



TEST REPORT

No.I22N02501-RF LTE

for

Honor Device Co., Ltd.

Smart Phone

Model Name: RBN-NX1

FCC ID: 2AYGCRBN-NX1

with

Hardware Version: HN2VNEM

Software Version: 6.1.0.9(C900E9R1P1)

Issued Date: 2023-01-17

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 SAICT.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I22N02501-RF LTE	Rev.0	1st edition	2023-01-17

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1. SUMMARY OF TEST REPORT

1.1. Test Items

Description	Smart Phone
Model Name	RBN-NX1
Brand Name	HONOR
Applicant's name	Honor Device Co., Ltd.
Manufacturer's Name	Honor Device Co., Ltd.

1.2. Test Standards

FCC Part 2/22/24/27/90	10-1-20 Edition
ANSI C63.26	2015
KDB971168 D01	v03r01

1.3. Test Result

All test items are passed. Please refer to "6 Summary of Test Results" for detail.

1.4. Testing Location

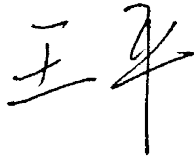
Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000

1.5. Project Data

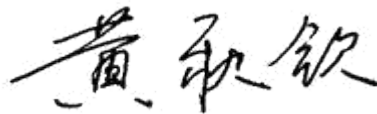
Testing Start Date: 2022-12-02

Testing End Date: 2022-12-28

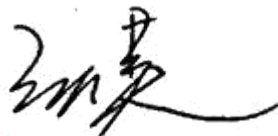
1.6. Signature



Wang Ping
(Prepared this test report)



Huang Qiuqin
(Reviewed this test report)



Zhang Hao
(Approved this test report)



2. CLIENT INFORMATION

2.1. Applicant Information

Company Name: Honor Device Co., Ltd.
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Contact: Li Ming
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2.2. Manufacturer Information

Company Name: Honor Device Co., Ltd.
Address /Post: Suite 3401, Unit A, Building 6, Shum Yip Sky Park, No. 8089, Hongli West Road, Xiangmihu Street, Futian District, Shenzhen, P.R.China
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3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT

(AE)

3.1. About EUT

Description	Smart Phone
Model Name	RBN-NX1
FCC ID	2AYGCRBN-NX1
Frequency Bands	LTE Bands 5/7/38/41
Antenna	Integrated
Extreme vol. Limits	3.60V to 4.45V (nominal: 3.87V)
Condition of EUT as received	No abnormality in appearance

Note1: Components list, please refer to documents of the manufacturer; it is also included in the original test record of SAICT.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT01aa	868648060007462	HN2VNEM	6.1.0.9(C900E9R1P1)	2022-11-29

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

UT01aa is used for conduction test, UT28aa is used for radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE2	RF cable

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

3.4. General Description

RBN-NX1 is subscriber equipment in the GSM/WCDMA/LTE/5G NR system. The GSM frequency bands include GSM850, GSM900, DCS1800 and PCS1900. The UMTS frequency band includes band I, band II, band V and band VIII. The LTE frequency bands include band 1, band3, band 5, band 7, band 8, band 20, band 28A, band 32, band 38, band 40 and band 41. The 5G NR frequency bands include band 1, band3, band 7, band 8, band 20, band 28A, band 38, band 40, band 41, band 77(3.3GHz-3.8GHz) and band 78. But only GSM850 and GSM1900, UMTS frequency band II and band V, LTE frequency band 5, band 7, band 38, band 41, 5G NR frequency band 7,band 38, band 41, band 78(3450MHz-3550MHz) bands test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, 5G NR/LTE/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS, AGPS, Wi-Fi etc. Externally it provides one micro SD card interface, earphone port (to provide voice service), and dual SIM/single SIM card interface.RBN-NX1 is single/dual SIM smart phone. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

4. REFERENCE DOCUMENTS

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

Reference	Title	Version
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-20 Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	10-1-20 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-20 Edition
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB971168 D01	Power Meas License Digital Systems	v03r01

5. LABORATORY ENVIRONMENT

Shielded room did not exceed following limits along the RF testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz>60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	>2 MΩ
Ground system resistance	< 4 Ω

Fully-anechoic chamber did not exceed following limits along the EMC testing

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured

LTE band 5

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/22.913	A.1	P
2	Frequency Stability	2.1055/22.355	A.2	P
3	Occupied Bandwidth	2.1049/22.917	A.3	P
4	Emission Bandwidth	2.1049/22.917	A.4	P
5	Band Edge Compliance	2.1051/22.917	A.5	P
6	Conducted Spurious Emission	2.1051/22.917	A.6	P
7	Peak-to-Average Power Ratio	KDB971168 D01	A.7	P

LTE Band 7

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/27.50(h)	A.1	P
2	Frequency Stability	2.1055/27.54	A.2	P
3	Occupied Bandwidth	2.1049/27.53(m)	A.3	P
4	Emission Bandwidth	2.1049/27.53(m)	A.4	P
5	Band Edge Compliance	2.1051/27.53(m)	A.5	P
6	Conducted Spurious Emission	2.1051/27.53(m)	A.6	P
7	Peak-to-Average Power Ratio	27.50(a)/ KDB971168 D01	A.7	P

LTE Band 38

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/27.50(h)	A.1	P
2	Frequency Stability	2.1055/27.54	A.2	P
3	Occupied Bandwidth	2.1049/27.53(m)	A.3	P
4	Emission Bandwidth	2.1049/27.53(m)	A.4	P
5	Band Edge Compliance	2.1051/27.53(m)	A.5	P
6	Conducted Spurious Emission	2.1051/27.53(m)	A.6	P
7	Peak-to-Average Power Ratio	27.50(a)/ KDB971168 D01	A.7	P

LTE Band 41

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/27.50(h)	A.1	P
2	Frequency Stability	2.1055/27.54	A.2	P
3	Occupied Bandwidth	2.1049/27.53(m)	A.3	P
4	Emission Bandwidth	2.1049/27.53(m)	A.4	P
5	Band Edge Compliance	2.1051/27.53(m)	A.5	P
6	Conducted Spurious Emission	2.1051/27.53(m)	A.6	P
7	Peak-to-Average Power Ratio	27.50(a)/ KDB971168 D01	A.7	P

7. STATEMENT

Since the information of samples in this report is provided by the client, the laboratory is not responsible for the authenticity of sample information.

This report takes measured values as criterion of test conclusion. The test conclusion meets the limit requirements.

8. TEST EQUIPMENTS UTILIZED

NO.	Description	TYPE	Manufacture	series number	Cal Due Date	Cal.Interval
1	Universal Radio Communication Tester	E7515B	Keysight	MY59322022	2023-04-14	1 year
2	Universal Radio Communication Tester	MT8000A	Anritsu	6261987936	2023-03-29	1 year
3	Universal Radio Communication Tester	CMW500	R&S	129146	2023-04-24	1 year
4	Spectrum Analyzer	FSW26	R&S	102197	2023-11-24	1 year
5	Temperature Chamber	SH-241	ESPEC	92007516	2023-10-15	1 year
6	DC Power Supply	U3606A	Agilent Technologies	MY50450012	2023-11-13	1 year

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: CFR Part 2.1046, 22.913, 27.50.

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation.

This result contains peak output power and ERP/EIRP measurements for the EUT.

In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

A.1.2.2 Measurement result

LTE band 5

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	848.3	23.26	22.53	21.52
		836.5	23.30	22.69	21.58
		824.7	23.35	22.71	21.60
	1 RB low	848.3	23.24	22.60	21.54
		836.5	23.29	22.68	21.59
		824.7	23.39	22.72	21.69
	50% RB mid	848.3	23.29	22.42	21.44
		836.5	23.33	22.43	21.58
		824.7	23.46	22.47	21.20
	100% RB	848.3	22.31	21.37	20.32
		836.5	22.43	21.44	20.35
		824.7	22.47	21.51	20.46
3MHz	1 RB high	847.5	23.41	22.74	20.80
		836.5	23.48	22.78	21.65
		825.5	23.49	22.79	21.77
	1 RB low	847.5	23.41	22.67	21.21
		836.5	23.45	22.73	21.56
		825.5	23.50	22.85	21.71
	50% RB mid	847.5	22.47	21.50	20.50
		836.5	22.52	21.64	20.55
		825.5	22.59	21.67	20.66
	100% RB	847.5	22.40	21.49	20.45
		836.5	22.44	21.46	20.42
		825.5	22.59	21.58	20.57

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	846.5	23.42	22.67	21.52
		836.5	23.53	22.86	21.69
		826.5	23.52	22.92	21.73
	1 RB low	846.5	23.44	22.71	21.54
		836.5	23.42	22.80	21.55
		826.5	23.59	22.96	21.73
	50% RB mid	846.5	22.53	21.50	20.45
		836.5	22.50	21.49	20.47
		826.5	22.62	21.66	20.58
	100% RB	846.5	22.50	21.46	20.43
		836.5	22.46	21.43	20.41
		826.5	22.62	21.58	20.57
10MHz	1 RB high	844.0	23.43	22.84	22.55
		836.5	23.47	22.90	22.68
		829.0	23.52	22.89	22.67
	1 RB low	844.0	23.41	22.83	22.51
		836.5	23.48	22.81	22.53
		829.0	23.55	22.91	22.60
	50% RB mid	844.0	22.61	21.63	21.55
		836.5	22.59	21.58	21.46
		829.0	22.66	21.68	21.57
	100% RB	844.0	22.52	21.52	21.40
		836.5	22.56	21.55	21.41
		829.0	22.67	21.67	21.57

Note: Expanded measurement uncertainty is U = 0.49dB, k = 1.96

LTE band 7

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	2567.5	22.61	21.85	20.88
		2535.0	22.69	21.78	20.71
		2502.5	22.54	21.72	20.69
	1 RB low	2567.5	22.78	21.97	20.89
		2535.0	22.67	21.86	20.73
		2502.5	22.71	21.95	20.97
	50% RB mid	2567.5	21.86	21.03	20.13
		2535.0	21.73	20.95	19.97
		2502.5	21.76	20.93	20.01
	100% RB	2567.5	21.72	21.03	19.96
		2535.0	21.77	21.10	20.05
		2502.5	21.57	20.95	19.86
10MHz	1 RB high	2565.0	22.59	21.75	20.84
		2535.0	22.67	21.74	20.69
		2505.0	22.48	21.63	20.63
	1 RB low	2565.0	22.67	21.93	20.75
		2535.0	22.66	21.80	20.67
		2505.0	22.70	21.82	20.92
	50% RB mid	2565.0	21.74	20.96	20.10
		2535.0	21.69	20.85	19.89
		2505.0	21.63	20.80	19.93
	100% RB	2565.0	21.66	21.01	19.87
		2535.0	21.72	21.08	20.04
		2505.0	21.52	20.86	19.83
15MHz	1 RB high	2562.5	22.49	21.74	20.75
		2535.0	22.57	21.76	20.68
		2507.5	22.42	21.65	20.67
	1 RB low	2562.5	22.64	21.89	20.86
		2535.0	22.56	21.83	20.67
		2507.5	22.68	21.94	20.91
	50% RB mid	2562.5	21.79	20.96	20.12
		2535.0	21.65	20.86	19.96
		2507.5	21.67	20.91	19.91
	100% RB	2562.5	21.61	21.02	19.90
		2535.0	21.71	21.08	19.94
		2507.5	21.50	20.84	19.82
20MHz	1 RB high	2560.0	22.58	21.75	20.86

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
		2535.0	22.57	21.72	20.61
		2510.0	22.43	21.66	20.56
	1 RB low	2560.0	22.64	21.85	20.79
		2535.0	22.61	21.83	20.66
		2510.0	22.71	21.87	20.92
	50% RB mid	2560.0	21.82	20.93	19.99
		2535.0	21.69	20.88	19.95
		2510.0	21.66	20.90	20.00
	100% RB	2560.0	21.62	20.98	19.84
		2535.0	21.71	21.05	19.98
		2510.0	21.57	20.92	19.78

Note: Expanded measurement uncertainty is U = 0.49 dB, k = 1.96

LTE band 38

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	2617.5	23.35	22.43	21.22
		2595.0	23.34	22.50	21.22
		2572.5	23.36	22.60	21.31
	1 RB low	2617.5	23.34	22.41	21.20
		2595.0	23.36	22.53	21.26
		2572.5	23.39	22.53	21.23
	50% RB mid	2617.5	22.48	21.39	20.48
		2595.0	22.38	21.36	20.43
		2572.5	22.57	21.45	20.52
	100% RB	2617.5	22.39	21.44	20.51
		2595.0	22.37	21.39	20.49
		2572.5	22.56	21.50	20.56
10MHz	1 RB high	2615.0	23.44	22.40	21.32
		2595.0	23.34	22.52	21.26
		2575.0	23.35	22.54	21.27
	1 RB low	2615.0	23.36	22.46	21.27
		2595.0	23.37	22.49	21.29
		2575.0	23.37	22.52	21.26
	50% RB mid	2615.0	22.50	21.53	20.59
		2595.0	22.42	21.49	20.56
		2575.0	22.51	21.51	20.58
	100% RB	2615.0	22.46	21.45	20.46
		2595.0	22.37	21.44	20.45
		2575.0	22.41	21.47	20.44
15MHz	1 RB high	2612.5	23.33	22.41	21.10
		2595.0	23.35	22.43	21.14
		2577.5	23.36	22.54	21.18
	1 RB low	2612.5	23.28	22.39	21.17
		2595.0	23.28	22.42	21.16
		2577.5	23.28	22.45	21.16
	50% RB mid	2612.5	22.37	21.31	20.40
		2595.0	22.32	21.28	20.44
		2577.5	22.47	21.46	20.54
	100% RB	2612.5	22.28	21.33	20.38
		2595.0	22.25	21.29	20.33
		2577.5	22.34	21.37	20.34

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
20MHz	1 RB high	2610.0	23.23	22.39	21.09
		2595.0	23.27	22.42	21.13
		2580.0	23.55	22.47	21.15
	1 RB low	2610.0	23.21	22.38	21.15
		2595.0	23.21	22.37	21.12
		2580.0	23.24	22.41	21.17
	50% RB mid	2610.0	22.32	21.40	20.43
		2595.0	22.24	21.35	20.37
		2580.0	23.39	21.41	20.55
	100% RB	2610.0	22.30	21.31	20.33
		2595.0	22.23	21.23	20.38
		2580.0	22.34	21.40	20.47

Note: Expanded measurement uncertainty is U = 0.49dB, k = 1.96

LTE band 41

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	2687.5	24.69	24.01	23.02
		2593.0	24.97	24.29	23.20
		2498.5	24.88	24.19	23.09
	1 RB low	2687.5	24.79	23.92	22.94
		2593.0	24.85	24.15	23.10
		2498.5	24.92	24.24	23.15
	50% RB mid	2687.5	23.82	22.92	21.94
		2593.0	23.98	23.06	22.13
		2498.5	23.97	22.98	22.13
	100% RB	2687.5	23.85	22.90	22.02
		2593.0	23.96	23.09	22.17
		2498.5	23.92	23.08	22.23
10MHz	1 RB high	2685.0	24.77	24.06	22.97
		2593.0	24.95	24.19	23.12
		2501.0	24.73	24.16	23.11
	1 RB low	2685.0	24.82	24.15	23.09
		2593.0	24.94	24.29	23.20
		2501.0	24.93	24.23	23.21
	50% RB mid	2685.0	23.94	23.04	22.10
		2593.0	24.03	23.10	22.17
		2501.0	23.94	23.06	22.15
	100% RB	2685.0	23.93	23.04	22.04
		2593.0	24.03	23.12	22.10
		2501.0	23.98	23.06	22.13
15MHz	1 RB high	2682.5	24.61	23.91	22.79
		2593.0	24.78	24.13	22.89
		2503.5	24.53	23.93	22.77
	1 RB low	2682.5	24.69	24.06	22.91
		2593.0	24.70	24.09	22.95
		2503.5	24.66	24.06	22.96
	50% RB mid	2682.5	23.88	22.84	21.94
		2593.0	23.98	22.97	21.95
		2503.5	23.84	22.86	21.98

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
	100% RB	2682.5	23.83	22.86	21.90
		2593.0	23.88	22.94	21.95
		2503.5	23.86	22.86	21.98
20MHz	1 RB high	2680.0	24.59	23.96	22.73
		2593.0	24.84	24.15	22.94
		2506.0	24.54	23.93	22.68
	1 RB low	2680.0	24.80	24.10	22.93
		2593.0	24.82	24.13	22.99
		2506.0	24.67	24.06	22.93
	50% RB mid	2680.0	23.87	22.84	21.84
		2593.0	23.97	22.98	22.02
		2506.0	23.78	22.82	21.86
	100% RB	2680.0	23.82	22.95	21.95
		2593.0	24.01	22.95	22.04
		2506.0	23.76	22.84	21.88

Note: Expanded measurement uncertainty is U = 0.49dB, k = 1.96

A.1.3 Radiated

A.1.3.1 Description

This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Rule Part 22.913(a) specifies " The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

A.1.3.2 Method of Measurement

ANSI C63.26 chapter 5.2.5.5: when working in decibels (i.e., logarithmic scale), the ERP and EIRP represent the sum of the transmit antenna gain (in dBd or dBi, respectively) and the conducted RF output power (expressed in dB relative to watts or milliwatts).

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:

$$\text{ERP or EIRP} = \text{PMea} + \text{GT}$$

Where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as PMea , e.g., dBm or dBW)

PMea measured transmitter output power , in dBm.

GT gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

A.1.3.3 Measurement result

LTE band 5-ERP

Limits: ≤38.4dBm (7W)

Max ERP: 21.64dBm

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power(dBm)			ERP(dBm)(Gt-Lc = 0.2)		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
1.4MHz	1 RB high	848.3	23.26	22.53	21.52	21.31	20.58	19.57
		836.5	23.3	22.69	21.58	21.35	20.74	19.63
		824.7	23.35	22.71	21.6	21.40	20.76	19.65
	1 RB low	848.3	23.24	22.6	21.54	21.29	20.65	19.59
		836.5	23.29	22.68	21.59	21.34	20.73	19.64
		824.7	23.39	22.72	21.69	21.44	20.77	19.74
	50% RB mid	848.3	23.29	22.42	21.44	21.34	20.47	19.49
		836.5	23.33	22.43	21.58	21.38	20.48	19.63
		824.7	23.46	22.47	21.2	21.51	20.52	19.25
	100% RB	848.3	22.31	21.37	20.32	20.36	19.42	18.37
		836.5	22.43	21.44	20.35	20.48	19.49	18.40
		824.7	22.47	21.51	20.46	20.52	19.56	18.51
3MHz	1 RB high	847.5	23.41	22.74	20.8	21.46	20.79	18.85
		836.5	23.48	22.78	21.65	21.53	20.83	19.70
		825.5	23.49	22.79	21.77	21.54	20.84	19.82

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power(dBm)			ERP(dBm)(Gt-Lc = 0.2)		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
	1 RB low	847.5	23.41	22.67	21.21	21.46	20.72	19.26
		836.5	23.45	22.73	21.56	21.50	20.78	19.61
		825.5	23.5	22.85	21.71	21.55	20.90	19.76
	50% RB mid	847.5	22.47	21.5	20.5	20.52	19.55	18.55
		836.5	22.52	21.64	20.55	20.57	19.69	18.60
		825.5	22.59	21.67	20.66	20.64	19.72	18.71
	100% RB	847.5	22.4	21.49	20.45	20.45	19.54	18.50
		836.5	22.44	21.46	20.42	20.49	19.51	18.47
		825.5	22.59	21.58	20.57	20.64	19.63	18.62
5MHz	1 RB high	846.5	23.42	22.67	21.52	21.47	20.72	19.57
		836.5	23.53	22.86	21.69	21.58	20.91	19.74
		826.5	23.52	22.92	21.73	21.57	20.97	19.78
	1 RB low	846.5	23.44	22.71	21.54	21.49	20.76	19.59
		836.5	23.42	22.8	21.55	21.47	20.85	19.60
		826.5	23.59	22.96	21.73	21.64	21.01	19.78
	50% RB mid	846.5	22.53	21.5	20.45	20.58	19.55	18.50
		836.5	22.5	21.49	20.47	20.55	19.54	18.52
		826.5	22.62	21.66	20.58	20.67	19.71	18.63
	100% RB	846.5	22.5	21.46	20.43	20.55	19.51	18.48
		836.5	22.46	21.43	20.41	20.51	19.48	18.46
		826.5	22.62	21.58	20.57	20.67	19.63	18.62
10MHz	1 RB high	844.0	23.43	22.84	22.55	21.48	20.89	20.60
		836.5	23.47	22.9	22.68	21.52	20.95	20.73
		829.0	23.52	22.89	22.67	21.57	20.94	20.72
	1 RB low	844.0	23.41	22.83	22.51	21.46	20.88	20.56
		836.5	23.48	22.81	22.53	21.53	20.86	20.58
		829.0	23.55	22.91	22.6	21.60	20.96	20.65
	50% RB mid	844.0	22.61	21.63	21.55	20.66	19.68	19.60
		836.5	22.59	21.58	21.46	20.64	19.63	19.51
		829.0	22.66	21.68	21.57	20.71	19.73	19.62
	100% RB	844.0	22.52	21.52	21.4	20.57	19.57	19.45
		836.5	22.56	21.55	21.41	20.61	19.60	19.46
		829.0	22.67	21.67	21.57	20.72	19.72	19.62

LTE band 7-EIRP
Limits: ≤33dBm (2W)

Max EIRP: 24.68dBm

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power(dBm)			EIRP(dBm)(Gt-Lc = 1.9)		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
5MHz	1 RB high	2567.5	22.61	21.85	20.88	24.51	23.75	22.78
		2535	22.69	21.78	20.71	24.59	23.68	22.61
		2502.5	22.54	21.72	20.69	24.44	23.62	22.59
	1 RB low	2567.5	22.78	21.97	20.89	24.68	23.87	22.79
		2535	22.67	21.86	20.73	24.57	23.76	22.63
		2502.5	22.71	21.95	20.97	24.61	23.85	22.87
	50% RB mid	2567.5	21.86	21.03	20.13	23.76	22.93	22.03
		2535	21.73	20.95	19.97	23.63	22.85	21.87
		2502.5	21.76	20.93	20.01	23.66	22.83	21.91
	100% RB	2567.5	21.72	21.03	19.96	23.62	22.93	21.86
		2535	21.77	21.1	20.05	23.67	23.00	21.95
		2502.5	21.57	20.95	19.86	23.47	22.85	21.76
10MHz	1 RB high	2565	22.59	21.75	20.84	24.49	23.65	22.74
		2535	22.67	21.74	20.69	24.57	23.64	22.59
		2505	22.48	21.63	20.63	24.38	23.53	22.53
	1 RB low	2565	22.67	21.93	20.75	24.57	23.83	22.65
		2535	22.66	21.8	20.67	24.56	23.70	22.57
		2505	22.7	21.82	20.92	24.60	23.72	22.82
	50% RB mid	2565	21.74	20.96	20.1	23.64	22.86	22.00
		2535	21.69	20.85	19.89	23.59	22.75	21.79
		2505	21.63	20.8	19.93	23.53	22.70	21.83
	100% RB	2565	21.66	21.01	19.87	23.56	22.91	21.77
		2535	21.72	21.08	20.04	23.62	22.98	21.94
		2505	21.52	20.86	19.83	23.42	22.76	21.73
15MHz	1 RB high	2562.5	22.49	21.74	20.75	24.39	23.64	22.65
		2535	22.57	21.76	20.68	24.47	23.66	22.58
		2507.5	22.42	21.65	20.67	24.32	23.55	22.57
	1 RB low	2562.5	22.64	21.89	20.86	24.54	23.79	22.76
		2535	22.56	21.83	20.67	24.46	23.73	22.57
		2507.5	22.68	21.94	20.91	24.58	23.84	22.81
	50% RB mid	2562.5	21.79	20.96	20.12	23.69	22.86	22.02
		2535	21.65	20.86	19.96	23.55	22.76	21.86
		2507.5	21.67	20.91	19.91	23.57	22.81	21.81
	100% RB	2562.5	21.61	21.02	19.9	23.51	22.92	21.80
		2535	21.71	21.08	19.94	23.61	22.98	21.84
		2507.5	21.5	20.84	19.82	23.40	22.74	21.72
20MHz	1 RB high	2560	22.58	21.75	20.86	24.48	23.65	22.76

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power(dBm)			EIRP(dBm)(Gt-Lc = 1.9)		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
		2535	22.57	21.72	20.61	24.47	23.62	22.51
		2510	22.43	21.66	20.56	24.33	23.56	22.46
		2560	22.64	21.85	20.79	24.54	23.75	22.69
	1 RB low	2535	22.61	21.83	20.66	24.51	23.73	22.56
		2510	22.71	21.87	20.92	24.61	23.77	22.82
		2560	21.82	20.93	19.99	23.72	22.83	21.89
	50% RB mid	2535	21.69	20.88	19.95	23.59	22.78	21.85
		2510	21.66	20.9	20	23.56	22.80	21.90
		2560	21.62	20.98	19.84	23.52	22.88	21.74
	100% RB	2535	21.71	21.05	19.98	23.61	22.95	21.88
		2510	21.57	20.92	19.78	23.47	22.82	21.68

LTE band 38- EIRP
Limits: ≤33.00dBm (2W)

Max ERP: 25.45dBm

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power(dBm)			EIRP(dBm)(Gt-Lc = 1.9)		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
5MHz	1 RB high	2617.5	23.35	22.43	21.22	25.25	24.33	23.12
		2595	23.34	22.5	21.22	25.24	24.40	23.12
		2572.5	23.36	22.6	21.31	25.26	24.50	23.21
	1 RB low	2617.5	23.34	22.41	21.2	25.24	24.31	23.10
		2595	23.36	22.53	21.26	25.26	24.43	23.16
		2572.5	23.39	22.53	21.23	25.29	24.43	23.13
	50% RB mid	2617.5	22.48	21.39	20.48	24.38	23.29	22.38
		2595	22.38	21.36	20.43	24.28	23.26	22.33
		2572.5	22.57	21.45	20.52	24.47	23.35	22.42
	100% RB	2617.5	22.39	21.44	20.51	24.29	23.34	22.41
		2595	22.37	21.39	20.49	24.27	23.29	22.39
		2572.5	22.56	21.5	20.56	24.46	23.40	22.46
10MHz	1 RB high	2615	23.44	22.4	21.32	25.34	24.30	23.22
		2595	23.34	22.52	21.26	25.24	24.42	23.16
		2575	23.35	22.54	21.27	25.25	24.44	23.17
	1 RB low	2615	23.36	22.46	21.27	25.26	24.36	23.17
		2595	23.37	22.49	21.29	25.27	24.39	23.19
		2575	23.37	22.52	21.26	25.27	24.42	23.16
	50% RB mid	2615	22.5	21.53	20.59	24.40	23.43	22.49
		2595	22.42	21.49	20.56	24.32	23.39	22.46
		2575	22.51	21.51	20.58	24.41	23.41	22.48
	100% RB	2615	22.46	21.45	20.46	24.36	23.35	22.36
		2595	22.37	21.44	20.45	24.27	23.34	22.35
		2575	22.41	21.47	20.44	24.31	23.37	22.34
15MHz	1 RB high	2612.5	23.33	22.41	21.1	25.23	24.31	23.00
		2595	23.35	22.43	21.14	25.25	24.33	23.04
		2577.5	23.36	22.54	21.18	25.26	24.44	23.08
	1 RB low	2612.5	23.28	22.39	21.17	25.18	24.29	23.07
		2595	23.28	22.42	21.16	25.18	24.32	23.06
		2577.5	23.28	22.45	21.16	25.18	24.35	23.06
	50% RB mid	2612.5	22.37	21.31	20.4	24.27	23.21	22.30
		2595	22.32	21.28	20.44	24.22	23.18	22.34
		2577.5	22.47	21.46	20.54	24.37	23.36	22.44
	100% RB	2612.5	22.28	21.33	20.38	24.18	23.23	22.28
		2595	22.25	21.29	20.33	24.15	23.19	22.23
		2577.5	22.34	21.37	20.34	24.24	23.27	22.24
	1 RB high	2610	23.23	22.39	21.09	25.13	24.29	22.99

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power(dBm)			EIRP(dBm)(Gt-Lc = 1.9)		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
20MHz		2595	23.27	22.42	21.13	25.17	24.32	23.03
		2580	23.55	22.47	21.15	25.45	24.37	23.05
		2610	23.21	22.38	21.15	25.11	24.28	23.05
	1 RB low	2595	23.21	22.37	21.12	25.11	24.27	23.02
		2580	23.24	22.41	21.17	25.14	24.31	23.07
		2610	22.32	21.4	20.43	24.22	23.30	22.33
	50% RB mid	2595	22.24	21.35	20.37	24.14	23.25	22.27
		2580	23.39	21.41	20.55	25.29	23.31	22.45
		2610	22.3	21.31	20.33	24.20	23.21	22.23
	100% RB	2595	22.23	21.23	20.38	24.13	23.13	22.28
		2580	22.34	21.4	20.47	24.24	23.30	19.24

LTE band 41
Limits: ≤33dBm (2W)

Max ERP: 26.87dBm

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power(dBm)			EIRP(dBm)(Gt-Lc =1.9)		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
5MHz	1 RB high	2687.5	24.69	24.01	23.02	26.59	25.91	24.92
		2593	24.97	24.29	23.2	26.87	26.19	25.10
		2498.5	24.88	24.19	23.09	26.78	26.09	24.99
	1 RB low	2687.5	24.79	23.92	22.94	26.69	25.82	24.84
		2593	24.85	24.15	23.1	26.75	26.05	25.00
		2498.5	24.92	24.24	23.15	26.82	26.14	25.05
	50% RB mid	2687.5	23.82	22.92	21.94	25.72	24.82	23.84
		2593	23.98	23.06	22.13	25.88	24.96	24.03
		2498.5	23.97	22.98	22.13	25.87	24.88	24.03
	100% RB	2687.5	23.85	22.9	22.02	25.75	24.80	23.92
		2593	23.96	23.09	22.17	25.86	24.99	24.07
		2498.5	23.92	23.08	22.23	25.82	24.98	24.13
10MHz	1 RB high	2685	24.77	24.06	22.97	26.67	25.96	24.87
		2593	24.95	24.19	23.12	26.85	26.09	25.02
		2501	24.73	24.16	23.11	26.63	26.06	25.01
	1 RB low	2685	24.82	24.15	23.09	26.72	26.05	24.99
		2593	24.94	24.29	23.2	26.84	26.19	25.10
		2501	24.93	24.23	23.21	26.83	26.13	25.11
	50% RB mid	2685	23.94	23.04	22.1	25.84	24.94	24.00
		2593	24.03	23.1	22.17	25.93	25.00	24.07
		2501	23.94	23.06	22.15	25.84	24.96	24.05
	100% RB	2685	23.93	23.04	22.04	25.83	24.94	23.94
		2593	24.03	23.12	22.1	25.93	25.02	24.00
		2501	23.98	23.06	22.13	25.88	24.96	24.03
15MHz	1 RB high	2682.5	24.61	23.91	22.79	26.51	25.81	24.69
		2593	24.78	24.13	22.89	26.68	26.03	24.79
		2503.5	24.53	23.93	22.77	26.43	25.83	24.67
	1 RB low	2682.5	24.69	24.06	22.91	26.59	25.96	24.81
		2593	24.7	24.09	22.95	26.60	25.99	24.85
		2503.5	24.66	24.06	22.96	26.56	25.96	24.86
	50% RB mid	2682.5	23.88	22.84	21.94	25.78	24.74	23.84
		2593	23.98	22.97	21.95	25.88	24.87	23.85
		2503.5	23.84	22.86	21.98	25.74	24.76	23.88
	100% RB	2682.5	23.83	22.86	21.9	25.73	24.76	23.80
		2593	23.88	22.94	21.95	25.78	24.84	23.85
		2503.5	23.86	22.86	21.98	25.76	24.76	23.88
20MHz	1 RB high	2680	24.59	23.96	22.73	26.49	25.86	24.63
		2593	24.84	24.15	22.94	26.74	26.05	24.84

Bandwidth	RB size/offset	Frequency (MHz)	Conducted Power(dBm)			EIRP(dBm)(Gt-Lc =1.9)		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
	1 RB low	2506	24.54	23.93	22.68	26.44	25.83	24.58
		2680	24.8	24.1	22.93	26.70	26.00	24.83
		2593	24.82	24.13	22.99	26.72	26.03	24.89
	50% RB mid	2506	24.67	24.06	22.93	26.57	25.96	24.83
		2680	23.87	22.84	21.84	25.77	24.74	23.74
		2593	23.97	22.98	22.02	25.87	24.88	23.92
	100% RB	2506	23.78	22.82	21.86	25.68	24.72	23.76
		2680	23.82	22.95	21.95	25.72	24.85	23.85
		2593	24.01	22.95	22.04	25.91	24.85	23.94
		2506	23.76	22.84	21.88	25.66	24.74	19.24

A.2 FREQUENCY STABILITY

Reference

FCC: CFR Part 2.1055, 22.355, 27.54.

A.2.1 Method of Measurement

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMW500.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -10°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on mid channel of all bands, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -10°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10°C increments from -10°C to +50°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of the lower, higher and nominal voltage. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

A.2.2 Measurement results

LTE Band 5, 10MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
50	3.87	824.330	848.620		
40				-1.00	0.0012
30				-0.51	0.0006
20				0.03	0.0000
10				0.16	0.0002
0				0.31	0.0004
-10				-1.18	0.0014

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.60	20	824.330	848.620	-0.83	0.0010
4.45				-0.56	0.0007

Expanded measurement uncertainty is 10 Hz, $k = 2$

LTE Band 7, 20MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	2500.520	2569.400		
50				-0.82	0.0003
40				-1.48	0.0006
30				-1.40	0.0006
10				-1.04	0.0004
0				-1.56	0.0006
-10				-1.53	0.0006

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.60	20	2500.520	2569.400	-0.46	0.0002
4.45				-0.84	0.0003

Expanded measurement uncertainty is 10 Hz, $k = 2$

LTE Band 38, 20MHz bandwidth (worst case of all bandwidths)
Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	2570.580	2619.400		
50				-0.81	0.0003
40				-0.66	0.0003
30				-0.88	0.0003
10				-0.68	0.0003
0				-0.95	0.0004
-10				-0.76	0.0003

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.60	20	2570.580	2619.400	-0.25	0.0001
4.45				-1.22	0.0005

Expanded measurement uncertainty is 10 Hz, $k = 2$
LTE band 41, 20MHz bandwidth QPSK(worst case of all bandwidths)
Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	2496.500	2689.400		
50				0.35	0.0001
40				-0.28	0.0001
30				-0.68	0.0003
10				-1.19	0.0005
0				-0.41	0.0002
-10				-0.79	0.0003

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.60	20	2689.400	-0.40	0.0002	0.0002
4.45			-0.12	0.0000	0.0004

Expanded measurement uncertainty is 10 Hz, $k = 2$

A.3 OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049, 22.917, 27.53.

A.3.1 Occupied Bandwidth Results

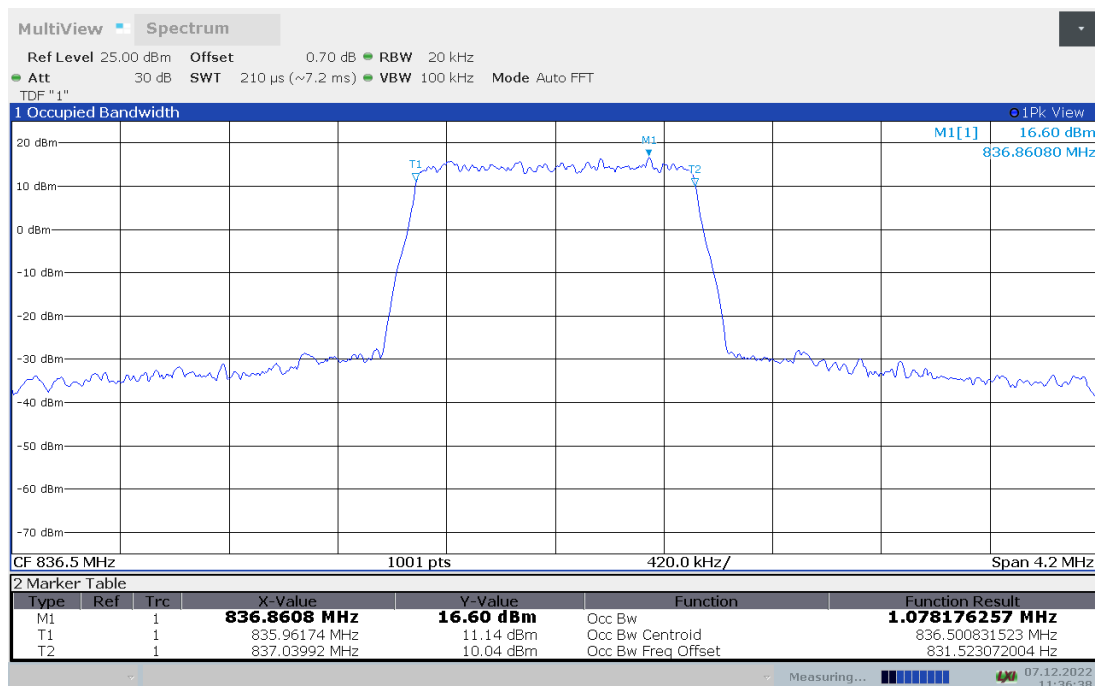
Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

- 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).
- 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.
- 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 $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- Set the detection mode to peak, and the trace mode to max hold.
- Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

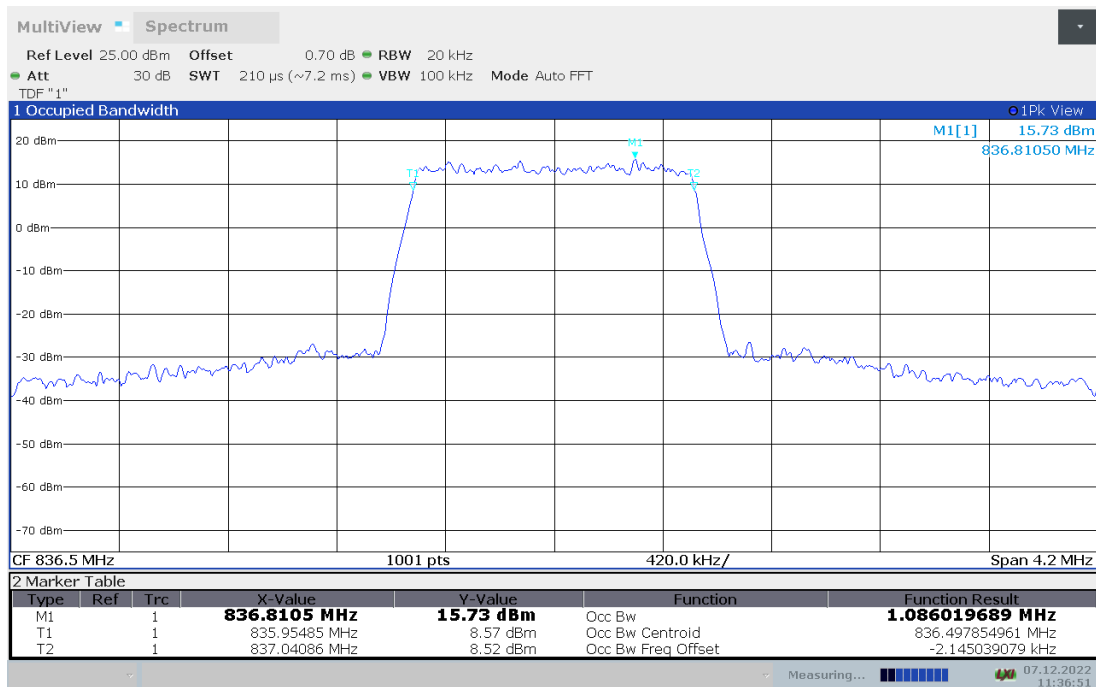
LTE band 5,1.4MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
836.5	1.078	1.086

LTE band 5 , 1.4MHz Bandwidth,QPSK (99% BW)



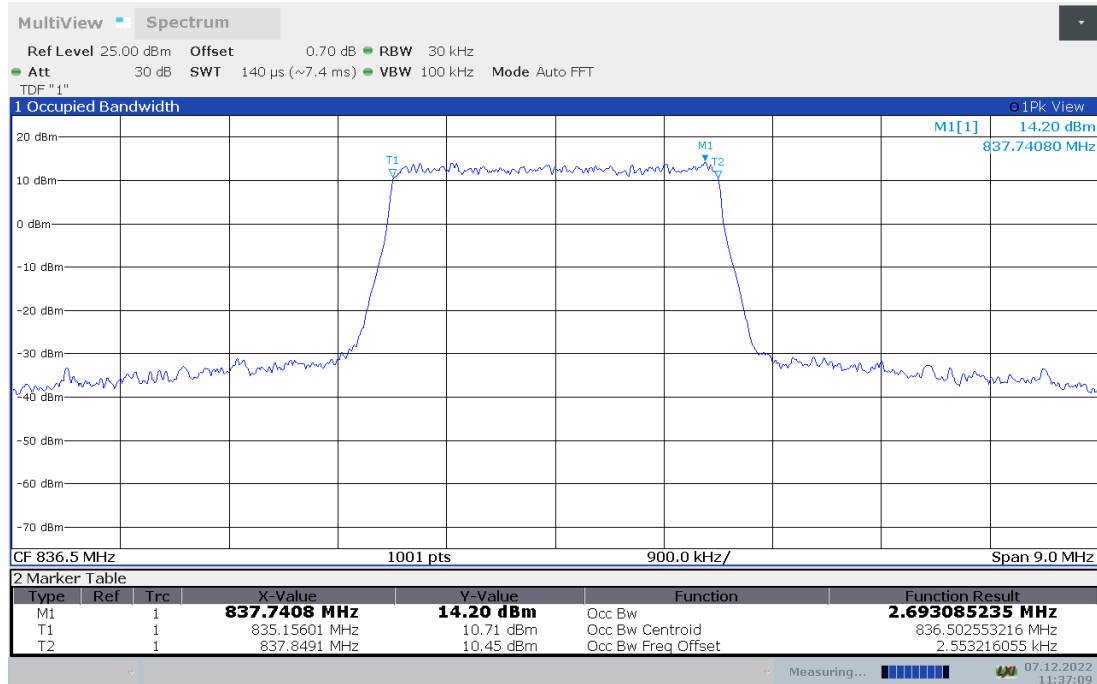
LTE band 5 , 1.4MHz Bandwidth,16QAM (99% BW)



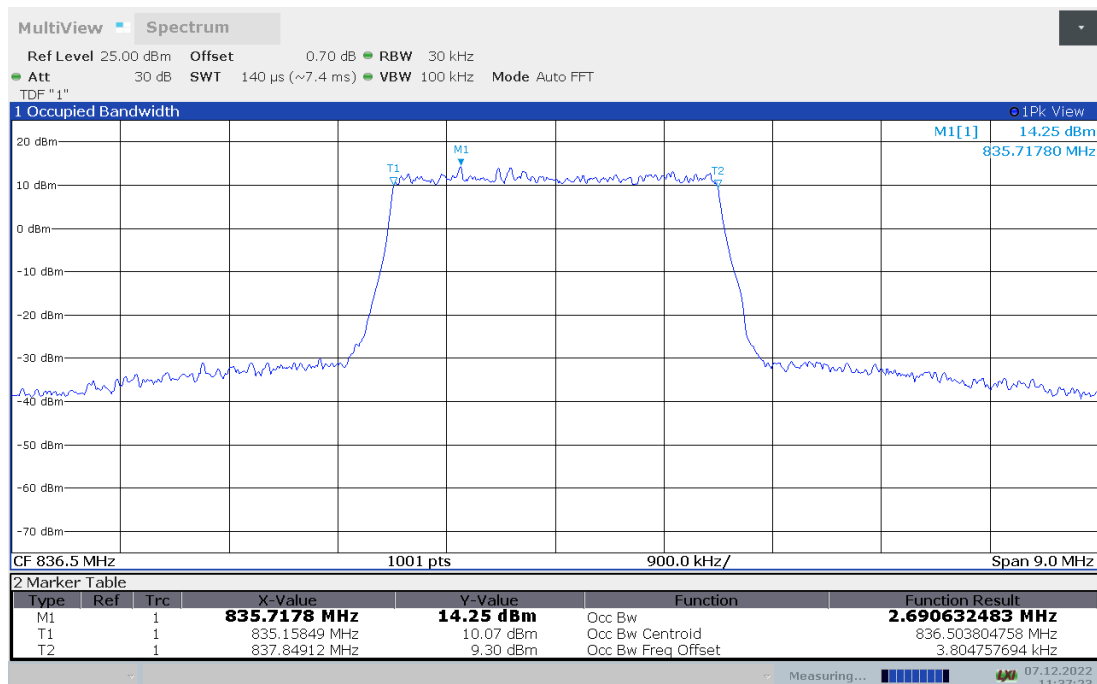
LTE band 5,3MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
836.5	2.693	2.691

LTE band 5 , 3MHz Bandwidth,QPSK (99% BW)



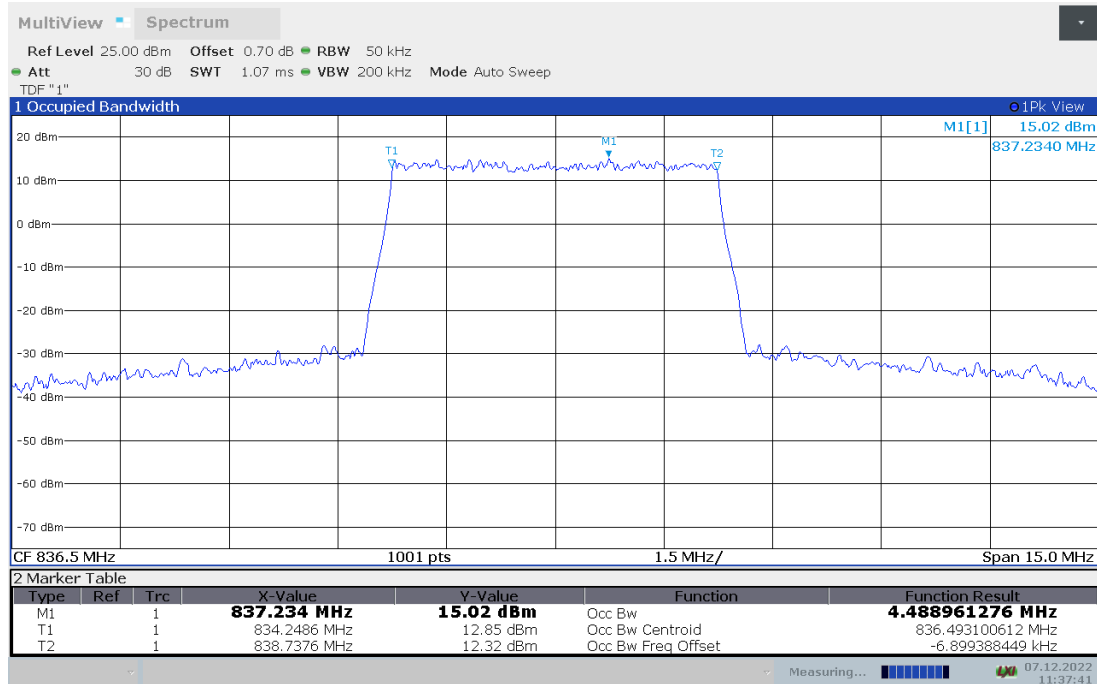
LTE band 5 , 3MHz Bandwidth,16QAM (99% BW)



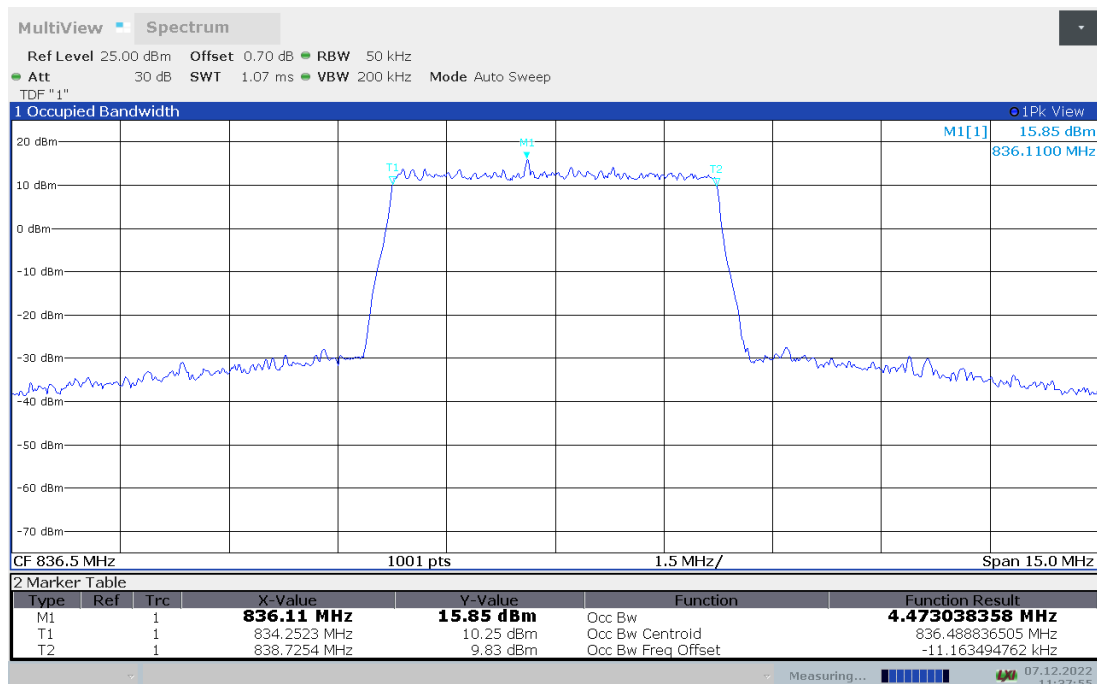
LTE band 5,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
836.5	4.489	4.473

LTE band 5 , 5MHz Bandwidth,QPSK (99% BW)



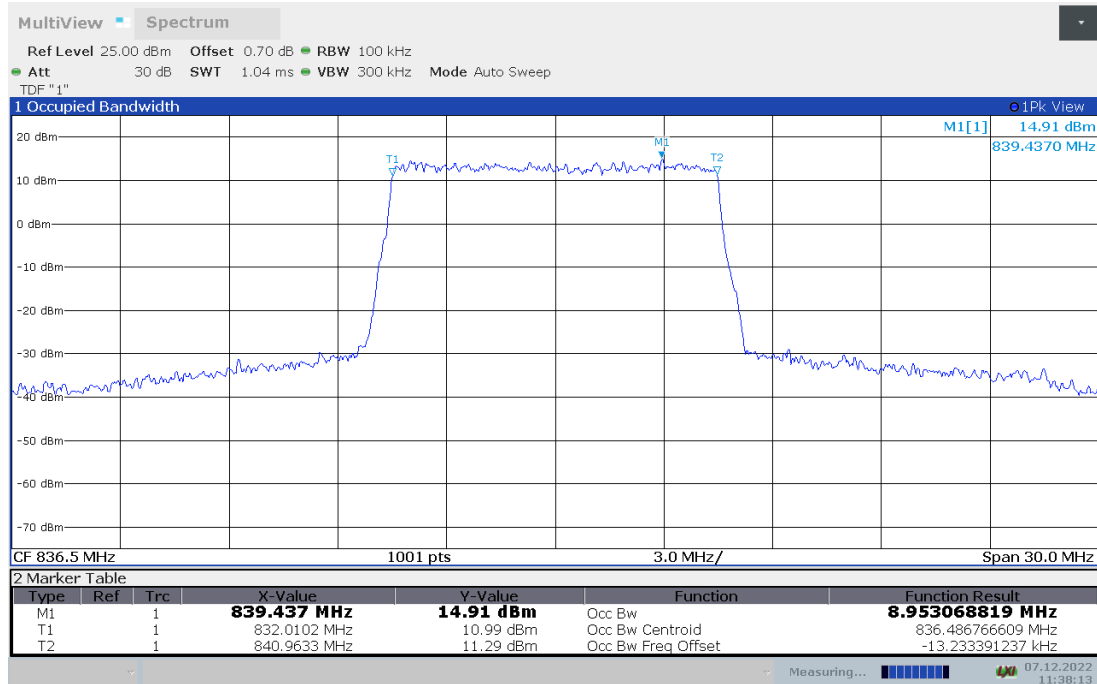
LTE band 5 , 5MHz Bandwidth,16QAM (99% BW)



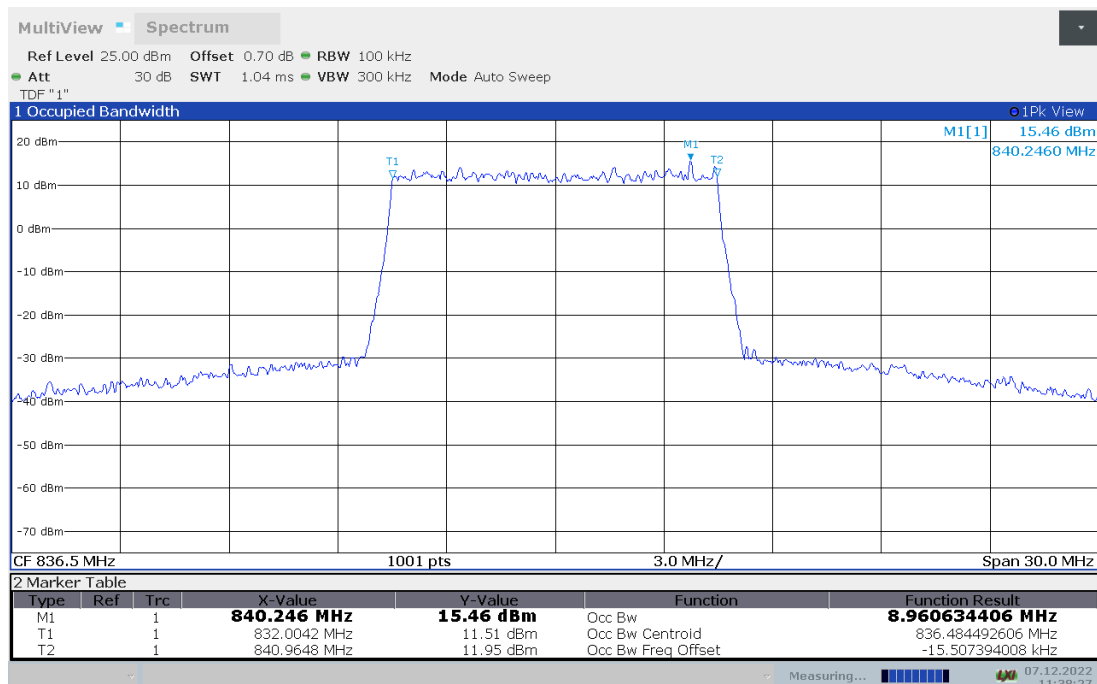
LTE band 5,10MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
836.5	8.953	8.961

LTE band 5 , 10MHz Bandwidth,QPSK (99% BW)



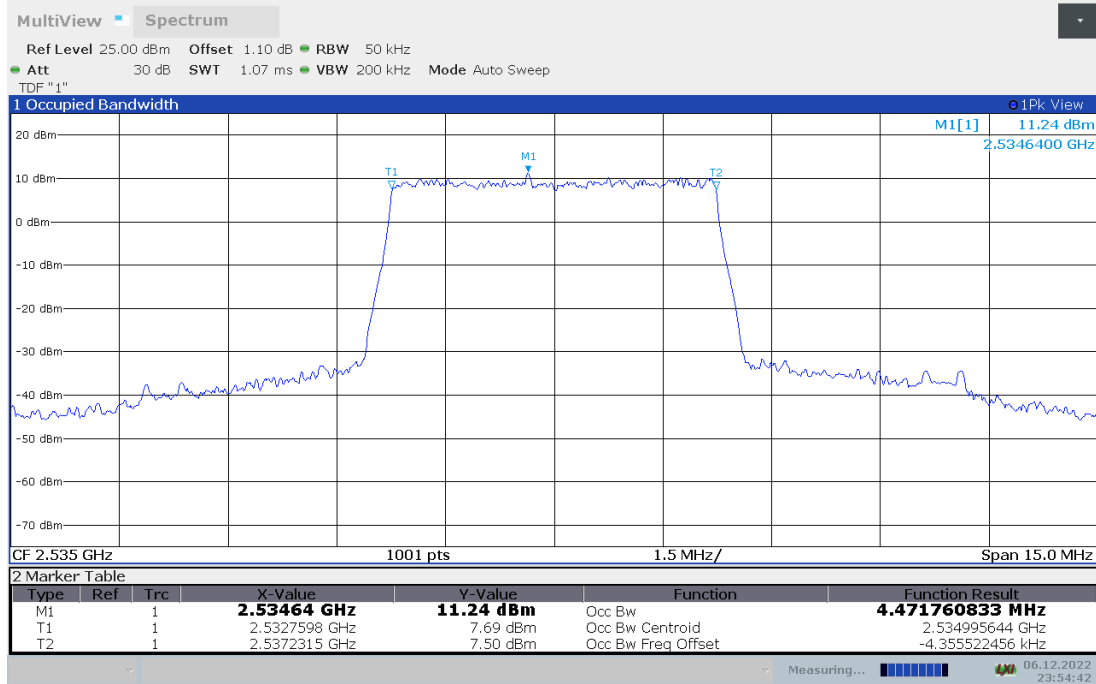
LTE band 5 , 10MHz Bandwidth,16QAM (99% BW)



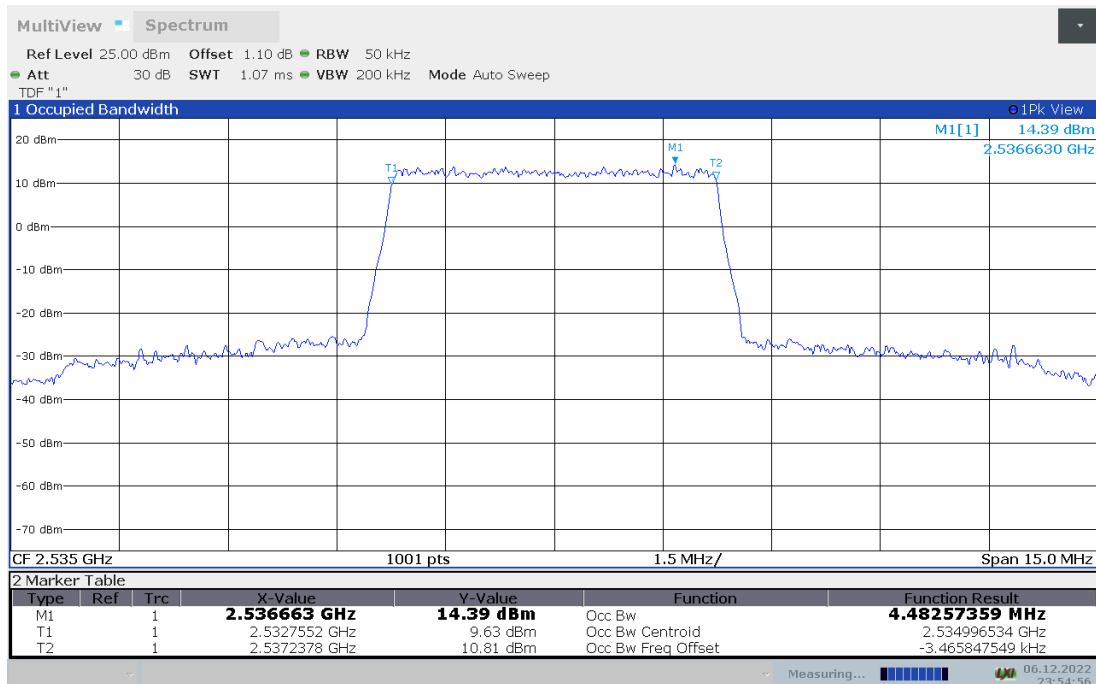
LTE band 7,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2535	4.472	4.483

LTE band 7 , 5MHz Bandwidth,QPSK (99% BW)



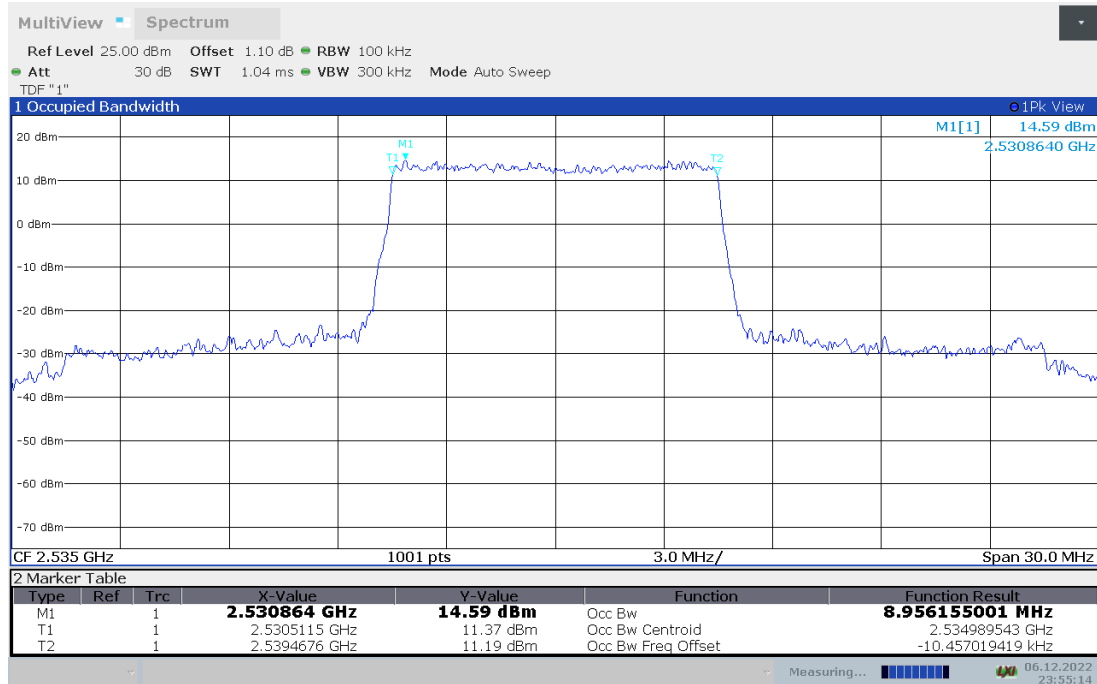
LTE band 7 , 5MHz Bandwidth,16QAM (99% BW)



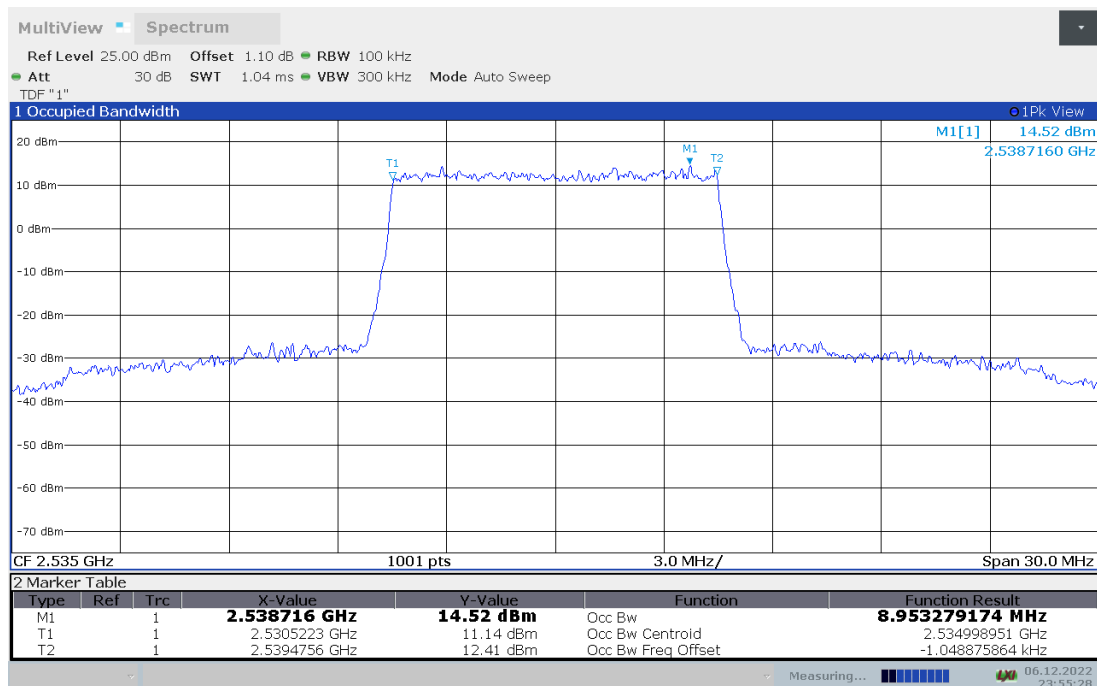
LTE band 7,10MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2535	8.956	8.953

LTE band 7 , 10MHz Bandwidth,QPSK (99% BW)



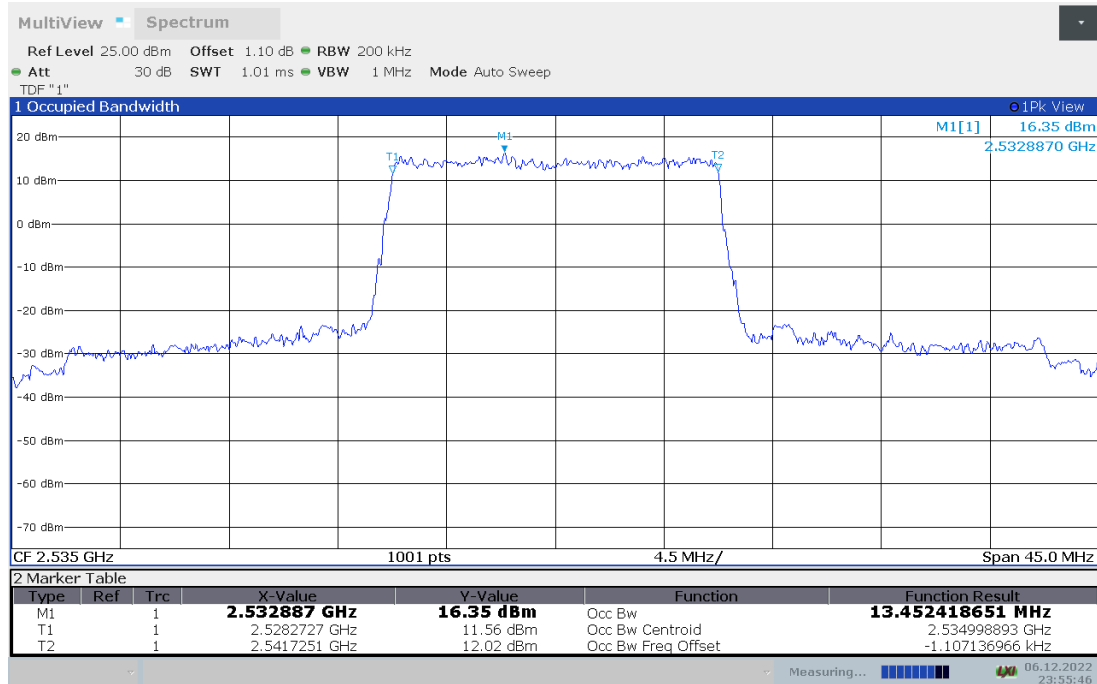
LTE band 7 , 10MHz Bandwidth,16QAM (99% BW)



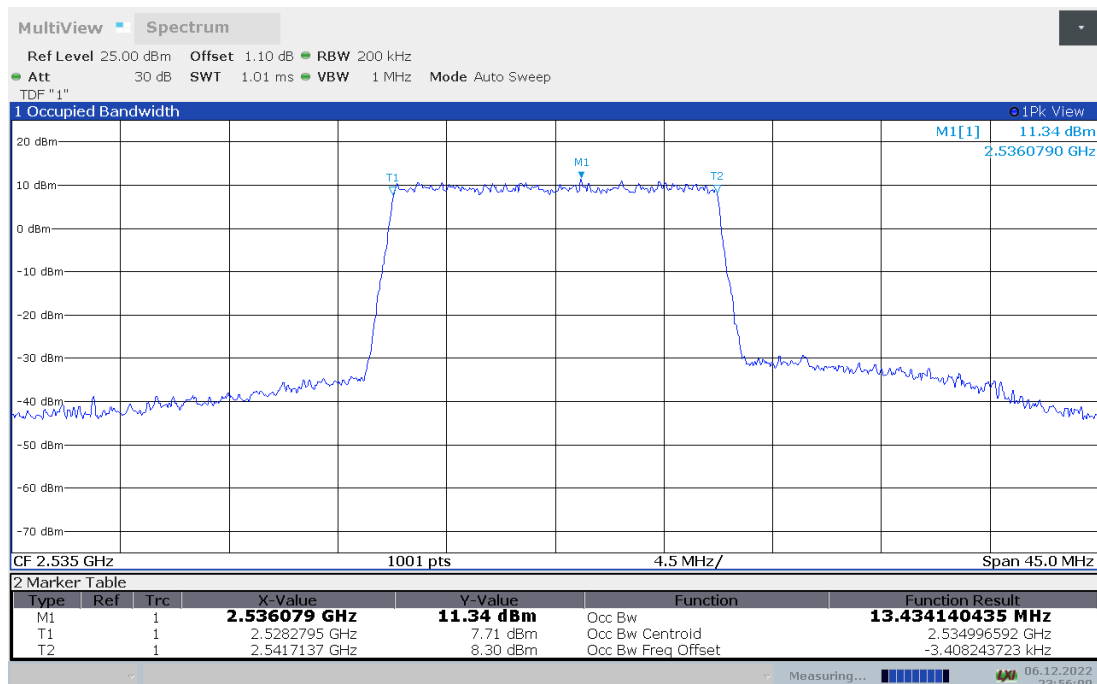
LTE band 7,15MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2535	13.452	13.434

LTE band 7 , 15MHz Bandwidth,QPSK (99% BW)



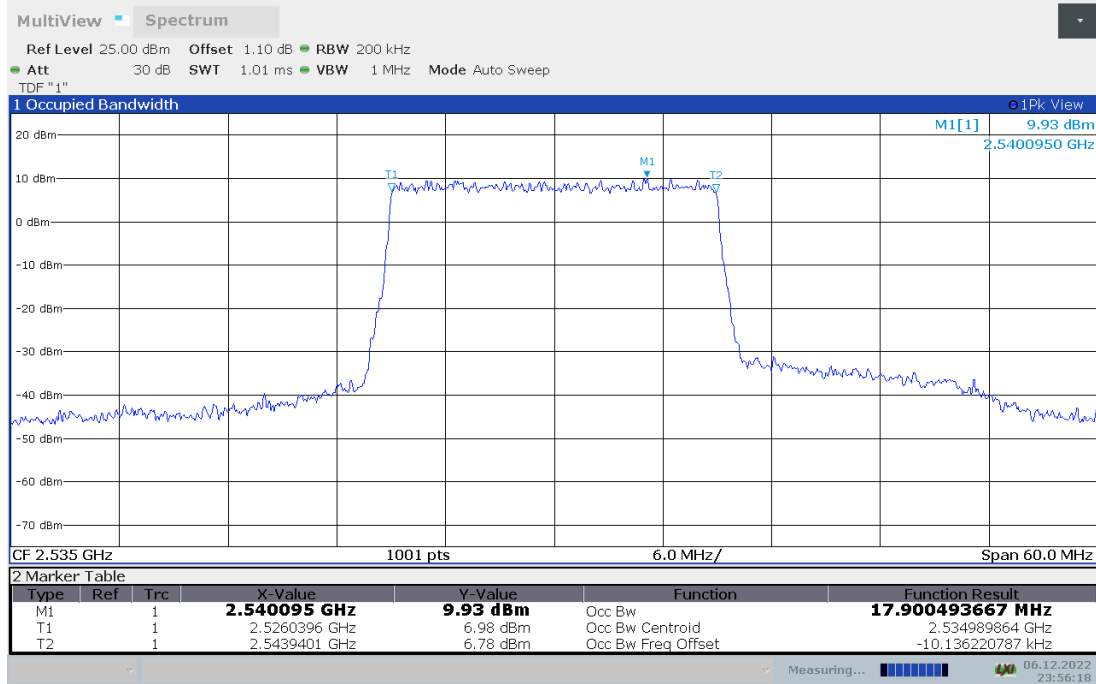
LTE band 7 , 15MHz Bandwidth,16QAM (99% BW)



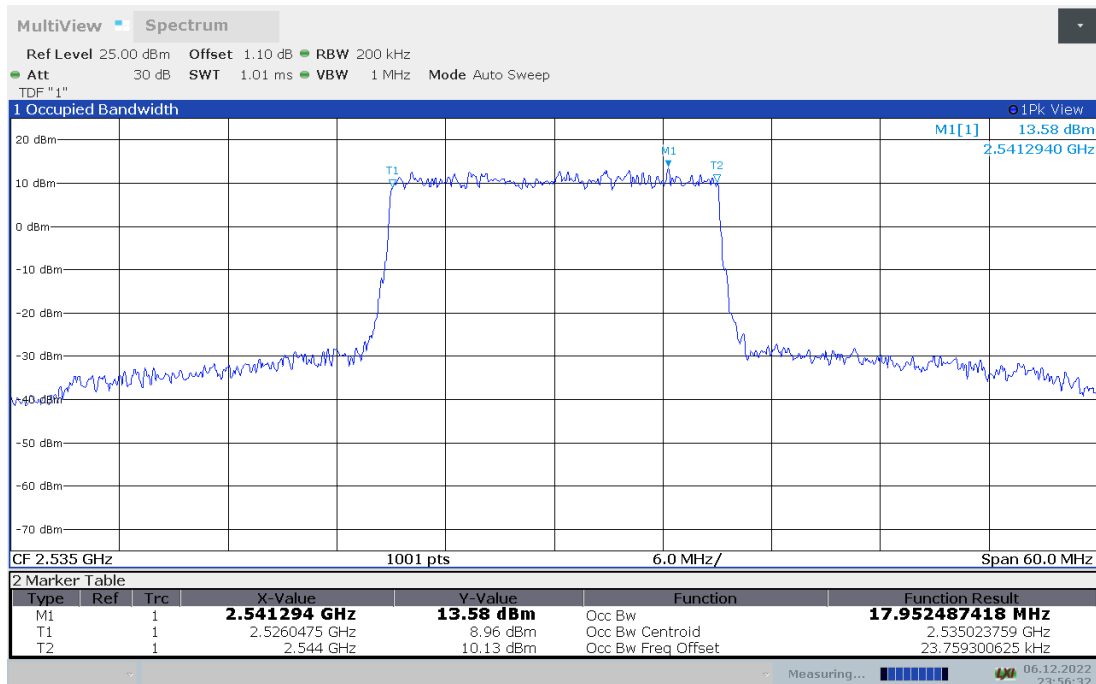
LTE band 7,20MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2535	17.900	17.952

LTE band 7 , 20MHz Bandwidth,QPSK (99% BW)



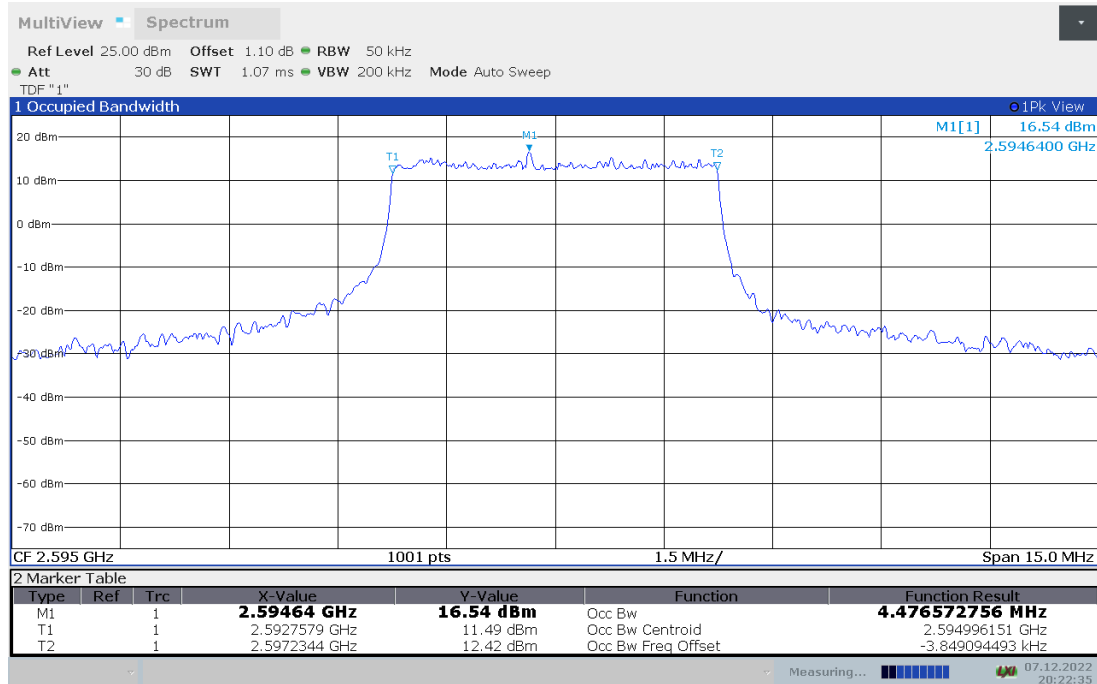
LTE band 7 , 20MHz Bandwidth,16QAM (99% BW)



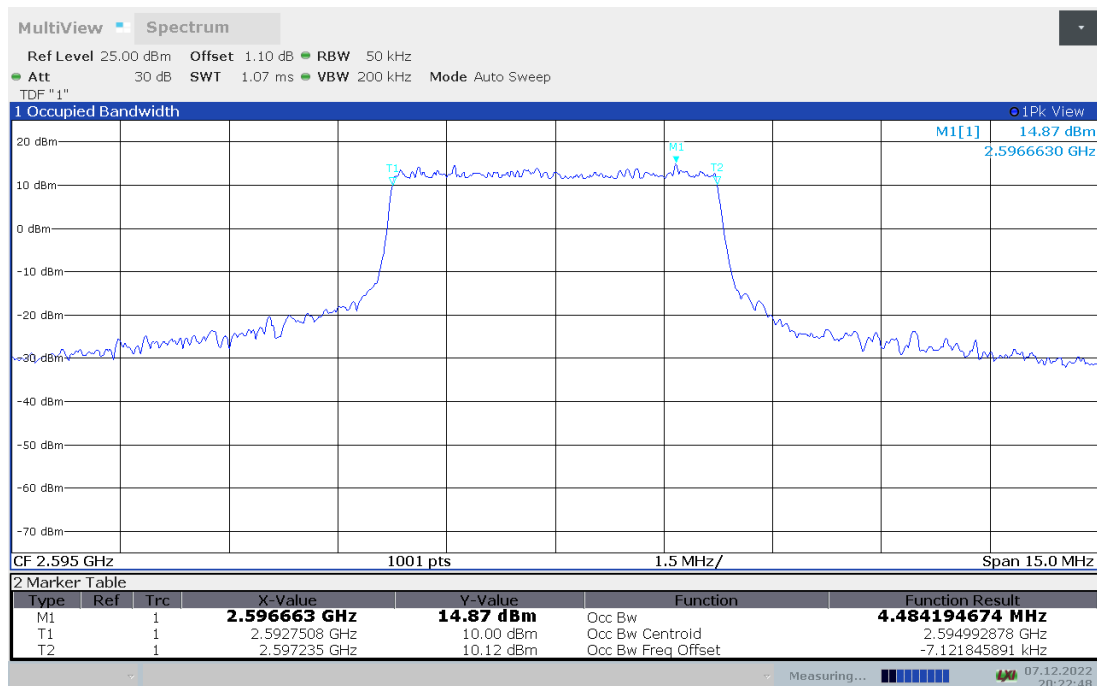
LTE band 38,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2595	4.477	4.484

LTE band 38 , 5MHz Bandwidth,QPSK (99% BW)



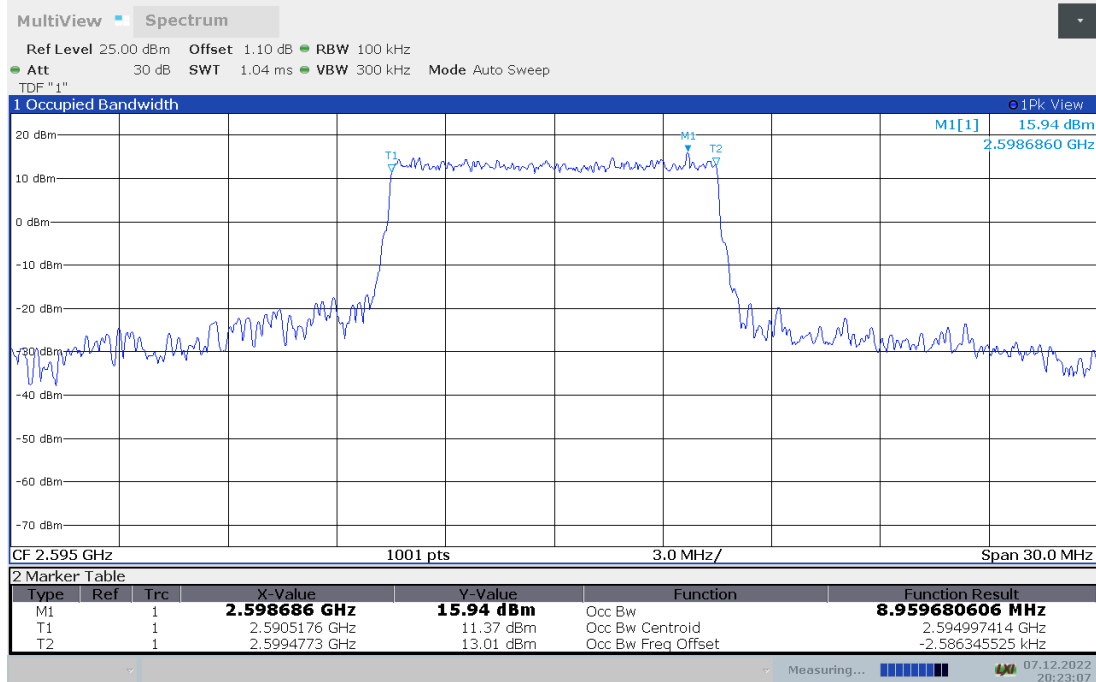
LTE band 38 , 5MHz Bandwidth,16QAM (99% BW)



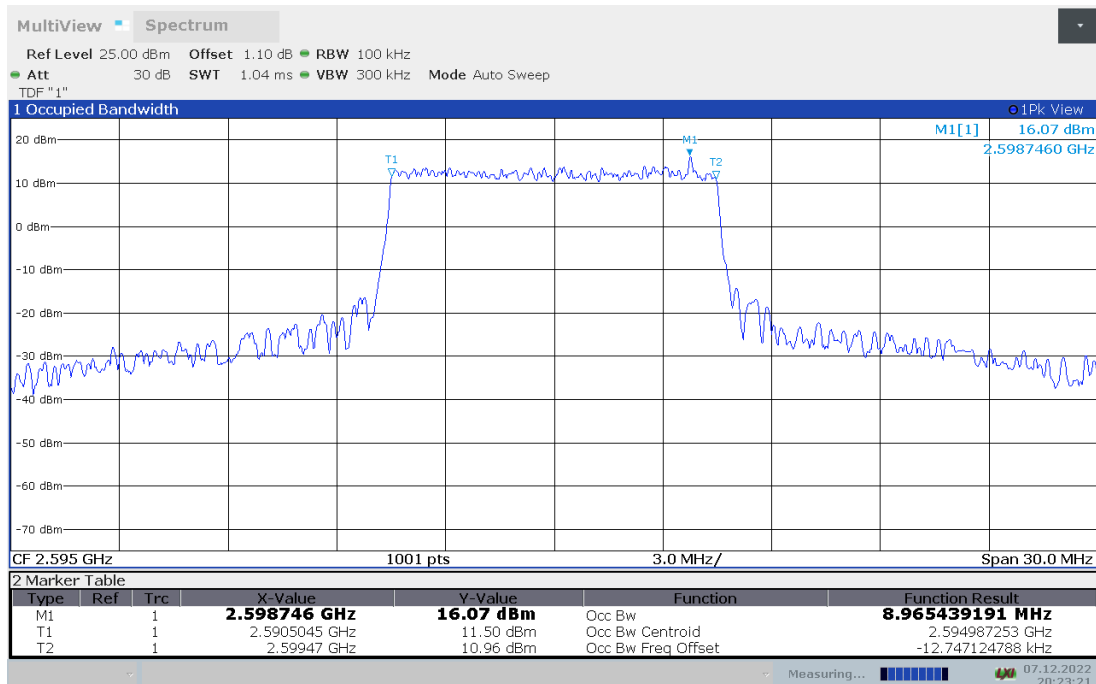
LTE band 38,10MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2595	8.960	8.965

LTE band 38 , 10MHz Bandwidth,QPSK (99% BW)



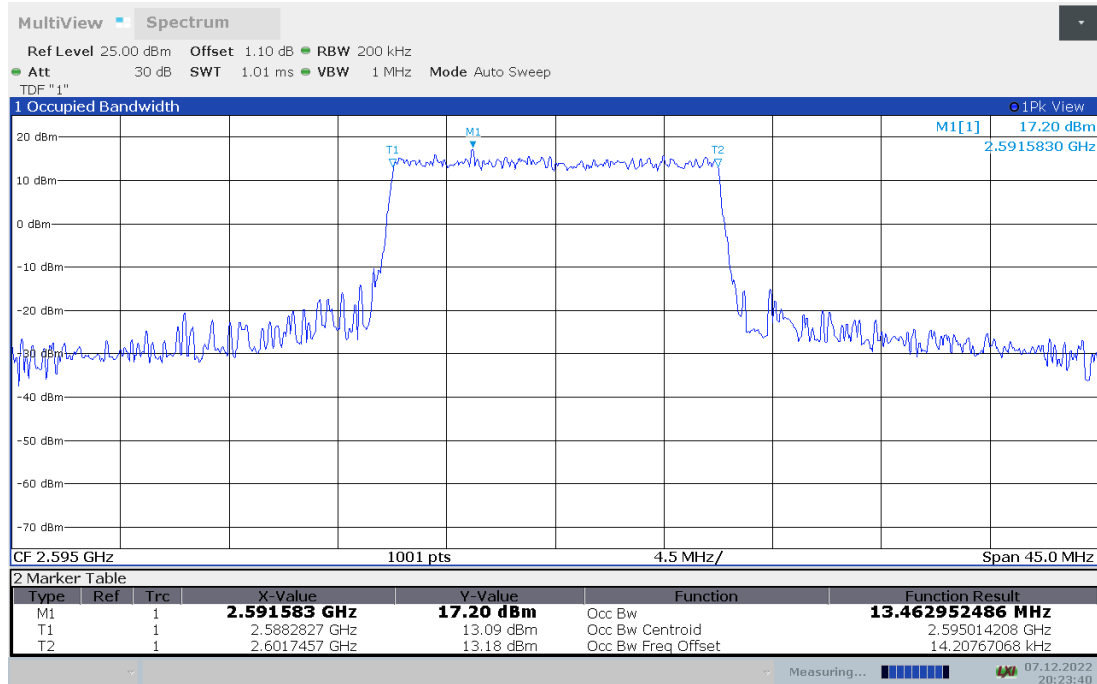
LTE band 38 , 10MHz Bandwidth,16QAM (99% BW)



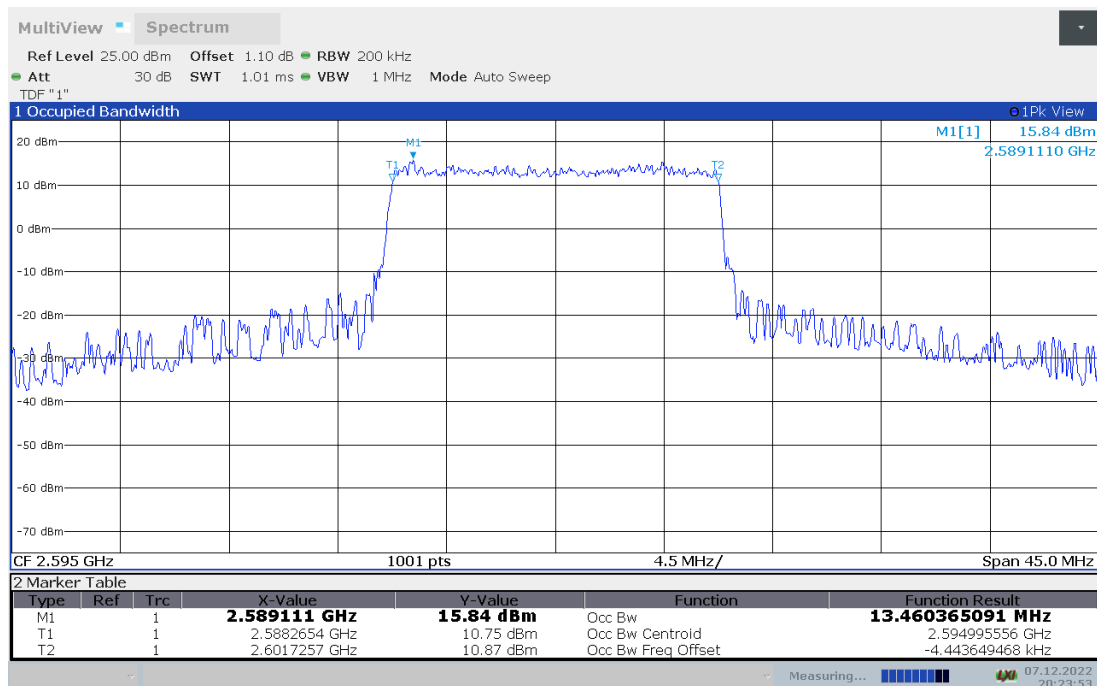
LTE band 38,15MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2595	13.463	13.460

LTE band 38 , 15MHz Bandwidth,QPSK (99% BW)



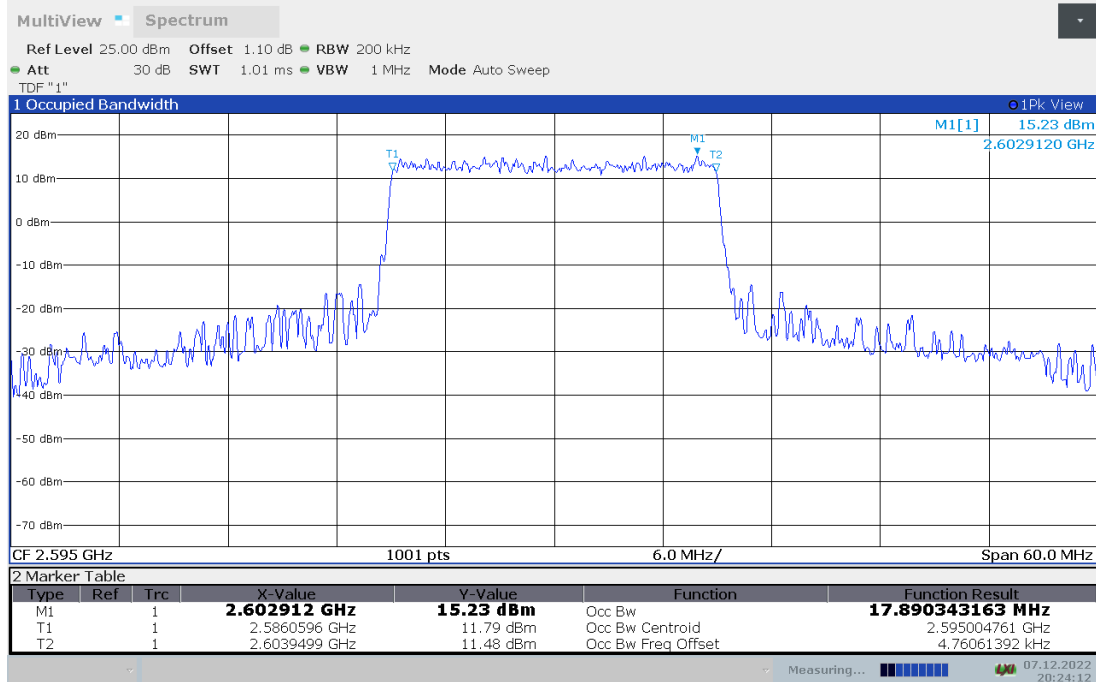
LTE band 38 , 15MHz Bandwidth,16QAM (99% BW)



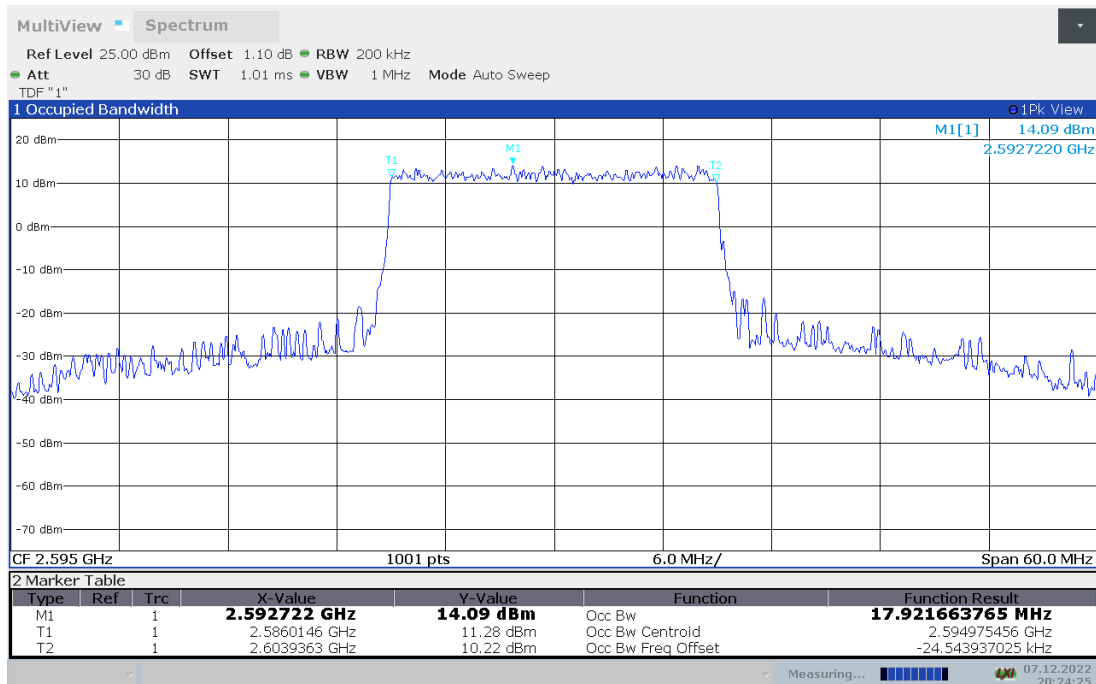
LTE band 38,20MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2595	17.890	17.922

LTE band 38 , 20MHz Bandwidth,QPSK (99% BW)



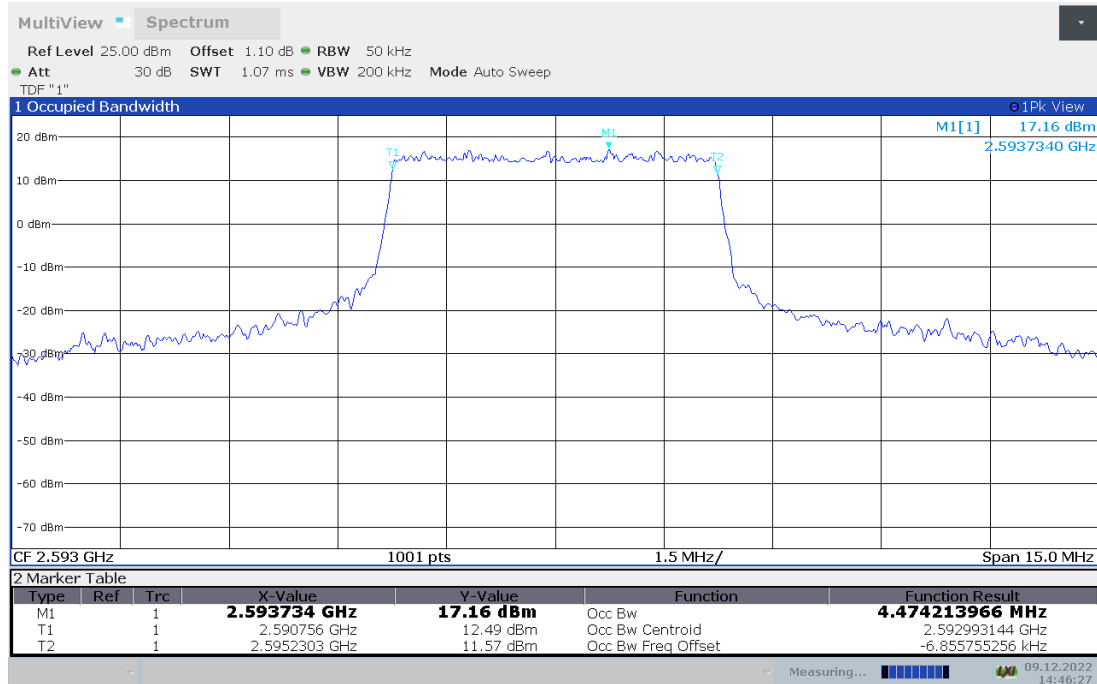
LTE band 38 , 20MHz Bandwidth,16QAM (99% BW)



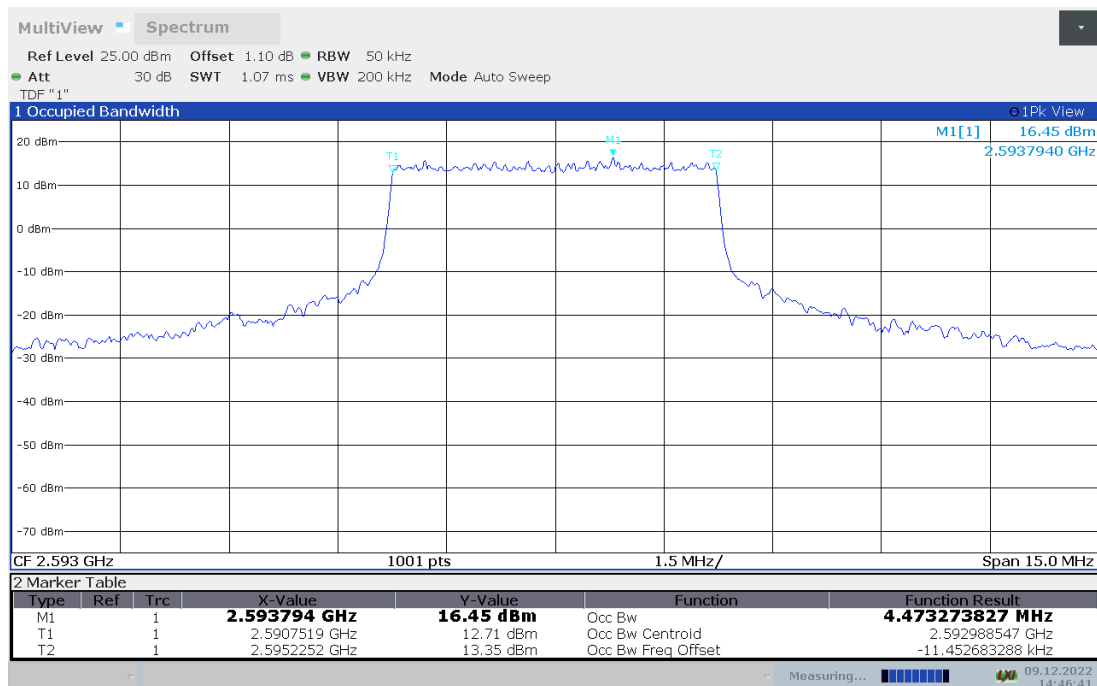
LTE band 41,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2593	4.474	4.473

LTE band 41 , 5MHz Bandwidth,QPSK (99% BW)



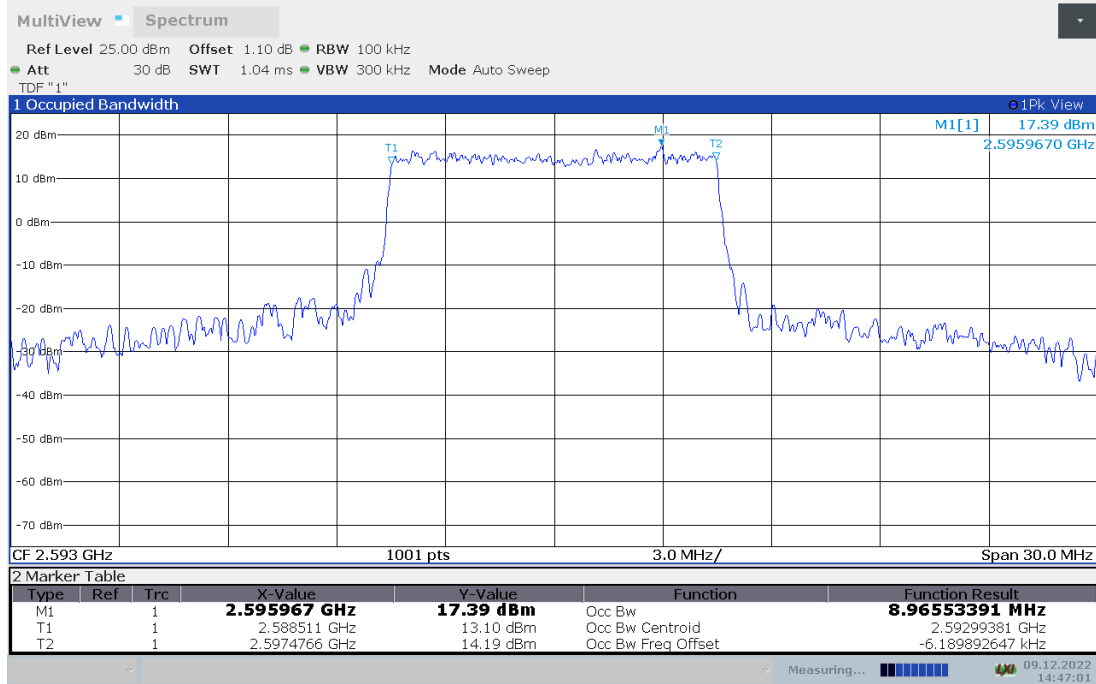
LTE band 41 , 5MHz Bandwidth,16QAM (99% BW)



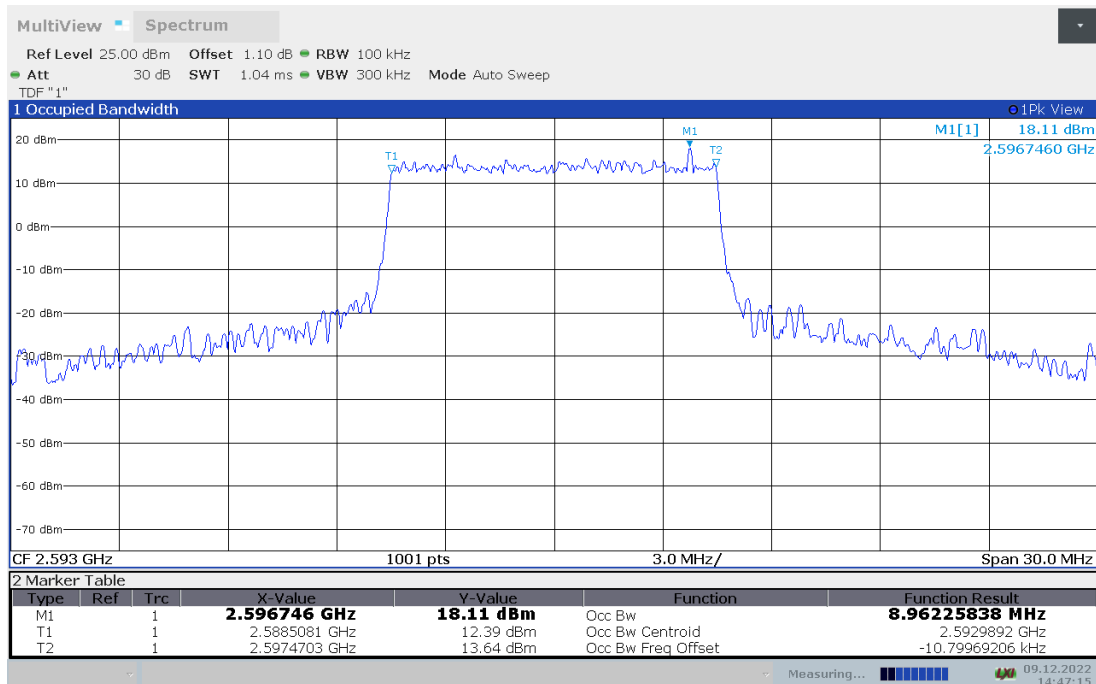
LTE band 41,10MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2593	8.966	8.962

LTE band 41 , 10MHz Bandwidth,QPSK (99% BW)



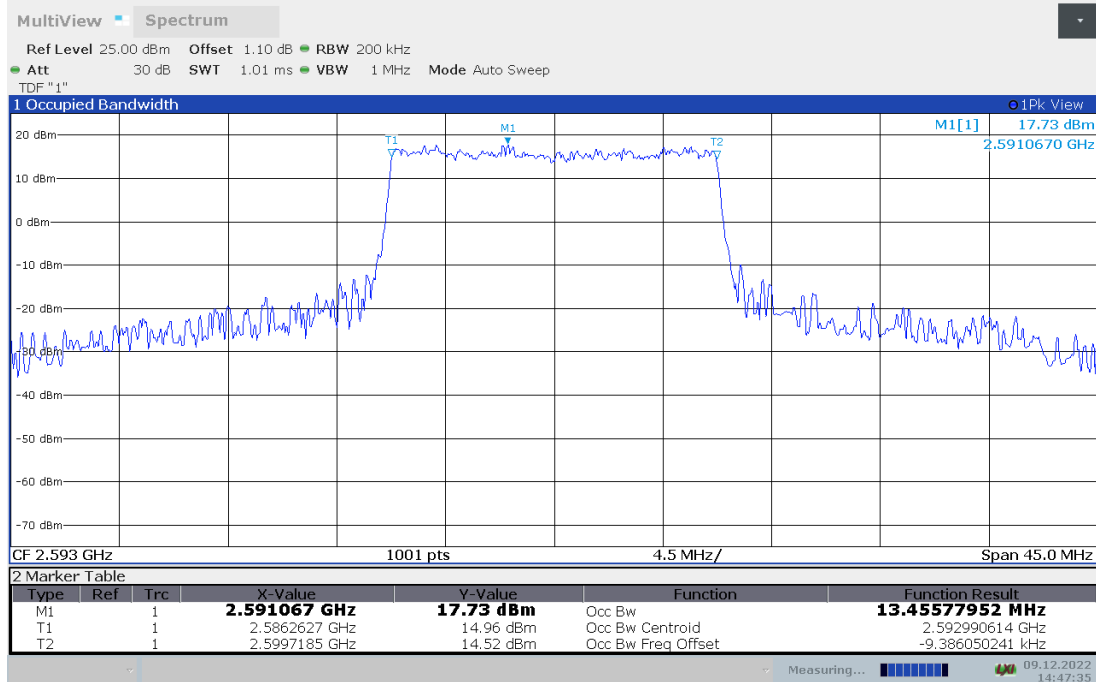
LTE band 41 , 10MHz Bandwidth,16QAM (99% BW)



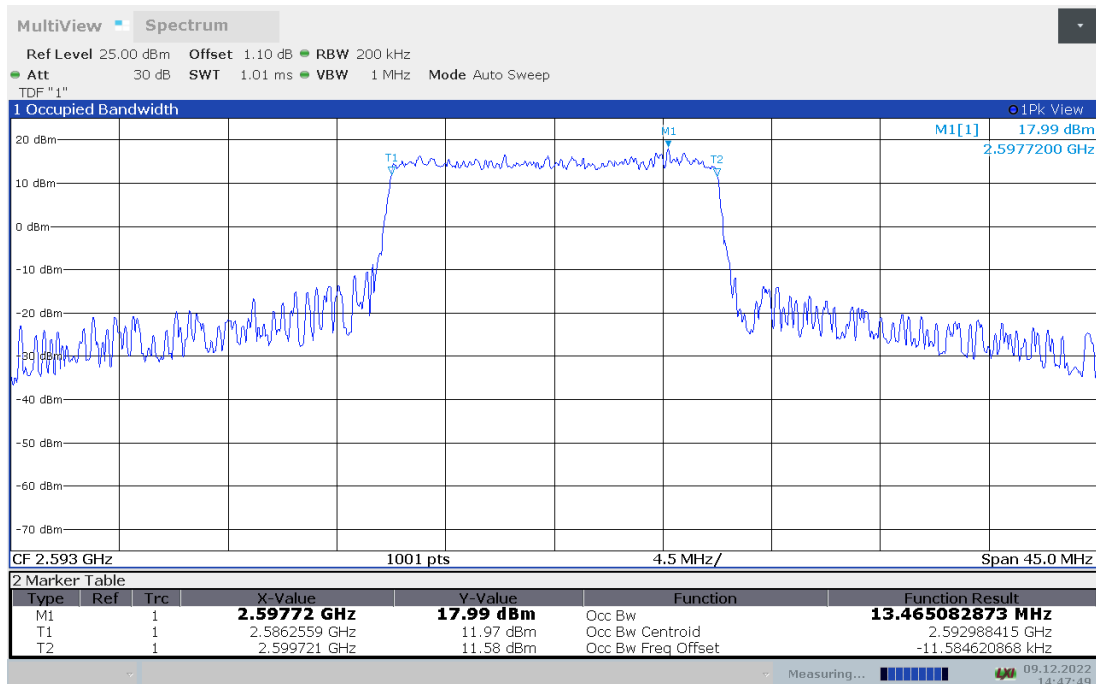
LTE band 41,15MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2593	13.456	13.465

LTE band 41 , 15MHz Bandwidth,QPSK (99% BW)



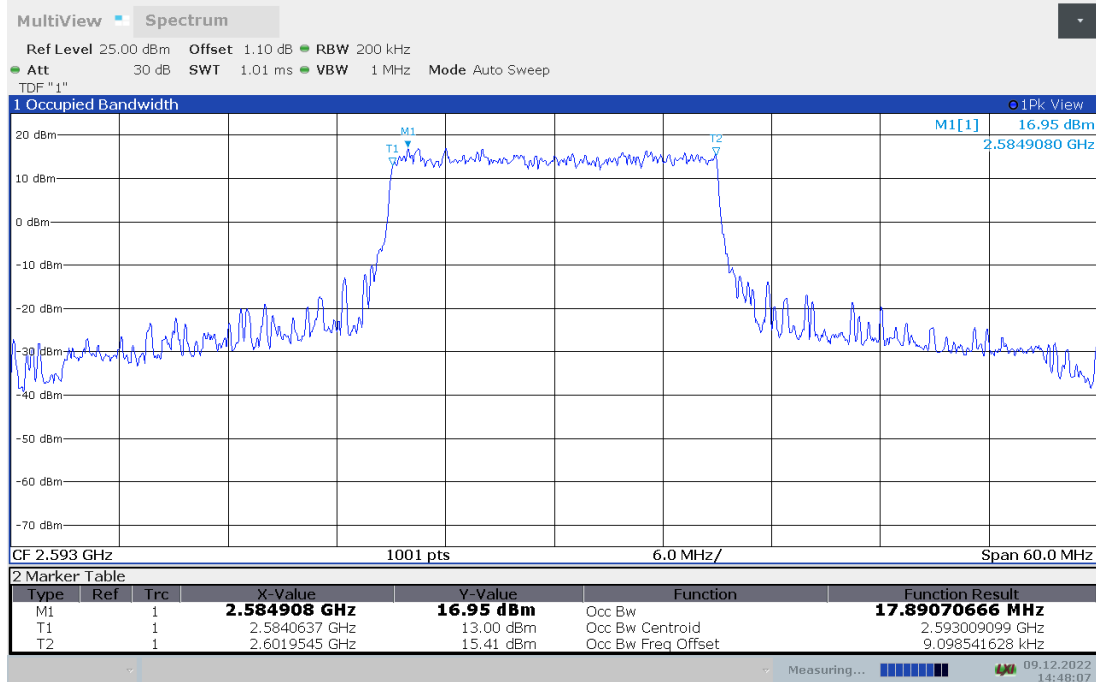
LTE band 41 , 15MHz Bandwidth,16QAM (99% BW)



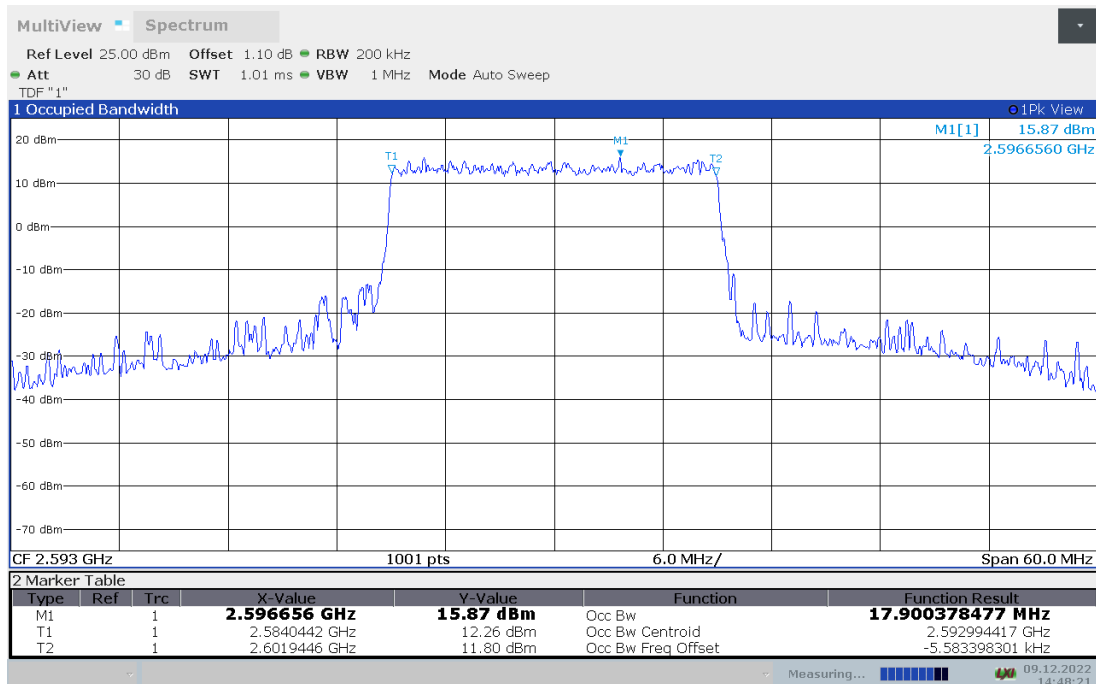
LTE band 41,20MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2593	17.891	17.900

LTE band 41 , 20MHz Bandwidth,QPSK (99% BW)



LTE band 41 , 20MHz Bandwidth,16QAM (99% BW)



Note: Expanded measurement uncertainty is $U = 3428 \text{ Hz}$, $k = 2$

A.4 EMISSION BANDWIDTH

Reference

FCC: CFR Part 2.1049, 22.917, 27.53.

A.4.1 Measurement Procedure

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

- 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 $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) Set the detection mode to peak, and the trace mode to max hold.
- e) Use the 26dB bandwidth function of the spectrum analyzer and report the measured bandwidth.

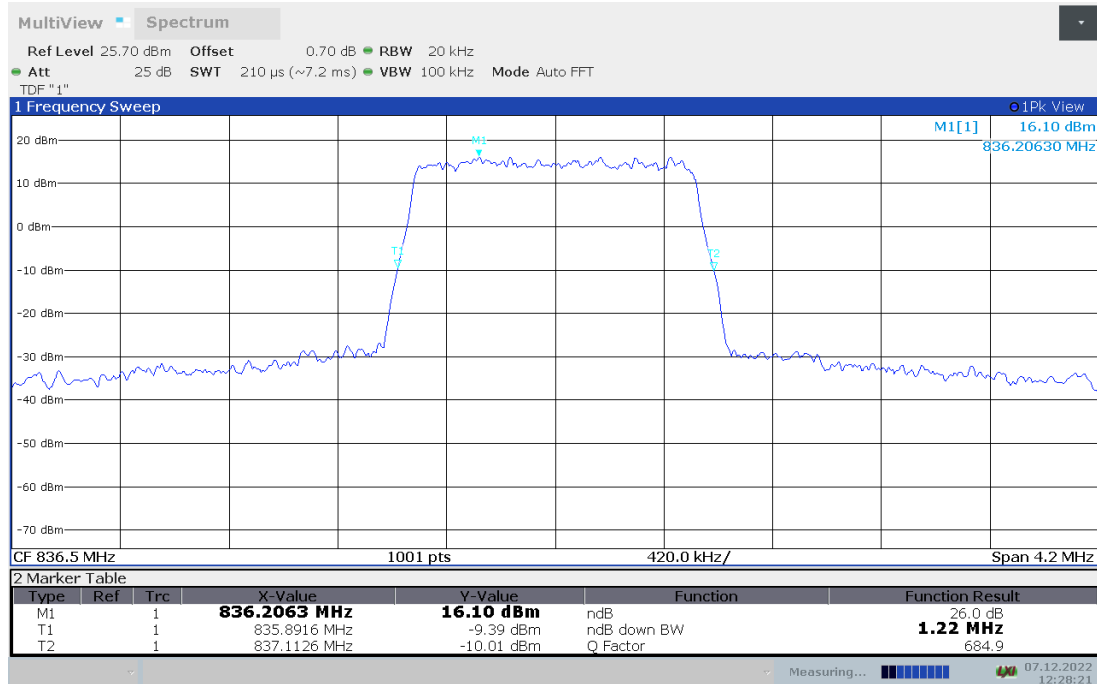
A.4.2 Emission Bandwidth Results

Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

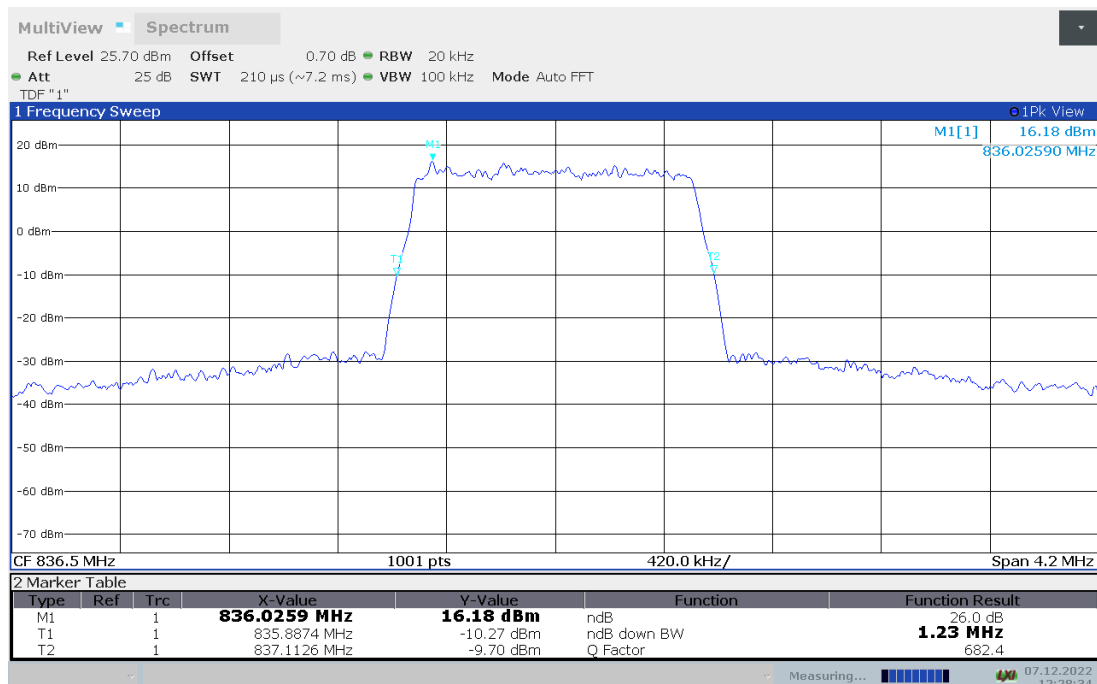
LTE band 5,1.4MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
836.5	1.221	1.225

LTE band 5 , 1.4MHz Bandwidth,QPSK (-26dBc BW)



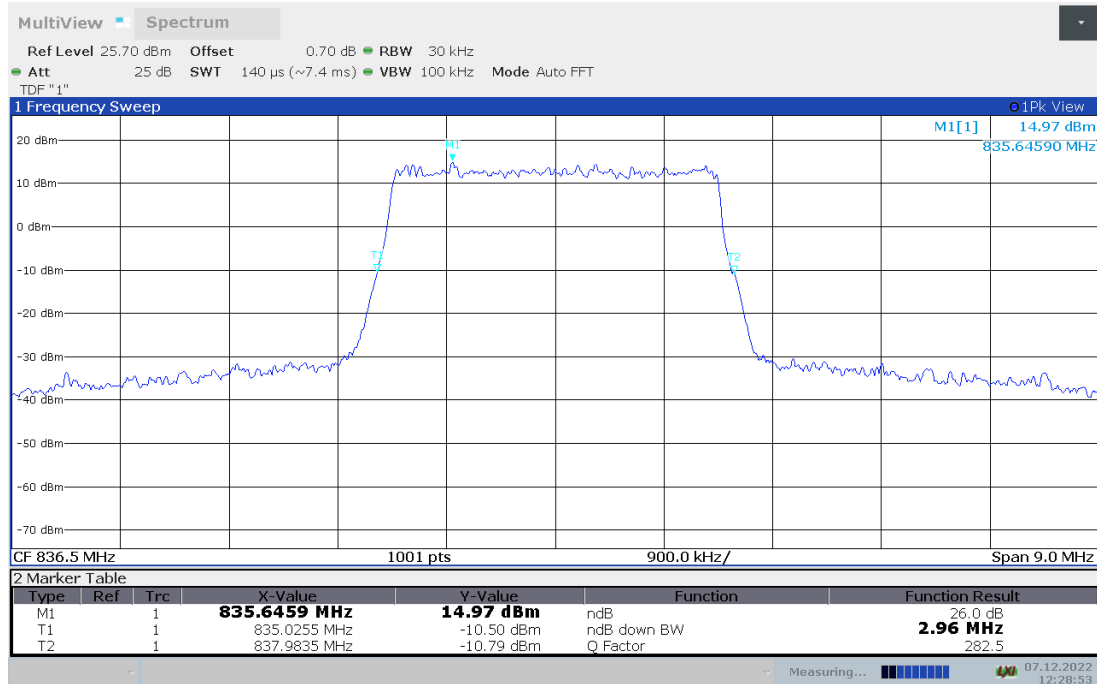
LTE band 5 , 1.4MHz Bandwidth,16QAM (-26dBc BW)



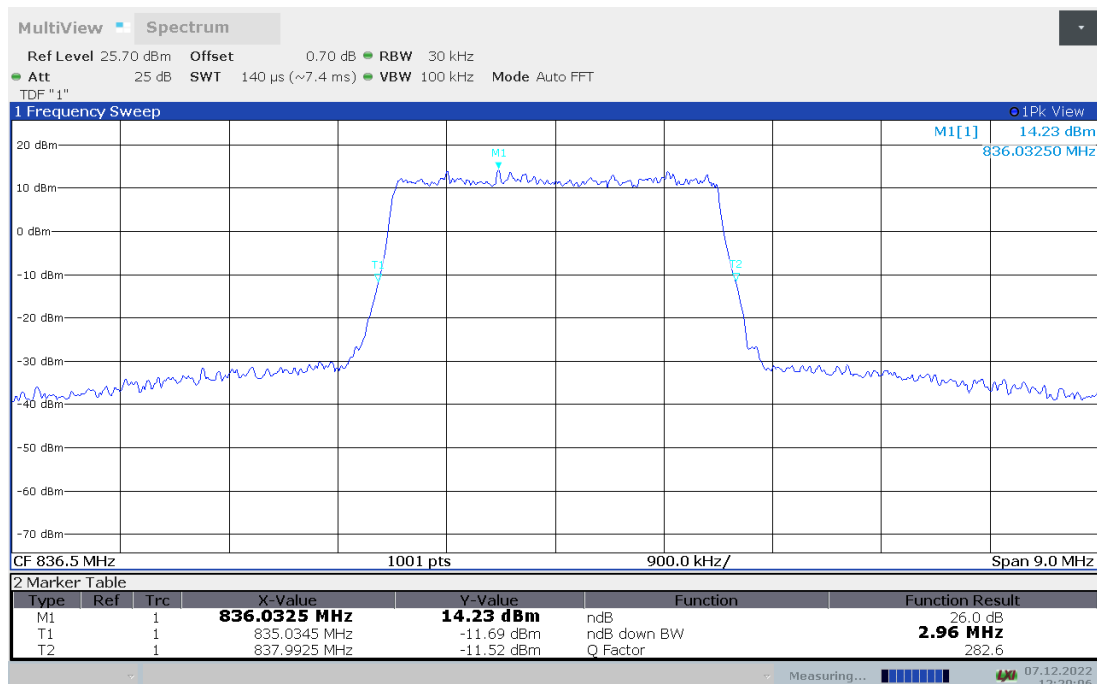
LTE band 5,3MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
836.5	2.958	2.958

LTE band 5 , 3MHz Bandwidth,QPSK (-26dBc BW)



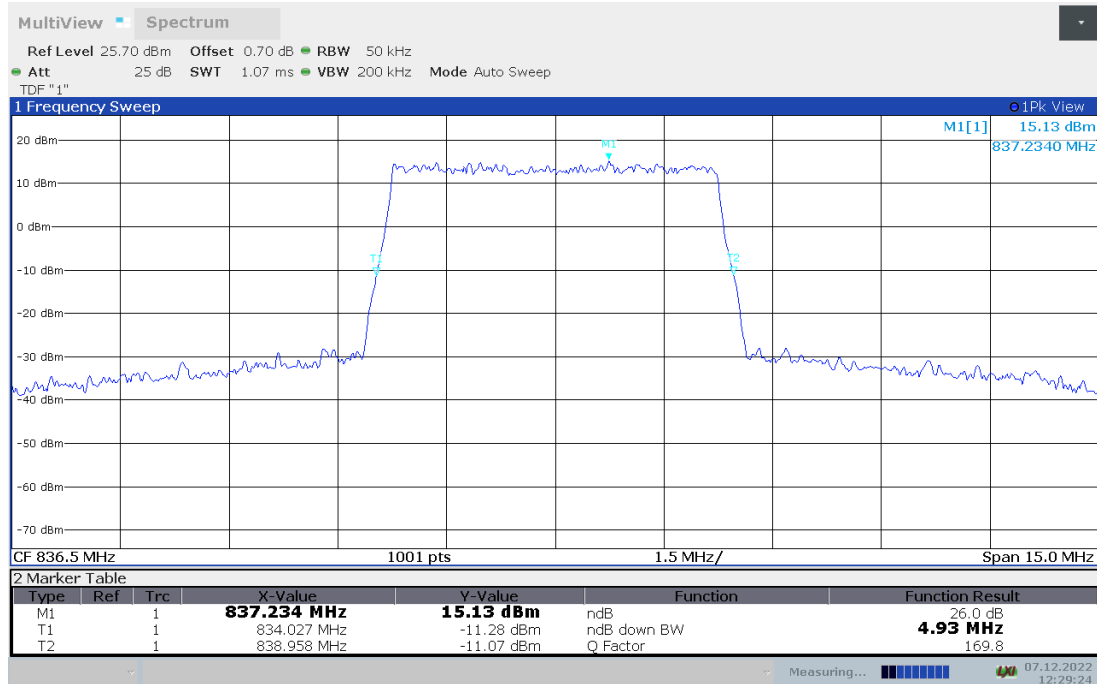
LTE band 5 , 3MHz Bandwidth,16QAM (-26dBc BW)



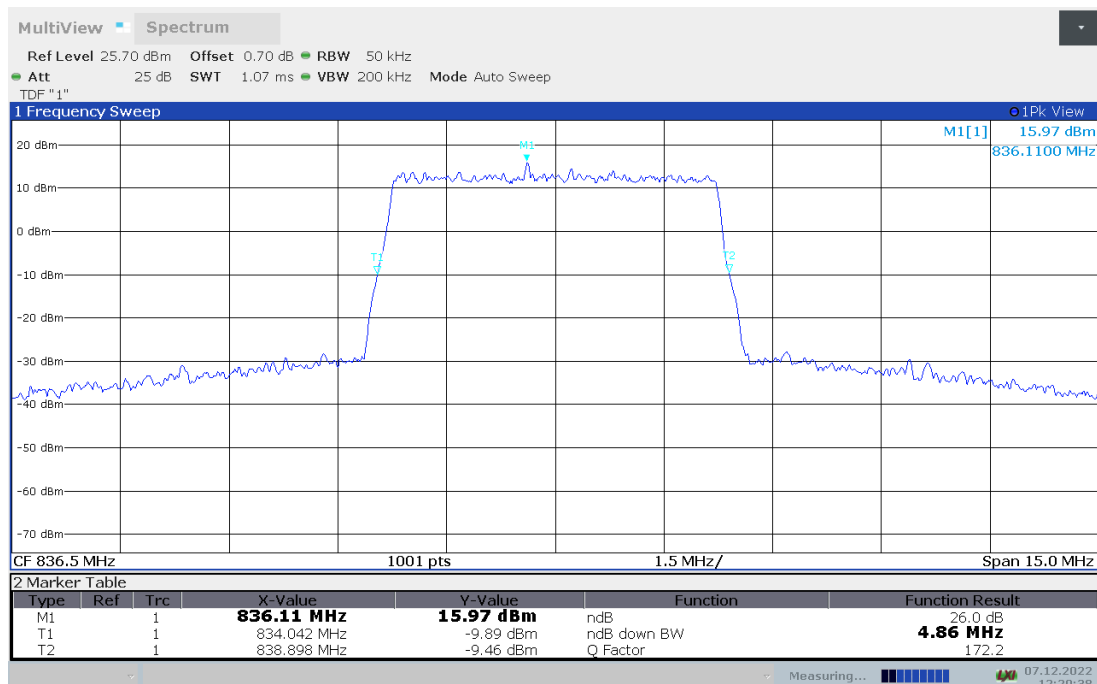
LTE band 5,5MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
836.5	4.930	4.855

LTE band 5 , 5MHz Bandwidth,QPSK (-26dBc BW)



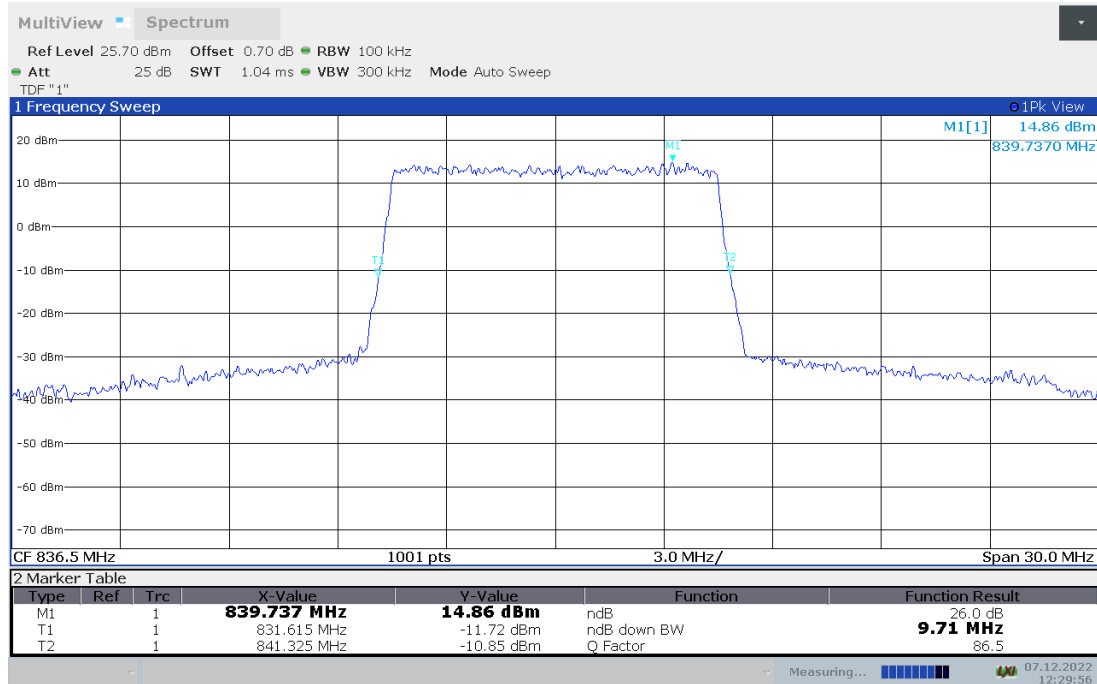
LTE band 5 , 5MHz Bandwidth,16QAM (-26dBc BW)



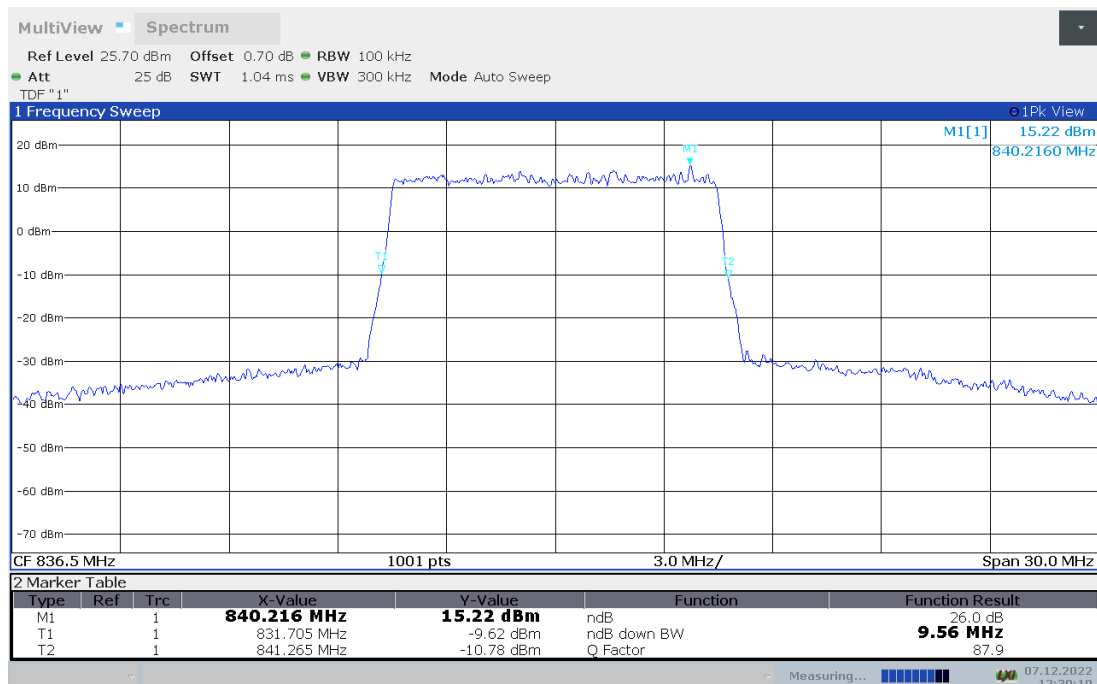
LTE band 5,10MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
836.5	9.710	9.560

LTE band 5 , 10MHz Bandwidth,QPSK (-26dBc BW)



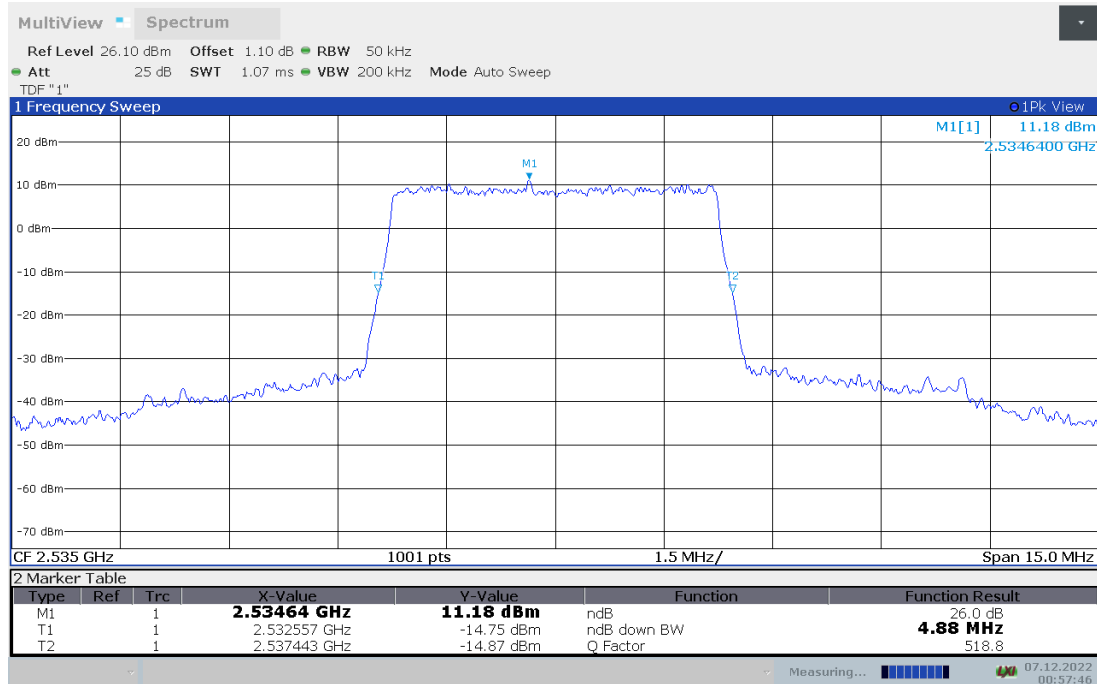
LTE band 5 , 10MHz Bandwidth,16QAM (-26dBc BW)



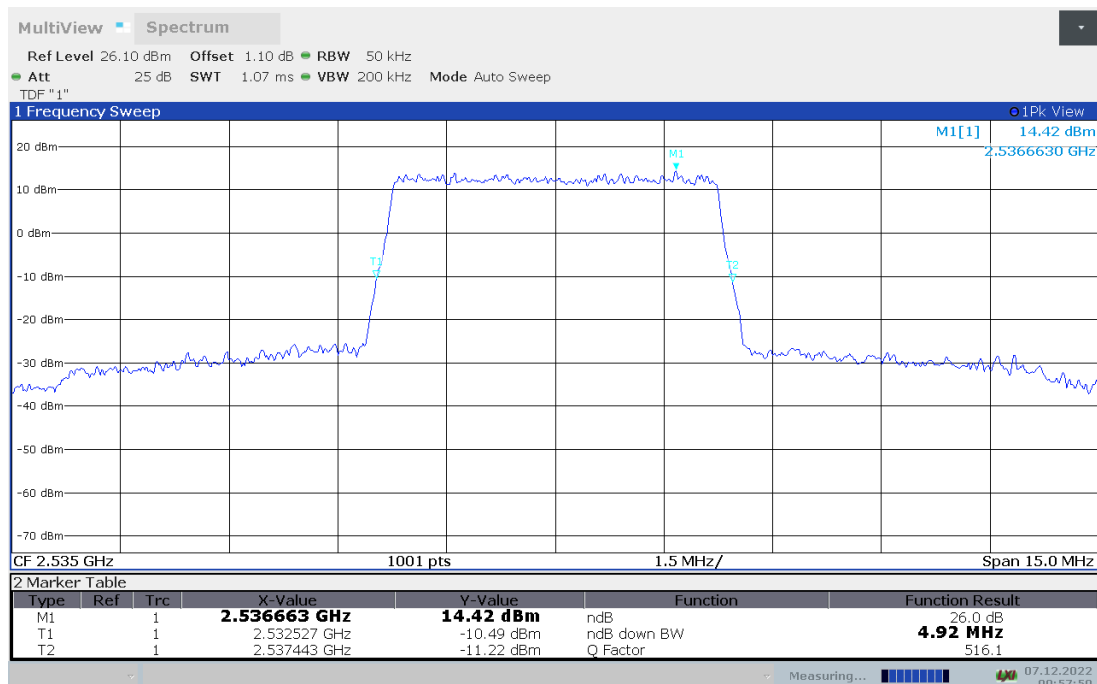
LTE band 7,5MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2535	4.885	4.915

LTE band 7 , 5MHz Bandwidth,QPSK (-26dBc BW)



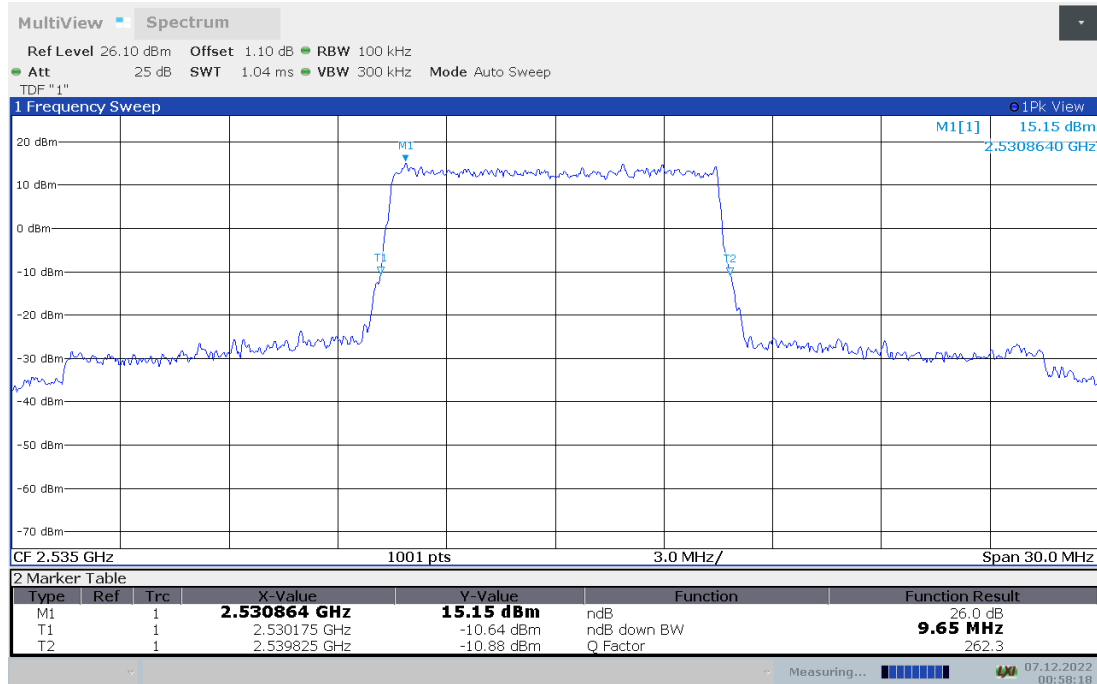
LTE band 7 , 5MHz Bandwidth,16QAM (-26dBc BW)



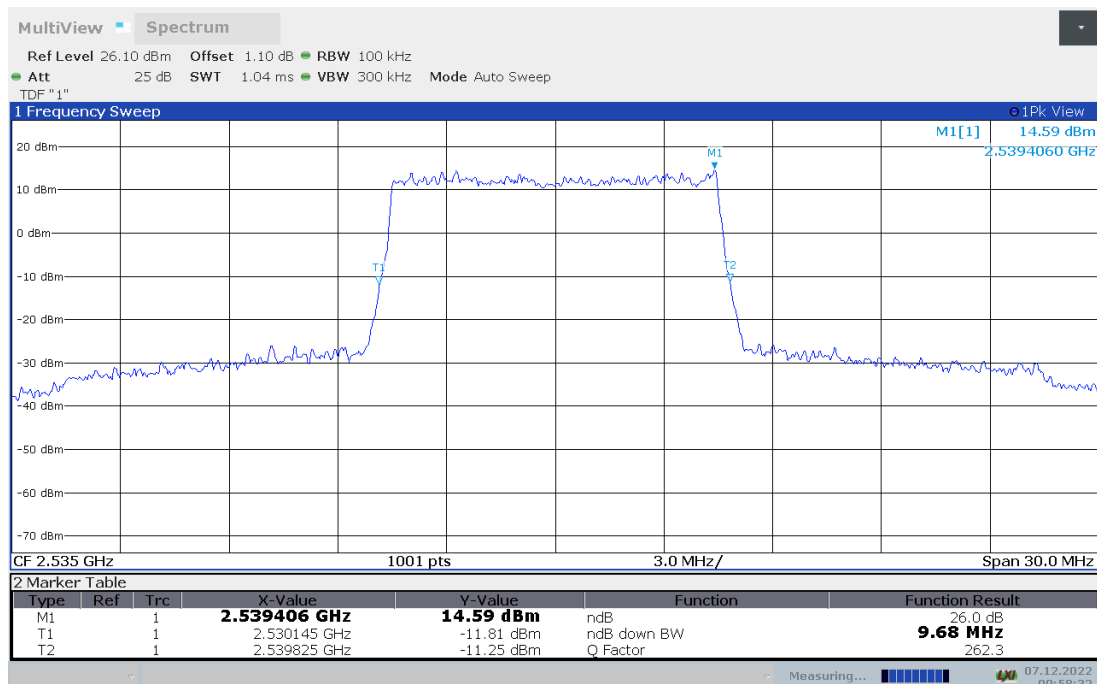
LTE band 7,10MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2535	9.650	9.680

LTE band 7 , 10MHz Bandwidth,QPSK (-26dBc BW)



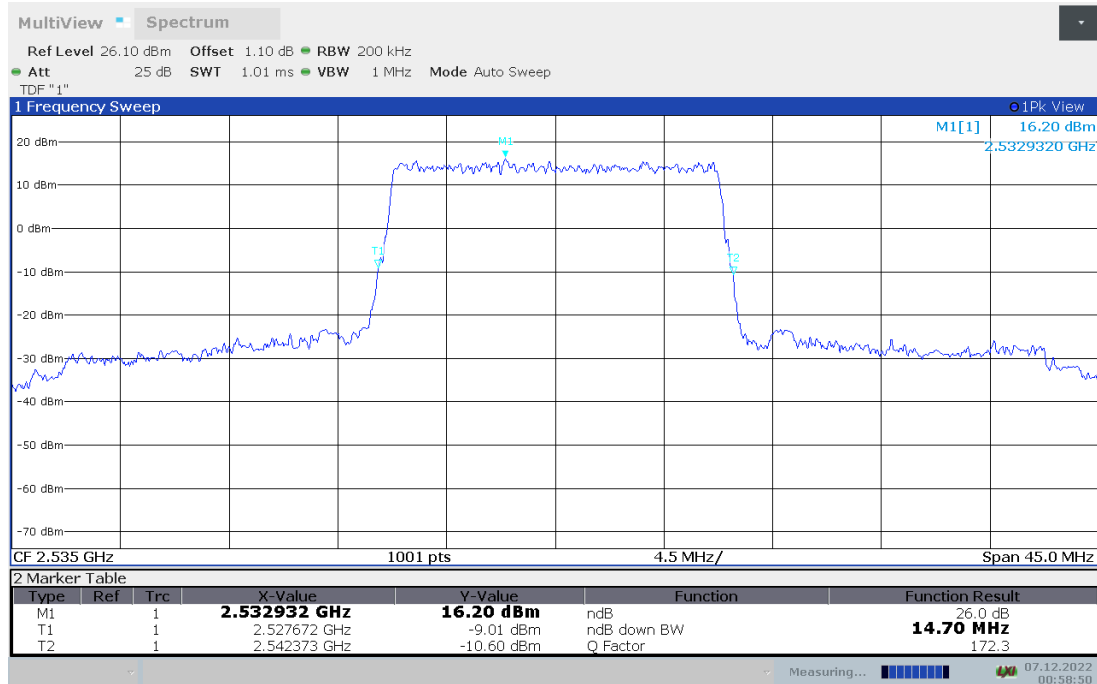
LTE band 7 , 10MHz Bandwidth,16QAM (-26dBc BW)



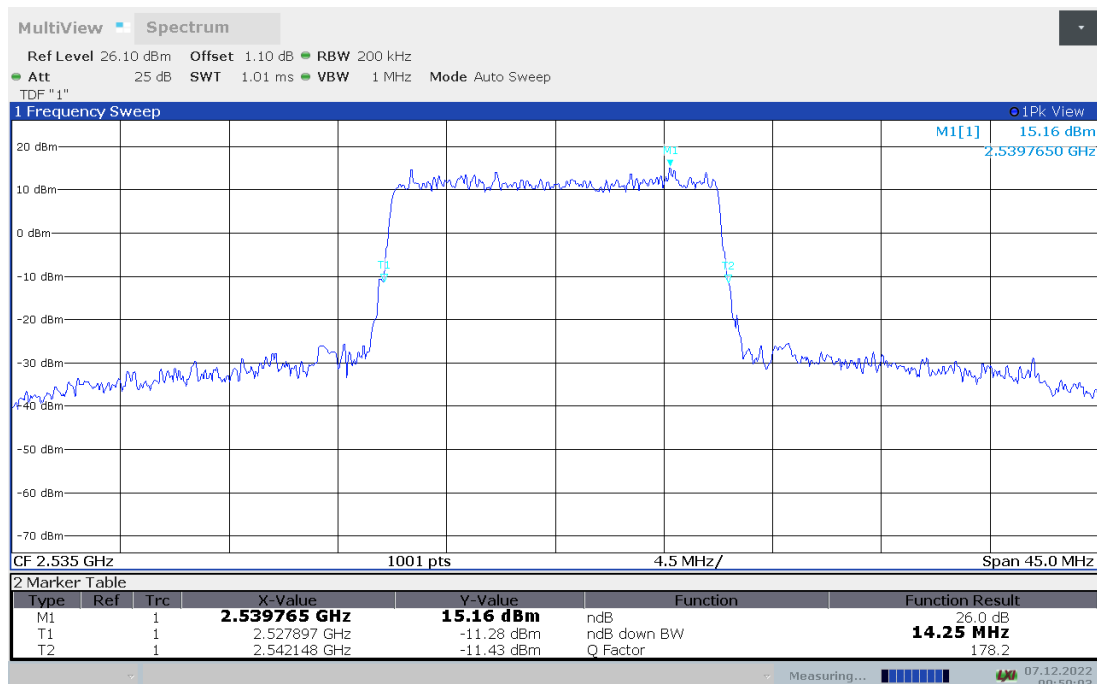
LTE band 7,15MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2535	14.700	14.251

LTE band 7 , 15MHz Bandwidth,QPSK (-26dBc BW)



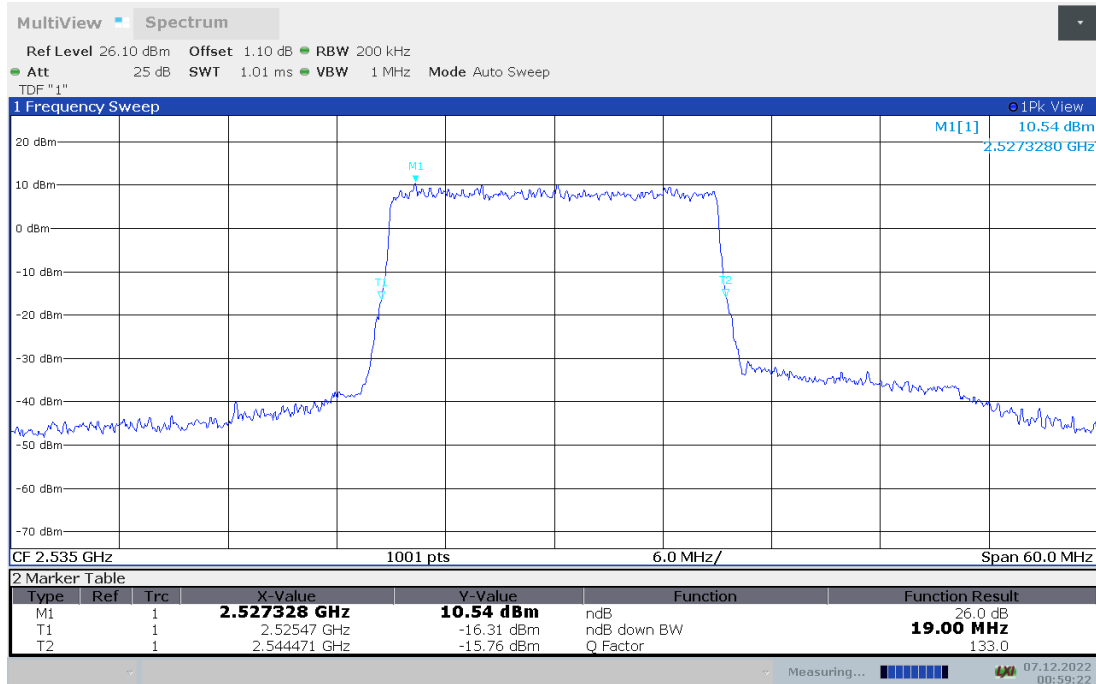
LTE band 7 , 15MHz Bandwidth,16QAM (-26dBc BW)



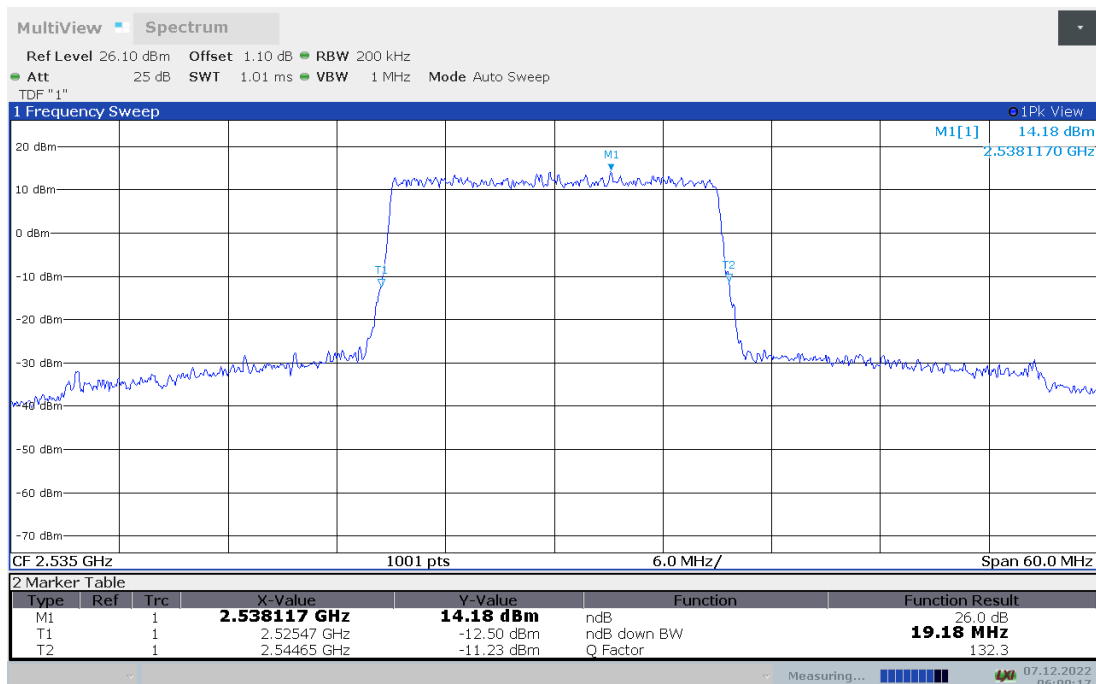
LTE band 7,20MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2535	19.001	19.181

LTE band 7 , 20MHz Bandwidth,QPSK (-26dBc BW)



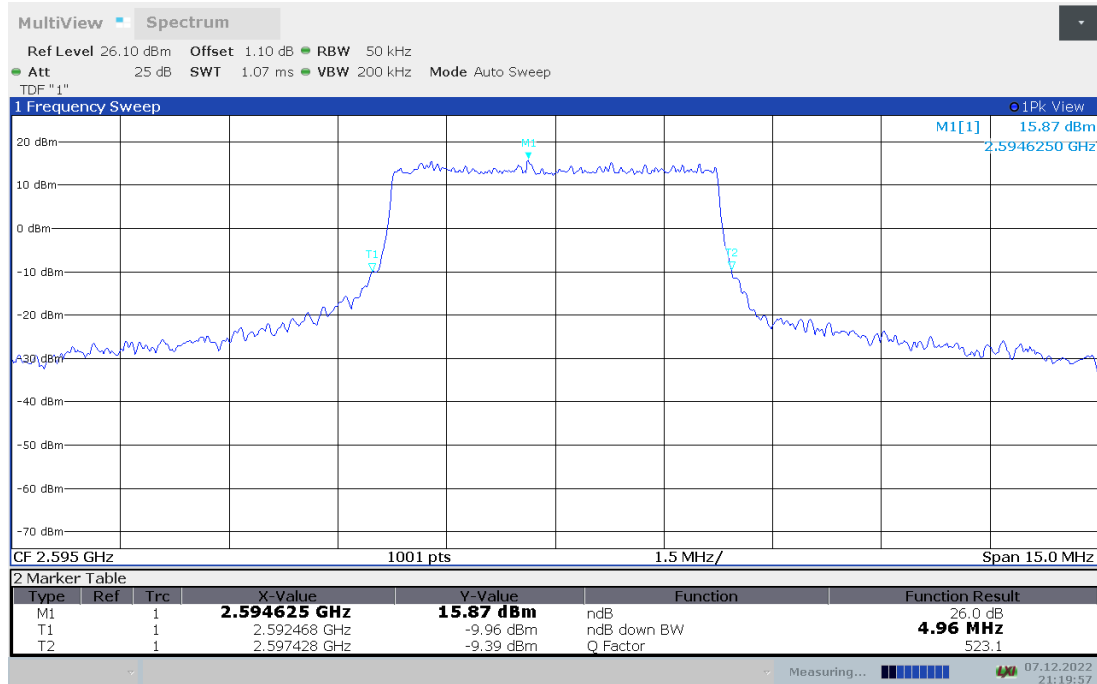
LTE band 7 , 20MHz Bandwidth,16QAM (-26dBc BW)



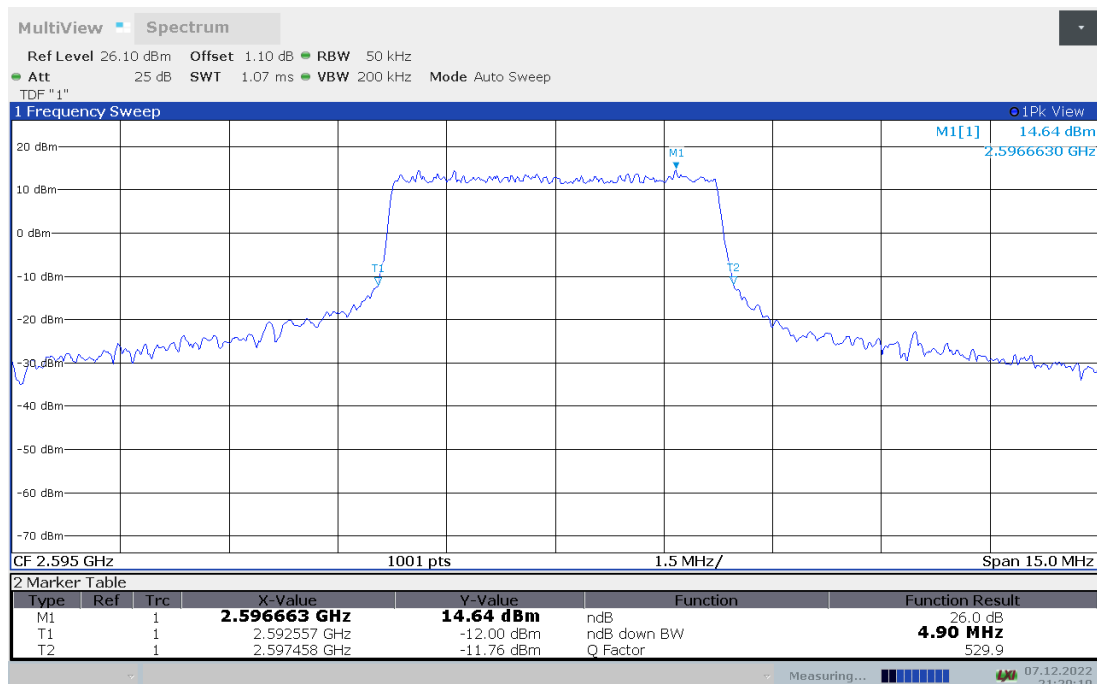
LTE band 38,5MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2595	4.960	4.900

LTE band 38 , 5MHz Bandwidth,QPSK (-26dBc BW)



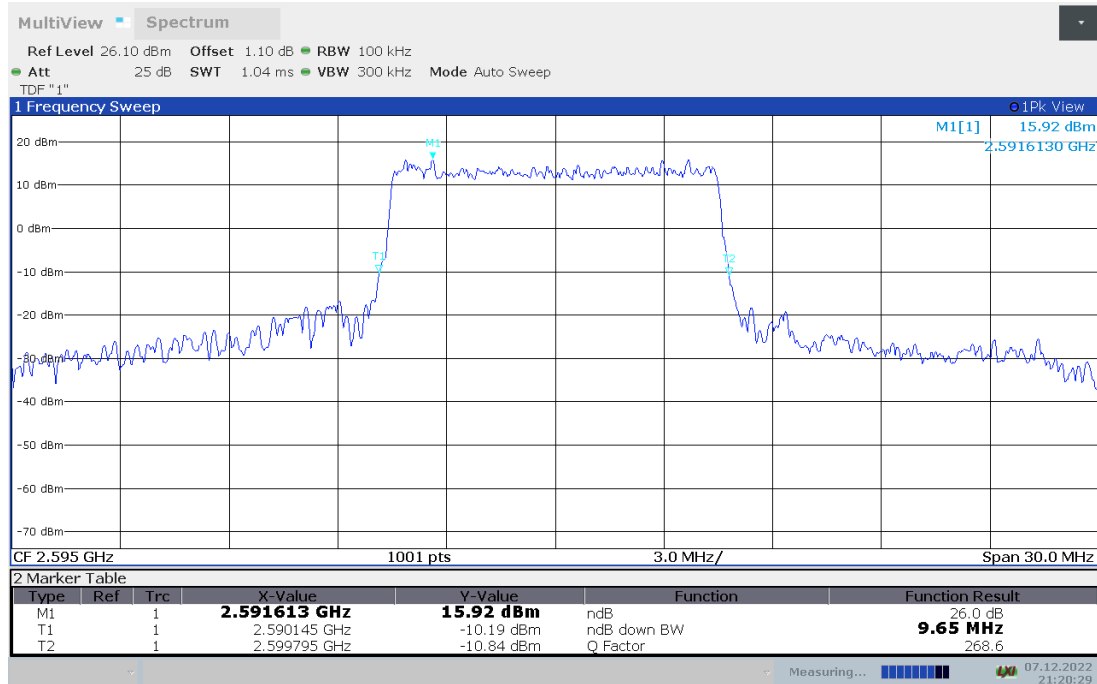
LTE band 38 , 5MHz Bandwidth,16QAM (-26dBc BW)



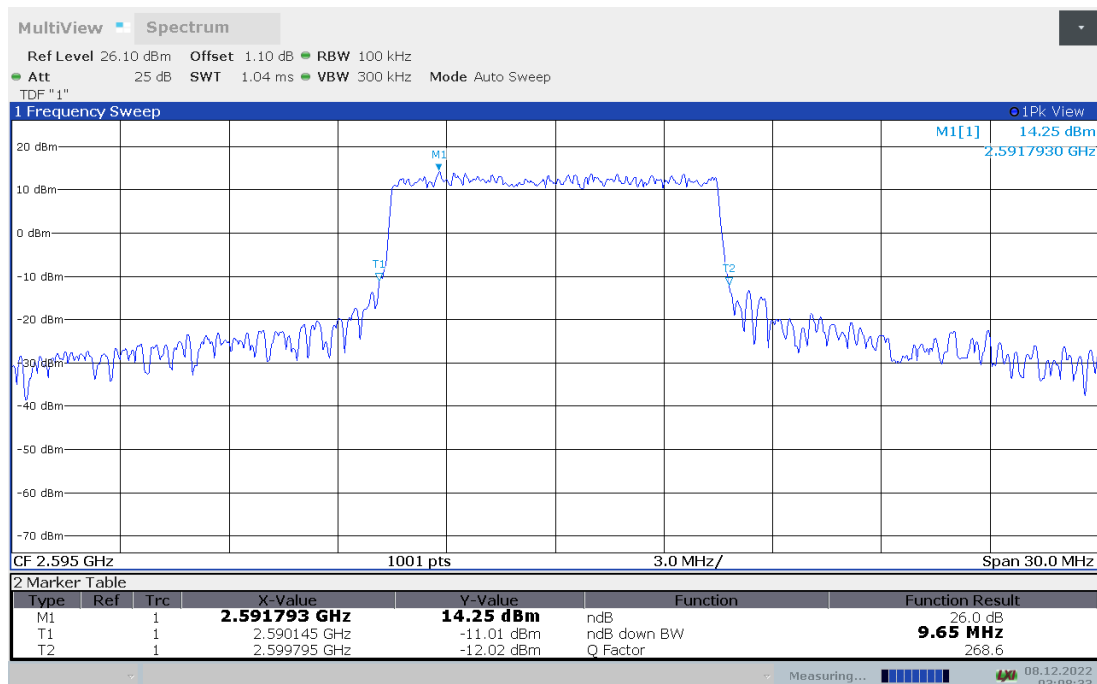
LTE band 38,10MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2595	9.650	9.650

LTE band 38 , 10MHz Bandwidth,QPSK (-26dBc BW)



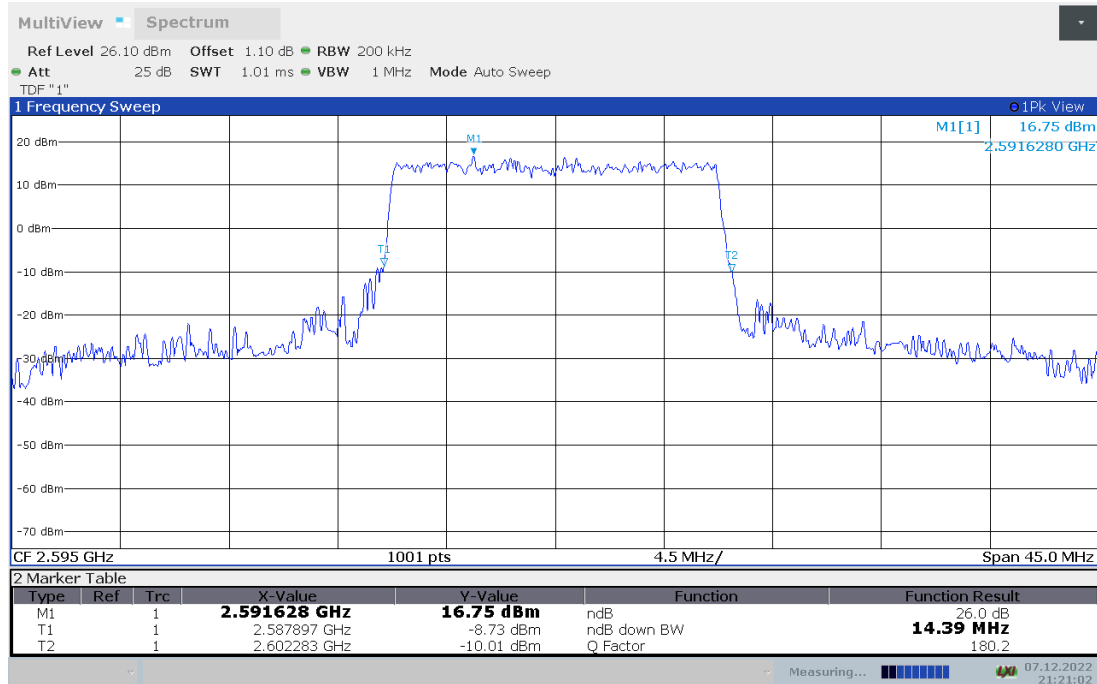
LTE band 38 , 10MHz Bandwidth,16QAM (-26dBc BW)



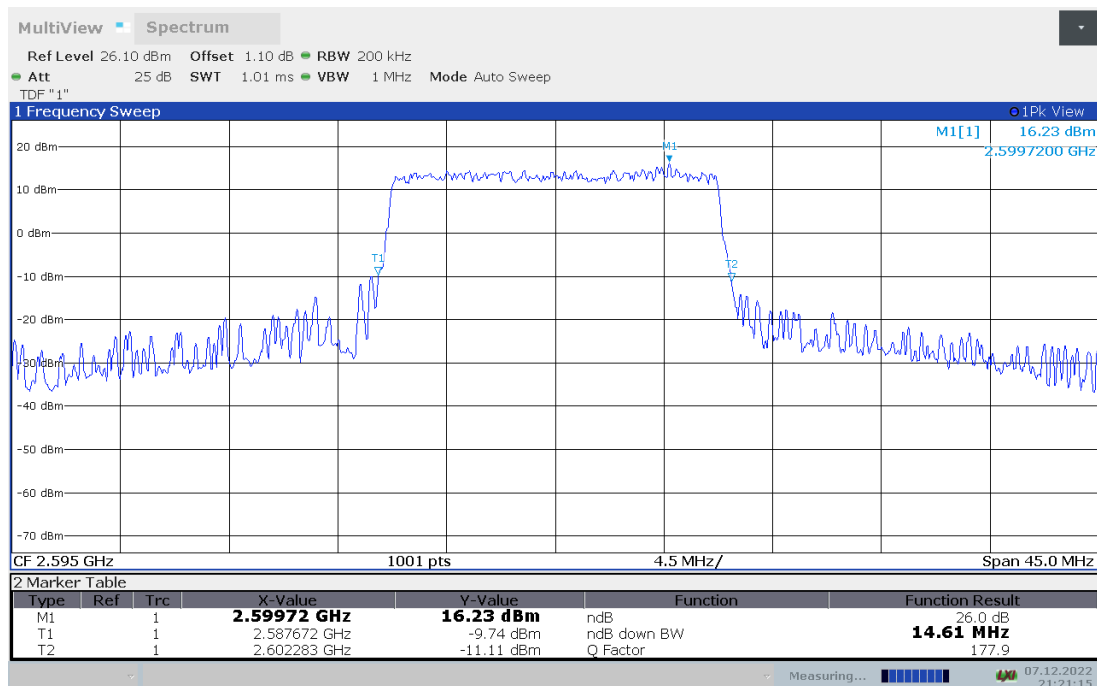
LTE band 38,15MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2595	14.386	14.610

LTE band 38 , 15MHz Bandwidth,QPSK (-26dBc BW)



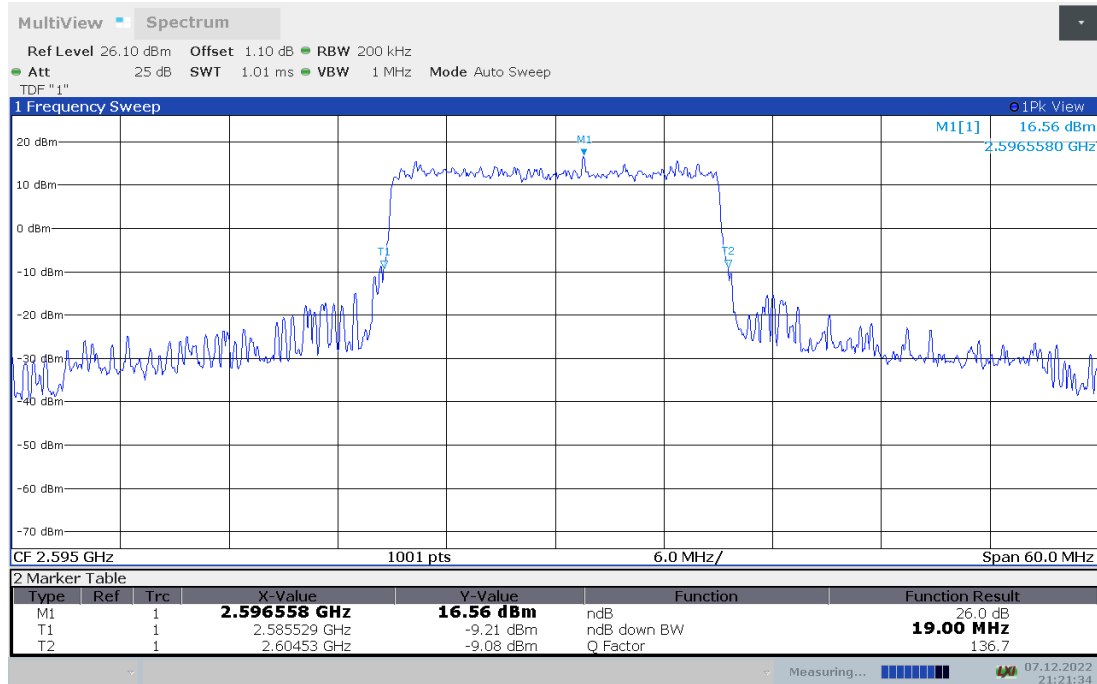
LTE band 38 , 15MHz Bandwidth,16QAM (-26dBc BW)



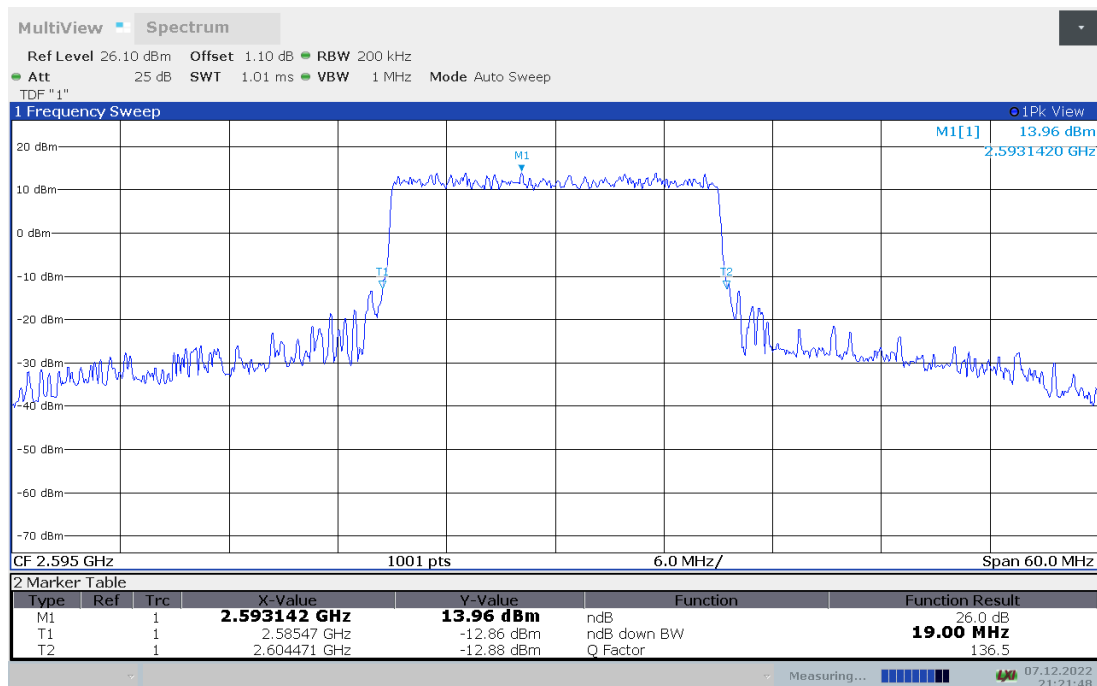
LTE band 38,20MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2595	19.001	19.001

LTE band 38 , 20MHz Bandwidth,QPSK (-26dBc BW)



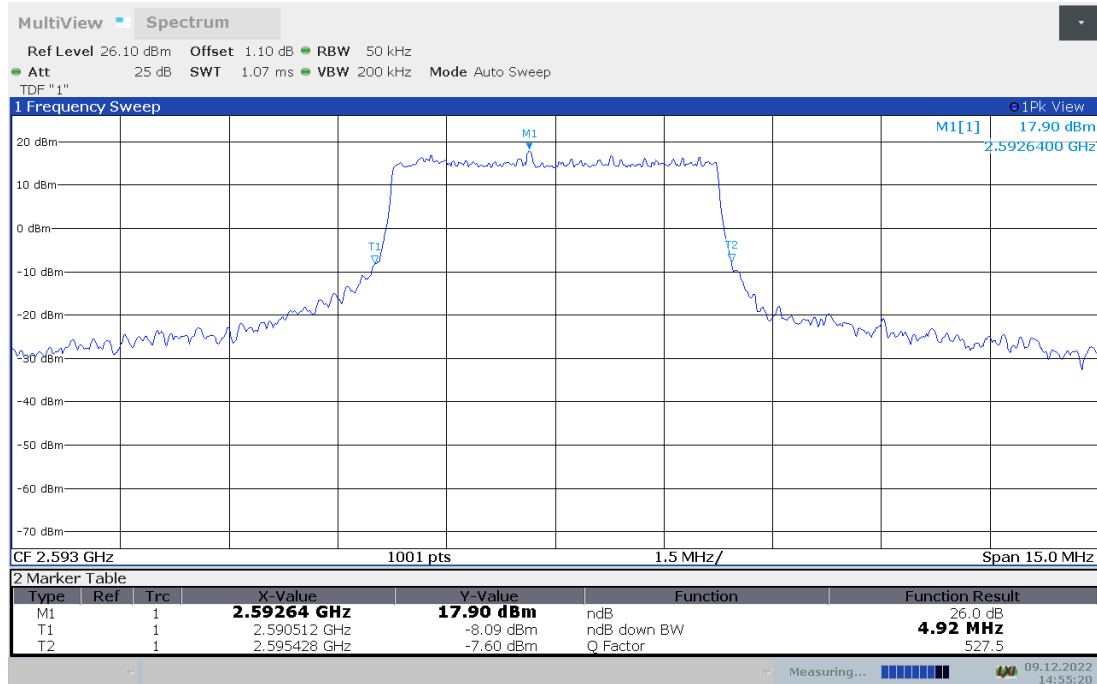
LTE band 38 , 20MHz Bandwidth,16QAM (-26dBc BW)



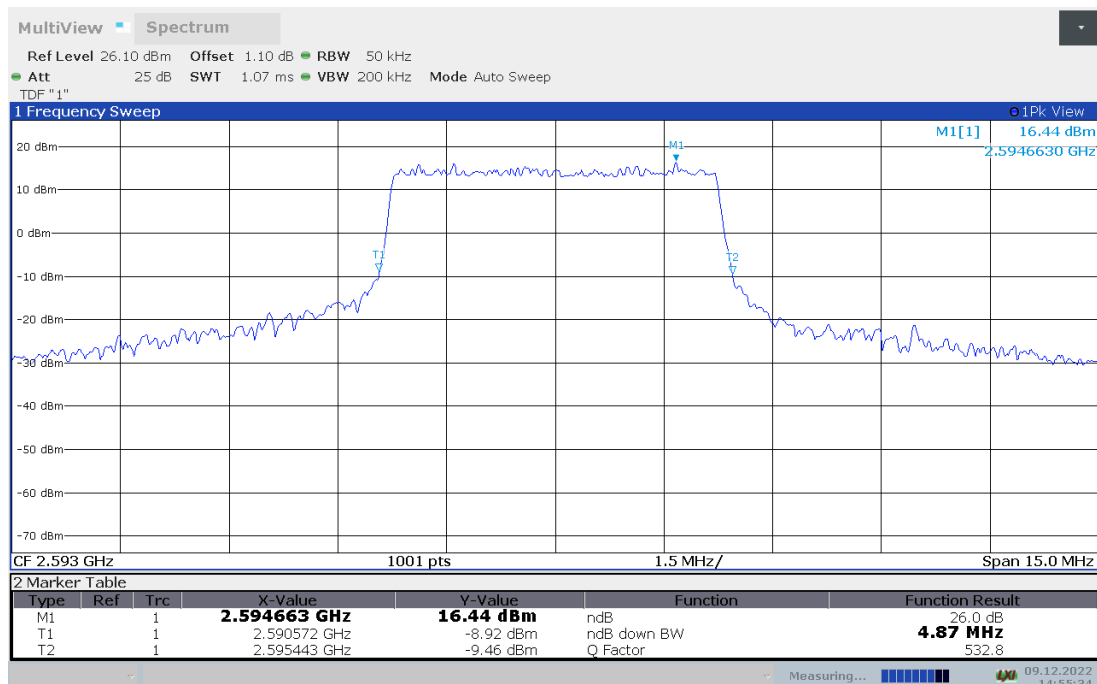
LTE band 41,5MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2593	4.915	4.870

LTE band 41 , 5MHz Bandwidth,QPSK (-26dBc BW)



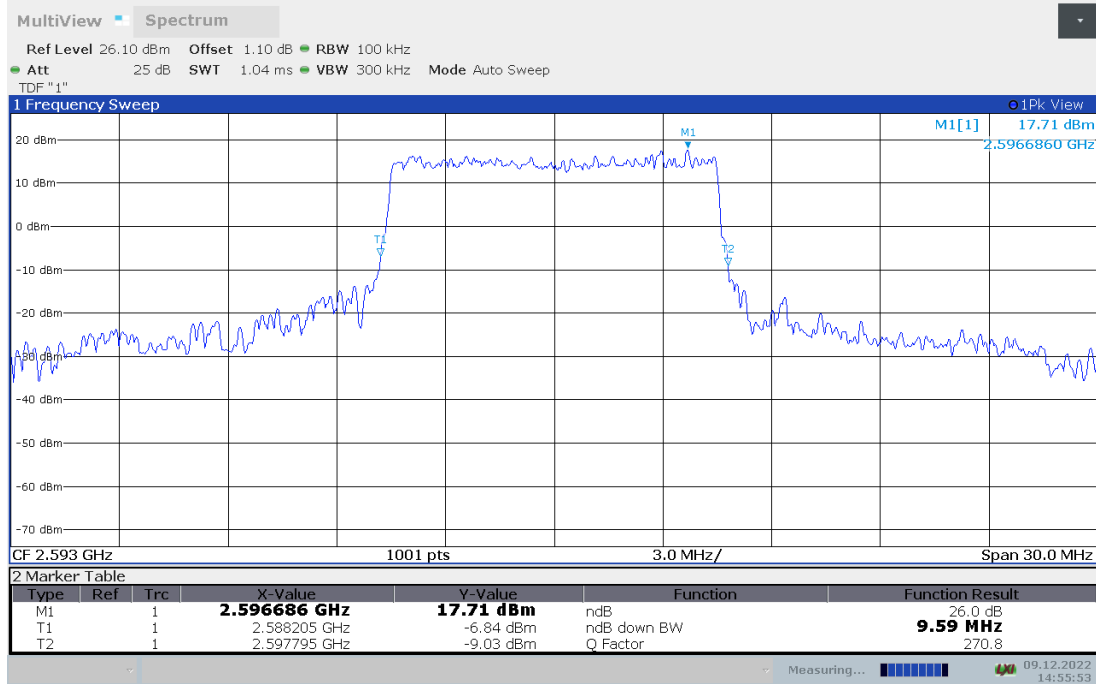
LTE band 41 , 5MHz Bandwidth,16QAM (-26dBc BW)



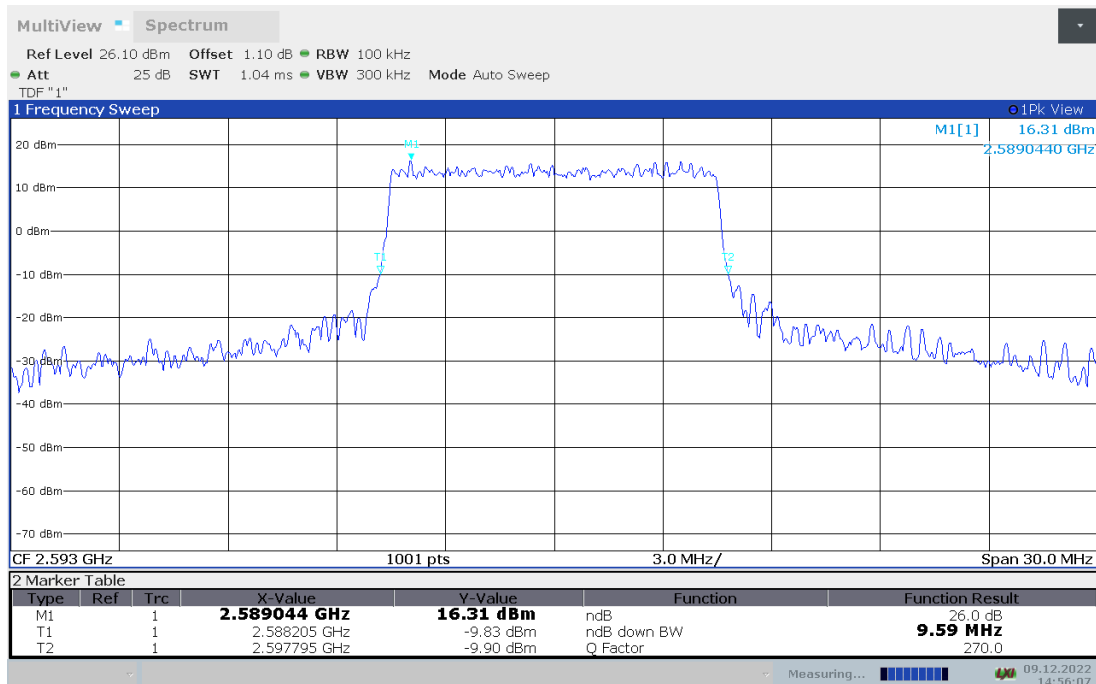
LTE band 41,10MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2593	9.590	9.590

LTE band 41 , 10MHz Bandwidth,QPSK (-26dBc BW)



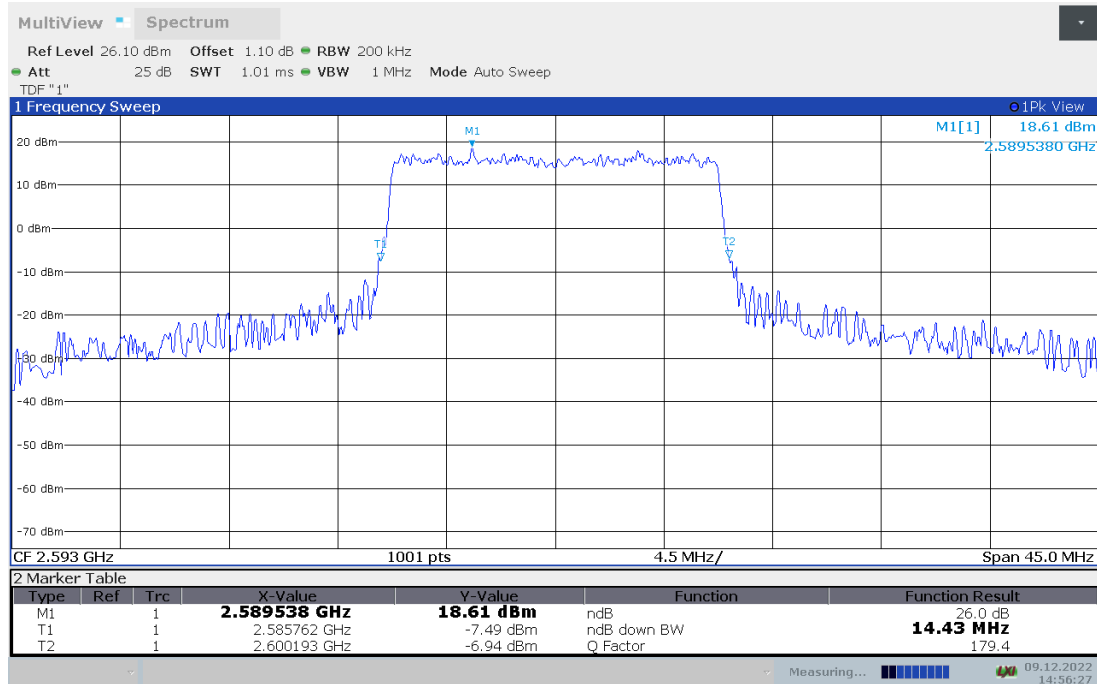
LTE band 41 , 10MHz Bandwidth,16QAM (-26dBc BW)



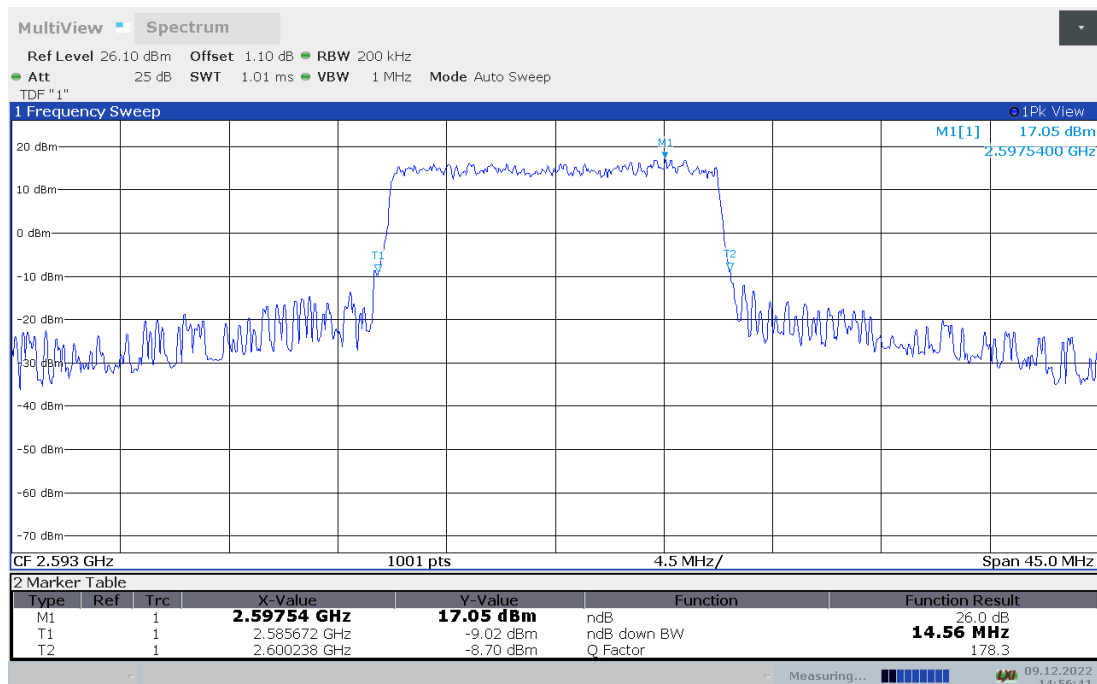
LTE band 41,15MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2593	14.431	14.565

LTE band 41 , 15MHz Bandwidth,QPSK (-26dBc BW)



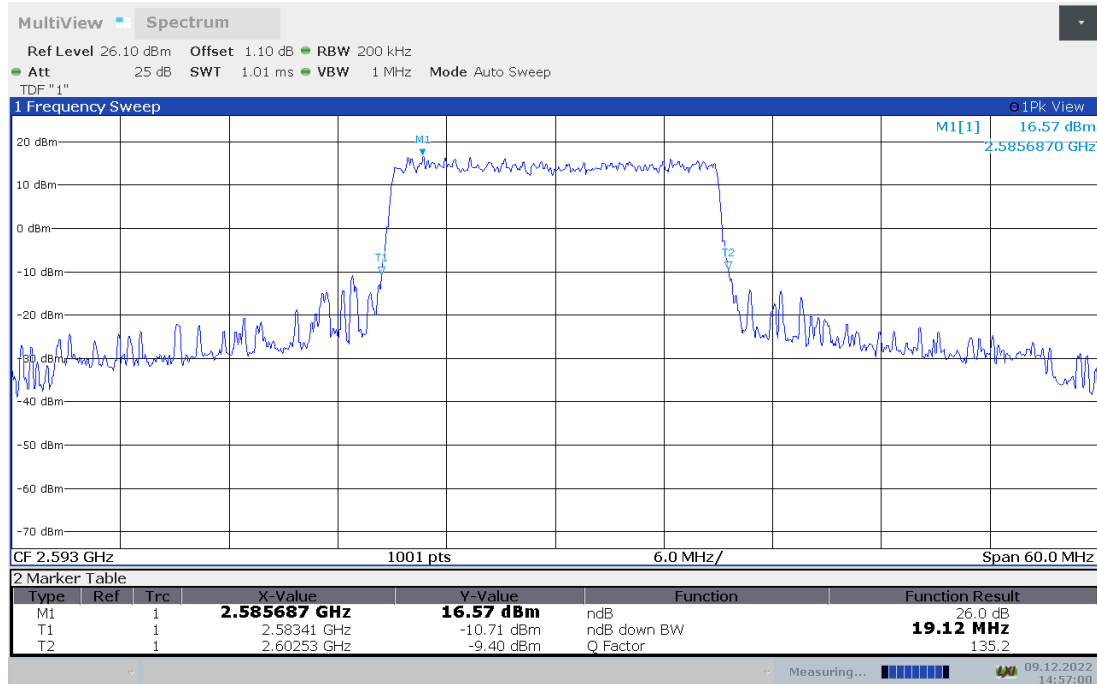
LTE band 41 , 15MHz Bandwidth,16QAM (-26dBc BW)



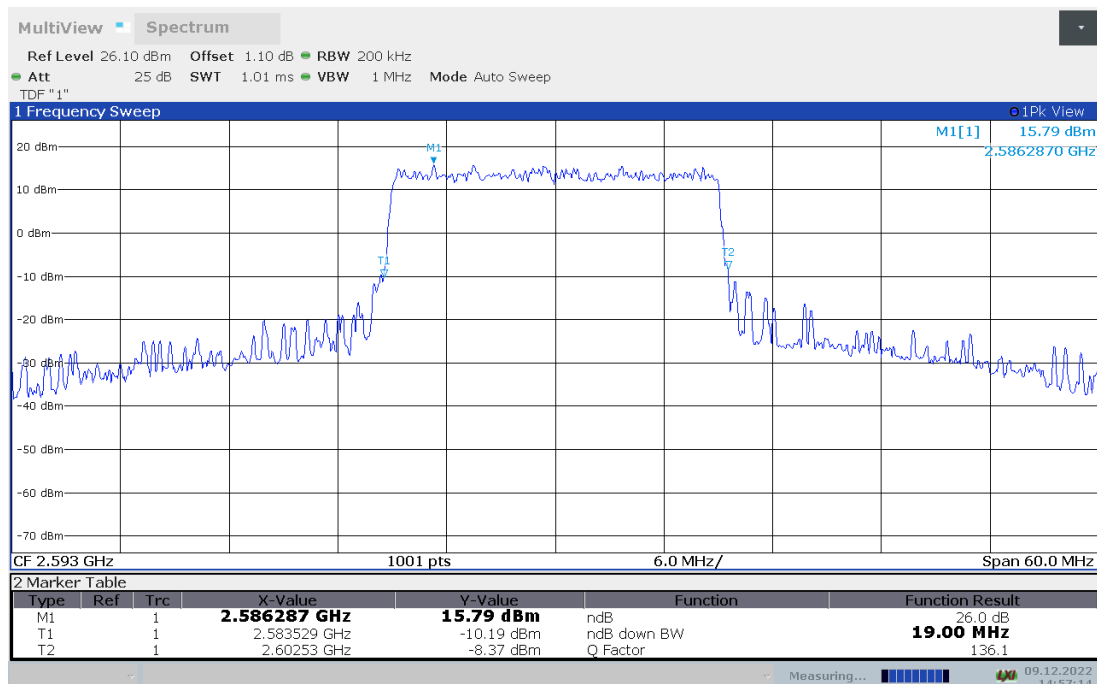
LTE band 41,20MHz(-26dBc)

Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2593	19.121	19.001

LTE band 41 , 20MHz Bandwidth,QPSK (-26dBc BW)



LTE band 41 , 20MHz Bandwidth,16QAM (-26dBc BW)



Note: Expanded measurement uncertainty is $U = 3428 \text{ Hz}$, $k = 2$

A.5 BAND EDGE COMPLIANCE

Reference

FCC: CFR Part 2.1051, 22.917, 27.53.

A.5.1 Measurement limit

Part 22.917 For operations in the 824–849MHz band, the FCC limit is $43 + 10 \log (P)$ dB below the transmitter power(P) in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

Part 27.53(m) specifies for mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

A.5.2 Measurement Procedure

The testing follows ANSI C63.26

- a) The EUT was connected to spectrum analyzer and system simulator via a power divider.
- b) The band edges of low and high channels for the highest RF powers were measured.
- c) Set RBW $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
- d) Set spectrum analyzer with RMS detector.
- e) The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- f) Checked that all the results comply with the emission limit line.

A.5.3 Measurement result

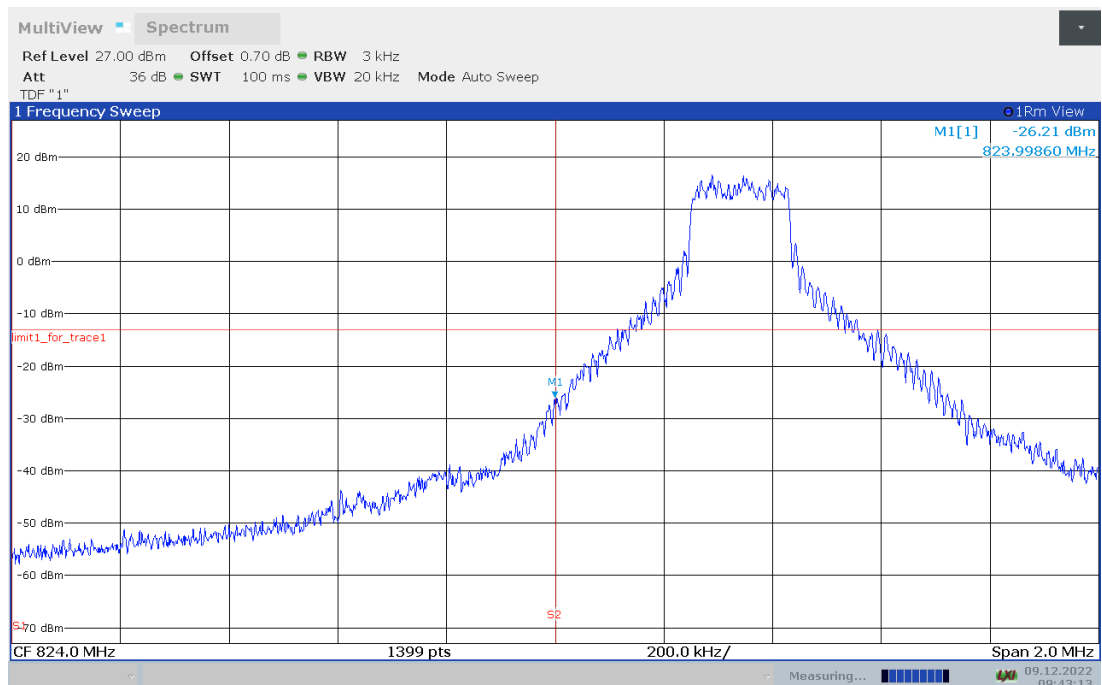
Only worst case result is given below

LTE band 5

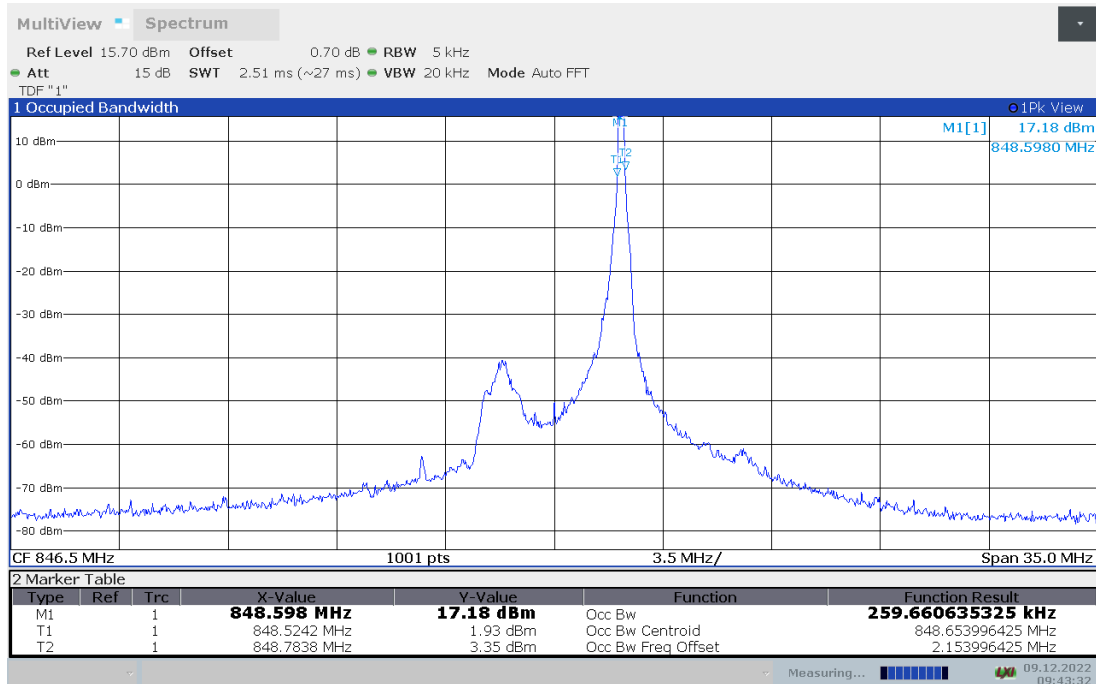
OBW: 1RB-LOW_offset



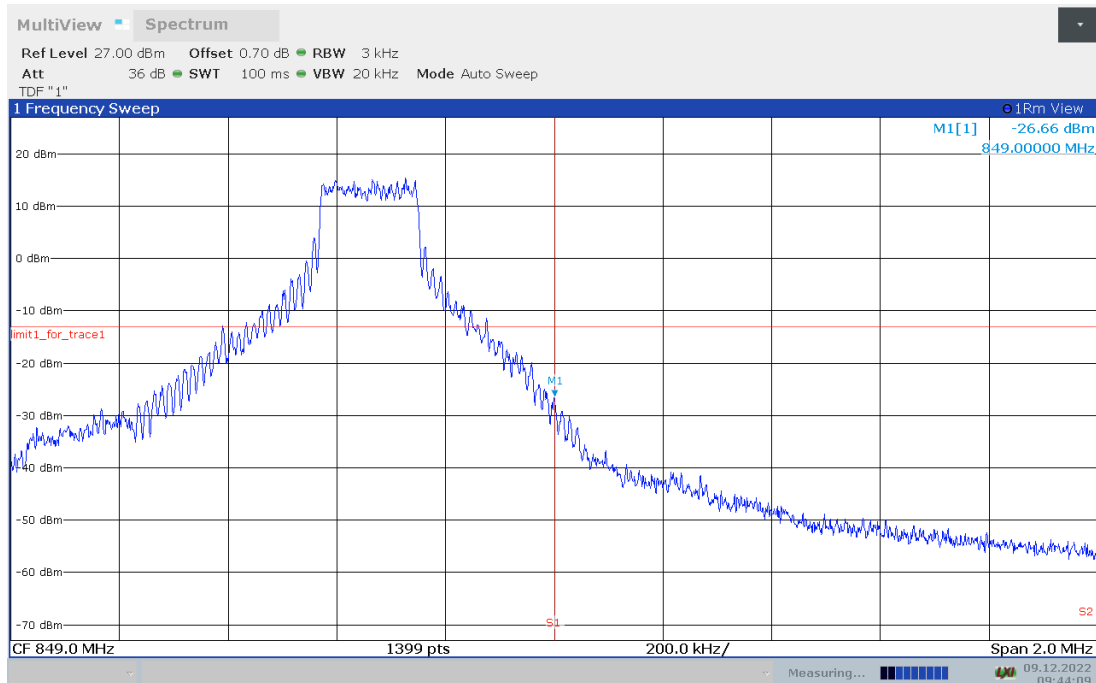
LOW BAND EDGE BLOCK-1RB-LOW_offset



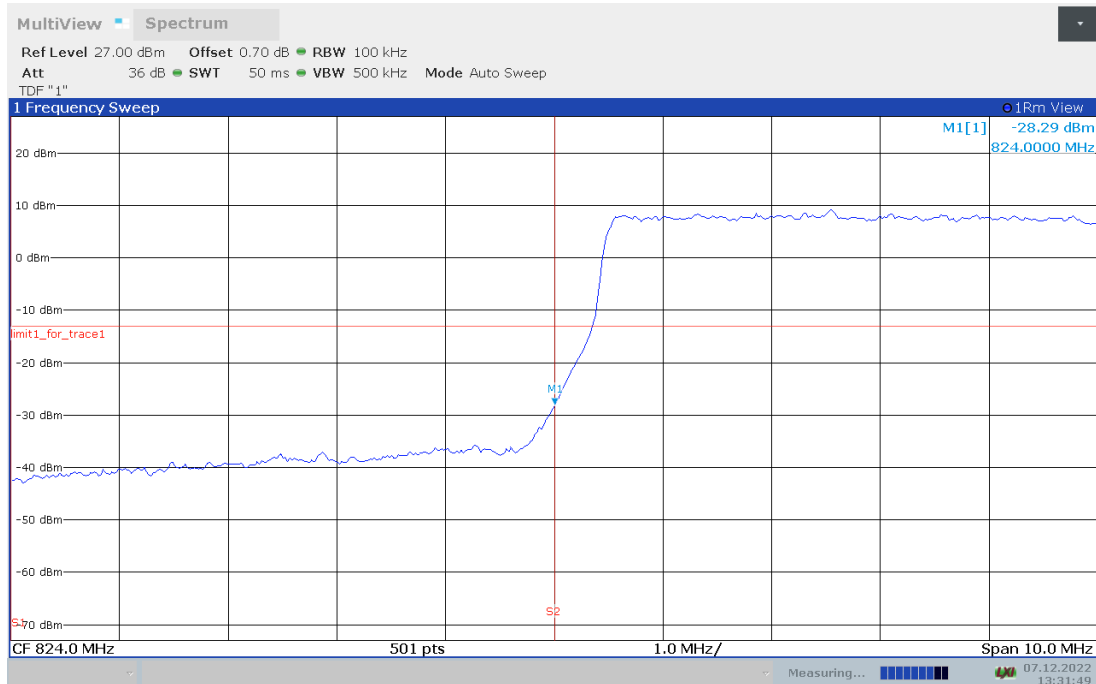
OBW: 1RB-HIGH_offset



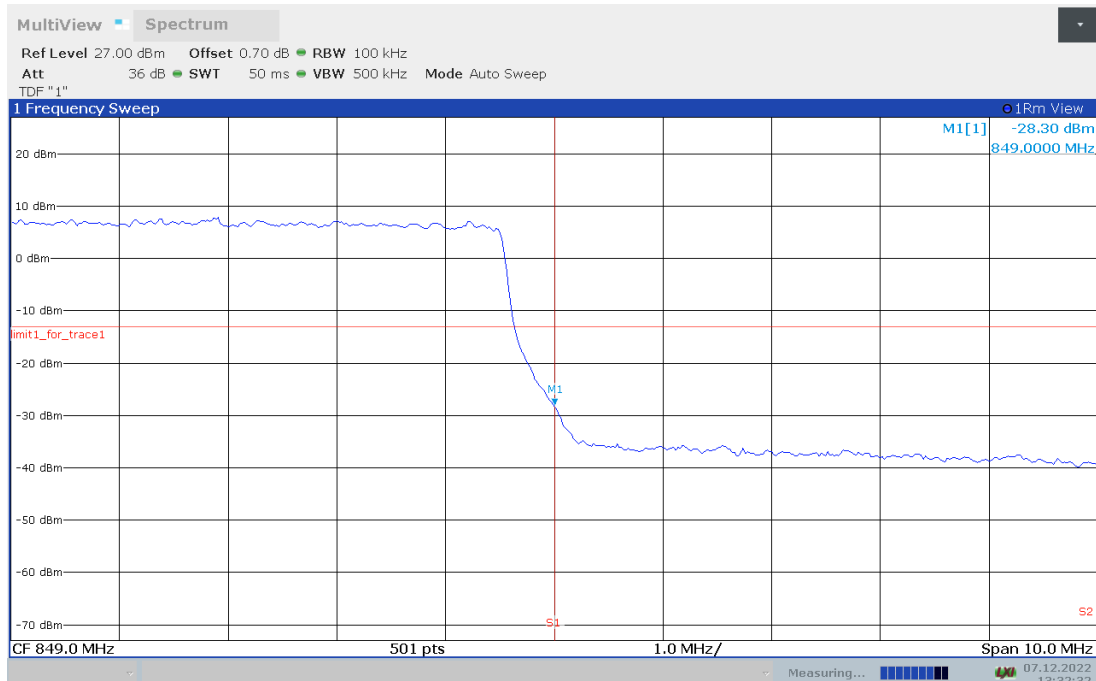
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



LOW BAND EDGE BLOCK-10M-100%RB

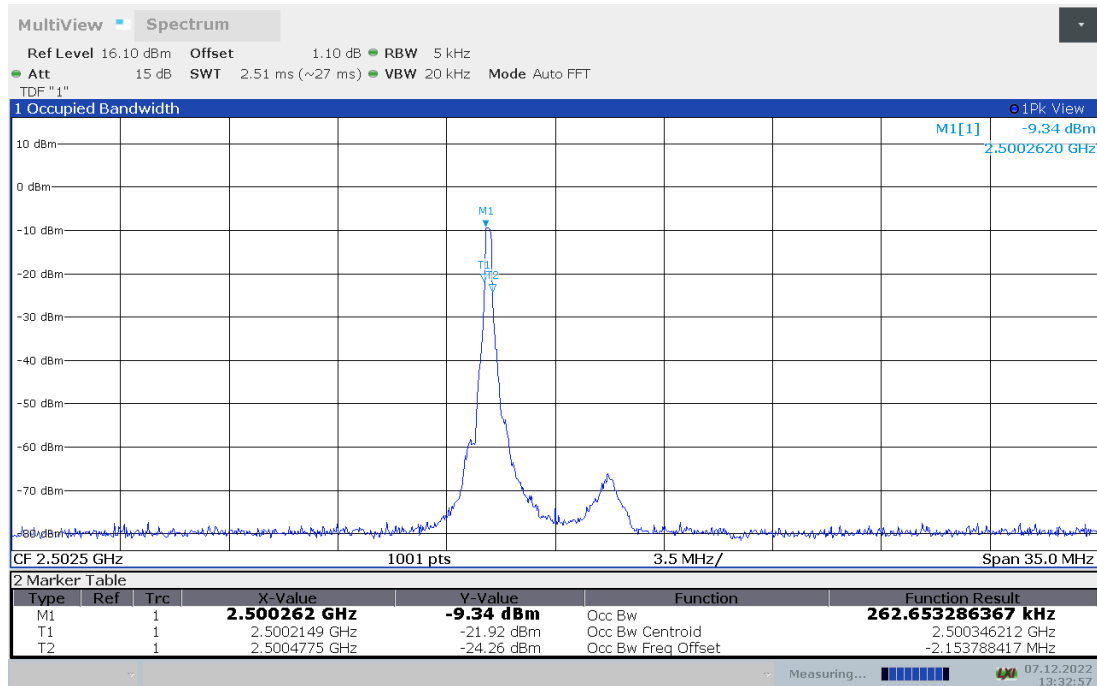


HIGH BAND EDGE BLOCK-10M-100%RB

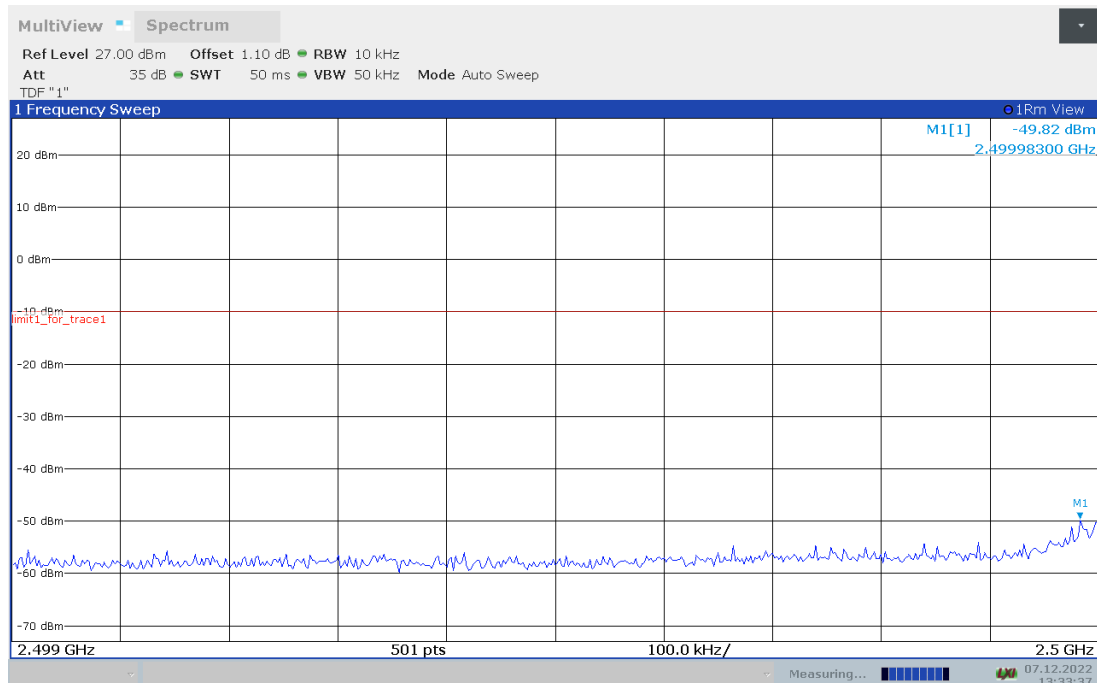


LTE band 7

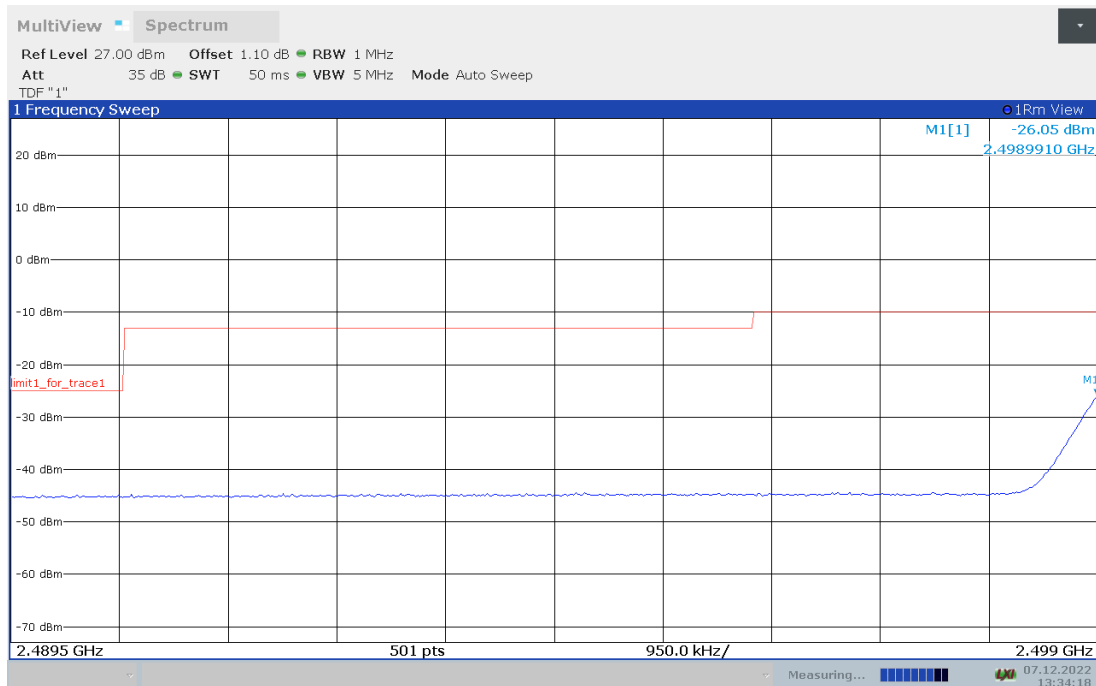
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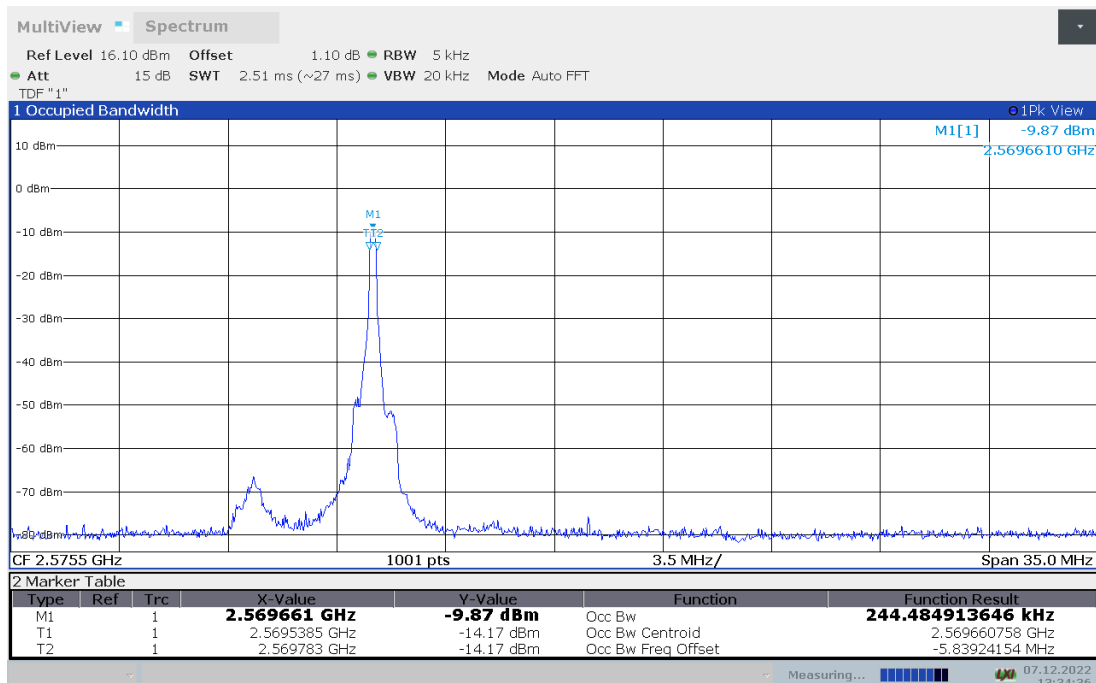
LOW BAND EDGE BLOCK-1RB-LOW_offset



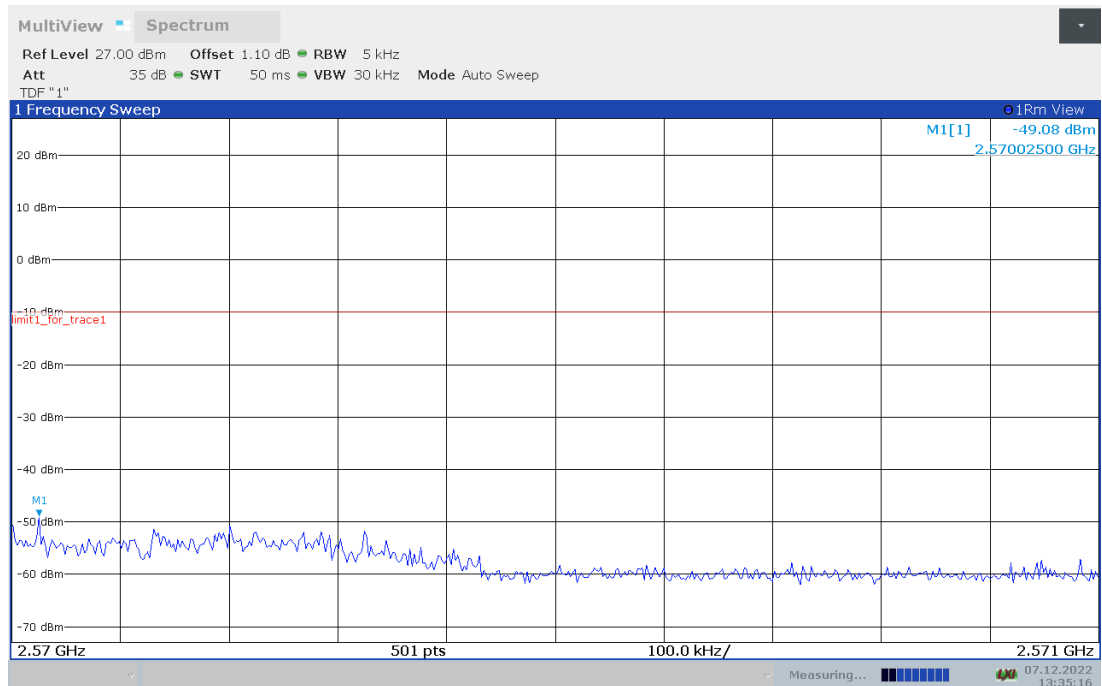
LOW BAND EDGE BLOCK-1RB-LOW_offset



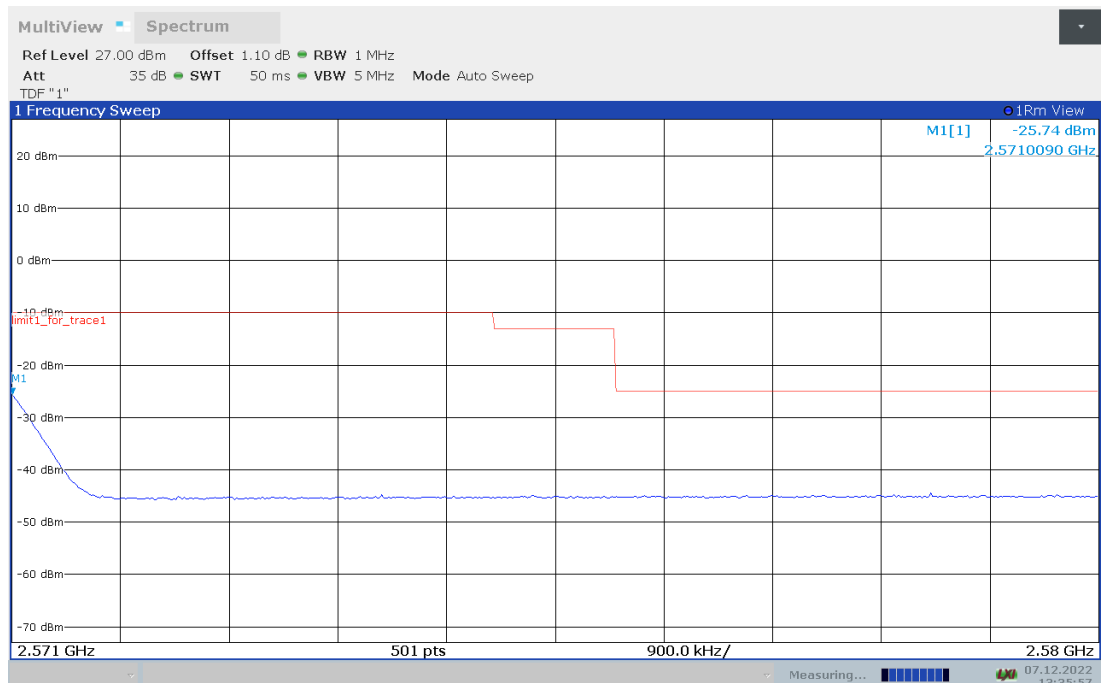
OBW: 1RB-HIGH_offset



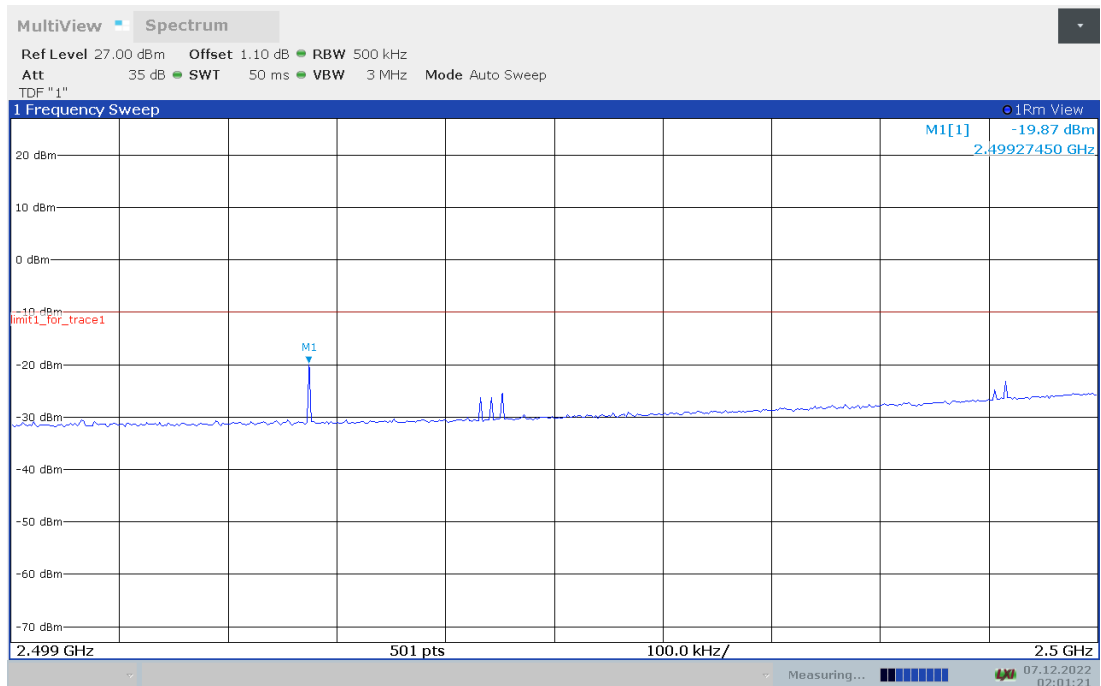
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



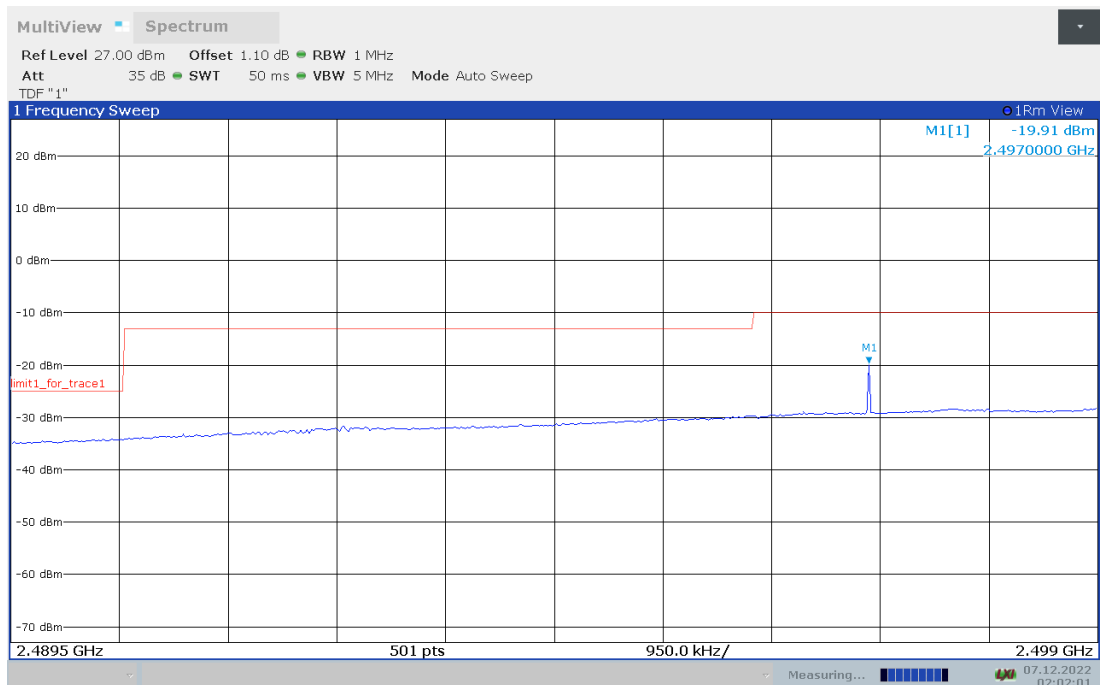
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



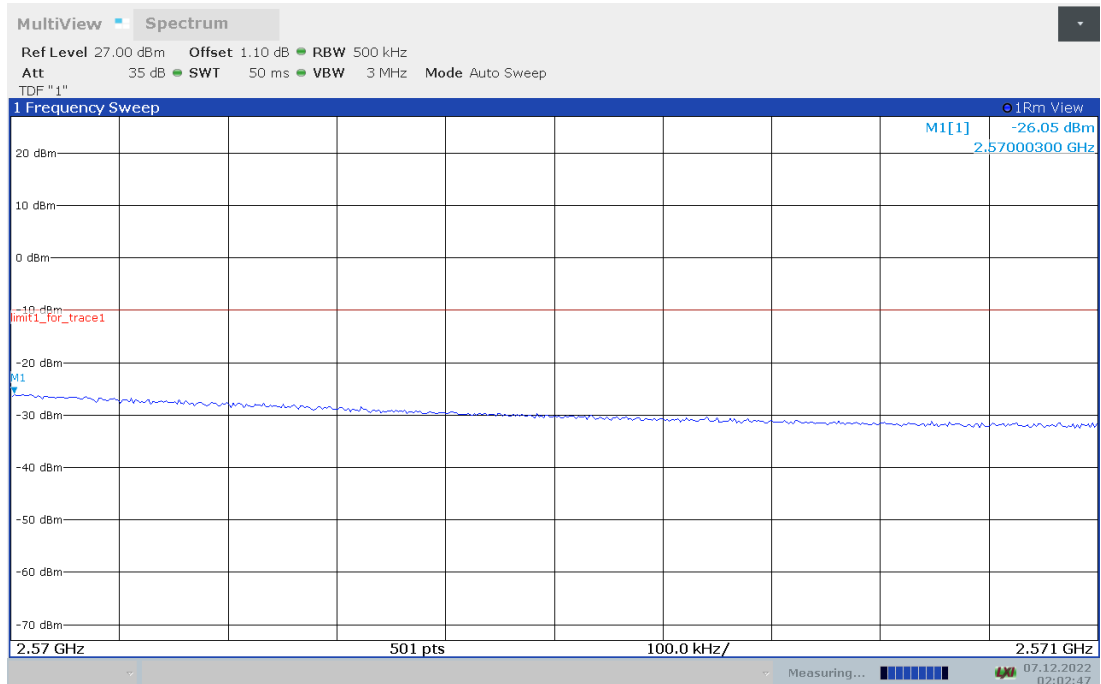
LOW BAND EDGE BLOCK-20M-100%RB



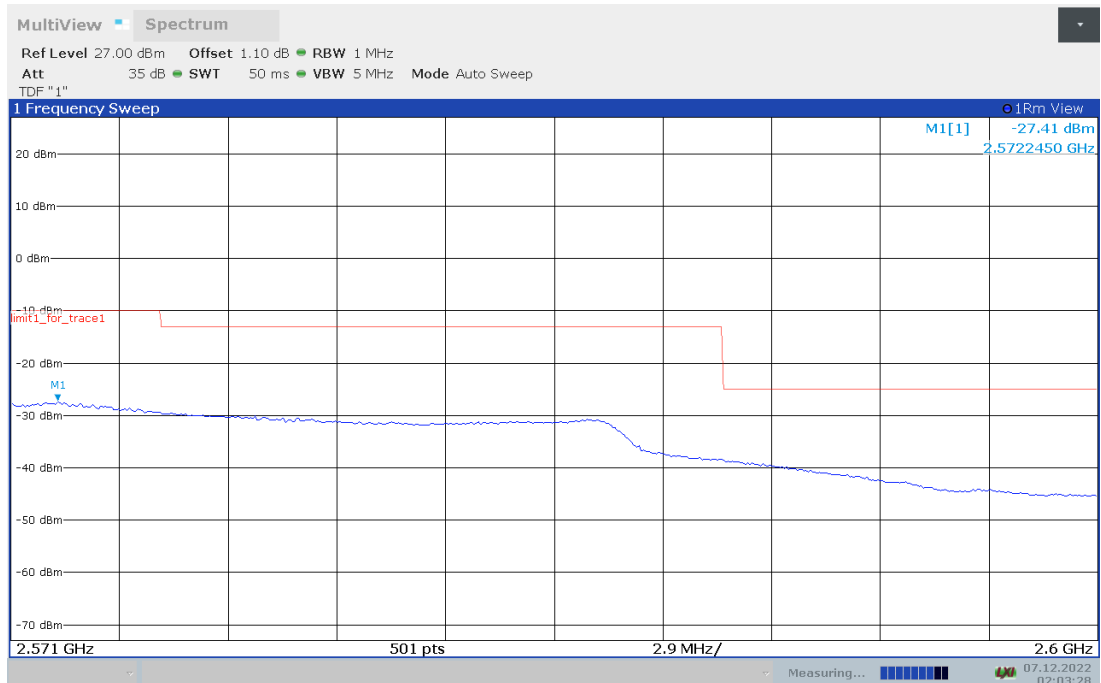
LOW BAND EDGE BLOCK-20M-100%RB



HIGH BAND EDGE BLOCK-20M-100%RB

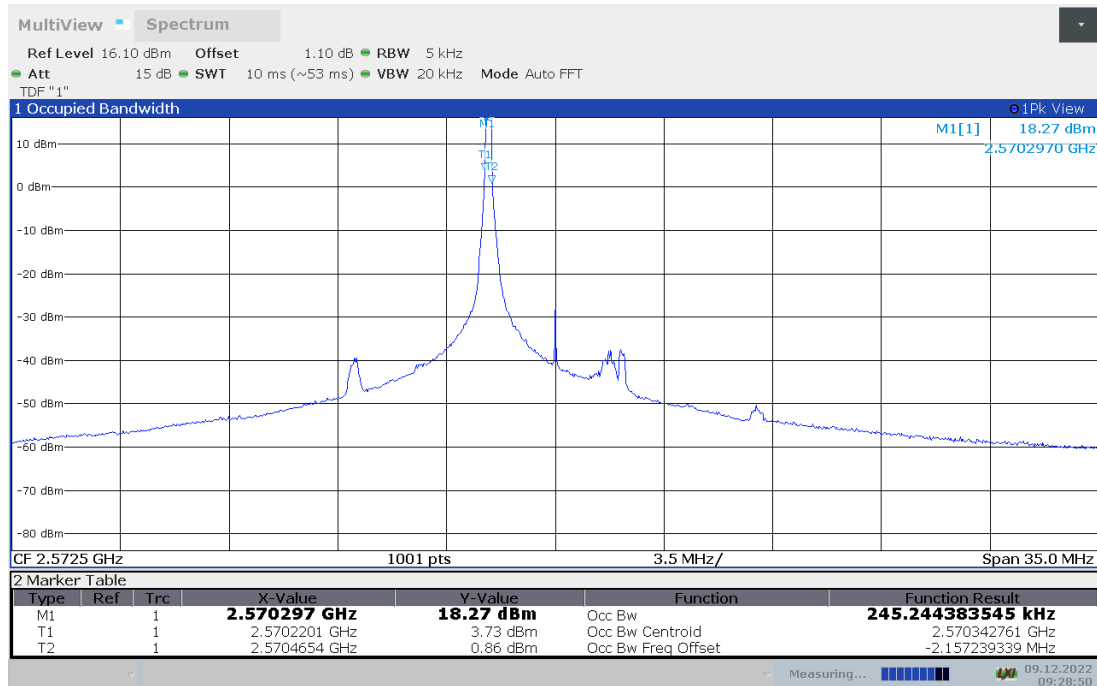


HIGH BAND EDGE BLOCK-20M-100%RB

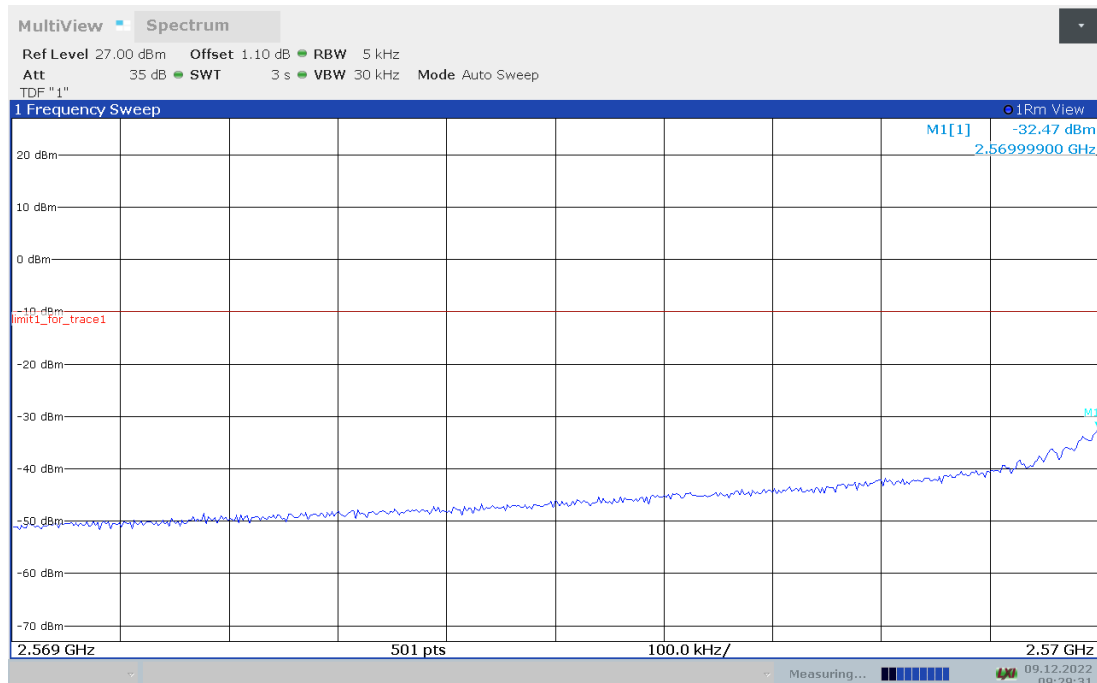


LTE band 38

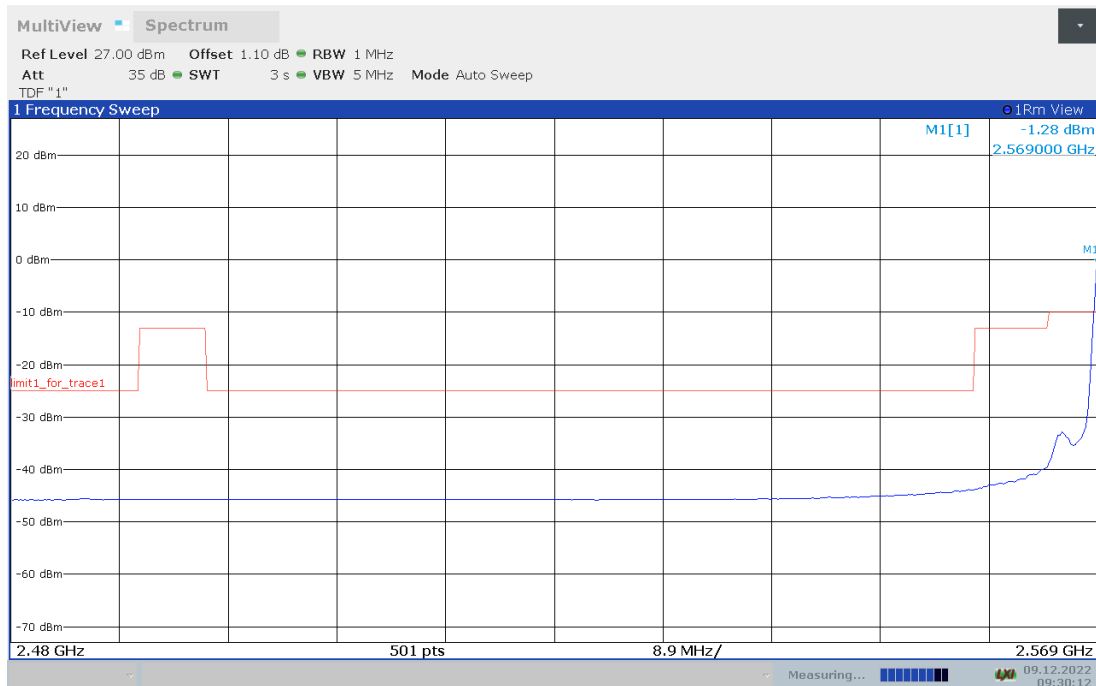
OBW: 1RB-LOW_offset



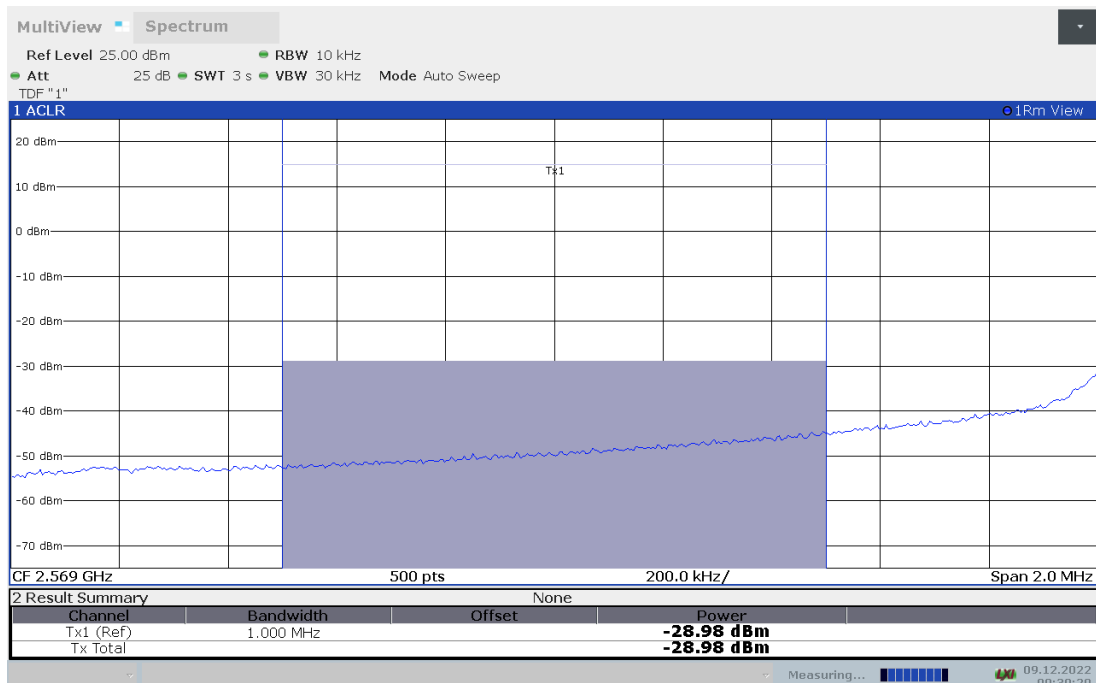
LOW BAND EDGE BLOCK-1RB-LOW_offset



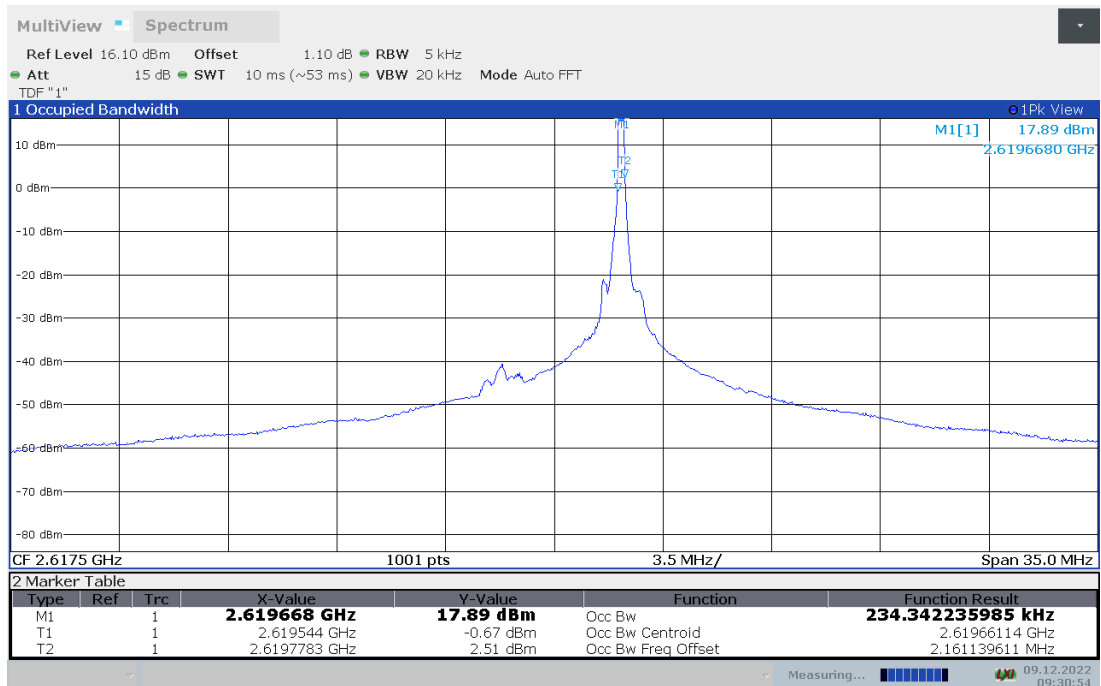
LOW BAND EDGE BLOCK-1RB-LOW_offset



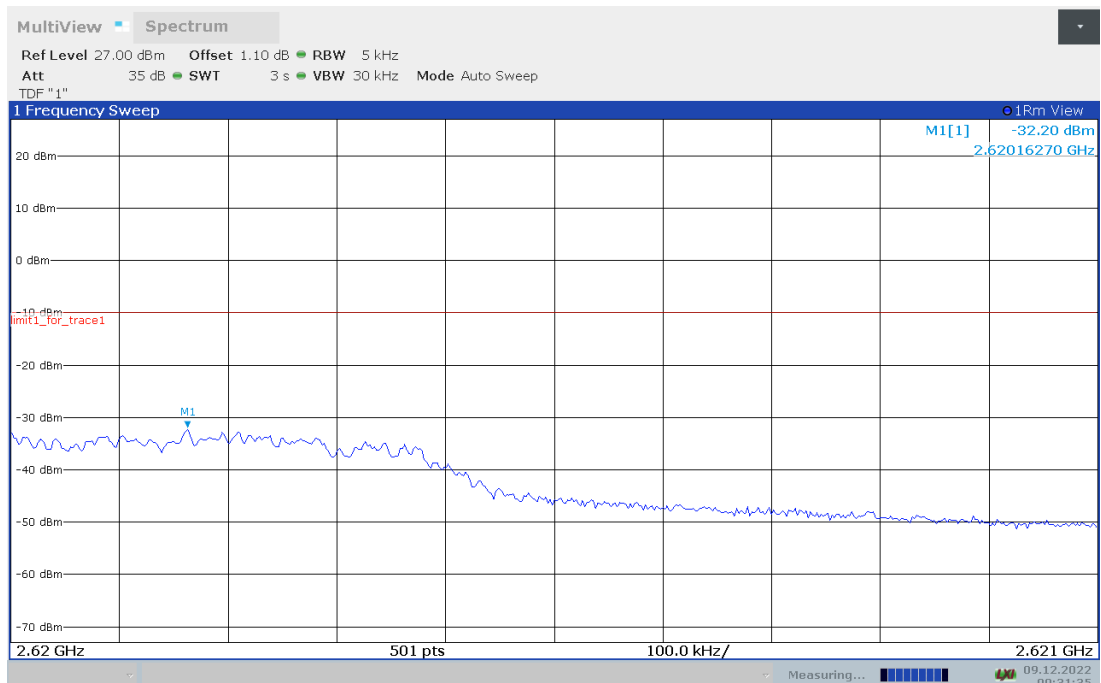
Channel power



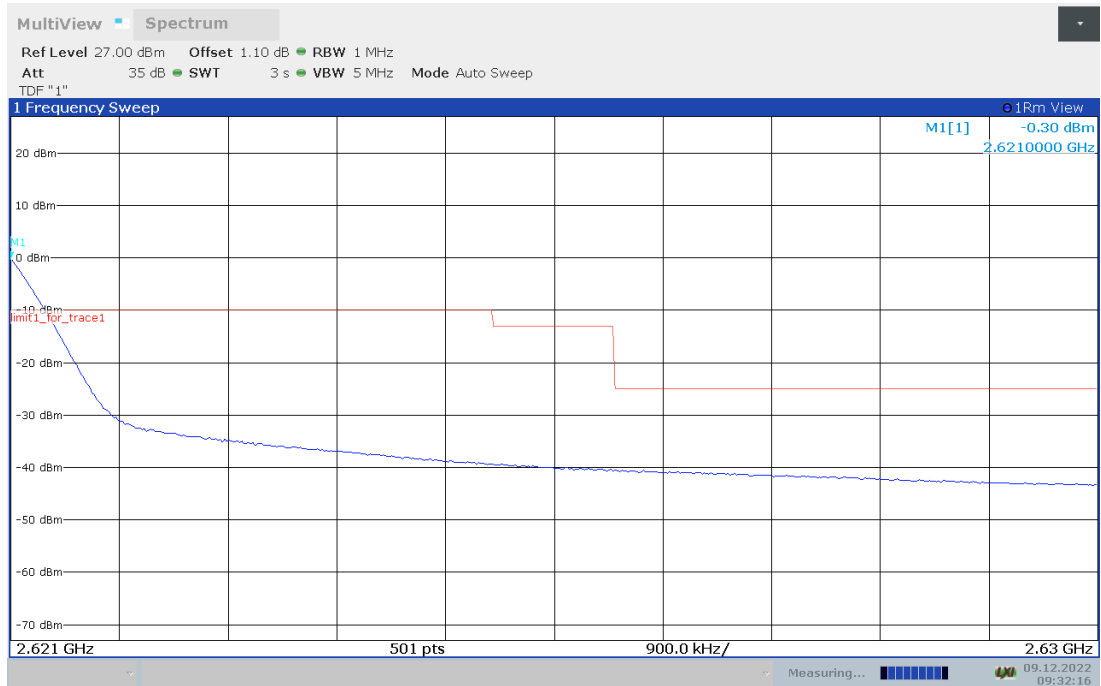
OBW: 1RB-HIGH_offset



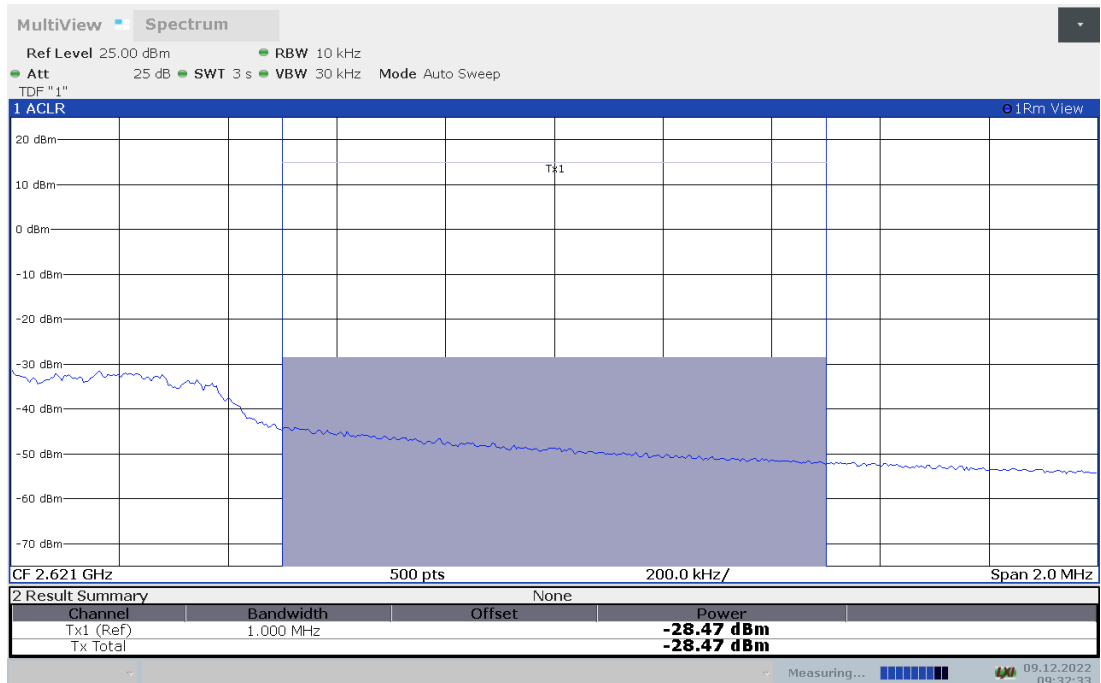
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



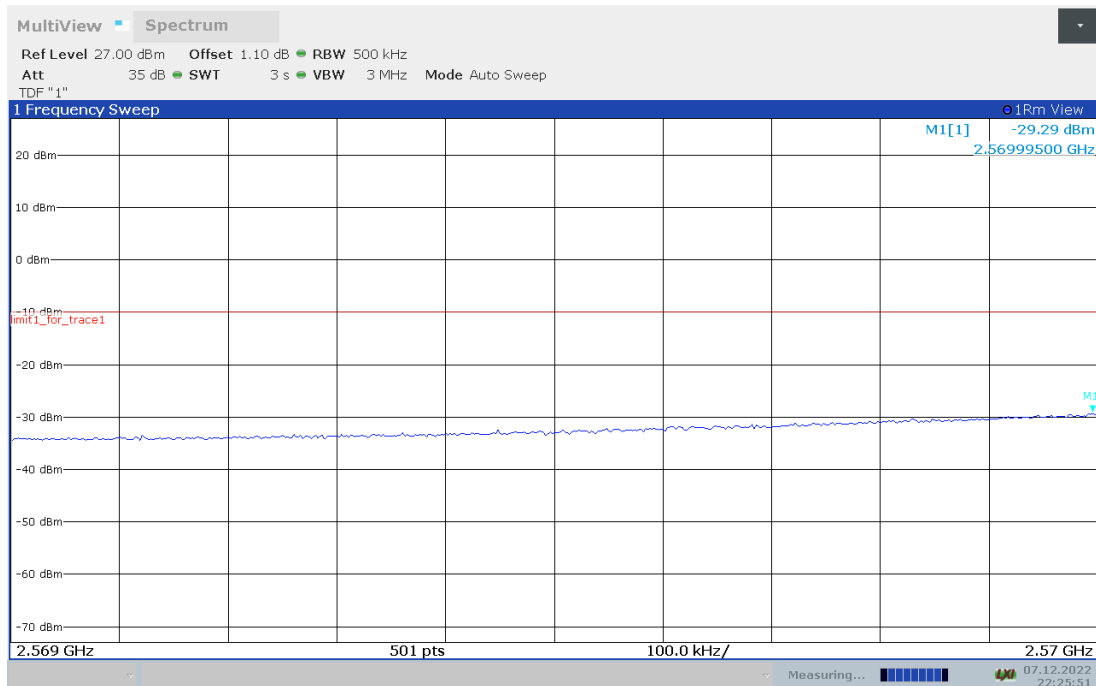
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



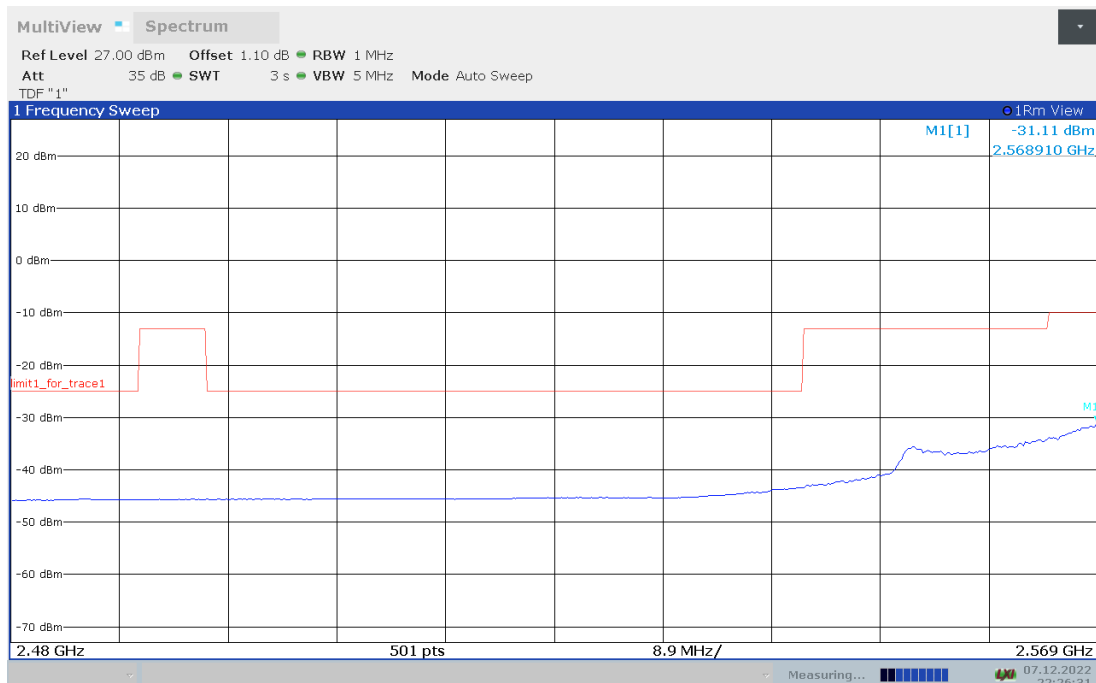
Channel power



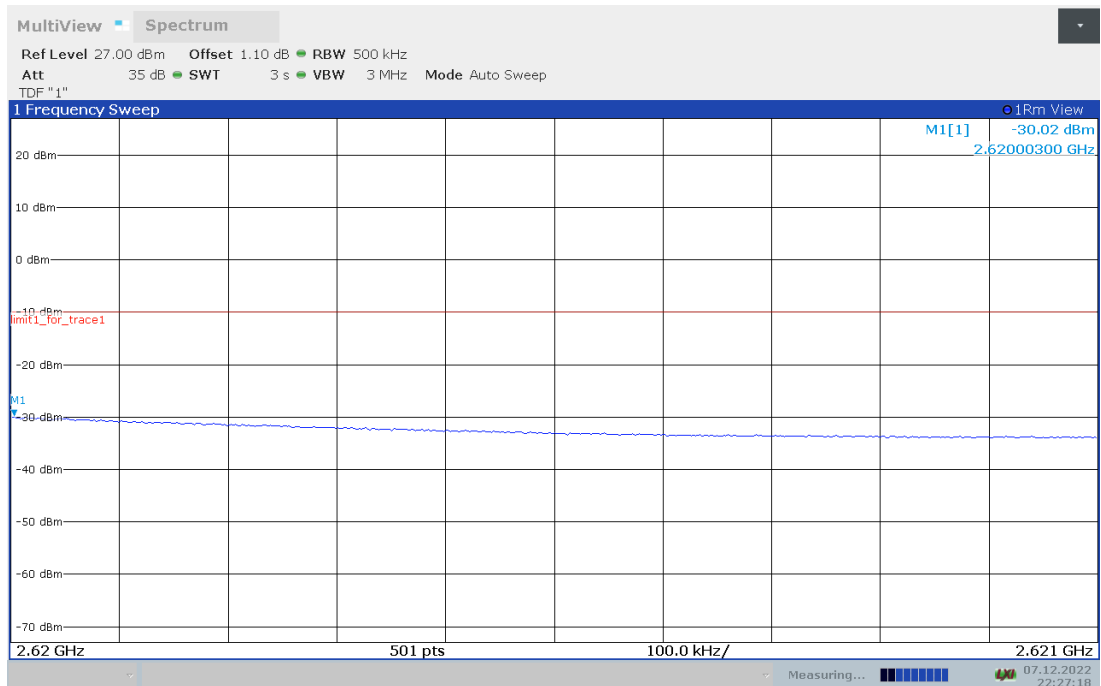
LOW BAND EDGE BLOCK-20M-100%RB



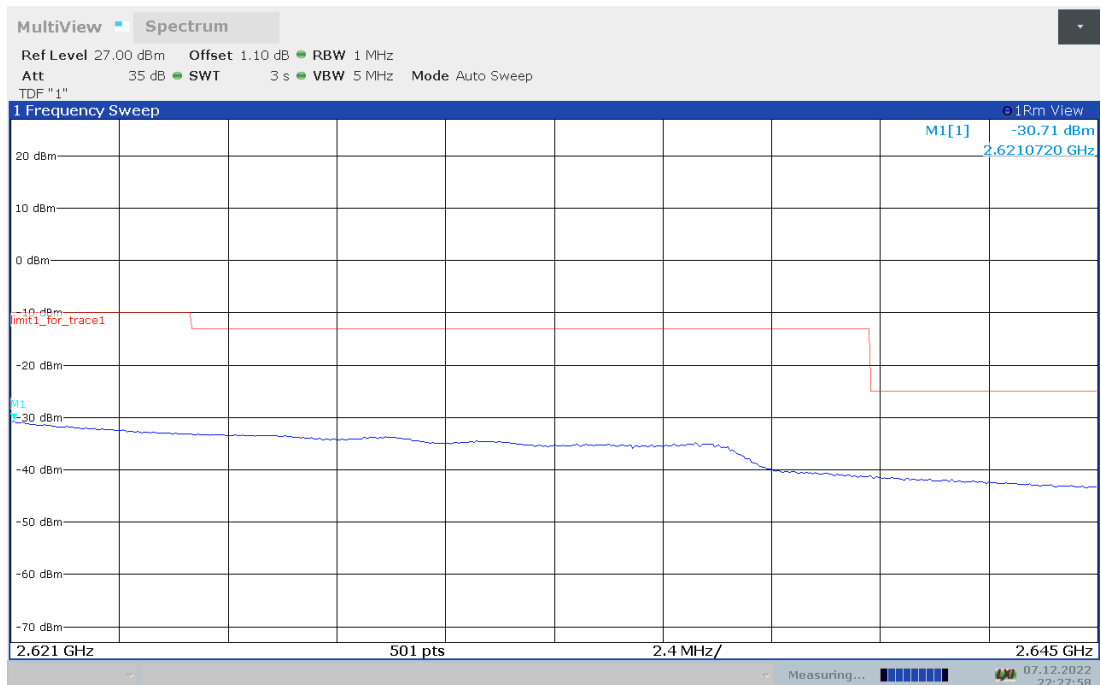
LOW BAND EDGE BLOCK-20M-100%RB



HIGH BAND EDGE BLOCK-20M-100%RB

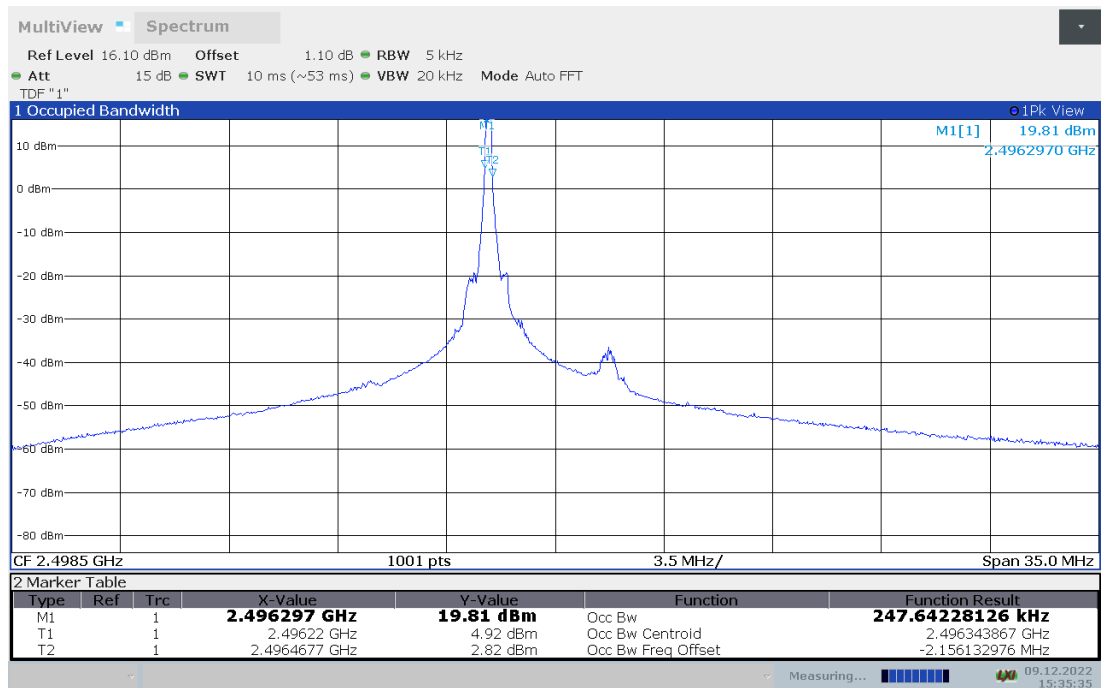


HIGH BAND EDGE BLOCK-20M-100%RB

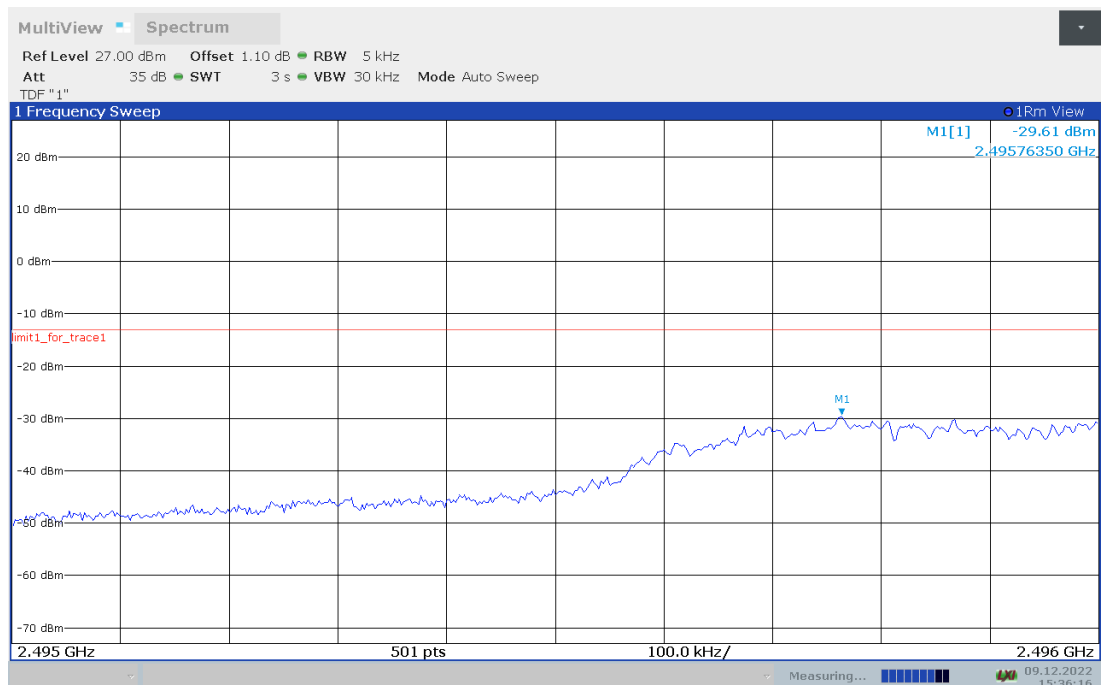


LTE band 41

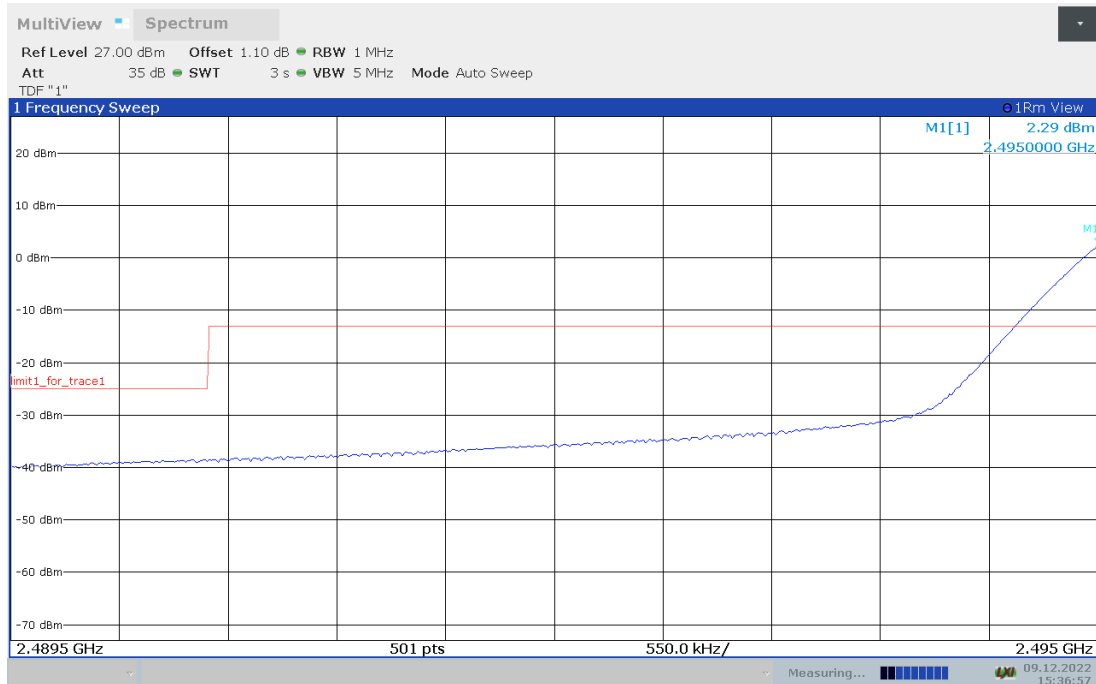
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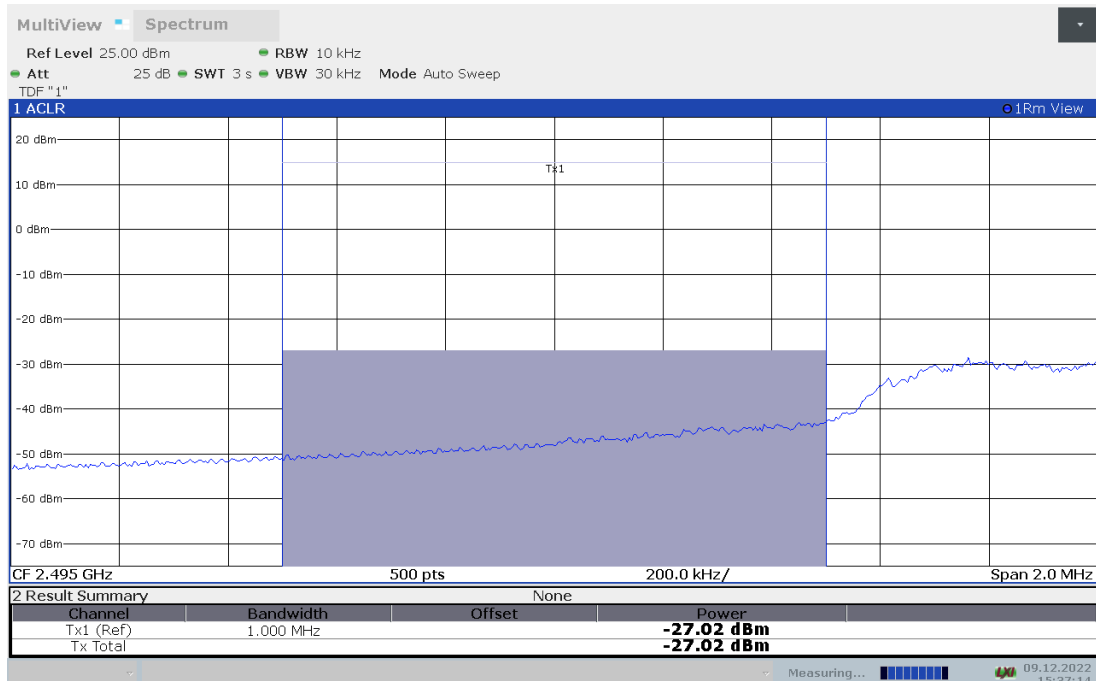
LOW BAND EDGE BLOCK-1RB-LOW_offset



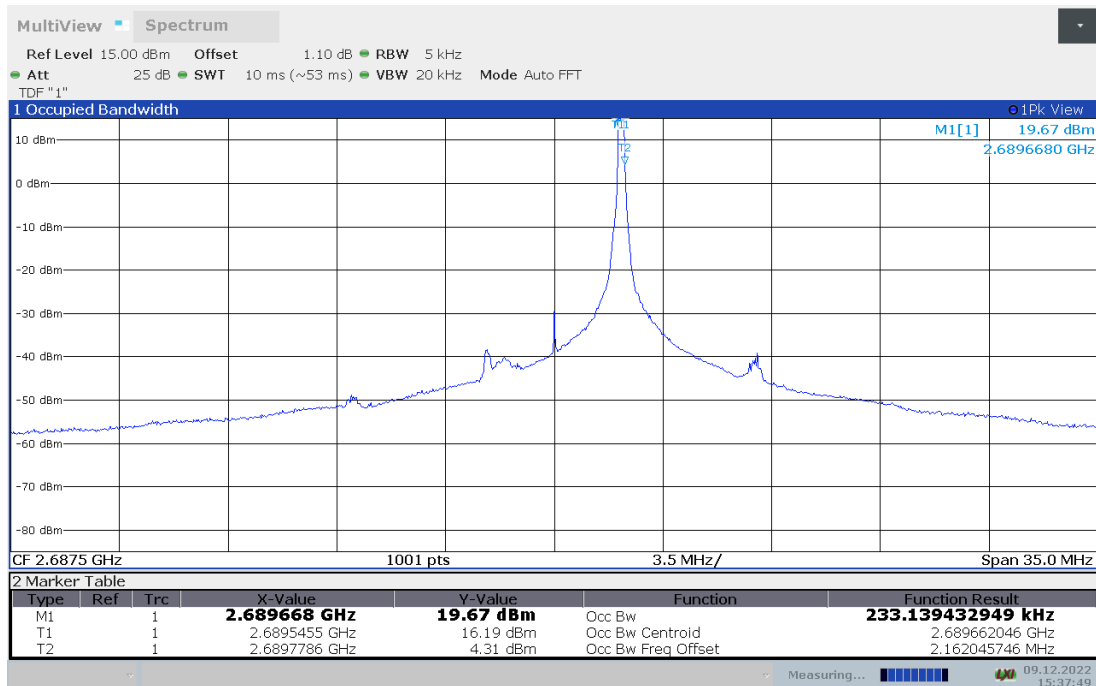
LOW BAND EDGE BLOCK-1RB-LOW_offset



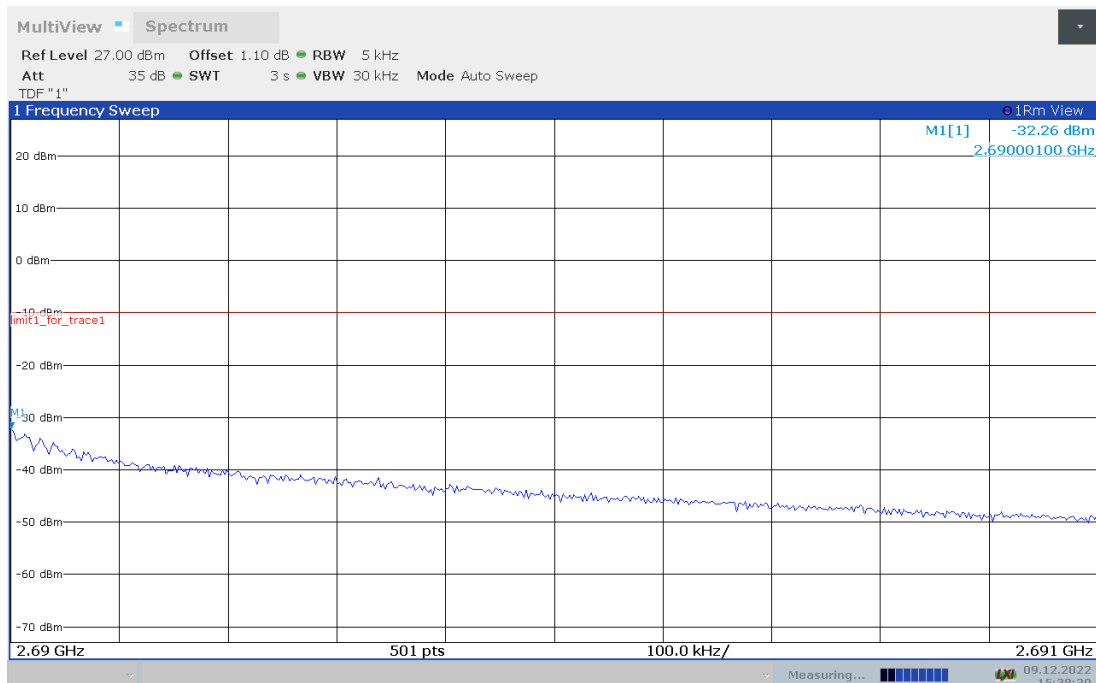
Channel power



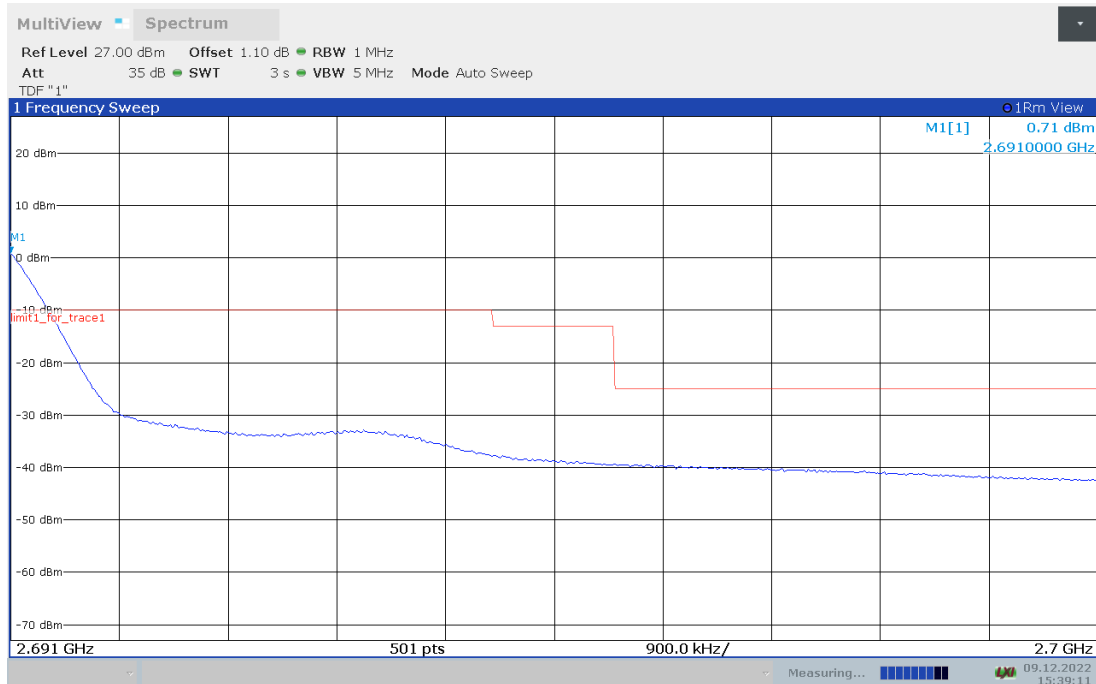
OBW: 1RB-HIGH_offset



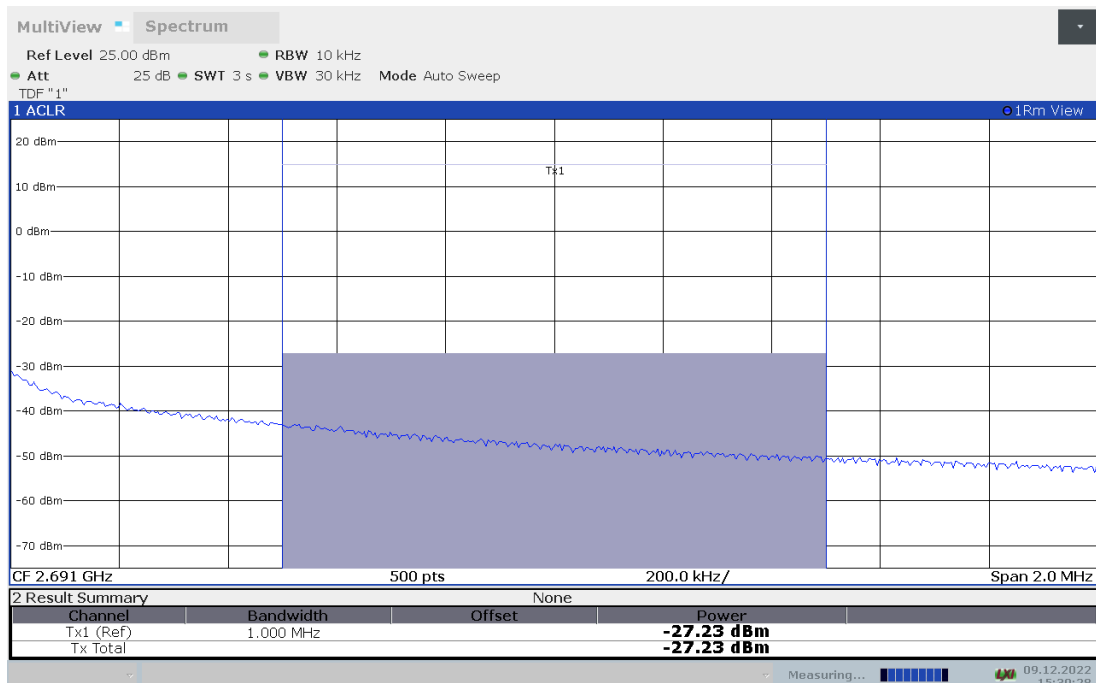
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



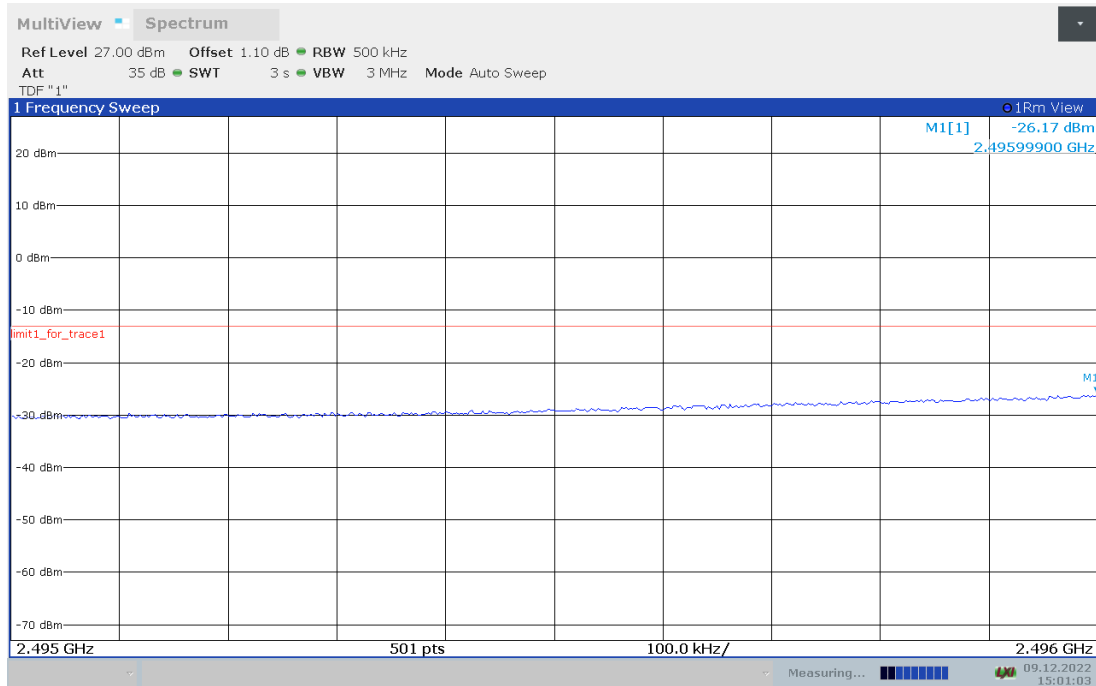
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



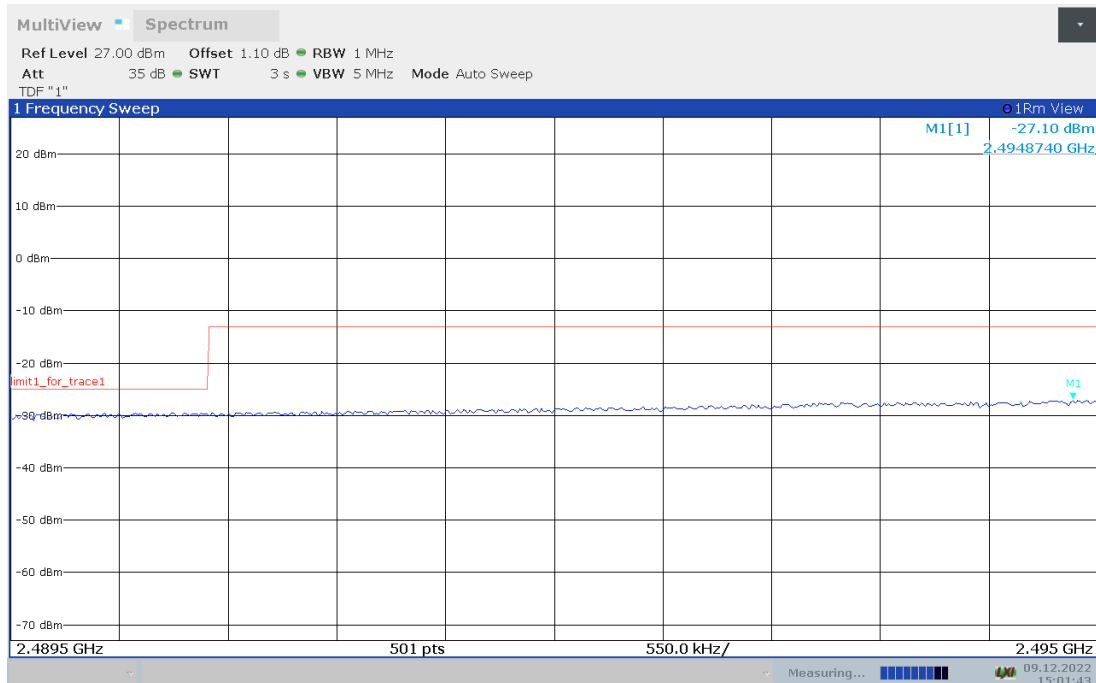
Channel power



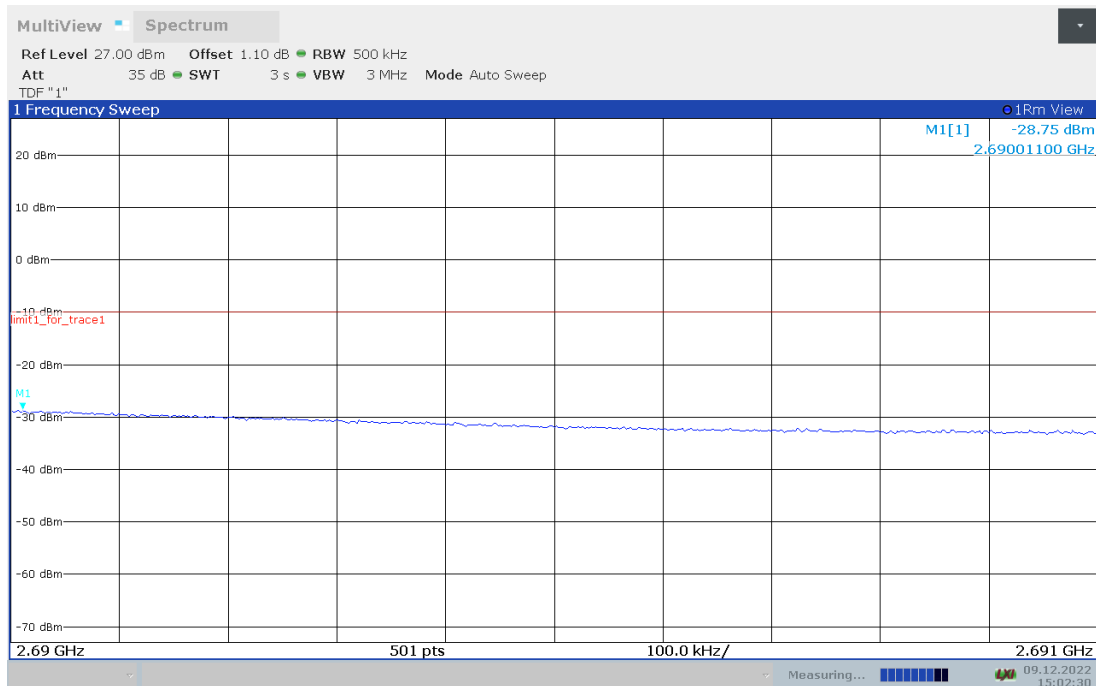
LOW BAND EDGE BLOCK-20M-100%RB



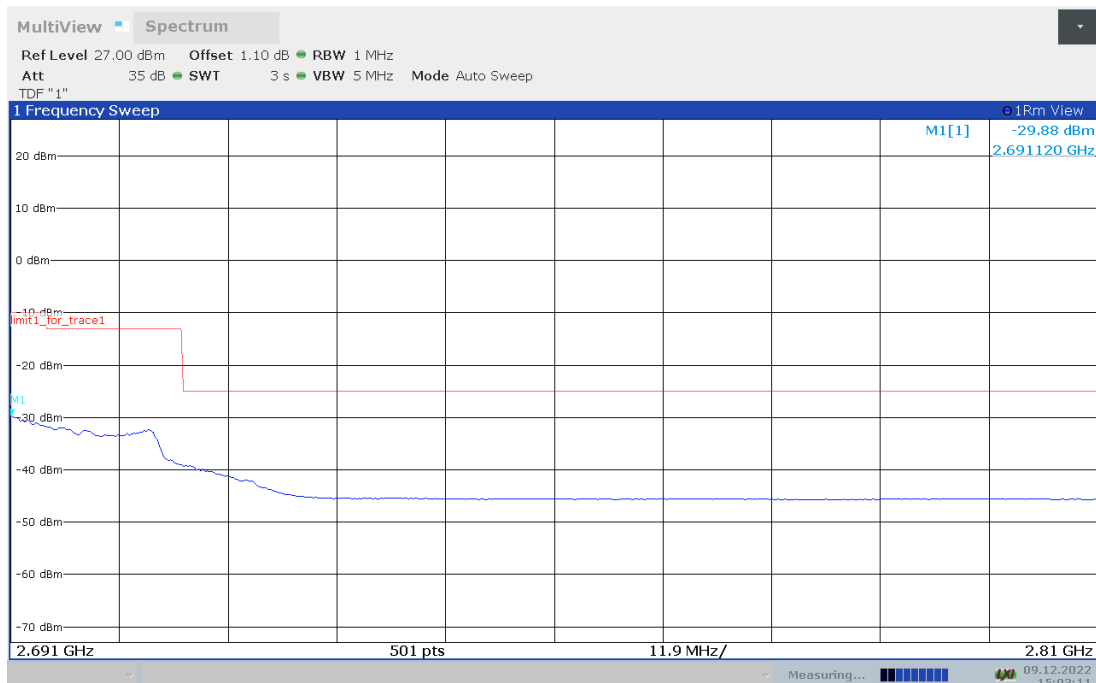
LOW BAND EDGE BLOCK-20M-100%RB



HIGH BAND EDGE BLOCK-20M-100%RB



HIGH BAND EDGE BLOCK-20M-100%RB



Note: Expanded measurement uncertainty is $U = 0.49\text{dB}(100\text{KHz}-2\text{GHz})/1.21\text{dB}(2\text{GHz}-26.5\text{GHz})$, $k = 1.96$

A.6 CONDUCTED SPURIOUS EMISSION

Reference

FCC: CFR Part 2.1051, 22.917, 27.53.

A.6.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1051 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 9 GHz, data taken from 10 MHz to 25 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. The number of sweep points of spectrum analyzer is set to 30001 which is greater than span/RBW.

A. 7.2 Measurement Limit

Part 22.917, specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Part 27.53(m)(4) specifies for mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

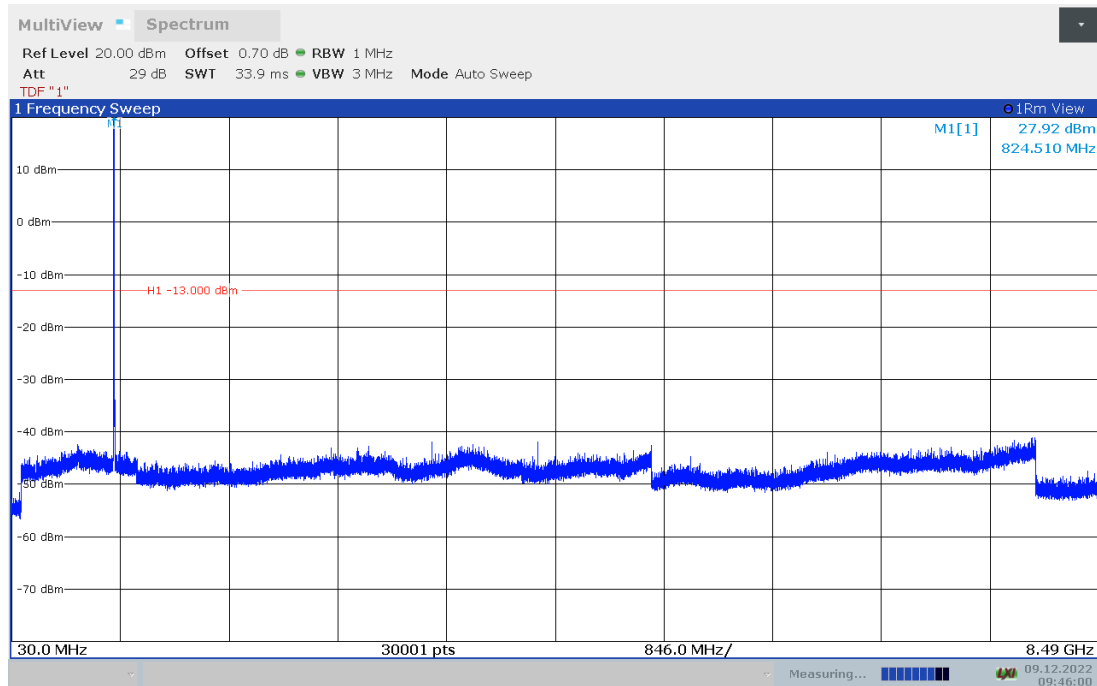
A. 7.3 Measurement result

Only worst case result is given below

LTE band 5 20MHz QPSK: 30MHz – 8.49GHz

Spurious emission limit –25dBm.

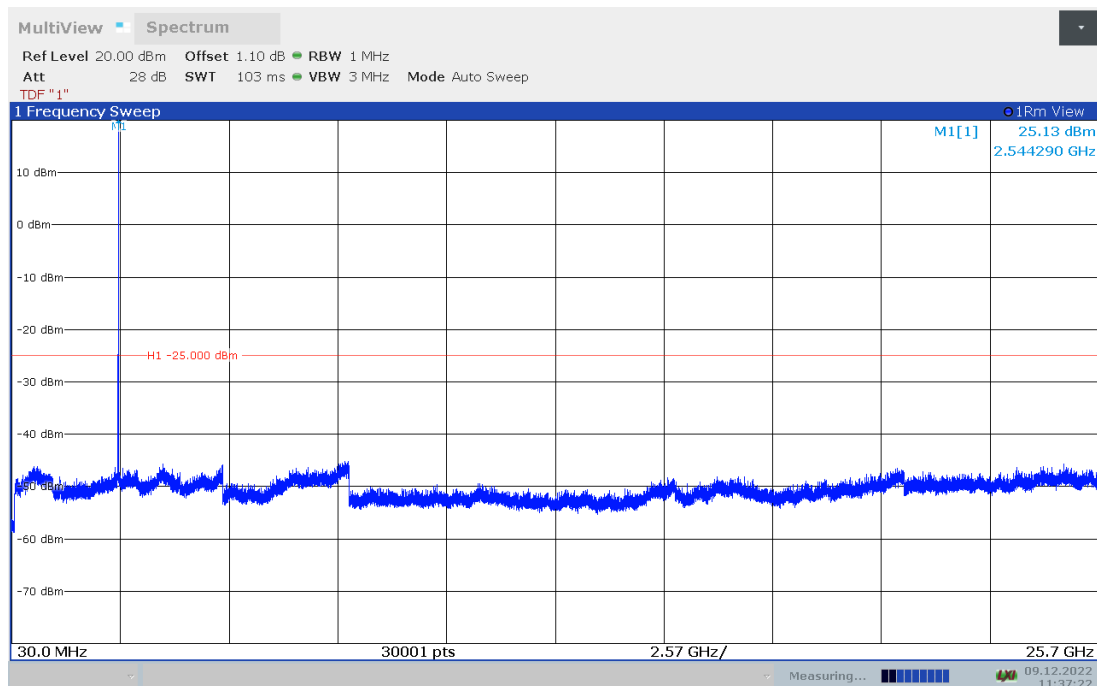
NOTE: peak above the limit line is the carrier frequency.



LTE band 7 20MHz QPSK: 30MHz – 25.7GHz

Spurious emission limit –25dBm.

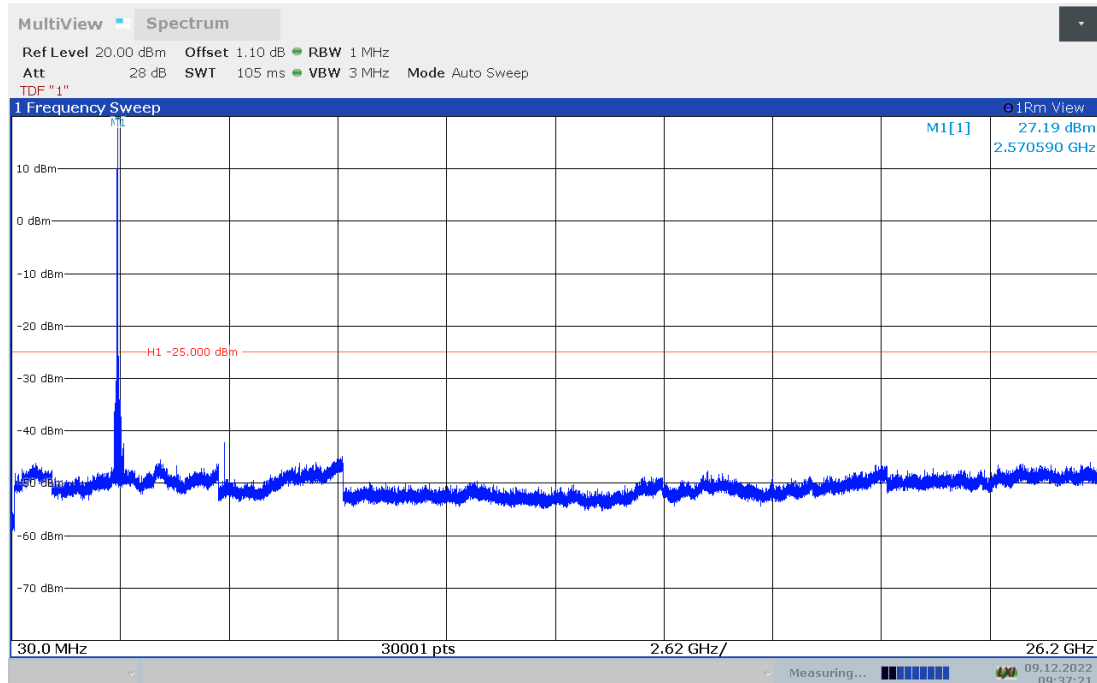
NOTE: peak above the limit line is the carrier frequency.



LTE band 38: 30MHz – 26.2GHz

Spurious emission limit –25dBm.

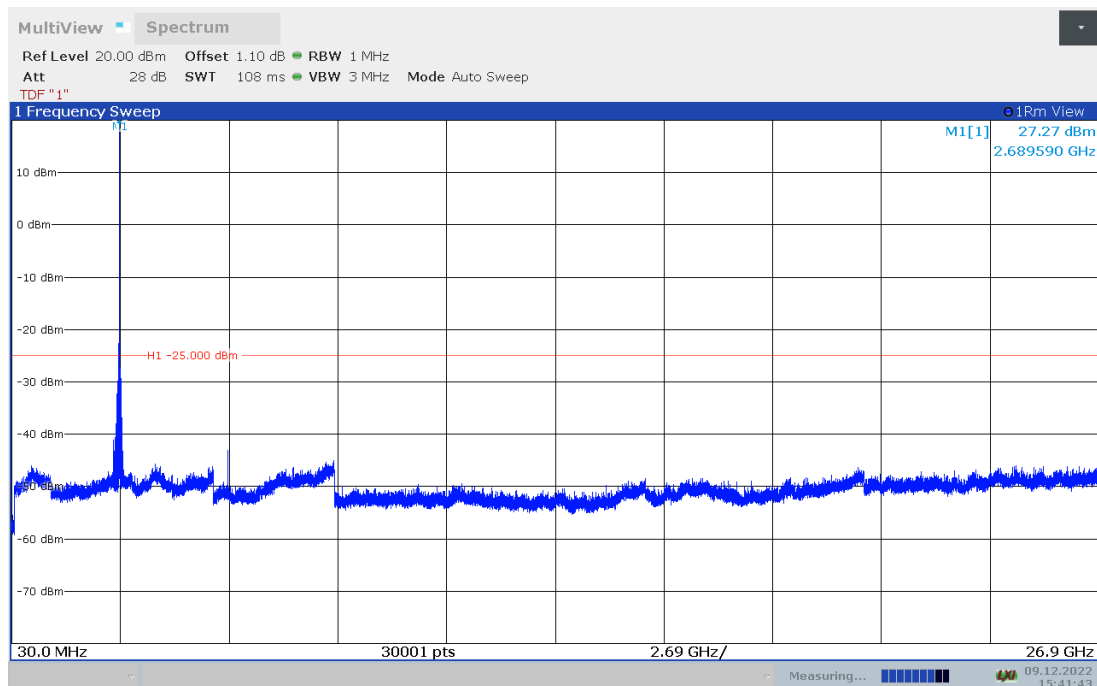
NOTE: peak above the limit line is the carrier frequency.



LTE band 41: 30MHz – 26.9GHz

Spurious emission limit –25dBm.

NOTE: peak above the limit line is the carrier frequency.



A.7 PEAK-TO-AVERAGE POWER RATIO

Reference

FCC: CFR Part 27.50(d), KDB971168 D01(5.7).

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

- a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- b) Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
- c) Set the number of counts to a value that stabilizes the measured CCDF curve;
- d) Set the measurement interval to 1 ms
- e) Record the maximum PAPR level associated with a probability of 0.1%

A.7.1 Measurement limit

not exceed 13 dB

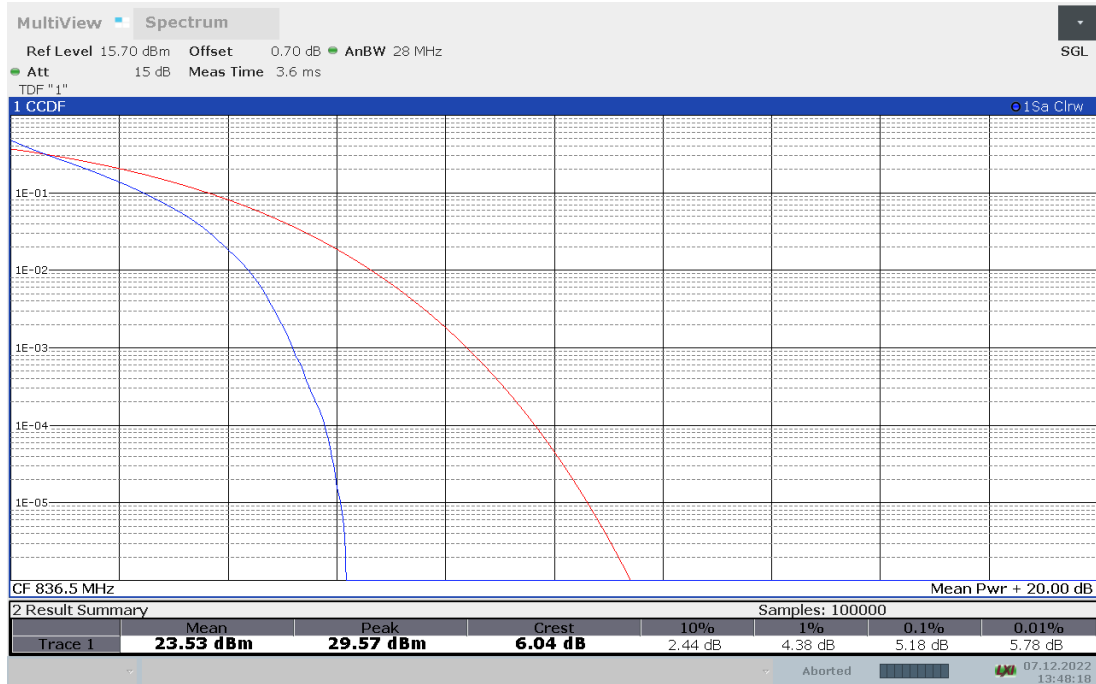
A.7.2 Measurement results

Only worst case result is given below

LTE band 5

Frequency(MHz)	Bandwidth(MHz)	PAPR(dB)	
		QPSK	16QAM
826.5	10	5.18	6.00

LTE band 5, 10MHz Bandwidth, QPSK (PAPR)



LTE band 5, 10MHz Bandwidth, 16QAM (PAPR)



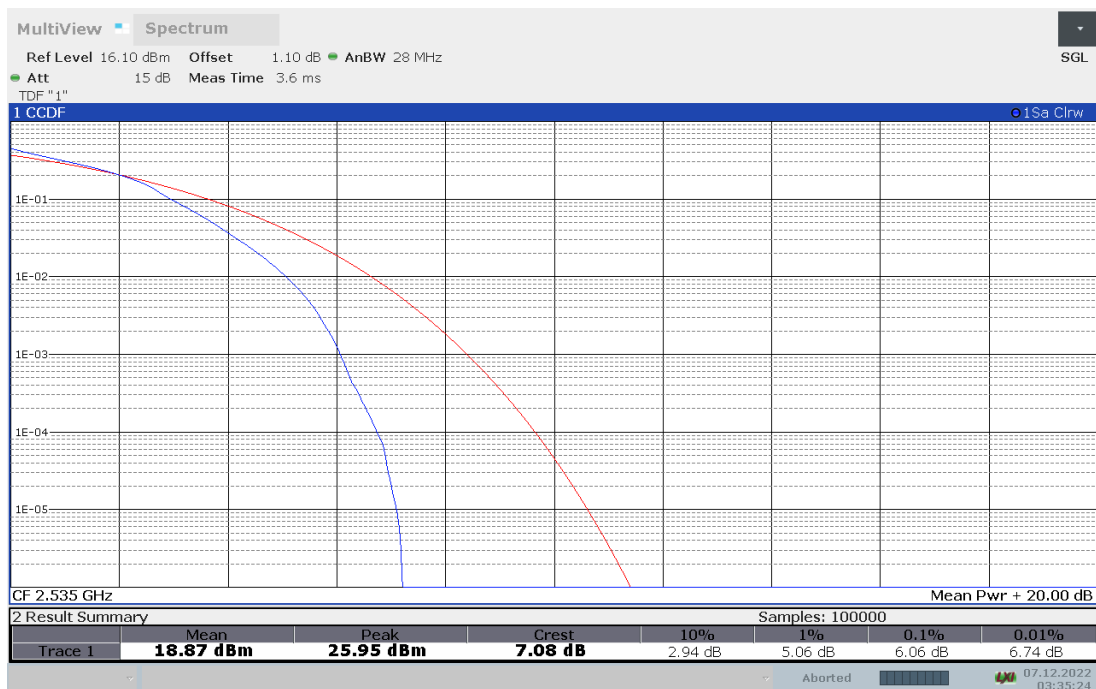
LTE band 7

Frequency(MHz)	Bandwidth(MHz)	PAPR(dB)	
		QPSK	16QAM
2535.0	20	5.28	6.06

LTE band 7, 20MHz Bandwidth, QPSK (PAPR)



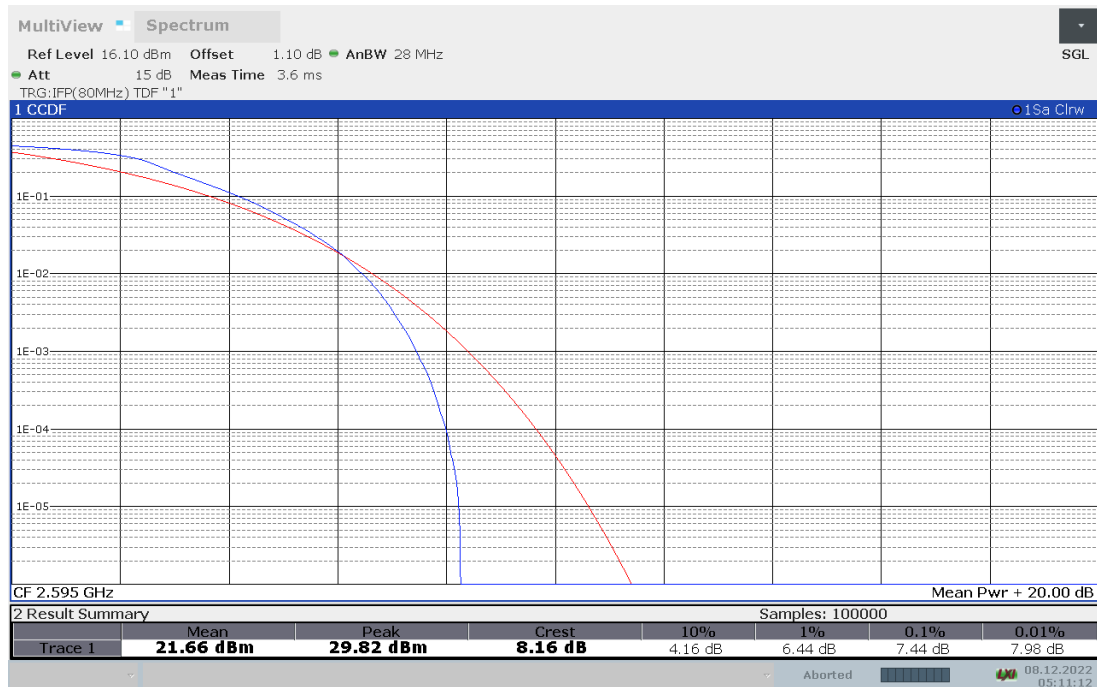
LTE band 7, 20MHz Bandwidth, 16QAM (PAPR)



LTE band 38

Frequency(MHz)	Bandwidth(MHz)	PAPR(dB)	
		QPSK	16QAM
2595.0	20	7.44	8.24

LTE band 38, 20MHz Bandwidth, QPSK (PAPR)



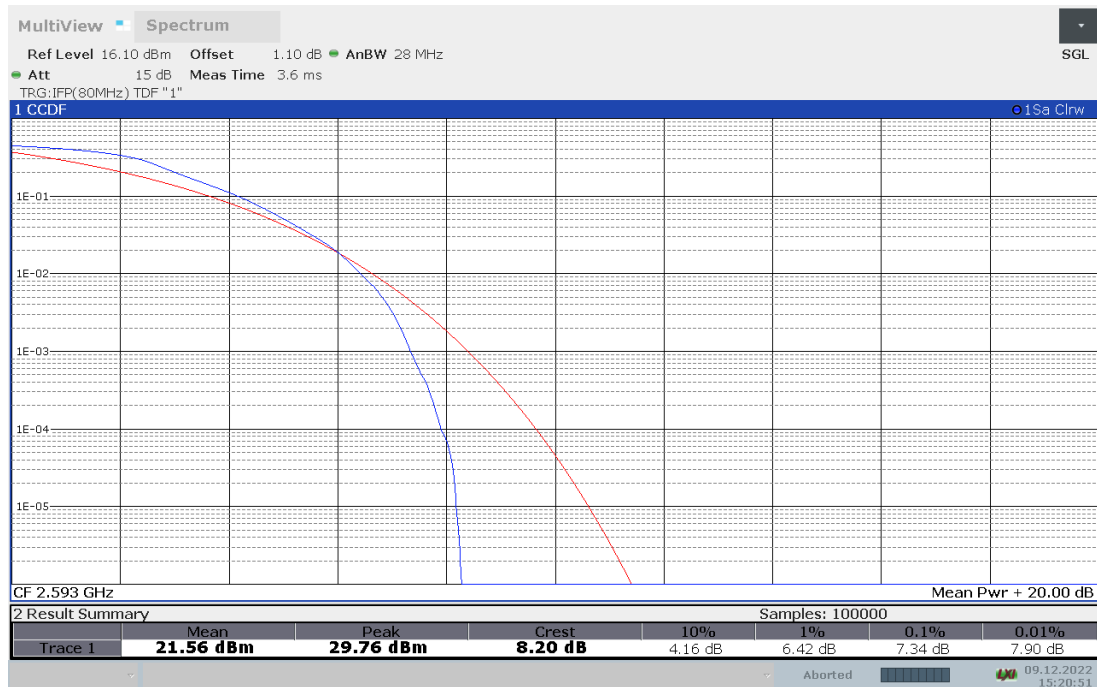
LTE band 38, 20MHz Bandwidth, 16QAM (PAPR)



LTE band 41

Frequency(MHz)	Bandwidth(MHz)	PAPR(dB)	
		QPSK	16QAM
2335	20	7.34	8.18

LTE band 41, 20MHz Bandwidth, QPSK (PAPR)



LTE band 41, 20MHz Bandwidth, 16QAM (PAPR)



Note: Expanded measurement uncertainty is $U = 0.48$, $k = 2$

END OF REPORT