NETOP COMPANY OVERVIEW

Mission Statement

- Design, manufacture and deploy worldwide RF total solutions for telecommunication networks
- Create value for our customers through innovative products, customized services and cost effective solutions
- Highest quality standards, state-of-the-art manufacturing facilities and reliable supply chain management to achieve and exceed customer expectations
- Socially responsible to our community and environment we do business in and committed to employee's personnel development

Core Value

- **Value Innovation**
- **Customer Focus**
- **Sustainable Growth**
- **Social Responsibility**

About Netop

Netop is an international company devoted to providing the total "end-to-end" solution for enabling wireless coverage & optimizing telecommunication networks. We are a modern and dynamic company involved in both site and in-building wireless coverage business, as well as the fiber optic infrastructure business. Netop has capabilities in R&D, manufacturing, logistics and on-site services.

Netop provides both off-the-shelf and customized products for our customers.

Our major offerings include:
1) Total Site Solutions
2) In-building Wireless Coverage Solutions
3) Customized Components for OEM Customers
4) Microwave and Satellite Communication Systems
5) Netop Cable Systems
6) FTTx-ODN Technologies
7) Telecom/OSP Fiber Solutions

Our technical competencies are protected with patents and our products adhere to the highest technical standards.

Netop production base is located in Qingpu Industrial Park, Shanghai. The factory has over 14,000 sqm production facilities with more than 800 employees.

To keep up with technological advancements, our R&D center in the United States is at the heart of technical innovations. We strive to be at the forefront of technology.

Netop also has an expansive sales and marketing network throughout the world. We have over 20 subsidiaries covering Asia Pacific, the Middle East, Africa, Europe and the Americas. Hence, we are able to be in constant contact with our local customers providing them with timely and quality services.

CONTENT

TECHNICAL BASIC

Glossary

Attenuation

The reduction of the amplitude of a signal after passing through a high-loss two port network. A section of a transmission line can be considered to be such a network. On a coaxial line, the sum of the following loss elements causes the attenuation of the transmitted electromagnetic wave:

resistive loss of the inner conductor
resistive loss of the outer conductor
leakage loss between the inner and outer conductor

whereby the resistive losses are influenced by the => skin effect especially at high frequencies. It must also be noted that the current routes are longer if the conductor surface is rough. The effective resistance and losses are greater than in the case of conductors with a smooth surface.

The attenuation is normally stated as the logarithm of the ratio of the network input signal to the network output signal in Neper(N)or decibel(dB).

The following equation is used to calculate the attenuation from the input

$$\alpha = \ln \frac{U_1}{U_2} [\,N\,] \qquad \alpha = \ln \frac{U_1}{U_2} [\,dB\,]$$

$$\alpha[\,N\,] = 8,686 \times \alpha[\,dB\,]$$

and out put power of the network:

$$\alpha \approx 10 \log \frac{P_1}{P_2} [\,dB\,]$$

Attenuation constant

The real component of the =>propagation constant γ is described as the attenuation constant. It describes the exponential reduction of the amplitudes of the current and voltage as a function of the line length.

The attenuation constant is zero for zero-loss lines, i.e. for lines where the resistance per unit length and the conductance per unit length are equal to zero.

For relatively low loss lines where G' << ω C'(C' capacitance per unit length) and R' << ω L'(L' inductance per unit length) the equation

$$\alpha \approx \ln \frac{R'}{2Z_L} + \frac{G'Z_L}{2}$$

gives a real value for the attenuation constants which is solely depend on the line parameters.

Characteristic impedance

Characteristic parameter of a transmission line for the calculation of the current and voltage distribution on the transmission line, if solely a traveling wave exists on the transmission line.
On a low-loss transmission line where R'<<wL' and G'<<Wc', the characteristic impedance can be determined by

$$Z_L \approx \sqrt{\frac{L'}{C'}}$$

If the transmission line is coaxial and has an external conductor with diameter D, an inner conductor with diameter d and an insulation with the dielectric constant ε r, then the characteristic impedance of the transmission line can be calculated using

$$Z_0 \approx \frac{60}{\sqrt{\varepsilon_r}} \ln \frac{D}{d}$$

Coaxial connector

A coaxial connector should provide a connection between two lines of the same characteristic impedance, that is as uniform, reliable and reflection-free as possible. It should be simple to connect and disconnect, possess good electrical transmission characteristics and offer a high degree of insensitivity to electromagnetic interference. The => characteristic impedance of the connector can be very well matched to the characteristic impedance of the various cables.

One can differentiate between two basic types of connector:

the **polarized** connector, where one part has a(male)plug pin contact and the other part, a(female)socket contact, and

the **non-polarized** connector, where the connector elements to be connected are generally symmetrical in form and the contact at the inner and outer conductors is achieved by a butt contact.

The inner conductor is mostly retained within the outer conductor by means of a dielectric support. The design of this support significantly influences the reflection behavior of the connector.

Coaxial cavity resonator

Transmission line section of particular lengths and termination resistances possess similar resonance characteristics to oscillating circuits comprising capacitance, inductance and resistance. Depending on the layout, parallel or serial resonance can be generated.

Crosstalk

Mutual interference of signals in neighboring transmission lines or electrical systems by electrical, magnetic and/or electromagnetic coupling.
=>Shielding
=>EMC
=>Transfer impedance

Cutoff frequency

The highest frequency at which only the fundamental wave of the corresponding waveguide can become unstable above the cutoff frequency due to the occurrence of higher modes.

The cutoff frequency for coaxial cables describes the maximum frequency at which only the fundamental wave of the => two-wire line, the TEM_{00} wave, can be propagated. It can be calculated by:

$$f_G \approx \frac{2c}{\pi\sqrt{\varepsilon_r}} \times \frac{1}{D+d}$$

Where
ε_r =relative dielectric constant of the insulator
c =speed of light
d,D =diameters of the inner and outer conductors

Dielectric constant

The insulation or dielectric materials used in electrical engineering are characterized by several material constants. The loss factor tan δ and the relative dielectric constant ε_r of the insulating material are the main parameters to be considered when selecting the optimum dielectric material and the associated component design. Both parameters significantly influence the => propagation constant(and the => characteristic impedance Z_0 of a line section, e.g. of a connector.

The dielectric constant describes the behavior of the material in electric fields.
The absolute dielectric constant ε_0 =8,8542$\times 10^{-12}$ As/Vm applies to a vacuum as an insulator. The relative dielectric constant ε_r is to be observed for real materials used in practical applications. The relative dielectric constant ε_r is to be as low as possible for most applications. Examples of the relative dielectric constant for materials often used as insulators are:

Air	ε_r =1.0006
Polystyrol	ε_r ≈2.56(frequency dependent)
PTFE	ε_r ≈2.04(frequency dependent)

EMC

Electro-Magnetic Compatibility describes the degree of protection of an electrical system against external interference, or the degree of interference of other systems by this system. The mutual interference of the systems can be caused by electrical, magnetic or electromagnetic fields. The reduction of the interference and the associated increase in the EMC can be achieved mainly by appropriate =>shielding

Equivalent line circuit

The representation of the line circuit by means of locally concentrated circuit elements, which are calculated from the line parameters per unit length of the line section being considered. After applying these concentrated elements, line calculations can be performed using the general Kirchhoff's laws.

Free space impedance

Free space impedance represents the ratio of electrical to magnetic field strength for a plane wave in a vacuum. The relationship in the equation for two-wire lines gives the so-called free space impedance.

$$Z_0 = \sqrt{\frac{\mu_0}{\varepsilon_0}} \approx 377\Omega$$

Input impedance

The input impedance is the quotient of the complex voltage and the complex current at the start of the line and is dependent upon the line parameters(=> characteristic impedance and => propagation constant), the line length and also the termination resistance.

Depending upon the type of line terminator and the line length, the input impedance can behave as an inductance or a capacitance. It can be equal to the characteristic impedance or behave as a parallel or serial resonant circuit. This behavior is utilized to generate circuit elements such as inductance, capacitance or resonators based on such line sections.

Intermodulation

Produced new, undefined and unwanted signals on non-linear characteristics at components in signals.

Intermodulation factors:

- magnetic materials
- contact force, contact surface
- oxidized contact surface

Line parameter

The specific line parameters define the electrical properties of a line as the so-called primary => transmission line constants. They represent the circuit elements of the => line equivalent circuit related to the line length. The following are defined:

Resistance per unit length R'
The ohmic line resistance for both the outgoing and return wires under consideration of the skin effect, related to a unit of length

Inductance per unit length L'
The line inductance for both the outgoing and return wires related to a unit of length

Conductance per unit length G'
The line conductance between the outgoing and return wires related to a unit of length

Capacitance per unit length C'
The line capacitance between the outgoing and return wires related to a unit of length.
The following values are typical for a low-loss coaxial line
($G' << \omega C'$ and $R' << \omega L'$)

$$L' = \frac{\mu_0}{2\pi} \ln \frac{D}{d}$$

$$C' = \frac{2\pi\varepsilon_0\varepsilon_r}{\ln \frac{D}{d}}$$

where
D = diameter of the outer connector
d = diameter of the inner connector
$\mu_0 = 1.256 * 10^{-6}$ Vs/Am
$\varepsilon_0 = 8.854 * 10^{-12}$ As/Vm
ε_r = relative dielectric constant of the dielectric used, in the case of air 1.0006

Line transformer

Transmission line sections possess certain transformation properties depending on their length, i .e. the resistance at the end of a line(termination resistance)is transformed into another resistance(input resistance)at the start of the line.
The $\lambda/4$ and $\lambda/2$ transformers are of special significance in the respect.

Measurement line

Measurement lines are rigid transmission lines of the respective line type(e. g. waveguide or coaxial line)with which the field distribution along the line is sample using a specially designed low power probe.

The mismatched test specimen,(e. g. a piece of coaxial cable of unknown, to be determined, characteristic impedance), which is fitted to the measurement line as the terminating resistance, causes a standing wave on the measurement line; this in turn has a certain relationship between the maximum and minimum amplitudes, and from this, the => reflection coefficient of the specimen can be calculated.

Mismatching

If the termination resistance of a line is different to its characteristic impedance, then the line is mismatched. Mismatching causes reflections and results in losses which are generally undesirable. It is caused in coaxial connectors by deviations from the theoretical design dimensions(tolerances) and also by inaccuracies in the assumed material used for manufacture.

The extent of the mismatching is characterized by the => reflection coefficient.

Mono mode range for coaxial cable

Frequency range within which only the Lecher wave is capable of propagation on the coaxial cable and which is in turn responsible for the propagation parameters. A=>cutoff frequency occurs at the higher end of this mono mode range. Above this frequency, additional wave type can be stimulated(e. g. by line discontinuities)in waveguide mode(E or H Modes)and can lead to irregularities.

As an approximate calculation of the cutoff wavelength λ_c for other wave types in addition to the Lecher wave, the following equation is valid for the ratio d/D ＞0.2(D=diameter of the outer conductor and d=diameter of the inner conductor of the coaxial cable).

$$\lambda_c \approx \frac{\pi}{2}(d+D)[\,H_{11}\,]$$

$$\lambda_c \approx (D-d)[\,E_{01}\,]$$

Typical examples are
coaxial cross section 3/7(N connector) f c≈19 GHz
coaxial cross section 7/16(7/16 connector) f c≈8.3GHz

Multiple reflection

As a general rule, most transmission lines do not have ideal terminations without reflections at both ends of the line. The waves that throughout the transmission system are reflected both at the input and the output ends are propagated. By this means, repeatedly reflected waves are propagated that superimpose themselves on the primary waves. Continuous new reflections finally cause a resulting multiple reflection wave.

No-load impedance

=>Input impedance of a line that is open at the remote end.

Phase constant

The imaginary component of the => propagation constant γ is designated as phase constant β. It indicates the gradient of the current and voltage phases as a function of the transmission line length.

For relatively low-loss lines, where G' << ω C'(C' capacitance per unit length)and R' << ω L'(L' inductance per unit length), the equation

$$\beta = \omega\sqrt{L'C'}$$

gives a real value for the phase constant that is solely dependent on the line constants and the frequency.

Phase speed

The phase speed V_{ph} is the speed with which a voltage phase relationship is propagated on a transmission line. It is equal to the ratio of the angular frequency $\Omega = 2\pi f$ and the phase constant β. It corresponds to the group velocity V_{gr} for the Lecher or, on coaxial lines, TEM(Transversal Electro-Magnetic) waves and is the determinative velocity for the transmission of information.

Propagation constant - γ

The propagation constant describes the longitudinal wave propagation along a conductor. Together with the => characteristic impedance, it permits the calculation of the current and voltage distribution on the conductor and their transformation characteristics.
Relatively simple => line equations can be stated for the special case of coaxial cables which represent the gradient of the voltage and current along the line as a function of the primary => transmission line constant(=> propagation constants per unit length)namely resistance per unit length R', electrical conductance per unit length G', capacitance per unit length C' and the inductance per unit length L'. The propagation constant γ is given with => attenuation constant α and => phase constant β.

$$\gamma = \alpha + j\,\beta$$

The attenuation constant α is zero for zero-loss lines.

Rated voltage

Maximum voltage that can be continuously applied to a connector, a cable or any other electrical component without causing a permanent change to the technical parameters or even the destruction of the component.

Reflection coefficient

The ratio of the voltage returning from the load to the voltage supplied by the generator and measured at the terminating resistance is defined as the complex reflection coefficient. In the same manner, a definition based on the transmitted and reflected currents is also possible.

The reflection coefficient is therefore related to the complex characteristic

$$r = \frac{(Z-Z_0)}{(Z+Z_0)}$$

Impedance Z_0 of the transmission line and the complex => termination resistance Z by the equation

The values for the => voltage standing wave ratio and the => inverse voltage standing wave ratio can be calculated from the value of the reflection coefficient.

As a practical example a reflection coefficient is named here resulting from the connection of a 50 Ω connector with a 75 Ω connector, which is quite possible with many connectors, e. g. a BNC, whether intended or not:

$$r = \frac{(75-50)}{(75+50)} = 0.2$$

corresponding to a voltage standing wave ratio(VSWR)s=1.5 and an inverse voltage standing wave ratio m=0.67.

Return loss coefficient

Logarithmic measure for => reflection coefficient

$$\alpha = -20\log(r)$$

Shielding

Shielding structures made from various metals or combinations of metals(housing, braids, foil tape, etc.)are employed to minimize the influence of electrical and magnetic fields on electronic modules, components and circuits. The effectiveness of the shielding is dependent upon the quality and impermeability of the protective measures and the type of materials => transfer impedance.

Short circuit impedance

=> Input impedance of a line with a short circuit at the remote end.

Skin effect

Alternating current do not uniformly occupy the entire cross section of the conductor, rather inductance effect in the conductor deflects the current towards the surface of the conductor, whereby this deflection increases with the frequency. The resistive attenuation of a transmission line increases with the frequency as a result of this skin effect.

The skin depth(equivalent thickness of the layer in which current flows)can be determined using.

$$\delta = \frac{1}{\sqrt{f\pi\sigma\mu_0\mu_r}}$$

Where

f = frequency

σ = conductivity of the conductor material

$\sigma_{Ag} = 62 \times 10^6$ S/m

$\sigma_{Cu} = 58 \times 10^6$ S/m

σ_0 = 1,256 10^{-6} Vs/Am

μ_r = relative permeability constant for the employed material

Smith chart

Representation of the complex plane of the => reflection coefficient within the restrictions of the unit circle. This contains lines of constant real components and constant imaginary components of complex resistances, each normalized respectively to the => characteristic impedance. Resistance transformations on transmission lines and corresponding matching circuits can be calculated relatively easily using the Smith chart.

=> Line transformer.

TEM wave

Transversal Electro-Magnetic waves possess electrical and magnetic field components that lie exclusively in one plane that is transversal(vertical)to the propagation direction. No components exist in the propagation direction. The fundamental waves capable of propagation on => twin-wine lines(e.g. coaxial lines)are of the TEM type.

Test voltage

The maximum voltage to which a component(e.g. connector)may be subjected under defined environmental conditions(temperature, atmospheric pressure)for a specified time without causing its destruction.

Transfer impedance

The design of the outer conductor of coaxial cables is responsible for the shielding effect. Its impermeability, i. e. the portion of the electromagnetic wave carried down the coaxial cable that is radiated through the outer conductor, is defined by the transfer impedance.

The transfer impedance Z_k of a section of line(e.g. cable, connector)is defined as the quotient of the voltage difference measured between the ends if the outer conductor of the line section and the current flowing in the inner conductor. The specification of the specific transfer impedance i.e. transfer impedance per unit length, is meaningful for coaxial cables.

A high frequency system consisting of cables with respective connectors is more impermeable when the transfer impedance of the system or its individual components is small at a comparable frequency. The connection points of the connector to the coaxial cable cause additional transfer impedance which increases approximately proportional to the frequency. Special attention should be paid to the correct and low-inductance layout of these connection points.

Transmission coefficient - g

Measurement of the degree of transmission of a signal through a two port network: ratio of the transmitted wave voltage amplitudes to the wave at the input to the two port network.

Transmission equation

Using the transmission equations, the current and voltage profiles on the line can be calculated as a function of the => transmission line constants(characteristic impedance and propagation constant)as well as the frequency and line length.

Transmission line constant

The transmission line constants are the characters parameters of a transmission line, a differentiation is made between the primary specific transmission line constants(capacitance per unit length L', resistance per unit length R', and the electrical conductance per unit length G'), and the secondary transmission line constants => characteristic impedance Z and the => propagation constant γ.

Two-wire line

The most common type of electrical cable consists of two individual, mutually insulated conductors. The technical can vary considerably, ranging from a parallel conductor type cable to a concentric coaxial cable. The most common wave mode encountered on a two-wire line is the Lecher wave(=> TEM mode). This possesses only transverse electrical or magnetic field components but none in the direction of propagation. The propagation of this type of wave on a line is possible for all wavelengths. If the frequency is sufficiently high, special Type E or Type H waves can be propagated, this causing disturbances to the basic Lecher wave.

Relatively simple => line equations can be stated for two-wire lines which represent the gradient of the voltage and current along the line as a function of the primary => transmission line constants, resistance per unit length C' and the inductance per unit length L', R' and G' are small for the low-loss two-wire lines normally employed, and the following generally apply:

$R' << \omega L'$ and $G' << \omega C'$

so that a real frequency-independent parameter Z_0 results for the => characteristic impedance.

This characteristic impedance is solely dependent on the geometric dimensions of the line and the employed dielectric, so that practical designs of two-wire lines and components can be quite simply dimensioned on this basis.

VSWR (Voltage standing wave ratio)

The ratio between the value of the largest and the smallest voltages on a loss-free line is known as the ripple or voltage standing wave ratio s(where $1 \le s \le \infty$). The reciprocal value of the VSWR is known as the inverse voltage standing wave ratio m(where $0 \le m \le 1$).
The value of s is linked with the => reflection coefficient r on a transmission line according to the equation

$$s = \frac{(1+|r|)}{(1-|r|)}$$

Waveguide

Waveguides are hollow tubes of variable dimensions with electrically conducting walls, in which electromagnetic waves can propagate in an axial direction. Various propagation modes are possible. The transmission characteristics of a waveguide are comparable to a high-pass. At frequencies higher than the cutoff frequency(that is dependent upon the geometry of the waveguide), the electromagnetic wave is propagated in a longitudinal direction. At frequencies below the cutoff frequency, the wave represents a critically damped field. The fundamental wave of a waveguide is the natural wave with the lowest cutoff of propagation. The mono mode range of a waveguide defines the frequency range for which there is only one wave in the waveguide that is capable of propagation.

The most commonly used waveguides possess rectangular, circular or elliptical cross-sections.

Waveguides waves(mostly undesirable)can also stimulated and propagated in a coaxial cable. The mode range dictated by the geometry of the coaxial line must be carefully considered during design.

Wavelength

Local period duration of an oscillation.

$$\lambda = \frac{2\pi}{\beta}$$

$$\text{mit}(\beta = \text{phase constant})$$

$$\beta = \omega\sqrt{L'C'}$$

$$\text{or}$$

$$\lambda = \frac{c_0}{f}$$

$$c_0 = \frac{1}{\sqrt{\varepsilon_0\mu_0}} = 2,997925\times10^8\,\text{m/s}$$

co=Velocity of light in a vacuum

Inbuilding Coverage System Feature

System performance after in building RF distribution system installation

- Ensure success telecom communication in all elevators
- Telephone call success rate shall be above 98%
- Call drop rate should be better than 1% in the acceptance test
- HO success rate at building gate shall be above 99%
- No spillage will occur and no cell re-selections & hand over between target area and outside

Performance for each system

GSM900

- DL Rx level (dBm)≥-75
- DL Rx quality(0-2)≥98%
- C/(N+I)＞20dB area not less than 95% of all area
- Coverage area not less than 99% all area
- Call success rate＞98%
- Call drop rate ＜1%

GSM1800

- DL Rx level(dBm)≥-75
- DL Rx quality(0-2)≥98
- DL Rx quality(0-4)≥99%
- C/(N+I)＞20dB area not less than 95% of all area
- Coverage area not less than 99% all area
- Call success rate＞98%
- Call drop rate＜1%

UMTS

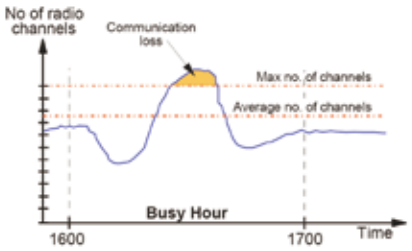
- CPICH RSCP≥-95dbm in 95% area
- CPICH Ec/I o≥-15 dB
- Coverage area not less than 99% all area

Definition of traffic

- Traffic demands and the desired system performance must be determined in order to estimate the system resources required.
- The traffic offered per subscriber is determined by:
  — **calling rate** (C) in calla/hour
  — **holding time** (T) in seconds
- The product of C and T gives the amount of traffic offered by a subscriber during the busy hour.

$$\text{Traffic, } A = \frac{C \times T}{3600} \text{ Erlangs}$$

- A expresses how large part of time a subscriber is busy using the system. The traffic is measured in Erlangs.



Grade of service

- Number of load during the busy hour depends on:
  — Efficiency of trunk usage of higher return revenue;
  — Proportion of blocked calls due to congestion.
- Grade of service (GOS) expresses the probability of meeting channels (trunks) required to the erlang congestion, or blocking, during the busy hour.

$$\text{Grade of service} = \frac{\text{Number of lost calls}}{\text{Number of offered calls}}$$

- In land-line telephone, GOS is well below 1%.
- In mobile telephony, the cost of a traffic channel and the restriction on radio spectrum call for a higher rate; typically 2 to 5%.

Erlang B equation

Used to determine the number of trunks, switches, and other traffic-carrying facilities required when such facilities are arranged in full-availability groups.

$$E_B = \frac{A^n / n!}{\sum_{\chi=0}^{n} A^\chi / \chi!}$$

Where

n is the number of trunks or servicing channels;

A is the mean offered traffic (in Erlangs);

EB is the grade of service using the Erlang B formula

Link analysis

The IBS downlink budget calculation is base on free space propagation plus additional loss

$$Lt=32.4+20Logf+20Logd+C(\text{additional loss})$$

f is frequency MHz

d is distance km

C is 99% coverage additional loss dB

Edge RX level: P=Pt+Gt-Lt

Pt – is output power of antenna port – dBm

Gt is antenna gain—dB

Network Optimization Solution for Site Application

With the development of modern wireless communication technology, various mobile wireless networks are deployed, such as GSM, CDMA, DCS, WiFi and 3G. The Outdoor RF environment is more congested and system interference poses greater challenges to overall network performance.

Netop Network Optimization Solution for Site Application offers a total package of antenna feeder subsystems including Base Station Antenna(BSA), Tower Mounted Amplifier(TMA), Filter, Diplexer and Triplexer – a one stop shop for site applications. We can guarantee the whole system meets performance guidelines while being cost-effective and meeting flexible configurations.

Our strong R&D team has expertise in all RF related and digital signal processing. All integrated products and components with advanced signal processing can be used individually or together to improve network performance.

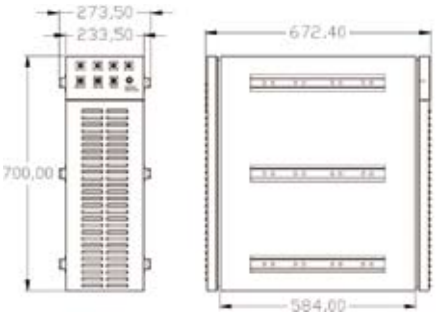
Content

MCPA

NETOP Multi-Carriers High Power Amplifier MCPA is designed to lower cost for network deployment in rural area which presents the challenge of large geographical areas with low population density. According to the typical BTS and site configuration, Antennas installed at 10-20m will lead to over capacity or small coverage when used for rural applications. Antennas installed at 30-100m can provide better coverage in rural areas. At the same time, MCPA can decrease feeder cable losses and provide DL link budget gains.

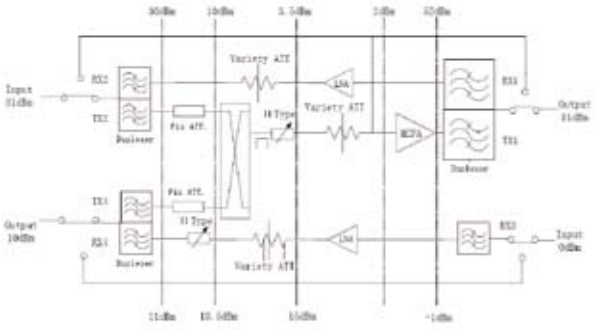
Main Feature

- High linearity and low noise performance
- Full band GSM900
- Lightning protected
- High reliability
- Improved base station coverage area
- Simple installation



Outline Drawing

System Diagram



Cellular 850MHz Feed-Forward MCPA Module

RF Parameter	850MHz MCPA
Frequency range	869-894MHz
Operating voltage	28VDC±1V
Gain@mid band	60dB±0.5dB
Output power, average	51dBm (125W) or 53dBm (200W)
Customer waveform	Any Random Mix of CDMA, EV-DO, GSM, EDGE, HSDPA
CDMA spurious emission (4FA)	-48dBc/30KHz@ f0±750KHz -63dBc/30KHz@ f0±1.98MHz
Spurious in Rx band	≤-36dBm/30KHz
Gain flatness over frequency	±1dB
2nd harmonic	≤-45dBc
Spurious in Tx band	≤-13dBm/MHz
Operating temperature	-25℃ ~ +60℃
Storage temperature	-40℃ ~ +80℃
Dimension	344.9x266.6x54 (WxDxH)
Efficiency@ALC power	≥20%

EGSM900MHz Feed-Forward MCPA Module

RF Parameter	900MHz MCPA
Frequency range	925-960MHz
Operating voltage	28VDC±1V
Gain@mid band	58dB±0.5dB
Output power, average	51dBm (125W) or 53dBm (200W)
Customer waveform	Any Random Mix of CDMA, EV-DO, GSM, EDGE, HSDPA
GSM IMD (4T)	-65dBc @ -10C < Temp < +60C 27V < Voltage < 30V
Spurious in Tx band	≤-13dBm/1MHz
Spurious in Rx band	≤-36dBm/30KHz
Gain flatness over frequency	±1.0dB
Operating temperature	-25℃ ~ +60℃
Storage temperature	-40℃ ~ +80℃
2nd harmonic	≤-45dBc
Dimension	344.9x266.6x54 (WxDxH)
Efficiency@ALC power	≥20%

DCS1800MHz Feed-Forward MCPA Module

RF Parameter	1800MHz MCPA
Frequency range	1805-1880MHz
Operating voltage	28VDC±1V
Gain@mid band	58dB±0.5dB
Output power, average	51dBm (125W) or 53dBm (200W)
Customer waveform	Any Random Mix of CDMA, EV-DO, GSM, EDGE, HSDPA
DCS IMD (4T)	-65dBc @ -10C < Temp < +60C 27V < Voltage < 30V
Spurious in Tx band	≤-13dBm/1MHz
Spurious in Rx band	≤-36dBm/30KHz
Gain flatness over frequency	±1.0dB
Operating temperature	-25℃ ~ +60℃
Storage temperature	-40℃ ~ +80℃
2nd harmonic	≤-45dBc
Dimension	344.9x266.6x 54 (WxDxH)
Efficiency@ALC power	≥20%

PCS1900MHz Feed-Forward MCPA Modules

RF Parameter	1900MHz MCPA
Frequency range	1930-1960MHz
Operating voltage	28VDC±1V
Gain@mid band	58dB±0.5dB
Output power, average	51dBm (125W) or 53dBm (200W)
Customer waveforms	Any Random Mix of CDMA, EV-DO, GSM, EDGE, HSDPA
PCS IMD (4T)	-65dBc @ -10C < Temp < +60C 27V < Voltage < 30V
Spurious in Tx band	≤-13dBm/1MHz
Spurious in Rx band	≤-36dBm/30KHz
Gain flatness over frequency	±1.0dB
Operating temperature	-25℃ ~ +60℃
Storage temperature	-40℃ ~ +80℃
2nd harmonic	≤-45dBc
Dimension	344.9x266.6x54 (WxDxH)
Efficiency@ALC power	≥20%

UMTS2100MHz Feed-Forward MCPA Module

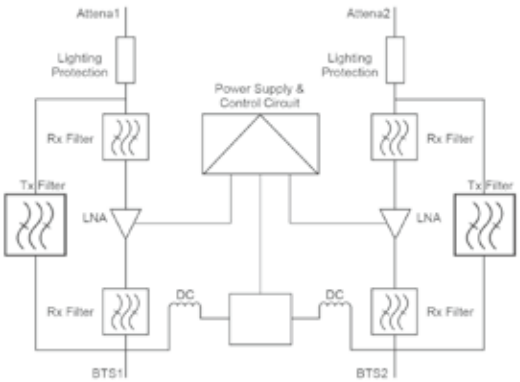
RF Parameter	2100MHz MCPA
Frequency range	2110-2170MHz
Operating voltage	28VDC±1V
Gain@mid band	58dB±0.5dB
Output power, average	51dBm (125W)
Customer waveform	Any Random Mix of CDMA, EV-DO, GSM, EDGE, HSDPA
GSM IMD (4T)	-65dBc @ -10C < Temp < +60C 27V < Voltage < 30V
WCDMA ACPR 4F	-50dBc/3.84MHz@ f0±5MHz -55dBc/30KHz@ f0±10MHz
Spectrum emission	PASS
Spurious	≤-13dBm/1MHz
Gain flatness over frequency	±1.0dB
Operating temperature	-25℃ ~ +60℃
Storage temperature	-40℃ ~ +80℃
2nd harmonic	≤-45dBc
Dimension	344.9x266.6x54 (WxDxH)
Efficiency@ALC power	≥20%

Spectrum Emission Mask Value, Maximum Output Power P ≥ 43 dBm

Frequency Offset of Measurement Filter-3dB Point, Δf	Frequency Offset of Measurement Filter Centre Frequency, f_offset	Minimum Requirement Band I, II, III, IV, V	Additional Requirement Band II, IV and V (Note 1)	Measurement Bandwidth
2.5MHz ≤ Δf < 2.7MHz	2.515MHz ≤ f_offset < 2.715MHz	-14dBm	-15dBm	30MHz
2.7MHz ≤ Δf < 3.5MHz	2.715MHz ≤ f_offset < 3.515MHz	$-14\text{dBm} - 15\left\{\frac{\text{f\_offset}}{\text{MHz}} - 2.715\right\}\text{dB}$	-15dBm	30MHz
	3.515MHz ≤ f_offset < 4.0MHz	-26dBm	NA	30MHz
3.5MHz ≤ Δf < 7.5MHz	4.0MHz ≤ f_offset < 8.0MHz	-13dBm	-13dBm	1MHz
7.5MHz ≤ Δf ≤ f_{max}	8.0MHz ≤ f_offset < f_offset_{max}	-13dBm	-13dBm	1MHz

TMA

TMAs will increase successful call rates, reduce dropped calls, maximize data transmission rate, improve call quality and therefore extend handset battery life. Quality improvements will lead to increased traffic volume and user satisfaction, hence increasing network revenue.



Main Feature

- Compact, low weight
- Dual duplexer
- High linearity and low noise performance
- Compatible with EGSM900, DCS1800 and WCDMA2100
- Lightning protected
- High reliability
- Improved base station sensitivity
- Simple installation

Downlink

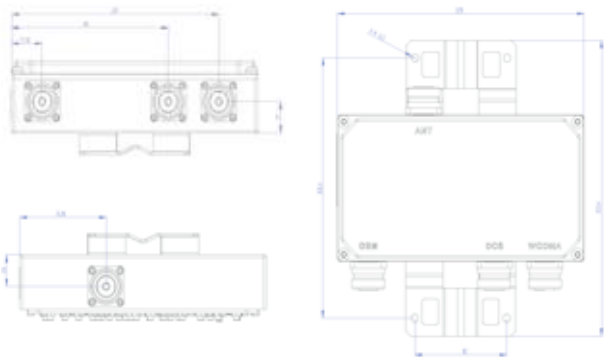
	DTA-09-DF-03	DTA-18-DF-01	DTA-21-DF-01
Frequency range	925-960MHz	1805-1880MHz	2110-2170MHz
Passband	35MHz	75MHz	60MHz
Insertion	<0.5dB	<0.5dB	<0.5dB
Input max power per port	<180W(+52.5dBm) CW <1600W(+62dBm) Peak	<180W(+52.5dBm) CW <1600W(+62dBm) Peak	<180W(+52.5dBm) CW <1600W(+62dBm) Peak
Intermodulation products in Rx band	<-117dBm(2 Tx carriers at +43dBm)	<-117dBm(2 Tx carriers at +43dBm)	<-117dBm(2 Tx carriers at +43dBm)
Return loss	<-18dB	<-18dB	<-18dB

Uplink

	DTA-09-DF-03	DTA-18-DF-01	DTA-21-DF-01
Frequency range	880-915MHz	1710-1785MHz	1920-1980MHz
Passband	35MHz	75MHz	60MHz
Gain(normal mode)	12±1B(-40℃~+55℃)	12±1dB(-40℃~+55℃)	12±1dB(-40℃~+55℃)
Insertion(bypass mode)	<2dB(bypass mode)	<2.5dB(bypass mode)	<2.5dB(bypass mode)
Noise figure	Typ:1.4dB/25℃ Typ:1.8dB/55℃	Typ:1.6dB/25℃ Typ:2.1dB/55℃	Typ:1.4dB
Input P1dB	>-5dBm	>-5dBm	>-5dBm
IIP3	>7dBm	>7dBm	>7dBm
Return loss	<-18dB(normal mode) <-15dB(bypass mode)	<-18dB(normal mode) <-15dB(bypass mode)	<-18dB(normal mode) <-15dB(bypass mode)

COMBINER

- Suitable for co-siting purposes
- Reduces infrastructure costs
- Enables feeder sharing
- Suitable for indoor or outdoor applications
- Available as a single unit, or for Xpol antennas as a double unit
- Can be used as a combiner or in reciprocal function
- Wall or mast mounting
- Low insertion loss
- DC stop available as an accessory



Main Feature

- High rejection
- Low PIM
- Low insertion loss
- High isolation
- Compact, low weight
- High reliability

Part Number	CB-2-DU-NF-01	CB-2-DU-DF-02
Frequency DCS	1710-1880MHz	1710-1880MHz
Frequency UMTS	1920-2170MHz	1920-2170MHz
Insertion loss	0.3dB for DCS 0.3dB for UMTS	0.3dB for DCS 0.3dB for UMTS
Isolation	80dB	50dB
Return loss	<-20dB	<-20dB
PIM	<-153dBc@2x43dBm	<-153dBc@2x43dBm
Impedance	50Ω	50Ω
Connectors type	N Female	7/16 Female
Power	100W	150W
Temperature range	-40℃~+85℃	-40℃~+65℃
Relative humidity	0 to 95%	0 to 95%
Packing	1 pce in box	1 pce in box
Dimension	230x145x55mm	230x180x65mm
Weight	<3.5kg	<3.5kg

Part Number	CB-GDW3-001	CB-3-GDU-DF-02
Frequency GSM	806-960MHz	806-960MHz
Frequency DCS	1710-1880MHz	1710-1880MHz
Frequency UMTS	1920-2170MHz	1920-2170MHz
Insertion loss	0.2dB for GSM 0.3dB for DCS 0.3dB for UMTS	0.2dB for GSM 0.3dB for DCS 0.3dB for UMTS
Rejection	60dB GSM to DCS/ GSM to UMTS 45dB DCS to UMTS 35dB UMTS to DCS	60dB GSM to DCS/ GSM to UMTS 50dB DCS to UMTS 50dB UMTS to DCS
Return loss	<-20dB	<-20dB
PIM	<-153dBc@2x43dBm	<-153dBc@2x43dBm
Impedance	50Ω	50Ω
Connectors type	7/16 Female	7/16 Female
Power	100W	150W
Temperature range	-40℃~+65℃	-40℃~+65℃
Relative humidity	0 to 95%	0 to 95%
Packing	1 pce in box	1 pce in box
Dimension	220x160x64mm	230x200x64mm
Weight	<3.5kg	<3.5kg

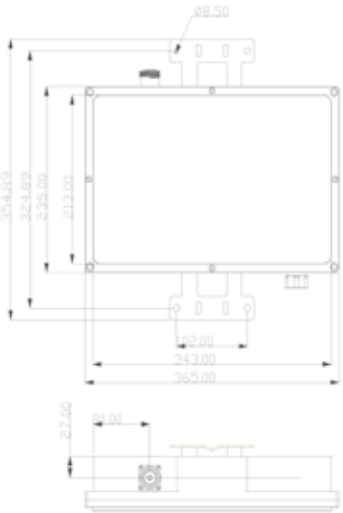
Part Number	CB-4-GDWL-NF
Frequency GSM	880-960MHz
Frequency DCS	1710-1880MHz
Frequency UMTS	1920-2170MHz
Frequency WLAN	2400-2500MHz
Insertion loss	0.3dB for GSM 0.7dB for DCS 0.7dB for UMTS 0.6dB for WLAN
Ripple in band	0.2dB for GSM 0.5dB for DCS 0.5dB for UMTS 0.6dB for WLAN
Rejection	80dB between any two bands
Return loss	<-20dB
PIM	<-140dBc@2x43dBm
Impedance	50Ω
Connectors type	N Female
Power	100W
Temperature range	-25℃~+65℃
Relative humidity	0 to 95%
Packing	1 pce in box
Dimension	200x160x64mm
Weight	<3.55kg

FILTER

- Suitable for indoor or outdoor applications
- Available as a single unit, or for Xpol antennas as a double unit
- Wall or mast mounting
- Low insertion loss
- DC stop available as an accessory
- Dielectric technology to achieve high rejection in narrow bandwidth

Main Feature

- Compact, low weight
- Low insertion loss
- High rejection
- High PIM
- High reliability
- Simple installation



Part Number	FT-09-DF-05
Frequency range	897.5-960MHz
Insertion loss	≤1.0dB@897.5-898.5MHz
	≤0.5dB@898.5-915MHz, 935-960MHz
Rejection	≥45dB@≤894MHz
	≥35dB@≥965MHz
Return loss	<-18dB
PIM	<-150dBc@2x43dBm
Impedance	50Ω
Connectors type	7/16 Female
Power	250W
Temperature range	-10℃~+65℃
Relative humidity	0 to 95%
Packing	1 pce in box
Dimension	365x235x70mm

Part Number	FT-C1-101	FT-G1-101
Frequency range	824-851MHz	880-915MHz
Insertion loss	<1.0dB	<1.0dB
Rejection	>40dB@869-896MHz	>30dB@925-960MHz
VSWR	<1.2	<1.2
Impedance	50Ω	50Ω
Connector	SMA Female	SMA Female
Temperature range	-10℃~+65℃	-10℃~+65℃
Relative humidity	0 to 95%	0 to 95%

Part Number	FT-W1-101	FT-08-5.4-NF(Dielectric)
Frequency range	1920-2060MHz	824.6-829.2MHz
Insertion loss	<1.0dB	<2.0dB
Rejection	>30dB@2110-2170MHz	>70dB@800-824.0MHz >70dB@830.0-840MHz
Return loss		<-18dB
VSWR	<1.2	
Impedance	50Ω	50Ω
Connector	SMA Female	N-Female
Temperature range	-10℃~+65℃	-40℃~+85℃
Relative humidity	0 to 95%	0 to 95%

Network Optimization Solution for Wireless Coverage

In the early days of mobile communications, there was only outdoor coverage. Today more and more sophisticated mobile services are required not only in outdoor environments but also in indoor environments. In-building coverage system (IBS) is proposed as it can uniformly distribute signals throughout the entire building to cover blind spots and weak signal areas. IBS thoroughly improves mobile communication quality in-building.

With the development of modern wireless communication technology, various mobile wireless networks are deployed, such as GSM, CDMA, DCS, WiFi and 3G. The indoor signal coverage is becoming much more complicated. Netop offers a multi-system coverage solution that can integrate different frequency signals from different operators via the application of a Point of Interconnection (POI) with low insertion loss. The signal out of the POI is then further distributed to a common DAS.

To ensure the multisystem coverage operates normally, the frequency range of all components must meet the frequency requests of all the input carriers. All Netop IBS products can operate in the range of either 800MHz to 2500MHz or 800MHz to 2700MHz. These ranges are compatible with CDMA800, GSM900, DCS1800, WiFi, 3G and even Wimax.

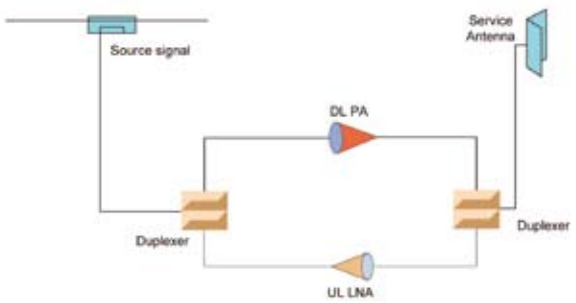
In this chapter, the total IBS package including repeaters, POIs, passive components, in-building and decorative antennas as well as WiFi coverage systems will be tailored to the comprehensive applications required by our customers.

Content

LINE AMPLIFIER

Line amplifiers are devices to amplify signals bi-directionally and the downlink circuit is band-selective. It can provide wireless service to the area, which contains signal uncovered sites due to topographical condition or obstructive buildings, especially to hotels, supermarkets, restaurants, skyscrapers and underground environments.

The series has the capabilities of being remote monitored and alert reporting. It is able to detect system failure by itself.



Main Feature

- Adjustable attenuation range of 31dB at 1dB per step
- Advanced digital controlled band selection to ensure high output of band rejection
- Highly stable power design, to work normally even in very tough power environments
- ALC technology to maintain stable signal in coverage areas

CDMA800 Line Amplifier

		Uplink	Downlink
Frequency range		824-849MHz	869-894MHz
Output power		5dBm	33/37/40dBm
Gain		≥40dB	≥40dB
Gain control range&step		≥30dB(1dB/step)	
VSWR		≤1.5	
Ripple in band		≤3 .0dB	
Noise figure		≤6.0dB	
Intermodulation(3rd order)		≤-40dBc	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Adjacent channel power ratio		≤-42dBc/30kHz, ±900kHz	≤-45dBc/30kHz, ±750kHz
		≤-59dBc/30kHz, ±1.98MHz	≤-65dBc/30kHz, ±1.98MHz
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Transmission delay		≤1.5μs	
Impedance		50Ω	
RF connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		<70W	
Temperature range		-5℃~+45℃	
Relative humidity		0 to 95%	
Application		Indoor	
Standard		1 Pce in box	
Dimension(H×W×D)		460x351x146mm	
Weight		<15Kg	

Part Number	Downlink Output Power
AM-33-08-NF	33dBm
AM-37-08-NF	37dBm
AM-40-08-NF	40dBm

GSM900 Line Amplifier

		Uplink	Downlink
Frequency range		890-915MHz	935-960MHz
Output power		5dBm	33/37/40dBm
Gain		≥40dB	≥40dB
Gain control range&step		≥30dB(1dB/step)	
VSWR		≤1.5	
Ripple in band		≤3 .0dB	
Noise figure		≤6.0dB	
Intermodulation(3rd order)		≤-40dBc	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Max. non-destructive input power		10dBm	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Transmission delay		≤1.5μs	
Impedance		50Ω	
RF connector type		N Female	
Power supply		AC 220V/DC 48V	
Temperature range		0℃~+45℃	
Relative humidity		0 to 95%	
Application		Indoor	
Standard		1 Pce in box	
Dimension(H×W×D)		460x350x150mm	
Weight		<15Kg	

Part Number	Downlink Output Power
AM-33-09-NF	33dBm
AM-37-09-NF	37dBm
AM-40-09-NF	40dBm

GSM1800 Line Amplifier

		Uplink	Downlink
Frequency range		1710-1785MHz	1805-1880MHz
Output power		5dBm	30/33/37/40dBm
Gain		≥40dB	≥40dB
Gain control range&step		≥30dB(1dB/step)	
VSWR		≤1.5	
Ripple in band		≤3 .0dB	
Noise figure		≤5.0dB	
Intermodulation(3rd order)		≤-40dBc	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Transmission delay		≤1.0μs	
Impedance		50Ω	
RF connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		<90W	
Temperature range		-5℃~+45℃	
Relative humidity		0 to 95%	
Application		Indoor	
Standard		1 Pce in box	
Dimension(H×W×D)		460x351x146mm	
Weight		<15Kg	

Part Number	Downlink Output Power
AM-33-18-NF	33dBm
AM-37-18-NF	37dBm
AM-40-18-NF	40dBm

WCDMA Line Amplifier

Part Number		AM-40-21-NF	
		Uplink	Downlink
Frequency range		1920-1980MHz	2110-2170MHz
Output power		5dBm	33/37/40dBm
Gain		≥40dB	≥40dB
Gain control range&step		≥30dB(1dB/step)	
VSWR		≤1.5	
Ripple in band		≤3 .0dB@3.84MHz	
Noise figure		≤6.0dB	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Error vector magnitude		≤12.5%	
Peak code domain error		≤-35dB	
Adjacent channel leakage ratio		≥45dBc@5MHz	
		≥50dBc@10MHz	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Transmission delay		≤1.5μs	
Impedance		50Ω	
RF connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤100W	
Temperature range		-5℃~+45℃	
Relative humidity		0 to 95%	
Application		Indoor	
Standard		1 Pce in box	
Dimension(H×W×D)		460x351x146mm	
Weight		<15Kg	

Part Number	Downlink Output Power
AM-33-21-NF	33dBm
AM-37-21-NF	37dBm
AM-40-21-NF	40dBm

Dual band Line Amplifier --GSM&DCS Line Amplifier

Part Number		GSM		DCS	
		Uplink	Downlink	Uplink	Downlink
Frequency range		890-915MHz	935-960MHz	1710-1785MHz	1805-1880MHz
Output power		5dBm	33/37/40dBm	5dBm	33/37/40dBm
Gain		≥40dB	≥40dB	≥40dB	≥40dB
Gain control range&step		≥30dB(1dB/step)		≥30dB(1dB/step)	
VSWR		≤1.5		≤1.5	
Ripple in band		≤3.0dB		≤3.0dB	
Noise figure		≤5.0dB		≤5.0dB	
Intermodulation(3rd order)		≤-45dBc		≤-45dBc	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater			
Spurious emission	9KHz-1GHz	≤-36dBm		≤-36dBm	
	1GHz-12.75GHz	≤-30dBm		≤-30dBm	
Transmission delay		≤1.5μs		≤1.5μs	
Impedance		50Ω			
RF connector type		N Female			
Power supply		AC 220V/DC 48V			
Power consumption rating		≤180W			
Temperature range		-25℃~+55℃			
Relative humidity		0 to 95%			
Application		IP65			
Standard		1 Pce in box			
Dimension(H×W×D)		610x445x215mm/670x420x230mm			
Weight		<35Kg			

Part Number	Downlink Output Power
AM-33-0918-NF	33dBm
AM-37-0918-NF	37dBm
AM-40-0918-NF	40dBm

Dual band Line Amplifier --GSM&WCDMA Line Amplifier

Part Number		GSM		WCDMA	
		Uplink	Downlink	Uplink	Downlink
Frequency range		890-915MHz	935-960MHz	1920-1980MHz	2110-2170MHz
Output power		5dBm	33/37/40dBm	5dBm	33/37/40dBm
Gain		≥40dB	≥40dB	≥40dB	≥40dB
Gain control range&step		≥30dB(1dB/step)		≥30dB(1dB/step)	
VSWR		≤1.5		≤1.5	
Ripple in band		≤3 .0dB		≤3 .0dB	
Noise figure		≤5 .0dB		≤5.0dB	
Intermodulation(3rd order)		≤-40dBc		≤-40dBc	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater			
Error vector magnitude		-------		≤12.5%	
Peak code domain error		-------		≤-35dB	
Adjacent channel leakage ratio		-------		≥45dBc@5MHz	
				≥50dBc@10MHz	
Spurious emission	9KHz-1GHz	≤-36dBm		≤-36dBm	
	1GHz-12.75GHz	≤-30dBm		≤-30dBm	
Transmission delay		≤1.5μs		≤1.5μs	
Impedance		50Ω			
RF connector type		N Female			
Power supply		AC 220V/DC 48V			
Power consumption rating		≤180W			
Temperature range		-25℃~+55℃			
Relative humidity		0 to 95%			
Application		IP65			
Standard		1 Pce in box			
Dimension(H×W×D)		610x445x215mm/670x420x230mm			
Weight		<35Kg			

Part Number	Downlink Output Power
AM-33-0921-NF	33dBm
AM-37-0921-NF	37dBm
AM-40-0921-NF	40dBm

Dual band Line Amplifier --DCS&WCDMA Line Amplifier

Part Number		DCS		WCDMA	
		Uplink	Downlink	Uplink	Downlink
Frequency range		1710-1785MHz	1805-1880MHz	1920-1980MHz	2110-2170MHz
Output power		5dBm	33/37/40dBm	5dBm	33/37/40dBm
Gain		≥40dB	≥40dB	≥40dB	≥40dB
Gain control range&step		≥30dB(1dB/step)		≥30dB(1dB/step)	
VSWR		≤1.5		≤1.5	
Ripple in band		≤3 .0dB		≤3 .0dB	
Noise figure		≤5 .0dB		≤5.0dB	
Intermodulation(3rd order)		≤-40dBc		≤-40dBc	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater			
Error vector magnitude		-------		≤12.5%	
Peak code domain error		-------		≤-35dB	
Adjacent channel leakage ratio		-------		≥45dBc@5MHz	
				≥50dBc@10MHz	
Spurious emission	9KHz-1GHz	≤-36dBm		≤-36dBm	
	1GHz-12.75GHz	≤-30dBm		≤-30dBm	
Transmission delay		≤1.5μs		≤1.5μs	
Impedance		50Ω			
RF connector type		N Female			
Power supply		AC 220V/DC 48V			
Power consumption rating		≤200W			
Temperature range		-25℃~+55℃			
Relative humidity		0 to 95%			
Application		IP65			
Standard		1 Pce in box			
Dimension(H×W×D)		610x445x215mm/670x420x230mm			
Weight		<35Kg			

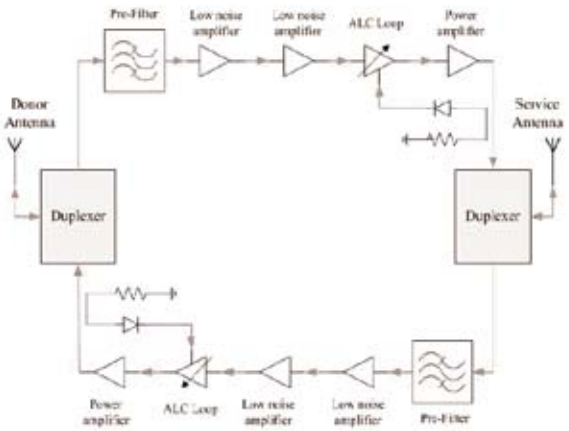
Part Number	Downlink Output Power
AM-33-1821-NF	33dBm
AM-37-1821-NF	37dBm
AM-40-1821-NF	40dBm

PICO REPEATER

Pico Repeater amplifies signals from mobile phones and base stations, so it can provide excellent solution for the situation of poor signal coverage or blind area.

Pico repeater can be applied in car parking lots, malls, offices, and shops etc, These places are originally blocked by structures and obstacles.

Netop pico repeaters allow both the interface with donor BTS and coverage of the confined area by using separate antennas without any extra interconnection with the Operator Networks. It's ideal repeater for modern indoor coverage environments.



Main Feature

- Adjustable gain
- Fixed band
- Automatic level control
- Low power consumption
- Cost effective

CDMA800 Pico Repeater

		Uplink	Downlink
Frequency range		824-849MHz	869-894MHz
Output power max		10/10/10dBm	10/15/17dBm
Gain		60dB	60dB
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		31dB±2dB(1dB/step)	
Noise figure		≤6dB	
Transmission delay		≤5μS	
Intermodulation(3rd order)		-40dBc	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Impedance		50Ω	
Connector		N or SMA type, Female	
Power supply		AC220V±30% 50Hz±10%	
Power consumption rating		≤10 W	
Operating temperature		-30℃~+55℃	
Application		Indoor use	
Humidity		0 to 95%	
Packing		1 Pce in box	
Dimension		175x121x24mm	
Weight		≤1.5 Kg	

Part Number	Downlink Output Power
RB-10-08-NF/SF	10dBm
RB-15-08-NF/SF	15dBm
RB-17-08-NF/SF	17dBm

GSM900 Pico Repeater

		Uplink	Downlink
Frequency range		890-915MHz	935-960MHz
Output power max		10/10/10dBm	10/15/17dBm
Gain		60dB	60dB
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		31dB±2dB(1dB/step)	
Noise figure		≤6dB	
Transmission delay		≤5μS	
Intermodulation(3rd order)		-40dBc	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Impedance		50Ω	
Connector		N or SMA type, Female	
Power supply		AC220V±30% 50Hz±10%	
Power consumption rating		≤10W	
Operating temperature		-30℃~+55℃	
Application		Indoor use	
Humidity		0 to 95%	
Packing		1 Pce in box	
Dimension		175x121x24mm	
Weight		≤1.5Kg	

Part Number	Downlink Output Power
RB-10-09-NF/SF	10dBm
RB-15-09-NF/SF	15dBm
RB-17-09-NF/SF	17dBm

DCS1800 Pico Repeater

		Uplink	Downlink
Frequency range		1710-1785MHz	1805-1880MHz
Output power max		10/10/10dBm	10/15/17dBm
Gain		60dB	60dB
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		31dB±2dB(1dB/step)	
Noise figure		≤6dB	
Transmission delay		≤5μS	
Intermodulation(3rd order)		-40dBc	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Impedance		50Ω	
Connector		N or SMA type, Female	
Power supply		AC220V±30% 50Hz±10%	
Power consumption rating		≤10W	
Operating temperature		-30℃~+55℃	
Application		Indoor use	
Humidity		0 to 95%	
Packing		1 Pce in box	
Dimension		175x121x24mm	
Weight		≤1.5 Kg	

Part Number	Downlink Output Power
RB-10-18-NF/SF	10dBm
RB-15-18-NF/SF	15dBm
RB-17-18-NF/SF	17dBm

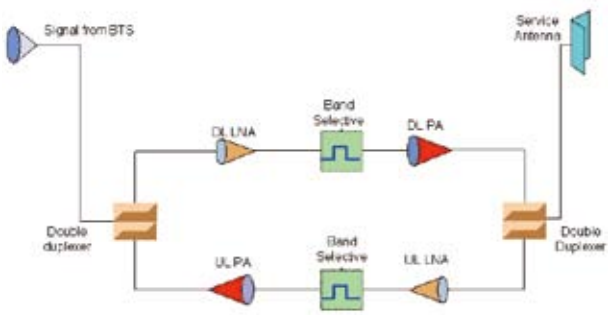
WCDMA2100 Pico Repeater

		Uplink	Downlink
Frequency range		1920-1980MHz	2110-2170MHz
Output power max		10/10/10dBm	10/15/17dBm
Gain		60dB	60dB
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		31dB±2dB(1dB/step)	
Noise figure		≤6dB	
Transmission delay		≤5μS	
Intermodulation(3rd order)		-40dBc	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Impedance		50Ω	
Connector		N or SMA type, Female	
Power supply		AC220V±30% 50Hz±10%	
Power consumption rating		≤10 W	
Operating temperature		-30℃~+55℃	
Application		Indoor use	
Humidity		0 to 95%	
Packing		1 Pce in box	
Dimension		175x121x24mm	
Weight		≤1.5 Kg	

Part Number	Downlink Output Power
RB-10-21-NF/SF	10dBm
RB-15-21-NF/SF	15dBm
RB-17-21-NF/SF	17dBm

BAND SELECTIVE REPEATER

Band selective repeater works as a bi-directional amplifier to increase the signal between the Mobile Station and the Base Station, Uses a pick up(donor) antenna to receive the radio signal from a donor cell and amplify the signal, then retransmit signal by the service antennas to the target coverage area. .



Main Feature

- Lower acquisition costs and lowest lifetime/operational costs
- Easy to install and small footprint with no need for expensive transmission lines, special cabinets, oversize battery backup or extra cooling
- Advanced technology, flexibility and proven reliability
- Modular design enables easy upgrade to additional bands at a relatively low cost
- Reduced site rental costs

CDMA800 Band Selective Repeater

		Uplink	Downlink
Frequency range		824-849MHz	869-894MHz
Output power max		27dBm	33/37/40/43dBm
Gain		≥85dB	≥85dB
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Ripple in band		≤3dB	
Noise figure		≤5dB	
VSWR		≤1.5	
Transmission delay		≤5μS	
Intermodulation(3rd order)		-40dBc	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Impedance		50Ω	
Connector		N type, Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤80W	
Operating temperature		-25℃~+55℃	
MTBF		＞50, 000 hours	
Application		IP65	
Humidity		0 to 95%	
Dimension(H×W×D)		650x 500x300mm	
Weight		≤35Kg	

Part Number	Downlink Output Power
RB-33-08-NF	33dBm
RB-37-08-NF	37dBm
RB-40-08-NF	40dBm
RB-43-08-NF	43dBm

GSM900 Band Selective Repeater

		Uplink	Downlink
Frequency range		890-915MHz	935-960MHz
Output power max		27dBm	33/37/40/43dBm
Gain		≥85dB	≥85dB
Bandwidth		25MHz	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Ripple in band		≤2.0dB	
Noise figure		≤3.0dB	
VSWR		≤1.5	
Transmission delay		≤5μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
IMD3		≤-36dBc	
Out of band rejection (100K-4000MHz except for working band)		≥70dB	
Impedance		50Ω	
Connector		N type, Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤150W	
Operating temperature		+5℃~+40℃	
Humidity		≤85%	
Dimension(H×W×D)		≤650×500×300mm	
Weight		≤35Kg	

Part Number	Downlink Output Power
RB-33-09-NF	33dBm
RB-37-09-NF	37dBm
RB-40-09-NF	40dBm
RB-43-09-NF	43dBm

DCS1800 Band Selective Repeater

		Uplink	Downlink
Frequency range		1710-1785MHz	1805-1880MHz
Output power max		27dBm	33/37/40/43dBm
Gain		≥85dB	≥85dB
Bandwidth		75MHz	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Ripple in band		≤3.0dB	
Noise figure		≤5.0dB	
VSWR		≤1.5	
Transmission delay		≤5μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
IMD3		≤-36dBc	
Out of band rejection (100K-4000MHz except for working band)		≥70dB	
Impedance		50Ω	
Connector		N type, Female	
Power supply		AC 220V/ DC 48V	
Power consumption rating		≤150W	
Operating temperature		+5℃~+40℃	
Humidity		≤85%	
Dimension(H×W×D)		≤650×500×300mm	
Weight		≤35Kg	

Part Number	Downlink Output Power
RB-33-18-NF	33dBm
RB-37-18-NF	37dBm
RB-40-18-NF	40dBm
RB-43-18-NF	43dBm

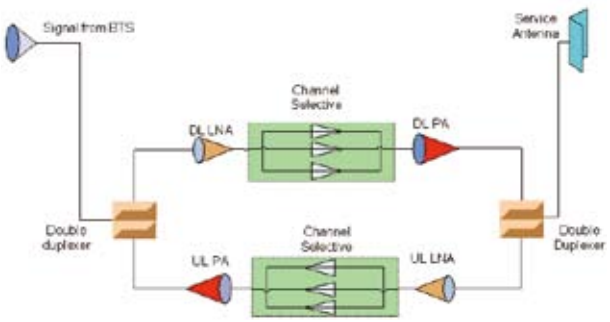
WCDMA Band Selective Repeater

		Uplink	Downlink
Frequency range		1920-1980MHz	2110-2170MHz
Output power max		27dBm	33/37/40/43dBm
Gain		≥85dB	≥85dB
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Ripple in band		≤3.0dB	
Noise figure		≤6.0dB	
VSWR		≤1.5	
Transmission delay		≤5μS	
Waveform quality		ρ ＞0.960	ρ ＞0.950
Error vector magnitude		≤12.5%	
Peak code domain error		≤-35dB	
Adjacent channel leakage ratio		≥45dBc@5MHz	
		≥50dBc@10MHz	
Intermodulation	In band	≤-15dBm/30KHz	
	Out of band	9KHz-1GHz(Include 1GHz):-36dBm/30KHz	
		1GHz-12.75GHz:-30dBm/30KHz	
Out of band rejection	Per band	∆fc≥2.5MHz: ≤-40dB or ≤-13dBm/30KHz	
		∆fc≥10MHz: ≤-60dB or ≤-33dBm/30KHz	
Connector		N type, Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤150W	
Operating temperature		+5℃~+40℃	
Humidity		≤85%	
Dimension(H×W×D)		≤650×500×300mm	
Weight		≤35Kg	

Part Number	Downlink Output Power
RB-33-21-NF	33dBm
RB-37-21-NF	37dBm
RB-40-21-NF	40dBm

CHANNEL SELECTIVE REPEATER

Channel selective repeater is capable of repeating only desired signals, thereby suppressing undesired interference and increasing network capacity, and works as a bi-directional amplifier to increase the signal between the Mobile Station and the Base Station. Uses a pick up(donor) antenna to receive the radio signal from a donor cell and amplify the signal, then retransmit signal by the service antennas to the target coverage area.



Main Feature

- Lower acquisition costs and lowest lifetime/operational costs
- Easy to install and small footprint with no need for expensive transmission lines, special cabinets, oversize battery backup or extra cooling
- Advanced technology, flexibility and proven reliability
- Modular design enables easy upgrade to additional bands at a relatively low cost
- High linear PA, stable performance
- Reduced site rental costs
- Number of channels is customized

GSM Channel Selective Repeater

		Uplink	Downlink
Frequency range		890-915MHz	935-960MHz
Output power max		27dBm	33/37/40/43dBm
Gain		≥85dB	≥85dB
Channel capacity(channel)		2-8	
ISelectivity	-1dB middle frequency bandwidth	200KHz	
	-35dB middle frequency bandwidth	<1000KHz	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Ripple in band		≤3.0dB	
Noise figure		≤5.0dB	
VSWR		≤1.5	
Transmission delay		≤5μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
IMD3		≤-36dBc	
Out of band rejection(100K-4000MHz except for working band)		≥70dB	
Impedance		50Ω	
Connector		N type, Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤150W	
Operating temperature		+5℃~+40℃	
Humidity		≤85%	
Dimension(H×W×D)		≤650×500×300mm	
Weight		≤35Kg	

Part Number	Downlink Output Power
RC-33-09-NF	33dBm
RC-37-09-NF	37dBm
RC-40-09-NF	40dBm
RC-43-09-NF	43dBm

CDMA800 Channel Selective Repeater

		Uplink	Downlink
Frequency range		824-849MHz	869-894MHz
Output power max		27dBm	33/37/40/43dBm
Gain		≥85dB	≥85dB
Channel capacity(channel)		1-3	
ISelectivity	-1dB middle frequency bandwidth	200KHz	
	-35dB middle frequency bandwidth	<1000KHz	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Ripple in band		≤3.0dB	
Noise figure		≤5.0dB	
VSWR		≤1.5	
Transmission delay		≤5μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
IMD3		≤-36dBc	
Out of band rejection(100K-4000MHz except for working band)		≥70dB	
Impedance		50Ω	
Connector		N type, Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤150W	
Operating temperature		+5℃~+40℃	
Humidity		≤85%	
Dimension(H×W×D)		≤650×500×300mm	
Weight		≤35Kg	

Part Number	Downlink Output Power
RC-33-08-NF	33dBm
RC-37-08-NF	37dBm
RC-40-08-NF	40dBm
RC-43-08-NF	43dBm

DCS Channel Selective Repeater

		Uplink	Downlink
Frequency range		1710-1785MHz	1805-1880MHz
Output power max		27dBm	33/37/40/43dBm
Gain		≥85dB	≥85dB
Channel capacity(channel)		2-8	
ISelectivity	-1dB middle frequency bandwidth	200KHz	
	-35dB middle frequency bandwidth	<1000KHz	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Ripple in band		≤3.0dB	
Noise figure		≤5.0dB	
VSWR		≤1.5	
Transmission delay		≤5μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
IMD3		≤-36dBc	
Out of band rejection(100K-4000MHz except for working band)		≥70dB	
Impedance		50Ω	
Connector		N type, Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤150W	
Operating temperature		+5℃~+40℃	
Humidity		≤85%	
Dimension(H×W×D)		≤650×500×300mm	
Weight		≤35Kg	

Part Number	Downlink Output Power
RC-33-18-NF	33dBm
RC-37-18-NF	37dBm
RC-40-18-NF	40dBm
RC-43-18-NF	43dBm

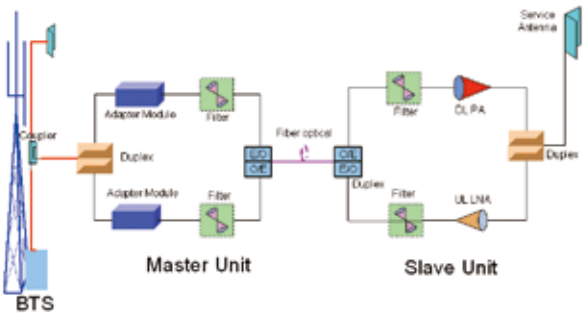
WCDMA Channel Selective Repeater

	Uplink	Downlink
Frequency range	1920-1980MHz	2110-2170MHz
Output power max	27dBm	33/37/40dBm
Gain	≥85dB	≥85dB
Channel capacity(channel)	1-3	
Error vector magnitude	≤12.5%	
Peak code domain error	≤-35dB	
ACLR	±5MHz≤-45dBc; ±10MHz≤-50dBc	
Gain control range&step	≥25dB(1dB/step)	
Ripple in band	≤2.0dB	
Noise figure	≤5.0dB	
VSWR	≤1.5	
Transmission delay	≤5μS	
Connector	N type, Female	
Out-of-Band gain	2, 7≤f-offset<3, 5MHz<60dB	
	3, 5≤f-offset<7, 5MHz<45dB	
	7, 5≤f-offset<12, 5MHz<45dB	
	12, 5MHz≤f-offset<35dB	
Power supply	AC 220V/DC 48V	
Power consumption	<135W	
Operating temperature	-25℃~+55℃	
Humidity	≤95%	
Dimension(H×W×D)	435×575×165mm	
Weight	≤35Kg	

Part Number	Downlink Output Power
RC-33-21-02-NF	33dBm
RC-37-21-02-NF	37dBm
RC-40-21-02-NF	40dBm

FIBER OPTICAL REPEATER

The fiber otpical repeater distribution system is built up by a master unit and one or several master units. The system allows the master unit to be fed with a signal directly from the BTS. The fiber optic repeater can distribute the received signal to the other co-located repeaters. Multiple nodes can be used with one master unit to facilitate large distribution systems. In order to reduce the number of fibers required by the system, wavelength division multiplexing can be utilized to allow the same fiber for both uplink and downlink.



Main Feature

- Suitable for large-scale indoor installation.
- Integrated unit supporting multiple cellular standards
- Laser technology with high linearity
- Low noise and high reliability
- Adjustable gain for link optimization
- Combined fiber operation by using WDM
- Full remote control of fiber optic repeaters
- Easy commissioning with Windows based OMT software
- Small optical transmitting loss, Optical fiber transmission up to 20km

CDMA800 Optical Fiber Repeater Master Unit

	Uplink	Downlink
Frequency range	824-849MHz	869-894MHz
Output power(optical)	≥0dBm	
Optical return loss	≤40dB	
Length wave	1310 and 1550nm WDM	
Optical distance link transmission	≤20km	
Optical noise floor	≤-132dBm/Hz	
Gain	-10±3dB	-10±3dB
Gain control range and step	≥30dB(1dB/step)	
VSWR	≤1.5	
Ripple in band	≤3dB	
Max RF input power	10dBm	
Impedance	50Ω	
RF connector type	N Female	
Optical connector	FC/APC	
Power supply	AC 220V/DC 48V	
Power consumption rating	≤30W	
MTBF	＞50000 hours	
Continuous working time for backup power	1 hour for CPU and remote control function	
Temperature range	0℃~+45℃	
Relative humidity	0 to 95%	
Application	Indoor	
Standard	1 Pce in box	
Dimension(H×W×D)	482.6x88.1x500mm(19 inch 2U)	
Weight	9Kg	

Part Number	Downlink Output Power
RO-33-08-NF(MU)	0dBm
RO-37-08-NF(MU)	0dBm
RO-40-08-NF(MU)	0dBm
RO-43-08-NF(MU)	0dBm

CDMA800 Optical Fiber Repeater Remote Unit

	Uplink	Downlink
Frequency range	824-849MHz	869-894MHz
Output power(optical)	≥0dBm	
Optical return loss	≤40dB	
Output power(RF)	33/37/40/43dBm	
Length wave	1310 and 1550nm WDM	
Optical distance link transmission	≤20km	
Optical noise floor	≤-132dBm/Hz(100m to 18km)	
Gain	65±3dB	65±3dB
ALC control(plus 10dB input signal)	When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range and step	≥30dB(1dB/step)	
Reppile in band	≤3.0dB	
Noise figure	≤5.0dB	
VSWR	≤1.5	
Transmission delay	≤5.0μs	
Intermodulation(3rd order)	≤-45dBc	
Impedance	50Ω	
RF connector type	N Female	
Optical connector	FC/PC	
Power supply	AC 220V/DC 48V	
Power consumption rating	≤120W	
MTBF	＞50000 hours	
Temperature range	-25℃~+55℃	
Relative humidity	0 to 95%	
Application	IP65	
Mounted	Wall or pole fixed	
Standard	1 Pce in box	
Dimension(H×W×D)	575x435x165mm	
Weight	23Kg	

Part Number	Downlink Output Power
RO-33-08-NF(RU)	33dBm
RO-37-08-NF(RU)	37dBm
RO-40-08-NF(RU)	40dBm
RO-43-08-NF(RU)	43dBm

GSM900 Optical Fiber Repeater Master Unit

	Uplink	Downlink
Frequency range	890-915MHz	935-960MHz
Output power(optical)	≥0dBm	
Length wave	1310 and 1550nm WDM	
Optical distance link transmission	≤20km	
Gain	-10±3dB	-10±3dB
Gain control range and step	≥30dB(1dB/step)	
VSWR	≤1.5	
Max RF input power	10dBm	
Impedance	50Ω	
RF connector type	N Female	
Optical connector	FC/APC	
Power supply	AC 220V/DC 48V	
Power consumption rating	≤30W	
Temperature range	-25℃~+55℃	
Relative humidity	0 to 95%	
Application	Indoor	
Standard	1 Pce in box	
Dimension(H×W×D)	482.6x88.1x500mm	
Weight	9Kg	

Part Number	Downlink Output Power
RO-33-09-NF(MU)	0dBm
RO-37-09-NF(MU)	0dBm
RO-40-09-NF(MU)	0dBm
RO-43-09-NF(MU)	0dBm

GSM900 Optical Fiber Repeater Remote Unit

		Uplink	Downlink
Frequency range		890-915MHz	935-960MHz
Output power(optical)		≥0dBm	
Output power(RF)		33/37/40/43dBm	
Length wave		1310 and 1550nm WDM	
Optical distance link transmission		≤20km	
Gain uplink		65±3dB	65±3dB
ALC control		When in max output power, if increased 10dB input Level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range and step		≥30dB(1dB/step)	
Reppile in band		≤3.0dB	
Noise figure		≤5.0dB	
VSWR		≤1.5	
Transmission delay		≤5.0μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Intermodulation(3rd order)		≤-40dBc	
Impedance		50Ω	
RF connector type		N Female	
Optical connector		FC/PC	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤150W	
Temperature range		-25℃~+55℃	
Relative humidity		0 to 95%	
Standard		1 Pce in box	
Dimension(H×W×D)		575x435x165mm	
Weight		23Kg	

Part Number	Downlink Output Power
RO-33-09-NF(RU)	33dBm
RO-37-09-NF(RU)	37dBm
RO-40-09-NF(RU)	40dBm
RO-43-09-NF(RU)	43dBm

DCS1800 Optical Fiber Repeater Master Unit

	Uplink	Downlink
Frequency range	1710-1785MHz	1805-1880MHz
Output power(optical)	≥0dBm	
Length wave	1310 and 1550nm WDM	
Optical distance link transmission	≤20km	
Gain	-10±3dB	-10±3dB
Gain control range and step	≥30dB(1dB/step)	
VSWR	≤1.5	
Max RF input power	10dBm	
Impedance	50Ω	
RF connector type	N Female	
Optical connector	FC/APC	
Power supply	AC 220V/DC 48V	
Power consumption rating	≤30W	
Temperature range	-25℃~+55℃	
Relative humidity	0 to 95%	
Application	Indoor	
Standard	1 Pce in box	
Dimension(H×W×D)	482.6x88.1x500mm	
Weight	9Kg	

Part Number	Downlink Output Power
RO-33-18-NF(MU)	0dBm
RO-37-18-NF(MU)	0dBm
RO-40-18-NF(MU)	0dBm
RO-43-18-NF(MU)	0dBm

DCS1800 Optical Fiber Repeater Remote Unit

		Uplink	Downlink
Frequency range		1710-1785MHz	1805-1880MHz
Output power(optical)		≥0dBm	
Output power(RF)		33/37/40/43dBm	
Length wave		1310 and 1550nm WDM	
Optical distance link transmission		≤20km	
Gain uplink		65±3dB	65±3dB
ALC control		When in max output power, if increased 10dB input Level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range and step		≥30dB(1dB/step)	
Reppile in band		≤3.0dB	
Noise figure		≤5.0dB	
VSWR		≤1.5	
Transmission delay		≤5.0μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Intermodulation(3rd order)		≤-40dBc	
Impedance		50Ω	
RF connector type		N Female	
Optical connector		FC/PC	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤150W	
Temperature range		-25℃~+55℃	
Relative humidity		0 to 95%	
Standard		1 Pce in box	
Dimension(H×W×D)		575x435x165mm	
Weight		23Kg	

Part Number	Downlink Output Power
RO-33-18-NF(RU)	33dBm
RO-37-18-NF(RU)	37dBm
RO-40-18-NF(RU)	40dBm
RO-43-18-NF(RU)	43dBm

WCDMA Optical Fiber Repeater Master Unit

	Uplink	Downlink
Frequency range	1920-1980MHz	2110-2170MHz
Output power(optical)	≥0dBm	
Length wave	1310 and 1550nm WDM	
Optical distance link transmission	≤20km	
Gain control range and step	≥30dB(1dB/step)	
VSWR	≤1.5	
Max RF input power	10dBm	
Impedance	50Ω	
RF connector type	N Female	
Optical connector	FC/APC	
Power supply	AC 220V/DC 48V	
Power consumption rating	≤30W	
Temperature range	0℃~+45℃	
Relative humidity	0 to 95%	
Application	Indoor	
Standard	1 Pce in box	
Dimension	482.6x88.1x500mm	
Weight	9Kg	

Part Number	Downlink Output Power
RO-33-21-NF(MU)	0dBm
RO-37-21-NF(MU)	0dBm
RO-40-21-NF(MU)	0dBm

WCDMA Optical Fiber Repeater Remote Unit

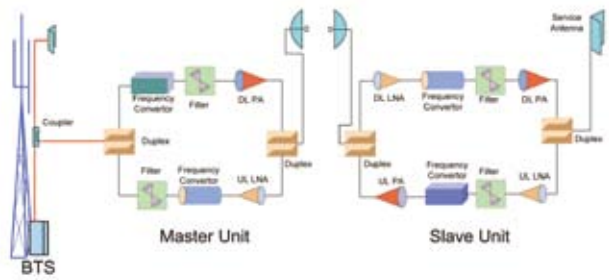
Part Number		RO-40-21-NF(RU)
		Uplink
Frequency range		1920-1980MHz
Output power(optical)		≥0dBm
Output power(RF)		33/37/40dBm
Length wave		1310 and 1550nm WDM
Optical distance link transmission		≤20km
Gain		65±3dB
Gain control range and step		≥30dB(1dB/step)
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater
Reppile in band		≤3.0dB
Noise figure		≤5.0dB
VSWR		≤1.5
Transmission delay		≤5.0μs
Error vector magnitude		≤12.5%
Peak code domain error		≤-35dB
Adjacent channel leakage ratio		≥45dBc@5MHz
		≥50dBc@10MHz
Spurious emission	9KHz-1GHz	≤-36dBm
	1GHz-12.75GHz	≤-30dBm
Impedance		50Ω
RF connector type		N Female
Optical connector		FC/PC
Power supply		AC 220V/DC 48V
Power consumption rating		≤120W
Temperature range		-25℃~+55℃
Relative humidity		0 to 95%
Standard		1 Pce in box
Dimension(H×W×D)		575x435x165mm
Weight		<23Kg

Part Number	Downlink Output Power
RO-33-21-NF(RU)	33dBm
RO-37-21-NF(RU)	37dBm
RO-40-21-NF(RU)	40dBm

FREQUENCY SHIFTING REPEATER

FSR is a point-to-multipoint system, which using frequency shifting techniques between the links that overcomes the system isolation problem in conventional repeater system.

FSR Comprises of Master Unit and Remote Unit. Donor site downlink signals are converted to a different in-band or out-of-band frequencies by the master unit and transmitted to remote repeater site. At remote site, links frequencies are being converted back to donor site signals to serve the target coverage area. It will be vice versal for the remote site's uplink signals.



Main Feature

- overcomes the antenna isolation problem
- Available in Low Output Power or High Output Power
- Permits flexible network design using point-to-multipoint configuration

EGSM900 Frequency Shifting Repeater Master Unit

Part Number		RS-37-09-NF(MU)-1.5G	
		Uplink	Downlink
Frequency range		885-915MHz	930-960MHz
Link frequency range		1444.5–1468.5MHz	1493.5–1517.5MHz
Output power		-10dBm	37dBm
Gain		≥45dB	≥45dB
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range and step		≥30dB(1dB/step)	
Ripple in band		≤3.0dB	
Noise figure		≤4.0dB	
VSWR		≤1.5	
Transmission delay		≤5.0μs	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Intermodulation(3rd order)		≤-40dBc	
Max. non-destructive input power		10dBm	
Impedance		50Ω	
RF connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤65W	
Temperature range		-25℃~+55℃	
Relative humidity		0 to 95%	
Application		IP65	
Standard		1 Pce in box	
Dimension(H×W×D)		575x435x165mm	
Weight		≤23Kg	

EGSM900 Frequency Shifting Repeater Remote Unit

		Uplink	Downlink
Frequency range		885-915MHz	930-960MHz
Link frequency range		1444.5–1468.5MHz	1493.5–1517.5MHz
Output power		33dBm	33/37/40dBm
Gain		≥85dB	≥85dB
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range and step		≥30dB(1dB/step)	
Ripple in band		≤3.0dB	
Noise figure		≤4.0dB	
VSWR		≤1.5	
Transmission delay		≤5.0μs	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Intermodulation(3rd order)		≤-40dBc	
Max. non-destructive input power		10dBm	
Impedance		50Ω	
RF connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤120W	
Temperature range		-25℃~+55℃	
Relative humidity		0 to 95%	
Application		IP65	
Standard		1 Pce in box	
Dimension(H×W×D)		575x435x165mm	
Weight		≤23Kg	

Part Number	Downlink Output Power
RS-33-09-NF(RU)-1.5G	33dBm
RS-37-09-NF(RU)-1.5G	37dBm
RS-40-09-NF(RU)-1.5G	40dBm

EGSM900 Frequency Shifting Repeater Master Unit

Part Number		RS-37-09-NF(MU)-1.8G	
		Uplink	Downlink
Frequency range		885-915MHz	930-960MHz
Link frequency range		1710–1740MHz	1805–1835MHz
Output power		-10dBm	37dBm
Gain		≥45dB	≥45dB
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range and step		≥30dB(1dB/step)	
Ripple in band		≤3.0dB	
Noise figure		≤4.0dB	
VSWR		≤1.5	
Transmission delay		≤5.0μs	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Intermodulation(3rd order)		≤-40dBc	
Max. non-destructive input power		10dBm	
Impedance		50Ω	
RF connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤65W	
Temperature range		-25℃~+55℃	
Relative humidity		0 to 95%	
Application		IP65	
Standard		1 Pce in box	
Dimension(H×W×D)		575×435×165mm	
Weight		≤23Kg	

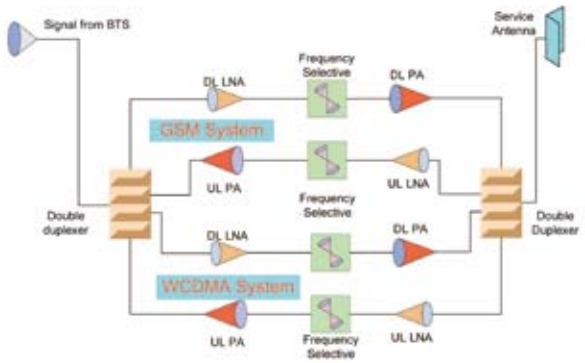
EGSM900 Frequency Shifting Repeater Remote Unit

		Uplink	Downlink
Frequency range		885-915MHz	930-960MHz
Link frequency range		1710–1740MHz	1805–1835MHz
Output power		33dBm	33/37/40dBm
Gain		≥85dB	≥85dB
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range and step		≥30dB(1dB/step)	
Ripple in band		≤3.0dB	
Noise figure		≤4.0dB	
VSWR		≤1.5	
Transmission delay		≤4.0μs	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Intermodulation(3rd order)		≤-40dBc	
Max. non-destructive input power		10dBm	
Impedance		50Ω	
RF connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤120W	
Temperature range		-25℃~+55℃	
Relative humidity		0 to 95%	
Application		IP65	
Standard		1 Pce in box	
Dimension(H×W×D)		575×435×165mm	
Weight		≤23Kg	

Part Number	Downlink Output Power
RS-33-09-NF(RU)-1.8G	33dBm
RS-37-09-NF(RU)-1.8G	37dBm
RS-40-09-NF(RU)-1.8G	40dBm

DUAL BAND REPEATER

Dual band repeater is a cost-effective two bands selective repeater in one chassis that will reduce the overall cost of signal coverage extension without implementing more BTS sites, and it works as a bi-directional amplifier to increase the signal between the Mobile Station and the Base Station, Uses a pick up(donor) antenna to receive the radio signal from a donor cell and amplify the signal, then retransmit signal by the service antennas to target coverage area.



Main Feature

- Lower acquisition costs and lowest lifetime/operational costs
- Easy to install and small footprint with no need for expensive transmission lines, special cabinets, extra cooling
- Advanced technology, flexibility and proven reliability
- Modular design enables easy upgrade to additional bands at a relatively low cost
- Allows operators with option of different two bands co-siting

GSM&DCS Hybrid Repeater

Part Number		GSM		DCS	
		Uplink	Downlink	Uplink	Downlink
Frequency range		890-915MHz	935-960MHz	1710-1785MHz	1805-1880MHz
Output power		27dBm	27/33/37/40dBm	27dBm	27/33/37/40dBm
Gain		85dB	85dB	85dB	85dB
Gain control range and step		≥30dB(1dB/step)		≥30dB(1dB/step)	
VSWR		≤1.5		≤1.5	
Ripple in band		≤3 .0dB		≤3 .0dB	
Noise figure		≤5 .0dB		≤5.0dB	
Intermodulation(3rd order)		≤-45dBc		≤-45dBc	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater			
Spurious emission	9KHz-1GHz	≤-36dBm		≤-36dBm	
	1GHz-12.75GHz	≤-30dBm		≤-30dBm	
Transmission delay		≤5.0μs		≤5.0μs	
Impedance		50Ω			
Max. non-destructive input power		10dBm		10dBm	
RF connector type		N Female			
Power supply		AC 220V/DC 48V			
Power consumption rating		≤180W			
Temperature range		-25℃~+55℃			
Relative humidity		0 to 95%			
Application		IP65			
Standard		1 Pce in box			
Dimension(H×W×D)		610×445×215mm/670×420×230mm			
Weight		<35Kg			

Part Number	Downlink Output Power
RB-27-0918-NF	27dBm
RB-33-0918-NF	33dBm
RB-37-0918-NF	37dBm
RB-40-0918-NF	40dBm

GSM&WCDMA Hybrid Repeater

Part Number		GSM		WCDMA	
		Uplink	Downlink	Uplink	Downlink
Frequency range		890-915MHz	935-960MHz	1920-1980MHz	2110-2170MHz
Output power		27dBm	27/33/37/40dBm	27dBm	27/33/37/40dBm
Gain		85dB	85dB	85dB	85dB
Gain control range and step		≥30dB(1dB/step)		≥30dB(1dB/step)	
VSWR		≤1.5		≤1.5	
Ripple in band		≤3 .0dB		≤3 .0dB	
Noise figure		≤5 .0dB		≤5.0dB	
Intermodulation(3rd order)		≤-45dBc		≤-45dBc	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater			
Error vector magnitude		-------		≤12.5%	
Peak code domain error		-------		≤-35dB	
Adjacent channel leakage ratio		-------		≥45dBc@5MHz	
				≥50dBc@10MHz	
Spurious emission	9KHz-1GHz	≤-36dBm		≤-36dBm	
	1GHz-12.75GHz	≤-30dBm		≤-30dBm	
Transmission delay		≤5.0μs		≤5.0μs	
Max. non-destructive input power		10dBm		10dBm	
Impedance		50Ω			
RF connector type		N Female			
Power supply		AC 220V/DC 48V			
Power consumption rating		≤200W			
Temperature range		-25℃~+55℃			
Relative humidity		0 to 95%			
Application		IP65			
Standard		1 Pce in box			
Dimension(H×W×D)		610x445x215mm/670x420x230mm			
Weight		<35Kg			

Part Number	Downlink Output Power
RB-27-1821-NF	27dBm
RB-33-1821-NF	33dBm
RB-37-1821-NF	37dBm
RB-40-1821-NF	40dBm

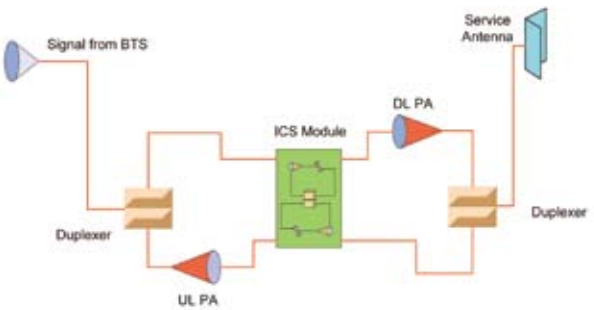
DCS&WCDMA Hybrid Repeater

Part Number		DCS		WCDMA	
		Uplink	Downlink	Uplink	Downlink
Frequency range		1710-1785MHz	1805-1880MHz	1920-1980MHz	2110-2170MHz
Output power		27dBm	27/33/37/40dBm	27dBm	27/33/37/40dBm
Gain		85dB	85dB	85dB	85dB
Gain control range and step		≥30dB(1dB/step)		≥30dB(1dB/step)	
VSWR		≤1.5		≤1.5	
Ripple in band		≤3 .0dB		≤3 .0dB	
Noise figure		≤5 .0dB		≤5.0dB	
Intermodulation(3rd order)		≤-45dBc		≤-45dBc	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater			
Error vector magnitude		-------		≤12.5%	
Peak code domain error		-------		≤-35dB	
Adjacent channel leakage ratio		-------		≥45dBc@5MHz	
				≥50dBc@10MHz	
Spurious emission	9KHz-1GHz	≤-36dBm		≤-36dBm	
	1GHz-12.75GHz	≤-30dBm		≤-30dBm	
Transmission delay		≤5.0μs		≤5.0μs	
Max. non-destructive input power		10dBm		10dBm	
Impedance		50Ω			
RF connector type		N Female			
Power supply		AC 220V/DC 48V			
Power consumption rating		≤180W			
Temperature range		-25℃~+55℃			
Relative humidity		0 to 95%			
Application		IP65			
Standard		1 Pce in box			
Dimension(H×W×D)		610x445x215mm/670x420x230mm			
Weight		<35Kg			

Part Number	Downlink Output Power
RB-27-0921-NF	27dBm
RB-33-0921-NF	33dBm
RB-37-0921-NF	37dBm
RB-40-0921-NF	40dBm

ICS REPEATER

ICS Repeater system, which is using DSP(Digital Signal Processing) technology, restores full operational capability against multi path fading and feedback signals by itself and all types of waveforms from both friendly and intentional sources of interference, works as a bi-directional amplifier to increase the signal between the Mobile Station and the Base Station, Uses a pick up(donor) antenna to receive the radio signal from a donor cell and amplify the signal, then retransmit signal by the service antennas to target coverage area.



Main Feature

- Easy to install and small footprint with no need for expensive transmission lines, special cabinets, oversize battery backup or extra cooling
- Advanced technology, flexibility and proven reliability
- Modular design enables easy upgrade to additional bands at a relatively low cost
- Easy to set up,
- Overcome the limit of system isolation

GSM900 ICS Repeater

		Uplink	Downlink
Frequency range		890-915MHz	935-960MHz
Output power max		27dBm	37/40/43dBm
Gain		≥90dB	≥90dB
Channel capacity(channel)		2-8	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Operating maximum gain		≥Antenna Isolation+15dB	
Power amplifier oscillation protection		Interference Cancellation System	
Interference cancellation range		≥15dB	
Ripple in band		≤3.0dB	
Intermodulation(3rd order)		≤-45dBc/1MHz @10W.Rated Power	
Noise figure		≤6.0dB	
VSWR		≤1.5	
Frequency error		≤0.05ppm	
Transmission delay		≤10.0μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Max. non-destructive input power		≥-10dBm	
Impedance		50Ω	
Connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤200W	
Temperature range		-25℃~+55℃	
Relative humidity		0 to 95%	
Application		IP65	
Standard		1 Pce in box	
Dimension(H×W×D)		610×445×215mm	
Weight		<35Kg	

Part Number	Downlink Output Power
RC-37-09-NF-ICS	37dBm
RC-40-09-NF-ICS	40dBm
RC-43-09-NF-ICS	43dBm

CDMA800 ICS Repeater

		Uplink	Downlink
Frequency range		824-849MHz	869-894MHz
Output power max		27dBm	37/40/43dBm
Gain		≥90dB	≥90dB
Channel capacity(channel)		1-3	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Operating maximum gain		≥Antenna Isolation+15dB	
Power amplifier oscillation protection		Interference Cancellation System	
Interference cancellation range		≥15dB	
Ripple in band		≤3.0dB	
Intermodulation(3rd order)		≤-45dBc/1MHz @10W.Rated Power	
Noise figure		≤6.0dB	
VSWR		≤1.5	
Frequency error		≤0.05ppm	
Transmission delay		≤10.0μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Max. non-destructive input power		≥-10dBm	
Impedance		50Ω	
Connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤200W	
Temperature range		-25℃~+55℃	
Relative humidity		0 to 95%	
Application		IP65	
Standard		1 Pce in box	
Dimension(H×W×D)		610×445×215mm	
Weight		<35Kg	

Part Number	Downlink Output Power
RC-37-08-NF-ICS	37dBm
RC-40-08-NF-ICS	40dBm
RC-43-08-NF-ICS	43dBm

DCS1800 ICS Repeater

		Uplink	Downlink
Frequency range		1710-1785MHz	1805-1880MHz
Output power max		27dBm	37/40/43dBm
Gain		85dB	85dB
Channel capacity(channel)		2-8	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Operating maximum gain		≥Antenna Isolation+15dB	
Power amplifier oscillation protection		Interference Cancellation System	
Interference cancellation range		≥15dB	
Ripple in band		≤3.0dB	
Intermodulation(3rd order)		≤-45dBc/1MHz @10W.Rated Power	
Noise figure		≤6.0dB	
VSWR		≤1.5	
Frequency error		≤0.05ppm	
Transmission delay		≤10.0μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Max. non-destructive input power		10dBm	
Impedance		50Ω	
Connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤200W	
Temperature range		-25℃~+55℃	
Relative humidity		0 to 95%	
Application		IP65	
Standard		1 Pce in box	
Dimension(H×W×D)		610x445x215mm	
Weight		≤35Kg	

Part Number	Downlink Output Power
RC-37-18-NF-ICS	37dBm
RC-40-18-NF-ICS	40dBm
RC-43-18-NF-ICS	43dBm

WCDMA ICS Repeater

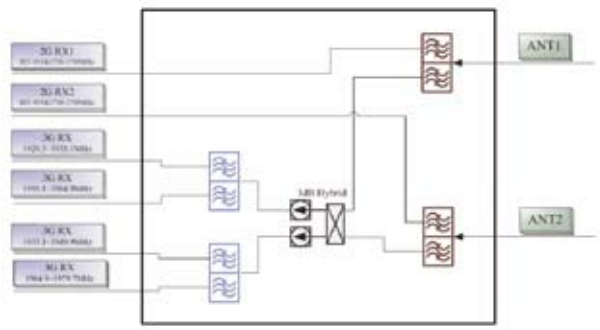
		Uplink	Downlink
Frequency range		1920-1980MHz	2110-2170MHz
Output power max		27dBm	37/40dBm
Gain		85dB	85dB
Channel capacity(channel)		1-3	
ALC control		When in max output power, if increased 10dB input level, the variation of the output power can be controlled within 2dB or shut down repeater	
Gain control range&step		≥30dB(1dB/step)	
Operating maximum gain		≥Antenna Isolation+15dB	
Power amplifier oscillation protection		Interference Cancellation System	
Interference cancellation range		≥15dB	
Ripple in band		≤2.0dB in every channel	
Intermodulation(3rd order)		≤-45dBc/1MHz @10W.Rated Power	
Noise figure		≤6.0dB	
VSWR		≤1.5	
Error vector magnitude		≤12.5%	
Peak code domain error		≤-35dB	
Adjacent channel leakage ratio		≥45dBc@5MKHz	
		≥50dBc@10MKHz	
Transmission delay		≤10.0μS	
Spurious emission	9KHz-1GHz	≤-36dBm	
	1GHz-12.75GHz	≤-30dBm	
Max. non-destructive input power		10dBm	
Impedance		50Ω	
Connector type		N Female	
Power supply		AC 220V/DC 48V	
Power consumption rating		≤200W	
Temperature range		-25℃~+55℃	
Relative humidity		0 to 95%	
Application		IP65	
Standard		1 Pce in box	
Dimension(H×W×D)		610x445x215mm	
Weight		≤35Kg	

Part Number	Downlink Output Power
RC-37-21-NF-ICS	37dBm
RC-40-21-NF-ICS	40dBm

POI

Netop offers a multi-system integration solution, which can integrate different frequency signals from different operators by the application of a Point of Interface (POI). This can avoid repeated investment of IBS for the same building by different Telecom operators; effectively integrate multi-signals to the same DAS with low insertion loss, low cost and minimum construction work.

It can also be easily extended and maintained. A multi system integration solution is usually deployed in large office buildings, public facilities, large exhibition centers, subways, railway stations, airports and government offices.



Block Diagram

Main Feature

- Modular design technology – the connectors in the equipment are standard and every signal channel can be linked to a standard module
- Low inter-modulation filter technology is used lowering the inter-modulation interference (less than 150 dBc)
- High input power handling
- High isolation capability minimizing signal interference
- Compatible with all system signals from current wireless communication systems as POI inputs

POI-5in2out

Electrical data	Frequency	CDMA800-1	829–835/874–880MHz
		CDMA800-2	837–845/882–890MHz
		GSM1800-1	1710 –1730/1805–1825MHz
		GSM1800-2	1730–1750/1825–1845MHz
		GSM1800-3	1750–1785/1845–1880MHz
	Isolation	Same band	40dB minimum
		Different band	80dB minimum
	Intermodulation(3rd order)		≤-140dBc@2x20W
	Power handling		100W
	Insertion loss		≤5.0dB
	Return loss		≤-18dB

POI-8in2out

Electrical data	Frequency	GSM900-1	890–900/935–945MHz
		GSM900-2	900–915/945–960MHz
		GSM1800-1	1710 –1730/1805–1825MHz
		GSM1800-2	1740–1760/1835–1855MHz
		GSM1800-3	1760–1780/1855–1875MHz
		3G-1	1920.0–1935.1/2110.3–2125.1MHz
		3G-2	1935.1–1950.1/2125.1–2140.1MHz
		3G-3	1950.1–1964.9/2140.1–2154.9MHz
	Isolation	Tx/Rx	60dB minimum
		Same band	≥33dB
		Different band	80dB minimum (2G&3G)
			40dB minimum (GSM900&GSM1800)
	Intermodulation(3rd order)		≤-140dBc@2x20W
	Power handling		100W/Port
	Insertion loss		≤6.0dB
	Return loss		≤-18dB

POI-10in2out

Electrical data	Frequency	EGSM	885–890/930–935MHz
		GSM900-1	890–900/935–945MHz
		GSM900-2	900–915/945–960MHz
		GSM1800-1	1710–1715/1805–1810MHz
		GSM1800-2	1720–1730/1815–1825MHz
		GSM1800-3	1740–1760/1835–1855MHz
		GSM1800-4	1760–1780/1855–1875MHz
		3G-1	1920.0–1935.1/2110.3–2125.1MHz
		3G-2	1935.1–1950.1/2125.1–2140.1MHz
		3G-3	1950.1–1964.9/2140.1–2154.9MHz
	Isolation	Tx/Rx	60dB minimum
		Same band	≥33dB
		Different band	80dB minimum (2G&3G)
			40dB minimum (GSM900&GSM1800)
	Intermodulation(3rd order)		≤-140dBc@2x20W
	Power handling		100W/Port
	Insertion loss		≤6.0dB
	Return loss		≤-18dB

POI-13in2out

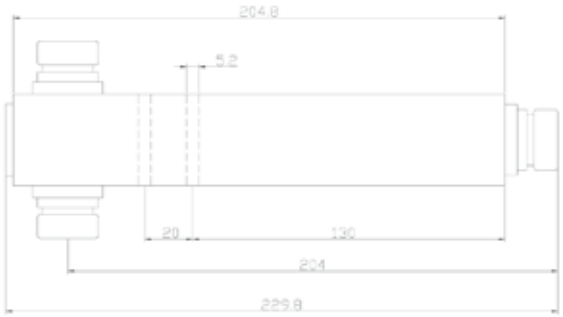
Electrical data	Frequency	CDMA800-1	820–835/865–880MHz
		CDMA800-2	835– 845/880–890MHz
		GSM1800-1	1710–1717.5/1805–1812.5MHz
		GSM1800-2	1717.5–1722.5/1750–1765MHz
			1812.5–1817.5/1845–1860MHz
		GSM1800-3	1765–1770/1722.5-1730/1745–1750MHz
			1860–1870/1817.5-1825/1840–1845MHz
		GSM1800-4	1730–1745/1825–1840MHz
		GSM1800-5	1755–1785/1870–1880MHz
		3G-1	1920–1930/2110–2120MHz
		3G-2	1930–1940/2120–2130MHz
		3G-3	1940–1945/2130–2135MHz
		3G-4	1945–1950/2135–2140MHz
		3G-5	1950–1965/2140–2155MHz
		WiFi	2412–2484MHz
	Isolation	Same band	≥40dB
		Different band	100dB minimum
	Intermodulation(3rd order)		≤-140dBc@2x20W
	Power handling		100W/Port
	Insertion loss		≤9.0dB (typical)
	Return loss		18dB typical, 16dB Min

PASSIVE COMPONENT

Cavity Power Splitter

The Cavity power splitter is designed to evenly split power cellular signals with minimal reflections and loss. Its reactive design employs no resistors eliminating their contribution to PIM and the potential of their damage. With few solder joints and an air dielectric, the loss has been minimized and reliability enhanced. The RF power is evenly split to all outputs with excellent amplitude and phase balance. All of them are conformance to IP65 standard. Its mechanical shape allows to be fixed on the wall or the pole easily.

Netop Cavity Power Splitters all operate from 800 to 2500MHz or 800-2700MHz, allowing integration of CDMA800, GSM900, GSM1800, PCS, WLAN and UMTS.



Main Feature

- Low insertion loss
- High return loss
- High power handling
- Low PIM
- High reliability
- Waterproof IP65
- Low cost design for ease of mounting to pole or wall

Cavity Power Splitter 2.5G

Frequency range	800-2500MHz
Impedance	50Ω
Return loss/VSWR	-20.8dB/1.20
Power handling	200W
PIM	-150dBc@2X20W
Connector type	N Female
Temperature range	-35℃~+75℃
Relative humidity	0 to 95%
Packing	1 Pce in box

Part Number	Split Loss	Insertion Loss	Weight
S-2-6F-NF	3dB typical	0.1dB typical	380g/pce
S-3-6F-NF	4.8dB typical	0.1dB typical	440g/pce
S-4-6F-NF	6.0dB typical	0.1dB typical	470g/pce

Cavity Power Splitter 2.7G

Frequency range	800-2700MHz
Impedance	50Ω
Return loss/VSWR	-19.0dB/1.25
Power handling	200W
PIM	-150dBc@2X20W
Connector type	N Female
Temperature range	-35℃~+75℃
Relative humidity	0 to 95%
Packing	1 Pce in box

Part Number	Split Loss	Insertion Loss	Weight
S-2-7F-NF	3dB typical	0.3dB typical	380g/pce
S-3-7F-NF	4.8dB typical	0.3dB typical	440g/pce
S-4-7F-NF	6.0dB typical	0.3dB typical	470g/pce

Cavity Power Splitter

S-6-6F-NF New

800~2500MHz 6 Way Splitter

Main Feature

- Splitter
- Contain CDMA, GSM, DCS and WCDMA band
- Low PIM
- High reliability
- Simple installation

Electrical Specification

Frequency	800~2500MHz
VSWR	≤1.25:1
Distribution Loss	7.8 dB
Insertion loss	±0.4 dB
Power handling	200 W
Intermodulation (3rd order)	≤ -150dBc @ 2 x 20 W
Impedance	-50 Ω
DC characteristic	No DC Block

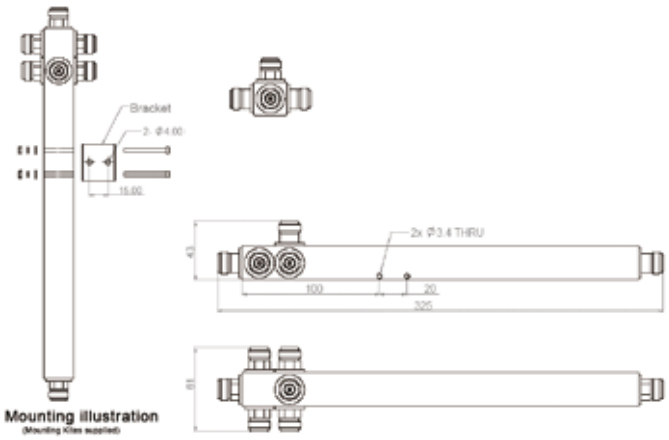
Environmental Specification

Operating temperature range	-30℃ to +75℃
Storage temperature range	-30℃ to +75℃
Relative humidity	5% - 95%
Barometric pressure	55 KPa -106KPa
Application	Outdoor (IP65)

Mechanical Specification

Dimensions	325 x61 x43(mm)
Weight	0.7kg
Connector type	N female
Mounting	Wall
Packing	1 Pce in box

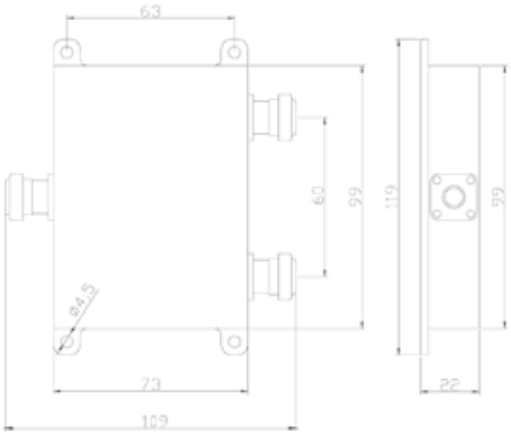
Outline Drawing



Microstrip Power Splitter 2.5G

Microstrip power splitter is designed to evenly split power cellular signals with minimal reflections and loss. All of them are conformance to IP65 standard. Its mechanical shape allows to be fixed ton the wall or the pole easily.

Netop Microstrip Power Splitters all operate from 800 to 2500MHz, allowing integration of CDMA800, GSM900, GSM1800, PCS, WLAN and UMTS.



Main Feature

- Superior RF performance, low VSWR and Insertion Loss
- Available in the frequency range from 800MHz to 2500MHz
- 20dB Isolation(Min.)
- 50 watt average power rating
- High reliability
- 2-way, 3-way and 4-way configurations
- Waterproof IP65
- Low cost design for ease of mounting to pole or wall

Microstrip Power Splitter 2.5G(Low Power)

Frequency range	800-2500MHz
Impedance	50Ω
Return loss/VSWR	-20.8dB/1.2
Power handling	50W
PIM	-140dBc@2X20W
Connector type	N Female
Temperature range	-20℃~+75℃
Relative humidity	0 to 95%
Packing	1 Pce in box

Part Number	Split Loss	Insertion Loss	Weight
SM-2-6F-NF	3dB typical	0.3dB typical	240g/pce
SM-3-6F-NF	4.8dB typical	0.5dB typical	460g/pce
SM-4-6F-NF	6.0dB typical	0.4dB typical	600g/pce

Microstrip Power Splitter 2.5G(High Power)

Frequency range	800-2500MHz
Impedance	50Ω
Return loss/VSWR	≤-19dB/1.25
Power handling	100W
PIM	-140dBc@2X20W
Connector type	N Female
Temperature range	-20℃~+75℃
Relative humidity	0 to 95%
Packing	1 Pce in box

Part Number	Split Loss	Insertion Loss	Weight
SM-2-6F-NF-02	3dB typical	0.3dB typical	370g/pce
SM-3-6F-NF-02	4.8dB typical	0.5dB typical	600g/pce
SM-4-6F-NF-02	6.0dB typical	0.4dB typical	620g/pce

Cavity Coupler

Cavity coupler unevenly split high power cellular signals from 5dB to 40dB with minimal reflections or loss over the whole band 800-2500MHz or 800-2700MHz. Designed without resistive components and soldering joint, the loss is minimized and reliability enhanced. All of them are conformance to IP65 standard. Its mechanical shape allows to be fixed on the wall or the pole easily. The ultra frequency range allows use with multi-band antennas and leaky cable systems..

Main Feature

- Low Insertion Loss
- High Return Loss
- High Power handling
- Low PIM
- High reliability
- Complete Coupling Series
- Waterproof IP65
- Low cost design for ease of mounting to pole or wall

Cavity Coupler(2.5G)

Frequency range	800-2500
Impedance	50Ω
Return loss/VSWR	≤-16.5dB/1.35 for 5, 6, 7, 10, 15dB
	≤-23.1dB/1.15 for 20, 25, 30, 40dB
Power handling	200W
PIM	-150dBc@2X20W
Connector type	N Female
Temperature range	-35℃~+75℃
Relative humidity	0 to 95%
Packing	1 Pce in box

Part Number	Coupling attenuation	Insertion Loss	Weight
C-5-6F-NF	5±0.6dB	1.7±0.5dB	370g typical
C-6-6F-NF	6±0.7dB	1.3±0.4dB	370g typical
C-7-6F-NF	7±0.8dB	1.0±0.3dB	370g typical
C-10-6F-NF	10±1.0dB	0.5±0.3dB	370g typical
C-13-6F-NF	13±1.0dB	0.3±0.3dB	370g typical
C-15-6F-NF	15±1.2dB	0.2±0.2dB	370g typical
C-20-6F-NF	20±1.5dB	0.1±0.1dB	180g typical
C-25-6F-NF	25±1.5dB	0.1±0.1dB	180g typical
C-30-6F-NF	30±1.5dB	0.1±0.1dB	180g typical
C-40-6F-NF	40±1.5dB	0.1±0.1dB	180g typical

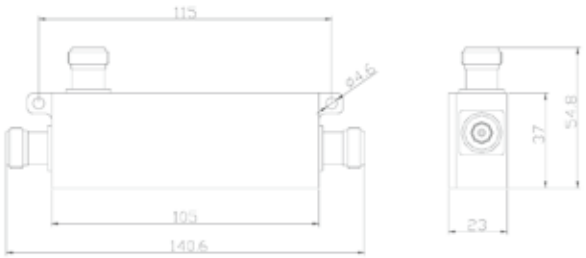
Cavity Coupler(2.7G)

Frequency range	800-2700
Impedance	50Ω
Return loss/VSWR	≤-19dB/1.25
Power handling	200W
PIM	-150dBc@2X20W
Connector type	N Female
Temperature range	-35℃~+75℃
Relative humidity	0 to 95%
Packing	1 Pce in box

Part Number	Coupling attenuation	Insertion Loss	Weight
C-6-7F-NF	6±0.7dB	1.3±0.4dB	370g typical
C-7-7F-NF	7±0.8dB	1.0±0.3dB	370g typical
C-10-7F-NF	10±1.0dB	0.5±0.3dB	370g typical
C-13-7F-NF	13±1.0dB	0.3±0.3dB	370g typical
C-15-7F-NF	15±1.2dB	0.2±0.2dB	370g typical
C-20-7F-NF	20±1.5dB	0.1±0.1dB	180g typical
C-25-7F-NF	25±1.5dB	0.1±0.1dB	180g typical
C-30-7F-NF	30±1.5dB	0.1±0.1dB	180g typical
C-40-7F-NF	40±1.5dB	0.1±0.1dB	180g typical

Microstrip Directional Coupler

Directional coupler is a stripline design for indoor/outdoor applications covering all the wireless services from 800 to 2500MHz. Units coupler off a defined fraction of signal with minimal reflections of loss. All of them are conformance to IP65 specification. Its mechanical shape allows to be fixed on the wall or the pole easily. The ultra frequency range allows use with multi-band antennas and leaky cable systems.



Main Feature

- Low Insertion Loss
- High Return Loss
- High Power handling
- Low PIM
- High reliability
- Complete Coupling Series
- Waterproof IP65
- Low cost design for ease of mounting to pole or wall

Microstrip Directional Coupler

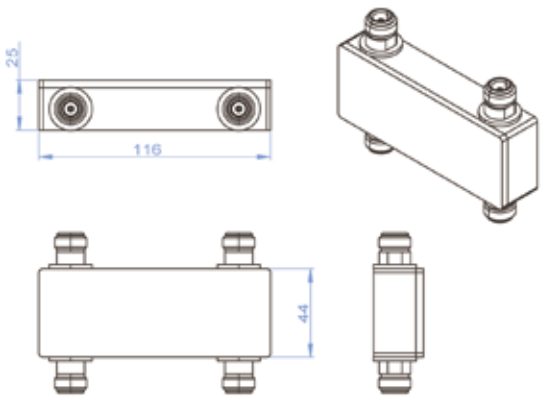
Frequency range	800-2500MHz
Impedance	50Ω
Return loss/VSWR	≤-20.8dB/1.20
Power handling	200W
PIM	-140dBc@2X20W
Connector type	N Female
Temperature range	-20℃~+75℃
Relative humidity	0 to 95%
Packing	1 Pce in box

Part Number	Coupling attenuation	Insertion Loss	Weight
DC-5-6F-NF	5±0.8dB	2.3dB	300g typical
DC-6-6F-NF	6±0.8dB	1.7dB	300g typical
DC-7-6F-NF	7±0.8dB	1.5dB	300g typical
DC-10-6F-NF	10±1.0dB	0.8dB	300g typical
DC-13-6F-NF	13±1.0dB	0.5dB	300g typical
DC-15-6F-NF	15±1.0dB	0.4dB	300g typical
DC-20-6F-NF	20±1.0dB	0.2dB	300g typical
DC-25-6F-NF	25±1.0dB	0.2dB	300g typical
DC-30-6F-NF	30±1.0dB	0.2dB	430g typical
DC-40-6F-NF	40±1.0dB	0.2dB	430g typical

Hybrid Coupler

Hybrid coupler is a passive device used in radio and telecommunications. It is a type of directional coupler where the input power is equally divided between two output ports.

It is designed for decoupled combining of two transmitters/ receiver units with the same frequency range at 3dB loss. It can also work as a combiner component to combine two signals to a common port or to split an incoming signal equally to two output ports.



Main Feature

- Guaranteed PIM performance
- High Isolation, Low VSWR and Loss
- Wide Band from 800-2500MHz or 800-2700MHz
- High reliability, Moisture sealed
- RoHS complaint

Part Number	HM-3-7F-NF	HM-3-6F-NF
Frequency range	800-2700MHz	800-2500MHz
Coupling attenuation	3.1±0.4dB	3.1±0.2dB
Return loss, all ports	22dB	22dB
Input Isolation	23dB	23dB
Power handling	160W max	160W max
Intermodulation, 2x 43dBm Tx Carriers at BTS port	-140dBC	-140dBC
Impedance	50Ω	50Ω
Operating temperature range	-35℃~+75℃	-35℃~+75℃
Environmental sealing	IP65 ventilated	IP65 ventilated
Connector	N Female	N Female

Attenuator

Coaxial fixed attenuators are used in absorbing energy of transmission line, expanding power range and controlling power level, they are also used in accurately measuring power or spectrum of RF microwave transmitters accompany with small power meter, comprehensive tester or spectrum analyzer.

Coaxial fixed attenuators feature wide frequency band, low VSWR, flatness attenuation value, excellent capacity in anti-pulse and anti-burnout etc.

Main Feature

- Wide frequency band
- Low VSWR
- Excellent capacity in anti-pulse and anti-burnout

2W, 5W Attenuator

Technical Specification	
Frequency range	DC-3GHz
VSWR	1.2 maximum
Impedance	50Ω
Connector	N Male to N Female
Relative humidity	0 to 95%
Application	Indoor

Order Number	Power Rating (W@25℃)	Attenuation (dB)	Weight (g)
A-3-2-N	2	3±0.3	100 typical
A-6-2-N	2	6±0.3	100 typical
A-10-2-N	2	10±0.5	100 typical
A-15-2-N	2	15±0.7	100 typical
A-20-2-N	2	20±0.7	100 typical
A-30-2-N	2	30±1.0	100 typical
A-3-5-N	5	3±0.3	100 typical
A-6-5-N	5	6±0.3	100 typical
A-10-5-N	5	10±0.5	100 typical
A-15-5-N	5	15±0.7	100 typical
A-20-5-N	5	20±0.7	100 typical
A-30-5-N	5	30±1.0	100 typical

25W, 30W Attenuator

Technical Specification	
Frequency range	DC-3GHz
VSWR	1.2 maximum
Impedance	50Ω
Connector	N Male to N Female
Relative humidity	0 to 95%
Application	Indoor

Order Number	Power Rating (W@25℃)	Attenuation (dB)	Weight (g)
A-3-25-N	25	3±0.4	150 typical
A-6-25-N	25	6±0.4	150 typical
A-10-25-N	25	10±0.6	150 typical
A-15-25-N	25	15±0.8	150 typical
A-20-25-N	25	20±1.0	150 typical
A-30-25-N	25	30±1.2	150 typical
A-3-30-N	30	3±0.4	150 typical
A-6-30-N	30	6±0.4	150 typical
A-10-30-N	30	10±0.6	150 typical
A-15-30-N	30	15±0.8	150 typical
A-20-30-N	30	20±1.0	150 typical
A-30-30-N	30	30±1.2	150 typical

10W, 15W Attenuator

Technical Specification	
Frequency range	DC-3GHz
VSWR	1.2 maximum
Impedance	50Ω
Connector	N Male to N Female
Relative humidity	0 to 95%
Application	Indoor

Order Number	Power Rating (W@25℃)	Attenuation (dB)	Weight (g)
A-3-10-N	10	3±0.4	100 typical
A-6-10-N	10	6±0.4	100 typical
A-10-10-N	10	10±0.5	100 typical
A-15-10-N	10	15±0.7	100 typical
A-20-10-N	10	20±0.7	100 typical
A-30-10-N	10	30±1.0	100 typical
A-3-15-N	15	3±0.4	100 typical
A-6-15-N	15	6±0.4	100 typical
A-10-15-N	15	10±0.5	100 typical
A-15-15-N	15	15±0.7	100 typical
A-20-15-N	15	20±0.7	100 typical
A-30-15-N	15	30±1.0	100 typical

50W Attenuator

Technical Specification	
Frequency range	DC-3GHz
VSWR	1.25 maximum
Impedance	50Ω
Connector	N Male to N Female
Relative humidity	0 to 95%
Application	Indoor

Order Number	Power Rating (W@25℃)	Attenuation (dB)	Weight (g)
A-3-50-N	50	3±0.5	1200 typical
A-6-50-N	50	6±0.5	1200 typical
A-10-50-N	50	10±0.7	1200 typical
A-15-50-N	50	15±1.0	1200 typical
A-20-50-N	50	20±1.0	1200 typical
A-30-50-N	50	30±1.2	1200 typical

Termination Load

Coaxial fixed terminations absorb RF& microwave energy and are commonly used as dummy loads of antenna and transmitter. They are also used as match ports in many multi-port microwave devices such as circulators and directional couplers to make these ports which are not involved in the measurement be terminated in their characteristic impedance in order to ensure an accurate measurement.

Main Feature

- DC-18GHz available.
- Wide frequency band
- Low VSWR
- N and 7-16 DIN type connectors are available
- Excellent capacity in anti-pulse and anti-burnout

Termination Load

Technical Specification	
Frequency range	DC-3GHz
VSWR	1.25 maximum
Impedance	50Ω
Temperature range	-35℃~+45℃
Relative humidity	0 to 95%
Application	Indoor

Order Number	Power Rating(W@25℃)	Connector	Weight(g)
L-2-NM	2	N Male	55 typical
L-5-NM	5	N Male	70 typical
L-10-NM	10	N Male	130 typical
L-10-NF	10	N Female	130 typical
L-15-NM	15	N Male	160 typical
L-15-NF	15	N Female	160 typical
L-20-NM	20	N Male	160 typical
L-20-NF	20	N Female	160 typical
L-25-NM	25	N Male	160 typical
L-25-NF	25	N Female	160 typical
L-30-NM	30	N Male	270 typical
L-30-NF	30	N Female	270 typical
L-50-NM	50	N Male	390 typical
L-50-NF	50	N Female	390 typical
L-100-NM	100	N Male	1500 typical
L-100-NF	100	N Female	1500 typical
L-20-DM	20	7-16 DIN Male	190 typical
L-20-DF	20	7-16 DIN Female	190 typical
L-25-DM	25	7-16 DIN Male	190 typical
L-25-DF	25	7-16 DIN Female	190 typical
L-30-DM	30	7-16 DIN Male	410 typical
L-30-DF	30	7-16 DIN Female	410 typical
L-50-DM	50	7-16 DIN Male	450 typical
L-50-DF	50	7-16 DIN Female	450 typical
L-100-DM	100	7-16 DIN Male	450 nomina
L-100-DF	100	7-16 DIN Female	450 typical

WIFI PRODUCT

WiFi(Wireless Fidelity) is one protocol which is capable of connecting to internet by wireless communication.

It can provide wireless wide band service for mobile users in hot spots such as office, meeting room, etc. The auto-sensing capability of the Wireless Access Point allows packet transmission up to 54Mbps for maximum data rate, or automatic speed reduction to lower speeds when the environment does not permit maximum data rate.

Main Feature

- Supports both 802.11b and 802.11g wireless stations
- Bridge mode support
- Client/Repeater access point
- Simple configuration
- DHCP client support
- Security profiles
- Multiple SSID isolation
- VLAN support
- WEP support
- WPA support
- 802.1x support
- Radius client support
- Radius MAC authentication
- Rogue AP detection
- Access control
- Password-protected configuration.

WIFI Access Point (AP)

	Uplink	Downlink
Frequency range	2400–2483.5MHz	
Wireless medium	DSSS, OFDM	
Network standard	IEEE802.11b, IEEE 802.11g	
Data rate	IEEE802.11b: 1/2/5.5/11Mbps	
	IEEE802.11g: 6/9/12/18/24/36/48/54Mbps	
Output power	20/27dBm	
Sensitivity	-88dBm@11Mbps, PER<8%;	
	-74dBm@54Mbps, PER<10%	
Protocol supported	CSMA/CA, TCP/IP, IPX/SPX, NetBEUI, DHCP, NDIS3, NDIS4, NDIS5	
Operating mode	AP/CPE(Infrastructure and Ad Hoc)/Repeater/WDS PtP and PtMP	
DHCP	DHCP server/client available	
Base on web technology	Available	
Multiple SSID	Available	
VLAN	Available	
Operating management function	Available	
MAC address control	Available	
WEP encryption	64-bit/128-bit/152-bit WEP data encryption	
WPA(Wi-Fi Protected Access)	Available	
802.1x	Available	
Ethernet type	RJ-45	
Antenna connector type	N female/SMA, external	
Impedance	50Ω	
Power supply	DC48V, 1.2A(Max.); AC adapter AC 100V~ 240V	
Power consumption rating	≤2000mA@12V DC	
Operating temperature	-20℃~+60℃	
Relative humidity	≤95%	
Standard	1 Pce in box	
Weight	3Kg/0.53Kg	

Part Number	**AP-27-24-SM**	**AP-20-24-SM**
Downlink output power	27dBm	20dBm

WIFI Line Amplifier

AM-27-24-NF			
		Reverse	Forward
Frequency range		2400-2500MHz	
Cellular standard		TDD	
Output power max		27±1dBm	
Gain		15dB typical	
Gain control range		15dB/1dB step	
Ripple in band		≤2.0dB	
Noise figure		≤3.5dB typical	
VSWR		≤1.8 : 1	
Switch time		≤1.5μS	
Spurious emission	30~1GHz	≤-36dBm/100kHz	
	2.4~2.4835GHz	≤-33dBm/100kHz	
	1.9~2.2GHz	≤-40dBm/1MHz	
	3.4~3.53GHz	≤-40dBm/1MHz	
	Others 1GHz~12.75GHz	≤-30dBm/1MHz	
Impedance		50Ω	
Power supply		AC220V±30% 50Hz±10%	
Power consumption rating		≤1000mA@7.5VDC	
Operating temperature		-30℃~+70℃	
Humidity		0 to 95%	
Dimension(H×W×D)		92x78x20mm	
Connector		N type, Female	

IBS ANTENNA

Vpol 806-960/1710-2500 3dBi 360º Ceiling Antenna

Part Number	S-Wave 6F-OD-3
Frequency range	806-960MHz/1710-2500MHz
VSWR	<1.5
Connector type	1×N(F)
Gain	>3
Polarization	Vertical
Impedance	50Ω
Max. power per input	50W
Weight	0.5Kg
Dimension	Ø190×100MM
Pigtail	300MM
Mounting	On ceiling

Vpol 806-960/1710-2700 3dBi 360º Ceiling Antenna

Part Number	S-Wave 7FW-OD-3-L500
Frequency range	806-960MHz/1710-2700MHz
VSWR	<1.5
Connector type	1×N(F)
Gain	3dBi
Polarization	Vertical
Impedance	50Ω
Max. power per input	50W
Weight	0.5Kg
Dimension	Ø190×100MM
Pigtail	500MM
Mounting	On ceiling

Vpol 806-960/1710-2500 3/5dBi 360º Ceiling Antenna

Part Number	S-Wave 6F-OD-3/5-A
Frequency range	806-960MHz/1710-2500MHz
VSWR	<1.4
Connector type	1×N(F)
Gain	3/5dBi
Polarization	Vertical
Impedance	50Ω
Max. power per input	50W
Weight	0.5Kg
Dimension	Ø160×130MM
Mounting	On ceiling

Vpol 806-960/1710-2500 3dBi 180º Ceiling Antenna

Part Number	S-Wave 6F-180-4/4.5
Frequency range	806-960MHz/1710-2500MHz
VSWR	<1.5
Connector type	1×N(F)
Gain	4/4.5dBi
Polarization	Vertical
Horizontal-3dB beamwidth	180º
Impedance	50Ω
Max. power per input	50W
Weight	0.5Kg
Dimension	Ø160×130MM
Mounting	On ceiling

Vpol 806-960/1710-2500 90º Directional Antenna

Part Number	S-Wave 6F-90-7
Frequency range	806-960MHz/1710-2500MHz
VSWR	<1.5
Connector type	1×N(F)
Gain	6dBi(806-960MHz)
	9dBi(1710-2300MHz)
	10dBi(2300-2500MHz)
Polarization	Vertical
Horizontal-3dB beamwidth	95º(806-960MHz)
	65º(1710-2300MHz)
	40º(2300-2500MHz)
Vertical-3dB beamwidth	80º(806-960MHz)
	55º(1710-2300MHz)
	50º(2300-2500MHz)
Impedance	50Ω
Max. power per input	100W
Weight	0.9Kg
Dimension	210×180×44MM
Pigtail	300MM
Mounting	On wall

Vpol 806-960/1710-2700 60º Directional Antenna

Part Number	S-Wave 7FW-60-7-L500
Frequency range	806-960MHz, 1710-2700MHz
VSWR	<1.8
Connector type	1×N(F)
Gain	7dBi
Polarization	Vertical
Horizontal-3dB beamwidth	65º
Vertical-3dB beamwidth	60º
Impedance	50Ω
Max. power per input	100W
Weight	0.9Kg
Dimension	210×180×44MM
Pigtail	500MM
Mounting	On wall

Vpol 806-960 12dBi Yagi Antenna

Part Number	S-Wave 0809-12-YG
Frequency range	806-960MHz
VSWR	≤1.5
Connector type	1×N(F)
Gain	12dBi
Polarization	Vertical
Horizontal-3dB beamwidth	46±4°
Vertical-3dB beamwidth	45±4°
Front to back ratio	≥14
Impedance	50Ω
Max. power per input	100W
Weight	0.49Kg
Dimension	773MM
Pigtail	380MM
Mounting pipe	Ø40-Ø50MM
Rated wind velocity	200Km/h

Vpol 1710-1880 12dBi Yagi Antenna

Part Number	S-Wave 18-12-YG
Frequency range	1710-1880MHz
VSWR	≤1.5
Connector type	1×N(F)
Gain	12dBi
Polarization	Vertical
Horizontal-3dB beamwidth	50±5°
Vertical-3dB beamwidth	40±5°
Front to back ratio	≥14
Impedance	50Ω
Max. power per input	100W
Weight	0.426Kg
Dimension	584MM
Pigtail	300MM
Mounting pipe	Ø40-Ø50MM
Rated wind velocity	200Km/h

Vpol 1710-2170 13dBi Yagi Antenna

Part Number	S-Wave U-13-YG
Frequency range	1710-2170MHz
VSWR	≤1.5
Connector type	1×N(F)
Gain	13dBi
Polarization	Vertical
Horizontal-3dB beamwidth	41±5°
Vertical-3dB beamwidth	36±5°
Front to back ratio	≥14
Impedance	50Ω
Max. power per input	100W
Weight	0.45Kg
Dimension	847MM
Pigtail	300MM
Mounting pipe	Ø40-Ø50MM
Rated wind velocity	200Km/h

Vpol 824-960/1710-2500 Directional Antenna

Part Number	S-Wave M6F-90-BD01-7
Frequency range	824-960MHz/1710-2500MHz
VSWR	<1.5
Connector type	1×N(F)
Gain	4-5dBi(824-960MHz)
	7.5±1dBi(1710-2500MHz)
Polarization	Vertical
Horizontal-3dB beamwidth	63-89°(824-960MHz)
	45-75°(1710-2500MHz)
Vertical-3dB beamwidth	75-102°(824-960MHz)
	45-75°(1710-2500MHz)
Impedance	50Ω
Max. power per input	100W
Weight	0.5Kg
Dimension	200×210×85MM
Pigtail	300MM
Mounting	On wall

Vpol 824-960/1710-2500 Directional Antenna

Part Number	S-Wave M6F-90-BH01-7
Frequency range	824-960MHz/1710-2500MHz
VSWR	<1.5
Connector type	1×N(F)
Gain	4.5-7dBi
Polarization	Vertical
Horizontal-3dB beamwidth	45-89°
Vertical-3dB beamwidth	45-130°
Impedance	50Ω
Max. power per input	20W
Weight	1.7Kg
Dimension	420×320×28MM
Pigtail	300MM
Mounting	On wall

Vpol 824-960/1710-2500 Omni Antenna

Part Number	S-Wave M6F-OD-CPD01-4.5/7
Frequency range	824-960MHz/1710-2500MHz
VSWR	<1.5
Connector type	1×N(F)
Gain	4.5dBi(824-960MHz) / 7dBi(1710-2500MHz)
Polarization	Vertical
Horizontal-3dB beamwidth	360°
Vertical-3dB beamwidth	30-48°(824-960MHz) / 16-25°(1710-2500MHz)
Elevation	20±5°(824-960MHz) / 11±3°(1710-2500MHz)
Impedance	50Ω
Max. power per input	200W
Weight	5Kg
Dimension	Φ200×1000MM
Pigtail	300MM

Vpol 824-960/1710-2500 Omni Antenna

Part Number	S-Wave M6F-OD-MG01-3
Frequency range	824-960MHz/1710-2500MHz
VSWR	<1.5
Connector type	1×N(F)
Gain	3/4dBi
Polarization	Vertical
Horizontal-3dB beamwidth	360°
Vertical-3dB beamwidth	65-102/40-65°
Elevation	6-17°
Impedance	50Ω
Max. power per input	100W
Weight	0.4Kg
Dimension	Φ100×240MM
Pigtail	300MM

Vpol 806-960/1710-2500 Directional Antenna

Part Number	S-Wave M6F-70-CPP01-9
Frequency range	824-960MHz/1710-2500MHz
VSWR	<1.5
Connector type	1×N(F)
Gain	8-10dBi
Polarization	Vertical
Horizontal-3dB beamwidth	61-68°(824-960MHz) / 70-110°(1710-2500MHz)
Vertical-3dB beamwidth	60-72°(824-960MHz) / 29-80°(1710-2500MHz)
Impedance	50Ω
Max. power per input	20W
Weight	3.8Kg
Dimension	400×300×75MM
Pigtail	300MM
Mounting	On wall

S-Wave® Base Station Antenna Solution

Netop S-Wave® antenna solution covers frequencies from 700MHz to 2500MHz. It is designed to meet the toughest application and functional operation requirements covering narrow band, broadband and multi-band models. Every antenna series is based on the experience and solid theoretical knowledge of our strong R&D team. Through extensive testing, simulation and optimization, Netop S-Wave® antenna guarantees excellent mechanical and electrical performance. Netop is committed to supplying high quality and cost effective antenna solutions.

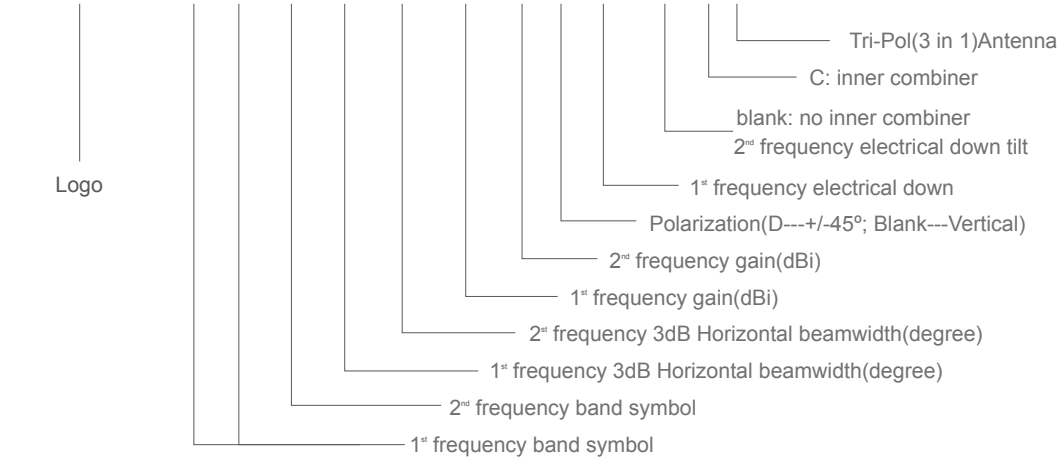
Design Philosophy

Netop adopts state-of-the-art simulation tools, e.g. IE3d, HFSS, and Designer. Based on the comprehensive experience of our R&D team, we have developed our own Microwave CAD software. This will guarantee design efficiency and also improve analysis, optimization and integration of antenna radiation/circuits parameters.

Content

PRODUCT DESCRIPTION

S-Wave 0809/U-65/60-15/17DT3/T6CS



Frequency Band (MHz)	Symbol
698-896	07
806-896	08
870-960	09
806-960	0809
1710-1880	18
1850-1990	19
1710-2170	U
1920-2170	21

Electrical Down Tilt	Symbol
Fixed electrical downtilt	T
Manual adjustable variable electrical downtilt	V
No electrical down tilt	Blank

Antenna 700/800/900
Dual Polarization +45º/–45º

Type	Frequency	Horizontal Beamwidth	Gain	Tilt
S-Wave 08-30-20D	806-896	30º	20dBi	0º
S-Wave 08-30-20DT3	806-896	30º	20dBi	3º
S-Wave 08-30-20DT6	806-896	30º	20dBi	6º
S-Wave 09-30-20D	870-960	30º	20dBi	0º
S-Wave 09-30-20DT3	870-960	30º	20dBi	3º
S-Wave 09-30-20DT6	870-960	30º	20dBi	6º
S-Wave 0809-30-18.5D	806-960	30º	18.5dBi	0º
S-Wave 0809-30-18.5DT3	806-960	30º	18.5dBi	3º
S-Wave 0809-30-18.5DT6	806-960	30º	18.5dBi	6º
S-Wave 0809-30-21D	806-960	30º	21dBi	0º
S-Wave 0809-30-21DT3	806-960	30º	21dBi	3º
S-Wave 0809-30-21DT6	806-960	30º	21dBi	6º
S-Wave 07-65-14.5D	698-896	65º	14.5dBi	0º
S-Wave 07-65-14.5DT3	698-896	65º	14.5dBi	3º
S-Wave 07-65-14.5DT6	698-896	65º	14.5dBi	6º
S-Wave 08-65-15D	806-896	65º	15dBi	0º
S-Wave 08-65-15DT3	806-896	65º	15dBi	3º
S-Wave 08-65-15DT6	806-896	65º	15dBi	6º
S-Wave 08-65-17D	806-896	65º	17dBi	0º
S-Wave 08-65-17DT3	806-896	65º	17dBi	3º
S-Wave 08-65-17DT6	806-896	65º	17dBi	6º
S-Wave 08-65-18D	806-896	65º	18dBi	0º
S-Wave 08-65-18DT3	806-896	65º	18dBi	3º
S-Wave 08-65-18DT6	806-896	65º	18dBi	6º
S-Wave 09-65-15D	870-960	65º	15dBi	0º
S-Wave 09-65-15DT3	870-960	65º	15dBi	3º
S-Wave 09-65-15DT6	870-960	65º	15dBi	6º
S-Wave 09-65-17D	870-960	65º	17dBi	0º
S-Wave 09-65-17DT3	870-960	65º	17dBi	3º
S-Wave 09-65-17DT6	870-960	65º	17dBi	6º
S-Wave 09-65-18D	870-960	65º	18dBi	0º
S-Wave 09-65-18DT3	870-960	65º	18dBi	3º
S-Wave 09-65-18DT6	870-960	65º	18dBi	6º
S-Wave 0809-65-15D	806-960	65º	15dBi	0º
S-Wave 0809-65-15DT3	806-960	65º	15dBi	3º
S-Wave 0809-65-15DT6	806-960	65º	15dBi	6º
S-Wave 0809-65-16.5D	806-960	65º	16.5dBi	0º

Antenna 700/800/900
Dual Polarization +45º/–45º

Type	Frequency	Horizontal Beamwidth	Gain	Tilt
S-Wave 0809-65-16.5DT3	806-960	65º	16.5dBi	3º
S-Wave 0809-65-16.5DT6	806-960	65º	16.5dBi	6º
S-Wave 0809-65-18D	806-960	65º	18dBi	0º
S-Wave 0809-65-18DT3	806-960	65º	18dBi	3º
S-Wave 0809-65-18DT6	806-960	65º	18dBi	6º
S-Wave 08-65-15DV14	806-896	65º	15dBi	0º-14º
S-Wave 08-65-17.5DV8	806-896	65º	17.5dBi	0º-8º
S-Wave 09-65-15DV14	870-960	65º	15dBi	0º-14º
S-Wave 09-65-17.5DV8	870-960	65º	17.5dBi	0º-8º
S-Wave 0809-65-15DV14	806-960	65º	15dBi	0º-14º
S-Wave 0809-65-16.5DV10	806-960	65º	16.5dBi	0º-10º
S-Wave 0809-65-18DV8	806-960	65º	18dBi	0º-8º
S-Wave 08-90-17D	806-896	90º	17dBi	0º
S-Wave 08-90-17DT3	806-896	90º	17dBi	3º
S-Wave 08-90-17DT6	806-896	90º	17dBi	6º
S-Wave 09-90-17D	870-960	90º	17dBi	0º
S-Wave 09-90-17DT3	870-960	90º	17dBi	3º
S-Wave 09-90-17DT6	870-960	90º	17dBi	6º
S-Wave 0809-90-15.5D	806-960	90º	15.5dBi	0º
S-Wave 0809-90-15.5DT3	806-960	90º	15.5dBi	3º
S-Wave 0809-90-15.5DT6	806-960	90º	15.5dBi	6º
S-Wave 0809-90-17D	806-960	90º	17dBi	0º
S-Wave 0809-90-17DT3	806-960	90º	17dBi	3º
S-Wave 0809-90-17DT6	806-960	90º	17dBi	6º
S-Wave 0809-90-17DV10	806-960	90º	17dBi	0º-10º

Antenna 800/900
Vertical Polarization

Type	Frequency	Horizontal Beamwidth	Gain	Tilt
S-Wave 08-30-20	806-896	30°	20dBi	0°
S-Wave 08-30-20T3	806-896	30°	20dBi	3°
S-Wave 08-30-20T6	806-896	30°	20dBi	6°
S-Wave 09-30-20	870-960	30°	20dBi	0°
S-Wave 09-30-20T3	870-960	30°	20dBi	3°
S-Wave 09-30-20T6	870-960	30°	20dBi	6°
S-Wave 0809-30-20	806-960	30°	20dBi	0°
S-Wave 0809-30-20T3	806-960	30°	20dBi	3°
S-Wave 0809-30-20T6	806-960	30°	20dBi	6°
S-Wave 08-65-15	806-896	65°	15dBi	0°
S-Wave 08-65-15T3	806-896	65°	15dBi	3°
S-Wave 08-65-15T6	806-896	65°	15dBi	6°
S-Wave 08-65-17	806-896	65°	17dBi	0°
S-Wave 08-65-17T3	806-896	65°	17dBi	3°
S-Wave 08-65-17T6	806-896	65°	17dBi	6°
S-Wave 08-65-18	806-896	65°	18dBi	0°
S-Wave 08-65-18T3	806-896	65°	18dBi	3°
S-Wave 08-65-18T6	806-896	65°	18dBi	6°
S-Wave 09-65-15	870-960	65°	15dBi	0°
S-Wave 09-65-15T3	870-960	65°	15dBi	3°
S-Wave 09-65-15T6	870-960	65°	15dBi	6°
S-Wave 09-65-17	870-960	65°	17dBi	0°
S-Wave 09-65-17T3	870-960	65°	17dBi	3°
S-Wave 09-65-17T6	870-960	65°	17dBi	6°
S-Wave 09-65-18	870-960	65°	18dBi	0°
S-Wave 09-65-18T3	870-960	65°	18dBi	3°
S-Wave 09-65-18T6	870-960	65°	18dBi	6°

Antenna 1800/1900/2000
Dual Polarization +45º/–45º

Type	Frequency	Horizontal Beamwidth	Gain	Tilt
S-Wave 18-33-21D	1710-1880	33º	21dBi	0º
S-Wave 18-33-21DT3	1710-1880	33º	21dBi	3º
S-Wave 18-33-21DT6	1710-1880	33º	21dBi	6º
S-Wave 21-33-21D	1920-2170	33º	21dBi	0º
S-Wave 21-33-21DT3	1920-2170	33º	21dBi	3º
S-Wave 21-33-21DT6	1920-2170	33º	21dBi	6º
S-Wave U-33-21D	1710-2170	33º	21dBi	0º
S-Wave U-33-21DT3	1710-2170	33º	21dBi	3º
S-Wave U-33-21DT6	1710-2170	33º	21dBi	6º
S-Wave U-33-23D *	1710-2170	33º	23dBi	0º
S-Wave U-33-23DT3 *	1710-2170	33º	23dBi	3º
S-Wave U-33-23DT6 *	1710-2170	33º	23dBi	6º
S-Wave U-33-23DV7 *	1710-2170	33º	23dBi	0º-7º
S-Wave 18-65-18D	1710-1880	65º	18dBi	0º
S-Wave 18-65-18DT3	1710-1880	65º	18dBi	3º
S-Wave 18-65-18DT6	1710-1880	65º	18dBi	6º
S-Wave 18-65-19D	1710-1880	65º	19dBi	0º
S-Wave 18-65-19DT3	1710-1880	65º	19dBi	3º
S-Wave 18-65-19DT6	1710-1880	65º	19dBi	6º
S-Wave 21-65-18D	1920-2170	65º	18dBi	0º
S-Wave 21-65-18DT3	1920-2170	65º	18dBi	3º
S-Wave 21-65-18DT6	1920-2170	65º	18dBi	6º
S-Wave 21-65-19D	1920-2170	65º	19dBi	0º
S-Wave 21-65-19DT3	1920-2170	65º	19dBi	3º
S-Wave 21-65-19DT6	1920-2170	65º	19dBi	6º
S-Wave U-65-15.5D	1710-2170	65º	15.5dBi	0º
S-Wave U-65-15.5DT3	1710-2170	65º	15.5dBi	3º
S-Wave U-65-15.5DT6	1710-2170	65º	15.5dBi	6º
S-Wave U-65-18D	1710-2170	65º	18dBi	0º
S-Wave U-65-18DT3	1710-2170	65º	18dBi	3º
S-Wave U-65-18DT6	1710-2170	65º	18dBi	6º
S-Wave U-65-19D	1710-2170	65º	19dBi	0º
S-Wave U-65-19DT3	1710-2170	65º	19dBi	3º
S-Wave U-65-19DT6	1710-2170	65º	19dBi	6º
S-Wave U-65-21D *	1710-2170	65º	21dBi	0º
S-Wave U-65-21DT3 *	1710-2170	65º	21dBi	3º
S-Wave U-65-21DT6 *	1710-2170	65º	21dBi	6º
S-Wave 18-65-17.5DV10	1710-1880	65º	17.5dBi	0º-10º
S-Wave 21-65-17.5DV10	1920-2170	65º	17.5dBi	0º-10º
S-Wave U-65-15DV14	1710-2170	65º	15dBi	0º-14º
S-Wave U-65-18DV10	1710-2170	65º	18dBi	0º-10º
S-Wave U-65-21DV7 *	1710-2170	65º	21dBi	0º-7º

*: New product: High Gain Antenna

Antenna 1800/1900/2000
Dual Polarization +45º/–45º

Type	Frequency	Horizontal Beamwidth	Gain	Tilt
S-Wave U-90-17D	1710-2170	90º	17dBi	0º
S-Wave U-90-17DT3	1710-2170	90º	17dBi	3º
S-Wave U-90-17DT6	1710-2170	90º	17dBi	6º
S-Wave U-90-17DV10	1710-2170	90º	17dBi	0º-10º

Antenna 1800/1900/2000
Vertical Polarization

Type	Frequency	Horizontal Beamwidth	Gain	Tilt
S-Wave 18-65-18	1710-1880	65º	18dBi	0º
S-Wave 18-65-18T3	1710-1880	65º	18dBi	3º
S-Wave 18-65-18T6	1710-1880	65º	18dBi	6º
S-Wave 21-65-18	1920-2170	65º	18dBi	0º
S-Wave 21-65-18T3	1920-2170	65º	18dBi	3º
S-Wave 21-65-18T6	1920-2170	65º	18dBi	6º
S-Wave U-65-18	1710-2170	65º	18dBi	0º
S-Wave U-65-18T3	1710-2170	65º	18dBi	3º
S-Wave U-65-18T6	1710-2170	65º	18dBi	6º

Dual Band Antenna --2 ports(with Inner Combiner)
Dual Polarization +45º/–45º

Type	Frequency	Horizontal Beamwidth	Gain	Tilt
S-Wave 0809/U-65-14/17DC	806-960	65º	14dBi	0º
	1710-2170	65	17dBi	0º
S-Wave 0809/U-65-14/17DT2/T6C	806-960	65º	14dBi	2º
	1710-2170	65	17dBi	6º
S-Wave 0809/U-65-16/18DC	806-960	65º	16dBi	0º
	1710-2170	65	18dBi	0º
S-Wave 0809/U-65-16/18DT6C	806-960	65º	16dBi	6º
	1710-2170	65	18dBi	6º
S-Wave 0809/U-65-17/18DC	806-960	65º	17dBi	0º
	1710-2170	65	18dBi	0º
S-Wave 0809/U-65-17/18DT6C	806-960	65º	17dBi	6º
	1710-2170	65	18dBi	6º
S-Wave 0809/U-65-14/17DV14/V8C	806-960	65º	14dBi	0º-14º
	1710-2170	65	17dBi	0º-8º
S-Wave 0809/U-65-16/18DV8C	806-960	65º	16dBi	0º-8º
	1710-2170	65	18dBi	0º-8º
S-Wave 0809/U-65-17/18DV8C	806-960	65º	17dBi	0º-8º
	1710-2170	65	18dBi	0º-8º

Dual Band Antenna --4 ports
Dual Polarization +45º/–45º

Type	Frequency	Horizontal Beamwidth	Gain	Tilt
S-Wave 09/18-65-15/17D	870-960	65º	15dBi	0º
	1710-1880	65	17dBi	0º
S-Wave 09/18-65-15/17DT6	870-960	65º	15dBi	6º
	1710-1880	65	17dBi	6º
S-Wave 09/18-65-17/18D	870-960	65º	17dBi	0º
	1710-1880	65	18dBi	0º
S-Wave 09/18-65-17/18DT6	870-960	65º	17dBi	6º
	1710-1880	65	18dBi	6º
S-Wave 09/18-65-18D	870-960	65º	18dBi	0º
	1710-1880	65	18dBi	0º
S-Wave 09/18-65-18DT6	870-960	65º	18dBi	6º
	1710-1880	65	18dBi	6º
S-Wave 0809/U-65-15/17D	806-960	65º	15dBi	0º
	1710-2170	65	17dBi	0º
S-Wave 0809/U-65-15/17DT6	806-960	65º	15dBi	6º
	1710-2170	65	17dBi	6º
S-Wave 0809/U-65-17/18D	806-960	65º	17dBi	0º
	1710-2170	65	18dBi	0º
S-Wave 0809/U-65-17/18DT6	806-960	65º	17dBi	6º
	1710-2170	65	18dBi	6º
S-Wave 0809/U-65-18D	806-960	65º	18dBi	0º
	1710-2170	65	18dBi	0º
S-Wave 0809/U-65-18DT6	806-960	65º	18dBi	6º
	1710-2170	65	18dBi	6º
S-Wave U/U-65-18D	1710-2170	65º	18dBi	0º
	1710-2170	65	18dBi	0º
S-Wave U/U-65-18DT6	1710-2170	65º	18dBi	6º
	1710-2170	65	18dBi	6º
S-Wave 09/18-65-17/18DV8	870-960	65º	17dBi	0º-8º
	1710-1880	65º	18dBi	0º-8º
S-Wave 09/18-65-16/18DV8	870-960	65º	16dBi	0º-8º
	1710-1880	65º	18dBi	0º-8º
S-Wave 0809/U-65-17/18DV8	806-960	65º	17dBi	0º-8º
	1710-2170	65º	18dBi	0º-8º
S-Wave 0809/U-65-16/18DV8	806-960	65º	16dBi	0º-8º
	1710-2170	65º	18dBi	0º-8º
S-Wave U/U-65-18DV8	1710-2170	65º	18dBi	0º-8º
	1710-2170	65º	18dBi	0º-8º

Triple Band Antenna --6 ports
Dual Polarization +45°/-45°

Type	Frequency	Horizontal Beamwidth	Gain	Tilt
S-Wave 09/18/21-65-17.5/17.5/18.0DV8	870-960	65º	17.5dBi	0º-8º
	1710-1880	65º	17.5dBi	0º-8º
	1920-2170	65º	18.0dBi	0º-8º
S-Wave 0809/18/21-65-17.5/17.5/18.0DV8	870-960	65º	17.5dBi	0º-8º
	1710-1880	65º	17.5dBi	0º-8º
	1920-2170	65º	18.0dBi	0º-8º
S-Wave 0809/U/U-65-15/17/17DV12/V8/V8	806-960	65º	15dBi	0º-12º
	1710-2170	65º	17dBi	0º-8º
	1710-2170	65º	17dBi	0º-8º
S-Wave 0809/U/U-65-17.5/18/18DV8	806-960	65º	17.5dBi	0º-8º
	1710-2170	65º	18dBi	0º-8º
	1710-2170	65º	18dBi	0º-8º

Tri-Sector Antenna
Dual Polarization +45°/-45°

Type	Frequency	Horizontal Beamwidth	Gain	Tilt
S-Wave U/U/U-65-15DV14S	1710-2170	65º	15.0dBi	0º-14º
	1710-2170	65º	15.0dBi	0º-14º
	1710-2170	65º	15.0dBi	0º-14º
S-Wave U/U/U-65-18DV8S	1710-2170	65º	18.0dBi	0º-8º
	1710-2170	65º	18.0dBi	0º-8º
	1710-2170	65º	18.0dBi	0º-8º

Remote Control Unit

Type
S-Wave RCU-001
S-Wave RCU-002

Mounting Configuration

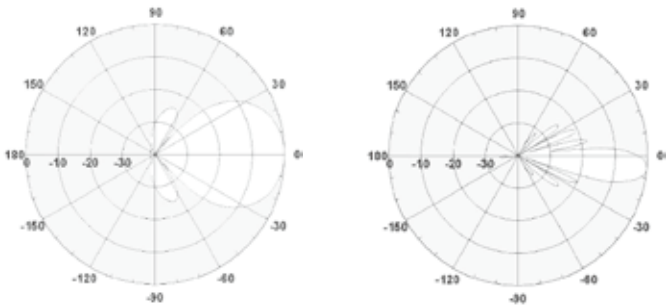
Type
S-Wave 67-1-mounting bracket
S-Wave 70-2-mounting bracket

PRODUCT SERIES

Antenna 700/800/900 Dual Polarization +45º/–45º

Xpol Panel 806-896 30º 20.0dBi FET0º, 3º, 6º

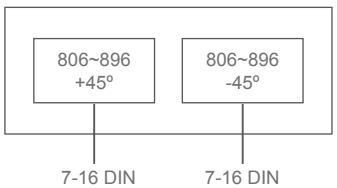
Part Number	S-Wave 08-30-20D S-Wave 08-30-20DT3 S-Wave 08-30-20DT6
Electrical Specification	
Frequency range	806-896MHz
Polarization	±45º
Gain	20.0dBi
Horizontal 3dB beam width	32º
Vertical 3dB beam width	9º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>28dB
Isolation	>30dB
Cross-polar ratio, 0º	>20dB
Impedance	50 Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W



Horizontal Pattern

Vertical Pattern

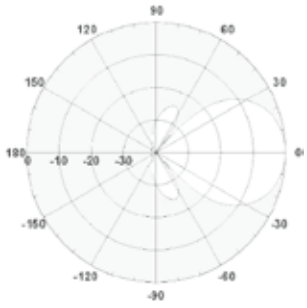
806-896MHz



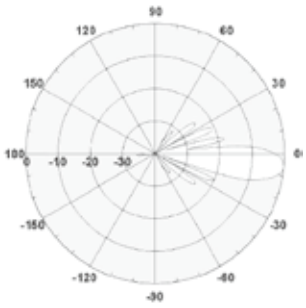
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	40Kg
Max. wind velocity	200Km/h
Dimension	2300×590×115MM

Xpol Panel 870-960 30º 20.0dBi FET0º, 3º, 6º

Part Number	S-Wave 09-30-20D S-Wave 09-30-20DT3 S-Wave 09-30-20DT6
Electrical Specification	
Frequency range	870-960MHz
Polarization	±45º
Gain	20dBi
Horizontal 3dB beam width	30º
Vertical 3dB beam width	8.5º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>28dB
Isolation	>30dB
Cross-polar ratio, 0º	>20dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

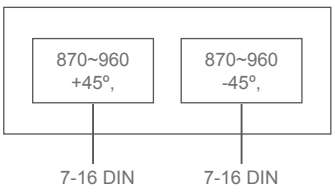


Horizontal Pattern



Vertical Pattern

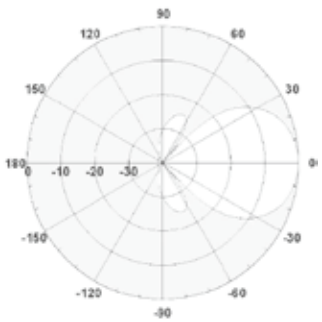
870-960MHz



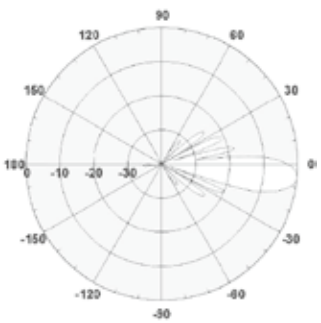
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	40Kg
Max. wind velocity	200Km/h
Dimension	2300×590×115MM

Xpol Panel 806-960 30º 18.5dBi FET0º, 3º, 6º

Part Number	S-Wave 0809-30-18.5D S-Wave 0809-30-18.5DT3 S-Wave 0809-30-18.5DT6	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	18dBi	18.5dBi
Horizontal 3dB beam width	31º	29º
Vertical 3dB beam width	15º	14º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB	>15dB
Front to back ratio, copolar	>30dB	>30dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.4	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	500W	

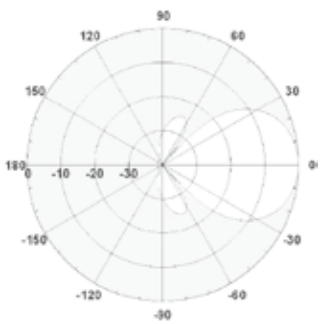


Horizontal Pattern

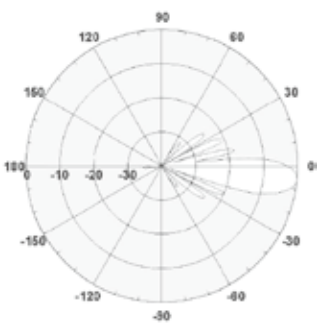


Vertical Pattern

806-896MHz

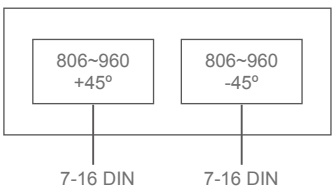


Horizontal Pattern



Vertical Pattern

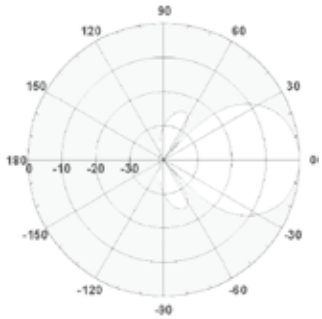
870-960MHz



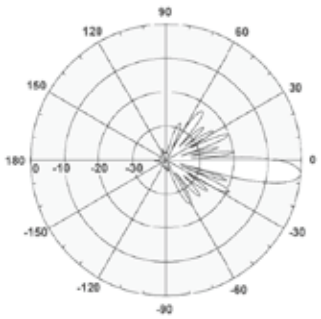
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	22Kg
Max. wind velocity	200Km/h
Dimension	1296×590×115MM

Xpol Panel 806-960 30º 21dBi FET0º, 3º, 6º

Part Number	S-Wave 0809-30-21D S-Wave 0809-30-21DT3 S-Wave 0809-30-21DT6	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	20dBi	20.5dBi
Horizontal 3dB beam width	31º	29º
Vertical 3dB beam width	8.5º	7.5º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB	>15dB
Front to back ratio, copolar	>30dB	>30dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.4	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	500W	

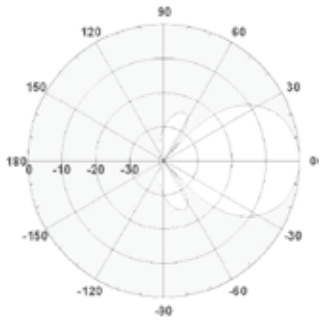


Horizontal Pattern

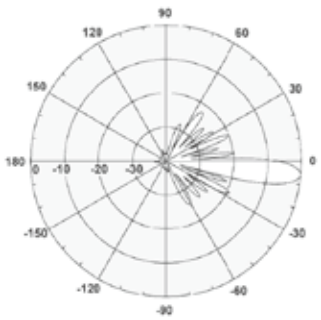


Vertical Pattern

806-896MHz

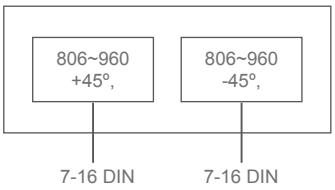


Horizontal Pattern



Vertical Pattern

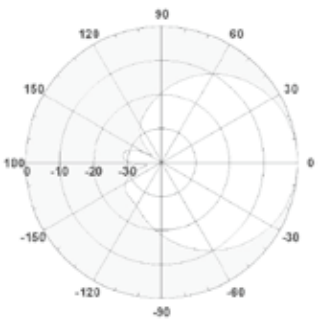
870-960MHz



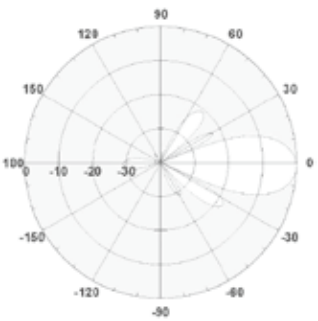
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	40Kg
Max. wind velocity	200Km/h
Dimension	2416×590×115MM

Xpol Panel 698-896 65º 14.5dBi FET0º, 3º, 6º

Part Number	S-Wave 07-65-14.5D S-Wave 07-65-14.5DT3 S-Wave 07-65-14.5DT6
Electrical Specification	
Frequency range	698-896MHz
Polarization	±45º
Gain	14.3dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	16º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>12dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

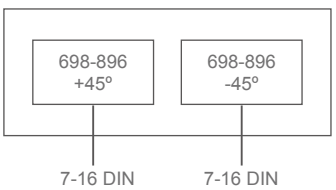


Horizontal Pattern



Vertical Pattern

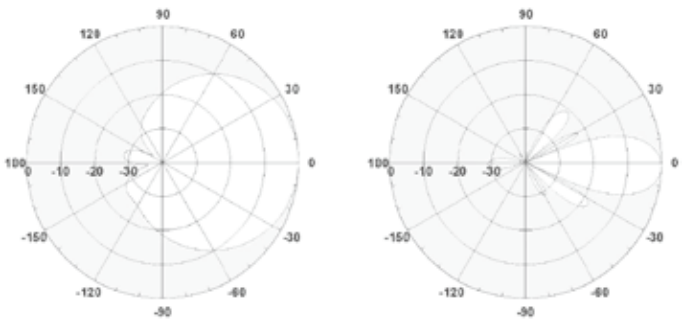
698-896MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	15Kg
Max. wind velocity	200Km/h
Dimension	1300×300×180MM

Xpol Panel 806-896 65º 15.0dBi FET0º, 3º, 6º

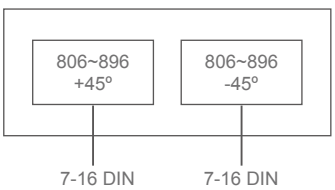
Part Number	S-Wave 08-65-15D S-Wave 08-65-15DT3 S-Wave 08-65-15DT6
Electrical Specification	
Frequency range	806-896MHz
Polarization	±45º
Gain	15dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	15º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W



Horizontal Pattern

Vertical Pattern

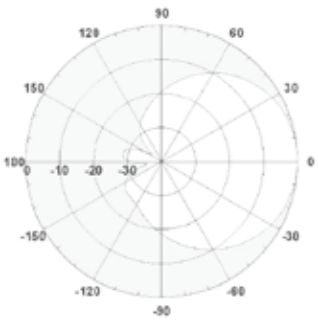
698-896MHz



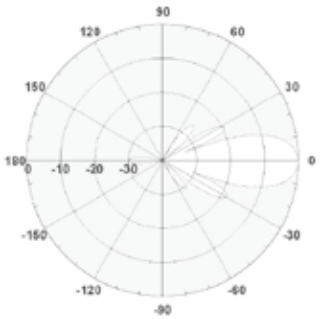
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	13Kg
Max. wind velocity	200Km/h
Dimension	1300×295×115MM

Xpol Panel 806-896 65º 17.0dBi FET0º, 3º, 6º

Part Number	S-Wave 08-65-17D S-Wave 08-65-17DT3 S-Wave 08-65-17DT6
Electrical Specification	
Frequency range	806-896MHz
Polarization	±45º
Gain	16.5dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	10º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

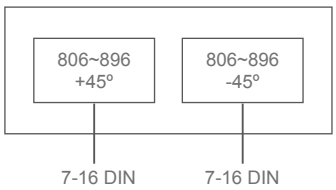


Horizontal Pattern



Vertical Pattern

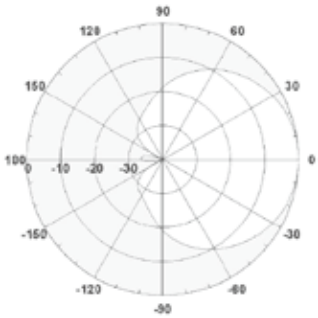
698-896MHz



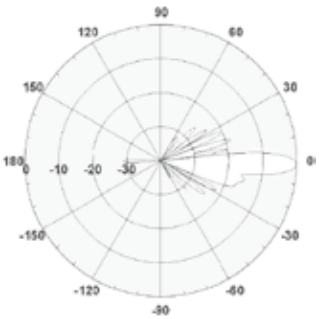
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	16Kg
Max. wind velocity	200Km/h
Dimension	1950×295×115MM

Xpol Panel 806-896 65º 18.0dBi FET0º, 3º, 6º

Part Number	S-Wave 08-65-18D S-Wave 08-65-18DT3 S-Wave 08-65-18DT6
Electrical Specification	
Frequency range	806-896MHz
Polarization	±45º
Gain	17.8dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	7.5º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

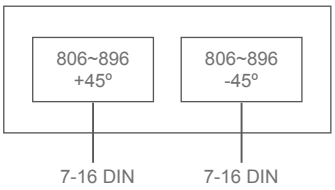


Horizontal Pattern



Vertical Pattern

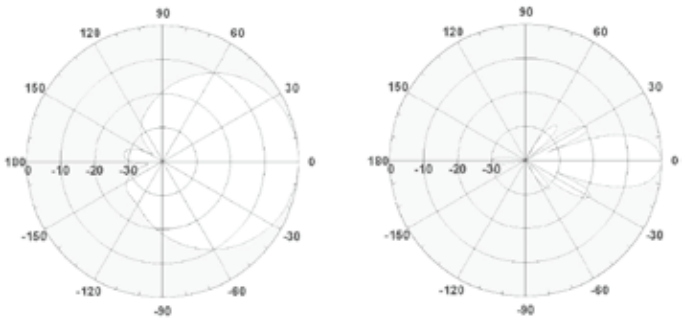
698-896MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	21Kg
Max. wind velocity	200Km/h
Dimension	2640×295×115MM

Xpol Panel 870-960 65º 15.0dBi FET0º, 3º, 6º

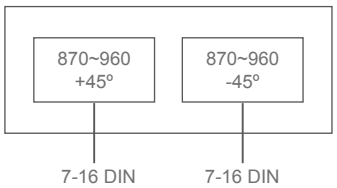
Part Number	S-Wave 09-65-15D S-Wave 09-65-15DT3 S-Wave 09-65-15DT6
Electrical Specification	
Frequency range	870-960MHz
Polarization	±45º
Gain	15dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	14º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W



Horizontal Pattern

Vertical Pattern

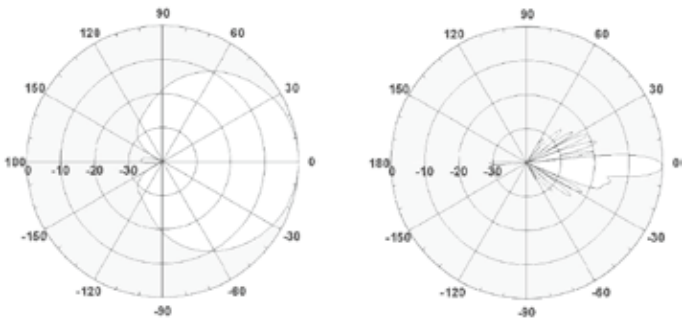
870-960MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	12Kg
Max. wind velocity	200Km/h
Dimension	1300×295×115MM

Xpol Panel 870-960 65º 17.0dBi FET0º, 3º, 6º

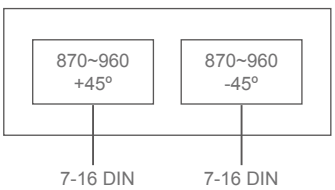
Part Number	S-Wave 09-65-17D S-Wave 09-65-17DT3 S-Wave 09-65-17DT6
Electrical Specification	
Frequency range	870-960MHz
Polarization	±45º
Gain	17dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	9.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W



Horizontal Pattern

Vertical Pattern

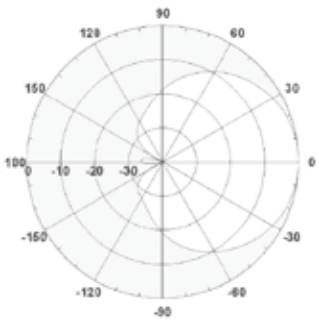
870-960MHz



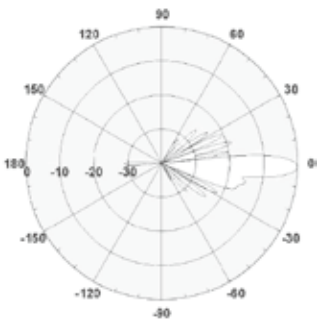
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	15Kg
Max. wind velocity	200Km/h
Dimension	1950×295×115MM

Xpol Panel 870-960 65º 18.0dBi FET0º, 3º, 6º

Part Number	S-Wave 09-65-18D S-Wave 09-65-18DT3 S-Wave 09-65-18DT6
Electrical Specification	
Frequency range	870-960MHz
Polarization	±45º
Gain	18.0dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	7.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

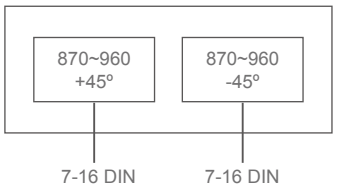


Horizontal Pattern



Vertical Pattern

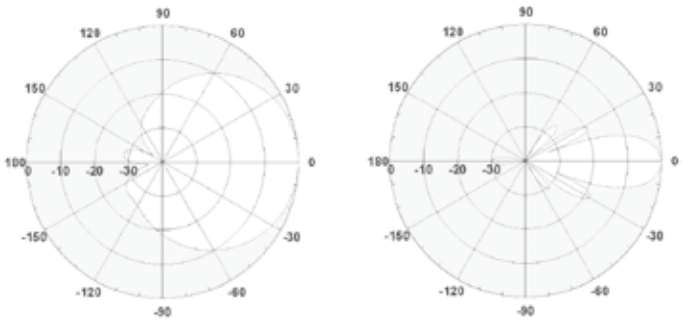
870-960MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	21Kg
Max. wind velocity	200Km/h
Dimension	2640×295×115MM

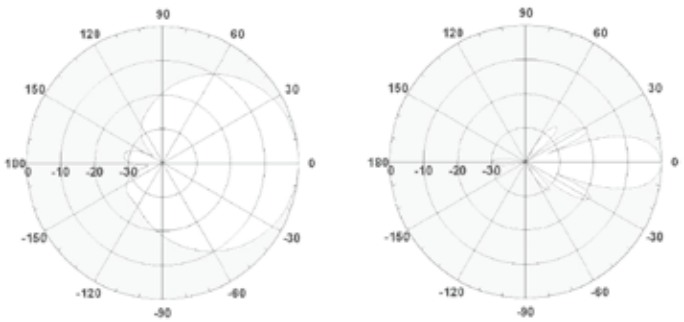
Xpol Panel 806-960 65º 15dBi FET0º, 3º, 6º

Part Number	S-Wave 0809-65-15D S-Wave 0809-65-15DT3 S-Wave 0809-65-15DT6	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	14.5dBi	15dBi
Horizontal 3dB beam width	68º	65º
Vertical 3dB beam width	16º	15º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.4	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	500W	



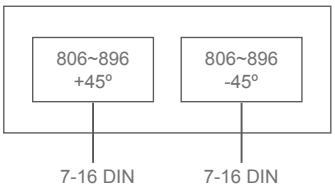
Horizontal Pattern Vertical Pattern

806-896MHz



Horizontal Pattern Vertical Pattern

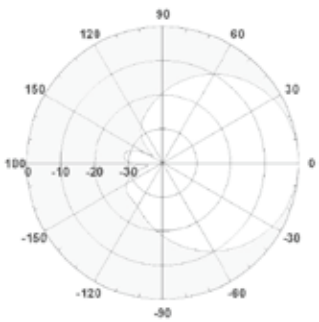
870-960MHz



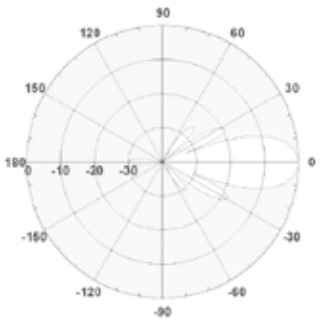
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	11Kg
Max. wind velocity	200Km/h
Dimension	1300×295×115MM

Xpol Panel 806-960 65º 16.5dBi FET0º, 3º, 6º

Part Number	S-Wave 0809-65-16.5D S-Wave 0809-65-16.5DT3 S-Wave 0809-65-16.5DT6	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	16dBi	16.5dBi
Horizontal 3dB beam width	68º	65º
Vertical 3dB beam width	10º	9º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB	>16dB
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.4	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	500W	

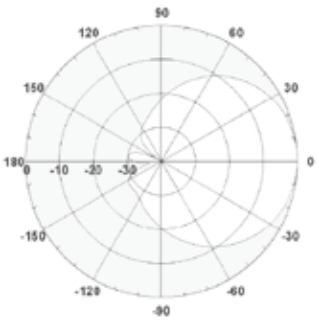


Horizontal Pattern

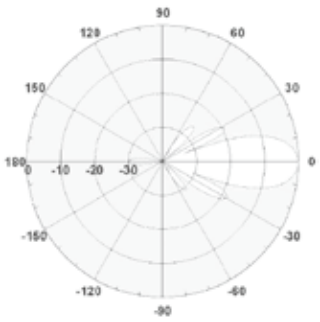


Vertical Pattern

806-896MHz

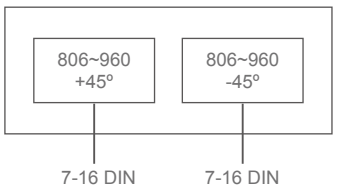


Horizontal Pattern



Vertical Pattern

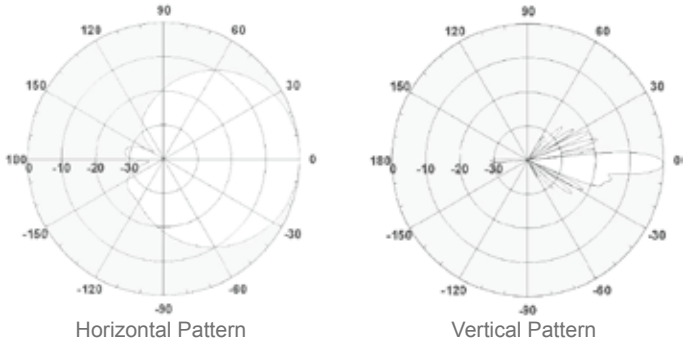
870-960MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	18Kg
Max. wind velocity	200Km/h
Dimension	1996×295×115MM

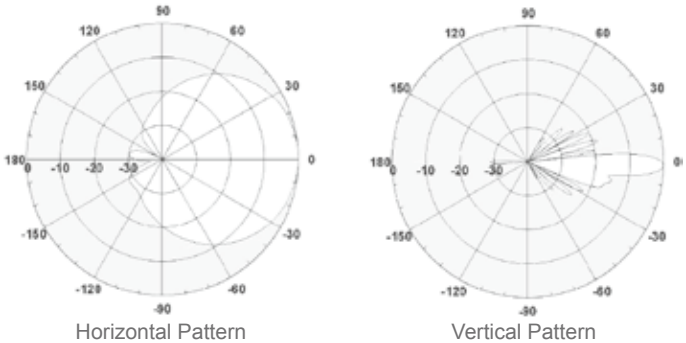
Xpol Panel 806-960 65º 18dBi FET0º, 3º, 6º

Part Number	S-Wave 0809-65-18D S-Wave 0809-65-18DT3 S-Wave 0809-65-18DT6	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	17.2dBi	17.5dBi
Horizontal 3dB beam width	68º	65º
Vertical 3dB beam width	7.5º	7º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB	>16dB
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.4	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	500W	



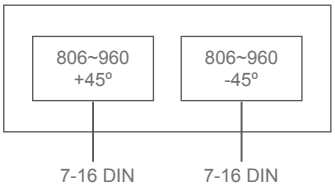
Horizontal Pattern　　Vertical Pattern

806-896MHz



Horizontal Pattern　　Vertical Pattern

870-960MHz

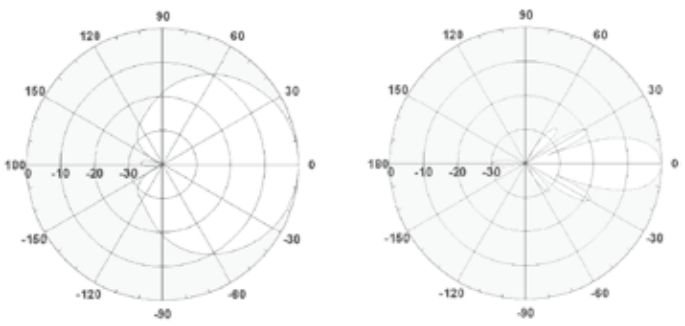


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	21Kg
Max. wind velocity	200Km/h
Dimension	2640×295×115MM

Xpol Panel 806-896 65º 15dBi VET0º-14º

Adjust. Electrical Downtilt set by hand or by optional RCU

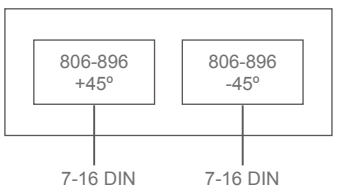
Part Number	S-Wave 08-65-15DV14
Electrical Specification	
Frequency range	806-896MHz
Polarization	±45º
Gain	14.8dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	15º
Electrical downtilt	0º-14º
First upper sidelobe suppression	>14dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.5
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	400W



Horizontal Pattern

Vertical Pattern

806-896MHz

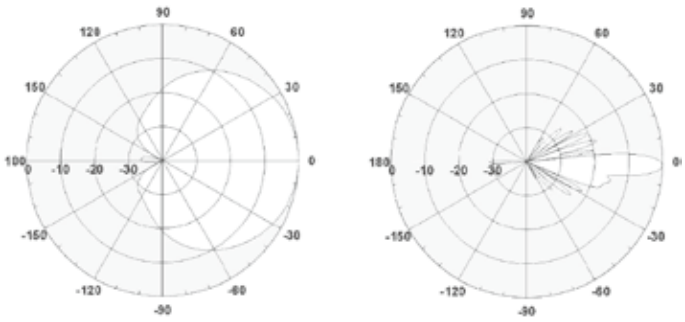


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	12Kg
Max. wind velocity	200Km/h
Dimension	1300×295×115MM

Xpol Panel 806-896 65º 17.5dBi VET0º-8º

Adjust. Electrical Downtilt set by hand or by optional RCU

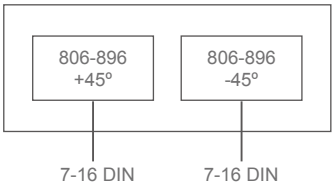
Part Number	S-Wave 08-65-17.5DV8
Electrical Specification	
Frequency range	806-896MHz
Polarization	±45º
Gain	17.2dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	9º
Electrical downtilt	0º-8º
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.5
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	400W



Horizontal Pattern

Vertical Pattern

806-896MHz

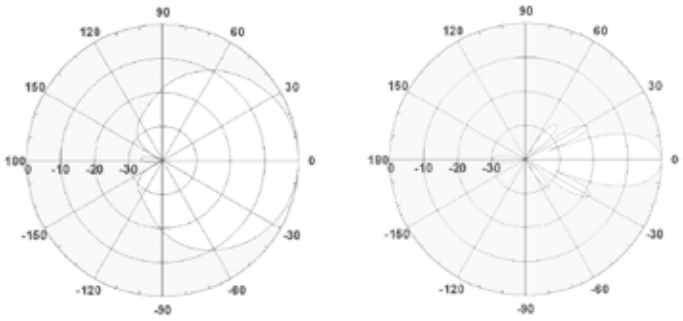


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	18Kg
Max. wind velocity	200Km/h
Dimension	2254×295×115MM

Xpol Panel 870-960 65º 15dBi VET0º-14º

Adjust. Electrical Downtilt set by hand or by optional RCU

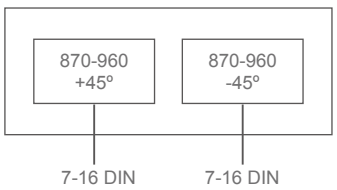
Part Number	S-Wave 09-65-15DV14
Electrical Specification	
Frequency range	870-960MHz
Polarization	±45º
Gain	15.0dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	15º
Electrical downtilt	0º-14º
First upper sidelobe suppression	>14dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.5
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	400W



Horizontal Pattern

Vertical Pattern

870-960MHz

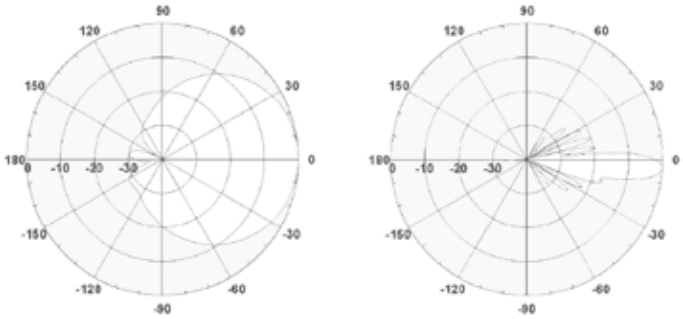


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	12Kg
Max. wind velocity	200Km/h
Dimension	1300×295×115MM

Xpol Panel 870-960 65º 17.5dBi VET0º-8º

Adjust. Electrical Downtilt set by hand or by optional RCU

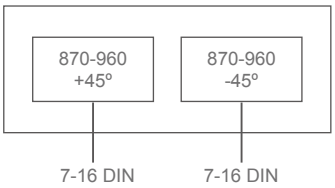
Part Number	S-Wave 09-65-17.5DV8
Electrical Specification	
Frequency range	870-960MHz
Polarization	±45º
Gain	17.5dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	8.5º
Electrical downtilt	0º-8º
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.5
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	400W



Horizontal Pattern

Vertical Pattern

870-960MHz

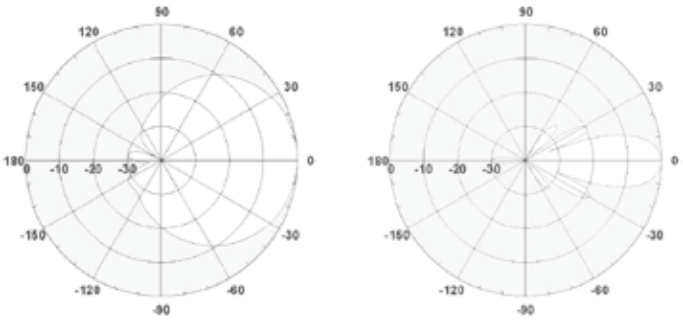


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	22Kg
Max. wind velocity	200Km/h
Dimension	2580×295×115MM

Xpol Panel 806-960 65º 15dBi VET0º-14º

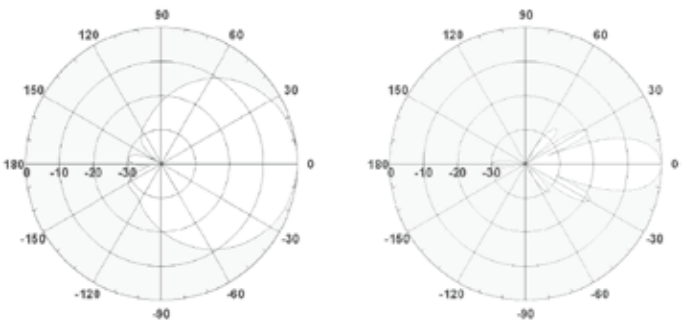
Adjust. Electrical Downtilt set by hand or by optional RCU

Part Number	S-Wave 0809-65-15DV14	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	14.5dBi	15dBi
Horizontal 3dB beam width	68º	65º
Vertical 3dB beam width	16º	15º
Electrical downtilt	0º-14º	0º-14º
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.5	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	400W	



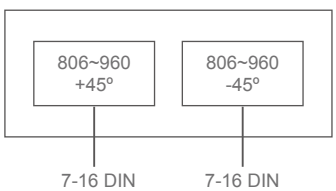
Horizontal Pattern Vertical Pattern

806-896MHz



Horizontal Pattern Vertical Pattern

870-960MHz

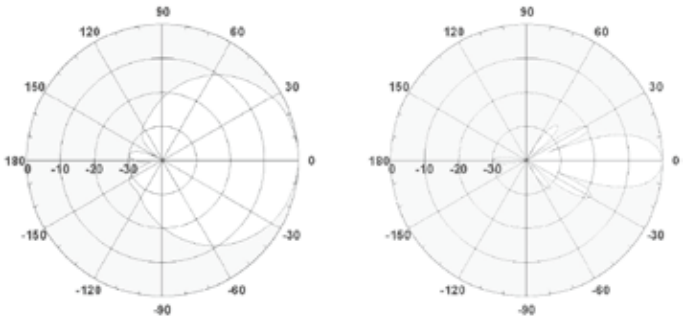


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	12Kg
Max. wind velocity	200Km/h
Dimension	1300×295×115MM

Xpol Panel 806-960 65º 16.5dBi VET0º-10º

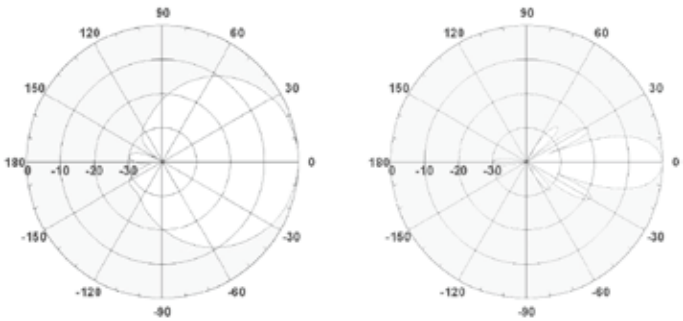
Adjust. Electrical Downtilt set by hand or by optional RCU

Part Number	S-Wave 0809-65-16.5DV10	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	15.8dBi	16.2dBi
Horizontal 3dB beam width	68º	65º
Vertical 3dB beam width	10º	9.5º
Electrical downtilt	0º-10º	0º-10º
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.5	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	400W	



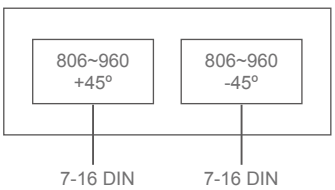
Horizontal Pattern Vertical Pattern

806-896MHz



Horizontal Pattern Vertical Pattern

870-960MHz

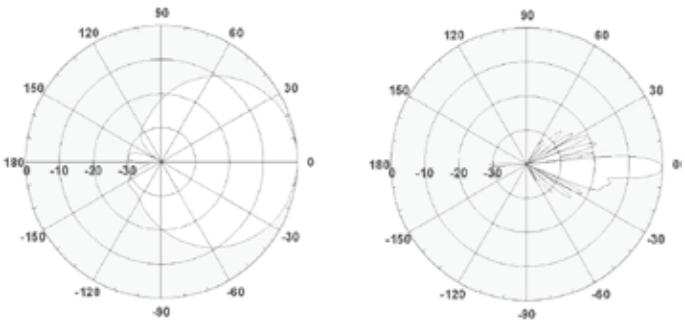


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	18Kg
Max. wind velocity	200Km/h
Dimension	1996×295×115MM

Xpol Panel 806-960 65º 18dBi VET0º-8º

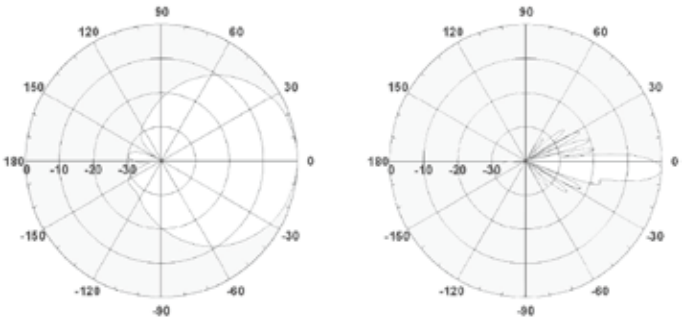
Adjust. Electrical Downtilt set by hand or by optional RCU

Part Number	S-Wave 0809-65-18DV8	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	17dBi	17.5dBi
Horizontal 3dB beam width	68º	65º
Vertical 3dB beam width	7.5º	7.3º
Electrical downtilt	0º-8º	0º-8º
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.5	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	400W	



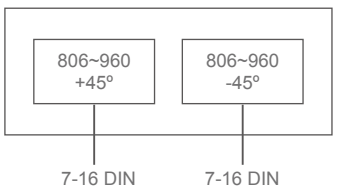
Horizontal Pattern Vertical Pattern

806-896MHz



Horizontal Pattern Vertical Pattern

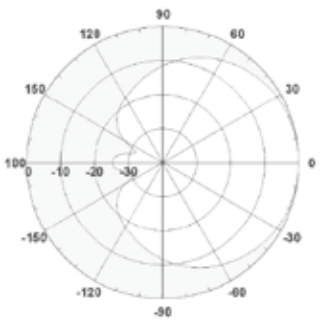
870-960MHz



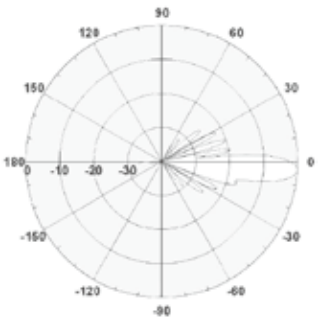
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	23Kg
Max. wind velocity	200Km/h
Dimension	2640×295×115MM

Xpol Panel 806-896 90º 17.0dBi FET0º, 3º, 6º

Part Number	S-Wave 08-90-17D S-Wave 08-90-17DT3 S-Wave 08-90-17DT6
Electrical Specification	
Frequency range	806-896MHz
Polarization	±45º
Gain	16.6dBi
Horizontal 3dB beam width	90º
Vertical 3dB beam width	8.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>23dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

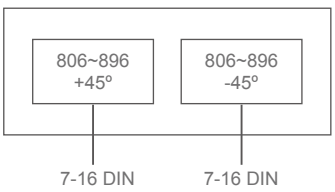


Horizontal Pattern



Vertical Pattern

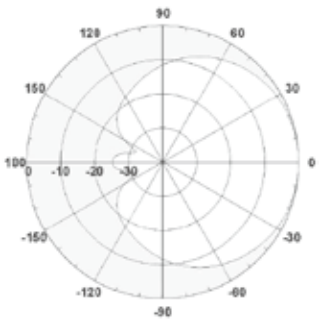
806-896MHz



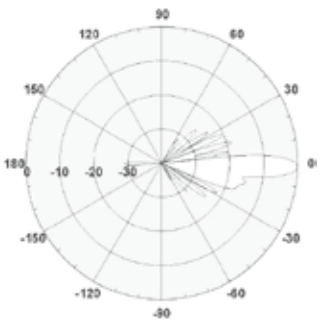
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	20Kg
Max. wind velocity	200Km/h
Dimension	2500×295×145MM

Xpol Panel 870-960 90º 17.0dBi FET0º, 3º, 6º

Part Number	S-Wave 09-90-17D S-Wave 09-90-17DT3 S-Wave 09-90-17DT6
Electrical Specification	
Frequency range	870-960MHz
Polarization	±45º
Gain	17dBi
Horizontal 3dB beam width	90º
Vertical 3dB beam width	7.5º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>23dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

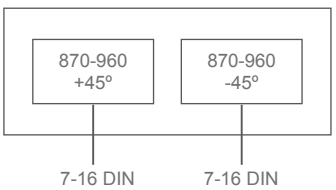


Horizontal Pattern



Vertical Pattern

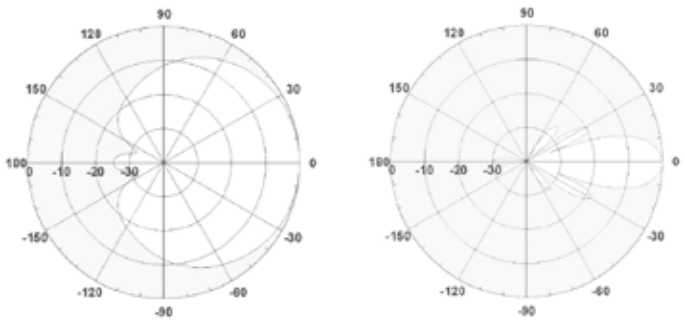
870-960MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	20Kg
Max. wind velocity	200Km/h
Dimension	2500×295×145MM

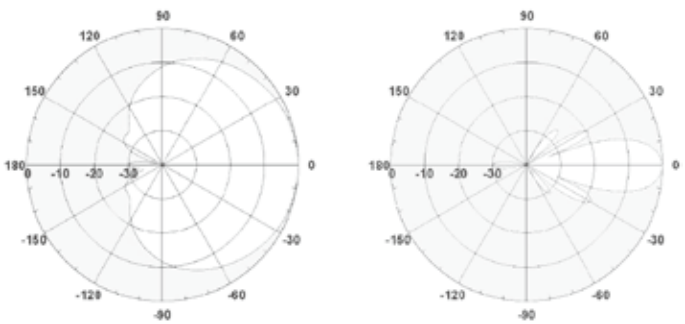
Xpol Panel 806-960 90º 15.5dBi FET0º, 3º, 6º

Part Number	S-Wave 0809-90-15.5D S-Wave 0809-90-15.5DT3 S-Wave 0809-90-15.5DT6	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	15 .3dBi	15.5dBi
Horizontal 3dB beam width	90º	88º
Vertical 3dB beam width	10.5º	10º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB	>15dB
Front to back ratio, copolar	>23dB	>23dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.5	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	500W	



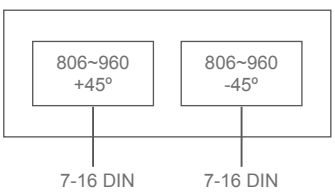
Horizontal Pattern Vertical Pattern

806-896MHz



Horizontal Pattern Vertical Pattern

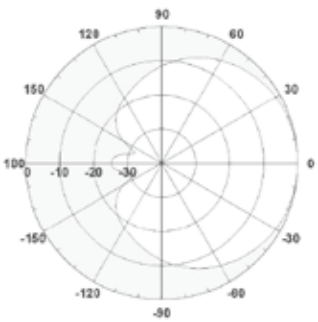
870-960MHz



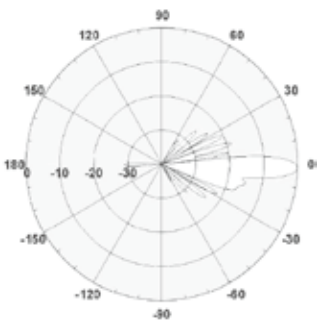
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	14Kg
Max. wind velocity	200Km/h
Dimension	1936×295×145MM

Xpol Panel 806-960 90º 17dBi FET0º, 3º, 6º

Part Number	S-Wave 0809-90-17D S-Wave 0809-90-17DT3 S-Wave 0809-90-17DT6	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	16.5dBi	16.8dBi
Horizontal 3dB beam width	85º	88º
Vertical 3dB beam width	8.5º	8º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB	>16dB
Front to back ratio, copolar	>23dB	>23dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.5	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	500W	

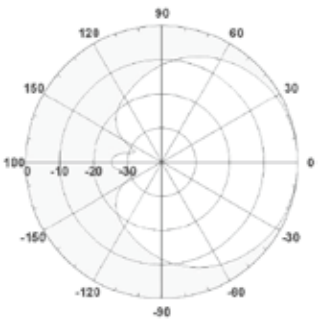


Horizontal Pattern

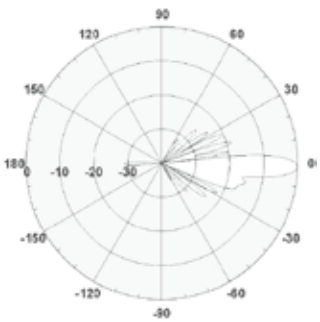


Vertical Pattern

806-896MHz

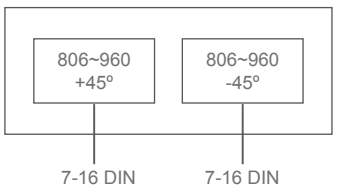


Horizontal Pattern



Vertical Pattern

870-960MHz

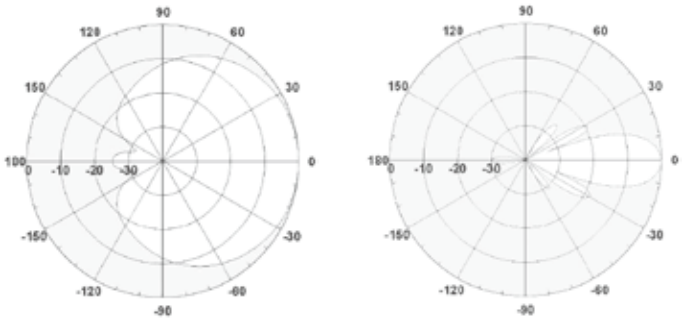


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	17Kg
Max. wind velocity	200Km/h
Dimension	2400×295×145MM

Xpol Panel 806-960 90º 17dBi VET0º-10º

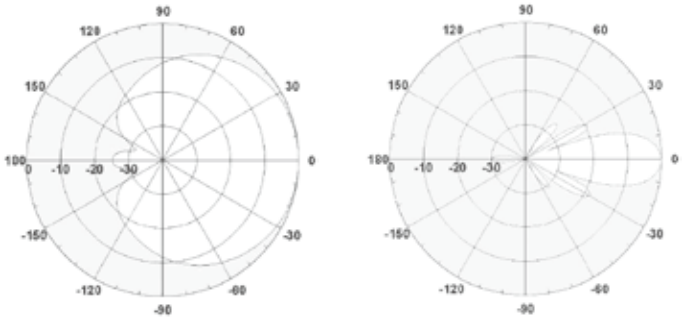
Adjust. Electrical Downtilt set by hand or by optional RCU

Part Number	S-Wave 0809-90-17DV10	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	16dBi	16.2dBi
Horizontal 3dB beam width	90º	88º
Vertical 3dB beam width	8º	7.5º
Electrical downtilt	0º-10º	0º-10º
First upper sidelobe suppression	>23dB	>23dB
Front to back ratio, copolar	>30dB	>30dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	
VSWR	<1.5	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	400W	



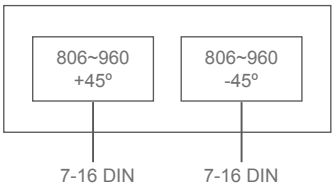
Horizontal Pattern Vertical Pattern

806-896MHz



Horizontal Pattern Vertical Pattern

870-960MHz

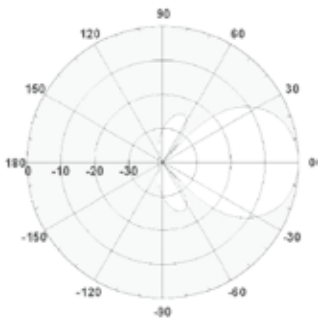


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	18Kg
Max. wind velocity	200Km/h
Dimension	2580×295×145MM

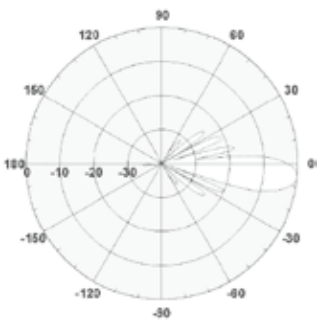
Antenna 800/900 Vertical Polarization

Vpol Panel 806-896 30º 20.0dBi FET0º, 3º, 6º

Part Number	S-Wave 08-30-20.0 S-Wave 08-30-20.0T3 S-Wave 08-30-20.0T6
Electrical Specification	
Frequency range	806-896MHz
Polarization	Vertical
Gain	20.0dBi
Horizontal 3dB beam width	32º
Vertical 3dB beam width	9º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
IMD3@2×43dBm carrier	>28dB
Isolation	>30dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

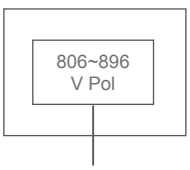


Horizontal Pattern



Vertical Pattern

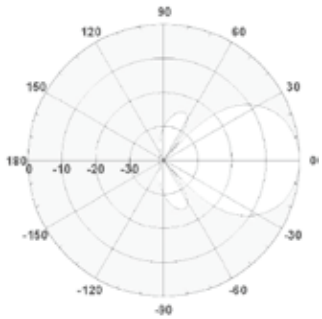
806-896MHz



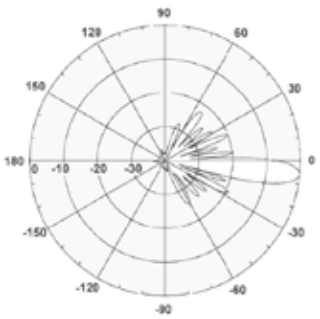
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	40Kg
Max. wind velocity	200Km/h
Dimension	2300×590×115MM

Vpol Panel 870-960 30º 20.0dBi FET0º, 3º, 6º

Part Number	S-Wave 09-30-20.0 S-Wave 09-30-20.0T3 S-Wave 09-30-20.0T6
Electrical Specification	
Frequency range	870-960MHz
Polarization	Vertical
Gain	20dBi
Horizontal 3dB beam width	30º
Vertical 3dB beam width	8.5º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
IMD3@2×43dBm carrier	>28dB
Isolation	>30dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

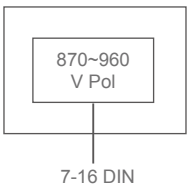


Horizontal Pattern



Vertical Pattern

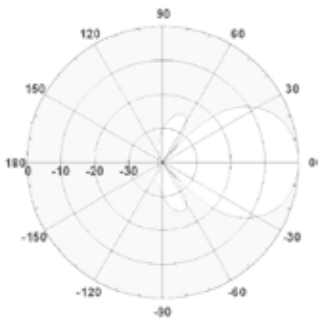
870-960MHz



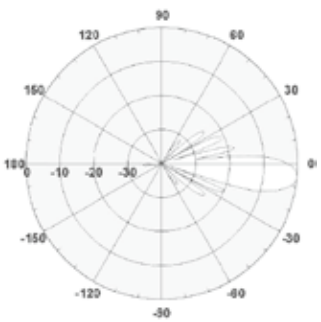
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	40Kg
Max. wind velocity	200Km/h
Dimension	2300×590×115MM

Vpol Panel 806-960 30º 20dBi FET0º, 3º, 6º

Part Number	S-Wave 0809-30-20 S-Wave 0809-30-20T3 S-Wave 0809-30-20T6	
Electrical Specification		
Frequency range	806-896MHz	870-960MHz
Polarization	±45º	±45º
Gain	19.7dBi	20.0dBi
Horizontal 3dB beam width	31º	29º
Vertical 3dB beam width	9.0º	8.5º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB	>16dB
IMD3@2×43dBm carrier	>28dB	>28dB
Isolation	>30dB	>30dB
Impedance	50Ω	
VSWR	<1.4	
IMD3@2×43dBm carrier	<-150dBc	
Max. power per input	500W	

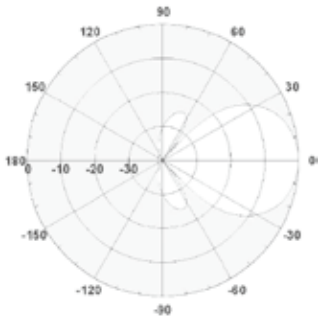


Horizontal Pattern

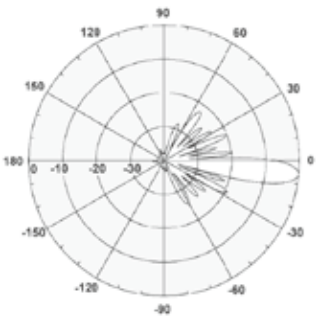


Vertical Pattern

806-896MHz

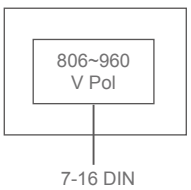


Horizontal Pattern



Vertical Pattern

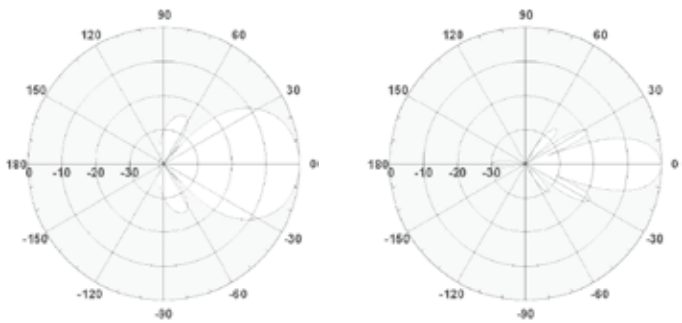
870-960MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	40Kg
Max. wind velocity	200Km/h
Dimension	2300×590×115MM

Vpol Panel 806-896 65º 15.0dBi FET0º, 3º, 6º

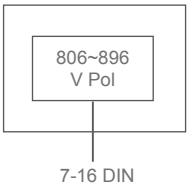
Part Number	S-Wave 08-65-15.0 S-Wave 08-65-15.0T3 S-Wave 08-65-15.0T6
Electrical Specification	
Frequency range	806-896MHz
Polarization	Vertical
Gain	15dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	15º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB
IMD3@2×43dBm carrier	>25dB
Isolation	>30dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W



Horizontal Pattern

Vertical Pattern

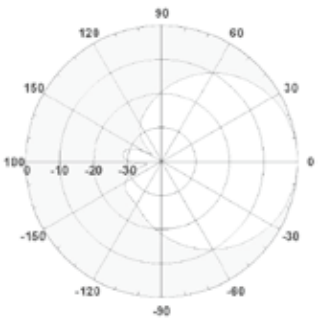
806-896MHz



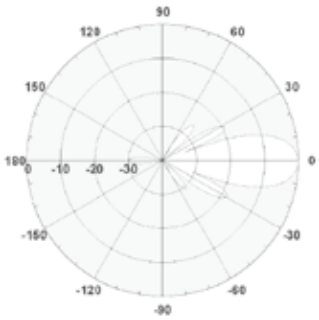
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	12Kg
Max. wind velocity	200Km/h
Dimension	1300×295×115MM

Vpol Panel 806-896 65º 17.0dBi FET0º, 3º, 6º

Part Number	S-Wave 08-65-17.0 S-Wave 08-65-17.0T3 S-Wave 08-65-17.0T6
Electrical Specification	
Frequency range	806-896MHz
Polarization	Vertical
Gain	16.5dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	10º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
IMD3@2×43dBm carrier	>25dB
Isolation	>30dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

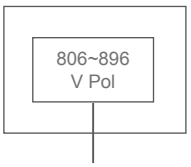


Horizontal Pattern



Vertical Pattern

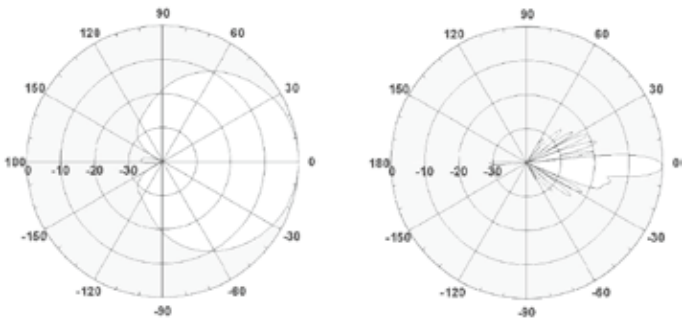
806-896MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	18Kg
Max. wind velocity	200Km/h
Dimension	1950×295×115MM

Vpol Panel 806-896 65º 18.0dBi FET0º, 3º, 6º

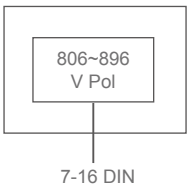
Part Number	S-Wave 08-65-18.0 S-Wave 08-65-18.0T3 S-Wave 08-65-18.0T6
Electrical Specification	
Frequency range	806-896MHz
Polarization	Vertical
Gain	17.8dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	7.5º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
IMD3@2×43dBm carrier	>25dB
Isolation	>30dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W



Horizontal Pattern

Vertical Pattern

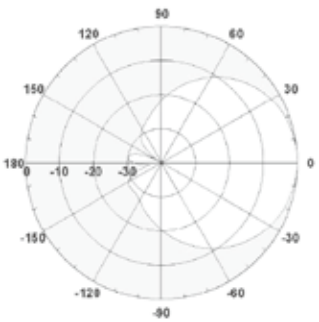
806-896MHz



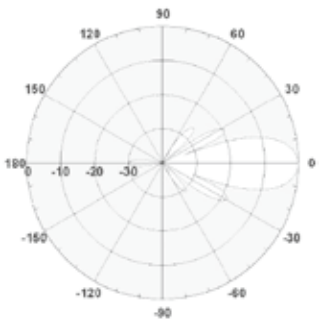
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	22Kg
Max. wind velocity	200Km/h
Dimension	2640×295×115MM

Vpol Panel 870-960 65º 15.0dBi FET0º, 3º, 6º

Part Number	S-Wave 09-65-15.0 S-Wave 09-65-15.0T3 S-Wave 09-65-15.0T6
Electrical Specification	
Frequency range	870-960MHz
Polarization	Vertical
Gain	15dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	14º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB
IMD3@2×43dBm carrier	>25dB
Isolation	>30dB
Impedance	50 Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

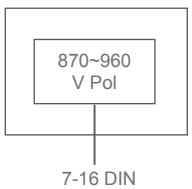


Horizontal Pattern



Vertical Pattern

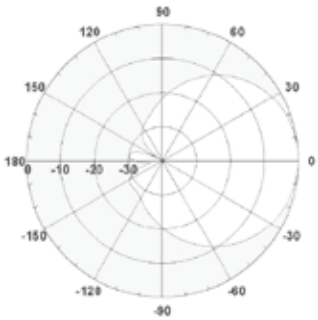
870-960MHz



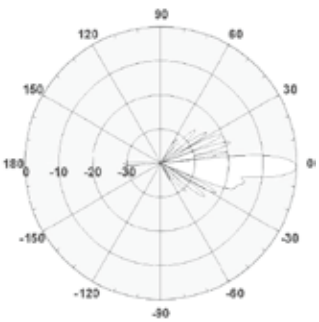
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	12Kg
Max. wind velocity	200Km/h
Dimension	1300×295×115MM

Vpol Panel 870-960 65º 17.0dBi FET0º, 3º, 6º

Part Number	S-Wave 09-65-17.0 S-Wave 09-65-17.0T3 S-Wave 09-65-17.0T6
Electrical Specification	
Frequency range	870-960MHz
Polarization	Vertical
Gain	17dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	9.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
IMD3@2×43dBm carrier	>25dB
Isolation	>30dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

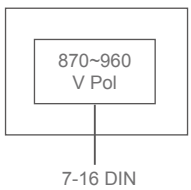


Horizontal Pattern



Vertical Pattern

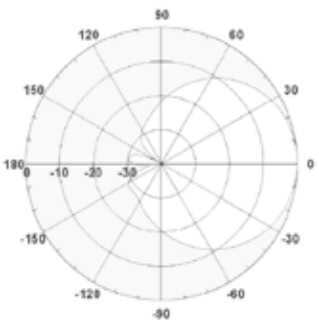
870-960MHz



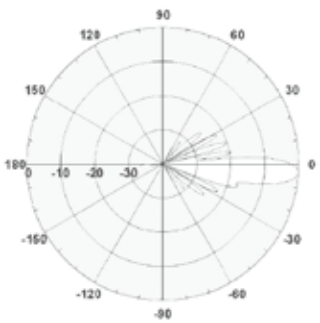
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	18Kg
Max. wind velocity	200Km/h
Dimension	1950×295×115MM

Vpol Panel 870-960 65º 18.0dBi FET0º, 3º, 6º

Part Number	S-Wave 09-65-18.0 S-Wave 09-65-18.0T3 S-Wave 09-65-18.0T6
Electrical Specification	
Frequency range	870-960MHz
Polarization	Vertical
Gain	18.0dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	7.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
IMD3@2×43dBm carrier	>25dB
Isolation	>30dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	500W

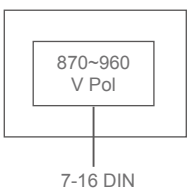


Horizontal Pattern



Vertical Pattern

870-960MHz

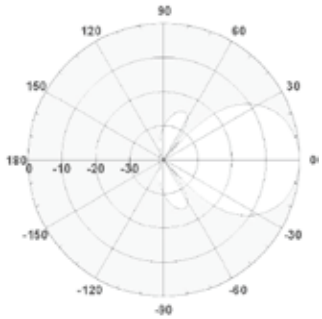


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	22Kg
Max. wind velocity	200Km/h
Dimension	2640×295×115MM

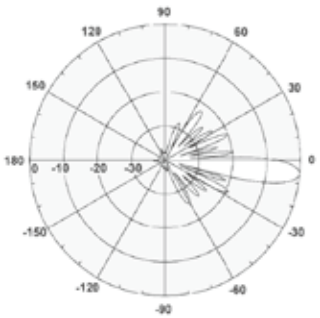
Antenna 1800/1900/2000 Dual Polarization +45º/–45º

Xpol Panel 1710-1880 33º 21.0dBi FET0º, 3º, 6º

Part Number	S-Wave 18-33-21D S-Wave 18-33-21DT3 S-Wave 18-33-21DT6
Electrical Specification	
Frequency range	1710-1880MHz
Polarization	±45º
Gain	20.5dBi
Horizontal 3dB beam width	35º
Vertical 3dB beam width	7.5º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB
Front to back ratio, copolar	>28dB
Isolation	>30dB
Cross-polar ratio, 0º	>18dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W

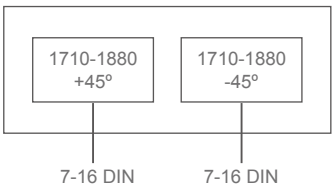


Horizontal Pattern



Vertical Pattern

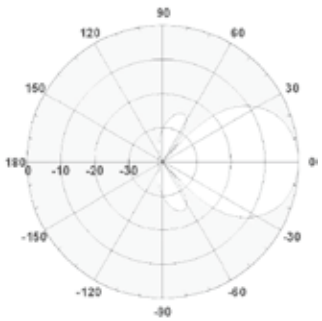
1710-1880MHz



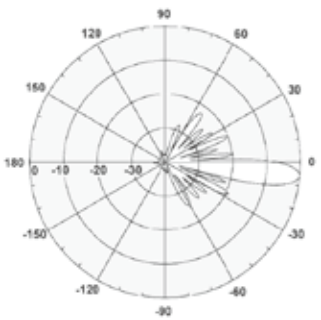
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	15Kg
Max. wind velocity	200Km/h
Dimension	1300×295×115MM

Xpol Panel 1920-2170 33º 21.0dBi FET0º, 3º, 6º

Part Number	S-Wave 21-33-21D S-Wave 21-33-21DT3 S-Wave 21-33-21DT6
Electrical Specification	
Frequency range	1920-2170MHz
Polarization	±45º
Gain	21.0dBi
Horizontal 3dB beam width	33º
Vertical 3dB beam width	7.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB
Front to back ratio, copolar	>28dB
Isolation	>30dB
Cross-polar ratio, 0º	>18dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W

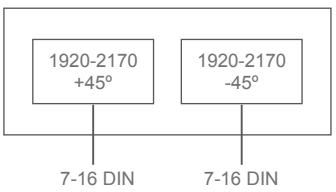


Horizontal Pattern



Vertical Pattern

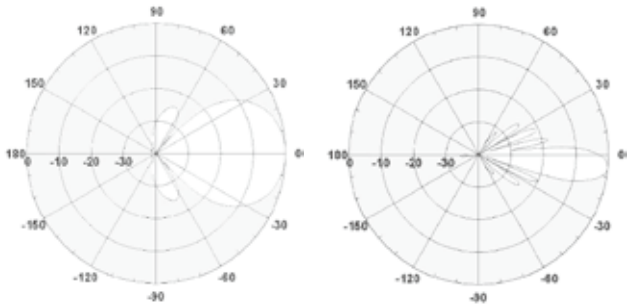
1920-2170MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	15Kg
Max. wind velocity	200Km/h
Dimension	1310×295×115MM

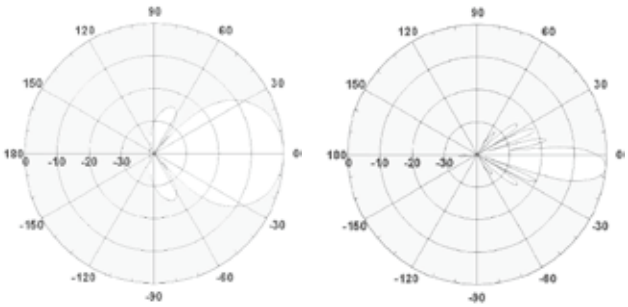
Xpol Panel 1710-2170 33º 21dBi FET0º, 3º, 6º

Part Number	S-Wave U-33-21D S-Wave U-33-21DT3 S-Wave U-33-21DT6		
Electrical Specification			
Frequency range	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º
Gain	20dBi	20.3dBi	20.5dBi
Horizontal 3dB beam width	36º	35º	33º
Vertical 3dB beam width	7.3º	7º	6.5º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB	>16dB	>16dB
Front to back ratio, copolar	>30dB	>30dB	>30dB
Isolation	>30dB	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		
VSWR	<1.4		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		



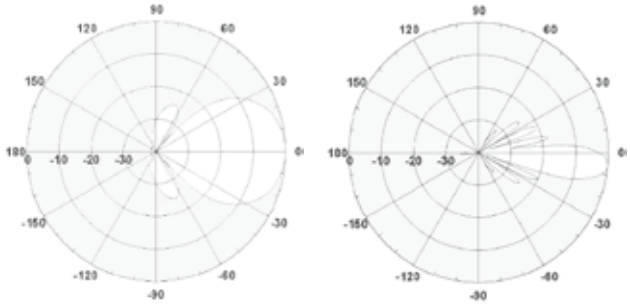
Horizontal Pattern Vertical Pattern

1710-1880MHz



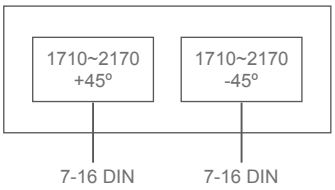
Horizontal Pattern Vertical Pattern

1850-1990MHz



Horizontal Pattern Vertical Pattern

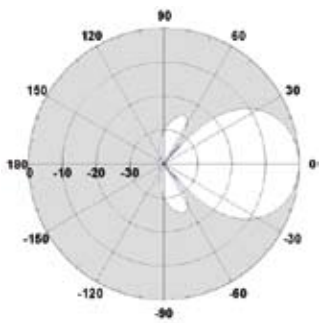
1920-2170MHz



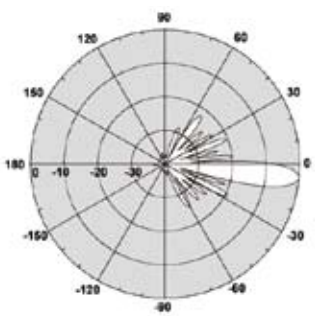
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	16Kg
Max. wind velocity	200Km/h
Dimension	1304×295×115MM

Xpol Panel 1710-2170 33º 23.0dBi FET0º, 3º, 6º

Part Number	S-Wave U-33-23D S-Wave U-33-23DT3 S-Wave U-33-23DT6
Electrical Specification	
Frequency range	1710-2170MHz
Polarization	±45º
Gain	22.5dBi
Horizontal 3dB beam width	33º
Vertical 3dB beam width	4.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB
Front to back ratio, copolar	>28dB
Isolation	>30dB
Cross-polar ratio, 0º	>18dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W

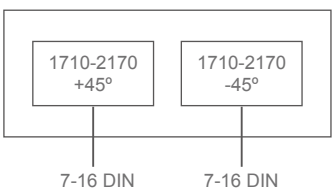


Horizontal Pattern



Vertical Pattern

1710-2170MHz

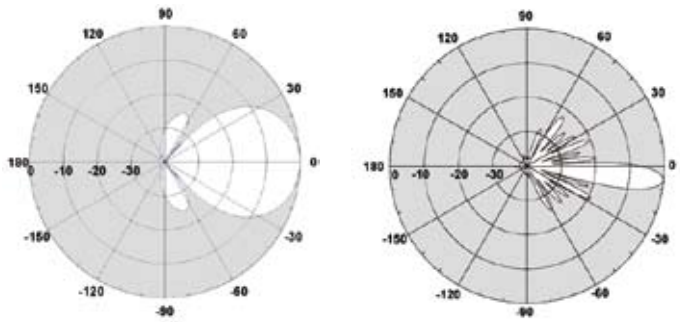


Mechanical Specification	
Connector type	2×7-16 DIN(F)
Weight	18Kg
Max. wind velocity	200Km/h
Dimension	2160×295×115MM

Xpol Panel 1710-2170 33º 23.0dBi VET0º- 7º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

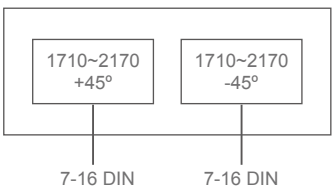
Part Number	S-Wave U-33-23DV7
Electrical Specification	
Frequency range	1710-2170MHz
Polarization	±45º
Gain	22.5dBi
Horizontal 3dB beam width	33º
Vertical 3dB beam width	4º
Electrical downtilt	0º-7º
First upper sidelobe suppression	>15dB
Front to back ratio, copolar	>28dB
Isolation	>30dB
Cross-polar ratio, 0º	>18dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W



Horizontal Pattern

Vertical Pattern

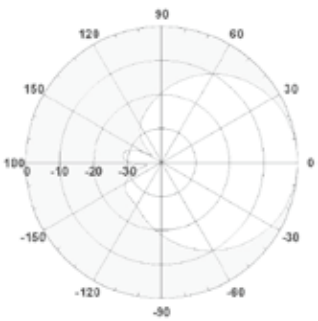
1710-2170MHz



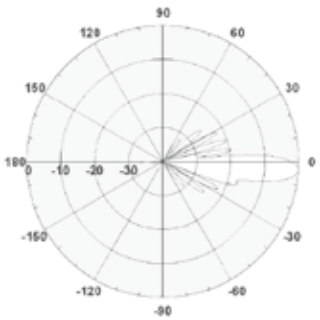
Mechanical Specification	
Connector type	2×7-16 DIN(F)
Weight	20Kg
Max. wind velocity	200Km/h
Dimension	2160×295×115MM

Xpol Panel 1710-1880 65º 18.0dBi FET0º, 3º, 6º

Part Number	S-Wave 18-65-18D S-Wave 18-65-18DT3 S-Wave 18-65-18DT6
Electrical Specification	
Frequency range	1710-1880MHz
Polarization	±45º
Gain	17.8dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	7.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W

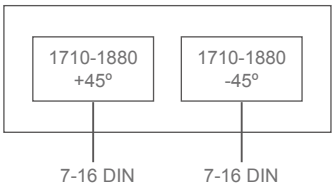


Horizontal Pattern



Vertical Pattern

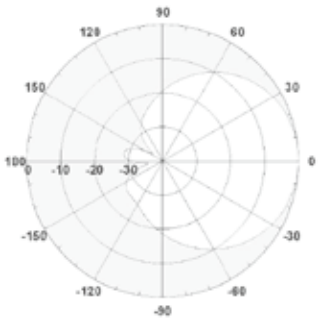
1710-1880MHz



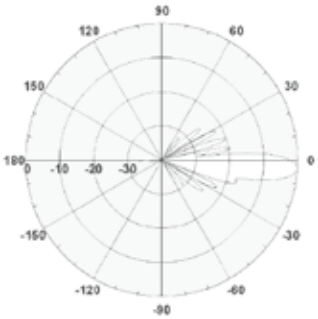
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	13Kg
Max. wind velocity	200Km/h
Dimension	1310×162×95MM

Xpol Panel 1710-1880 65º 19.0dBi FET0º, 3º, 6º

Part Number	S-Wave 18-65-19D S-Wave 18-65-19DT3 S-Wave 18-65-19DT6
Electrical Specification	
Frequency range	1710-1880MHz
Polarization	±45º
Gain	18.8dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	4.5º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>18dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W

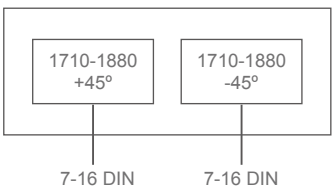


Horizontal Pattern



Vertical Pattern

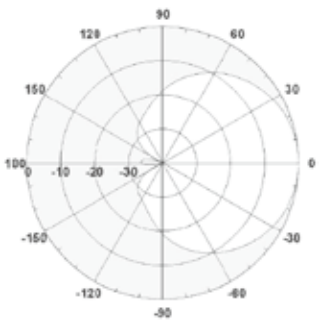
1710-1880MHz



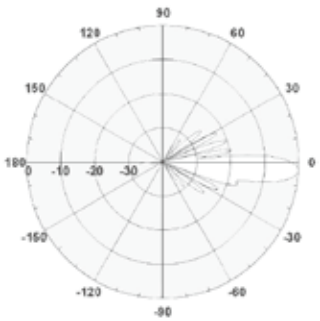
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	16Kg
Max. wind velocity	200Km/h
Dimension	1950×162×95MM

Xpol Panel 1920-2170 65º 18.0dBi FET0º, 3º, 6º

Part Number	S-Wave 21-65-18D S-Wave 21-65-18DT3 S-Wave 21-65-18DT6
Electrical Specification	
Frequency range	1920-2170MHz
Polarization	±45º
Gain	18.0dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	6.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W

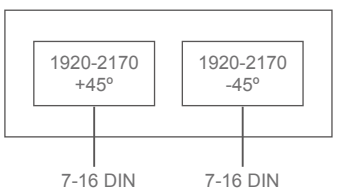


Horizontal Pattern



Vertical Pattern

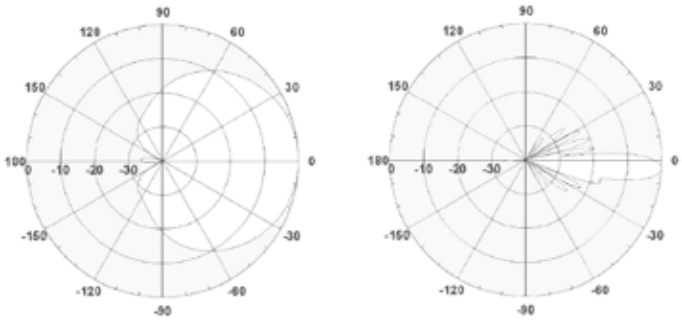
1920-2170MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	15Kg
Max. wind velocity	200Km/h
Dimension	1310×162×95MM

Xpol Panel 1920-2170 65º 19.0dBi FET0º, 3º, 6º

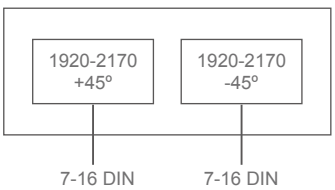
Part Number	S-Wave 21-65-19D S-Wave 21-65-19DT3 S-Wave 21-65-19DT6
Electrical Specification	
Frequency range	1920-2170MHz
Polarization	±45º
Gain	19.0dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	4.5º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>18dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W



Horizontal Pattern

Vertical Pattern

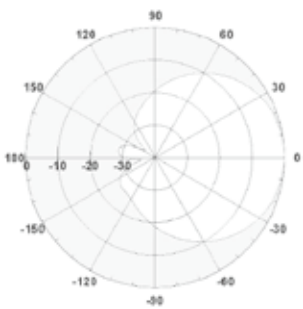
1920-2170MHz



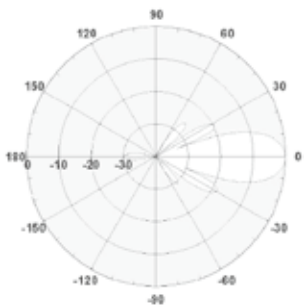
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	15Kg
Max. wind velocity	200Km/h
Dimension	1950×162×95MM

Xpol Panel 1710-2170 65º 15.5dBi FET0º, 3º, 6º

Part Number	S-Wave U-65-15.5D S-Wave U-65-15.5DT3 S-Wave U-65-15.5DT6		
Electrical Specification			
Frequency range	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º
Gain	15.2dBi	15.5dBi	15.7dBi
Horizontal 3dB beam width	66º	66º	64º
Vertical 3dB beam width	13º	12º	11º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB
Isolation	>30dB	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		
VSWR	<1.5		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		

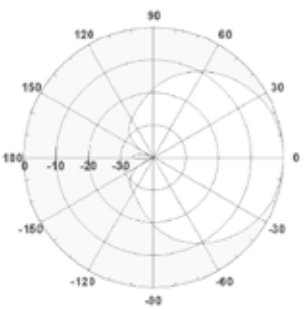


Horizontal Pattern

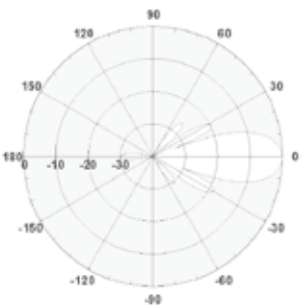


Vertical Pattern

1710-1880MHz

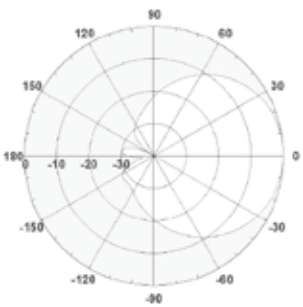


Horizontal Pattern

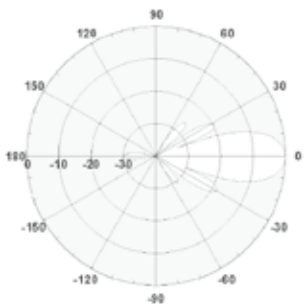


Vertical Pattern

1850-1990MHz

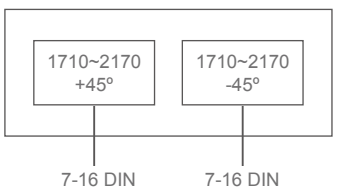


Horizontal Pattern



Vertical Pattern

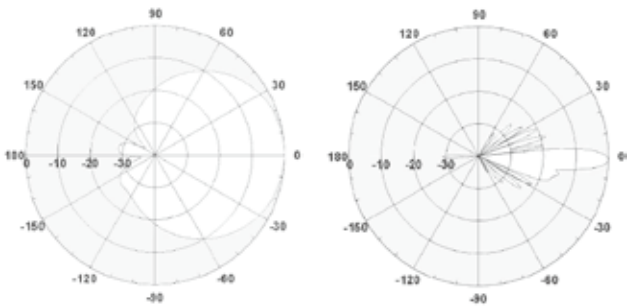
1920-2170MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	5Kg
Max. wind velocity	200Km/h
Dimension	735×162×95MM

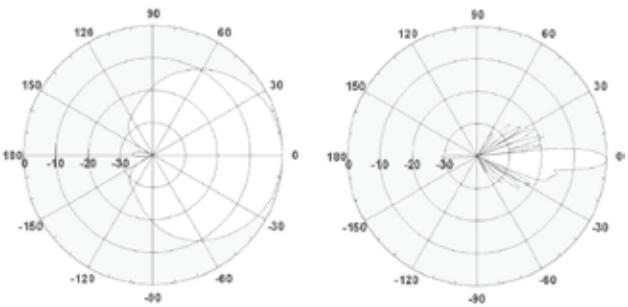
Xpol Panel 1710-2170 65º 18dBi FET0º, 3º, 6º

Part Number	S-Wave U-65-18D S-Wave U-65-18DT3 S-Wave U-65-18DT6		
Electrical Specification			
Frequency range	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º
Gain	17.5dBi	17.7dBi	18dBi
Horizontal 3dB beam width	68º	65º	63º
Vertical 3dB beam width	6.5º	6.1º	5.7º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB
Isolation	>30dB	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		
VSWR	<1.4		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		



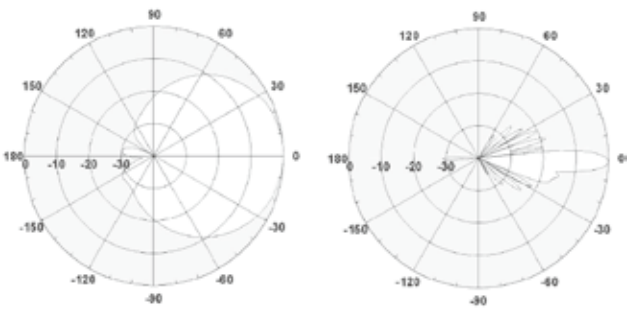
Horizontal Pattern Vertical Pattern

1710-1880MHz



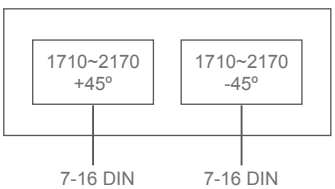
Horizontal Pattern Vertical Pattern

1850-1990MHz



Horizontal Pattern Vertical Pattern

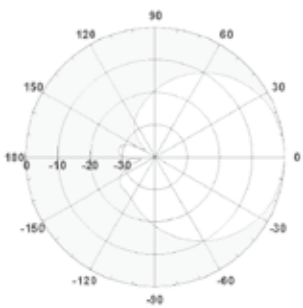
1920-2170MHz



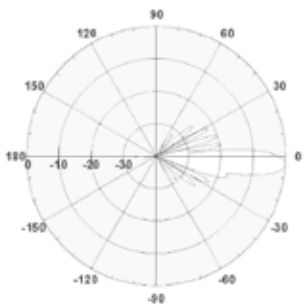
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	12Kg
Max. wind velocity	200Km/h
Dimension	1302×162×95MM

Xpol Panel 1710-2170 65º 19dBi FET0º, 3º, 6º

Part Number	S-Wave U-65-19D S-Wave U-65-19DT3 S-Wave U-65-19DT6		
Electrical Specification			
Frequency range	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º
Gain	18.7dBi	19dBi	19.2dBi
Horizontal 3dB beam width	68º	65º	63º
Vertical 3dB beam width	4.5º	4.3º	4.1º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB
Isolation	>30dB	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		
VSWR	<1.5		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		

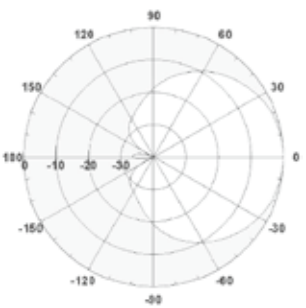


Horizontal Pattern

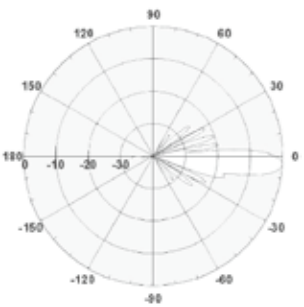


Vertical Pattern

1710-1880MHz

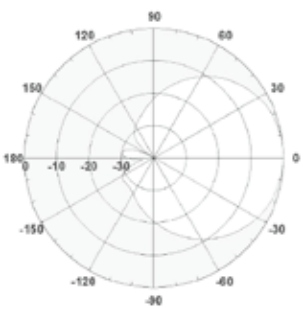


Horizontal Pattern

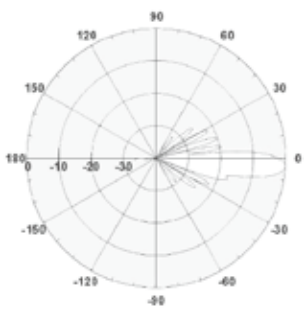


Vertical Pattern

1850-1990MHz

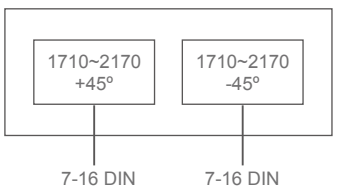


Horizontal Pattern



Vertical Pattern

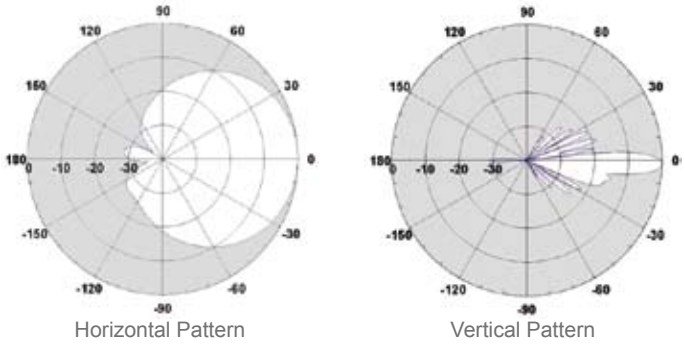
1920-2170MHz



Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	13Kg
Max. wind velocity	200Km/h
Dimension	1942×162×95MM

Xpol Panel 1710-2170 65º 21.0dBi FET0º, 3º, 6º

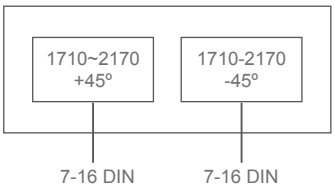
Part Number	S-Wave U-65-21D S-Wave U-65-21DT3 S-Wave U-65-21DT6
Electrical Specification	
Frequency range	1710-2170MHz
Polarization	±45º
Gain	20.5dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	4º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>18dB
Front to back ratio, copolar	>28dB
Isolation	>30dB
Cross-polar ratio, 0º	>18dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W



Horizontal Pattern

Vertical Pattern

1710-2170MHz

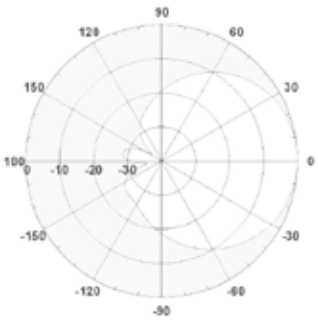


Mechanical Specification	
Connector type	2×7-16 DIN(F)
Weight	11Kg
Max. wind velocity	200Km/h
Dimension	2160×162×95MM

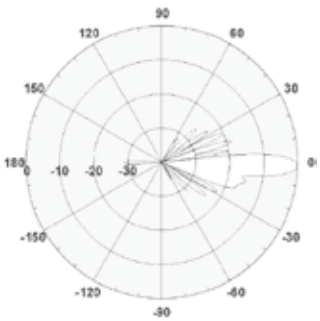
Xpol Panel 1710-1880 65º 17.5dBi VET0º-10º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 18-65-17.5DV10
Electrical Specification	
Frequency range	1710-1880MHz
Polarization	±45º
Gain	17.3dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	7.0º
Electrical downtilt	0º-10º
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.5
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W

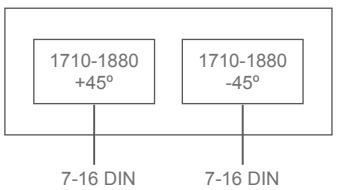


Horizontal Pattern



Vertical Pattern

1710-1880MHz

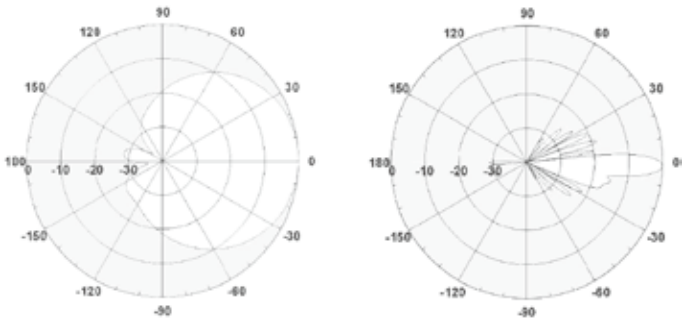


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	13Kg
Max. wind velocity	200Km/h
Dimension	1314×162×95MM

Xpol Panel 1920-2170 65º 17.5dBi VET0º-10º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

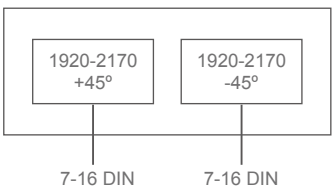
Part Number	S-Wave 21-65-17.5DV10
Electrical Specification	
Frequency range	1920-2170MHz
Polarization	±45º
Gain	17.5dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	6.5º
Electrical downtilt	0º-10º
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB
Impedance	50Ω
VSWR	<1.5
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W



Horizontal Pattern

Vertical Pattern

1920-2170MHz

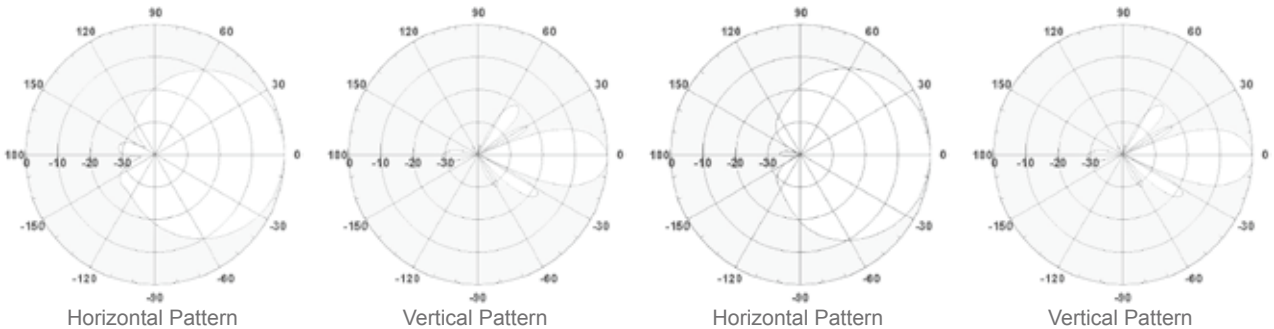


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	16Kg
Max. wind velocity	200Km/h
Dimension	1314×162×95MM

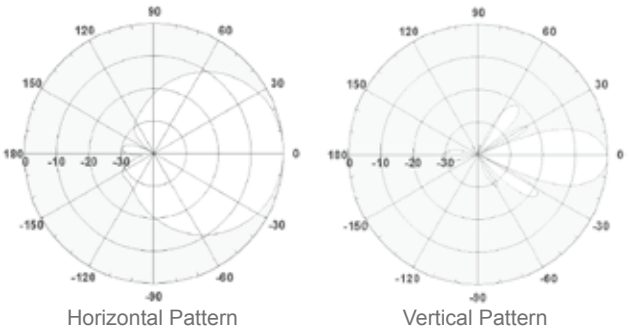
Xpol Panel 1710-2170 65º 15dBi VET 0º-14º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

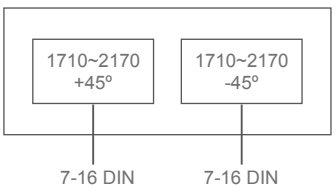
Part Number	S-Wave U-65-15DV14		
Electrical Specification			
Frequency range	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º
Gain	14.5dBi	14.8dBi	15dBi
Horizontal 3dB beam width	68º	66º	64º
Vertical 3dB beam width	14º	13.5º	13º
Electrical downtilt	0º-14º	0º-14º	0º-14º
First upper sidelobe suppression	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB
Isolation	>30dB	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		
VSWR	<1.5		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		



1710-1880MHz **1850-1990MHz**



1920-2170MHz

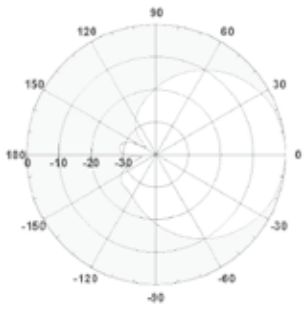


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	6Kg
Max. wind velocity	200Km/h
Dimension	662×162×95MM

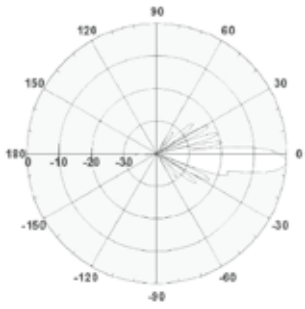
Xpol Panel 1710-2170 65º 18dBi VET 0º-10º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave U-65-18DV10		
Electrical Specification			
Frequency range	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º
Gain	17.4dBi	17.7dBi	17.9dBi
Horizontal 3dB beam width	68º	66º	64º
Vertical 3dB beam width	6.7º	6.5º	6.1º
Electrical downtilt	0º-10º	0º-10º	0º-10º
First upper sidelobe suppression	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB
Isolation	>30dB	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		
VSWR	<1.5		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		

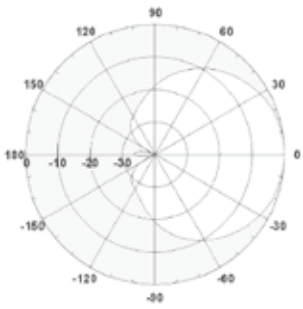


Horizontal Pattern

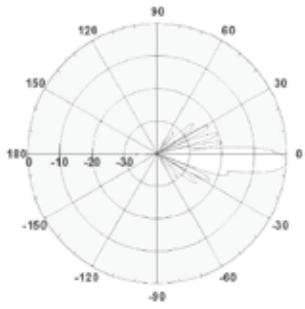


Vertical Pattern

1710-1880MHz

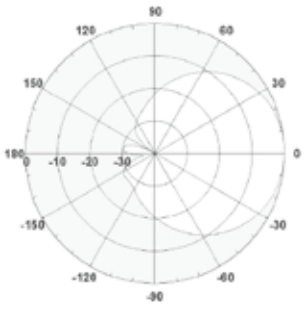


Horizontal Pattern

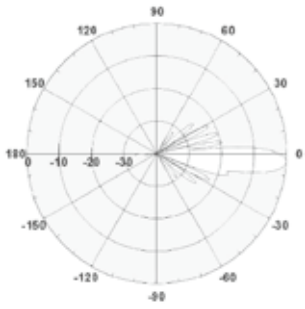


Vertical Pattern

1850-1990MHz

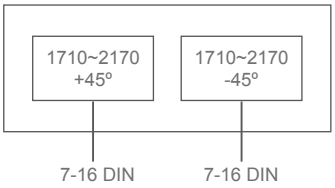


Horizontal Pattern



Vertical Pattern

1920-2170MHz

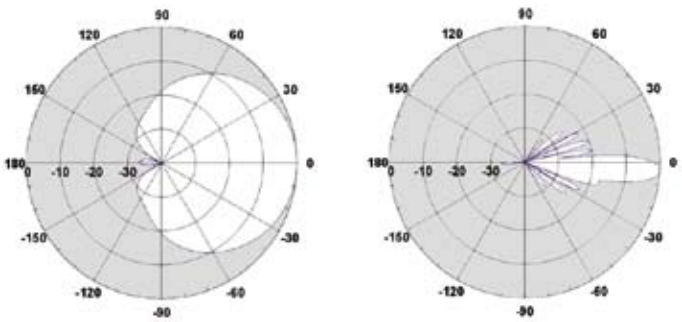


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	8Kg
Max. wind velocity	200Km/h
Dimension	1302×162×95MM

Xpol Panel 1710-2170 65º 21.0dBi VET 0º-7º

Adjustable Electrical Set by Hand or by Optional RCU

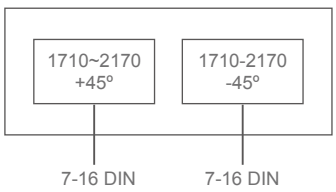
Part Number	S-Wave U-65-21DV7
Electrical Specification	
Frequency range	1710-2170MHz
Polarization	±45º
Gain	20.5dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	4º
Electrical downtilt	0º-7º
First upper sidelobe suppression	>15dB
Front to back ratio, copolar	>28dB
Isolation	>30 dB
Cross-polar ratio, 0º	>18dB
Impedance	50 Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W



Horizontal Pattern

Vertical Pattern

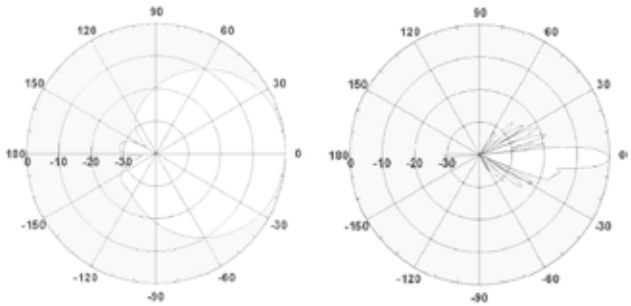
1710-2170MHz



Mechanical Specification	
Connector type	2×7-16 DIN(F)
Weight	11Kg
Max. wind velocity	200Km/h
Dimension	2160×162×95MM

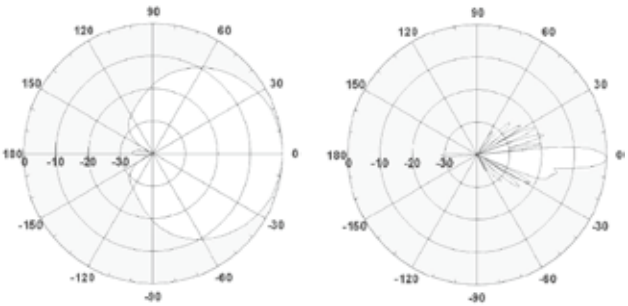
Xpol Panel 1710-2170 90º 17dBi FET0º, 3º, 6º

Part Number	S-Wave U-90-17D S-Wave U-90-17DT3 S-Wave U-90-17DT6		
Electrical Specification			
Frequency range	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º
Gain	16.5dBi	16.7dBi	16.9dBi
Horizontal 3dB beam width	88º	87º	85º
Vertical 3dB beam width	6.8º	6.5º	6.2º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB	>15dB	>15dB
Front to back ratio, copolar	>23dB	>23dB	>23dB
Isolation	>30dB	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		
VSWR	<1.5		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		



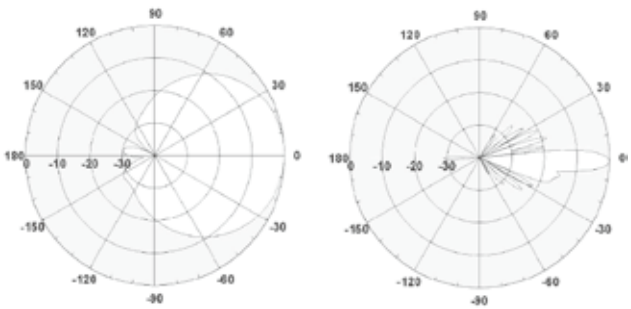
Horizontal Pattern Vertical Pattern

1710-1880MHz



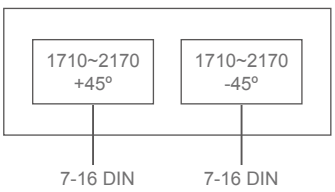
Horizontal Pattern Vertical Pattern

1850-1990MHz



Horizontal Pattern Vertical Pattern

1920-2170MHz

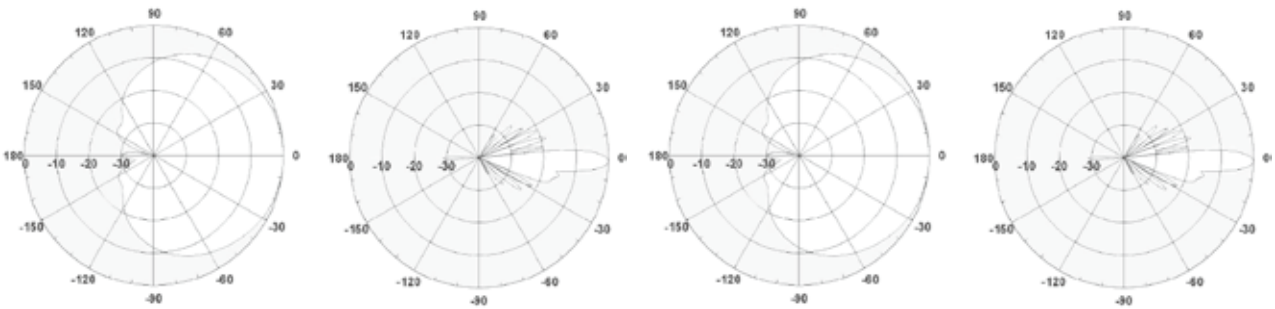


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	13Kg
Max. wind velocity	200Km/h
Dimension	1302×162×95MM

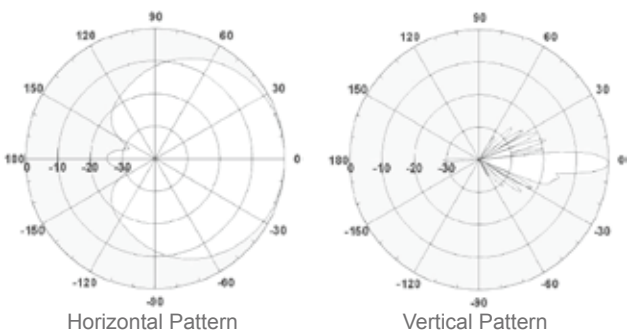
Xpol Panel 1710-2170 90º 17dBi VET 0º-10º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

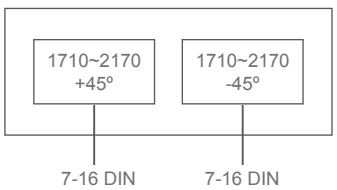
Part Number	S-Wave U-90-17DV10		
Electrical Specification			
Frequency range	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º
Gain	16.5dBi	16.7dBi	16.8dBi
Horizontal 3dB beam width	90º	88º	88º
Vertical 3dB beam width	7º	6.5º	6.3º
Electrical downtilt	0º-10º	0º-10º	0º-10º
First upper sidelobe suppression	>15dB	>15dB	>15dB
Front to back ratio, copolar	>23dB	>23dB	>23dB
Isolation	>30dB	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		
VSWR	<1.5		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		



1710-1880MHz **1850-1990MHz**



1920-2170MHz

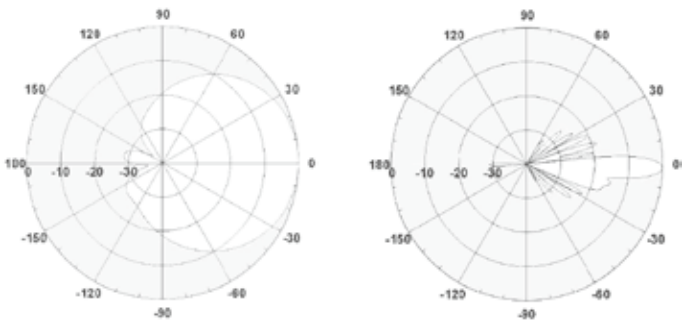


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	7.5Kg
Max. wind velocity	200Km/h
Dimension	1574×162×95MM

Antenna 1800/1900/2000 Vertical Polarization

Vpol Panel 1710-1880 65º 18.0dBi FET0º, 3º, 6º

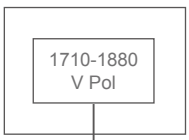
Part Number	S-Wave 18-65-18 S-Wave 18-65-18T3 S-Wave 18-65-18T6
Electrical Specification	
Frequency range	1710-1880MHz
Polarization	Vertical
Gain	17.8dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	7.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30 dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W



Horizontal Pattern

Vertical Pattern

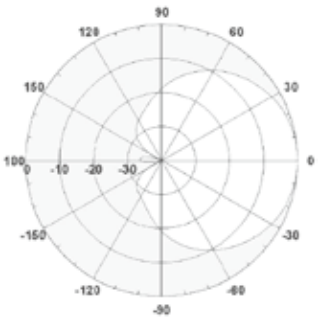
1710-1880MHz



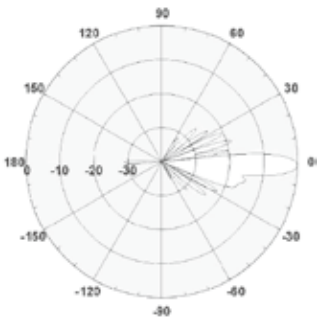
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	13Kg
Max. wind velocity	200Km/h
Dimension	1310×162×95MM

Vpol Panel 1920-2170 65º 18.0dBi FET0º, 3º, 6º

Part Number	S-Wave 21-65-18.0 S-Wave 21-65-18.0T3 S-Wave 21-65-18.0T6
Electrical Specification	
Frequency range	1920-2170MHz
Polarization	Vertical
Gain	18.0dBi
Horizontal 3dB beam width	65º
Vertical 3dB beam width	6.0º
Electrical downtilt	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>16dB
Front to back ratio, copolar	>25dB
Isolation	>30 dB
Impedance	50Ω
VSWR	<1.4
IMD3@2×43dBm carrier	<-150dBc
Max. power per input	300W

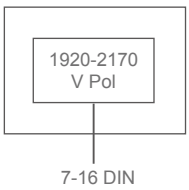


Horizontal Pattern



Vertical Pattern

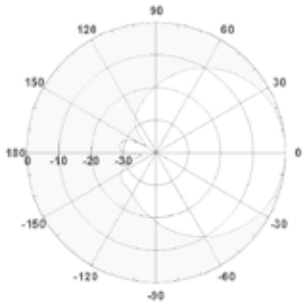
1920-2170MHz



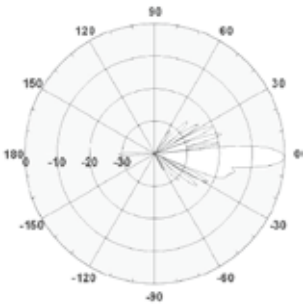
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	13Kg
Max. wind velocity	200Km/h
Dimension	1310×162×95MM

Vpol Panel 1710-2170 65º 18dBi FET0º, 3º, 6º

Part Number	S-Wave U-65-18 S-Wave U-65-18T3 S-Wave U-65-18T6		
Electrical Specification			
Frequency range	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º
Gain	17.5 dBi	17.7dBi	18 dBi
Horizontal 3dB beam width	68º	65º	63º
Vertical 3dB beam width	7º	6.6º	6.3º
Electrical downtilt	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed	0º, 3º, 6º, Fixed
First upper sidelobe suppression	>15dB	>15 dB	>15dB
Front to back ratio, copolar	>25 dB	>25 dB	>25dB
Impedance	50Ω		
VSWR	<1.5		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		

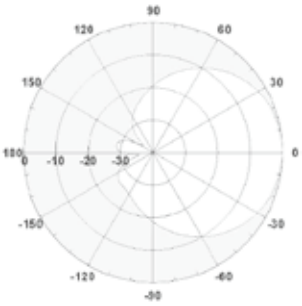


Horizontal Pattern

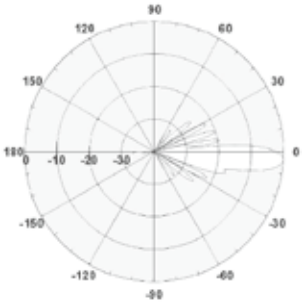


Vertical Pattern

1710-1880MHz

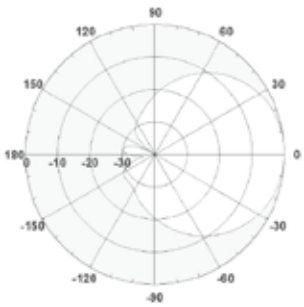


Horizontal Pattern

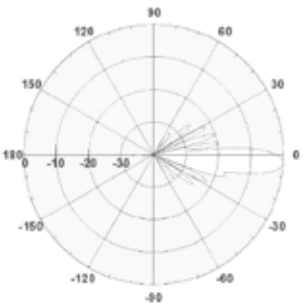


Vertical Pattern

1850-1990MHz

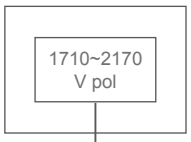


Horizontal Pattern



Vertical Pattern

1920-2170MHz



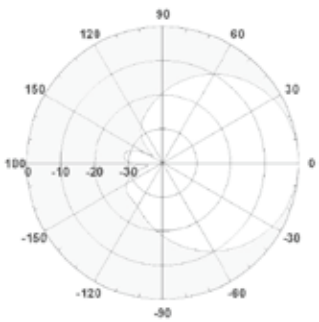
7-16 DIN

Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	13Kg
Max. wind velocity	200Km/h
Dimension	1302×162×95MM

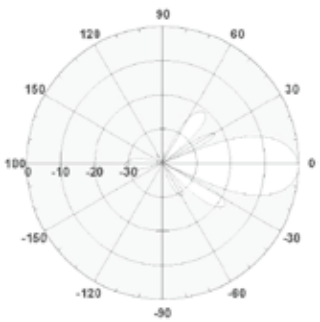
Dual Band Antenna --2 ports(with Inner Combiner) Dual Polarization +45º/–45º

XXpol Panel C 806-960/1710-2170 65º 14/17dBi FET0º/0º

Part Number	S-Wave 0809/U-65-14/17DC				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-896MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	14dBi	14dBi	16.3dBi	16.6dBi	16.8dBi
Horizontal 3dB beam width	68º	65º	68º	66º	64º
Vertical 3dB beam width	15º	14º	7.5º	7.3º	6.8º
Electrical downtilt	0º	0º	0º	0º	0º
First upper sidelobe suppression	>14dB	>14dB	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		50Ω		
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc		<-150dBc		
Max. power	250W		200W		
Max. power per input	450W				
Inner combiner	The insertion loss is included in the given antenna values.				

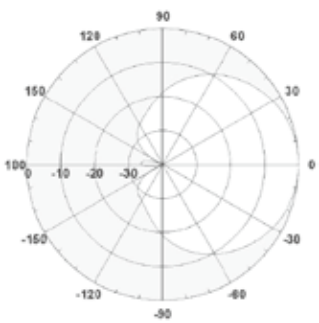


Horizontal Pattern

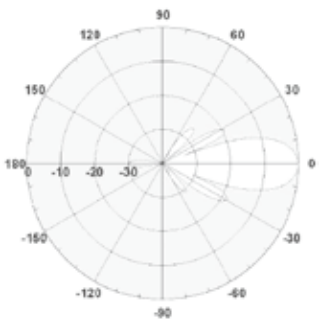


Vertical Pattern

806-896MHz

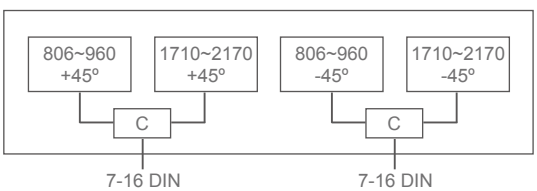


Horizontal Pattern



Vertical Pattern

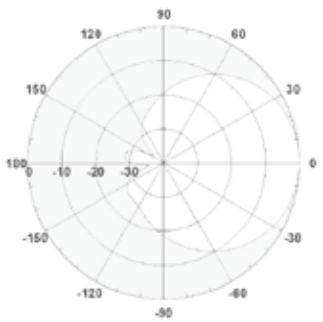
1710-2170MHz



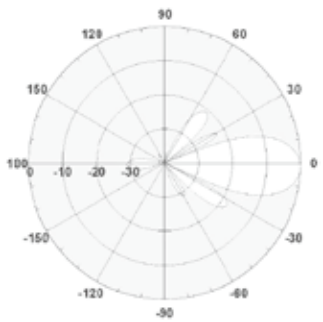
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	16.5Kg
Max. wind velocity	200Km/h
Dimension	1316×295×145MM

XXpol Panel C 806-960/1710-2170 65º 14/17dBi FET2º/6º

Part Number	S-Wave 0809/U-65-14/17DT2/T6C				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-896MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	14dBi	14dBi	16.3dBi	16.6dBi	16.8dBi
Horizontal 3dB beam width	68º	65º	68º	66º	64º
Vertical 3dB beam width	15º	14º	7.5º	7.3º	6.8º
Electrical downtilt	2º	2º	6º	6º	6º
First upper sidelobe suppression	>14dB	>14dB	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		50Ω		
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc		<-150dBc		
Max. power	250W		200W		
Max. power per input	450W				
Inner combiner	The insertion loss is included in the given antenna values.				

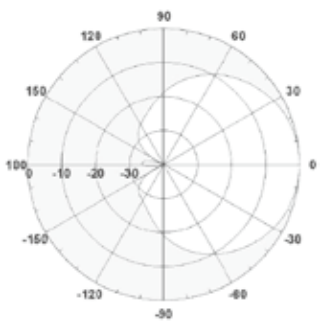


Horizontal Pattern

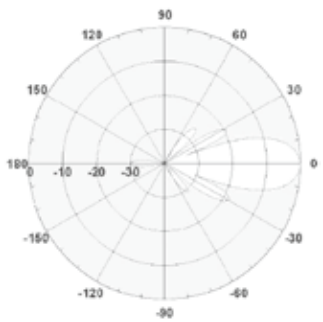


Vertical Pattern

806-896MHz

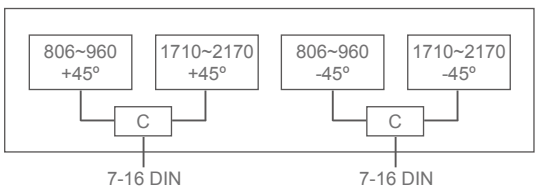


Horizontal Pattern



Vertical Pattern

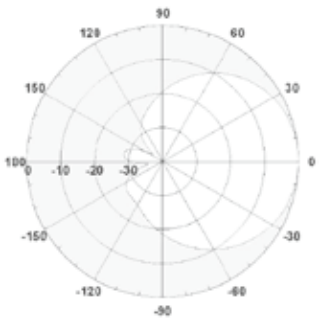
1710-2170MHz



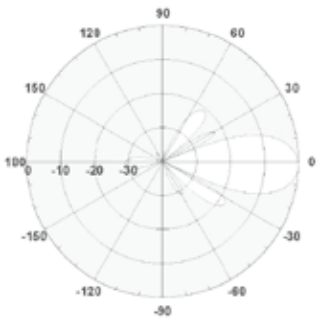
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	16.5Kg
Max. wind velocity	200Km/h
Dimension	1316×295×145MM

XXpol Panel C 806-960/1710-2170 65º 16/18dBi FET0º/0º

Part Number	S-Wave 0809/U-65-16/18DC				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-896MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	15.5dBi	16dBi	17.5dBi	17.8dBi	18dBi
Horizontal 3dB beam width	68º	65º	68º	66º	64º
Vertical 3dB beam width	10º	9.5º	5.2º	5º	4.7º
Electrical downtilt	0º	0º	0º	0º	0º
First upper sidelobe suppression	>15dB	>15dB	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		50Ω		
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc		<-150dBc		
Max. power	250W		200W		
Max. power per input	450W				
Inner combiner	The insertion loss is included in the given antenna values.				

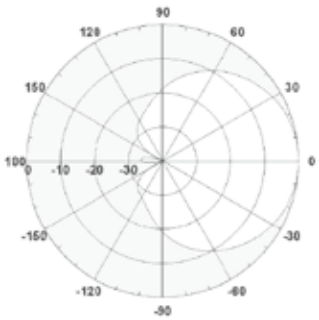


Horizontal Pattern

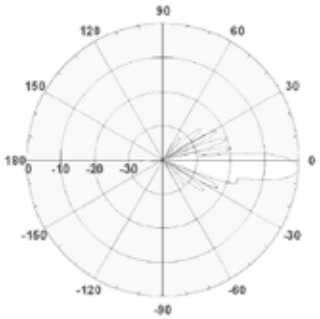


Vertical Pattern

806-896MHz

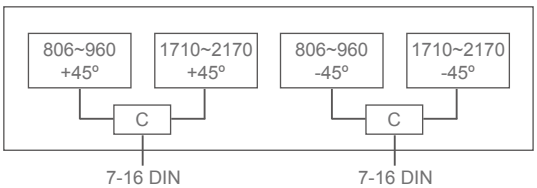


Horizontal Pattern



Vertical Pattern

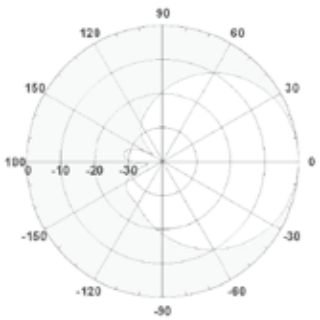
1710-2170MHz



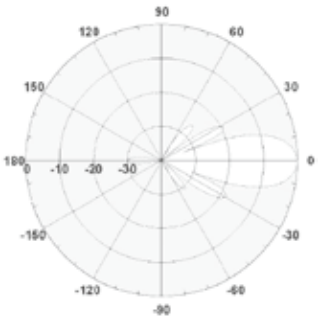
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	23Kg
Max. wind velocity	200Km/h
Dimension	1916×295×145MM

XXpol Panel C 806-960/1710-2170 65º 16/18dBi FET6º/6º

Part Number	S-Wave 0809/U-65-16/18DT6C				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-896MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	15.5dBi	16dBi	17.5dBi	17.8dBi	18dBi
Horizontal 3dB beam width	68º	65º	68º	66º	64º
Vertical 3dB beam width	10º	9.5º	5.2º	5º	4.7º
Electrical downtilt	6º	6º	6º	6º	6º
First upper sidelobe suppression	>15dB	>15dB	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		50Ω		
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc		<-150dBc		
Max. power	250W		200W		
Max. power per input	450W				
Inner combiner	The insertion loss is included in the given antenna values.				

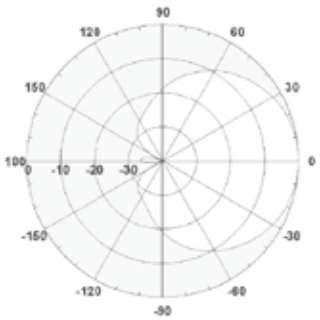


Horizontal Pattern

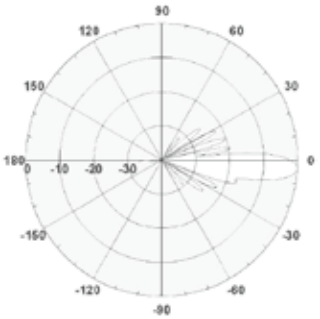


Vertical Pattern

806-896MHz

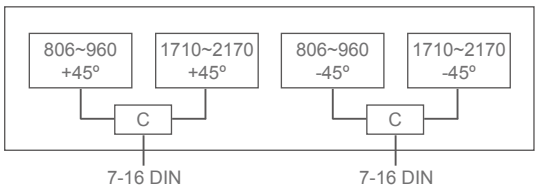


Horizontal Pattern



Vertical Pattern

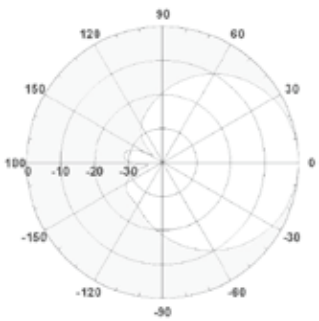
1710-2170MHz



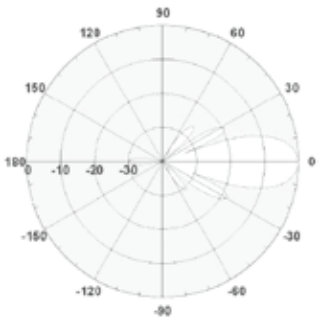
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	23Kg
Max. wind velocity	200Km/h
Dimension	1916×295×145MM

XXpol Panel C 806-960/1710-2170 65º 17/18dBi FET0º/0º

Part Number	S-Wave 0809/U-65-17/18DC				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-896MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	16.5dBi	16.8dBi	17.5dBi	17.8dBi	18dBi
Horizontal 3dB beam width	68º	65º	68º	66º	64º
Vertical 3dB beam width	8º	7.5º	5.2º	5º	4.7º
Electrical downtilt	0º	0º	0º	0º	0º
First upper sidelobe suppression	>15dB	>15dB	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		50Ω		
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc		<-150dBc		
Max. power	250W		200W		
Max. power per input	450W				
Inner combiner	The insertion loss is included in the given antenna values.				

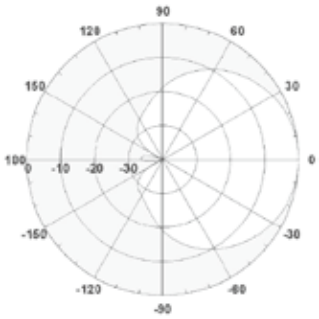


Horizontal Pattern

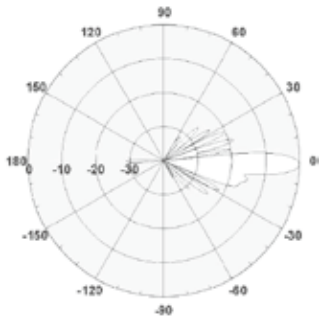


Vertical Pattern

806-896MHz

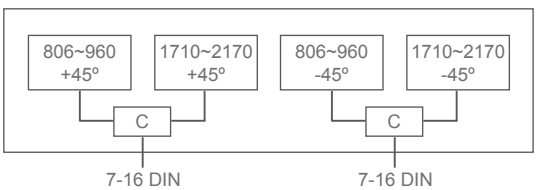


Horizontal Pattern



Vertical Pattern

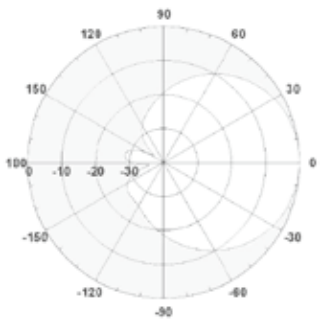
1710-2170MHz



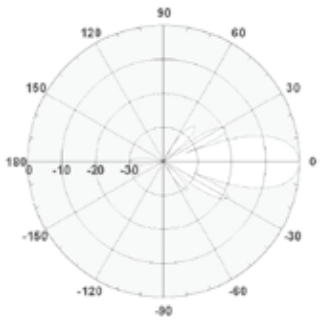
Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	26Kg
Max. wind velocity	200Km/h
Dimension	2516×295×145MM

XXpol Panel C 806-960/1710-2170 65º 17/18dBi FET6º/6º

Part Number	S-Wave 0809/U-65-17/18DT6C				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-896MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	16.5dBi	16.8dBi	17.5dBi	17.8dBi	18dBi
Horizontal 3dB beam width	68º	65º	68º	66º	64º
Vertical 3dB beam width	8º	7.5º	5.2º	5º	4.7º
Electrical downtilt	6º	6º	6º	6º	6º
First upper sidelobe suppression	>15dB	>15dB	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		50Ω		
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc		<-150dBc		
Max. power	250W		200W		
Max. power per input	450W				
Inner combiner	The insertion loss is included in the given antenna values.				

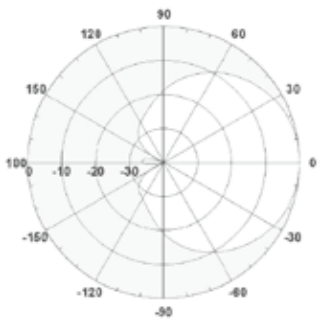


Horizontal Pattern

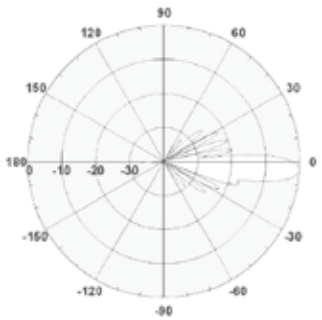


Vertical Pattern

806-896MHz

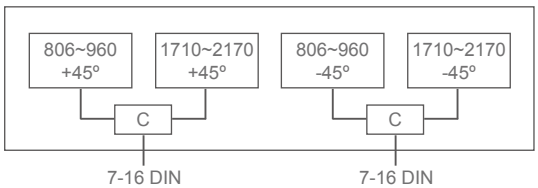


Horizontal Pattern



Vertical Pattern

1710-2170MHz

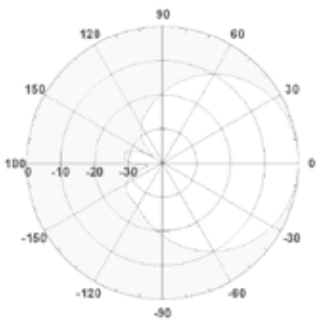


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	26Kg
Max. wind velocity	200Km/h
Dimension	2516×295×145MM

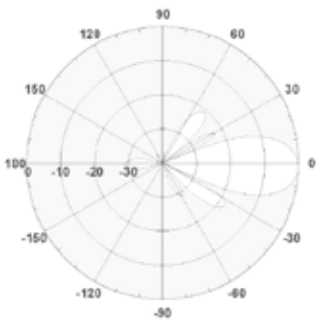
XXpol Panel C 806-960/1710-2170 65º 14/17dBi VET0º-14º/ VET0º-8º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 0809/U-65-14/17DV14/V8C				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-896MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	14dBi	14dBi	16.3dBi	16.6dBi	16.8dBi
Horizontal 3dB beam width	68º	65º	68º	66º	64º
Vertical 3dB beam width	15º	14º	7.5º	7.3º	6.8º
Electrical downtilt	0º-14º	0º-14º	0º-8º	0º-8º	0º-8º
First upper sidelobe suppression	>14dB	>14dB	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		50Ω		
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc		<-150dBc		
Max. power	250W		200W		
Max. power per input	450W				
Inner combiner	The insertion loss is included in the given antenna values.				

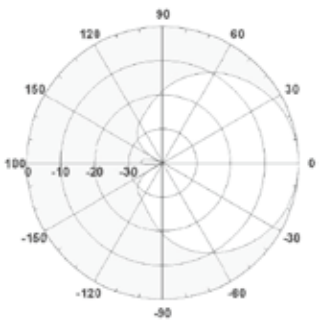


Horizontal Pattern

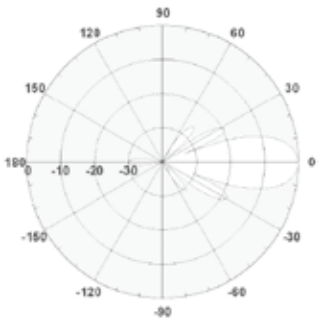


Vertical Pattern

806-896MHz

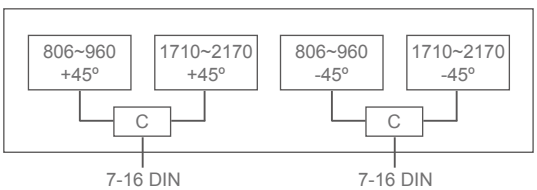


Horizontal Pattern



Vertical Pattern

1710-2170MHz

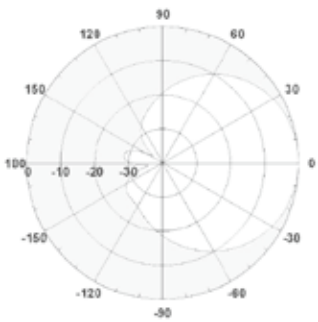


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	16.5Kg
Max. wind velocity	200Km/h
Dimension	1316×295×145MM

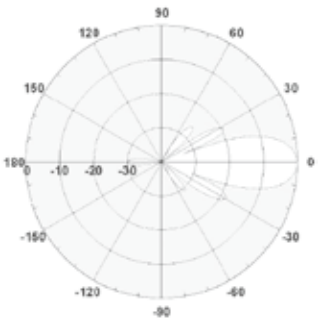
XXpol Panel C 806-960/1710-2170 65º 16/18dBi VET0º-6º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 0809/U-65-16/18DV8C				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-896MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	15.5dBi	16dBi	17.5dBi	17.8dBi	18dBi
Horizontal 3dB beam width	68º	65º	68º	66º	64º
Vertical 3dB beam width	10º	9.5º	5.2º	5º	4.7º
Electrical downtilt	0º-6º	0º-6º	0º-6º	0º-6º	0º-6º
First upper sidelobe suppression	>15dB	>15dB	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		50Ω		
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc		<-150dBc		
Max. power	250W		200W		
Max. power per input	450W				
Inner combiner	The insertion loss is included in the given antenna values.				

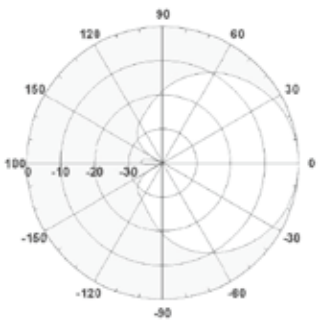


Horizontal Pattern

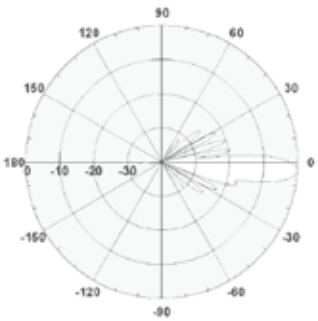


Vertical Pattern

806-896MHz

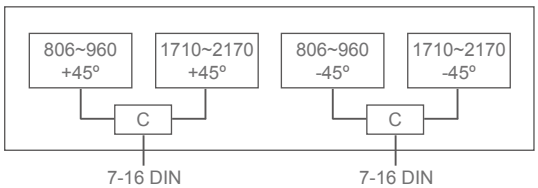


Horizontal Pattern



Vertical Pattern

1710-2170MHz

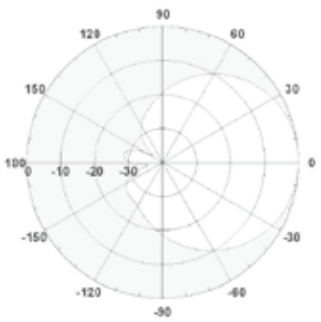


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	23Kg
Max. wind velocity	200Km/h
Dimension	1916×295×145MM

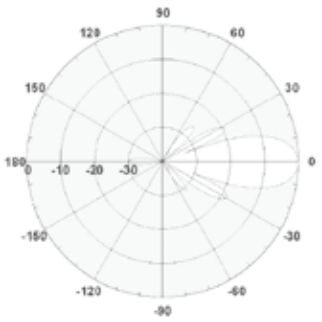
XXpol Panel C 806-960/1710-2170 65º 17/18dBi VET0º-6º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 0809/U-65-17/18DV8C				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-896MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	16.5dBi	16.8dBi	17.5dBi	17.8dBi	18dBi
Horizontal 3dB beam width	68º	65º	68º	66º	64º
Vertical 3dB beam width	8º	7.5º	5.2º	5º	4.7º
Electrical downtilt	0º-6º	0º-6º	0º-6º	0º-6º	0º-6º
First upper sidelobe suppression	>15dB	>15dB	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		50Ω		
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc		<-150dBc		
Max. power	250W		200W		
Max. power per input	450W				
Inner combiner	The insertion loss is included in the given antenna values.				

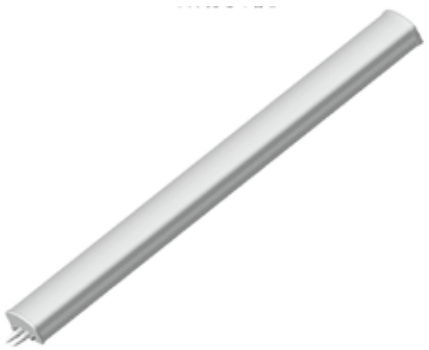


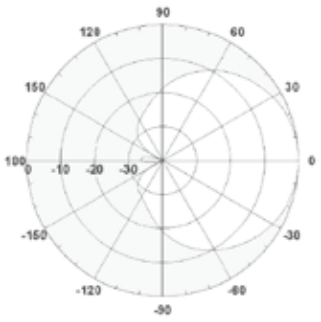
Horizontal Pattern



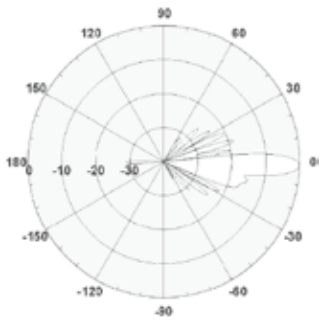
Vertical Pattern

806-896MHz



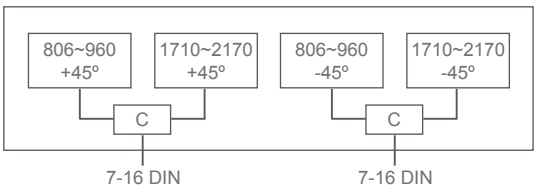


Horizontal Pattern



Vertical Pattern

1710-2170MHz

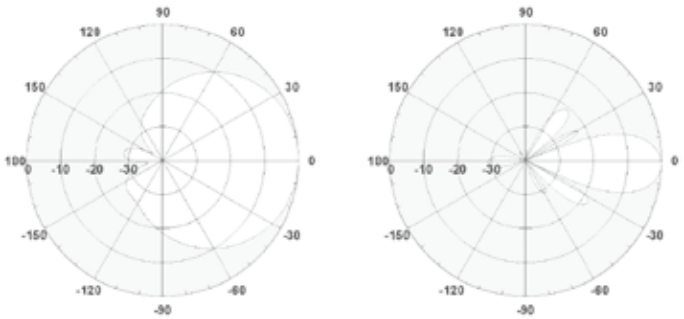


Mechanical Specification	
Connector type	2×7-16DIN(F)
Weight	26Kg
Max. wind velocity	200Km/h
Dimension	2516×295×145MM

Dual Band Antenna --4 ports Dual Polarization +45º/–45º

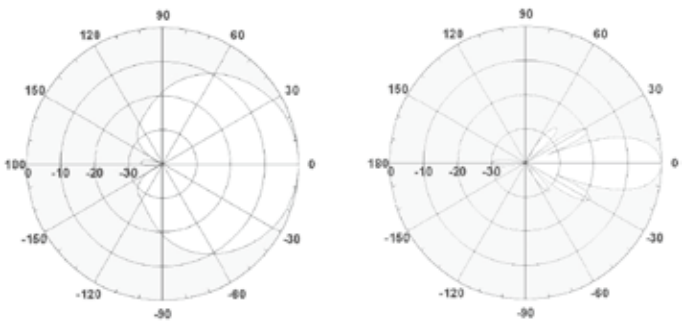
XXpol Panel 870-960/1710-1880 65º/65º 15/17dBi FET0º

Part Number	S-Wave 09/18-65-15/17D	
Electrical Specification		
Frequency range	870-960MHz	1710-1880MHz
Polarization	±45º	±45º
Gain	15.0dBi	16.8dBi
Horizontal 3dB beam width	65º	66º
Vertical 3dB beam width	15.0º	7.8º
Electrical downtilt	0ºFixed	0ºFixed
First upper sidelobe suppression	>14dB	>15dB
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	50Ω
VSWR	<1.5	<1.5
IMD3@2×43dBm carrier	<-150dBc	<-150dBc
Max. power per input	400W	300W



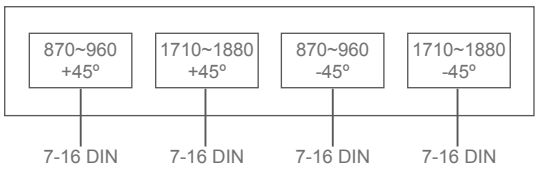
Horizontal Pattern　　Vertical Pattern

870-960MHz



Horizontal Pattern　　Vertical Pattern

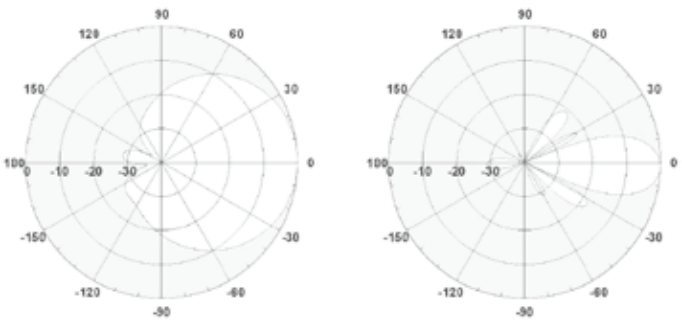
1710-1880MHz



Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	15Kg
Max. wind velocity	200Km/h
Dimension	1350×295×145MM

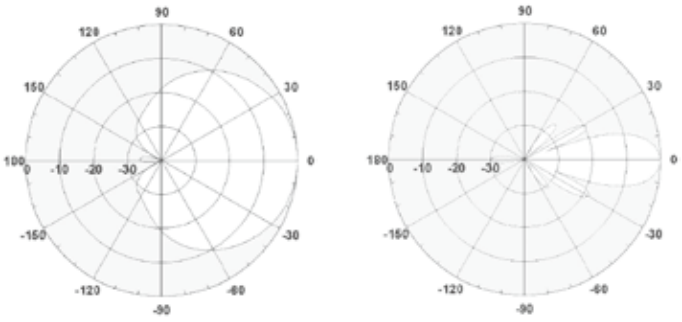
XXpol Panel 870-960/1710-1880 65º/65º 15/17dBi FET6º

Part Number	S-Wave 09/18-65-15/17DT6	
Electrical Specification		
Frequency range	870-960MHz	1710-1880MHz
Polarization	±45º	±45º
Gain	14.8dBi	16.7dBi
Horizontal 3dB beam width	65º	63º
Vertical 3dB beam width	15.0º	7.8º
Electrical downtilt	6ºFixed	6ºFixed
First upper sidelobe suppression	>14dB	>15dB
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	50Ω
VSWR	<1.5	<1.5
IMD3@2×43dBm carrier	<-150dBc	<-150dBc
Max. power per input	400W	300W



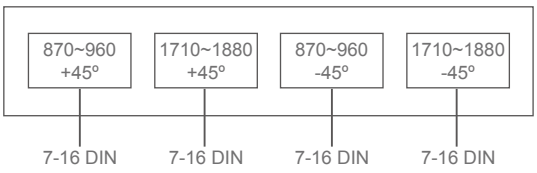
Horizontal Pattern Vertical Pattern

870-960MHz



Horizontal Pattern Vertical Pattern

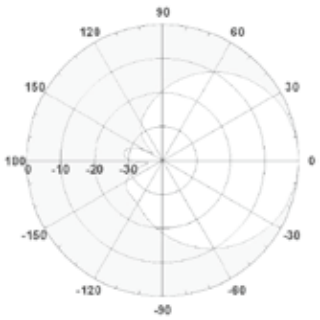
1710-1880MHz



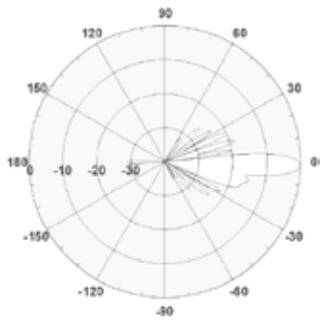
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	15Kg
Max. wind velocity	200Km/h
Dimension	1350×295×145MM

XXpol Panel 870-960/1710-1880 65º/65º 17/18dBi FET0º

Part Number	S-Wave 09/18-65-17/18D	
Electrical Specification		
Frequency range	870-960MHz	1710-1880MHz
Polarization	±45º	±45º
Gain	17.0dBi	18.0dBi
Horizontal 3dB beam width	65º	62º
Vertical 3dB beam width	9.5º	6.5º
Electrical downtilt	0ºFixed	0ºFixed
First upper sidelobe suppression	>16dB	>16dB
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	50Ω
VSWR	<1.5	<1.5
IMD3@2×43dBm carrier	<-150dBc	<-150dBc
Max. power per input	400W	300W

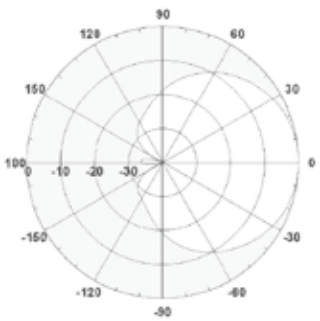


Horizontal Pattern

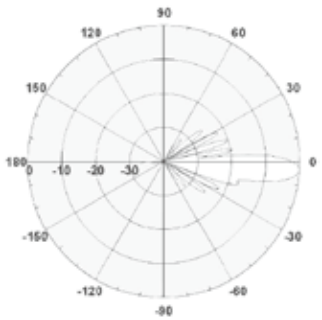


Vertical Pattern

870-960MHz

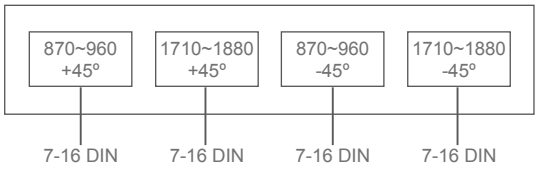


Horizontal Pattern



Vertical Pattern

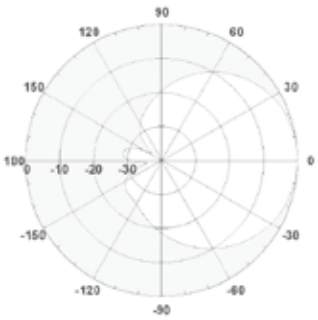
1710-1880MHz



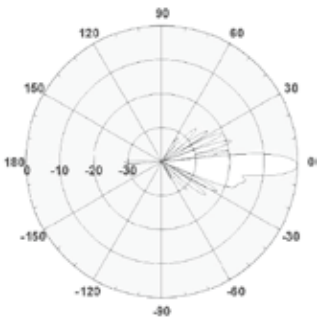
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	22Kg
Max. wind velocity	200Km/h
Dimension	1936×295×145MM

XXpol Panel 870-960/1710-1880 65º/65º 17/18dBi FET6º

Part Number	S-Wave 09/18-65-17/18DT6	
Electrical Specification		
Frequency range	870-960MHz	1710-1880MHz
Polarization	±45º	±45º
Gain	17.0dBi	18.0dBi
Horizontal 3dB beam width	65º	62º
Vertical 3dB beam width	9.5º	6.5º
Electrical downtilt	6ºFixed	6ºFixed
First upper sidelobe suppression	>16dB	>16dB
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	50Ω
VSWR	<1.5	<1.5
IMD3@2×43dBm carrier	<-150dBc	<-150dBc
Max. power per input	400W	300W

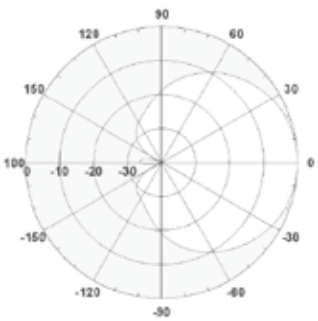


Horizontal Pattern

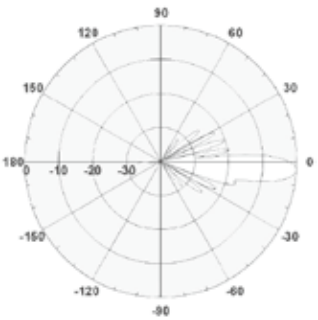


Vertical Pattern

870-960MHz

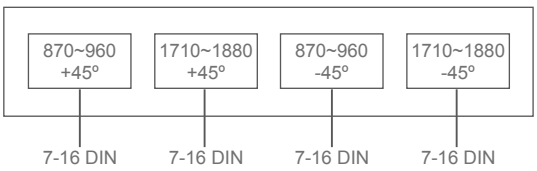


Horizontal Pattern



Vertical Pattern

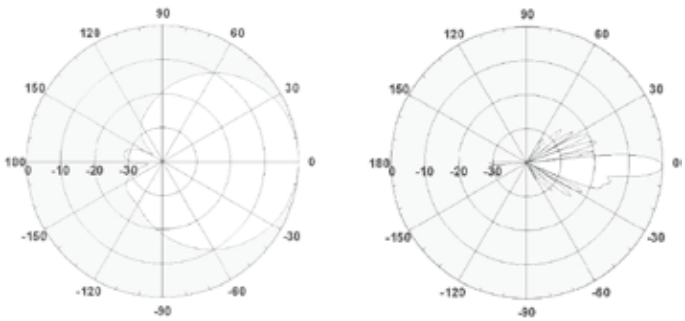
1710-1880MHz



Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	22Kg
Max. wind velocity	200Km/h
Dimension	1936×295×145MM

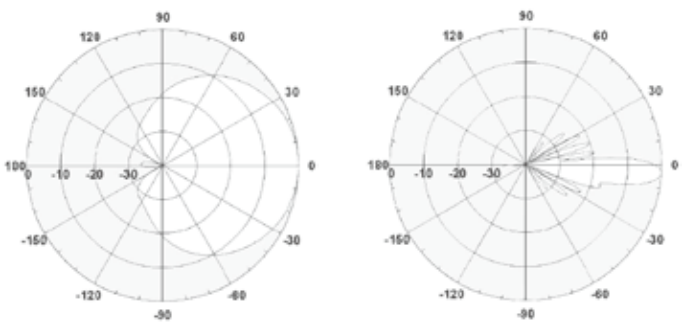
XXpol Panel 870-960/1710-1880 65º/65º 18/18dBi FET0º

Part Number	S-Wave 09/18-65-18D	
Electrical Specification		
Frequency range	870-960MHz	1710-1880MHz
Polarization	±45º	±45º
Gain	17.5dBi	18.0dBi
Horizontal 3dB beam width	65º	62º
Vertical 3dB beam width	7.0º	6.5º
Electrical downtilt	0ºFixed	0ºFixed
First upper sidelobe suppression	>16dB	>16dB
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	50Ω
VSWR	<1.5	<1.5
IMD3@2×43dBm carrier	<-150dBc	<-150dBc
Max. power per input	400W	300W



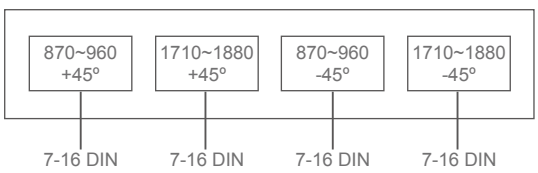
Horizontal Pattern　　Vertical Pattern

870-960MHz



Horizontal Pattern　　Vertical Pattern

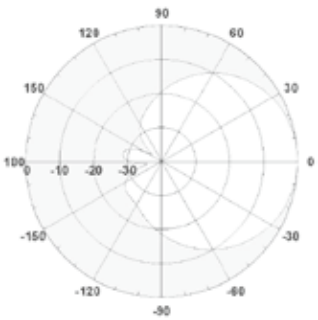
1710-1880MHz



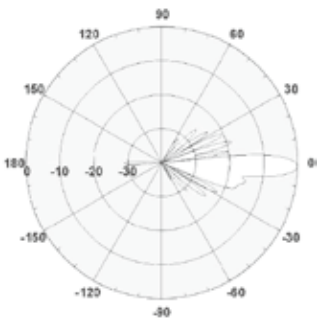
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	24Kg
Max. wind velocity	200Km/h
Dimension	2640×295×145MM

XXpol Panel 870-960/1710-1880 65º/65º 18/18dBi FET6º

Part Number	S-Wave 09/18-65-18DT6	
Electrical Specification		
Frequency range	870-960MHz	1710-1880MHz
Polarization	±45º	±45º
Gain	17.5dBi	18.0dBi
Horizontal 3dB beam width	65º	62º
Vertical 3dB beam width	7.0º	6.5º
Electrical downtilt	6ºFixed	6ºFixed
First upper sidelobe suppression	>16dB	>16dB
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	50Ω
VSWR	<1.5	<1.5
IMD3@2×43dBm carrier	<-150dBc	<-150dBc
Max. power per input	400W	300W

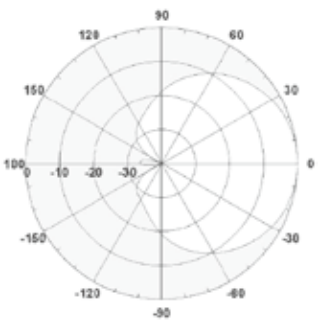


Horizontal Pattern

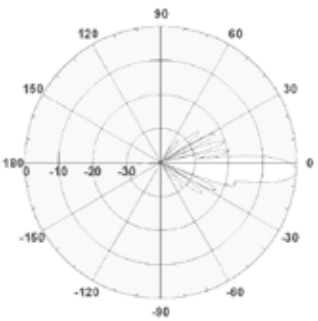


Vertical Pattern

870-960MHz

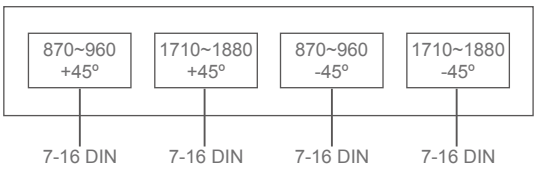


Horizontal Pattern



Vertical Pattern

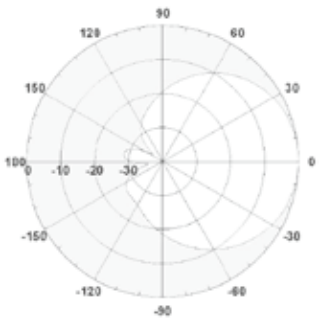
1710-1880MHz



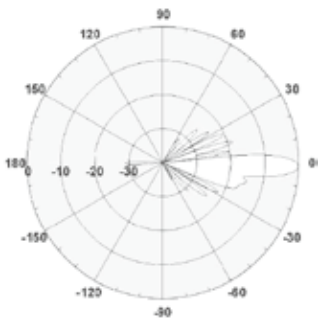
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	25Kg
Max. wind velocity	200Km/h
Dimension	2640×295×145MM

XXpol Panel 806-960/1710-2170 65º/65º 15/17dBi FET0º

Part Number	S-Wave 0809/U-65-15/17D				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-894MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	14.7dBi	15.0dBi	16.5dBi	16.8dBi	17.0dBi
Horizontal 3dB beam width	68º	65º	65º	63º	62º
Vertical 3dB beam width	15.0º	14.2º	7.5º	7.2º	7.0º
Electrical downtilt	0ºFixed		0ºFixed		
First upper sidelobe suppression	>14dB		>16dB		
Front to back ratio, copolar	>25dB		>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB		>18dB >10dB		
Impedance	50Ω				
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc				
Max. power per input	400W		300W		

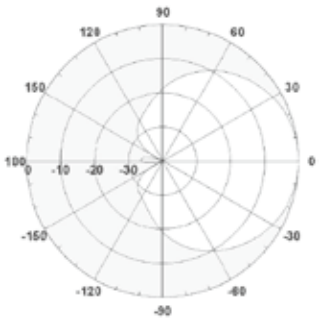


Horizontal Pattern

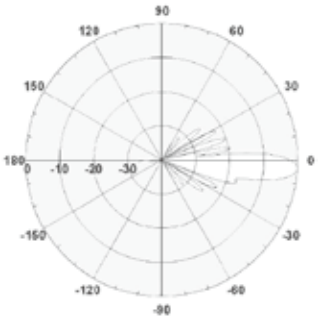


Vertical Pattern

806-960MHz

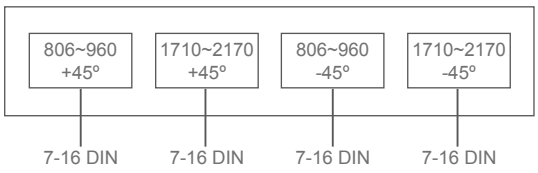


Horizontal Pattern



Vertical Pattern

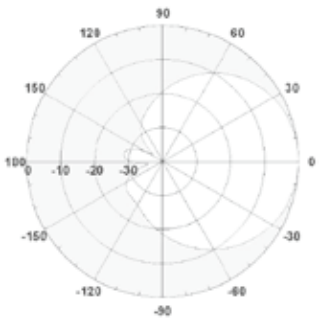
1710-2170MHz



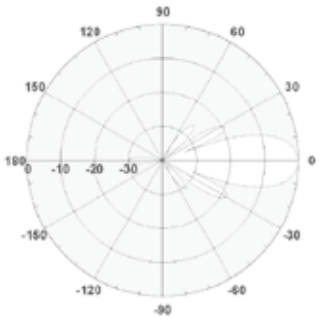
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	15Kg
Max. wind velocity	200Km/h
Dimension	1350×295×145MM

XXpol Panel 806-960/1710-2170 65º/65º 15/17dBi FET6º

Part Number	S-Wave 0809/U-65-15/17DT6				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-894MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	14.7dBi	15.0dBi	16.5dBi	16.8dBi	17.0dBi
Horizontal 3dB beam width	68º	65º	65º	63º	62º
Vertical 3dB beam width	15.0º	14.2º	7.5º	7.2º	7.0º
Electrical downtilt	6º Fixed		6º Fixed		
First upper sidelobe suppression	>14dB		>16dB		
Front to back ratio, copolar	>25dB		>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB		>18dB >10dB		
Impedance	50Ω				
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc				
Max. power per input	400W		300W		

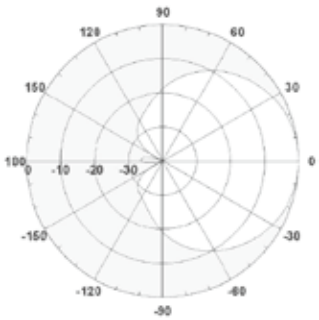


Horizontal Pattern

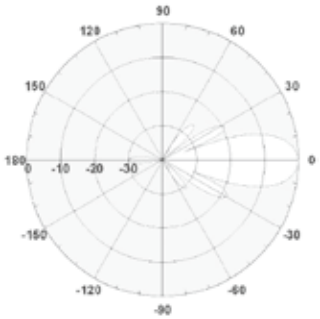


Vertical Pattern

806-960MHz

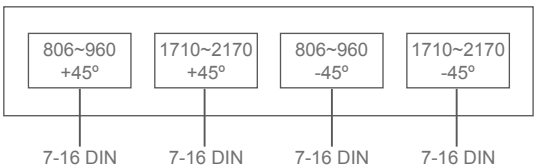


Horizontal Pattern



Vertical Pattern

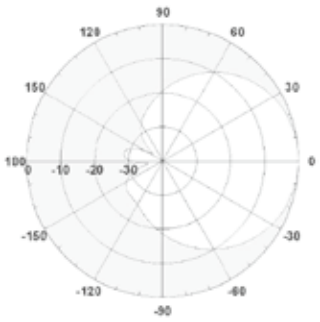
1710-2170MHz



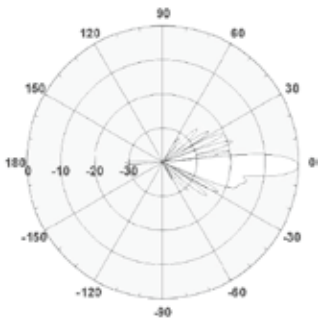
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	15Kg
Max. wind velocity	200Km/h
Dimension	1350×295×145MM

XXpol Panel 806-960/1710-2170 65º/65º 17/18dBi FET0º

Part Number	S-Wave 0809/U-65-17/18D				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-894MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	16.7dBi	17.0dBi	17.5dBi	17.8dBi	18.0dBi
Horizontal 3dB beam width	68º	65º	65º	63º	62º
Vertical 3dB beam width	10.0º	9.5º	6.5º	6.2º	6.0º
Electrical downtilt	0ºFixed		0ºFixed		
First upper sidelobe suppression	>16dB		>16dB		
Front to back ratio, copolar	>25dB		>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB		>18dB >10dB		
Impedance	50Ω				
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc				
Max. power per input	400W		300W		

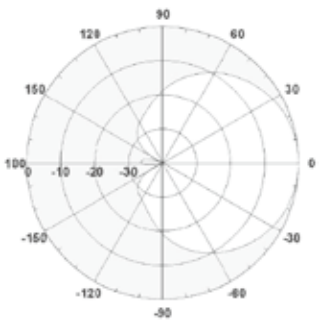


Horizontal Pattern

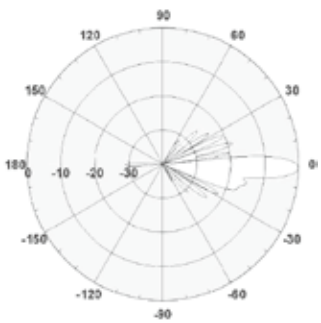


Vertical Pattern

806-960MHz

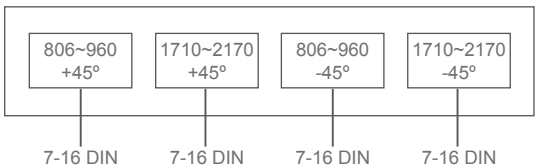


Horizontal Pattern



Vertical Pattern

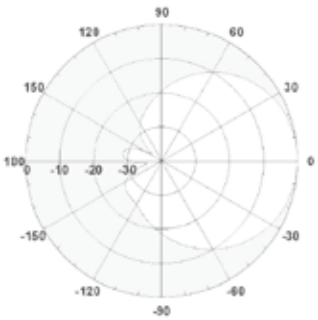
1710-2170MHz



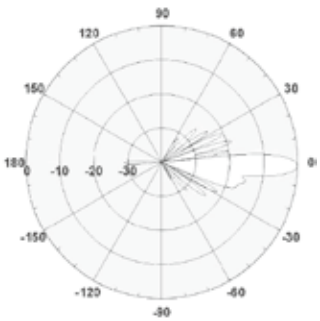
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	22Kg
Max. wind velocity	200Km/h
Dimension	1936×295×145MM

XXpol Panel 806-960/1710-2170 65º/65º 17/18dBi FET6º

Part Number	S-Wave 0809/U-65-17/18DT6				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-894MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	16.7dBi	17.0dBi	17.5dBi	17.8dBi	18.0dBi
Horizontal 3dB beam width	68º	65º	65º	63º	62º
Vertical 3dB beam width	10.0º	9.5º	6.5º	6.2º	6.0º
Electrical downtilt	6º Fixed		6º Fixed		
First upper sidelobe suppression	>16dB		>16dB		
Front to back ratio, copolar	>25dB		>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB		>18dB >10dB		
Impedance	50Ω				
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc				
Max. power per input	400W		300W		

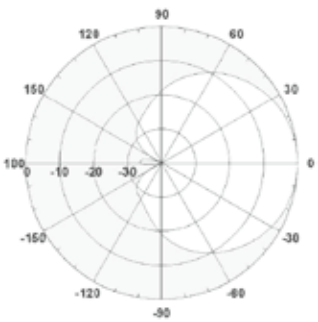


Horizontal Pattern

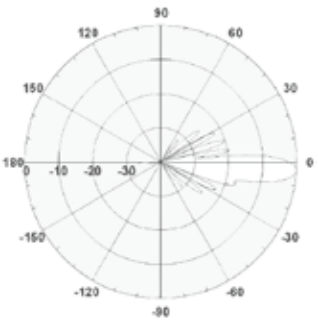


Vertical Pattern

806-960MHz

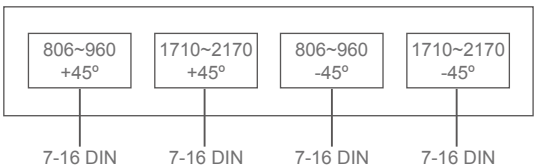


Horizontal Pattern



Vertical Pattern

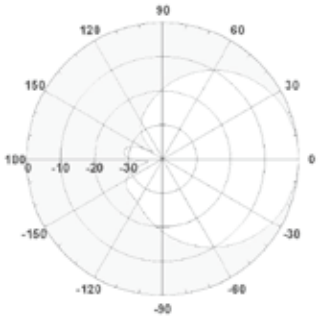
1710-2170MHz



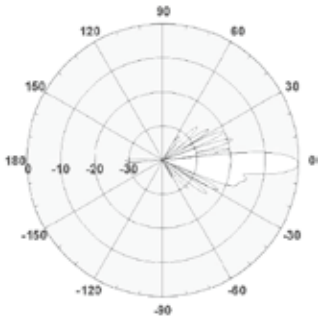
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	22Kg
Max. wind velocity	200Km/h
Dimension	1936×295×145MM

XXpol Panel 806-960/1710-2170 65º/65º 18/18dBi FET0º

Part Number	S-Wave 0809/U-65-18D				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-894MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	17.3dBi	17.6dBi	17.5dBi	17.8dBi	18.0dBi
Horizontal 3dB beam width	68º	65º	65º	63º	62º
Vertical 3dB beam width	7.5º	7.0º	6.5º	6.0º	5.5º
Electrical downtilt	0ºFixed		0ºFixed		
First upper sidelobe suppression	>16dB		>16dB		
Front to back ratio, copolar	>25dB		>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB		>18dB >10dB		
Impedance	50Ω				
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc				
Max. power per input	400W		300W		

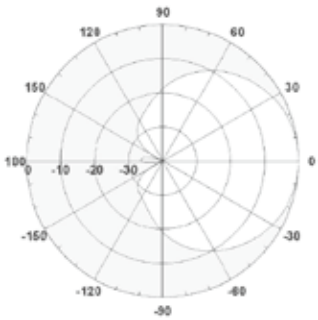


Horizontal Pattern

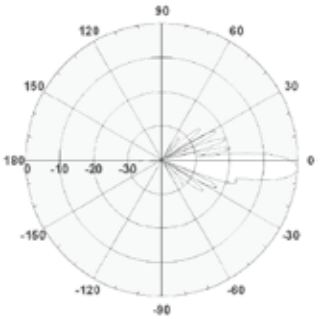


Vertical Pattern

806-960MHz

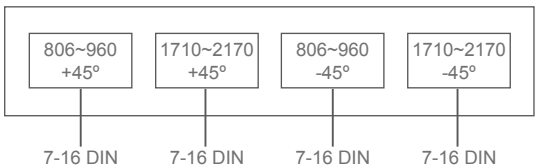


Horizontal Pattern



Vertical Pattern

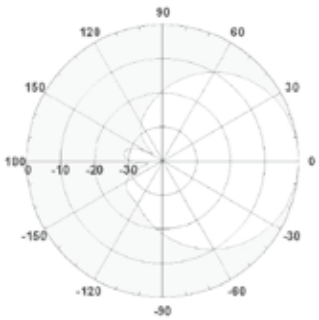
1710-2170MHz



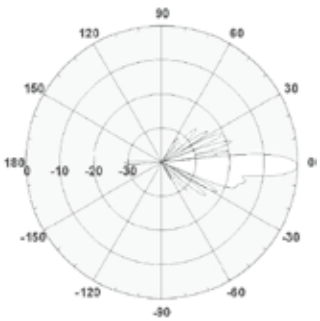
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	25Kg
Max. wind velocity	200Km/h
Dimension	2640×295×145MM

XXpol Panel 806-960/1710-2170 65º/65º 18/18dBi FET6º

Part Number	S-Wave 0809/U-65-18DT6				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-894MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	17.3dBi	17.6dBi	17.5dBi	17.8dBi	18.0dBi
Horizontal 3dB beam width	68º	65º	65º	63º	62º
Vertical 3dB beam width	7.5º	7.0º	6.5º	6.0º	5.5º
Electrical downtilt	6º Fixed		6º Fixed		
First upper sidelobe suppression	>16dB		>16dB		
Front to back ratio, copolar	>25dB		>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB		>18dB >10dB		
Impedance	50Ω				
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc				
Max. power per input	400W		300W		

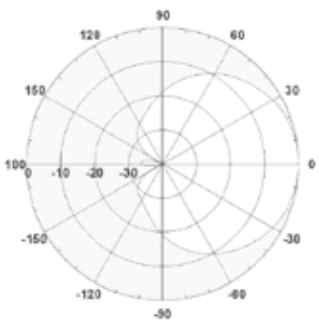


Horizontal Pattern

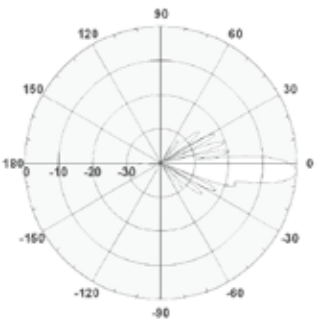


Vertical Pattern

806-960MHz

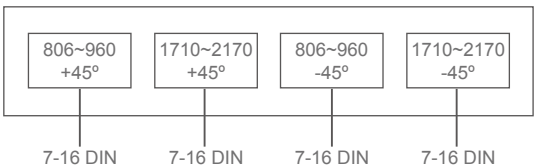


Horizontal Pattern



Vertical Pattern

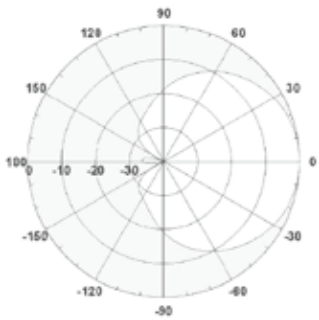
1710-2170MHz



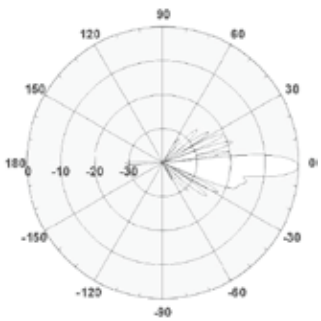
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	25Kg
Max. wind velocity	200Km/h
Dimension	2640×295×145MM

XXpol Panel 1710-2170/1710-2170 65º/65º 18/18dBi FET0º

Part Number	S-Wave U/U-65-18D					
Electrical Specification						
Frequency range	1710-2170MHz			1710-2170MHz		
	1710-1880MHz	1850-1990MHz	1920-2170MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º	±45º
Gain	17.5dBi	17.6dBi	17.8dBi	17.5dBi	17.6dBi	17.8dBi
Horizontal 3dB beam width	65º	63º	62º	65º	63º	62º
Vertical 3dB beam width	7.0º	6.8º	6.5º	7.0º	6.8º	6.5º
Electrical downtilt	0ºFixed			0ºFixed		
First upper sidelobe suppression	>16dB			>16dB		
Front to back ratio, copolar	>25dB			>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB			>18dB >10dB		
Impedance	50Ω					
VSWR	<1.5			<1.5		
Isolation	>30dB					
IMD3@2×43dBm carrier	<-150dBc					
Max. power per input	400W			300W		

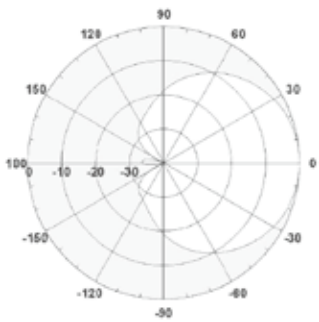


Horizontal Pattern

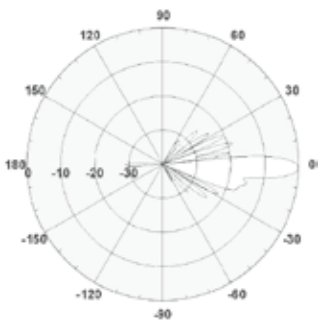


Vertical Pattern

1710-2170MHz

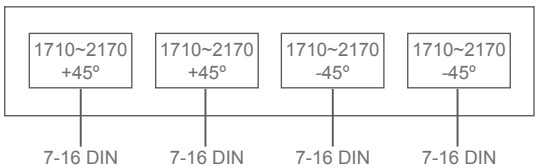


Horizontal Pattern



Vertical Pattern

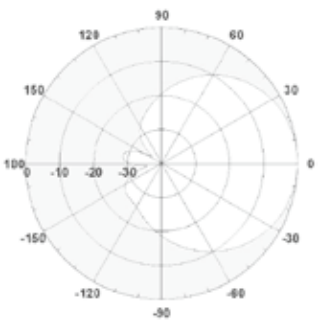
1710-2170MHz



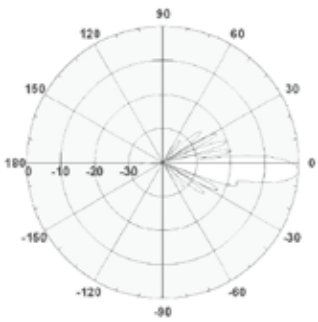
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	18Kg
Max. wind velocity	200Km/h
Dimension	1320×295×115MM

XXpol Panel 1710-2170/1710-2170 65º/65º 18/18dBi FET6º

Part Number	S-Wave U/U-65-18DT6					
Electrical Specification						
Frequency range	1710-2170MHz			1710-2170MHz		
	1710-1880MHz	1850-1990MHz	1920-2170MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º	±45º
Gain	17.5dBi	17.6dBi	17.8dBi	17.5dBi	17.6dBi	17.8dBi
Horizontal 3dB beam width	65º	63º	62º	65º	63º	62º
Vertical 3dB beam width	7.0º	6.8º	6.5º	7.0º	6.8º	6.5º
Electrical downtilt	6ºFixed			6ºFixed		
First upper sidelobe suppression	>16dB			>16dB		
Front to back ratio, copolar	>25dB			>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB			>18dB >10dB		
Impedance	50Ω					
VSWR	<1.5			<1.5		
Isolation	>30dB					
IMD3@2×43dBm carrier	<-150dBc					
Max. power per input	400W			300W		

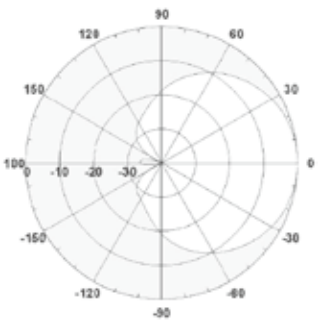


Horizontal Pattern

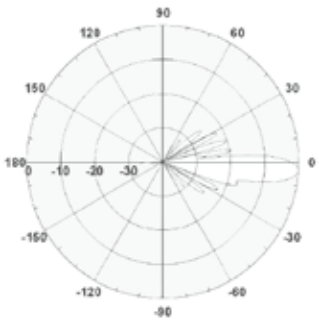


Vertical Pattern

806-960MHz

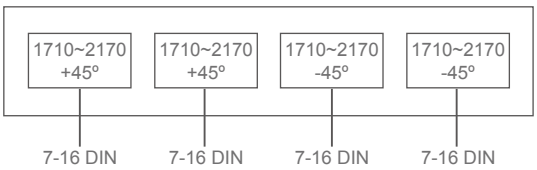


Horizontal Pattern



Vertical Pattern

1710-2170MHz

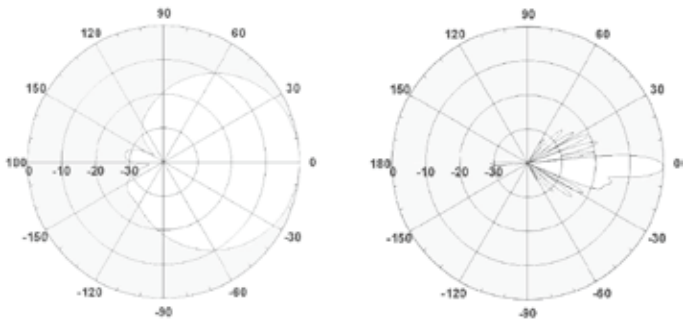


Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	18Kg
Max. wind velocity	200Km/h
Dimension	1320×295×115MM

XXpol Panel 870-960/1710-1880 65º/65º 17/18dBi VET0º-8º

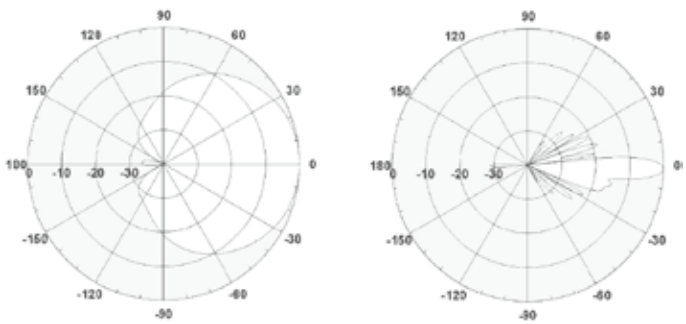
Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 09/18-65-17/18DV8	
Electrical Specification		
Frequency range	870-960MHz	1710-1880MHz
Polarization	±45º	±45º
Gain	17.0dBi	18.0dBi
Horizontal 3dB beam width	65º	62º
Vertical 3dB beam width	9.5º	6.5º
Electrical downtilt	0º-8º	0º-8º
First upper sidelobe suppression	>16dB	>16dB
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	50Ω
VSWR	<1.5	<1.5
IMD3@2×43dBm carrier	<-150dBc	<-150dBc
Max. power per input	400W	300W



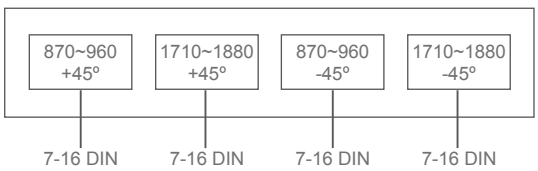
Horizontal Pattern Vertical Pattern

870-960MHz



Horizontal Pattern Vertical Pattern

1710-1880MHz

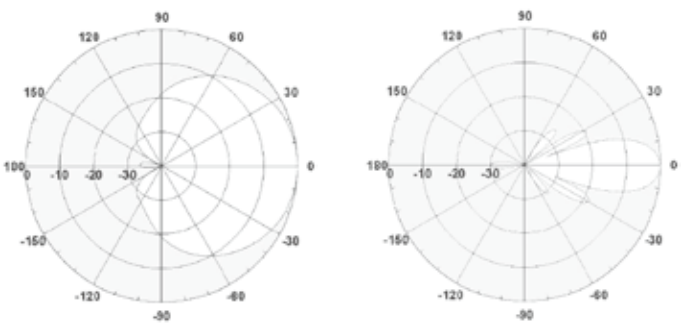


Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	25Kg
Max. wind velocity	200Km/h
Dimension	1936×295×145MM

XXpol Panel 870-960/1710-1880 65º/65º 16/18dBi VET0º-8º

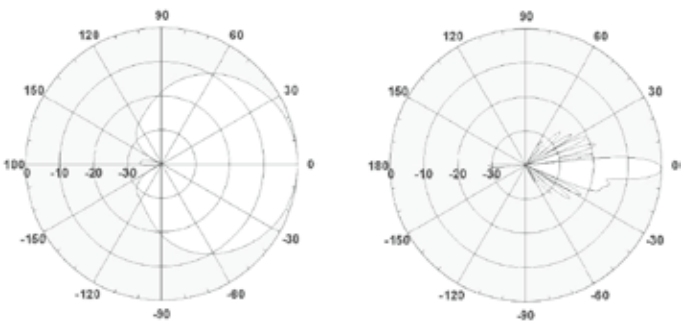
Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 09/18-65-16/18DV8	
Electrical Specification		
Frequency range	870-960MHz	1710-1880MHz
Polarization	±45º	±45º
Gain	16.0dBi	18.0dBi
Horizontal 3dB beam width	65º	62º
Vertical 3dB beam width	10.0º	6.5º
Electrical downtilt	0º-8º	0º-8º
First upper sidelobe suppression	>16dB	>16dB
Front to back ratio, copolar	>25dB	>25dB
Isolation	>30dB	>30dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB
Impedance	50Ω	50Ω
VSWR	<1.5	<1.5
IMD3@2×43dBm carrier	<-150dBc	<-150dBc
Max. power per input	400W	300W



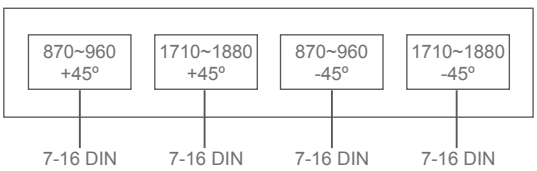
Horizontal Pattern Vertical Pattern

870-960MHz



Horizontal Pattern Vertical Pattern

1710-1880MHz

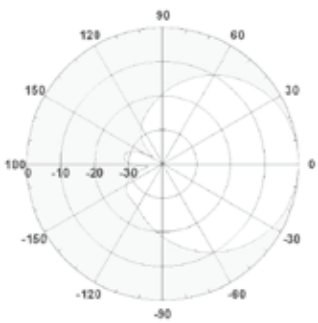


Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	23Kg
Max. wind velocity	200Km/h
Dimension	1700×295×145MM

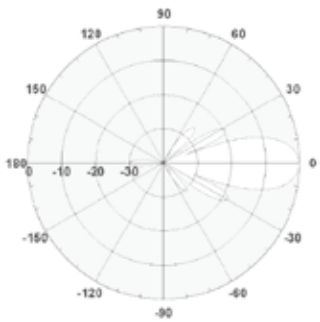
XXpol Panel 806-960/1710-2170 65º/65º 17/18dBi VET0º-8º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 0809/U-65-17/18DV8				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-894MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	16.7dBi	17.0dBi	17.5dBi	17.8dBi	18.0dBi
Horizontal 3dB beam width	68º	65º	65º	63º	62º
Vertical 3dB beam width	10.0º	9.5º	6.5º	6.2º	6.0º
Electrical downtilt	0º-8º		0º-8º		
First upper sidelobe suppression	>16dB		>16dB		
Front to back ratio, copolar	>25dB		>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB		>18dB >10dB		
Impedance	50Ω				
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc				
Max. power per input	400W		300W		

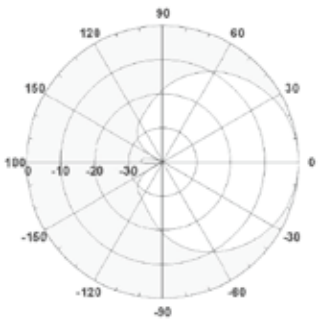


Horizontal Pattern

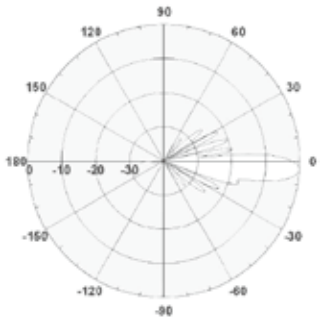


Vertical Pattern

806-960MHz

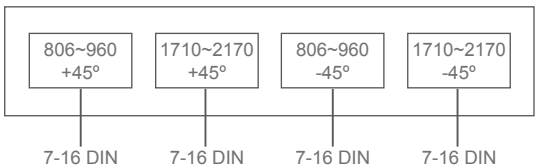


Horizontal Pattern



Vertical Pattern

1710-2170MHz

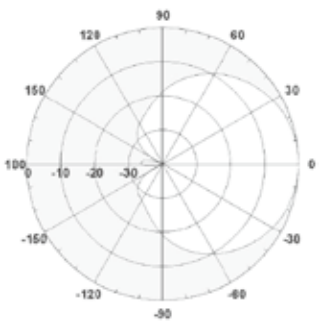


Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	25Kg
Max. wind velocity	200Km/h
Dimension	1936×295×145MM

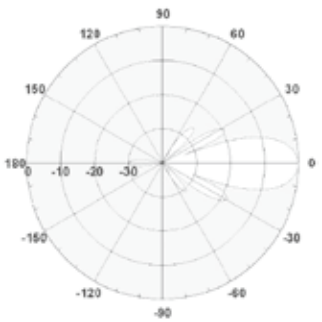
XXpol Panel 806-960/1710-2170 65º/65º 16/18dBi VET0º-8º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 0809/U-65-16/18DV8				
Electrical Specification					
Frequency range	806-960MHz		1710-2170MHz		
	806-894MHz	870-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	15.7dBi	16.0dBi	17.5dBi	17.8dBi	18.0dBi
Horizontal 3dB beam width	68º	65º	65º	63º	62º
Vertical 3dB beam width	11.0º	10.0º	6.5º	6.2º	6.0º
Electrical downtilt	0º-8º		0º-8º		
First upper sidelobe suppression	>15dB		>16dB		
Front to back ratio, copolar	>25dB		>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB		>18dB >10dB		
Impedance	50Ω				
VSWR	<1.5		<1.5		
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc				
Max. power per input	400W		300W		

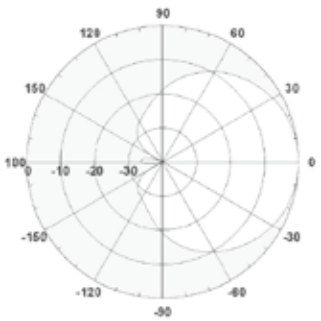


Horizontal Pattern

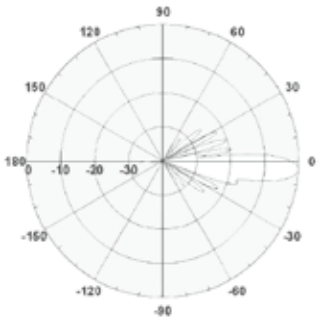


Vertical Pattern

806-960MHz

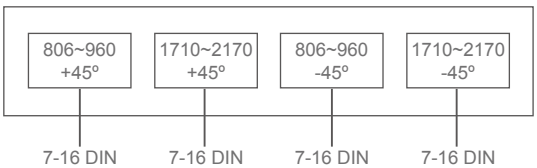


Horizontal Pattern



Vertical Pattern

1710-2170MHz

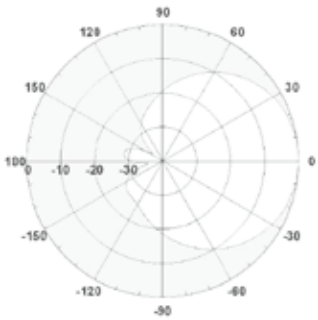


Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	23Kg
Max. wind velocity	200Km/h
Dimension	1700×295×145MM

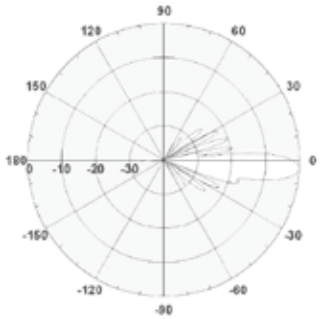
XXpol Panel 1710-2170/1710-2170 65º/65º 18/18dBi VET0º-8º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave U/U-65-18DV8					
Electrical Specification						
Frequency range	1710-2170MHz			1710-2170MHz		
	1710-1880MHz	1850-1990MHz	1920-2170MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º	±45º
Gain	17.5dBi	17.6dBi	17.8dBi	17.5dBi	17.6dBi	17.8dBi
Horizontal 3dB beam width	65º	63º	62º	65º	63º	62º
Vertical 3dB beam width	7.0º	6.8º	6.5º	7.0º	6.8º	6.5º
Electrical downtilt	0º-8º			0º-8º		
First upper sidelobe suppression	>16dB			>16dB		
Front to back ratio, copolar	>25dB			>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB			>18dB >10dB		
Impedance	50Ω					
VSWR	<1.5			<1.5		
Isolation	>30dB					
IMD3@2×43dBm carrier	<-150dBc					
Max. power per input	400W			300W		

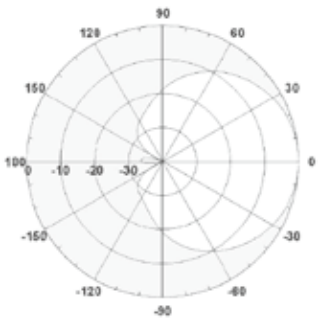


Horizontal Pattern

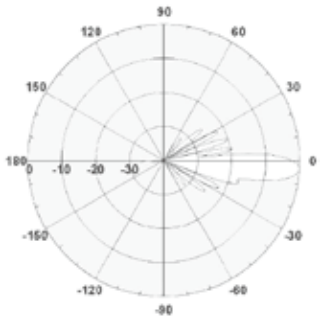


Vertical Pattern

1710-2170MHz

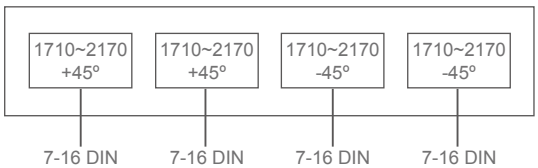


Horizontal Pattern



Vertical Pattern

1710-2170MHz



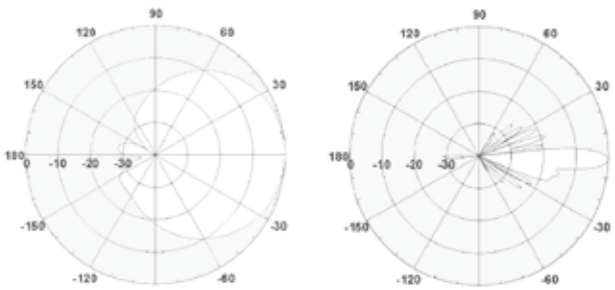
Mechanical Specification	
Connector type	4×7-16DIN(F)
Weight	16Kg
Max. wind velocity	200Km/h
Dimension	1320×295×115MM

Triple Band Antenna --6 ports Dual Polarization +45º/-45º

XXXpol Panel 870-960/1710-1880/1920-2170 65º 17.5/17.5/18.0dBi VET0º-8º

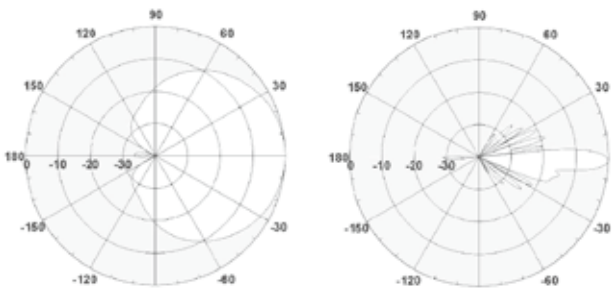
Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 09/18/21-65-17.5/17.5/18.0DV8		
Electrical Specification			
Frequency range	870-960MHz	1710-1880MHz	1920-2170MHz
Polarization	±45º	±45º	±45º
Gain	17.5dBi	17.5dBi	18.0dBi
Horizontal 3dB beam width	65º	65º	63º
Vertical 3dB beam width	7.0º	4.7º	4.4º
Electrical downtilt	0º-8º	0º-8º	0º-8º
First upper sidelobe suppression	>15dB	>16dB	>16dB
Front to back ratio, copolar	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		
VSWR	<1.5	<1.5	<1.5
Isolation	>30dB		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W	200W	



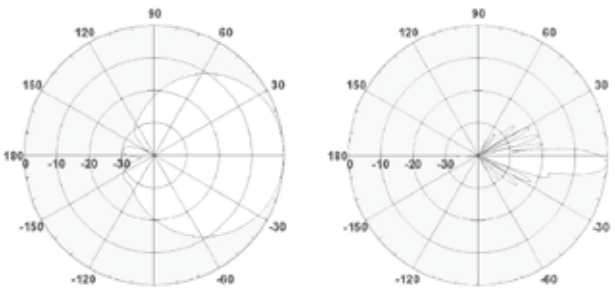
Horizontal Pattern Vertical Pattern

870-960MHz



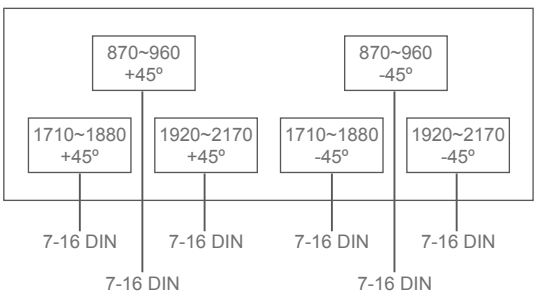
Horizontal Pattern Vertical Pattern

1710-1880MHz



Horizontal Pattern Vertical Pattern

1920-2170MHz

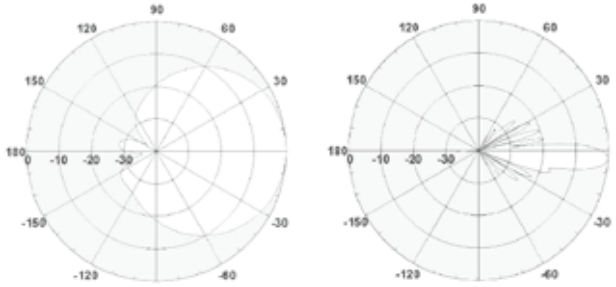


Mechanical Specification	
Connector type	6×7-16DIN(F)
Weight	42Kg
Max. wind velocity	200Km/h
Dimension	2628×295×145MM

XXXpol Panel 806-960/1710-1880/1920-2170 65º 17.5/17.5/18.0dBi VET0º-8º

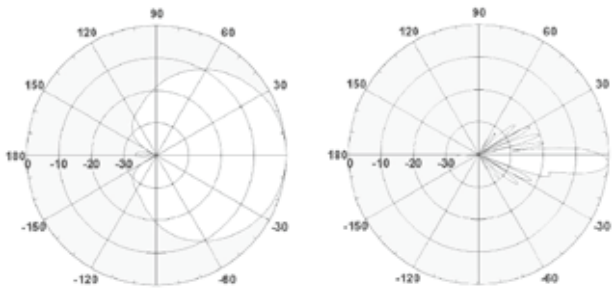
Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 0809/18/21-65-17.5/17.5/18.0DV8				
Electrical Specification					
Frequency range	870-960MHz			1710-1880MHz	1920-2170MHz
	806-866MHz	824-894MHz	880-960MHz		
Polarization	±45º	±45º	±45º	±45º	±45º
Gain	17.1dBi	17.3dBi	17.5dBi	17.5dBi	18.0dBi
Horizontal 3dB beam width	69º	66º	64º	65º	63º
Vertical 3dB beam width	7.4º	7.2º	6.8º	4.7º	4.4º
Electrical downtilt	0º-8º			0º-8º	0º-8º
First upper sidelobe suppression	>15dB			>16dB	>16dB
Front to back ratio, copolar	>25dB			>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB			>18dB >10dB	>18dB >10dB
Impedance	50Ω				
VSWR	<1.5			<1.5	<1.5
Isolation	>30dB				
IMD3@2×43dBm carrier	<-150dBc				
Max. power per input	250W			200W	



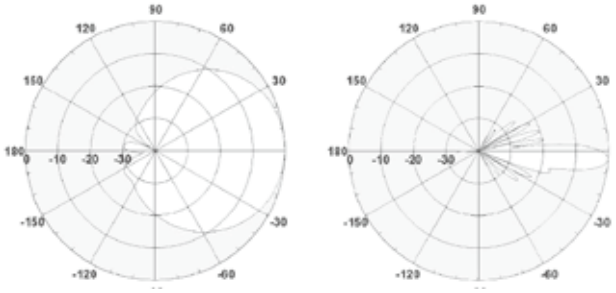
Horizontal Pattern Vertical Pattern

806-960MHz



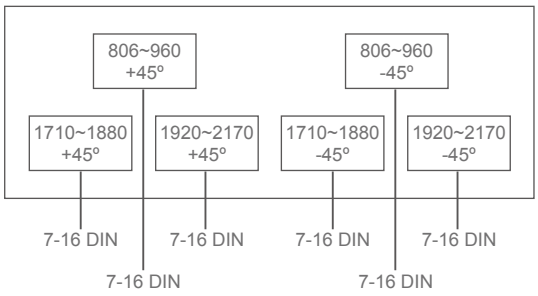
Horizontal Pattern Vertical Pattern

1710-1880MHz



Horizontal Pattern Vertical Pattern

1920-2170MHz

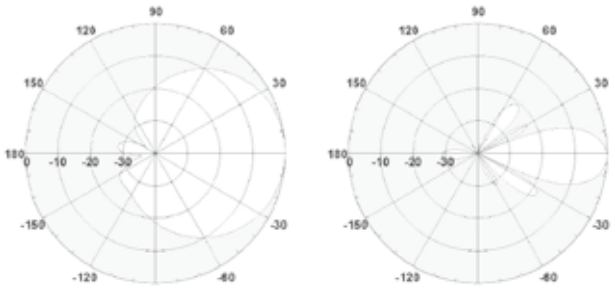


Mechanical Specification	
Connector type	6×7-16DIN(F)
Weight	42Kg
Max. wind velocity	200Km/h
Dimension	2628×295×145MM

XXXpol Panel 806-960/1710-2170/1710-2170 65º 15.0/17.0/17.0dBi VET0º-12º/ VET0º-8º/ VET0º-8º

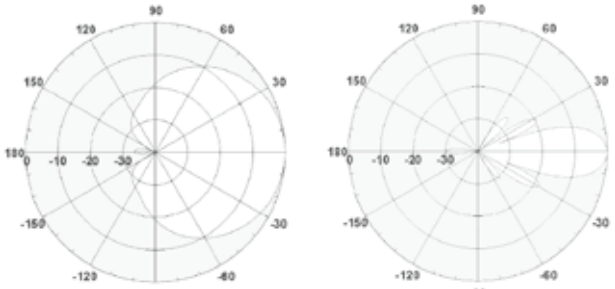
Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 0809/U/U-65-15/17/17DV12/V8/V8					
Electrical Specification						
Frequency range	806-960MHz			1710-2170MHz/1710-2170 MHz		
	806-866MHz	824-894MHz	880-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º	±45º
Gain	14.5dBi	14.8dBi	15.0dBi	16.5dBi	16.8dBi	17.0dBi
Horizontal 3dB beam width	69º	66º	64º	65º	63º	62º
Vertical 3dB beam width	14º	13.5º	13 º	6.7º	6.5º	6.2º
Electrical downtilt	0º-12º			0º-8º		
First upper sidelobe suppression	>14dB			>16dB		
Front to back ratio, copolar	>25dB			>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB			>18dB >10dB		
Impedance	50Ω					
VSWR	<1.5			<1.5		
Isolation	>30dB					
IMD3@2×43dBm carrier	<-150dBc					
Max. power per input	250W			200W		



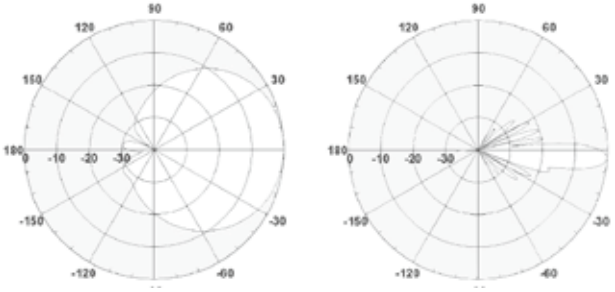
Horizontal Pattern Vertical Pattern

806-960MHz



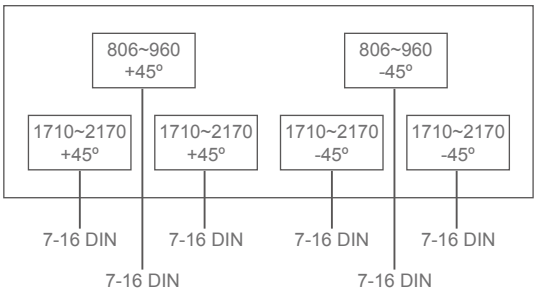
Horizontal Pattern Vertical Pattern

1710-2170MHz



Horizontal Pattern Vertical Pattern

1710-2170MHz

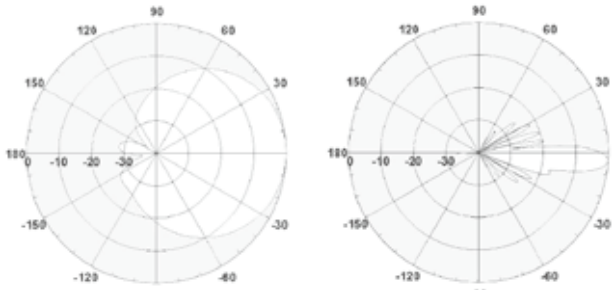


Mechanical Specification	
Connector type	6×7-16DIN(F)
Weight	26Kg
Max. wind velocity	200Km/h
Dimension	1500×295×145MM

XXXpol Panel 806-960/1710-2170/1710-2170 65º 17.5/18.0/18.0dBi VET0º-8º

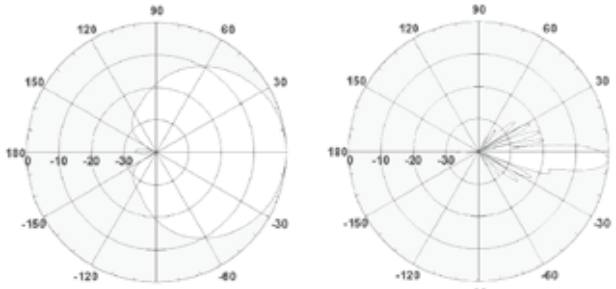
Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave 0809/U/U-65-17.5/18.0/18.0DV8					
Electrical Specification						
Frequency range	806-960MHz			1710-2170MHz/1710-2170 MHz		
	806-866MHz	824-894MHz	880-960MHz	1710-1880MHz	1850-1990MHz	1920-2170MHz
Polarization	±45º	±45º	±45º	±45º	±45º	±45º
Gain	17.1dBi	17.3dBi	17.5dBi	17.5dBi	17.8dBi	18.0dBi
Horizontal 3dB beam width	69º	66º	64º	65º	63º	62º
Vertical 3dB beam width	7.4º	7.2º	6.8º	4.7º	4.5º	4.4º
Electrical downtilt	0º-8º			0º-8º		
First upper sidelobe suppression	>15dB			>16dB		
Front to back ratio, copolar	>25dB			>25dB		
Cross-polar ratio, 0º ±60º	>18dB >10dB			>18dB >10dB		
Impedance	50Ω					
VSWR	<1.5			<1.5		
Isolation	>30dB					
IMD3@2×43dBm carrier	<-150dBc					
Max. power per input	250W			200W		



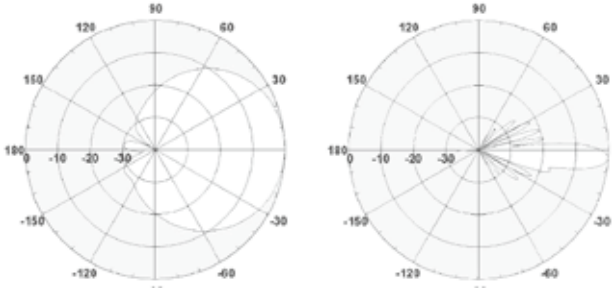
Horizontal Pattern Vertical Pattern

806-960MHz



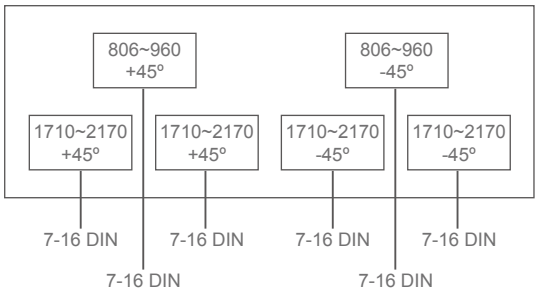
Horizontal Pattern Vertical Pattern

1710-2170MHz



Horizontal Pattern Vertical Pattern

1710-2170MHz



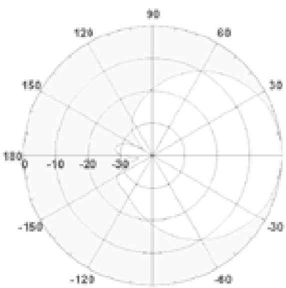
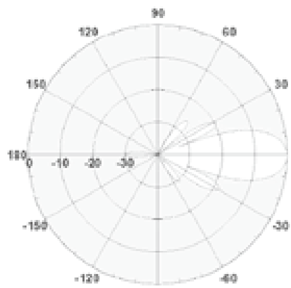
Mechanical Specification	
Connector type	6×7-16DIN(F)
Weight	42Kg
Max. wind velocity	200Km/h
Dimension	2628×295×145MM

Tri-Sector Antenna Dual Polarization +45º/-45º

Xpol Tri-Sector 1710-2170 65º 15.0dBi VET0º-14º

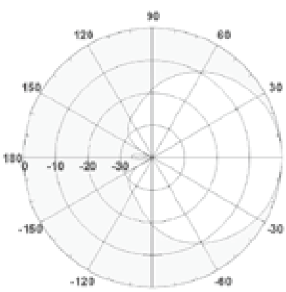
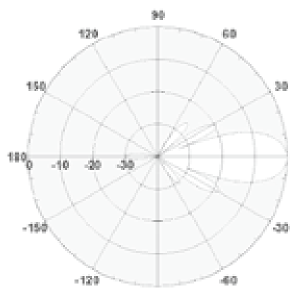
Adjust. Electrical Downtilt Set by Hand or by Optional RCU

Part Number	S-Wave U/U/U-65-15DV14S		
Electrical Specification			
Frequency range	1710-2170MHz	1710-2170MHz	1710-2170MHz
Polarization	±45º	±45º	±45º
Gain	15dBi	15dBi	15dBi
Horizontal 3dB beam width	65º	65º	63º
Vertical 3dB beam width	12º	12º	12º
Electrical downtilt	0º-14º	0º-14º	0º-14º
First upper sidelobe suppression	>15dB	>15dB	>15dB
Front to back ratio, copolar	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50 Ω		
VSWR	<1.5	<1.5	<1.5
Isolation	>30dB		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		

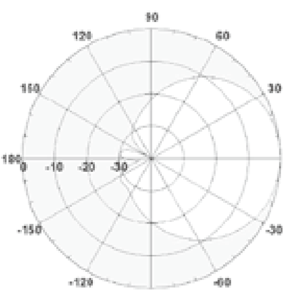
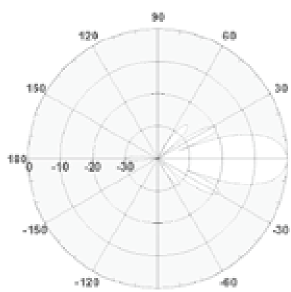
Horizontal Pattern   Vertical Pattern

1710-2170MHz

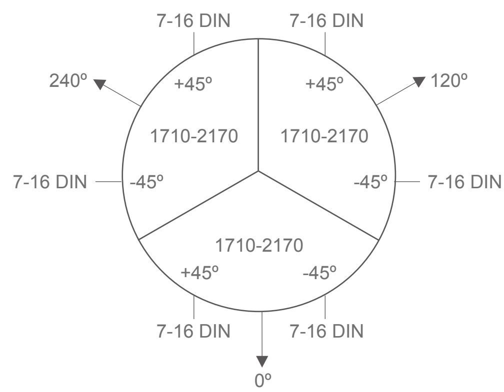
Horizontal Pattern   Vertical Pattern

1710-2170MHz

Horizontal Pattern   Vertical Pattern

1710-2170MHz

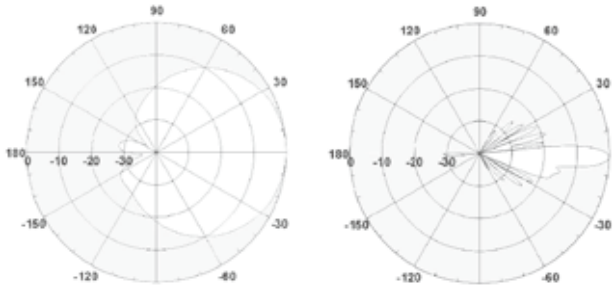


Mechanical Specification	
Connector type	6×7-16DIN(F)
Weight	35Kg
Max. wind velocity	200Km/h
Dimension	Φ250×1300MM

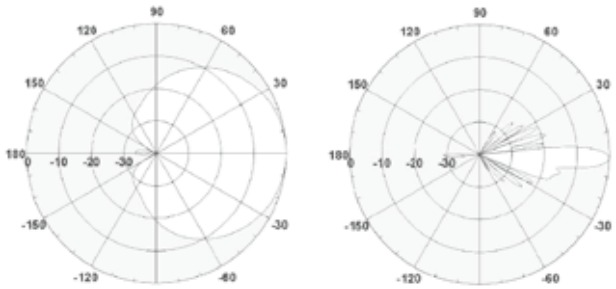
Xpol Tri-Sector 1710-2170 65º 18.0dBi VET0º-8º

Adjust. Electrical Downtilt Set by Hand or by Optional RCU

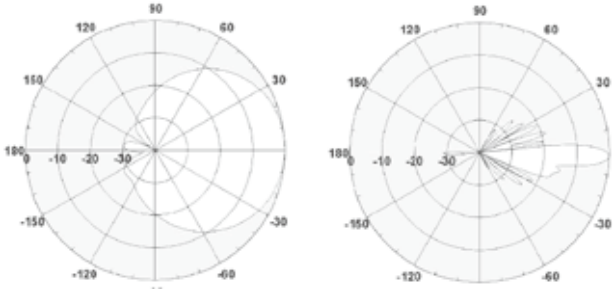
Part Number	S-Wave U/U/U-65-18DV8S		
Electrical Specification			
Frequency range	1710-2170MHz	1710-2170MHz	1710-2170MHz
Polarization	±45º	±45º	±45º
Gain	17.8dBi	17.8dBi	17.8dBi
Horizontal 3dB beam width	65º	65º	63º
Vertical 3dB beam width	7.0º	7.0º	7.0º
Electrical downtilt	0º-8º	0º-8º	0º-8º
First upper sidelobe suppression	>16dB	>16dB	>16dB
Front to back ratio, copolar	>25dB	>25dB	>25dB
Cross-polar ratio, 0º ±60º	>18dB >10dB	>18dB >10dB	>18dB >10dB
Impedance	50Ω		
VSWR	<1.5	<1.5	<1.5
Isolation	>30dB		
IMD3@2×43dBm carrier	<-150dBc		
Max. power per input	250W		



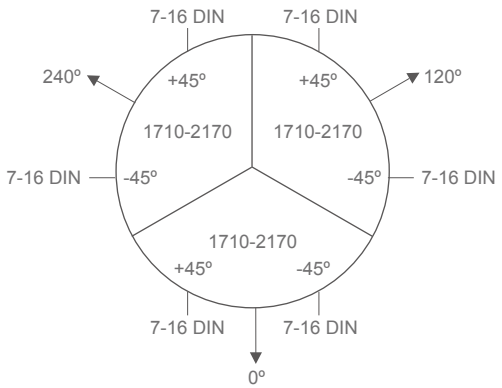
1710-2170MHz



1710-2170MHz



1710-2170MHz



Mechanical Specification	
Connector type	6×7-16DIN(F)
Weight	70Kg
Max. wind velocity	200Km/h
Dimension	Φ250×2230MM

ANTENNA CONTROL UNIT (ACU)

Antenna Control Unit (ACU) for Netop base station antennas with adjustable electrical down-tilt and appropriate mechanical interface.

- Compliant to AISG 1.1 and 3GPP/AISG 2.0
- Compact size
- Daisy Chain feasibility
- Suitable for operation under outdoor conditions
- Remote software upgrade

Type No.	S-Wave ACU-001	S-Wave ACU-002
Protocol	Compliant to AISG 1.1 and 3GPP/AISG 2.0	
Logical interface ex factory 1)	AISG 1.1	3GPP/AISG 2.0
Input voltage range	10 ... 30 V (pin 1, pin 6)	
Power consumption	<2 W (stand by); <13 W (motor activated)	
Connector 2)	2 x 8 pin connector according to IEC 60130-9; according to AISG	
	Daisy chain in: male; Daisy chain out: female	
Hardware interface	RS 485A/B (pin 5, pin 3);	
	Power supply (pin 1, pin 6); DC return (pin 7);	
	According to AISG	
Adjustment time (full range)	100 sec (typically, depending on antenna type)	
Adjustment cycle	> 50,000	
Temperature range	–40 ºC…+60 ºC	
Protection class	IP 34	
Color	RAL 7035, light grey	
Housing material	Profile: Aluminum; Cover: Zinc die cast	
Weight	350g	
Packing size	240x90x100 mm	
Dimension (HxWxD)	161x72x58 mm	

The protocol of the logical interface can be switched from AISG 1.1 to 3GPP/AISG 2.0 and vice versa with a vendor specific command. Start-up operation of the ACU S-Wave ACU-001 is only possible in a RET system supporting AISG 1.1 and start-up operation of the RCU S-Wave ACU-002 is only possible in a RET system supporting 3GPP/AISG 2.0.

Please note:
If the Primary of the RET system doesn't support the standard of the ACU, the ACU must be switched to the appropriate standard of the Primary before installation. Please contact Netop for further information.

Standard:

- ETS 301 489-8
- ETS 300 342-2
- EMC EN 60950
- RTTE Directive 99/5/EEC
- IEC 60068-2-6:1995
- IEC 61000-4-5

MOUNTING CONFIGURATION

Standard Downtilt

Part Number	S-Wave 67-1-mounting bracket

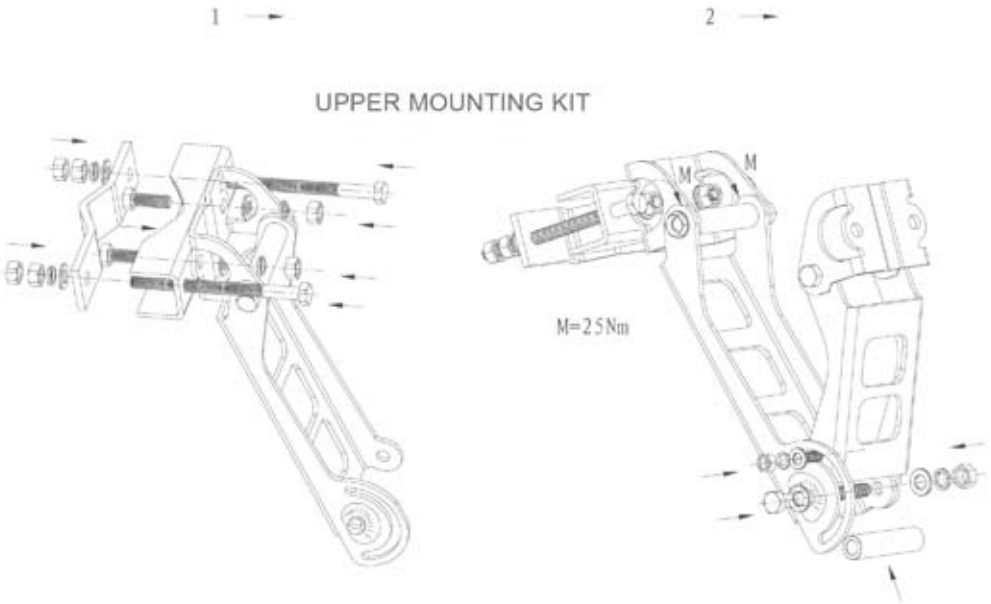


FIG 1

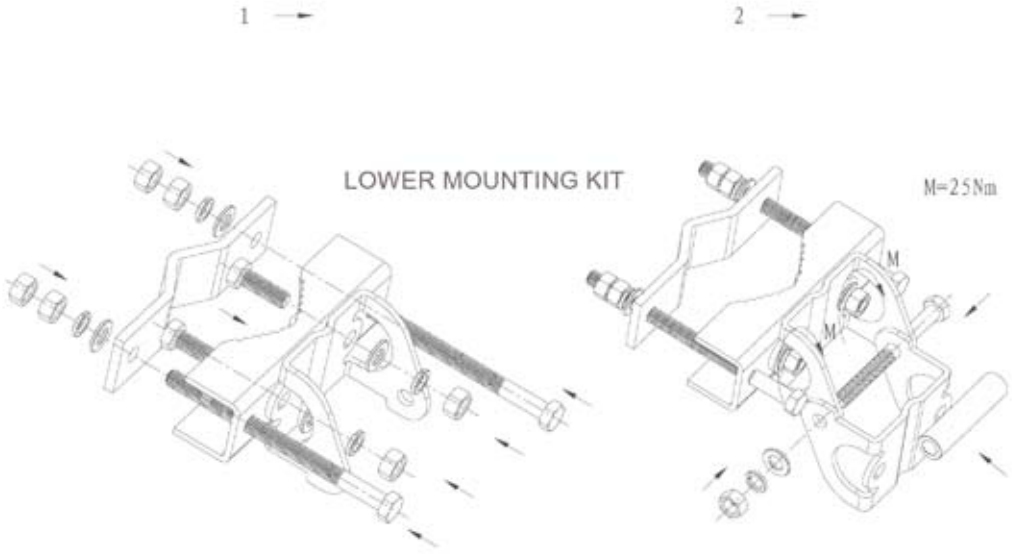
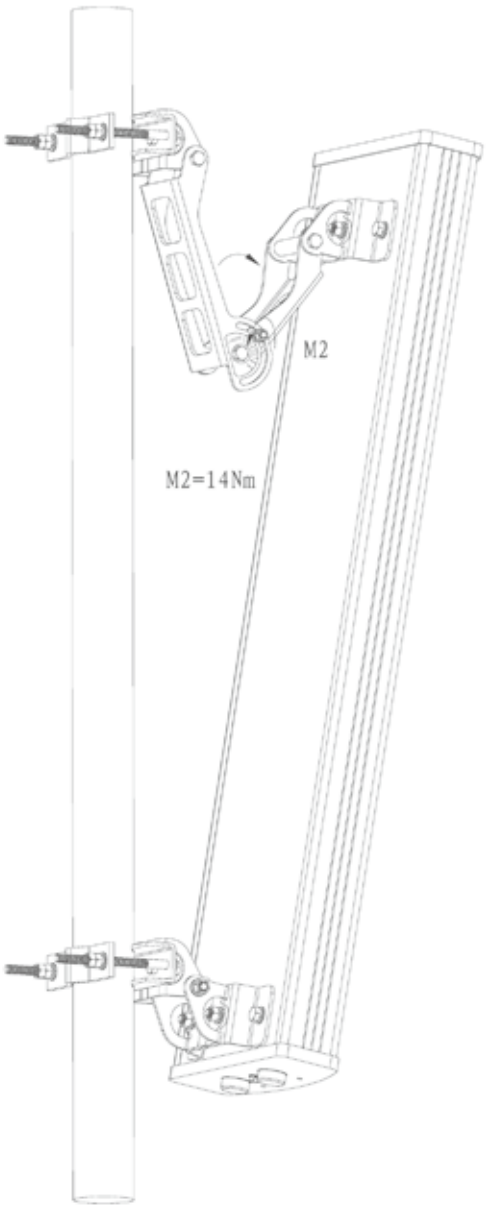
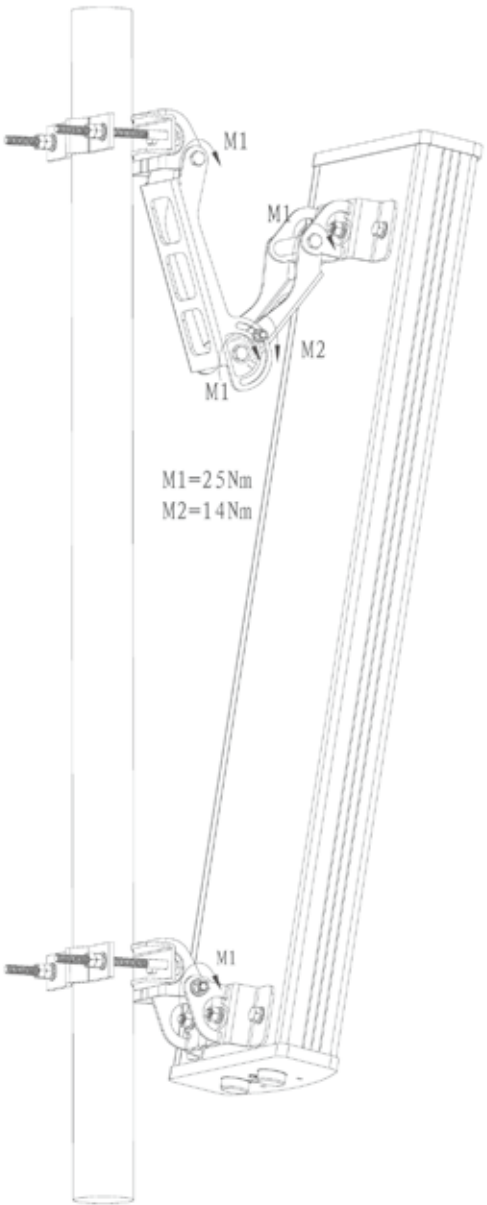


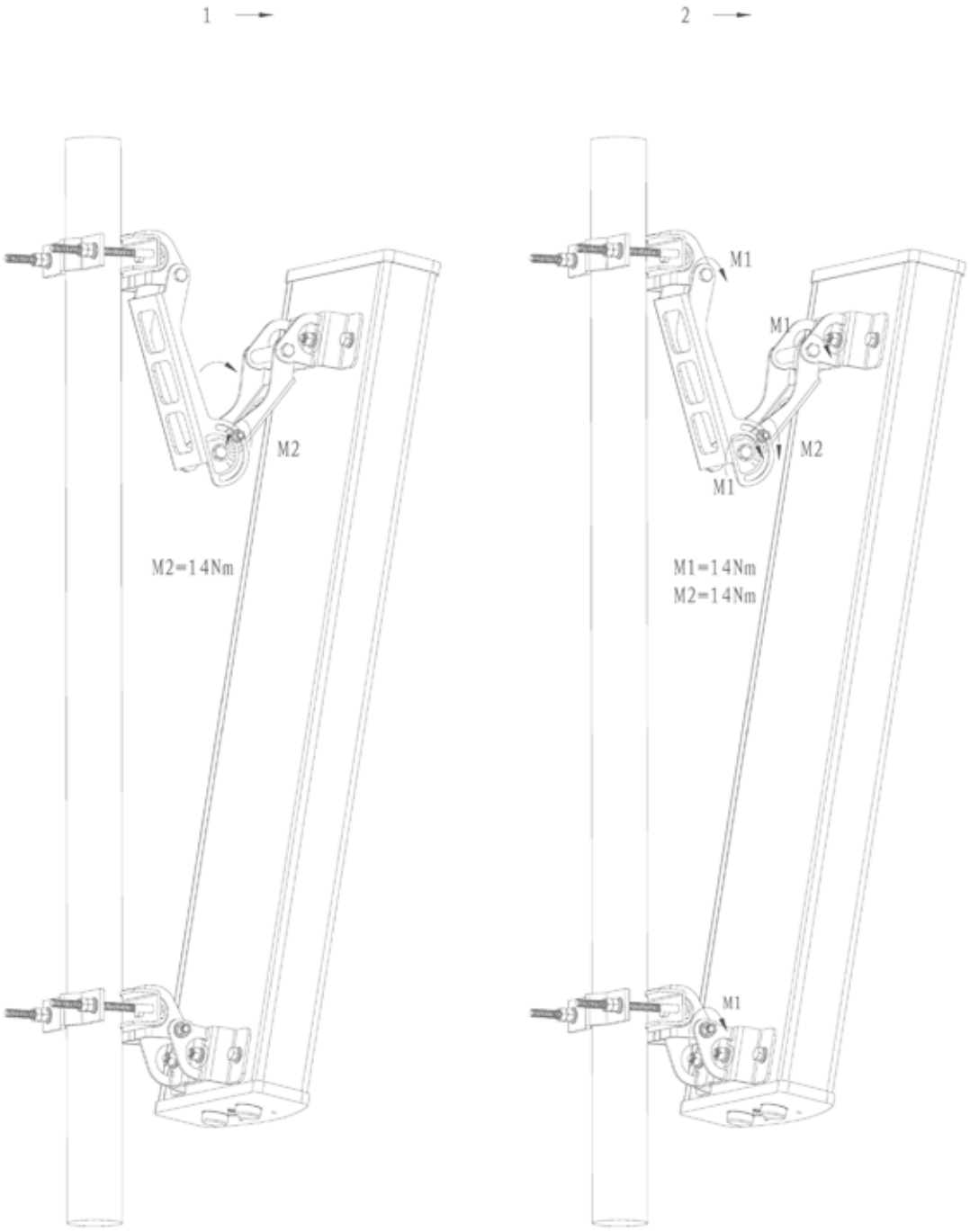
FIG 2

Part Number	S-Wave 67-1-mounting bracket





Part Number	S-Wave 70-2-mounting bracket



Microwave & VSAT System

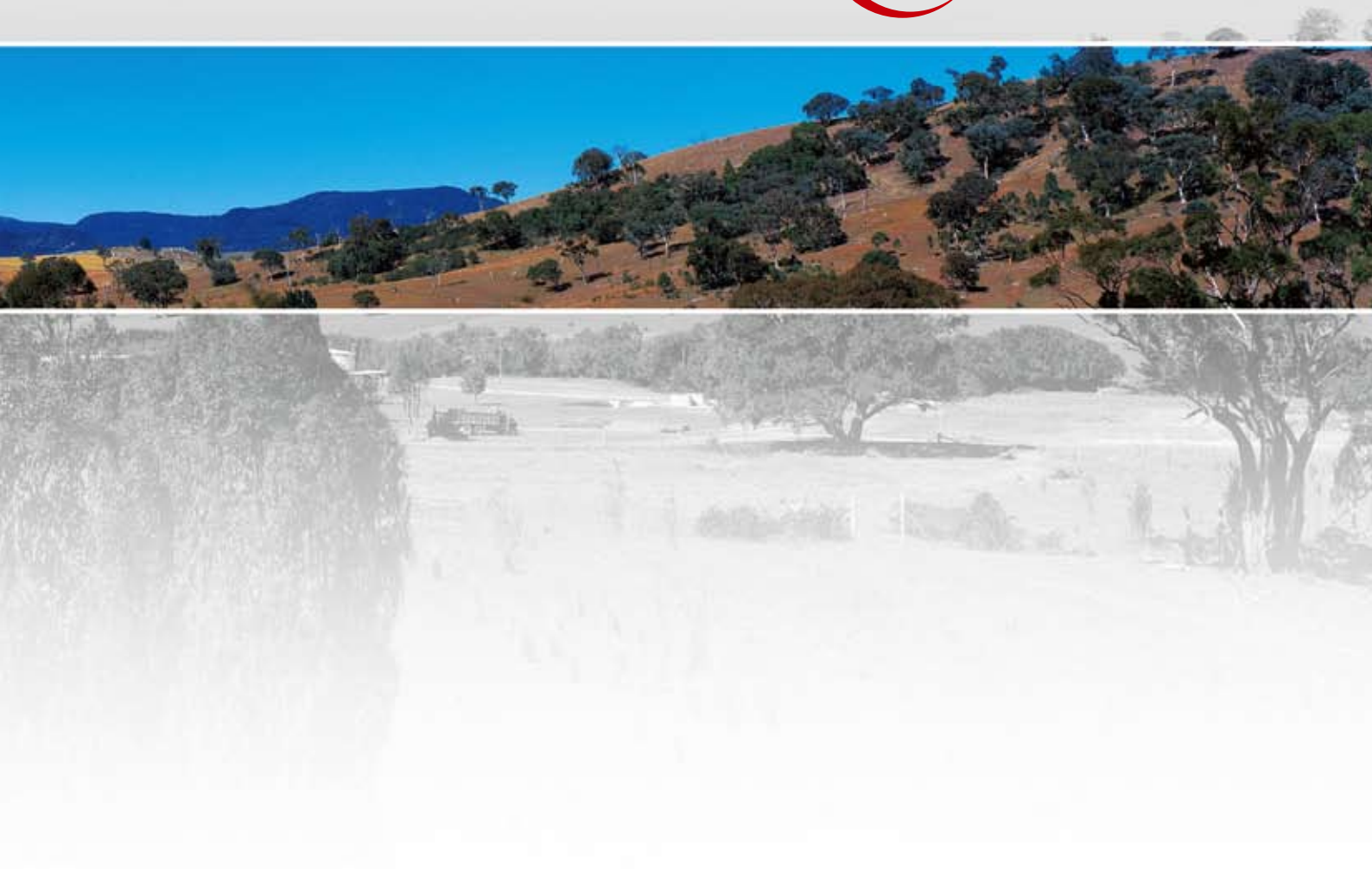
In order to fulfill the growing demand of transmission networks, Netop has developed a full series of Microwave and VSAT systems. These systems are easily adaptable to multiple configurations of data capacity and transmission distances.

Netop Microwave System

Netop Digital Microwave System is a robust and flexible point-to-point digital microwave platform to dramatically reduce the total cost of network planning, deployment and maintenance. Netop incorporates the latest technology to deliver a solution optimized to provide wireless connectivity for telecoms and enterprises, broadband fixed wireless access and mobile backhaul networks.

Netop VSAT System

The Netop VSAT system for Cellular Network Solutions uses optimization technology to bridge the gap between dispersed areas, enabling cellular operators to extend their networks efficiently and economically, irrespective of distance, geographic barriers or terrestrial infrastructure.



Content

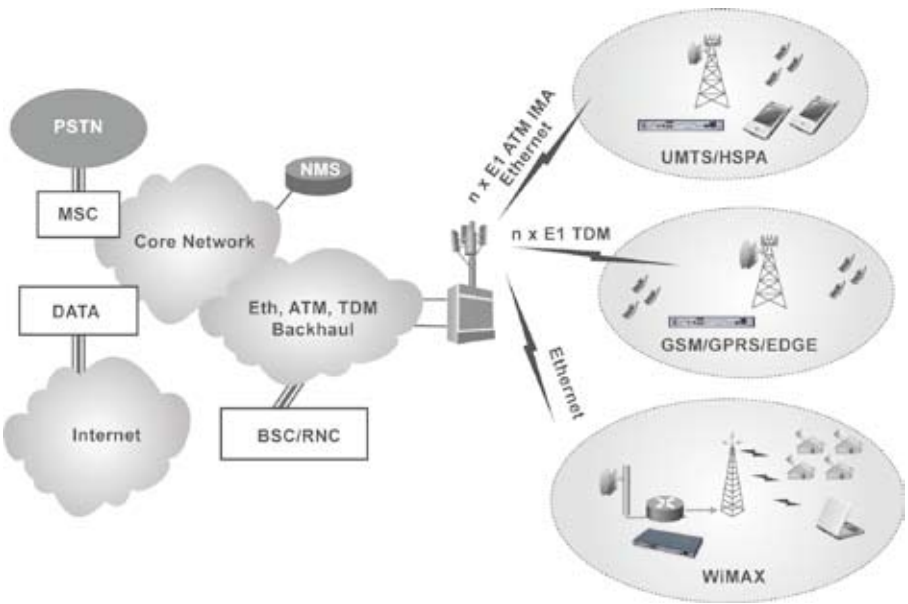
MICROWAVE SYSTEM

Netop Digital Microwave System is a robust and flexible point-to-point digital microwave platform to dramatically reduce the total cost for network planning, deployment and maintenances. Netop incorporates the latest technology to deliver a solution optimized to provide wireless connectivity for telecom and enterprise, broadband fixed wireless access and mobile backhaul networks.

Main Feature

- Operates in Broad frequency including all ITU frequency bands from 6 to 38GHz
- E1, STM-1, Fast ethernet tributary interface options by flexible plug-in module
- Software programmable output power level
- Software-selectable frequency, upgradeable capacity
- Adaptive Reed-Solomon Forward Error Correction (FEC)
- Automatic Transmit Power Control (ATPC)
- Integrated WEB server
- SNMP based network management system
- Comprehensive, integrated performance monitoring and logging
- Available in protected and unprotected configurations
- High Link performance and reliability

System Topology



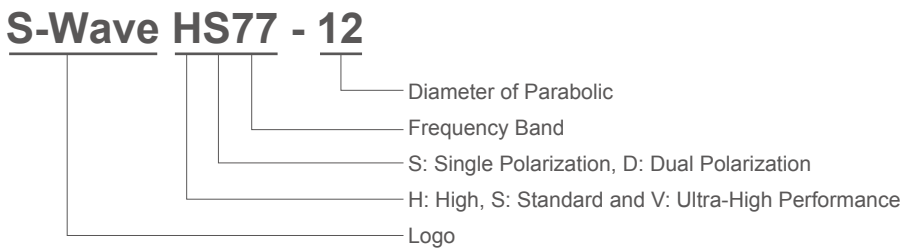
Indoor Unit(IDU) and Outdoor Unit(ODU)

System Specification								
Frequency range (GHz)	2.4	5.8	7	8	13	15	18	23
T-R spacings (MHz)	55	82	154/161	119/126	266	420/490	1010/1092.5	1008/1232
Occupied bandwidth (MHz)	3.5/7	7/14/28	3.5/7/14/28					
Modulation type	QPSK		QPSK/16QAM					
Frequency source	Synthesizer							
Synthesizer step size (kHz)	250/500							
Frequency stability (ppm)	± 10							
Systems configurations	Non-protected (1+0)							
	1+1 hot standby							
	Space and frequency diversity							
RF channel selection	IDU controlled or via NMS							
Digital line code	HDB3 for E1 and E3							
E1 interface	E1 75Ω unbalanced-DB37 /120Ω balanced RJ-48							
Ethernet	10/100BASE-T 100W balanced RJ45							
RBER	better than 10×E-11							
Loopback	Baseband/IF, local&remote							
Power supply (V)	DC -48V±20%							
Consumption (W)	35	30	35	35	30	30	30	30
RF flange	N	N	UBR84/N	UBR84/N	UBR140	UBR140	UBR220	UBR220

Transmitter								
Tx IF frequency (MHz)	310							
RF output power (dBm)	24	20	25	25	20	20	18	18
ATPC range	+5dBm ~ max							
Tx spectrum mask	As per ETSI EN 301 128 V1.2.1							
Receiver								
Noise figure	4	4	5	5	5	5	6	6
Rx IF frequency (MHz)	70							
RF input range (dBm)	- 20 ~ - 90							
Threshold (dBm) BER=1E-6 4×E1	-87	-87	-87/-83	-87/-83	-87/-83	-87/-83	-86/-82	-86/-82
Threshold (dBm) BER=1E-6 8×E1	_	-84	-84/-80	-84/-80	-84/-80	-84/-80	-83/-79	-83/-79
Threshold (dBm) BER=1E-6 16×E1	_	-81	-81/-77	-81/-77	-81/-77	-81/-77	-80/-76	-80/-76
Threshold (dBm) BER=1E-6 32×E1	_	_	/-74	/-74	/-74	/-74	/-73	/-73
Overload (dBm)	-10							
Auxiliary & NMS								
Order wire	1 channel, 3.5mm(1/8 inch) mini-jack							
Auxiliary data	19.2kbit/s, RS232C, RJ45							
NMS channel 1	115.2kbit/s, RS232C, RJ45							
NMS channel 2	100Mbit/s, 10/100BASE-T, RJ45							
Operation system	WIN2000 / WINDOWS NT / WINXP							
Mechanical								
Dimension	IDU: 482×44×265 IDU: 3.5Kg				ODU: 265×265×110 ODU: 5.5Kg			
Weight	IDU: 3.5Kg				ODU: 5.5Kg			
Environmental								
Temperature range	IDU: -10~+50℃				ODU: -33~+55℃			
Relative humidity	IDU: 20%~90%				ODU: All weather condition			
Altitude (m)	≤4500							

Microwave Antenna	
Parabolic Diameter	
0.3m/0.6m/0.9m/1.2m/1.5m/1.8m/2.0m/2.5m/3.2m	
Frequency Range	
1 GHz ~40GHz	
Polarization	
Single polarization /dual polarization	

Coding Rule



Microwave Antenna			
Frequency(GHz)	Code	Frequency(GHz)	Code
4.4-5	44	5.725-5.85	57
5.925-6.425	59	6.425-7.125	64
7.125-7.725	71	7.725-8.5	77
10.7-11.7	107	12.75-13.25	127
14.4-15.35	144	17.7-19.7	177
21.2-23.6	212	24.25-26.5	242
26.5-29.5	295	37-40	370

Φ0.3m Microwave Antenna

Frequency (GHz)	PN	ETSI Class	Gain (dBi)			F/B (dB)	VSWR	XPD. (dB)	Iso. dB	HPBW (º)	WG Flange	Feed Mean
			Low	Med.	High							
12.75-13.25	S-Wave SS127-03	CLASS-1	29.5	30.0	30.5	40	1.2	30	---	5.00	PBR140	Forward
	S-Wave HS127-03	CLASS-2	29.5	30.0	30.5	50	1.2	30	---	5.00	PBR140	Forward
	S-Wave VS127-03	CLASS-3	29.5	30.0	30.5	55	1.2	30	---	5.00	PBR140	Forward
14.4-15.35	S-Wave SS144-03	CLASS-1	30.6	31.1	31.6	40	1.2	30	---	4.70	PBR140	Forward
	S-Wave HS144-03	CLASS-2	30.6	31.1	31.6	52	1.2	30	---	4.70	PBR140	Forward
	S-Wave VS144-03	CLASS-3	30.6	31.1	31.6	59	1.2	30	---	4.70	PBR140	Forward
17.7-19.7	S-Wave SS177-03	CLASS-1	32.8	32.3	33.8	42	1.2	30	---	3.90	PBR220	Forward
	S-Wave HS17703	CLASS-2	32.8	32.3	33.8	54	1.2	30	---	3.90	PBR220	Forward
	S-Wave VS177-03	CLASS-3	32.8	32.3	33.8	61	1.2	30	---	3.90	PBR220	Forward
21.2-23.6	S-Wave SS212-03	CLASS-1	33.7	34.2	34.7	43	1.2	30	---	3.10	PBR220	Forward
	S-Wave HS212-03	CLASS-2	33.7	34.2	34.7	55	1.2	30	---	3.10	PBR220	Forward
	S-Wave VS212-03	CLASS-3	33.7	34.2	34.7	60	1.2	30	---	3.10	PBR220	Forward
24.25-26.5	S-Wave SS242-03	CLASS-1	34.7	35.2	35.7	44	1.2	30	---	2.75	PBR220	Forward
	S-Wave HS242-03	CLASS-2	34.7	35.2	35.7	56	1.2	30	---	2.75	PBR220	Forward
	S-Wave VS242-03	CLASS-3	34.7	35.2	35.7	61	1.2	30	---	2.75	PBR220	Forward
26.5-29.5	S-Wave SS265-03	CLASS-1	35	35.5	36	44	1.2	30	---	2.50	PBR320	Forward
	S-Wave HS265-03	CLASS-2	35	35.5	36	56	1.2	30	---	2.50	PBR320	Forward
	S-Wave VS265-03	CLASS-3	35	35.5	36	61	1.2	30	---	2.50	PBR320	Forward
37-40	S-Wave SS37-03	CLASS-1	37.7	38.2	38.7	48	1.2	30	---	1.80	PBR320	Forward
	S-Wave HS37-03	CLASS-2	37.7	38.2	38.7	58	1.2	30	---	1.80	PBR320	Forward
	S-Wave VS37-03	CLASS-3	37.7	38.2	38.7	63	1.2	30	---	1.80	PBR320	Forward

Φ0.6m Microwave Antenna

Frequency (GHz)	PN	ETSI Class	Gain (dBi)			F/B (dB)	VSWR	XPD. (dB)	Iso. dB	HPBW (º)	WG Flange	Feed Mean
			Low	Med.	High							
7.125-7.725	S-Wave SS71-06	CLASS-1	30.4	30.8	31.1	39	1.15	30	---	4.70	PBR84	Forward
	S-Wave HS71-06	CLASS-2	30.4	30.8	31.1	52	1.15	30	---	4.70	PBR84	Forward
	S-Wave VS71-06	CLASS-3	30.4	30.8	31.1	56	1.15	30	---	4.70	PBR84	Forward
7.725-8.5	S-Wave SS77-06	CLASS-1	31.3	31.6	31.9	40	1.15	30	---	4.30	PBR84	Forward
	S-Wave HS77-06	CLASS-2	31.3	31.6	31.9	52	1.15	30	---	4.30	PBR84	Forward
	S-Wave VS77-06	CLASS-3	31.3	31.6	31.9	57	1.15	30	---	4.30	PBR84	Forward
10.7-11.7	S-Wave SS107-06	CLASS-1	33.6	34.1	34.6	43	1.15	30	---	3.30	PBR100	Forward
	S-Wave HS107-06	CLASS-2	33.6	34.1	34.6	55	1.15	30	---	3.30	PBR100	Forward
	S-Wave VS107-06	CLASS-3	33.6	34.1	34.6	60	1.15	30	---	3.30	PBR100	Forward
12.75-13.25	S-Wave SS127-06	CLASS-1	34.8	35.3	35.8	44	1.2	30	---	2.70	PBR140	Forward
	S-Wave HS127-06	CLASS-2	34.8	35.3	35.8	56	1.2	30	---	2.70	PBR140	Forward
	S-Wave VS127-06	CLASS-3	34.8	35.3	35.8	61	1.2	30	---	2.70	PBR140	Forward
14.4-15.35	S-Wave SS144-06	CLASS-1	36.5	36.8	37.1	45	1.2	30	---	2.35	PBR140	Forward
	S-Wave HS144-06	CLASS-2	36.5	36.8	37.1	58	1.2	30	---	2.35	PBR140	Forward
	S-Wave VS144-06	CLASS-3	36.5	36.8	37.1	64	1.2	30	---	2.35	PBR140	Forward
17.7-19.7	S-Wave SS177-06	CLASS-1	38.5	39	39.5	47	1.2	30	---	1.90	PBR220	Forward
	S-Wave HS177-06	CLASS-2	38.5	39	39.5	59	1.2	30	---	1.90	PBR220	Forward
	S-Wave VS177-06	CLASS-3	38.5	39	39.5	66	1.2	30	---	1.90	PBR220	Forward
21.2-23.6	S-Wave SS212-06	CLASS-1	39.7	40.2	40.5	51	1.2	30	---	1.56	PBR220	Forward
	S-Wave HS212-06	CLASS-2	39.7	40.2	40.5	61	1.2	30	---	1.56	PBR220	Forward
	S-Wave VS212-06	CLASS-3	39.7	40.2	40.5	64	1.2	30	---	1.56	PBR220	Forward
24.25-26.5	S-Wave SS242-06	CLASS-1	40.7	41	41.5	48	1.2	30	---	1.37	PBR220	Forward
	S-Wave HS242-06	CLASS-2	40.7	41	41.5	61	1.2	30	---	1.37	PBR220	Forward
	S-Wave VS242-06	CLASS-3	40.7	41	41.5	66	1.2	30	---	1.37	PBR220	Forward
26.5-29.5	S-Wave SS265-06	CLASS-1	41.8	42.3	42.8	50	1.2	30	---	1.25	PBR320	Forward
	S-Wave HS265-06	CLASS-2	41.8	42.3	42.8	60	1.2	30	---	1.25	PBR320	Forward
	S-Wave VS265-06	CLASS-3	41.8	42.3	42.8	68	1.2	30	---	1.25	PBR320	Forward
37-40	S-Wave SS37-06	CLASS-1	44.5	45	45.5	55	1.2	30	---	0.91	PBR320	Forward
	S-Wave HS37-06	CLASS-2	44.5	45	45.5	59	1.2	30	---	0.91	PBR320	Forward
	S-Wave VS37-06	CLASS-3	44.5	45	45.5	62	1.2	30	---	0.91	PBR320	Forward

Φ1.2m Microwave Antenna

Frequency (GHz)	PN	ETSI Class	Gain (dBi)			F/B (dB)	VSWR	XPD. (dB)	Iso. dB	HPBW (º)	WG Flange	Feed Mean
			Low	Med.	High							
5.725-5.85	S-Wave SS57-12	CLASS-1	34	34.5	35	43	1.2	30	---	3.00	PDR70	Forward
	S-Wave HS57-12	CLASS-2	34	34.5	35	55	1.2	30	---	3.00	PDR70	Forward
	S-Wave VS57-12	CLASS-3	34	34.5	35	60	1.2	30	---	3.00	PDR70	Forward
5.925-6.425	S-Wave SS59-12	CLASS-1	34.4	34.8	35.2	45	1.2	30	---	2.90	PDR70	Forward
	S-Wave HS59-12	CLASS-2	34.4	34.8	35.2	55	1.2	30	---	2.90	PDR70	Forward
	S-Wave VS59-12	CLASS-3	34.4	34.8	35.2	60	1.2	30	---	2.90	PDR70	Forward
6.425-7.125	S-Wave SS64-12	CLASS-1	35.1	35.6	36	47	1.2	30	---	2.60	PDR70	Forward
	S-Wave HS64-12	CLASS-2	35.1	35.6	36	56	1.2	30	---	2.60	PDR70	Forward
	S-Wave VS64-12	CLASS-3	35.1	35.6	36	61	1.2	30	---	2.60	PDR70	Forward
7.125-7.725	S-Wave SS71-12	CLASS-1	36.4	36.8	37.1	45	1.1	30	---	2.36	PBR84	Forward
	S-Wave HS71-12	CLASS-2	36.4	36.8	37.1	58	1.1	30	---	2.36	PBR84	Forward
	S-Wave VS71-12	CLASS-3	36.4	36.8	37.1	62	1.1	30	---	2.36	PBR84	Forward
7.725-8.5	S-Wave SS77-12	CLASS-1	37	37.3	37.6	46	1.15	30	---	2.20	PBR84	Forward
	S-Wave HS77-12	CLASS-2	37	37.3	37.6	58	1.15	30	---	2.20	PBR84	Forward
	S-Wave VS77-12	CLASS-3	37	37.3	37.6	63	1.15	30	---	2.20	PBR84	Forward
10.7-11.7	S-Wave SS107-12	CLASS-1	39.8	40.2	40.6	49	1.15	30	---	1.60	PBR100	Forward
	S-Wave HS107-12	CLASS-2	39.8	40.2	40.6	61	1.15	30	---	1.60	PBR100	Forward
	S-Wave VS107-12	CLASS-3	39.8	40.2	40.6	66	1.15	30	---	1.60	PBR100	Forward
	S-Wave SD107-12	CLASS-1	39.8	40.2	40.6	49	1.15	30	35	1.60	PBR100	Forward
	S-Wave HD107-12	CLASS-2	39.8	40.2	40.6	61	1.15	30	35	1.60	PBR100	Forward
	S-Wave VD107-12	CLASS-3	39.8	40.2	40.6	66	1.15	30	35	1.60	PBR100	Forward
12.75-13.25	S-Wave SS127-12	CLASS-1	41.2	41.5	41.8	50	1.15	30	---	1.35	PBR140	Forward
	S-Wave HS127-12	CLASS-2	41.2	41.5	41.8	62	1.15	30	---	1.35	PBR140	Forward
	S-Wave VS127-12	CLASS-3	41.2	41.5	41.8	67	1.15	30	---	1.35	PBR140	Forward
	S-Wave SD127-12	CLASS-1	41.2	41.5	41.8	50	1.15	30	35	1.35	PBR140	Forward
	S-Wave HD127-12	CLASS-2	41.2	41.5	41.8	62	1.15	30	35	1.35	PBR140	Forward
	S-Wave VD127-12	CLASS-3	41.2	41.5	41.8	67	1.15	30	35	1.35	PBR140	Forward
14.4-15.35	S-Wave SS144-12	CLASS-1	42.6	42.8	43.1	51	1.15	30	---	1.20	PBR140	Forward
	S-Wave HS144-12	CLASS-2	42.6	42.8	43.1	64	1.15	30	---	1.20	PBR140	Forward
	S-Wave VS144-12	CLASS-3	42.6	42.8	43.1	70	1.15	30	---	1.20	PBR140	Forward
17.7-19.7	S-Wave SS177-12	CLASS-1	44	44.5	45	53	1.2	30	---	0.97	PBR220	Forward
	S-Wave HS177-12	CLASS-2	44	44.5	45	65	1.2	30	---	0.97	PBR220	Forward
	S-Wave VS177-12	CLASS-3	44	44.5	45	72	1.2	30	---	0.97	PBR220	Forward
21.2-23.6	S-Wave SS212-12	CLASS-1	45.5	46	46.5	56	1.25	30	---	0.80	PBR220	Forward
	S-Wave HS212-12	CLASS-2	45.5	46	46.5	66	1.25	30	---	0.80	PBR220	Forward
	S-Wave VS212-12	CLASS-3	45.5	46	46.5	69	1.25	30	---	0.80	PBR220	Forward

Φ1.5m Microwave Antenna

Frequency (GHz)	PN	ETSI Class	Gain (dBi)			F/B (dB)	VSWR	XPD. (dB)	Iso. dB	HPBW (º)	WG Flange	Feed Mean
			Low	Med.	High							
5.725-5.85	S-Wave SS57-15	CLASS-1	35.9	36.4	36.9	46	1.20	30	---	2.40	PDR70	Forward
	S-Wave HS57-15	CLASS-2	35.9	36.4	36.9	58	1.20	30	---	2.40	PDR70	Forward
	S-Wave VS57-15	CLASS-3	35.9	36.4	36.9	63	1.20	30	---	2.40	PDR70	Forward
5.925-6.425	S-Wave SS59-15	CLASS-1	36.2	36.7	37.2	48	1.08	30	---	2.27	PDR70	Forward
	S-Wave HS59-15	CLASS-2	36.2	36.7	37.2	60	1.08	30	---	2.27	PDR70	Forward
	S-Wave VS59-15	CLASS-3	36.2	36.7	37.2	65	1.08	30	---	2.27	PDR70	Forward
6.425-7.125	S-Wave SS64-15	CLASS-1	30.7	37.5	38.0	48	1.08	30	---	2.06	PDR70	Forward
	S-Wave HS64-15	CLASS-2	30.7	37.5	38.0	59	1.08	30	---	2.06	PDR70	Forward
	S-Wave VS64-15	CLASS-3	30.7	37.5	38.0	64	1.08	30	---	2.06	PDR70	Forward
7.125-7.725	S-Wave SS71-15	CLASS-1	38.2	38.5	38.8	47	1.10	30	---	1.90	PDR84	Forward
	S-Wave HS71-15	CLASS-2	38.2	38.5	38.8	59	1.10	30	---	1.90	PDR84	Forward
	S-Wave VS71-15	CLASS-3	38.2	38.5	38.8	64	1.10	30	---	1.90	PDR84	Forward
7.725-8.5	S-Wave SS77-15	CLASS-1	39.0	39.3	39.6	48	1.15	30	---	1.70	PDR84	Forward
	S-Wave HS77-15	CLASS-2	39.0	39.3	39.6	60	1.15	30	---	1.70	PDR84	Forward
	S-Wave VS77-15	CLASS-3	39.0	39.3	39.6	65	1.15	30	---	1.70	PDR84	Forward
10.7-11.7	S-Wave SS107-15	CLASS-1	41.6	42.1	42.6	51	1.15	30	---	1.25	PBR100	Forward
	S-Wave HS107-15	CLASS-2	41.6	42.1	42.6	63	1.15	30	---	1.25	PBR100	Forward
	S-Wave VS107-15	CLASS-3	41.6	42.1	42.6	68	1.15	30	---	1.25	PBR100	Forward
12.75-13.25	S-Wave SS127-15	CLASS-1	42.9	43.4	43.9	52	1.15	30	---	1.10	PBR140	Forward
	S-Wave HS127-15	CLASS-2	42.9	43.4	43.9	64	1.15	30	---	1.10	PBR140	Forward
	S-Wave VS127-15	CLASS-3	42.9	43.4	43.9	69	1.15	30	---	1.10	PBR140	Forward
14.4-15.35	S-Wave SS144-15	CLASS-1	44.1	44.6	45.1	53	1.15	30	---	0.90	PBR140	Forward
	S-Wave HS144-15	CLASS-2	44.1	44.6	45.1	65	1.15	30	---	0.90	PBR140	Forward
	S-Wave VS144-15	CLASS-3	44.1	44.6	45.1	72	1.15	30	---	0.90	PBR140	Forward
17.7-19.7	S-Wave SS177-15	CLASS-1	46.0	46.5	47.0	55	1.20	30	---	0.80	PBR220	Forward
	S-Wave HS177-15	CLASS-2	46.0	46.5	47.0	67	1.20	30	---	0.80	PBR220	Forward
	S-Wave VS177-15	CLASS-3	46.0	46.5	47.0	74	1.20	30	---	0.80	PBR220	Forward
21.2-23.6	S-Wave SS212-15	CLASS-1	47.3	47.8	48.3	58	1.15	30	---	0.63	PBR220	Forward
	S-Wave HS212-15	CLASS-2	47.3	47.8	48.3	68	1.15	30	---	0.63	PBR220	Forward
	S-Wave VS212-15	CLASS-3	47.3	47.8	48.3	73	1.15	30	---	0.63	PBR220	Forward

Φ1.8m Microwave Antenna

Frequency (GHz)	PN	ETSI Class	Gain (dBi)			F/B (dB)	VSWR	XPD. (dB)	Iso. dB	HPBW (º)	WG Flange	Feed Mean
			Low	Med.	High							
5.725-5.85	S-Wave SS57-18	CLASS-1	37.5	38	38.5	50	1.2	30	---	2.00	PDR70	Forward
	S-Wave HS57-18	CLASS-2	37.5	38	38.5	55	1.2	30	---	2.00	PDR70	Forward
	S-Wave VS57-18	CLASS-3	37.5	38	38.5	60	1.2	30	---	2.00	PDR70	Forward
5.925-6.425	S-Wave SS59-18	CLASS-1	38.2	38.7	.9.2	45	1.08	30	---	1.90	PDR70	Forward
	S-Wave HS59-18	CLASS-2	38.2	38.7	.9.2	57	1.08	30	---	1.90	PDR70	Forward
	S-Wave VS59-18	CLASS-3	38.2	38.7	.9.2	64	1.08	30	---	1.90	PDR70	Forward
6.425-7.125	S-Wave SS64-18	CLASS-1	39.0	39.5	40.0	47	1..07	30	---	1.72	PDR70	Forward
	S-Wave HS64-18	CLASS-2	39.0	39.5	40.0	59	1..07	30	---	1.72	PDR70	Forward
	S-Wave VS64-18	CLASS-3	39.0	39.5	40.0	66	1..07	30	---	1.72	PDR70	Forward
7.125-7.725	S-Wave SS71-18	CLASS-1	40.2	40.5	40.8	50	1.08	30	---	1.58	PDR84	Forward
	S-Wave HS71-18	CLASS-2	40.2	40.5	40.8	62	1.08	30	---	1.58	PDR84	Forward
	S-Wave VS71-18	CLASS-3	40.2	40.5	40.8	67	1.08	30	---	1.58	PDR84	Forward
7.725-8.5	S-Wave SS77-18	CLASS-1	40.8	41.1	41.4	50	1.08	30	---	1.46	PDR84	Forward
	S-Wave HS77-18	CLASS-2	40.8	41.1	41.4	62	1.08	30	---	1.46	PDR84	Forward
	S-Wave VS77-18	CLASS-3	40.8	41.1	41.4	67	1.08	30	---	1.46	PDR84	Forward
	S-Wave SD77-18	CLASS-1	40.8	41.1	41.4	50	1.08	30	35	1.40	PDR84	Forward
	S-Wave HD77-18	CLASS-2	40.8	41.1	41.4	62	1.08	30	35	1.40	PDR84	Forward
	S-Wave VD77-18	CLASS-3	40.8	41.1	41.4	67	1.08	30	35	1.40	PDR84	Forward
10.7-11.7	S-Wave SS107-18	CLASS-1	43.2	43.7	44.2	52	1.08	30	---	1.04	PBR100	Forward
	S-Wave HS107-18	CLASS-2	43.2	43.7	44.2	64	1.08	30	---	1.04	PBR100	Forward
	S-Wave VS107-18	CLASS-3	43.2	43.7	44.2	69	1.08	30	---	1.04	PBR100	Forward
	S-Wave SD107-18	CLASS-1	43.2	43.7	44.2	52	1.08	30	35	1.04	PBR100	Forward
	S-Wave HD107-18	CLASS-2	43.2	43.7	44.2	64	1.08	30	35	1.04	PBR100	Forward
	S-Wave VD107-18	CLASS-3	43.2	43.7	44.2	69	1.08	30	35	1.04	PBR100	Forward
12.75-13.25	S-Wave SS127-18	CLASS-1	44.6	45.1	45.6	54	1.15	30	---	0.90	PBR140	Forward
	S-Wave HS127-18	CLASS-2	44.6	45.1	45.6	66	1.15	30	---	0.90	PBR140	Forward
	S-Wave VS127-18	CLASS-3	44.6	45.1	45.6	71	1.15	30	---	0.90	PBR140	Forward
	S-Wave SD127-18	CLASS-1	44.6	45.1	45.6	54	1.15	30	35	0.90	PBR140	Forward
	S-Wave HD127-18	CLASS-2	44.6	45.1	45.6	66	1.15	30	35	0.90	PBR140	Forward
	S-Wave VD127-18	CLASS-3	44.6	45.1	45.6	71	1.15	30	35	0.90	PBR140	Forward
14.4-15.35	S-Wave SS144-18	CLASS-1	45.5	46.0	46.5	54	1.15	30	---	0.80	PBR140	Forward
	S-Wave HS144-18	CLASS-2	45.5	46.0	46.5	66	1.15	30	---	0.80	PBR140	Forward
	S-Wave VS144-18	CLASS-3	45.5	46.0	46.5	73	1.15	30	---	0.80	PBR140	Forward
17.7-19.7	S-Wave SS177-18	CLASS-1	47.5	48.0	48.5	56	1.15	30	---	0.65	PBR220	Forward
	S-Wave HS177-18	CLASS-2	47.5	48.0	48.5	68	1.15	30	---	0.65	PBR220	Forward
	S-Wave VS177-18	CLASS-3	47.5	48.0	48.5	75	1.15	30	---	0.65	PBR220	Forward

Φ2.0m Microwave Antenna

Frequency (GHz)	PN	ETSI Class	Gain (dBi)			F/B (dB)	VSWR	XPD. (dB)	Iso. dB	HPBW (º)	WG Flange	Feed Mean
			Low	Med.	High							
5.725-5.85	S-Wave SS57-20	CLASS-1	38.6	38.7	38.9	45	1.07	30	---	1.90	PDR70	Forward
	S-Wave HS57-20	CLASS-2	38.6	38.7	38.9	57	1.07	30	---	1.90	PDR70	Forward
	S-Wave VS57-20	CLASS-3	38.6	38.7	38.9	64	1.07	30	---	1.90	PDR70	Forward
5.925-6.425	S-Wave SS59-20	CLASS-1	39.1	39.6	40.1	46	1.07	30	---	1.70	PDR70	Forward
	S-Wave HS59-20	CLASS-2	39.1	39.6	40.1	58	1.07	30	---	1.70	PDR70	Forward
	S-Wave VS59-20	CLASS-3	39.1	39.6	40.1	65	1.07	30	---	1.70	PDR70	Forward
6.425-7.125	S-Wave SS64-20	CLASS-1	39.9	40.4	40.9	48	1.07	30	---	1.55	PDR70	Forward
	S-Wave HS64-20	CLASS-2	39.9	40.4	40.9	60	1.07	30	---	1.55	PDR70	Forward
	S-Wave VS64-20	CLASS-3	39.9	40.4	40.9	66	1.07	30	---	1.55	PDR70	Forward
7.125-7.725	S-Wave SS71-20	CLASS-1	40.7	41.2	41.7	50	1.08	30	---	1.43	PDR84	Forward
	S-Wave HS71-20	CLASS-2	29.5	30.0	30.5	62	1.08	30	---	1.43	PDR84	Forward
	S-Wave VS71-20	CLASS-3	29.5	30.0	30.5	67	1.08	30	---	1.43	PDR84	Forward
7.725-8.5	S-Wave SS77-20	CLASS-1	41.4	41.9	42.4	51	1.08	30	---	1.31	PDR84	Forward
	S-Wave HS77-20	CLASS-2	41.4	41.9	42.4	63	1.08	30	---	1.31	PDR84	Forward
	S-Wave VS77-20	CLASS-3	41.4	41.9	42.4	68	1.08	30	---	1.31	PDR84	Forward
	S-Wave SD77-20	CLASS-1	41.4	41.9	42.4	51	1.08	30	35	1.31	PDR84	Forward
	S-Wave HD77-20	CLASS-2	41.4	41.9	42.4	63	1.08	30	35	1.31	PDR84	Forward
	S-Wave VD77-20	CLASS-3	41.4	41.9	42.4	68	1.08	30	35	1.31	PDR84	Forward
10.7-11.7	S-Wave SS107-20	CLASS-1	44.3	44.7	45.3	53	1.07	30	---	0.94	PBR100	Forward
	S-Wave HS107-20	CLASS-2	43.2	43.7	44.2	65	1.07	30	---	0.94	PBR100	Forward
	S-Wave VS107-20	CLASS-3	43.2	43.7	44.2	70	1.07	30	---	0.94	PBR100	Forward
	S-Wave SD107-20	CLASS-1	43.2	43.7	44.2	53	1.07	30	35	0.94	PBR100	Forward
	S-Wave HD107-20	CLASS-2	43.2	43.7	44.2	65	1.07	30	35	0.94	PBR100	Forward
	S-Wave VD107-20	CLASS-3	43.2	43.7	44.2	70	1.07	30	35	0.94	PBR100	Forward

Φ2.5m Microwave Antenna

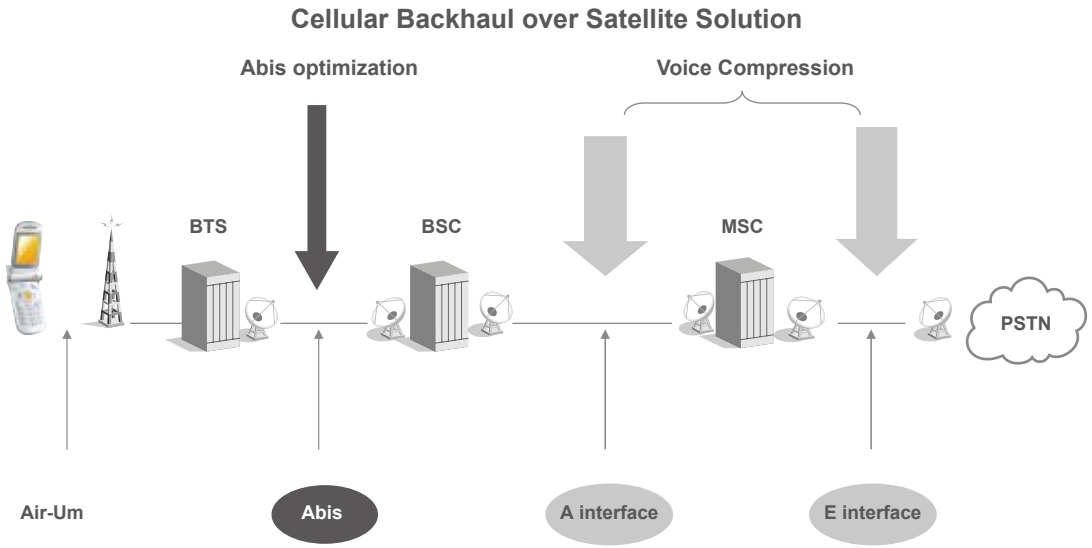
Frequency (GHz)	PN	ETSI Class	Gain (dBi)			F/B (dB)	VSWR	XPD. (dB)	Iso. dB	HPBW (º)	WG Flange	Feed Mean
			Low	Med.	High							
4.4-5	S-Wave SS44-25	CLASS-1	38.5	39.0	39.5	46	1.07	30	---	1.80	PDR48	Forward
	S-Wave HS44-25	CLASS-2	38.5	39.0	39.5	59	1.07	30	---	1.80	PDR48	Forward
	S-Wave VS44-25	CLASS-3	38.5	39.0	39.5	66	1.07	30	---	1.80	PDR48	Forward
	S-Wave SD44-25	CLASS-1	38.5	39.0	39.5	46	1.07	30	35	1.80	PDR48	Forward
	S-Wave HD44-25	CLASS-2	38.5	39.0	39.5	59	1.07	30	35	1.80	PDR48	Forward
	S-Wave VD44-25	CLASS-3	38.5	39.0	39.5	66	1.07	30	35	1.80	PDR48	Forward
5.925-6.425	S-Wave SS59-25	CLASS-1	40.8	41.3	41.8	48	1.07	30	---	1.36	PDR70	Forward
	S-Wave HS59-25	CLASS-2	40.8	41.3	41.8	61	1.07	30	---	1.36	PDR70	Forward
	S-Wave VS59-25	CLASS-3	40.8	41.3	41.8	68	1.07	30	---	1.36	PDR70	Forward
	S-Wave SD59-25	CLASS-1	40.8	41.3	41.8	48	1.07	30	35	1.36	PDR70	Forward
	S-Wave HD59-25	CLASS-2	40.8	41.3	41.8	61	1.07	30	35	1.36	PDR70	Forward
	S-Wave VD59-25	CLASS-3	40.8	41.3	41.8	68	1.07	30	35	1.36	PDR70	Forward
6.425-7.125	S-Wave SS64-25	CLASS-1	41.7	42.2	42.7	50	1.07	30	---	1.42	PDR70	Forward
	S-Wave HS64-25	CLASS-2	41.7	42.2	42.7	62	1.07	30	---	1.42	PDR70	Forward
	S-Wave VS64-25	CLASS-3	41.7	42.2	42.7	69	1.07	30	---	1.42	PDR70	Forward
	S-Wave SD64-25	CLASS-1	41.7	42.2	42.7	50	1.07	30	35	1.42	PDR70	Forward
	S-Wave HD64-25	CLASS-2	41.7	42.2	42.7	62	1.07	30	35	1.42	PDR70	Forward
	S-Wave VD64-25	CLASS-3	41.7	42.2	42.7	69	1.07	30	35	1.42	PDR70	Forward
7.125-7.725	S-Wave SS71-25	CLASS-1	42.5	43.0	43.5	51	1.07	30	---	1.14	PDR84	Forward
	S-Wave HS71-25	CLASS-2	42.5	43.0	43.5	63	1.07	30	---	1.14	PDR84	Forward
	S-Wave VS71-25	CLASS-3	42.5	43.0	43.5	68	1.07	30	---	1.14	PDR84	Forward
	S-Wave SD71-25	CLASS-1	42.5	43.0	43.5	51	1.07	30	35	1.14	PDR84	Forward
	S-Wave HD71-25	CLASS-2	42.5	43.0	43.5	63	1.07	30	35	1.14	PDR84	Forward
	S-Wave VD71-25	CLASS-3	42.5	43.0	43.5	68	1.07	30	35	1.14	PDR84	Forward
7.725-8.5	S-Wave SS77-25	CLASS-1	43.1	43.6	44.1	52	1.07	30	---	1.05	PDR84	Forward
	S-Wave HS77-25	CLASS-2	43.1	43.6	44.1	64	1.07	30	---	1.05	PDR84	Forward
	S-Wave VS77-25	CLASS-3	43.1	43.6	44.1	69	1.07	30	---	1.05	PDR84	Forward
	S-Wave SD77-25	CLASS-1	43.1	43.6	44.1	52	1.07	30	35	1.05	PDR84	Forward
	S-Wave HD77-25	CLASS-2	43.1	43.6	44.1	64	1.07	30	35	1.05	PDR84	Forward
	S-Wave VD77-25	CLASS-3	43.1	43.6	44.1	69	1.07	30	35	1.05	PDR84	Forward
10.7-11.7	S-Wave SS107-25	CLASS-1	46.0	46.5	47.0	55	1.07	30	---	0.75	PBR100	Forward
	S-Wave HS107-25	CLASS-2	46.0	46.5	47.0	67	1.07	30	---	0.75	PBR100	Forward
	S-Wave VS107-25	CLASS-3	46.0	46.5	47.0	72	1.07	30	---	0.75	PBR100	Forward
	S-Wave SD107-25	CLASS-1	46.0	46.5	47.0	55	1.07	30	35	0.75	PBR100	Forward
	S-Wave HD107-25	CLASS-2	46.0	46.5	47.0	67	1.07	30	35	0.75	PBR100	Forward
	S-Wave VD107-25	CLASS-3	46.0	46.5	47.0	72	1.07	30	35	0.75	PBR100	Forward

Φ3.2m Microwave Antenna

Frequency (GHz)	PN	ETSI Class	Gain (dBi)			F/B (dB)	VSWR	XPD. (dB)	Iso. dB	HPBW (º)	WG Flange	Feed Mean
			Low	Med.	High							
4.4-5	S-Wave SS44-32	CLASS-1	39.4	39.9	40.4	49	1.07	30	---	1.40	PDR48	Forward
	S-Wave HS44-32	CLASS-2	39.4	39.9	40.4	61	1.07	30	---	1.40	PDR48	Forward
	S-Wave VS44-32	CLASS-3	39.4	39.9	40.4	68	1.07	30	---	1.40	PDR48	Forward
	S-Wave SD44-32	CLASS-1	39.4	39.9	40.4	49	1.07	30	35	1.40	PDR48	Forward
	S-Wave HD44-32	CLASS-2	39.4	39.9	40.4	61	1.07	30	35	1.40	PDR48	Forward
	S-Wave VD44-32	CLASS-3	39.4	39.9	40.4	68	1.07	30	35	1.40	PDR48	Forward
5.925-6.425	S-Wave SS59-32	CLASS-1	42.8	43.3	43.8	50	1.07	30	---	1.06	PDR70	Forward
	S-Wave HS59-32	CLASS-2	42.8	43.3	43.8	63	1.07	30	---	1.06	PDR70	Forward
	S-Wave VS59-32	CLASS-3	42.8	43.3	43.8	70	1.07	30	---	1.06	PDR70	Forward
	S-Wave SD59-32	CLASS-1	42.8	43.3	43.8	50	1.07	30	35	1.06	PDR70	Forward
	S-Wave HD59-32	CLASS-2	42.8	43.3	43.8	63	1.07	30	35	1.06	PDR70	Forward
	S-Wave VD59-32	CLASS-3	42.8	43.3	43.8	70	1.07	30	35	1.06	PDR70	Forward
6.425-7.125	S-Wave SS64-32	CLASS-1	43.6	44.1	44.6	52	1.07	30	---	0.97	PDR70	Forward
	S-Wave HS64-32	CLASS-2	43.6	44.1	44.6	64	1.07	30	---	0.97	PDR70	Forward
	S-Wave VS64-32	CLASS-3	43.6	44.1	44.6	71	1.07	30	---	0.97	PDR70	Forward
	S-Wave SD64-32	CLASS-1	43.6	44.1	44.6	52	1.07	30	35	0.97	PDR70	Forward
	S-Wave HD64-32	CLASS-2	43.6	44.1	44.6	64	1.07	30	35	0.97	PDR70	Forward
	S-Wave VD64-32	CLASS-3	43.6	44.1	44.6	71	1.07	30	35	0.97	PDR70	Forward
7.125-7.725	S-Wave SS71-32	CLASS-1	44.8	45.3	45.8	54	1.07	30	---	0.88	PDR84	Forward
	S-Wave HS71-32	CLASS-2	44.8	45.3	45.8	66	1.07	30	---	0.88	PDR84	Forward
	S-Wave VS71-32	CLASS-3	44.8	45.3	45.8	73	1.07	30	---	0.88	PDR84	Forward
	S-Wave SD71-32	CLASS-1	44.8	45.3	45.8	54	1.07	30	35	0.88	PDR84	Forward
	S-Wave HD71-32	CLASS-2	44.8	45.3	45.8	66	1.07	30	35	0.88	PDR84	Forward
	S-Wave VD71-32	CLASS-3	44.8	45.3	45.8	73	1.07	30	35	0.88	PDR84	Forward
7.725-8.5	S-Wave SS77-32	CLASS-1	45.4	45.9	46.4	55	1.07	30	---	0.82	PDR84	Forward
	S-Wave HS77-32	CLASS-2	45.4	45.9	46.4	67	1.07	30	---	0.82	PDR84	Forward
	S-Wave VS77-32	CLASS-3	45.4	45.9	46.4	74	1.07	30	---	0.82	PDR84	Forward
	S-Wave SD77-32	CLASS-1	45.4	45.9	46.4	55	1.07	30	35	0.82	PDR84	Forward
	S-Wave HD77-32	CLASS-2	45.4	45.9	46.4	67	1.07	30	35	0.82	PDR84	Forward
	S-Wave VD77-32	CLASS-3	45.4	45.9	46.4	74	1.07	30	35	0.82	PDR84	Forward
10.7-11.7	S-Wave SS107-32	CLASS-1	48.3	48.8	49.3	57	1.07	30	---	0.59	PBR100	Forward
	S-Wave HS107-32	CLASS-2	48.3	48.8	49.3	69	1.07	30	---	0.59	PBR100	Forward
	S-Wave VS107-32	CLASS-3	48.3	48.8	49.3	76	1.07	30	---	0.59	PBR100	Forward
	S-Wave SD107-32	CLASS-1	48.3	48.8	49.3	57	1.07	30	35	0.59	PBR100	Forward
	S-Wave HD107-32	CLASS-2	48.3	48.8	49.3	69	1.07	30	35	0.59	PBR100	Forward
	S-Wave VD107-32	CLASS-3	48.3	48.8	49.3	76	1.07	30	35	0.59	PBR100	Forward

VSAT SYSTEM

VSAT stands for Very Small Aperture Terminal. It is an earthbound station used in satellite communications of data, voice and video signals. Netop VSAT systems for Cellular Network Solutions use optimization technology to bridge the gap between dispersed areas, enabling cellular operators to extend their networks efficiently and economically, irrespective of distance, geographic barriers or terrestrial infrastructure.



Why Satellite Backhauling

Satellite Communication Advantage

- Wide coverage
- Fast deployment
- Flexible and Reliable communication
- Support point to multi-point service
- Easily expandable

Characteristics of BSC/BTS Traffic

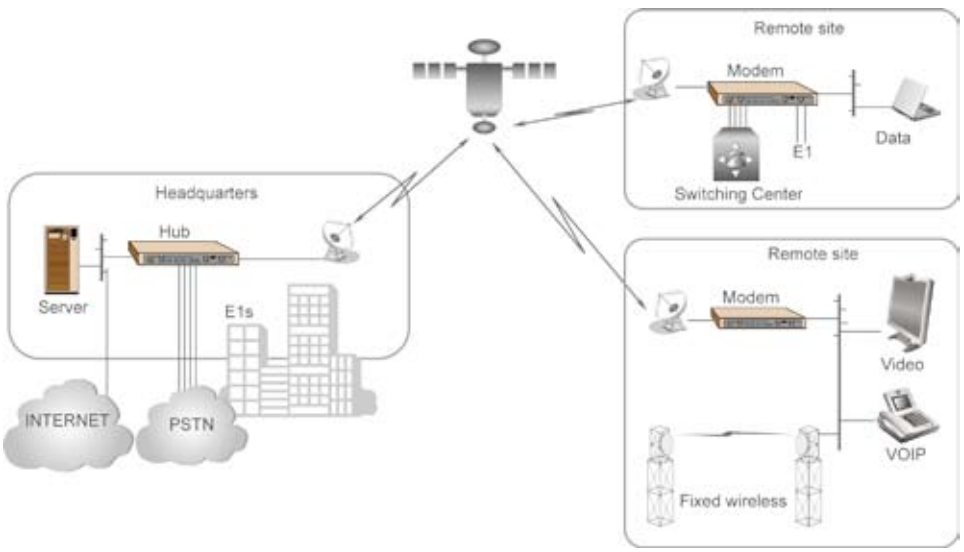
- Large number of BTSs typically connected to one BSC
- BTS dispersed over large territories
- Microwave or terrestrial infrastructure is cost-prohibitive when covering long distances to reach BTS in rural areas
- Rural BTS' traffic is lower in volume and more peaky

So Satellite Is Ideally Suitable for Cellular Operator to:

- Profitably expand into under-served regions where there is no terrestrial build-out or microwave reach is limited
- Be first-to-market to gain customer's commitment
- Rapidly adjust to changing traffic and subscriber growth
- Leverage greater revenue opportunities and increase customer loyalty by easily adding new services
- Provide rapid means to meet regular requirements of universal access

Satellite Communications are a lifeline in many areas of the world, where the wire line access or radio infrastructure does not exit or is not feasible. For a wide range of users, a satellite link is the only option for efficiently transmitting the voice, data and video traffic between the remote locations and a communication centre. Netop VSAT systems meet the demands of cellular operators, service providers, government operations and enterprises or corporations with most cost-effective and flexible solutions.

Voice, Data and Video over Satellite



Application

- Cellular backhaul
- Emergency response and disaster recovery
- Corporations dedicated networks
- National and international branch networks
- Trunking traffic for carriers
- IP based voice/video/data communications

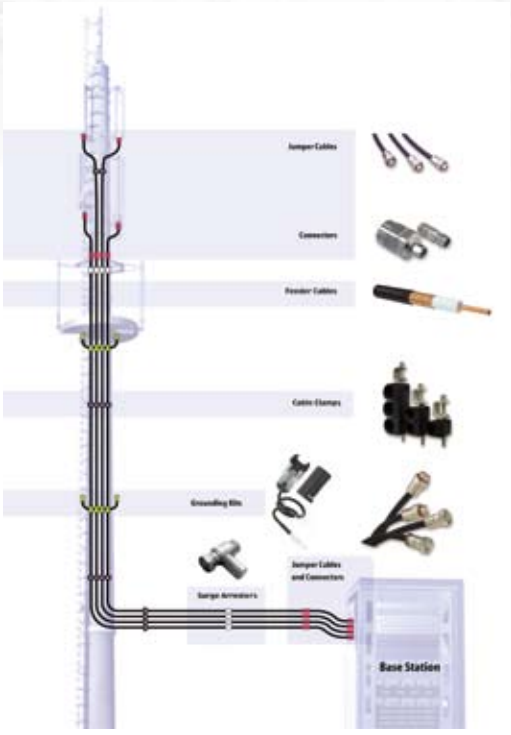
Rosenberger S-Link® RF Cable Solution

Netop supplys complete RF subsystem for site application with Rosenberger *S-Link*® site solution package which include feeder cables, jumpers, connectors, surge arresters, grounding kits, etc. Rosenberger has more than 50 years RF expertise and their solution is already being successfully used in GSM, CDMA and 3G network systems around the world.

For the feeder sub-system, the Rosenberg *S-Link*® feeder cable solution offers outstanding electrical and mechanical performance around the world. The system performs at a low VSWR, a low attenuation, excellent 3rd intermodulation, and has a high power rating which can be reliable and durable in any situation. The whole system's waterproof class complies with the harshest standard IP68 and can be installed easily.

Rosenberger offers a complete cable range from 1/4"R to 1-5/8"R. And the cables are constructed with inner conductor, foam dielectric, outer conductor and protective jacket.

With worldwide manufacturing experience, Rosenberger offers a complete cable range from 1/4"R to 1-5/8"R. Rosenberger also offers a whole series of low loss coaxial cables and can be at your site quickly via our global distribution network. Designed and engineered with both your link and cost budgets in mind, Rosenberger low loss RF coaxial cables continue to provide long-time outstanding quality and excellent performance that has been delivered for telecommunications industry applications for decades.



Content

Rosenberger *S-Link*® Flexible Cable

Outline

Rosenberger *S-Link*® flexible cables feature annularly corrugated outer conductor and mainly used for cellular and personal communications, land mobile radio, earth station antenna jumpers, equipment room and antenna jumper etc.

Rosenberger offers a complete cable range from 1/4”R to 1-5/8”R. And the cables are constructed with inner conductor, foam dielectric, outer conductor and protective jacket.

The inner conductor is made of a copper clad aluminum wire, a smooth or corrugated copper tube according to cable size. With high conductivity copper, it can guarantee excellent low loss.

This foam insulator consists of a mixture of low dielectric polyethylene melted and extruded with an insert gas injection process. With low density, close and homogenous cell dielectric can ensure remarkable low loss and prevent water penetration.

The outer conductor is made of annularly welded copper tubes that provide excellent screening while offering fl exibility.

*SL is abbreviation of *S-Link*® cable series
*R is a trade mark of this flexible cables series
SL 014R PE, SL 038R PE, SL 012R PE, SL 078R PE, SL 114R PE, SL 158R PE FRNC=Flame Retardant Non Corrosive(Halogen free)

1/4” R Cable

Part Number

SL 014R PE **Standard polyethylene jacket**

SL 014R FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Copper wire	2.4mm
Dielectric	Foamed PE	6.4mm
Diameter over outer conductor	Corrugated copper tube	7.5mm
Diameter over outer jacket	PE/FRNC	10.2mm
Cable with standard UV resistant and halogen free PE/FRNC		
Cable weight PE(FRNC)	107(129) kg/km	
Tensile strength	600N	
Min. bending radius, single	50 mm	
Min. bending radius, repeated	120 mm	
Number of bends, minimum(typical)	15(50)	
Recommended hanger spacing	0.6 m	
Permissable temperature range, installation	-40℃ to +60℃	
Permissable temperature range, operation	-55℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	2200V
Relative velocity of propagation	83%	Jacket spark, volts RMS	5000V
Capacitance	80pF/m	Inner conductor DC-resistance	5.7 Ω/km
Inductance	0.195μH/m	Outer conductor DC-resistance	3.5 Ω/km
Maximum operating frequency	15.8GHz	Return loss 800-1000MHz	26dB
Cutoff frequency	19GHz	Return loss 1700-2500MHz	24dB
Peak power rating	10.5KW		

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature
Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
50MHz	2.98	2.460
150MHz	5.21	1.410
200MHz	6.03	1.220
400MHz	8.64	0.850
450MHz	9.15	0.821
800MHz	12.53	0.585
900MHz	13.35	0.548
960MHz	13.80	0.527

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1000MHz	14.11	0.521
1500MHz	17.62	0.411
1800MHz	19.38	0.377
1900MHz	19.92	0.366
2000MHz	20.61	0.354
2200MHz	21.67	0.336
2500MHz	23.26	0.313

3/8” R Cable

Part Number

SL 038R PE **Standard polyethylene jacket**

SL 038R FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Copper-clad alu wire	3.1mm
Dielectric	Foamed PE	7.2mm
Diameter over outer conductor	Corrugated copper tube	9.5mm
Diameter over outer jacket	PE/FRNC	11.2mm
Cable with standard UV resistant and halogen free PE/FRNC		
Cable weight PE(FRNC)	127(132) kg/km	
Tensile strength	600N	
Min. bending radius, single	50mm	
Min. bending radius, repeated	110mm	
Number of bends, minimum(typical)	15(50)	
Recommended hanger spacing	0.6m	
Permissable temperature range, installation	-40℃ to +60℃	
Permissable temperature range, operation	-55℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	2500V
Relative velocity of propagation	88%	Jacket spark, volts RMS	5000V
Capacitance	76pF/m	Inner conductor DC-resistance	3.8 Ω/km
Inductance	0.195µH/m	Outer conductor DC-resistance	2.9 Ω/km
Maximum operating frequency	13.5GHz	Return loss 800-1000MHz	26dB
Cutoff frequency	15.1GHz	Return loss 1700-2500MHz	24dB
Peak power rating	15.4KW		

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature
Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
50MHz	2.44	3.053
150MHz	3.45	2.159
200MHz	4.92	1.510
400MHz	7.05	1.054
450MHz	7.50	0.989
800MHz	10.30	0.718
900MHz	10.80	0.685
960MHz	11.30	0.655

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1000MHz	11.50	0.650
1500MHz	14.30	0.517
1800MHz	15.80	0.467
1900MHz	16.40	0.451
2000MHz	16.80	0.439
2200MHz	17.80	0.413
2500MHz	18.90	0.391

1/2” R Cable

Part Number

SL 012R PE **Standard polyethylene jacket**

SL 012R FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Copper-clad-alu wire	4.8mm
Dielectric	Foamed PE	12.1mm
Diameter over outer conductor	Corrugated copper tube	13.8mm
Diameter over outer jacket	PE/FRNC	16.0mm
Cable with standard UV resistant and halogen free PE/FRNC		
Cable weight PE(FRNC)	237(266) kg/km	
Tensile strength	1150N	
Min. bending radius, single	50 mm	
Min. bending radius, repeated	125 mm	
Number of bends, minimum(typical)	15(50)	
Recommended hanger spacing	0.8 m	
Permissable temperature range, installation	-40℃ to +60℃	
Permissable temperature range, operation	-55℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	6000V
Relative velocity of propagation	88%	Jacket spark, volts RMS	8000V
Capacitance	76pF/m	Inner conductor DC-resistance	1.5 Ω/km
Inductance	0.190μH/m	Outer conductor DC-resistance	1.9 Ω/km
Maximum operating frequency	8.8GHz	Return loss 800-1000MHz	26dB
Cutoff frequency	10.0GHz	Return loss 1700-2500MHz	24dB
Peak power rating	40KW		

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature;
Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
50MHz	1.52	5.050
150MHz	2.66	2.880
200MHz	3.11	2.450
400MHz	4.39	1.720
450MHz	4.75	1.590
800MHz	6.46	1.170
900MHz	6.85	1.100
960MHz	7.12	1.060

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1000MHz	7.28	1.040
1500MHz	9.15	0.820
1800MHz	10.10	0.753
1900MHz	10.40	0.730
2000MHz	10.70	0.710
2200MHz	11.20	0.673
2500MHz	12.10	0.620

7/8” R Cable

Part Number

SL 078R PE **Standard polyethylene jacket**

SL 078R FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Copper tube	9.0mm
Dielectric	Foamed PE	22.4mm
Diameter over outer conductor	Corrugated copper tube	24.9mm
Diameter over outer jacket	PE/FRNC	27.5mm
Cable with standard UV resistant and halogen free PE/FRNC		
Cable weight PE(FRNC)	530(587) kg/km	
Tensile strength	1450N	
Min. bending radius, single	120 mm	
Min. bending radius, repeated	250 mm	
Number of bends, minimum(typical)	15(50)	
Recommended hanger spacing	1.0 m	
Permissable temperature range, installation	-40℃ to +60℃	
Permissable temperature range, operation	-55℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	10000V
Relative velocity of propagation	88%	Jacket spark, volts RMS	8000V
Capacitance	76pF/m	Inner conductor DC-resistance	1.21 Ω/km
Inductance	0.190μH/m	Outer conductor DC-resistance	1.17 Ω/km
Maximum operating frequency	5.0GHz	Return loss 800-1000MHz	26dB
Cutoff frequency	5.2GHz	Return loss 1700-2500MHz	24dB
Peak power rating	91KW		

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature
Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
50MHz	0.81	12.310
150MHz	1.46	6.830
200MHz	1.71	6.270
400MHz	2.48	3.970
450MHz	2.64	3.730
800MHz	3.63	2.480
900MHz	3.86	2.340
960MHz	3.95	2.520

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1000MHz	4.12	2.190
1500MHz	5.18	1.920
1800MHz	5.75	1.730
1900MHz	5.92	1.680
2000MHz	6.11	1.630
2200MHz	6.46	1.400
2500MHz	6.95	1.330

1-1/4” R Cable

Part Number

SL 114R PE **Standard polyethylene jacket**

SL 114R FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Copper tube	13.1mm
Dielectric	Foamed PE	32.5mm
Diameter over outer conductor	Corrugated copper tube	35.8mm
Diameter over outer jacket	PE/FRNC	39.0mm
Cable with standard UV resistant and halogen free PE/FRNC		
Cable weight PE(FRNC)	980(1117) kg/km	
Tensile strength	2500N	
Min. bending radius, single	200 mm	
Min. bending radius, repeated	380 mm	
Number of bends, minimum(typical)	15(50)	
Recommended hanger spacing	1.2 m	
Permissable temperature range, installation	-40℃ to +60℃	
Permissable temperature range, operation	-55℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	10000V
Relative velocity of propagation	88%	Jacket spark, volts RMS	10000V
Capacitance	76pF/m	Inner conductor DC-resistance	0.7 Ω/km
Inductance	0.190μH/m	Outer conductor DC-resistance	0.54 Ω/km
Maximum operating frequency	3.3GHz	Return loss 800-1000MHz	24dB
Cutoff frequency	3.7GHz	Return loss 1700-2500MHz	24dB
Peak power rating	200KW		

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature;
Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
50MHz	0.58	18.450
150MHz	1.04	10.290
200MHz	1.19	8.810
400MHz	1.81	5.690
450MHz	1.92	5.410
800MHz	2.66	3.880
900MHz	2.85	3.690
960MHz	2.97	3.500

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1000MHz	3.03	3.540
1500MHz	3.84	2.710
1800MHz	4.27	2.420
1900MHz	4.38	2.360
2000MHz	4.48	2.310
2200MHz	4.75	2.190
2500MHz	5.14	2.030

1-5/8” R Cable

Part Number

SL 158R PE **Standard polyethylene jacket**

SL 158R FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Copper tube	17.3mm
Dielectric	Foamed PE	43.5mm
Diameter over outer conductor	Corrugated copper tube	46.5mm
Diameter over outer jacket	PE/FRNC	50.0mm
Cable with standard UV resistant and halogen free PE/FRNC		
Cable weight PE(FRNC)	1185(1349) kg/km	
Tensile strength	3500N	
Min. bending radius, single	300 mm	
Min. bending radius, repeated	510 mm	
Number of bends, minimum(typical)	15(50)	
Recommended hanger spacing	1.2 m	
Permissable temperature range, installation	-40℃ to +60℃	
Permissable temperature range, operation	-55℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	15000V
Relative velocity of propagation	88%	Jacket spark, volts RMS	10000V
Capacitance	76pF/m	Inner conductor DC-resistance	0.85 Ω/km
Inductance	0.190μH/m	Outer conductor DC-resistance	0.55 Ω/km
Maximum operating frequency	2.70GHz	Return loss 800-1000MHz	23dB
Cutoff frequency	3.0GHz	Return loss 1700-2500MHz	23dB
Peak power rating	310KW		

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature
Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
50MHz	0.47	25.530
150MHz	0.84	13.810
200MHz	0.98	11.840
400MHz	1.45	8.020
450MHz	1.56	7.450
800MHz	2.18	5.330
900MHz	2.34	4.970
960MHz	2.44	4.760

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1000MHz	2.49	4.670
1500MHz	3.19	3.650
1800MHz	3.57	3.260
1900MHz	3.69	2.970
2000MHz	3.81	3.050
2200MHz	4.05	2.870
2500MHz	4.41	2.640

Rosenberger *S-Link*® Super Flexible Cable

Outline

Rosenberger *S-Link*® super flexible cables are manufactured with deep spiral corrugation in the outer conductor and designed for applications which require smaller bending radius, high flexibility especially in shelters or plenum while outstanding mechanical and electrical performance are available.

These series super flexible cables covered by 1/4”S, 3/8”S and 1/2”S and constructed with inner conductor, foam dielectric, outer conductor and protective jacket. With unique spiral corrugated process, *S-Link*® super flexible cables feature more flexible characteristic compare with flexible series cables. Rosenberger offers outer jacket with polyethylene or flame-retardant, halogen-free material according to client requirement.

*SL is abbreviation of *S-Link*® cable series
*S is a mark of this super flexible cables series
SL 014S PE, SL 038S PE and SL 012S PE
FRNC= Flame Retardant Non Corrosive(Halogen free)

1/4” S Cable

Part Number

SL 014S PE **Standard polyethylene jacket**

SL 014S FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Copper-Clad Alu Wire	1.9mm
Dielectric	Foamed PE	4.4mm
Diameter over outer conductor	Corrugated copper tube	6.4mm
Diameter over outer jacket	Jacket PE/FRNC	7.7mm
Cable with standard UV resistant and halogen free PE/FRNC		
Cable weight PE(FRNC)	70(78) kg/km	
Tensile strength	600N	
Min. bending radius, single	13 mm	
Min. bending radius, repeated	25 mm	
Number of bends, minimum(typical)	20(50)	
Recommended hanger spacing	0.6 m	
Permissable temperature range, installation	-40℃ to +60℃	
Permissable temperature range, operation	-55℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	2000V
Relative velocity of propagation	83%	Jacket spark, volts RMS	5000V
Capacitance	80pF/m	Inner conductor DC-resistance	9.8 Ω/km
Inductance	0.195μH/m	Outer conductor DC-resistance	6.6 Ω/km
Maximum operating frequency	20.4GHz	Return loss 800-1000MHz	26dB
Cutoff frequency	25.0GHz	Return loss 1700-2500MHz	24dB
Peak power rating	6.4KW		

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature
Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
50MHz	4.06	1.704
150MHz	7.20	0.961
200MHz	8.36	0.828
400MHz	12.40	0.558
450MHz	13.10	0.527
800MHz	17.50	0.395
900MHz	18.50	0.373
960MHz	19.20	0.359

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1000MHz	19.60	0.351
1500MHz	24.50	0.281
1800MHz	26.90	0.256
1900MHz	27.70	0.249
2000MHz	28.50	0.242
2200MHz	30.20	0.228
2500MHz	32.50	0.212

3/8” S Cable

Part Number

SL 038S PE **Standard polyethylene jacket**

SL 038S FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Copper-Clad Alu Wire	2.6mm
Dielectric	Foamed PE	6.7mm
Diameter over outer conductor	Corrugated copper tube	9.1mm
Diameter over outer jacket	PE	10.2mm
Cable with standard UV resistant and halogen free PE/FRNC		
Cable weight PE(FRNC)	125(130) kg/km	
Tensile strength	600N	
Min. bending radius, single	13 mm	
Min. bending radius, repeated	25 mm	
Number of bends, minimum(typical)	20(50)	
Recommended hanger spacing	0.6 m	
Permissable temperature range, installation	-40℃ to +60℃	
Permissable temperature range, operation	-55℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	2500V
Relative velocity of propagation	82%	Jacket spark, volts RMS	5000V
Capacitance	83pF/m	Inner conductor DC-resistance	5.3 Ω/km
Inductance	0.195μH/m	Outer conductor DC-resistance	4.4 Ω/km
Maximum operating frequency	13.4GHz	Return loss 800-1000MHz	26dB
Cutoff frequency	16.1GHz	Return loss 1700-2500MHz	24dB
Peak power rating	11.9KW		

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature;
Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
50MHz	2.94	2.738
100MHz	4.16	1.920
200MHz	6.05	1.327
400MHz	8.71	0.918
450MHz	9.18	0.871
800MHz	12.50	0.640
900MHz	13.30	0.601
960MHz	13.90	0.575

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1000MHz	14.20	0.563
1500MHz	17.70	0.451
1800MHz	19.50	0.411
1900MHz	20.10	0.398
2000MHz	20.70	0.386
2200MHz	21.80	0.367
2500MHz	23.50	0.338

1/2” S Cable

Part Number

SL 012S PE **Standard polyethylene jacket**

SL 012S FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Copper-Clad Alu Wire	3.6mm
Dielectric	Foamed PE	9.0mm
Diameter over outer conductor	Corrugated copper tube	12.2mm
Diameter over outer jacket	PE/FRNC	13.6mm
Cable with standard UV resistant and halogen free PE/FRNC		
Cable weight PE(FRNC)	171(184) kg/km	
Tensile strength	750N	
Min. bending radius, single	25 mm	
Min. bending radius, repeated	35 mm	
Number of bends, minimum(typical)	20(50)	
Recommended hanger spacing	0.8 m	
Permissable temperature range, installation	-40℃ to +60℃	
Permissable temperature range, operation	-55℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	2500V
Relative velocity of propagation	83%	Jacket spark, volts RMS	5000V
Capacitance	81pF/m	Inner conductor DC-resistance	2.69 Ω/km
Inductance	0.195μH/m	Outer conductor DC-resistance	3.54 Ω/km
Maximum operating frequency	10.2GHz	Return loss 800-1000MHz	26dB
Cutoff frequency	13.0GHz	Return loss 1700-2500MHz	24dB
Peak power rating	16KW		

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature
Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
50MHz	2.35	4.590
150MHz	4.23	2.550
200MHz	4.95	2.162
400MHz	7.48	1.404
450MHz	7.59	1.380
800MHz	10.40	1.010
900MHz	11.00	0.950
960MHz	11.30	0.930

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1000MHz	11.50	0.889
1500MHz	14.35	0.707
1800MHz	16.00	0.634
1900MHz	16.50	0.615
2000MHz	17.20	0.597
2200MHz	18.20	0.564
2500MHz	19.61	0.523

Rosenberger *S-Link*® Low Loss Cable

Outline

SL 078 R L PE & SL 158R L PE From Rosenberger Asia Pacific Electronic Co., Ltd. are new-designed low attenuation RF co-axial cable in the industry application.

With Rosenberger SL 078R L PE & SL 158R L PE cable , system designers and operators can cut cable subsystem costs by up to 30% and gain cable height at the same time. Engineers can now meet system link using Rosenberger SL 078R L PE & SL 158R L PE RF coaxial cable in certain taller tower applications, instead of cable which would have been required before.

With worldwide manufactory experience , Rosenberger SL 078R L PE & SL 158R L PE RF coaxial cables can be at your site quickly via our global distribution network. Designed and engineered with both your link and cost budgets in advance, Rosenberger SL 078R L PE & SL 158R L PE RF coaxial cables continue provide the long-time outstanding quality and excellence performance that delivered to the communication industry application for decades.

*SL is abbreviation of *S-Link*® cable series
*L is a mark of this Low Loss cables series
SL 078R L PE & SL 158R L PE
FRNC = Flame Retardant Non Corrosive(Halogen free)

7/8” L Cable

Part Number

SL 078R L PE **Standard polyethylene jacket**

SL 078R L FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Copper tube	9.45mm
Dielectric	Highly foamed polyethylene	22.4mm
Diameter over outer conductor	Regular Corrugated copper tube	25.4mm
Diameter over outer jacket	PE/FRNC	27.5mm
Cable with standard UV resistant and halogen free compliant		
Cable weight	PE jacket	510kg/km
	FRNC jacket	567kg/km
Tensile strength	1450N	
Min. bending radius, single	120 mm	
Min. bending radius, repeated	250 mm	
Number of bends, minimum(typical)	15(50)	
Recommended hanger spacing	1.0 m	
Permissable temperature range, installation	-30℃ to +60℃	
Permissable temperature range, operation	-45℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	10000V
Relative velocity of propagation	89%	Jacket spark, volts RMS	8000V
Capacitance	74pF/m	Inner conductor DC-resistance	1.25 Ω/km
Inductance	0.195μH/m	Outer conductor DC-resistance	1.17 Ω/km
Maximum operating frequency	5.0GHz	Return loss 800-1000MHz	≤-26dB
Cutoff frequency	5.2GHz	Return loss 1700-2500MHz	≤-24dB
Peak power rating	95KW		

* Can provide special cable according to customer’s requirement

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature

Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
50MHz	0.74	12.56
150MHz	1.35	6.97
200MHz	1.59	6.40
400MHz	2.34	4.05
450MHz	2.49	3.81
800MHz	3.45	2.75
900MHz	3.61	2.62
960MHz	3.69	2.59

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1000MHz	3.84	2.49
1500MHz	4.77	1.98
1800MHz	5.35	1.79
1900MHz	5.45	1.75
2000MHz	5.62	1.70
2200MHz	6.01	1.60
2500MHz	6.48	1.53

1-5/8” L Cable

Part Number

SL 158R L PE **Standard polyethylene jacket**

SL 158R L FRNC **Flame retardant, non-corrosive jacket**

Mechanical Characteristic		
Inner conductor	Spiral corrugated copper tube	17.6mm
Dielectric	Highly foamed polyethylene	41.0mm
Diameter over outer conductor	Regular corrugated copper tube	46.5mm
Diameter over outer jacket	PE/FRNC	49.8mm
Cable with standard UV resistant and halogen free compliant		
Cable weight	PE jacket	1185kg/km
	FRNC jacket	1349kg/km
Tensile strength	3500N	
Min. bending radius, single	300 mm	
Min. bending radius, repeated	510 mm	
Number of bends, minimum(typical)	15(50)	
Recommended hanger spacing	1.2 m	
Permissable temperature range, installation	-40℃ to +60℃	
Permissable temperature range, operation	-55℃ to +85℃	

Electrical Characteristic			
Impedance	50 +/-1 Ω	DC breakdown voltage	15000V
Relative velocity of propagation	90%	Jacket spark, volts RMS	10000V
Capacitance	74pF/m	Inner conductor DC-resistance	1.25 Ω/km
Inductance	0.190μH/m	Outer conductor DC-resistance	0.65 Ω/km
Maximum operating frequency	2.7GHz	Return loss 800-1000MHz	≤-23dB
Cutoff frequency	2.9GHz	Return loss 1700-2500MHz	≤-23dB
Peak power rating	310KW		

* Can provide special cable according to customer’s requirement

Attenuation value and power rating

Attenuation value typical at 20℃ ambient temperature

Mean power rating at 40℃ ambient temperature

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
450MHz	1.51	6.29
800MHz	2.09	4.54
900MHz	2.24	4.24
1000MHz	2.35	4.05

Frequency	Attenuation	M.P.Rating
[MHz]	[dB/100m]	[KW]
1800MHz	3.38	2.82
2000MHz	3.57	2.68
2200MHz	3.82	2.52
2500MHz	4.11	2.34

* Maximum attenuation value shall be 105% of the nominal attenuation value

Rosenberger *S-Link*® Connector

Rosenberger offers a complete range *S-Link*® connectors covered N and 7/16 DIN series which are used for a variety of *S-Link*® cable from 1/4" to 1-5/8". As a result, a bespoke connection solution for mobile radio station is possible. With excellent electrical, mechanical and climatic characteristics, *S-Link*® connectors ensure your RF cable line and system more durable and reliable.

	N Series	7/16 Series
Nominal impedance	50Ω	50Ω
Frequency range	DC-11GHz	DC-8.3GHz
Insertion loss	0.1dB	0.05dB
Intermodulation	-158dBc@2×20W	-158dBc@2×20W
RF-Leakage	<-128dB@1GHz	<-128dB@1GHz
Operation temperature	-45ºC to +85ºC	-45ºC to +85ºC

Connector 1C7 Series

Rosenberger *S-Link*® 1C7 connectors are extremely robust, waterproof coaxial connectors with outstanding electrical, mechanical and climatic characteristics. The product range covers straight and right angle plus for various types of *S-Link*® cables from 1/4” to 1-5/8”.

Return Loss

Up to 35dB(2.7GHz)

Insertion loss <0.1dB
Intermodulation <160dBc

Cable Type	Connector Type	Order Number
1/2” S	N straight jack	53K1C7-C08N1
	N straight plug	53S1C7-C08N1
	N plug right angle	53S2C7-C08N1
1/2” R	N straight jack	53K1C7-C03N1
	N straight plug	53S1C7-C03N1
	N plug right angle	53S2C7-C03N1
7/8” R & 7/8” L	N straight jack	53K1C7-CX5N1
	N straight plug	53S1C7-CX5N1
1-1/4” R	N straight jack	53K1C7-C06N1
	N straight plug	53S1C7-C06N1
1-5/8” R	N straight jack	53K1C7-C07N1
	N straight plug	53S1C7-C07N1

Cable Type	Connector Type	Order Number
1/2” S	7-16 DIN straight jack	60K1C7-C08N1
	7-16 DIN straight plug	60S1C7-C08N1
	7-16 DIN plug right angle	60S2C7-C08N1
1/2” R	7-16 DIN straight jack	60K1C7-C03N1
	7-16 DIN straight plug	60S1C7-C03N1
	7-16 DIN plug right angle	60S2C7-C03N1
7/8” R & 7/8” L	7-16 DIN straight jack	60K1C7-CX5N1
	7-16 DIN straight plug	60S1C7-CX5N1
1-1/4” R	7-16 DIN straight jack	60K1C7-C06N1
	7-16 DIN straight plug	60S1C7-C06N1
1-5/8” R	7-16 DIN straight jack	60K1C7-C07N1
	7-16 DIN straight plug	60S1C7-C07N1

Rosenberger *S-Link*® Stripping Tool

Rosenberger *S-Link*® stripping tools are ideal for fast and easy using and reliable preparation of the connector assembly on the antenna mast. The cutting blades ensure a smooth cut on the outer and inner conductor.

Rosenberger *S-Link*® stripping tools have been newly constructed and are available for the complete *S-Link*® cable range from 1/4” to 1-5/8”.

Rosenberger *S-Link*® Jumper Cable

Outline

Rosenberger *S-Link*® jumpers are commonly used for the connection of the RF cable lines with the antenna or with the radios.

Rosenberger *S-Link*® jumpers are ideal for daily use even under diffi cult conditions and featured by the following characteristics:

- Long trouble-free fi eld life as a result of tried and tested materials and production technologies
- Designed for outdoor applications under extreme climatic conditions(longitudinal waterproofi ng)
- High fl exibility and small bending diameters
- Specially developed connectors using soldering technology, that guarantees superior electrical characteristics:
  - Screening attenuation >120dB
  - Low intermodulation product IM3 >160dBc
- Excellent return loss due to silver-plated connectors and attenuation-optimized cable materials
- Integrated lighting protection technology saves setup time, that is site-optimized and reduces system attenuation
- Hot-polyamide moulding between connector and cable jacket
- Waterproof to safety class IP68
- Used cable jacket of fl ame retardant, halogen-free material(FRNC)

Technical Specification

Electrical Characteristic		1/4” S	3/8” S	1/2” S	1/2” R
Frequency range		DC to 2200MHz			
Peak power rating		6.4KW	11.9KW	16KW	40KW
Nominal impedance		50 Ω			
Return loss	30 - 1000MHz 1000 - 2200MHz	>28dB >26dB			
Insertion loss	900MHz	≤0.18dB/m(cable) + 0.10dB(2connectors)	≤0.13dB/m(cable) + 0.10dB(2connectors)	≤0.10dB/m(cable) + 0.10dB(2connectors)	≤0.07dB/m(cable) + 0.10dB(2connectors)
	1800MHz	≤0.26dB/m(cable) + 0.10dB(2connectors)	≤0.20dB/m(cable) + 0.10dB(2connectors)	≤0.16dB/m(cable) + 0.10dB(2connectors)	≤0.10dB/m(cable) + 0.10dB(2connectors)
	2200MHz	≤0.30dB/m(cable) + 0.10dB(2connectors)	≤0.22dB/m(cable) + 0.10dB(2connectors)	≤0.17dB/m(cable) + 0.10dB(2connectors)	≤0.11dB/m(cable) + 0.10dB(2connectors)
Relative velocity of propagation		82% bis 84%			
Intermodulation at 900MHz +1800MHz +2200MHz		> 160dBc(3rd order product with 2 x 43dBm)			

Mechanical Characteristic				
Bending diameter repeated bending	> 25 mm	> 25 mm	> 35 mm	> 125 mm
Bending diameter single bending	> 13 mm	> 13 mm	> 25 mm	> 50 mm
Tensile strength	max. 600N	max. 600N	max. 750N	max. 1150N

Environment	
Waterproof to safety class(IEC 529)	IP 68
Max operating temperature range	-40℃ to + 80℃
Installation temperature range	-15℃ to + 60℃
Mechanical vibration	MIL STD 202 Meth. 204/B
Shock resistance	MIL STD 202 Meth. 213/B
Corrosion resistance	MIL STD 202 Meth. 101

Material					
Cable	Inner conductor	copper clad aluminum wire	copper clad aluminum wire	copper clad aluminum wire	copper clad aluminum wire
	Dielectric	highly foamed polyethylene			
	Outer conductor	spiral corrugated copper tube	spiral corrugated copper tube	spiral corrugated copper tube	annular corrugated copper tube
	Jacket options	FRNC, black and PE black			
Connector	Inner conductor	brass/CuBe, silver-plated			
	Outer conductor	brass, silver-plated/Optargen			
Insulator	PP/PE/PTFE				
Sealing	hot-polyamide moulding				

*Provide special jumper cable according to customer’s requirement

Rosenberger *S-Link*® Surge Arrester

Outline

Surge Arresters can lead to voltage surge of up to 50Kv/m-within a few microseconds. These high voltages are enormous loads for electronic system, e.g. mobile base stations, and can lead to serious damage, extremely high repair costs and, above, “loss of air time”.

To protect whole system-antenna, cables, connections and base station, against overvoltage damages, the safe and effective lighting and EMP protections must be installed.
Rosenberger offers coaxial surge arresters with N and 7/16 interfaces.

1/4 λ Wideband Surge Arrester

Application for a broad frequency range from 800MHz to 2500MHz grounded center contact.

Return Loss: ≥26dB, 800 to 960MHz
≥21dB, 960 to 1700MHz
≥26dB, 1700 to 2400MHz
≥23dB, 2400 to 2500MHz

Order Information

* No direction requirement on appliction.

Connector Configuration		7-16 Series	
Antenna side interface	Female	Male	Female
RxTx side interface	Male	Female	Female
Order number	60HK561-S00N1	60HK561-S00N1	60HK561-K00N1

Rosenberger *S-Link*® Grounding Kit

Rosenberger *S-Link*® Grounding kits are designed to withstand possible lighting strikes for reliability of system operation. With premium material solid copper construction, the kits can eliminate corrosion caused by moisture and have long life expectancy. More than four kits options are available according to customer's requirements.

SLGK001 series

Specification	
SLGK001-C02-XXX	for 3/8" cable
SLGK001-C03-XXX	for 1/2" cable
SLGK001-C05-XXX	for 7/8" cable
SLGK001-C06-XXX	for 1-1/4" cable
SLGK001-C07-XXX	for 1-5/8" cable

SLGK002 series

Specification	
SLGK002-C02-XXX	for 3/8" cable
SLGK002-C03-XXX	for 1/2" cable
SLGK002-C05-XXX	for 7/8" cable
SLGK002-C06-XXX	for 1-1/4" cable
SLGK002-C07-XXX	for 1-5/8" cable

* XXX: Length, upon customer's requests

SLGK003 series

Specification	
SLGK003-C02-XXX	for 3/8” cable
SLGK003-C03-XXX	for 1/2” cable
SLGK003-C05-XXX	for 7/8” cable
SLGK003-C06-XXX	for 1-1/4” cable
SLGK003-C07-XXX	for 1-5/8” cable

SLGK004 series

Specification	
SLGK004-C02-XXX	for 3/8” cable
SLGK004-C03-XXX	for 1/2” cable
SLGK004-C05-XXX	for 7/8” cable
SLGK004-C06-XXX	for 1-1/4” cable
SLGK004-C07-XXX	for 1-5/8” cable

SLGK005 series

Specification	
SLGK005-C02-XXX	for 3/8” cable
SLGK005-C03-XXX	for 1/2” cable
SLGK005-C05-XXX	for 7/8” cable
SLGK005-C06-XXX	for 1-1/4” cable
SLGK005-C07-XXX	for 1-5/8” cable

SLGK009 series

Specification	
SLGK009-C03-XXX	for 1/2” cable
SLGK009-C05-XXX	for 7/8” cable
SLGK009-C06-XX	for 1-1/4” cable
SLGK009-C07-XXX	for 1-5/8” cable

* XXX: Length, upon customer’s requests

Rosenberger *S-Link*® Installation Accessory

Weatherproofing Kit

Weatherproofing Tape
The tapes and mastics are used for protection of connectors, splices and interfaces that are exposed to corrosive environmental conditions. An additional feature is to prevent the loosing of connectors at jumper cable interfaces caused by vibration.

Order Information

Order Number	Description
SLWK001-000	3M 2166 6pcs+3M 1712(38mm) 1pc+3M 1712(18mm) 2 pcs
SLWK001-001	3M 2166 4pcs+3M 1712(38mm) 1pc+3M 1712(18mm) 1 pc
SLWK002-000	3M 23 1pcs+3M 33 1pc
SLWK003-000	3M 2228 1pc+3M 33 1pc
SLWK004-000	3M J20 2pcs+3M 33 1pc
SLWK005-000	3M J20 2pcs +3M 1712 1pc

Weatherproofing Kit

This accessory is used for mounting cable to angle tower members including hanger attachment hardware. They are manufactured from stainless steel, easy to install and owing stable performance.

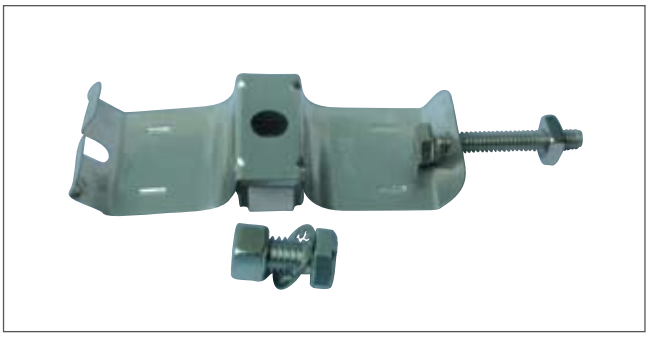
Specification

SLAA
SLAA-3/4
Accept for Snap-in angle adapters with 3/8”× 3/4” tapped holes

Butterfly Clip Hanger

SLCH

The Butterfly Hangers are the traditional option for securing the coaxial cable safely to all type of structures. The product is designed & shaped in a way so as to ensure effective installation. The Butterfly Hanger is supplied with all the associated hardwarerequired, and supplied in a kit which can conveniently be used with the Angle Adapter or Round Member Adapter Kit.



Specification

Butterfly Clip Hanger	
SLCH-C03	for 1/2” cable
SLCH-C05	for 7/8” cable
SLCH-C06	for 1-1/4” cable
SLCH-C07	for 1-5/8” cable

Hanger Hardware Kit
Slotted hex head bolts, 3/8” * 3/4”
Lock washers, 3/8”
Nuts, 3/8”

Stand-off Adapter Kit

SLSA381 combined with SLRMC provides a versatile means enable hangers to be mounted to the round member of a structure. The standard design for the stand off kit has a threaded hole to accommodate a 3/8” or threaded rod, which allows hangers to be mounted efficiently to the member, ensuring effective installation for any cables system. They are supplied with screws and lock washers.
SLSA341 combined with SLRMC have 3/4” tapped hole to accommodate all types of Snap-in Hanger.

Stand-off Adapter

SLSA381	
SLSA381	with 3/8” tapped hole (Round member clip not inc.)

Specification	
SLSA381-103	match round member clip 1” to 3”
SLSA381-306	match round member clip 3” to 6”

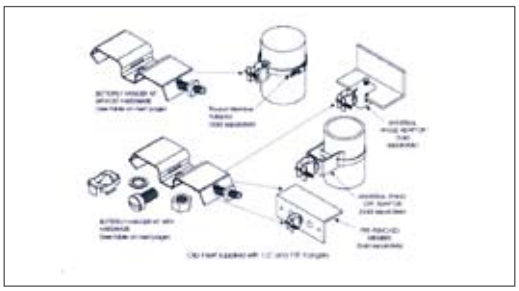
SLSA341	
SLSA341	with 3/4” tapped hole (Round member clip not inc.)

Specification	
SLSA341-103	match round member clip 1” to 3”
SLSA341-306	match round member clip 3” to 6”

Round Member Clip

SLRMC	
SLRMC001-102	1” - 2” OD(stainless steel)
SLRMC001-203	2” - 3” OD(stainless steel)
SLRMC001-304	3” - 4” OD(stainless steel)
SLRMC001-405	4” - 5” OD(stainless steel)
SLRMC001-506	5” - 6” OD(stainless steel)

Application



Cable Clamp

Each Cable Clamp products conform to most or all brands of coaxial cables and are designed to ultimately ease the installation process. Without additional adapters, these clamps can provide sturdy, reliable, long-term support to system by means of tough and UV material.

Cable Clamp Single Hole

Specification	
SLCC1X1-C03	for 1/2” cable
SLCC1X1-C05	for 7/8” cable
SLCC1X1-C06	for 1-1/4” cable
SLCC1X1-C07	for 1-5/8” cable

Double Cable Clamp Double Hole

Specification	
SLCC2X1-C03	for 1/2” cable
SLCC2X1-C05	for 7/8” cable
SLCC2X1-C06	for 1-1/4” cable
SLCC2X1-C07	for 1-5/8” cable

Cable Clamp Without Angle Adapter

Specification	
SLCC0X1-C03	for 1/2” cable without adapter
SLCC0X1-C05	for 7/8” cable without adapter
SLCC0X1-C06	for 1-1/4” cable without adapter
SLCC0X1-C07	for 1-5/8” cable without adapter

* X: Quantity, upon customer’s requests

Hoisting Grip

SLHG

Hoisting Grips are available for lace-up installation at any point on coaxial cable, made up of mesh grip with single eye support, it allow for quick and efficient installation.

Specification	
SLHG001-C03	for 1/2” cable
SLHG001-C05	for 7/8” cable
SLHG001-C06	for 1-1/4” cable
SLHG001-C07	for 1-5/8” cable

Cable Entry Plates & Boot Accessory

SLEP

Cable Entry Plates with round ports are easy to install when you require multiple entries for variety cables.

Specification	
SLEP001-101	4” cable entry plate, 1 port
SLEP001-102	4” cable entry plate, 2 ports
SLEP001-103	4” cable entry plate, 3 ports
SLEP001-202	4” cable entry plate, 4 ports
SLEP001-106	4” cable entry plate, 6 ports
SLEP001-203	4” cable entry plate, 6 ports
SLEP001-204	4” cable entry plate, 8 ports
SLEP001-206	4” cable entry plate, 12 ports
SLEP001-304	4” cable entry plate, 12 ports
SLEP001-404	4” cable entry plate, 16 ports
SLEP001-306	4” cable entry plate, 18 ports
SLEP001-406	4” cable entry plate, 24 ports

* Rosenberger provides all kinds of Cable Entry Plates as customer’s requirement.

SLEB

Cable Boot Entry Kits are supplied inclusive of cable boot assembly and insert, providing one piece design simplifi es installation.

Specification	
SLEB011-C03	4” cable entry boot kit, with 1 hole for 1/2” R cable
SLEB021-C03	4” cable entry boot kit, with 2 holes for 1/2” R cable
SLEB031-C03	4” cable entry boot kit, with 3 holes for 1/2” R cable
SLEB041-C03	4” cable entry boot kit, with 4 holes for 1/2” R cable
SLEB011-C05	4” cable entry boot kit, with 1 hole for 7/8” cable
SLEB021-C05	4” cable entry boot kit, with 2 holes for 7/8” cable
SLEB031-C05	4” cable entry boot kit, with 3 holes for 7/8” cable
SLEB041-C05	4” cable entry boot kit, with 4 holes for 7/8” cable
SLEB011-C06	4” cable entry boot kit, with 1 hole for 1 1/4” cable
SLEB011-C07	4” cable entry boot kit, with 1 hole for 1 5/8” cable

Netop Service

Netop offers professional services that improve network design, reliability, scalability and efficiency.

Our service core competences include:

- Network optimization
- Technical consultation
- Customized product design
- Installation & commissioning
- Onsite training & supervision
- System troubleshooting
- After-sale services

In addition, we also offer professional training, technical support and workshops for distributors and agents. We are committed to offering our services in anyway, anywhere and at anytime.

Netop is much more than just a supplier – Netop is a valued development partner and we will strive to devote all effort to meet new challenges in order to scale to new heights.