

Test data, continued

On the plots below the measured *Channel Power* value in the “Total Channel Power” column must be -19 dBm and lower.

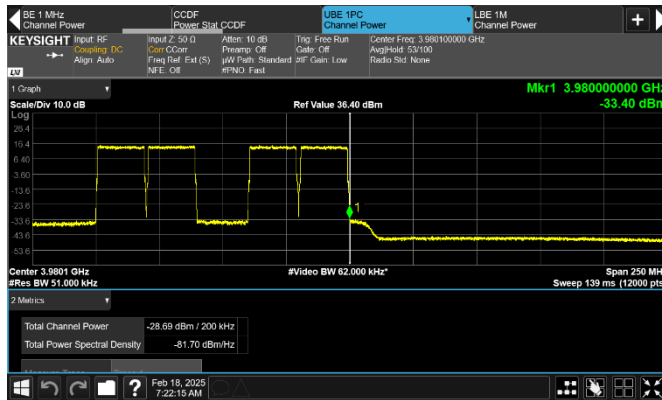


Figure 8.2-332: Conducted emission at the upper band edge

Frequency: 3980 MHz Mode: 4 carrier operation
Meas. BW: 200 kHz Tech.: $2 \times \text{NR } 100 \text{ MHz} + 2 \times \text{NR } 100 \text{ MHz}$
Limit: $-19 \text{ dBm}/200 \text{ kHz}$ Notes: Non-Contiguous

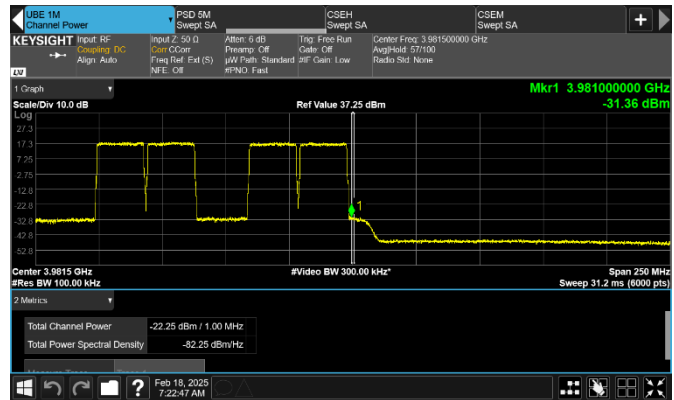


Figure 8.2-333: Conducted emission 1 MHz away from the upper band edge

Frequency: 3981 MHz Mode: 4 carrier operation
Meas. BW: 1 MHz Tech.: $2 \times \text{NR } 100 \text{ MHz} + 2 \times \text{NR } 100 \text{ MHz}$
Limit: $-19 \text{ dBm}/1 \text{ MHz}$ Notes: Non-Contiguous

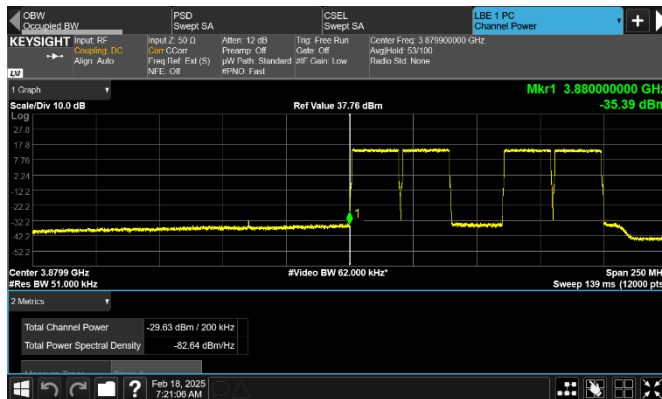


Figure 8.2-334: Conducted emission at the lower frequency block edge of top channel

Frequency: 3880 MHz Mode: 4-carrier operation
Meas. BW: 200 kHz Tech.: $2 \times \text{NR } 100 \text{ MHz} + 2 \times \text{NR } 100 \text{ MHz}$
Limit: $-19 \text{ dBm}/200 \text{ kHz}$ Notes: Non-Contiguous

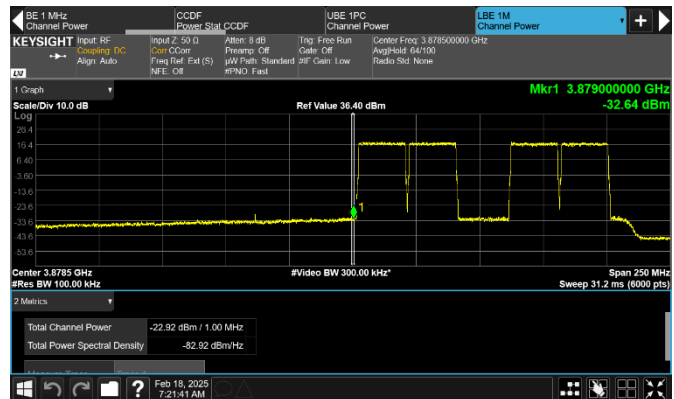


Figure 8.2-335: Conducted emission 1 MHz away from the lower frequency block edge of top channel

Frequency: 3879 MHz Mode: 4-carrier operation
Meas. BW: 1 MHz Tech.: $2 \times \text{NR } 100 \text{ MHz} + 2 \times \text{NR } 100 \text{ MHz}$
Limit: $-19 \text{ dBm}/1 \text{ MHz}$ Notes: Non-Contiguous

Test data, continued

On the plots below the measured *Channel Power* value in the “*Total Channel Power*” column must be -19 dBm and lower.

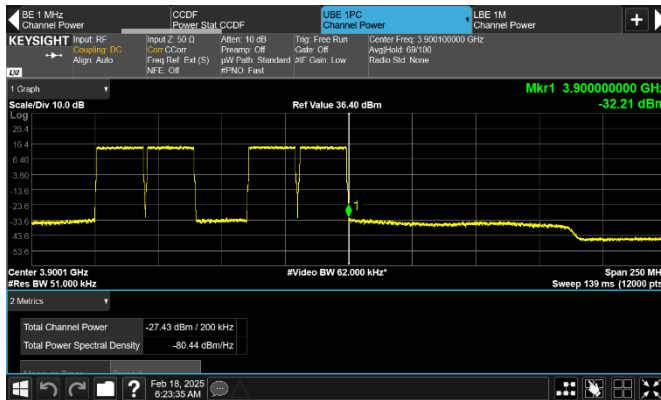


Figure 8.2-336: Conducted emission at the upper band edge [ISED]

Frequency: 3900 MHz
Meas. BW: 200 kHz
Limit: -19 dBm/200 kHz

Mode: 4-carrier operation
Tech.: $2 \times \text{NR } 100 \text{ MHz} + 2 \times \text{NR } 100 \text{ MHz}$
Notes: Non-Contiguous

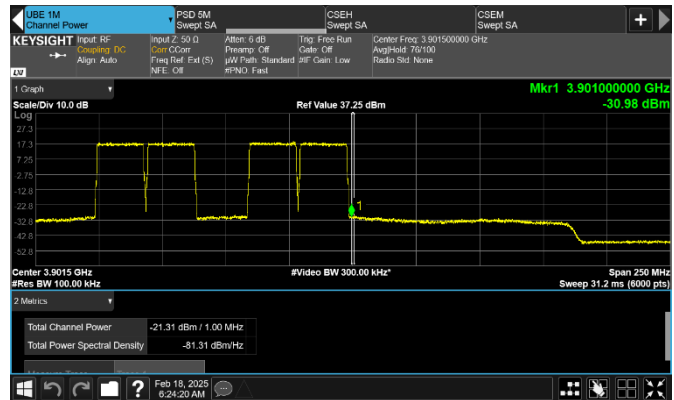


Figure 8.2-337: Conducted emission 1 MHz away from the upper band edge [ISED]

Frequency: 3901 MHz
Meas. BW: 1 MHz
Limit: -19 dBm/1 MHz

Mode: 4-carrier operation
Tech.: $2 \times \text{NR } 100 \text{ MHz} + 2 \times \text{NR } 100 \text{ MHz}$
Notes: Non-Contiguous

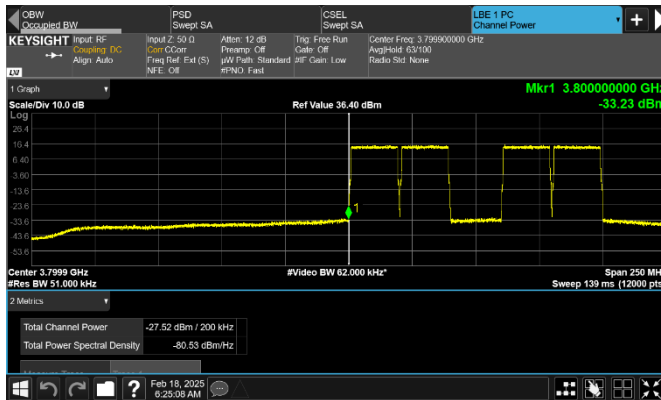


Figure 8.2-338: Conducted emission at the lower frequency block edge of top channel [ISED]

Frequency: 3800 MHz
Meas. BW: 200 kHz
Limit: -19 dBm/200 kHz

Mode: 4-carrier operation
Tech.: $2 \times \text{NR } 100 \text{ MHz} + 2 \times \text{NR } 100 \text{ MHz}$
Notes: Non-Contiguous

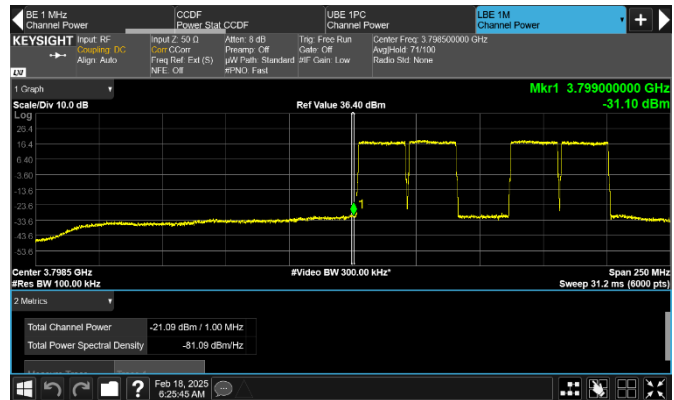


Figure 8.2-339: Conducted emission 1 MHz away from the lower frequency block edge of top channel [ISED]

Frequency: 3799 MHz
Meas. BW: 1 MHz
Limit: -19 dBm/1 MHz

Mode: 4-carrier operation
Tech.: $2 \times \text{NR } 100 \text{ MHz} + 2 \times \text{NR } 100 \text{ MHz}$
Notes: Non-Contiguous

8.3 Radiated spurious emissions

8.3.1 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.

8.3.2 Test summary

Test date	February 12, 2025
Test engineer	Dhara Patel

8.3.3 Observations, settings and special notes

The spectrum was analyzed at a distance of 3 meters, ranging from 30 MHz to at least the 10th harmonic, in accordance with ANSI C63.26 Paragraph 5.5.3.2. The resolution bandwidth (RBW) was set to 100 kHz for frequencies between 30–1000 MHz and 1 MHz for frequencies above 1 GHz, with the video bandwidth (VBW) set wider than the RBW.

Testing was conducted with RF ports terminated with a 50 Ohm loads. The limit line of -13 dBm was recalculated for field strength measurement at a distance of 3 meters, resulting in a value of 82.23 dBμV/m.

For the 1 to 40 GHz range, the RF loads were placed outside the chamber to minimize RF leakage from the support equipment.

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.

Transmission testing was performed on the channels that yielded the maximum power results in previous sections. No emissions, other than those displayed in the plots, were detected during the spectrum scans.

8.3.4 Test data

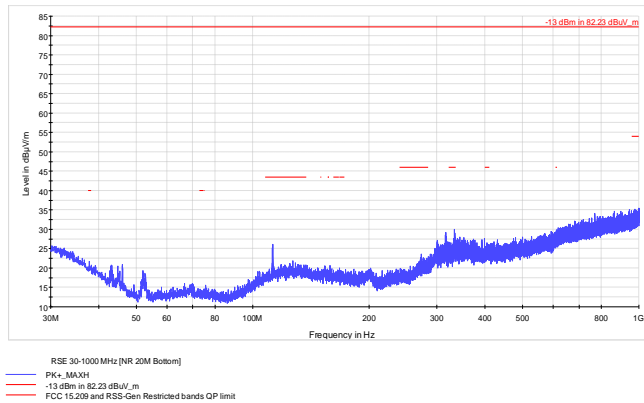


Figure 8.3-1: Radiated spurious emissions within 30–1000 MHz, [NR 20 MHz bottom Channel]

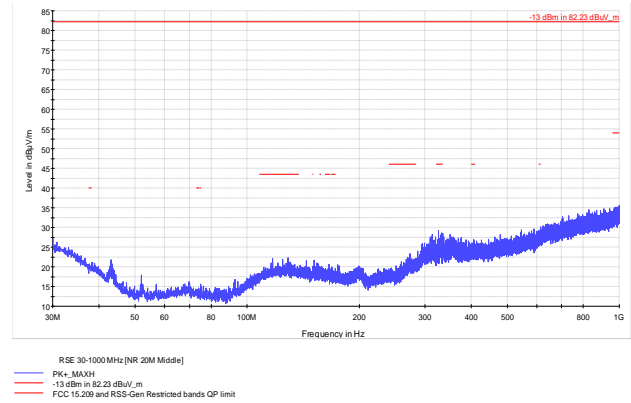


Figure 8.3-2: Radiated spurious emissions within 30–1000 MHz, [NR 20 MHz mid Channel]

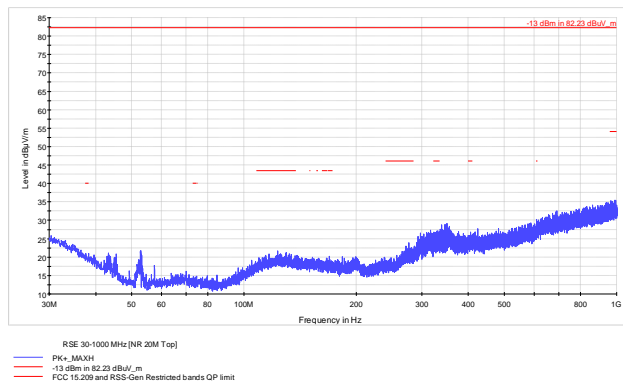


Figure 8.3-3: Radiated spurious emissions within 30–1000 MHz, [NR 20 MHz top Channel]

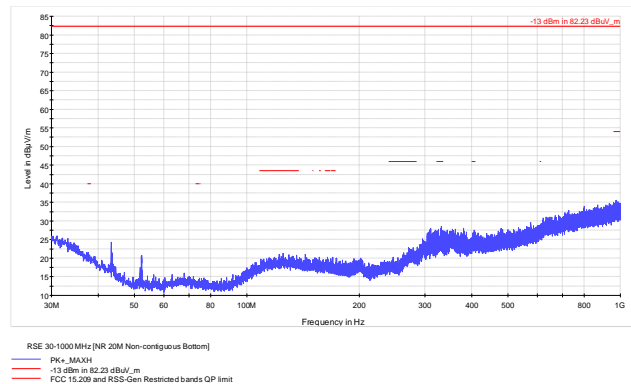


Figure 8.3-4: Radiated spurious emissions within 30–1000 MHz, [NR 20 MHz 2 carrier non-contiguous bottom Channel]

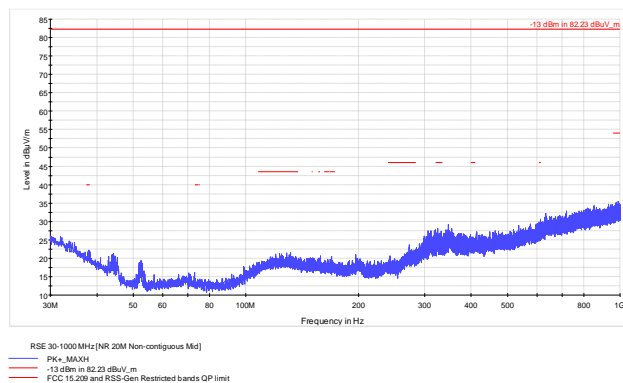


Figure 8.3-5: Radiated spurious emissions within 30–1000 MHz, [NR 20 MHz 2 carrier non-contiguous mid Channel]

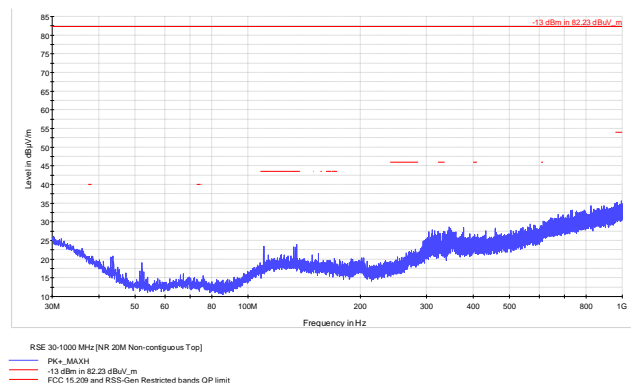


Figure 8.3-6: Radiated spurious emissions within 30–1000 MHz, [NR 20 MHz 2 carrier non-contiguous Top Channel]

Test data, continued

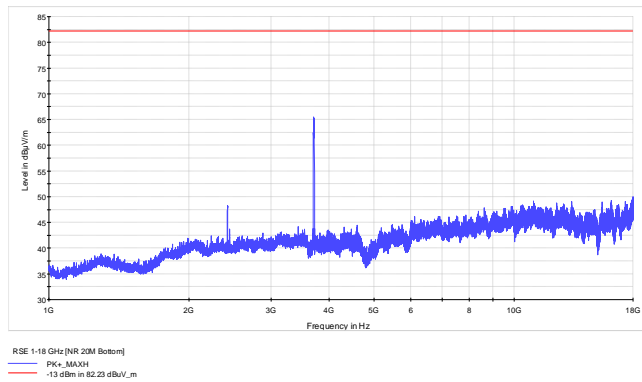


Figure 8.3-7: Radiated spurious emissions within 1-18 GHz, [NR 20 MHz bottom Channel]

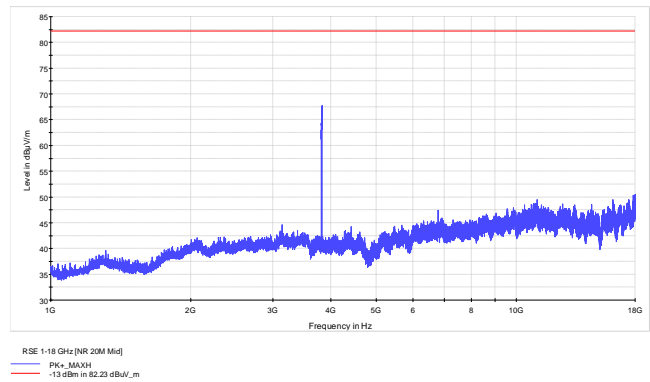


Figure 8.3-8: Radiated spurious emissions within 1-18 GHz, [NR 20 MHz mid Channel]

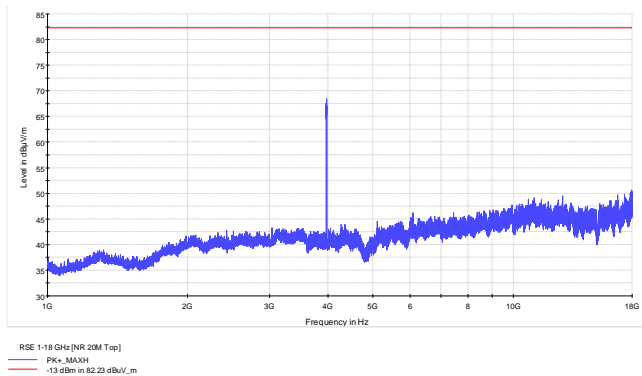


Figure 8.3-9: Radiated spurious emissions within 1-18 GHz, [NR 20 MHz top Channel]

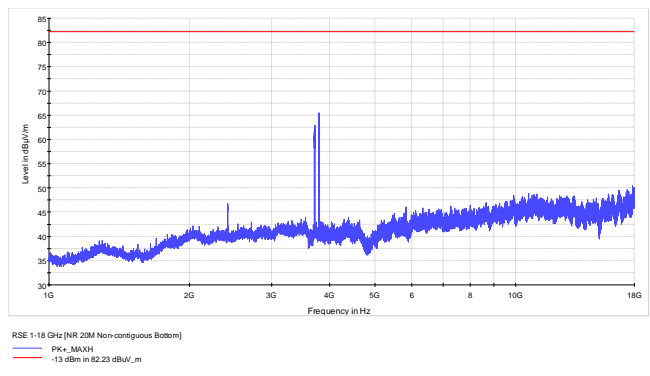


Figure 8.3-10: Radiated spurious emissions within 1-18 GHz, [NR 20 MHz 2 carrier non-contiguous bottom Channel]

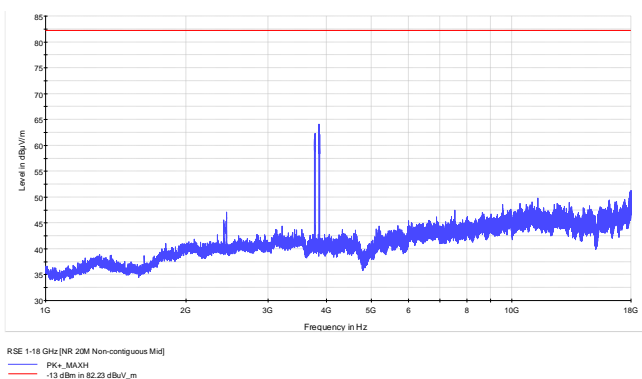


Figure 8.3-11: Radiated spurious emissions within 1-18 GHz, [NR 20 MHz 2 carrier non-contiguous mid Channel]

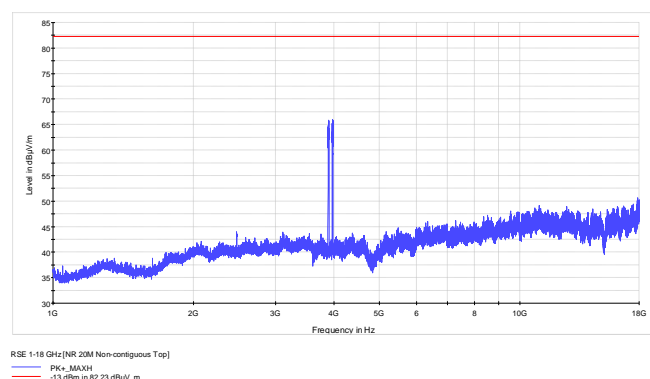


Figure 8.3-12: Radiated spurious emissions within 1-18 GHz, [NR 20 MHz 2 carrier non-contiguous Top Channel]

Test data, continued

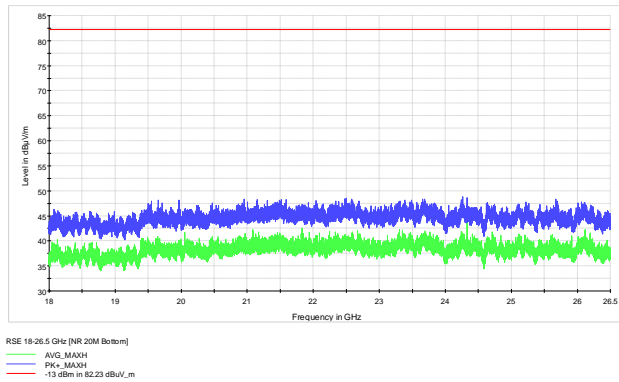


Figure 8.3-13: Radiated spurious emissions within 18-26.5 GHz, [NR 20 MHz bottom Channel]

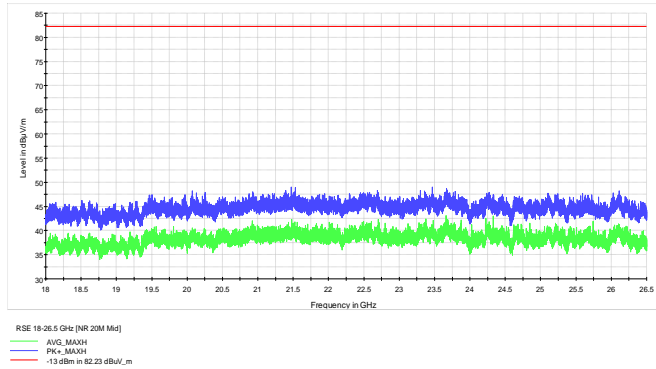


Figure 8.3-14: Radiated spurious emissions within 18-26.5 GHz, [NR 20 MHz mid Channel]

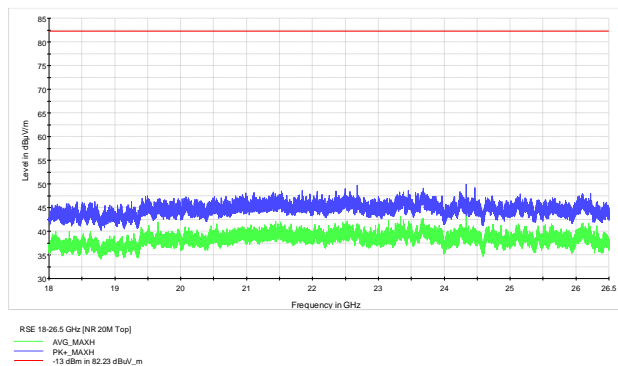


Figure 8.3-15: Radiated spurious emissions within 18-26.5 GHz, [NR 20 MHz top Channel]

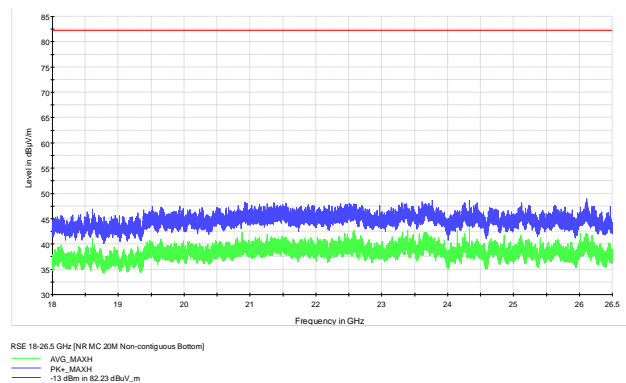


Figure 8.3-16: Radiated spurious emissions within 18-26.5 GHz, [NR 20 MHz 2 carrier non-contiguous bottom Channel]

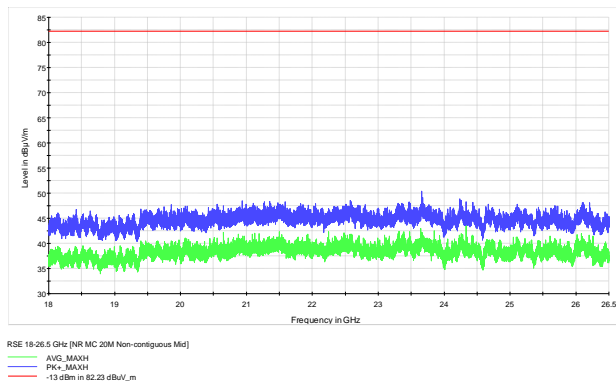


Figure 8.3-17: Radiated spurious emissions within 18-26.5 GHz, [NR 20 MHz 2 carrier non-contiguous mid Channel]

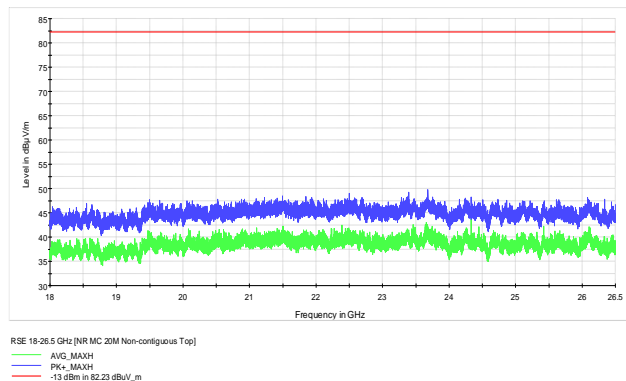


Figure 8.3-18: Radiated spurious emissions within 18-26.5 GHz, [NR 20 MHz 2 carrier non-contiguous Top Channel]

Test data, continued

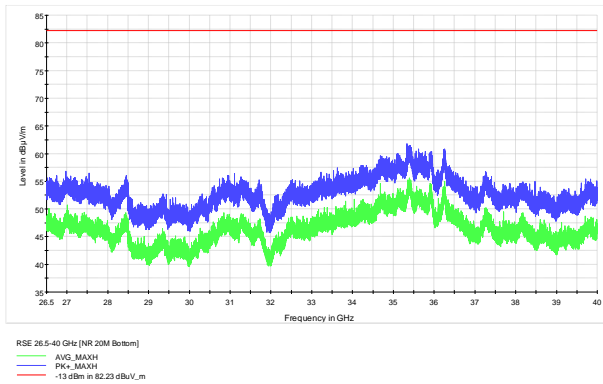


Figure 8.3-19: Radiated spurious emissions within 26.5-40 GHz, [NR 20 MHz bottom Channel]

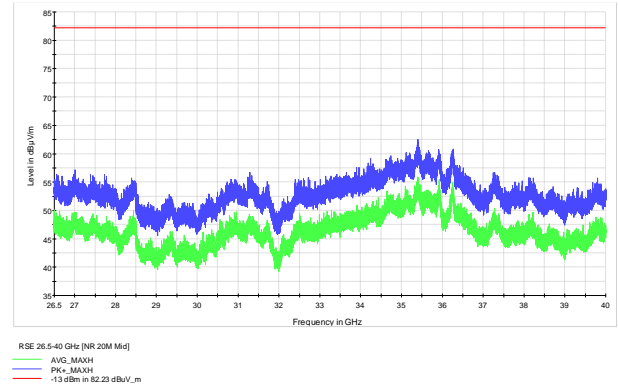


Figure 8.3-20: Radiated spurious emissions within 26.5-40 GHz, [NR 20 MHz mid Channel]

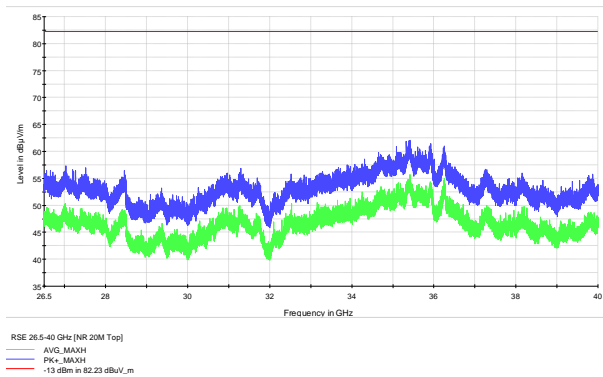


Figure 8.3-21: Radiated spurious emissions within 26.5-40 GHz, [NR 20 MHz top Channel]

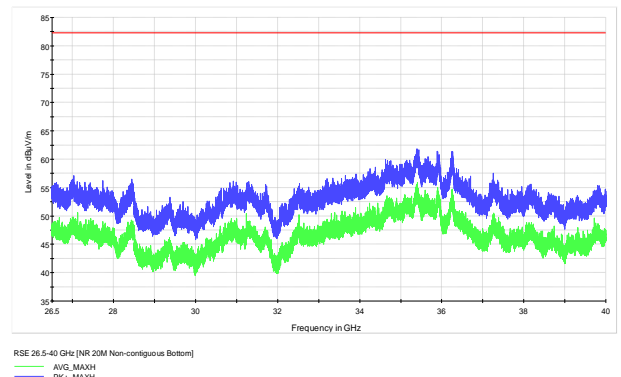


Figure 8.3-22: Radiated spurious emissions within 26.5-40 GHz, [NR 20 MHz 2 carrier non-contiguous bottom Channel]

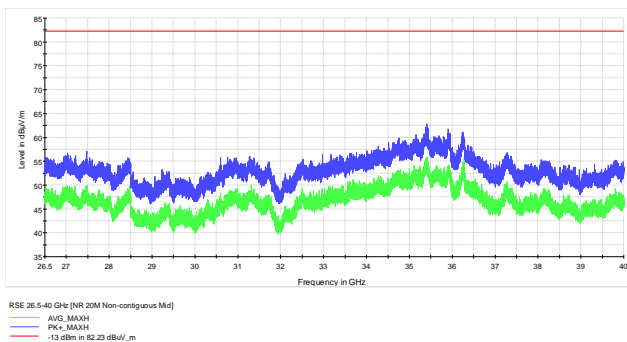


Figure 8.3-23: Radiated spurious emissions within 26.5-40 GHz, [NR 20 MHz 2 carrier non-contiguous mid Channel]

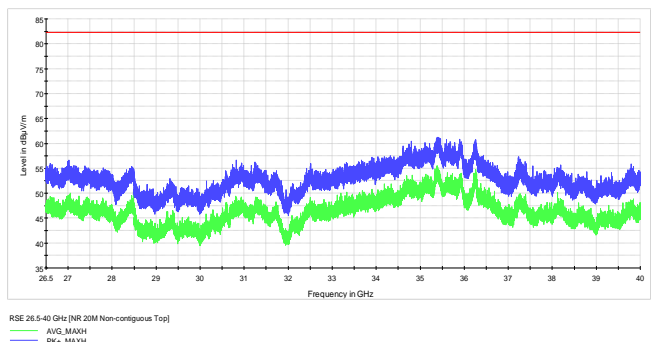


Figure 8.3-24: Radiated spurious emissions within 26.5-40 GHz, [NR 20 MHz 2 carrier non-contiguous Top Channel]

8.4 Frequency stability

Definitions and limits

FCC 27.54:

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

RSS-192, Section 5.4:

The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

Test summary

Test date	February 12, 2025
Test engineer	Dhara Patel

Observations, settings and special notes

Testing was performed per ANSI C63.26 Paragraphs 5.6.3, 5.6.4 and 5.6.5 methods.
26 dBc points including frequency tolerance were assessed to remain within assigned band.

Test data

Table 8.4-1: Frequency error results

Temperature, °C	Voltage, V _{DC}	Frequency error, Hz
-40	48.00	-1.89
-30	48.00	-7.96
-20	48.00	7.37
-10	48.00	-3.50
0	48.00	-9.03
10	48.00	3.87
20	48.00	6.48
20	40.80	-6.99
20	55.20	-9.21
30	48.00	-8.38
40	48.00	-2.19
50	48.00	9.44
55	48.00	-4.12

The maximum negative drift is -9.21 Hz, and the maximum positive drift is +9.44 Hz. The 99% OBW and 26 dB emission bandwidth, corrected for these drifts, are located within the operating frequency blocks and authorized bands of operation.

8.5 Occupied bandwidth

Definitions and limits

FCC §2.1049:

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-Gen, 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

Test summary

Test date	February 12, 2025
Test engineer	Dhara Patel

Observations, settings and special notes

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 modulation due to its higher power output.

Testing was performed per ANSI C63.26 Paragraphs 5.4.3 and 5.4.4 methods.

Spectrum analyzer settings:

Detector mode	Peak
Resolution bandwidth	≥1 % of EBW
Video bandwidth	RBW × 3
Trace mode	Max Hold

Table 8.5-1: Occupied bandwidth results for NR 20 MHz channel

Remarks	Frequency, MHz	26 dB BW, MHz	99% OBW, MHz
20 MHz, Low channel	3710.01	19.02	18.201
20 MHz, Mid channel	3819.99	18.96	18.232
20 MHz, Top channel	3969.99	18.97	18.233
20 MHz, Top channel [ISED]	3890.01	19.08	18.202

Table 8.5-2: Occupied bandwidth results for NR 30 MHz channel

Remarks	Frequency, MHz	26 dB BW, MHz	99% OBW, MHz
30 MHz, Low channel	3714.99	28.99	27.799
30 MHz, Mid channel	3819.99	29.20	27.745
30 MHz, Top channel	3965.01	29.25	27.912
30 MHz, Top channel [ISED]	3885.00	29.25	27.836

Test data

Table 8.5-3: Occupied bandwidth results for NR 40 MHz channel

Remarks	Frequency, MHz	26 dB BW, MHz	99% OBW, MHz
40 MHz, Low channel	3720.00	39.58	37.734
40 MHz, Mid channel	3819.99	39.67	37.779
40 MHz, Top channel	3960.00	39.59	37.863
40 MHz, Top channel [ISED]	3879.99	39.58	37.739

Table 8.5-4: Occupied bandwidth results for NR 50 MHz channel

Remarks	Frequency, MHz	26 dB BW, MHz	99% OBW, MHz
50 MHz, Low channel	3725.01	49.31	47.372
50 MHz, Mid channel	3819.99	49.44	47.426
50 MHz, Top channel	3954.99	49.31	47.393
50 MHz, Top channel [ISED]	3875.01	49.48	47.458

Table 8.5-5: Occupied bandwidth results for NR 60 MHz channel

Remarks	Frequency, MHz	26 dB BW, MHz	99% OBW, MHz
60 MHz, Low channel	3729.99	59.79	57.616
60 MHz, Mid channel	3819.99	59.75	57.759
60 MHz, Top channel	3950.01	59.75	57.762
60 MHz, Top channel [ISED]	3870.00	59.86	57.590

Table 8.5-6: Occupied bandwidth results for NR 70 MHz channel

Remarks	Frequency, MHz	26 dB BW, MHz	99% OBW, MHz
70 MHz, Low channel	3735.00	69.97	67.280
70 MHz, Mid channel	3819.99	69.92	67.629
70 MHz, Top channel	3945.00	70.05	67.274
70 MHz, Top channel [ISED]	3864.99	70.02	67.357

Table 8.5-7: Occupied bandwidth results for NR 80 MHz channel

Remarks	Frequency, MHz	26 dB BW, MHz	99% OBW, MHz
80 MHz, Low channel	3740.01	80.07	77.150
80 MHz, Mid channel	3819.99	80.03	77.269
80 MHz, Top channel	3939.99	79.97	77.235
80 MHz, Top channel [ISED]	3860.01	80.08	77.454

Table 8.5-8: Occupied bandwidth results for NR 90 MHz channel

Remarks	Frequency, MHz	26 dB BW, MHz	99% OBW, MHz
90 MHz, Low channel	3744.99	90.13	87.158
90 MHz, Mid channel	3819.99	90.29	87.286
90 MHz, Top channel	3935.01	90.08	87.414
90 MHz, Top channel [ISED]	3855.00	90.17	87.256

Table 8.5-9: Occupied bandwidth results for NR 100 MHz channel

Remarks	Frequency, MHz	26 dB BW, MHz	99% OBW, MHz
100 MHz, Low channel	3750.00	100.8	97.182
100 MHz, Mid channel	3819.99	100.9	97.056
100 MHz, Top channel	3930.00	100.8	97.276
100 MHz, Top channel [ISED]	3849.99	100.8	97.270

Test data, continued

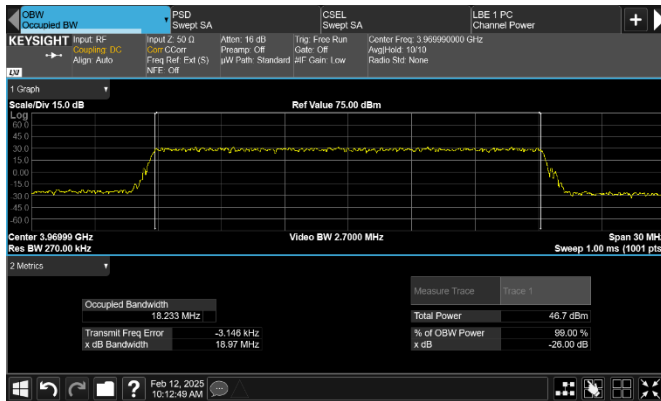


Figure 8.5-1: Sample plot for NR 20 MHz channel

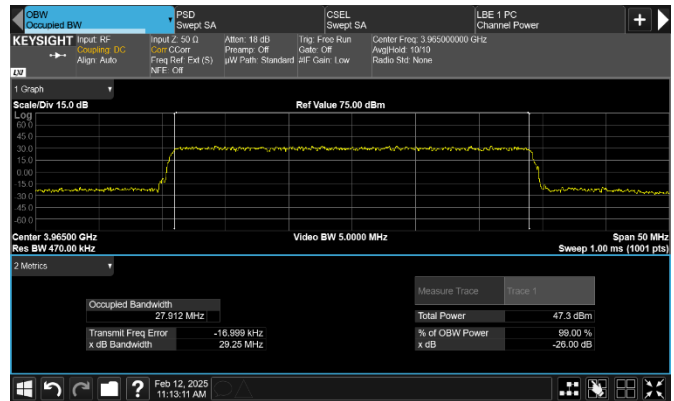


Figure 8.5-2: Sample plot for NR 30 MHz channel

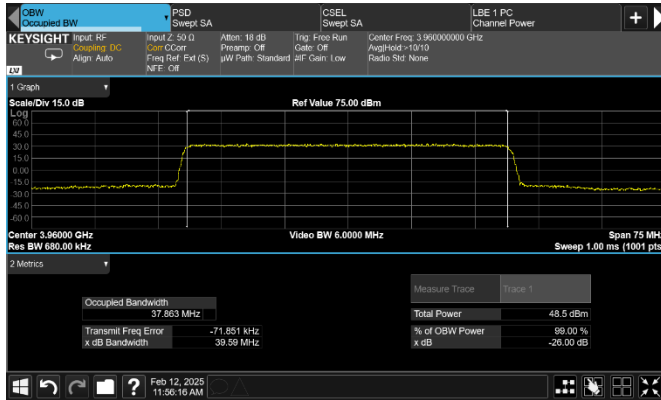


Figure 8.5-3: Sample plot for NR 40 MHz channel

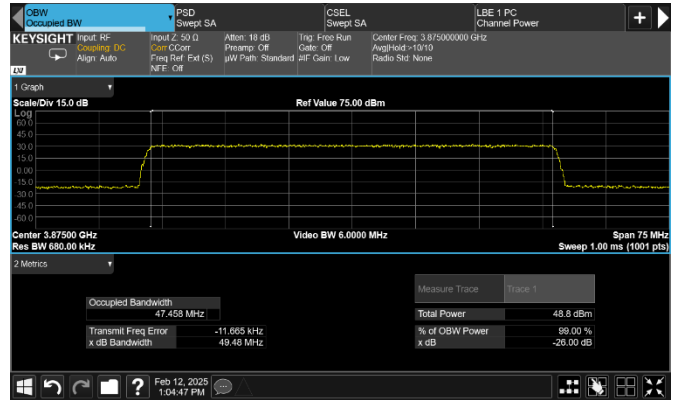


Figure 8.5-4: Sample plot for NR 50 MHz Channel

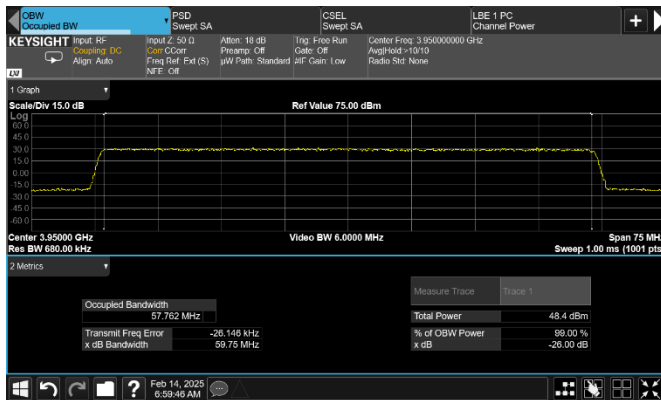


Figure 8.5-5: Sample plot for NR 60 MHz Channel

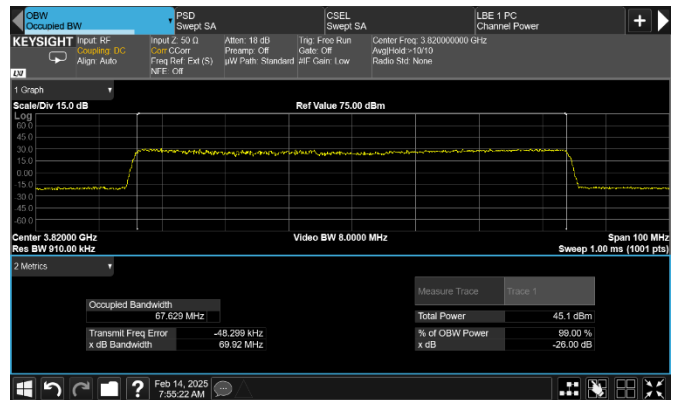


Figure 8.5-6: Sample plot for NR 70 MHz Channel



Test data, continued

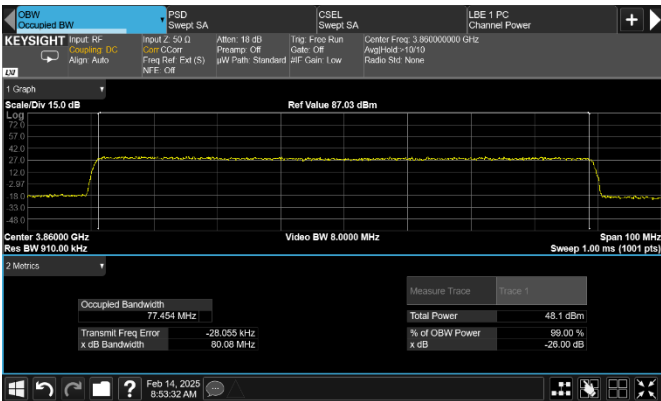


Figure 8.5-7: Sample plot for NR 80 MHz channel

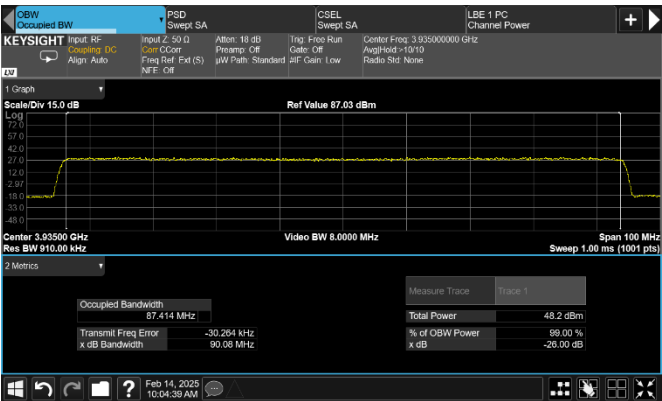


Figure 8.5-8: Sample plot for NR 90 MHz channel

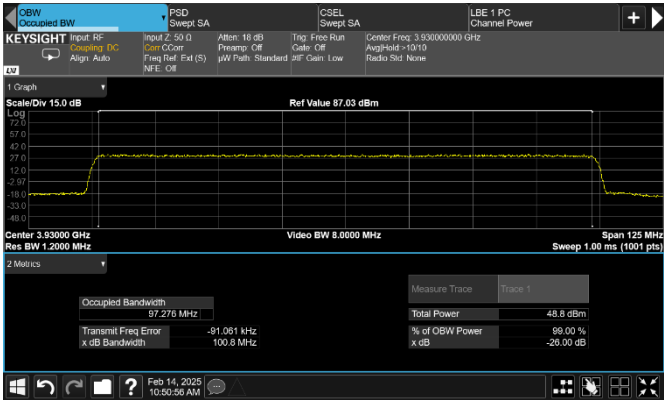
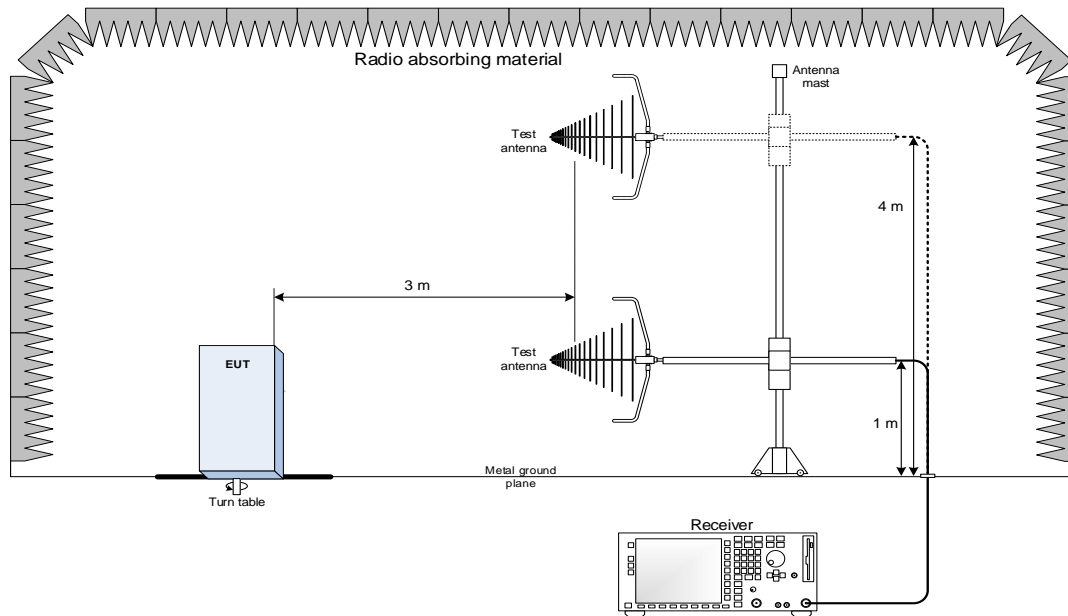


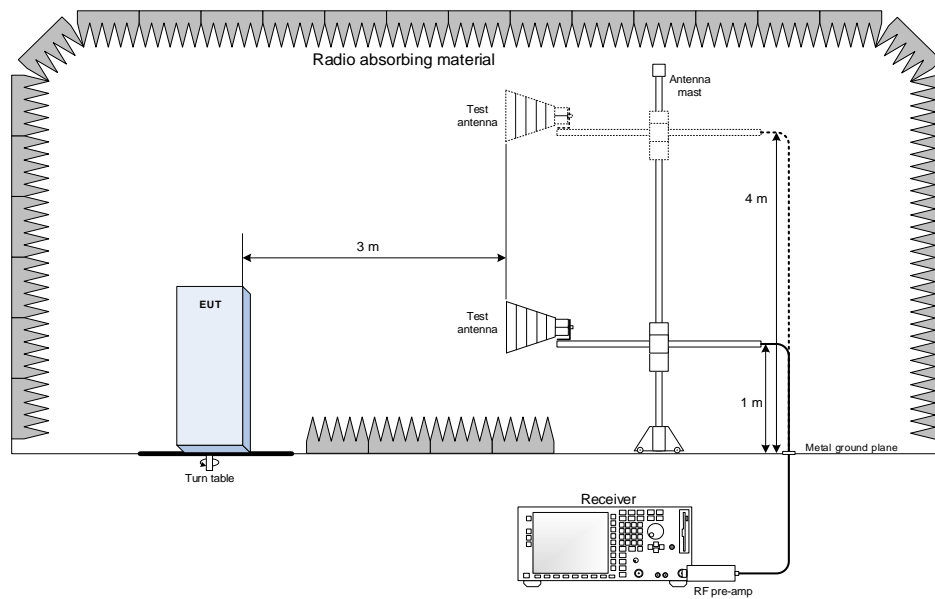
Figure 8.5-9: Sample plot for NR 100 MHz channel

Section 9. Block diagrams of test setups

9.1 Radiated emissions set-up for frequencies below 1 GHz



9.2 Radiated emissions set-up for frequencies above 1 GHz



9.3 Conducted emissions set-up

