



FCC RF Test Report

APPLICANT : Xiaomi Communications Co., Ltd.
EQUIPMENT : Mobile Phone
BRAND NAME : Redmi
MODEL NAME : 2201117TL
FCC ID : 2AFZZ117TL
STANDARD : 47 CFR Part 2, 22(H), 27(L), 27(H), 27(F), 27(M)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S) : Dec. 23, 2021 ~ Jan. 10, 2022

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	-	Report Only	-
	§22.913(a)(5)	Effective Radiated Power (Band 26)	ERP < 7 Watt	PASS	-
	§27.50(b)(10) §27.50(c)(10)	Effective Radiated Power (Band 12) (Band 13) (Band 17)	ERP < 3 Watt		-
	§27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 38) (Band 41)	EIRP < 2Watt		-
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 66)	EIRP < 1Watt		-
3.5	N/A	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	-	Report Only	-
3.7	§2.1051 §27.53(c)(2)(4) §27.53(g) §27.53(h)	Conducted Band Edge Measurement (Band 12) (Band 13) (Band 17) (Band 26) (Band 66)	< 43+10log ₁₀ (P[Watts])	PASS	-
	§27.53(m)(4)	Conducted Band Edge Measurement (Band 38) (Band 41)	§27.53(m)(4)		
3.8	§2.1051 §27.53(c)(2) §27.53(g) §27.53(h)	Conducted Spurious Emission (Band 12) (Band 13) (Band 17) (Band 26) (Band 66)	< 43+10log ₁₀ (P[Watts])	PASS	-
	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (Band 38) (Band 41)	< 55+10log ₁₀ (P[Watts])		
3.9	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§2.1055 §27.54		Within Authorized Band		



Report Section	FCC Rule	Description	Limit	Result	Remark
4.4	§2.1053 §27.53(c)(2) §27.53(f) §27.53(g) §27.53(h)	Radiated Spurious Emission (Band 12) (Band 13) (Band 17) (Band 26) (Band 66)	$< 43+10\log_{10}(P[\text{Watts}])$	PASS	Under limit 23.43 dB at 1560.00 MHz
	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 38) (Band 41)	$< 55+10\log_{10}(P[\text{Watts}])$		

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Xiaomi Communications Co., Ltd.

#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

1.2 Manufacturer

Xiaomi Communications Co., Ltd.

#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	Redmi
Model Name	2201117TL
FCC ID	2AFZZ117TL
IMEI Code	Conducted: 861360050012042/861360050012059 Radiation: 864154050025824/864154050025832
HW Version	P1.1
SW Version	MIUI13
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 17 : 704 MHz ~ 716 MHz LTE Band 26 : 824 MHz ~ 849 MHz LTE Band 38 : 2570 MHz ~ 2620 MHz LTE Band 41 : 2496 MHz ~ 2690 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz
Rx Frequency	LTE Band 12 : 729 MHz ~ 746 MHz LTE Band 13 : 746 MHz ~ 756 MHz LTE Band 17 : 734 MHz ~ 746 MHz LTE Band 26 : 869 MHz ~ 894 MHz LTE Band 38 : 2570 MHz ~ 2620 MHz LTE Band 41 : 2496 MHz ~ 2690 MHz LTE Band 66 : 2110 MHz~ 2200 MHz
Bandwidth	LTE Band 12 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 13 : 5MHz / 10MHz LTE Band 17 : 5MHz / 10MHz LTE Band 26 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz LTE Band 38 : 5MHz / 10MHz / 15MHz / 20MHz LTE Band 41 : 5MHz / 10MHz / 15MHz / 20MHz



	LTE Band 66 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	<p><Ant. 1> LTE Band 12 : 24.10 dBm LTE Band 13 : 24.28 dBm LTE Band 17 : 24.04 dBm LTE Band 26 : 24.52 dBm LTE Band 38 : 24.20 dBm; LTE Band 38C : 23.98 dBm LTE Band 41 : 24.22 dBm; LTE Band 41C : 24.01 dBm LTE Band 66 : 24.43 dBm</p> <p><Ant. 2> LTE Band 12 : 24.36 dBm LTE Band 13 : 24.55 dBm LTE Band 17 : 24.23 dBm LTE Band 26 : 24.27 dBm LTE Band 38 : 24.64 dBm; LTE Band 38C : 24.10 dBm LTE Band 41 : 24.70 dBm; LTE Band 41C : 24.44 dBm LTE Band 66 : 24.89 dBm</p>
Antenna Gain	<p><Ant. 1> LTE Band 12 : -4.95 dBi LTE Band 13 : -4.82 dBi LTE Band 17 : -4.95 dBi LTE Band 26 : -3.36 dBi LTE Band 38 : -0.50 dBi LTE Band 41 : -0.50 dBi LTE Band 66 : -1.00 dBi</p> <p><Ant. 2> LTE Band 12 : -5.02 dBi LTE Band 13 : -5.33 dBi LTE Band 17 : -5.02 dBi LTE Band 26 : -3.45 dBi LTE Band 38 : -0.70 dBi LTE Band 41 : -0.70 dBi LTE Band 66 : -1.10 dBi</p>
Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM(Downlink only)

Note: The maximum ERP/EIRP is calculated from max output power and antenna gain, only the maximum ERP/EIRP of B13/26/38C for Ant. 1 and B12/17/38/41/66/41C for Ant. 2 are shown in the report.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.



1.6 Maximum ERP/EIRP and Emission Designator

LTE Band 12		QPSK		16QAM/64QAM	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
10	704.0 ~ 711.0	0.0524	9M03G7D	0.0423	9M01W7D
LTE Band 13		QPSK		16QAM/64QAM	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
10	782.0	0.0538	9M09G7D	0.0437	9M03W7D
LTE Band 17		QPSK		16QAM/64QAM	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
10	709.0 ~ 711.0	0.0508	9M03G7D	0.0411	9M01W7D
LTE Band 26		QPSK		16QAM/64QAM	
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)
15	831.5 ~ 841.5	0.0796	13M4G7D	0.0631	13M5W7D
CH26765	821.5	0.0794	13M4G7D	0.0607	13M5W7D
LTE Band 38		QPSK		16QAM/64QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	2580.0 ~ 2610.0	0.2477	18M5G7D	0.1977	18M3W7D
LTE Band 41		QPSK		16QAM/64QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	2506.0 ~ 2680.0	0.2512	18M5G7D	0.2000	18M3W7D
LTE Band 66		QPSK		16QAM/64QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	1720.0 ~ 1770.0	0.2393	18M3G7D	0.1866	18M3W7D



LTE Band 38 CA	QPSK		16QAM/64QAM	
BW (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20MHz+20MHz	0.2228	37M2G7D	0.1742	37M4W7D
LTE Band 41 CA	QPSK		16QAM/64QAM	
BW (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20MHz+20MHz	0.2366	37M2G7D	0.1968	37M4W7D

Note:

1. LTE Band 12 overlaps the entire frequency range of LTE Band 17. Therefore, the test results provided in this report covers Band 12 as well as Band 17.
2. LTE Band 41 overlaps the entire frequency range of LTE Band 38. Therefore, the test results provided in this report covers Band 41 as well as Band 38.
3. Based on engineering evaluation, only the maximum bandwidth and the worst modulation test results are shown in the report.

1.7 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-KS TH01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24a



1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2, 22(H), 27(L), 27(H), 27(F), 27(M)
- ♦ ANSI C63.26-2015
- ♦ FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v	v
	13	-	-	v	v	-	-	v	v	v	v	v	v	v	v	v
	17	-	-	v	v	-	-	v	v	v	v	v	v	v	v	v
	26	v	v	v	v	v	-	v	v	v	v	v	v	v	v	v
	38	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
	41	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
	66	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	12				v	-	-	v	v	v			v		v	
	13	-	-		v	-	-	v	v	v			v		v	
	26					v	-	v	v	v			v		v	
	41	-	-				v	v	v	v			v		v	
	66						v	v	v	v			v		v	
26dB and 99% Bandwidth	12				v	-	-	v	v				v		v	
	13	-	-		v	-	-	v	v				v		v	
	26				v	v	-	v	v				v		v	
	41	-	-				v	v	v				v		v	
	66						v	v	v				v		v	
Conducted Band Edge	12	v	v	v	v	-	-	v	v	v	v		v	v		v
	13	-	-	v	v	-	-	v	v	v	v		v	v		v
	26	v	v	v	v	v	-	v	v	v	v		v	v		v
	41	-	-	v	v	v	v	v	v	v	v		v	v		v
	66	v	v	v	v	v	v	v	v	v	v		v	v		v

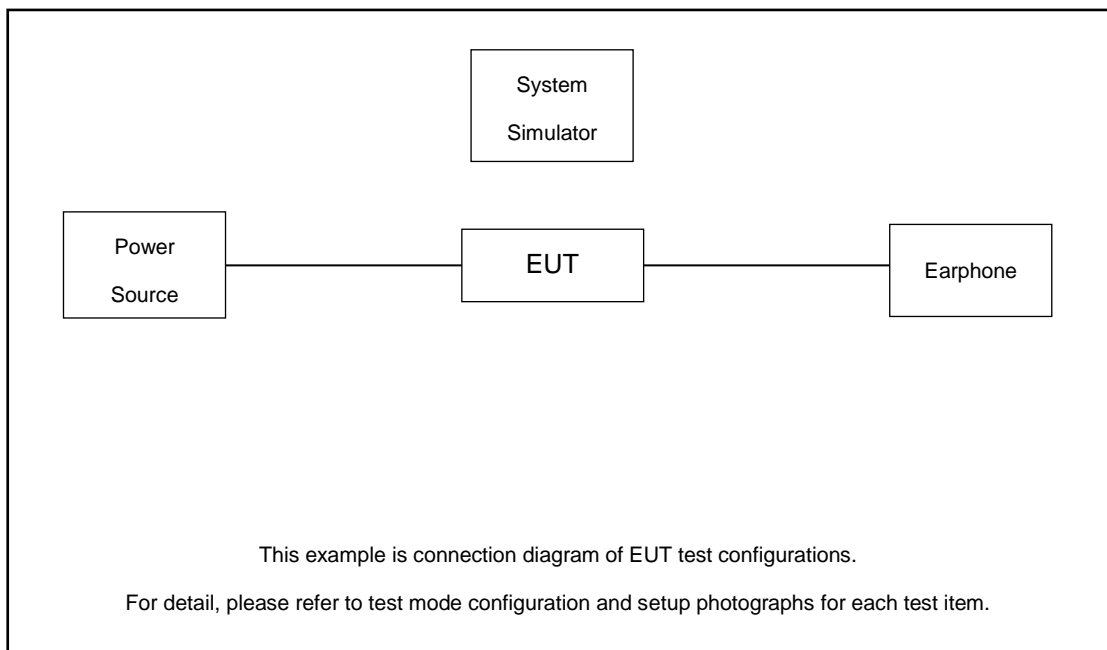


Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Conducted Spurious Emission	12	v	v	v	v	-	-	v			v			v	v	v
	13	-	-	v	v	-	-	v			v			v	v	v
	26	v	v	v	v	v	-	v			v			v	v	v
	41	-	-	v	v	v	v	v			v			v	v	v
	66	v	v	v	v	v	v	v			v			v	v	v
Frequency Stability	12				v	-	-	v					v		v	
	13	-	-		v	-	-	v					v		v	
	26					v	-	v					v		v	
	41	-	-				v	v					v		v	
	66						v	v					v		v	
E.R.P / E.I.R.P	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v	v
	13	-	-	v	v	-	-	v	v	v	v	v	v	v	v	v
	17	-	-	v	v	-	-	v	v	v	v	v	v	v	v	v
	26	v	v	v	v	v	-	v	v	v	v	v	v	v	v	v
	38	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
	41	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
	66	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Radiated Spurious Emission	12	Worst Case												v		
	13	Worst Case												v		
	26	Worst Case												v		
	41	Worst Case												v		
	66	Worst Case												v		
Note	<ol style="list-style-type: none"> The mark "v" means that this configuration is chosen for testing The mark "-" means that this bandwidth is not supported. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. All test items are based on engineering evaluation. 															



Test Items	Band	Bandwidth (MHz)										Modulation			RB #			Test Channel		
		20+20	20+15	15+20	20+10	10+20	20+5	5+20	15+15	15+10	10+15	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	38C_CA	v	-	-	-	-	-	-	v	-	-	v	v	v	v			v	v	v
	41C_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	v			v	v	v
26dB and 99% Bandwidth	41C_CA	v										v	v				v		v	
Conducted Band Edge	41C_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	41C_CA	v	v	v	v	v	v	v	v	v	v	v			v			v	v	v
E.I.R.P.	38C_CA	v	-	-	-	-	-	-	v	-	-	v	v	v	v			v	v	v
	41C_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	38C_CA	Worst Case																	v	
	41C_CA	Worst Case																	v	
Note	<ol style="list-style-type: none"> The mark "v" means that this configuration is chosen for testing The mark "-" means that this bandwidth is not supported. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. All test items are based on engineering evaluation. 																			

2.2 Connection Diagram of Test System





2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss.

$$\text{Offset} = \text{RF cable loss.}$$

Following shows an offset computation example with cable loss 4.6 dB.

Example :

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)}. \\ &= 4.6 \text{ (dB)} \end{aligned}$$

2.5 Frequency List of Low/Middle/High Channels

LTE Band 12 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	23060	23095	23130
	Frequency	704	707.5	711
5	Channel	23035	23095	23155
	Frequency	701.5	707.5	713.5
3	Channel	23025	23095	23165
	Frequency	700.5	707.5	714.5
1.4	Channel	23017	23095	23173
	Frequency	699.7	707.5	715.3



LTE Band 13 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	-	23230	-
	Frequency	-	782	-
5	Channel	23205	23230	23255
	Frequency	779.5	782	784.5

LTE Band 17 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	23780	23790	23800
	Frequency	709	710	711
5	Channel	23755	23790	23825
	Frequency	706.5	710	713.5

LTE Band 26 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
15	Channel	26865	26915	26965
	Frequency	831.5	836.5	841.5
10	Channel	26840	26915	26990
	Frequency	829	836.5	844
5	Channel	26815	26915	27015
	Frequency	826.5	836.5	846.5
3	Channel	26805	26915	27025
	Frequency	825.5	836.5	847.5
1.4	Channel	26797	26915	27033
	Frequency	824.7	836.5	848.3



LTE Band 38 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	37850	38000	38150
	Frequency	2580	2595	2610
15	Channel	37825	38000	38175
	Frequency	2577.5	2595	2612.5
10	Channel	37800	38000	38200
	Frequency	2575	2595	2615
5	Channel	37775	38000	38225
	Frequency	2572.5	2595	2617.5

LTE Band 41 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	39750	40620	41490
	Frequency	2506	2593	2680
15	Channel	39725	40620	41515
	Frequency	2503.5	2593	2682.5
10	Channel	39700	40620	41540
	Frequency	2501	2593	2685
5	Channel	39675	40620	41565
	Frequency	2498.5	2593	2687.5

LTE Band 66 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	132072	132322	132572
	Frequency	1720	1745	1770
15	Channel	132047	132322	132597
	Frequency	1717.5	1745	1772.5
10	Channel	132022	132322	132622
	Frequency	1715	1745	1775
5	Channel	131997	132322	132647
	Frequency	1712.5	1745	1777.5
3	Channel	131987	132322	132657
	Frequency	1711.5	1745	1778.5
1.4	Channel	131979	132322	132665



	Frequency	1710.7	1745	1779.3
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LTE Band 38C_CA Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
20 + 20	PCC	Channel	37850	37901	37952
		Frequency	2580.0	2585.1	2590.2
	SCC	Channel	38048	38099	38150
		Frequency	2599.8	2604.9	2610.0
15+ 15	PCC	Channel	37825	37925	38025
		Frequency	2577.5	2587.5	2597.5
	SCC	Channel	37975	38075	38175
		Frequency	2592.5	2602.5	2612.5

LTE Band 41C_CA Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
20 + 20	PCC	Channel	39750	40521	41292
		Frequency	2506.0	2583.1	2660.2
	SCC	Channel	39948	40719	41490
		Frequency	2525.8	2602.9	2680.0
20 + 15	PCC	Channel	39750	40546	41341
		Frequency	2506.0	2585.6	2665.1
	SCC	Channel	39921	40717	41512
		Frequency	2523.1	2602.7	2682.2
15 + 20	PCC	Channel	39728	40523	41319
		Frequency	2503.8	2593.3	2662.9
	SCC	Channel	39899	40694	41490
		Frequency	2520.9	2600.4	2680.0
20 + 10	PCC	Channel	39750	40571	41391
		Frequency	2506.0	2588.1	2670.1
	SCC	Channel	39894	40715	41535
		Frequency	2520.4	2602.5	2684.5
10 + 20	PCC	Channel	39705	40526	41346
		Frequency	2501.5	2583.6	2665.6
	SCC	Channel	39849	40670	41490
		Frequency	2515.9	2598.0	2680.0



LTE Band 41C_CA Channel and Frequency List					
20 + 5	PCC	Channel	39750	40595	41440
		Frequency	2506.0	2590.5	2675.0
	SCC	Channel	39867	40712	41557
		Frequency	2517.7	2602.2	2686.7
5 + 20	PCC	Channel	39683	40528	41373
		Frequency	2499.3	2583.8	2668.3
	SCC	Channel	39800	40645	41490
		Frequency	2511.0	2595.5	2680.0
15 + 15	PCC	Channel	39725	40545	41365
		Frequency	2503.5	2585.5	2667.5
	SCC	Channel	39875	40695	41515
		Frequency	2518.5	2600.5	2682.5
10 + 15	PCC	Channel	39703	40549	41395
		Frequency	2501.3	2585.9	2670.5
	SCC	Channel	39823	40669	41515
		Frequency	2513.3	2597.9	2682.5
15 + 10	PCC	Channel	39725	40571	41417
		Frequency	2503.5	2588.1	2672.7
	SCC	Channel	39845	40691	41537
		Frequency	2515.5	2600.1	2684.7

3 Conducted Test Items

3.1 Measuring Instruments

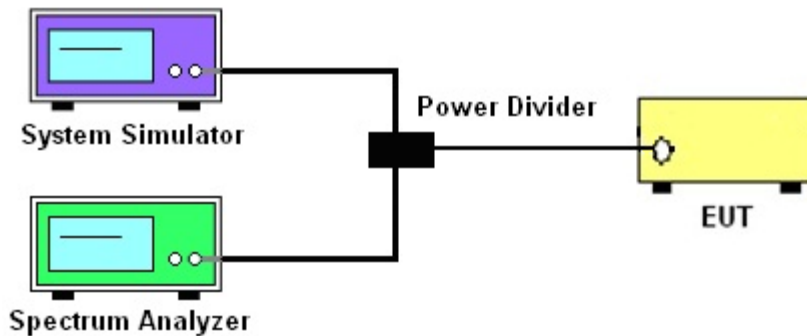
See list of measuring instruments of this test report.

3.2 Test Setup

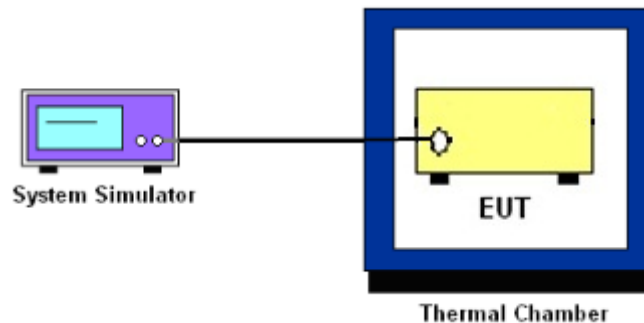
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.



3.4 Conducted Output Power and ERP/EIRP

3.4.1 Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 26.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 12, Band 13 and Band 17.

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 38 and Band 41.

The EIRP of mobile transmitters must not exceed 1 Watts for LTE Band 66.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

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

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.



3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.



3.6 Occupied Bandwidth

3.6.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (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.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.
(this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.



3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

27.53 (c)

For operations in the 776-788 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. In addition, the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least $65 + 10 \log_{10} p(\text{watts})$, dB, for mobile and portable equipment.

27.53 (g)

For operations in the 600MHz band and 698 -746 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

27.53 (h)

For operations in the 1710 – 1755 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53(m)(4)

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.



3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW \geq 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.

Example:

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
= P(W)- [43 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.

9. For LTE Band 38, 41, the other 40 dB, and 55 dB have additionally applied same calculation above.
10. When using the integration method, the starting frequency of the integration shall be centered at one-half of the RBW away from the band edge.



3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For Band 38,41:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13$ dBm.
11. For Band 38, 41
The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [55 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[55 + 10\log(P)]$ (dB)
 $= -25$ dBm.



3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

3.9.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at $20\pm 5^{\circ}\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

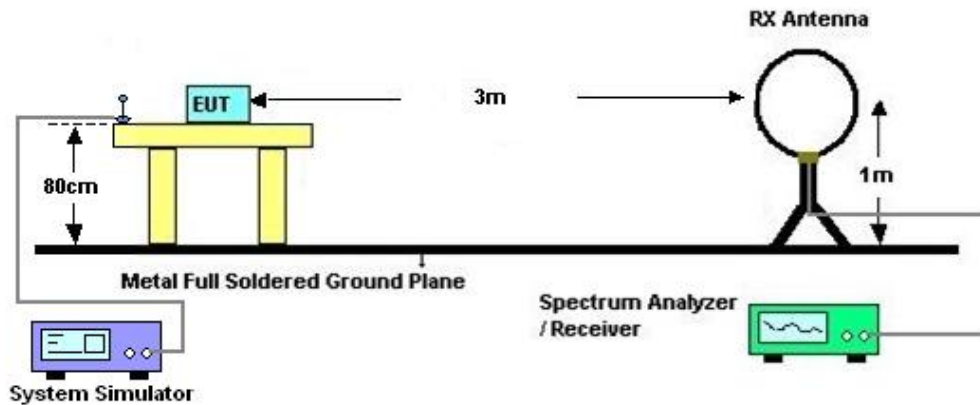
4 Radiated Test Items

4.1 Measuring Instruments

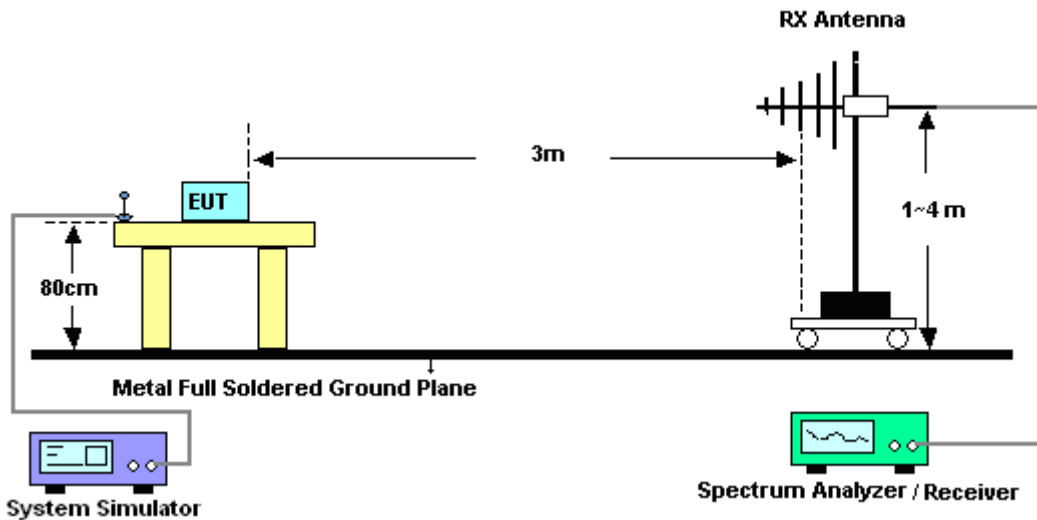
See list of measuring instruments of this test report.

4.2 Test Setup

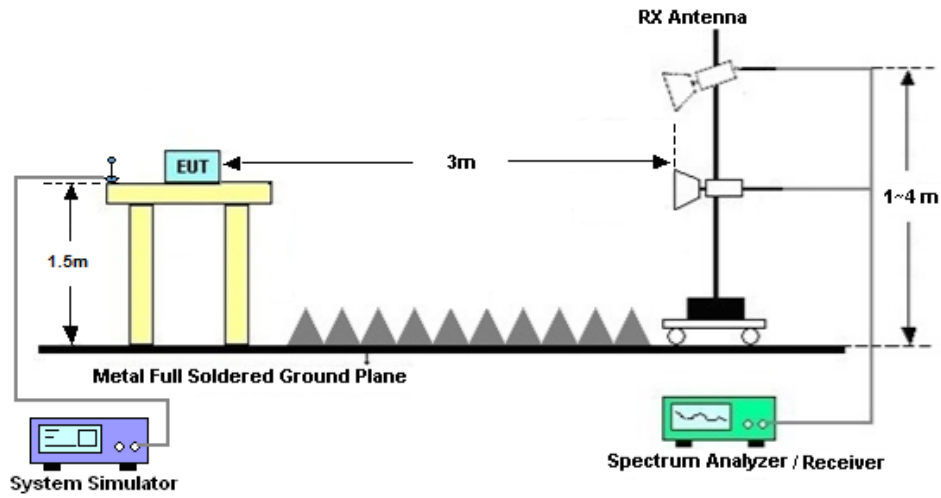
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix B.



4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For Band 38, 41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

For LTE Band 13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. $EIRP (dBm) = S.G. Power - Tx Cable Loss + Tx Antenna Gain$
11. $ERP (dBm) = EIRP - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] (dB)$
 $= [30 + 10\log(P)] (dBm) - [43 + 10\log(P)] (dB)$
 $= -13dBm.$

13. For Band 38, 41:

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 14, 2021	Dec. 23, 2021~ Dec. 28, 2021	Oct. 13, 2022	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	Aug. 26, 2021	Dec. 23, 2021~ Dec. 28, 2021	Aug. 25, 2022	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 12, 2021	Dec. 23, 2021~ Dec. 28, 2021	Jul. 11, 2022	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44G,MAX 30dB	Apr. 13, 2021	Jan. 10, 2022	Apr. 12, 2022	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Jan. 10, 2022	Oct. 29, 2022	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 30, 2021	Jan. 10, 2022	May 29, 2022	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1356	1GHz~18GHz	Apr. 18, 2021	Jan. 10, 2022	Apr. 17, 2022	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Jan. 05, 2022	Jan. 10, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 05, 2022	Jan. 10, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40G GA	060728	18~40GHz	Jan. 06, 2022	Jan. 10, 2022	Jan. 05, 2023	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P	2025788	1Ghz-18Ghz	Jan. 05, 2022	Jan. 10, 2022	Jan. 04, 2023	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5GHz	Oct. 13, 2021	Jan. 10, 2022	Oct. 12, 2022	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jan. 10, 2022	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jan. 10, 2022	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jan. 10, 2022	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required



6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.3dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB
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Appendix A. Test Results of Conducted Test

Test Engineer :	Simle Wang	Temperature :	22~23°C
		Relative Humidity :	40~42%

Conducted Output Power(Average power) and ERP/EIRP

LTE Band 12:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				23060	23095	23130			
Frequency (MHz)				704	707.5	711	L	M	H
10	QPSK	1	0	24.12	24.36	24.28	0.0495	0.0524	0.0514
10	QPSK	1	49	23.90	24.25	24.03	0.0471	0.0511	0.0485
10	QPSK	50	0	23.25	23.34	23.17	0.0406	0.0414	0.0398
10	16QAM	1	0	23.19	23.43	23.23	0.0400	0.0423	0.0404
10	64QAM	1	0	22.18	22.33	22.22	0.0317	0.0328	0.0320
Channel				23035	23095	23205	ERP(W)		
Frequency (MHz)				701.5	707.5	718.5	L	M	H
5	QPSK	1	0	23.93	24.32	24.10	0.0474	0.0519	0.0493
5	16QAM	1	0	22.88	23.24	23.00	0.0372	0.0405	0.0383
Channel				23025	23095	23195	ERP(W)		
Frequency (MHz)				700.5	707.5	717.5	L	M	H
3	QPSK	1	0	23.94	24.31	24.08	0.0475	0.0518	0.0491
3	16QAM	1	0	23.02	23.35	23.03	0.0385	0.0415	0.0385
Channel				23017	23095	23173	ERP(W)		
Frequency (MHz)				699.7	707.5	715.3	L	M	H
1.4	QPSK	1	0	24.04	24.21	24.20	0.0486	0.0506	0.0505
1.4	16QAM	1	0	23.03	23.38	23.12	0.0385	0.0418	0.0394

LTE Band 13:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				23230					
Frequency (MHz)				-	782	-	-	M	-
10	QPSK	1	0	-	24.28	-	-	0.0538	-
10	QPSK	1	49	-	24.25	-	-	0.0535	-
10	QPSK	50	0	-	23.19	-	-	0.0419	-
10	16QAM	1	0	-	23.37	-	-	0.0437	-
10	64QAM	1	0	-	22.30	-	-	0.0341	-
Channel				23205	23230	23255	ERP(W)		
Frequency (MHz)				779.5	782	784.5	L	M	H
5	QPSK	1	0	24.09	24.19	24.26	0.0515	0.0527	0.0536
5	16QAM	1	0	23.15	23.22	23.33	0.0415	0.0422	0.0433



LTE Band 17:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				23780	23790	23800			
Frequency (MHz)				709	710	711	L	M	H
10	QPSK	1	0	24.11	24.23	24.17	0.0494	0.0508	0.0501
10	QPSK	1	49	24.17	24.22	24.01	0.0501	0.0507	0.0483
10	QPSK	50	0	23.17	23.32	23.08	0.0398	0.0412	0.0390
10	16QAM	1	0	23.23	23.31	23.01	0.0404	0.0411	0.0384
10	64QAM	1	0	22.30	22.21	22.00	0.0326	0.0319	0.0304
Channel				23755	23790	23825	ERP(W)		
Frequency (MHz)				706.5	710	713.5	L	M	H
5	QPSK	1	0	23.90	24.11	24.15	0.0471	0.0494	0.0499
5	16QAM	1	0	23.08	23.30	22.91	0.0390	0.0410	0.0375

LTE Band 26:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)					
Channel				26765	26865	26915	26965						
Frequency (MHz)				821.5	831.5	836.5	841.5	L	M	H			
15	QPSK	1	0	24.51	24.52	24.41	24.44	0.0794	0.0796	0.0776	0.0782		
15	QPSK	1	74	24.44	24.39	24.40	24.26	0.0782	0.0773	0.0774	0.0750		
15	QPSK	75	0	23.46	23.59	23.49	23.45	0.0624	0.0643	0.0628	0.0622		
15	16QAM	1	0	23.34	23.51	23.43	23.32	0.0607	0.0631	0.0619	0.0604		
15	64QAM	1	0	22.53	22.61	22.51	22.37	0.0504	0.0513	0.0501	0.0485		
Channel				26840	26915	26990	ERP(W)						
Frequency (MHz)							829	836.5	844	L	M	H	
10	QPSK	1	0				24.33	24.49	24.30	0.0762	0.0791	0.0757	
10	16QAM	1	0				23.43	23.22	23.30	0.0619	0.0590	0.0601	
Channel							26815	26915	27015	ERP(W)			
Frequency (MHz)							826.5	836.5	846.5	L	M	H	
5	QPSK	1	0				24.31	24.44	24.36	0.0759	0.0782	0.0767	
5	16QAM	1	0				23.31	23.46	23.26	0.0603	0.0624	0.0596	
Channel							26815	26915	27025	ERP(W)			
Frequency (MHz)							825.5	836.5	847.5	L	M	H	
3	QPSK	1	0				24.47	24.33	24.24	0.0787	0.0762	0.0746	
3	16QAM	1	0				23.17	23.49	23.21	0.0583	0.0628	0.0589	
Channel				26797	26915	27033	ERP(W)						
Frequency (MHz)				824.7	836.5	848.3	L	M	H				
1.4	QPSK	1	0	24.31	24.45	24.25	0.0759	0.0783	0.0748				
1.4	16QAM	1	0	23.35	23.29	23.44	0.0608	0.0600	0.0621				



LTE Band 38:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				37850	38000	38150			
Frequency (MHz)				2580	2595	2610	L	M	H
20	QPSK	1	0	24.50	24.64	24.45	0.2399	0.2477	0.2371
20	QPSK	1	99	24.45	24.39	24.24	0.2371	0.2339	0.2259
20	QPSK	100	0	23.47	23.65	23.61	0.1892	0.1972	0.1954
20	16QAM	1	0	23.66	23.41	23.33	0.1977	0.1866	0.1832
20	64QAM	1	0	22.70	22.37	22.34	0.1585	0.1469	0.1459
Channel				37825	38000	38175	EIRP(W)		
Frequency (MHz)				2577.5	2595	2612.5	L	M	H
15	QPSK	1	0	24.51	24.62	24.44	0.2404	0.2466	0.2366
15	16QAM	1	0	23.65	23.42	23.33	0.1972	0.1871	0.1832
Channel				37800	38000	38200	EIRP(W)		
Frequency (MHz)				2575	2595	2615	L	M	H
10	QPSK	1	0	24.55	24.48	24.43	0.2427	0.2388	0.2360
10	16QAM	1	0	23.66	23.27	23.33	0.1977	0.1807	0.1832
Channel				37775	38000	38225	EIRP(W)		
Frequency (MHz)				2572.5	2595	2617.5	L	M	H
5	QPSK	1	0	24.53	24.53	24.41	0.2415	0.2415	0.2350
5	16QAM	1	0	23.52	23.39	23.24	0.1914	0.1858	0.1795

LTE Band 41:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				39750	40620	41490			
Frequency (MHz)				2506	2593	2680	L	M	H
20	QPSK	1	0	24.55	24.70	24.54	0.2427	0.2512	0.2421
20	QPSK	1	99	24.45	24.46	24.33	0.2371	0.2377	0.2307
20	QPSK	100	0	23.54	23.73	23.66	0.1923	0.2009	0.1977
20	16QAM	1	0	23.71	23.60	23.60	0.2000	0.1950	0.1950
20	64QAM	1	0	22.63	22.90	22.58	0.1560	0.1660	0.1542
Channel				39725	40620	41515	EIRP(W)		
Frequency (MHz)				2503.5	2593	2682.5	L	M	H
15	QPSK	1	0	24.44	24.67	24.33	0.2366	0.2495	0.2307
15	16QAM	1	0	23.40	23.68	23.48	0.1862	0.1986	0.1897
Channel				39700	40620	41540	EIRP(W)		
Frequency (MHz)				2501	2593	2685	L	M	H
10	QPSK	1	0	24.54	24.48	24.35	0.2421	0.2388	0.2317
10	16QAM	1	0	23.57	23.66	23.50	0.1936	0.1977	0.1905
Channel				39675	40620	41565	EIRP(W)		
Frequency (MHz)				2498.5	2593	2687.5	L	M	H
5	QPSK	1	0	24.54	24.66	24.54	0.2421	0.2489	0.2421
5	16QAM	1	0	23.64	23.53	23.48	0.1968	0.1919	0.1897



LTE Band 66:

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				132072	132322	132572	EIRP(W)		
Frequency (MHz)				1720	1745	1770	L	M	H
20	QPSK	1	0	24.62	24.89	24.74	0.2249	0.2393	0.2312
20	QPSK	1	99	24.42	24.56	24.63	0.2148	0.2218	0.2254
20	QPSK	100	0	23.76	23.91	23.79	0.1845	0.1910	0.1858
20	16QAM	1	0	23.81	23.51	23.64	0.1866	0.1742	0.1795
20	64QAM	1	0	22.59	22.86	22.67	0.1409	0.1500	0.1435
Channel				132047	132322	132597	EIRP(W)		
Frequency (MHz)				1717.5	1745	1772.5	L	M	H
15	QPSK	1	0	24.40	24.68	24.76	0.2138	0.2280	0.2323
15	16QAM	1	0	23.16	23.61	23.36	0.1607	0.1782	0.1683
Channel				132022	132322	132622	EIRP(W)		
Frequency (MHz)				1715	1745	1775	L	M	H
10	QPSK	1	0	24.60	24.80	24.74	0.2239	0.2344	0.2312
10	16QAM	1	0	23.49	23.69	23.79	0.1734	0.1816	0.1858
Channel				131997	132322	132647	EIRP(W)		
Frequency (MHz)				1712.5	1745	1777.5	L	M	H
5	QPSK	1	0	24.54	24.71	24.74	0.2208	0.2296	0.2312
5	16QAM	1	0	23.64	23.49	23.48	0.1795	0.1734	0.1730
Channel				131987	132322	132657	EIRP(W)		
Frequency (MHz)				1711.5	1745	1778.5	L	M	H
3	QPSK	1	0	24.52	24.69	24.53	0.2198	0.2286	0.2203
3	16QAM	1	0	23.36	23.34	23.57	0.1683	0.1675	0.1766
Channel				131979	132322	132665	EIRP(W)		
Frequency (MHz)				1710.7	1745	1779.3	L	M	H
1.4	QPSK	1	0	24.44	24.77	24.74	0.2158	0.2328	0.2312
1.4	16QAM	1	0	23.68	23.31	23.61	0.1811	0.1663	0.1782



LTE Band 38C:

Combination 20MHz+20MHz (100RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	23.94	0.2208
M	QPSK	1	Max	1	0	23.98	0.2228
H	QPSK	1	Max	1	0	23.72	0.2099
L	16QAM	1	Max	1	0	22.68	0.1652
M	16QAM	1	Max	1	0	22.91	0.1742
H	16QAM	1	Max	1	0	22.54	0.1600
L	64QAM	1	Max	1	0	19.58	0.0809
M	64QAM	1	Max	1	0	19.69	0.0830
H	64QAM	1	Max	1	0	19.37	0.0771
Combination 15MHz+15MHz (75RB+75RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
M	QPSK	1	Max	1	0	23.69	0.2084
M	16QAM	1	Max	1	0	22.87	0.1726

LTE Band 41C:

Combination 20MHz+20MHz (100RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	24.44	0.2366
M	QPSK	1	Max	1	0	24.35	0.2317
H	QPSK	1	Max	1	0	24.22	0.2249
L	16QAM	1	Max	1	0	23.64	0.1968
M	16QAM	1	Max	1	0	23.29	0.1816
H	16QAM	1	Max	1	0	23.24	0.1795
L	64QAM	1	Max	1	0	20.32	0.0916
M	64QAM	1	Max	1	0	20.12	0.0875
H	64QAM	1	Max	1	0	20.17	0.0885
Combination 20MHz+15MHz (100RB+75RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	24.03	0.2153
L	16QAM	1	Max	1	0	23.12	0.1746
Combination 15MHz+20MHz (75RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	24.12	0.2198
L	16QAM	1	Max	1	0	23.23	0.1791



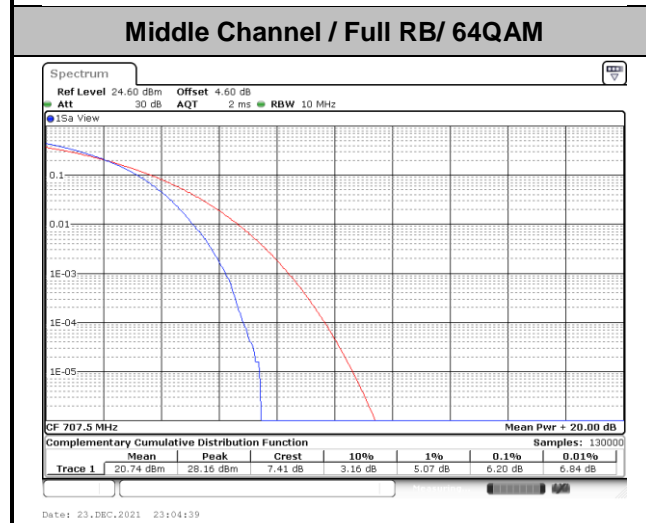
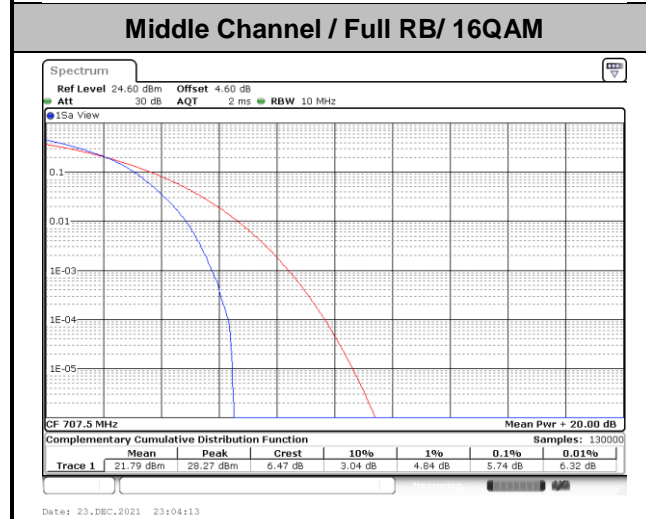
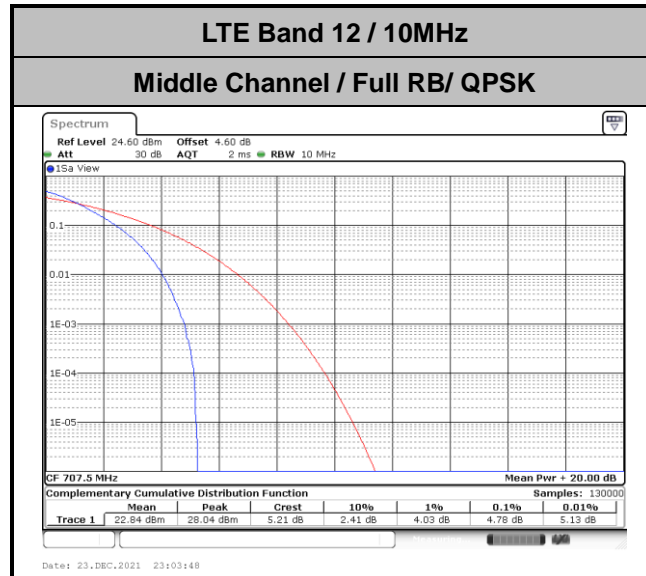
Combination 15MHz+15MHz (75RB+75RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	24.19	0.2234
L	16QAM	1	Max	1	0	23.42	0.1871
Combination 20MHz+10MHz (100RB+50RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	24.03	0.2153
L	16QAM	1	Max	1	0	23.18	0.1770
Combination 10MHz+20MHz (50RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	24.15	0.2213
L	16QAM	1	Max	1	0	23.14	0.1754
Combination 15MHz+10MHz (75RB+50RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	23.98	0.2128
L	16QAM	1	Max	1	0	22.65	0.1567
Combination 10MHz+15MHz (50RB+75RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	24.05	0.2163
L	16QAM	1	Max	1	0	23.17	0.1766
Combination 20MHz+5MHz (100RB+25RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	24.19	0.2234
L	16QAM	1	Max	1	0	23.38	0.1854
Combination 5MHz+20MHz (25RB+100RB)							
Channel	Modulation	PCC		SCC		Measured Power	EIRP(W)
		RB Size	RB offset	RB Size	RB offset		
L	QPSK	1	Max	1	0	24.03	0.2153
L	16QAM	1	Max	1	0	23.21	0.1782



LTE Band 12

Peak-to-Average Ratio

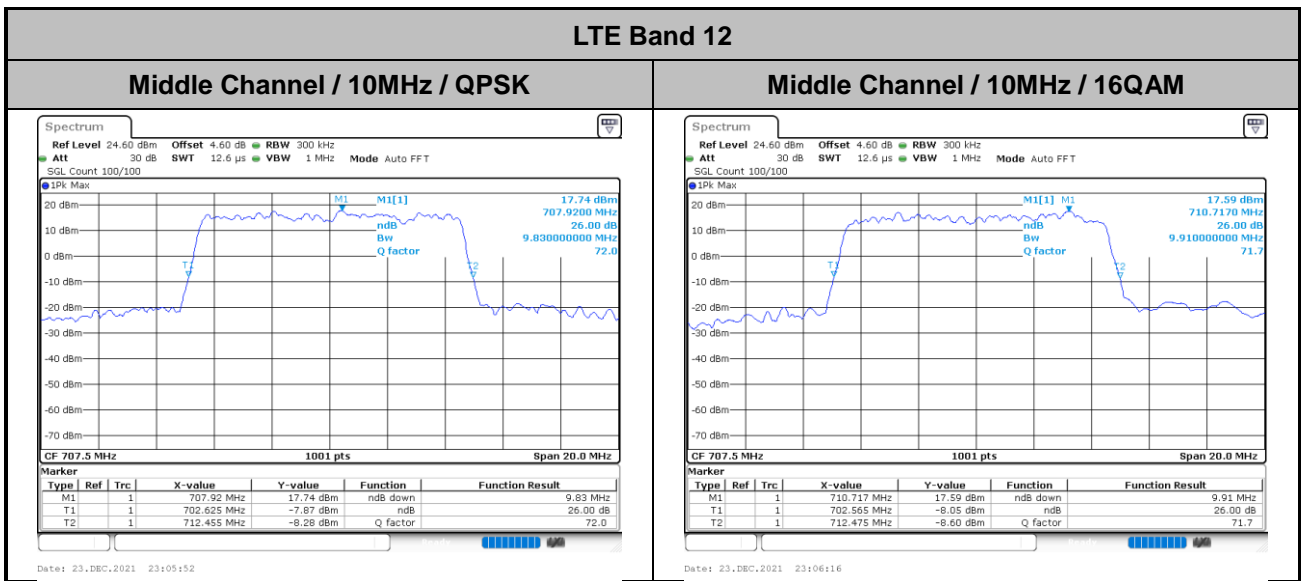
Mode	LTE Band 12 / 10MHz			
Mod.	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Result
Middle CH	4.78	5.74	6.20	PASS





26dB Bandwidth

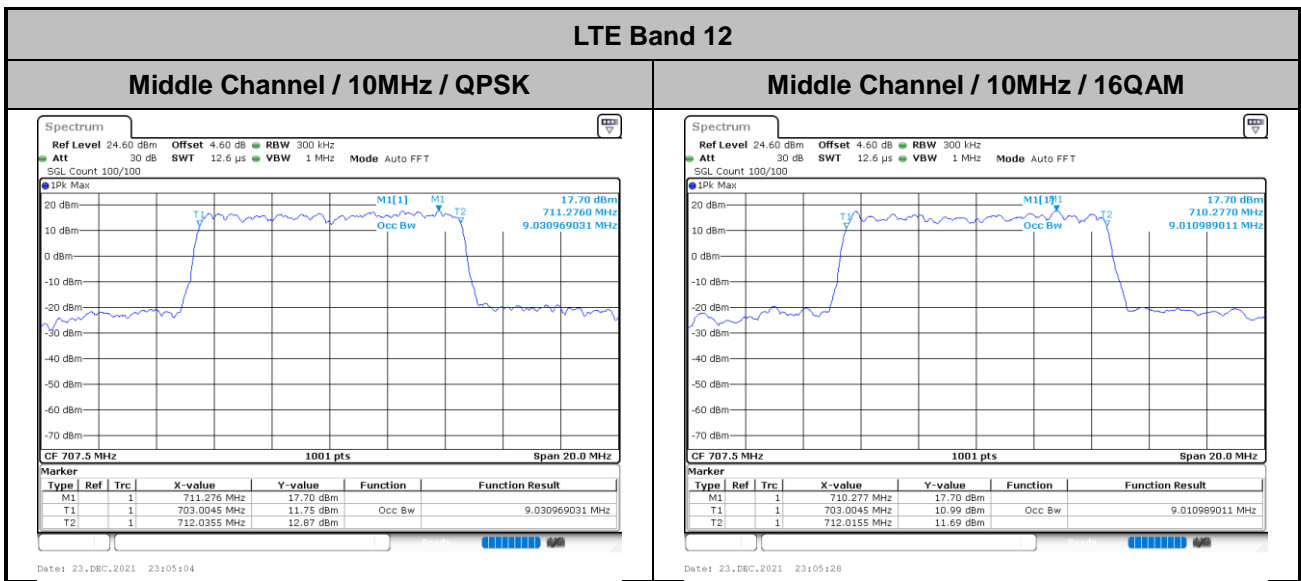
Mode	LTE Band 12 : 26dB BW(MHz)	
BW	10MHz	
Mod.	QPSK	16QAM
Middle CH	9.83	9.91





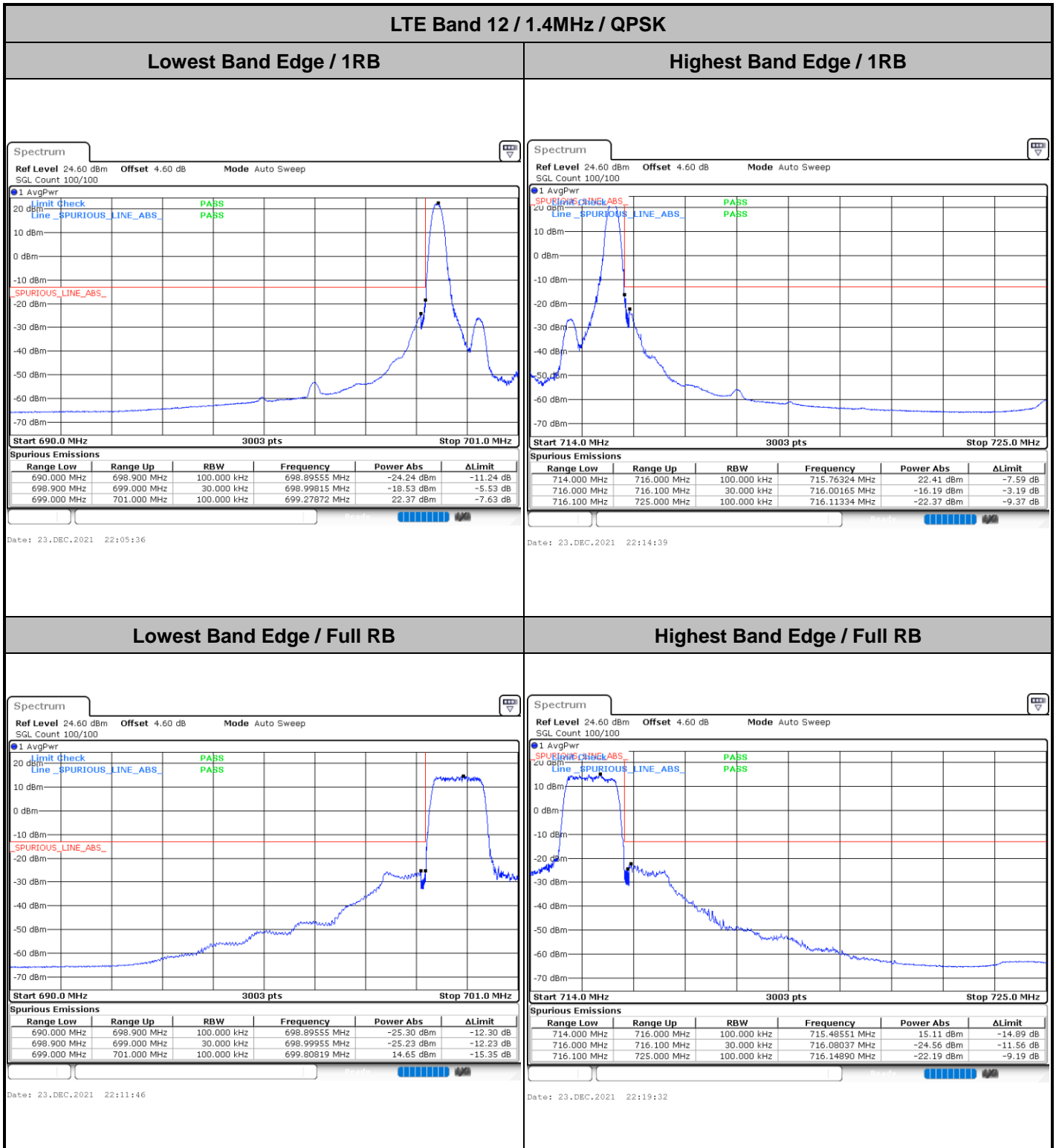
Occupied Bandwidth

Mode	LTE Band 12 : 99%OBW(MHz)	
BW	10MHz	
Mod.	QPSK	16QAM
Middle CH	9.03	9.01





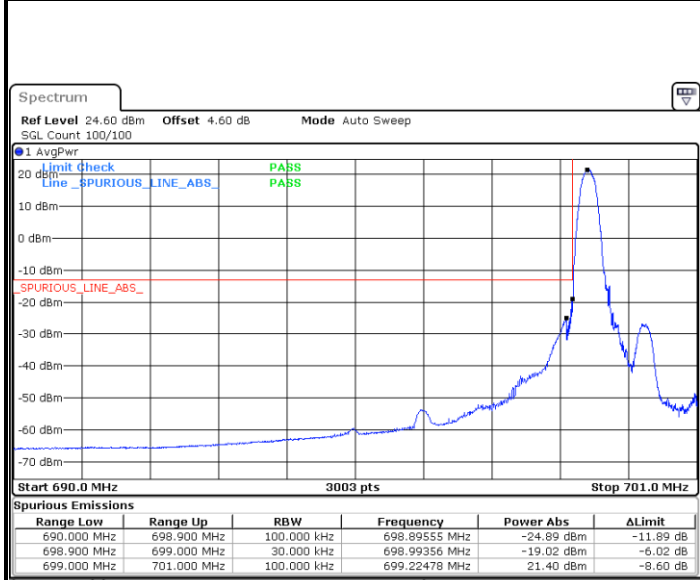
Conducted Band Edge





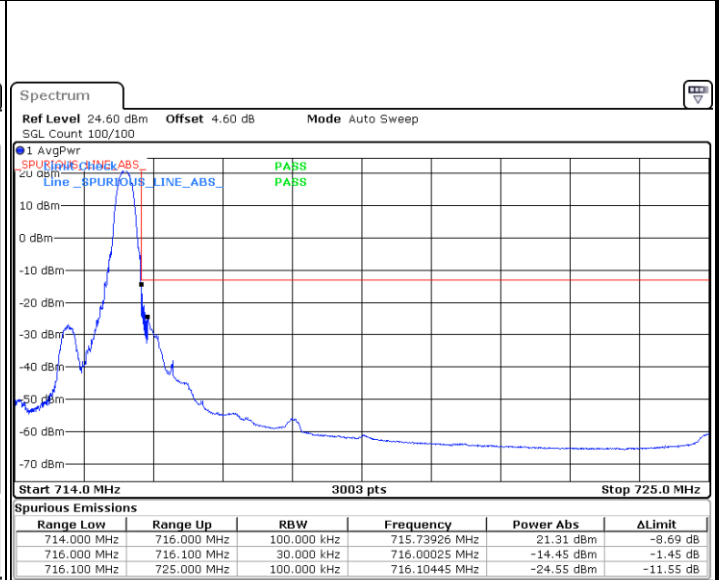
LTE Band 12 / 1.4MHz / 16QAM

Lowest Band Edge / 1 RB



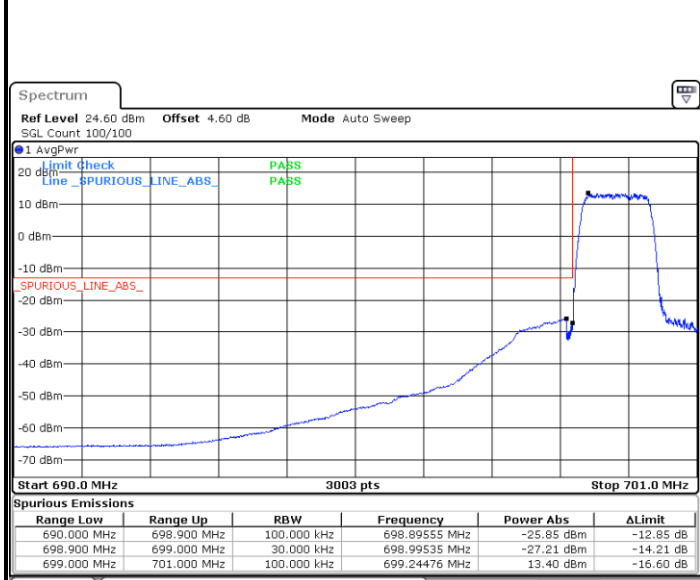
Date: 23.DEC.2021 22:07:25

Highest Band Edge / 1 RB



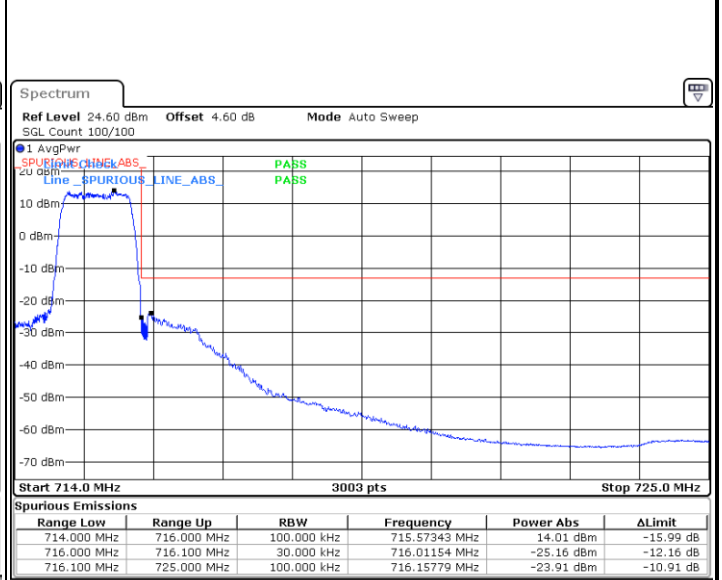
Date: 23.DEC.2021 22:15:37

Lowest Band Edge / Full RB



Date: 23.DEC.2021 22:10:48

Highest Band Edge / Full RB



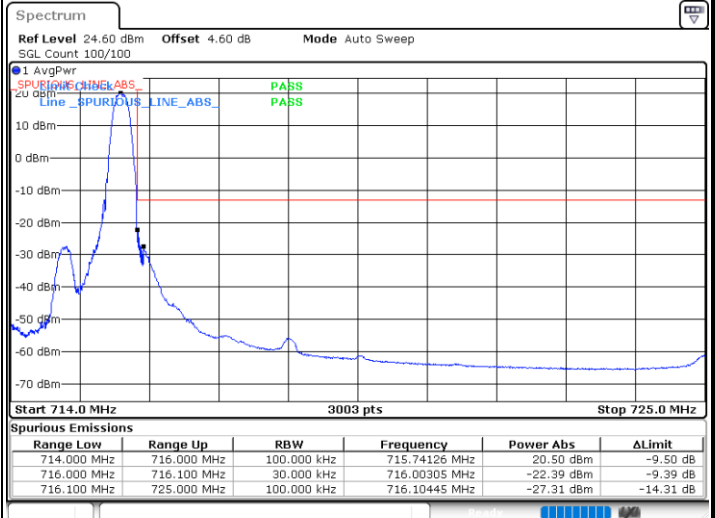
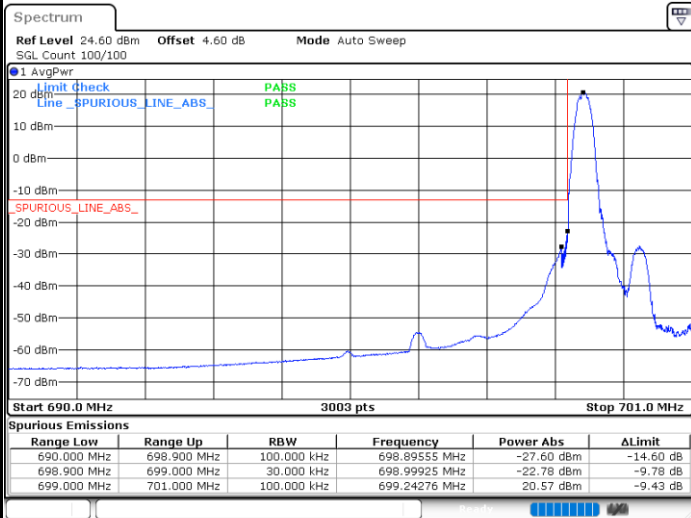
Date: 23.DEC.2021 22:18:34



LTE Band 12 / 1.4MHz / 64QAM

Lowest Band Edge / 1 RB

Highest Band Edge / 1 RB

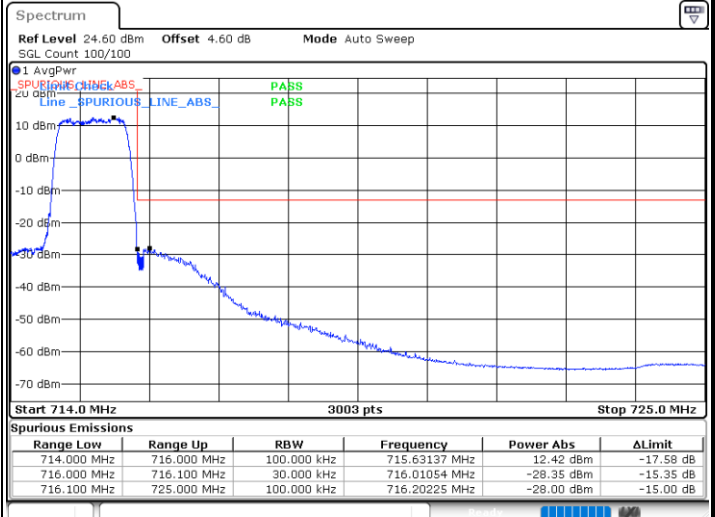
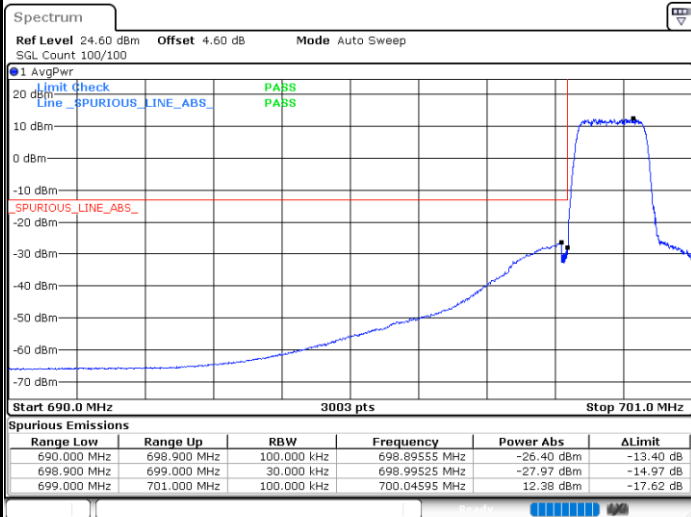


Date: 23.DEC.2021 22:08:52

Date: 23.DEC.2021 22:16:35

Lowest Band Edge / Full RB

Highest Band Edge / Full RB



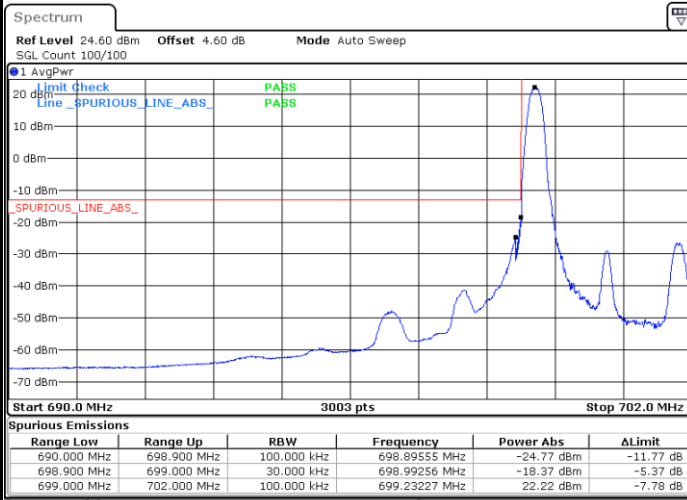
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Date: 23.DEC.2021 22:17:33



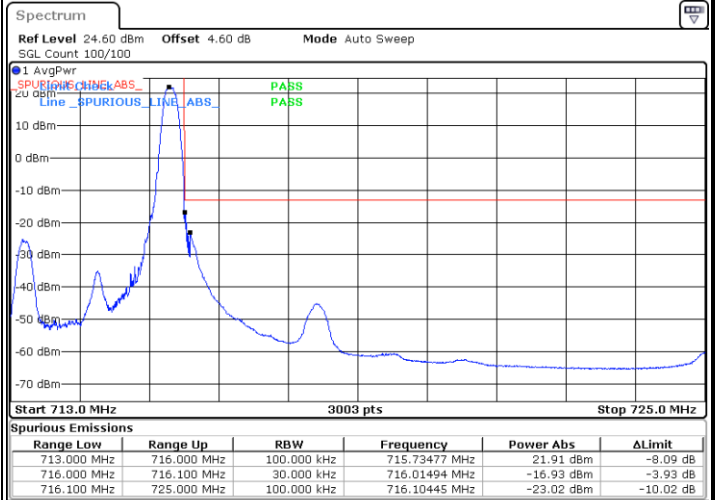
LTE Band 12 / 3MHz / QPSK

Lowest Band Edge / 1RB



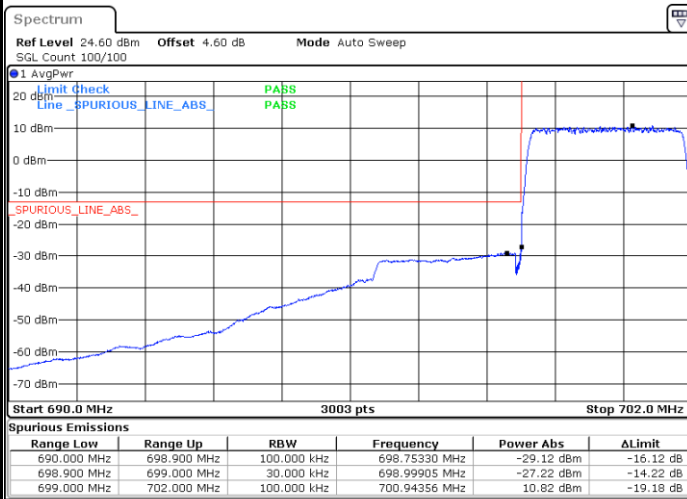
Date: 23.DEC.2021 22:21:18

Highest Band Edge / 1 RB



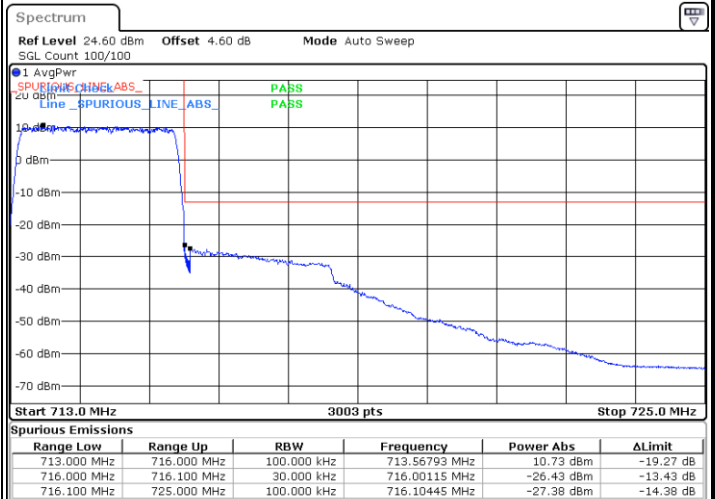
Date: 23.DEC.2021 22:29:04

Lowest Band Edge / Full RB



Date: 23.DEC.2021 22:26:11

Highest Band Edge / Full RB

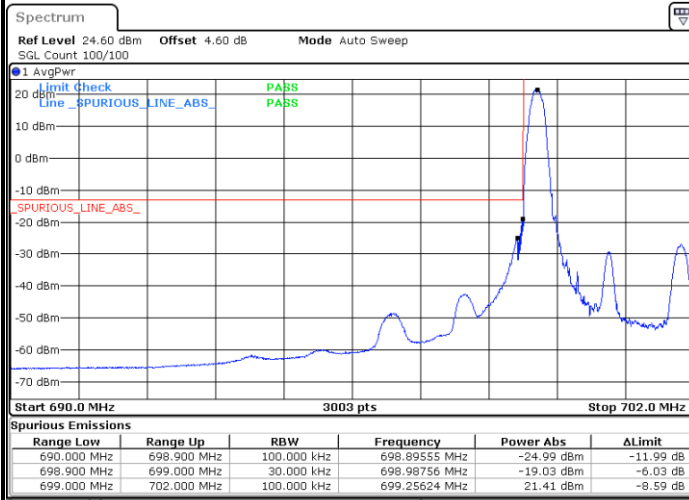


Date: 23.DEC.2021 22:33:56



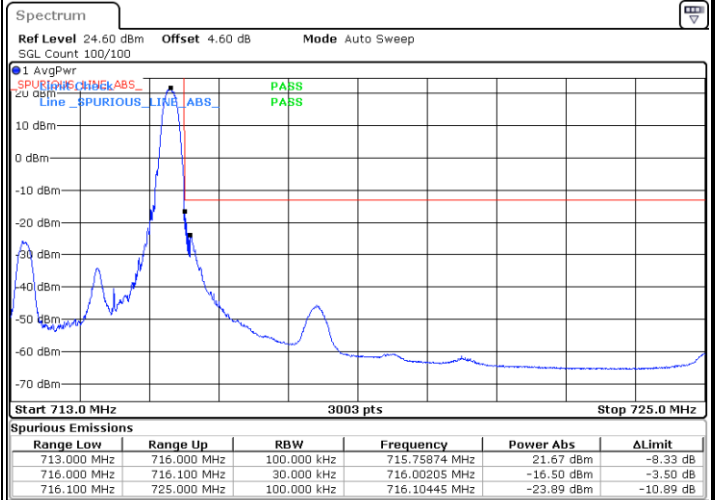
LTE Band 12 / 3MHz / 16QAM

Lowest Band Edge / 1 RB



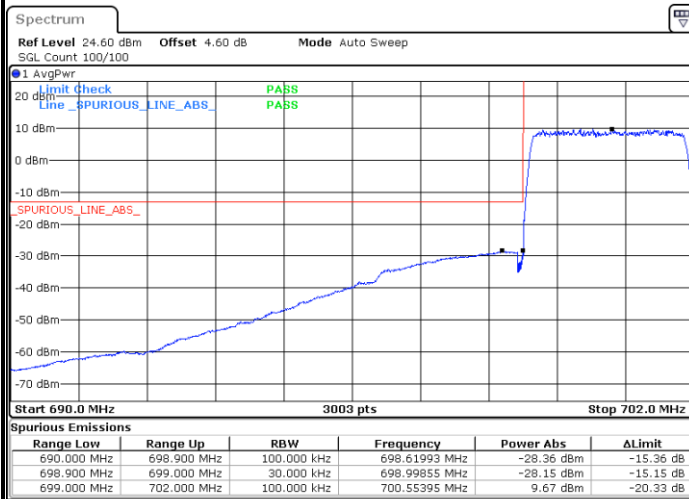
Date: 23.DEC.2021 22:22:16

Highest Band Edge / 1 RB



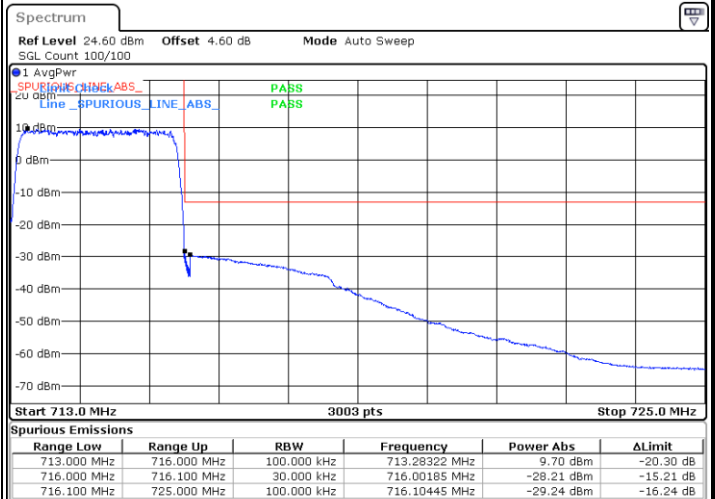
Date: 23.DEC.2021 22:30:02

Lowest Band Edge / Full RB



Date: 23.DEC.2021 22:25:13

Highest Band Edge / Full RB



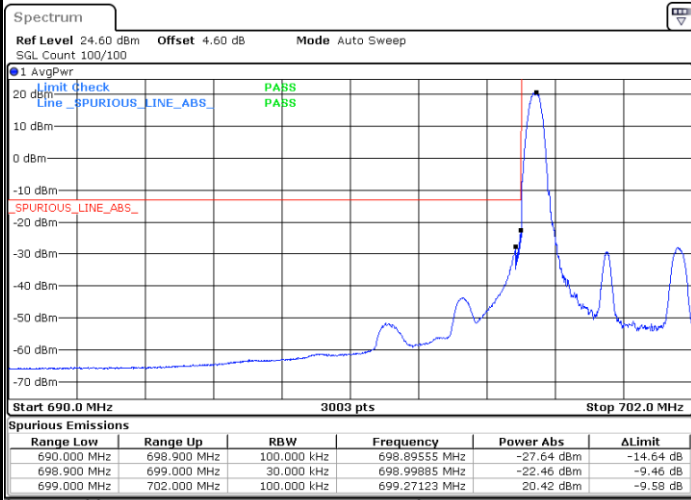
Date: 23.DEC.2021 22:32:58



LTE Band 12 / 3MHz / 64QAM

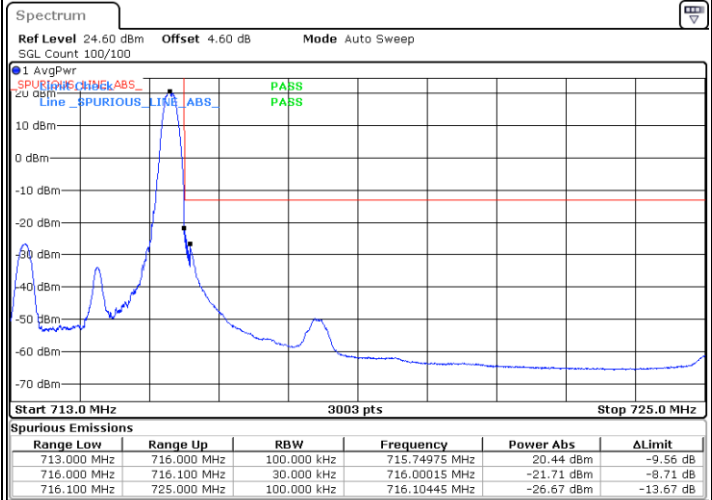
Lowest Band Edge / 1 RB

Highest Band Edge / 1 RB



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
690.000 MHz	698.900 MHz	100.000 kHz	698.89555 MHz	-27.64 dBm	-14.64 dB
698.900 MHz	699.000 MHz	30.000 kHz	698.99885 MHz	-22.46 dBm	-9.46 dB
699.000 MHz	702.000 MHz	100.000 kHz	699.27123 MHz	20.42 dBm	-9.58 dB

Date: 23.DEC.2021 22:23:16

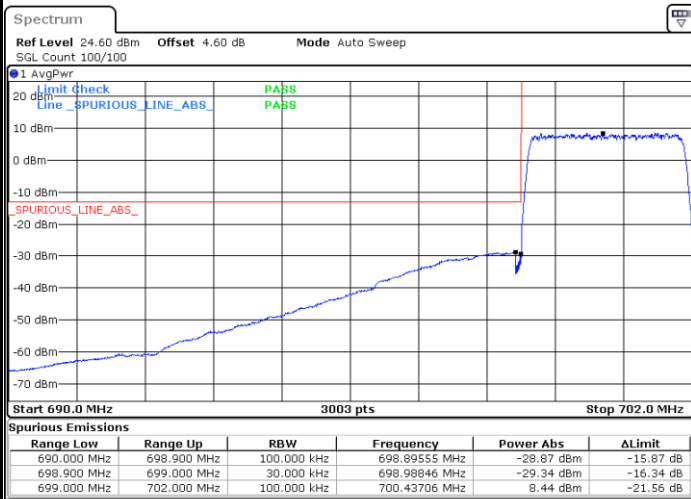


Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
713.000 MHz	716.000 MHz	100.000 kHz	715.74975 MHz	20.44 dBm	-9.56 dB
716.000 MHz	716.100 MHz	30.000 kHz	716.00015 MHz	-21.71 dBm	-8.71 dB
716.100 MHz	725.000 MHz	100.000 kHz	716.10445 MHz	-26.67 dBm	-13.67 dB

Date: 23.DEC.2021 22:31:01

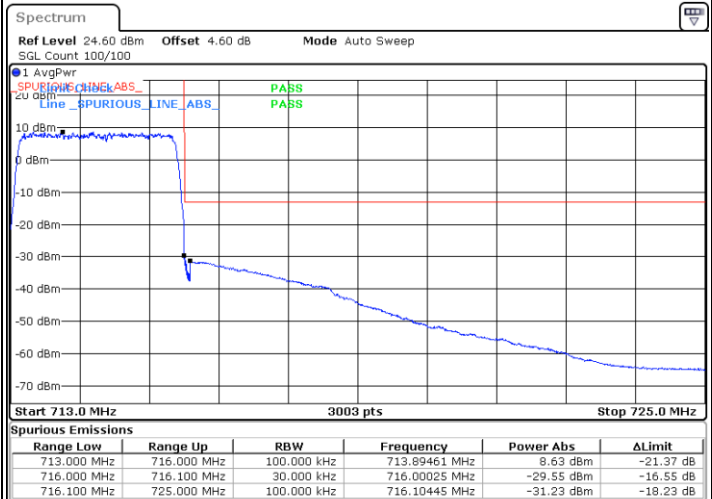
Lowest Band Edge / Full RB

Highest Band Edge / Full RB



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
690.000 MHz	698.900 MHz	100.000 kHz	698.89555 MHz	-28.87 dBm	-15.87 dB
698.900 MHz	699.000 MHz	30.000 kHz	698.98846 MHz	-29.34 dBm	-16.34 dB
699.000 MHz	702.000 MHz	100.000 kHz	700.43706 MHz	8.44 dBm	-21.56 dB

Date: 23.DEC.2021 22:24:15



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
713.000 MHz	716.000 MHz	100.000 kHz	713.89461 MHz	8.63 dBm	-21.37 dB
716.000 MHz	716.100 MHz	30.000 kHz	716.00025 MHz	-29.55 dBm	-16.55 dB
716.100 MHz	725.000 MHz	100.000 kHz	716.10445 MHz	-31.23 dBm	-18.23 dB

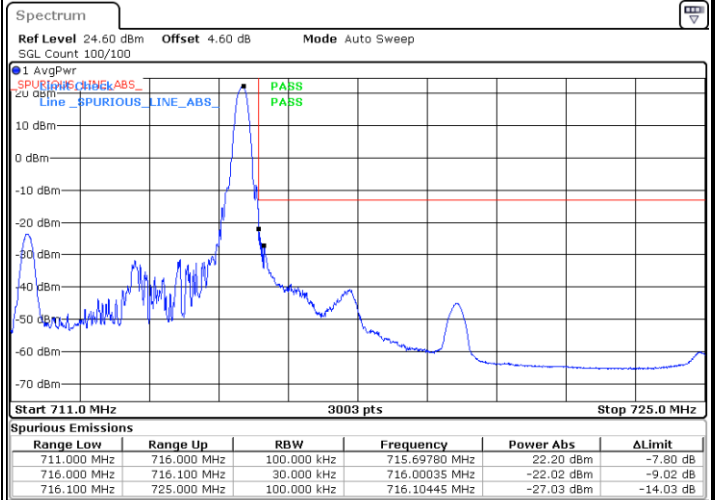
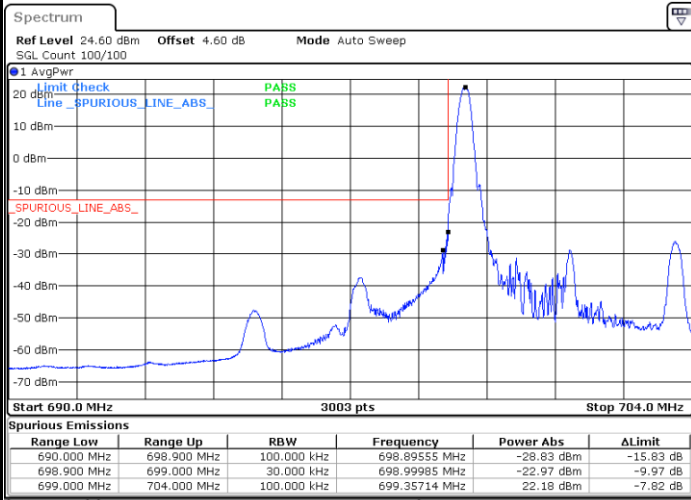
Date: 23.DEC.2021 22:32:00



LTE Band 12 / 5MHz / QPSK

Lowest Band Edge / 1 RB

Highest Band Edge / 1 RB

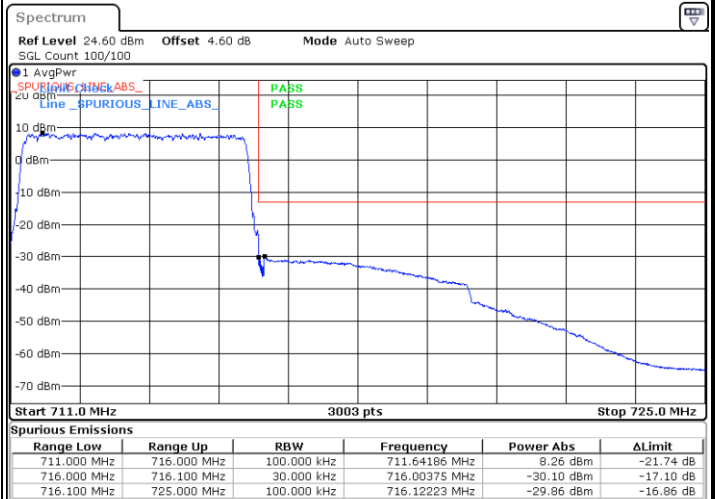
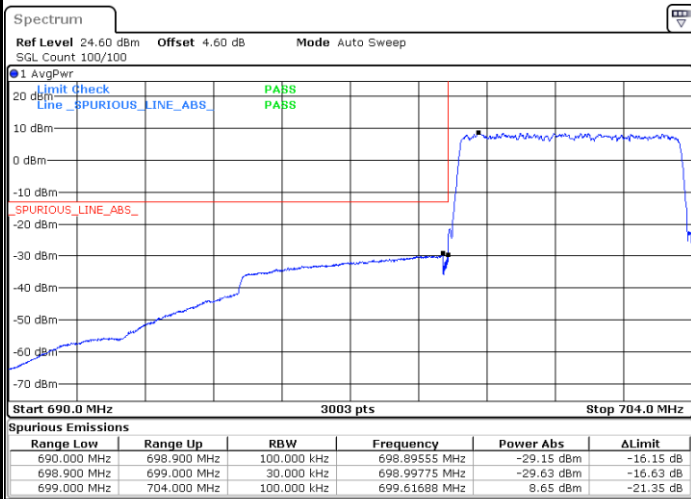


Date: 23.DEC.2021 22:35:44

Date: 23.DEC.2021 22:43:28

Lowest Band Edge / Full RB

Highest Band Edge / Full RB



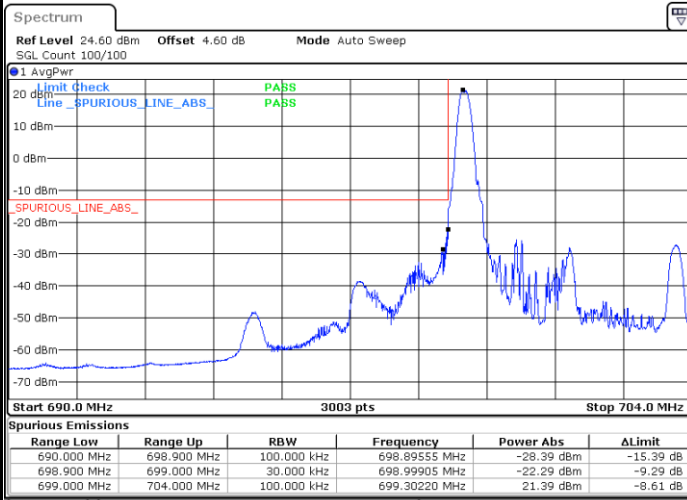
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Date: 23.DEC.2021 22:49:00



LTE Band 12 / 5MHz / 16QAM

Lowest Band Edge / 1RB



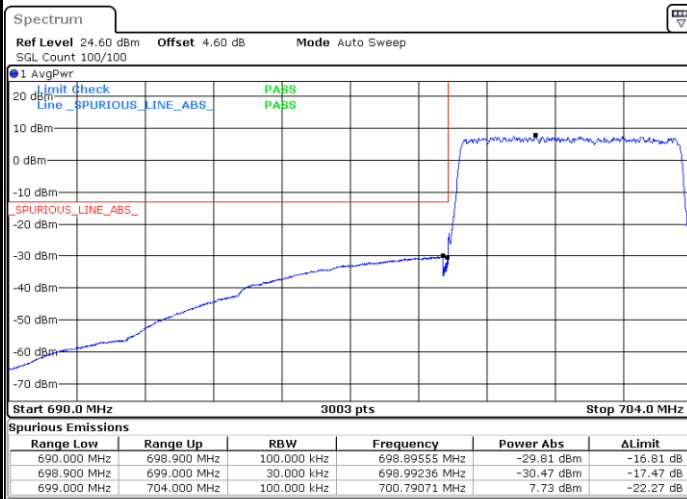
Date: 23.DEC.2021 22:36:42

Highest Band Edge / 1 RB



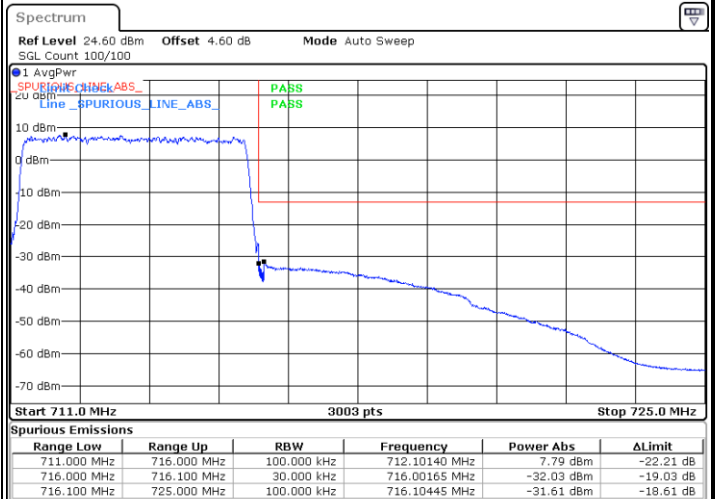
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Lowest Band Edge / Full RB



Date: 23.DEC.2021 22:39:36

Highest Band Edge / Full RB

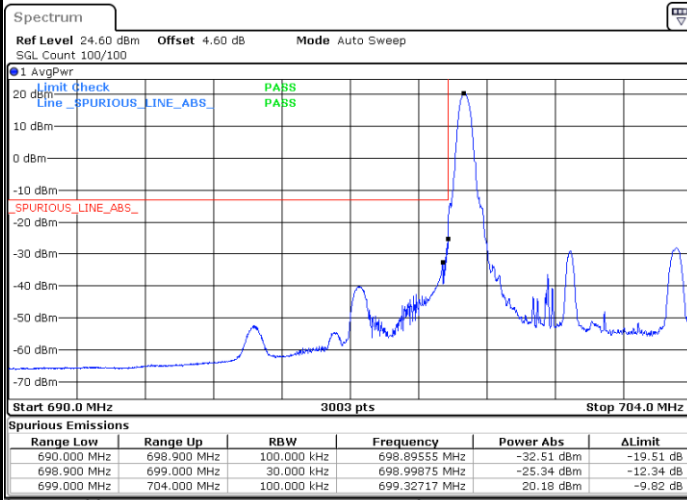


Date: 23.DEC.2021 22:48:02



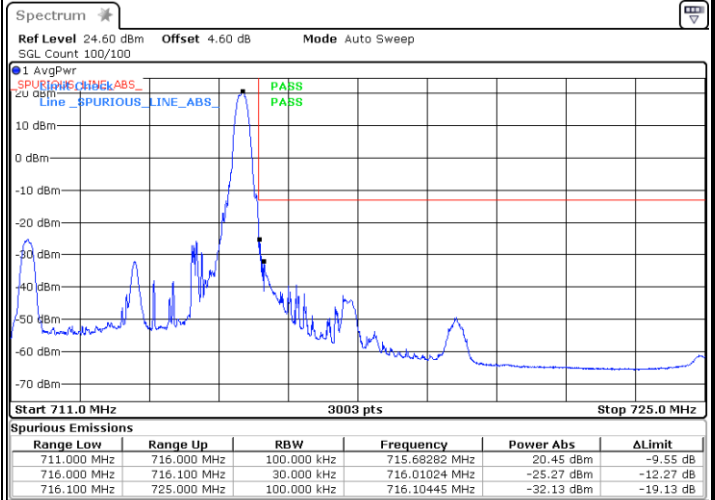
LTE Band 12 / 5MHz / 64QAM

Lowest Band Edge / 1RB



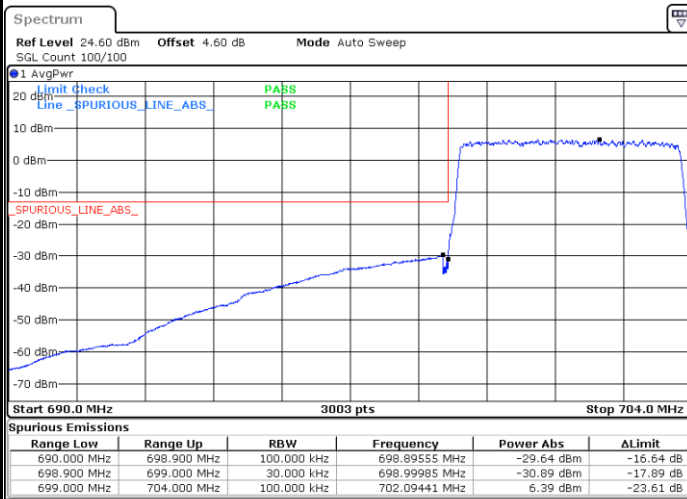
Date: 23.DEC.2021 22:37:40

Highest Band Edge / 1 RB



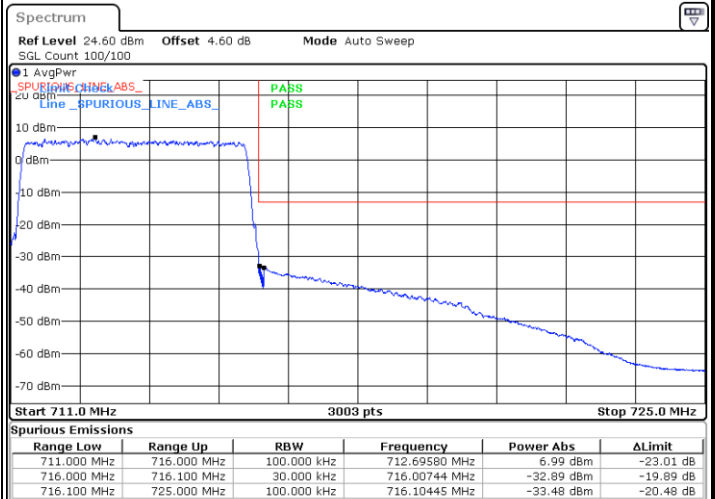
Date: 23.DEC.2021 22:46:06

Lowest Band Edge / Full RB



Date: 23.DEC.2021 22:38:38

Highest Band Edge / Full RB



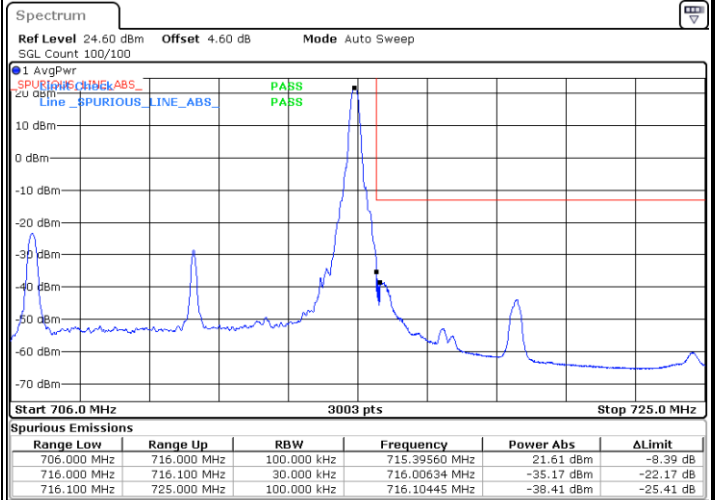
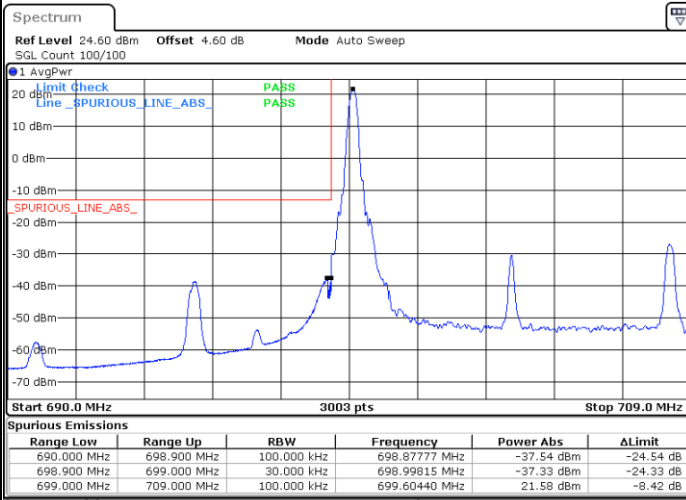
Date: 23.DEC.2021 22:47:04



LTE Band 12 / 10MHz / QPSK

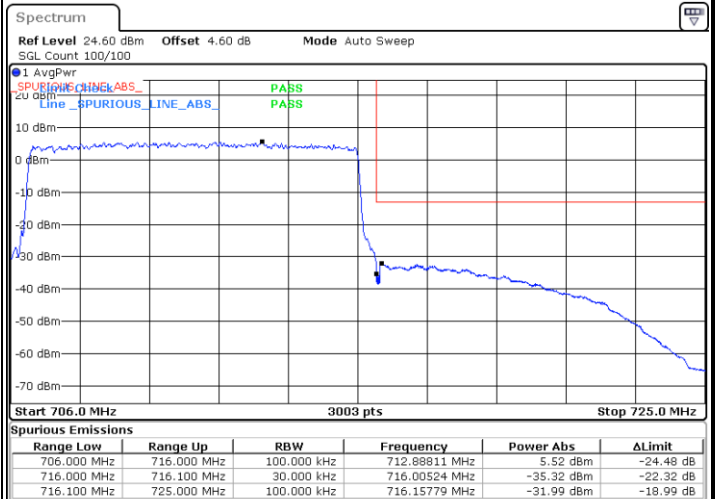
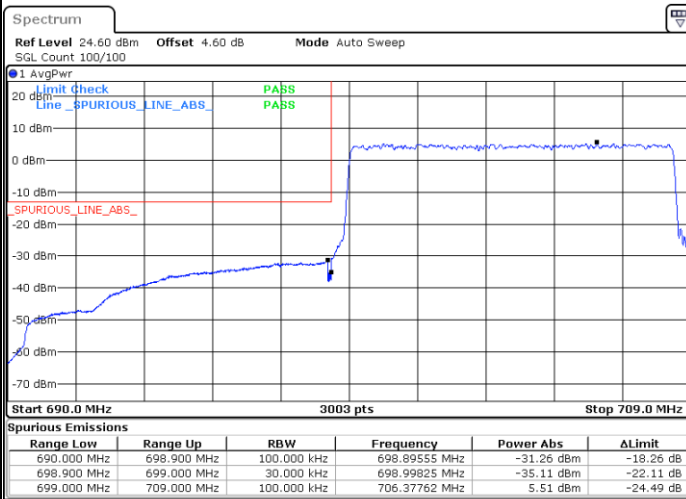
Lowest Band Edge / 1 RB

Highest Band Edge / 1 RB



Lowest Band Edge / Full RB

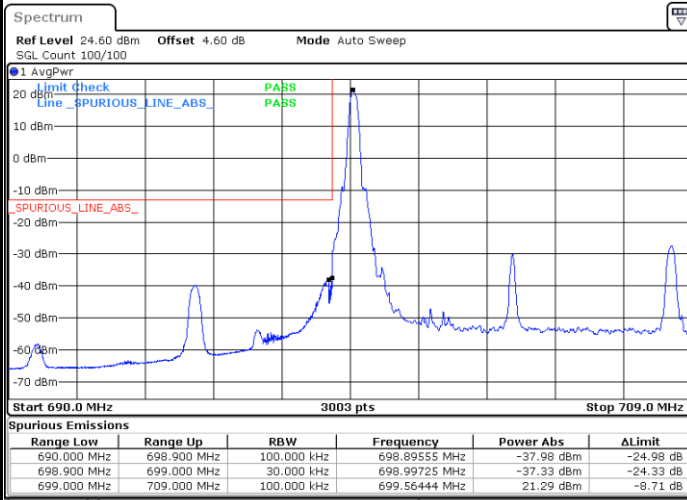
Highest Band Edge / Full RB



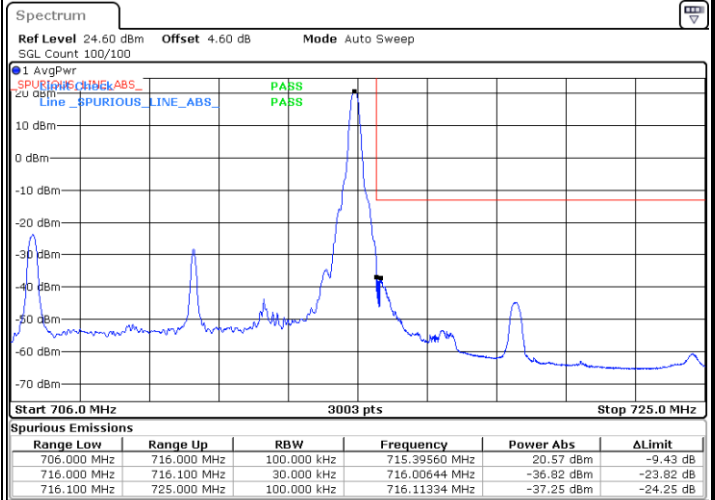


LTE Band 12 / 10MHz / 16QAM

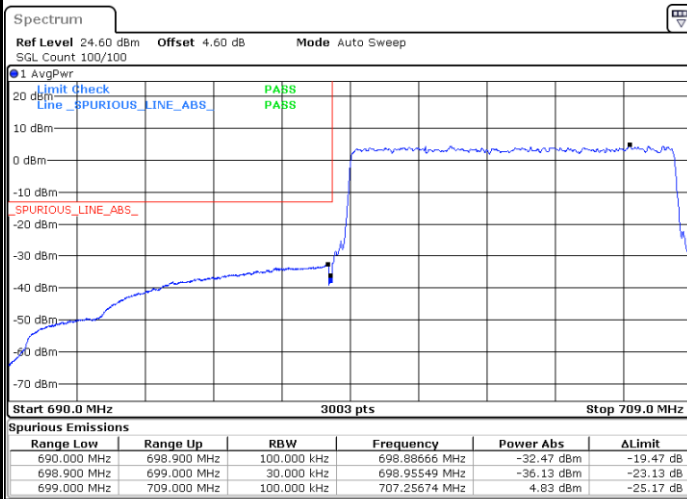
Lowest Band Edge / 1 RB



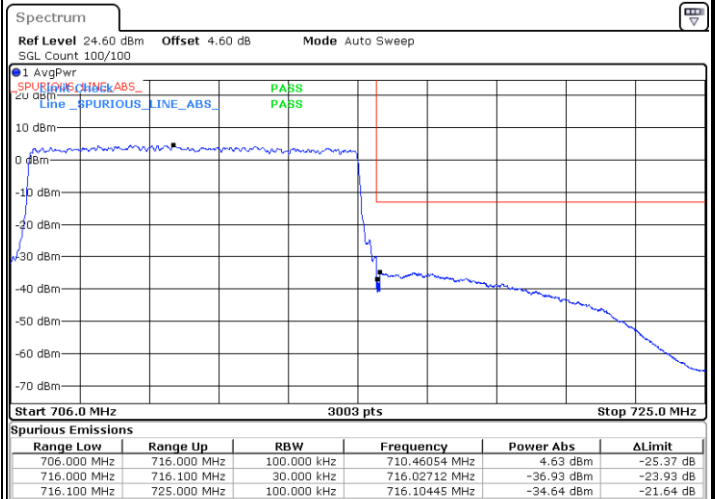
Highest Band Edge / 1 RB



Lowest Band Edge / Full RB



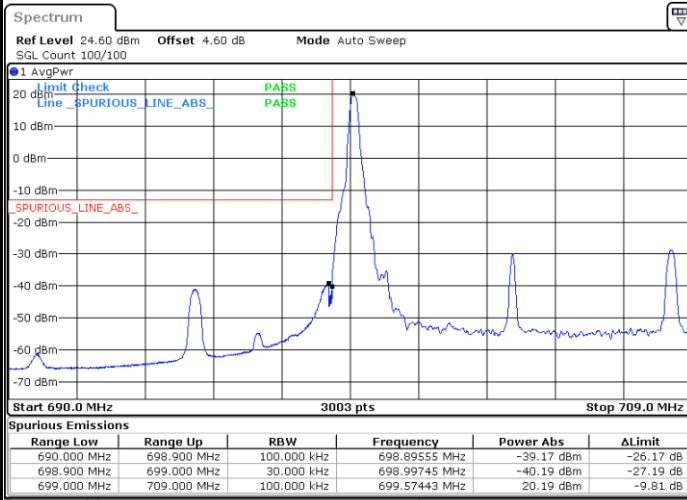
Highest Band Edge / Full RB





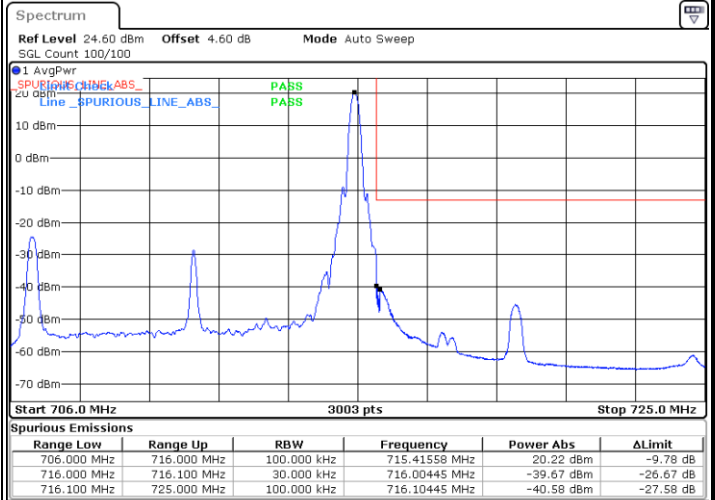
LTE Band 12 / 10MHz / 64QAM

Lowest Band Edge / 1 RB



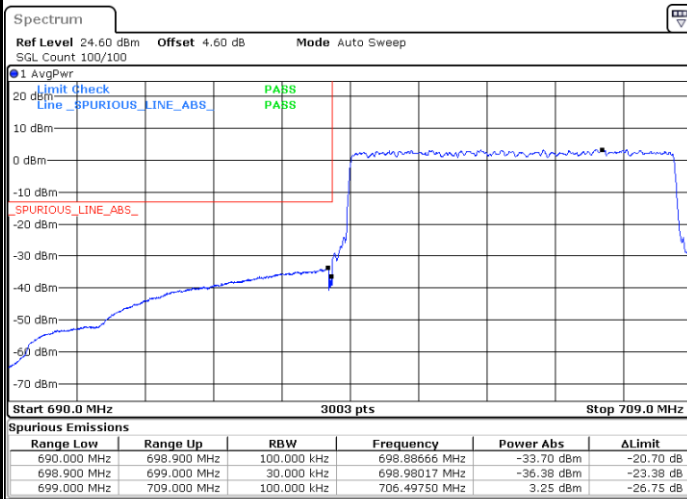
Date: 23.DEC.2021 22:52:42

Highest Band Edge / 1 RB



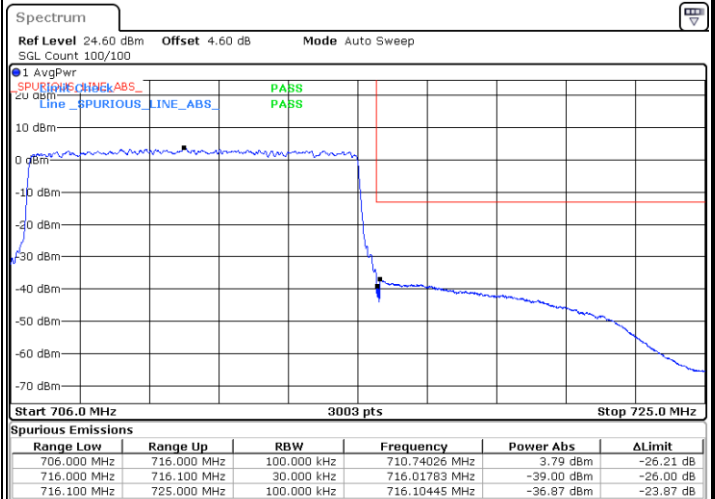
Date: 23.DEC.2021 23:00:27

Lowest Band Edge / Full RB



Date: 23.DEC.2021 22:53:41

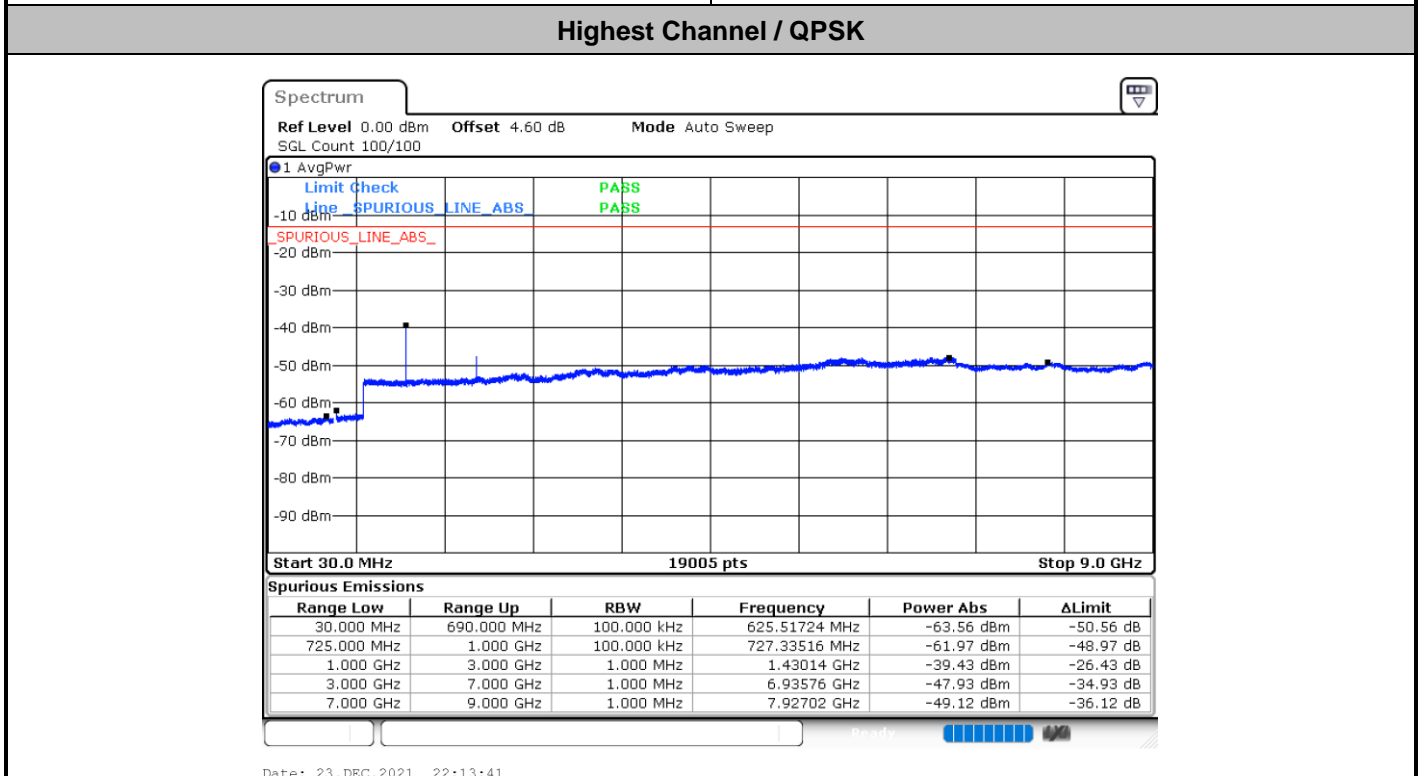
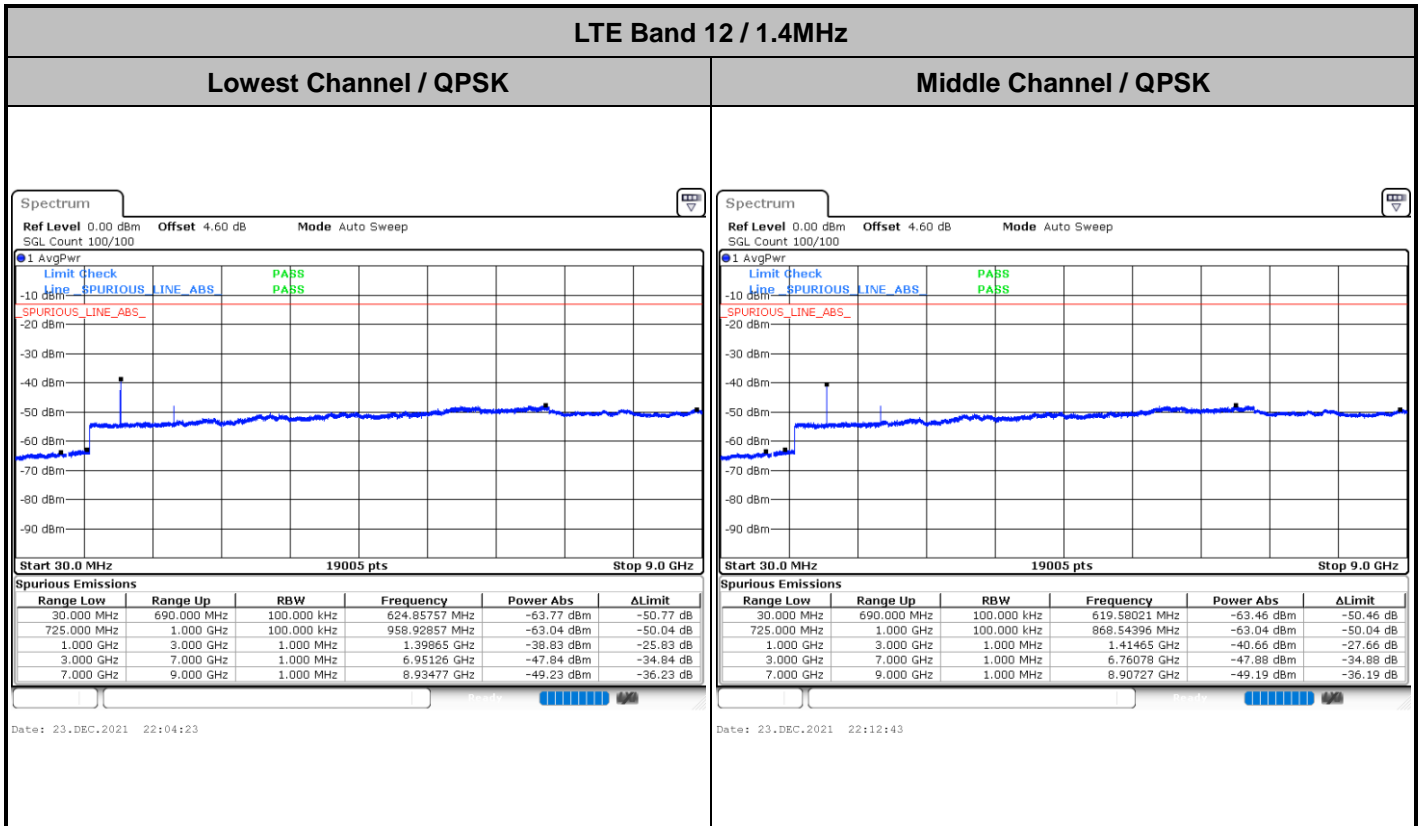
Highest Band Edge / Full RB



Date: 23.DEC.2021 23:01:26



Conducted Spurious Emission

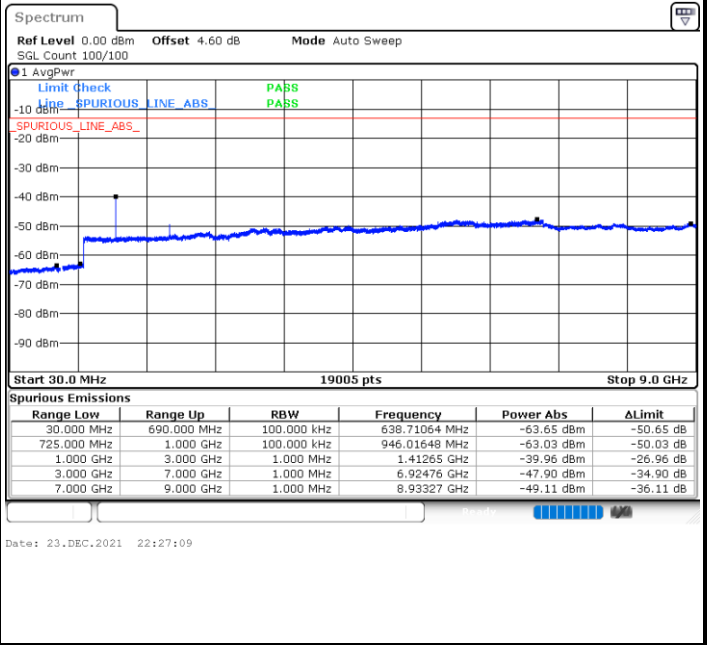
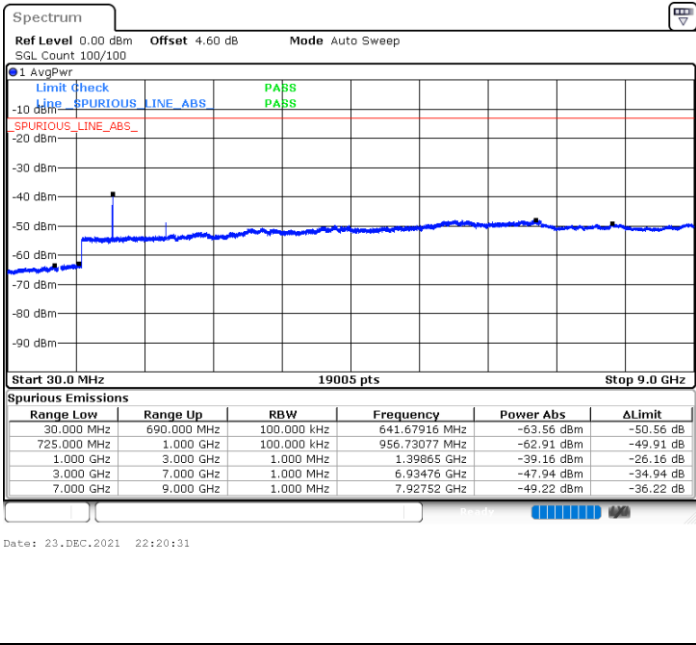




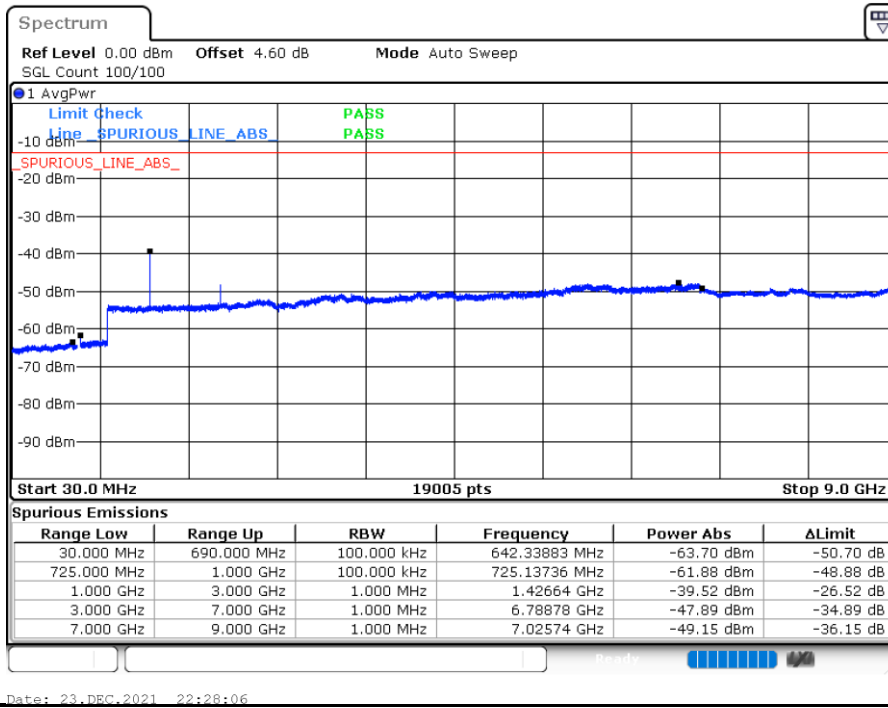
LTE Band 12 / 3MHz

Lowest Channel / QPSK

Middle Channel / QPSK



Highest Channel / QPSK

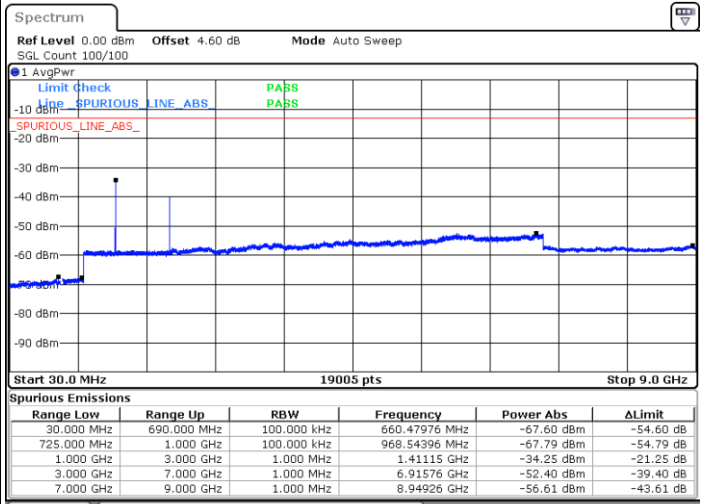
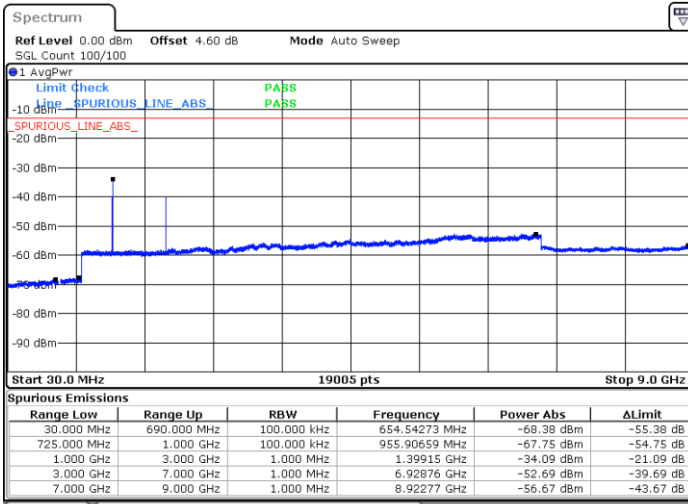




LTE Band 12 / 5MHz

Lowest Channel / QPSK

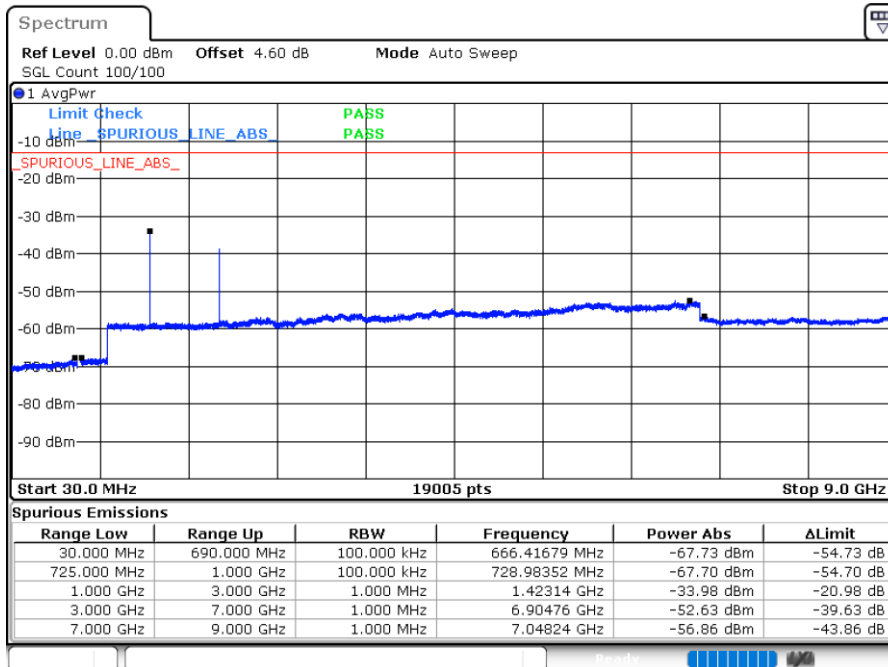
Middle Channel / QPSK



Date: 23.DEC.2021 22:34:56

Date: 23.DEC.2021 22:41:32

Highest Channel / QPSK



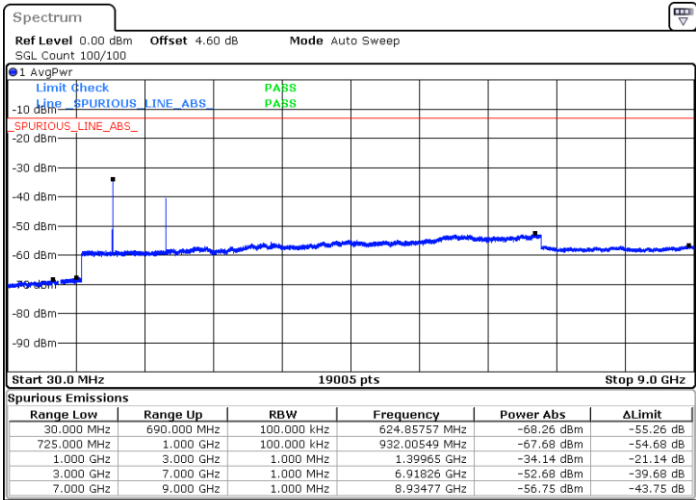
Date: 23.DEC.2021 22:42:30



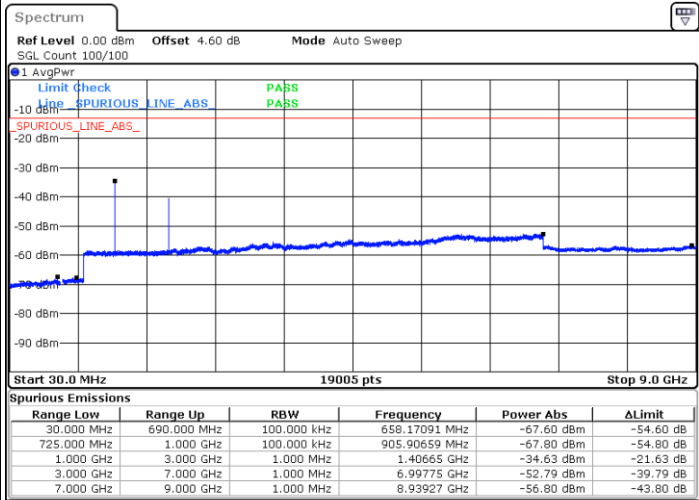
LTE Band 12 / 10MHz

Lowest Channel / QPSK

Middle Channel / QPSK

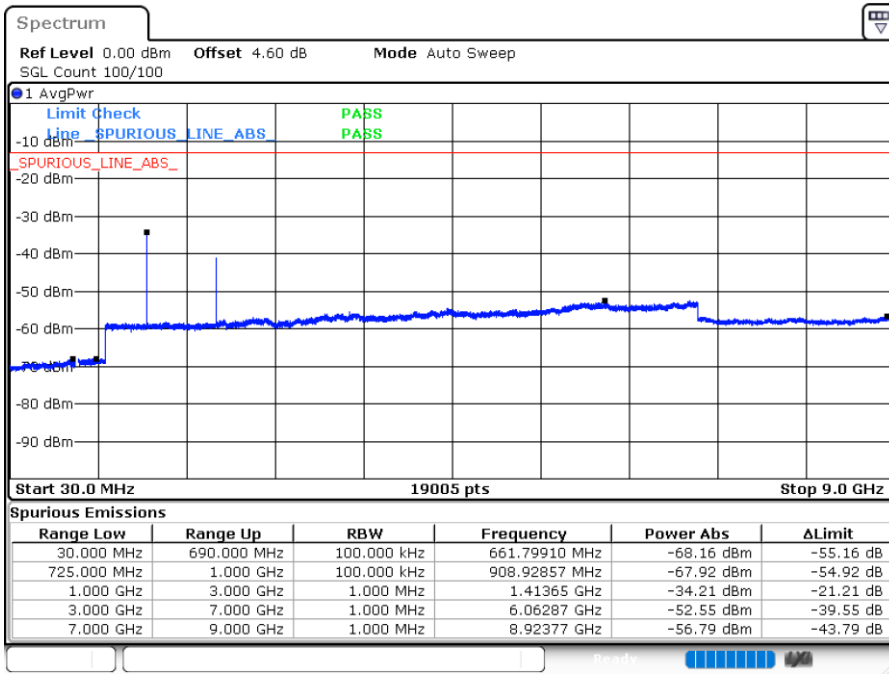


Date: 23.DEC.2021 22:49:58



Date: 23.DEC.2021 22:56:36

Highest Channel / QPSK



Date: 23.DEC.2021 22:57:33



Frequency Stability

Test Conditions		LTE Band 12 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0021	PASS
40	Normal Voltage	0.0015	
30	Normal Voltage	0.0013	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0011	
0	Normal Voltage	0.0008	
-10	Normal Voltage	0.0009	
-20	Normal Voltage	0.0017	
-30	Normal Voltage	0.0006	
20	Maximum Voltage	0.0018	
20	Normal Voltage	0.0014	
20	Battery End Point	0.0005	

Note:

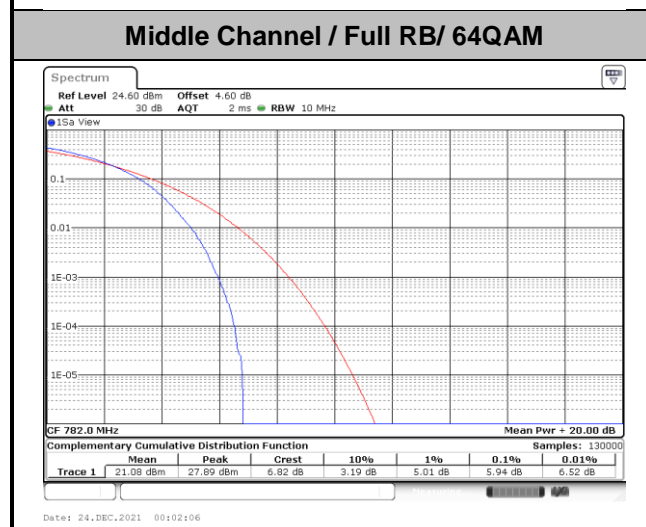
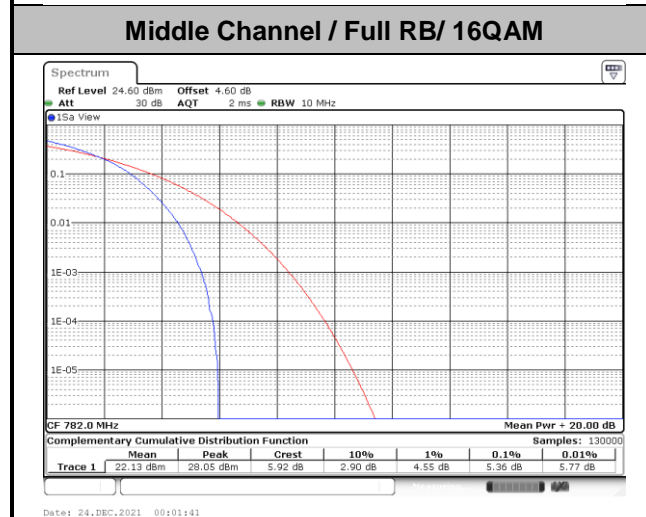
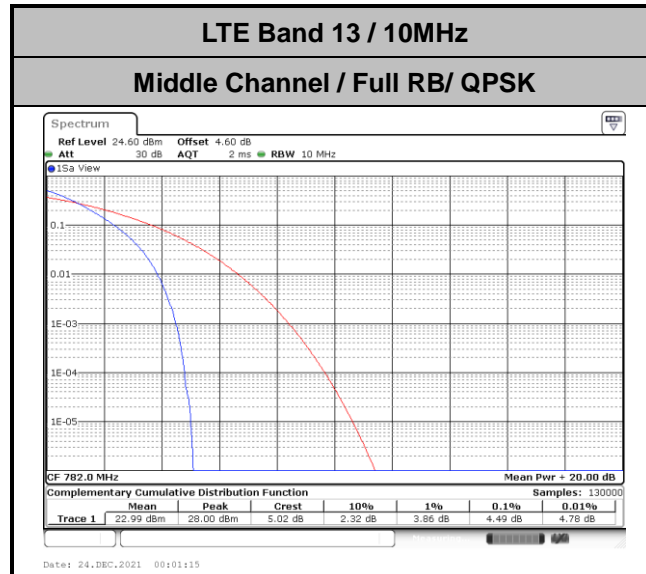
1. Normal Voltage =3.87 V. ; Battery End Point (BEP) =3.6 V. ; Maximum Voltage =4.2 V.
2. Note: The frequency fundamental emissions stay within the authorized frequency block.



LTE Band 13

Peak-to-Average Ratio

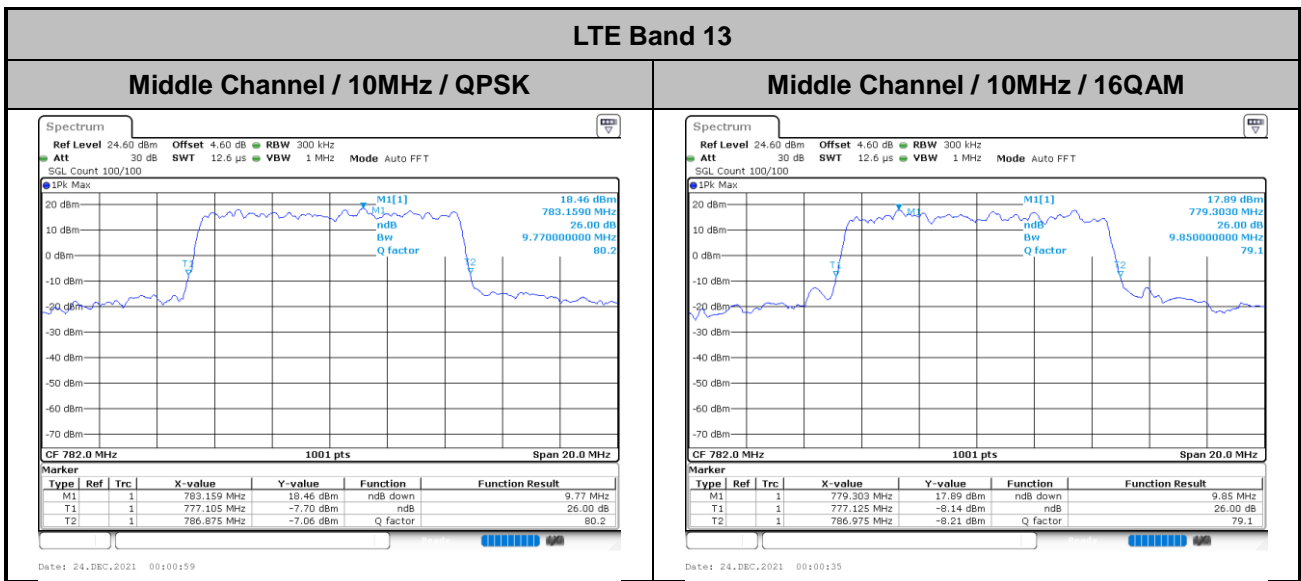
Mode	LTE Band 13 / 10MHz			
Mod.	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Result
Middle CH	4.49	5.36	5.94	PASS





26dB Bandwidth

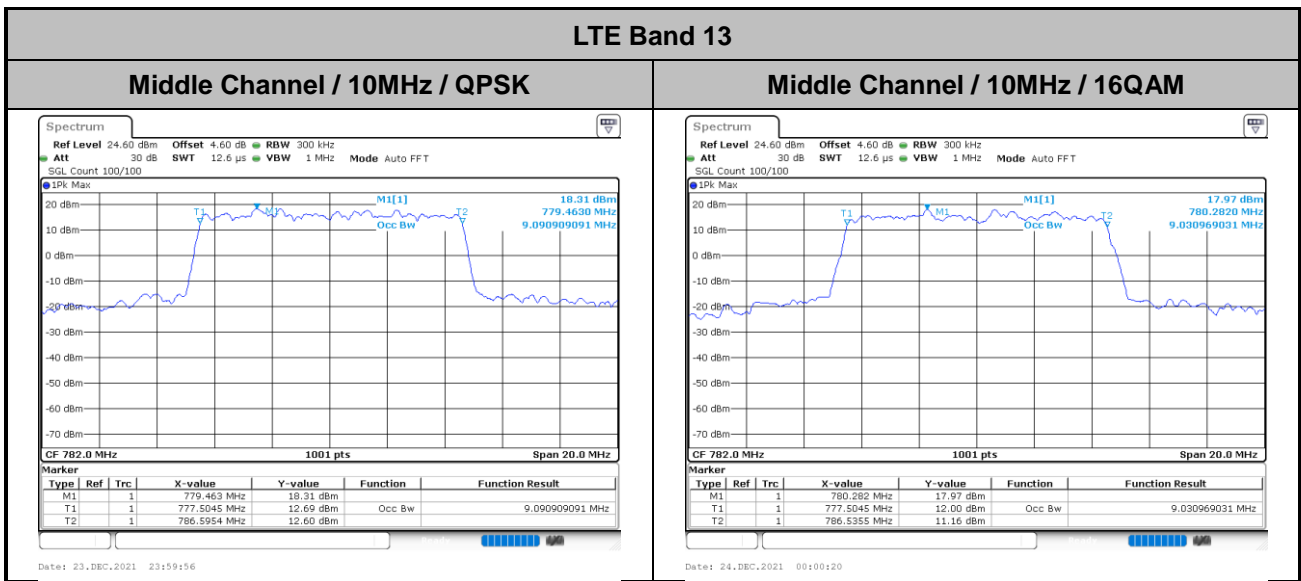
Mode	LTE Band 13 : 26dB BW(MHz)	
BW	10MHz	
Mod.	QPSK	16QAM
Middle CH	9.77	9.85





Occupied Bandwidth

Mode	LTE Band 13 : 99%OBW(MHz)	
BW	10MHz	
Mod.	QPSK	16QAM
Middle CH	9.09	9.03

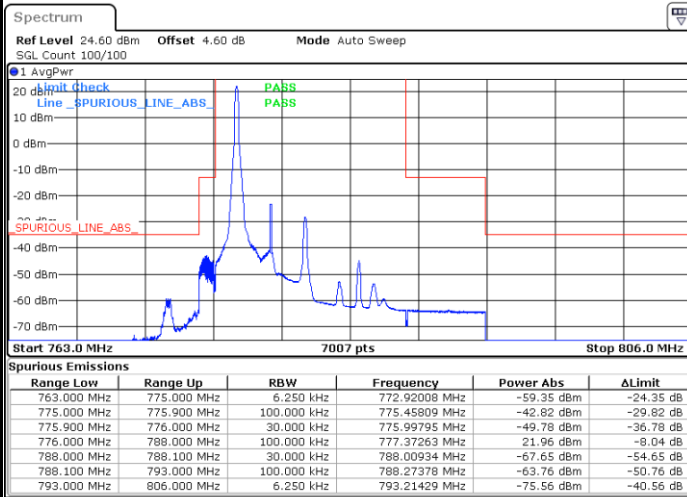




Conducted Band Edge

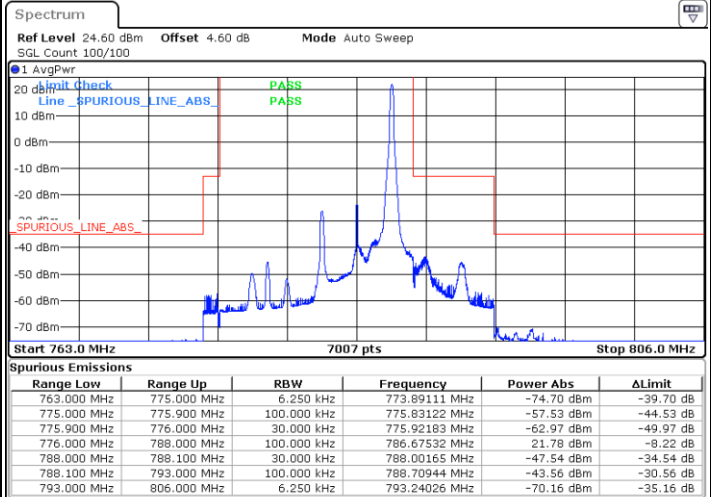
LTE Band 13 / 5MHz / QPSK

Lowest Band Edge / 1 RB



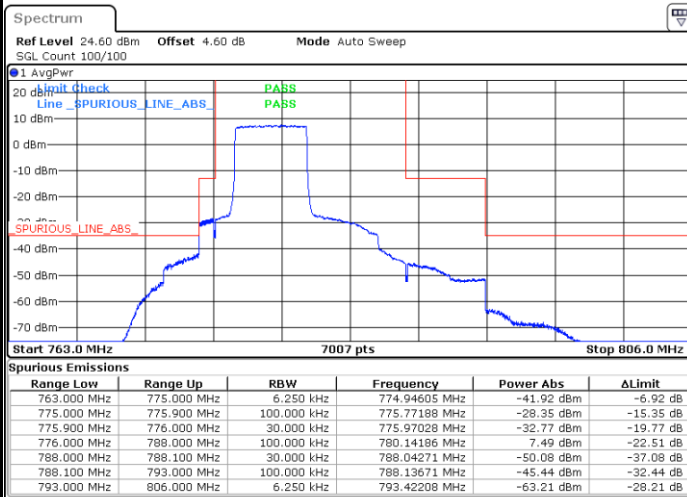
Date: 23.DEC.2021 23:19:09

Highest Band Edge / 1 RB



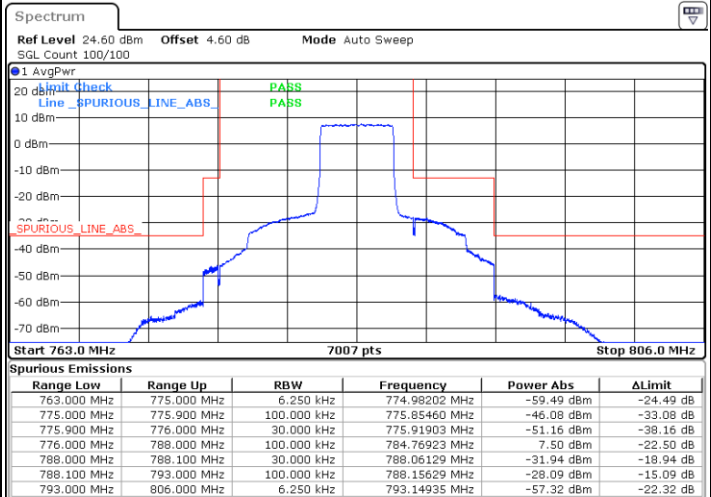
Date: 23.DEC.2021 23:32:26

Lowest Band Edge / Full RB



Date: 23.DEC.2021 23:28:37

Highest Band Edge / Full RB



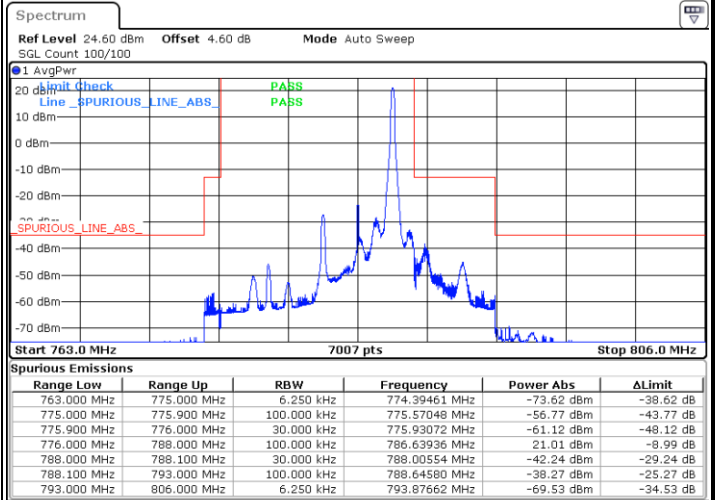
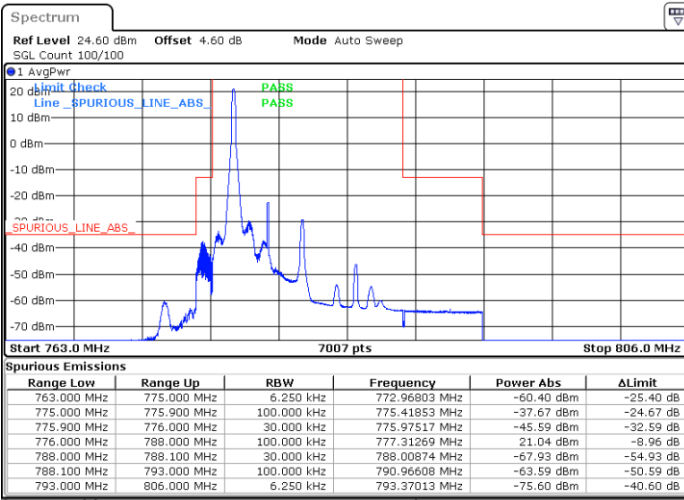
Date: 23.DEC.2021 23:41:51



LTE Band 13 / 5MHz / 16QAM

Lowest Band Edge / 1RB

Highest Band Edge / 1 RB

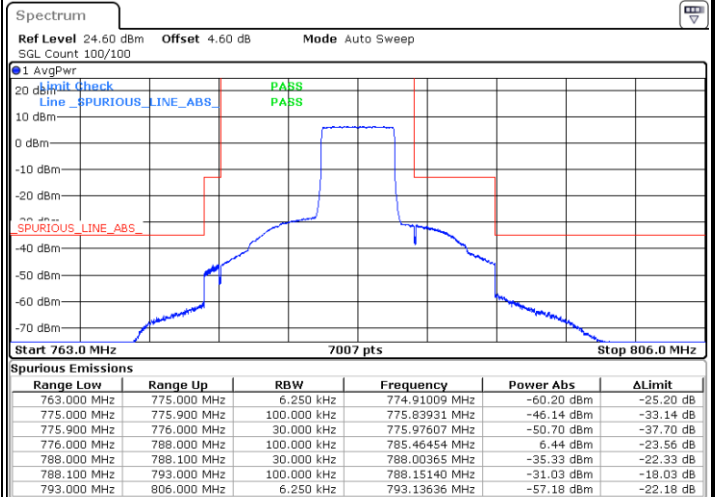
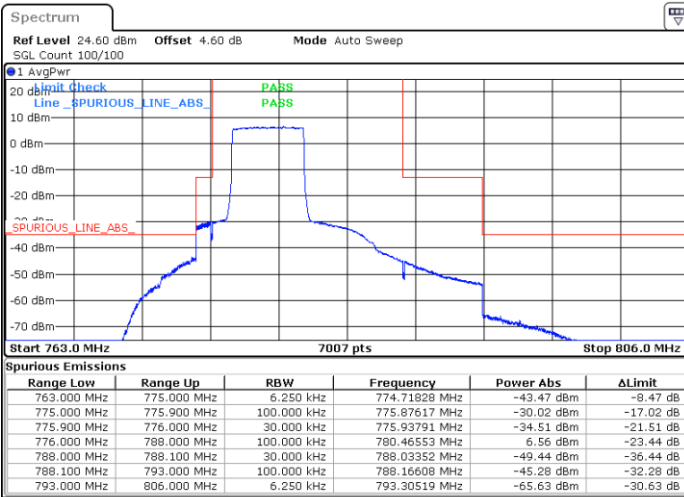


Date: 23.DEC.2021 23:21:02

Date: 23.DEC.2021 23:34:19

Lowest Band Edge / Full RB

Highest Band Edge / Full RB



Date: 23.DEC.2021 23:26:43

Date: 23.DEC.2021 23:39:58