FCC RF Test Report

APPLICANT	:	**HMD Global Oy**
EQUIPMENT	:	**Mobile phone**
BRAND NAME	:	**Nokia**
MODEL NAME	:	**TA-1222**
FCC ID	:	**2AJOTTA-1222**
STANDARD	:	**47 CFR Part 2, 90(R)**
CLASSIFICATION	:	**PCS Licensed Transmitter Held to Ear (PCE)**

The product was received on Dec. 31, 2019 and completely tested on Mar. 02, 2020. We, Sporton International 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 Inc., the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Testing Laboratory 1190

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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APPENDIX A. TEST RESULTS OF CONDUCTED TEST

APPENDIX B. TEST RESULTS OF RADIATED TEST

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG9D3107C	Rev. 01	Initial issue of report	Mar. 05, 2020

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	§2.1049	Occupied Bandwidth	Reporting only	PASS	-
3.4	§2.1053 §90.543 (e)(2)(3)	Conducted Band Edge Measurement	Refer standard	PASS	-
3.5	§2.1051 §90.210(n)	Emission Mask	Mask B	PASS	-
3.6	§2.1053 §90.543 (e)(3)	Conducted Spurious Emission	< $43+10\log_{10}$(P[Watts])	PASS	-
3.7	§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 15.77 dB at 1584.000 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

HMD Global Oy
Bertel Jungin aukio 9, 02600 Espoo, Finland

1.2 Manufacturer

HMD Global Oy
Bertel Jungin aukio 9, 02600 Espoo, Finland

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Mobile phone
Brand Name	Nokia
Model Name	TA-1222
FCC ID	2AJOTTA-1222
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	22.66 dBm
Antenna Gain	1.09 dBi
Type of Modulation	QPSK / 16QAM / 64QAM
IMEI Code	Conducted: 355787100004170 Radiation: 355787100003410
HW Version	V1.0
SW Version	00CUS_0_18Q
EUT Stage	Production Unit

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(W), 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	4M52G7D	-	0.1442	4M51W7D	-	0.1186
10	793	9M03G7D	0.0158	0.1445	9M03W7D	-	0.1169

LTE Band 14		64QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)
5	790.5~795.5	4M52W7D	-	0.0938
10	793	9M03W7D	-	0.0906

1.5 Testing Site

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007.

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
Test Site Location	No. 52, Huaya 1st Rd., Guishan Dist.., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH03-HY

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
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

1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH12-HY	AUDIX	E3	6.2009-8-24

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 C63.26-2015
- 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.

2 Test Configuration of Equipment Under Test

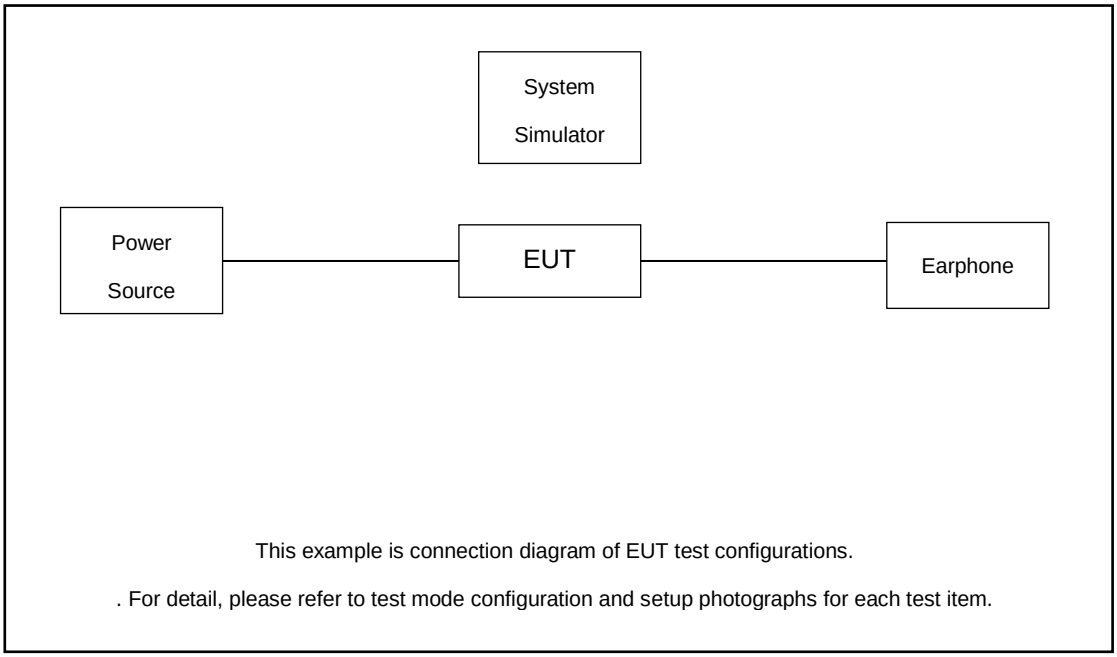
2.1 Test Mode

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 Emission Mask	14	-	-	V		-	-	V	V	V	V		V	V		V
	14	-	-		V	-	-	V	V	V	V		V		V	
	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	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	Apple	A1285	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 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 0.70 dB and 10.00dB attenuator.
Example :
Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 0.70 + 10.00 = 10.70(dB)

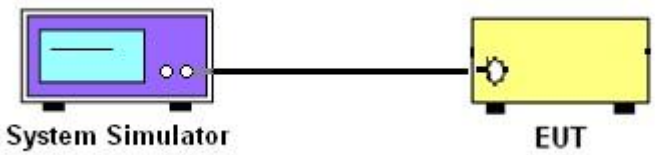
3 Conducted Test Items

3.1 Measuring Instruments

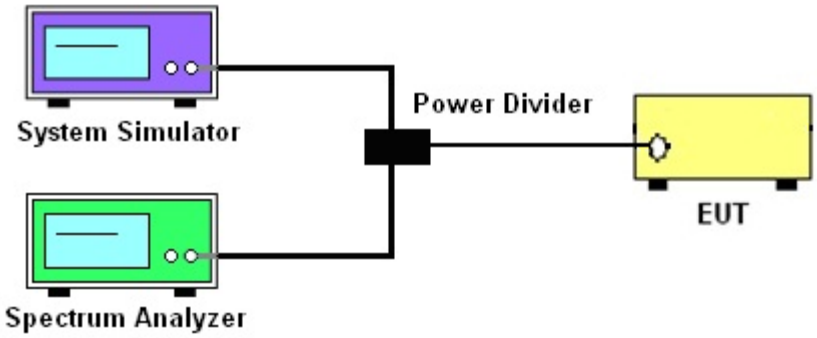
See list of measuring instruments of this test report.

3.1.1 Test Setup

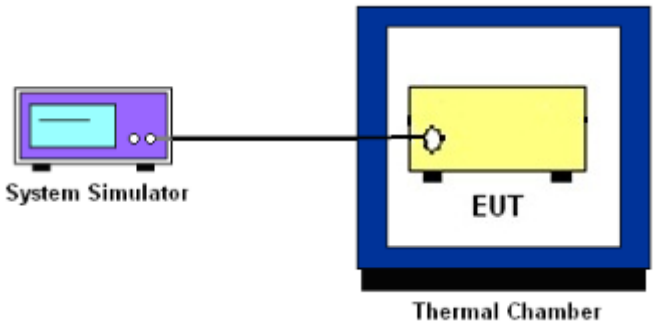
3.1.2 Conducted Output Power



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.

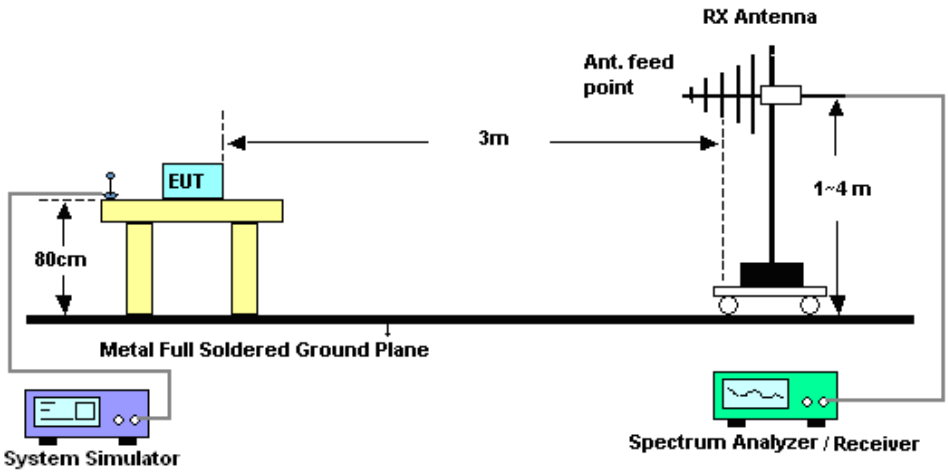
4 Radiated Test Items

4.1 Measuring Instruments

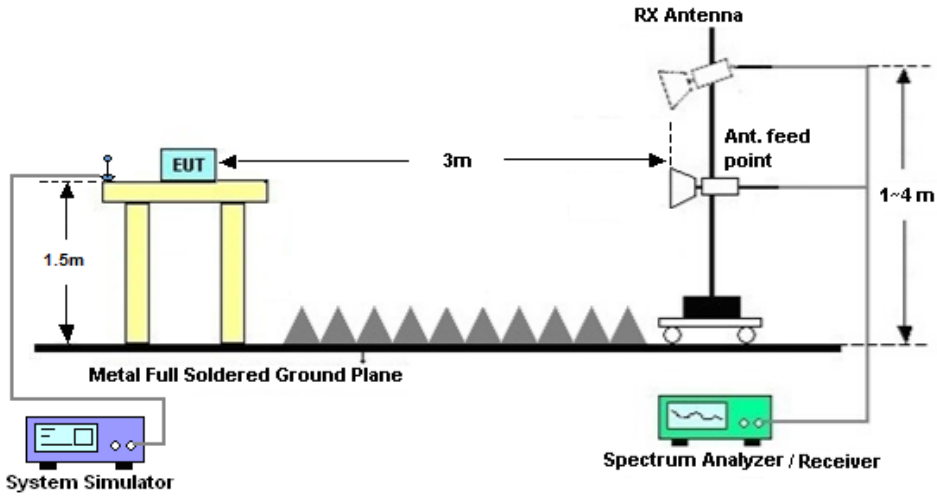
See list of measuring instruments of this test report.

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
Base Station(Measure)	Anritsu	MT8821C	6201664755	GSM / GPRS /WCDMA / LTE FDD/TDD with 44)	Mar. 03, 2019	Feb. 08, 2020 ~ Mar. 02, 2020	Mar. 02, 2020	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 15, 2019	Feb. 08, 2020 ~ Mar. 02, 2020	Nov. 14, 2020	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃~90℃	Sep. 02, 2019	Feb. 08, 2020 ~ Mar. 02, 2020	Sep. 01, 2020	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 09, 2019	Feb. 08, 2020 ~ Mar. 02, 2020	Oct. 08, 2020	Conducted (TH05-HY)
Coupler	Warison	20dB 25W SMA Directional	#A	1-18GHz	Jan. 13, 2020	Feb. 08, 2020 ~ Mar. 02, 2020	Jan. 12, 2021	Conducted (TH05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Dec. 26, 2019	Feb. 05, 2019~ Feb. 12, 2019	Dec. 25, 2020	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N 1D01N-06	37059 & 01	30MHz~1GHz	Otc. 12, 2019	Feb. 05, 2019~ Feb. 12, 2019	Otc 11, 2020	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1328	1GHz ~ 18GHz	Nov. 14, 2019	Feb. 05, 2019~ Feb. 12, 2019	Nov. 13, 2020	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1522	1GHz ~ 18GHz	Sep. 19, 2019	Feb. 05, 2019~ Feb. 12, 2019	Sep. 18, 2020	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz ~ 40GHz	Dec. 10, 2019	Feb. 05, 2019~ Feb. 12, 2019	Dec. 09, 2020	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 25, 2019	Feb. 05, 2019~ Feb. 12, 2019	Mar. 24, 2020	Radiation (03CH12-HY)
Preamplifier	Jet-Power	JPA00101800-30-10P	1601180002	1GHz~18GHz	Aug. 01, 2019	Feb. 05, 2019~ Feb. 12, 2019	Jul. 01, 2020	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 13, 2019	Feb. 05, 2019~ Feb. 12, 2019	Dec. 12, 2020	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY53270148	1GHz~26.5GHz	Dec. 20, 2019	Feb. 05, 2019~ Feb. 12, 2019	Dec. 19, 2020	Radiation (03CH12-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101408	10Hz~40GHz	Aug. 13, 2019	Feb. 05, 2019~ Feb. 12, 2019	Aug. 12, 2020	Radiation (03CH12-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	Aug. 27, 2019	Feb. 05, 2019~ Feb. 12, 2019	Aug. 26, 2020	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP161243	N/A	May. 11, 2019	Feb. 05, 2019~ Feb. 12, 2019	May. 10, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30M-18G	Mar. 13, 2019	Feb. 05, 2019~ Feb. 12, 2019	Mar. 12, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Feb. 26, 2019	Feb. 05, 2019~ Feb. 12, 2019	Feb. 25, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Feb. 26, 2019	Feb. 05, 2019~ Feb. 12, 2019	Feb. 25, 2020	Radiation (03CH12-HY)

Base Station	Anritsu	MT8821C	6201432816	GSM / GPRS /W CDMA / LTE FDD /TDD with 44) /LT	May 05, 2019	Feb. 05, 2019~ Feb. 12, 2019	May 04, 2020	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Feb. 05, 2019~ Feb. 12, 2019	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-450 0-B	N/A	1m~4m	N/A	Feb. 05, 2019~ Feb. 12, 2019	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Feb. 05, 2019~ Feb. 12, 2019	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8 -24	RK-000989	N/A	N/A	Feb. 05, 2019~ Feb. 12, 2019	N/A	Radiation (03CH12-HY)

NCR: No Calibration Required

6 Uncertainty of Evaluation

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.24dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.62dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.06dB

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
5	1	0	QPSK	22.32	22.34	22.36
5	1	12		22.63	22.65	22.63
5	1	24		22.33	22.35	22.37
5	12	0		21.43	21.54	21.56
5	12	7		21.50	21.54	21.55
5	12	13		21.41	21.46	21.50
5	25	0		21.42	21.50	21.51
5	1	0	16-QAM	21.60	21.48	21.54
5	1	12		21.74	21.71	21.80
5	1	24		21.48	21.54	21.62
5	12	0		20.40	20.48	20.49
5	12	7		20.48	20.46	20.49
5	12	13		20.33	20.39	20.44
5	25	0		20.42	20.44	20.48
5	1	0	64QAM	20.50	20.42	20.47
5	1	12		20.70	20.75	20.78
5	1	24		20.41	20.46	20.55
5	12	0		19.43	19.51	19.53
5	12	7		19.49	19.48	19.53
5	12	13		19.39	19.42	19.50
5	25	0		19.41	19.44	19.52

LTE Band 14 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK		22.44	
10	1	25			**22.66**	
10	1	49			22.41	
10	25	0			21.54	
10	25	12			21.56	
10	25	25			21.45	
10	50	0			21.53	
10	1	0	16-QAM		21.73	
10	1	25			21.74	
10	1	49			21.60	
10	25	0			20.48	
10	25	12			20.50	
10	25	25			20.41	
10	50	0			20.46	
10	1	0	64QAM		20.59	
10	1	25			20.63	
10	1	49			20.59	
10	25	0			19.51	
10	25	12			19.50	
10	25	25			19.45	
10	50	0			19.47	

ERP

LTE Band 14 (G_T - L_C = 1.09 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)	22.63	22.65	22.63		22.66	
Conducted Power (Watts)	0.1832	0.1841	0.1832		0.1845	
ERP(dBm)	21.57	21.59	21.57		21.60	
ERP(Watts)	0.1435	0.1442	0.1435		0.1445	

LTE Band 14 (G_T - L_C = 1.09 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)	21.74	21.71	21.80		21.74	
Conducted Power (Watts)	0.1493	0.1483	0.1514		0.1493	
ERP(dBm)	20.68	20.65	20.74		20.68	
ERP(Watts)	0.1169	0.1161	0.1186		0.1169	

LTE Band 14 (G_T - L_C = 1.09 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)	20.70	20.75	20.78		20.63	
Conducted Power (Watts)	0.1175	0.1189	0.1197		0.1156	
ERP(dBm)	19.64	19.69	19.72		19.57	
ERP(Watts)	0.0920	0.0931	0.0938		0.0906	

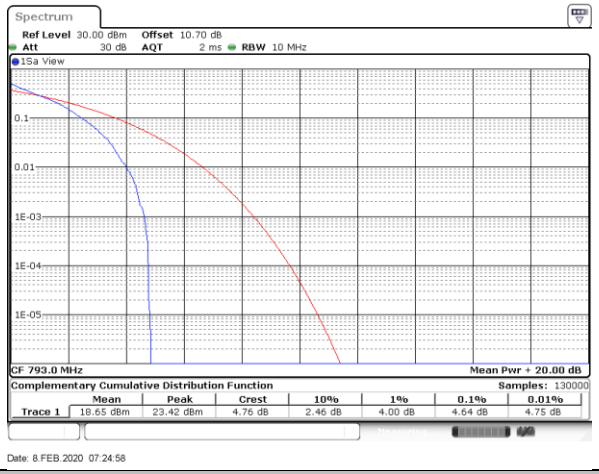
LTE Band 14

Peak-to-Average Ratio

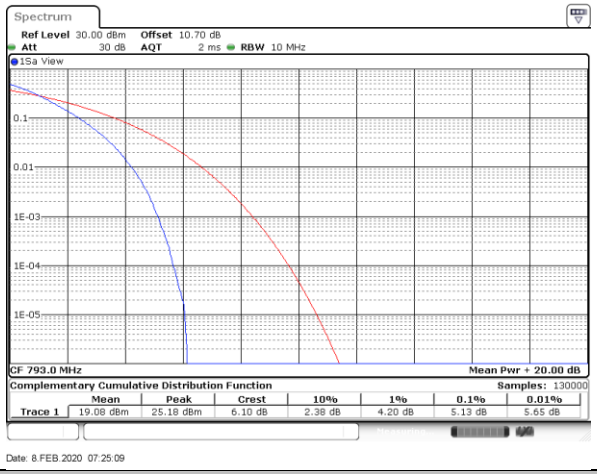
Mode	LTE Band 14 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	-	-	-	-	PASS
Middle CH	4.64	5.13	5.83	5.83	
Highest CH	-	-	-	-	
Mode	LTE Band 14 / 10MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB			Result
Lowest CH	-	-	-	-	PASS
Middle CH	5.94	6.17	-	-	
Highest CH	-	-	-	-	

LTE Band 14 / 10MHz / QPSK

Middle Channel / 1RB

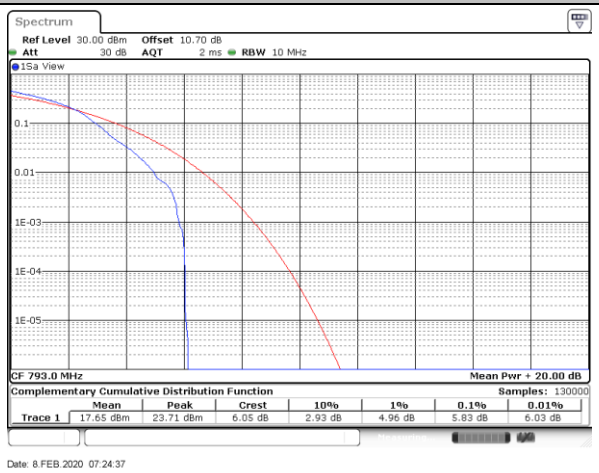


Middle Channel / Full RB

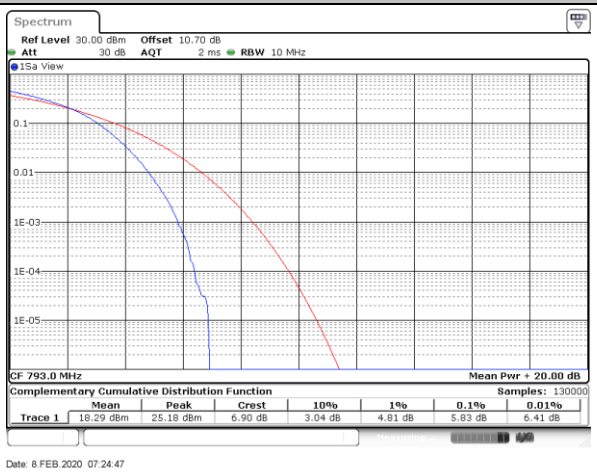


LTE Band 14 / 10MHz / 16QAM

Middle Channel / 1RB

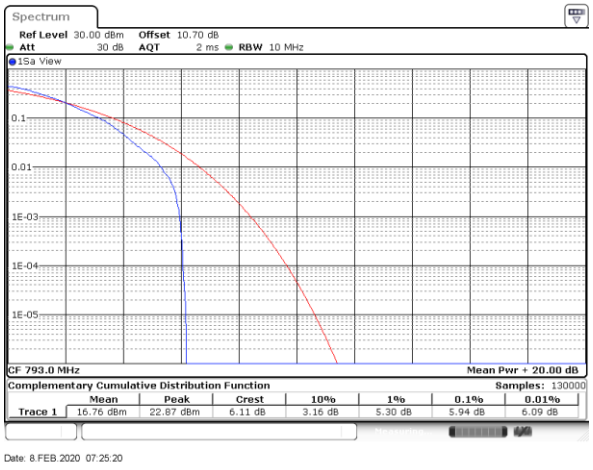


Middle Channel / Full RB

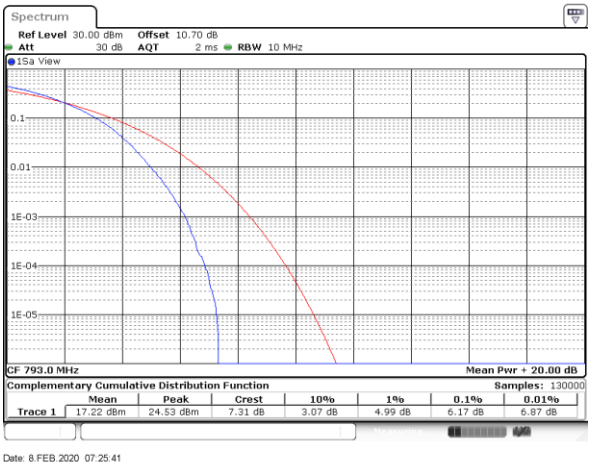


LTE Band 14 / 10MHz / 64QAM

Middle Channel / 1RB



Middle Channel / Full RB

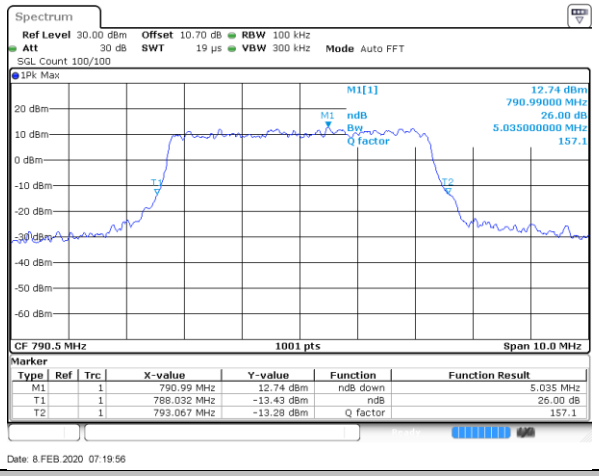


26dB Bandwidth

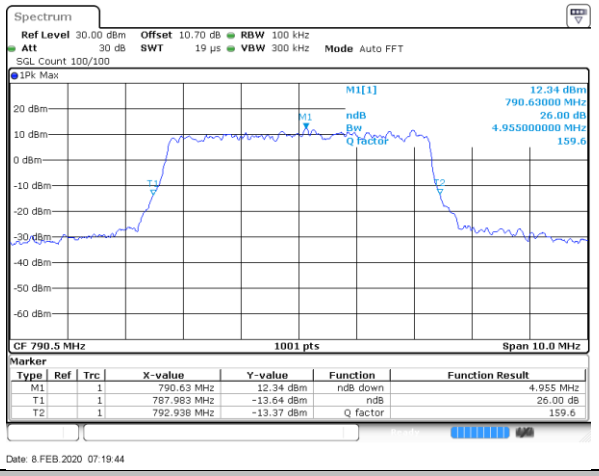
Mode	LTE Band 14 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	5.04	4.96	-	-	-	-	-	-
Middle CH	-	-	-	-	5.00	4.96	9.77	9.87	-	-	-	-
Highest CH	-	-	-	-	5.05	5.11	-	-	-	-	-	-
Mode	LTE Band 14 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	5.08	-	-	-	-	-	-	-
Middle CH	-	-	-	-	5.02	-	9.93	-	-	-	-	-
Highest CH	-	-	-	-	5.11	-	-	-	-	-	-	-

LTE Band 14

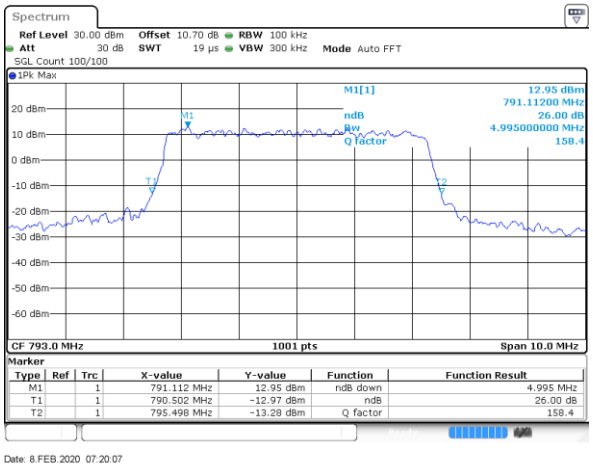
Lowest Channel / 5MHz / QPSK



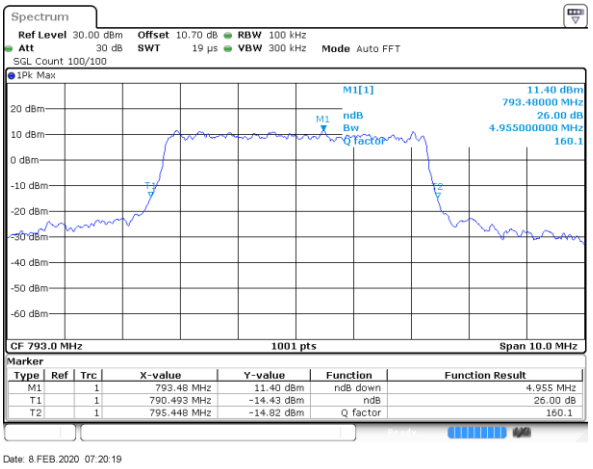
Lowest Channel / 5MHz / 16QAM



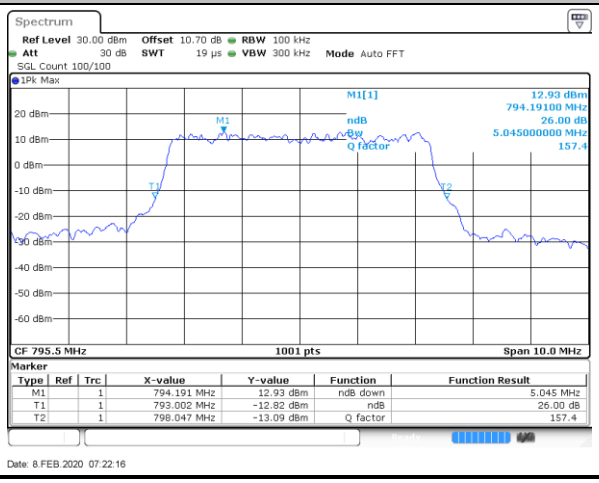
Middle Channel / 5MHz / QPSK



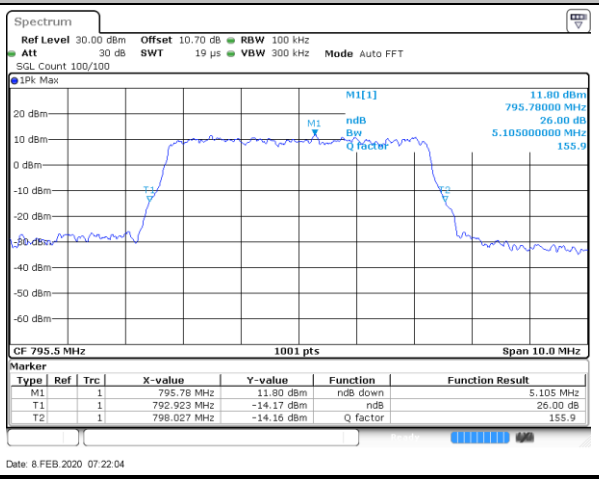
Middle Channel / 5MHz / 16QAM



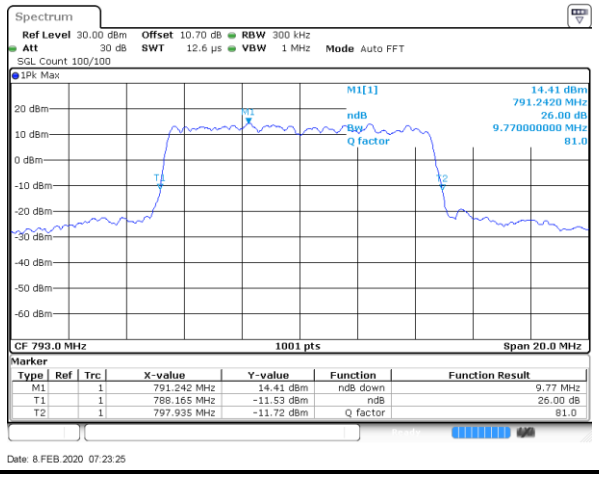
Highest Channel / 5MHz / QPSK

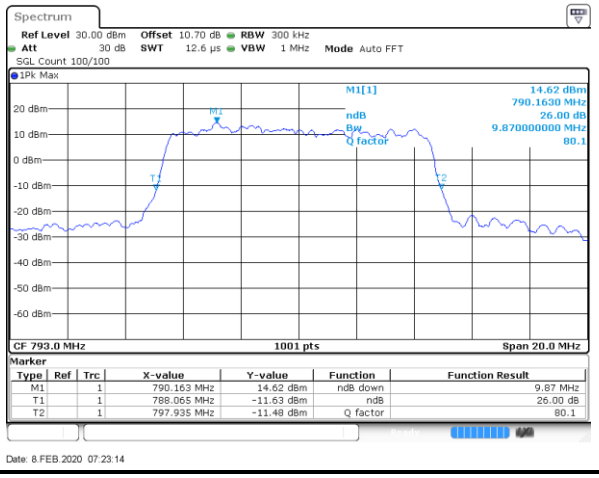


Highest Channel / 5MHz / 16QAM



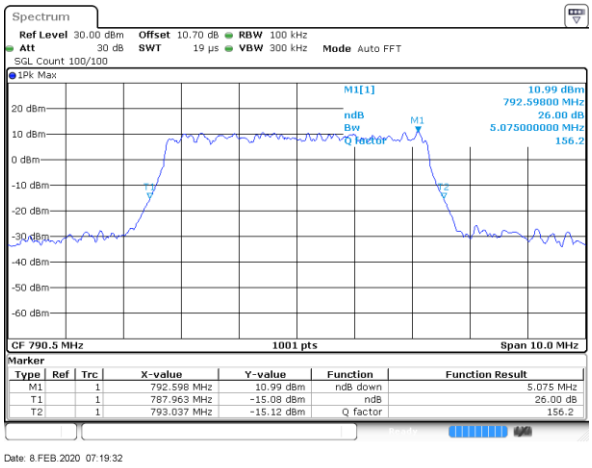
LTE Band 14	
Middle Channel / 10MHz / QPSK	Middle Channel / 10MHz / 16QAM



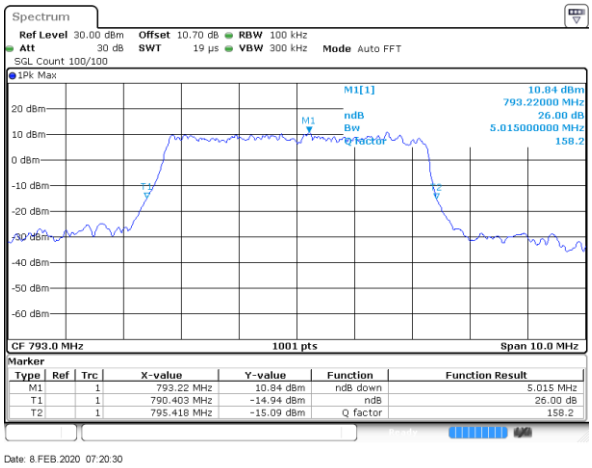


LTE Band 14

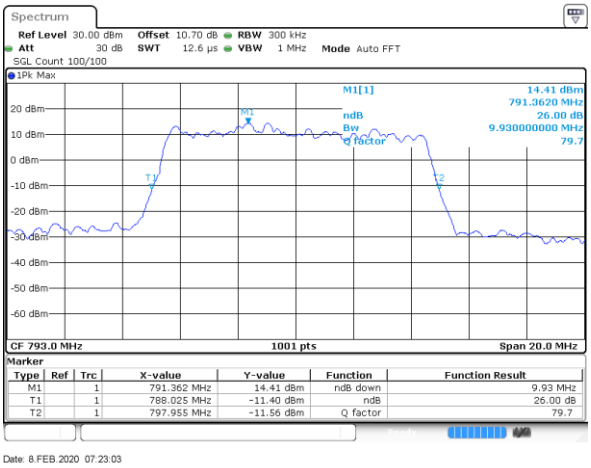
Lowest Channel / 5MHz / 64QAM



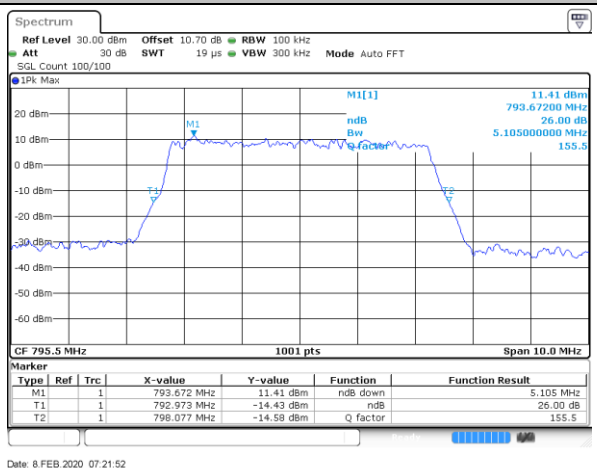
Middle Channel / 5MHz / 64QAM



Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM

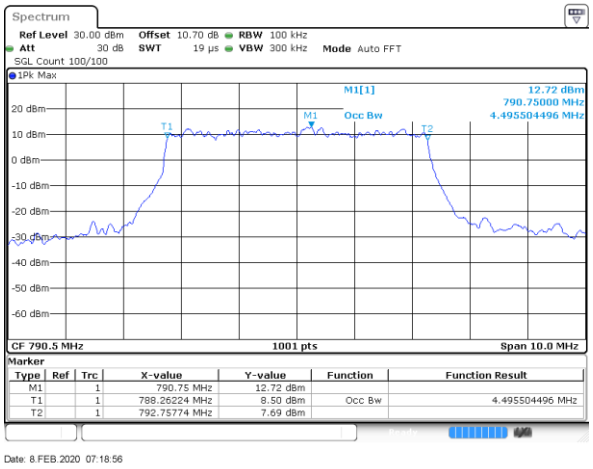


Occupied Bandwidth

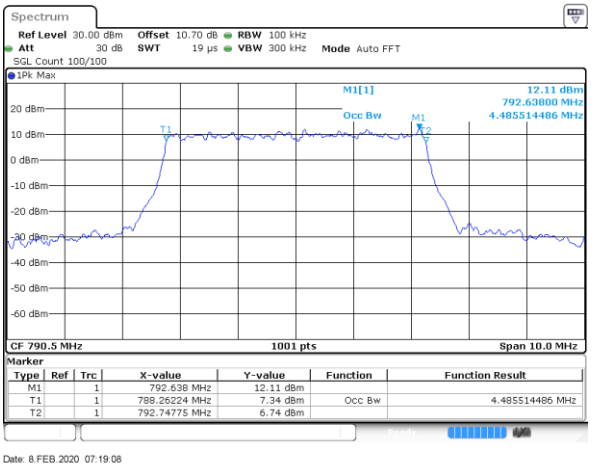
Mode	LTE Band 14 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.50	4.49	-	-	-	-	-	-
Middle CH	-	-	-	-	4.52	4.51	9.03	9.03	-	-	-	-
Highest CH	-	-	-	-	4.50	4.51	-	-	-	-	-	-
Mode	LTE Band 14 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.49	-	-	-	-	-	-	-
Middle CH	-	-	-	-	4.50	-	9.03	-	-	-	-	-
Highest CH	-	-	-	-	4.52	-	-	-	-	-	-	-

LTE Band 14

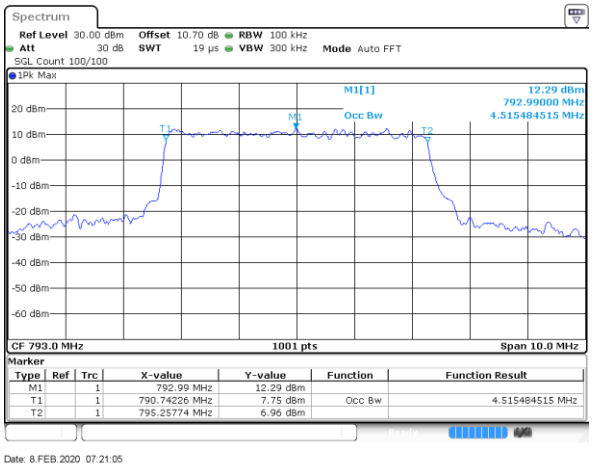
Lowest Channel / 5MHz / QPSK



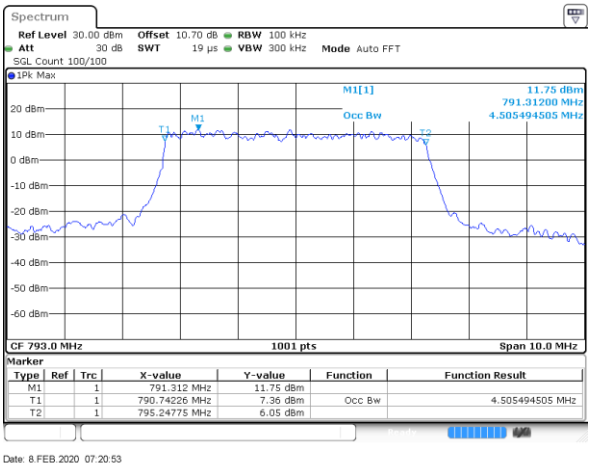
Lowest Channel / 5MHz / 16QAM



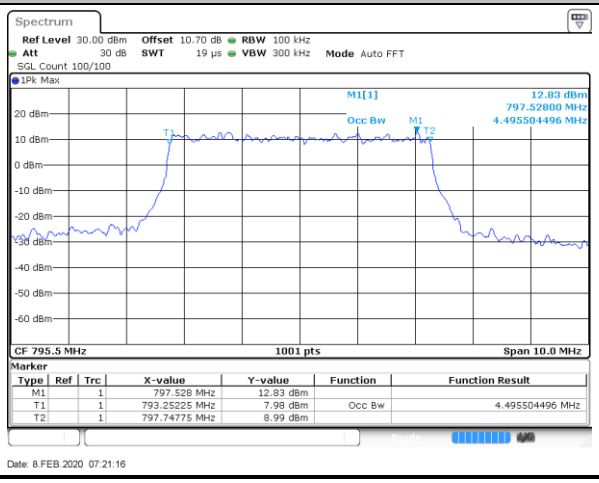
Middle Channel / 5MHz / QPSK



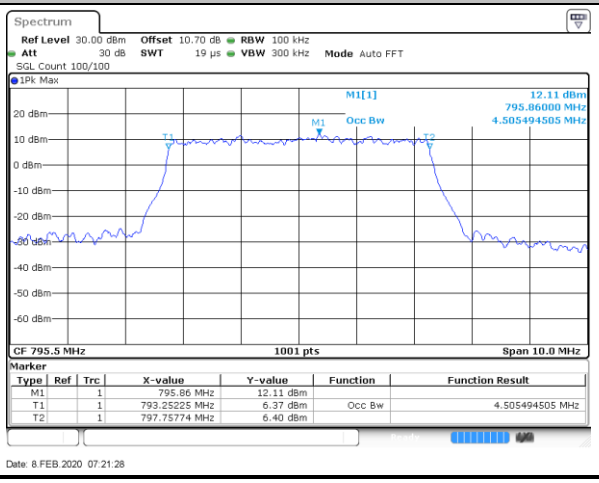
Middle Channel / 5MHz / 16QAM



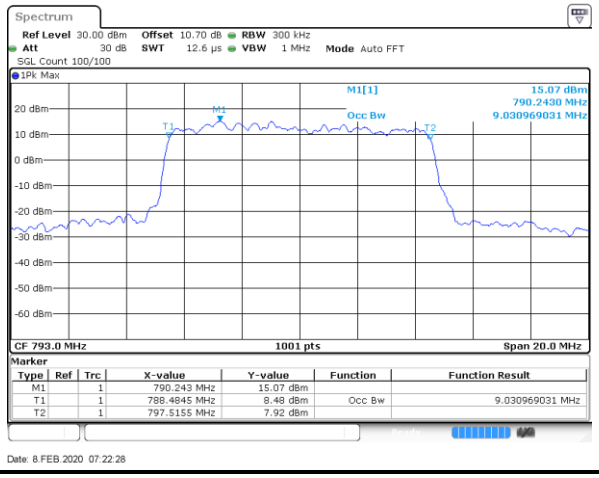
Highest Channel / 5MHz / QPSK

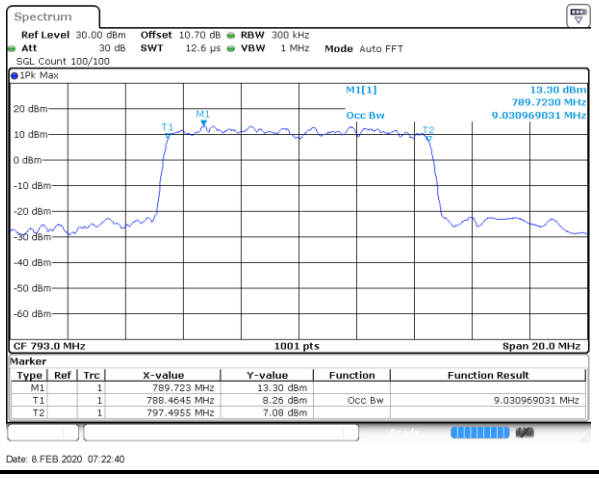


Highest Channel / 5MHz / 16QAM



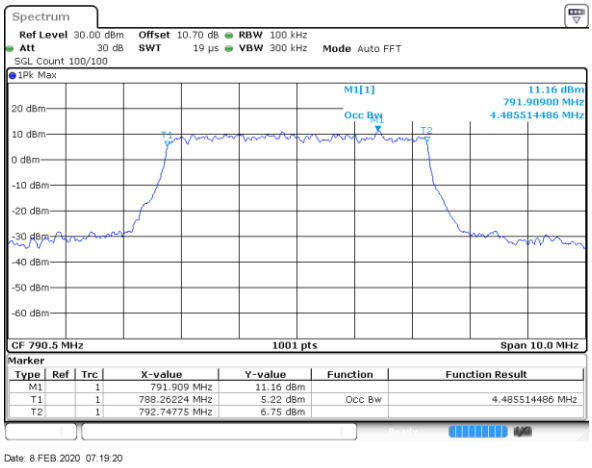
LTE Band 14	
Middle Channel / 10MHz / QPSK	Middle Channel / 10MHz / 16QAM



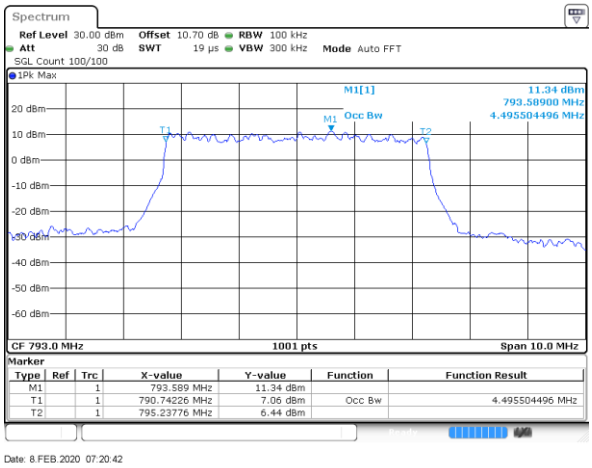


LTE Band 14

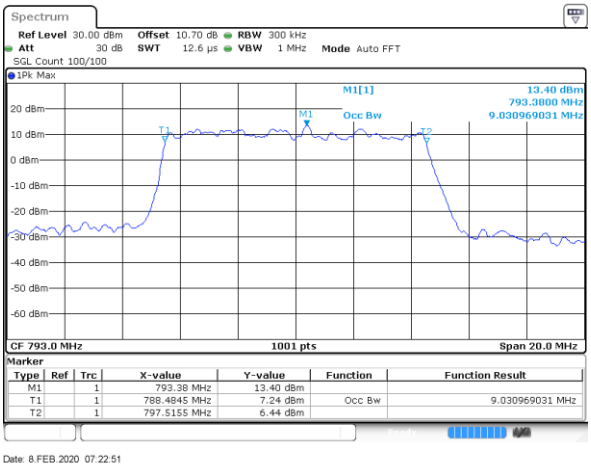
Lowest Channel / 5MHz / 64QAM



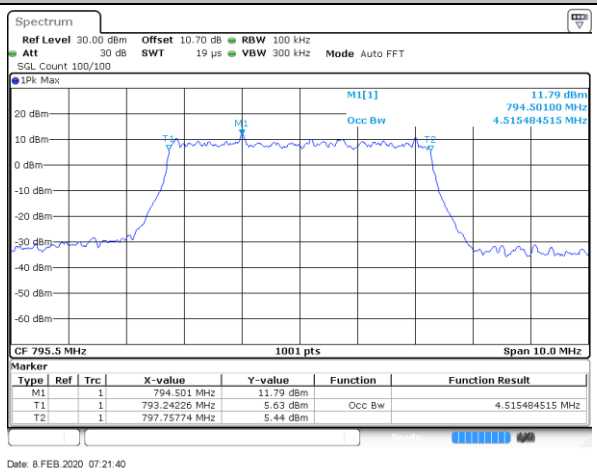
Middle Channel / 5MHz / 64QAM



Middle Channel / 10MHz / 64QAM



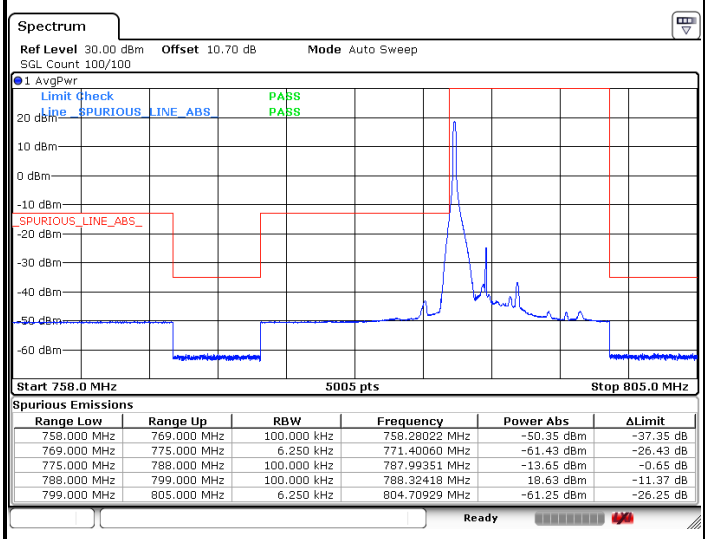
Highest Channel / 5MHz / 64QAM



Conducted Band Edge

LTE Band 14 / 5MHz / QPSK

Lowest Band Edge / 1 RB

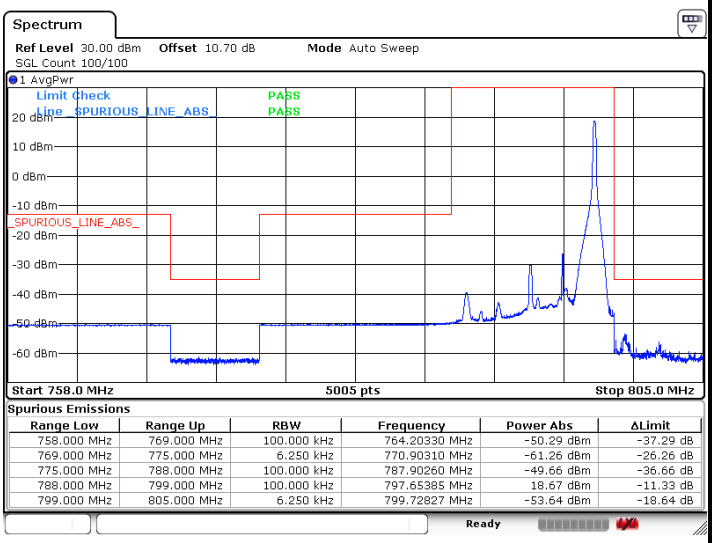


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	758.28022 MHz	-50.35 dBm	-37.35 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.40060 MHz	-61.43 dBm	-26.43 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-13.65 dBm	-0.65 dB
788.000 MHz	799.000 MHz	100.000 kHz	798.32418 MHz	18.63 dBm	-11.37 dB
799.000 MHz	805.000 MHz	6.250 kHz	804.70929 MHz	-61.25 dBm	-26.25 dB

Date: 2 MAR 2020 14:01:21

Highest Band Edge / 1 RB

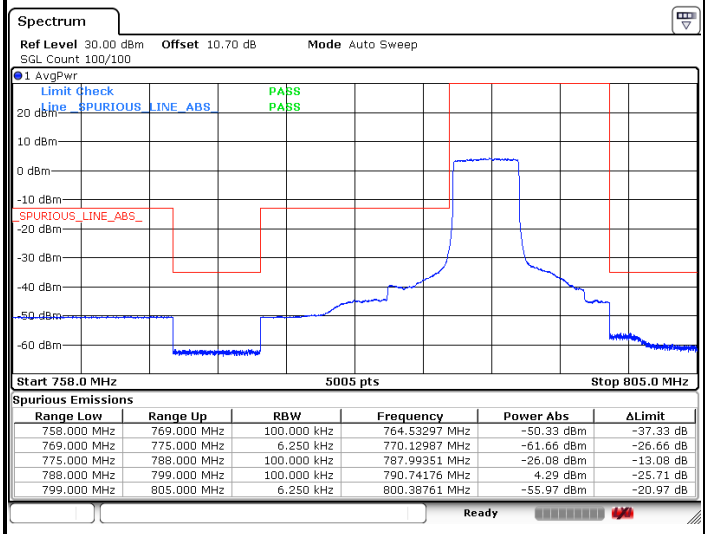


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	764.20330 MHz	-50.29 dBm	-37.29 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.90310 MHz	-61.26 dBm	-26.26 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.90260 MHz	-49.66 dBm	-36.66 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.65385 MHz	18.67 dBm	-11.33 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.72827 MHz	-53.64 dBm	-18.64 dB

Date: 2 MAR 2020 14:03:31

Lowest Band Edge / Full RB

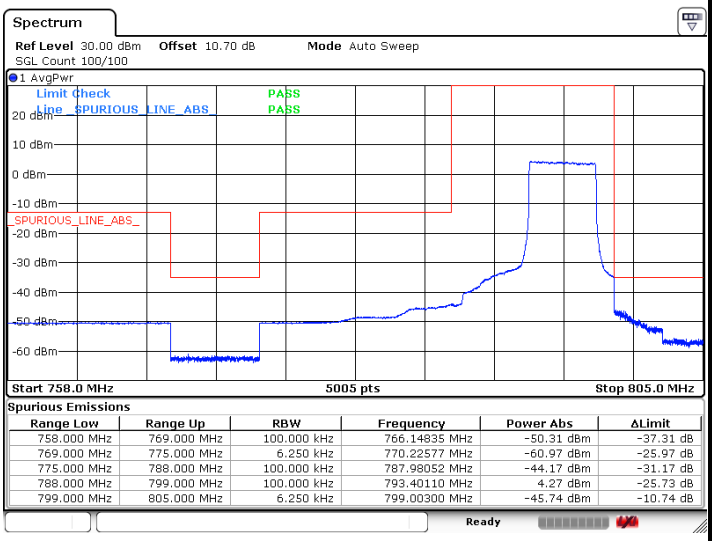


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	764.53297 MHz	-50.33 dBm	-37.33 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.12987 MHz	-61.66 dBm	-26.66 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-26.08 dBm	-13.08 dB
788.000 MHz	799.000 MHz	100.000 kHz	790.74176 MHz	4.29 dBm	-25.71 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.38761 MHz	-55.97 dBm	-20.97 dB

Date: 2 MAR 2020 13:52:16

Highest Band Edge / Full RB



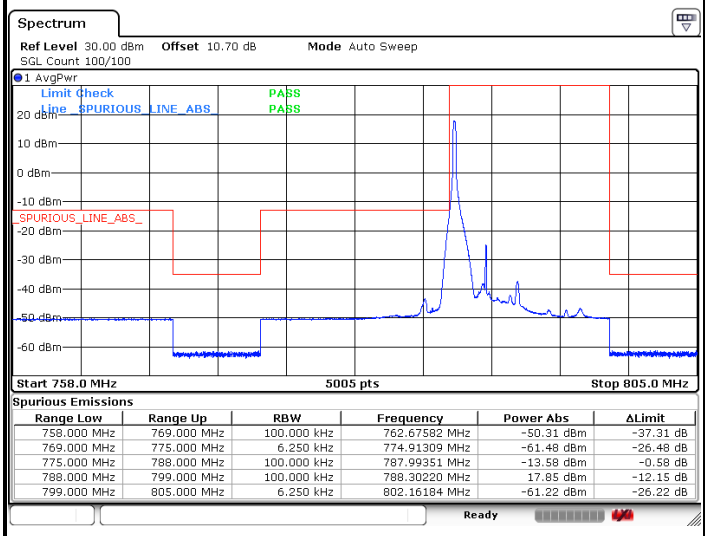
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	766.14835 MHz	-50.31 dBm	-37.31 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.22577 MHz	-60.97 dBm	-25.97 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.98052 MHz	-44.17 dBm	-31.17 dB
788.000 MHz	799.000 MHz	100.000 kHz	793.40110 MHz	4.27 dBm	-25.73 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.00300 MHz	-45.74 dBm	-10.74 dB

Date: 2 MAR 2020 14:13:50

LTE Band 14 / 5MHz / 16QAM

Lowest Band Edge /1 RB

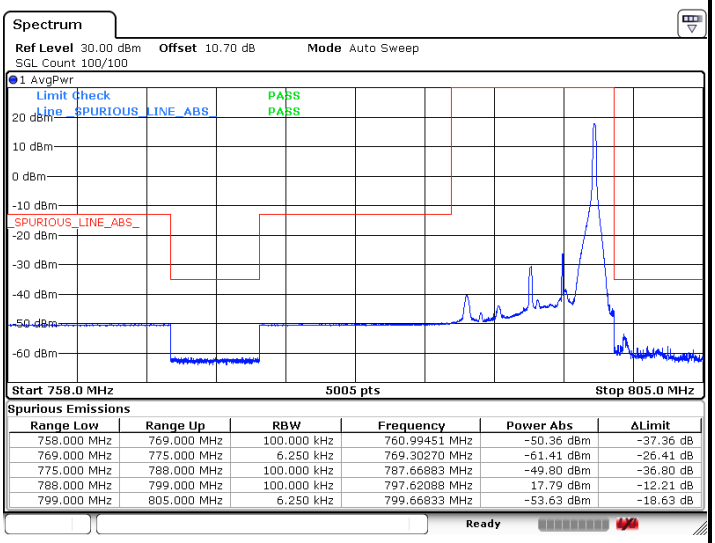


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	762.67582 MHz	-50.31 dBm	-37.31 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.91309 MHz	-61.48 dBm	-26.48 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-13.58 dBm	-0.58 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.30220 MHz	17.85 dBm	-12.15 dB
799.000 MHz	805.000 MHz	6.250 kHz	802.16184 MHz	-61.22 dBm	-26.22 dB

Date: 2 MAR 2020 13:59:31

Highest Band Edge / 1 RB

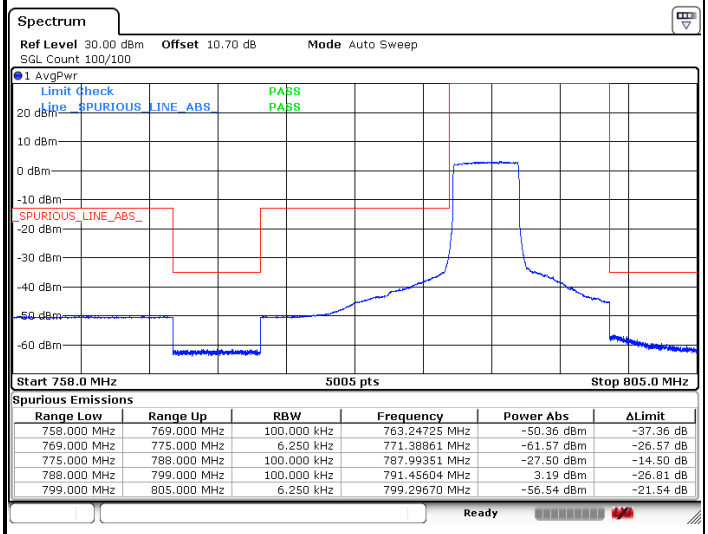


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	760.99451 MHz	-50.36 dBm	-37.36 dB
769.000 MHz	775.000 MHz	6.250 kHz	769.30270 MHz	-61.41 dBm	-26.41 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.66883 MHz	-49.80 dBm	-36.80 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.62088 MHz	17.79 dBm	-12.21 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.66833 MHz	-53.63 dBm	-18.63 dB

Date: 2 MAR 2020 14:05:20

Lowest Band Edge / Full RB

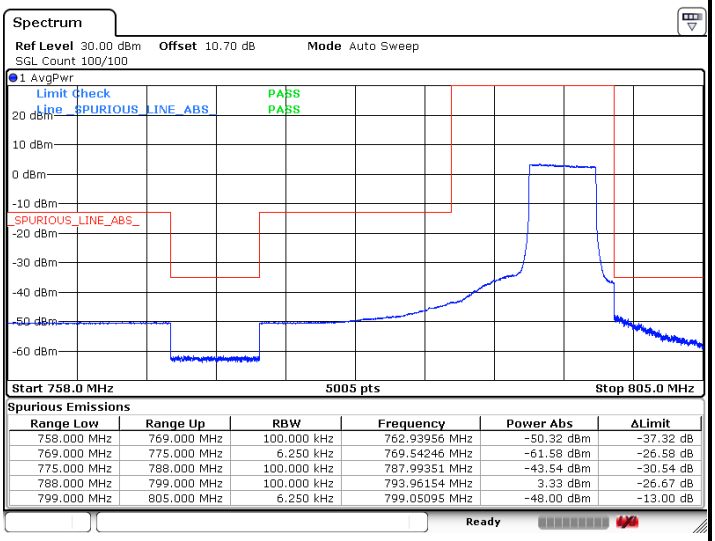


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	763.24725 MHz	-50.36 dBm	-37.36 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.38861 MHz	-61.57 dBm	-26.57 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-27.50 dBm	-14.50 dB
788.000 MHz	799.000 MHz	100.000 kHz	791.45604 MHz	3.19 dBm	-26.81 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.29670 MHz	-56.54 dBm	-21.54 dB

Date: 2 MAR 2020 13:54:18

Highest Band Edge / Full RB



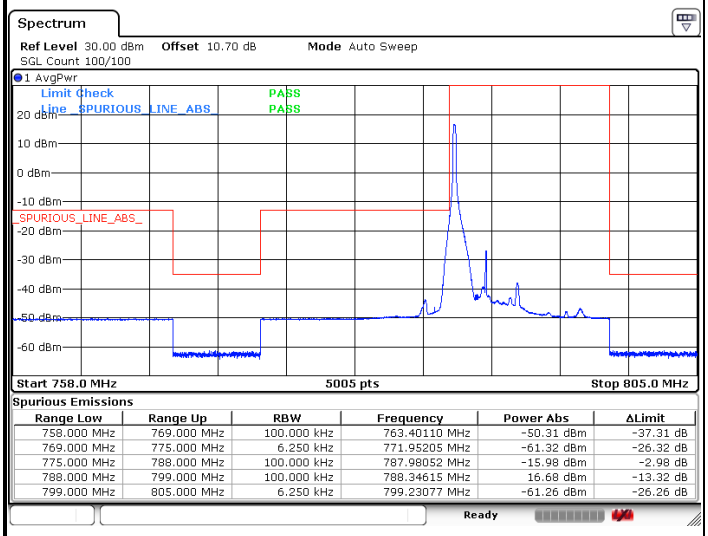
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	762.93956 MHz	-50.32 dBm	-37.32 dB
769.000 MHz	775.000 MHz	6.250 kHz	769.54246 MHz	-61.58 dBm	-26.58 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-43.54 dBm	-30.54 dB
788.000 MHz	799.000 MHz	100.000 kHz	793.96154 MHz	3.33 dBm	-26.67 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.05095 MHz	-48.00 dBm	-13.00 dB

Date: 2 MAR 2020 14:12:12

LTE Band 14 / 5MHz / 64QAM

Lowest Band Edge / 1 RB

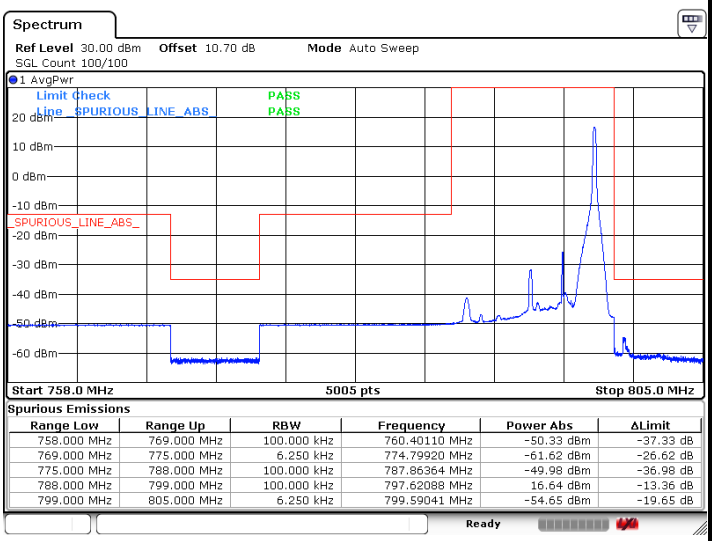


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	763.40110 MHz	-50.31 dBm	-37.31 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.95205 MHz	-61.32 dBm	-26.32 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.98052 MHz	-15.98 dBm	-2.98 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.34615 MHz	16.68 dBm	-13.32 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.23077 MHz	-61.26 dBm	-26.26 dB

Date: 2 MAR 2020 13:57:43

Highest Band Edge / 1 RB

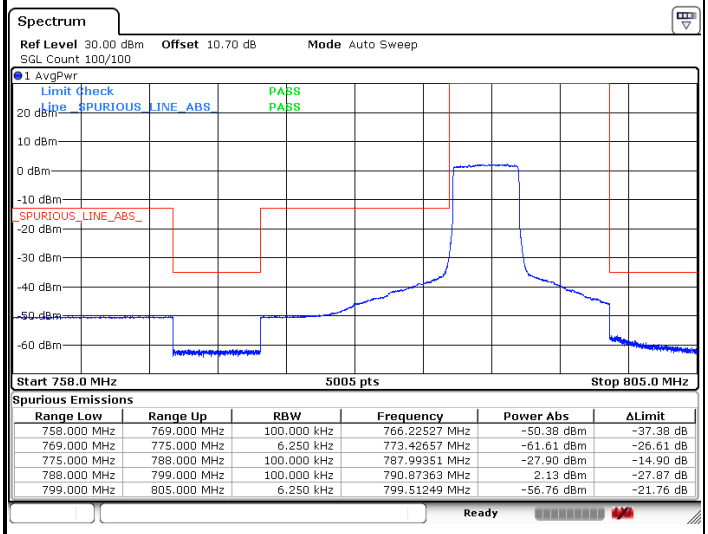


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	760.40110 MHz	-50.33 dBm	-37.33 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.79920 MHz	-61.62 dBm	-26.62 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.86364 MHz	-49.98 dBm	-36.98 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.62088 MHz	16.64 dBm	-13.36 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.59041 MHz	-54.65 dBm	-19.65 dB

Date: 2 MAR 2020 14:08:31

Lowest Band Edge / Full RB

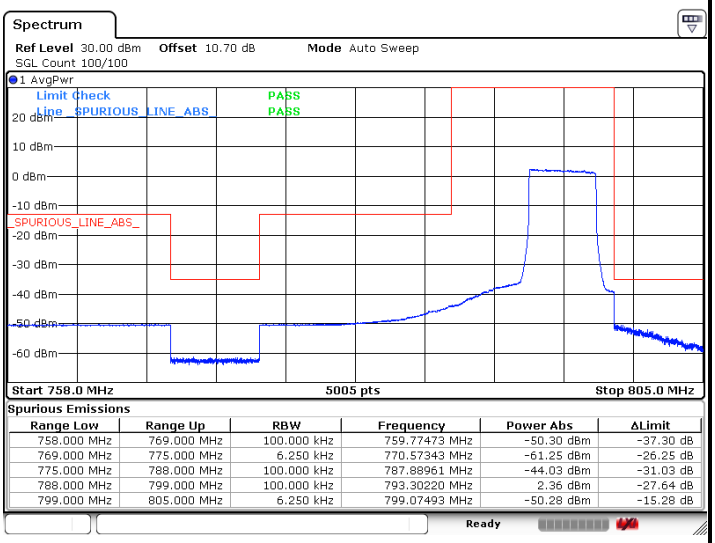


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	766.22527 MHz	-50.38 dBm	-37.38 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.42657 MHz	-61.61 dBm	-26.61 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-27.90 dBm	-14.90 dB
788.000 MHz	799.000 MHz	100.000 kHz	790.87363 MHz	2.13 dBm	-27.87 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.51249 MHz	-56.76 dBm	-21.76 dB

Date: 2 MAR 2020 13:55:56

Highest Band Edge / Full RB



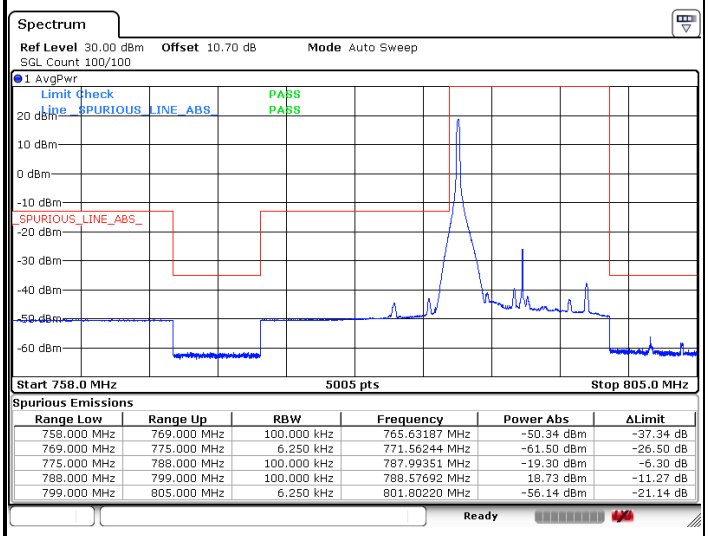
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.77473 MHz	-50.30 dBm	-37.30 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.57343 MHz	-61.25 dBm	-26.25 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.88961 MHz	-44.03 dBm	-31.03 dB
788.000 MHz	799.000 MHz	100.000 kHz	793.30220 MHz	2.36 dBm	-27.64 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.07493 MHz	-50.28 dBm	-15.28 dB

Date: 2 MAR 2020 14:10:16

LTE Band 14 / 10MHz / QPSK

Lowest Band Edge / 1 RB

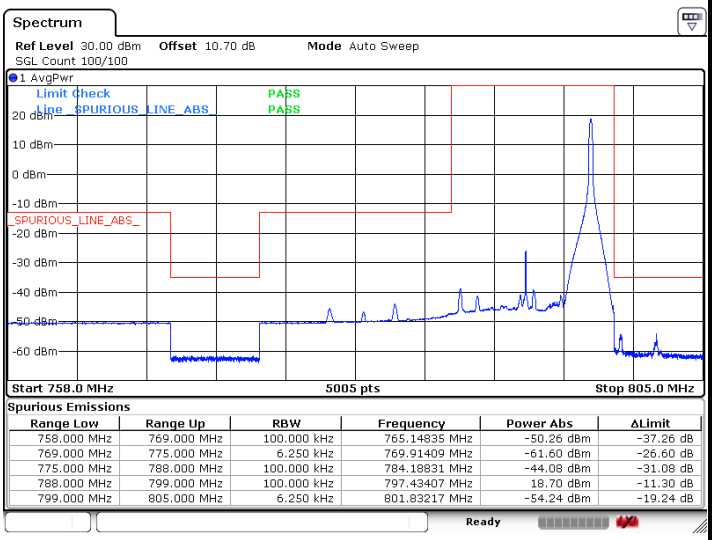


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	765.63187 MHz	-50.34 dBm	-37.34 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.56244 MHz	-61.50 dBm	-26.50 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-19.30 dBm	-6.30 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.57692 MHz	18.73 dBm	-11.27 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.80220 MHz	-56.14 dBm	-21.14 dB

Date: 2 MAR 2020 14:32:04

Highest Band Edge / 1 RB

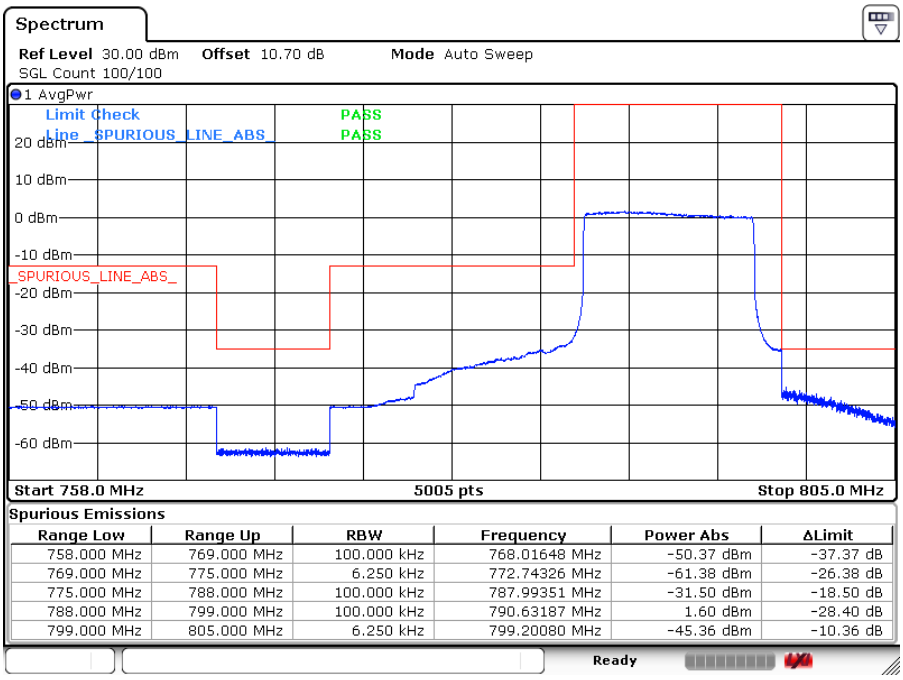


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	765.14835 MHz	-50.26 dBm	-37.26 dB
769.000 MHz	775.000 MHz	6.250 kHz	769.91409 MHz	-61.60 dBm	-26.60 dB
775.000 MHz	788.000 MHz	100.000 kHz	784.18831 MHz	-44.08 dBm	-31.08 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.43407 MHz	18.70 dBm	-11.30 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.83217 MHz	-54.24 dBm	-19.24 dB

Date: 2 MAR 2020 14:34:47

Band Edge / Full RB



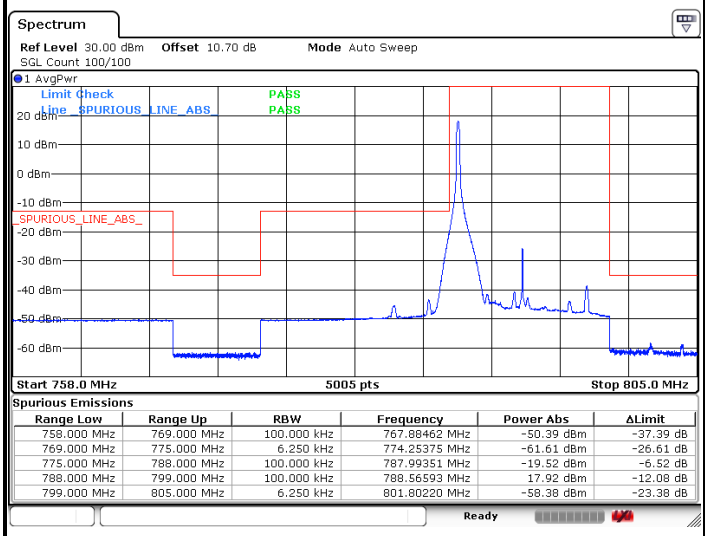
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	768.01648 MHz	-50.37 dBm	-37.37 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.74326 MHz	-61.38 dBm	-26.38 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-31.50 dBm	-18.50 dB
788.000 MHz	799.000 MHz	100.000 kHz	790.63187 MHz	1.60 dBm	-28.40 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.20080 MHz	-45.36 dBm	-10.36 dB

Date: 2 MAR 2020 14:18:24

LTE Band 14 / 10MHz / 16QAM

Lowest Band Edge / 1 RB

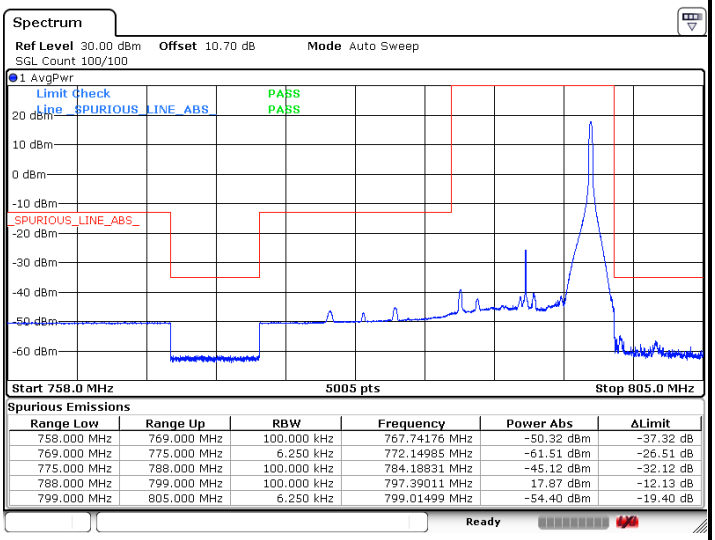


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	767.88462 MHz	-50.39 dBm	-37.39 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.25375 MHz	-61.61 dBm	-26.61 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-19.52 dBm	-6.52 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.56593 MHz	17.92 dBm	-12.08 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.80220 MHz	-58.38 dBm	-23.38 dB

Date: 2 MAR 2020 14:30:11

Highest Band Edge / 1 RB

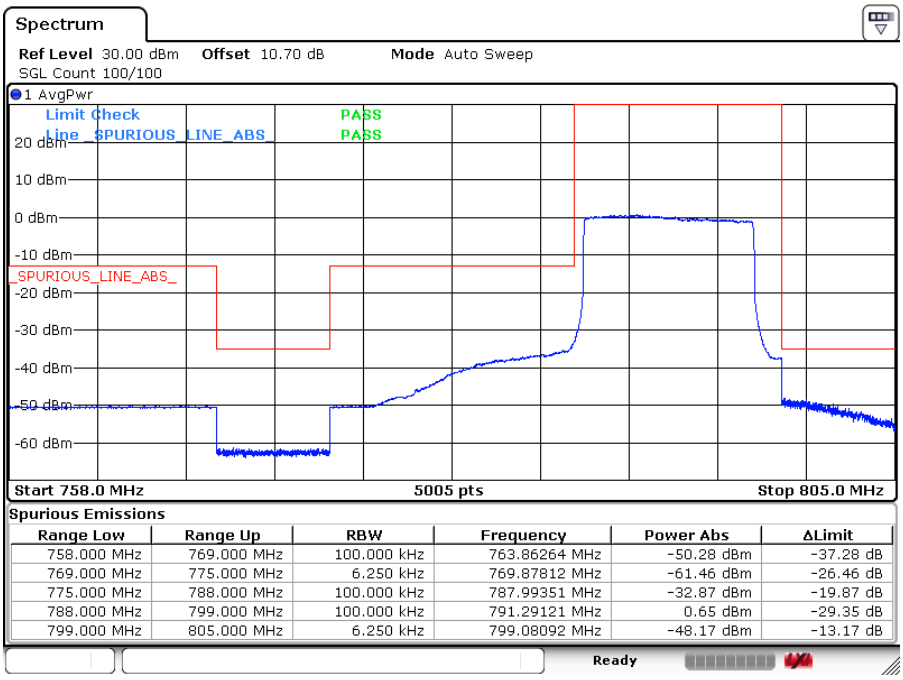


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	767.74176 MHz	-50.32 dBm	-37.32 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.14985 MHz	-61.51 dBm	-26.51 dB
775.000 MHz	788.000 MHz	100.000 kHz	784.18831 MHz	-45.12 dBm	-32.12 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.39011 MHz	17.87 dBm	-12.13 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.01499 MHz	-54.40 dBm	-19.40 dB

Date: 2 MAR 2020 14:36:34

Band Edge / Full RB



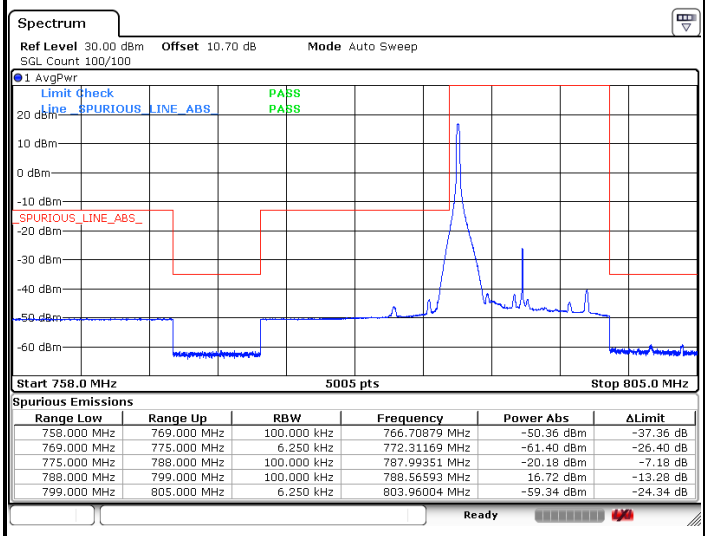
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	763.86264 MHz	-50.28 dBm	-37.28 dB
769.000 MHz	775.000 MHz	6.250 kHz	769.87812 MHz	-61.46 dBm	-26.46 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-32.87 dBm	-19.87 dB
788.000 MHz	799.000 MHz	100.000 kHz	791.29121 MHz	0.65 dBm	-29.35 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.08092 MHz	-48.17 dBm	-13.17 dB

Date: 2 MAR 2020 14:24:24

LTE Band 14 / 10MHz / 64QAM

Lowest Band Edge / 1 RB

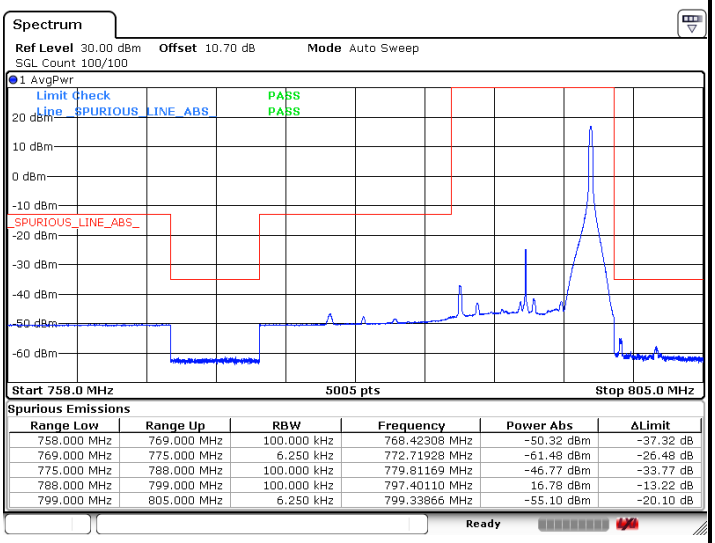


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	766.70879 MHz	-50.36 dBm	-37.36 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.31169 MHz	-61.40 dBm	-26.40 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-20.18 dBm	-7.18 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.56593 MHz	16.72 dBm	-13.28 dB
799.000 MHz	805.000 MHz	6.250 kHz	803.96004 MHz	-59.34 dBm	-24.34 dB

Date: 2.MAR.2020 14:28:16

Highest Band Edge / 1 RB

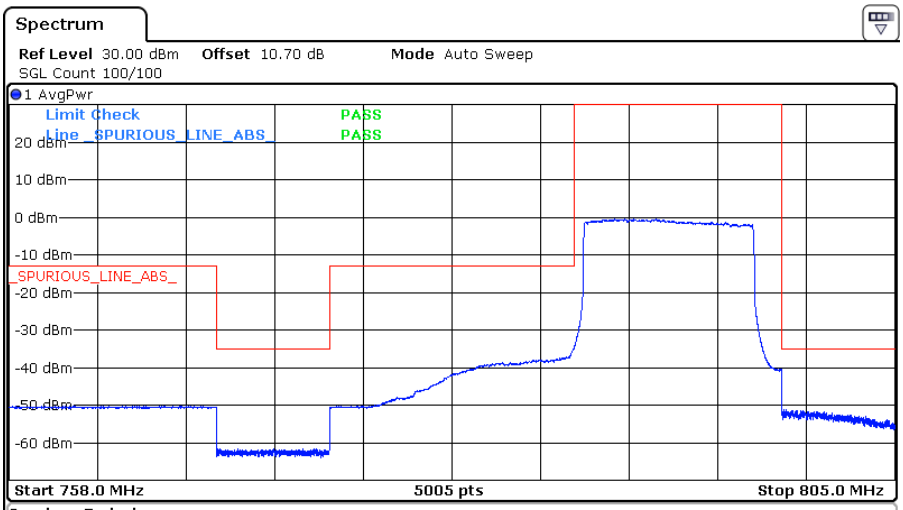


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	768.42308 MHz	-50.32 dBm	-37.32 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.71928 MHz	-61.48 dBm	-26.48 dB
775.000 MHz	788.000 MHz	100.000 kHz	779.81169 MHz	-46.77 dBm	-33.77 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.40110 MHz	16.78 dBm	-13.22 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.33866 MHz	-55.10 dBm	-20.10 dB

Date: 2.MAR.2020 14:38:55

Band Edge / Full RB



Spurious Emissions

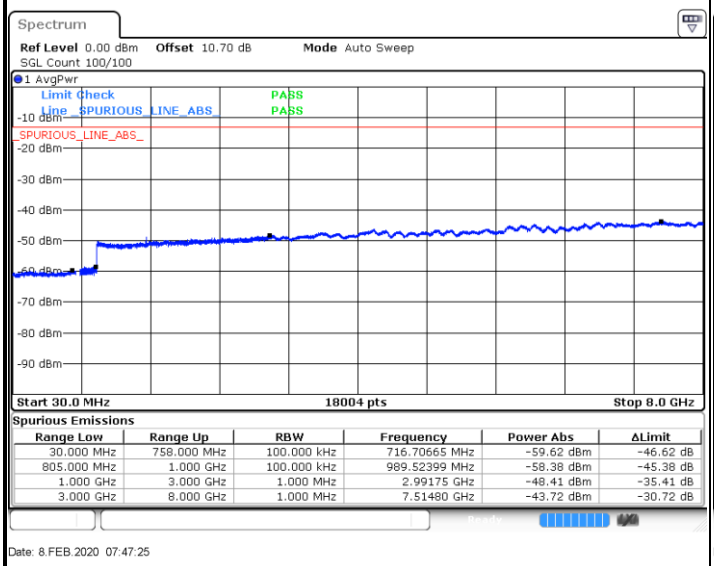
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	761.40110 MHz	-50.30 dBm	-37.30 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.15784 MHz	-61.62 dBm	-26.62 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-34.34 dBm	-21.34 dB
788.000 MHz	799.000 MHz	100.000 kHz	790.67582 MHz	-0.42 dBm	-30.42 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.09890 MHz	-51.07 dBm	-16.07 dB

Date: 2.MAR.2020 14:26:03

Conducted Spurious Emission

LTE Band 14 / 5MHz

Lowest Channel / QPSK

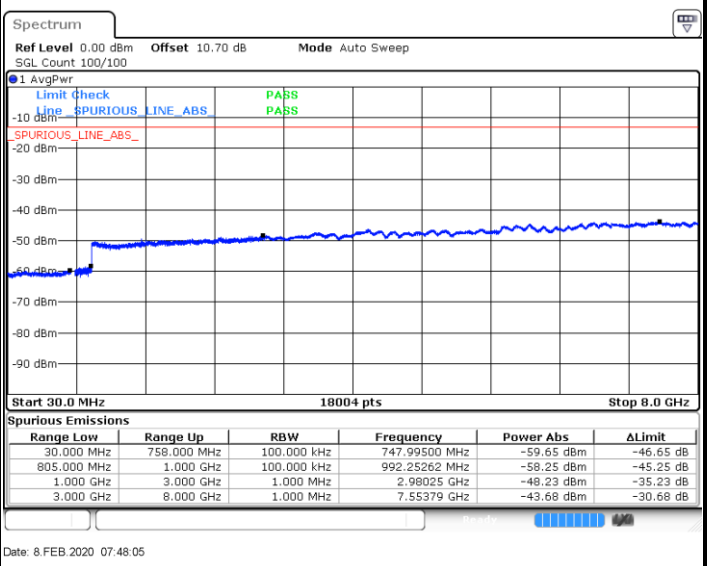


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	716.70665 MHz	-59.62 dBm	-46.62 dB
805.000 MHz	1.000 GHz	100.000 kHz	989.52399 MHz	-58.38 dBm	-45.38 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99175 GHz	-48.41 dBm	-35.41 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.51480 GHz	-43.72 dBm	-30.72 dB

Date: 8.FEB.2020 07:47:25

Lowest Channel / 16QAM

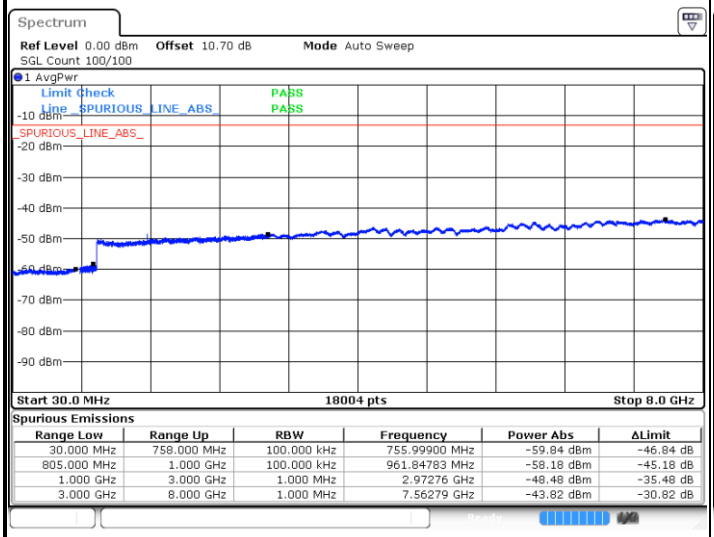


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	747.99500 MHz	-59.65 dBm	-46.65 dB
805.000 MHz	1.000 GHz	100.000 kHz	992.25262 MHz	-58.25 dBm	-45.25 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.98025 GHz	-48.23 dBm	-35.23 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55379 GHz	-43.68 dBm	-30.68 dB

Date: 8.FEB.2020 07:48:05

Middle Channel / QPSK

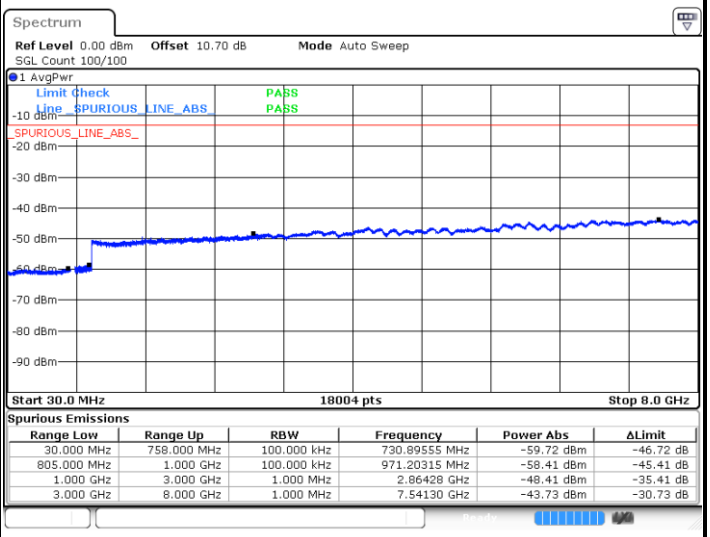


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	755.99900 MHz	-59.84 dBm	-46.84 dB
805.000 MHz	1.000 GHz	100.000 kHz	961.84783 MHz	-58.18 dBm	-45.18 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.97276 GHz	-48.48 dBm	-35.48 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.56279 GHz	-43.82 dBm	-30.82 dB

Date: 8.FEB.2020 07:49:26

Middle Channel / 16QAM



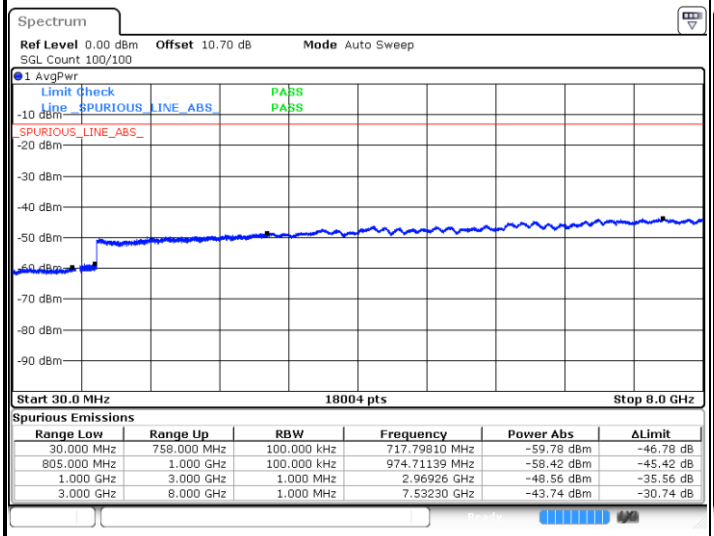
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	730.89555 MHz	-59.72 dBm	-46.72 dB
805.000 MHz	1.000 GHz	100.000 kHz	971.20315 MHz	-58.41 dBm	-45.41 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.86428 GHz	-48.41 dBm	-35.41 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.54130 GHz	-43.73 dBm	-30.73 dB

Date: 8.FEB.2020 07:50:06

LTE Band 14 / 5MHz

Highest Channel / QPSK

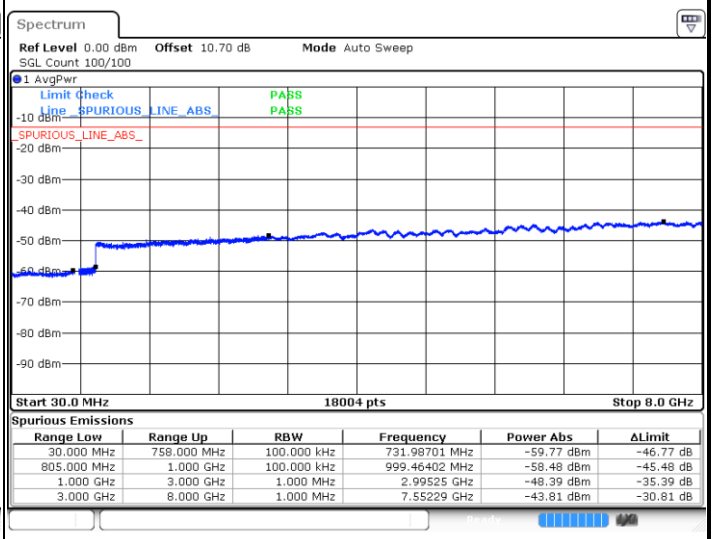


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	717.79810 MHz	-59.78 dBm	-46.78 dB
805.000 MHz	1.000 GHz	100.000 kHz	974.71139 MHz	-58.42 dBm	-45.42 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.96926 GHz	-48.56 dBm	-35.56 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.53230 GHz	-43.74 dBm	-30.74 dB

Date: 8.FEB.2020 07:51:26

Highest Channel / 16QAM



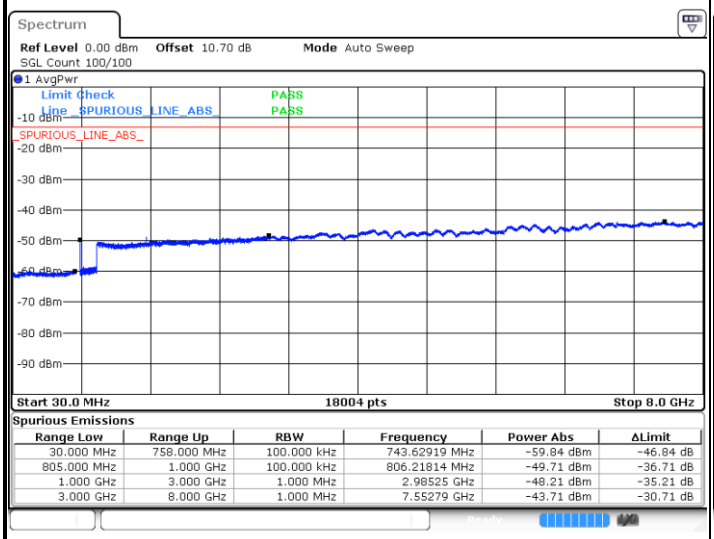
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	731.98701 MHz	-59.77 dBm	-46.77 dB
805.000 MHz	1.000 GHz	100.000 kHz	999.46402 MHz	-58.48 dBm	-45.48 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99525 GHz	-48.39 dBm	-35.39 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55229 GHz	-43.81 dBm	-30.81 dB

Date: 8.FEB.2020 07:52:07

LTE Band 14 / 10MHz

Middle Channel / QPSK

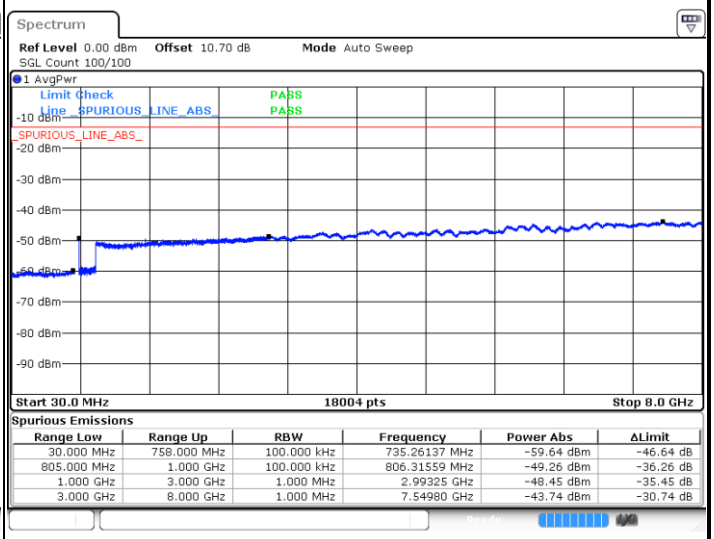


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	743.62919 MHz	-59.84 dBm	-46.84 dB
805.000 MHz	1.000 GHz	100.000 kHz	806.21814 MHz	-49.71 dBm	-36.71 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.98525 GHz	-48.21 dBm	-35.21 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55279 GHz	-43.71 dBm	-30.71 dB

Date: 8.FEB.2020 07:53:28

Middle Channel / 16QAM



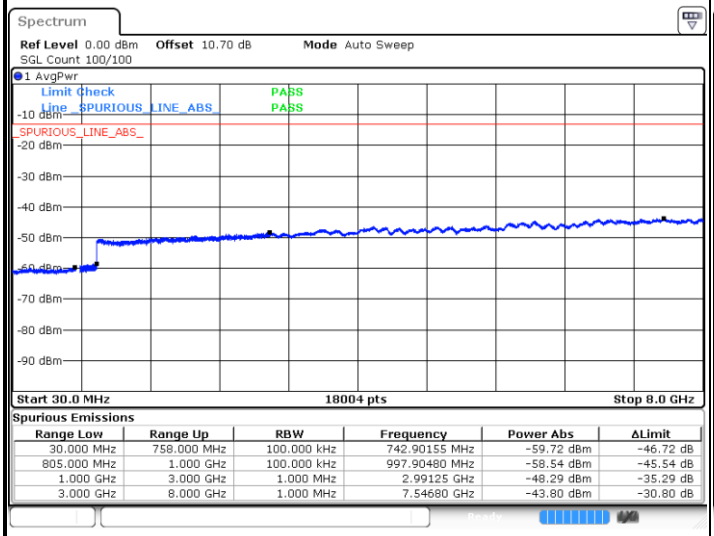
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	735.26137 MHz	-59.64 dBm	-46.64 dB
805.000 MHz	1.000 GHz	100.000 kHz	806.31559 MHz	-49.26 dBm	-36.26 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99325 GHz	-48.45 dBm	-35.45 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.54980 GHz	-43.74 dBm	-30.74 dB

Date: 8.FEB.2020 07:54:08

LTE Band 14 / 5MHz

Lowest Channel / 64QAM

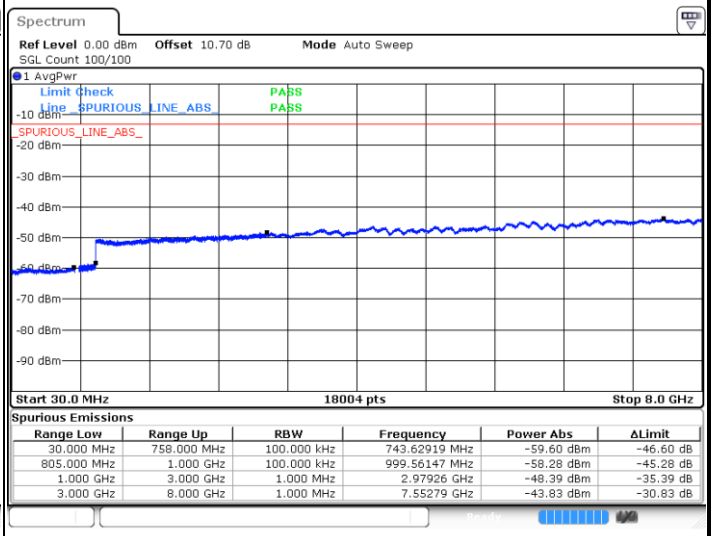


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	742.90155 MHz	-59.72 dBm	-46.72 dB
805.000 MHz	1.000 GHz	100.000 kHz	997.90480 MHz	-58.54 dBm	-45.54 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99125 GHz	-48.29 dBm	-35.29 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.54680 GHz	-43.80 dBm	-30.80 dB

Date: 8.FEB.2020 07:48:46

Middle Channel / 64QAM

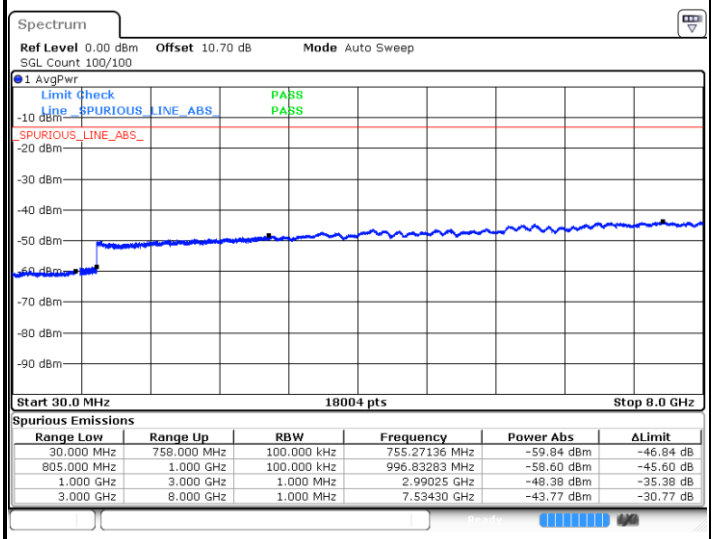


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	743.62919 MHz	-59.60 dBm	-46.60 dB
805.000 MHz	1.000 GHz	100.000 kHz	999.56147 MHz	-58.28 dBm	-45.28 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.97926 GHz	-48.39 dBm	-35.39 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55279 GHz	-43.83 dBm	-30.83 dB

Date: 8.FEB.2020 07:50:46

Highest Channel / 64QAM

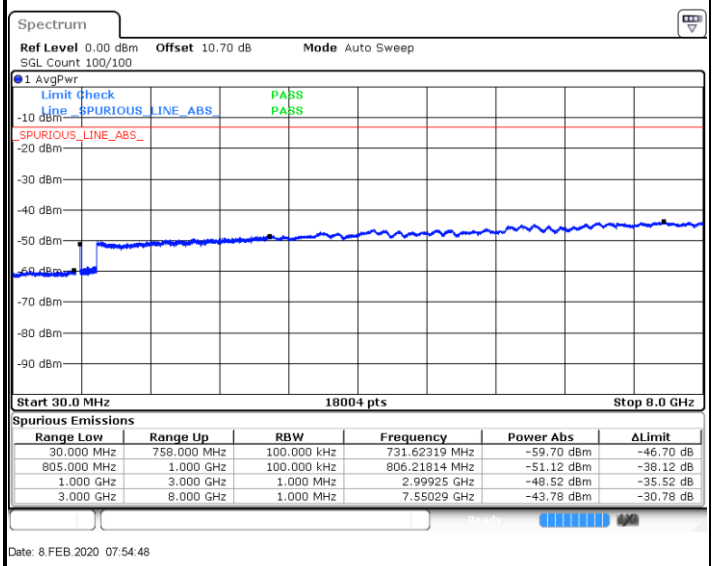


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	755.27136 MHz	-59.84 dBm	-46.84 dB
805.000 MHz	1.000 GHz	100.000 kHz	996.83283 MHz	-58.60 dBm	-45.60 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99025 GHz	-48.38 dBm	-35.38 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.53430 GHz	-43.77 dBm	-30.77 dB

Date: 8.FEB.2020 07:52:47

LTE Band 14 / 10MHz	
Middle Channel / 64QAM	



Spurious Emissions

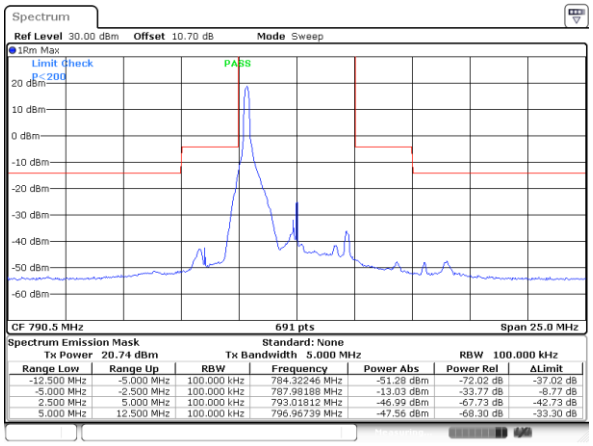
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	731.62319 MHz	-59.70 dBm	-46.70 dB
805.000 MHz	1.000 GHz	100.000 kHz	806.21814 MHz	-51.12 dBm	-38.12 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99925 GHz	-48.52 dBm	-35.52 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55029 GHz	-43.78 dBm	-30.78 dB

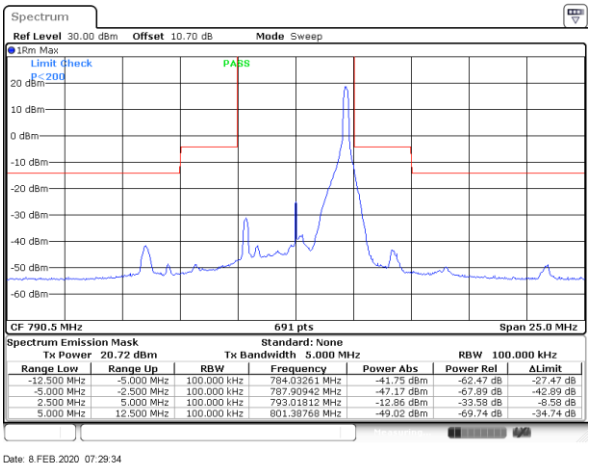
Date: 8.FEB.2020 07:54:48

Mask

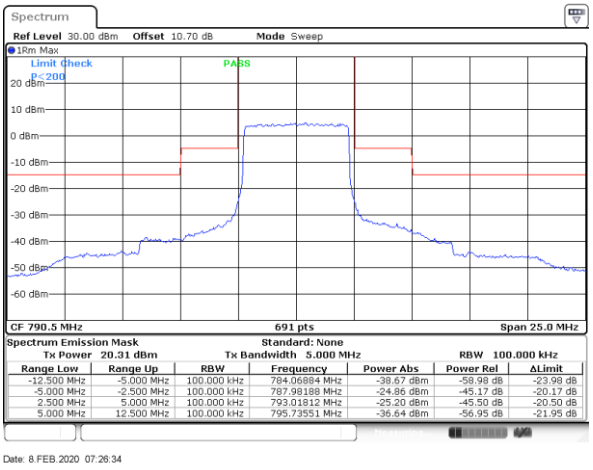
LTE Band 14 / 5MHz / QPSK

Lowest Channel / 1RB



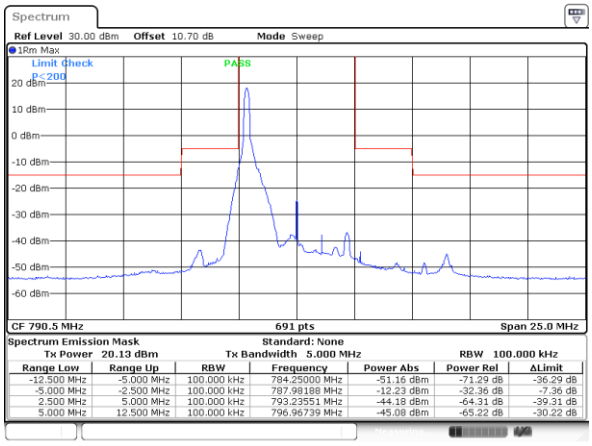


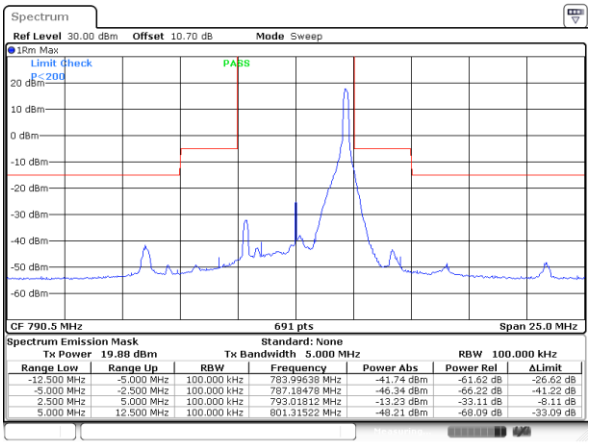
Lowest Channel / Full RB



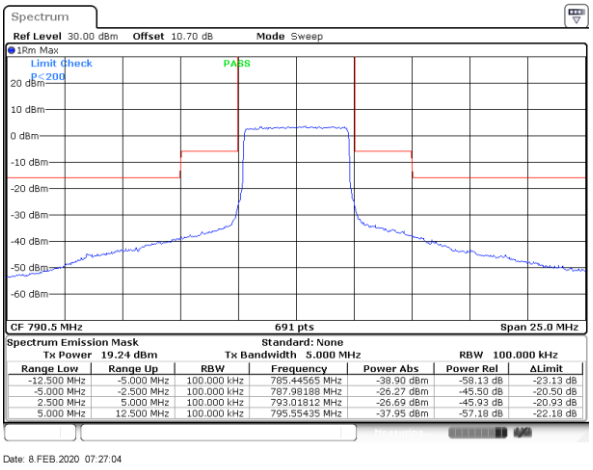
LTE Band 14 / 5MHz / 16QAM

Lowest Channel / 1RB



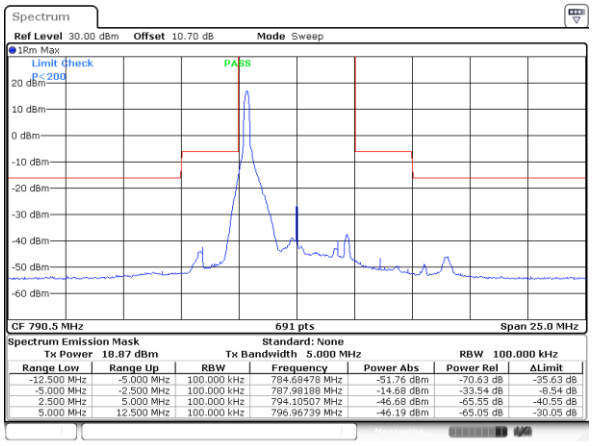


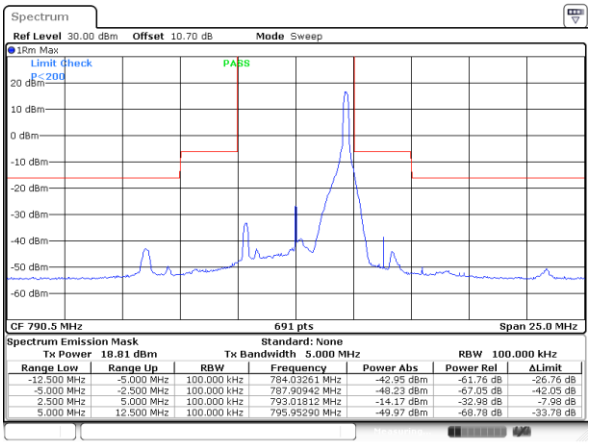
Lowest Channel / Full RB



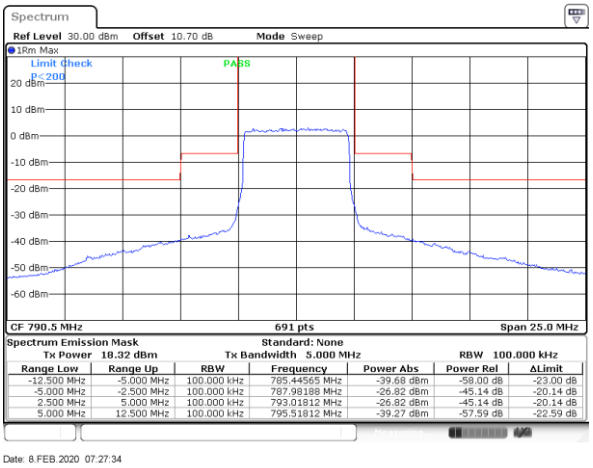
LTE Band 14 / 5MHz / 64QAM

Lowest Channel / 1RB



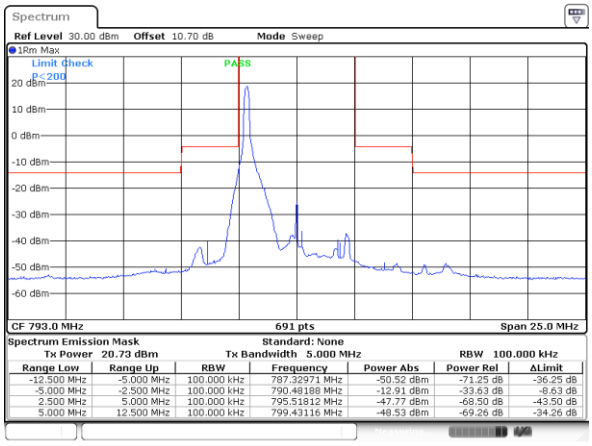


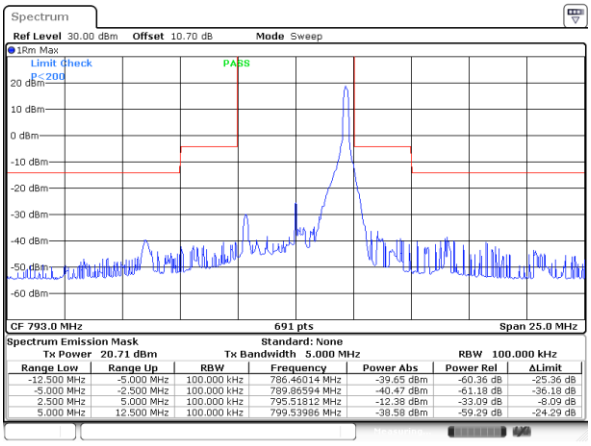
Lowest Channel / Full RB



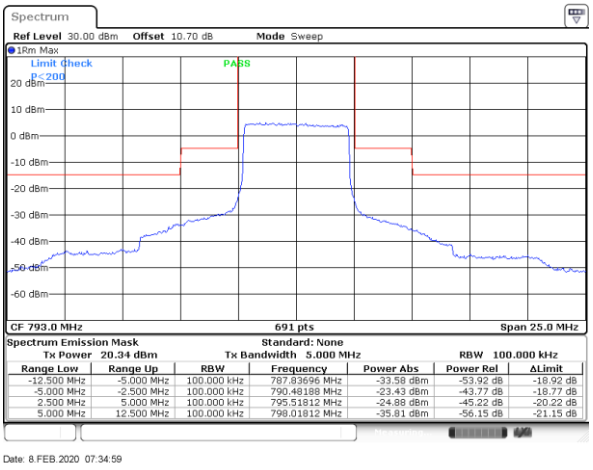
LTE Band 14 / 5MHz / QPSK

Middle Channel / 1RB



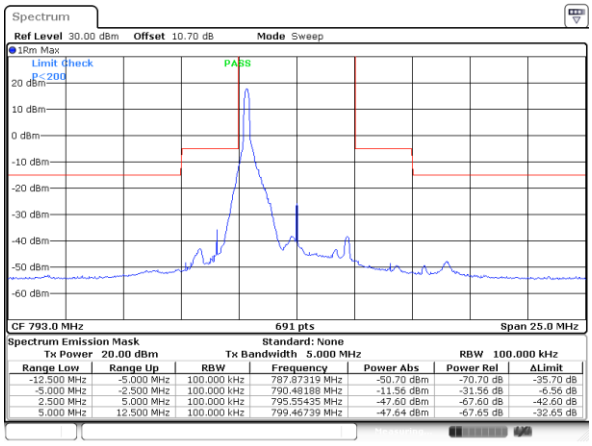


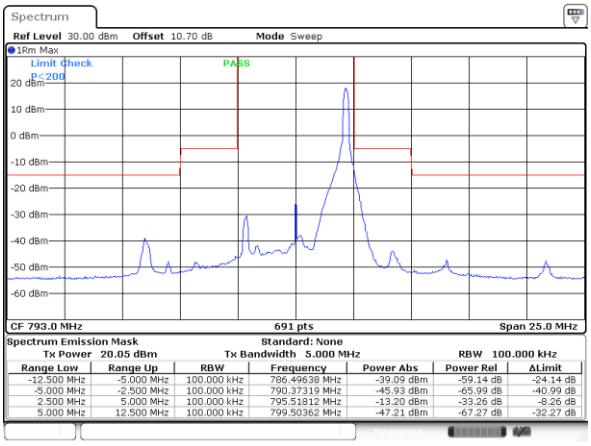
Middle Channel / Full RB



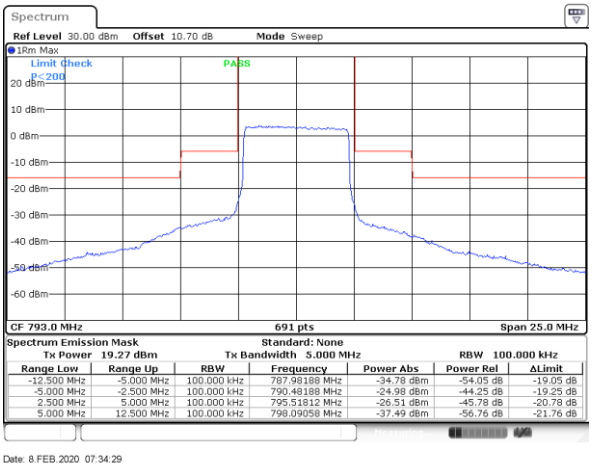
LTE Band 14 / 5MHz / 16QAM

Middle Channel / 1RB



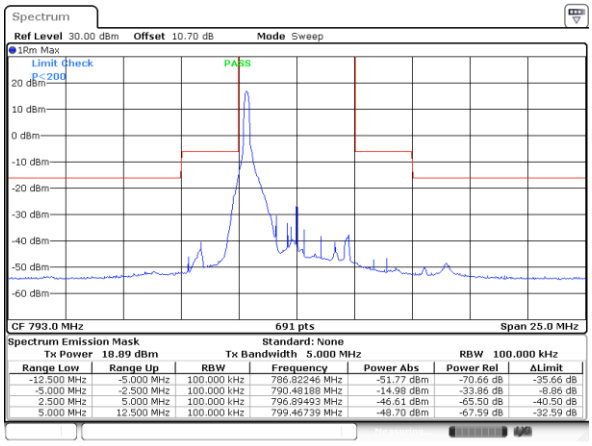


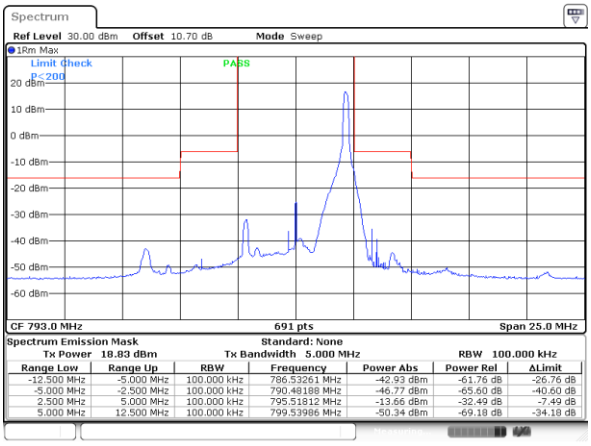
Middle Channel / Full RB



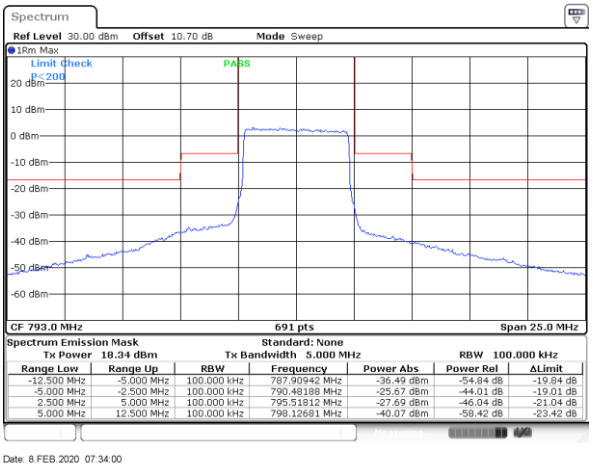
LTE Band 14 / 5MHz / 64QAM

Middle Channel / 1RB



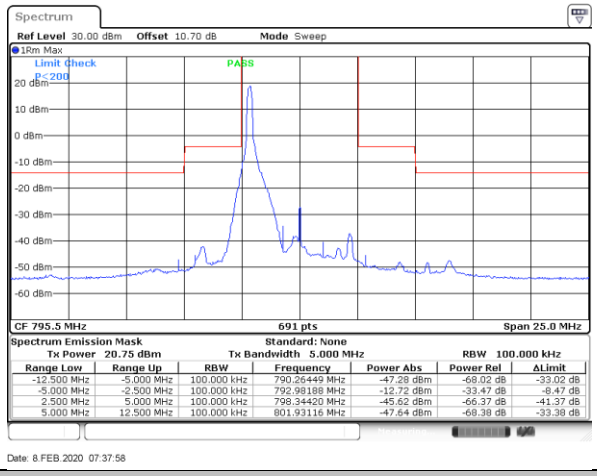


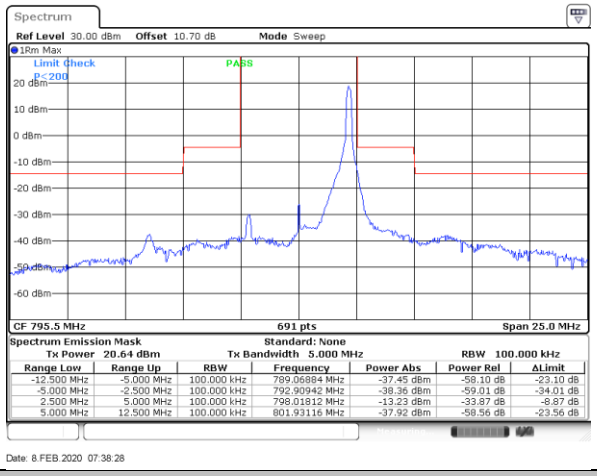
Middle Channel / Full RB



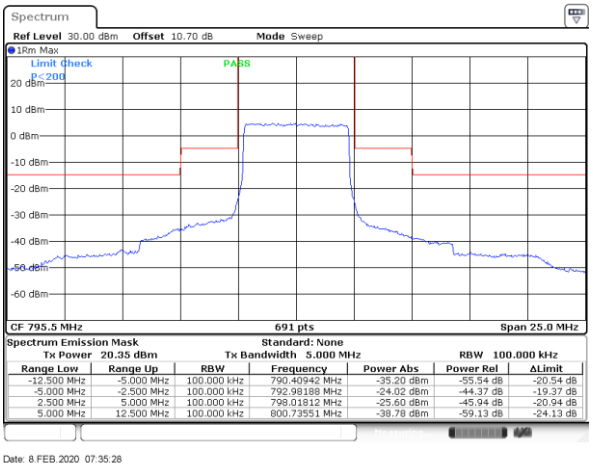
LTE Band 14 / 5MHz / QPSK

Highest Channel / 1RB



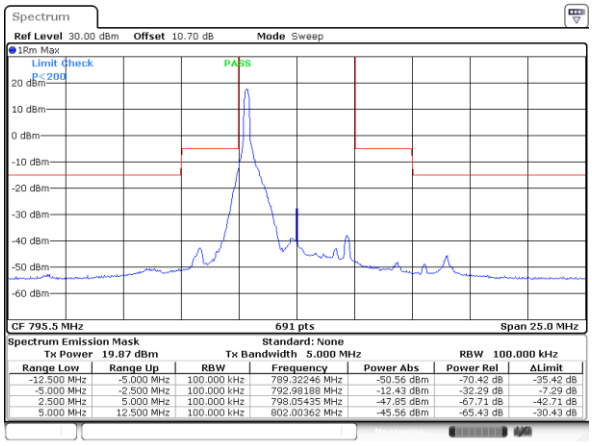


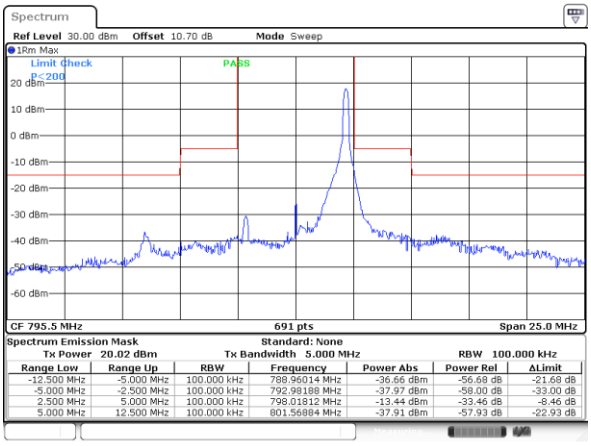
Highest Channel / Full RB



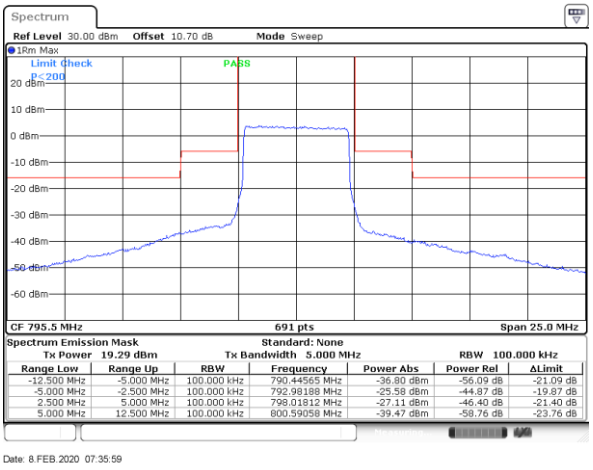
LTE Band 14 / 5MHz / 16QAM

Highest Channel / 1RB



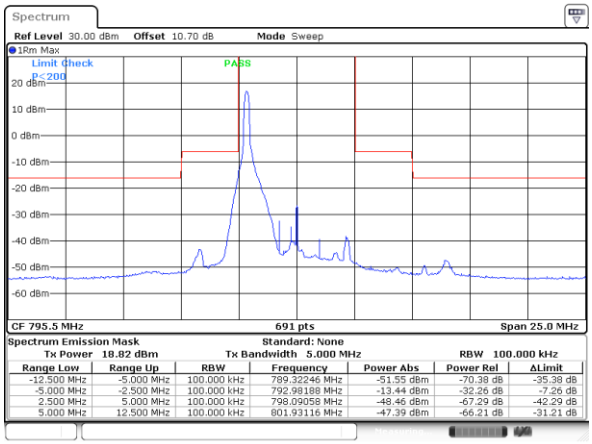


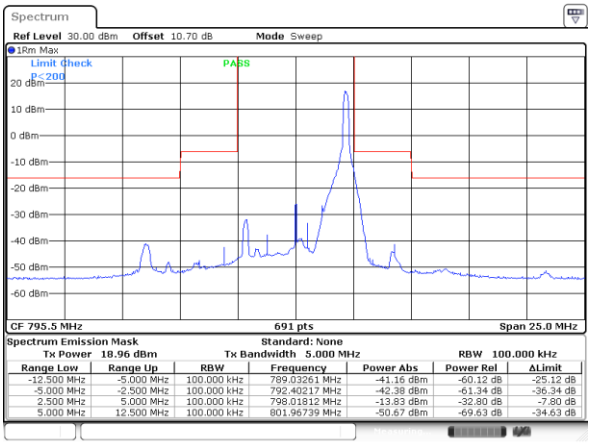
Highest Channel / Full RB



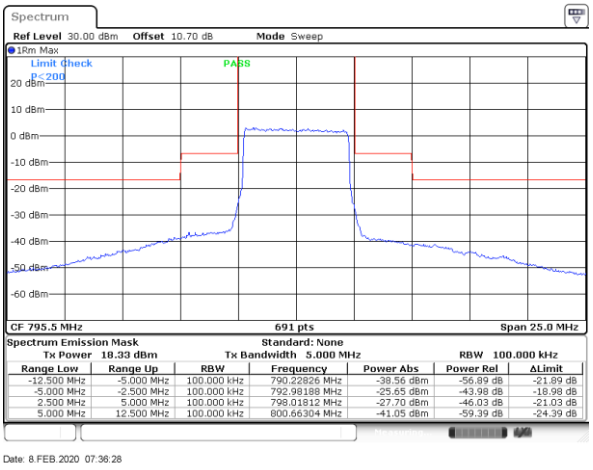
LTE Band 14 / 5MHz / 64QAM

Highest Channel / 1RB



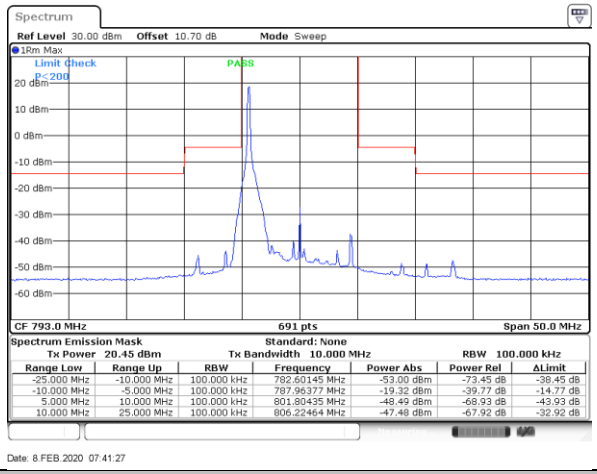


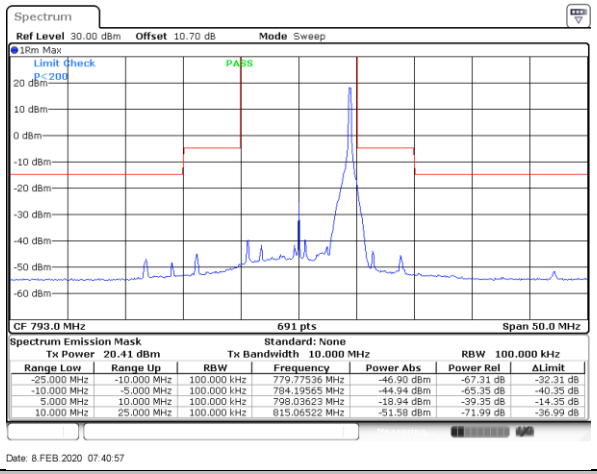
Highest Channel / Full RB



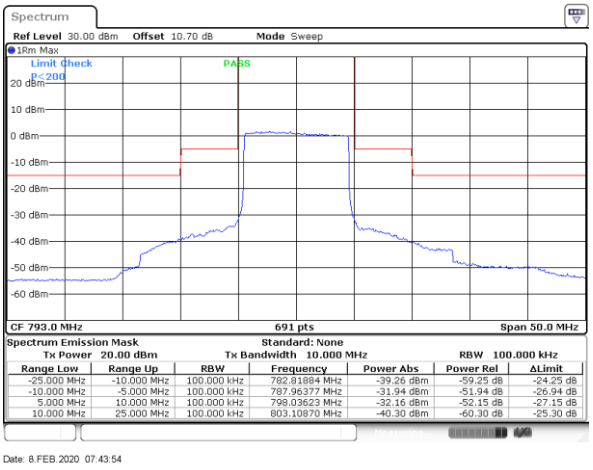
LTE Band 14 / 10MHz / QPSK

Middle Channel / 1RB



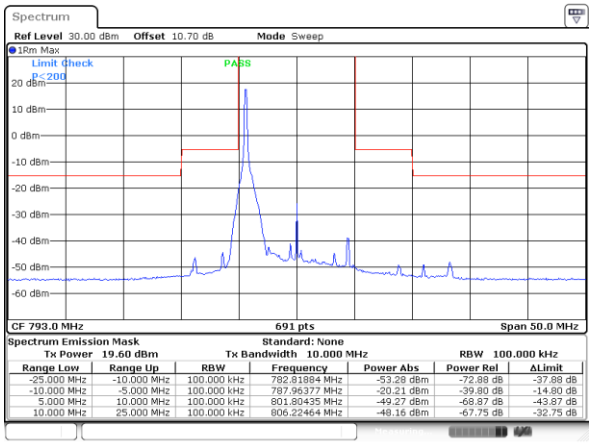


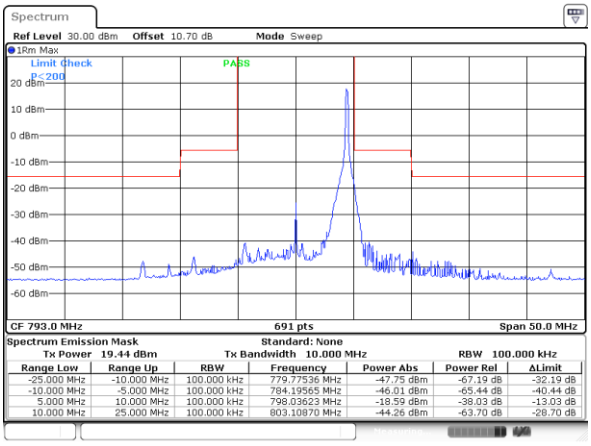
Middle Channel / Full RB



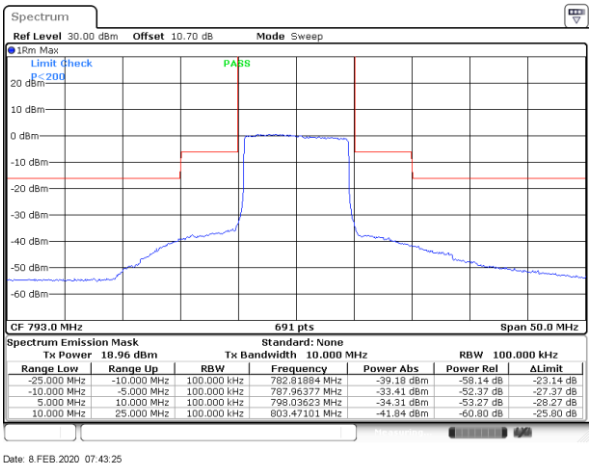
LTE Band 14 / 10MHz / 16QAM

Middle Channel / 1RB



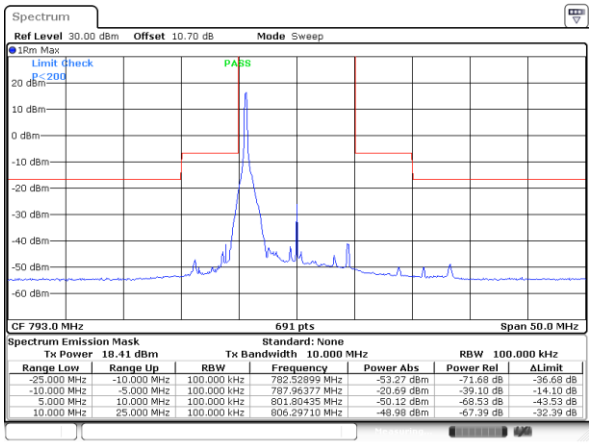


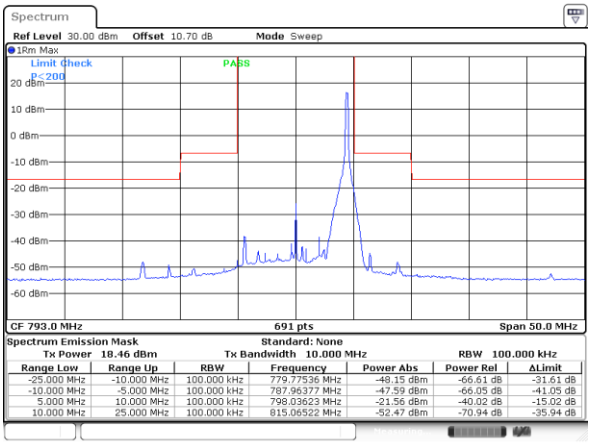
Middle Channel / Full RB



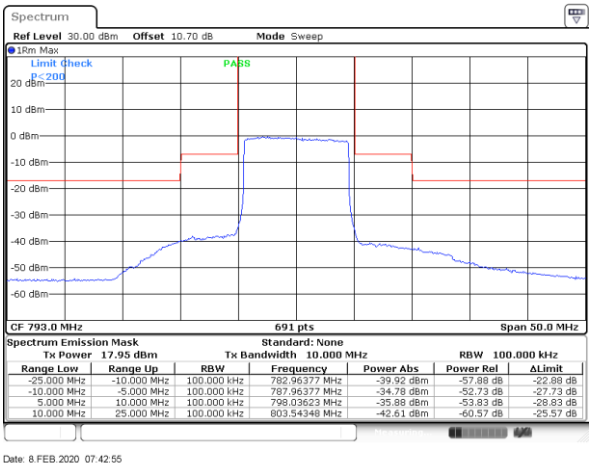
LTE Band 14 / 10MHz / 64QAM

Middle Channel / 1RB





Middle Channel / Full RB



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	0.0111	PASS
40	Normal Voltage	0.0158	
30	Normal Voltage	0.0134	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0144	
0	Normal Voltage	0.0124	
-10	Normal Voltage	0.0057	
-20	Normal Voltage	0.0039	
-30	Normal Voltage	0.0131	
20	Maximum Voltage	0.0068	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0144	

Note:

1. Normal Voltage =4 V. ; Battery End Point (BEP) =3.7 V. ; Maximum Voltage =4.3 V.
2. Note: The frequency fundamental emissions stay within the authorized frequency block.

Appendix B. Test Results of Radiated Test

Field Strength of Spurious Radiated

LTE Band 14 / 5MHz / QPSK									
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1584	-58.74	-42.15	-16.59	-72.22	-64.11	0.90	8.42	H
	2371	-55.99	-13	-42.99	-74.39	-63.24	1.12	10.52	H
	3162	-54.44	-13	-41.44	-74.74	-62.68	1.30	11.69	H
	1584	-60.34	-42.15	-18.19	-73.35	-65.71	0.90	8.42	V
	2371	-55.52	-13	-42.52	-73.72	-62.77	1.12	10.52	V
	3162	-54.02	-13	-41.02	-74.76	-62.26	1.30	11.69	V
Middle	1584	-57.92	-42.15	-15.77	-71.40	-63.29	0.90	8.42	H
	2376	-55.67	-13	-42.67	-74.06	-62.92	1.12	10.53	H
	3176	-54.47	-13	-41.47	-74.80	-62.74	1.30	11.72	H
	1584	-60.32	-42.15	-18.17	-73.33	-65.69	0.90	8.42	V
	2376	-56.29	-13	-43.29	-74.49	-63.54	1.12	10.53	V
	3176	-54.09	-13	-41.09	-74.88	-62.36	1.30	11.72	V
Highest	1592	-58.14	-42.15	-15.99	-71.56	-63.54	0.90	8.45	H
	2384	-55.67	-13	-42.67	-74.00	-62.93	1.12	10.54	H
	3184	-54.31	-13	-41.31	-74.65	-62.60	1.30	11.74	H
	1592	-60.90	-42.15	-18.75	-73.91	-66.30	0.90	8.45	V
	2384	-56.07	-13	-43.07	-74.27	-63.33	1.12	10.54	V
	3184	-53.94	-13	-40.94	-74.76	-62.23	1.30	11.74	V

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

LTE Band 14 / 10MHz / QPSK									
Channel	Frequency (MHz)	ERP (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	1584	-58.32	-42.15	-16.17	-72.1	-63.69	0.90	8.42	H
	2376	-55.49	-13	-42.49	-73.88	-62.74	1.12	10.53	H
	3176	-54.59	-13	-41.59	-74.92	-62.86	1.30	11.72	H
	1584	-60.62	-42.15	-18.47	-73.63	-65.99	0.90	8.42	V
	2376	-56.10	-13	-43.10	-74.3	-63.35	1.12	10.53	V
	3176	-50.10	-13	-37.10	-74.89	-58.37	1.30	11.72	V

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