Industrial Internet Innovation Center (Shanghai) Co.,Ltd.

FCC/IC LTE TEST REPORT

PRODUCT	Wireless data POS System
BRAND	SUNMI
MODEL	T5820
APPLICANT	Shanghai Sunmi Technology Co.,Ltd.
FCC ID	2AH25T5820C
IC	22621-T5820C
ISSUE DATE	January 31, 2023
STANDARD(S)	FCC Part 2, FCC Part 22, FCC Part 24, FCC Part 27, RSS-Gen Issue 5, RSS-130 Issue 2, RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3, RSS-199 Issue 3

Prepared by:Wu Rui **Reviewed by:** ***Yang Fan*** **Approved by:** ***Zhang Min***

CAUTION:
This report shall not be reproduced except in full without the written permission of the test laboratory and shall not be quoted out of context.

CONTENTS

1. Summary of Test Report

1.1 Test Standard (s)

No.	Test Standard	Title	Version
1	FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	2021-10-01
2	FCC Part 22	PUBLIC MOBILE SERVICES	2021-10-01
3	FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	2021-10-01
4	FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	2021-10-01
5	RSS-Gen Issue 5	RSS-Gen —General Requirements for Compliance of Radio Apparatus	2021-02
6	RSS-130 Issue 2	Equipment Operating in the Frequency Bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz	2019-02
7	RSS-132 Issue 3	Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz	2013-01
8	RSS-133 Issue 6	2 GHz Personal Communications Services	2018-01
9	RSS-139 Issue 3	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz	2015-07
10	RSS-199 Issue 3	Broadband Radio Service (BRS) Equipment Operating in the Band 2500–2690 MHz	2016-12

1.2 Reference Documents

No.	Test Standard	Title	Version
1	ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
2	ANSI C63.26	American National Standard of Procedures for Compliance Testing of Licensed Transmitters Used in Licensed Radio	2015
3	KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v03r01

1.3 Summary of Test Results

LTE Band 2

Items	Test Name	Clause in FCC rules	Sub-clause of IC	Verdict
1	Output Power	24.232(c)	RSS-133 6.4	Pass
2	Emission Limit	24.238(a), 2.1051	RSS-133 6.5	Pass
3	Frequency Stability	24.235, 2.1055	RSS-133 6.3	Pass
4	Occupied Bandwidth	2.1049(h)(i)	RSS-Gen 6.7	Pass
5	Emission Bandwidth	24.238(a)	RSS-Gen 6.7	Pass
6	Band Edge Compliance	24.238(a)	RSS-133 6.5	Pass
7	Conducted Spurious Emission	24.238, 2.1057	RSS-133 6.5	Pass
8	Peak to Average Power Ratio	24.232 (d)	RSS-133 6.4	Pass

LTE Band 4

Items	Test Name	Clause in FCC rules	Sub-clause of IC	Verdict
1	Output Power	27.50(d)(4)	RSS-139 6.5	Pass
2	Emission Limit	27.53(h), 2.1051	RSS-139 6.6	Pass
3	Frequency Stability	27.54, 2.1055	RSS-139 6.4	Pass
4	Occupied Bandwidth	2.1049(h)(i)	RSS-Gen 6.7	Pass
5	Emission Bandwidth	27.53(h)	RSS-Gen 6.7	Pass
6	Band Edge Compliance	27.53(h)	RSS-139 6.6	Pass
7	Conducted Spurious Emission	27.53(h), 2.1057	RSS-139 6.6	Pass
8	Peak to Average Power Ratio	27.50(a)	RSS-139 6.5	Pass

LTE Band 5

Items	Test Name	Clause in FCC rules	Sub-clause of IC	Verdict
1	Output Power	2.1046(a), 22.913(a)	RSS-132 5.4	Pass
2	Emission Limit	22.917, 2.1051	RSS-132 5.5	Pass
3	Frequency Stability	22.235, 2.1055	RSS-132 5.3	Pass
4	Occupied Bandwidth	2.1049(h)(i)	RSS-Gen 6.7	Pass
5	Emission Bandwidth	22.917(b)	RSS-Gen 6.7	Pass
6	Band Edge Compliance	22.917(b)	RSS-132 5.5	Pass
7	Conducted Spurious Emission	22.917, 2.1057	RSS-132 5.5	Pass

LTE Band 7

Items	Test Name	Clause in FCC rules	Sub-clause of IC	Verdict
1	Output Power	27.50(d)(4)	RSS-199 4.4	Pass
2	Emission Limit	27.53(h), 2.1051	RSS-199 4.5	Pass
3	Frequency Stability	27.54, 2.1055	RSS-199 4.3	Pass
4	Occupied Bandwidth	2.1049(h)(i)	RSS-Gen 6.7	Pass
5	Emission Bandwidth	27.53(h)	RSS-Gen 6.7	Pass
6	Band Edge Compliance	27.53(h)	RSS-199 4.5	Pass
7	Conducted Spurious Emission	27.53(h), 2.1057	RSS-199 4.5	Pass
8	Peak to Average Power Ratio	27.50(a)	RSS-199 4.4	Pass

LTE Band 12

Items	Test Name	Clause in FCC rules	Sub-clause of IC	Verdict
1	Output Power	27.50(d)(4)	RSS-130 4.6	Pass
2	Emission Limit	27.53(h), 2.1051	RSS-130 4.7	Pass
3	Frequency Stability	27.54, 2.1055	RSS-130 4.5	Pass
4	Occupied Bandwidth	2.1049(h)(i)	RSS-Gen 6.7	Pass
5	Emission Bandwidth	27.53(h)	RSS-Gen 6.7	Pass
6	Band Edge Compliance	27.53(h)	RSS-130 4.7	Pass
7	Conducted Spurious Emission	27.53(h), 2.1057	RSS-130 4.7	Pass
8	Peak to Average Power Ratio	27.50(a)	RSS-130 4.6	Pass

LTE Band 17

Items	Test Name	Clause in FCC rules	Sub-clause of IC	Verdict
1	Output Power	27.50(d)(4)	RSS-130 4.6	Pass
2	Emission Limit	27.53(h), 2.1051	RSS-130 4.7	Pass
3	Frequency Stability	27.54, 2.1055	RSS-130 4.5	Pass
4	Occupied Bandwidth	2.1049(h)(i)	RSS-Gen 6.7	Pass
5	Emission Bandwidth	27.53(h)	RSS-Gen 6.7	Pass
6	Band Edge Compliance	27.53(h)	RSS-130 4.7	Pass
7	Conducted Spurious Emission	27.53(h), 2.1057	RSS-130 4.7	Pass
8	Peak to Average Power Ratio	27.50(a)	RSS-130 4.6	Pass

LTE Band 38

Items	Test Name	Clause in FCC rules	Sub-clause of IC	Verdict
1	Output Power	27.50(d)(4)	RSS-199 4.4	Pass
2	Emission Limit	27.53(h), 2.1051	RSS-199 4.5	Pass
3	Frequency Stability	27.54, 2.1055	RSS-199 4.3	Pass
4	Occupied Bandwidth	2.1049(h)(i)	RSS-Gen 6.7	Pass
5	Emission Bandwidth	27.53(h)	RSS-Gen 6.7	Pass
6	Band Edge Compliance	27.53(h)	RSS-199 4.5	Pass
7	Conducted Spurious Emission	27.53(h), 2.1057	RSS-199 4.5	Pass
8	Peak to Average Power Ratio	27.50(a)	RSS-199 4.4	Pass

LTE Band 41

Items	Test Name	Clause in FCC rules	Sub-clause of IC	Verdict
1	Output Power	27.50(d)(4)	RSS-199 4.4	Pass
2	Emission Limit	27.53(h), 2.1051	RSS-199 4.5	Pass
3	Frequency Stability	27.54, 2.1055	RSS-199 4.3	Pass
4	Occupied Bandwidth	2.1049(h)(i)	RSS-Gen 6.7	Pass
5	Emission Bandwidth	27.53(h)	RSS-Gen 6.7	Pass
6	Band Edge Compliance	27.53(h)	RSS-199 4.5	Pass
7	Conducted Spurious Emission	27.53(h), 2.1057	RSS-199 4.5	Pass
8	Peak to Average Power Ratio	27.50(a)	RSS-199 4.4	Pass

Note:

The T5820, manufactured by Shanghai Sunmi Technology Co.,Ltd. is a new product for testing.

The product's Band 41 uses only 2535-2655 MHZ.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 1.3.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 4 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 1 of this test report.

1.4 Data Provided by Applicant

No.	Item(s)	Data
1	LTE band 2	1.77 dBi
2	LTE band 4	2.02 dBi

3	LTE band 5	0.15 dBi
4	LTE band 7	2.96 dBi
5	LTE band 12	-0.48 dBi
6	LTE band 17	-0.48 dBi
7	LTE band 38	2.04 dBi
8	LTE band 41	2.96 dBi

2. General Information of The Laboratory

2.1 Testing Laboratory

Lab Name	Industrial Internet Innovation Center (Shanghai) Co.,Ltd.
Address	Building 4，No. 766，Jingang Road，Pudong，Shanghai，China
Telephone	021-68866880
FCC Registration No.	958356
FCC Designation No.	CN1177
IC Designation No.	10766A
CAB identifier	CN0067

2.2 Laboratory Environmental Requirements

Temperature	15℃~35℃
Relative Humidity	25%RH~75%RH
Atmospheric Pressure	101kPa

2.3 Project Information

Project Manager	Gao Hongning
Test Date	October 20, 2022 to January 10, 2023

3. General Information of The Customer

3.1 Applicant

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, No.388,Song Hu Road, Yang Pu District, Shanghai, China
Telephone	13510126210

3.2 Manufacturer

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, No.388,Song Hu Road, Yang Pu District, Shanghai, China

4. General Information of The Product12

4.1 Product Description for Equipment under Test (EUT)

Product	Wireless data POS System
Model	T5820
Date of Receipt	S05aa/S06aa:October 20,2022
EUT ID*	S05aa/S06aa
SN/IMEI	S05aa: 860450060019169 860450060019177 S06aa: 860450060018740 860450060018757
Supported Radio Technology and Bands	GSM850/GSM900/DCS1800/PCS1900 WCDMA Band I/II/IV/V/VIII LTE Band 2/4/5/7/12/17/38/41 BT 5.1 BR/EDR ,BLE WLAN 802.11b/g/n WLAN 802.11a/n/ac GPS/Glonass/BDS/OTDOA NFC
HVIN	T5820C
Hardware Version	V01
Software Version	XQT530_V004_20220923
FCC ID	2AH25T5820C
IC	22621-T5820C
NOTE： EUT ID is the internal identification code of the laboratory.	

4.2 Description for Auxiliary Equipment (AE)

AE ID*	Description	Model	SN/Remark
AE1	RF Cable	N/A	N/A
NOTE： AE ID is the internal identification code of the laboratory.			

4.3 Additional Information

Type of modulation	QPSK/16QAM

5. Test Configuration Information

5.1 Laboratory Environmental Conditions

5.1.1 Permanent Facilities

Relative Humidity	Min. = 45%, Max. = 55%		
Atmospheric Pressure	101kPa		
Temperature	Normal	Minimum	Maximum
	25℃	0℃	45℃
Working Voltage of EUT	Normal	Minimum	Maximum
	7.2V	6.8V	8.4V

5.2 Test Equipments Utilized

Radiated emission test system

No.	Name	Model	S/N	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication Tester	CMU200	123123	R&S	October 17,2022	1Year
					March 5, 2021	1.5 Years
2	Universal Radio Communication Tester	CMW500	104178	R&S	October 17,2022	1Year
					March 5, 2021	1.5 Years
3	EMI Test Receiver	ESU40	100307	R&S	February 23, 2022	1 Year
4	TRILOG Broadband Antenna	VULB9163	VULB9163-515	Schwarzbeck	March 11, 2022	1 Year
5	Double- ridged Waveguide Antenna	ETS-3117	00135890	ETS	March 9, 2022	2 Years
6	2-Line V-Network	ENV216	101380	R&S	February 21, 2022	1 Year
7	EMI Test Software	EMC32 V9.15.00	N/A	R&S	N/A	N/A

Anechoic chamber

Fully anechoic chamber by ETS.

Conducted Test System

No.	Name	Model	S/N	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication	CMW500	148874	R&S	August. 23,2022	1 Year

	Tester					
2	Vector Signal Analyzer	FSQ26	101091	R&S	August. 23,2022	1 Year
3	Programmable power supply	Keithley 2303	4039070	Keithley	July 12,2022	1 Year
4	Eagle Test Software	Eagle V3.3 FCC BT/WIFI	N/A	ECIT	N/A	N/A
5	Temperature Chamber	B-TF-107C	BTF107C-201804107	BoYi	June 30,2022	1Year

5.3 Measurement Uncertainty

Measurement Items	Range	Confidence Level	Calculated Uncertainty
Maximum Peak Output Power	30MHz-3600MHz	95%	±0.544dB
EBW and VBW	30MHz-3600MHz	95%	±62.04Hz
Transmitter Spurious Emission-Conducted	30MHz-2GHz	95%	±0.90dB
Transmitter Spurious Emission-Conducted	2GHz-3.6GHz	95%	±0.88dB
Transmitter Spurious Emission-Conducted	3.6GHz-8GHz	95%	±0.96dB
Transmitter Spurious Emission-Conducted	8GHz-20GHz	95%	±0.94dB
Transmitter Spurious Emission-Radiated	9KHz-30MHz	95%	±5.66dB
Transmitter Spurious Emission-Radiated	30MHz-1000MHz	95%	±4.98dB
Transmitter Spurious Emission-Radiated	1000MHz -18000MHz	95%	±5.06dB
Transmitter Spurious Emission-Radiated	18000MHz -40000MHz	95%	±5.20dB
Frequency stability	1MHz-16GHz	95%	±62.04Hz

6. Test Results

6.1 Output Power

6.1.1 Summary

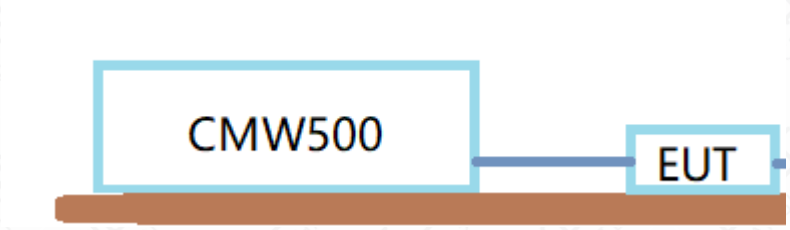
During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation. In all cases, output power is within the specified limits.
CMW500 setting：
1: CMW500 is connected to the DUT
2: Set RX Expected PEP to 30 dBm

6.1.2 Conducted

6.1.2.1Method 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.

6.1.2.2 Test Setup



6.1.2.3 Measurement result

LTE band 2

LTE			LTE B2			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				18607	18900	19193
QPSK	1	Low	24.00	23.23	23.26	23.19
		Middle		23.37	23.33	23.31
		High		23.13	23.08	23.23
	50%	Low	24.00	23.12	23.33	23.30
		Middle		23.22	23.36	23.44
		High		23.14	23.28	23.12
	100%	/	23.00	22.11	21.96	22.24
16QAM	1	Low	23.00	22.26	22.49	22.44
		Middle		22.24	22.50	22.39
		High		22.31	22.20	22.33
	50%	Low	23.00	22.25	22.31	22.22
		Middle		22.23	22.26	22.23
		High		22.25	22.30	22.16
	100%	/	22.00	21.33	21.43	21.35
Modulation	RB	RB Offset	Tune up	3MHz		
				18615	18900	19185

QPSK	1	Low	24.00	23.25	23.30	23.22
		Middle		23.35	23.36	23.35
		High		23.16	23.13	23.27
	50%	Low	23.00	22.22	22.45	22.43
		Middle		22.34	22.46	22.56
		High		22.24	22.39	22.22
	100%	/	23.00	22.11	22.00	22.27
16QAM	1	Low	23.00	22.29	22.51	22.47
		Middle		22.27	22.50	22.43
		High		22.33	22.24	22.36
	50%	Low	22.00	21.36	21.44	21.34
		Middle		21.34	21.39	21.35
		High		21.35	21.42	21.29
	100%	/	22.00	21.36	21.47	21.38
Modulation	RB	RB Offset	Tune up	5MHz		
				18625	18900	19175
QPSK	1	Low	24.00	23.22	23.28	23.18
		Middle		23.33	23.32	23.32
		High		23.13	23.08	23.23
	50%	Low	23.00	22.19	22.40	22.39
		Middle		22.32	22.42	22.51
		High		22.22	22.37	22.18
	100%	/	23.00	22.11	21.99	22.25
16QAM	1	Low	23.00	22.26	22.47	22.44
		Middle		22.24	22.48	22.40
		High		22.30	22.22	22.32
	50%	Low	22.00	21.34	21.40	21.31
		Middle		21.31	21.34	21.31
		High		21.32	21.37	21.25
	100%	/	22.00	21.34	21.43	21.33
Modulation	RB	RB Offset	Tune up	10MHz		
				18650	18900	19150
QPSK	1	Low	24.00	23.24	23.29	23.21
		Middle		23.36	23.37	23.36
		High		23.15	23.12	23.26
	50%	Low	23.00	22.22	22.45	22.43
		Middle		22.35	22.47	22.55
		High		22.24	22.41	22.23
	100%	/	23.00	22.15	22.01	22.29
16QAM	1	Low	23.00	22.28	22.50	22.46
		Middle		22.27	22.52	22.43
		High		22.33	22.24	22.35
	50%	Low	22.00	21.37	21.45	21.35
		Middle		21.33	21.38	21.34

		High		21.35	21.42	21.29
	100%	/	22.00	21.37	21.48	21.37
Modulation	RB	RB Offset	Tune up	15MHz		
				18675	18900	19125
QPSK	1	Low	24.00	23.23	23.25	23.19
		Middle		23.34	23.36	23.33
		High		23.12	23.07	23.22
	50%	Low	23.00	22.20	22.41	22.40
		Middle		22.32	22.42	22.51
		High		22.21	22.38	22.19
	100%	/	23.00	22.13	21.97	22.24
16QAM	1	Low	23.00	22.23	22.48	22.44
		Middle		22.25	22.49	22.41
		High		22.30	22.20	22.32
	50%	Low	22.00	21.34	21.43	21.32
		Middle		21.30	21.33	21.30
		High		21.33	21.38	21.26
	100%	/	22.00	21.34	21.43	21.33
Modulation	RB	RB Offset	Tune up	20MHz		
				18700	18900	19100
QPSK	1	Low	24.00	23.20	23.21	23.16
		Middle		23.33	23.32	23.31
		High		23.10	23.06	23.19
	50%	Low	23.00	22.17	22.36	22.36
		Middle		22.30	22.38	22.48
		High		22.18	22.33	22.15
	100%	/	23.00	22.10	21.92	22.20
16QAM	1	Low	23.00	22.29	22.44	22.39
		Middle		22.21	22.47	22.37
		High		22.28	22.17	22.30
	50%	Low	22.00	21.31	21.39	21.29
		Middle		21.27	21.31	21.27
		High		21.30	21.33	21.22
	100%	/	22.00	21.32	21.39	21.30

LTE BAND 4

LTE			LTE B4			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				19957	20175	20393
QPSK	1	Low	24.00	23.05	23.15	23.07
		Middle		23.20	23.19	23.06
		High		22.95	22.87	22.85
	50%	Low	24.00	23.02	23.00	22.98
		Middle		23.10	23.19	23.12

		High		23.06	23.05	23.00
	100%	/	23.00	22.18	22.19	22.06
16QAM	1	Low	23.00	22.09	22.15	22.11
		Middle		22.07	22.18	22.13
		High		22.04	22.07	22.16
	50%	Low	23.00	21.95	21.99	21.95
		Middle		22.05	22.05	22.07
		High		22.13	22.11	22.03
	100%	/	22.00	21.13	21.17	21.21
Modulation	RB	RB Offset	Tune up	3MHz		
				19965	20175	20385
QPSK	1	Low	24.00	23.07	23.19	23.10
		Middle		23.18	23.22	23.10
		High		22.98	22.92	22.89
	50%	Low	23.00	22.12	22.12	22.11
		Middle		22.22	22.29	22.24
		High		22.16	22.16	22.10
	100%	/	23.00	22.18	22.23	22.09
16QAM	1	Low	23.00	22.12	22.17	22.14
		Middle		22.10	22.18	22.17
		High		22.06	22.11	22.19
	50%	Low	22.00	21.06	21.12	21.07
		Middle		21.16	21.18	21.19
		High		21.23	21.23	21.16
	100%	/	22.00	21.16	21.21	21.24
Modulation	RB	RB Offset	Tune up	5MHz		
				19975	20175	20375
QPSK	1	Low	24.00	23.04	23.17	23.06
		Middle		23.16	23.18	23.07
		High		22.95	22.87	22.85
	50%	Low	23.00	22.09	22.07	22.07
		Middle		22.20	22.25	22.19
		High		22.14	22.14	22.06
	100%	/	23.00	22.18	22.22	22.07
16QAM	1	Low	23.00	22.09	22.13	22.11
		Middle		22.07	22.16	22.14
		High		22.03	22.09	22.15
	50%	Low	22.00	21.04	21.08	21.04
		Middle		21.13	21.13	21.15
		High		21.20	21.18	21.12
	100%	/	22.00	21.14	21.17	21.19
Modulation	RB	RB Offset	Tune up	10MHz		
				20000	20175	20350
QPSK	1	Low	24.00	23.06	23.18	23.09

		Middle		23.19	23.23	23.11
		High		22.97	22.91	22.88
	50%	Low	23.00	22.12	22.12	22.11
		Middle		22.23	22.30	22.23
		High		22.16	22.18	22.11
	100%	/	23.00	22.22	22.24	22.11
16QAM	1	Low	23.00	22.11	22.16	22.13
		Middle		22.10	22.20	22.17
		High		22.06	22.11	22.18
	50%	Low	22.00	21.07	21.13	21.08
		Middle		21.15	21.17	21.18
		High		21.23	21.23	21.16
	100%	/	22.00	21.17	21.22	21.23
Modulation	RB	RB Offset	Tune up	15MHz		
				20025	20175	20325
QPSK	1	Low	24.00	23.05	23.14	23.07
		Middle		23.17	23.22	23.08
		High		22.94	22.86	22.84
	50%	Low	23.00	22.10	22.08	22.08
		Middle		22.20	22.25	22.19
		High		22.13	22.15	22.07
	100%	/	23.00	22.20	22.20	22.06
16QAM	1	Low	23.00	22.06	22.14	22.11
		Middle		22.08	22.17	22.15
		High		22.03	22.07	22.15
	50%	Low	22.00	21.04	21.11	21.05
		Middle		21.12	21.12	21.14
		High		21.21	21.19	21.13
	100%	/	22.00	21.14	21.17	21.19
Modulation	RB	RB Offset	Tune up	20MHz		
				20050	20175	20300
QPSK	1	Low	24.00	23.02	23.10	23.04
		Middle		23.16	23.18	23.06
		High		22.92	22.85	22.81
	50%	Low	23.00	22.07	22.03	22.04
		Middle		22.18	22.21	22.16
		High		22.10	22.10	22.03
	100%	/	23.00	22.17	22.15	22.02
16QAM	1	Low	23.00	22.05	22.10	22.06
		Middle		22.04	22.15	22.11
		High		22.01	22.04	22.13
	50%	Low	22.00	21.01	21.07	21.02
		Middle		21.09	21.10	21.11
		High		21.18	21.14	21.09

	100%	/	22.00	21.12	21.13	21.16

LTE BAND 5

LTE			LTE B5			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				20407	20525	20643
QPSK	1	Low	24.00	23.29	23.28	23.14
		Middle		23.34	23.32	23.27
		High		23.11	23.27	23.26
	50%	Low	24.00	23.35	23.43	23.39
		Middle		23.37	23.33	23.28
		High		23.34	23.23	23.14
	100%	/	23.00	22.48	22.40	22.39
16QAM	1	Low	23.00	22.43	22.45	22.34
		Middle		22.41	22.52	22.34
		High		22.32	22.37	22.42
	50%	Low	23.00	22.41	22.38	22.34
		Middle		22.40	22.40	22.39
		High		22.28	22.29	22.25
	100%	/	22.00	21.42	21.52	21.48
Modulation	RB	RB Offset	Tune up	3MHz		
				20415	20525	20635
QPSK	1	Low	24.00	23.30	23.31	23.16
		Middle		23.33	23.36	23.32
		High		23.13	23.31	23.29
	50%	Low	23.00	22.45	22.55	22.52
		Middle		22.50	22.44	22.39
		High		22.44	22.36	22.25
	100%	/	23.00	22.52	22.45	22.44
16QAM	1	Low	23.00	22.45	22.46	22.36
		Middle		22.44	22.54	22.38
		High		22.34	22.41	22.44
	50%	Low	22.00	21.53	21.52	21.47
		Middle		21.50	21.52	21.50
		High		21.38	21.41	21.38
	100%	/	22.00	21.46	21.57	21.50
Modulation	RB	RB Offset	Tune up	5MHz		
				20425	20525	20625
QPSK	1	Low	24.00	23.29	23.27	23.14
		Middle		23.31	23.35	23.29
		High		23.10	23.26	23.25

	50%	Low	23.00	22.43	22.51	22.49
		Middle		22.47	22.39	22.35
		High		22.41	22.33	22.21
	100%	/	23.00	22.50	22.41	22.39
16QAM	1	Low	23.00	22.40	22.44	22.34
		Middle		22.42	22.51	22.36
		High		22.31	22.37	22.41
	50%	Low	22.00	21.50	21.50	21.44
		Middle		21.47	21.47	21.46
		High		21.36	21.37	21.35
	100%	/	22.00	21.43	21.52	21.46
Modulation	RB	RB Offset	Tune up	10MHz		
				20450	20525	20600
QPSK	1	Low	24.00	23.26	23.23	23.11
		Middle		23.30	23.31	23.27
		High		23.08	23.25	23.22
	50%	Low	23.00	22.40	22.46	22.45
		Middle		22.45	22.35	22.32
		High		22.38	22.28	22.17
	100%	/	23.00	22.47	22.36	22.35
16QAM	1	Low	23.00	22.39	22.40	22.29
		Middle		22.38	22.49	22.32
		High		22.29	22.34	22.39
	50%	Low	22.00	21.47	21.46	21.41
		Middle		21.44	21.45	21.43
		High		21.33	21.32	21.31
	100%	/	22.00	21.41	21.48	21.43

LTE BAND 7

LTE			LTE B7			
Modulation	RB	RB Offset	Tune up	5MHz		
				20775	21100	21425
QPSK	1	Low	25.00	23.92	23.94	24.13
		Middle		24.26	24.30	24.24
		High		24.08	24.04	24.14
	50%	Low	24.00	23.37	23.53	23.51
		Middle		23.33	23.47	23.46
		High		23.19	23.41	23.30
	100%	/	24.00	23.31	23.26	23.33
16QAM	1	Low	24.00	23.33	23.40	23.35
		Middle		23.31	23.31	23.30
		High		23.21	23.28	23.23
	50%	Low	23.00	22.29	22.22	22.39
		Middle		22.41	22.34	22.30

		High		22.36	22.26	22.32
	100%	/	23.00	22.35	22.31	22.34
Modulation	RB	RB Offset	Tune up	10MHz		
				20800	21100	21400
QPSK	1	Low	25.00	23.94	23.95	24.16
		Middle		24.29	24.35	24.28
		High		24.10	24.08	24.17
	50%	Low	24.00	23.40	23.58	23.55
		Middle		23.36	23.52	23.50
		High		23.21	23.45	23.35
	100%	/	24.00	23.35	23.28	23.37
16QAM	1	Low	24.00	23.35	23.43	23.37
		Middle		23.34	23.35	23.33
		High		23.24	23.30	23.26
	50%	Low	23.00	22.32	22.27	22.43
		Middle		22.43	22.38	22.33
		High		22.39	22.31	22.36
	100%	/	23.00	22.38	22.36	22.38
Modulation	RB	RB Offset	Tune up	15MHz		
				20825	21100	21375
QPSK	1	Low	25.00	23.93	23.91	24.14
		Middle		24.27	24.34	24.25
		High		24.07	24.03	24.13
	50%	Low	24.00	23.38	23.54	23.52
		Middle		23.33	23.47	23.46
		High		23.18	23.42	23.31
	100%	/	24.00	23.33	23.24	23.32
16QAM	1	Low	24.00	23.30	23.41	23.35
		Middle		23.32	23.32	23.31
		High		23.21	23.26	23.23
	50%	Low	23.00	22.29	22.25	22.40
		Middle		22.40	22.33	22.29
		High		22.37	22.27	22.33
	100%	/	23.00	22.35	22.31	22.34
Modulation	RB	RB Offset	Tune up	20MHz		
				20850	21100	21350
QPSK	1	Low	25.00	23.90	23.87	24.11
		Middle		24.26	24.30	24.23
		High		24.05	24.02	24.10
	50%	Low	24.00	23.35	23.49	23.48
		Middle		23.31	23.43	23.43
		High		23.15	23.37	23.27
	100%	/	24.00	23.30	23.19	23.28
16QAM	1	Low	24.00	23.31	23.37	23.30

		Middle		23.28	23.30	23.27
		High		23.19	23.23	23.21
	50%	Low	23.00	22.26	22.21	22.37
		Middle		22.37	22.31	22.26
		High		22.34	22.22	22.29
	100%	/	23.00	22.33	22.27	22.31

LTE BAND 12

LTE			LTE B12			
Modulation	RB	RB Offset	Tune up	1.4MHz		
				23017	23095	23173
QPSK	1	Low	24.50	23.42	23.49	23.48
		Middle		23.59	23.59	23.54
		High		23.52	23.48	23.55
	50%	Low	24.50	23.53	23.69	23.45
		Middle		23.45	23.66	23.53
		High		23.62	23.65	23.45
	100%	/	23.50	22.61	22.75	22.56
16QAM	1	Low	23.50	22.94	22.73	22.74
		Middle		22.92	22.84	22.73
		High		22.66	22.62	22.61
	50%	Low	23.50	22.74	22.63	22.62
		Middle		22.67	22.63	22.57
		High		22.64	22.70	22.62
	100%	/	22.50	21.84	21.80	21.83
Modulation	RB	RB Offset	Tune up	3MHz		
				23025	23095	23165
QPSK	1	Low	24.50	23.43	23.52	23.50
		Middle		23.58	23.63	23.59
		High		23.54	23.52	23.58
	50%	Low	23.50	22.63	22.81	22.58
		Middle		22.58	22.77	22.64
		High		22.72	22.78	22.56
	100%	/	23.50	22.65	22.80	22.61
16QAM	1	Low	23.50	22.96	22.74	22.76
		Middle		22.95	22.86	22.77
		High		22.68	22.66	22.63
	50%	Low	22.50	21.86	21.77	21.75
		Middle		21.77	21.75	21.68
		High		21.74	21.82	21.75
	100%	/	22.50	21.88	21.85	21.85
Modulation	RB	RB Offset	Tune up	5MHz		
				23035	23095	23155
QPSK	1	Low	24.50	23.42	23.48	23.48

		Middle		23.56	23.62	23.56
		High		23.51	23.47	23.54
	50%	Low	23.50	22.61	22.77	22.55
		Middle		22.55	22.72	22.60
		High		22.69	22.75	22.52
	100%	/	23.50	22.63	22.76	22.56
16QAM	1	Low	23.50	22.91	22.72	22.74
		Middle		22.93	22.83	22.75
		High		22.65	22.62	22.60
	50%	Low	22.50	21.83	21.75	21.72
		Middle		21.74	21.70	21.64
		High		21.72	21.78	21.72
	100%	/	22.50	21.85	21.80	21.81
Modulation	RB	RB Offset	Tune up	10MHz		
				23060	23095	23130
QPSK	1	Low	24.50	23.39	23.44	23.45
		Middle		23.55	23.58	23.54
		High		23.49	23.46	23.51
	50%	Low	23.50	22.58	22.72	22.51
		Middle		22.53	22.68	22.57
		High		22.66	22.70	22.48
	100%	/	23.50	22.60	22.71	22.52
16QAM	1	Low	23.50	22.63	22.68	22.69
		Middle		22.89	22.81	22.71
		High		22.63	22.59	22.58
	50%	Low	22.50	21.80	21.71	21.69
		Middle		21.71	21.68	21.61
		High		21.69	21.73	21.68
	100%	/	22.50	21.83	21.76	21.78

LTE BAND 17

LTE			LTE B17			
Modulation	RB	RB Offset	Tune up	5MHz		
				23755	23790	23825
QPSK	1	Low	24.00	23.53	23.51	23.55
		Middle		23.51	23.60	23.56
		High		23.54	23.56	23.54
	50%	Low	23.00	22.58	22.59	22.55
		Middle		22.72	22.66	22.67
		High		22.76	22.66	22.62
	100%	/	23.00	22.64	22.64	22.57
16QAM	1	Low	23.00	22.69	22.79	22.72
		Middle		22.71	22.56	22.63

		High		22.67	22.73	22.73
	50%	Low	22.00	21.62	21.61	21.54
		Middle		21.76	21.71	21.61
		High		21.66	21.65	21.56
	100%	/	22.00	21.72	21.75	21.69
Modulation	RB	RB Offset	Tune up	10MHz		
				23780	23790	23800
QPSK	1	Low	24.00	23.50	23.47	23.52
		Middle		23.50	23.56	23.54
		High		23.52	23.55	23.51
	50%	Low	23.00	22.55	22.54	22.51
		Middle		22.70	22.62	22.64
		High		22.73	22.61	22.58
	100%	/	23.00	22.61	22.59	22.53
16QAM	1	Low	23.00	22.71	22.75	22.67
		Middle		22.67	22.54	22.59
		High		22.65	22.70	22.71
	50%	Low	22.00	21.59	21.57	21.51
		Middle		21.73	21.69	21.58
		High		21.63	21.60	21.52
	100%	/	22.00	21.70	21.71	21.66

LTE BAND 38

LTE			LTE B38			
Modulation	RB	RB Offset	Tune up	5MHz		
				37775	38000	38225
QPSK	1	Low	25.00	24.03	23.91	24.13
		Middle		23.87	24.14	24.26
		High		23.91	24.14	24.21
	50%	Low	24.00	23.22	23.20	23.18
		Middle		23.24	23.24	23.27
		High		23.27	23.30	23.29
	100%	/	24.00	23.33	23.37	23.34
16QAM	1	Low	24.00	23.42	23.23	23.22
		Middle		23.40	23.43	23.34
		High		23.28	23.26	23.21
	50%	Low	23.00	22.10	22.10	22.13
		Middle		22.16	22.18	22.20
		High		22.20	22.32	22.23
	100%	/	23.00	22.31	22.37	22.34
Modulation	RB	RB Offset	Tune up	10MHz		
				37800	38000	38200
QPSK	1	Low	25.00	24.05	23.92	24.16
		Middle		23.90	24.19	24.30

		High		23.93	24.18	24.24
	50%	Low	24.00	23.25	23.25	23.22
		Middle		23.27	23.29	23.31
		High		23.29	23.34	23.34
	100%	/	24.00	23.37	23.39	23.38
16QAM	1	Low	24.00	23.44	23.26	23.24
		Middle		23.43	23.47	23.37
		High		23.31	23.28	23.24
	50%	Low	23.00	22.13	22.15	22.17
		Middle		22.18	22.22	22.23
		High		22.23	22.37	22.27
	100%	/	23.00	22.34	22.42	22.38
Modulation	RB	RB Offset	Tune up	15MHz		
				37825	38000	38175
QPSK	1	Low	25.00	24.04	23.88	24.14
		Middle		23.88	24.18	24.27
		High		23.90	24.13	24.20
	50%	Low	24.00	23.23	23.21	23.19
		Middle		23.24	23.24	23.27
		High		23.26	23.31	23.30
	100%	/	24.00	23.35	23.35	23.33
16QAM	1	Low	24.00	23.39	23.24	23.22
		Middle		23.41	23.44	23.35
		High		23.28	23.24	23.21
	50%	Low	23.00	22.10	22.13	22.14
		Middle		22.15	22.17	22.19
		High		22.21	22.33	22.24
	100%	/	23.00	22.31	22.37	22.34
Modulation	RB	RB Offset	Tune up	20MHz		
				37850	38000	38150
QPSK	1	Low	25.00	24.01	23.84	24.11
		Middle		23.87	24.14	24.21
		High		23.88	24.12	24.17
	50%	Low	24.00	23.20	23.16	23.15
		Middle		23.22	23.20	23.24
		High		23.23	23.26	23.26
	100%	/	24.00	23.32	23.30	23.29
16QAM	1	Low	24.00	23.25	23.20	23.17
		Middle		23.37	23.42	23.31
		High		23.26	23.21	23.19
	50%	Low	23.00	22.07	22.09	22.11
		Middle		22.12	22.15	22.16
		High		22.18	22.28	22.20
	100%	/	23.00	22.29	22.33	22.31

LTE BAND 41

LTE			LTE B41			
Modulation	RB	RB Offset	Tune up	5MHz		
				39675	40620	41565
QPSK	1	Low	25.00	23.89	24.09	24.00
		Middle		24.08	24.22	24.03
		High		24.02	24.05	24.02
	50%	Low	24.00	23.02	23.21	23.12
		Middle		23.09	23.18	23.09
		High		23.07	23.15	22.98
	100%	/	24.00	23.15	23.28	23.16
16QAM	1	Low	24.00	23.32	23.12	23.15
		Middle		23.30	23.29	23.20
		High		23.11	23.17	23.13
	50%	Low	23.00	21.96	22.01	21.96
		Middle		22.15	22.20	22.12
		High		22.21	22.18	22.23
	100%	/	23.00	22.18	22.22	22.14
Modulation	RB	RB Offset	Tune up	10MHz		
				39700	40620	41540
QPSK	1	Low	25.00	23.91	24.10	24.03
		Middle		24.11	24.27	24.07
		High		24.04	24.09	24.05
	50%	Low	24.00	23.05	23.26	23.16
		Middle		23.12	23.23	23.13
		High		23.09	23.19	23.03
	100%	/	24.00	23.19	23.30	23.20
16QAM	1	Low	24.00	23.34	23.15	23.17
		Middle		23.33	23.33	23.23
		High		23.14	23.19	23.16
	50%	Low	23.00	21.99	22.06	22.00
		Middle		22.17	22.24	22.15
		High		22.24	22.23	22.27
	100%	/	23.00	22.21	22.27	22.18
Modulation	RB	RB Offset	Tune up	15MHz		
				39725	40620	41515
QPSK	1	Low	25.00	23.90	24.06	24.01
		Middle		24.09	24.26	24.04
		High		24.01	24.04	24.01
	50%	Low	24.00	23.03	23.22	23.13
		Middle		23.09	23.18	23.09
		High		23.06	23.16	22.99

	100%	/	24.00	23.17	23.26	23.15
16QAM	1	Low	24.00	23.29	23.13	23.15
		Middle		23.31	23.30	23.21
		High		23.11	23.15	23.13
	50%	Low	23.00	21.96	22.04	21.97
		Middle		22.14	22.19	22.11
		High		22.22	22.19	22.24
	100%	/	23.00	22.18	22.22	22.14
Modulation	RB	RB Offset	Tune up	20MHz		
				39750	40620	41490
QPSK	1	Low	25.00	23.87	24.02	23.98
		Middle		24.08	24.22	24.02
		High		23.99	24.03	23.98
	50%	Low	24.00	23.00	23.17	23.09
		Middle		23.07	23.14	23.06
		High		23.03	23.11	22.95
	100%	/	24.00	23.14	23.21	23.11
16QAM	1	Low	24.00	23.11	23.09	23.10
		Middle		23.27	23.28	23.17
		High		23.09	23.12	23.11
	50%	Low	23.00	21.93	22.00	21.94
		Middle		22.11	22.17	22.08
		High		22.19	22.14	22.20
	100%	/	23.00	22.16	22.18	22.11

6.1.3 Radiated

6.1.3.1 Description

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

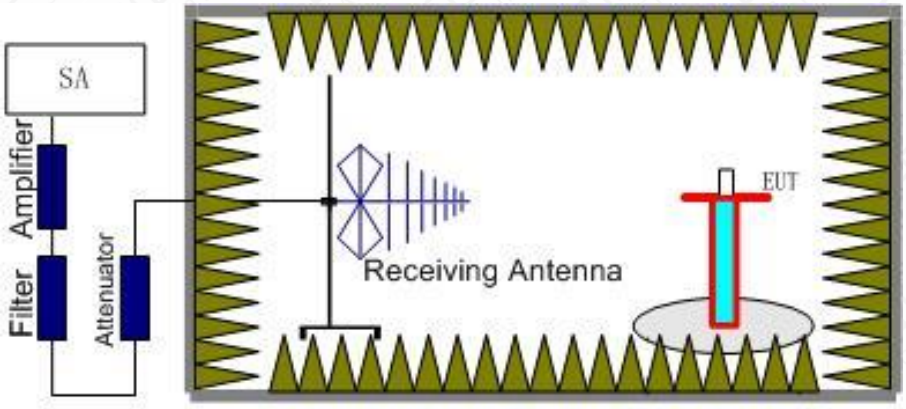
Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Rule Part 27.50(d) specifies “Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP”.

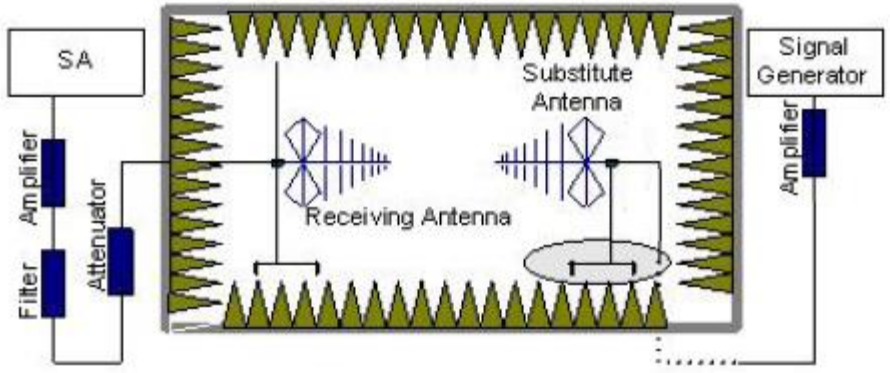
Rule Part 27.50(h)(2) specifies “Mobile stations are limited to 2.0 watts EIRP.”.

Rule Part 27.50(c) specifies “Portable stations (hand-held de-vices) are limited to 3 watts ERP.”

6.1.3.2 Method of Measurement



The measurements procedures in TIA-603E-2016 are used.
1.EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2.The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3.The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
4.An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.
The cable loss (Pcl), the substitution antenna Gain (Ga) and the amplifier Gain (PAg) should be recorded after test.
The measurement results are obtained as described below:
Power (EIRP) = PMea + PAg - Pcl + Ga
5.This value is EIRP since the measurement is calibrated using an antenna of known gain (unit dBi) and known input power.
6.ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

6.1.3.3 Measurement result

LTE Band 2- EIRP 24. 232(b)

Limits: ≤33dBm (2W)

LTE Band 2_1.4MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1850.7	25.14	33.00	H
1880	25.13	33.00	H
1909.3	25.21	33.00	H

LTE Band 2_3MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1851.5	25.12	33.00	H
1880	25.13	33.00	H
1908.5	25.12	33.00	H

LTE Band 2_5MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1852.5	25.10	33.00	H
1880	25.09	33.00	H
1907.5	25.09	33.00	H

LTE Band 2_10MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1855	25.13	33.00	H
1880	25.14	33.00	H
1905	25.13	33.00	H

LTE Band 2_15MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1857.5	25.11	33.00	H
1880	25.13	33.00	H
1902.5	25.10	33.00	H

LTE Band 2_20 MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1860	25.10	33.00	H
1880	25.09	33.00	H
1900	25.08	33.00	H

LTE Band 2_1.4MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1850.7	24.08	33.00	H
1880	24.27	33.00	H
1909.3	24.21	33.00	H

LTE Band 2_3MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1851.5	24.10	33.00	H
1880	24.28	33.00	H

1908.5	24.24	33.00	H

LTE Band 2_5MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1852.5	24.07	33.00	H
1880	24.25	33.00	H
1907.5	24.21	33.00	H

LTE Band 2_10MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1855	24.10	33.00	H
1880	24.29	33.00	H
1905	24.23	33.00	H

LTE Band 2_15MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1857.5	24.07	33.00	H
1880	24.26	33.00	H
1902.5	24.21	33.00	H

LTE Band 2_20 MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1860	24.06	33.00	H
1880	24.24	33.00	H
1900	24.16	33.00	H

LTE Band 4- EIRP 27.50(d)

Limits: ≤30dBm (1W)

LTE Band 4_1.4MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1710.7	25.22	30.00	H
1732.5	25.21	30.00	H
1754.3	25.14	30.00	H

LTE Band 4_3MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1711.5	25.20	30.00	H
1732.5	25.24	30.00	H
1753.5	25.12	30.00	H

LTE Band 4_5MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1712.5	25.18	30.00	H
1732.5	25.20	30.00	H
1752.5	25.09	30.00	H

LTE Band 4_10MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1715	25.21	30.00	H
1732.5	25.25	30.00	H
1750	25.13	30.00	H

LTE Band 4_15MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1717.5	25.19	30.00	H
1732.5	25.24	30.00	H
1747.5	25.10	30.00	H

LTE Band 4_20MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1720	25.18	30.00	H
1732.5	25.20	30.00	H
1745	25.08	30.00	H

LTE Band 4_1.4MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1710.7	24.15	30.00	H
1732.5	24.20	30.00	H
1754.3	24.18	30.00	H

LTE Band 4_3MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1711.5	24.14	30.00	H
1732.5	24.20	30.00	H
1753.5	24.21	30.00	H

LTE Band 4_5MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1712.5	24.11	30.00	H
1732.5	24.18	30.00	H
1752.5	24.17	30.00	H

LTE Band 4_10MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1715	24.13	30.00	H
1732.5	24.22	30.00	H
1750.5	24.20	30.00	H

LTE Band 4_15MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1717.5	24.10	30.00	H
1732.5	24.19	30.00	H
1747.5	24.17	30.00	H

LTE Band 4_20MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
1720	24.07	30.00	H
1732.5	24.17	30.00	H
1745	24.15	30.00	H

LTE Band 5- ERP/EIRP 22.913(a)

Limits: ≤38.45dBm (7W)

LTE Band 5_1.4MHz_QPSK

Frequency(MHz)	ERP(dBm)	EIRP(dBm)	Limit(dBm)	Polarization
824.70	21.37	23.52	38.45	H
836.50	21.43	23.58	38.45	H
848.30	21.39	23.54	38.45	H

LTE Band 5_3MHz_QPSK

Frequency(MHz)	ERP(dBm)	EIRP(dBm)	Limit(dBm)	Polarization
825.50	21.33	23.48	38.45	H
836.50	21.36	23.51	38.45	H
847.50	21.32	23.47	38.45	H

LTE Band 5_5MHz_QPSK

Frequency(MHz)	ERP(dBm)	EIRP(dBm)	Limit(dBm)	Polarization
826.50	21.31	23.46	38.45	H
836.50	21.35	23.50	38.45	H
846.50	21.29	23.44	38.45	H

LTE Band 5_10MHz_QPSK

Frequency(MHz)	ERP(dBm)	EIRP(dBm)	Limit(dBm)	Polarization
829.00	21.30	23.45	38.45	H
836.50	21.31	23.46	38.45	H
844.00	21.27	23.42	38.45	H

LTE Band 5_1.4MHz_16QAM

Frequency(MHz)	ERP(dBm)	EIRP(dBm)	Limit(dBm)	Polarization
824.70	20.43	22.58	38.45	H
836.50	20.52	22.67	38.45	H
848.30	20.42	22.57	38.45	H

LTE Band 5_3MHz_16QAM

Frequency(MHz)	ERP(dBm)	EIRP(dBm)	Limit(dBm)	Polarization
825.50	20.45	22.60	38.45	H
836.50	20.54	22.69	38.45	H
847.50	20.44	22.59	38.45	H

LTE Band 5_5MHz_16QAM

Frequency(MHz)	ERP(dBm)	EIRP(dBm)	Limit(dBm)	Polarization
826.50	20.42	22.57	38.45	H
836.50	20.51	22.66	38.45	H
846.50	20.41	22.56	38.45	H

LTE Band 5_10MHz_16QAM

Frequency(MHz)	ERP(dBm)	EIRP(dBm)	Limit(dBm)	Polarization
829.00	20.39	22.54	38.45	H
836.50	20.49	22.64	38.45	H
844.00	20.39	22.54	38.45	H

LTE Band 7- EIRP 27.50(h)(2)

Limits: ≤33 dBm (2W)

LTE Band 7_5MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization

2502.5	27.22	33.00	H
2535	27.26	33.00	H
2567.5	27.20	33.00	H

LTE Band 7_10MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2505	27.25	33.00	H
2535	27.31	33.00	H
2565	27.24	33.00	H

LTE Band 7_15MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2507.5	27.23	33.00	H
2535	27.30	33.00	H
2562.5	27.21	33.00	H

LTE Band 7_20MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2510	27.22	33.00	H
2535	27.26	33.00	H
2560	27.19	33.00	H

LTE Band 7_5MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2502.5	26.29	33.00	H
2535	26.36	33.00	H
2567.5	26.31	33.00	H

LTE Band 7_10MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2505	26.31	33.00	H
2535	26.39	33.00	H
2565	26.33	33.00	H

LTE Band 7_15MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2507.5	26.28	33.00	H
2535	26.37	33.00	H
2562.5	26.31	33.00	H

LTE Band 7_20MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2510	26.27	33.00	H
2535	26.33	33.00	H
2560	26.26	33.00	H

LTE Band 12- ERP 27.50(c)

Limits: ≤38.45dBm (7W)

LTE Band 12_1.4MHz_QPSK

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
699.7	20.99	38.45	H

707.5	21.06	38.45	H
715.3	20.92	38.45	H

LTE Band 12_3MHz_QPSK

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
700.5	20.31	38.45	H
707.5	20.21	38.45	H
714.5	20.11	38.45	H

LTE Band 12_5MHz_QPSK

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
701.5	20.95	38.45	H
707.5	21.00	38.45	H
713.5	20.96	38.45	H

LTE Band 12_10MHz_QPSK

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
704	20.93	38.45	H
707.5	20.99	38.45	H
711	20.93	38.45	H

LTE Band 12_1.4MHz_16QAM

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
699.7	20.31	38.45	H
707.5	20.21	38.45	H
715.3	20.11	38.45	H

LTE Band 12_3MHz_16QAM

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
700.5	20.33	38.45	H
707.5	20.23	38.45	H
714.5	20.14	38.45	H

LTE Band 12_5MHz_16QAM

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
701.5	20.30	38.45	H
707.5	20.20	38.45	H
713.5	20.12	38.45	H

LTE Band 12_10MHz_16QAM

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
704	20.26	38.45	H
707.5	20.18	38.45	H
711	20.08	38.45	H

LTE Band 17- ERP 27.50(c)(10)

Limits: ≤34.77dBm (3W)

LTE Band 17_5MHz_QPSK

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
706.5	20.91	34.77	H

710	20.97	34.77	H
713.5	20.93	34.77	H

LTE Band 17_10MHz_QPSK

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
709	20.89	34.77	H
710	20.93	34.77	H
711	20.91	34.77	H

LTE Band 17_5MHz_16QAM

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
706.5	20.08	34.77	H
710	20.16	34.77	H
713.5	20.10	34.77	H

LTE Band 17_10MHz_16QAM

Frequency(MHz)	ERP(dBm)	Limit(dBm)	Polarization
709	20.08	34.77	H
710	20.12	34.77	H
711	20.08	34.77	H

LTE Band 38- EIRP 27.50(h)(2)

Limits: ≤33 dBm (2W)

LTE Band 38_5MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2572.5	26.07	33.00	H
2595	26.18	33.00	H
2617.5	26.30	33.00	H

LTE Band 38_10MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2575	26.09	33.00	H
2595	26.23	33.00	H
2615	26.34	33.00	H

LTE Band 38_15MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2577.5	26.08	33.00	H
2595	26.22	33.00	H
2612.5	26.31	33.00	H

LTE Band 38_20MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2580	26.05	33.00	H
2595	26.18	33.00	H
2610	26.25	33.00	H

LTE Band 38_5MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2572.5	25.46	33.00	H
2595	25.47	33.00	H
2617.5	25.38	33.00	H

LTE Band 38_10MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2575	25.48	33.00	H
2595	25.51	33.00	H
2615	25.41	33.00	H

LTE Band 38_15MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2577.5	25.45	33.00	H
2595	25.48	33.00	H
2612.5	25.39	33.00	H

LTE Band 38_20MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2580	25.41	33.00	H
2595	25.46	33.00	H
2610	25.35	33.00	H

LTE Band 41- EIRP 27.50(h)(2)

Limits: ≤33 dBm (2W)

LTE Band 41_5MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2498.5	27.04	33.00	H
2593	27.18	33.00	H
2687.5	26.99	33.00	H

LTE Band 41_10MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2501	27.07	33.00	H
2593	27.23	33.00	H
2685	27.03	33.00	H

LTE Band 41_15MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2503.5	27.05	33.00	H
2593	27.22	33.00	H
2682.5	27.00	33.00	H

LTE Band 41_20MHz_QPSK

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2506	27.04	33.00	H
2593	27.18	33.00	H
2680	26.98	33.00	H

LTE Band 41_5MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization

2498.5	26.28	33.00	H
2593	26.25	33.00	H
2687.5	26.16	33.00	H

LTE Band 41_10MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2501	26.30	33.00	H
2593	26.29	33.00	H
2685	26.19	33.00	H

LTE Band 41_15MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2503.5	26.27	33.00	H
2593	26.26	33.00	H
2682.5	26.17	33.00	H

LTE Band 41_20MHz_16QAM

Frequency(MHz)	EIRP(dBm)	Limit(dBm)	Polarization
2506	26.23	33.00	H
2593	26.24	33.00	H
2680	26.13	33.00	H

ANALYZER SETTINGS:

RBW = VBW = 8MHz for occupied bandwdiths equal to or less than 5MHz.

RBW = VBW = 20MHz for occupied bandwidths equal to or greater than 10MHz.

6.2 Emission Limt

Reference

CFR 2.1051,2.1053,22.917,24.238(a), 27.53(g), 27.53(h), 27.53(m),90.669.

Rule RSS-130 4.7; Rule RSS-132 5.5; Rule RSS-133 6.5; Rule RSS-139 6.6; Rule RSS-199 4.5

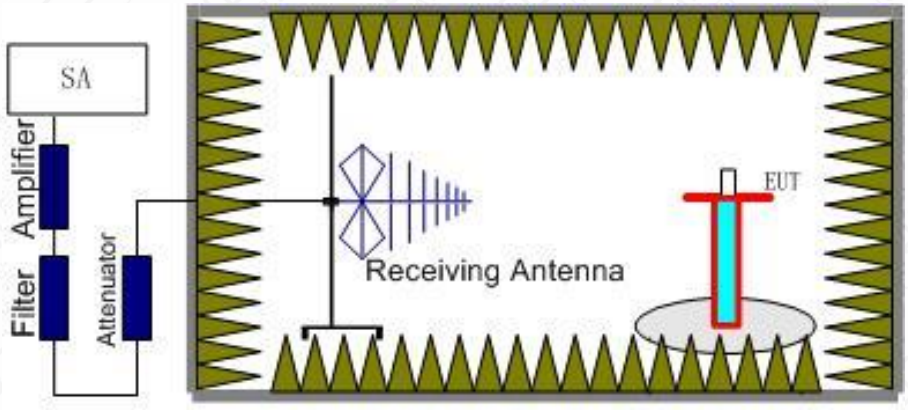
6.2.1 Measurement Method

The measurements procedures in TIA-603E-2016 are used. This measurement is carried out in fully-anechoic chamber FAC-3.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz as outlined in Part 27.53(g), Part 27.53(h), Part 27.53(m). The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Bands 7.

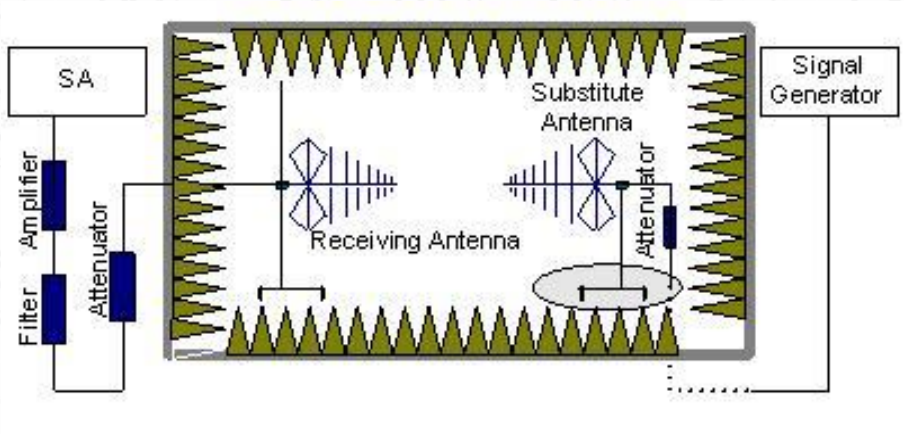
The procedure of radiated spurious emissions is as follows:

1.Below 1 GHz, EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. Above 1 GHz, EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna.EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2.The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3.The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4.The Path loss (Ppl) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (Ga) should be recorded after test.

An amplifier should be connected in for the test.

The Path loss (Ppl) is the summation of the cable loss and the gain of the amplifier.

The measurement results are obtained as described below:

Power (EIRP) =PMea- Ppl + Ga

5.This value is EIRP since the measurement is calibrated using an antenna of known gain (unit: dBi) and known input power.

6.ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

6.2.2 Measurement Limit

Part 27.53(g),27.53(h), 27.53(m) state that on any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

According to KDB 971168 6, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

Part 27.53(m) states that 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 that 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.

Rule RSS-132: 5.5 specifies that " In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts).
After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required. Limit -13 dBm
Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).
After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm
Rule RSS-139 6.6 specifies that "In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,Footnote2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.
After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.
Limit -13 dBm

6.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Bands 5.It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE Bands 5. Into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this. The evaluated frequency range is from 30MHz to 26GHz.

BAND	Channel		Result
2	L	18607	Pass
	M	18900	Pass
	H	19193	Pass
4	L	19957	Pass
	M	20175	Pass
	H	20393	Pass
5	L	20407	Pass
	M	20525	Pass

	H	20643	Pass
7	L	20775	Pass
	M	21100	Pass
	H	21425	Pass
12	L	23017	Pass
	M	23095	Pass
	H	23173	Pass
17	L	23755	Pass
	M	23790	Pass
	H	23825	Pass
38	L	37775	Pass
	M	38000	Pass
	H	38225	Pass
41	L	40065	Pass
	M	40640	Pass
	H	41215	Pass

RSE-LTE2-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3818.4	-44.68	6.7	7.9	-43.48	-13	H
4738.0	-53.86	7.5	9.0	-52.36	-13	H
5728.0	-45.77	8.5	10.2	-44.07	-13	H
7914.8	-53.14	9.9	12.2	-50.84	-13	V
10562.8	-49.94	11.6	12.3	-49.24	-13	V
13626.4	-47.05	13.8	12.3	-48.55	-13	V

RSE-LTE2-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3701.2	-49.28	6.6	7.9	-47.98	-13	H
4542.8	-53.78	7.4	8.7	-52.48	-13	H

5552.0	-49.62	8.2	9.8	-48.02	-13	H
7915.6	-53.19	9.9	12.2	-50.89	-13	H
11085.4	-46.82	12.1	12.3	-46.62	-13	H
14343.2	-47.17	13.6	12.3	-48.47	-13	V

RSE-LTE2-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3760.0	-47.69	6.6	7.9	-46.39	-13	H
5209.6	-50.98	8.0	9.4	-49.58	-13	H
6940.8	-53.28	9.3	11.1	-51.48	-13	H
9258.8	-50.55	10.7	12.7	-48.55	-13	V
12036.0	-46.62	12.6	12.3	-46.92	-13	V
15515.0	-43	14.5	12.3	-45.2	-13	H

RSE-LTE4-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3508.0	-44.12	6.4	7.8	-42.72	-13	H
5262.8	-47.41	8.0	9.4	-46.01	-13	H
7107.2	-53.61	9.4	11.1	-51.91	-13	V
9407.2	-50.7	10.7	12.7	-48.7	-13	V
12258.6	-46.33	12.7	12.3	-46.73	-13	V
15366.6	-43.63	14.4	12.3	-45.73	-13	H

RSE-LTE4-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3420.8	-46.71	6.3	7.8	-45.21	-13	V
5132.0	-48.42	7.9	9.4	-46.92	-13	H
6686.8	-53.31	9.1	10.9	-51.51	-13	H
8402.4	-54.49	10.2	12.6	-52.09	-13	H
10562.8	-50.32	11.6	12.3	-49.62	-13	V

12617.0	-46.43	12.8	12.3	-46.93	-13	H

RSE-LTE4-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3464.4	-40.95	6.4	7.8	-39.55	-13	H
5197.2	-44.54	8.0	9.4	-43.14	-13	H
7156.4	-53.44	9.4	11.4	-51.44	-13	V
9308.4	-51.77	10.7	12.7	-49.77	-13	V
11716.8	-46.87	12.4	12.3	-46.97	-13	V
15537.4	-43.61	14.5	12.3	-45.81	-13	H

RSE-LTE5-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
2627.3	-42.47	5.5	6.1	-41.87	-13	H
3254.8	-52.97	6.1	6.9	-52.17	-13	H
4011.2	-54.38	6.9	8.6	-52.68	-13	H
4904.8	-53.49	7.7	9.6	-51.59	-13	H
5594.8	-53.68	8.3	9.8	-52.18	-13	V
6304.0	-53.36	8.8	10.3	-51.86	-13	H

RSE-LTE5-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
2712.7	-43.47	5.6	6.1	-42.97	-13	H
3606.0	-55.31	6.5	7.8	-54.01	-13	V
4285.2	-54.46	7.1	8.9	-52.66	-13	H
5088.4	-53.26	7.9	9.6	-51.56	-13	H
6059.2	-55	8.6	10.2	-53.4	-13	V
7022.8	-53.63	9.3	11.1	-51.83	-13	H

RSE-LTE5-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization

2448.1	-31.15	5.3	5.6	-30.85	-13	H
3382.8	-55.31	6.3	7.8	-53.81	-13	H
4124.4	-54.67	7.0	8.6	-53.07	-13	H
5146.8	-53.01	7.9	9.4	-51.51	-13	H
6242.4	-52.87	8.8	10.3	-51.37	-13	V
7590.4	-52.83	9.7	11.6	-50.93	-13	V

RSE-LTE7-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
5161.6	-47.76	7.9	9.4	-46.26	-13	H
6766.8	-49.69	9.2	10.9	-47.99	-13	H
8282.0	-49.97	10.1	12.4	-47.67	-13	H
10212.0	-47.1	11.3	12.5	-45.9	-13	H
12186.5	-42.94	12.6	12.3	-43.24	-13	V
14085.2	-41.62	14.0	12.3	-43.32	-13	V

RSE-LTE7-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
5198.4	-47.64	8.0	9.4	-46.24	-13	V
6787.2	-49.6	9.2	10.9	-47.9	-13	H
8721.2	-49.59	10.4	12.7	-47.29	-13	V
10614.4	-45.91	11.6	12.3	-45.21	-13	V
13285.5	-39.87	13.6	12.3	-41.17	-13	H
15777.5	-33.48	14.9	12.3	-36.08	-13	H

RSE-LTE7-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
5010.8	-49.69	7.8	9.6	-47.89	-13	H
6552.0	-48.95	9.0	10.6	-47.35	-13	H
7979.6	-50.33	9.9	12.2	-48.03	-13	V

9697.2	-46.51	10.9	12.7	-44.71	-13	V
11252.0	-43.38	12.1	12.3	-43.18	-13	V
14836.0	-36.82	14.3	12.3	-38.82	-13	V

RSE-LTE12-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1426.1	-51.94	4.1	5.3	-50.74	-13	H
2190.0	-45.75	5.0	5.1	-45.65	-13	V
2822.3	-41.44	5.7	6.1	-41.04	-13	V
3566.4	-53.35	6.4	7.8	-51.95	-13	V
4240.4	-53.87	7.1	8.9	-52.07	-13	H
5264.4	-51.24	8.0	9.4	-49.84	-13	H

RSE-LTE12-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
2166.9	-45.65	5.0	5.1	-45.55	-13	H
2726.9	-42.44	5.7	6.1	-42.04	-13	V
3570.4	-54.06	6.4	7.8	-52.66	-13	H
4377.2	-53.62	7.3	8.7	-52.22	-13	H
5106.0	-53	7.9	9.6	-51.3	-13	H
6269.2	-53.57	8.8	10.3	-52.07	-13	V

RSE-LTE12-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1432.0	-54.89	4.1	5.3	-53.69	-13	V
2087.3	-47.39	4.9	4.5	-47.79	-13	V
2802.3	-42.2	5.7	6.1	-41.8	-13	V
3545.2	-54.05	6.4	7.8	-52.65	-13	H
4237.2	-53.38	7.1	8.9	-51.58	-13	H
5258.0	-51.36	8.0	9.4	-49.96	-13	H

RSE-LTE17-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1427.1	-52.29	4.1	5.3	-51.09	-13	H
2208.1	-45.88	5.0	5.1	-45.78	-13	V
2949.6	-41.25	5.8	6.7	-40.35	-13	V
3837.6	-53.2	6.7	7.9	-52	-13	V
4643.2	-52.14	7.5	9.0	-50.64	-13	H
5822.8	-53.06	8.4	10.2	-51.26	-13	H

RSE-LTE17-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1489.1	-53.29	4.1	5.3	-52.09	-13	V
2128.8	-46.74	5.0	5.1	-46.64	-13	H
2871.9	-41.57	5.8	6.1	-41.27	-13	V
3700.4	-53.84	6.6	7.9	-52.54	-13	V
4835.2	-53.62	7.6	9.0	-52.22	-13	V
6226.8	-53.26	8.8	10.3	-51.76	-13	H

RSE-LTE17-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1483.2	-53.95	4.1	5.3	-52.75	-13	H
2221.2	-44.65	5.0	5.1	-44.55	-13	V
2963.5	-41.92	5.8	6.7	-41.02	-13	H
3697.2	-53.95	6.6	7.9	-52.65	-13	H
4794.0	-52.18	7.6	9.0	-50.78	-13	H
6304.4	-53.08	8.8	10.3	-51.58	-13	V

RSE-LTE38-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
4150.8	-51.48	7.0	8.9	-49.58	-13	V
5500.4	-50.4	8.2	9.8	-48.8	-13	V

7117.6	-49.74	9.4	11.1	-48.04	-13	H
9097.6	-48.27	10.5	12.6	-46.17	-13	V
11252.0	-43.64	12.1	12.3	-43.44	-13	V
14304.0	-39.05	13.6	12.3	-40.35	-13	V

RSE-LTE38-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3665.6	-50.76	6.6	7.9	-49.46	-13	H
4584.8	-50.42	7.4	8.7	-49.12	-13	H
5554.4	-50.4	8.2	9.8	-48.8	-13	H
6828.4	-50.2	9.2	10.9	-48.5	-13	V
8171.2	-50.38	10.0	12.4	-47.98	-13	V
9839.2	-46.82	11.0	12.5	-45.32	-13	H

RSE-LTE38-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3728.4	-51.12	6.6	7.9	-49.82	-13	V
4635.2	-51.72	7.5	9.0	-50.22	-13	H
5867.6	-50.94	8.4	10.2	-49.14	-13	H
7293.2	-48.51	9.6	11.4	-46.71	-13	V
9063.2	-48.49	10.5	12.6	-46.39	-13	V
11287.0	-43.9	12.1	12.3	-43.7	-13	V

RSE-LTE41-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
4739.6	-50.91	7.5	9.0	-49.41	-13	H
6376.0	-48.53	8.9	10.6	-46.83	-13	H
8243.6	-49.9	10.1	12.4	-47.6	-13	V
10426.8	-45.5	11.6	12.3	-44.8	-13	V
13289.0	-39.8	13.6	12.3	-41.1	-13	V

16297.2	-33.66	14.7	12.3	-36.06	-13	V

RSE-LTE41-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3850.8	-51.36	6.7	7.9	-50.16	-13	V
4884.4	-50.12	7.7	9.6	-48.22	-13	H
6559.6	-49.62	9.0	10.6	-48.02	-13	V
8102.4	-50.32	9.9	12.2	-48.02	-13	H
9969.6	-45.45	11.2	12.5	-44.15	-13	V
12879.5	-39.79	13.0	12.3	-40.49	-13	H

RSE-LTE41-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3810.4	-51.03	6.7	7.9	-49.83	-13	H
5107.2	-47.54	7.9	9.6	-45.84	-13	V
6942.4	-50.4	9.3	11.1	-48.6	-13	H
9136.8	-47.76	10.5	12.6	-45.66	-13	V
11637.0	-42.69	12.2	12.3	-42.59	-13	H
14339.0	-39.06	13.6	12.3	-40.36	-13	V

6.3 Frqency Stability

Reference

CFR Part 2.1055,22.235,24.235,27.54,90.213(a).
Rule RSS-130 4.5;Rule RSS-132 5.3; Rule RSS-133 6.3; Rule RSS-139 6.4; Rule RSS-199 4.3

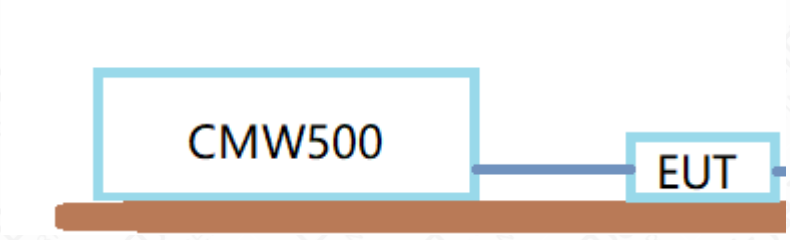
6.3.1 Method of Measurement

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 DIGITAL RADIO COMMUNICATION TESTER.
1.Measure the carrier frequency at room temperature.
2.Subject the EUT to overnight soak at -10℃.
3.With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE band 7. 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℃ increments from -10℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5.Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring 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℃.
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 ℃ decrements from +50℃ to -10℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9.At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

6.3.2Measurement Limit

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. 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 between 3.6VDC and 4.35VDC, with a nominal voltage of 3.8VDC. 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. For the purposes of measuring frequency stability these voltage limits are to be used.

6.3.3 Test Setup



6.3.4 Measurement results

LTE Band 2, 1.4MHz bandwidth,mid (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
6.8	-12.46	-34.962	0.007	0.019
7.2	-5.393	-38.023	0.003	0.021
8.4	-20.342	-26.107	0.011	0.014

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50	-6.194	-29.426	0.003	0.016
40	-19.555	-38.924	0.011	0.021
30	6.194	-15.85	0.003	0.009
20	-20.256	-34.103	0.011	0.018
10	-16.165	-33.989	0.009	0.018
0	-16.479	-28.439	0.009	0.015
-10	-19.484	-30.341	0.011	0.016
-20	-19.269	-36.85	0.01	0.02
-30	-16.723	-28.467	0.009	0.015

LTE Band 4, 1.4MHz bandwidth,mid (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
6.8	-18.969	-27.137	0.011	0.016
7.2	6.094	-29.898	0.004	0.017
8.4	-12.817	-32.701	0.007	0.019

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50	-16.851	-34.347	0.01	0.02
40	-15.092	-23.36	0.009	0.014
30	-12.417	-24.347	0.007	0.014
20	-11.172	-23.804	0.007	0.014
10	3.004	-30.041	0.002	0.018
0	8.683	-14.391	0.005	0.008
-10	-6.266	-14.82	0.004	0.009
-20	-13.189	-22.559	0.008	0.013
-30	-4.835	-18.811	0.003	0.011

LTE Band 5, 1.4MHz bandwidth ,mid (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
6.8	-2.089	-23.646	0.003	0.029
7.2	-9.713	-22.559	0.012	0.027
8.4	-11.287	-24.705	0.014	0.03

Frequency Error vs Temperature

Temperature	Frequency error (Hz)	Frequency error (ppm)

(℃)	QPSK	16QAM	QPSK	16QAM
50	-9.227	-27.022	0.011	0.033
40	-1.788	-24.962	0.002	0.03
30	-2.775	-27.051	0.003	0.033
20	-7.782	-14.348	0.009	0.017
10	-14.749	-20.714	0.018	0.025
0	-9.913	-26.379	0.012	0.032
-10	-7.639	-20.185	0.009	0.024
-20	-14.935	-23.189	0.018	0.028
-30	-7.639	-18.454	0.009	0.022

LTE Band 7, 5MHz bandwidth,mid (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
6.8	-22.13	-26.851	0.009	0.011
7.2	-14.949	-17.252	0.006	0.007
8.4	-19.426	24.405	0.008	0.01

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50	-13.318	19.026	0.005	0.008
40	19.054	18.826	0.008	0.008
30	15.45	14.892	0.006	0.006
20	-25.02	-24.848	0.01	0.01
10	-19.097	-20.971	0.008	0.008
0	-19.398	-24.862	0.008	0.01
-10	-19.283	20.242	0.008	0.008
-20	-23.06	-22.502	0.009	0.009
-30	-15.206	25.592	0.006	0.01

LTE Band 12, 1.4MHz bandwidth,mid (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
6.8	-14.377	-25.549	0.021	0.037
7.2	-14.763	-26.708	0.021	0.038
8.4	-8.712	-23.789	0.012	0.034

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50	-11.716	-19.026	0.017	0.027
40	-12.932	-28.853	0.018	0.041
30	-4.506	-33.259	0.006	0.048
20	-14.734	-30.67	0.021	0.044
10	-11.601	-26.35	0.017	0.038
0	-16.58	-21.372	0.024	0.031
-10	-13.304	-26.65	0.019	0.038
- 20	-9.484	-23.961	0.014	0.034
- 30	-7.482	-25.949	0.011	0.037

LTE Band 17, 5MHz bandwidth,mid (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
6.8	-7.41	-12.345	0.01	0.017
7.2	-11.029	-12.96	0.016	0.018
8.4	-11.401	-14.191	0.016	0.02

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50	-9.713	-13.204	0.014	0.019
40	-9.155	-14.935	0.013	0.021
30	-9.756	-14.863	0.014	0.021
20	-8.168	-13.003	0.012	0.018
10	-12.259	-11.101	0.017	0.016
0	-9.727	7.453	0.014	0.011
-10	-6.895	-13.432	0.01	0.019
-20	-11.201	-15.249	0.016	0.022
-30	-12.431	-11.988	0.018	0.017

LTE Band 38, 5MHz bandwidth ,mid (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
6.8	-47.493	-17.18	0.018	0.007
7.2	-22.559	-24.433	0.009	0.009
8.4	-14.892	-7.195	0.006	0.003

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50	6.952	-30.398	0.003	0.012
40	-22.13	-25.263	0.009	0.01
30	-19.741	-13.204	0.008	0.005
20	-24.648	-22.488	0.01	0.009
10	-24.805	-22.488	0.01	0.009
0	-25.635	-22.03	0.01	0.009
-10	-20.471	-21.343	0.008	0.008
-20	-20.399	-27.766	0.008	0.011
-30	-13.189	-20.928	0.005	0.008

LTE Band 41, 5MHz bandwidth ,mid (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
6.8	-5.922	-21.386	0.002	0.008
7.2	-16.322	-15.035	0.006	0.006
8.4	-12.388	-18.611	0.005	0.007

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50	-7.567	-18.625	0.003	0.007

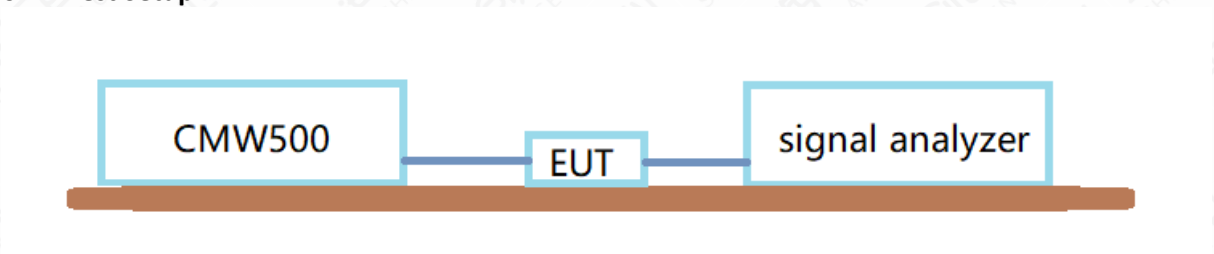
40	-9.427	-17.796	0.004	0.007
30	-19.798	-19.183	0.008	0.007
20	-12.774	-23.017	0.005	0.009
10	-9.77	-22.044	0.004	0.009
0	-21.429	-12.002	0.008	0.005
-10	-11.816	-15.464	0.005	0.006
-20	-13.132	-19.026	0.005	0.007
-30	-10.042	-24.018	0.004	0.009

6.4 Occupied Bandwidth

Reference

CFR Part 2.1049(h) (i)
No specific occupied bandwidth requirements in RSS-Gen: 6.7.

6.4.1 Test Setup

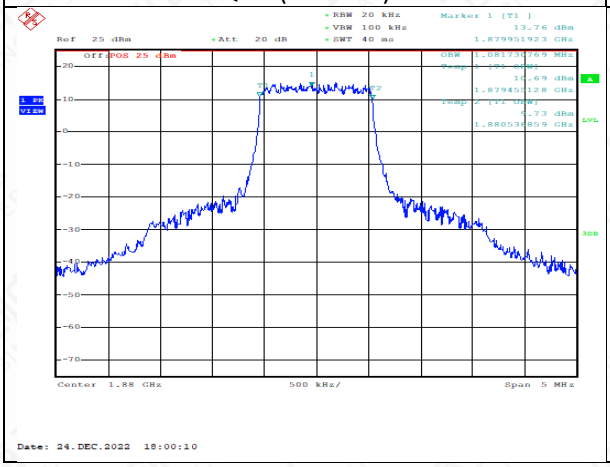
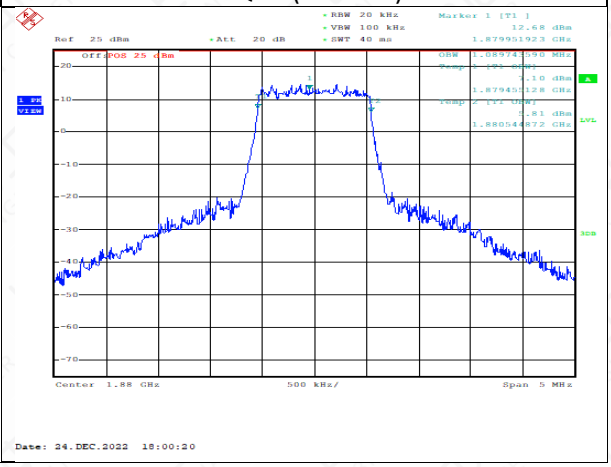


6.4.2 Occupied Bandwidth Results

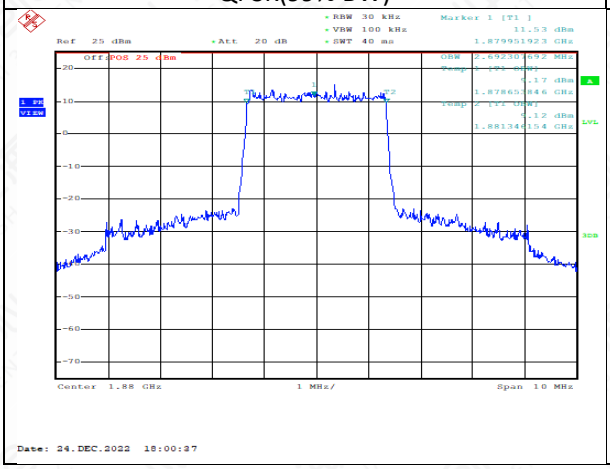
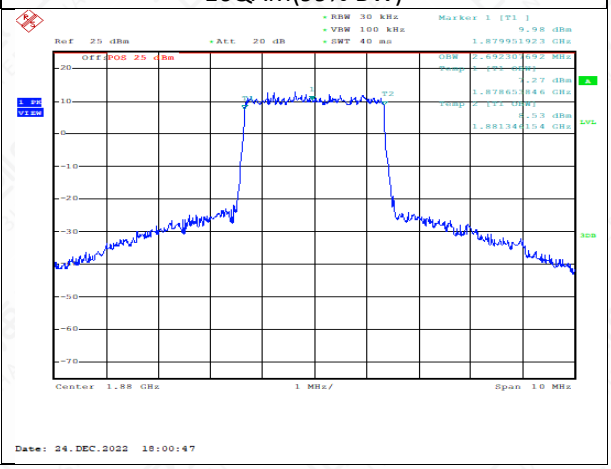
Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.
The measurement method is from KDB 971168 4:
a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.
d) Set the detection mode to peak, and the trace mode to max hold.
e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

Occupied Bandwidth Measurement Results:

LTE band 2, 1.4MHz (99%)

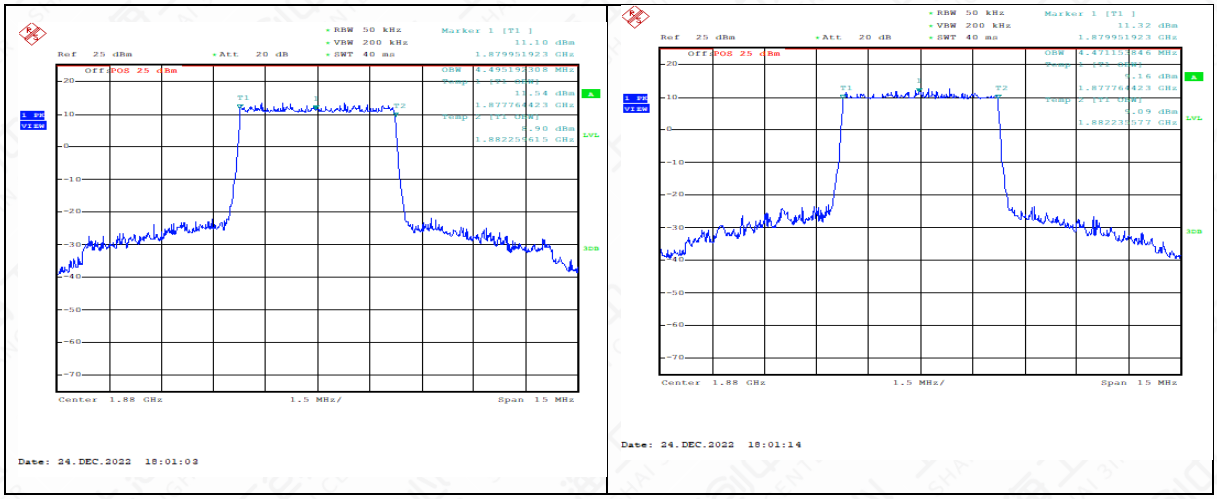
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	1.08	1.09
QPSK(99% BW)	16QAM(99% BW)	
		

LTE band 2, 3MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	2.69	2.69
QPSK(99% BW)	16QAM(99% BW)	
		

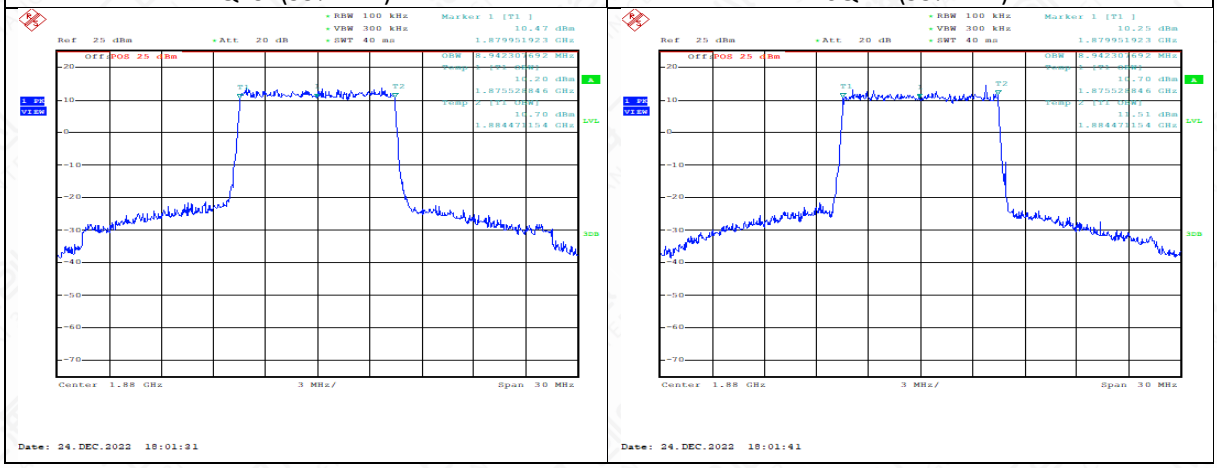
LTE band 2, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	4.50	4.47
QPSK(99% BW)	16QAM(99% BW)	



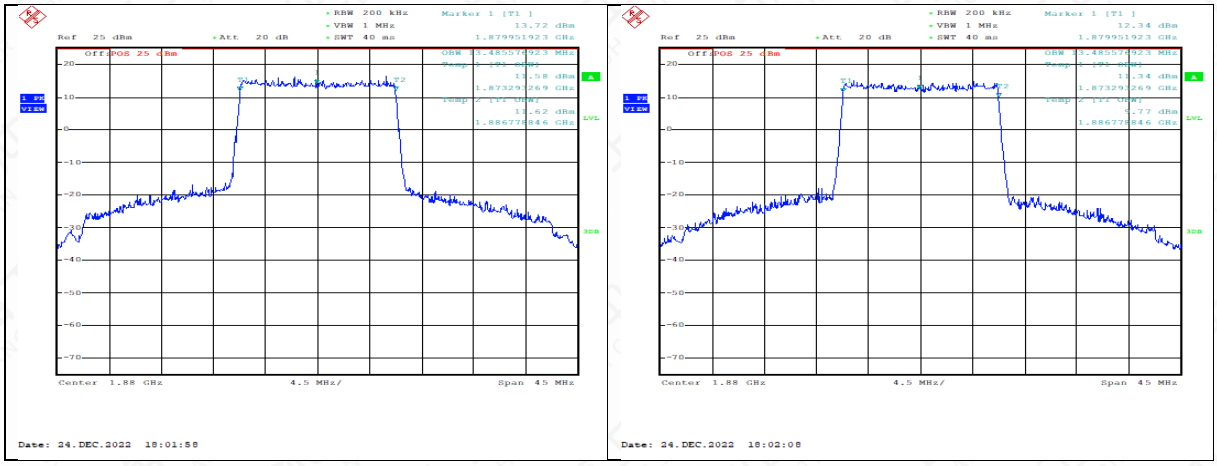
LTE band 2, 10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	8.94	8.94
QPSK(99% BW)	16QAM(99% BW)	



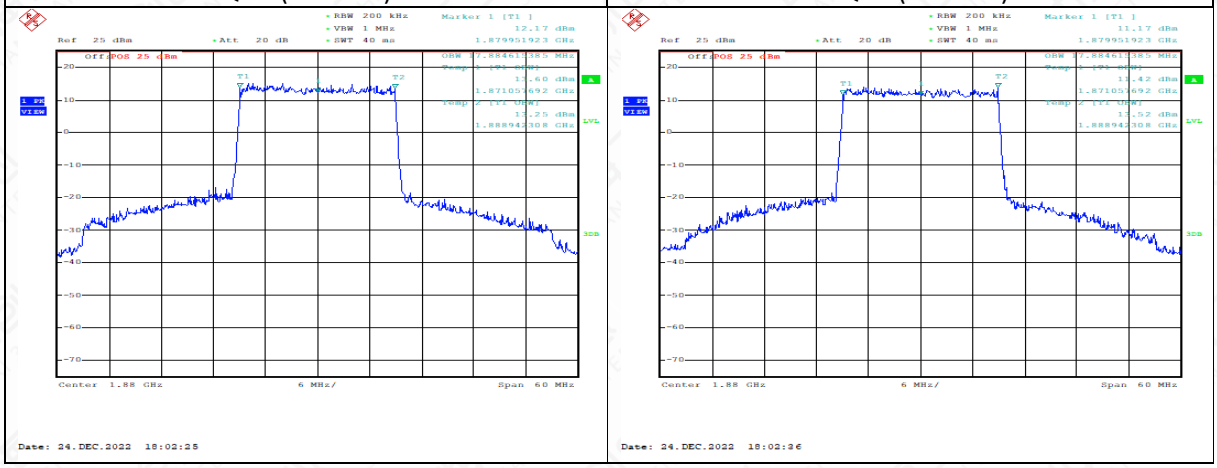
LTE band 2, 15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	13.49	13.49
QPSK(99% BW)	16QAM(99% BW)	

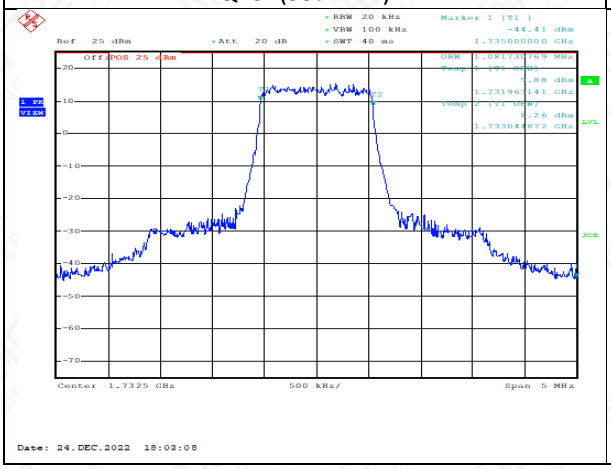
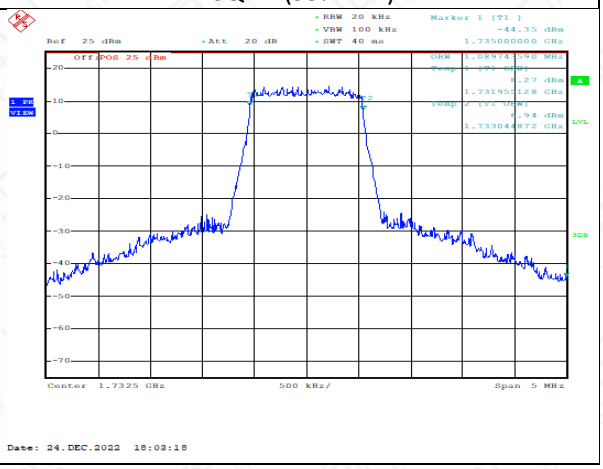


LTE band 2, 20MHz (99%)

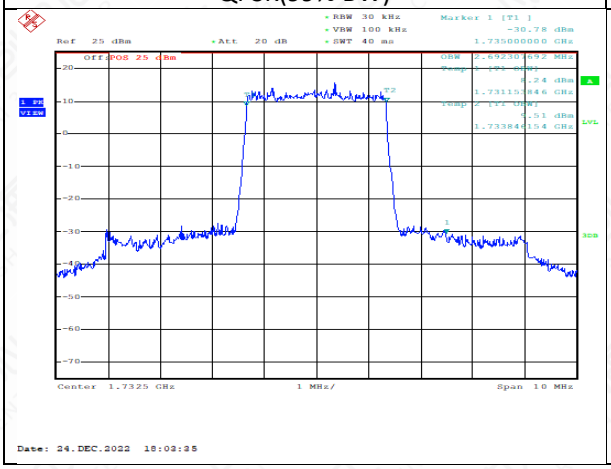
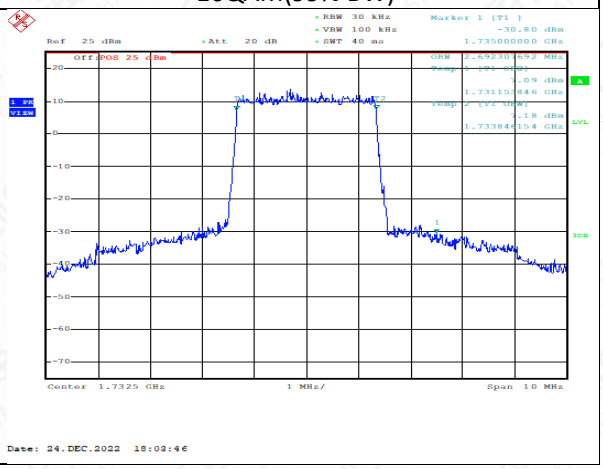
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	17.89	17.89
QPSK(99% BW)	16QAM(99% BW)	



LTE band 4, 1.4MHz (99%)

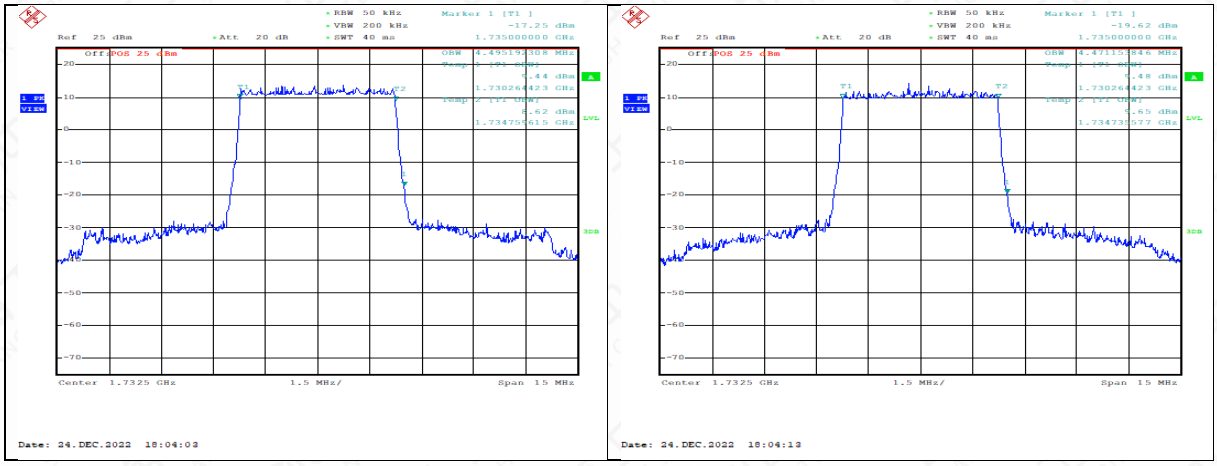
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	1.08	1.09
QPSK(99% BW)	16QAM(99% BW)	
		

LTE band 4, 3MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	2.69	2.69
QPSK(99% BW)	16QAM(99% BW)	
		

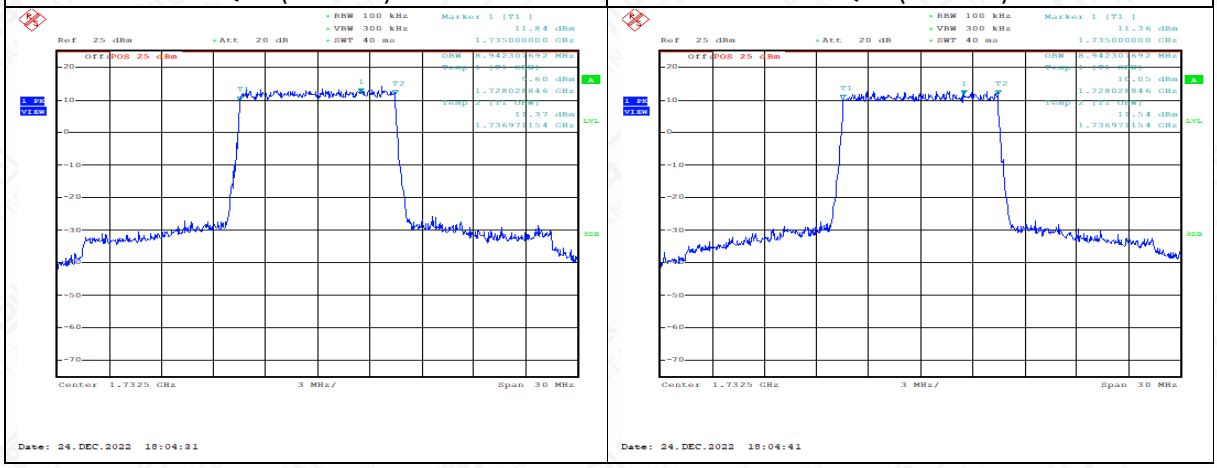
LTE band 4, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	4.50	4.47
QPSK(99% BW)	16QAM(99% BW)	



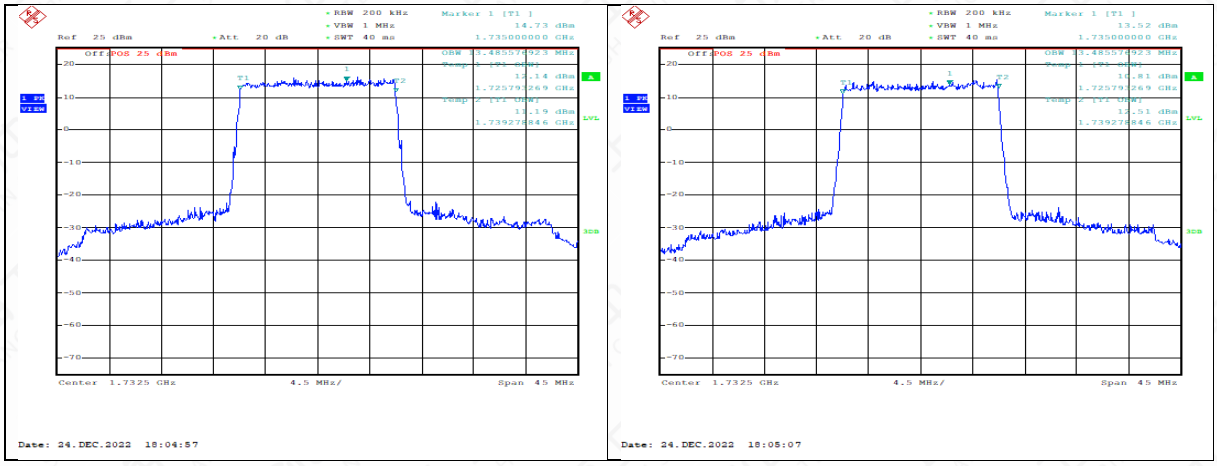
LTE band 4, 10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	8.94	8.94
QPSK(99% BW)	16QAM(99% BW)	



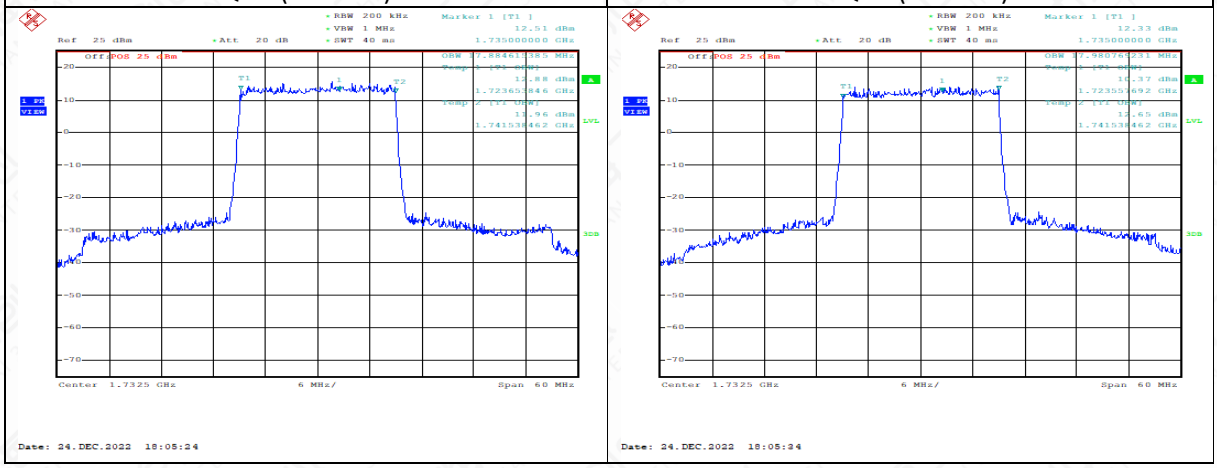
LTE band 4, 15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	13.49	13.49
QPSK(99% BW)	16QAM(99% BW)	



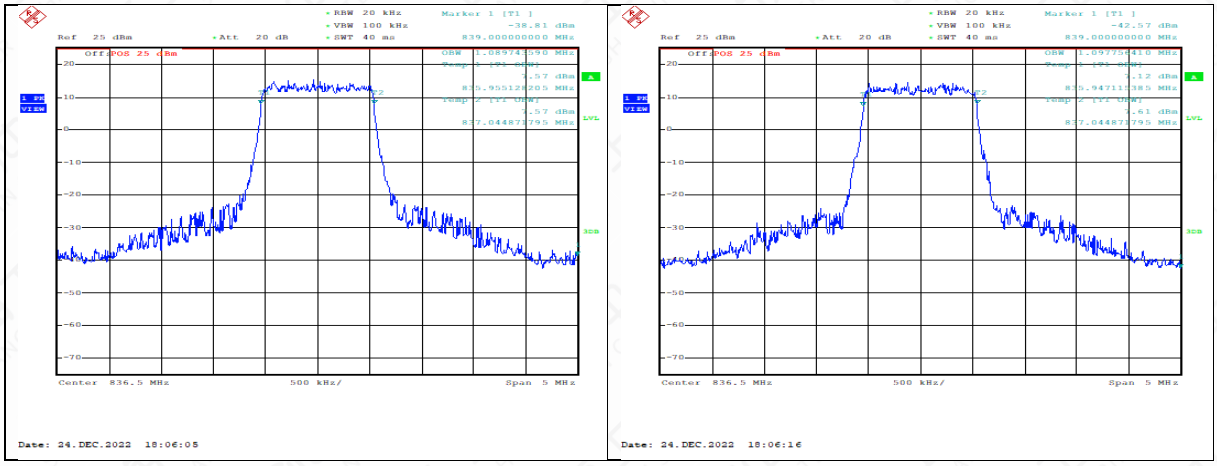
LTE band 4, 20MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	17.89	17.98
QPSK(99% BW)	16QAM(99% BW)	



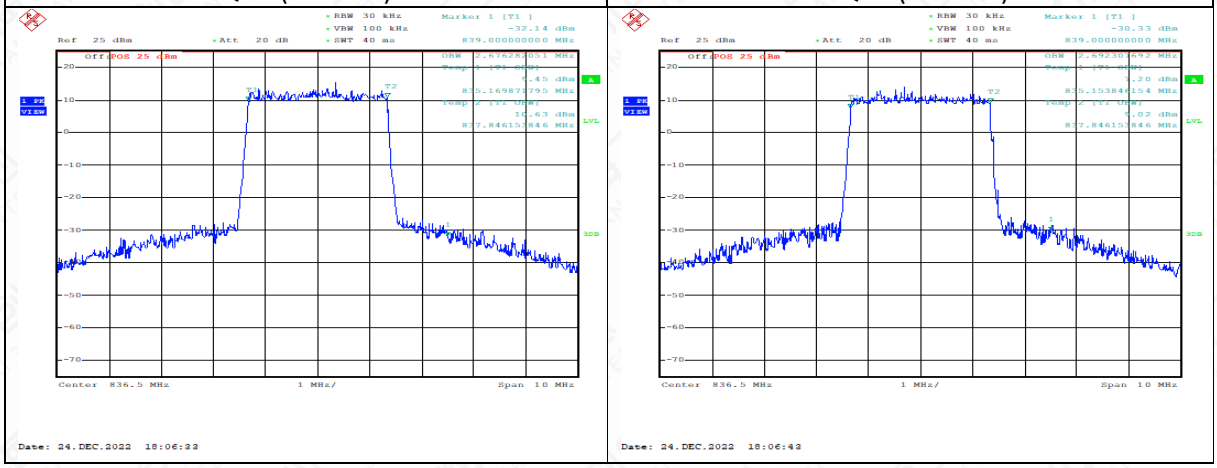
LTE band 5,1.4MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
836.5	QPSK	16QAM
	1.09	1.10
QPSK(99% BW)	16QAM(99% BW)	



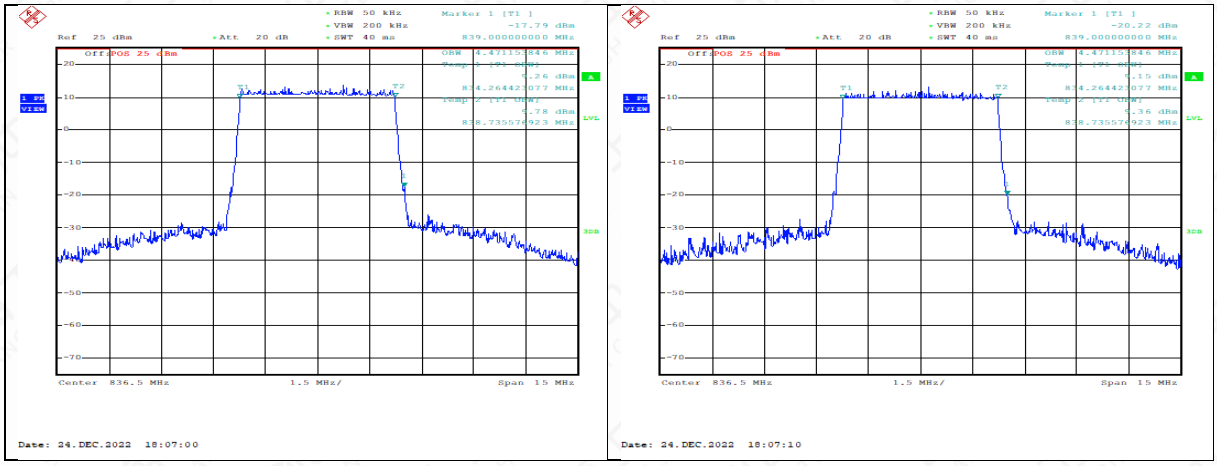
LTE band 5, 3MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
836.5	QPSK	16QAM
	2.68	2.69
QPSK(99% BW)	16QAM(99% BW)	



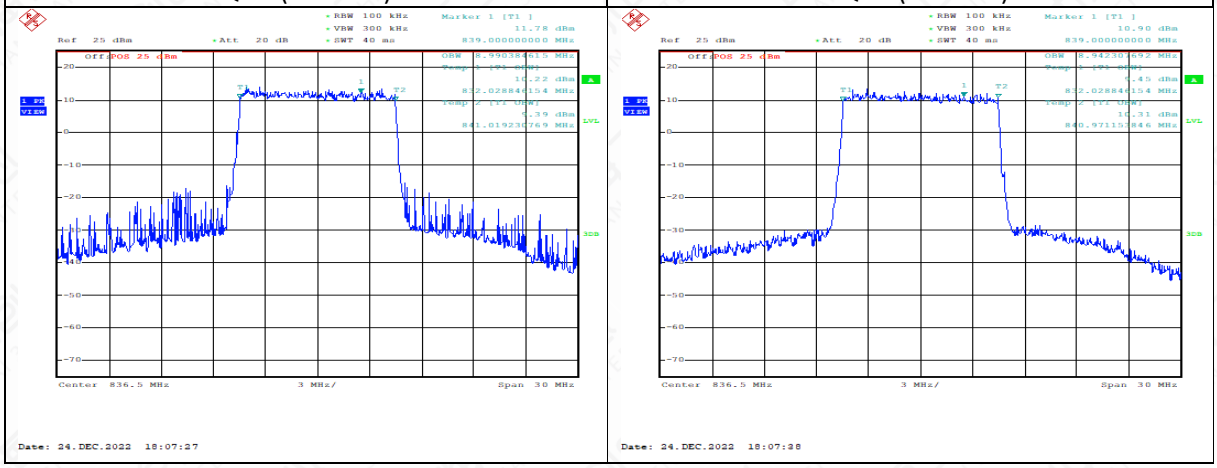
LTE band 5, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
836.5	QPSK	16QAM
	4.47	4.47
QPSK(99% BW)	16QAM(99% BW)	



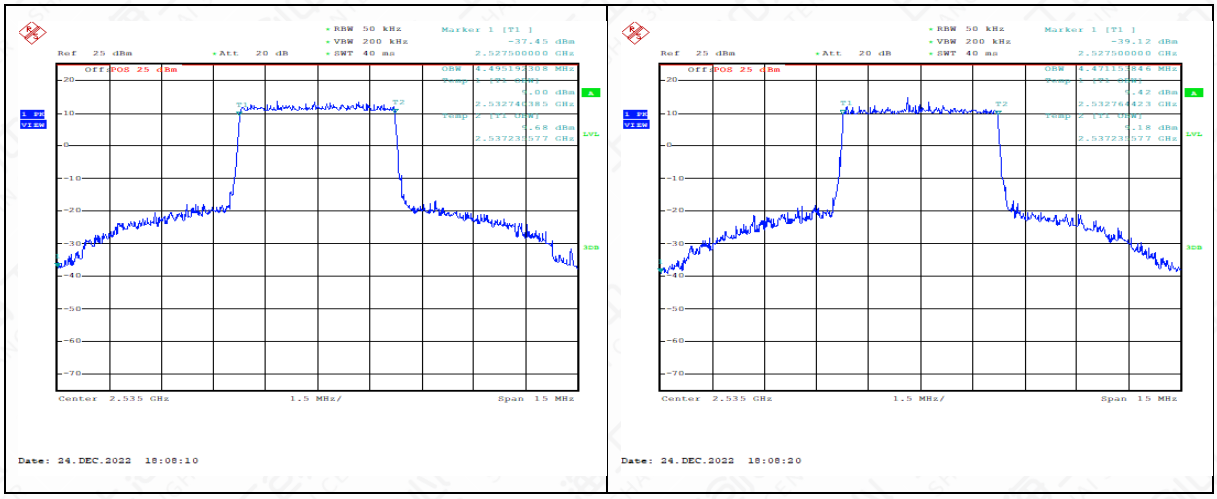
LTE band 5, 10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
836.5	QPSK	16QAM
	8.99	8.94
QPSK(99% BW)	16QAM(99% BW)	



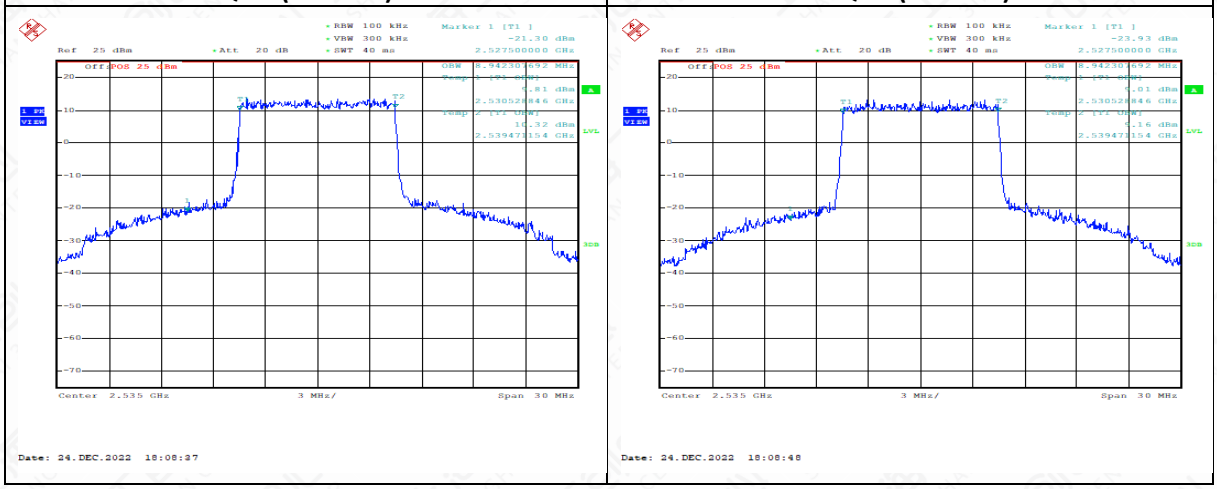
LTE band 7, 5MHz (99%)

Frequency(MHz)	**Occupied Bandwidth (99%)(MHz)**	
2535	**QPSK**	**16QAM**
	4.50	4.47
QPSK(99% BW)	**16QAM(99% BW)**	



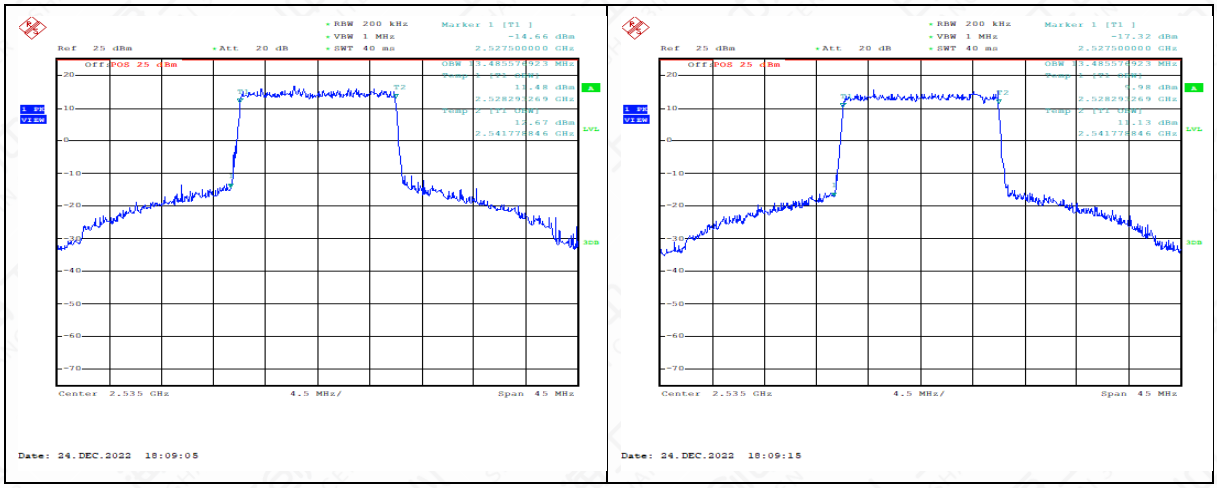
LTE band 7, 10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2535	8.94	8.94
QPSK(99% BW)	16QAM(99% BW)	



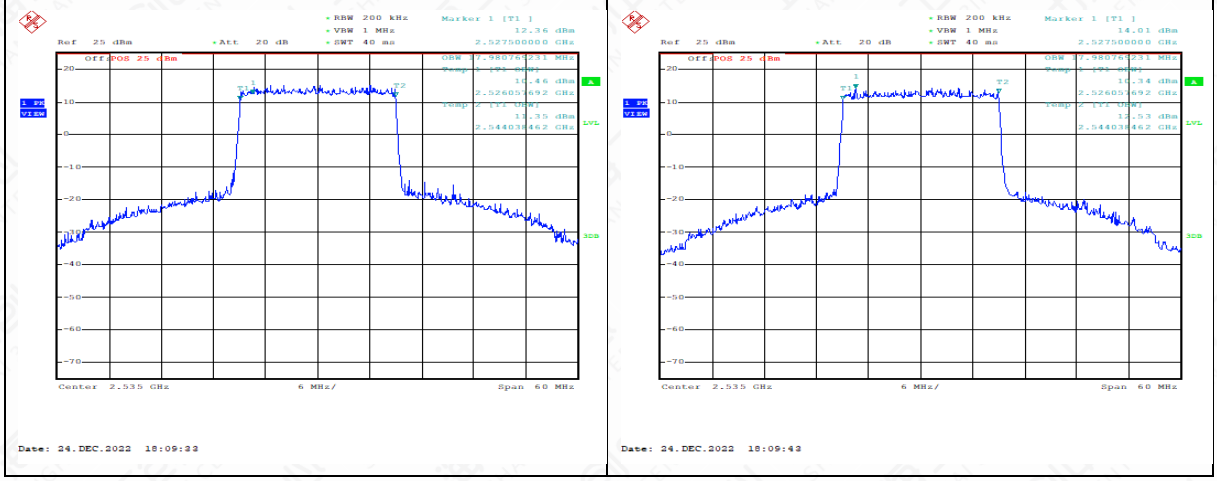
LTE band 7, 15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2535	13.49	13.49
QPSK(99% BW)	16QAM(99% BW)	



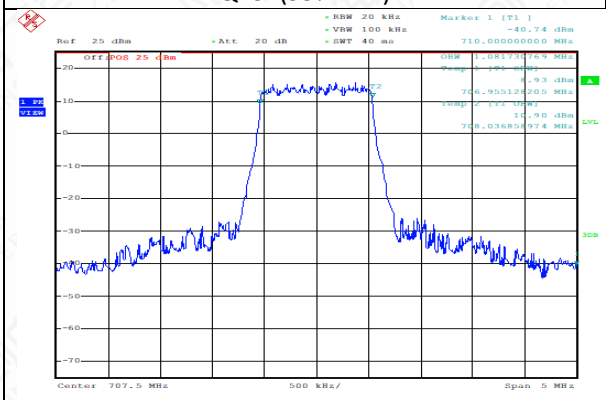
LTE band 7, 20MHz (99%)

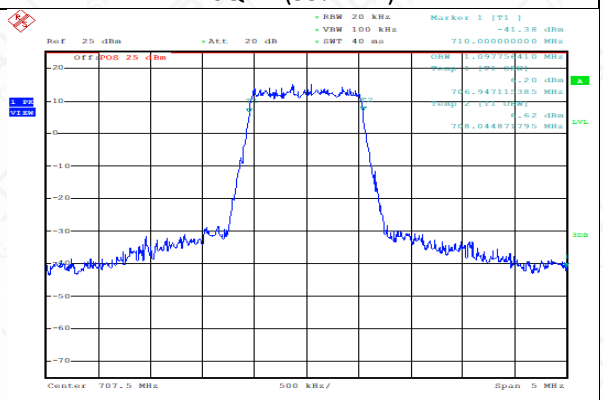
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
	QPSK	16QAM
2535	17.98	17.98
QPSK(99% BW)	16QAM(99% BW)	



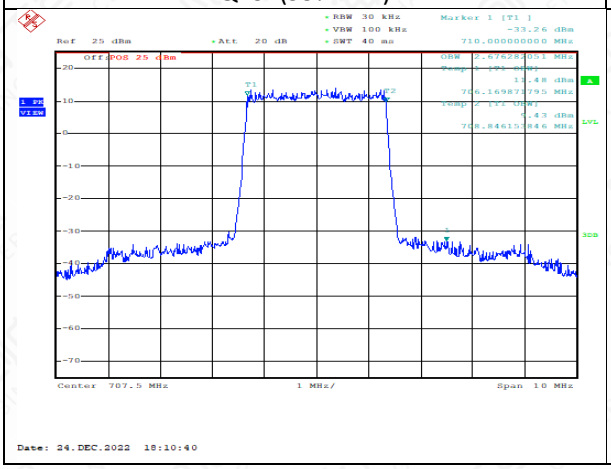
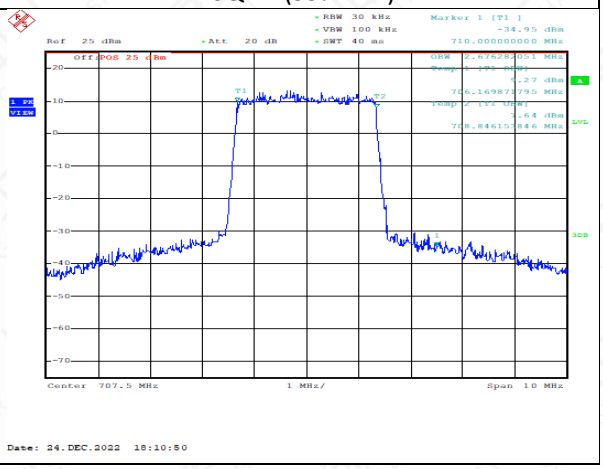
LTE band 12,1.4MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	1.08	1.10
QPSK(99% BW)	16QAM(99% BW)	



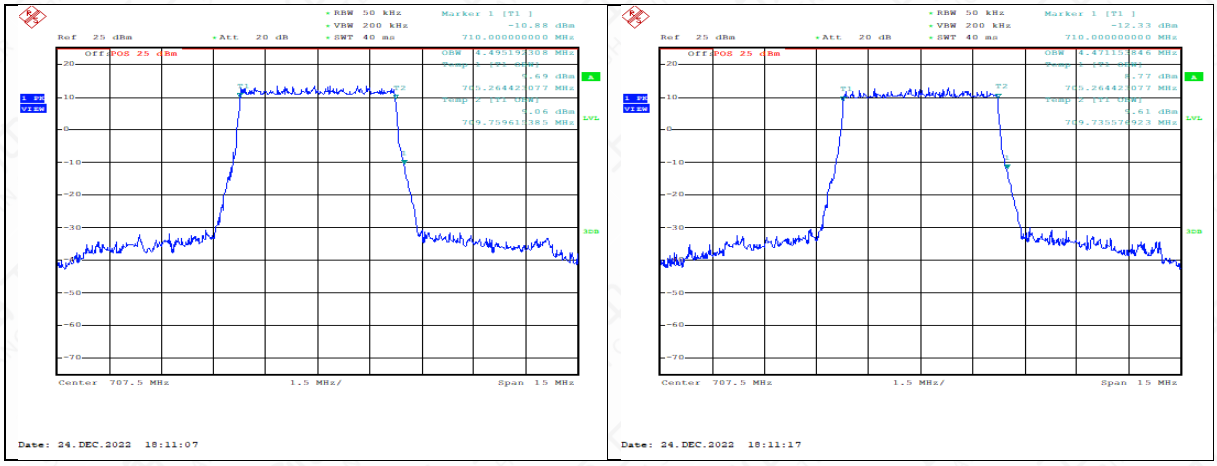


LTE band 12, 3MHz (99%)

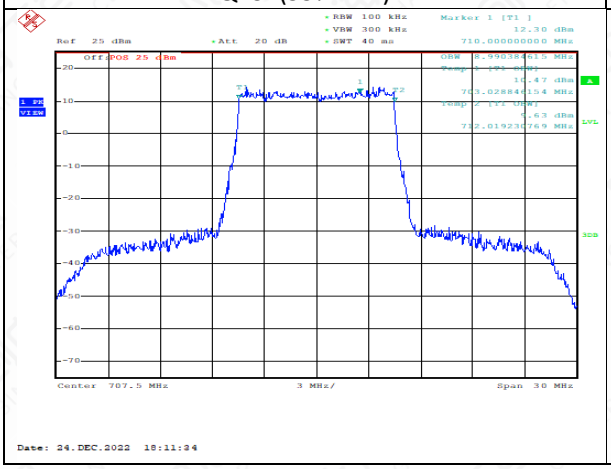
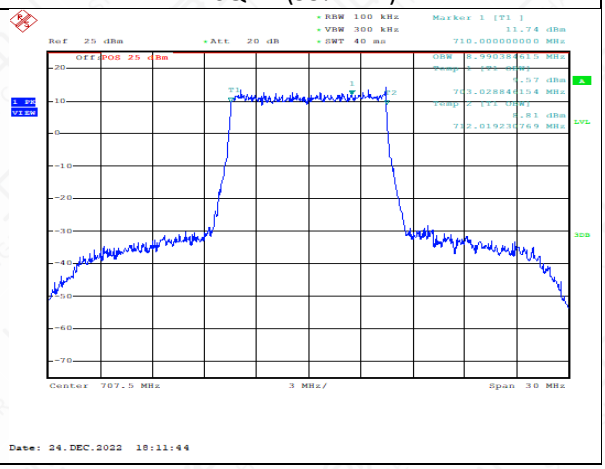
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	2.68	2.68
QPSK(99% BW)	16QAM(99% BW)	
		

LTE band 12, 5MHz (99%)

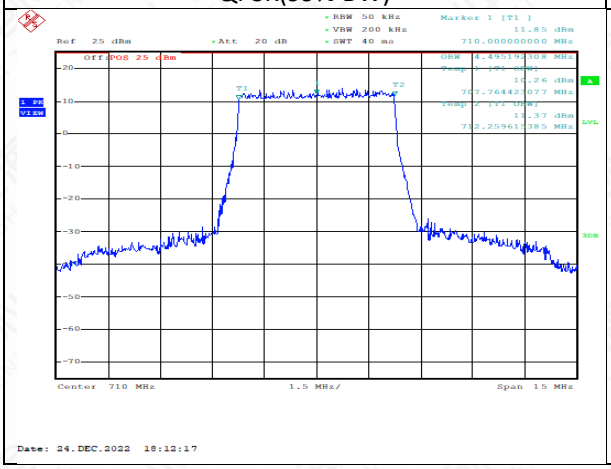
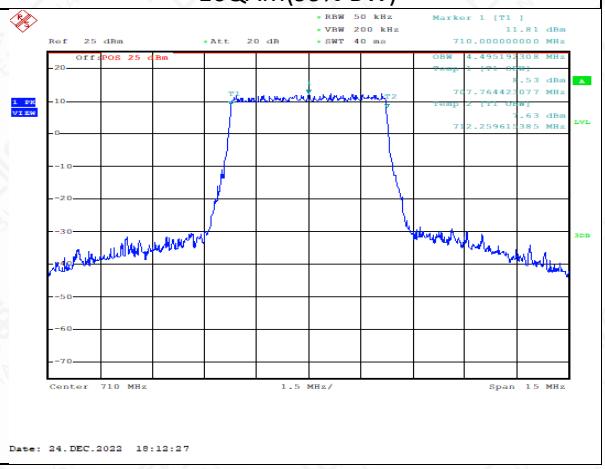
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	4.50	4.47
QPSK(99% BW)	16QAM(99% BW)	


RBW 50 kHz
VBW 200 kHz
SWT 40 ms
Marker 1 [T1]
-10.88 dBm
710.000000000 MHz
Ref 25 dBm
Att 20 dB
Offset 25 dB
dBm
Center 707.5 MHz
1.5 MHz/
Span 15 MHz
Date: 24.DEC.2022 18:11:07
RBW 50 kHz
VBW 200 kHz
SWT 40 ms
Marker 1 [T1]
-12.33 dBm
710.000000000 MHz
Ref 25 dBm
Att 20 dB
Offset 25 dB
dBm
Center 707.5 MHz
1.5 MHz/
Span 15 MHz
Date: 24.DEC.2022 18:11:17

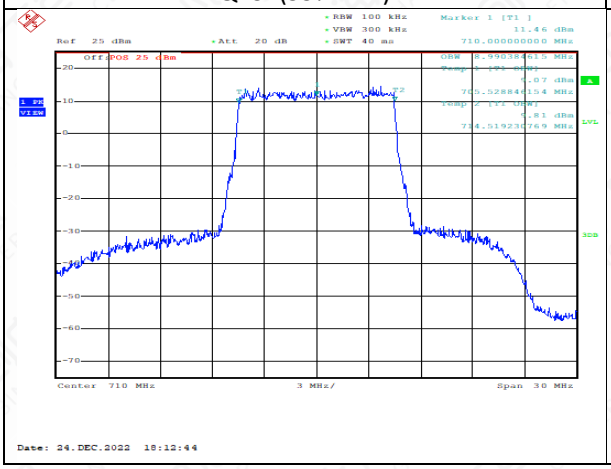
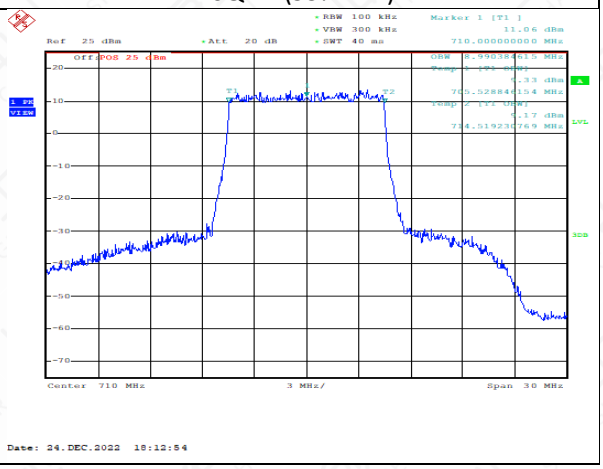
LTE band 12, 10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	8.99	8.99
QPSK(99% BW)	16QAM(99% BW)	
		

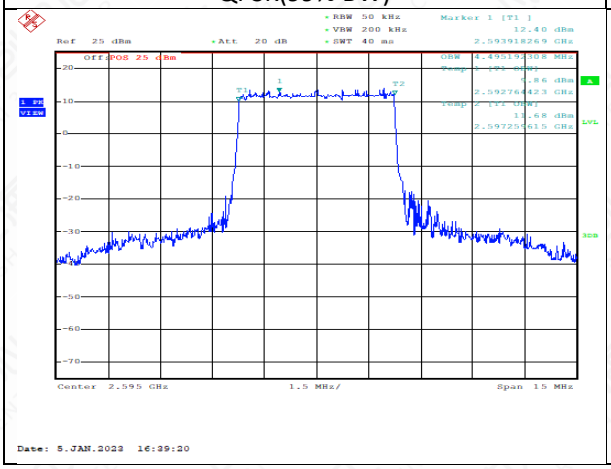
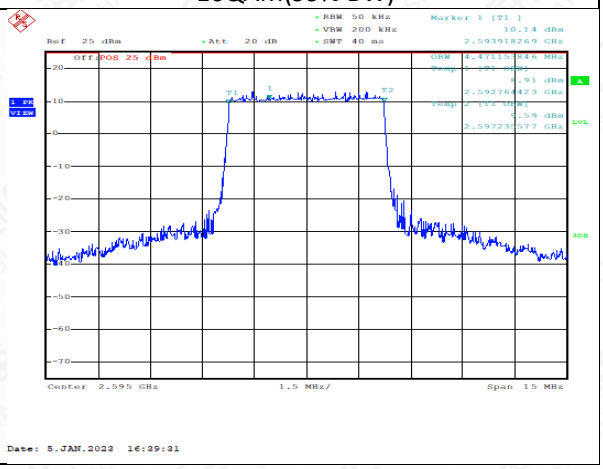
LTE band 17, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
710.0	QPSK	16QAM
	4.50	4.50
QPSK(99% BW)	16QAM(99% BW)	
		

LTE band 17, 10MHz (99%)

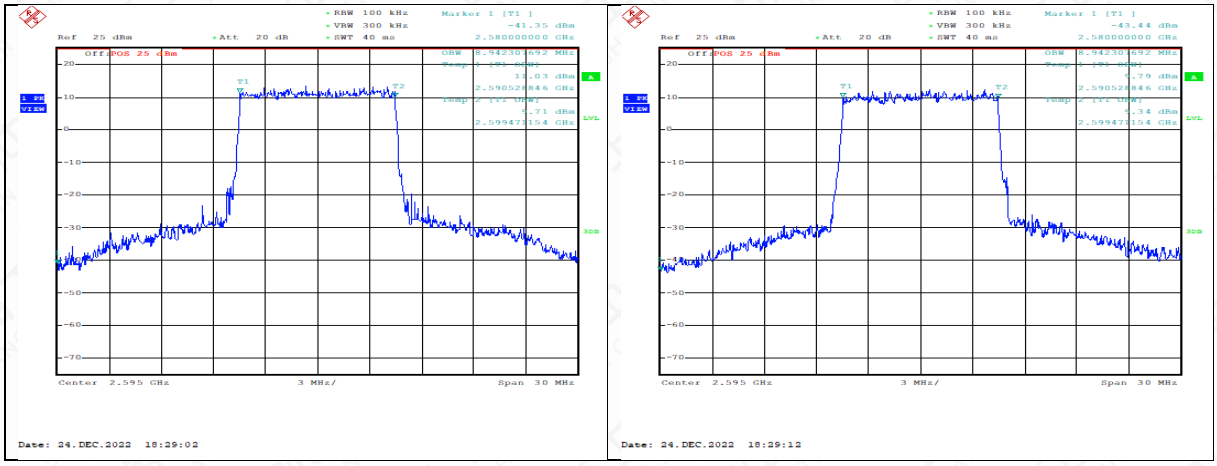
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	8.99	8.99
QPSK(99% BW)	16QAM(99% BW)	
		

LTE band 38, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2595.0	QPSK	16QAM
	4.50	4.47
QPSK(99% BW)	16QAM(99% BW)	
		

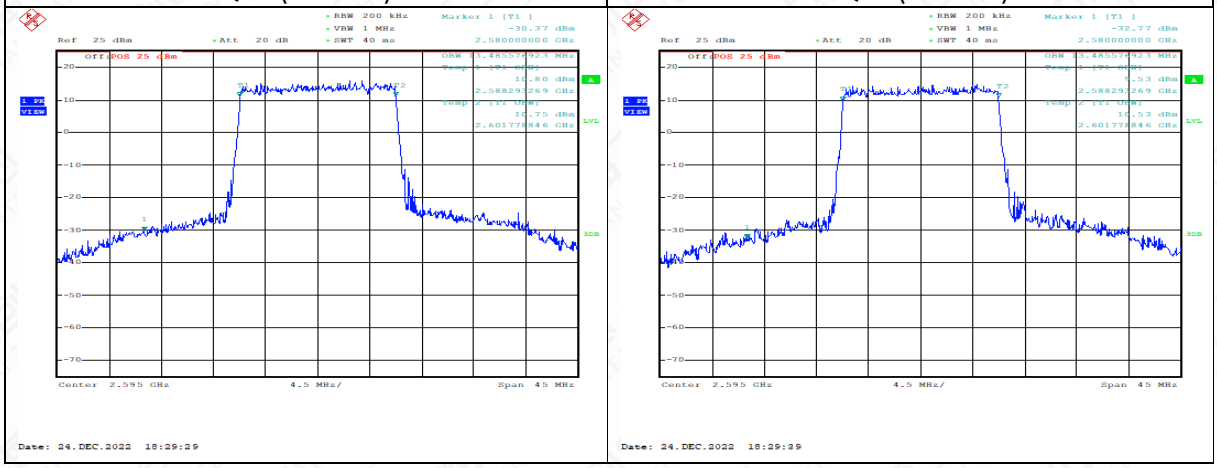
LTE band 38, 10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2595.0	QPSK	16QAM
	8.94	8.94
QPSK(99% BW)	16QAM(99% BW)	



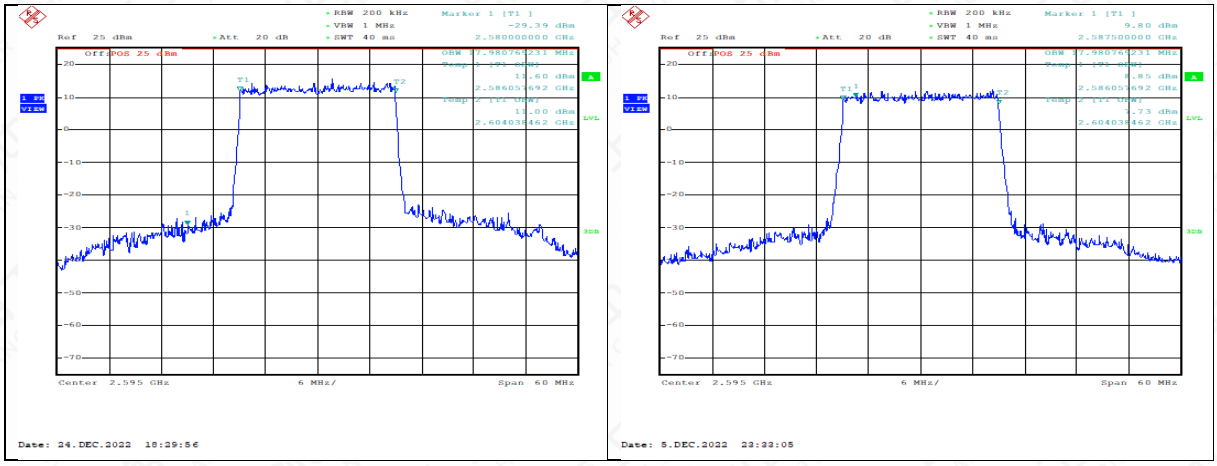
LTE band 38, 15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2595.0	QPSK	16QAM
	13.49	13.49
QPSK(99% BW)	16QAM(99% BW)	



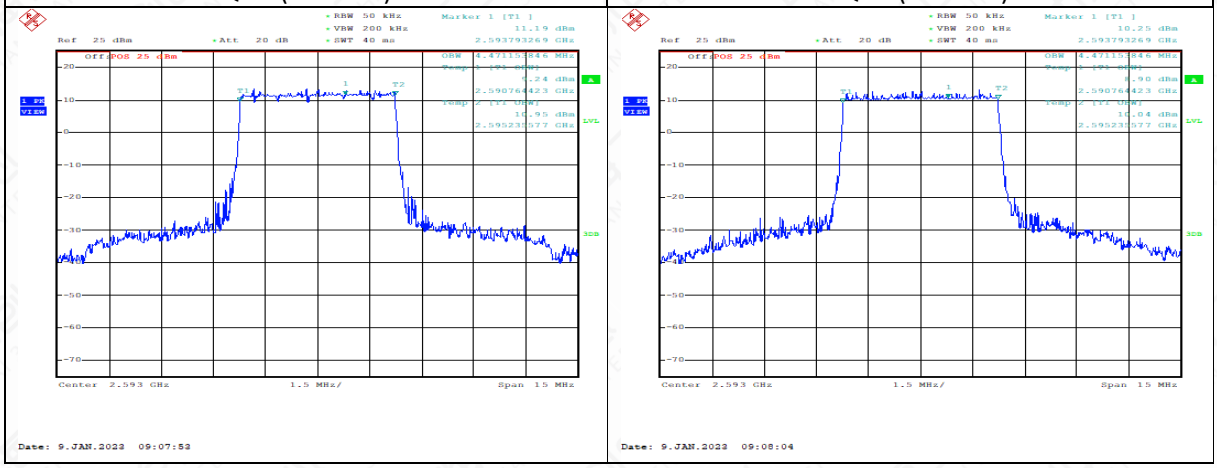
LTE band 38, 20MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2595.0	QPSK	16QAM
	17.98	17.02
QPSK(99% BW)	16QAM(99% BW)	



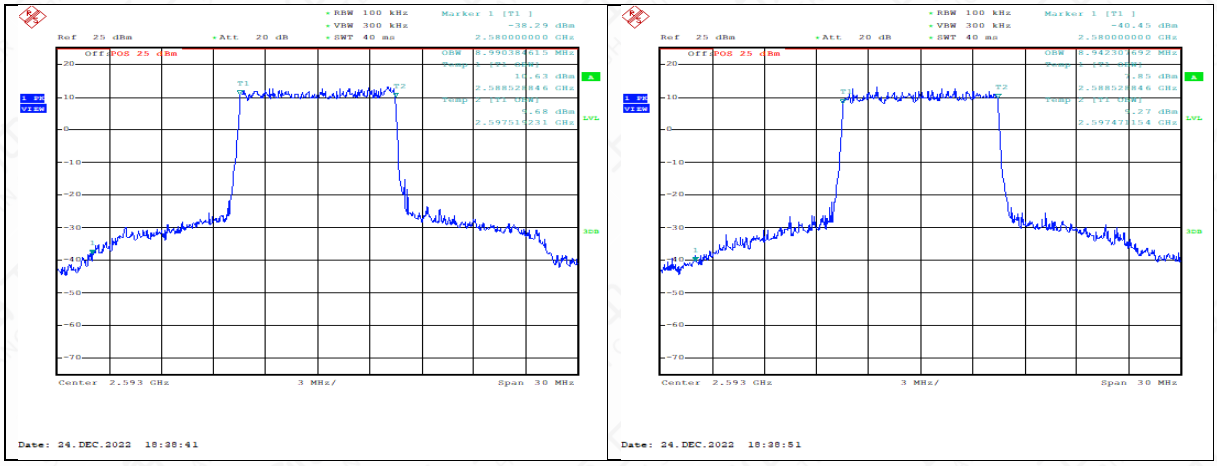
LTE band 41, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	4.47	4.47
QPSK(99% BW)	16QAM(99% BW)	



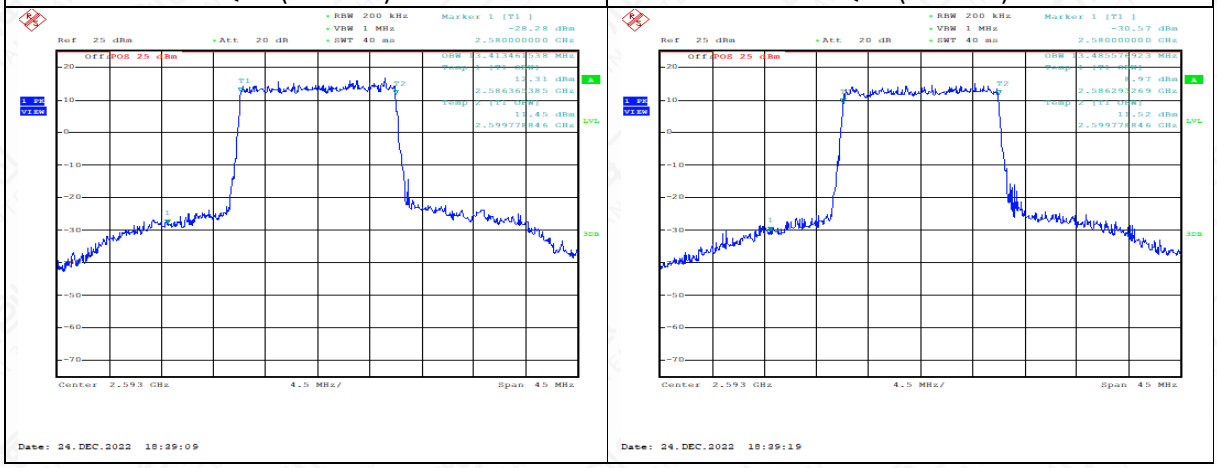
LTE band 41, 10MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	8.99	8.94
QPSK(99% BW)	16QAM(99% BW)	



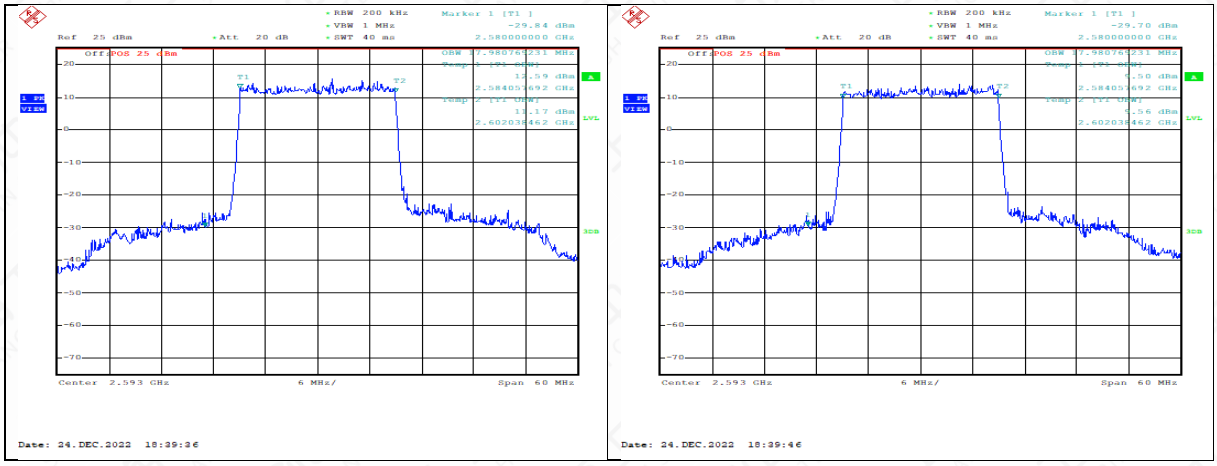
LTE band 41, 15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	13.41	13.49
QPSK(99% BW)	16QAM(99% BW)	



LTE band 41, 20MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2593.0	QPSK	16QAM
	17.98	17.98
QPSK(99% BW)	16QAM(99% BW)	


RBW 200 kHz
VBW 1 MHz
SWT 40 ms
Marker 1 [T1]
-29.84 dBm
2.580000000 GHz
Ref 25 dBm
Att 20 dB
OffPOS 25 dBm
T1
T2
Center 2.593 GHz
6 MHz/
Span 60 MHz
Date: 24.DEC.2022 18:39:36
RBW 200 kHz
VBW 1 MHz
SWT 40 ms
Marker 1 [T1]
-29.70 dBm
2.580000000 GHz
Ref 25 dBm
Att 20 dB
OffPOS 25 dBm
T1
T2
Center 2.593 GHz
6 MHz/
Span 60 MHz
Date: 24.DEC.2022 18:39:46

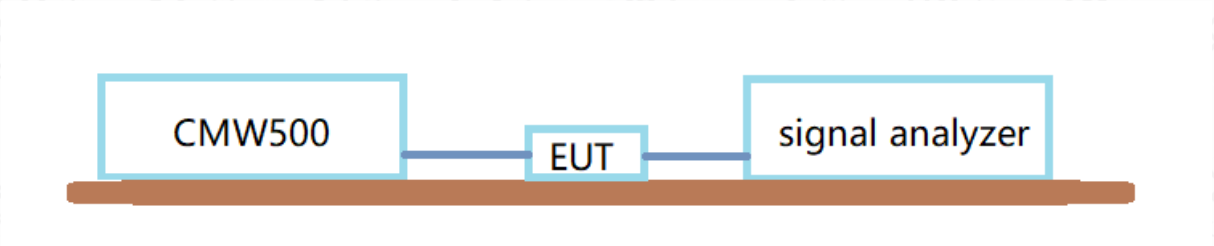
6.5 Emission Bandwidth

Reference

CFR Part 2.1049,22.917(b),24.238(a),27.53(g),27.53(h), 27.53(m),90.209(b)

No specific occupied bandwidth requirements in RSS-Gen: 6.7.

6.5.1 Test Setup

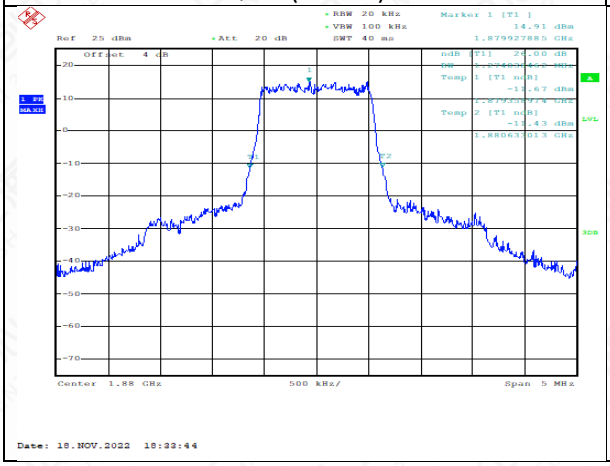


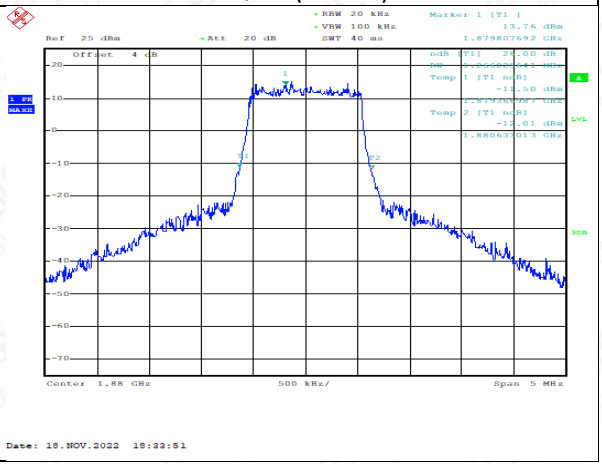
6.5.2 Emission Bandwidth Results

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. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the followinag pages.

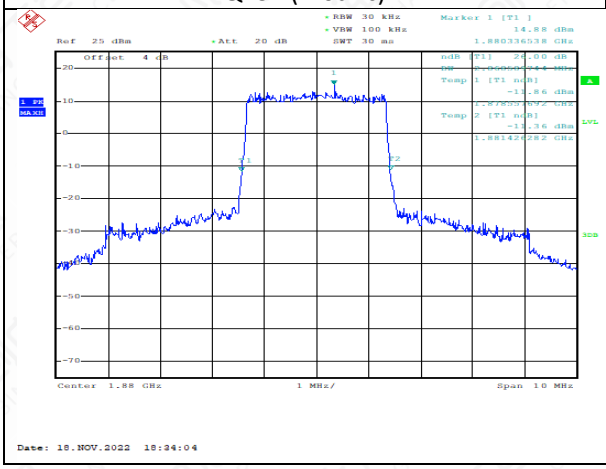
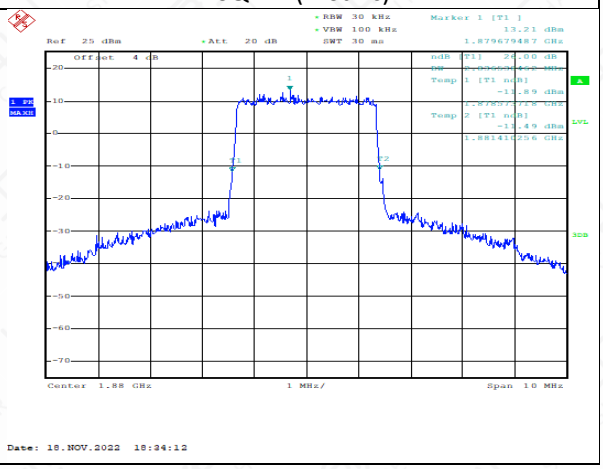
LTE band 2, 1.4MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	1.27	1.27
QPSK (-26dBc)	16QAM (-26dBc)	

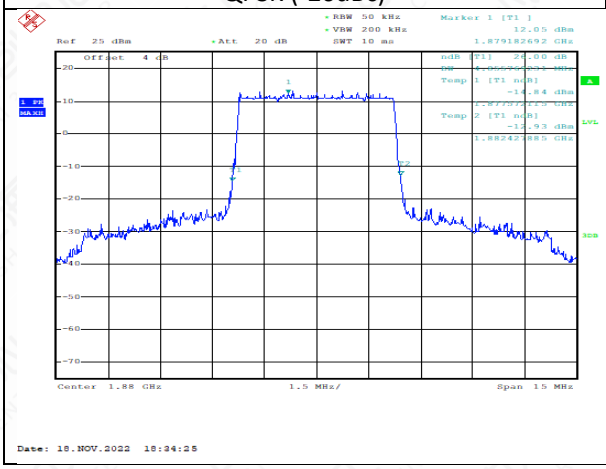
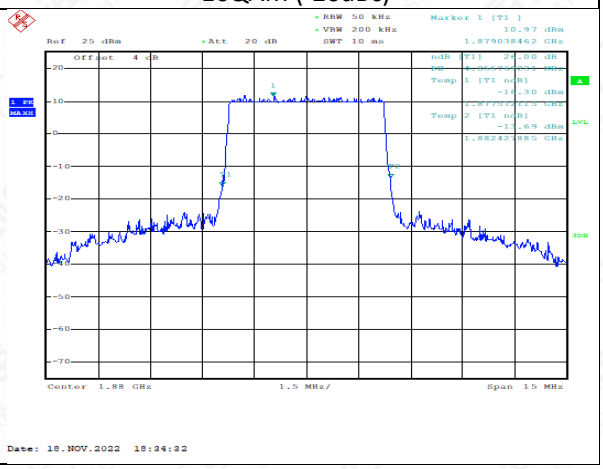




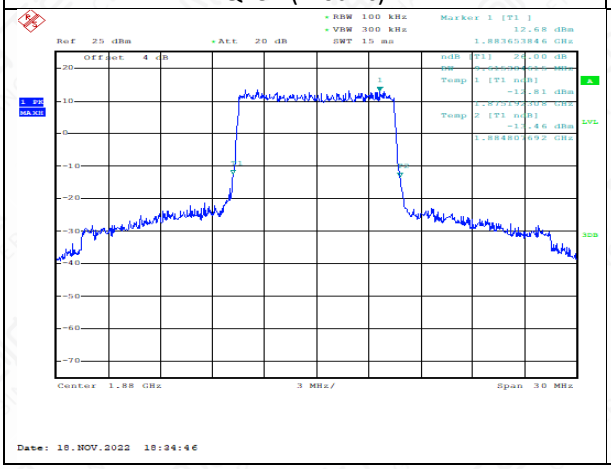
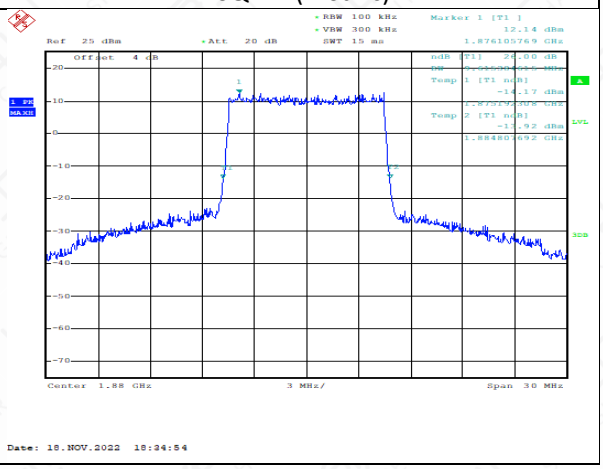
LTE band 2, 3MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	2.87	2.84
QPSK (-26dBc)	16QAM (-26dBc)	
		

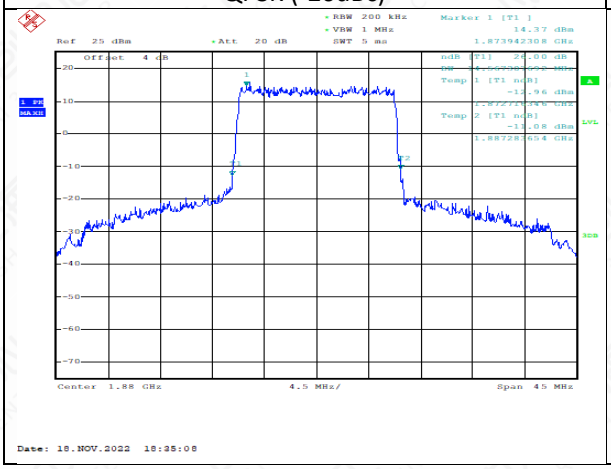
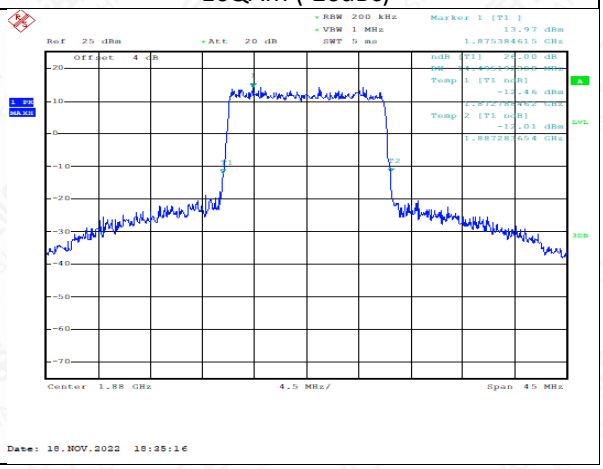
LTE band 2, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	4.86	4.86
QPSK (-26dBc)	16QAM (-26dBc)	
		

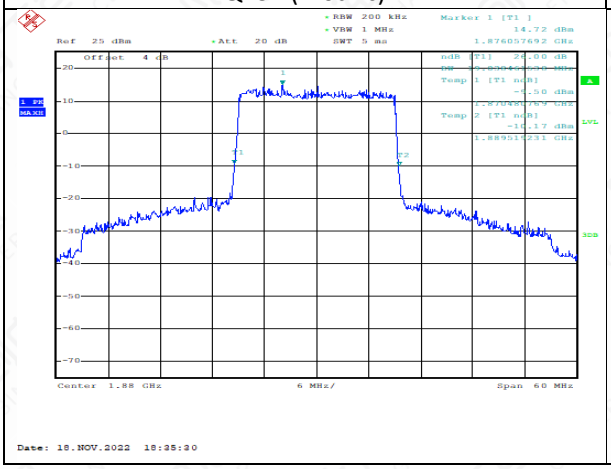
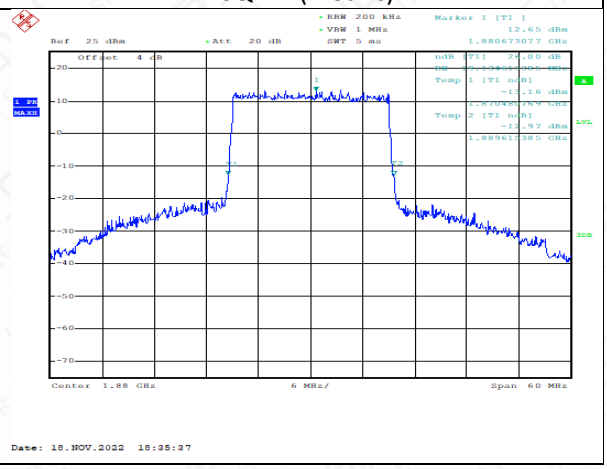
LTE band 2, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	9.62	9.62
QPSK (-26dBc)	16QAM (-26dBc)	
		

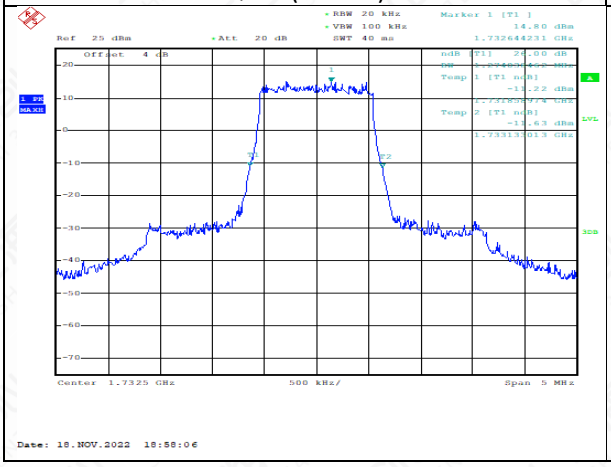
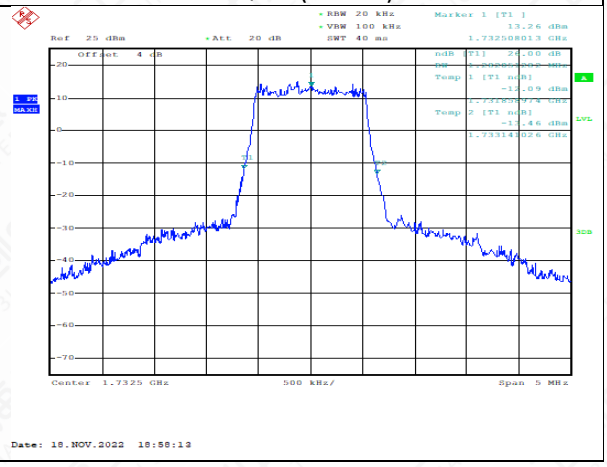
LTE band 2, 15MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	14.57	14.50
QPSK (-26dBc)	16QAM (-26dBc)	
		

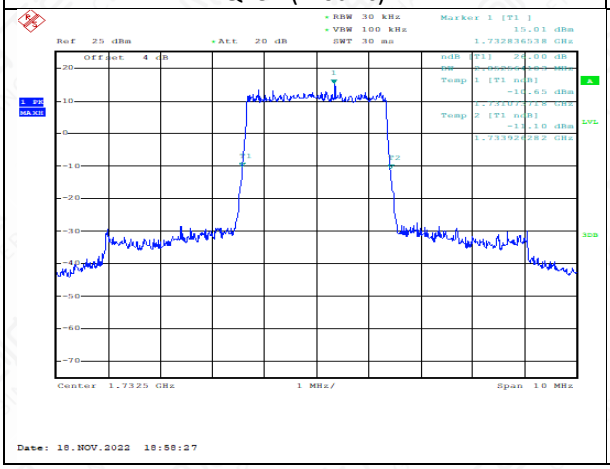
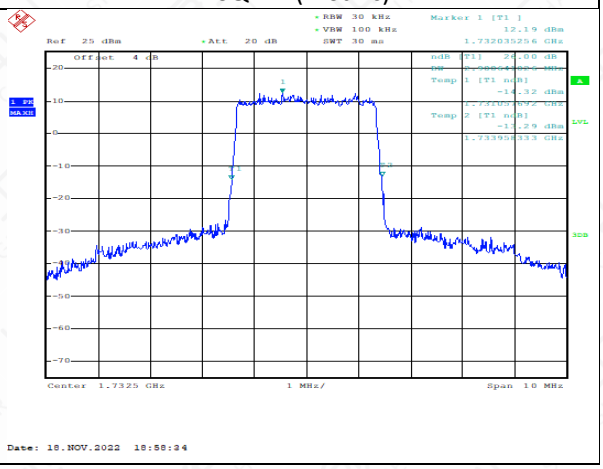
LTE band 2, 20MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	19.04	19.04
QPSK (-26dBc)	16QAM (-26dBc)	
		

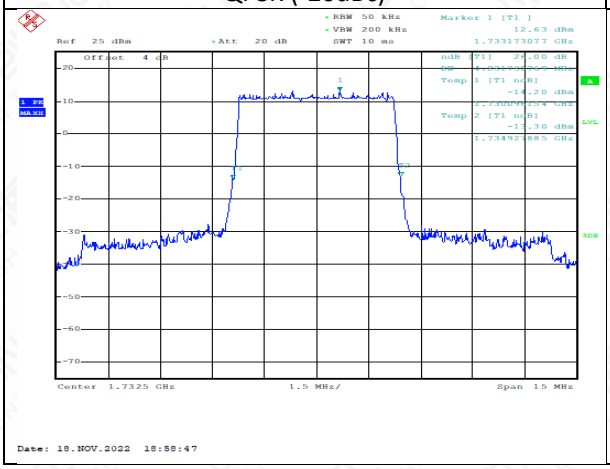
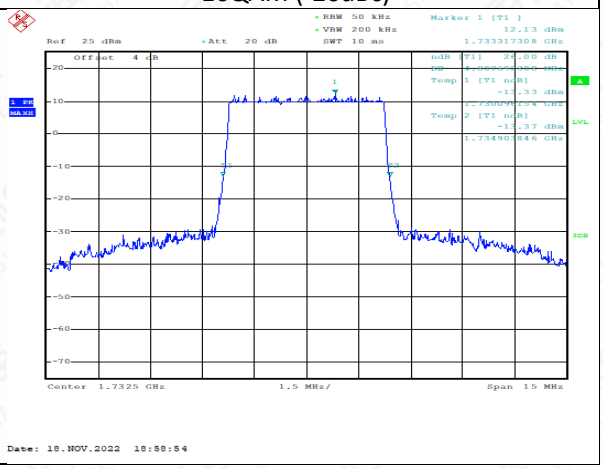
LTE band 4, 1.4MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	1.27	1.28
QPSK (-26dBc)	16QAM (-26dBc)	
		

LTE band 4, 3MHz (-26dBc)

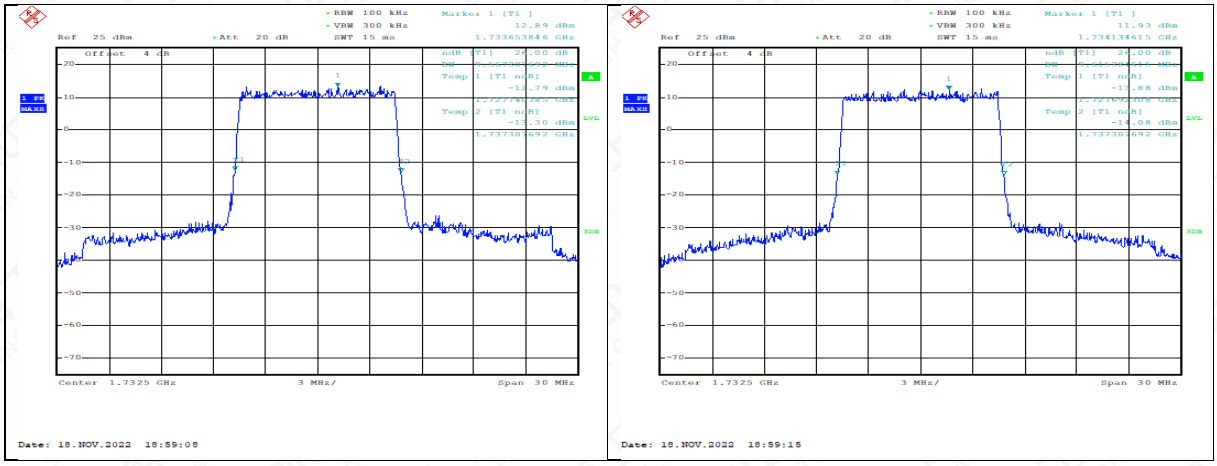
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	2.85	2.90
QPSK (-26dBc)	16QAM (-26dBc)	
		

LTE band 4, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	4.83	4.81
QPSK (-26dBc)	16QAM (-26dBc)	
		

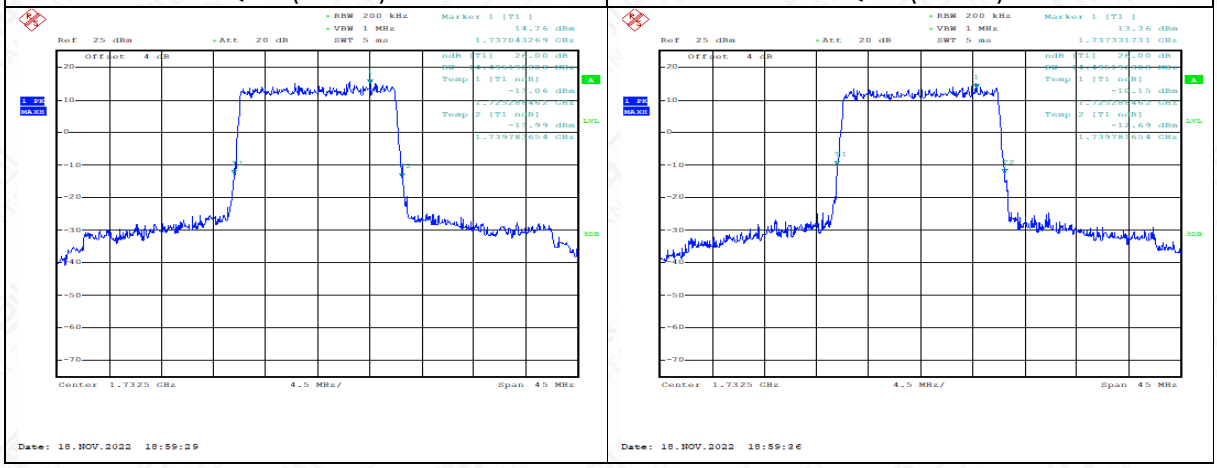
LTE band 4, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	9.57	9.62
QPSK (-26dBc)	16QAM (-26dBc)	



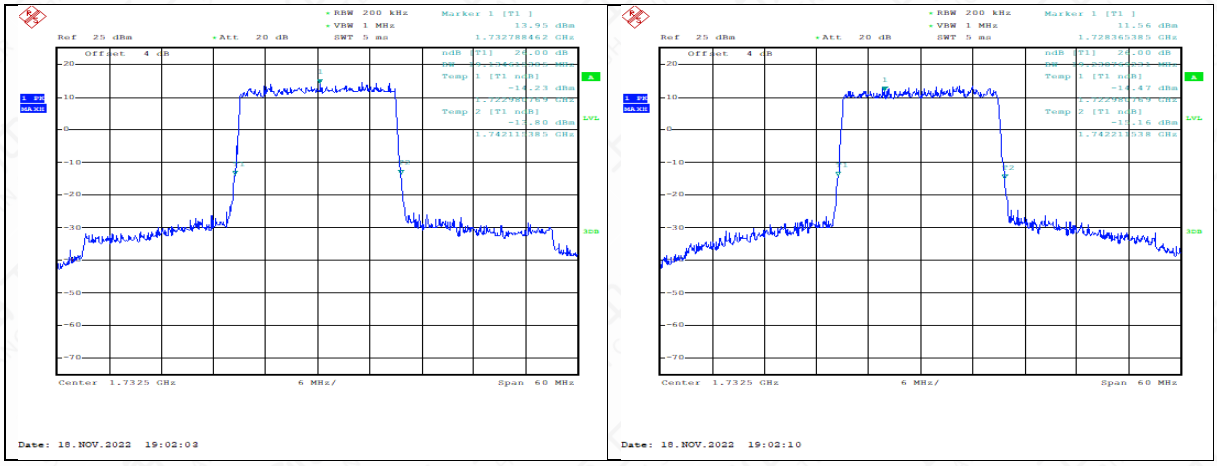
LTE band 4, 15MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	14.50	14.50
QPSK (-26dBc)	16QAM (-26dBc)	



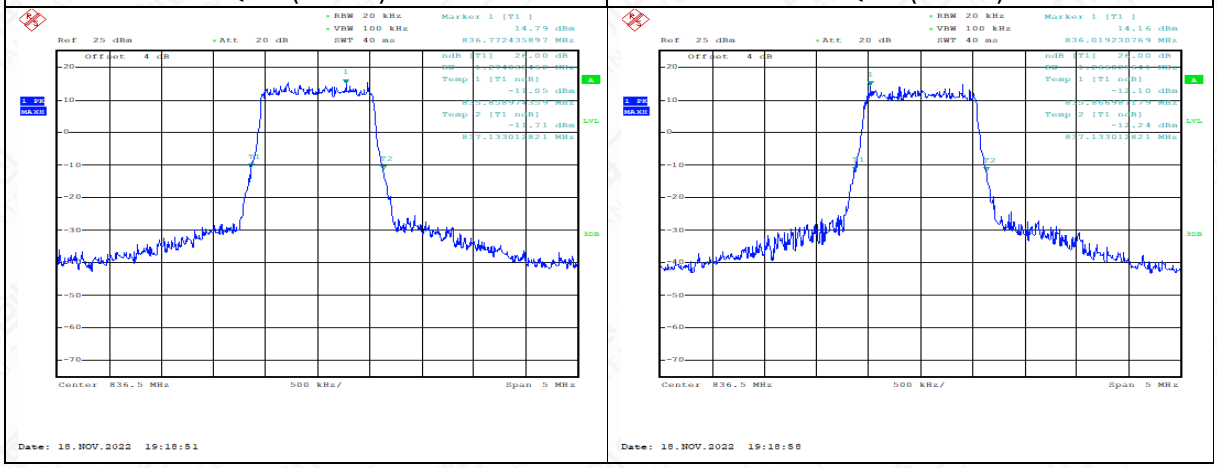
LTE band 4, 20MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	19.13	19.23
QPSK (-26dBc)	16QAM (-26dBc)	



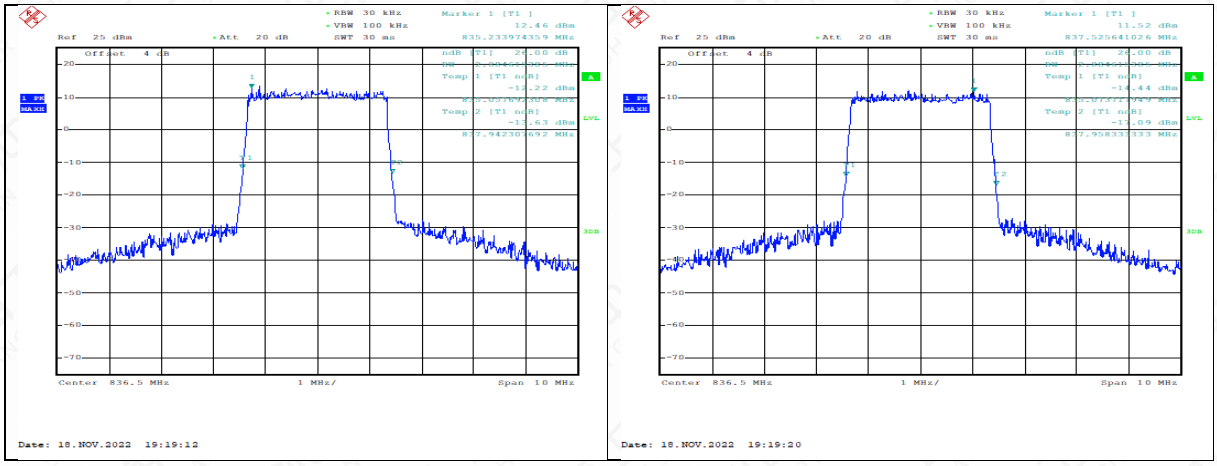
LTE band 5,1.4MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	1.27	1.27
QPSK (-26dBc)	16QAM (-26dBc)	



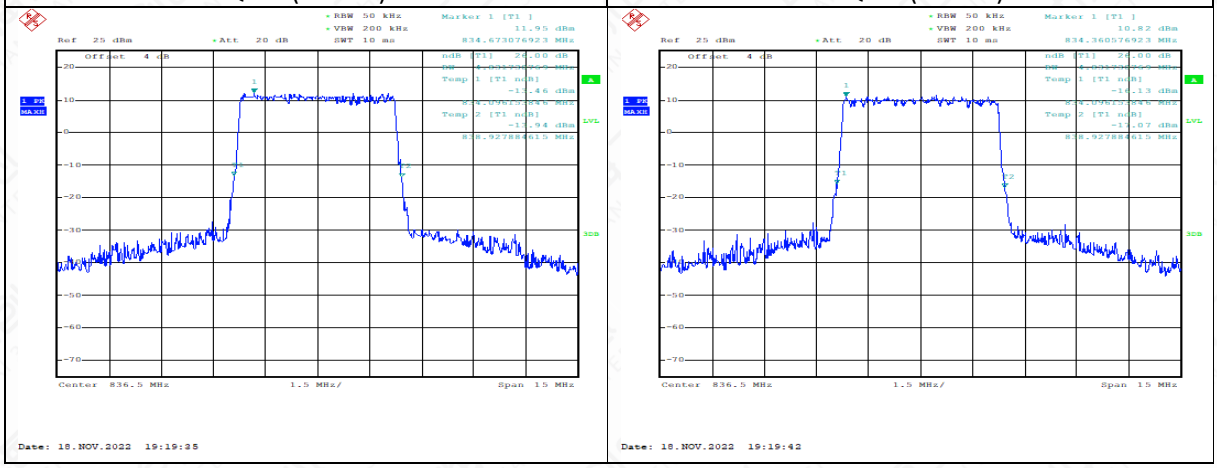
LTE band 5, 3MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	2.88	2.88
QPSK (-26dBc)	16QAM (-26dBc)	



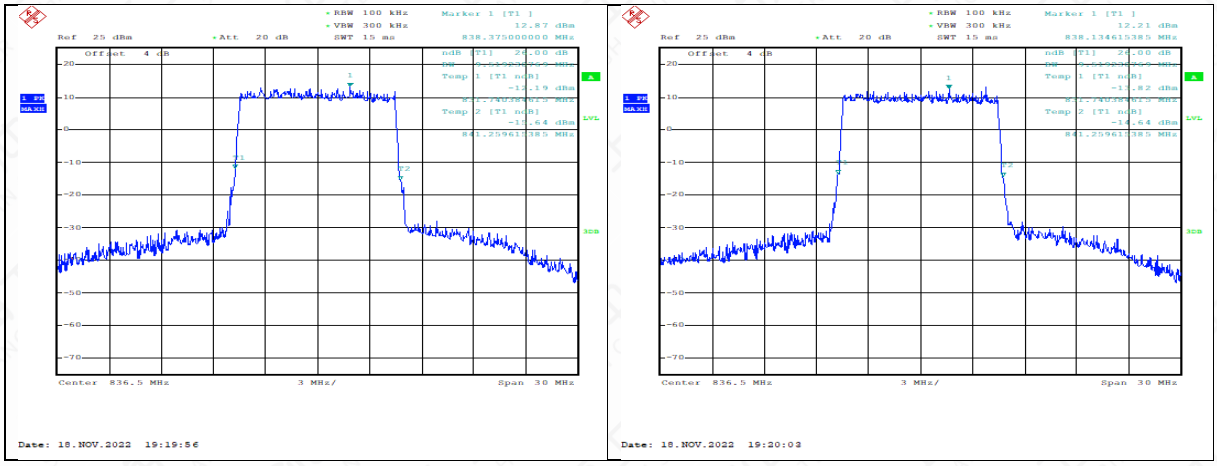
LTE band 5, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	4.83	4.83
QPSK (-26dBc)	16QAM (-26dBc)	



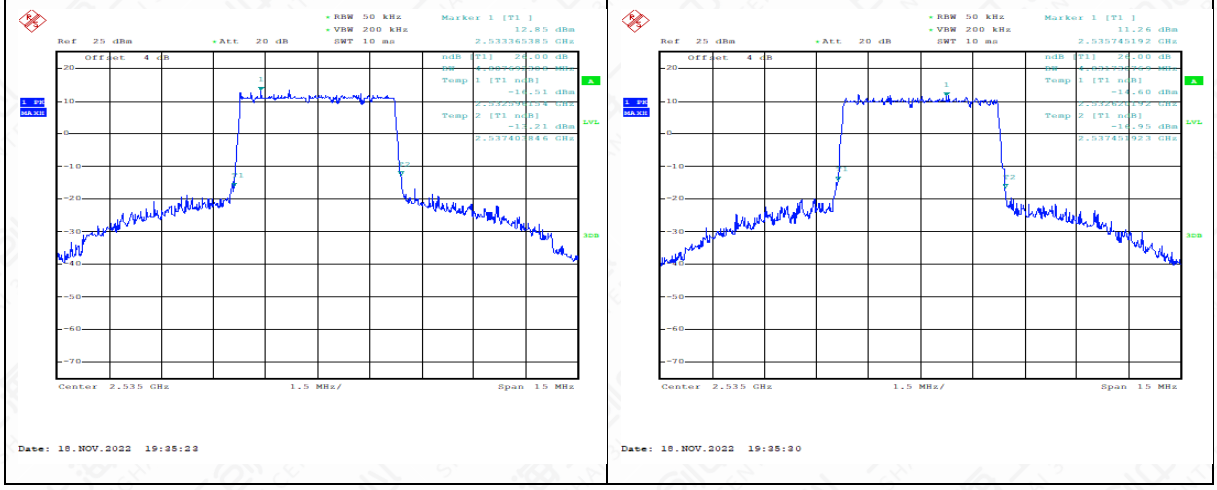
LTE band 5, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	9.47	9.52
QPSK (-26dBc)	16QAM (-26dBc)	



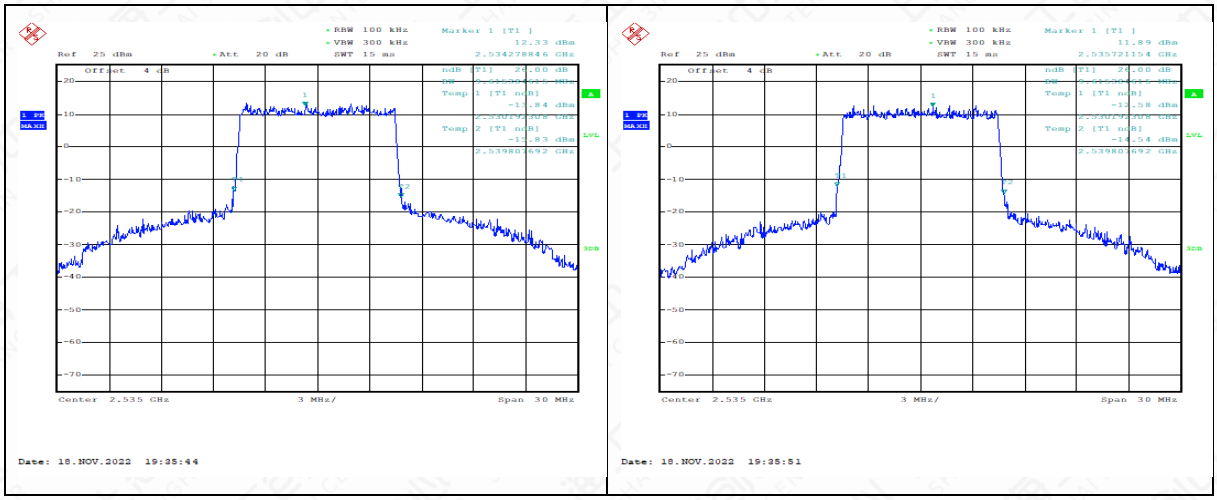
LTE band 7, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2535	4.78	4.81
QPSK (-26dBc)	16QAM (-26dBc)	



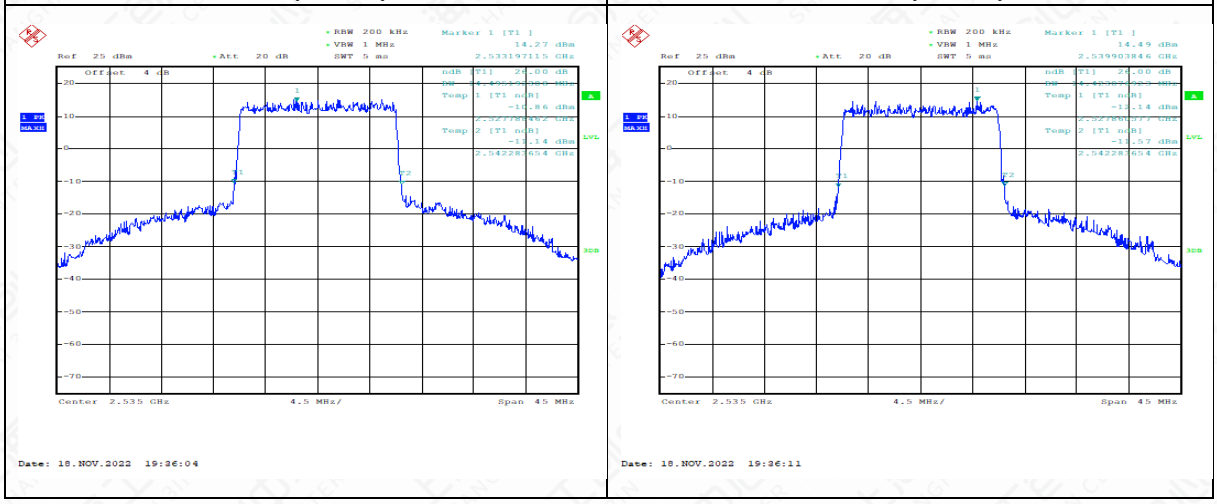
LTE band 7, 10MHz (-26dBc)mid

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2535	9.62	9.62
QPSK (-26dBc)	16QAM (-26dBc)	



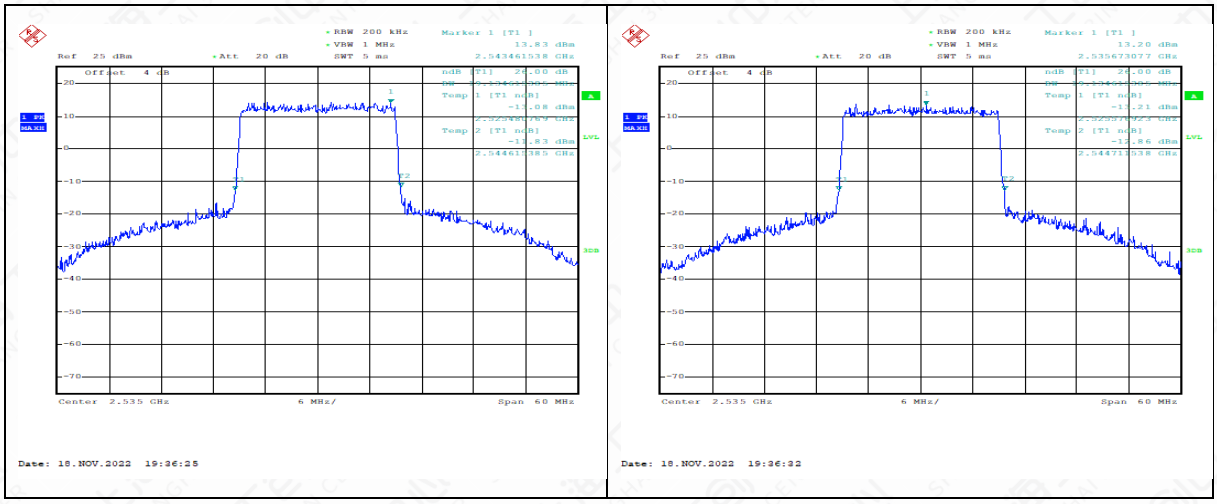
LTE band 7, 15MHz (-26dBc)mid

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2535	14.50	14.42
QPSK (-26dBc)	16QAM (-26dBc)	



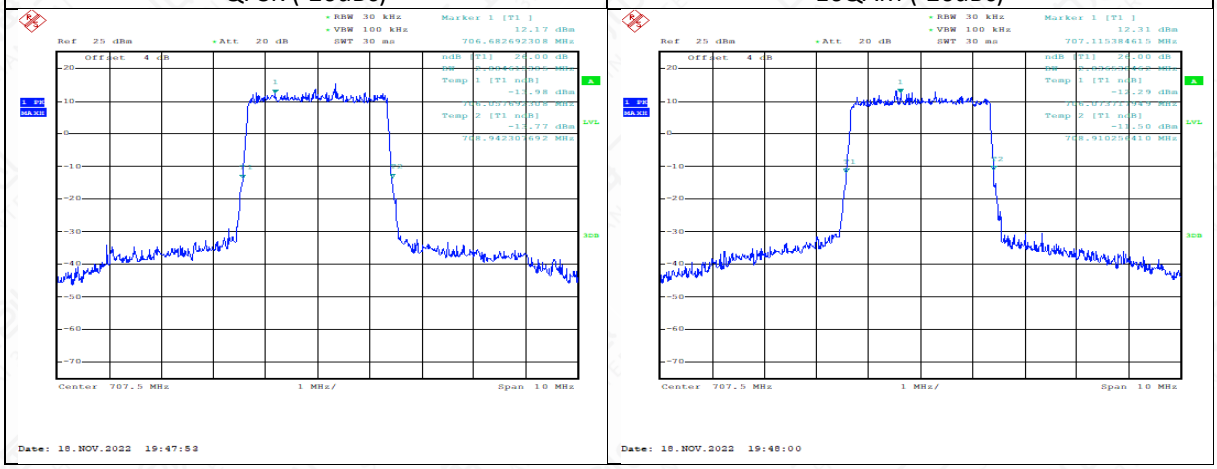
LTE band 7, 20MHz (-26dBc)mid

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2535	19.13	19.13
QPSK (-26dBc)	16QAM (-26dBc)	



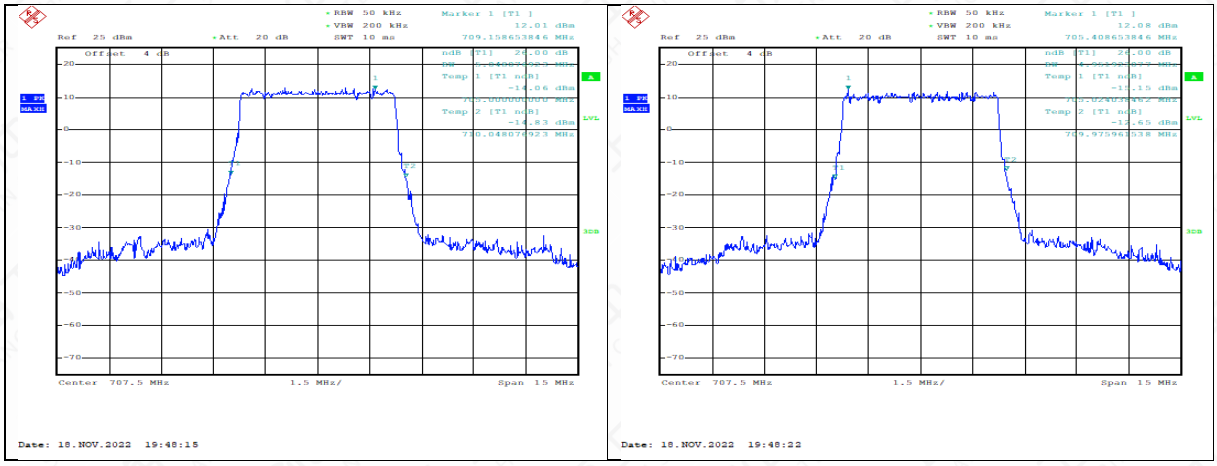
LTE band 12, 3MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
707.5	QPSK	16QAM
	2.88	2.84
QPSK (-26dBc)	16QAM (-26dBc)	



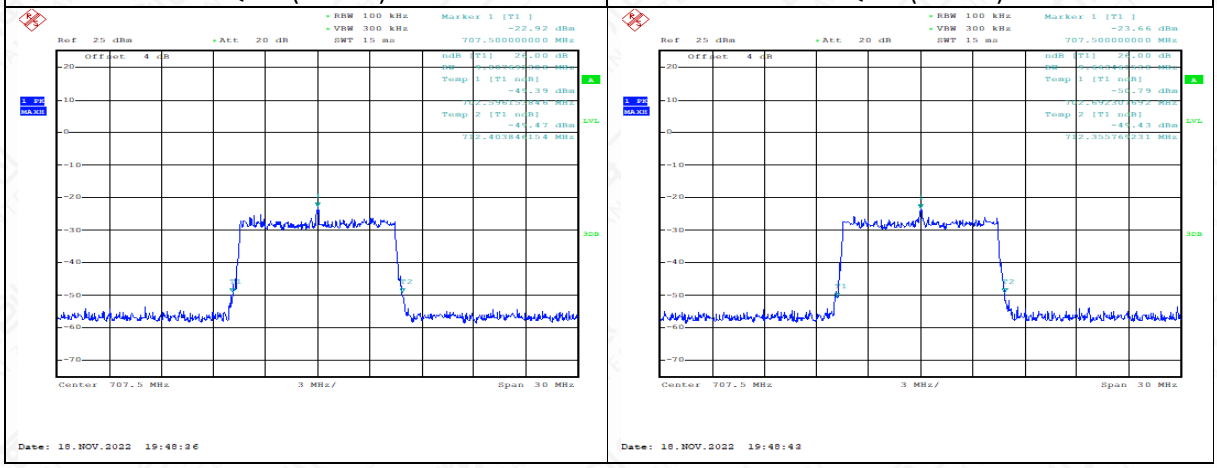
LTE band 12, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
707.5	QPSK	16QAM
	5.05	4.95
QPSK (-26dBc)	16QAM (-26dBc)	



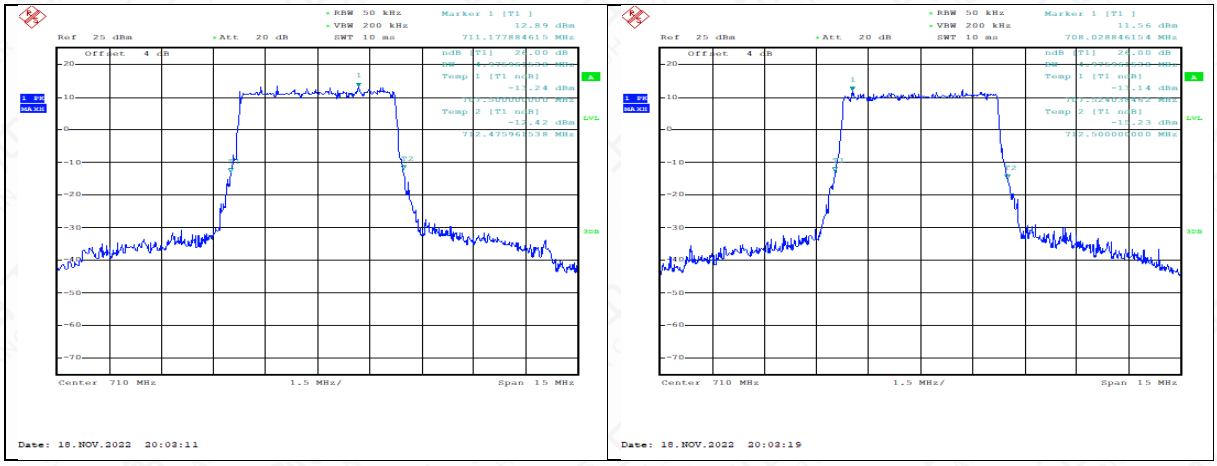
LTE band 12, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
707.5	QPSK	16QAM
	9.81	9.66
QPSK (-26dBc)	16QAM (-26dBc)	



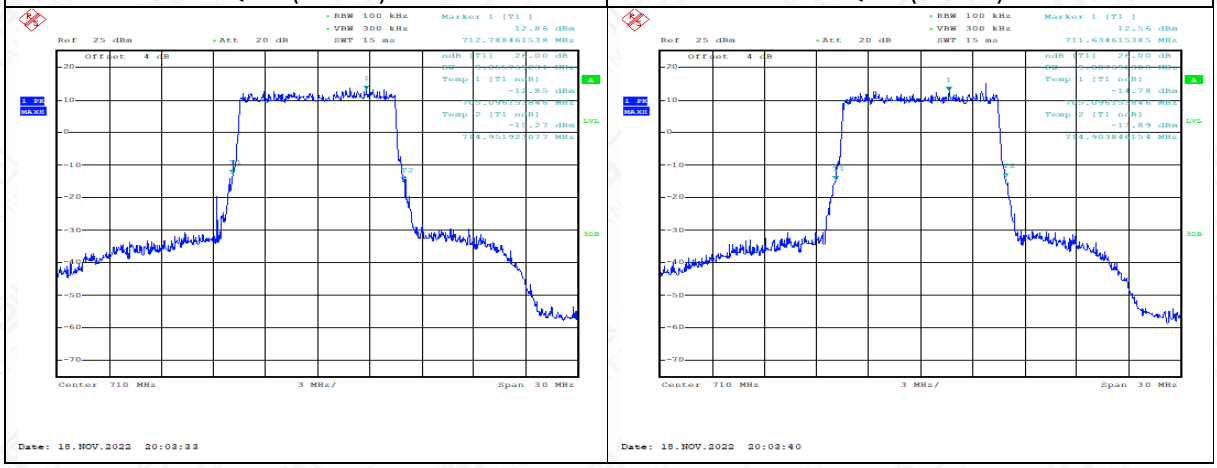
LTE band 17, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
710.0	QPSK	16QAM
	4.98	4.98
QPSK (-26dBc)	16QAM (-26dBc)	



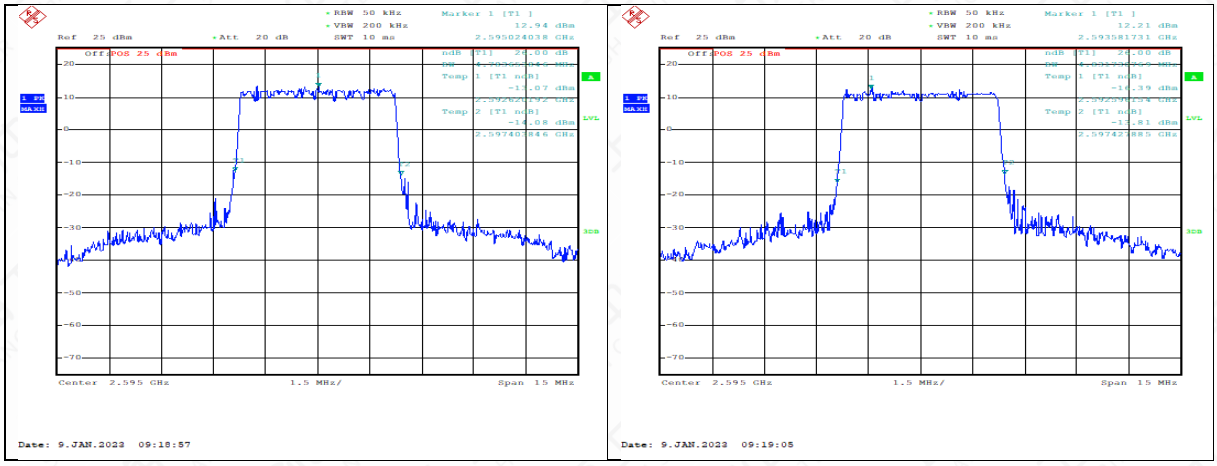
LTE band 17, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
710.0	QPSK	16QAM
	9.86	9.76
QPSK (-26dBc)	16QAM (-26dBc)	



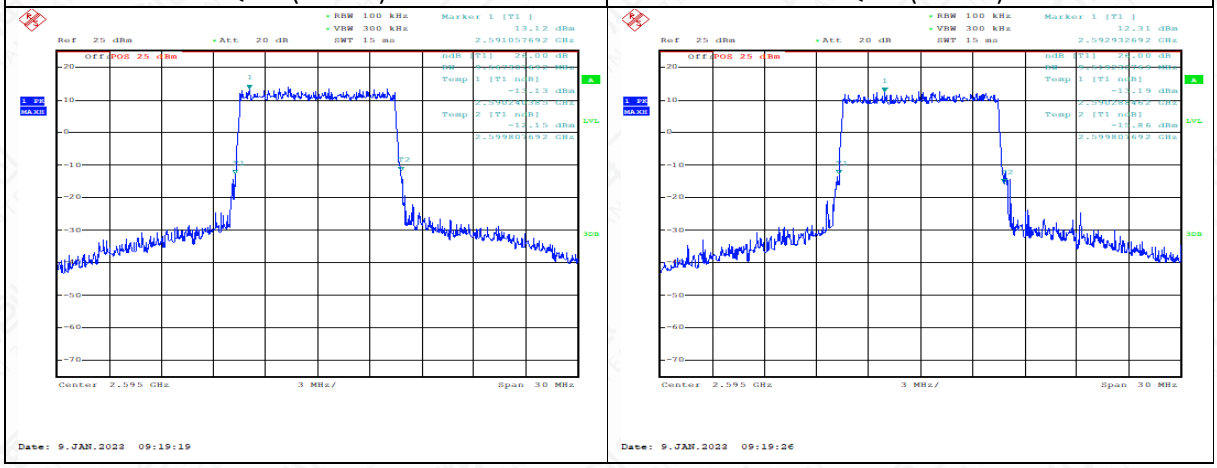
LTE band 38, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2595.0	QPSK	16QAM
	4.78	4.83
QPSK (-26dBc)	16QAM (-26dBc)	



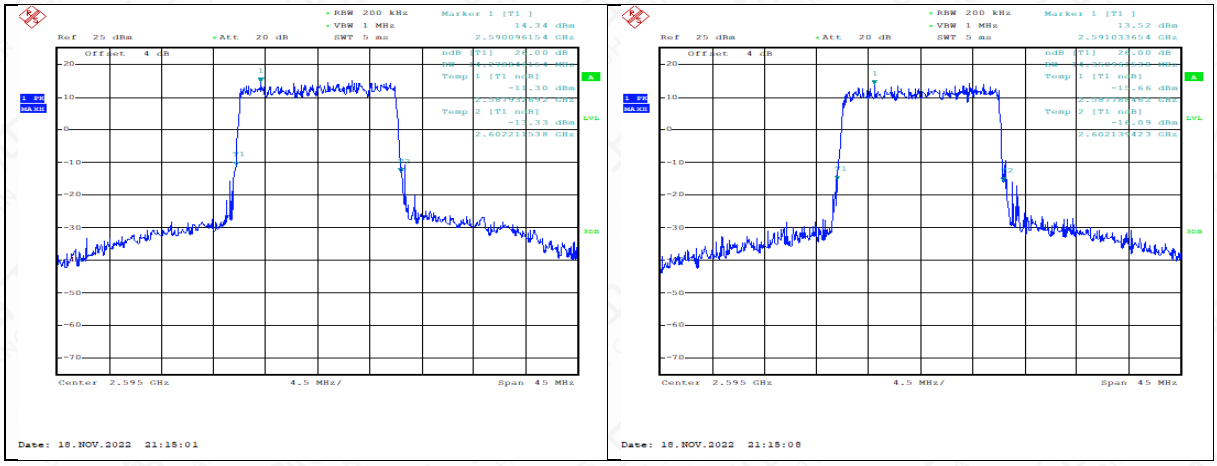
LTE band 38, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2595.0	QPSK	16QAM
	9.57	9.52
QPSK (-26dBc)	16QAM (-26dBc)	



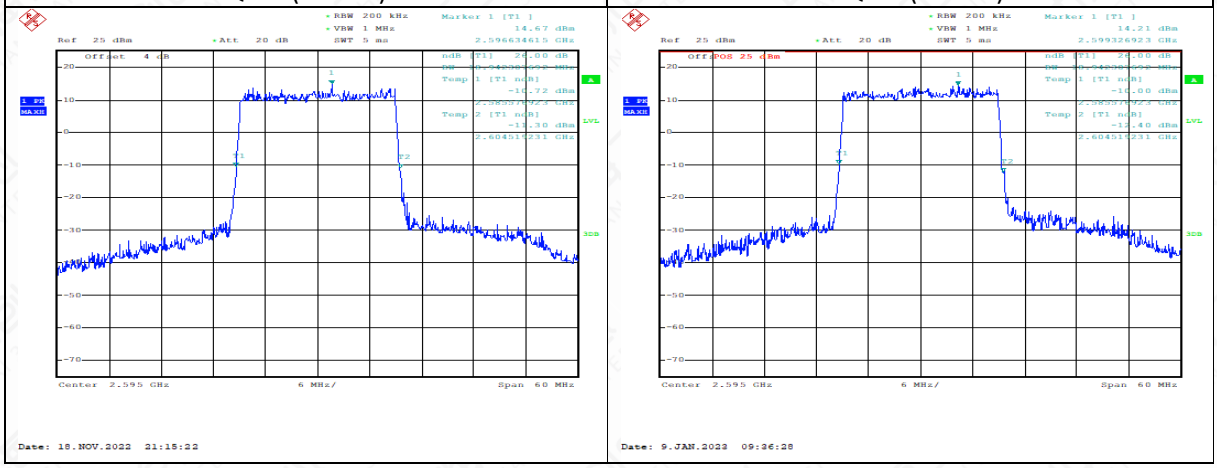
LTE band 38, 15MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2595.0	QPSK	16QAM
	14.28	14.35
QPSK (-26dBc)	16QAM (-26dBc)	

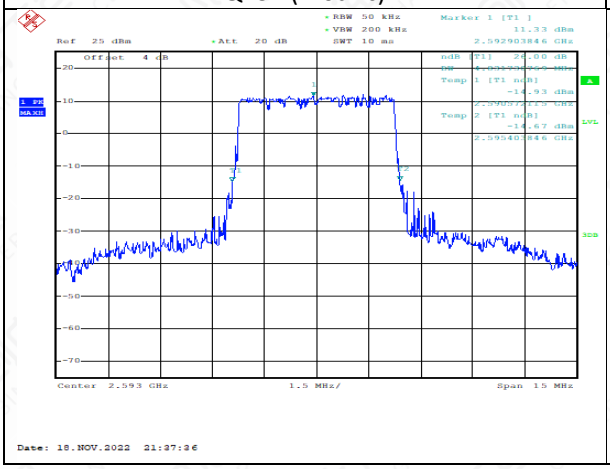
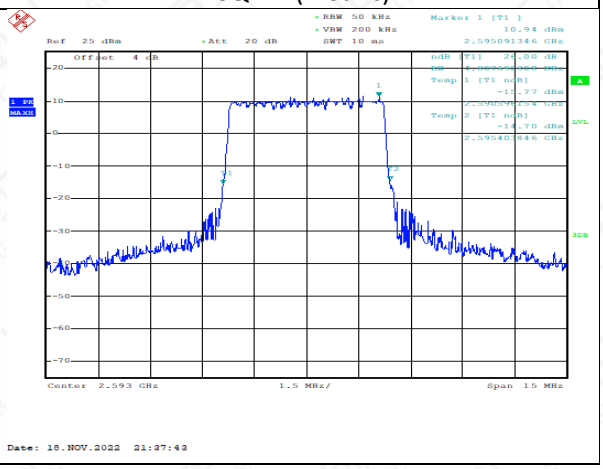


LTE band 38, 20MHz (-26dBc)

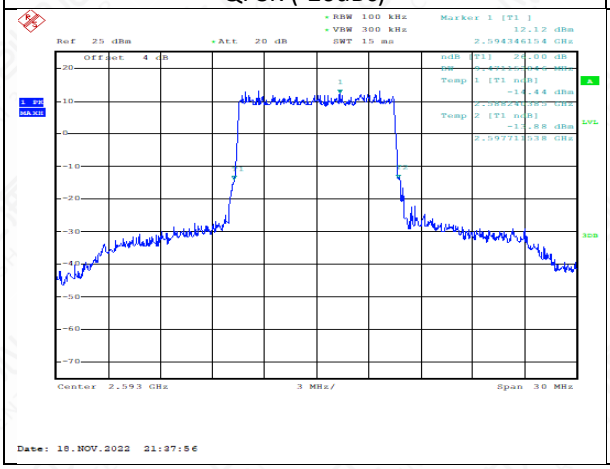
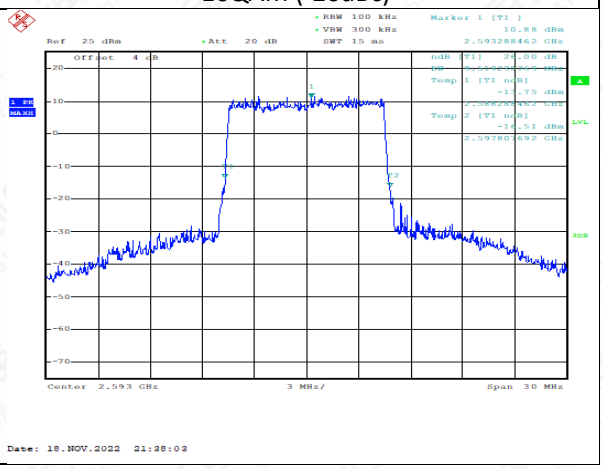
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
	QPSK	16QAM
2595.0	18.94	18.94
QPSK (-26dBc)	16QAM (-26dBc)	



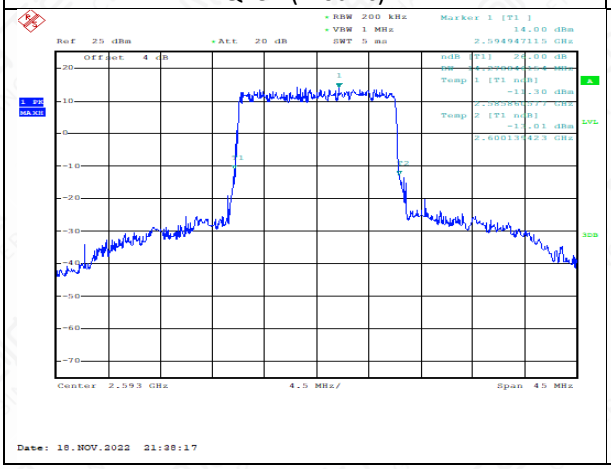
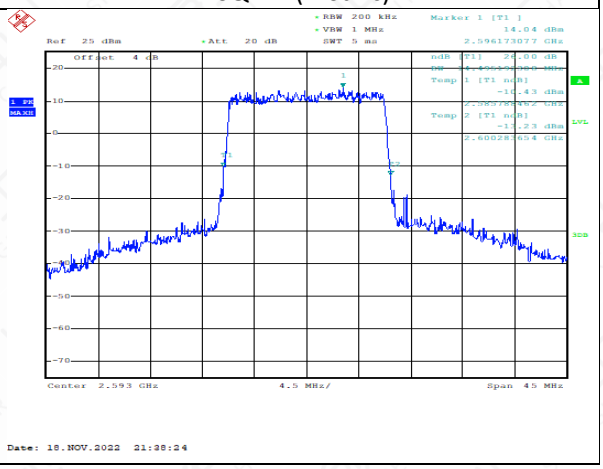
LTE band 41, 5MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	4.83	4.81
QPSK (-26dBc)	16QAM (-26dBc)	
		

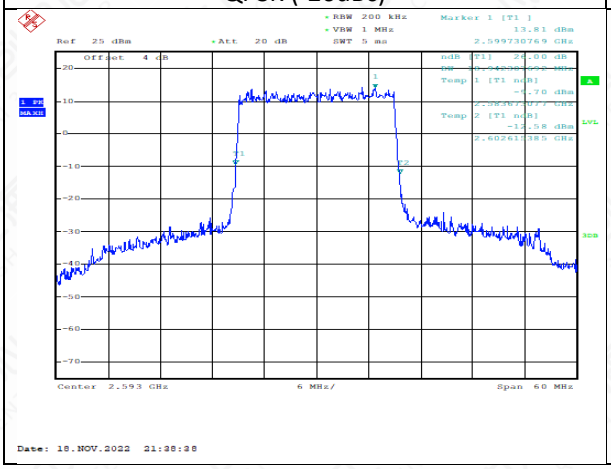
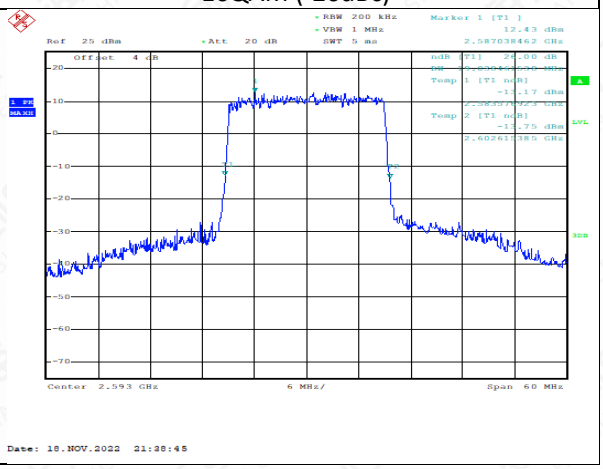
LTE band 41, 10MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	9.47	9.47
QPSK (-26dBc)	16QAM (-26dBc)	
		

LTE band 41, 15MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	14.28	14.50
QPSK (-26dBc)	16QAM (-26dBc)	
		

LTE band 41, 20MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2593.0	QPSK	16QAM
	18.94	18.94
QPSK (-26dBc)	16QAM (-26dBc)	
		

6.6 Band Edge Compliance

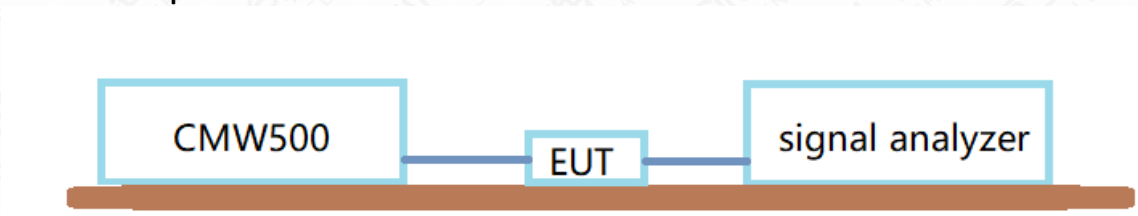
Reference

CFR Part 2.1049,22.917(b),24.238(a),27.53(g),27.53(h), 27.53(m),90.669
Rule RSS-130 4.7, Rule RSS-132 5.5 , Rule RSS-133 6.5, Rule RSS-139 6.6, Rule RSS-199 4.5

6.6.1 Measurement limit

Part 27.53(g),27.53(h), 27.53(m) state that on any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dm.
According to KDB 971168 6, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.
Part 27.53(m) states that 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 that 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.
Rule RSS-132: 5.5: (i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). (ii)After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required. Limit -13 dBm
Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).
After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm
Rule RSS-139 6.6 specifies that " In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB. (ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.".

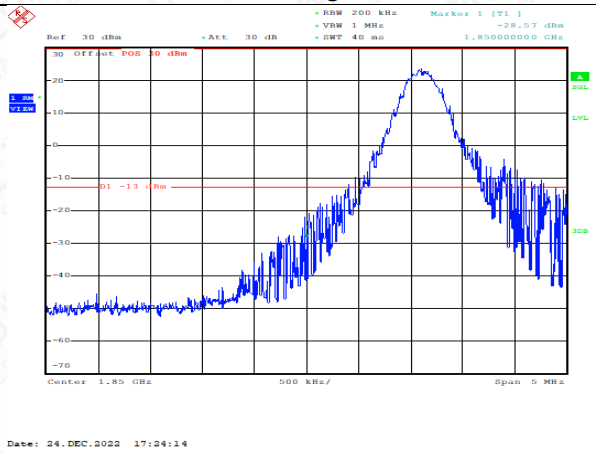
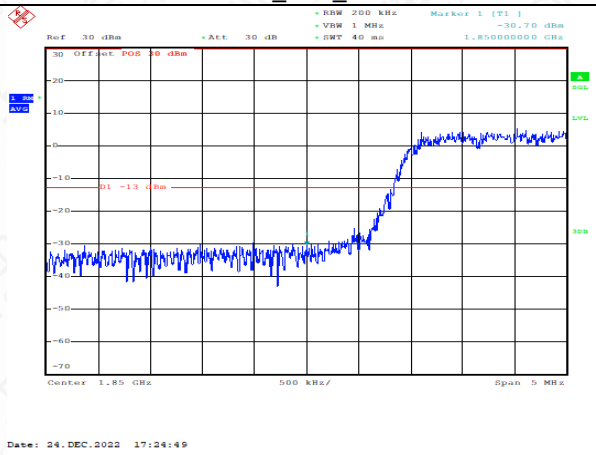
6.6.2 Test Setup

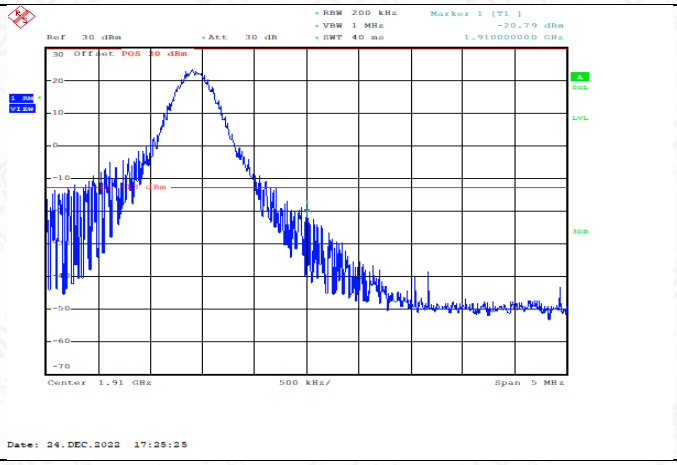


6.6.3 Measurement result

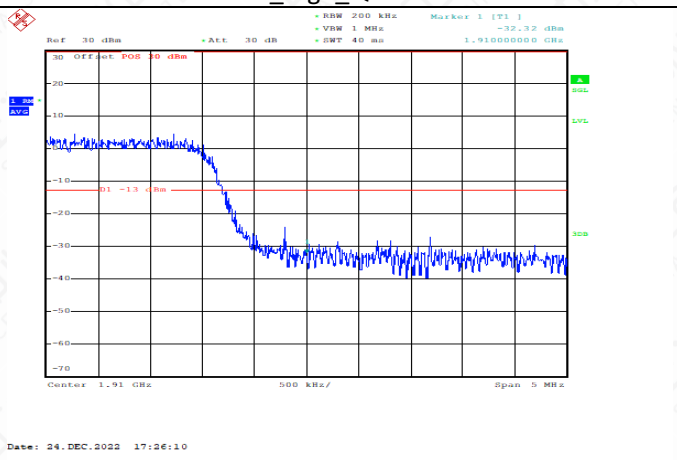
Only worst case result is given below,QPSK,

LTE band 2

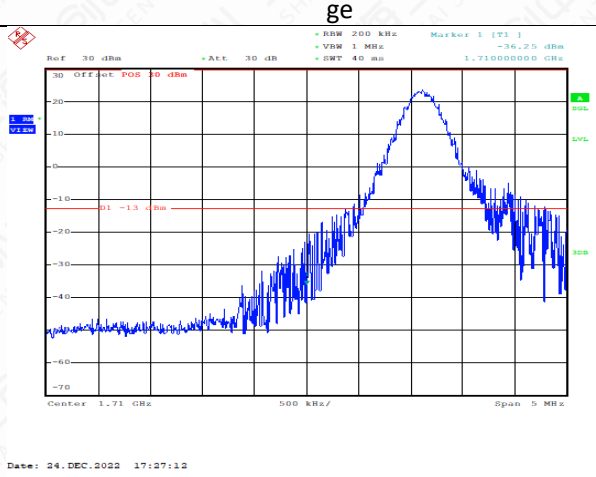
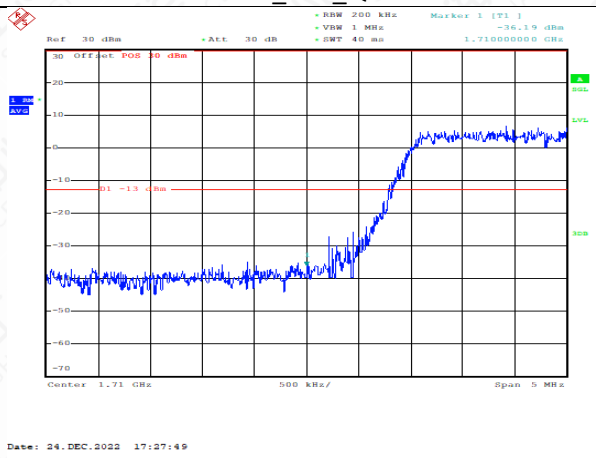
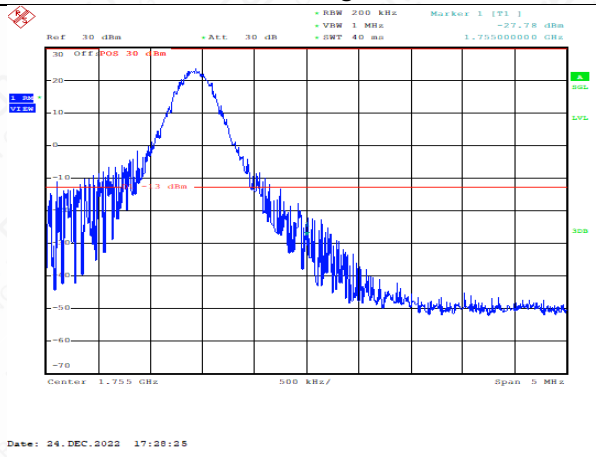
FDD02_20MHz_1860_OneRB_low_QPSKLowRange

LowRange_ FDD02_20MHz_1860_fullRB_Low_QPSK

FDD02_20MHz_1900_OneRB_high_QPSKHighRange

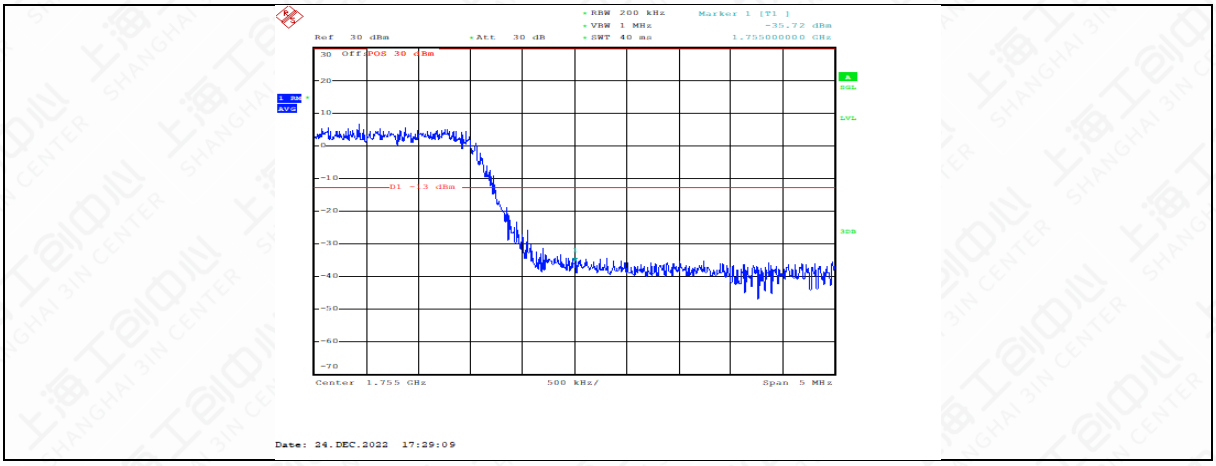


HighRange_ FDD02_20MHz_1900_fullRB _High_QPSK

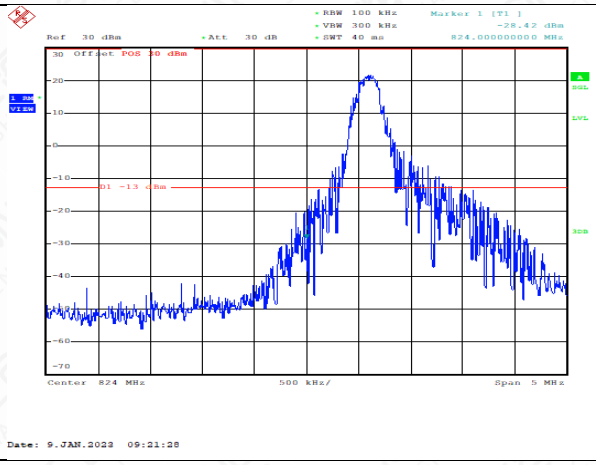
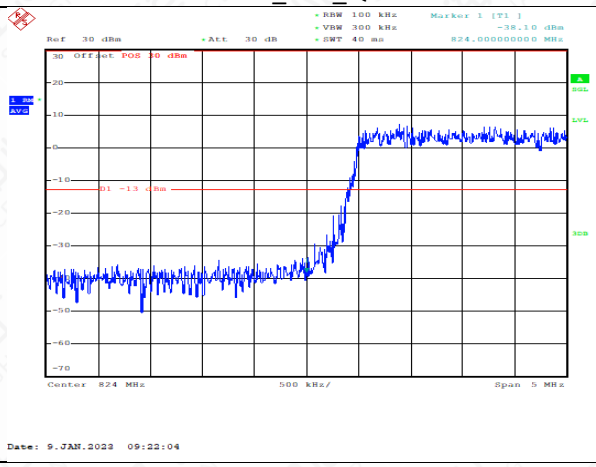
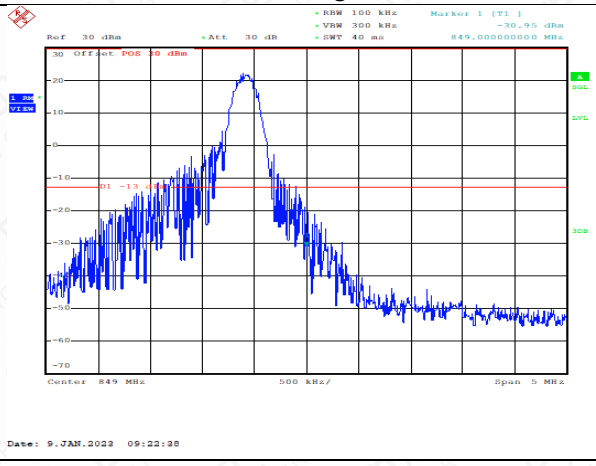


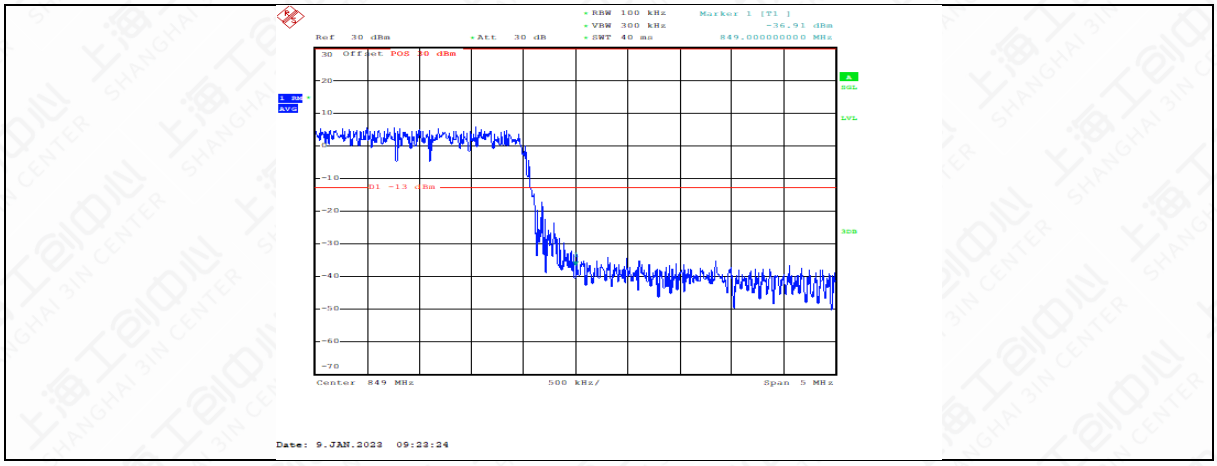
LTE band 4

FDD04_20MHz_1720_OneRB_low_QPSKLowRange

LowRange_ FDD04_20MHz_1720_fullRB_Low_QPSK

FDD04_20MHz_1745_OneRB_high_QPSKHighRange

HighRange_ FDD04_20MHz_1745_fullRB_High_QPSK

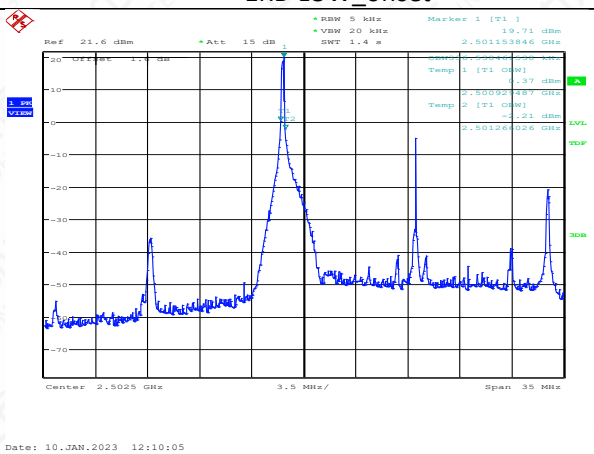
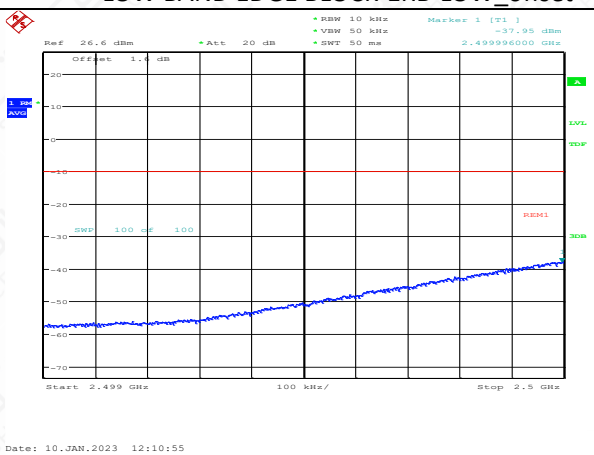
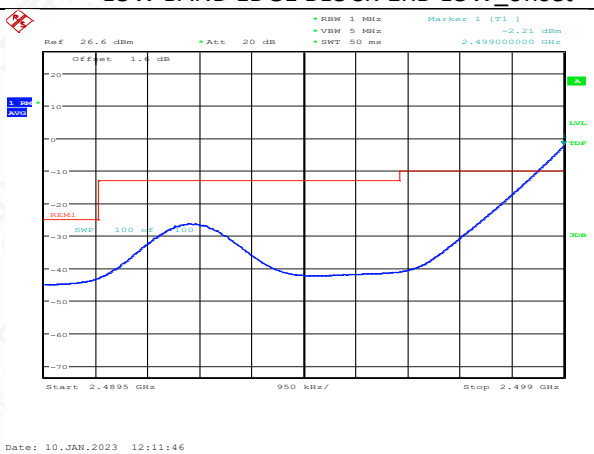

RBW 200 kHz
VBW 1 MHz
SWT 40 ms
Marker 1 [T1]
-35.72 dBm
1.755000000 GHz
Ref 30 dBm
Att 30 dB
Offset 30 dB
D1 -3 dBm
Center 1.755 GHz
500 kHz/
Span 5 MHz
Date: 24.DEC.2022 17:29:09

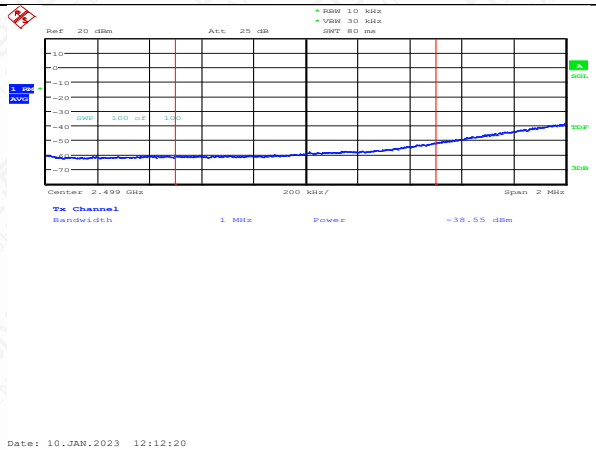
LTE band 5

FDD05_10MHz_829_OneRB_low_QPSKLowRang e

LowRange_ FDD05_10MHz_829_fullRB _Low_QPSK

FDD05_10MHz_844_OneRB_high_QPSKHighRa nge

HighRange_ FDD05_10MHz_844_fullRB _High_QPSK

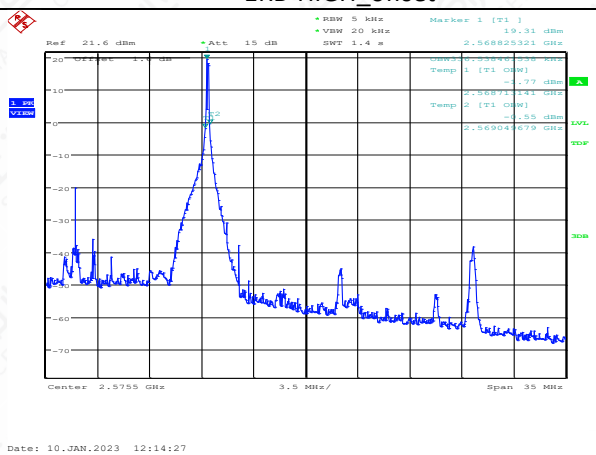

RBW 100 kHz
VBW 300 kHz
SWT 40 ms
Marker 1 [T1]
-36.91 dBm
849.000000000 MHz
Ref 30 dBm
Att 30 dB
Offset POS 10 dBm
D1 -13 dBm
Center 849 MHz
500 kHz/
Span 5 MHz
Date: 9.JAN.2023 09:23:24

LTE band 7

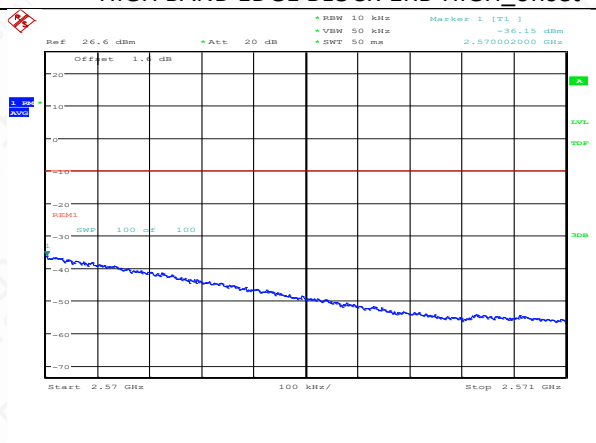
1RB-LOW_offset

LOW BAND EDGE BLOCK-1RB-LOW_offset

LOW BAND EDGE BLOCK-1RB-LOW_offset

Channal Power



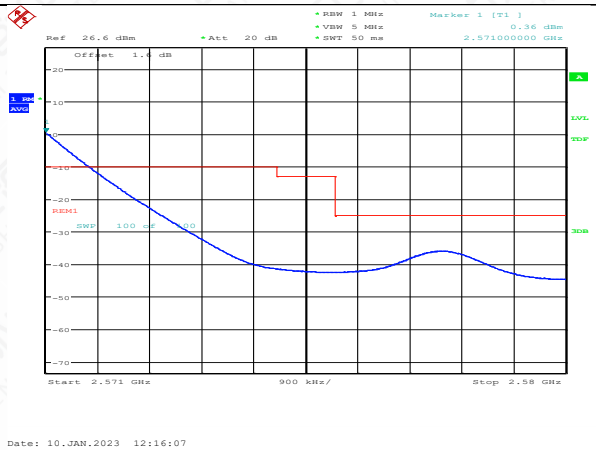
1RB-HIGH_offset



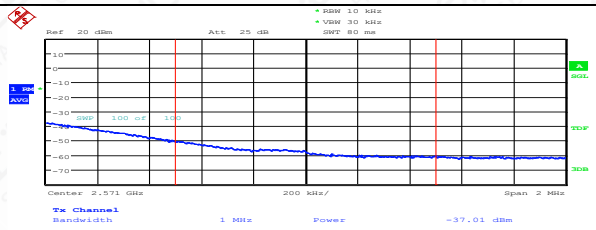
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



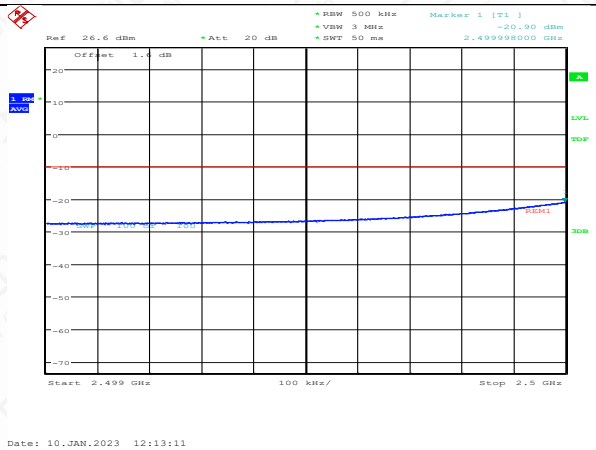
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



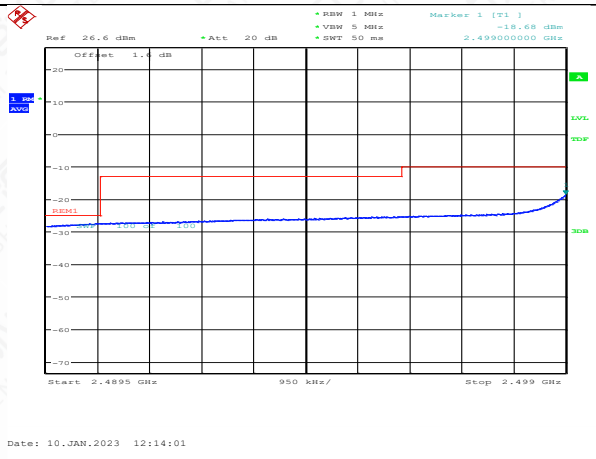
Channal Power



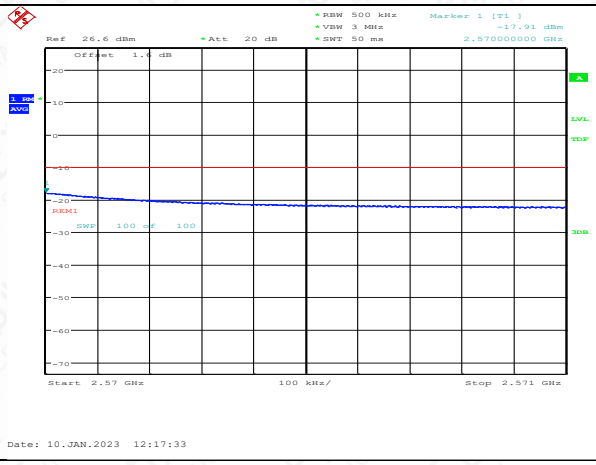
LOW BAND EDGE BLOCK-20M-100%RB



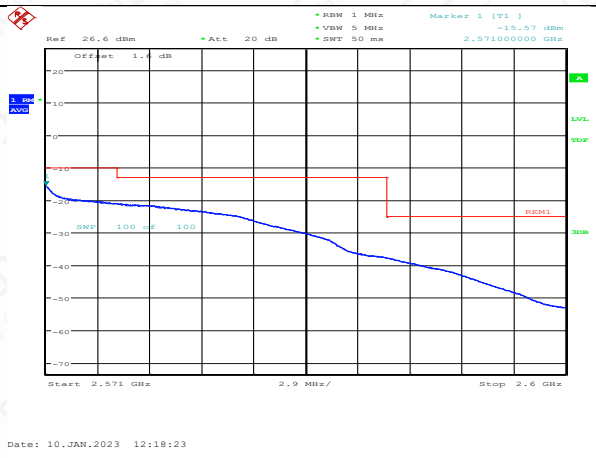
LOW BAND EDGE BLOCK-20M-100%RB



HIGH BAND EDGE BLOCK-20M-100%RB

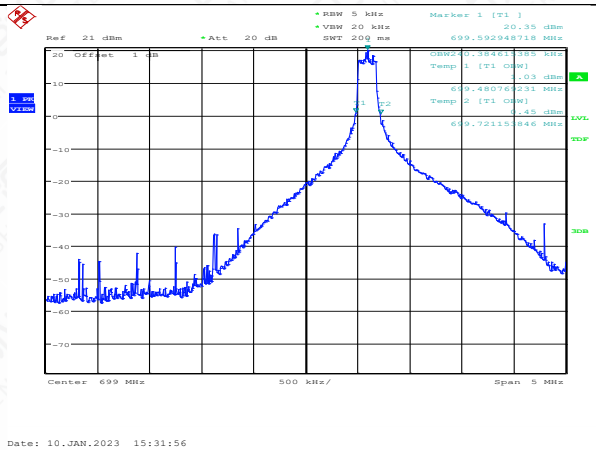


HIGH BAND EDGE BLOCK-20M-100%RB

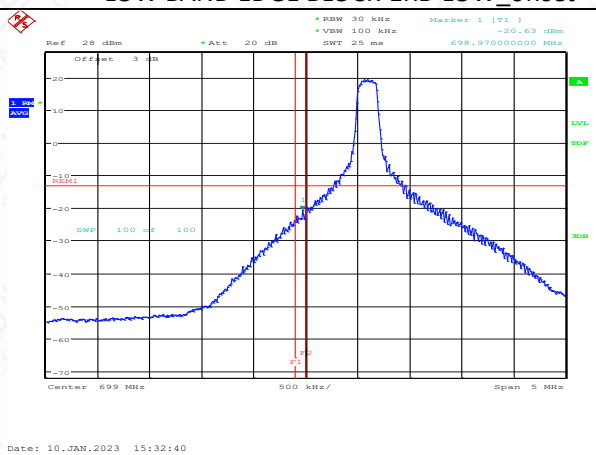


LTE band 12

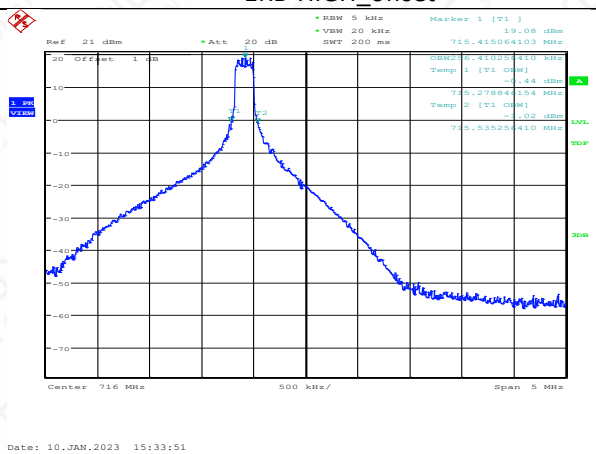
1RB-LOW_offset



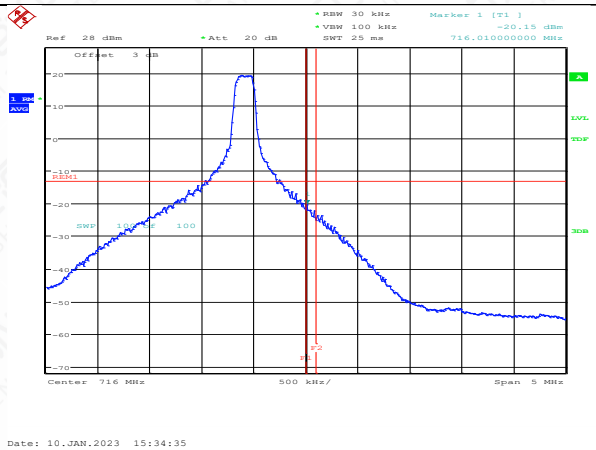
LOW BAND EDGE BLOCK-1RB-LOW_offset



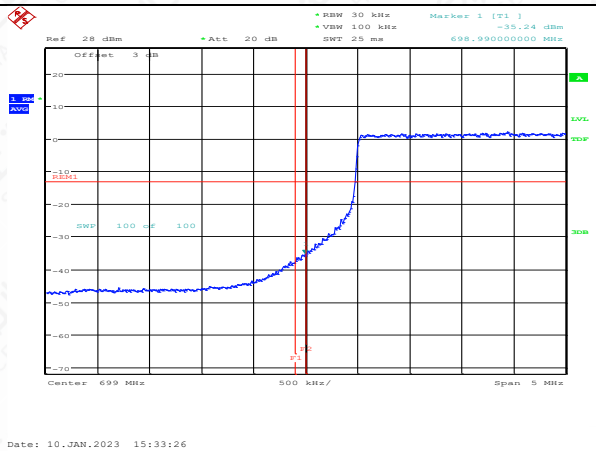
1RB-HIGH_offset



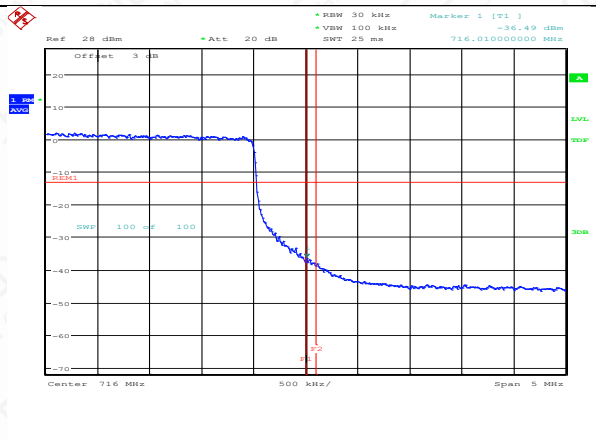
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



LOW BAND EDGE BLOCK-10M-100%RB

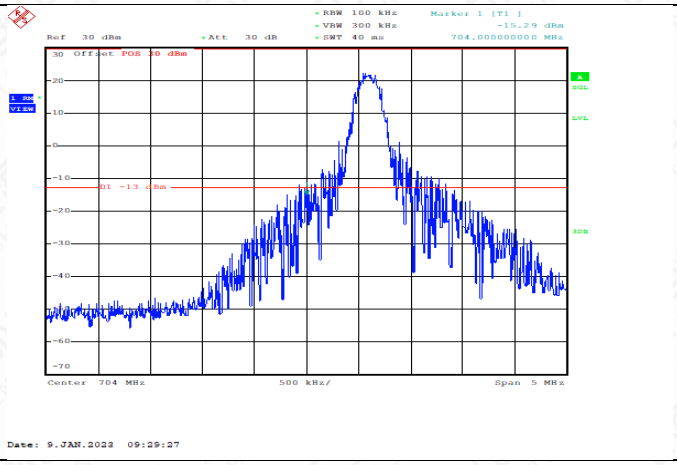


HIGH BAND EDGE BLOCK-10M-100%RB

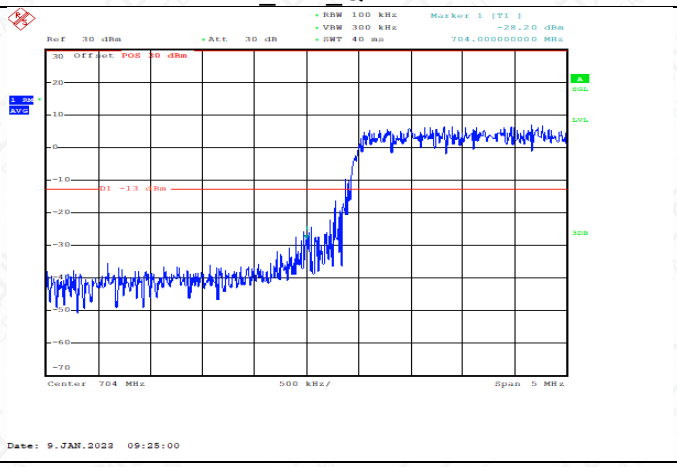


LTE band 17

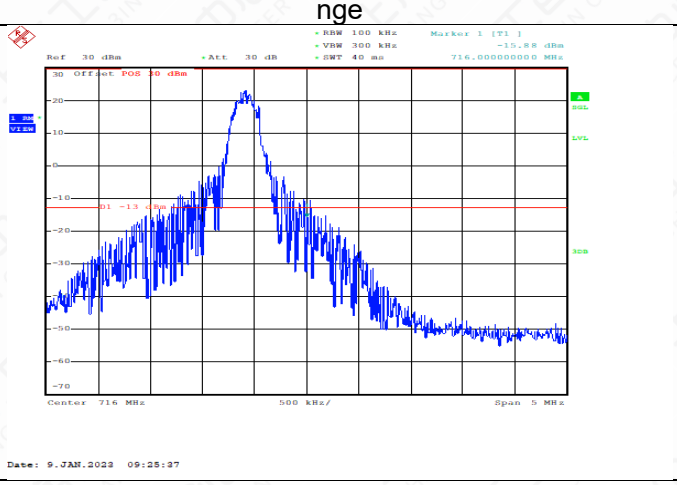
FDD17_10MHz_709_OneRB_low_QPSKLowRange



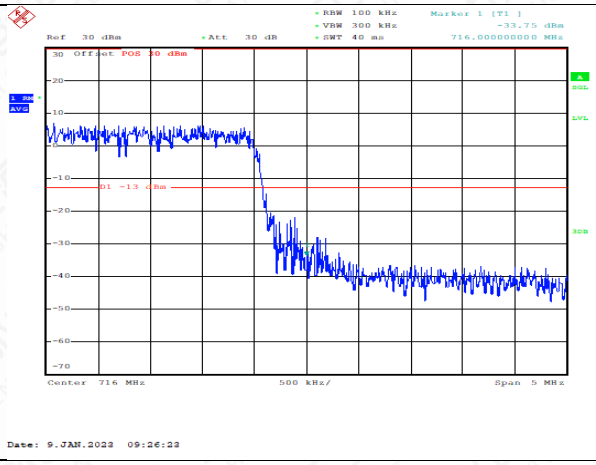
LowRange_ FDD17_10MHz_709_fullRB_Low_QPSK



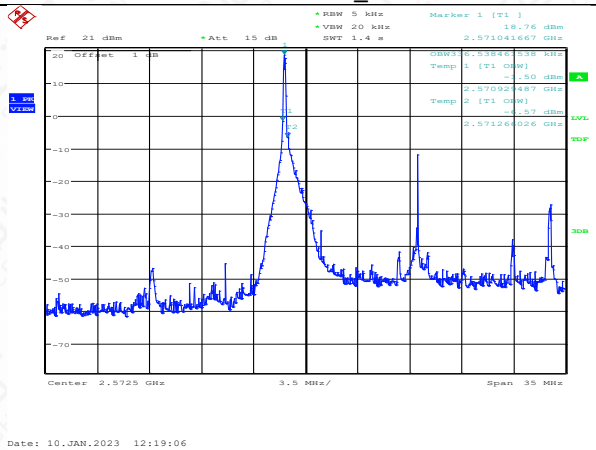
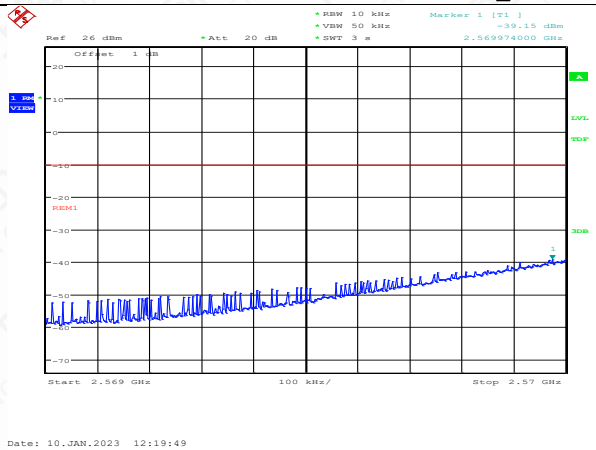
FDD17_10MHz_711_OneRB_high_QPSKHighRange

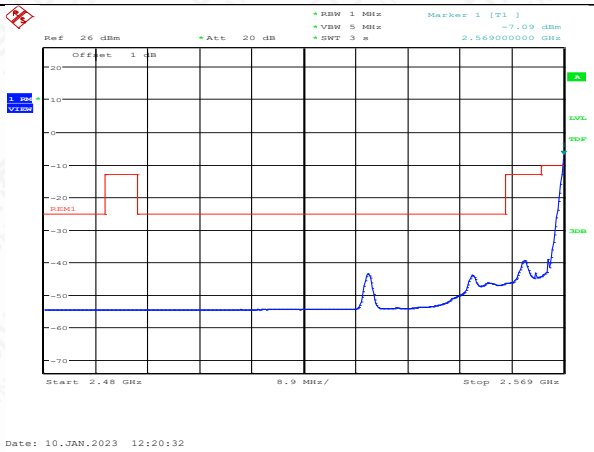


HighRange_ FDD17_10MHz_711_fullRB_High_QPSK

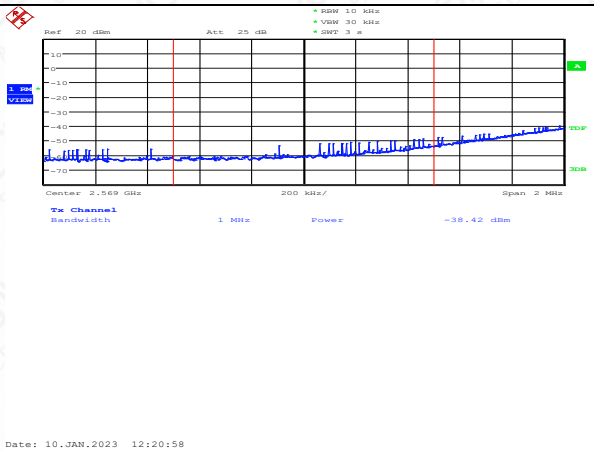


LTE band 38

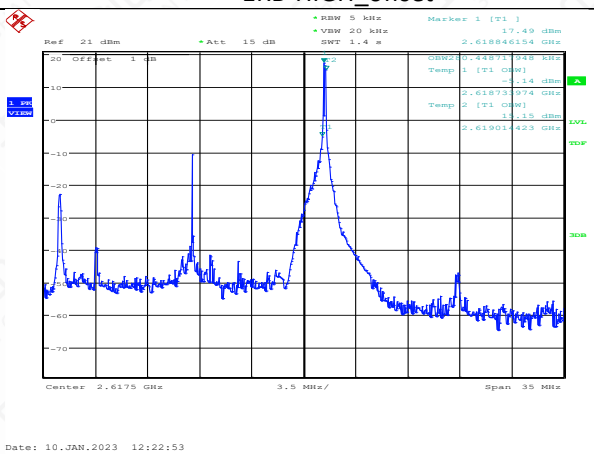
1RB-LOW_offset

LOW BAND EDGE BLOCK-1RB-LOW_offset

LOW BAND EDGE BLOCK-1RB-LOW_offset



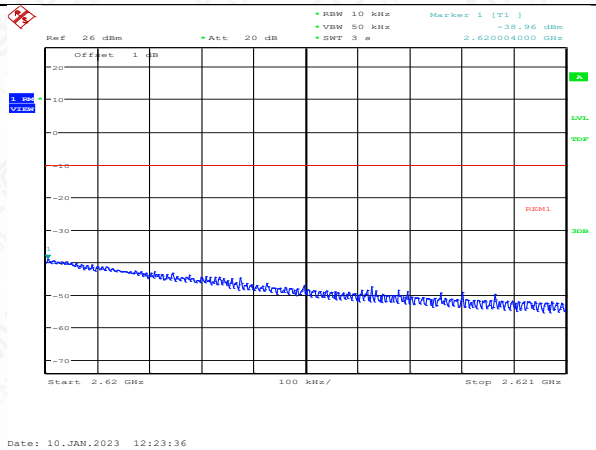
Channal Power



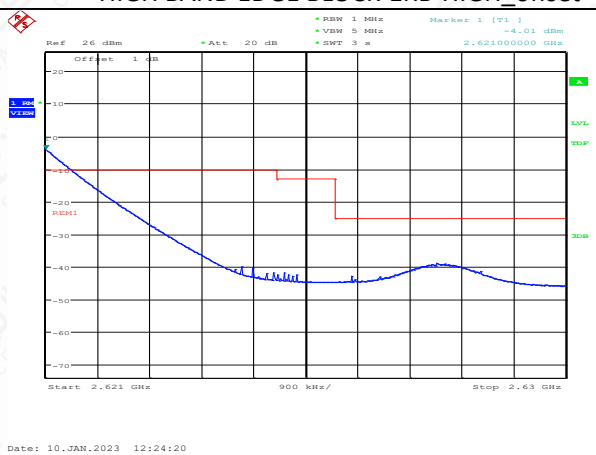
1RB-HIGH_offset



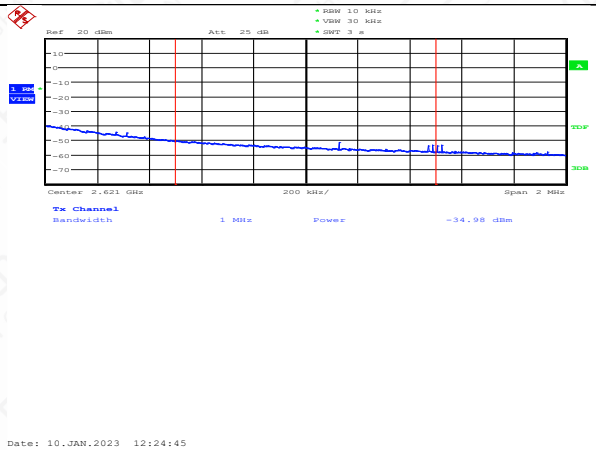
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



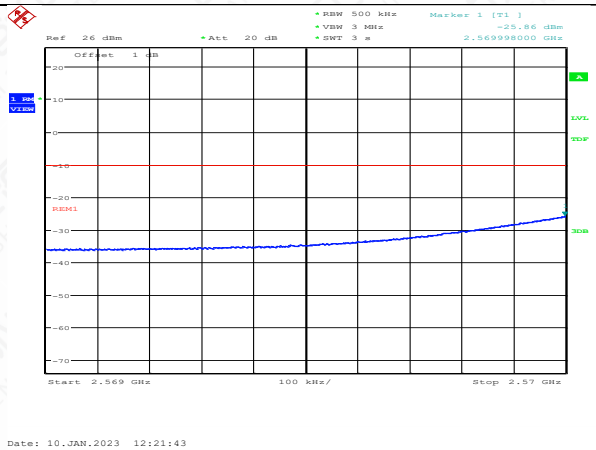
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



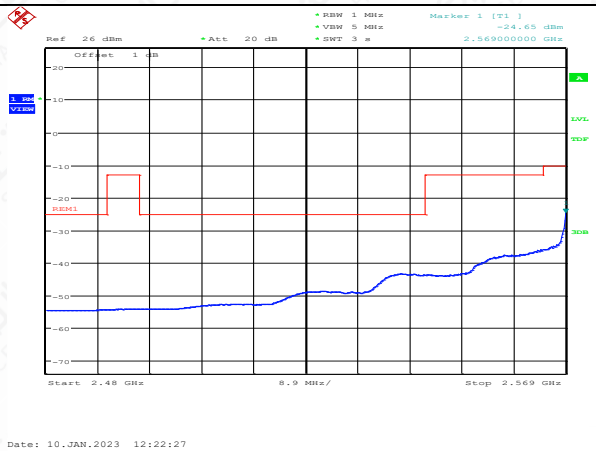
Channal Power



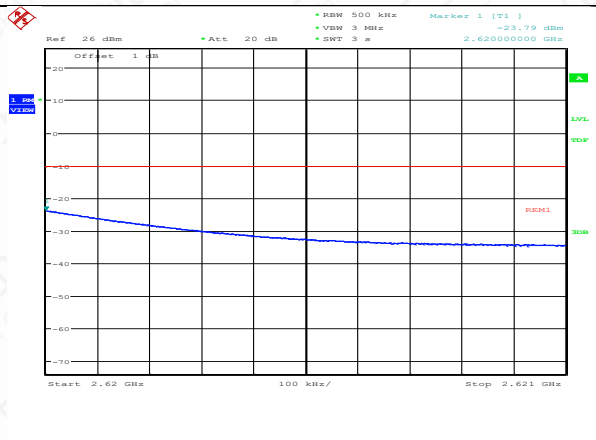
LOW BAND EDGE BLOCK-20M-100%RB



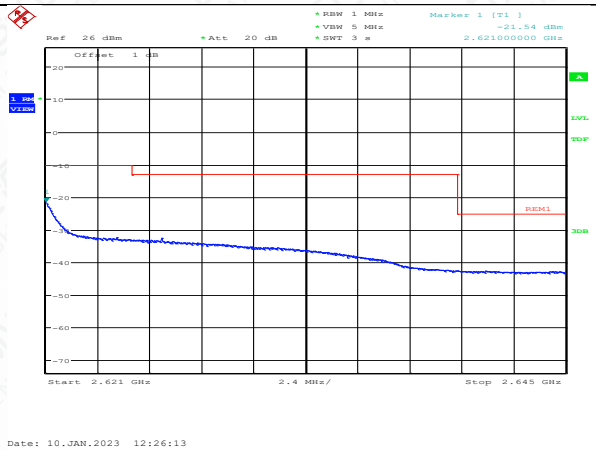
LOW BAND EDGE BLOCK-20M-100%RB



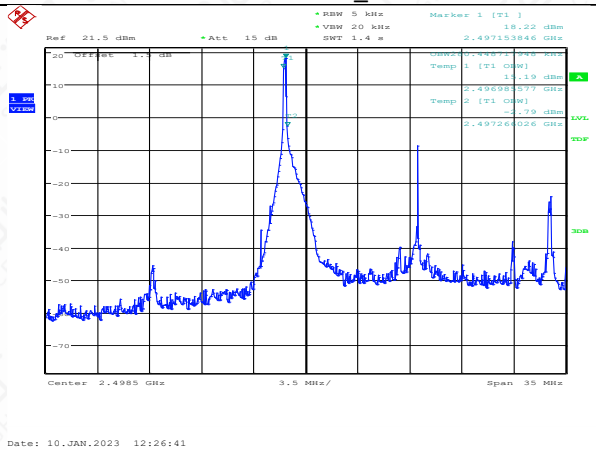
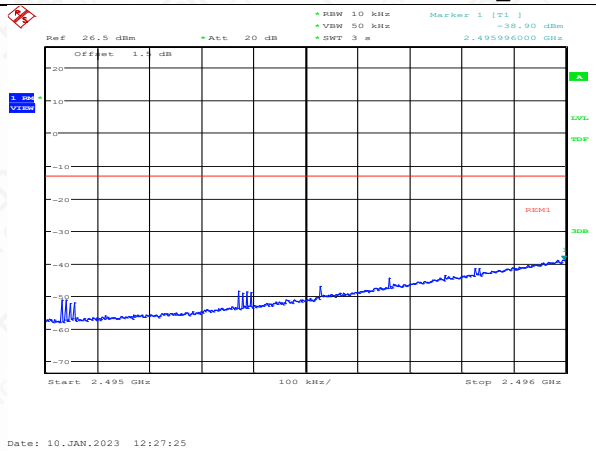
HIGH BAND EDGE BLOCK-20M-100%RB

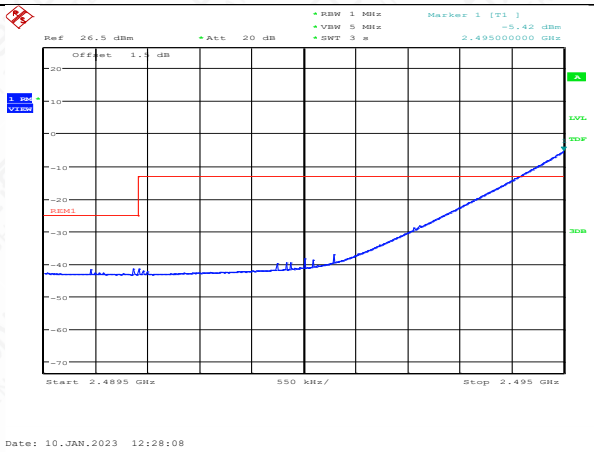


HIGH BAND EDGE BLOCK-20M-100%RB

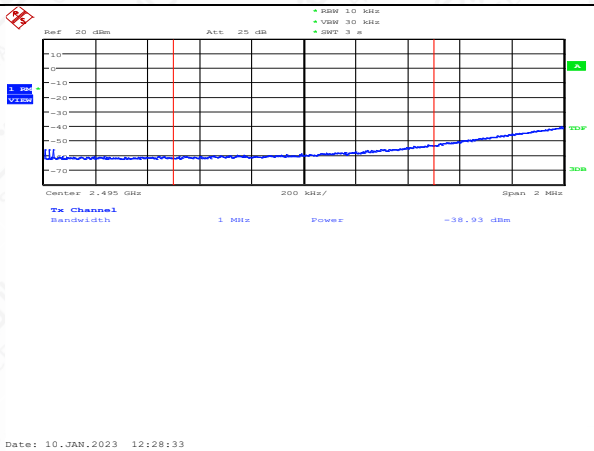


LTE band 41

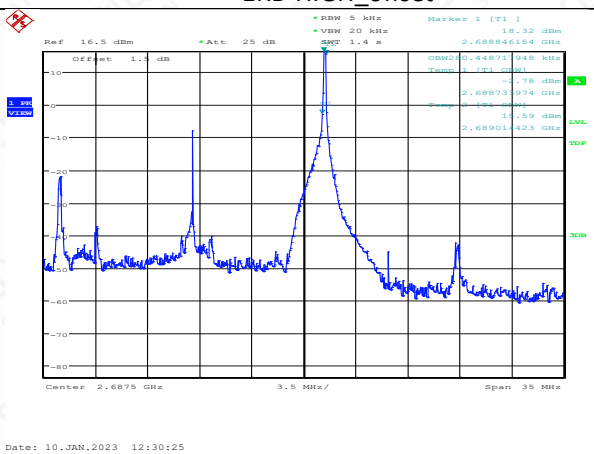
1RB-LOW_offset

LOW BAND EDGE BLOCK-1RB-LOW_offset

LOW BAND EDGE BLOCK-1RB-LOW_offset



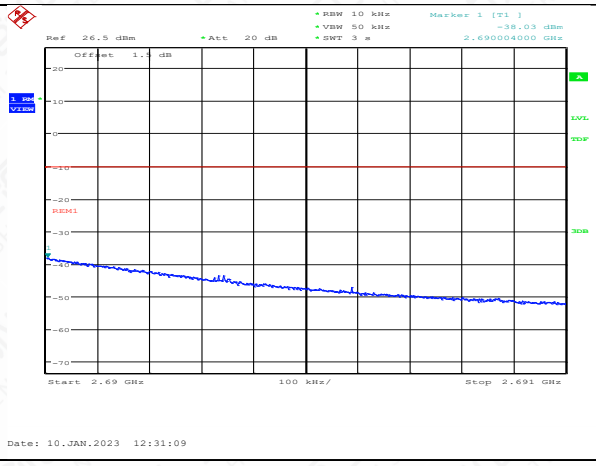
Channal Power



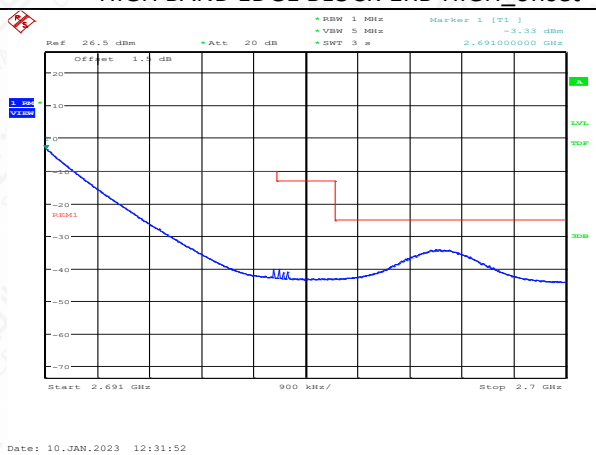
1RB-HIGH_offset



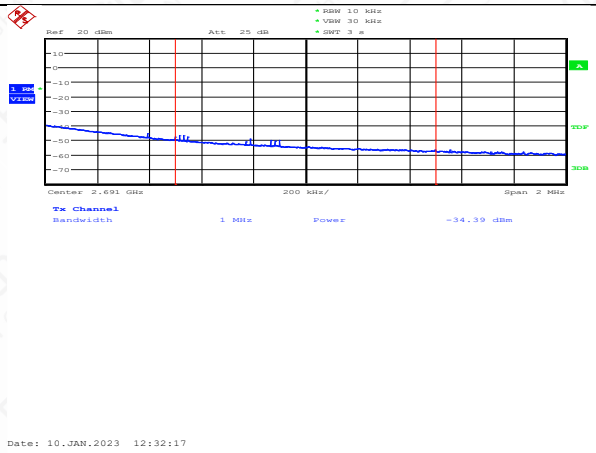
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



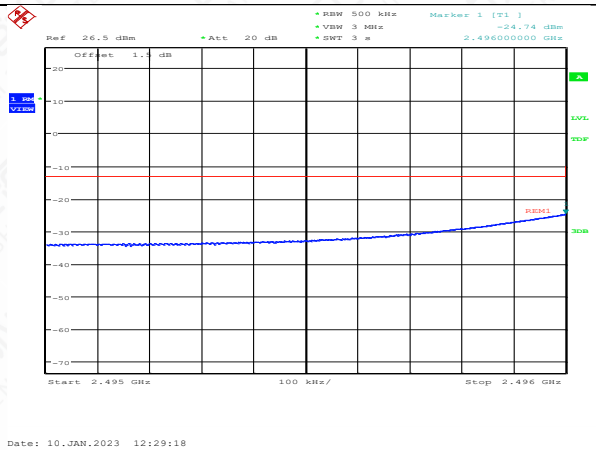
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



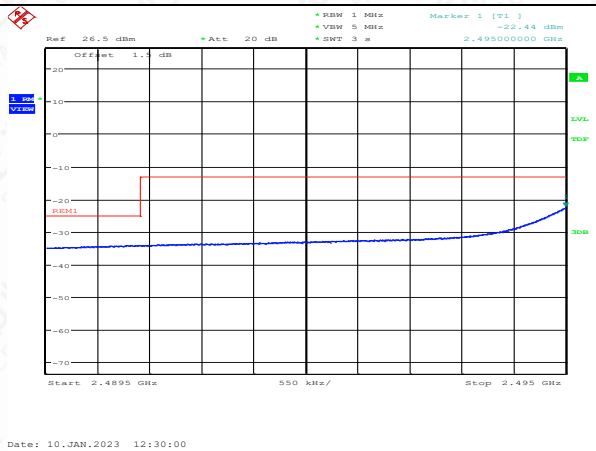
Channal Power



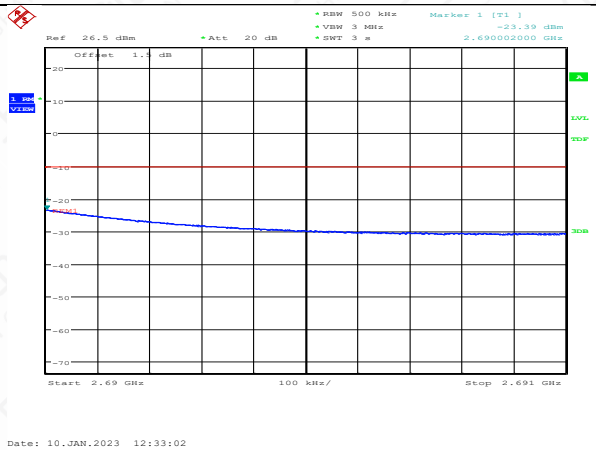
LOW BAND EDGE BLOCK-20M-100%RB



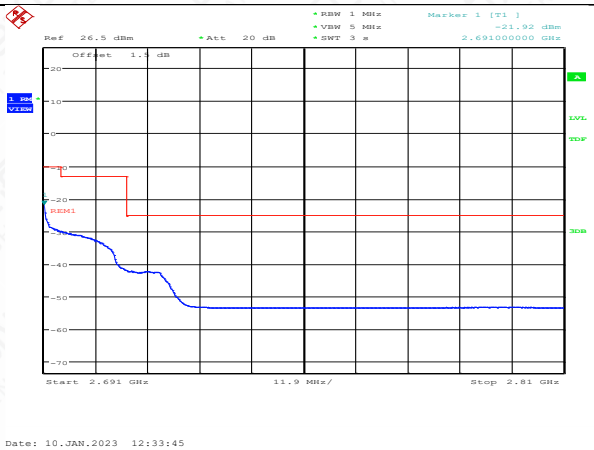
LOW BAND EDGE BLOCK-20M-100%RB



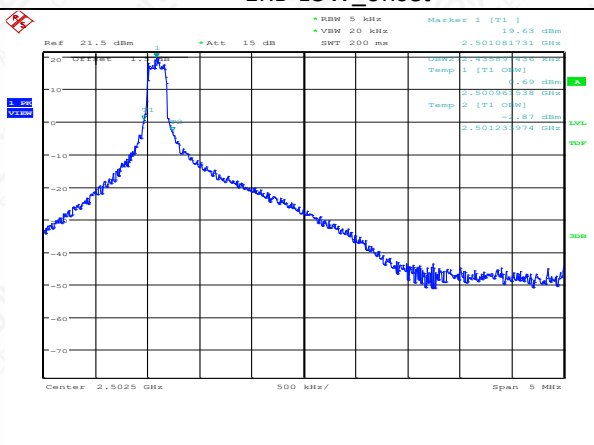
HIGH BAND EDGE BLOCK-20M-100%RB



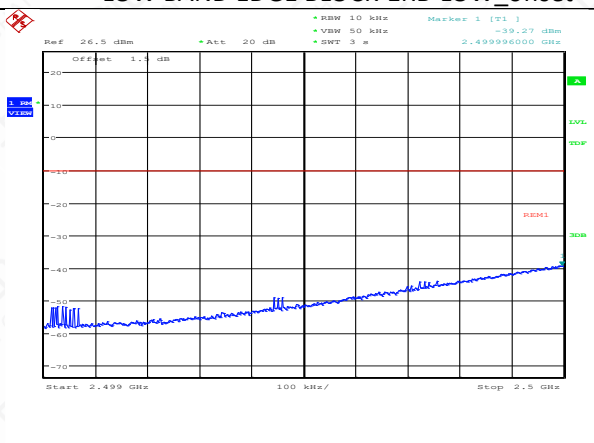
HIGH BAND EDGE BLOCK-20M-100%RB



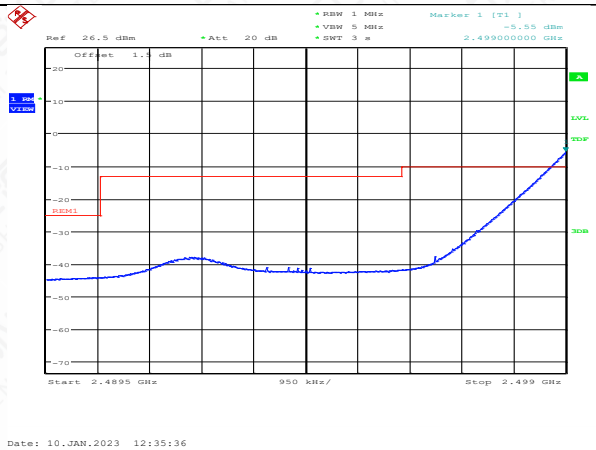
1RB-LOW_offset



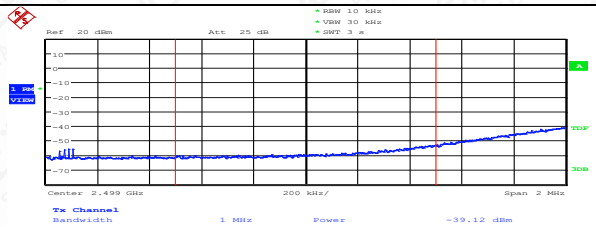
LOW BAND EDGE BLOCK-1RB-LOW_offset



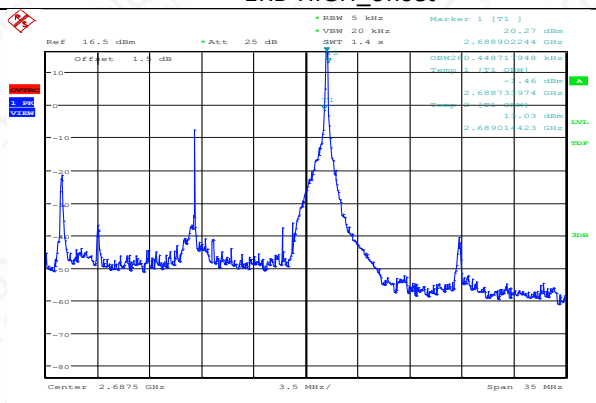
LOW BAND EDGE BLOCK-1RB-LOW_offset

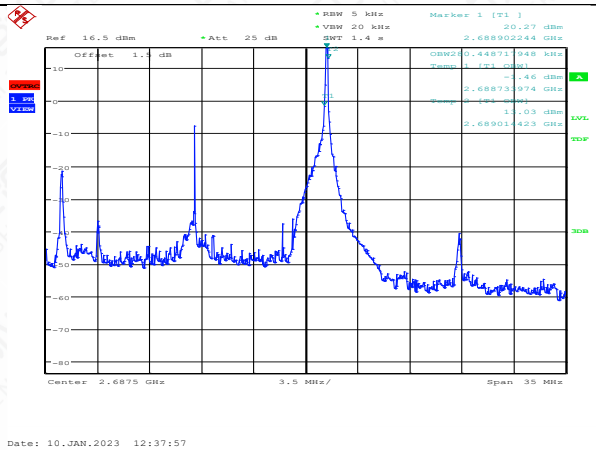


Channal Power

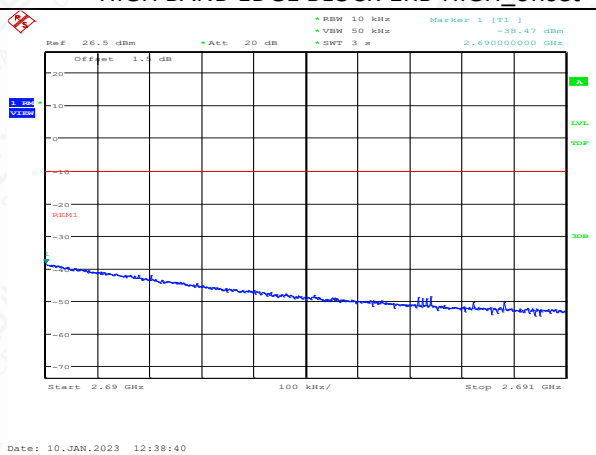


1RB-HIGH_offset

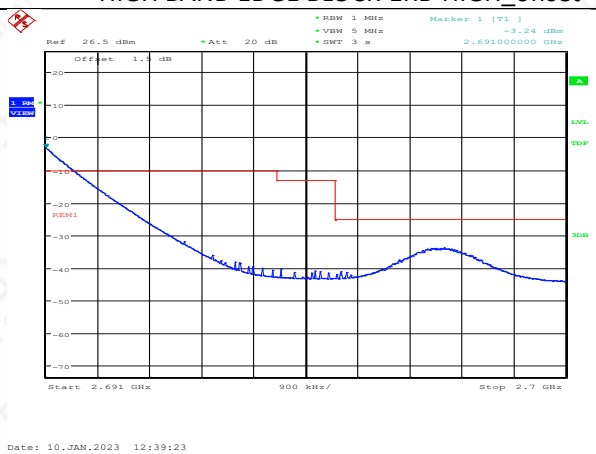




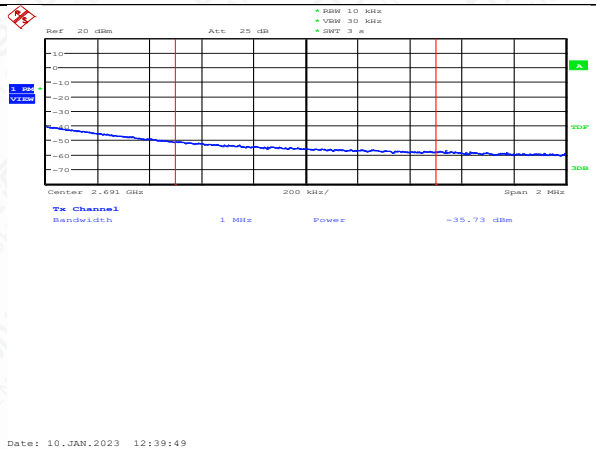
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



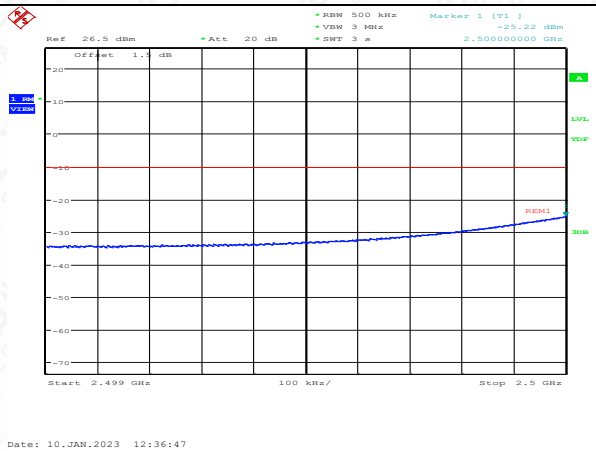
HIGH BAND EDGE BLOCK-1RB-HIGH_offset



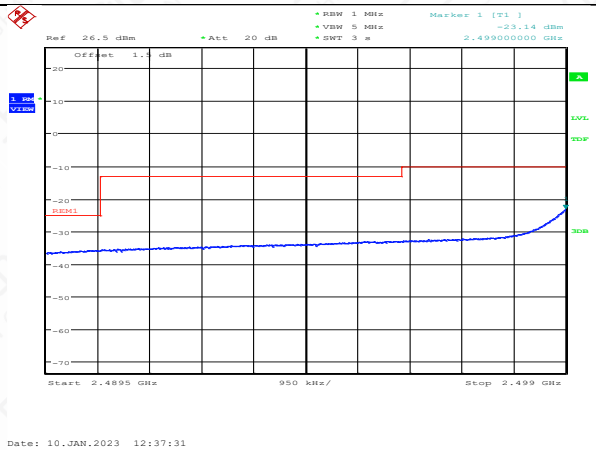
Channal Power



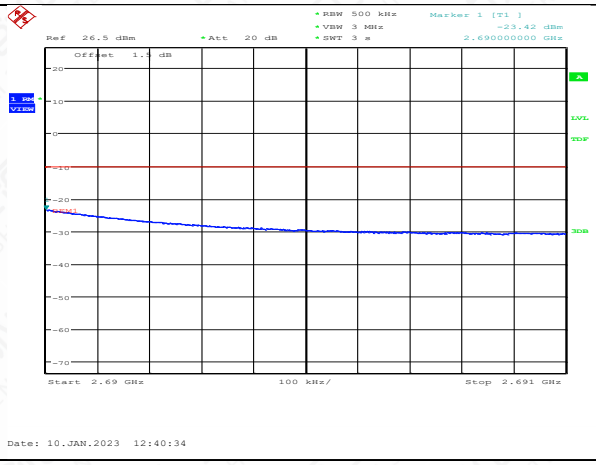
LOW BAND EDGE BLOCK-20M-100%RB



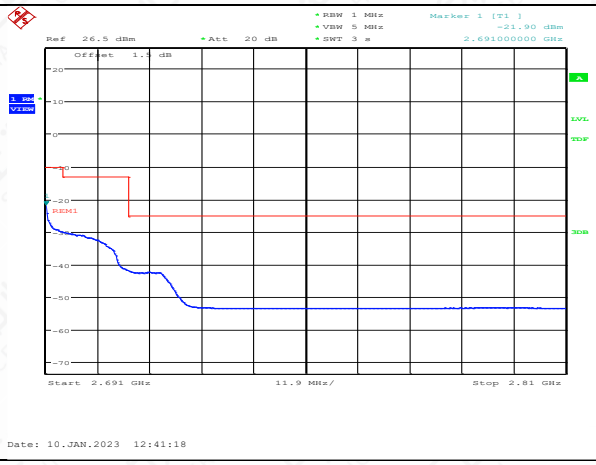
LOW BAND EDGE BLOCK-20M-100%RB



HIGH BAND EDGE BLOCK-20M-100%RB



HIGH BAND EDGE BLOCK-20M-100%RB



6.7 Conducted Spurious Emission

6.7.1 Measurement Method

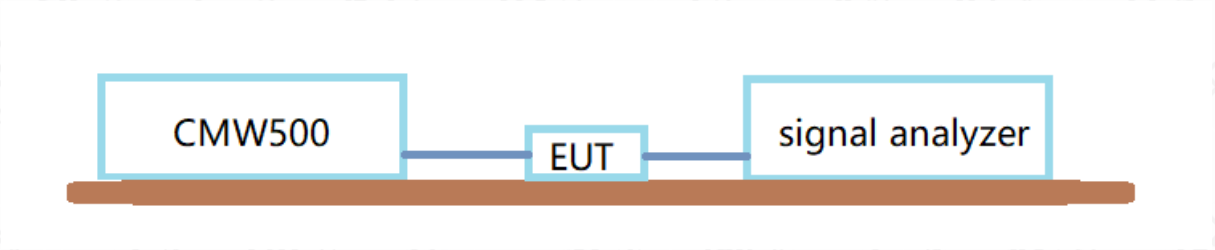
The following steps outline the procedure used to measure the conducted emissions from the EUT.
1.Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier 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.

6.7.2 Measurement Limit

Part 27.53(g),27.53(h), 27.53(m) 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.
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.
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 that 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.
Rule RSS-132 5.5 specifies that " In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts).
(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.” Limit -13 dBm
Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment’s operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).
After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.” Limit -13 dBm
Rule RSS-139 6.6 specifies that “ In the first 1.0 MHz bands immediately outside and adjacent to the equipment’s smallest operating frequency block,2 which can contain the equipment’s occupied

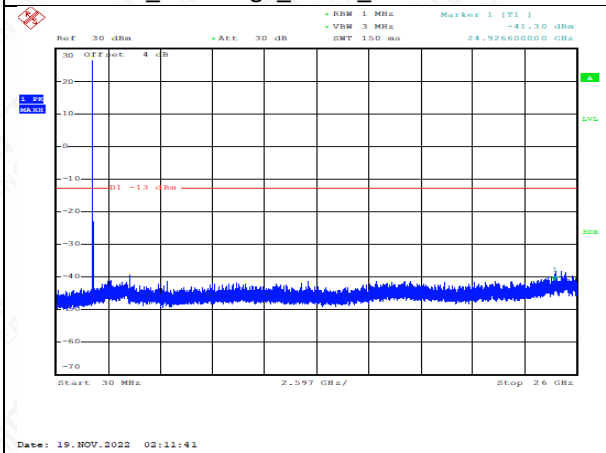
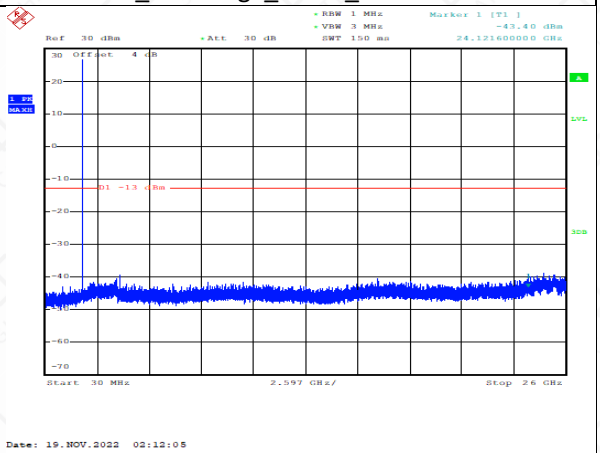
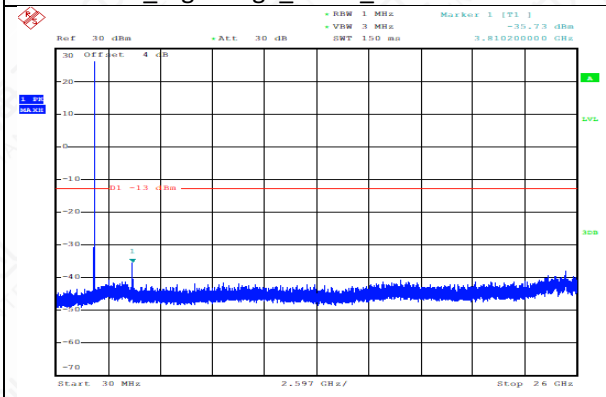
bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB. (ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

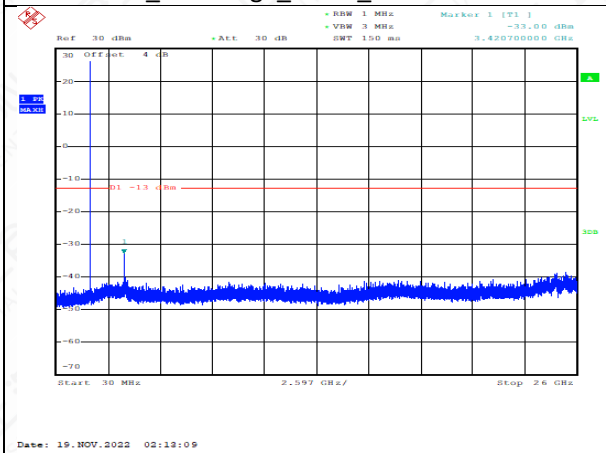
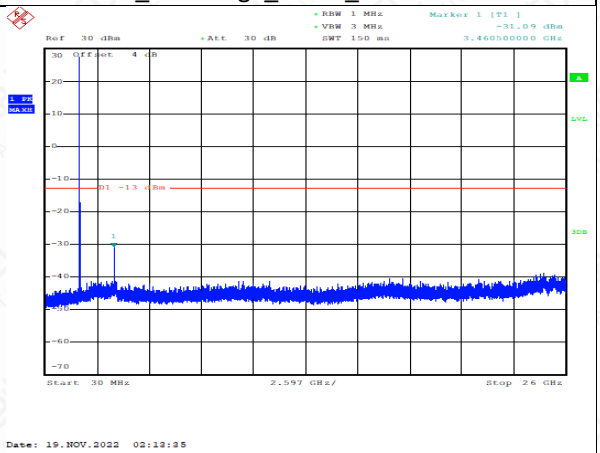
6.7.3 Test Setup

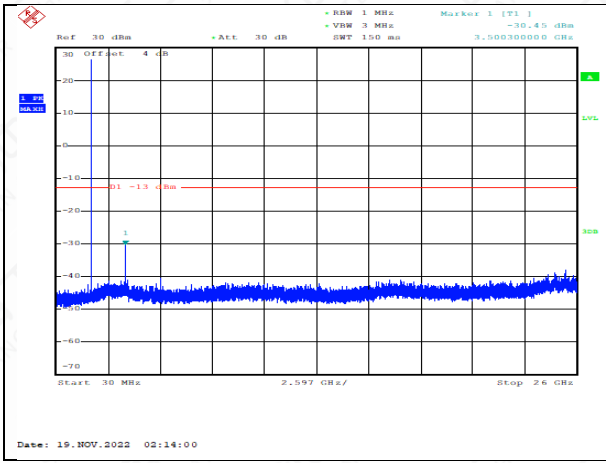


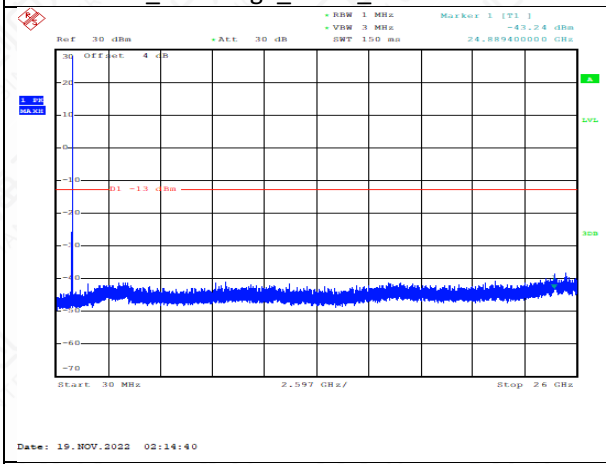
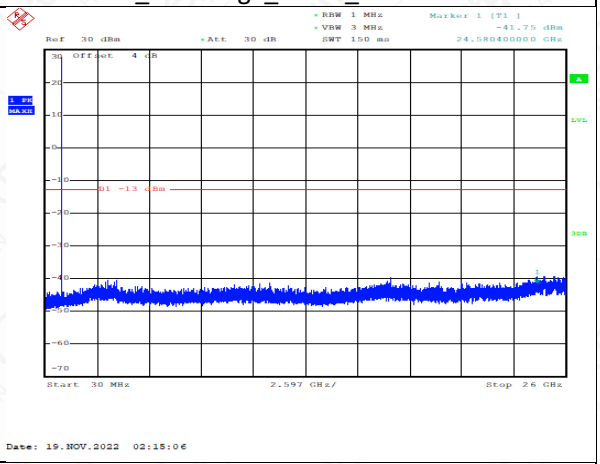
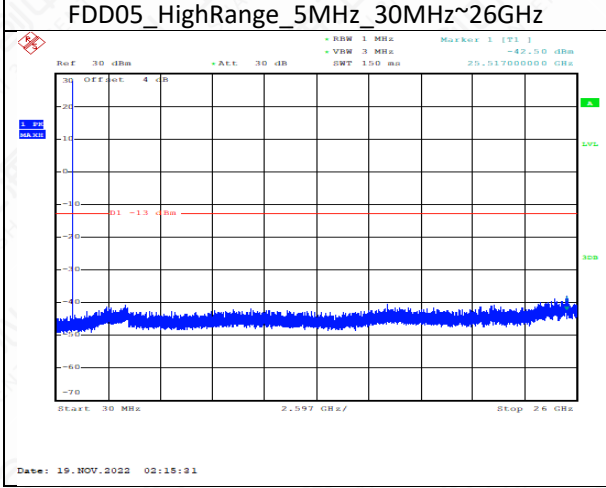
6.7.4 Measurement result

Only worst case result is given below

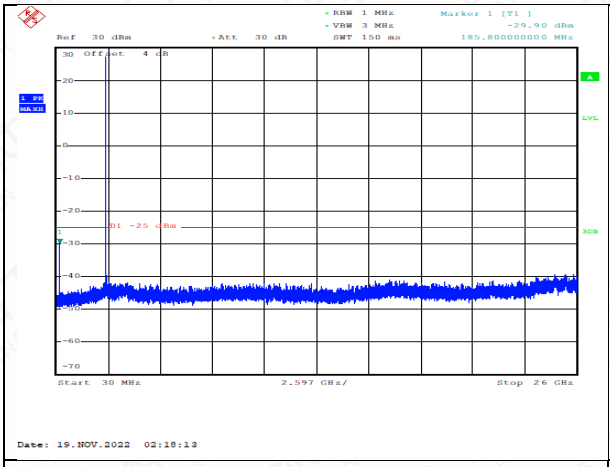
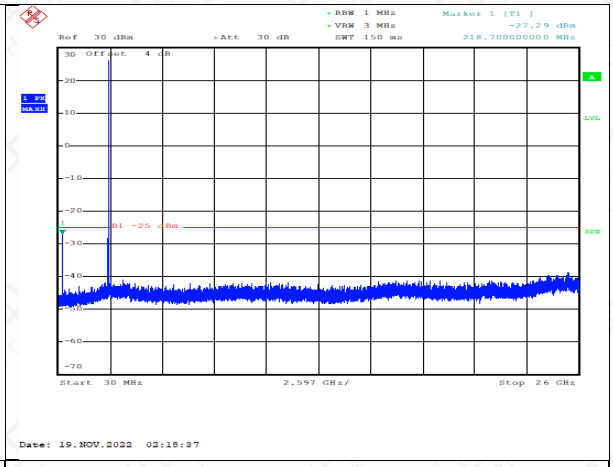
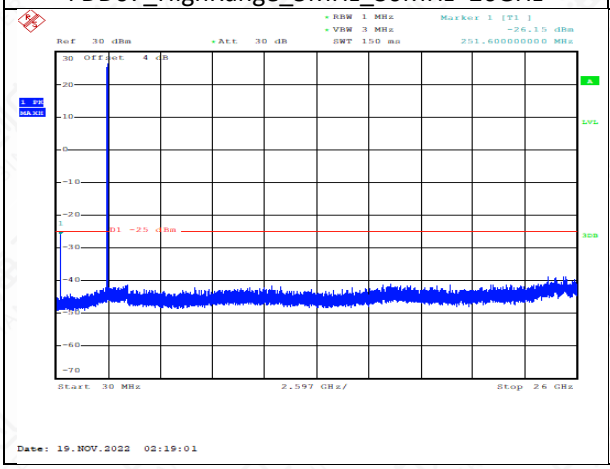
Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD02_LowRange_5MHz_30MHz~26GHz	FDD02_MidRange_5MHz_30MHz~26GHz
	
FDD02_HighRange_5MHz_30MHz~26GHz	/
	/

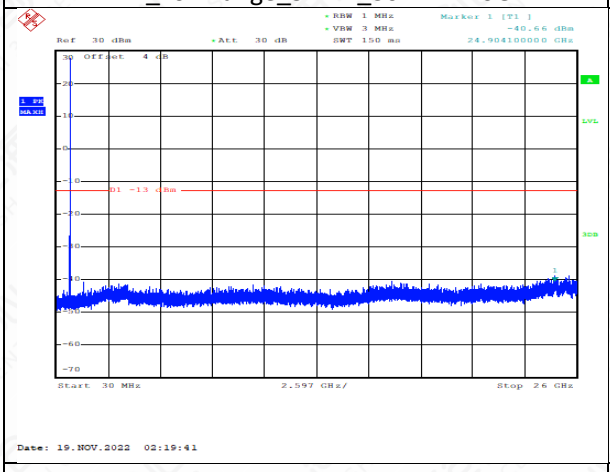
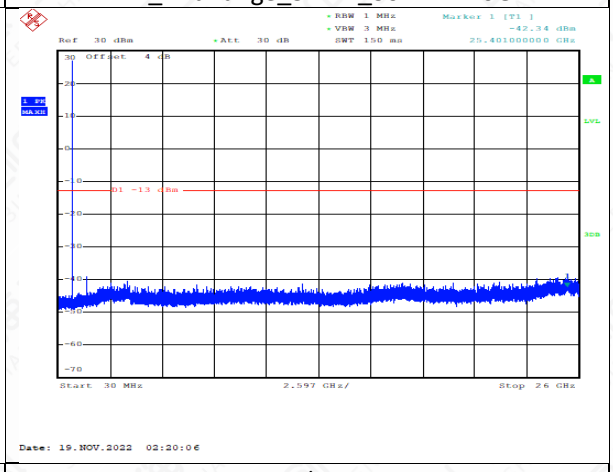
Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD04_LowRange_5MHz_30MHz~26GHz	FDD04_MidRange_5MHz_30MHz~26GHz
	
FDD04_HighRange_5MHz_30MHz~26GHz	/

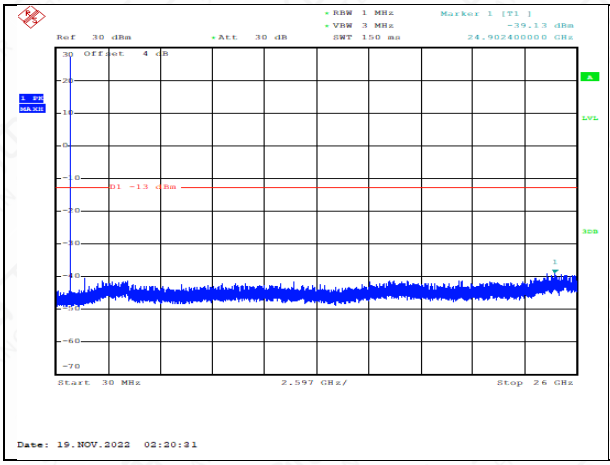
	/

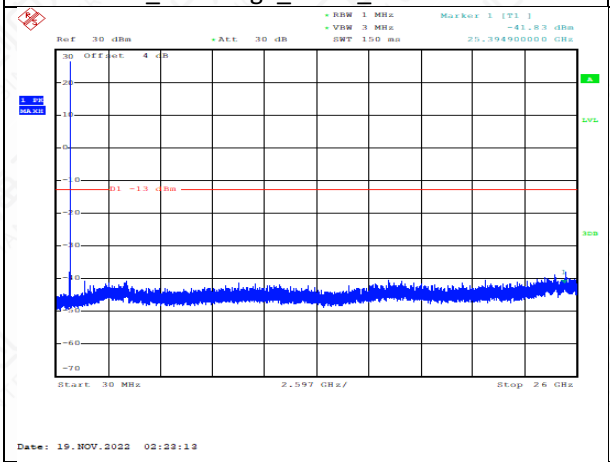
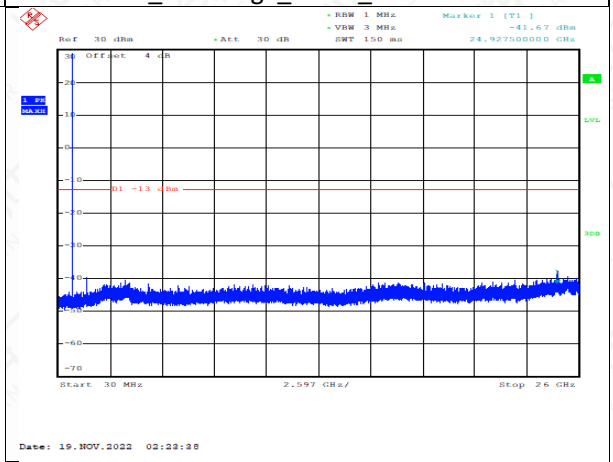
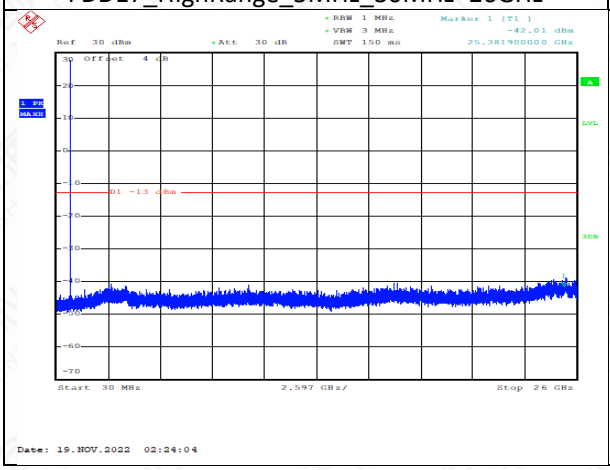
Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD05_LowRange_5MHz_30MHz~26GHz	FDD05_MidRange_5MHz_30MHz~26GHz
	
FDD05_HighRange_5MHz_30MHz~26GHz	/
	/

Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD07_LowRange_5MHz_30MHz~26GHz	FDD07_MidRange_5MHz_30MHz~26GHz

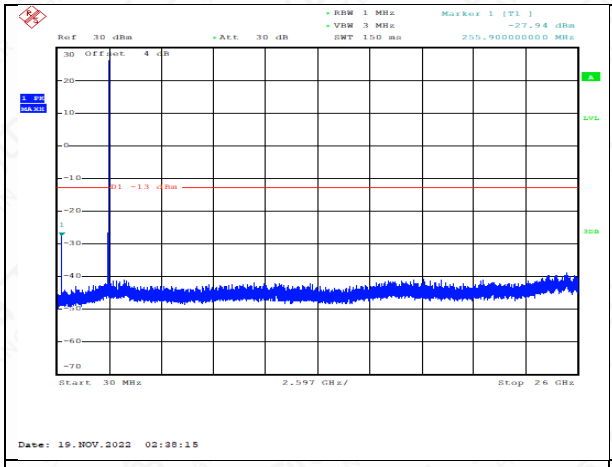
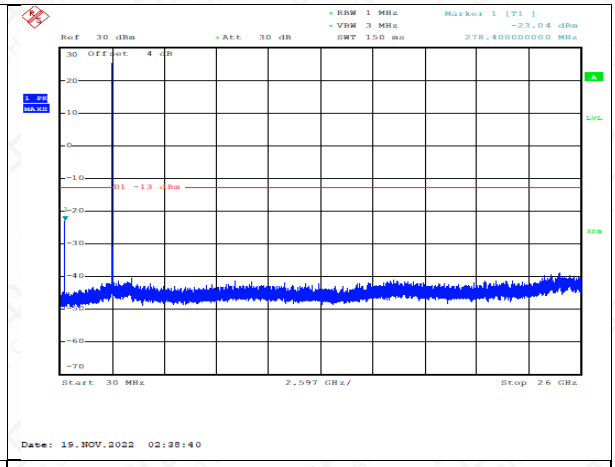
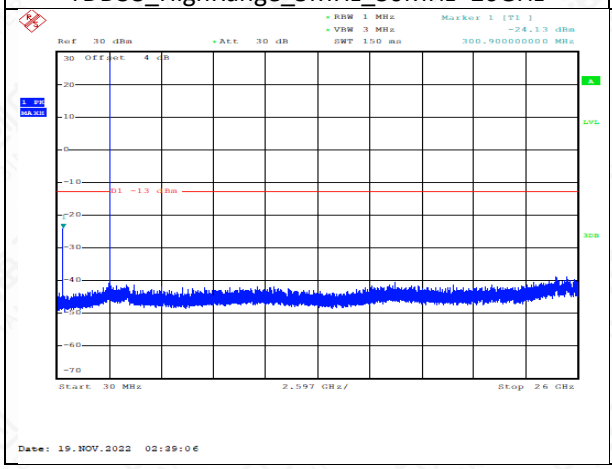
	
FDD07_HighRange_5MHz_30MHz~26GHz	/
	/

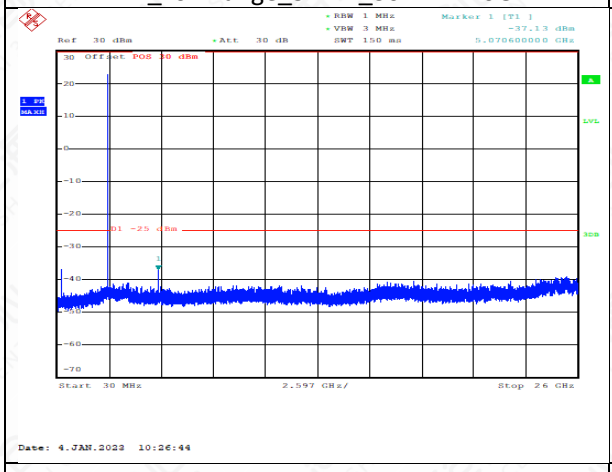
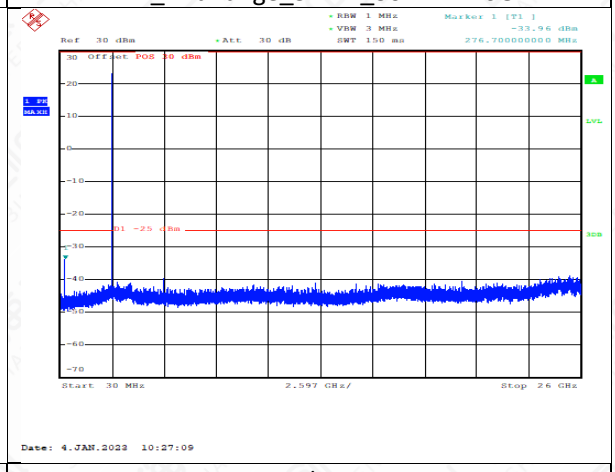
Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD12_LowRange_5MHz_30MHz~26GHz	FDD12_MidRange_5MHz_30MHz~26GHz
	
FDD12_HighRange_5MHz_30MHz~26GHz	/

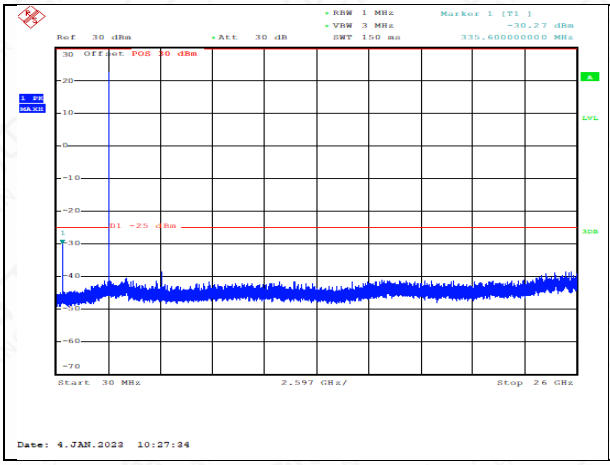
	/

Spurious emission limit –13dBm.(30MHz – 26GHz)	
FDD17_LowRange_5MHz_30MHz~26GHz	FDD17_MidRange_5MHz_30MHz~26GHz
	
FDD17_HighRange_5MHz_30MHz~26GHz	/
	/

Spurious emission limit –13dBm.(30MHz – 26GHz)	
TDD38_LowRange_5MHz_30MHz~26GHz	TDD38_MidRange_5MHz_30MHz~26GHz

	
TDD38_HighRange_5MHz_30MHz~26GHz	/
	/

Spurious emission limit –13dBm.(30MHz – 26GHz)	
TDD41_LowRange_5MHz_30MHz~26GHz	TDD41_MidRange_5MHz_30MHz~26GHz
	
TDD41_HighRange_5MHz_30MHz~26GHz	/


RBW 1 MHz
VBW 3 MHz
SWT 150 ms
Marker 1 [T1]
-30.27 dBm
335.600000000 MHz
Ref 30 dBm
Att 30 dB
Offset POS 30 dBm
01 -25 dBm
Start 30 MHz
2.597 GHz/
Stop 26 GHz
Date: 4.JAN.2023 10:27:34

/

6.8 Peak-To-Average Power Ratio

Reference

CFR Part2.1049,24.238, 24.232 (d), 27.50(a)

Rule RSS 130 4.6,Rule RSS-132 5.4, Rule RSS-133 6.4, Rule RSS-139 6.5, Rule RSS-199 4.4

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.

According to KDB 971168 5.7:

a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ 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%

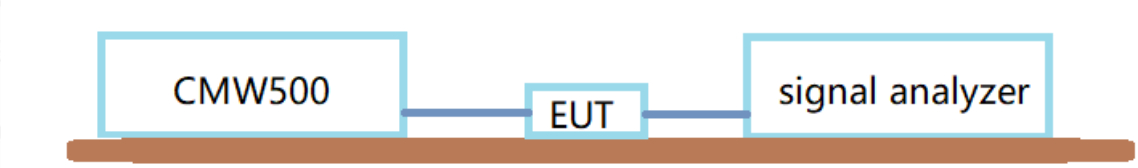
Rule RSS-132: 5.4: the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission. Limit ≤ 13dB

Rule RSS-133 6.4 specifies that " 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." Limit ≤ 13dB

Rule RSS-139 6.5 specifies that "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."

Rule RSS-199 4.4 specifies that "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.

6.8.1 Test Setup



6.8.2 Measurement results

LTE band 2, 20MHz

Frequency(MHz)	PAPR(dB)	
1880.0	QPSK	16QAM
	5.00	6.19

LTE band 4, 20MHz

Frequency(MHz)	PAPR(dB)	
1732.5	QPSK	16QAM
	5.00	6.28

LTE band 5, 10MHz

Frequency(MHz)	PAPR(dB)	
836.5	QPSK	16QAM
	5.67	6.41

LTE band 7, 20MHz

Frequency(MHz)	PAPR(dB)	
2535	QPSK	16QAM
	5.00	6.15

LTE band 12,10MHz

Frequency(MHz)	PAPR(dB)	
707.5	QPSK	16QAM
	5.74	6.47

LTE band 17,10MHz

Frequency(MHz)	PAPR(dB)	
710	QPSK	16QAM
	5.58	6.31

LTE band 38, 20MHz

Frequency(MHz)	PAPR(dB)	
2595	QPSK	16QAM
	9.07	10.32

LTE band 41, 20MHz

Frequency(MHz)	PAPR(dB)	
2593	QPSK	16QAM
	9.65	9.20

Annex A: Revised History

Version	Revised Content
V00	Initial
V01	HVIN is added in Section 4.1

Annex B: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

Shanghai, People's Republic of China

for technical competence in the field of

Electrical Testing

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

Presented this 12th day of April 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2023

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

END OF REPORT