FCC RADIO TEST REPORT

FCC ID	:	**J9CQSIP7180**
Equipment	:	**7c Modular Platform**
Brand Name	:	**Qualcomm**
Model Name	:	**QSIP7180**
Applicant	:	**Qualcomm Technologies, Inc. 5775 Morehouse Dr.San Diego, CA 92121-1714 (USA)**
Manufacturer	:	**Qualcomm Technologies, Inc. 5775 Morehouse Dr.San Diego, CA 92121-1714 (USA)**
Standard	:	**FCC 47 CFR Part 2, 90(R)**

The product was received on Apr. 20, 2020 and testing was started from May 23, 2020 and completed on Aug. 25, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FG042002D	01	Initial issue of report	Sep. 17, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
	§90.542 (a)(7)	Effective Radiated Power	Pass	-
3.3	-	Peak-to-Average Ratio	Reporting only	-
3.4	§2.1049	Occupied Bandwidth	Reporting only	-
3.5	§2.1053 §90.543 (e)(2)	Conducted Band Edge Measurement	Pass	-
3.6	§2.1051 §90.210 (n)	Emission Mask	Pass	-
3.7	§2.1053 §90.543 (e)(3)	Conducted Spurious Emission	Pass	-
3.8	§2.1055 §90.539 (e)	Frequency Stability Temperature & Voltage	Pass	-
4.2	§90.542 (a)(7)	Effective Radiated Power	Pass	-
4.3	§2.1053 §90.543 (e)(3) §90.543 (f)	Radiated Spurious Emission	Pass	Under limit 10.40 dB at 1576.000 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.

Reviewed by: Wii Chang

Report Producer: Celery Wei

1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ac, Wi-Fi 5GHz 802.11a/n/ac and GNSS

Product Specification subjective to this standard	
Antenna Type / Gain	**WWAN:** WCDMA Band 1: 5.0 dBi WCDMA Band 8: 0.8 dBi LTE Band 1: 5.0 dBi LTE Band 3: 5.8 dBi LTE Band 7: 5.4 dBi LTE Band 8: 0.8 dBi LTE Band 20: 1.7 dBi LTE Band 28 : 0.9 dBi LTE Band 34 : 3.8 dBi LTE Band 38 : 5.2 dBi LTE Band 40 : 5.5 dBi

1.2 Modification of EUT

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

1.3 Testing Site

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.**
	TH05-HY
Test Engineer	Bryant Liu
Temperature	22~24℃
Relative Humidity	51~55%

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
Test Engineer	Jack Cheng, Lance Chiang and Chuan Chu
Temperature	22.6~26.2℃
Relative Humidity	55.7~67.8%

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190 and TW0007

1.4 Applied Standards

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

- ANSI C63.26-2015
- FCC 47 CFR Part 2, Part 90(R)
- ANSI / TIA-603-E
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- FCC KDB 414788 D01 Radiated Test Site 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.
3. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

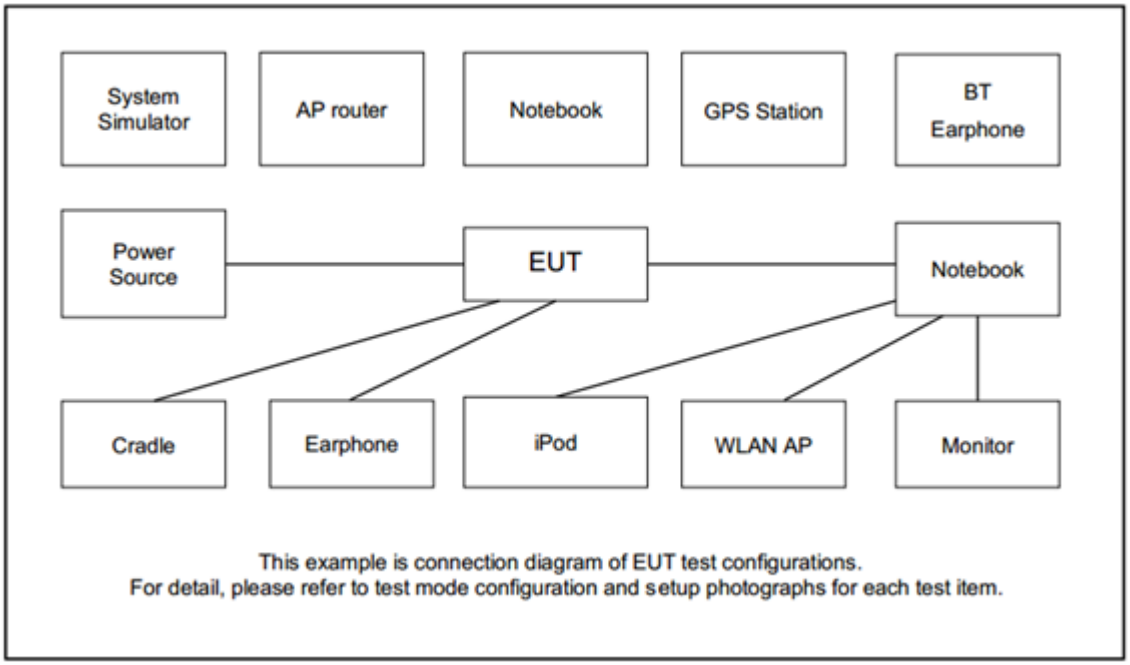
2.1 Test Mode

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.

For radiated measurement, pre-scanned in two degrees, Ant. 0° and 90°. The worst cases (Ant. 0°) were recorded in this report.

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	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	v
Conducted Band Edge	14	-	-	v	v	-	-	v	v	v	v		v	v		v
Emission Mask	14	-	-	v	v	-	-	v	v	v	v		v	v	v	v
Conducted Spurious Emission	14	-	-	v	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	v
Radiated Spurious Emission	14	Worst Case												v	v	v
Remark	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	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

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

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

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

Example :

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

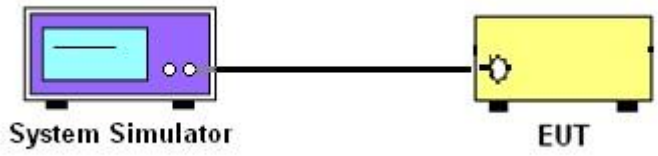
3 Conducted Test Items

3.1 Measuring Instruments

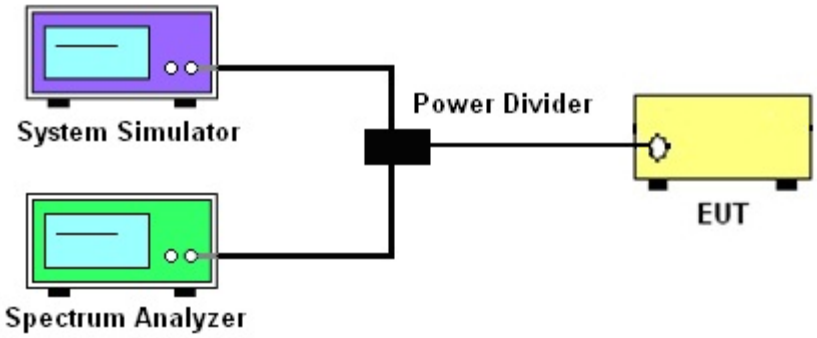
See list of measuring instruments of this test report.

3.1.1 Test Setup

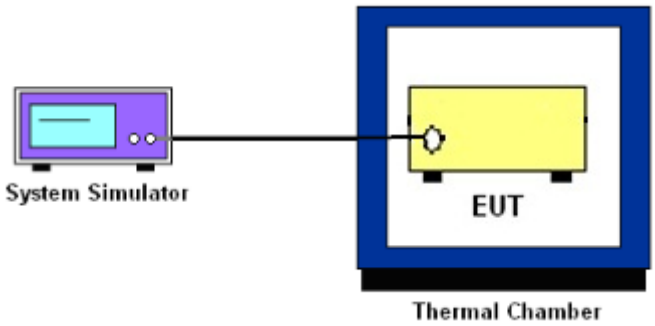
3.1.2 Conducted Output Power



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 Measurement and ERP

3.2.1 Description of the Conducted Output Power Measurement and ERP Measurement

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 transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.3 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

The testing follows ANSI C63.26-2015 Section 5.2.6

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

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

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.

3.5 Conducted Band Edge

3.5.1 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.

3.5.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

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)

3.6 Emission Mask

3.6.1 Description of Emissions Mask Measurement

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

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 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.

3.7 Conducted Spurious Emission

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 10^{th} harmonic.

3.7.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and base station via 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 RBW = 1MHz, VBW = 3MHz.
6. Set spectrum analyzer with RMS detector.
7. Taking the record of maximum spurious emission.
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)

3.8 Frequency Stability

3.8.1 Description of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.8.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was set up in the thermal chamber and connected with the base station.
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.

3.8.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was placed in a temperature chamber at 20±5° C and connected with the base station.
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.

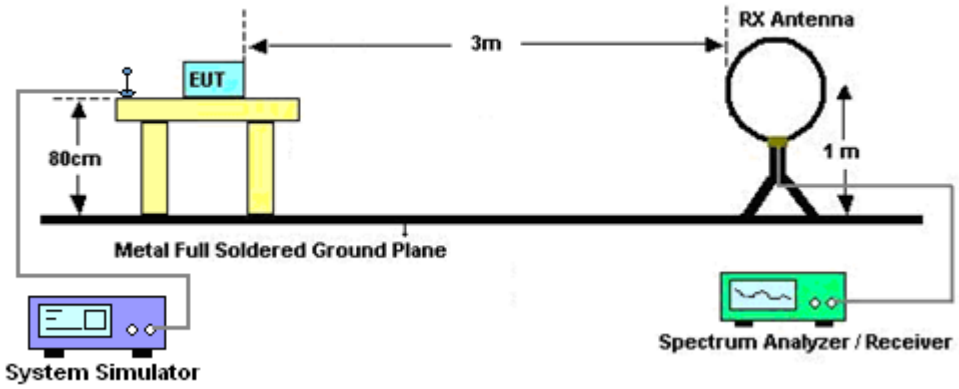
4 Radiated Test Items

4.1 Measuring Instruments

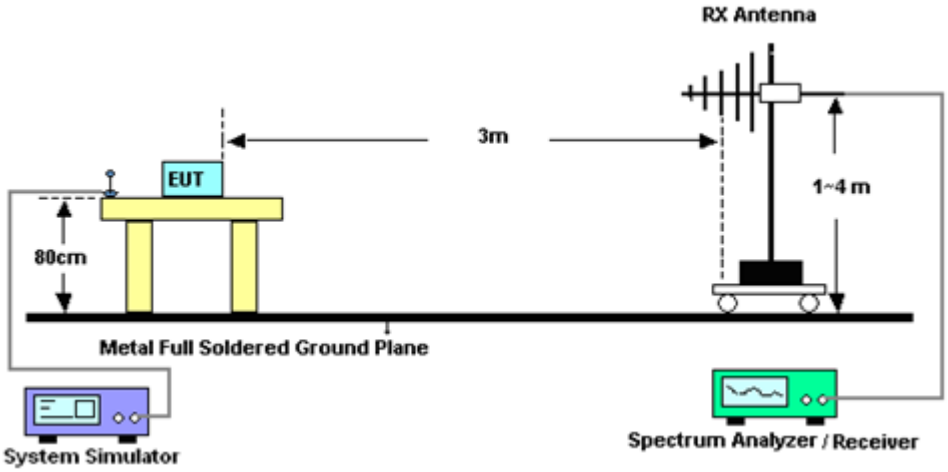
See list of measuring instruments of this test report.

4.1.1 Test Setup

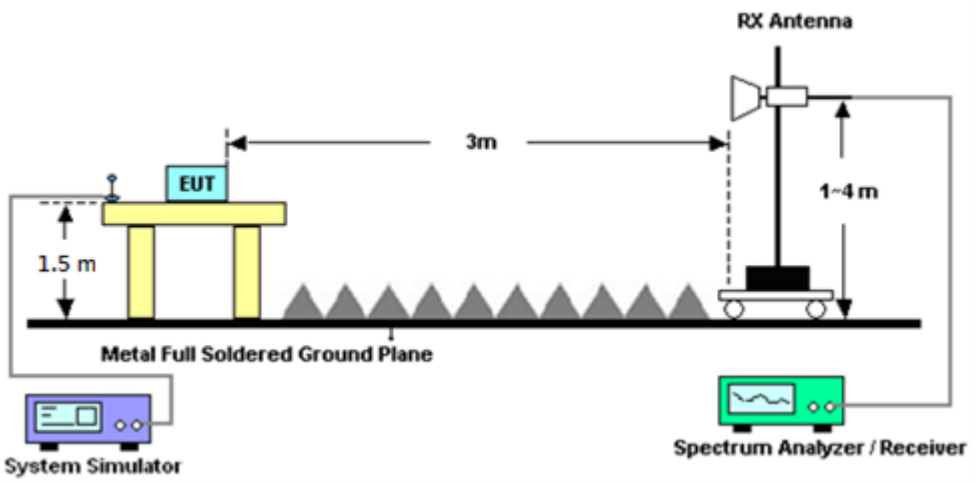
For radiated emissions below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

Note:

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

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

4.2 Effective Radiated Power

4.2.1 Description of the ERP Measurement

Effective radiated power output measurements by substitution method according to ANSI / TIA-603-E, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v03r01. The ERP of mobile transmitters must not exceed 3 Watts for Part 90(R).

4.2.2 Test Procedures

1. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01 v03r01.
2. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, EIRP = LVL + Correction factor and ERP = EIRP - 2.15. Take the record of the output power at substitution antenna.

	LTE Average					
LTE BW	1.4M	3M	5M	10M	15M	20M
Span	3MHz	6MHz	10MHz	20MHz	30MHz	40MHz
RBW	30kHz	100kHz	100kHz	300kHz	300kHz	300kHz
VBW	100kHz	300kHz	300kHz	1MHz	1MHz	1MHz
Detector	RMS	RMS	RMS	RMS	RMS	RMS
Trace	Average	Average	Average	Average	Average	Average
Average Type	Power	Power	Power	Power	Power	Power
Sweep Count	100	100	100	100	100	100

4.3 Radiated Spurious Emission

4.3.1 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.

4.3.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 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.
11. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Dec. 26, 2019	May 28, 2020~ Aug. 14, 2020	Dec. 25, 2020	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01 N-06	37059 & 01	30MHz~1GHz	Oct. 12, 2019	May 28, 2020~ Aug. 14, 2020	Oct. 11, 2020	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1328	1GHz~18GHz	Nov. 14, 2019	May 28, 2020~ Aug. 14, 2020	Nov. 13, 2020	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 25, 2020	May 28, 2020~ Aug. 14, 2020	Mar. 24, 2021	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	Mar. 26, 2020	May 28, 2020~ Aug. 14, 2020	Mar. 25, 2021	Radiation (03CH12-HY)
Preamplifier	Jet-Power	JPA0118-55-303K	1710001800054002	1GHz~18GHz	Feb. 07, 2020	May 28, 2020~ Aug. 14, 2020	Feb. 06, 2021	Radiation (03CH12-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	103738	10Hz~30GHz	May 14, 2020	May 28, 2020~ Aug. 14, 2020	May 13, 2021	Radiation (03CH12-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101756	10Hz~40GHz	Dec. 24, 2019	May 28, 2020~ Aug. 14, 2020	Dec. 23, 2020	Radiation (03CH12-HY)
Signal Generator	Rohde & Schwarz	SMB100A	101107	100kHz~40GHz	Aug. 27, 2019	May 28, 2020~ Aug. 14, 2020	Aug. 26, 2020	Radiation (03CH12-HY)
Filter	Wainwright	WLKS1200-12SS	SN2	1.2GHz Low Pass Filter	Mar. 21, 2020	May 28, 2020~ Aug. 14, 2020	Mar. 20, 2021	Radiation (03CH12-HY)
Notch Filter	Wainwright	WRCT700/915-20/40-8SSK	SN1	700-915	Mar. 06, 2020	May 28, 2020~ Aug. 14, 2020	Mar. 05, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Dec. 12, 2019	May 28, 2020~ Aug. 14, 2020	Dec. 11, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 25, 2020	May 28, 2020~ Aug. 14, 2020	Feb. 24, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz~40GHz	Feb. 25, 2020	May 28, 2020~ Aug. 14, 2020	Feb. 24, 2021	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	May 28, 2020~ Aug. 14, 2020	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	May 28, 2020~ Aug. 14, 2020	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	May 28, 2020~ Aug. 14, 2020	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	May 28, 2020~ Aug. 14, 2020	N/A	Radiation (03CH12-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 15, 2019	May 23, 2020~ Aug. 24, 2020	Nov. 14, 2020	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃~90℃	Sep. 02, 2019	May 23, 2020~ Aug. 24, 2020	Sep. 01, 2020	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 09, 2019	May 23, 2020~ Aug. 24, 2020	Oct. 08, 2020	Conducted (TH05-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#A	1-18GHz	Jan. 13, 2020	May 23, 2020~ Aug. 24, 2020	Jan. 12, 2021	Conducted (TH05-HY)
Base Station	Anritsu	MT8820C	6201026480	-	Dec. 27, 2019	Jul. 19, 2020 ~ Aug. 25, 2020	Dec. 26, 2020	Conducted (TH05-HY)
Base Station	Anritsu	MT8821C	6201664755	-	Jul. 16, 2020	Jul. 19, 2020 ~ Aug. 25, 2020	Jul. 15, 2021	Conducted (TH05-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))	**3.07**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.21**

Appendix A. Test Results of Conducted Test

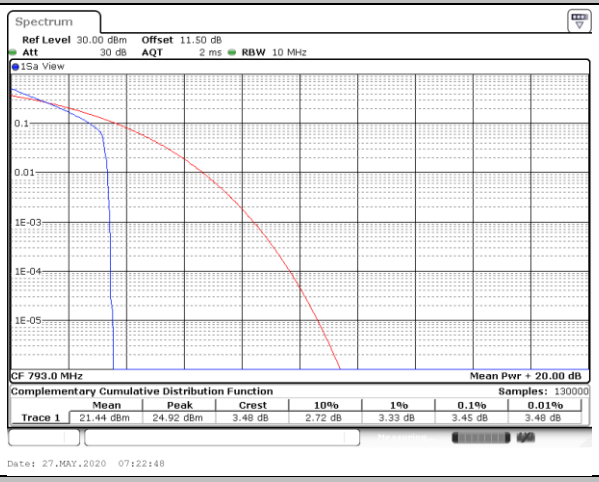
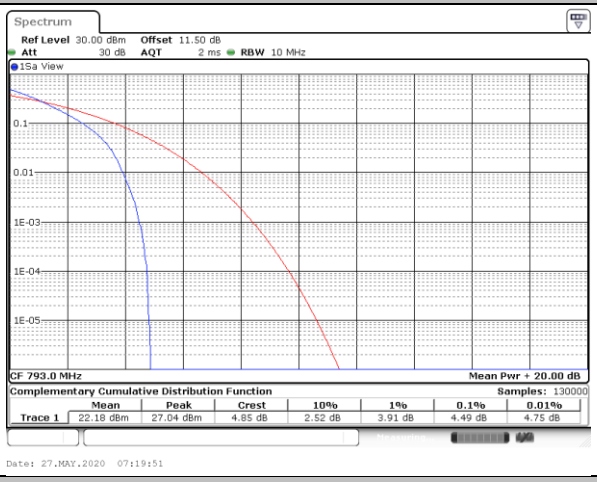
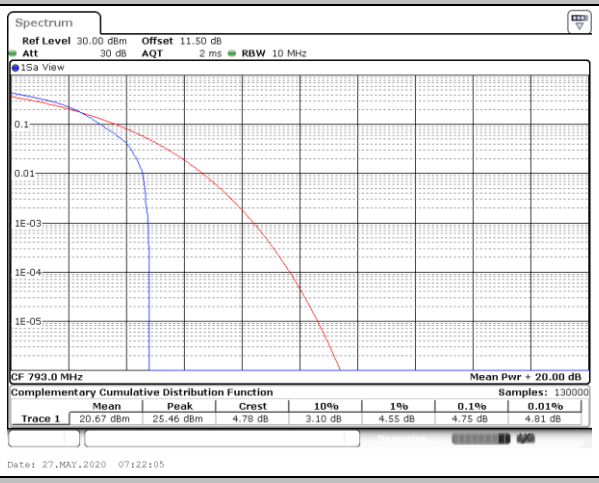
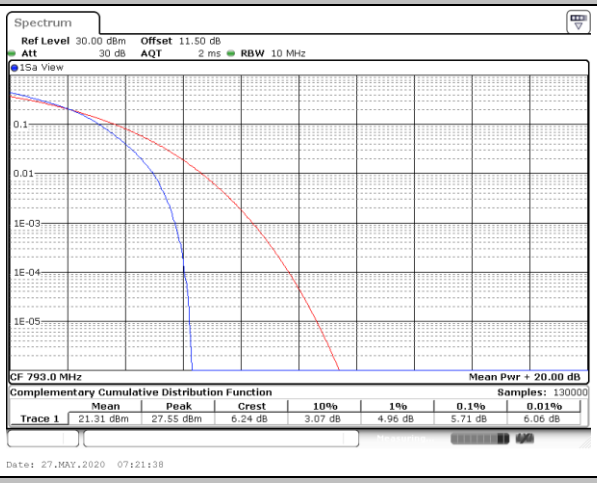
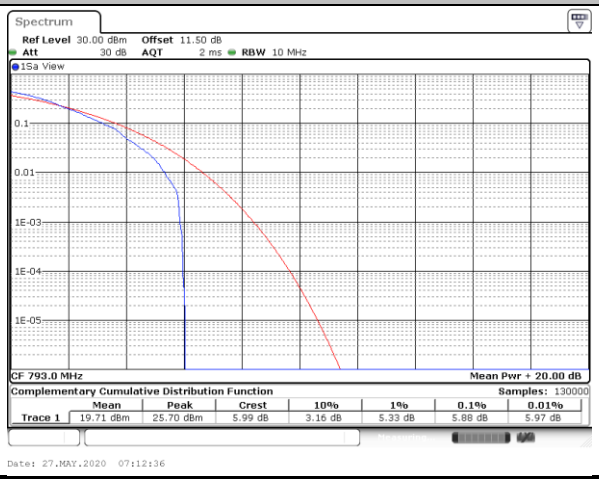
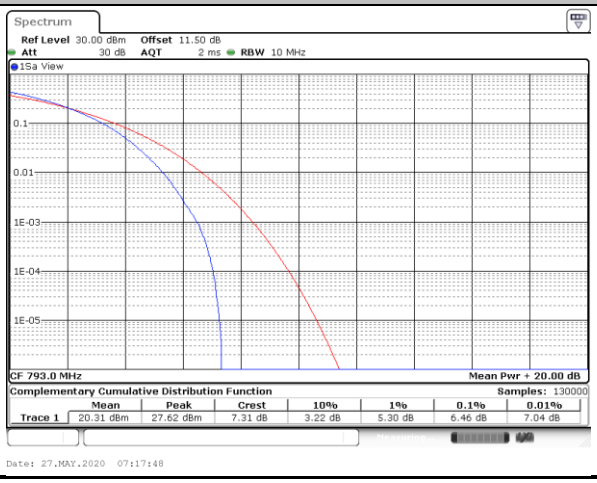
Conducted Output Power(Average power)

LTE Band 14 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	-	**23.64**	-
10	1	25			23.57	
10	1	49			23.60	
10	25	0			22.63	
10	25	12			22.60	
10	25	25			22.57	
10	50	0			22.63	
10	1	0	16-QAM		22.89	
10	1	25			22.91	
10	1	49			22.92	
10	25	0			21.77	
10	25	12			21.76	
10	25	25			21.72	
10	50	0			21.74	
10	1	0	64-QAM		21.86	
10	1	25			21.88	
10	1	49			21.88	
10	25	0			20.80	
10	25	12			20.80	
10	25	25			20.73	
10	50	0			20.77	
5	1	0	QPSK	23.46	23.58	23.47
5	1	12		23.38	23.49	23.41
5	1	24		23.33	23.51	23.46
5	12	0		22.44	22.56	22.46
5	12	7		22.32	22.51	22.40
5	12	13		22.35	22.53	22.41
5	25	0		22.38	22.56	22.45
5	1	0	16-QAM	22.78	22.88	22.76
5	1	12		22.75	22.85	22.71
5	1	24		22.81	22.91	22.79
5	12	0		21.65	21.76	21.62
5	12	7		21.47	21.66	21.55
5	12	13		21.56	21.71	21.59
5	25	0		21.51	21.69	21.59
5	1	0	64-QAM	21.60	21.77	21.62
5	1	12		21.70	21.88	21.80
5	1	24		21.67	21.84	21.77
5	12	0		20.63	20.77	20.63
5	12	7		20.62	20.71	20.65
5	12	13		20.55	20.69	20.62
5	25	0		20.63	20.73	20.61

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	3.45	4.49	4.75	5.71	
Highest CH	-	-	-	-	
Mode	LTE Band 14 / 10MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB			Result
Lowest CH	-	-	-	-	PASS
Middle CH	5.88	6.46	-	-	
Highest CH	-	-	-	-	

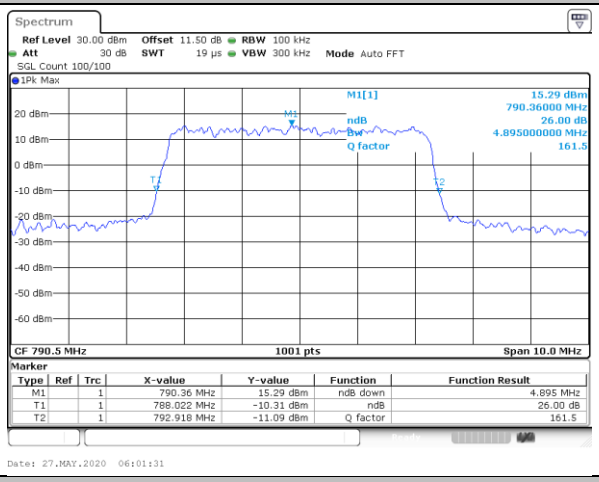
LTE Band 14 / 10MHz / QPSK	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
LTE Band 14 / 10MHz / 16QAM	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
LTE Band 14 / 10MHz / 64QAM	
Middle Channel / 1RB	**Middle Channel / Full RB**
	

26dB Bandwidth

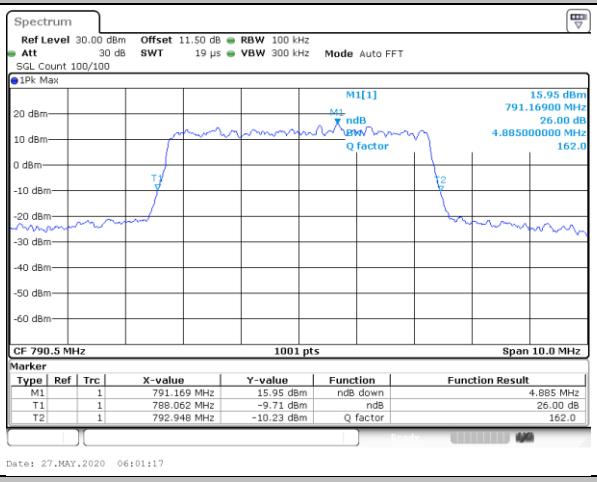
Mode	LTE Band 14 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.90	4.89	-	-	-	-	-	-
Middle CH	-	-	-	-	4.89	5.00	9.67	9.65	-	-	-	-
Highest CH	-	-	-	-	4.92	4.76	-	-	-	-	-	-
Mode	LTE Band 14 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.95	-	-	-	-	-	-	-
Middle CH	-	-	-	-	4.89	-	9.77	-	-	-	-	-
Highest CH	-	-	-	-	4.84	-	-	-	-	-	-	-

LTE Band 14

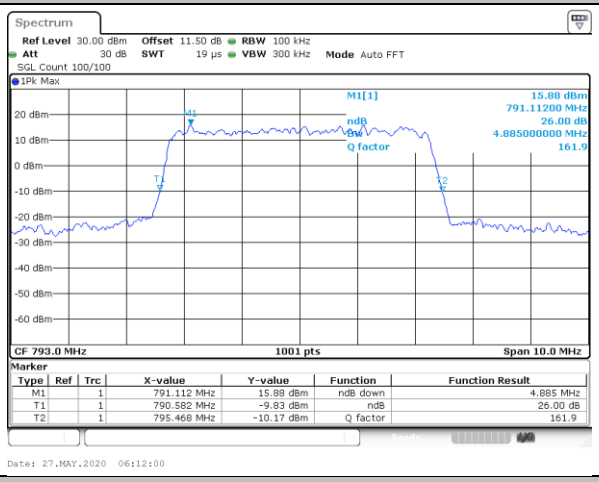
Lowest Channel / 5MHz / QPSK



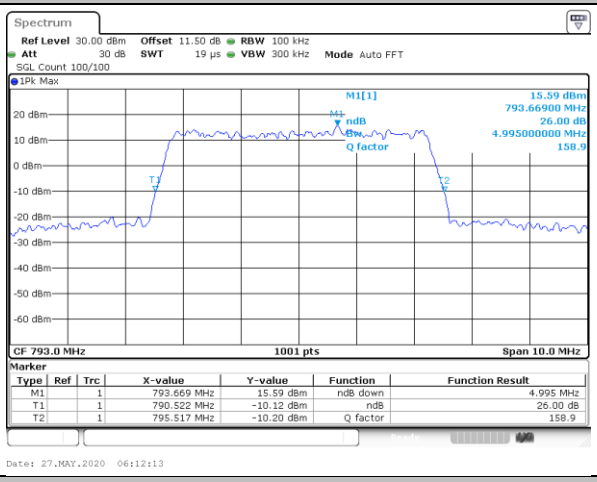
Lowest Channel / 5MHz / 16QAM



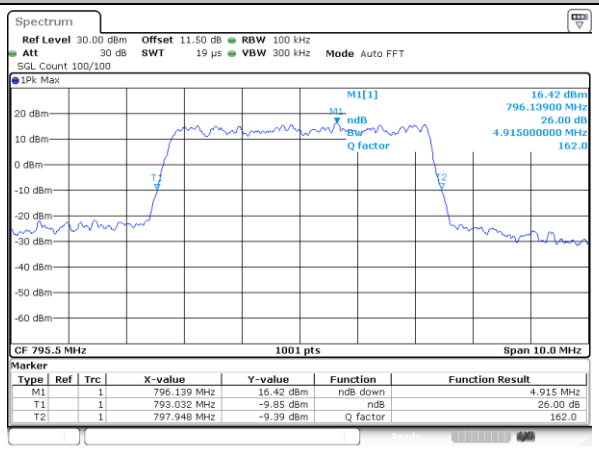
Middle Channel / 5MHz / QPSK



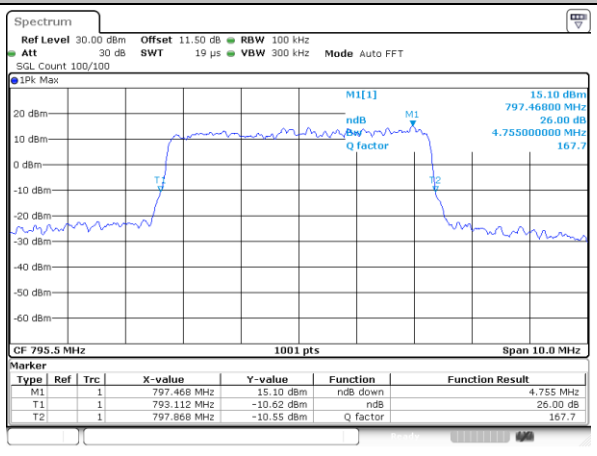
Middle Channel / 5MHz / 16QAM

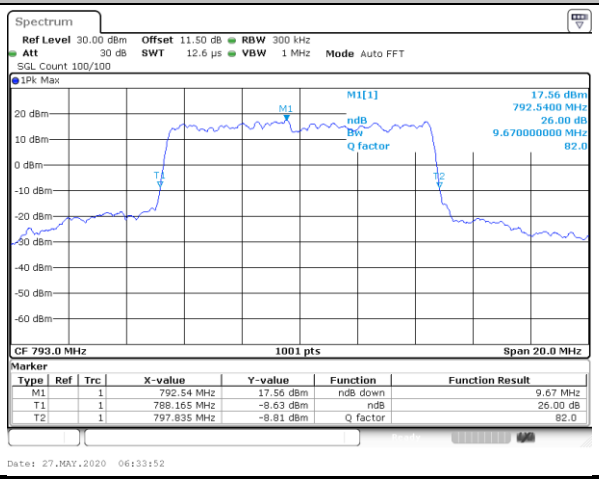
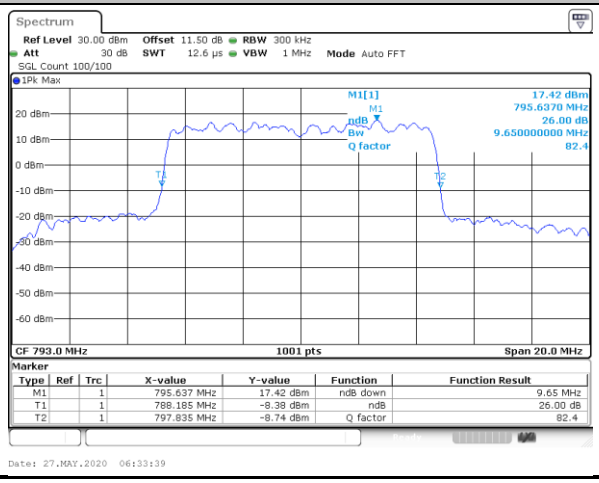


Highest Channel / 5MHz / QPSK



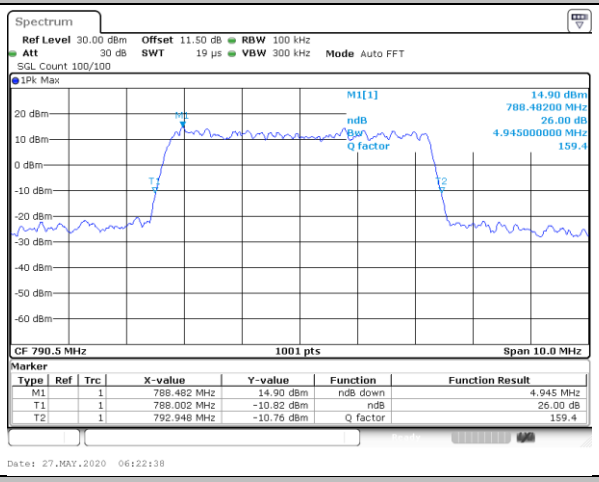
Highest Channel / 5MHz / 16QAM



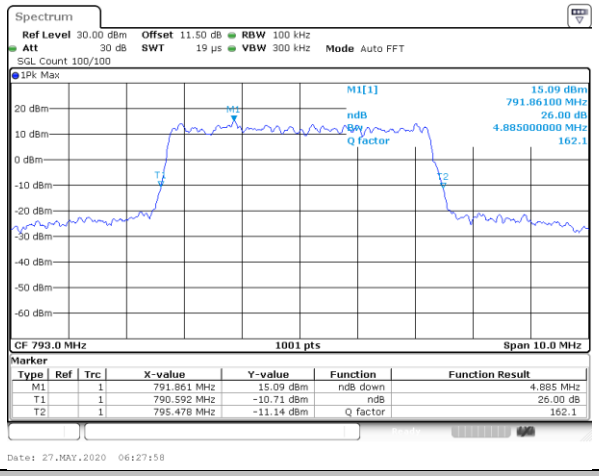
LTE Band 14	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**
	

LTE Band 14

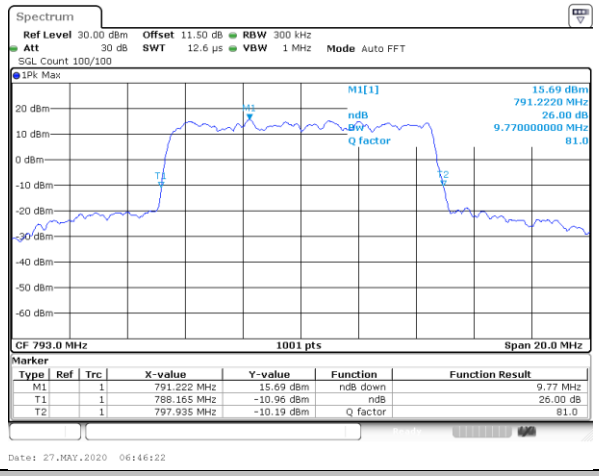
Lowest Channel / 5MHz / 64QAM



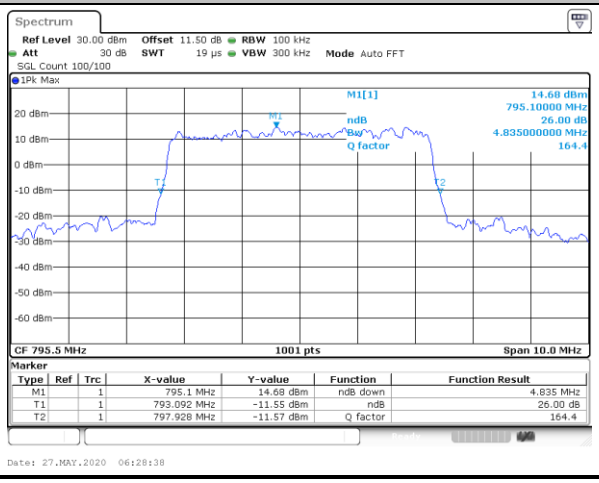
Middle Channel / 5MHz / 64QAM



Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM

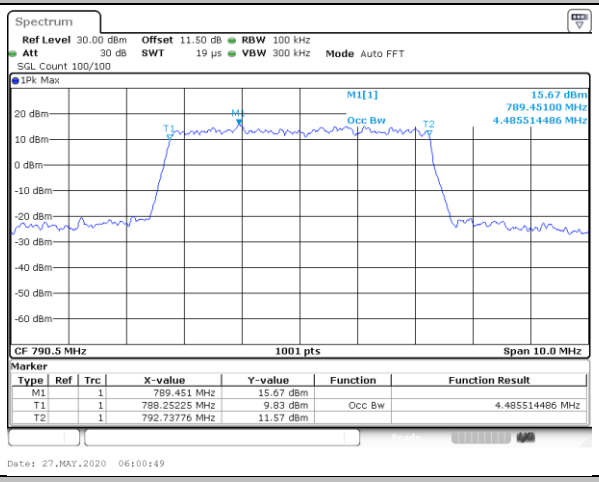


Occupied Bandwidth

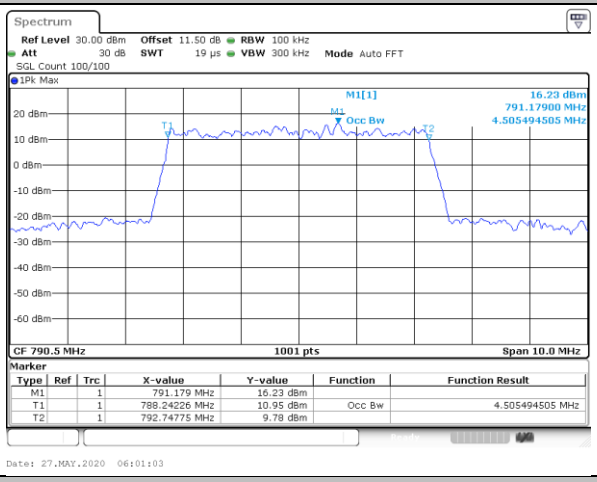
Mode	LTE Band 14 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.49	4.51	-	-	-	-	-	-
Middle CH	-	-	-	-	4.50	4.49	9.01	9.03	-	-	-	-
Highest CH	-	-	-	-	4.50	4.50	-	-	-	-	-	-
Mode	LTE Band 14 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.51	-	-	-	-	-	-	-
Middle CH	-	-	-	-	4.51	-	9.05	-	-	-	-	-
Highest CH	-	-	-	-	4.50	-	-	-	-	-	-	-

LTE Band 14

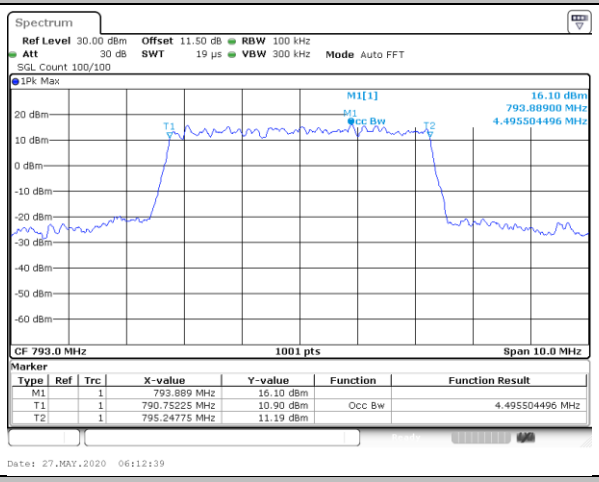
Lowest Channel / 5MHz / QPSK



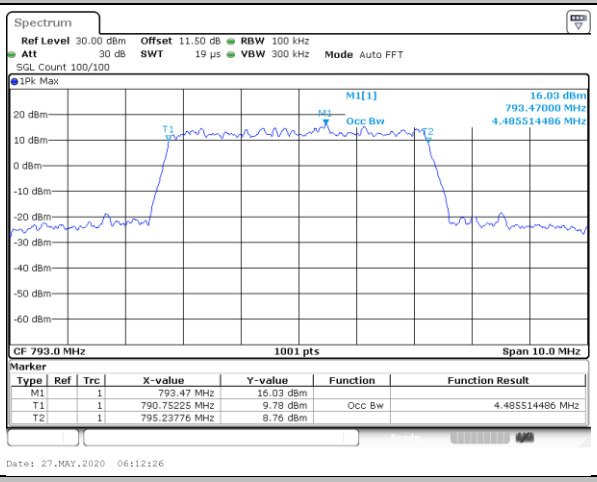
Lowest Channel / 5MHz / 16QAM



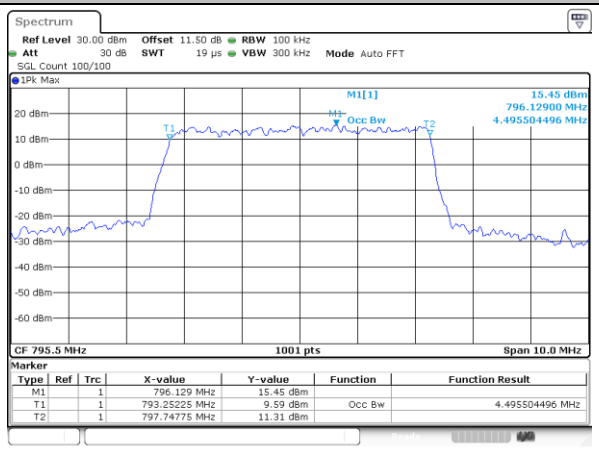
Middle Channel / 5MHz / QPSK



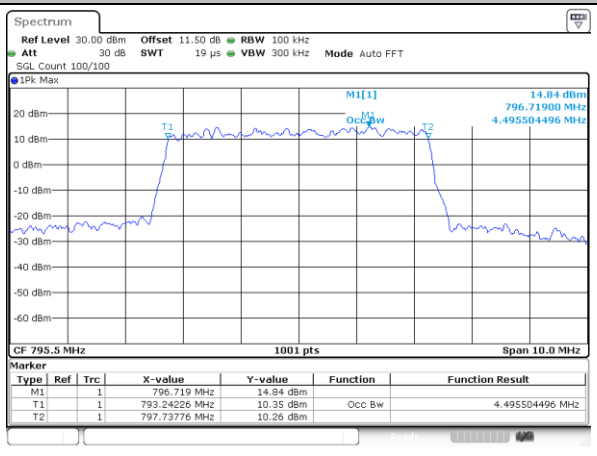
Middle Channel / 5MHz / 16QAM

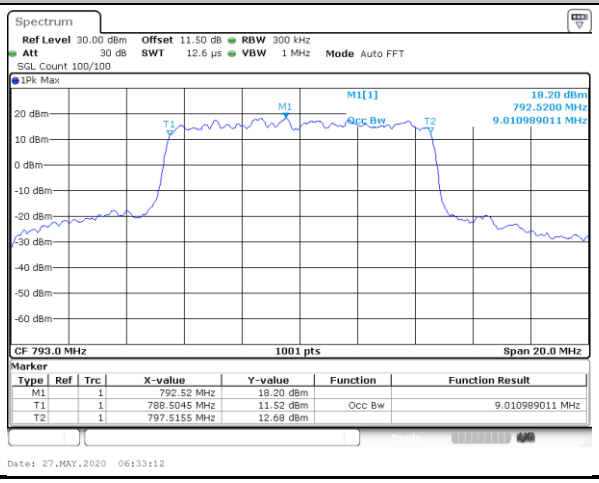
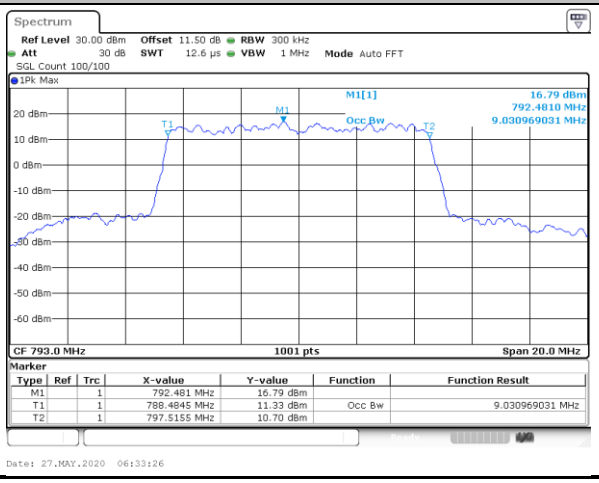


Highest Channel / 5MHz / QPSK



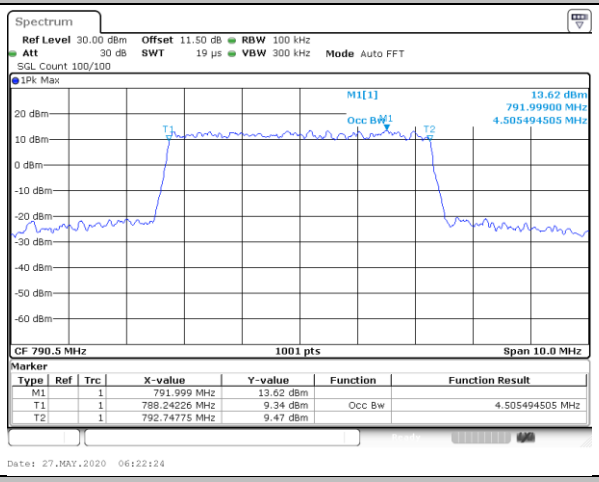
Highest Channel / 5MHz / 16QAM



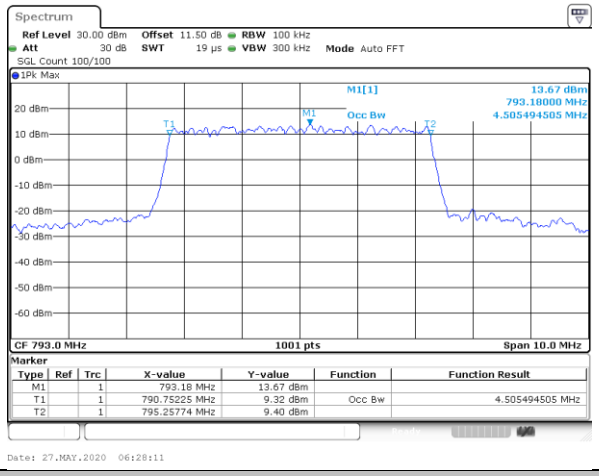
LTE Band 14	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**
	

LTE Band 14

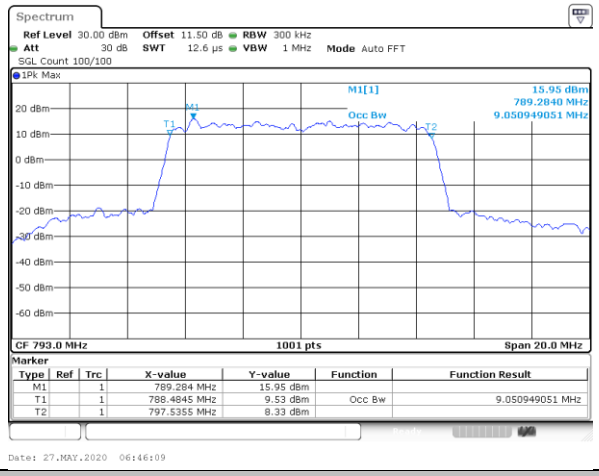
Lowest Channel / 5MHz / 64QAM



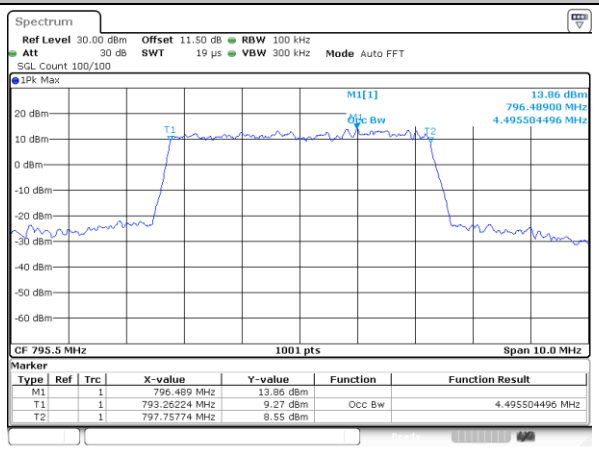
Middle Channel / 5MHz / 64QAM



Middle Channel / 10MHz / 64QAM



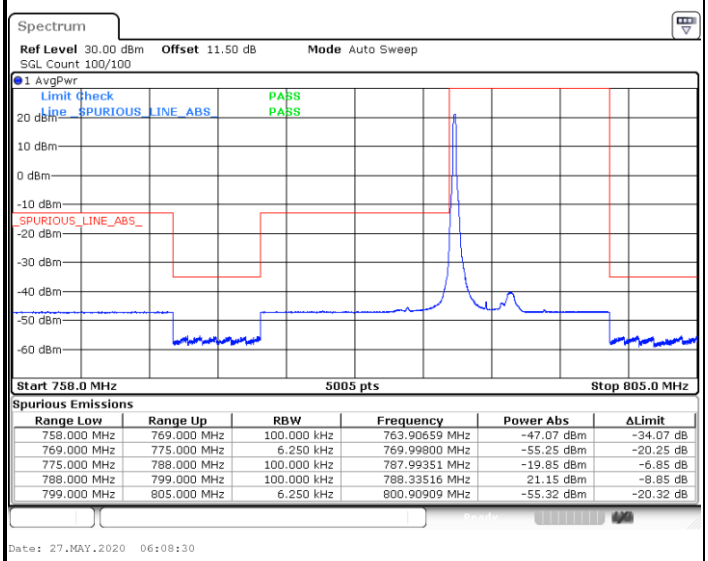
Highest Channel / 5MHz / 64QAM



Conducted Band Edge

LTE Band 14 / 5MHz / QPSK

Lowest Band Edge / 1 RB

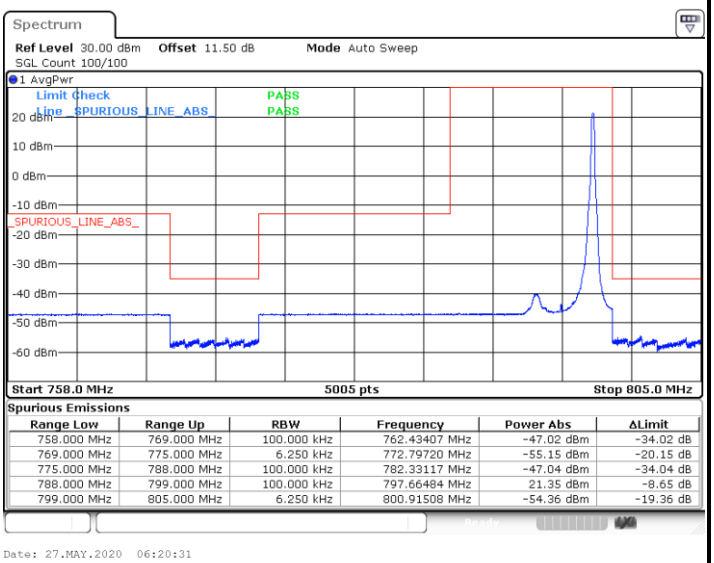


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	763.90659 MHz	-47.07 dBm	-34.07 dB
769.000 MHz	775.000 MHz	6.250 kHz	769.99800 MHz	-55.25 dBm	-20.25 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-19.85 dBm	-6.85 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.33516 MHz	21.15 dBm	-8.85 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.90909 MHz	-55.32 dBm	-20.32 dB

Date: 27.MAY.2020 06:08:30

Highest Band Edge / 1 RB

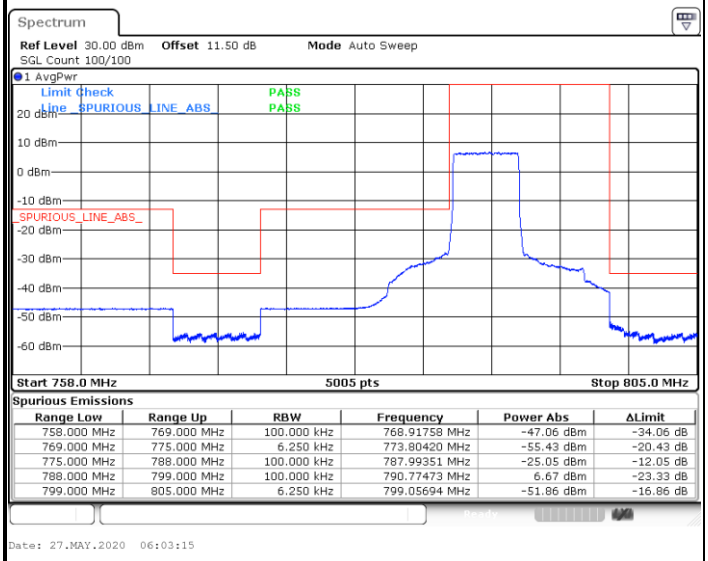


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	762.43407 MHz	-47.02 dBm	-34.02 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.79720 MHz	-55.15 dBm	-20.15 dB
775.000 MHz	788.000 MHz	100.000 kHz	782.33117 MHz	-47.04 dBm	-34.04 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.66484 MHz	21.35 dBm	-8.65 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.91508 MHz	-54.36 dBm	-19.36 dB

Date: 27.MAY.2020 06:20:31

Lowest Band Edge / Full RB

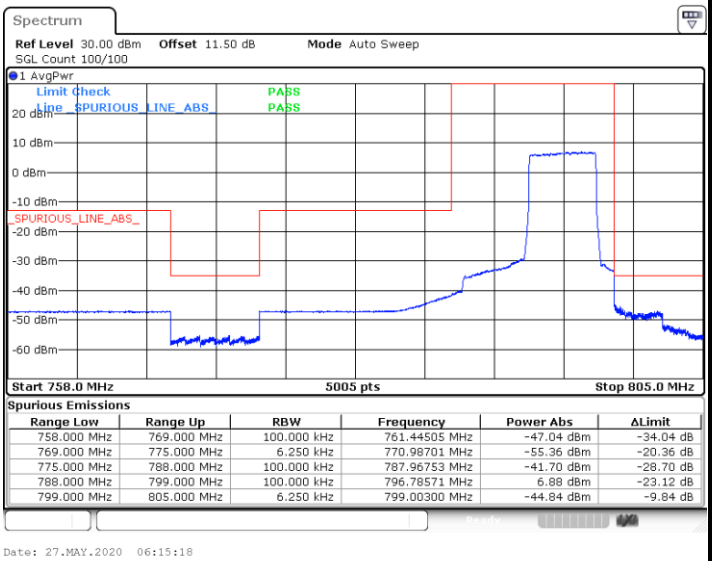


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	768.91758 MHz	-47.06 dBm	-34.06 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.80420 MHz	-55.43 dBm	-20.43 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-25.05 dBm	-12.05 dB
788.000 MHz	799.000 MHz	100.000 kHz	790.77473 MHz	6.67 dBm	-23.33 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.05694 MHz	-51.86 dBm	-16.86 dB

Date: 27.MAY.2020 06:03:15

Highest Band Edge / Full RB



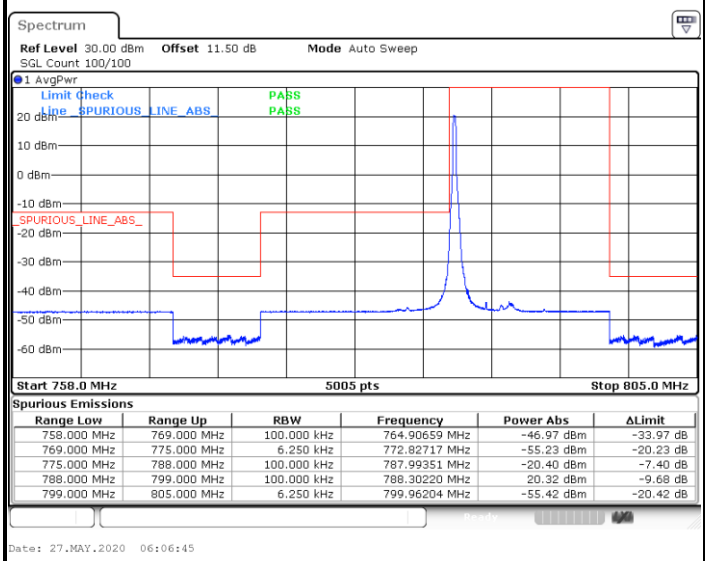
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	761.44505 MHz	-47.04 dBm	-34.04 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.98701 MHz	-55.36 dBm	-20.36 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.96753 MHz	-41.70 dBm	-28.70 dB
788.000 MHz	799.000 MHz	100.000 kHz	796.78571 MHz	6.88 dBm	-23.12 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.00300 MHz	-44.84 dBm	-9.84 dB

Date: 27.MAY.2020 06:15:18

LTE Band 14 / 5MHz / 16QAM

Lowest Band Edge /1 RB

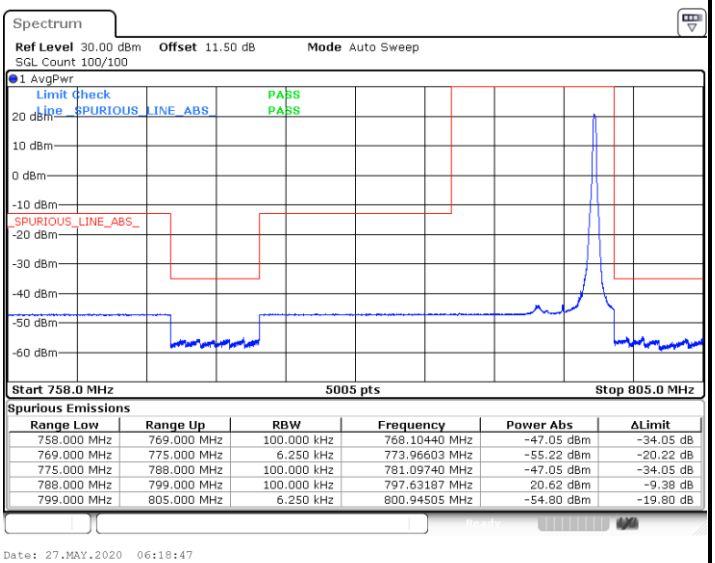


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	764.90659 MHz	-46.97 dBm	-33.97 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.82717 MHz	-55.23 dBm	-20.23 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-20.40 dBm	-7.40 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.30220 MHz	20.32 dBm	-9.68 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.96204 MHz	-55.42 dBm	-20.42 dB

Date: 27.MAY.2020 06:06:45

Highest Band Edge / 1 RB

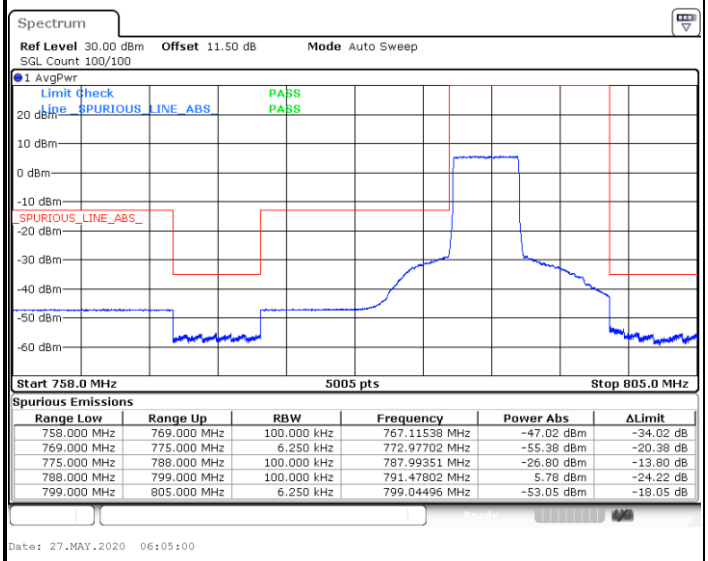


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	768.10440 MHz	-47.05 dBm	-34.05 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.96603 MHz	-55.22 dBm	-20.22 dB
775.000 MHz	788.000 MHz	100.000 kHz	781.09740 MHz	-47.05 dBm	-34.05 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.63187 MHz	20.62 dBm	-9.38 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.94505 MHz	-54.80 dBm	-19.80 dB

Date: 27.MAY.2020 06:18:47

Lowest Band Edge / Full RB

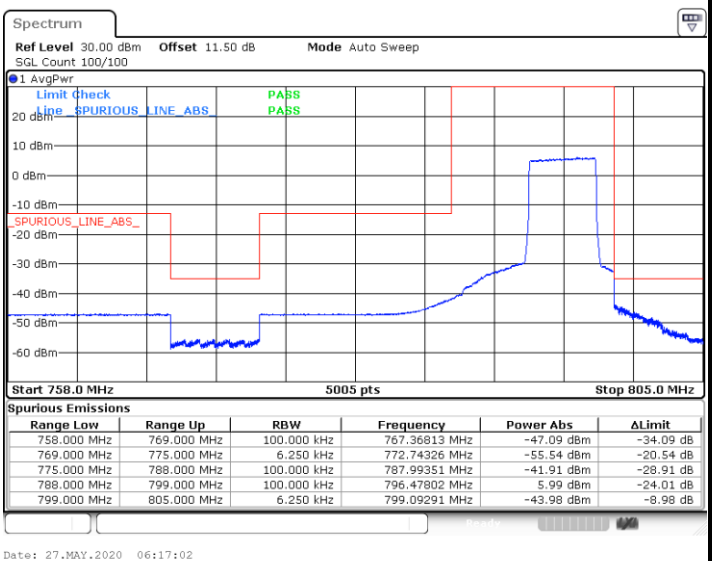


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	767.11538 MHz	-47.02 dBm	-34.02 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.97702 MHz	-55.38 dBm	-20.38 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-26.80 dBm	-13.80 dB
788.000 MHz	799.000 MHz	100.000 kHz	791.47802 MHz	5.78 dBm	-24.22 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.04496 MHz	-53.05 dBm	-18.05 dB

Date: 27.MAY.2020 06:05:00

Highest Band Edge / Full RB



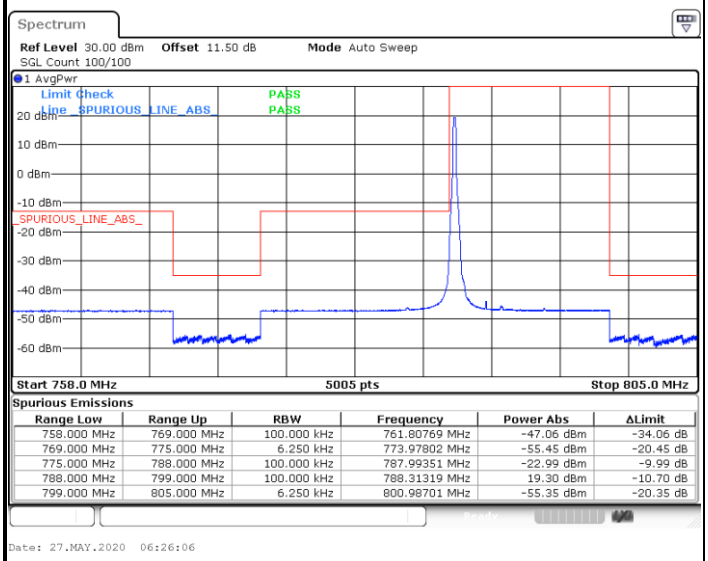
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	767.36813 MHz	-47.09 dBm	-34.09 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.74326 MHz	-55.54 dBm	-20.54 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-41.91 dBm	-28.91 dB
788.000 MHz	799.000 MHz	100.000 kHz	796.47802 MHz	5.99 dBm	-24.01 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.09291 MHz	-43.98 dBm	-8.98 dB

Date: 27.MAY.2020 06:17:02

LTE Band 14 / 5MHz / 64QAM

Lowest Band Edge / 1 RB

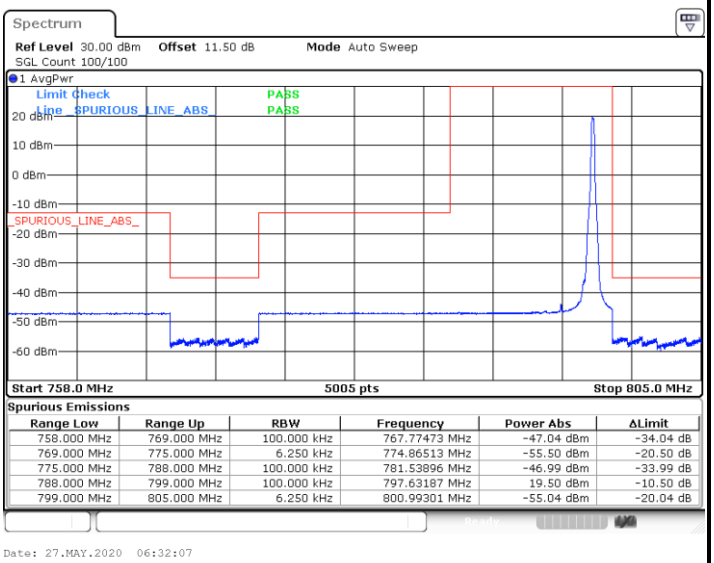


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	761.80769 MHz	-47.06 dBm	-34.06 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.97802 MHz	-55.45 dBm	-20.45 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-22.99 dBm	-9.99 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.31319 MHz	19.30 dBm	-10.70 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.98701 MHz	-55.35 dBm	-20.35 dB

Date: 27.MAY.2020 06:26:06

Highest Band Edge / 1 RB

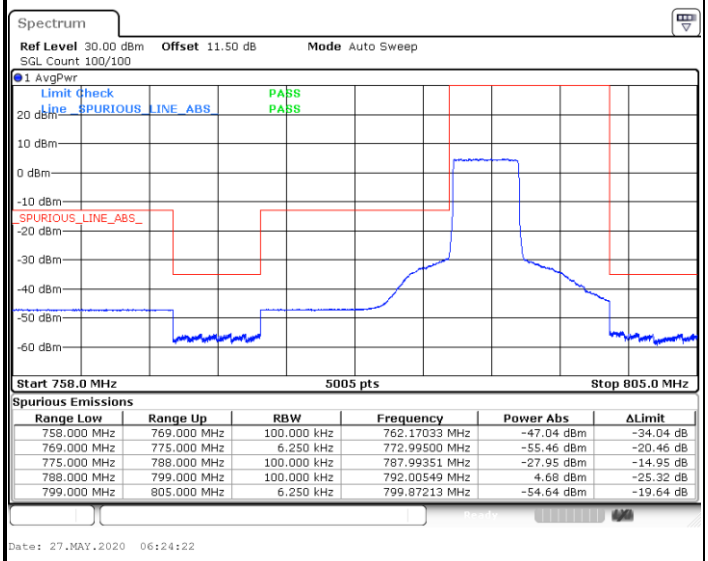


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	767.77473 MHz	-47.04 dBm	-34.04 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.86513 MHz	-55.50 dBm	-20.50 dB
775.000 MHz	788.000 MHz	100.000 kHz	781.53896 MHz	-46.99 dBm	-33.99 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.63187 MHz	19.50 dBm	-10.50 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.99301 MHz	-55.04 dBm	-20.04 dB

Date: 27.MAY.2020 06:32:07

Lowest Band Edge / Full RB

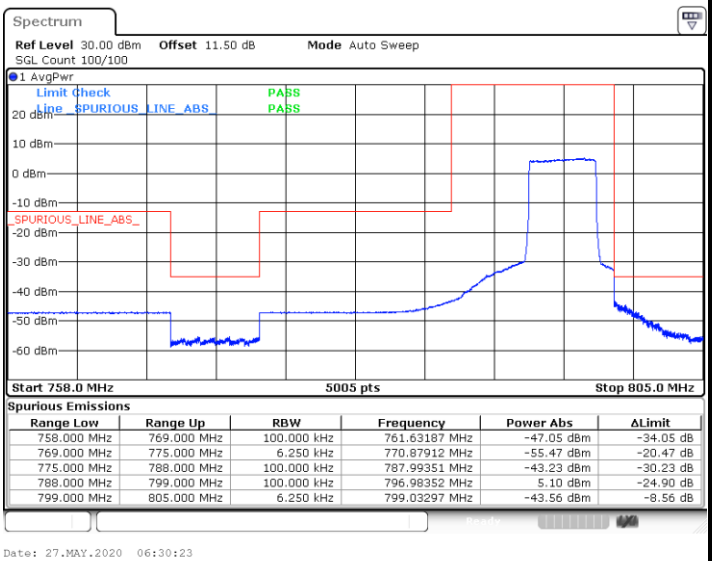


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	762.17033 MHz	-47.04 dBm	-34.04 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.99500 MHz	-55.46 dBm	-20.46 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-27.95 dBm	-14.95 dB
788.000 MHz	799.000 MHz	100.000 kHz	792.00549 MHz	4.68 dBm	-25.32 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.87213 MHz	-54.64 dBm	-19.64 dB

Date: 27.MAY.2020 06:24:22

Highest Band Edge / Full RB



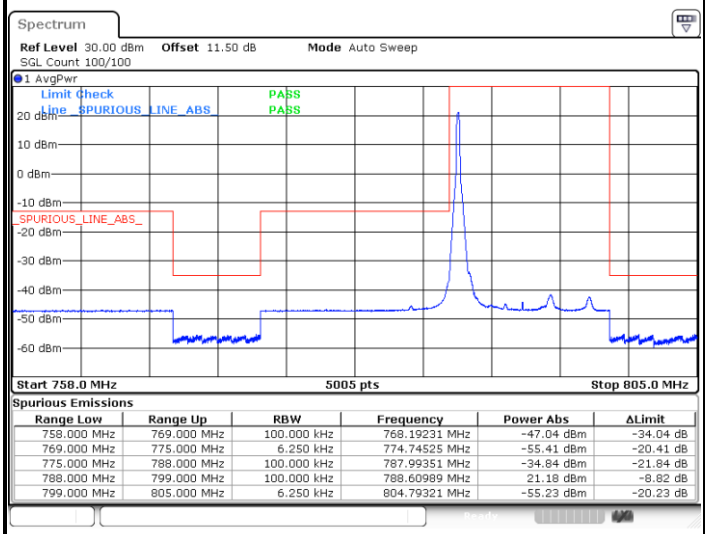
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	761.63187 MHz	-47.05 dBm	-34.05 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.87912 MHz	-55.47 dBm	-20.47 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-43.23 dBm	-30.23 dB
788.000 MHz	799.000 MHz	100.000 kHz	796.98352 MHz	5.10 dBm	-24.90 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.03297 MHz	-43.56 dBm	-8.56 dB

Date: 27.MAY.2020 06:30:23

LTE Band 14 / 10MHz / QPSK

Lowest Band Edge / 1 RB

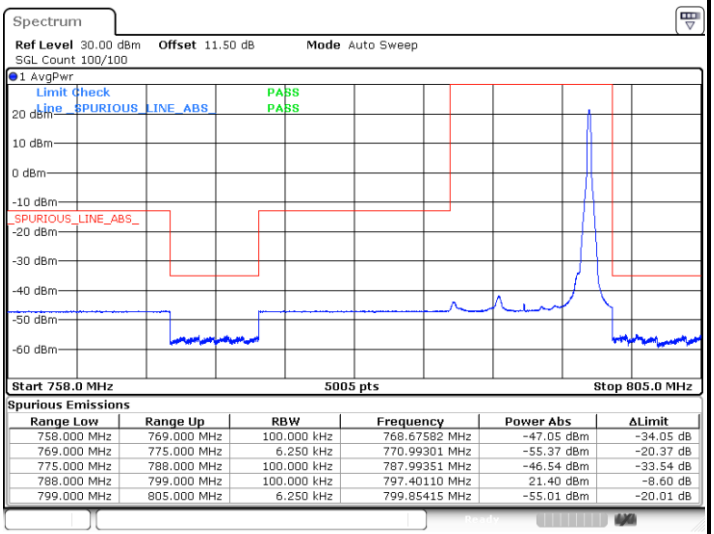


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	768.19231 MHz	-47.04 dBm	-34.04 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.74525 MHz	-55.41 dBm	-20.41 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-34.84 dBm	-21.84 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.60989 MHz	21.18 dBm	-8.82 dB
799.000 MHz	805.000 MHz	6.250 kHz	804.79321 MHz	-55.23 dBm	-20.23 dB

Date: 27.MAY.2020 06:40:50

Highest Band Edge / 1 RB

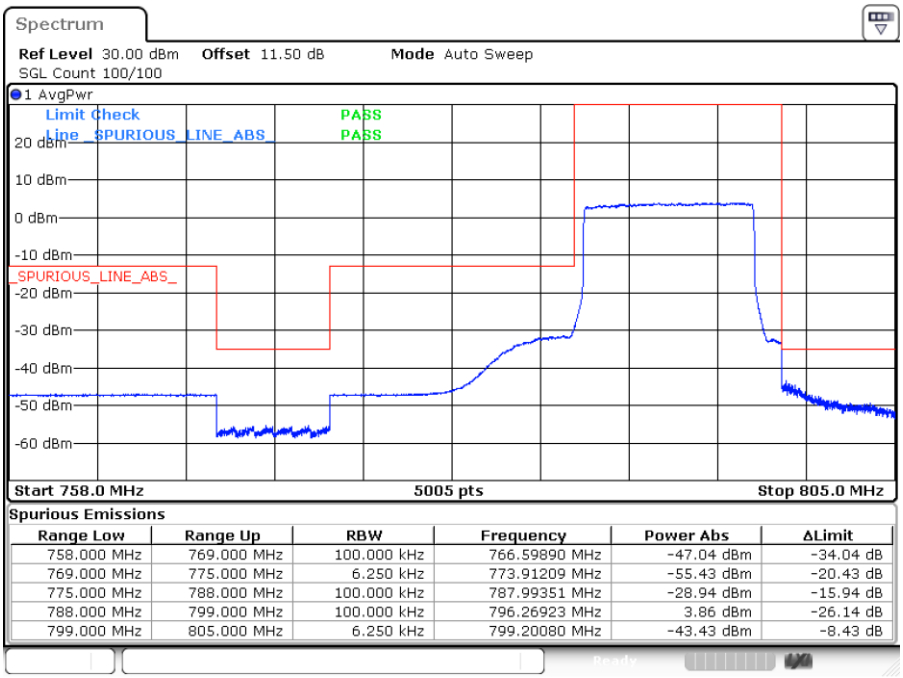


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	768.67582 MHz	-47.05 dBm	-34.05 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.99301 MHz	-55.37 dBm	-20.37 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-46.54 dBm	-33.54 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.40110 MHz	21.40 dBm	-8.60 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.85415 MHz	-55.01 dBm	-20.01 dB

Date: 27.MAY.2020 06:42:34

Band Edge / Full RB



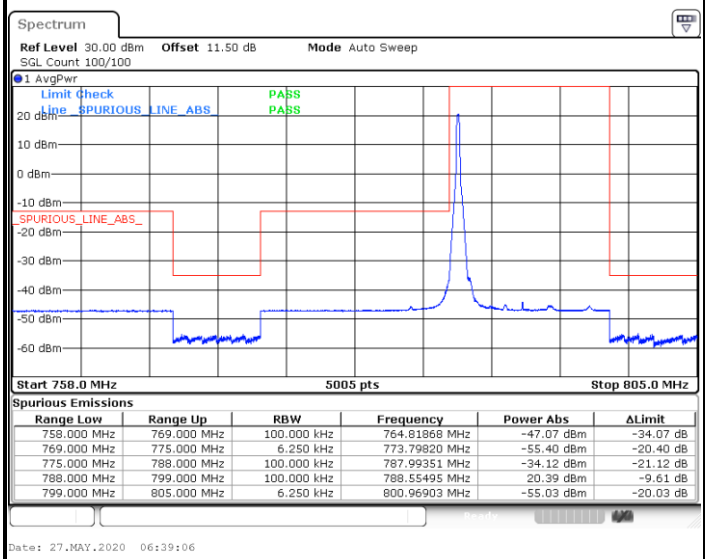
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	766.59890 MHz	-47.04 dBm	-34.04 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.91209 MHz	-55.43 dBm	-20.43 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-28.94 dBm	-15.94 dB
788.000 MHz	799.000 MHz	100.000 kHz	796.26923 MHz	3.86 dBm	-26.14 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.20080 MHz	-43.43 dBm	-8.43 dB

Date: 27.MAY.2020 06:35:38

LTE Band 14 / 10MHz / 16QAM

Lowest Band Edge / 1 RB

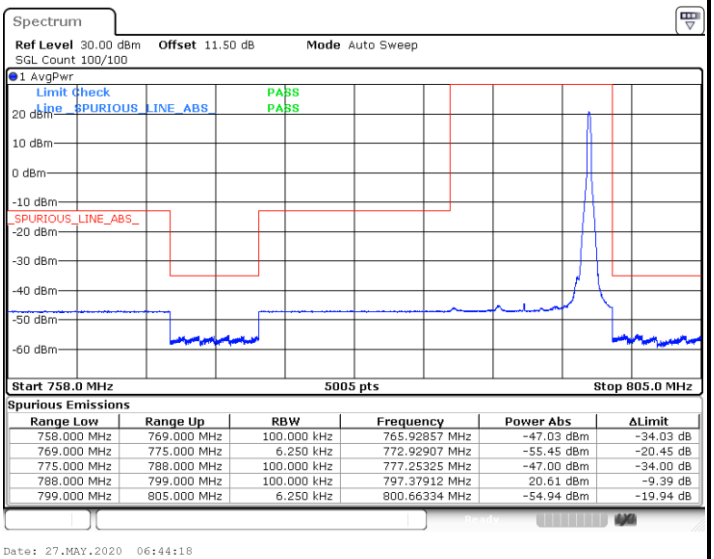


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	764.81868 MHz	-47.07 dBm	-34.07 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.79820 MHz	-55.40 dBm	-20.40 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-34.12 dBm	-21.12 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.55495 MHz	20.39 dBm	-9.61 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.96903 MHz	-55.03 dBm	-20.03 dB

Date: 27.MAY.2020 06:39:06

Highest Band Edge / 1 RB

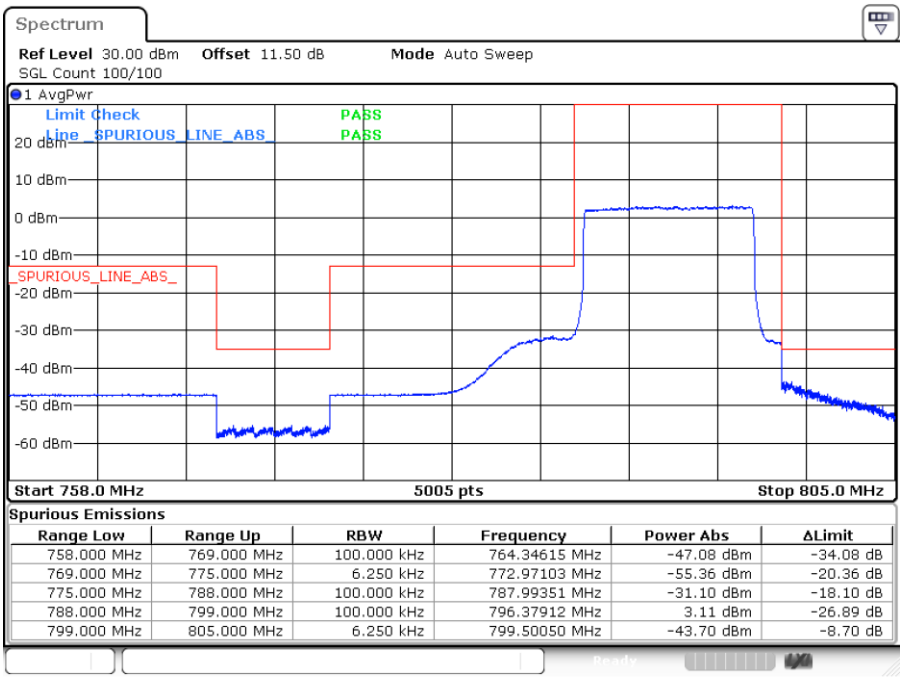


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	765.92857 MHz	-47.03 dBm	-34.03 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.92907 MHz	-55.45 dBm	-20.45 dB
775.000 MHz	788.000 MHz	100.000 kHz	777.25325 MHz	-47.00 dBm	-34.00 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.37912 MHz	20.61 dBm	-9.39 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.66334 MHz	-54.94 dBm	-19.94 dB

Date: 27.MAY.2020 06:44:18

Band Edge / Full RB



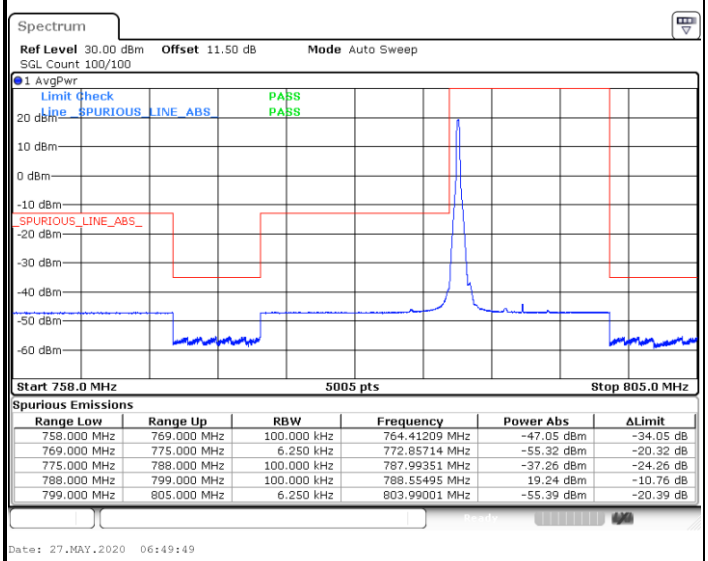
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	764.34615 MHz	-47.08 dBm	-34.08 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.97103 MHz	-55.36 dBm	-20.36 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-31.10 dBm	-18.10 dB
788.000 MHz	799.000 MHz	100.000 kHz	796.37912 MHz	3.11 dBm	-26.89 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.50050 MHz	-43.70 dBm	-8.70 dB

Date: 27.MAY.2020 06:37:22

LTE Band 14 / 10MHz / 64QAM

Lowest Band Edge / 1 RB

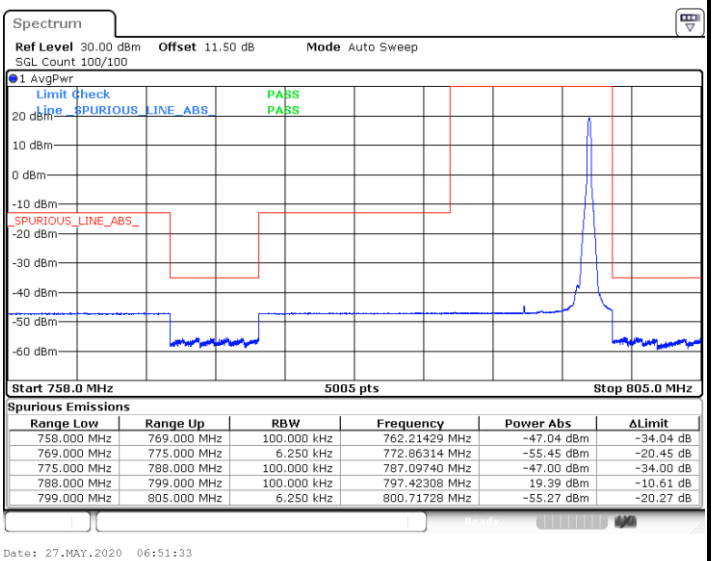


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	764.41209 MHz	-47.05 dBm	-34.05 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.85714 MHz	-55.32 dBm	-20.32 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-37.26 dBm	-24.26 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.55495 MHz	19.24 dBm	-10.76 dB
799.000 MHz	805.000 MHz	6.250 kHz	803.99001 MHz	-55.39 dBm	-20.39 dB

Date: 27.MAY.2020 06:49:49

Highest Band Edge / 1 RB

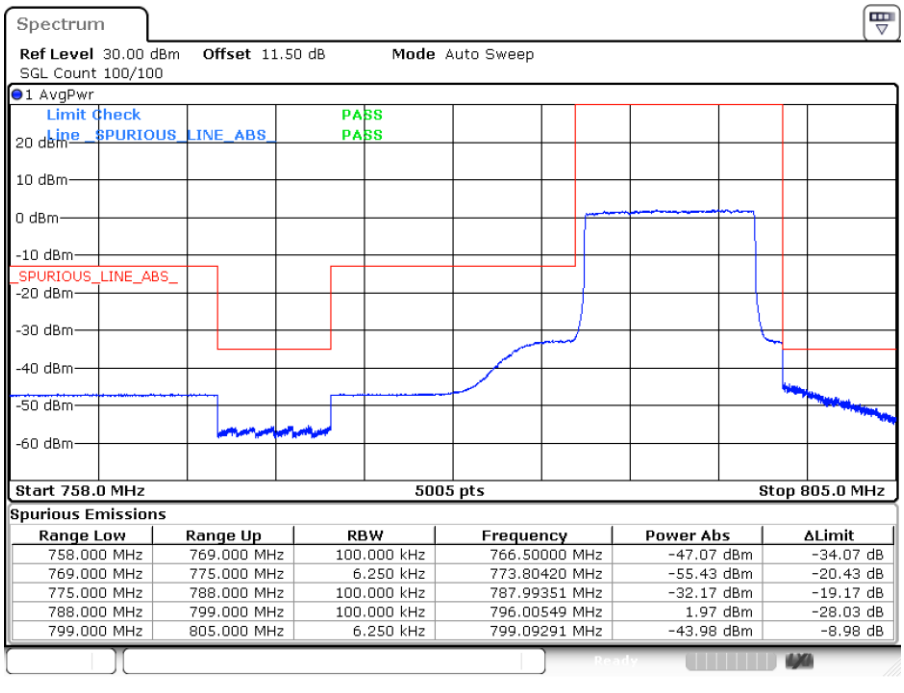


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	762.21429 MHz	-47.04 dBm	-34.04 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.86314 MHz	-55.45 dBm	-20.45 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.09740 MHz	-47.00 dBm	-34.00 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.42308 MHz	19.39 dBm	-10.61 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.71728 MHz	-55.27 dBm	-20.27 dB

Date: 27.MAY.2020 06:51:33

Band Edge / Full RB



Spurious Emissions

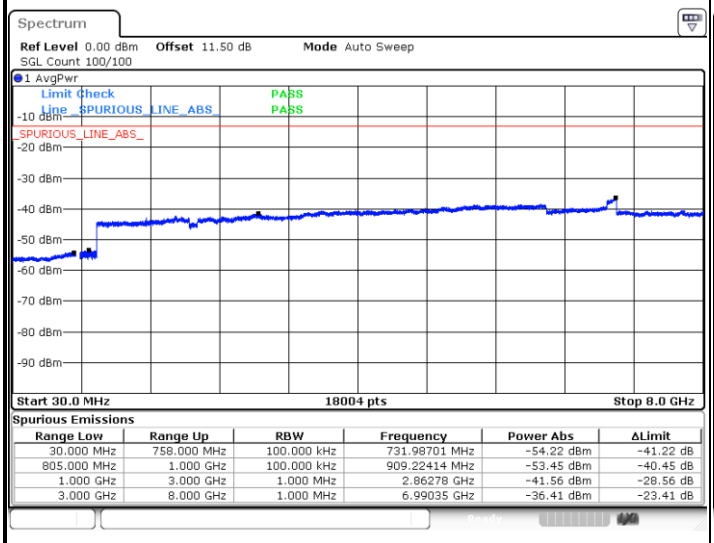
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	766.50000 MHz	-47.07 dBm	-34.07 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.80420 MHz	-55.43 dBm	-20.43 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-32.17 dBm	-19.17 dB
788.000 MHz	799.000 MHz	100.000 kHz	796.00549 MHz	1.97 dBm	-28.03 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.09291 MHz	-43.98 dBm	-8.98 dB

Date: 27.MAY.2020 06:48:05

Conducted Spurious Emission

LTE Band 14 / 5MHz

Lowest Channel / QPSK

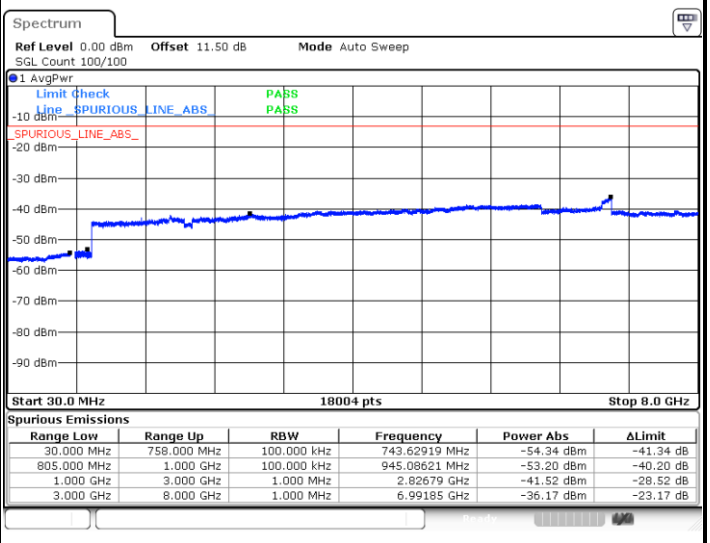


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	731.98701 MHz	-54.22 dBm	-41.22 dB
805.000 MHz	1.000 GHz	100.000 kHz	909.22414 MHz	-53.45 dBm	-40.45 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.86278 GHz	-41.56 dBm	-28.56 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99035 GHz	-36.41 dBm	-23.41 dB

Date: 27.MAY.2020 06:09:19

Lowest Channel / 16QAM

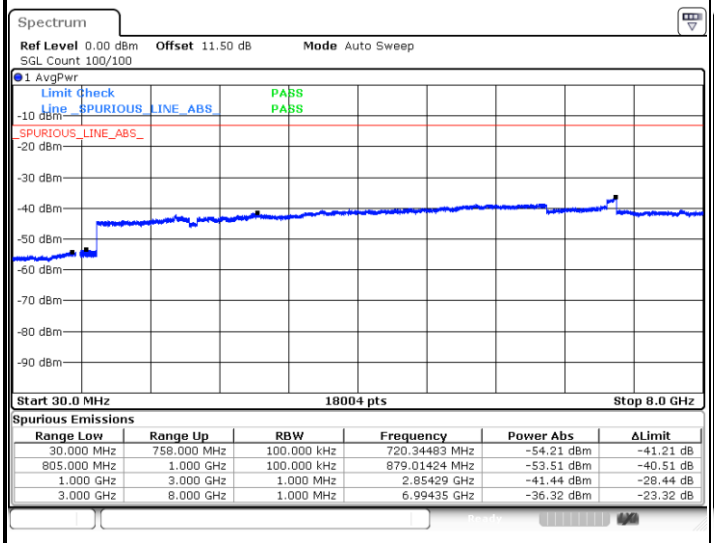


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	743.62919 MHz	-54.34 dBm	-41.34 dB
805.000 MHz	1.000 GHz	100.000 kHz	945.08621 MHz	-53.20 dBm	-40.20 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.82679 GHz	-41.52 dBm	-28.52 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99185 GHz	-36.17 dBm	-23.17 dB

Date: 27.MAY.2020 06:10:08

Middle Channel / QPSK

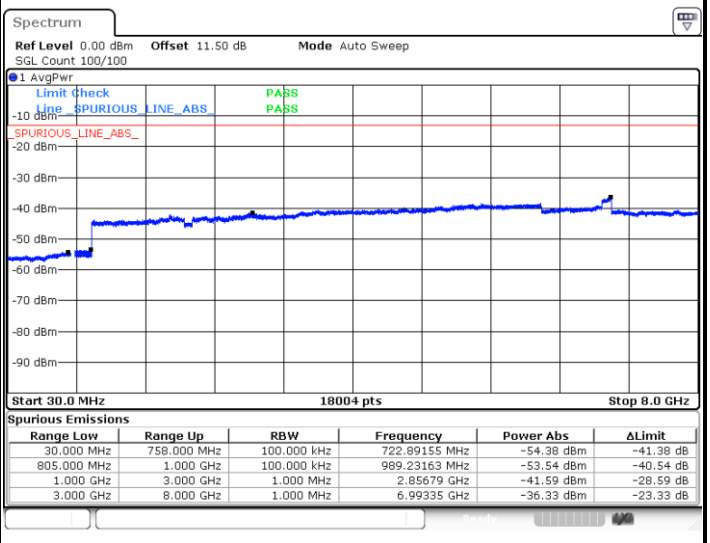


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	720.34483 MHz	-54.21 dBm	-41.21 dB
805.000 MHz	1.000 GHz	100.000 kHz	879.01424 MHz	-53.51 dBm	-40.51 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.85429 GHz	-41.44 dBm	-28.44 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99435 GHz	-36.32 dBm	-23.32 dB

Date: 27.MAY.2020 06:11:46

Middle Channel / 16QAM



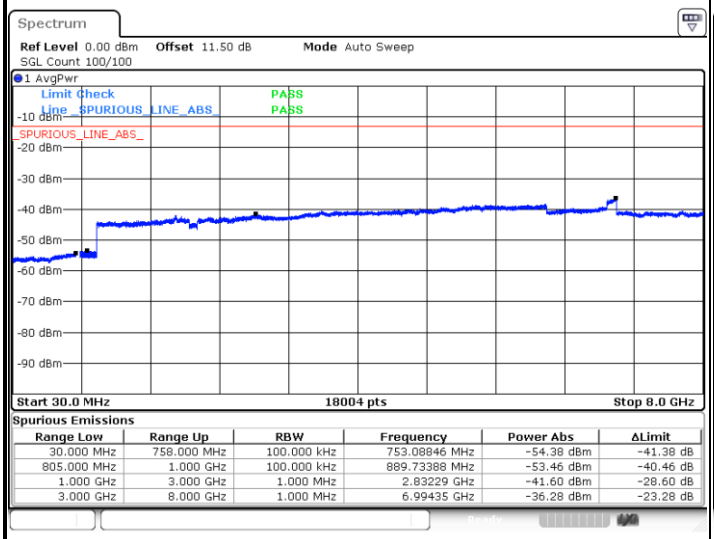
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	722.89155 MHz	-54.38 dBm	-41.38 dB
805.000 MHz	1.000 GHz	100.000 kHz	989.23163 MHz	-53.54 dBm	-40.54 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.85679 GHz	-41.59 dBm	-28.59 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99335 GHz	-36.33 dBm	-23.33 dB

Date: 27.MAY.2020 06:10:57

LTE Band 14 / 5MHz

Highest Channel / QPSK

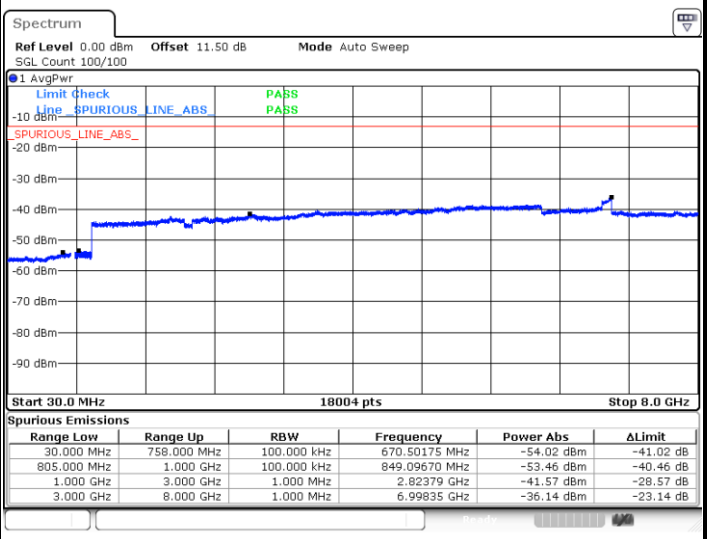


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	753.08846 MHz	-54.38 dBm	-41.38 dB
805.000 MHz	1.000 GHz	100.000 kHz	889.73388 MHz	-53.46 dBm	-40.46 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.83229 GHz	-41.60 dBm	-28.60 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99435 GHz	-36.28 dBm	-23.28 dB

Date: 27.MAY.2020 06:21:20

Highest Channel / 16QAM



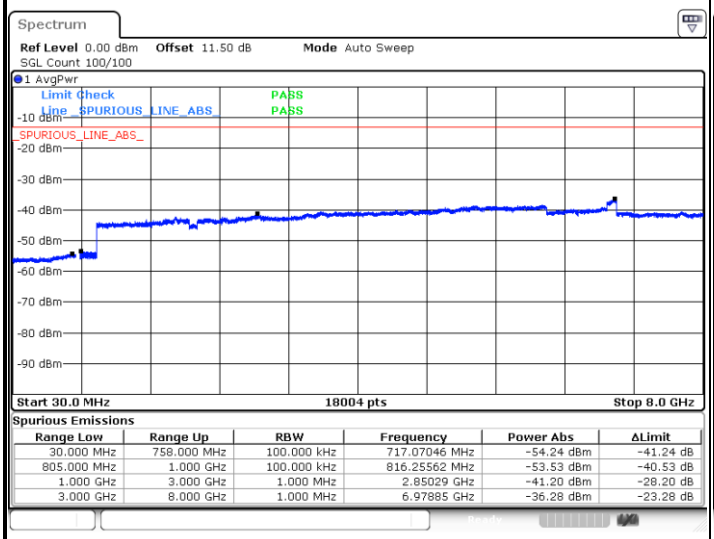
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	670.50175 MHz	-54.02 dBm	-41.02 dB
805.000 MHz	1.000 GHz	100.000 kHz	849.09670 MHz	-53.46 dBm	-40.46 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.82379 GHz	-41.57 dBm	-28.57 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99835 GHz	-36.14 dBm	-23.14 dB

Date: 27.MAY.2020 06:22:10

LTE Band 14 / 10MHz

Middle Channel / QPSK

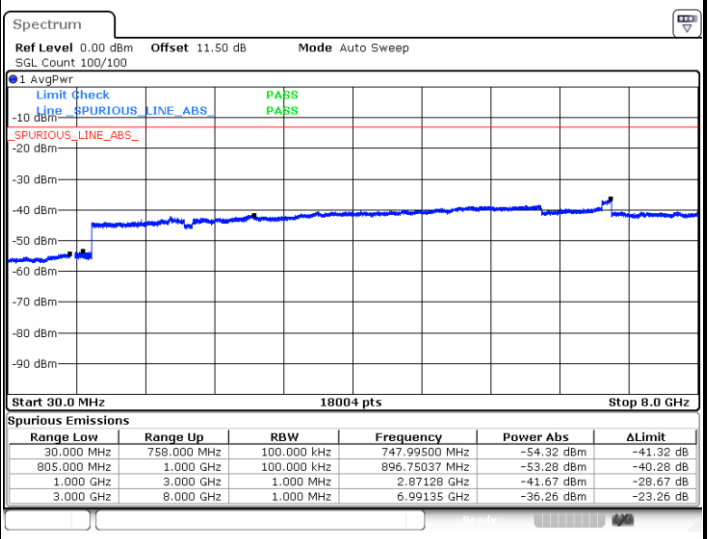


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	717.07046 MHz	-54.24 dBm	-41.24 dB
805.000 MHz	1.000 GHz	100.000 kHz	816.25562 MHz	-53.53 dBm	-40.53 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.85029 GHz	-41.20 dBm	-28.20 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.97885 GHz	-36.28 dBm	-23.28 dB

Date: 27.MAY.2020 06:45:55

Middle Channel / 16QAM



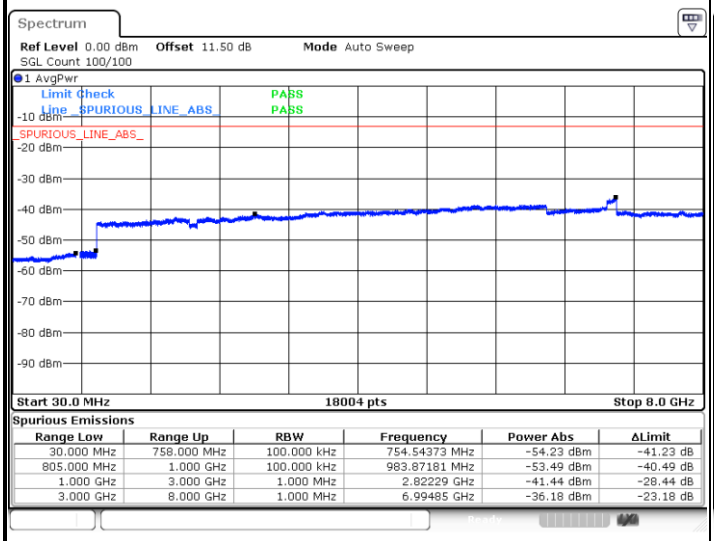
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	747.99500 MHz	-54.32 dBm	-41.32 dB
805.000 MHz	1.000 GHz	100.000 kHz	896.75037 MHz	-53.28 dBm	-40.28 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.87128 GHz	-41.67 dBm	-28.67 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99135 GHz	-36.26 dBm	-23.26 dB

Date: 27.MAY.2020 06:45:06

LTE Band 14 / 5MHz

Lowest Channel / 64QAM

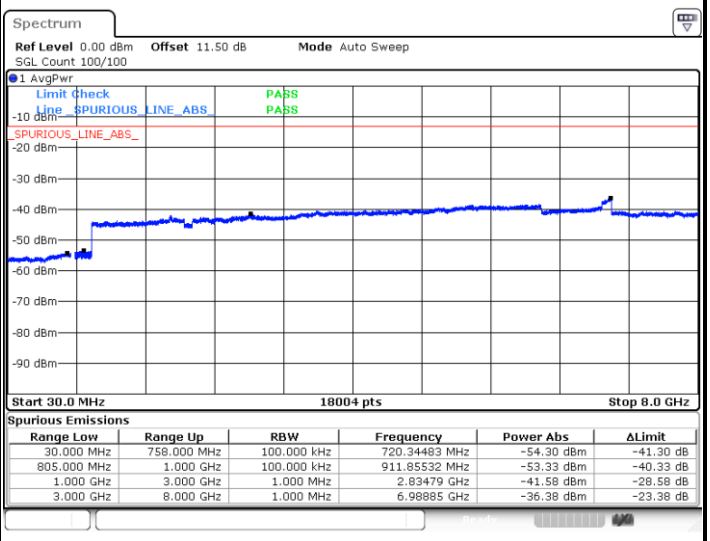


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	754.54373 MHz	-54.23 dBm	-41.23 dB
805.000 MHz	1.000 GHz	100.000 kHz	983.87181 MHz	-53.49 dBm	-40.49 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.82229 GHz	-41.44 dBm	-28.44 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99485 GHz	-36.18 dBm	-23.18 dB

Date: 27.MAY.2020 06:26:56

Middle Channel / 64QAM

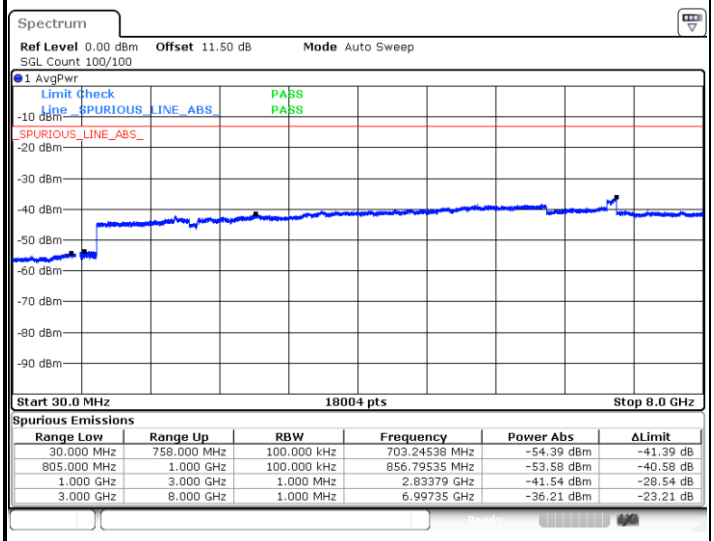


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	720.34483 MHz	-54.30 dBm	-41.30 dB
805.000 MHz	1.000 GHz	100.000 kHz	911.85532 MHz	-53.33 dBm	-40.33 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.83479 GHz	-41.58 dBm	-28.58 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.98885 GHz	-36.38 dBm	-23.38 dB

Date: 27.MAY.2020 06:27:45

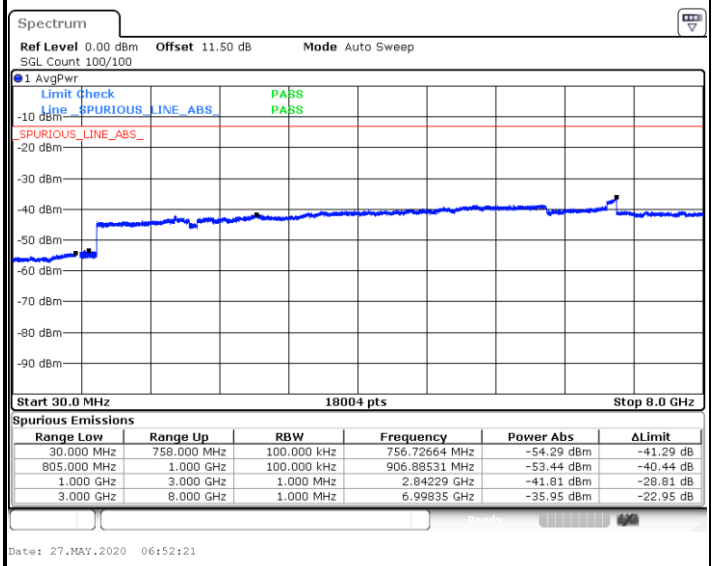
Highest Channel / 64QAM



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	703.24538 MHz	-54.39 dBm	-41.39 dB
805.000 MHz	1.000 GHz	100.000 kHz	856.79535 MHz	-53.58 dBm	-40.58 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.83379 GHz	-41.54 dBm	-28.54 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99735 GHz	-36.21 dBm	-23.21 dB

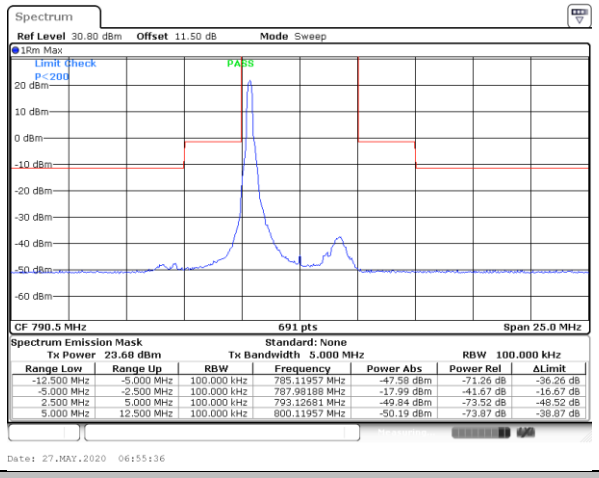
Date: 27.MAY.2020 06:32:57

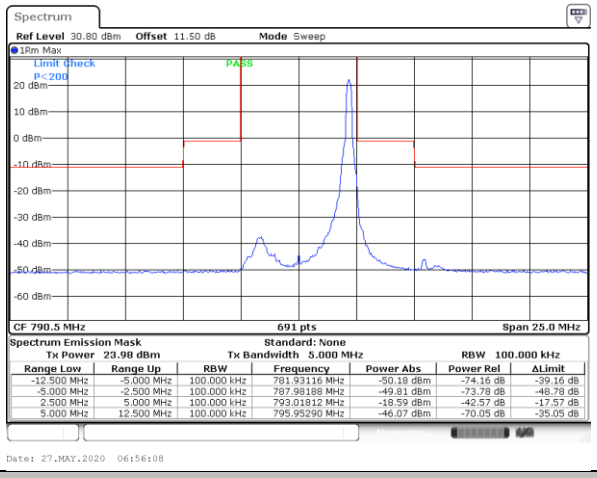
LTE Band 14 / 10MHz	
Middle Channel / 64QAM	
	

Mask

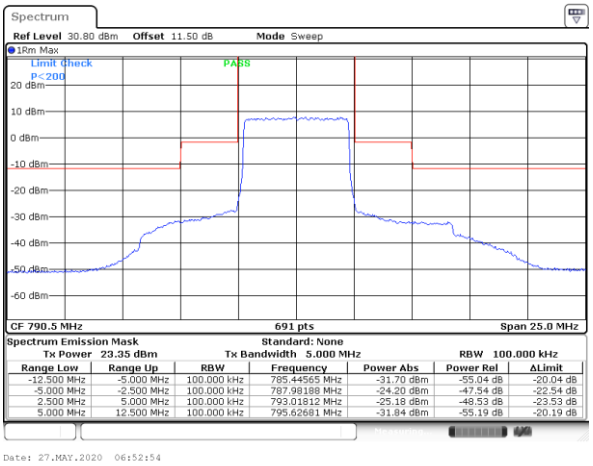
LTE Band 14 / 5MHz / QPSK

Lowest Channel / 1RB



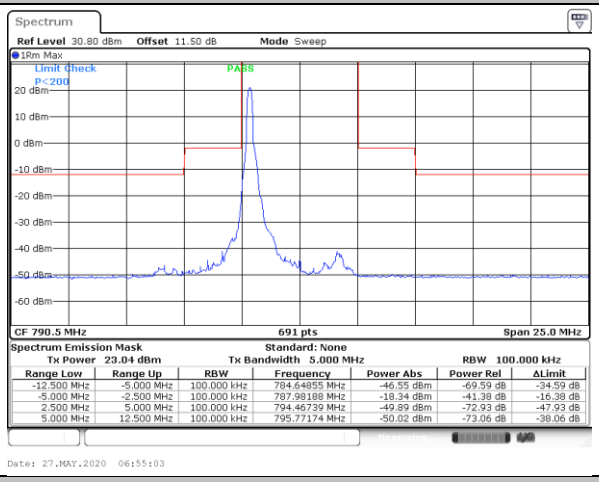


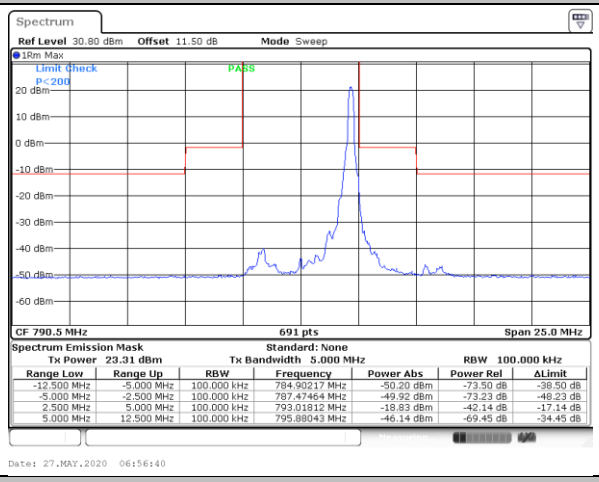
Lowest Channel / Full RB



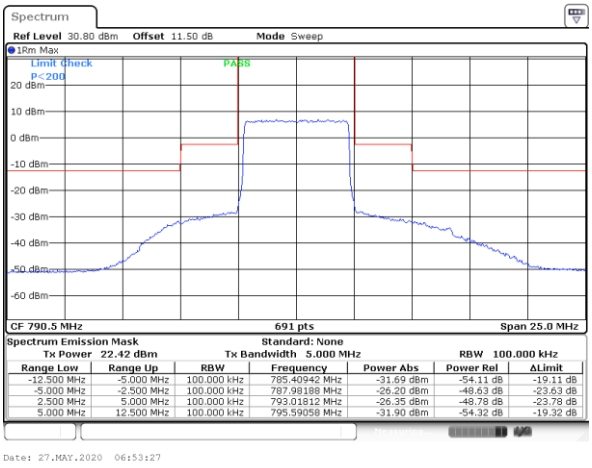
LTE Band 14 / 5MHz / 16QAM

Lowest Channel / 1RB



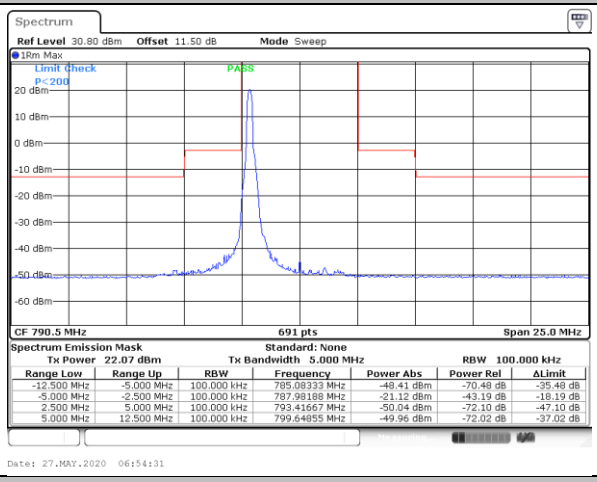


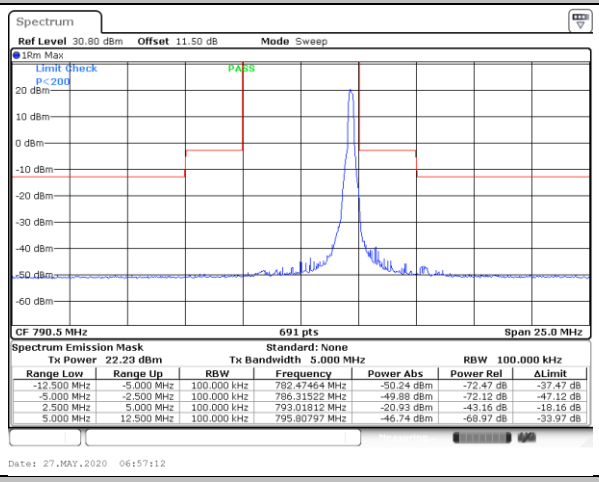
Lowest Channel / Full RB



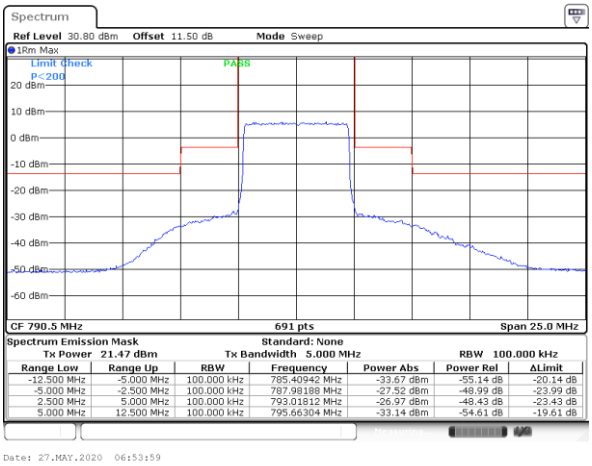
LTE Band 14 / 5MHz / 64QAM

Lowest Channel / 1RB



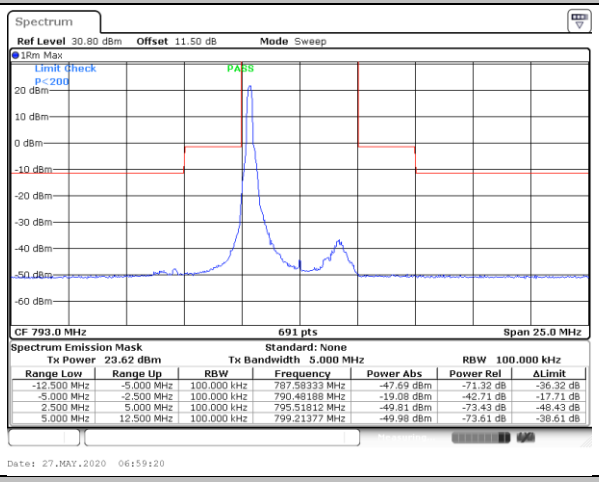


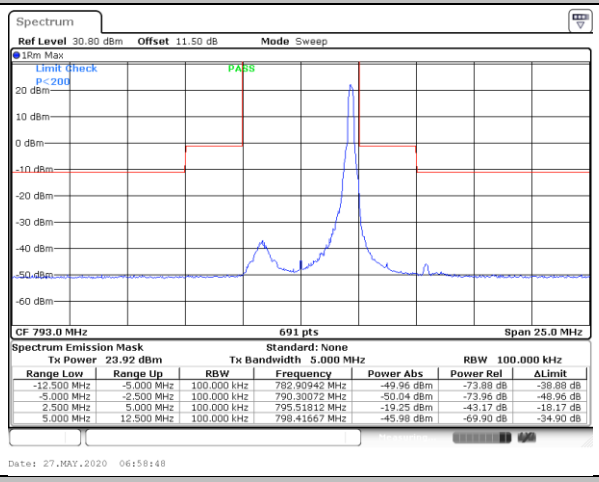
Lowest Channel / Full RB



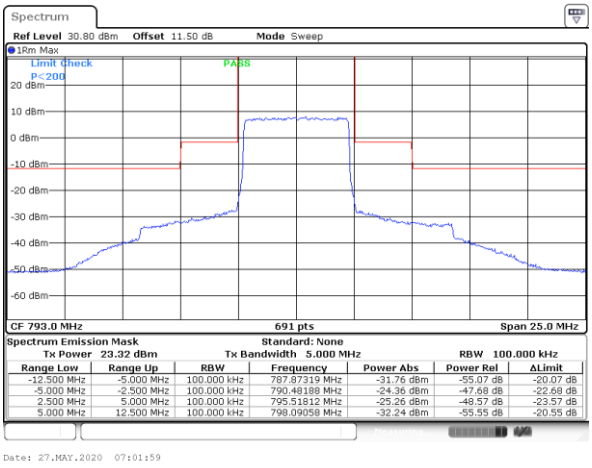
LTE Band 14 / 5MHz / QPSK

Middle Channel / 1RB



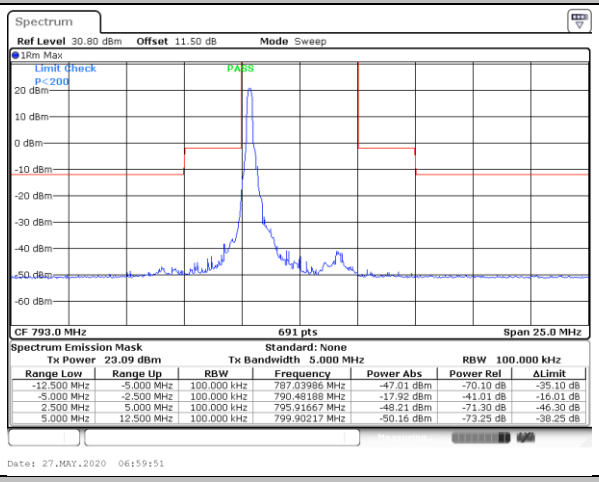


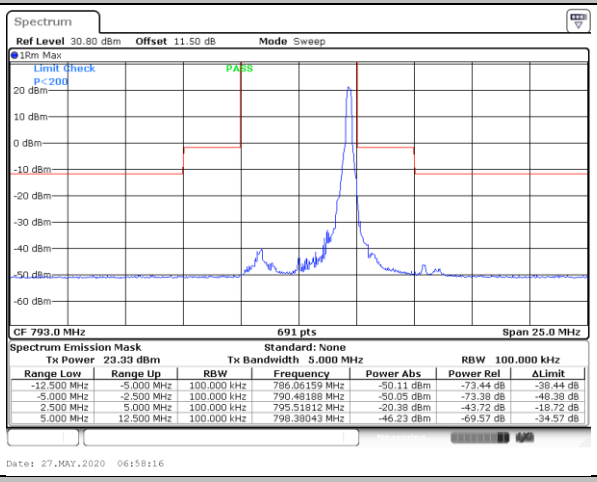
Middle Channel / Full RB



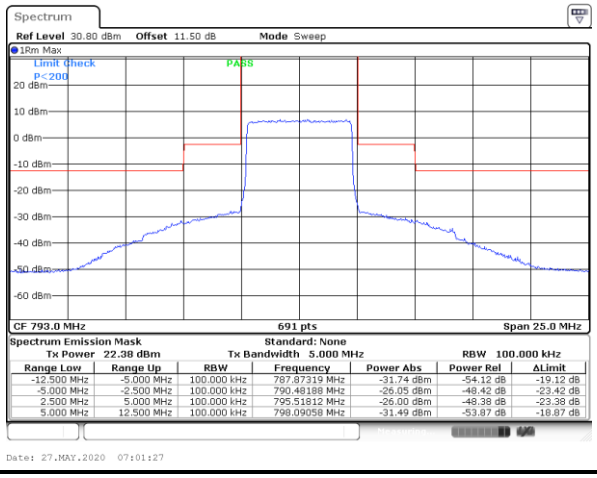
LTE Band 14 / 5MHz / 16QAM

Middle Channel / 1RB



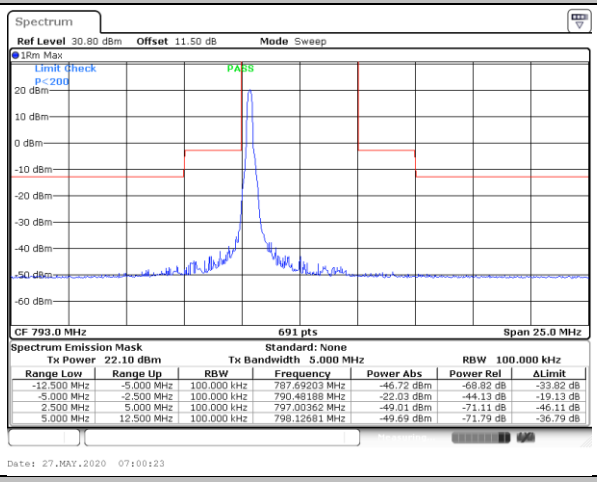


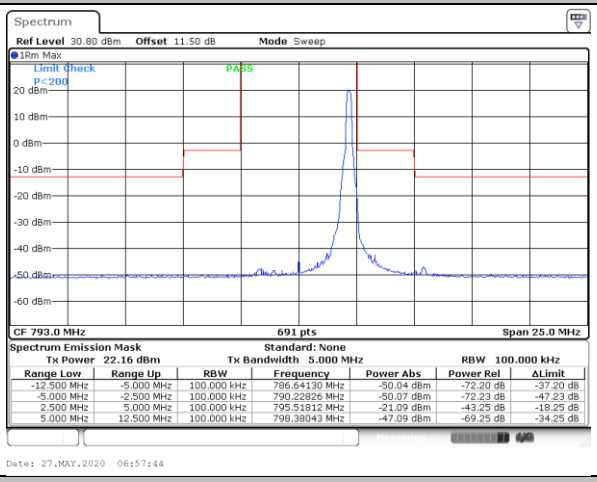
Middle Channel / Full RB



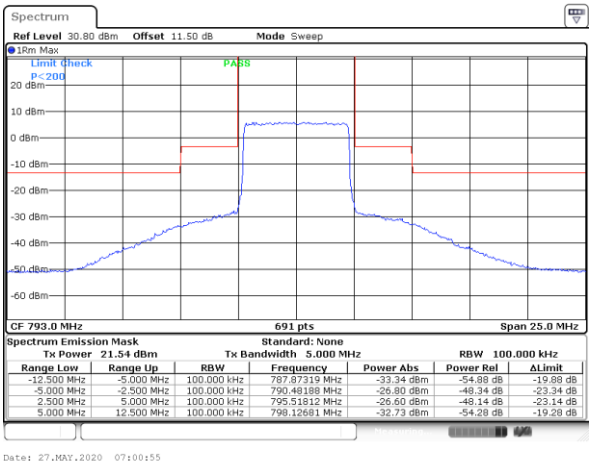
LTE Band 14 / 5MHz / 64QAM

Middle Channel / 1RB



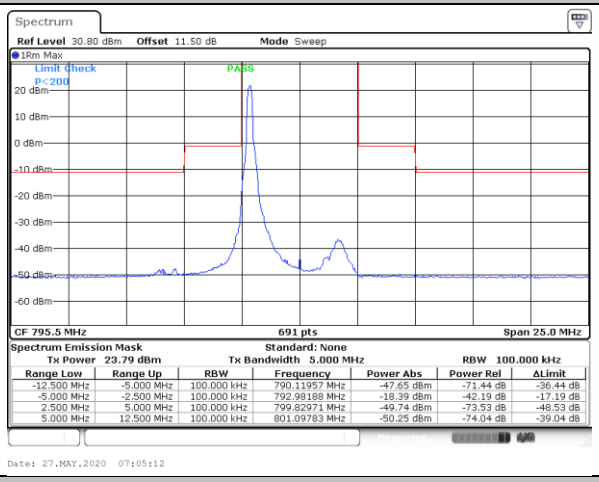


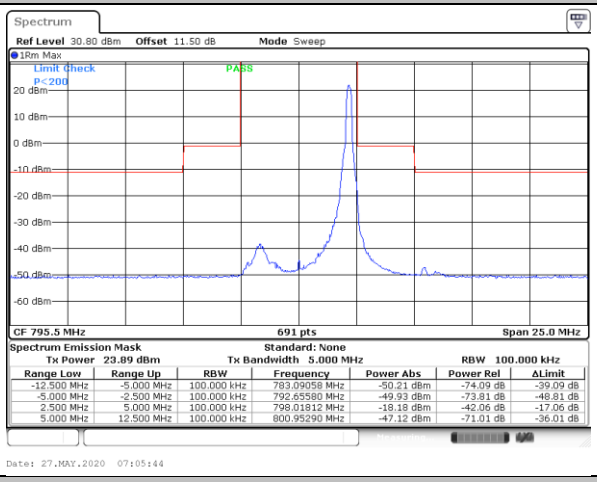
Middle Channel / Full RB



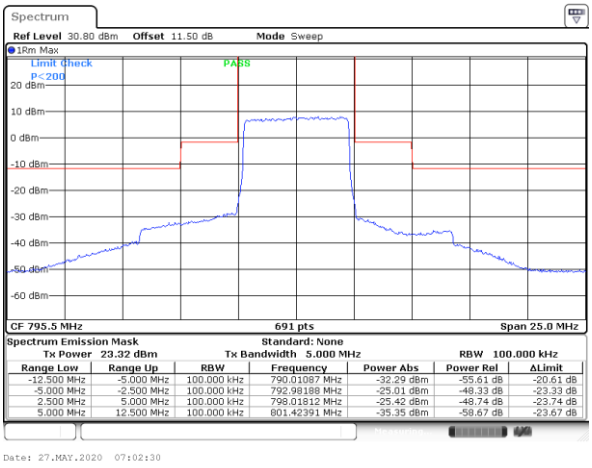
LTE Band 14 / 5MHz / QPSK

Highest Channel / 1RB



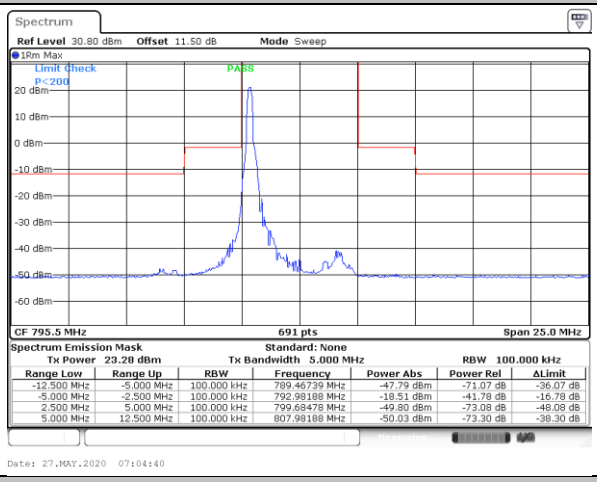


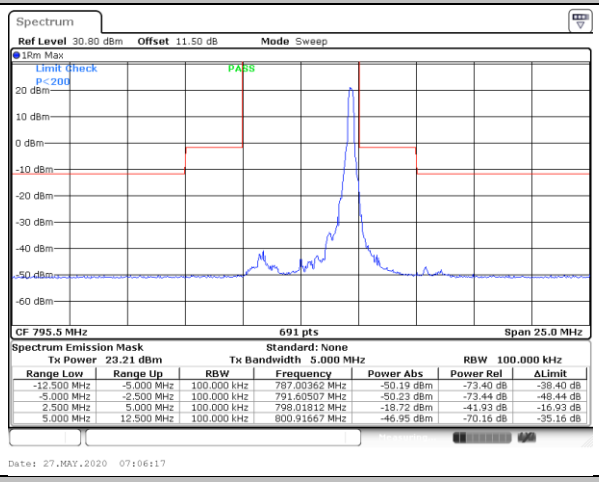
Highest Channel / Full RB



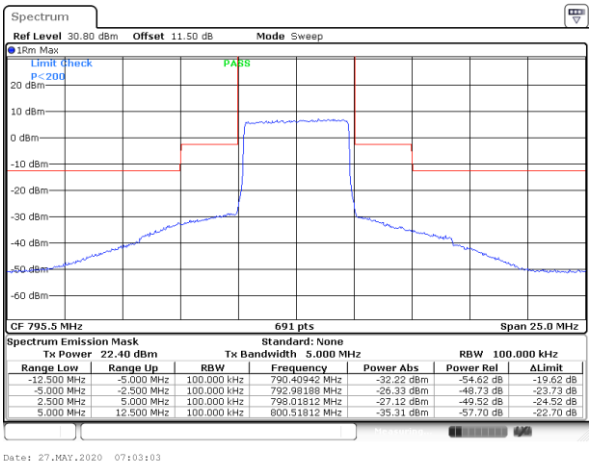
LTE Band 14 / 5MHz / 16QAM

Highest Channel / 1RB



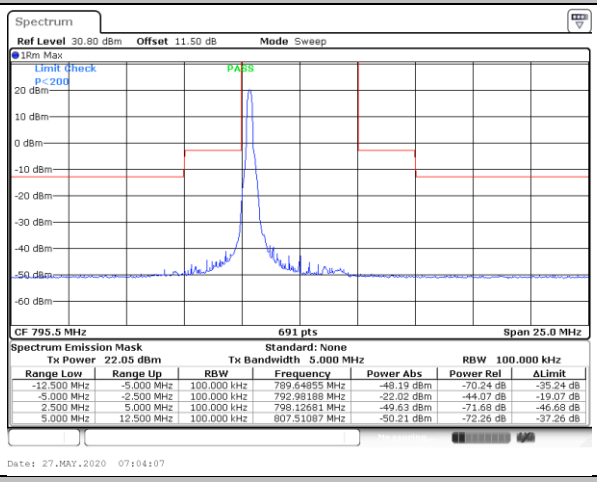


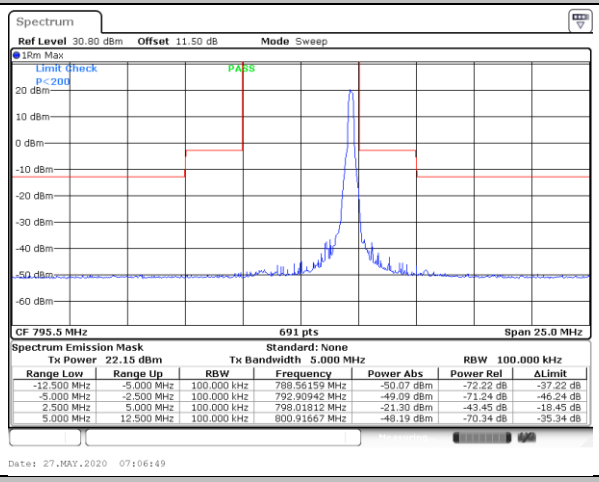
Highest Channel / Full RB



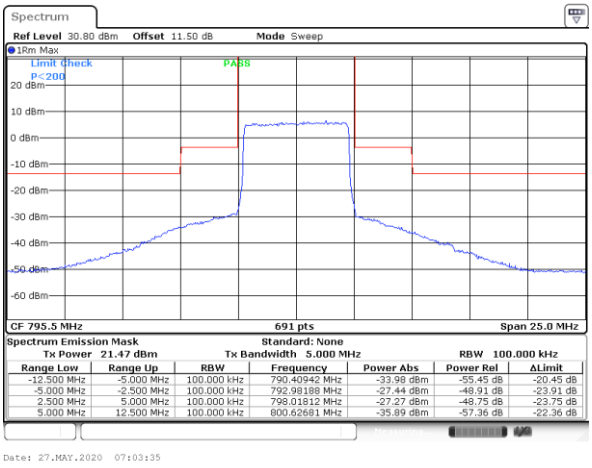
LTE Band 14 / 5MHz / 64QAM

Highest Channel / 1RB



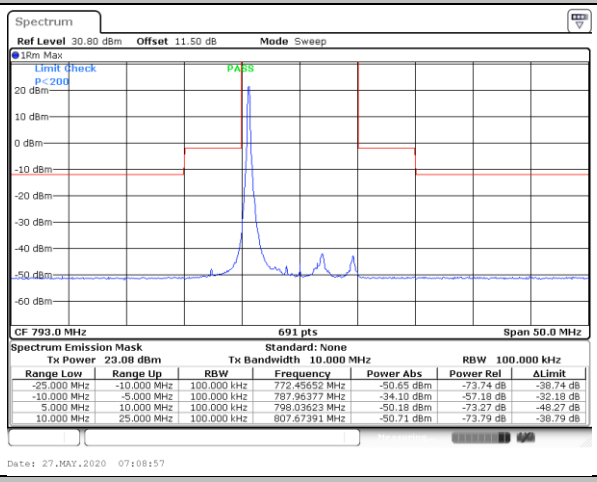


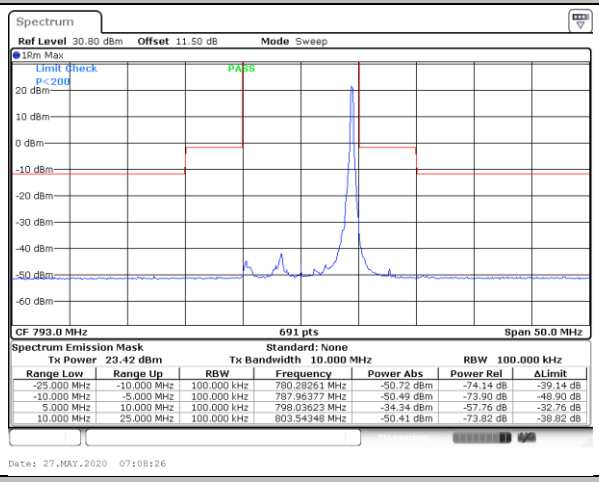
Highest Channel / Full RB



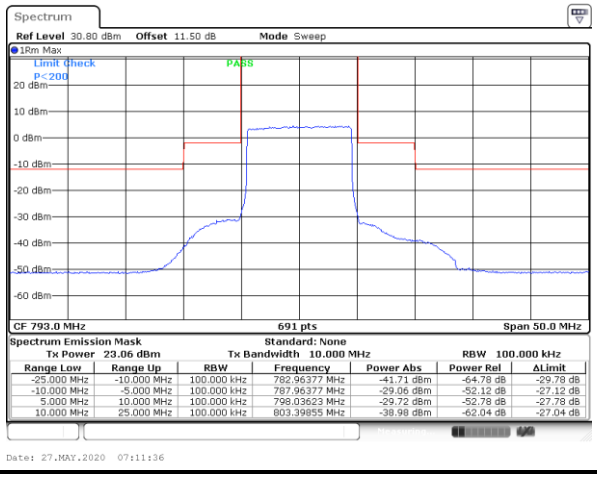
LTE Band 14 / 10MHz / QPSK

Middle Channel / 1RB



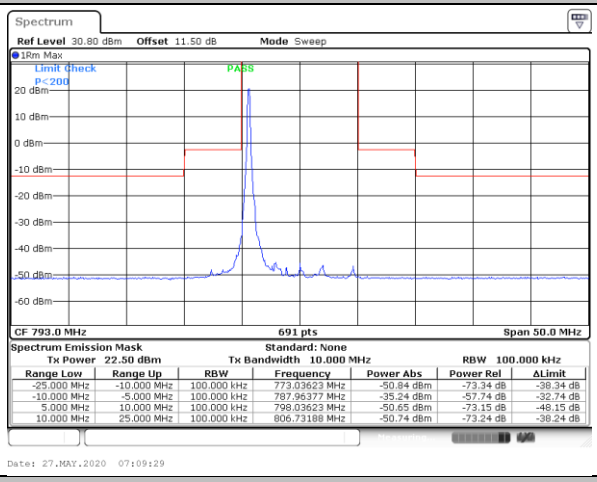


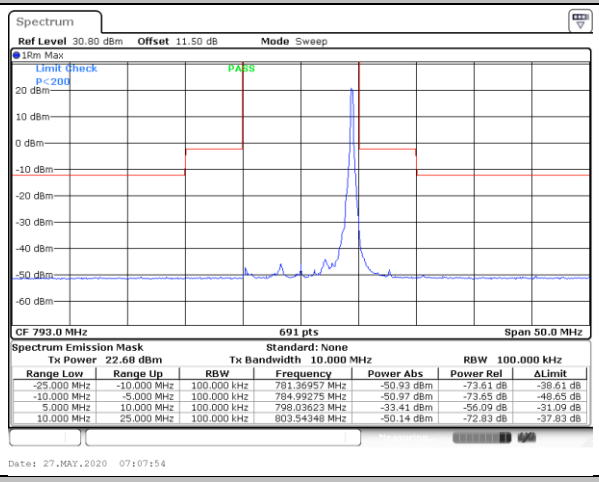
Middle Channel / Full RB



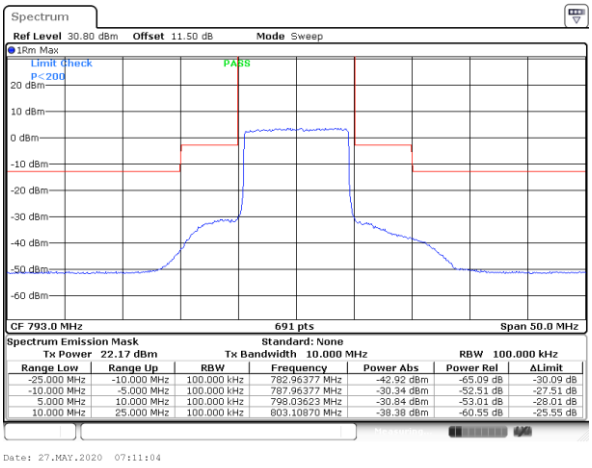
LTE Band 14 / 10MHz / 16QAM

Middle Channel / 1RB



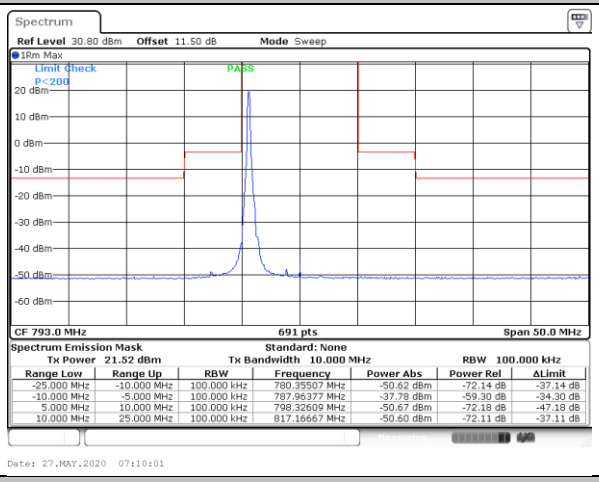


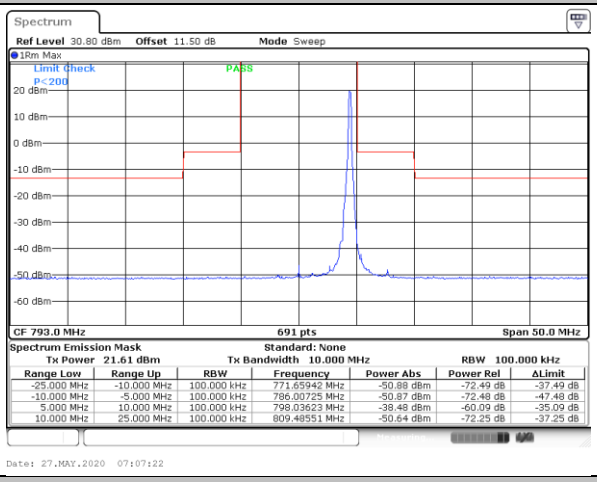
Middle Channel / Full RB



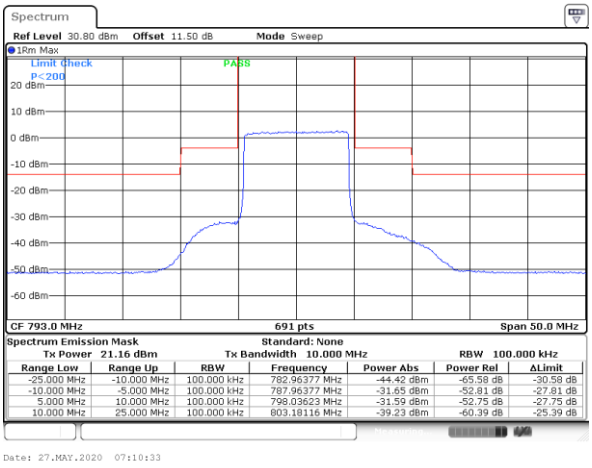
LTE Band 14 / 10MHz / 64QAM

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	0.0172	PASS
40	Normal Voltage	0.0021	
30	Normal Voltage	0.0148	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0172	
0	Normal Voltage	0.0066	
-10	Normal Voltage	0.0180	
-20	Normal Voltage	0.0013	
-30	Normal Voltage	0.0163	
20	Maximum Voltage	0.0170	
20	Normal Voltage	0.0172	
20	Battery End Point	0.0095	

Note:

1. Normal Voltage =3.8 V.；Battery End Point (BEP) =3.4 V.；Maximum Voltage =4.8 V.

2. Note: The frequency fundamental emissions stay within the authorized frequency block.

Appendix B. Test Results of ERP and Radiated Test

ERP

LTE Band 14 / 5MHz (Average) (GT - LC = 1.8 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	EIRP(dBm)	EIRP(W)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	0	23.46	0.2218	23.11	0.2046
Middle		1	0	23.58	0.2280	23.23	0.2104
Highest		1	0	23.47	0.2223	23.12	0.2051
Lowest	16QAM	1	24	22.81	0.1910	22.46	0.1762
Middle		1	24	22.91	0.1954	22.56	0.1803
Highest		1	24	22.79	0.1901	22.44	0.1754
Lowest	64QAM	1	12	21.70	0.1479	21.35	0.1365
Middle		1	12	21.88	0.1542	21.53	0.1422
Highest		1	12	21.80	0.1514	21.45	0.1396
Limit	ERP < 3W			Result		PASS	

LTE Band 14 / 10MHz (Average) (GT - LC = 1.8 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	EIRP(dBm)	EIRP(W)	ERP(dBm)	ERP(W)
Lowest	QPSK	-	-	-	-	-	-
Middle		1	0	23.64	0.2312	23.29	0.2133
Highest		-	-	-	-	-	-
Lowest	16QAM	-	-	-	-	-	-
Middle		1	49	22.92	0.1959	22.57	0.1807
Highest		-	-	-	-	-	-
Lowest	64QAM	-	-	-	-	-	-
Middle		1	25	21.88	0.1542	21.53	0.1422
Highest		-	-	-	-	-	-
Limit	ERP < 3W			Result		PASS	

Radiated Spurious Emission

LTE Band 14

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	1576	-56.13	-42.15	-13.98	-69.67	-61.47	0.90	8.39	H
	2365	-55.81	-13	-42.81	-74.25	-63.05	1.12	10.51	H
	3153	-54.61	-13	-41.61	-74.9	-62.83	1.30	11.67	H
									H
									H
									H
	1576	-52.62	-42.15	-10.47	-65.63	-57.96	0.90	8.39	V
	2365	-55.68	-13	-42.68	-73.87	-62.92	1.12	10.51	V
	3153	-54.25	-13	-41.25	-74.96	-62.47	1.30	11.67	V
									V
									V
									V
Middle	1581	-56.02	-42.15	-13.87	-69.52	-61.38	0.90	8.41	H
	2372	-56.22	-13	-43.22	-74.62	-63.47	1.12	10.52	H
	3163	-54.48	-13	-41.48	-74.79	-62.72	1.30	11.69	H
									H
									H
									H
	1581	-53.17	-42.15	-11.02	-66.18	-58.53	0.90	8.41	V
	2372	-56.48	-13	-43.48	-74.67	-63.73	1.12	10.52	V
	3163	-53.94	-13	-40.94	-74.69	-62.18	1.30	11.69	V
									V
									V
									V

Highest	1586	-56.45	-42.15	-14.30	-69.91	-61.83	0.90	8.43	H
	2380	-56.41	-13	-43.41	-74.77	-63.67	1.12	10.53	H
	3173	-54.44	-13	-41.44	-74.76	-62.70	1.30	11.72	H
									H
									H
									H
	1586	-55.05	-42.15	-12.90	-68.05	-60.43	0.90	8.43	V
	2380	-56.76	-13	-43.76	-74.97	-64.02	1.12	10.53	V
	3173	-54.02	-13	-41.02	-74.80	-62.28	1.30	11.72	V
									V
									V
									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	1576	-53.55	-42.15	-11.40	-67.09	-58.89	0.90	8.39	H
	2365	-56.11	-13	-43.11	-74.55	-63.35	1.12	10.51	H
	3154	-54.63	-13	-41.63	-74.92	-62.85	1.30	11.67	H
									H
									H
									H
									H
	1576	-52.55	-42.15	-10.40	-65.56	-57.89	0.90	8.39	V
	2365	-56.25	-13	-43.25	-74.44	-63.49	1.12	10.51	V
	3154	-54.13	-13	-41.13	-74.84	-62.35	1.30	11.67	V
									V
									V
									V
									V

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