



FCC RF Test Report

APPLICANT : Shenzhen Tinno Mobile Technology Corp.
EQUIPMENT : Watch
MODEL NAME : UW538AA
FCC ID : XD6UW538AA
STANDARD : 47 CFR Part 2, 22(H), 24(E), 27(H), 27(L)
CLASSIFICATION : PCS Licensed Transmitter worn on body (PCT)
TEST DATE(S) : May 18, 2024 ~ Jun. 12, 2024

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.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (ShenZhen)

1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055

People's Republic of China



TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Product Feature of Equipment Under Test	5
1.4 Product Specification of Equipment Under Test	6
1.5 Modification of EUT	6
1.6 Maximum ERP/EIRP Power and Emission Designator	7
1.7 Testing Location	8
1.8 Test Software	8
1.9 Applicable Standards	9
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	10
2.1 Test Mode	10
2.2 Connection Diagram of Test System	11
2.3 Support Unit used in test configuration and system	12
2.4 Measurement Results Explanation Example	12
2.5 Frequency List of Low/Middle/High Channels	13
3 CONDUCTED TEST ITEMS	15
3.1 Measuring Instruments	15
3.2 Test Setup	15
3.3 Test Result of Conducted Test	15
3.4 Conducted Output Power and ERP/EIRP	16
3.5 Peak-to-Average Ratio	17
3.6 Occupied Bandwidth	18
3.7 Conducted Band Edge	19
3.8 Conducted Spurious Emission	21
3.9 Frequency Stability	22
4 RADIATED TEST ITEMS	23
4.1 Measuring Instruments	23
4.2 Test Setup	23
4.3 Test Result of Radiated Test	24
4.4 Radiated Spurious Emission	25
5 LIST OF MEASURING EQUIPMENT	26
6 MEASUREMENT UNCERTAINTY	27
APPENDIX A. TEST RESULTS OF CONDUCTED TEST	
APPENDIX B. TEST RESULTS OF RADIATED TEST	
APPENDIX C. TEST SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG431213	Rev. 01	Initial issue of report	Jun. 18, 2024



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 5)	ERP < 7 Watt	PASS	-
	§27.50(c)(10)	Effective Radiated Power (Band 12)	ERP < 3 Watt		-
	§24.232(c)	Equivalent Isotropic Radiated Power (Band 2)	EIRP < 2Watt		-
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4) (Band 66)	EIRP < 1Watt		-
3.5	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	-	Report Only	-
3.7	§2.1051 §22.917(a) §24.238(a) §27.53(g) §27.53(h)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 12) (Band 66)	< 43+10log ₁₀ (P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §24.238(a) §27.53(g) §27.53(h)	Conducted Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 66)	< 43+10log ₁₀ (P[Watts])	PASS	-
3.9	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§2.1055 §24.235 §27.54		Within Authorized Band		
4.4	§2.1053 §22.917(a) §24.238(a) §27.53(g) §27.53(h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 66)	< 43+10log ₁₀ (P[Watts])	PASS	Under limit 35.00 dB at 5238.000 MHz

Conformity Assessment Condition:

- The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
- The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.



1 General Description

1.1 Applicant

Shenzhen Tinno Mobile Technology Corp.

27-001, South Side of Tianlong Mobile Headquarters Building, Tongfa South Road, Xili Community, Xili Street, Nanshan District, Shenzhen ,PRC

1.2 Manufacturer

Shenzhen Tinno Mobile Technology Corp.

27-001, South Side of Tianlong Mobile Headquarters Building, Tongfa South Road, Xili Community, Xili Street, Nanshan District, Shenzhen ,PRC

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Watch
Model Name	UW538AA
FCC ID	XD6UW538AA
IMEI Code	Conducted: 864796070005176 for Sample 1 864796070011687 for Sample 2 Radiation: 864796070003494 for Sample 1 864796070011406 for Sample 2
HW Version	V1.0
SW Version	UW538AAV01.08.10
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two type of EUT. The difference between them is EUT materials: sample 1 is 1st source materials, Sample 2 is 2nd source materials. According to the difference, we chose sample 1 to perform full test and sample 2 to verify the power/RSE.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz
Rx Frequency	LTE Band 2 : 1930 MHz ~ 1990 MHz LTE Band 4 : 2110 MHz ~ 2155 MHz LTE Band 5 : 869 MHz ~ 894 MHz LTE Band 12 : 729 MHz ~ 746 MHz LTE Band 66 : 2110 MHz ~ 2180 MHz
Bandwidth	LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 12 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 66 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	For Sample 1 : LTE Band 2 : 22.20 dBm LTE Band 4 : 22.16 dBm LTE Band 5 : 22.55 dBm LTE Band 12 : 22.21 dBm LTE Band 66 : 22.18 dBm For Sample 2 : LTE Band 2 : 22.11 dBm LTE Band 4 : 21.70 dBm LTE Band 5 : 22.43 dBm LTE Band 12 : 22.15 dBm LTE Band 66 : 21.73 dBm
Antenna Gain	LTE Band 2 : -8.50 dBi LTE Band 4 : -8.00 dBi LTE Band 5 : -11.00 dBi LTE Band 12 : -11.50 dBi LTE Band 66 : -8.00 dBi
Type of Modulation	QPSK

1.5 Modification of EUT

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



1.6 Maximum ERP/EIRP Power and Emission Designator

LTE Band 2		QPSK	
BW (MHz)	Frequency Range(MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)
1.4	1850.7 ~ 1909.3	0.0226	1M09G7D
3	1851.5 ~ 1908.5	0.0224	2M75G7D
5	1852.5 ~ 1907.5	0.0228	4M50G7D
10	1855.0 ~ 1905.0	0.0228	8M97G7D
15	1857.5 ~ 1902.5	0.0231	13M4G7D
20	1860.0 ~ 1900.0	0.0234	17M8G7D
LTE Band 4		QPSK	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)
1.4	1710.7 ~ 1754.3	0.0237	1M09G7D
3	1711.5 ~ 1753.5	0.0239	2M70G7D
5	1712.5 ~ 1752.5	0.0237	4M50G7D
10	1715.0 ~ 1750.0	0.0240	8M97G7D
15	1717.5 ~ 1747.5	0.0242	13M5G7D
20	1720.0 ~ 1745.0	0.0261	17M8G7D
LTE Band 5		QPSK	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)
1.4	824.7 ~ 848.3	0.0077	1M09G7D
3	825.5 ~ 847.5	0.0077	2M71G7D
5	826.5 ~ 846.5	0.0078	4M49G7D
10	829.0 ~ 844.0	0.0087	9M01G7D
LTE Band 12		QPSK	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)
1.4	699.7 ~ 715.3	0.0069	1M09G7D
3	700.5 ~ 714.5	0.0068	2M70G7D
5	701.5 ~ 713.5	0.0069	4M49G7D
10	704.0 ~ 711.0	0.0072	8M99G7D



LTE Band 66		QPSK	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)
1.4	1710.7 ~ 1779.3	0.0248	1M09G7D
3	1711.5 ~ 1778.5	0.0246	2M70G7D
5	1712.5 ~ 1777.5	0.0244	4M50G7D
10	1715.0 ~ 1775.0	0.0249	8M97G7D
15	1717.5 ~ 1772.5	0.0245	13M5G7D
20	1720.0 ~ 1770.0	0.0262	17M8G7D

1. LTE Band 66 overlaps the entire frequency range of LTE Band 4. Therefore, the test results provided in this report covers Band 66 as well as Band 4.

1.7 Testing Location

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	TH01-SZ	CN1256	421272

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-SZ	CN1256	421272

1.8 Test Software

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



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), 24(E), 27(H), 27(L)
- ♦ 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

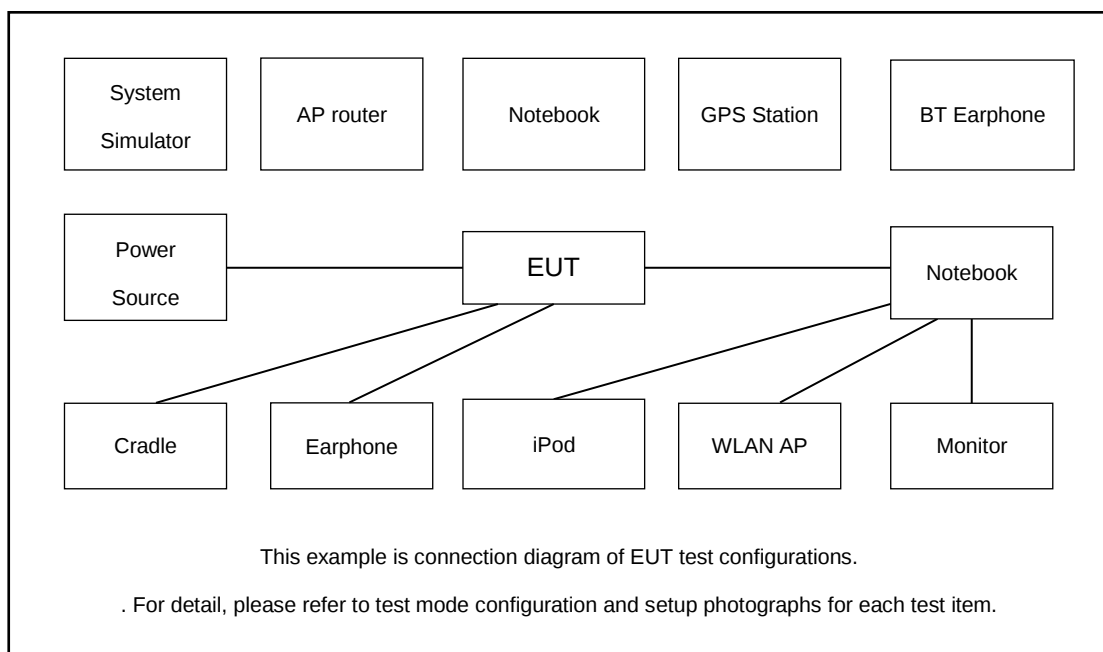
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

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

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	2	v	v	v	v	v	v	v	-	-	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	-	-	v	v	v	v	v	v
	5	v	v	v	v	-	-	v	-	-	v	v	v	v	v	v
	12	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
Peak-to-Average Ratio	2						v	v	-	-	v		v	v	v	v
	4						v	v	-	-	v		v	v	v	v
	5				v	-	-	v	-	-	v		v	v	v	v
	12				v	-	-	v	-	-	v		v	v	v	v
	66						v	v	-	-	v		v	v	v	v
26dB and 99% Bandwidth	2	v	v	v	v	v	v	v	-	-			v	v	v	v
	4	v	v	v	v	v	v	v	-	-			v	v	v	v
	5	v	v	v	v	-	-	v	-	-			v	v	v	v
	12	v	v	v	v	-	-	v	-	-			v	v	v	v
	66	v	v	v	v	v	v	v	-	-			v	v	v	v
Conducted Band Edge	2	v	v	v	v	v	v	v	-	-	v		v	v		v
	4	v	v	v	v	v	v	v	-	-	v		v	v		v
	5	v	v	v	v	-	-	v	-	-	v		v	v		v
	12	v	v	v	v	-	-	v	-	-	v		v	v		v
	66	v	v	v	v	v	v	v	-	-	v		v	v		v
Conducted Spurious Emission	2	v	v	v	v	v	v	v	-	-	v			v	v	v
	4	v	v	v	v	v	v	v	-	-	v			v	v	v
	5	v	v	v	v	-	-	v	-	-	v			v	v	v
	12	v	v	v	v	-	-	v	-	-	v			v	v	v
	66	v	v	v	v	v	v	v	-	-	v			v	v	v
Frequency Stability	2				v			v	-	-			v		v	
	4				v			v	-	-			v		v	
	5				v	-	-	v	-	-			v		v	
	12				v	-	-	v	-	-			v		v	
	66				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
E.R.P / E.I.R.P	2	v	v	v	v	v	v	v	-	-	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	-	-	v	v	v	v	v	v
	5	v	v	v	v	-	-	v	-	-	v	v	v	v	v	v
	12	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
Radiated Spurious Emission	2	Worst Case													v	
	4	Worst Case													v	
	5	Worst Case													v	
	12	Worst Case													v	
	66	Worst Case													v	
Note	1. The mark “v “ means that this configuration is chosen for testing 2. The mark “-“ means that this bandwidth is not supported. 3. 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. 4. LTE Band 66 overlaps the entire frequency range of LTE Band 4. Therefore, the test results provided in this report covers Band 66 as well as Band 4.															

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 and attenuator factor 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 and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.5 dB and 10dB attenuator.

Example :

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 4.5 + 10 = 14.5 \text{ (dB)}\end{aligned}$$



2.5 Frequency List of Low/Middle/High Channels

LTE Band 2 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	18700	18900	19100
	Frequency	1860	1880	1900
15	Channel	18675	18900	19125
	Frequency	1857.5	1880	1902.5
10	Channel	18650	18900	19150
	Frequency	1855	1880	1905
5	Channel	18625	18900	19175
	Frequency	1852.5	1880	1907.5
3	Channel	18615	18900	19185
	Frequency	1851.5	1880	1908.5
1.4	Channel	18607	18900	19193
	Frequency	1850.7	1880	1909.3

LTE Band 4 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	20050	20175	20300
	Frequency	1720	1732.5	1745
15	Channel	20025	20175	20325
	Frequency	1717.5	1732.5	1747.5
10	Channel	20000	20175	20350
	Frequency	1715	1732.5	1750
5	Channel	19975	20175	20375
	Frequency	1712.5	1732.5	1752.5
3	Channel	19965	20175	20385
	Frequency	1711.5	1732.5	1753.5
1.4	Channel	19957	20175	20393
	Frequency	1710.7	1732.5	1754.3



LTE Band 5 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	20450	20525	20600
	Frequency	829	836.5	844
5	Channel	20425	20525	20625
	Frequency	826.5	836.5	846.5
3	Channel	20415	20525	20635
	Frequency	825.5	836.5	847.5
1.4	Channel	20407	20525	20643
	Frequency	824.7	836.5	848.3

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 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

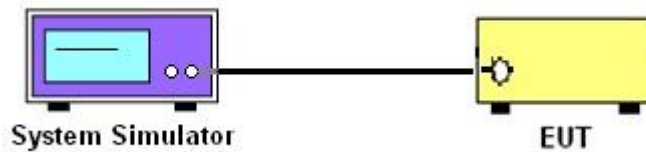
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.2 Test Setup

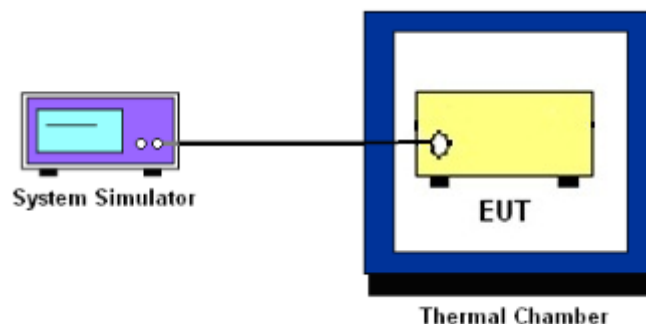
3.2.1 Conducted Output Power



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 5.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 12.

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

The EIRP of mobile transmitters must not exceed 1 Watts for LTE Band 4 and 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

22.917(a)

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

24.238 (a)

For operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 1MHz bandwidth. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

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 $P(\text{Watts})$ 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 $P(\text{Watts})$ 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.

3.7.2 Test Procedures

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

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)} = -13\text{dBm}.$$

8. 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.

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.

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

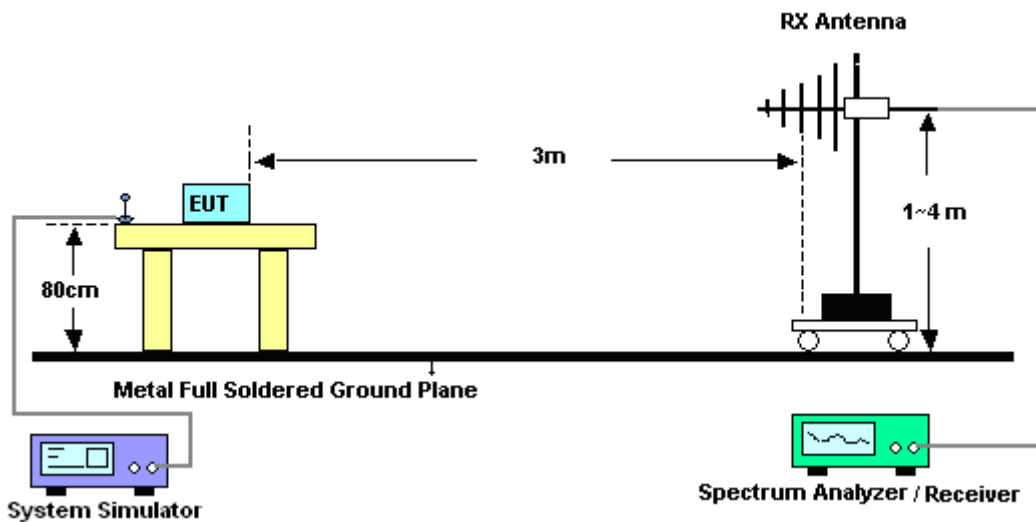
See list of measuring instruments of this test report.

4.2 Test Setup

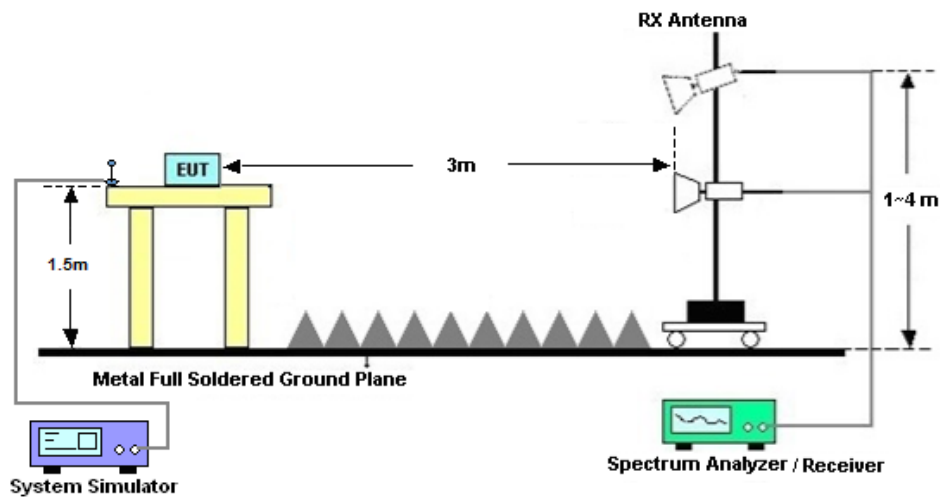
4.2.1 For radiated test below 30MHz



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.

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. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11. $ERP \text{ (dBm)} = EIRP - 2.15$
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)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 09, 2024	May 21, 2024 ~Jun. 05, 2024	Apr. 08, 2025	Conducted (TH01-SZ)
DC Power Supply	TTI	PL330P	290070	Max 32V , 3A	Oct. 16, 2023	May 21, 2024 ~Jun. 05, 2024	Oct. 15, 2024	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04 265	60.06.020.007 7	0.4GHz~26.5GHz	Dec. 25, 2023	May 21, 2024 ~Jun. 05, 2024	Dec. 24, 2024	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 05, 2023	May 21, 2024 ~Jun. 05, 2024	Jul. 04, 2024	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Oct. 18, 2023	May 18, 2024 ~Jun. 12, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Jul. 07, 2023	May 18, 2024 ~Jun. 12, 2024	Jul. 06, 2024	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 28, 2022	May 18, 2024 ~Jun. 12, 2024	Jun. 27, 2024	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May. 09 2024	May 18, 2024 ~Jun. 12, 2024	May. 08, 2025	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1474	1GHz~18GHz	Jul. 07, 2023	May 18, 2024 ~Jun. 12, 2024	Jul. 06, 2024	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Jul. 08, 2023	May 18, 2024 ~Jun. 12, 2024	Jul. 07, 2024	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 18, 2023	May 18, 2024 ~Jun. 12, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-1	1943528	1GHz~18GHz	Oct. 18, 2023	May 18, 2024 ~Jun. 12, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 07, 2023	May 18, 2024 ~Jun. 12, 2024	Jul. 06, 2024	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY57280136	500MHz~26.5GHz	Aug. 21, 2023	May 18, 2024 ~Jun. 12, 2024	Aug. 20, 2024	Radiation (03CH04-SZ)
AC Power Source	APC	AFV-S-600B	F119050019	N/A	Oct. 18, 2023	May 18, 2024 ~Jun. 12, 2024	Oct. 17, 2024	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	May 18, 2024 ~Jun. 12, 2024	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	May 18, 2024 ~Jun. 12, 2024	NCR	Radiation (03CH04-SZ)

NCR: No Calibration Required

6 Measurement Uncertainty

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 Conducted Measurement

Test Item	Uncertainty
Conducted Spurious Emission & Bandedge	± 1.34 dB
Occupied Channel Bandwidth	± 0.012 MHz
Conducted Power	± 1.34 dB
Peak to Average Ratio	± 1.34 dB
Frequency Stability	± 1.3 Hz

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
---	-------

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.8dB
---	-------

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
---	-------

----- THE END -----



Appendix A. Test Results of Conducted Test

Test Engineer :	Gary	Temperature :	24~26°C
		Relative Humidity :	50~53%

Conducted Output Power(Average power)

LTE Band 2

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				18700	18900	19100			
Frequency (MHz)				1860	1880	1900	L	M	H
20	QPSK	1	0	22.15	22.11	21.90	0.0232	0.0230	0.0219
20	QPSK	1	49	22.17	22.20	22.05	0.0233	0.0234	0.0226
20	QPSK	1	99	22.06	22.11	21.91	0.0227	0.0230	0.0219
20	QPSK	50	0	21.05	21.10	20.97	0.0180	0.0182	0.0177
20	QPSK	50	24	21.11	21.15	21.08	0.0182	0.0184	0.0181
20	QPSK	50	50	21.07	21.10	20.78	0.0181	0.0182	0.0169
20	QPSK	100	0	20.48	20.50	20.45	0.0158	0.0158	0.0157
Channel				18675	18900	19125	EIRP(W)		
Frequency (MHz)				1857.5	1880	1902.5	L	M	H
15	QPSK	1	0	22.14	22.03	21.80	0.0231	0.0225	0.0214
Channel				18650	18900	19150	EIRP(W)		
Frequency (MHz)				1855	1880	1905	L	M	H
10	QPSK	1	0	22.06	22.08	21.85	0.0227	0.0228	0.0216
Channel				18625	18900	19175	EIRP(W)		
Frequency (MHz)				1852.5	1880	1907.5	L	M	H
5	QPSK	1	0	22.08	22.02	21.84	0.0228	0.0225	0.0216
Channel				18615	18900	19185	EIRP(W)		
Frequency (MHz)				1851.5	1880	1908.5	L	M	H
3	QPSK	1	0	22.00	21.96	21.77	0.0224	0.0222	0.0212
Channel				18607	18900	19193	EIRP(W)		
Frequency (MHz)				1850.7	1880	1909.3	L	M	H
1.4	QPSK	1	0	22.05	22.01	21.82	0.0226	0.0224	0.0215



LTE Band 4

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				20050	20175	20300			
Frequency (MHz)				1720	1732.5	1745	L	M	H
20	QPSK	1	0	21.66	21.88	21.83	0.0232	0.0244	0.0242
20	QPSK	1	49	22.05	22.16	22.13	0.0254	0.0261	0.0259
20	QPSK	1	99	21.70	21.83	21.82	0.0234	0.0242	0.0241
20	QPSK	50	0	20.90	20.95	20.83	0.0195	0.0197	0.0192
20	QPSK	50	24	20.95	21.00	20.85	0.0197	0.0200	0.0193
20	QPSK	50	50	20.54	20.68	20.61	0.0179	0.0185	0.0182
20	QPSK	100	0	20.47	20.48	20.46	0.0177	0.0177	0.0176
Channel				20025	20175	20325	EIRP(W)		
Frequency (MHz)				1717.5	1732.5	1747.5	L	M	H
15	QPSK	1	0	21.60	21.84	21.69	0.0229	0.0242	0.0234
Channel				20000	20175	20350	EIRP(W)		
Frequency (MHz)				1715	1732.5	1750	L	M	H
10	QPSK	1	0	21.62	21.76	21.81	0.0230	0.0238	0.0240
Channel				19975	20175	20375	EIRP(W)		
Frequency (MHz)				1712.5	1732.5	1752.5	L	M	H
5	QPSK	1	0	21.60	21.75	21.69	0.0229	0.0237	0.0234
Channel				19965	20175	20385	EIRP(W)		
Frequency (MHz)				1711.5	1732.5	1753.5	L	M	H
3	QPSK	1	0	21.60	21.79	21.75	0.0229	0.0239	0.0237
Channel				19950	20175	20393	EIRP(W)		
Frequency (MHz)				1710	1732.5	1754.3	L	M	H
1.4	QPSK	1	0	21.55	21.75	21.69	0.0226	0.0237	0.0234



LTE Band 5

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				20450	20525	20600			
Frequency (MHz)				829	836.5	844	L	M	H
10	QPSK	1	0	22.10	21.98	22.03	0.0079	0.0076	0.0077
10	QPSK	1	25	22.53	22.55	22.22	0.0087	0.0087	0.0081
10	QPSK	1	49	21.98	22.06	22.12	0.0076	0.0078	0.0079
10	QPSK	25	0	21.20	21.30	21.30	0.0064	0.0065	0.0065
10	QPSK	25	12	21.21	21.35	21.32	0.0064	0.0066	0.0066
10	QPSK	25	25	21.17	21.23	21.25	0.0063	0.0064	0.0065
10	QPSK	50	0	21.27	21.30	21.28	0.0065	0.0065	0.0065
Channel				20425	20525	20625	ERP(W)		
Frequency (MHz)				826.5	836.5	846.5	L	M	H
5	QPSK	1	0	22.06	21.94	21.98	0.0078	0.0076	0.0076
Channel				20415	20525	20635	ERP(W)		
Frequency (MHz)				825.5	836.5	847.5	L	M	H
3	QPSK	1	0	21.99	21.89	21.95	0.0077	0.0075	0.0076
Channel				20407	20525	20643	ERP(W)		
Frequency (MHz)				824.7	836.5	848.3	L	M	H
1.4	QPSK	1	0	21.96	21.88	22.02	0.0076	0.0075	0.0077



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	22.05	22.12	22.06	0.0069	0.0070	0.0069
10	QPSK	1	25	22.11	22.21	22.13	0.0070	0.0072	0.0070
10	QPSK	1	49	22.00	22.16	22.00	0.0068	0.0071	0.0068
10	QPSK	25	0	20.99	21.09	20.94	0.0054	0.0055	0.0054
10	QPSK	25	12	21.19	21.31	21.24	0.0057	0.0058	0.0057
10	QPSK	25	25	20.95	21.08	20.94	0.0054	0.0055	0.0054
10	QPSK	50	0	21.03	21.12	21.02	0.0055	0.0056	0.0055
Channel				23035	23095	23155	ERP(W)		
Frequency (MHz)				701.5	707.5	713.5	L	M	H
5	QPSK	1	0	21.94	22.06	21.97	0.0067	0.0069	0.0068
Channel				23025	23095	23165	ERP(W)		
Frequency (MHz)				700.5	707.5	714.5	L	M	H
3	QPSK	1	0	22.00	21.97	21.95	0.0068	0.0068	0.0068
Channel				23017	23095	23173	ERP(W)		
Frequency (MHz)				699.7	707.5	715.3	L	M	H
1.4	QPSK	1	0	21.99	22.05	21.94	0.0068	0.0069	0.0067



LTE Band 66

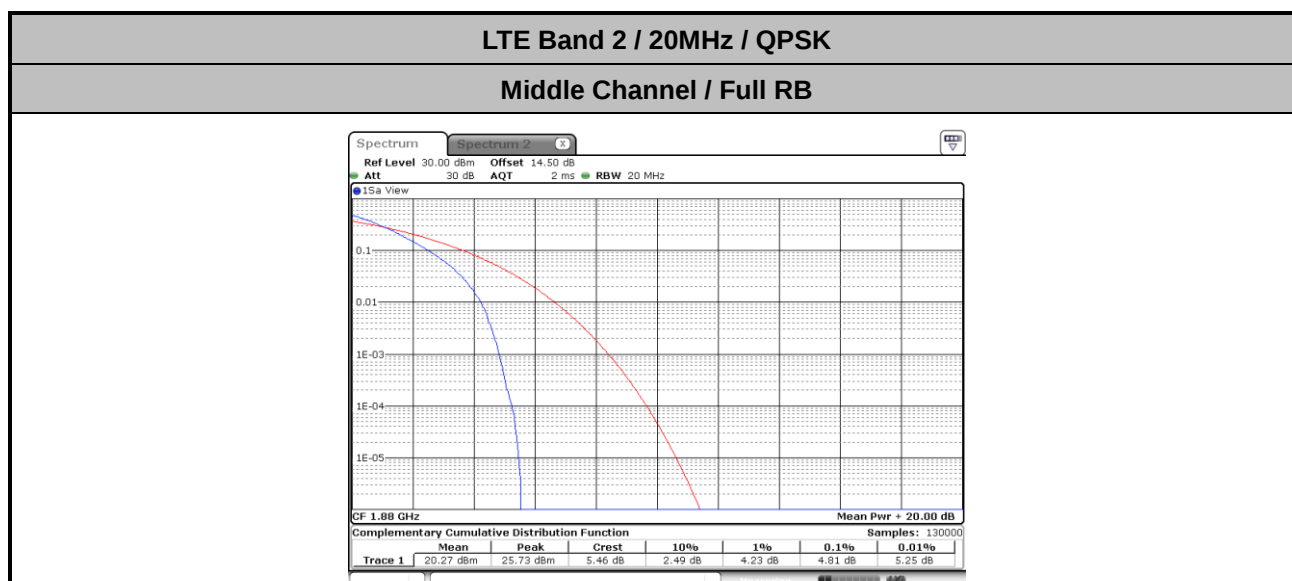
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				132072	132322	132572			
Frequency (MHz)				1720	1745	1770	L	M	H
20	QPSK	1	0	21.78	22.00	21.98	0.0239	0.0251	0.0250
20	QPSK	1	49	21.89	22.18	22.11	0.0245	0.0262	0.0258
20	QPSK	1	99	21.78	21.89	21.85	0.0239	0.0245	0.0243
20	QPSK	50	0	20.71	21.08	20.92	0.0187	0.0203	0.0196
20	QPSK	50	24	20.78	21.11	21.05	0.0190	0.0205	0.0202
20	QPSK	50	50	20.71	20.93	20.98	0.0187	0.0196	0.0199
20	QPSK	100	0	20.50	20.53	20.48	0.0178	0.0179	0.0177
Channel				132047	132322	132597	EIRP(W)		
Frequency (MHz)				1717.5	1745	1772.5	L	M	H
15	QPSK	1	0	21.76	21.90	21.89	0.0238	0.0245	0.0245
Channel				132022	132322	132622	EIRP(W)		
Frequency (MHz)				1715	1745	1775	L	M	H
10	QPSK	1	0	21.66	21.93	21.96	0.0232	0.0247	0.0249
Channel				131997	132322	132647	EIRP(W)		
Frequency (MHz)				1712.5	1745	1777.5	L	M	H
5	QPSK	1	0	21.74	21.88	21.87	0.0237	0.0244	0.0244
Channel				131987	132322	132657	EIRP(W)		
Frequency (MHz)				1711.5	1745	1778.5	L	M	H
3	QPSK	1	0	21.69	21.90	21.91	0.0234	0.0245	0.0246
Channel				131979	132322	132665	EIRP(W)		
Frequency (MHz)				1710.7	1745	1779.3	L	M	H
1.4	QPSK	1	0	21.76	21.95	21.94	0.0238	0.0248	0.0248



LTE Band 2

Peak-to-Average Ratio

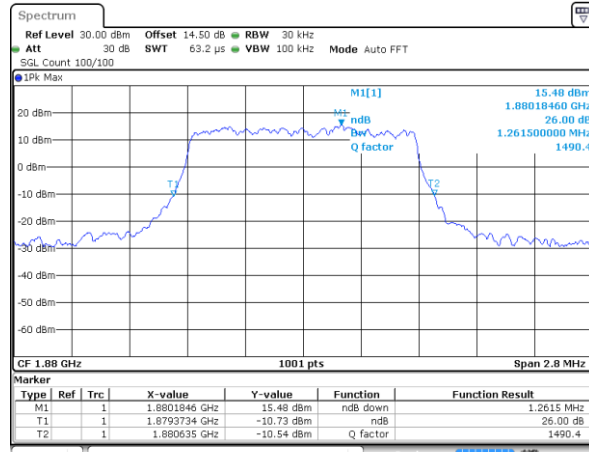
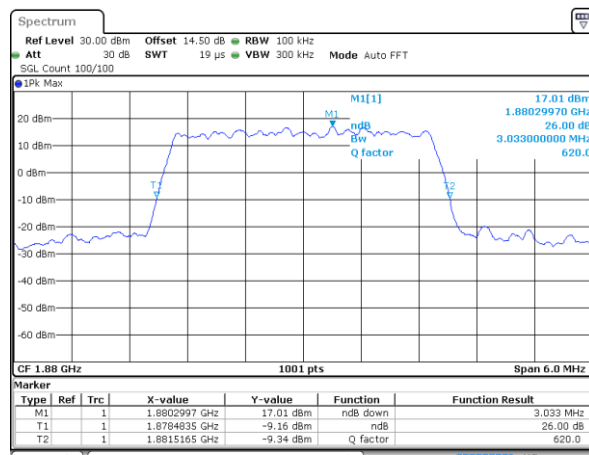
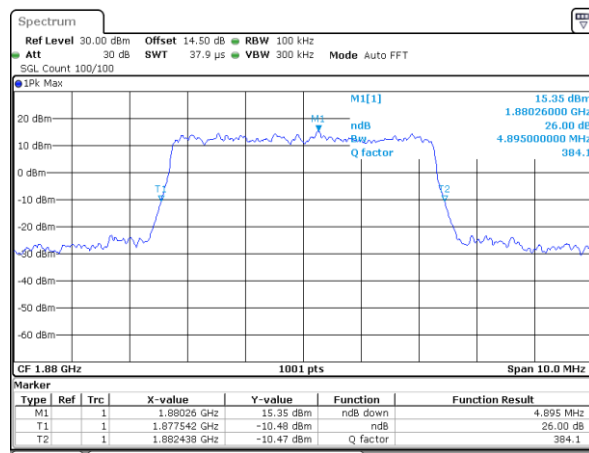
Mode	LTE Band 2 / 20MHz	
Mod.	QPSK	Limit: 13dB
RB Size	Full RB	Result
Middle CH	4.81	PASS





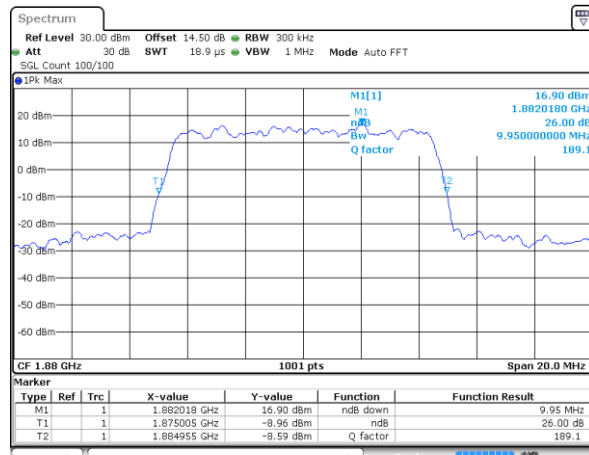
26dB Bandwidth

Mode	LTE Band 2 : 26dB BW(MHz)					
BW	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
Mod.	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Middle CH	1.26	3.03	4.90	9.95	14.48	18.82

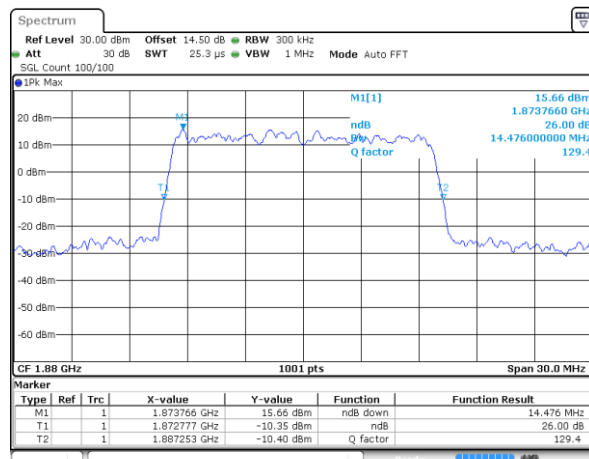
LTE Band 2
Middle Channel / 1.4MHz / QPSK

Middle Channel / 3MHz / QPSK

Middle Channel / 5MHz / QPSK




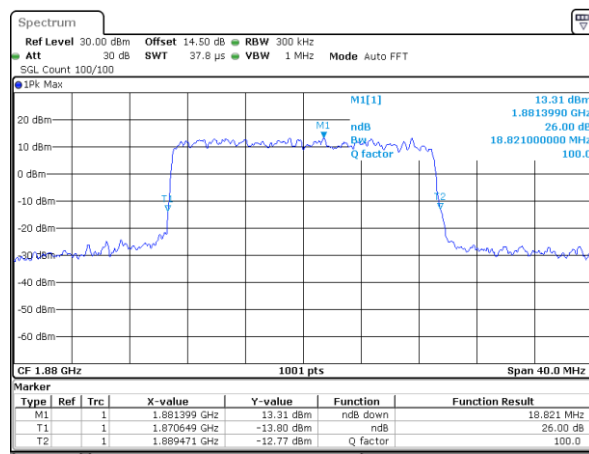
Middle Channel / 10MHz / QPSK



Middle Channel / 15MHz / QPSK



Middle Channel / 20MHz / QPSK





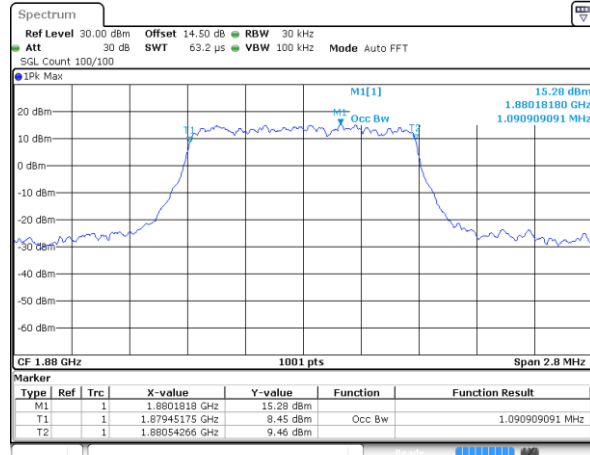
Occupied Bandwidth

Mode	LTE Band 2 : 99%OBW(MHz)					
BW	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz
Mod.	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Middle CH	1.09	2.75	4.50	8.97	13.40	17.82

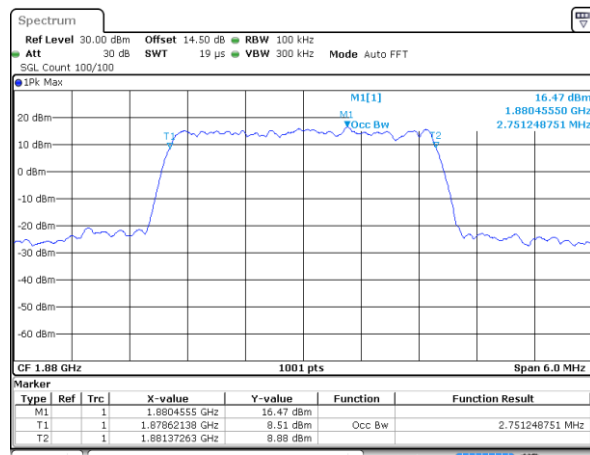


LTE Band 2

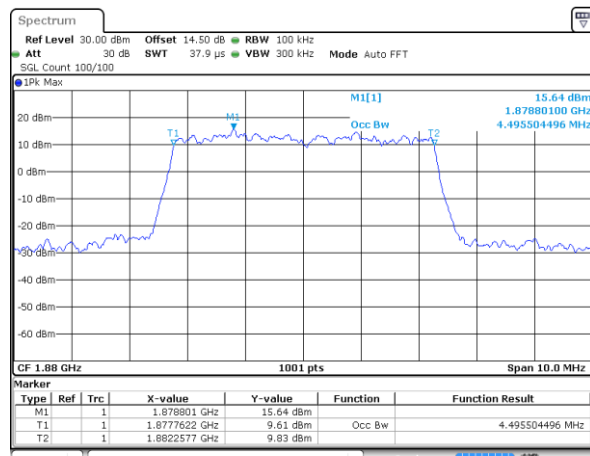
Middle Channel / 1.4MHz / QPSK

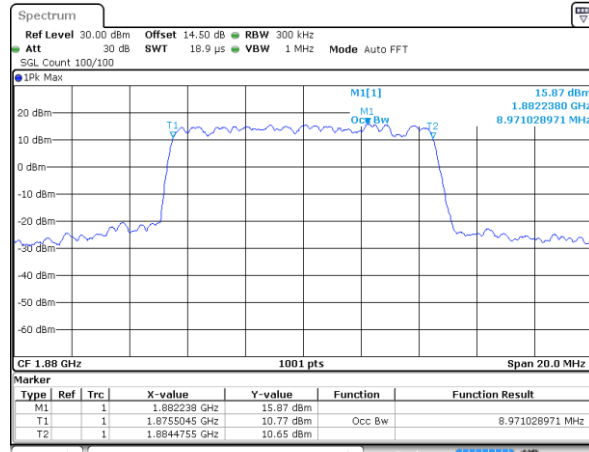
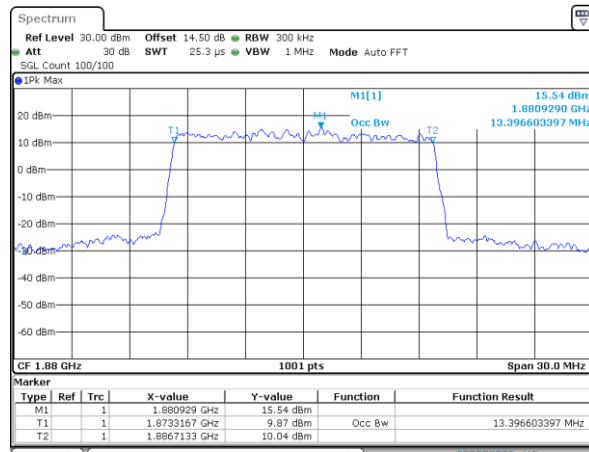
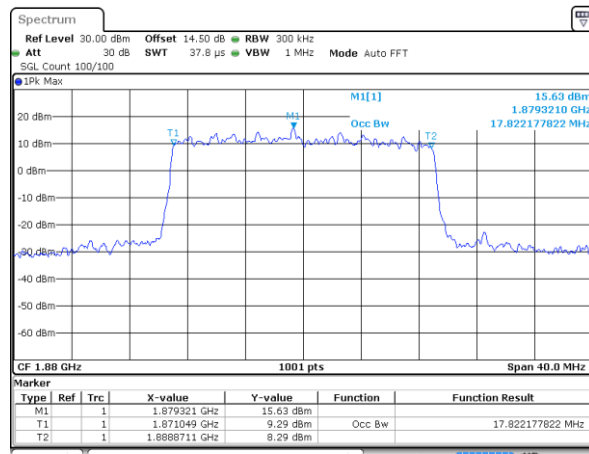


Middle Channel / 3MHz / QPSK



Middle Channel / 5MHz / QPSK



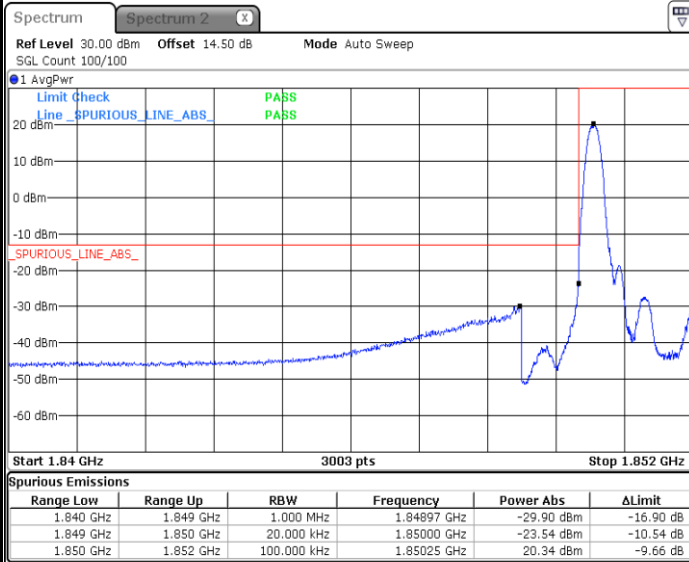
LTE Band 2
Middle Channel / 10MHz / QPSK

Middle Channel / 15MHz / QPSK

Middle Channel / 20MHz / QPSK




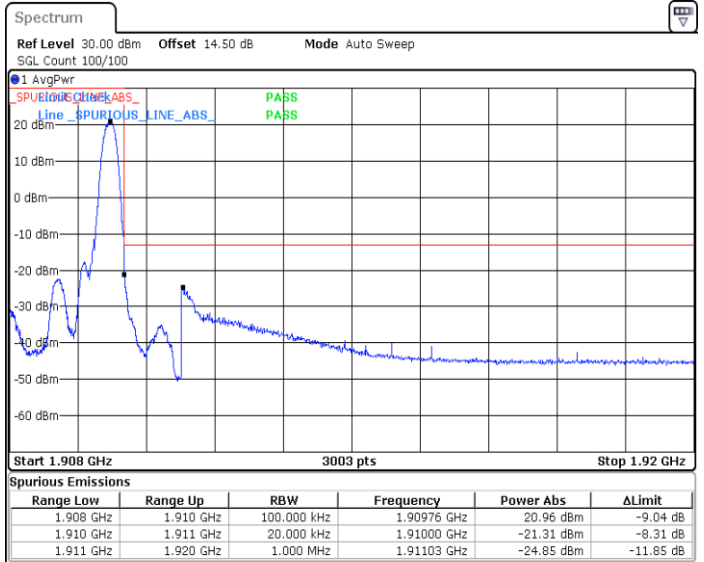
Conducted Band Edge

LTE Band 2 / 1.4MHz / QPSK

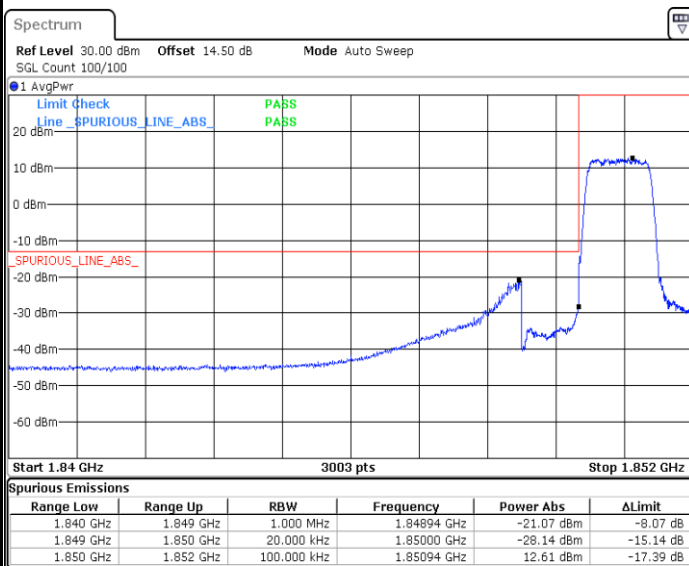
Lowest Band Edge / 1RB



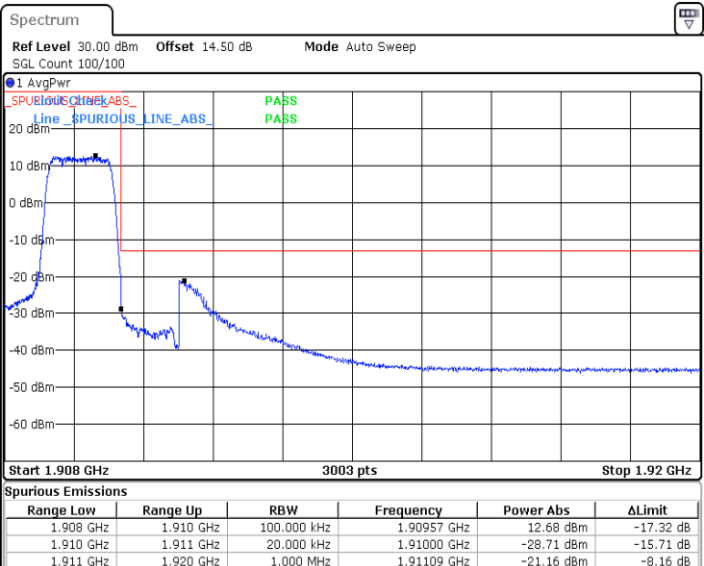
Highest Band Edge / 1RB



Lowest Band Edge / Full RB



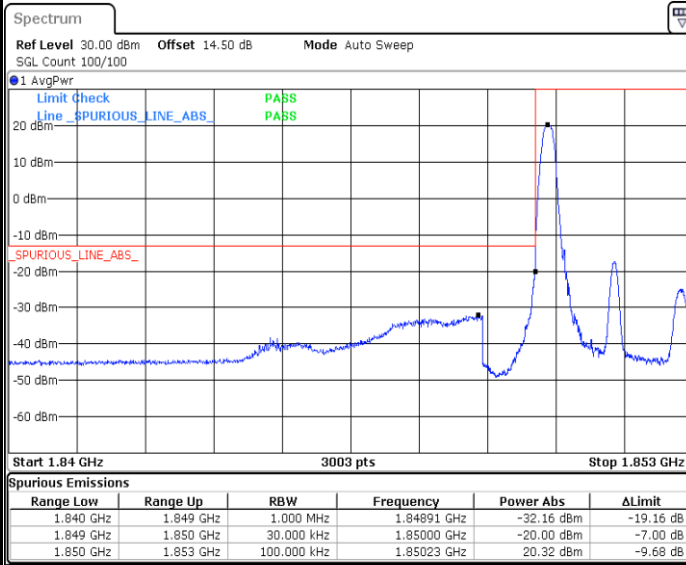
Highest Band Edge / Full RB



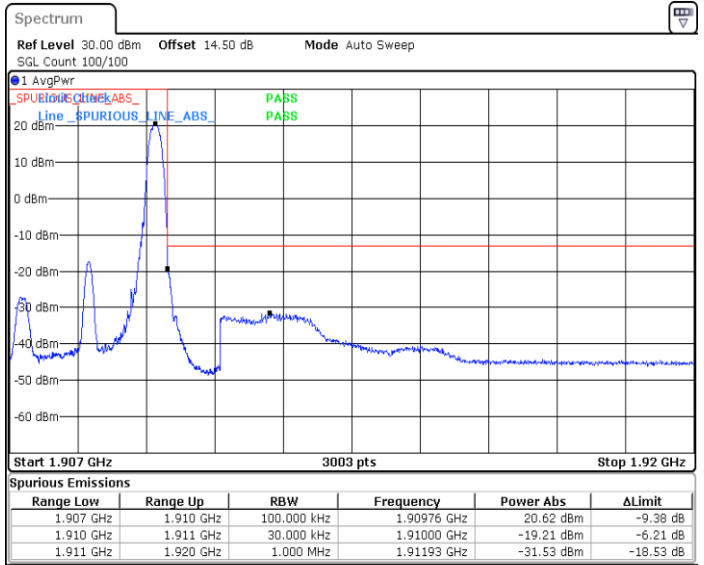


LTE Band 2 / 3MHz / QPSK

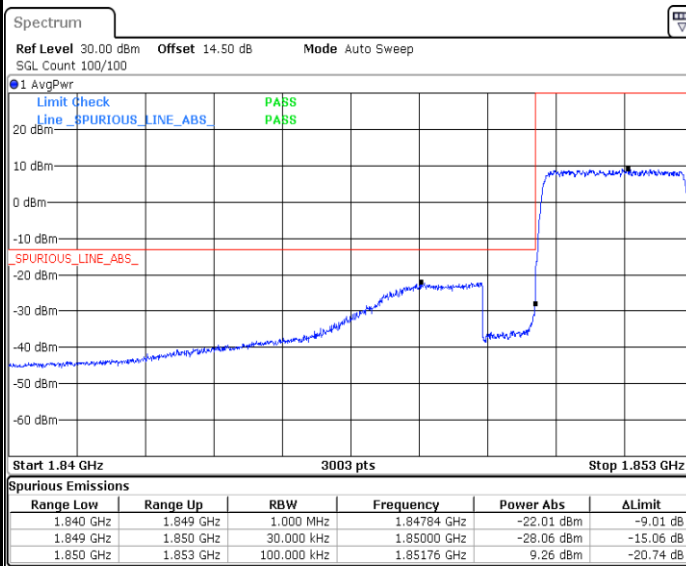
Lowest Band Edge / 1RB



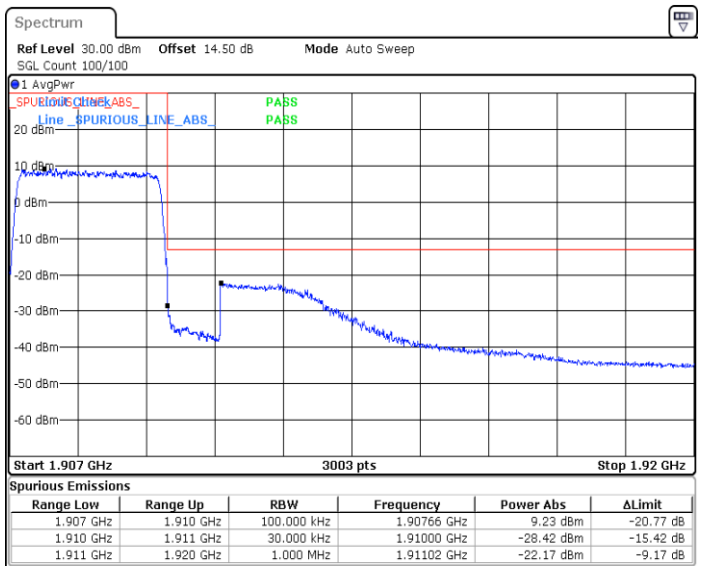
Highest Band Edge / 1RB



Lowest Band Edge / Full RB



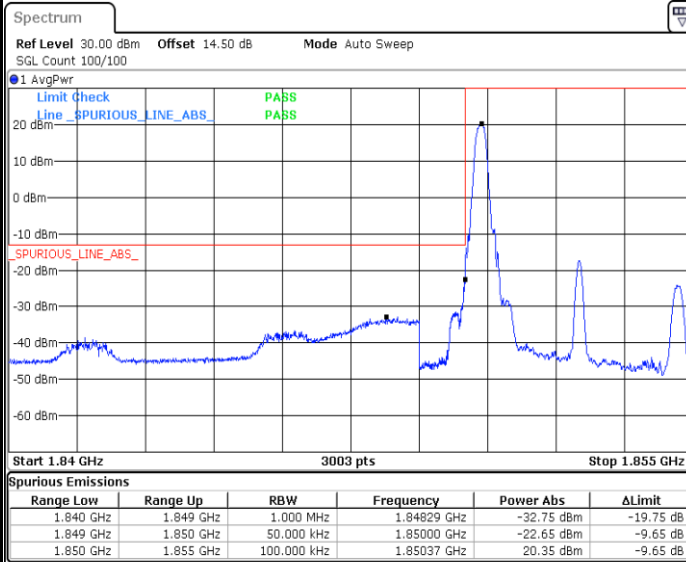
Highest Band Edge / Full RB



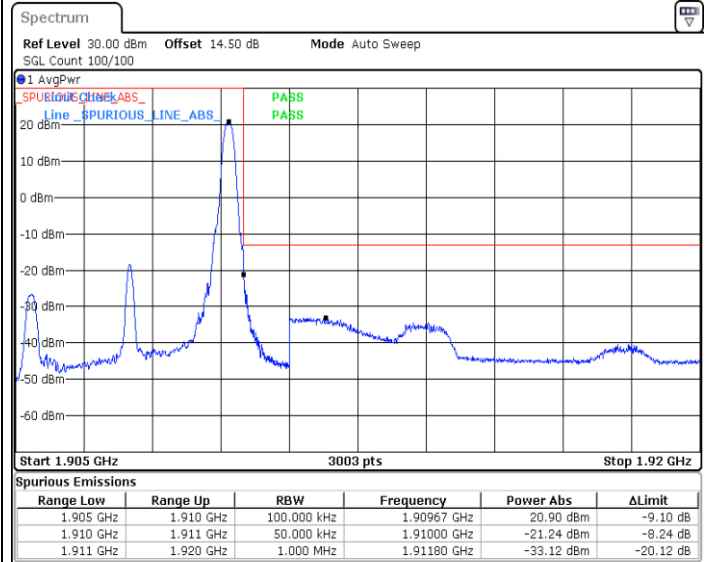


LTE Band 2 / 5MHz / QPSK

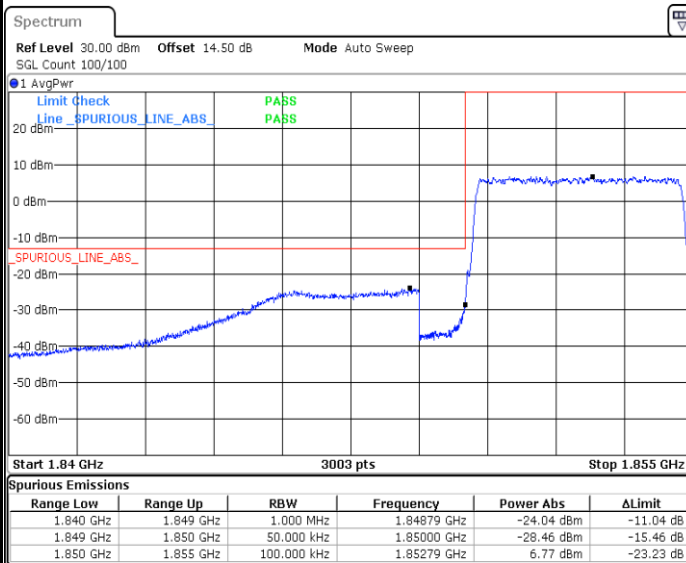
Lowest Band Edge / 1RB



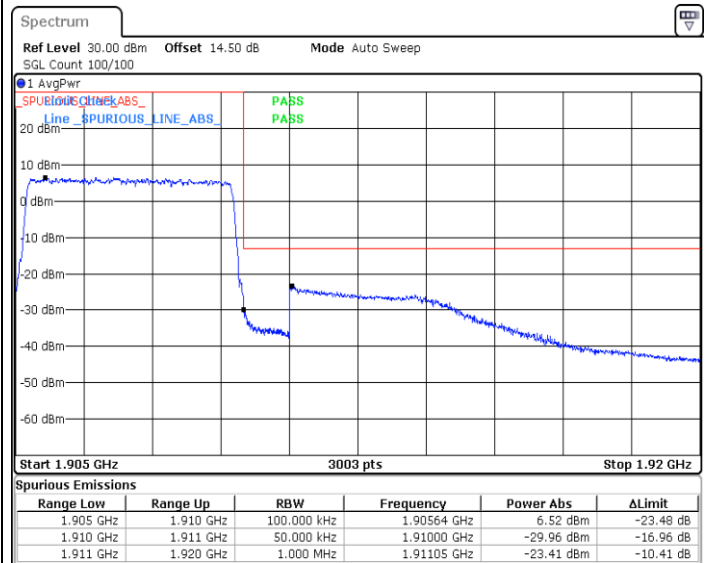
Highest Band Edge / 1RB



Lowest Band Edge / Full RB



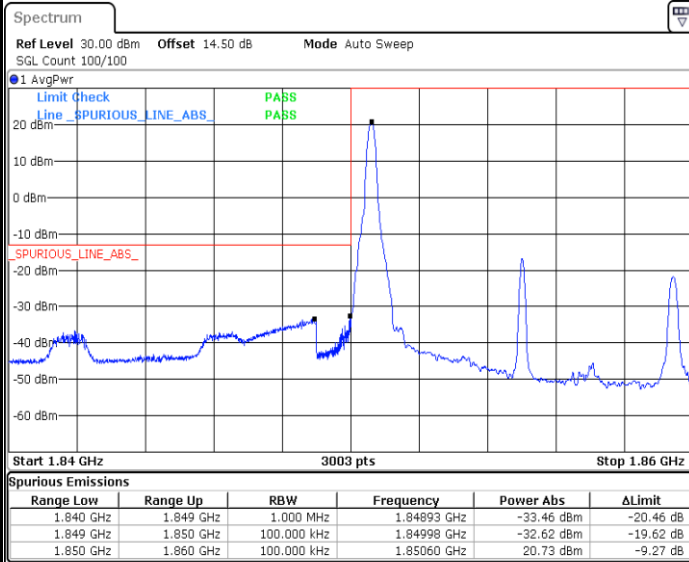
Highest Band Edge / Full RB



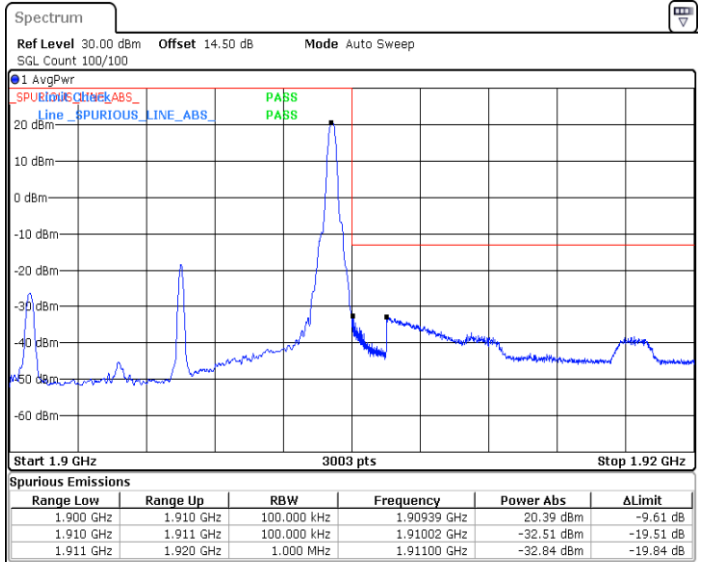


LTE Band 2 / 10MHz / QPSK

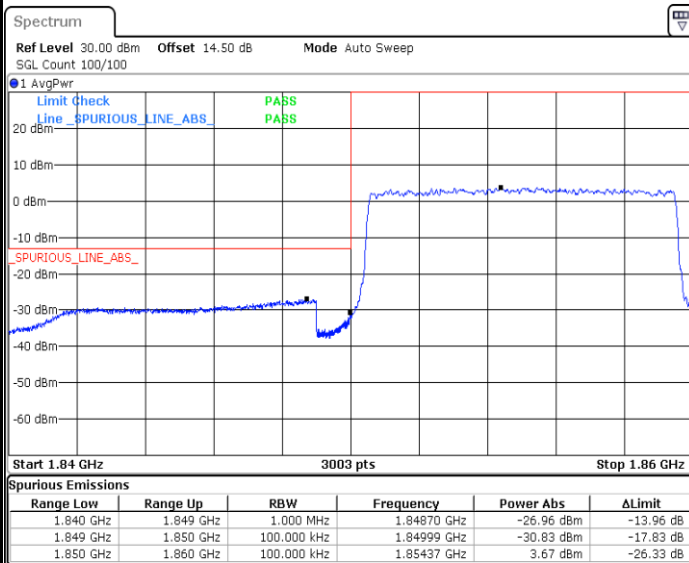
Lowest Band Edge / 1RB



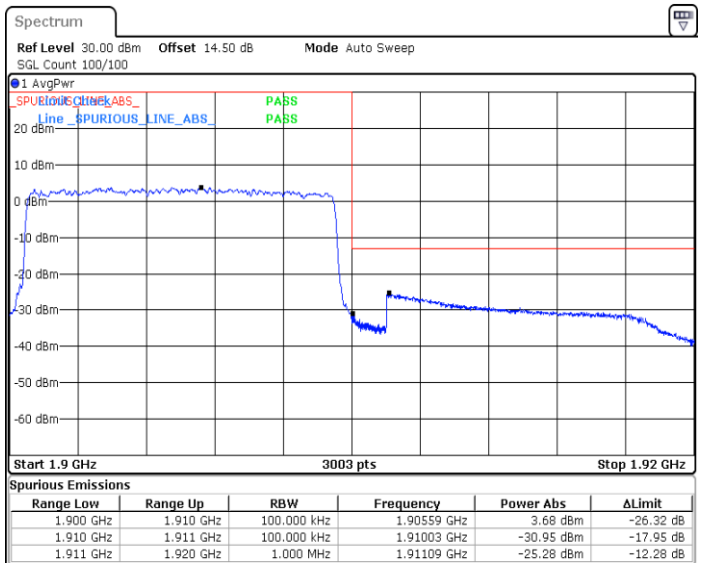
Highest Band Edge / 1RB



Lowest Band Edge / Full RB



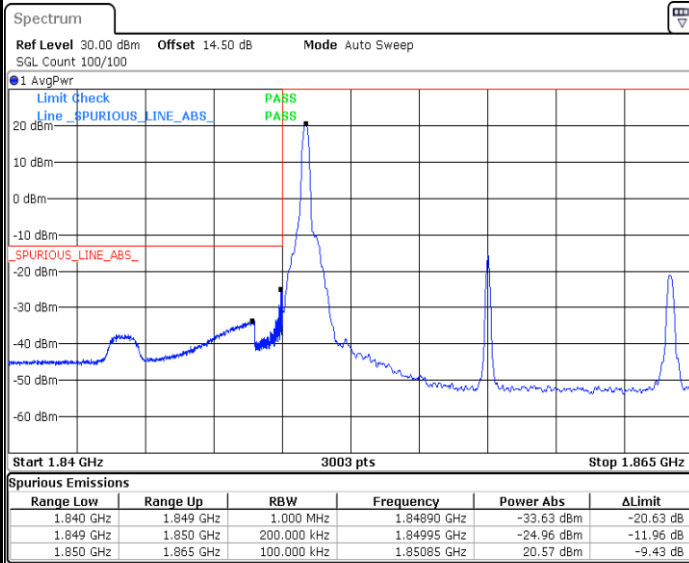
Highest Band Edge / Full RB



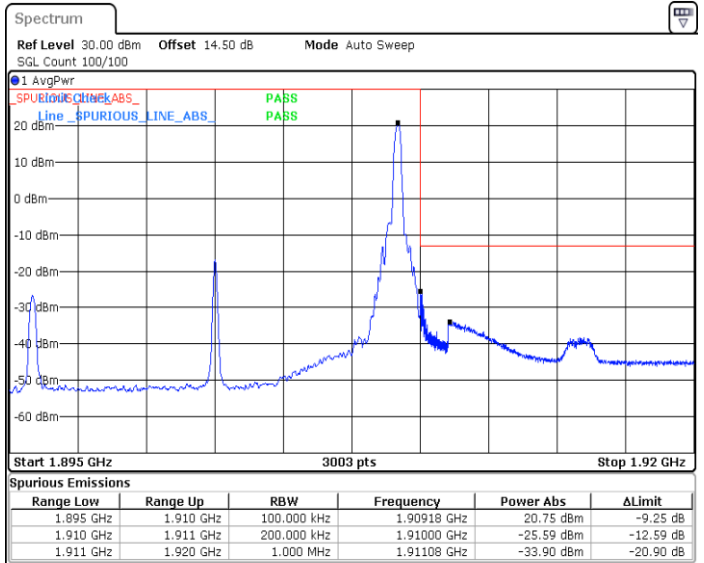


LTE Band 2 / 15MHz / QPSK

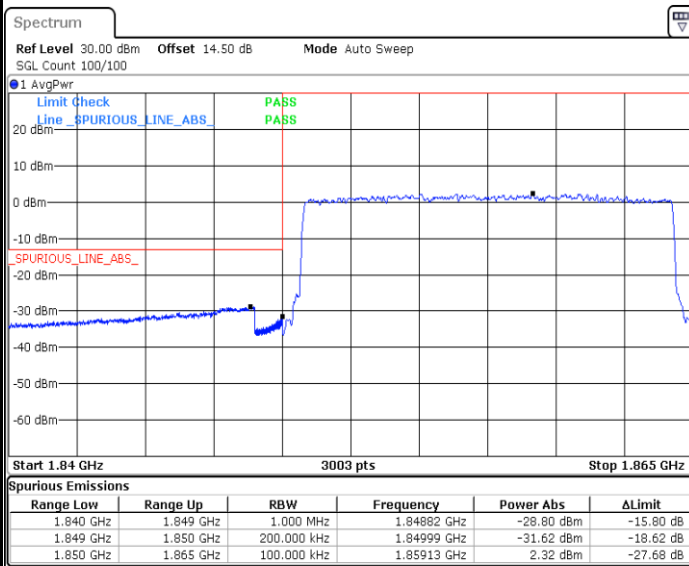
Lowest Band Edge / 1RB



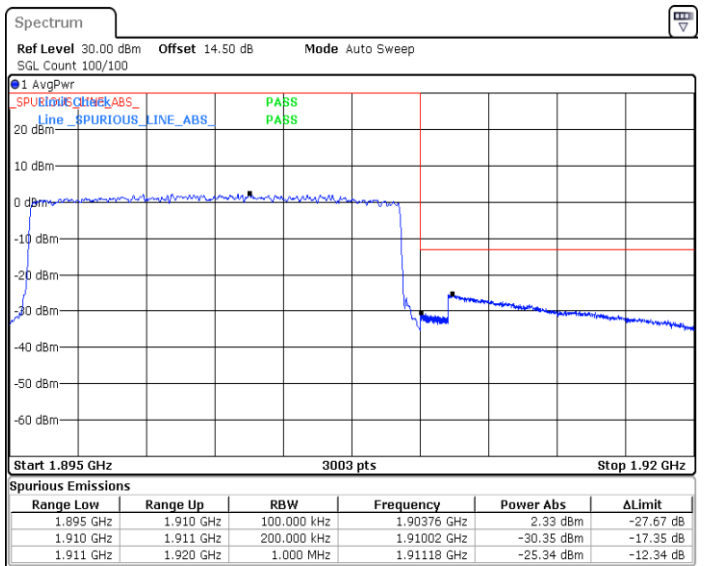
Highest Band Edge / 1RB



Lowest Band Edge / Full RB



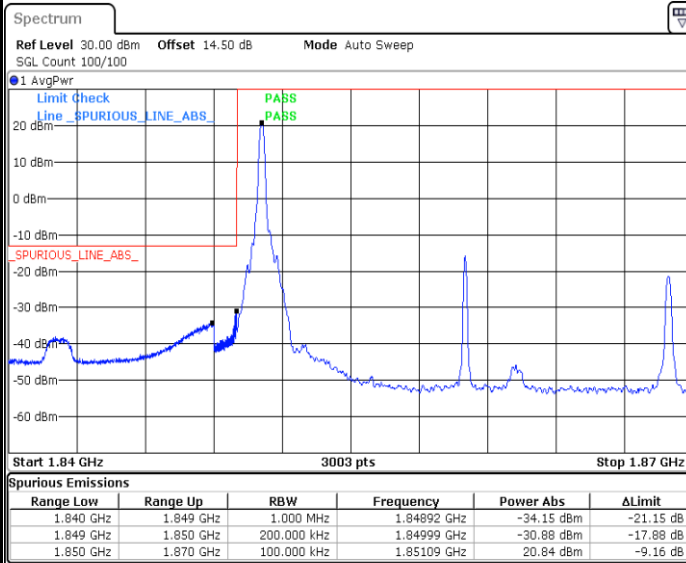
Highest Band Edge / Full RB



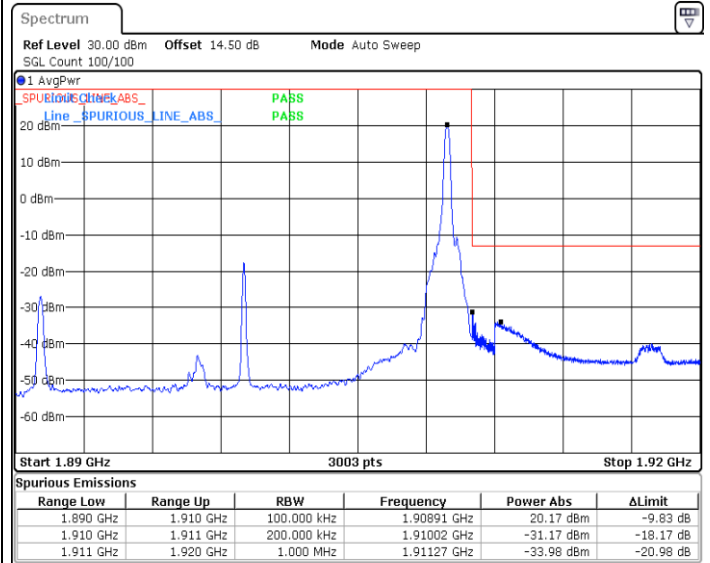


LTE Band 2 / 20MHz / QPSK

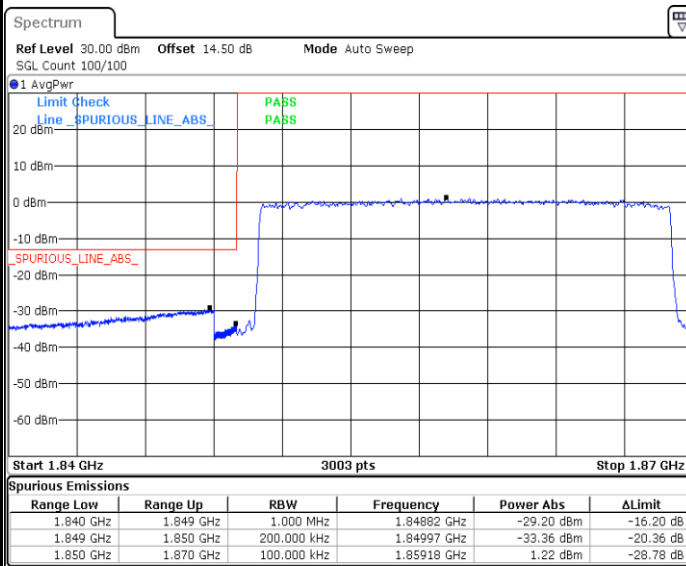
Lowest Band Edge / 1RB



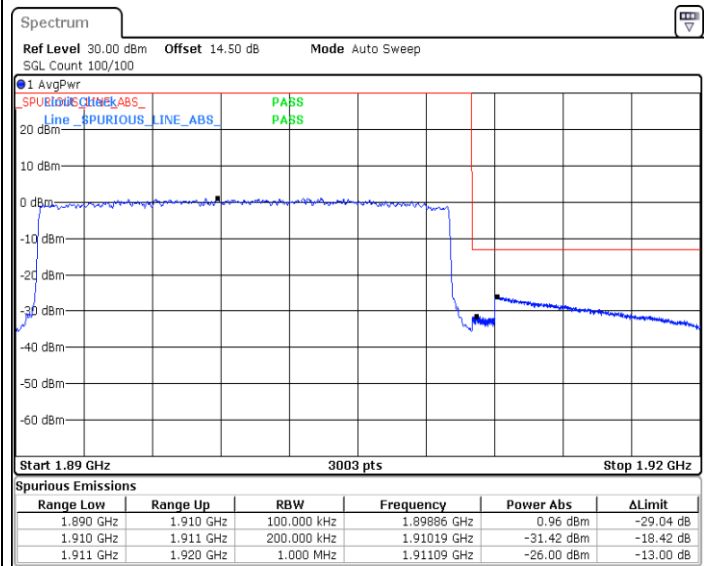
Highest Band Edge / 1RB



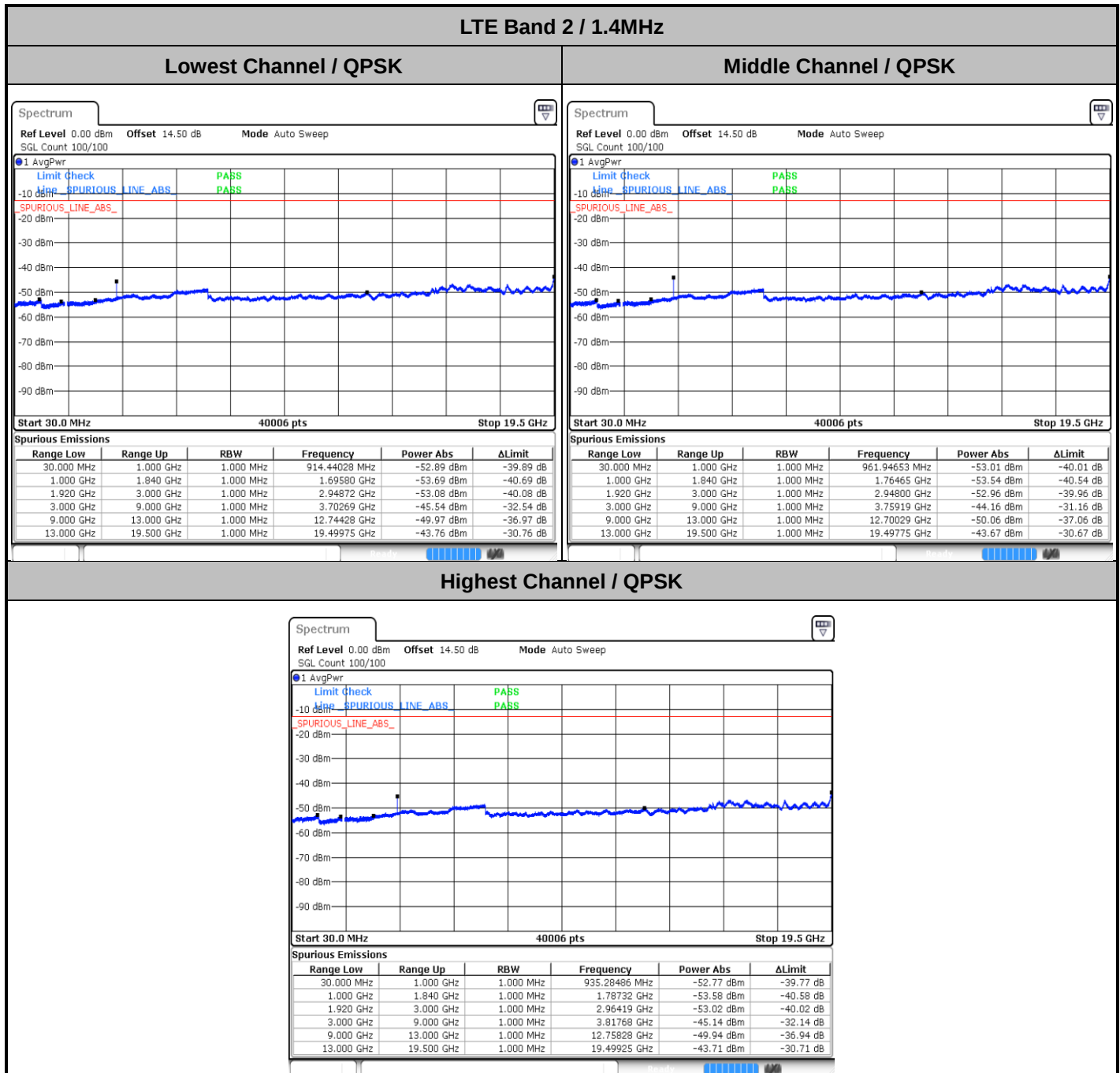
Lowest Band Edge / Full RB



Highest Band Edge / Full RB



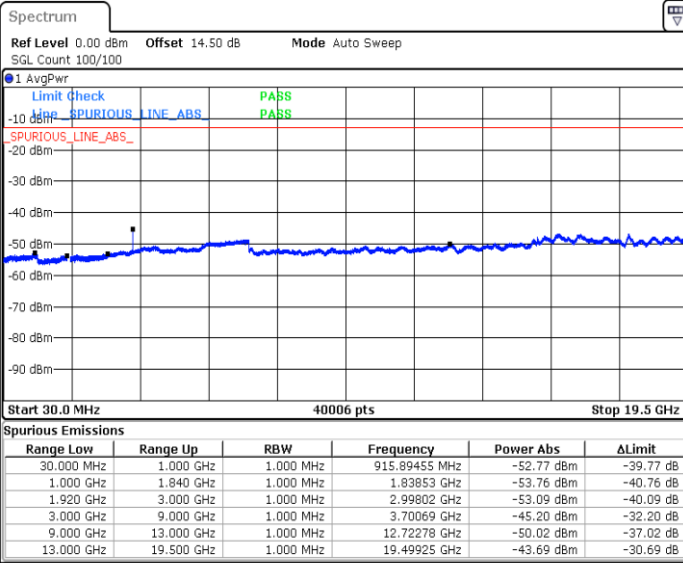
Conducted Spurious Emission



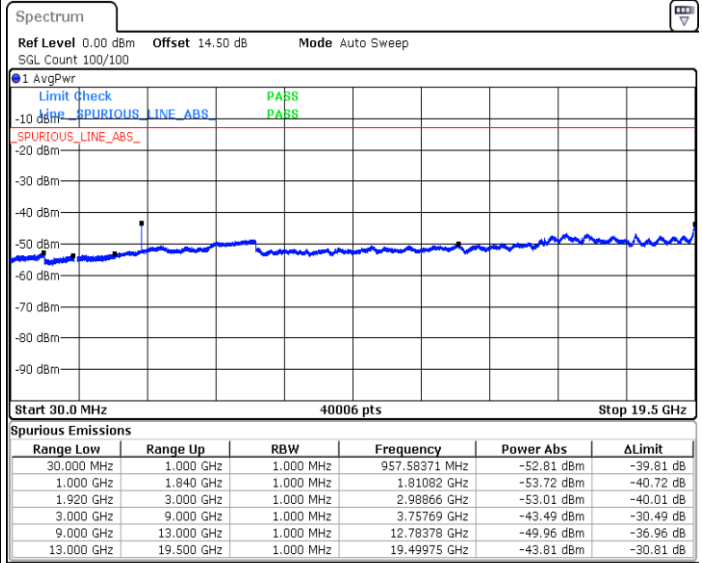


LTE Band 2 / 3MHz

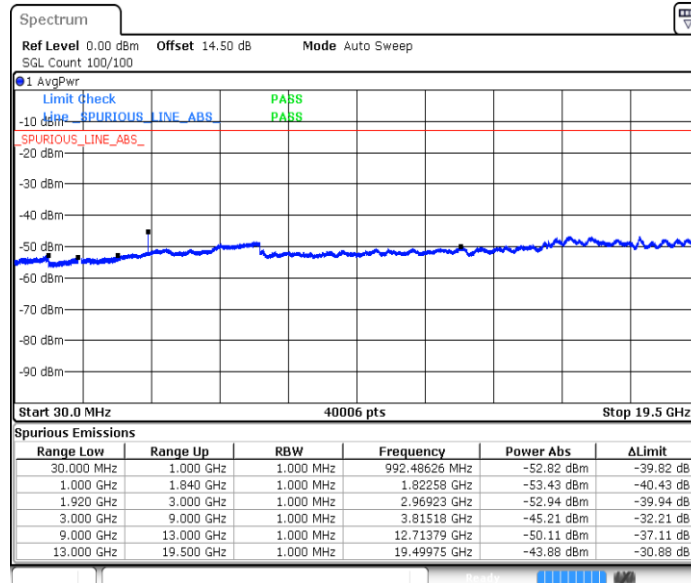
Lowest Channel / QPSK



Middle Channel / QPSK



Highest Channel / QPSK

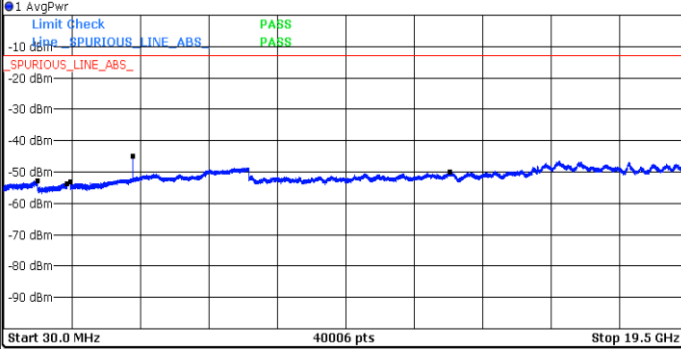




LTE Band 2 / 5MHz

Lowest Channel / QPSK

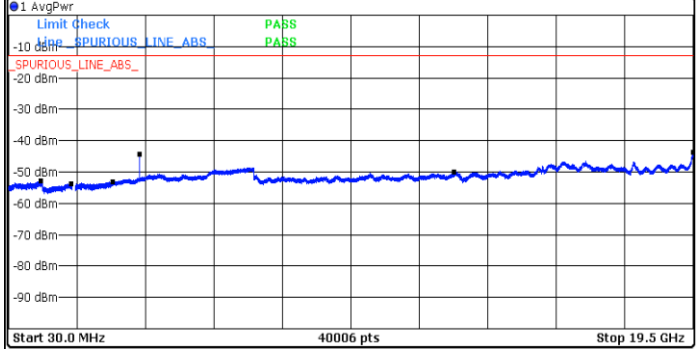
Spectrum

Ref Level 0.00 dBm Offset 14.50 dB Mode Auto Sweep
SGL Count 100/100

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	992.97101 MHz	-52.85 dBm	-39.85 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.83979 GHz	-53.80 dBm	-40.80 dB
1.920 GHz	3.000 GHz	1.000 MHz	1.93422 GHz	-53.22 dBm	-40.22 dB
3.000 GHz	9.000 GHz	1.000 MHz	3.70069 GHz	-44.89 dBm	-31.89 dB
9.000 GHz	13.000 GHz	1.000 MHz	12.72428 GHz	-49.96 dBm	-36.96 dB
13.000 GHz	19.500 GHz	1.000 MHz	19.49825 GHz	-43.48 dBm	-30.48 dB

Middle Channel / QPSK

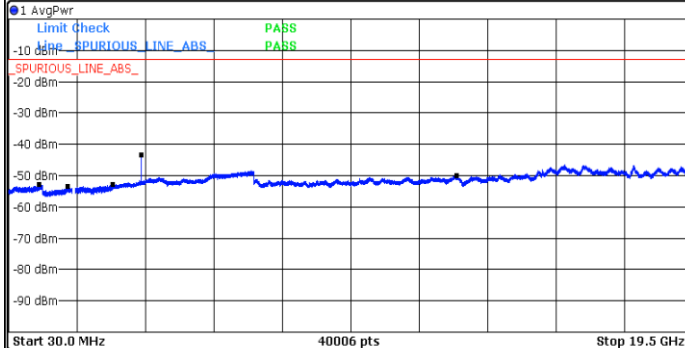
Spectrum

Ref Level 0.00 dBm Offset 14.50 dB Mode Auto Sweep
SGL Count 100/100

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	950.31234 MHz	-52.88 dBm	-39.88 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.79487 GHz	-53.65 dBm	-40.65 dB
1.920 GHz	3.000 GHz	1.000 MHz	2.98866 GHz	-53.06 dBm	-40.06 dB
3.000 GHz	9.000 GHz	1.000 MHz	3.75569 GHz	-44.27 dBm	-31.27 dB
9.000 GHz	13.000 GHz	1.000 MHz	12.69629 GHz	-50.06 dBm	-37.06 dB
13.000 GHz	19.500 GHz	1.000 MHz	19.49975 GHz	-43.76 dBm	-30.76 dB

Highest Channel / QPSK

Spectrum

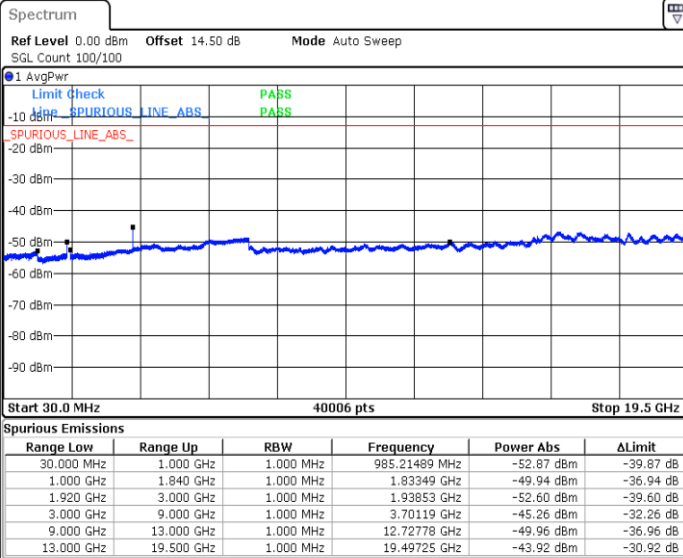
Ref Level 0.00 dBm Offset 14.50 dB Mode Auto Sweep
SGL Count 100/100

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	904.74513 MHz	-52.78 dBm	-39.78 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.70378 GHz	-53.60 dBm	-40.60 dB
1.920 GHz	3.000 GHz	1.000 MHz	2.98974 GHz	-52.87 dBm	-39.87 dB
3.000 GHz	9.000 GHz	1.000 MHz	3.81068 GHz	-43.26 dBm	-30.26 dB
9.000 GHz	13.000 GHz	1.000 MHz	12.76128 GHz	-49.97 dBm	-36.97 dB
13.000 GHz	19.500 GHz	1.000 MHz	19.49975 GHz	-43.78 dBm	-30.78 dB

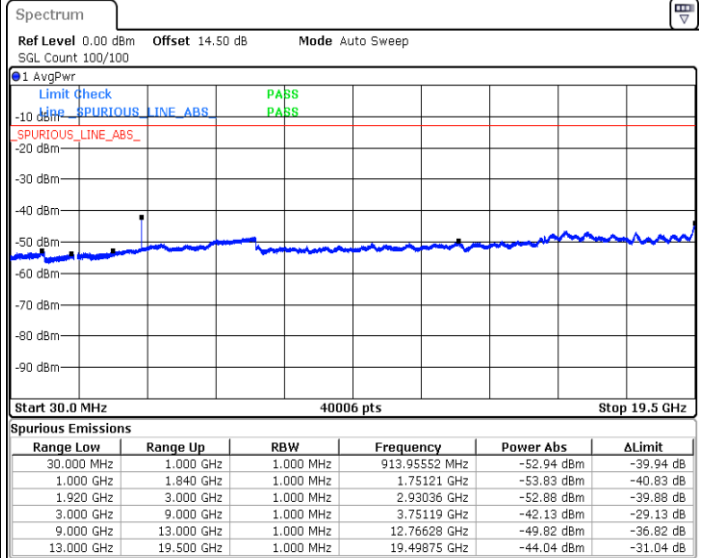


LTE Band 2 / 10MHz

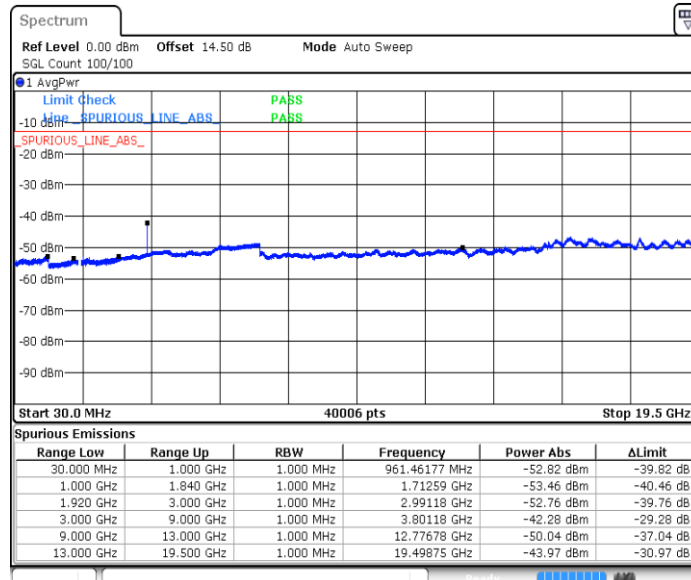
Lowest Channel / QPSK



Middle Channel / QPSK



Highest Channel / QPSK

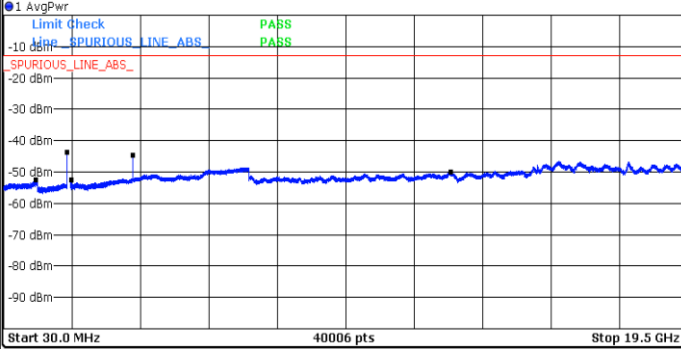




LTE Band 2 / 15MHz

Lowest Channel / QPSK

Spectrum

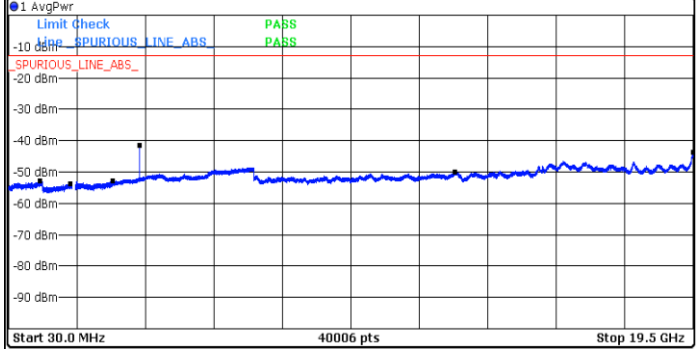
Ref Level 0.00 dBm Offset 14.50 dB Mode Auto Sweep
SGL Count 100/100

Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	947.40380 MHz	-52.52 dBm	-39.52 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.83811 GHz	-43.56 dBm	-30.56 dB
1.920 GHz	3.000 GHz	1.000 MHz	1.94069 GHz	-52.38 dBm	-39.38 dB
3.000 GHz	9.000 GHz	1.000 MHz	3.70169 GHz	-44.76 dBm	-31.76 dB
9.000 GHz	13.000 GHz	1.000 MHz	12.74078 GHz	-50.15 dBm	-37.15 dB
13.000 GHz	19.500 GHz	1.000 MHz	19.49975 GHz	-44.00 dBm	-31.00 dB

Middle Channel / QPSK

Spectrum

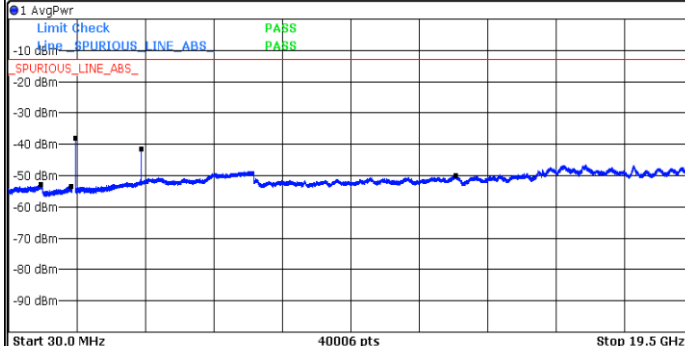
Ref Level 0.00 dBm Offset 14.50 dB Mode Auto Sweep
SGL Count 100/100

Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	909.10795 MHz	-52.78 dBm	-39.78 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.77556 GHz	-53.78 dBm	-40.78 dB
1.920 GHz	3.000 GHz	1.000 MHz	2.98219 GHz	-52.92 dBm	-39.92 dB
3.000 GHz	9.000 GHz	1.000 MHz	3.74669 GHz	-41.51 dBm	-28.51 dB
9.000 GHz	13.000 GHz	1.000 MHz	12.72728 GHz	-49.96 dBm	-36.96 dB
13.000 GHz	19.500 GHz	1.000 MHz	19.49925 GHz	-43.58 dBm	-30.58 dB

Highest Channel / QPSK

Spectrum

Ref Level 0.00 dBm Offset 14.50 dB Mode Auto Sweep
SGL Count 100/100

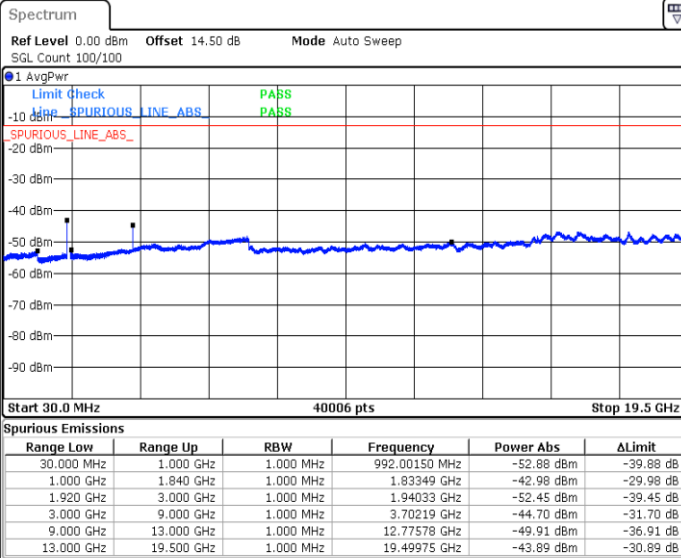
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	939.64768 MHz	-52.84 dBm	-39.84 dB
1.000 GHz	1.840 GHz	1.000 MHz	1.80201 GHz	-53.35 dBm	-40.35 dB
1.920 GHz	3.000 GHz	1.000 MHz	1.92270 GHz	-37.98 dBm	-24.98 dB
3.000 GHz	9.000 GHz	1.000 MHz	3.79168 GHz	-41.52 dBm	-28.52 dB
9.000 GHz	13.000 GHz	1.000 MHz	12.73528 GHz	-49.94 dBm	-36.94 dB
13.000 GHz	19.500 GHz	1.000 MHz	19.49825 GHz	-44.18 dBm	-31.18 dB

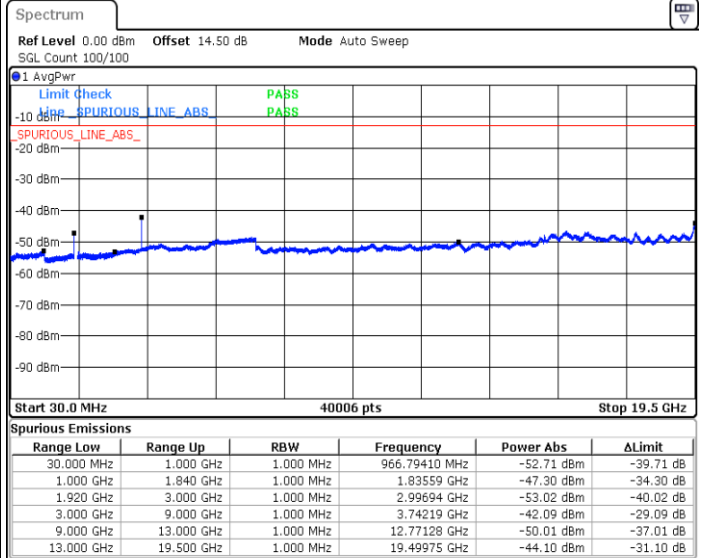


LTE Band 2 / 20MHz

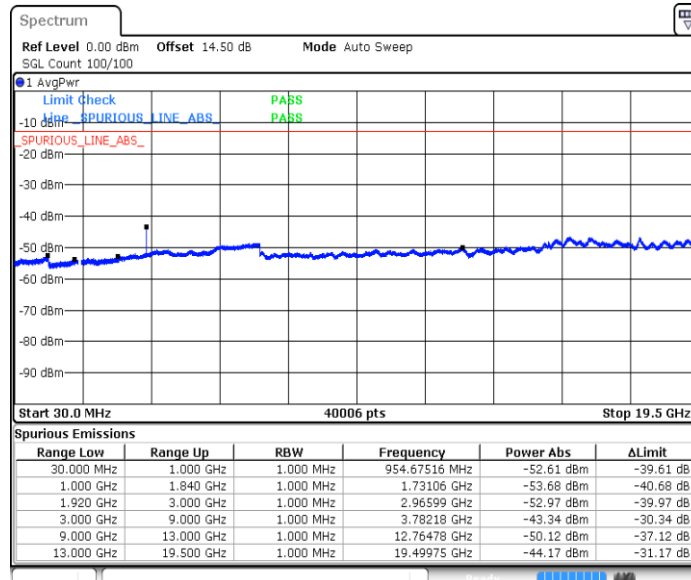
Lowest Channel / QPSK



Middle Channel / QPSK



Highest Channel / QPSK



Frequency Stability

Test Conditions		LTE Band 2 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0027	PASS
40	Normal Voltage	0.0013	
30	Normal Voltage	0.0045	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0053	
0	Normal Voltage	0.0046	
-10	Normal Voltage	0.0002	
-20	Normal Voltage	0.0005	
-30	Normal Voltage	0.0008	
20	Maximum Voltage	0.0021	
20	Normal Voltage	0.0014	
20	Battery End Point	0.0019	

Note:

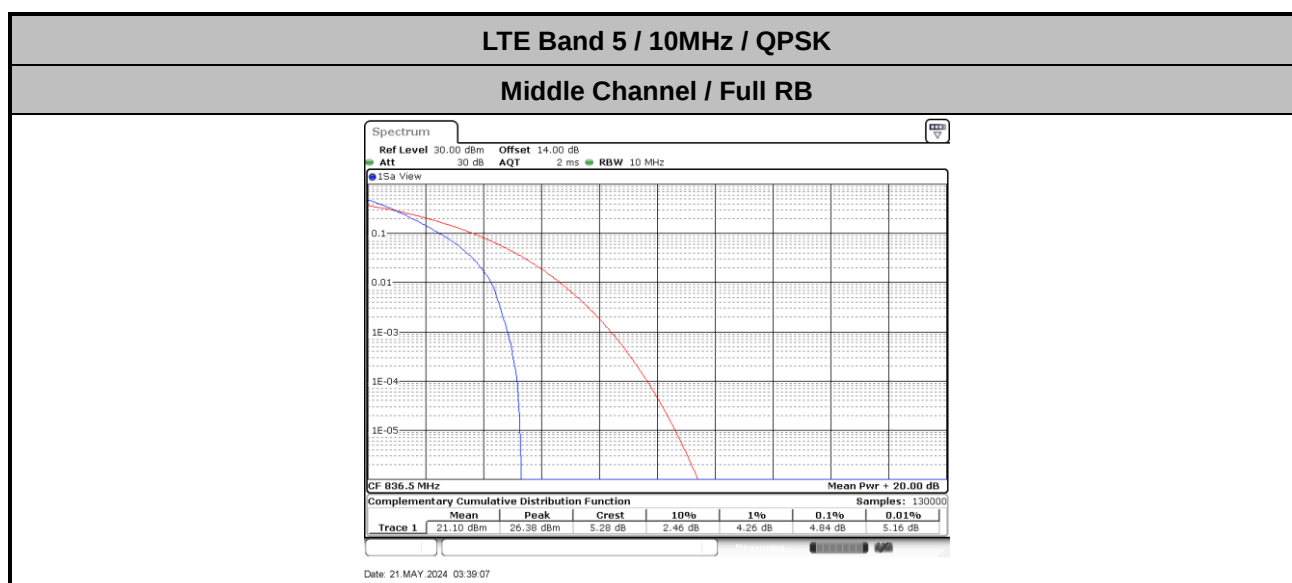
1. Normal Voltage = 3.8 V. ; Battery End Point (BEP) = 3.6 V. ; Maximum Voltage = 4.35 V.
2. The frequency fundamental emissions stay within the authorized frequency block.



LTE Band 5

Peak-to-Average Ratio

Mode	LTE Band 5 / 10MHz	
Mod.	QPSK	Limit: 13dB
RB Size	Full RB	Result
Middle CH	4.84	PASS



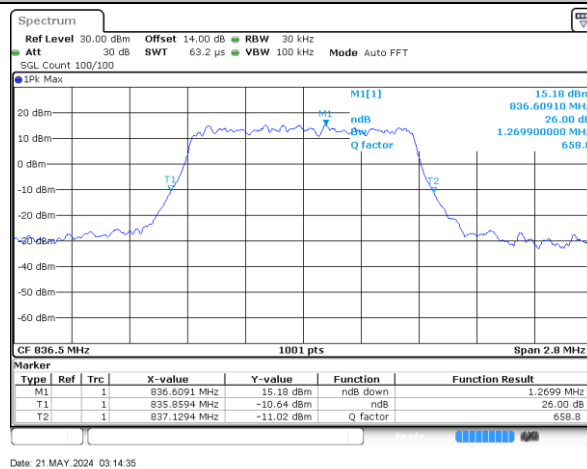


26dB Bandwidth

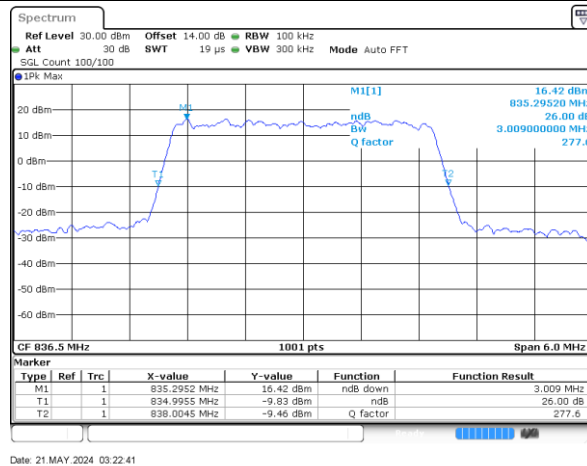
Mode	LTE Band 5 : 26dB BW(MHz)			
BW	1.4MHz	3MHz	5MHz	10MHz
Mod.	QPSK	QPSK	QPSK	QPSK
Middle CH	1.27	3.01	5.01	9.81

LTE Band 5

Middle Channel / 1.4MHz / QPSK

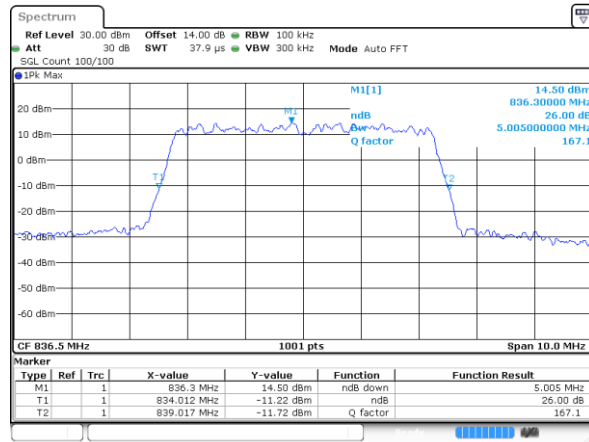


Middle Channel / 3MHz / QPSK





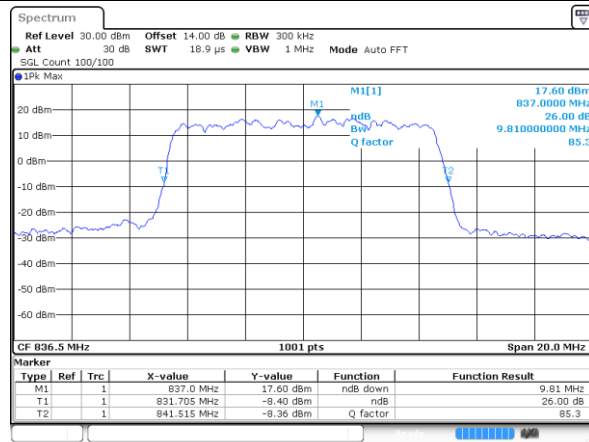
Middle Channel / 5MHz / QPSK



Date: 21 MAY 2024 03:30:47

LTE Band 5

Middle Channel / 10MHz / QPSK



Date: 21 MAY 2024 03:38:52

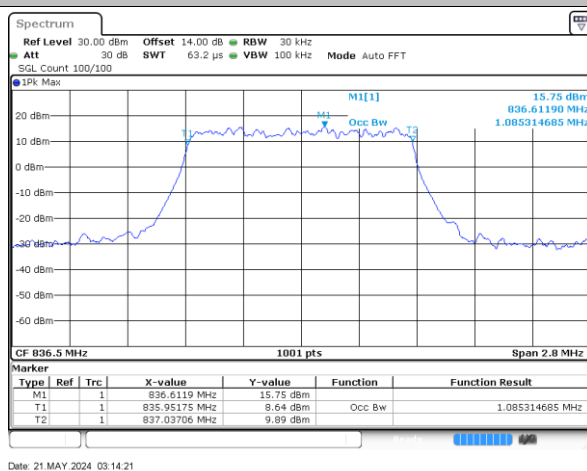


Occupied Bandwidth

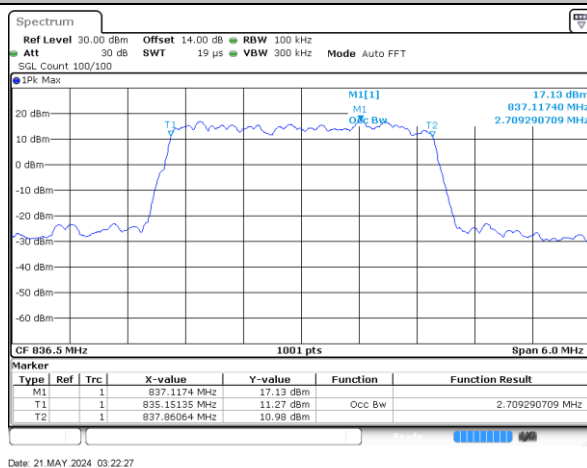
Mode	LTE Band 5 : 99%OBW(MHz)			
BW	1.4MHz	3MHz	5MHz	10MHz
Mod.	QPSK	QPSK	QPSK	QPSK
Middle CH	1.09	2.71	4.49	9.01

LTE Band 5

Middle Channel / 1.4MHz / QPSK

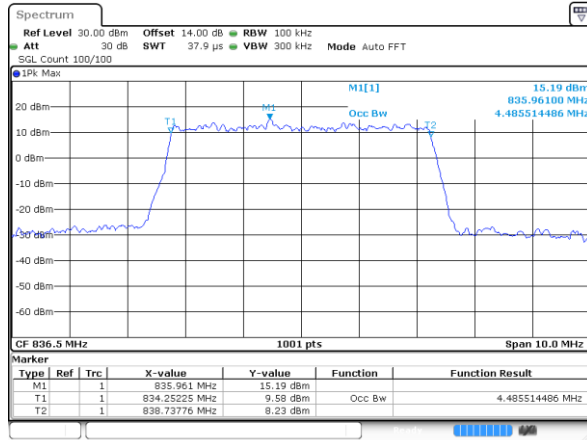


Middle Channel / 3MHz / QPSK





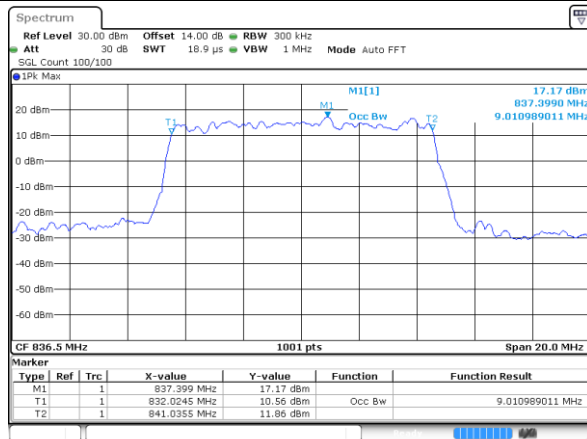
Middle Channel / 5MHz / QPSK



Date: 21 MAY 2024 03:30:33

LTE Band 5

Middle Channel / 10MHz / QPSK



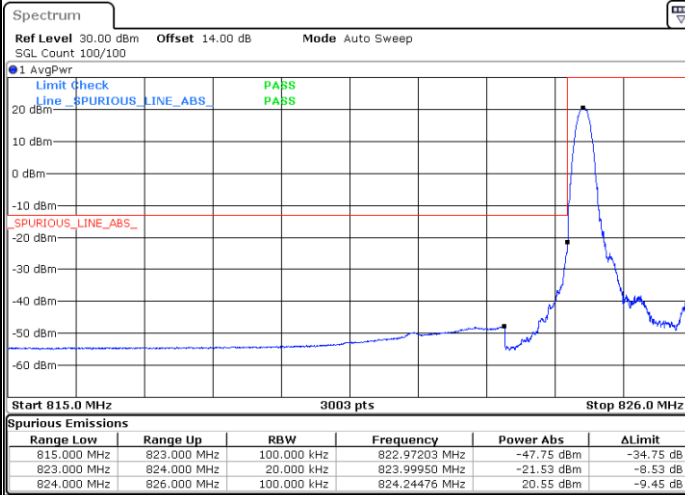
Date: 21 MAY 2024 03:38:38



Conducted Band Edge

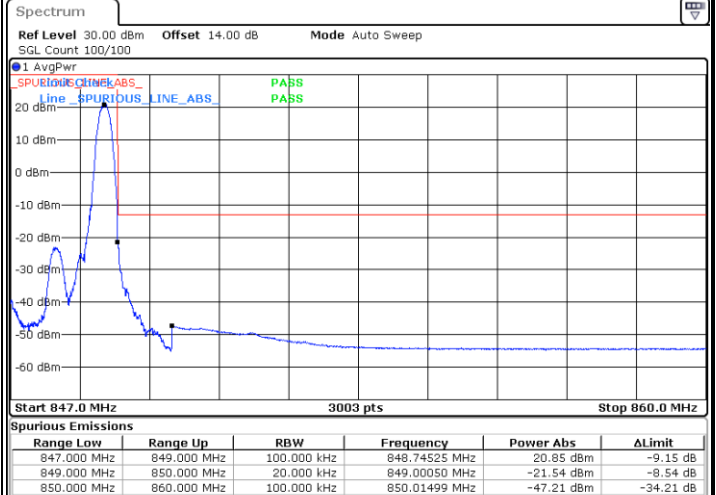
LTE Band 5 / 1.4MHz / QPSK

Lowest Band Edge / 1RB



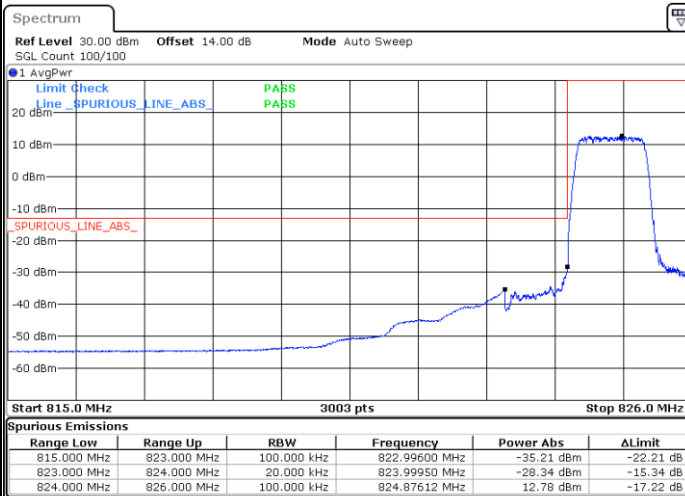
Date: 21 MAY 2024 03:10:37

Highest Band Edge / 1RB



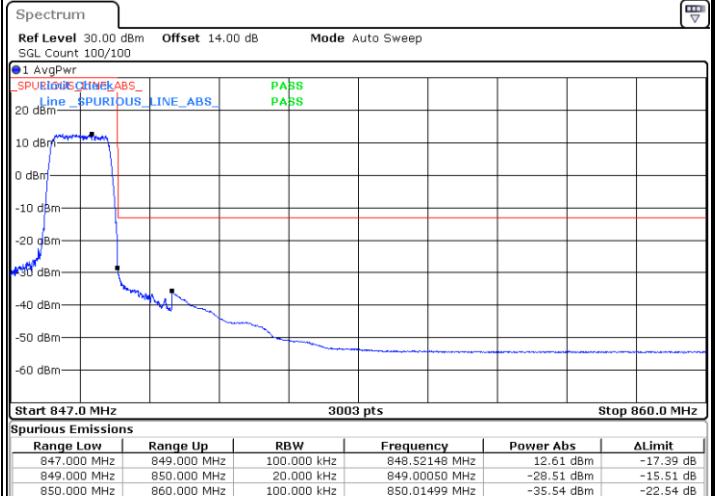
Date: 21 MAY 2024 03:15:33

Lowest Band Edge / Full RB



Date: 21 MAY 2024 03:11:36

Highest Band Edge / Full RB

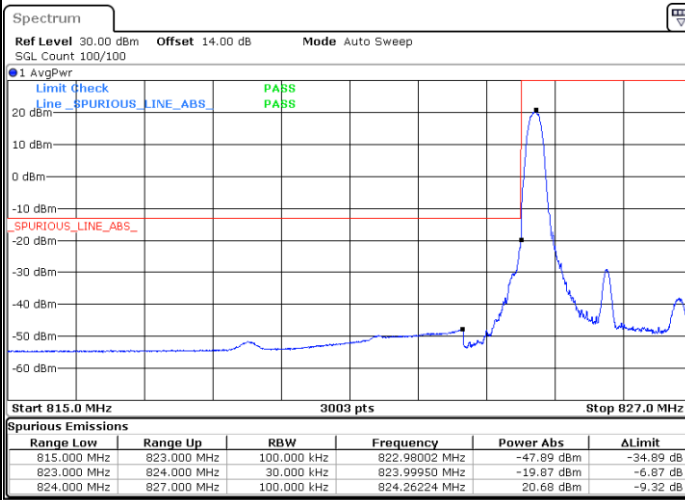


Date: 21 MAY 2024 03:16:32



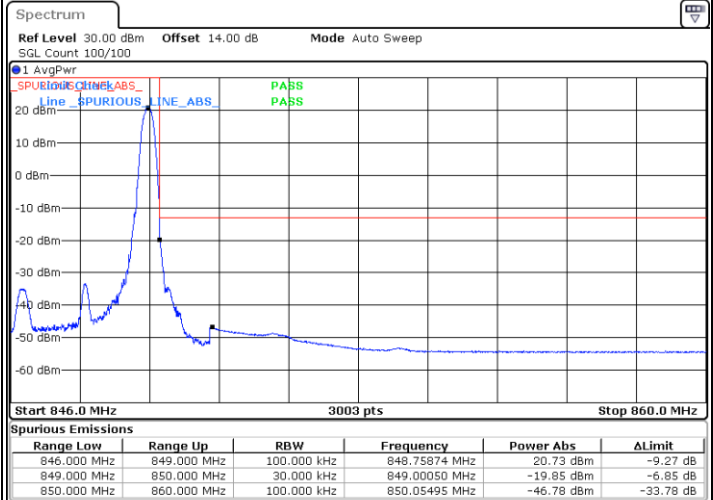
LTE Band 5 / 3MHz / QPSK

Lowest Band Edge / 1RB



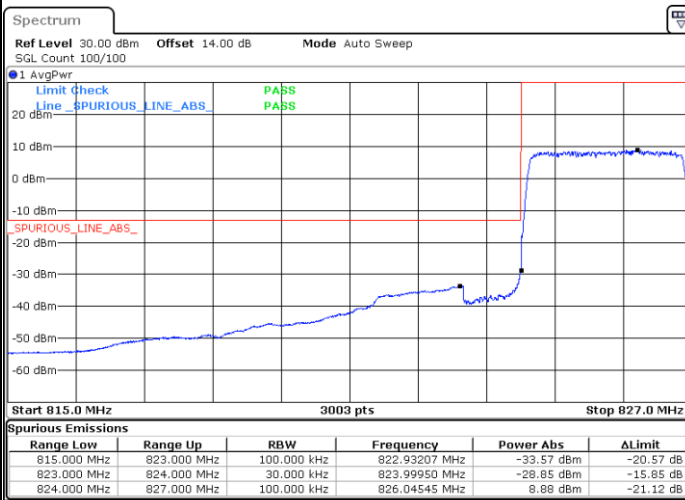
Date: 21 MAY 2024 03:18:43

Highest Band Edge / 1RB



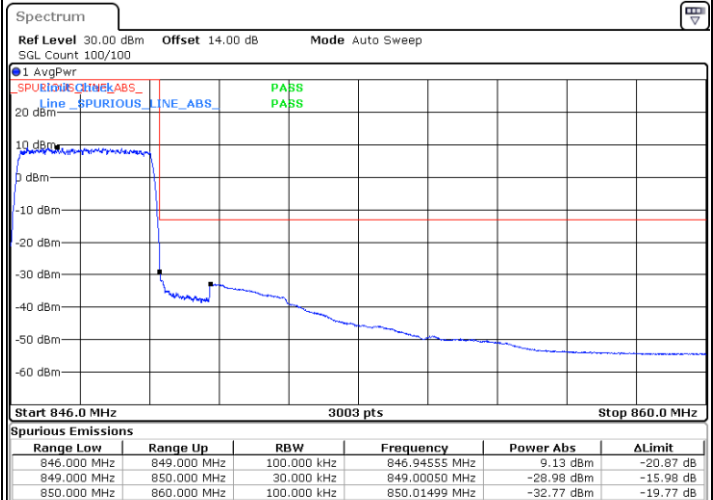
Date: 21 MAY 2024 03:23:39

Lowest Band Edge / Full RB



Date: 21 MAY 2024 03:19:42

Highest Band Edge / Full RB

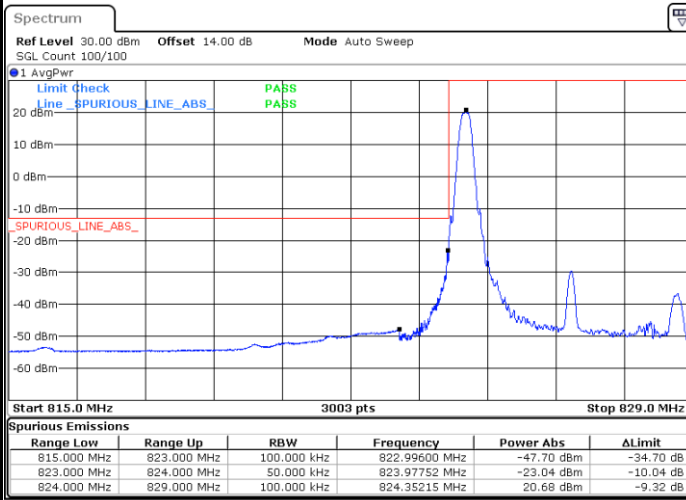


Date: 21 MAY 2024 03:24:37



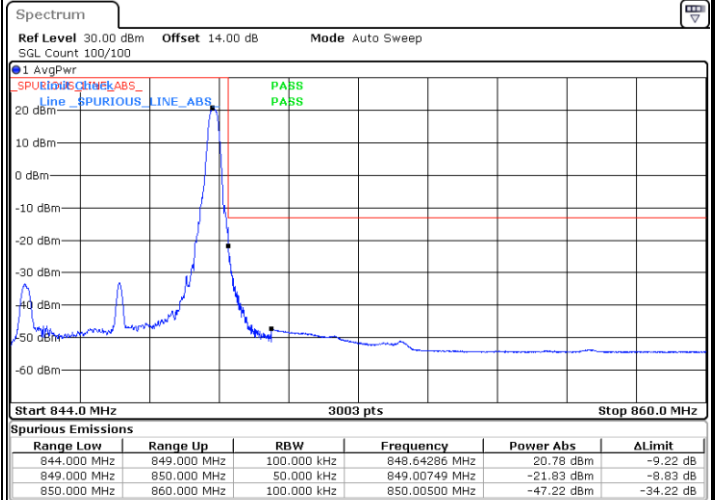
LTE Band 5 / 5MHz / QPSK

Lowest Band Edge / 1RB



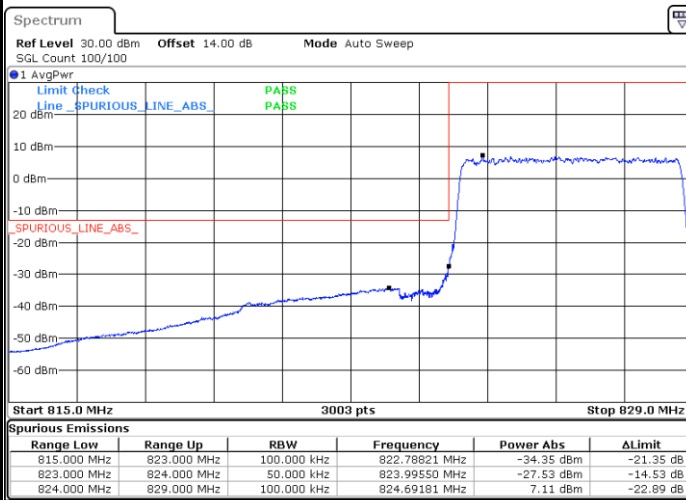
Date: 21 MAY 2024 03:26:49

Highest Band Edge / 1RB



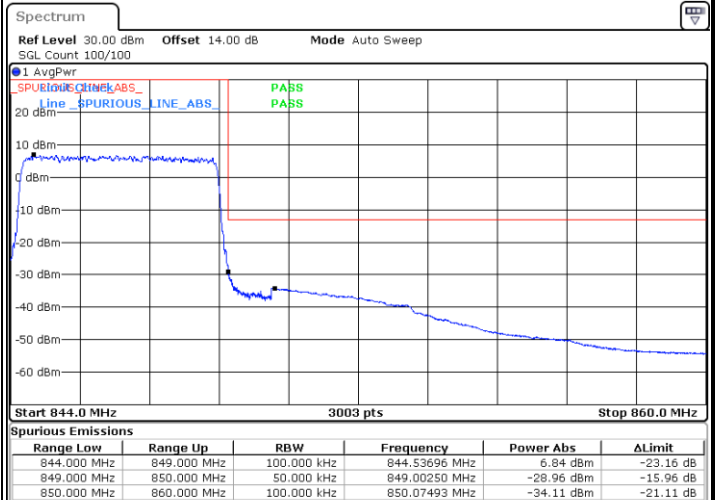
Date: 21 MAY 2024 03:31:44

Lowest Band Edge / Full RB



Date: 21 MAY 2024 03:27:48

Highest Band Edge / Full RB

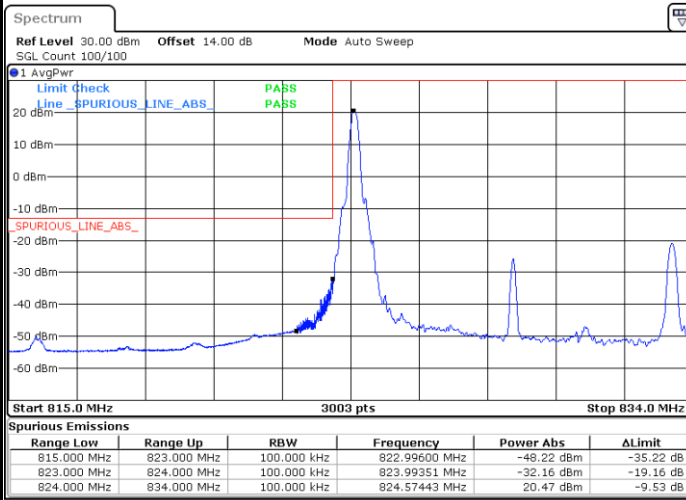


Date: 21 MAY 2024 03:32:43



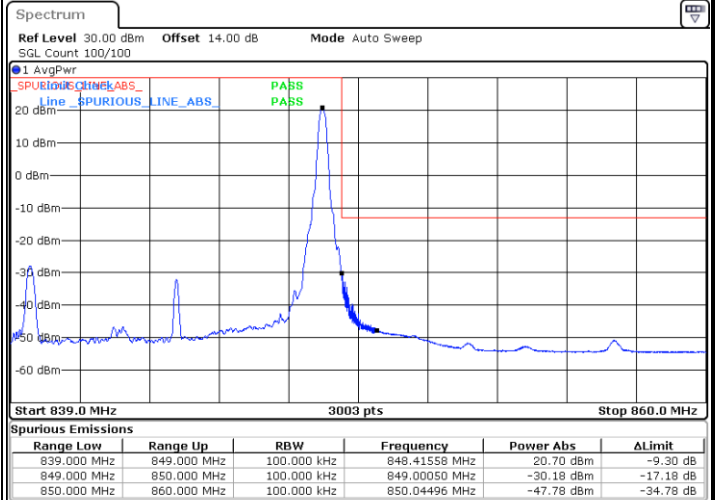
LTE Band 5 / 10MHz / QPSK

Lowest Band Edge / 1RB



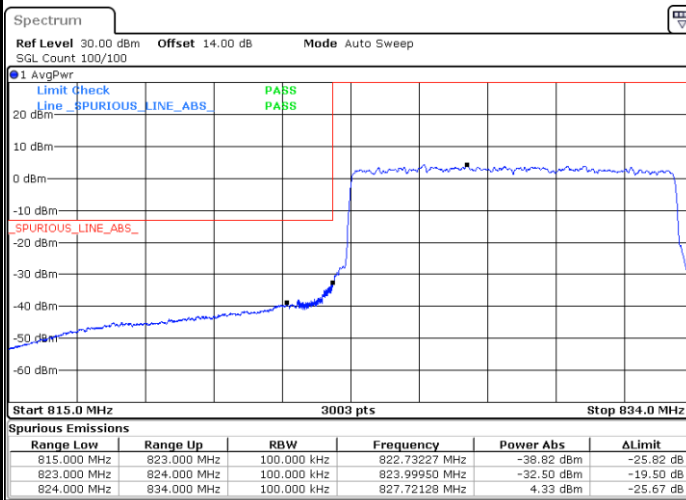
Date: 21 MAY 2024 03:34:55

Highest Band Edge / 1RB



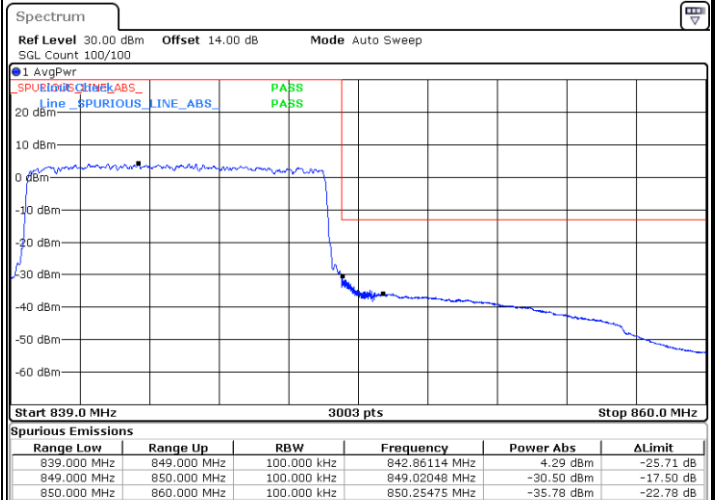
Date: 21 MAY 2024 03:40:05

Lowest Band Edge / Full RB



Date: 21 MAY 2024 03:35:53

Highest Band Edge / Full RB



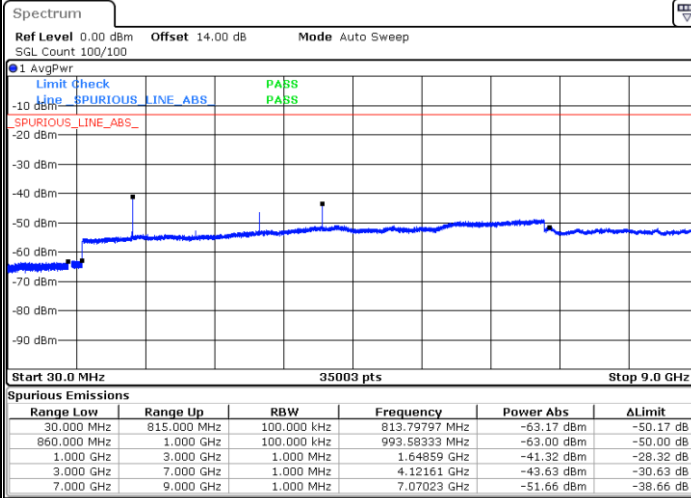
Date: 21 MAY 2024 03:41:04



Conducted Spurious Emission

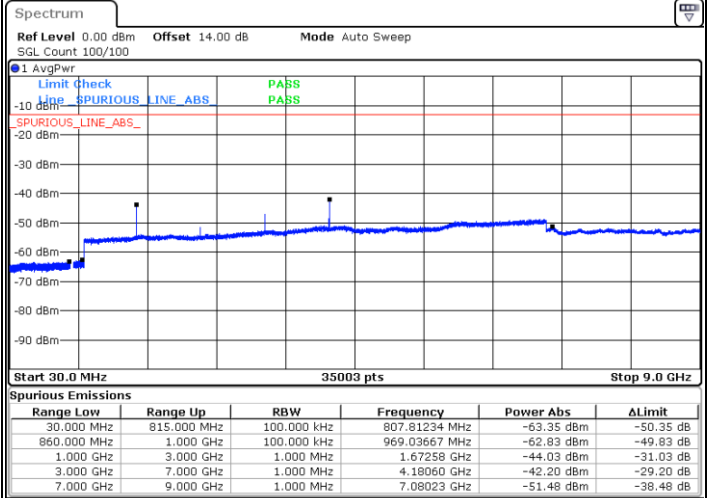
LTE Band 5 / 1.4MHz

Lowest Channel / QPSK



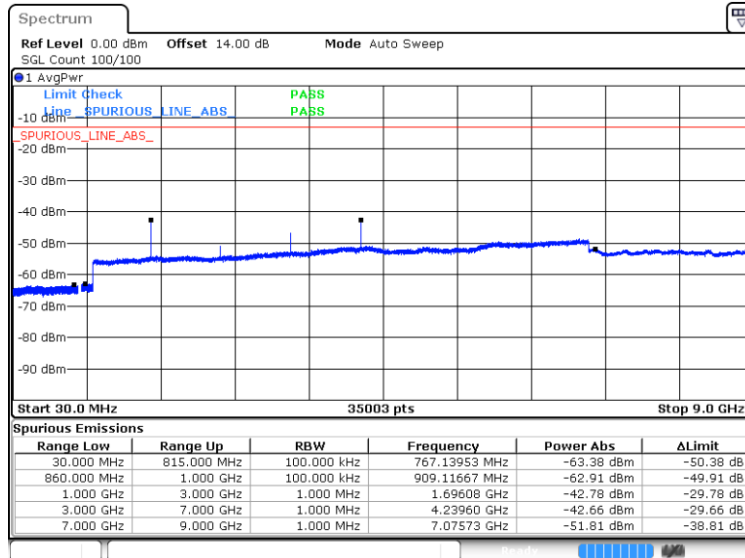
Date: 21 MAY 2024 03:12:44

Middle Channel / QPSK



Date: 21 MAY 2024 03:13:52

Highest Channel / QPSK

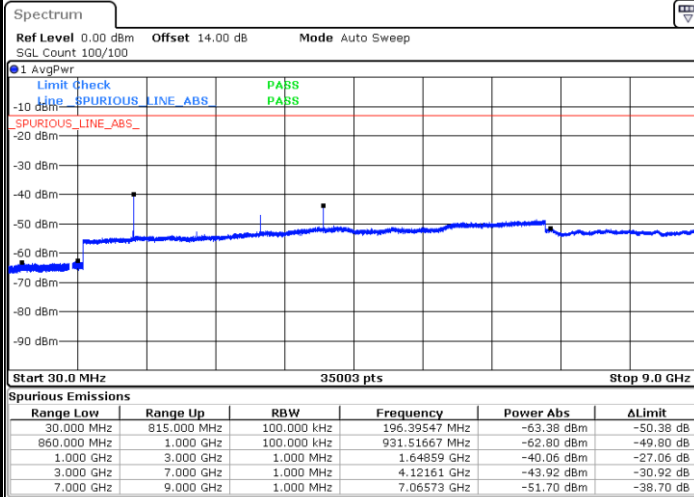


Date: 21 MAY 2024 03:17:40



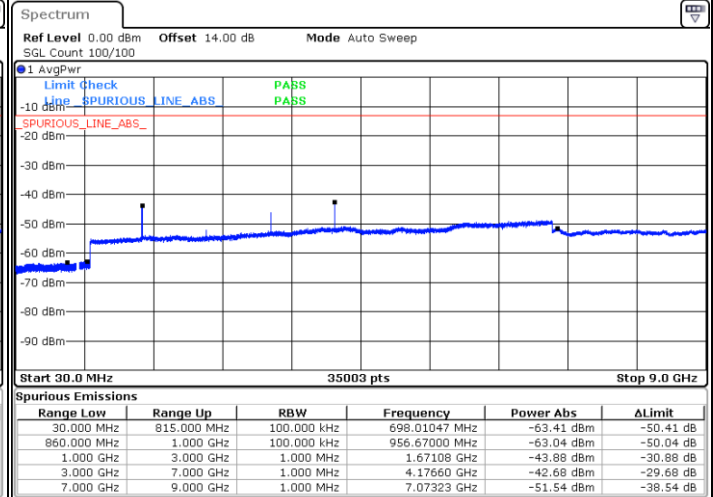
LTE Band 5 / 3MHz

Lowest Channel / QPSK



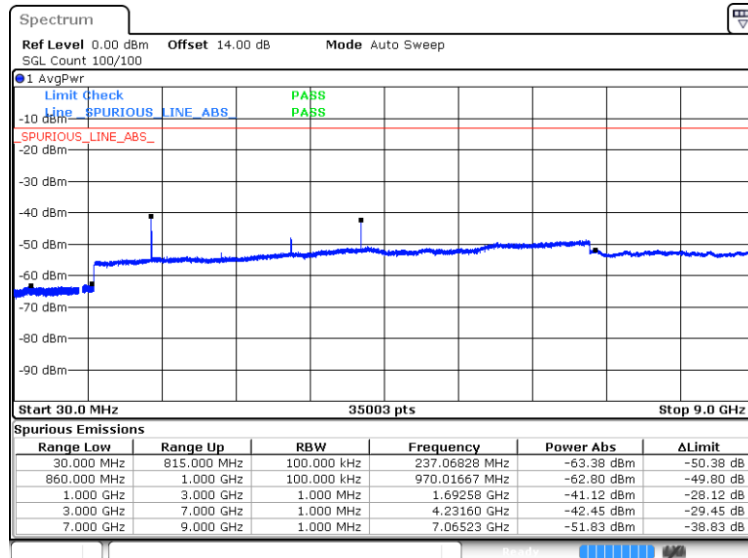
Date: 21.MAY.2024 03:20:50

Middle Channel / QPSK



Date: 21.MAY.2024 03:21:58

Highest Channel / QPSK

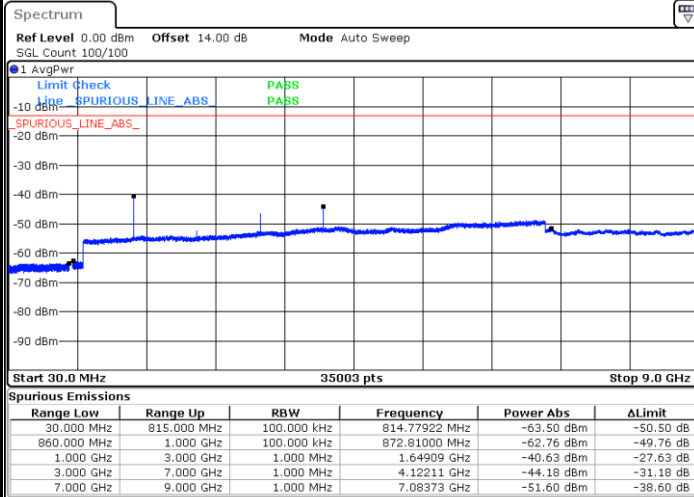


Date: 21.MAY.2024 03:25:46



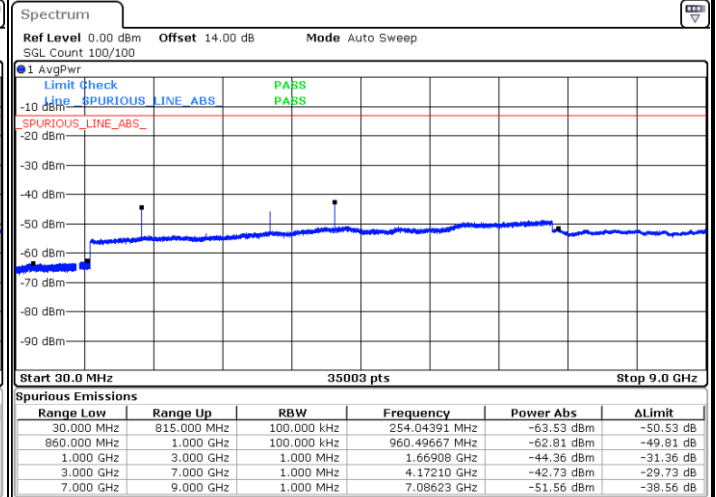
LTE Band 5 / 5MHz

Lowest Channel / QPSK



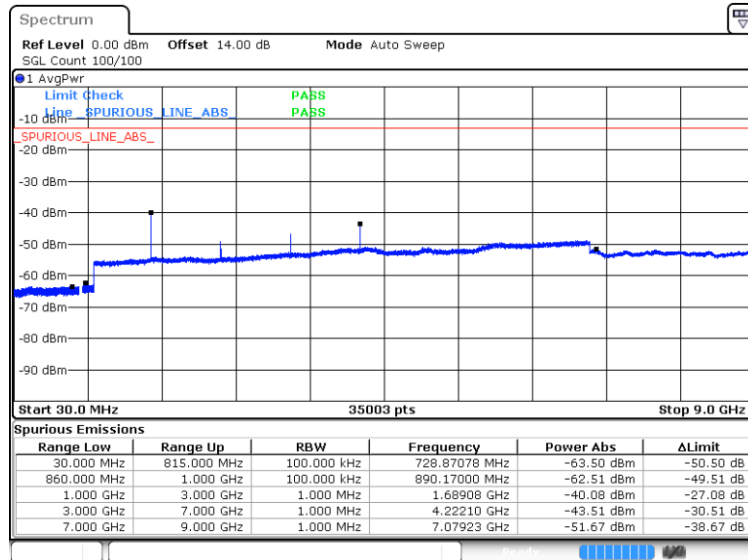
Date: 21.MAY.2024 03:28:56

Middle Channel / QPSK



Date: 21.MAY.2024 03:30:04

Highest Channel / QPSK

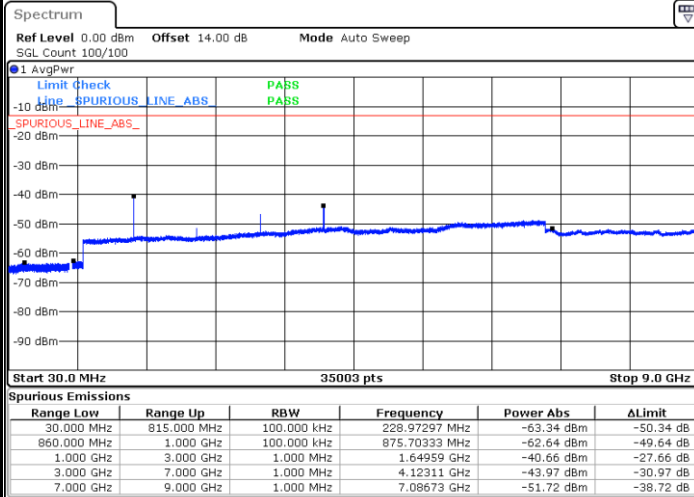


Date: 21.MAY.2024 03:33:51



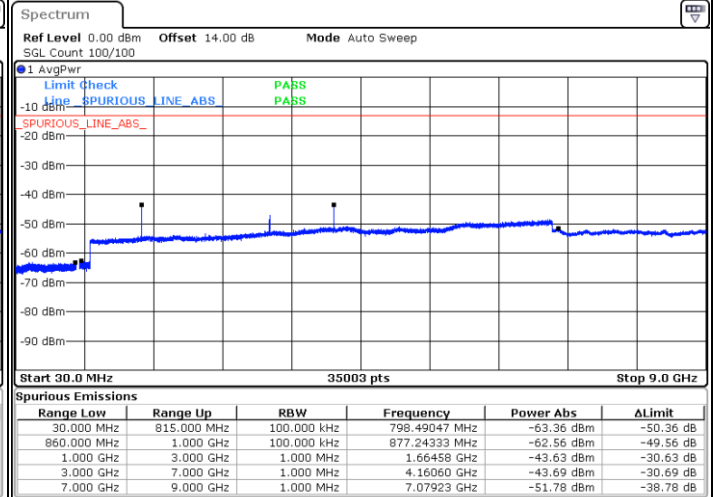
LTE Band 5 / 10MHz

Lowest Channel / QPSK



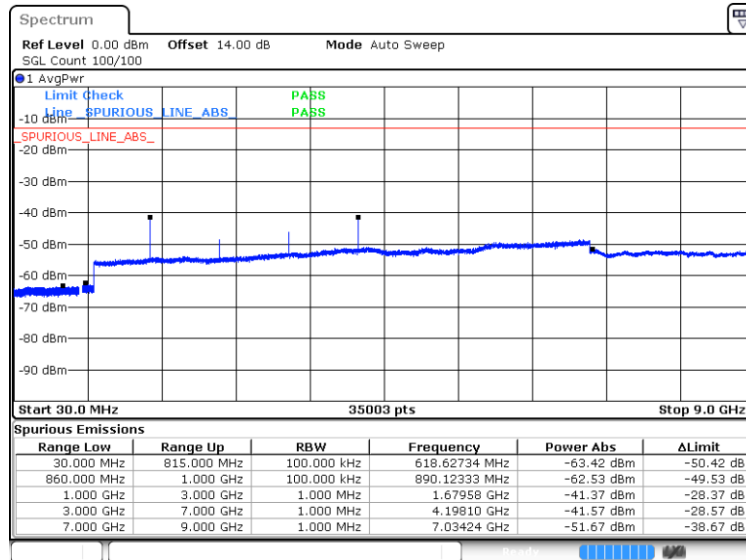
Date: 21.MAY.2024 03:37:02

Middle Channel / QPSK



Date: 21.MAY.2024 03:38:09

Highest Channel / QPSK



Date: 21.MAY.2024 03:42:12

**Frequency Stability**

Test Conditions		LTE Band 5 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	2.5ppm
		Deviation (ppm)	Result
50	Normal Voltage	0.0026	PASS
40	Normal Voltage	0.0031	
30	Normal Voltage	0.0023	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0013	
0	Normal Voltage	0.0025	
-10	Normal Voltage	0.0018	
-20	Normal Voltage	0.0016	
-30	Normal Voltage	0.0024	
20	Maximum Voltage	0.0031	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0044	

Note:

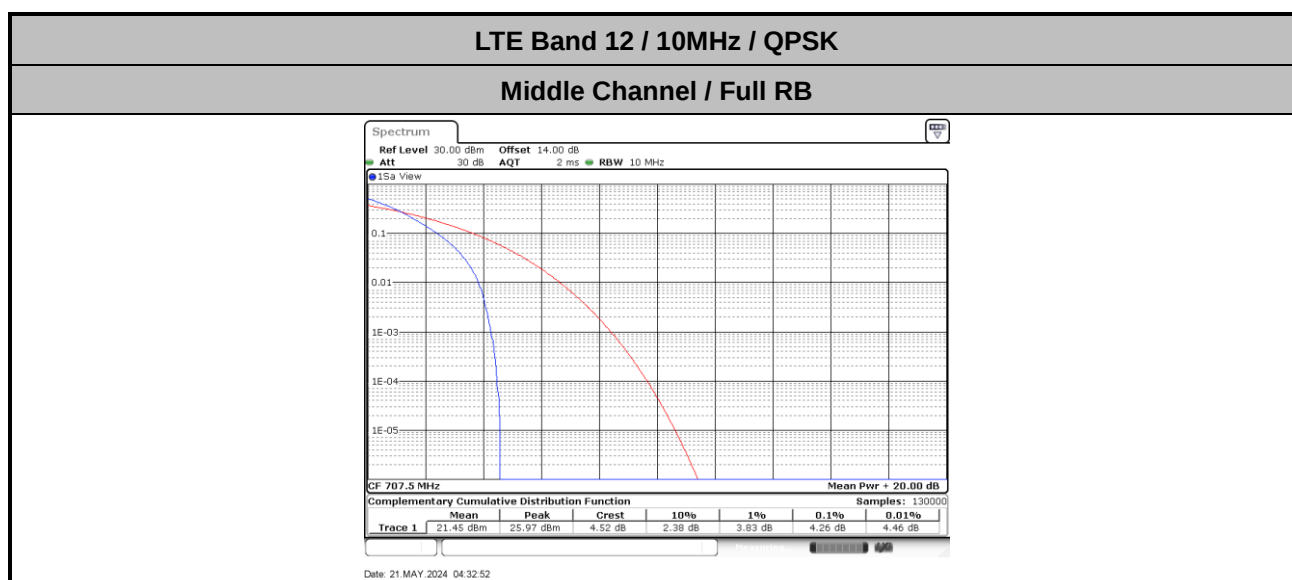
1. Normal Voltage = 3.8 V. ; Battery End Point (BEP) = 3.6 V. ; Maximum Voltage = 4.35 V.
2. The frequency fundamental emissions stay within the authorized frequency block.



LTE Band 12

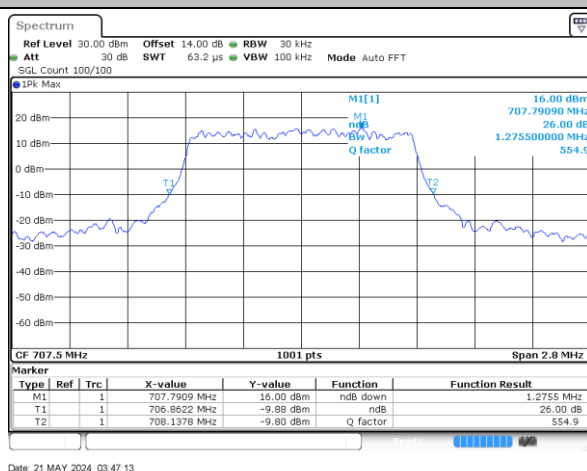
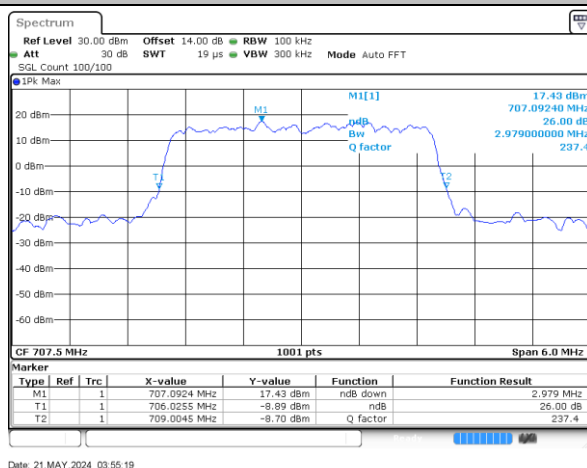
Peak-to-Average Ratio

Mode	LTE Band 12 / 10MHz	
Mod.	QPSK	Limit: 13dB
RB Size	Full RB	Result
Middle CH	4.26	PASS



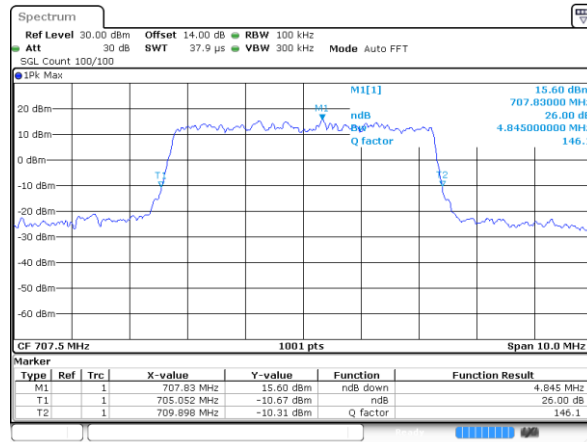
**26dB Bandwidth**

Mode	LTE Band 12 : 26dB BW(MHz)			
BW	1.4MHz	3MHz	5MHz	10MHz
Mod.	QPSK	QPSK	QPSK	QPSK
Middle CH	1.28	2.98	4.85	9.73

LTE Band 12**Middle Channel / 1.4MHz / QPSK****Middle Channel / 3MHz / QPSK**



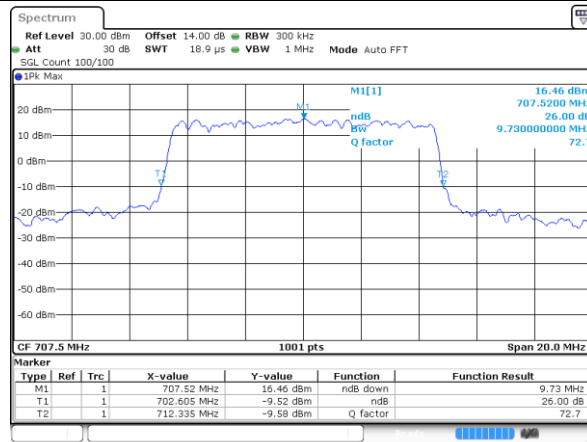
Middle Channel / 5MHz / QPSK



Date: 21 MAY 2024 04:03:25

LTE Band 12

Middle Channel / 10MHz / QPSK



Date: 21 MAY 2024 04:11:30