FCC RF Test Report

APPLICANT	: Motorola Mobility LLC
EQUIPMENT	: Mobile Cellular Phone
BRAND NAME	: Motorola
MODEL NAME	: XT1921-2
FCC ID	: IHDT56XC4
STANDARD	: FCC 47 CFR Part 2, 90
CLASSIFICATION	: PCS Licensed Transmitter Held to Ear (PCE)

This is a variant report. The product was received on Dec. 20, 2017 and completely tested on Jan. 30, 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA-603-E 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., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG7D2018-02D	Rev. 01	Initial issue of report	Feb. 23, 2018
FG7D2018-02D	Rev. 02	Revising the Maximum ERP of QPSK 5 MHz BW to 0.0813 W	Mar. 06, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting only	PASS	-
	§90.542 (a)(7)	Effective Radiated Power	ERP < 3Watt	PASS	-
3.5	-	Peak-to-Average Ratio	<13dB	N/A	Reporting only
3.6	§2.1049	Occupied Bandwidth	Reporting only	PASS	-
3.7	§2.1053 §90.543 (e)(2)	Conducted Band Edge Measurement	Refer standard	PASS	-
3.8	§2.1051 §90.210(n)	Emission Mask	Mask B	PASS	-
3.9	§2.1053 §90.543 (e)(3)	Conducted Spurious Emission	< $43+10\log_{10}$(P[Watts])	PASS	-
3.10	§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 17.39 dB at 1576.000 MHz
Remark: This is a variant report which can be referred Product Equality Declaration. Based on the change, the test cases of LTE Band 14 were tested.					

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 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT1921-2
FCC ID	IHDT56XC4
IMEI Code	351840090009840 (for Radiation) 351840090015086 (for Conducted)
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE/FM/GNSS WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 Bluetooth BR/EDR/LE
HW Version	DVT1B
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.

Accessory List	
AC Adapter 1	Brand Name : Motorola
	Model Name : C-P56
AC Adapter 2	Brand Name : Motorola
	Model Name : C-P56
Battery	Brand Name : Motorola
	Model Name : GK40
USB Cable	Brand Name : Saibao
	Model Name : SWT-A083A

1.4 Product Specification of Equipment Under Test

Product Feature	
Tx Frequency	790.5 MHz ~ 795.5 MHz
Rx Frequency	760.5 MHz ~ 765.5 MHz
Bandwidth	5MHz / 10MHz
Maximum Output Power to Antenna	22.67dBm
Antenna Type	PIFA Antenna and Coupling type (LDS) Antenna
Antenna Gain	-1.32dBi
Type of Modulation	QPSK / 16QAM

1.5 Emission Designator

LTE Band 14	QPSK			16QAM		
BW(MHz)	**Emission Designator (99%OBW)**	**Frequency Tolerance (ppm)**	**Maximum ERP(W)**	**Emission Designator (99%OBW)**	**Frequency Tolerance (ppm)**	**Maximum ERP(W)**
5	4M49G7D	-	0.0813	4M52W7D	-	0.0698
10	8M97G7D	0.0045	0.1849	9M05W7D	-	0.1641

1.6 Modification of EUT

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

1.7 Testing Site

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH05-HY

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH12-HY

1.8 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 / TIA-603-E
- FCC KDB 971168 Measurement Guidance of License Digital Systems v03
- 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

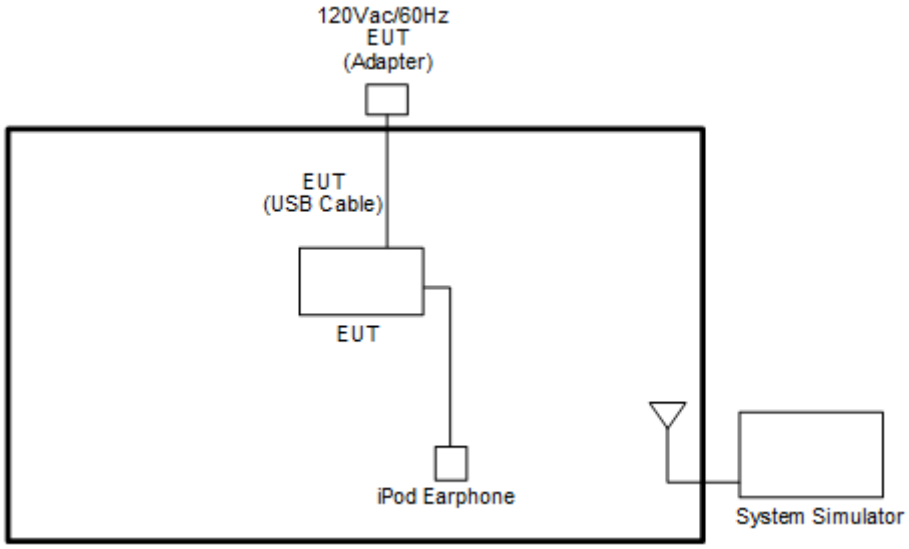
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03 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	1	Half	Full	L	M	H
Max. Output Power	14	-	-	v	v	-	-	v	v	v	v	v	v	v	v
26dB and 99% Bandwidth	14	-	-	v	v	-	-	v	v			v	v	v	v
Conducted Band Edge	14	-	-	v	v	-	-	v	v	v		v	v		v
Emission Mask	14	-	-	v	v	-	-	v	v	v		v	v	v	v
Conducted Spurious Emission	14	-	-	v	v	-	-	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
Radiated Spurious Emission	14	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.														

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.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	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 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 :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.5 + 10 = 14.5 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 14 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
10	Channel	-	23330	-
	Frequency	-	793	-
5	Channel	23305	23330	23355
	Frequency	790.5	793	795.5

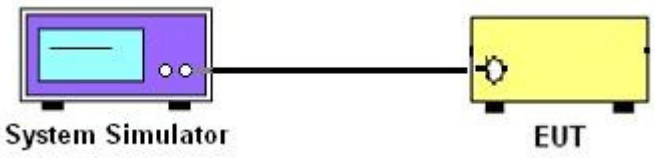
3 Conducted Test Items

3.1 Measuring Instruments

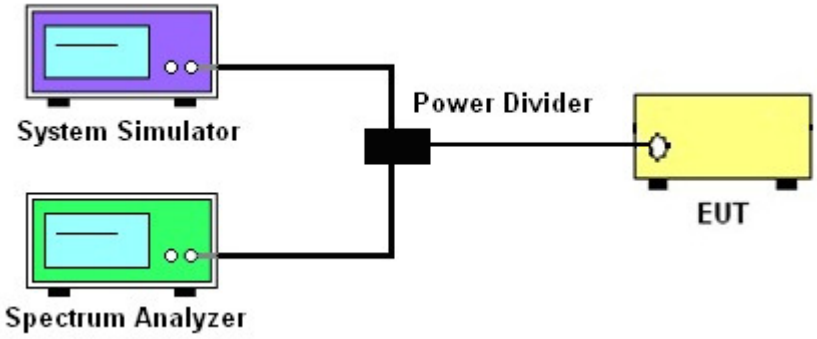
The measuring equipment is listed in the section 5 of this test report

3.2 Test Setup

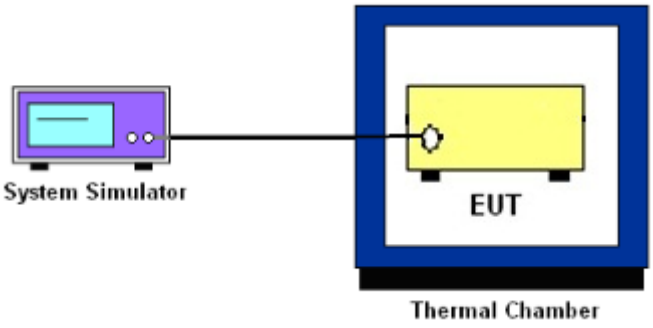
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge, Emission Mask, 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 Measurement and ERP

3.4.1 Description of the Conducted Output Power Measurement and ERP 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 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

3.4.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. 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

The testing follows FCC KDB 971168 v03 Section 5.7.1

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.

3.6 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

The testing follows FCC KDB 971168 v03 Section 4.2.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. 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.
3. 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.
4. Set the detection mode to peak, and the trace mode to max hold.
5. 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)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. 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.
8. 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

90.543(e)

(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.

3.7.2 Test Procedures

The testing follows FCC KDB 971168 v03 Section 6.0.

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

3.8 Emission Mask

3.8.1 Description of Emissions Mask Measurement

Transmitters designed must meet the emission mask comply with the emission mask provisions of FCC Part 90.210(n).

3.8.2 Test Procedures

The testing follows FCC KDB 971168 v03 Section 6.0.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The power of the modulated signal was measured on a spectrum analyzer using an RMS and 10 second sweep time in order to maximize the level.
3. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.9 Conducted Spurious Emission

3.9.1 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 10^{th} harmonic.

3.9.2 Test Procedures

The testing follows FCC KDB 971168 v03 Section 6.0.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. 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.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. 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.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

3.10 Frequency Stability Measurement

3.10.1 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.

3.10.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 v03 Section 9.0.

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. 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.
3. 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.

3.10.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 v03 Section 9.0.

1. The EUT was placed in a temperature chamber at 20±5° C and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

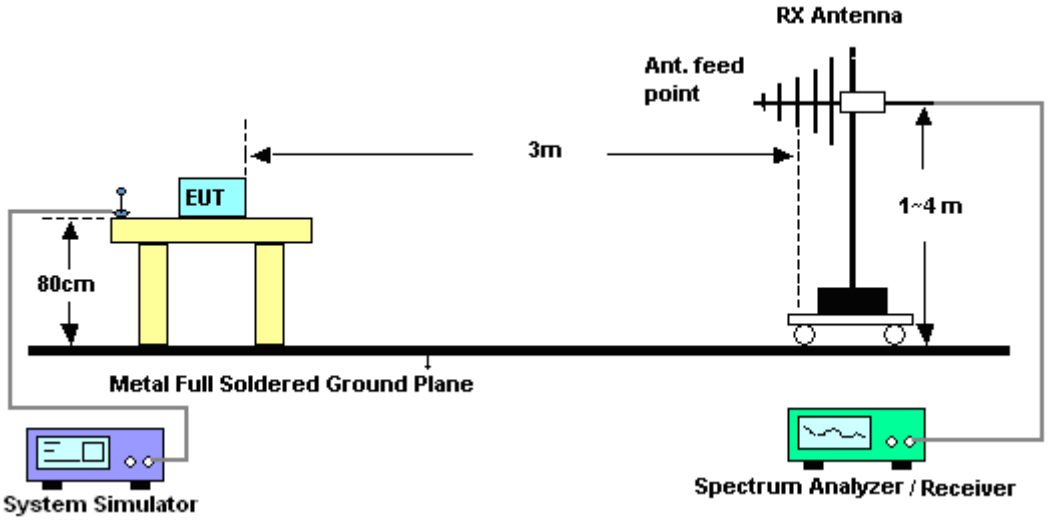
4 Radiated Test Items

4.1 Measuring Instruments

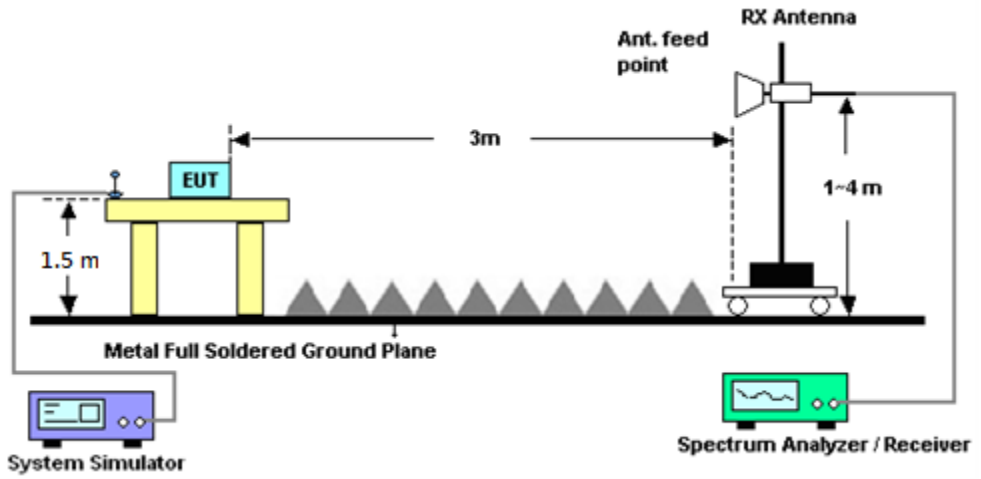
See list of measuring instruments of this test report.

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 / TIA-603-E. 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.

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

4.4.2 Test Procedures

The testing follows FCC KDB 971168 v03 Section 5.8 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. 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)

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
LTE Base Station	Anritsu	MT8820C	6201432821	GSM/GPRS /WCDMA/LTE	Oct. 13, 2017	Jan. 23, 2018 ~ Jan. 30, 2018	Oct. 12, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 07, 2017	Jan. 23, 2018 ~ Jan. 30, 2018	Nov. 06, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	100895	9kHz~30GHz	Apr. 25, 2017	Jan. 23, 2018 ~ Jan. 30, 2018	Apr. 24, 2018	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-30℃~70℃	Aug. 28, 2017	Jan. 23, 2018 ~ Jan. 30, 2018	Aug. 27, 2018	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890001	1V~20V 0.5A~5A	Oct. 06, 2017	Jan. 23, 2018 ~ Jan. 30, 2018	Oct. 05, 2018	Conducted (TH05-HY)
Coupler	Warison	1-18GHz 20dB 25WSMA Directional Coupler	#B	1G~18GHz	Feb. 20, 2017	Jan. 23, 2018 ~ Jan. 30, 2018	Feb. 19, 2018	Conducted (TH05-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Jan. 15, 2017 ~ Jan. 16, 2018	Jul. 17, 2018	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35413&02	30MHz~1GHz	Dec. 18, 2017	Jan. 15, 2017 ~ Jan. 16, 2018	Dec. 17, 2018	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Oct. 20, 2017	Jan. 15, 2017 ~ Jan. 16, 2018	Oct. 19, 2018	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 23, 2017	Jan. 15, 2017 ~ Jan. 16, 2018	Mar. 22, 2018	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	Dec. 19, 2017	Jan. 15, 2017 ~ Jan. 16, 2018	Dec. 18, 2018	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Jan. 15, 2017 ~ Jan. 16, 2018	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Jan. 15, 2017 ~ Jan. 16, 2018	N/A	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	Apr. 27, 2017	Jan. 15, 2017 ~ Jan. 16, 2018	Apr. 26, 2018	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9030A	MY52350276	3Hz~44GHz	Mar. 23, 2017	Jan. 15, 2017 ~ Jan. 16, 2018	Mar. 22, 2018	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1212	1GHz ~ 18GHz	Mar. 17, 2017	Jan. 15, 2017 ~ Jan. 16, 2018	Mar. 16, 2018	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Jan. 15, 2017 ~ Jan. 16, 2018	Nov. 26, 2018	Radiation (03CH12-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	May 22, 2017	Jan. 15, 2017 ~ Jan. 16, 2018	May 21, 2018	Radiation (03CH12-HY)

6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.36**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.70**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.98**

Appendix A. Test Results of Conducted Test

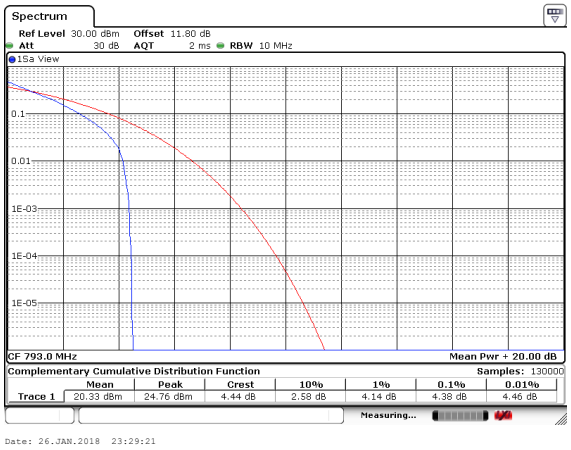
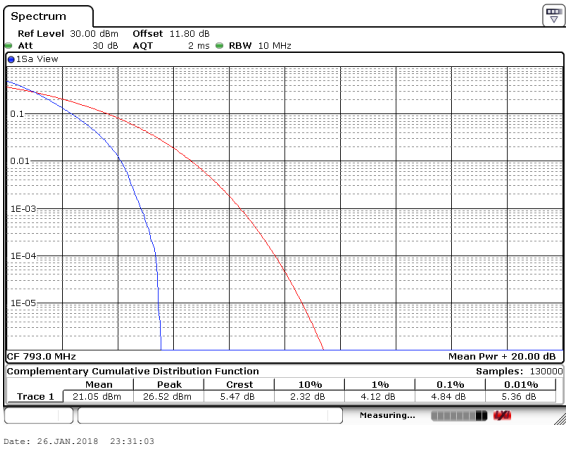
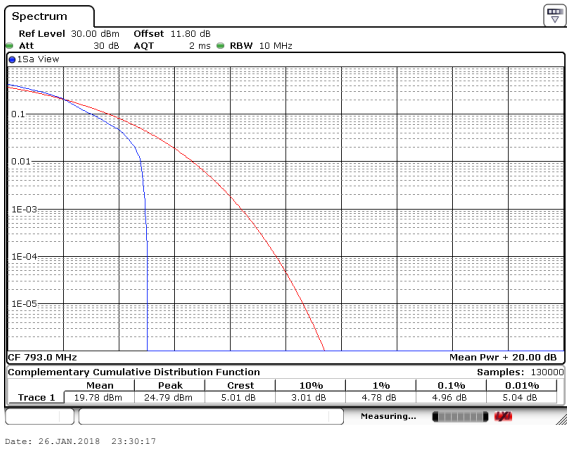
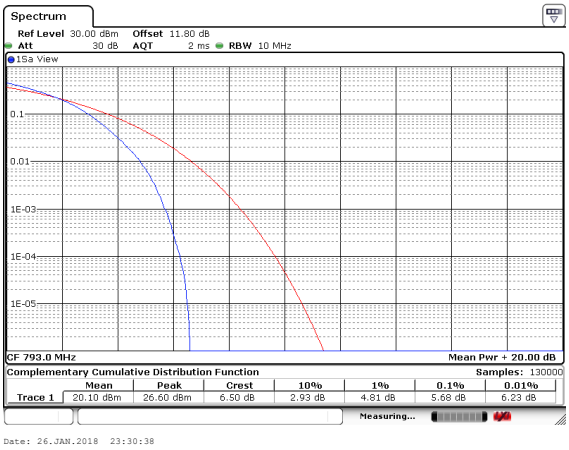
Conducted Output Power(Average power)

LTE Band 14 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	-	22.55	-
10	1	25		-	22.53	-
10	1	49		-	**22.67**	-
10	25	0		-	21.67	-
10	25	12		-	21.57	-
10	25	25		-	21.62	-
10	50	0		-	21.59	-
10	1	0	16-QAM	-	22.15	-
10	1	25		-	21.72	-
10	1	49		-	21.90	-
10	25	0		-	20.74	-
10	25	12		-	20.62	-
10	25	25		-	20.62	-
10	50	0		-	20.66	-
5	1	0	QPSK	22.24	22.20	22.17
5	1	12		22.49	22.48	22.57
5	1	24		22.55	22.55	22.51
5	12	0		21.67	21.51	21.49
5	12	7		21.58	21.56	21.57
5	12	13		21.60	21.53	21.55
5	25	0		21.62	21.54	21.60
5	1	0	16-QAM	21.91	21.89	21.83
5	1	12		21.75	21.72	21.81
5	1	24		21.78	21.81	21.77
5	12	0		20.69	20.55	20.55
5	12	7		20.61	20.58	20.60
5	12	13		20.63	20.54	20.58
5	25	0		20.59	20.51	20.60

LTE Band 14

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	4.38	4.84	4.96	5.68	
Highest CH	-	-	-	-	

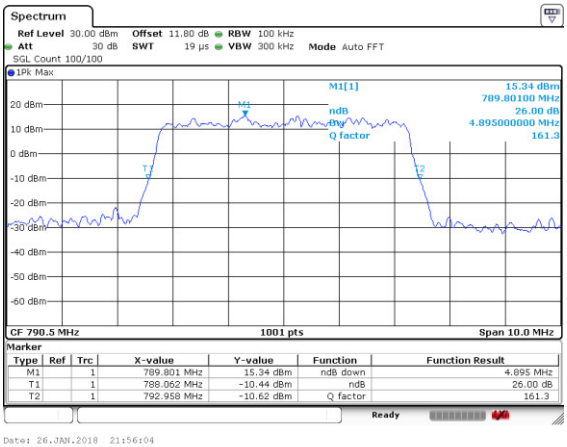
LTE Band 14 / 10MHz / QPSK	
Middle Channel/ 1RB	**Middle Channel / Full RB**
	
LTE Band 14 / 10MHz / 16QAM	
Middle Channel/ 1RB	**Middle Channel / Full RB**
	

26dB Bandwidth

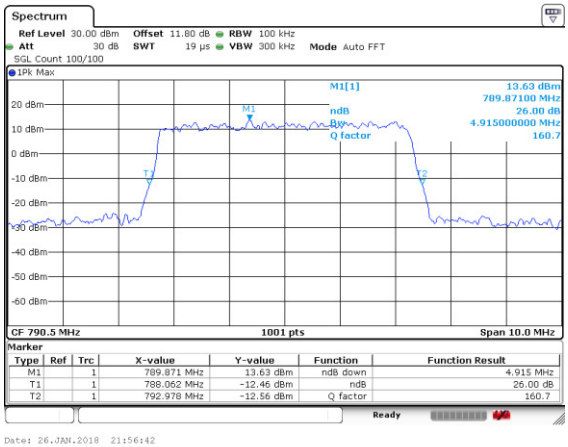
Mode	LTE Band 14 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.90	4.92	-	-	-	-	-	-
Middle CH	-	-	-	-	4.94	4.91	9.65	9.73	-	-	-	-
Highest CH	-	-	-	-	4.89	4.88	-	-	-	-	-	-

LTE Band 14

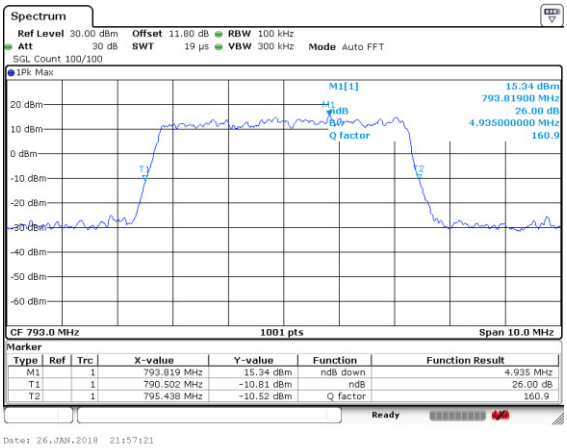
Lowest Channel / 5MHz / QPSK



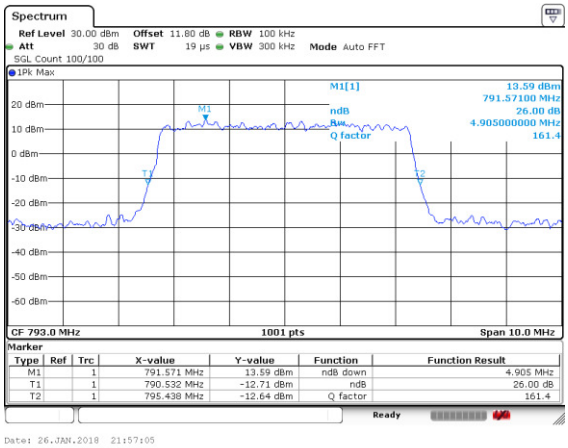
Lowest Channel / 5MHz / 16QAM



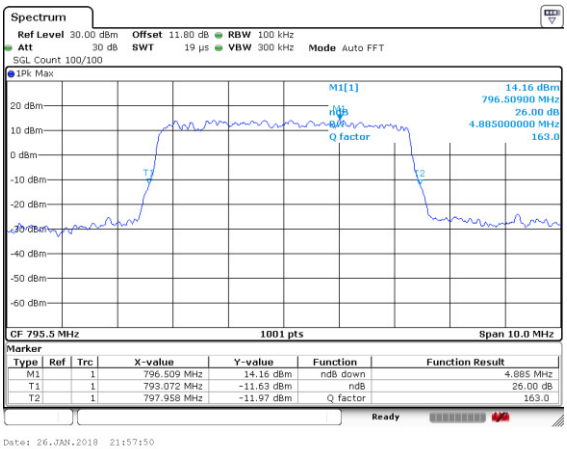
Middle Channel / 5MHz / QPSK



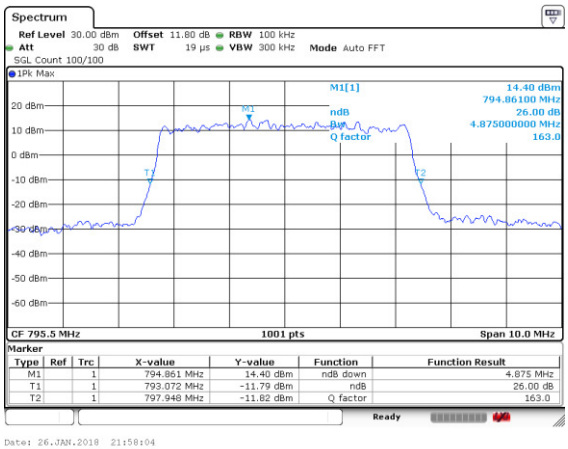
Middle Channel / 5MHz / 16QAM

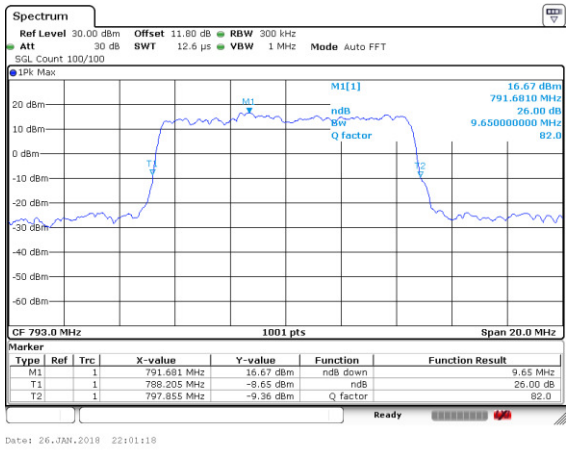
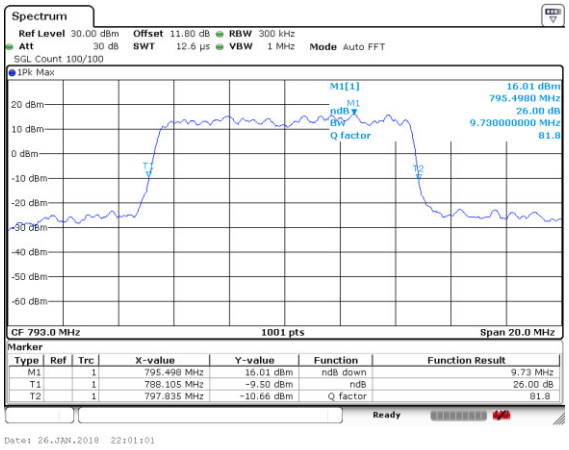


Highest Channel / 5MHz / QPSK



Highest Channel / 5MHz / 16QAM



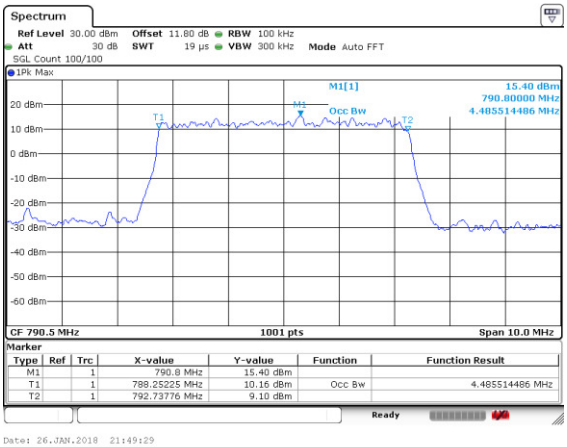
LTE Band 14	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**
	

Occupied Bandwidth

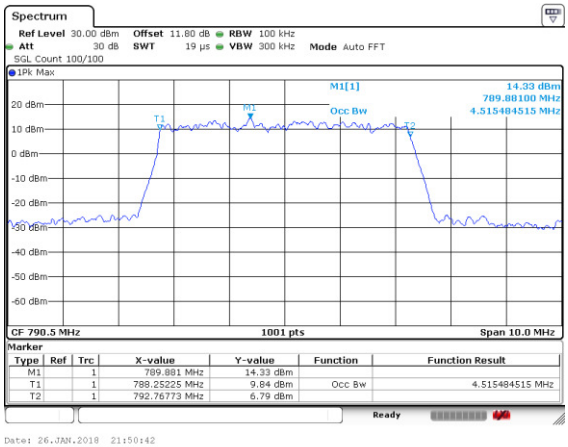
Mode	LTE Band 14 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.49	4.52	-	-	-	-	-	-
Middle CH	-	-	-	-	4.49	4.49	8.97	9.05	-	-	-	-
Highest CH	-	-	-	-	4.48	4.47	-	-	-	-	-	-

LTE Band 14

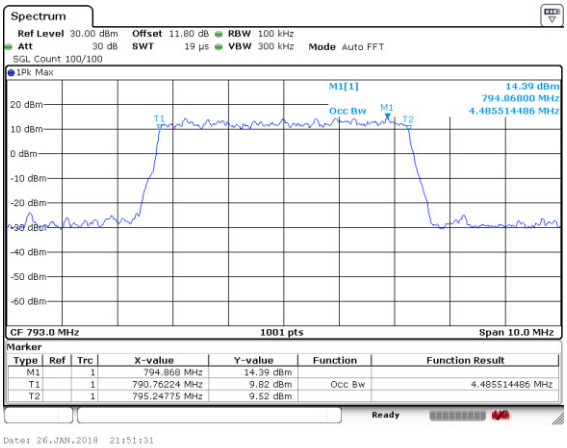
Lowest Channel / 5MHz / QPSK



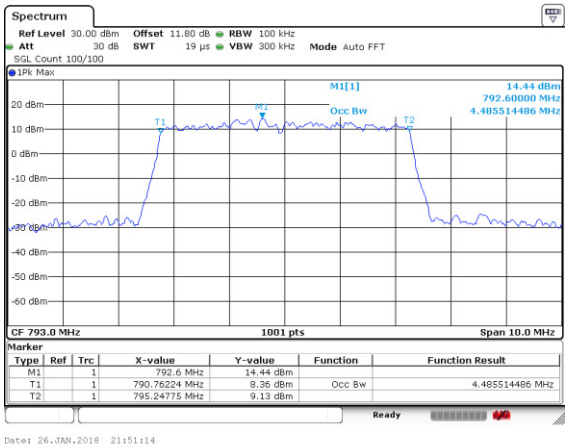
Lowest Channel / 5MHz / 16QAM



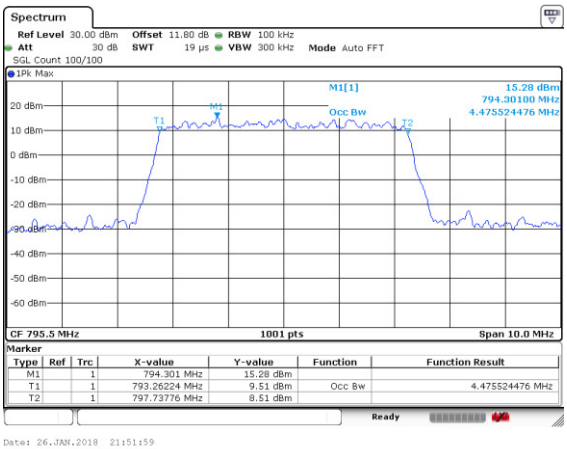
Middle Channel / 5MHz / QPSK



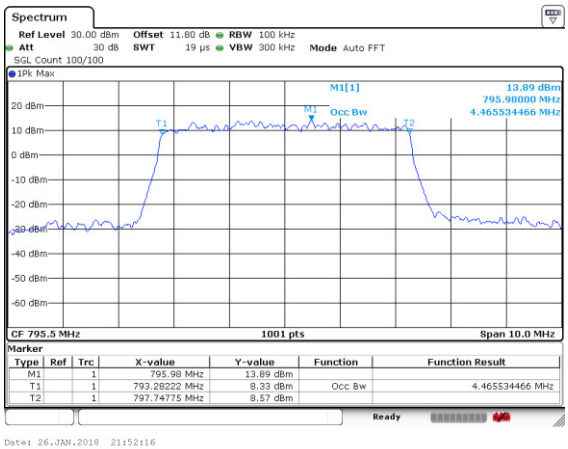
Middle Channel / 5MHz / 16QAM

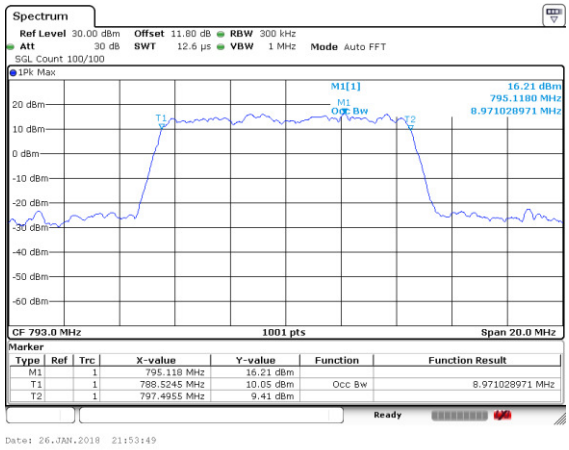
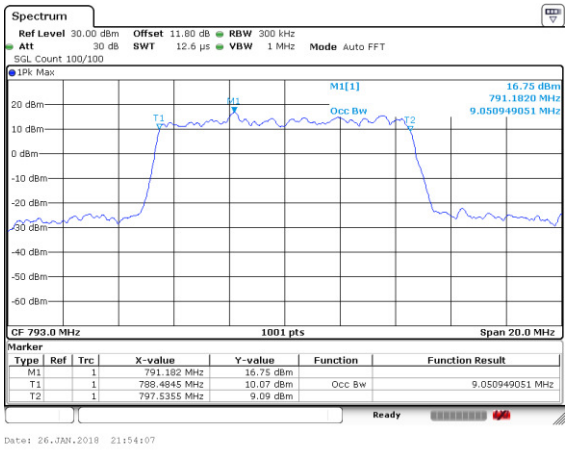


Highest Channel / 5MHz / QPSK



Highest Channel / 5MHz / 16QAM

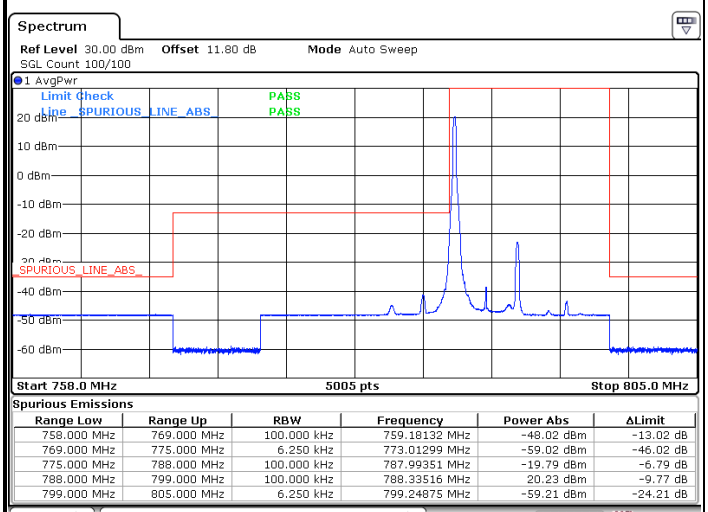


LTE Band 14	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**
	

Conducted Band Edge

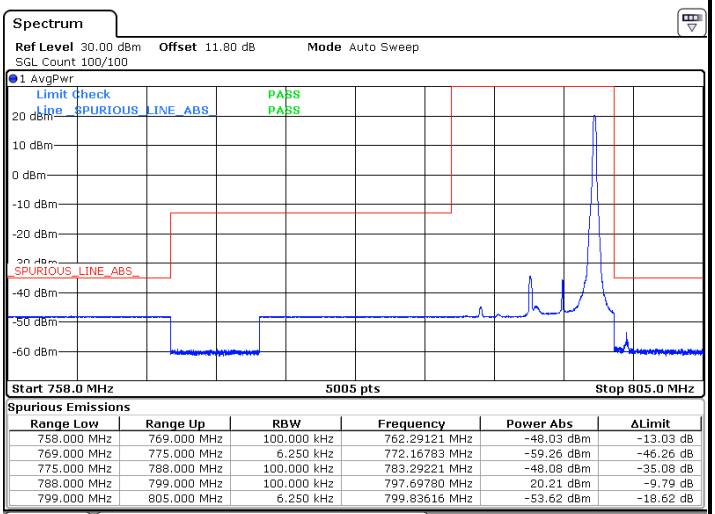
LTE Band 14 / 5MHz / QPSK

Lowest Band Edge / 1 RB



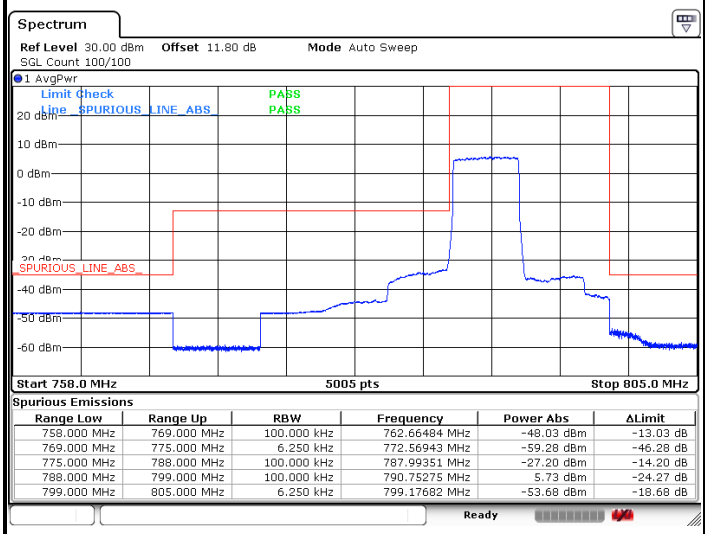
Date: 26.JAN.2018 22:46:44

Highest Band Edge / 1 RB



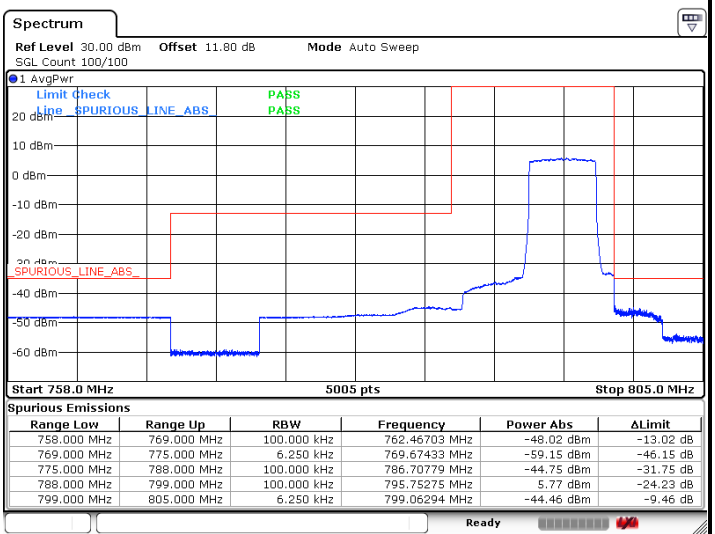
Date: 26.JAN.2018 23:00:04

Lowest Band Edge / Full RB



Date: 26.JAN.2018 22:40:25

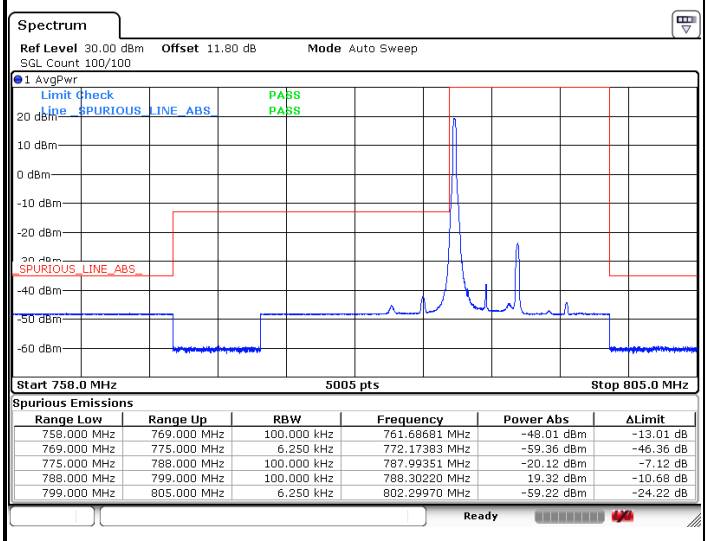
Highest Band Edge / Full RB



Date: 26.JAN.2018 22:54:49

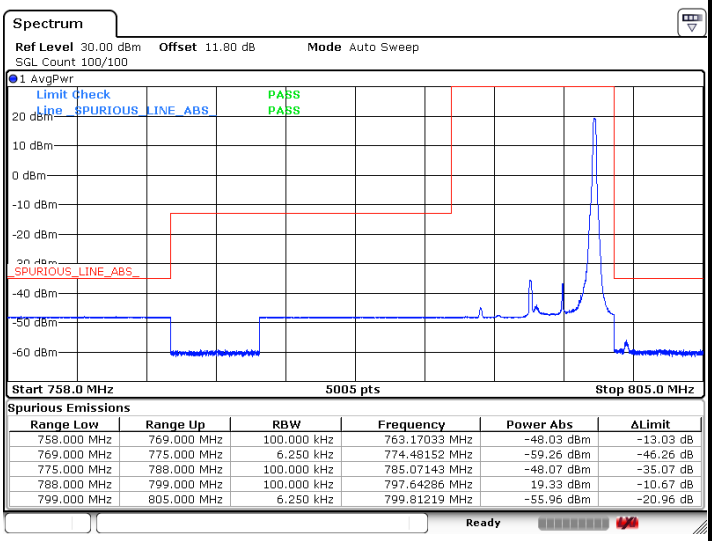
LTE Band 14 / 5MHz / 16QAM

Lowest Band Edge /1 RB



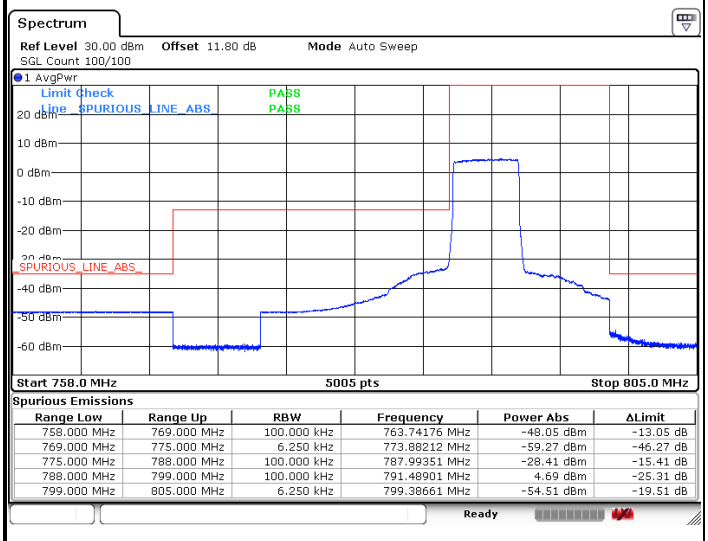
Date: 26.JAN.2018 22:44:53

Highest Band Edge / 1 RB



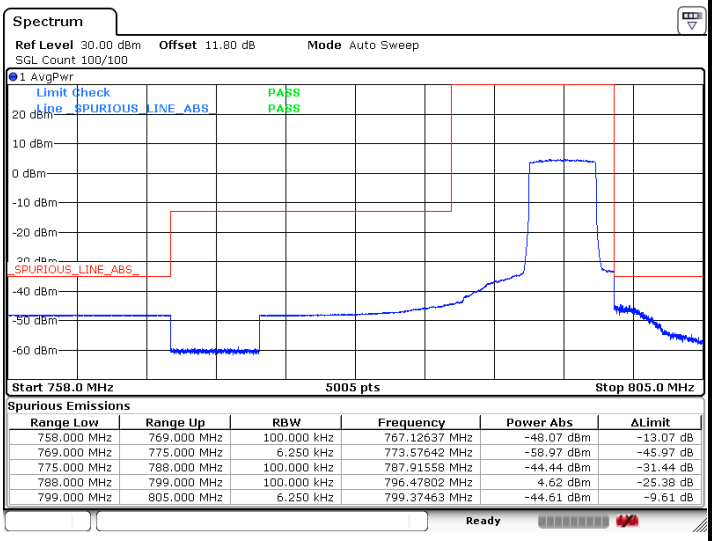
Date: 26.JAN.2018 22:58:22

Lowest Band Edge / Full RB



Date: 26.JAN.2018 22:42:53

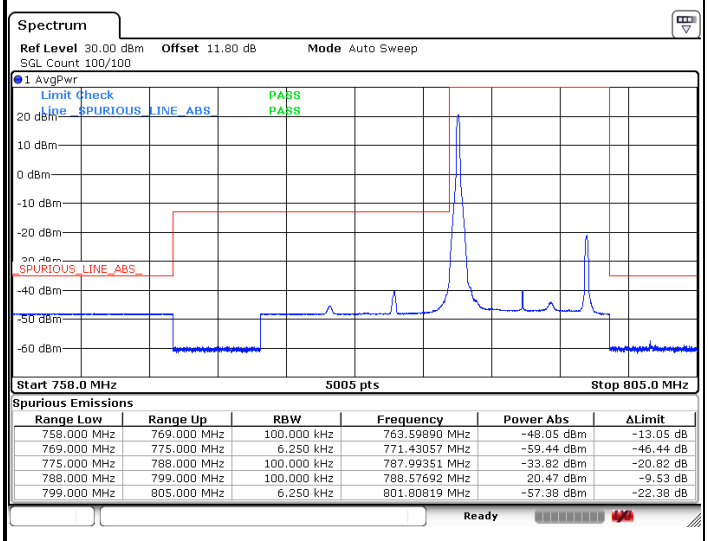
Highest Band Edge / Full RB



Date: 26.JAN.2018 22:56:39

LTE Band 14 / 10MHz / QPSK

Lowest Band Edge / 1 RB

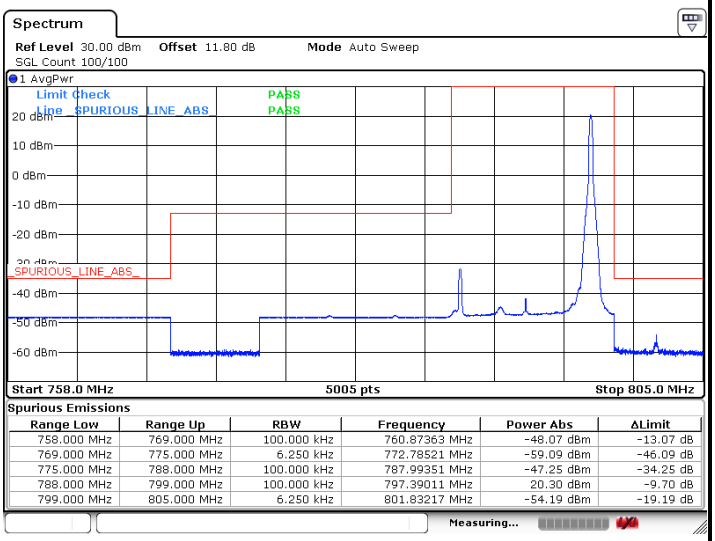


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	763.59890 MHz	-48.05 dBm	-13.05 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.43057 MHz	-59.44 dBm	-46.44 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-33.82 dBm	-20.82 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.57692 MHz	20.47 dBm	-9.53 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.80819 MHz	-57.38 dBm	-22.38 dB

Date: 26.JAN.2018 23:06:32

Highest Band Edge / 1 RB

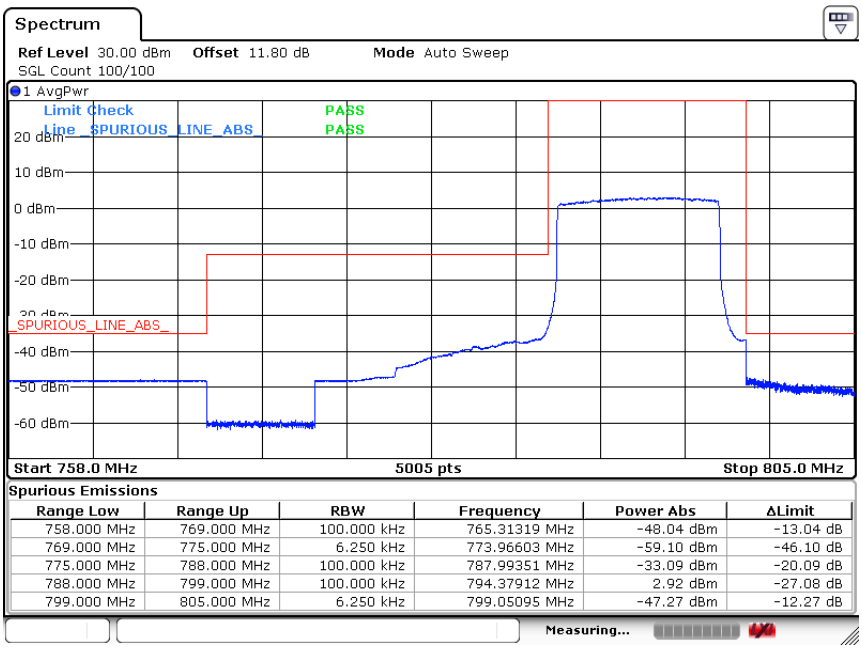


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	760.87363 MHz	-48.07 dBm	-13.07 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.78521 MHz	-59.09 dBm	-46.09 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-47.25 dBm	-34.25 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.39011 MHz	20.30 dBm	-9.70 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.83217 MHz	-54.19 dBm	-19.19 dB

Date: 26.JAN.2018 23:11:53

Band Edge / Full RB



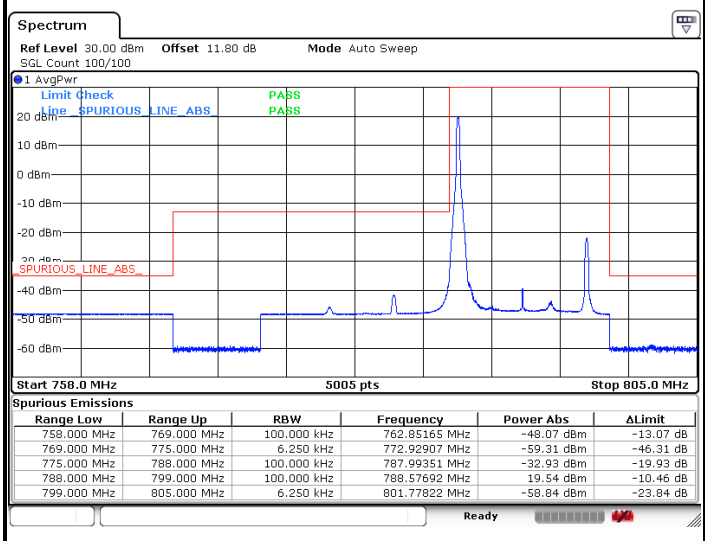
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	765.31319 MHz	-48.04 dBm	-13.04 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.96603 MHz	-59.10 dBm	-46.10 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-33.09 dBm	-20.09 dB
788.000 MHz	799.000 MHz	100.000 kHz	794.37912 MHz	2.92 dBm	-27.08 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.05095 MHz	-47.27 dBm	-12.27 dB

Date: 26.JAN.2018 23:02:15

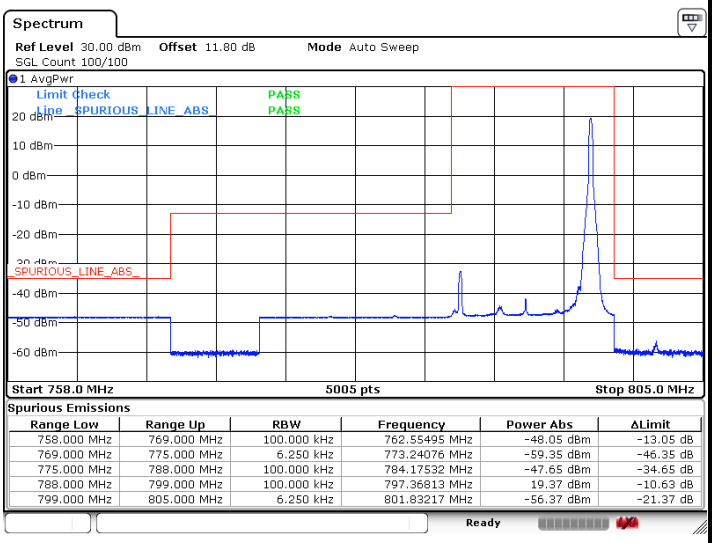
LTE Band 14 / 10MHz / 16QAM

Lowest Band Edge / 1 RB



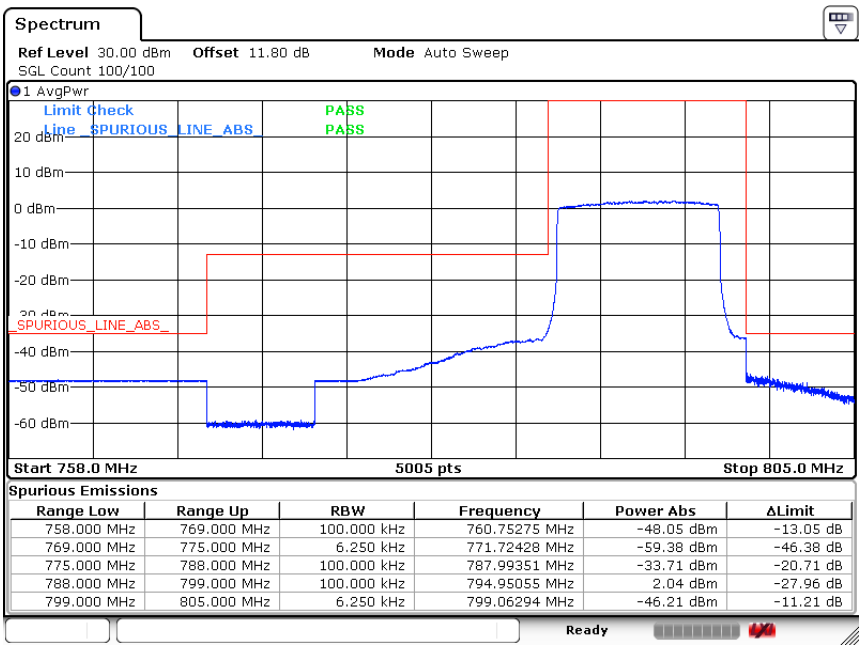
Date: 26.JAN.2018 23:08:19

Highest Band Edge / 1 RB



Date: 26.JAN.2018 23:10:13

Band Edge / Full RB

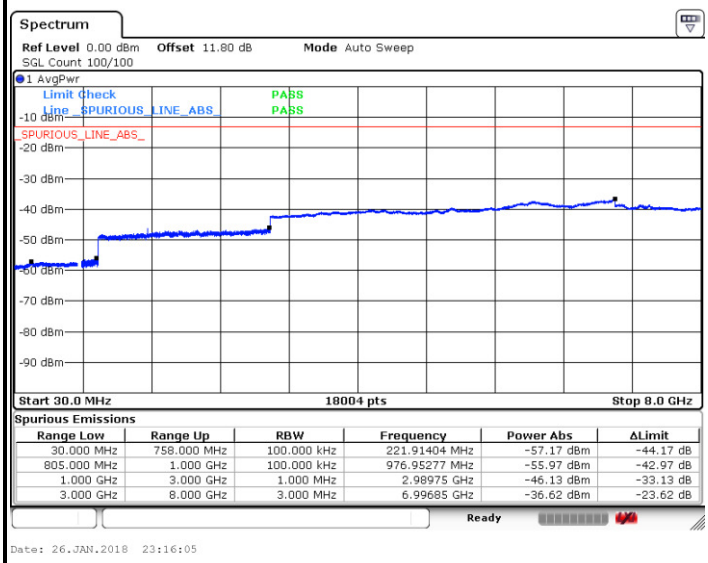


Date: 26.JAN.2018 23:04:02

Conducted Spurious Emission

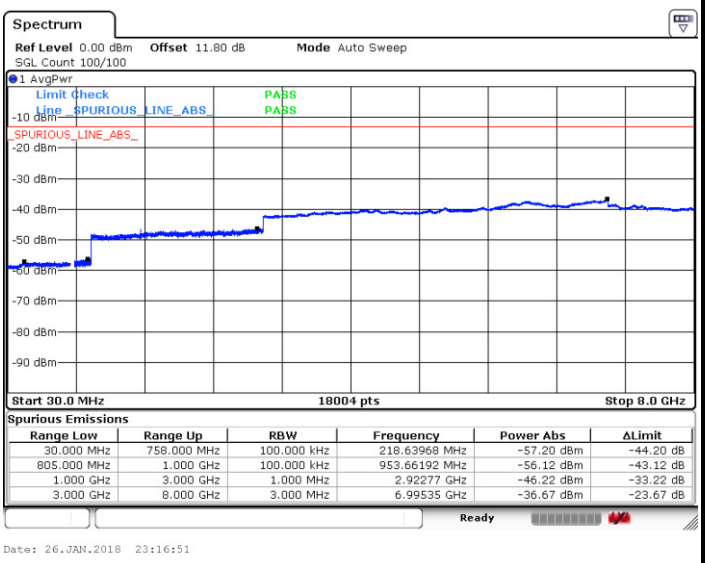
LTE Band 14 / 5MHz

Lowest Channel / QPSK



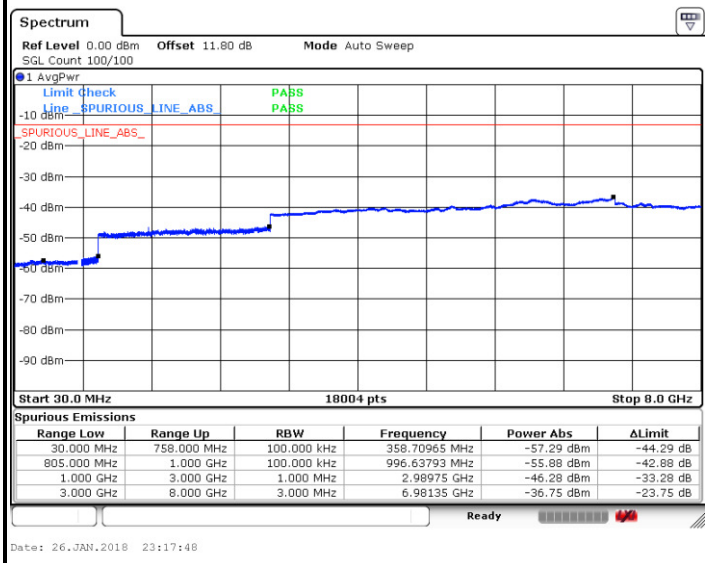
Date: 26.JAN.2018 23:16:05

Lowest Channel / 16QAM



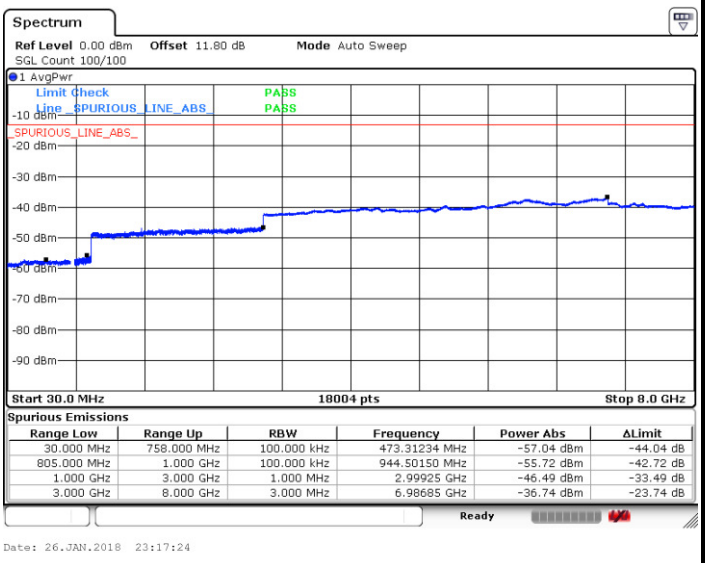
Date: 26.JAN.2018 23:16:51

Middle Channel / QPSK



Date: 26.JAN.2018 23:17:48

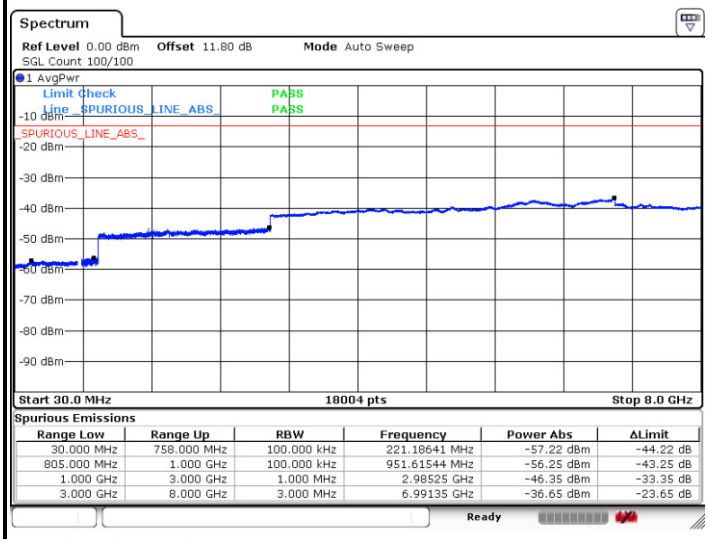
Middle Channel / 16QAM



Date: 26.JAN.2018 23:17:24

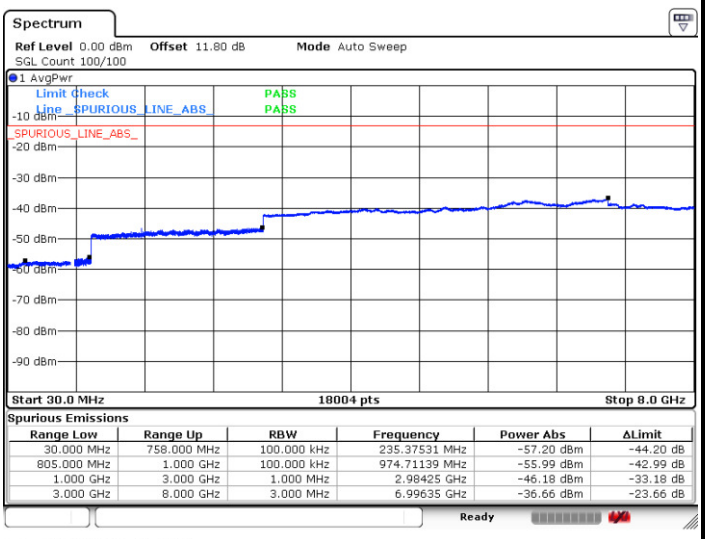
LTE Band 14 / 5MHz

Highest Channel / QPSK



Date: 26.JAN.2018 23:18:28

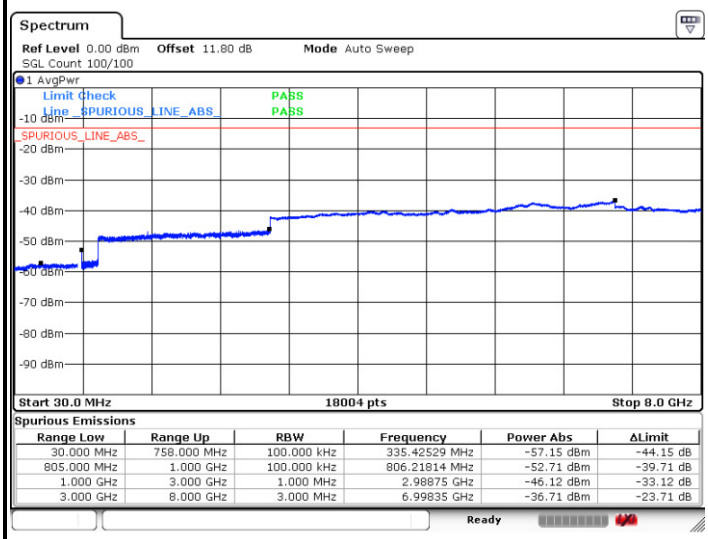
Highest Channel / 16QAM



Date: 26.JAN.2018 23:19:16

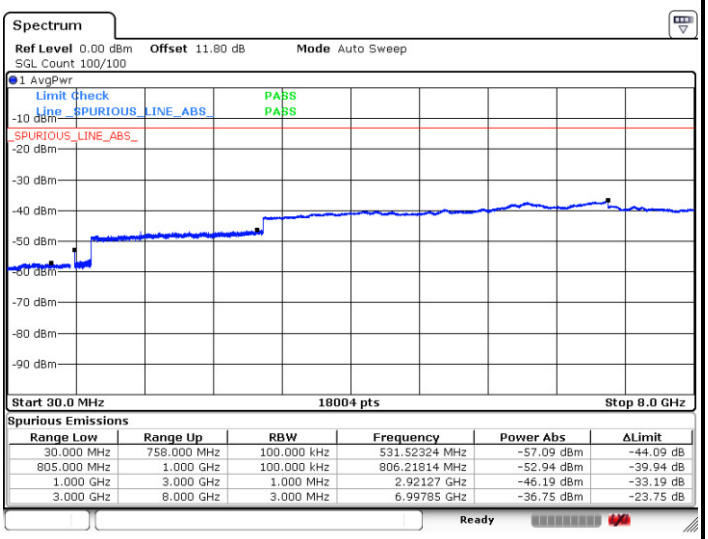
LTE Band 14 / 10MHz

Middle Channel / QPSK



Date: 26.JAN.2018 23:20:51

Middle Channel / 16QAM

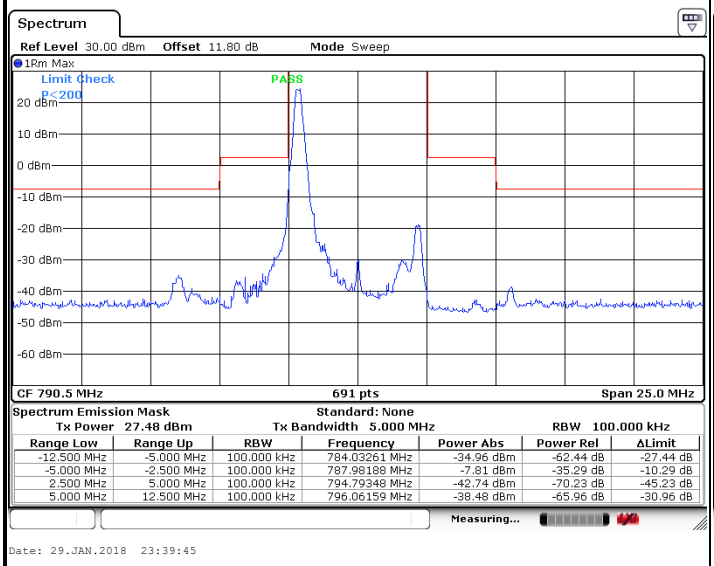


Date: 26.JAN.2018 23:20:23

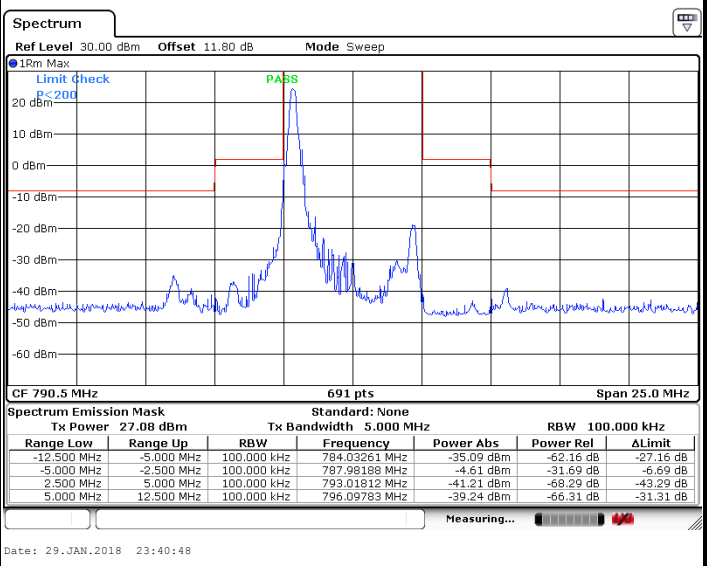
Emission Mask

LTE Band 14 / 5MHz

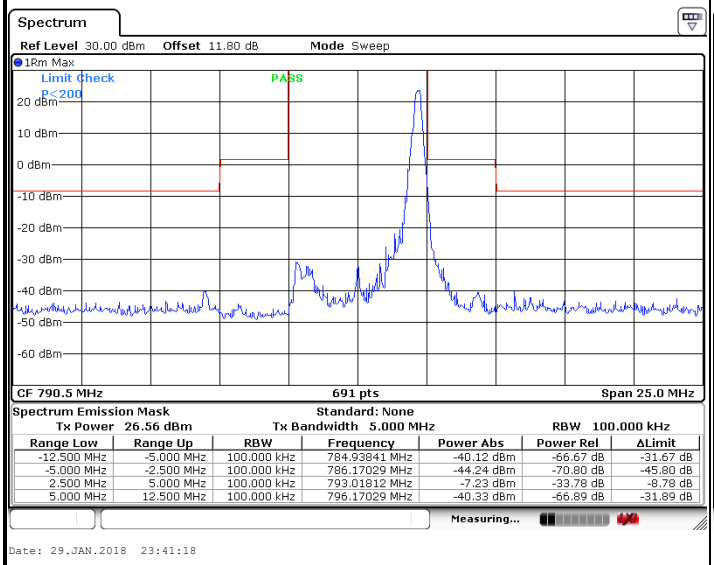
Lowest Channel / 1RB0 / QPSK



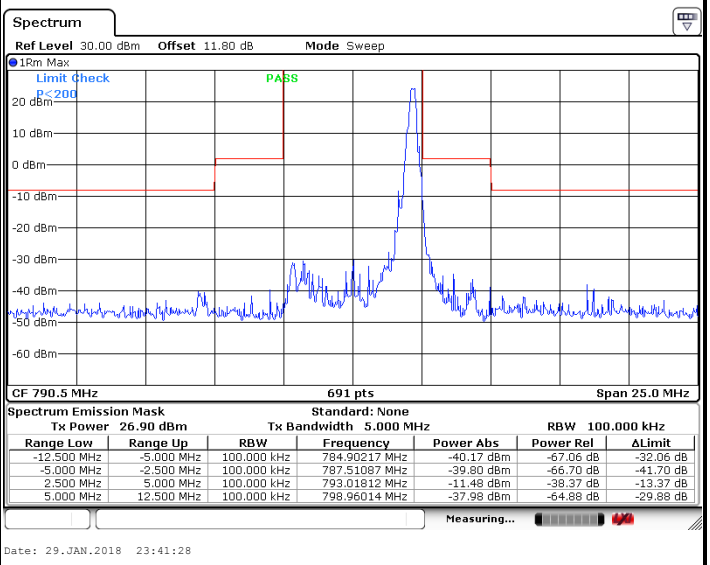
Lowest Channel / 1RB0 / 16QAM



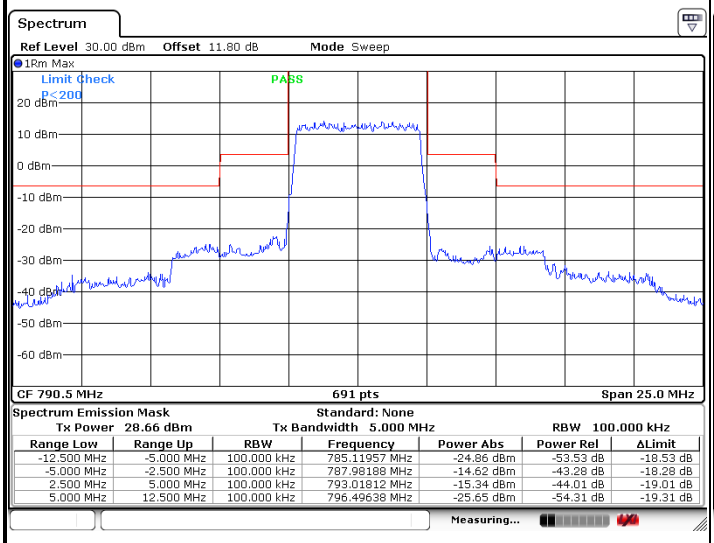
Lowest Channel / 1RB24 / QPSK

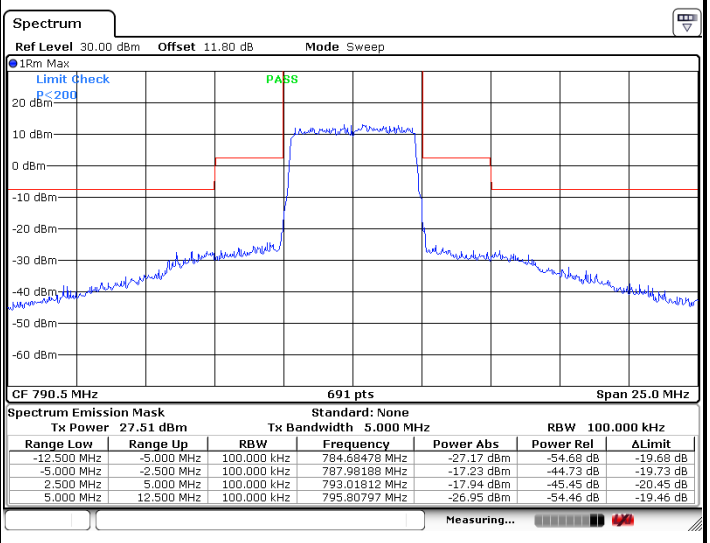


Lowest Channel / 1RB24 / 16QAM



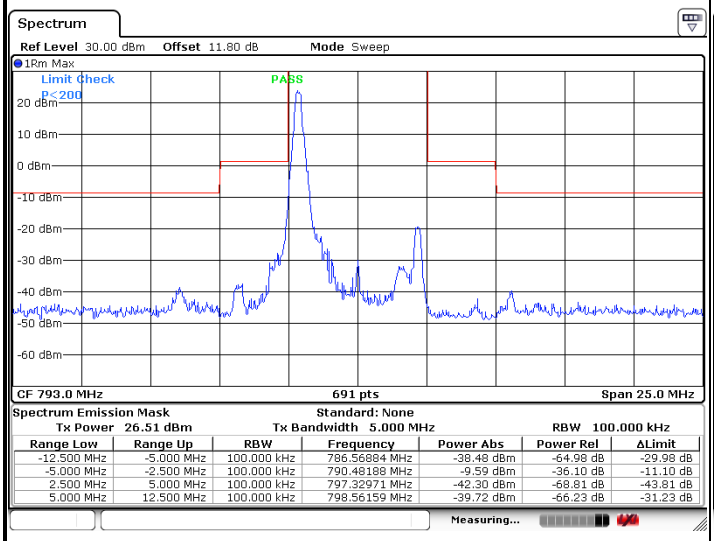
Lowest Channel / 25RB0 / QPSK	Lowest Channel / 25RB0 / 16QAM



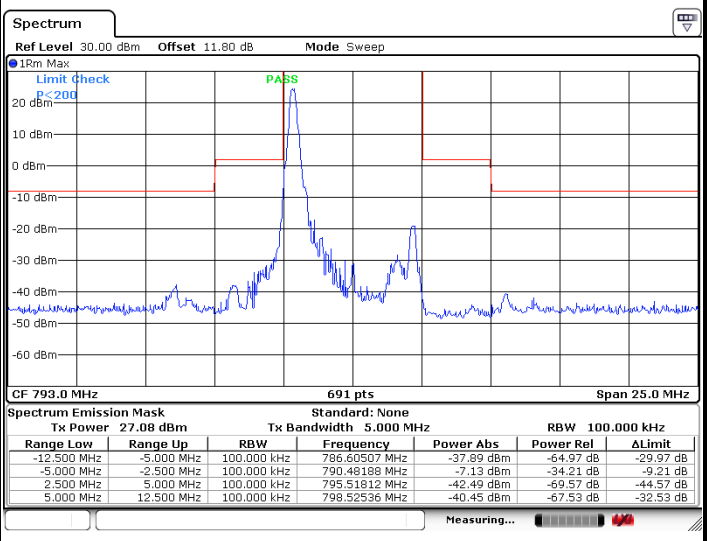


LTE Band 14 / 5MHz

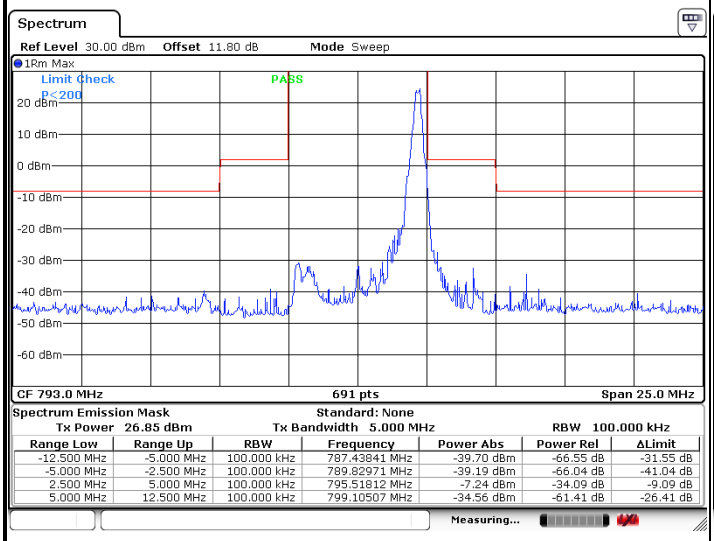
Middle Channel / 1RB0 / QPSK



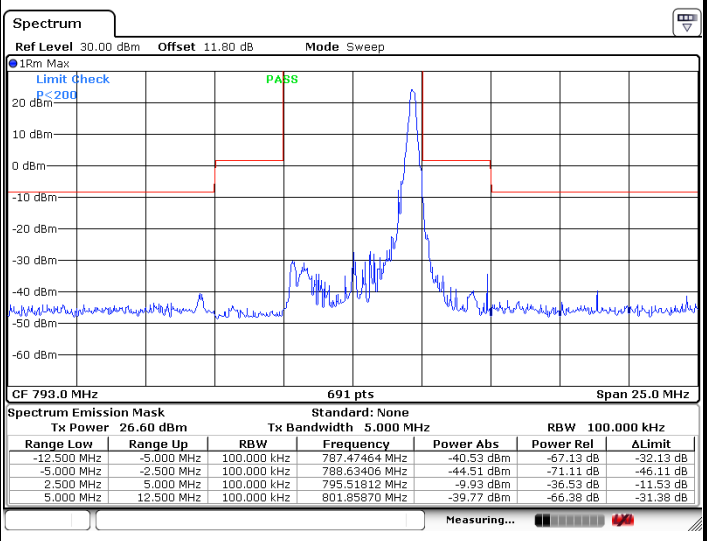
Middle Channel / 1RB0 / 16QAM



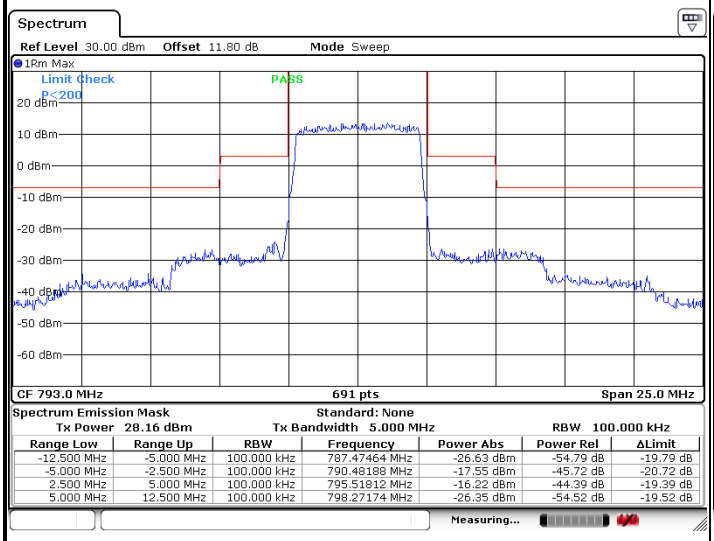
Middle Channel / 1RB24 / QPSK

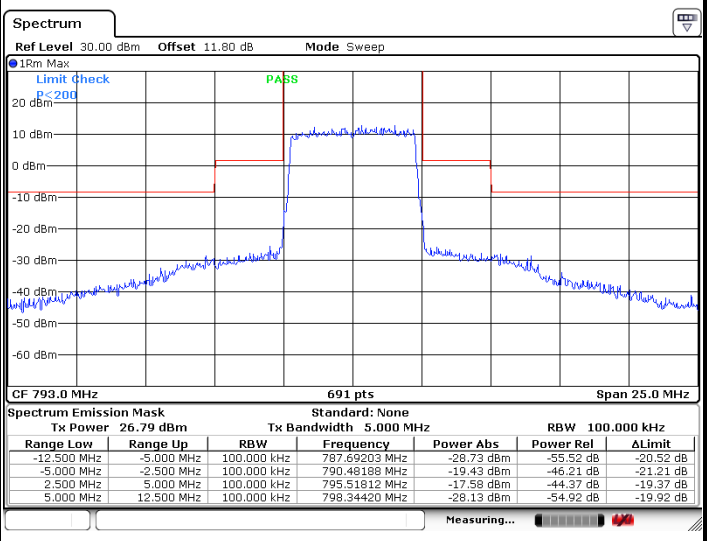


Middle Channel / 1RB24 / 16QAM



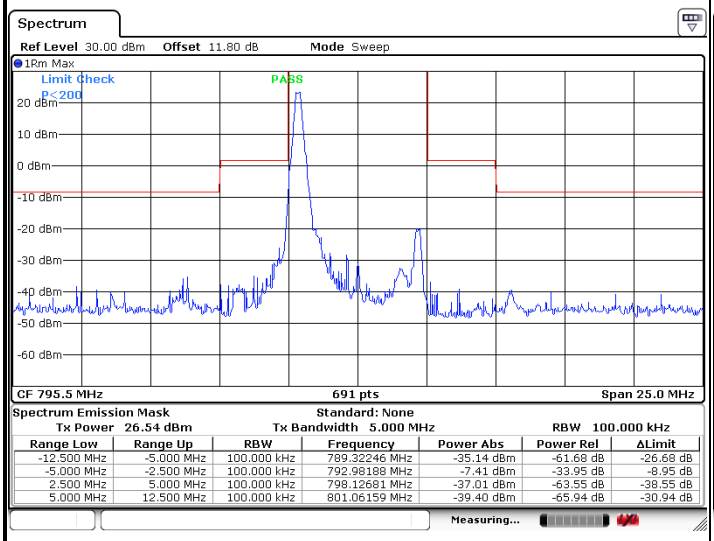
Middle Channel / 25RB0 / QPSK	Middle Channel / 25RB0 / 16QAM



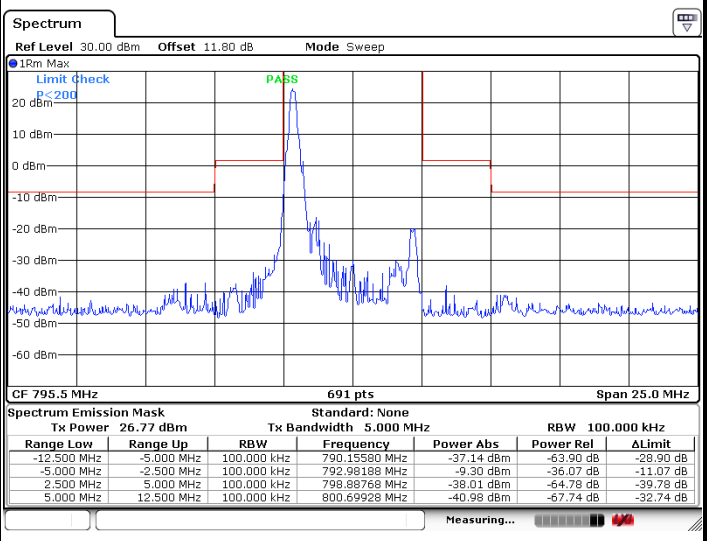


LTE Band 14 / 5MHz

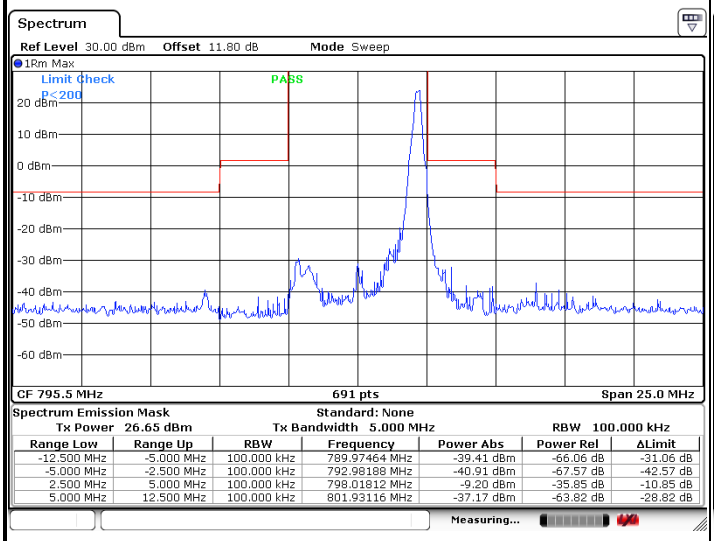
Highest Channel / 1RB0 / QPSK



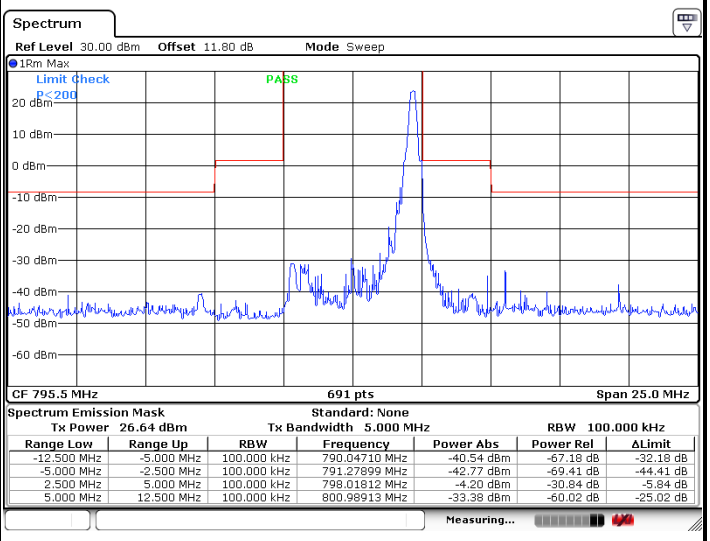
Highest Channel / 1RB0 / 16QAM



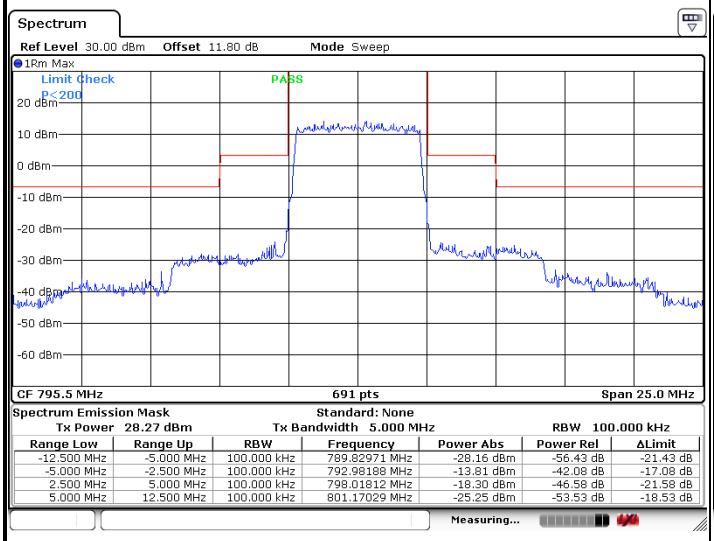
Highest Channel / 1RB24 / QPSK

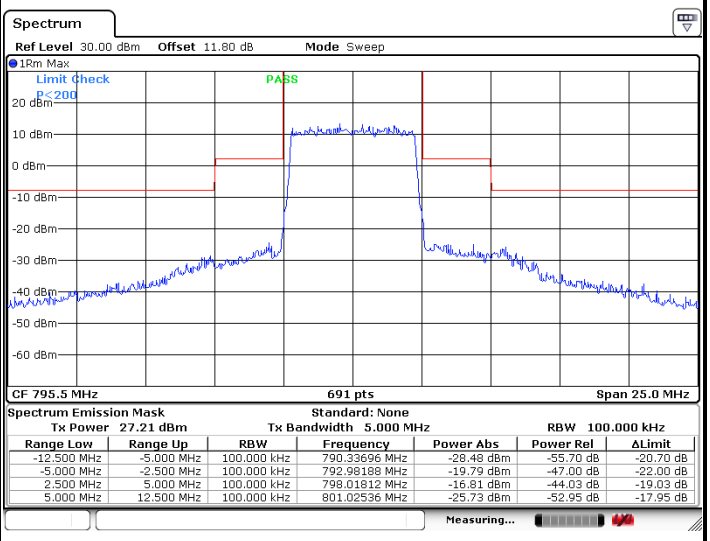


Highest Channel / 1RB24 / 16QAM



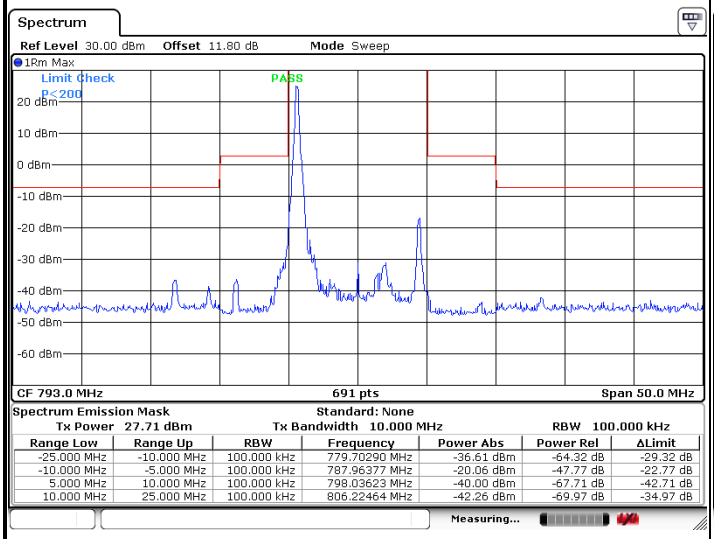
Highest Channel / 25RB0 / QPSK	Highest Channel / 25RB0 / 16QAM





LTE Band 14 / 10MHz

Middle Channel / 1RB0 / QPSK

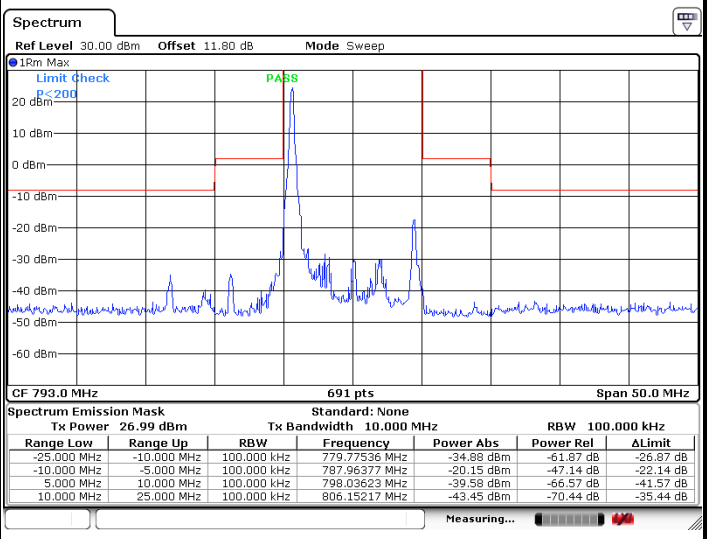


Spectrum Emission Mask Standard: None
Tx Power 27.71 dBm Tx Bandwidth 10.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-25.000 MHz	-10.000 MHz	100.000 kHz	779.70290 MHz	-36.61 dBm	-64.32 dB	-29.32 dB
-10.000 MHz	-5.000 MHz	100.000 kHz	787.96377 MHz	-20.06 dBm	-47.77 dB	-22.77 dB
5.000 MHz	10.000 MHz	100.000 kHz	798.03623 MHz	-40.00 dBm	-67.71 dB	-42.71 dB
10.000 MHz	25.000 MHz	100.000 kHz	806.22464 MHz	-42.26 dBm	-69.97 dB	-34.97 dB

Date: 29.JAN.2018 23:50:34

Middle Channel / 1RB0 / 16QAM

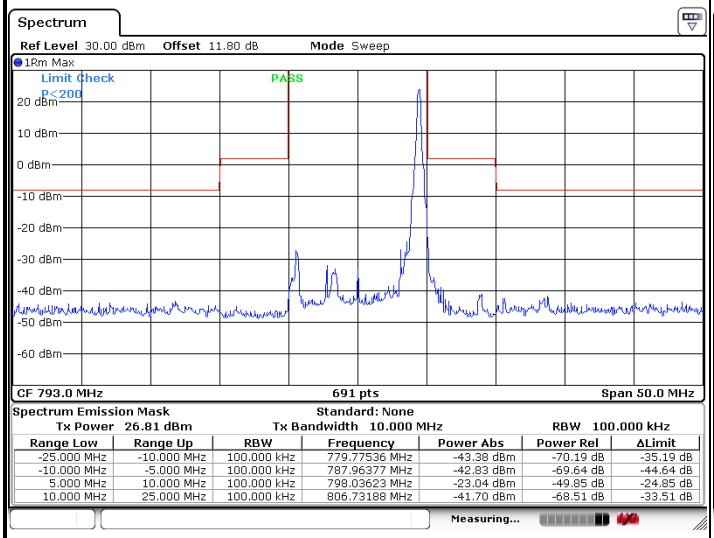


Spectrum Emission Mask Standard: None
Tx Power 26.99 dBm Tx Bandwidth 10.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-25.000 MHz	-10.000 MHz	100.000 kHz	779.77536 MHz	-34.88 dBm	-61.87 dB	-26.87 dB
-10.000 MHz	-5.000 MHz	100.000 kHz	787.96377 MHz	-20.15 dBm	-47.14 dB	-22.14 dB
5.000 MHz	10.000 MHz	100.000 kHz	798.03623 MHz	-39.58 dBm	-66.57 dB	-41.57 dB
10.000 MHz	25.000 MHz	100.000 kHz	806.15217 MHz	-43.45 dBm	-70.44 dB	-35.44 dB

Date: 29.JAN.2018 23:50:55

Middle Channel / 1RB49 / QPSK



Spectrum Emission Mask Standard: None
Tx Power 26.81 dBm Tx Bandwidth 10.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-25.000 MHz	-10.000 MHz	100.000 kHz	779.77536 MHz	-43.38 dBm	-70.19 dB	-35.19 dB
-10.000 MHz	-5.000 MHz	100.000 kHz	787.96377 MHz	-42.83 dBm	-69.64 dB	-44.64 dB
5.000 MHz	10.000 MHz	100.000 kHz	798.03623 MHz	-23.04 dBm	-49.85 dB	-24.85 dB
10.000 MHz	25.000 MHz	100.000 kHz	806.73188 MHz	-41.70 dBm	-68.51 dB	-33.51 dB

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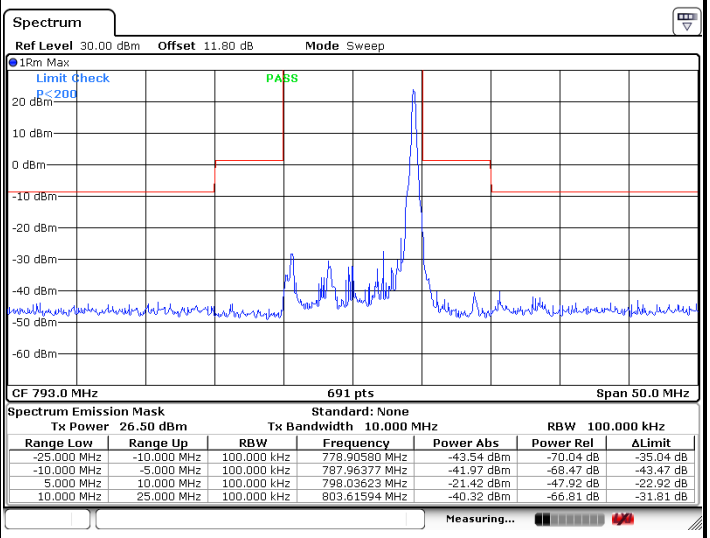
Middle Channel / 1RB49 / 16QAM

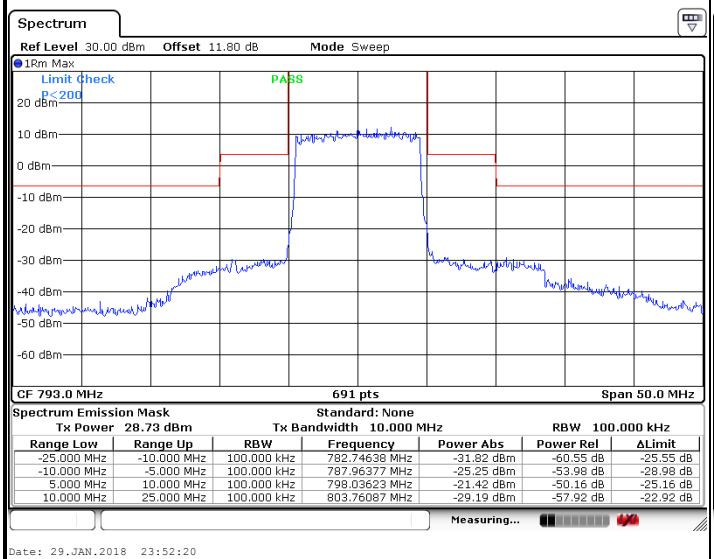


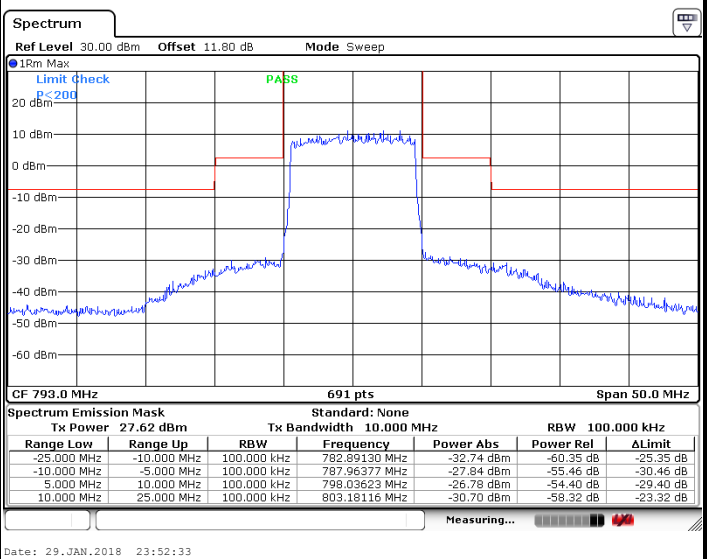
Spectrum Emission Mask Standard: None
Tx Power 26.50 dBm Tx Bandwidth 10.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-25.000 MHz	-10.000 MHz	100.000 kHz	778.90580 MHz	-43.54 dBm	-70.04 dB	-35.04 dB
-10.000 MHz	-5.000 MHz	100.000 kHz	787.96377 MHz	-41.97 dBm	-68.47 dB	-43.47 dB
5.000 MHz	10.000 MHz	100.000 kHz	798.03623 MHz	-21.42 dBm	-47.92 dB	-22.92 dB
10.000 MHz	25.000 MHz	100.000 kHz	803.61594 MHz	-40.32 dBm	-66.81 dB	-31.81 dB

Date: 29.JAN.2018 23:51:48

Middle Channel / 50RB0 / QPSK	Middle Channel / 50RB0 / 16QAM





Frequency Stability

Test Conditions		LTE Band 14 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0013	PASS
40	Normal Voltage	0.0045	
30	Normal Voltage	0.0001	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0003	
0	Normal Voltage	0.0001	
-10	Normal Voltage	0.0021	
-20	Normal Voltage	0.0009	
-30	Normal Voltage	0.0023	
20	Maximum Voltage	0.0001	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0034	

Note:

1. Normal Voltage =3.8 V.；Battery End Point (BEP) =3.5 V.；Maximum Voltage =4.4 V.
2. The frequency fundamental emissions stay within the authorized frequency block.

Appendix B. Test Results of ERP and Radiated Test

ERP

LTE Band 14 / 10MHz (Average) (GT - LC = -1.32 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	-	-	-	-	-	-
Middle		1	49	22.67	0.1849	19.20	0.0832
Highest		-	-	-	-	-	-
Lowest	16QAM	-	-	-	-	-	-
Middle		1	0	22.15	0.1641	18.68	0.0738
Highest		-	-	-	-	-	-
Limit	ERP < 3W			Result		PASS	

LTE Band 14 / 5MHz (Average) (GT - LC = -1.32 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	Power (dBm)	Power (Watts)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	12	22.49	0.1774	19.02	0.0798
Middle		1	12	22.48	0.1770	19.01	0.0796
Highest		1	12	22.57	0.1807	19.10	0.0813
Lowest	16QAM	1	0	21.91	0.1552	18.44	0.0698
Middle		1	0	21.89	0.1545	18.42	0.0695
Highest		1	0	21.83	0.1524	18.36	0.0685
Limit	ERP < 3W			Result		PASS	

Radiated Spurious Emission

LTE Band 14

LTE Band 14 / 10MHz / QPSK									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1576	-60.09	-42.15	-17.94	-67.82	-65.23	1.20	8.49	H
	2365	-60.32	-13	-47.32	-70.99	-67.14	1.42	10.39	H
	3154	-59.17	-13	-46.17	-71.25	-66.80	1.59	11.36	H
									H
									H
									H
									H
	1576	-59.54	-42.15	-17.39	-66.06	-64.68	1.20	8.49	V
	2365	-60.24	-13	-47.24	-70.82	-67.06	1.42	10.39	V
	3154	-59.38	-13	-46.38	-71.14	-67.01	1.59	11.36	V
									V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.