REPORT

issued by an Accredited Testing Laboratory

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Date: 2025-04-25

Reference: P124914-F2

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Torshamnsgatan 21
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Radio measurements on Radio 4471HP B2/B25 with FCC ID TA8AKRC1614475 and IC 287AB-AS1614475

Product name: Radio 4471HP B2/B25
Product number: KRC 161 4475/3

RISE Research Institutes of Sweden AB
Vehicles and Automation – EMC-IKT

Performed by

Björn Skönvall

Examined by

Daniel Lundgren

Summary

Standard Listed part of		Compliant
FCC CFR 47 part 24/ RSS-133 and RSS-Gen		
2.1046/ RSS-133 5.5	RF power output	Yes
2.1049/ RSS-Gen 6.7	Occupied bandwidth	Yes
2.1051/ RSS-133 5.6	Band edge	Yes
2.1051/ RSS-133 5.6	Spurious emission at antenna terminals	Yes
2.1053/ RSS-133 5.6	Field strength of spurious radiation	Yes
2.1055/ RSS-133 5.4	Frequency stability	Yes

Description of the test object

Equipment:	Radio 4471HP B2/B25 Product number KRC 161 4475/3 FCC ID: TA8AKRC1614475 IC: 287AB-AS1614475 * The hardware and software (except for the security software) are identical for the Radios KRC 161 4475/3 (Security unlocked), KRC 161 4475/31 (Security locked) and KRC 161 4475/11 (Security locked) and PIM (Passive Inter Modulation) Receiver SW. The tests were performed on KRC 161 4475/3.
HVIN:	AS161985
FVIN:	-
Hardware revision state:	R1B
Radio Access Technology, RAT and Frequency range:	Single RAT: LTE, NR, NB IoT SA (IB, GB) Multi RAT: NR + NB IoT (IB), LTE + NB IoT (IB, GB), ESS, NB IoT SA TX: 1930 – 1995 MHz RX: 1850 – 1915 MHz
IBW:	65 MHz
Output power:	Maximum nominal output power per carrier and port LTE: 5 MHz: 40 W 10, 15, 20 MHz 60 W NR: 5 MHz: 40 W 10, 15, 20 , 25, 30, 40 MHz 60 W ESS 10, 20 MHz: 60 W NB-IoT SA 20 W Maximum total output power per port: 60W Maximum total output power per Radio Unit: 240W
Antenna ports	A-D: 4 TX / 4 RX ports
Antenna:	50 Ohm Impedance, No dedicated antenna, handled during licensing.

RF configuration	Single and multi-carrier, 6 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. Supported channel bandwidth LTE 5, 10 15, 20MHz Supported channel bandwidth LTE NB IoT IB 5, 10, 15, 20 MHz Supported channel bandwidth LTE NB IoT GB 10, 15, 20 MHz Supported channel bandwidth NR NB IoT IB 5, 10, 15, 20, 25 MHz Supported channel bandwidth NR 5, 10, 15, 20, 25, 30, 40MHz Supported channel bandwidth ESS 10, 15, 20 MHz Supported channel bandwidth NB-IoT SA 0.2 MHz Max number of supported PRBs: NB IoT GB PRB /LTE: 2 NB IoT IB PRB /LTE:4 NB IoT IB PRB/ NR: 4 NB IoT SA (Stand-alone): 4/ 1 per port.
Emission designators:	LTE with and without NB IoT IB: 5 MHz, BW: 4M49W7D 10 MHz, BW: 8M97W7D 15 MHz, BW: 13M9W7D 20MHz, BW: 17M9W7D LTE with NB IoT GB: 10 MHz, BW: 9M33W7D 15 MHz, BW: 14M2W7D 20 MHz, BW: 18M3W7D NR with and without NB IoT IB: 5 MHz, BW: 4M51W7D 10 MHz, BW: 9M32W7D 15 MHz, BW: 14M2W7D 20 MHz, BW: 19M0W7D 25 MHz, BW: 23M9W7D 30 MHz, BW: 28M5W7D 40 MHz, BW: 38M5W7D NB IoT SA: 200 kHz, BW: 195KW7D MAX CA LTE: 65 MHz, BW: 63M0W7D MAX CA NR: 65 MHz, BW: 63M5W7D
RF power Tolerance:	+0.6/ -1.5 dB
CPRI Speed	Up to 24.3 Gbps

Nominal supply voltage: -48VDC

The information above is supplied by the manufacturer.

Purpose of test

The purpose of the tests is to verify compliance to the performance characteristics specified in applicable items of FCC CFR 47, RSS-133 and RSS-Gen.

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 measurements were performed with the test object transmitting test model N-TM representing QPSK as defined in 3GPP TS 36.141.

NB IoT 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 transmitting at maximum output power settings for all ports during all measurements.

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
eCFR 47 Part 2, March 2025
eCFR 47 Part 24 Subpart E, March 2025
KDB 662911 D01 Multiple Transmitter Output v02r01
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-133 Issue 7
RSS-Gen Issue 5

Measurement equipment

Measurement equipment

Item	Name	Inv.no	Cal. due date
Semi Anechoic Chamber	TDK	503881	-
	NSA	BX90699	2025-11-04
	SVSWR	BX90702	2027-06-10
Spectrum Analyzer	Rohde & Schwarz ESW44	KWP18505	2025-07-10
Software	Rohde & Schwarz Elektra 5.11	KWP19425	-
RF cable	Huber & Suhner Eacon 4C	BX91490	2025-06-19
RF Cable	Rosenberger UFB311A	503508	2025-09-06
RF Cable	Rosenberger UFB311A	503509	2025-09-06
Antenna, Bilog	Teseq CBL6143A	BX92331	2028-03-02
Preamplifier	MicroComp Nordic MCN-JS42-00101800-28-10P	901545	2026-01-21
HP filter	WHK/M3.0/13G-10SS	503637	2025-08-28
Antenna, Horn	Emco 3115	502175	2027-06-12
Antenna, Horn	Std.gain Horn Antenn 18240	503673	2026-12-12
Spectrum analyzer	R&S FSQ 40	504143	2025-07-23
Spectrum analyzer	R&S FSW 43	902073	2025-09-26
RF attenuator	Weinschel 40dB	902282	2025-08-28
RF cable	Sucoflex 102EA	BX50236	2026-03-01
RF Cable	Sucoflex 102EA	BX50237	2026-03-01
Thermohygrometer	Testo 635	504203	2025-08-14
Thermohygrometer	Testo 625	504117	2025-06-26

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).

Reservation

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

Delivery of test object

The test object was delivered: 2025-03-03.

Manufacturer's representative

Patrik Hellström, Ericsson AB.

Test engineers

Björn Skönvall, RISE.

Test participant(-s)

None.

Test frequencies used for conducted and radiated measurements

LTE:

Frequency [MHz]	Symbolic name	Comment
1932.5	B_{5LTE}	TX bottom frequency in 5 MHz BW configuration
1935	B_{10LTE}	TX bottom frequency in 10 MHz BW configuration
1937.5	B_{15LTE}	TX bottom frequency in 15 MHz BW configuration
1940	B_{20LTE}	TX bottom frequency in 20 MHz BW configuration
1962.5	M_{5LTE}	TX middle frequency in 5 MHz BW configuration
1962.5	M_{10LTE}	TX middle frequency in 10 MHz BW configuration
1962.5	M_{15LTE}	TX middle frequency in 15 MHz BW configuration
1962.5	M_{20LTE}	TX middle frequency in 20 MHz BW configuration
1992.5	T_{5LTE}	TX top frequency in 5 MHz BW configuration.
1990	T_{10LTE}	TX top frequency in 10 MHz BW configuration
1987.5	T_{15LTE}	TX top frequency in 15 MHz BW configuration
1985	T_{20LTE}	TX top frequency in 20 MHz BW configuration
1935 1945 1955 1965 1975 1987.5	CA_{LTE}	TX constellation for maximum number of carriers with 10/15 MHz bandwidth configuration.

The RX frequency was configured 80 MHz below the corresponding TX frequency according to the applicable duplex offset for the operating band.

LTE with NB IoT IB/ GB

Frequency [MHz]	Symbolic name	Comment
IoT=PRB-1 LTE=1935	$B_{GB+10LTE}$	TX constellation for Bottom LTE carrier with 10 MHz carrier bandwidth. IoT Boosted 6 dB
IoT=PRB50 LTE=1990	$T_{GB+10LTE}$	TX constellation for Top LTE carrier with 10 MHz carrier bandwidth. IoT Boosted 6 dB
IoT=PRB-1 LTE=1937.5	$B_{GB+15LTE}$	TX constellation for Bottom LTE carrier with 15 MHz carrier bandwidth. IoT Boosted 6 dB
IoT=PRB75 LTE=1987.5	$T_{GB+15LTE}$	TX constellation for Top LTE carrier with 15 MHz carrier bandwidth. IoT Boosted 6 dB
IoT1PRB-1 LTE=1940	$B_{GB+20LTE}$	TX constellation for Bottom LTE carrier with 20 MHz carrier bandwidth. IoT Boosted 6 dB
IoT1PRB100 LTE=1975	$T_{GB+20LTE}$	TX constellation for Top LTE carrier with 20 MHz carrier bandwidth. IoT Boosted 6 dB
IoT=PRB2 LTE=1932.5	$B_{IB+5LTE}$	TX constellation for Bottom NB IoT IB. LTE carrier with 5 MHz carrier bandwidth. IoT IB was boosted with 6 dB
IoT=PRB22 LTE=1992.5	$T_{IB+5LTE}$	TX constellation for Top NB IoT IB. LTE carrier with 5 MHz carrier bandwidth. IoT IB was boosted with 6 dB
IoT=PRB4 LTE=1935	$B_{IB+10LTE}$	TX constellation for Bottom NB IoT IB. LTE carrier with 10 MHz carrier bandwidth. IoT IB was boosted with 6 dB
IoT=PRB45 LTE=1990	$T_{IB+10LTE}$	TX constellation for Top NB IoT IB. LTE carrier with 10 MHz carrier bandwidth. IoT IB was boosted with 6 dB

The RX frequency was configured 80 MHz below the corresponding TX frequency according to the applicable duplex offset for the operating band.

NR:

Frequency [MHz]	Symbolic name	Comment
1932.5	B_{5NR}	TX bottom frequency in 5 MHz BW configuration
1935	B_{10NR}	TX bottom frequency in 10 MHz BW configuration
1937.5	B_{15NR}	TX bottom frequency in 15 MHz BW configuration
1940	B_{20NR}	TX bottom frequency in 20 MHz BW configuration
1942.5	B_{25NR}	TX bottom frequency in 25 MHz BW configuration
1945	B_{30NR}	TX bottom frequency in 30 MHz BW configuration
1950	B_{40NR}	TX bottom frequency in 40 MHz BW configuration
1962.5	M_{5NR}	TX middle frequency in 5 MHz BW configuration
1962.5	M_{10NR}	TX middle frequency in 10 MHz BW configuration
1962.5	M_{15NR}	TX middle frequency in 15 MHz BW configuration
1962.5	M_{20NR}	TX middle frequency in 20 MHz BW configuration
1962.5	M_{25NR}	TX middle frequency in 25 MHz BW configuration
1962.5	M_{30NR}	TX middle frequency in 30 MHz BW configuration
1962.5	M_{40NR}	TX middle frequency in 40 MHz BW configuration
1992.5	T_{5NR}	TX top frequency in 5 MHz BW configuration.
1990	T_{10NR}	TX top frequency in 10 MHz BW configuration
1987.5	T_{15NR}	TX top frequency in 15 MHz BW configuration
1985	T_{20NR}	TX top frequency in 20 MHz BW configuration
1982.5	T_{25NR}	TX top frequency in 25 MHz BW configuration
1980	T_{30NR}	TX top frequency in 30 MHz BW configuration
1975	T_{40NR}	TX top frequency in 40 MHz BW configuration
1935 1945 1955 1965 1975 1987.5	CA_{NR}	TX constellation for maximum number of carriers with 10/15 MHz bandwidth configuration.

The RX frequency was configured 80 MHz below the corresponding TX frequency according to the applicable duplex offset for the operating band.

NB IoT SA

Frequency [MHz]	Symbolic name	Comment
IoT SA= 1930.2	$B_{IOT\ SA\_}$	TX constellation for Bottom NB IoT SA.
IoT SA= 1994.8	$T_{IOT\ SA}$	TX constellation for Top NB IoT SA.

NR with NB IoT IB

Frequency [MHz]	Symbolic name	Comment
IoT=PRB0 NR=1932.5	B_{IB+5NR}	TX constellation for Bottom NB IoT IB. NR carrier with 5 MHz carrier bandwidth. IoT IB PRB was boosted with 6 dB
IoT=PRB24 NR=1992.5	T_{IB+5NR}	TX constellation for Top NB IoT IB. NR carrier with 5 MHz carrier bandwidth. IoT IB PRB was boosted with 6 dB
IoT=PRB-1 NR=1962.5	$M_{IB+10NR}$	TX constellation for Middle NB IoT IB. NR carrier with 10 MHz carrier bandwidth. IoT IB was boosted with 6 dB
IoT=PRB-2 NR=1962.5	$M_{IB+15NR}$	TX constellation for Middle NB IoT IB. NR carrier with 15 MHz carrier bandwidth. IoT IB was boosted with 6 dB
IoT=PRB-3 NR=1962.5	$M_{IB+20NR}$	TX constellation for Middle NB IoT IB. NR carrier with 20 MHz carrier bandwidth. IoT IB was boosted with 6 dB
IoT=PRB0 NR=1962.5	$M_{IB+25NR}$	TX constellation for Middle NB IoT IB. NR carrier with 25 MHz carrier bandwidth. IoT IB was boosted with 6 dB

The RX frequency was configured 80 MHz below the corresponding TX frequency according to the applicable duplex offset for the operating band.

Multi RAT

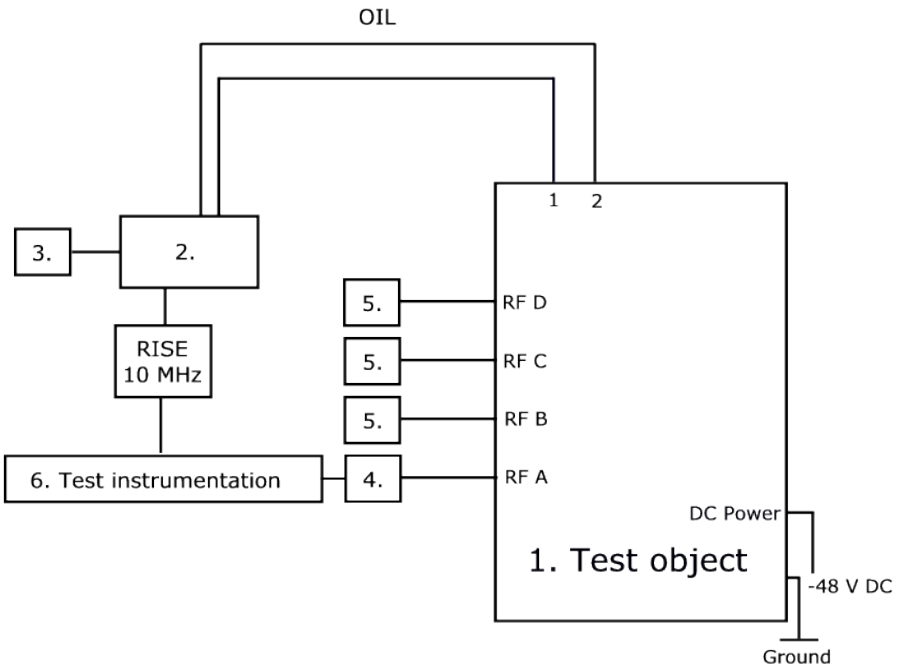
Frequency [MHz]	Symbolic name	Comment
NR1=1932.5 NR2=1942.5 IOT SA=1994.8	$B_{NR+IOT\ SA}$	TX constellation for 2 bottom carriers with 5 MHz carrier bandwidth and one IOT SA top carrier
NR1=1992.5 NR2=1982.5 IOT SA=1930.2	$T_{NR+IOT\ SA}$	TX constellation for 2 top carriers with 5 MHz carrier bandwidth and one IOT SA bottom carrier

ESS RAT

Frequency [MHz]	Symbolic name	Comment
1935	$BESS_{10NR+LTE}$	TX constellation for Bottom NR/LTE carrier with 10 MHz carrier bandwidth.NR 90% LTE 10%
1990	$TESS_{10NR+LTE}$	TX constellation for Top NR/LTE carrier with 10 MHz carrier bandwidth.NR 90% LTE 10%
1940	$BESS_{20NR+LTE}$	TX constellation for Bottom NR/LTE carrier with 20 MHz carrier bandwidth.NR 90% LTE 10%
1985	$TESS_{20NR+LTE}$	TX constellation for Top NR/LTE carrier with 20 MHz carrier bandwidth.NR 90% LTE 10%

The RX frequency was configured 80 MHz below the corresponding TX frequency according to the applicable duplex offset for the operating band.

Test setup: conducted measurements



Test object:

1.	Radio 4471HP B2/B25, KRC 161 4475/3, rev. R1B, s/n: E23G260016 With Radio Software: CXP 202 1113/1, rev. R24A461. FCC ID: TA8AKRC1614475, IC: 287AB-AS1614475

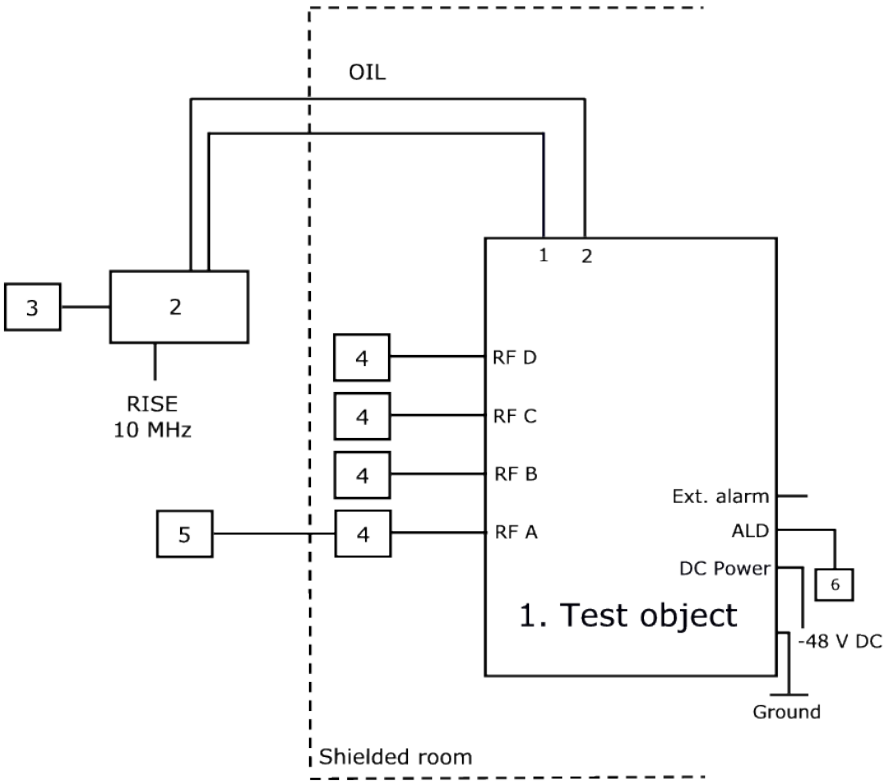
Associated equipment:

2.	Testing Equipment: CT-DU25, LPC 102 500/1, rev. R3B, s/n: T010G520910 with software Ruma P50E02

Functional test equipment:

3.	Computer, Mac book mini, BAMS – 1002046451
4.	RF Attenuator: RISE number: 902 282
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.

Test setup: radiated measurements



1.	Radio 4471HP B2/B25, KRC 161 4475/3, rev. R1B, s/n: E23G260016 With Radio Software: CXP 202 1113/1, rev. R24A461. FCC ID: TA8AKRC1614475, IC: 287AB-AS1614475

Associated equipment:

2.	Testing Equipment: CT-DU25, LPC 102 500/1, rev. R3B, s/n: T010G520910 with software Ruma P50E02

Functional test equipment:

3.	Computer, Mac book mini, BAMS – 1002046451
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

RF power output measurements according to CFR 47 §24.232 / RSS-133 5.5, conducted

Date	Temperature	Humidity
2025-03-05	22 °C ± 3 °C	33 % ± 5 %
2025-03-07	22 °C ± 3 °C	40 % ± 5 %
2025-03-11	23 °C ± 3 °C	28 % ± 5 %
2025-03-12	22 °C ± 3 °C	40 % ± 5 %
2025-03-18	23 °C ± 3 °C	29 % ± 5 %
2025-03-19	22 °C ± 3 °C	29 % ± 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 80 MHz was used if not otherwise specified.

Measurement equipment	RISE number
R&S FSW 43	902 073
RF attenuator	902 282
Coaxial cable Sucoflex 102EA	BX50236
Coaxial cable Sucoflex 102EA	BX50237
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 1.1 dB

Results LTE Single carrier

Single carrier Test model E-TM1.1

Rated output power level at each RF port 1x 46dBm BW 5 MHz / 1x47.8 dBm BW≥10MHz/ 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}	45.76/7.39	45.70/7.39	45.71/7.39	45.65/7.39	51.73
B_{10LTE}	46.96/7.68	46.84/7.71	46.91/7.72	46.83/7.69	52.91
B_{15LTE}	46.88/8.03	46.77/8.04	46.90/8.03	46.81/8.00	52.86
B_{20LTE}	46.88/8.38	46.83/8.37	46.91/8.39	46.87/8.39	52.89
M_{5LTE}	45.63/7.28	45.54/7.29	45.68/7.28	45.65/7.28	51.65
M_{10LTE}	47.33/7.29	47.25/7.3	47.38/7.32	47.33/7.31	53.34
M_{15LTE}	47.31/7.31	47.22/7.32	47.27/7.32	47.27/7.32	53.29
M_{20LTE}	47.31/7.38	47.17/7.40	47.30/7.39	47.24/7.37	52.40
T_{5LTE}	45.55/7.38	45.52/7.4	45.6/7.43	45.59/7.4	51.59
T_{10LTE}	47.02/7.55	46.99/7.6	47.00/7.58	47.02/7.57	53.03
T_{15LTE}	47.12/7.69	47.13/7.74	47.06/7.72	47.10/7.67	52.22
T_{20LTE}	47.10/7.85	47.14/7.34	47.08/7.89	47.13/7.85	53.13

[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 E-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_{5LTE}	45.72/7.42

Single carrier Test model E-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}	45.73/7.45

Single carrier Test model E-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}	45.68/7.69

Single carrier Test model E-TM1.1

Rated output power level at each RF port 1x 46dBm BW 5 MHz / 1x47.8 dBm BW≥10MHz/ 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)] [dBi]/ e.i.r.p Limit [dBm]
B_{5LTE}	39.51	39.45	39.46	39.40	45.51	19.65/ 65.16
M_{10LTE}	38.16	38.14	38.17	38.15	44.17	21.43/ 65.16
M_{15LTE}	36.39	36.28	36.45	36.40	42.45	22.71/ 65.16
M_{20LTE}	35.16	34.99	35.14	35.11	41.16	24.00/ 65.16

[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.
Feeder loss is assumed to be 0 dB in the antenna gain calculation.
The used formula is: Maximum antenna gain (dBi) = e.i.r.p limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Please note that the maximum e.i.r.p limit for a specific site may be lower due to various site conditions.
3) The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested, and still comply with the maximum e.i.r.p limits as defined in FCC 24.232 and RSS-133.

Results NR Single carrier

Single carrier Test model FR1-TM1.1
Rated output power level at each RF port 1x 46dBm BW 5 MHz / 1x47.8 dBm BW≥10MHz/ 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}	45.76/7.39	45.70/7.37	45.73/7.38	45.66/7.38	51.73
B_{10NR}	46.85/7.84	46.79/7.87	46.89/7.86	46.85/7.83	52.87
B_{15NR}	46.82/8.30	46.78/8.18	46.86/8.16	46.81/8.14	52.84
B_{20NR}	46.98/8.30	46.83/8.26	46.95/8.28	46.85/8.22	52.92
B_{25NR}	46.71/8.63	46.66/8.62	46.76/8.66	46.71/8.61	52.73
B_{30NR}	46.82/8.86	46.79/9.08	46.86/9.00	46.76/8.95	52.83
B_{40NR}	46.85/9.27	46.78/9.14	46.87/9.20	46.79/9.14	52.84
M_{5NR}	45.66/7.28	45.58/7.28	45.67/7.28	45.66/7.27	51.66
M_{10NR}	47.32/7.31	47.23/7.34	47.37/7.32	47.33/7.30	53.33
M_{15NR}	47.29/7.37	47.16/7.40	47.29/7.39	47.27/7.36	53.27
M_{20NR}	47.29/7.36	47.19/7.41	47.29/7.38	47.27/7.36	53.28
M_{25NR}	47.20/7.45	47.07/7.47	47.24/7.48	47.10/7.44	53.17
M_{30NR}	47.24/7.60	47.17/7.54	47.32/7.55	47.24/7.52	53.26
M_{40NR}	47.19/7.82	47.09/7.81	47.23/7.86	47.14/7.90	53.18
T_{5NR}	45.45/7.28	45.52/7.41	45.59/7.38	45.56/7.38	51.55
T_{10NR}	47.00/7.63	46.98/7.70	47.02/7.67	47.01/7.65	53.02
T_{15NR}	47.07/7.80	47.05/7.88	47.03/7.84	47.11/7.82	53.09
T_{20NR}	47.13/7.84	47.16/7.87	47.13/7.86	47.13/7.85	53.16
T_{25NR}	46.87/7.99	46.87/8.03	46.87/8.04	46.89/7.98	52.90
T_{30NR}	46.94/8.03	46.97/8.06	46.95/8.09	46.93/8.03	52.97
T_{40NR}	46.96/8.20	46.92/8.31	46.93/8.04	46.91/8.02	52.95

[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 FR1-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}	45.76/7.40

Single carrier Test model FR1-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}	45.75/7.37

Single carrier Test model FR1-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}	45.78/7.39

Single carrier Test model FR1-TM1.1

Rated output power level at each RF port 1x 46dBm BW 5 MHz / 1x47.8 dBm BW≥10MHz/ 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)] [dBi]/ e.i.r.p Limit [dBm]
B_{5NR}	39.53	39.46	39.50	39.42	45.53	19.63/ 65.16
M_{10NR}	37.98	37.89	38.02	37.97	44.02	21.14/ 65.16
M_{15NR}	36.14	35.99	36.13	36.13	42.14	23.02/ 65.16
M_{20NR}	34.87	34.78	34.85	34.85	40.87	24.29/ 65.16
M_{25NR}	33.85	33.73	33.88	33.78	39.88	25.28/ 65.16
M_{30NR}	33.02	32.96	33.11	33.04	39.11	26.05/ 65.16
M_{40NR}	31.73	31.58	31.74	31.66	37.74	27.42/65.16

[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.
Feeder loss is assumed to be 0 dB in the antenna gain calculation.
The used formula is: Maximum antenna gain (dBi) = e.i.r.p limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Please note that the maximum e.i.r.p limit for a specific site may be lower due to various site conditions.
[3)] The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested, and still comply with the maximum e.i.r.p limits as defined in FCC 24.232 and RSS-133.

Results LTE Multi carrier

Multi carrier, Carrier aggregation E-TM1.1

Rated output power level at each RF port 6x 40 dBm/ port.

	Output power CCDF [RMS dBm]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
CA_{LTE}	47.00	46.89	47.00	46.92	52.97

[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 NR Multi carrier

Multi carrier, Carrier aggregation FR1-TM1.1

Rated output power level at each RF port 6x 40 dBm/ port.

	Output power CCDF [RMS dBm]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
CA_{NR}	46.80	46.68	46.79	46.70	52.76

[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 with NB IoT GB

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

Rated output power level at each RF port 1x 46dBm BW 5 MHz / 1x47.8 dBm BW≥10MHz/ 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)]
$M_{GB+10LTE}$	47.12/7.33	47.07/7.36	47.17/7.34	47.09/7.33	53.13
$M_{GB+15LTE}$	47.23/7.33	47.12/7.38	47.26/7.36	47.17/7.33	53.22
$M_{GB+20LTE}$	46.82/7.75	46.72/7.81	46.85/7.81	46.76/7.77	52.81

[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 46dBm BW 5 MHz / 1x47.8 dBm BW≥10MHz/ 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)] [dBi]/ e.i.r.p Limit [dBm]
$M_{GB+10LTE}$	37.36	37.34	37.26	37.29	43.36	21.80/65.16
$M_{GB+15LTE}$	36.28	36.16	36.44	36.30	42.44	22.72/65.16
$M_{GB+20LTE}$	35.10	34.96	35.14	34.99	41.14	24.02/65.16

[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.
Feeder loss is assumed to be 0 dB in the antenna gain calculation.
The used formula is: Maximum antenna gain (dBi) = e.i.r.p limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Please note that the maximum e.i.r.p limit for a specific site may be lower due to various site conditions.
[3)] The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested, and still comply with the maximum e.i.r.p limits as defined in FCC 24.232 and RSS-133.

Results LTE with NB IoT IB

Rated output power level at each RF port 1x 46dBm BW 5 MHz / 1x47.8 dBm BW≥10MHz/ 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)]
$B_{IB+5LTE}$	45.05/7.90	45.01/7.90	45.00/7.90	44.96/7.90	51.03
$M_{IB+10LTE}$	46.71/7.69	46.62/7.67	46.74/7.66	46.67/7.65	52.71
$M_{IB+15LTE}$	47.11/7.29	47.03/7.32	47.15/7.31	47.08/7.28	53.11
$M_{IB+20LTE}$	46.66/7.80	46.57/7.83	46.70/7.80	46.58/7.81	52.65

[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 46dBm BW 5 MHz / 1x47.8 dBm BW≥10MHz/ 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)] [dBi]/ e.i.r.p Limit [dBm]
$B_{IB+5LTE}$	39.55	39.55	39.42	39.53	45.55	19.61/65.16
$M_{IB+10LTE}$	37.99	37.93	38.08	38.05	44.08	21.08/65.16
$M_{IB+15LTE}$	36.71	36.48	36.69	36.63	42.71	22.45/65.16
$M_{IB+20LTE}$	34.80	34.78	34.88	34.74	40.88	24.28/65.16

[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.
Feeder loss is assumed to be 0 dB in the antenna gain calculation.
The used formula is: Maximum antenna gain (dBi) = e.i.r.p limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Please note that the maximum e.i.r.p limit for a specific site may be lower due to various site conditions.
[3)] The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested, and still comply with the maximum e.i.r.p limits as defined in FCC 24.232 and RSS-133.

Results NR with NB IoT IB

Single carrier: NR: FR1-TM1.1, NB IoT: N-TM
Rated output power level at each RF port 1x 46dBm BW 5 MHz / 1x47.8 dBm BW≥10MHz/ 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_{IB+5NR}	45.40/7.51	45.38/7.52	45.38/7.52	45.36/7.52	51.40
$M_{IB+10NR}$	47.15/7.34	47.09/7.36	47.20/7.34	47.13/7.34	53.16
$M_{IB+15NR}$	47.05/7.45	47.07/7.40	46.95/7.40	46.99/7.50	53.04
$M_{IB+20NR}$	46.98/7.41	46.89/7.40	46.95/7.40	46.94/7.50	52.96
$M_{IB+25NR}$	46.99/7.51	47.04/7.55	47.01/7.51	46.98/7.50	53.03

[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 46dBm BW 5 MHz / 1x47.8 dBm BW≥10MHz/ 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)] [dBi]/ e.i.r.p Limit [dBm]
M_{IB+5NR}	39.47	39.45	39.45	39.49	45.49	19.67/ 65.16
$M_{IB+10NR}$	38.21	38.21	38.34	38.22	44.34	20.82/ 65.16
$M_{IB+15NR}$	37.92	37.89	37.88	37.86	43.92	21.24/ 65.16
$M_{IB+20NR}$	37.49	37.45	37.49	37.48	43.49	21.67/ 65.16
$M_{IB+25NR}$	34.01	34.05	34.03	34.02	40.05	25.11/ 65.16

[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.
Feeder loss is assumed to be 0 dB in the antenna gain calculation.
The used formula is: Maximum antenna gain (dBi) = e.i.r.p limit (dBm) - Measured Total power[2)]/ 1 MHz (dBm) + feeder loss (dB).
Please note that the maximum e.i.r.p limit for a specific site may be lower due to various site conditions.
[3)] The gain value is the maximum antenna gain that can be used with the tested device for the configuration tested, and still comply with the maximum e.i.r.p limits as defined in FCC 24.232 and RSS-133.

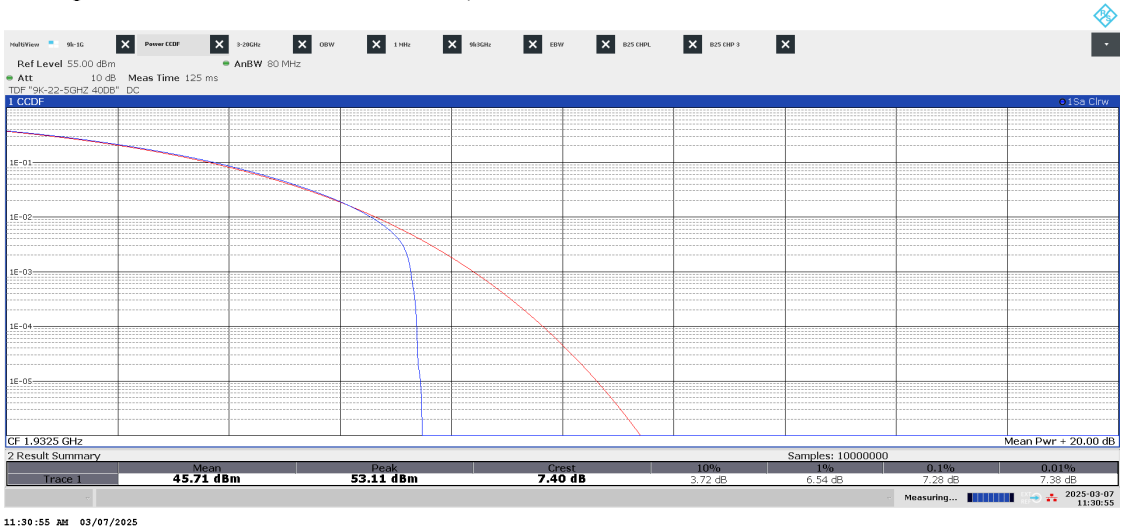
Results Multi RAT ESS NR and LTE

ESS NR 90% and LTE 10% TM1.1

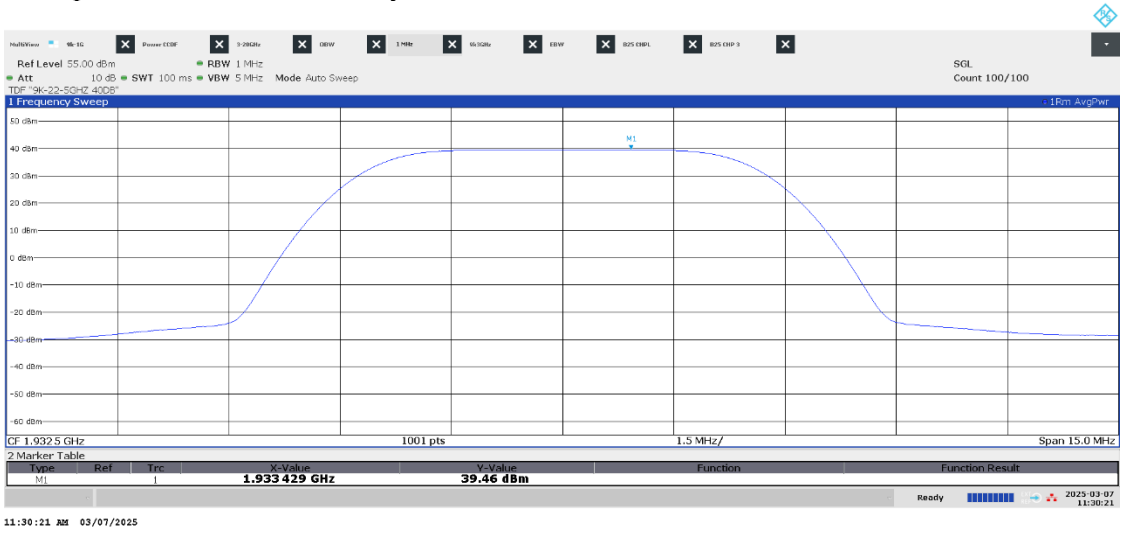
Rated output power level at each RF port 1x 47.8 dBm/ port.

	Output power CCDF [RMS dBm/ PAR dB]				
Symbolic name	Port RF A	Port RF B	Port RF C	Port RF D	Total power[1)]
$MESS_{10NR+LTE}$	47.17/7.45	47.07/7.81	47.21/7.86	47.10/7.90	53.16

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



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



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.

Limits

§ 24.232 Power and antenna height limits.

(a)

(1) Base stations with an emission bandwidth of 1 MHz or less are limited to 1640 watts equivalent isotopically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.

(2) Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotopically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.

(3) Base station antenna heights may exceed 300 meters HAAT with a corresponding reduction in power; *see* Tables 1 and 2 of this section.

(b)

(1) Base stations that are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census, with an emission bandwidth of 1 MHz or less are limited to 3280 watts equivalent isotopically radiated power (EIRP) with an antenna height up to 300 meters HAAT.

(2) Base stations that are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census, with an emission bandwidth greater than 1 MHz are limited to 3280 watts/MHz equivalent isotopically radiated power (EIRP) with an antenna height up to 300 meters HAAT.

(3) Base station antenna heights may exceed 300 meters HAAT with a corresponding reduction in power; *see* Tables 3 and 4 of this section.

In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

RSS-133 5.5 Transmitter output power

The maximum power spectral density of this equipment, measured in terms of average values, shall not exceed 3280 W/MHz e.i.r.p for the purpose of certification and may not apply to all deployment scenarios. Consult SRSP-510 for more deployment details in the band 1930-1995 MHz.

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 corresponding to the highest PAPR during periods of continuous transmission.

Complies?	Yes

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

Date	Temperature	Humidity
2025-03-07	22 °C ± 3 °C	26 % ± 5 %
2025-03-10	22 °C ± 3 °C	31 % ± 5 %
2025-03-11	23 °C ± 3 °C	28 % ± 5 %
2025-03-12	23 °C ± 3 °C	26 % ± 5 %
2025-03-14	22 °C ± 3 °C	31 % ± 5 %
2025-04-07	23 °C ± 3 °C	32 % ± 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	902 282
Coaxial cable Sucoflex 102EA	BX50236
Coaxial cable Sucoflex 102EA	BX50237
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 2.6%

Results LTE

Single carrier: E-TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
1.1	B_{5LTE}	RF B	4479	4790
1.2	B_{10LTE}	RF C	8959	9640
	B_{15LTE}	RF A	13434	14415
1.3	B_{20LTE}	RF A	17889	19160
	M_{5LTE}	RF A	4479	4798
	M_{5LTE}	RF B	4479	4798
	M_{5LTE}	RF C	4478	4798
	M_{5LTE}	RF D	4478	4790
	M_{10LTE}	RF D	8965	9625
1.4	M_{15LTE}	RF C	13439	14438
	M_{20LTE}	RF C	17883	19205
	T_{5LTE}	RF A	4479	4790
	T_{10LTE}	RF B	8960	9640
	T_{15LTE}	RF D	13435	14438
	T_{20LTE}	RF C	17873	19160

Single carrier: E-TM3.2

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
	M_{5LTE}	RF A	4475	4790

Single carrier: E-TM3.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
1.5	M_{5LTE}	RF A	4491	4813

Single carrier: E-TM3.1a

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
	B_{5LTE}	RF A	4486	4813

Carrier aggregation: E-TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
1.6	CA_{LTE}	RF A	63011	65697

Results NR

Single carrier: FR1-TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
1.7	B_{5NR}	RF D	4470	4798
	M_{5NR}	RF A	4474	4805
	M_{5NR}	RF B	4476	4783
	M_{5NR}	RF C	4473	4813
	M_{5NR}	RF D	4472	4798
1.8	M_{10NR}	RF B	9265	9745
1.9	M_{15NR}	RF D	14122	14775
1.10	M_{20NR}	RF C	18923	19924
1.11	M_{25NR}	RF D	23719	24738
1.12	M_{30NR}	RF B	28486	29595
1.13	M_{40NR}	RF A	38487	39940
	T_{5NR}	RF B	4477	4813

Single carrier: FR1-TM3.2

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
	M_{5NR}	RF A	4476	4783

Single carrier: FR1-TM3.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
	M_{5NR}	RF A	4476	4813

Single carrier: FR1-TM3.1a

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
	M_{5NR}	RF A	4462	4820

Carrier aggregation: FR1-TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
1.14	CA_{NR}	RF A	63476	66387

Results NB IoT SA

Single carrier: NB IoT: N-TM

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
	$B_{IOT\ SA}$	RF A	194	270
1.15	$M_{IOT\ SA}$	RF A	194	270
	$T_{IOT\ SA}$	RF A	194	270

Results LTE with NB IoT GB

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

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
1.16	$B_{GB+10LTE}$	RF A	9.331	9700
	$B_{GB+15LTE}$	RF A	14207	14723
	$B_{GB+20LTE}$	RF A	18338	19228

Results LTE with NB IoT IB

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

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
	$B_{IB+5LTE}$	RF A	4.475	4812
	$B_{IB+10LTE}$	RF A	8966	9550
	$B_{IB+15LTE}$	RF A	13890	14415
	$B_{IB+20LTE}$	RF A	17874	19100

Results NR with NB IoT IB

Single carrier: NR: FR1-TM1.1, NB IoT: N-TM

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
1.17	B_{IB+5NR}	RF A	4507	4768
1.18	$M_{IB+10NR}$	RF A	9321	9700
1.19	$M_{IB+15NR}$	RF A	14160	14820
1.20	$M_{IB+20NR}$	RFA	19044	19768
1.21	$M_{IB+25NR}$	RF A	23858	24670

Results Multi RAT ESS NR and LTE

ESS NR 90% and LTE 10% FR1/E-TM1.1

Diagram	Symbolic name	Tested Port	Occupied BW (99%) [kHz]	Emission BW (26dB) [kHz]
	$MESS_{10NR+LTE}$	RF A	9253	9730
1.22	$MESS_{20NR+LTE}$	RF A	18859	19745

Diagram 1.1 LTE: E-TM1.1, B_{5LTE}, Port B:

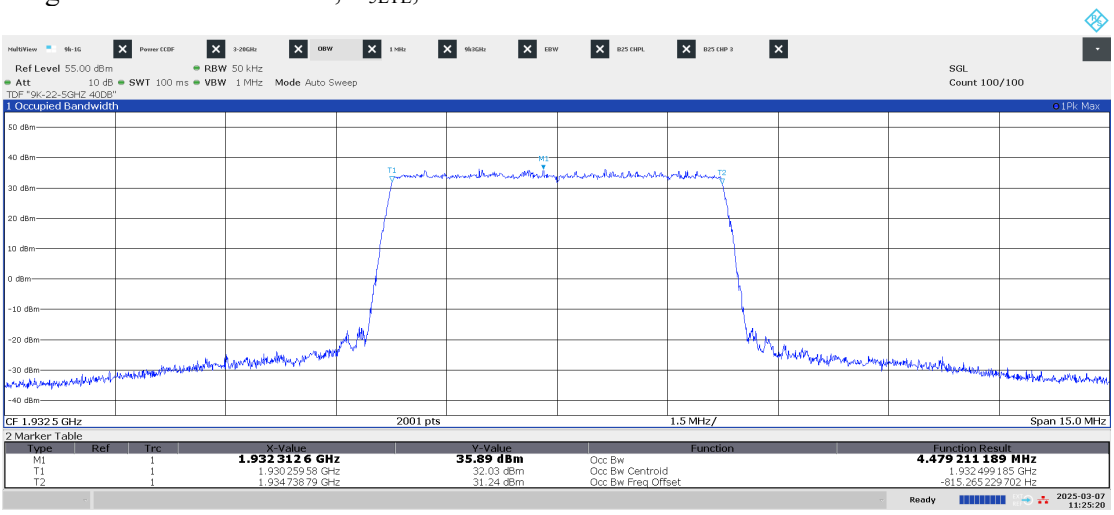


Diagram 1.2 LTE: E-TM1.1, B_{10LTE}, Port C:

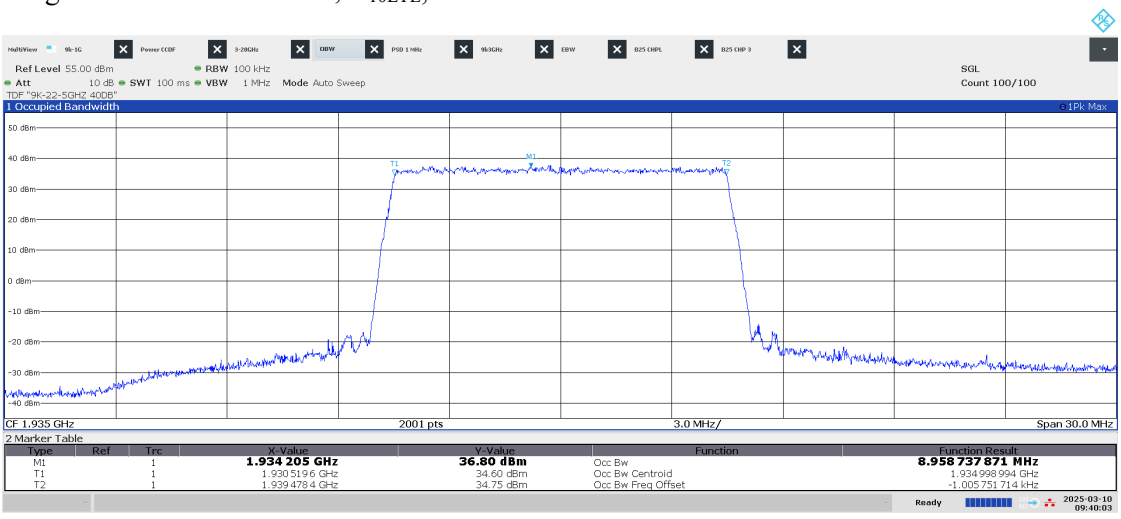


Diagram 1.3 LTE: E-TM3.1, B_{20LTE}, Port A:

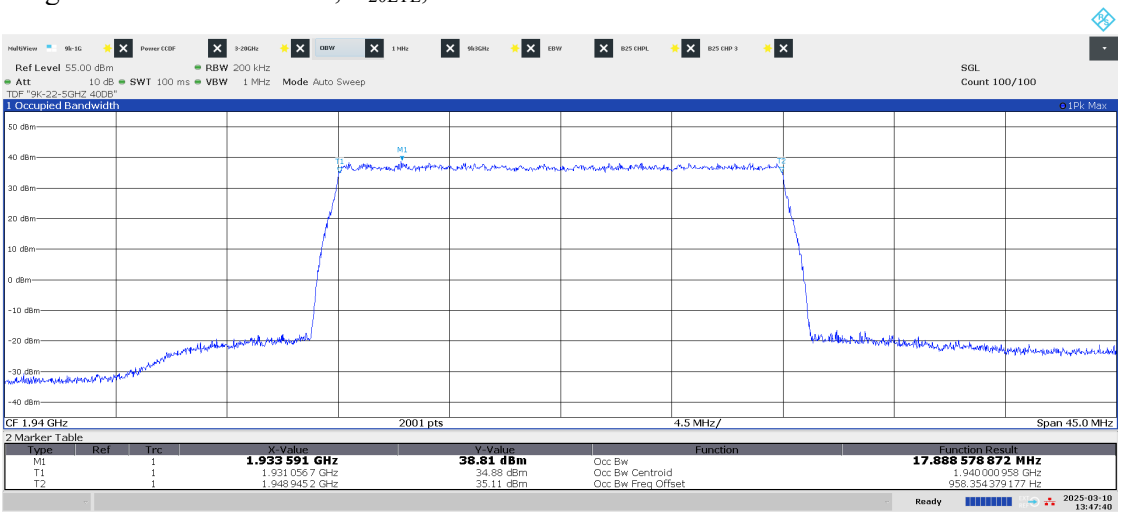


Diagram 1.4 LTE: E-TM1.1, M_{15LTE}, Port C:

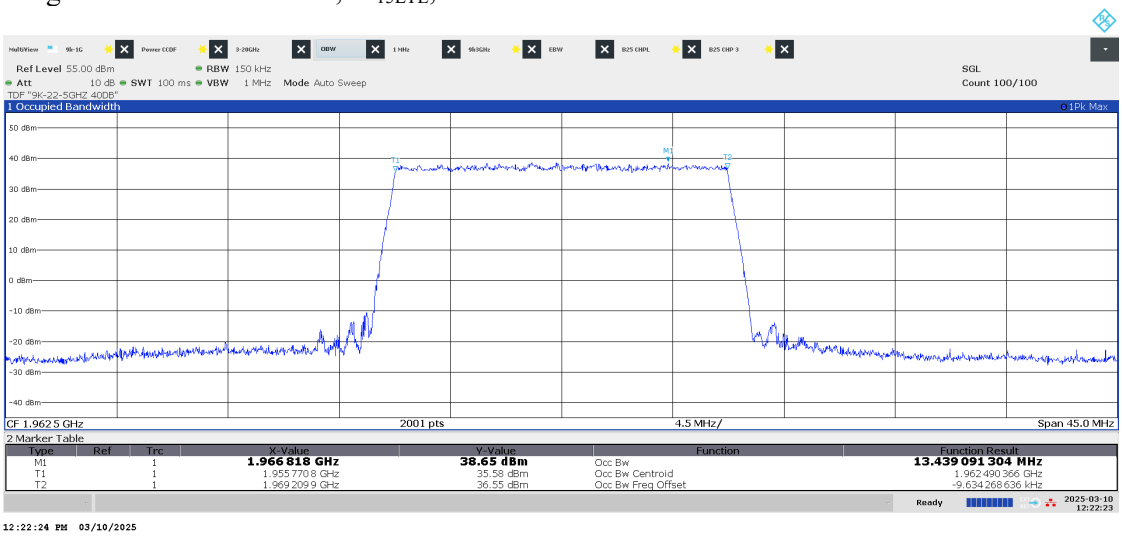


Diagram 1.5 LTE: E-TM3.1, M_{5LTE}, Port A:

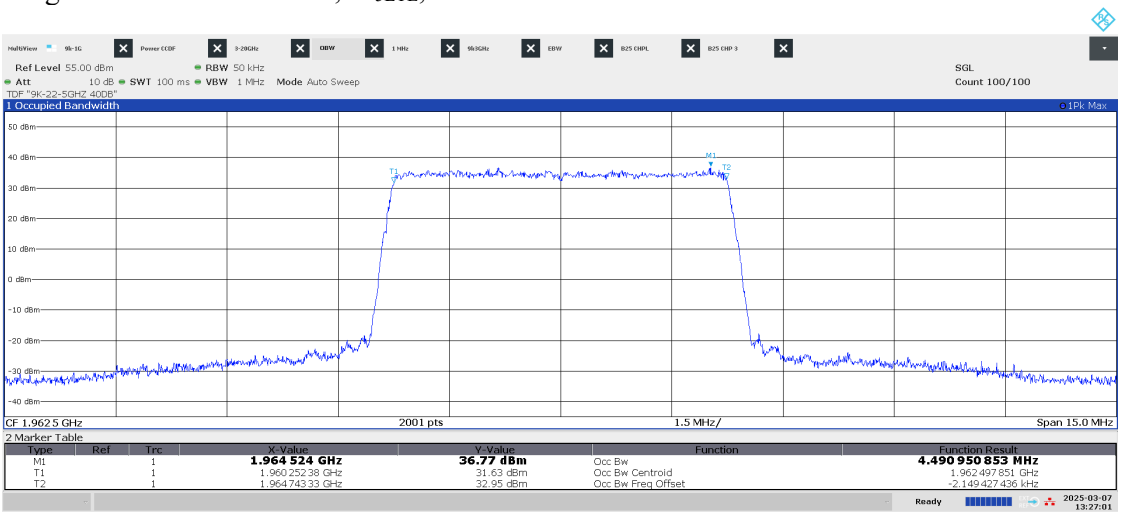


Diagram 1.6 LTE: E-TM1.1, CA_{LTE}, Port A:

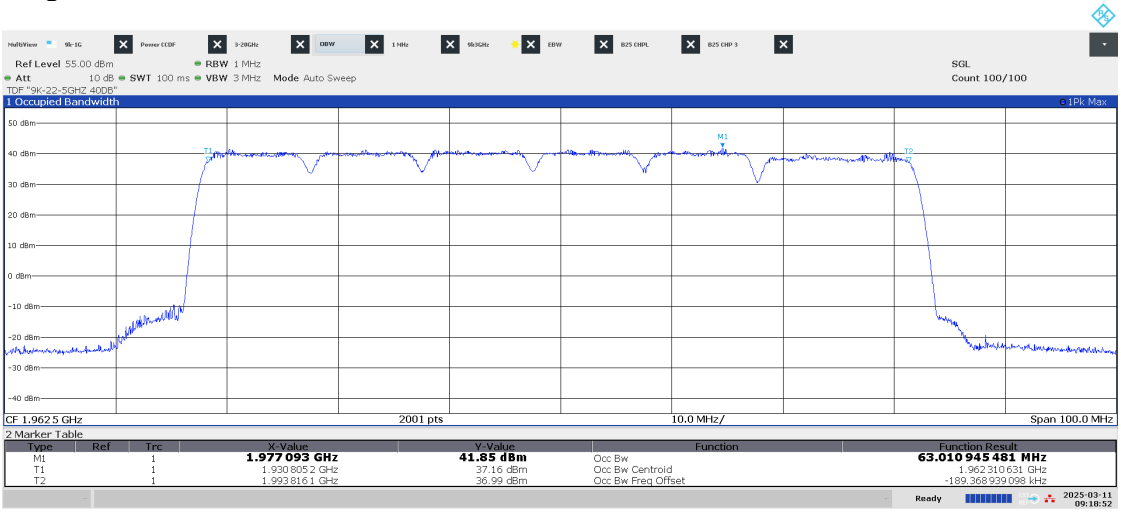


Diagram 1.7 NR: FR1-TM1.1, B_{5NR}, Port D:

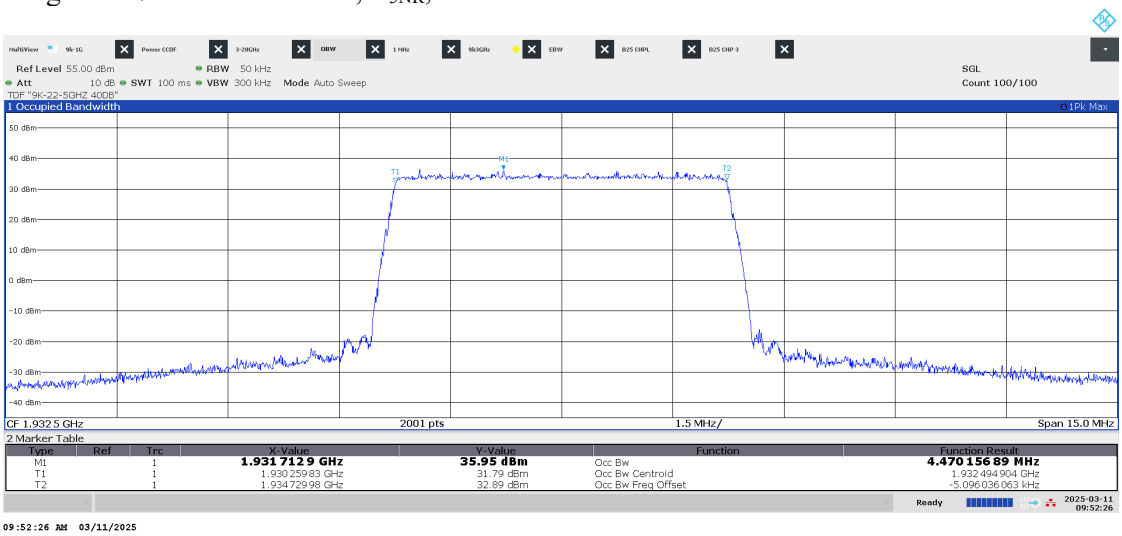


Diagram 1.8 NR: FR1-TM1.1, M_{10NR}, Port B:

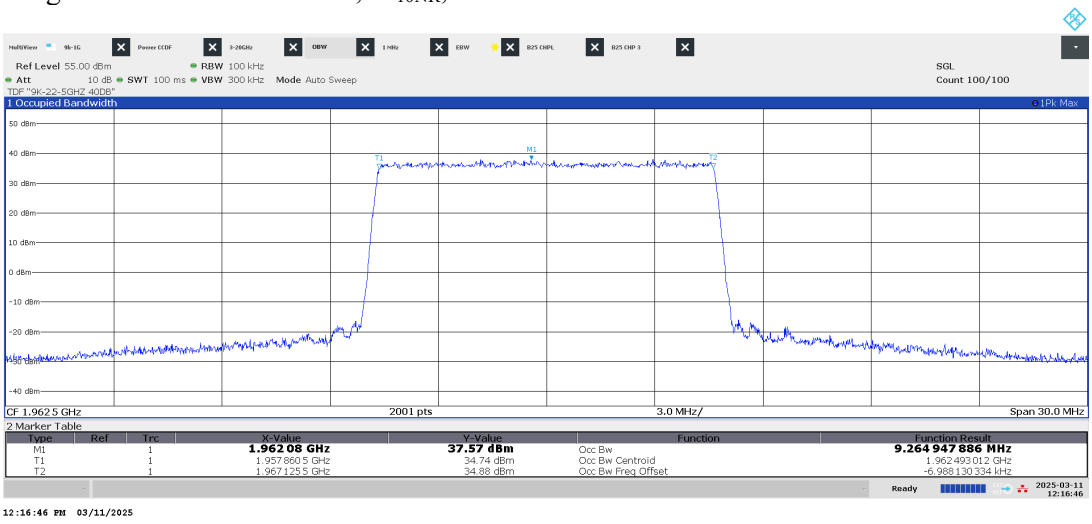


Diagram 1.9 NR: FR1-TM1.1, M_{15NR}, Port D:

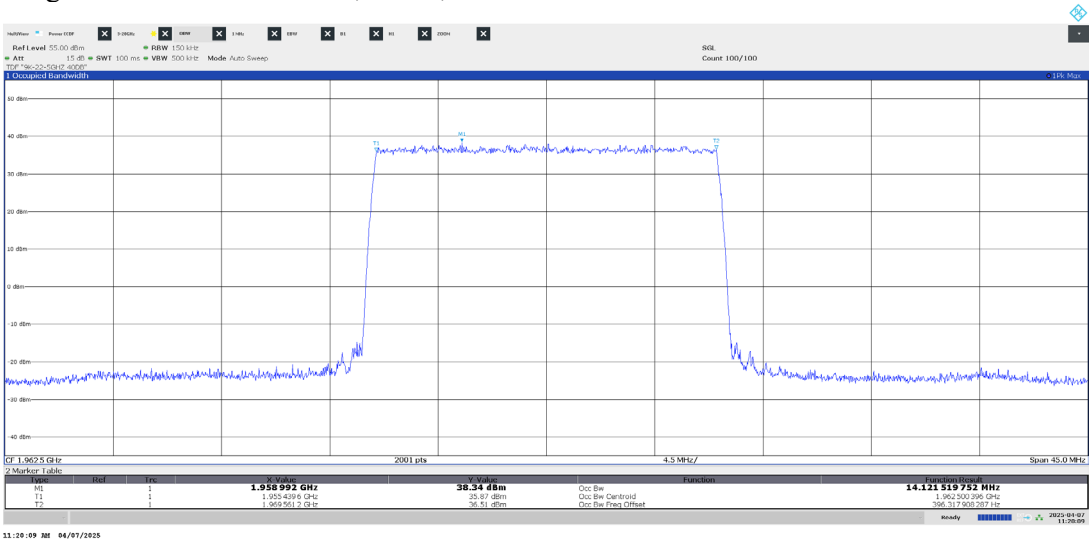


Diagram 1.10 NR: FR1-TM1.1, M_{20NR}, Port C:

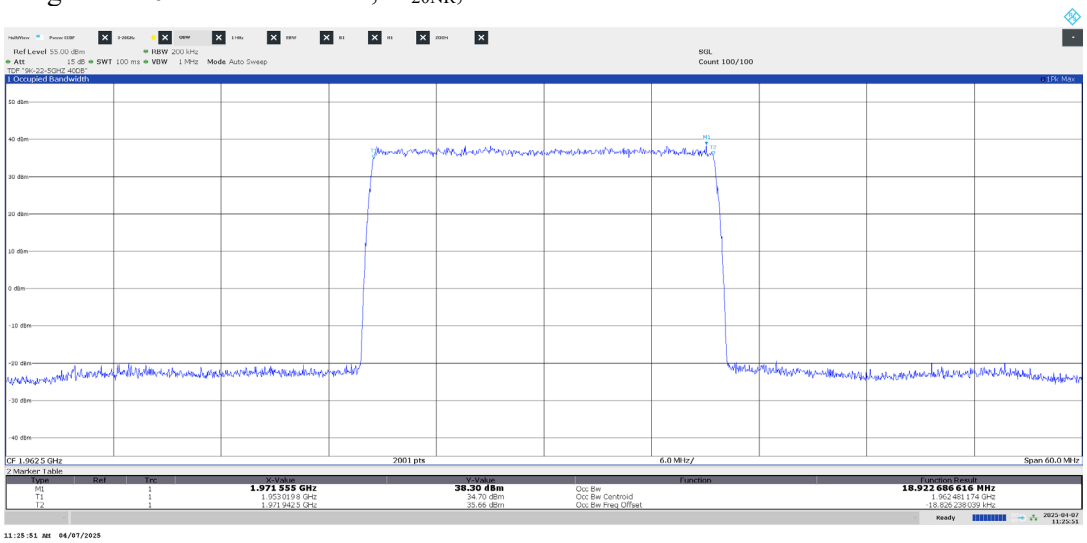


Diagram 1.11 NR: FR1-TM1.1, M_{25NR}, Port D:

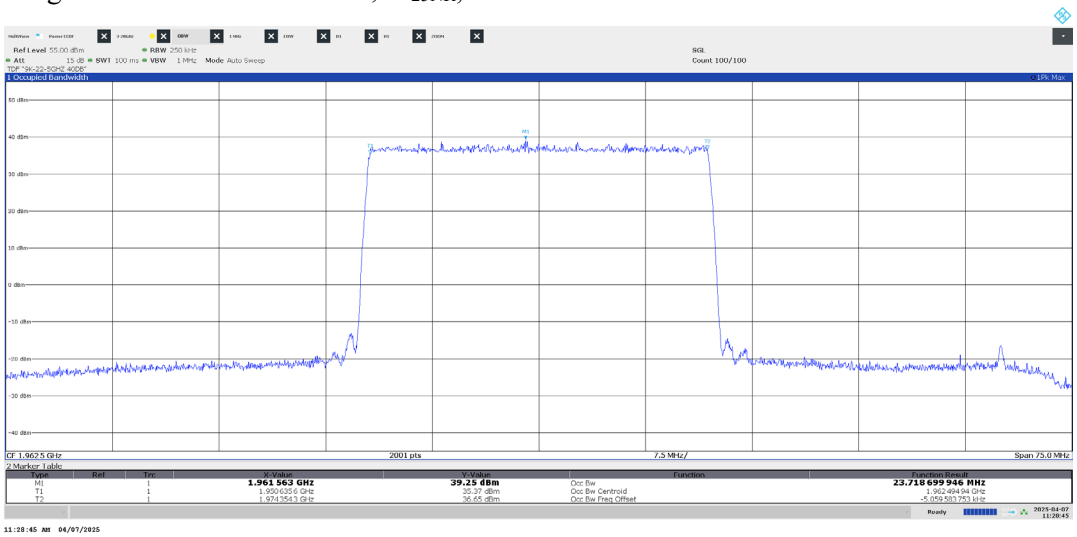


Diagram 1.12 NR: FR1-TM1.1, M_{30NR}, Port B:

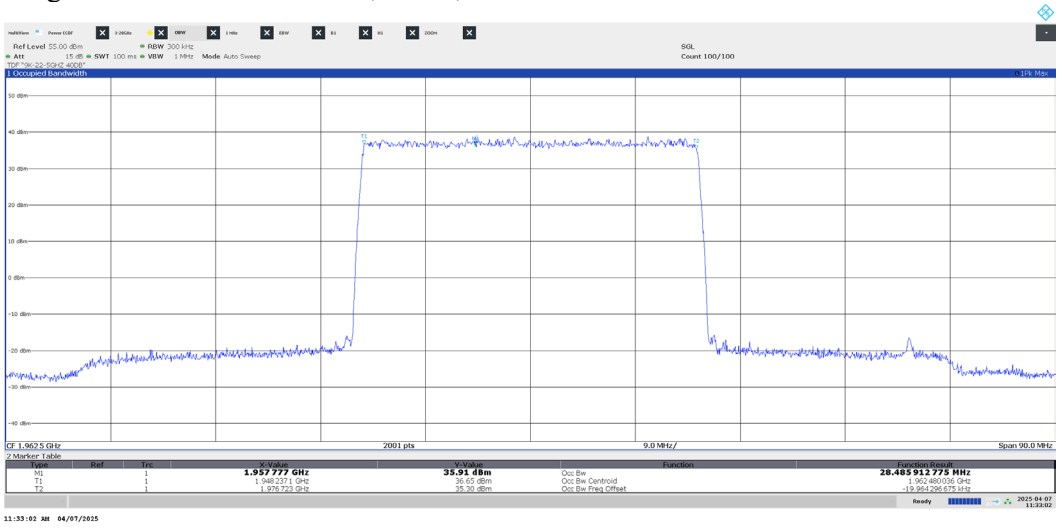


Diagram 1.13 NR: FR1-TM1.1, M_{40NR}, Port A:

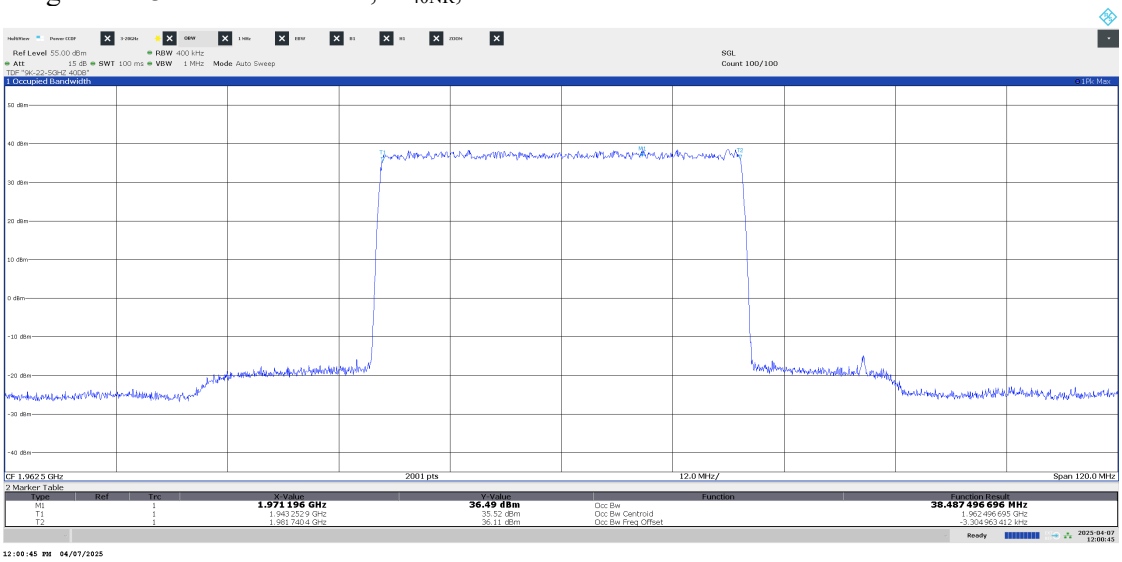


Diagram 1.14 NR: FR1-TM1.1, CA_{NR}, Port A:

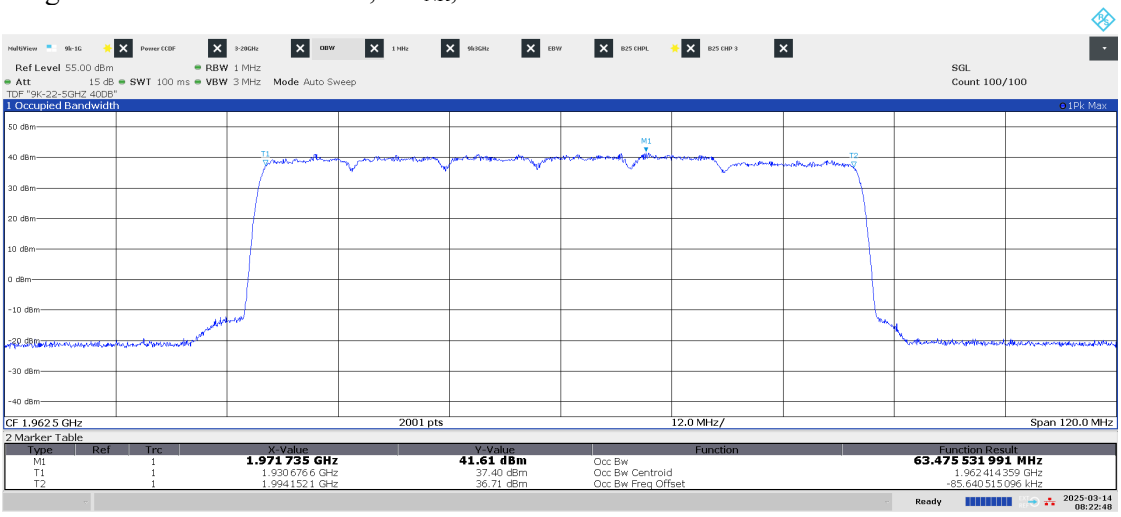


Diagram 1.15 NB IoT SA: N-TM, $M_{IOT\ SA}$, Port A:

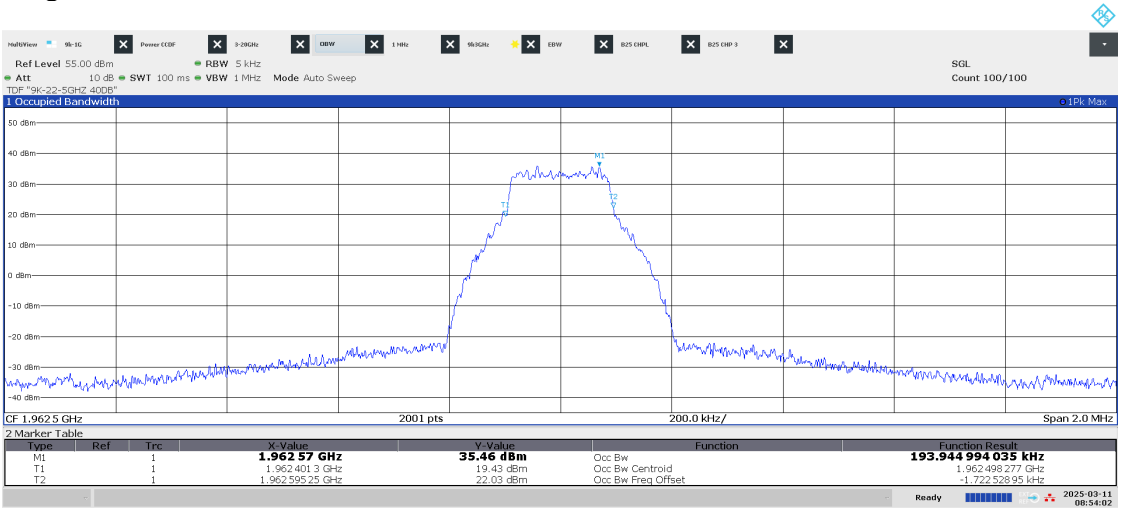


Diagram 1.16 LTE: E-TM3.1, NB IoT: N-TM, $B_{GB+10LTE}$, Port A:

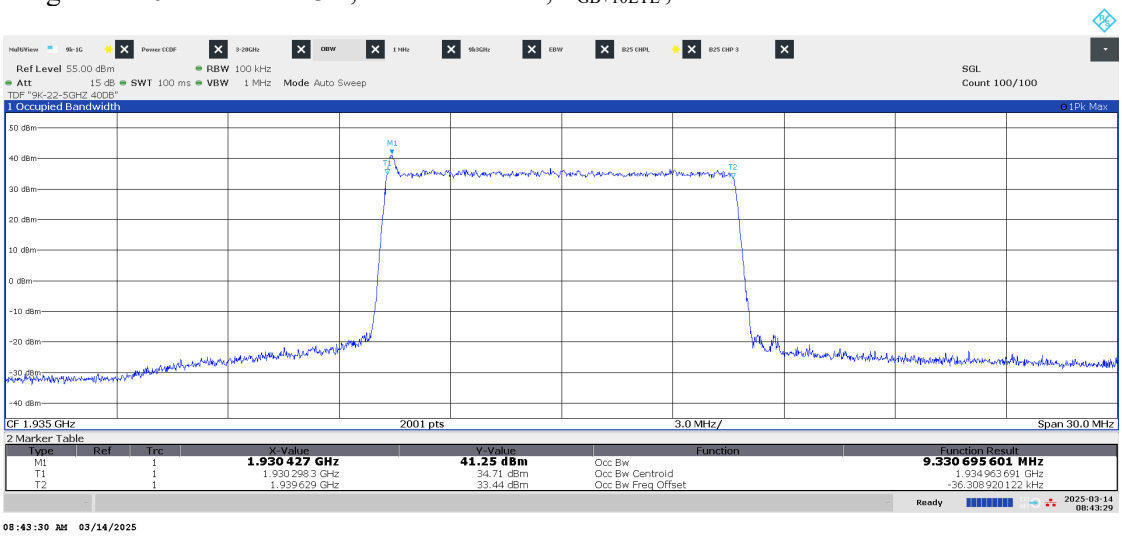


Diagram 1.17 NR: FR1-TM1.1, NB IoT: N-TM, B_{IB+5NR}, Port A:

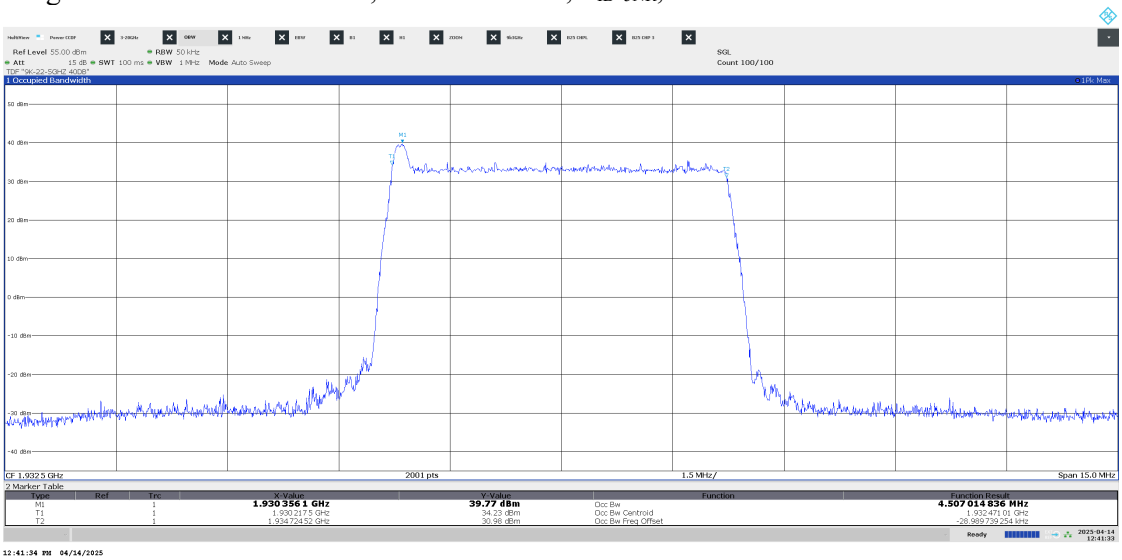


Diagram 1.18 NR: FR1-TM1.1, NB IoT: N-TM, $B_{IB+10NR}$, Port A:

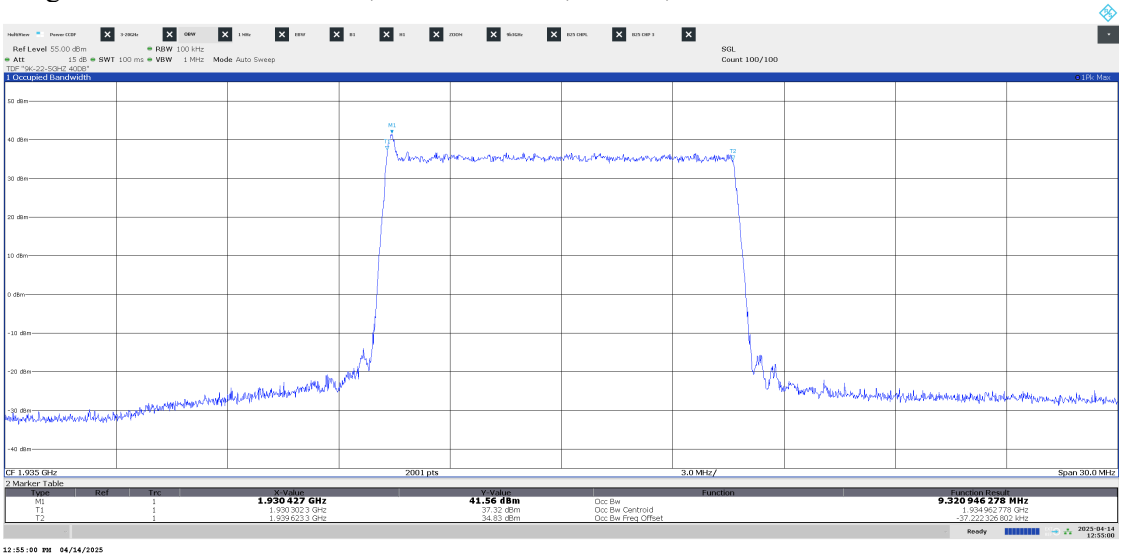


Diagram 1.19 NR: FR1-TM1.1, NB IoT: N-TM, $B_{IB+15NR}$, Port A:

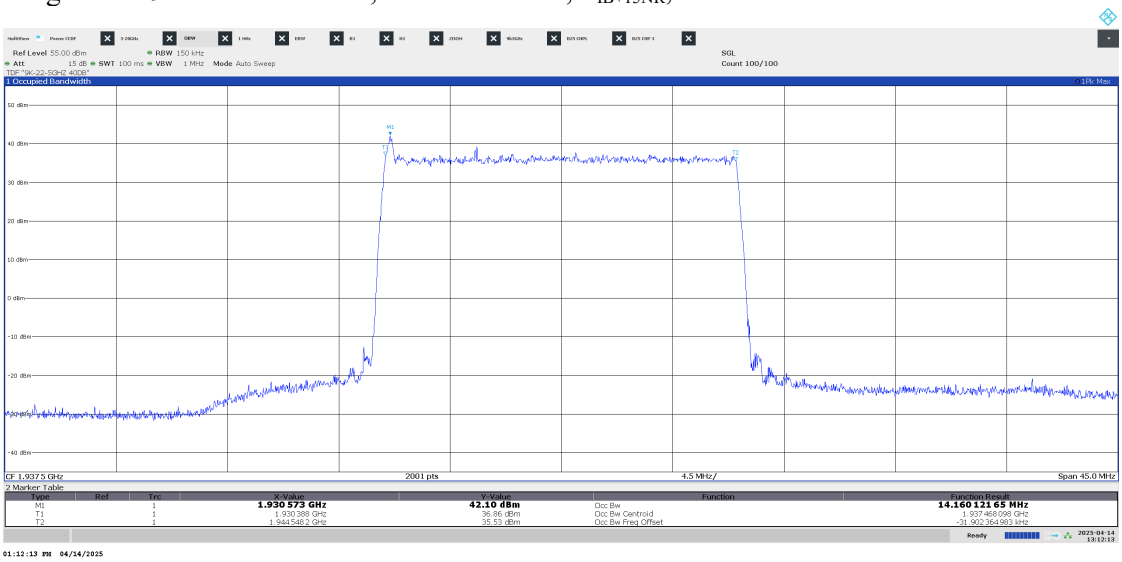


Diagram 1.20 NR: FR1-TM1.1, NB IoT: N-TM, $B_{IB+20NR}$, Port A:

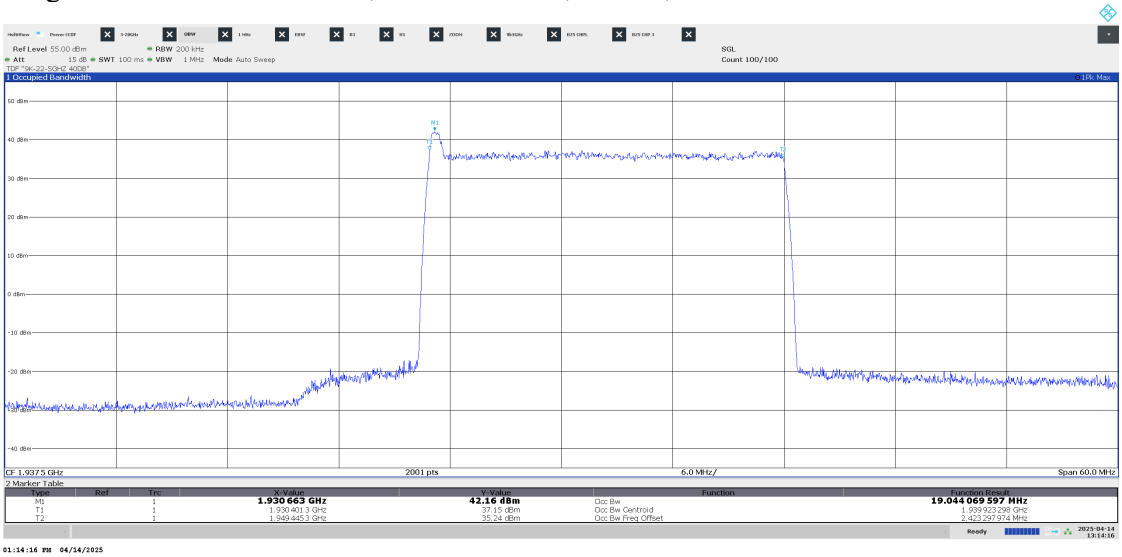


Diagram 1.21 NR: FR1-TM1.1, NB IoT: N-TM, $B_{IB+25NR}$, Port A:

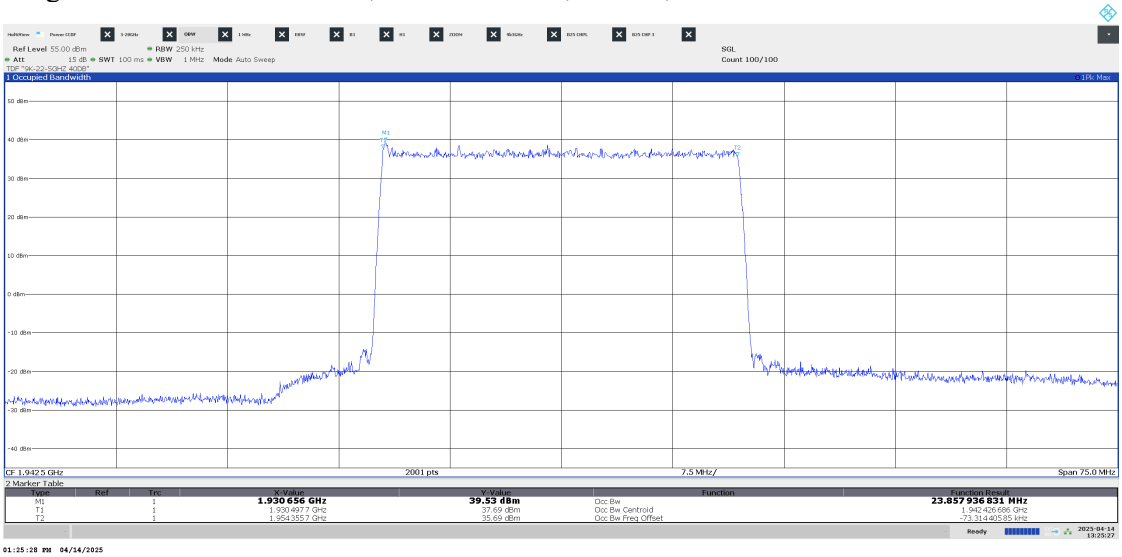
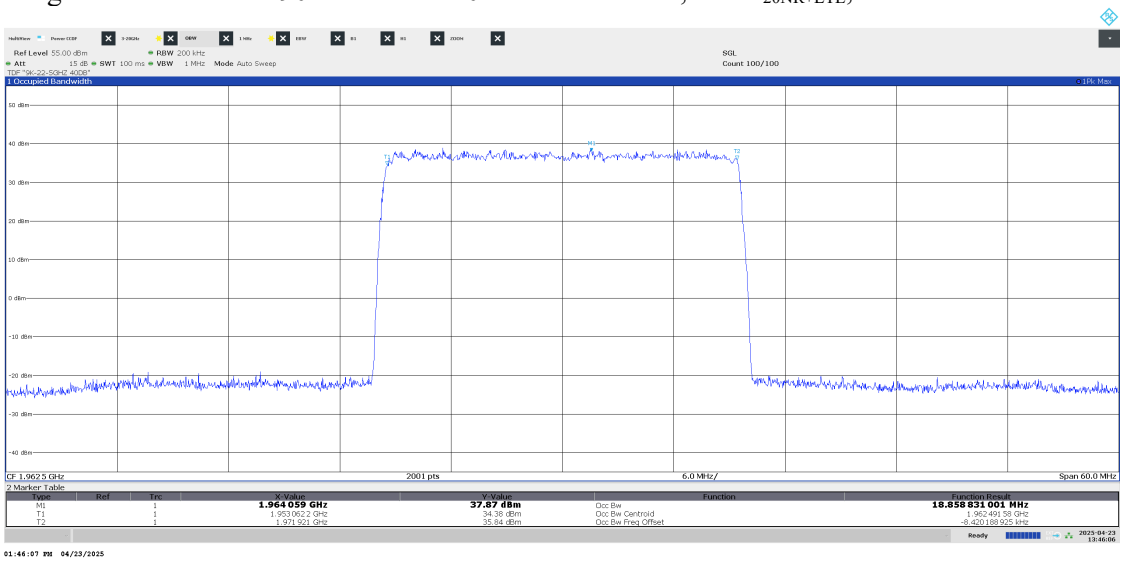


Diagram 1.22 ESS NR 90% and LTE 10% FR1/E-TM1.1, $MESS_{20NR+LTE}$, Port A:



Band edge measurements according to CFR 47 §24.238 / RSS-133 5.6

Date	Temperature	Humidity
2025-03-17	22 °C ± 3 °C	22 % ± 5 %
2025-03-18	23 °C ± 3 °C	29 % ± 5 %
2025-03-19	22 °C ± 3 °C	29 % ± 5 %
2025-04-03	23 °C ± 3 °C	33 % ± 5 %
2025-04-07	23 °C ± 3 °C	32 % ± 5 %
2025-04-15	23 °C ± 3 °C	33 % ± 5 %

Test set-up and procedure

The measurements were made per definition in ANSI C63.26, 5.7.2. The test object was connected to a spectrum analyzer with the RMS detector activated.

For each supported Bandwidth configuration the Channel power Bandwidth of at least 1% of the Emission Bandwith were used within 1 MHz from the Band edge frequency.

For each supported Bandwidth configuration the Channel power Bandwidth of 1 MHz were used from 1 MHz away from the Band edge frequency.

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})".

Measurement equipment	RISE number
R&S FSW 43	902 073
RF attenuator	902 282
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

Single carrier LTE: E-TM1.1

Diagram	Symbolic name	Tested Port
2.1	B_{5LTE}	RF A
2.2	B_{10LTE}	RF B
2.3	T_{5LTE}	RF A
2.4	T_{10LTE}	RF C
2.5	B_{15LTE}	RF A
2.6	T_{15LTE}	RF A
2.7	B_{20LTE}	RF A
2.8	T_{20LTE}	RF A

Results NR

Single carrier NR: FR1-TM1.1

Diagram	Symbolic name	Tested Port
2.9	B_{5NR}	RF B
2.10	B_{10NR}	RF A
2.11	B_{15NR}	RF A
2.12	B_{20NR}	RF A
2.13	T_{5NR}	RF A
2.14	T_{10NR}	RF A
2.15	T_{15NR}	RF A
2.16	T_{20NR}	RF A
2.17	B_{25NR}	RF A
2.18	T_{25NR}	RF A
2.19	B_{30NR}	RF A
2.20	T_{30NR}	RF A
2.21	B_{40NR}	RF A
2.22	T_{40NR}	RF A

Results LTE with NB IoT GB

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

Diagram	Symbolic name	Tested Port
2.23	$B_{GB+10LTE}$	RF A
2.24	$T_{GB+10LTE}$	RF A
2.25	$B_{GB+15LTE}$	RF A
2.26	$T_{GB+15LTE}$	RF A
2-27	$B_{GB+20LTE}$	RF A
2.28	$T_{GB+20LTE}$	RF A

Results LTE with NB IoT IB

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

Diagram	Symbolic name	Tested Port
2.29	$B_{IB+5LTE}$	RF A
2.30	$T_{IB+5LTE}$	RF A
2.31	$B_{IB+10LTE}$	RF A
2.32	$T_{IB+10LTE}$	RF A
2.33	$B_{IB+15LTE}$	RF A
2.34	$T_{IB+15LTE}$	RF A
2.35	$B_{IB+20LTE}$	RF A
2.36	$T_{IB+20LTE}$	RF A

Results NR with NB IoT IB

Single carrier NR: FR1-TM1.1, NB IoT: N-TM

Diagram	Symbolic name	Tested Port
2.37	B_{IB+5NR}	RF A
2.38	T_{IB+5NR}	RF A
2.39	$B_{IB+10NR}$	RF A
2.40	$T_{IB+10NR}$	RF A
2.41	$B_{IB+15NR}$	RF A
2.42	$T_{IB+15NR}$	RF A
2.43	$B_{IB+20NR}$	RF A
2.44	$T_{IB+20NR}$	RF A
2.45	$B_{IB+25NR}$	RF A
2.46	$T_{IB+25NR}$	RF A

Results NB IoT SA

Single carrier: NB IoT: N-TM

Diagram	Symbolic name	Tested Port
2.47	$B_{IOT\ SA}$	RF A
2.48	$T_{IOT\ SA}$	RF A

Results Multi RAT ESS NR and LTE

Single carrier: ESS NR 90% and LTE 10% TM1.1

Diagram	Symbolic name	Tested Port
2.49	$BESS_{10NR+LTE}$	RF A
2.50	$TESS_{10NR+LTE}$	RF A
2.51	$BESS_{20NR+LTE}$	RF A
2.52	$TESS_{20NR+LTE}$	RF A

Limits

§24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(a) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB,
-13 dBm.

(b) *Measurement procedure.* Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified).

The emission bandwidth is defined as the width of the signal between two points, one below the carrier centre frequency and one above the carrier centre frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

RSS-133 5.6 Unwanted emission limits

Unwanted emissions shall be measured in terms of average values while the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen.

Equipment shall meet the unwanted emission limits, –13 dBm, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment’s operating frequency range.

For the unwanted emission limits, in the 1 MHz bands immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth (OBW). Beyond these 1 MHz bands, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth may be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% of the OBW, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed –13 dBm.

Complies?	Yes

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

Diagram 2.2 LTE: E-TM1.1, B_{10LTE}, Port B:

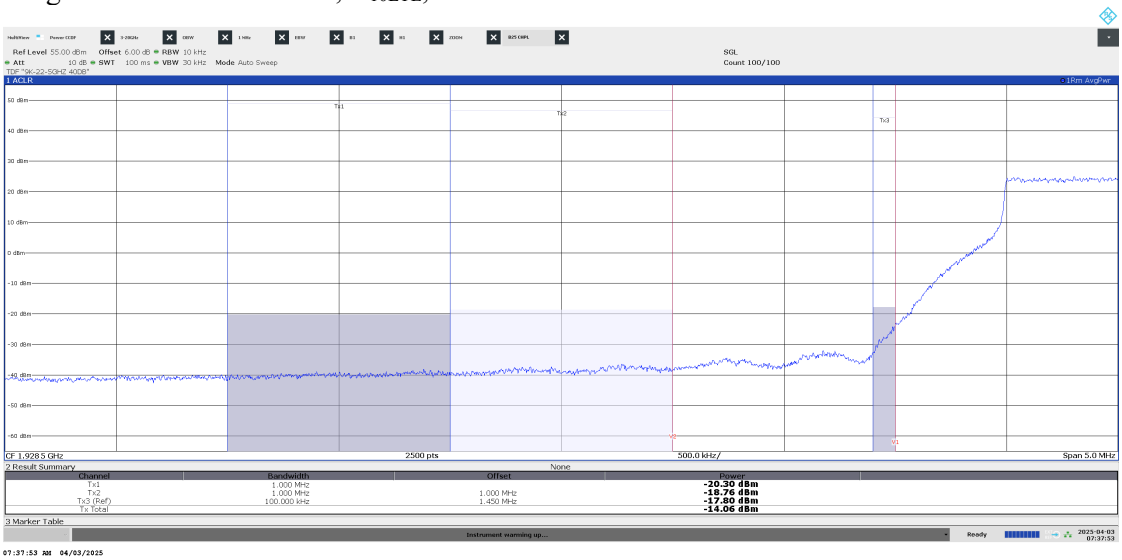


Diagram 2.3 LTE: E-TM1.1, T_{5LTE}, Port A:

Diagram 2.4 LTE: E-TM1.1, T_{10LTE}, Port A:

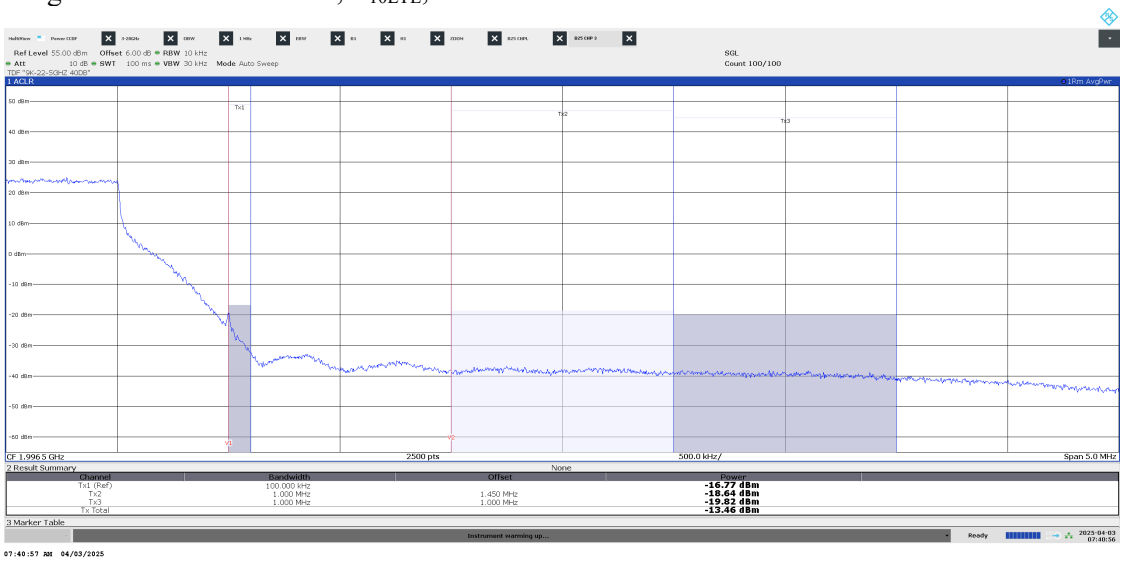


Diagram 2.5 LTE: E-TM1.1, B_{15LTE}, Port A:

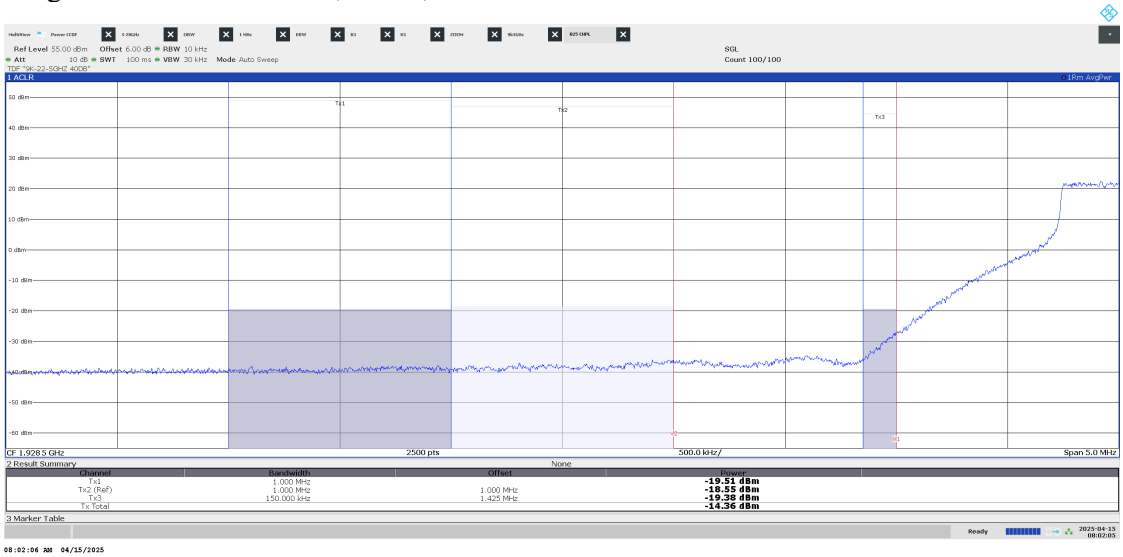


Diagram 2.6 LTE: E-TM1.1, T_{15LTE}, Port A:

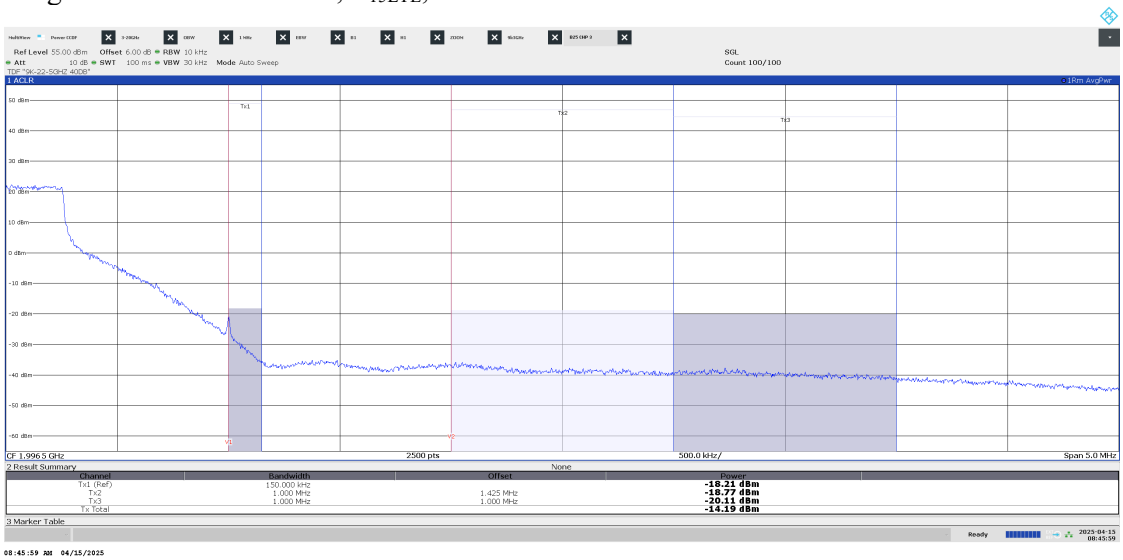


Diagram 2.7 LTE: E-TM1.1, $B_{20\ LTE}$, Port A:

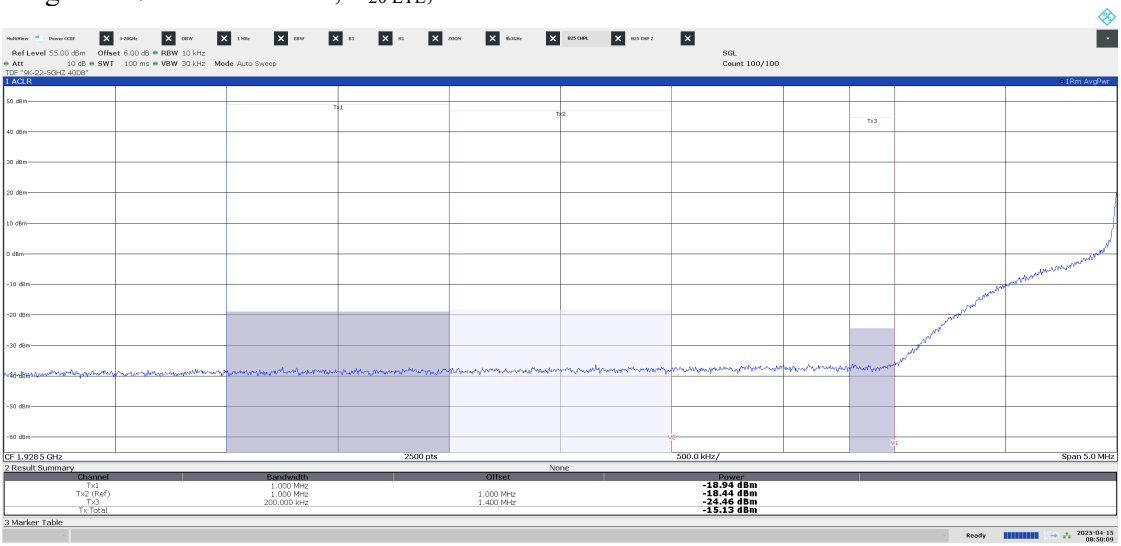


Diagram 2.8 LTE: E-TM1.1, $T_{20\ LTE}$, Port A:

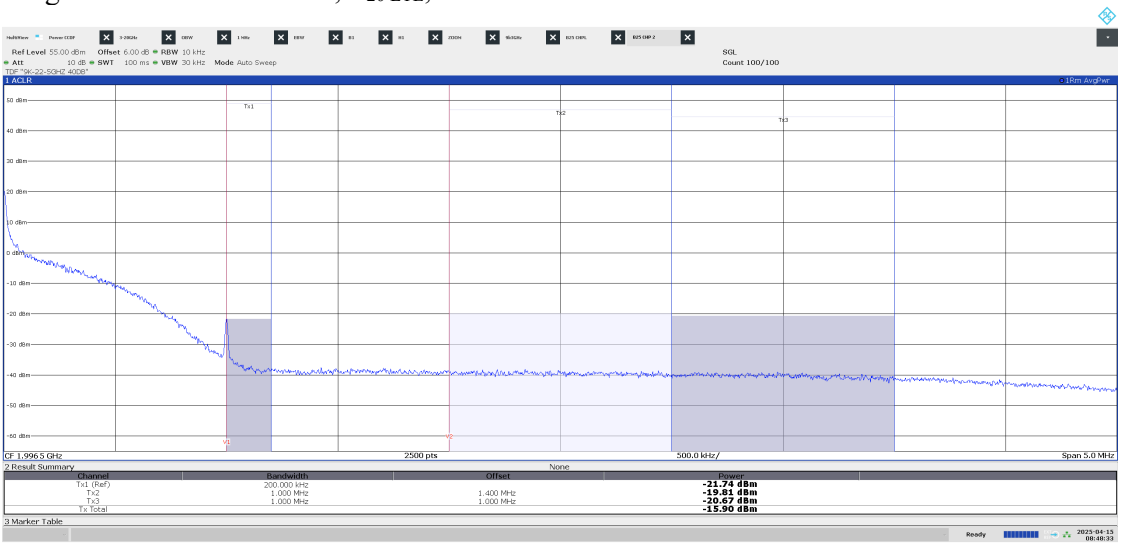


Diagram 2.9 NR: FR1-TM1.1, B_{5NR}, Port A:

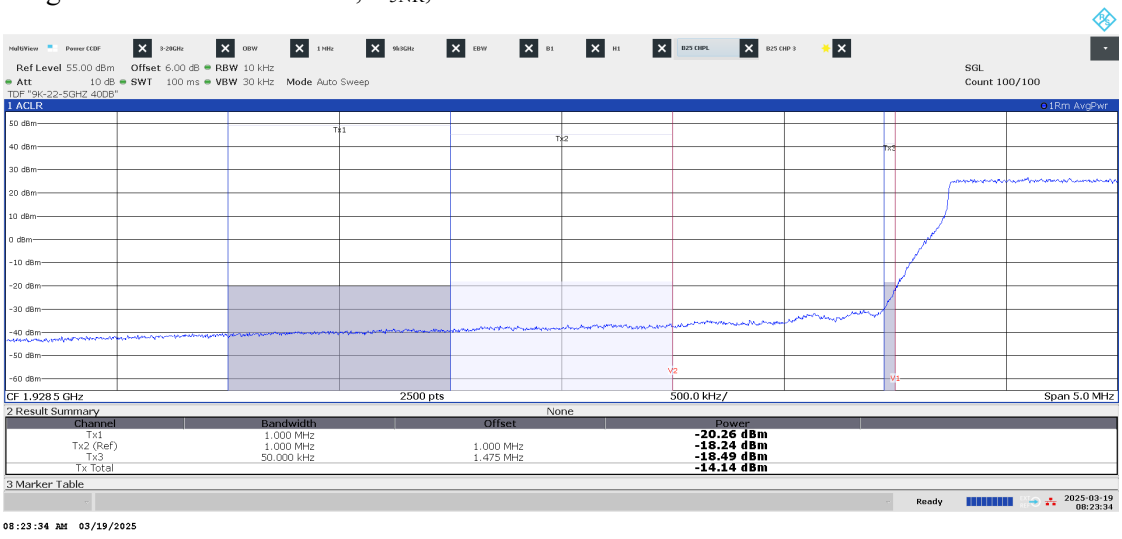


Diagram 2.10 NR: FR1-TM1.1, B_{10NR}, Port A:

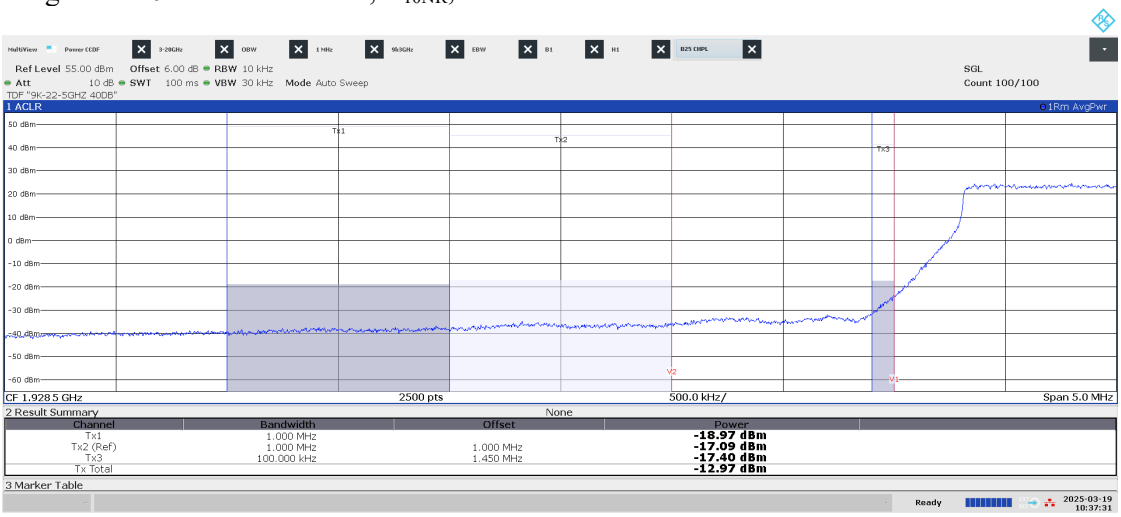


Diagram 2.11 NR: FR1-TM1.1, B_{15NR}, Port A:

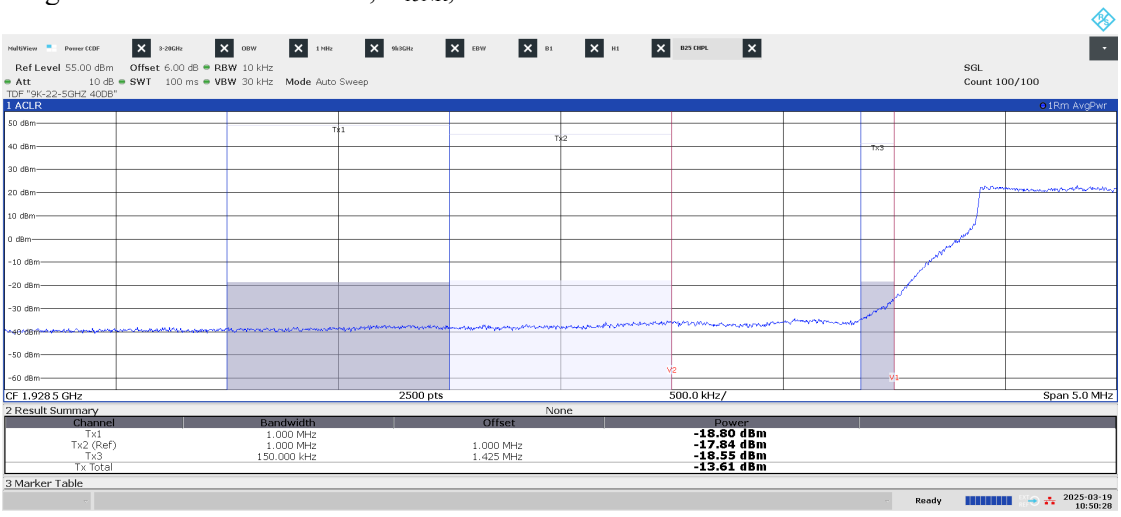
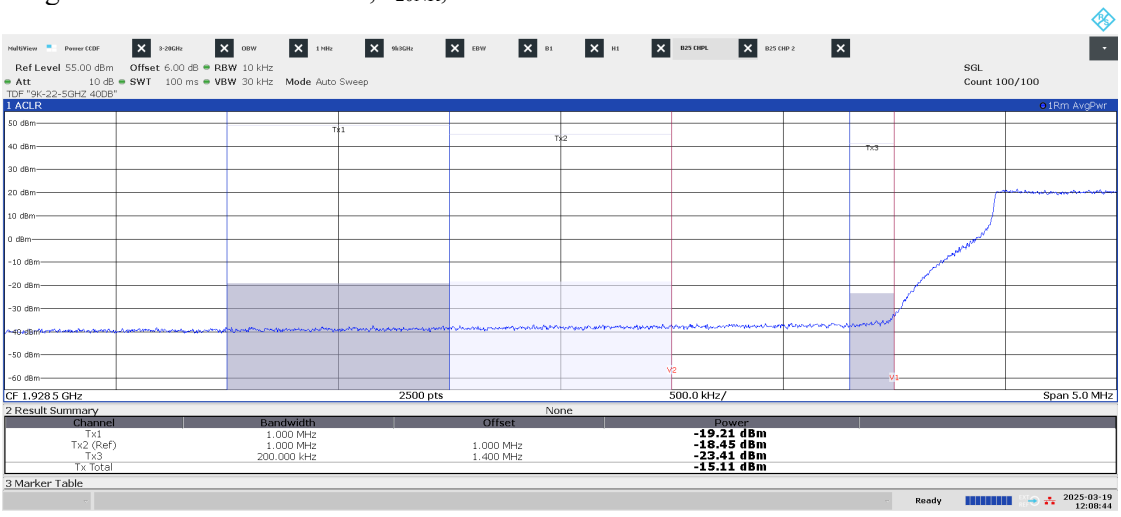


Diagram 2.12 NR: FR1-TM1.1,B_{20NR}, Port A:



Verification

Transaction 09222115557545297505

Document

P124914-F2_Part 1
Main document
50 pages
Initiated on 2025-04-28 08:42:30 CEST (+0200) by Björn Skönvall (BS)
Finalised on 2025-04-28 09:26:30 CEST (+0200)

Signatories

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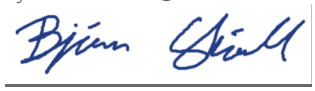

Signed 2025-04-28 08:43:45 CEST (+0200)

Daniel Lundgren (DL)
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Signed 2025-04-28 09:26:30 CEST (+0200)

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