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Radio Test report – AIR 1641 B2/25a B66a

Project number:

391738-5TRFWL-R1

Applicant:

Ericsson Canada Inc.

Product:	Model:	Part number:
AIR 1641	AIR 1641 B2/25a B66a	KRD 901 800/1
FCC ID:	**ISED Reg. Number**	**HVIN:**
TA8AKRD901800-1	287AB-AS9018001	AS9018001

Requirements/Summary:

Standard	Environmental phenomenon	Compliance
FCC 47 CFR Part 27	Miscellaneous wireless communications services	Yes
FCC 47 CFR Part 24, Subpart E	Broadband Personal Communications Services (PCS)	Yes
RSS-133 Issue 6 A1, Jan 18, 2018	2 GHz Personal Communications Services	Yes
RSS-139 Issue 3, July 16, 2015	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710–1780 MHz and 2110–2180 MHz	Yes
RSS-170 Issue 3, July 9, 2015	Ancillary Terrestrial Component (ATC) Equipment Operating in the Mobile-Satellite Service (MSS) Bands AWS-4 (2180-2200MHz) Limitation as per IC P9 Licensing Agreement https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11536.html	Yes

Date of issue: April 1, 2021

Andrey Adelberg, Senior EMC/Wireless Specialist
Tested by


Signature

David Duchesne, Senior EMC/Wireless Specialist
Reviewed by


Signature

Two test locations

Company name	Nemko Canada Inc.	
Address	303 River Road	349 Terry Fox
City	Ottawa	Ottawa
Province	Ontario	Ontario
Postal code	K1V 1H2	K2K 2V6
Country	Canada	Canada
Telephone	+1 613 737 9680	+1 613 963 8000
Facsimile	+1 613 737 9691	
Toll free	+1 800 563 6336	
Website	www.nemko.com	
Site number	FCC test site registration number: CA2040, IC: 2040A-4 (3 m semi anechoic chamber)	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this reAnt Are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

Table of contents

Section 1. Report summary

1.1 Applicant and manufacturer

Company name	Ericsson Canada Inc.
Address	349 Terry Fox Drive, Ottawa, ON, Canada, K2K 2V6

1.2 Test specifications

FCC 47 CFR Part 2	Frequency Allocations and Radio Treaty Maters; General Rules and Regulations
FCC 47 CFR Part 24, Subpart E	Broadband Personal Communications Services (PCS)
FCC 47 CFR Part 27	Miscellaneous wireless communications services (2110–2200 MHz)
RSS-133 Issue 6 A1, Jan. 18, 2018	2 GHz Personal Communications Services
RSS-139 Issue 3, July 16, 2015	Advanced Wireless Services (AWS) equipment operating in the bands 1710–1780 MHz and 2110–2180 MHz
SRSP-510, Issue 5, February 2009	Technical Requirements for Personal Communications Services (PCS) in the Bands 1850–1915 MHz and 1930–1995 MHz
RSS-170 Issue 3, July 9, 2015*	Ancillary Terrestrial Component (ATC) Equipment Operating in the Mobile-Satellite Service (MSS) Bands
RSS-Gen, Issue 5, April 2018	General Requirements for Compliance of Radio Apparatus

*Equipment operating in the ancillary terrestrial component (ATC) of the frequency bands 2000–2020 MHz and 2180–2200 MHz is certified under RSS-170. Limitations specified under Industry Canada P9 Licensing Agreement applied as per https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11536.html

1.3 Test method

ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
KDB 662911 D01	Multiple Transmitter Output v02r01
KDB 662911 D02	MIMO with Cross-Polarized Antennas v01

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant. Testing was completed against customer test plan. Results obtained indicate that the product under test complies in full with the requirements tested.

This test report (**391738-5TRFWL-R1**) applies to the *AIR 1641 B2/25a B66a* with part number *KRD 901 800/1*. See "Summary of test results" for full details.
EUT Configuration(s) SRO/MRO:
NR: 5, 10, 15, 20 MHz (1–3 Carriers)
NR + LTE: 5, 10, 15, 20 MHz

Notes / Report Details:
CIIPC adding NR 5, 10, 15, 20MHz (1–3 Carriers)
LTE configurations include NB-IoT (IB, GB)

1.5 Test report revision history

Table 1.5-1: *Test report revision history*

Revision #	Date of issue	Details of changes made to test report
TRF	April 1, 2021	Original report issued

Section 2. Summary of test results

2.1 Testing location

Test location (s)	Ottawa

2.2 Testing period

Test start date	January 22, 2021	Test end date	January 27, 2021

2.3 Sample information

Receipt date	January 22, 2021	Nemko sample ID number	1

2.4 FCC Part 27/24 test results

Table 2.4-1: *FCC results summary*

Part	Test description	Verdict
§27.50(b)	Maximum output power at RF antenna connector	Pass
§27.53	Spurious emissions at RF antenna connector	Pass
§27.53	Radiated spurious emissions (conducted and radiated)	Pass
§24.229	Frequencies	Pass[1]
§24.232(a)(2)	Power and antenna height limits for base stations with BW greater than 1 MHz	Pass
§24.238(a)	Emission limitations for Broadband PCS equipment – out of band emissions (conducted and radiated)	Pass
§2.1049	Occupied bandwidth	Pass

Notes: Only tests requested by the client have been performed

[1]EUT transmits within 1930–1995 MHz frequency range

2.5 RSS-133/139/170 test results

Table 2.5-1: *ISED results summary*

Part	Test description	Verdict
RSS-133, 6.1	Frequency Plan	Pass[1]
RSS-133, 6.2	Types of Modulation	Pass[2]
RSS-133, 6.4	Transmitter Output Power and Equivalent Isotropically Radiated Power	Pass
RSS-133, 6.5	Transmitter Unwanted Emissions (conducted and radiated)	Pass
RSS-139, 4.1	Transmitter output power and Equivalent Isotropic Radiated Power (e.i.r.p.)	Pass
RSS-139, 4.2	Spurious emissions at RF antenna connector	Pass
RSS-139, 4.2	Radiated spurious emissions (conducted and radiated)	Pass
RSS-170, 5.3	Transmitter output power and Equivalent Isotropic Radiated Power (e.i.r.p.)	Pass
RSS-170, 5.4	Spurious emissions at RF antenna connector	Pass
RSS-170, 5.4	Radiated spurious emissions (conducted and radiated)	Pass
RSS-Gen, 6.7	Occupied bandwidth	Pass

Notes: Only tests requested by the client have been performed

[1]EUT transmits within 1930–1995 MHz frequency range

[2]EUT employs digital modulation (QPSK to 256-QAM)

ATC Base Station Equipment operating in bands 2000–2020 MHz and 2180–2200 MHz

The unwanted emissions of ATC base station equipment transmitting in the bands 2000–2020 MHz and 2180–2200 MHz shall comply with the following:	(1) The power of any unwanted emissions at frequencies outside the equipment's operating frequency block shall be attenuated below the transmitter power P (dBW), by 43 + 10 log p (watts), dB. (2) For equipment operating in the band 2180–2200 MHz, in addition to (1), the power of any emissions on all frequencies between 2200 MHz and 2290 MHz shall not exceed an e.i.r.p. of −100.6 dBW/4 kHz (−70.6 dBm/4 kHz).*

*** This requirement is for implementation and is enforced at the time of licensing. Therefore, results are not included in this report.**

Section 3. Equipment under test (EUT) details

3.1 EUT information

Product name	AIR 1641
Model	AIR 1641 B2/25a B66a
Part number	KRD 901 800/1
Revision	R2B
Serial number	E23B853551
Antenna ports	16 TX/RX Ports
RF BW / IBW	B25 IBW DL: 65 MHz B25 IBW UL: 65 MHz B66 IBW DL: 90 MHz B66 IBW UL: 70 MHz
FDD	B2/25: 80 MHz B66: 400 MHz
Frequency	B25 TX (DL): 1930–1995 MHz B25 RX (UL): 1850–1915 MHz B66 TX (DL): 2110–2200 MHz B66 RX (UL): 1710–1780 MHz
Nominal O/P per Antenna port	20 W (43 dBm): 10 W per Band
Nominal O/P per Band	Single Carrier: 1 × 10 W (40 dBm) 2 Carrier: 2 × 5 W (40 dBm total) 3 Carrier: 2 × 3.33 W (40 dBm total)
Accuracy (nominal)	±0.1 ppm
Nominal voltage	−48 V_{DC} @ 40 A
RAT	LTE: SC, MC (LTE+NB-IoT (GB, IB)) NR: SC, MC
Modulation	LTE: QPSK, 16 QAM, 64 QAM, 256 QAM NR: QPSK, 16 QAM, 64 QAM, 256 QAM
Channel bandwidth	LTE: 5, 10, 15, 20 MHz NR: 5, 10, 15, 20 MHz
Channel bandwidth LTE + NB-IoT	LTE + NB-IoT: GB, IB (200 kHz) LTE BW: 5, 10, 15, 20 MHz
Maximum combined OBW per port	B25: 65 MHz B66: 90 MHz
CPRI	10 Gbps
Channel raster	LTE: 100 kHz NR: 100 kHz
Regulatory requirements	Radio: FCC Part 2, 24, 27, RSS-Gen, RSS-133, RSS-139, (RSS-170 / IC P9 Licensing Agreement AWS-4)
	EMC: FCC Part 15, ICES-003
	Safety: IEC/EN 62368-1, UL/CSA 62368-1 IEC/EN 60950-22, UL 50E /CAN/CSA, IEC/EN 60529, Type 3 Enclosure
Emission Designator	LTE: 5M00W7D, 10M0W7D, 15M0W7D, 20M0W7D NR: 5M00W7D, 10M0W7D, 15M0W7D, 20M0W7D
Supported Configurations	Single Antenna, TX Diversity, MIMO, Carrier Aggregation, Ericsson Spectral Sharing (ESS)
Operating temperature	−40 °C to +55 °C
Total Power based on IBW	160W/Band – Total / Radio: 320W
Supported carrier / port	LTE: (1–3) NR: (1–3) LTE + NB-IoT: GB (1–2), IB (1–2)

3.2 Product description and theory of operation

EUT description of the methods used to exercise the EUT and all relevant ports:

Description/theory of operation	The AIR 1641 B2/25a B66a (KRD 901 800/1) is a multi-standard remote Dual Band radio forming part of the Ericsson RBS (Radio Base Station) equipment. The AIR (Antenna Integrated Radio) 1641 provides radio access for mobile and fixed devices and is designed for the outdoor environment. The AIR 1641 operates over 2 bands (Band 2/25 and Band 66) via 16 TX/RX ports connected directly into an integrated antenna. Radio unit installation is designed for pole, wall or mast mount options. A fiber optic interface (4) provides the RRU/RBS control and digital interface between the Radio and the RBS. The AIR 1641 product is convection cooled and shall be mounted vertically. Output RF Power is rated at 16 × 10 W (per Band). Altitude during operation: Below 4000 m The AIR 1641 is a synthesized Transceiver designed for use in the 3GPP (Third Generation Partnership Project) for LTE (Long Term Evolution) - E-UTRA Base Station and NR (New Radio). AIR 1641 B2/25a B66a is a 16TX/16RX remote radio unit (RRU). This RRU operates in Band 2/25 as defined by 3GPP. TX (DL): 1930–1995 MHz, RX (UL): 1850–1915 MHz and Band 66 TX (DL): 2110–2200 MHz, RX (UL): 1710–1780 MHz For LTE/NR, the AIR 1641 B2/25a B66a supports modulations QPSK, 16QAM, 64QAM and 256QAM. Channel Bandwidth is configurable for 5, 10, 15 or 20 MHz. The Radio transmits SRO/MRO in single carrier mode and multi carrier mode within the Band Specific IBW (Instantaneous Band Width). LTE NB-IoT is supported for IB and GB. The AIR 1641 supports single and multi-beam FD MIMO (Multiple Input Multiple Output), Carrier Aggregation and ESS/DSS). ***Test Configuration:*** KRC 161 800/1: The radio functionality and performance are evaluated without the antenna attached. This configuration replaces the antenna with the Ericsson RDNB (Radio Distribution Network Board) providing access to the RF Ports for compliance measurements. The RDNB is an ODM supplied assembly (KRE 105 341/1R) designed to plug into and support the radio equipment assessment, test and compliance verification.

Ant Description

Port	Description
ANT 1–16	RF Output ports from 1 to 16
Alarm	Alarm
Data 1	Optical Interface Data 1
Data 2	Optical Interface Data 2
Data 3	Optical Interface Data 3
Data 4	Optical Interface Data 4
DC Input	−48 V_{DC}
MMI	Display - Radio Status
GND	Ground

Physical

Dimensions	1555 mm × 635 mm × 320 mm (H × W × D)
Weight	101 kg
Operating Temperature	−40 to +55 °C
Mounting	Pole, Wall, Mast Mount
Cooling	Convection (forced air)

Software details: CXP9013268%19-R85FE

Radio Hardware Configuration

Product: KRD 901 800/1	R2B	KRC 161 800/1	R2B	Description
KRY 901 800/1	R2A	KRY 901 800/1	R2A	Radio Unit
ROA 128 6840/625	R1F	ROA 128 6840/625	R1F	Radio PCP (4)
ROA 128 6850/625	R1D	ROA 128 6850/625	R1D	FIB PCP
ROA 128 6860/625	R3D	ROA 128 6860/625	R3D	PCB PCP
KRF 901 800	R1A	KRF 901 800	R1A	Filter Unit (4)
NTB 101 0679/1	R2C	NTB 101 0679/1	R2C	Parts
KRY 901 850/1	R1D	KRY 901 850/1	R1D	I/O Assembly
ROA 128 6850/99	R1C	ROA 128 6950/99	R1C	PCB SFP Daughter Card
NTB 101 0780/1	R1C	NTB 101 0780/1	R1C	Parts
KRE 105 322	R1D	KRE 105 341/1	R1C	Antenna / RDNB
NTB 101 0678/1	R3A	NTB 101 0678/1	R3A	Parts

Product Identification Label

FCC ID: TA8AKRD901800-1
IC: 287AB-AS9018001
AS9018001

3.3 EUT test details

EUT setup/configuration rationale for Down link:

RAT	Modulation	Performance Requirement	Test Model / Configuration
LTE/NR	QPSK	N/A	E-TM1.1
LTE/NR	16QAM	N/A	E-TM3.2
LTE/NR	64QAM	N/A	E-TM3.1
LTE/NR	256QAM	N/A	E-TM3.1a

LTE Single Carrier B25

Bandwidth, MHz	LTE Transmit / DL, MHz					
	B	EARFCN	M	EARFCN	T	EARFCN
5	1932.5	*66461*	1962.5	*66761*	1992.5	*67061*
10	1935.0	*66486*	1962.5	*66761*	1990.0	*67036*
15	1937.5	*66511*	1962.5	*66761*	1987.5	*67011*
20	1940.0	*66536*	1962.5	*66761*	1985.0	*66986*

Bandwidth, MHz	LTE Receive / UL, MHz					
	B	EARFCN	M	EARFCN	T	EARFCN
5	1852.5	*131997*	1882.5	*132297*	1912.5	*132597*
10	1855.0	*132022*	1882.5	*132297*	1910.0	*132572*
15	1857.5	*132047*	1882.5	*132297*	1907.5	*132547*
20	1860.0	*132072*	1882.5	*132297*	1905.0	*132522*

NR Single Carrier B25

Bandwidth, MHz	Transmit / DL, MHz					
	B	NR-ARFCN	M	NR-ARFCN	T	NR-ARFCN
5	1932.5	*386500*	1962.5	*392500*	1992.5	*398500*
10	1935.0	*387000*	1962.5	*392500*	1990.0	*398000*
15	1937.5	*387500*	1962.5	*392500*	1987.5	*397500*
20	1940.0	*388000*	1962.5	*392500*	1985.0	*397000*

Bandwidth, MHz	Receive / UL, MHz					
	B	NR-ARFCN	M	NR-ARFCN	T	NR-ARFCN
5	1852.5	*370500*	1882.5	*376500*	1912.5	*382500*
10	1855.0	*371000*	1882.5	*376500*	1910.0	*382000*
15	1857.5	*371500*	1882.5	*376500*	1907.5	*381500*
20	1860.0	*372000*	1882.5	*376500*	1905.0	*381000*

LTE Single Carrier B66

Bandwidth, MHz	LTE Transmit / DL, MHz					
	B	EARFCN	M	EARFCN	T	EARFCN
5	2112.5	*66461*	2155.0	*66886*	2197.5	*67311*
10	2115.0	*66486*	2155.0	*66886*	2195.0	*67286*
15	2117.5	*66511*	2155.0	*66886*	2192.5	*67261*
20	2120.0	*66536*	2155.0	*66886*	2190.0	*67236*

Bandwidth, MHz	LTE Receive / UL, MHz					
	B	EARFCN	M	EARFCN	T	EARFCN
5	1712.5	*131997*	1745.0	*132322*	1777.5	*132647*
10	1715.0	*132022*	1745.0	*132322*	1775.0	*132622*
15	1717.5	*132047*	1745.0	*132322*	1772.5	*132597*
20	1720.0	*132072*	1745.0	*132322*	1770.0	*132572*

EUT test details, continued

NR Single Carrier B66

Bandwidth, MHz	Transmit / DL, MHz					
	B	NR-ARFCN	M	NR-ARFCN	T	NR-ARFCN
5	2112.5	*422500*	2155.0	*431000*	2197.5	*439500*
10	2115.0	*423000*	2155.0	*431000*	2195.0	*439000*
15	2117.5	*423500*	2155.0	*431000*	2192.5	*438500*
20	2120.0	*424000*	2155.0	*431000*	2190.0	*438000*

Bandwidth, MHz	Receive / UL, MHz					
	B	NR-ARFCN	M	NR-ARFCN	T	NR-ARFCN
5	1712.5	*342500*	1755.0	*351000*	1797.5	*359500*
10	1715.0	*343000*	1755.0	*351000*	1795.0	*359000*
15	1717.5	*343500*	1755.0	*351000*	1792.5	*358500*
20	1720.0	*344000*	1755.0	*351000*	1790.0	*358000*

B25 LTE Multi-Carrier for Band Edge Emissions:

Bandwidth, MHz	Transmit / DL, MHz								
	B1	EARFCN	B2	EARFCN		T2	EARFCN	T1	EARFCN
5	1932.5	*66461*	1937.5	*66511*		1987.5	*67011*	1992.5	*67061*
10	1935.0	*66486*	1945.0	*66586*		1980.0	*66936*	1990.0	*67036*
15	1937.5	*66511*	1952.5	*66661*		1972.5	*66861*	1987.5	*67011*
20	1940.0	*66536*	1960.0	*66736*		1965.0	*66786*	1985.0	*66986*

Bandwidth, MHz	Receive / UL, MHz								
	B1	EARFCN	B2	EARFCN		T2	EARFCN	T1	EARFCN
5	1852.5	*131997*	1857.5	*132047*		1907.5	*132547*	1912.5	*132597*
10	1855.0	*132022*	1865.0	*132122*		1900.0	*132472*	1910.0	*132572*
15	1857.5	*132047*	1872.5	*132197*		1892.5	*132397*	1907.5	*132547*
20	1860.0	*132072*	1880.0	*132272*		1885.0	*132322*	1905.0	*132522*

B25 NR Multi-Carrier for Band Edge Emissions:

Bandwidth, MHz	Transmit / DL, MHz								
	B1	NR-ARFCN	B2	NR-ARFCN		T2	NR-ARFCN	T1	NR-ARFCN
5	1932.5	*386500*	1937.5	*387500*		1987.5	*397500*	1992.5	*398500*
10	1935.0	*387000*	1945.0	*389000*		1980.0	*396000*	1990.0	*398000*
15	1937.5	*387500*	1952.5	*390500*		1972.5	*394500*	1987.5	*397500*
20	1940.0	*388000*	1960.0	*392000*		1965.0	*393000*	1985.0	*397000*

Bandwidth, MHz	Receive / UL, MHz								
	B1	NR-ARFCN	B2	NR-ARFCN		T2	NR-ARFCN	T1	NR-ARFCN
5	1852.5	*370500*	1857.5	1852.5		1907.5	*381500*	1912.5	*382500*
10	1855.0	*371000*	1865.0	1855.0		1900.0	*380000*	1910.0	*382000*
15	1857.5	*371500*	1872.5	1857.5		1892.5	*378500*	1907.5	*381500*
20	1860.0	*372000*	1880.0	1860.0		1885.0	*377000*	1905.0	*381000*

EUT test details, continued

B66 LTE Multi-Carrier for Band Edge Emissions:

Bandwidth, MHz	Transmit / DL, MHz							
	B1	EARFCN	B2	EARFCN		T2	EARFCN	T1	EARFCN
5	2112.5	***66461***	2117.5	***66511***		2192.5	***67261***	2197.5	***67311***
10	2115.0	***66486***	2125.0	***66586***		2185.0	***67186***	2195.0	***67286***
15	2117.5	***66511***	2132.5	***66661***		2177.5	***67111***	2192.5	***67261***
20	2120.0	***66536***	2140.0	***66736***		2170.0	***67036***	2190.0	***67236***

Bandwidth, MHz	Receive / UL, MHz							
	B1	EARFCN	B2	EARFCN		T2	EARFCN	T1	EARFCN
5	1712.5	*131997*	1717.5	*132047*		1772.5	*132597*	1777.5	*132647*
10	1715.0	*132022*	1725.0	*132122*		1765.0	*132522*	1775.0	*132622*
15	1717.5	*132047*	1732.5	*132197*		1757.5	*132447*	1772.5	*132597*
20	1720.0	*132072*	1740.0	*132272*		1750.0	*132372*	1770.0	*132572*

B66 NR Multi-Carrier for Band Edge Emissions:

Bandwidth, MHz	Transmit / DL, MHz							
	B1	NR-ARFCN	B2	NR-ARFCN		T2	NR-ARFCN	T1	NR-ARFCN
5	2112.5	*422500*	2117.5	*423500*		2192.5	*438500*	2197.5	*439500*
10	2115.0	*423000*	2125.0	*425000*		2185.0	*437000*	2195.0	*439000*
15	2117.5	*423500*	2132.5	*426500*		2177.5	*435500*	2192.5	*438500*
20	2120.0	*424000*	2140.0	*428000*		2170.0	*434000*	2190.0	*438000*

Bandwidth, MHz	Receive / UL, MHz							
	B1	NR-ARFCN	B2	NR-ARFCN		T2	NR-ARFCN	T1	NR-ARFCN
5	**1712.5**	***342500***	**1717.5**	***343500***		1797.5	*359500*	1792.5	*358500*
10	**1715.0**	***343000***	**1725.0**	***345000***		1795.0	*359000*	1785.0	*357000*
15	**1717.5**	***343500***	**1732.5**	***346500***		1792.5	*358500*	1777.5	*355500*
20	**1720.0**	***344000***	**1740.0**	***348000***		1790.0	*358000*	1770.0	*354000*

B25 LTE Multiple-Carriers for spurious emissions (IBW=65MHz):

Bandwidth (MHz)	Transmit / DL (MHz)			
	C1	*EARFCN*	C2	*EARFCN*
5	1932.5	*66461*	1992.5	*67061*
10	1935.0	*66486*	1990.0	*67036*
15	1937.5	*66511*	1987.5	*67011*
20	1940.0	*66536*	1985.0	*66986*

Bandwidth (MHz)	Receive / UL (MHz)			
	C1	*EARFCN*	C2	*EARFCN*
5	1852.5	*131997*	1912.5	*132597*
10	1855.0	*132022*	1910.0	*132572*
15	1857.5	*132047*	1907.5	*132547*
20	1860.0	*132072*	1905.0	*132522*

EUT test details, continued

B25 NR Multiple-Carriers for spurious emissions (IBW=65MHz):

Bandwidth (MHz)	Transmit / DL (MHz)					
	C1	*NR-ARFCN*	C2	*NR-ARFCN*	C3	*NR-ARFCN*
5	1932.5	*386500*	1937.5	*387500*	1992.5	*398500*
10	1935.0	*387000*	1945.0	*389000*	1990.0	*398000*
15	1937.5	*387500*	1952.5	*390500*	1987.5	*397500*
20	1940.0	*388000*	1960.0	*392000*	1985.0	*397000*

Bandwidth (MHz)	Receive / UL (MHz)					
	C1	*NR-ARFCN*	C2	*NR-ARFCN*	C3	*NR-ARFCN*
5	1852.5	*370500*	1857.5	*371500*	1912.5	*382500*
10	1855.0	*371000*	1865.0	*373000*	1910.0	*382000*
15	1857.5	*371500*	1872.5	*374500*	1907.5	*381500*
20	1860.0	*372000*	1880.0	*376000*	1905.0	*381000*

B66 LTE Multiple-Carriers for spurious emissions (IBW=70)

Bandwidth (MHz)	Transmit / DL (MHz)			
	C1	*EARFCN*	C2	*EARFCN*
5	2112.5	*66461*	2177.5	*67111*
10	2115.0	*66486*	2175.0	*67086*
15	2117.5	*66511*	2172.5	*67061*
20	2120.0	*66536*	2170.0	*67036*

Bandwidth (MHz)	Receive / UL (MHz)			
	C1	*EARFCN*	C2	*EARFCN*
5	1712.5	*131997*	1777.5	*132647*
10	1715.0	*132022*	1775.0	*132622*
15	1717.5	*132047*	1772.5	*132597*
20	1720.0	*132072*	1770.0	*132572*

B66 NR Multiple-Carriers for spurious emissions (IBW=65MHz):

Bandwidth (MHz)	Transmit / DL (MHz)					
	C1	*NR-ARFCN*	C2	*NR-ARFCN*	C3	*NR-ARFCN*
5	2112.5	*422500*	2117.5	*423500*	2197.5	*439500*
10	2115.0	*423000*	2125.0	*425000*	2195.0	*439000*
15	2117.5	*423500*	2132.5	*426500*	2192.5	*438500*
20	2120.0	*424000*	2140.0	*428000*	2190.0	*438000*

EUT test details, continued

Bandwidth (MHz)	Receive / UL (MHz)					
	C1	*NR-ARFCN*	C2	*NR-ARFCN*	C3	*NR-ARFCN*
5	1712.5	*342500*	1717.5	*343500*	1797.5	*359500*
10	1715.0	*343000*	1725.0	*345000*	1795.0	*359000*
15	1717.5	*343500*	1732.5	*346500*	1792.5	*358500*
20	1720.0	*344000*	1740.0	*348000*	1790.0	*358000*

3.4 EUT setup diagram

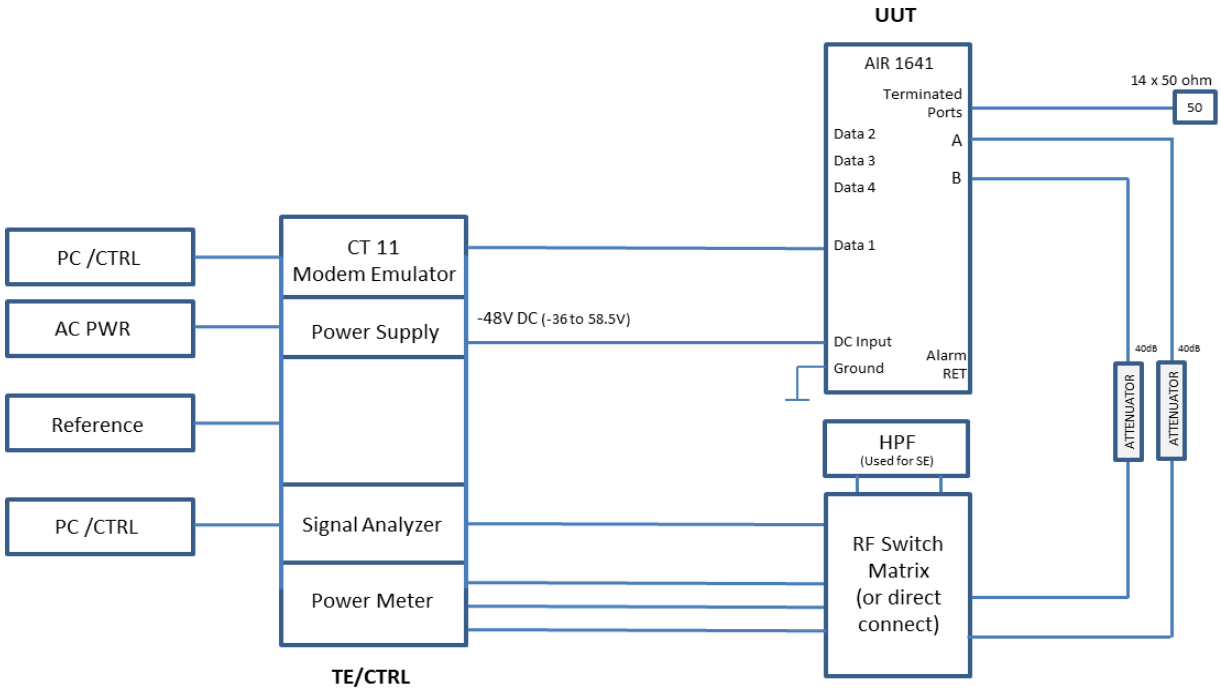

Figure 3.4-1: *Setup diagram – Radio Compliance*

3.5 Setup photographs

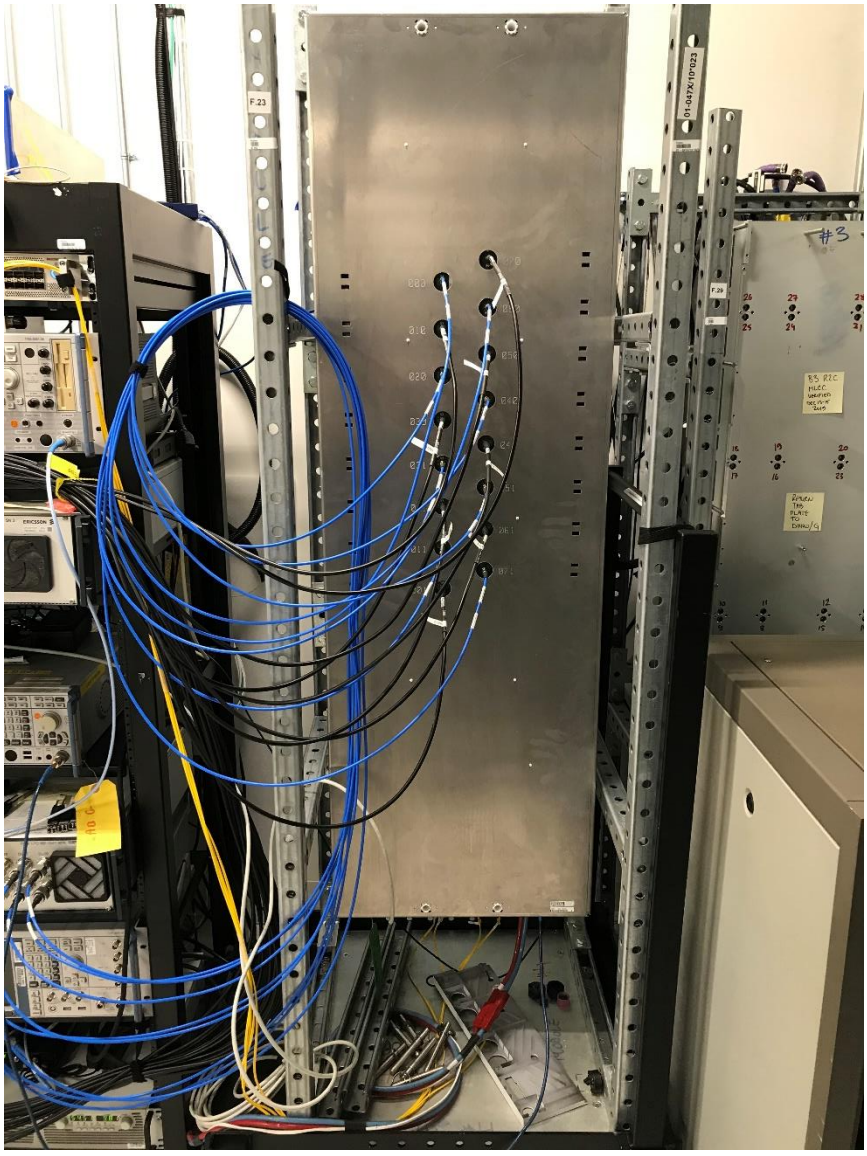

Figure 3.5-1: *Set up photo for Radio Compliance Testing*

3.6 Setup photographs, continued

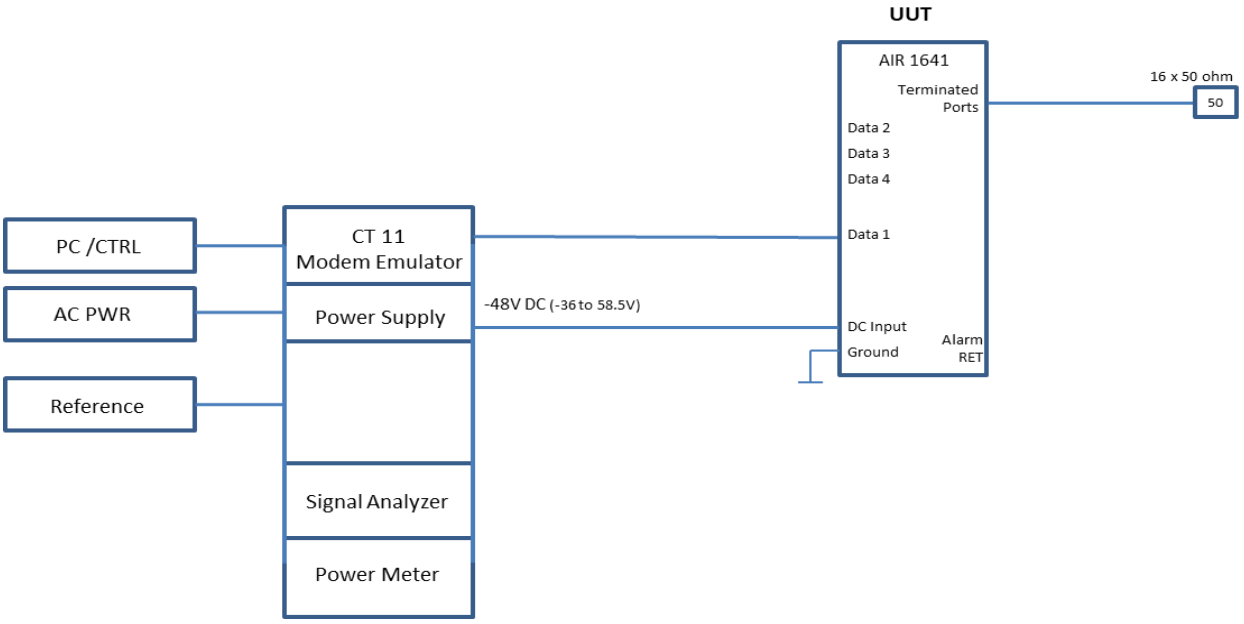

Figure 3.6-1: *EUT Set-up diagram for Radiated Compliance Testing*

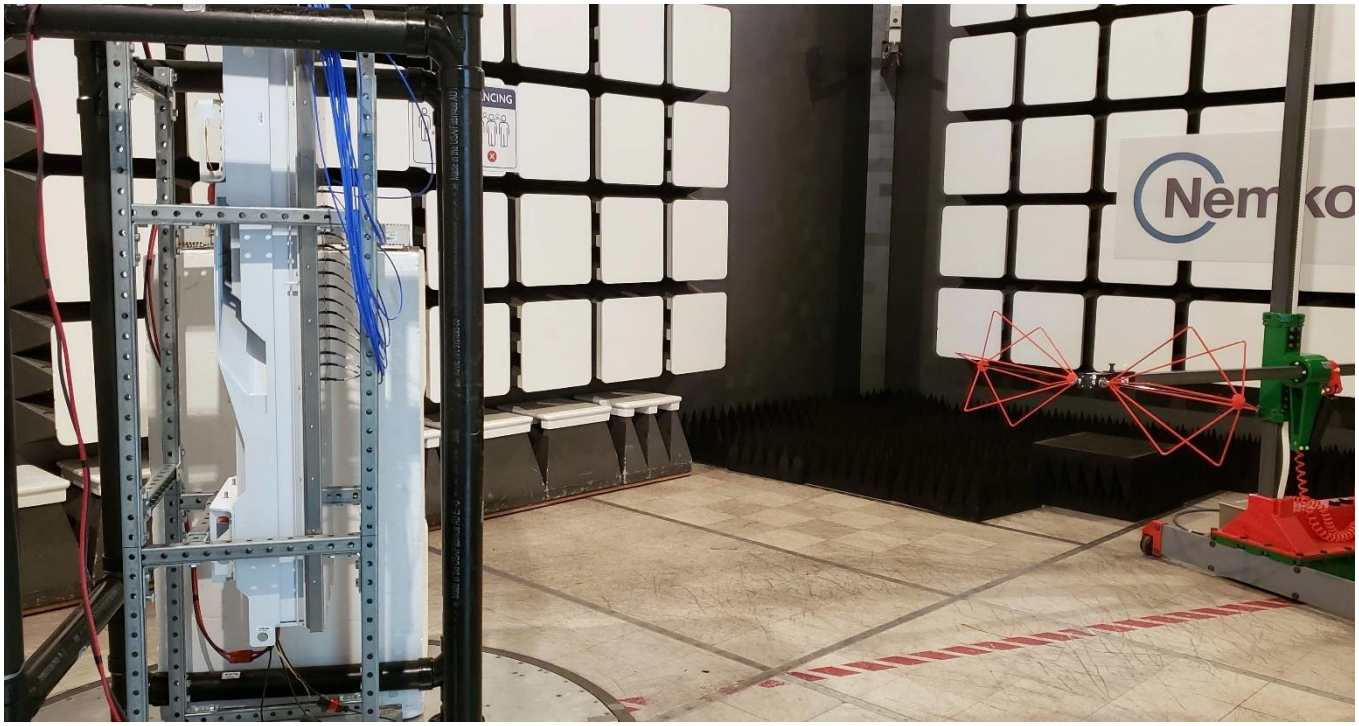

Figure 3.6-2: *EUT Set-up photo for Radiated Compliance Testing*

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

The testing was performed in accordance with the test plan, which suggested to measure output power on all 16 antenna ports, to find the port with the highest output power and perform the rest of the testing on that one representing antenna port.

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	860–1060 mbar

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Test name	Measurement uncertainty, dB
All antenna port measurements	0.55
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: *Equipment list*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	April 24, 2021
Flush mount turntable	Sunol	FM2022	FA002082	—	NCR
Controller	Sunol	SC104V	FA002060	—	NCR
Antenna mast	Sunol	TLT2	FA002061	—	NCR
DC Power source	Ametek	SGA80X125C-0AAA	FA002737	—	VOU
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 26	FA002043	1 year	November 6, 2021
Biconical antenna (30–300 MHz)	Sunol	BC2	FA002078	1 year	April 30, 2021
Log periodic antenna (200–5000 MHz)	Sunol	LP5	FA002077	1 year	April 30, 2021
Horn antenna (18–40 GHz)	EMCO	3116	FA001847	1 year	May 7, 2021
Pre-amplifier (18–26 GHz)	Narda	BBS-1826N612	FA001550	—	VOU
Horn antenna (1–18 GHz)	EMCO	3115	FA000825	1 year	April 30, 2021
Preamp (1–18 GHz)	ETS Lindgren	124334	FA002873	1 year	October 13, 2021
50 Ω coax cable	C.C.A.	None	FA002556	1 year	April 9, 2021
High pass filter (3-18 GHz)	Thilithic Inc.	6HC3000/18000-1.3-KK	FA002231	—	VOU
Spectrum signal analyzer (Ericsson)	Keysight	PXA N9030B	BAMS1002036362	1 year	24 April 2021
Testing Equipment*	Ericsson	CT11	T01G495060	—	NCR

Notes: NCR - no calibration required, VOU - verify on use.

* Testing equipment (CT11) is the test equipment that drives the radios traffic.

Section 8. Testing data

8.1 Maximum output power at RF antenna connector (Band 66)

8.1.1 Definitions and limits

FCC §27.50(d) Operation within the bands: 2110–2155 MHz and 2155–2180 MHz.

(1) The power of each fixed or base station transmitting in the 1995–2000 MHz, 2110–2155 MHz, 2155–2180 MHz or 2180–2200 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to:

(i) An equivalent isotropically radiated power (EIRP) of 3280 watts when transmitting with an emission bandwidth of 1 MHz or less;

(ii) An EIRP of 3280 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

(2) The power of each fixed or base station transmitting in the 1995–2000 MHz, the 2110–2155 MHz 2155–2180 MHz band, or 2180–2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:

(i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;

(ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

(3) A licensee operating a base or fixed station in the 2110–2155 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must coordinate such operations in advance with all Government and non-Government satellite entities in the 2025–2110 MHz band. A licensee operating a base or fixed station in the 2110–2180 MHz band utilizing power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with the following licensees authorized to operate within 120 kilometers (75 miles) of the base or fixed station operating in this band: All Broadband Radio Service (BRS) licensees authorized under this part in the 2155–2160 MHz band and all advanced wireless services (AWS) licensees authorized to operate on adjacent frequency blocks in the 2110–2180 MHz band.

(5) Equipment employed must be authorized in accordance with the provisions of §24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

(6) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

8.1.1 Definitions and limits, continued

RSS-139, Section 4.1

The transmitter power shall be measured in terms of a root-mean-square (RMS) average value.

RSS-139, Section 6.5

Consult SRSP-513 for e.i.r.p. limits on fixed and base stations operating in the band 2110–2180 MHz.

In addition, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission.

RSS-170, Section 5.3.1

Consult SRSP-519 for e.i.r.p. limits on ATC base stations operating in the bands 2000–2020 MHz and 2180–2200 MHz.

SRSP-513, Section 5.1

5.1.1 Fixed and base stations

5.1.1.1 For fixed and base stations operating within the frequency range 2110–2180 MHz with a channel bandwidth equal to or less than 1 MHz, the maximum permissible equivalent isotropically radiated power (e.i.r.p.) is 1640 watts with an antenna height above average terrain (HAAT) up to 300 metres.

5.1.1.2 For fixed and base stations operating within the frequency range 2110–2180 MHz with a channel bandwidth greater than 1 MHz, the maximum permissible e.i.r.p. is 1640 watts/MHz e.i.r.p. (i.e. no more than 1640 watts e.i.r.p. in any 1 MHz band segment) with an antenna height above average terrain (HAAT) up to 300 metres.

5.1.1.3 Fixed and base stations located in geographic areas at a distance greater than 26 km from large or medium population centres, and transmitting within the frequency range 2110–2180 MHz, may increase their e.i.r.p. up to a maximum of 3280 watts/MHz (i.e. no more than 3280 watts e.i.r.p. in any 1 MHz band segment), with an antenna HAAT up to 300 metres.

Within 26 km of any large or medium population centre, fixed and base stations may operate at increased e.i.r.p. if more than 50% of the population within a particular sector's coverage is located outside these large and medium population centres.

Fixed and base stations with increased e.i.r.p. must not be used to provide coverage to large and medium population centres. However, some incidental coverage of these large and medium population centres by stations with increased e.i.r.p. is permitted.

This provision also applies for fixed and base stations with a channel bandwidth equal to or less than 1 MHz (i.e. the e.i.r.p. may be increased up to a maximum of 3280 watts).

5.1.1.4 Fixed and base station antenna heights above average terrain may exceed 300 metres with a reduction in e.i.r.p. The maximum permissible e.i.r.p. for installations with antenna HAAT in excess of 300 metres is given in the following table:

Table 8.1-1: *Reduction to Maximum Allowable E.I.R.P. for HAAT > 300 m*

HAAT (m)	Maximum EIRP, W/MHz
HAAT ≤ 300	1640 (or 3280[1])
300 < HAAT ≤ 500	1070
500 < HAAT ≤ 1000	490
1000 < HAAT ≤ 1500	270
1500 < HAAT ≤ 2000	160

Note: [1]for fixed and base stations with a channel bandwidth equal to or less than 1 MHz

8.1.1 Definitions and limits, continued

SRSP-519, Section 5.1

The equivalent isotropically radiated power (e.i.r.p.) of base stations shall not exceed 1640 W when transmitting with an emission bandwidth of 1 MHz or less, and 1640 W/MHz when transmitting with an emission bandwidth greater than 1 MHz.

Base stations located outside of large or medium population may increase their e.i.r.p. to a maximum of 3280 W when transmitting with an emission bandwidth of 1 MHz or less, and to 3280 W/MHz when transmitting with an emission bandwidth greater than 1 MHz.

A licensee operating a base station utilizing an e.i.r.p greater than 1640 W/MHz must coordinate in advance with all AWS–4 licensees authorized to operate on adjacent frequency blocks within the same band.

Base station antenna heights above average terrain may exceed 300 m with a corresponding reduction in e.i.r.p. in accordance with Table above

8.1.2 Test summary

Test date	January 22, 2021
Test engineer	Andrey Adelberg

8.1.3 Observations, settings and special notes

- Output power was measured with RMS power meter per ANSI C63.26 Paragraph 5.2.4.2 method. PSD was measured using method described in paragraph 5.2.4.4.
- Antenna sub-array gain is 14.5 dBi with uncorrelated signals.
- RBS (Radio Base Station) EIRP Limits are deployment dependent. To ensure compliance with legal limits detailed in section 8.1.1, RBS set up and carrier configurations are addressed during site commissioning.

Spectrum analyzer settings for PSD:

Detector mode	RMS
Resolution bandwidth	1 MHz
Video bandwidth	>RBW
Measurement mode	Power over emission bandwidth
Trace mode	Averaging
Measurement time	Auto

8.1.4 Test data

Table 8.1-2: *Output power density measurement results of a single-carrier operation for 5 MHz channel*

Remarks	Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 5 MHz, Low channel	2112.5	38.91	31.17	14.50	45.67	62.15	16.48
16QAM, 5 MHz, Low channel	2112.5	38.81	31.39	14.50	45.89	62.15	16.26
64QAM, 5 MHz, Low channel	2112.5	38.77	31.10	14.50	45.60	62.15	16.55
256QAM, 5 MHz, Low channel	2112.5	38.78	31.40	14.50	45.90	62.15	16.25
QPSK, 5 MHz, Mid channel	2155.0	39.26	31.78	14.50	46.28	62.15	15.87
QPSK, 5 MHz, High channel	2197.5	38.84	31.96	14.50	46.46	62.15	15.69

Table 8.1-3: *Total EIRP calculation for a single-carrier operation for 5 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
40.99	14.50	9.03	64.52	2831.98

Notes:
[1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 31.96 dBm/MHz. Maximum PSD sum = 31.96 dBm/MHz + 10 × $Log_{10}(8)$ = 40.99 dBm/MHz
[2] Antenna Array Column Gain = 10 × $Log_{10}(8)$
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Table 8.1-4: *Total EIRP calculation for a single Macro Narrow traffic beam operation for 5 MHz channel*

Maximum PSD sum, dBm/MHz	Directional beam gain, dBi	Total EIRP, dBm/MHz	Total EIRP, W/MHz
40.99	25.00	65.99	3971.92

Table 8.1-5: *Output power density measurement results of a single-carrier operation for 10 MHz channel*

Remarks	Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 10 MHz, Low channel	2115.0	38.85	28.61	14.50	43.11	62.15	19.04
16QAM, 10 MHz, Low channel	2115.0	38.81	29.02	14.50	43.52	62.15	18.63
64QAM, 10 MHz, Low channel	2115.0	38.78	28.00	14.50	42.50	62.15	19.65
256QAM, 10 MHz, Low channel	2115.0	38.80	28.17	14.50	42.67	62.15	19.48
QPSK, 10 MHz, Mid channel	2155.0	39.26	28.67	14.50	43.17	62.15	18.98
QPSK, 10 MHz, High channel	2195.0	38.94	28.24	14.50	42.74	62.15	19.41

Table 8.1-6: *Total EIRP calculation for a single-carrier operation for 10 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
38.05	14.50	9.03	61.58	1439.10

Notes:
[1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 29.02 dBm/MHz. Maximum PSD sum = 29.02 dBm/MHz + 10 × $Log_{10}(8)$ = 38.05 dBm/MHz
[2] Antenna Array Column Gain = 10 × $Log_{10}(8)$
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Table 8.1-7: *Total EIRP calculation for a single Macro Narrow traffic beam operation for 10 MHz channel*

Maximum PSD sum, dBm/MHz	Directional beam gain, dBi	Total EIRP, dBm/MHz	Total EIRP, W/MHz
38.05	25.00	63.05	2018.78

Test data, continued

Table 8.1-8: *Output power density measurement results of a single-carrier operation for 15 MHz channel*

Remarks	Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 15 MHz, Low channel	2117.5	38.75	26.45	14.50	40.95	62.15	21.20
16QAM, 15 MHz, Low channel	2117.5	38.79	27.97	14.50	42.47	62.15	19.68
64QAM, 15 MHz, Low channel	2117.5	38.74	26.65	14.50	41.15	62.15	21.00
256QAM, 15 MHz, Low channel	2117.5	38.77	26.44	14.50	40.94	62.15	21.21
16QAM, 15 MHz, Mid channel	2155.0	39.25	28.43	14.50	42.93	62.15	19.22
16QAM, 15 MHz, High channel	2192.5	39.01	27.88	14.50	42.38	62.15	19.77

Table 8.1-9: *Total EIRP calculation for a single-carrier operation for 15 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
37.46	14.50	9.03	60.99	1256.29

Notes:
[1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 28.43 dBm/MHz. Maximum PSD sum = 28.43 dBm/MHz + 10 × $Log_{10}(8)$ = 37.46 dBm/MHz
[2] Antenna Array Column Gain = 10 × $Log_{10}(8)$
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Table 8.1-10: *Total EIRP calculation for a single Macro Narrow traffic beam operation for 15 MHz channel*

Maximum PSD sum, dBm/MHz	Directional beam gain, dBi	Total EIRP, dBm/MHz	Total EIRP, W/MHz
37.46	25.00	62.46	1762.34

Table 8.1-11: *Output power density measurement results of a single-carrier operation for 20 MHz channel*

Remarks	Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
QPSK, 20 MHz, Low channel	2120.0	38.88	25.04	14.50	39.54	62.15	22.61
16QAM, 20 MHz, Low channel	2120.0	38.88	26.46	14.50	40.96	62.15	21.19
64QAM, 20 MHz, Low channel	2120.0	38.87	25.09	14.50	39.59	62.15	22.56
256QAM, 20 MHz, Low channel	2120.0	38.84	25.31	14.50	39.81	62.15	22.34
QPSK, 20 MHz, Mid channel	2155.0	39.22	26.36	14.50	40.86	62.15	21.29
QPSK, 20 MHz, High channel	2190.0	39.04	25.32	14.50	39.82	62.15	22.33

Table 8.1-12: *Total EIRP calculation for a single-carrier operation for 20 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
35.49	14.50	9.03	59.02	798.16

Notes:
[1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 26.46 dBm/MHz. Maximum PSD sum = 26.46 dBm/MHz + 10 × $Log_{10}(8)$ = 35.49 dBm/MHz
[2] Antenna Array Column Gain = 10 × $Log_{10}(8)$
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Table 8.1-13: *Total EIRP calculation for a single Macro Narrow traffic beam operation for 20 MHz channel*

Maximum PSD sum, dBm/MHz	Directional beam gain, dBi	Total EIRP, dBm/MHz	Total EIRP, W/MHz
35.49	25.00	60.49	1119.67

Test data, continued

Table 8.1-14: *Output power density measurement results of a two-carrier operation for 5 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2112.5 + 2117.5	38.74	28.44	14.50	42.94	62.15	19.21
2152.5 + 2157.5	39.15	28.53	14.50	43.03	62.15	19.12
2192.5 + 2197.5	38.85	28.31	14.50	42.81	62.15	19.34

Table 8.1-15: *Total EIRP calculation for a two-carrier operation for 5 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
37.56	14.50	9.03	61.09	1285.55

Notes: [1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 28.53 dBm/MHz. Maximum PSD sum = 28.53 dBm/MHz + 10 × Log_{10}(8) = 37.56 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Table 8.1-16: *Output power density measurement results of a two-carrier operation for 10 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2115 + 2125	38.80	25.37	14.50	39.87	62.15	22.28
2150 + 2160	39.15	25.48	14.50	39.98	62.15	22.17
2185 + 2195	38.94	25.57	14.50	40.07	62.15	22.08

Table 8.1-17: *Total EIRP calculation for a two-carrier operation for 10 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
34.60	14.50	9.03	58.13	650.26

Notes: [1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 25.57 dBm/MHz. Maximum PSD sum = 25.57 dBm/MHz + 10 × Log_{10}(8) = 34.60 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Test data, continued

Table 8.1-18: *Output power density measurement results of a two-carrier operation for 15 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2117.5 + 2132.5	38.90	24.92	14.50	39.42	62.15	22.73
2147.5 + 2162.5	39.16	25.05	14.50	39.55	62.15	22.6
2177.5 + 2192.5	38.99	25.36	14.50	39.86	62.15	22.29

Table 8.1-19: *Total EIRP calculation for a two-carrier operation for 15 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
34.39	14.50	9.03	57.92	619.57

Notes:
[1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 25.36 dBm/MHz. Maximum PSD sum = 25.36 dBm/MHz + 10 × Log_{10}(8) = 34.39 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Table 8.1-20: *Output power density measurement results of a two-carrier operation for 20 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2120 + 2140	39.00	22.43	14.50	36.93	62.15	25.22
2145 + 2165	39.19	22.49	14.50	36.99	62.15	25.16
2170 + 2190	39.08	22.71	14.50	37.21	62.15	24.94

Table 8.1-21: *Total EIRP calculation for a two-carrier operation for 20 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
31.74	14.50	9.03	55.27	336.58

Notes:
[1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 22.71 dBm/MHz. Maximum PSD sum = 22.71 dBm/MHz + 10 × Log_{10}(8) = 31.74 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Test data, continued

Table 8.1-22: *Output power density measurement results of a three-carrier operation for 5 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2112.5 + 2117.5 + 2122.5	38.86	26.45	14.50	40.95	62.15	21.2
2150.0 + 2155.0 + 2160.0	39.24	26.97	14.50	41.47	62.15	20.68
2187.5 + 2192.5 + 2197.5	39.01	26.53	14.50	41.03	62.15	21.12

Table 8.1-23: *Total EIRP calculation for a three-carrier operation for 5 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
36.00	14.50	9.03	59.53	897.61

Notes: [1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 26.97 dBm/MHz. Maximum PSD sum = 26.97 dBm/MHz + 10 × Log_{10}(8) = 36 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Table 8.1-24: *Output power density measurement results of a three-carrier operation for 10 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2115 + 2125 + 2135	39.01	23.53	14.50	38.03	62.15	24.12
2145 + 2155 + 2165	39.20	23.73	14.50	38.23	62.15	23.92
2175 + 2185 + 2195	39.09	23.81	14.50	38.31	62.15	23.84

Table 8.1-25: *Total EIRP calculation for a three-carrier operation for 10 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
32.84	14.50	9.03	56.37	433.60

Notes: [1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 23.81 dBm/MHz. Maximum PSD sum = 23.81 dBm/MHz + 10 × Log_{10}(8) = 32.84 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Test data, continued

Table 8.1-26: *Output power density measurement results of a three-carrier operation for 15 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2117.5 + 2132.5 + 2147.5	39.03	23.48	14.50	37.98	62.15	24.17
2140.0 + 2155.0 + 2170.0	39.17	23.70	14.50	38.20	62.15	23.95
2162.5 + 2177.5 + 2192.5	39.10	23.41	14.50	37.91	62.15	24.24

Table 8.1-27: *Total EIRP calculation for a three-carrier operation for 15 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
32.73	14.50	9.03	56.26	422.76

Notes: [1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 23.70 dBm/MHz. Maximum PSD sum = 23.70 dBm/MHz + 10 × Log_{10}(8) = 32.73 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Table 8.1-28: *Output power density measurement results of a three-carrier operation for 20 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2120 + 2140 + 2160	39.05	21.00	14.50	35.50	62.15	26.65
2135 + 2155 + 2175	39.12	21.20	14.50	35.70	62.15	26.45
2150 + 2170 + 2190	39.12	20.94	14.50	35.44	62.15	26.71

Table 8.1-29: *Total EIRP calculation for a three-carrier operation for 20 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
30.23	14.50	9.03	53.76	237.73

Notes: [1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 21.20 dBm/MHz. Maximum PSD sum = 21.20 dBm/MHz + 10 × Log_{10}(8) = 30.23 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Test data, continued

Table 8.1-30: *Output power density measurement results of LTE + NR* operation for 5 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2112.5 + 2117.5	38.82	28.38	14.50	42.88	62.15	19.27
2152.5 + 2157.5	39.25	29.04	14.50	43.54	62.15	18.61
2192.5 + 2197.5	38.94	28.64	14.50	43.14	62.15	19.01

Note: *NR 5 MHz + LTE 5 MHz

Table 8.1-31: *Total EIRP calculation for LTE + NR operation for 5 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
38.07	14.50	9.03	61.60	1445.74

Notes:
[1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 29.04 dBm/MHz. Maximum PSD sum = 29.04 dBm/MHz + 10 × Log_{10}(8) = 38.07 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Table 8.1-32: *Output power density measurement results of LTE + NR* operation for 10 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2115 + 2125	38.90	25.39	14.50	39.89	62.15	22.26
2150 + 2160	39.21	25.72	14.50	40.22	62.15	21.93
2185 + 2195	38.95	25.86	14.50	40.36	62.15	21.79

Note: *NR 10 MHz + LTE 10 MHz

Table 8.1-33: *Total EIRP calculation for LTE + NR operation for 10 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
34.89	14.50	9.03	58.42	695.17

Notes:
[1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 25.86 dBm/MHz. Maximum PSD sum = 25.86 dBm/MHz + 10 × Log_{10}(8) = 34.89 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Test data, continued

Table 8.1-34: *Output power density measurement results of LTE + NR* operation for 15 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2117.5 + 2132.5	38.92	24.69	14.50	39.19	62.15	22.96
2147.5 + 2162.5	39.17	25.12	14.50	39.62	62.15	22.53
2177.5 + 2192.5	39.01	25.00	14.50	39.50	62.15	22.65

Note: *NR 15 MHz + LTE 15 MHz

Table 8.1-35: *Total EIRP calculation for LTE + NR operation for 15 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
34.15	14.50	9.03	57.68	586.26

Notes:
[1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 25.12 dBm/MHz. Maximum PSD sum = 25.12 dBm/MHz + 10 × Log_{10}(8) = 34.15 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain

Table 8.1-36: *Output power density measurement results of LTE + NR* operation for 20 MHz channel*

Frequency, MHz	Total RF power, dBm	RF power density, dBm/MHz	Antenna gain, dBi	EIRP, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2120 + 2140	38.97	22.71	14.50	37.21	62.15	24.94
2145 + 2165	39.12	22.90	14.50	37.40	62.15	24.75
2170 + 2190	39.06	22.59	14.50	37.09	62.15	25.06

Note: *NR 20 MHz + LTE 20 MHz

Table 8.1-37: *Total EIRP calculation for LTE + NR operation for 20 MHz channel*

Maximum PSD sum[1], dBm/MHz	Antenna Gain, dBi	Antenna Array Column Gain[2], dB	EIRP per polarization[3], dBm/MHz	EIRP per polarization, W/MHz
31.93	14.50	9.03	55.46	351.63

Notes:
[1] Linear sum of 8 ports of each polarization was based on the worst-case scenario, then all ports transmit at the maximum found power density of 22.90 dBm/MHz. Maximum PSD sum = 22.90 dBm/MHz + 10 × Log_{10}(8) = 31.93 dBm/MHz
[2] Antenna Array Column Gain = 10 × Log_{10}(8)
[3] EIRP = PSD Sum + Antenna Gain + Antenna Array Column Gain