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Radio Test report – Radio 4890HP 48B2/25 48B66 M01

Report ID
REP013195

Project ID
PRJ0038757

Applicant:
Ericsson Canada Inc.

Product name:
Radio Unit

Model (PMN):
Radio 4890HP 48B2/B25 48B66 M01

Part number:
KRC 161 983/31

FCC Identifier
TA8AKRC161983-3

ISED certification number:
IC: 287AB-AS1619833

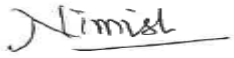
HVIN:
AS1619833

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 4, September 29, 2022	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710–1780 MHz and 2110–2200 MHz	Yes

Date of issue: July 25, 2023

Nimish Kapoor, EMC/RF Test Specialist
Tested by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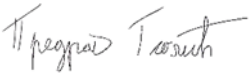
Predrag Golic, EMC/RF Test Specialist
Tested by


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 report 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 4, September 29, 2022	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710–1780 MHz and 2110–2200 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-Gen, Issue 5, April 2018	General Requirements for Compliance of Radio Apparatus

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 (**REP013195**) applies to the *Radio 4890HP 48B2/B25 48B66 M01* with part number *KRC 161 983/31*. See "Summary of test results" for full details.

EUT Configuration(s) SRO/MRO:

B2/B25:
LTE : 5, 10, 15, 20 MHz, Max 6 Carriers
NR : 5, 10, 15, 20, 25, 30, 40 MHz, Max 6 Carriers
LTE + NR

B66:
LTE : 5, 10, 15, 20 MHz, Max 6 Carriers
NR : 5, 10, 15, 20, 25, 30, 40 MHz, Max 6 Carriers
LTE + NR

1.5 Test report revision history

Table 1.5-1: *Test report revision history*

Report ID	Date of issue	Details of changes made to test report
REP013195	July 25, 2023	Original report issued

Section 2. Summary of test results

2.1 Testing location

Test location (s)	Ottawa

2.2 Testing period

Test start date	June 26, 2023	Test end date	June 30, 2023

2.3 Sample information

Receipt date	June 26, 2023	Nemko sample ID number	PRJ00387570001

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
§27.54	Frequency stability	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
§24.235	Frequency stability	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 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, 6.3	Frequency stability	Pass
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, 5.3	Types of Modulation	Pass[2]
RSS-139, 5.4	Frequency stability	Pass
RSS-139, 5.5	Transmitter output power and Equivalent Isotropic Radiated Power (e.i.r.p.)	Pass
RSS-139, 5.6	Unwanted emission limits	Pass
RSS-139, 5.6	Radiated spurious emissions (conducted and radiated)	Pass
RSS-Gen, 6.7	Occupied bandwidth	Pass
RSS-Gen, 7.4	Receiver conducted spurious emissions	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)

Section 3. Equipment under test (EUT) details

3.1 EUT information

Product name	Radio Unit	
Model	Radio 4890HP 48B2/B25 48B66 M01	
Part number	KRC 161 983/3	
Revision	R1B	
Serial number	E23E657242, E23E674486 (for radiated spurious)	
Antenna ports	4 TX/RX Ports for B66 4 TX/RX Ports for B2/B25	
RF BW / IBW	B2/B25 IBW DL: 65 MHz B2/B25 IBW UL: 65 MHz	B66 IBW DL: 90 MHz B66 IBW UL: 70 MHz
FDD	B2/B25: 80 MHz	B66: 400 MHz
Frequency	B2/B25 TX (DL): 1930–1995 MHz B2/B25 RX (UL): 1850–1915 MHz	B66 TX (DL): 2110–2200 MHz B66 RX (UL): 1710–1780 MHz
Nominal O/P per Antenna port	60 W (47.78dBm)	
Nominal O/P per Anternna port per Band	Single Carrier: 1 x 60 W (47.78 dBm/Carrier) 2 Carrier: 2 x 30 W (44.77 dBm/Carrier) 3 Carrier: 3 x 20 W (43.01 dBm/Carrier) 6 Carrier: 6 x 10W (40.00 dBm/Carrier)	
Accuracy (nominal)	±0.1 ppm	
Nominal voltage	−48 V_{DC} (-36 to -58.5 VDC, max 40.5 A at 42 V)	
RAT	B2/B25: LTE, (LTE+NB-IoT (IB, GB)), NR	B66: LTE, (LTE+NB-IoT (IB, GB)), NR
Modulation	LTE: QPSK, 16 QAM, 64 QAM, 256 QAM NR: QPSK, 16 QAM, 64 QAM, 256 QAM NB-IoT: QPSK	
Channel bandwidth	LTE: 5, 10, 15, 20 MHz NR: 5, 10, 15, 20, 25, 30, 40 MHz	
Channel bandwidth LTE + NB-IoT	LTE+NB-IoT IB: 5, 10, 15, 20 MHz LTE+NB-IoT GB: 10, 15, 20 MHz NB-IoT (GB, IB): 200 kHz	
Maximum combined OBW per port	B2/B25: 65 MHz	B66: 90 MHz
CPRI	2.5 - 25 Gbps (Data 1, 2)	

Channel raster	LTE: 100 kHz NR: 100 kHz		
Regulatory requirements	Radio: FCC Part 2, 24, 27, RSS-Gen, RSS-133, RSS-139		
	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, 25M0W7D, 30M0W7D, 40M0W7D		
Supported Configurations	Single Antenna, TX Diversity, MIMO, Carrier Aggregation, Ericsson Spectral Sharing (ESS)		
Operating temperature	−40 °C to +55 °C		
Max RF Power	480 W total / radio (= 8 ports x 60W)		
Supported carriers /band/ port SRO/MRO	Up to 6 carriers. LTE: Max 6 NR: Max 6 LTE + NB-IoT: GB Max 2, IB Max 2		
Carrier Configuration:	B2/25 SRO: LTE, NR MRO: NR+LTE		B66 SRO: LTE, NR MRO: NR+LTE
RAT SC Carrier Power (max)	RAT	BW	PWR/Carrier(max)
	LTE/NR	5 MHz	40 W
	LTE/NR	10 MHz	60 W
	LTE/NR	15 MHz	60 W
	LTE/NR	20 MHz	60 W
	NR	25 MHz	60 W
	NR	30 MHz	60 W
	NR	40 MHz	60 W

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

Radio 4890HP 48B2/B25 48B66 M01 is a multi-standard remote Dual Band radio forming part of the Ericsson RBS (Radio Base Station) equipment. Radio 4890HP provides radio access for mobile and fixed devices and is designed for the outdoor environment. Radio 4890HP operates over 2 bands (Band 2/25 and Band 66) via 4 TX/RX ports connected directly into an integrated antenna. Radio 4890HP transmits B2/B25 on 4 ports and B66 on separate 4 ports. Both bands receive on all 8 ports. Radio unit installation is designed for pole, wall or rail mount options. A fiber optic interface (2) provides the RRU/RBS control and digital interface between the Radio and the RBS. Radio 4890HP product is convection cooled and shall be mounted vertically.

Output RF Power is rated at 8 x 60 W. Altitude during operation: Below 4000 m.

Radio 4890HP 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).

Radio product is KRC 161 983/31 which is a SW locked customer deliverable. In some cases, tests were executed on the KRC 161 983/3 which is unlocked for Ericsson convenience.

Ports/Interface

Port	Description
A, B, C, D	RF Ports B2/B25 TX (B2/B25 B66 RX)
E, F, G, H	RF Ports B66 TX (B2/B25 B66 RX)
Data 1, 2	Optical Interface
Alarm / Fan	Alarm / Fan
AISG	AISG communition port
-48VDC	DC Input

Physical

Dimensions	Dimensions excl. protruding parts (handles, mounting bosses, radio foot, connectors, etc): 384 x 444 x 174mm (15.1" x 17.5" x 6.9") Dimensions incl. protruding parts: 398 x 523 x 179 mm (15.7" x 20.6" x 7.0")
Weight	Approximately 30.5 kg
Operating Temperature	–40 °C to +55 °C
Mounting	Vertical: Shelf and portrait, behind antenna
Cooling	Convection (Option - forced air)

Software details

CXP2021113/1_R34A112

Radio Hardware Configuration

Product: KRC 161 983/31	R1B	Description
ROX 128 7221/31	R1B	PCB ASSEMB/MOX
ROR 101 0091/25	R1C	CIRCUIT MODULE/PAX 4890 B25
ROR 101 0091/66	R1C	CIRCUIT MODULE/PAX 4890 B66
KRF 901 686	R1B	FILTER UNIT
NTB 101 1260/1	R1E	Mech parts
NTB 101 1360/5	R1B	Mech parts

Product Identification / Markings and Labels

3.3 EUT test details

EUT setup/configuration rationale for Down link:

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

LTE Single Carrier B25

Bandwidth, MHz	LTE Transmit / DL, MHz					
	B	EARFCN	M	EARFCN	T	EARFCN
5	1932.5	*8065*	1962.5	*8365*	1992.5	*8665*
10	1935.0	*8090*	1962.5	*8365*	1990.0	*8640*
15	1937.5	*8115*	1962.5	*8365*	1987.5	*8615*
20	1940.0	*8140*	1962.5	*8365*	1985.0	*8590*

Bandwidth, MHz	LTE Receive / UL, MHz					
	B	EARFCN	M	EARFCN	T	EARFCN
5	1852.5	*26065*	1882.5	*26365*	1912.5	*26665*
10	1855.0	*26090*	1882.5	*26365*	1910.0	*26640*
15	1857.5	*26115*	1882.5	*26365*	1907.5	*26615*
20	1860.0	*26140*	1882.5	*26365*	1905.0	*26590*

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*
25	1942.5	*388500*	1962.5	*392500*	1982.5	*396500*
30	1945.0	*389000*	1962.5	*392500*	1980.0	*396000*
40	1950.0	*390000*	1962.5	*392500*	1975.0	*395000*

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*
25	1862.5	*372500*	1882.5	*376500*	1902.5	*380500*
30	1865.0	*373000*	1882.5	*376500*	1900.0	*380000*
40	1870.0	*374000*	1882.5	*376500*	1895.0	*379000*

EUT test details, continued

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*	n/a	*n/a*
10	1715.0	*132022*	1745.0	*132322*	n/a	*n/a*
15	1717.5	*132047*	1745.0	*132322*	n/a	*n/a*
20	1720.0	*132072*	1745.0	*132322*	n/a	*n/a*

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*
25	2122.5	*424500*	2155.0	*431000*		
30	2125.0	*425000*	2155.0	*431000*		
40	2130.0	*426000*	2155.0	*431000*		

Bandwidth, MHz	Receive / UL, MHz					
	B	NR-ARFCN	M	NR-ARFCN	T	NR-ARFCN
5	1712.5	*342500*	1755.0	*351000*	n/a	*n/a*
10	1715.0	*343000*	1755.0	*351000*	n/a	*n/a*
15	1717.5	*343500*	1755.0	*351000*	n/a	*n/a*
20	1720.0	*344000*	1755.0	*351000*	n/a	*n/a*
25	1722.5	*344500*	1755.0	*351000*	n/a	*n/a*
30	1725.0	*345000*	1755.0	*351000*	n/a	*n/a*
40	1730.0	*346000*	1755.0	*351000*	n/a	*n/a*

EUT test details, continued

B25 LTE Configurations Tested:

Carrier configurations	Transmit / DL, MHz
SC, 5MHz, Bottom	1932.5
SC, 5MHz, Middle	1962.5
SC, 5MHz, Top	1992.5
SC, 10MHz, Bottom	1935.0
SC, 10MHz, Middle	1962.5
SC, 10MHz, Top	1990.0
SC, 15MHz, Bottom	1937.5
SC, 15MHz, Middle	1962.5
SC, 15MHz, Top	1987.5
SC, 20MHz, Bottom	1940.0
SC, 20MHz, Middle	1962.5
SC, 20MHz, Top	1985.0
SC, 5MHz iot1, Bottom	1932.5
SC, 5MHz iot2, Bottom	1932.5
SC, 5MHz iot1, Middle	1962.5
SC, 5MHz iot2, Middle	1962.5
SC, 5MHz iot1, Top	1992.5
SC, 5MHz iot2, Top	1992.5
SC, 10MHz GB1L0, Bottom	1935.0
SC, 10MHz GB1L0, Middle	1962.5
SC, 10MHz GB0L1, Top	1990.0
SC, 15MHz GB1L0, Bottom	1937.5
SC, 15MHz GB1L0, Middle	1962.5
SC, 15MHz GB0L1, Top	1987.5
SC, 20MHz GB1L0, Bottom	1940.0
SC, 20MHz GB1L0, Middle	1962.5
SC, 20MHz GB0L1, Top	1985.0
2C, 5MHz, Bottom(iot1) + Top	1932.5 + 1992.5
2C, 20MHz, Bottom(GB1L0) + Top	1940.0 + 1985.0
2C, 5MHz, Bottom(iot1)+Bottom	1932.5+1937.5
2C, 5MHz, Middle(iot1)+Middle	1960.0+1965.0
2C, 5MHz, Top+Top(iot1)	1987.5+1992.5
3C, 5MHz, Bottom(iot1)+Bottom + Top	1932.5+1937.5 + 1992.5
3C, 20MHz, Bottom(GB1L0)+Bottom + Top	1940.0+1960.0 + 1985.0
3C, 5MHz, Bottom(iot1)+Bottom+Bottom	1932.5+1937.5+1942.5
3C, 5MHz, Middle(iot1)+Middle+Middle	1957.5+1962.5+1967.5
3C, 5MHz, Top+Top+Top(iot1)	1982.5+1987.5+1992.5
6C, 5MHz, Bottom(iot1)+Bottom+Bottom + Top+Top+Top	1932.5+1937.5+1942.5 + 1982.5+1987.5+1992.5
6C, 10MHz, Bottom(GB1L0)+Bottom+Bottom + Top+Top+Top	1935.0+1945.0+1955.0 + 1970.0+1980.0+1990.0
6C, 5MHz, Bottom(iot1)+Bottom+Bottom+Bottom+Bottom+Bottom	1932.5+1937.5+1942.5+1947.5+1952.5+1957.5
6C, 5MHz, Middle(iot1)+Middle+Middle+Middle+Middle+Middle	1950.0+1955.0+1960.0+1965.0+1970.0+1975.0
6C, 5MHz, Top+Top+top+Top+Top+Top(iot1)	1967.5+1972.5+1977.5+1982.5+1987.5+1992.5

EUT test details, continued

B25 NR Configurations Tested:

Carrier configurations	Transmit / DL, MHz
SC, 5MHz, Bottom	1932.5
SC, 5MHz, Middle	1962.5
SC, 5MHz, Top	1992.5
SC, 10MHz, Bottom	1935.0
SC, 10MHz, Middle	1962.5
SC, 10MHz, Top	1990.0
SC, 15MHz, Bottom	1937.5
SC, 15MHz, Middle	1962.5
SC, 15MHz, Top	1987.5
SC, 20MHz, Bottom	1940.0
SC, 20MHz, Middle	1962.5
SC, 20MHz, Top	1985.0
SC, 25MHz, Bottom	1942.5
SC, 25MHz, Middle	1962.5
SC, 25MHz, Top	1982.5
SC, 30MHz, Bottom	1945.0
SC, 30MHz, Middle	1962.5
SC, 30MHz, Top	1980.0
SC, 40MHz, Bottom	1950.0
SC, 40MHz, Middle	1962.5
SC, 40MHz, Top	1975.0
2C, 5MHz, Bottom + Top	1932.5 + 1992.5
2C, 30MHz, Bottom + Top	1940.0 + 1985.0
2C, 5MHz, Bottom	1932.5+1937.5
2C, 5MHz, Middle	1960.0+1965.0
2C, 5MHz, Top	1987.5+1992.5
3C, 5MHz, Bottom+Bottom + Top	1932.5+1937.5 + 1992.5
3C, 20MHz, Bottom+Bottom + Top	1940.0+1960.0 + 1985.0
3C, 5MHz, Bottom	1932.5+1937.5+1942.5
3C, 5MHz, Middle	1957.5+1962.5+1967.5
3C, 5MHz, Top	1982.5+1987.5+1992.5
6C, 5MHz, Bottom+Bottom+Bottom + Top+Top+Top	1932.5+1937.5+1942.5 + 1982.5+1987.5+1992.5
6C, 10MHz, Bottom+Bottom+Bottom + Top+Top+Top	1935.0+1945.0+1955.0 + 1970.0+1980.0+1990.0
6C, 5MHz, Bottom	1932.5+1937.5+1942.5+1947.5+1952.5+1957.5
6C, 5MHz, Middle	1950.0+1955.0+1960.0+1965.0+1970.0+1975.0
6C, 5MHz, Top	1967.5+1972.5+1977.5+1982.5+1987.5+1992.5

EUT test details, continued

B25 Mixed Mode Configurations Tested:

Carrier configurations	Transmit / DL, MHz
2C, N5 + L5, Bottom + Top	1932.5 + 1992.5
6C, N5+N5+N5 + L5(iot1)+L5+L5, Bottom+Bottom+Bottom + Top+Top+Top	1932.5+1937.5+1942.5 + 1982.5+1987.5+1992.5
2C, N5+L5(iot1), Bottom+Bottom	1932.5+1937.5
2C, N5+L5(iot1), Middle+Middle	1960.0+1965.0
2C, N5+L5(iot1), Top+Top	1987.5+1992.5
6C, N5+N5+N5+L5(iot1)+L5+L5, Bottom	1932.5+1937.5+1942.5+1947.5+1952.5+1957.5
6C, N5+N5+N5+L5(iot1)+L5+L5, Middle	1950.0+1955.0+1960.0+1965.0+1970.0+1975.0
6C, N5+N5+N5+L5+L5+L5(iot1), Top	1967.5+1972.5+1977.5+1982.5+1987.5+1992.5
4C, L10(GB1L0)+N5+N5+N5, Bottom	1935.0+1942.5+1947.5+1952.5
4C, N5+N5+N5+L10(GB0L1), Top	1972.5+1977.5+1982.5+1990.0
5C, N40+L5(iot1)+L5+L5+N10	1950.0+1972.5+1977.5+1982.5+1990.0
5C, N10+L5(iot1)+L5+L5+N40	1935.0+1942.5+1947.5+1952.5+1975.0

EUT test details, continued

B66 LTE Configurations Tested:

Carrier configurations	Transmit / DL, MHz
SC, 5MHz, Bottom	2112.5
SC, 5MHz, Middle	2155.0
SC, 5MHz, Top	2197.5
SC, 10MHz, Bottom	2115.0
SC, 10MHz, Middle	2155.0
SC, 10MHz, Top	2195.0
SC, 15MHz, Bottom	2117.5
SC, 15MHz, Middle	2155.0
SC, 15MHz, Top	2192.5
SC, 20MHz, Bottom	2120.0
SC, 20MHz, Middle	2155.0
SC, 20MHz, Top	2190.0
SC, 5MHz iot1, Bottom	2112.5
SC, 5MHz iot2, Bottom	2112.5
SC, 5MHz iot1, Middle	2155.0
SC, 5MHz iot2, Middle	2155.0
SC, 5MHz iot1, Top	2197.5
SC, 5MHz iot2, Top	2197.5
SC, 10MHz GB1L0, Bottom	2115.0
SC, 10MHz GB1L0, Middle	2155.0
SC, 10MHz GB0L1, Top	2195.0
SC, 15MHz GB1L0, Bottom	2117.5
SC, 15MHz GB1L0, Middle	2155.0
SC, 15MHz GB0L1, Top	2192.5
SC, 20MHz GB1L0, Bottom	2120.0
SC, 20MHz GB1L0, Middle	2155.0
SC, 20MHz GB0L1, Top	2190.0
2C, 5MHz, Bottom(iot1) + Top	2112.5 + 2197.5
2C, 20MHz, Bottom(GB1L0) + Top	2120.0 + 2190.0
2C, 5MHz, Bottom(iot1)+Bottom	2112.5+2117.5
2C, 5MHz, Middle(iot1)+Middle	2152.5+2157.5
2C, 5MHz, Top+Top(iot1)	2192.5+2197.5
3C, 5MHz, Bottom(iot1)+Bottom + Top	2112.5+2117.5 + 2197.5
3C, 20MHz, Bottom(GB1L0)+Bottom + Top	2120.0+2140.0 + 2190.0
3C, 5MHz, Bottom(iot1)+Bottom+Bottom	2112.5+2117.5+2122.5
3C, 5MHz, Middle(iot1)+Middle+Middle	2150.0+2155.0+2160.0
3C, 5MHz, Top+Top+Top(iot1)	2187.5+2192.5+2197.5
6C, 5MHz, Bottom(iot1)+Bottom+Bottom + Top+Top+Top	2112.5+2117.5+2122.5 + 2187.5+2192.5+2197.5
6C, 15MHz, Bottom(GB1L0)+Bottom+Bottom+Top+Top+Top	2117.5+2132.5+2147.5+2162.5+2177.5+2192.5
6C, 15MHz, Bottom+Bottom+Bottom+Top+Top+Top(GB0L1)	2117.5+2132.5+2147.5+2162.5+2177.5+2192.5
6C, 5MHz, Bottom(iot1)+Bottom+Bottom+Bottom+Bottom+Bottom	2112.5+2117.5+2122.5+2127.5+2132.5+2137.5
6C, 5MHz, Middle(iot1)+Middle+Middle+Middle+Middle+Middle	2142.5+2147.5+2152.5+2157.5+2162.5+2167.5
6C, 5MHz, Top+Top+top+Top+Top+Top(iot1)	2172.5+2177.5+2182.5+2187.5+2192.5+2197.5

EUT test details, continued

B66 NR Configurations Tested:

Carrier configurations	Transmit / DL, MHz
SC, 5MHz, Bottom	2112.5
SC, 5MHz, Middle	2155.0
SC, 5MHz, Top	2197.5
SC, 10MHz, Bottom	2115.0
SC, 10MHz, Middle	2155.0
SC, 10MHz, Top	2195.0
SC, 15MHz, Bottom	2117.5
SC, 15MHz, Middle	2155.0
SC, 15MHz, Top	2192.5
SC, 20MHz, Bottom	2120.0
SC, 20MHz, Middle	2155.0
SC, 20MHz, Top	2190.0
SC, 25MHz, Bottom	2122.5
SC, 25MHz, Middle	2155.0
SC, 25MHz, Top	2187.5
SC, 30MHz, Bottom	2125.0
SC, 30MHz, Middle	2155.0
SC, 30MHz, Top	2185.0
SC, 40MHz, Bottom	2130.0
SC, 40MHz, Middle	2155.0
SC, 40MHz, Top	2180.0
2C, 5MHz, Bottom + Top	2112.5 + 2197.5
2C, 40MHz, Bottom + Top	2130.0 + 2180.0
2C, 5MHz, Bottom	2112.5+2117.5
2C, 5MHz, Middle	2152.5+2157.5
2C, 5MHz, Top	2192.5+2197.5
3C, 5MHz, Bottom+Bottom + Top	2112.5+2117.5 + 2197.5
3C, 30MHz	2125.0+2155.0+2185.0
3C, 5MHz, Bottom	2112.5+2117.5+2122.5
3C, 5MHz, Middle	2150.0+2155.0+2160.0
3C, 5MHz, Top	2187.5+2192.5+2197.5
6C, 5MHz, Bottom+Bottom+Bottom + Top+Top+Top	2112.5+2117.5+2122.5 + 2187.5+2192.5+2197.5
6C, 15MHz	2117.5+2132.5+2147.5+2162.5+2177.5+2192.5
6C, 5MHz, Bottom	2112.5+2117.5+2122.5+2127.5+2132.5+2137.5
6C, 5MHz, Middle	2142.5+2147.5+2152.5+2157.5+2162.5+2167.5
6C, 5MHz, Top	2172.5+2177.5+2182.5+2187.5+2192.5+2197.5

B66 Mixed Mode Configurations Tested:

Carrier configurations	Transmit / DL, MHz
2C, N5 + L5, Bottom + Top	2112.5 + 2197.5
6C, N5+N5+N5 + L5(iot1)+L5+L5, Bottom+Bottom+Bottom + Top+Top+Top	2112.5+2117.5+2122.5 + 2187.5+2192.5+2197.5
2C, N5+L5(iot1), Bottom	2112.5+2117.5
2C, N5+L5(iot1), Middle	2152.5+2157.5
2C, N5+L5(iot1), Top	2192.5+2197.5
6C, N5+N5+N5+L5(iot1)+L5+L5, Bottom	2112.5+2117.5+2122.5+2127.5+2132.5+2137.5
6C, N5+N5+N5+L5(iot1)+L5+L5, Middle	2142.5+2147.5+2152.5+2157.5+2162.5+2167.5
6C, N5+N5+N5+L5+L5+L5(iot1), Top	2172.5+2177.5+2182.5+2187.5+2192.5+2197.5
4C, L10(GB1L0)+N5+N5+N5, Bottom	2115.0+2122.5+2127.5+2132.5
4C, N5+N5+N5+L10(GB0L1), Top	2177.5+2182.5+2187.5+2195.0
5C, N10+L15(GB1L0)+L15+L15+N30, Bottom	2115.0+2127.5+2142.5+2157.5+2180.0
5C, N30+L15(GB1L0)+L15+L15+N10, Top	2130.0+2152.5+2167.5+2182.5+2195.0

EUT test details, continued

Configurations Tested for Radiated Spurious Emissions:

Carrier configurations	Transmit / DL, MHz
$^{B66(EFGH)}1xM_{10NR}$ + $^{B25(ABCD)}1xM_{10NR}$	B66: 2155MHz; B25: 1962.5MHz
$^{B66(EF)}1xM_{10LTE(GB-IoT)}$ + $^{B66(GH)}1xM_{10LTE}$ + $^{B25(AB)}1xM_{10LTE(GB-IoT)}$ + $^{B25(CD)}1xM_{10LTE}$	B66: 2155MHz; B25: 1962.5MHz
$^{B66(EFGH)}1xB_{10NR}$ + $^{B25(ABCD)}1xB_{10NR}$	B66: 2115MHz; B25: 1935MHz
$^{B66(EFGH)}1xT_{10NR}$ + $^{B25(ABCD)}1xT_{10NR}$	B66: 2195MHz (DL only) / 2175MHz (UL only); B25: 1990MHz
$^{B66(EFGH)}2xNC_{10NR}$ + $^{B25(ABCD)}2xNC_{10NR}$	B66: 2115MHz, 2195MHz; B25: 1935MHz, 1990MHz
$^{B66(E)}1xB_{10LTE(GB-IoT)}$ + $^{B66(FGH)}1xB_{10LTE}$ + $^{B66(EFGH)}1xT_{10NR}$ + $^{B25(A)}1xB_{10LTE(GB-IoT)}$ + $^{B25(BCD)}1xB_{10LTE}$ + $^{B25(ABCD)}1xT_{10NR}$	B66: 2115MHz (LTE), 2195MHz (NR); B25: 1935MHz (LTE), 1990MHz (NR)

3.4 EUT setup diagram

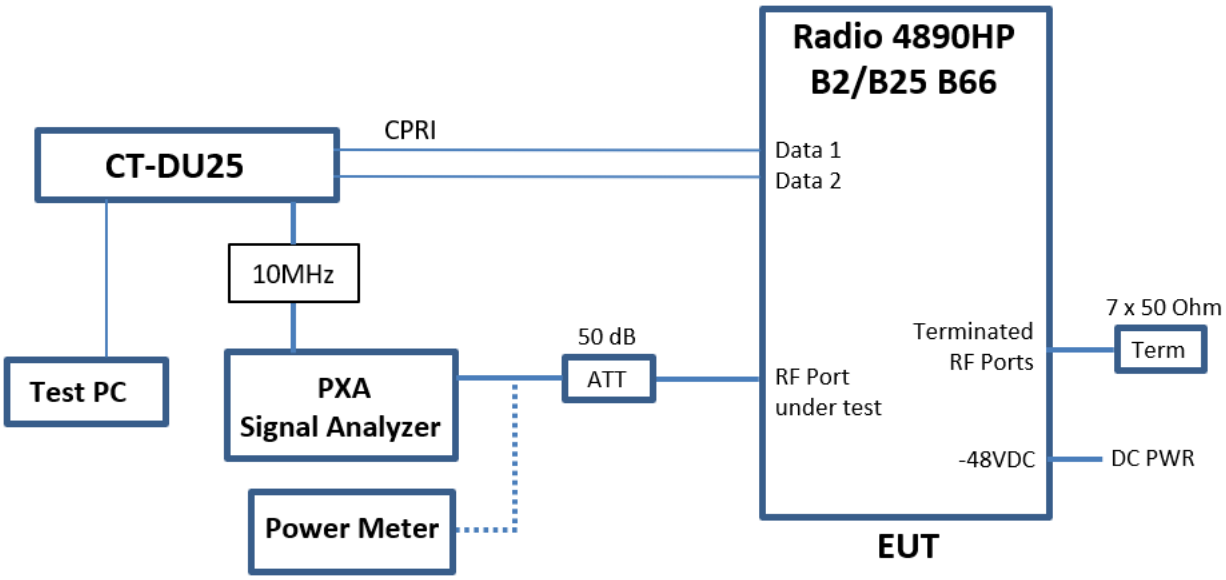


Figure 3.4-1: *Setup diagram – Radio Compliance*

3.5 Setup photographs

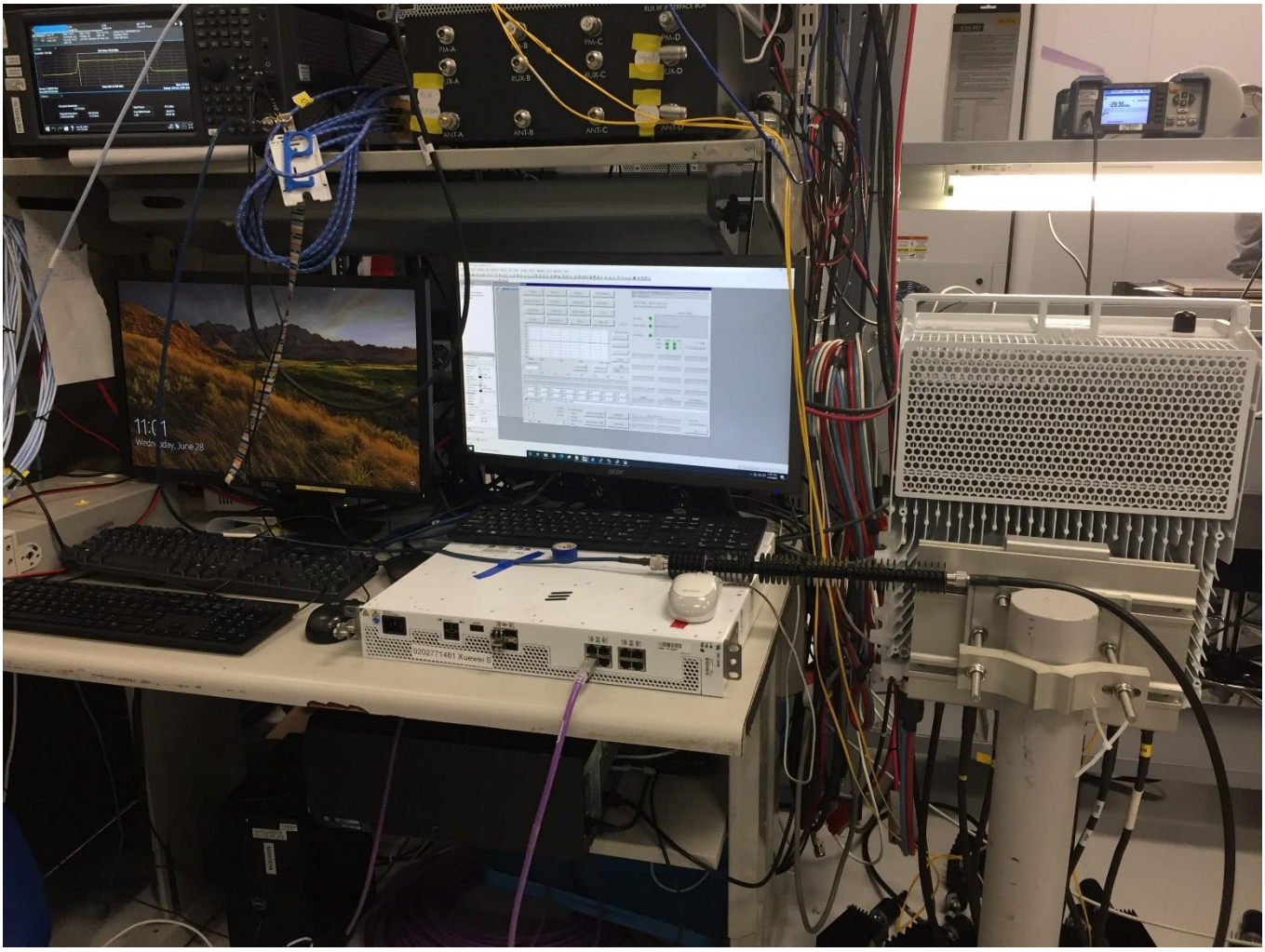


Figure 3.5-1: *Set up photo for Radio Compliance Testing*

Setup photographs, continued

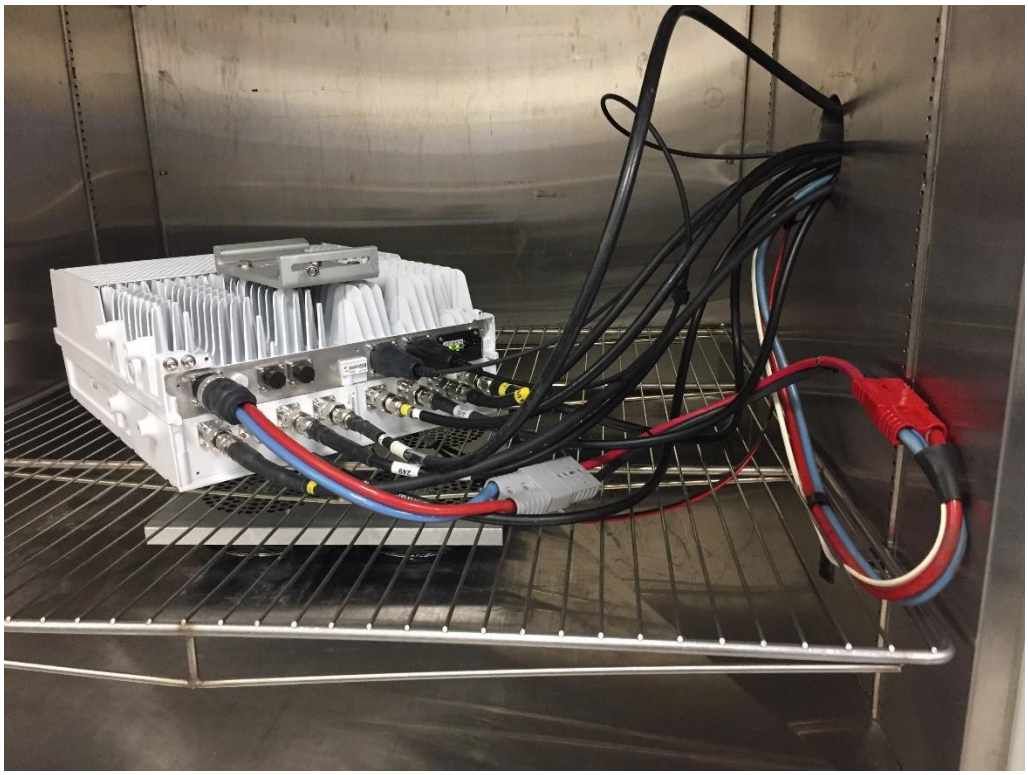


Figure 3.5-2: *EUT Set-up photo for Radiated Compliance Testing*

Setup photographs, continued

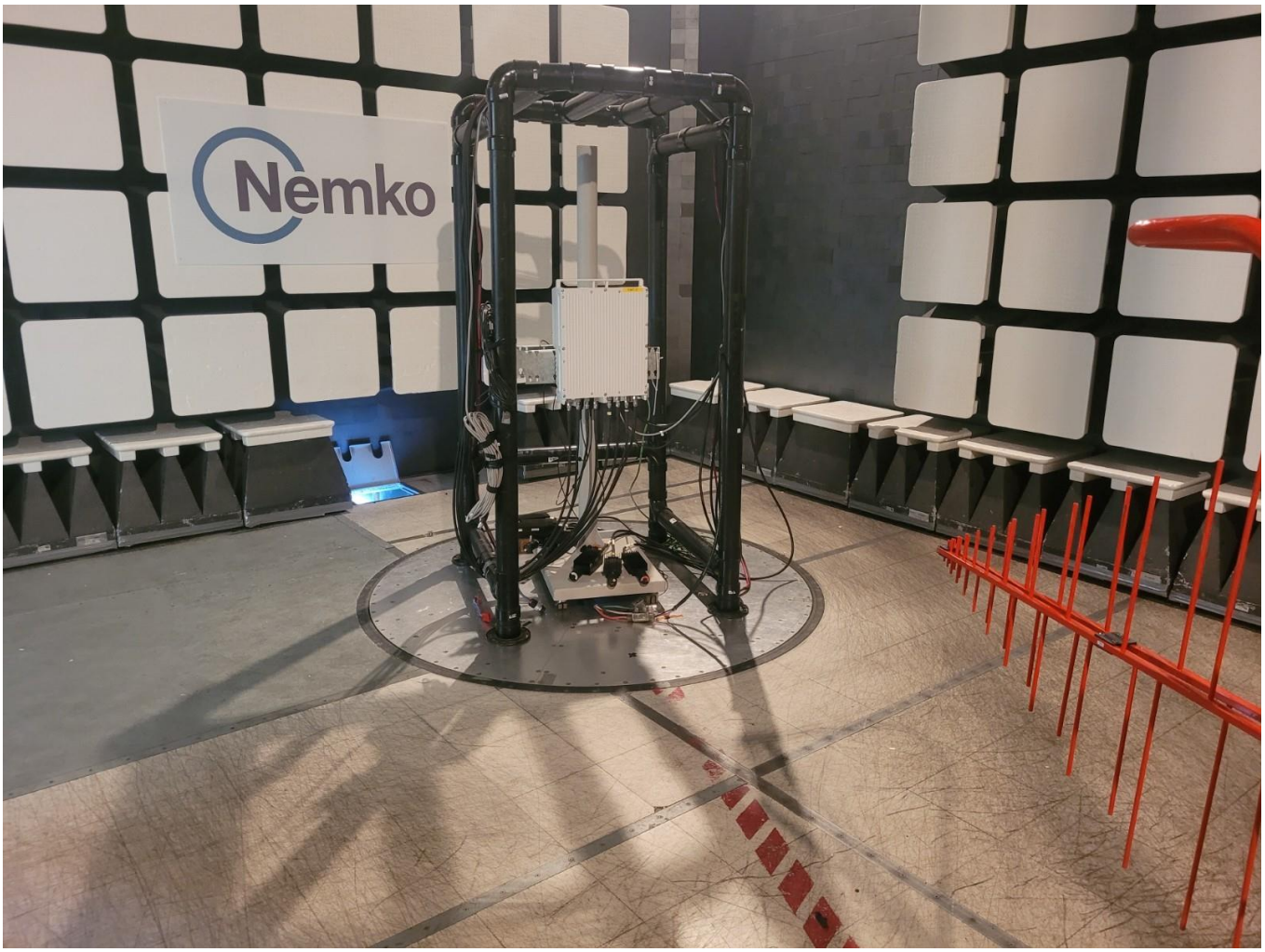


Figure 3.5-3: *EUT Set-up photo for Radiated Emissions [30 MHz to 1000 MHz]*

Setup photographs, continued

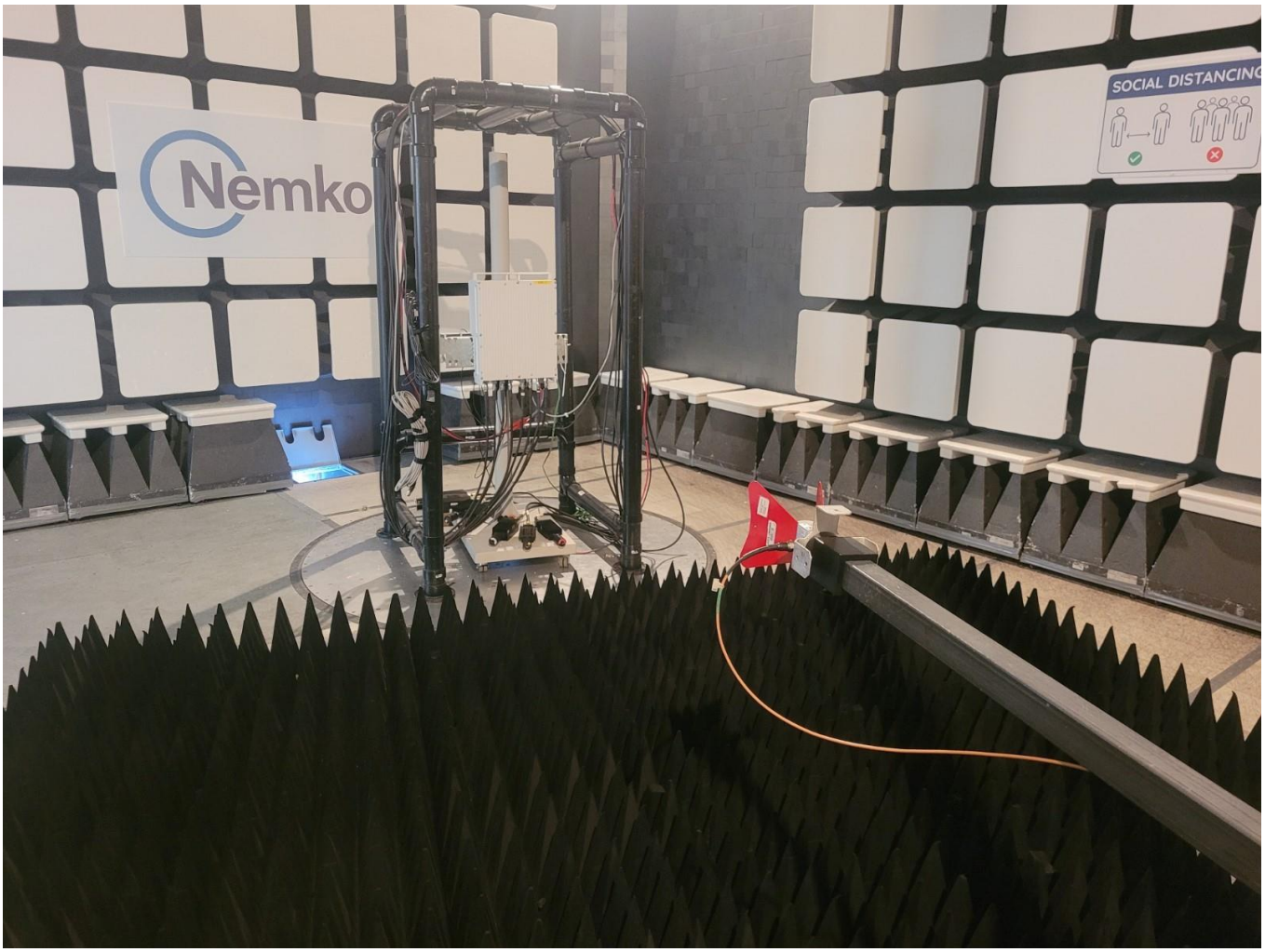


Figure 3.5-4: *EUT Set-up photo for Radiated Emissions [1-3 GHz]*

Setup photographs, continued

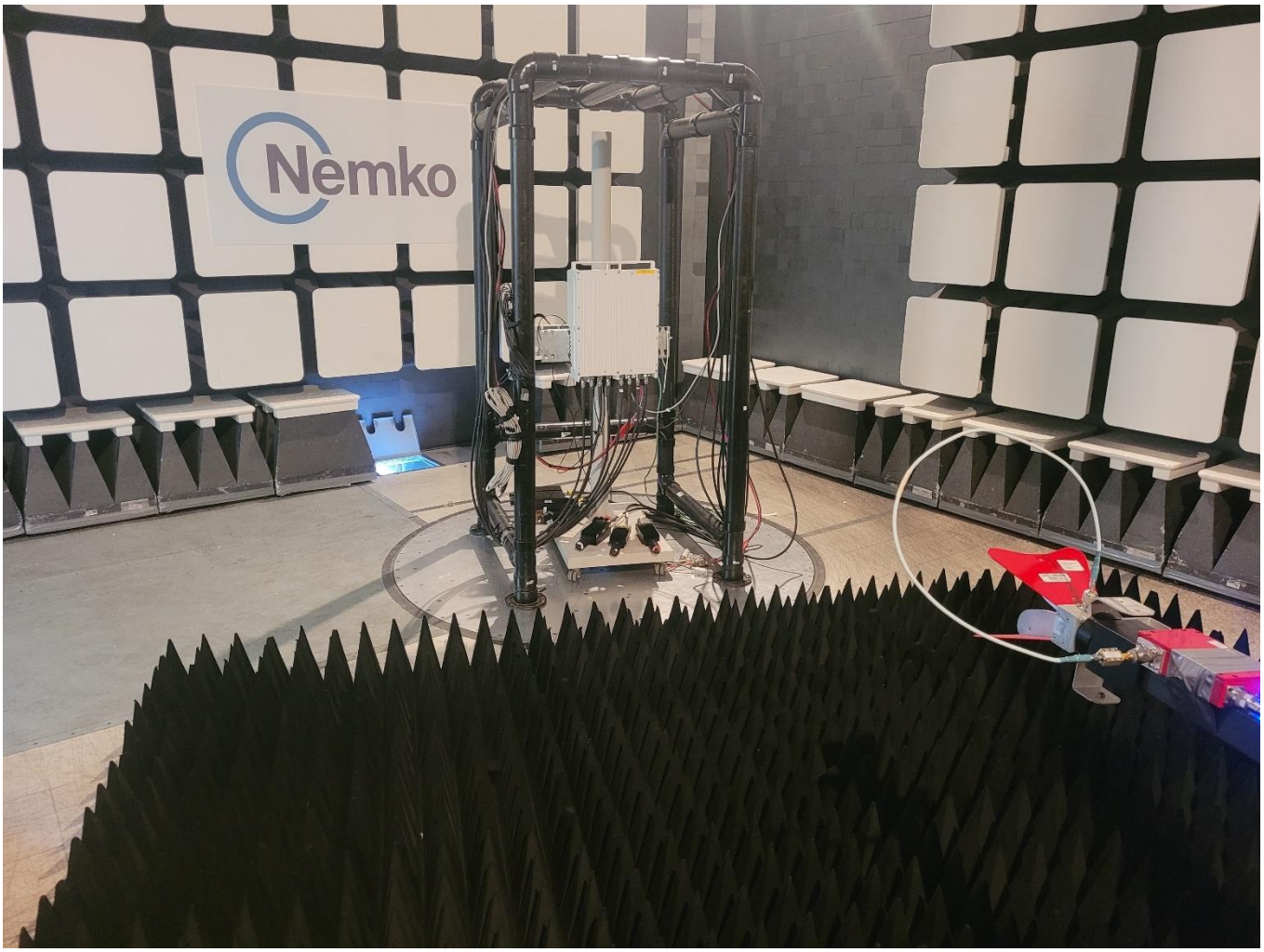


Figure 3.5-5: *EUT Set-up photo for Radiated Emissions [3-18 GHz]*

Setup photographs, continued

Figure 3.5-6: *EUT Set-up photo for Radiated Emissions [18-40 GHz]*

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

None

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	January 19, 2024
Flush mount turntable	Sunol	FM2022	FA002082	—	NCR
Controller	Sunol	SC104V	FA002060	—	NCR
Antenna mast	Sunol	TLT2	FA002061	—	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 40	FA002071	1 year	March 2, 2024
Horn (1–18 GHz)	ETS Lindgren	3117	FA002840	1 year	March 7, 2024
Preamp (1–18 GHz)	ETS Lindgren	124334	FA002873	1 year	August 16, 2023
Horn antenna (18–40 GHz)	EMCO	3116	FA001847	1 year	June 15, 2024
Pre-amplifier (18–26 GHz)	Narda	BBS-1826N612	FA001550	—	VOU
Pre-amplifier (26–40 GHz)	Narda	DBL-2640N610	FA001556	—	VOU
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	March 7, 2024
High pass filter (3-18 GHz)	Thilithic Inc.	6HC3000/18000-1.3-KK	FA002231	1 year	June 9, 2024
50 Ω coax cable	Carlisle	WHU18-1818-072	FA002391	1 year	October 17, 2023
PXA Signal Analyzer	Keysight	N9030B	MY57144347	1 year	March 30, 2024
Power Meter	Rohde & Schwarz	NRP2	101123	2 years	May 11, 2025
Power Sensor	Rohde & Schwarz	NRP-Z11	100070	2 years	March 31, 2025
Radio Supporting Equipment*	Ericsson	CT-DU25	T01G525053	—	NCR

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

* Radio Supporting equipment (CT-DU25) 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 5.5

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

RSS-139, Section 5.5

Consult SRSP-513 and SRSP-519 for e.i.r.p. limits on fixed and base stations operating in the band 2110–2180 MHz and 2180-2200 MHz respectively.

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.

SRSP-513, Section 6

6.1 Fixed and base stations using non-active antenna systems

6.1.3 E.i.r.p. limits and antenna height limits for non-AAS systems.

20. 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 62 dBm with an antenna height above average terrain (HAAT) up to 300 metres.

21. 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 62 dBm/MHz e.i.r.p. (i.e. no more than 62 dBm e.i.r.p. in any 1 MHz band segment) with an antenna height above average terrain (HAAT) up to 300 metres.

22. Fixed and base stations in the band 2110-2180 MHz and located in geographic areas at a distance greater than 26 km from large or medium population centres, may increase their e.i.r.p. up to a maximum of 65 dBm/MHz (i.e. no more than 65 dBm e.i.r.p. in any 1 MHz band segment), with an antenna HAAT up to 300 metres.

23. 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.

24. Fixed and base stations operating with an with increased e.i.r.p. as speciofied above, 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.

25. The above provisions to allow increased e.i.r.p. limits also apply to fixed and base stations with a channel bandwidth equal to or less than 1 MHz. The e.i.r.p. may be increased up to a maximum of 65 dBm.

26. Fixed and base stations with an antenna HAAT exceeding 300 m shall apply a reduction in e.i.r.p. according to the following formula:

$$\text{e.i.r.p.}_{\text{reduction}} = 20\log_{10}(\text{HAAT}/300)\ \text{dB}$$

27. The HAAT of a fixed or base station with multiple antennas shall be calculated based on the measurements of the highest antenna.

8.1.1 Definitions and limits, continued

SRSP-519, Section 6

6.1 Base stations using non-active antenna systems

6.1.3 E.i.r.p. limits and antenna height limits for non-AAS systems.

21. For base stations operating in the bands 2000-2020 MHz and 2180-2200 MHz with an antenna height above average terrain (HAAT) of up to 300 m, the e.i.r.p. shall not exceed 62 dBm when transmitting with an emission bandwidth of 1 MHz or less.

22. For base stations operating in the bands 2000-2020 MHz and 2180-2200 MHz with an antenna HAAT of up to 300 m, the e.i.r.p.shall not exceed 62 dBm/MHz when transmitting with an emission bandwidth greater than 1 MHz.

23. Base stations located in geographic areas at a distance greater than 26 km from large or medium population centres may increase their e.i.r.p. to a maximum of 65 dBm when transmitting with an emission bandwidth of 1 MHz or less, and 65 dBm/MHz when transmitting with an emission bandwidth greater than 1 MHz, with an antenna HAAT of up to 300 m

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

25. Base stations operating with an increased e.i.r.p., as specified above (i.e. up to 65 dBm/MHz), must not be used to provide coverage to large and medium population centres. However, some incidental coverage of these population centres by stations operating with an increased e.i.r.p. is permitted.

26. A licensee operating a base station with an e.i.r.p. greater than 62 dBm/MHz must coordinate in advance with all AWS-4 licensees authorized to operate on adjacent frequency blocks within the same band.

27. Base stations with an antenna HAAT exceeding 300 m shall apply a reduction in e.i.r.p. according to the following formula:
e.i.r.p.reduction = 〖20log〗_10 (HAAT⁄300) dB

28. The HAAT of a base station with multiple antennas shall be calculated based on the measurements of the highest antenna.

8.1.2 Test summary

Test date	June 26, 2023
Test engineer	Nimish Kapoor

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.

- Randomly selected sample plots provided for information and settings only
- Total MIMO PSD was calculated as follows: PSD from one antenna port + 10 × Log_{10} (4)
- 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.
- Report results are compiled for the maximum output rated power for worst case emission assessment. EIRP, based on possible beam configuration, indicate the maximum power / worst case beam configuration based on ideal antenna parameters. Customer carrier configuration and power will be limited to comply with legal limits of 1640 W/MHz or 3280 W/MHz during RBS site set up and commissioning. Non-compliant configurations will be restricted to lower carrier power to ensure compliance.
- **To ensure compliance under worst case conditions with maximum output power based on a MIMO configuration, the maximum antenna gain for an RBS (Radio Base Station) system with Radio Radio 4890HP 48B2/B25 48B66 M01 is 17.0 dBi with 2.50 dB path loss. Maximum measured PSD to EIRP margin 0.33 dB.**

Observations, settings, and special notes, continued

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 8.1-1: *EIRP calculation based on the* ***worst-case PSD measurement***

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2197.5	41.30	47.32	2.50	17.00	61.82	62.15	0.33

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

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2112.5	40.21	46.23	62.15	15.92
2155.0	**40.50**	46.52	62.15	15.63
2197.5	40.48	46.50	62.15	15.65

Table 8.1-3: *RF power density measurement results of a single-carrier operation for LTE with IB (IoT1) on 5 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2112.5	41.12	47.14	62.15	15.01
2155.0	41.20	47.22	62.15	14.93
2197.5	**41.30**	47.32	62.15	14.83

Table 8.1-4: *RF power density measurement results of a single-carrier operation for LTE with IB (IoT2) on 5 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2112.5	40.76	46.78	62.15	15.37
2155.0	41.15	47.17	62.15	14.98
2197.5	**41.19**	47.21	62.15	14.94

Table 8.1-5: *RF power density measurement results of a single-carrier operation for NR on 5 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2112.5	40.15	46.17	62.15	15.98
2155.0	40.49	46.51	62.15	15.64
2197.5	**40.50**	46.52	62.15	15.63

Test data, continued

Table 8.1-6: *RF power density measurement results of a single-carrier operation for LTE on 10 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2115.0	39.01	45.03	62.15	17.12
2155.0	39.28	45.30	62.15	16.85
2195.0	**39.50**	45.52	62.15	16.63

Table 8.1-7: *RF power density measurement results of a single-carrier operation for LTE with IoT on 10 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2115.0	39.19	45.21	62.15	16.94
2155.0	**39.62**	45.64	62.15	16.51
2195.0	39.45	45.47	62.15	16.68

Table 8.1-8: *RF power density measurement results of a single-carrier operation for NR on 10 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2115.0	38.84	44.86	62.15	17.29
2155.0	39.02	45.04	62.15	17.11
2195.0	**39.38**	45.40	62.15	16.75

Table 8.1-9: *RF power density measurement results of a single-carrier operation for LTE on 15 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2117.5	37.38	43.40	62.15	18.75
2155.0	**37.60**	43.62	62.15	18.53
2192.5	37.47	43.49	62.15	18.66

Table 8.1-10: *RF power density measurement results of a single-carrier operation for LTE with IoT on 15 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2117.5	37.43	43.45	62.15	18.70
2155.0	**37.52**	43.54	62.15	18.61
2192.5	37.35	43.37	62.15	18.78

Table 8.1-11: *RF power density measurement results of a single-carrier operation for NR on 15 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2117.5	37.11	43.13	62.15	19.02
2155.0	37.03	43.05	62.15	19.10
2192.5	**37.20**	43.22	62.15	18.93

Table 8.1-12: *RF power density measurement results of a single-carrier operation for LTE on 20 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2120.0	35.86	41.88	62.15	20.27
2155.0	36.05	42.07	62.15	20.08
2190.0	**36.23**	42.25	62.15	19.90

Test data, continued

Table 8.1-13: *RF power density measurement results of a single-carrier operation for LTE with IoT on 20 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2120.0	35.97	41.99	62.15	20.16
2155.0	**36.35**	42.37	62.15	19.78
2190.0	36.18	42.20	62.15	19.95

Table 8.1-14: *RF power density measurement results of a single-carrier operation for NR on 20 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2120.0	35.58	41.60	62.15	20.55
2155.0	35.80	41.82	62.15	20.33
2190.0	**35.98**	42.00	62.15	20.15

Table 8.1-15: *RF power density measurement results of a single-carrier operation for NR on 25 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2122.5	34.58	40.60	62.15	21.55
2155.0	34.80	40.82	62.15	21.33
2187.5	**34.97**	40.99	62.15	21.16

Table 8.1-16: *RF power density measurement results of a single-carrier operation for NR on 30 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2125.0	33.76	39.78	62.15	22.37
2155.0	34.01	40.03	62.15	22.12
2185.0	**34.16**	40.18	62.15	21.97

Table 8.1-17: *RF power density measurement results of a single-carrier operation for NR on 40 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2130.0	32.47	38.49	62.15	23.66
2155.0	32.70	38.72	62.15	23.43
2180.0	**32.83**	38.85	62.15	23.30

Table 8.1-18: *RF power density measurement results of a multi-carrier operation for LTE on 5 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	**39.32**	45.34	62.15	16.81
3 carriers	37.51	43.53	62.15	18.62
6 carriers	34.71	40.73	62.15	21.42

Table 8.1-19: *RF power density measurement results of a multi-carrier operation for NR on 5 MHz channel [Non-Contiguous]*

Notes	dBm/MHz	dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	**38.43**	44.45	62.15	17.70
3 carriers	36.65	42.67	62.15	19.48
6 carriers	34.00	40.02	62.15	22.13

Test data, continued

Table 8.1-20: *RF power density measurement results of a multi-carrier operation for LTE on 20 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	**32.84**	38.86	62.15	23.29
3 carriers	31.16	37.18	62.15	24.97

Table 8.1-21: *RF power density measurement results of a multi-carrier operation for NR on 40 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	**29.55**	35.57	62.15	26.58

Table 8.1-22: *RF power density measurement results of a multi-carrier operation for LTE on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	Bottom	39.75	45.77	62.15	16.38
	Middle	40.01	46.03	62.15	16.12
	Top	**40.16**	46.18	62.15	15.97

Table 8.1-23: *RF power density measurement results of a multi-carrier operation for LTE on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
3 carriers	Bottom	37.68	43.70	62.15	18.45
	Middle	**37.98**	44.00	62.15	18.15
	Top	37.96	43.98	62.15	18.17

Table 8.1-24: *RF power density measurement results of a multi-carrier operation for LTE on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
6 carriers	Bottom	34.78	40.80	62.15	21.35
	Middle	**35.12**	41.14	62.15	21.01
	Top	35.08	41.10	62.15	21.05

Table 8.1-25: *RF power density measurement results of a multi-carrier operation for LTE on 15 MHz channel Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
6 carriers	**29.47**	35.49	62.15	26.66

Table 8.1-26: *RF power density measurement results of a multi-carrier operation for LTE on 15 MHz channel with GB [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
6 carriers	**29.49**	35.51	62.15	26.64

Test data, continued

Table 8.1-27: *RF power density measurement results of a multi-carrier operation for NR on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	Bottom	38.91	44.93	62.15	17.22
	Middle	38.99	45.01	62.15	17.14
	Top	**39.19**	45.21	62.15	16.94

Table 8.1-28: *RF power density measurement results of a multi-carrier operation for NR on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
3 carriers	Bottom	36.84	42.86	62.15	19.29
	Middle	36.99	43.01	62.15	19.14
	Top	**37.11**	43.13	62.15	19.02

Table 8.1-29: *RF power density measurement results of a multi-carrier operation for NR on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
6 carriers	Bottom	34.05	40.07	62.15	22.08
	Middle	34.18	40.20	62.15	21.95
	Top	**34.38**	40.40	62.15	21.75

Table 8.1-30: *RF power density measurement results of a multi-carrier operation for NR on 40 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	**29.55**	35.57	62.15	26.58

Table 8.1-31: *RF power density measurement results of a multi-carrier operation for NR on 30 MHz channel [Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
3 carriers	**29.11**	35.13	62.15	27.02

Table 8.1-32: *RF power density measurement results of a multi-carrier operation for NR on 15 MHz channel [Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
6 carriers	**29.24**	35.26	62.15	26.89

Test data, continued

Table 8.1-33: *RF power density measurement results of a multi-RAT operation*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
NR 5 MHz and LTE with IoT 15 MHz	39.31	45.33	62.15	16.82
3 × NR 5 MHz and 3 × LTE with IoT 15 MHz	35.06	41.08	62.15	21.07
NR 5 MHz + LTE 5 MHz, Low Channel	39.91	45.93	62.15	16.22
NR 5 MHz + LTE 5 MHz, Mid Channel	40.10	46.12	62.15	16.03
NR 5 MHz + LTE 5 MHz, High Channel	**40.23**	46.25	62.15	15.90
3 × NR 5 MHz + 3 × LTE 5 MHz, Low Channel	35.21	41.23	62.15	20.92
3 × NR 5 MHz + 3 × LTE 5 MHz, Mid Channel	35.13	41.15	62.15	21.00
3 × NR 5 MHz + 3 × LTE 5 MHz, High Channel	35.19	41.21	62.15	20.94
LTE 10 MHz + 3 × NR 5 MHz, Low Channel	35.83	41.85	62.15	20.30
LTE 10 MHz + 3 × NR 5 MHz, High Channel	36.28	42.30	62.15	19.85
NR 10 MHz + 3 × LTE 15 MHz + NR 30 MHz, Low Channel	31.62	37.64	62.15	24.51
NR 10 MHz + 3 × LTE 15 MHz + NR 30 MHz, High Channel	31.74	37.76	62.15	24.39

Note: “and”: non-contiguous channels; “+”: contiguous channels

Test data, continued

Table 8.1-34: *RF total channel power measurement results for LTE [5 MHz]*

Remarks	5 MHz channel (40 W)
Low channel, QPSK	46.12
Mid channel, QPSK	46.51
Top channel, QPSK	46.21
LTE with IoT1 Low channel, QPSK	46.08
LTE with IoT1 Mid channel, QPSK	46.52
LTE with IoT1 Top channel, QPSK	46.23
LTE with IoT2 Low channel, QPSK	46.08
LTE with IoT2 Mid channel, QPSK	46.53
LTE with IoT2 Top channel, QPSK	46.23

Note: all results in the table are in dBm units

Table 8.1-35: *RF total channel power measurement results for LTE [10 MHz]*

Remarks	10 MHz channel (60 W)
Low channel, QPSK	47.97
Mid channel, QPSK	48.25
Top channel, QPSK	48.14
LTE with GB, Low channel, QPSK	47.81
LTE with GB, Mid channel, QPSK	48.12
LTE with GB, Top channel, QPSK	47.98

Note: all results in the table are in dBm units

Table 8.1-36: *RF total channel power measurement results for LTE [15 MHz]*

Remarks	15 MHz channel (60 W)
Low channel, QPSK	47.93
Mid channel, QPSK	48.27
Top channel, QPSK	48.09
LTE with GB, Low channel, QPSK	47.79
LTE with GB, Mid channel, QPSK	48.17
LTE with GB, Top channel, QPSK	47.96

Note: all results in the table are in dBm units

Table 8.1-37: *RF total channel power measurement results for LTE [20 MHz]*

Remarks	20 MHz channel (60 W)
Low channel, QPSK	47.95
Mid channel, QPSK	48.26
Top channel, QPSK	48.15
LTE with GB, Low channel, QPSK	47.77
LTE with GB, Mid channel, QPSK	48.11
LTE with GB, Top channel, QPSK	47.97

Note: all results in the table are in dBm units

Table 8.1-38: *RF total channel power measurement results for NR [5 MHz]*

Remarks	5 MHz channel (40 W)
Low channel, QPSK	46.09
Mid channel, QPSK	46.54
Top channel, QPSK	46.22

Note: all results in the table are in dBm units

Test data, continued

Table 8.1-39: *RF total channel power measurement results for NR [10 MHz]*

Remarks	10 MHz channel (60 W)
Low channel, QPSK	47.97
Mid channel, QPSK	48.29
Top channel, QPSK	48.18

Note: all results in the table are in dBm units

Table 8.1-40: *RF total channel power measurement results for NR [15 MHz]*

Remarks	15 MHz channel (60 W)
Low channel, QPSK	47.93
Mid channel, QPSK	48.28
Top channel, QPSK	48.10

Note: all results in the table are in dBm units

Table 8.1-41: *RF total channel power measurement results for NR [20 MHz]*

Remarks	20 MHz channel (60 W)
Low channel, QPSK	47.95
Mid channel, QPSK	48.28
Top channel, QPSK	48.17

Note: all results in the table are in dBm units

Table 8.1-42: *RF total channel power measurement results for NR [25 MHz]*

Remarks	25 MHz channel (60 W)
Low channel, QPSK	47.96
Mid channel, QPSK	48.30
Top channel, QPSK	48.19

Note: all results in the table are in dBm units

Table 8.1-43: *RF total channel power measurement results for NR [30 MHz]*

Remarks	30 MHz channel (60 W)
Low channel, QPSK	47.97
Mid channel, QPSK	48.30
Top channel, QPSK	48.22

Note: all results in the table are in dBm units

Table 8.1-44: *RF total channel power measurement results for NR [40 MHz]*

Remarks	40 MHz channel (60 W)
Low channel, QPSK	47.96
Mid channel, QPSK	48.31
Top channel, QPSK	48.24

Note: all results in the table are in dBm units

Test data, continued

Table 8.1-45: *RF total channel power measurement results for LTE Multi-carrier [Non-contiguous]*

Carriers	5 MHz channel (60 W)	20 MHz channel (60 W)
2 Carriers, QPSK	47.43	47.70
3 Carriers, QPSK	47.46	47.79
6 Carriers, QPSK	47.71	

Note: all results in the table are in dBm units

Table 8.1-46: *RF total channel power measurement results for NR Multi-carrier [Non-contiguous]*

Carriers	5 MHz channel (60 W)	40 MHz channel (60 W)
2 Carriers, QPSK	47.60	47.93
3 Carriers, QPSK	47.61	
6 Carriers, QPSK	47.85	

Note: all results in the table are in dBm units

Table 8.1-47: *RF total channel power measurement results for LTE Multi-carrier [5 MHz bandwidth Contiguous]*

Carriers	Channel	5 MHz channel (60 W)
2 Carriers, QPSK	Low Channel	48.03
	Middle Channel	48.27
	Top Channel	48.12
3 Carriers, QPSK	Low Channel	47.73
	Middle Channel	48.00
	Top Channel	47.82
6 Carriers, QPSK	Low Channel	47.96
	Middle Channel	48.21
	Top Channel	48.16

Note: all results in the table are in dBm units

Table 8.1-48: *RF total channel power measurement results for LTE Multi-carrier [15 MHz bandwidth Contiguous]*

Carriers	Channel	15 MHz channel (60 W)
6 Carriers, QPSK	IoT1 on Left Side of the Channel	47.95
	IoT1 on Right Side of the Channel	47.93

Note: all results in the table are in dBm units

Table 8.1-49: *RF total channel power measurement results for NR Multi-carrier [5 MHz bandwidth Contiguous]*

Carriers	Channel	5 MHz channel (60 W)
2 Carriers, QPSK	Low Channel	48.03
	Middle Channel	48.26
	Top Channel	48.08
3 Carriers, QPSK	Low Channel	47.73
	Middle Channel	47.98
	Top Channel	47.80
6 Carriers, QPSK	Low Channel	48.06
	Middle Channel	48.09
	Top Channel	48.14

Note: all results in the table are in dBm units

Table 8.1-50: *RF total channel power measurement results for NR Multi-carrier [Contiguous]*

Carriers	15 MHz channel (60 W)	30 MHz channel (60 W)
3 Carriers, QPSK		48.08
6 Carriers, QPSK	48.11	

Note: all results in the table are in dBm units

Test data, continued

Table 8.1-51: *RF total channel power measurement results for multi-RAT operation*

Remarks	Power (dBm)
NR 5 MHz and LTE with IoT1 5 MHz	47.62
3 × NR 5 MHz and 3 × LTE with IoT1 5 MHz	47.86
NR 5 MHz + LTE 5 MHz, Low Channel	48.04
NR 5 MHz + LTE 5 MHz, Mid Channel	48.24
NR 5 MHz + LTE 5 MHz, High Channel	48.10
3 × NR 5 MHz + 3 × LTE 5 MHz, Low Channel	47.96
3 × NR 5 MHz + 3 × LTE 5 MHz, Mid Channel	48.18
3 × NR 5 MHz + 3 × LTE 5 MHz, High Channel	48.13
LTE 10 MHz + 3 × NR 5 MHz, Low Channel	47.97
LTE 10 MHz + 3 × NR 5 MHz, High Channel	48.16
NR 10 MHz + 3 × LTE 15 MHz + NR 30 MHz, Low Channel	48.00
NR 10 MHz + 3 × LTE 15 MHz + NR 30 MHz, High Channel	47.97

Note: “and”: non-contiguous channels; “+”: contiguous channels

Test data, continued

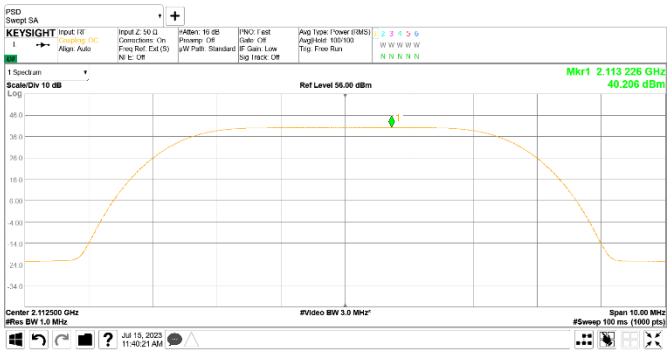


Figure 8.1-1: *PSD of LTE 5 MHz channel bandwidth, single carrier operation, sample plot*

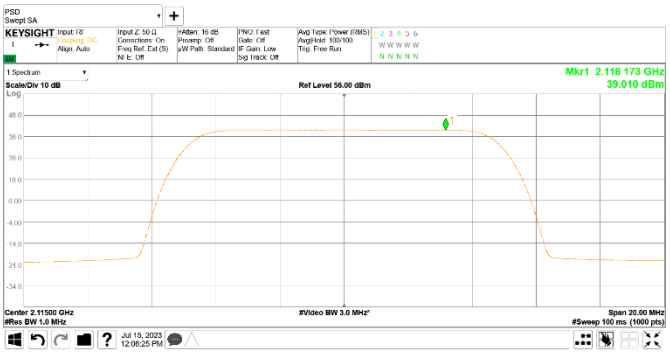


Figure 8.1-2: *PSD of LTE 10 MHz channel bandwidth, single carrier operation, sample plot*

Figure 8.1-3: *PSD of LTE 15 MHz channel bandwidth, single carrier operation, sample plot*

Figure 8.1-4: *PSD of LTE 20 MHz channel bandwidth, single carrier operation, sample plot*

Test data, continued

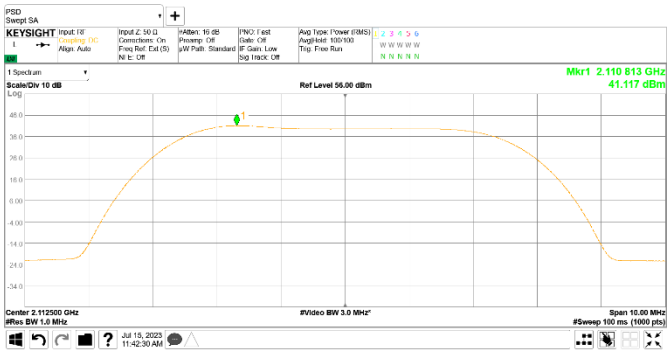


Figure 8.1-5: *PSD of LTE 5 MHz channel bandwidth with guard-band, single carrier operation, sample plot*

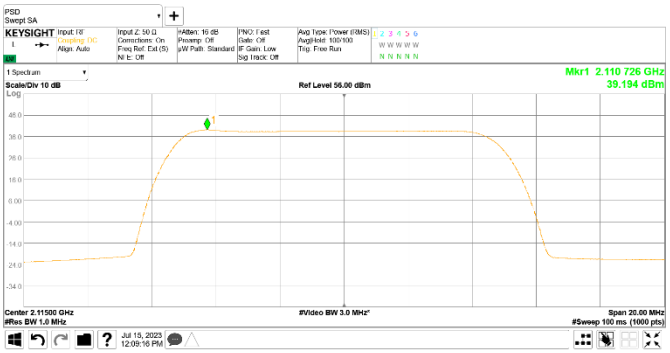


Figure 8.1-6: *PSD of LTE 10 MHz channel bandwidth with IoT, single carrier operation, sample plot*

Figure 8.1-7: *PSD of LTE 15 MHz channel bandwidth with IoT, single carrier operation, sample plot*

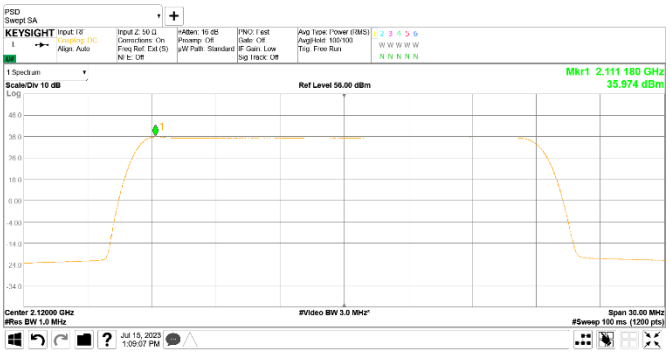


Figure 8.1-8: *PSD of LTE 20 MHz channel bandwidth with IoT, single carrier operation, sample plot*

Test data, continued

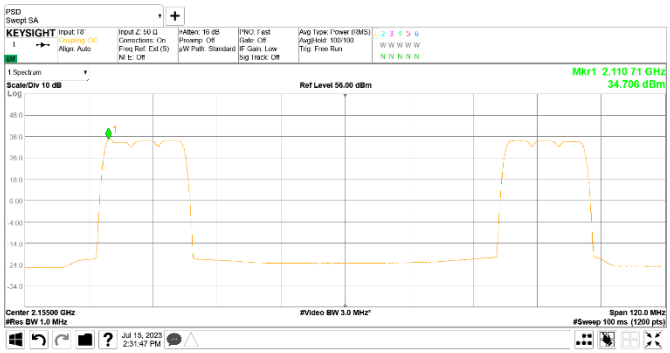


Figure 8.1-9: *PSD of LTE 5 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

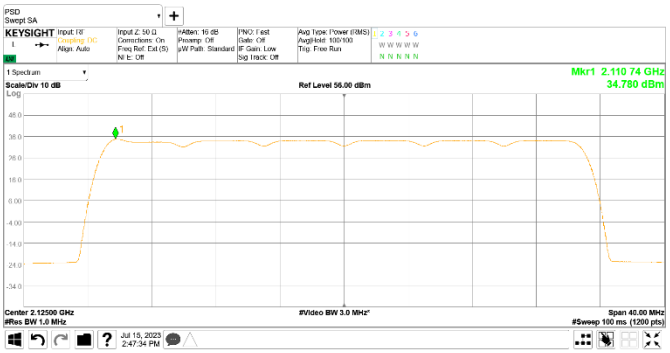


Figure 8.1-10: *PSD of LTE 5 MHz channel bandwidth, multi-carrier operation, sample plot, Contiguous*

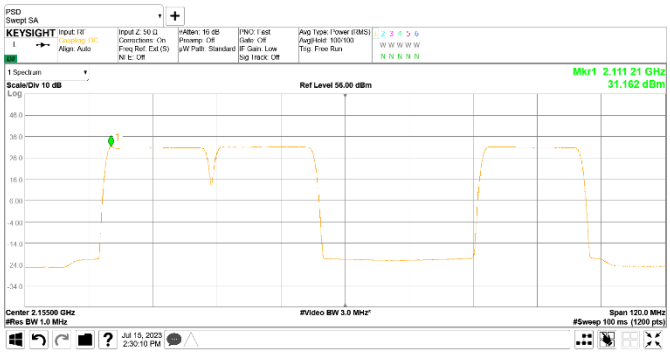


Figure 8.1-11: *PSD of LTE 20 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

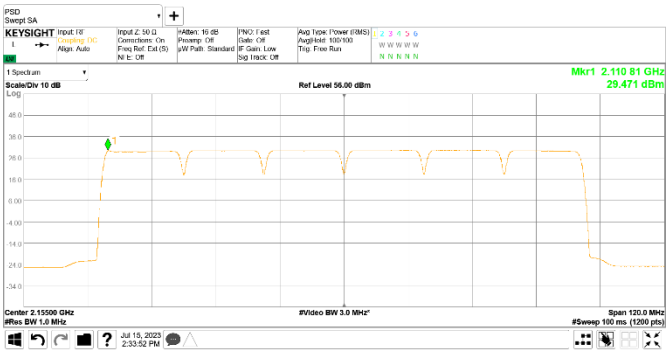


Figure 8.1-12: *PSD of LTE 15 MHz channel bandwidth, multi-carrier operation, sample plot, Contiguous*

Test data, continued

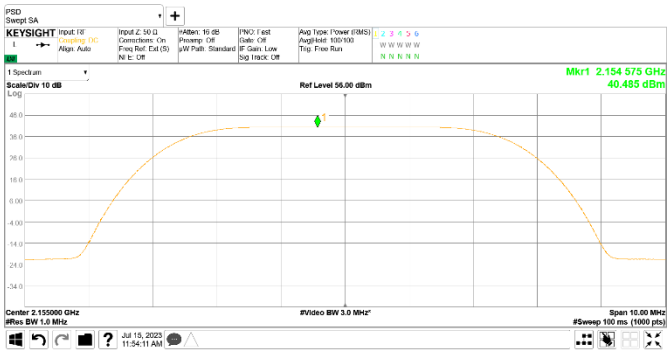


Figure 8.1-13: *PSD of NR 5 MHz channel bandwidth, single carrier operation, sample plot*

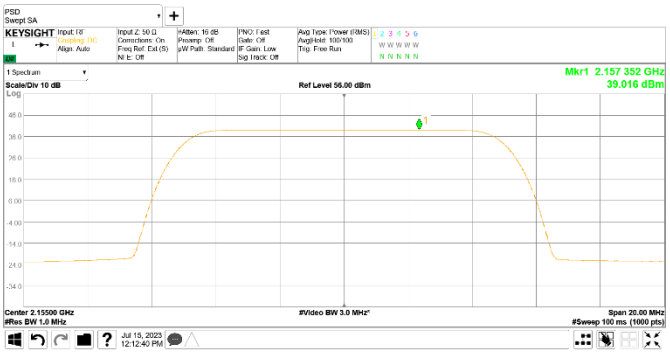


Figure 8.1-14: *PSD of NR 10 MHz channel bandwidth, single carrier operation, sample plot*

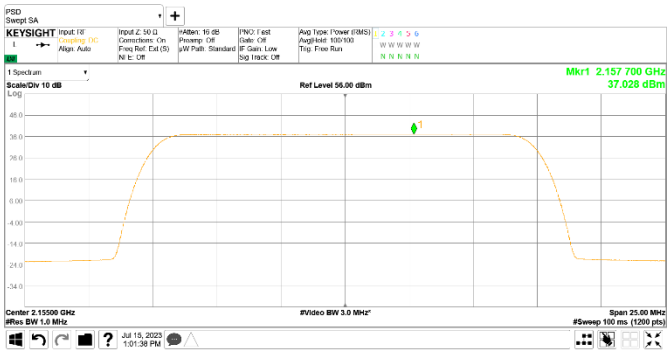


Figure 8.1-15: *PSD of NR 15 MHz channel bandwidth, single carrier operation, sample plot*

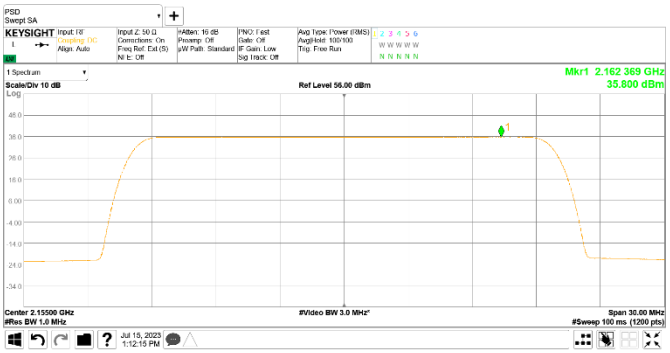


Figure 8.1-16: *PSD of NR 20 MHz channel bandwidth, single carrier operation, sample plot*

Test data, continued

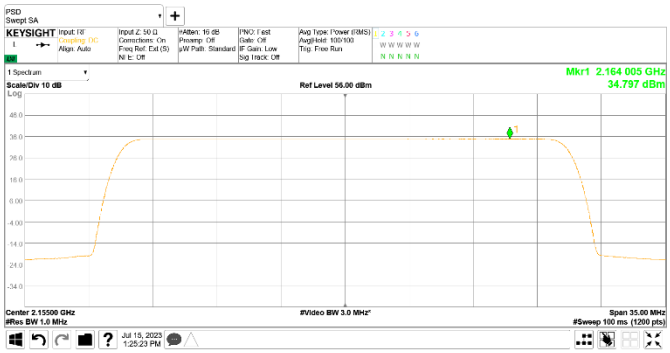


Figure 8.1-17: *PSD of NR 25 MHz channel bandwidth, single carrier operation, sample plot*

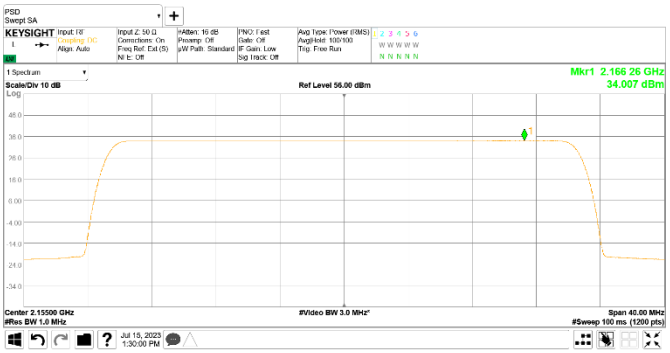


Figure 8.1-18: *PSD of NR 30 MHz channel bandwidth, single carrier operation, sample plot*

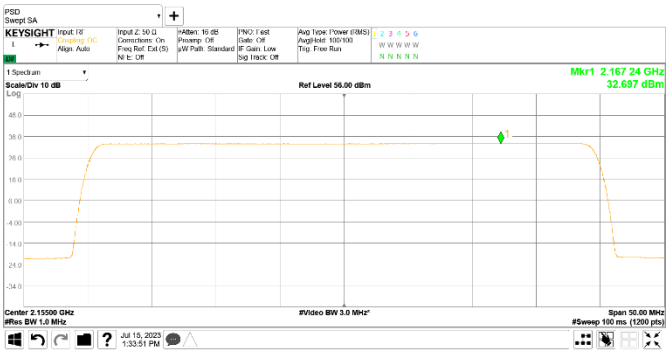


Figure 8.1-19: *PSD of NR 40 MHz channel bandwidth, single carrier operation, sample plot*

Test data, continued

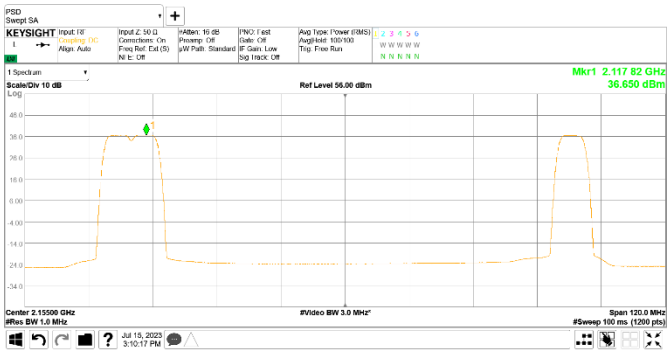


Figure 8.1-20: *PSD of NR 5 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

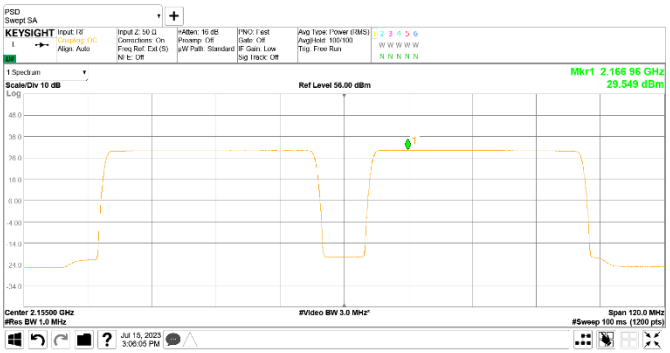


Figure 8.1-21: *PSD of NR 40 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

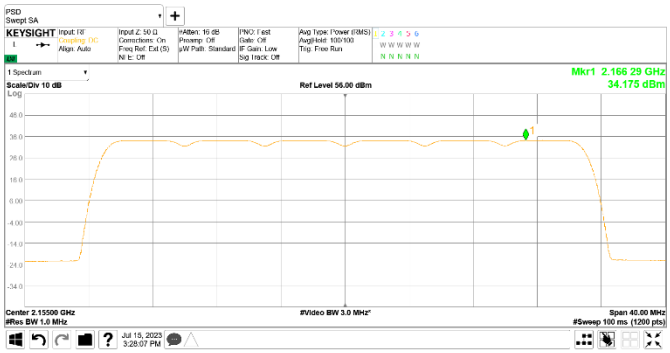


Figure 8.1-22: *PSD of NR 5 MHz channel bandwidth, multi-carrier operation, sample plot, Contiguous*

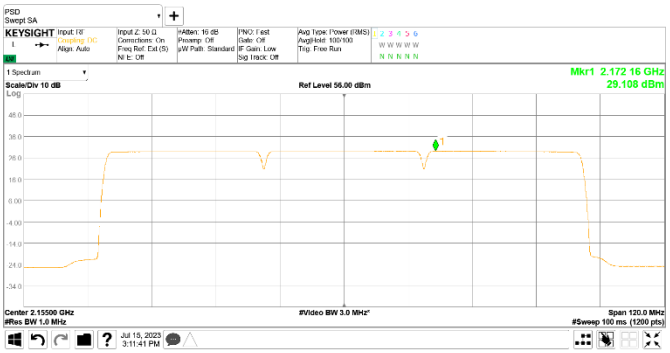


Figure 8.1-23: *PSD of NR 30 MHz channel bandwidth, multi-carrier operation, sample plot, Contiguous*

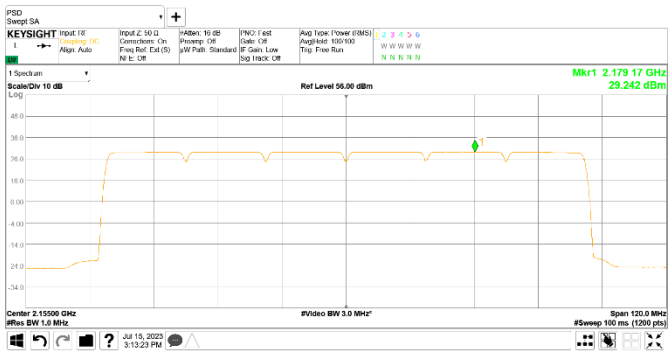


Figure 8.1-24: *PSD of NR 15 MHz channel bandwidth, multi-carrier operation, sample plot, Contiguous*

Test data, continued

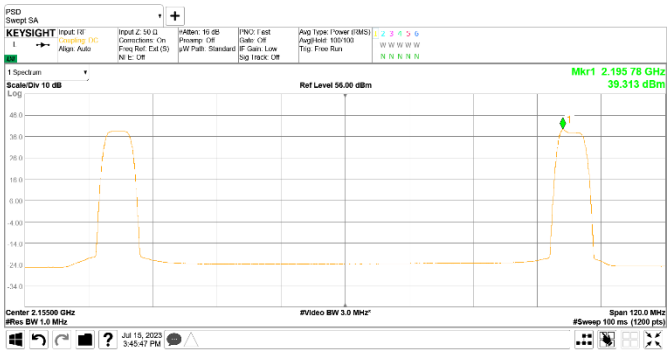


Figure 8.1-25: *PSD of multi-RAT operation, NR 5 MHz and LTE with IoT1 5 MHz*

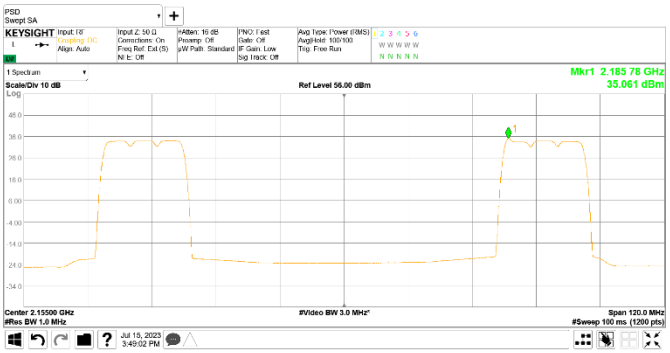


Figure 8.1-26: *PSD of multi-RAT operation, 3 × NR 5 MHz and 3 × LTE with IoT1 5 MHz*

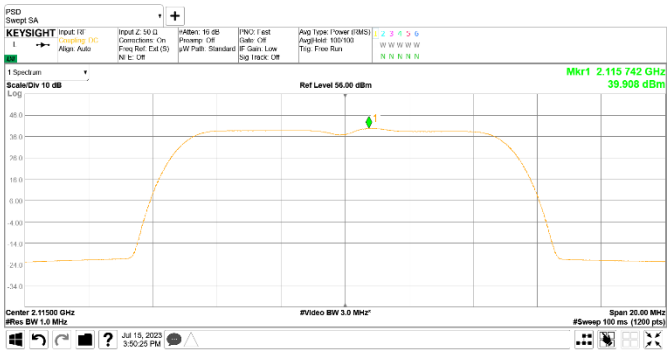


Figure 8.1-27: *PSD of multi-RAT operation, NR 5 MHz + LTE 5 MHz*

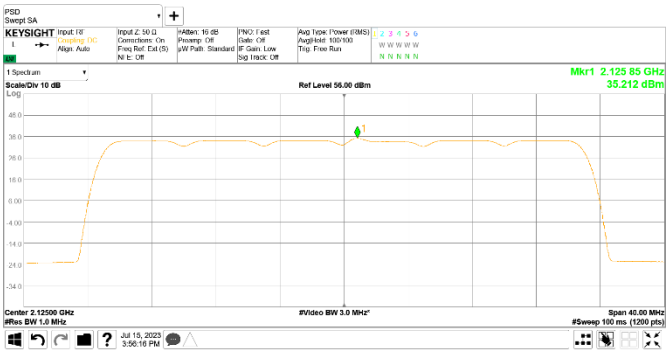


Figure 8.1-28: *PSD of multi-RAT operation, 3 × NR 5 MHz + 3 × LTE 5 MHz*

Test data, continued

Figure 8.1-29: *PSD of multi-RAT operation, LTE 10 MHz + 3 × NR 5 MHz, Low channel*

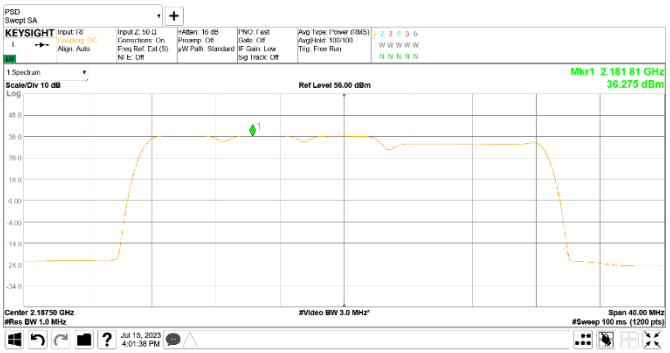


Figure 8.1-30: *PSD of multi-RAT operation, LTE 10 MHz + 3 × NR 5 MHz, High Channel*

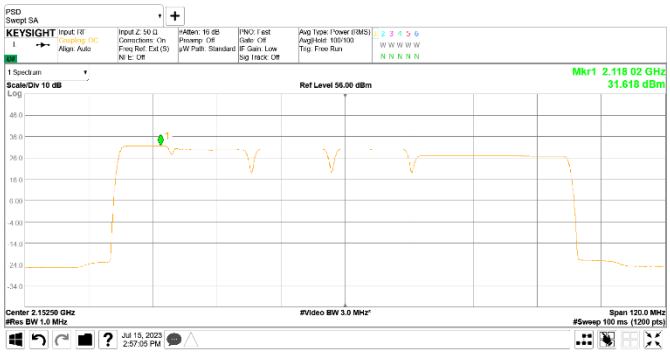


Figure 8.1-31: *PSD of multi-RAT operation,*

NR 10 MHz + 3 × LTE 15 MHz + NR 30 MHz, Low Channel

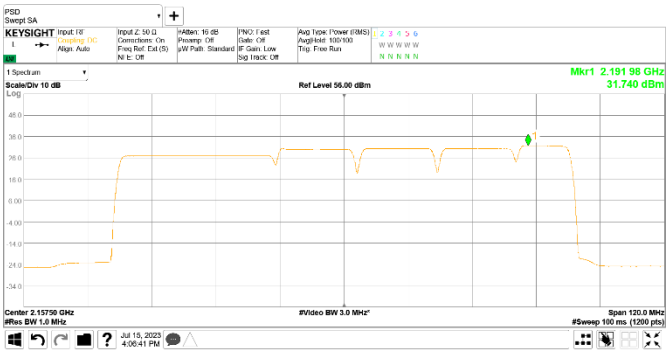


Figure 8.1-32: *PSD of multi-RAT operation, NR 10 MHz + 3 × LTE 15 MHz + NR 30 MHz, High Channel*

Test data, continued

Table 8.1-52: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for LTE 5 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
5 MHz, Low channel	2112.5	8.13	13.00	4.87
5 MHz, Mid channel	2155.0	8.13	13.00	4.87
5 MHz, Top channel	2197.5	8.12	13.00	4.88
5 MHz with IoT1, Low channel	2112.5	8.08	13.00	4.92
5 MHz with IoT1, Mid channel	2155.0	8.09	13.00	4.91
5 MHz with IoT1, Top channel	2197.5	8.11	13.00	4.89
5 MHz with IoT2, Low channel	2112.5	8.12	13.00	4.88
5 MHz with IoT2, Mid channel	2155.0	8.11	13.00	4.89
5 MHz with IoT2, Top channel	2197.5	8.12	13.00	4.88

Table 8.1-53: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for LTE 10 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
10 MHz, Low channel	2115.0	7.23	13.00	5.77
10 MHz, Mid channel	2155.0	7.25	13.00	5.75
10 MHz, Top channel	2195.0	7.28	13.00	5.72
10 MHz with IoT, Low channel	2115.0	7.39	13.00	5.61
10 MHz with IoT, Mid channel	2155.0	7.41	13.00	5.59
10 MHz with IoT, Top channel	2195.0	7.42	13.00	5.58

Table 8.1-54: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for LTE 15 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
15 MHz, Low channel	2112.5	7.25	13.00	5.75
15 MHz, Mid channel	2155.0	7.26	13.00	5.74
15 MHz, Top channel	2197.5	7.34	13.00	5.66
15 MHz with IoT, Low channel	2112.5	7.35	13.00	5.65
15 MHz with IoT, Mid channel	2155.0	7.00	13.00	6.00
15 MHz with IoT, Top channel	2197.5	7.45	13.00	5.55

Table 8.1-55: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for LTE 20 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
20 MHz, Low channel	2120.0	7.28	13.00	5.72
20 MHz, Mid channel	2155.0	7.26	13.00	5.74
20 MHz, Top channel	2190.0	7.38	13.00	5.62
20 MHz with IoT, Low channel	2120.0	7.44	13.00	5.56
20 MHz with IoT, Mid channel	2155.0	7.43	13.00	5.57
20 MHz with IoT, Top channel	2190.0	7.54	13.00	5.46

Test data, continued

Table 8.1-56: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 5 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
5 MHz, Low channel	2112.5	8.06	13.00	4.94
5 MHz, Mid channel	2155.0	8.13	13.00	4.87
5 MHz, Top channel	2197.5	8.13	13.00	4.87

Table 8.1-57: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 10 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
10 MHz, Low channel	2115.0	7.23	13.00	5.77
10 MHz, Mid channel	2155.0	7.25	13.00	5.75
10 MHz, Top channel	2195.0	7.29	13.00	5.71

Table 8.1-58: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 15 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
15 MHz, Low channel	2117.5	7.26	13.00	5.74
15 MHz, Mid channel	2155.0	7.26	13.00	5.74
15 MHz, Top channel	2192.5	7.36	13.00	5.64

Table 8.1-59: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 20 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
20 MHz, Low channel	2120.0	7.28	13.00	5.72
20 MHz, Mid channel	2155.0	7.25	13.00	5.75
20 MHz, Top channel	2190.0	7.43	13.00	5.57

Test data, continued

Table 8.1-60: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 25 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
25 MHz, Low channel	2122.5	7.29	13.00	5.71
25 MHz, Mid channel	2155.0	7.25	13.00	5.75
25 MHz, Top channel	2187.5	7.47	13.00	5.53

Table 8.1-61: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 30 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
30 MHz, Low channel	2125.0	7.31	13.00	5.69
30 MHz, Mid channel	2155.0	7.25	13.00	5.75
30 MHz, Top channel	2185.0	7.51	13.00	5.49

Table 8.1-62: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 40 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
40 MHz, Low channel	2130.0	7.35	13.00	5.65
40 MHz, Mid channel	2155.0	7.25	13.00	5.75
40 MHz, Top channel	2180.0	7.62	13.00	5.38

Test data, continued

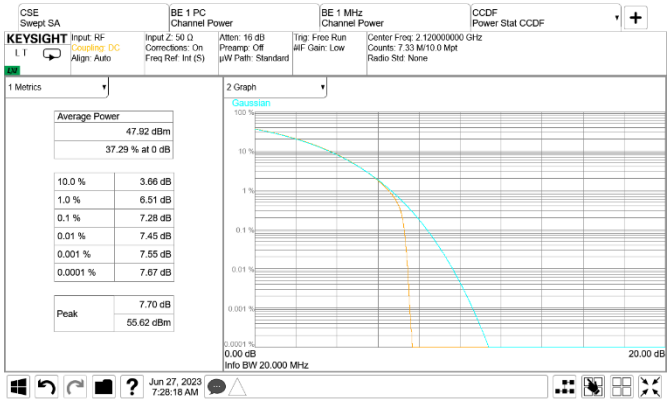


Figure 8.1-33: *CCDF sample plot, LTE*

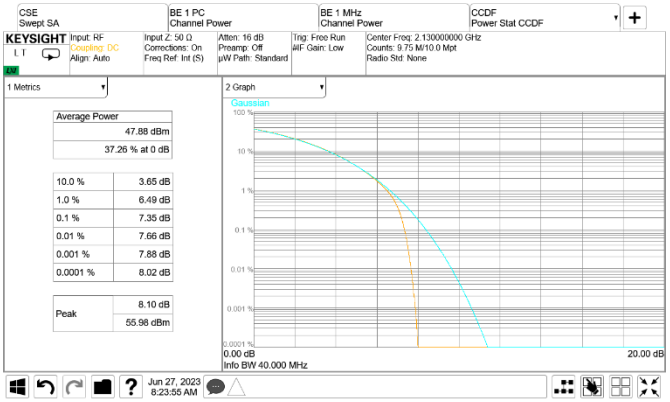


Figure 8.1-34: *CCDF sample plot, NR*

8.2 Transmitter output power (EIRP) and antenna height (Band 2/25)

8.2.1 Definitions and limits

FCC §24.232(a)(2):

Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.
(2) Base station antenna heights may exceed 300 meters HAAT with a corresponding reduction in power; see table below.
(b)(1) Base stations that are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census, with an emission bandwidth of 1 MHz or less are limited to 3280 watts equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT.
(d) 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 (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. 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.

RSS-133, Section 6.4
The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510.
In addition, the transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.
SRSP-510, Section 5.1
5.1.1 Base stations
For base stations with a channel bandwidth greater than 1 MHz, the maximum e.i.r.p. is limited to 3280 watts/MHz e.i.r.p. (i.e., no more than 3280 watts e.i.r.p. in any 1 MHz band segment) with an antenna height above average terrain (HAAT) up to 300 metres. Fixed or base stations operating in urban areas are limited to a maximum allowable e.i.r.p. of 1640 watts/MHz e.i.r.p. Base station antenna heights above average terrain may exceed 300 metres with a corresponding reduction in e.i.r.p. according to the following table.

Table 8.2-1: *Reduction to Maximum Allowable E.I.R.P. for HAAT > 300 m*

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

8.2.2 Test summary

Test date	June 27 and 28, 2023
Test engineer	Nimish Kapoor

8.2.3 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.

- Randomly selected sample plots provided for information and settings only
- Total MIMO PSD was calculated as follows: PSD from one antenna port + 10 × Log_{10} (4)
- RBS (Radio Base Station) EIRP Limits are deployment dependent. To ensure compliance with legal limits detailed in section 8.1.2, RBS set up and carrier configurations are addressed during site commissioning.
- Report results are compiled for the maximum output rated power for worst case emission assessment. EIRP, based on possible beam configuration, indicate the maximum power / worst case beam configuration based on ideal antenna parameters. Customer carrier configuration and power will be limited to comply with legal limits of 1640 W/MHz or 3280 W/MHz during RBS site set up and commissioning. Non-compliant configurations will be restricted to lower carrier power to ensure compliance.
- **To ensure compliance under worst case conditions with maximum output power based on a MIMO configuration, the maximum antenna gain for an RBS (Radio Base Station) system with Radio Radio 4890HP 48B2/B25 48B66 M01 is 17.0 dBi with 2.50 dB path loss. Maximum measured PSD to EIRP margin 0.20 dB.**

Spectrum analyzer settings for PSD:

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

8.2.1 Test data

Table 8.2-2: *EIRP calculation based on the* ***worst-case PSD measurement.***

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1992.5	41.43	47.45	2.50	17.00	61.95	62.15	0.20

Table 8.2-3: *RF power density measurement results of a single-carrier operation for LTE on 5 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1932.5	40.26	46.28	62.15	15.87
1962.5	40.20	46.22	62.15	15.93
1992.5	**40.46**	46.48	62.15	15.67

Table 8.2-4: *RF power density measurement results of a single-carrier operation for LTE with IB (IoT1) on 5 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1932.5	41.25	47.27	62.15	14.88
1962.5	41.24	47.26	62.15	14.89
1992.5	**41.43**	47.45	62.15	14.70

Table 8.2-5: *RF power density measurement results of a single-carrier operation for LTE with IB (IoT2) on 5 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1932.5	40.85	46.87	62.15	15.28
1962.5	40.84	46.86	62.15	15.29
1992.5	**41.09**	47.11	62.15	15.04

Table 8.2-6: *RF power density measurement results of a single-carrier operation for NR on 5 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1932.5	40.27	46.29	62.15	15.86
1962.5	40.20	46.22	62.15	15.93
1992.5	**40.48**	46.50	62.15	15.65

Table 8.2-7: *RF power density measurement results of a single-carrier operation for LTE on 10 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1935.0	39.05	45.07	62.15	17.08
1962.5	38.98	45.00	62.15	17.15
1990.0	**39.37**	45.39	62.15	16.76

Table 8.2-8: *RF power density measurement results of a single-carrier operation for LTE with IoT on 10 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1935.0	39.30	45.32	62.15	16.83
1962.5	39.33	45.35	62.15	16.80
1990.0	**39.82**	45.84	62.15	16.31

Test data, continued

Table 8.2-9: *RF power density measurement results of a single-carrier operation for NR on 10 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1935.0	38.92	44.94	62.15	17.21
1962.5	**39.80**	45.82	62.15	16.33
1990.0	39.18	45.20	62.15	16.95

Table 8.2-10: *RF power density measurement results of a single-carrier operation for LTE on 15 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1937.5	37.13	43.15	62.15	19.00
1962.5	37.22	43.24	62.15	18.91
1987.5	**37.57**	43.59	62.15	18.56

Table 8.2-11: *RF power density measurement results of a single-carrier operation for LTE with IoT on 15 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1937.5	37.32	43.34	62.15	18.81
1962.5	37.44	43.46	62.15	18.69
1987.5	**37.90**	43.92	62.15	18.23

Table 8.2-12: *RF power density measurement results of a single-carrier operation for NR on 15 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1937.5	36.89	42.91	62.15	19.24
1962.5	36.98	43.00	62.15	19.15
1987.5	**37.33**	43.35	62.15	18.80

Table 8.2-13: *RF power density measurement results of a single-carrier operation for LTE on 20 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1940.0	35.90	41.92	62.15	20.23
1962.5	36.01	42.03	62.15	20.12
1985.0	**36.22**	42.24	62.15	19.91

Table 8.2-14: *RF power density measurement results of a single-carrier operation for LTE with IoT on 20 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1940.0	36.13	42.15	62.15	20.00
1962.5	36.29	42.31	62.15	19.84
1985.0	**36.60**	42.62	62.15	19.53

Table 8.2-15: *RF power density measurement results of a single-carrier operation for NR on 20 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1940.0	35.61	41.63	62.15	20.52
1962.5	35.66	41.68	62.15	20.47
1985.0	**35.99**	42.01	62.15	20.14

Test data, continued

Table 8.2-16: *RF power density measurement results of a single-carrier operation for NR on 25 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1942.5	34.57	40.59	62.15	21.56
1962.5	34.68	40.70	62.15	21.45
1982.5	**34.94**	40.96	62.15	21.19

Table 8.2-17: *RF power density measurement results of a single-carrier operation for NR on 30 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1945.0	33.79	39.81	62.15	22.34
1962.5	33.84	39.86	62.15	22.29
1980.0	**34.11**	40.13	62.15	22.02

Table 8.2-18: *RF power density measurement results of a single-carrier operation for NR on 40 MHz channel*

Frequency, MHz	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
1950.0	32.55	38.57	62.15	23.58
1962.5	32.55	38.57	62.15	23.58
1975.0	**32.78**	38.80	62.15	23.35

Table 8.2-19: *RF power density measurement results of a multi-carrier operation for LTE on 5 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	**38.63**	44.65	62.15	17.50
3 carriers	36.76	42.78	62.15	19.37
6 carriers	33.94	39.96	62.15	22.19

Table 8.2-20: *RF power density measurement results of a multi-carrier operation for NR on 5 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	**38.46**	44.48	62.15	17.67
3 carriers	36.63	42.65	62.15	19.50
6 carriers	33.97	39.99	62.15	22.16

Table 8.2-21: *RF power density measurement results of a multi-carrier operation for LTE on 20 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	**32.70**	38.72	62.15	23.43
3 carriers	31.02	37.04	62.15	25.11

Table 8.2-22: *RF power density measurement results of a multi-carrier operation for LTE on 10 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
6 carriers	**31.02**	37.04	62.15	25.11

Test data, continued

Table 8.2-23: *RF power density measurement results of a multi-carrier operation for NR on 30 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	**30.76**	36.78	62.15	25.37

Table 8.2-24: *RF power density measurement results of a multi-carrier operation for NR on 20 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
3 carriers	**30.82**	36.84	62.15	25.31

Table 8.2-25: *RF power density measurement results of a multi-carrier operation for NR on 10 MHz channel [Non-Contiguous]*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
6 carriers	**30.93**	36.95	62.15	25.20

Table 8.2-26: *RF power density measurement results of a multi-carrier operation for LTE on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	Bottom	39.96	45.98	62.15	16.17
	Middle	39.81	45.83	62.15	16.32
	Top	**40.32**	46.34	62.15	15.81

Table 8.2-27: *RF power density measurement results of a multi-carrier operation for LTE on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
3 carriers	Bottom	37.85	43.87	62.15	18.28
	Middle	37.79	43.81	62.15	18.34
	Top	**38.29**	44.31	62.15	17.84

Table 8.2-28: *RF power density measurement results of a multi-carrier operation for LTE on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
6 carriers	Bottom	34.37	40.39	62.15	21.76
	Middle	34.94	40.96	62.15	21.19
	Top	**35.07**	41.09	62.15	21.06

Test data, continued

Table 8.2-29: *RF power density measurement results of a multi-carrier operation for NR on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
2 carriers	Bottom	39.12	45.14	62.15	17.01
	Middle	38.97	44.99	62.15	17.16
	Top	**39.36**	45.38	62.15	16.77

Table 8.2-30: *RF power density measurement results of a multi-carrier operation for NR on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
3 carriers	Bottom	36.97	42.99	62.15	19.16
	Middle	36.92	42.94	62.15	19.21
	Top	**37.33**	43.35	62.15	18.80

Table 8.2-31: *RF power density measurement results of a multi-carrier operation for NR on 5 MHz channel [Contiguous]*

Notes	Channel	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
6 carriers	Bottom	**34.20**	40.22	62.15	21.93
	Middle	34.15	40.17	62.15	21.98
	Top	34.20	40.22	62.15	21.93

Test data, continued

Table 8.2-32: *RF power density measurement results of a multi-RAT operation*

Notes	RF power density, dBm/MHz	Total MIMO PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
NR 5 MHz and LTE with IoT 15 MHz	39.48	45.50	62.15	16.65
3 × NR 5 MHz and 3 × LTE with IoT 15 MHz	34.85	40.87	62.15	21.28
NR 5 MHz + LTE 5 MHz, Low Channel	40.23	46.25	62.15	15.90
NR 5 MHz + LTE 5 MHz, Mid Channel	39.95	45.97	62.15	16.18
NR 5 MHz + LTE 5 MHz, High Channel	**40.35**	46.37	62.15	15.78
3 × NR 5 MHz + 3 × LTE 5 MHz, Low Channel	35.06	41.08	62.15	21.07
3 × NR 5 MHz + 3 × LTE 5 MHz, Mid Channel	35.08	41.10	62.15	21.05
3 × NR 5 MHz + 3 × LTE 5 MHz, High Channel	35.14	41.16	62.15	20.99
LTE 10 MHz with GB + 3 × NR 5 MHz, Low Channel	35.96	41.98	62.15	20.17
LTE 10 MHz with GB + 3 × NR 5 MHz, High Channel	36.07	42.09	62.15	20.06
NR 40 MHz + 3 × LTE 5 MHz with GB + NR 10 MHz, Low Channel	35.18	41.20	62.15	20.95
NR 40 MHz + 3 × LTE 5 MHz with GB + NR 10 MHz, High Channel	35.69	41.71	62.15	20.44

Note: “and”: non-contiguous channels; “+”: contiguous channels

Test data, continued

Table 8.2-33: *RF total channel power measurement results for LTE [5 MHz]*

Remarks	5 MHz channel (40 W)
Low channel, QPSK	46.44
Mid channel, QPSK	46.56
Top channel, QPSK	46.58
LTE with IoT1 Low channel, QPSK	46.47
LTE with IoT1 Mid channel, QPSK	46.55
LTE with IoT1 Top channel, QPSK	46.61
LTE with IoT2 Low channel, QPSK	46.48
LTE with IoT2 Mid channel, QPSK	46.56
LTE with IoT2 Top channel, QPSK	46.60

Note: all results in the table are in dBm units

Table 8.2-34: *RF total channel power measurement results for LTE [10 MHz]*

Remarks	10 MHz channel (60 W)
Low channel, QPSK	48.21
Mid channel, QPSK	48.32
Top channel, QPSK	48.44
LTE with GB, Low channel, QPSK	48.07
LTE with GB, Mid channel, QPSK	48.14
LTE with GB, Top channel, QPSK	48.29

Note: all results in the table are in dBm units

Table 8.2-35: *RF total channel power measurement results for LTE [15 MHz]*

Remarks	15 MHz channel (60 W)
Low channel, QPSK	48.14
Mid channel, QPSK	48.28
Top channel, QPSK	48.36
LTE with GB, Low channel, QPSK	48.03
LTE with GB, Mid channel, QPSK	48.16
LTE with GB, Top channel, QPSK	48.26

Note: all results in the table are in dBm units

Table 8.2-36: *RF total channel power measurement results for LTE [20 MHz]*

Remarks	20 MHz channel (60 W)
Low channel, QPSK	48.09
Mid channel, QPSK	48.26
Top channel, QPSK	48.31
LTE with GB, Low channel, QPSK	48.02
LTE with GB, Mid channel, QPSK	48.11
LTE with GB, Top channel, QPSK	48.16

Note: all results in the table are in dBm units

Table 8.2-37: *RF total channel power measurement results for NR [5 MHz]*

Remarks	5 MHz channel (40 W)
Low channel, QPSK	46.49
Mid channel, QPSK	46.56
Top channel, QPSK	46.61

Note: all results in the table are in dBm units

Test data, continued

Table 8.2-38: *RF total channel power measurement results for NR [10 MHz]*

Remarks	10 MHz channel (40 W)
Low channel, QPSK	48.27
Mid channel, QPSK	48.33
Top channel, QPSK	48.47

Note: all results in the table are in dBm units

Table 8.2-39: *RF total channel power measurement results for NR [15 MHz]*

Remarks	15 MHz channel (40 W)
Low channel, QPSK	48.13
Mid channel, QPSK	48.28
Top channel, QPSK	48.36

Note: all results in the table are in dBm units

Table 8.2-40: *RF total channel power measurement results for NR [20 MHz]*

Remarks	20 MHz channel (40 W)
Low channel, QPSK	48.11
Mid channel, QPSK	48.27
Top channel, QPSK	48.34

Note: all results in the table are in dBm units

Table 8.2-41: *RF total channel power measurement results for NR [25 MHz]*

Remarks	25 MHz channel (40 W)
Low channel, QPSK	48.10
Mid channel, QPSK	48.26
Top channel, QPSK	48.30

Note: all results in the table are in dBm units

Table 8.2-42: *RF total channel power measurement results for NR [30 MHz]*

Remarks	30 MHz channel (40 W)
Low channel, QPSK	48.09
Mid channel, QPSK	48.25
Top channel, QPSK	48.29

Note: all results in the table are in dBm units

Table 8.2-43: *RF total channel power measurement results for NR [40 MHz]*

Remarks	40 MHz channel (40 W)
Low channel, QPSK	48.14
Mid channel, QPSK	48.24
Top channel, QPSK	48.32

Note: all results in the table are in dBm units

Test data, continued

Table 8.2-44: *RF total channel power measurement results for LTE Multi-carrier [Non-contiguous]*

Carriers	5 MHz channel (60 W)	10 MHz channel (60 W)	20 MHz channel (60 W)
2 Carriers, QPSK	47.39		47.72
3 Carriers, QPSK	47.38		47.89
6 Carriers, QPSK	47.74	47.93	

Note: all results in the table are in dBm units

Table 8.2-45: *RF total channel power measurement results for NR Multi-carrier [Non-contiguous]*

Carriers	5 MHz channel (60 W	10 MHz channel (60 W)	20 MHz channel (60 W)	30 MHz channel (60 W)
2 Carriers, QPSK	47.41			47.92
3 Carriers, QPSK	47.40		47.97	
6 Carriers, QPSK	47.01	47.98		

Note: all results in the table are in dBm units

Table 8.2-46: *RF total channel power measurement results for LTE Multi-carrier [5 MHz bandwidth Contiguous]*

Carriers	Channel	5 MHz channel (60 W)
2 Carriers, QPSK	Low Channel	48.23
	Middle Channel	48.26
	Top Channel	48.41
3 Carriers, QPSK	Low Channel	47.94
	Middle Channel	47.97
	Top Channel	48.06
6 Carriers, QPSK	Low Channel	48.01
	Middle Channel	48.13
	Top Channel	48.14

Note: all results in the table are in dBm units

Table 8.2-47: *RF total channel power measurement results for NR Multi-carrier [5 MHz bandwidth Contiguous]*

Carriers	Channel	5 MHz channel (60 W)
2 Carriers, QPSK	Low Channel	48.24
	Middle Channel	48.28
	Top Channel	48.41
3 Carriers, QPSK	Low Channel	47.85
	Middle Channel	47.99
	Top Channel	48.08
6 Carriers, QPSK	Low Channel	48.03
	Middle Channel	48.15
	Top Channel	48.16

Note: all results in the table are in dBm units

Test data, continued

Table 8.2-48: *RF total channel power measurement results for multi-RAT operation*

Remarks	Power (dBm)
NR 5 MHz and LTE with IoT1 5 MHz	47.42
3 × NR 5 MHz and 3 × LTE with IoT1 5 MHz	47.77
NR 5 MHz + LTE 5 MHz, Low Channel	48.24
NR 5 MHz + LTE 5 MHz, Mid Channel	48.29
NR 5 MHz + LTE 5 MHz, High Channel	48.42
3 × NR 5 MHz + 3 × LTE 5 MHz, Low Channel	48.06
3 × NR 5 MHz + 3 × LTE 5 MHz, Mid Channel	48.13
3 × NR 5 MHz + 3 × LTE 5 MHz, High Channel	48.15
LTE 10 MHz with GB + 3 × NR 5 MHz, Low Channel	48.09
LTE 10 MHz with GB + 3 × NR 5 MHz, High Channel	48.21
NR 40 MHz + 3 × LTE 5 MHz with GB + NR 10 MHz, Low Channel	48.08
NR 40 MHz + 3 × LTE 5 MHz with GB + NR 10 MHz, High Channel	48.07

Note: “and”: non-contiguous channels; “+”: contiguous channels

Test data, continued

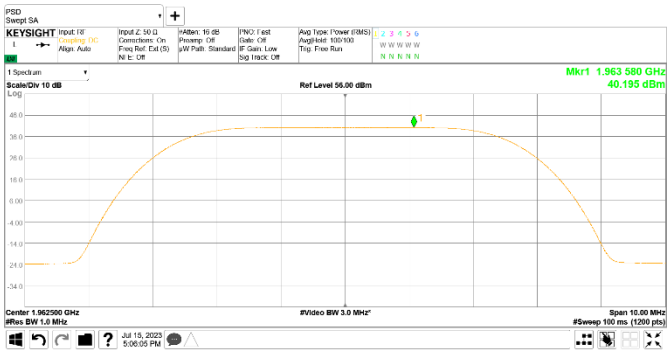


Figure 8.2-1: *PSD of LTE 5 MHz channel bandwidth, single carrier operation, sample plot*

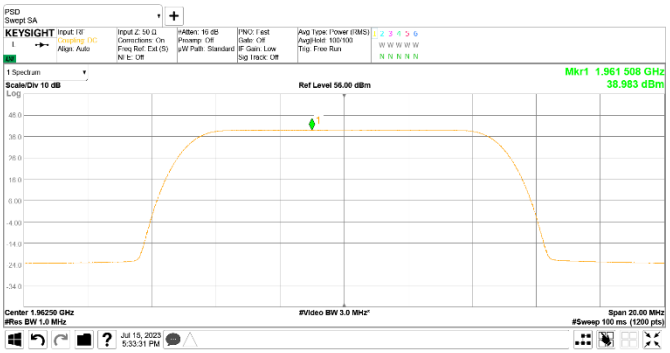


Figure 8.2-2: *PSD of LTE 10 MHz channel bandwidth, single carrier operation, sample plot*

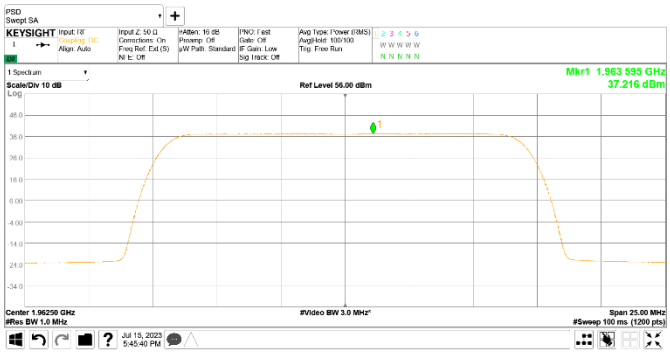


Figure 8.2-3: *PSD of LTE 15 MHz channel bandwidth, single carrier operation, sample plot*

Figure 8.2-4: *PSD of LTE 20 MHz channel bandwidth, single carrier operation, sample plot*

Test data, continued

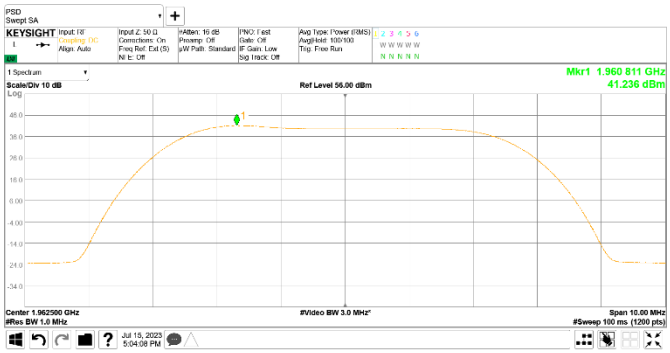


Figure 8.2-5: *PSD of LTE 5 MHz channel bandwidth with guard-band, single carrier operation, sample plot*

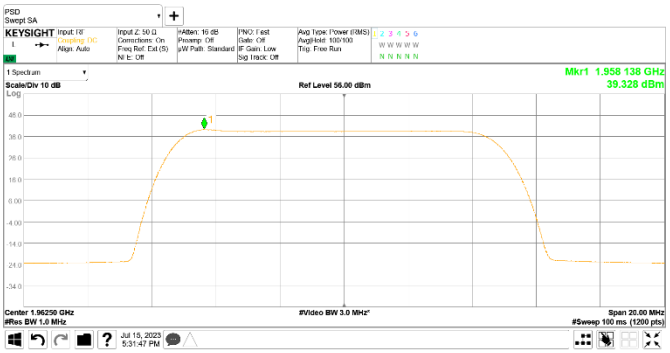


Figure 8.2-6: *PSD of LTE 10 MHz channel bandwidth with IoT, single carrier operation, sample plot*

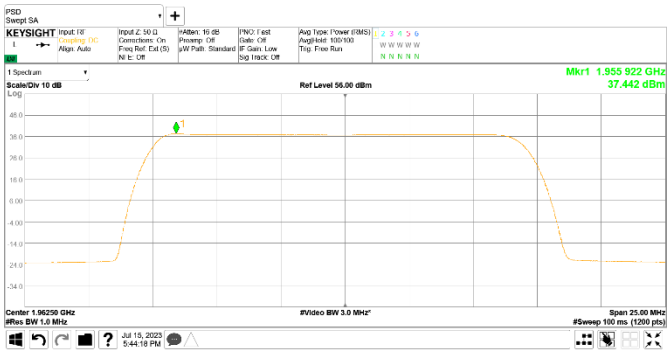


Figure 8.2-7: *PSD of LTE 15 MHz channel bandwidth with IoT, single carrier operation, sample plot*

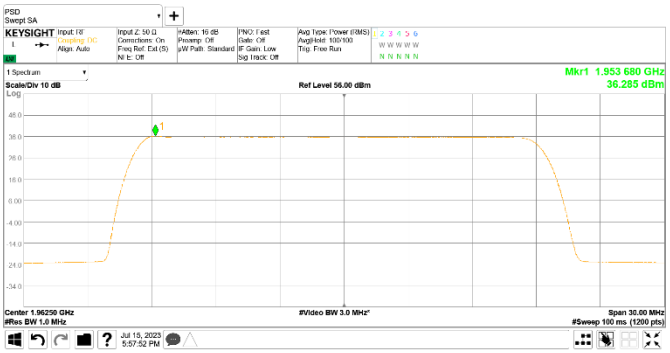


Figure 8.2-8: *PSD of LTE 20 MHz channel bandwidth with IoT, single carrier operation, sample plot*

Test data, continued

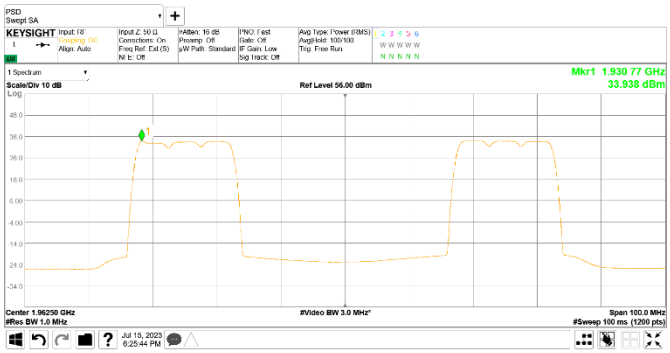


Figure 8.2-9: *PSD of LTE 5 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

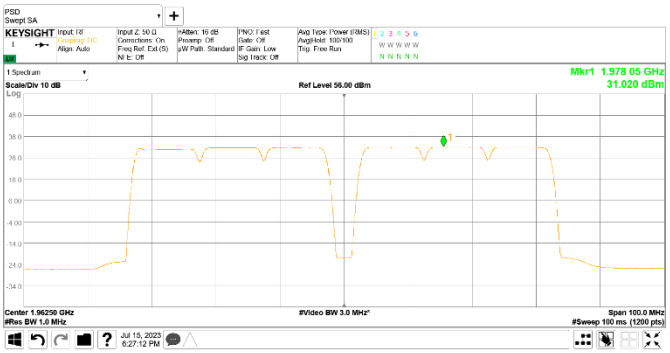


Figure 8.2-10: *PSD of LTE 10 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

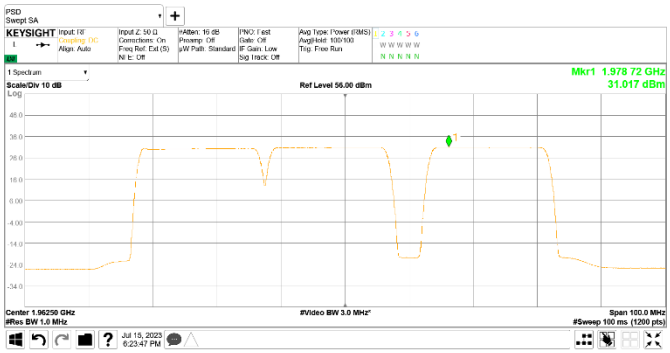


Figure 8.2-11: *PSD of LTE 20 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

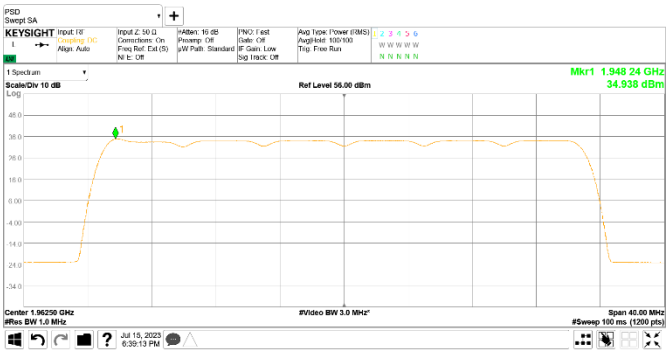


Figure 8.2-12: *PSD of LTE 5 MHz channel bandwidth, multi-carrier operation, sample plot, Contiguous*

Test data, continued

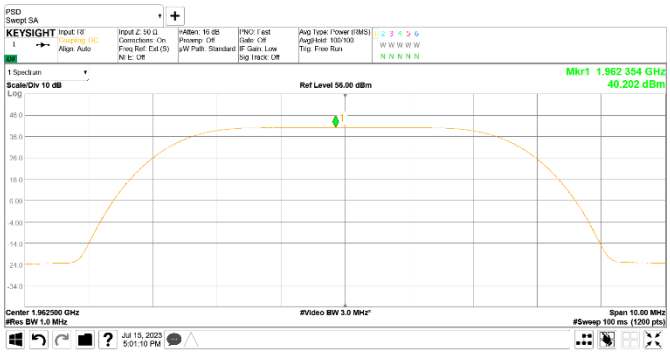


Figure 8.2-13: *PSD of NR 5 MHz channel bandwidth, single carrier operation, sample plot*

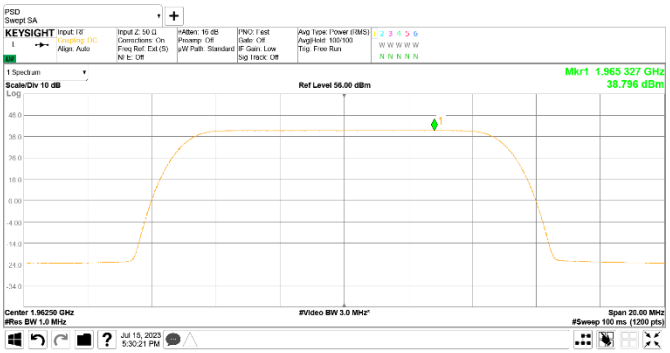


Figure 8.2-14: *PSD of NR 10 MHz channel bandwidth, single carrier operation, sample plot*

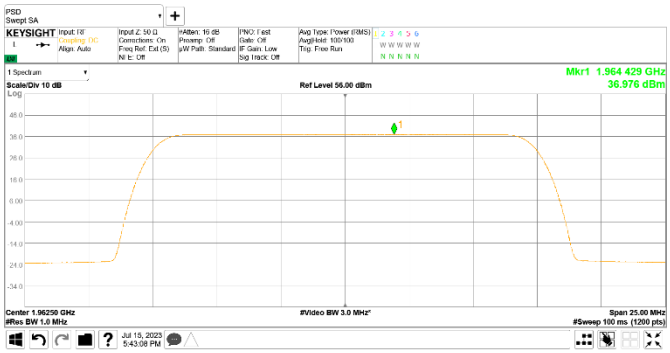


Figure 8.2-15: *PSD of NR 15 MHz channel bandwidth, single carrier operation, sample plot*

Figure 8.2-16: *PSD of NR 20 MHz channel bandwidth, single carrier operation, sample plot*

Test data, continued

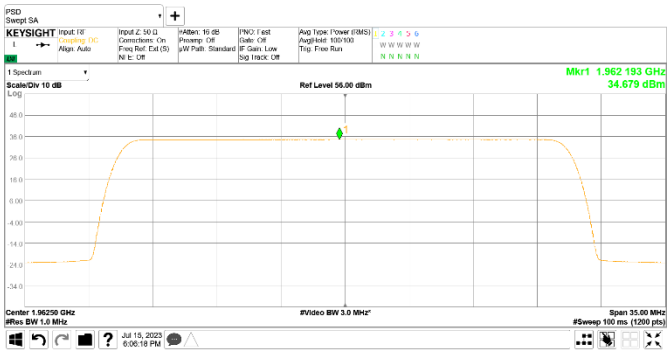


Figure 8.2-17: *PSD of NR 25 MHz channel bandwidth, single carrier operation, sample plot*

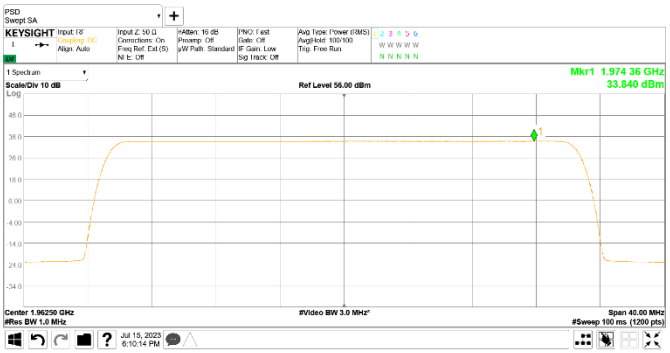


Figure 8.2-18: *PSD of NR 30 MHz channel bandwidth, single carrier operation, sample plot*

Figure 8.2-19: *PSD of NR 40 MHz channel bandwidth, single carrier operation, sample plot*

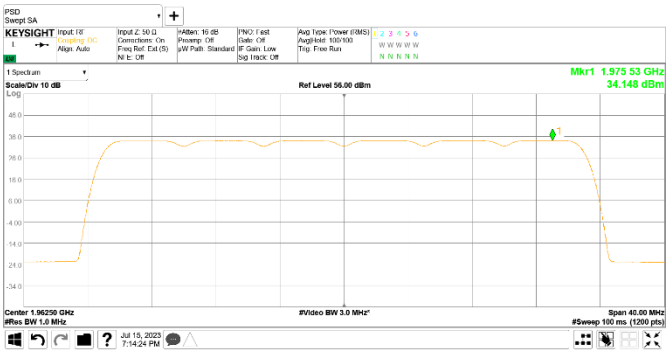


Figure 8.2-20: *PSD of NR 5 MHz channel bandwidth, multi-carrier operation, sample plot, Contiguous*

Test data, continued

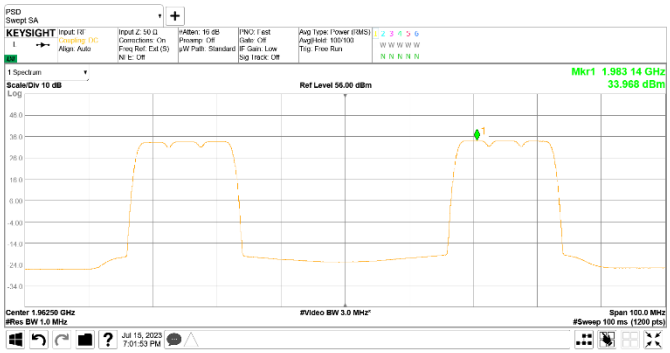


Figure 8.2-21: *PSD of NR 5 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

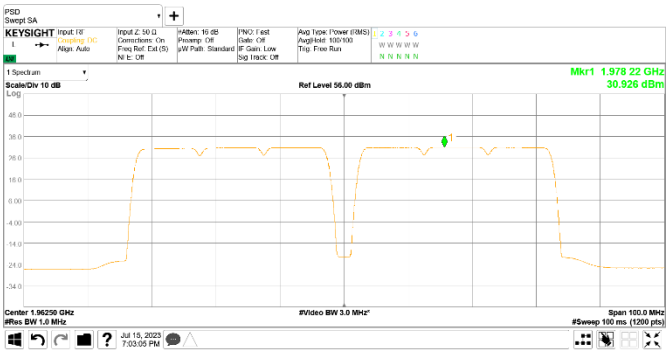


Figure 8.2-22: *PSD of NR 10 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

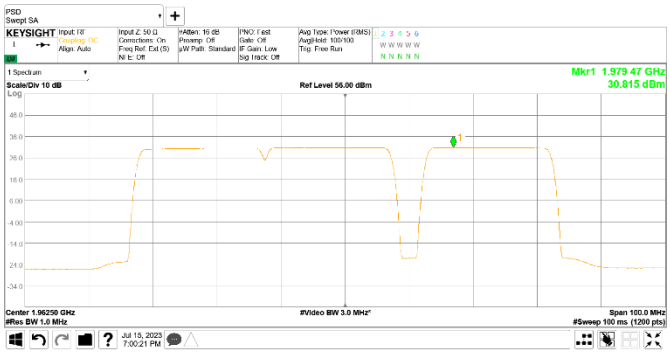


Figure 8.2-23: *PSD of NR 20 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

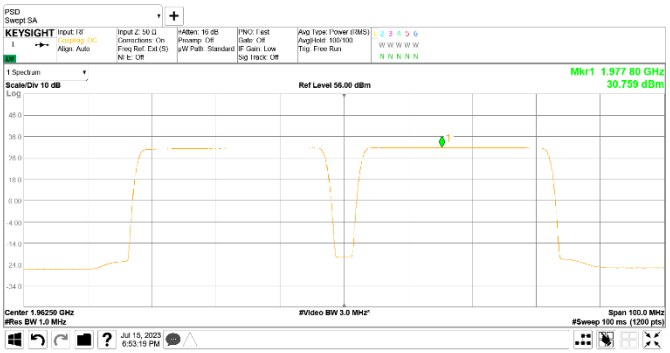


Figure 8.2-24: *PSD of NR 30 MHz channel bandwidth, multi-carrier operation, sample plot, Non-Contiguous*

Test data, continued

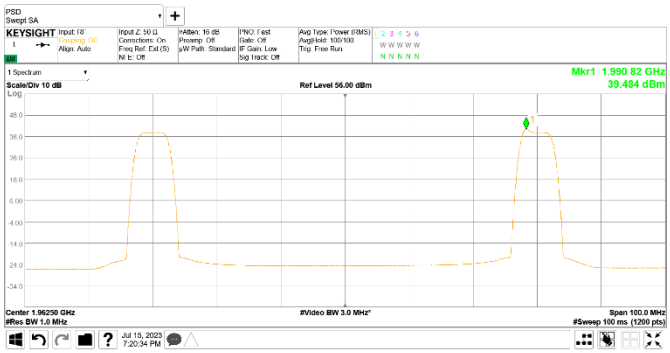


Figure 8.2-25: *PSD of multi-RAT operation, NR 5 MHz and LTE with IoT1 5 MHz*

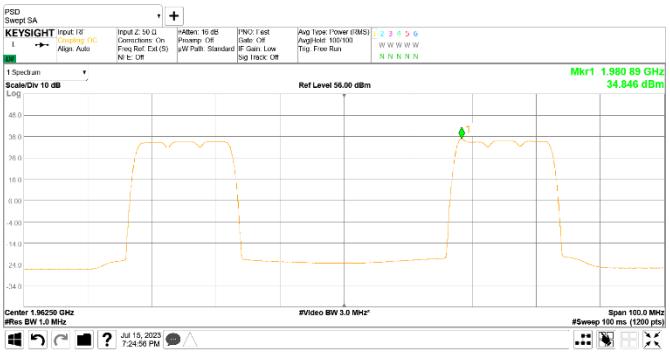


Figure 8.2-26: *PSD of multi-RAT operation, 3 × NR 5 MHz and 3 × LTE with IoT1 5 MHz*

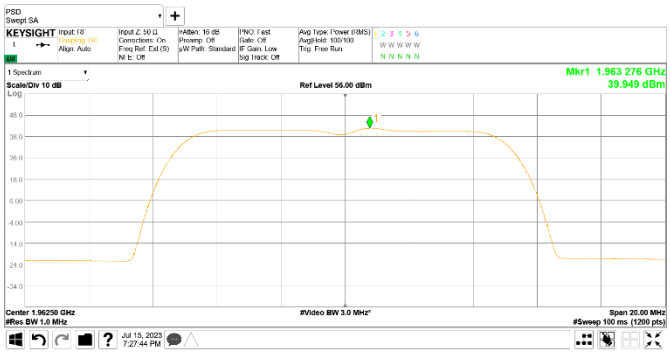


Figure 8.2-27: *PSD of multi-RAT operation, NR 5 MHz + LTE 5 MHz*

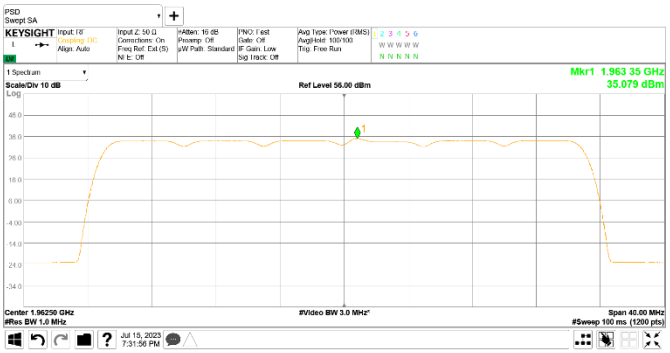


Figure 8.2-28: *PSD of multi-RAT operation, 3 × NR 5 MHz + 3 × LTE 5 MHz*

Test data, continued

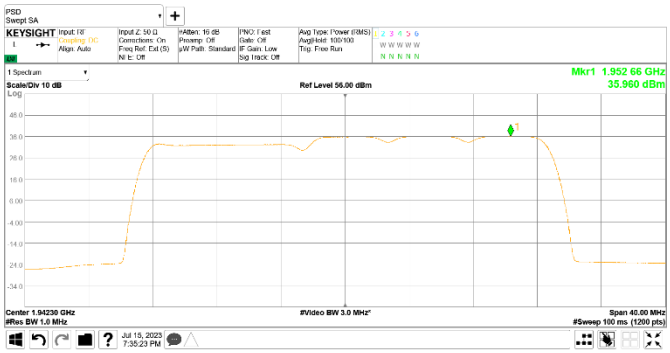


Figure 8.2-29: *PSD of multi-RAT operation, LTE 10 MHz + 3 × NR 5 MHz, Low channel*

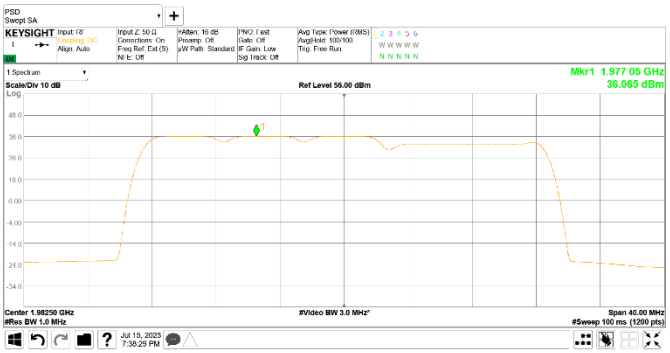


Figure 8.2-30: *PSD of multi-RAT operation, LTE 10 MHz + 3 × NR 5 MHz, High Channel*

Figure 8.2-31: *PSD of multi-RAT operation,*

NR 40 MHz + 3 × LTE 5 MHz + NR 10 MHz, Low Channel

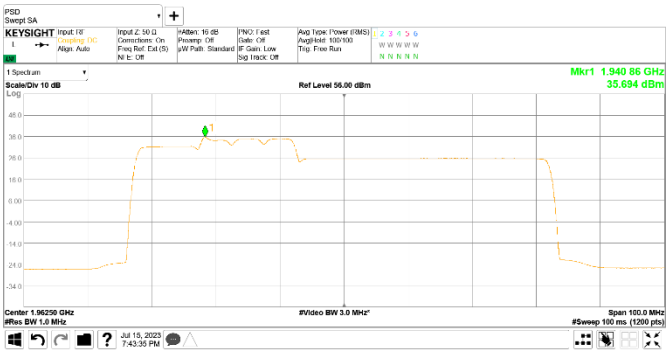


Figure 8.2-32: *PSD of multi-RAT operation, NR 40 MHz + 3 × LTE 5 MHz + NR 10 MHz, High Channel*

Test data, continued

Table 8.2-49: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for LTE 5 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
5 MHz, Low channel	1932.5	8.13	13.00	4.87
5 MHz, Mid channel	1962.5	8.14	13.00	4.86
5 MHz, Top channel	1992.5	8.14	13.00	4.86
5 MHz with IoT1, Low channel	1932.5	8.12	13.00	4.88
5 MHz with IoT1, Mid channel	1962.5	8.07	13.00	4.93
5 MHz with IoT1, Top channel	1992.5	8.08	13.00	4.92
5 MHz with IoT2, Low channel	1932.5	8.12	13.00	4.88
5 MHz with IoT2, Mid channel	1962.5	8.12	13.00	4.88
5 MHz with IoT2, Top channel	1992.5	8.13	13.00	4.87

Table 8.2-50: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for LTE 10 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
10 MHz, Low channel	1935.0	7.29	13.00	5.71
10 MHz, Mid channel	1962.5	7.25	13.00	5.75
10 MHz, Top channel	1990.0	7.26	13.00	5.74
10 MHz with IoT, Low channel	1935.0	7.46	13.00	5.54
10 MHz with IoT, Mid channel	1962.5	7.41	13.00	5.59
10 MHz with IoT, Top channel	1990.0	7.41	13.00	5.59

Table 8.2-51: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for LTE 15 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
15 MHz, Low channel	1937.5	7.36	13.00	5.64
15 MHz, Mid channel	1962.5	7.24	13.00	5.76
15 MHz, Top channel	1987.5	7.27	13.00	5.73
15 MHz with IoT, Low channel	1937.5	7.46	13.00	5.54
15 MHz with IoT, Mid channel	1962.5	7.36	13.00	5.64
15 MHz with IoT, Top channel	1987.5	7.39	13.00	5.61

Table 8.2-52: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for LTE 20 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
20 MHz, Low channel	1940.0	7.44	13.00	5.56
20 MHz, Mid channel	1962.5	7.25	13.00	5.75
20 MHz, Top channel	1985.0	7.28	13.00	5.72
20 MHz with IoT, Low channel	1940.0	7.57	13.00	5.43
20 MHz with IoT, Mid channel	1962.5	7.43	13.00	5.57
20 MHz with IoT, Top channel	1985.0	7.45	13.00	5.55

Table 8.2-53: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 5 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Low channel	1932.5	8.13	13.00	4.87
Mid channel	1962.5	8.12	13.00	4.88
Top channel	1992.5	8.13	13.00	4.87

Test data, continued

Table 8.2-54: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 10 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Low channel	1935.0	7.29	13.00	5.71
Mid channel	1962.5	7.24	13.00	5.76
Top channel	1990.0	7.26	13.00	5.74

Table 8.2-55: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 15 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Low channel	1937.5	7.40	13.00	5.60
Mid channel	1962.5	7.26	13.00	5.74
Top channel	1987.5	7.29	13.00	5.71

Table 8.2-56: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 20 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Low channel	1940.0	7.47	13.00	5.53
Mid channel	1962.5	7.26	13.00	5.74
Top channel	1985.0	7.30	13.00	5.70

Table 8.2-57: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 25 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Low channel	1942.5	7.53	13.00	5.47
Mid channel	1962.5	7.26	13.00	5.74
Top channel	1982.5	7.31	13.00	5.69

Table 8.2-58: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 30 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Low channel	1945.0	7.63	13.00	5.37
Mid channel	1962.5	7.28	13.00	5.72
Top channel	1980.0	7.34	13.00	5.66

Table 8.2-59: *Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 40 MHz*

Remarks	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
Low channel	1950.0	7.76	13.00	5.24
Mid channel	1962.5	7.33	13.00	5.67
Top channel	1975.0	7.35	13.00	5.65