



TEST REPORT

No. 24T04Z102605-003

for

Baicells Technologies Co., Ltd.

Product Name: NeutrinoE224

Model Name: pBS42020

FCC ID: 2AG32PBS42020

with

Hardware Version: B01

Software Version: BaiBS_QAFA_2.17.5.7.1

Issued Date: 2024-12-02

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z102605-003	Rev.0	1 st edition	2024-11-26
24T04Z102605-003	Rev.1	Editorial modifications	2024-12-02

Note: the latest revision of the test report supersedes all previous version.

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1: CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China100191

Location 2: CTTL (BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, P. R. China 100176

1.3. Project date

Testing Start Date: 2024-11-12

Testing End Date: 2024-12-02

1.4. Signature



Dong Yuan

(Prepared this test report)



Zhou Yu

(Reviewed this test report)



Zhao Hui Lin

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: Baicells Technologies Co., Ltd.
Address: 9-10F, 1stBldg., No.81 Beiqing Road, Haidian District, Beijing, China
City: Beijing
Country: China
Contact: Back Huang
Telephone: 010-62607100
Email: contact@baicells.com

2.2. Manufacturer Information

Company Name: Baicells Technologies Co., Ltd.
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City: Beijing
Country: China
Contact: Back Huang
Telephone: 010-62607100
Email: contact@baicells.com

3. Equipment Under Test (EUT)

3.1. About EUT

Description	NeutrinoE224
Model Name	pBS42020
Antenna Gain	5dBi
Supported Channel bandwidth	LTE: 5/10/15/20 MHz
Output Power(*)	EIRP maximum 29dBm
Number of Antenna ports	2
Frequency range(*)	Band7 2620MHz-2690MHz
Type of modulation	QPSK, 16QAM, 64QAM
Extreme Temperature	-5°C to +45°C
Normal Voltage	12V DC

(*): Declared by applicant.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Date of receipt
UT01a	120200061024ABB0003	B01	BaiBS_QAFA_2.17.5.7.1	2024-11-11
UT02a	120200061024ABB0005	B01	BaiBS_QAFA_2.17.5.7.1	2024-11-11

*EUT ID: is used to identify the test sample in the lab internally.

Note: UT02a was for radiated test, and UT01a was for conducted test.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1, AE2	Charger
AE1, AE2	
Model	S24B72-120A200-0K
Manufacturer	Shenzhen Gongjin Electronics Co.,Ltd

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment Under Test (EUT) pBS42020 is a LTE indoor base station which provides communication connections to 2620-2690 MHz network. The EUT operates from a 12V DC supply.

The EUT includes 2 TX/RX ports. It can operate in LTE single RAT mode. It can be configured to transmit in MIMO mode which was used for measurements as the worst configuration. The complete testing was performed with the EUT transmitting at rated maximum RF power unless otherwise stated.

A full technical description can be found in the Manufacturer's documentation.

3.5. Configuration Description

The following settings were used to represent all traffic scenarios. The output power was measured on the bottom, middle and top channel of all applicable antenna ports. By measuring the output power of QPSK, 16QAM and 64QAM for LTE on one of the antenna ports, it was determined that QPSK was the worst-case modulation scheme and was used for all testing.

Complete testing was carried out on the worst-case antenna port which was established as being the highest output power from the applicable measured ports on worst case modulation scheme. This antenna port was Port 1 for LTE mode.

The settings below were used for all measurements unless otherwise noted:

LTE

Configuration	Carrier	Carrier Bandwidth	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
LTE-MIMO-1C	1LTE	5MHz	2622.5	2655.0	2687.5
LTE-MIMO-1C	1LTE	10MHz	2625.0	2655.0	2685.0
LTE-MIMO-1C	1LTE	15MHz	2627.5	2655.0	2682.5
LTE-MIMO-1C	1LTE	20MHz	2630.0	2655.0	2680.0

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-23 Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	10-1-23 Edition
ANSI 63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v03r01
KDB 662911 D01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band	v02r01

5. Laboratory Environment

Control room / conducted chamber did not exceed following limits along the testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

Anechoic chamber did not exceed following limits along the testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ± 3.9 dB, 3 m distance
Site voltage standing-wave ratio (S_{VSWR})	< 5 dB, from 1GHz to 18GHz

6. Summary of Test Results

Items	Test Name	Clause in ISED rules	Verdict
1	Transmitter Output Power / PAPR	27.50(h), 2.1046	Pass
2	Occupied Bandwidth	27.53 (m), 2.1049	Pass
3	Transmitter unwanted emissions at Band Edge	27.53 (m), 2.1051	Pass
4	Transmitter unwanted emissions - Conducted Spurious Emission	27.53 (m), 2.1051	Pass
5	Radiated Spurious Emission	27.53 (m)	Pass
6	Frequency Stability	2.1055	Pass

7. Test Equipment Utilized

Description	Type	Series Number	Manufacture	Cal Due Date	Calibration Interval
Spectrum Analyzer	FSV30	101525	R&S	2025-01-18	1 year
Antenna	VULB9163	9163-482	Schwarzbeck	2025-05-19	1 year
Antenna	9117	167	Schwarzbeck	2026-10-15	3 years
Antenna	LB-7180-NF	J203001300005	A-INFO	2025-05-16	1 year
Antenna	3115	00146404	ETS-Lindgren	2025-05-16	1 year
Signal generator	SMF100A	101295	R&S	2025-02-04	1 year
Spectrum Analyzer	FSW	104038	R&S	2025-07-02	1 year
DC Power Supply	PCR2000M	PJ000583	Kikusui	2025-5-13	1 year
10dB Attenuator	4A-10dB	64671	INMET	-	-
Climate Chamber	GPS-4	0010-003512	Espec	2025-3-18	1 year

Test Item	Test Software	Software Vendor
Emission Limit	ELEKTRA 5.00.2	R&S

8. Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Discipline	Measurement Uncertainty
Conducted Maximum Peak Output Power	0.68dB
Occupied Bandwidth	439.79kHz
Conducted Unwanted Emissions	4.5dB
Frequency Stability	11Hz
Radiated Spurious Emissions	<1GHz 2.21dB, k=2 >1GHz 3.10dB, k=2

Measurement uncertainty is not taken into account when stating conformity with a specified requirement.

ANNEX A: Measurement Results

A.1 Maximum Output Power

A.1.1 Reference

FCC CFR 47 Part 2, Clause 2.1046

FCC CFR 47 Part 27, Clause 27.50(h)

A.1.2 Method of Measurements

During the process of testing, the EUT was configured to transmit on maximum power and proper modulation. The transmitter power shall be measured in terms of a root-mean-square (RMS) average value. In case of the EUT was configured to MIMO mode, since the EUT transmits on all antennas simultaneously in the same frequency range, using the Measure-and-Sum approach, the output power at all antennas were tested, and the total output power were then summed mathematically in linear power units according to FCC KDB 662911 D01.

A peak to average ratio measurement is performed at the conducted ports of the EUT for single carrier for single RAT mode. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) was used and 0.1% probability value recorded.

A.1.3 Limit

EIRP Power: $33\text{dBW} + 10\lg(X/Y)\text{dBW}$

where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition.

A.1.4 Measurement result

Configuration LTE-MIMO-1C

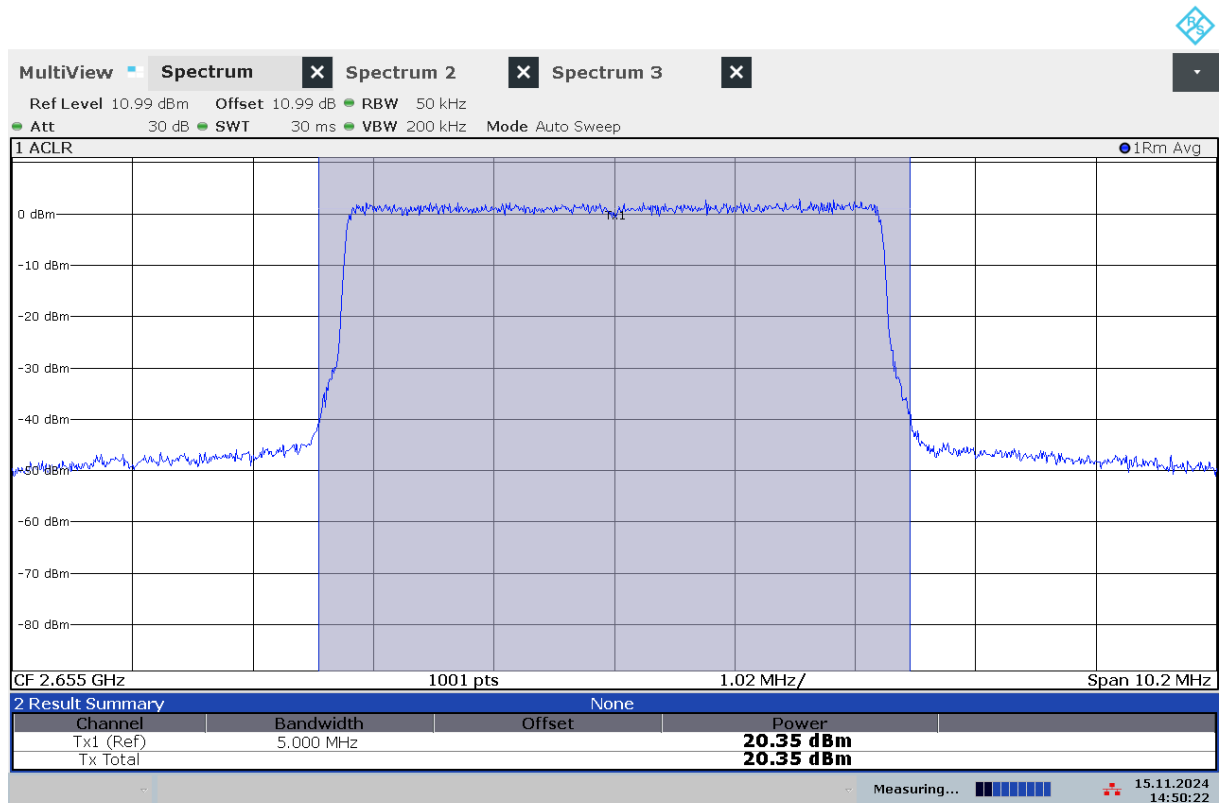
Port	Modulation/ Carrier Bandwidth (MHz)	Output Power								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (dB)	POWER (dBm)	POWER (dBm/MHz)	PAR (dB)	POWER (dBm)	POWER (dBm/MHz)	PAR (dB)
1	QPSK/5 Conducted power	21.52	-	7.62	21.53	-	7.74	21.49	-	7.84
2	QPSK/5 Conducted power	20.87	-	7.68	20.35	-	7.86	20.85	-	7.81
Total calculated radiated EIRP Power		29.22	-	-	28.99	-	-	29.19	-	-
1	QPSK/10.0 Conducted power	21.07	-	7.79	21.03	-	7.84	20.61	-	7.73
2	QPSK/10.0 Conducted power	20.59	-	7.77	20.46	-	7.86	21.08	-	7.74
Total calculated radiated EIRP Power		28.85	-	-	28.76	-	-	28.86	-	-
1	QPSK/15.0 Conducted power	21.10	-	7.78	20.89	-	7.74	21.07	-	7.65
2	QPSK/15.0 Conducted power	20.95	-	7.64	21.06	-	7.71	20.86	-	7.78
Total calculated radiated EIRP Power		29.04	-	-	28.99	-	-	28.98	-	-
1	QPSK/20.0 Conducted power	20.93	-	7.75	20.47	-	7.72	20.51	-	7.74
2	QPSK/20.0 Conducted power	20.48	-	7.79	20.81	-	7.72	20.89	-	7.72
Total calculated radiated EIRP Power		28.72	-	-	28.65	-	-	28.71	-	-

Port	Modulation/ Carrier Bandwidth (MHz)	Output Power								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (dB)	POWER (dBm)	POWER (dBm/MHz)	PAR (dB)	POWER (dBm)	POWER (dBm/MHz)	PAR (dB)
1	16QAM/5 Conducted power	20.53	-	7.82	20.97	-	7.79	20.41	-	7.81
2	16QAM/5 Conducted power	20.99	-	7.78	21.21	-	7.81	20.74	-	7.80
Total calculated radiated EIRP Power		28.78	-	-	29.10	-	-	28.59	-	-
1	16QAM/10.0 Conducted power	20.75	-	7.76	20.66	-	7.88	20.72	-	7.73
2	16QAM/10.0 Conducted power	20.54	-	7.75	20.53	-	7.74	20.67	-	7.78
Total calculated radiated EIRP Power		28.66	-	-	28.61	-	-	28.71	-	-
1	16QAM/15.0	20.48	-	7.78	20.67	-	7.81	20.71	-	7.77

	Conducted power									
2	16QAM/15.0 Conducted power	20.69	-	7.73	20.72	-	7.75	20.87	-	7.78
Total calculated radiated EIRP Power		28.60	-	-	28.71	-	-	28.80	-	-
1	16QAM/20.0 Conducted power	20.76	-	7.74	20.69	-	7.72	20.71	-	7.73
2	16QAM/20.0 Conducted power	20.87	-	7.77	20.78	-	7.66	20.89	-	7.77
Total calculated radiated EIRP Power		28.83	-	-	28.75	-	-	28.81	-	-

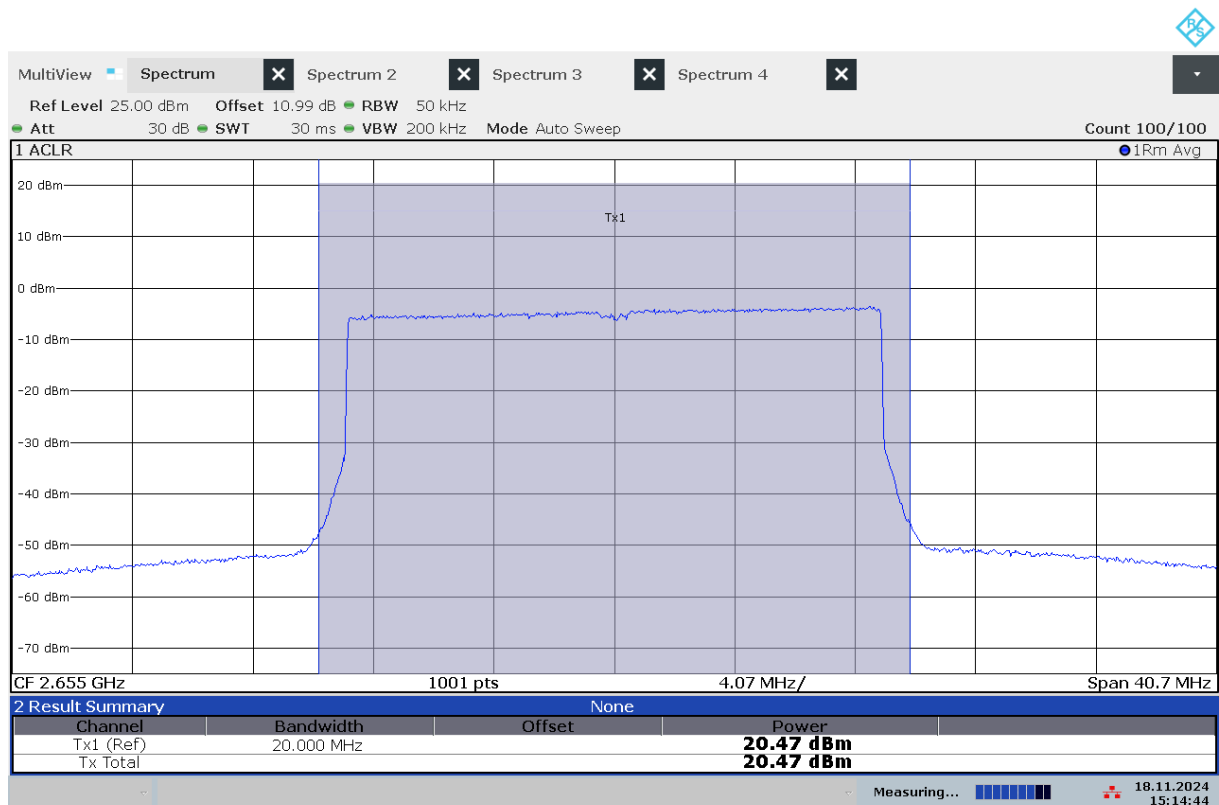
Port	Modulation/ Carrier Bandwidth (MHz)	Output Power								
		Channel position B			Channel position M			Channel position T		
		POWER (dBm)	POWER (dBm/MHz)	PAR (dB)	POWER (dBm)	POWER (dBm/MHz)	PAR (dB)	POWER (dBm)	POWER (dBm/MHz)	PAR (dB)
1	64QAM/5 Conducted power	20.98	-	7.68	20.85	-	7.82	20.98	-	7.71
2	64QAM/5 Conducted power	21.02	-	7.72	21.13	-	7.86	21.11	-	7.68
Total calculated radiated EIRP Power		29.01	-	-	29.00	-	-	29.06	-	-
1	64QAM/10.0 Conducted power	21.12	-	7.86	21.02	-	7.65	21.03	-	7.72
2	64QAM/10.0 Conducted power	20.85	-	7.64	21.08	-	7.71	21.11	-	7.74
Total calculated radiated EIRP Power		29.00	-	-	29.06	-	-	29.08	-	-
1	64QAM/15.0 Conducted power	20.96	-	7.86	20.41	-	7.70	20.64	-	7.72
2	64QAM/15.0 Conducted power	20.56	-	7.71	20.86	-	7.68	20.76	-	7.68
Total calculated radiated EIRP Power		28.77	-	-	28.65	-	-	28.71	-	-
1	64QAM/20.0 Conducted power	20.96	-	7.69	20.93	-	7.64	20.97	-	7.86
2	64QAM/20.0 Conducted power	20.98	-	7.63	20.91	-	7.68	20.98	-	7.73
Total calculated radiated EIRP Power		28.98	-	-	28.93	-	-	28.99	-	-

Port 2, Configuration LTE-MIMO-1C 5 MHz QPSK, Channel Position M



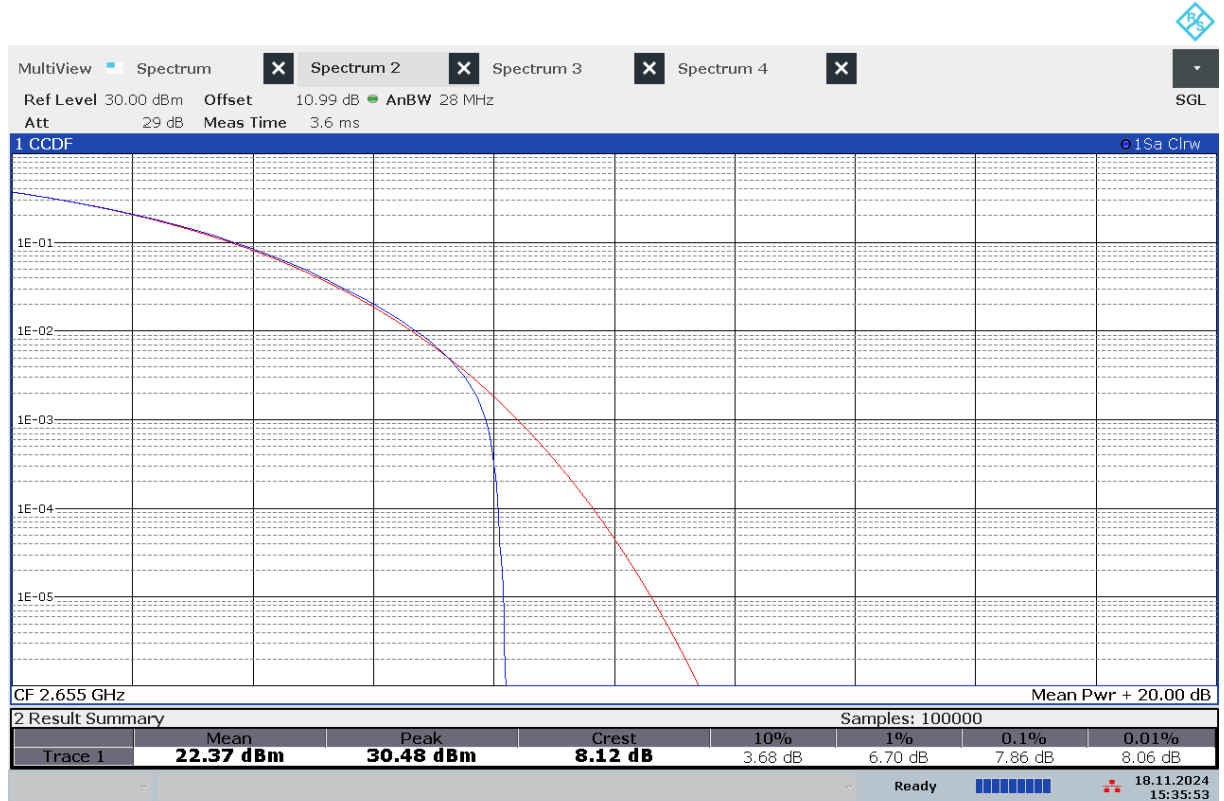
14:50:23 15.11.2024

Port 1, Configuration LTE-MIMO-1C 20 MHz QPSK, Channel Position M



15:14:45 18.11.2024

Port 2, Configuration LTE-MIMO-1C 5 MHz QPSK, Channel Position M



15:35:54 18.11.2024

A.2 Occupied Bandwidth

A.2.1 Reference

FCC CFR 47 Part 2, Clause 2.1049

FCC CFR 47 Part 27, Clause 27.53 (m)

A.2.2 Method of Measurements

The EUT was set to transmit at maximum power. Using the Occupied Bandwidth measurement function in the spectrum analyzer, the occupied bandwidth was measured in accordance with ANSI 63.26.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

A.2.3 Measurement result

Configuration LTE-MIMO-1C

-26dBc Occupied Bandwidth

Port	Modulation/ Bandwidth	Occupied Bandwidth (MHz)		
		Channel Position B	Channel Position M	Channel Position T
1	QPSK/5 MHz	4.80	4.82	4.87
1	QPSK/10 MHz	9.72	9.72	9.72
1	QPSK/15 MHz	14.41	14.31	14.40
1	QPSK/20 MHz	18.88	18.94	18.90

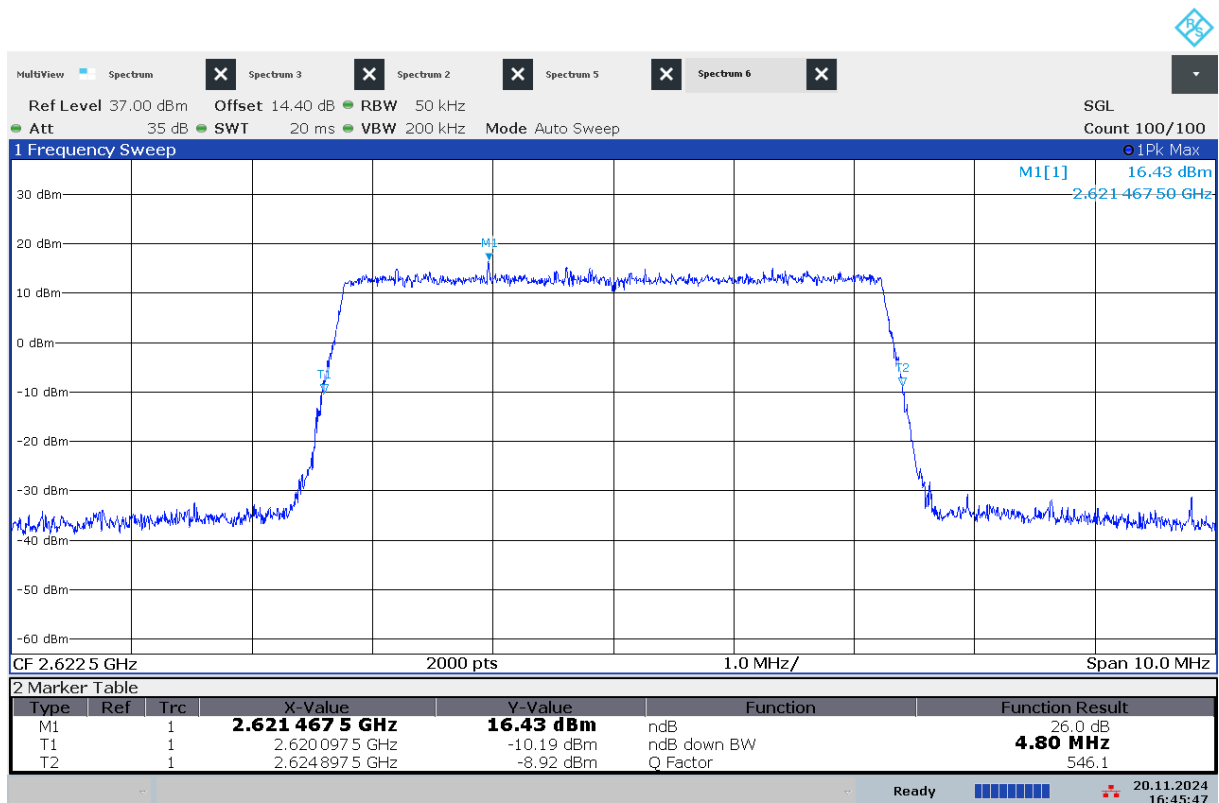
Port	Modulation/ Bandwidth	Occupied Bandwidth (MHz)		
		Channel Position B	Channel Position M	Channel Position T
1	16QAM/5 MHz	-	4.74	-
1	64QAM/5 MHz	-	4.80	-

99% Occupied Bandwidth

Port	Modulation/ Bandwidth	Occupied Bandwidth (MHz)		
		Channel Position B	Channel Position M	Channel Position T
1	QPSK/5 MHz	-	4.47	-
1	16QAM /5 MHz	-	4.46	-
1	QPSK/20 MHz	-	17.86	-
1	16QAM/20 MHz	-	17.86	-

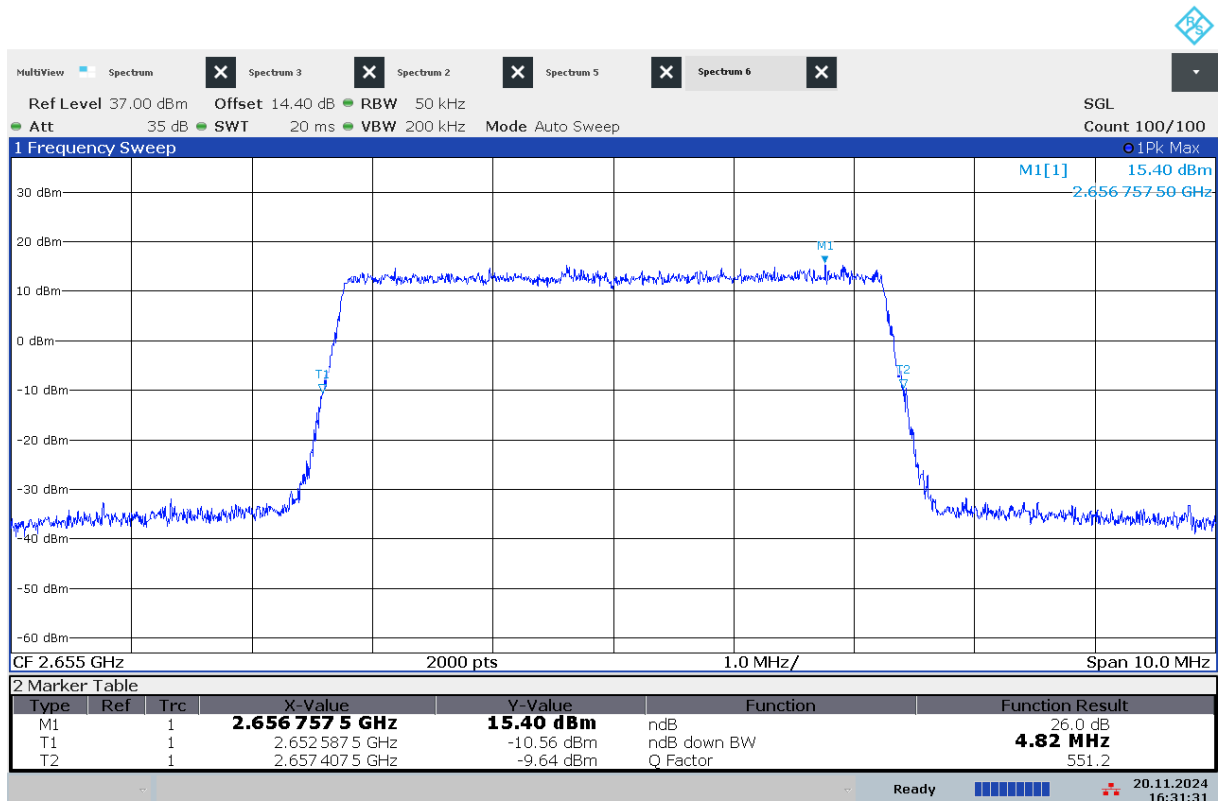
-26dBc Occupied Bandwidth

Port 1, QPSK 5M, Channel position B



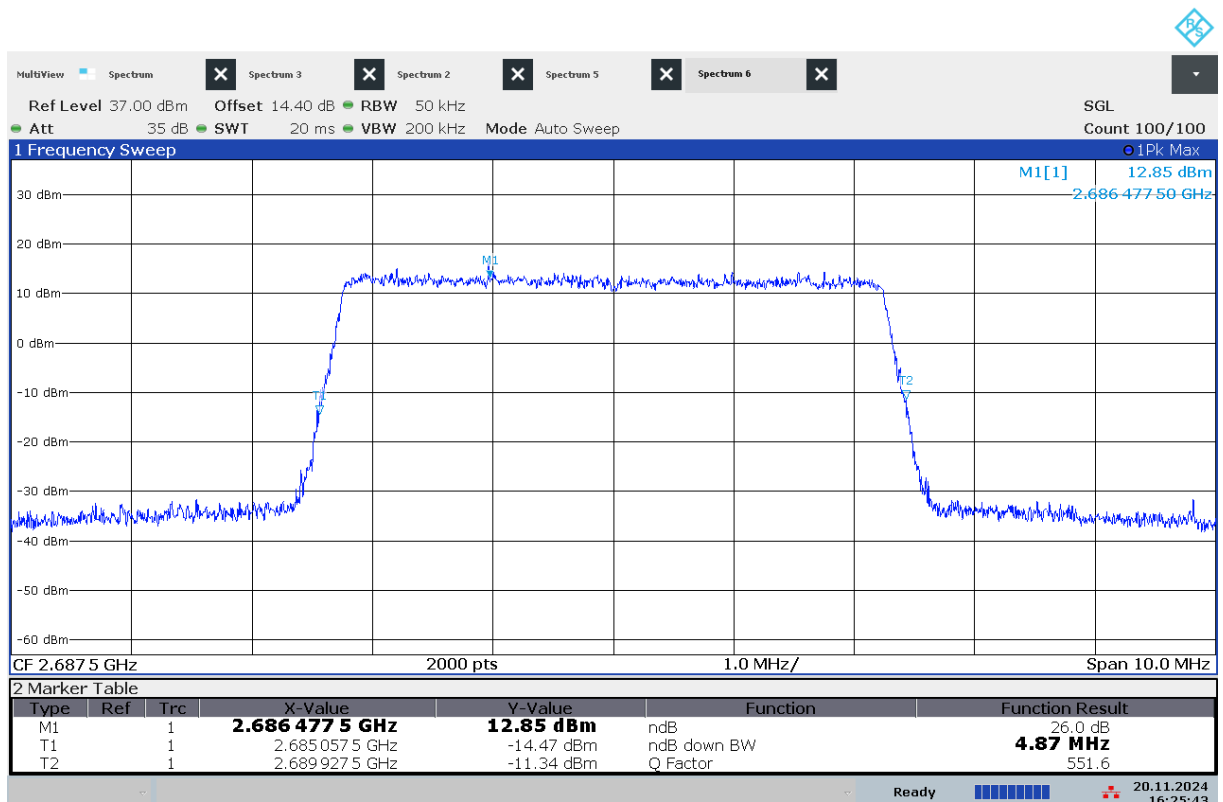
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Port 1, QPSK 5M, Channel position M



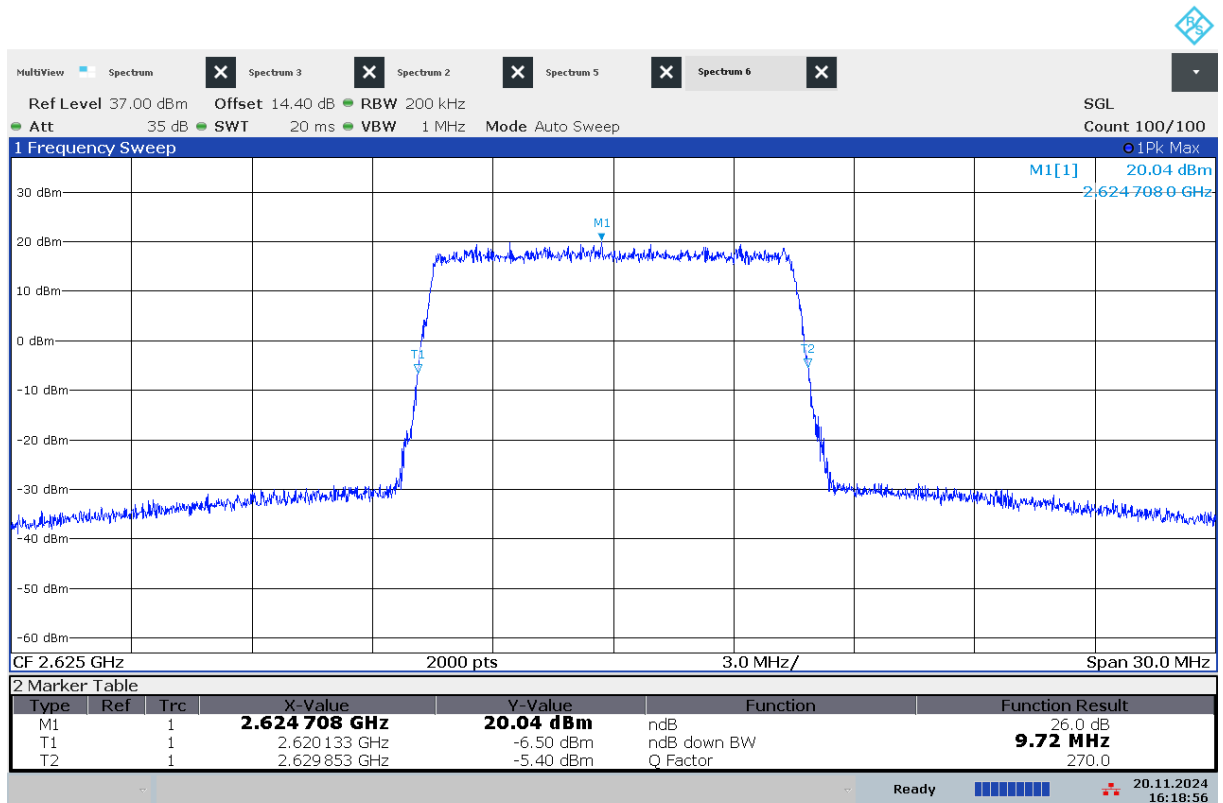
16:31:31 20.11.2024

Port 1, QPSK 5M, Channel position T



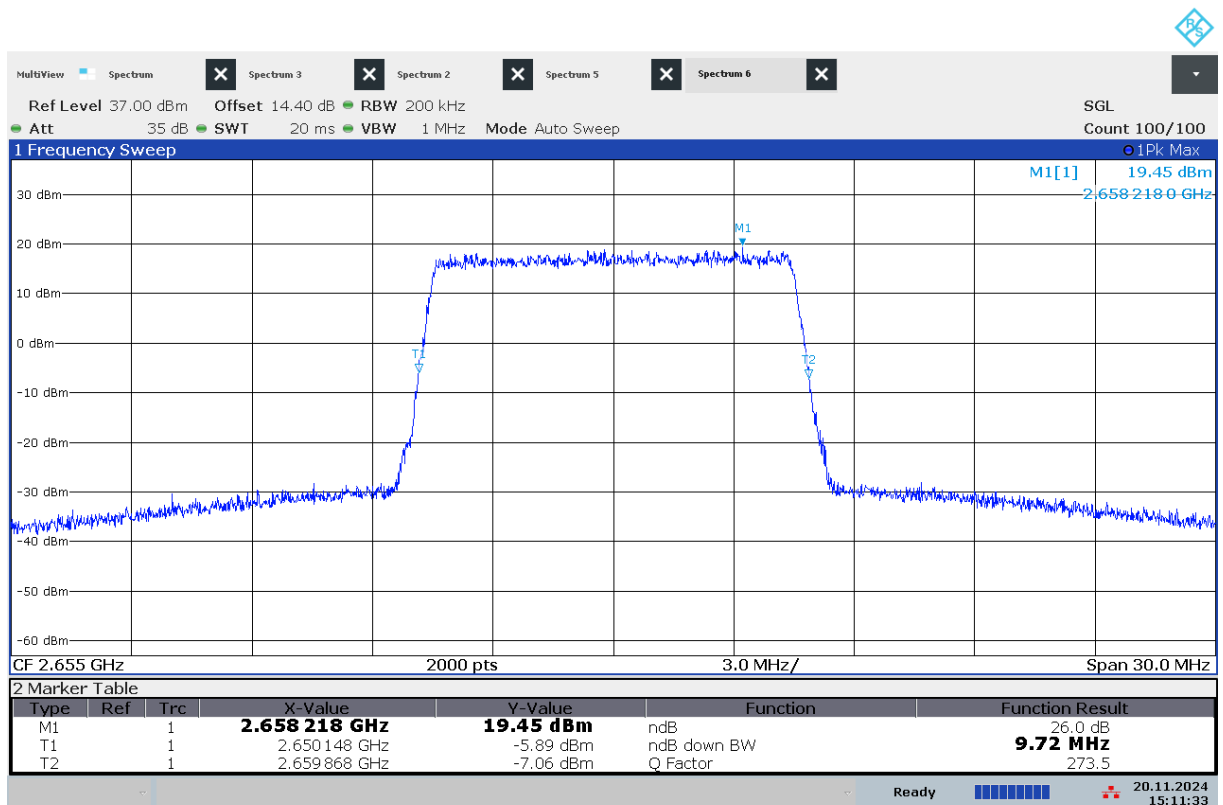
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Port 1, QPSK 10M, Channel position B



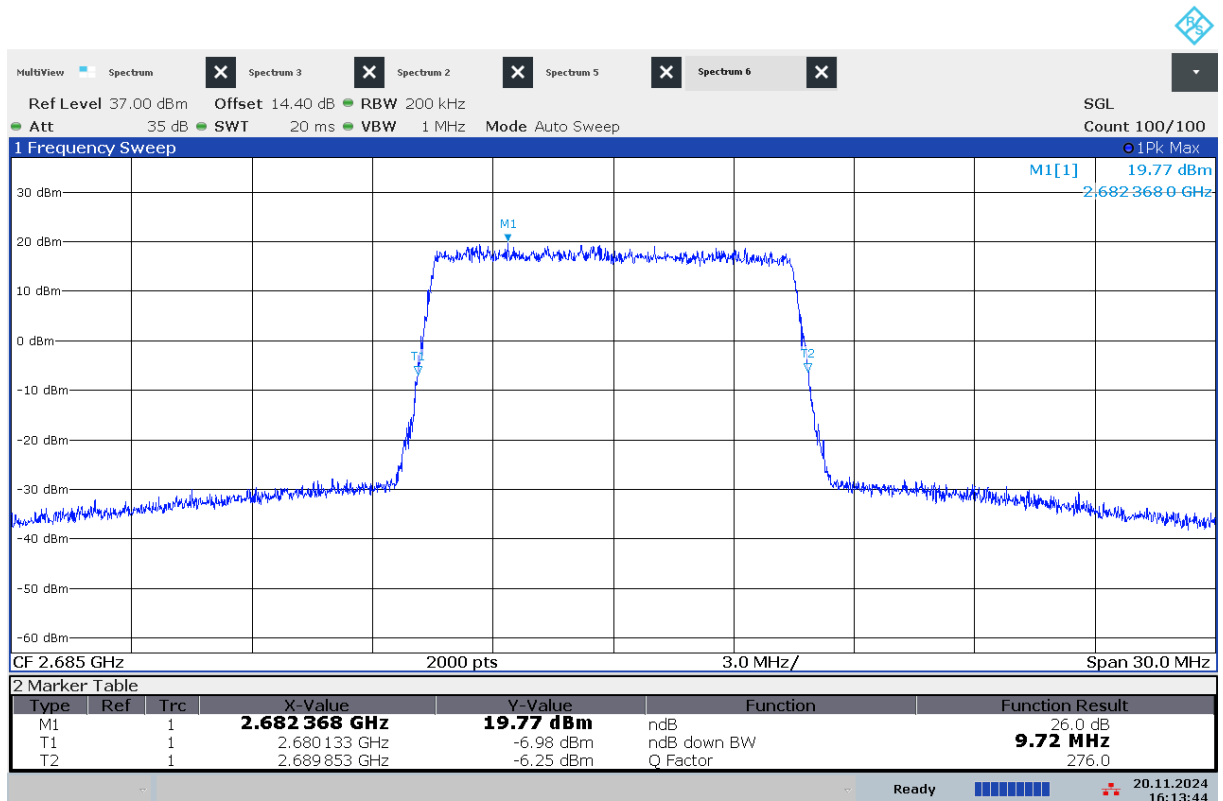
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Port 1, QPSK 10M, Channel position M



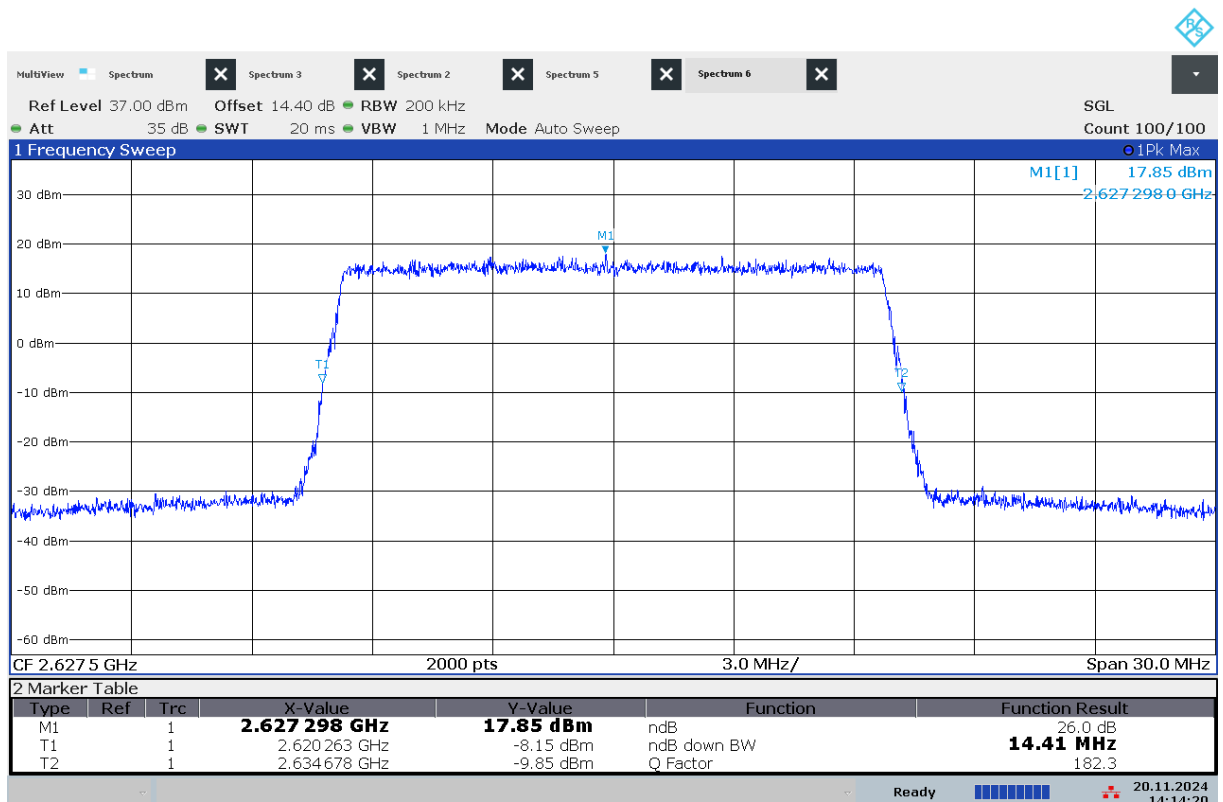
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Port 1, QPSK 10M, Channel position T



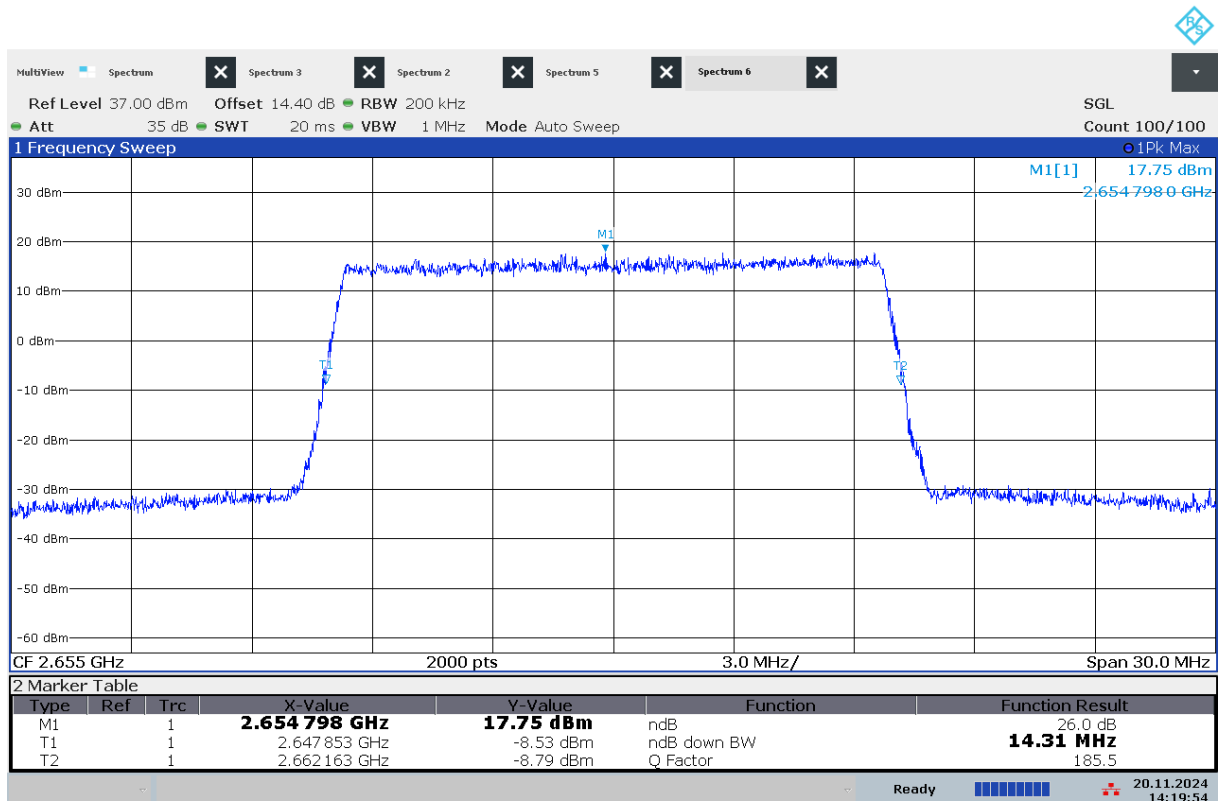
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Port 1, QPSK 15M, Channel position B



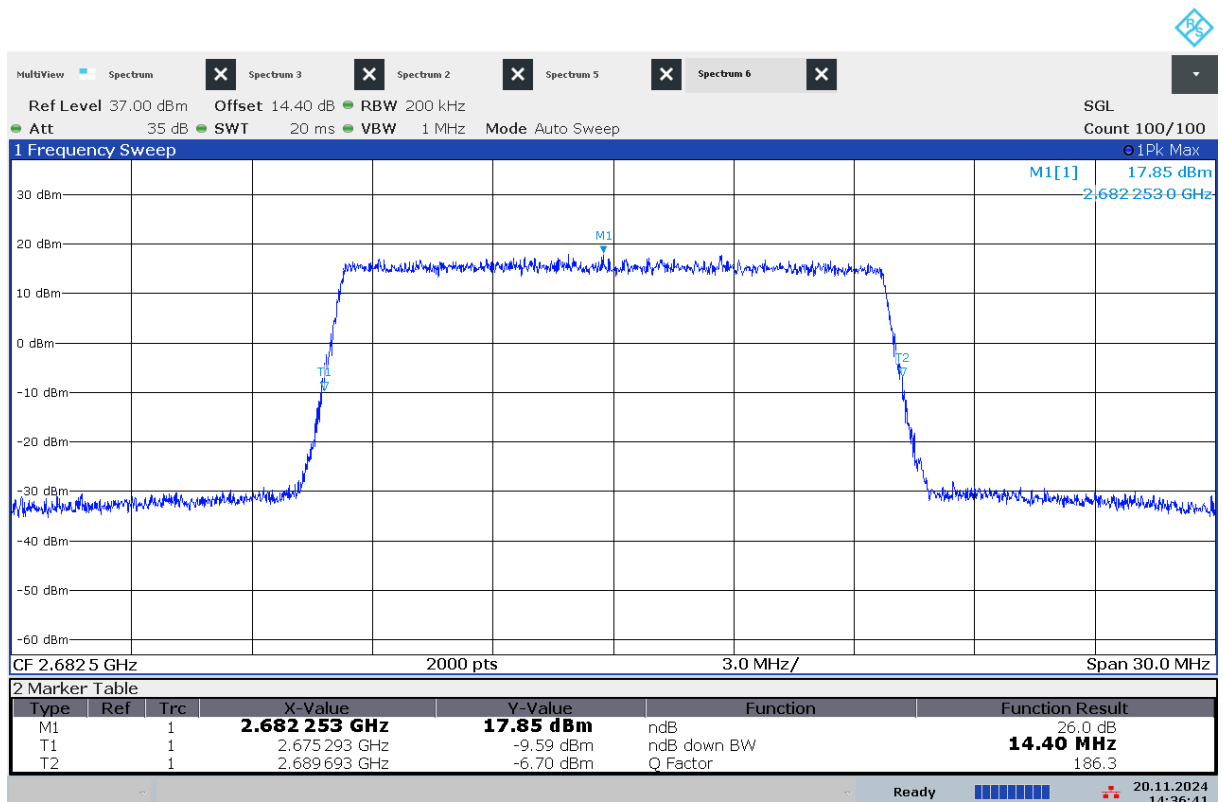
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Port 1, QPSK 15M, Channel position M



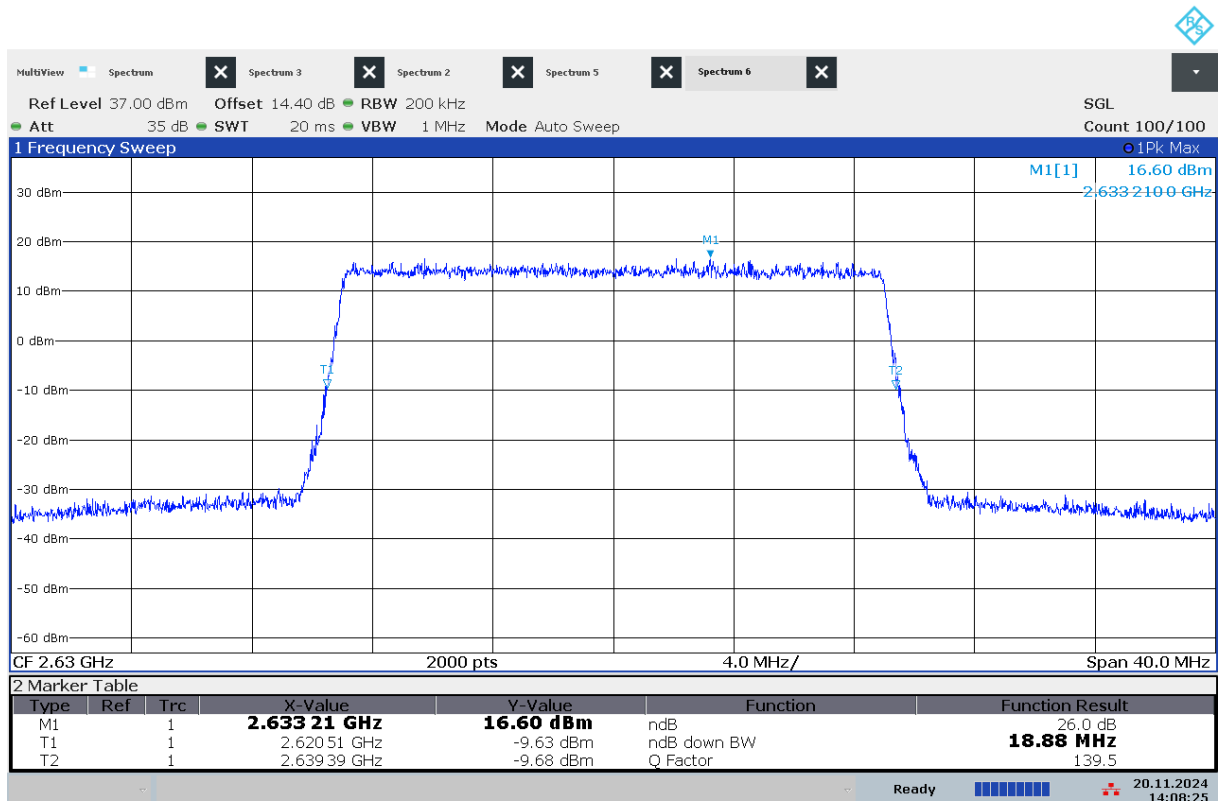
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Port 1, QPSK 15M, Channel position T



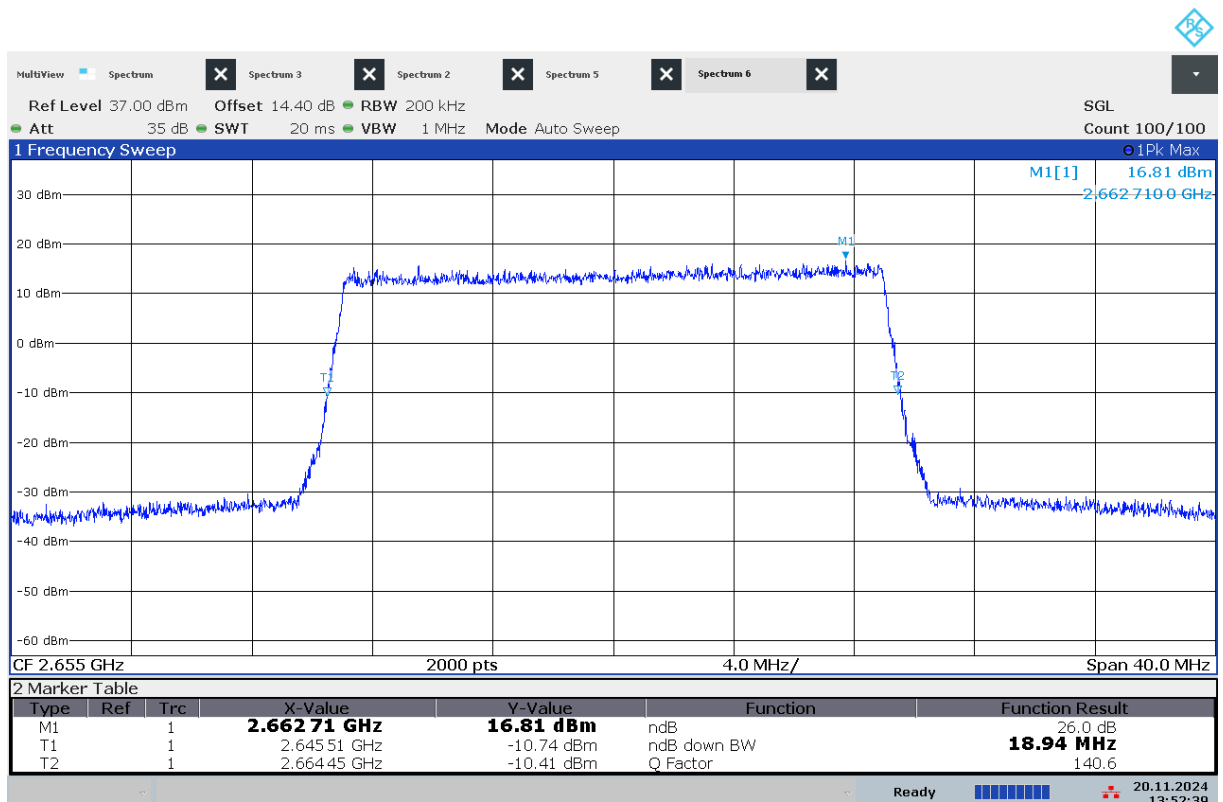
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Port 1, QPSK 20M, Channel position B



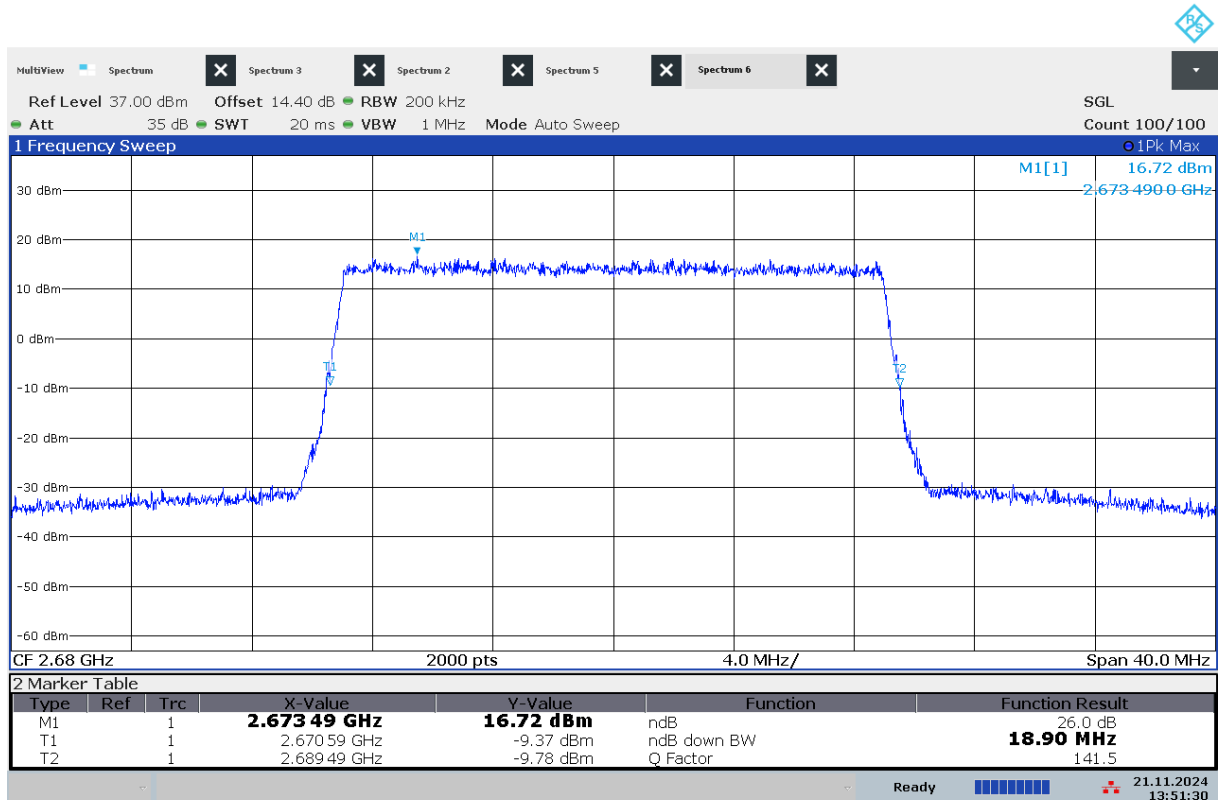
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Port 1, QPSK 20.0M, Channel position M



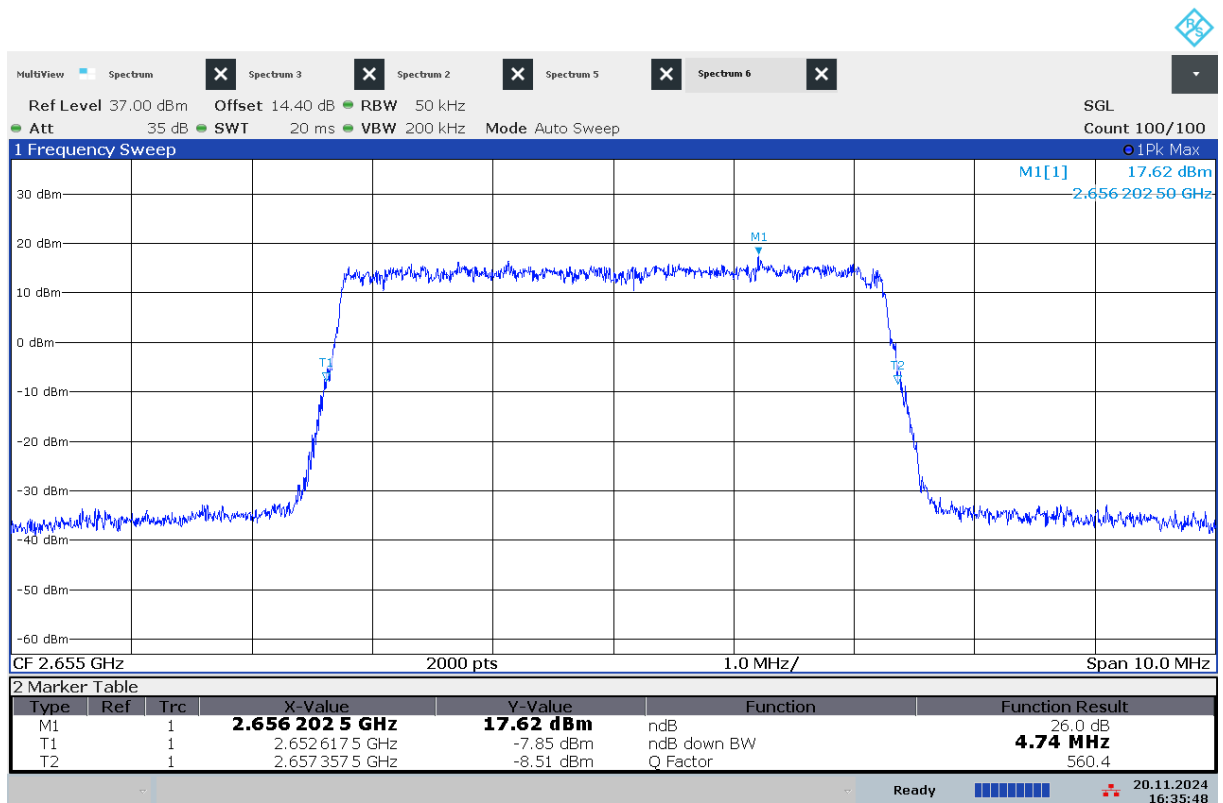
13:52:39 20.11.2024

Port 1, QPSK 20M, Channel position T



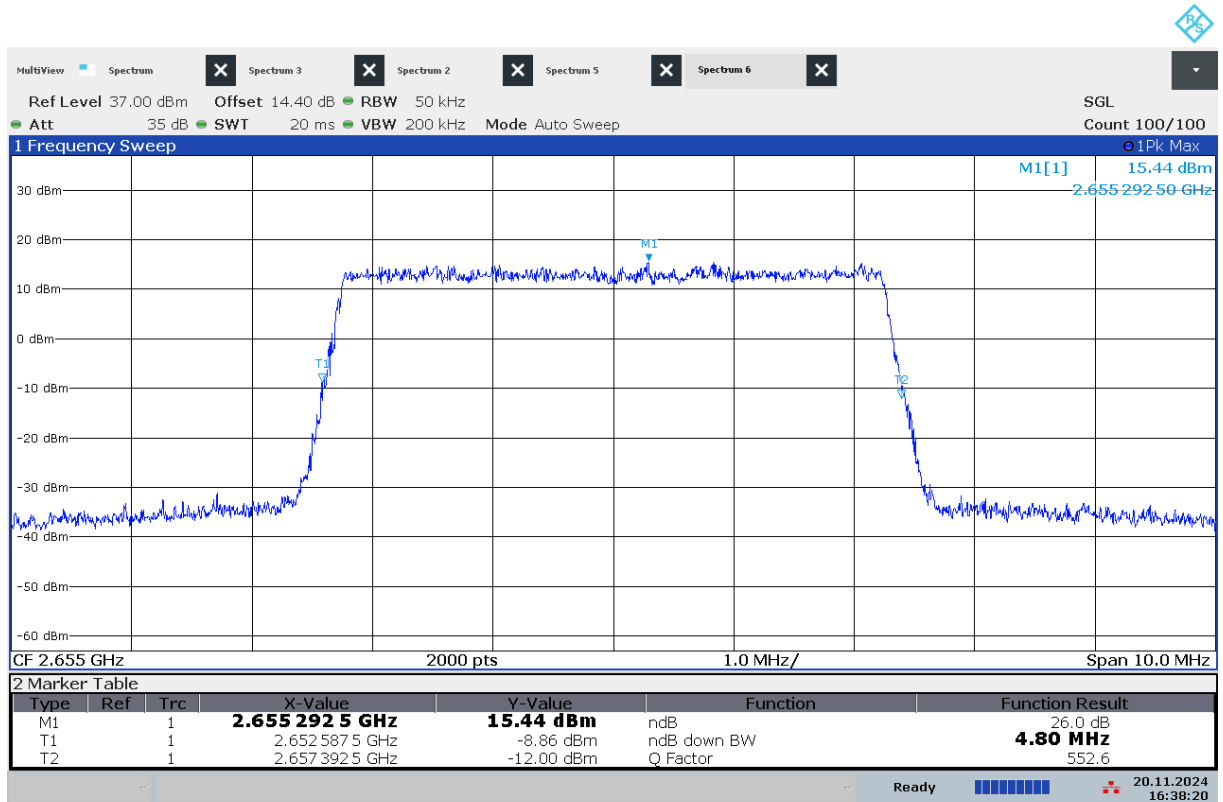
13:51:31 21.11.2024

Port 1, 16QAM 5M, Channel position M



16:35:49 20.11.2024

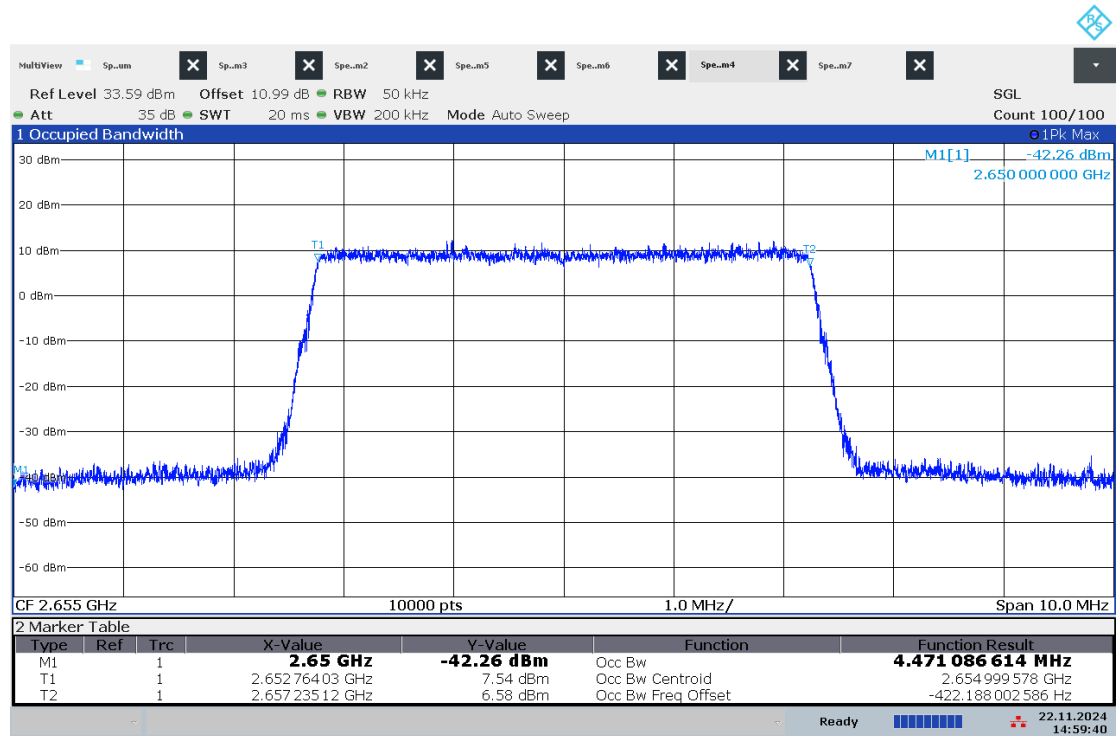
Port 1, 64QAM 5M, Channel position M



16:38:20 20.11.2024

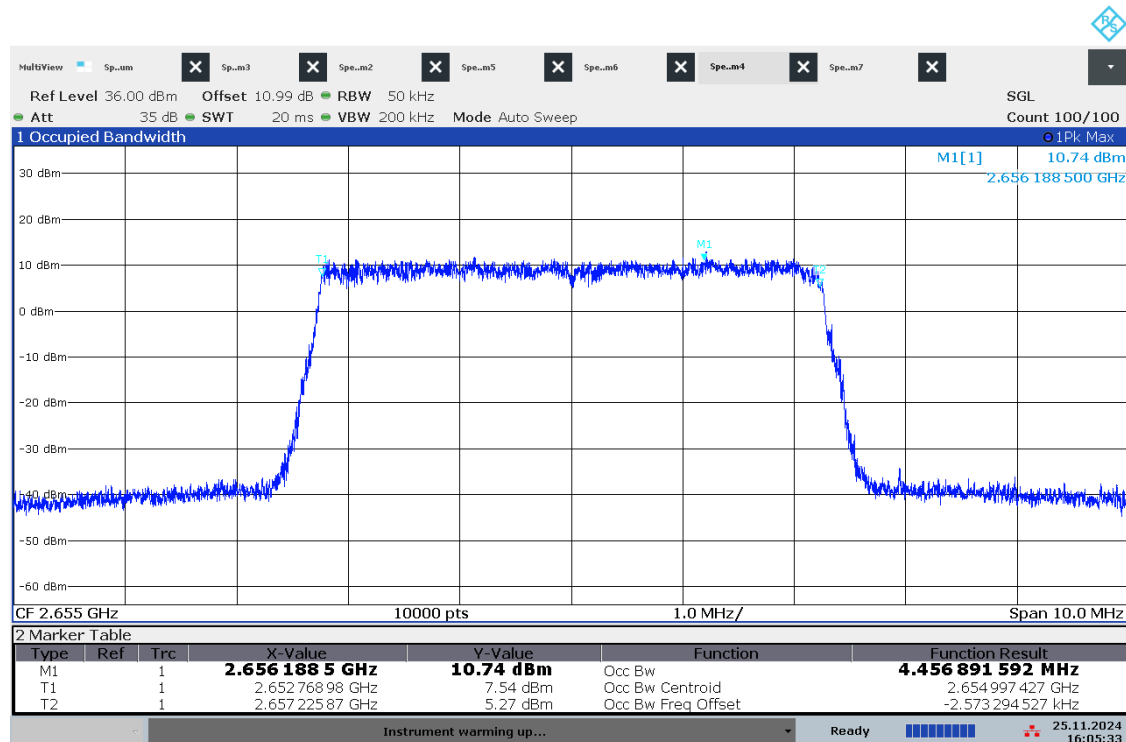
99% Occupied Bandwidth

Port 1, QPSK 5M, Channel position M, 99%BW



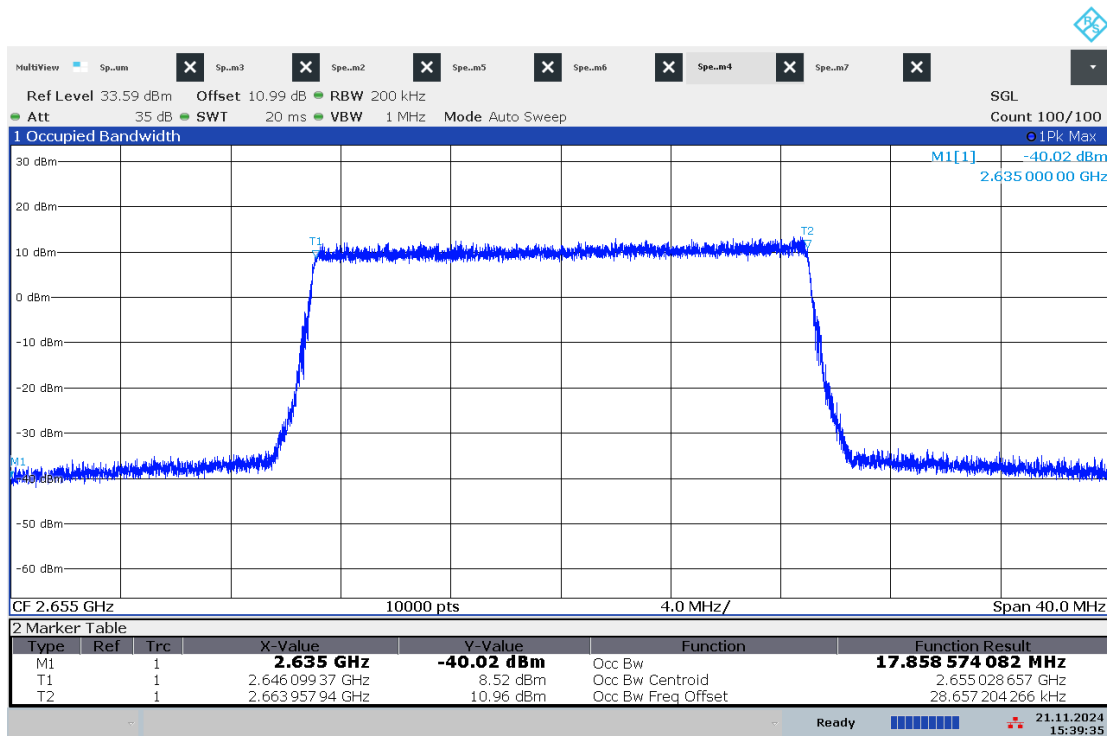
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Port 1, 16QAM 5M, Channel position M, 99%BW



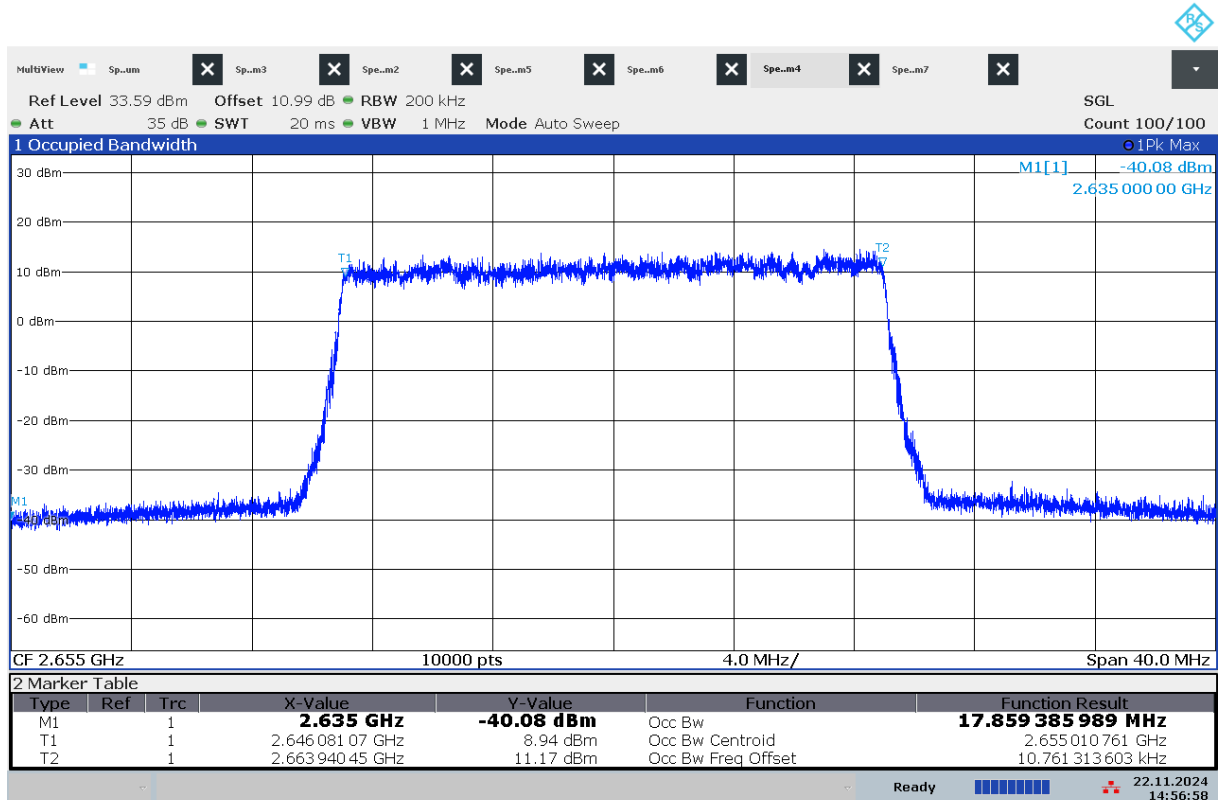
16:05:34 25.11.2024

Port 1, QPSK 20M, Channel position M, 99%BW



15:39:36 21.11.2024

Port 1, 16QAM 20M, Channel position M, 99%BW



14:56:58 22.11.2024

A.3 Transmitter unwanted emissions at Band Edge

A.3.1 Reference

FCC CFR 47 Part 2, Clause 2.1051

FCC CFR 47 Part 27, Clause 27.53(m)

A.3.2 Method of measurement

For MIMO mode configurations, the limit was adjusted with a correction of -3.01dB [10Log2] by using the Measure and Add 10Log(N) dB technique according to FCC KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports. Then the limit was adjusted to -16.01dBm.

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 and a RBW of 1MHz for measurements of emissions > 1MHz away from the band edges.

The limit was adjusted with -13.01dB [10Log(50/1000)] to compensate for the reduced measurement bandwidth 50KHz for emission more than 1MHz away from the LTE 5MHz band edges. For MIMO mode, the limit of -29.02dBm was used for emission more than 1MHz away from the LTE 5MHz band edges.

The limit was adjusted with -10dB [10Log(100/1000)] to compensate for the reduced measurement bandwidth 100KHz for emission more than 1MHz away from the LTE 10MHz band edges. For MIMO mode, the limit of -26.01dBm was used for emission more than 1MHz away from the LTE 10MHz band edges.

The limit was adjusted with -6.99dB [10Log(200/1000)] to compensate for the reduced measurement bandwidth 200KHz for emission more than 1MHz away from the LTE 15MHz and 20MHz band edges. For MIMO mode, the limit of -23dBm was used for emission more than 1MHz away from the LTE 15MHz and 20MHz band edges.

Spectrum analyzer detector was set as RMS.

A.3.3 Measurement limit

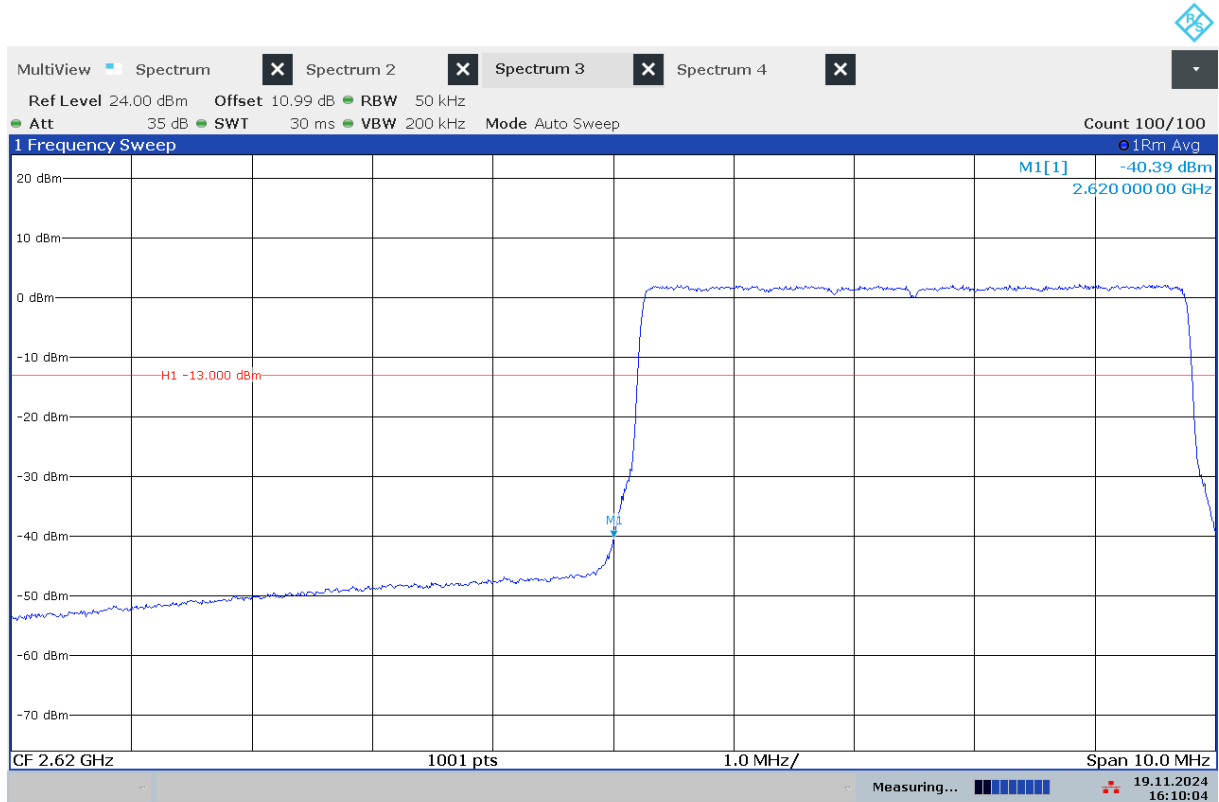
The power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts not less than $43 + 10 \log (P)$ dB.

A.3.4 Measurement result

Configuration LTE-MIMO-1C, QPSK

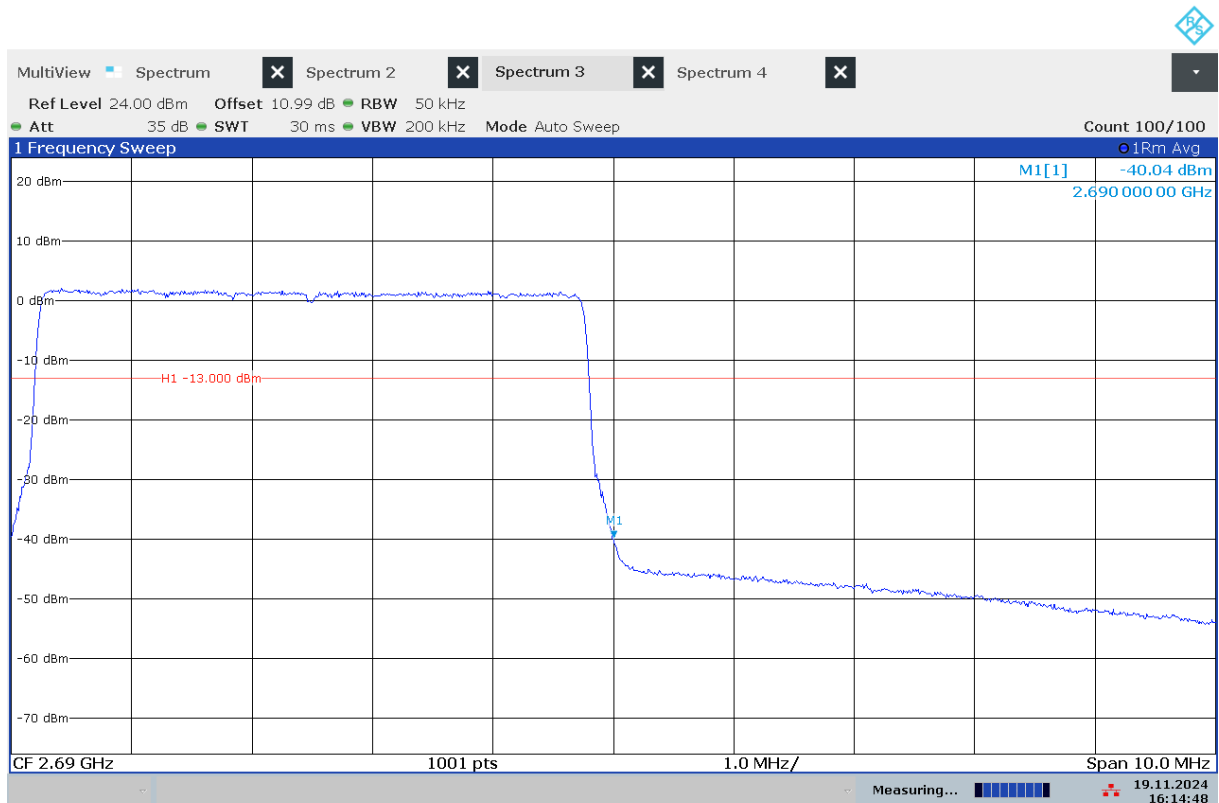
Band Edge Frequency	Channel Bandwidth	RBW	Limit(dBm)
2620/2690	5	50KHz	-16.01/-29.02
2620/2690	10	100KHz	-16.01/-26.01
2620/2690	15	200KHz	-16.01/-23
2620/2690	20	200KHz	-16.01/-23

Port 1, Channel Position B, 5 MHz



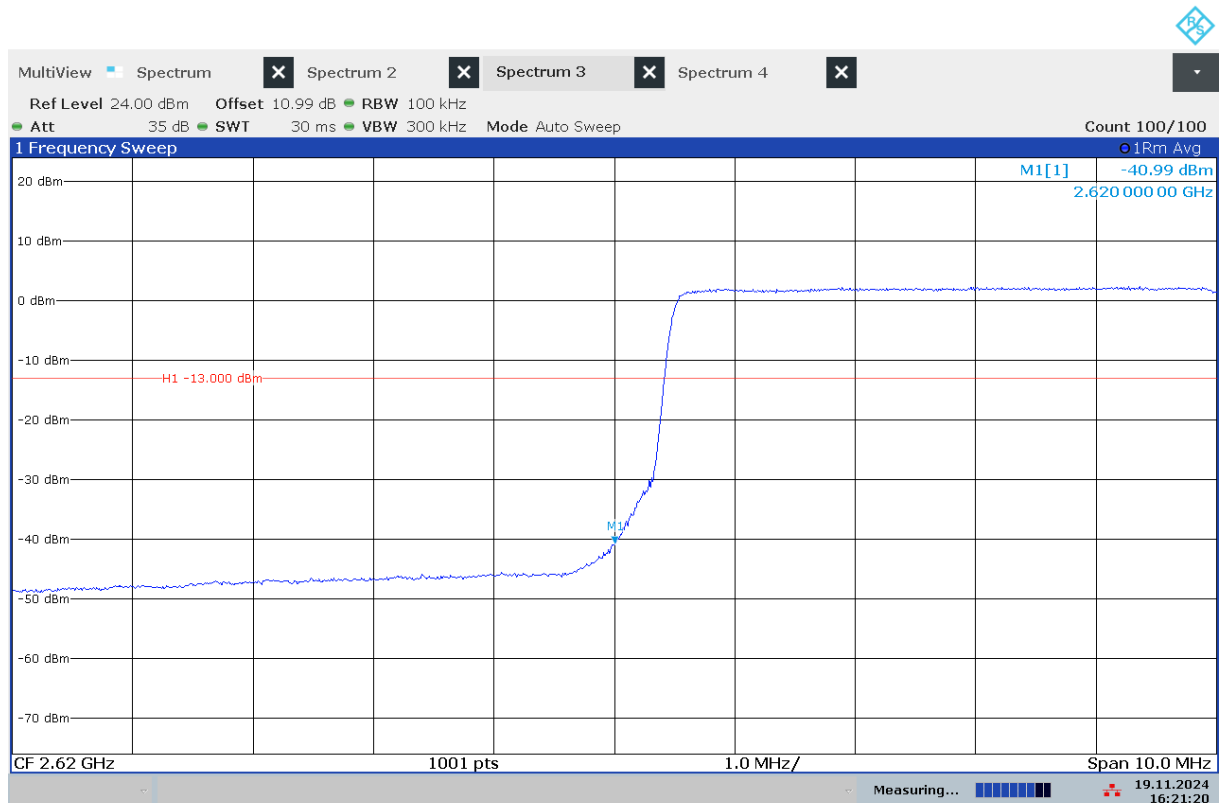
16:10:05 19.11.2024

Port 1, Channel Position T, 5 MHz



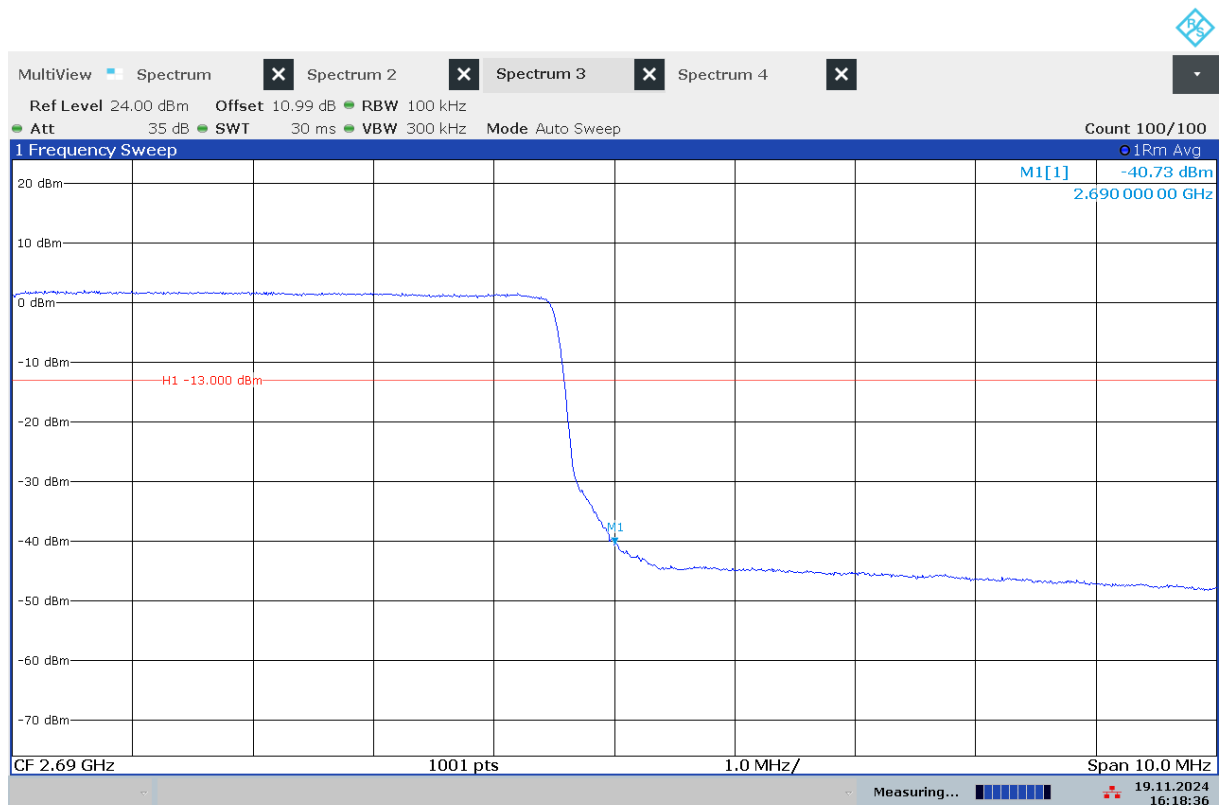
16:14:49 19.11.2024

Port 1, Channel Position B, 10 MHz



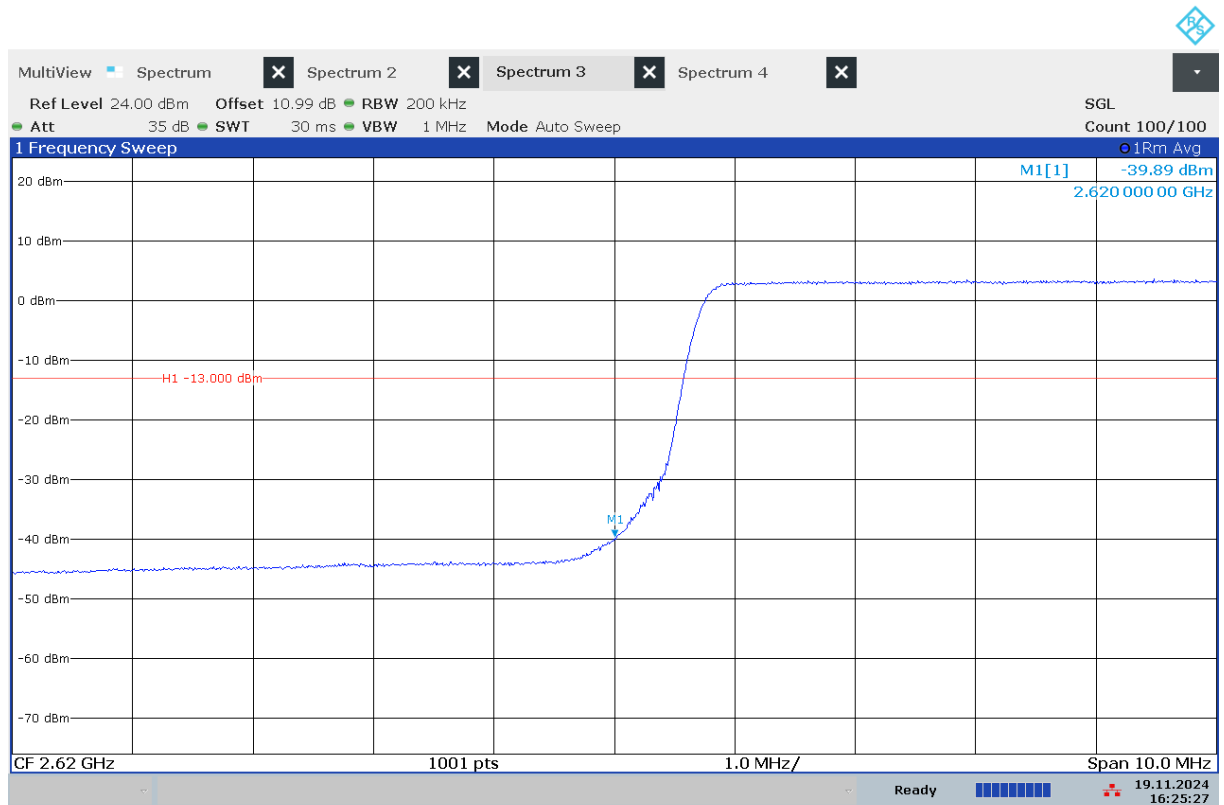
16:21:21 19.11.2024

Port 1, Channel Position T, 10 MHz



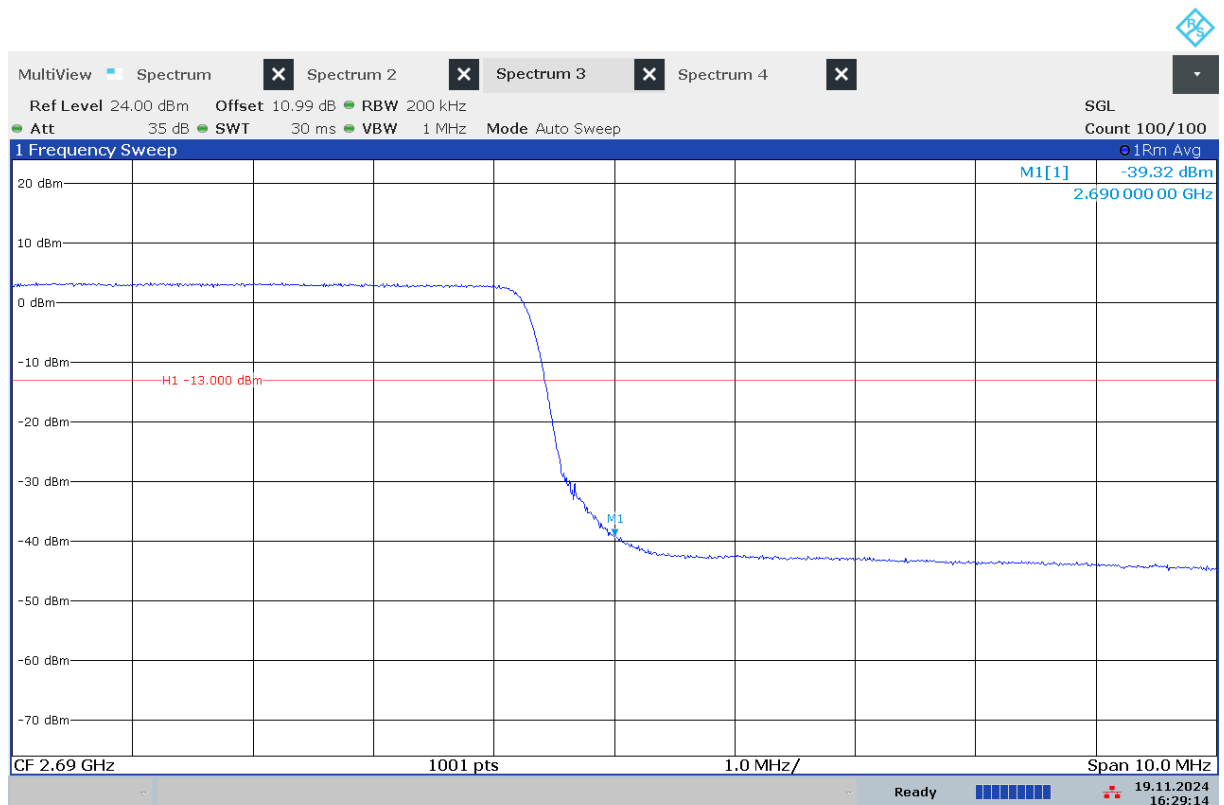
16:18:37 19.11.2024

Port 1, Channel Position B, 15 MHz



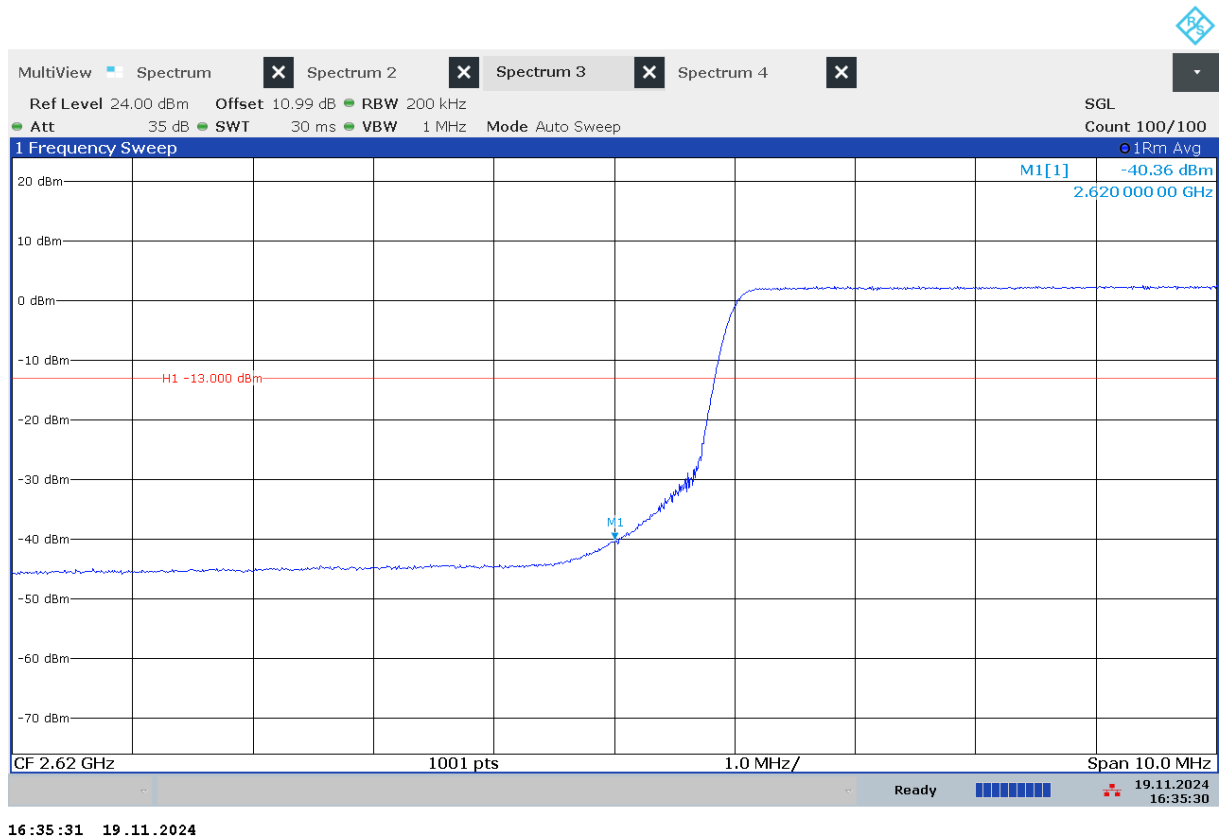
16:25:28 19.11.2024

Port 1, Channel Position T, 15 MHz

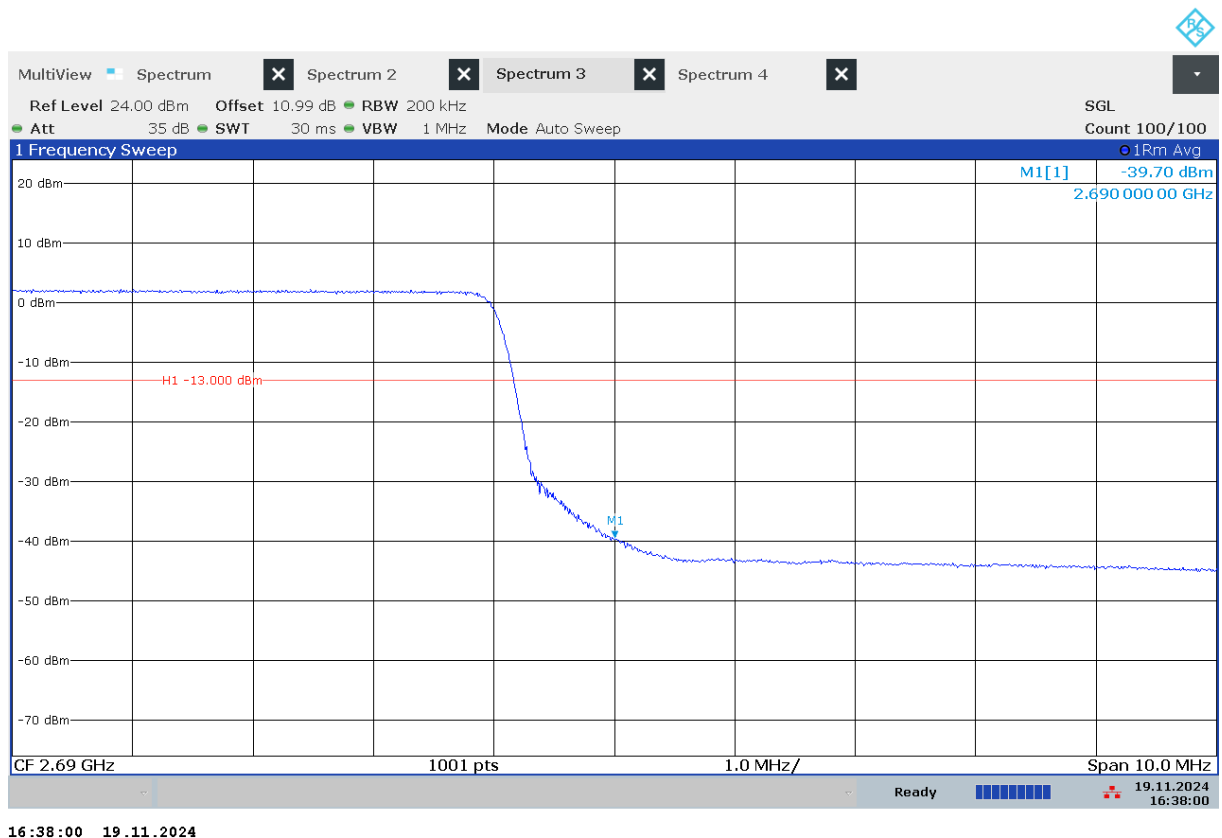


16:29:14 19.11.2024

Port 1, Channel Position B, 20 MHz



Port 1, Channel Position T, 20 MHz



A.4 Transmitter unwanted emissions - Conducted Spurious Emission

A.4.1 Reference

FCC CFR 47 Part 2, Clause 2.1051

FCC CFR 47 Part 27, Clause 27.53(m)

A.4.2 Method of measurement

For MIMO mode configurations, the limit was adjusted with a correction of -3.01dB [10Log2] by using the Measure and Add 10Log(N) dB technique according to FCC KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports.

The spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using an attenuator and the frequency spectrum was investigated from 3kHz to 27GHz.

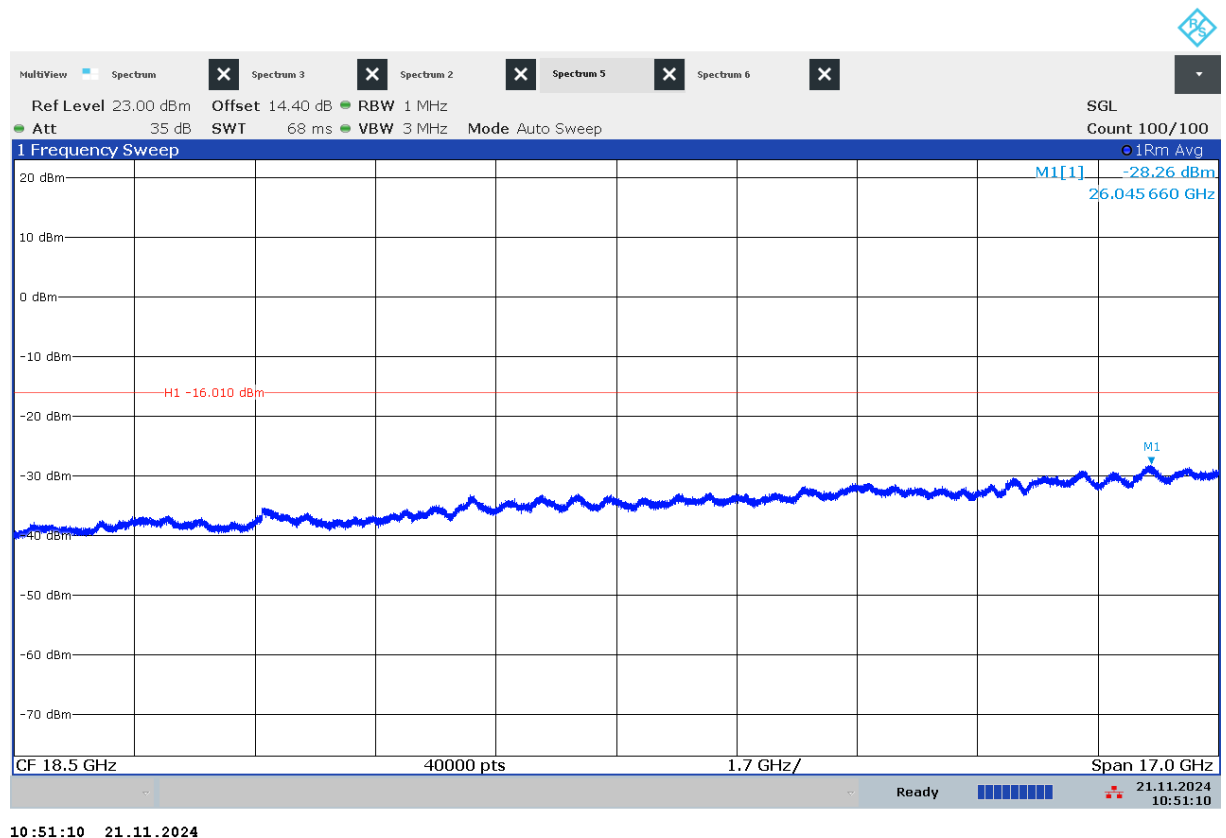
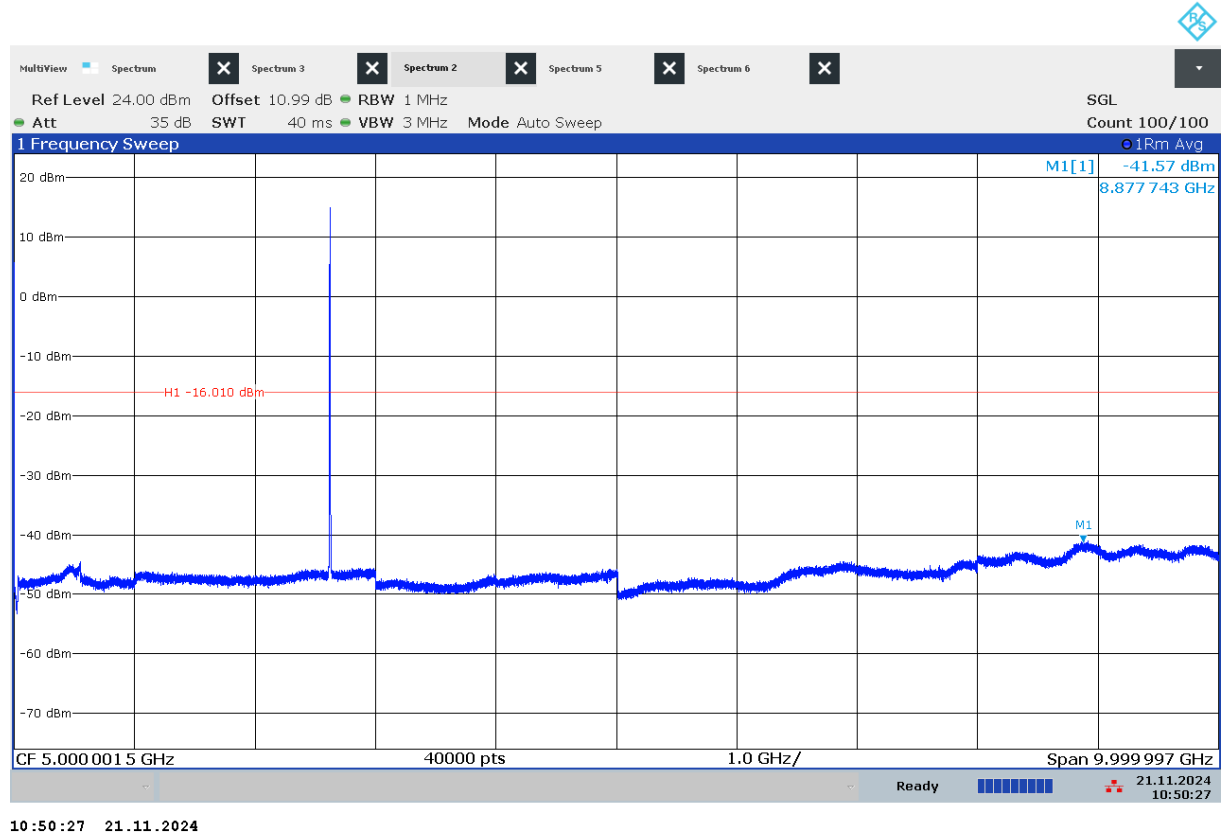
Spectrum analyzer detector was set as RMS.

A.4.3 Measurement limit

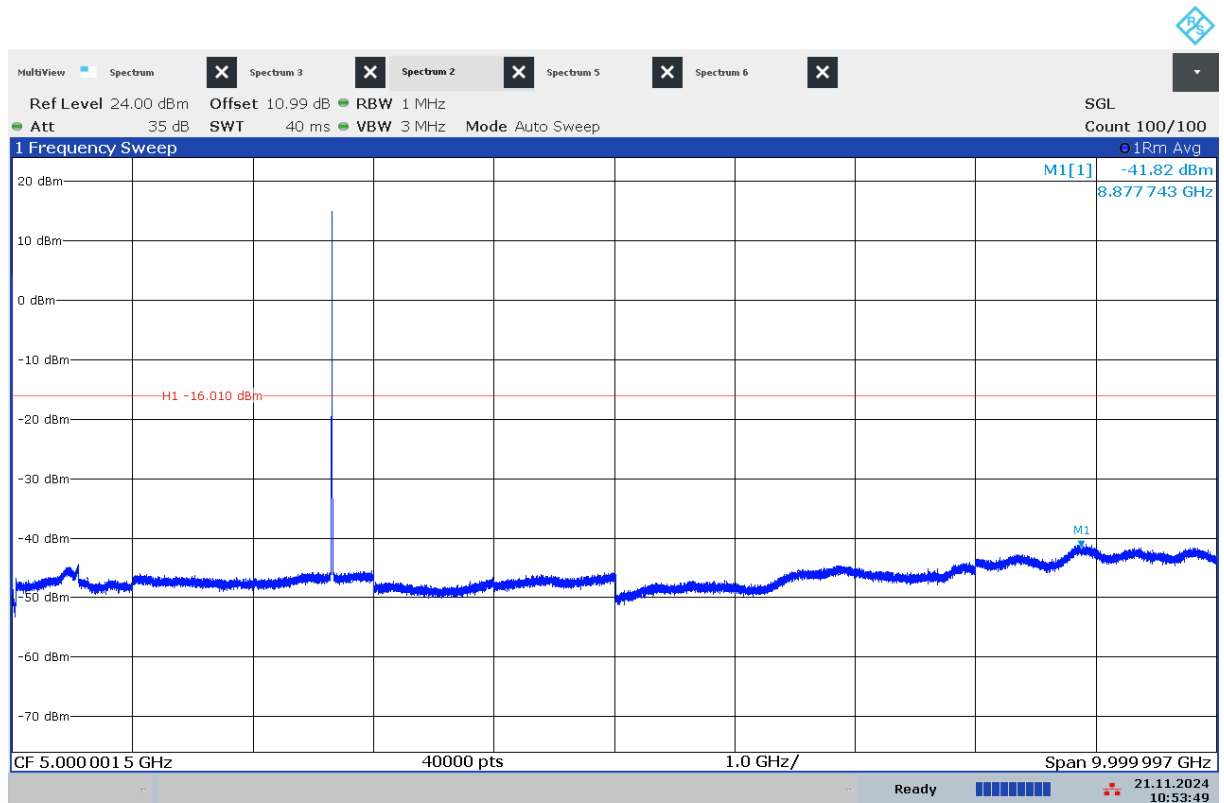
The power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts not less than $43 + 10 \log (P)$ dB.

A.4.4 Measurement results

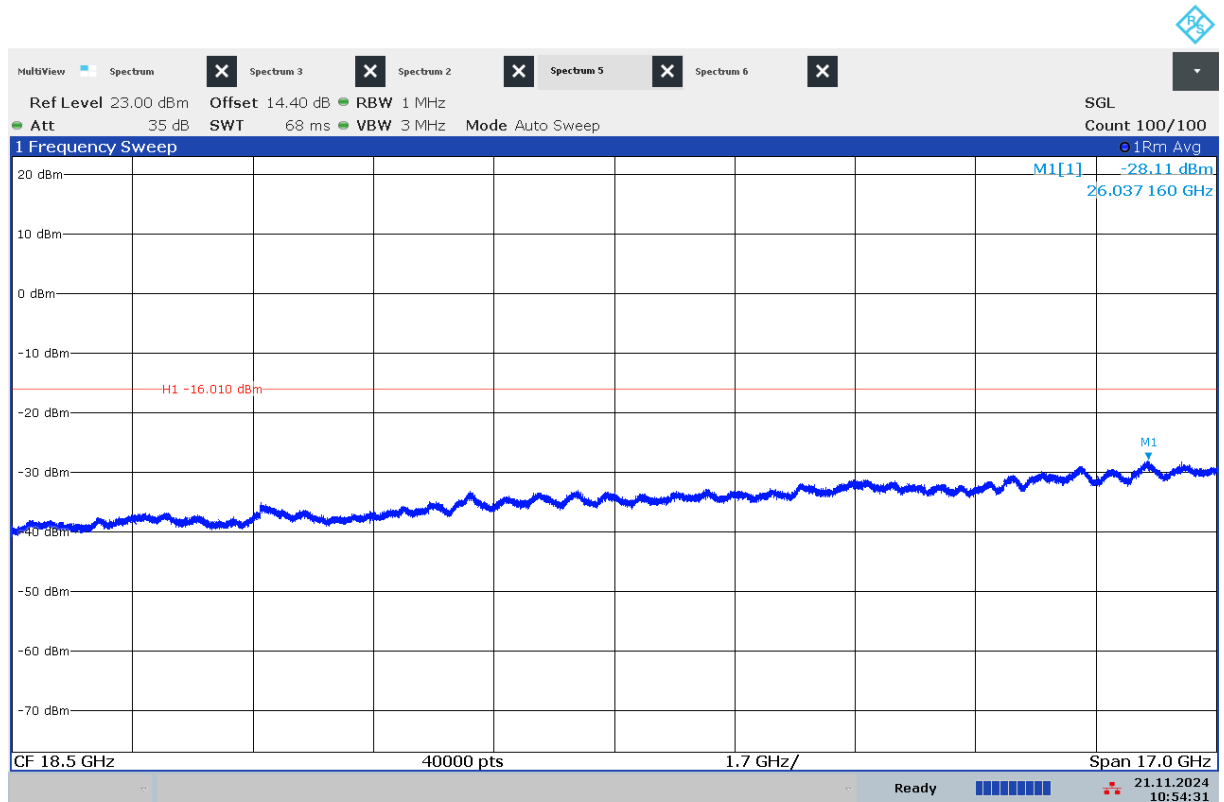
Configuration LTE-MIMO-1C 5M, QPSK
Port 1, QPSK 5M, Channel Position B



Port 1, QPSK 5M, Channel Position M

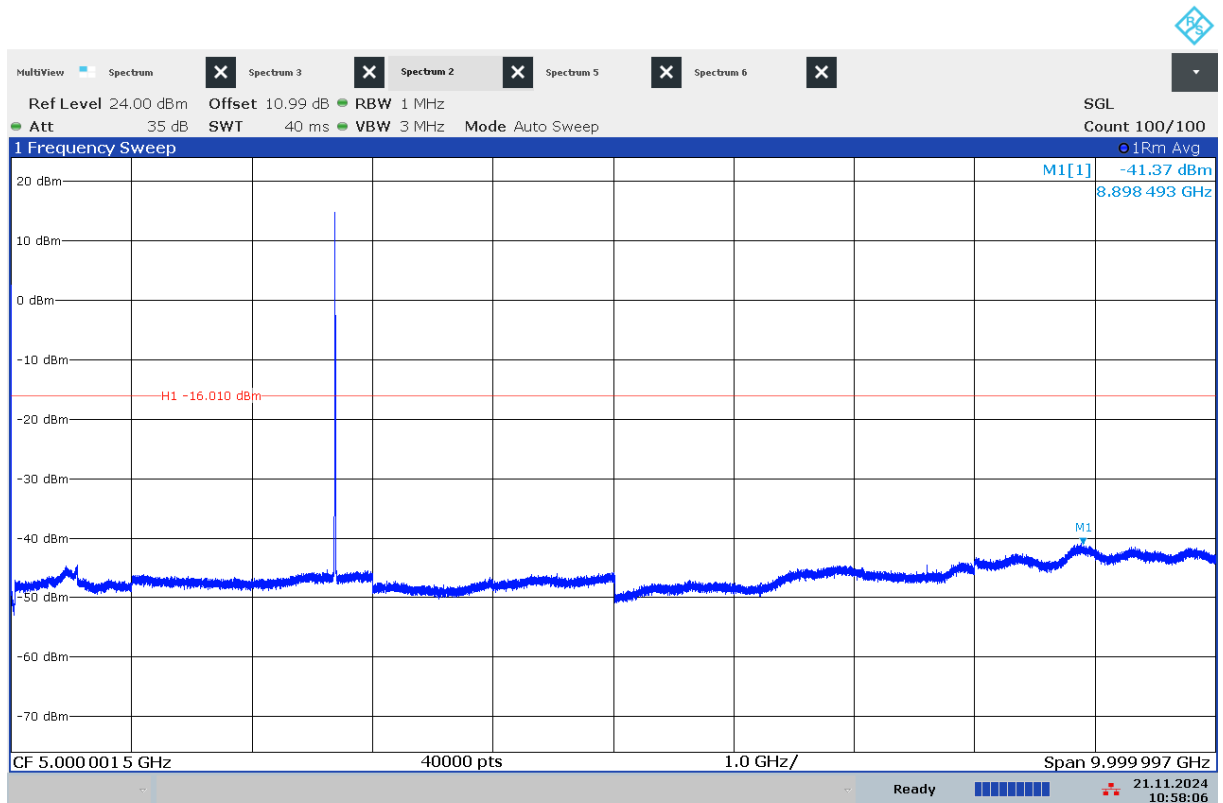


10:53:50 21.11.2024

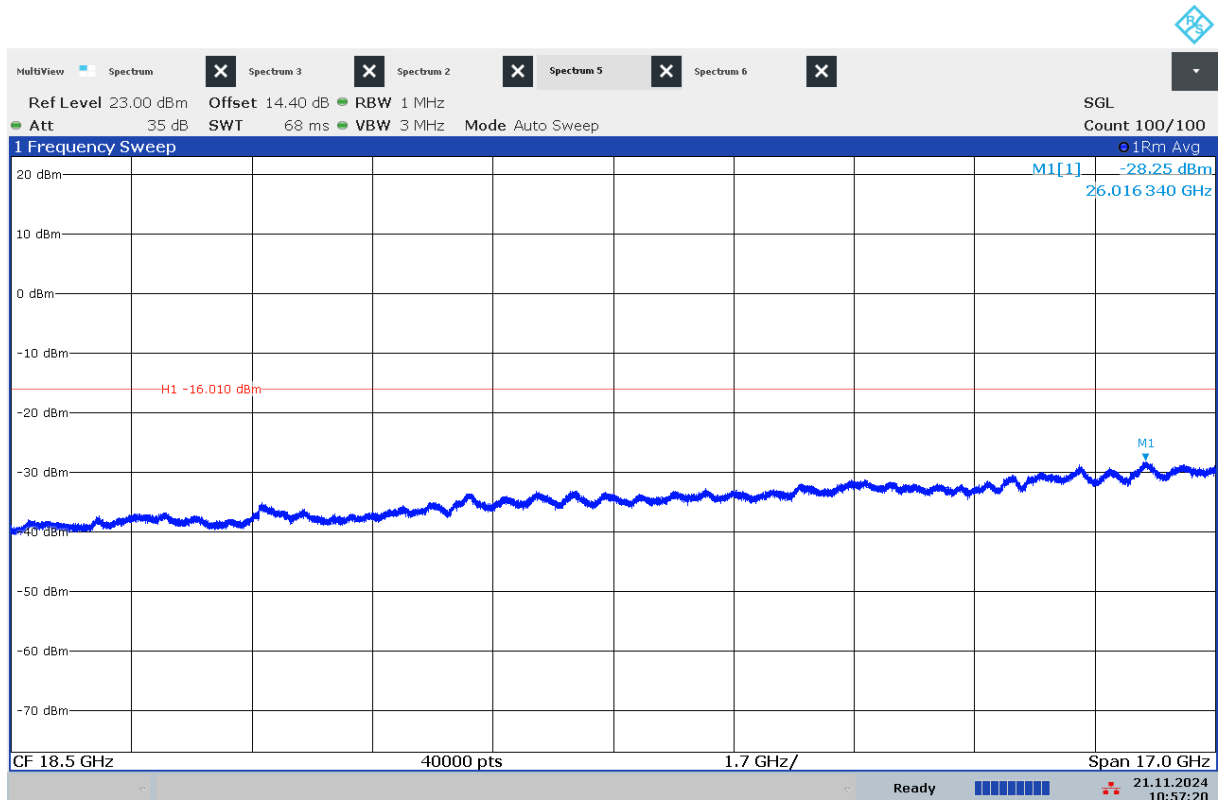


10:54:31 21.11.2024

Port 1, QPSK 5M, Channel Position T

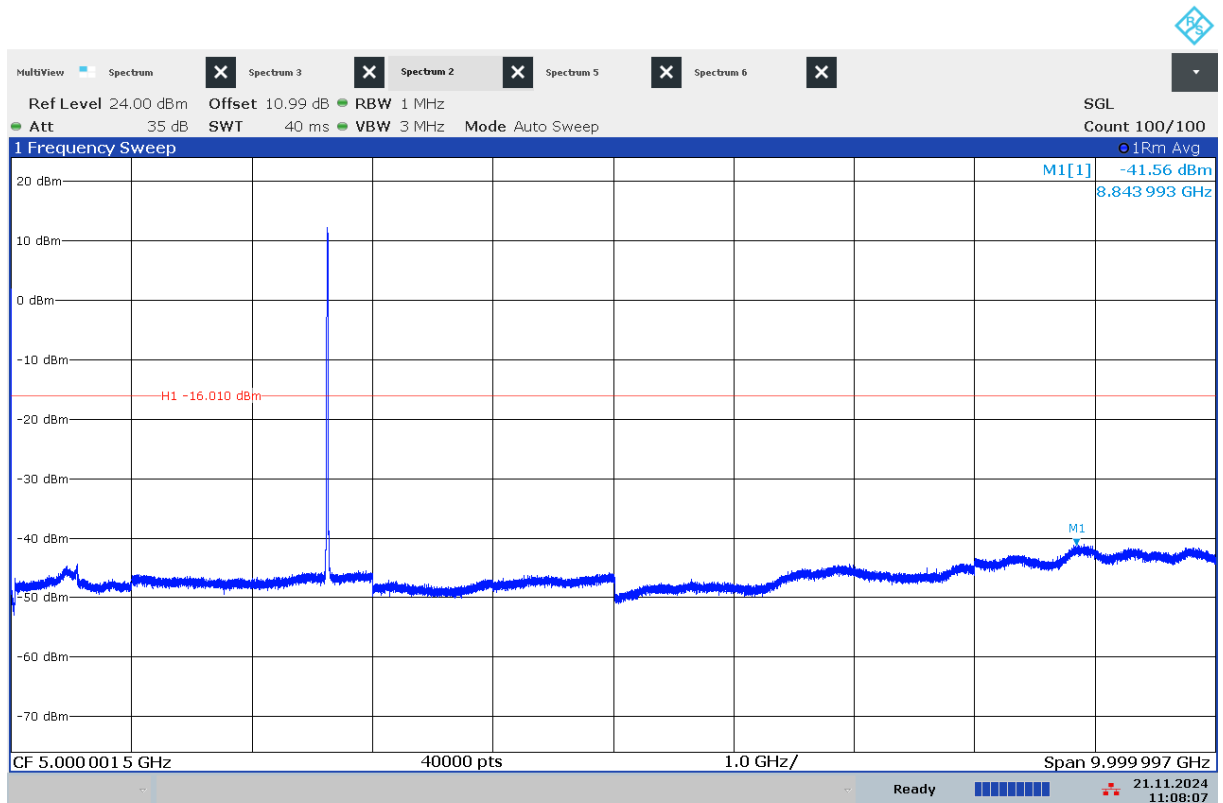


10:58:07 21.11.2024

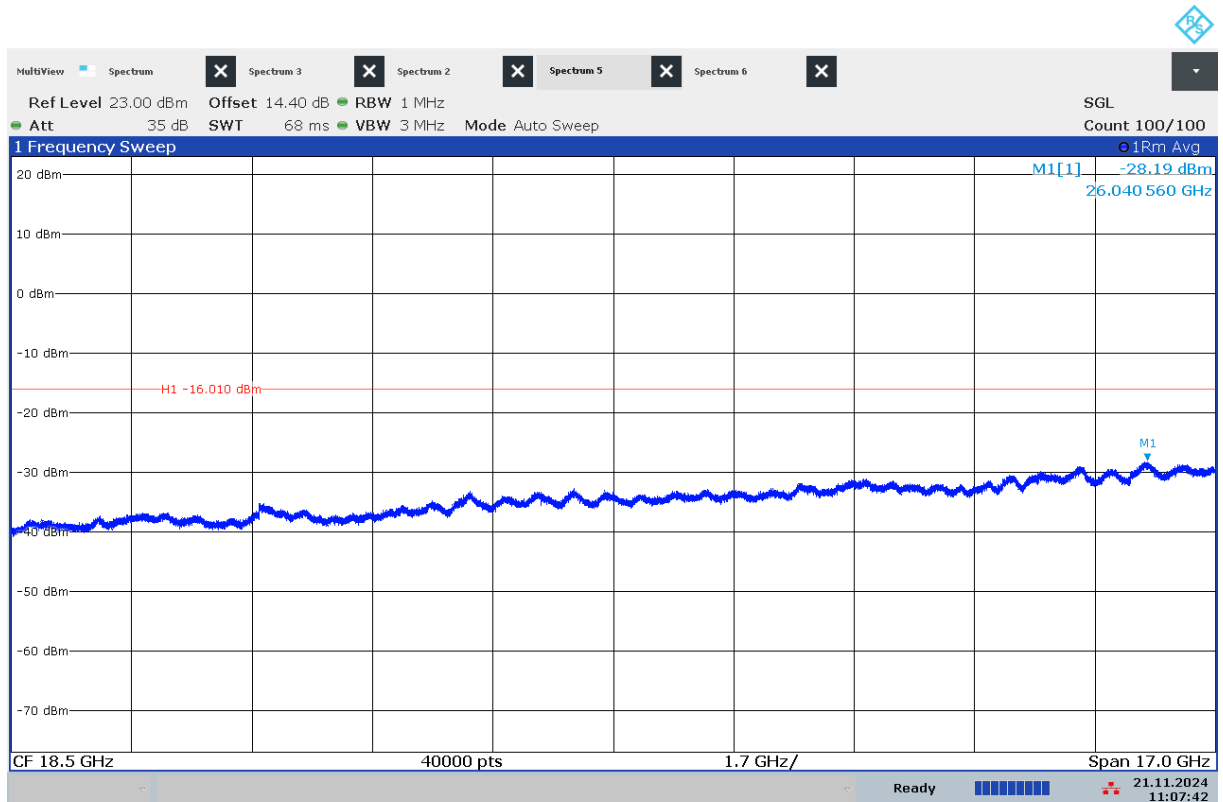


10:57:20 21.11.2024

Port 1, QPSK 10M, Channel Position B

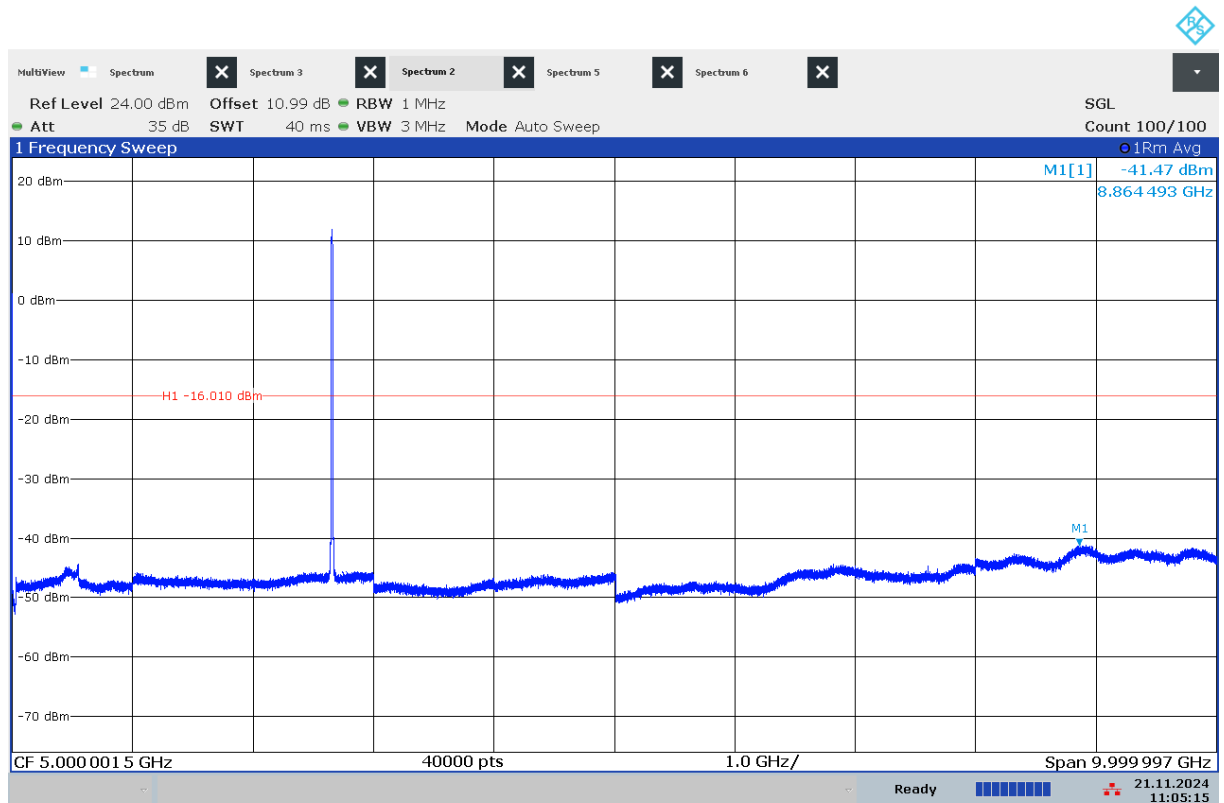


11:08:08 21.11.2024

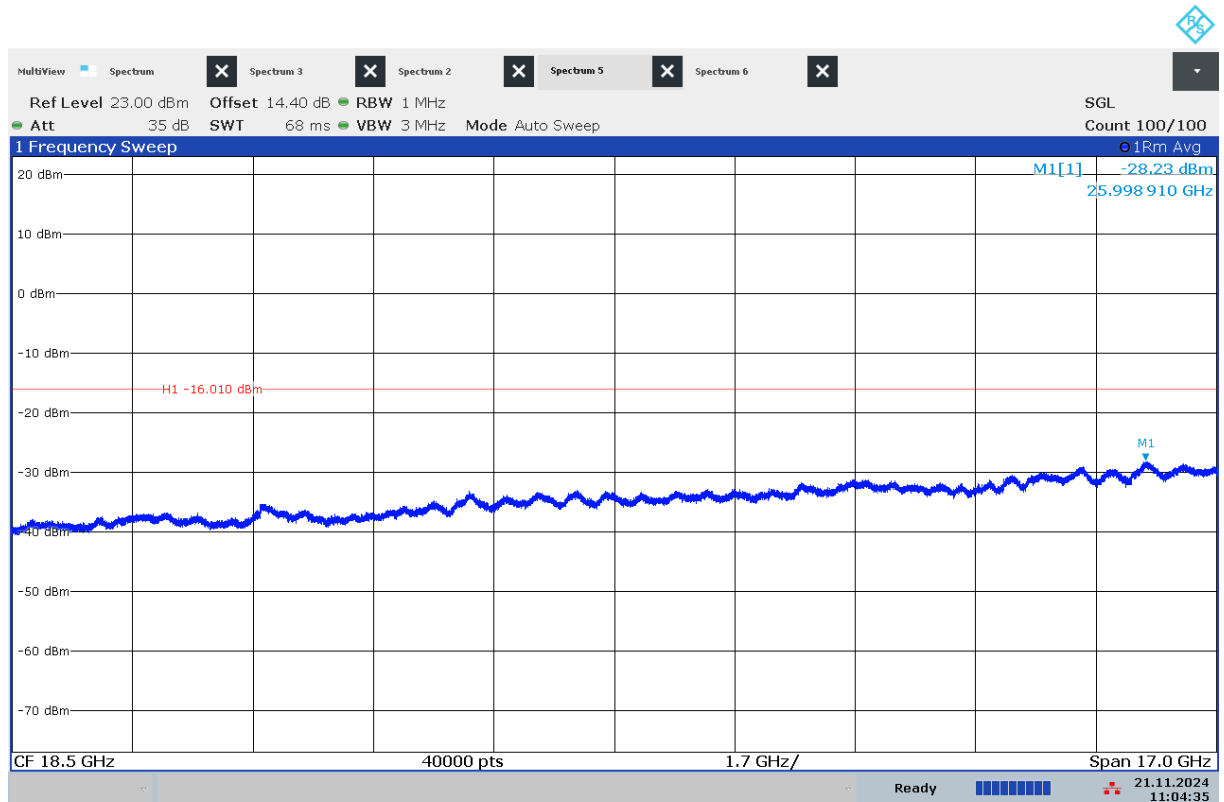


11:07:42 21.11.2024

Port 1, QPSK 10M, Channel Position M

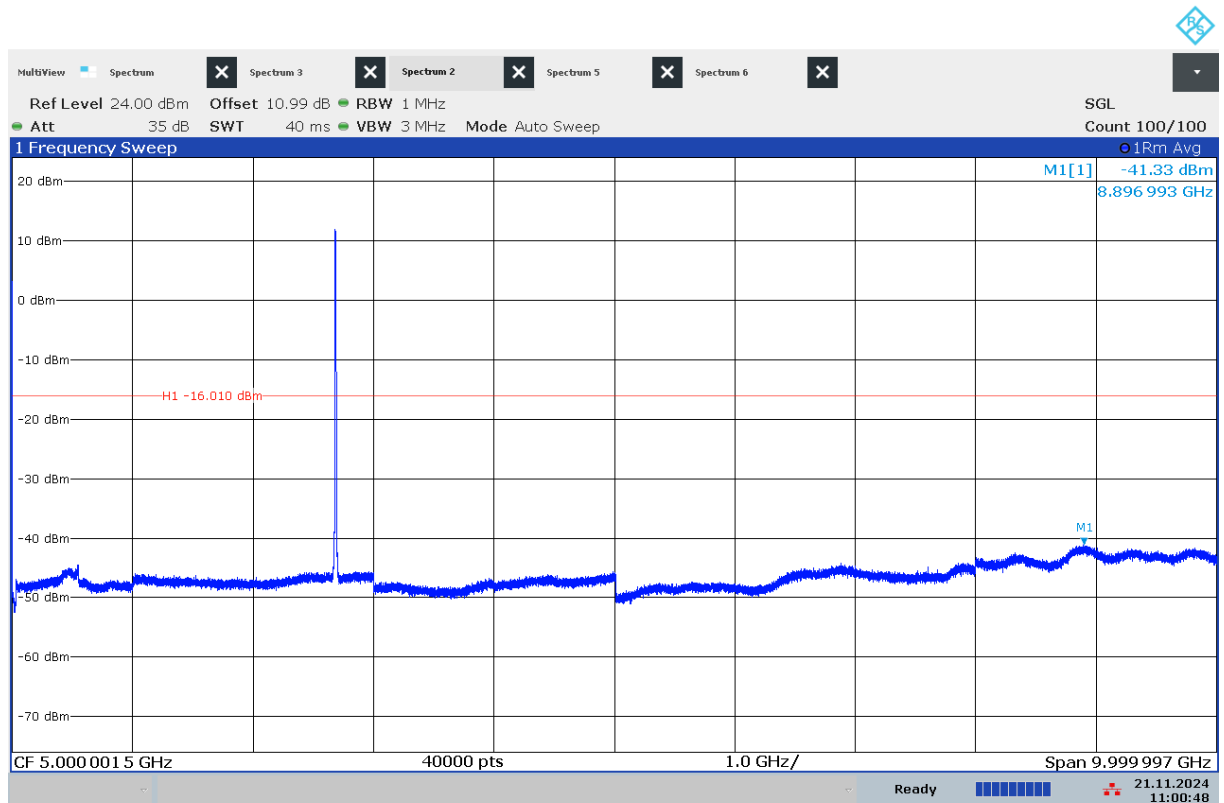


11:05:15 21.11.2024

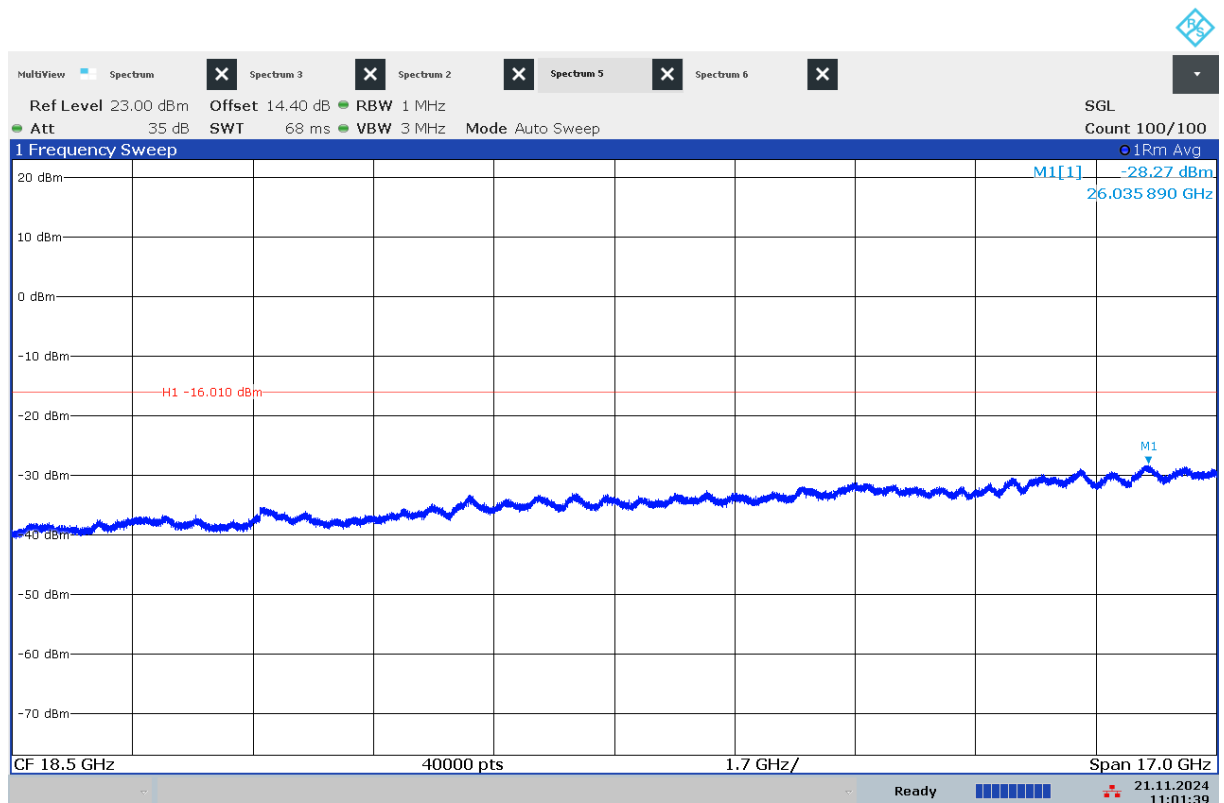


11:04:36 21.11.2024

Port 1, QPSK 10M, Channel Position T

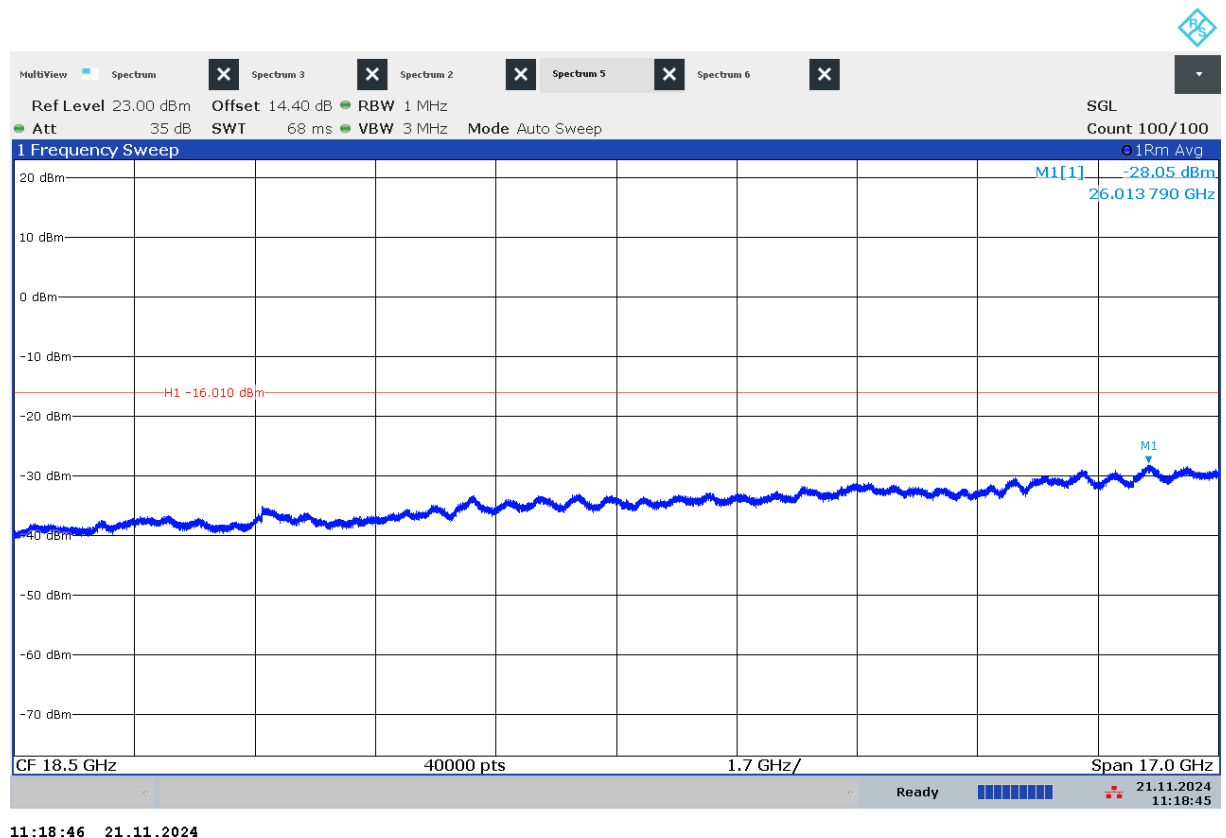
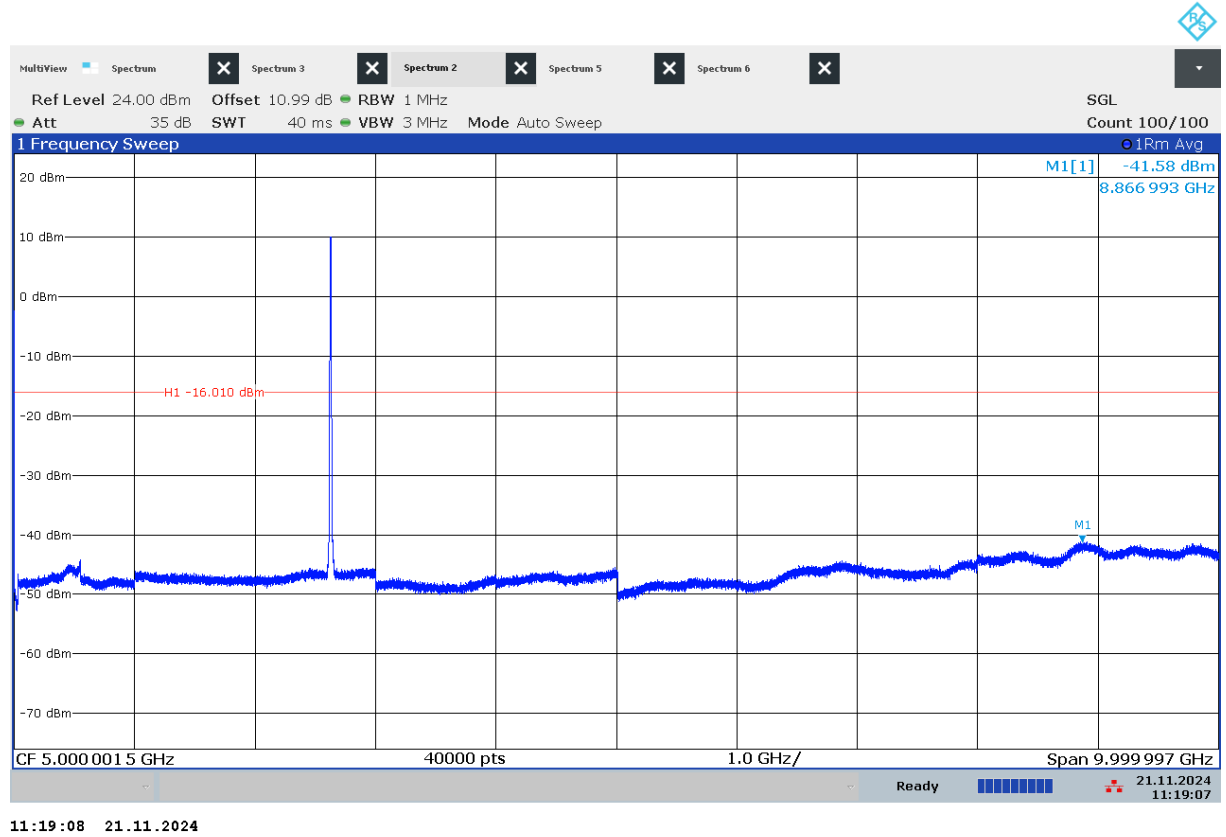


11:00:48 21.11.2024

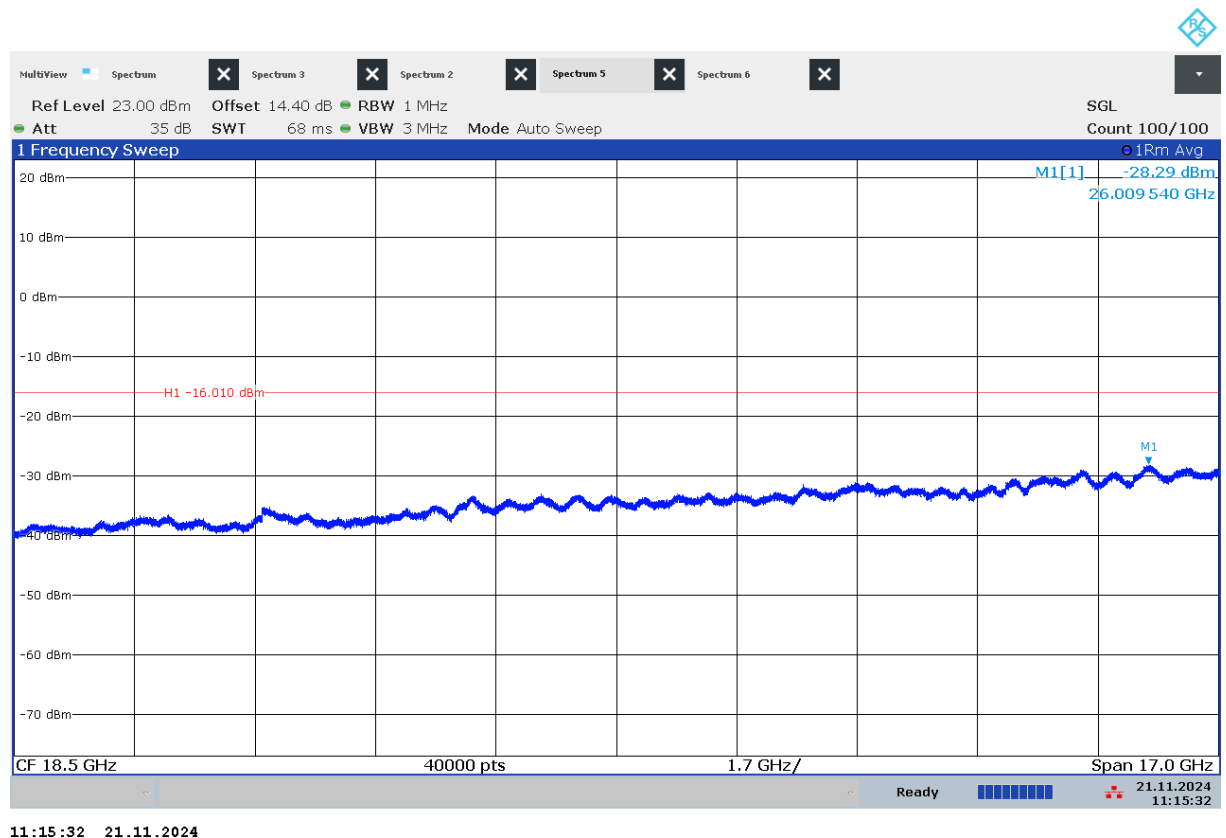
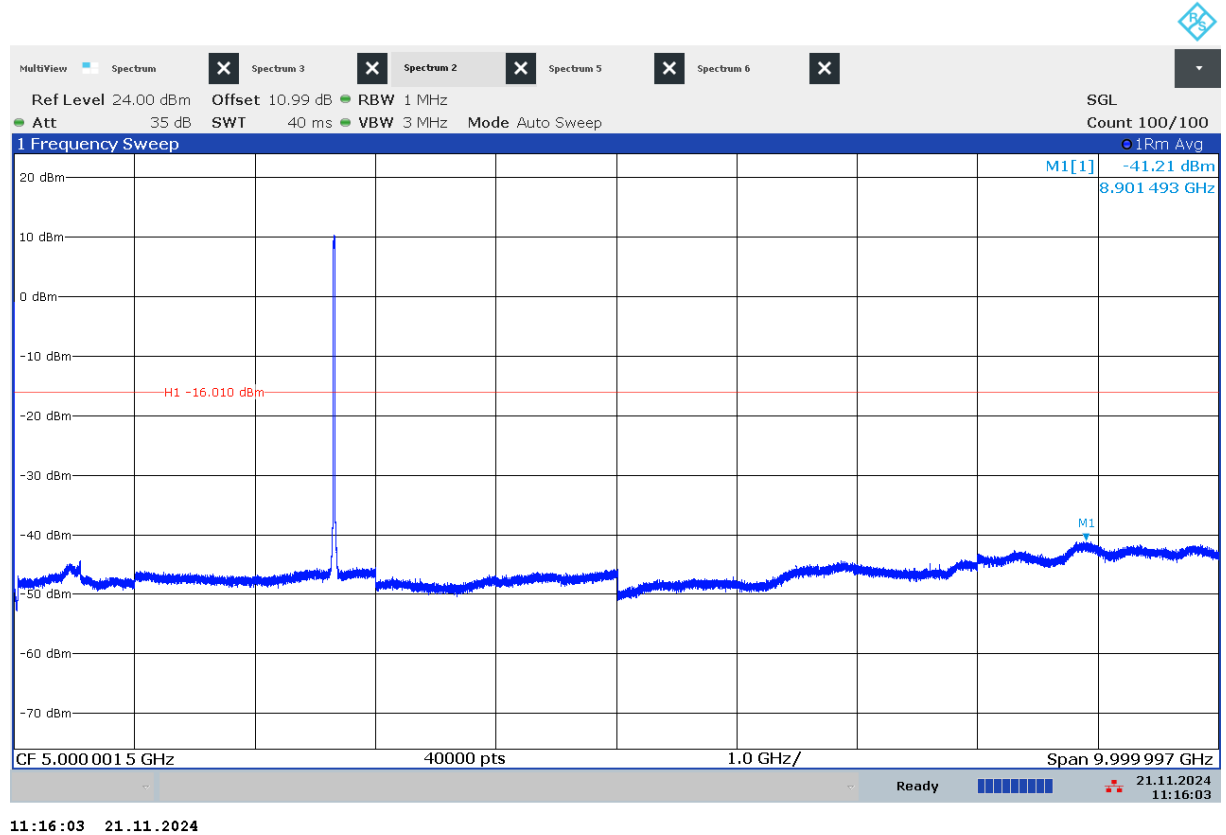


11:01:39 21.11.2024

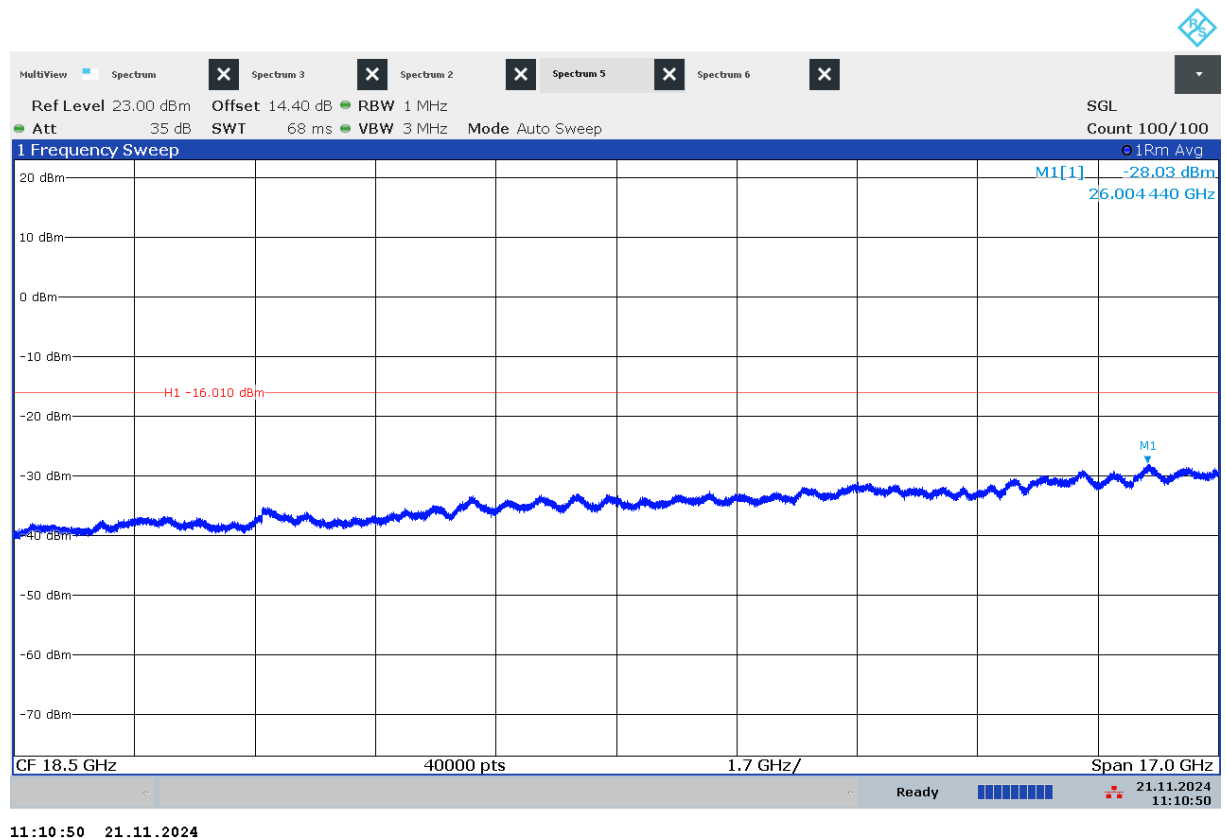
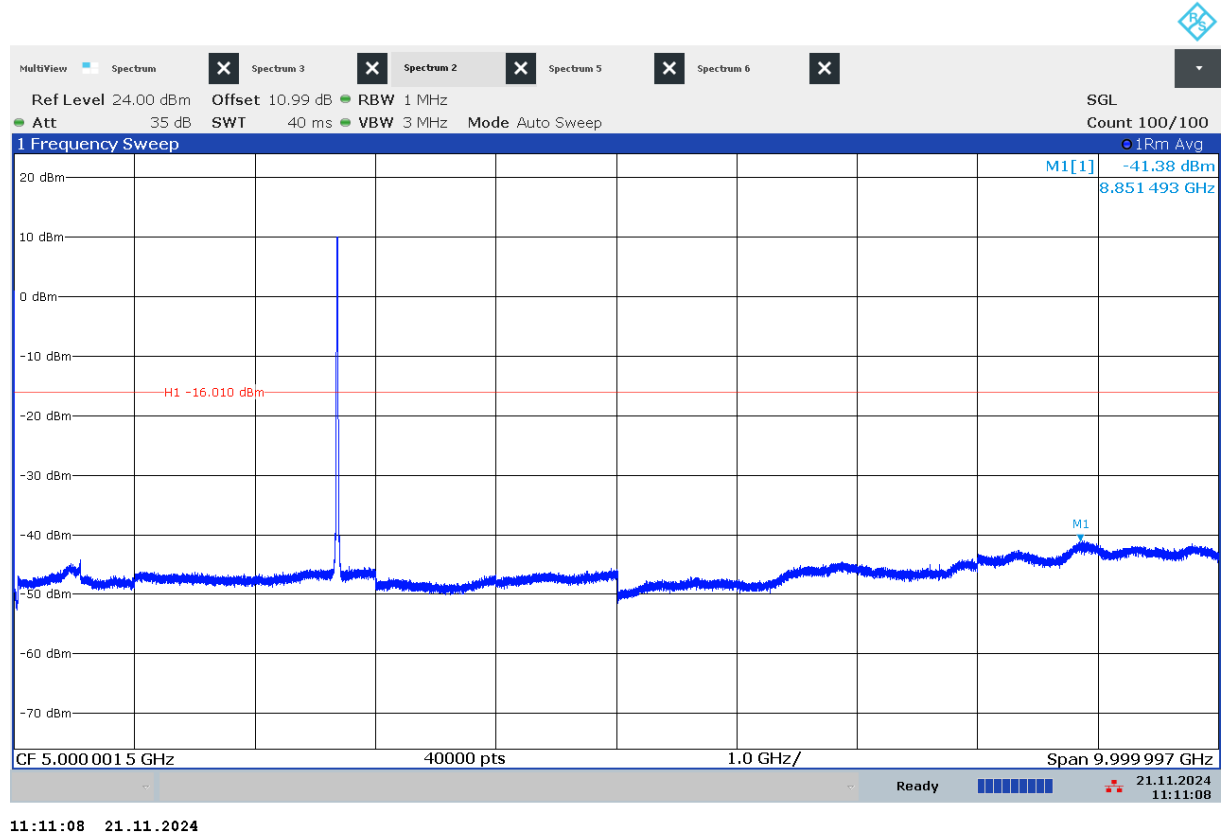
Port 1, QPSK 15M, Channel Position B



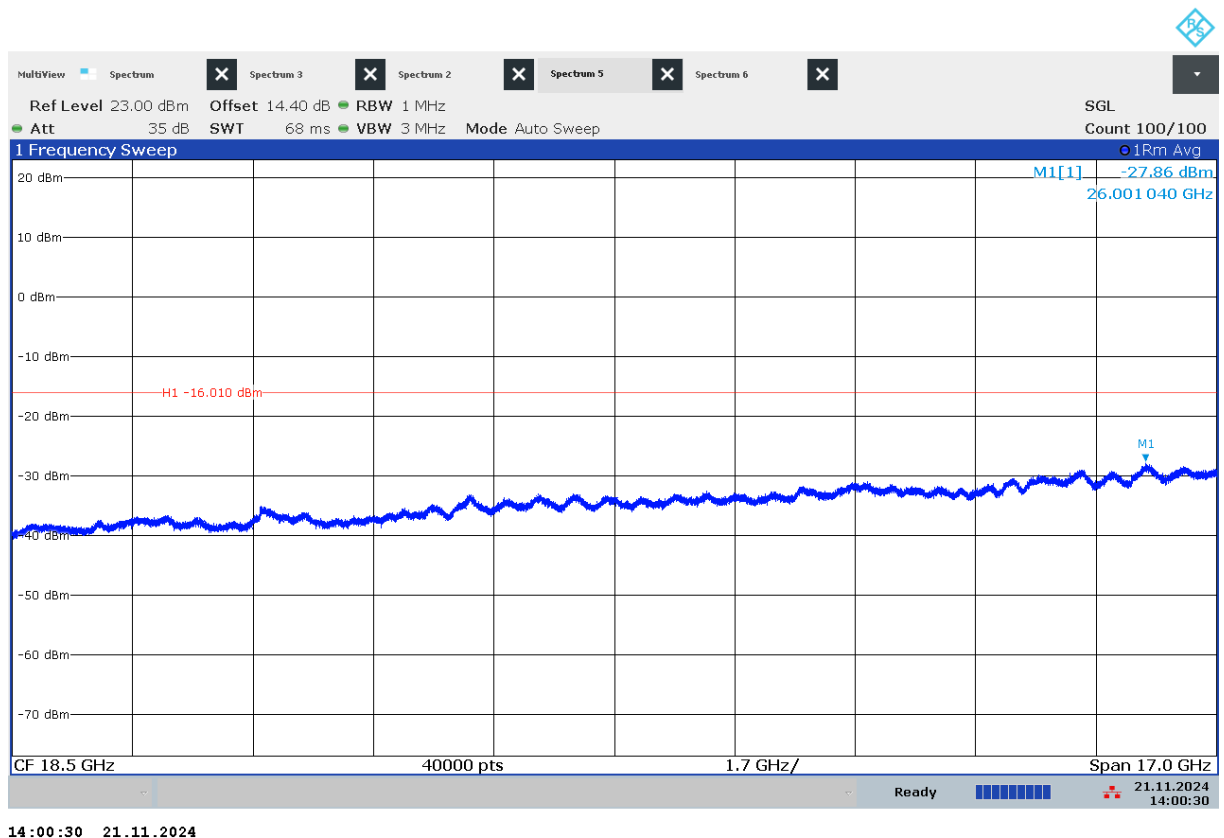
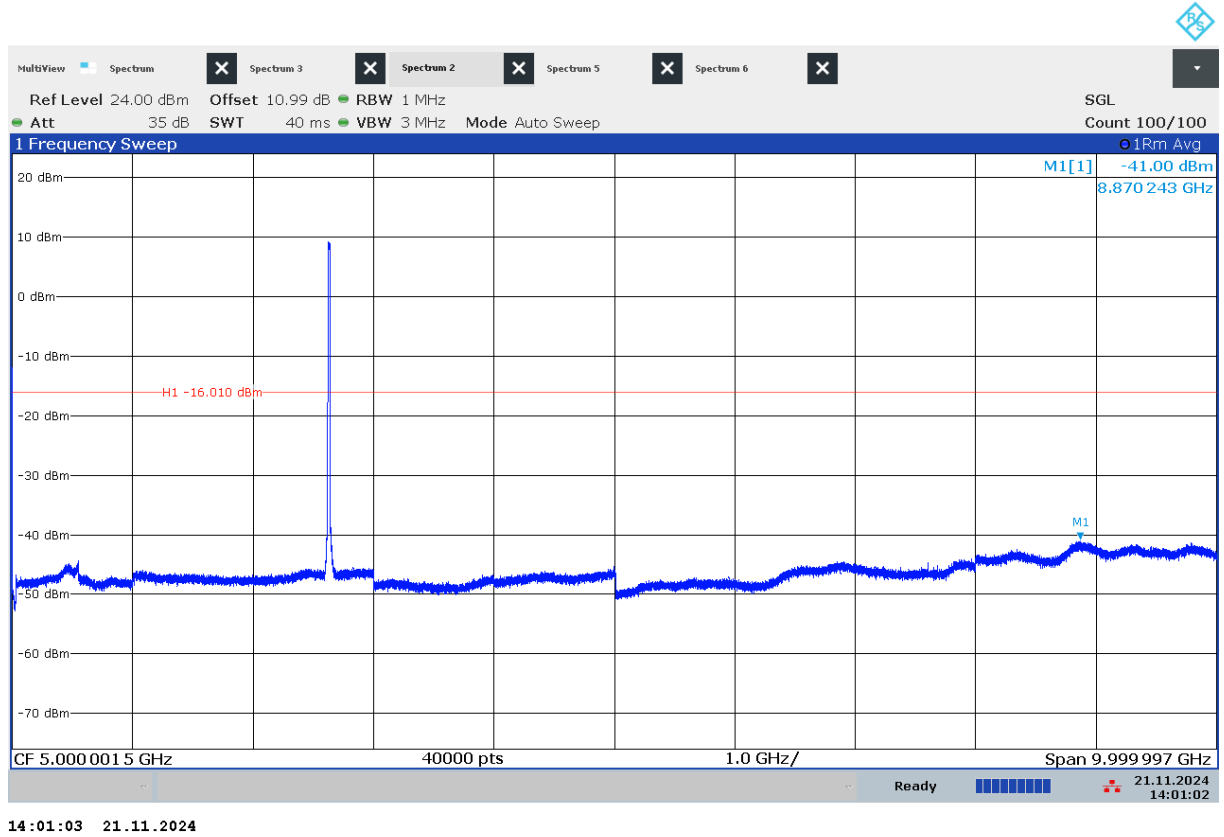
Port 1, QPSK 15M, Channel Position M



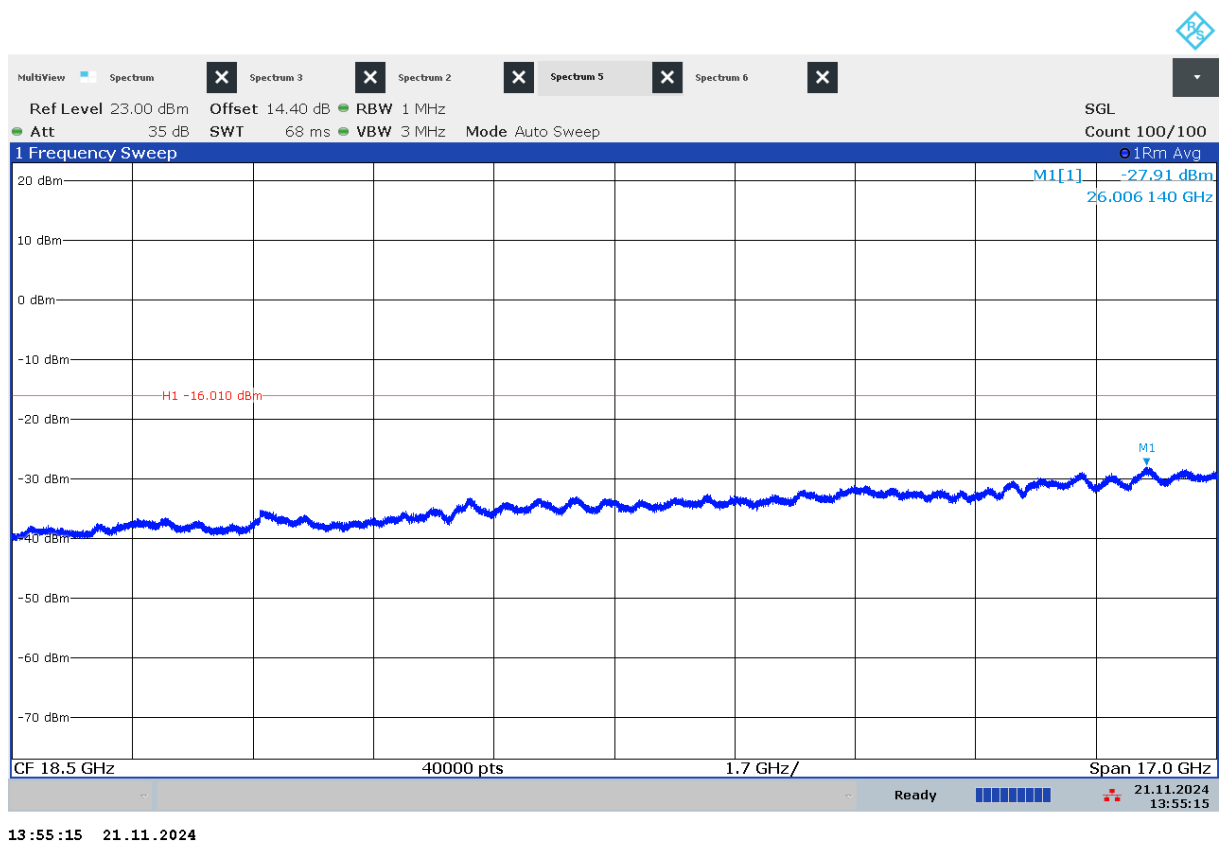
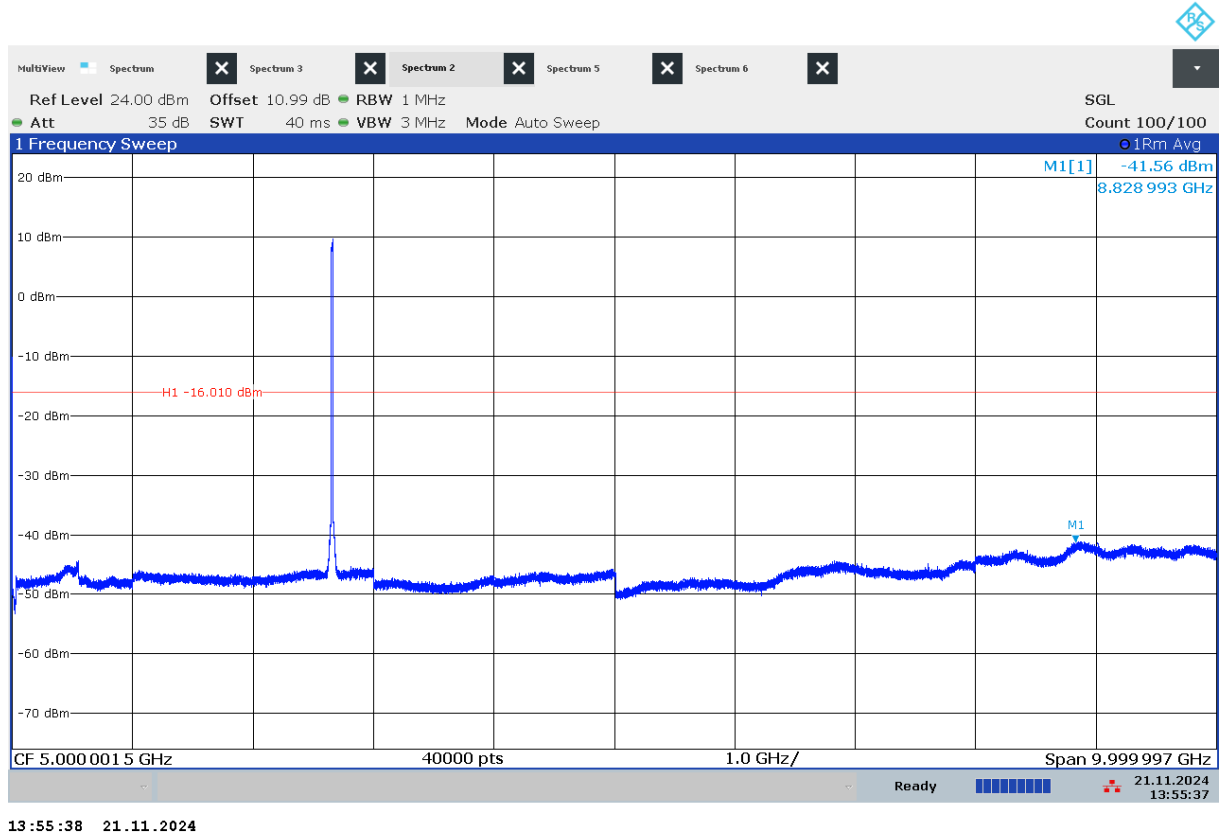
Port 1, QPSK 15M, Channel Position T



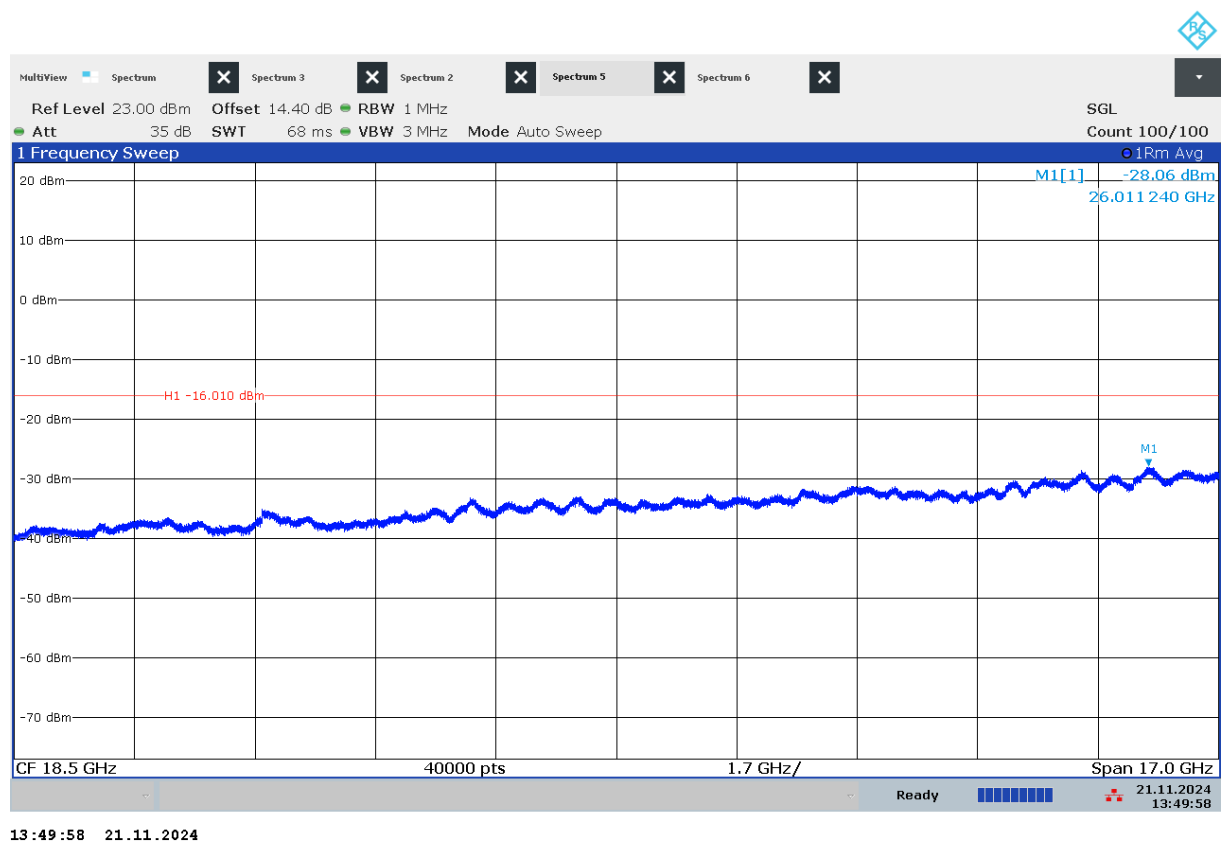
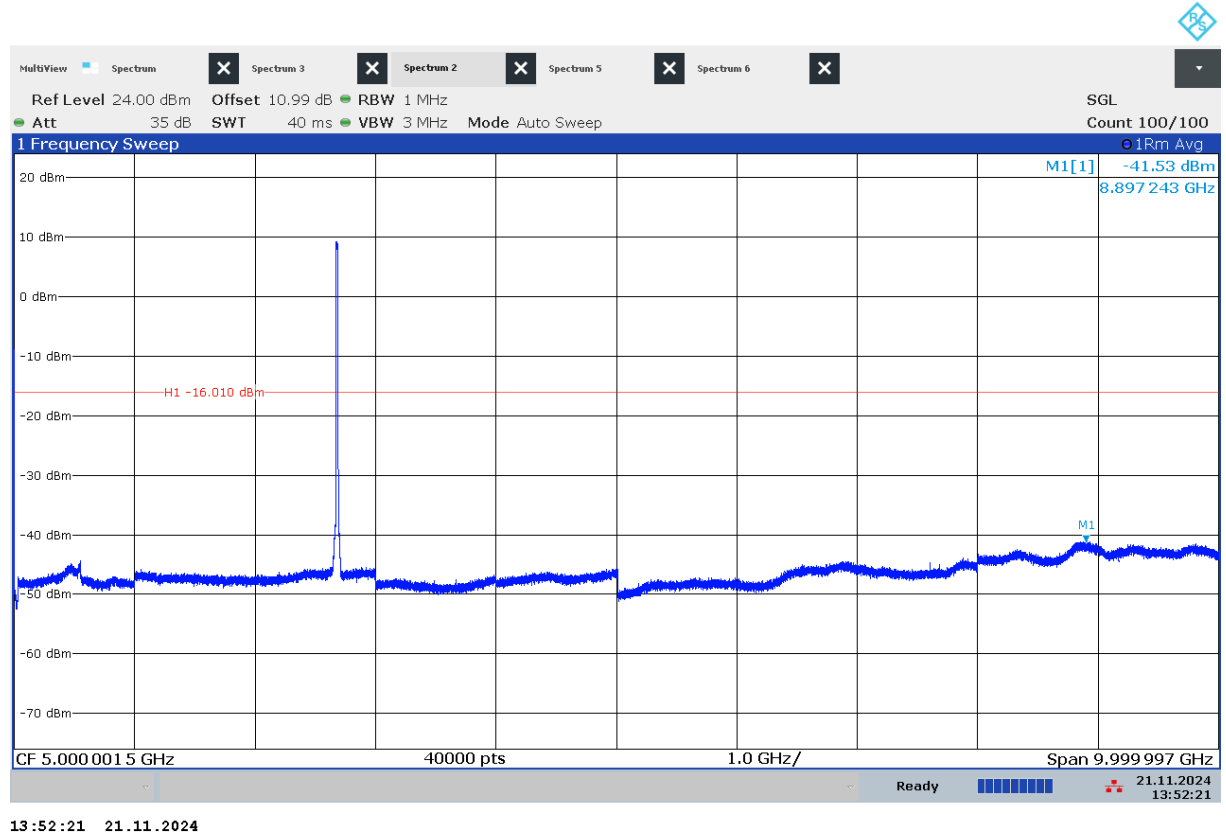
Port 1, QPSK 20M, Channel Position B



Port 1, QPSK 20M, Channel Position M



Port 1, QPSK 20M, Channel Position T



A.5 Radiated Spurious Emission

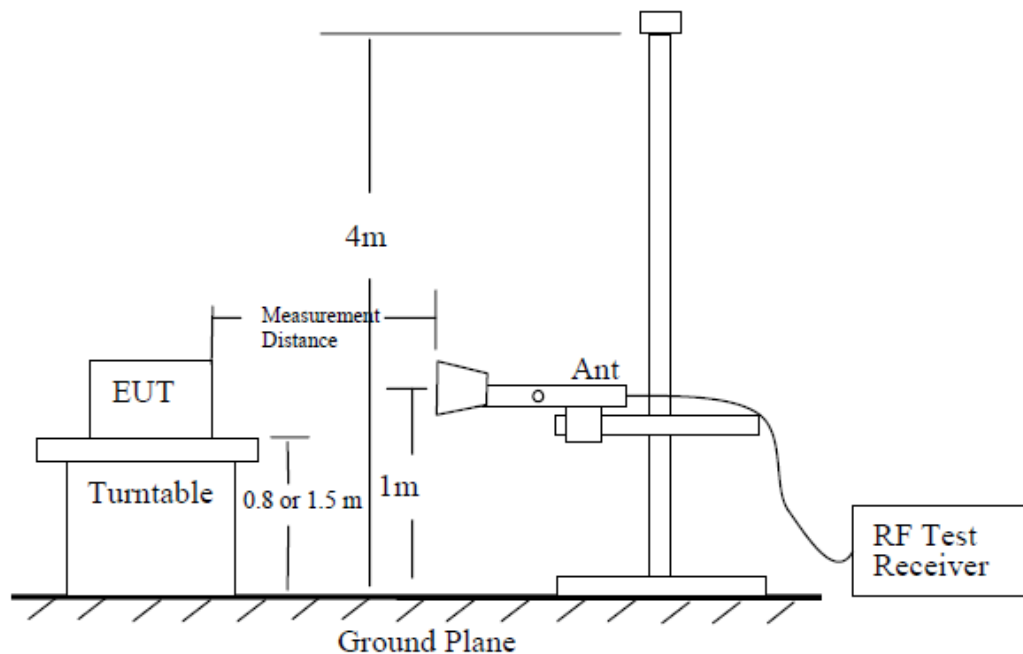
A.5.1 Measurement procedures

The measurements procedures in C63.26 are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Band 7.

The procedure of radiated spurious emissions is as follows:

Using the test configuration as follow, measure the radiated emissions directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits.



The emission characteristics of the EUT can be identified from the pre-scan measurement information.

Exploratory radiated measurements (pre-scans) may be performed to determine the general EUT radiated emissions characteristics and, when necessary, the EUT-to-measurement antenna orientation that produces the maximum emission amplitude. Pre-scans shall only be used to determine the emission frequencies (i.e., not amplitude levels). The information garnered from a pre-scan can then be used to perform final compliance measurements using either the substitution or direct field strength method.

For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80 cm above the reference ground plane. Radiated measurements shall be made with the measurement antenna positioned in both horizontal and vertical polarization. The measurement antenna shall be varied from 1 m to 4 m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level (i.e., field strength or received power). When orienting the measurement antenna in vertical polarization, the minimum height of

the lowest element of the antenna shall clear the site reference ground plane by at least 25 cm.

The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.

For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table or support at a nominal height of 1.5 m above the ground plane.

When maximizing the emissions from the EUT for measurement, the EUT and its transmitting antenna(s) shall be rotated through 360°. For each mode of operation to be tested, the frequency spectrum (based on findings from exploratory measurements) shall be monitored.

Final measurements shall be performed for the worst case combination(s) of variable technical parameters that result in the maximum measured emission amplitude, record the frequency and amplitude of the highest fundamental emission (if applicable), and the frequency and amplitude data for the six highest-amplitude spurious emissions.

A.5.2 Measurement Limit

FDD Band 7: 27.53(m) (2) specifies " For digital base stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS No. 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. ".

A.5.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Band 7. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE Band 7 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this. The range of evaluated frequency is from 30MHz to 26GHz.

Test note

1. The EUT is operating at its maximum duty cycle and its maximum power control level.
2. Investigation has been done on all modes and modulations/data rates. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.
3. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept.

Measurement Results:
LTE-MIMO-1C
LTE Band 7, 5 MHz, QPSK, Channel 20775

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5244.50	-39.16	7.00	10.24	-35.92	-13.00	22.92	H
7864.50	-40.05	8.38	12.49	-35.94	-13.00	22.94	V
10488.50	-39.16	9.67	13.10	-35.73	-13.00	22.73	V
13110.00	-49.00	10.89	13.65	-46.24	-13.00	33.24	H
15735.00	-41.50	11.63	13.70	-39.43	-13.00	26.43	H
17066.00	-45.42	12.57	13.95	-44.04	-13.00	31.04	H

LTE Band 7, 5 MHz, QPSK, Channel 21100

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5308.50	-30.82	6.99	10.33	-27.48	-13.00	14.48	V
7965.00	-44.48	8.36	12.57	-40.27	-13.00	27.27	H
10621.00	-42.31	9.29	13.12	-38.48	-13.00	25.48	V
13283.00	-47.67	10.57	13.90	-44.34	-13.00	31.34	V
15930.50	-44.35	11.68	13.70	-42.33	-13.00	29.33	H
17275.50	-45.36	12.37	14.41	-43.32	-13.00	30.32	H

LTE Band 7, 5 MHz, QPSK, Channel 21425

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5375.00	-28.73	6.88	10.43	-25.18	-13.00	12.18	H
8061.00	-40.84	8.32	12.65	-36.51	-13.00	23.51	V
10750.00	-36.03	9.43	13.15	-32.31	-13.00	19.31	V
13436.50	-47.34	10.60	14.11	-43.83	-13.00	30.83	H
16125.00	-41.33	11.82	13.68	-39.47	-13.00	26.47	H
17476.50	-44.67	12.67	14.85	-42.49	-13.00	29.49	V

Sample: 5375.00 MHz

Power (EIRP) = P_{Mea} + P_{pl} + G_a

Power (-25.18dBm) = P_{Mea} (-28.73dBm)+ P_{pl} (6.88 dB)+ G_a(10.43dBi)

Note: The measurement results showed here are worst cases

A.6 Frequency Stability

A.6.1 Reference

FCC CFR 47 Part 2, Clause 2.1055

FCC CFR 47 Part 27, Clause 27.54

A.6.2 Method of measurement

Temperature Variation

The EUT was tested over the temperature range -30°C to +50°C in 10°C steps with -12VDC Power Supply. At each temperature step, the Base Station was configured to transmit a [RAT]* at maximum power on the middle channel of the operating band. After achieving thermal balance, the averages of 200 transmission bursts were measured and the result recorded.

Voltage Variation

The EUT was tested at the supplied voltages varied from 85 to 115 percent of the nominal value of 12VDC. At +20°C, the Base Station was configured to transmit a [RAT]* at maximum power on the middle channel of the operating band. The average of 200 transmission bursts was measured and the result recorded.

[RAT]*:

LTE – QPSK modulation

A.6.3 Measurement limit

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

A.6.4 Measurement results

Configuration LTE-MIMO-1C, 5MHz, QPSK

Frequency Error – Temperature Variation

Supply Voltage DC(V)	Temperature(°C)	Frequency Stability (Hz)
		Channel position M
12	-30	-1.27
	-20	-1.24
	-10	1.68
	0	-1.35
	10	1.35
	20	1.25
	30	1.01
	40	-1.04
	50	-1.72

Frequency Error – Voltage Variation

Supply Voltage DC(V)	Frequency Stability (Hz)
	Channel position M
10.2	0.38
13.8	0.55

ANNEX B: Accreditation Certificate



Accredited Laboratory

A2LA has accredited

TELECOMMUNICATION TECHNOLOGY LABS, CAICT

Beijing, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 23rd day of July 2024.



Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2026

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

*****END OF REPORT*****