

6 Existing to be Removed



AXP18-60

60° Azimuth Beam, 48 inches

Directing our energies for you.

1710-2170 MHz Band

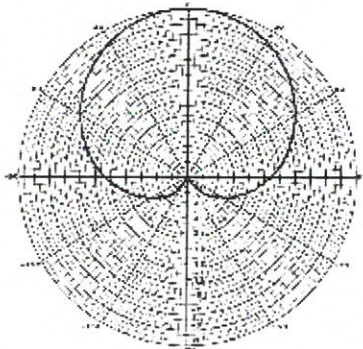
Electrical Specifications

Frequency	1710-2170 MHz
Polarization	Slant +/- 45
Gain @ 1710 MHz	17.1 dBi
Gain @ 1920 MHz	17.4 dBi
Gain @ 2170 MHz	17.8 dBi
Horizontal Beam (3dB Points)	60°
Vertical Beam (3dB Points)	7°
Electrical Downtilt Options	0, 2, 4 or 6°
VSWR	<1.40:1
Front-to-Back at Horizon	>30 dB
Upper Side Lobe Suppression	<-18 dB
Impedance	50 Ohms
Power Input Per Connector (W CW)	250 Watts
Isolation	< -28 dB
Intermodulation (2x20W)	typ -150 dBc

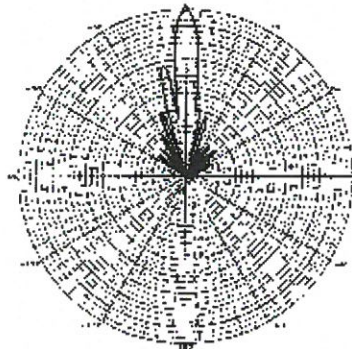
Mechanical Specifications

Input Connector (female)	Back Mounted 7/16 DIN (silver finish)
Antenna Dimensions (inches)	48 x 6.7 x 4
Antenna Weight	10 lbs
Bracket Weight	13.4 lbs
Lightning Protection	Direct Ground
RF Distribution	Printed Microstrip Substrate
Radome	Ultra High-Strength Luran
Weatherability	UV Stabilized, ASTM D1925
Radome Water Absorption	ASTM D570, 0.45%
Environmental	MIL-STD-810E
Wind Survival	150 mph
Front Wind Load at 100 mph	63.5 lbs
Front Flat Plate Equivalent	1.35 sq-ft. (c=2)
Mounting Brackets	Fits 2.5 to 3 Inch Schedule 40 Pipe
Mechanical Downtilt Range	0-12°
Clamps/Bolts	Hot Dip Galvanized Steel/Stainless Steel

Typical Horizontal Beam

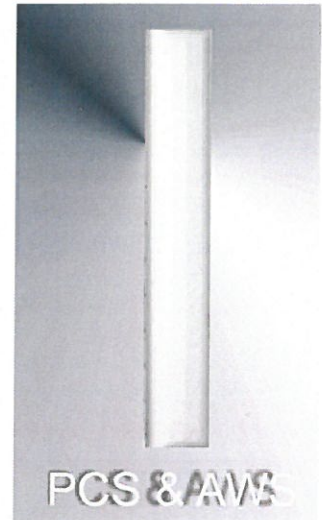
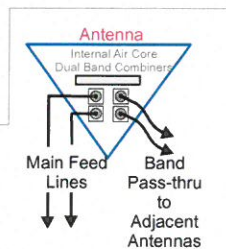


Typical Vertical Beam



Available with Opt "i"

- The Opt "i" antenna option provides Integrated Diplexers that reduce mainline cables and eliminate separate external devices. Add 1" to the antenna depth for Opt "i".



5 Year Warranty

Ordering Information & Options

AXP18-60-x	"-x" is a placeholder for the built-in fixed electrical downtilt in degrees, set to 0, 2, 4 or 6
AXP18-60-xi	to add the Opt "i" option for integrated diplexers, add "i" to model number
AXP18-60-xi-b	for bottom mounted connectors, add "-b" (otherwise antenna comes standard with back mounted connectors)
AXP18-60-xi-b-j#	add a "-j#" to add a 1/2" RF cable, where "#" is the cable length, "j2" is 2 meters, "j4" is 4 meters, "j6" is 6 meters...

6 Existing - 3 to Remain + 3 to be removed



X7C-465

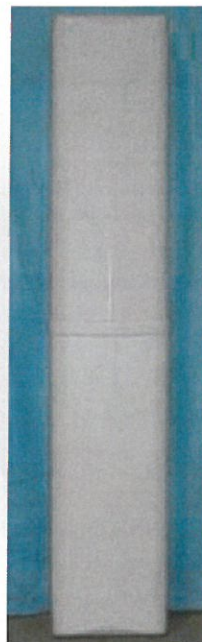
Directing our energies for you.

700 MHz Wide Band

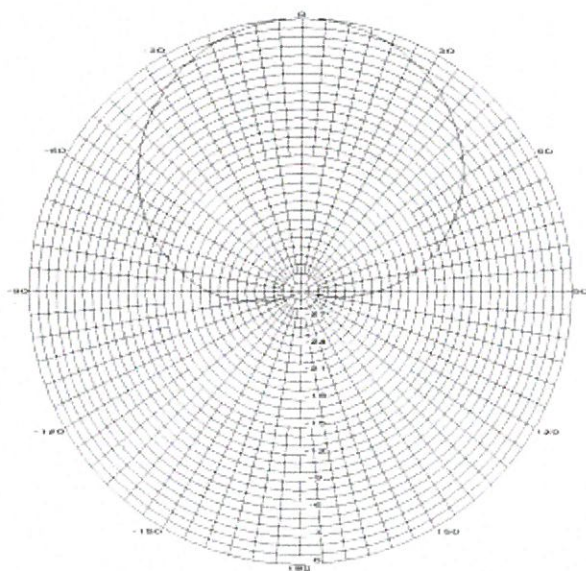
65 degree Azimuth Beams and 12.2 dBd Gain

- Dual Polarized Slant $\pm 45^\circ$
- Precision Printed Microstrip Circuitry
- Designed for Superb IM Performance
- Seamless Feed-to-Radiator Interface
- High Thermal Conductivity
- Integrated Diplexer Options

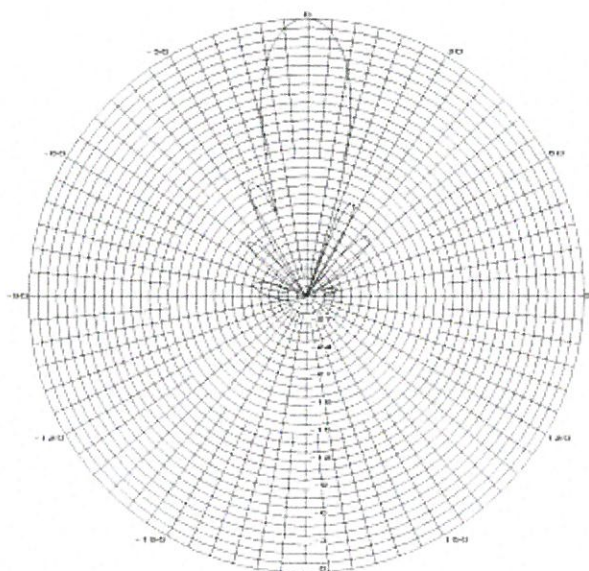
698-896 MHz



Azimuth Beam: 65 degree



Elevation Beam: 16 degree





Directing our energies for you.

X7C-465

Electrical Specifications

Frequency Range	698-896 MHz
Gain	12.2 dBd
Electrical Downtilt Options	0, 2, 4 & 6 Degrees
VSWR	1.4:1
Front-to-Back at Horizon	> 27 dB
Upper Side Lobe Suppression	< -18 dB
Elevation Beam (3-dB Points)	16 Degrees
Azimuth Beam (3-dB Points)	65 Degrees
Polarization	Dual Polarized (Slant ±45 Degrees)
Impedance	50 Ohms
Power Input Rating	1000 CW Total, 500 CW Per Port
Intermodulation Specification	typ. -150 dBc (2x20W)
Port to Port Isolation	>27 dB
Cross Polar Discrimination	>16 dB

Mechanical Specifications

Input Connectors (female)	Two Back Mounted 7/16 DIN (Silver Finish)
Antenna Dimensions	50.5 x 12.5 x 7.1 Inches
Antenna Weight	20 lbs
Bracket Weight	13 lbs
Lightning Protection	Direct Ground
RF Distribution	Printed Microstrip Substrate
Radome	Ultra High-Strength Luran
Weatherability	UV Stabilized, ASTM D1925
Radome Water Absorption	ASTM D570, 0.45%
Environmental	MIL-STD-810E
Wind Survival	150 mph
Front Wind Load at 100 mph	123.4 lbs
Front Flat Plate Equivalent	2.5 sq-ft. (c=2)
Mounting Brackets	Fits 2.5 to 3 Inch Schedule 40 Pipe
Mechanical Downtilt Range	0-12 Degrees in 1 Degree Increments
Clamps/Bolts	Hot Dip Galvanized Steel/Stainless Steel

Ordering Information

<u>Model</u>	<u>Options</u>
X7C-465-x	x=Electrical Downtilt in Degrees (0, 2, 4 or 6)
X7C-465-xi	x=Electrical Downtilt in Degrees (0, 2, 4 or 6) with "i" option

6 Proposed

Product Specifications

COMMSCOPE®

HBXX-6516DS-VTM

Andrew® Quad Port Teletilt® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

POWERED BY



Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	17.2	17.2	17.5
Gain by all Beam Tilts Tolerance, dB	±0.3	±0.3	±0.5
Gain by Beam Tilt, average, dBi	0 ° 17.0	0 ° 17.1	0 ° 17.4
	5 ° 17.3	5 ° 17.4	5 ° 17.7
	10 ° 17.0	10 ° 17.0	10 ° 17.2
Beamwidth, Horizontal, degrees	67	66	64
Beamwidth, Horizontal Tolerance, degrees	±2.7	±2.3	±3.5
Beamwidth, Vertical, degrees	7.5	7.0	6.6
Beamwidth, Vertical Tolerance, degrees	±0.5	±0.4	±0.4
Beam Tilt, degrees	0–10	0–10	0–10
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	26	26	26
CPR at Boresight, dB	22	22	22
CPR at Sector, dB	9	9	9
Isolation, dB	30	30	30
VSWR Return Loss, dB	1.4 15.6	1.4 15.6	1.4 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°

*Values calculated using NGMN Alliance N-P-BASTA v9.6

Mechanical Specifications

Color Radome Material	Light gray PVC, UV resistant
Connector Interface Location Quantity	7-16 DIN Female Bottom 4
Wind Loading, maximum	419.0 N @ 150 km/h 94.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h 149.8 mph
Antenna Dimensions, L x W x D	1294.0 mm x 305.0 mm x 166.0 mm 50.9 in x 12.0 in x 6.5 in
Net Weight	13.9 kg 30.6 lb
Model with factory installed AISG 2.0 RET	HBXX-6516DS-A2M



3 Proposed

Product Specifications



This specification is PRELIMINARY

DBXNH-6565A-VTM

DualPol® Dual Band Antenna, 698-896 MHz and 1710-2180 MHz, 65° horizontal beamwidth, RET compatible variable electrical tilt



- Two DualPol® antennas under one radome
- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Each antenna is independently capable of field adjustable electrical tilt
- Fully compatible with Andrew remote electrical tilt system

CHARACTERISTICS

General Specifications

Antenna Type	DualPol® dual band
Brand	DualPol® Teletilt®
Operating Frequency Band	1710 – 2180 MHz 698 – 896 MHz

Electrical Specifications

Frequency Band, MHz	698-806	806-896	1710-1880	1850-1990	1920-2180
Beamwidth, Horizontal, degrees	65	65	65	65	65
Gain, dBd	11.6	11.6	14.0	14.0	14.0
Gain, dBi	13.7	13.7	16.1	16.1	16.1
Beamwidth, Vertical, degrees	16.0	16.0	6.8	6.8	6.8
Beam Tilt, degrees	0-15	0-15	0-8	0-8	0-8
Upper Sidelobe Suppression (USLS), typical, dB	17	17	17	17	17
Front-to-Back Ratio at 180°, dB	30	30	30	30	30
Isolation, dB	30	30	30	30	30
VSWR Return Loss, db	1.5:1 14.0	1.5:1 14.0	1.5:1 14.0	1.5:1 14.0	1.5:1 14.0
Intermodulation Products, 3rd Order, 2 x 20 W, dBc	-150	-150	-150	-150	-150
Input Power, maximum, watts	400	400	300	300	300
Polarization	±45°	±45°	±45°	±45°	±45°
Impedance, ohms	50	50	50	50	50
Lightning Protection	dc Ground	dc Ground	dc Ground	dc Ground	dc Ground

Product Specifications

DBXNH-6565A-VTM



Mechanical Specifications

Color	Off white
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity	4
Wind Loading, maximum	525.0 N @ 100 mph 118.0 lbf @ 100 mph
Wind Speed, maximum	201.2 km/h 125.0 mph

Dimensions

Depth	180.0 mm 7.1 in
Length	1295.4 mm 51.0 in
Width	302.0 mm 11.9 in
Net Weight	15.0 kg 33.1 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	DBXNH-6565A-R2M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency

RoHS 2002/95/EC
China RoHS SJ/T 11364-2006

Classification

Compliant by Exemption
Above Maximum Concentration Value (MCV)



Included Products



DB380

Pipe Mounting Kit for 4.5 in (114.3 mm) OD round members



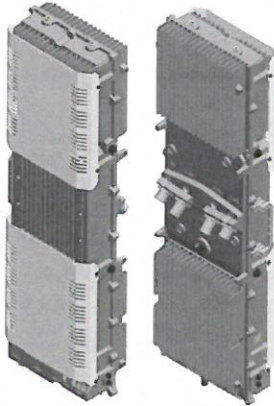
DB5083

Downtilt Mounting Kit for 4.5 in (114.3 mm) OD round members

Remove 3 + Proposed 6

ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest

technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

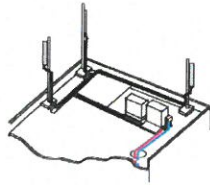
EASY INSTALLATION

The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

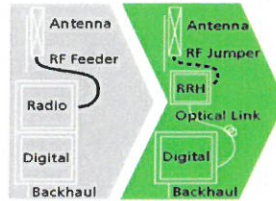
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

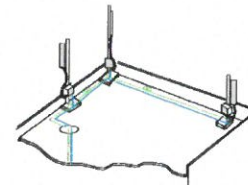
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 25 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and

silent solutions, with minimum impact on the neighborhood, which ease the deployment

- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

Dimensions and weights

- HxWxD : 930x270x146 mm (with solar shield)
- Weight : 25 kg (55 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

Connectivity

- Two CPRI (3-6) optical ports for daisy chaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 300m using MM fiber, up to 15km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Four external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

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DC and Fiber Management Distribution Boxes for HYBRIFLEX™ Cable

Product Description

RFS' flexible Tower, Base Stations and Rooftop protection and Distribution products provide protection for up to 6 Remote Radio Heads/Integrated Antennas. The solutions mitigate the risk of damage due to lightning and provide high levels of availability and reliability to radio equipment.

Features

- Employs the Strikesorb® 30-V1-HV Surge Protective Device (SPD) specifically designed for the Remote Radio Head (RRH) installation environment and certified for use in DC applications and at low DC operating voltages (48V).
- The Strikesorb 30-V1-HV is a Class I SPD, certified by VDE per the IEC 61643-1 standard as suitable for installation in areas where direct lightning exposure is expected. Strikesorb 30-V1-HV is able to withstand direct lightning currents of up to 5kA (10/350) and induced surge currents of up to 60kA (8/20).
- Provides very low let through / clamping voltage – unique for a Class I product – as it does not employ spark gaps or other switching elements. Strikesorb offers unique protection levels to the RRH equipment as well as the Base Band Units.
- Alarms for SPD sacrifice, Moisture detection and Intrusion.
- Fully recognized to the UL 1449 3rd Edition Safety Standard.
- Patent pending design



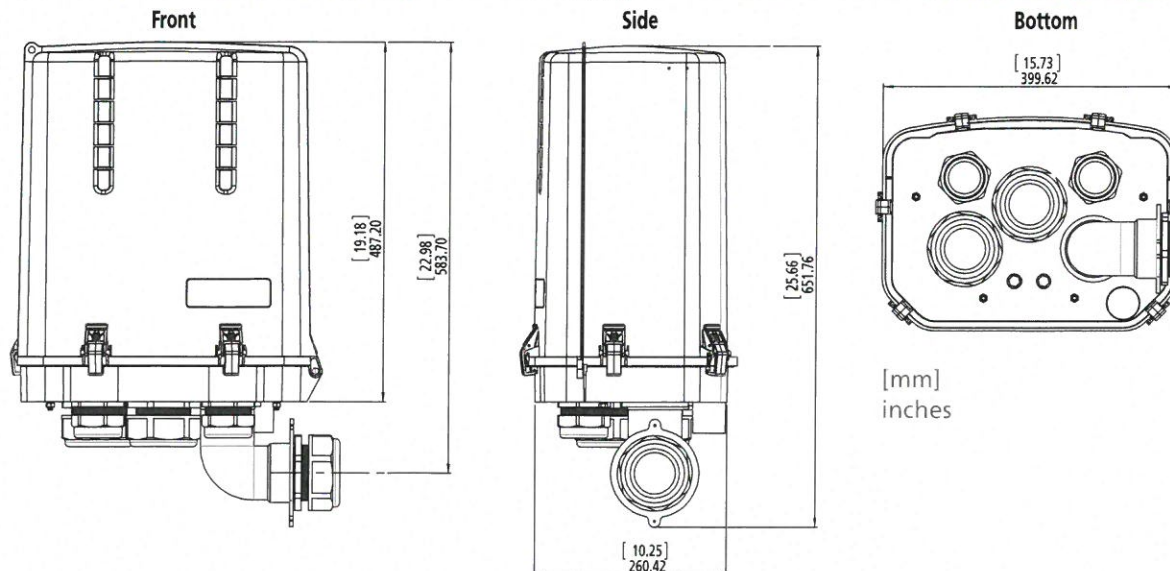
Tower / Base / Rooftop /
Rooftop Distribution Models:
DB-T1-6Z-12AB-0Z
DB-B1-6C-12AB-0Z

Companion Sector Model:
DB-E1-2C-4AB-0Z

Benefits

- Offers unique maintenance-free protection against direct lightning currents.
- Protects up to 6 Remote Radio Heads and connects up to 12 fiber pairs.
- Utilizes an IP67 rated enclosure, allowing for indoor or outdoor installation on a roof or tower top.
- Configurable cable ports are designed to accommodate varying diameters of hybrid (combined power and fiber optic) or standard cables with diameters up to 2" (will fit most standard 15/8" coax class cables) depending upon port configuration.
- Lightweight aerodynamic design provides maximum flexibility for tower top installation.

Product Diagram



* This data is provisional and subject to change.



Technical Specifications

Electrical Specifications

Model Numbers	DB-T1-6Z-12AB-0Z	DB-B1-6C-12AB-0Z
Nominal Operating Voltage		48 VDC
Nominal Discharge Current [In]		20 kA 8/20 μs
Maximum Surge Current [Imax]		60 kA 8/20 μs
Maximum Impulse (Lightning) Current per IEC 61643-1		5 kA 10/350 μs
Maximum Continuous Operating Voltage [Uc]		75 VDC
Voltage Protection Rating (VPR) per UL 1449 3rd Edition		400V
Protection Class as per IEC 61643-1		Class I
SPD Alarm		Upon sacrifice
Intrusion Sensor		Microswitch
Moisture Sensor		Infrared moisture detector
Strikesorb Module Type	No Strikesorb modules installed <i>(used as Distribution Unit only)</i>	30-V1-HV – Strikesorb modules installed to protect 6 RRHs

Mechanical Specifications

Suppression Connection Method	Compression lug, #20-#6 AWG (0.5 mm ² -16 mm ²)	
Fiber Connection Method	LC-LC Single mode	
Pressure Equalizing Vent	Gore™ Vent	
Environmental Rating	IP 67	
Operating Temperature	-40° C to +80° C	
UV Resistant	Yes	
Weight	System: 16.0 lbs (7.25 kg) Mount: 5.5 lbs (2.49 kg) Total: 21.5 lbs (9.75 kg)	System: 21.4 lbs (9.70 kg) Mount: 5.5 lbs (2.49 kg) Total: 26.9 lbs (12.20 kg)
Combined Wind Loading	150mph (sustained): 200 lbs (889.6 N)	

Standards Compliance

Standards (Strikesorb modules ONLY)	Not Applicable	ANSI/UL 1449 3rd Edition IEEE C62.41, NEMA LS-1 IEC 61643-1:2005 2nd Ed (Class I Protection) IEC 61643-12 EN 61643-11:2002 (including A11:2007)
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* This data is provisional and subject to change.

All information contained in the present datasheet is subject to confirmation at time of ordering.