FCC Part 27
FCC Part 22H, Part 24E
RSS-GEN Issue 5, February 2021 Amendment 2
RSS-130 Issue 2, February 2019
RSS-132 Issue 3, January 2013
RSS-133 Issue 6, January 2018 Amendment 1
RSS-139 Issue 4, September 2022

TEST REPORT

For

Tractive GmbH

Poststrasse 4 ,Pasching, 4061 Austria

FCC ID:2AVE6TG5
IC:25970-TG5

Report Type:	**Product Type:**
Original Report	Tractive CAT mini

Report Producer : COCO Lin

Report Number : RXZ230110032RF01

Report Date : 2023-05-04

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Revision History

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
0.0	RXZ230110032	RXZ230110032RF01	2023.05.04	Original Report	COCO.Lin

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1. General Information

1.1 Product Description for Equipment under Test (EUT)

Applicant	Tractive GmbH		
	Poststrasse 4, Pasching, 4061 Austria		
Manufacturer	Tractive GmbH		
	Poststrasse 4, Pasching, 4061 Austria		
Brand(Trade) Name	N/A		
Product (Equipment)	Tractive CAT mini		
Main Model Name	TG5		
Series Model Name	N/A		
Model Discrepancy	N/A		
Frequency Range	LTE Band 2: 1850-1910 MHz(TX), 1930-1990MHz(RX) LTE Band 4: 1710-1755 MHz(TX), 2110-2155MHz(RX) LTE Band 5: 824-849 MHz(TX), 869-894 MHz(RX) LTE Band 12:699-716 MHz(TX), 729-746 MHz(RX) LTE Band 13:777-787 MHz(TX), 746-756 MHz(RX) Cellular: 824-849MHz(GPRS) PCS:1850-1910MHz(GPRS)		
Modulation Technique	QPSK, 16QAM, GMSK		
Antenna Specification	Mode	Type	Gain(dBi)
	LTE Band 2	FPC	0.9
	LTE Band 4	FPC	0.9
	LTE Band 5	FPC	-3.3
	LTE Band 12	FPC	-3.3
	LTE Band 13	FPC	-3.3
	Cellula 850	FPC	-3.3
	PCS 1900	FPC	0.9
Output Voltage	☒ AC Type ☒ Adapter Brand Name: Opro9 ☐ By AC Power Cord		
	☒ DC Type ☒ Battery: 3.8Vdc Brand Name: Tractive GmbH Model: HI9213380677 ☐ DC Power Supply 12V ☒ External from USB Cable ☐ External DC Adapter		
Received Date	2023/01/10		
Date of Test	2023/01/11~2023/04/28		

** All measurement and test data in this report was gathered from production sample serial number: RXZ230110032 (Assigned by BACL New Taipei Laboratory)*

1.2 Objective

This report is prepared on behalf of ***Tractive GmbH*** in accordance with Part 2, Part 22-Subpart H and Part 24-Subpart E, Part 27 of the Federal Communication Commission's rules and RSS-130 Issue 2, February 2019, RSS-132 Issue 3, January 2013, RSS-133 Issue 6, January 2018 Amendment 1, RSS-139 ISSUE 3, July 2015 and RSS-Gen Issue 5, February 2021 Amendment 2 of the Industry Canada rules.

The objective is to determine the compliance of EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability, and band edge.

1.3 Related Submittal(s)/Grant(s)

N/A

1.4 Test Methodology

FCC tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 22 Subpart H –Public Mobile Services
Part 24 Subpart E – Personal Communications Services
Part 27 – Miscellaneous wireless communications services
Applicable Standards: ANSI C63.26-2015.

IC tests and measurements indicated in this document were performed in accordance with the RSS-130, RSS-132, RSS-133, RSS-139, RSS-Gen & ANSI C63.26-2015.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.5 Statement

Decision Rule: No, (The test results do not include MU judgment)

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
The determination of the test results does not require consideration of the uncertainty of the measurement, unless the assessment is required by customer agreement, regulation or standard document specification.
Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is not responsible for the authenticity of the information provided by the applicant that affects the test results.

1.6 Measurement Uncertainty

Parameter		Uncertainty
RF output power, conducted		+/- 0.9 dBm
Frequency stability		+/- 0.02 MHz
Occupied Bandwidth		+/- 0.35 MHz
Unwanted Emissions, conducted		+/- 1.69 dBm
Emissions, radiated	30 MHz~1GHz	+/- 5.22 dB
	1 GHz~18 GHz	+/- 6.12 dB
	18 GHz~40 GHz	+/- 4.99 dB
Temperature		+/- 1.27 ℃
Humidity		+/- 3 %

1.7 Environmental Conditions

Test Site	Test Data	Temperature (℃)	Relative Humidity (%)	ATM Pressure (hPa)	Test Engineer
Radiation Spurious Emissions	2023/1/11~2023/1/14	22.3~22.5	74~75	1010	Aaron
Conducted Spurious Emissions	2023/1/13~2023/4/28	23.8~24.5	45~59	1010	Andy Chemg
Emission Bandwidth	2023/1/11~2023/4/21	23.8~25.9	45~68	1010	
Maximum Output Power	2023/1/11	24.6	59	1010	
PAR	2023/1/11	24.6	59	1010	
Band Edge	2023/1/12~2023/4/21	23.8~25.9	45~68	1010	
Frequency stability	2023/1/12	25.9	59	1010	

1.8 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) to collect test data is located on

☒70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (New Taipei Laboratory) is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3732) and the FCC designation No.TW3732 under the Mutual Recognition Agreement (MRA) in FCC Test.

2. System Test Configuration

2.1 Description of Test Configuration

The EUT was configured for testing according to ANSI C63.26-2015.

The final qualification test was performed with the EUT operating at normal mode.

Channel List

Mode	Bandwidth (MHz)	Test Frequency (MHz)	
LTE Band 2	1.4	Low	1850.7
		Middle	1880.0
		High	1909.3
	3	Low	1851.5
		Middle	1880.0
		High	1908.5
	5	Low	1852.5
		Middle	1880.0
		High	1907.5
	10	Low	1855.0
		Middle	1880.0
		High	1905.0

Mode	Bandwidth (MHz)	Test Frequency (MHz)	
LTE Band 4	1.4	Low	1710.7
		Middle	1732.5
		High	1754.3
	3	Low	1711.5
		Middle	1732.5
		High	1753.5
	5	Low	1712.5
		Middle	1732.5
		High	1752.5
	10	Low	1715.0
		Middle	1732.5
		High	1750.0
Mode	Bandwidth (MHz)	Test Frequency (MHz)	
LTE Band 5	1.4	Low	824.7
		Middle	836.5
		High	848.3
	3	Low	825.5
		Middle	836.5
		High	847.5
	5	Low	826.5
		Middle	836.5
		High	846.5
	10	Low	829.0
		Middle	836.5
		High	844.0

Mode	Bandwidth (MHz)	Test Frequency (MHz)	
LTE Band 12	1.4	Low	699.7
		Middle	707.5
		High	715.3
	3	Low	700.5
		Middle	707.5
		High	714.5
	5	Low	701.5
		Middle	707.5
		High	713.5
	10	Low	704.0
		Middle	707.5
		High	711.0
Mode	Bandwidth (MHz)	Test Frequency (MHz)	
LTE Band 13	5	Low	779.5
		Middle	782.0
		High	784.5
	10	Low	N/A
		Middle	782.0
		High	N/A

2.2 Equipment Modifications

No modification was made to the EUT.

Test Mode

Full System (Model: TG5) for all test item.

2.3 EUT Exercise Software

N/A.

2.4 Support Equipment List and Details

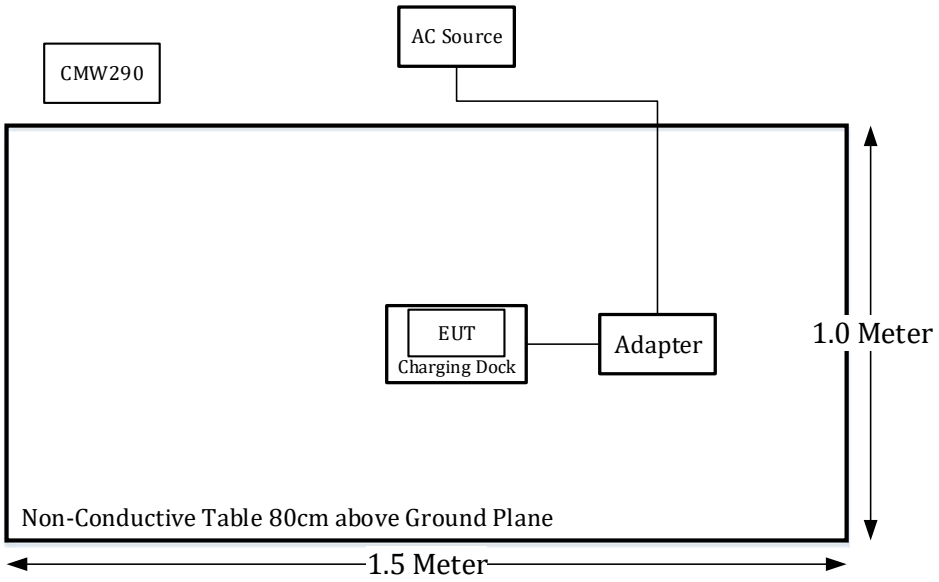
Description	Manufacturer	Model Number	S/N
Charging Dock	Tractive	N/A	N/A
Adapter	Opro9	FMP205	N/A

2.5 External Cable List and Details

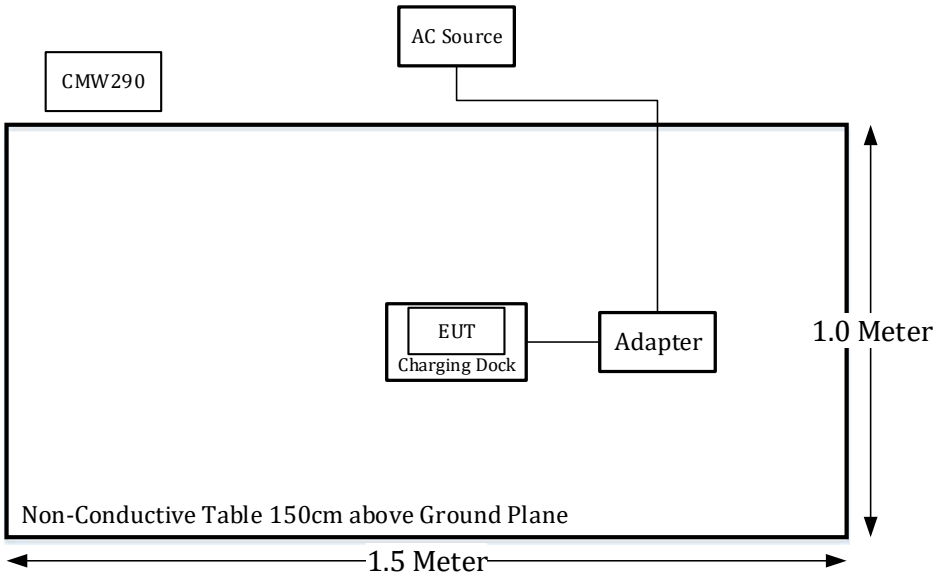
Cable Description	Length (m)	From Port	To
USB Cable	0.8	Charging	Adapter

2.6 Block Diagram of Test Setup

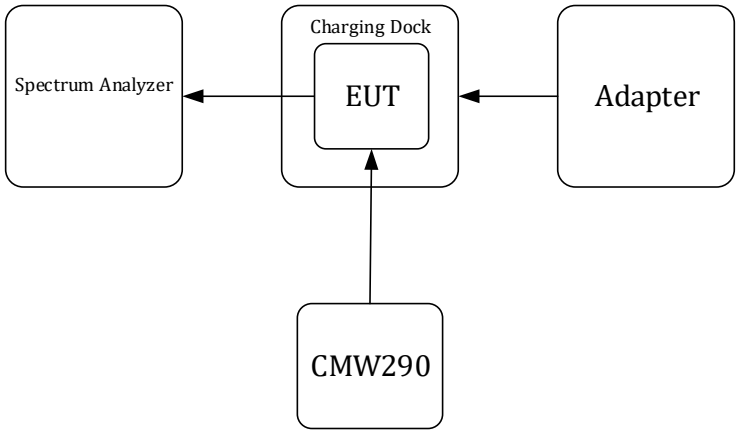
For Radiated Emissions (Below 1GHz).



For Radiated Emissions (Above 1GHz).



For Conducted



3. Summary of Test Results

FCC and RSS Rules	Description of Test	Result
§1.1307(b)(3)(i) RSS-102 §4	RF Exposure	Compliance
§2.1046; §22.913 (a),(d) §24.232(c)(d) ;§27.50 RSS-130 Clause 4.6 RSS-132 Clause 5.4 RSS-133 Clause 6.4 RSS-139 Clause 6.5	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
RSS-130 Clause 4.2 RSS-132 Clause 5.2 RSS-133 Clause 6.2 RSS-139 Clause 6.2	Types of Modulation	Compliance
RSS-130 Clause 4.3 RSS-132 Clause 5.1 RSS-133 Clause 6.1 RSS-139 Clause 6.1	Channeling Arrangements Frequency Plan	Compliance
§ 2.1049; §22.905; §22.917; §24.238 ;§27.53 RSS-Gen Clause 6.7	Occupied Bandwidth	Compliance
§ 2.1051; §22.917(a); §24.238(a) ;§27.53 RSS-130 Clause 4.7 RSS-132 Clause 5.5 RSS-133 Clause 6.5 RSS-139 Clause 6.6	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; §22.917(a); §24.238(a) ;§27.53 RSS-130 Clause 4.7 RSS-132 Clause 5.5 RSS-133 Clause 6.5 RSS-139 Clause 6.6	Field Strength of Spurious Radiation	Compliance
§22.917(a); §24.238(a) ;§27.53 RSS-130 Clause 4.7 RSS-132 Clause 5.5 RSS-133 Clause 6.5 RSS-139 Clause 6.6	Band Edge	Compliance
§ 2.1055; §22.355; §24.235 ;§27.54 RSS-130 Clause 4.5 RSS-132 Clause 5.3 RSS-133 Clause 6.3 RSS-139 Clause 6.4	Frequency stability	Compliance

RSS-132 Clause 5.6 RSS-133 Clause 6.6	Receiver Spurious Emissions	Not Applicable (See Note)

Note:
According to RSS-Gen, only radio communication receivers operating in stand-alone mode within the band 30-960 MHz, as well as scanner receivers, are subject to Industry Canada requirements, as described above. All other receivers are exempted from any Industry Canada certification, testing, labeling and reporting requirements.

4. Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Room (966-A)					
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/15542_01	2022/2/14	2023/2/13
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2022/11/2	2023/11/1
Horn Antenna	EMCO	SAS-571	1020	2022/5/25	2023/5/24
Horn Antenna	ETS-Lindgren	3116	62638	2022/8/18	2023/8/17
Preamplifier	Sonoma	310N	130602	2022/6/16	2023/6/15
Microware Preamplifier	EM Electronics Corporation	EM18G40G	60656	2023/1/6	2024/1/5
Spectrum Analyzer	Rohde & Schwarz	FSV40	1A322C4	2022/5/13	2024/5/12
Micro flex Cable	UTIFLEX	UFB197C-1-2362-70U-70U	225757-001	2022/1/24	2023/1/23
Coaxial Cable	COMMATE	PEWC	8Dr	2022/12/24	2023/12/23
Coaxial Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2022/1/24	2023/1/23
Coaxial Cable	JUNFLON	J12J102248-00-B-5	AUG-07-15-044	2022/12/24	2023/12/23
Cable	EMC	EMC105-SM-SM-10000	201003	2022/1/24	2023/1/23
Preamplifier	A.H. system Inc.	PAM-0118P	470	2022/3/28	2023/3/27
Software	Audix	E3	18621a Bacl	N.C.R	N.C.R
Sweep Signal Generator	Agilent	MXG N5183A	MY50140407	2022/12/29	2023/12/28
Wideband Radio Communication Tester	Rohde & Schwarz	CMW290	10741	2022/7/19	2023/7/18
Bilog Antenna	SUNOL SCIENCES & EMEC	JB3 / EM-ATT6000-6-NN	A061204 /ATT-09-012	2023/2/2	2024/02/01
Horn Antenna	EMCO	SAS-571	1983	2022/05/25	2023/05/24
Horn Antenna	ETS-Lindgren	3116	60023	2022/08/18	2023/08/17
Signal Generator	Agilent	MXG N5183A	MY50140407	2023/01/03	2024/01/02

Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2022/2/18	2023/2/17
				2023/2/10	2024/2/9
Cable	UTIFLEX	UFA210A	9435	2022/10/3	2023/10/2
Attenuator	MINI-CIRCUITS	BW-S10W5+	1419	2022/2/11	2023/2/10
				2023/2/2	2024/2/1
Power Splitter	Mini-Circuits	ZFRSC-183-S+	S F448201614	2022/06/23	2023/06/22
Temp & Humidity Chamber	BACL	BTH-150	30028	2022/1/19	2023/1/18
				2023/1/17	2024/1/16
Wideband Radio Communication Tester	Rohde & Schwarz	CMW290	10741	2022/7/19	2023/7/18
Regulated DC Power Supply	KIKUSUI	PMC35-2	MK002127	NCR	NCR
Multimeter	Fluke	114	28810152WS	2022/02/09	2023/02/08
				2023/02/09	2024/02/08

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements.*

5. FCC §1.1307(b)(3)(i) - RF Exposure

Applicable Standard

According to subpart §1.1307(b)(3)(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

For single RF sources (*i.e.*, any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);
(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold *Pth* (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). *Pth* is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^x & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

(C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

RF Exposure Evaluation Result

Please refer to the SAR report, report No.: RXZ230110032SA01.

6. RSS-102 Clause 4 – RF EXPOSURE EVALUATIONN

6.1 Applicable Standard

According to RSS-102 Clause 4:

For the purpose of this standard, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6

Table 3: SAR Limits for Devices Used by the General Public (Uncontrolled Environment)			
Body Region	Average SAR (W/kg)	Averaging Time (minutes)[20]	Mass Average (g)
Whole Body	0.08	6	Whole Body
Localized Head, Neck and Trunk	1.6	6	1
Localized Limbs	4	6	10

RF Exposure Evaluation Result

Please refer to the SAR report, report No.: RXZ230110032SA02

7. FCC §2.1047 - Modulation Characteristics

According to FCC § 2.1047(d), Part 22H & 24E, Part 27, there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

8. RSS-130 ISSUE 2 CLAUSE 4.3 & RSS-132 ISSUE 3 CLAUSE 5.1 & RSS-133 ISSUE 6 CLAUSE 6.1 & RSS-139 ISSUE 4 CLAUSE 6.1 - CHANNELLING ARRANGEMENTS & FREQUENCY PLAN

8.1 Applicable Standard

According to RSS-130 Issue 2 clause 4.3

The frequency bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz are divided into small frequency blocks as per SRSP-518. Equipment shall operate according to the frequency plan given in the SRSP.

According to RSS-132 Issue 3 clause 5.1

The frequency bands 824-849 MHz and 869-894 MHz are divided into sub-bands as described in SRSP-503. These sub-bands are:

- 824-835 MHz, 835-845 MHz, 845-846.5 MHz, and 846.5-849 MHz for mobile transmit; and
- 869-880 MHz, 880-890 MHz, 890-891.5 MHz, and 891.5-894 MHz for base transmit.

According to RSS-133 Issue6 clause 6.1

The frequency plan is described in SRSP-510.

According to RSS-139 Issue3 clause 6.1

The frequency plan is described in SRSP-513.

8.2 Result:

Channeling arrangement meets all relevant conditions specified in SRSP-503, SRSP-510, SRSP-513 and SRSP-518.

9. RSS-130 ISSUE 2 CLAUSE 4.2 & RSS-132 ISSUE 3 CLAUSE 5.2 & RSS-133 ISSUE 6 CLAUSE 6.2 & RSS-139 ISSUE 4 CLAUSE 6.2 – TYPES OF MODULATION

9.1 Applicable Standard

According to RSS-130 Issue 2 clause 4.2, Equipment certified under this standard shall employ digital modulation.

According to RSS-132 Issue 3 clause 5.2, Equipment certified under this standard shall use digital modulation.

According to RSS-133 Issue 6 clause 6.2, The devices shall employ digital modulation techniques.

According to RSS-139 Issue 4 clause 6.2, The devices may employ any type of modulation techniques.

The type of modulation used must be reported.

9.2 Test Results

The EUT uses QPSK, 16QAM modulation.

10. FCC § 2.1046, § 22.913 (A) & § 24.232 (C) & § 27.50 & RSS-130 ISSUE 2 CLAUSE 4.6 & RSS-132 ISSUE 3 CLAUSE 5.4 & RSS-133 ISSUE 6 CLAUSE 6.4 & RSS-139 ISSUE 4 CLAUSE 6.5 - RF Output Power

10.1 Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §24.232 (d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. 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.

According to FCC §2.1046 and §27.50 (d), (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bandsmust employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50
(b)(10) Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

(c) (10) Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

(d), (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(h),(2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

According to RSS-130 Issue 2 clause 4.6
The transmitter output power shall be measured in terms of average power. In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

Frequency bands 698-756 MHz and 777-787 MHz
The e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.
For base and fixed equipment other than fixed subscriber equipment, refer to SRSP-518 for the e.i.r.p. limits.

According to RSS-132 Issue 3 clause 5.4
The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts. Refer to SRSP-503 for base station e.i.r.p. limits.

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

According to RSS-133 Issue 6 clause 6.4
The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510.
In addition, the transmitter's peak-to-average power ratio (PAPR) 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.

According to RSS-139 Issue 3 clause 6.5
The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt. Consult SRSP-513 for e.i.r.p. limits on fixed and base stations operating in the band 2110-2180 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 that corresponds to the highest PAPR during periods of continuous transmission.

Test Procedure

For Conducted method:

The RF output of the transmitter was connected to the CMW500/CMW290 through sufficient attenuation

For ERP measurement:

ERP can be calculated by below formula from KDB 412172 D01.

$EIRP=P_T + G_T - L_C$

P_T = transmitter output power, in dBm.

G_T = gain of the transmitting antenna, in dBi (EIRP).

L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

ERP = EIRP – 2.15 dB.

Test Results

LTE Band 2

Antenna Gain (dBi):	0.9	Cable Loss (dB):	0.5

1.4 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum EIRP(dBm)	EIRP Limit (dBm)
QPSK	RB1#0	20.09	19.80	19.79	20.51	33
	RB1#3	20.10	19.81	19.82		
	RB1#5	20.11	19.82	19.78		
	RB3#0	19.11	18.92	18.82		
	RB3#3	19.09	18.93	18.82		
	RB6#0	18.01	17.81	17.64		
16QAM	RB1#0	19.47	19.10	19.07	19.88	33
	RB1#2	19.46	19.11	19.06		
	RB1#4	19.48	19.13	19.08		
	RB3#0	18.49	18.10	18.05		
	RB3#2	18.47	18.11	18.04		
	RB5#0	17.49	17.12	17.06		

3 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum EIRP(dBm)	EIRP Limit (dBm)
QPSK	RB1#0	19.99	19.80	19.77	20.42	33.00
	RB1#3	20.01	19.83	19.78		
	RB1#5	20.02	19.84	19.79		
	RB3#0	19.00	18.89	18.83		
	RB3#3	19.02	18.89	18.85		
	RB6#0	17.89	17.68	17.76		
16QAM	RB1#0	19.36	19.19	19.13	19.78	33.00
	RB1#2	19.38	19.18	19.11		
	RB1#4	19.36	19.22	19.16		
	RB3#0	18.39	18.20	18.13		
	RB3#2	18.42	18.21	18.12		
	RB5#0	17.38	17.17	17.12		

5 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum EIRP(dBm)	EIRP Limit (dBm)
QPSK	RB1#0	20.12	19.88	19.82	20.52	33.00
	RB1#3	20.10	19.89	19.83		
	RB1#5	20.09	19.90	19.82		
	RB3#0	19.13	18.91	18.88		
	RB3#3	19.15	18.93	18.86		
	RB6#0	18.97	18.85	18.79		
16QAM	RB1#0	19.51	19.19	19.12	19.93	33.00
	RB1#2	19.50	19.22	19.15		
	RB1#4	19.53	19.17	19.11		
	RB3#0	18.54	18.19	18.10		
	RB3#2	18.53	18.22	18.13		
	RB5#0	17.51	17.21	17.13		

10 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum EIRP(dBm)	EIRP Limit (dBm)
QPSK	RB1#0	20.15	20.02	20.03	20.55	33.00
	RB1#3	20.13	20.00	20.01		
	RB1#5	20.11	19.98	20.00		
	RB3#0	20.07	19.88	19.91		
	RB3#3	20.08	19.91	19.91		
	RB6#0	18.99	18.84	18.89		
16QAM	RB1#0	19.44	19.38	19.44	19.86	33.00
	RB1#2	19.45	19.40	19.45		
	RB1#4	19.43	19.38	19.46		
	RB3#0	18.45	18.40	18.46		
	RB3#2	18.45	18.43	18.48		
	RB5#0	17.45	17.37	17.47		

Note: EIRP=Conducted Power (dBm) - Cable loss (dB) + Antenna Gain (dBi)

LTE Band 4

Antenna Gain (dBi):	0.9	Cable Loss (dB):	0.5

1.4 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum EIRP(dBm)	EIRP Limit (dBm)
QPSK	RB1#0	22.01	21.70	20.92	22.46	30
	RB1#3	22.03	21.71	20.93		
	RB1#5	22.06	21.69	20.96		
	RB3#0	20.96	20.65	19.69		
	RB3#3	20.96	20.67	19.72		
	RB6#0	19.85	19.51	18.62		
16QAM	RB1#0	21.30	21.12	20.20	21.70	30
	RB1#2	21.28	21.10	20.21		
	RB1#4	21.29	21.10	20.19		
	RB3#0	20.30	20.12	19.19		
	RB3#2	20.32	20.12	19.17		
	RB5#0	19.32	19.11	18.20		

3 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum EIRP(dBm)	EIRP Limit (dBm)
QPSK	RB1#0	22.08	21.88	21.36	22.50	30.00
	RB1#3	22.10	21.86	21.38		
	RB1#5	22.08	21.89	21.37		
	RB3#0	21.14	20.82	20.35		
	RB3#3	21.17	20.82	20.38		
	RB6#0	19.93	19.67	19.19		
16QAM	RB1#0	21.43	21.28	20.68	21.84	30.00
	RB1#2	21.42	21.29	20.71		
	RB1#4	21.44	21.29	20.68		
	RB3#0	20.46	20.28	19.70		
	RB3#2	20.45	20.30	19.73		
	RB5#0	19.45	19.27	18.69		

5 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum EIRP(dBm)	EIRP Limit (dBm)
QPSK	RB1#0	22.10	21.85	21.07	22.50	30.00
	RB1#3	22.09	21.88	21.09		
	RB1#5	22.09	21.90	21.07		
	RB3#0	21.19	20.81	20.15		
	RB3#3	21.22	20.83	20.15		
	RB6#0	20.94	20.74	20.23		
16QAM	RB1#0	21.46	21.20	20.37	21.89	30.00
	RB1#2	21.44	21.19	20.40		
	RB1#4	21.49	21.21	20.39		
	RB3#0	20.44	20.23	19.36		
	RB3#2	20.45	20.23	19.37		
	RB5#0	19.46	19.21	18.36		

10 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum EIRP(dBm)	EIRP Limit (dBm)
QPSK	RB1#0	22.15	21.95	21.52	22.60	30.00
	RB1#3	22.18	21.95	21.50		
	RB1#5	22.20	21.96	21.49		
	RB3#0	22.01	21.88	21.33		
	RB3#3	22.04	21.90	21.34		
	RB6#0	20.88	20.72	20.24		
16QAM	RB1#0	21.46	21.35	20.92	21.87	30.00
	RB1#2	21.46	21.36	20.90		
	RB1#4	21.47	21.35	20.94		
	RB3#0	20.47	20.34	19.95		
	RB3#2	20.49	20.33	19.95		
	RB5#0	19.46	19.33	18.93		

Note: EIRP=Conducted Power (dBm) - Cable loss (dB) + Antenna Gain (dBi)

LTE Band 5

Antenna Gain (dBi):	-3.3	Antenna Gain (dBd):	-5.45	Cable Loss (dB):	0.2

1.4 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum ERP(dBm)	ERP Limit (dBm)
QPSK	RB1#0	22.02	21.67	21.41	16.41	38.45
	RB1#3	22.03	21.70	21.44		
	RB1#5	22.06	21.68	21.47		
	RB3#0	20.98	20.66	20.34		
	RB3#3	21.00	20.69	20.32		
	RB6#0	19.71	19.49	19.20		
16QAM	RB1#0	21.44	20.99	20.75	15.82	38.45
	RB1#2	21.47	21.02	20.76		
	RB1#4	21.43	20.97	20.78		
	RB3#0	20.47	19.99	19.78		
	RB3#2	20.48	19.97	19.79		
	RB5#0	19.44	18.98	18.78		

3 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum ERP(dBm)	ERP Limit (dBm)
QPSK	RB1#0	22.00	21.63	21.37	16.39	38.45
	RB1#3	22.02	21.66	21.36		
	RB1#5	22.04	21.65	21.38		
	RB3#0	21.01	20.68	20.39		
	RB3#3	20.99	20.68	20.42		
	RB6#0	19.73	19.55	19.22		
16QAM	RB1#0	21.34	21.01	20.72	15.72	38.45
	RB1#2	21.37	21.00	20.75		
	RB1#4	21.35	21.01	20.74		
	RB3#0	20.34	20.00	19.70		
	RB3#2	20.32	20.00	19.70		
	RB5#0	19.35	19.01	18.73		

5 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum ERP(dBm)	ERP Limit (dBm)
QPSK	RB1#0	21.99	21.79	21.64	16.39	38.45
	RB1#3	22.01	21.76	21.63		
	RB1#5	22.04	21.78	21.64		
	RB3#0	20.90	20.60	20.44		
	RB3#3	20.88	20.61	20.42		
	RB6#0	20.79	20.48	20.31		
16QAM	RB1#0	21.36	21.10	21.07	15.71	38.45
	RB1#2	21.36	21.09	21.10		
	RB1#4	21.34	21.11	21.07		
	RB3#0	20.37	20.12	20.10		
	RB3#2	20.35	20.10	20.09		
	RB5#0	19.36	19.12	19.06		

10 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum ERP(dBm)	ERP Limit (dBm)
QPSK	RB1#0	22.07	21.99	22.00	16.44	38.45
	RB1#3	22.09	21.98	22.00		
	RB1#5	22.07	22.00	22.03		
	RB3#0	21.85	21.66	21.43		
	RB3#3	21.86	21.66	21.45		
	RB6#0	20.78	20.58	20.30		
16QAM	RB1#0	21.47	21.32	21.39	15.82	38.45
	RB1#2	21.46	21.32	21.42		
	RB1#4	21.45	21.35	21.38		
	RB3#0	20.45	20.31	20.42		
	RB3#2	20.46	20.31	20.42		
	RB5#0	19.48	19.35	19.41		

Note: ERP=Conducted Power (dBm) - Cable loss (dB) + Antenna Gain (dBd)

LTE Band 12

Antenna Gain (dBi):	-3.3	Antenna Gain (dBd):	-5.45	Cable Loss (dB):	0.2

1.4 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum ERP(dBm)	ERP Limit (dBm)
QPSK	RB1#0	21.52	21.77	21.97	16.32	34.77
	RB1#3	21.53	21.79	21.96		
	RB1#5	21.55	21.82	21.97		
	RB3#0	20.54	20.78	21.24		
	RB3#3	20.54	20.79	21.25		
	RB6#0	19.45	19.71	20.17		
16QAM	RB1#0	20.85	21.06	21.39	15.77	34.77
	RB1#2	20.85	21.07	21.41		
	RB1#4	20.84	21.05	21.42		
	RB3#0	19.85	20.07	20.39		
	RB3#2	19.83	20.06	20.41		
	RB5#0	18.84	19.05	19.39		

3 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum ERP(dBm)	ERP Limit (dBm)
QPSK	RB1#0	21.56	21.93	22.01	16.36	34.77
	RB1#3	21.55	21.91	22.00		
	RB1#5	21.55	21.92	21.99		
	RB3#0	20.64	20.94	21.44		
	RB3#3	20.66	20.92	21.43		
	RB6#0	19.54	19.77	20.28		
16QAM	RB1#0	20.84	21.34	21.37	15.72	34.77
	RB1#2	20.84	21.37	21.35		
	RB1#4	20.85	21.36	21.36		
	RB3#0	19.84	20.37	20.39		
	RB3#2	19.82	20.37	20.39		
	RB5#0	18.83	19.37	19.35		

5 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum ERP(dBm)	ERP Limit (dBm)
QPSK	RB1#0	21.67	21.94	22.00	16.35	34.77
	RB1#3	21.69	21.93	22.00		
	RB1#5	21.72	21.91	21.10		
	RB3#0	20.74	20.97	21.24		
	RB3#3	20.76	20.97	21.25		
	RB6#0	20.64	20.88	21.14		
16QAM	RB1#0	21.00	21.31	21.32	15.68	34.77
	RB1#2	21.03	21.29	21.31		
	RB1#4	20.99	21.29	21.33		
	RB3#0	20.03	20.34	20.32		
	RB3#2	20.04	20.36	20.35		
	RB5#0	19.02	19.29	19.31		

10 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum ERP(dBm)	ERP Limit (dBm)
QPSK	RB1#0	21.92	22.05	22.02	16.40	34.77
	RB1#3	21.88	22.02	21.12		
	RB1#5	21.90	21.99	21.15		
	RB3#0	21.70	21.75	21.88		
	RB3#3	21.72	21.75	21.91		
	RB6#0	20.52	20.72	20.84		
16QAM	RB1#0	21.22	21.28	20.44	15.66	34.77
	RB1#2	21.22	21.31	20.46		
	RB1#4	21.25	21.27	20.42		
	RB3#0	20.23	20.31	19.43		
	RB3#2	20.21	20.29	19.43		
	RB5#0	19.20	19.30	18.44		

Note: ERP=Conducted Power (dBm) - Cable loss (dB) + Antenna Gain (dBd)

LTE Band 13

Antenna Gain (dBi):	-3.3	Antenna Gain (dBd):	-5.45	Cable Loss (dB):	0.2

5 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum ERP(dBm)	ERP Limit (dBm)
QPSK	RB1#0	22.55	22.47	22.46	16.90	34.77
	RB1#3	22.52	22.45	22.43		
	RB1#5	22.53	22.45	22.44		
	RB3#0	21.54	21.42	21.34		
	RB3#3	21.57	21.43	21.33		
	RB6#0	21.44	21.16	21.21		
16QAM	RB1#0	21.87	21.80	21.73	16.23	34.77
	RB1#2	21.88	21.82	21.72		
	RB1#4	21.85	21.82	21.73		
	RB3#0	20.87	20.81	20.73		
	RB3#2	20.86	20.79	20.75		
	RB5#0	19.88	19.82	19.73		

10 MHz:

Modulation	RB	Low channel (dBm)	Middle channel (dBm)	High channel (dBm)	Maximum ERP(dBm)	ERP Limit (dBm)
QPSK	RB1#0	/	22.58	/	16.93	34.77
	RB1#3	/	22.56	/		
	RB1#5	/	22.56	/		
	RB3#0	/	22.53	/		
	RB3#3	/	22.53	/		
	RB6#0	/	22.42	/		
16QAM	RB1#0	/	21.97	/	16.34	34.77
	RB1#2	/	21.99	/		
	RB1#4	/	21.99	/		
	RB3#0	/	20.98	/		
	RB3#2	/	20.97	/		
	RB5#0	/	19.95	/		

Note: ERP=Conducted Power (dBm) - Cable loss (dB) + Antenna Gain (dBd)

Cellular Band

Antenna Gain (dBi):	-3.3	Antenna Gain (dBd):	-5.45	Cable Loss (dB):	0.2

Mode	Test Condition	Channel	Frequency (MHz)	Burst Average Output Power (dBm)				Limit (dBm)
				1 slot	2 slot	3 slot	4 slot	
GPRS	Normal	128	824.2	29.25	27.23	/	/	38.45
		190	836.6	29.10	27.07	/	/	
		251	848.8	28.65	26.45	/	/	

Mode	Test Condition	Channel	Frequency (MHz)	Maximum Average Output Power (dBm)	Maximum ERP (dBm)	Limit (dBm)
GPRS	Normal	128	824.2	29.25	23.60	38.45
		190	836.6	29.10	23.45	
		251	848.8	28.65	23.00	

ERP=Conducted Power (dBm) – Cable Loss (dB) + Antenna Gain (dBd)

PCS Band

Antenna Gain (dBi):	0.9	Cable Loss (dB):	0.5

Mode	Test Condition	Channel	Frequency (MHz)	Burst Average Output Power (dBm)				Limit (dBm)
				1 slot	2 slot	3 slot	4 slot	
GPRS	Normal	512	1850.2	25.19	23.28	/	/	33
		661	1880.0	25.11	23.21	/	/	
		810	1909.8	25.22	23.28	/	/	

Mode	Test Condition	Channel	Frequency (MHz)	Maximum Average Output Power (dBm)	Maximum EIRP (dBm)	Limit (dBm)
GPRS	Normal	512	1850.2	25.19	25.59	33
		661	1880.0	25.11	25.51	
		810	1909.8	25.22	25.62	

EIRP=Conducted Power (dBm) – Cable Loss (dB) + Antenna Gain (dBi)

Peak-to-average ratio (PAR)

LTE Band 2

Modulation	Bandwidth (MHz)	RB	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	PAR Limit (dB)
QPSK	10	RB1#0	10.01	9.48	10.01	13
	10	RB6#0	10.01	10.22	11.08	13
16-QAM	10	RB1#0	9.99	9.59	9.28	13
	10	RB5#0	10.23	10.57	9.88	13

LTE Band 4

Modulation	Bandwidth (MHz)	RB	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	PAR Limit (dB)
QPSK	10	RB1#0	9.37	9.22	10.08	13
	10	RB6#0	10.03	10.11	10.32	13
16-QAM	10	RB1#0	9.44	10.00	9.93	13
	10	RB5#0	10.25	10.39	10.11	13

LTE Band 5

Modulation	Bandwidth (MHz)	RB	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	PAR Limit (dB)
QPSK	10	RB1#0	9.22	8.37	9.24	13
	10	RB6#0	9.33	9.28	9.75	13
16-QAM	10	RB1#0	8.97	9.28	10.21	13
	10	RB5#0	10.33	10.96	10.27	13

LTE Band 12

Modulation	Bandwidth (MHz)	RB	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	PAR Limit (dB)
QPSK	10	RB1#0	9.38	8.27	9.64	13
	10	RB6#0	10.39	10.17	10.22	13
16-QAM	10	RB1#0	9.87	9.93	9.74	13
	10	RB5#0	10.17	10.29	10.20	13

LTE Band 13

Modulation	Bandwidth (MHz)	RB	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	PAR Limit (dB)
QPSK	10	RB1#0	/	10.6	/	13
	10	RB6#0	/	10.38	/	13
16-QAM	10	RB1#0	/	10.8	/	13
	10	RB5#0	/	10.11	/	13

Cellular Band

mode	Channel	PAR (dB)	PAR Limit (dB)
GPRS	Low	9.77	≤ 13
	Middle	11.40	≤ 13
	High	12.01	≤ 13

PCS Band

mode	Channel	PAR (dB)	PAR Limit (dB)
GPRS	Low	10.40	≤ 13
	Middle	11.22	≤ 13
	High	12.40	≤ 13

11. FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53 & RSS-GEN ISSUE 5 Clause 6.7– Occupied Bandwidth

11.1 Applicable Standard

FCC §2.1049, §22.917, §22.905, §24.238, §27.53

IC RSS-GEN Issue 5 Clause 6.7

11.2 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.

11.3 Test Results

Test Mode: Transmitting

Test Result: Compliant.

Please refer to the following table and plots.

(Worst case is Resource Block & RB offset: Full RB)

LTE Band 2:

Bandwidth (MHz)	Modulation	Low channel		Middle channel		High channel	
		99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.094	1.298	1.098	1.311	1.107	1.298
	16QAM	0.929	1.189	0.924	1.163	0.929	1.202
3	QPSK	1.094	1.345	1.102	1.293	1.102	1.332
	16QAM	0.916	1.189	0.933	1.150	0.933	1.193
5	QPSK	1.102	1.293	1.098	1.298	1.102	1.332
	16QAM	0.933	1.180	0.920	1.185	0.929	1.137
10	QPSK	1.102	1.311	1.098	1.315	1.102	1.341
	16QAM	0.933	1.141	0.929	1.246	0.929	1.133

LTE Band 4:

Bandwidth (MHz)	Modulation	Low channel		Middle channel		High channel	
		99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.102	1.332	1.094	1.371	1.098	1.311
	16QAM	0.933	1.185	0.929	1.189	0.933	1.137
3	QPSK	1.102	1.367	1.102	1.350	1.098	1.324
	16QAM	0.933	1.154	0.929	1.176	0.924	1.133
5	QPSK	1.102	1.354	1.102	1.367	1.102	1.363
	16QAM	0.933	1.133	0.929	1.141	0.933	1.150
10	QPSK	1.098	1.384	1.094	1.315	1.102	1.311
	16QAM	0.933	1.146	0.920	1.154	0.924	1.146

LTE Band 5:

Bandwidth (MHz)	Modulation	Low channel		Middle channel		High channel	
		99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.094	1.332	1.094	1.328	1.098	1.337
	16QAM	0.929	1.228	0.933	1.141	0.924	1.137
3	QPSK	1.098	1.328	1.102	1.350	1.102	1.328
	16QAM	0.929	1.198	0.929	1.193	0.929	1.189
5	QPSK	1.098	1.324	1.107	1.348	1.102	1.320
	16QAM	0.929	1.158	0.933	1.134	0.929	1.142
10	QPSK	1.094	1.312	1.094	1.324	1.098	1.324
	16QAM	0.929	1.239	0.929	1.239	0.924	1.199

LTE Band 12:

Bandwidth (MHz)	Modulation	Low channel		Middle channel		High channel	
		99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4 MHz	QPSK	1.098	1.341	1.094	1.376	1.094	1.341
	16QAM	0.929	1.237	0.929	1.176	0.937	1.233
3 MHz	QPSK	1.102	1.316	1.102	1.315	1.098	1.328
	16QAM	0.929	1.246	0.929	1.241	0.933	1.163
5 MHz	QPSK	1.102	1.358	1.102	1.332	1.098	1.341
	16QAM	0.929	1.233	0.942	1.233	0.933	1.176
10 MHz	QPSK	1.102	1.363	1.098	1.332	1.098	1.345
	16QAM	0.924	1.259	0.929	1.172	0.929	1.215

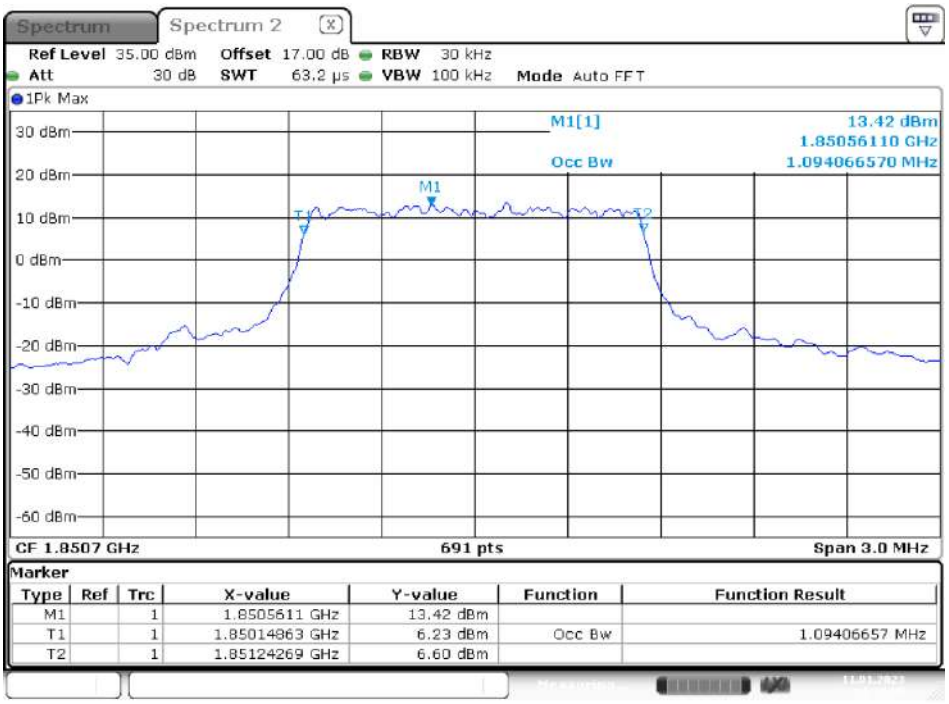
LTE Band 13:

Bandwidth (MHz)	Modulation	Low channel		Middle channel		High channel	
		99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5 MHz	QPSK	1.098	1.328	1.094	1.354	1.098	1.332
	16QAM	0.933	1.198	0.929	1.150	0.933	1.163
10 MHz	QPSK	/	/	1.094	1.324	/	/
	16QAM	/	/	0.924	1.246	/	/

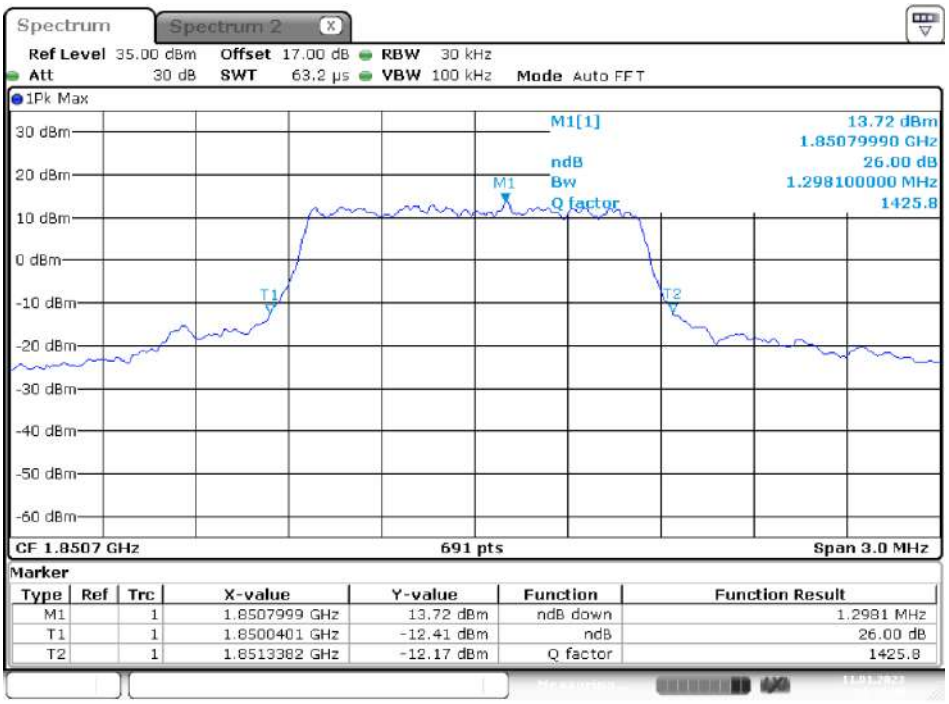
Please refer to the following plots.

LTE Band 2

QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel

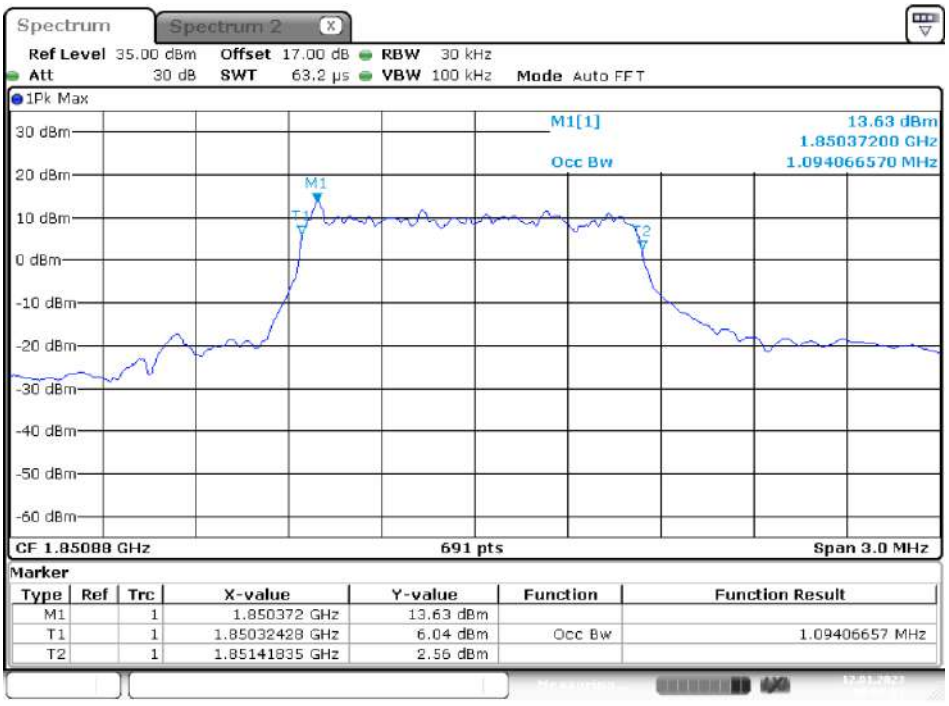


Date: 11.JAN.2023 14:47:20

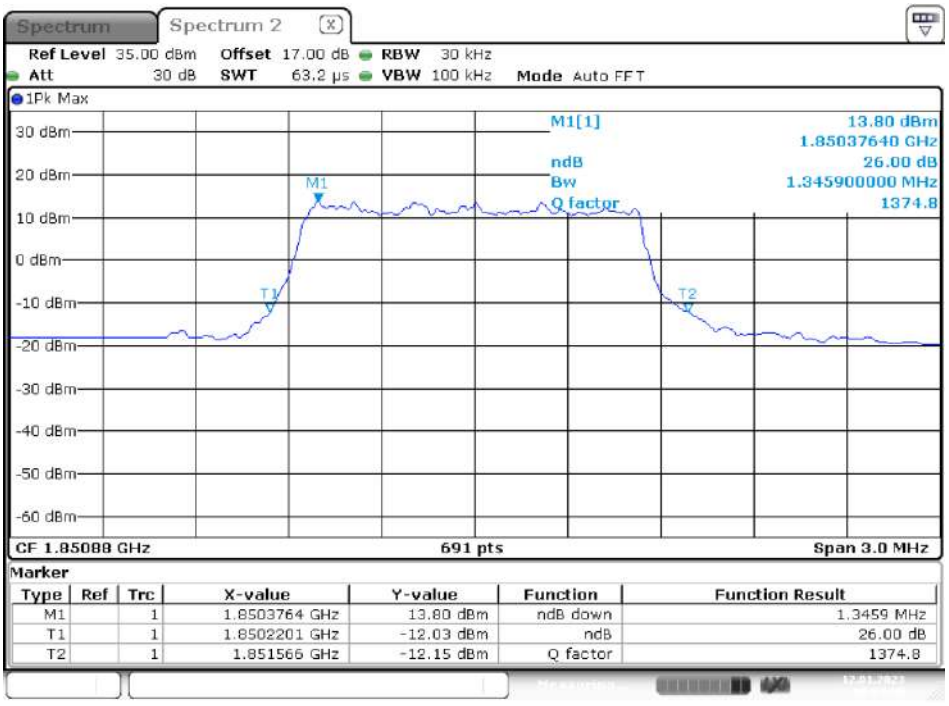


Date: 11.JAN.2023 14:47:48

QPSK (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel

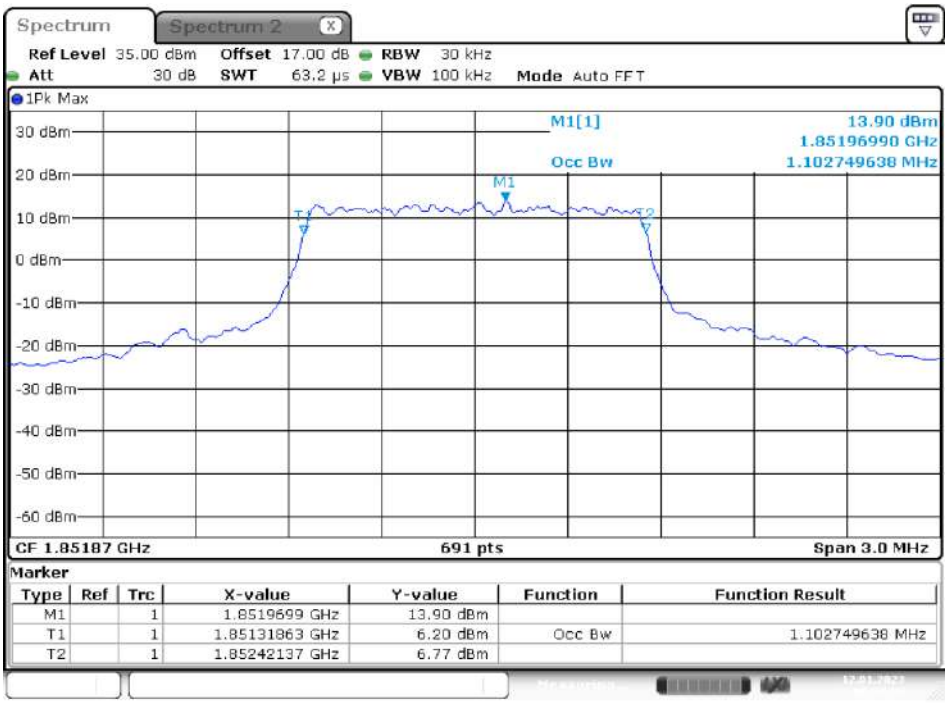


Date: 12.JAN.2023 08:05:01

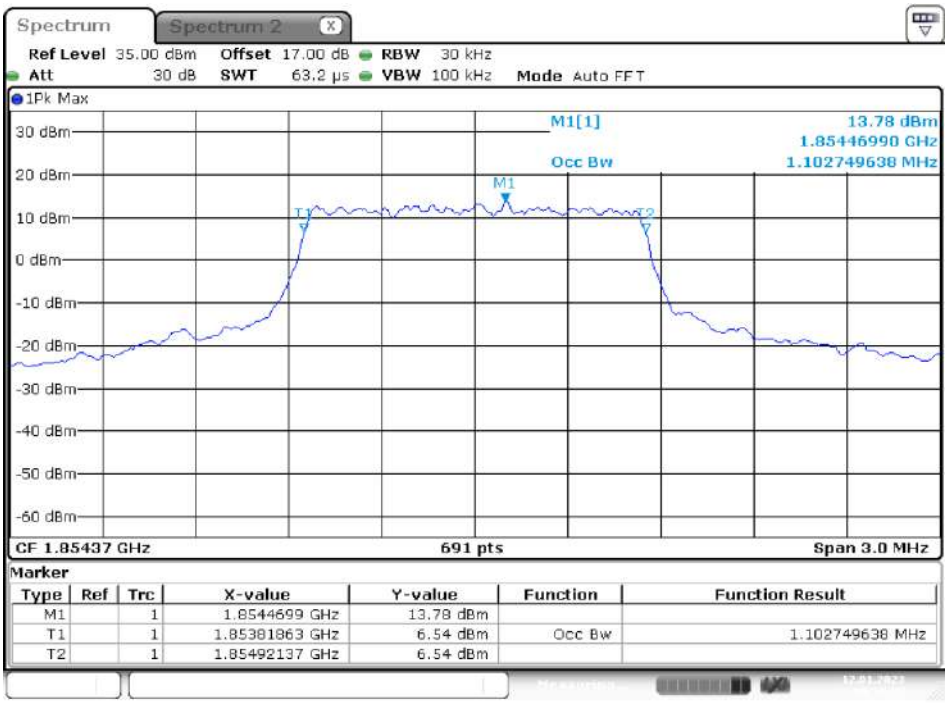


Date: 12.JAN.2023 08:04:00

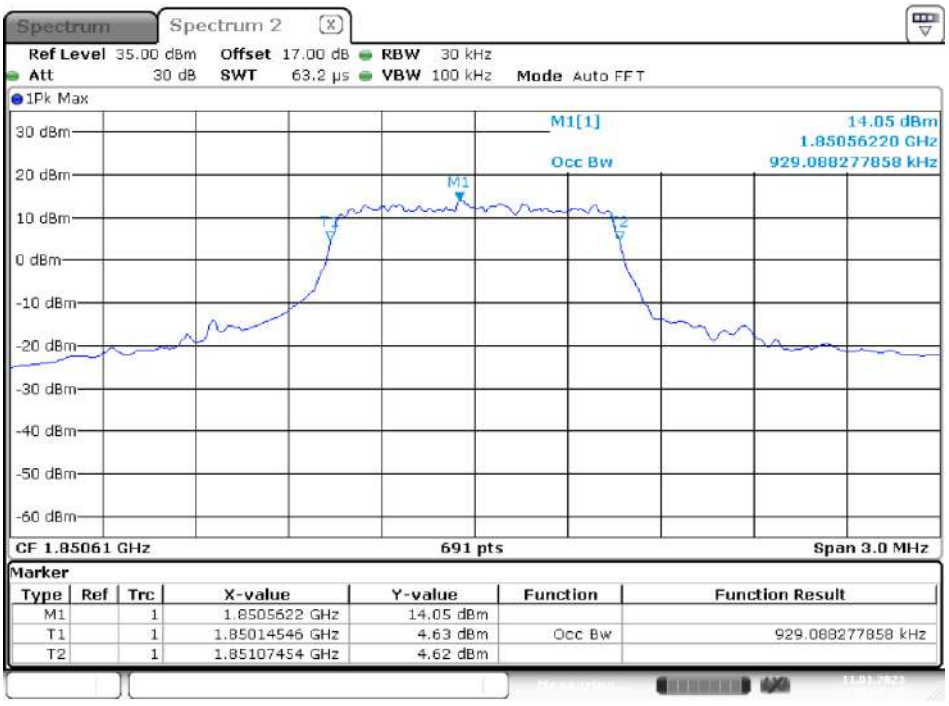
QPSK (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



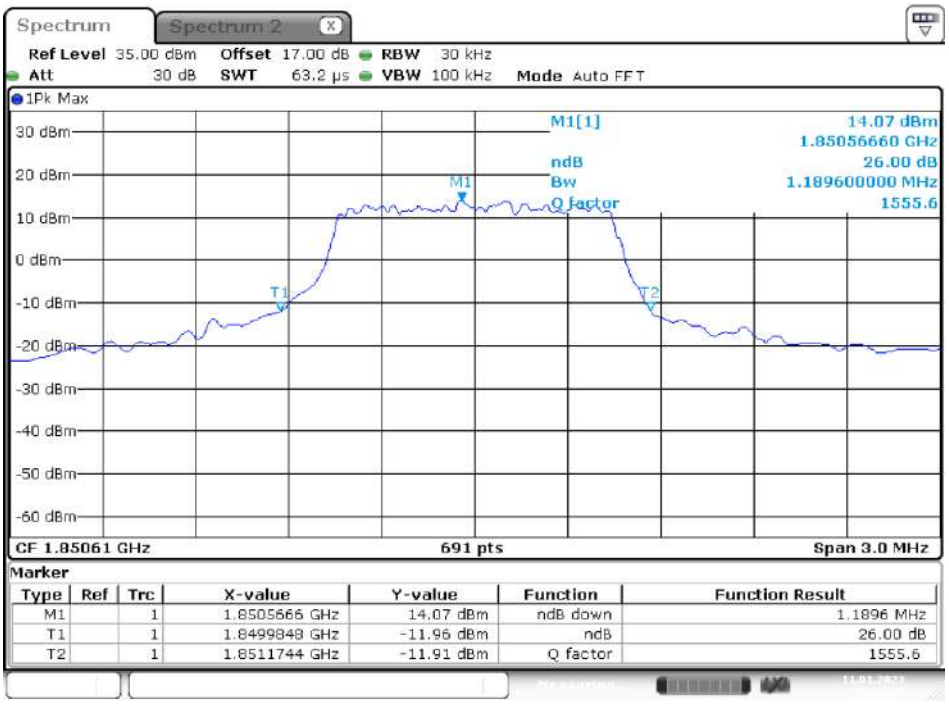
QPSK (10MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel

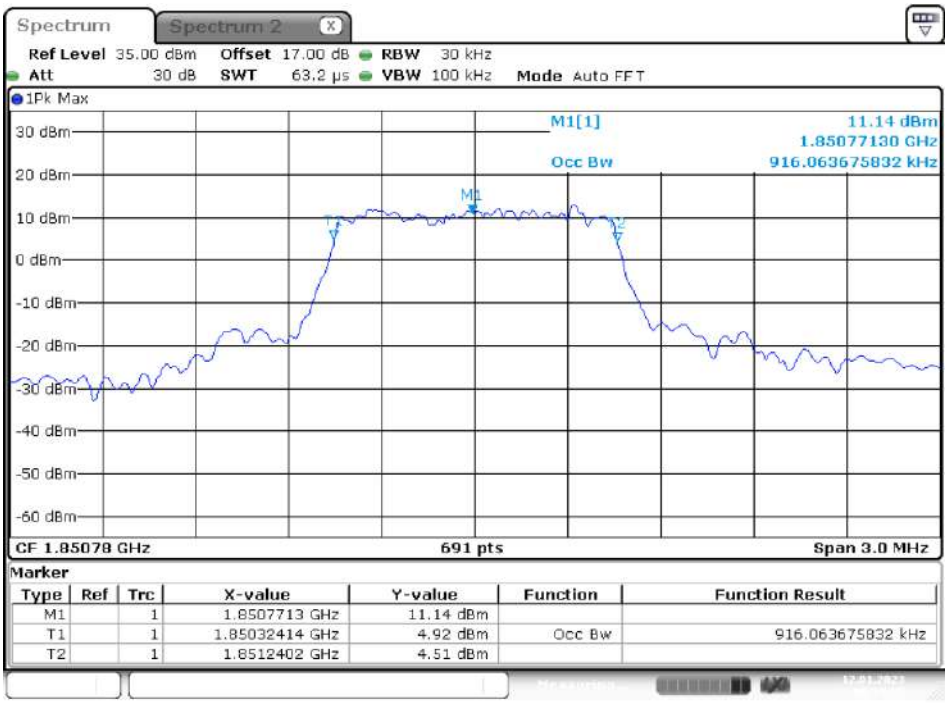


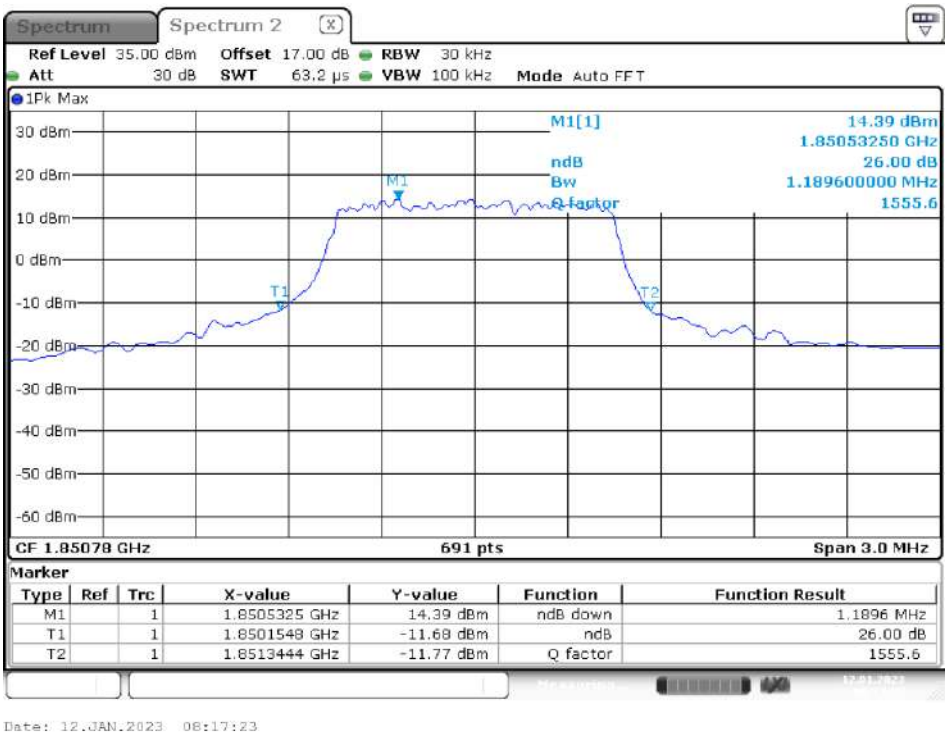
Date: 11.JAN.2023 15:56:05



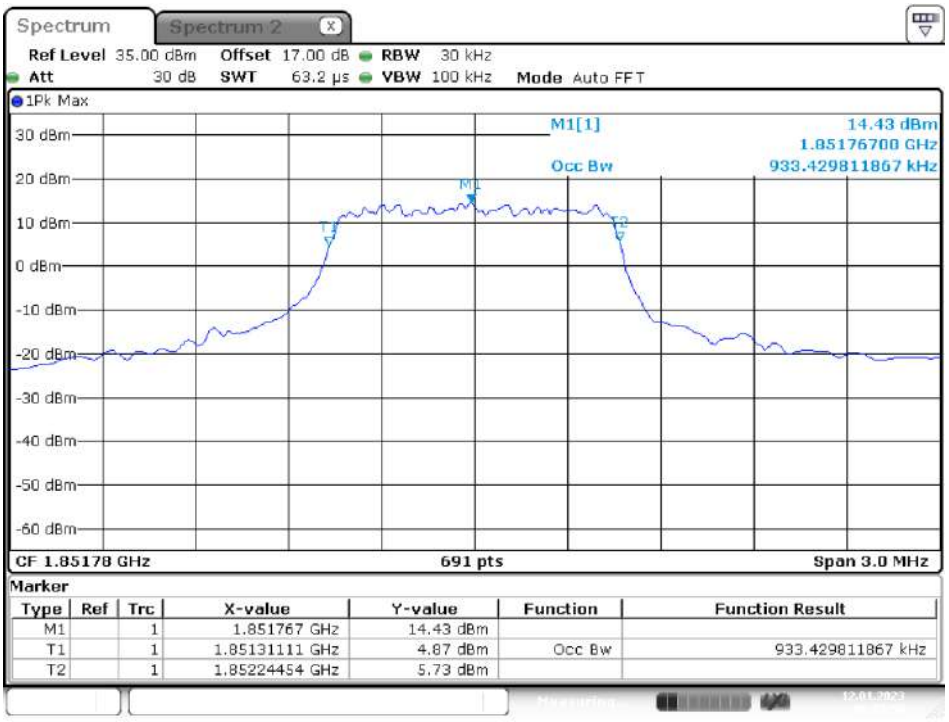
Date: 11.JAN.2023 15:55:49

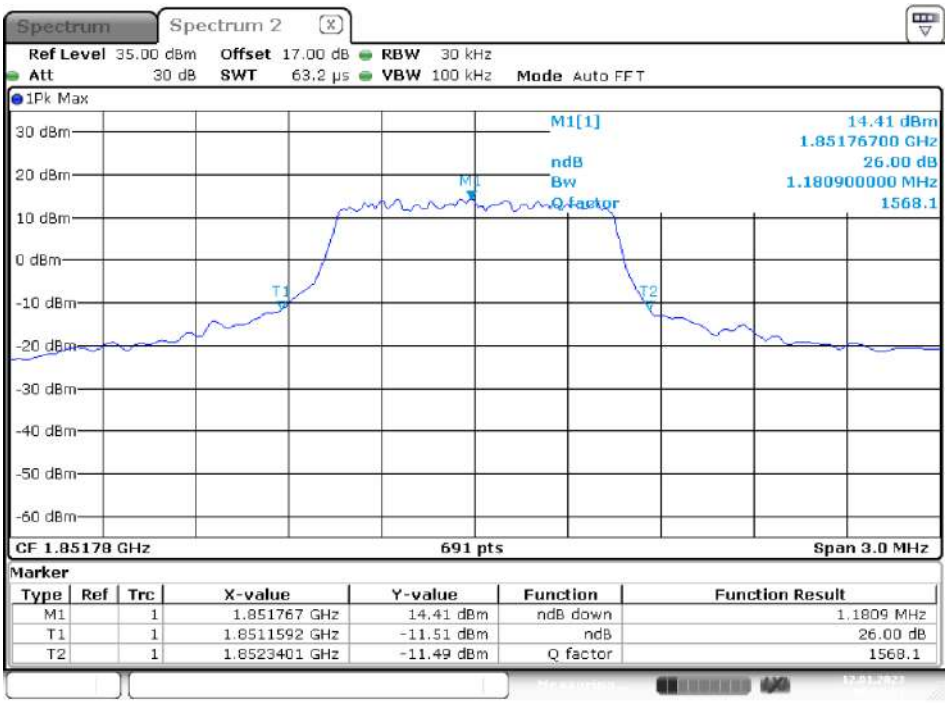
16-QAM (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



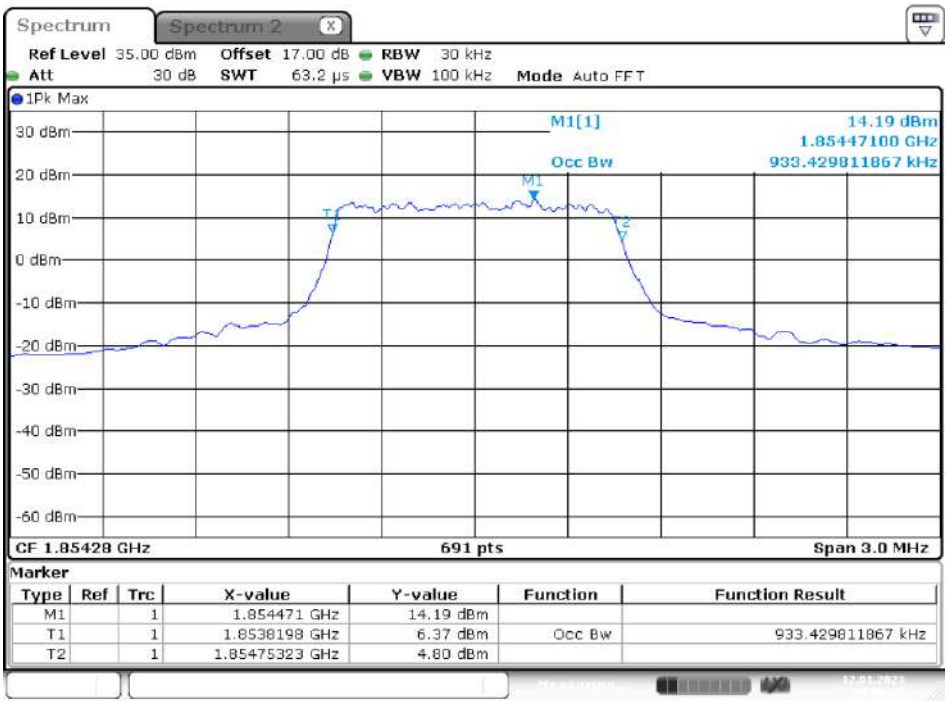


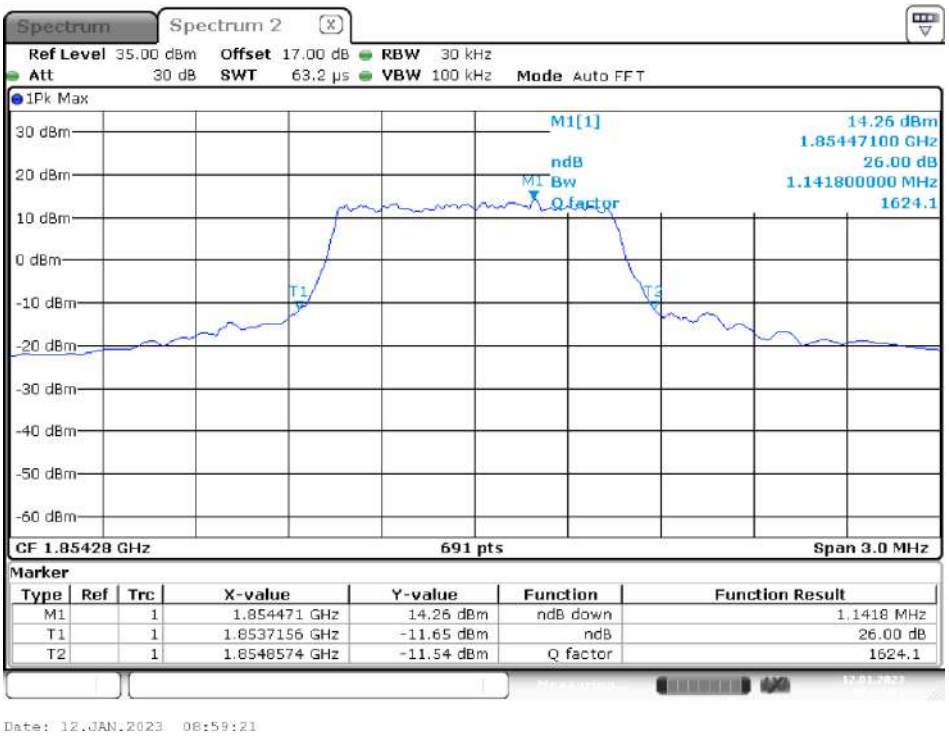
16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



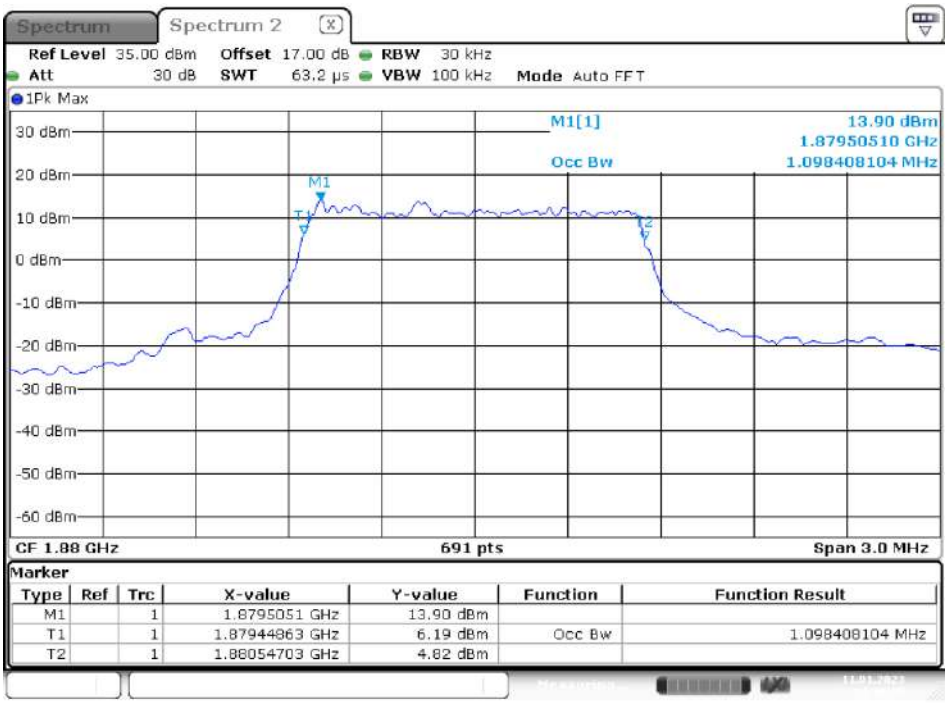


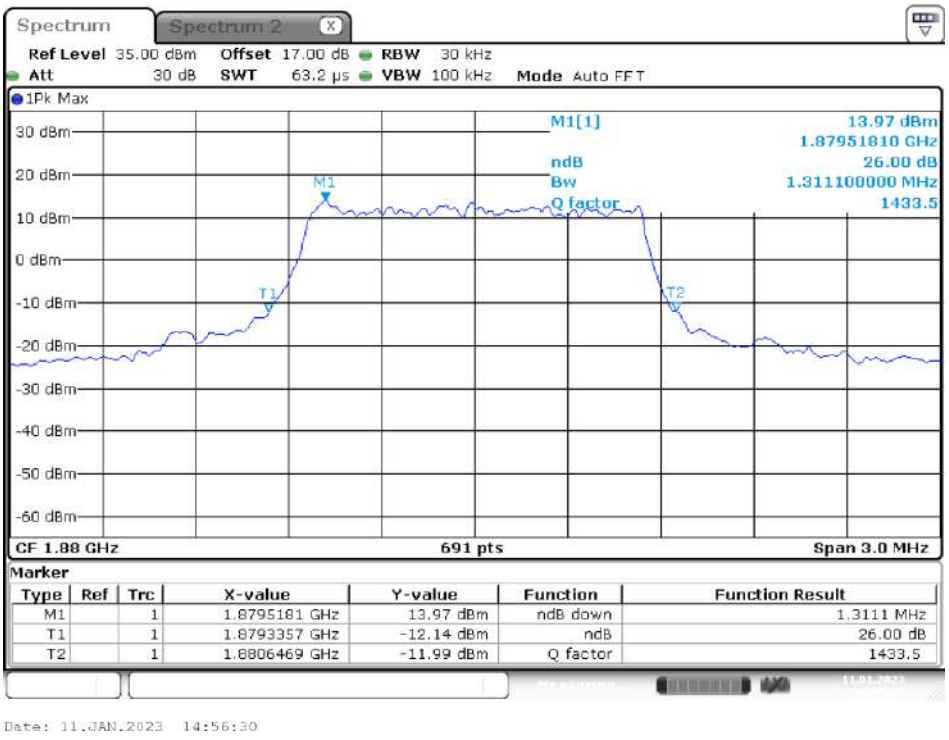
16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



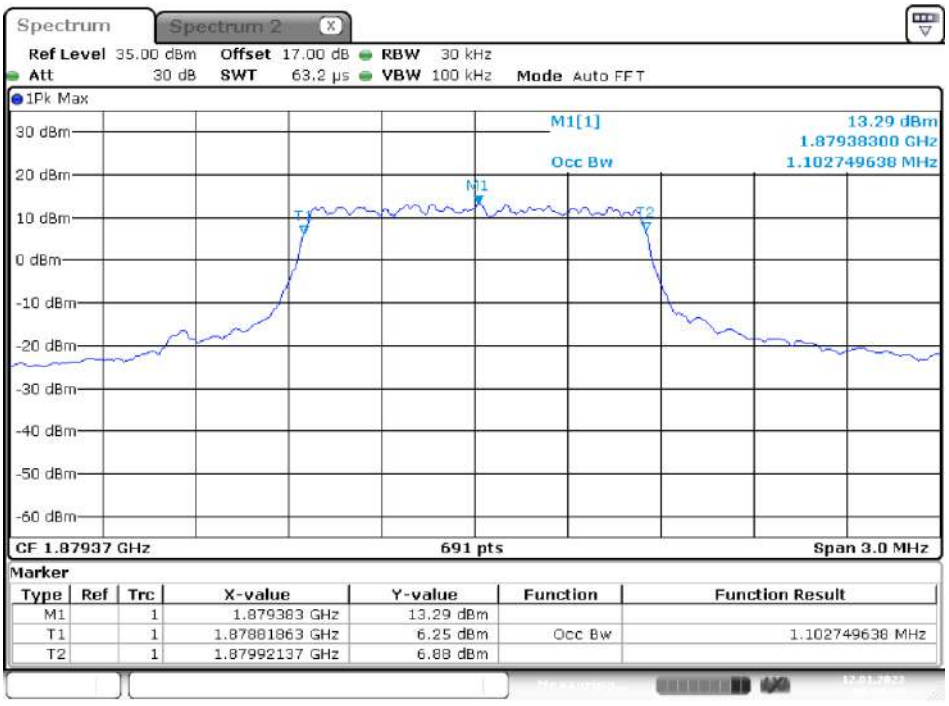


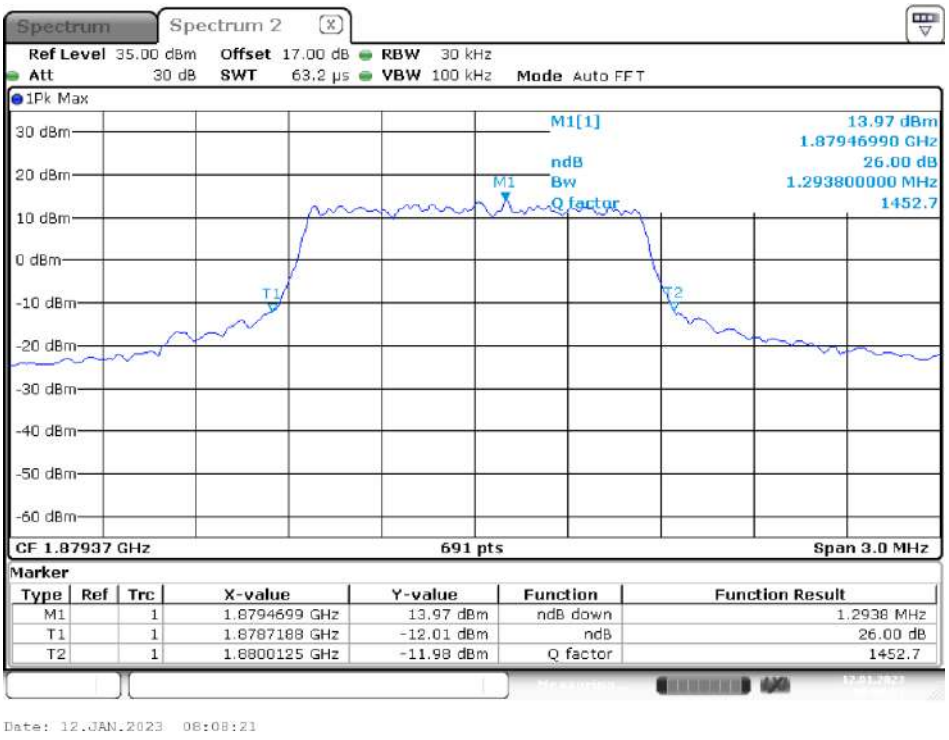
QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



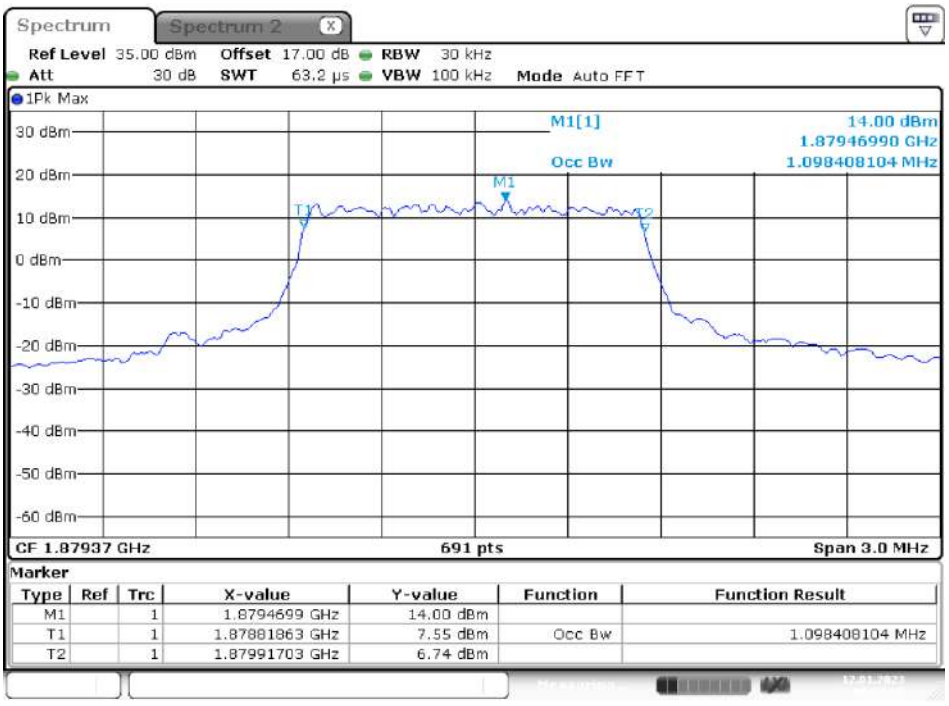


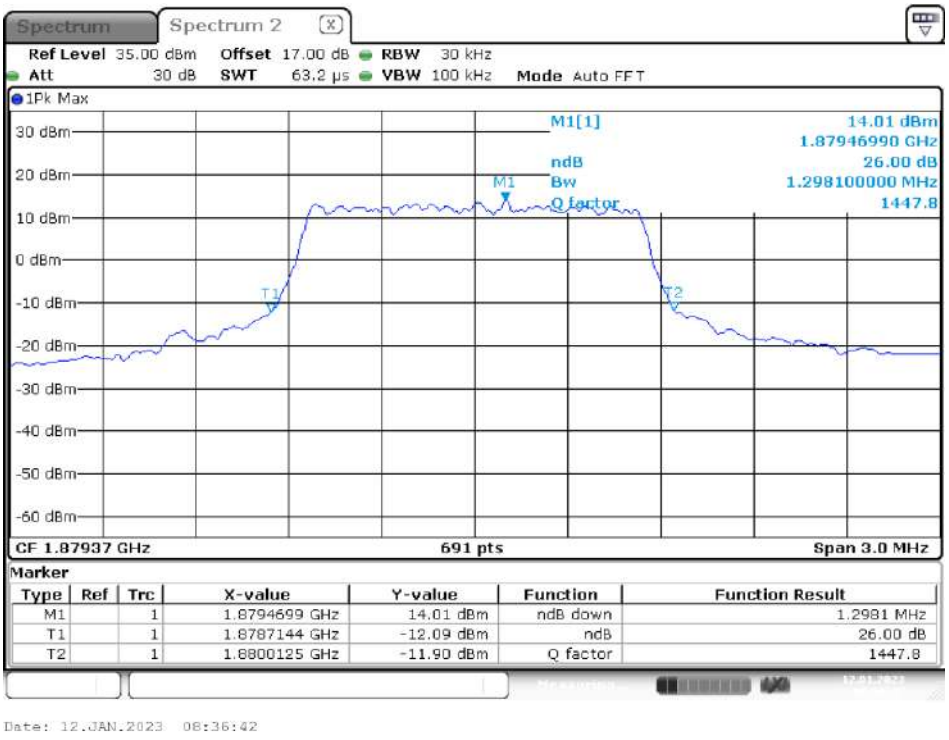
QPSK (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



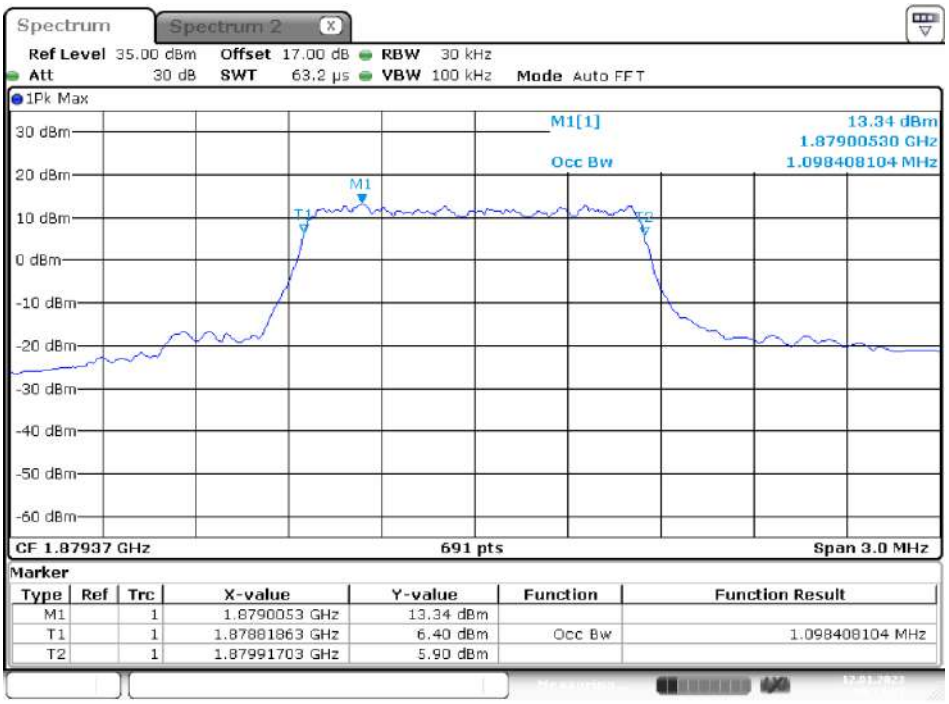


QPSK (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel

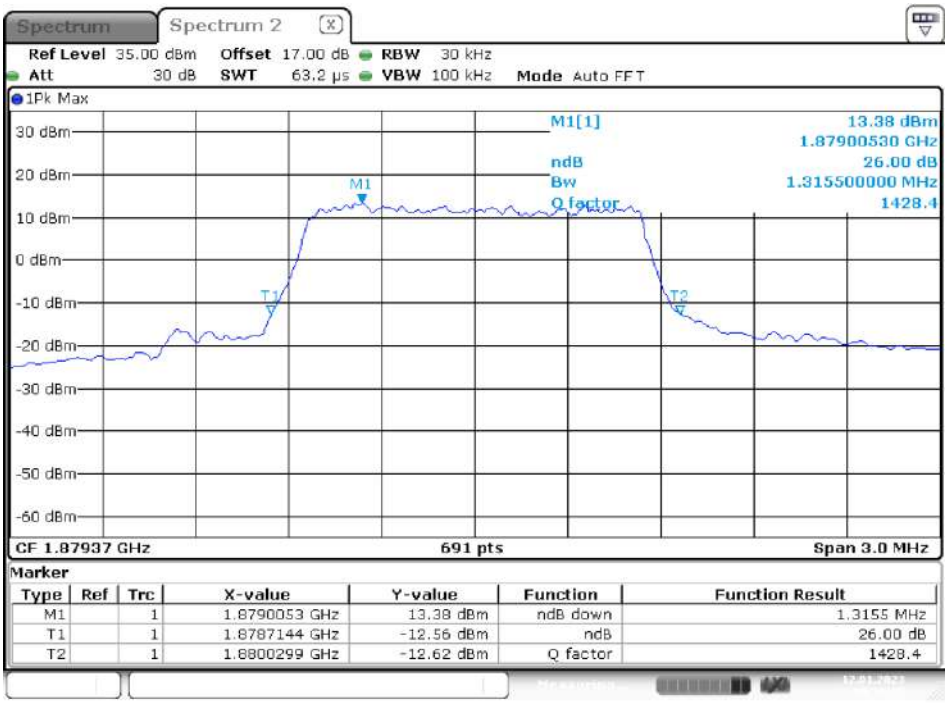




QPSK (10MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel

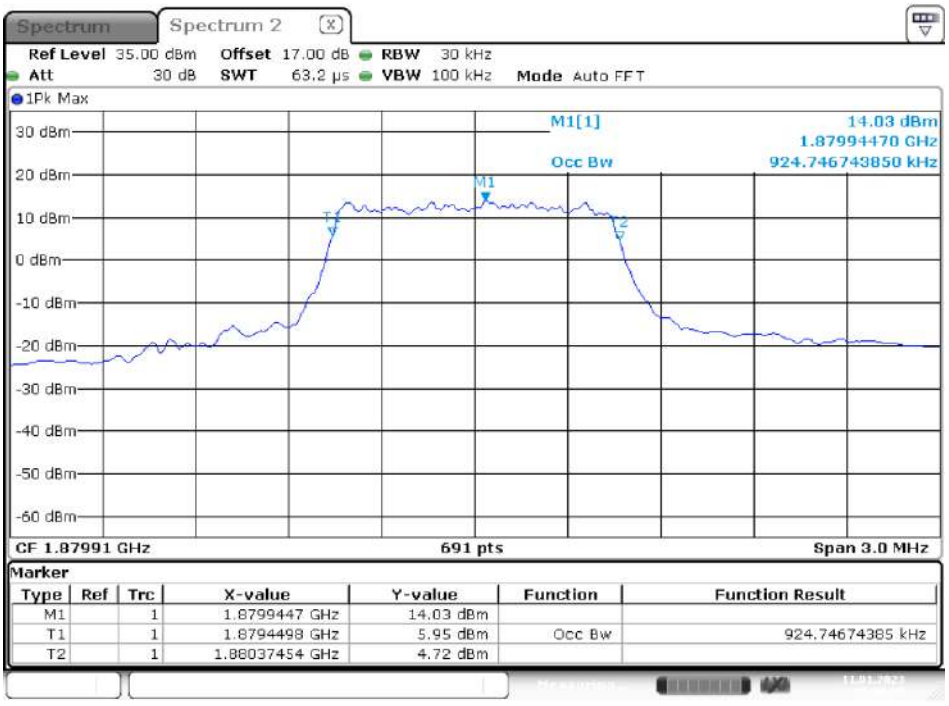


Date: 12.JAN.2023 09:17:41

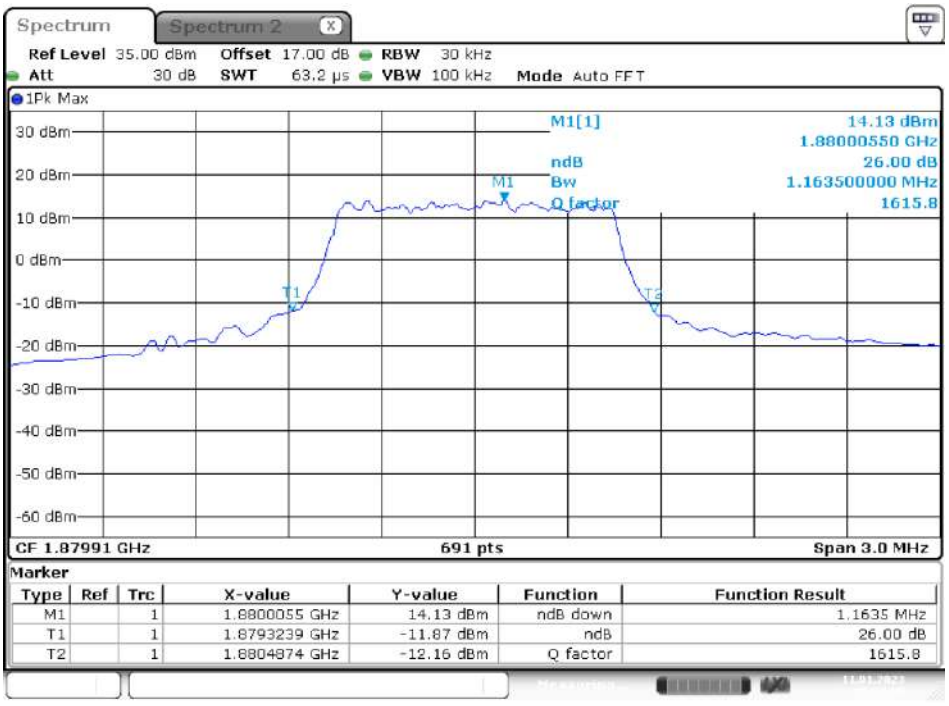


Date: 12.JAN.2023 09:18:13

16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel

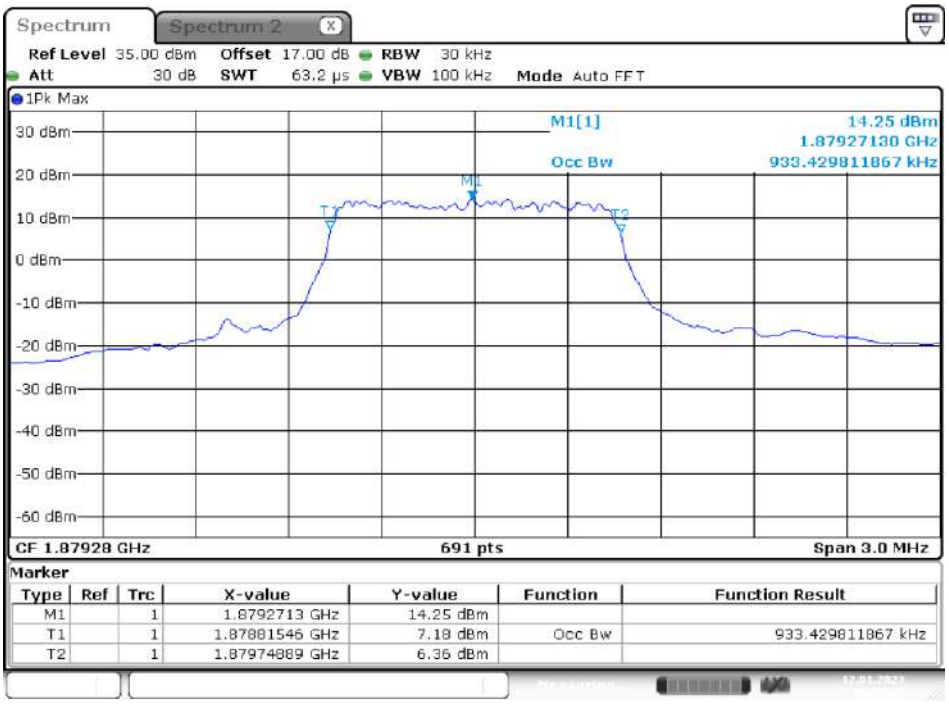


Date: 11.JAN.2023 15:50:59

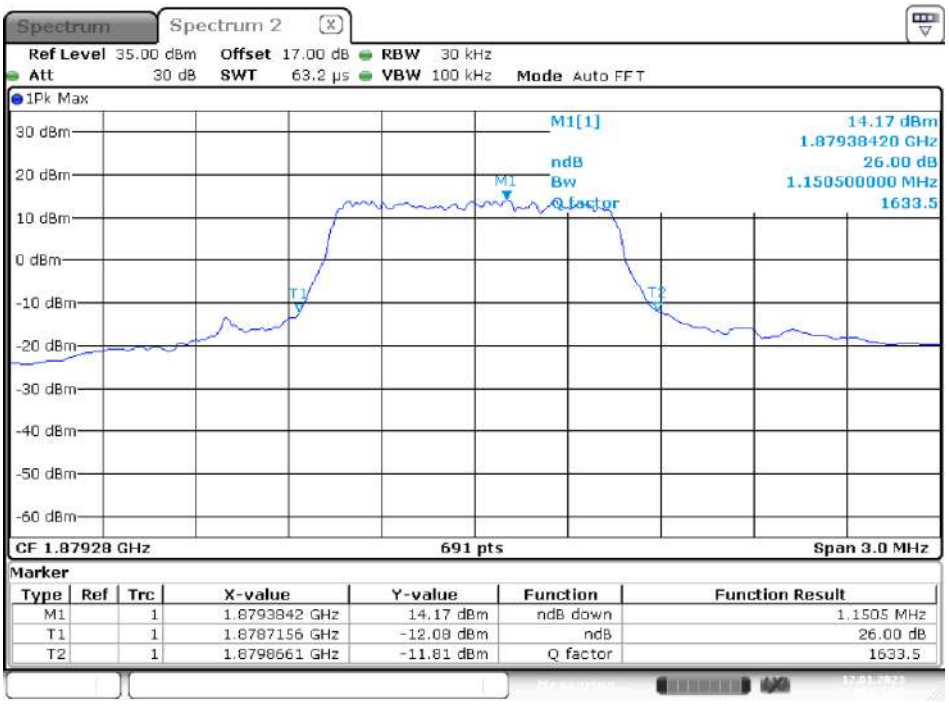


Date: 11.JAN.2023 15:52:36

16-QAM (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel

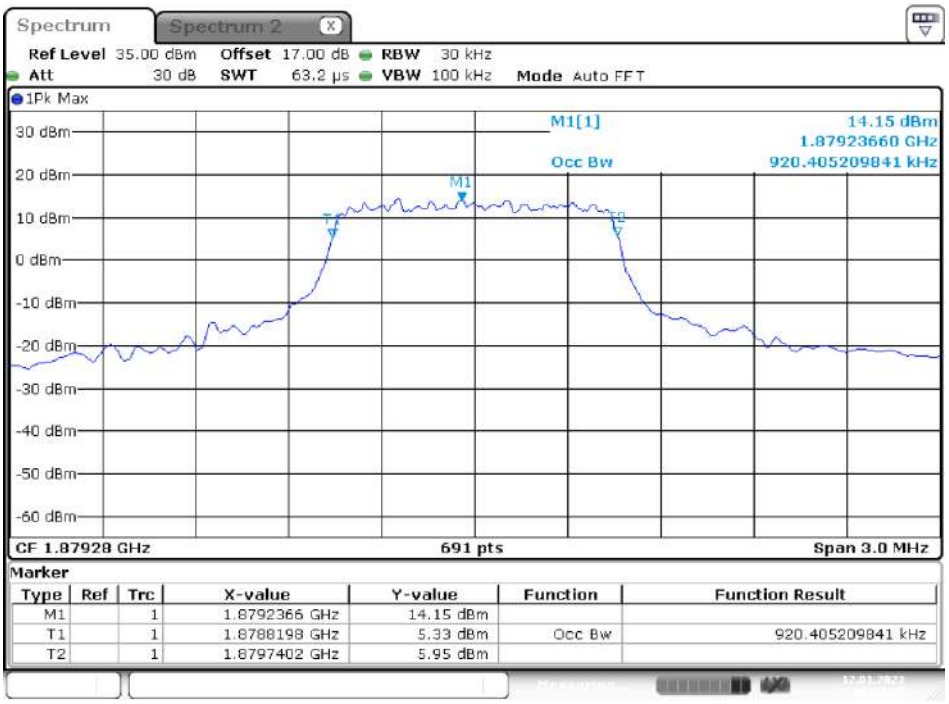


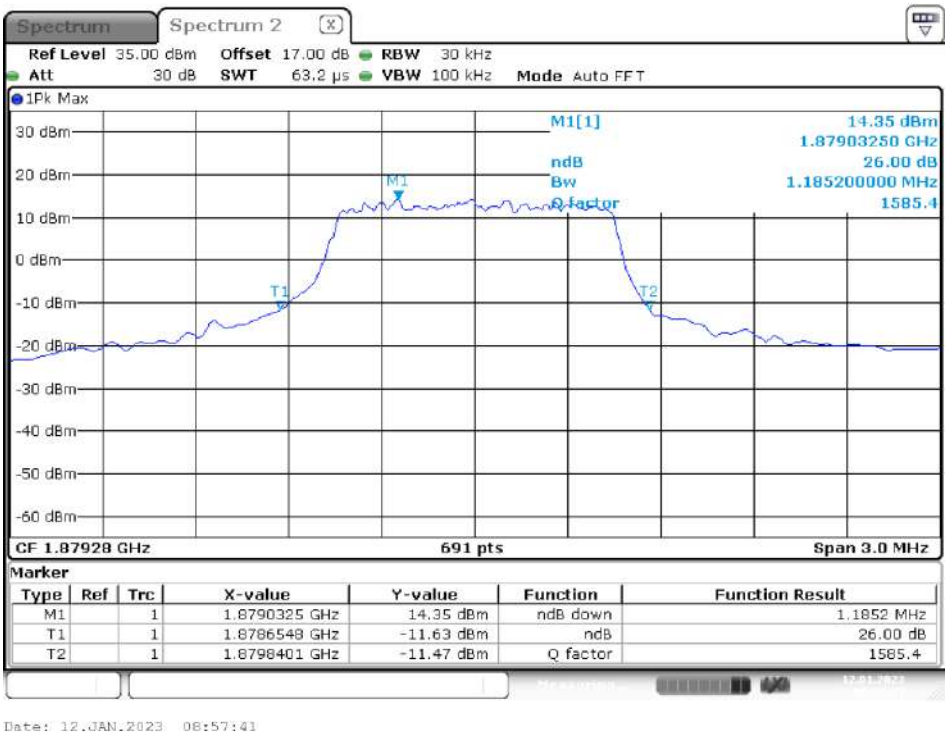
Date: 12.JAN.2023 08:20:53



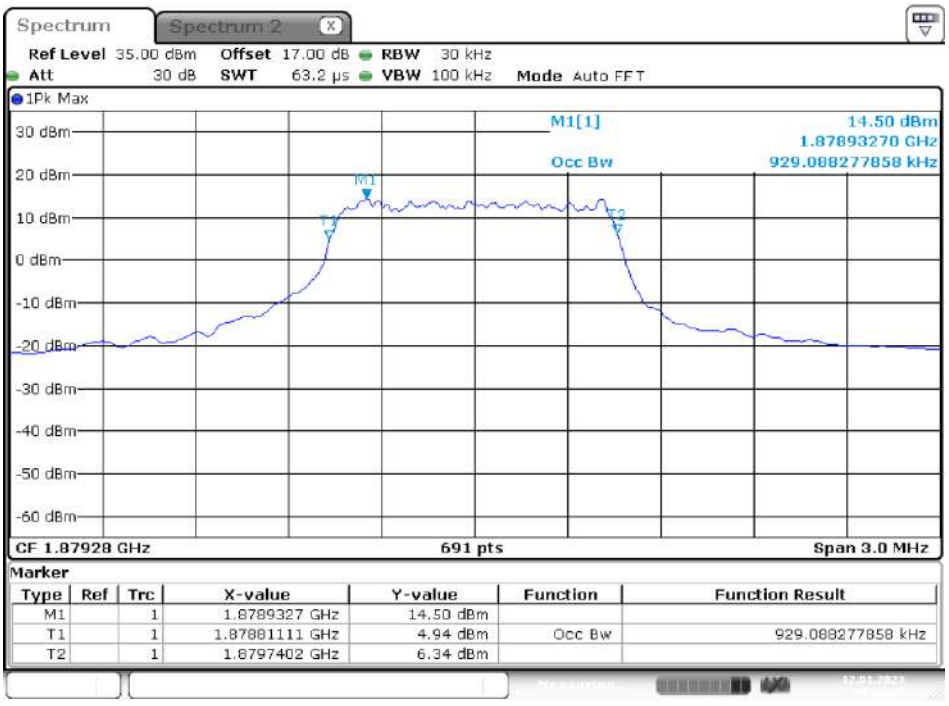
Date: 12.JAN.2023 08:21:36

16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel

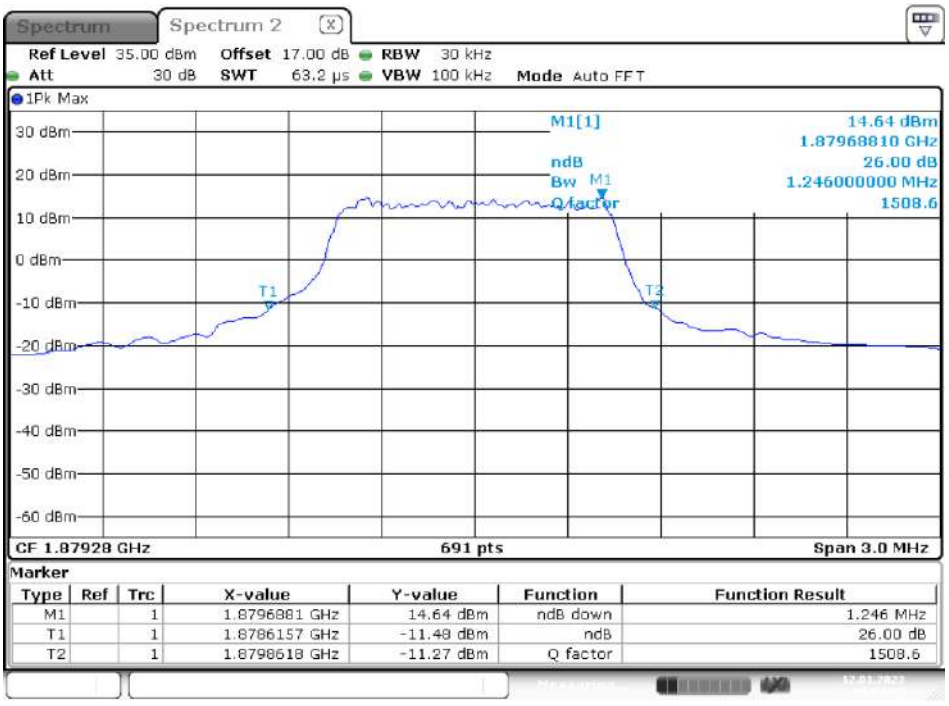




16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel

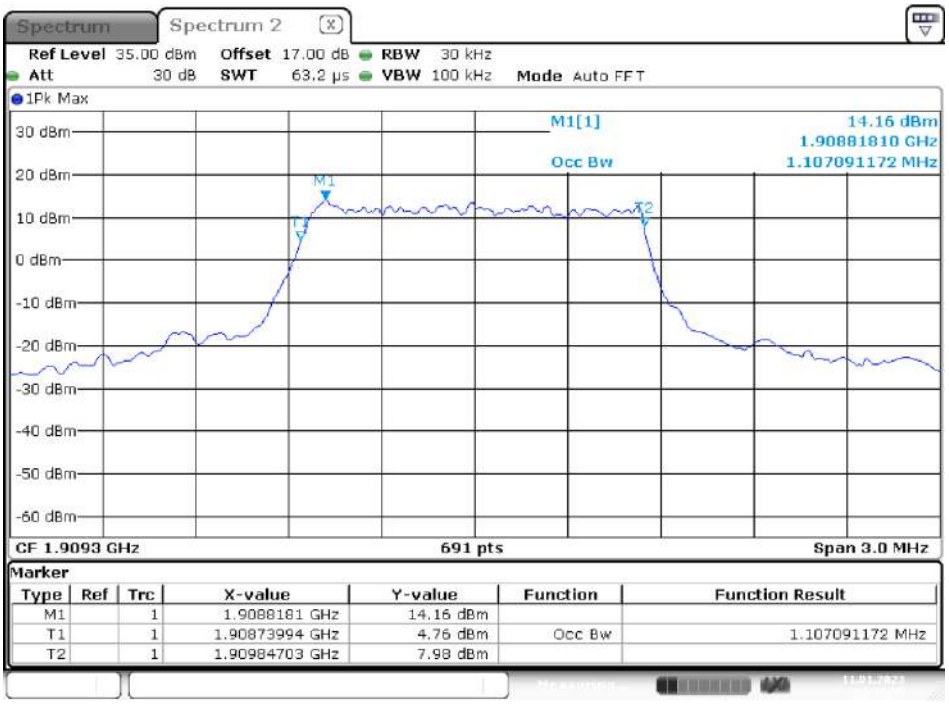


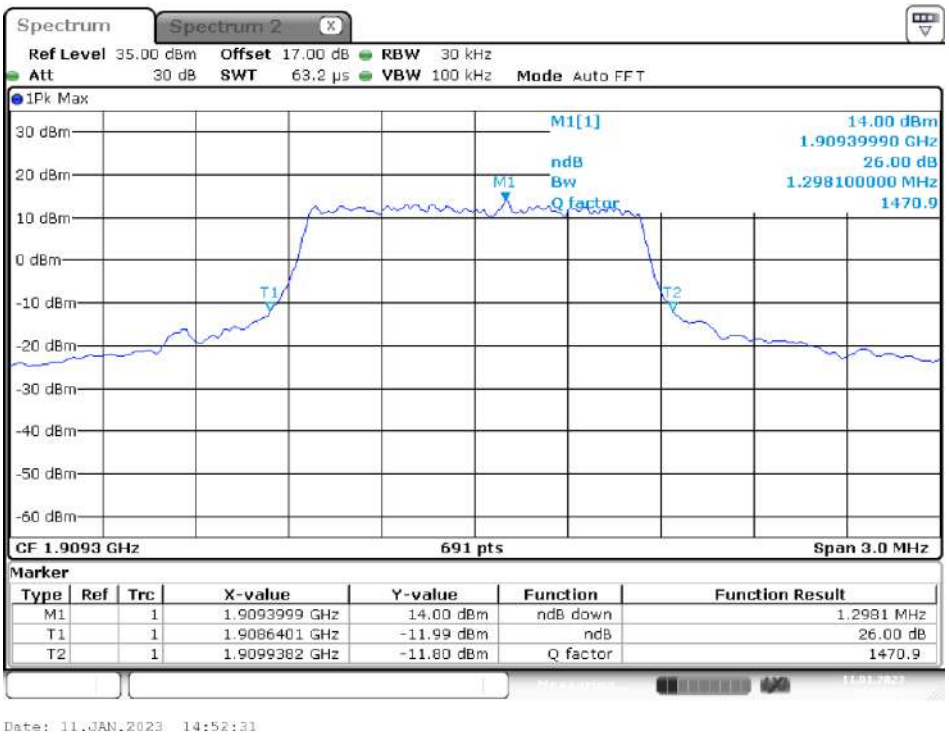
Date: 12.JAN.2023 09:02:58



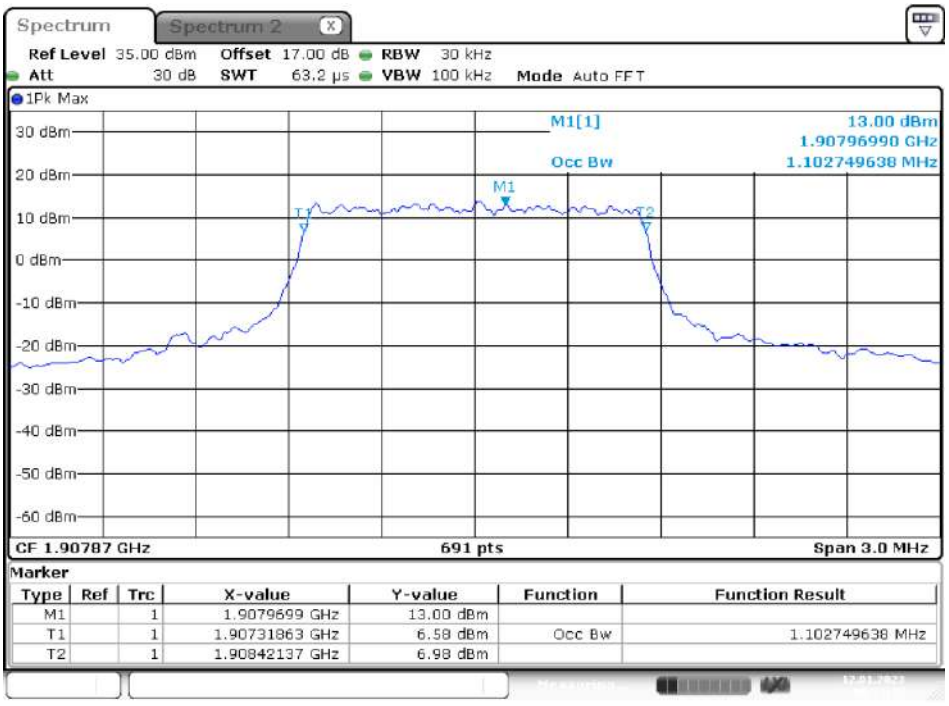
Date: 12.JAN.2023 09:04:03

QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

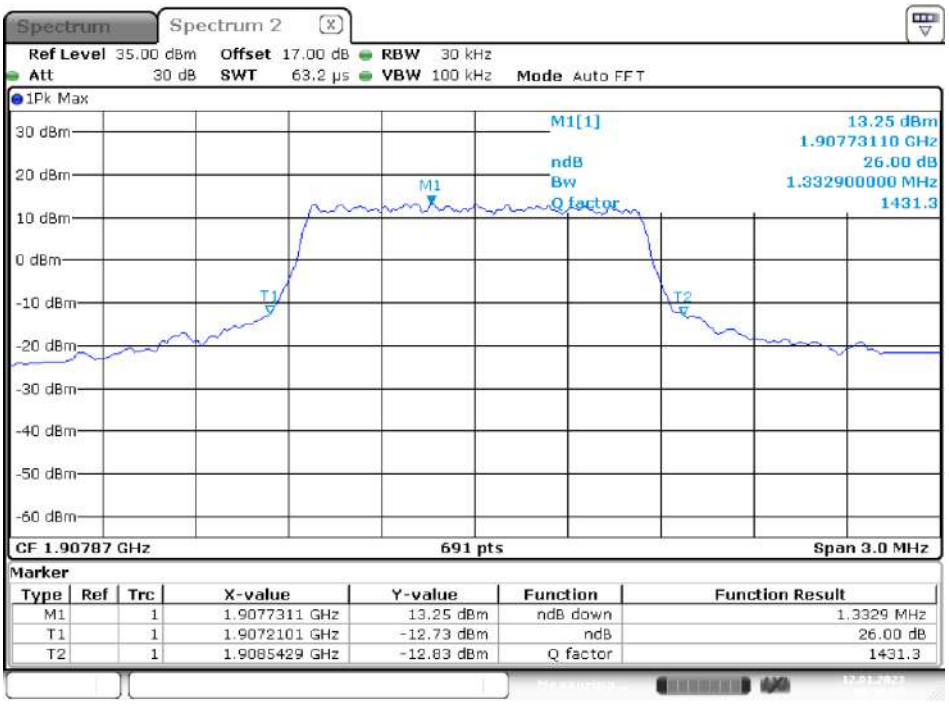




QPSK (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

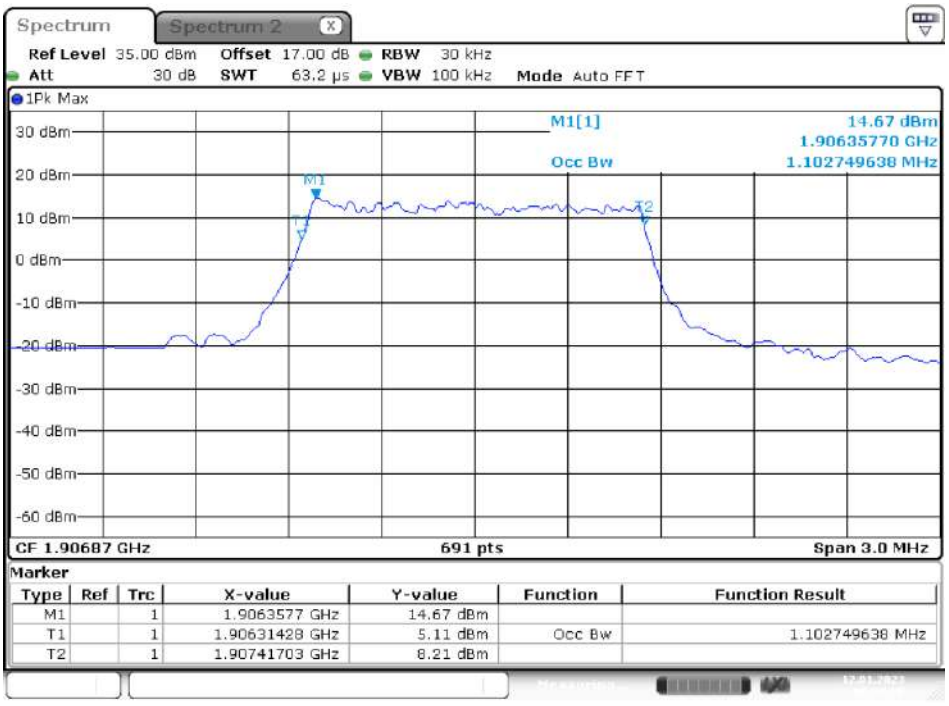


Date: 12.JAN.2023 08:11:18

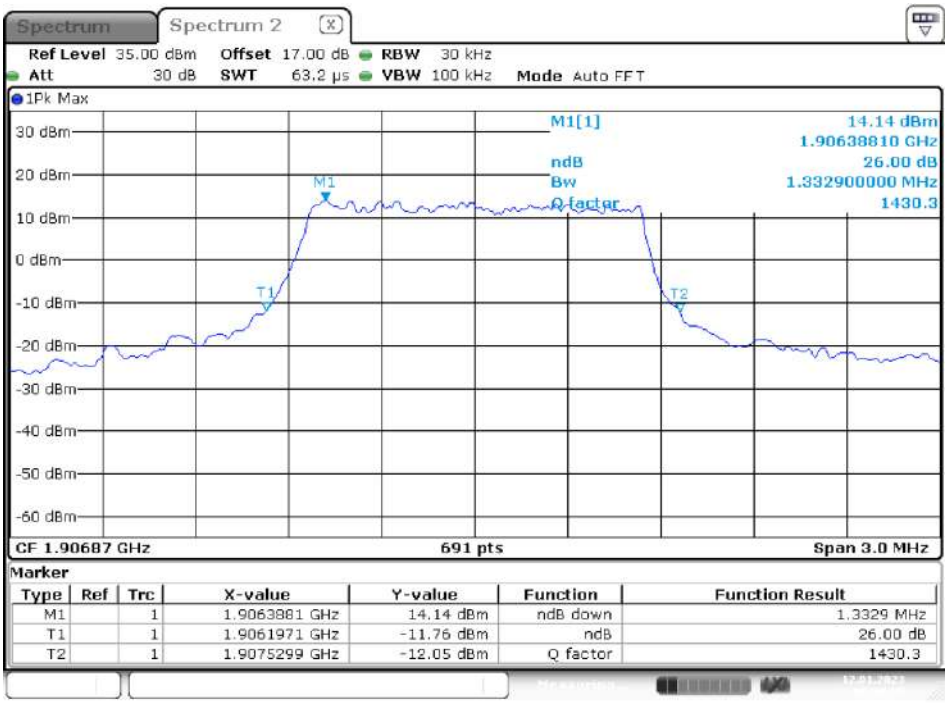


Date: 12.JAN.2023 08:10:30

QPSK (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

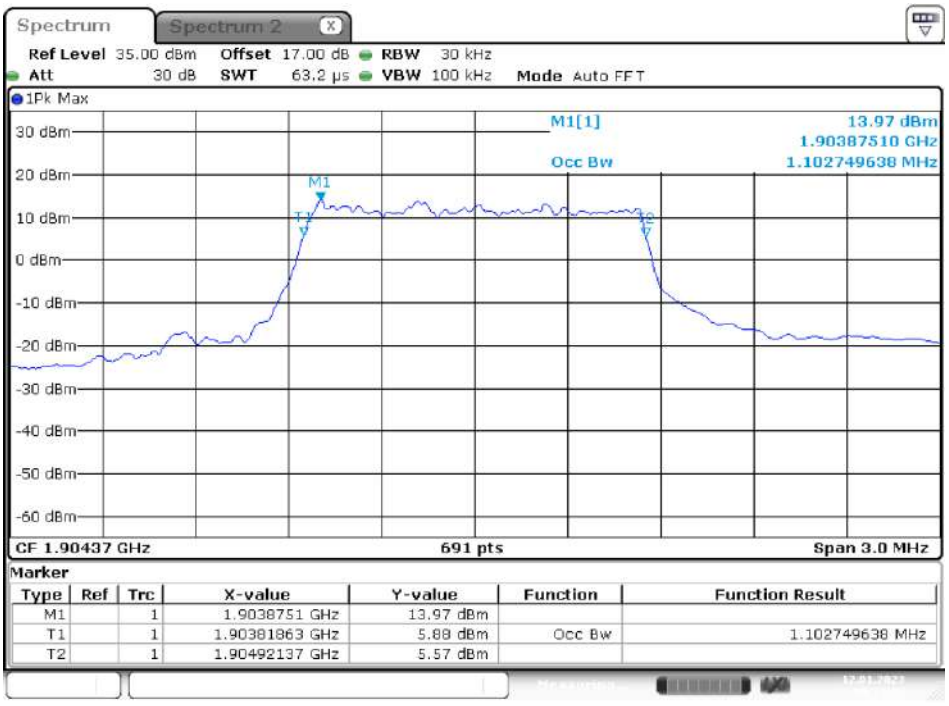


Date: 12.JAN.2023 08:39:26

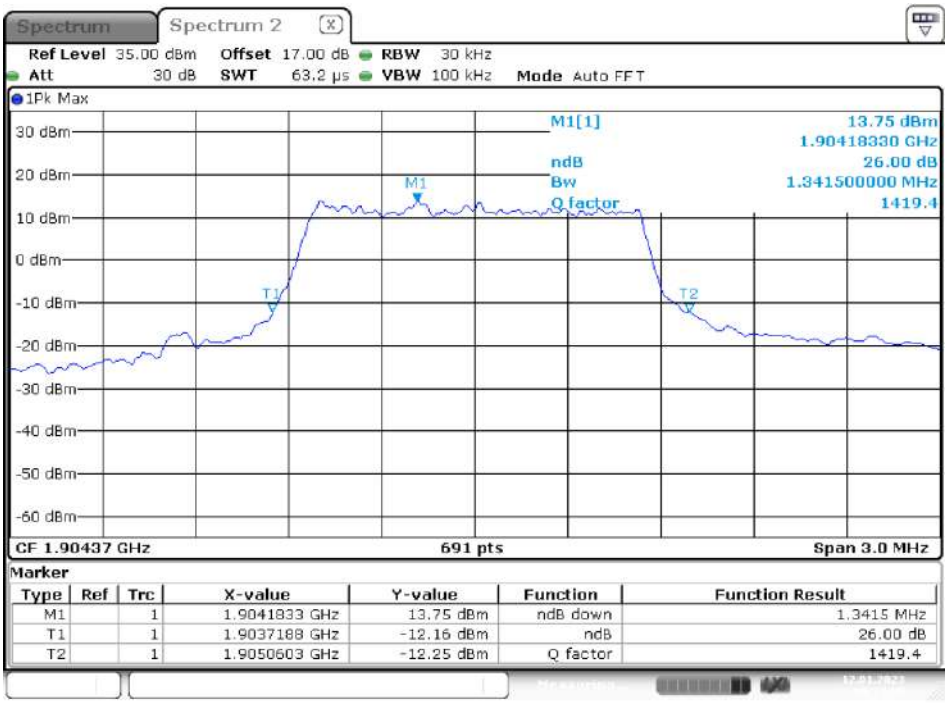


Date: 12.JAN.2023 08:40:07

QPSK (10MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

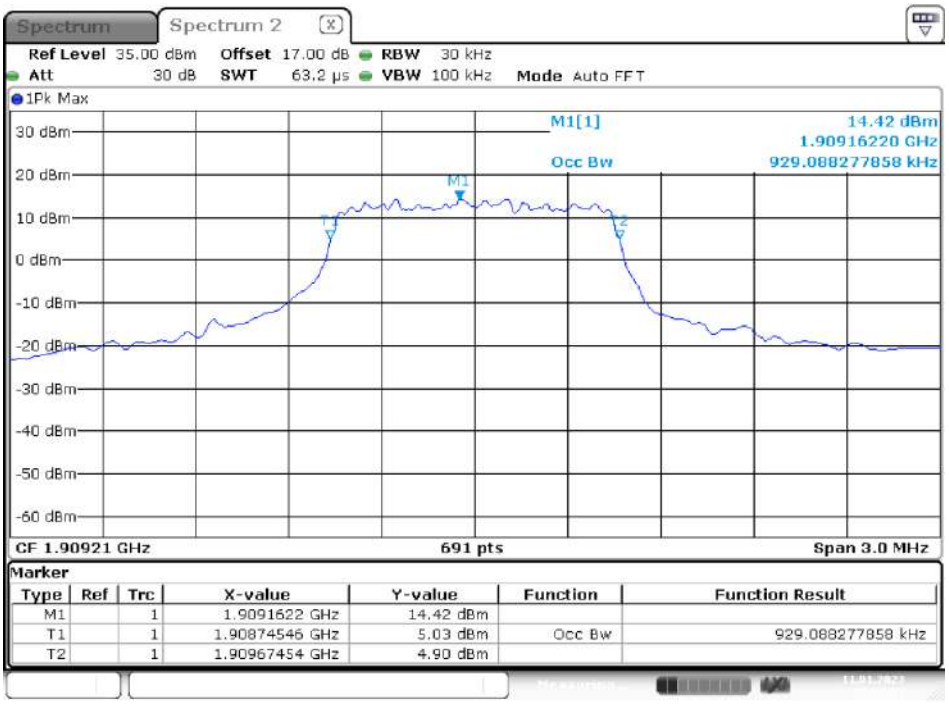


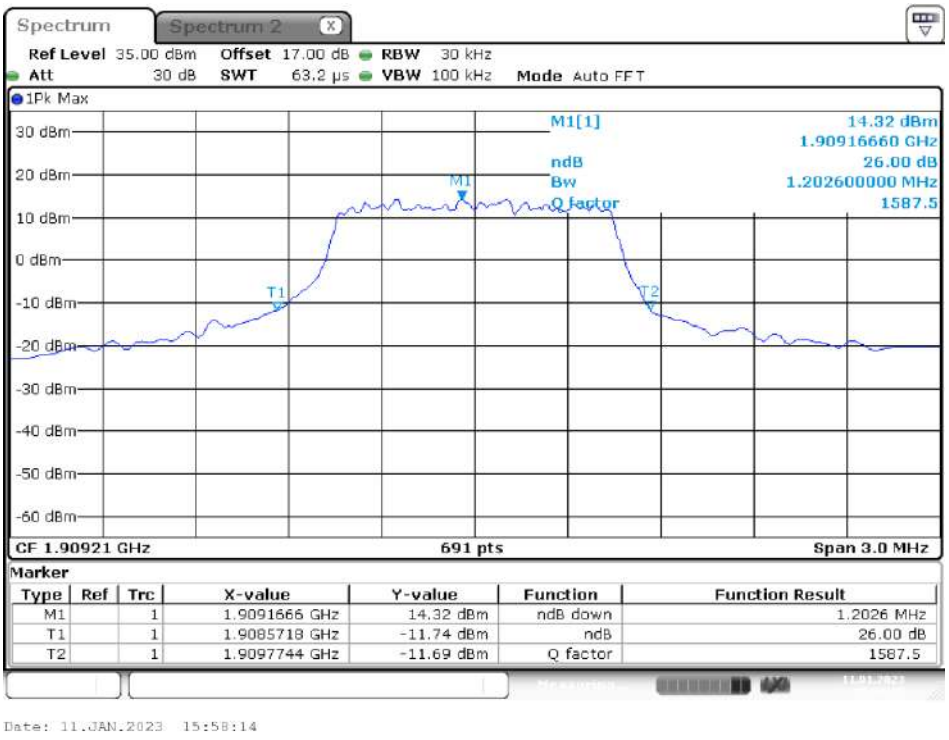
Date: 12.JAN.2023 09:13:13



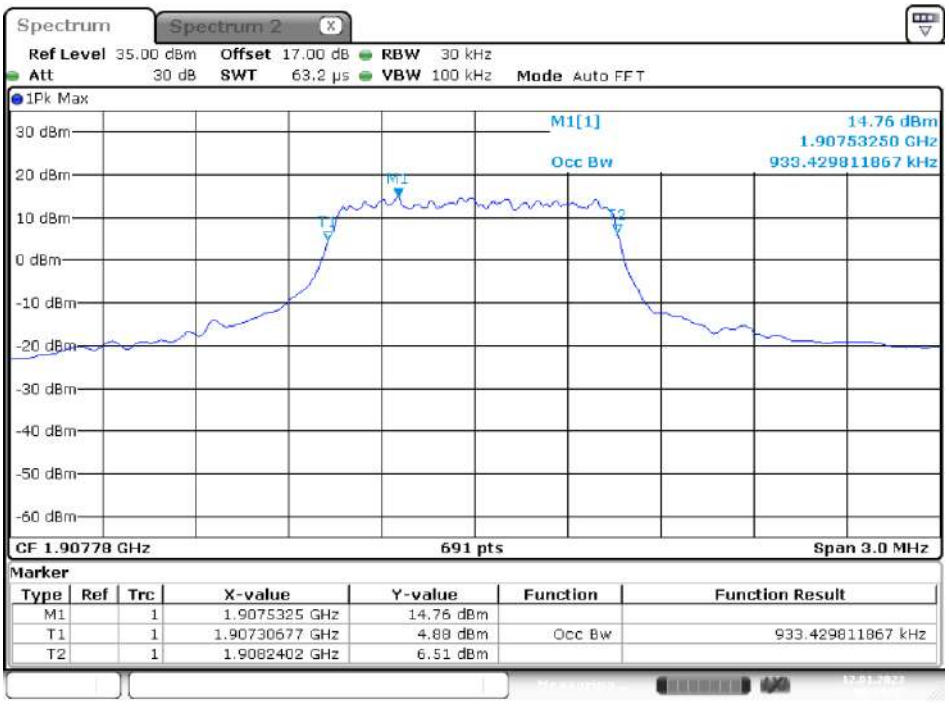
Date: 12.JAN.2023 09:13:50

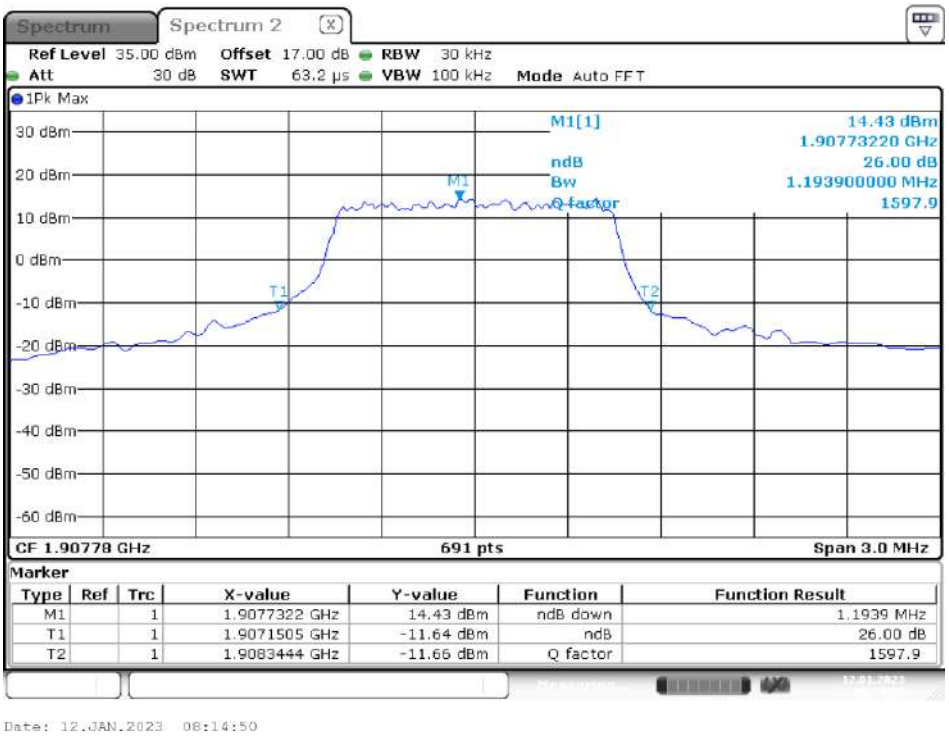
16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel



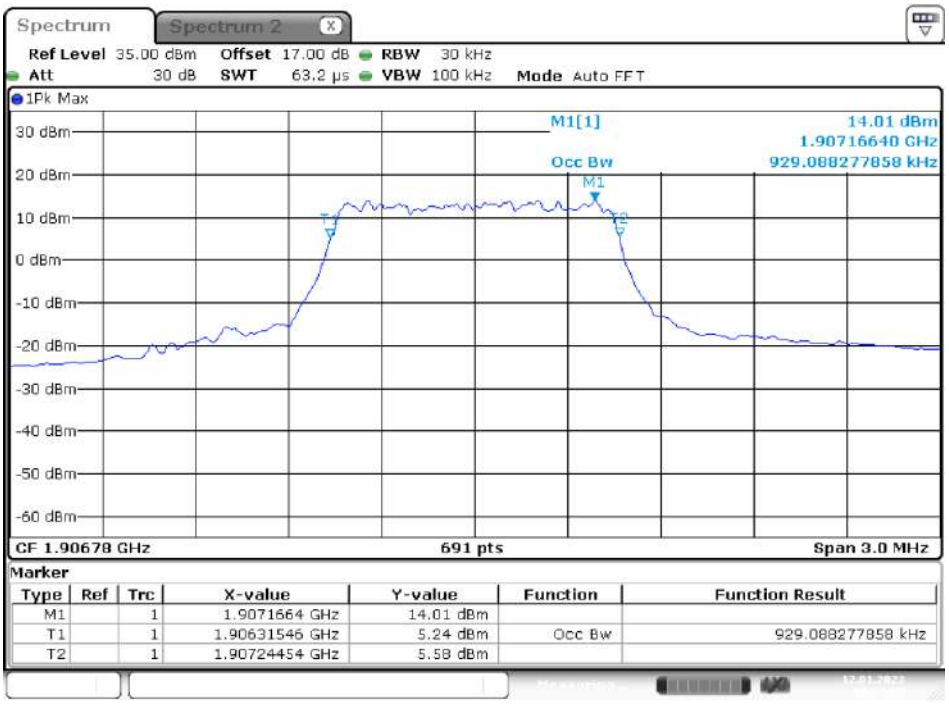


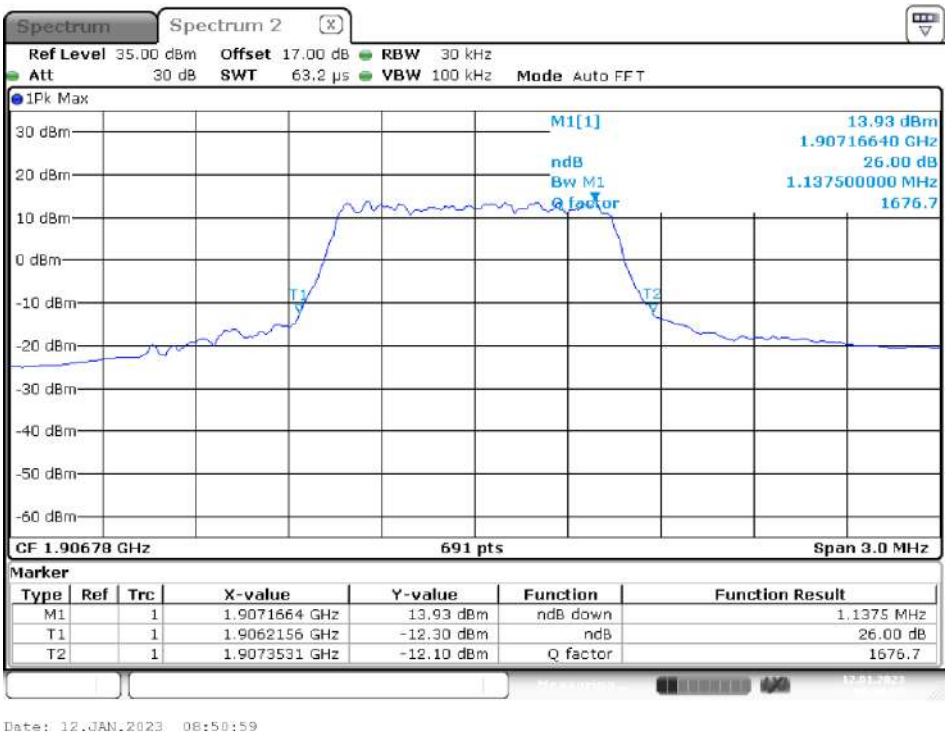
16-QAM (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel



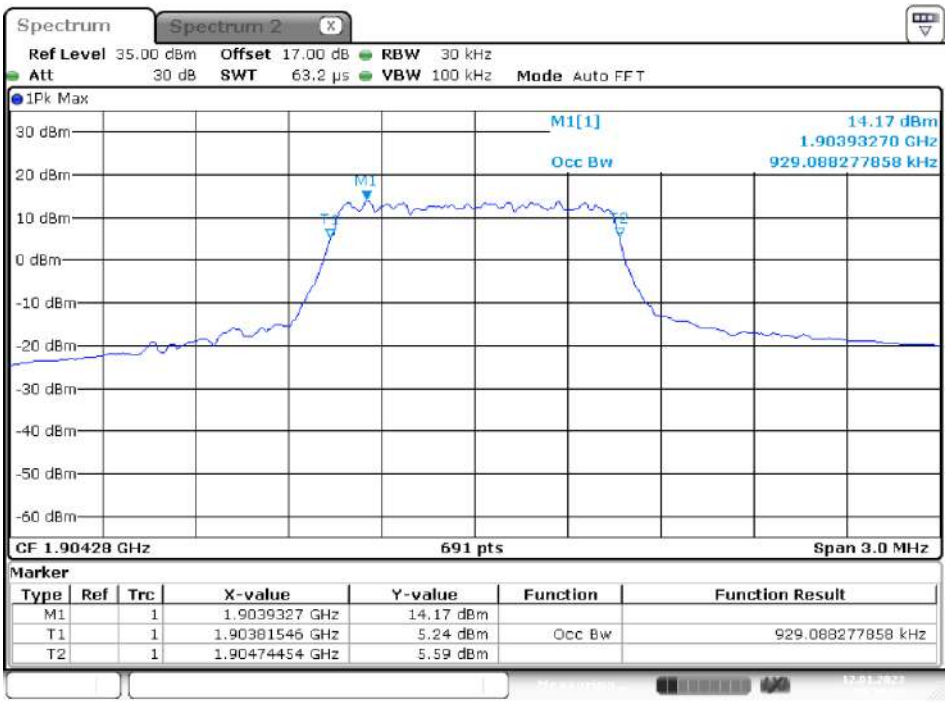


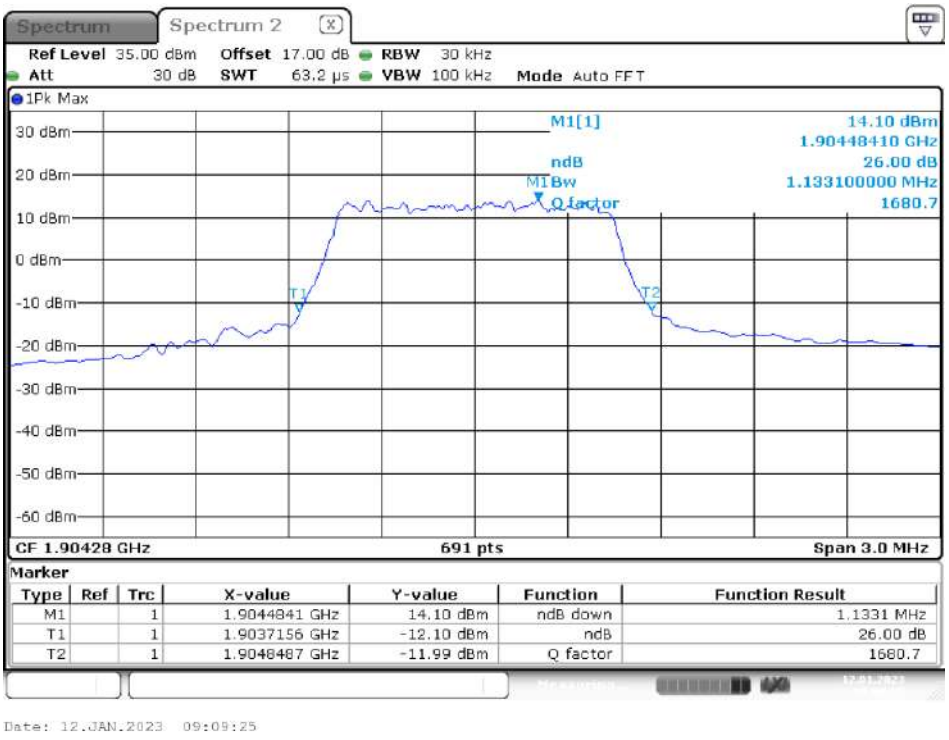
16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel





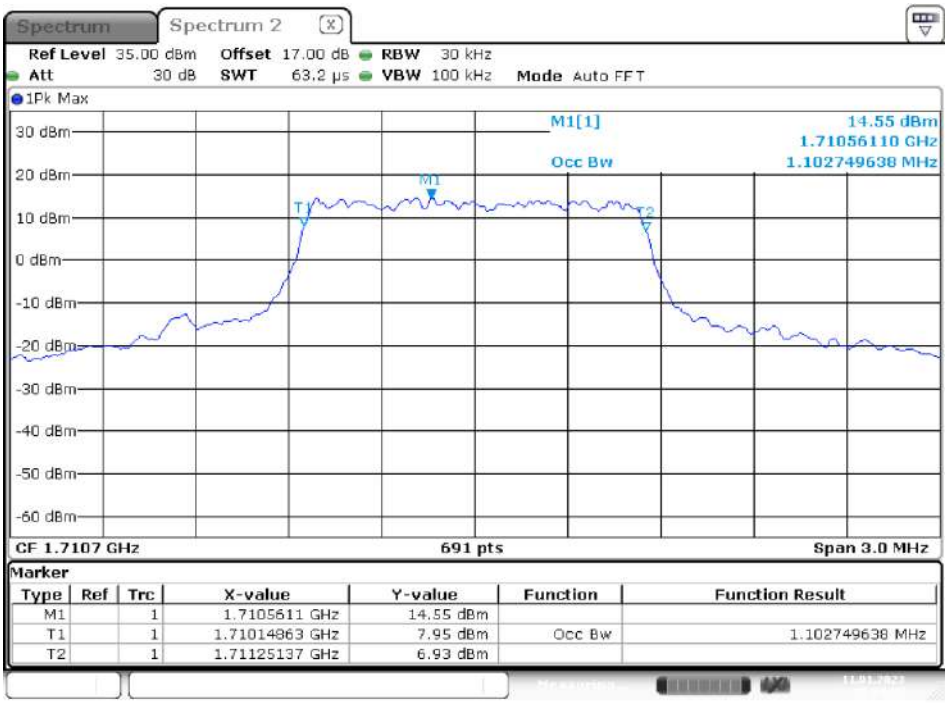
16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

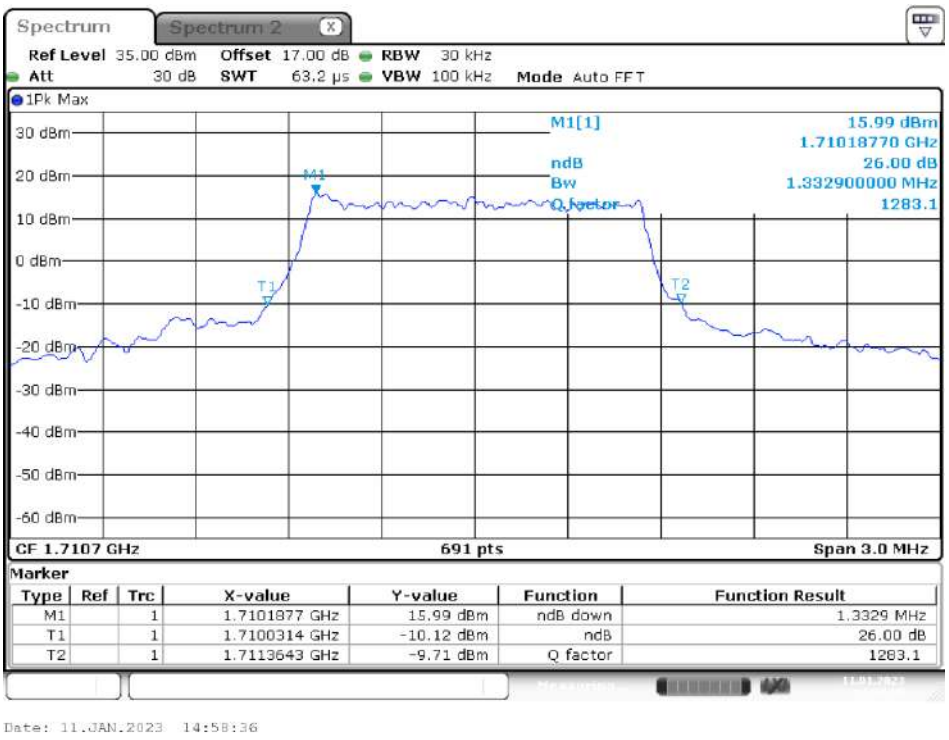




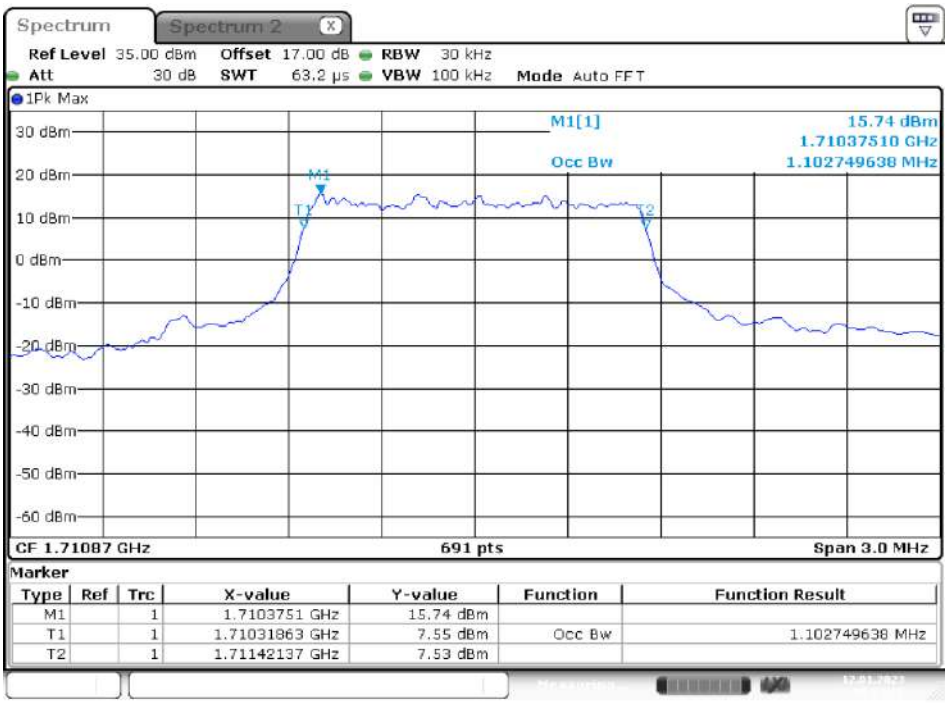
LTE Band 4

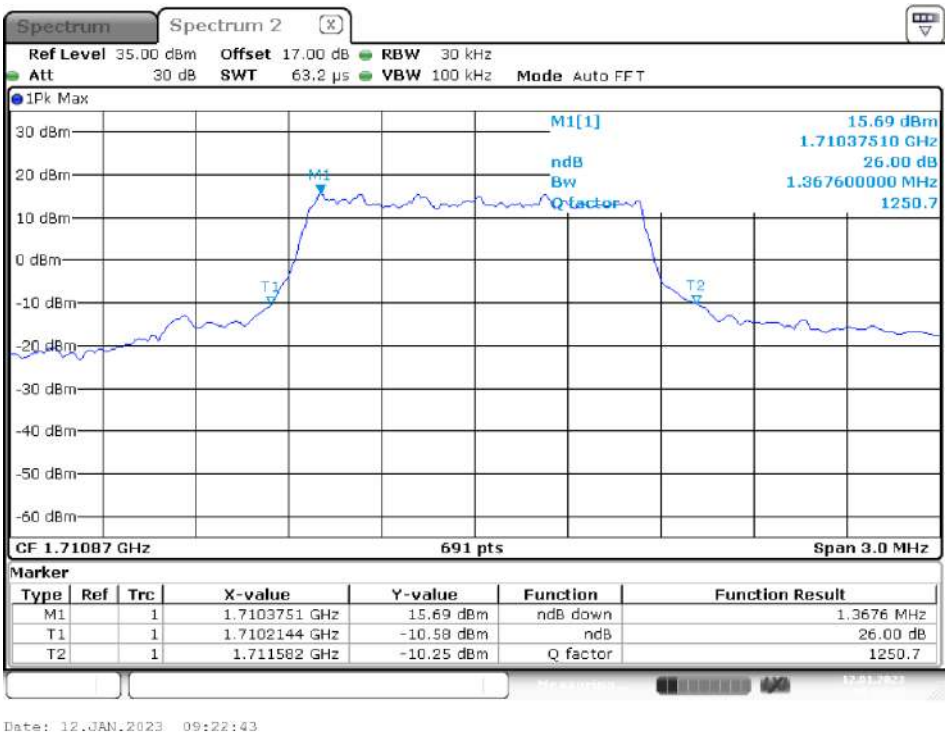
QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



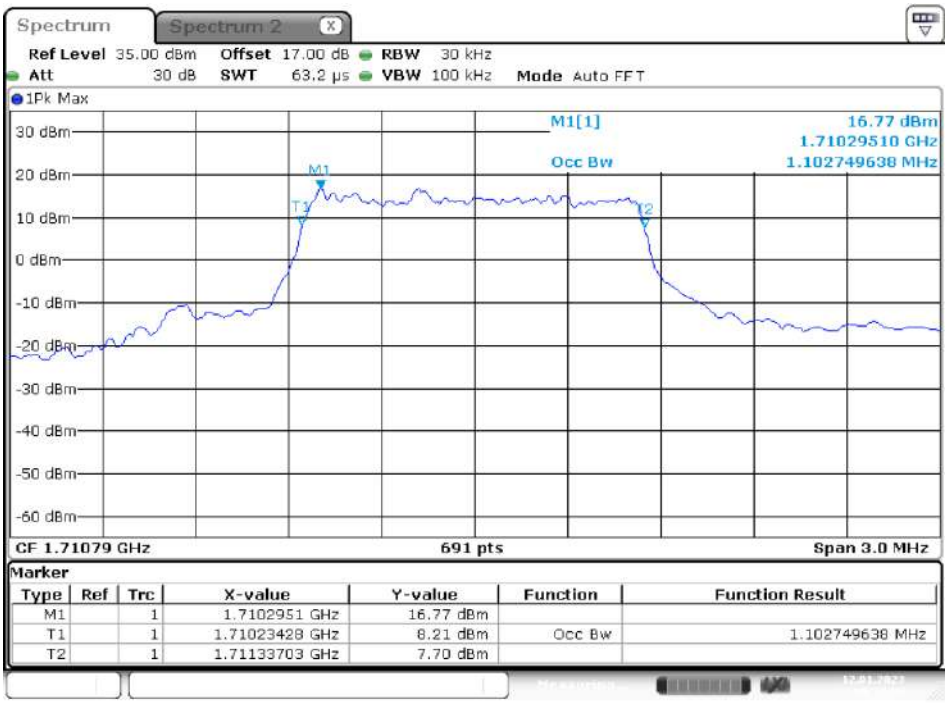


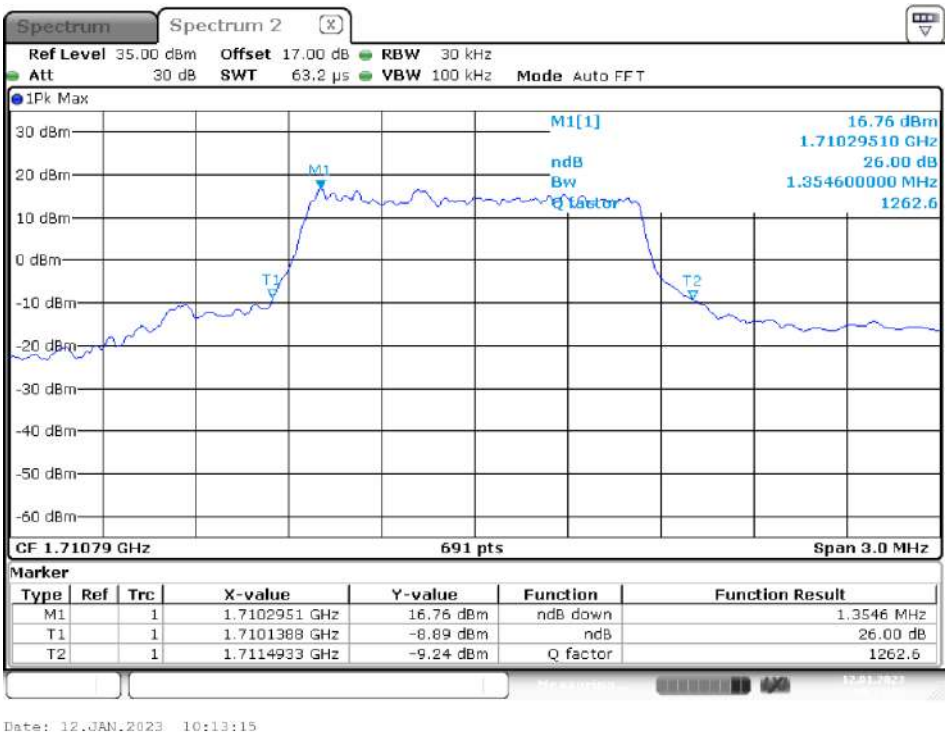
QPSK (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



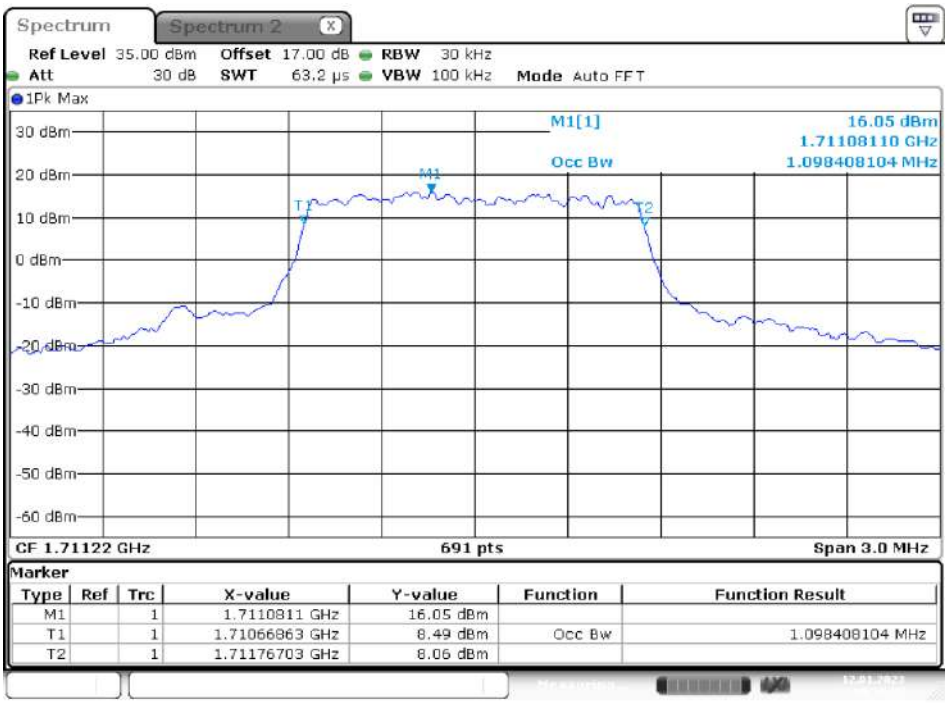


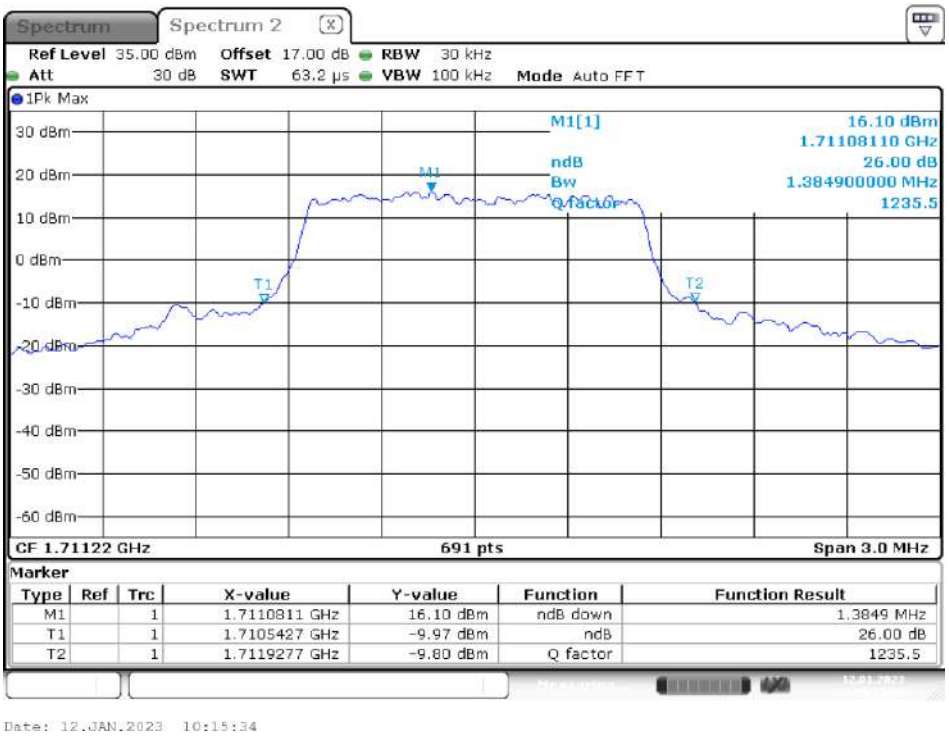
QPSK (5MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



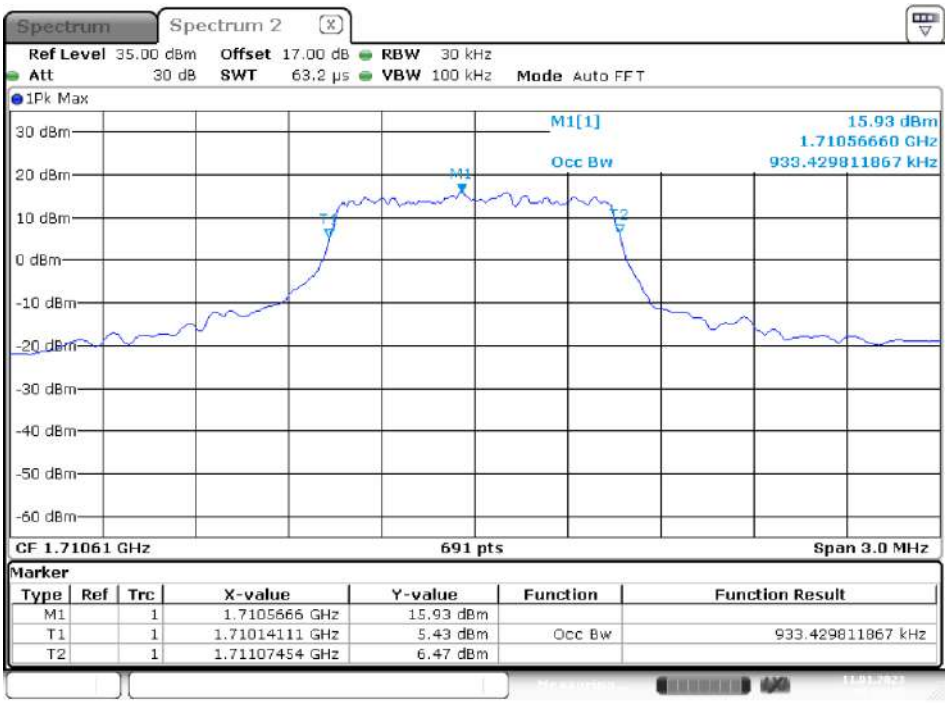


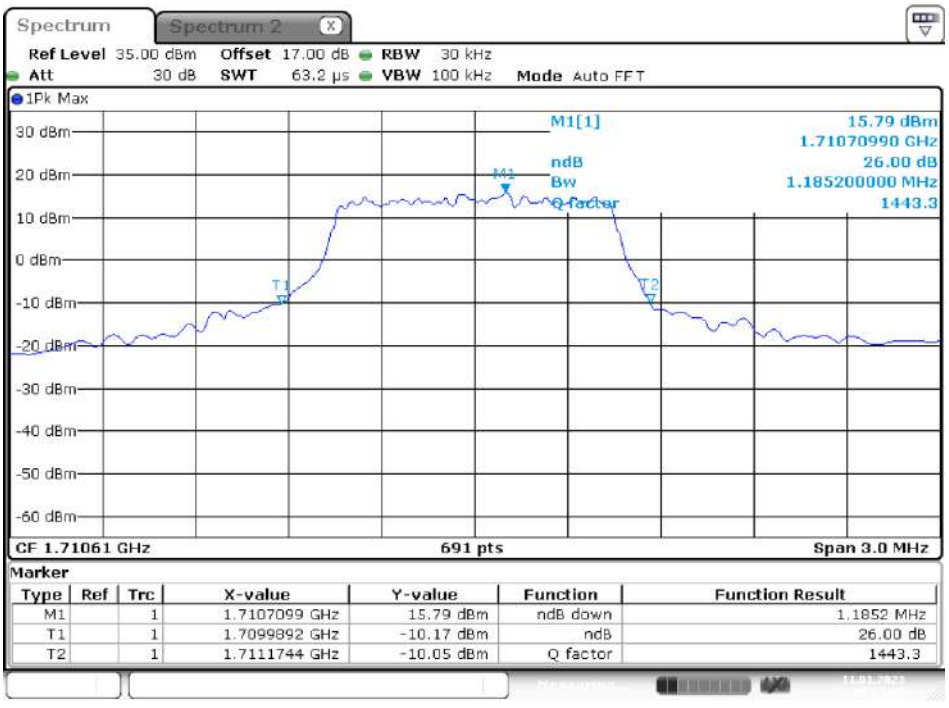
QPSK (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



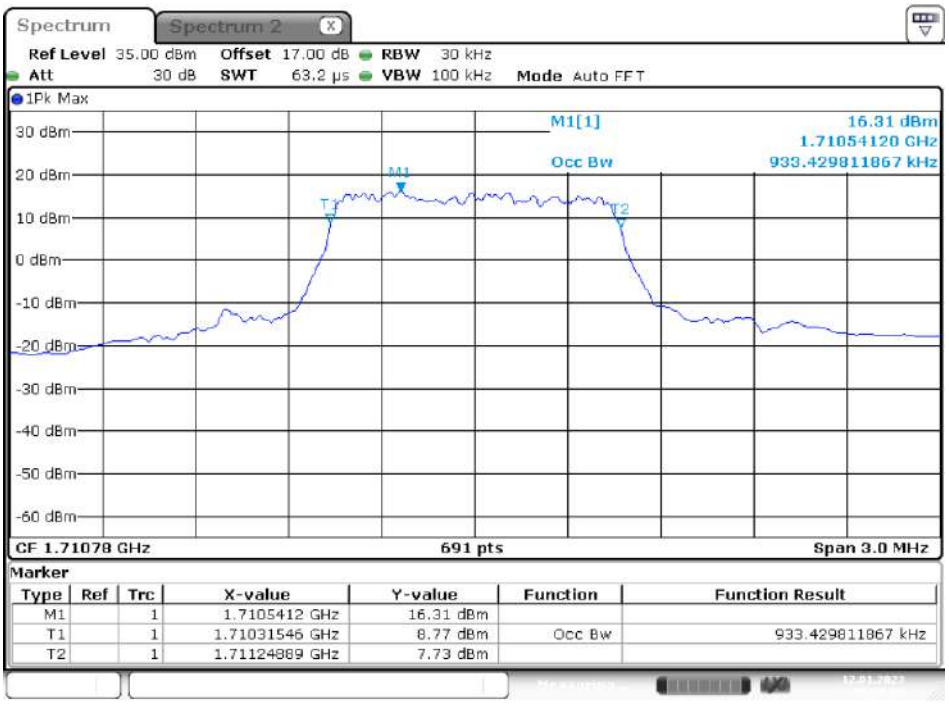


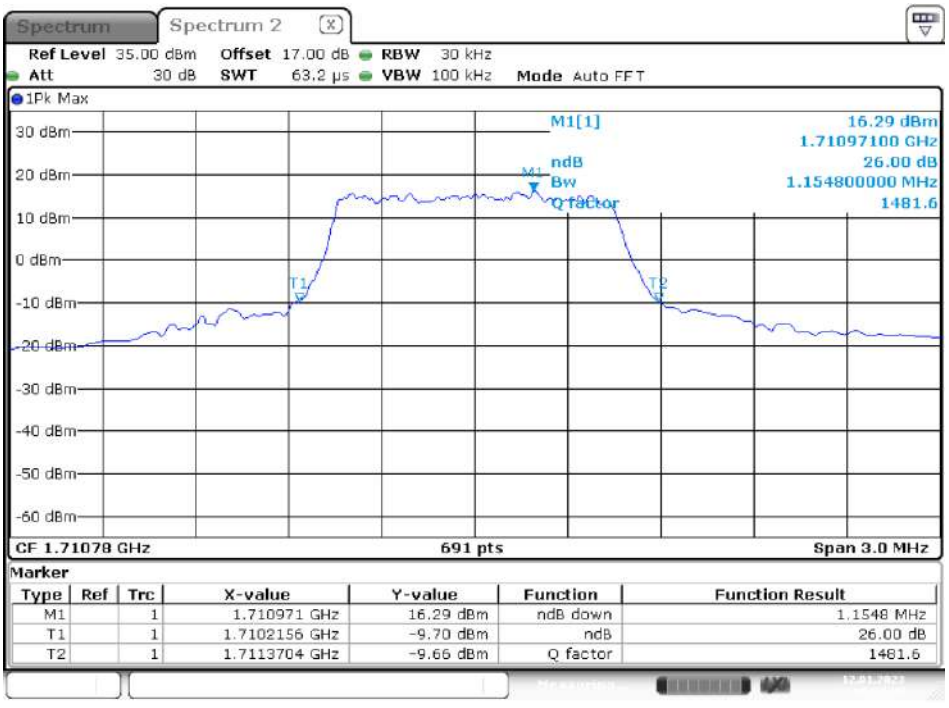
16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



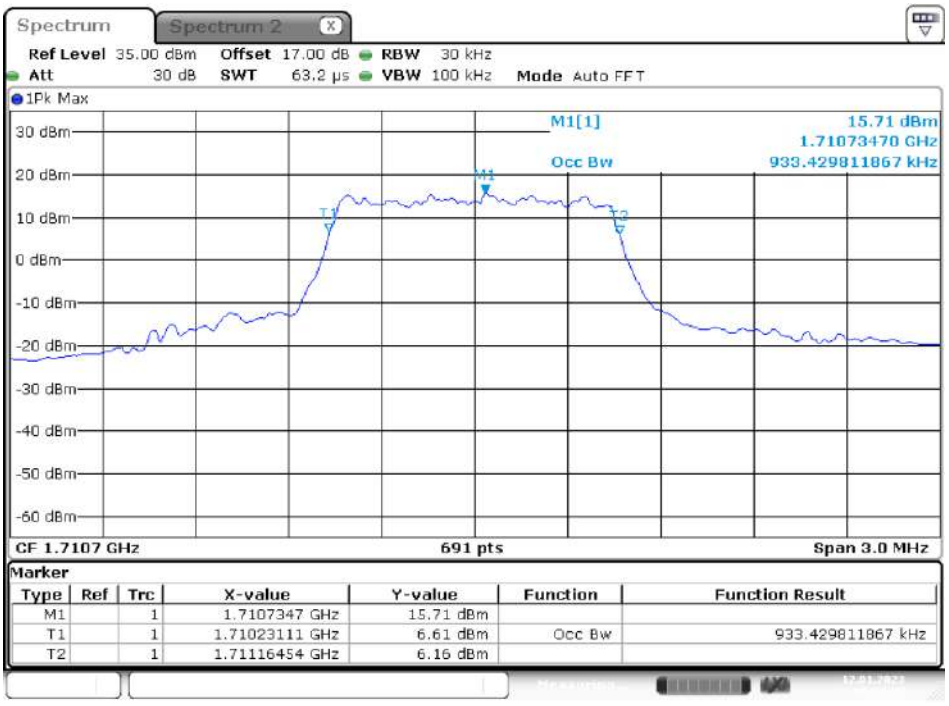


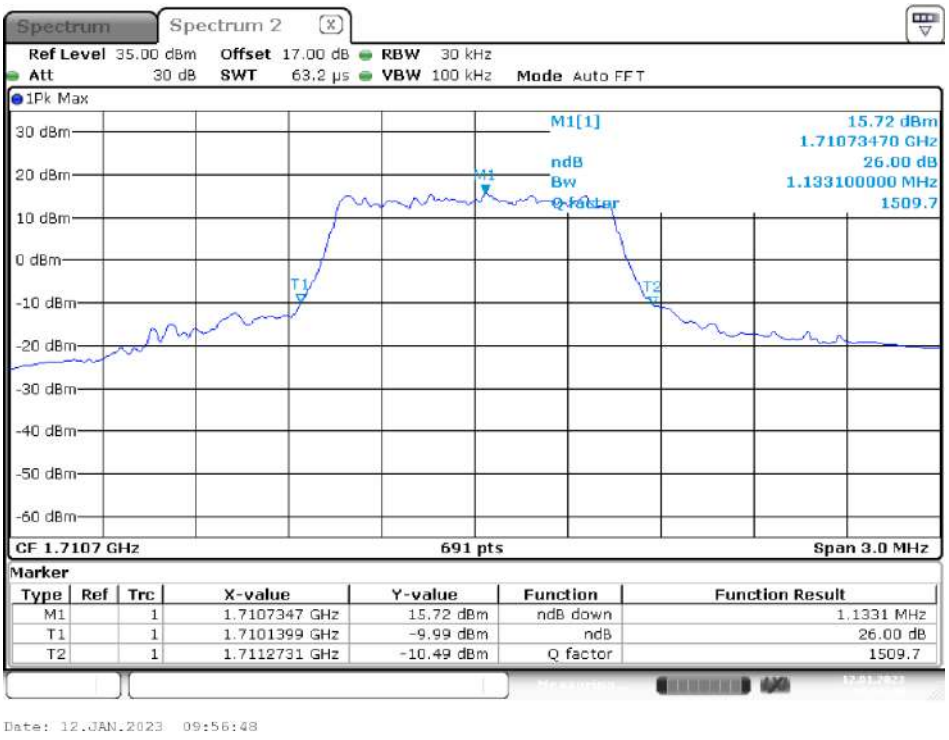
16-QAM (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



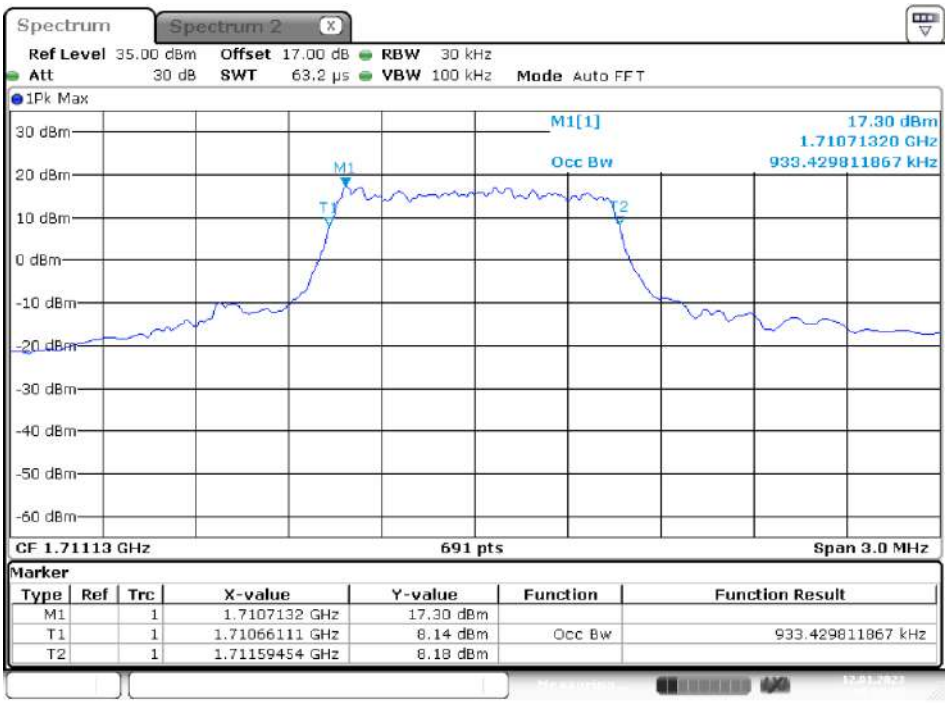


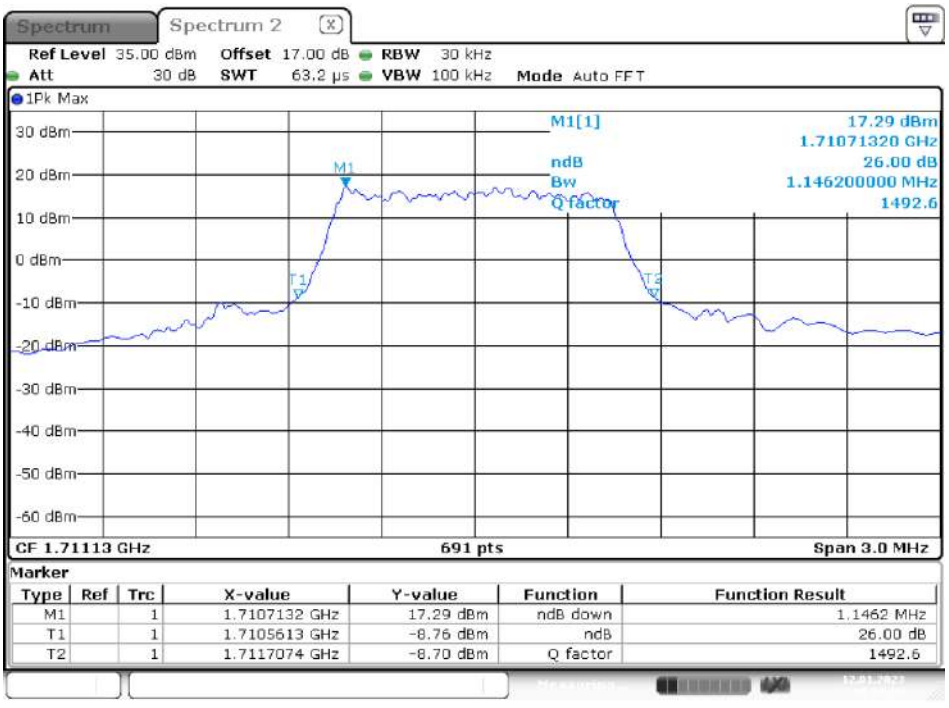
16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



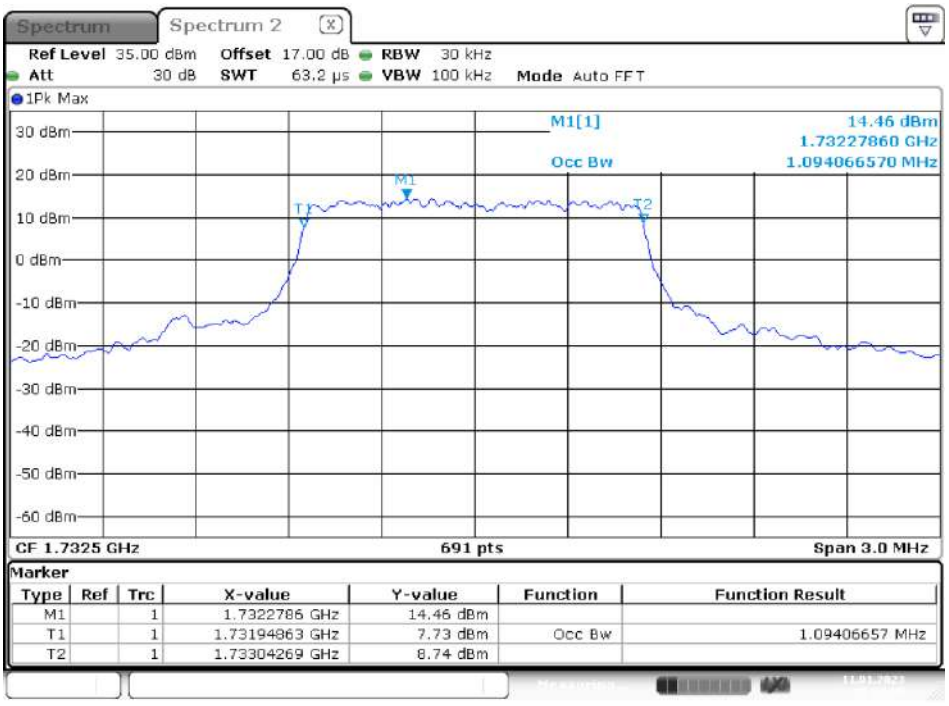


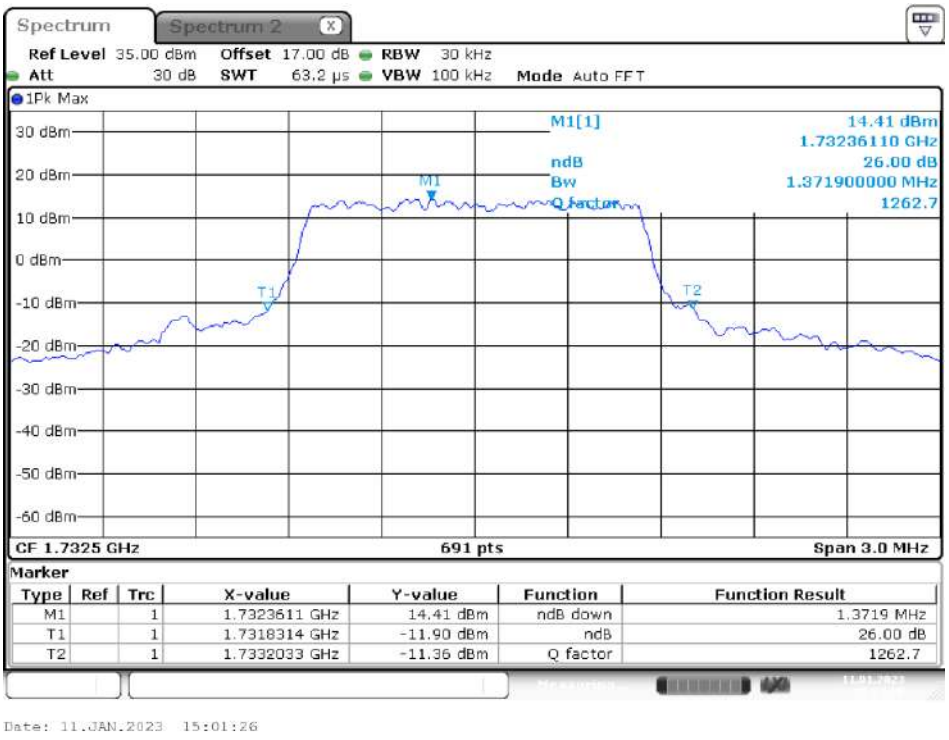
16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



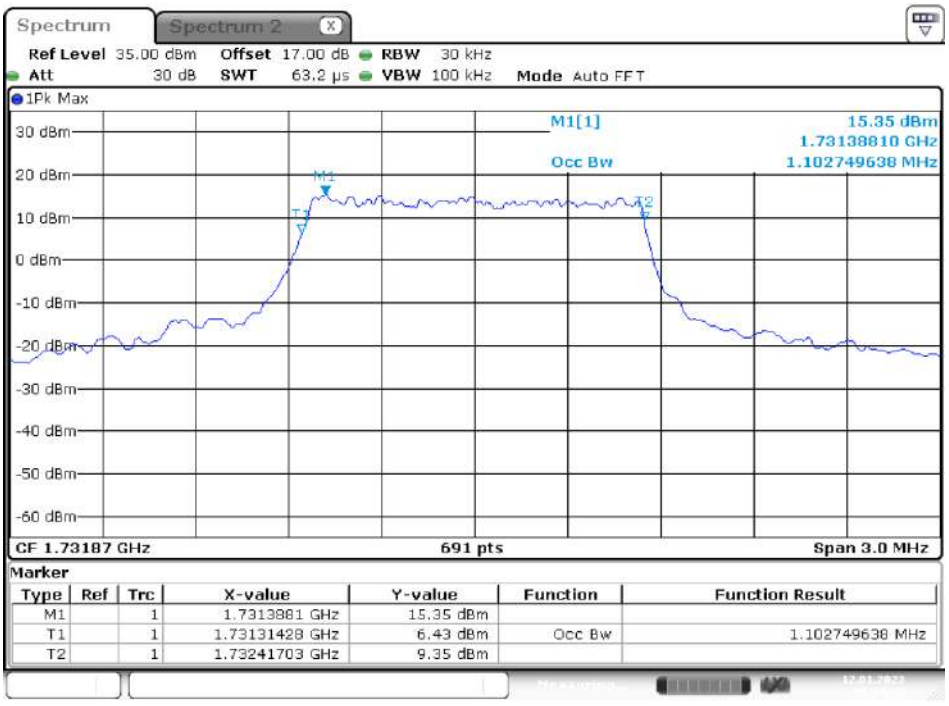


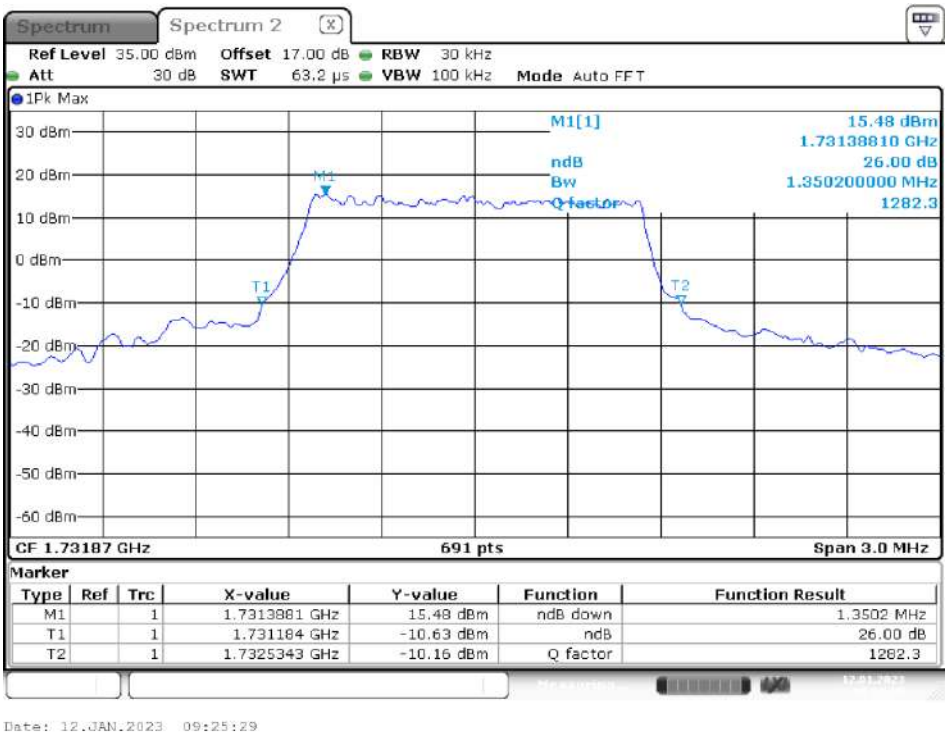
QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



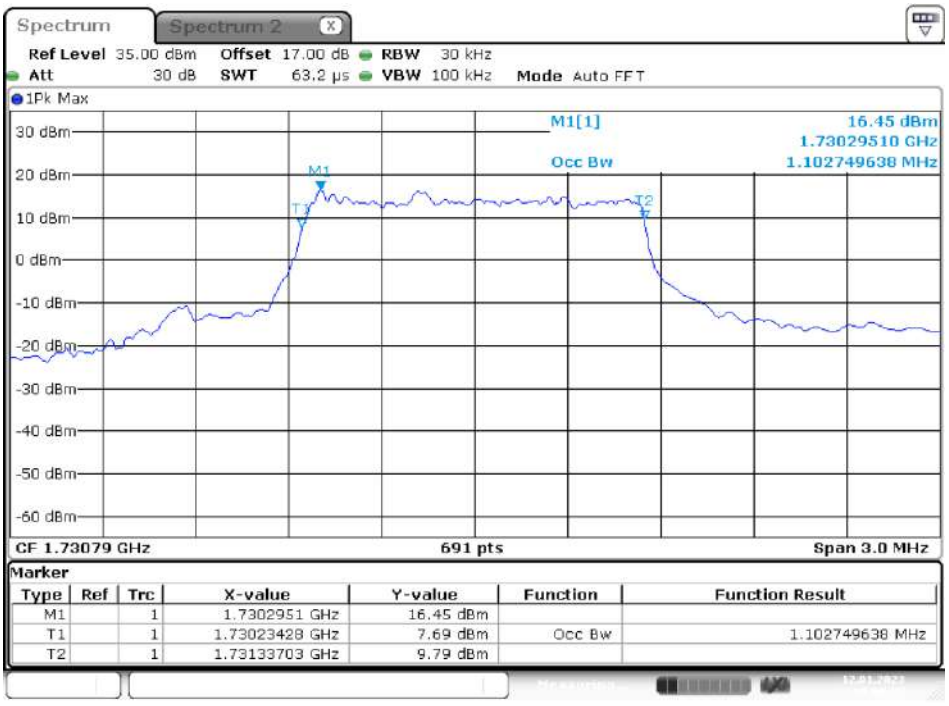


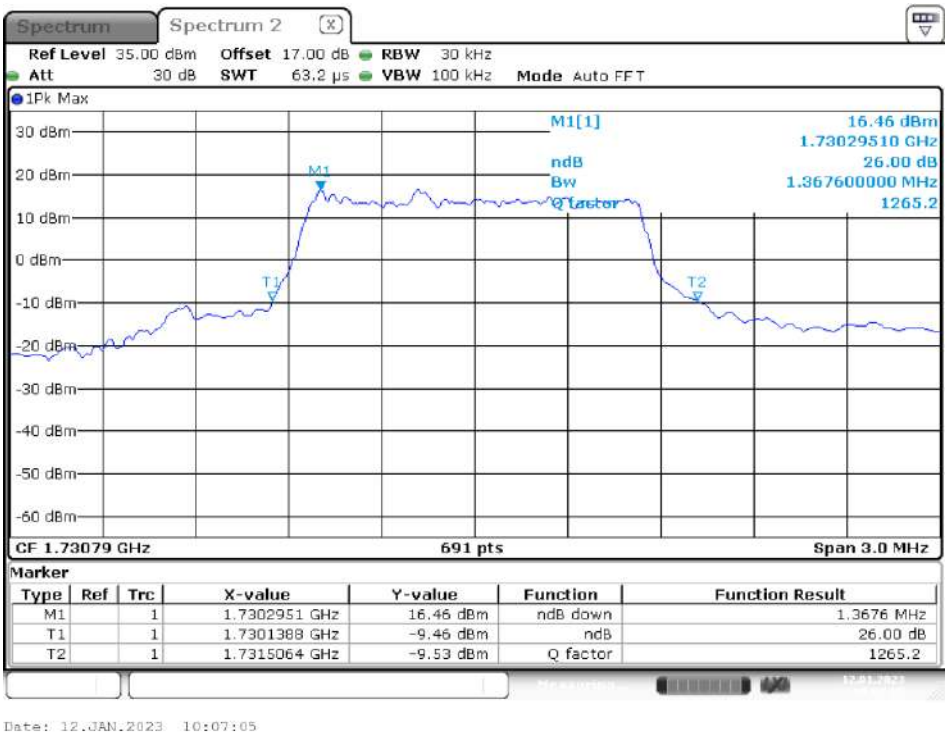
QPSK (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



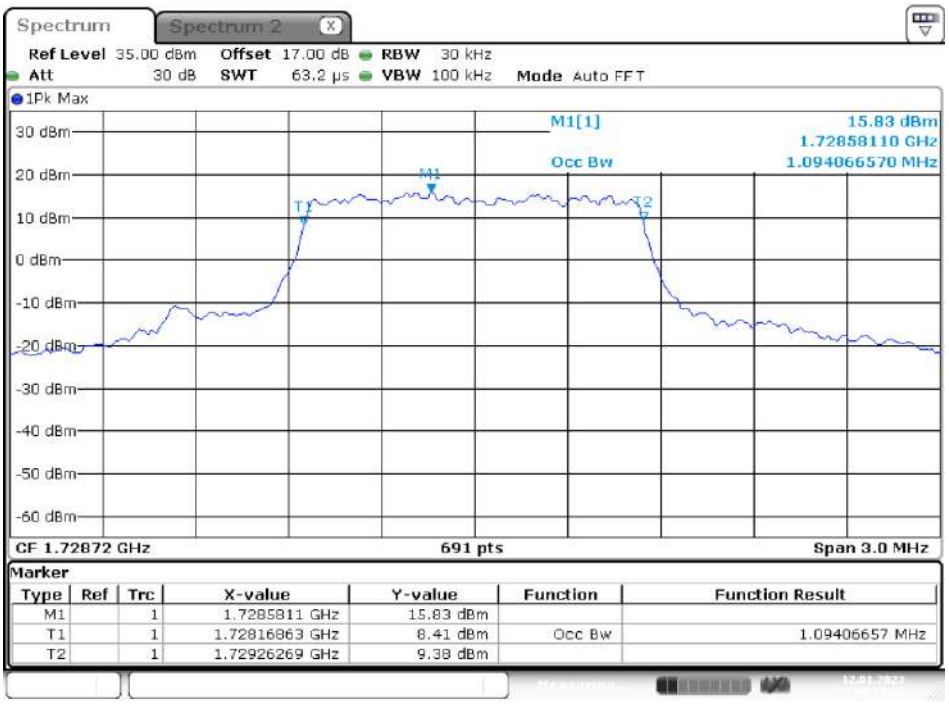


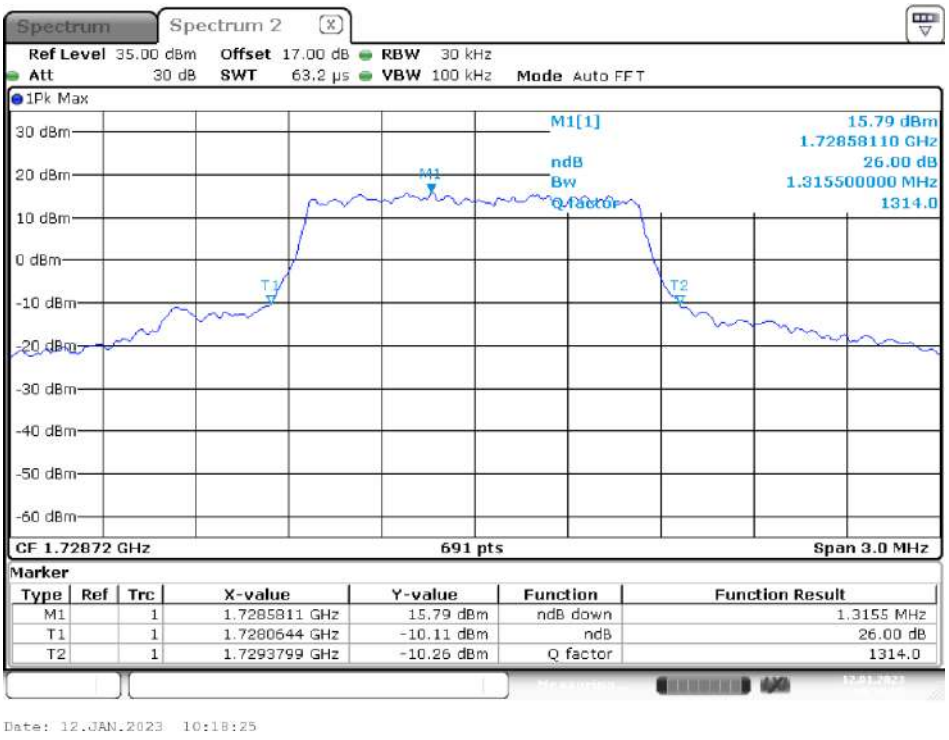
QPSK (5MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



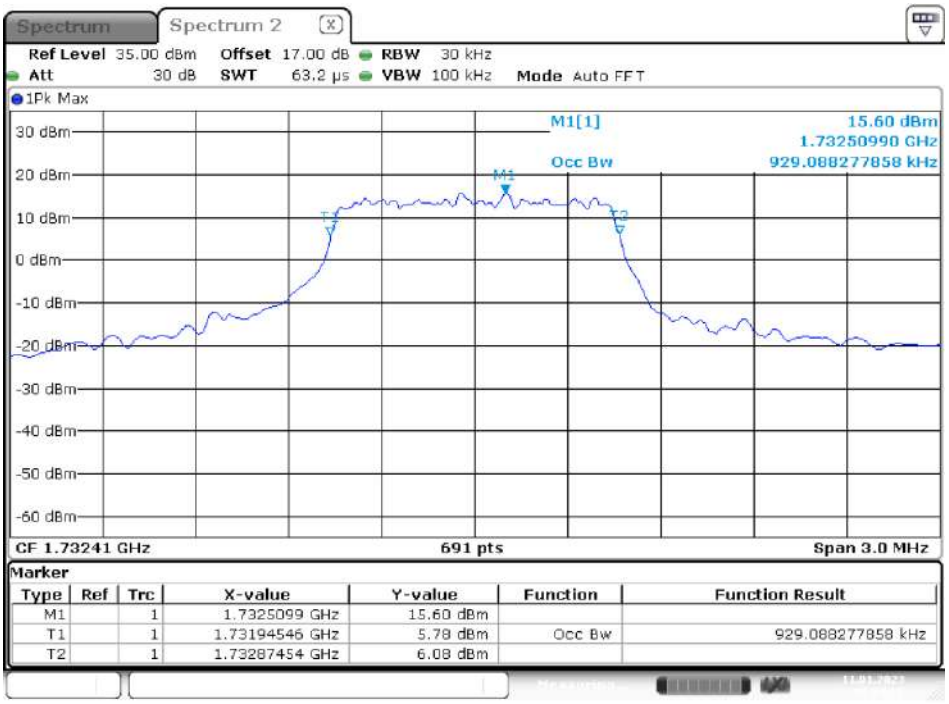


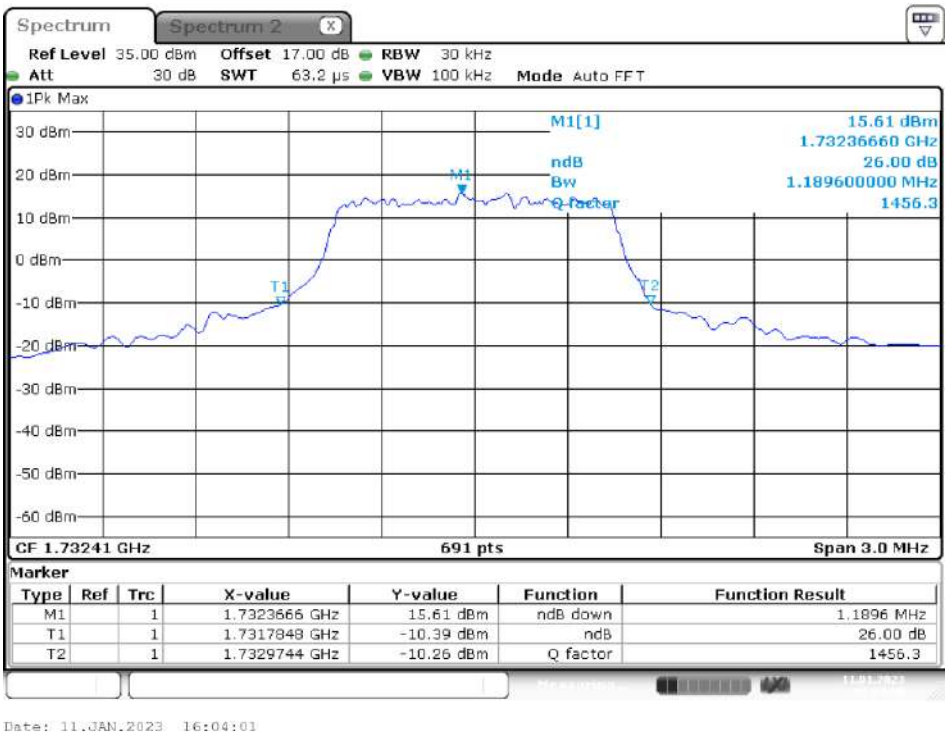
QPSK (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



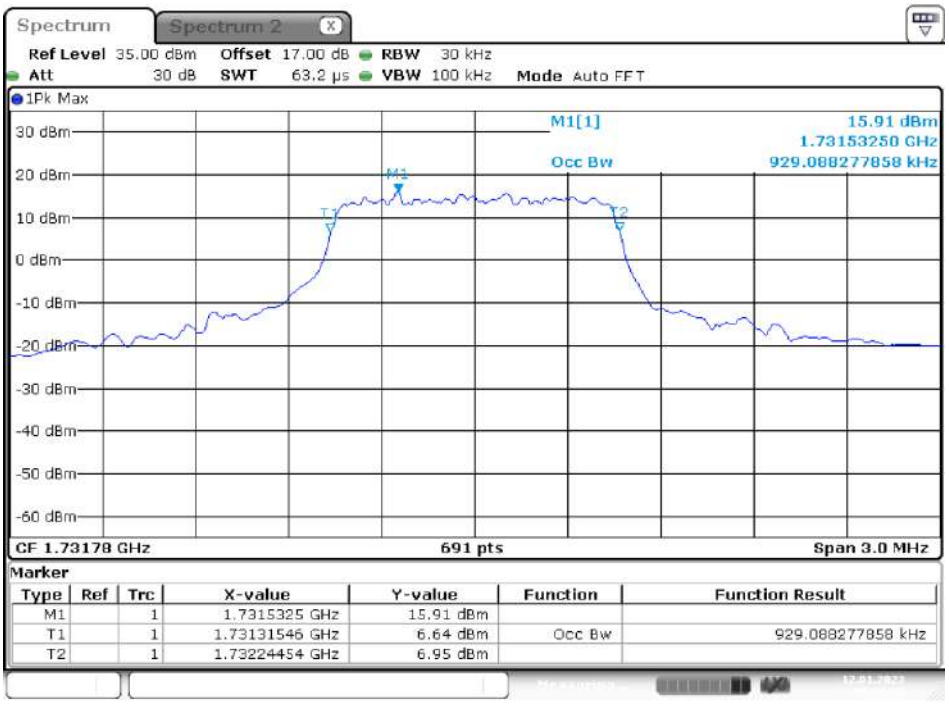


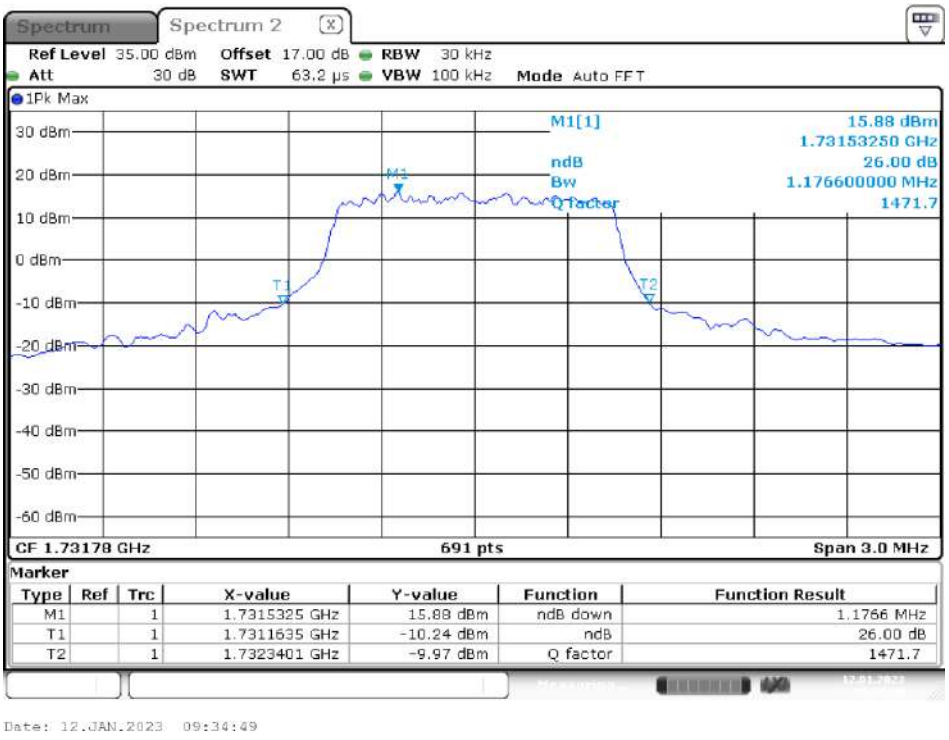
16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



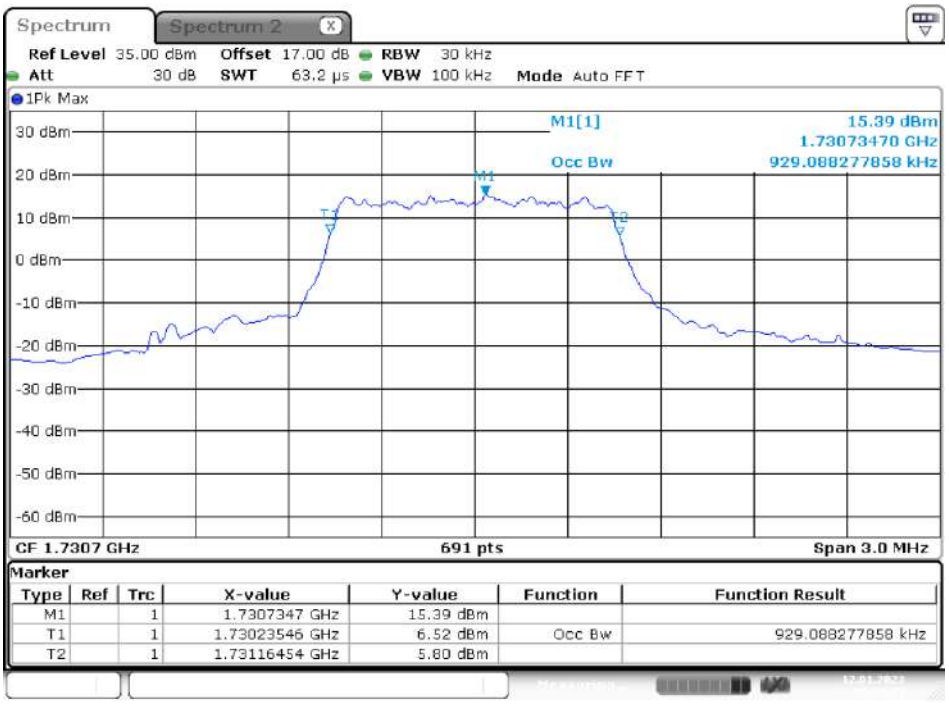


16-QAM (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel

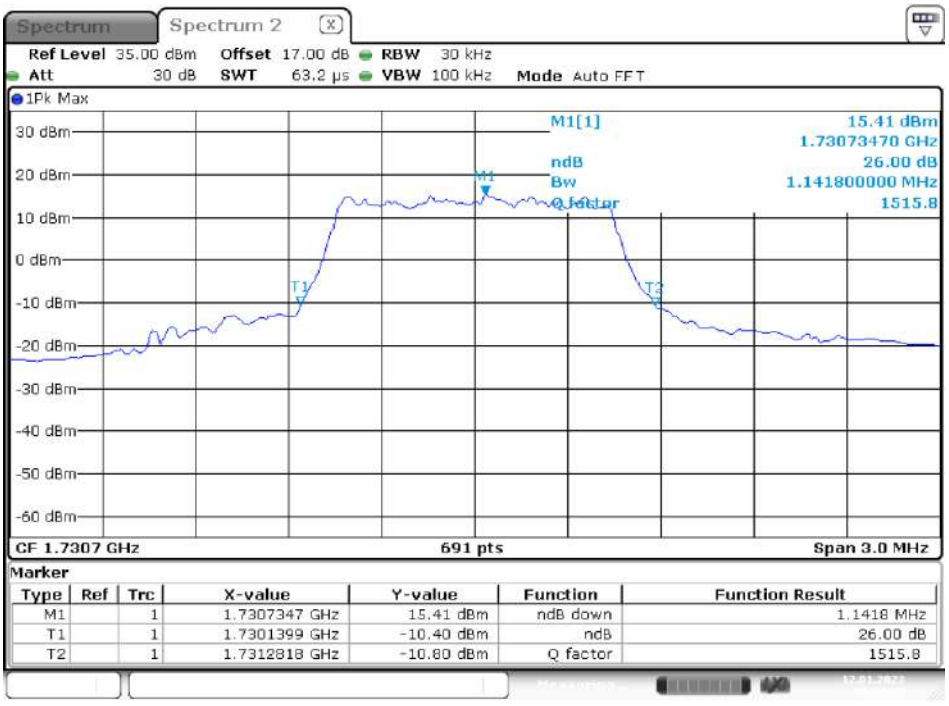




16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel

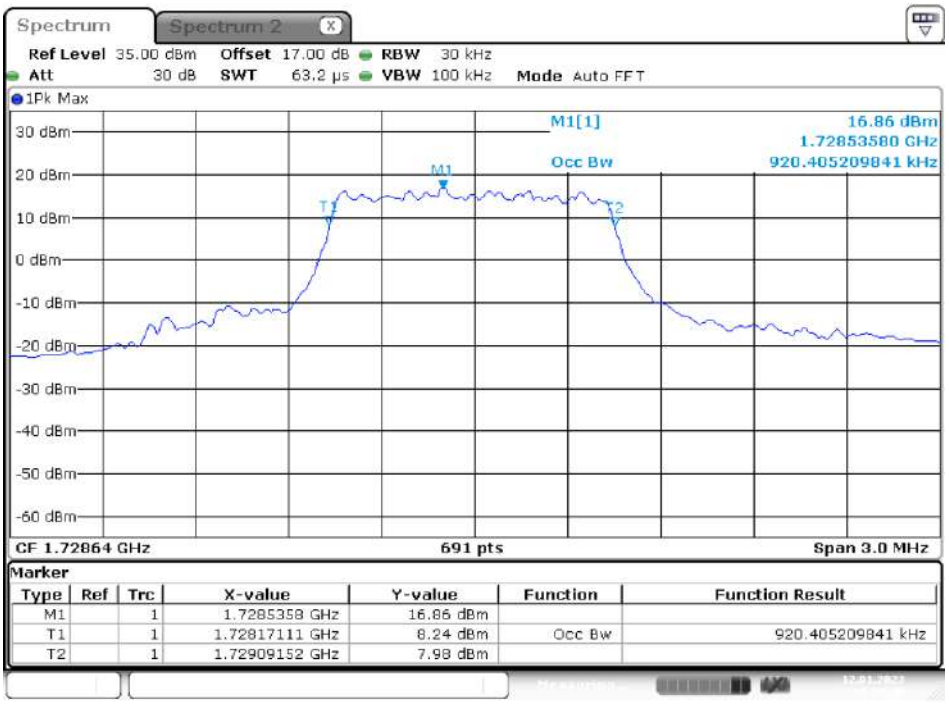


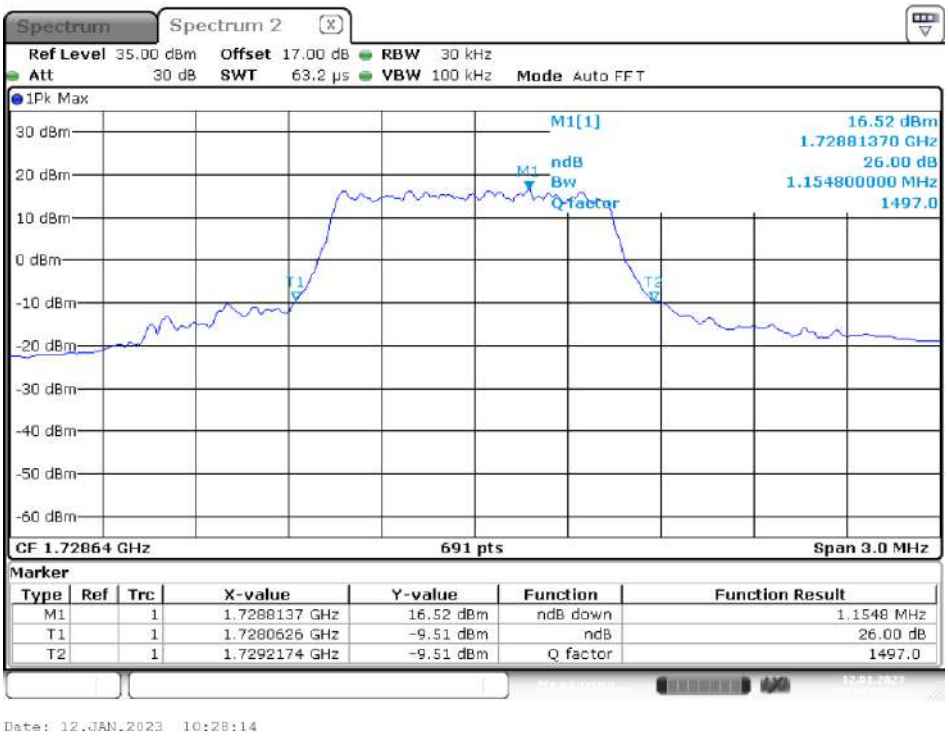
Date: 12.JAN.2023 09:58:41



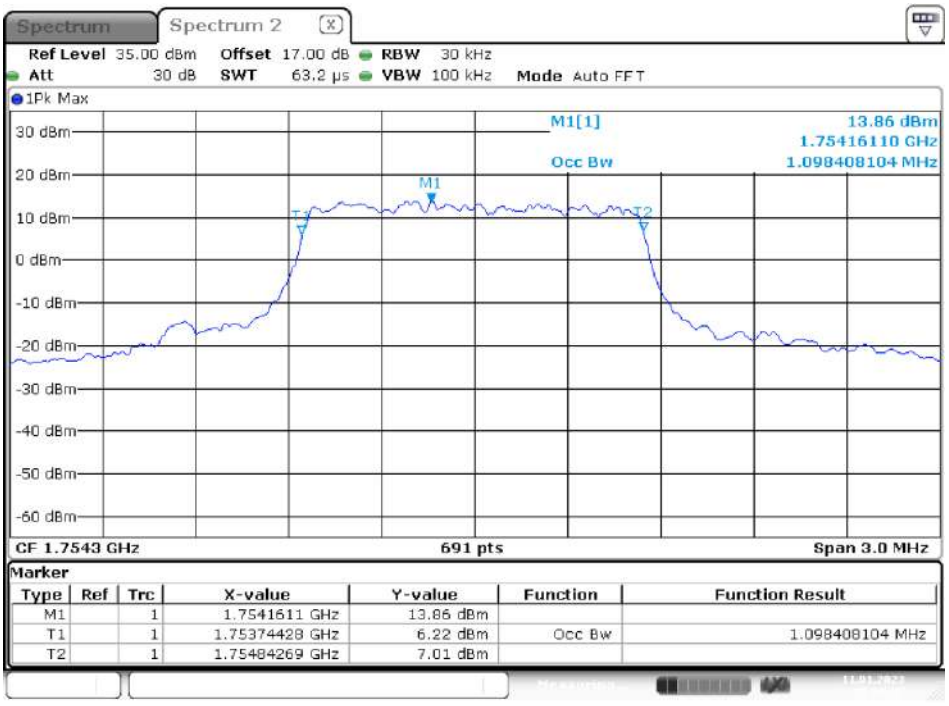
Date: 12.JAN.2023 09:57:53

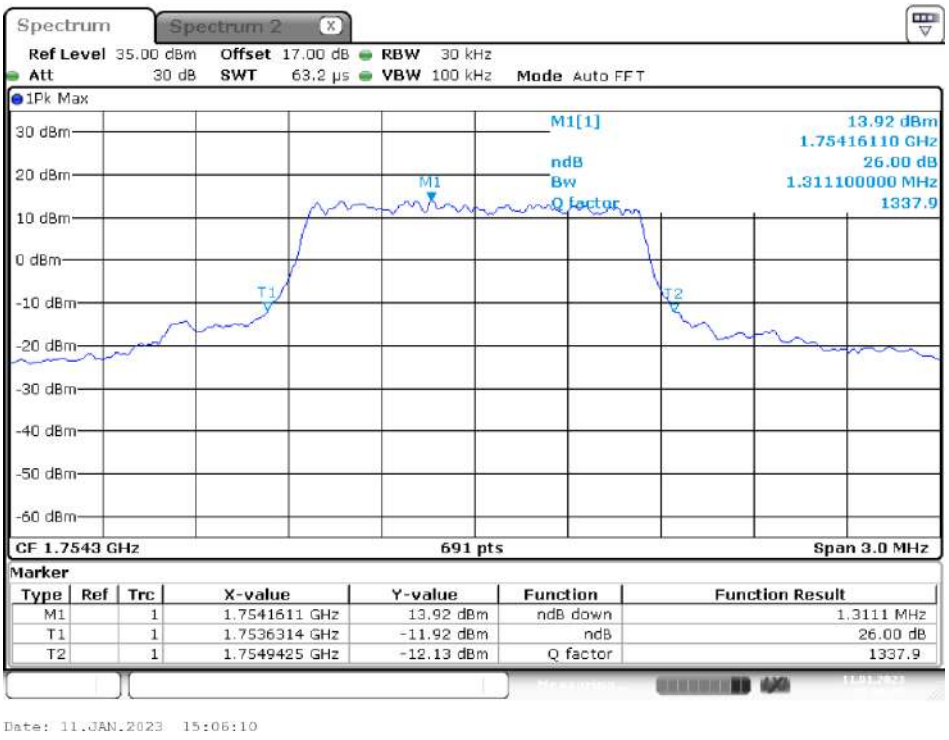
16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



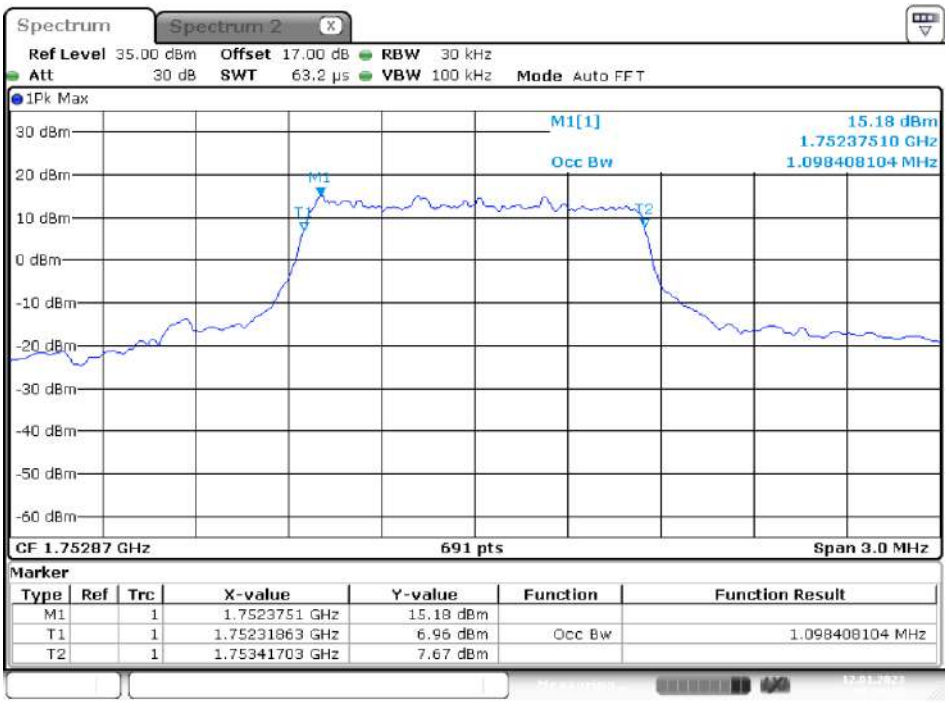


QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

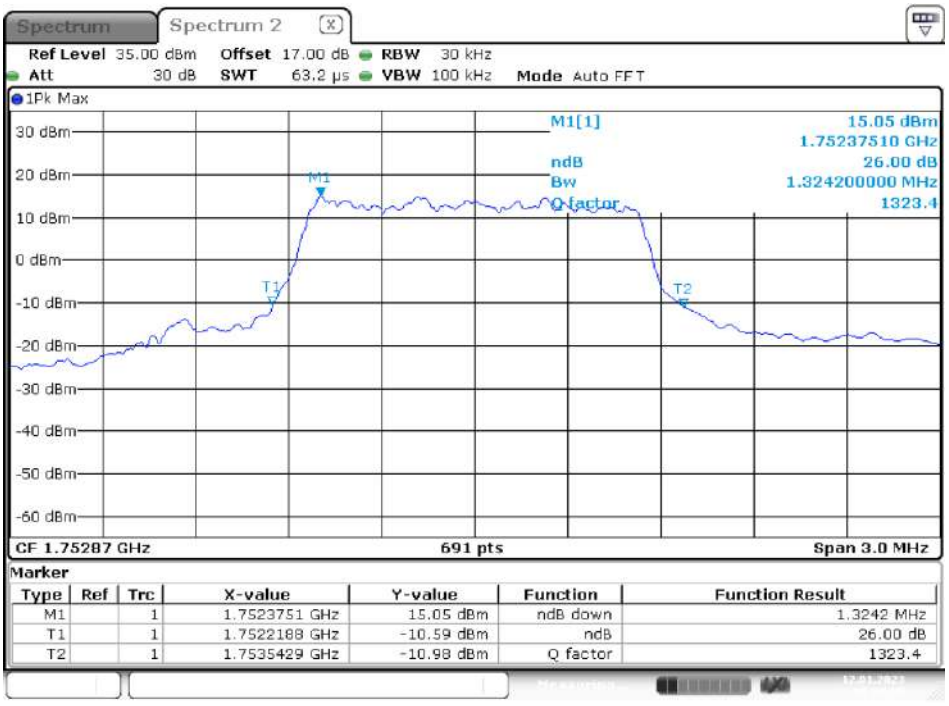




QPSK (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

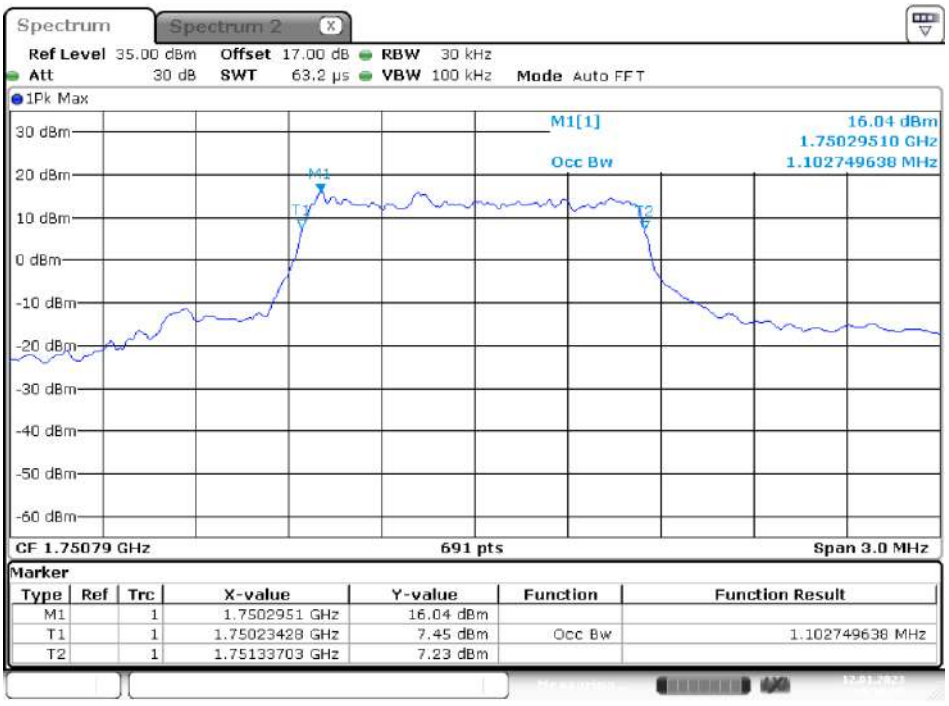


Date: 12.JAN.2023 09:29:15

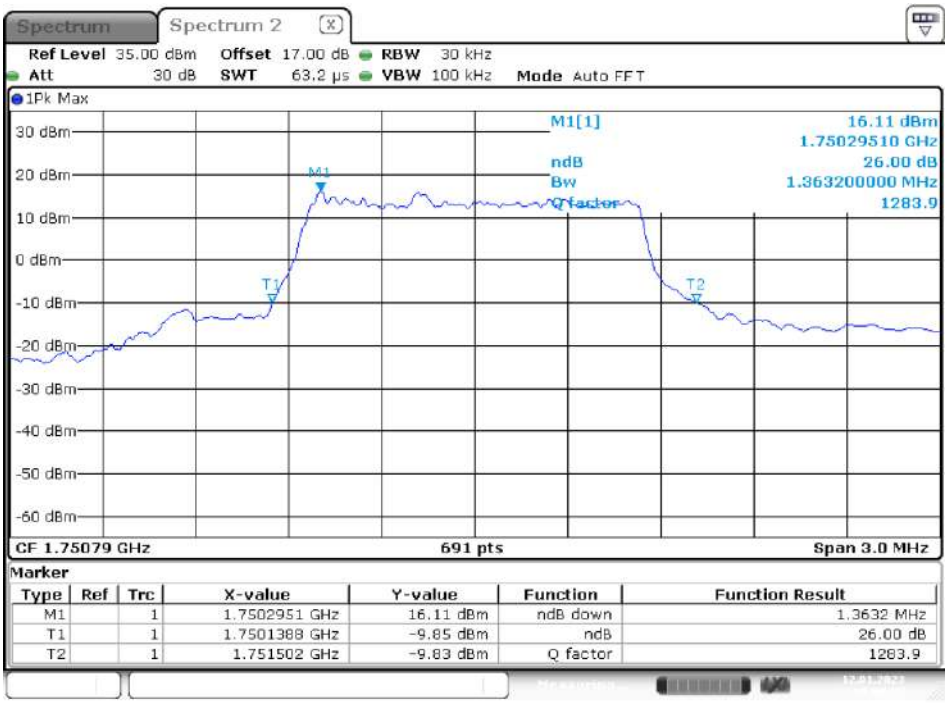


Date: 12.JAN.2023 09:28:37

QPSK (5MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

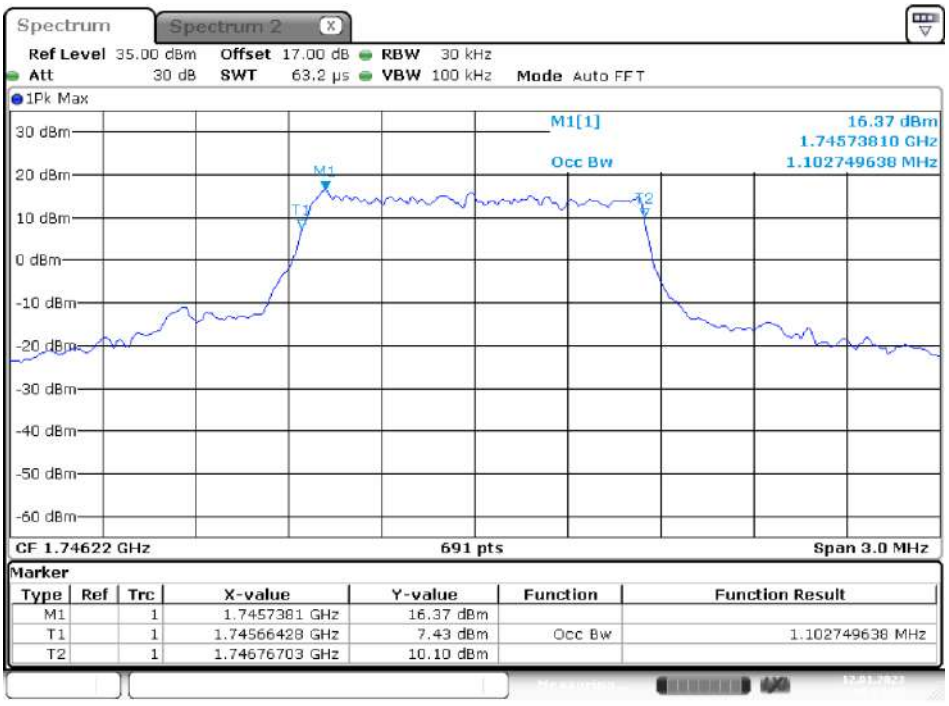


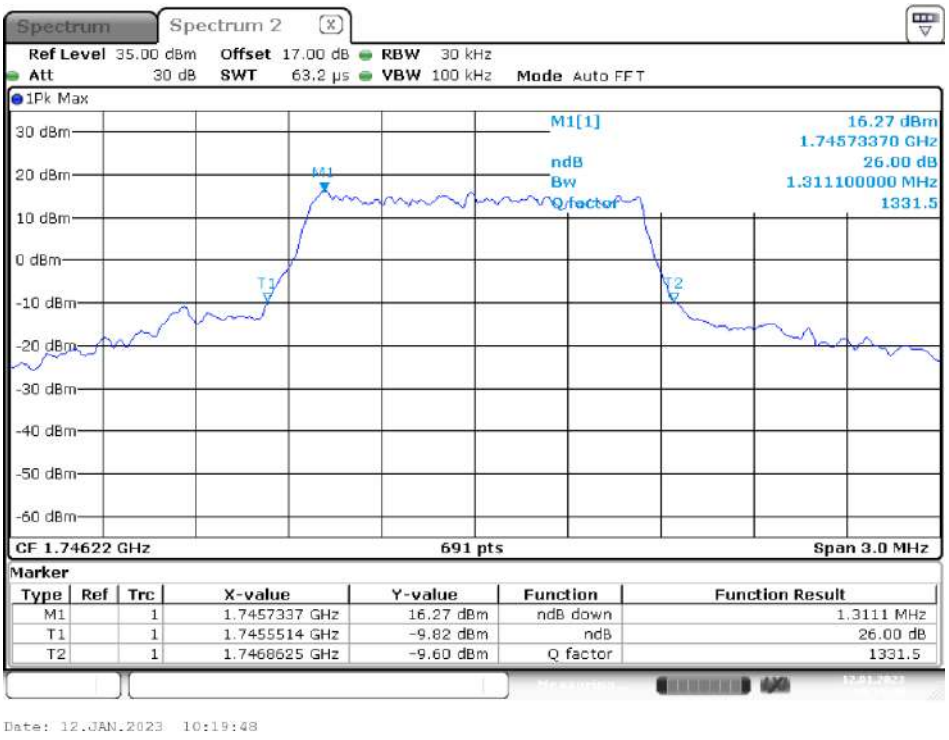
Date: 12.JAN.2023 10:10:30



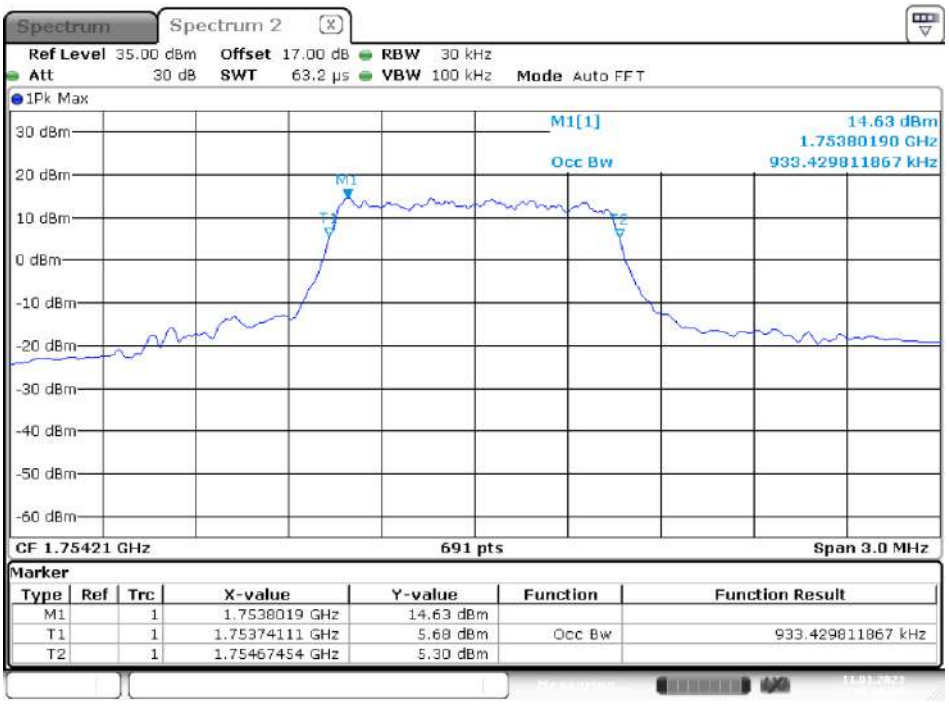
Date: 12.JAN.2023 10:09:54

QPSK (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

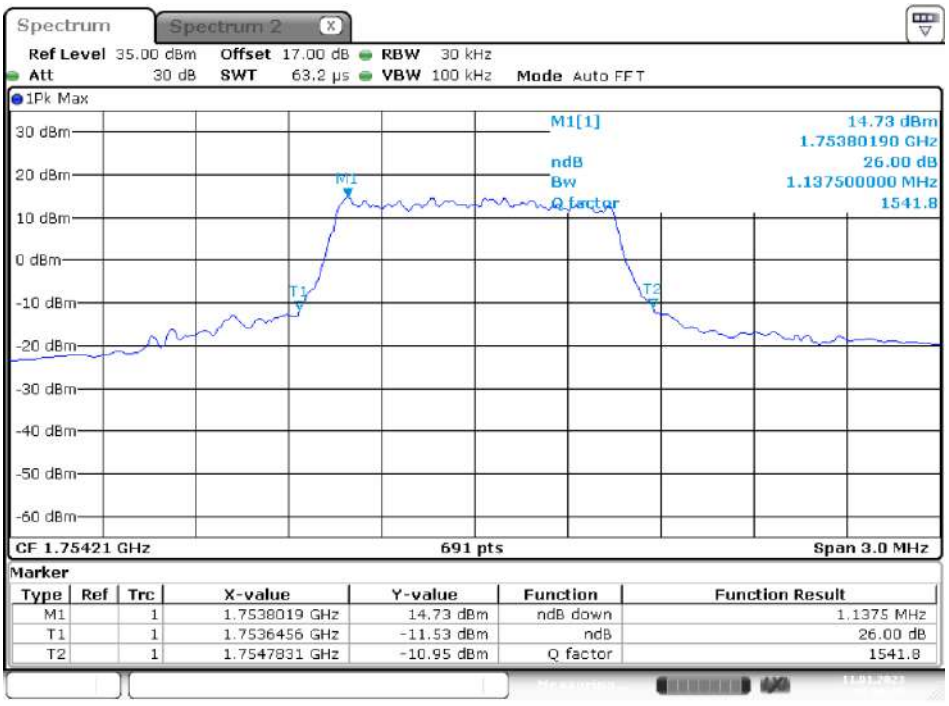




16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

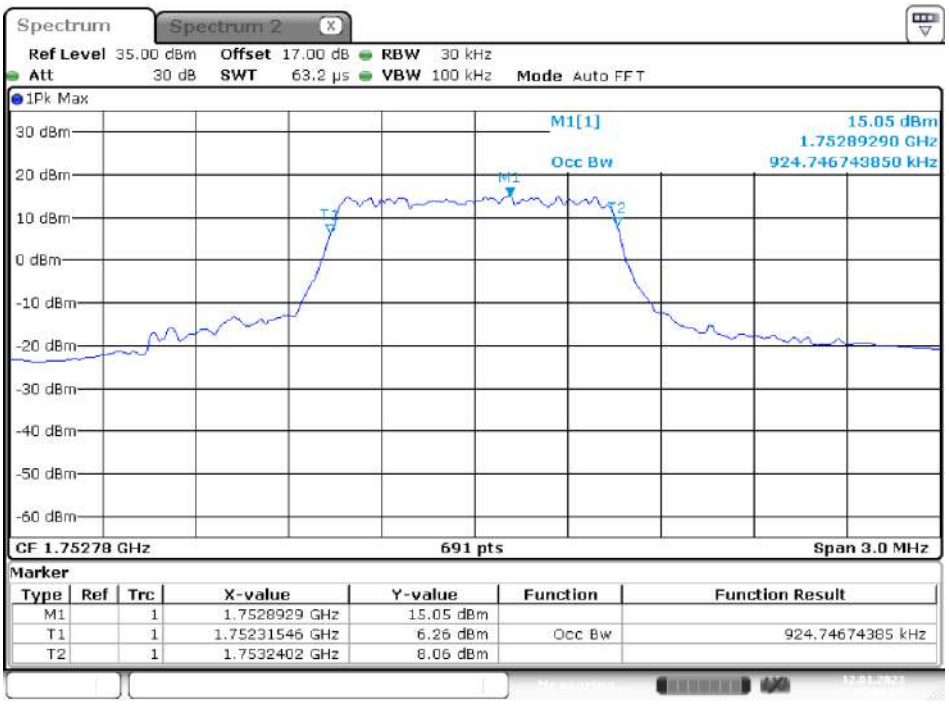


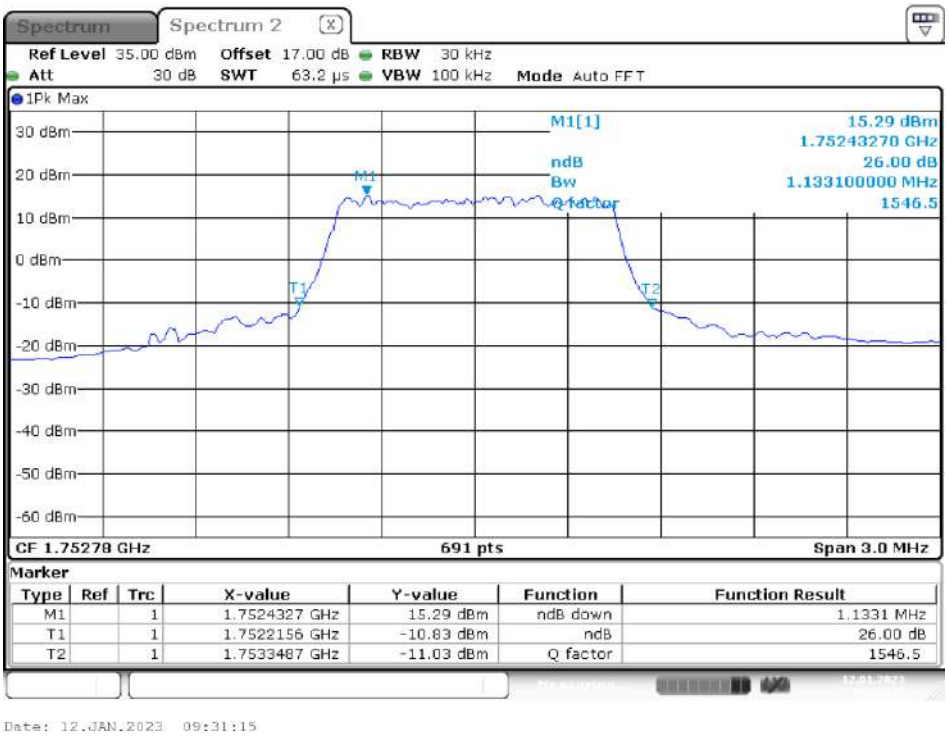
Date: 11.JAN.2023 16:06:34



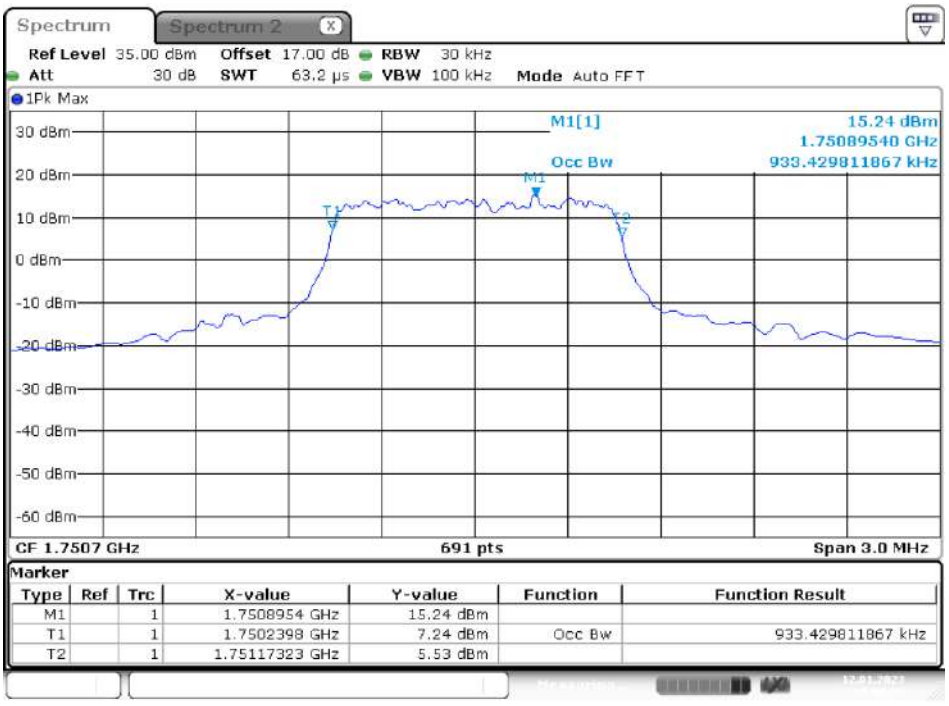
Date: 11.JAN.2023 16:06:18

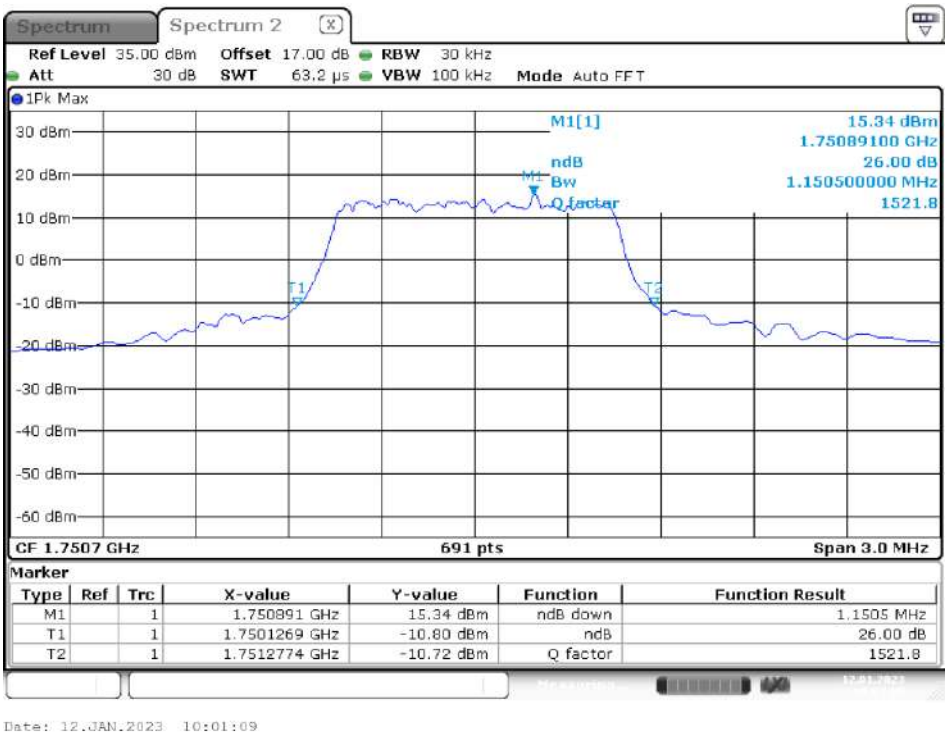
16-QAM (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel



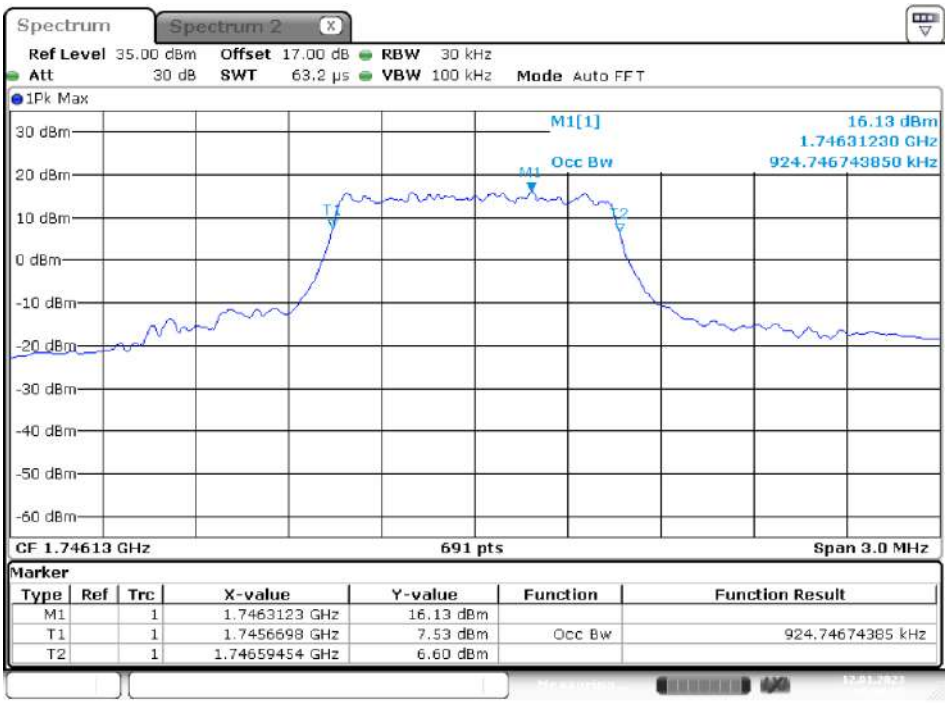


16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

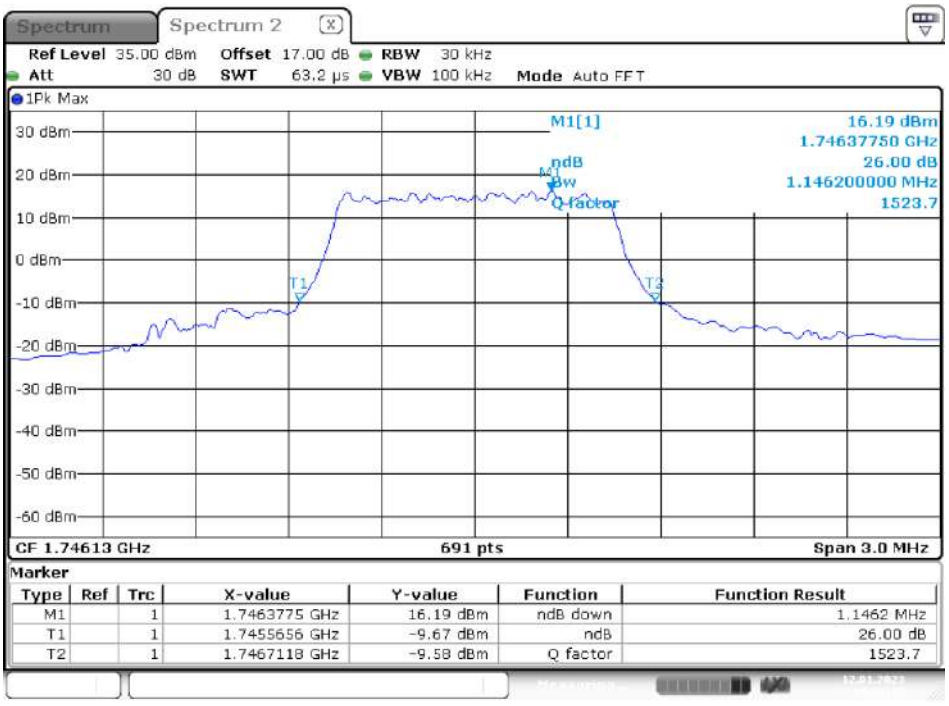




16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel



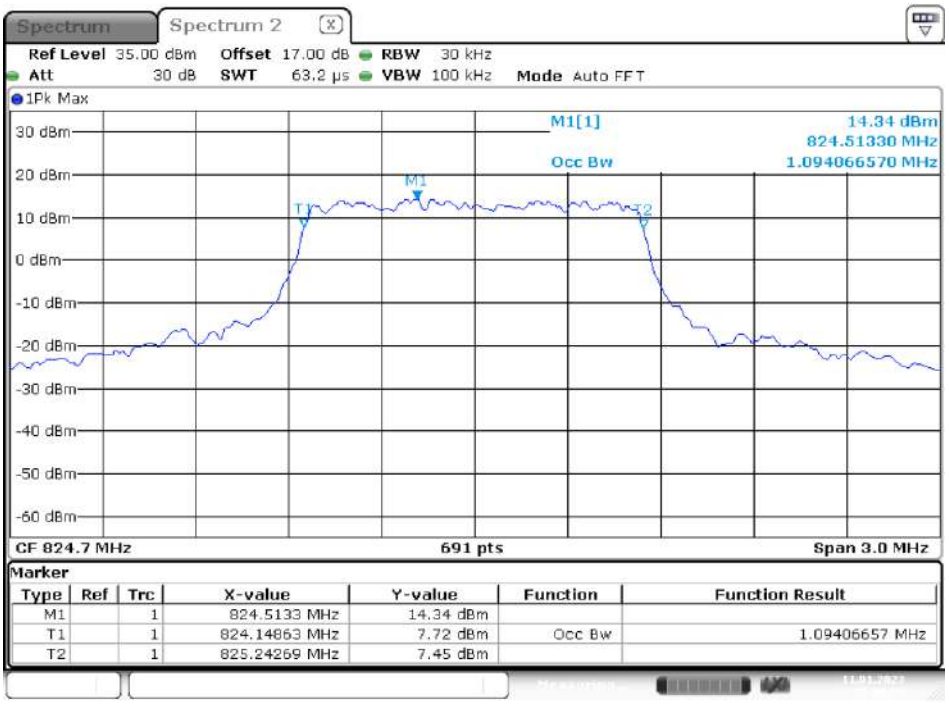
Date: 12.JAN.2023 10:30:35

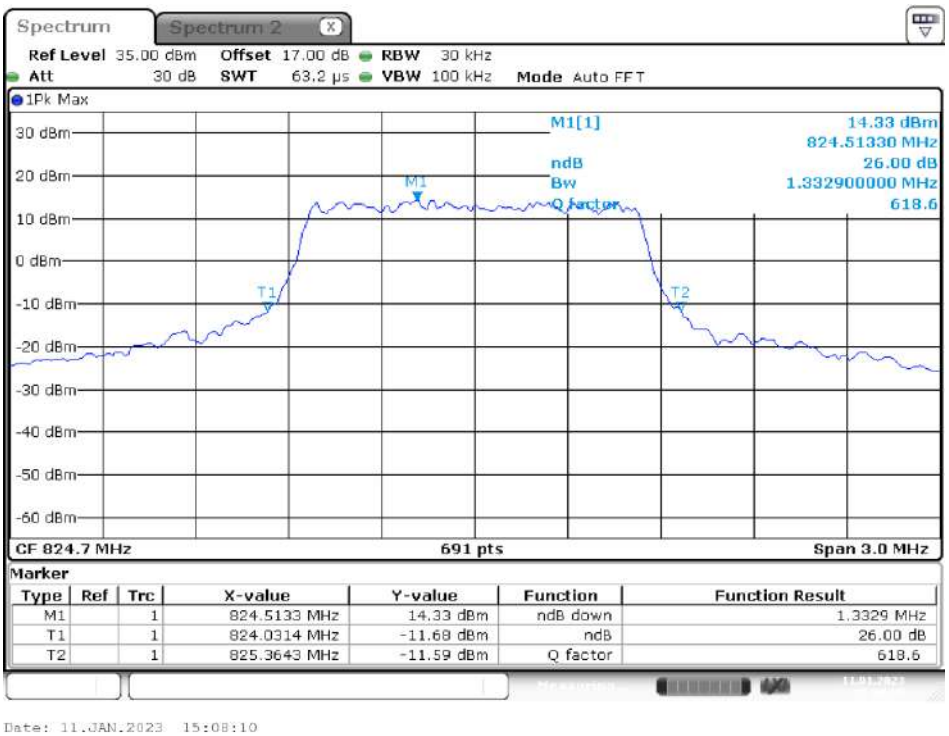


Date: 12.JAN.2023 10:31:12

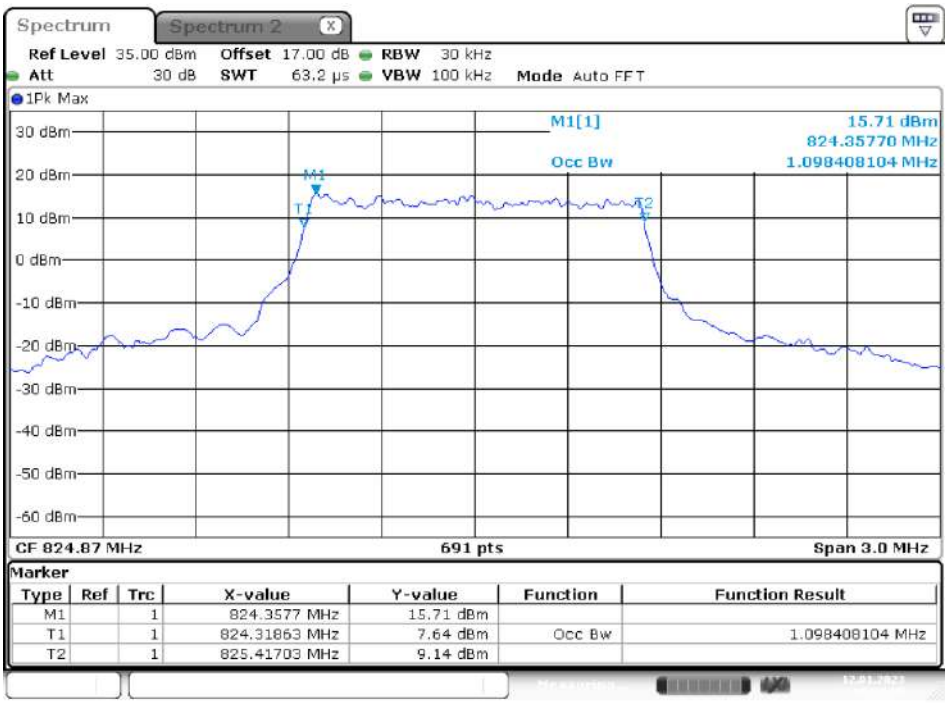
LTE Band 5

QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel

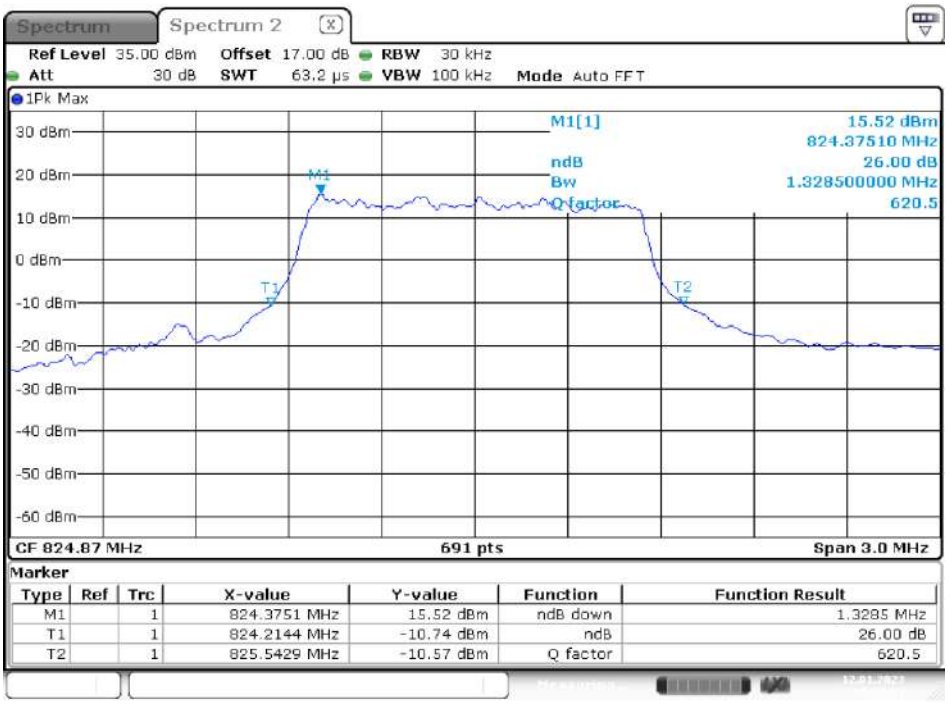




QPSK (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel

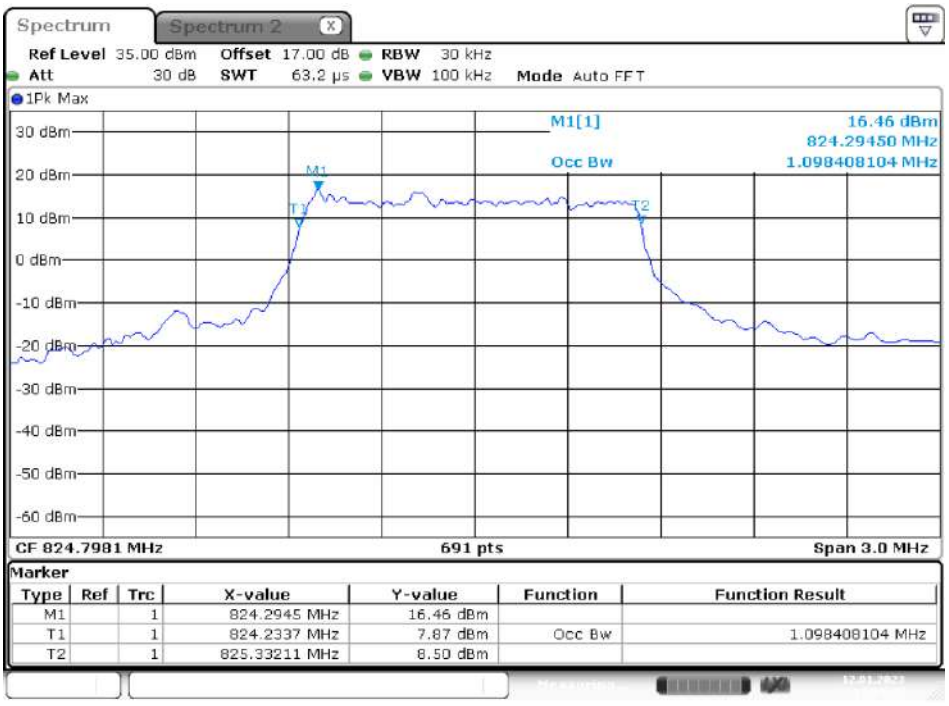


Date: 12.JAN.2023 10:47:37

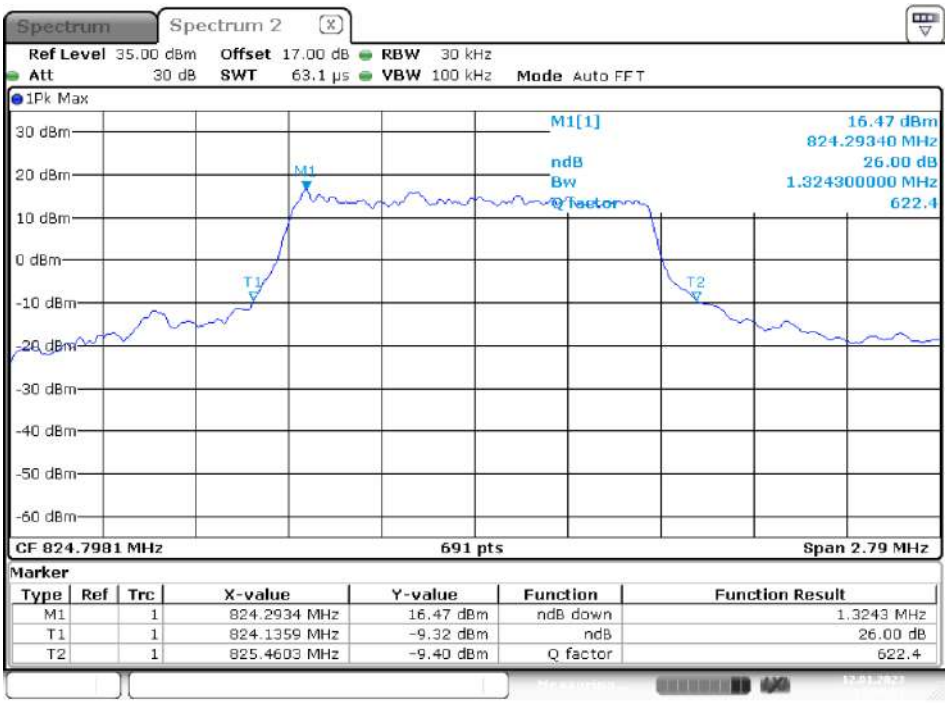


Date: 12.JAN.2023 10:52:31

QPSK (5.0MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel

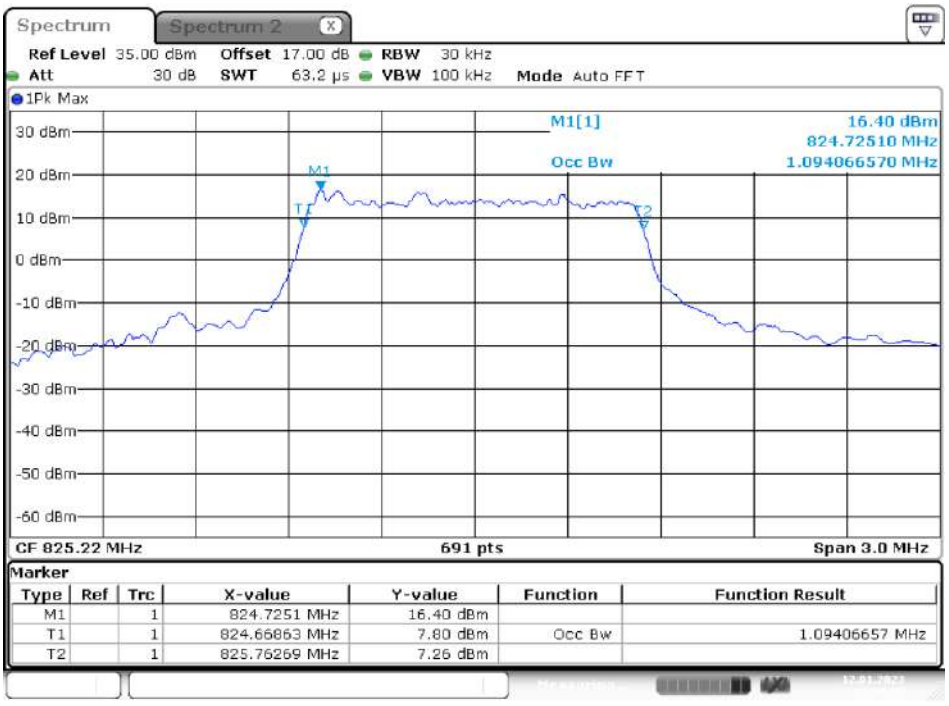


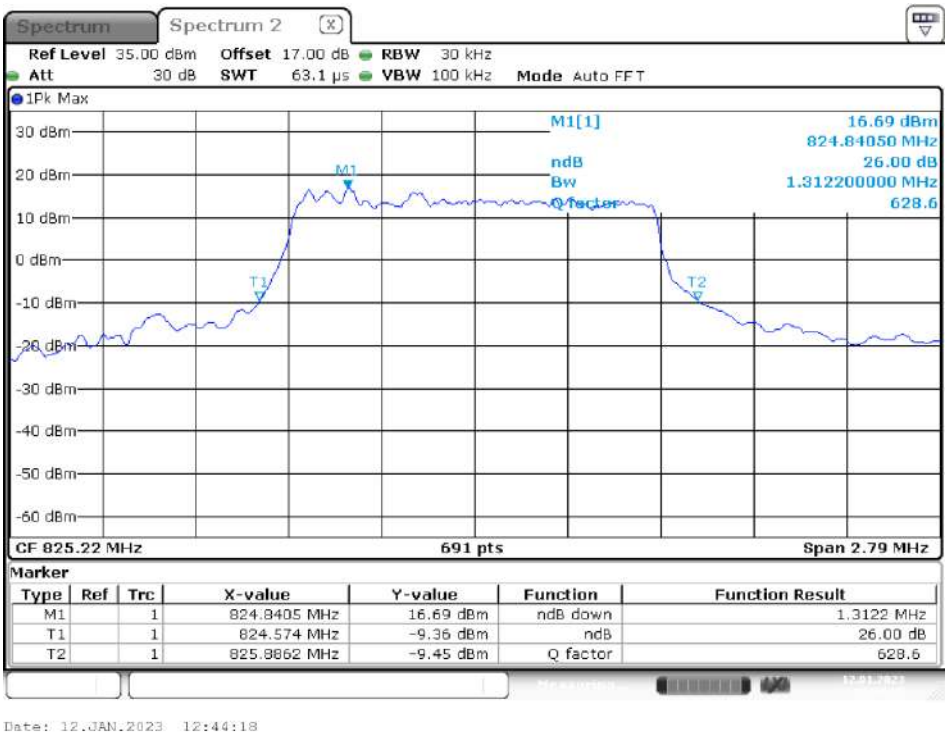
Date: 12.JAN.2023 11:19:45



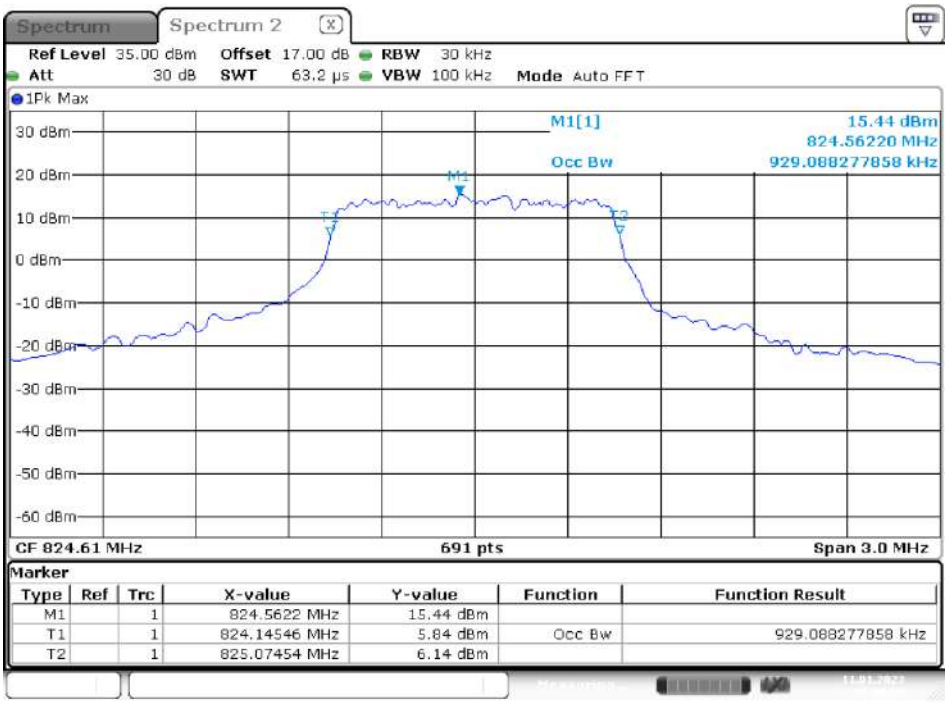
Date: 12.JAN.2023 11:18:51

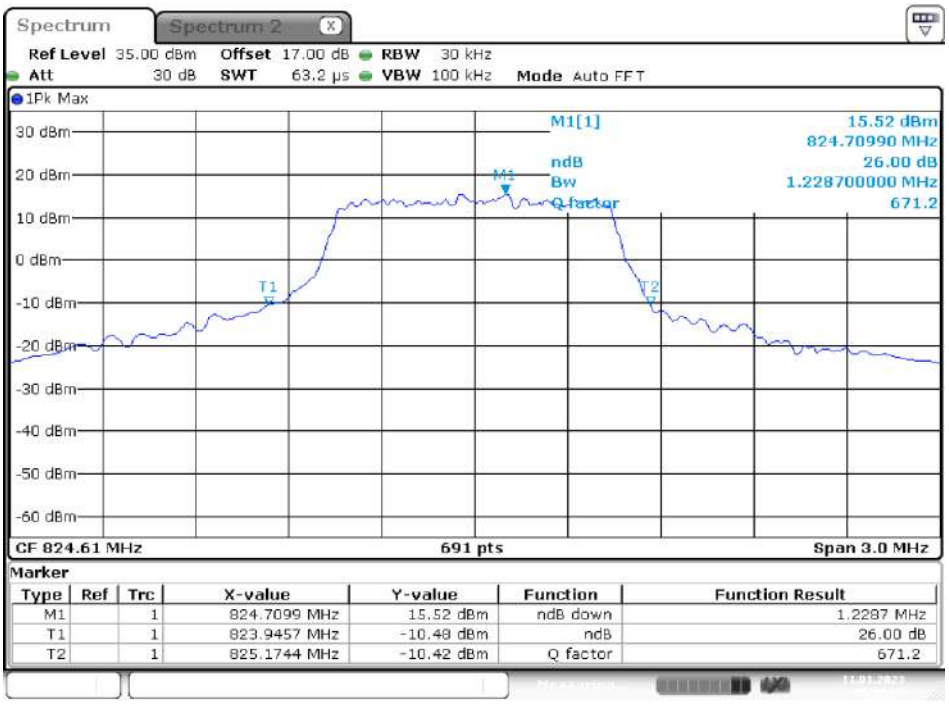
QPSK (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



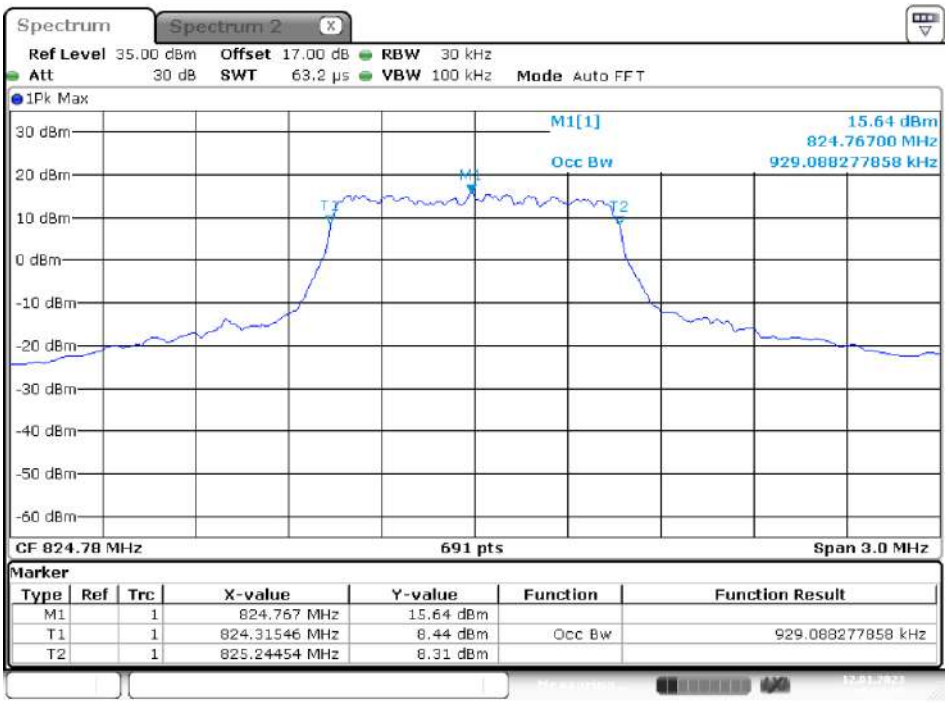


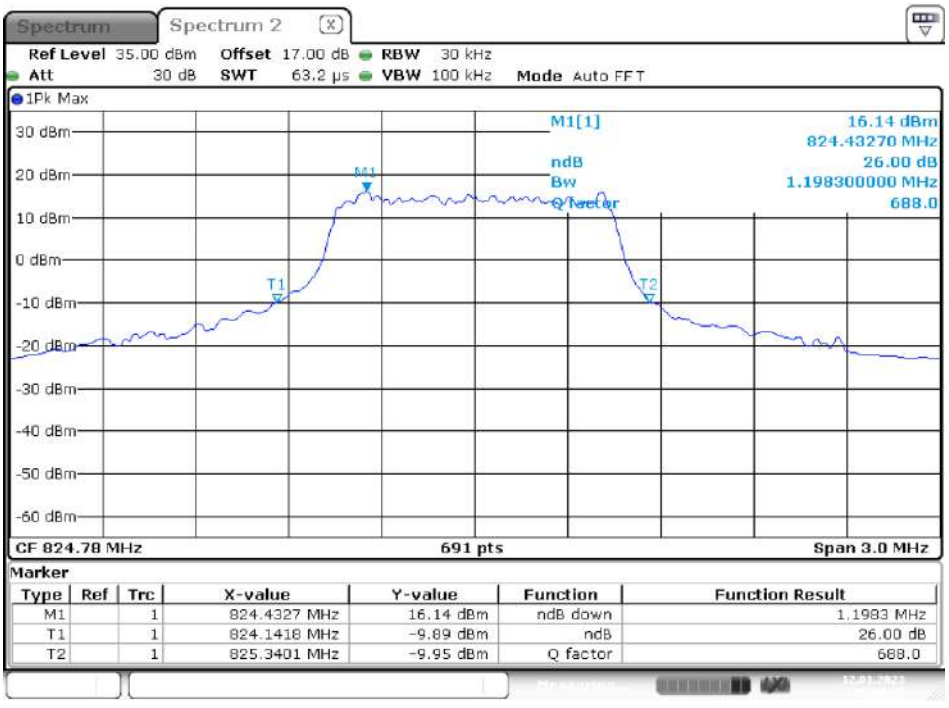
16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



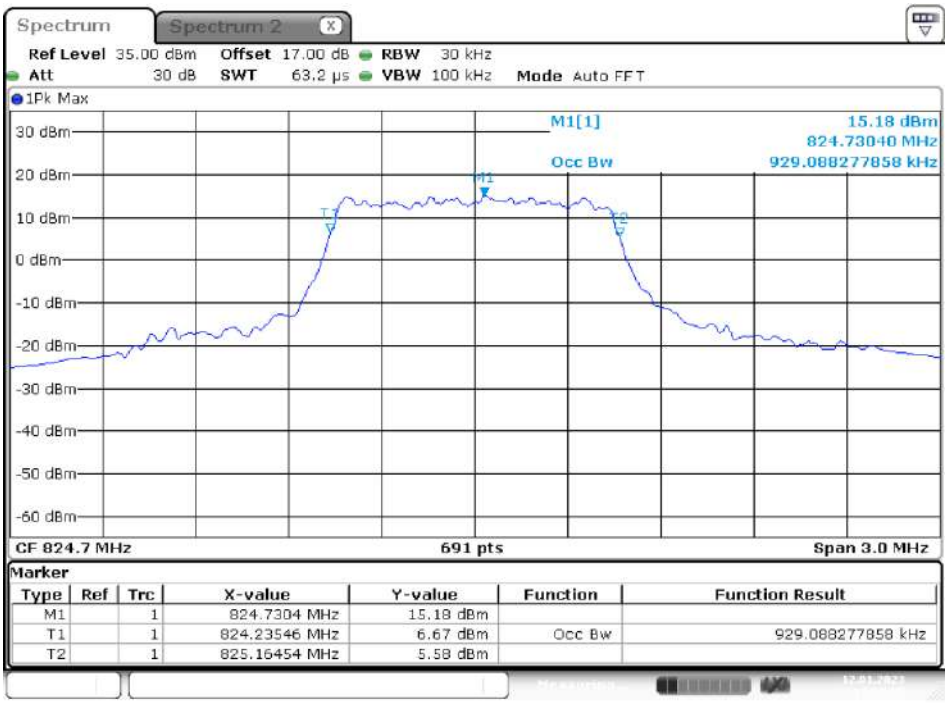


16-QAM (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel





16-QAM (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



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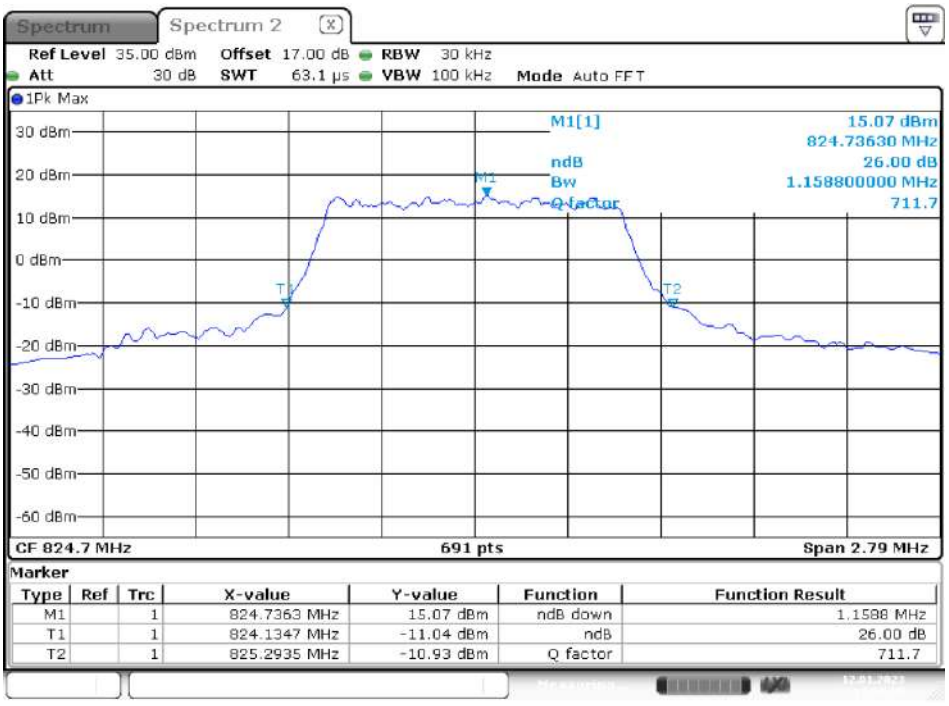

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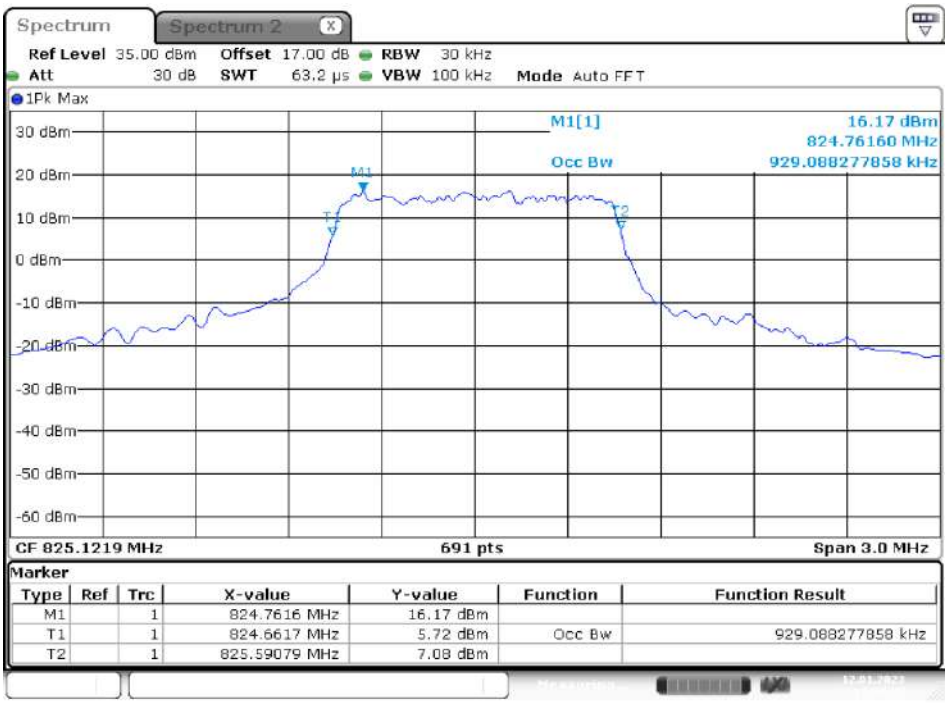
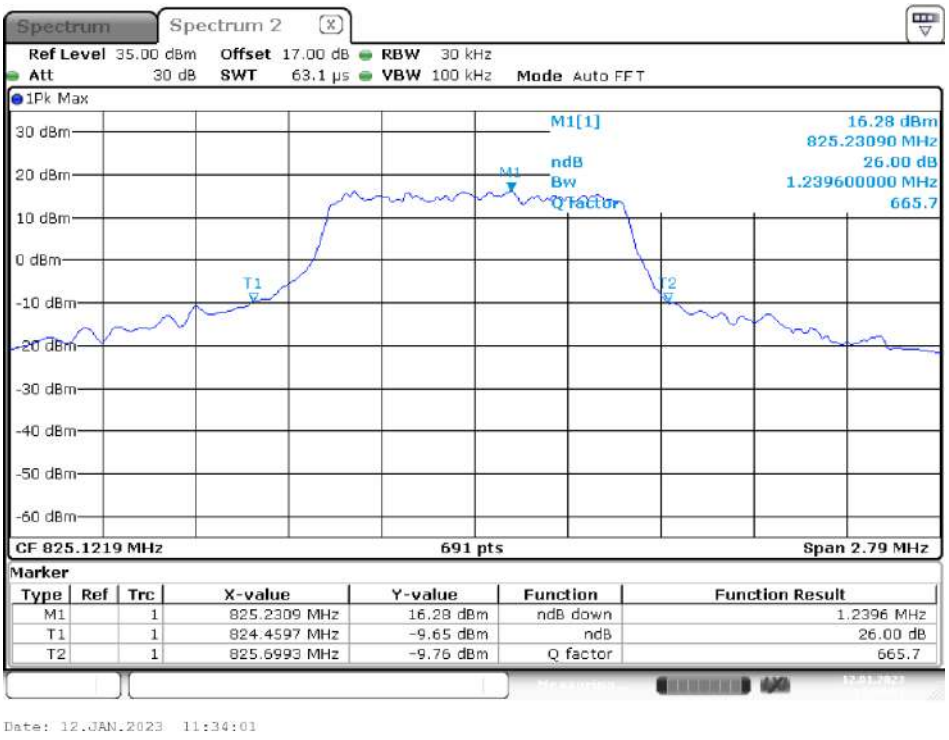
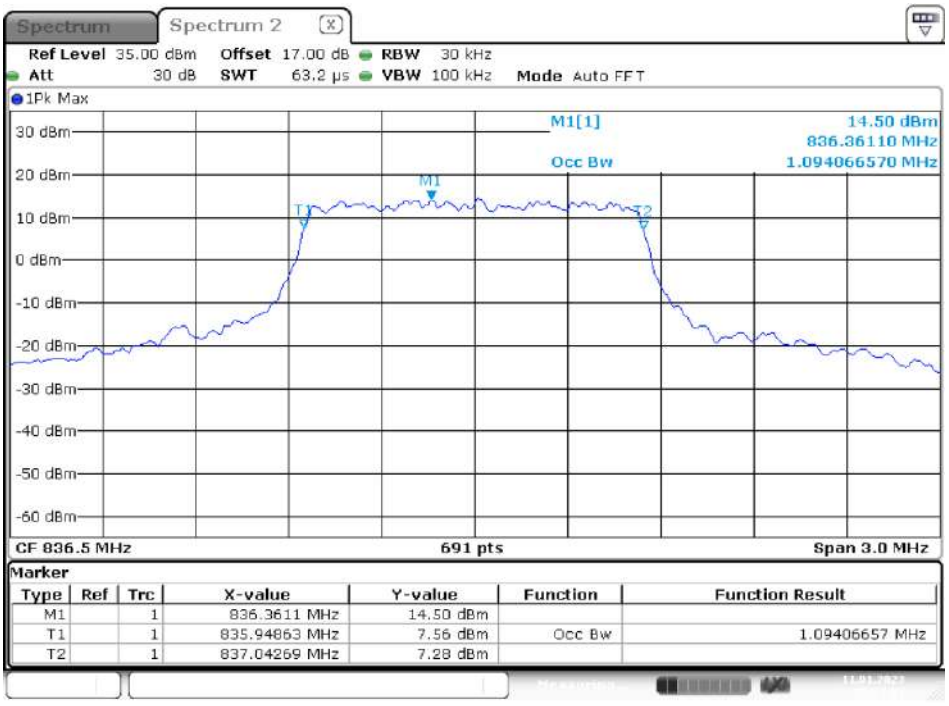
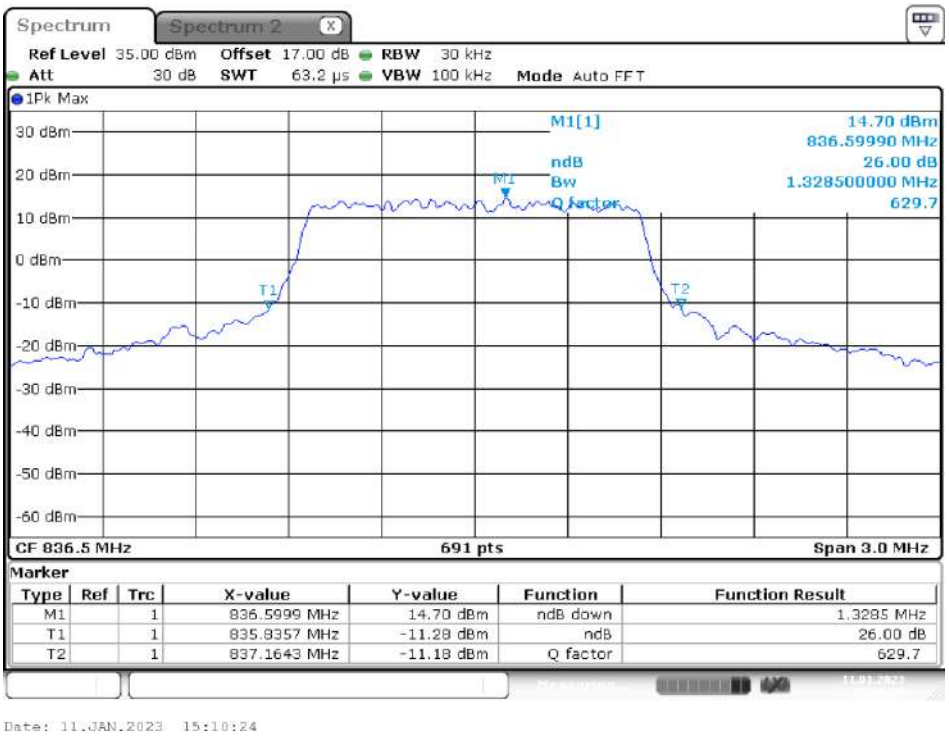
16-QAM (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



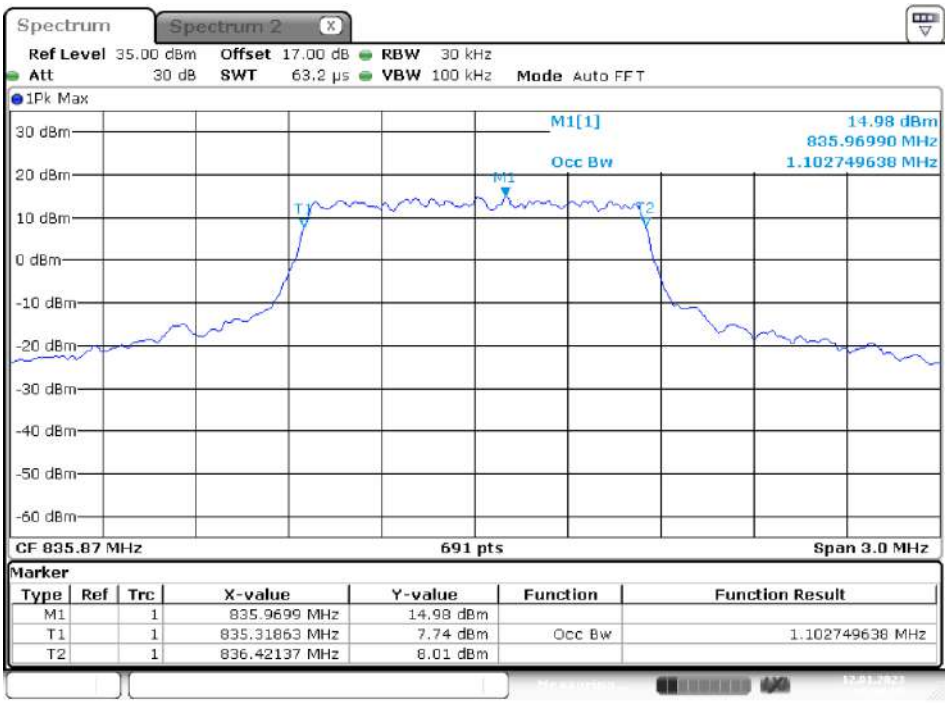


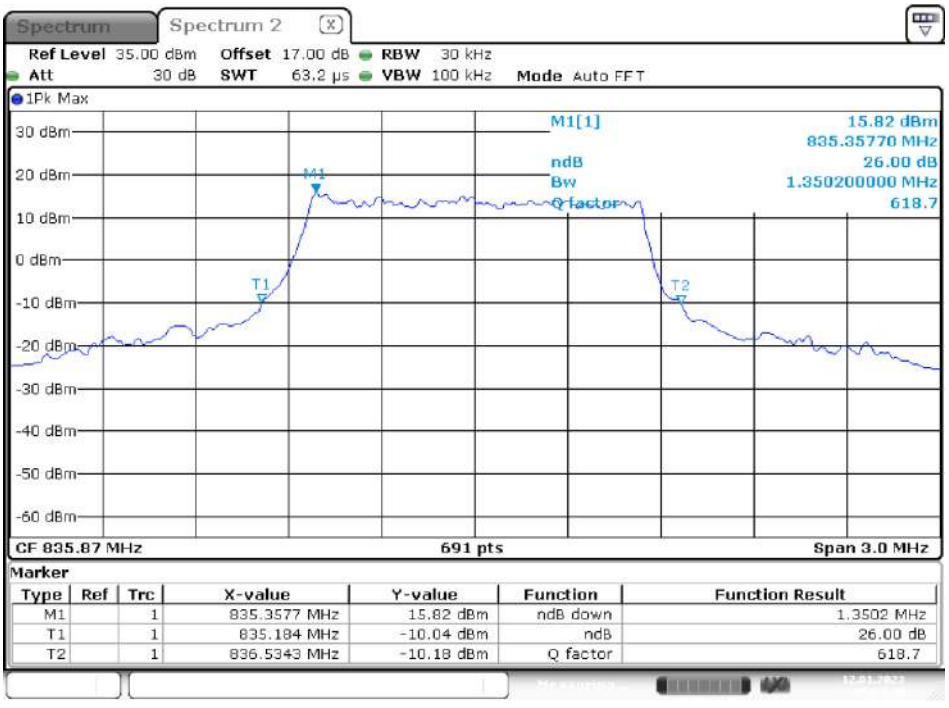
QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



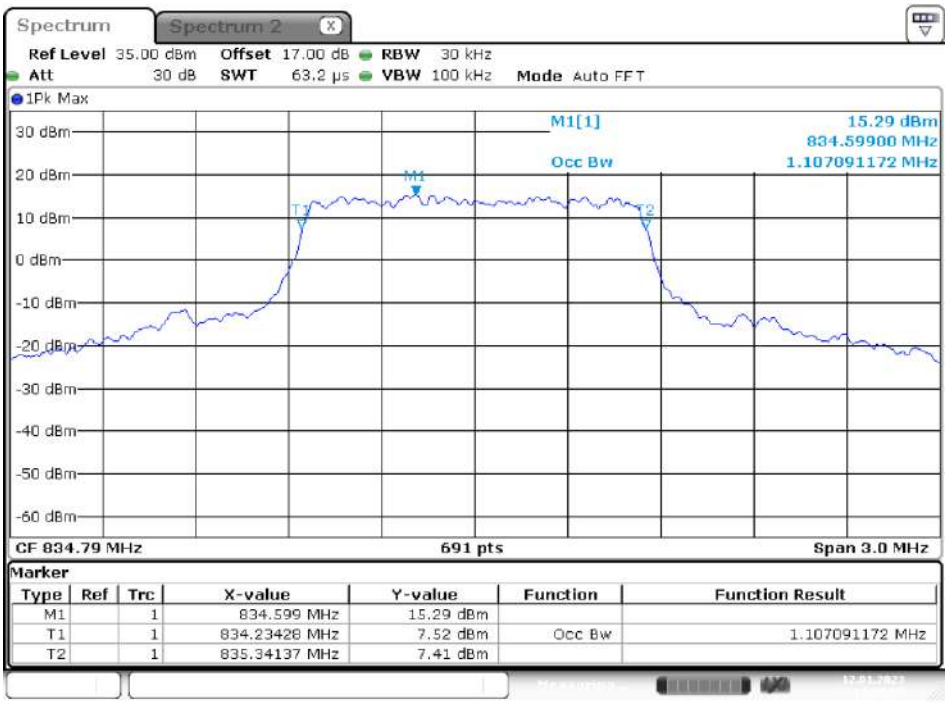


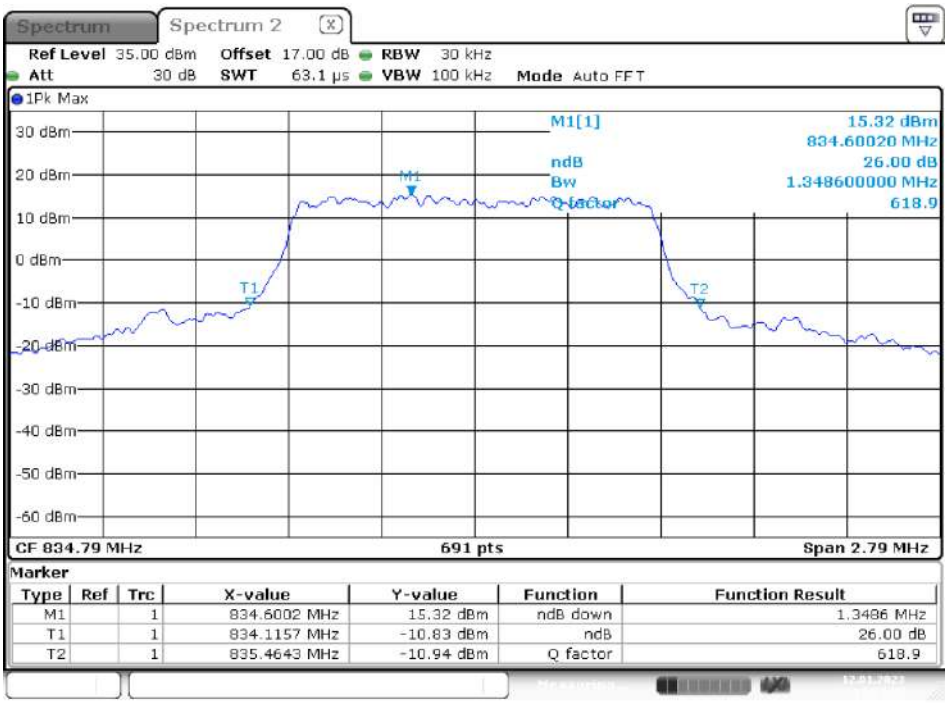
QPSK (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



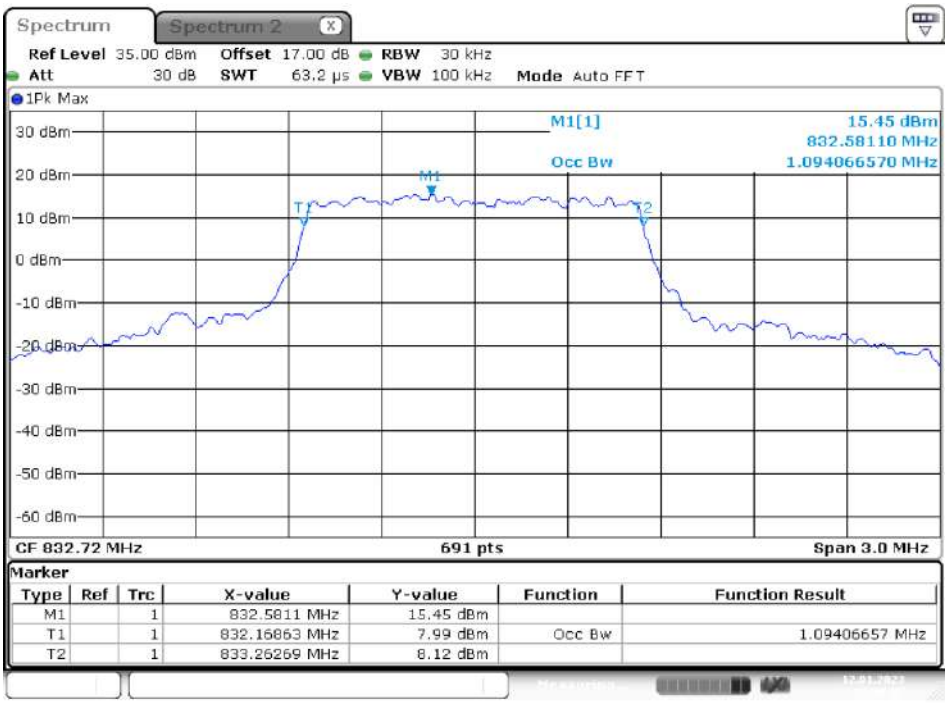


QPSK (5.0MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel





QPSK (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



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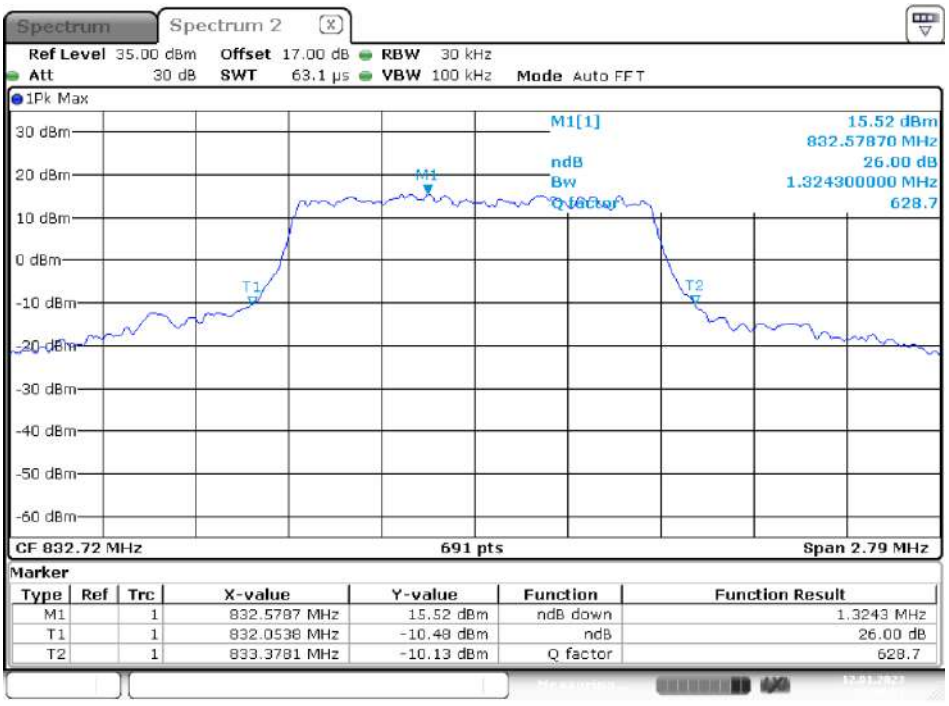

Date: 12.JAN.2023 12:46:51

16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel