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Radio Test report – Radio 4461 B77D

Report ID
REP083712

Project ID
PRJ0073941

Applicant:
Ericsson AB

Product description:
Radio Unit

Model name (PMN):
Radio 4461 B77D

Part number:
KRC 161 4477/31

FCC Identifier
FCC ID: TA8AKRC1614477

ISED certification number:
IC: 287AB-AS1614477

Model number (HVIN):
AS1614477

Requirements/Summary:

Standard	Environmental phenomenon	Compliance
FCC 47 CFR Part 27	Miscellaneous wireless communications services (3700-3980 MHz band)	Yes
RSS-192 Issue 5, RSS Gen	Equipment Operating in the Frequency Band (3700-3900)	Yes

Date of issue: March 17, 2025

Dhara Patel, EMC/Wireless Specialist
Tested by

Andrey Adelberg, Senior EMC/Wireless Specialist
Reviewed by

Reviewer 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

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Section 1. Report summary

1.1 Applicant

Company name	Ericsson AB
Address	PEU Radio Torshamnsgatan 23, Stockholm, Sweden 164 80

1.2 Manufacturer

Company name	Ericsson AB
Address	PEU Radio Torshamnsgatan 23, Stockholm, Sweden 164 80

1.3 Test specifications

FCC 47 CFR Part 2	Frequency Allocations and Radio Treaty Maters; General Rules and Regulations
FCC 47 CFR Part 27	Miscellaneous wireless communications services (698-746 MHz band)
RSS-192 Issue 5, July 2023	Flexible Use Broadband Equipment Operating in the Band 3450-3900 MHz
SRSP-520, Issue 3, July 2023	Technical Requirements for Fixed and/or Mobile Systems, Including Flexible Use Broadband Systems, in the Band 3450-3900 MHz
RSS-Gen, Issue 5, April 2018	General Requirements for Compliance of Radio Apparatus

1.4 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

1.5 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 (**REP083712**) applies to the *Radio 4461 B77D* with part number *KRC 161 4477/31*. See "Summary of test results" for full details.

EUT Configuration(s): refer to Section 3.

1.6 Test report revision history

Table 1.6-1: *Test report revision history*

Report ID	Date of issue	Details of changes made to test report
REP083712	March 17, 2025	Original report issued

Section 2. Summary of test results

2.1 Testing location

Test location (s)	Ottawa

2.2 Testing period

Test start date	February 12, 2025	Test end date	February 18, 2025

2.3 Sample information

Receipt date	February 12, 2025	Nemko sample ID number	PRJ00739410001

2.4 FCC Part 27 test results

Table 2.4-1: *FCC results summary*

Part	Test description	Verdict
§27.5(m)	Frequencies (3700–3980 MHz band)	Pass
§27.50(j)	Maximum output power at RF antenna connector	Pass
§27.53(l)(1)	Spurious emissions at RF antenna connector	Pass
§27.53(l)(1)	Radiated spurious emissions	Pass
§27.54	Frequency stability	Pass
§2.1049	Occupied bandwidth	Pass

Notes: None

2.5 RSS-192/Gen test results

Table 2.5-1: *ISED results summary*

Part	Test description	Verdict
RSS-192, 5.2	Band Plan	Pass[1]
RSS-192, 5.3	Types of Modulation	Pass[2]
RSS-192, 5.4	Frequency stability	Pass
RSS-192, 5.5	Transmitter Output Power	Pass
RSS-192, 5.6	Transmitter Unwanted Emissions (conducted and radiated)	Pass
RSS-Gen, 6.7	Occupied bandwidth	Pass

Notes: [1]EUT transmits within 3700–3900 MHz frequency range

[2]EUT utilizes the digital modulation (QPSK, 16 QAM, 64 QAM, 256 QAM)

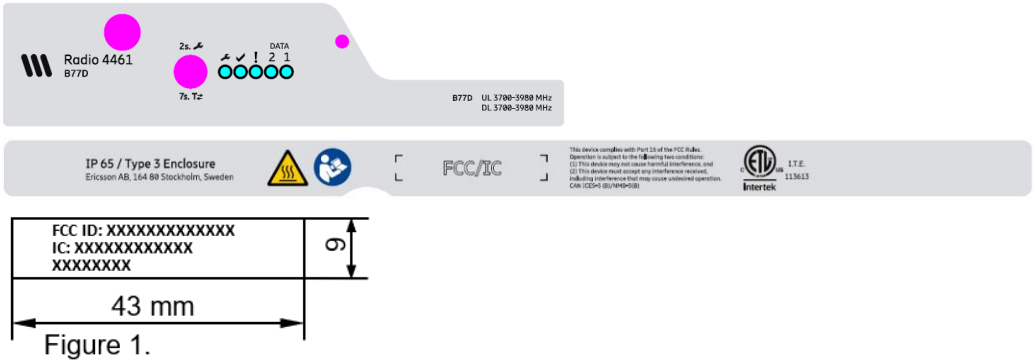
Section 3. Equipment under test (EUT) details

3.1 EUT information

Product name	Radio Unit
Model	Radio 4461 B77D
Part number tested	KRC 161 4477/3
Revision	R1B
Serial number	EA2B064416, EA2B064422 (for radiated spurious emissions)
Antenna ports	4 TX/RX
RF BW / IBW	200 MHz
Duplex mode	TDD
Frequency	FCC: 3700 – 3980 MHz ISED: 3700 – 3900 MHz
Nominal O/P per Antenna port	40 W
Accuracy (nominal)	±0.1 ppm
Nominal voltage	-48 VDC (-36 to -58.5 VDC)
RAT	NR
Modulation	QPSK, 16 QAM, 64 QAM, 256 QAM
Channel bandwidth	20, 30, 40, 50, 60, 70, 80, 90, 100 MHz
Maximum combined OBW per port	FCC: 280 MHz ISED: 200 MHz
CPRI	2.5 – 24.3 Gbps (Data 1, 2)
Channel raster	30 kHz
Regulatory requirements	Radio: FCC Part 2, 27, RSS-Gen, RSS-192
	EMC: FCC Part 15, ICES-003
Emission Designator	20M0W7D, 30M0W7D, 40M0W7D, 50M0W7D, 60M0W7D, 70M0W7D, 80M0W7D, 90M0W7D, 100MW7D
Supported Configurations	Single Antenna, TX Diversity, MIMO, Carrier Aggregation
Operating temperature	−40 °C to +55 °C
Max RF Power	160 W total / radio (= 4 ports x 40W)
Supported carriers /band/ port SRO/MRO	Max 6 carriers per port
Carrier Configuration:	NR TDD
RAT SC Carrier Power (max)	40 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 4461 B77D is a multi-standard remote Single Band radio forming part of the Ericsson RBS (Radio Base Station) equipment. Radio 4461 provides radio access for mobile and fixed devices and is designed for the outdoor environment. Radio 4461 operates over the band 77D via 4 TX/RX ports connected to the Remote Radio Unit (RRU) antennas. Radio 4461 transmits and receive on all 4 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 4461 product is convection cooled and can be mounted either vertically or horizontally. Output RF Power is rated at 4 × 40 W. Altitude during operation: Below 4000 m. Radio 4461 is a synthesized Transceiver designed for use in the 3GPP (Third Generation Partnership Project) for NR (New Radio). Radio product is KRC 161 4477/31 which is a SW locked customer deliverable. Tests were executed on the KRC 161 4477/3 which is a SW unlocked variant of the KRC 161 4477/31 radio to enable efficient testing for compliance. Both variants are electrically identical.
Ports/Interface	**Port** / **Description** A, B, C, D / RF Ports Data 1, 2 / Optical Interface Alarm / Fan / Alarm / Fan Control AISG / AISG communition port -48VDC / DC Input
Physical	**Dimensions**: 409 × 269 × 122 (mm) **Weight**: 11.2 kg without fan **Operating Temperature**: –40 °C to +55 °C **Mounting**: Rail, wall and pole Vertical: portrait and bookshelf mounting are supported Horizontal: supported only with fan **Cooling**: Natural convection; fan unit for horizontal mounting
Software details	CXP2021113/1_R24A416
Product Identification / Markings and Labels	 Figure 1. FCC ID: TA8AKRC1614477 IC: 287AB-AS1614477 AS1614477

3.3 EUT test details

EUT setup/configuration rationale for Down link:

RAT	Modulation	Test Model / Configuration
NR	QPSK	TM1.1
NR	16QAM	TM3.2
NR	64QAM	TM3.1
NR	256QAM	TM3.1a

Single Carrier Test Configurations:

Carrier	CBW (MHz)	Low (MHz)	Middle (MHz)	High FCC (MHz)	High ISED (MHz)
NR 1C	20	3710.01	3819.99	3969.99	3890.01
	30	3714.99	3819.99	3965.01	3885
	40	3720	3819.99	3960	3879.99
	50	3725.01	3819.99	3954.99	3875.01
	60	3729.99	3819.99	3950.01	3870
	70	3735	3819.99	3945	3864.99
	80	3740.01	3819.99	3939.99	3860.01
	90	3744.99	3819.99	3935.01	3855
	100	3750	3819.99	3930	3849.99

Multi Carrier Test Configurations:

Carrier	CBW (MHz)	Low (MHz)	Middle (MHz)	High FCC (MHz)	High ISED (MHz)
NR 2C Contig	20	3710.01+3729.99	3810+3830.01	3950.01+3969.99	3870+3890.01
	100	3750+3849.99	3770.01+3870	3829.99+3930	Same as FCC low
NR 6C Contig	20	3710.01+3729.99+3750 +3770.01+3789.99+3810	3770.01+3789.99+3810 +3830.01+3849.99+3870	3870+3890.01+3909.99 +3929.99+3950.01+3969.99	3789.99+3810+3829.99 +3849.99+3870+3890.01
	30	3714.99+3744.99+3774.99 +3804.99+3834.99+3864.99	3744.99+3774.99+3804.99 +3834.99+3864.99+3894.99	3815.01+3845.01+3875.01 +3905.01+3935.01+3965.01	3735+3765+3795 +3825+3855+3885
NR 2C NC	20	3710.01_3789.99	3780_3860.01	3890.01_3969.99	3810_3890.01
NR 4C NC	20	3710.01+3729.99 _3770.01+3789.99	3780+3800.01 _3840.01+3860.01	3890.01+3909.99 _3950.01+3969.99	3810+3829.99 _3870+3890.01

Note: NC = Non-contiguous

Radiated Emissions Test Configurations:

Carrier Configs	Frequency (MHz)
NR 1C Low	3710.01
NR 1C Mid	3819.99
NR 1C High	3969.99
NR 2C Non-contig Low	3710.01_3789.99
NR 2C Non-contig Mid	3780_3860.01
NR 2C Non-contig High	3890.01_3969.99

3.4 EUT setup diagram

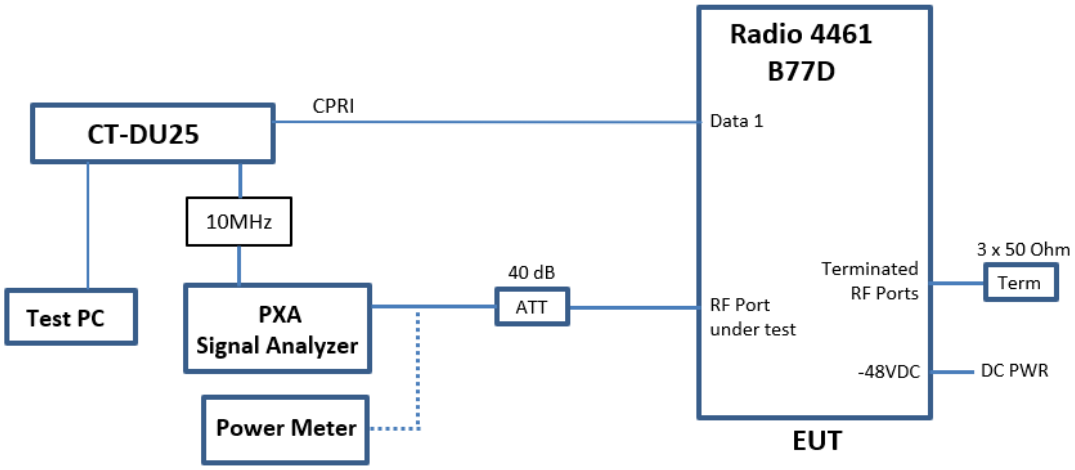


Figure 3.4-1: *Setup diagram – Radio Compliance*

3.5 Setup photographs

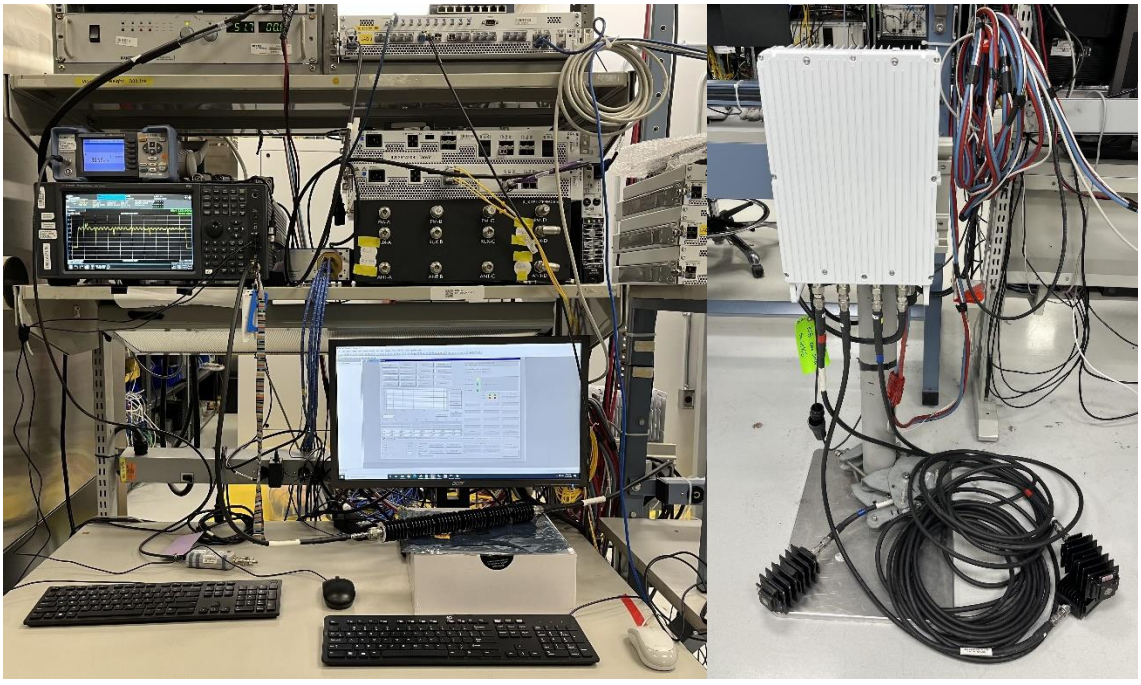


Figure 3.5-1: *Set up photo for Radio Compliance Testing*

Setup photographs, continued

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

Figure 3.5-3: *EUT Set-up photos for Radiated Emissions below 1 GHz*

Setup photographs, continued

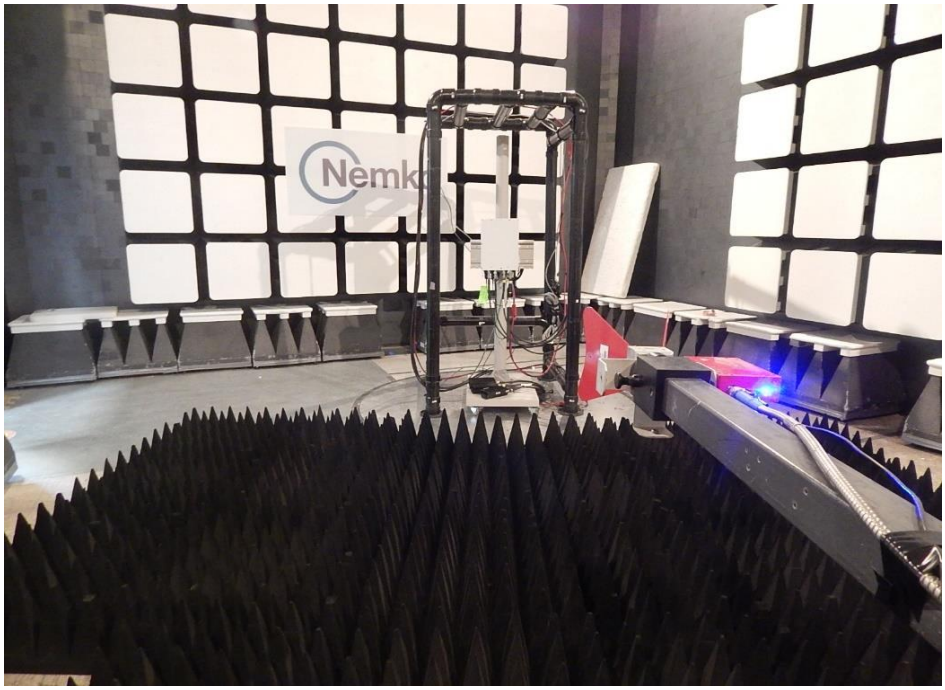


Figure 3.5-4: *EUT Set-up photos for Radiated Emissions from 1-18 GHz*

Figure 3.5-5: *EUT Set-up photos for Radiated Emissions from 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	**Measurement uncertainty, ±dB**
Radiated spurious emissions (30 MHz to 1 GHz)	5.8
Radiated spurious emissions (1 GHz to 6 GHz)	4.7
Radiated spurious emissions (6 GHz to 18 GHz)	5.0
Radiated spurious emissions (18 GHz to 26 GHz)	5.0
Radiated spurious emissions (18 GHz to 40 GHz)	5.2
RF Output power measurement using Spectrum Analyzer[1]	0.71
RF Output power measurement using Power Meter	0.54
Conducted spurious emissions	0.90
Other antenna port measurements	0.81

Notes: UKAS Lab 34, TIA-603 and ETSI TR 100 028-1&2 have been used as guidance for measurement uncertainty reasonable estimations with regards to previous experience and validation of data. Nemko Canada Inc. follows these test methods in order to satisfy ISO/IEC 17025 requirements for estimation of uncertainty of measurement for wireless products. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: *Equipment list*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002047	1 year	April 18, 2025
Flush mount turntable	Sunol	FM2022	FA002082	—	NCR
Controller	Sunol	SC104V	FA002060	—	NCR
Antenna mast	Sunol	TLT2	FA002061	—	NCR
DC Power source	Ametek	SGA80X125C-0AAA	FA002737	—	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 40	FA002071	1 year	March 7, 2025
Horn (1–18 GHz)	ETS Lindgren	3117	FA002840	1 year	March 8, 2025
Preamp (1–18 GHz)	ETS Lindgren	124334	FA002877	1 year	November 19, 2025
Horn antenna (18–40 GHz)	EMCO	3116	FA001847	1 year	May 21, 2025
Pre-amplifier (18–26 GHz)	Narda	BBS-1826N612	FA001550	1 year	May 9, 2025
Pre-amplifier (26–40 GHz)	Narda	DBL-2640N610	FA001556	1 year	May 9, 2025
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	March 27, 2025
50 Ω coax cable	Carlisle	WHU18-1818-072	FA002391	1 year	October 18, 2025
50 Ω coax cable	Huber+Suhner	104B11NX2/11000	FA003441	1 year	October 18, 2025
PXA Signal Analyzer	Keysight	N9030B	MY57144347	1 year	April 3, 2025
Power Meter	Rohde & Schwarz	NRP2	101814	2 years	March 21, 2025
Power Sensor	Rohde & Schwarz	NRP-Z11	11941	2 years	February 28, 2026
CT-DU25*	Ericsson	LPC 102 500/1	T01G525053	—	NCR
ENA Network Analyzer	Keysight	E5080B	MY59202549	1 year	April 4, 2025
30 dB Attenuator	API Weinschel	66-30-33	CJ6535	—	VOU
10 dB Attenuator	Mini-Circuits	BW-K10-2W44+	—	—	VOU
DC Power Supply	Xantrex	XKW 60-50	E00109863	—	VOU

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

* CT-DU25 is the test equipment that drives the radios traffic.

Section 8. Testing data

8.1 Maximum output power at RF antenna connector

8.1.1 Definitions and limits

FCC §27.50(j) Operation within the bands 3700-3980 MHz

The power of each fixed or base station transmitting in the 3700-3980 MHz band and situated in any geographic location other than that described in paragraph (j)(1) of this section is limited to:

(i) An equivalent isotropically radiated power (EIRP) of an EIRP of 1640 Watts/MHz

RSS-192, Section 5.5

The maximum output power of the equipment measured in terms of average values shall comply with the limits specified in table below:

Table 8.1-1: *Maximum power of equipment*

Equipment type	Maximum power
Non-AAS: base station (outdoor), fixed P-P station, P-MP hub station	68 dBm e.i.r.p./5 MHz
AAS: base station (outdoor), P-MP hub station	47 dBm TRP/5MHz
Indoor base station	39 dBm TRP/channel bandwidth
Fixed subscriber equipment	39 dBm e.i.r.p./channel bandwidth
Subscriber equipment other than fixed subscriber equipment	30 dBm e.i.r.p./channel bandwidth

Notes: Equipment type is Indoor base station

RSS-192, Section 5.5

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.

Definitions and limits, continued

SRSP-518, Section 5: Technical Criteria

5.1 Radiated power and antenna height limits for fixed and base stations

21. For fixed and base stations transmitting in accordance with section 4, the maximum permissible equivalent isotropically radiated power (e.i.r.p.) is 1640 watts and 1640 watts/MHz for a channel bandwidth less than or equal to 1 MHz and greater than 1 MHz, respectively. These e.i.r.p. limits apply for stations with an antenna height above average terrain (HAAT)Footnote2 up to 305 metres.

5.4 Stations with multiple antennas using multiple-input, multiple-output (MIMO) technology
29. If a fixed or base station is equipped with multiple antennas, the following rules regarding e.i.r.p. and antenna height shall apply.

5.4.1 E.i.r.p. for correlated transmission

30. When multiple antennas are used at a station to transmit the same digital data in a given symbol period (even with different coding or phase shifts) for transmit diversity or to steer signal energy towards a particular direction for enhanced directional gain (i.e. beamforming) or to devise any other transmission mode where signals from different antennas are correlated, the e.i.r.p. shall be calculated based on the aggregate power conducted across all antennas and resulting directional gain of 10 log10(N) + Gmax(dBi). Here, N is the number of antennas and Gmax is the highest gain in dBi among all antennas.

5.4.2 E.i.r.p. for uncorrelated transmission

31. When multiple antennas are used at a station in which each antenna transmits different digital data during any given symbol period (i.e. space-time block codes) or independent parallel data stream over the same frequency bandwidth in order to increase data rates (i.e. spatial multiplexing), or forms any other transmission mode where signals from different antennas are completely uncorrelated, the e.i.r.p. shall be calculated based on the aggregate power conducted across all antennas and maximum antenna gain Gmax.

5.4.3 Antenna height

32. The HAAT of a fixed or a base station with multiple antennas shall be calculated with reference to the highest antenna.

8.1.2 Test summary

Test date	February 12, 2025
Test engineer	Dhara Patel

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.

- Sample Selection: A random sample of devices was selected for testing to ensure representative results.
- Antenna Port Selection: The device under test (EUT) has four antenna ports. Port D was identified as the port with the highest transmit power and was selected for all subsequent measurements.
- Modulation Selection: The EUT supports Quadrature Phase Shift Keying (QPSK) and multiple Quadrature Amplitude Modulation (QAM) schemes. Sample testing was performed at each supported modulation and QPSK was chosen as the worst-case representative modulation due to its higher power output, except that 16-QAM was chosen as the worst-case modulation for PSD (per MHz) measurement.
- MIMO Power Calculation:
  - The Total MIMO Power Spectral Density (PSD) was calculated by adding 6.0 dB to the PSD of a single antenna port to account for the 4×4 MIMO configuration.
- Radio Base Station (RBS) EIRP Limits: RBS EIRP limits vary depending on deployment scenarios. To ensure compliance with regulatory limits, specific RBS setups and carrier configurations are considered during site commissioning.
- Test Conditions: The EUT was tested under maximum rated output power conditions to assess worst-case emission levels.
- Antenna and Deployment Considerations: The EUT was tested without an antenna. Licensees are responsible for evaluating installation and deployment factors, including maximum power settings, antenna gain, and feeder loss, to ensure compliance with Equivalent Isotropically Radiated Power (EIRP) limits as defined by the FCC and ISED regulations.
- EIRP Calculation Example: For Radio 4461 B77D, EIRP was calculated using an antenna gain of 12.0 dBi and a feeder loss of 2.5 dB. Power settings and carrier configurations will be adjusted as necessary to meet regulatory requirements based on specific deployment scenarios.
- The FCC and ISED regulatory limits for Equivalent Isotropic Radiated Power (EIRP) are 1640 W (62.15 dBm/MHz) and 68 dBm/5 MHz, respectively.
- The measurements were performed using the calibrated path and included the duty cycle correction based on the test configuration. For NR TDD, with a duty cycle of 74%, a compensation factor of 1.3 dB was applied. The factor was added to the input correction factors of the spectrum analyzer and the power meter in addition to the path loss.

Spectrum analyzer settings for PSD:

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

8.1.4 Test data

Table 8.1-2: *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
3969.99	35.596	41.60	2.5	12.0	51.10	62.15	11.05

Table 8.1-3: *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	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
3710.01	35.496	41.49	2.5	12.0	50.99	62.15	11.16
3819.99	35.584	41.58	2.5	12.0	51.08	62.15	11.07
3969.99	35.596	41.60	2.5	12.0	51.10	62.15	11.05

Table 8.1-4: *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	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
3714.99	34.127	40.13	2.5	12.0	49.63	62.15	12.52
3819.99	35.250	41.25	2.5	12.0	50.75	62.15	11.40
3969.99	34.414	40.41	2.5	12.0	49.91	62.15	12.24

Table 8.1-5: *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	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/MHz	EIRP limit, dBm/MHz	Margin, dB
3720.00	33.264	39.26	2.5	12.0	48.76	62.15	13.39
3819.99	34.182	40.18	2.5	12.0	49.68	62.15	12.47
3960.00	33.500	39.50	2.5	12.0	49.00	62.15	13.15

Table 8.1-6: *RF power density measurement results of a single-carrier operation for NR on 50 MHz channel*

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
3725.01	31.779	37.78	2.5	12.0	47.28	62.15	14.87
3819.99	32.513	38.51	2.5	12.0	48.01	62.15	14.14
3954.99	32.151	38.15	2.5	12.0	47.65	62.15	14.50

Table 8.1-7: *RF power density measurement results of a single-carrier operation for NR on 60 MHz channel*

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
3729.99	31.389	37.39	2.5	12.0	46.89	62.15	15.26
3819.99	31.811	37.81	2.5	12.0	47.31	62.15	14.84
3950.01	31.017	37.02	2.5	12.0	46.52	62.15	15.63

Table 8.1-8: *RF power density measurement results of a single-carrier operation for NR on 70 MHz channel*

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
3735.00	31.052	37.05	2.5	12.0	46.55	62.15	15.60
3819.99	31.334	37.33	2.5	12.0	46.83	62.15	15.32
3945.00	30.904	36.90	2.5	12.0	46.40	62.15	15.75

Table 8.1-9: *RF power density measurement results of a single-carrier operation for NR on 80 MHz channel*

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
3740.01	30.298	36.30	2.5	12.0	45.80	62.15	16.35
3819.99	30.589	36.59	2.5	12.0	46.09	62.15	16.06
3939.99	30.314	36.31	2.5	12.0	45.81	62.15	16.34

Table 8.1-10: *RF power density measurement results of a single-carrier operation for NR on 90 MHz channel*

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
3744.99	30.066	36.07	2.5	12.0	45.57	62.15	16.58
3819.99	30.018	36.02	2.5	12.0	45.52	62.15	16.63
3935.01	29.907	35.91	2.5	12.0	45.41	62.15	16.74

Table 8.1-11: *RF power density measurement results of a single-carrier operation for NR on 100 MHz channel*

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
3750.00	29.444	35.44	2.5	12.0	44.94	62.15	17.21
3819.99	29.656	35.66	2.5	12.0	45.16	62.15	16.99
3930.00	29.356	35.36	2.5	12.0	44.86	62.15	17.29

Table 8.1-12: *RF power density measurement results of a multi-carrier operation for NR on 20 MHz channel (2C)*

Notes	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
2 carriers, Low	33.006	39.01	2.5	12.0	48.51	62.15	13.64
2 carriers, Mid	33.512	39.51	2.5	12.0	49.01	62.15	13.14
2 carriers, Top	32.911	38.91	2.5	12.0	48.41	62.15	13.74

Table 8.1-13: *RF power density measurement results of a multi-carrier operation for NR on 20 MHz channel (6C)*

Notes	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
6 carriers, Low	27.857	33.86	2.5	12.0	43.36	62.15	18.79
6 carriers, Mid	28.647	34.65	2.5	12.0	44.15	62.15	18.00
6 carriers, Top	28.288	34.29	2.5	12.0	43.79	62.15	18.36

Table 8.1-14: *RF power density measurement results of a multi-carrier operation for NR on 30 MHz channel (6C)*

Notes	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
6 carriers, Low	26.780	32.78	2.5	12.0	42.28	62.15	19.87
6 carriers, Mid	27.229	33.23	2.5	12.0	42.73	62.15	19.42
6 carriers, Top	26.904	32.90	2.5	12.0	42.40	62.15	19.75

Table 8.1-15: *RF power density measurement results of a multi-carrier operation for NR on 100 MHz channel (2C)*

Notes	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
2 carriers, Low	25.272	31.27	2.5	12.0	40.77	62.15	21.38
2 carriers, Mid	25.832	31.83	2.5	12.0	41.33	62.15	20.82
2 carriers, Top	26.193	32.19	2.5	12.0	41.69	62.15	20.46

Table 8.1-16: *RF power density measurement results of a multi-carrier operation for NR on 20 MHz channel (2C Non-contiguous)*

Notes	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
2 carriers, Low	32.479	38.48	2.5	12.0	47.98	62.15	14.17
2 carriers, Mid	32.870	38.87	2.5	12.0	48.37	62.15	13.78
2 carriers, Top	32.629	38.63	2.5	12.0	48.13	62.15	14.02

Table 8.1-17: *RF power density measurement results of a multi-carrier operation for NR on 20 MHz channel (4C Non-contiguous)*

Notes	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
4 carriers, Low	30.006	36.01	2.5	12.0	45.51	62.15	16.64
4 carriers, Mid	30.818	36.82	2.5	12.0	46.32	62.15	15.83
4 carriers, Top	30.154	36.15	2.5	12.0	45.65	62.15	16.50

Table 8.1-18: *EIRP calculation based on the* ***worst-case PSD measurement [ISED]***

Frequency, MHz	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
3819.99	41.622	47.62	2.5	12.0	57.12	68.00	10.88

Table 8.1-19: *RF power density measurement results of a single-carrier operation for NR on 20 MHz channel [ISED]*

Frequency, MHz	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
3710.01	40.269	46.27	2.5	12.0	55.77	68.00	12.23
3819.99	41.622	47.62	2.5	12.0	57.12	68.00	10.88
3890.01	41.457	47.46	2.5	12.0	56.96	68.00	11.04

Table 8.1-20: *RF power density measurement results of a single-carrier operation for NR on 30 MHz channel [ISED]*

Frequency, MHz	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
3714.99	39.206	45.21	2.5	12.0	54.71	68.00	13.29
3819.99	39.996	46.00	2.5	12.0	55.50	68.00	12.50
3855.00	39.542	45.54	2.5	12.0	55.04	68.00	12.96

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

Frequency, MHz	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
3720.00	37.153	43.15	2.5	12.0	52.65	68.00	15.35
3819.99	38.301	44.30	2.5	12.0	53.80	68.00	14.20
3879.99	38.793	44.79	2.5	12.0	54.29	68.00	13.71

Table 8.1-22: *RF power density measurement results of a single-carrier operation for NR on 50 MHz channel [ISED]*

Frequency, MHz	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
3725.01	37.153	43.15	2.5	12.0	52.65	68.00	15.35
3819.99	37.682	43.68	2.5	12.0	53.18	68.00	14.82
3875.01	37.683	43.68	2.5	12.0	53.18	68.00	14.82

Test data, continued

Table 8.1-23: *RF power density measurement results of a single-carrier operation for NR on 60 MHz channel [ISED]*

Frequency, MHz	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
3729.99	36.128	42.13	2.5	12.0	51.63	68.00	16.37
3819.99	36.366	42.37	2.5	12.0	51.87	68.00	16.13
3870.00	36.527	42.53	2.5	12.0	52.03	68.00	15.97

Table 8.1-24: *RF power density measurement results of a single-carrier operation for NR on 70 MHz channel [ISED]*

Frequency, MHz	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
3735.00	35.368	41.37	2.5	12.0	50.87	68.00	17.13
3819.99	36.102	42.10	2.5	12.0	51.60	68.00	16.40
3864.99	36.199	42.20	2.5	12.0	51.70	68.00	16.30

Table 8.1-25: *RF power density measurement results of a single-carrier operation for NR on 80 MHz channel [ISED]*

Frequency, MHz	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
3740.01	35.073	41.07	2.5	12.0	50.57	68.00	17.43
3819.99	34.999	41.00	2.5	12.0	50.50	68.00	17.50
3860.01	35.502	41.50	2.5	12.0	51.00	68.00	17.00

Table 8.1-26: *RF power density measurement results of a single-carrier operation for NR on 90 MHz channel [ISED]*

Frequency, MHz	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
3744.99	34.399	40.40	2.5	12.0	49.90	68.00	18.10
3819.99	35.012	41.01	2.5	12.0	50.51	68.00	17.49
3855.00	35.062	41.06	2.5	12.0	50.56	68.00	17.44

Table 8.1-27: *RF power density measurement results of a single-carrier operation for NR on 100 MHz channel [ISED]*

Frequency, MHz	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
3750.00	34.187	40.19	2.5	12.0	49.69	68.00	18.31
3819.99	34.411	40.41	2.5	12.0	49.91	68.00	18.09
3849.99	34.256	40.26	2.5	12.0	49.76	68.00	18.24

Table 8.1-28: *RF power density measurement results of a multi-carrier operation for NR on 20 MHz channel (2C) [ISED]*

Notes	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
2 carriers, Low	37.919	43.92	2.5	12.0	53.42	68.00	14.58
2 carriers, Mid	38.527	44.53	2.5	12.0	54.03	68.00	13.97
2 carriers, Top	38.607	44.61	2.5	12.0	54.11	68.00	13.89

Test data, continued

Table 8.1-29: *RF power density measurement results of a multi-carrier operation for NR on 20 MHz channel (6C) [ISED]*

Notes	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
6 carriers, Low	32.947	38.95	2.5	12.0	48.45	68.00	19.55
6 carriers, Mid	33.368	39.37	2.5	12.0	48.87	68.00	19.13
6 carriers, Top	33.559	39.56	2.5	12.0	49.06	68.00	18.94

Table 8.1-30: *RF power density measurement results of a multi-carrier operation for NR on 30 MHz channel (6C) [ISED]*

Notes	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
6 carriers, Low	29.057	35.06	2.5	12.0	44.56	68.00	23.44
6 carriers, Mid	31.459	37.46	2.5	12.0	46.96	68.00	21.04
6 carriers, Top	30.245	36.25	2.5	12.0	45.75	68.00	22.26

Table 8.1-31: *RF power density measurement results of a multi-carrier operation for NR on 100 MHz channel (2C) [ISED]*

Notes	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
2 carriers, Low	30.496	36.49	2.5	12.0	45.99	68.00	22.01
2 carriers, Mid	30.133	36.13	2.5	12.0	45.63	68.00	22.37
2 carriers, Top	29.324	35.32	2.5	12.0	44.82	68.00	23.18

Table 8.1-32: *RF power density measurement results of a multi-carrier operation for NR on 20 MHz channel (2C Non-contiguous) [ISED]*

Notes	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
2 carriers, Low	37.705	43.71	2.5	12.0	53.21	68.00	14.80
2 carriers, Mid	38.491	44.49	2.5	12.0	53.99	68.00	14.01
2 carriers, Top	38.203	44.20	2.5	12.0	53.70	68.00	14.30

Table 8.1-33: *RF power density measurement results of a multi-carrier operation for NR on 20 MHz channel (4C Non-contiguous) [ISED]*

Notes	RF power density, dBm/5 MHz	Total MIMO PSD, dBm/5 MHz	Cable loss, dB	Antenna gain, dBi	EIRP PSD, dBm/5 MHz	EIRP limit, dBm/5 MHz	Margin, dB
4 carriers, Low	34.596	40.60	2.5	12.0	50.10	68.00	17.90
4 carriers, Mid	34.996	41.00	2.5	12.0	50.50	68.00	17.50
4 carriers, Top	35.417	41.42	2.5	12.0	50.92	68.00	17.08

Test data, continued

Table 8.1-34: *RF total channel power measurement results for NR [20 MHz]*

Remarks	20 MHz channel
Low channel, QPSK	45.47
Mid channel, QPSK	45.94
Top channel, QPSK	45.65
Top channel, QPSK [ISED]	46.01

Note: all results in the table are in dBm units

Table 8.1-35: *RF total channel power measurement results for NR [30 MHz]*

Remarks	30 MHz channel
Low channel, QPSK	45.51
Mid channel, QPSK	45.93
Top channel, QPSK	45.72
Top channel, QPSK [ISED]	46.02

Note: all results in the table are in dBm units

Table 8.1-36: *RF total channel power measurement results for NR [40 MHz]*

Remarks	40 MHz channel
Low channel, QPSK	45.55
Mid channel, QPSK	45.91
Top channel, QPSK	45.77
Top channel, QPSK [ISED]	46.01

Note: all results in the table are in dBm units

Table 8.1-37: *RF total channel power measurement results for NR [50 MHz]*

Remarks	50 MHz channel
Low channel, QPSK	45.57
Mid channel, QPSK	45.92
Top channel, QPSK	45.81
Top channel, QPSK [ISED]	46.01

Note: all results in the table are in dBm units

Table 8.1-38: *RF total channel power measurement results for NR [60 MHz]*

Remarks	60 MHz channel
Low channel, QPSK	45.61
Mid channel, QPSK	45.92
Top channel, QPSK	45.85
Top channel, QPSK [ISED]	45.99

Note: all results in the table are in dBm units

Table 8.1-39: *RF total channel power measurement results for NR [70 MHz]*

Remarks	70 MHz channel
Low channel, QPSK	45.53
Mid channel, QPSK	45.84
Top channel, QPSK	45.81
Top channel, QPSK [ISED]	45.91

Note: all results in the table are in dBm units

Test data, continued

Table 8.1-40: *RF total channel power measurement results for NR [80 MHz]*

Remarks	80 MHz channel (24 dBm)
Low channel, QPSK	45.59
Mid channel, QPSK	45.89
Top channel, QPSK	45.87
Top channel, QPSK [ISED]	45.95

Note: all results in the table are in dBm units

Table 8.1-41: *RF total channel power measurement results for NR [90 MHz]*

Remarks	90 MHz channel (24 dBm)
Low channel, QPSK	45.58
Mid channel, QPSK	45.87
Top channel, QPSK	45.85
Top channel, QPSK [ISED]	45.93

Note: all results in the table are in dBm units

Table 8.1-42: *RF total channel power measurement results for NR [100 MHz]*

Remarks	100 MHz channel (24 dBm)
Low channel, QPSK	45.68
Mid channel, QPSK	45.90
Top channel, QPSK	45.93
Top channel, QPSK [ISED]	45.94

Note: all results in the table are in dBm units

Table 8.1-43: *RF total channel power measurement results for NR 2-carrier [20 MHz bandwidth Contiguous]*

Carriers	Channel	20 MHz channel
2 Carriers, QPSK	Low Channel	45.50
	Middle Channel	45.90
	Top Channel	45.74
	Top channel [ISED]	45.97

Note: all results in the table are in dBm units

Table 8.1-44: *RF total channel power measurement results for NR 2-carrier [100 MHz bandwidth Contiguous]*

Carriers	Channel	100 MHz channel
2 Carriers, QPSK	Low Channel	45.42
	Middle Channel	45.47
	Top Channel	45.49
	Top channel [ISED]	45.42

Note: all results in the table are in dBm units

Table 8.1-45: *RF total channel power measurement results for NR 6-carrier [20 MHz bandwidth Contiguous]*

Carriers	Channel	20 MHz channel
6 Carriers, QPSK	Low Channel	45.61
	Middle Channel	45.77
	Top Channel	45.79
	Top channel [ISED]	45.82

Note: all results in the table are in dBm units

Test data, continued

Table 8.1-46: *RF total channel power measurement results for NR 6-carrier [30 MHz bandwidth Contiguous]*

Carriers	Channel	30 MHz channel
6 Carriers, QPSK	Low Channel	45.57
	Middle Channel	45.64
	Top Channel	45.72
	Top channel [ISED]	45.65

Note: all results in the table are in dBm units

Table 8.1-47: *RF total channel power measurement results for NR 2-carrier [20 MHz bandwidth Non-Contiguous]*

Carriers	Channel	20 MHz channel
2 Carriers, QPSK	Low Channel	45.41
	Middle Channel	45.63
	Top Channel	45.56
	Top channel [ISED]	45.66

Note: all results in the table are in dBm units

Table 8.1-48: *RF total channel power measurement results for NR 4-carrier [20 MHz bandwidth Non-Contiguous]*

Carriers	Channel	20 MHz channel
4 Carriers, QPSK	Low Channel	45.56
	Middle Channel	45.77
	Top Channel	45.76
	Top channel [ISED]	45.82

Note: all results in the table are in dBm units

Test data, continued

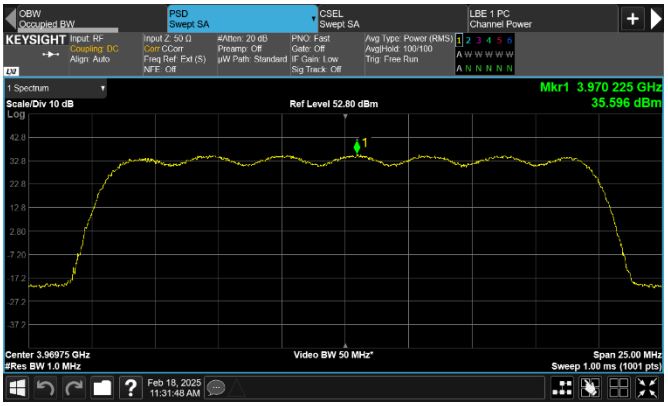


Figure 8.1-1: *PSD of NR 20 MHz channel bandwidth, single carrier operation, sample plot (1 MHz Resolution)*

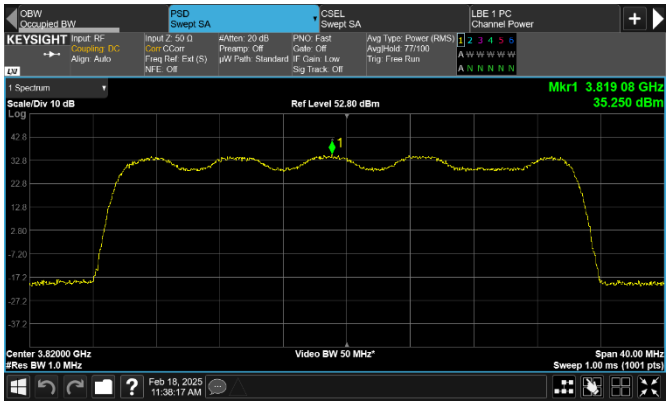


Figure 8.1-2: *PSD of NR 30 MHz channel bandwidth, single carrier operation, sample plot (1 MHz Resolution)*

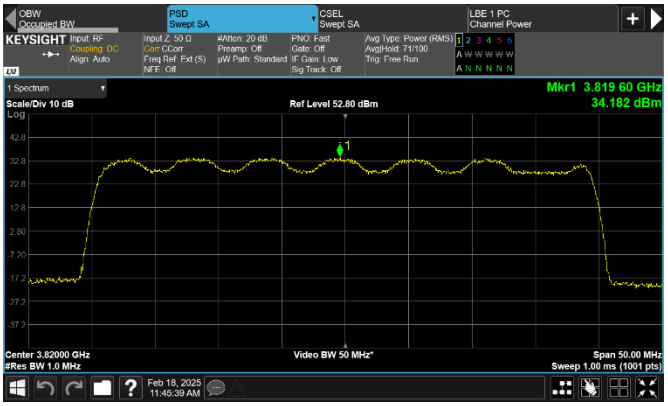


Figure 8.1-3: *PSD of NR 40 MHz channel bandwidth, single carrier operation, sample plot (1 MHz Resolution)*

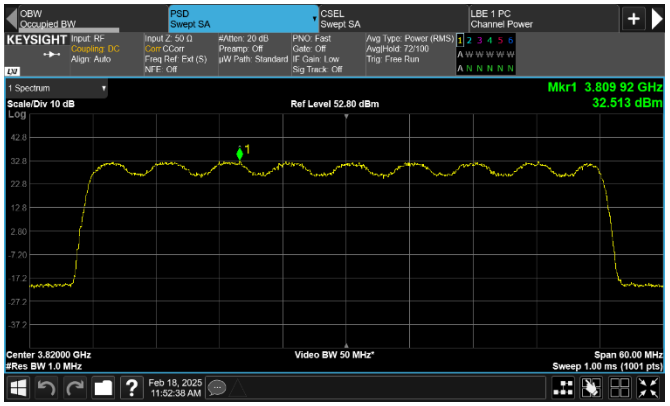


Figure 8.1-4: *PSD of NR 50 MHz channel bandwidth, single carrier operation, sample plot (1 MHz Resolution)*

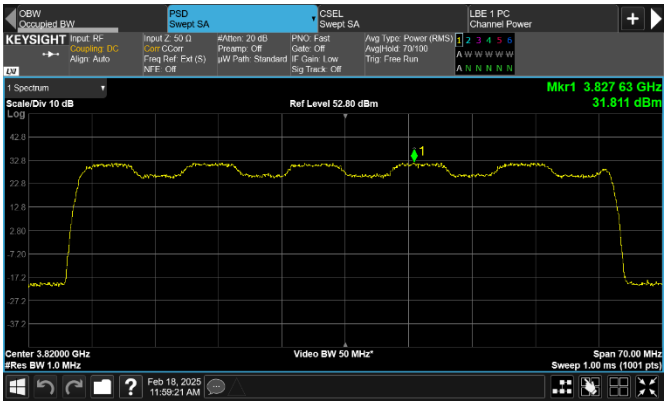


Figure 8.1-5: *PSD of NR 60 MHz channel bandwidth, single carrier operation, sample plot (1 MHz Resolution)*

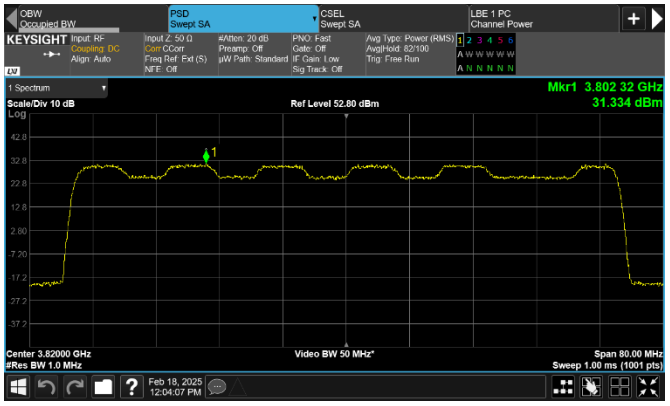


Figure 8.1-6: *PSD of NR 70 MHz channel bandwidth, single carrier operation, sample plot (1 MHz Resolution)*

Test data, continued

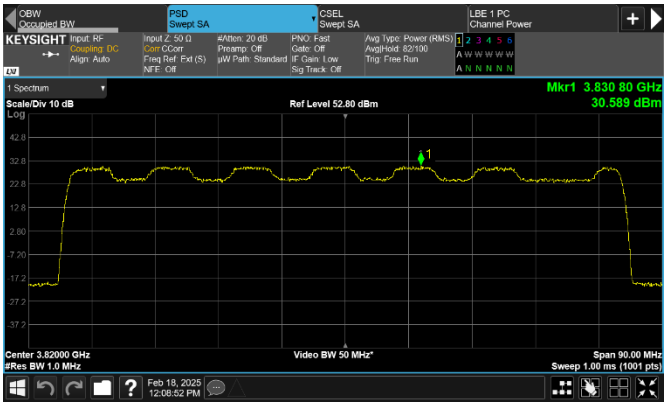


Figure 8.1-7: *PSD of NR 80 MHz channel bandwidth, single carrier operation, sample plot (1 MHz Resolution)*

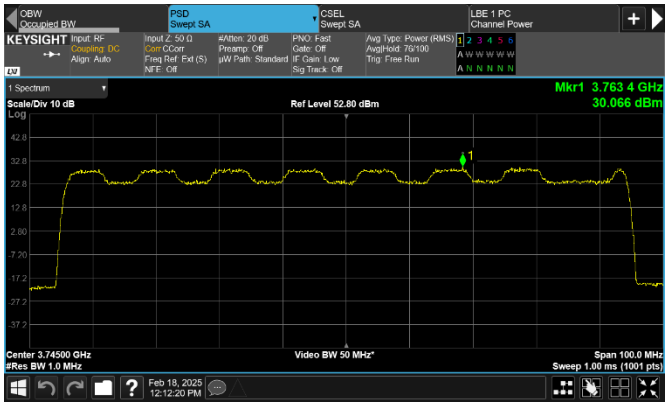


Figure 8.1-8: *PSD of NR 90 MHz channel bandwidth, single carrier operation, sample plot (1 MHz Resolution)*

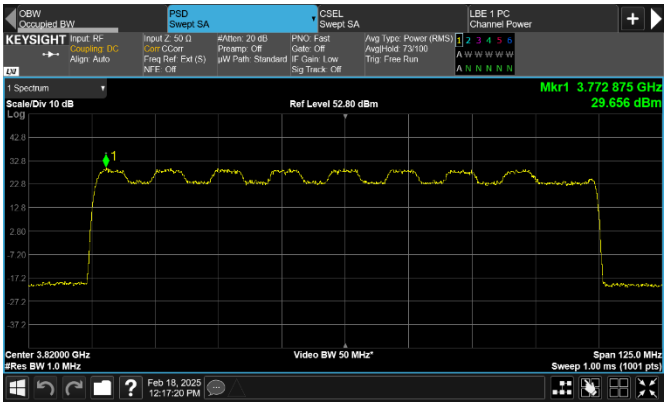


Figure 8.1-9: *PSD of NR 100 MHz channel bandwidth, single carrier operation, sample plot (1 MHz Resolution)*

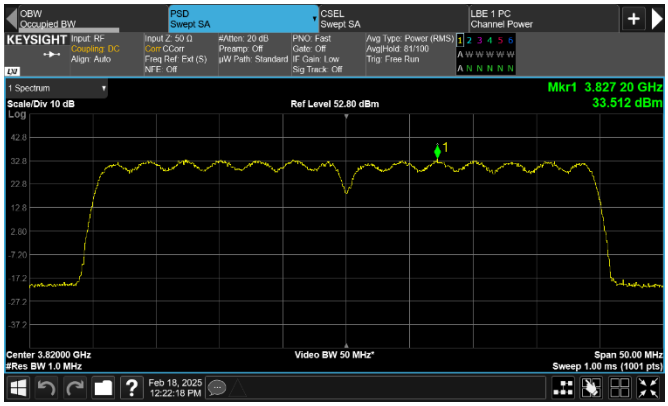


Figure 8.1-10: *PSD of NR 20 MHz channel bandwidth, 2-carrier operation, sample plot (1 MHz Resolution)*

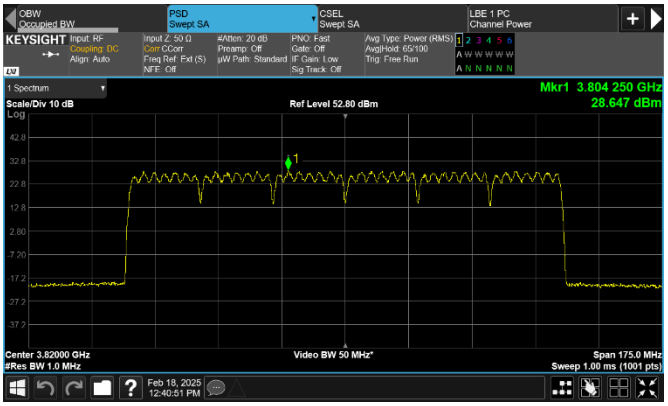


Figure 8.1-11: *PSD of NR 20 MHz channel bandwidth, 6-carrier operation, sample plot (1 MHz Resolution)*

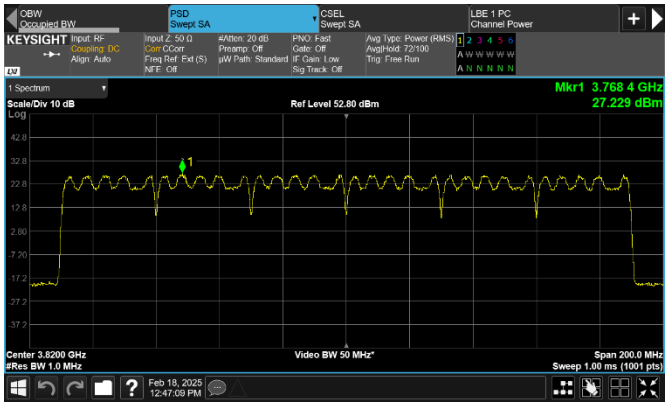


Figure 8.1-12: *PSD of NR 30 MHz channel bandwidth, 6-carrier operation, sample plot (1 MHz Resolution)*

Test data, continued

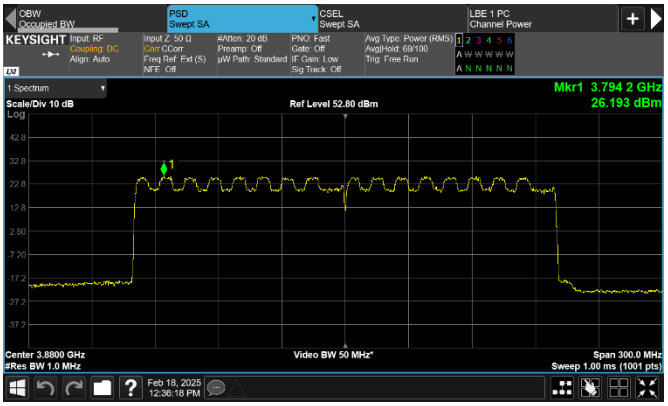


Figure 8.1-13: *PSD of NR 100 MHz channel bandwidth, 2-carrier operation, sample plot (1 MHz Resolution)*

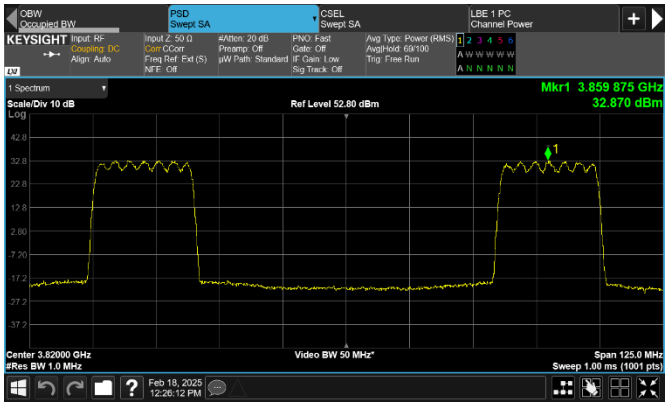


Figure 8.1-14: *PSD of NR 20 MHz channel bandwidth, 2-carrier operation non-contiguous, sample plot (1 MHz Resolution)*

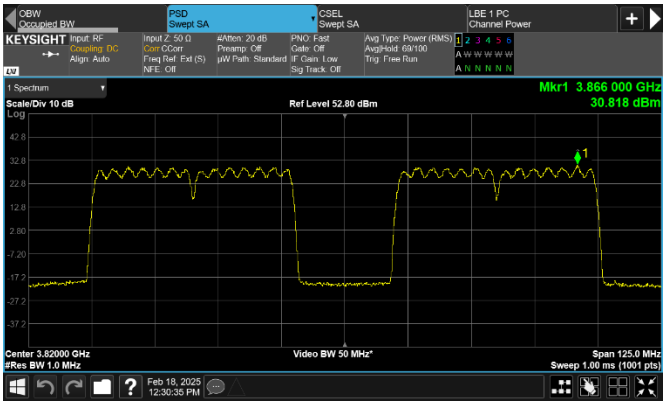


Figure 8.1-15: *PSD of NR 20 MHz channel bandwidth, 4-carrier operation non-contiguous, sample plot (1 MHz Resolution)*

Test data, continued

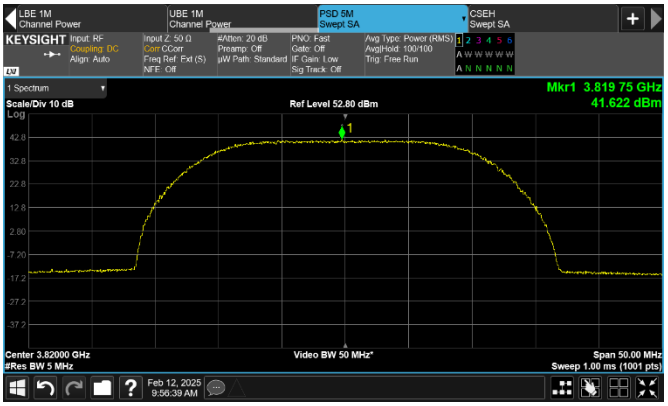


Figure 8.1-16: *PSD of NR 20 MHz channel bandwidth, single carrier operation, sample plot (5 MHz Resolution)*

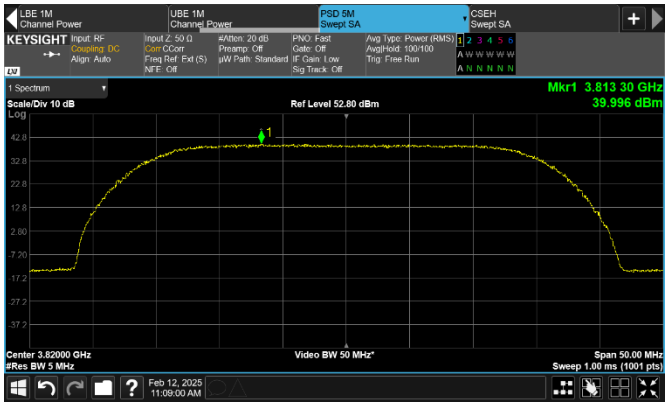


Figure 8.1-17: *PSD of NR 30 MHz channel bandwidth, single carrier operation, sample plot (5 MHz Resolution)*

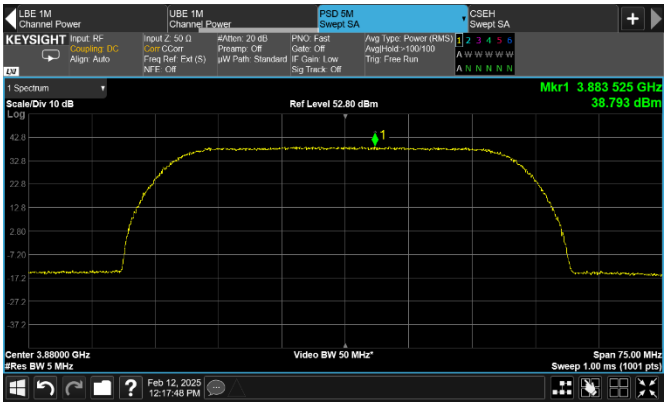


Figure 8.1-18: *PSD of NR 40 MHz channel bandwidth, single carrier operation, sample plot (5 MHz Resolution)*

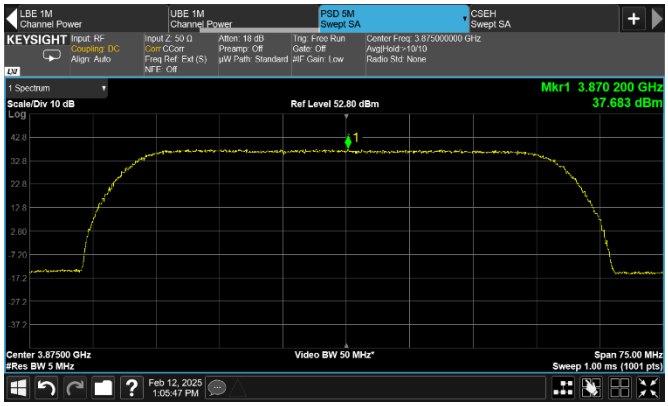


Figure 8.1-19: *PSD of NR 50 MHz channel bandwidth, single carrier operation, sample plot (5 MHz Resolution)*

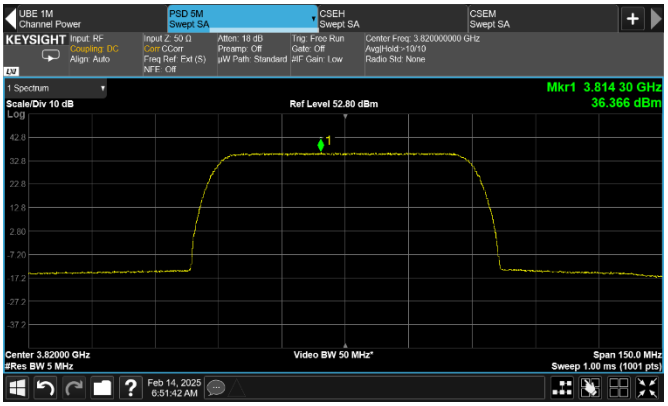


Figure 8.1-20: *PSD of NR 60 MHz channel bandwidth, single carrier operation, sample plot (5 MHz Resolution)*

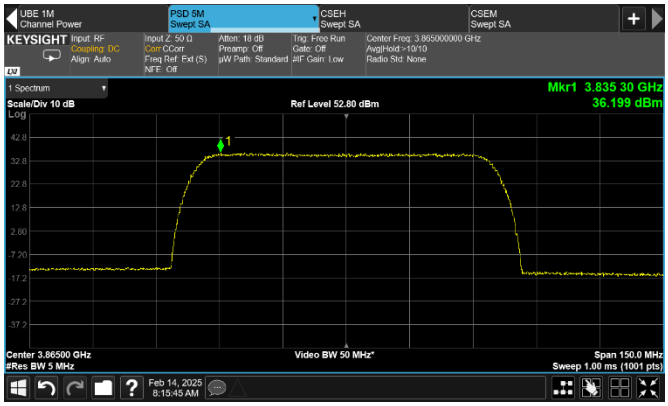


Figure 8.1-21: *PSD of NR 70 MHz channel bandwidth, single carrier operation, sample plot (5 MHz Resolution)*

Test data, continued

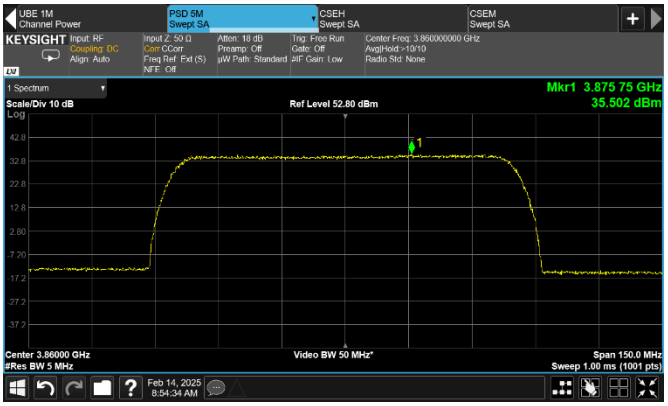


Figure 8.1-22: *PSD of NR 80 MHz channel bandwidth, single carrier operation, sample plot (5 MHz Resolution)*

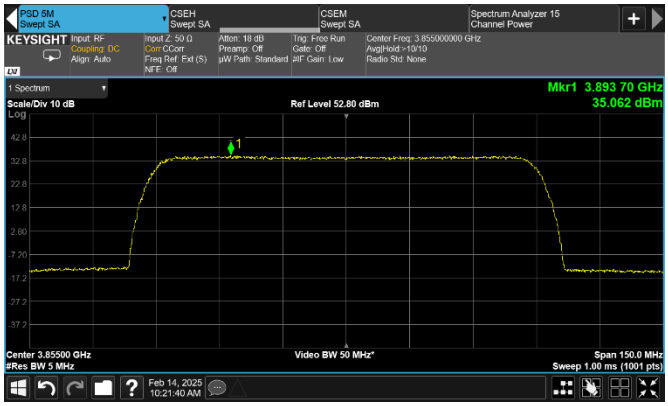


Figure 8.1-23: *PSD of NR 90 MHz channel bandwidth, single carrier operation, sample plot (5 MHz Resolution)*

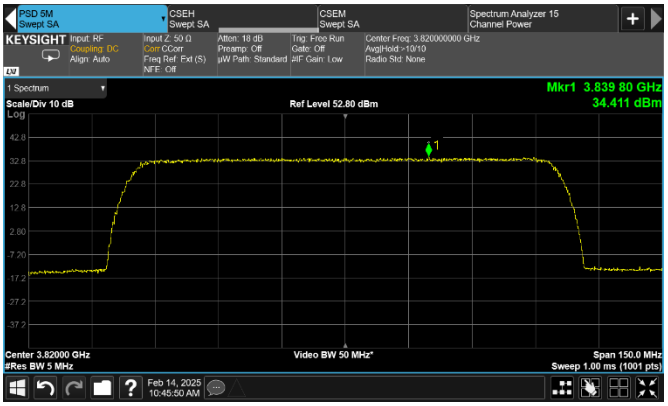


Figure 8.1-24: *PSD of NR 100 MHz channel bandwidth, single carrier operation, sample plot (5 MHz Resolution)*

Figure 8.1-25: *PSD of NR 20 MHz channel bandwidth, 2-carrier operation, sample plot (5 MHz Resolution)*

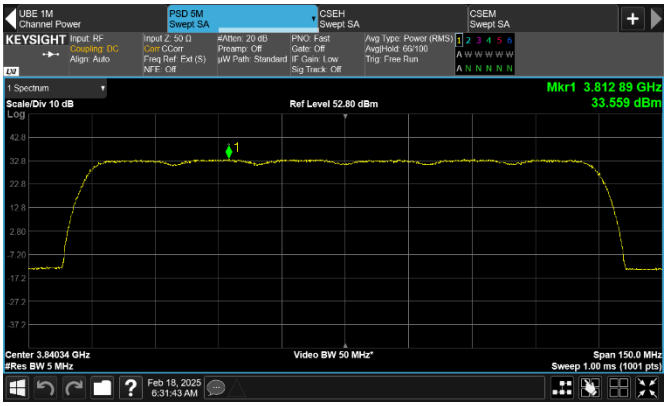


Figure 8.1-26: *PSD of NR 20 MHz channel bandwidth, 6-carrier operation, sample plot (5 MHz Resolution)*

Figure 8.1-27: *PSD of NR 30 MHz channel bandwidth, 6-carrier operation, sample plot (5 MHz Resolution)*

Test data, continued

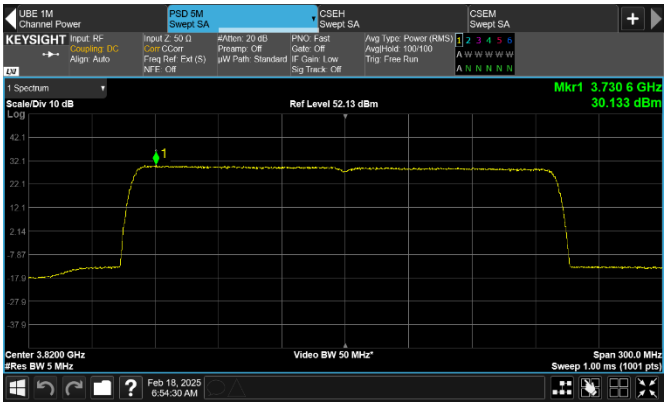


Figure 8.1-28: *PSD of NR 100 MHz channel bandwidth, 2-carrier operation, sample plot (5 MHz Resolution)*

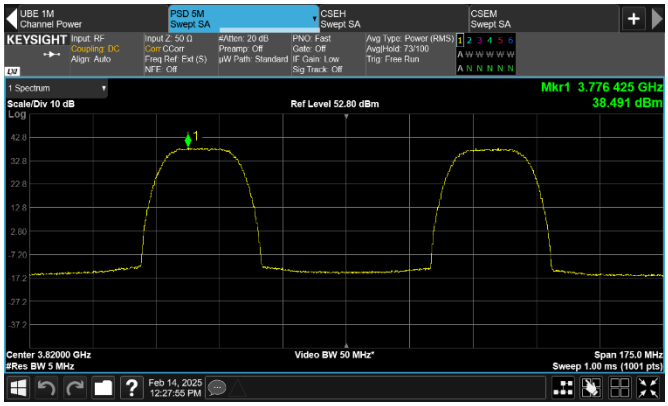


Figure 8.1-29: *PSD of NR 20 MHz channel bandwidth, 2-carrier operation non-contiguous, sample plot (5 MHz Resolution)*

Figure 8.1-30: *PSD of NR 20 MHz channel bandwidth, 4-carrier operation non-contiguous, sample plot (5 MHz Resolution)*

Test data, continued

Table 8.1-49: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 20 MHz

Channel size, notes	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
20 MHz, Low channel	3710.01	8.54	13.00	4.46
20 MHz, Mid channel	3819.99	8.66	13.00	4.34
20 MHz, Top channel	3969.99	8.63	13.00	4.37
20 MHz, Top channel [ISED]	3890.01	8.75	13.00	4.25

Table 8.1-50: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 30 MHz

Channel size, notes	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
30 MHz, Low channel	3714.99	8.72	13.00	4.28
30 MHz, Mid channel	3819.99	8.69	13.00	4.31
30 MHz, Top channel	3965.01	8.83	13.00	4.17
30 MHz, Top channel [ISED]	3885.00	8.80	13.00	4.20

Table 8.1-51: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 40 MHz

Channel size, notes	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
40 MHz, Low channel	3720.00	8.81	13.00	4.19
40 MHz, Mid channel	3819.99	9.17	13.00	3.83
40 MHz, Top channel	3960.00	8.69	13.00	4.31
40 MHz, Top channel [ISED]	3879.99	8.61	13.00	4.39

Table 8.1-52: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 50 MHz

Channel size, notes	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
50 MHz, Low channel	3725.01	8.51	13.00	4.49
50 MHz, Mid channel	3819.99	8.70	13.00	4.30
50 MHz, Top channel	3954.99	8.71	13.00	4.29
50 MHz, Top channel [ISED]	3875.01	8.60	13.00	4.40

Table 8.1-53: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 60 MHz

Channel size, notes	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
60 MHz, Low channel	3729.99	8.81	13.00	4.19
60 MHz, Mid channel	3819.99	8.67	13.00	4.33
60 MHz, Top channel	3950.01	8.79	13.00	4.21
60 MHz, Top channel [ISED]	3870.00	8.47	13.00	4.53

Table 8.1-54: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 70 MHz

Channel size, notes	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
70 MHz, Low channel	3735.00	8.75	13.00	4.25
70 MHz, Mid channel	3819.99	8.62	13.00	4.38
70 MHz, Top channel	3945.00	9.05	13.00	3.95
70 MHz, Top channel [ISED]	3864.99	8.46	13.00	4.54

Test data, continued

Table 8.1-55: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 80 MHz

Channel size, notes	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
80 MHz, Low channel	3740.01	8.77	13.00	4.23
80 MHz, Mid channel	3819.99	8.66	13.00	4.34
80 MHz, Top channel	3939.99	8.74	13.00	4.26
80 MHz, Top channel [ISED]	3860.01	8.71	13.00	4.29

Table 8.1-56: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 90 MHz

Channel size, notes	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
90 MHz, Low channel	3744.99	8.72	13.00	4.28
90 MHz, Mid channel	3819.99	8.60	13.00	4.40
90 MHz, Top channel	3935.01	9.12	13.00	3.88
90 MHz, Top channel [ISED]	3855.00	8.75	13.00	4.25

Table 8.1-57: Complementary Cumulative Distribution Function (CCDF) of the PAPR reduction measurement results for single carrier operation for NR 100 MHz

Channel size, notes	Frequency, MHz	0.1% CCDF, dB	PAPR reduction limit, dB	Margin, dB
100 MHz, Low channel	3750.00	8.64	13.00	4.36
100 MHz, Mid channel	3819.99	8.60	13.00	4.40
100 MHz, Top channel	3930.00	8.97	13.00	4.03
100 MHz, Top channel [ISED]	3849.99	8.63	13.00	4.37

Test data, continued

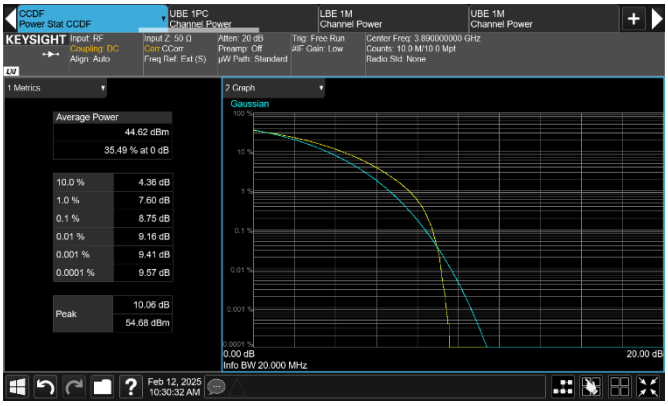


Figure 8.1-31: *CCDF sample plot, NR 20 MHz*

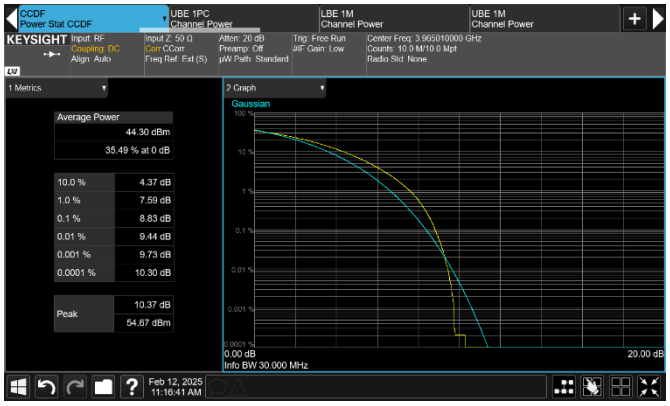


Figure 8.1-32: *CCDF sample plot, NR 30 MHz*

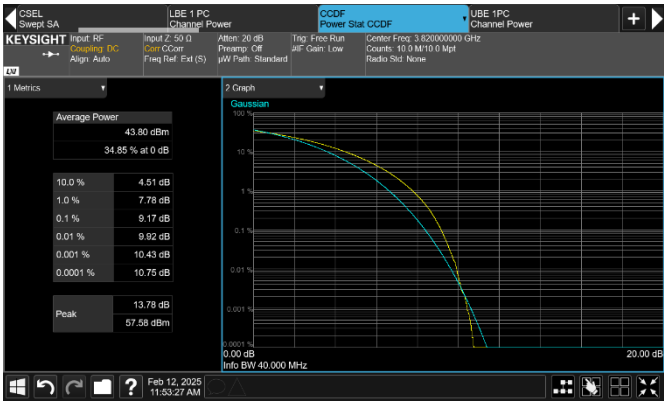


Figure 8.1-33: *CCDF sample plot, NR 40 MHz*

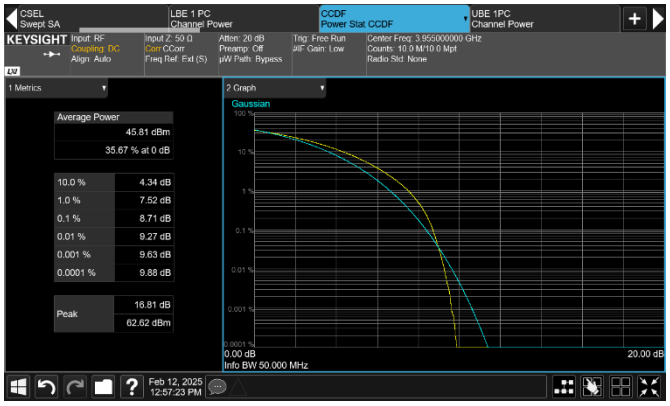


Figure 8.1-34: *CCDF sample plot, NR 50 MHz*

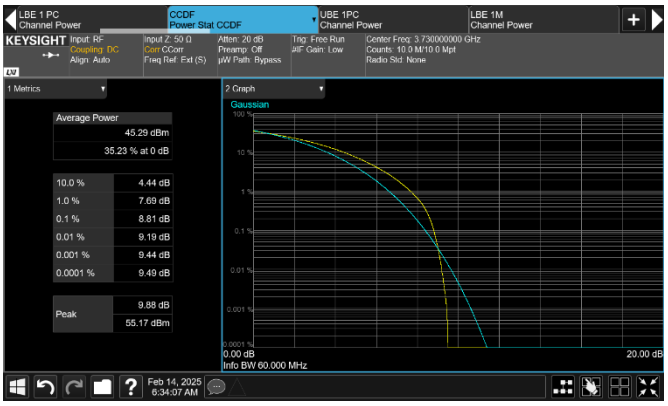


Figure 8.1-35: *CCDF sample plot, NR 60 MHz*

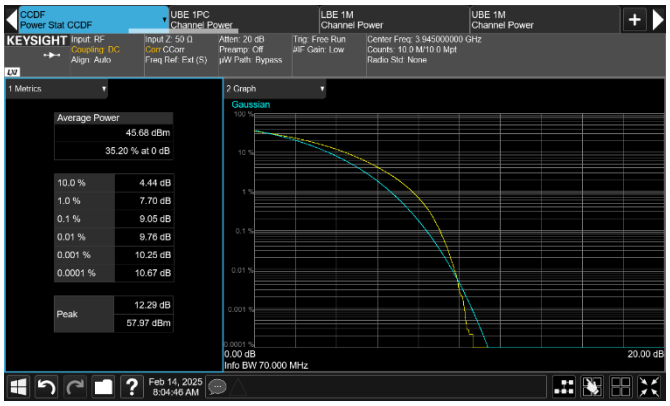


Figure 8.1-36: *CCDF sample plot, NR 70 MHz*

Test data, continued

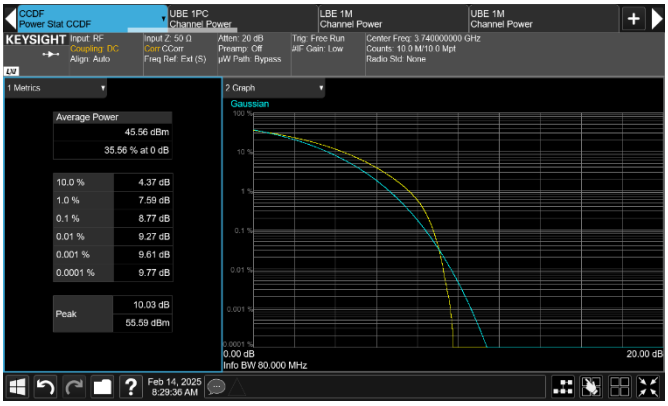


Figure 8.1-37: *CCDF sample plot, NR 80 MHz*

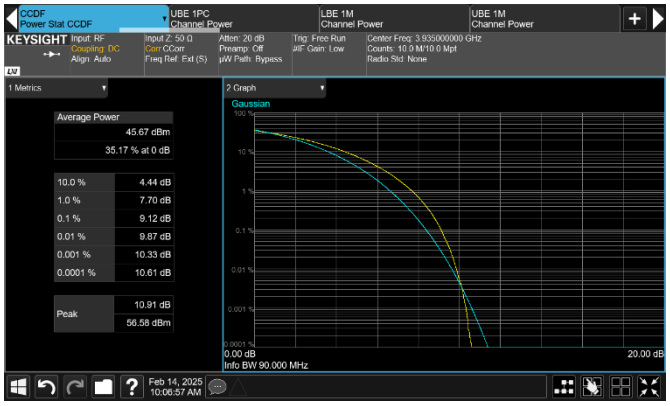


Figure 8.1-38: *CCDF sample plot, NR 90 MHz*

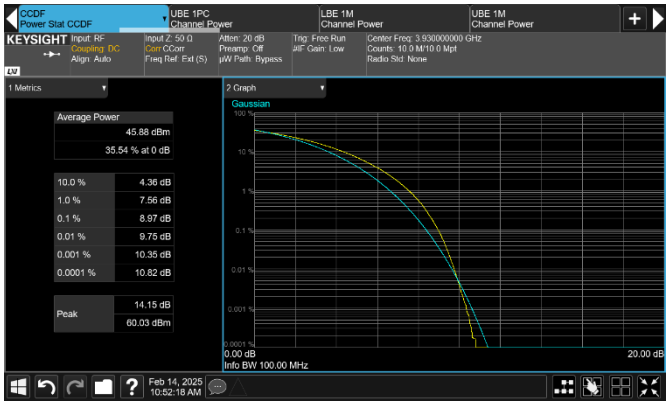


Figure 8.1-39: *CCDF sample plot, NR 100 MHz*

8.2 Spurious emissions at RF antenna connector

8.2.1 Definitions and limits

FCC §27.53: Emission limits

(l)(1) For base station operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1-megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

RSS-192, Section 5.6:

Unwanted emissions shall be measured in terms of average values when the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.
Equipment shall meet the unwanted emission limits, specified below, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end, and one located as close as possible to the high end of the equipment's operating frequency range.
If the transmitter is designed for multi-carrier operation, the tests shall be carried out using both the maximum and minimum number of carriers intended for the equipment.
5.6.1 Unwanted emission limits for outdoor base station, point-to-point and point-to-multipoint equipment
The unwanted emissions of base station, P-P and P-MP equipment shall comply with the following:

a) the limits in table 2 for all frequencies between 3450-3900 MHz
b) the limits in table 3 for all frequencies between 3400-3450 MHz
c) a limit of -13 dBm TRP /MHz or conducted power (sum of conducted power across all antenna connectors), where applicable, for all frequencies below 3400 MHz
d) the limits in table 4 for all frequencies above 3900 MHz
e) a limit of -30 dBm TRP /MHz or conducted power (sum of conducted power across all antenna connectors), where applicable, for all frequencies between 4200-4400 MHz

Offset frequency from the edge of the frequency block group (MHz)	Non-AAS e.i.r.p. (dBm/5 MHz) per antenna
0–5	Min {(e.i.r.pmax- 40), 21}
5–10	Min {(e.i.r.pmax- 43), 15}
> 10	Min {(e.i.r.pmax- 43), 13}

Note: $e.i.r.p_{max}$ is expressed in dBm

8.2.2 Test summary

Test date	February 12, 2025
Test engineer	Dhara Patel

8.2.3 Observations, settings and special notes

The spectrum was analyzed from 30 MHz to the 10th harmonic. All measurements were conducted using an average (RMS) detector in accordance with ANSI C63.26 Paragraph 5.7.2.
All limit lines were adjusted for MIMO operation by 6 dB, for example: −13 dBm – 6 dB = −19 dBm; and −30 dBm – 6 dB = −36 dBm (within 4.2–4.4 GHz).
MIMO correction factor for 4 antenna ports: $10 \times \text{Log}_{10}(4) = 6$ dB.

Antenna Port Selection: The device under test (EUT) has four antenna ports. Port D was identified as the port with the highest transmit power and was selected for all subsequent measurements.
For general scan, the RBW was set to 1 MHz, with the VBW set wider than the RBW.
Band and Frequency block edges were tested using the channel power function of the spectrum analyzer, which calculates the total power within a specific band. This method is correlated with the resolution bandwidths specified in the regulations.
The measurements were performed using the calibrated path and included the duty cycle correction based on the test configuration. For NR TDD, with a duty cycle of 74%, a compensation factor of 1.3 dB was applied. The factor was added to the input correction factors of the spectrum analyzer in addition to the path loss.

Modulation Selection: The EUT supports Quadrature Phase Shift Keying (QPSK) and multiple Quadrature Amplitude Modulation (QAM) schemes. Sample testing was performed at each supported modulation and 16-QAM was chosen as the worst-case modulation due to its higher PSD value.

ISED RSS-192 Section 5.6.1 Table 2 Compliance:
The total EIRP per port is calculated as: 46.02 dBm (measured max total conducted power) – 2.5 dB (cable loss) + 12 dBi (antenna gain) = 55.52 dBm.
The EIRP limit (5 MHz RBW) is determined as follows:

- **0–5 MHz frequency offset:** Min {(55.52 – 40), 21} = 15.52 dBm/5MHz
- **5–10 MHz frequency offset:** Min {(55.52 – 43), 15} = 12.52 dBm/5MHz
- **> 10 MHz frequency offset:** Min {(55.52 – 43), 13} = 12.52 dBm/5MHz
  The limits for 5–10 MHz and for above 10 MHz are identical. If the emissions at 0 MHz frequency offset are below the more stringent limit of 12.52 dBm/5MHz, the testing at 5 MHz and 10 MHz offsets is not required.

Measurements were performed with a resolution bandwidth (RBW) equal to 1% of the channel bandwidth. For a 20 MHz channel, an RBW of 200 kHz was used. The bandwidth scaling factor from 5 MHz to the measurement RBW is 10×Log10(5 / RBW).

Conducted Emission Limits at the frequency block edge (per port):

- **20 MHz Channel (RBW = 200 kHz):** Using "> 5 MHz offset" EIRP limit of 12.52 dBm/5MHz. Scaling to 200 kHz RBW gives 12.52 – 10×Log10(5 / 0.2) = 12.52 – 13.98 = −1.46 dBm/200kHz. Removing the system gain (12 dBi – 2.5 dB = 9.5 dBi) results in a conducted limit of −1.46 – 9.5 = **−10.96 dBm/200kHz**.
- **Other Channel Bandwidths (for > 5 MHz offset):**
  - 30 MHz (RBW = 300 kHz): 12.52 – 10×Log10(5 / 0.3) – 9.5 = **−9.20 dBm/300kHz**
  - 40 MHz (RBW = 400 kHz): 12.52 – 10×Log10(5 / 0.4) – 9.5 = **−7.95 dBm/400kHz**
  - 50 MHz (RBW = 500 kHz): 12.52 – 10×Log10(5 / 0.5) – 9.5 = **−6.98 dBm/500kHz**
  - 60 MHz (RBW = 600 kHz): 12.52 – 10×Log10(5 / 0.6) – 9.5 = **−6.19 dBm/600kHz**
  - 70 MHz (RBW = 700 kHz): 12.52 – 10×Log10(5 / 0.7) – 9.5 = **−5.52 dBm/700kHz**
  - 80 MHz (RBW = 800 kHz): 12.52 – 10×Log10(5 / 0.8) – 9.5 = **−4.94 dBm/800kHz**
  - 90 MHz (RBW = 900 kHz): 12.52 – 10×Log10(5 / 0.9) – 9.5 = **−4.43 dBm/900kHz**
  - 100 MHz (RBW = 1 MHz): 12.52 – 10×Log10(5 / 1) – 9.5 = **−3.97 dBm/MHz**

Compliance Note: All measured emissions at the frequency block edges were below −19 dBm/RBW, and 1 MHz away from the edge were below −19 dBm/MHz, which satisfies the worst-case conducted limit requirements.

8.2.4 Test data

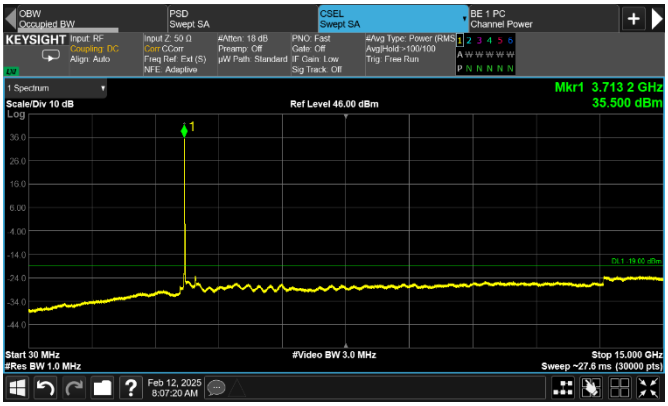


Figure 8.2-1: *Conducted spurious emissions 30 MHz to 15 GHz of NR 20 MHz low channel, single carrier operation*

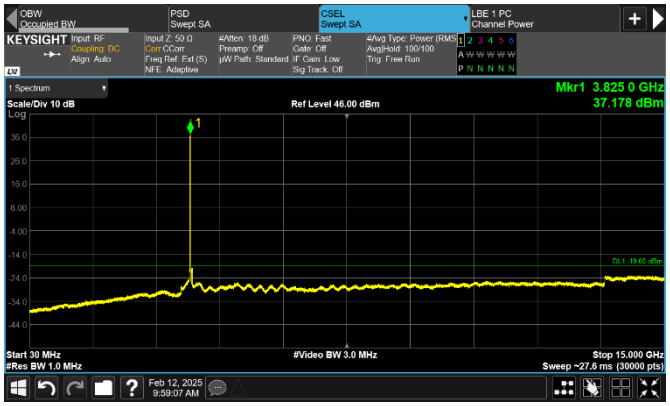


Figure 8.2-2: *Conducted spurious emissions 30 MHz to 15 GHz of NR 20 MHz mid channel, single carrier operation*

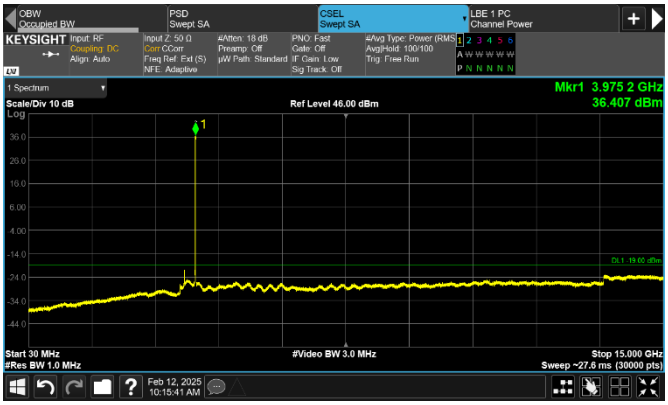


Figure 8.2-3: *Conducted spurious emissions 30 MHz to 15 GHz of NR 20 MHz top channel, single carrier operation*

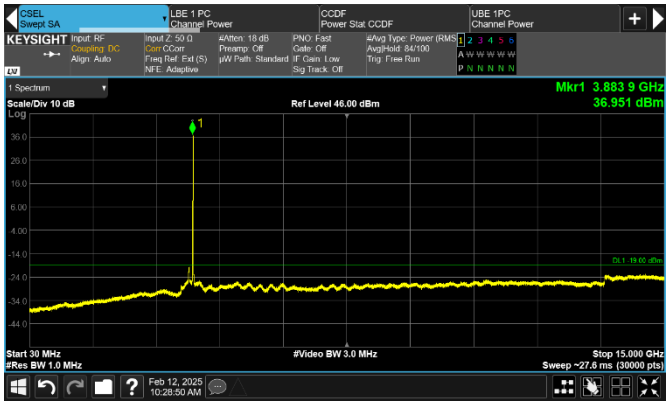


Figure 8.2-4: *Conducted spurious emissions 30 MHz to 15 GHz of NR 20 MHz top channel, single carrier operation [ISED]*

Test data, continued

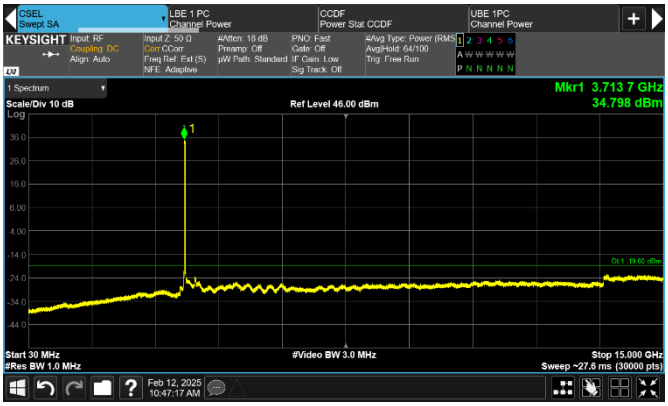


Figure 8.2-5: *Conducted spurious emissions 30 MHz to 15 GHz of NR 30 MHz low channel, single carrier operation*

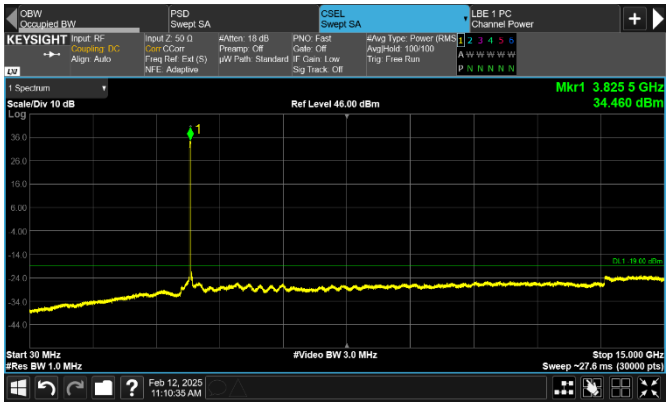


Figure 8.2-6: *Conducted spurious emissions 30 MHz to 15 GHz of NR 30 MHz mid channel, single carrier operation*

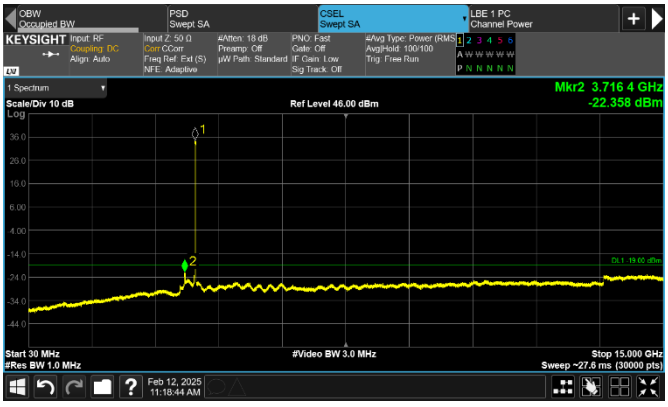


Figure 8.2-7: *Conducted spurious emissions 30 MHz to 15 GHz of NR 30 MHz top channel, single carrier operation*

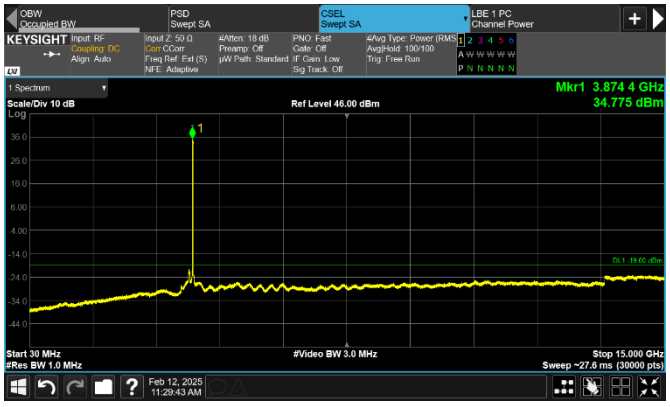


Figure 8.2-8: *Conducted spurious emissions 30 MHz to 15 GHz of NR 30 MHz top channel, single carrier operation [ISED]*

Test data, continued

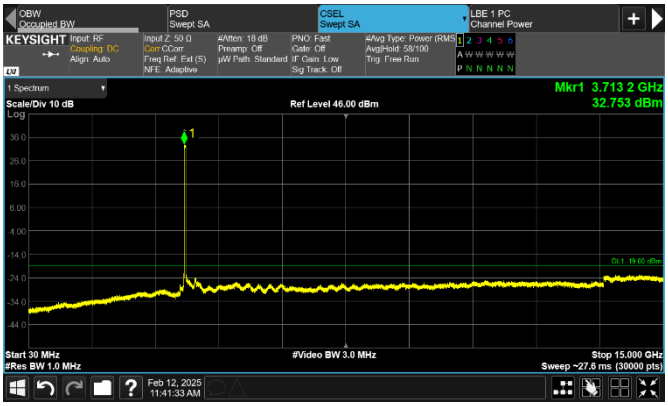


Figure 8.2-9: *Conducted spurious emissions 30 MHz to 15 GHz of NR 40 MHz low channel, single carrier operation*

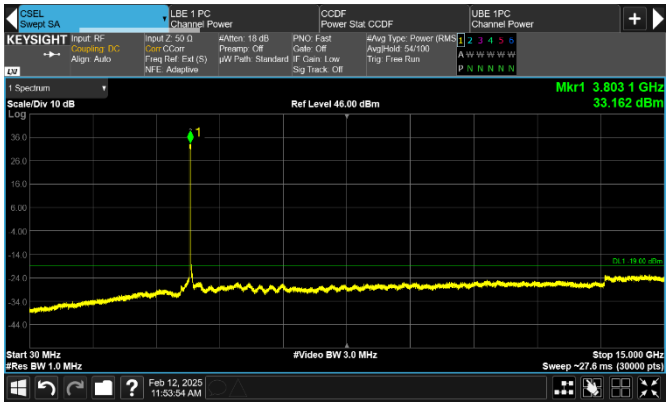


Figure 8.2-10: *Conducted spurious emissions 30 MHz to 15 GHz of NR 40 MHz mid channel, single carrier operation*

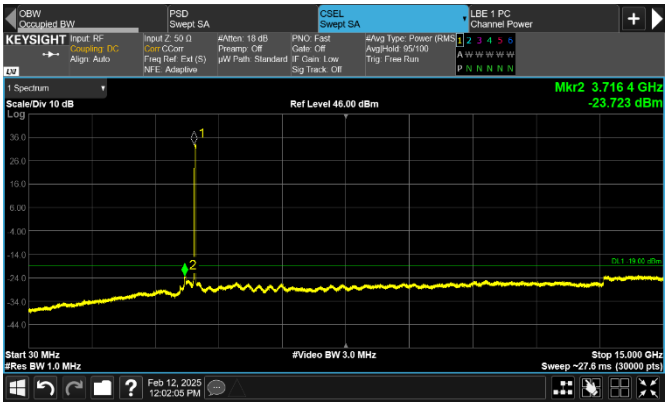


Figure 8.2-11: *Conducted spurious emissions 30 MHz to 15 GHz of NR 40 MHz top channel, single carrier operation*

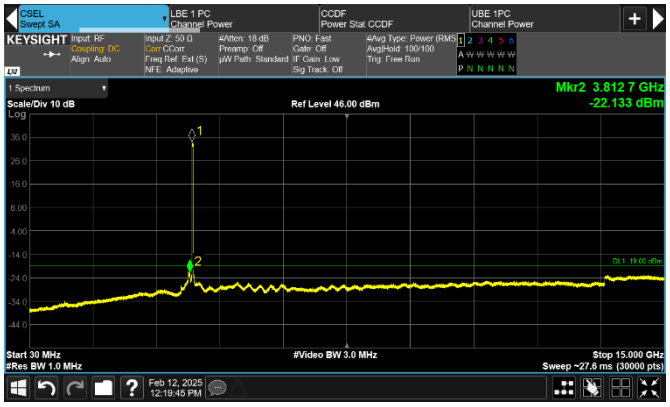


Figure 8.2-12: *Conducted spurious emissions 30 MHz to 15 GHz of NR 40 MHz top channel, single carrier operation [ISED]*

Test data, continued

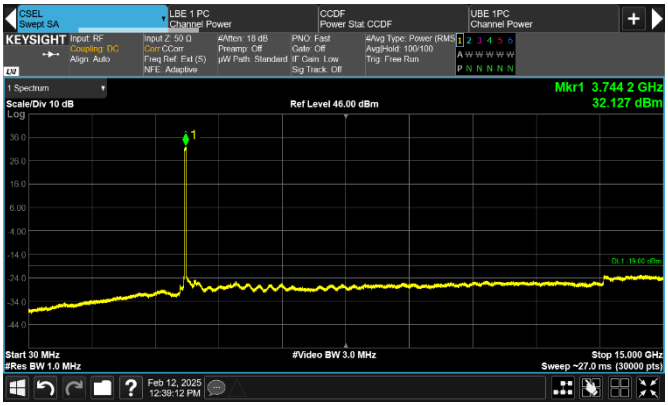


Figure 8.2-13: *Conducted spurious emissions 30 MHz to 15 GHz of NR 50 MHz low channel, single carrier operation*

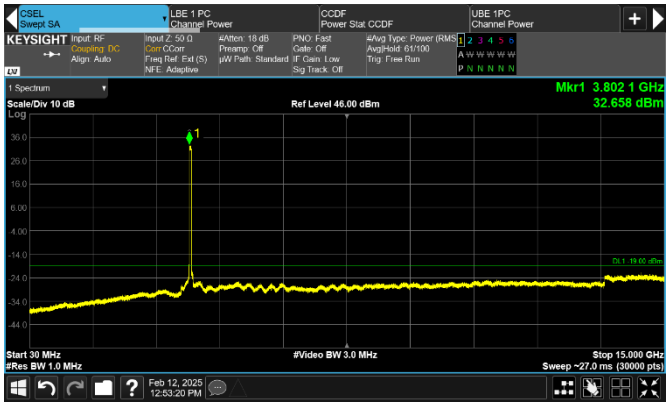


Figure 8.2-14: *Conducted spurious emissions 30 MHz to 15 GHz of NR 50 MHz mid channel, single carrier operation*

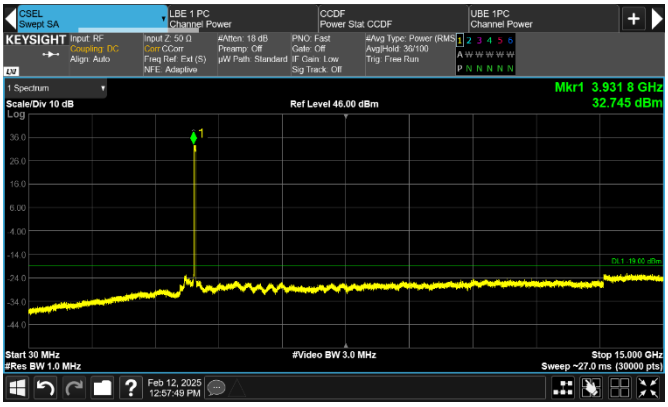


Figure 8.2-15: *Conducted spurious emissions 30 MHz to 15 GHz of NR 50 MHz top channel, single carrier operation*

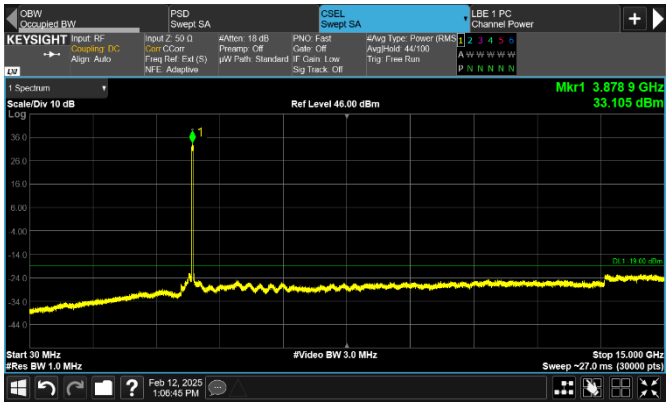


Figure 8.2-16: *Conducted spurious emissions 30 MHz to 15 GHz of NR 50 MHz top channel, single carrier operation [ISED]*

Test data, continued

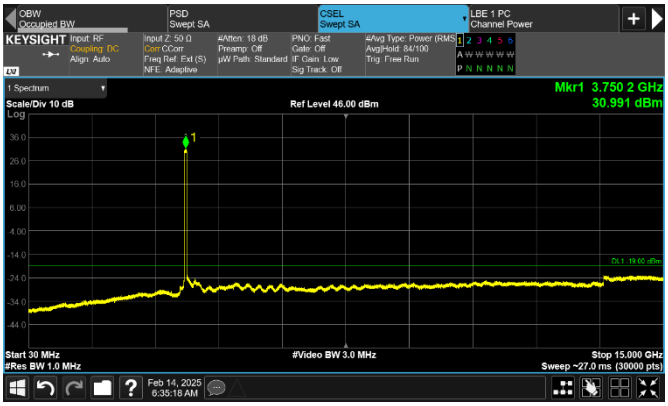


Figure 8.2-17: *Conducted spurious emissions 30 MHz to 15 GHz of NR 60 MHz low channel, single carrier operation*

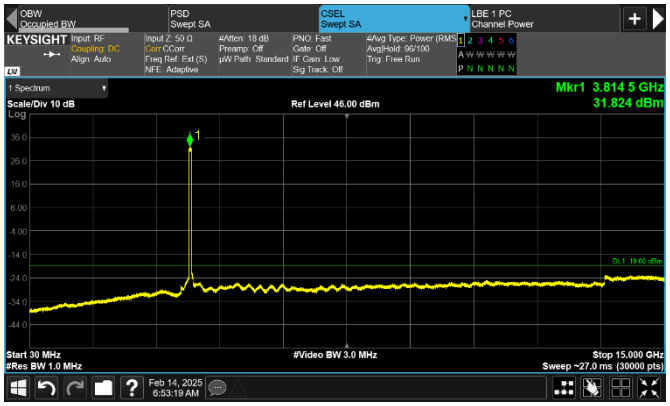


Figure 8.2-18: *Conducted spurious emissions 30 MHz to 15 GHz of NR 60 MHz mid channel, single carrier operation*

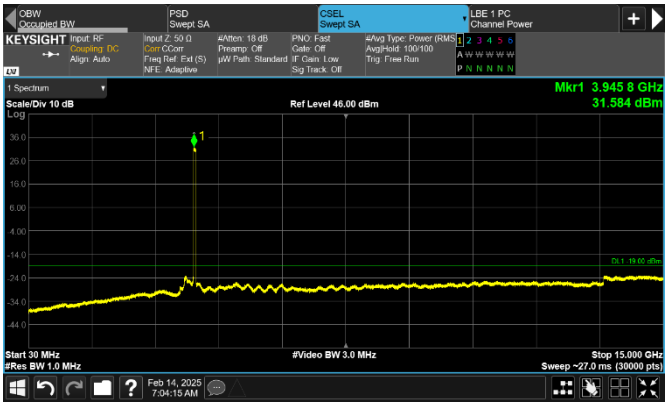


Figure 8.2-19: *Conducted spurious emissions 30 MHz to 15 GHz of NR 60 MHz top channel, single carrier operation*

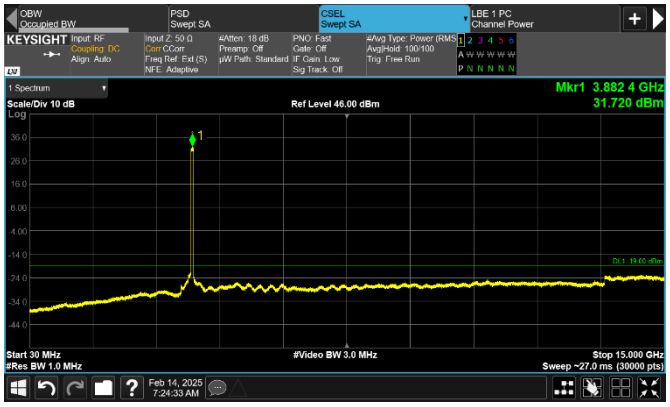


Figure 8.2-20: *Conducted spurious emissions 30 MHz to 15 GHz of NR 60 MHz top channel, single carrier operation [ISED]*

Test data, continued

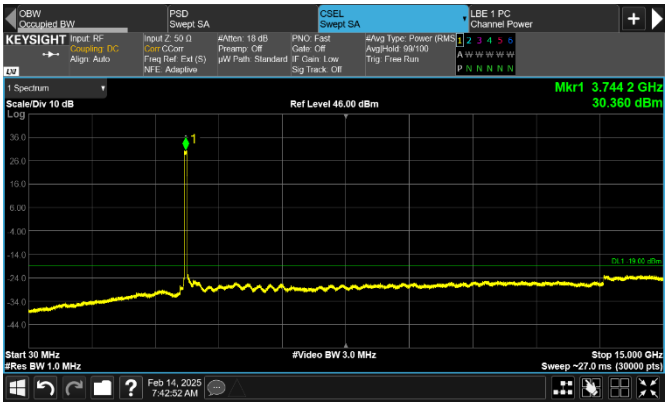


Figure 8.2-21: *Conducted spurious emissions 30 MHz to 15 GHz of NR 70 MHz low channel, single carrier operation*

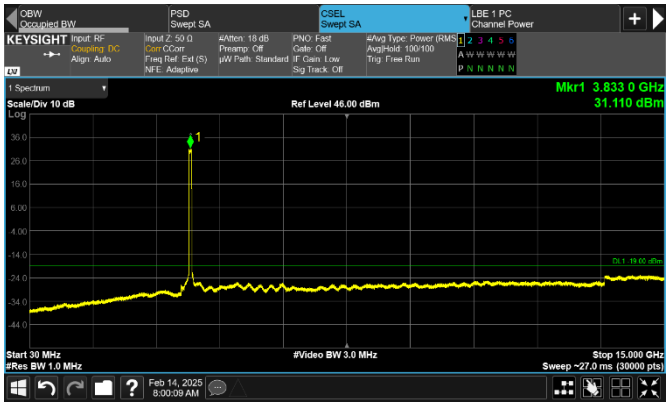


Figure 8.2-22: *Conducted spurious emissions 30 MHz to 15 GHz of NR 70 MHz mid channel, single carrier operation*

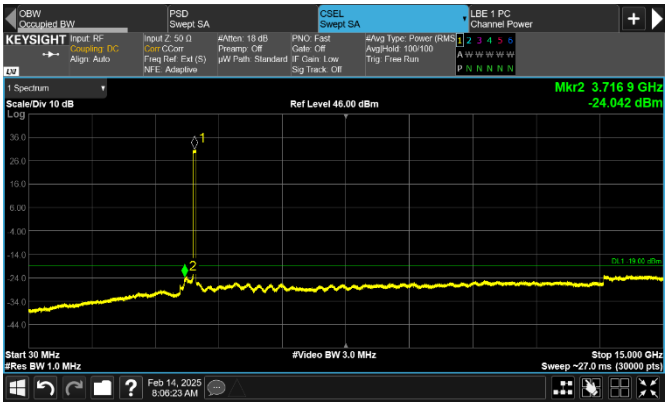


Figure 8.2-23: *Conducted spurious emissions 30 MHz to 15 GHz of NR 70 MHz top channel, single carrier operation*

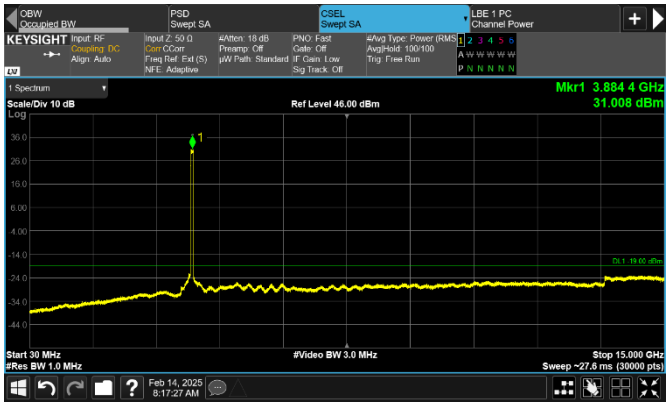


Figure 8.2-24: *Conducted spurious emissions 30 MHz to 15 GHz of NR 70 MHz top channel, single carrier operation [ISED]*

Test data, continued

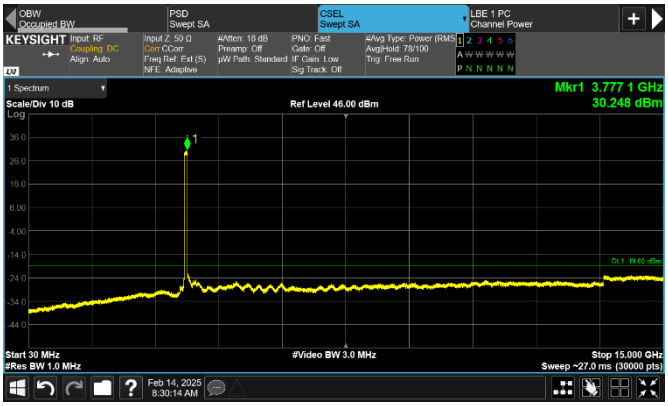


Figure 8.2-25: *Conducted spurious emissions 30 MHz to 15 GHz of NR 80 MHz low channel, single carrier operation*

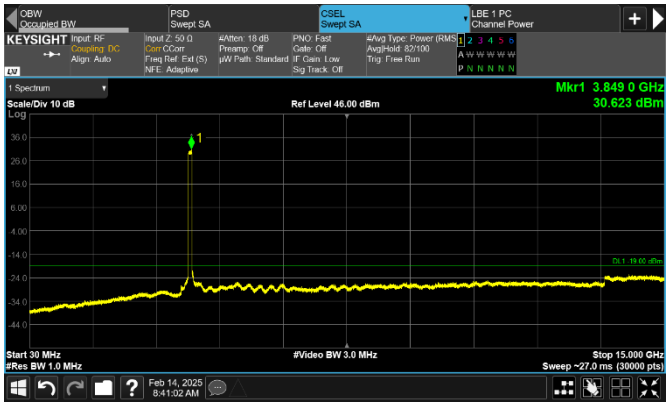


Figure 8.2-26: *Conducted spurious emissions 30 MHz to 15 GHz of NR 80 MHz mid channel, single carrier operation*

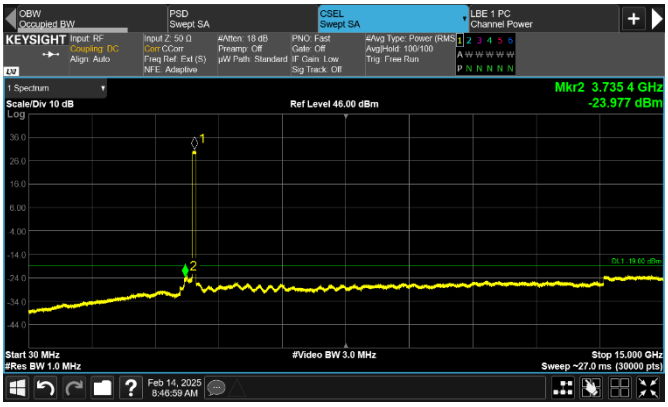


Figure 8.2-27: *Conducted spurious emissions 30 MHz to 15 GHz of NR 80 MHz top channel, single carrier operation*

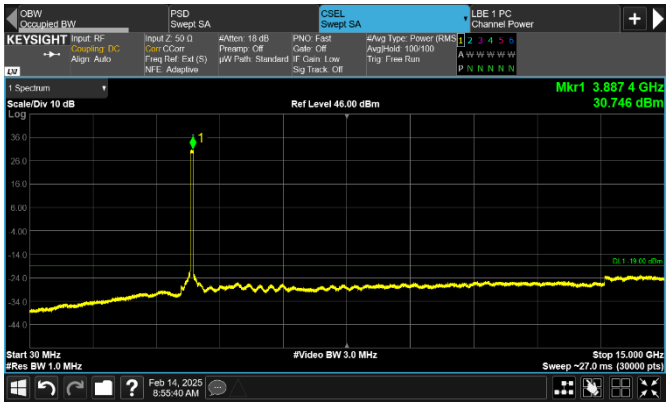


Figure 8.2-28: *Conducted spurious emissions 30 MHz to 15 GHz of NR 80 MHz top channel, single carrier operation [ISED]*

Test data, continued

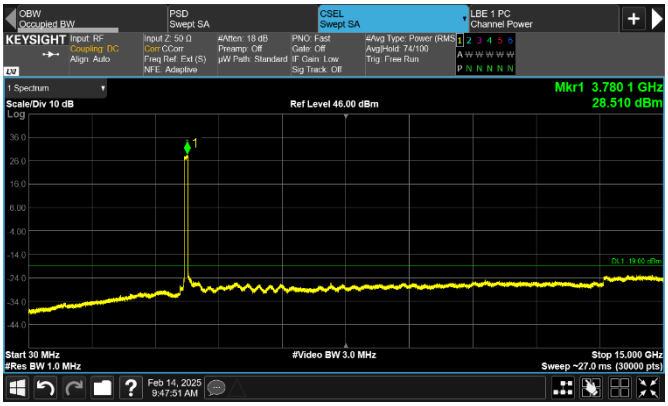


Figure 8.2-29: *Conducted spurious emissions 30 MHz to 15 GHz of NR 90 MHz low channel, single carrier operation*

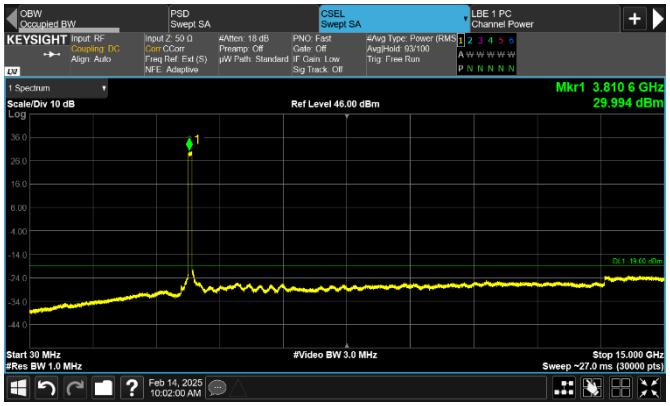


Figure 8.2-30: *Conducted spurious emissions 30 MHz to 15 GHz of NR 90 MHz mid channel, single carrier operation*

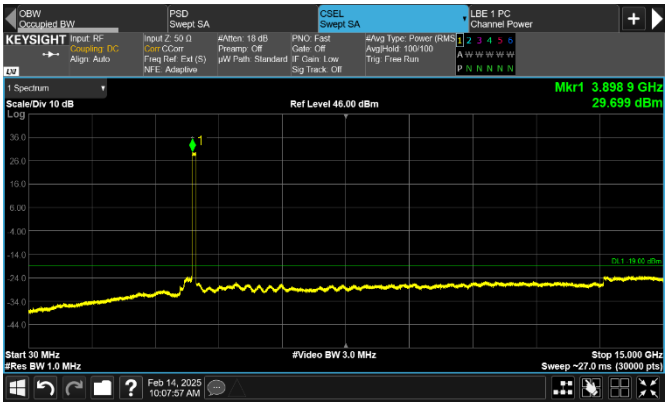


Figure 8.2-31: *Conducted spurious emissions 30 MHz to 15 GHz of NR 90 MHz top channel, single carrier operation*

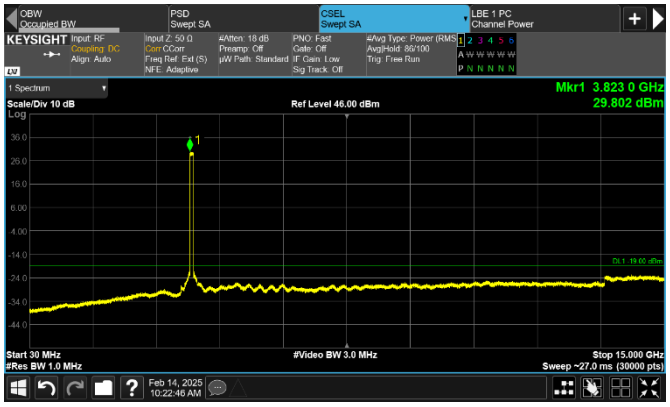


Figure 8.2-32: *Conducted spurious emissions 30 MHz to 15 GHz of NR 90 MHz top channel, single carrier operation [ISED]*

Test data, continued

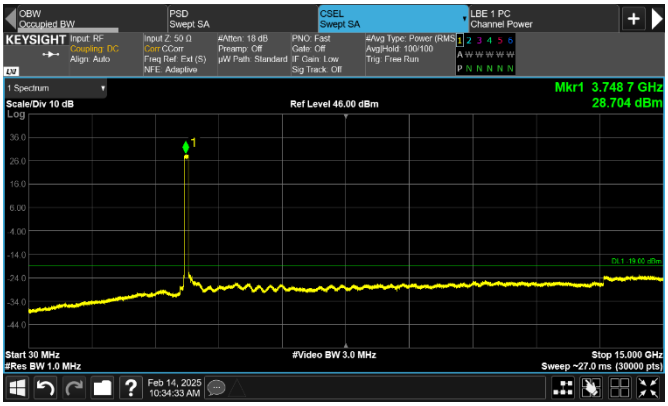


Figure 8.2-33: *Conducted spurious emissions 30 MHz to 15 GHz of NR 100 MHz low channel, single carrier operation*

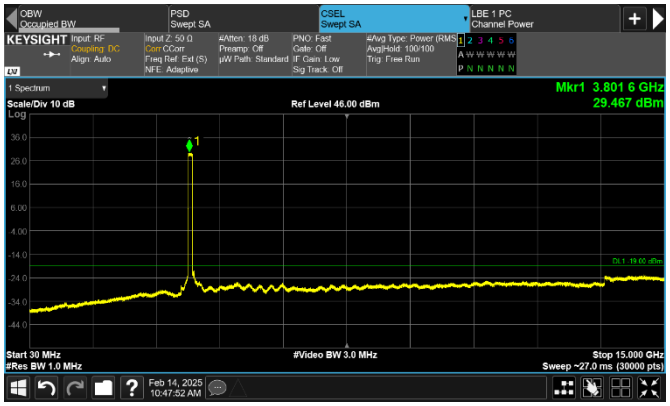


Figure 8.2-34: *Conducted spurious emissions 30 MHz to 15 GHz of NR 100 MHz mid channel, single carrier operation*

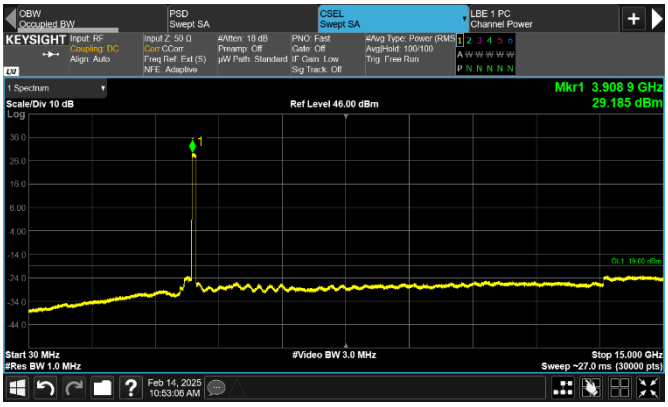


Figure 8.2-35: *Conducted spurious emissions 30 MHz to 15 GHz of NR 100 MHz top channel, single carrier operation*

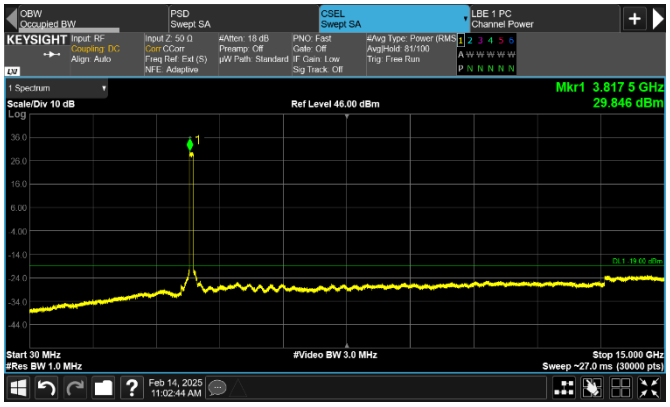


Figure 8.2-36: *Conducted spurious emissions 30 MHz to 15 GHz of NR 100 MHz top channel, single carrier operation [ISED]*