

65° Single Band Panel Antenna, 6'

|   |                |
|---|----------------|
|   | Antenna        |
| Single Band (MHz)   | <b>698–894</b> |
| Dual Polarization   | <b>X</b>       |
| HPBW  | <b>65°</b>     |
| Adj. Electrical Downtilt<br>Manual or optional remote control | <b>0°–10°</b>  |

**General specifications:**

|                         |   |
|-------------------------|---|
| Frequency range         | 698–894 MHz   |
| VSWR                    | <1.5:1  |
| Impedance               | 50 ohms   |
| Intermodulation (2x20w) | IM3: <-150 dBc                                      |
| Polarization            | +45° and -45°                                       |
| Maximum input power     | 500 watts per input (at 50°C)                       |
| Connector               | 2 x 7-16 DIN female (long neck)<br>(bottom mounted) |
| Isolation               | >30 dB  |
| Electrical downtilt     | 0–10 degrees (continuously adjustable)              |

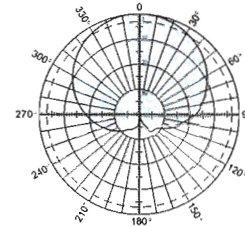
*See reverse for order information.*

| Specifications:  | 698–806 MHz                               | 824–894 MHz                               |
|--|---|---|
| Gain   | 15.5 dBi                                  | 16 dBi                                    |
| Front-to-back ratio  | >30 dB (co-polar)<br>35 dB (average)      | >30 dB (co-polar)<br>35 dB (average)      |
| +45° and -45° polarization<br>horizontal beamwidth                         | 67° (half-power)                          | 65° (half-power)                          |
| +45° and -45° polarization<br>vertical beamwidth                           | 11.3° (half-power)                        | 10° (half-power)                          |
| Min. sidelobe suppression for<br>first sidelobe above main beam<br>average | 0° 5° 10° T<br>16 17 17 dB<br>16 19 20 dB | 0° 5° 10° T<br>18 17 16 dB<br>20 20 20 dB |
| Cross polar ratio  |   |   |
| Main direction 0°  | 25 dB (typical)                           | 25 dB (typical)                           |
| Sector ±60°  | >11 dB, Average: 15 dB                    | >11 dB, Average: 15 dB                    |

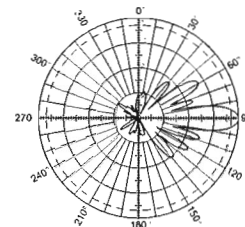
**IRT specifications:**

|   |  |
|---|--|
| Logical interface ex factory <sup>1</sup> | 3GPP/AISG 2.0  |
| Protocols                                 | AISG 1.1 and 3GPP/AISG 2.0 compliant   |
| Hardware interface <sup>2</sup>           | 2 x 8 pin connector acc. IEC 60130-9;<br>according to AISG:<br>– IRT in (male): Control / Daisy chain in<br>– IRT in (female): Daisy chain out |
| Power supply                              | 10–30 V  |
| Power consumption                         | <1 watt (standby)<br><8.5 watts (motor activated)  |
| Adjustment time (full range)              | 40 sec.  |
| Adjustment cycles                         | >50,000  |
| Certification                             | FCC 15.107 Class B Computing Devices   |

698–894 MHz



Horizontal pattern  
±45°- polarization



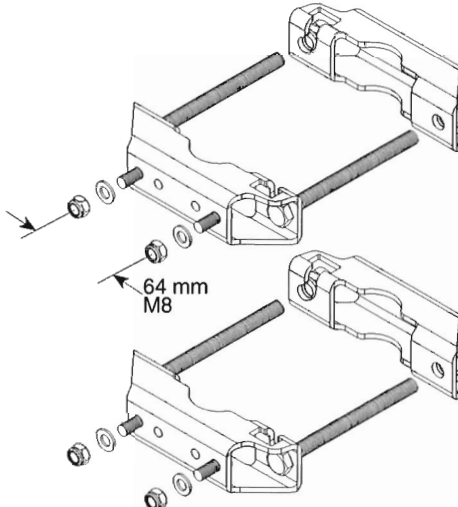
Vertical pattern  
±45°- polarization  
0°–10° electrical downtilt



<sup>1</sup>) The protocol of the logical interface can be switched from 3GPP/AISG 2.0 to AISG 1.1 and vice versa with a vendor specific command. Start-up operation of the RCU 86010149 is possible in an RET system supporting AISG 1.1 or supporting 3GPP/AISG 2.0 after performing a layer 2 reset before address assignment. The protocol can also be changed as follows: AISG 1.1 to 3GPP: Enter "3GPP" into the additional data field "Installer's ID" and perform a layer 7 reset or a power reset. 3GPP to AISG 1.1: Enter "AISG 1" into the additional datafield "Installer's ID" and perform a layer 2 reset or a power reset. After switching the protocol any other information can be entered into the "Installer's ID" field.

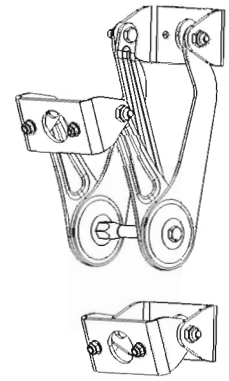
<sup>2</sup>) The tightening torque for fixing the connector must be 0.5 – 1.0 Nm ("hand-tightened"). The connector should be tightened by hand only!





64 mm  
M8

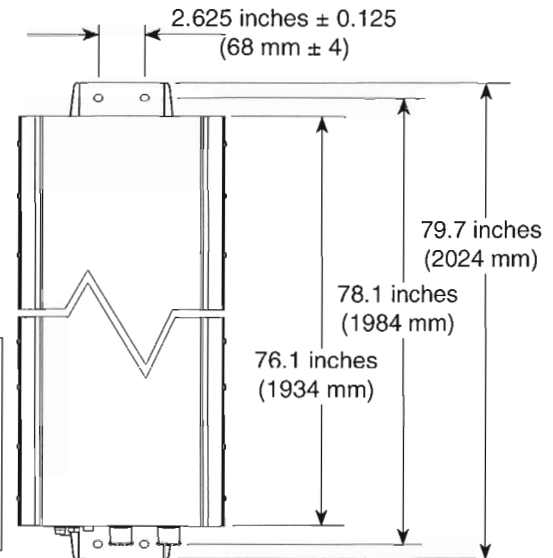
**Mounting Brackets**  
for use with 2-point mount antennas  
Mast dia. 2–4.5 inches (50–115 mm)  
Weight: 4.4 lb (2 kg)



**Mechanical Tilt Brackets**  
for use with 2-point mount antennas  
Weight: 9.5 lb (4.3 kg)  
(Model 850 10008)

**Mechanical specifications:**

|                       |   |   |
|-----------------------|---|---|
| Weight                | 30.9 lb (14 kg)   | 35.3 lb (16 kg) clamps included               |
| Dimensions            | H x W x D   | 76.1 x 11.9 x 3.9 inches (1934 x 303 x 99 mm) |
| Wind load             | at 93 mph (150kph)  |   |
| Front/Side/Rear       | 203 lbf / 70 lbf / 232 lbf<br>(900 N / 310 N / 1030 N)  |   |
| Mounting category     | H (Heavy)   |   |
| Wind survival rating* | 150 mph (240 kph)   |   |
| Shipping dimensions   | 81.1 x 12.4 x 4.5 inches (2060 x 315 x 115 mm)  |   |
| Shipping weight       | 39.7 lb (18 kg)   |   |
| Mounting bracket      | 2-point hot-dip galvanized with stainless steel hardware for 2 to 4.5 inch (50 to 115 mm) OD masts. |   |

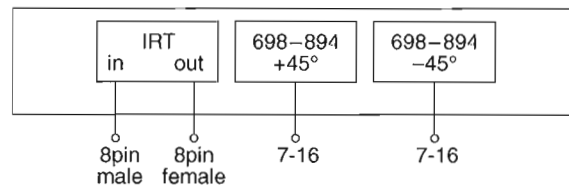
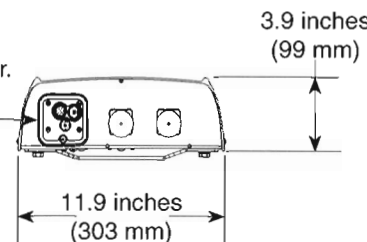


KATHREIN 860 10149

**FC** Tested To Comply With FCC Standards

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:  
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: Refer to part number 860 10149 for the specifications of the remote control actuator.

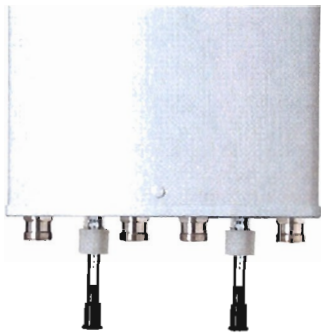


**Order Information:**

| Model         | Description   |
|---------------|---|
| 800 10735V01  | Antenna with mounting bracket<br>0°–10° electrical downtilt                             |
| 800 10735V01K | Antenna with mounting bracket and mechanical tilt bracket<br>0°–10° electrical downtilt |

\* Mechanical design is based on environmental conditions as stipulated in TIA-222-G-2 (December 2009) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

All specifications are subject to change without notice. The latest specifications are available at [www.kathrein-scala.com](http://www.kathrein-scala.com).



## HBXX-6516DS-VTM

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

- Each DualPol® array can be independently adjusted for greater flexibility
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Great solution to maximize network coverage and capacity

### Electrical Specifications

| Frequency Band, MHz                  | 1710–1880  | 1850–1990  | 1920–2180  |
|--------------------------------------|------------|------------|------------|
| Gain, dBi                            | 17.7       | 18.0       | 18.0       |
| Beamwidth, Horizontal, degrees       | 67         | 66         | 64         |
| Beamwidth, Vertical, degrees         | 7.5        | 7.0        | 6.6        |
| Beam Tilt, degrees                   | 0–10       | 0–10       | 0–10       |
| USLS, dB                             | 18         | 18         | 18         |
| Front-to-Back Ratio at 180°, dB      | 30         | 30         | 30         |
| CPR at Boresight, dB                 | 22         | 22         | 21         |
| CPR at Sector, dB                    | 8          | 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°       |
| Impedance                            | 50 ohm     | 50 ohm     | 50 ohm     |

### Electrical Specifications, BASTA\*

| 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        |
|   | 0 °   17.0  | 0 °   17.1  | 0 °   17.4  |
| Gain by Beam Tilt, average, dBi             | 5 °   17.3  | 5 °   17.4  | 5 °   17.7  |
|   | 10 °   17.0 | 10 °   17.0 | 10 °   17.2 |
| Beamwidth, Horizontal Tolerance, degrees    | ±2.7        | ±2.3        | ±3.5        |
| Beamwidth, Vertical Tolerance, degrees      | ±0.5        | ±0.4        | ±0.4        |
| 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           |

\* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper [Time to Raise the Bar on BSAs](#).

### General Specifications

|                          |                      |
|--------------------------|----------------------|
| Antenna Brand            | Andrew®              |
| Antenna Type             | DualPol® quad        |
| Band                     | Single band          |
| Brand                    | DualPol®   Teletilt® |
| Operating Frequency Band | 1710 – 2180 MHz      |

HBXX-6516DS-VTM

POWERED BY



Performance Note

Outdoor usage

## Mechanical Specifications

|                              |   |
|------------------------------|---|
| Color                        | Light gray                                |
| Lightning Protection         | dc Ground                                 |
| Radiator Material            | Low loss circuit board                    |
| Radome Material              | PVC, UV resistant                         |
| RF Connector Interface       | 7-16 DIN Female                           |
| RF Connector Location        | Bottom                                    |
| RF Connector Quantity, total | 4   |
| Wind Loading, maximum        | 419.0 N @ 150 km/h<br>94.2 lbf @ 150 km/h |
| Wind Speed, maximum          | 241 km/h   150 mph                        |

## Dimensions

|            |                     |
|------------|---------------------|
| Depth      | 166.0 mm   6.5 in   |
| Length     | 1297.0 mm   51.1 in |
| Width      | 305.0 mm   12.0 in  |
| Net Weight | 13.9 kg   30.6 lb   |

## Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator HBXX-6516DS-A2M

RET System Teletilt®

## Packed Dimensions

|                 |                     |
|-----------------|---------------------|
| Depth           | 294.0 mm   11.6 in  |
| Length          | 1609.0 mm   63.3 in |
| Width           | 409.0 mm   16.1 in  |
| Shipping Weight | 25.1 kg   55.3 lb   |

## Regulatory Compliance/Certifications

**Agency**

RoHS 2011/65/EU

China RoHS SJ/T 11364-2006

ISO 9001:2008

**Classification**

Compliant by Exemption

Above Maximum Concentration Value (MCV)

Designed, manufactured and/or distributed under this quality management system



## Included Products

600899A-2 — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.



# Product Specifications

COMMSCOPE®

HBXX-6516DS-VTM

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## \* **Footnotes**

Performance Note

Severe environmental conditions may degrade optimum performance

# ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

**Supporting 2Tx/4Tx MIMO and 4-way Rx diversity**, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

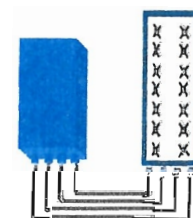


## FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

## BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R  
or  
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

## TECHNICAL SPECIFICATIONS

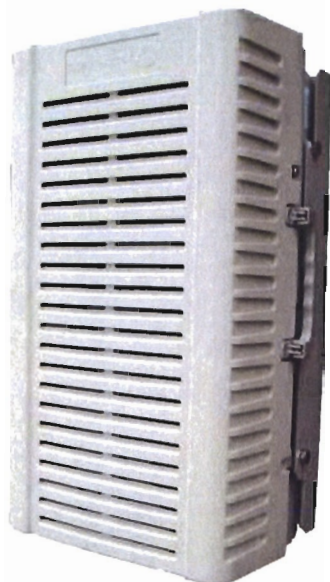
| Features & performance              |   |
|-------------------------------------|---|
| Number of TX/RX paths               | 4 duplexed (either 4T4R or 2T4R by SW)  |
| Frequency band                      | U700 (C) (3GPP bands 13):<br>DL: 746 - 756 MHz / UL: 777 - 787 MHz                          |
| Instantaneous bandwidth - #carriers | 10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)   |
| LTE carrier bandwidth               | 10 MHz  |
| RF output power                     | 2x60W or 4x30W (by SW)  |
| Noise figure – RX Diversity scheme  | 2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity   |
| Sizes (HxWxD) in mm (in.)           | 550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)                                    |
| Volume in L                         | 38 (wlth solar shield)  |
| Weight in kg (lb) (w/o mounting HW) | 26 (57.2) (with solar shield)   |
| DC voltage range                    | -40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption         |
| DC power consumption                | 550W typical @100% RF load ( in 2Tx or 4TX mode)  |
| Environmental conditions            | -40°C (-40°F) / +55°C (+131°F)<br>IP65  |
| Wind load (@150km/h or 93mph)       | Frontal: <200N / Lateral : <150N  |
| Antenna ports                       | 4 ports 7/16 DIN female (50 ohms)<br>VSWR < 1.5   |
| CPRI ports                          | 2 CPRI ports (HW ready for Rate7, 9.8 Gbps)<br>SFP single mode dual fiber                   |
| AISG interfaces                     | 1 AISG2.0 output (RS485)<br>Integrated Smart Bias Tees (x2)                                 |
| Misc. Interfaces                    | 4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins) |
| Installation conditions             | Pole and wall mounting  |
| Regulatory compliance               | 3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27          |

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# ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET RRH2X60-1900A-4R FOR BAND 2/25 APPLICATIONS

The Alcatel-Lucent RRH2x60-1900A-4R is a high power, small form factor Remote Radio Head operating in the PCS 1900MHz frequency band for WCDMA and LTE technologies. 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 RRH2x60-1900A-4R 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 RRH2x60-1900A-4R integrates all the latest technologies. This allows operators 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.

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 RRH2x60-1900A-4R 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 RRH2x60-1900A-4R is a very cost-effective solution to deploy LTE MIMO.

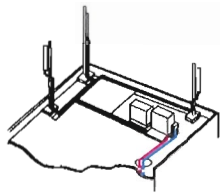
### **EASY INSTALLATION**

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 RRH2x60-1900A-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

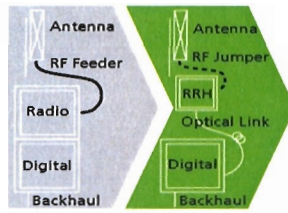
The Alcatel-Lucent RRH2x60-1900A-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-190A-4R is compact and weighs about 21 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.

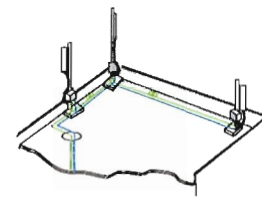




Macro



RRH for space-constrained cell sites



Distributed

## FEATURES

- RRH2x60-1900A-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- RRH2x60-1900A-4R can operate WCDMA only, LTE only or a mix of WCDMA and LTE
- RRH2x60-1900A-4R offers the possibility for WCDMA (non MIMO) to operate the two radio chains independently (2 blocks of 20 MHz anywhere in the band)

- RRH2x60-1900A-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

## BENEFITS

- MIMO deployment and/or WCDMA and LTE simultaneous 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

- 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 : 500x285x208 mm (30l with solar shield)
- Weight : 21 kg (46 lbs) (with solar shield)

### Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption: 460W typ. @2x60W (100%RF)

### RF Characteristics

- Supported spectrum: DL 1930-1990 / UL 1850-1910
- Frequency band: 3GPP band 2/25
- Output power: 2x60W at antenna connectors
- Technology supported: W-CDMA and LTE
- Instantaneous bandwidth: 20 MHz (MIMO) or 2x20 MHz (non MIMO)
- Rx diversity: 2-way and 4-way uplink reception

- Typical sensitivity without Rx diversity: -124.8dBm for WCDMA and -105 dBm for LTE

### Connectivity

- Two CPRI 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 500m using MM fiber, up to 15km using SM fiber
- TMA/RETA: AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six 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: ETS300-019-1-4 class4.1E
- 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
- Safety : IEC60950-1, EN 60825-1
- Regulatory: CE Mark-European Directive 2002/95/EC (RoHS), 2002/96/EC (WEEE), 1999/5/EC (R&TTE)
- Health : EN 50385

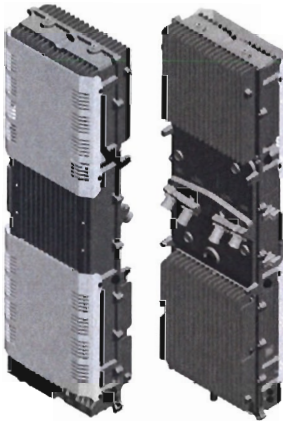
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# ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET

## B4 RRH2X60-4R FOR AWS BAND APPLICATIONS

The Alcatel-Lucent B4 RRH2x60-4R 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 B4 RRH2x60-4R 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 B4 RRH2x60-4R integrates all the latest

technologies. This allows operators 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 B4 RRH2x60-4R 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 B4 RRH2x60-4R is a very cost-effective solution to deploy LTE MIMO.

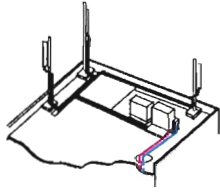
### **EASY INSTALLATION**

The B4 RRH2x60-4R 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.

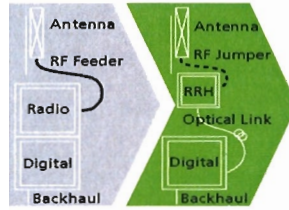
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent B4 RRH2x60-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent B4 RRH2x60-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

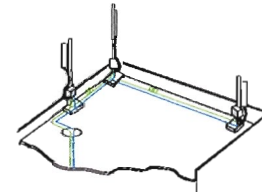
Installation can easily be done by a single person as the Alcatel-Lucent B4 RRH2x60-4R is compact and weighs about 25 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

## FEATURES

- B4 RRH2x60-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- B4 RRH2x60-4R is optimized for LTE operation
- B4 RRH2x60-4R 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 (-38 to -57V)
- Power Consumption: 346W typ. @2x30W (100%RF), 560W typ. @2x60W (100%RF)

### 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
- Health : EN 50385

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**HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber**

**Product Description**

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

**Features/Benefits**

- Aluminum corrugated armor with outstanding bending characteristics - minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding - Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design - Decreases tower loading
- Robust cabling - Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH - Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable - Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket - Ensures long-lasting cable protection

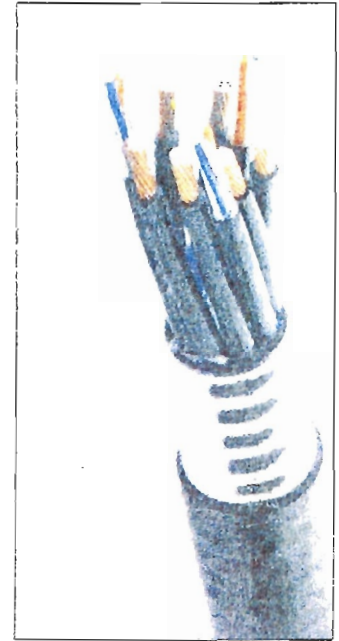


Figure 1: HYBRIFLEX Series

**Technical Specifications**

|  |                                |                   |   |
|--|--------------------------------|-------------------|---|
| Outer Conductor Armor                    | Corrugated Aluminum            | [mm (in)]         | 46.5 (1.83)   |
| Jacket                                   | Polyethylene, PE               | [mm (in)]         | 50.3 (1.98)   |
| UV-Protection                            | Individual and External Jacket |                   | Yes   |
| <b>Mechanical Properties</b>             |                                |                   |   |
| Weight, Approximate                      |                                | [kg/m (lb/ft)]    | 1.9 (1.30)  |
| Minimum Bending Radius, Single Bending   |                                | [mm (in)]         | 200 (8)   |
| Minimum Bending Radius, Repeated Bending |                                | [mm (in)]         | 500 (20)  |
| Recommended/Maximum Clamp Spacing        |                                | [m (ft)]          | 1.0 / 1.2 (3.25 / 4.0)  |
| <b>Electrical Properties</b>             |                                |                   |   |
| DC-Resistance Outer Conductor Armor      |                                | [Ω/km (Ω/1000ft)] | 0.68 (0.205)  |
| DC-Resistance Power Cable, 8 4mm²(8AWG)  |                                | [Ω/km (Ω/1000ft)] | 2.1 (0.307)   |
| <b>Optical Properties</b>                |                                |                   |   |
| Version                                  |                                |                   | Single-mode OM3   |
| Quantity, Fiber Count                    |                                |                   | 16 (8 pairs)  |
| Core/Clad                                |                                | [μm]              | 50/125  |
| Primary Coating (Acrylate)               |                                | [μm]              | 245   |
| Buffer Diameter, Nominal                 |                                | [μm]              | 900   |
| Secondary Protection, Jacket, Nominal    |                                | [mm (in)]         | 2.0 (0.08)  |
| Minimum Bending Radius                   |                                | [mm (in)]         | 104 (4.1)   |
| Insertion Loss @ wavelength 850nm        |                                | dB/km             | 3.0   |
| Insertion Loss @ wavelength 1310nm       |                                | dB/km             | 1.0   |
| Standards (Meets or exceeds)             |                                |                   | UL94-V0, UL1666<br>RoHS Compliant   |
| <b>DC Power Cable Properties</b>         |                                |                   |   |
| Size (Power)                             |                                | [mm (AWG)]        | 8.4 (8)   |
| Quantity, Wire Count (Power)             |                                |                   | 16 (8 pairs)  |
| Size (Alarm)                             |                                | [mm (AWG)]        | 0.8 (18)  |
| Quantity, Wire Count (Alarm)             |                                |                   | 4 (2 pairs)   |
| Type                                     |                                |                   | UV protected  |
| Strands                                  |                                |                   | 19  |
| Primary Jacket Diameter, Nominal         |                                | [mm (in)]         | 6.8 (0.27)  |
| Standards (Meets or exceeds)             |                                |                   | NFPA 130, ICEA S-95-658<br>UL Type XHHW-2, UL 44<br>UL-LS Limited Smoke, UL VW-1<br>IEEE-383 (1974), IEEE1202/FT4<br>RoHS Compliant |
| <b>Environmental</b>                     |                                |                   |   |
| Installation Temperature                 |                                | [°C (°F)]         | -40 to +65 (-40 to 149)   |
| Operation Temperature                    |                                | [°C (°F)]         | -40 to +65 (-40 to 149)   |

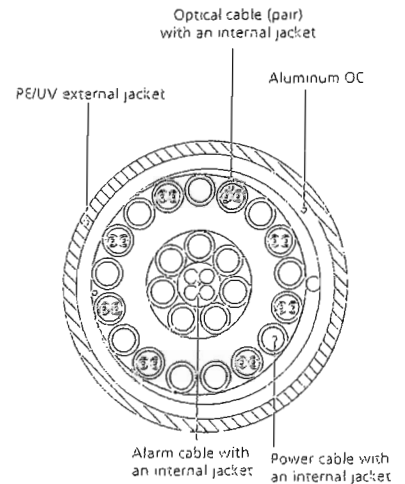


Figure 2: Construction Detail

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

# 8220K-WG972 GENERATOR SPECIFICATIONS 10kW Propane Fueled

## ENGINE

Model.....WG972 (Liquid Propane)  
 Engine.....Kubota WG972-LPG  
 Cylinders.....3 In-line  
 Displacement.....58.7 cu.in.  
 Aspiration.....Liquid Propane  
 Emissions.....EPA and CARB Certified  
 Variable RPM .....2300RPM to 2600RPM  
 Engine Start SuperCapacitor .....14.4V  
 SuperCapacitor DC-DC Charger.....>1A  
 Muffler.....Dual  
 Radiator.....Aluminum with Electric Fan

## FUEL SYSTEM

Type.....Propane  
 Fuel Tank.....Supplied by Customer

| Operating Range of Propane |            |
|----------------------------|------------|
| 9 to 13                    | in. of H2O |
| 0.3 to 0.5                 | psi        |

## ALTERNATOR

Type.....Permanent Magnet  
 Regulation Type.....RPM Control  
 Output Ripple.....Less than 50 milivolts RMS  
 No. of Poles.....32  
 Overcurrent Protection.....250A  
 Disconnect Means.....Fused Disconnect

**Genset UL 2200 LISTED**  
**ETL listed per UL 2200 by Interek Testing Labs.**

## ENGINE CONTROLLER

Engine Controller model.....Supra 250  
 Instrumentation.....Generator output voltage, amperage, kW, Coolant, Temperature, RPM, Hour meter, maintenance intervals, Starting circuit voltage

Automatic Shutdown & Alarm for:.....  
 Under/ Overspeed, Low Oil Pressure, High Coolant Temp., Fail to Start,

Warning Alarm for:.....  
 Low Fuel Level, Fuel Tank Rupture Basin, Low/High Engine Battery Voltage, High Water Temp, and Low Oil Press, Pre-alarm

Glow Plug Delay.....Automatic with temp  
 Engine Start Delay.....Adj. set at 60 seconds  
 Return to Utility Delay...Adj. set at 60 seconds  
 Engine Cool-Down.....Adj. set at 60 seconds  
 Exerciser.....Programmable/ bi-weekly

Contact Closure for Remote Indication .....  
 ....Shutdown Alarm, Warning Alarm, Engine Run, Low Fuel Level, Fuel Leak, E-Stop Depressed

## ENCLOSURE

Type.....Weather Protective Materials.....Marine Grade Aluminum  
 Sound Attenuated.....<61dBA @ 7 Meters  
 Door Hardware.....Three Point / w Padlock Hasp and Removable Side Panel  
 Mounting.....Secure Mounting Tabs  
 Dimensions.....32" x 50" x 72"  
 Weight (dry).....770 lbs.