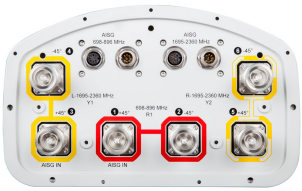
Exhibit ML-1
NHH-65B-R2B



6-port sector antenna, 2x 698–896 and 4x 1695–2360 MHz, 65° HPBW, 2x RET. Both high bands share the same electrical tilt.

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Internal SBT on low and high band allow remote RET control from the radio over the RF jumper cable
- Separate RS-485 RET input/output for low and high band
- One RET for low band and one RET for both high bands to ensure same tilt level for 4x Rx or 4x MIMO

General Specifications

Antenna Type	Sector
Band	Multiband
Color	Light gray
Effective Projective Area (EPA), frontal	0.26 m² | 2.799 ft²
Effective Projective Area (EPA), lateral	0.22 m² | 2.368 ft²
Grounding Type	RF connector body grounded to reflector and mounting bracket
Performance Note	Outdoor usage | Wind loading figures are validated by wind tunnel measurements described in white paper WP-112534-EN
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	4
RF Connector Quantity, low band	2
RF Connector Quantity, total	6

Remote Electrical Tilt (RET) Information, General

RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	2 female | 2 male

Dimensions

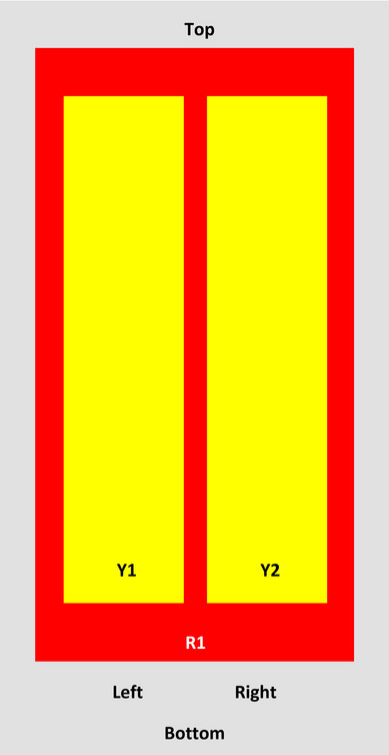
Width	301 mm | 11.85 in
Depth	180 mm | 7.087 in

NHH-65B-R2B

Length	1828 mm | 71.969 in

Array Layout

NHH



Array	Freq (MHz)	Conns	RET (SRET)	AISG RET UID
R1	698-896	1-2	1	ANxxxxxxxxxxxxxxx1
Y1	1695-2360	3-4	2	ANxxxxxxxxxxxxxxx2
Y2	1695-2360	5-6		

View from the front of the antenna

(Sizes of colored boxes are not true depictions of array sizes)

Electrical Specifications

Impedance	50 ohm
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Polarization	±45°
Total Input Power, maximum	900 W @ 50 °C

Remote Electrical Tilt (RET) Information, Electrical

Protocol	3GPP/AISG 2.0 (Single RET)
Power Consumption, idle state, maximum	2 W

NHH-65B-R2B

Power Consumption, normal conditions, maximum	13 W
Input Voltage	10–30 Vdc
Internal Bias Tee	Port 1 | Port 3
Internal RET	High band (1) | Low band (1)

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2360**
Gain, dBi	14.9	15	17.7	17.9	18.4	18.7
Beamwidth, Horizontal, degrees	65	60	71	69	64	57
Beamwidth, Vertical, degrees	12.4	11.2	5.7	5.2	4.9	4.6
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	13	14	18	18	19	18
Front-to-Back Ratio at 180°, dB	30	29	31	30	29	31
Isolation, Cross Polarization, dB	25	25	25	25	25	25
Isolation, Inter-band, dB	30	30	30	30	30	30
VSWR | Return loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port at 50°C, maximum, watts	300	300	300	300	300	300

Electrical Specifications, BASTA

Frequency Band, MHz	**698–806**	**806–896**	**1695–1880**	**1850–1990**	**1920–2200**	**2300–2360**
Gain by all Beam Tilts, average, dBi	14.5	14.5	17.3	17.7	18.1	18.5
Gain by all Beam Tilts Tolerance, dB	±0.6	±1.1	±0.4	±0.4	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.4 7 ° | 14.6 14 ° | 14.3	0 ° | 14.7 7 ° | 14.7 14 ° | 14.1	0 ° | 17.2 4 ° | 17.3 7 ° | 17.3	0 ° | 17.6 4 ° | 17.7 7 ° | 17.7	0 ° | 18.0 4 ° | 18.2 7 ° | 18.1	0 ° | 18.3 4 ° | 18.5 7 ° | 18.6
Beamwidth, Horizontal Tolerance, degrees	±2	±2.1	±3	±4.1	±6.5	±2.9
Beamwidth, Vertical Tolerance, degrees	±0.7	±0.7	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	13	14	16	16	17	15
Front-to-Back Total Power at	23	22	27	27	25	25

NHH-65B-R2B

180° ± 30°, dB						
CPR at Boresight, dB	22	21	23	23	22	19
CPR at Sector, dB	10	7	16	13	11	4

Mechanical Specifications

Wind Loading at Velocity, frontal	278.0 N @ 150 km/h | 63.6 lbf @ 150 km/h
Wind Loading at Velocity, lateral	230.0 N @ 150 km/h | 51.7 lbf @ 150 km/h
Wind Loading at Velocity, maximum	120.7 lbf @ 150 km/h | 537.0 N @ 150 km/h
Wind Loading at Velocity, rear	282.0 N @ 150 km/h | 63.4 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 149.75 mph

Packaging and Weights

Width, packed	409 mm | 16.102 in
Depth, packed	299 mm | 11.772 in
Length, packed	1952 mm | 76.85 in
Net Weight, without mounting kit	19.8 kg | 43.651 lb
Weight, gross	32.3 kg | 71.209 lb

Regulatory Compliance/Certifications

Agency	**Classification**
CHINA-ROHS	Below maximum concentration value
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system
REACH-SVHC	Compliant as per SVHC revision on www.commscope.com/ProductCompliance
ROHS	Compliant

Included Products

BSAMNT-3	–	Wide Profile Antenna 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.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

Chapter 1 Introduction

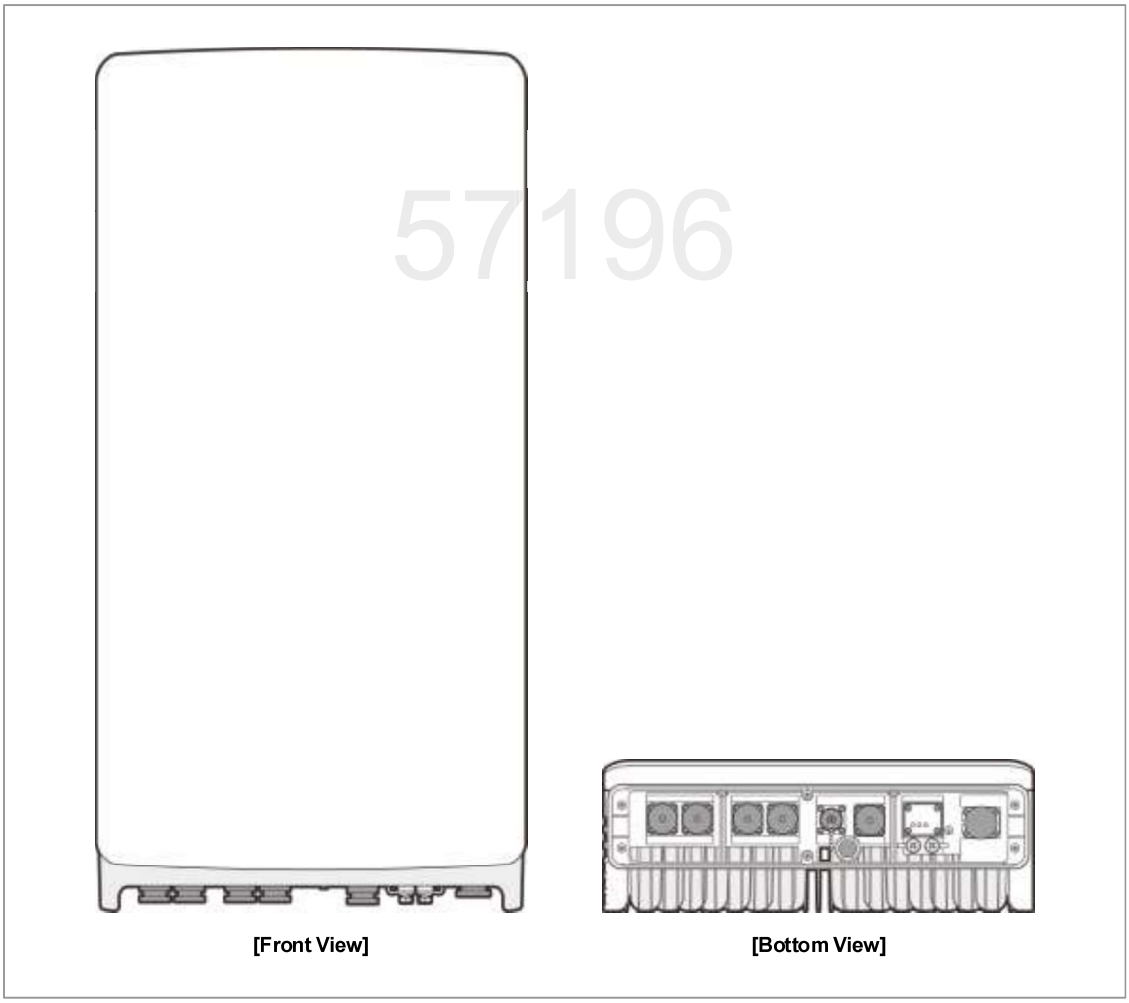
This chapter provides the hardware overview, functional description, and general specification of the product.

Overview

The MT6413-77A is a Massive MIMO Unit (MMU) consisting of digital and radio blocks. The digital block supports the interface with Digital Unit (DU) and the Low-PHY function (functional split option 7-2). The radio block transmits and receives the Radio Frequency (RF) signals with an integrated 64T64R antenna.

The following figure depicts the appearance of the MT6413-77A.

Figure 1. MT6413-77A Appearance



Specifications

The following table displays the main specifications of the MT6413-77A.

Table 2. Specifications of the MT6413-77A

Item		MT6413-77A
Air Technology		5G
Band/Duplex		n77/TDD
OFR		3,700 to 3,980 MHz
IBW		200 MHz
OBW		200 MHz
Carrier Configuration	Ch. BW	NR 20/40/60/80/100 MHz
	Number of carriers (per unit)	2CC
TRX Path Configuration		64T64R
Antenna Configuration		4V16H 192 AE (3 x 1 sub-array)
Conductive Power		320 W
MIMO Capacity		DL 16L, UL 16RX (8L)
Function Split		Opt. 7-2x
Optic Interface		20 km, 25 Gbps × 4 ports
Input Voltage		-48 V DC (-36 to -58 V DC)
Power Consumption [a)]		• 882 W @ 40 % room temp • 1,260 W @ 100 % room temp • 1,299 W @ 100 % all temp
Volume / Dimension (W x H x D)		41.1 L / 15.75 x 28.9 x 5.51 in. (400 x 734 x 140 mm)
Weight		57.32 lb (26 kg) or less (without a Bracket)
Operating Temperature [b)]		-104 °F to +131 °F (-40 °C to +55 °C), (without solar load)
Cooling Scheme		Natural Convection
Installation		Pole, Wall
Operating Humidity [b)]		5% to 100% RH (non-condensing, not to exceed 30 g/m^3 absolute humidity)
Altitude		Telcordia GR-63-CORE, Issue 5, Section 4.1.3
Noise		Telcordia GR-487-CORE, Issue 5, Section 3.34 (45 dBA)
Ingress Protection Rating		IEC 60529 (IP65)
Salt Fog / Salt Spray		Telcordia GR-487-CORE, Issue 5, Section 3.40.1
Wind Resistance		Telcordia GR-487-CORE, Issue 5, Section 3.36
Earthquake		Telcordia GR-63-CORE, Issue 5, Section 4.4.1 (Zone 4)
Vibration		Telcordia GR-63-CORE, Issue 5, Section 4.4.4 / 4.4.5
EMC		FCC Title 47 CFR Part 15 Subpart B

Item	MT6413-77A
Safety	UL 62368-1
RF	FCC Title 47, CFR Part 27

1) These values are predictive of simulation. When development is completed, measurement data can change by +/- 10%.

2) Temperature and humidity are measured 1.5 m above the floor and 400 mm from the equipment's front panel.

SAMSUNG

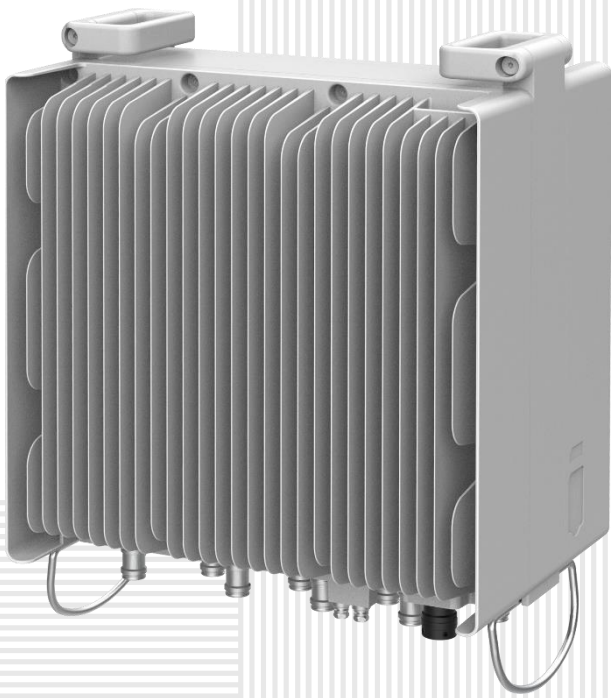
AWS/PCS MACRO RADIO

DUAL-BAND AND HIGH POWER FOR MACRO COVERAGE

Samsung's future proof dual-band radio is designed to help effectively increase the coverage areas in wireless networks. This AWS/PCS 4T4R dual-band radio has 4Tx/4Rx to 2Tx/2Rx RF chains options and a total output power of 320W, making it ideal for macro sites.

57196

Model Code	RF4439d-25A



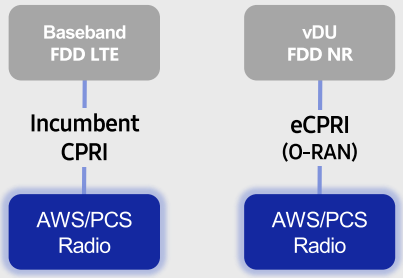
Homepage
samsungnetworks.com

Youtube
www.youtube.com/samsung5g

Points of Differentiation

Continuous Migration

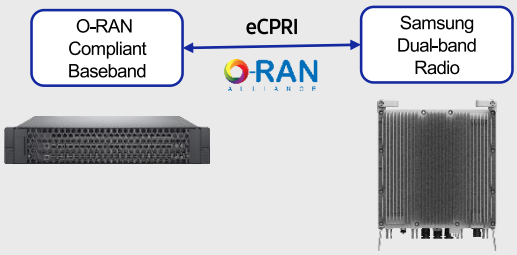
Samsung's AWS/PCS macro radio can support each incumbent CPRI interface as well as advanced eCPRI interfaces. This feature provides installable options for both legacy LTE networks and added NR networks.



O-RAN Compliant

A standardized O-RAN radio can help in implementing cost-effective networks, which are capable of sending more data without compromising additional investments.

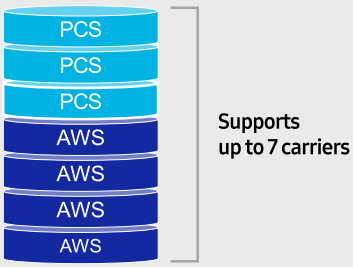
Samsung's state-of-the-art O-RAN technology will help accelerate the effort toward constructing a solid O-RAN ecosystem.



Optimum Spectrum Utilization

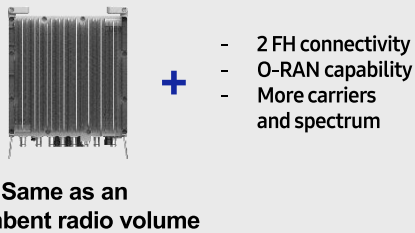
The number of required carriers varies according to site (region). Supporting many carriers is essential for using all frequencies that the operator has available.

The new AWS/PCS dual-band radio can support up to 3 carriers in the PCS (1.9GHz) band and 4 carriers in the AWS (2.1GHz) band, respectively.



Brand New Features in a Compact Size

Samsung's AWS/PCS macro radio offers several features, such as dual connectivity for baseband for both CDU and vDU, O-RAN capability, more carriers and an enlarged PCS spectrum, combined into an incumbent radio volume of 36.8L.



Technical Specifications

Item	Specification
Tech	LTE / NR
Brand	B25(PCS), B66(AWS)
Frequency Band	DL: 1930 – 1995MHz, UL: 1850 – 1915MHz DL: 2110 – 2200MHz, UL: 1710 – 1780MHz
RF Power	(B25) 4 × 40W or 2 × 60W (B66) 4 × 60W or 2 × 80W
IBW/OBW	(B25) 65MHz / 30MHz (B66) DL 90MHz, UL 70MHz / 60MHz
Installation	Pole, Wall
Size/ Weight	14.96 x 14.96 x 10.04inch (36.8L) / 74.7lb

Samsung Forecast Planning

verizon

Product transition: ORAN Macro 700/850 (New Filter)

	WxHxD (mm)	WxHxD (in)	Volume	Weight	Power consumption
Macro ORAN LL	380 x 380 x 230	14.96 x 14.96 x 9.05	33.2L	31.9kg	1121W
Macro ORAN LL New Filter	380 x 380 x 260	14.96 x 14.96 x 10.24	37.5L	35.9kg	1230W

Current:

SFG-ARR27201VZ/1900413090 O-RAN 700/850 B13/B5 (RF4440d-13A)

New Filter:

SFG-ARR57201VZ/MMID TBD ORAN 700/850 B13/B5 New Filter (RF4461d-13A)

- Dimension Changes / Impacts: Yes
- Timing: ~Q1'2024 (design change required)
- Ancillary Change: No

Samsung Update: 4th Aug 2022

700+850 Dualband ORAN RRH OOBE improvement

Item	ORAN Macro RU (RF4440d-13A)		Updated Band 5 Specification Config. #1 (50 dB rejection at 896~901MHz)
Air Interface	LTE, NR(HW resource ready)		Same as ORAN Macro LL
Band	Band13 (700MHz)	Band5 (850MHz)	
Frequency	DL: 746~756MHz	DL: 869~894MHz	
	UL: 777~787MHz	UL: 824~849MHz	
IBW	10MHz	25MHz	
OBW	10MHz	25MHz	
Carrier Bandwidth	LTE/NR 5*/10MHz	LTE: 5/10MHz NR: 5/10/20MHz	
# of carriers	2C	3C	
Total # of carriers	4 carriers + B13 (SDL) 1 carrier		
RF Chain	4T4R, 2T4R, 2T2R+2T2R bi-sector		
RF Output Power	Total : 320W		
	4 x 40W or 2 x 60W	4 x 40W or 2 x 60W	
Spectrum Analyzer	TX/RX Support		
RX Sensitivity	Typ. -104.5dBm @1Rx (25RBs 5MHz)		
Modulation	256QAM support, (1024QAM with 1~2dB power back-off)		
Input Power	-48VDC (-38VDC to -57VDC)		
Power Consumption	1,121 Watt@ 100% RF load, room temperature		**1,230 Watt @ 100% RF load, room temperature**
Size (WHD)	380 x 380 x 230 mm (14.96 x 14.96 x 9.05 inch)		~~380 x 380 x 240 mm (14.96 x 14.96 x 9.45 inch)~~ 380 x 380 x 260 mm (14.96 x 14.96 x 10.24 inch)
Volume	33.2L		~~34.6L~~ 37.5L
Weight (W/o Solar Shield & finger guard)	31.9 kg (70.33 lb)		~~33.9 kg (74.73lb)~~ 35.9kg (79.15lb)
Operating Temperature	-40°C (-40°F) ~ 55°C (131°F) (Without solar load)		Same as ORAN Macro LL
Cooling	Natural convection		
Unwanted Emission	3GPP 36.104	3GPP 36.104	
	FCC 47 CFR 27.53 c), f)	FCC 47 CFR 22.917	
OOBE Additional Operator Requirement	N/A	N/A	**B5: -69dBm/100KHz per path@896 ~901MHz**
CPRI Cascade	Not supported		**Same as ORAN Macro LL**
Optic Interface	20km, 2 ports (9.8Gbps x 2), SFP+, single mode, Duplex (Option: Bi-di)		
RET & TMA Interface	AISG 3.0		
Bias-T	4 ports (2 ports per band)		
Mounting Options	Pole, wall		
NB-IoT	2GB+2IB or 4IB	2SA+2GB or 2GB+2IB or 4GB	
PIM Cancellation	Support		
# of antenna port	4		
External Alarm	4		
- Specification is subject to change Fronthaul Interface	Opt. 8 CPRI / Opt. 7-2x selectable (not simultaneous support)		
CPRI compression	Not Support		

Product Specifications

RCMDC-6627-PF-48

Raycap OVP box for 12 RRUs, 12 strikesorb modules, voltage indicator, large box, UL

Product Classification

Portfolio	CommScope®
Product Type	Outdoor junction box
Regional Availability	North America

Construction Materials

Material Type	High-impact polycarbonate, UV resistant

Dimensions

Depth	320.04 mm | 12.60 in
Height	749.30 mm | 29.50 in
Width	419.10 mm | 16.50 in
Weight	14.51 kg | 32.00 lb

Environmental Specifications

Environmental Space	Indoor | Outdoor
Qualification Standards	IEC 60529:2001, IP67

General Specifications

Application	Used as a fiber/power junction box
Color	Gray
Includes	Mounting kit
Mount Type	Pipe, 44–114 mm (1.75–4.5 in) OD | Wall

Mechanical Specifications

Cable Entry, quantity, maximum, bottom	6

Regulatory Compliance/Certifications

Agency	Classification
UL/ETL Certification	
RoHS 2011/65/EU	Compliant
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Product Specifications

RCMDC-6627-PF-48