FCC RF Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	XT2043-4, XT2043-5, XT2043-6
FCC ID	:	IHDT56YN1
STANDARD	:	47 CFR Part 2, 90(R)
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Oct. 09, 2019 and completely tested on Nov. 08, 2019. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26 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 (Kunshan) Inc., the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager

ACCREDITED
Cert #5145.02

Sporton International (Kunshan) Inc.

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 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 Feature of Equipment Under Test 5
1.4 Maximum ERP Power, Frequency Tolerance, and Emission Designator 6
1.5 Testing Site 6
1.6 Test Software 6
1.7 Applied Standards 7
1.8 Specification of Accessory 7

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST **8**

2.1 Test Mode 8
2.2 Connection Diagram of Test System 9
2.3 Support Unit used in test configuration and system 9
2.4 Measurement Results Explanation Example 10

3 CONDUCTED TEST ITEMS **11**

3.1 Measuring Instruments 11
3.2 Conducted Output Power and ERP 12
3.3 Peak-to-Average Ratio 13
3.4 Occupied Bandwidth 14
3.5 Conducted Band Edge Measurement 15
3.6 Emission Mask 16
3.7 Conducted Spurious Emission Measurement 17
3.8 Frequency Stability Measurement 18

4 RADIATED TEST ITEMS **19**

4.1 Measuring Instruments 19
4.2 Test Setup 19
4.3 Test Result of Radiated Test 19
4.4 Radiated Spurious Emission Measurement 20

5 LIST OF MEASURING EQUIPMENT **21**

6 UNCERTAINTY OF EVALUATION **22**

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
FG9O0912E	Rev. 01	Initial issue of report	Dec. 10, 2019

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	PASS	-
	§90.542 (a)(7)	Effective Radiated Power	ERP < 3Watt	PASS	-
3.3	-	Peak-to-Average Ratio	Reporting only	-	-
3.4	§2.1049	Occupied Bandwidth	Reporting only	PASS	-
3.5	§2.1053 §90.543 (e)(2)(3)	Conducted Band Edge Measurement	Refer standard	PASS	-
3.6	§2.1051 §90.210(n)	Emission Mask	Mask B	PASS	-
3.7	§2.1053 §90.543 (e)(3)	Conducted Spurious Emission	< $43+10\log_{10}$(P[Watts])	PASS	-
3.8	§2.1055 §90.539 (e)	Frequency Stability Temperature & Voltage	< ±1.25 ppm	PASS	-
4.4	§2.1053 §90.543 (e)(3) §90.543 (f)	Radiated Spurious Emission	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 24.95 dB at 1586.680 MHz

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

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.2 Manufacturer

Motorola Mobility LLC
222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2043-4, XT2043-5, XT2043-6
FCC ID	IHDT56YN1
Tx Frequency	LTE Band 14: 790.5 MHz ~ 795.5 MHz
Rx Frequency	LTE Band 14: 760.5 MHz ~ 765.5 MHz
Bandwidth	5MHz / 10MHz
Maximum Output Power to Antenna	23.06 dBm
Type of Modulation	QPSK / 16QAM / 64QAM
IMEI Code	Conducted:N/A Radiation: 359084100021238
HW Version	DVT2
SW Version	QPR30.56
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Maximum ERP Power, Frequency Tolerance, and Emission Designator

LTE Band 14		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)
5	**790.5~795.5**	4M51G7D	-	0.0617	4M49W7D	-	0.0522
10	**793**	8M95G7D	0.0040	0.0618	8M91W7D	-	0.0527

LTE Band 14		64QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)
5	**790.5~795.5**	4M50W7D	-	0.0415
10	**793**	8M95W7D	-	0.0414

1.5 Testing Site

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

Test Firm	Sporton International (Kunshan) Inc.		
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.**
	03CH06-KS TH01-KS	CN1257	314309

1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH06-KS	AUDIX	E3	6.2009-8-24al

1.7 Applied Standards

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

- 47 CFR Part 2, Part 90(R)
- ANSI C63.26
- KDB 971168 D01 Power Meas License Digital Systems v03r01
- 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.

1.8 Specification of Accessory

Specification of Accessory				
AC Adapter 1	**Brand Name**	Motorola (Acbel)	**Model Name**	SC-41
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5Vdc, 2000mA		
AC Adapter 2	**Brand Name**	Motorola (Chenyang)	**Model Name**	SC-41
	Power Rating	I/P: 100-240 Vac, 300mA, O/P: 5Vdc, 2000mA		
Battery 1	**Brand Name**	Motorola(Amperex)	**Model Name**	KX50
	Power Rating	3.8Vdc, 4000mAh	**Type**	Li-ion polymer
USB Cable 1	**Brand Name**	Motorola (Luxshare)	**Model Name**	SC18C24368
	Signal Line Type	1.0 meter, shielded cable, without ferrite core		
USB Cable 2	**Brand Name**	Motorola (Saibao)	**Model Name**	SC18C24367
	Signal Line Type	1.0 meter, shielded cable, without ferrite core		

2 Test Configuration of Equipment Under Test

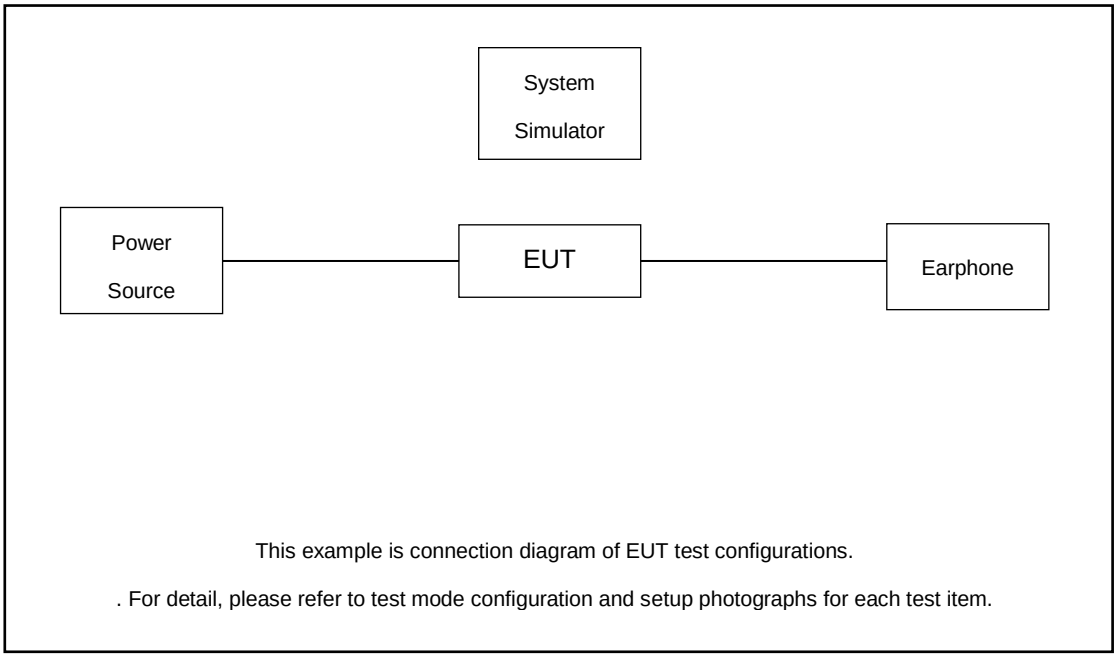
2.1 Test Mode

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.

Conducted Test Cases	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	14	-	-	v	-	-	-	v	v	v	v	v	v	v	v	v
	14	-	-		v	-	-	v	v	v	v	v	v		v	
Peak-to-Average Ratio	14	-	-		v	-	-	v	v	v	v		v		v	
26dB and 99% Bandwidth	14	-	-	v		-	-	v	v	v			v	v	v	v
	14	-	-		v	-	-	v	v	v			v		v	
Conducted Band Edge	14	-	-	v		-	-	v	v	v	v		v	v		v
	14	-	-		v	-	-	v	v	v	v		v		v	
Emission Mask	14	-	-	v		-	-	v	v	v	v		v	v	v	v
	14	-	-		v	-	-	v	v	v	v		v		v	
Conducted Spurious Emission	14	-	-	v		-	-	v	v	v	v			v	v	v
	14	-	-		v	-	-	v	v	v	v				v	
Frequency Stability	14	-	-		v	-	-	v					v		v	
E.R.P	14	-	-	v		-	-	v	v	v	v			v	v	v
	14	-	-		v	-	-	v	v	v	v				v	
Radiated Spurious Emission	14	-	-	v	v	-	-	v			v				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.															

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.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW INSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	Earphone	N/A	N/A	N/A	N/A	N/A

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.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 4.9 dB.

Example :

Offset(dB) = RF cable loss(dB).

= 4.9 (dB)

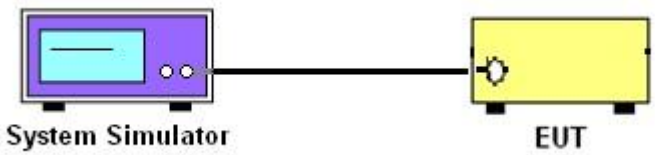
3 Conducted Test Items

3.1 Measuring Instruments

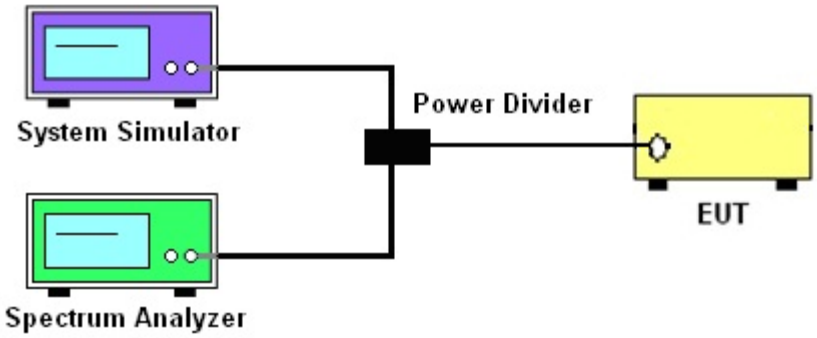
See list of measuring instruments of this test report.

3.1.1 Test Setup

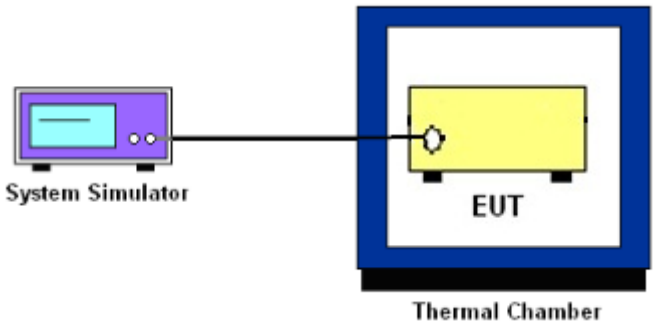
3.1.2 Conducted Output Power



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



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power and ERP

3.2.1 Description of the Conducted Output Power Measurement and ERP

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

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 14.

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

3.2.2 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.

3.3 Peak-to-Average Ratio

3.3.1 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.

3.3.2 Test Procedures

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

3.4 Occupied Bandwidth

3.4.1 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.

3.4.2 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.

3.5 Conducted Band Edge Measurement

3.5.1 Description of Conducted Band Edge Measurement

For operations in the 758-768 MHz and the 788-798 MHz bands

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

3.5.2 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 spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. Checked that all the results comply with the emission limit line.

   Example:

   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

   = P(W)- [43 + 10log(P)] (dB)

   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.

3.6 Emission Mask

3.6.1 Description of Emission Mask

<Emission Mask B>.

For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

3.6.2 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. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
5. Set spectrum analyzer with RMS detector.
6. Taking the record of maximum spurious emission.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

3.7 Conducted Spurious Emission Measurement

3.7.1 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 30MHz up to a frequency including its 10th harmonic.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and base station via 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, for under 1GHz RBW = 100kHz, VBW = 300kHz and for above 1GHz RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. Set spectrum analyzer with RMS detector.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

3.8 Frequency Stability Measurement

3.8.1 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 ±1.25 ppm of the center frequency.

3.8.2 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.

3.8.3 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±5°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.

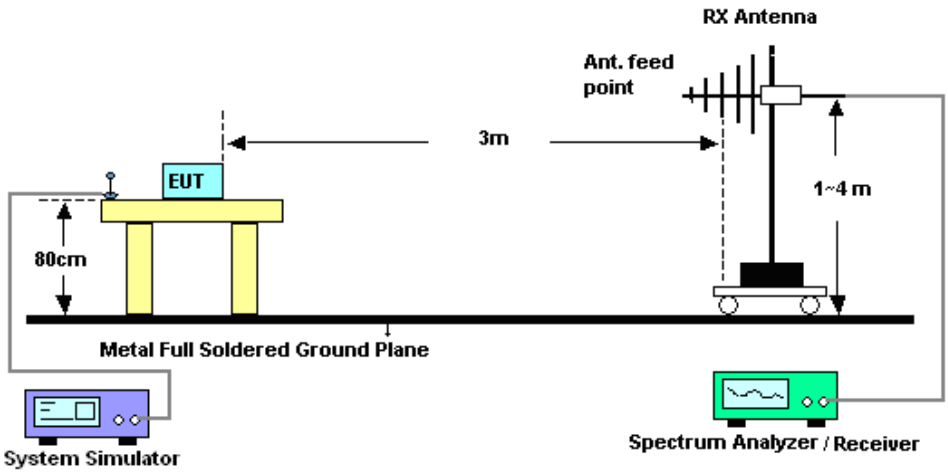
4 Radiated Test Items

4.1 Measuring Instruments

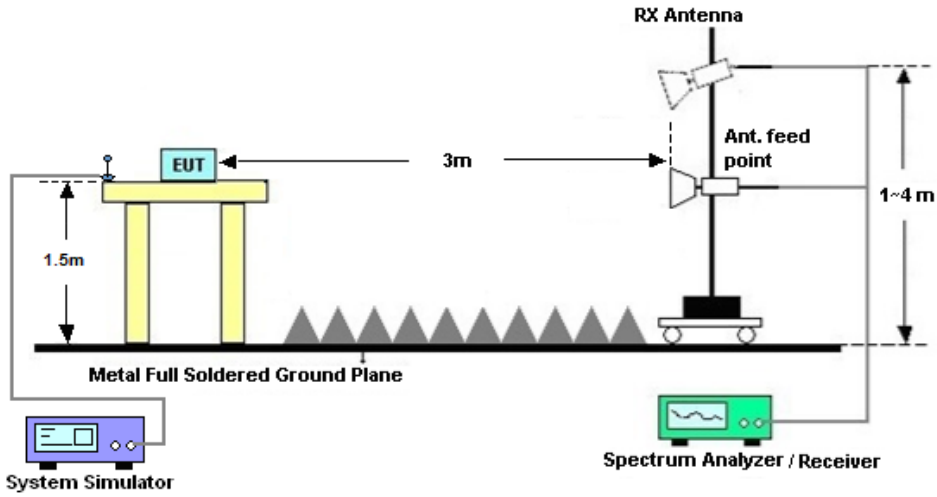
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Radiated Spurious Emission Measurement

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 operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics 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. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

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 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.

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	Aug. 06, 2019	Oct. 30, 2019~ Oct. 31, 2019	Aug. 05, 2020	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Nov.19, 2018	Oct. 30, 2019~ Oct. 31, 2019	Nov.18, 2019	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44GHz	Apr. 16, 2019	Nov. 08, 2019	Apr. 18, 2020	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 28, 2018	Nov. 08, 2019	Dec. 27, 2019	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 27, 2019	Nov. 08, 2019	Jan. 26, 2020	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2019	Nov. 08, 2019	Jan. 04, 2020	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Aug. 06, 2019	Nov. 08, 2019	Aug. 05, 2020	Radiation (03CH06-KS)
Amplifier	MITEQ	TTA1840-35-HG	2014749	18~40GHz	Jan. 14, 2019	Nov. 08, 2019	Jan. 13, 2020	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Apr. 17, 2019	Nov. 08, 2019	Apr. 16, 2020	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 15, 2019	Nov. 08, 2019	Apr. 14, 2020	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Nov. 08, 2019	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Nov. 08, 2019	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Nov. 08, 2019	NCR	Radiation (03CH06-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))	**2.5dB**

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.1dB**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 14 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK		23.06	
10	1	25			22.99	
10	1	49			22.95	
10	25	0			22.09	
10	25	12			22.09	
10	25	25			22.07	
10	50	0			22.09	
10	1	0	16-QAM		22.37	
10	1	25			22.22	
10	1	49			22.26	
10	25	0			21.15	
10	25	12			21.14	
10	25	25			21.09	
10	50	0			21.14	
10	1	0	64QAM		21.32	
10	1	25			21.17	
10	1	49			21.24	
10	25	0			20.23	
10	25	12			20.22	
10	25	25			20.15	
10	50	0			20.17	

LTE Band 14 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	23.05	23.01	22.98
5	1	12		22.99	22.98	22.95
5	1	24		23.01	22.97	22.94
5	12	0		22.06	22.01	22.02
5	12	7		22.09	22.05	22.04
5	12	13		22.03	22.04	21.98
5	25	0		22.05	22.07	22.03
5	1	0	16-QAM	22.33	22.29	22.16
5	1	12		22.27	22.21	22.16
5	1	24		22.20	22.19	22.22
5	12	0		21.17	21.09	21.05
5	12	7		21.13	21.10	21.05
5	12	13		21.13	21.09	21.05
5	25	0		21.14	21.09	21.07
5	1	0	64QAM	21.33	21.25	21.21
5	1	12		21.29	21.19	21.18
5	1	24		21.21	21.16	21.20
5	12	0		20.24	20.20	20.10
5	12	7		20.21	20.16	20.13
5	12	13		20.19	20.14	20.13
5	25	0		20.23	20.18	20.14

ERP

LTE Band 14 (G_T - L_C = -3.00 dBi) QPSK						
Bandwidth	5M			10M		
Channel	23305	23330	23355		23330	
	(Low)	(Mid)	(High)		(Mid)	
Frequency (MHz)	790.5	793	795.5		793	
Conducted Power (dBm)	23.05	23.01	22.98		23.06	
Conducted Power (Watts)	0.2018	0.2000	0.1986		0.2023	
ERP(dBm)	17.90	17.86	17.83		17.91	
ERP(Watts)	0.0617	0.0611	0.0607		0.0618	

LTE Band 14 (G_T - L_C = -3.00 dBi) 16QAM						
Bandwidth	5M			10M		
Channel	23305	23330	23355		23330	
	(Low)	(Mid)	(High)		(Mid)	
Frequency (MHz)	790.5	793	795.5		793	
Conducted Power (dBm)	22.33	22.29	22.16		22.37	
Conducted Power (Watts)	0.1710	0.1694	0.1644		0.1726	
ERP(dBm)	17.18	17.14	17.01		17.22	
ERP(Watts)	0.0522	0.0518	0.0502		0.0527	

LTE Band 14 (G_T - L_C = -3.00 dBi) 64QAM						
Bandwidth	5M			10M		
Channel	23305	23330	23355		23330	
	(Low)	(Mid)	(High)		(Mid)	
Frequency (MHz)	790.5	793	795.5		793	
Conducted Power (dBm)	21.33	21.25	21.21		21.32	
Conducted Power (Watts)	0.1358	0.1334	0.1321		0.1355	
ERP(dBm)	16.18	16.10	16.06		16.17	
ERP(Watts)	0.0415	0.0407	0.0404		0.0414	

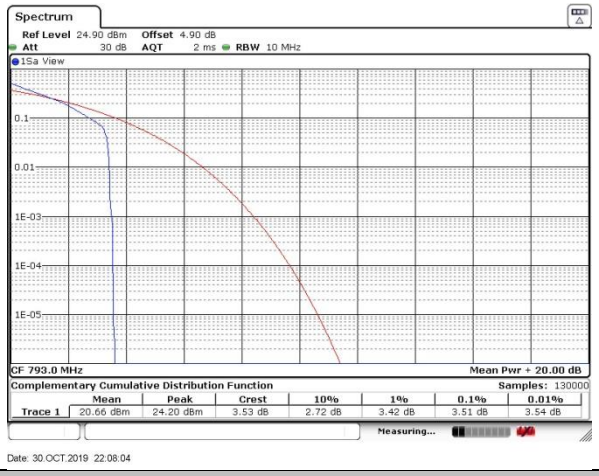
Peak-to-Average Ratio

Mode	LTE Band 14 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH					PASS
Middle CH	3.51	4.32	4.78	5.62	
Highest CH					

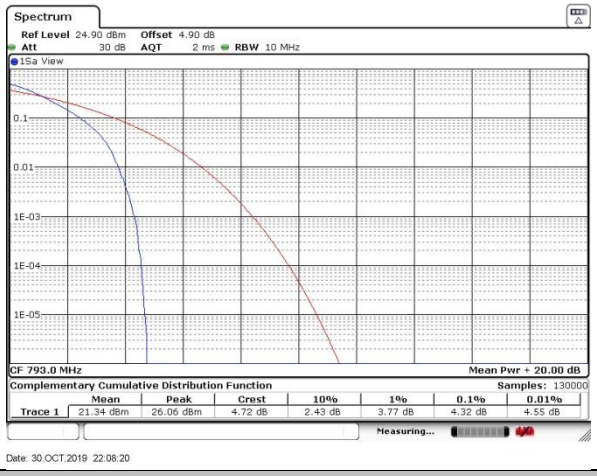
Mod.	64QAM		Limit: 13dB
RB Size	1RB	Full RB	Result
Lowest CH			PASS
Middle CH	6.49	6.20	
Highest CH			

LTE Band 14 / 10MHz / QPSK

Middle Channel/ 1RB

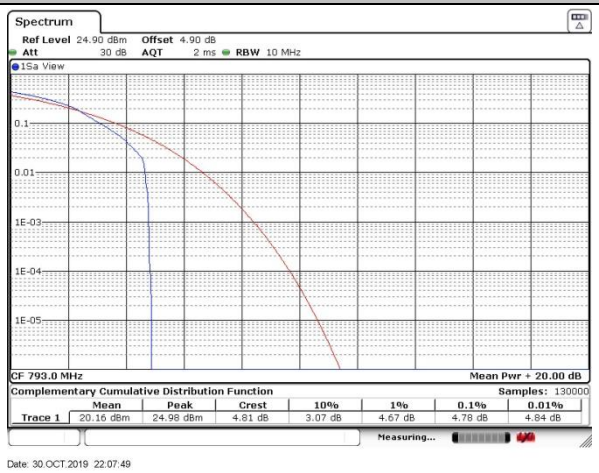


Middle Channel / Full RB

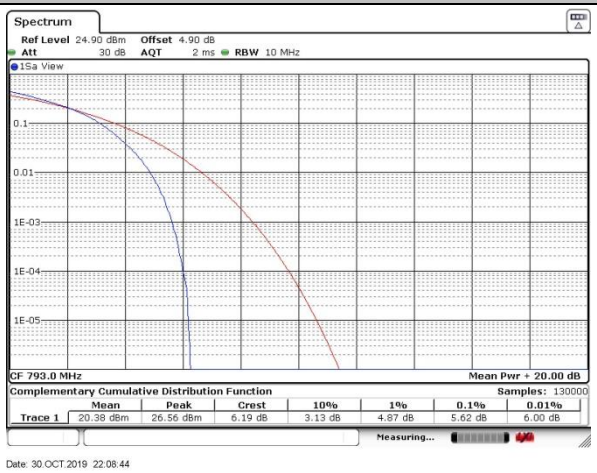


LTE Band 14 / 10MHz / 16QAM

Middle Channel/ 1RB

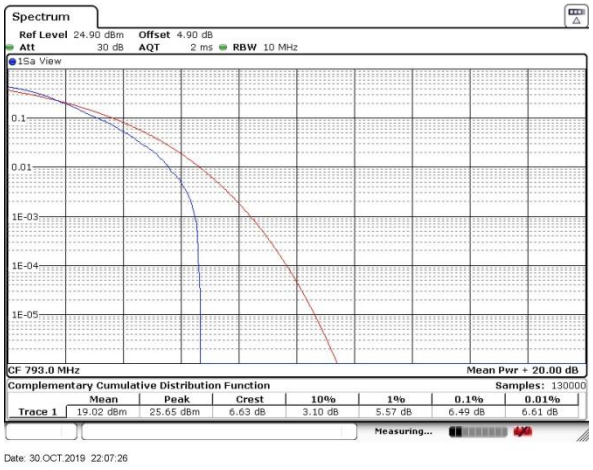


Middle Channel / Full RB

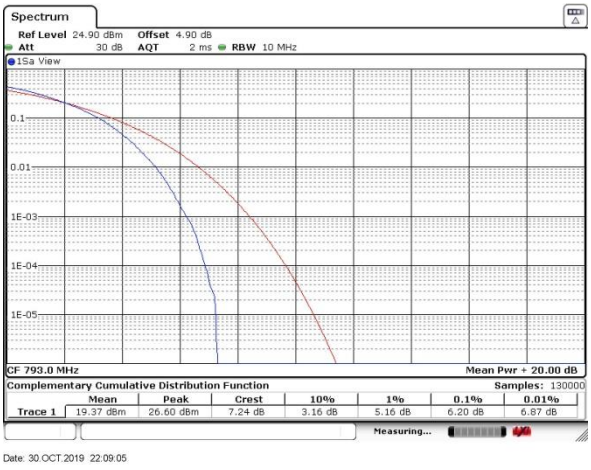


LTE Band 14 / 10MHz / 64QAM

Middle Channel/ 1RB



Middle Channel / Full RB

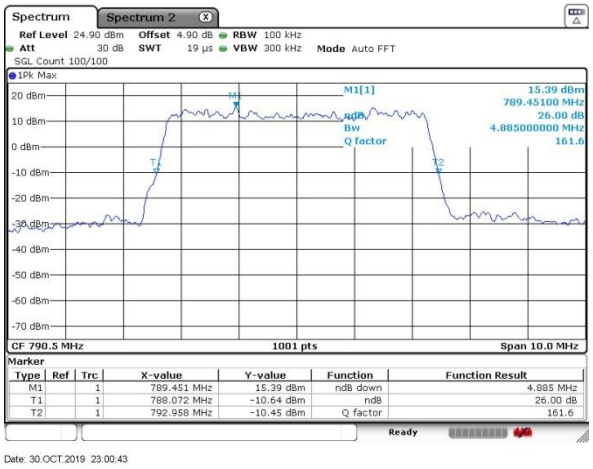


26dB Bandwidth

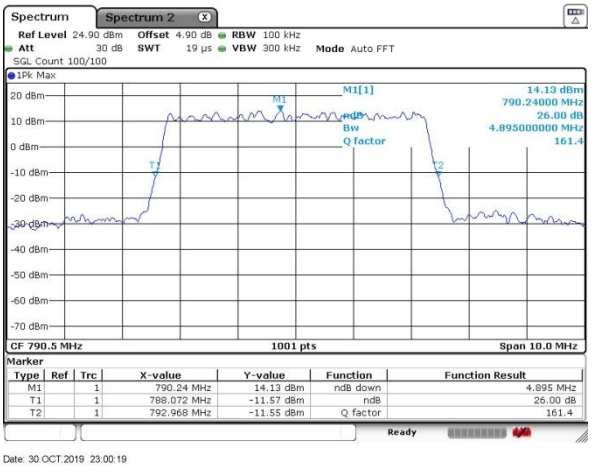
Mode	LTE Band 14 : 26dB BW(MHz)											
BW	5MHz		10MHz		5MHz	10MHz						
Mod.	QPSK	16QAM	QPSK	16QAM	64QAM	64QAM						
Lowest CH	4.885	4.895			4.945							
Middle CH	4.835	4.905	9.371	9.351	4.895	9.451						
Highest CH	4.955	4.875			4.885							

LTE Band 14

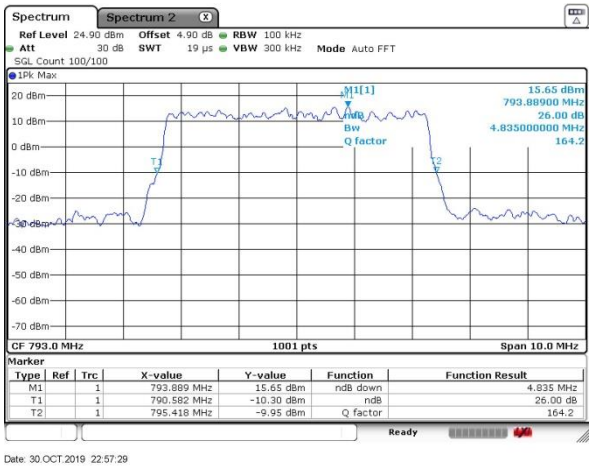
Lowest Channel / 5MHz / QPSK



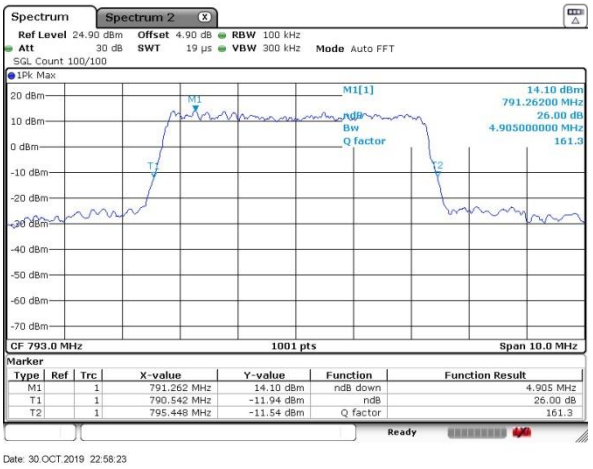
Lowest Channel / 5MHz / 16QAM



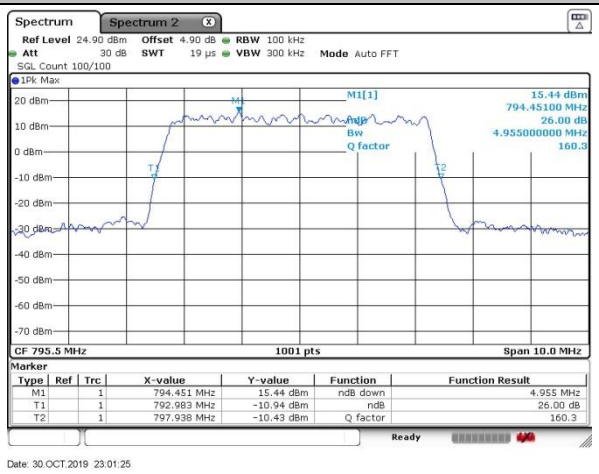
Middle Channel / 5MHz / QPSK



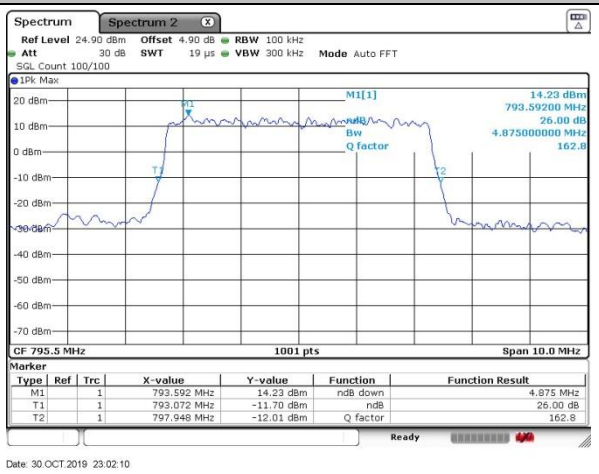
Middle Channel / 5MHz / 16QAM



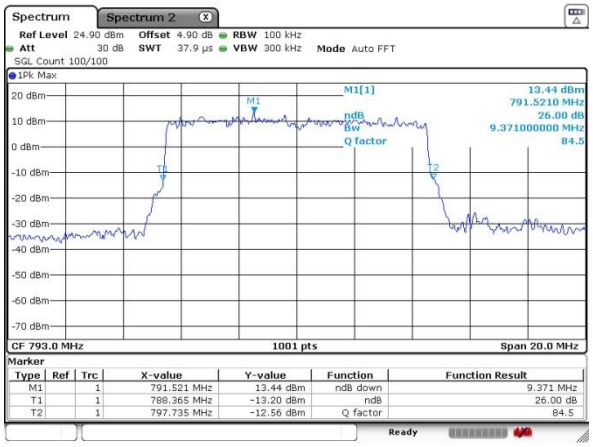
Highest Channel / 5MHz / QPSK

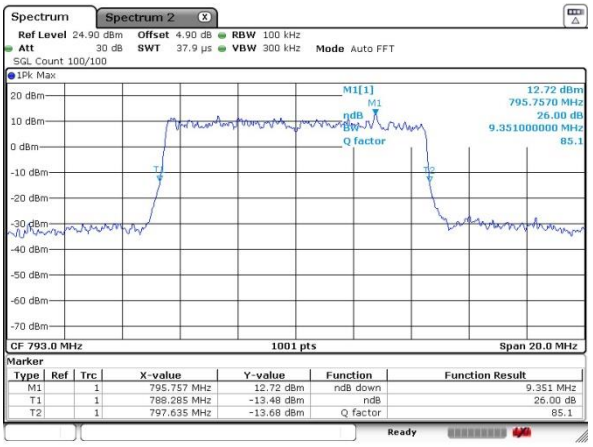


Highest Channel / 5MHz / 16QAM



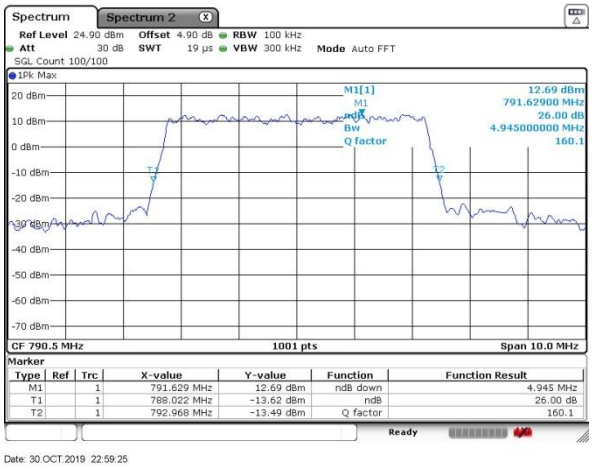
LTE Band 14	
Middle Channel / 10MHz / QPSK	Middle Channel / 10MHz / 16QAM





LTE Band 14

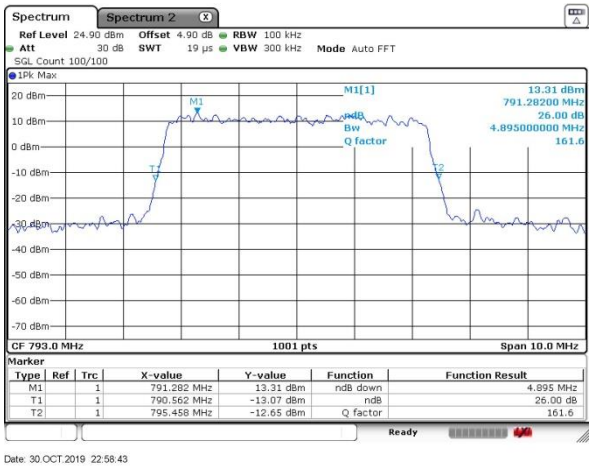
Lowest Channel / 5MHz / 64QAM



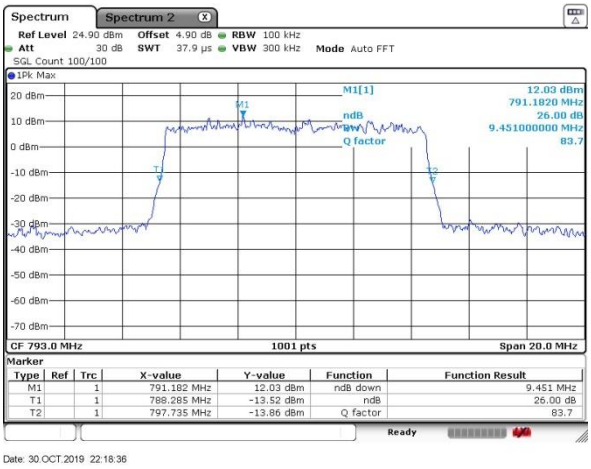
Lowest Channel / 10MHz / 64QAM

-

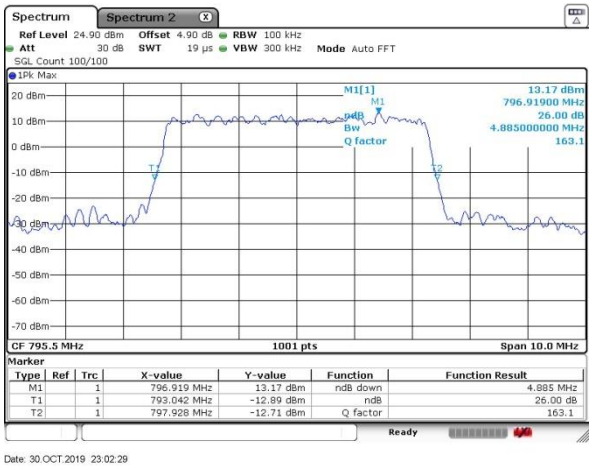
Middle Channel / 5MHz / 64QAM



Middle Channel /10MHz / 64QAM



Highest Channel /5MHz / 64QAM



Highest Channel /10MHz / 64QAM

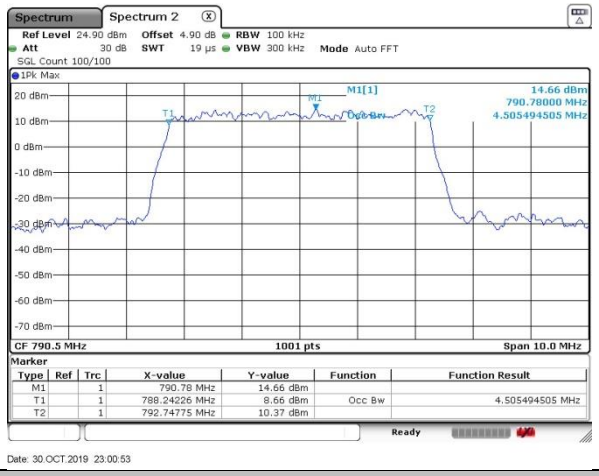
-

Occupied Bandwidth

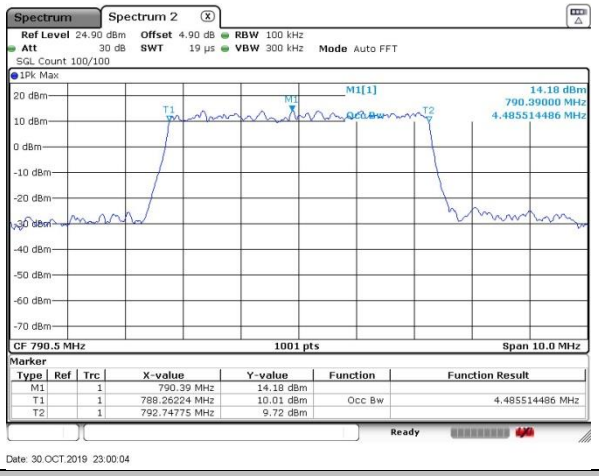
Mode	LTE Band 14 : 99%OBW(MHz)											
BW	5MHz		10MHz		5MHz	10MHz						
Mod.	QPSK	16QAM	QPSK	16QAM	64QAM	64QAM						
Lowest CH	4.51	4.49			4.50							
Middle CH	4.50	4.48	8.95	8.91	4.50	8.95						
Highest CH	4.50	4.49			4.50							

LTE Band 14

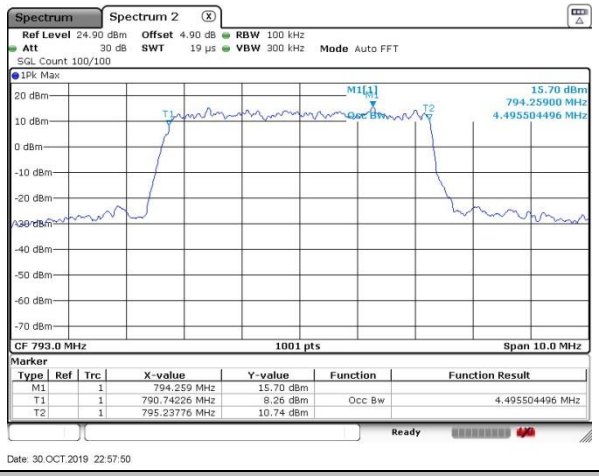
Lowest Channel / 5MHz / QPSK



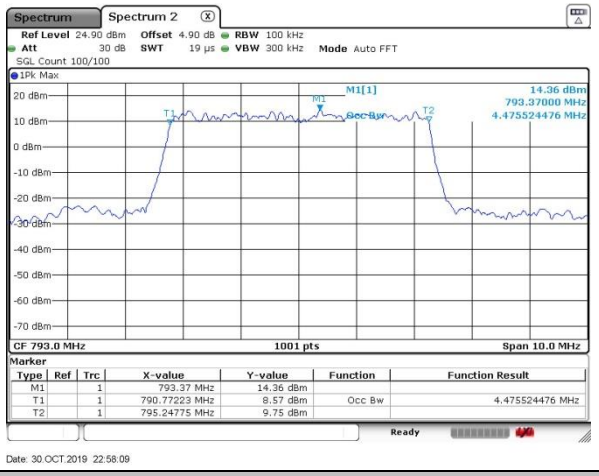
Lowest Channel / 5MHz / 16QAM



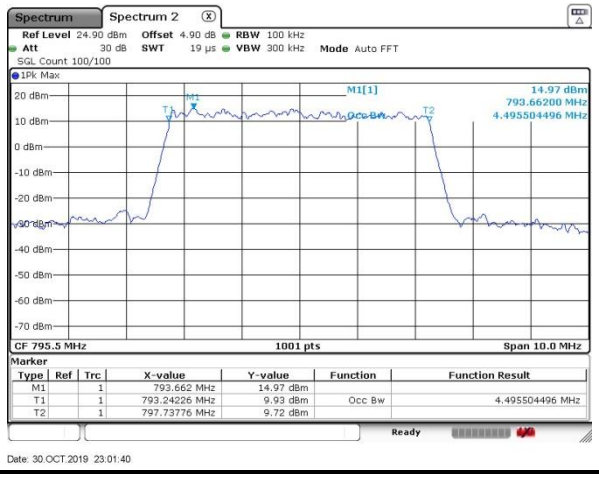
Middle Channel / 5MHz / QPSK



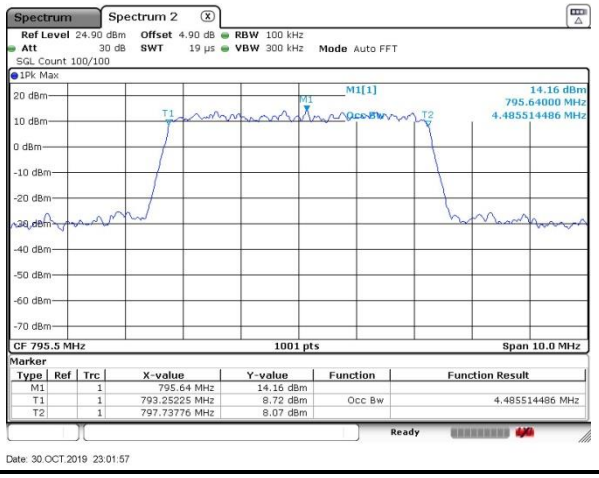
Middle Channel / 5MHz / 16QAM



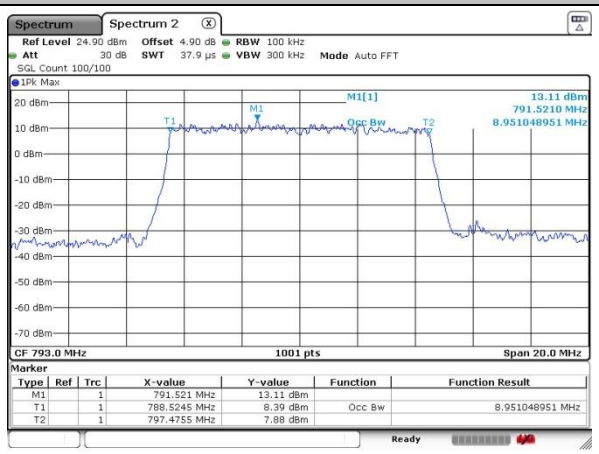
Highest Channel / 5MHz / QPSK

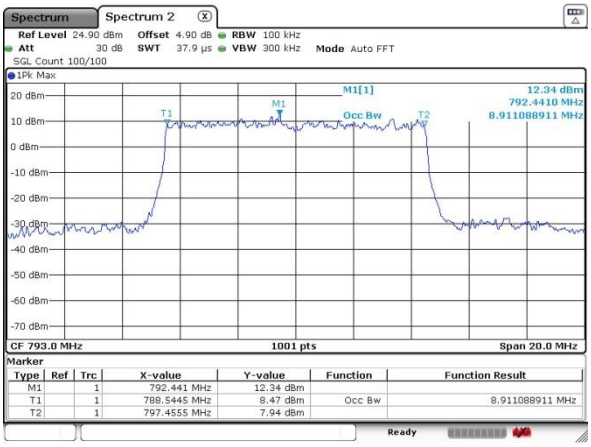


Highest Channel / 5MHz / 16QAM



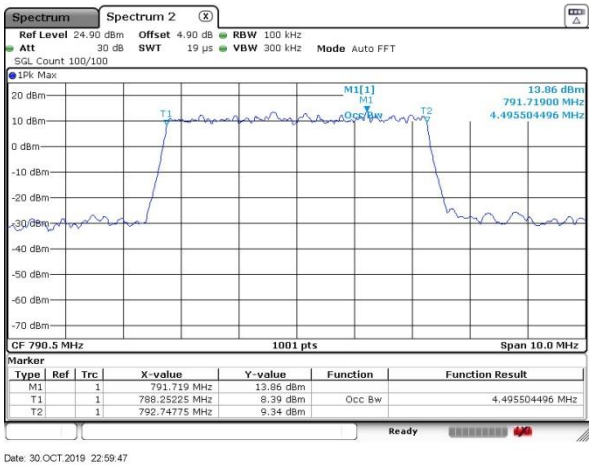
LTE Band 14	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**





LTE Band 14

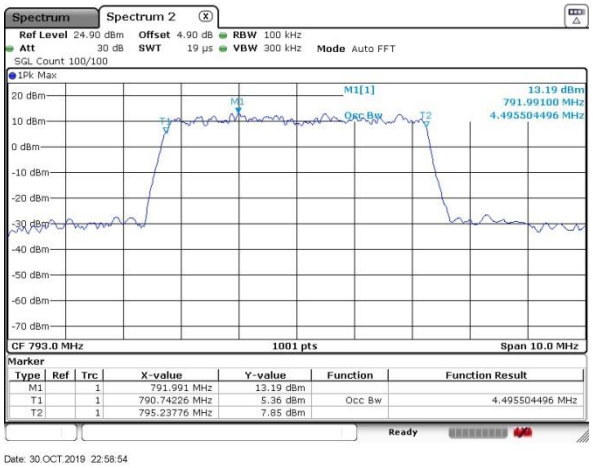
Lowest Channel / 5MHz / 64QAM



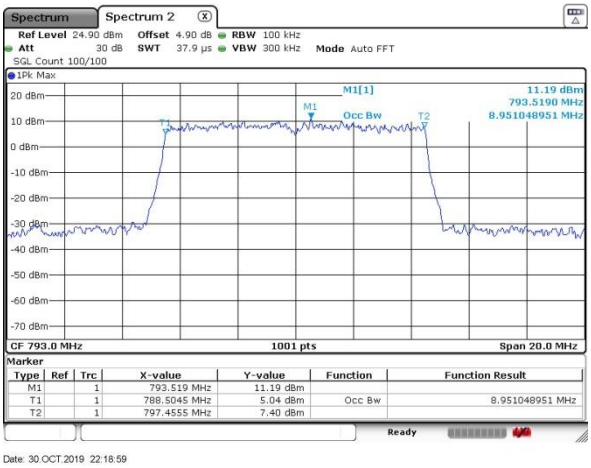
Lowest Channel / 10MHz / 64QAM

-

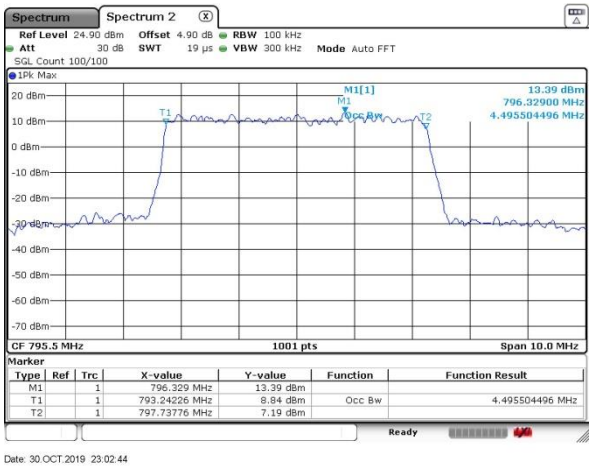
Middle Channel / 5MHz / 64QAM



Middle Channel /10MHz / 64QAM



Highest Channel /5MHz / 64QAM



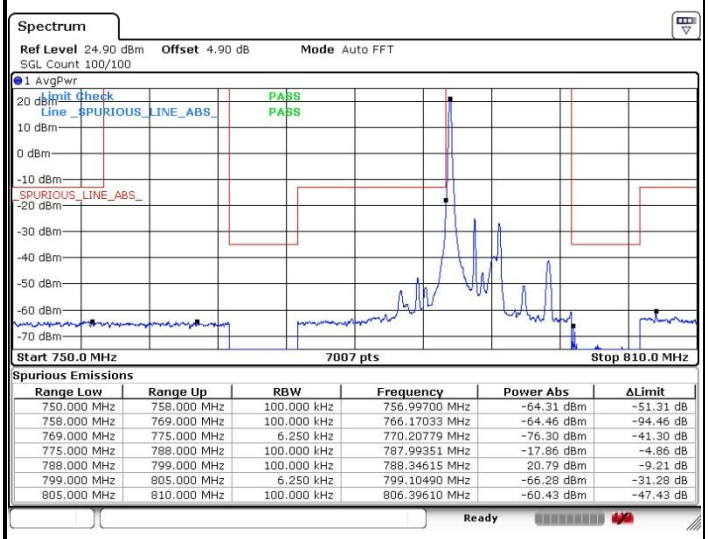
Highest Channel /10MHz / 64QAM

-

Conducted Band Edge

LTE Band 14 / 5MHz / QPSK

Lowest Band Edge / 1 RB

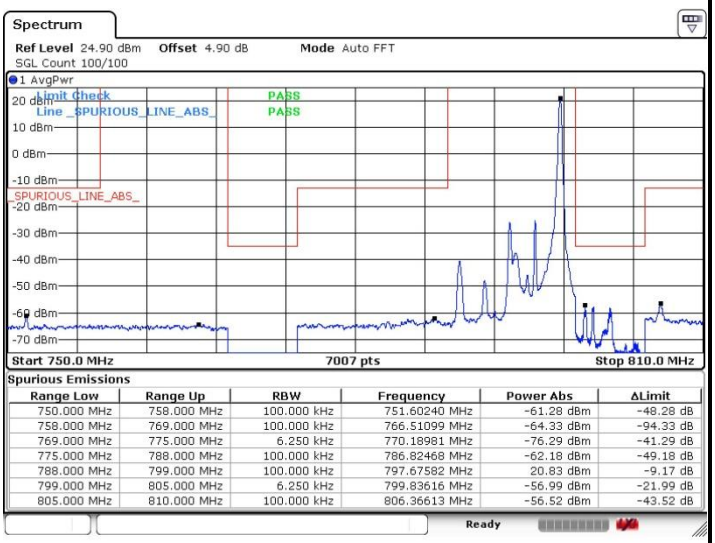


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	756.99700 MHz	-64.31 dBm	-51.31 dB
758.000 MHz	769.000 MHz	100.000 kHz	766.17033 MHz	-64.46 dBm	-94.46 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.20779 MHz	-76.30 dBm	-41.30 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-17.86 dBm	-4.86 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.34615 MHz	20.79 dBm	-9.21 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.10490 MHz	-66.28 dBm	-31.28 dB
805.000 MHz	810.000 MHz	100.000 kHz	806.39610 MHz	-60.43 dBm	-47.43 dB

Date: 30.OCT.2019 21:50:20

Highest Band Edge / 1 RB

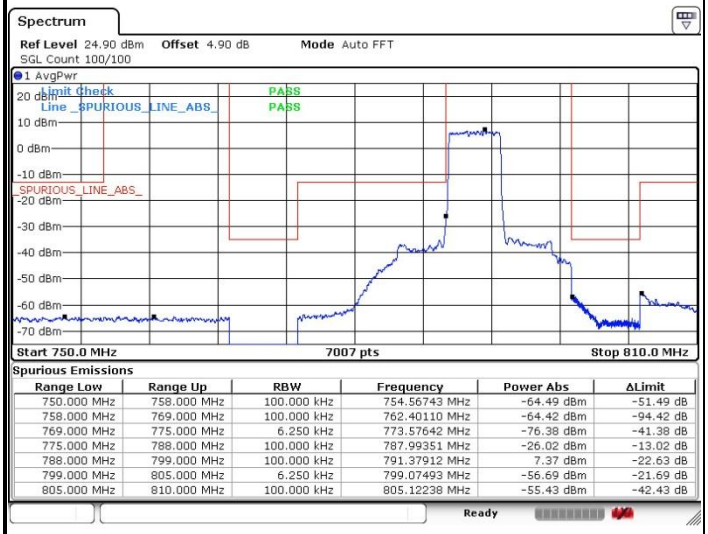


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	751.60240 MHz	-61.28 dBm	-48.28 dB
758.000 MHz	769.000 MHz	100.000 kHz	766.51099 MHz	-64.33 dBm	-94.33 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.18981 MHz	-76.29 dBm	-41.29 dB
775.000 MHz	788.000 MHz	100.000 kHz	786.82468 MHz	-62.18 dBm	-49.18 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.67582 MHz	20.83 dBm	-9.17 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.83616 MHz	-56.99 dBm	-21.99 dB
805.000 MHz	810.000 MHz	100.000 kHz	806.36613 MHz	-56.52 dBm	-43.52 dB

Date: 30.OCT.2019 21:52:29

Lowest Band Edge / Full RB

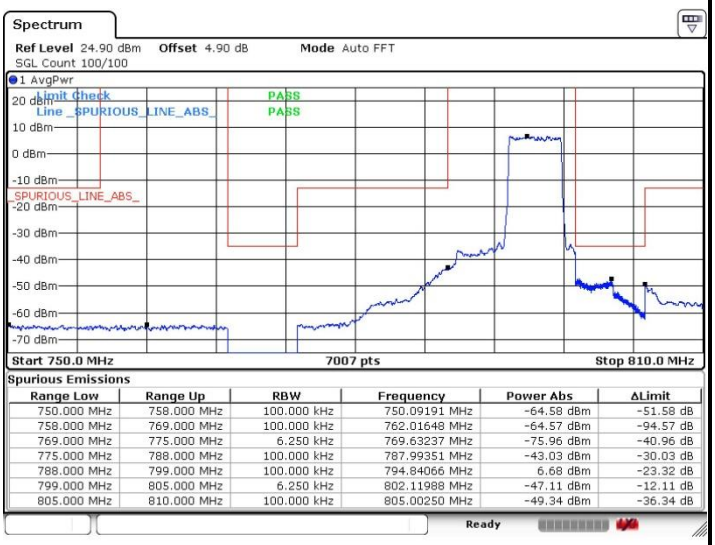


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	754.56743 MHz	-64.49 dBm	-51.49 dB
758.000 MHz	769.000 MHz	100.000 kHz	762.40110 MHz	-64.42 dBm	-94.42 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.57642 MHz	-76.38 dBm	-41.38 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-26.02 dBm	-13.02 dB
788.000 MHz	799.000 MHz	100.000 kHz	791.37912 MHz	7.37 dBm	-22.63 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.07493 MHz	-56.69 dBm	-21.69 dB
805.000 MHz	810.000 MHz	100.000 kHz	805.12238 MHz	-55.43 dBm	-42.43 dB

Date: 30.OCT.2019 21:49:58

Highest Band Edge / Full RB



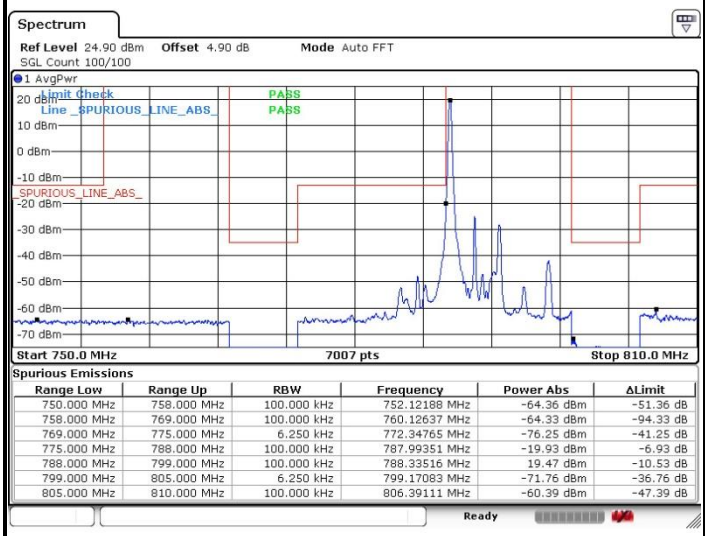
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	750.09191 MHz	-64.58 dBm	-51.58 dB
758.000 MHz	769.000 MHz	100.000 kHz	762.01648 MHz	-64.57 dBm	-94.57 dB
769.000 MHz	775.000 MHz	6.250 kHz	769.63237 MHz	-75.96 dBm	-40.96 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-43.03 dBm	-30.03 dB
788.000 MHz	799.000 MHz	100.000 kHz	794.84066 MHz	6.68 dBm	-23.32 dB
799.000 MHz	805.000 MHz	6.250 kHz	802.11988 MHz	-47.11 dBm	-12.11 dB
805.000 MHz	810.000 MHz	100.000 kHz	805.00250 MHz	-49.34 dBm	-36.34 dB

Date: 30.OCT.2019 21:52:57

LTE Band 14 / 5MHz / 16QAM

Lowest Band Edge /1 RB

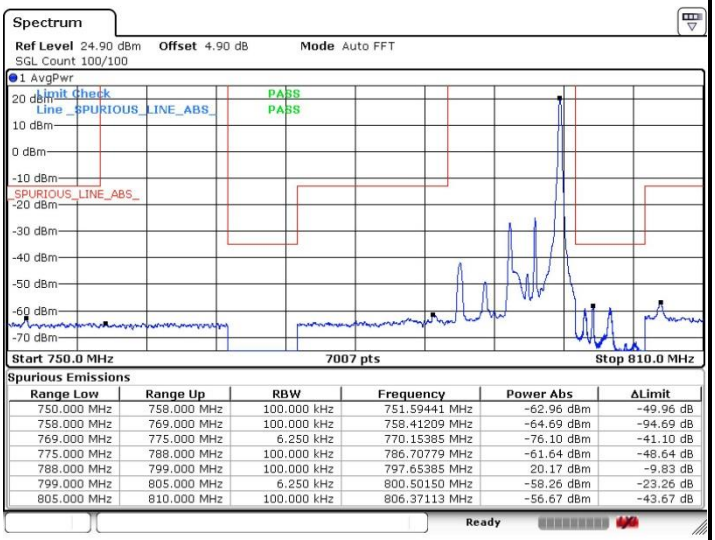


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	752.12188 MHz	-64.36 dBm	-51.36 dB
758.000 MHz	769.000 MHz	100.000 kHz	760.12637 MHz	-64.33 dBm	-94.33 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.34765 MHz	-76.25 dBm	-41.25 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-19.93 dBm	-6.93 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.33516 MHz	19.47 dBm	-10.53 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.17083 MHz	-71.76 dBm	-36.76 dB
805.000 MHz	810.000 MHz	100.000 kHz	806.39111 MHz	-60.39 dBm	-47.39 dB

Date: 30.OCT.2019 21:50:42

Highest Band Edge / 1 RB

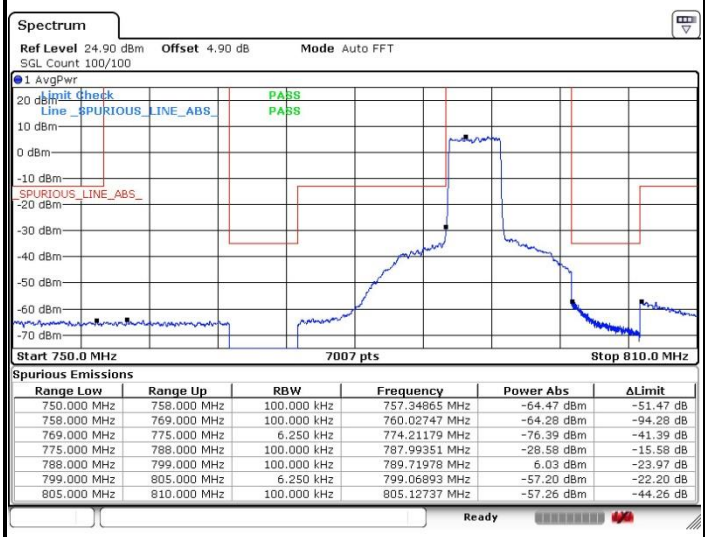


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	751.59441 MHz	-62.96 dBm	-49.96 dB
758.000 MHz	769.000 MHz	100.000 kHz	758.41209 MHz	-64.69 dBm	-94.69 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.15385 MHz	-76.10 dBm	-41.10 dB
775.000 MHz	788.000 MHz	100.000 kHz	786.70779 MHz	-61.64 dBm	-48.64 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.65385 MHz	20.17 dBm	-9.83 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.50150 MHz	-58.26 dBm	-23.26 dB
805.000 MHz	810.000 MHz	100.000 kHz	806.37113 MHz	-56.67 dBm	-43.67 dB

Date: 30.OCT.2019 21:52:14

Lowest Band Edge / Full RB

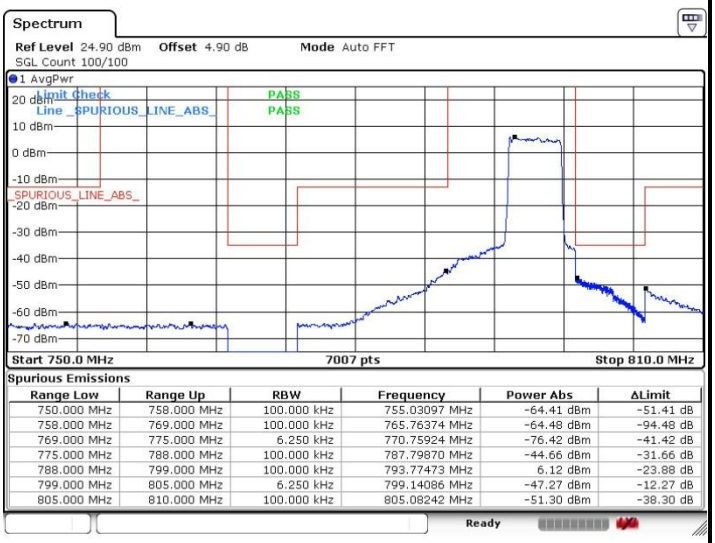


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	757.34865 MHz	-64.47 dBm	-51.47 dB
758.000 MHz	769.000 MHz	100.000 kHz	760.02747 MHz	-64.28 dBm	-94.28 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.21179 MHz	-76.39 dBm	-41.39 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-28.58 dBm	-15.58 dB
788.000 MHz	799.000 MHz	100.000 kHz	789.71978 MHz	6.03 dBm	-23.97 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.06893 MHz	-57.20 dBm	-22.20 dB
805.000 MHz	810.000 MHz	100.000 kHz	805.12737 MHz	-57.26 dBm	-44.26 dB

Date: 30.OCT.2019 21:49:45

Highest Band Edge / Full RB



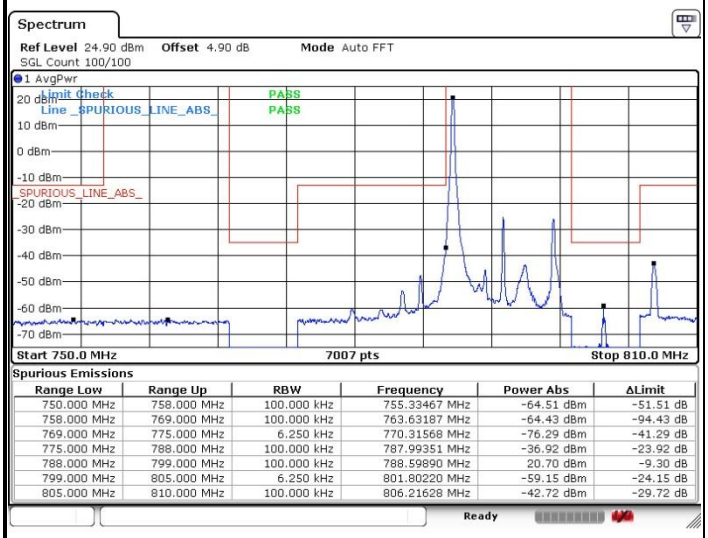
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	755.03097 MHz	-64.41 dBm	-51.41 dB
758.000 MHz	769.000 MHz	100.000 kHz	765.76374 MHz	-64.48 dBm	-94.48 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.75924 MHz	-76.42 dBm	-41.42 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.79870 MHz	-44.66 dBm	-31.66 dB
788.000 MHz	799.000 MHz	100.000 kHz	793.77473 MHz	6.12 dBm	-23.88 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.14086 MHz	-47.27 dBm	-12.27 dB
805.000 MHz	810.000 MHz	100.000 kHz	805.08242 MHz	-51.30 dBm	-38.30 dB

Date: 30.OCT.2019 21:53:21

LTE Band 14 / 10MHz / QPSK

Lowest Band Edge / 1 RB

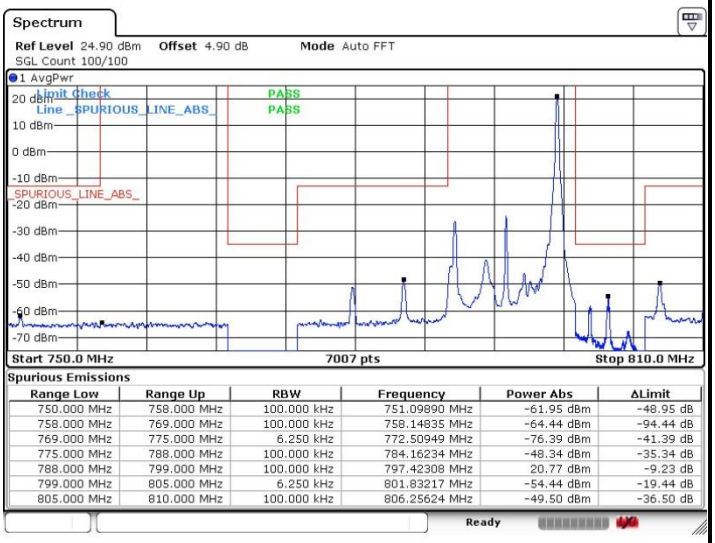


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	755.33467 MHz	-64.51 dBm	-51.51 dB
758.000 MHz	769.000 MHz	100.000 kHz	763.63187 MHz	-64.43 dBm	-94.43 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.31568 MHz	-76.29 dBm	-41.29 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-36.92 dBm	-23.92 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.59890 MHz	20.70 dBm	-9.30 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.80220 MHz	-59.15 dBm	-24.15 dB
805.000 MHz	810.000 MHz	100.000 kHz	806.21628 MHz	-42.72 dBm	-29.72 dB

Date: 30.OCT.2019 21:46:50

Highest Band Edge / 1 RB

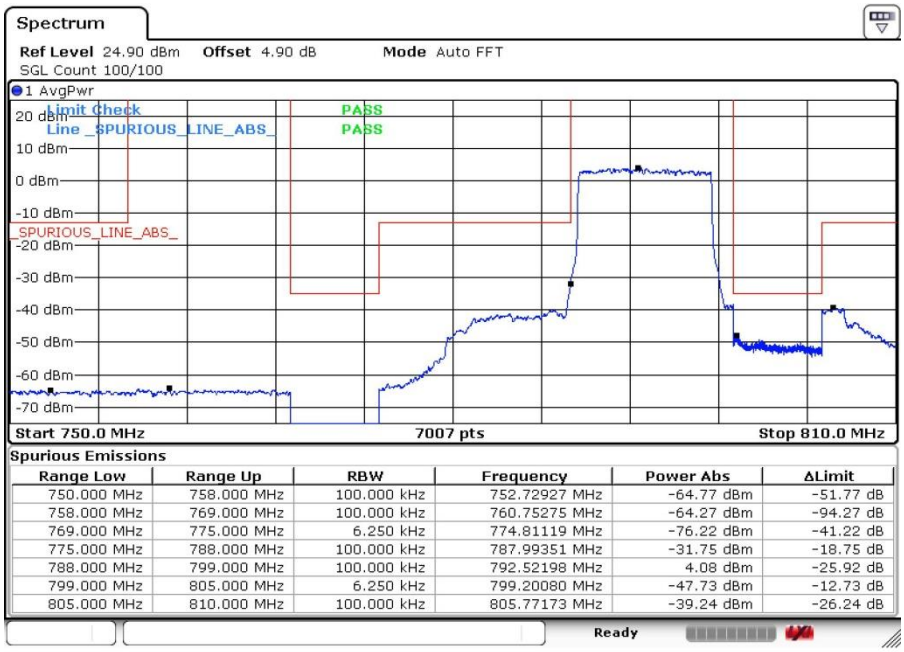


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	751.09890 MHz	-61.95 dBm	-48.95 dB
758.000 MHz	769.000 MHz	100.000 kHz	758.14835 MHz	-64.44 dBm	-94.44 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.50949 MHz	-76.39 dBm	-41.39 dB
775.000 MHz	788.000 MHz	100.000 kHz	784.16234 MHz	-48.34 dBm	-35.34 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.42308 MHz	20.77 dBm	-9.23 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.83217 MHz	-54.44 dBm	-19.44 dB
805.000 MHz	810.000 MHz	100.000 kHz	806.25624 MHz	-49.50 dBm	-36.50 dB

Date: 30.OCT.2019 21:47:12

Band Edge / Full RB



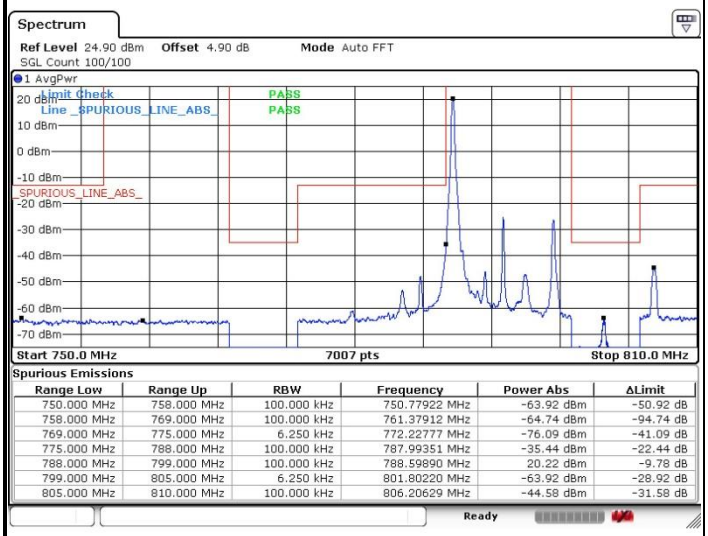
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	752.72927 MHz	-64.77 dBm	-51.77 dB
758.000 MHz	769.000 MHz	100.000 kHz	760.75275 MHz	-64.27 dBm	-94.27 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.81119 MHz	-76.22 dBm	-41.22 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-31.75 dBm	-18.75 dB
788.000 MHz	799.000 MHz	100.000 kHz	792.52198 MHz	4.08 dBm	-25.92 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.20080 MHz	-47.73 dBm	-12.73 dB
805.000 MHz	810.000 MHz	100.000 kHz	805.77173 MHz	-39.24 dBm	-26.24 dB

Date: 30.OCT.2019 21:44:31

LTE Band 14 / 10MHz / 16QAM

Lowest Band Edge / 1 RB

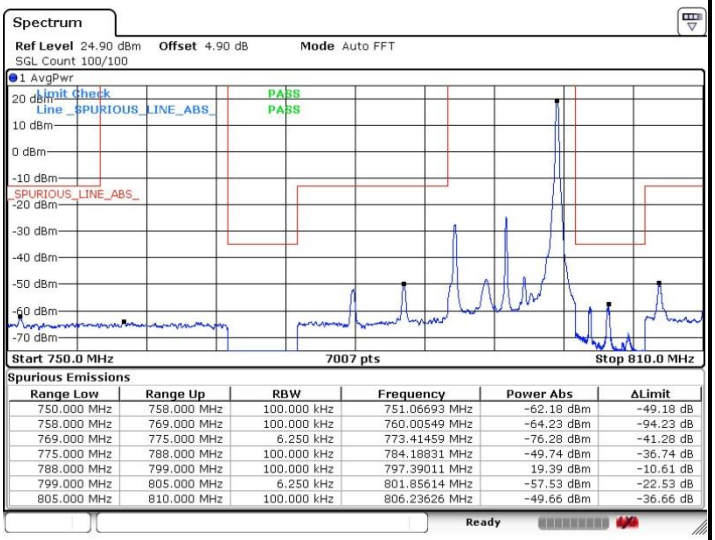


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	750.77922 MHz	-63.92 dBm	-50.92 dB
758.000 MHz	769.000 MHz	100.000 kHz	761.37912 MHz	-64.74 dBm	-94.74 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.22777 MHz	-76.09 dBm	-41.09 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-35.44 dBm	-22.44 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.59890 MHz	20.22 dBm	-9.78 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.80220 MHz	-63.92 dBm	-28.92 dB
805.000 MHz	810.000 MHz	100.000 kHz	806.20629 MHz	-44.58 dBm	-31.58 dB

Date: 30.OCT.2019 21:46:34

Highest Band Edge / 1 RB

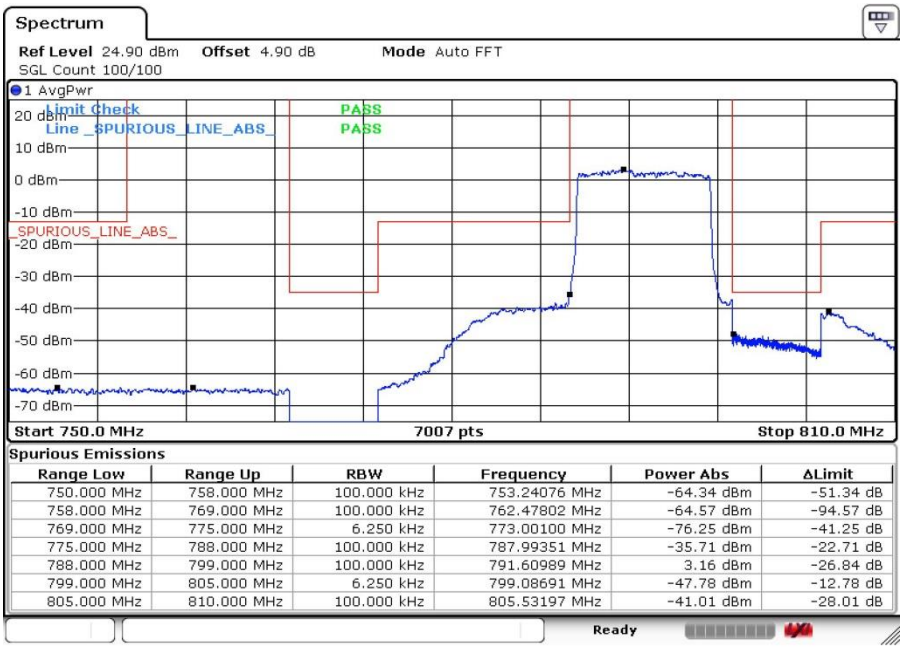


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	751.06693 MHz	-62.18 dBm	-49.18 dB
758.000 MHz	769.000 MHz	100.000 kHz	760.00549 MHz	-64.23 dBm	-94.23 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.41459 MHz	-76.28 dBm	-41.28 dB
775.000 MHz	788.000 MHz	100.000 kHz	784.18831 MHz	-49.74 dBm	-36.74 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.39011 MHz	19.39 dBm	-10.61 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.85614 MHz	-57.53 dBm	-22.53 dB
805.000 MHz	810.000 MHz	100.000 kHz	806.23626 MHz	-49.66 dBm	-36.66 dB

Date: 30.OCT.2019 21:47:30

Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
750.000 MHz	758.000 MHz	100.000 kHz	753.24076 MHz	-64.34 dBm	-51.34 dB
758.000 MHz	769.000 MHz	100.000 kHz	762.47802 MHz	-64.57 dBm	-94.57 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.00100 MHz	-76.25 dBm	-41.25 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-35.71 dBm	-22.71 dB
788.000 MHz	799.000 MHz	100.000 kHz	791.60989 MHz	3.16 dBm	-26.84 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.08691 MHz	-47.78 dBm	-12.78 dB
805.000 MHz	810.000 MHz	100.000 kHz	805.53197 MHz	-41.01 dBm	-28.01 dB

Date: 30.OCT.2019 21:45:17