Conducted spurious emission measurements according to CFR 47 §27.53 and §90.543/ RSS-130 4.7 and RSS-140 4.4

Date	Temperature	Humidity
2023-05-16	23 °C ± 3 °C	23 % ± 5 %
2023-05-20	23 °C ± 3 °C	35 % ± 5 %
2023-05-31	22 °C ± 3 °C	49 % ± 5 %
2024-06-18	22 °C ± 3 °C	38 % ± 5 %
2024-06-19	22 °C ± 3 °C	33 % ± 5 %
2024-06-20	22 °C ± 3 °C	31 % ± 5 %

Test set-up and procedure

The measurements were made per definition in ANSI C63.26, 5.7.4. The output was connected to a spectrum analyzer with the RMS detector activated.

An offset of 6 dB has been used to cover 4x4 MIMO according to ANSI C63.26 6.4.4.1 c "measure and add 10 $\log_{10}$ (N_{ANT})" in the frequency range 9k – 1GHz, for 1–8 GHz an offset of 6.62 was used to compensate for the high pass filter

The vertical lines V1 and V2 in the plots 9k to 1 GHz represent the band edges of the operating band 29.
The vertical lines V3 and V4 in the plots 9k to 1 GHz represent the band edges of the operating band 14

Measurement equipment	RISE number
R&S FSW 43	902 073
RF attenuator	900 229
High pass filter 1-20 GHz	504 199
Coaxial cable Sucoflex 102EA	BX50236
Coaxial cable Sucoflex 102EA	BX50237
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 2.6 dB

Results LTE B14 and B29

Single carrier LTE: TM1.1

Diagram	Symbolic name B14	Symbolic name B29	Tested Port
3.1 a-d	B_{5LTE}	B_{5LTE}	RF B
3.2 a-d	M_{5LTE}	M_{5LTE}	RF A
3.3 a-d	M_{5LTE}	M_{5LTE}	RF B
3.4 a-d	M_{5LTE}	-	RF C
3.5 a-d	M_{5LTE}	-	RF D
3.6 a-d	M_{10LTE}	M_{10LTE}	RF B
3.7 a-d	T_{5LTE}	T_{5LTE}	RF B

Note: Measurements were mainly limited to port RF A due to the measurement result in single carrier mode that shows that the ports are electrical identical as declared by the client.

Multi carrier LTE: TM1.1

Diagram	Symbolic name B14	Symbolic name B29	Tested Port
3.8 a-d	$M2_{5+5LTE}$	$M2_{5+5LTE}$	RF A

Results NR B14 and B29 SCS 15kHz

Single carrier NR: TM1.1

Diagram	Symbolic name B14	Symbolic name B29	Tested Port
3.9 a-d	B_{5NR}	B_{5NR}	RF A
3.10 a-d	M_{5NR}	M_{5NR}	RF A
3.11 a-d	M_{10NR}	M_{10NR}	RF A
3.12 a-b	T_{5NR}	T_{5NR}	RF A

Multi carrier NR: TM1.1

Diagram	Symbolic name B14	Symbolic name B29	Tested Port
3.13 a-d	$M2_{5+5NR}$	$M2_{5+5NR}$	RF A

Results LTE with NB IoT GB B14

Single carrier: LTE: TM1.1,NB IoT : N-TM

Diagram	Symbolic name B14	Tested Port
3.14 a-d	$B_{GB+10LTE}$	RF A
3.15 a-d	$T_{GB+10LTE}$	RF A

Results NR B14 SCS 30kHz

Single carrier NR: TM1.1

Diagram	Symbolic name B14	Tested Port
3.16 a-d	M_{10NR}	RF A

Results Multi RAT LTE and NR B14 and B29 SCS 15kHz

Multi RAT: LTE and NR: TM1.1,

Diagram	Symbolic name B14	Symbolic name B29	Tested Port
3.17 a-d	1NR+1LTE	1NR+2LTE	RF A

Results LTE with NB IoT SA B14

Single carrier: LTE: TM1.1,NB IoT : N-TM

Diagram	Symbolic name B14	Tested Port
3.18 a-d	$B_{IoT\ SA} + T_{5LTE}$	RF A
3.19 a-d	$T_{IoT\ SA} + B_{5LTE}$	RF A

Results Multi RAT ESS NR and LTE B14 SCS 15kHz

ESS NR 50% and LTE 50% TM1.1

Diagram	Symbolic name B14	Tested Port
3.20 a-d	ESS_{NR+LTE}	RF A

Remark

The emission at 9 kHz on the plots was not generated by the test object. A complementary measurement with a smaller RBW showed that it was related to the LO feed-through.

The highest fundamental frequency is 768 MHz. The measurements were made up to 8 GHz (10x768 MHz = 7.68 GHz).

Limits

eCFR 47 §90.543 Emission limitations.

e) For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:
   1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB(-46 dBm) in a 6.25 kHz band segment, for base and fixed stations.
   3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB (-13 dBm)
   4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.
   5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz (-40 dBm) equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW (-50 dBm) EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

RSS-140

4.4 Transmitter unwanted emission limits

The power of any unwanted emission outside the bands 758-768 MHz and 788-798 MHz shall be attenuated below the transmitter output power P in dBW as follows, where P is the transmitter output power in watts:

a. For any frequency between 769-775 MHz and 799-806 MHz:
   i. 76 + 10 log (p), dB (-46 dBm) in a 6.25 kHz band for fixed and base station equipment
b. For any frequency between 775-788 MHz, above 806 MHz, and below 758 MHz: 43 + 10 log (p), dB (-13 dBm) in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency bands 758-768 MHz and 788-798 MHz, a resolution bandwidth of 30 kHz may be employed.

In addition, the equivalent isotropically radiated power (e.i.r.p.) of all emissions, including harmonics in the band 1559-1610 MHz, shall not exceed −70 dBW/MHz (-40 dBm) for wideband emissions, and −80 dBW/kHz (-50 dBm) for discrete emissions of less than 700 Hz bandwidth.

eCFR 47 §27.53 (g)
For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB (-13 dBm). Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

RSS-130

4.7 Transmitter unwanted emissions
4.7.1 General unwanted emissions limits
The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log p (watts), dB (-13 dBm). However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

Complies?	Yes

Diagram 3.1a LTE: TM1.1, B_{5LTE}, 9 kHz – 1 GHz, Port B:

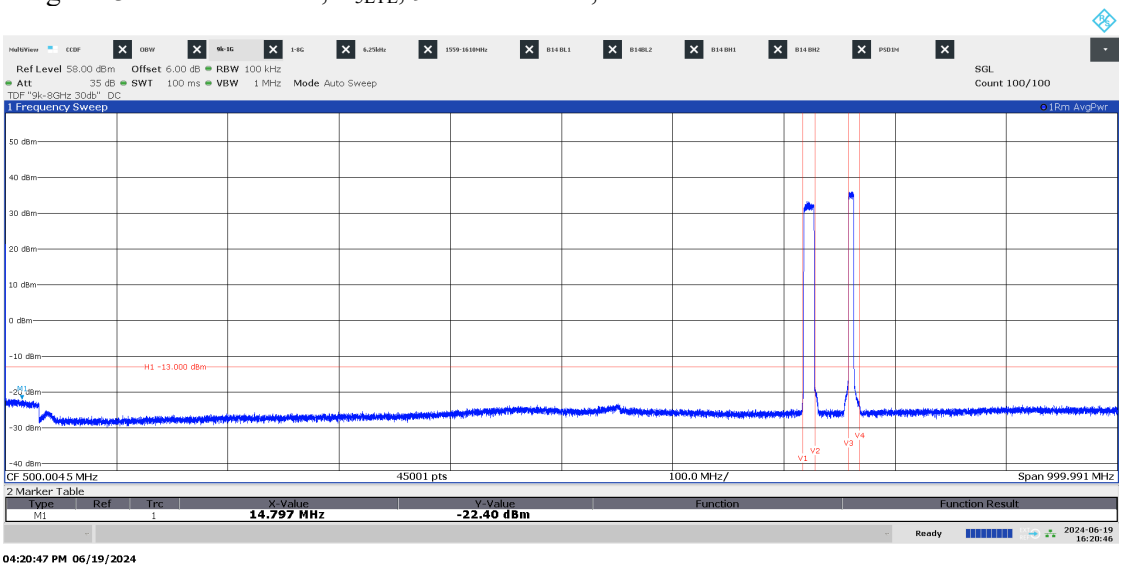

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Diagram 3.1b LTE: TM1.1, B_{5LTE}, 769 – 806 MHz, Port B:

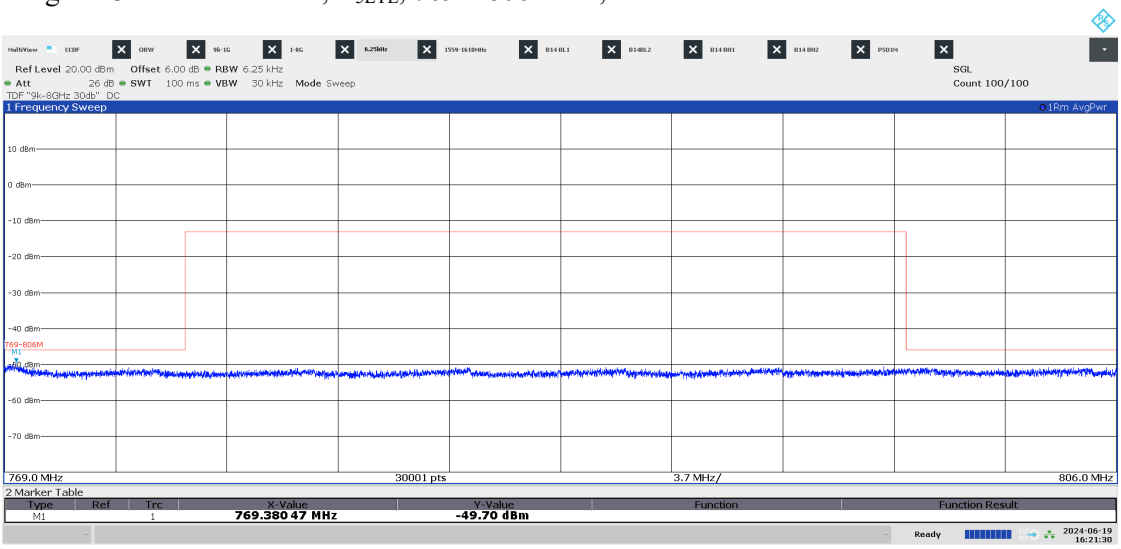

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Diagram 3.1c LTE: TM1.1, B_{5LTE}, 1 – 8 GHz, Port B:

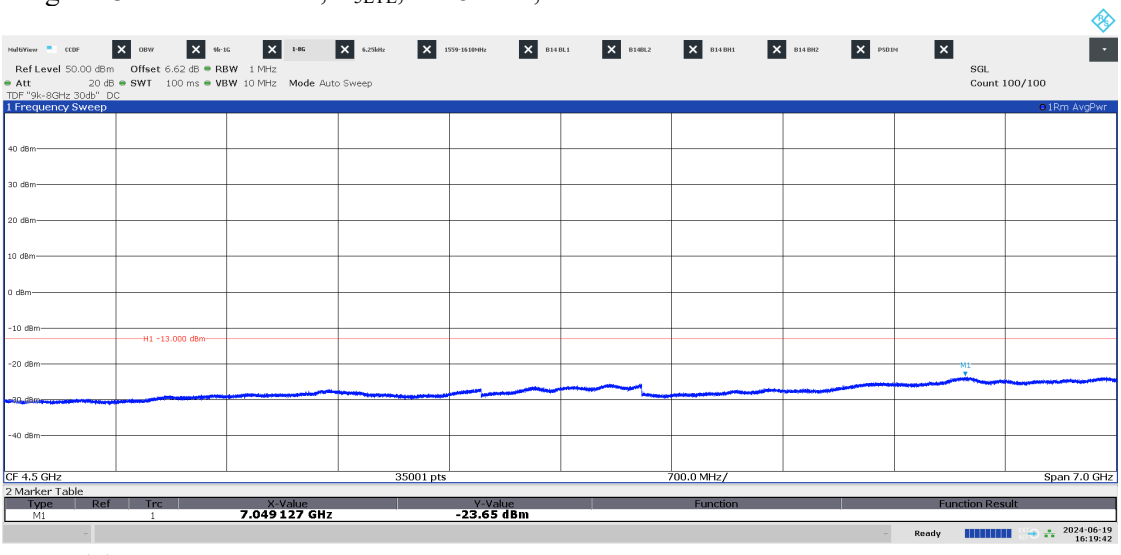

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Diagram 3.1d LTE: TM1.1, B_{5LTE}, 1559 – 1610 MHz, Port B:

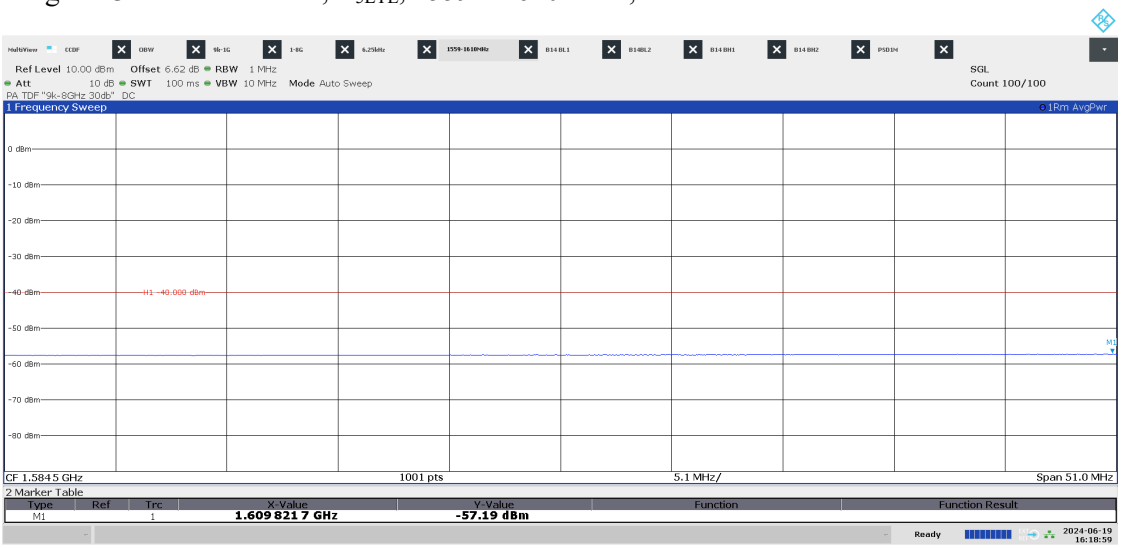

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Diagram 3.2a LTE: TM1.1, M_{5LTE}, 9 kHz – 1 GHz, Port A:

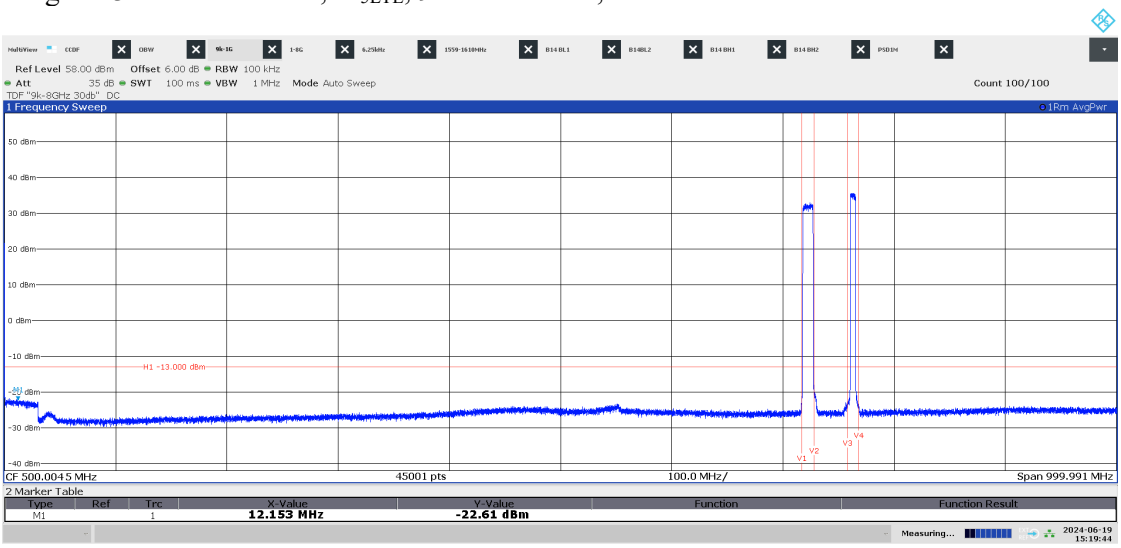

Diagram 3.2b LTE: TM1.1, M_{5LTE}, 769 – 806 MHz, Port A:

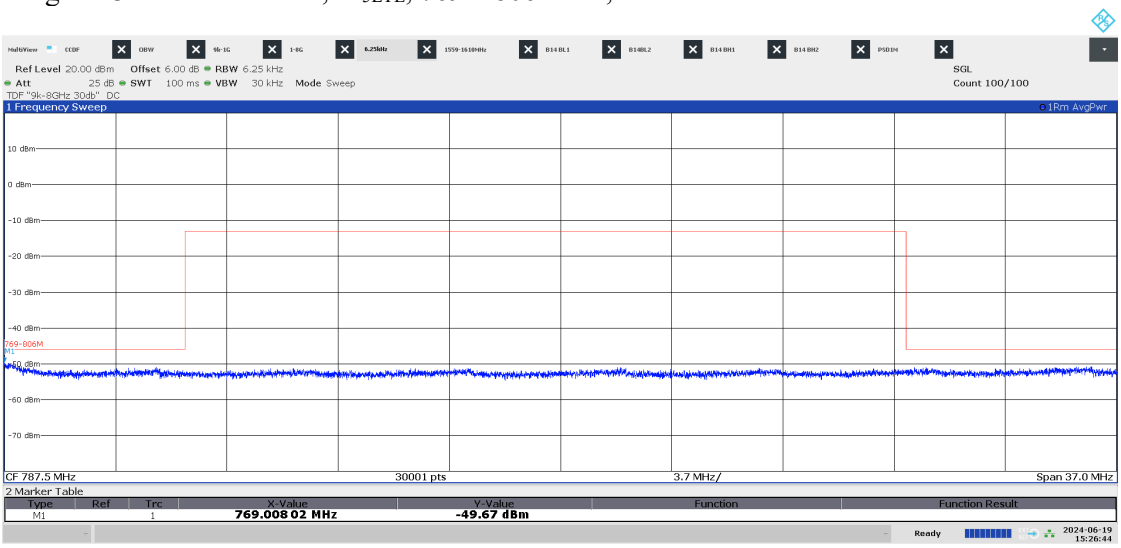

Diagram 3.2c LTE: TM1.1, M_{5LTE}, 1 – 9 GHz, Port A:

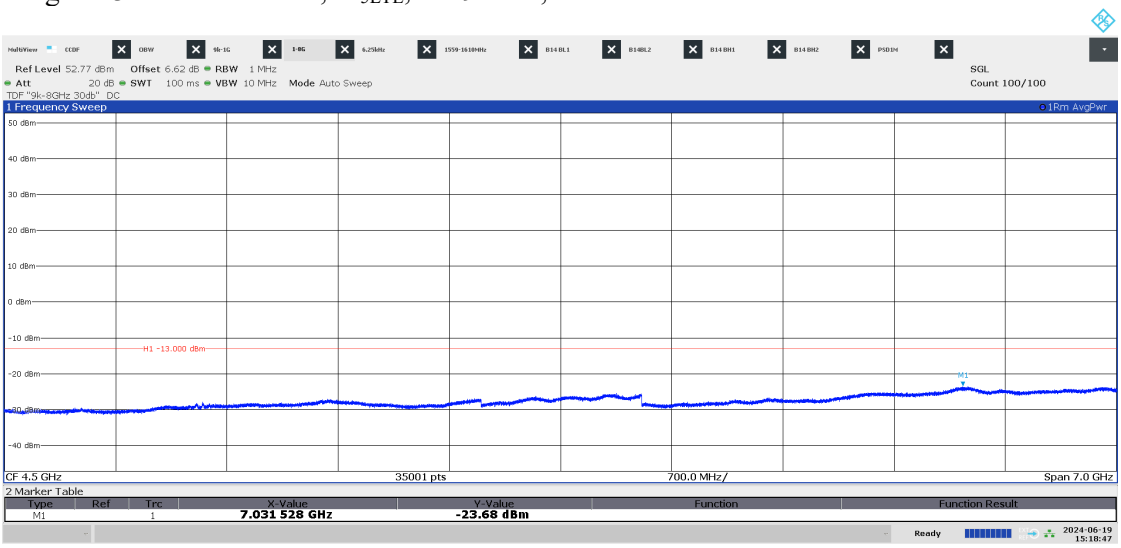

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Diagram 3.2d LTE: TM1.1, M_{5LTE}, 1559 – 1610 MHz, Port A:

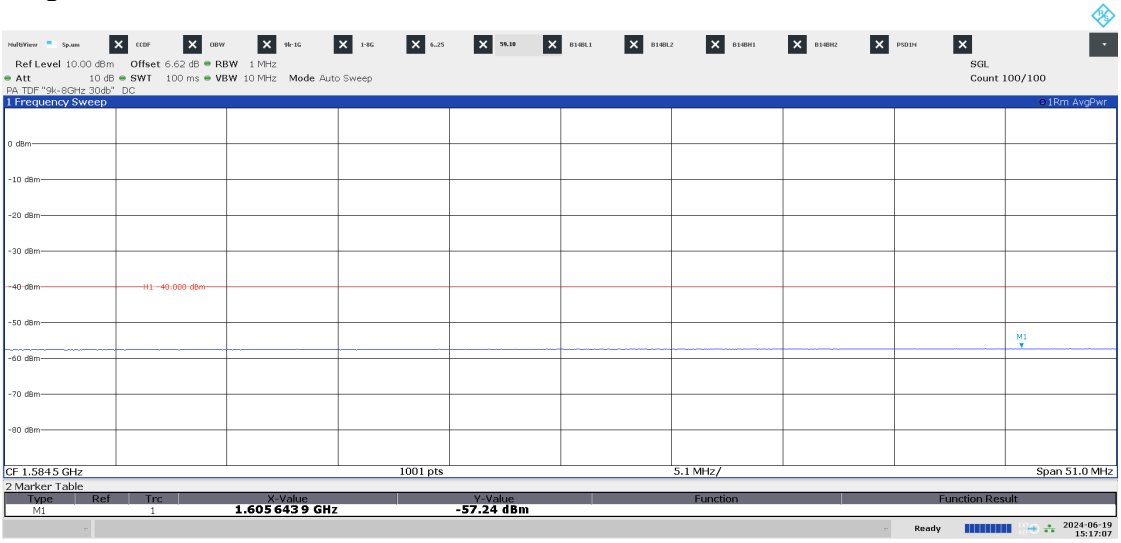

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Diagram 3.3a LTE: TM1.1, M_{5LTE}, 9 kHz – 1 GHz, Port B:

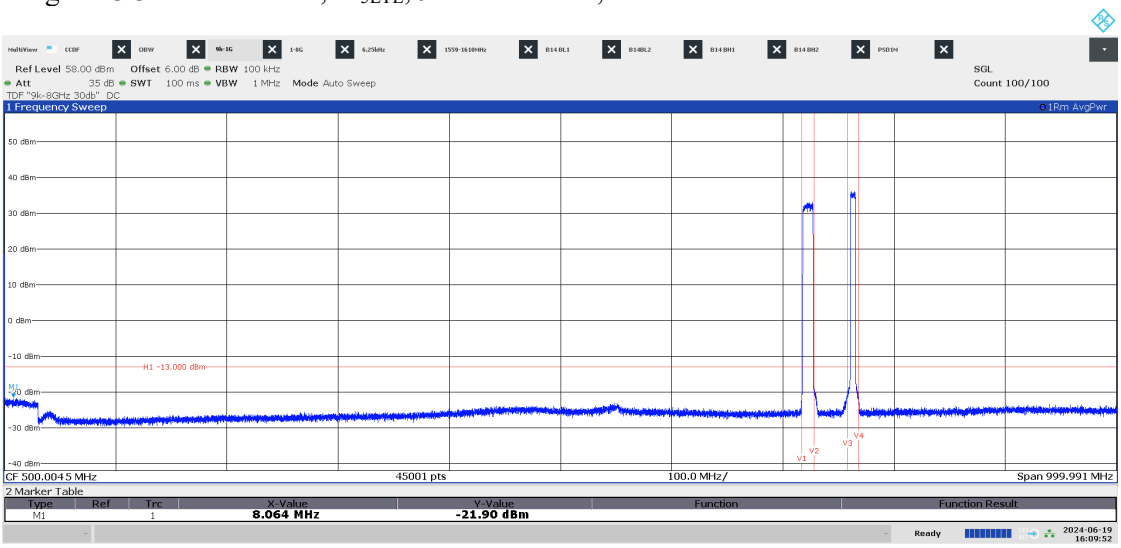

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Diagram 3.3b LTE: TM1.1, M_{5LTE}, 769 – 806 MHz, Port B:

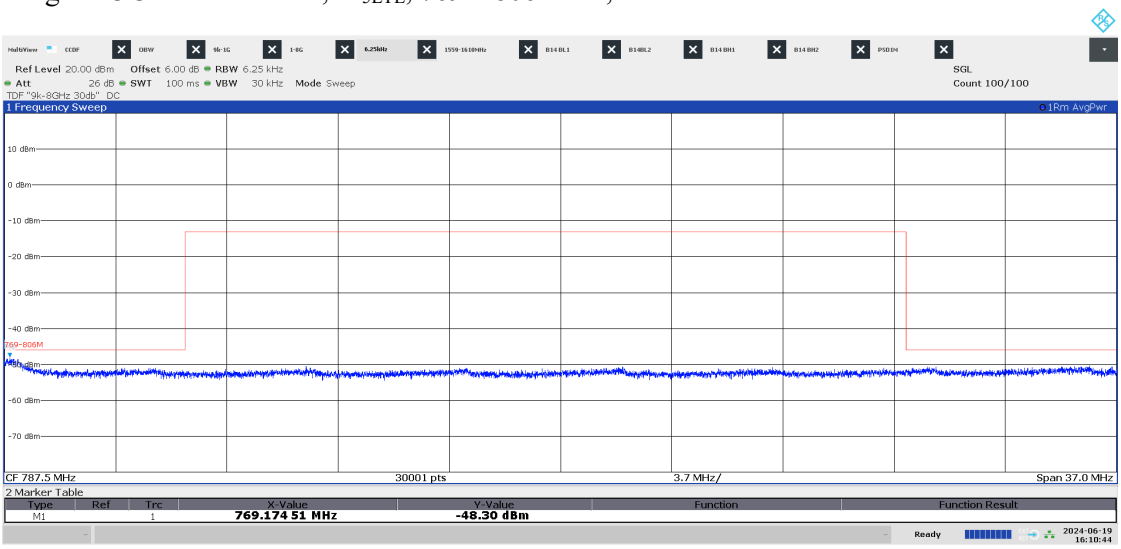

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Diagram 3.3c LTE: TM1.1, M_{5LTE}, 1 – 8 GHz, Port B:

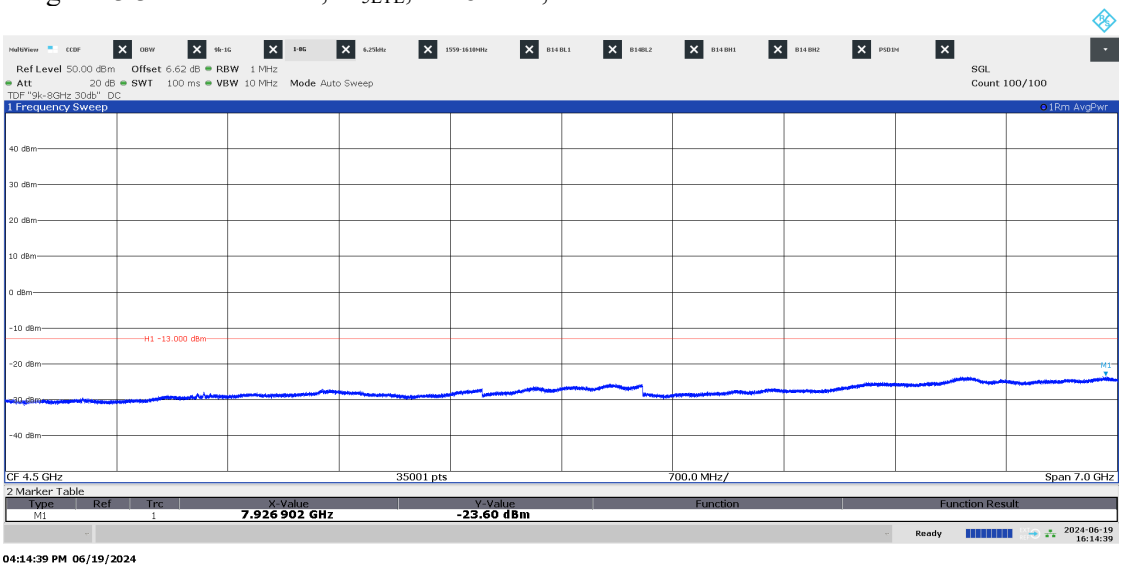

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Diagram 3.3d LTE: TM1.1, M_{5LTE}, 1559 – 1610 MHz, Port B:

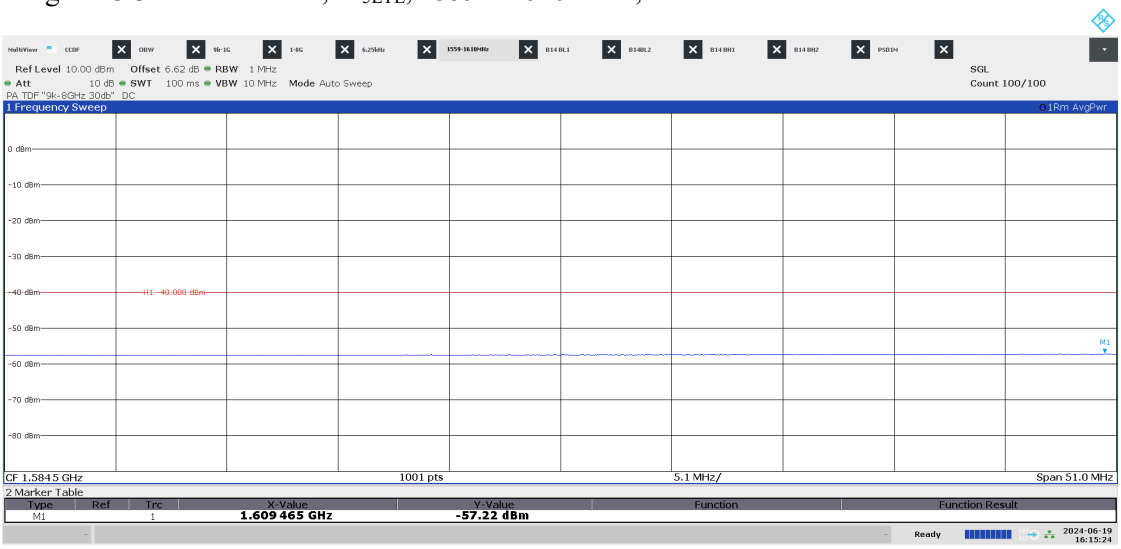

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Diagram 3.4a LTE: TM1.1, M_{5LTE}, 9 kHz – 1 GHz, Port C:

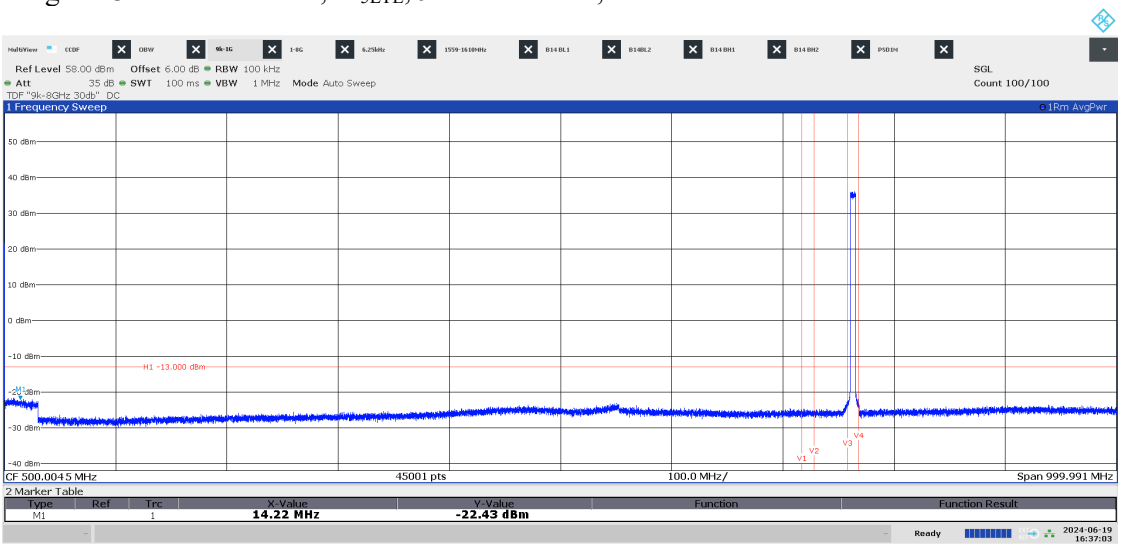

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Diagram 3.4b LTE: TM1.1, M_{5LTE}, 769 – 806 MHz, Port C:

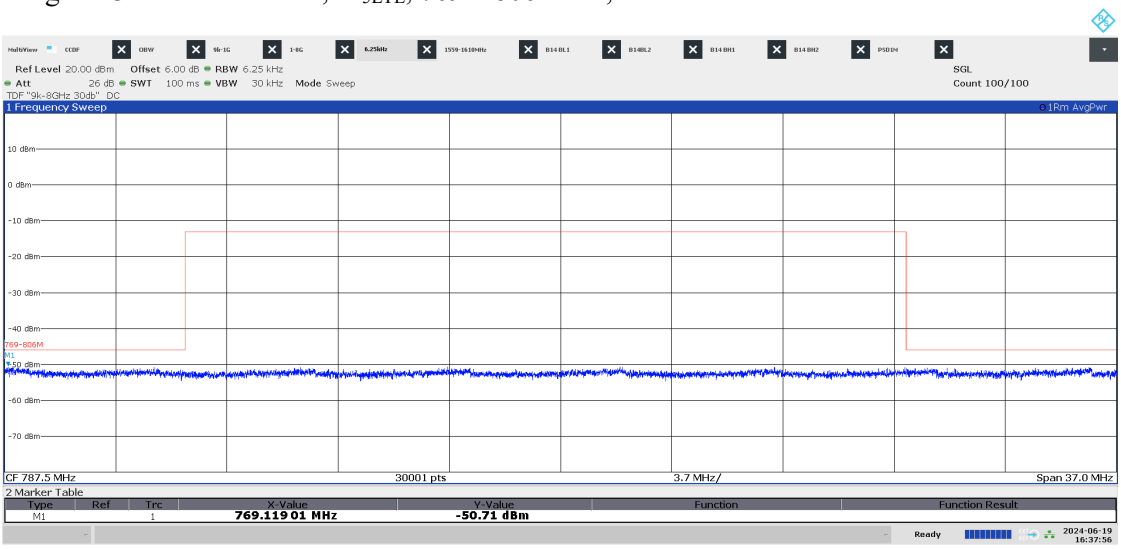

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Diagram 3.4c LTE: TM1.1, M_{5LTE}, 1 – 8 GHz, Port C:

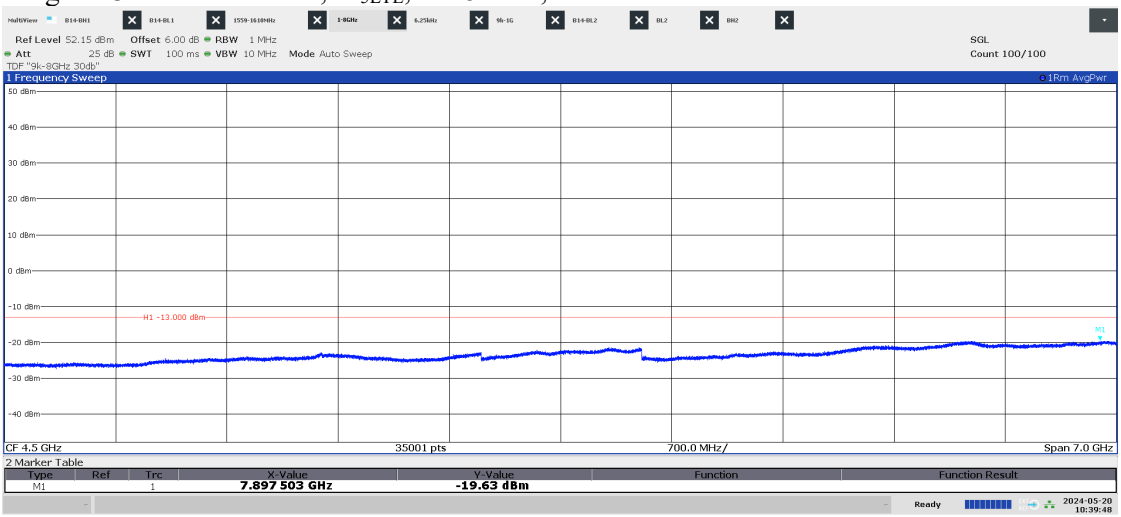

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Diagram 3.4d LTE: TM1.1, M_{5LTE}, 1559 – 1610 MHz, Port C:

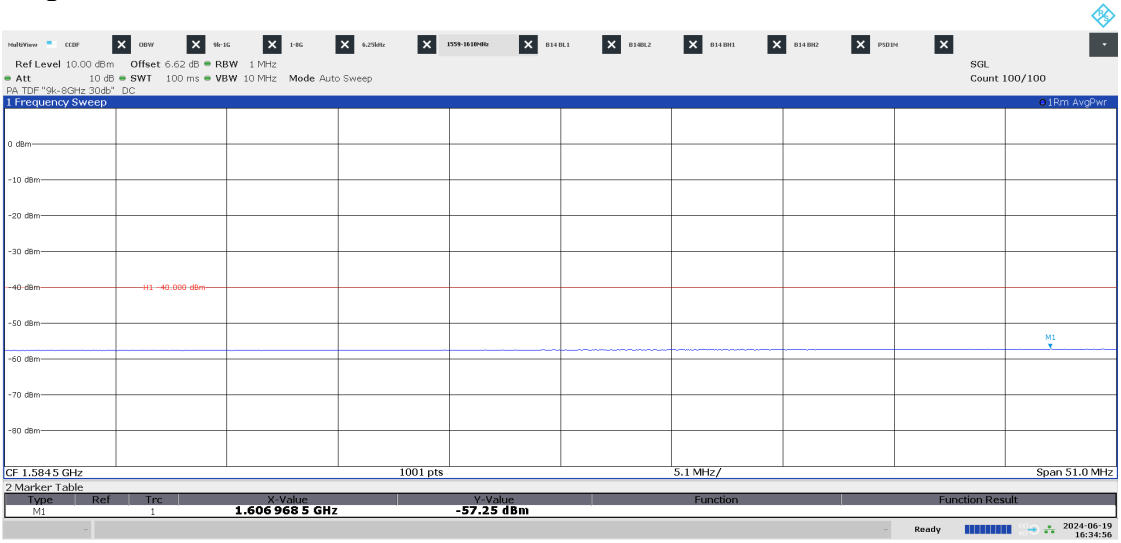

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Diagram 3.5a LTE: TM1.1, M_{5LTE}, 9 kHz – 1 GHz, Port D:

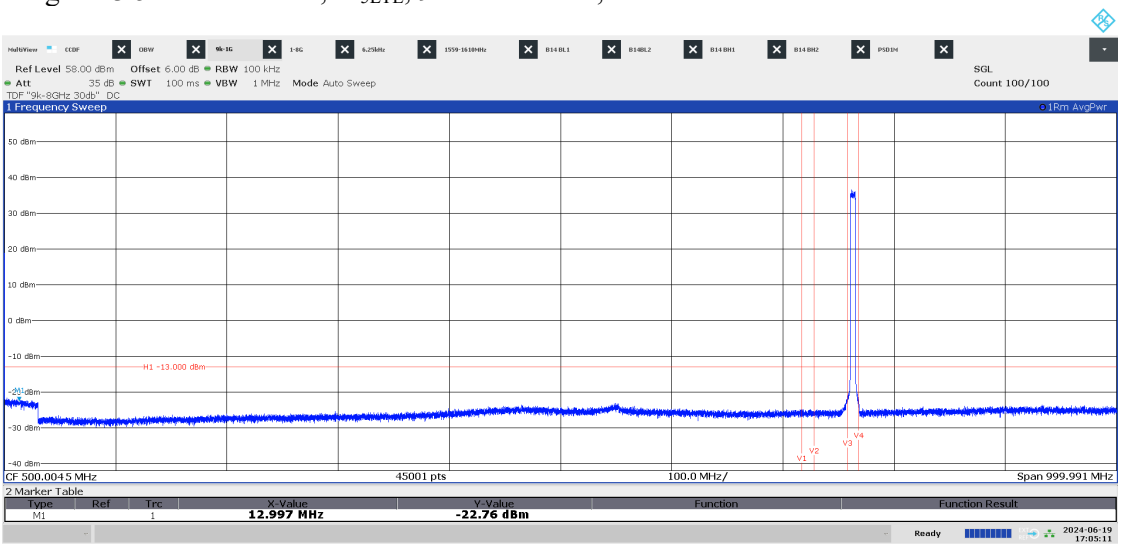

Diagram 3.5b LTE: TM1.1, M_{5LTE}, 769 – 806 MHz, Port D:

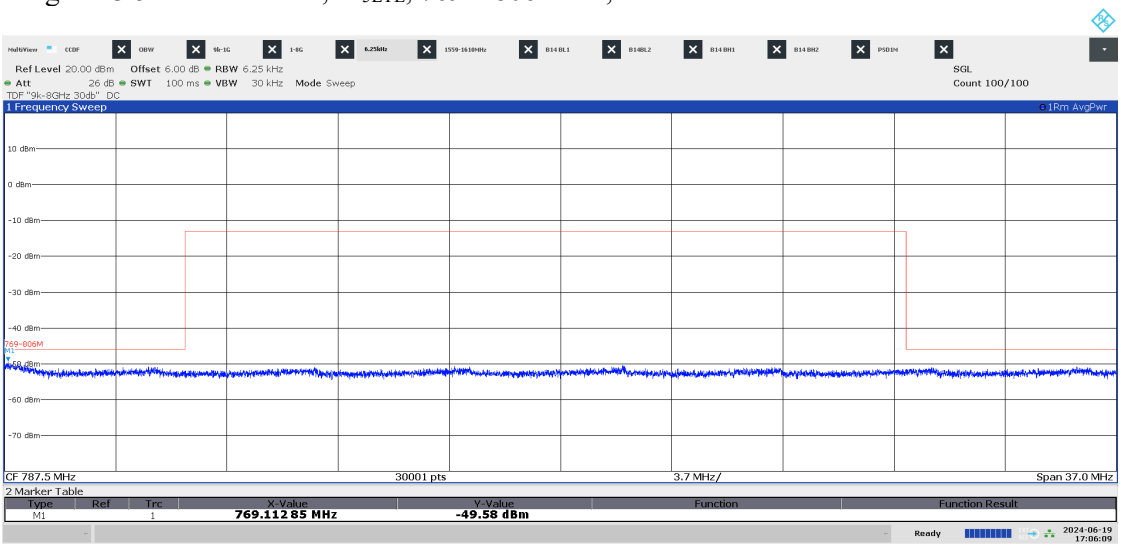

Diagram 3.5c LTE: TM1.1, M_{5LTE}, 1 – 8 GHz, Port D:

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Diagram 3.5d LTE: TM1.1, M_{5LTE}, 1559 – 1610 MHz, Port D:

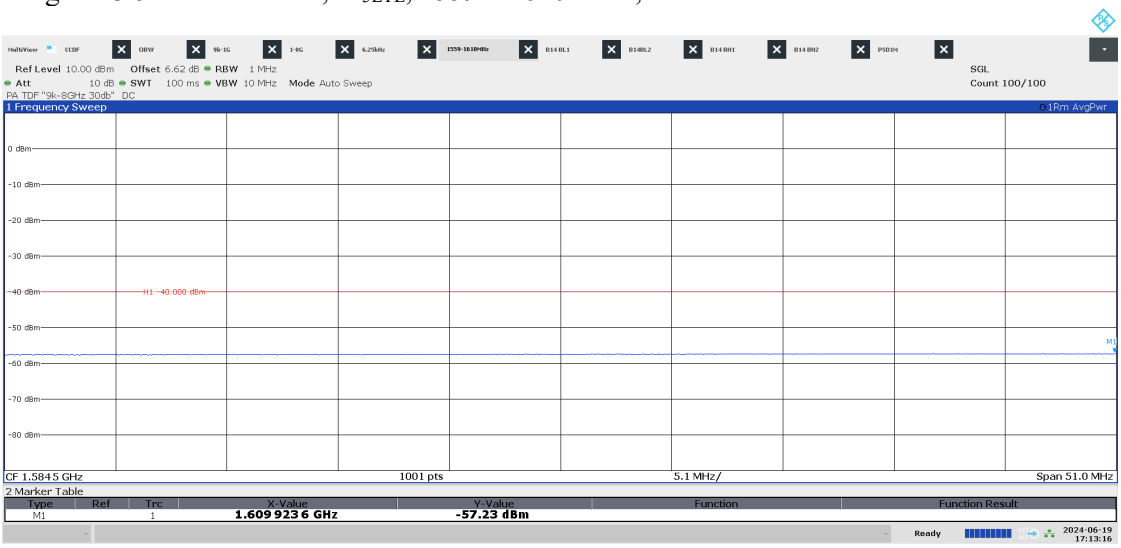

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Diagram 3.6a LTE: TM1.1, M_{10LTE}, 9 kHz – 1 GHz, Port B:

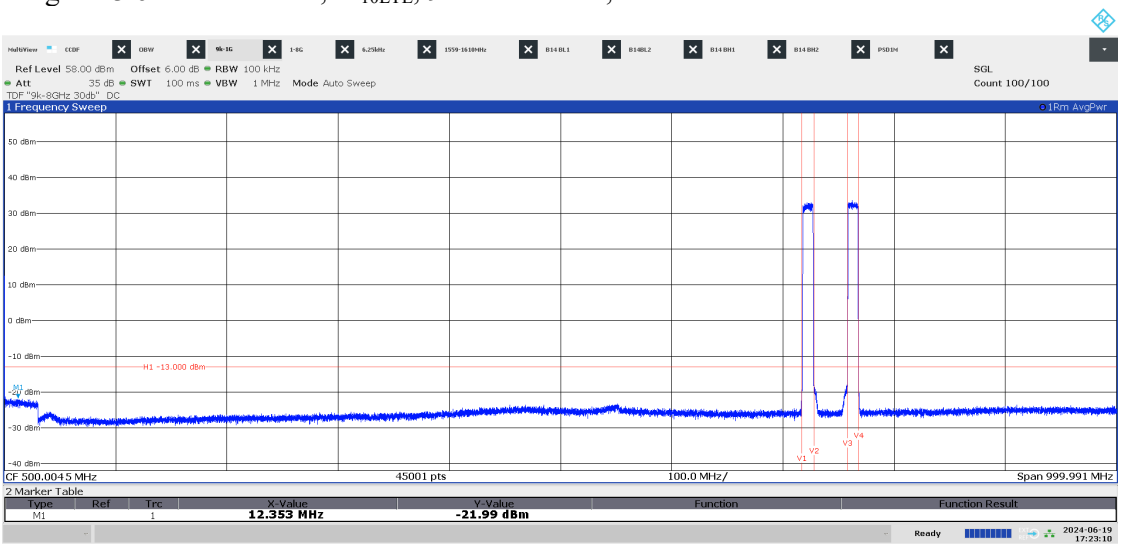

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Diagram 3.6b LTE: TM1.1, M_{10LTE}, 769 – 806 MHz, Port B:

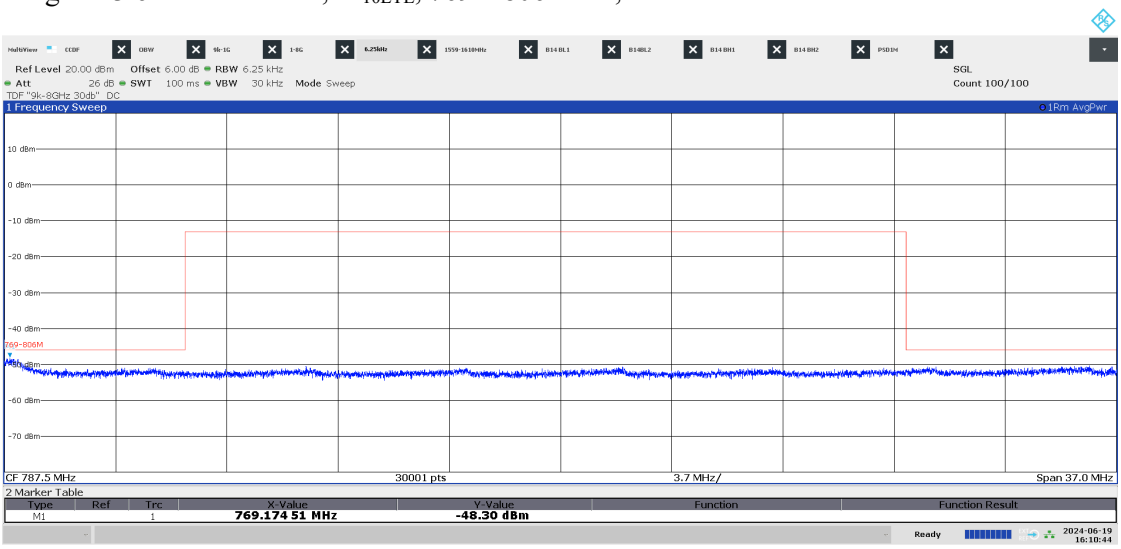

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Diagram 3.6c LTE: TM1.1, M_{10LTE}, 1 – 8 GHz, Port B:

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Diagram 3.6d LTE: TM1.1, M_{10LTE}, 1559 – 1610 MHz, Port B:

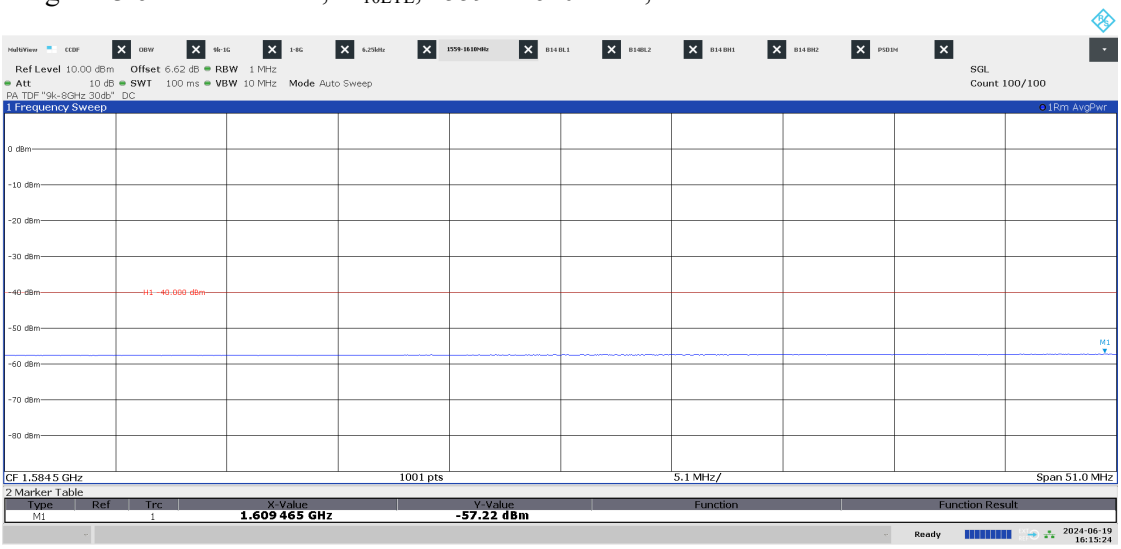

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Diagram 3.7a LTE: TM1.1, T_{5LTE}, 9 kHz – 1 GHz, Port B:

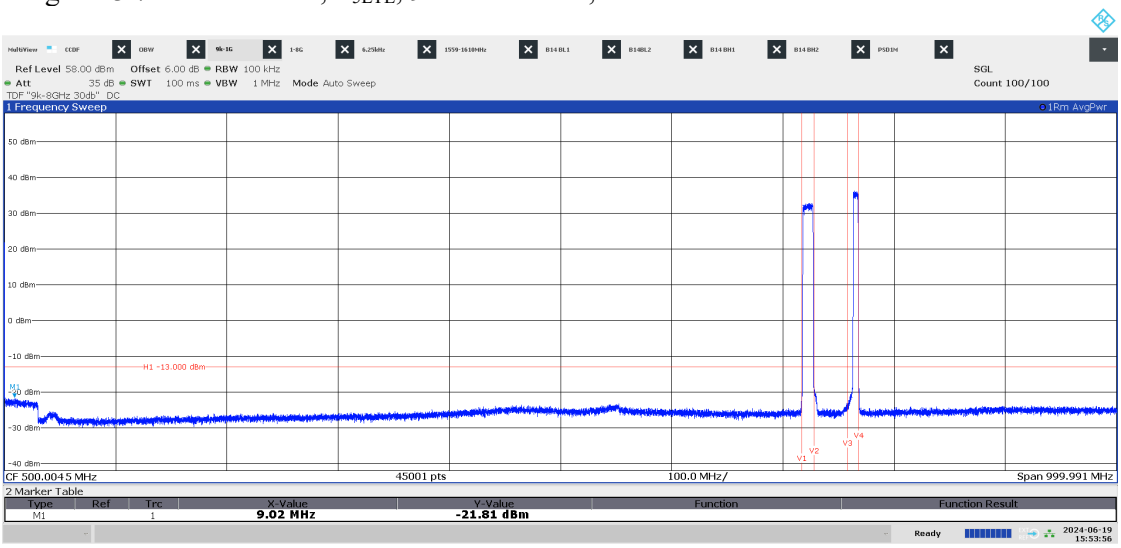

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Diagram 3.7b LTE: TM1.1, T_{5LTE}, 769 – 806 MHz, Port B:

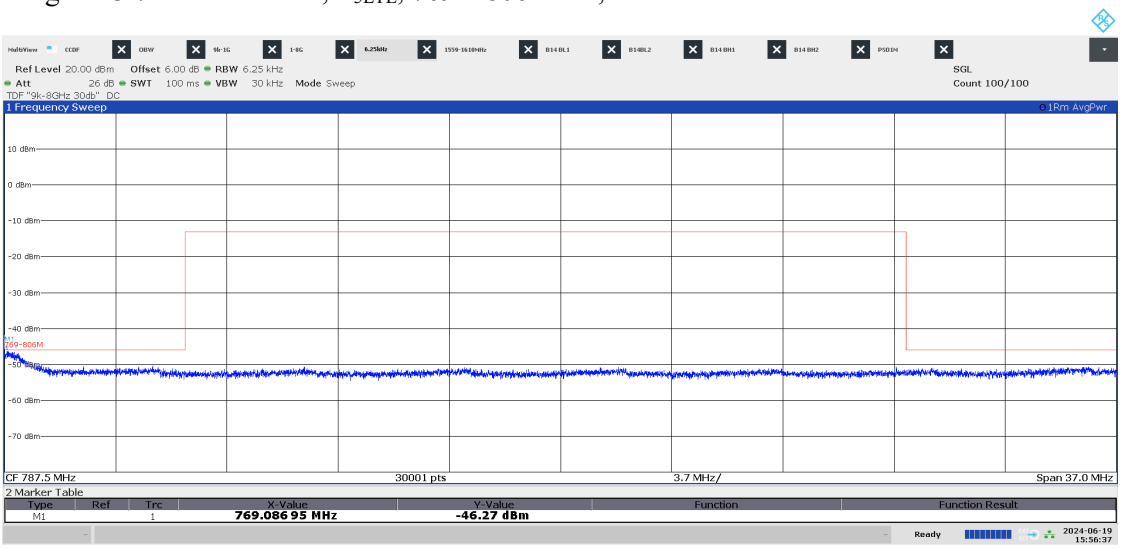

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Diagram 3.7c LTE: TM1.1, T_{5LTE}, 1 – 8 GHz, Port B:

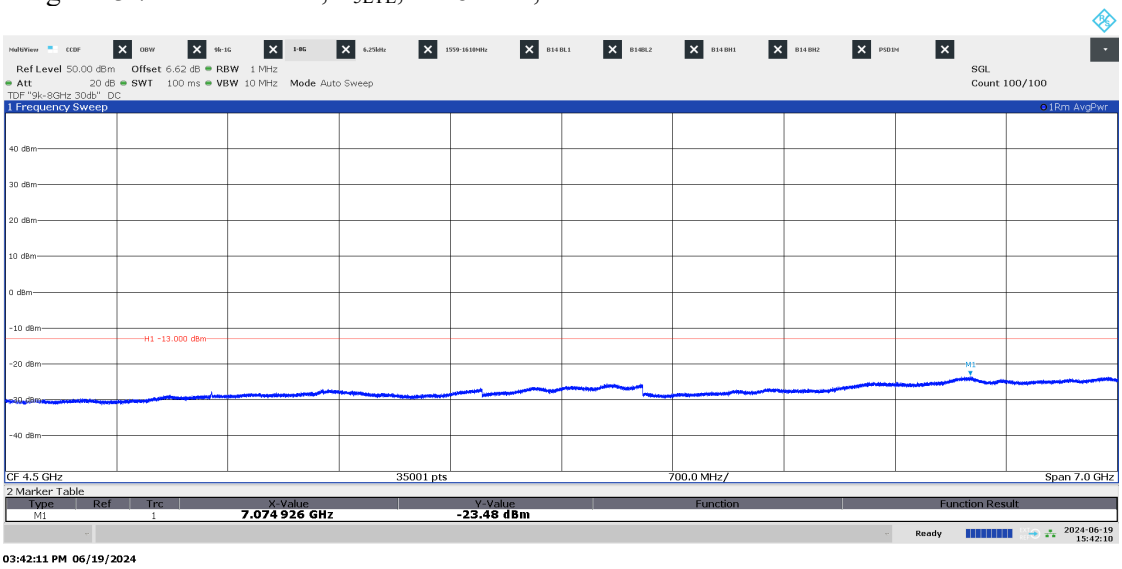

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Diagram 3.7d LTE: TM1.1, T_{5LTE}, 1559 – 1610 MHz, Port B:

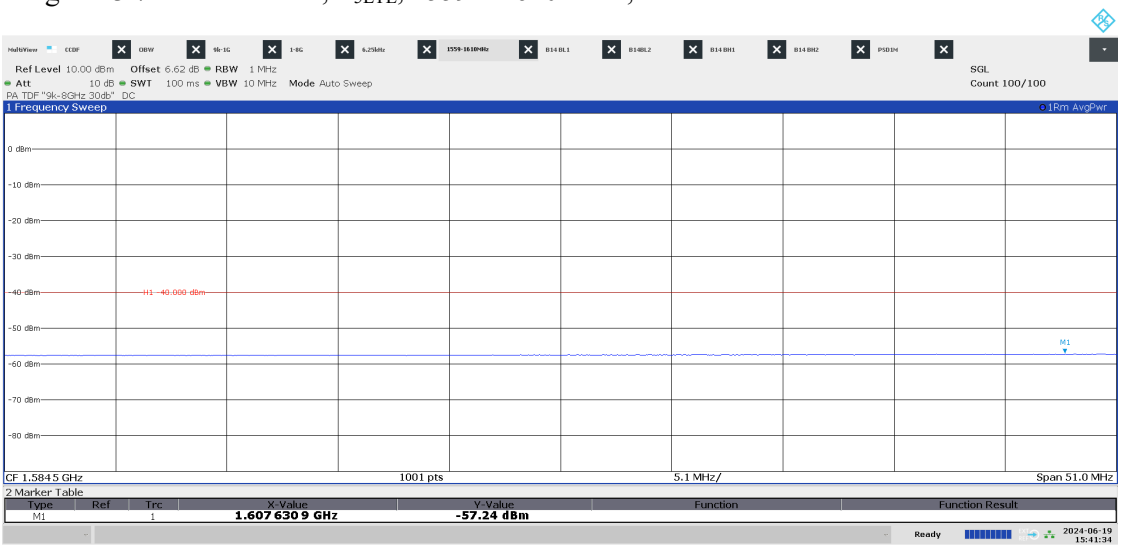

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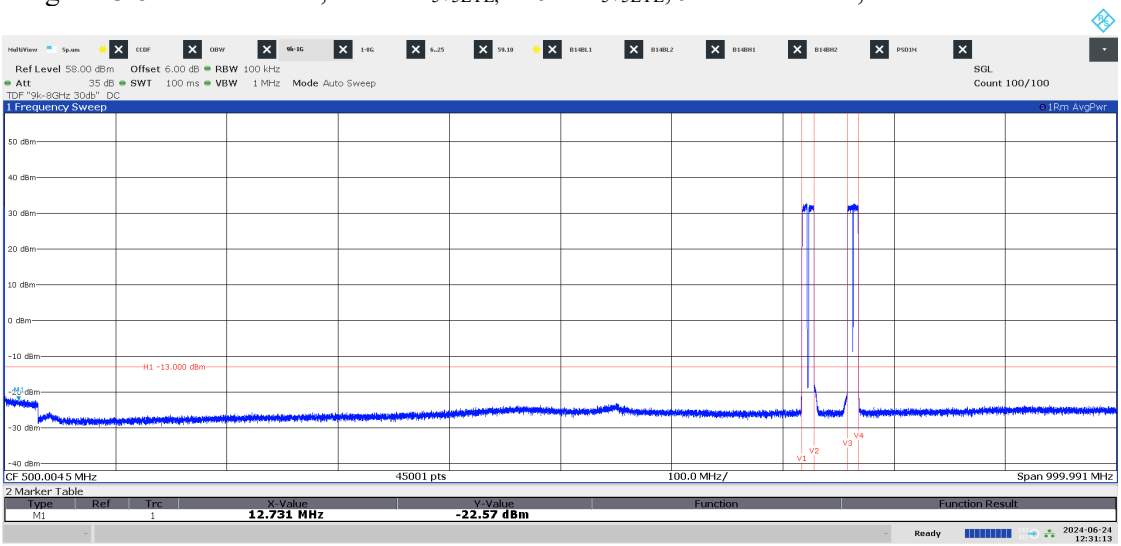
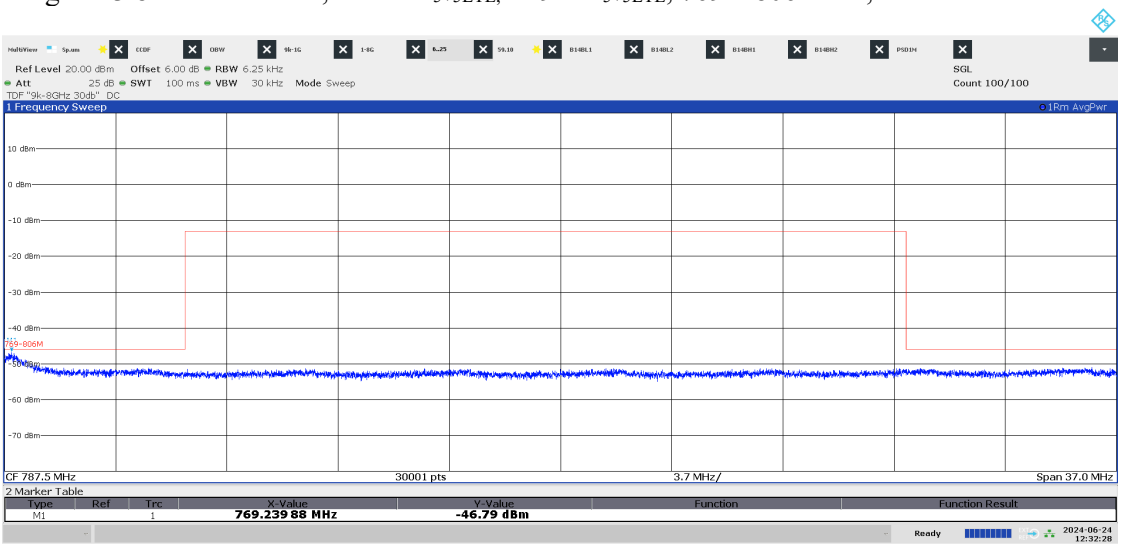
Diagram 3.8a LTE: TM1.1, B14 $M2_{5+5LTE}$, B29 $M2_{5+5LTE}$, 9 kHz – 1 GHz, Port A:



12:31:14 PM 06/24/2024

Diagram 3.8b LTE: TM1.1, B14 $M2_{5+5LTE}$, B29 $M2_{5+5LTE}$, 769 – 806 MHz, Port A:



12:32:29 PM 06/24/2024

Diagram 3.8c LTE: TM1.1, B14 $M2_{5+5LTE,}$ B29 $M2_{5+5LTE}$, 1 – 8 GHz, Port A:

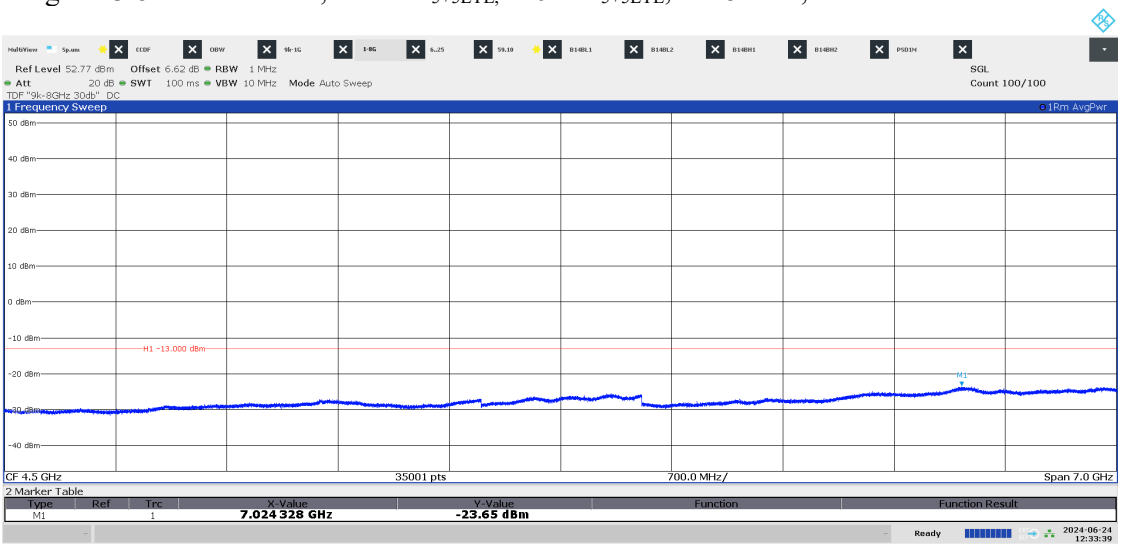


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Diagram 3.8d LTE: TM1.1, B14 $M2_{5+5LTE,}$ B29 $M2_{5+5LTE}$, 1559 – 1610 MHz, Port A:

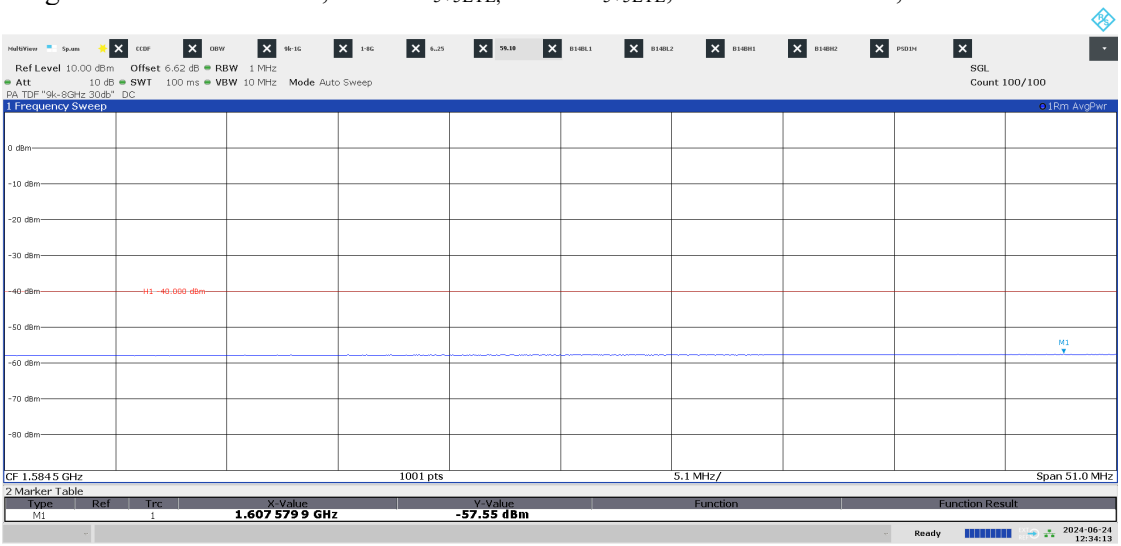

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Diagram 3.9a NR: TM1.1, B_{5NR}, 9 kHz – 1 GHz, Port B:

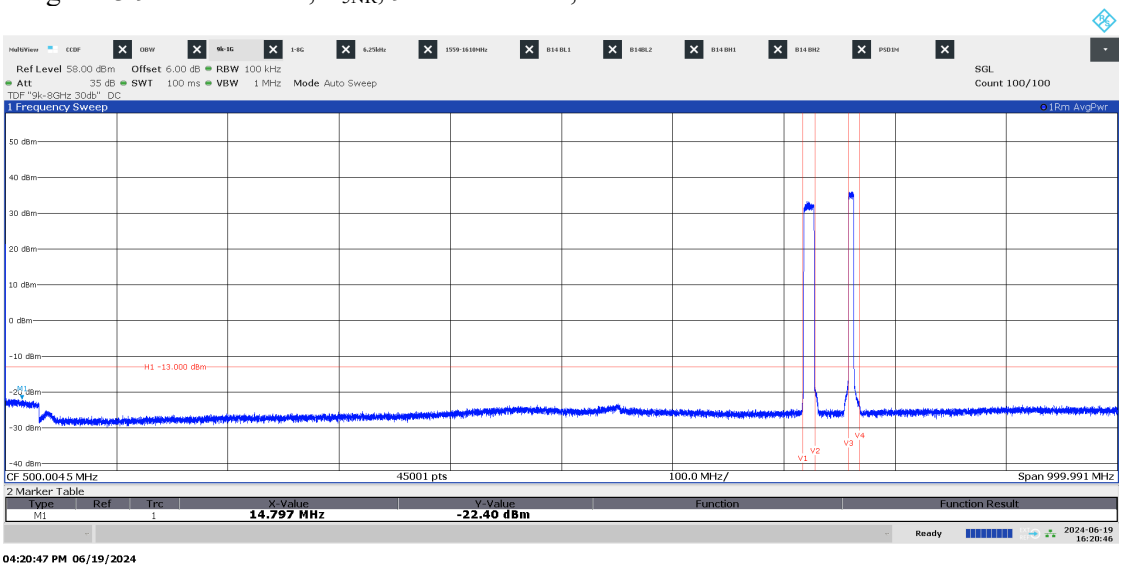

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Diagram 3.9b NR: TM1.1, B_{5NR}, 769 – 806 MHz, Port B:

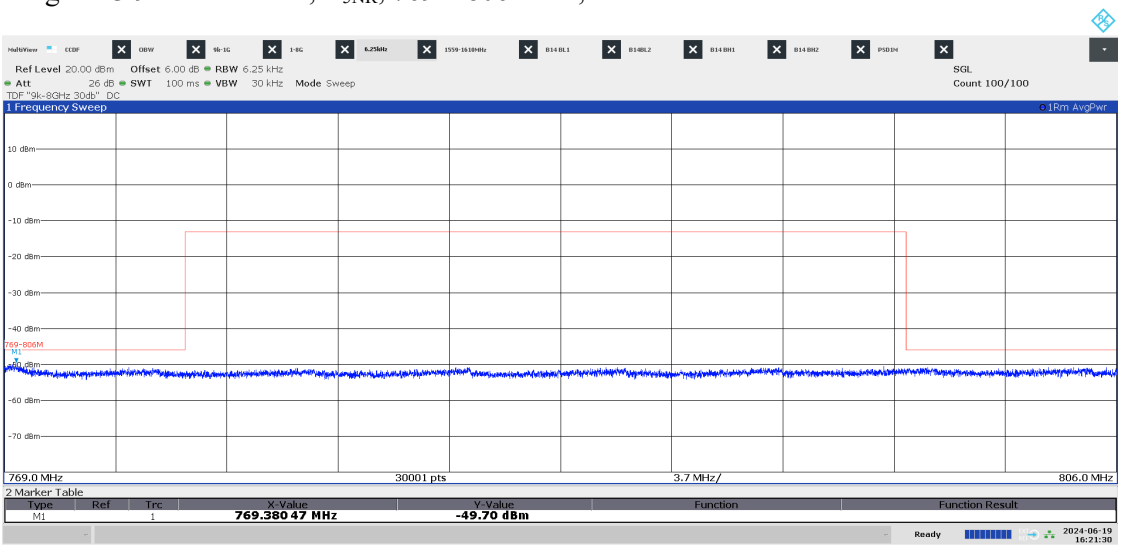

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Diagram 3.9c NR: TM1.1, B_{5NR}, 1 – 8 GHz, Port B:

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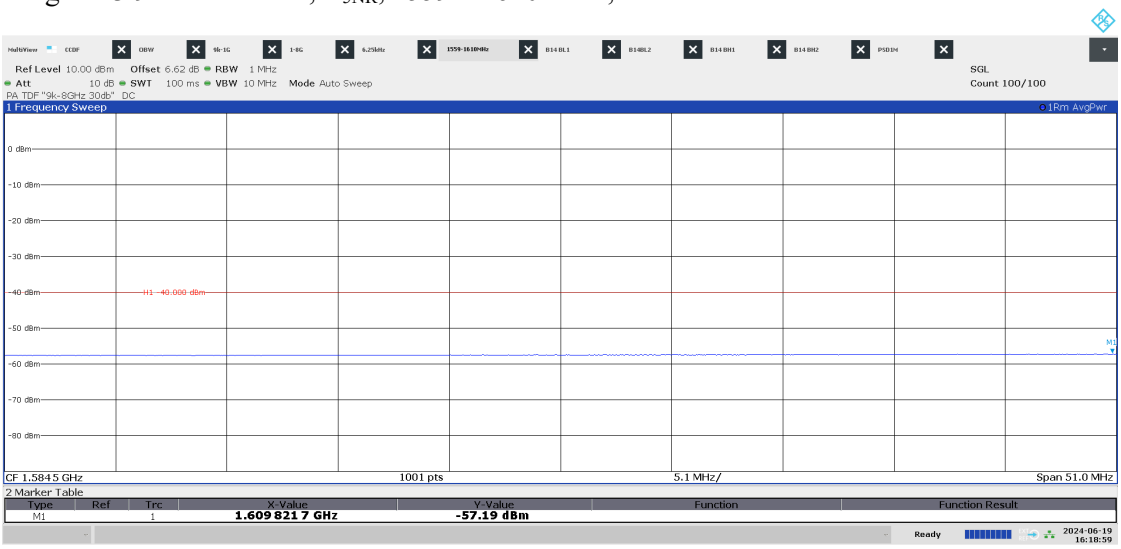
Diagram 3.9d NR: TM1.1, B_{5NR}, 1559 – 1610 MHz, Port B:



04:18:59 PM 06/19/2024

Diagram 3.10a NR: TM1.1, M_{5NR}, 9 kHz – 1 GHz, Port A:

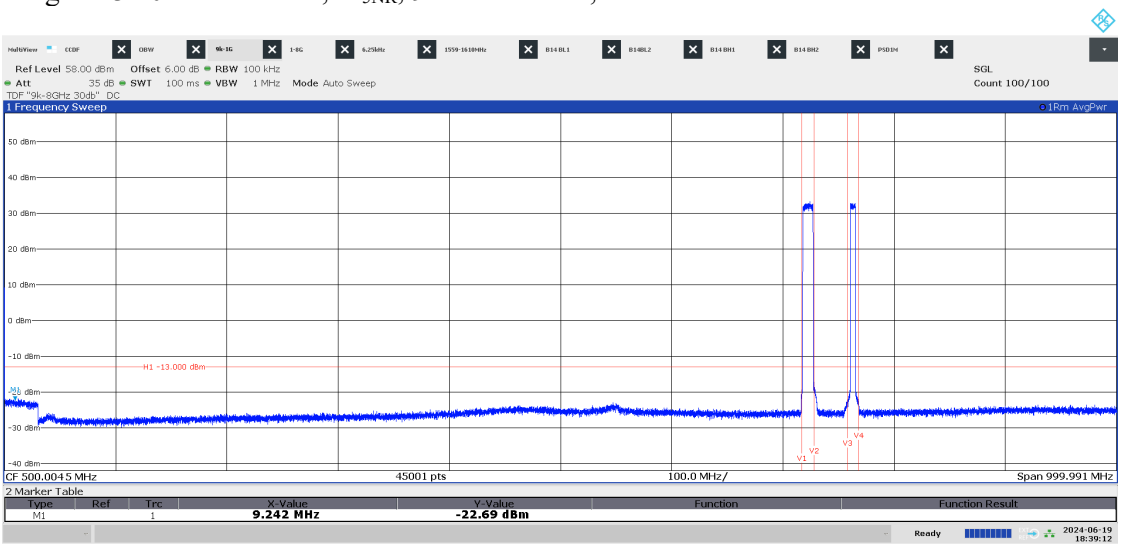


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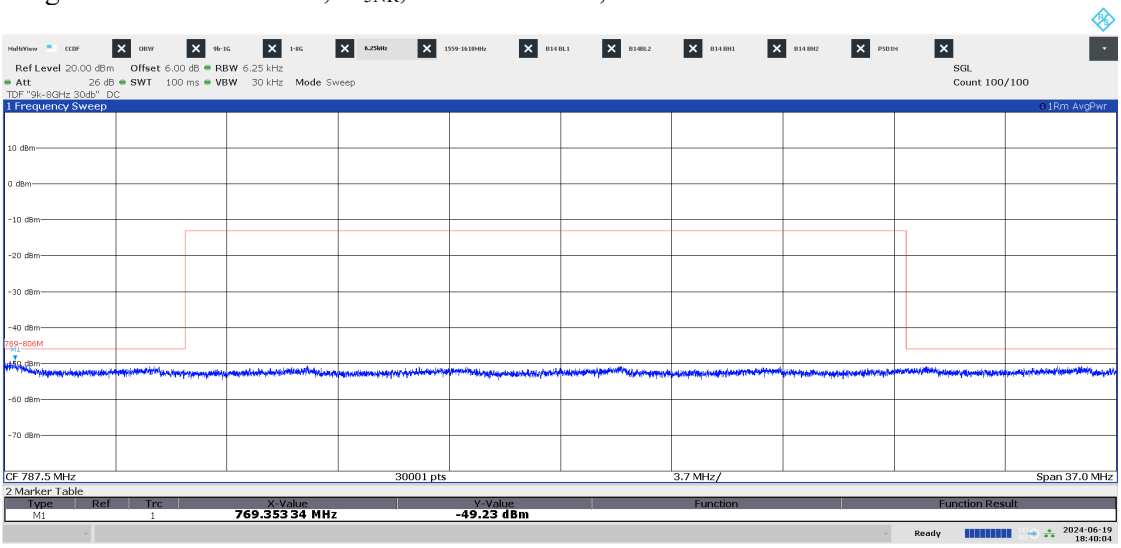
Diagram 3.10b NR: TM1.1, M_{5NR}, 769 – 806 MHz, Port A:



06:40:04 PM 06/19/2024

Diagram 3.10c NR: TM1.1, M_{5NR}, 1 – 8 GHz, Port A:

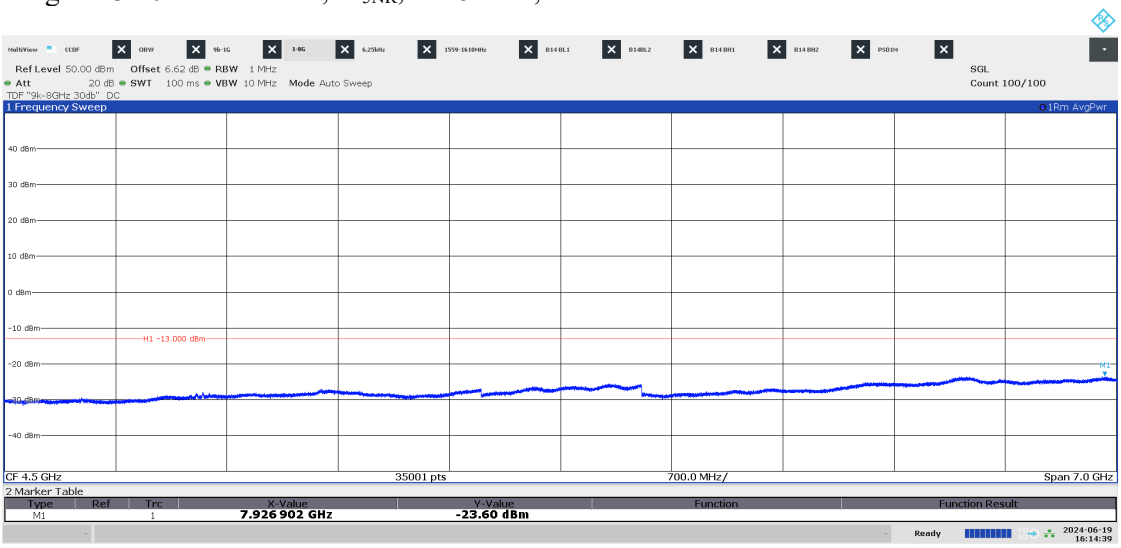


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Diagram 3.10d NR: TM1.1, M_{5NR}, 1559 – 1610 MHz, Port A:

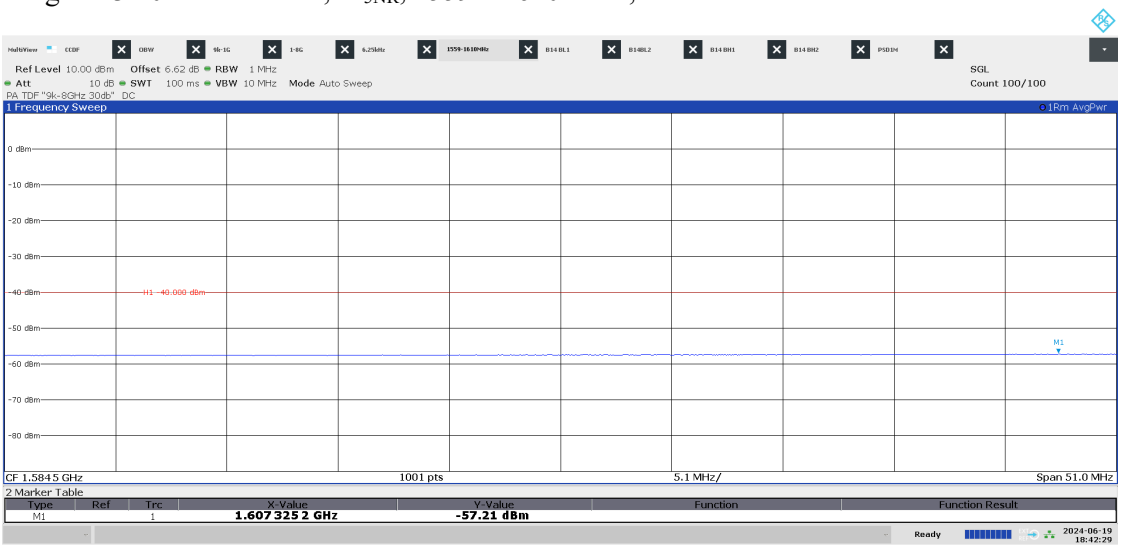

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Diagram 3.11a NR: TM1.1, M_{10NR}, 9 kHz – 1 GHz, Port B:

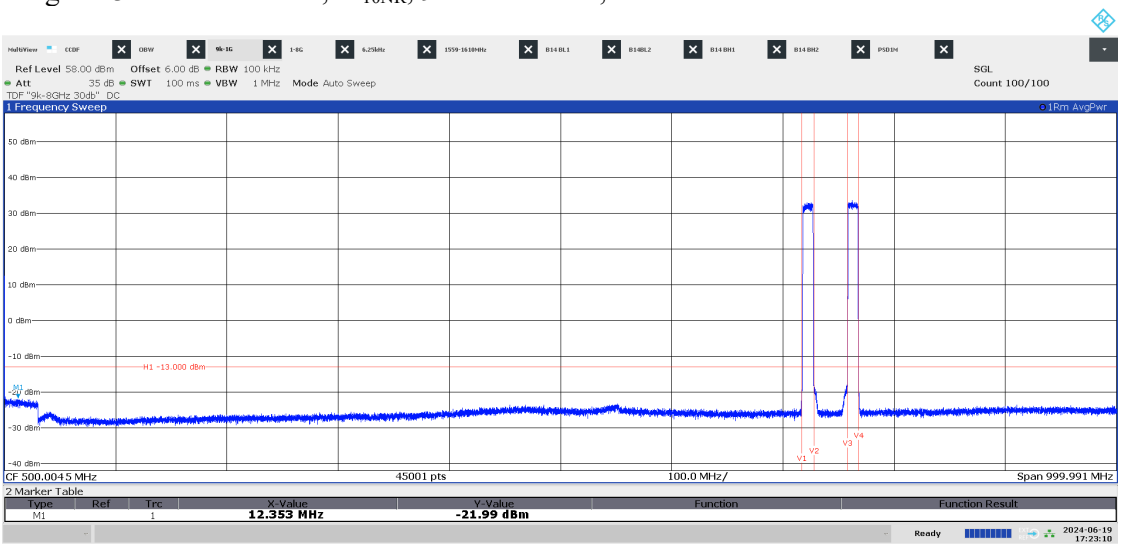

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Diagram 3.11b NR: TM1.1, M_{10NR}, 769 – 806 MHz, Port B:

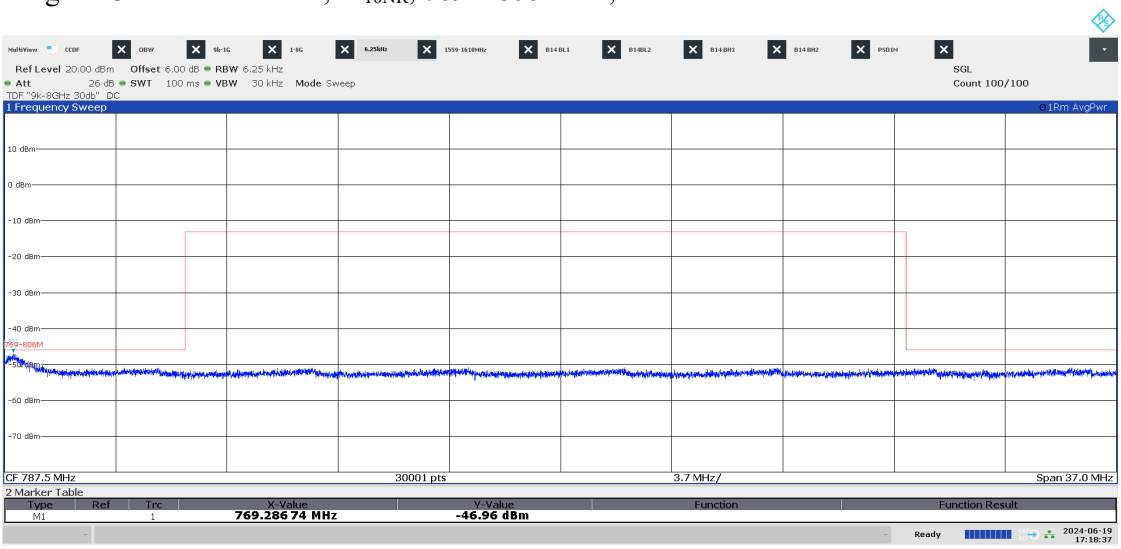

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Diagram 3.11c NR: TM1.1, M_{10NR}, 1 – 8 GHz, Port B:

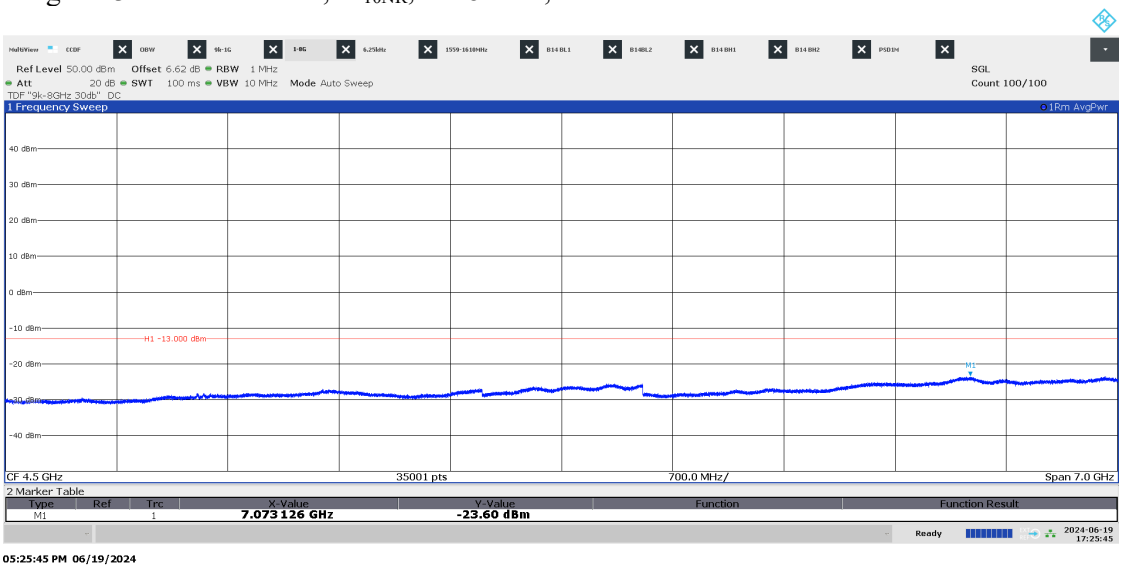

Diagram 3.11d NR: TM1.1, M_{10NR},, 1559 – 1610 MHz, Port B:

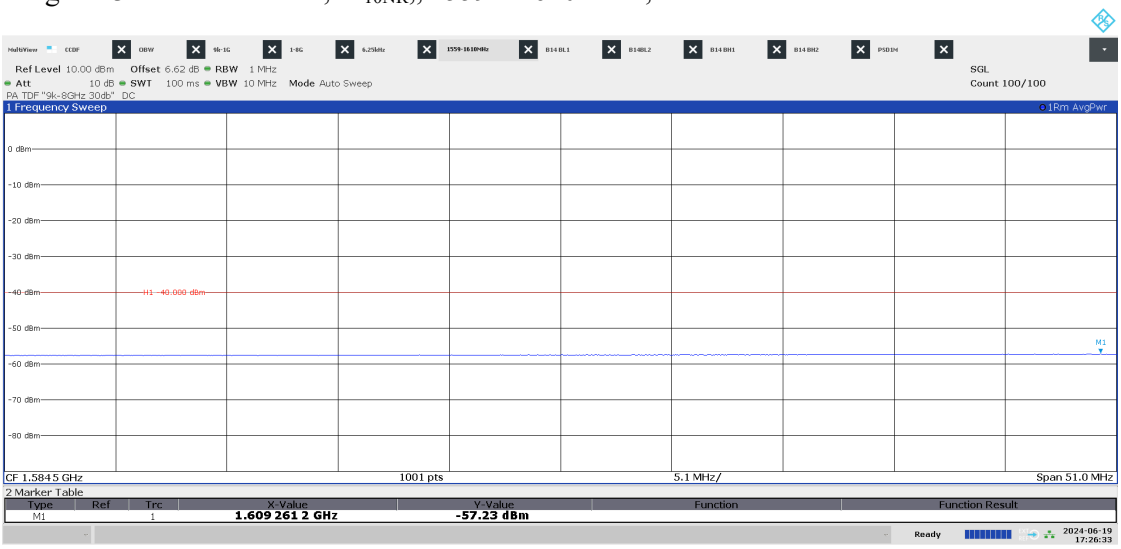

Diagram 3.12a NR: TM1.1, T_{5NR}, 9 kHz – 1 GHz, Port B:

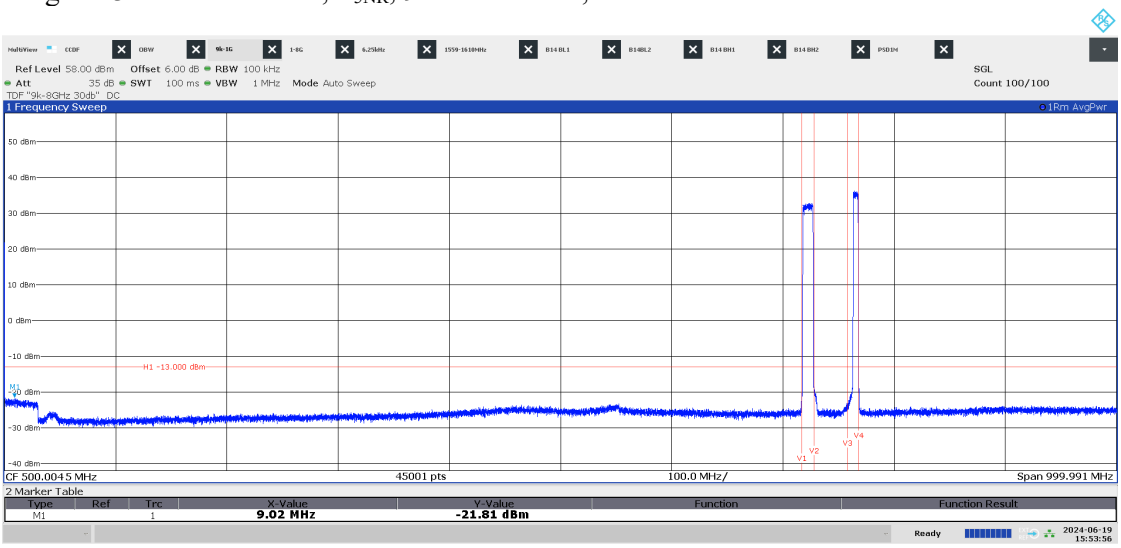

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Diagram 3.12b NR: TM1.1, T_{5NR}, 769 – 806 MHz, Port B:

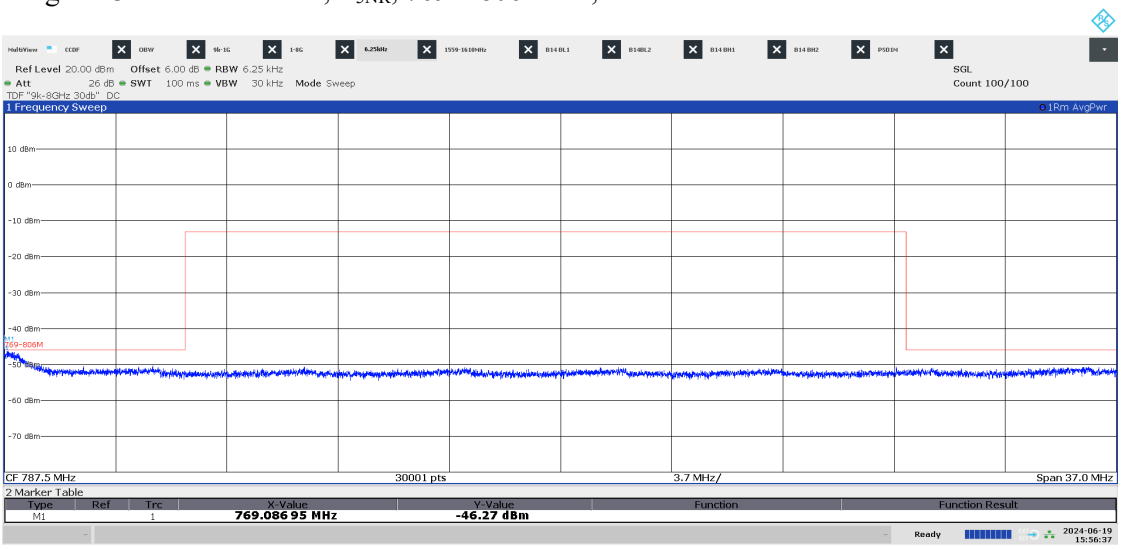

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Diagram 3.12c NR: TM1.1, T_{5NR}, 1 – 8 GHz, Port B:

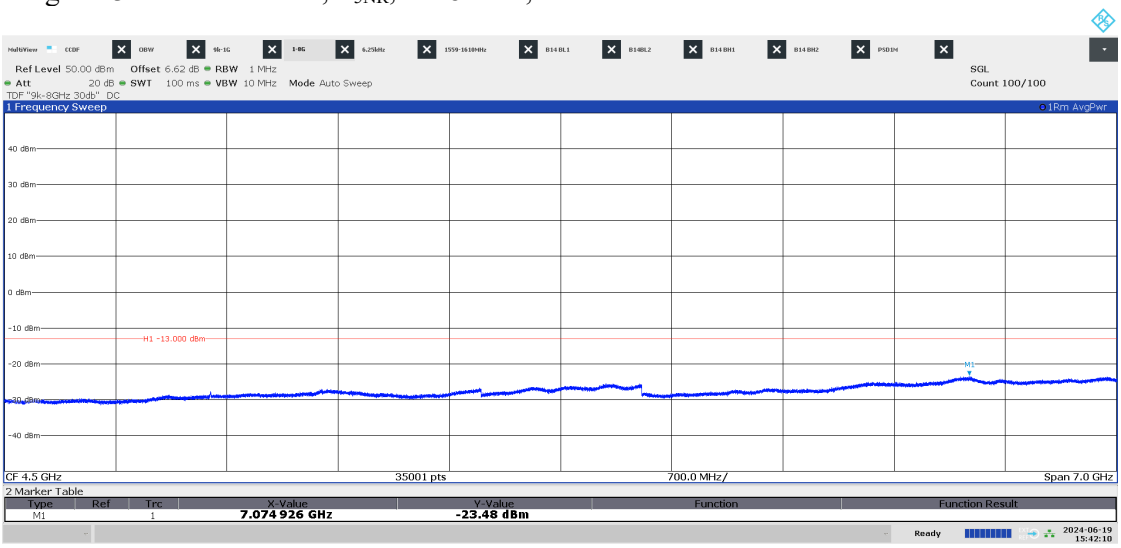

Diagram 3.12d NR: TM1.1, T_{5NR}, 1559 – 1610 MHz, Port B:

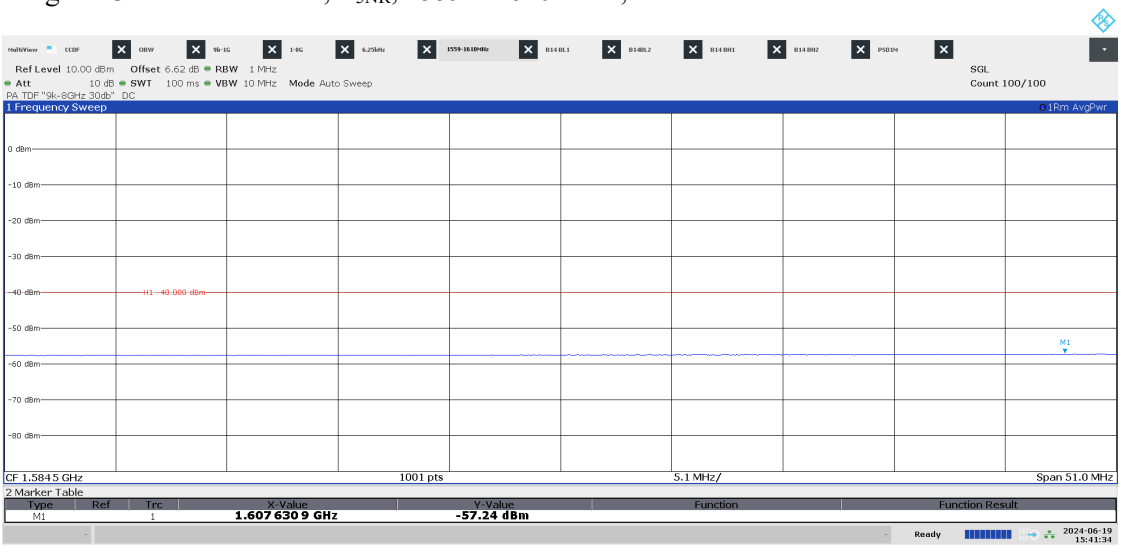

Diagram 3.13a NR: TM1.1, B14 $M2_{5+5NR,}$ B29 $M2_{5+5NR}$, 9 kHz – 1 GHz, Port A:

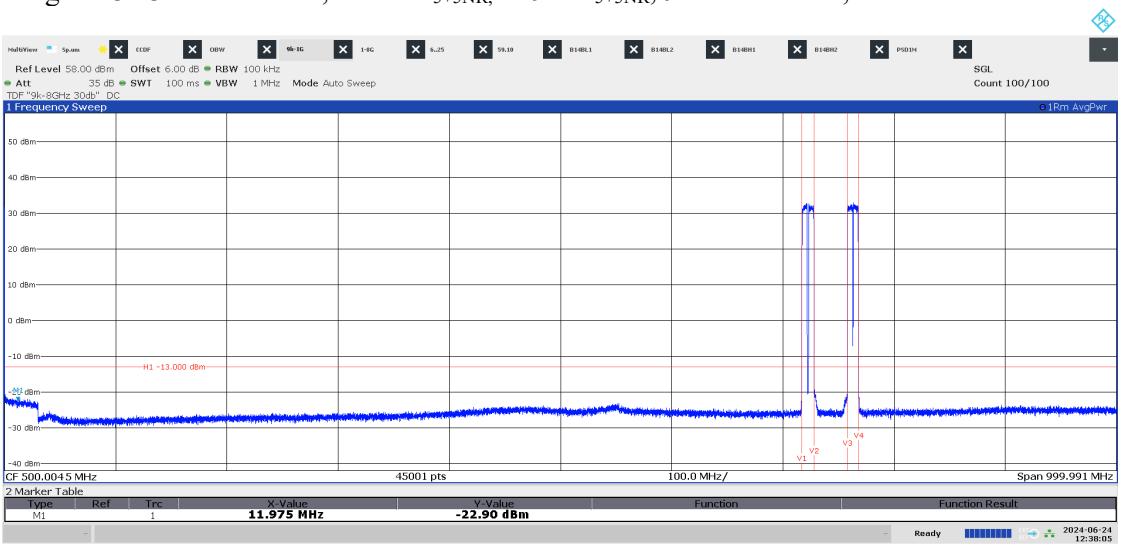

Diagram 3.13b NR: TM1.1, B14 $M2_{5+5NR,}$ B29 $M2_{5+5NR}$, 769 – 806 MHz, Port A:

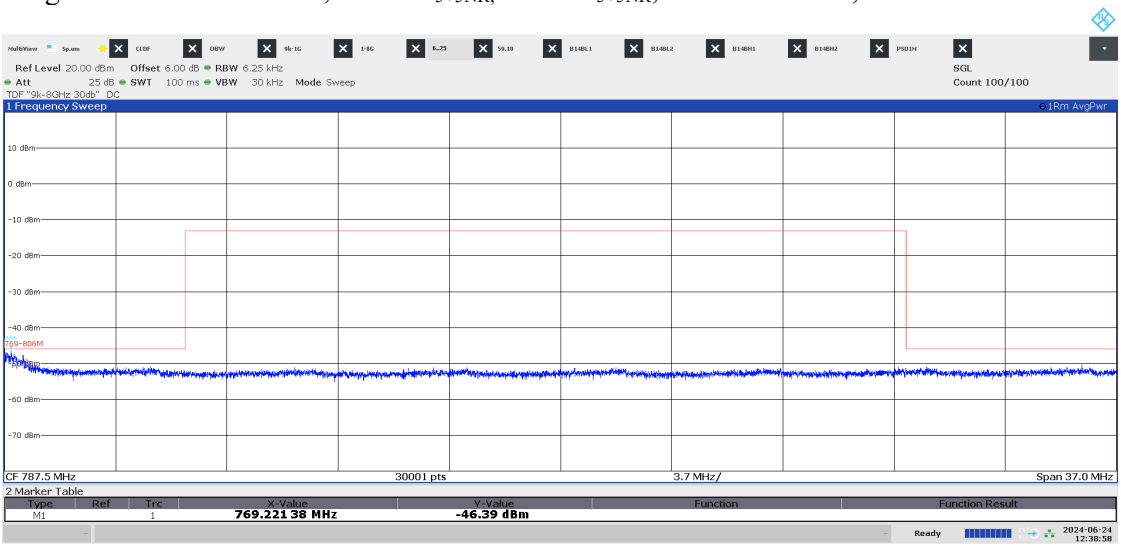

Diagram 3.13c NR: TM1.1, B14 $M2_{5+5NR,}$ B29 $M2_{5+5NR}$, 1– 8 GHz, Port A:

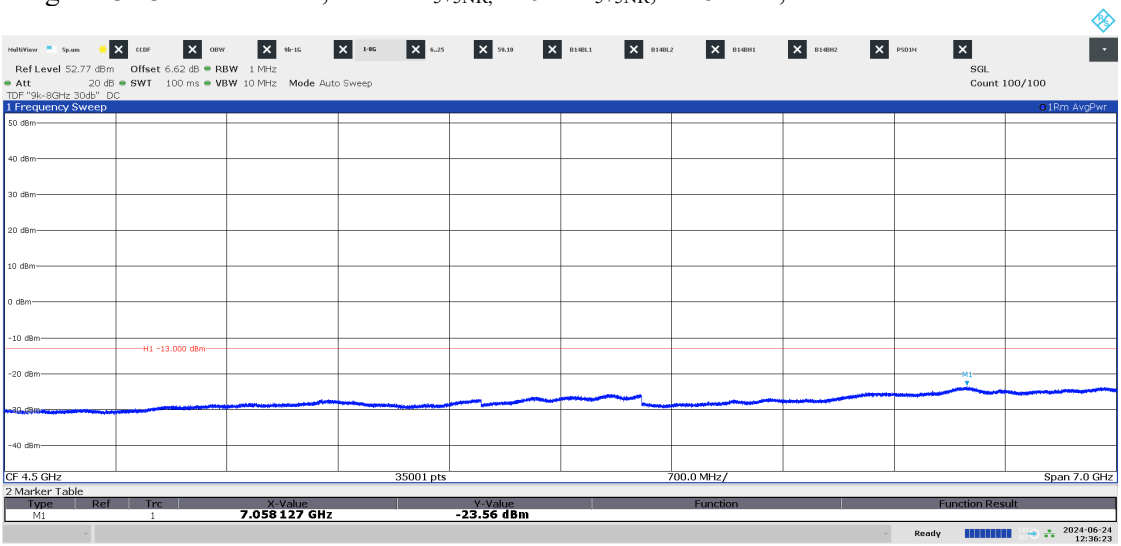

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Diagram 3.13d NR: TM1.1, B14 $M2_{5+5NR,}$ B29 $M2_{5+5NR}$, 1559 – 1610 MHz, Port A:

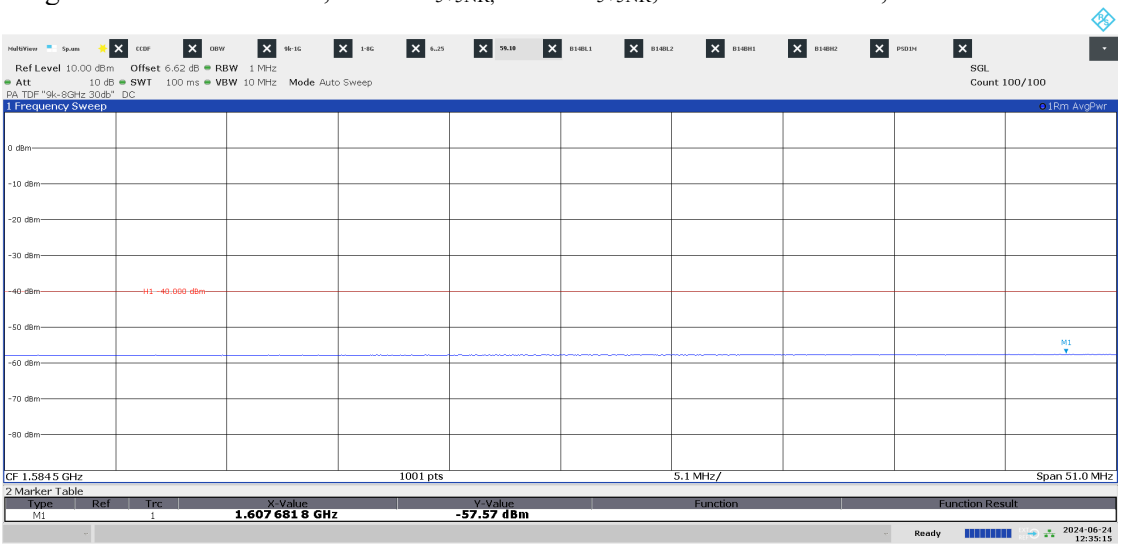

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Diagram 3.14a LTE: TM1.1, B14 $B_{GB+10LTE}$, 9 kHz – 1 GHz, Port A:

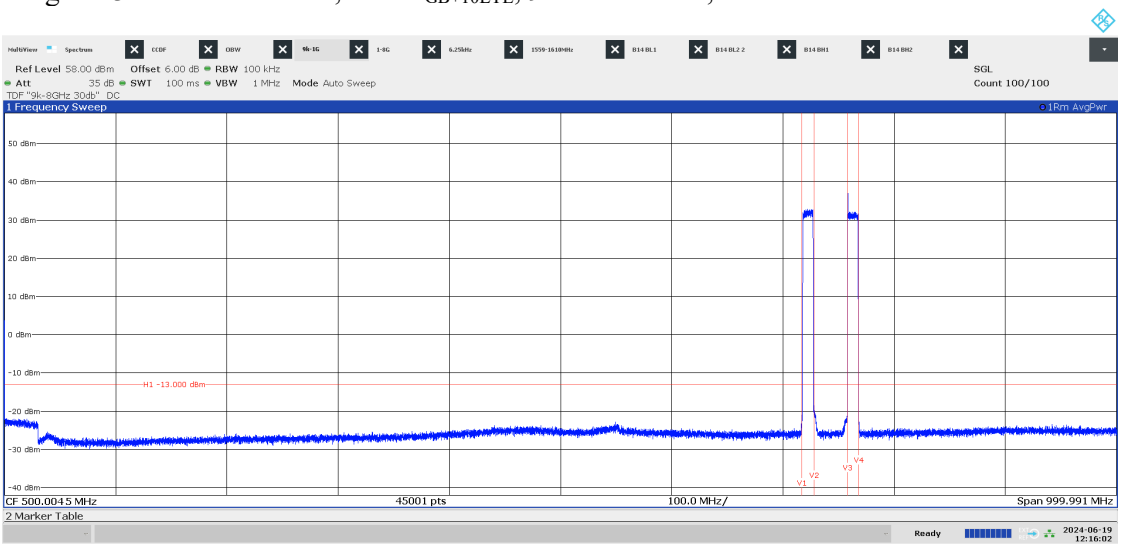

Diagram 3.14b LTE: TM1.1, B14 $B_{GB+10LTE}$, 769 – 806 MHz, Port A:

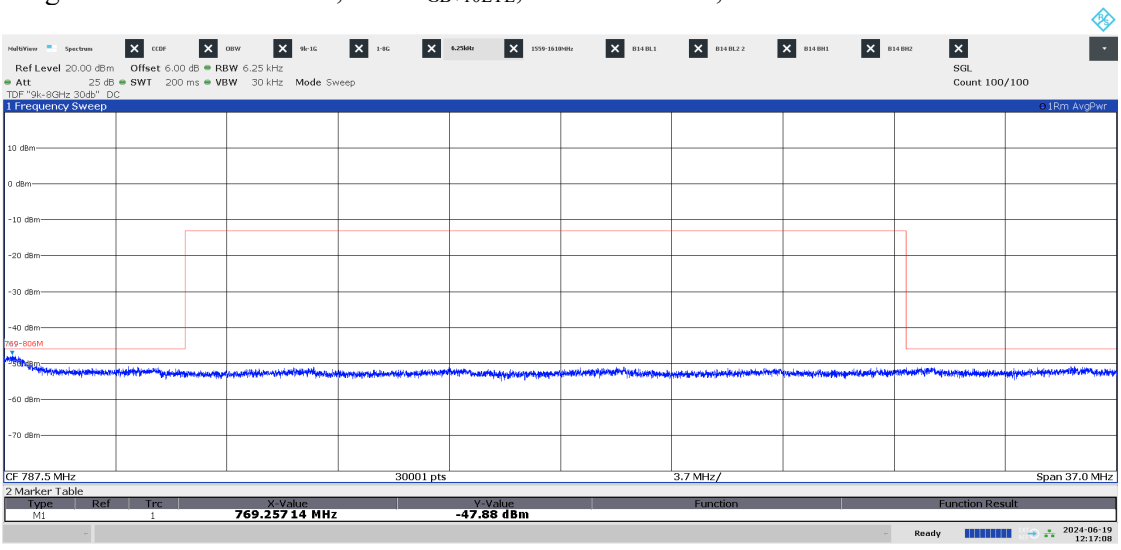

Diagram 3.14c LTE: TM1.1, B14 $B_{GB+10LTE}$, 1 – 8 GHz, Port A:

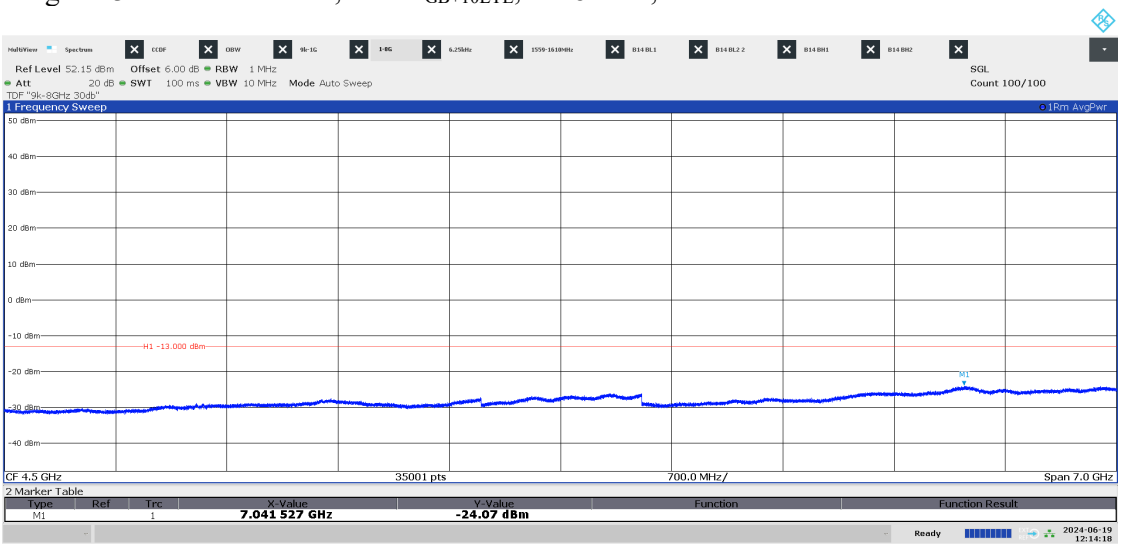

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Diagram 3.14d LTE: TM1.1, B14 $B_{GB+10LTE}$, 1559 – 1610 MHz, Port A:

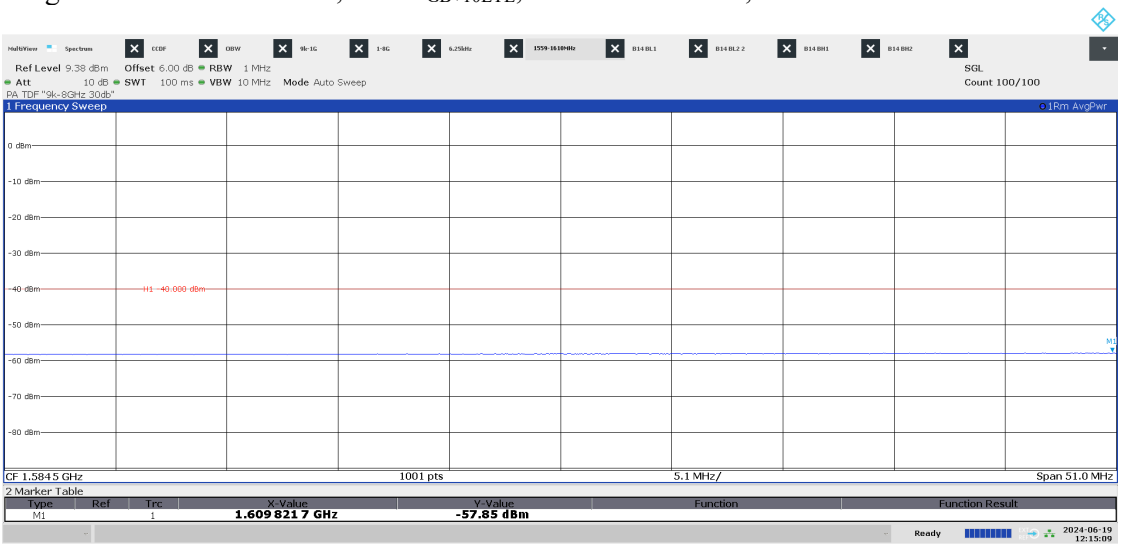

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Diagram 3.15a LTE: TM1.1, B14 $T_{GB+10LTE}$, 9 kHz – 1 GHz, Port A:

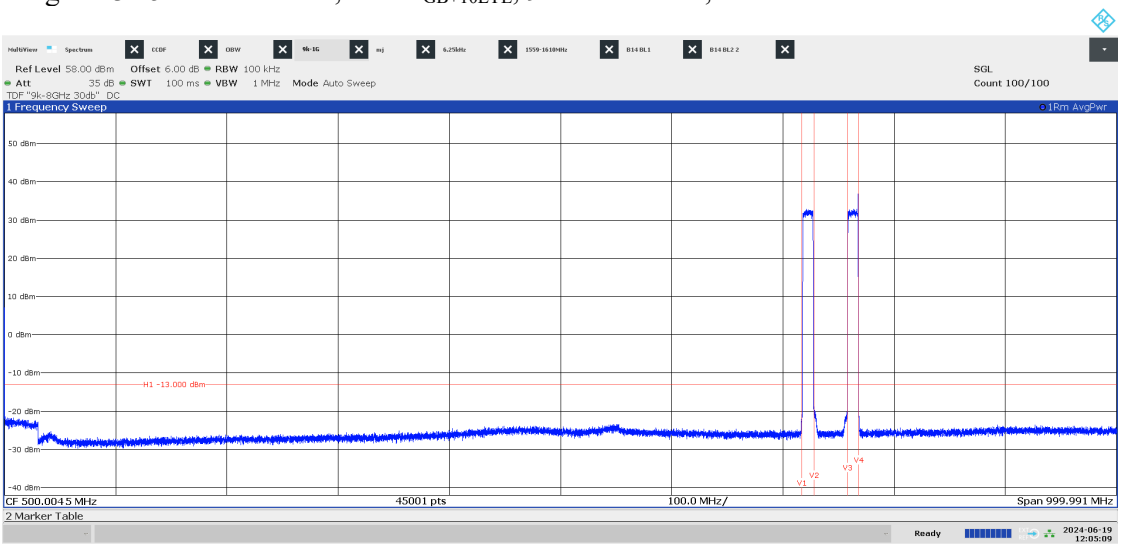

Diagram 3.15b LTE: TM1.1, B14 $T_{GB+10LTE}$, 769 – 806 MHz, Port A:

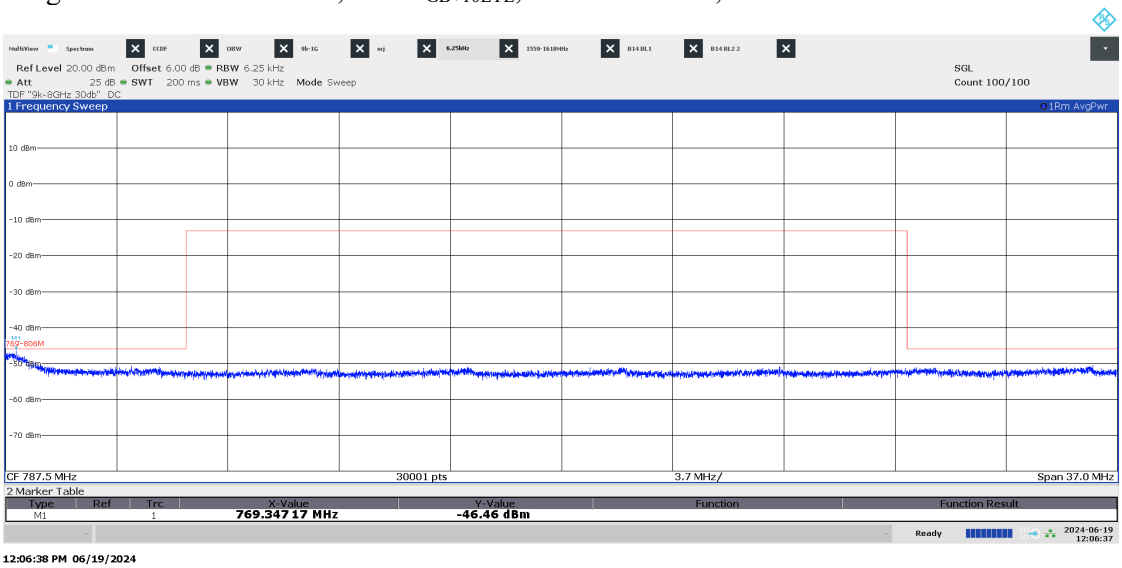

Diagram 3.15c LTE: TM1.1, B14 $T_{GB+10LTE}$, 1 – 8 GHz, Port A:

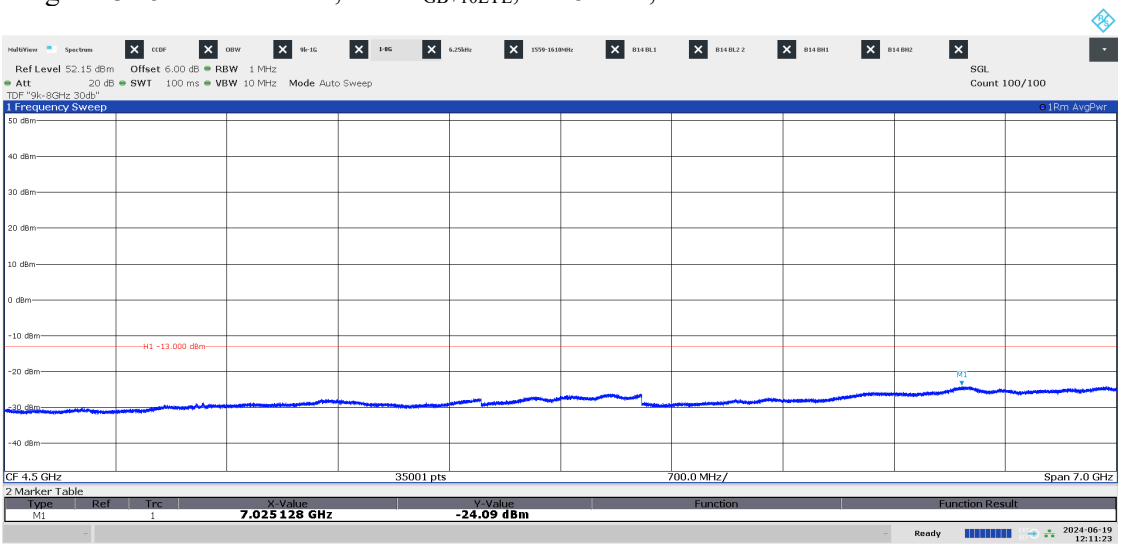

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Diagram 3.15d LTE: TM1.1, B14 $T_{GB+10LTE}$, 1559 – 1610 MHz, Port A:

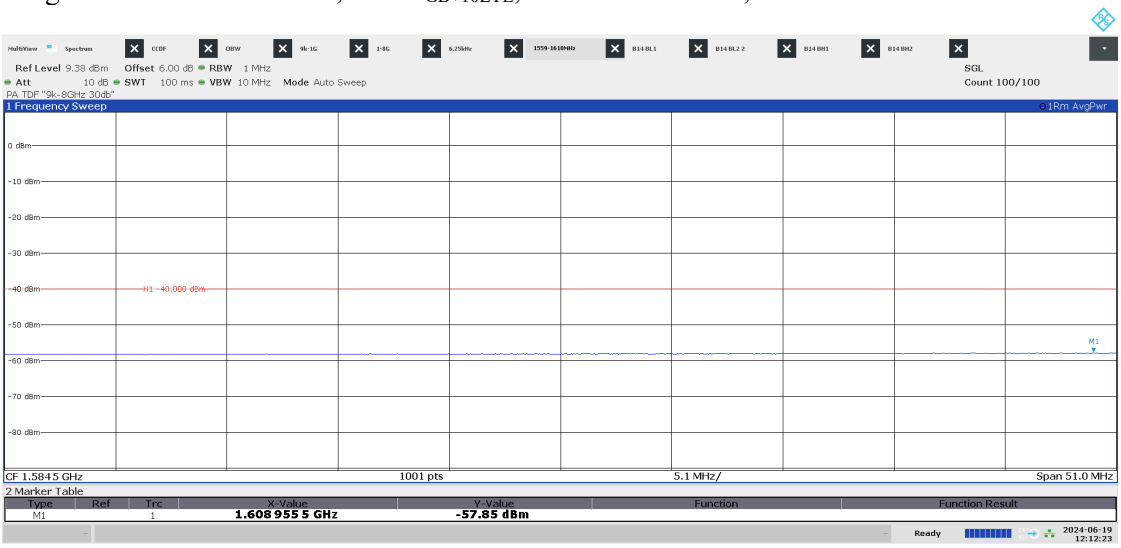

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Diagram 3.16a NR: TM1.1, B14 M_{10LTE}, 9 kHz – 1 GHz, Port A:

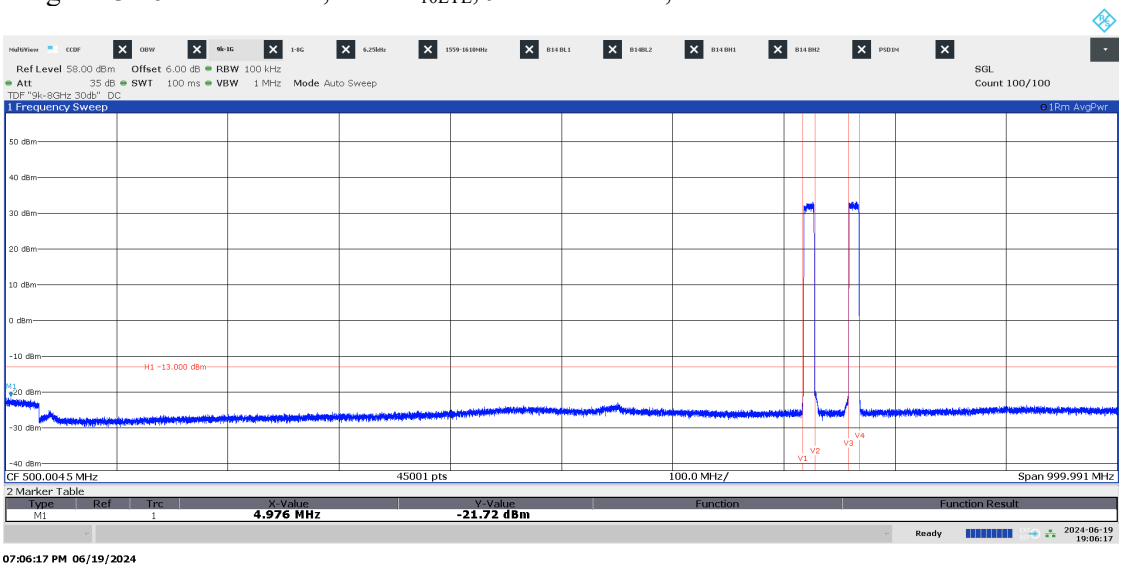

Diagram 3.16b NR: TM1.1, B14 M_{10LTE}, 769 – 806 MHz, Port A:

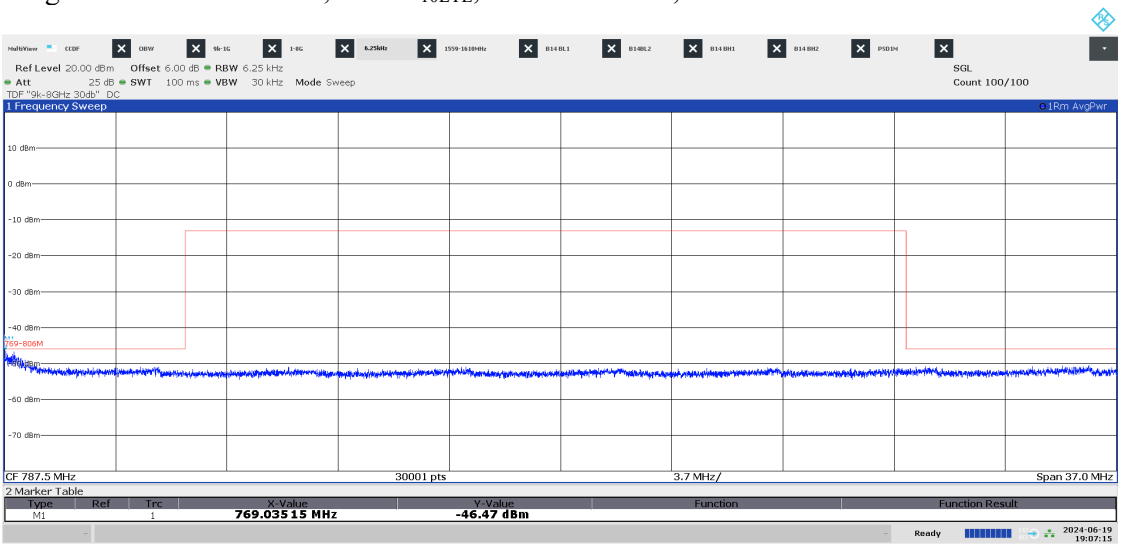

Diagram 3.16c NR: TM1.1, B14 M_{10LTE}, 1 – 8 GHz, Port A:

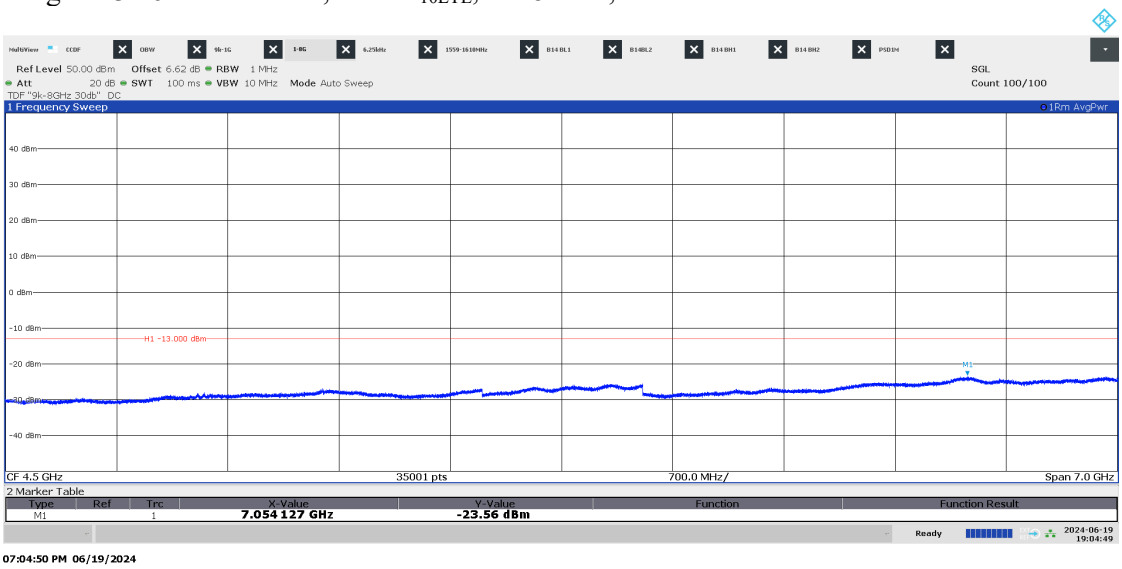

Diagram 3.16d LTE: TM1.1, B14 M_{10LTE}, 1559 – 1610 MHz, Port A:

Diagram 3.17a NR + LTE: TM1.1, B14 M_{5+5NR} B29 $M_{3+3+3LTE}$, 9 kHz – 1 GHz, Port A:

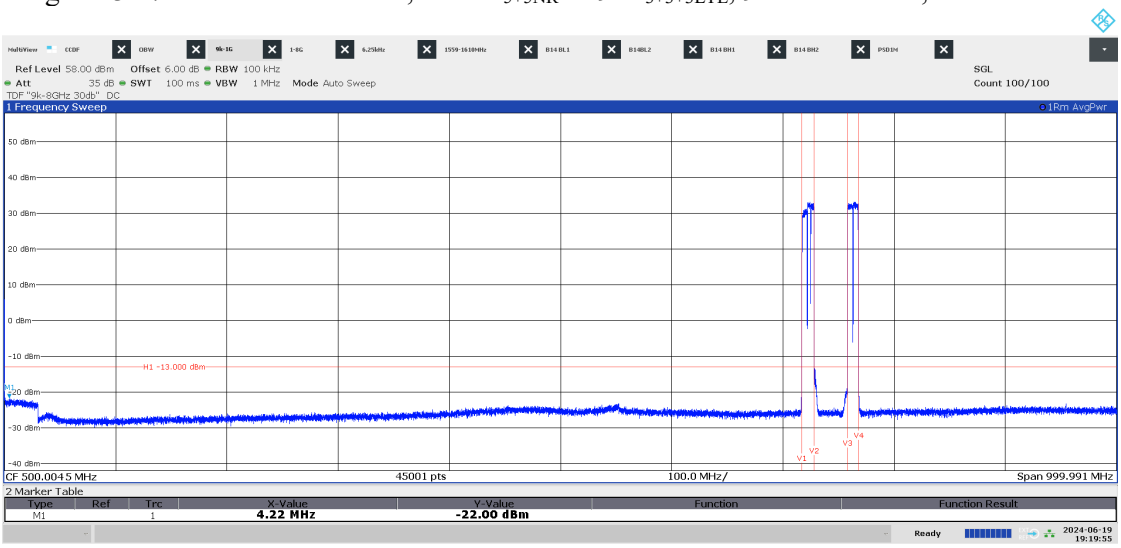

Diagram 3.17b NR + LTE: TM1.1, B14 M_{5+5NR} B29 $M_{3+3+3LTE}$, 769 – 806 MHz, Port A:

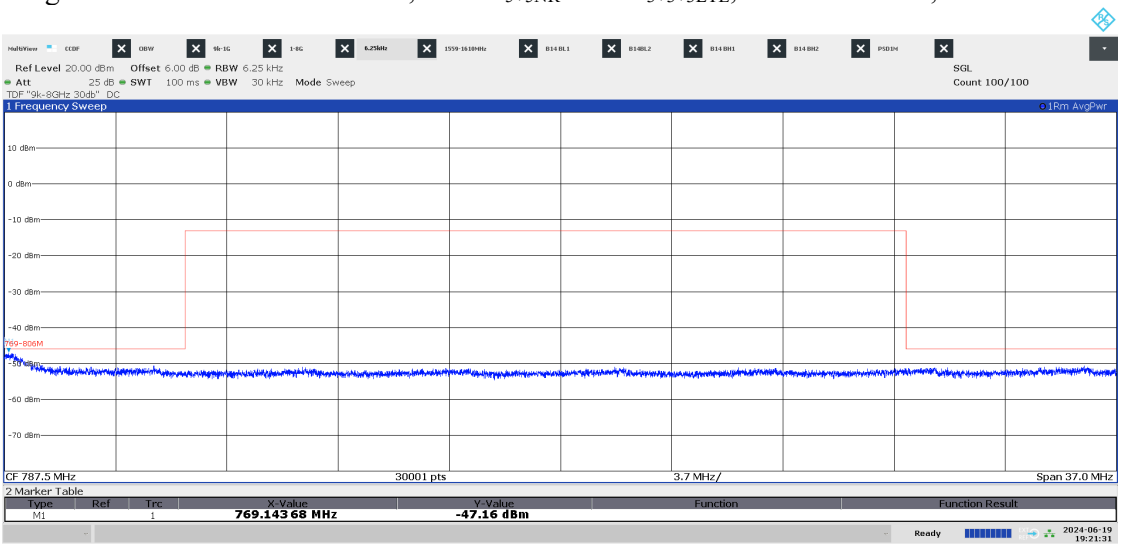

Diagram 3.17c NR + LTE: TM1.1, B14 M_{5+5NR} B29 $M_{3+3+3LTE}$, 1 – 8 GHz, Port A:

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Diagram 3.17d NR + LTE: TM1.1, B14 M_{5+5NR} B29 $M_{3+3+3LTE}$ 1559 – 1610 MHz, Port A:

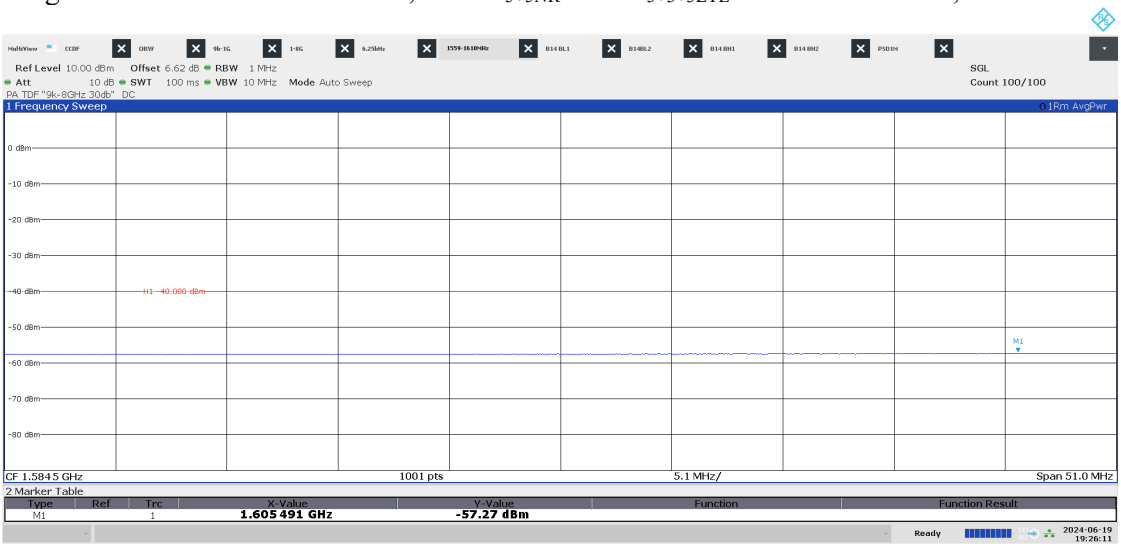

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Diagram 3.18a B NB IoT SA: N-TM, T5 LTE: TM1.1, 9 kHz – 1 GHz, Port A:

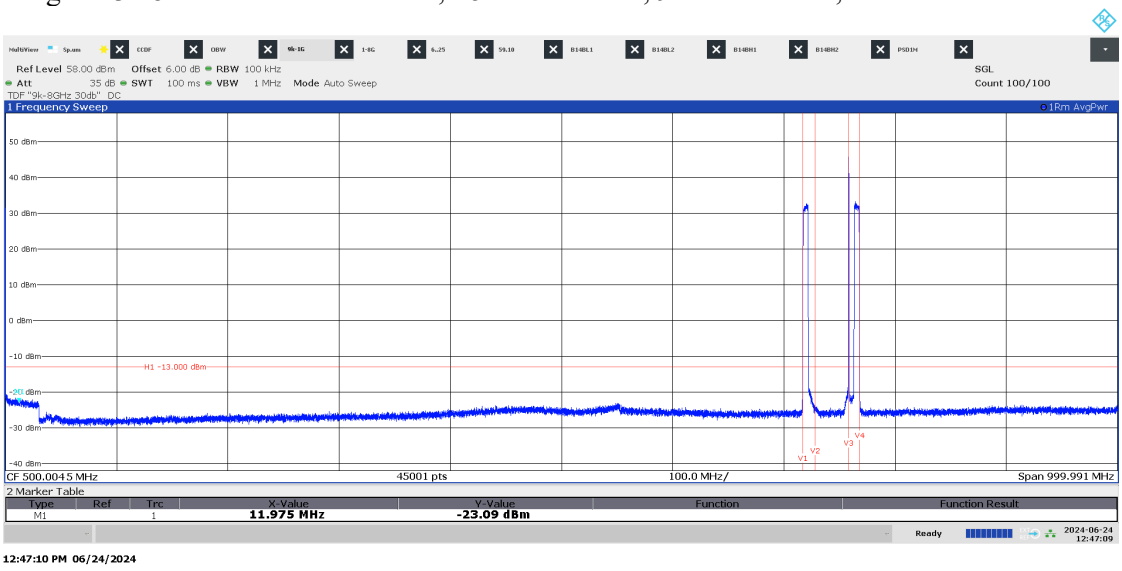

Diagram 3.18b NB B IoT SA: N-TM, T5 LTE: TM1.1, 769 – 806 MHz, Port A:

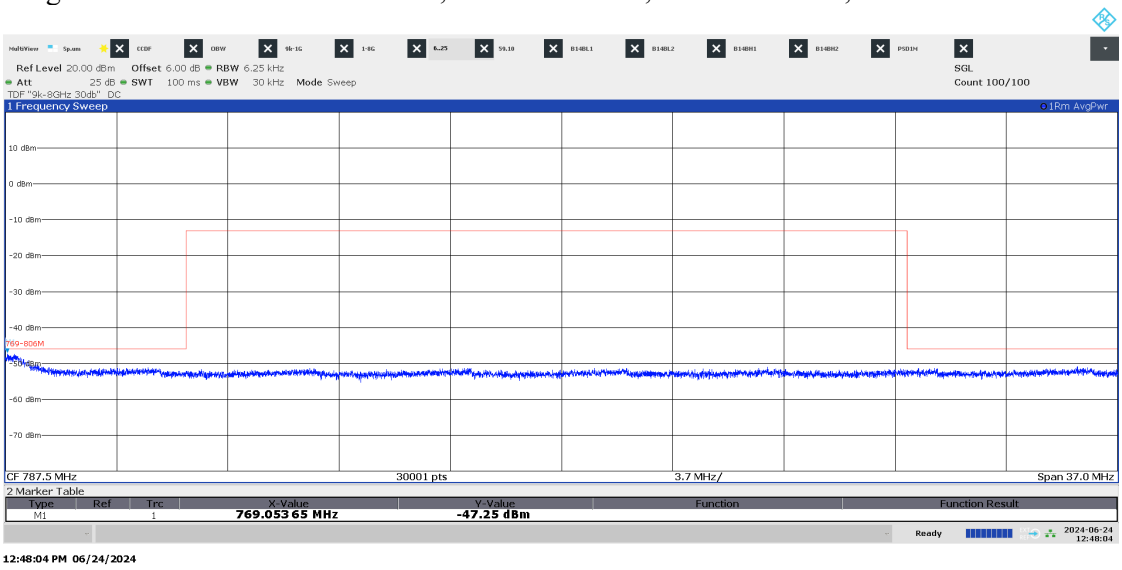

Diagram 3.18c NB B IoT SA: N-TM, T5 LTE: TM1.1, 1 – 8 GHz, Port A:

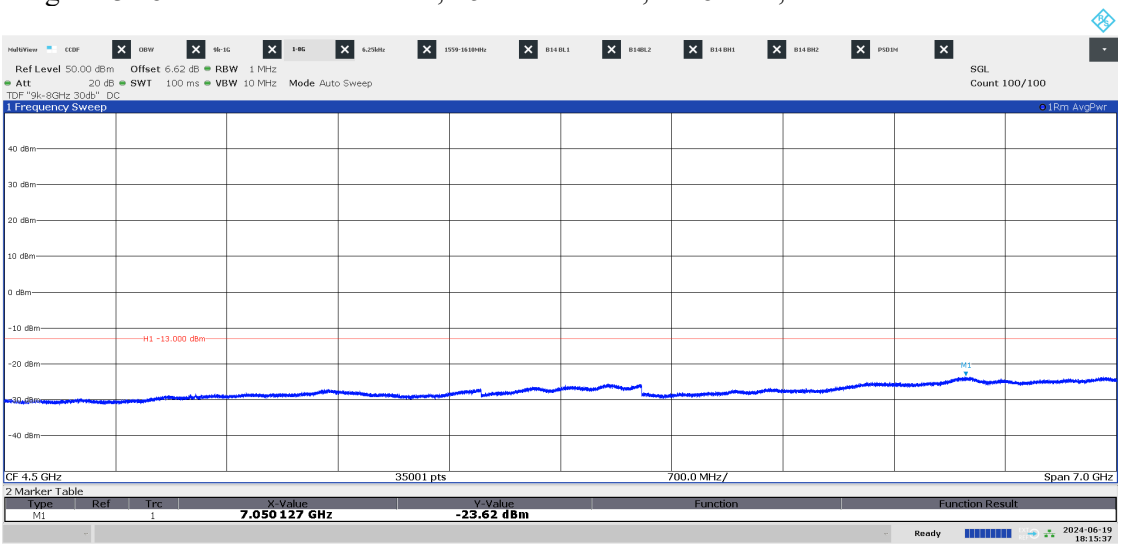

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Diagram 3.18d NB B IoT SA: N-TM, T5 LTE: TM1.1, 1559 – 1610 MHz, Port A:

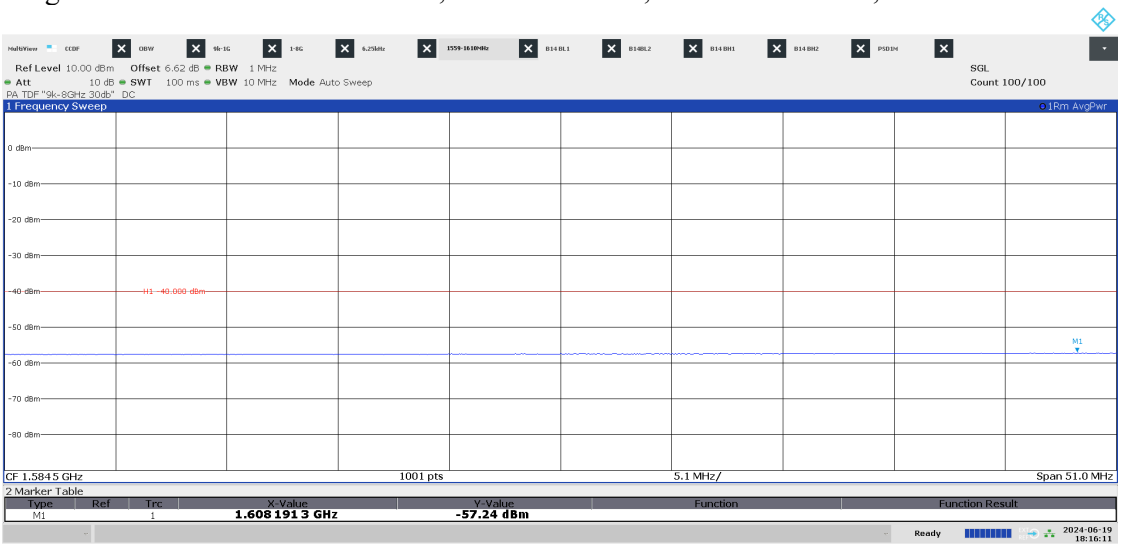

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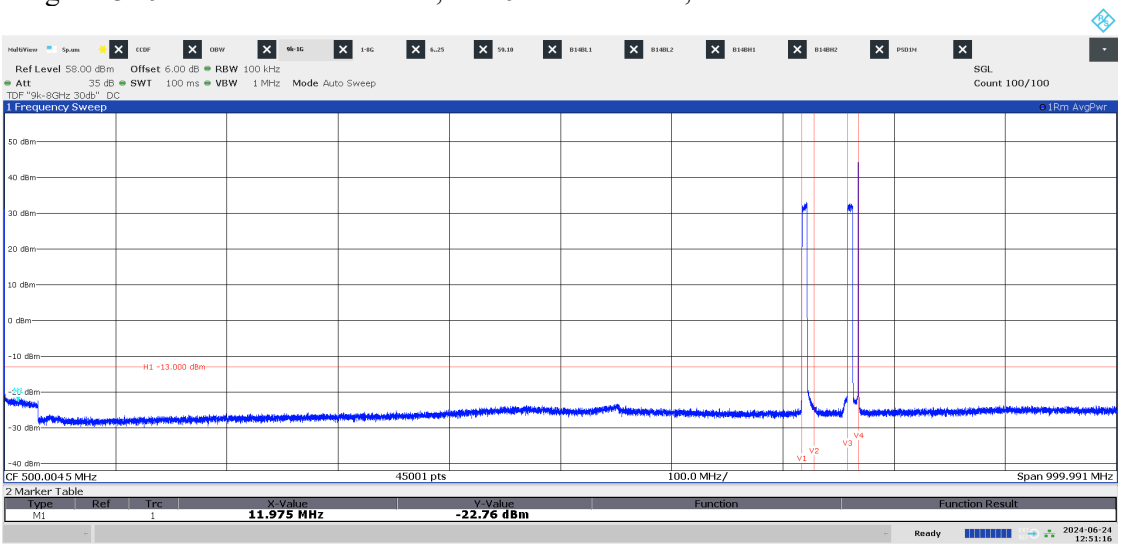
Diagram 3.19a NB T IoT SA: N-TM, B14 9 kHz – 1 GHz, Port A:



12:51:16 PM 06/24/2024

Diagram 3.19b NB T IoT SA: N-TM, B14 769 – 806 MHz, Port A:

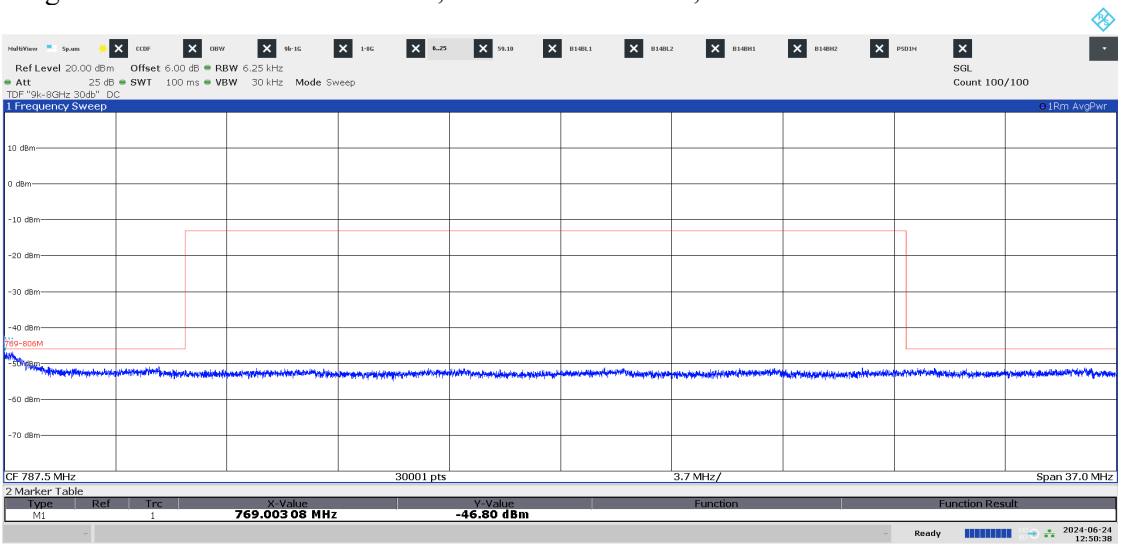


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Diagram 3.19c NB T IoT SA: N-TM, B14 1 – 8 GHz, Port A:

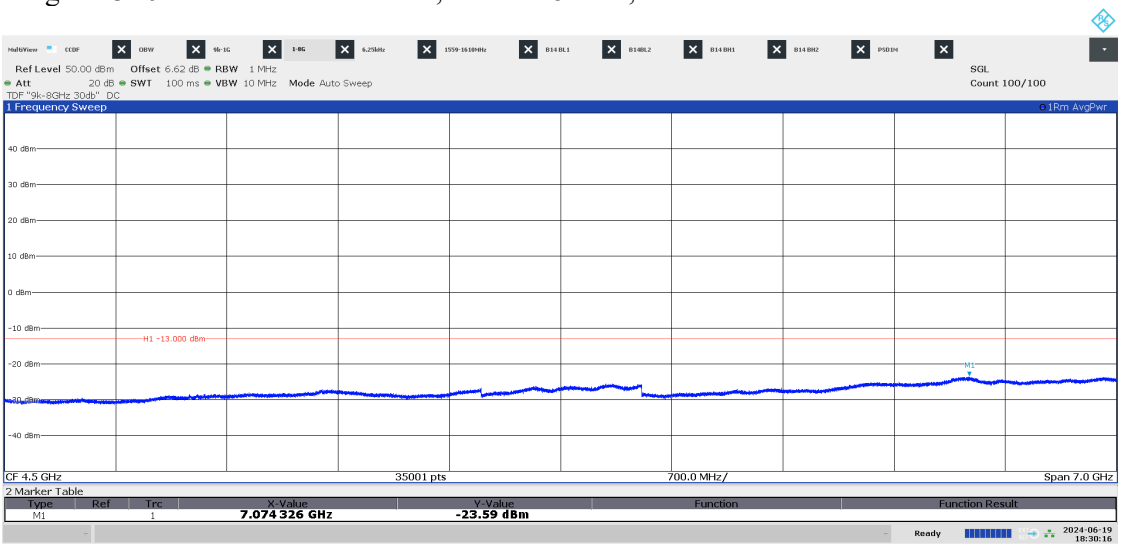

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Diagram 3.19d NB T IoT SA: N-TM, B14 1559 – 1610 MHz, Port A:

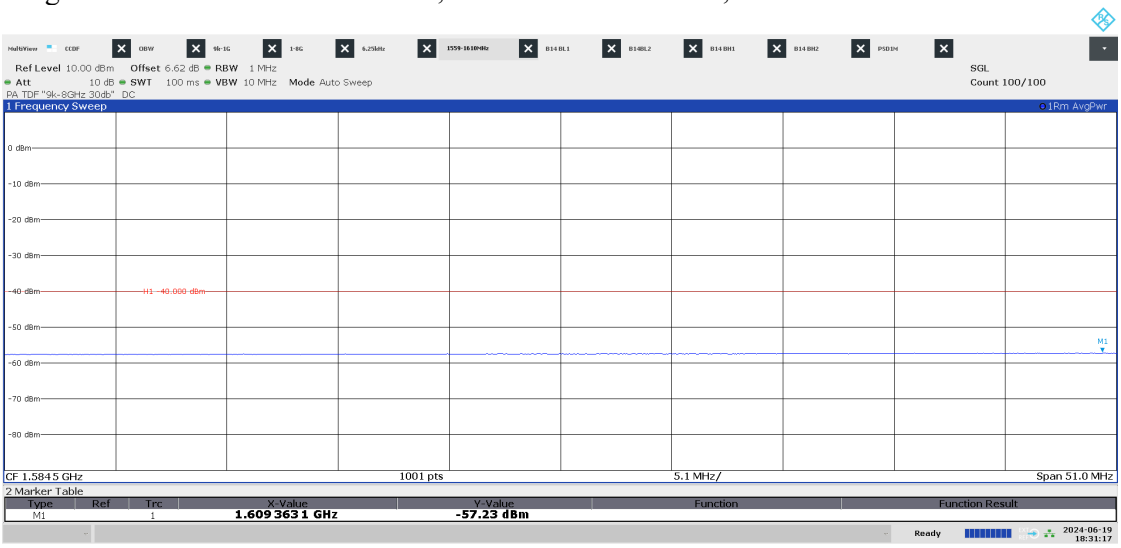

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Diagram 3.20a: LTE and NR: TM1.1, B14 ESS_{NR+LTE}, 9 kHz – 1 GHz, Port A:

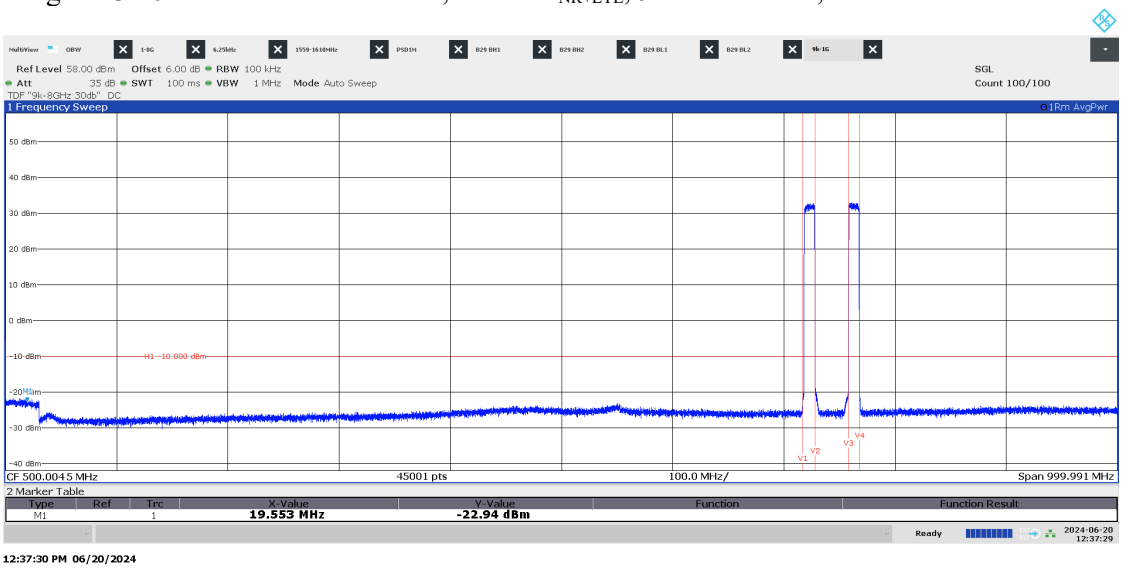

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Diagram 3.20b: LTE and NR: TM1.1, B14 ESS_{NR+LTE}, 769 – 806 MHz, Port A:

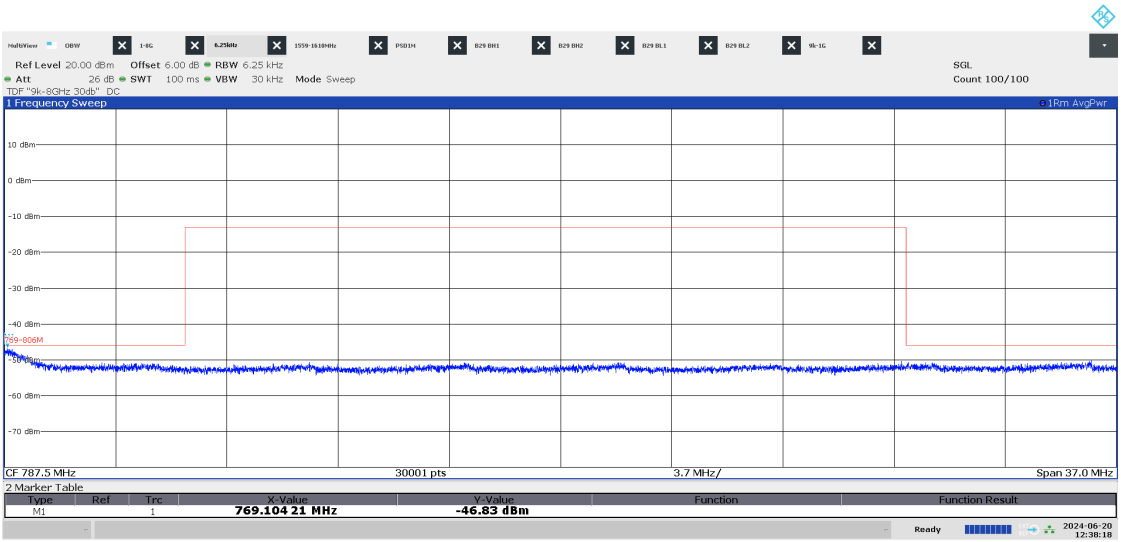

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Diagram 3.20c: LTE and NR: TM1.1, B14 ESS_{NR+LTE}, 1 – 8 GHz, Port A:

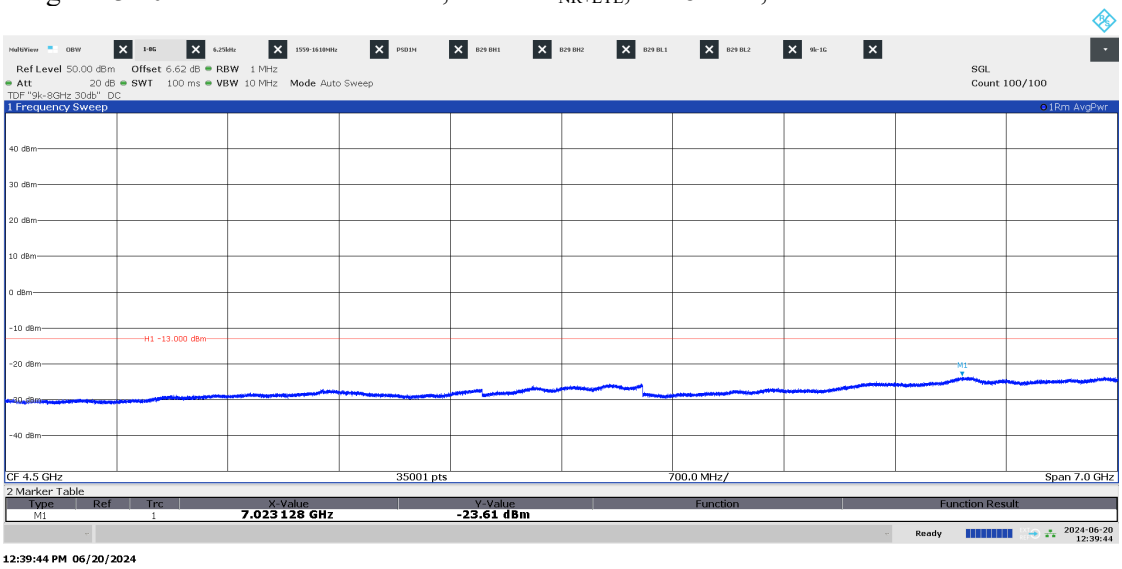

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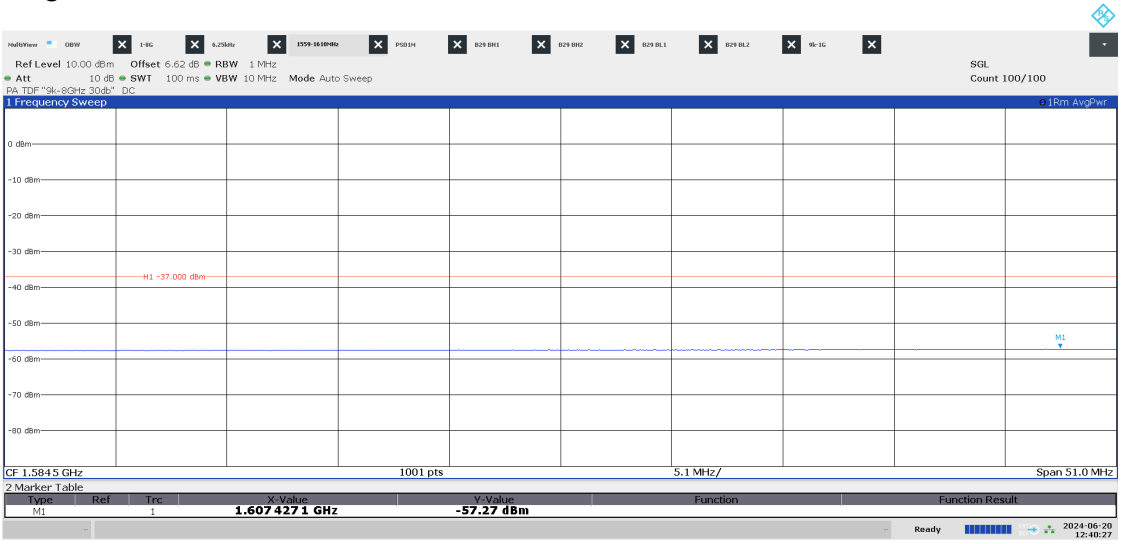
Diagram 3.20d: LTE and NR: TM1.1, B14 ESS_{NR+LTE}, 1559 – 1610 MHz, Port A:



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Field strength of spurious radiation measurements according to CFR 47 §27.53 and §90.543/ RSS-130 4.7and RSS-140 4.4

Date	Temperature	Humidity
2024-05-07	22 °C ± 3 °C	35 % ± 5 %

The test site conforms to the site validation criterion specified in ANSI C63.4.

The measurements were performed with both horizontal and vertical polarization of the antenna.

The antenna distance was 3 m in the frequency range 30 MHz – 8 GHz.

The EUT was placed 0.8 m above reference ground plane in frequency range 30 MHz – 1 GHz and 1.5 m above reference ground plane in frequency range 1 GHz – 8 GHz.

The measurement was performed with an RBW of 1 MHz.

A propagation loss in free space was calculated. The used formula was $\gamma = 20\log\left(\frac{4\pi D}{\lambda}\right)$, γ is the propagation loss and D is the antenna distance.

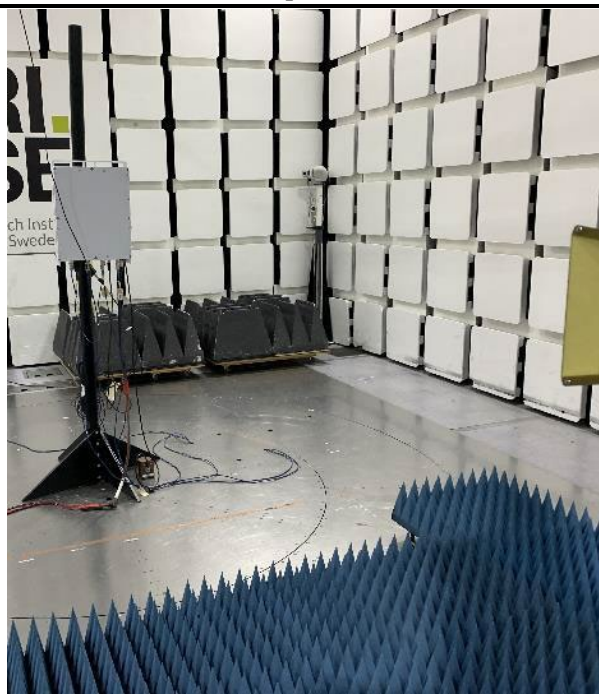
The measurement procedure was as the following:

1. A pre-measurement is performed with peak detector. For measurement < 1 GHz the test object was measured in eight directions with the antenna at three heights, 1.0 m, 1.5 m and 2.0 m. For measurements > 1 GHz the test object was measured in seventeen directions with the antenna height 1.5 m, 2.0 m and 2.5 m with elevation angle.
2. Spurious radiation on frequencies closer than 20 dB to the limit in the pre-measurement is scanned 0-360 degrees and the antenna is scanned 1- 4 m for maximum response. The emission is then measured with the RMS detector and the RMS value is reported. Frequencies closer than 10 dB to the limit when measured with the RMS detector were measured with the substitution method according to ANSI 63.26.

The test set-up during the spurious radiation measurements is shown in the pictures below:

Test setup 30-1000 MHz:

Test setup 1-8 GHz:



Measurement equipment

Item	Name	Inv.no
Semi Anechoic Chamber	TDK	503881
	NSA	BX90699
	SVSWR	BX90702
Spectrum Analyzer	Rohde & Schwarz ESU40	901385
Software	Rohde & Schwarz EMC32	BX62351
RF cable	Huber & Suhner Eacon 4C	BX91490
RF Cable	Rosenberger UFB311A	503508
RF Cable	Rosenberger UFB311A	503509
Antenna, Bilog	Teseq CBL6143A	BX92331
Preamplifier	MicroComp Nordic MCN-JS42-00101800-28-10P	901545
HP filter	Wainwright WHKX1.0/18G-10SS	901373
Antenna, Horn	Emco 3115	502175
Thermohygrometer	Testo 625	504188

Tested frequencies

Symbolic name:

Symbolic name:B14	Symbolic name:B29
B_{5L}	B_{5L}
B_{5NR}	B_{5LTE}
M_{5L}	M_{5L}
T_{5NR}	T_{5NR}
$M_{GB+10LTE}$	M_{10NR}
$B_{IB+5LTE}$	M_{10NR}
$T_{IB+5LTE}$	M_{10NR}
B_{5NR}	$M3_{3LTE}$
$M10_{ESS}$	M_{10NR}

Results

Representing worst case:
LTE:
Symbolic name:B14: B_{5NR} and B29: $B_{5LTE,}$ Diagram 4.1a-b

NR:
Symbolic name:B14: B_{5NR} and B29: $B_{5LTE,}$ Diagram 4.2a-b

Multi RAT:
Symbolic name: B14: B_{5NR} and B29: $M3_{3LTE}$, Diagram 4.3a-b

Frequency (MHz)	Spurious emission level (dBm)	
	Vertical	Horizontal
30-8000	All emission > 20 dB below limit	All emission > 20 dB below limit

Measurement uncertainty: 3.1 dB

Limits

eCFR 47 §90.543 Emission limitations.

e) For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:
   1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB(-46 dBm) in a 6.25 kHz band segment, for base and fixed stations.
   3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB (-13 dBm)
   4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.
   5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz (-40 dBm) equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW (-50 dBm) EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

RSS-140

4.4 Transmitter unwanted emission limits

The power of any unwanted emission outsidethe bands 758-768 MHz and 788-798 MHz shall be attenuated below the transmitteroutput power P in dBW as follows, where p is the transmitter output power in watts:

a. For any frequency between 769-775 MHz and 799-806 MHz:
   i. 76 + 10 log (p), dB (-46 dBm) in a 6.25 kHz band for fixed and base station equipment
b. For any frequency between 775-788 MHz, above 806 MHz, and below 758 MHz: 43 + 10 log (p), dB in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency bands 758-768 MHz and 788-798 MHz, a resolution bandwidth of 30 kHz may be employed.

In addition, the equivalent isotropically radiated power (e.i.r.p.) of all emissions, including harmonics in the band 1559-1610 MHz, shall not exceed −70 dBW/MHz for wideband emissions, and −80 dBW/kHz for discrete emissions ofless than 700 Hz bandwidth.

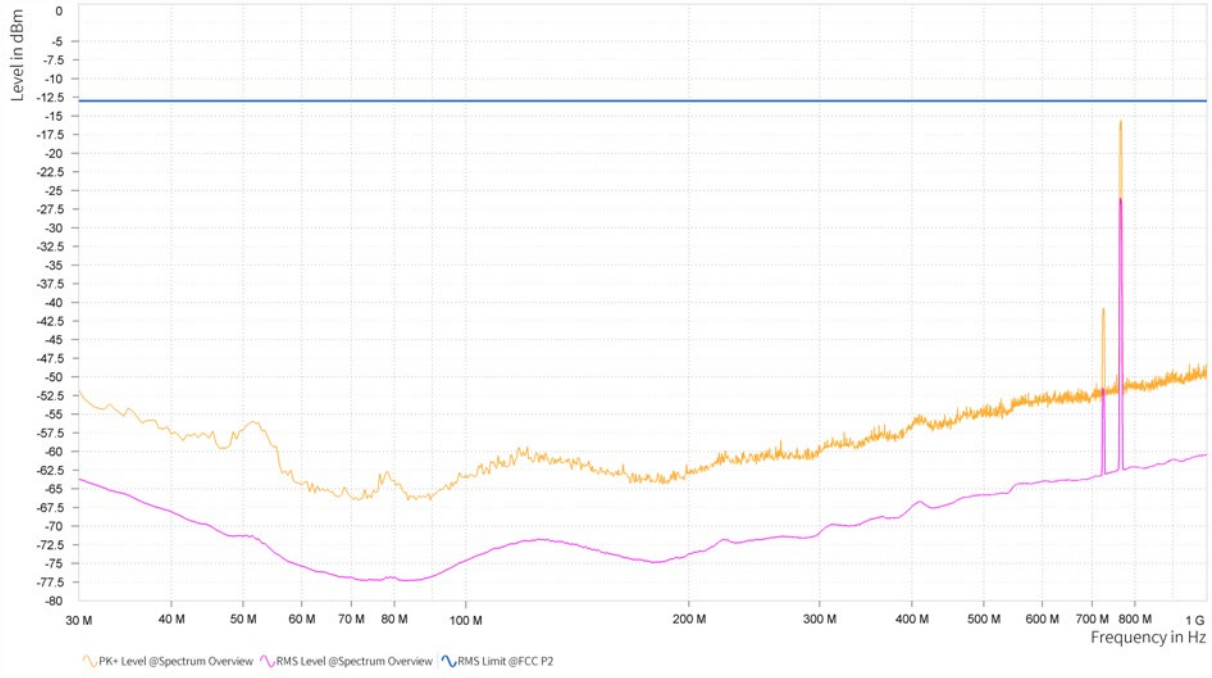
eCFR 47 §27.53 (g)
For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB (-13 dBm). Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

RSS-130

4.7 Transmitter unwanted emissions
4.7.1 General unwanted emissions limits
The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB (-13 dBm). However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

Complies?	Yes

Diagram 4.1a: B14: B_{5NR} and B29: B_{5LTE}, 30-1000 MHz



Note: The emissions in frequency range 758-768 MHz and 717-728 MHz MHz are the carrier frequencies and shall be ignored in the context.

Diagram 4.1b: B14: B_{5NR} and B29: B_{5LTE}, 1 - 8 GHz

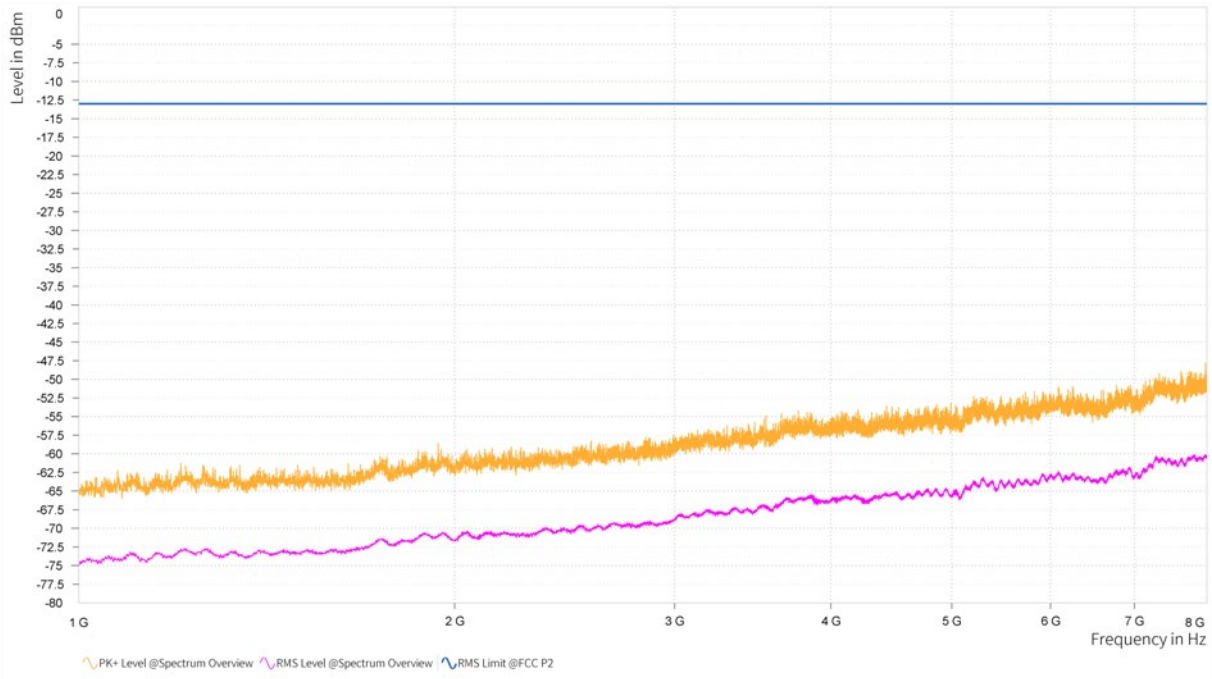
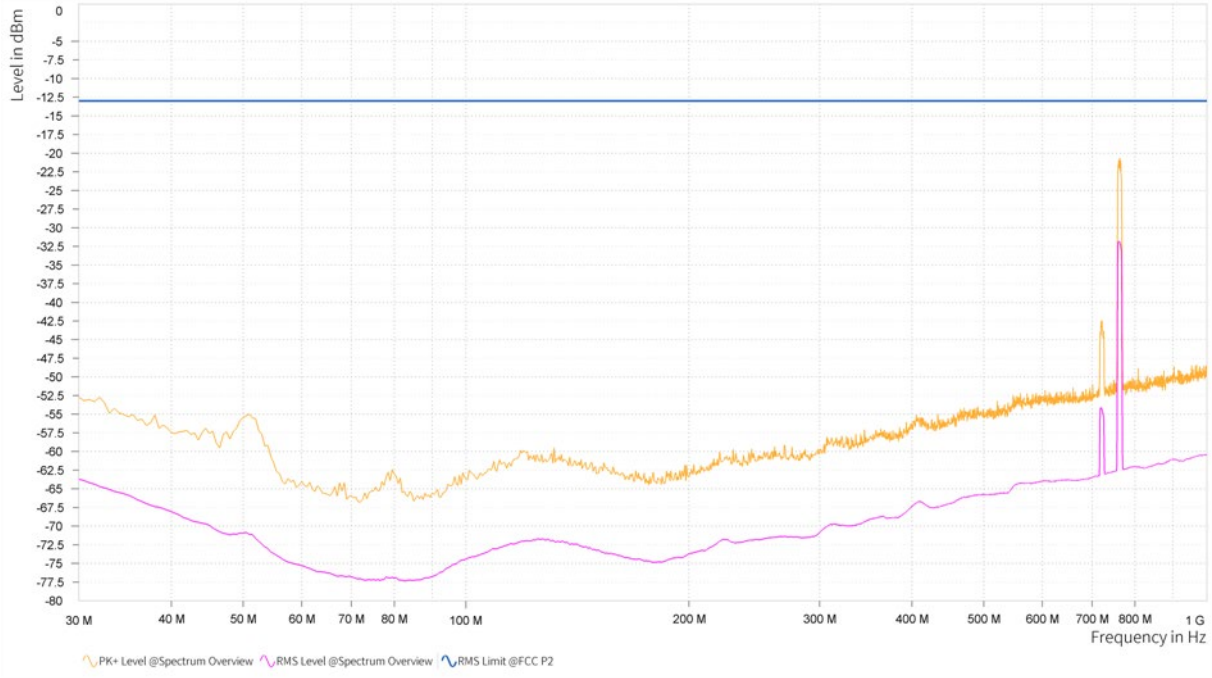


Diagram 4.2a: B14: B_{5NR} and B29: B_{5LTE}, 30-1000 MHz



Note: The emissions in frequency range 758-768 MHz and 717-728 MHz are the carrier frequencies and shall be ignored in the context.

Diagram 4.2b: B14: B_{5NR} and B29: B_{5LTE}, 1 - 8 GHz

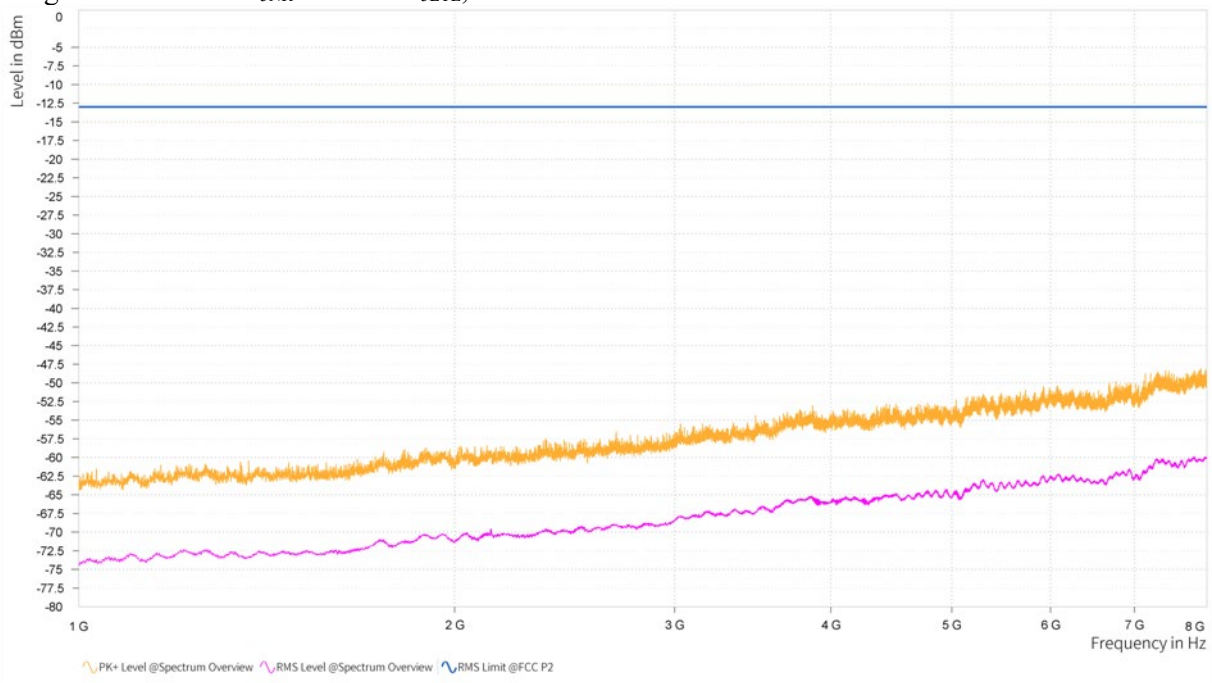


Diagram 4.3a: B14: B_{5NR} and B29: $M3_{3LTE,}$ 30-1000 MHz

Note: The emissions in frequency range 758-768 MHz and 717-728 MHz are the carrier frequencies and shall be ignored in the context.

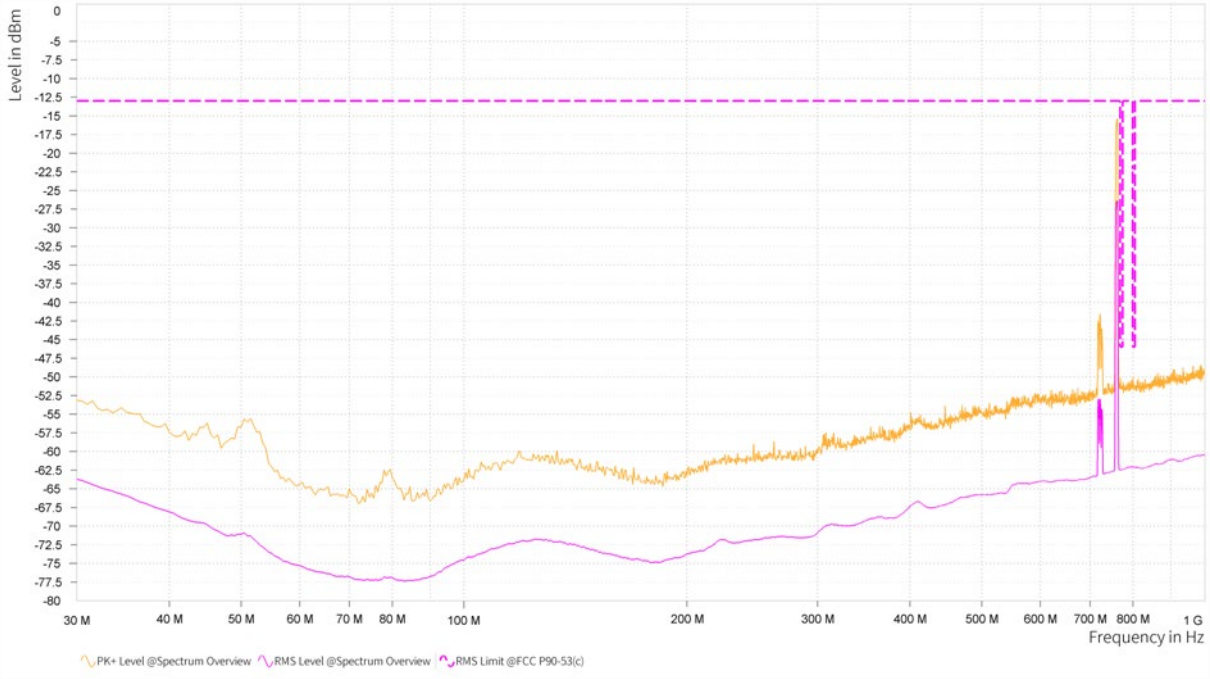
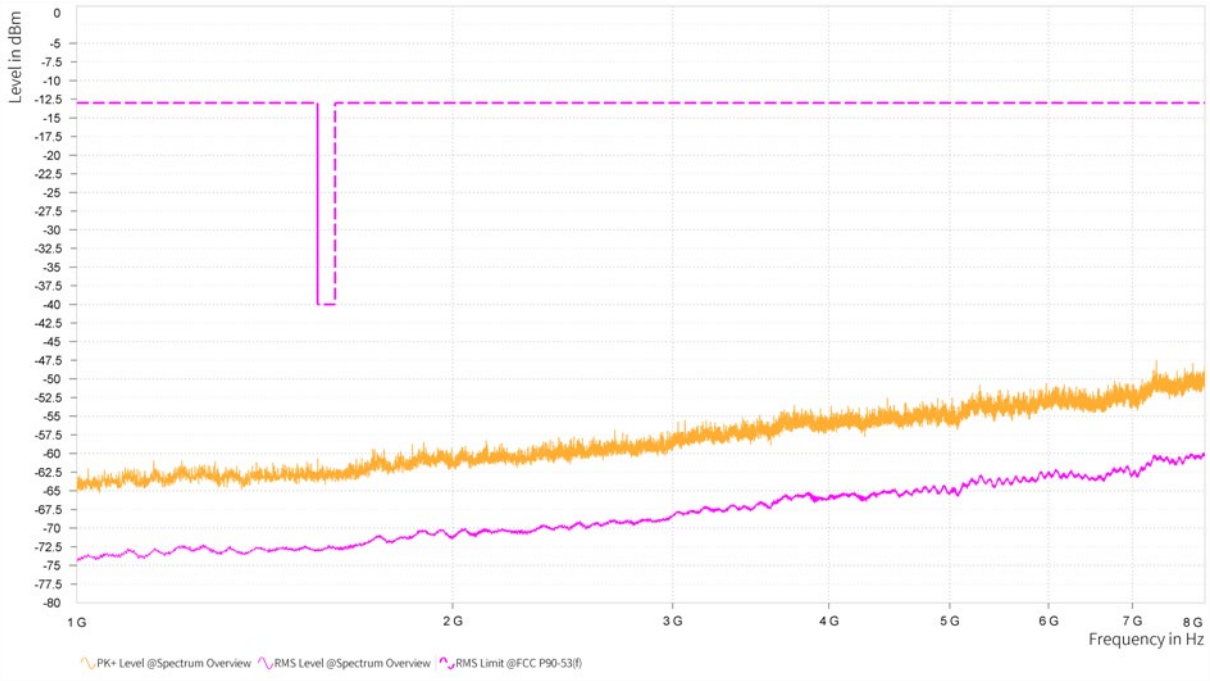


Diagram 4.3b: B14: B_{5NR} and B29: $M3_{3LTE}$ 1 - 8 GHz



Frequency stability measurements according to CFR 47 §27.54 and § 2.1055/ RSS-130 4.5 and RSS-140 4.2

Date	Temperature (test equipment)	Humidity (test equipment)
2024-05-27	23 °C ± °5	46 % ± 5 %
2024-05-28	23 °C ± °5	48 % ± 5 %

Test set-up and procedure

The measurements were made per definition in ANSI C63.26, 5.6. The test object was connected to a signal analyzer activated with build in software option to demodulate the RF carrier and report the measured frequency error.

Measurement equipment	RISE number
R&S FSQ40	504 143
R&S FSW 43	902 073
RF attenuator	900 292
Coaxial cable Sucoflex 102EA	BX50236
Coaxial cable Sucoflex 102EA	BX50237
Temperature Chamber	503 360
Testo 635, temperature and humidity meter	504 203
Multimeter Fluke 87	502 190

Results LTE B14

Nominal transmitter frequency was 763 MHz (M) with a bandwidth of 5 MHz. Rated output power level at connector RF A (maximum): 46 dBm.

Test conditions		Frequency error (Hz)
Supply voltage DC (V)	Temp. (°C)	
40.8	+20	-8
55.2	+20	-10
48	+20	-16
48	+30	-14
48	+40	-14
48	+50	13
48	+10	-11
48	0	-14
48	-10	-12
48	-20	10
48	-30	-14
Maximum freq. error (Hz)		16
Measurement uncertainty		$< \pm 1 \times 10^{-7}$

Results LTE B29

Nominal transmitter frequency was 722,5 MHz (M) with a bandwidth of 3 MHz. Rated output power level at connector RF A (maximum): 43 dBm.

Test conditions		Frequency error (Hz)
Supply voltage DC (V)	Temp. (°C)	
40.8	+20	-5
55.2	+20	14
48	+20	-18
48	+30	-8
48	+40	12
48	+50	-14
48	+10	13
48	0	-13
48	-10	11
48	-20	-10
48	-30	-11
Maximum freq. error (Hz)		18
Measurement uncertainty		$< \pm 1 \times 10^{-7}$

Results NR B14

Nominal transmitter frequency was 763 MHz (M) with a bandwidth of 5 MHz. Rated output power level at connector RF A (maximum): 46 dBm.

Test conditions		Frequency error (Hz)
Supply voltage DC (V)	Temp. (°C)	
40.8	+20	-5
55.2	+20	3
48	+20	-5
48	+30	-4
48	+40	-5
48	+50	5
48	+10	3
48	0	4
48	-10	4
48	-20	5
48	-30	3
Maximum freq. error (Hz)		5
Measurement uncertainty		$< \pm 1 \times 10^{-7}$

Results NR B29

Nominal transmitter frequency was 722,5 MHz (M) with a bandwidth of 5 MHz. Rated output power level at connector RF A (maximum): 46 dBm.

Test conditions		Frequency error (Hz)
Supply voltage DC (V)	Temp. (°C)	
40.8	+20	-5
55.2	+20	-5
48	+20	-5
48	+30	-5
48	+40	4
48	+50	2
48	+10	-3
48	0	2
48	-10	5
48	-20	5
48	-30	3
Maximum freq. error (Hz)		5
Measurement uncertainty		$< \pm 1 \times 10^{-7}$

The frequency error results shows that the frequency stability is good enough to ensure that the transmitted carrier stay within the operating band.

Remark

It was deemed sufficient to test one combination of TX frequency, channel bandwidth configuration and test model (modulation), as all combinations share a common internal reference to derive the TX frequency from.

Limits

§27.54
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

RSS-130 4.5
The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.

§2.1055
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

RSS-132 5.3
The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within each of the sub-bands when tested at the temperature and supply voltage variations specified in RSS-Gen.

Complies?	Yes

Photos of test object

Front side

Rear side

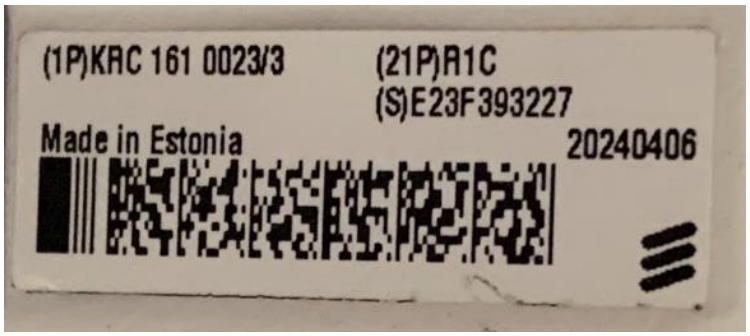
Left side

Right side

Bottom side

Top side

Test object label:



End of report.

Verification

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