Equipment Specifications
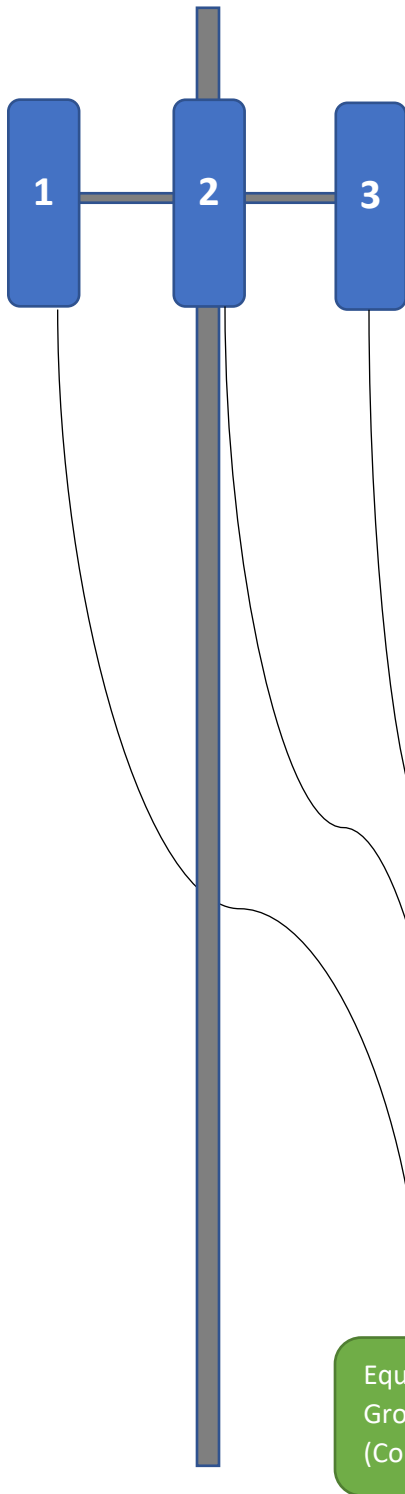
Equipment on Towers

	Model	Manufacturer
Antenna # 1	K 73 36 21	Kathrein
Antenna #2	10P-2L8M-B5-V2	Commscope
Antenna #3	K 73 36 21	Kathrein
Coax cable Type	7/8"	
No Of Coax cables	3	

Equipment on Ground & Mobile

Transmitter Receiver	CA-D8A4-RF4	Commagility
Power	Battery Source/Existing Outlet	
Backhaul	Wireless Modem	[Vz/AT&T etc.]
No. of mobile units 3		

1

2

3

Equipment on Ground (Commagility)

Mobile Units (Commagility)

CA-D8A4-RF4
Stand-alone baseband processing and RF card for eNodeB and UE in an LTE-A network

- Includes four high quality, flexible and wideband RF channels, supporting MIMO and carrier aggregation
- Combines 4 ARM® Cortex®-A15 cores with 8 TI C66x+ DSP cores, accelerators and shared memory, plus FPGA, RF and CPRI interfaces
- Supported by CommAgility small cell and UE, PHY and stack software

The CommAgility CA-D8A4-RF4 is a stand-alone baseband processing and RF card supporting eNodeB and UE functionality in an LTE-A network.

The card includes four RF channels, tuneable in pairs over a very wide frequency range to cover LTE and unlicensed frequency bands, and with RF bandwidth up to 100MHz to support carrier aggregation and 5G applications.

The RF channels include low latency control features to support UE and eNodeB operation. Discrete ADCs and DACs ensure high RF quality. Optional RF front end cards provide amplification and filtering to support specific bands in over-the-air applications.

generation of DSP/ARM SoCs. This SoC provides Layer 1-3 baseband processing, with a Gigabit Ethernet interface to the network. The EPC functionality can also be integrated into the SoC if required, giving a fully stand-alone network.

A Kintex-7 FPGA provides RF control, digital up/down conversion and processing, interfacing over CPRI to on-board baseband processing or external SFP+ interfaces.

For eNodeB, the card is supported by CommAgility's SmallCellPHY-TI and SmallCellSTACK LTE Release 10 software. For UE, the card is supported by CommAgility's MobilePHY-TI and MobileSTACK LTE Release 10 software. A

Hardware Specifications

DSP0: TMS320TCI6638K2K KeyStone II SoC:
- 8x C66x DSP cores @ 1.2GHz
- 4x ARM A15 cores @ 1.4GHz
- Accelerators and packet processors
- 2Gbytes x72 DDR3L-1600 SDRAM
- 512Mbytes x16 boot FLASH
- 3x 5Gbaud AIF2 CPRI lanes
- GbE and UART interfaces
- 20Gbaud RapidIO interface

FPGA0: Xilinx Kintex-7™ K410T FPGA
- Optional 3 CPRI lanes at up to 10.3Gbaud (CPRI rate 8)
- Interfaces to RF and DSP0
- Configured by DSP0 at boot-up
- Supplied with CommAgility image which performs RF control, up conversion and down conversion, CPRI interfacing etc.
- Crest Factor Reduction support optional

Timing:
- Integrated GPS for timing sync
- Clock and sync
- Configurable PLL/jitter cleaner
- Timing from GPS, IEEE1588, received RF or external clock source

External I/O:
- Four flexible RF channels, each with separate Tx/Rx SMA ports
- 3x SFP+ to DSP AIF2 or FPGA, up to 10.3Gbaud
- GPS aerial and 2 x SMB clock/sync
- RJ45 and SFP+ Gigabit Ethernet
- 12V power connector
- SFF-8643 to DSP RapidIO

Form Factor:
- Standalone card with optional RF front-end cards for amplification and filtering
- Dimension: 225mm (L) x 165mm (W) x 26.5mm (H)

Debug:
- DSP and FPGA debug connectors
- Mini-USB B jack and LEDs

Environment/EMC/Safety
- Operating temp: -40°C to +70°C ambient (conduction cooled)
- Power consumption: typically <60W
- 2011/65/EU RoHS and EC/1907/2006 REACH compliant

RF Specifications

RF Channels:
- Four channels
- Each pair in a set is identical and frequency synchronized
- Two sets can be synchronized or set to different frequencies
- Tx and Rx can be the same (TDD) or different (FDD) frequencies

Frequency and Bandwidth:
- RF Freq Range: 410MHz – 5925MHz
- RF Fine Freq Resolution: <1Hz
- RF Bandwidths supported: 1.4, 3, 5, 10, 15, 20, 30, 40, 100MHz
- Actual baseband sampling rates: up to 245.76MSPS
- For other RF configurations (for example narrowband LTE), please contact CommAgility

TX Ports:
- Maximum Rated Output Power (PRAT) +21dBm eNodeB, +23dBm UE per antenna
- 0dBm without front-end module
- Tx Dynamic Range: >50dB
- EVM: <2% at 0dBm without FEM
- DAC SFDR: >55dB

RX Ports:
- Maximum operational input power 0dBm
- Noise figure: <5dB, Pin <-50dBm with optional FEM
- Gain range: 50dBm supporting AGC with optional FEM

Calibration and Tuning:
- Continuous auto-tuning of RF receive parameters

USIM Support:
- Standard uSIM connection allows UE applications to be supported with suitable external RF

Panel
## Vertical Polarization
Half-power Beam Width

408–512
V
63°

KATHREIN
Antennen · Electronic

VPol Panel 408–512 63° 9dBi

Type No.	K 73 36 21
Frequency range	408 – 512 MHz
Polarization	Vertical
Gain	9 dB
Half-power beam width	H-plane: 63° E-plane: 63°
Impedance	50 Ω
VSWR	< 1.4
Max. power	500 W (at 50 °C ambient temperature)

Arrays:	This antenna is especially suitable as a component in arrays to achieve various radiation patterns.
Scope of supply:	Antenna including two weather-proof covers for straight and elbow connector, but without mounting hardware.
Material:	Dipoles and reflector screen: Weather-resistant aluminum. Radome: Fiberglass, colour: White. All screws and nuts: Stainless steel.
Attachment:	Use clamps K 61 14 0 .. for tubular mast diameters of 40 – 521 mm (see the "Mechanical Accessories" part of this catalogue).
Ice protection:	Due to the very sturdy antenna construction and the protection of the radiating system by the radome, the antenna remains operational even under icy conditions.
Grounding:	All metal parts of the antenna including the mounting kit are DC grounded. The inner conductor is capacitively coupled.

Mounting Dimensions

Horizontal Pattern   Vertical Pattern
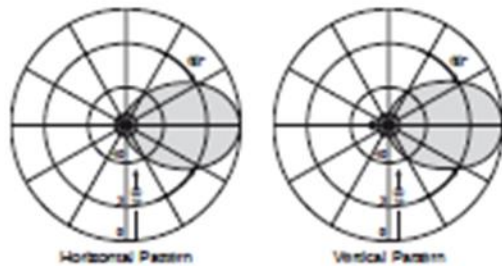
Mechanical specifications	
Input	N female
Connector position	Rearside
Weight	6 kg
Wind load	Frontal: 220 N (at 150 km/h) Lateral: 100 N (at 150 km/h) Rearside: 330 N (at 150 km/h)
Max. wind velocity	200 km/h
Packing size	603 x 567 x 262 mm
Height/width/depth	493 / 493 / 209 mm

10P-2L8M-B5-V2

10-port sector antenna, 2x 694–960 and 8x 1695–2690 MHz, 65° HPBW, 5x RET

- All Internal RET actuators are connected in "Cascaded SRET" configuration
- Utilizes RET-PMOD-A20-5A07

General Specifications

Antenna Type	Sector
Band	Multiband
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Performance Note	Outdoor usage
Radome Material	Fiberglass, UV resistant
Radiator Material	Low loss circuit board
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, high band	8
RF Connector Quantity, low band	2
RF Connector Quantity, total	10

Remote Electrical Tilt (RET) Information

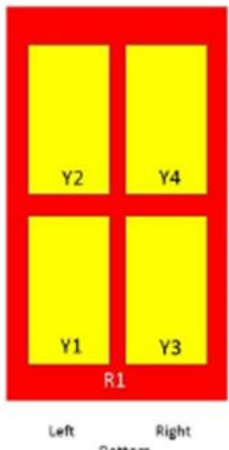|	
RET Hardware	CommRET v2
RET Interface	2x 8 pin connector as per IEC 60130-9 Daisy chain in: Male / Daisy chain out: Female Pin3: RS485A(AISG_B), Pin5: RS485B(AISG_A), Pin6: DC 10~30V, Pin7: DC_ Return
RET Interface, quantity	1 female	1 male

10P-2L8M-B5-V2

Input Voltage	10–30 Vdc
Internal RET	High band (4)	Low band (1)
Power Consumption, idle state, maximum	2 W
Power Consumption, normal conditions, maximum	10 W
Protocol	3GPP/AISG 2.0 (Single RET)

Dimensions

Width	301 mm	11.85 in
Depth	181 mm	7.126 in
Length	2090 mm	82.284 in
Net Weight, without mounting kit	21.9 kg	48.281 lb

Array Layout

Array	Freq (MHz)	Conns	RET (SRET)	AISG RET UID
R1	694-960	1-2	1	CPxxxxxxxxxxxxxxxxR1
Y1	1695-2690	3-4	2	CPxxxxxxxxxxxxxxxxY1
Y2	1695-2690	5-6	3	CPxxxxxxxxxxxxxxxxY2
Y3	1695-2690	7-8	4	CPxxxxxxxxxxxxxxxxY3
Y4	1695-2690	9-10	5	CPxxxxxxxxxxxxxxxxY4

Left   Right

(Sizes of colored boxes are not

10P-2L8M-B5-V2

Electrical Specifications

Impedance	50 ohm
Operating Frequency Band	1695 – 2690 MHz | 694 – 960 MHz
Polarization	±45°
Total Input Power, maximum	900 W

Electrical Specifications

Frequency Band, MHz	694–790	790–890	890–960	1695–1920	1920–2200	2300–2500	2500–2690
Gain, dBi	15.5	15.8	16.1	16.6	16.9	16.9	17.1
Beamwidth, Horizontal, degrees	73	70	68	63	62	60	63
Beamwidth, Vertical, degrees	10.7	9.6	8.9	8.7	7.9	6.9	6.5
Beam Tilt, degrees	0–12	0–12	0–12	0–12	0–12	0–12	0–12
USLS (First Lobe), dB	17	17	20	17	18	20	20
Front-to-Back Ratio at 180°, dB	32	32	30	34	34	32	36
Front-to-Back Ratio, Copolarization 180° ± 30°, dB	27	27	27	29	29	30	30
Isolation, Cross Polarization, dB	25	25	25	25	25	25	25