REPORT

issued by an Accredited Testing Laboratory

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Reference
P122228-F2

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Radio measurements on Radio 4494 44B14 20B29 M01 with FCC ID TA8AKRC1610023 and IC 287AB-AS1610023

Product name: Radio 4494 44B14 20B29 M01
Product number: KRC 161 0023/3

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Accred. No. 1002
Testing
ISO/IEC 17025

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Summary

Standard Listed part of		Compliant
FCC CFR 47 Part 2, Part 27 Subpart C and Part 90 Subpart R ISED RSS-130, RSS-140 and RSS-Gen		
2.1046/ RSS-130 4.6/ RSS-140 4.3	RF power output	Yes
2.1049/ RSS-Gen 6.7	Occupied bandwidth	Yes
2.1051/ RSS-130 4.7/ RSS-140 4.4	Band edge	Yes
2.1051/ RSS-130 4.7/ RSS-140 4.4	Spurious emission at antenna terminals	Yes
2.1053/ RSS-130 4.7/ RSS-140 4.4	Field strength of spurious radiation	Yes
2.1055/ RSS-130 4.5/ RSS-140 4.2	Frequency stability	Yes

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Description of the test object

Equipment:	Radio 4494 44B14 20B29 M01 Product number KRC 161 0023/3 and variant KRC 161 0023/31 FCC ID: TA8AKRC1610023 IC: 287AB-AS1610023 Note*, The hardware and software (except for the security software) are identical for both types of Radios KRC 161 0023/3 (Security unlocked) and KRC 161 0023/31 (Security locked). The tests were performed on KRC 161 0023/3, Radio 4494 44B14 20B29 M01 with security unlocked software for testing purpose.
HVIN:	AS1610023
FVIN:	-
Hardware revision state:	R1C
Radio Access Technology, RAT and Frequency range:	**Band 14:** Single RAT: LTE, NR, NB IoT SA, LTE+NB IoT(IB, GB) Multi RAT: NR, LTE, ESS, NB IoT TX: 758 – 768 MHz RX: 788 – 798 MHz **Band 29** Single RAT: LTE, NR Multi RAT: LTE, NR TX: 717 – 728 MHz RX: No RX in this Band
IBW:	B14: 10 MHz B29: 11 MHz
Output power:	Maximum nominal output power per band, carrier and port B14 LTE: 5, 10 MHz: 40 W (With and without NB IoT) B14 NB IoT SA 20 W B14 NR: 5, 10 MHz: 40 W B14 ESS 10 MHz: 40 W B29 LTE: 5, 10 MHz: 40 W B29 LTE: 3 MHz: 20 W B29 NR: 5, 10 MHz: 40 W Maximum total output power per port(both bands): 80 W on RF port A, B (Band 14/n14+29/n29). 40 W on RF port C, D (Only Band 14/n14) Maximum total output power per Radio Unit(Multi Band): 240W

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Antenna ports B14:	A-D: 4 TX / 4 RX ports
Antenna ports B29:	A-B: 2 TX / 0 RX ports
Antenna:	50 Ohm Impedance, No dedicated antenna, handled during licensing.
RF configuration B14:	Single and multi-carrier, maximum 2 carriers per port, Non-Contiguous Spectrum (NCS), Contiguous Spectrum (CS) TX Diversity, 2x2 MIMO, 4x4 MIMO, Carrier Aggregation (CA) intra-band and inter-band supported. LTE with NB IoT IB/GB: 1 PRB, Boosted up to 6 dB
RF configuration B29:	Single and multi-carrier, maximum 3 carriers per port, Non-Contiguous Spectrum (NCS), Contiguous Spectrum (CS) TX Diversity, 2x2 MIMO, 2x2 MIMO, Carrier Aggregation (CA) intra-band and inter-band supported.
Channel bandwidths:	Band 14 LTE: 5 MHz and 10 MHz NB IoT SA: 200 kHz NR: 5 MHz, 10 MHz Band 29 LTE: 3 MHz, 5 MHz and 10 MHz NR: 5 MHz and 10 MHz
Sub-carrier spacing:	LTE: 15 kHz NR: 15 kHz and 30 kHz (30 kHz only for 10 MHz BW B14)
Modulations:	LTE: QPSK, 16QAM, 64QAM and 256QAM NR: QPSK, 16QAM, 64QAM and 256QAM NB IoT: QPSK
RF power Tolerance:	+0.6/ -2.5 dB
CPRI Speed	Up to 25.8 Gbps
Nominal supply voltage:	-48VDC

The information above is supplied by the manufacturer.

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Emission designators: B14:

NB IoT SA: 189KW7D

LTE with and without NB IoT IB
5 MHz, BW: 4M49W7D
10 MHz, BW: 8M95W7D
10 MHz, BW: 9M42W7D (5+5 MHz, Carrier aggregation)

LTE with NB IoT GB:
10 MHz, BW: 9M32W7D

NR SCS 15kHz :
5 MHz, BW: 4M48W7D
10 MHz, BW: 9M26W7D
10 MHz, BW: 9M40W7D (5+5 MHz, Carrier aggregation)

NR SCS 30kHz :
10 MHz, BW: 8M64W7D

B29:
LTE
3 MHz, BW: 2M70W7D
5 MHz, BW: 4M48W7D
10 MHz, BW: 8M95W7D
10 MHz, BW: 9M41W7D (5+5 MHz, Carrier aggregation

NR: SCS 15kHz :
5 MHz, BW: 4M48W7D
10 MHz, BW: 9M26W7D
10 MHz, BW: 9M41W7D (5+5 MHz, Carrier aggregation)

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Purpose of test

The purpose of the tests is to verify compliance to the performance characteristics specified in applicable items of FCC CFR 47 Part 2, 27, 90, RSS-130, RSS-140 and RSS-Gen.

No modifications of the test object was made during the testing.

Operation modes during measurements

LTE measurements were performed with the test object transmitting test models as defined in 3GPP TS 36.141. Test model E-TM1.1 was used to represent QPSK, test model E-TM3.2 to represent 16QAM, test model E-TM3.1 to represent 64QAM modulation and E-TM3.1A to represent 256QAM modulation. Test model E-TM1.1 was used for all measurements representing worst case if not otherwise stated.

NR measurements were performed with the test object transmitting test models as defined in 3GPP TS 38.141-1. Test model NR: FR1-TM1.1 is used to represent QPSK, test model NR: FR1-TM3.2 to represent 16QAM, test model NR: FR1-TM3.1 to represent 64QAM modulation and test model NR: FR1-TM3.1a to represent 256QAM modulation. Test model NR: FR1-TM1.1 was used for all measurements representing worst case.

NB IoT GB/ IB and SA measurements were performed with the test object transmitting test model N-TM representing QPSK as defined in 3GPP TS 36.141.

The test object was simultaneously transmitting in both bands at maximum output power settings during all measurements.

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Conducted measurements

The test object was supplied with -48 VDC by an external power supply. Additional connections are documented in the set-up drawings for conducted measurements.

The signal path of the measurement chain was calibrated with a network analyzer and the correction stored as a transducer factor in the measurement equipment.

Radiated measurements

The test object was powered with -48 VDC by an external power supply. Additional connections are documented in the set-up drawings for radiated measurements.

EUT Emission= SA reading + (CableLosses – Antenna gain(dBi) + TheoreticalPathloss + FilterLoss – LNAgain)

The correction factors are stored in R&S Elektra software as separate files and activated as applicable in the Hardware setup, for each measurement configuration. Emissions close or above the limit is verified with the substitution method where the EUT is replaced by a signal generator and an Antenna with known gain.

Test facility

The used semi-anechoic chamber is compliant with ANSI C63.4. RISE is an ISO 17025 accredited test facility for Electromagnetic Compatibility (EMC) and Radio testing. RISE is a Recognized Lab under FCC (Designation number: SE0001) and ISED (CAB identifier: SE0002) rules for the scope of standards used in this test report.

References

Measurements were done according to relevant parts of the following standards:
ANSI C63.4-2014+ C63.4a-2017
ANSI C63.5-2017
ANSI C63.26-2015
CFR 47 part 2, May 2024
CFR 47 part 27, May 2024
CFR 47 part 90, May 2024
KDB 662911 D01 Multiple Transmitter Output v02r02
KDB 971168 D01 Power Meas License Digital Systems v03r01
KDB 971168 D03 IM Emission Repeater Amp v01
3GPP TS 36.141, version 15.3.0
3GPP TS 38.141-1, version 15.4.0
RSS-130 Issue 2
RSS-140 Issue 1
RSS-Gen Issue 5

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Measurement equipment

Item	Name	Inv.no	Cal. due date
Semi Anechoic Chamber	TDK	503881	-
	NSA	BX90699	2025-11-04
	SVSWR	BX90702	2024-09-20
Spectrum Analyzer	Rohde & Schwarz ESU40	901385	2024-07-24
Software	Rohde & Schwarz Elektra	-	-
RF cable	Huber & Suhner Eacon 4C	BX91490	2025-06-19
RF Cable	Rosenberger UFB311A	503508	2024-09-08
RF Cable	Rosenberger UFB311A	503509	2024-09-08
Antenna, Bilog	Teseq CBL6143A	BX92331	2025-09-16
Preamplifier	MicroComp Nordic MCN-JS42-00101800-28-10P	901545	2025-03-01
HP filter	Wainwright WHKX1.0/18G-10SS	901373	2025-06-04
Antenna, Horn	Emco 3115	502175	2024-07-02
Spectrum analyzer	R&S FSQ 40	504143	2024-07-25
Spectrum analyzer	R&S FSW 43	902073	2024-07-25
RF attenuator	Weinschel 30dB	900229	2024-09-01
HP filter	Wainwright WHKY1.0/15G-12SS	504199	2025-06-04
RF cable	Sucoflex 102EA	BX50236	2025-06-26
RF Cable	Sucoflex 102EA	BX50237	2024-08-30
Thermohygrometer	Testo 635	504203	2024-07-05
Thermohygrometer	Testo 625	504117	2024-06-28

Uncertainties

Measurement and test instrument uncertainties are described in the quality assurance documentation ”RISE – 3936”. The uncertainties are calculated with a coverage factor k=2 (95% level of confidence).

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Reservation

The test results in this report apply only to the particular test objects as declared in the report.

Delivery of test object

The test object was delivered: 2024-05-10 Sample 1 and 2024-05-30 Sample 2.

Manufacturer's representative

Patrik Hellström, Ericsson AB.

Test engineers

Björn Skönvall, RISE.

Test participant(-s)

None.

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Test frequencies used for conducted and radiated measurements

B14 LTE:

Frequency [MHz]	Symbolic name	Comment
760.5	B_{5LTE}	TX bottom frequency in 5 MHz BW configuration
763.0	M_{10LTE}	TX bottom frequency in 10 MHz BW configuration
763.0	M_{5LTE}	TX middle frequency in 5 MHz BW configuration
765.5	T_{5LTE}	TX top frequency in 5 MHz BW configuration.
760.5 765.5	$CA2_{5+5LTE}$	Carrier Aggregation TX middle 5+5 MHz BW configuration
760.5 765.5	$M2_{5+5LTE}$	TX middle 5+5 MHz BW configuration

B14 LTE with NB IoT IB/ GB

Frequency [MHz]	Symbolic name	Comment
IoT=PRB2 LTE=760.5	$B_{IB+5LTE}$	TX constellation for Bottom LTE carrier with 5 MHz carrier bandwidth. IoT Bottom position, Boosted 6 dB
IoT=PRB22 LTE=765.5	$T_{IB+5LTE}$	TX constellation for Top LTE carrier with 5 MHz carrier bandwidth. IoT Top position, Boosted 6 dB
IoT=PRB-1 LTE=763.0	$B_{GB+10LTE}$	TX constellation for Middle LTE carrier with 10 MHz carrier bandwidth. IoT Bottom position, Boosted 6 dB
IoT=PRB50 LTE=763.0	$T_{GB+10LTE}$	TX constellation for Middle LTE carrier with 10 MHz carrier bandwidth. IoT Top position, Boosted 6 dB

B14 NB IoT SA:

Frequency [MHz]	Symbolic name	Comment
758.2	$B_{NB\ IoT\ SA}$	TX Bottom frequency NB IoT SA configuration
763.0	$M_{NB\ IoT\ SA}$	TX Middle frequency NB IoT SA configuration
767.8	$T_{NB\ IoT\ SA}$	TX Top frequency NB IoT SA configuration

B14 NR:

Frequency [MHz]	Symbolic name	Comment
760.5	B_{5NR}	TX bottom frequency in 5 MHz BW configuration
763.0	M_{10NR}	TX bottom frequency in 10 MHz BW configuration
763.0	M_{5NR}	TX middle frequency in 5 MHz BW configuration
765.5	T_{5NR}	TX top frequency in 5 MHz BW configuration.
760.5 765.5	$CA2_{5+5NR}$	Carrier Aggregation TX middle 5+5 MHz BW configuration
760.5 765.5	$M2_{5+5NR}$	TX middle 5+5 MHz BW configuration

The RX frequency in Band 14/n14 was configured 30 MHz above the corresponding TX frequency according to the applicable duplex offset for the operating band.

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B29 LTE:

Frequency [MHz]	Symbolic name	Comment
718.5	B_{3LTE}	TX bottom frequency in 3 MHz BW configuration
719.5	B_{5LTE}	TX bottom frequency in 5 MHz BW configuration
722.0	B_{10LTE}	TX bottom frequency in 10 MHz BW configuration
722.5	M_{5LTE}	TX middle frequency in 5 MHz BW configuration
722.5	M_{10LTE}	TX middle frequency in 10 MHz BW configuration
723.0	T_{10LTE}	TX top frequency in 10 MHz BW configuration
725.5	T_{5LTE}	TX top frequency in 5 MHz BW configuration.
726.5	T_{3LTE}	TX top frequency in 3 MHz BW configuration.
719.5 725.5	$CA2_{5+5LTE}$	Carrier Aggregation TX middle 5+5 MHz BW configuration
719.5 725.5	$M2_{5+5LTE}$	2 carrier TX middle frequency 5+5 MHz BW configuration
718.5 722.5 726.5	$M3_{3+3+3LTE}$	3 carrier TX middle frequency 3+3+3 MHz BW configuration

B29 NR:

Frequency [MHz]	Symbolic name	Comment
719.5	B_{5NR}	TX bottom frequency in 5 MHz BW configuration
722.5	M_{5NR}	TX middle frequency in 5 MHz BW configuration
722.5	M_{10NR}	TX middle frequency in 10 MHz BW configuration
725.5	T_{5NR}	TX top frequency in 5 MHz BW configuration.
719.5 725.5	$M2_{5+5NR}$	2 carrier TX middle frequency 5+5 MHz BW configuration
719.5 725.5	$CA2_{5+5NR}$	Carrier Aggregation TX middle 5+5 MHz BW configuration

B14 B29 Multi RAT

Frequency [MHz]	Symbolic name	Comment
B14: NR1=760.5 LTE1=765.5 B29: NR1=719.5 LTE1=723.5 LTE2=726.5	1NR+1LTE 1NR+2LTE	TX constellation for Max number of carriers:B14 5+5 MHz bandwidth and B29 5+3+3 MHz bandwidth.

B14 ESS RAT

763.0	ESS_{NR+LTE}	TX constellation for Middle NR/LTE carrier with 10 MHz carrier bandwidth.NR 50% LTE 50%

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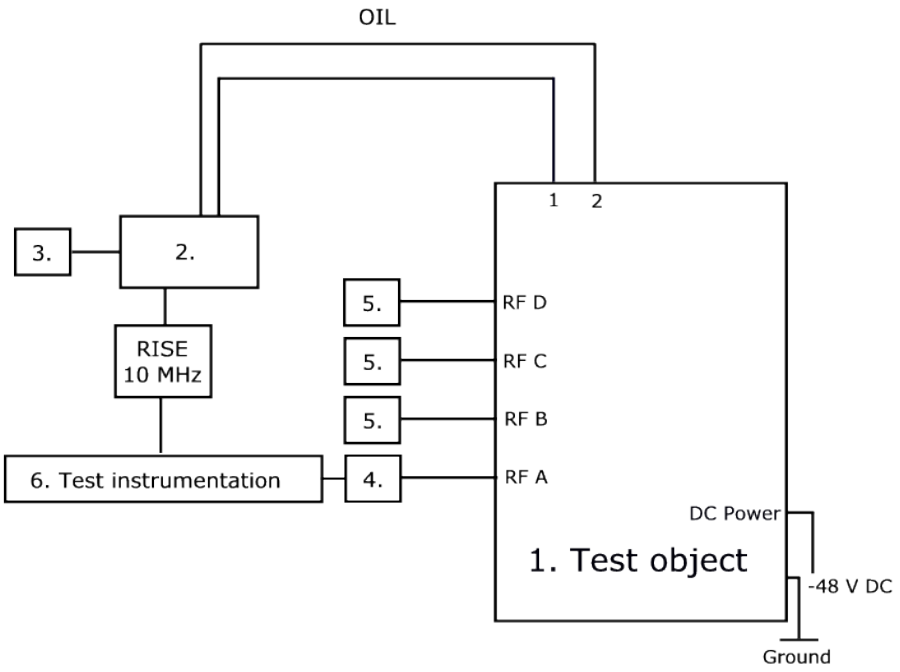
Test setup: conducted measurements



Test object:

1.	Radio 4494 44B14 20B29 M01, KRC 161 0023/3, rev. R1C, s/n: E23F393227 With Radio Software: CXP 202 1113/1, rev. R21A08. Radio 4494 44B14 20B29 M01, KRC 161 0023/3, rev. R1C, s/n: E23F384287 With Radio Software: CXP 202 1113/1, rev. R21A08. FCC ID: TA8AKRC1610023, IC: 287AB-AS1610023

EUT sample 1, serial No: E23F384287 was found to be faulty calibrated on port A (isolated to port A).
EUT sample 2, serial No: E23F393227 Replacement unit.

Associated equipment:

2.	Testing Equipment: CT-DU25, LPC 102 500/1, rev. R3F, s/n: ET5K000193 with software Ruma R50B02

Functional test equipment:

3.	Computer, Mac book pro, BAMS – 1056772758
4.	RF Attenuator: RISE number: 900 229
5.	Terminator, 50 ohm
6.	RISE Test Instrumentation according to measurement equipment list for each test. The signal analyzer was connected to the RISE 10 MHz reference standard during all measurements.

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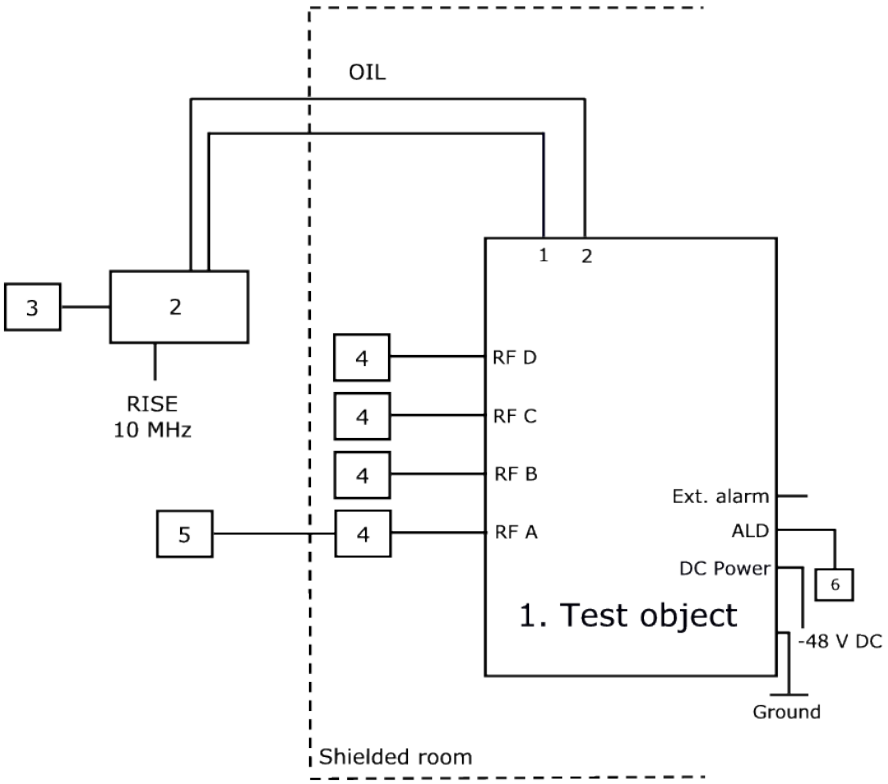
Test setup: radiated measurements



1.	Radio 4494 44B14 20B29 M01, KRC 161 0023/3, rev. R1C, s/n: E23F384287 With Radio Software: CXP 202 1113/1, rev. R21A08. FCC ID: TA8AKRC1610023, IC: 287AB-AS1610023

Associated equipment:

2.	Testing Equipment: CT-DU25, LPC 102 500/1, rev. R3F, s/n: ET5K000193 with software Ruma R50B02

Functional test equipment:

3.	Computer, Mac book pro, BAMS – 1056772758
4.	Attenuator/ Terminator
5.	R&S ESIB 26, SP no: 503 885 for supervision purpose only
6.	Remote Control Unit, ANDREW Model: ATM200-A20, Serial: DESA101412073

Interfaces:

Power input configuration DC: -48 VDC	Power
RF A-D, 4.3-10 connector, combined TX/RX	Antenna
1, Optical Interface Link, single mode opto fibre	Signal
2, Optical Interface Link, single mode opto fibre	Signal
ALD Control, shielded multi-wire	Signal
EXT Alarm, shielded multi-wire	Signal
Ground wire	Ground

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RF power output measurements according to CFR 47 §27.50 and §90.542/ RSS-130 4.6 and RSS-140 4.3, conducted

Date	Temperature	Humidity
2024-05-13	23 °C ± 3 °C	32 % ± 5 %
2024-05-15	23 °C ± 3 °C	29 % ± 5 %
2024-05-31	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, 5.2.3.4. The test object was connected to a signal analyser measuring peak and RMS output power in CDF mode. A resolution bandwidth of 20 MHz was used if not otherwise specified.

Measurement equipment	RISE number
R&S FSW 43	902 073
R&S FSQ 40	504 143
RF attenuator	900 229
Coaxial cable Sucoflex 102EA	BX50236
Coaxial cable Sucoflex 102EA	BX50237
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 1.1 dB

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Results LTE B14 Single carrier

Single carrier Test model TM1.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
B_{5LTE}	46.02/7.62	45.90/7.64	45.96/7.64	45.86/7.64	51.95
M_{10LTE}	45.96/7.64	45.84/7.68	45.87/7.66	45.85/7.66	51.90
M_{5LTE}	46.02/7.62	46.05/7.62	46.05/7.62	45.99/7.62	51.47
T_{5LTE}	46.01/7.50	45.87/7.54	45.88/7.51	45.86/7.52	51.92

[1)]: summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Single carrier Test model TM3.2

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]
Symbolic name	Port RF A
M_{5LTE}	46.01/7.56

Single carrier Test model TM3.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]
Symbolic name	Port RF A
B_{5LTE}	45.99/7.58

Single carrier Test model TM3.1a

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]
Symbolic name	Port RF A
B_{5LTE}	46.05/7.56

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Single carrier Test model TM1.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power per 1 MHz [RMS dBm]					
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[2)]	Maximum Antenna gain[3)] [dBd]/ ERP Limit [dBm]
B_{5LTE}	39.90	39.74	39.85	39.81	45.90	17.10/ 63.0
M_{10LTE}	36.95	36.86	36.90	36.90	42.95	20.05/ 63.0

[2)]: 6 dB (10 $\log_{10}$ (N_{out})) was added to the highest measured power among the measured ports, according to the procedure described in ANSI C63.26 section 6.4.3.2.4.
[3)]: The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested with maximum power setting, and still comply with the maximum ERP limit as defined in §90.542(a) and SRSP-540 section 5.1.1

The used formula is: Maximum antenna gain (dBd) = ERP limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Feeder loss is assumed to be 0 dB in the antenna gain calculation.

Please note that the maximum ERP limit for a specific site may be lower due to various site conditions.

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Results NB IoT SA B14

Single carrier Test model NTM

Rated output power level at each RF port 1x 43 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]					
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]	Maximum Antenna gain[2)] [dBd]/ ERP Limit [dBm]
$B_{IoT\ SA}$	42.80/5.13	42.90/5.19	42.81/5.22	42.94/5.16	48.88	14.12/ 63.0
$M_{IoT\ SA}$	42.90/5.22	43.03/5.16	42.95/5.16	42.91/5.13	48.97	14.03/ 63.0
$T_{IoT\ SA}$	42.64/5.16	42.59/5.16	42.58/5.19	42.55/5.16	48.61	14.39/ 63.0

1): summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.
2): The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested with maximum power setting, and still comply with the maximum ERP limit as defined in §90.542(a) and SRSP-540 section 5.1.1

The used formula is: Maximum antenna gain (dBd) = ERP limit (dBm) - Measured Total power[2)]+ feeder loss (dB).
Feeder loss is assumed to be 0 dB in the antenna gain calculation.

Please note that the maximum ERP limit for a specific site may be lower due to various site conditions.

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Results LTE B29 Single carrier

Single carrier Test model TM1.1

Rated output power level at each RF port 1x 43/46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
B_{3LTE}	42.76/8.36	42.53/8.23	-	-	45.66
B_{5LTE}	45.98/7.66	45.63/7.56	-	-	48.80
M_{3LTE}	43.04/8.42	42.87/8.26	-	-	45.97
M_{5LTE}	46.01/7.6	45.76/7.62	-	-	48.90
M_{10LTE}	46.01/7.7	45.78/7.7	-	-	48.90
T_{3LTE}	43.03/8.24	42.73/8.26	-	-	45.90
T_{5LTE}	45.95/7.68	45.69/7.68	-	-	48.83

1): summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Single carrier Test model TM1.1

Rated output power level at each RF port 1x 43/46 dBm/ port.

	Output power per 1 MHz [RMS dBm]						
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[2)]	Maximum Antenna gain[3)] [dBd]/ ERP Limit [dBm]	Maximum Antenna gain[4)] [dBi]/ EIRP Limit [dBm]
B_{3LTE}	38.99	38.73			41.99	21.01/ 63.0	23.17/ 65.16
B_{5LTE}	39.86	39.86			42.86	20.14/ 63.0	22.30/ 65.16
M_{10LTE}	37.12	36.83			40.12	22.88/ 63.0	25.04/ 65.16

2): 3 dB (10 $\log_{10}$ (N_{out})) was added to the highest measured power among the measured ports, according to the procedure described in ANSI C63.26 section 6.4.3.2.4.

3): The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested with maximum power setting, and still comply with the maximum ERP limit as defined in §27.50 (c)

The used formula is: Maximum antenna gain (dBd) = ERP limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Feeder loss is assumed to be 0 dB in the antenna gain calculation.

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Please note that the maximum ERP limit for a specific site may be lower due to various site conditions.

[4)]: The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested with maximum power setting, and still comply with the maximum EIRP limit as defined in SRSP-518

The used formula is: Maximum antenna gain (dBi) = EIRP limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Feeder loss is assumed to be 0 dB in the antenna gain calculation.

Please note that the maximum EIRP limit for a specific site may be lower due to various site conditions.

Transaction 09222115557521059487 Signed BS, DL

Results NR B14 SCS 15kHz Single carrier

Single carrier Test model TM1.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
B_{5NR}	46.05/7.62	46.11/7.62	46.05/7.62	46.04/7.64	52.08
M_{5NR}	46.02/7.6	46.09/7.6	46.08/7.6	46.04/7.6	52.08
M_{10NR}	46.03/764	46.05/7.68	46.04/7.64	46.02/7.66	52.06
T_{5NR}	46.03/7.52	46.08/7.52	46.08/7.50	46.05/7.52	52.08

1): summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Single carrier Test model TM3.2

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]
Symbolic name	Port RF A
B_{5NR}	45.97/7.62

Single carrier Test model TM3.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]
Symbolic name	Port RF A
B_{5NR}	46.03/7.62

Single carrier Test model TM3.1a

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]
Symbolic name	Port RF A
B_{5NR}	45.98/7.62

Transaction 09222115557521059487 Signed BS, DL

Single carrier Test model TM1.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power per 1 MHz [RMS dBm]					
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[2)]	Maximum Antenna gain[3)] [dBd]/ ERP Limit [dBm]
M_{5NR}	39.92	40.01	39.97	39.94	46.03	16.97/ 63.0
M_{10NR}	36.86	36.94	36.93	36.87	42.94	20.06/ 63.0

[2)]: 6 dB (10 $\log_{10}$ (N_{out})) was added to the highest measured power among the measured ports, according to the procedure described in ANSI C63.26 section 6.4.3.2.4.
[3)]: The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested with maximum power setting, and still comply with the maximum ERP limit as defined in §90.542(a) and SRSP-540 section 5.1.1

The used formula is: Maximum antenna gain (dBd) = ERP limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Feeder loss is assumed to be 0 dB in the antenna gain calculation.

Please note that the maximum ERP limit for a specific site may be lower due to various site conditions.

Transaction 09222115557521059487 Signed BS, DL

Results NR B29 SCS 15kHz Single carrier

Single carrier Test model TM1.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
B_{5NR}	45.89/7.6	45.70/7.56	-	-	48.80
M_{5NR}	45.95/7.6	45.82/7.6	-	-	48.90
M_{10NR}	45.93/7.74	45.80/7.76	-	-	49.90
T_{5NR}	45.88/7.66	45.74/7.66	-	-	48.82

[1)]: summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Single carrier Test model TM3.2

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]
Symbolic name	Port RF A
M_{5NR}	45.95/7.58

Single carrier Test model TM3.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]
Symbolic name	Port RF A
M_{5NR}	45.94/7.6

Single carrier Test model TM3.1a

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]
Symbolic name	Port RF A
M_{5NR}	45.98/7.6

Transaction 09222115557521059487 Signed BS, DL

Single carrier Test model TM1.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power per 1 MHz [RMS dBm]						
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[2)]	Maximum Antenna gain[3)] [dBd]/ ERP Limit [dBm]	Maximum Antenna gain[4)] [dBi]/ EIRP Limit [dBm]
M_{5NR}	39.93	39.78	-	-	42.93	20.07/ 63.0	22.23/ 65.16
M_{10NR}	36.91	36.71	-	-	39.91	23.09/ 63.0	25.25/ 65.16

[2)]: 3 dB (10 $\log_{10}$ (N_{out})) was added to the highest measured power among the measured ports, according to the procedure described in ANSI C63.26 section 6.4.3.2.4.

[3)]: The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested with maximum power setting, and still comply with the maximum ERP limit as defined in §27.50 (c)

The used formula is: Maximum antenna gain (dBd) = ERP limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Feeder loss is assumed to be 0 dB in the antenna gain calculation.

Please note that the maximum ERP limit for a specific site may be lower due to various site conditions.

[4)]: The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested with maximum power setting, and still comply with the maximum EIRP limit as defined in SRSP-518

The used formula is: Maximum antenna gain (dBi) = EIRP limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Feeder loss is assumed to be 0 dB in the antenna gain calculation.

Please note that the maximum EIRP limit for a specific site may be lower due to various site conditions.

Transaction 09222115557521059487 Signed BS, DL

Results NR B14 SCS 30kHz Single carrier

Single carrier Test model TM1.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
M_{10NR}	45.86/7.78	45.86/7.92	45.82/7.86	45.78/7.83	51.85

[1)]: summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power per 1 MHz [RMS dBm]					
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[2)]	Maximum Antenna gain[3)] [dBd]/ ERP Limit [dBm]
M_{10NR}	37.01	37.06	37.06	37.06	43.10	19.9/ 63.0

[2)]: 6 dB (10 $\log_{10}$ (N_{out})) was added to the highest measured power among the measured ports, according to the procedure described in ANSI C63.26 section 6.4.3.2.4.
[3)]: The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested with maximum power setting, and still comply with the maximum ERP limit as defined in §90.542(a) and SRSP-540 section 5.1.1

The used formula is: Maximum antenna gain (dBd) = ERP limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Feeder loss is assumed to be 0 dB in the antenna gain calculation.

Please note that the maximum ERP limit for a specific site may be lower due to various site conditions.

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Results LTE B14 Multi carrier

Multi carrier, Carrier aggregation TM1.1

Rated output power level at each RF port 2x 43 dBm/ port.

	Output power CCDF [RMS dBm]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
$CA2_{5+5LTE}$	45.98/7.64	45.80/7.68	45.98/7.64	45.87/7.68	51.93

[1)]: summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Results LTE B29 Multi carrier

Multi carrier, TM1.1

Rated output power level at each RF port 3x 41.2 dBm/ port.

	Output power CCDF [RMS dBm]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
$M3_{3+3+3LTE}$	44.67/8.38	44.42/8.38	-	-	47.56

[1)]: summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Rated output power level at each RF port 2x 43 dBm/ port.

	Output power CCDF [RMS dBm]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
$CA2_{5+5LTE}$	46.29/8.33	46.29/8.4	-	-	49.30

[1)]: summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Multi carrier, Carrier aggregation TM1.1

Rated output power level at each RF port 2x 43 dBm/ port.

	Output power CCDF [RMS dBm]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
$CA2_{5+5NR}$	46.10/8.43	46.10/8.49	-	-	49.11

[1)]: summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Transaction 09222115557521059487 Signed BS, DL

Results NR B14 SCS 15kHz Multi carrier

Multi carrier, Carrier aggregation TM1.1

Rated output power level at each RF port 2x 43 dBm/ port.

	Output power CCDF [RMS dBm]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
$CA2_{5+5NR}$	46.01/7.62	46.03/8.33	46.07/8.21	46.01/8.24	52.06

[1)]: summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Transaction 09222115557521059487 Signed BS, DL

Results LTE with NB IoT B14

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

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
$B_{IB+5LTE}$	45.77/8.17	45.81/8.17	45.92/8.12	45.79/8.11	51.84
$B_{GB+10LTE}$	45.89/8.3	45.85/8.33	45.95/8.09	45.88/8.29	51.91

1): summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power per 1 MHz [RMS dBm]					
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[2)]	Maximum Antenna gain[3)] [dBd]/ ERP Limit [dBm]
$B_{IB+5LTE}$	36.86	36.92	36.99	36.91	42.99	20.01/ 63.0
$M_{GB+10LTE}$	33.61	33.79	33.65	33.68	39.79	23.21/ 63.0

2): 6 dB (10 $\log_{10}$ (N_{out})) was added to the highest measured power among the measured ports, according to the procedure described in ANSI C63.26 section 6.4.3.2.4.
3): The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested with maximum power setting, and still comply with the maximum ERP limit as defined in §90.542(a) and SRSP-540 section 5.1.1

The used formula is: Maximum antenna gain (dBd) = ERP limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Feeder loss is assumed to be 0 dB in the antenna gain calculation.

Please note that the maximum ERP limit for a specific site may be lower due to various site conditions.

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Results Multi RAT ESS NR and LTE B14 SCS 15kHz

ESS NR 50% and LTE 50% TM1.1

Rated output power level at each RF port 1x 46 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
ESS_{NR+LTE}	45.83/7.74	45.86/7.78	45.80/7.8	45.55/7.88	53.27

[1)]: summed output power according to ANSI C63.26 section 6.4.3.1
Note: The PAR value is the 0.1 % Peak to Average Ratio.

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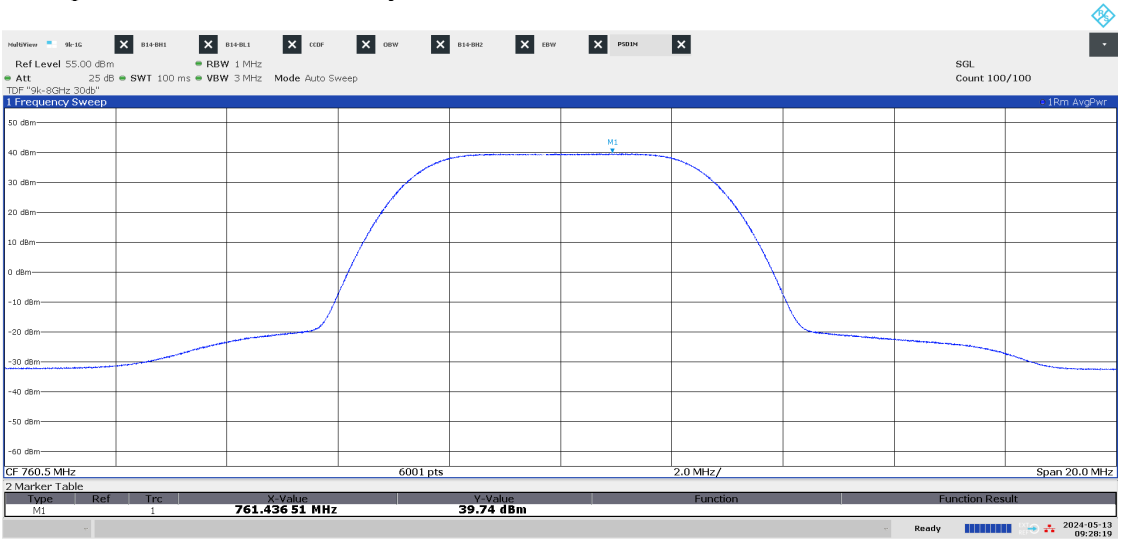
Example of CCDF measurement: B14 $B_{5LTE,}$ Port B

09:11:44 AM 05/13/2024

Example of 1 MHz Power density measurement: B14 $B_{5LTE,}$ Port B



09:28:20 AM 05/13/2024

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Limits

§ 90.542 Broadband transmitting power limits:

(a) The following power limits apply to the 758-768/788-798 MHz band:

1) Fixed and base stations transmitting a signal in the 758-768 MHz band with an emission bandwidth of 1 MHz or less must not exceed an ERP of 1000 watts and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts ERP in accordance with Table 1 of this section.
2) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 758-768 MHz band with an emission bandwidth of 1 MHz or less must not exceed an ERP of 2000 watts and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts ERP in accordance with Table 2 of this section.
3) Fixed and base stations transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP accordance with Table 3 of this section.
4) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section.
5) Licensees of fixed or base stations transmitting a signal in the 758-768 MHz band at an ERP greater than 1000 watts must comply with the provisions set forth in paragraph (b) of this section.

(b) For base and fixed stations operating in the 758-768 MHz band in accordance with the provisions of paragraph (a)(5) of this section, the power flux density that would be produced by such stations through a combination of antenna height and vertical gain pattern must not exceed 3000 microwatts per square meter on the ground over the area extending to 1 km from the base of the antenna mounting structure.

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RSS-140

4.3 Transmitter output power
Fixed and base station equipment shall comply with the e.r.p. limits in SRSP-540.

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

SRSP-540
5.1 Radiated power and antenna height limits
5.1.1 Fixed and base stations
For fixed and base stations transmitting in accordance with section 4 within the frequency range 758-768 MHz with a channel bandwidth equal to or less than 1 MHz, the maximum permissible equivalent radiated power (e.r.p.) is 1000 W with an antenna height above average terrain (HAAT) of up to 305 m.

For fixed and base stations transmitting in accordance with section 4 within the frequency range 758-768 MHz with a channel bandwidth greater than 1 MHz, the maximum permissible e.r.p. is 1000 W/MHz (i.e. no more than 1000 W e.r.p. in any 1 MHz band segment) with an antenna HAAT of up to 305 m.

Fixed and base stations located in geographical areas at a distance greater than 26 km from large or medium population centres and transmitting in accordance with section 4 within the frequency range 758-768 MHz may increase their e.r.p. up to a maximum of 2000 W/MHz (i.e. no more than 2000 W e.r.p. in any 1 MHz band segment), with an antenna HAAT of up to 305 m.

This provision also applies to fixed and base stations with a channel bandwidth equal to or less than 1 MHz (i.e. e.r.p. may be increased up to a maximum of 2000 W).

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§ 27.50 Power limits and duty cycle

(c) The following power and antenna height requirements apply to stations transmitting in the 600 MHz band and the 698-746 MHz band:

a. Fixed and base stations transmitting a signal with an emission bandwidth of 1 MHz or less must not exceed an effective radiated power (ERP) of 1000 watts and an antenna height of 305 m height above average terrain (HAAT), except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts ERP in accordance with Table 1 of this section;

b. Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal with an emission bandwidth of 1 MHz or less must not exceed an ERP of 2000 watts and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts ERP in accordance with Table 2 of this section;

c. Fixed and base stations transmitting a signal with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP in accordance with Table 3 of this section;

d. Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section;

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RSS-130
4.6 Transmitter output power and effective radiated power

4.6.1 General
The transmitter output power shall be measured in terms of average power. In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

4.6.3 Frequency bands 698-756 MHz and 777-787 MHz
For base and fixed equipment other than fixed subscriber equipment, refer to SRSP-518 for the e.i.r.p. limits.

SRSP-518
5.1 Radiated power and antenna height limits for fixed and base stations
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) up to 305 metres.

Fixed and base stations located in geographical areas at a distance greater than 26 km from large or medium population centres and transmitting in accordance with section 4, may increase their e.i.r.p. up to a maximum of 3280 watts/MHz (i.e. no more than 3280 watts e.i.r.p. in any 1 MHz band segment), with an antenna HAAT up to 305 metres..

Remark

ERP/EIRP compliance is addressed at the time of licensing, as required by the responsible FCC/ISED Bureau(s). Licensee’s are required to take into account maximum antenna gain used in combination with above power settings to prevent the radiated output power to exceed the limits.

Complies?	Yes

Transaction 09222115557521059487 Signed BS, DL

Occupied bandwidth measurements according to CFR47 §2.1049/ RSS-Gen 6.7

Date	Temperature	Humidity
2024-05-13	23 °C ± 3 °C	32 % ± 5 %
2024-05-15	23 °C ± 3 °C	29 % ± 5 %
2024-05-31	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, 5.4.4. The output was connected to a signal analyzer using the built in OBW function with the Peak detector activated in max hold.

Measurement equipment	RISE number
R&S FSW 43	902 073
RF attenuator	900 229
Coaxial cable Sucoflex 102EA	BX50236
Coaxial cable Sucoflex 102EA	BX50237
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 2.6%

Results LTE B14

Single carrier: TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
1.1	B_{5LTE}	RF A	4478
1.2	M_{10LTE}	RF B	8946
	M_{5LTE}	RF A	4477
	M_{5LTE}	RF B	4478
	M_{5LTE}	RF C	4476
	M_{5LTE}	RF D	4479
	T_{5LTE}	RF A	4477

Single carrier: TM3.2

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
1.3	B_{5LTE}	RF A	4474

Single carrier: TM3.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
1.4	B_{5LTE}	RF A	4488

Single carrier: TM3.1a

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
1.5	B_{5LTE}	RF A	4484

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Carrier aggregation: TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
1.6	$CA2_{5+5LTE}$	RF A	9416

Results LTE B29

Single carrier: TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	B_{3LTE}	RF A	2690
	B_{5LTE}	RF A	4470
	M_{3LTE}	RF A	2689
	M_{5LTE}	RF B	4479
	M_{10LTE}	RF B	8945
	T_{5LTE}	RF A	4479
	T_{3LTE}	RF B	2694

Single carrier: TM3.2

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	M_{3LTE}	RF A	2695

Single carrier: TM3.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	M_{3LTE}	RF A	2693

Single carrier: TM3.1a

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	M_{3LTE}	RF A	2693

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Results NR B14 SCS 15kHz

Single carrier: TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	B_{5NR}	RF B	4466
	M_{5NR}	RF A	4464
1.7	M_{5NR}	RF B	4465
	M_{5NR}	RF C	4465
	M_{5NR}	RF D	4465
1.8	M_{10NR}	RF D	9264
	T_{5NR}	RF B	4463

Single carrier: TM3.2

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	M_{5NR}	RF A	4480

Single carrier: TM3.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	M_{5NR}	RF A	4464

Single carrier: TM3.1a

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	M_{5NR}	RF A	4452

Carrier aggregation: TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	$CA2_{5+5NR}$	RF A	9404

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Results NR B29 SCS 15kHz

Single carrier: TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	B_{5NR}	RF B	4460
	M_{5NR}	RF A	4466
	M_{5NR}	RF B	4466
	M_{10NR}	RF A	9256
	T_{5NR}	RF A	4467

Single carrier: TM3.2

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	M_{5NR}	RF A	4476

Single carrier: TM3.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	M_{5NR}	RF A	4464

Single carrier: TM3.1a

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	M_{5NR}	RF A	4452

Results NB IoT SA B14

Single carrier: NB IoT: N-TM,

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	B_{NBIoT}	RF A	189
	M_{NBIoT}	RF A	189
1.9	T_{NBIoT}	RF A	189

Results NR B14 SCS 30kHz

Single carrier: TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]
	M_{10NR}	RF A	8635

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Results LTE with NB IoT IB B14

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

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [MHz]
	$B_{IB+5LTE}$	RF A	4489

Results LTE with NB IoT GB B14

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

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [MHz]
	$B_{GB+10LTE}$	RF A	9323

Results Multi RAT ESS NR and LTE B14 SCS 15kHz

ESS NR 50% and LTE 50% TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [MHz]
	ESS_{NR+LTE}	RF D	9248

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Diagram 1.1 LTE: TM1.1, B_{5LTE}, Port A:

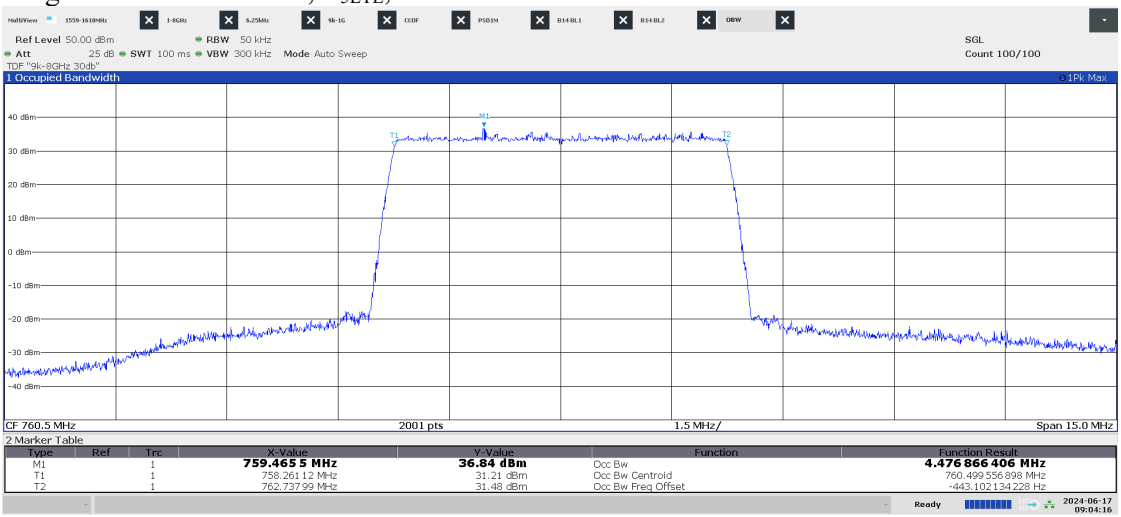

Diagram 1.2 LTE: TM1.1, M_{10LTE}, Port B:

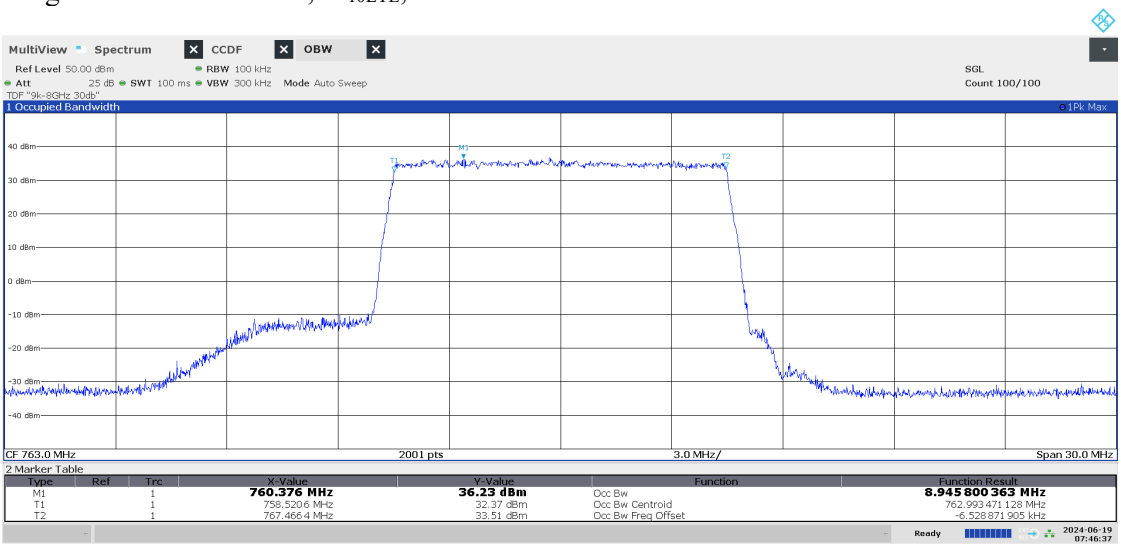

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Diagram 1.3 LTE: T3.2, B_{5LTE}, Port A:

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Diagram 1.4 LTE: TM3.1, B_{5LTE}, Port A:

07:24:15 AM 06/19/2024

Diagram 1.5 LTE: TM3.1a, B_{5LTE}, Port A:

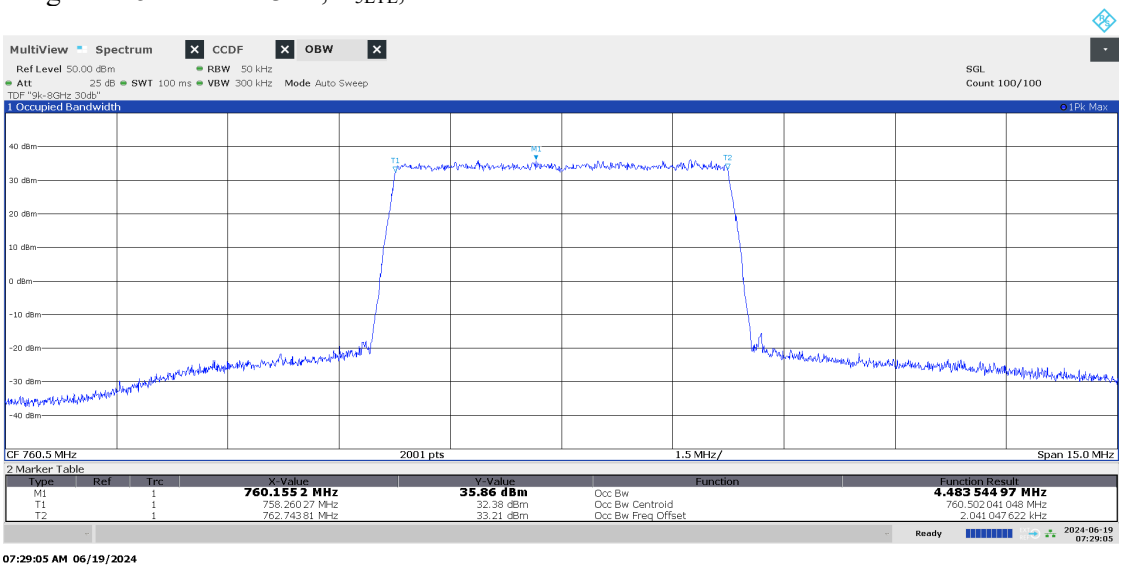

Diagram 1.6 LTE: TM1.1, $CA2_{5+5LTE}$, Port A:

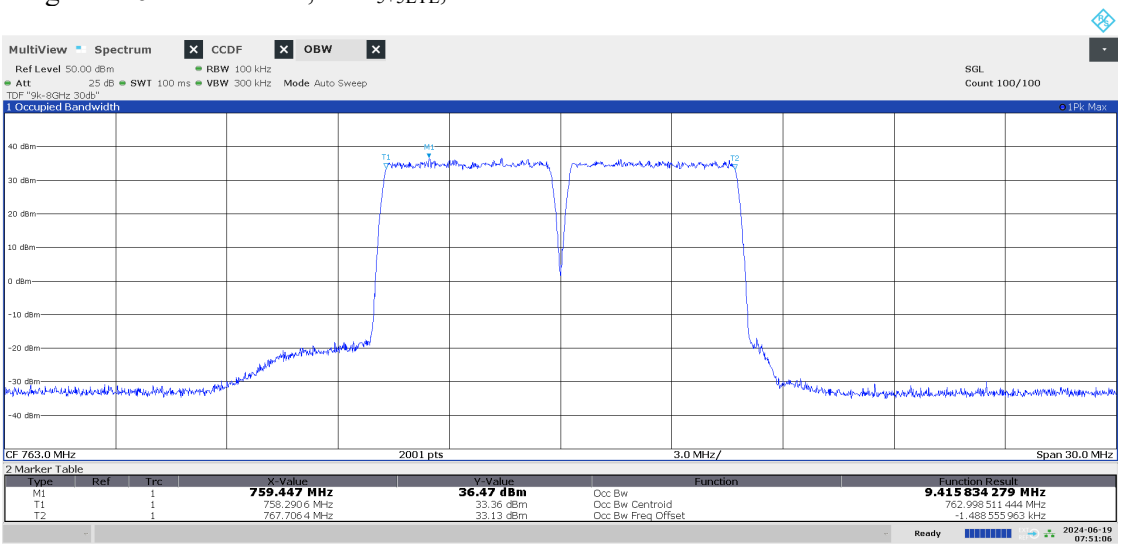

Diagram 1.7 NR: TM1.1, M_{5NR}, Port B:

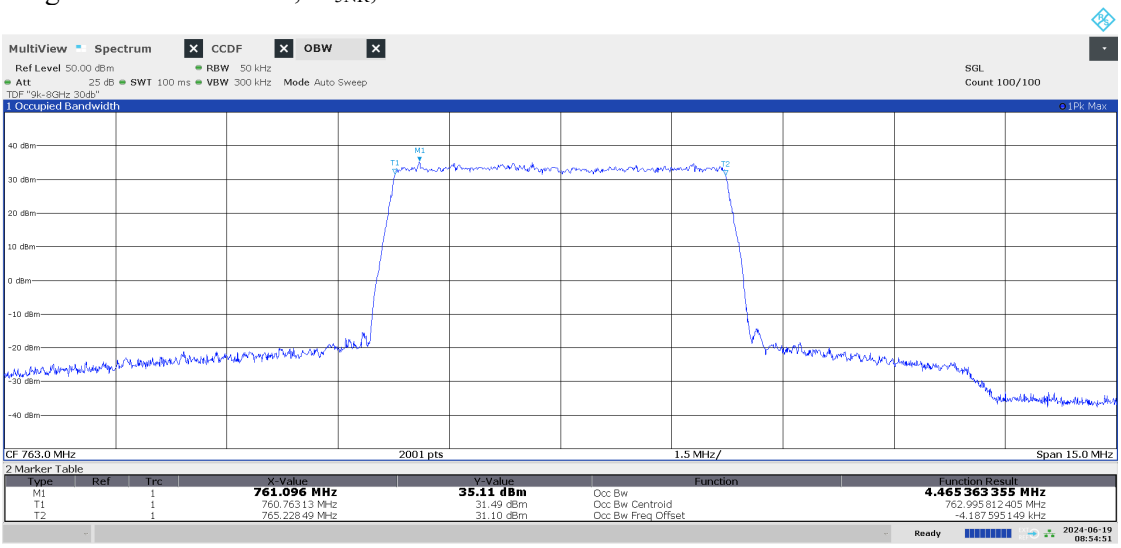

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Diagram 1.8 NR: TM1.1, M_{10NR}, Port D:

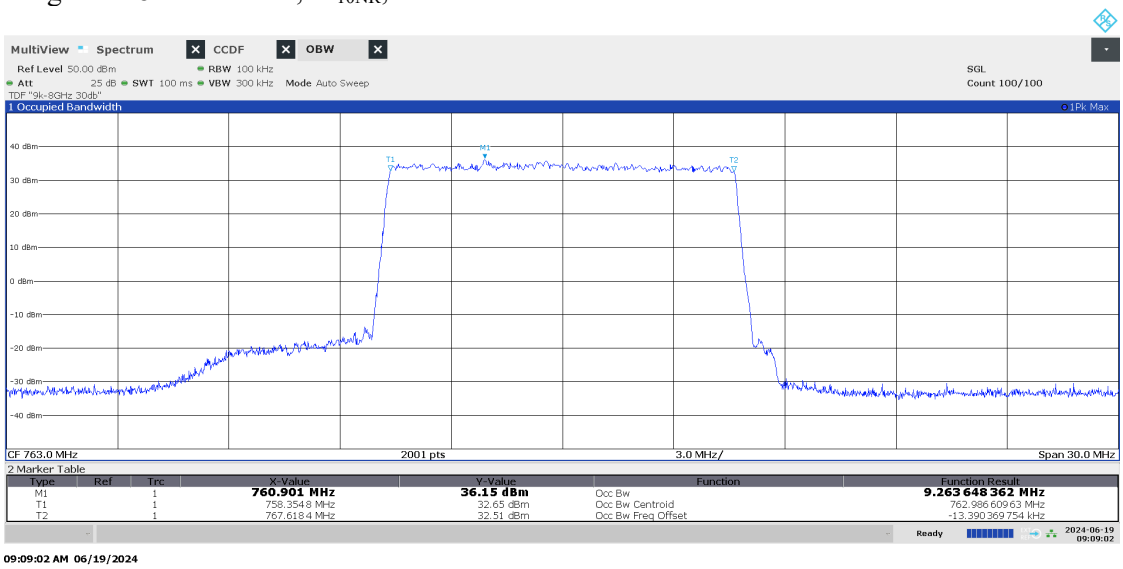
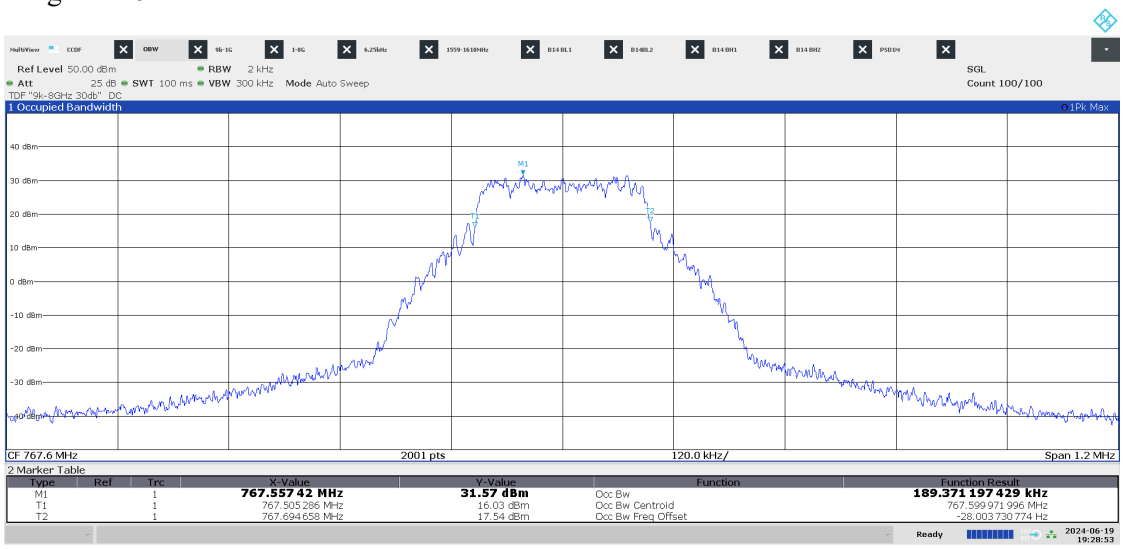


Diagram 1.9: T NB IoT SA: N-TM Port A



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Band edge measurements according to CFR 47 §27.53 and §90.543/ RSS-130 4.7 and RSS-140 4.4

Date	Temperature	Humidity
2024-05-16	23 °C ± 3 °C	23 % ± 5 %
2024-05-20	23 °C ± 3 °C	35 % ± 5 %
2024-05-31	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, 5.7.2 and 5.7.3. The test object was connected to a spectrum analyzer with the RMS detector activated.

The transmitter unwanted emissions shall be measured with a resolution bandwidth of at least 100 kHz. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

An offset of 6 dB has been used for Band 14 and 3 dB for Band 29 to cover 4x4/ 2x2 MIMO according to ANSI C63.26 6.4.4.1 c “measure and add 10 $\log_{10}$ (N_{ANT})”.

Measurement equipment	RISE number
R&S FSW 43	902 073
RF attenuator	900 292
Coaxial cable Sucoflex 102EA	BX50236
Coaxial cable Sucoflex 102EA	BX50237
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 2.6 dB

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Results LTE B14

Single carrier LTE: TM1.1

Diagram	Symbolic name	Tested Port
2.1 a-b	B_{5LTE}	RF A
2.2 a-d	M_{10LTE}	RF A
2.3 a-b	T_{5LTE}	RF A

Results LTE B29

Single carrier TM1.1

Diagram	Symbolic name	Tested Port
2.4 a-b	B_{3LTE}	RF A
2.5 a-b	B_{5LTE}	RF A
2.6 a-d	B_{10LTE}, T_{10LTE}	RF A
2.7 a-b	T_{5LTE}	RF A
2.8 a-b	T_{3LTE}	RF A

Results NR B14 SCS 15kHz

Single carrier NR: TM1.1

Diagram	Symbolic name	Tested Port
2.9 a-b	B_{5NR}	RF A
2.10 a-c	M_{10NR}	RF A
2.11 a-b	T_{5NR}	RF A

Results NR B29 SCS 15kHz

Single carrier NR:TM1.1

Diagram	Symbolic name	Tested Port
2.12 a-b	B_{5NR}	RF A
2.13 a-d	B_{10NR}, T_{10NR}	RF A
2.14 a-b	T_{5NR}	RF A

Results LTE with NB IoT GB B14

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

Diagram	Symbolic name	Tested Port
2.15 a-b	$B_{GB+10LTE}$	RF A
2.16 a-b	$T_{GB+10LTE}$	RF A

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Results LTE with NB IoT IB B14

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

Diagram	Symbolic name	Tested Port
2.17 a-d	$T_{IB+5LTE}$	RF A
2.18 a-d	$B_{IB+5LTE}$	RF A

Results NB IOT SA B14

Single carrier NB IoT: N-TM

Diagram	Symbolic name	Tested Port
2.19 a-b	$B_{NB\ IoT\ SA}$	RF A
2.20 a-b	$T_{NB\ IoT\ SA}$	RF A

Results NR B14 SCS 30kHz

Single carrier NR: TM1.1

Diagram	Symbolic name	Tested Port
2.21 a-b	M_{10NR}	RF A

Results Multi RAT ESS NR and LTE B14 SCS 15kHz

ESS NR 50% and LTE 50% TM1.1

Diagram	Symbolic name	Tested Port
2.22 a-c	ESS_{NR+LTE}	RF A

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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 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.

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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

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Diagram 2.1a LTE: TM1.1, B_{5LTE}, Port A:

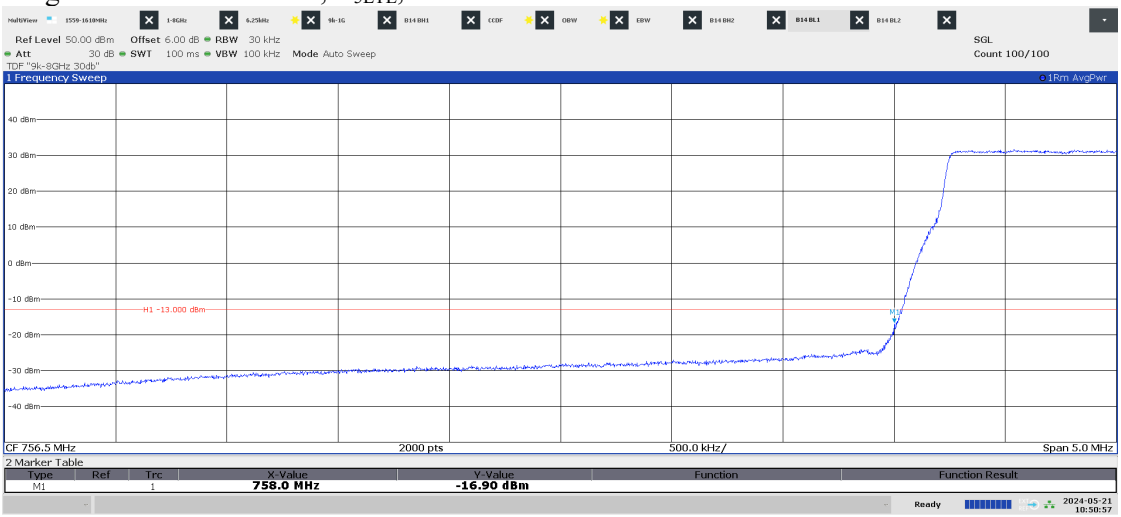

Diagram 2.1b LTE: TM1.1, B_{5LTE}, Port A:

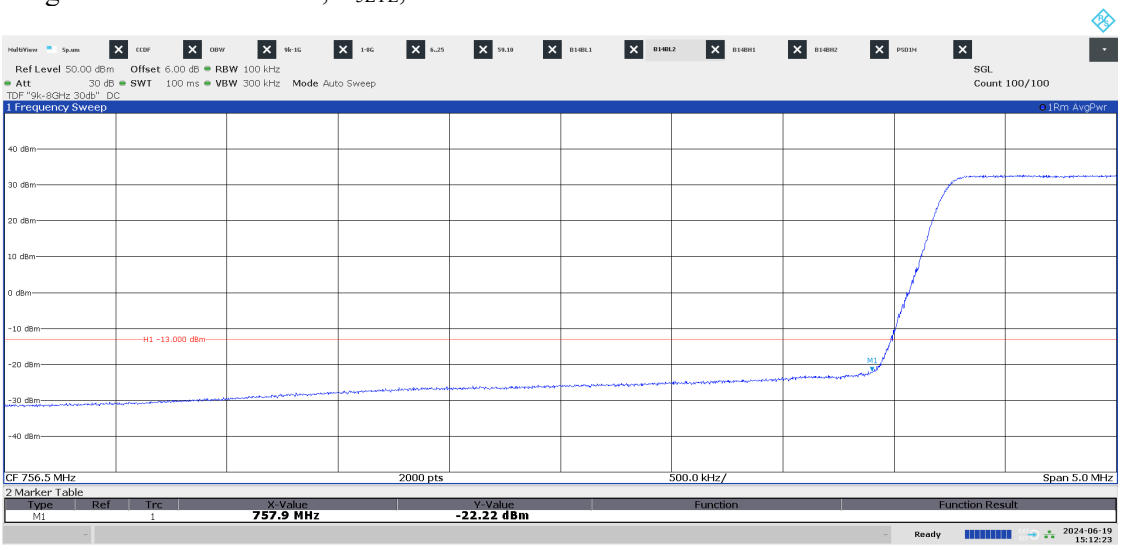

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Diagram 2.2a LTE: TM1.1, M_{10LTE}, Port A:

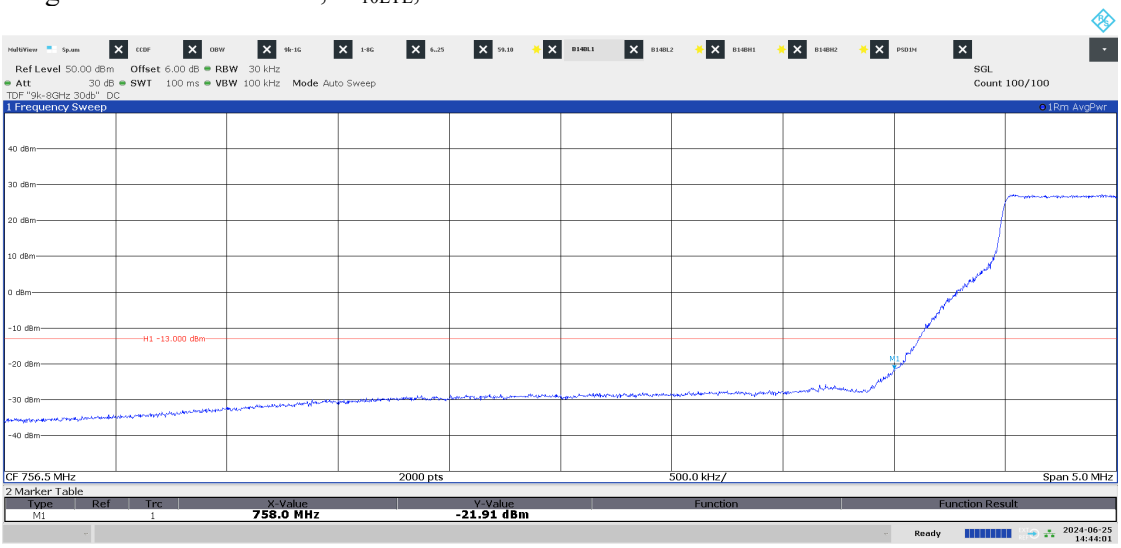

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Diagram 2.2b LTE: TM1.1, M_{10LTE}, Port A:

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Diagram 2.2a LTE: TM1.1, M_{10LTE}, Port A:

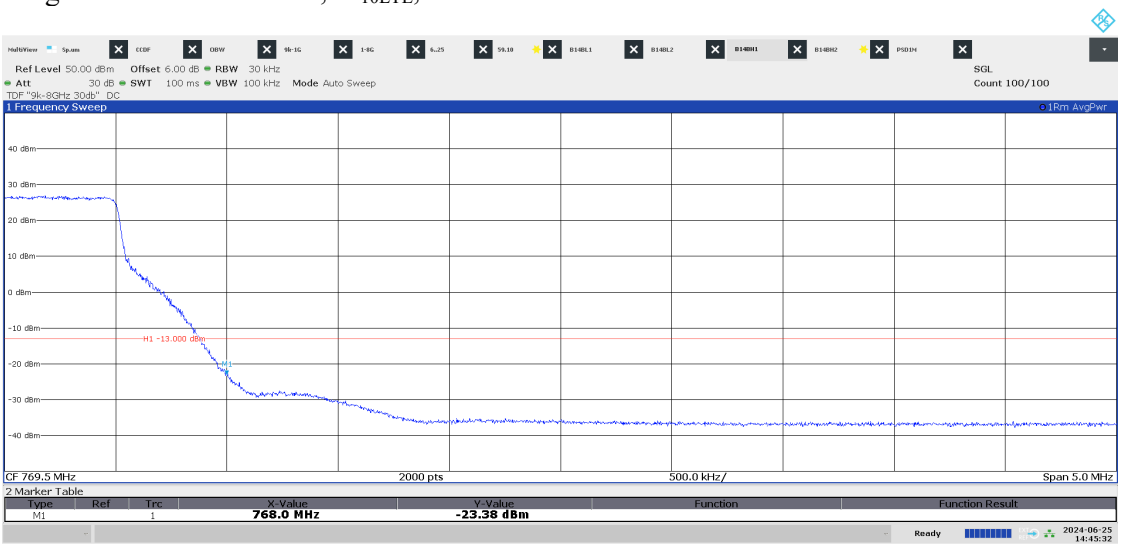

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Diagram 2.2b LTE: TM1.1, M_{10LTE}, Port A:

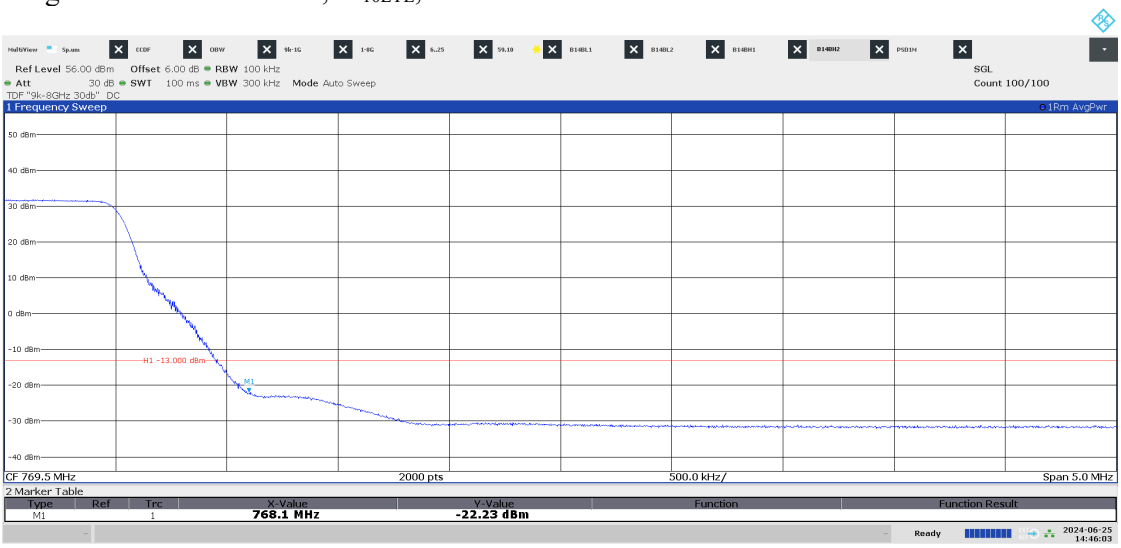

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Diagram 2.3a LTE: TM1.1, T_{5LTE}, Port A:

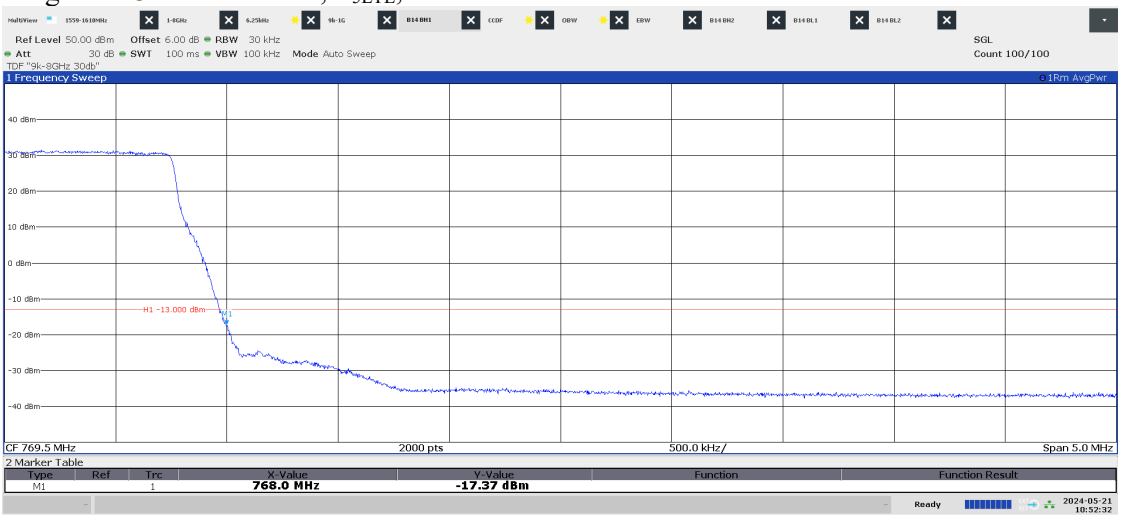

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Diagram 2.3 LTE: TM1.1, T_{5LTE}, Port A:

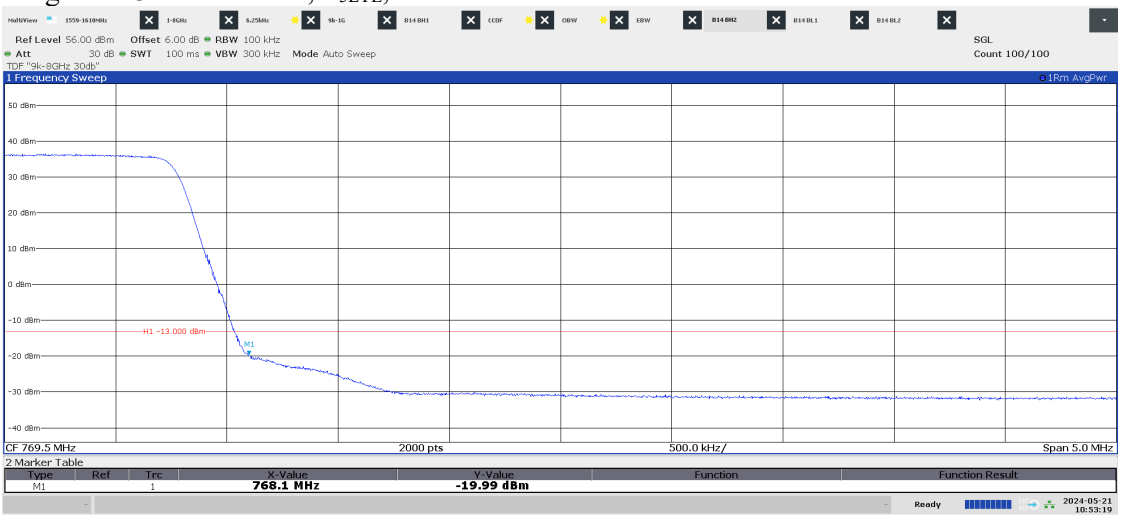

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Diagram 2.4a LTE: TM1.1, B_{3LTE}, Port A:

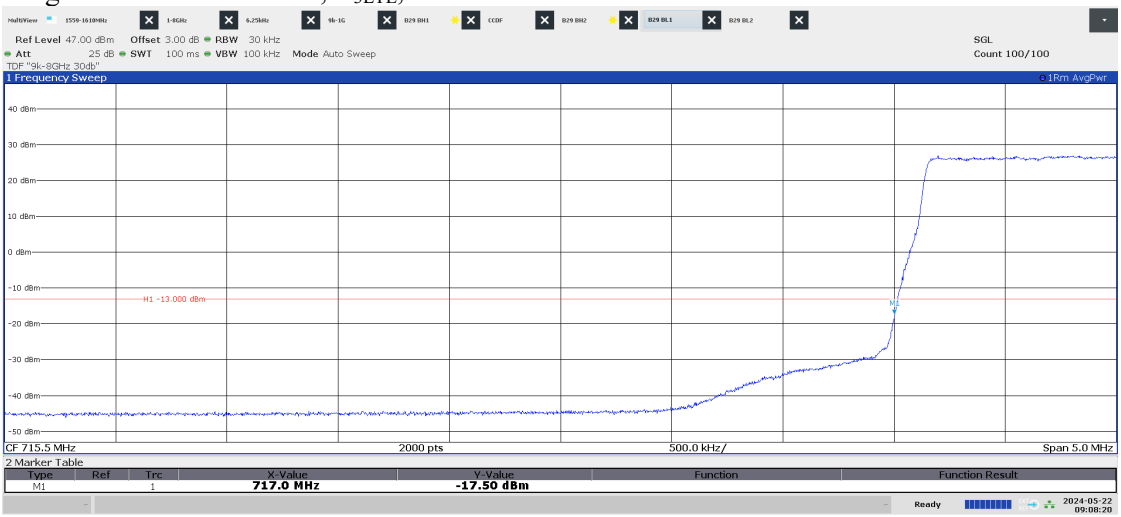

Diagram 2.4b LTE: TM1.1, B_{3LTE}, Port A:

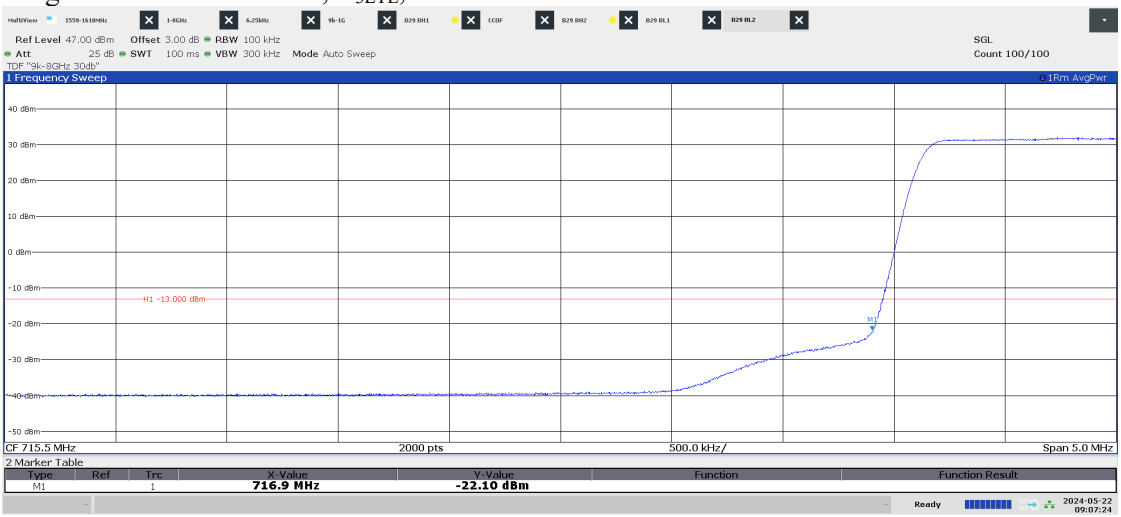

Diagram 2.5a LTE: TM1.1, B_{5LTE}, Port A:

Diagram 2.5a LTE: TM1.1, B_{5LTE}, Port A:

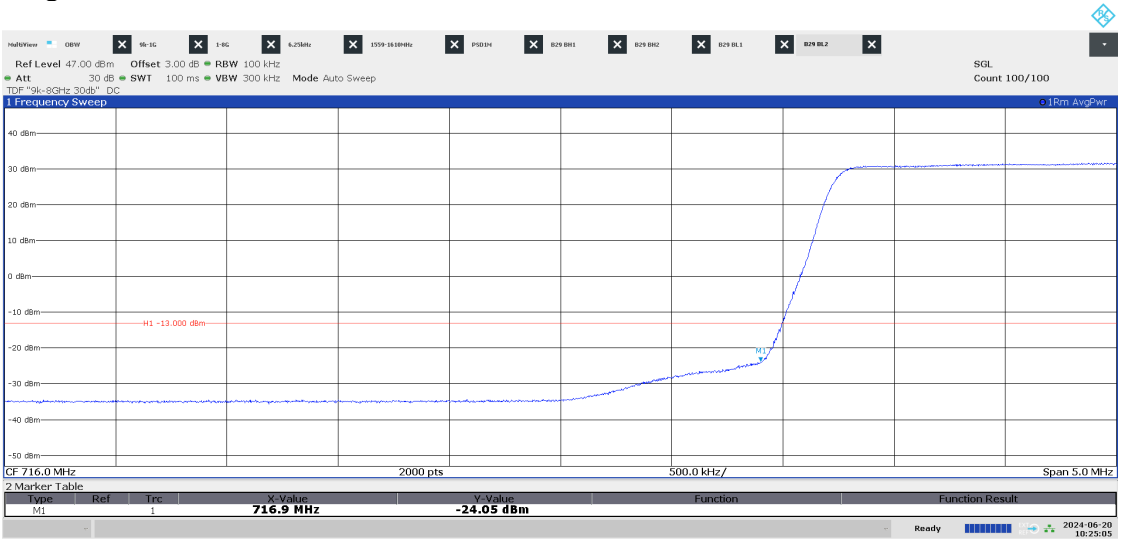

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Diagram 2.6a LTE: TM1.1, B_{10LTE}, Port A:

10:28:39 AM 06/20/2024

Diagram 2.6b LTE: TM1.1, B_{10LTE}, Port A:

10:28:01 AM 06/20/2024

Diagram 2.6c LTE: TM1.1, T_{10LTE}, Port A:

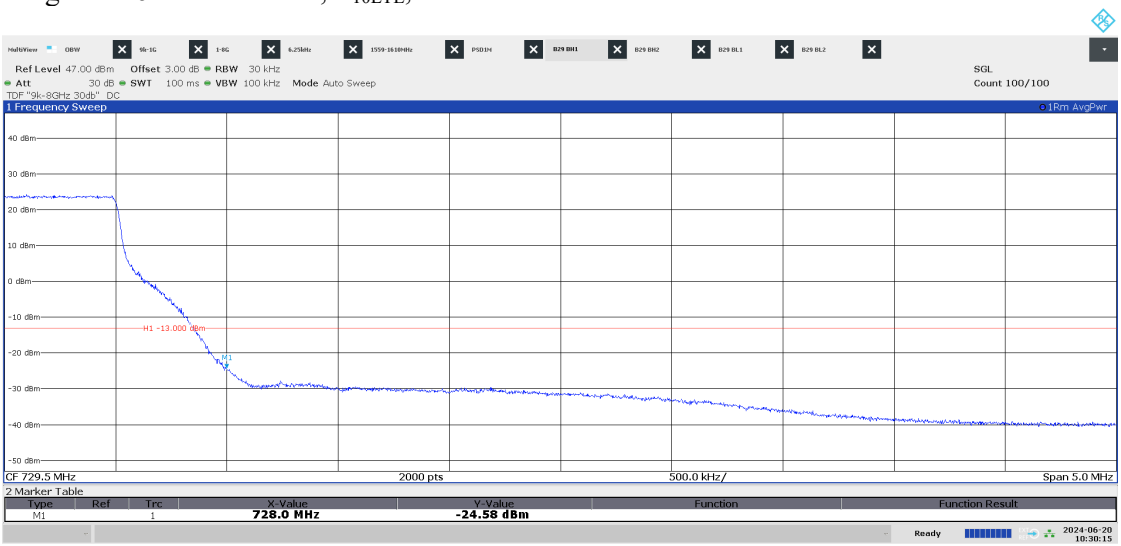

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Diagram 2.6d LTE: TM1.1, T_{10LTE}, Port A:

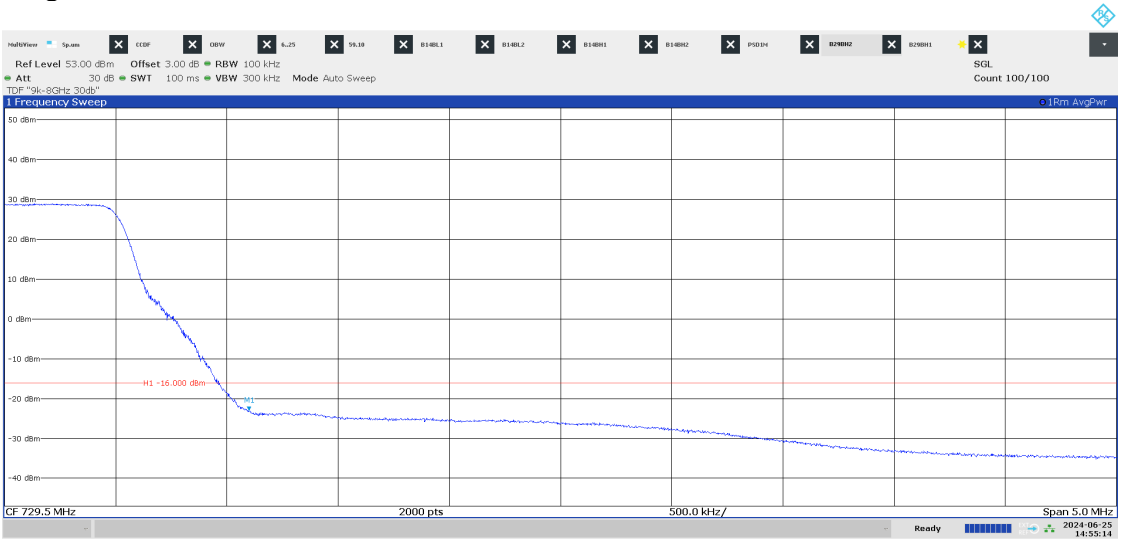

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Diagram 2.7a LTE: TM1.1, T_{5LTE}, Port A:

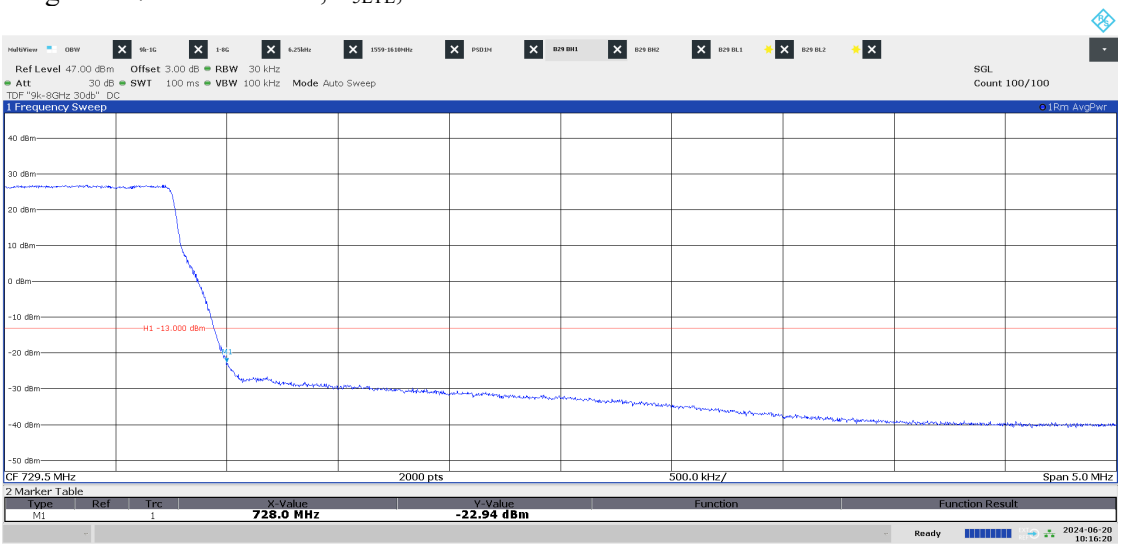

Diagram 2.7b LTE: TM1.1, T_{5LTE}, Port A:

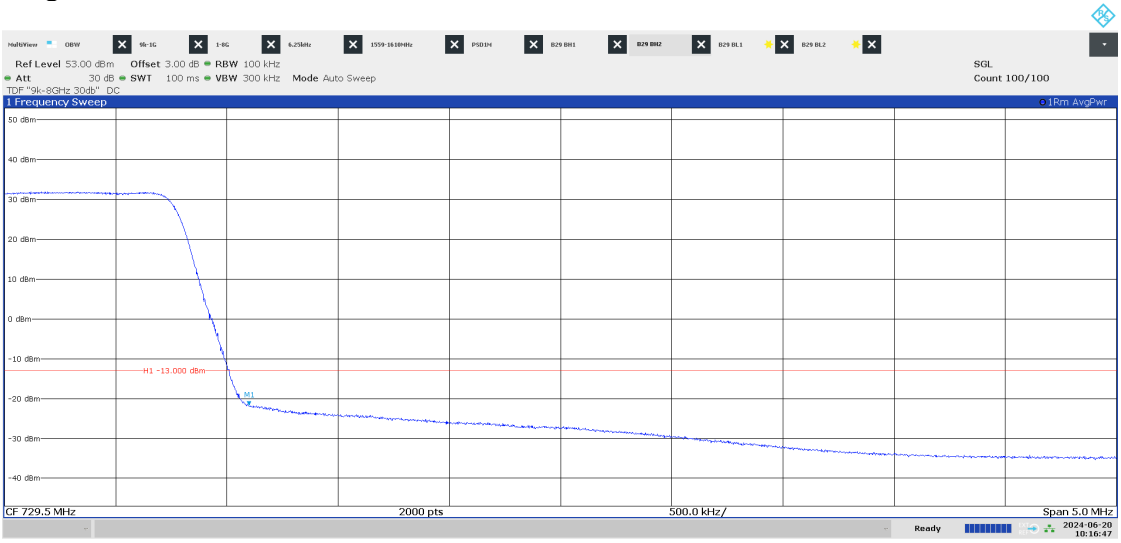

Diagram 2.8a LTE: TM1.1, T_{3LTE}, Port A:

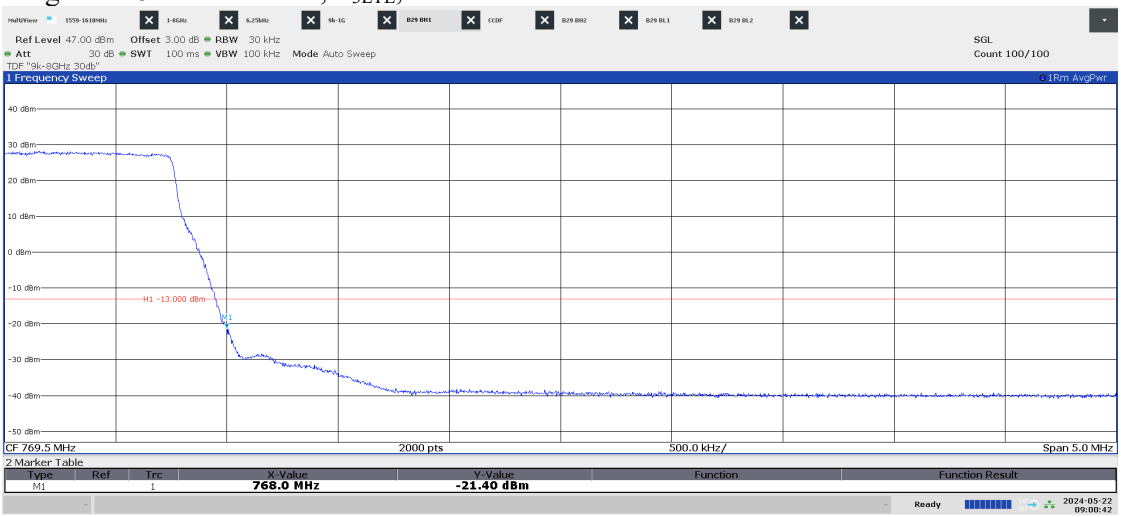

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Diagram 2.8b LTE: TM1.1, T_{3LTE}, Port A:

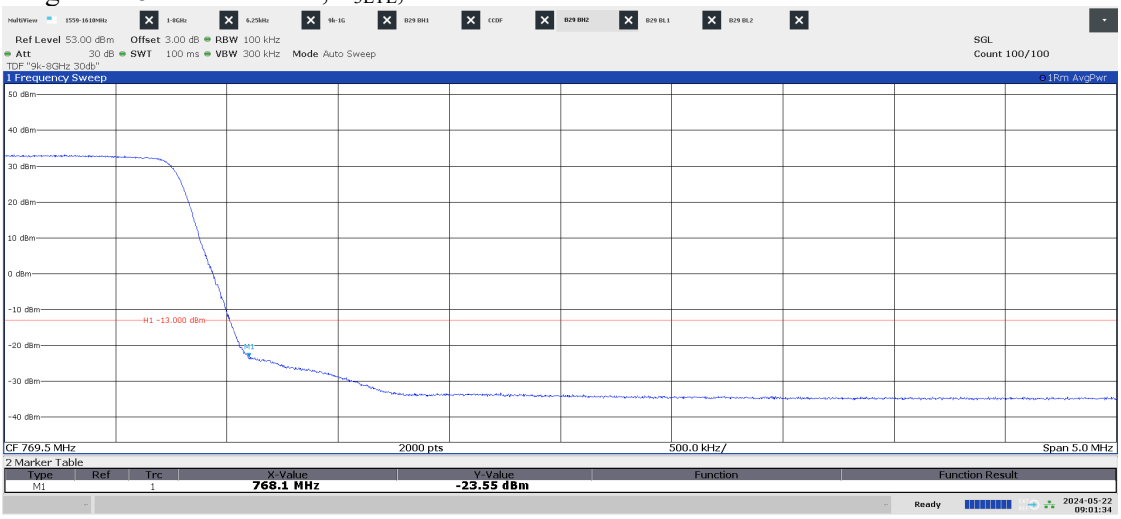

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Diagram 2.9a NR: TM1.1, B_{5NR}, Port A:

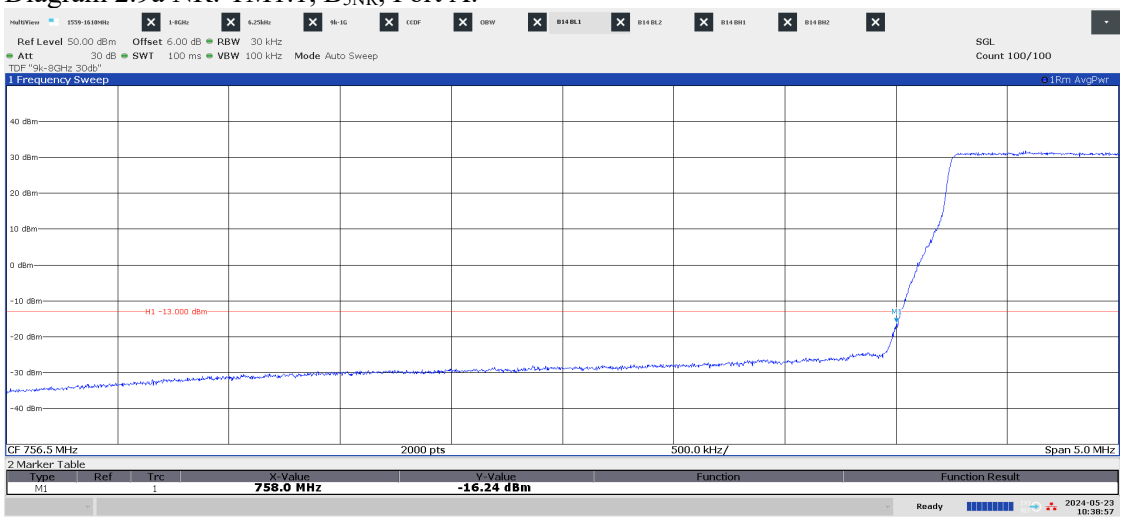

Diagram 2.9b NR: TM1.1, B_{5NR}, Port A:

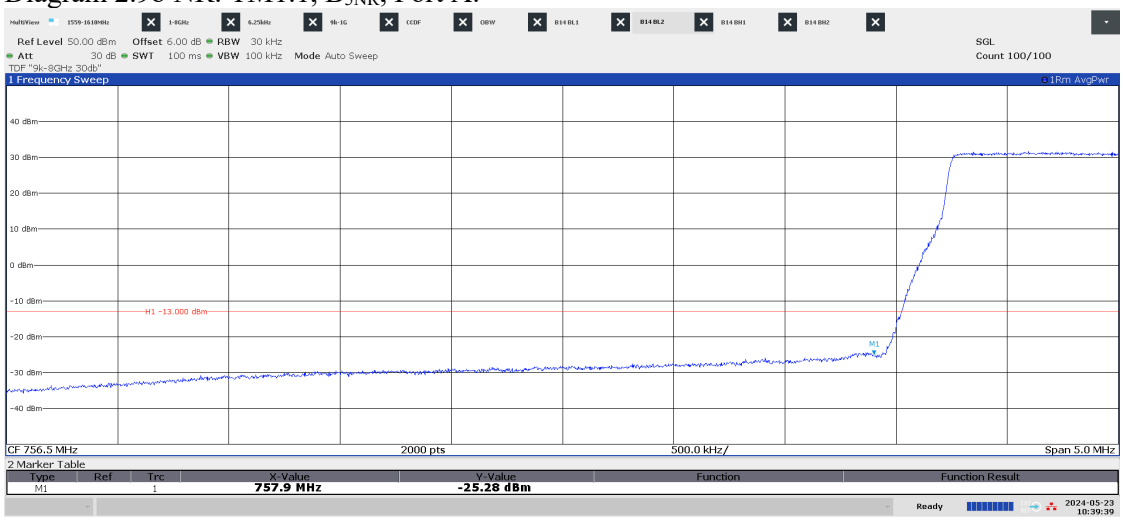

Diagram 2.10a NR: TM1.1, M_{10NR}, Port A:

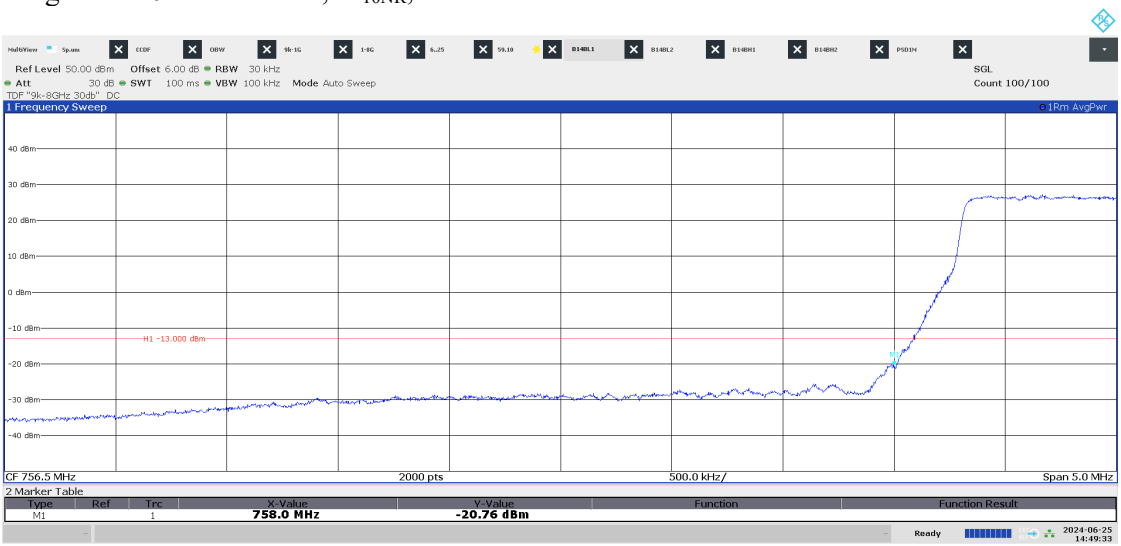

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Diagram 2.10b NR: TM1.1, M_{10NR}, Port A:

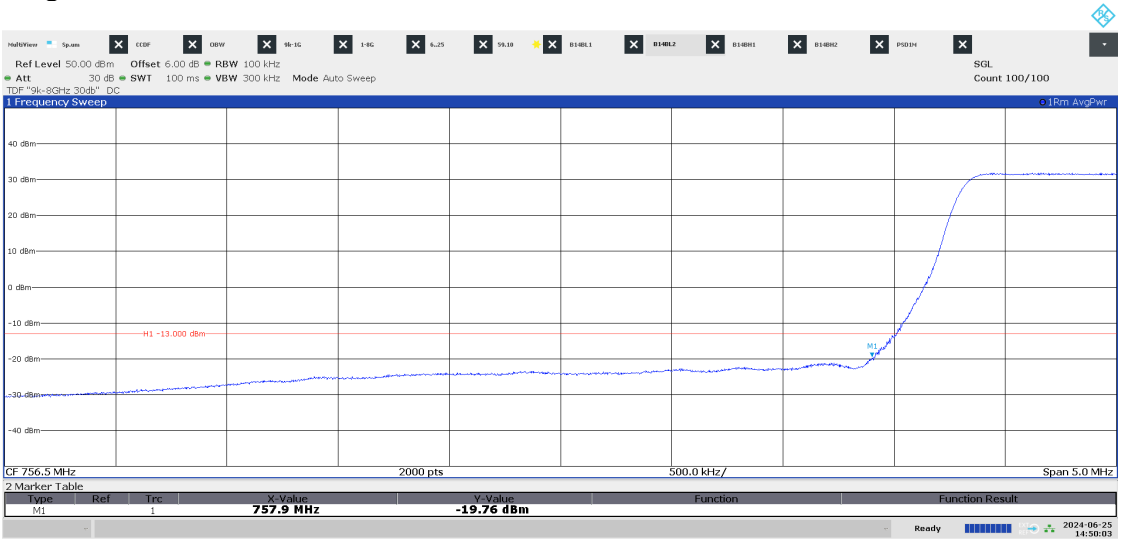

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Diagram 2.10c NR: TM1.1, M_{10NR}, Port A:

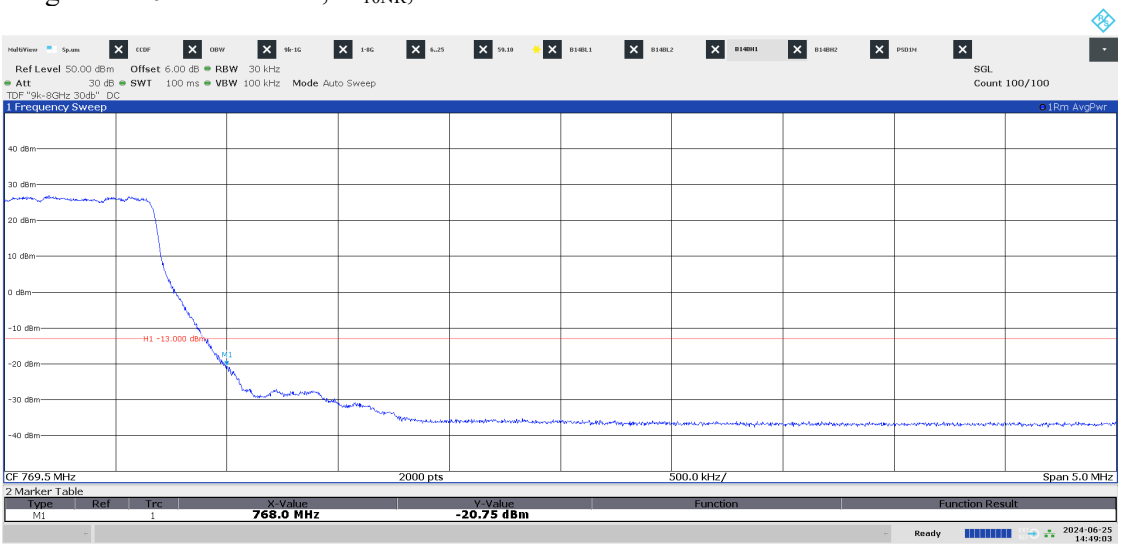

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Diagram 2.10d NR: TM1.1, M_{10NR}, Port A:

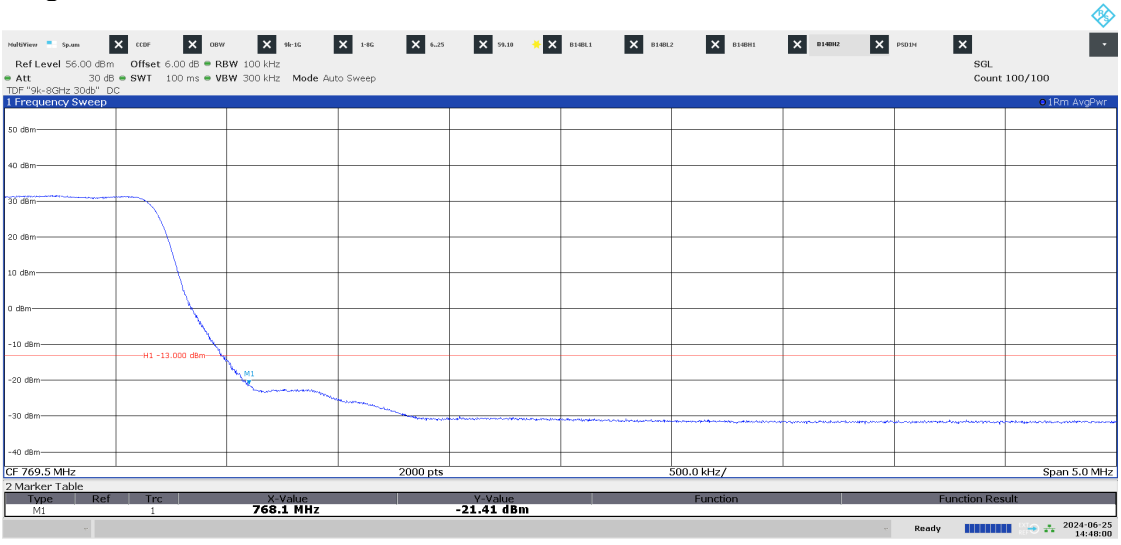

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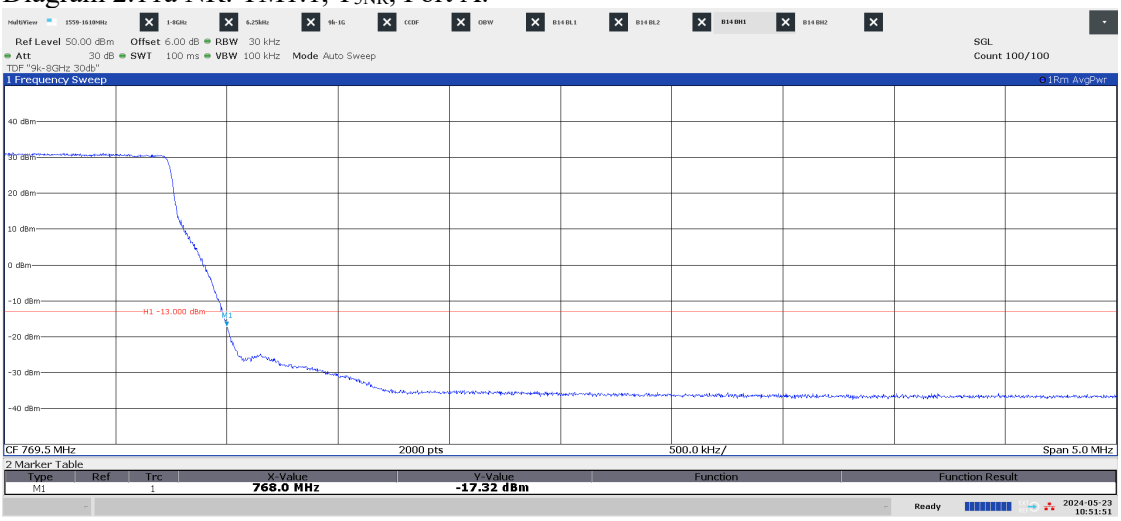
Diagram 2.11a NR: TM1.1, T_{5NR}, Port A:



10:51:51 AM 05/23/2024

Diagram 2.11b NR: TM1.1, T_{5NR}, Port A:

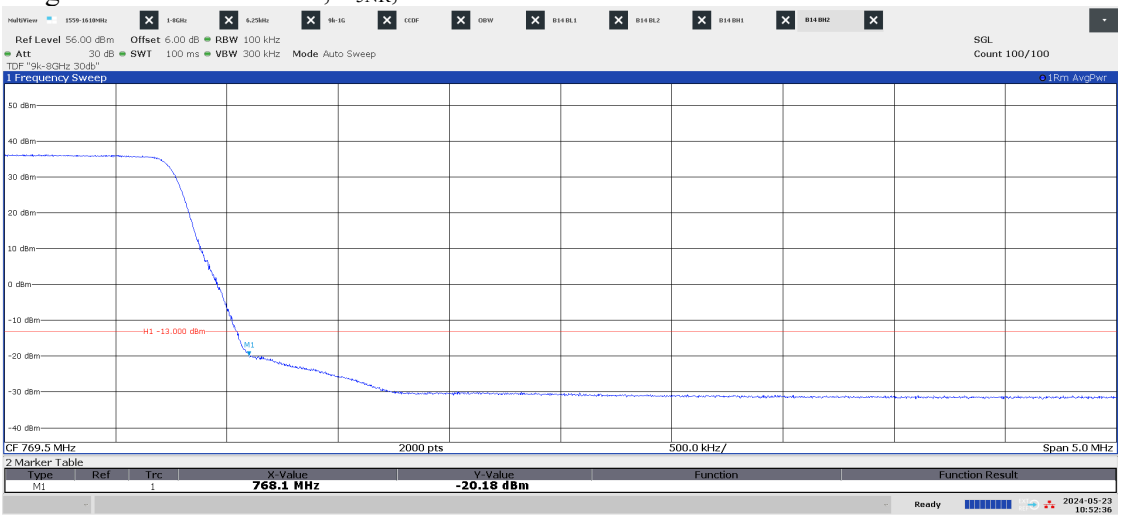


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Diagram 2.12a NR: TM1.1, B_{5NR}, Port A:

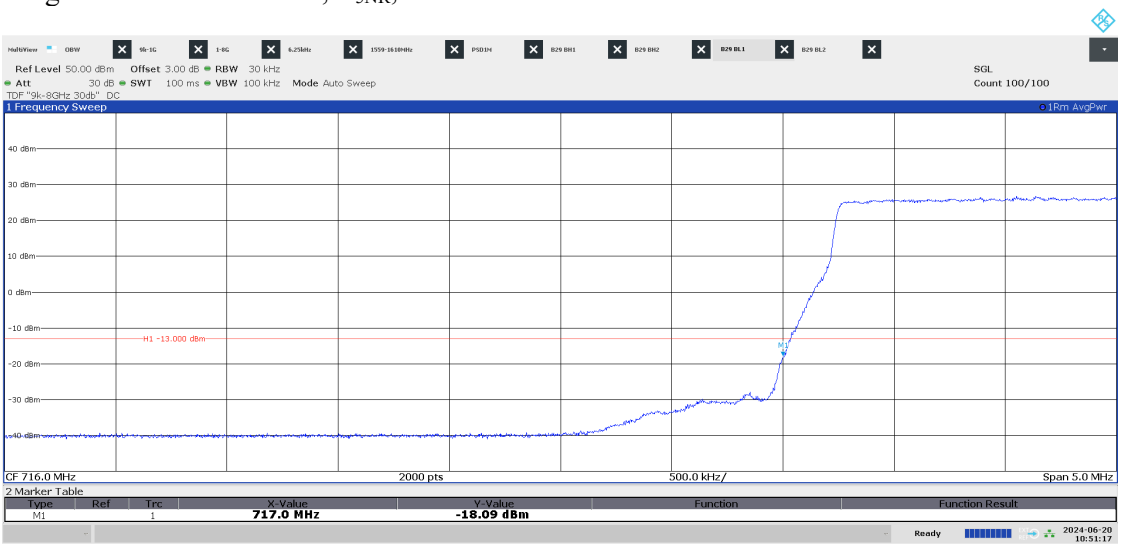

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Diagram 2.12b NR: TM1.1, B_{5NR}, Port A:

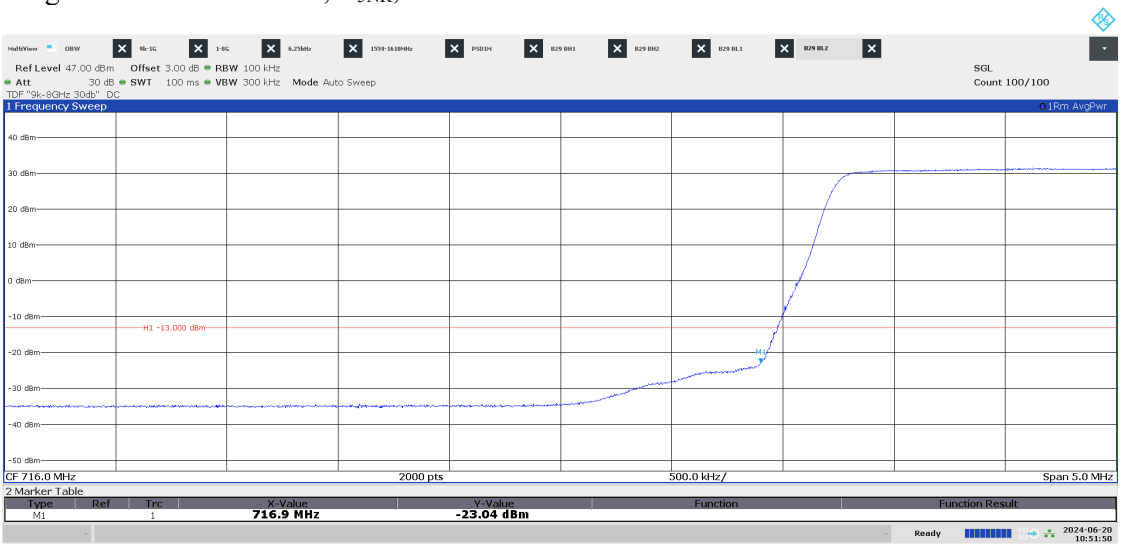

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Diagram 2.13a NR: TM1.1, B_{10NR}, Port A:

Diagram 2.13b NR: TM1.1, B_{10NR}, Port A:

Diagram 2.13c NR: TM1.1, T_{10NR}, Port A:

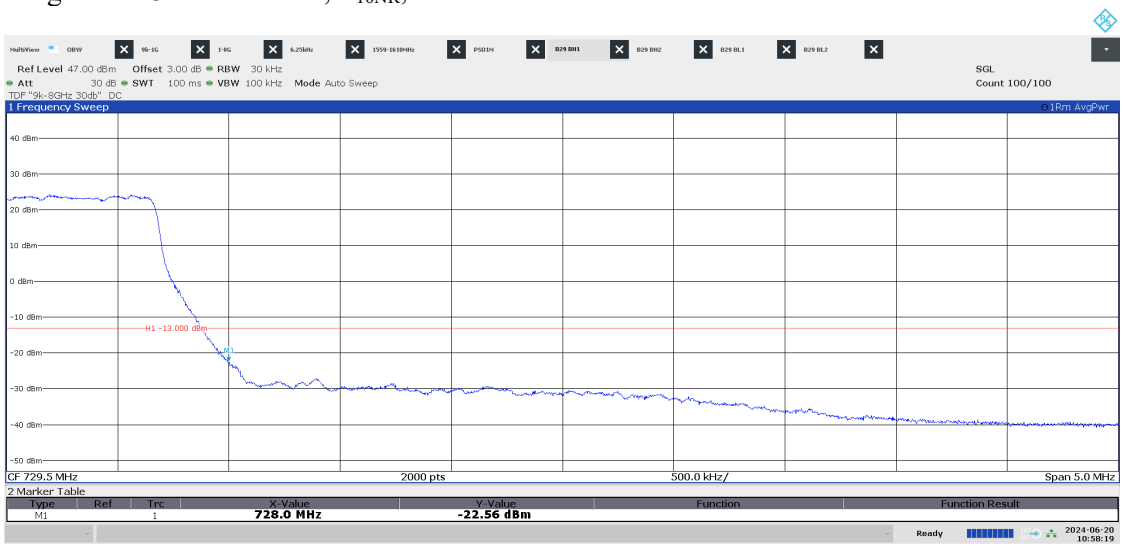

Diagram 2.13d NR: TM1.1, T_{10NR}, Port A:

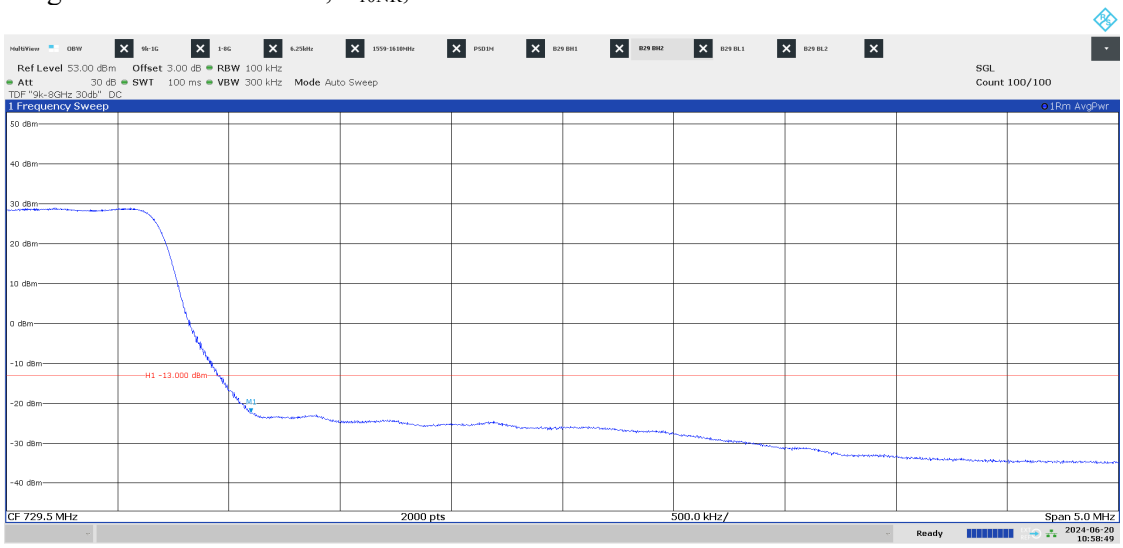

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Diagram 2.14a NR: TM1.1, T_{5NR}, Port A:

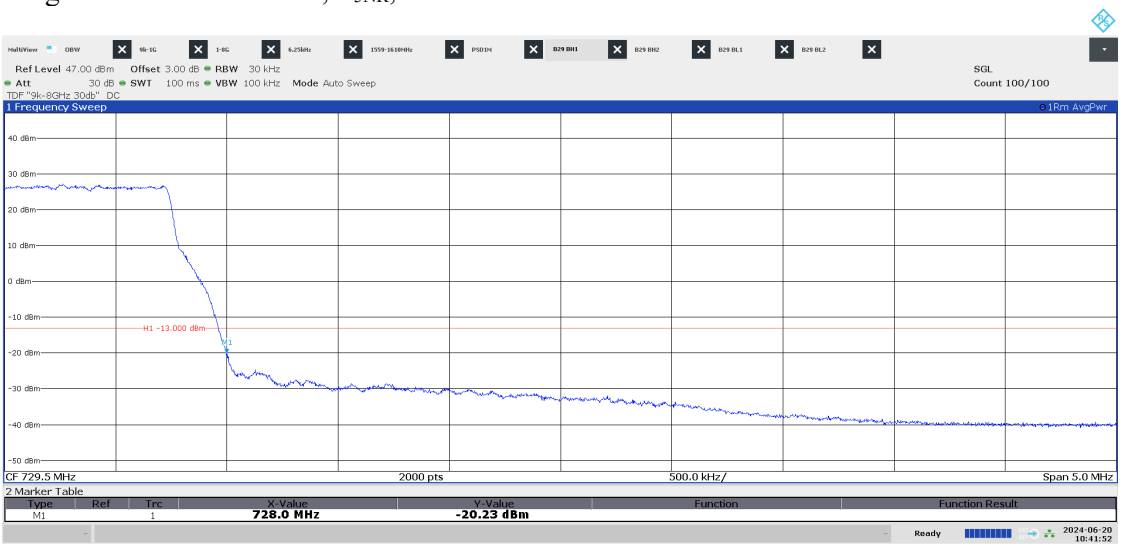

Diagram 2.14b NR: TM1.1, T_{5NR}, Port A:

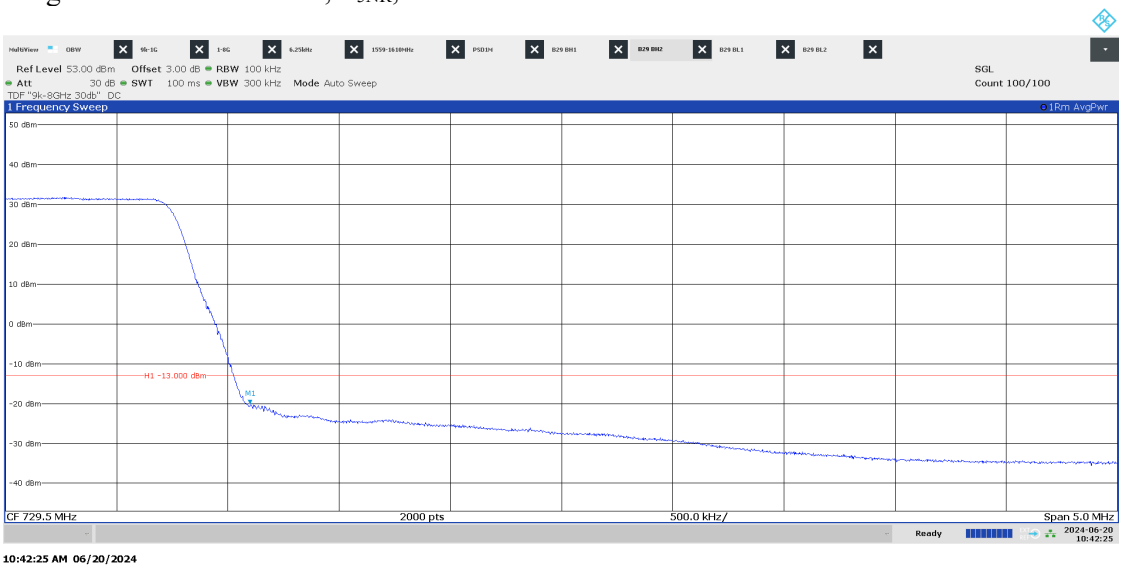

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Diagram 2.15a NB IoT: N-TM, LTE: TM1.1, $B_{GB+10LTE}$, Port A:

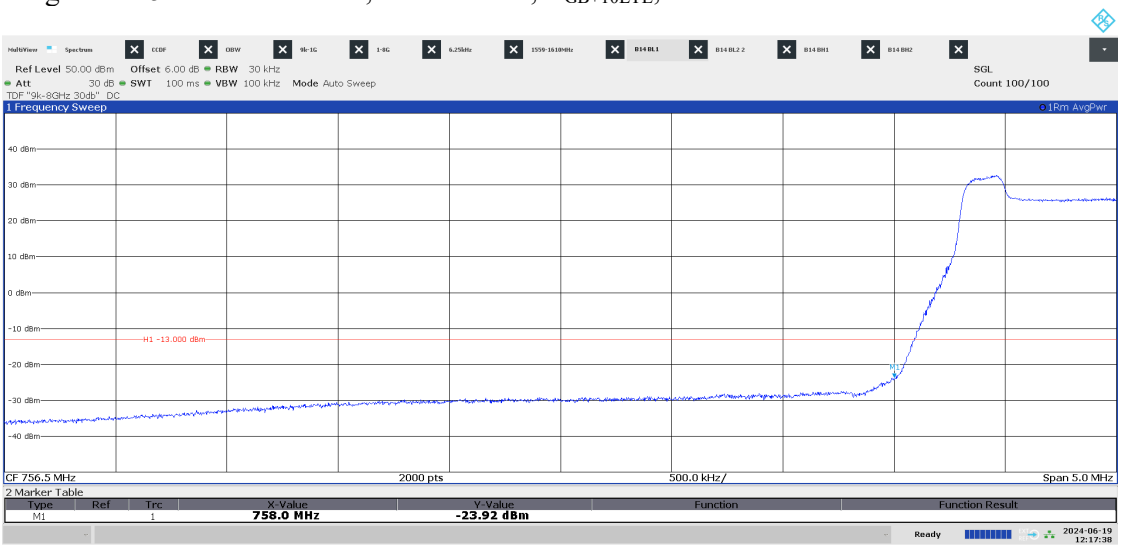

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Diagram 2.15b NB IoT: N-TM, LTE: TM1.1, $B_{GB+10LTE}$, Port A:

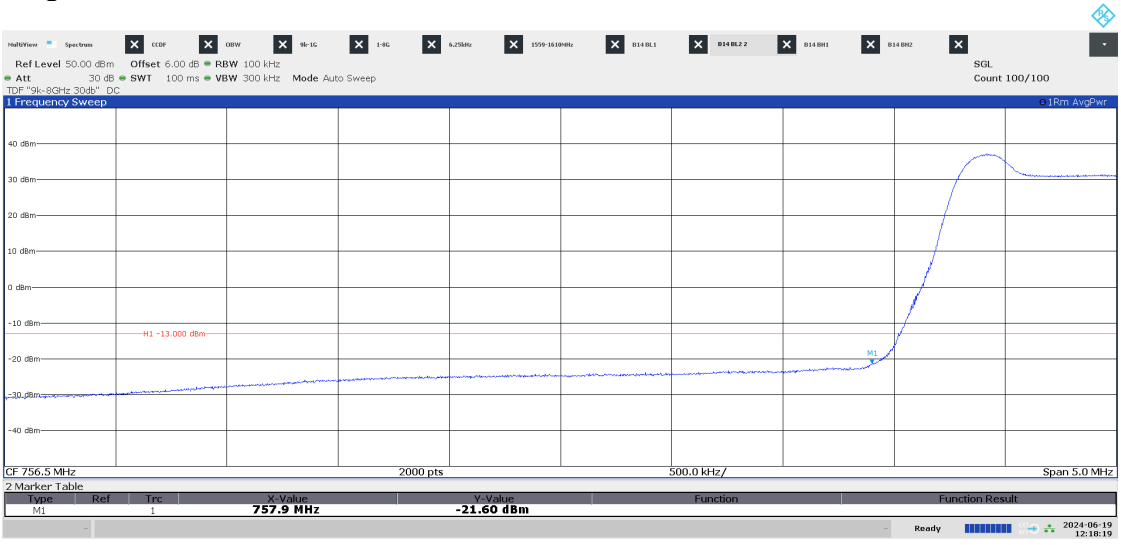

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Diagram 2.16a LTE: NB IoT: N-TM, LTE: TM1.1, $T_{GB+10LTE}$, Port A:

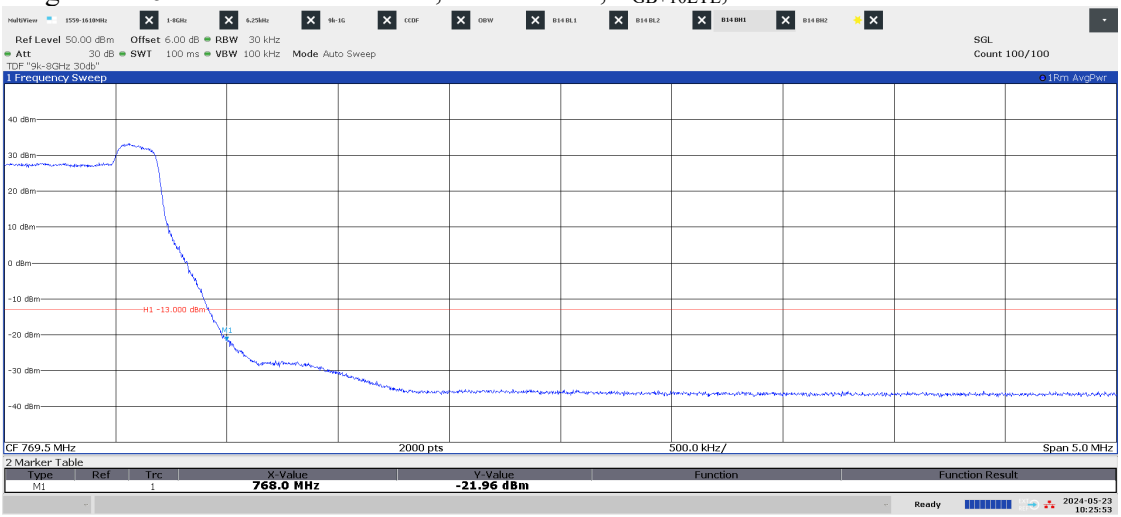

Diagram 2.16b LTE: NB IoT: N-TM, LTE: TM1.1, $T_{GB+10LTE}$, Port A:

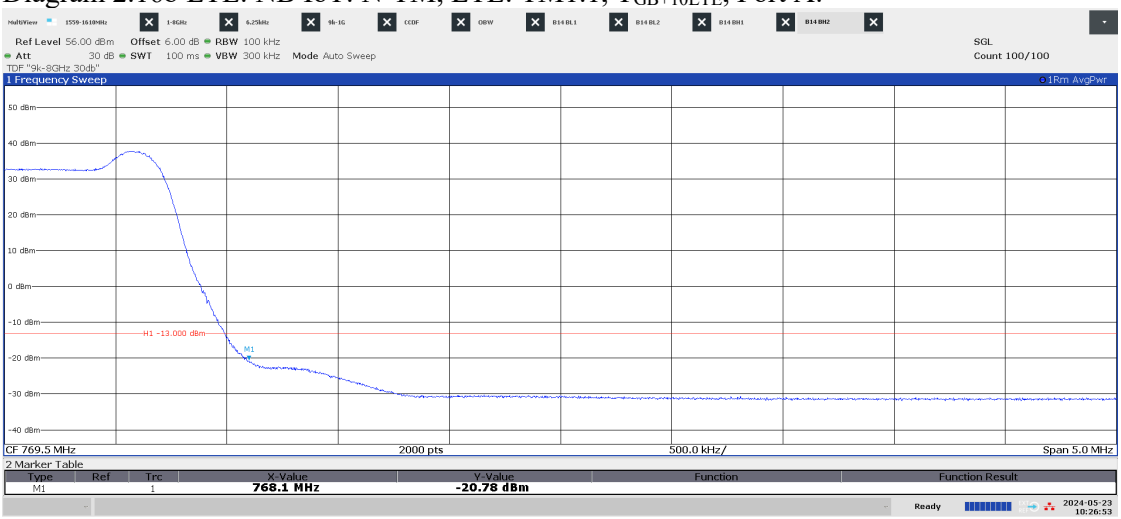

Diagram 2.17a LTE: NB IoT: N-TM, LTE: TM1.1, $T_{IB\ M5LTE}$, Port A:

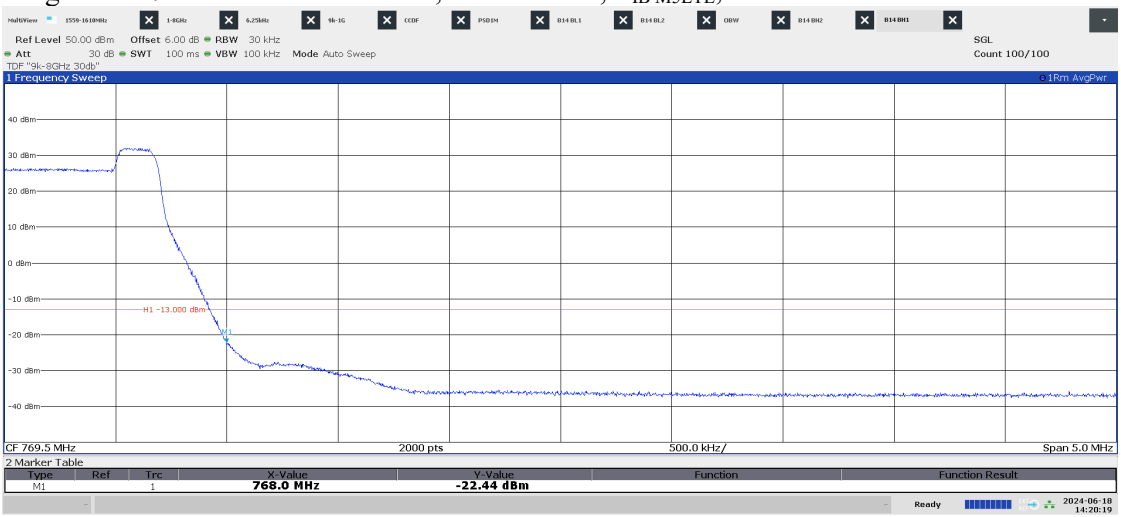

Diagram 2.17b LTE: NB IoT: N-TM, LTE: TM1.1, $T_{IB+M5LTE}$, Port A:

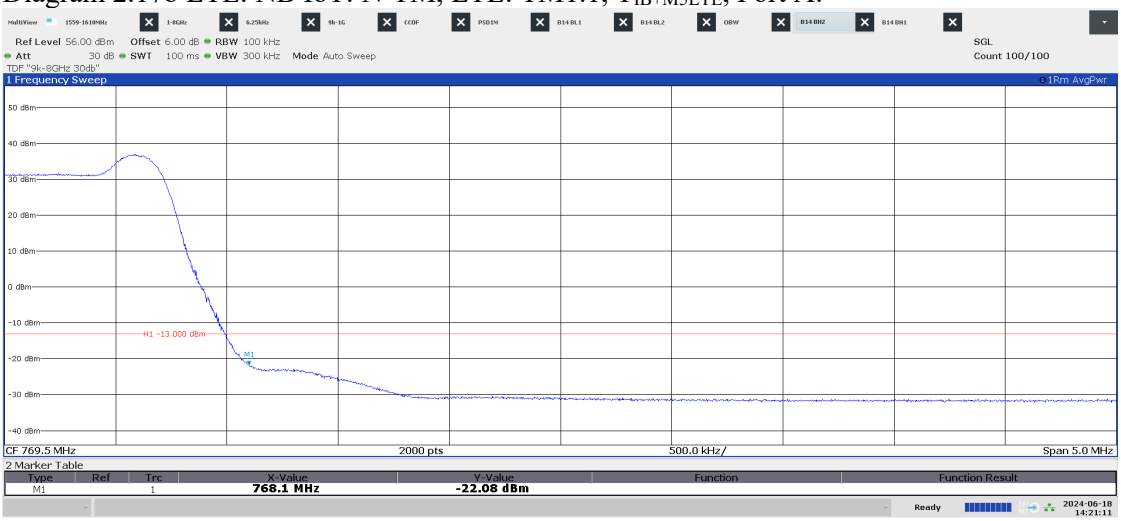

Diagram 2.18a LTE: NB IoT: N-TM, LTE: TM1.1, $B_{IB\ M5LTE}$, Port A:

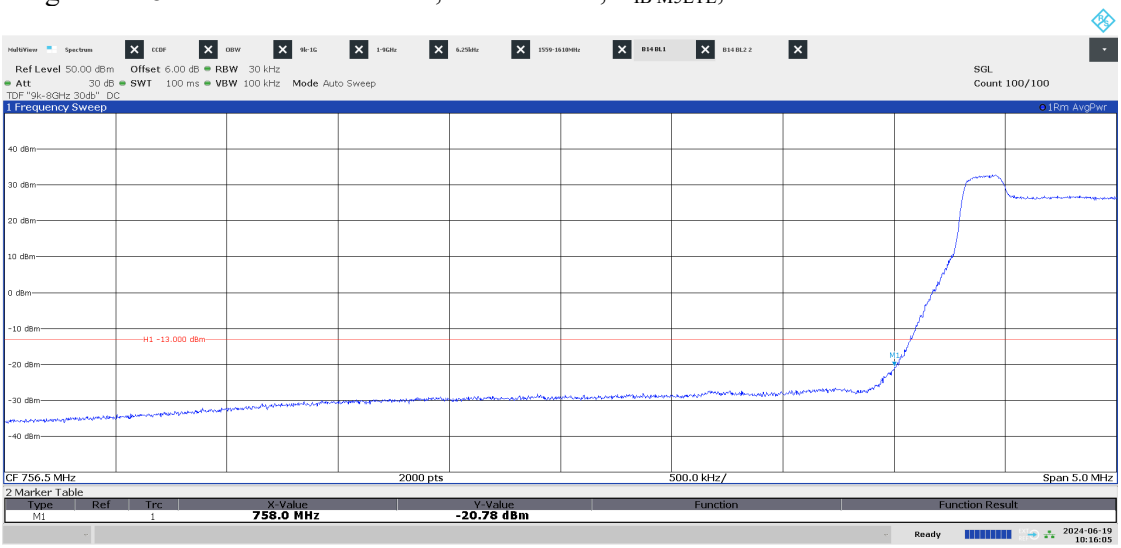

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Diagram 2.18b LTE: NB IoT: N-TM, LTE: TM1.1, $B_{IB+M5LTE}$, Port A:

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Diagram 2.19a B NB IoT SA: N-TM, Port A:

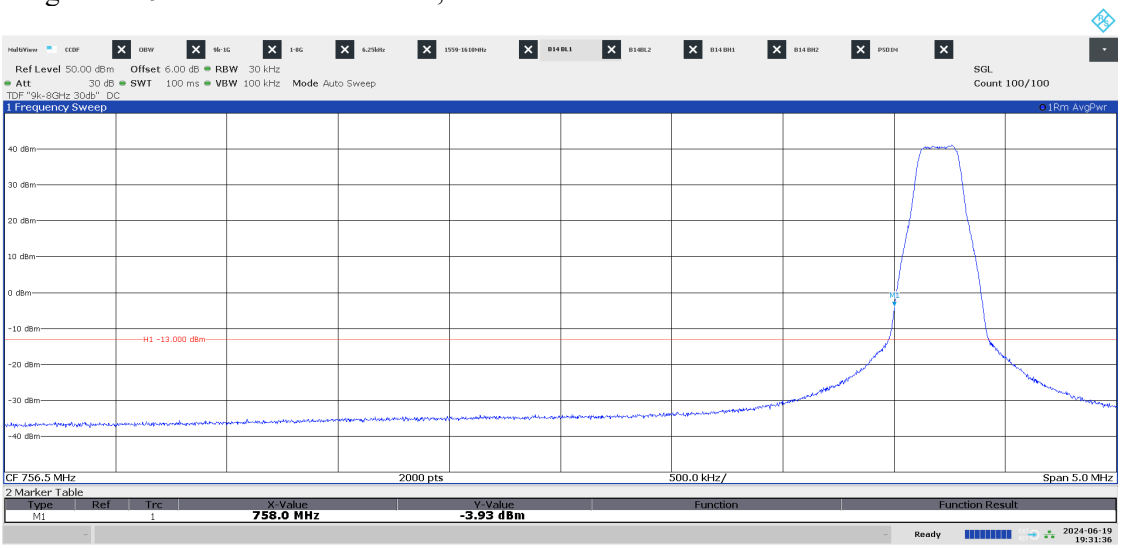

Diagram 2.19b B NB IoT SA : N-TM, Port A:

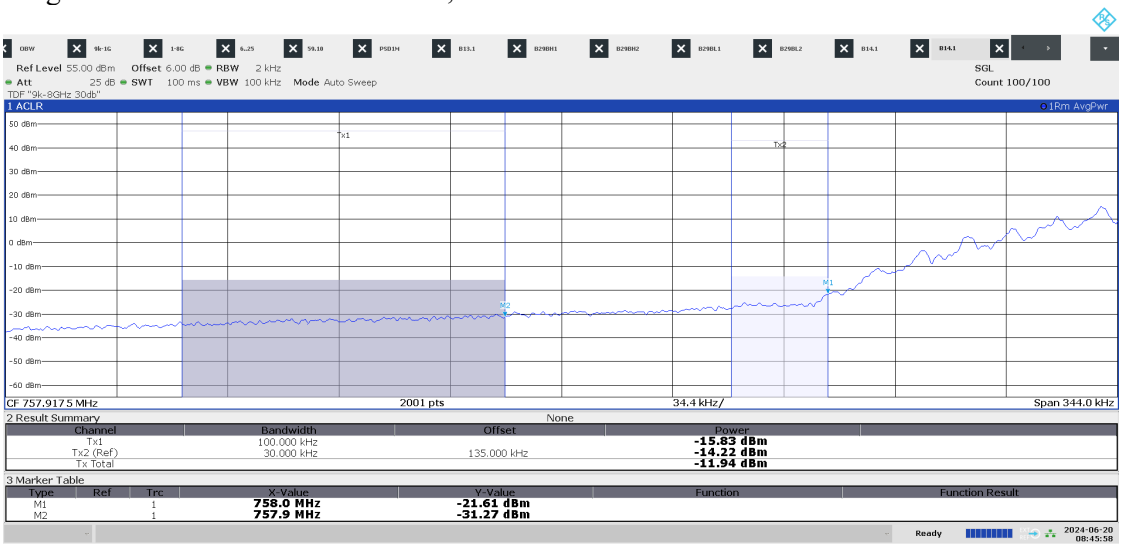

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Diagram 2.20a T NB IoT SA: N-TM, Port A:

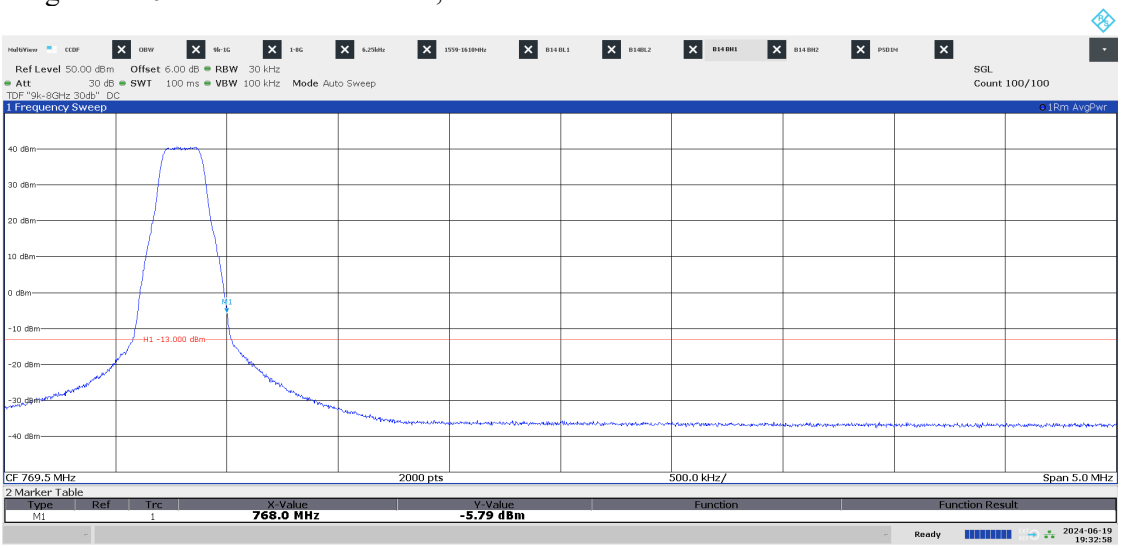

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Diagram 2.20b T NB IoT SA: N-TM, Port A:

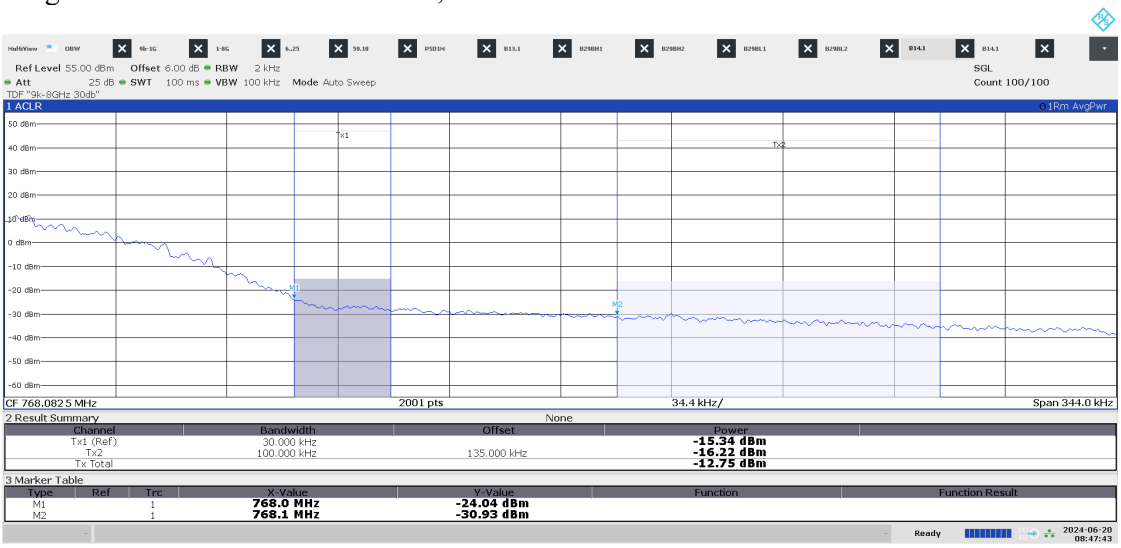

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Diagram 2.21a NR: TM1.1, $M10_{NR}$ SCS 30kHz, Port A:

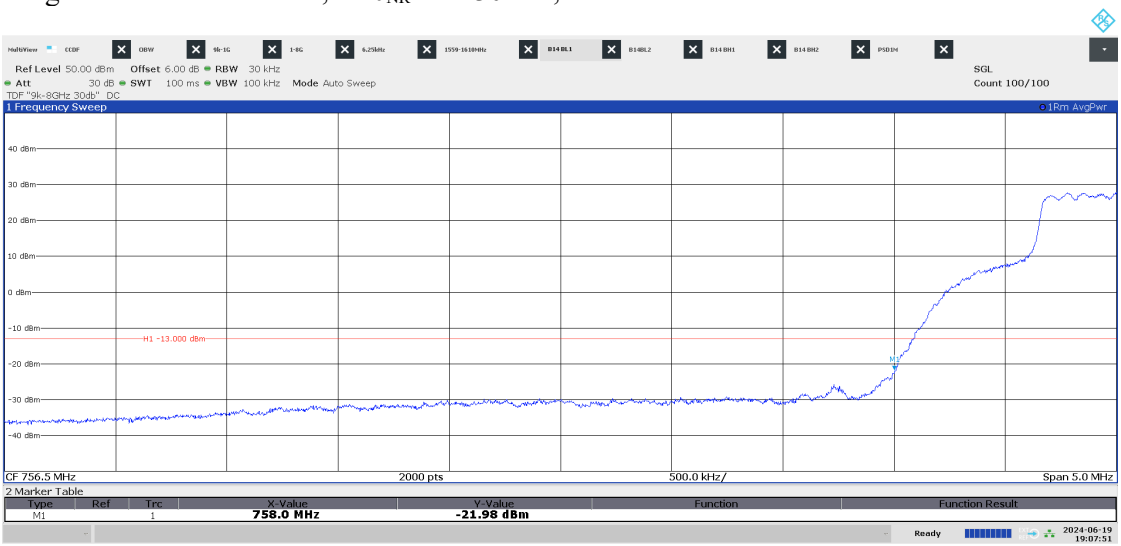

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Diagram 2.21b NR: TM1.1, $M10_{NR}$ SCS 30kHz, Port A:

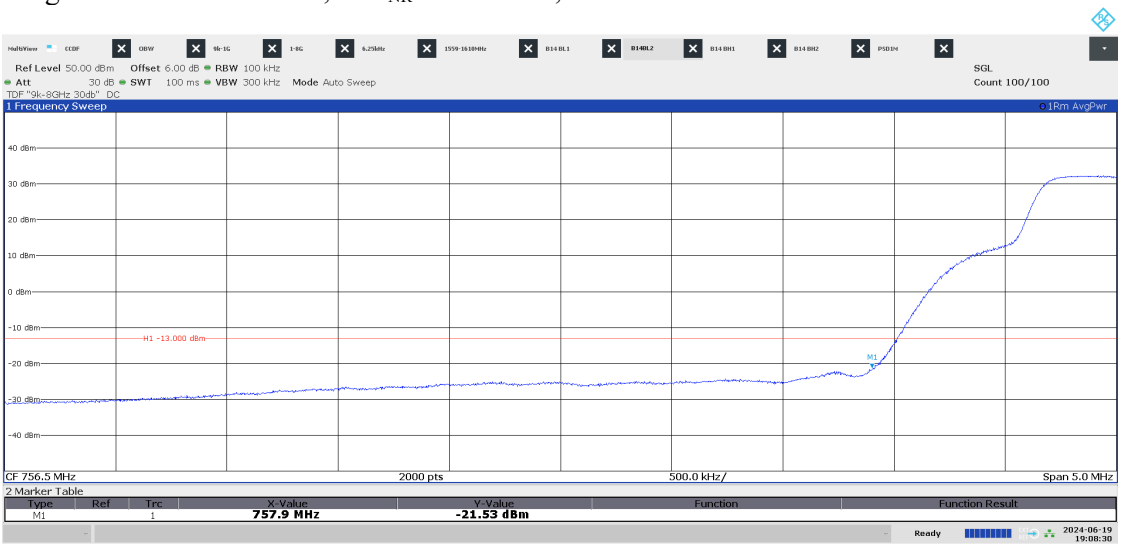

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Diagram 2.21c NR: TM1.1, $M10_{NR}$ SCS 30kHz, Port A:

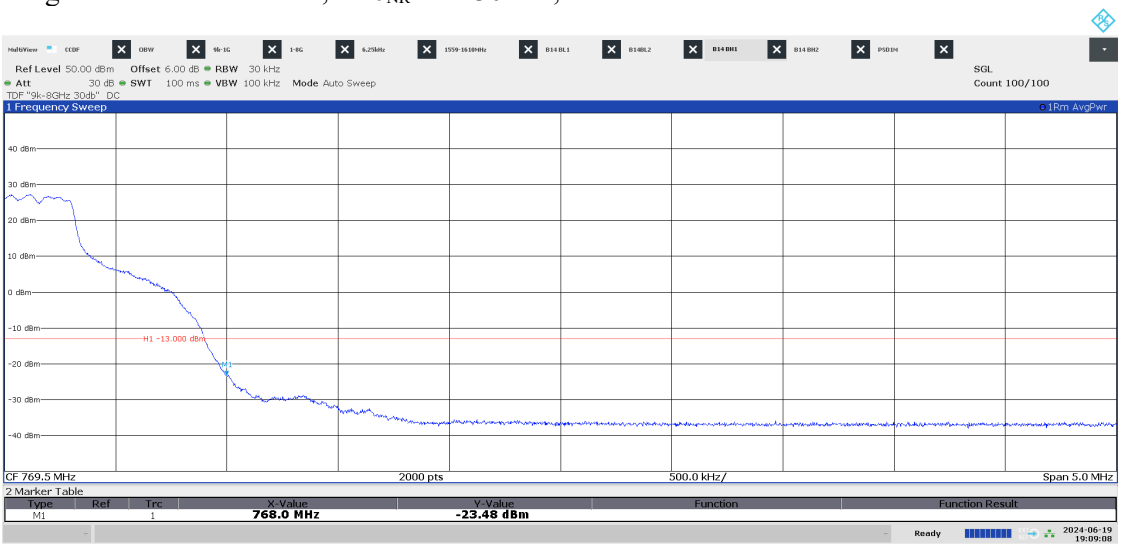

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Diagram 2.21d NR: TM1.1, $M10_{NR}$ SCS 30kHz, Port A:

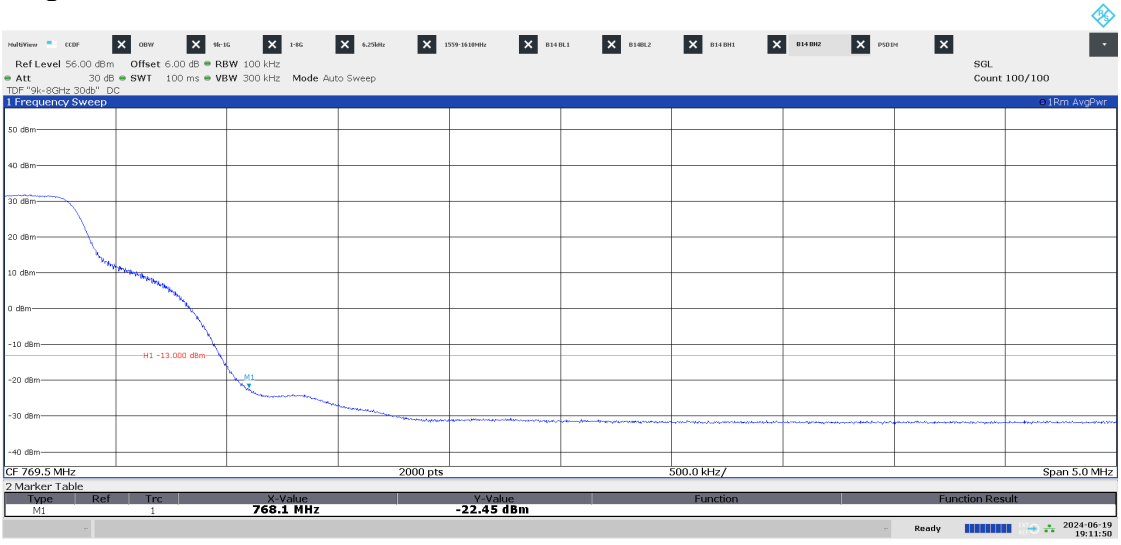

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Diagram 2.22a LTE and NR: TM1.1, ESS_{NR+LTE}, Port A:

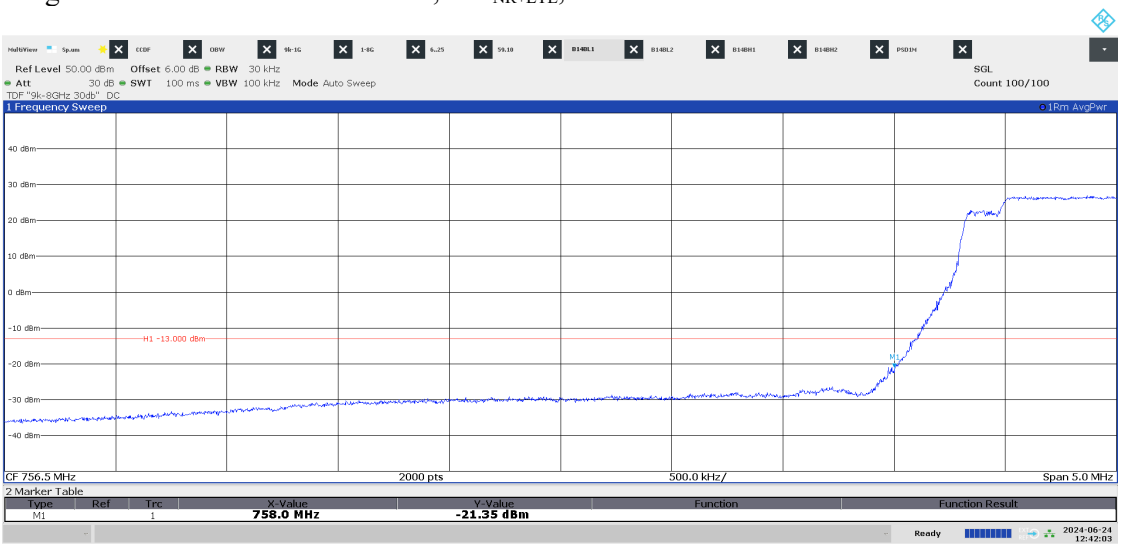

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Diagram 2.22b LTE and NR: TM1.1, ESS_{NR+LTE}, Port A:

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Diagram 2.22a LTE and NR: TM1.1, ESS_{NR+LTE}, Port A:

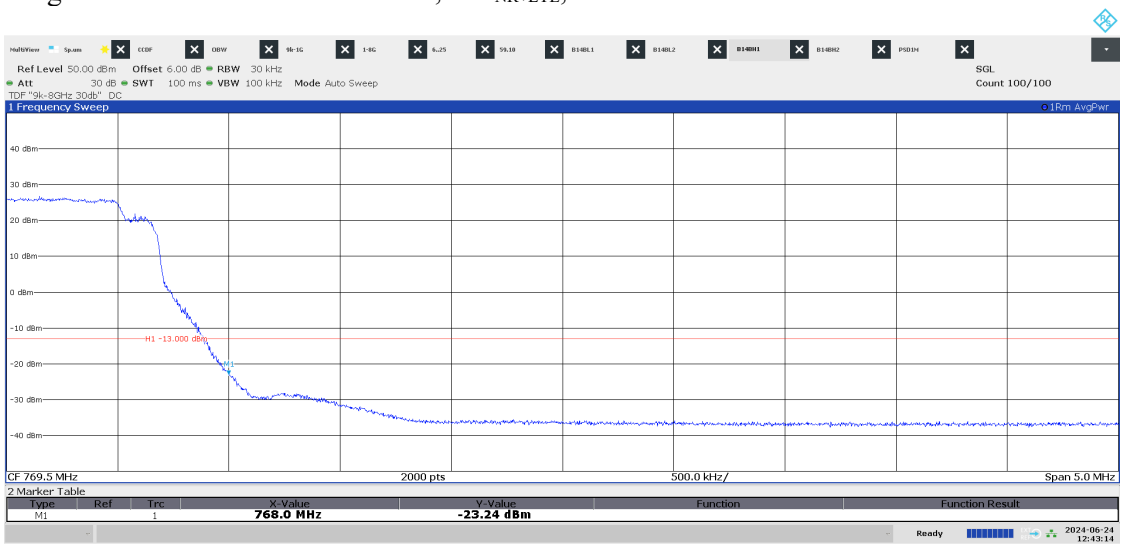

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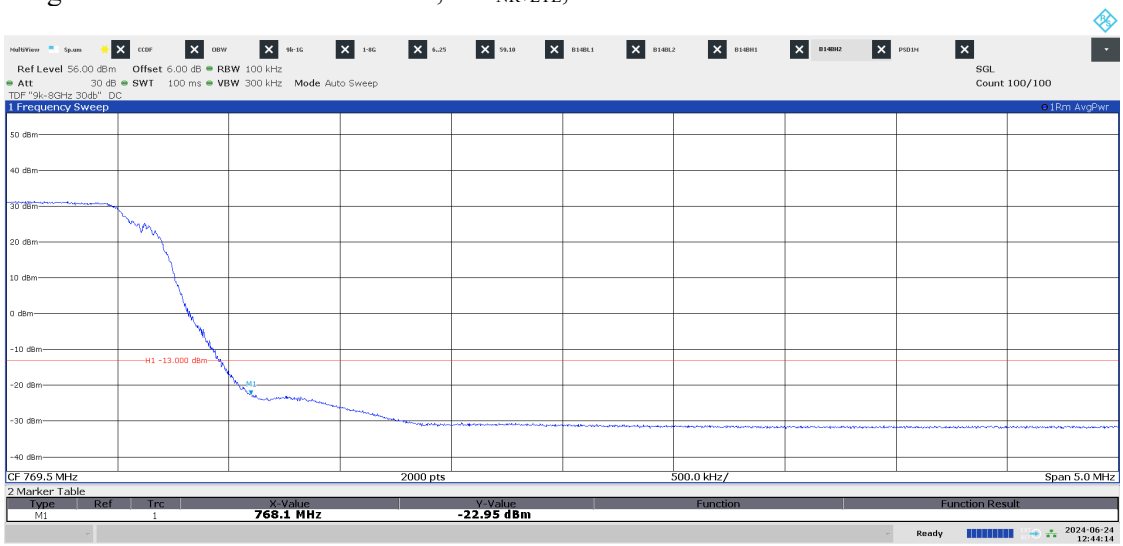
Diagram 2.22b LTE and NR: TM1.1, ESS_{NR+LTE}, Port A:



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