FCC RADIO TEST REPORT

FCC ID	:	**RI7FN980**
Equipment	:	**5G/ LTE M.2 Data Card**
Brand Name	:	**Telit**
Model Name	:	**FN980**
Marketing Name	:	**FN980**
Applicant	:	**TELIT COMMUNICATIONS S.P.A. VIA STAZIONE DI PROSECCO 5B - SGONICO -TRIESTE - ITALY**
Manufacturer	:	**TELIT COMMUNICATIONS S.P.A. VIA STAZIONE DI PROSECCO 5B - SGONICO -TRIESTE - ITALY**
Standard	:	**FCC 47 CFR Part 2, 90(R)**

The product was received on Mar. 17, 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 **3**
1 General Description **4**
1.1 Product Feature of Equipment Under Test 4
1.2 Modification of EUT 4
Appendix A. Original Report

History of this test report

Report No.	Version	Description	Issued Date
FG031715E	01	Initial issue of report	Jul. 23, 2020

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: Tina Chuang

1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE/5G NR and GNSS.

Product Specification subjective to this standard	
Antenna Type	**WWAN:** <Ant. 0> Dipole Antenna <Ant. 1> Dipole Antenna <Ant. 2> Dipole Antenna <Ant. 3> Dipole Antenna **GNSS :** **<1559 MHz ~ 1610 MHz>:** <Ant. 3> Dipole Antenna <Ant. 4> Dipole Antenna **<1164 MHz ~ 1215 MHz>:** <Ant. 2> Dipole Antenna

Remark: The RF design is the electrically identical across all two models FN980 and FN980m except that FN980 does not support mmWave functions, please find the product equality letter as provided by manufacturer. The test has been performed with the selected model FN980m. Besides, the model FN980 has been verified consistency. Hence, the test data of FN980m can represent among all the two models in this test report. All the test cases were performed on original report which can be referred to Sporton Report Number FG031715-01E.

1.2 Modification of EUT

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

Appendix A. Original Report

Please refer to Sporton report number FG031715-01E.

FCC RADIO TEST REPORT

FCC ID	:	**RI7FN980**
Equipment	:	**5G/ LTE M.2 Data Card**
Brand Name	:	**Telit**
Model Name	:	**FN980m**
Marketing Name	:	**FN980m**
Applicant	:	**TELIT COMMUNICATIONS S.P.A. VIA STAZIONE DI PROSECCO 5B - SGONICO -TRIESTE - ITALY**
Manufacturer	:	**TELIT COMMUNICATIONS S.P.A. VIA STAZIONE DI PROSECCO 5B - SGONICO -TRIESTE - ITALY**
Standard	:	**FCC 47 CFR Part 2, 90(R)**

The product was received on Mar. 17, 2020 and testing was started from Apr. 01, 2020 and completed on Jul. 10, 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.

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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 **3**
Summary of Test Result **4**
1 General Description **5**
1.1 Product Feature of Equipment Under Test 5
1.2 Modification of EUT 5
1.3 Testing Site 6
1.4 Applied Standards 6
2 Test Configuration of Equipment Under Test **7**
2.1 Test Mode 7
2.2 Connection Diagram of Test System 8
2.3 Support Unit used in test configuration and system 8
2.4 Measurement Results Explanation Example 8
2.5 Frequency List of Low/Middle/High Channels 9
3 Conducted Test Items **10**
3.1 Measuring Instruments 10
3.2 Conducted Output Power Measurement 11
3.3 Peak-to-Average Ratio 12
3.4 Occupied Bandwidth 13
3.5 Conducted Band Edge 14
3.6 Emission Mask 15
3.7 Conducted Spurious Emission 16
3.8 Frequency Stability 17
4 Radiated Test Items **18**
4.1 Measuring Instruments 18
4.2 Radiated Spurious Emission 20
5 List of Measuring Equipment **21**
6 Uncertainty of Evaluation **22**
Appendix A. Test Results of Conducted Test
Appendix B. Test Results of ERP and Radiated Test
Appendix C. Test Setup Photographs

History of this test report

Report No.	Version	Description	Issued Date
FG031715-01E	01	Initial issue of report	Jul. 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	§2.1053 §90.543 (e)(3) §90.543 (f)	Radiated Spurious Emission	Pass	Under limit 8.96 dB at 9234.000 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: Tina Chuang

1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE/5G NR, and GNSS.

Product Specification subjective to this standard	
Antenna Type	**WWAN:** <Ant. 0> Dipole Antenna <Ant. 1> Dipole Antenna <Ant. 2> Dipole Antenna <Ant. 3> Dipole Antenna **GNSS :** **<1559 MHz ~ 1610 MHz>:** <Ant. 3> Dipole Antenna <Ant. 4> Dipole Antenna **<1164 MHz ~ 1215 MHz>:** <Ant. 2> Dipole Antenna

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	03CH07-HY
Test Engineer	Jacky Wang	Jesse Wang, Stan Hsieh, Ken Wu
Temperature	22.5~24.5°C	23~25°C
Relative Humidity	46~56%	50~56%

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

FCC Designation No.: TW1190

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.

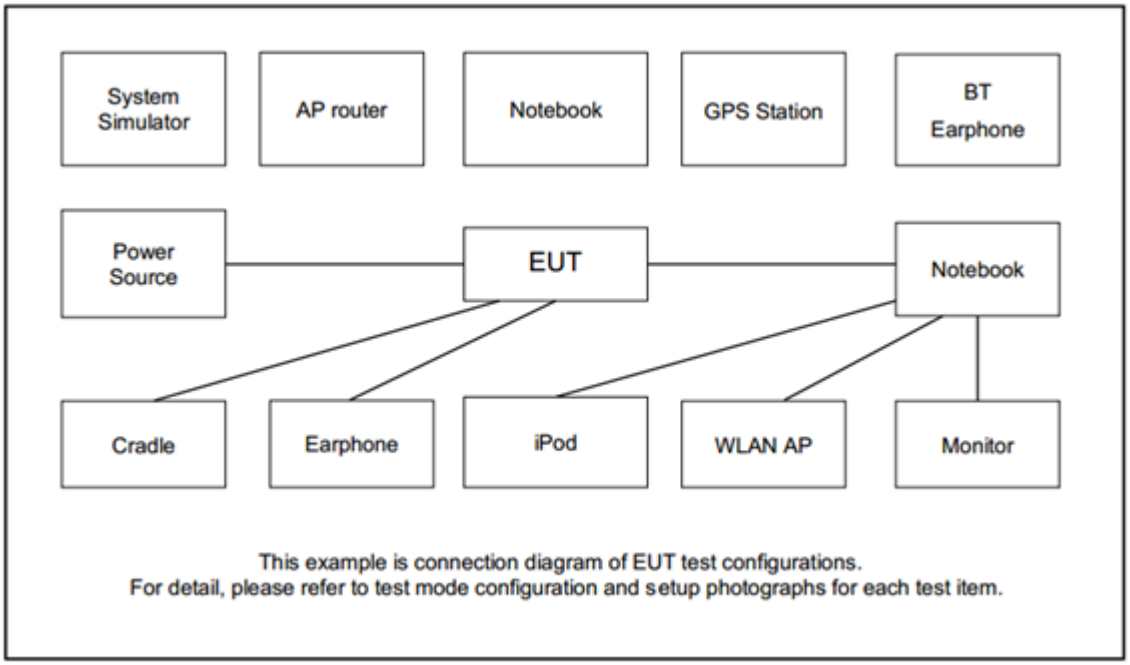
2 Test Configuration of Equipment Under Test

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.

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	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			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	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	DC power Supply	Agilent	E3610A	N/A	N/A	N/A
2.	System Simulator	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

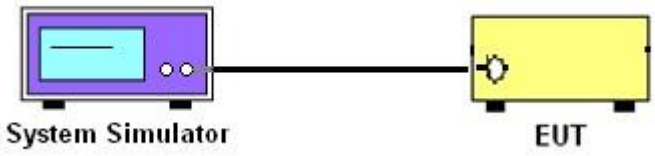
3 Conducted Test Items

3.1 Measuring Instruments

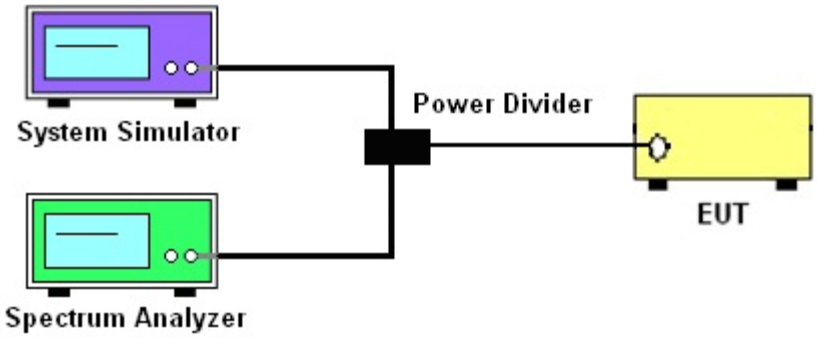
See list of measuring instruments of this test report.

3.1.1 Test Setup

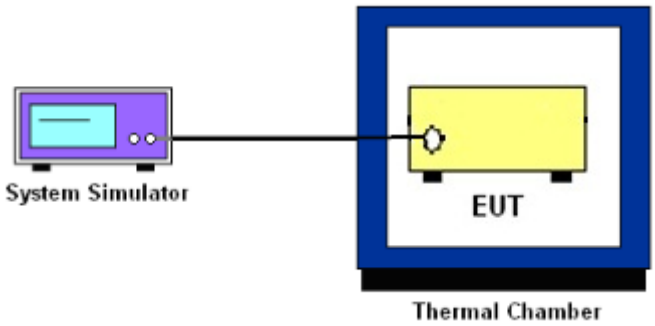
3.1.2 Conducted Output Power



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

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.

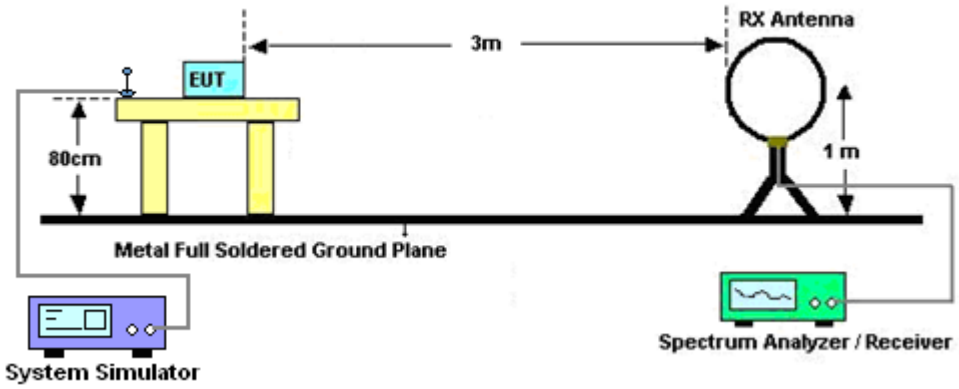
4 Radiated Test Items

4.1 Measuring Instruments

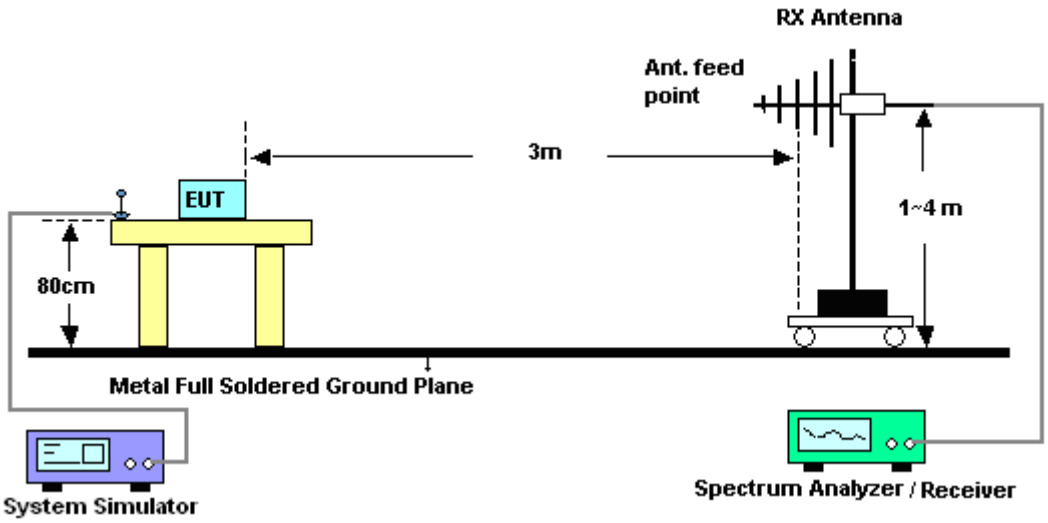
See list of measuring instruments of this test report.

4.1.1 Test Setup

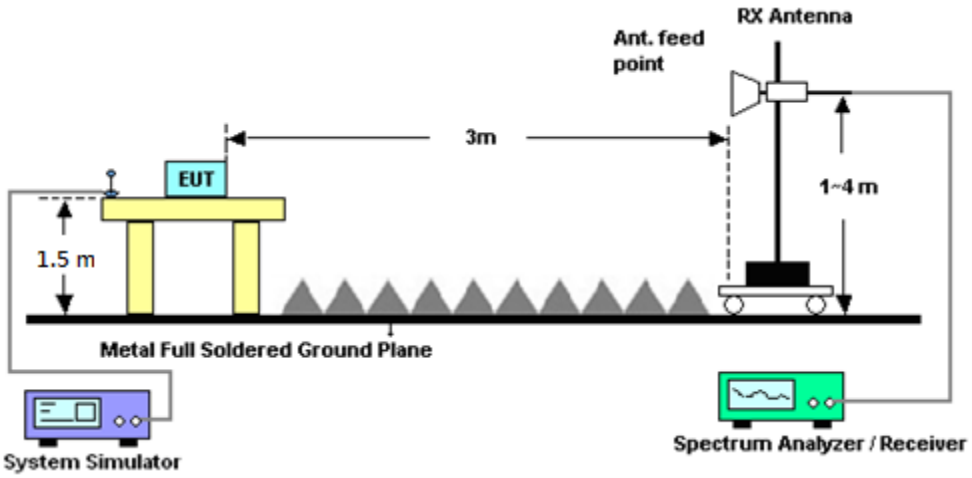
For radiated emissions below 30MHz



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 Radiated Spurious Emission

4.2.1 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.

4.2.2 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	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 15, 2019	Apr 17, 2020 ~ Jul. 10, 2020	Nov. 14, 2020	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃~90℃	Sep. 02, 2019	Apr 17, 2020 ~ Jul. 10, 2020	Sep. 01, 2020	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 09, 2019	Apr 17, 2020 ~ Jul. 10, 2020	Oct. 08, 2020	Conducted (TH05-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#A	1-18GHz	Jan. 13, 2020	Apr 17, 2020 ~ Jul. 10, 2020	Jan. 12, 2021	Conducted (TH05-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D0 1N-06	35419 & 03	30MHz~1GHz	Apr. 30, 2019	Apr. 01, 2020 ~ Apr. 28, 2020	Apr. 29, 2020	Radiation (03CH07-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D0 1N-06	35419 & 03	30MHz~1GHz	Apr. 29, 2020	Apr. 30, 2020 ~ Jun. 19, 2020	Apr. 28, 2021	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Dec. 06, 2019	Apr. 01, 2020 ~ Jun. 19, 2020	Dec. 05, 2020	Radiation (03CH07-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz~44GHz	Feb. 10, 2020	Apr. 01, 2020 ~ Jun. 19, 2020	Feb. 09, 2021	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz~1GHz	May 20, 2019	Apr. 01, 2020 ~ May 18, 2020	May 19, 2020	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz~1GHz	May 19, 2020	May 20, 2020~ Jun. 19, 2020	May 18, 2021	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~26.5GHz	Nov. 01, 2019	Apr. 01, 2020 ~ Jun. 19, 2020	Oct. 31, 2020	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2858/2,801606/2	18GHz~40GHz	Feb. 25, 2020	Apr. 01, 2020 ~ Jun. 19, 2020	Feb. 24, 2021	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	30MHz~1GHz	Feb. 25, 2020	Apr. 01, 2020 ~ Jun. 19, 2020	Feb. 24, 2021	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	1GHz~18GHz	Feb. 25, 2020	Apr. 01, 2020 ~ Jun. 19, 2020	Feb. 24, 2021	Radiation (03CH07-HY)
Controller	ChainTek	Chaintek 3000	N/A	Control Turn table	N/A	Apr. 01, 2020 ~ Jun. 19, 2020	N/A	Radiation (03CH07-HY)
Controller	Max-Full	MF7802	MF780208368	Control Ant Mast	N/A	Apr. 01, 2020 ~ Jun. 19, 2020	N/A	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Apr. 01, 2020 ~ Jun. 19, 2020	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Apr. 01, 2020 ~ Jun. 19, 2020	N/A	Radiation (03CH07-HY)
USB Data Logger	TECPEL	TR-32	HE17XB2495	N/A	N/A	Apr. 01, 2020 ~ Jun. 19, 2020	N/A	Radiation (03CH07-HY)
Horn Antenna	EMCO	3117	00143261	1GHz~18GHz	Jan. 10, 2020	Apr. 01, 2020 ~ Jun. 19, 2020	Jan. 09, 2021	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~40GHz	Nov. 26, 2019	Apr. 01, 2020 ~ Jun. 19, 2020	Nov. 25, 2020	Radiation (03CH07-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 13, 2019	Apr. 01, 2020 ~ Jun. 19, 2020	Dec. 12, 2020	Radiation (03CH07-HY)
Software	Audix	E3 6.2009-8-24	N/A	N/A	N/A	Apr. 01, 2020 ~ Jun. 19, 2020	N/A	Radiation (03CH07-HY)
Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	Aug. 27, 2019	Apr. 01, 2020 ~ Jun. 19, 2020	Aug. 26, 2020	Radiation (03CH07-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))	**3.23**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.63**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.70**

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	-	**23.60**	-
10	1	25			23.51	
10	1	49			23.49	
10	25	0			22.62	
10	25	12			22.62	
10	25	25			22.63	
10	50	0			22.59	
10	1	0	16-QAM		22.98	
10	1	25			22.94	
10	1	49			22.85	
10	25	0			21.61	
10	25	12			21.61	
10	25	25			21.64	
10	50	0			21.59	
10	1	0	64-QAM		21.79	
10	1	25			21.84	
10	1	49			21.75	
10	25	0			20.67	
10	25	12			20.66	
10	25	25			20.67	
10	50	0			20.61	
5	1	0	QPSK	23.41	23.45	23.41
5	1	12		23.34	23.41	23.40
5	1	24		23.32	23.36	23.26
5	12	0		22.54	22.61	22.53
5	12	7		22.48	22.55	22.50
5	12	13		22.51	22.55	22.46
5	25	0		22.46	22.55	22.52
5	1	0	16-QAM	22.83	22.87	22.86
5	1	12		22.90	22.93	22.91
5	1	24		22.70	22.71	22.65
5	12	0		21.38	21.47	21.47
5	12	7		21.42	21.49	21.42
5	12	13		21.40	21.50	21.50
5	25	0		21.34	21.39	21.31
5	1	0	64-QAM	21.54	21.60	21.51
5	1	12		21.64	21.65	21.59
5	1	24		21.71	21.74	21.66
5	12	0		20.54	20.63	20.53
5	12	7		20.57	20.64	20.56
5	12	13		20.60	20.60	20.59
5	25	0		20.45	20.49	20.49

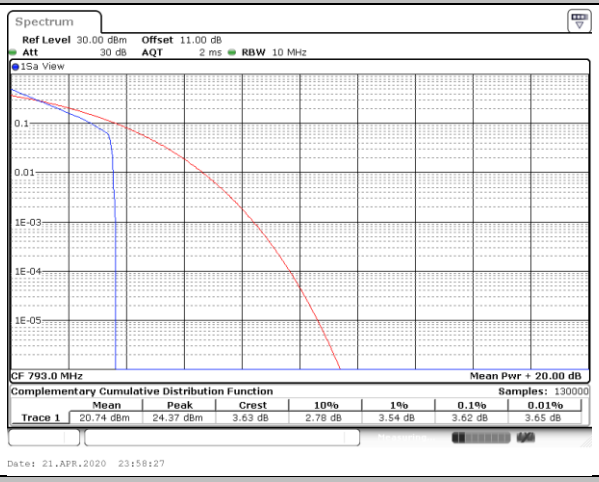
LTE Band 14

Peak-to-Average Ratio

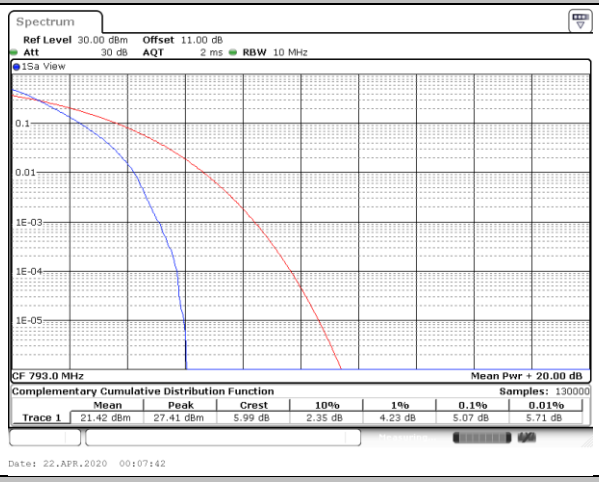
Mode	LTE Band 14 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	-	-	-	-	PASS
Middle CH	3.62	5.07	4.29	5.86	
Highest CH	-	-	-	-	
Mode	LTE Band 14 / 10MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB			Result
Lowest CH	-	-	-	-	PASS
Middle CH	7.22	6.43	-	-	
Highest CH	-	-	-	-	

LTE Band 14 / 10MHz / QPSK

Middle Channel / 1RB

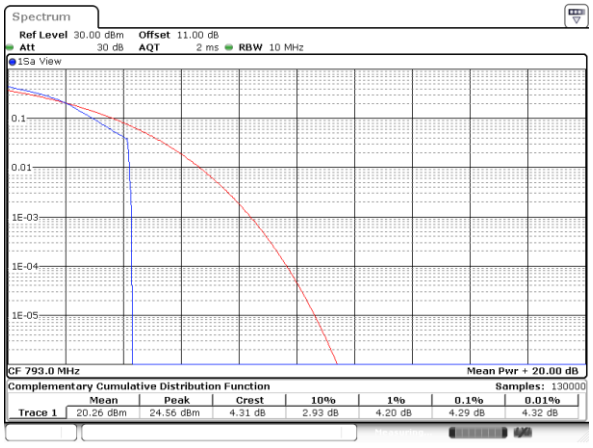


Middle Channel / Full RB

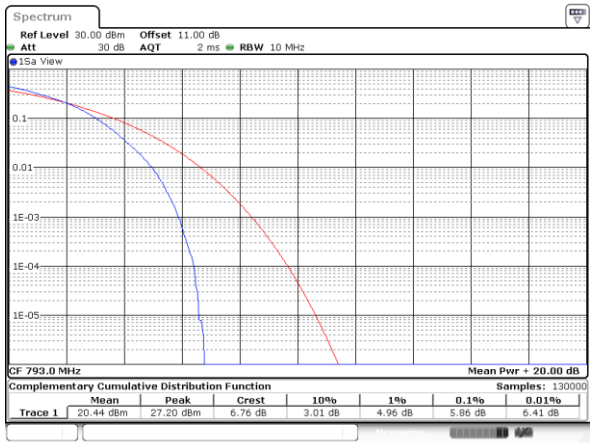


LTE Band 14 / 10MHz / 16QAM

Middle Channel / 1RB

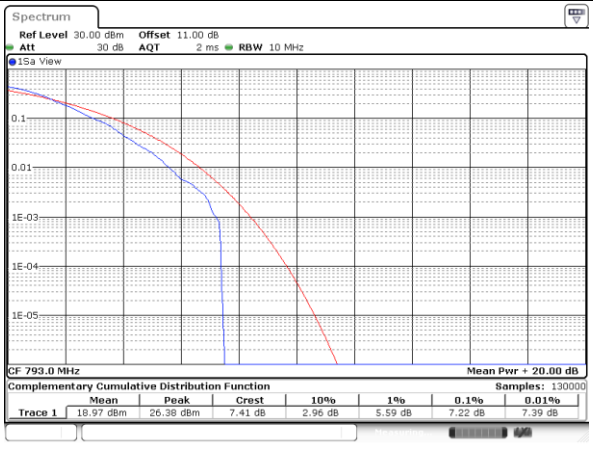


Middle Channel / Full RB

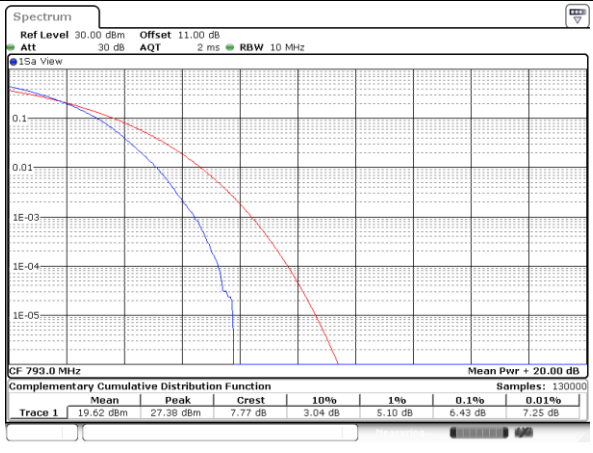


LTE Band 14 / 10MHz / 64QAM

Middle Channel / 1RB



Middle Channel / Full RB

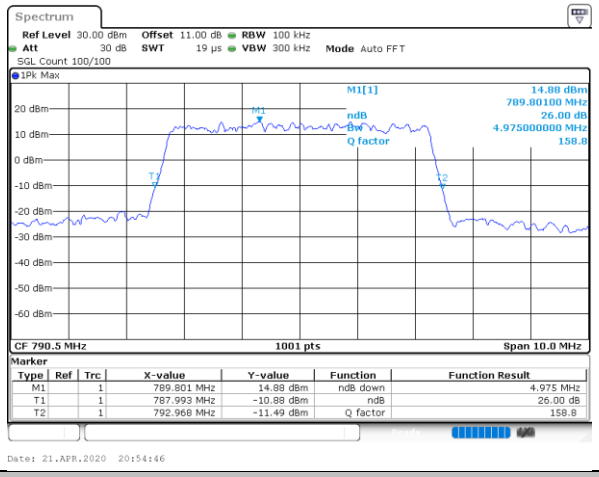


26dB Bandwidth

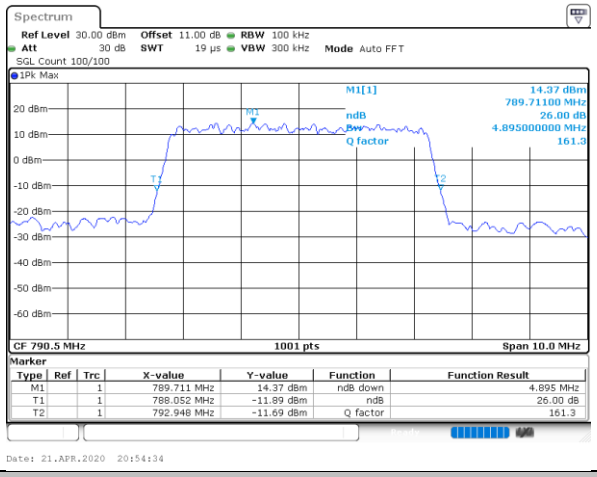
Mode	LTE Band 14 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.98	4.90	-	-	-	-	-	-
Middle CH	-	-	-	-	4.89	4.92	9.79	9.89	-	-	-	-
Highest CH	-	-	-	-	4.89	4.83	-	-	-	-	-	-
Mode	LTE Band 14 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	5.00	-	-	-	-	-	-	-
Middle CH	-	-	-	-	4.84	-	9.69	-	-	-	-	-
Highest CH	-	-	-	-	4.98	-	-	-	-	-	-	-

LTE Band 14

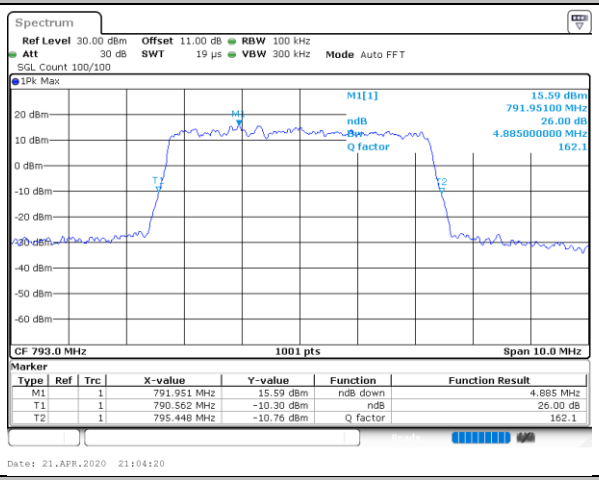
Lowest Channel / 5MHz / QPSK



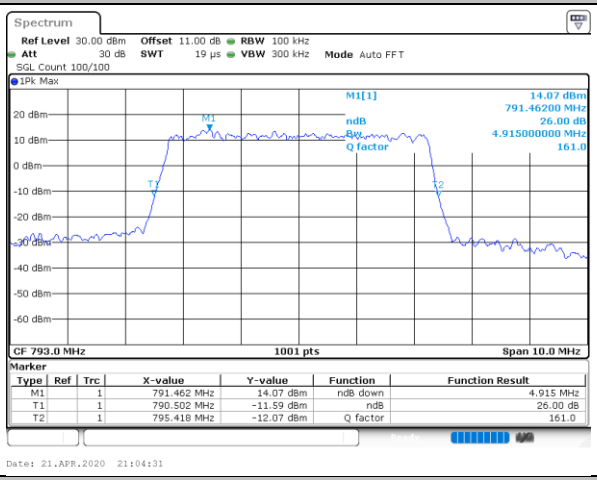
Lowest Channel / 5MHz / 16QAM



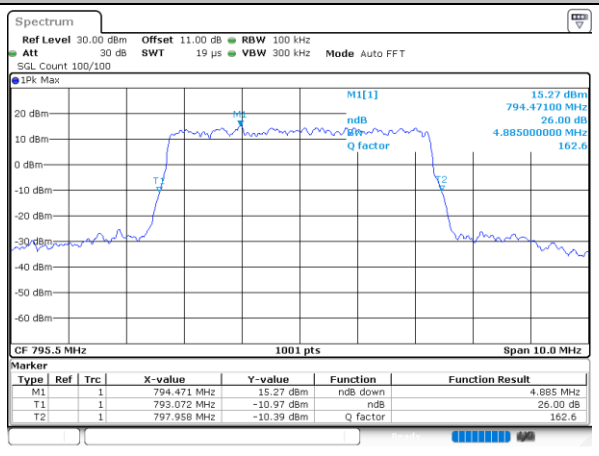
Middle Channel / 5MHz / QPSK



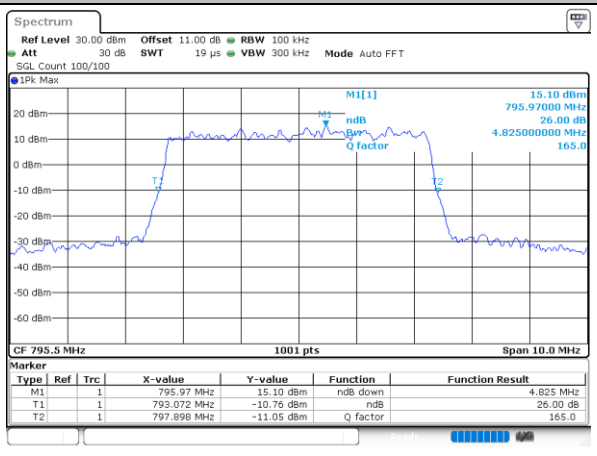
Middle Channel / 5MHz / 16QAM



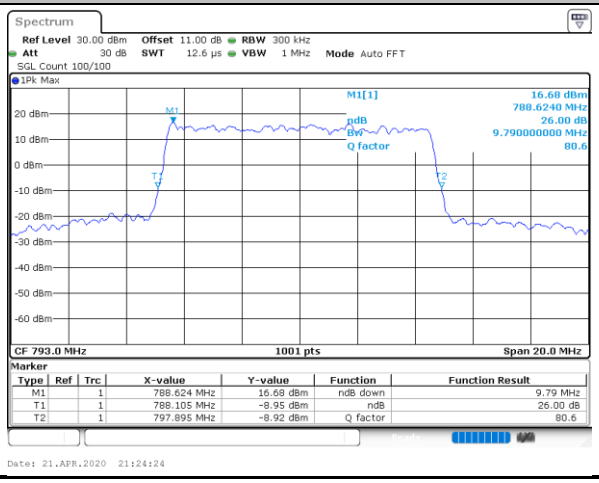
Highest Channel / 5MHz / QPSK

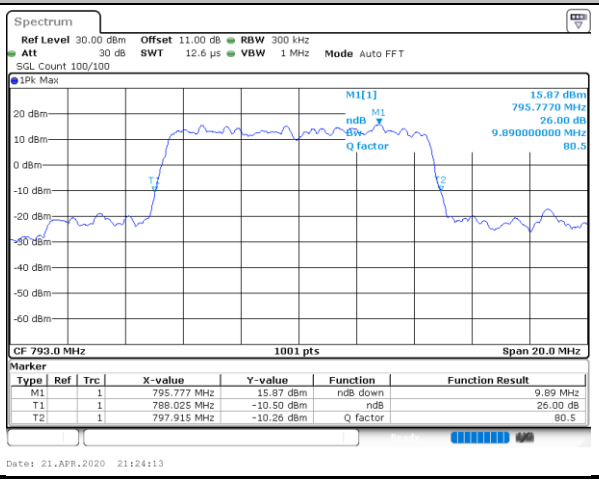


Highest Channel / 5MHz / 16QAM



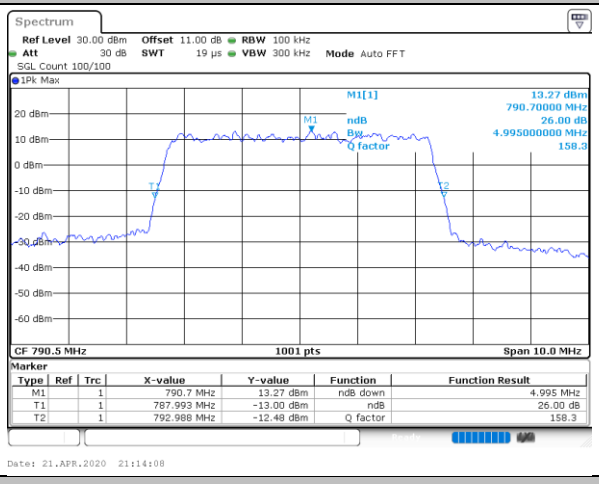
LTE Band 14	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**



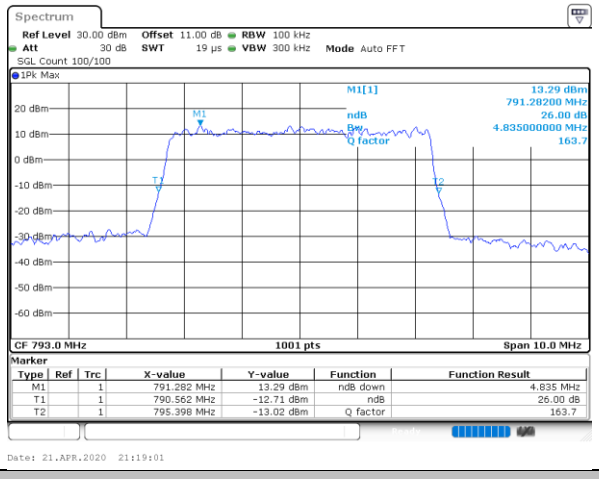


LTE Band 14

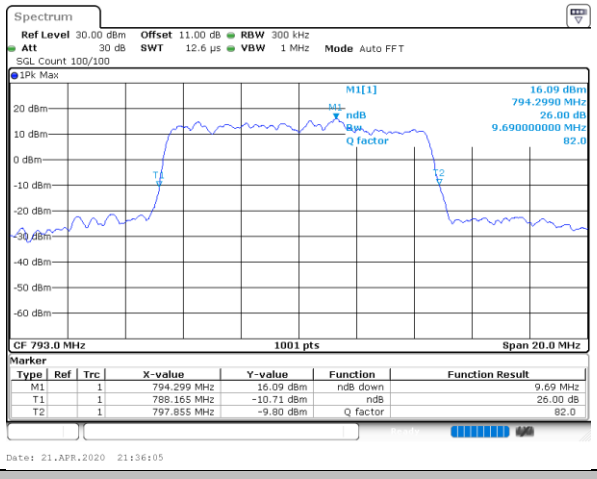
Lowest Channel / 5MHz / 64QAM



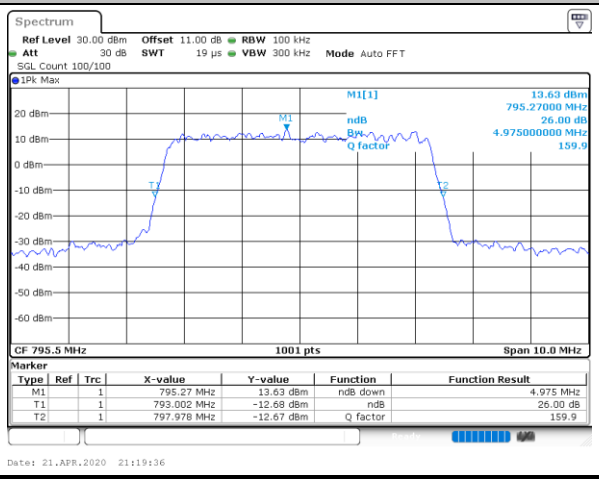
Middle Channel / 5MHz / 64QAM



Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM

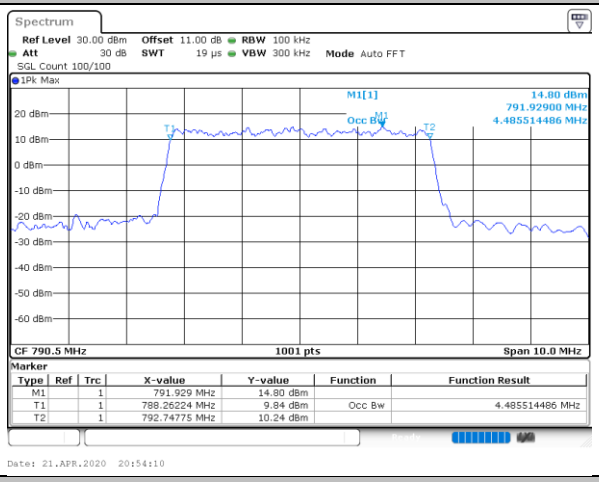


Occupied Bandwidth

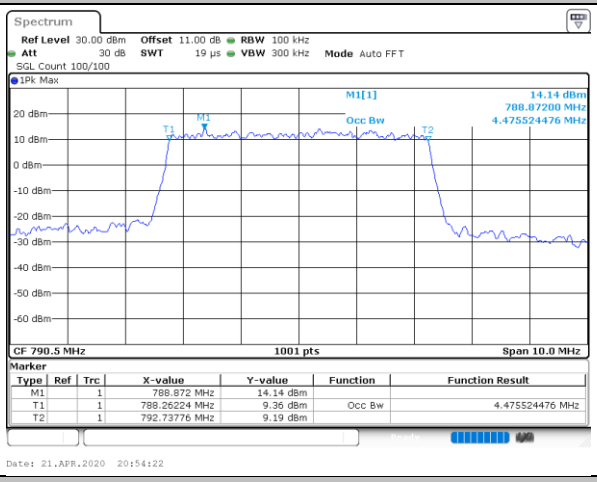
Mode	LTE Band 14 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.49	4.48	-	-	-	-	-	-
Middle CH	-	-	-	-	4.47	4.48	9.11	9.03	-	-	-	-
Highest CH	-	-	-	-	4.49	4.51	-	-	-	-	-	-
Mode	LTE Band 14 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.48	-	-	-	-	-	-	-
Middle CH	-	-	-	-	4.49	-	9.01	-	-	-	-	-
Highest CH	-	-	-	-	4.48	-	-	-	-	-	-	-

LTE Band 14

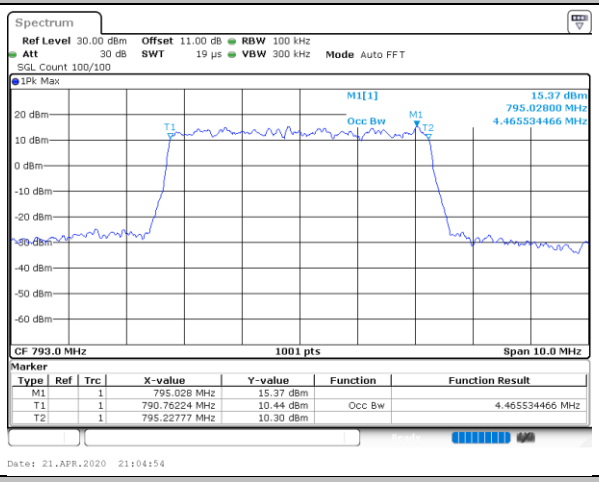
Lowest Channel / 5MHz / QPSK



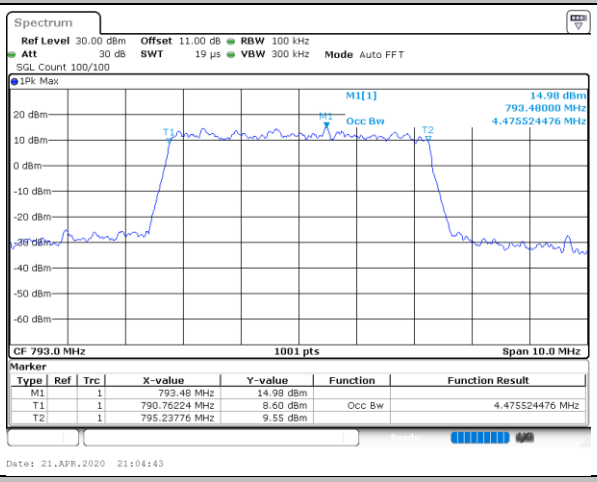
Lowest Channel / 5MHz / 16QAM



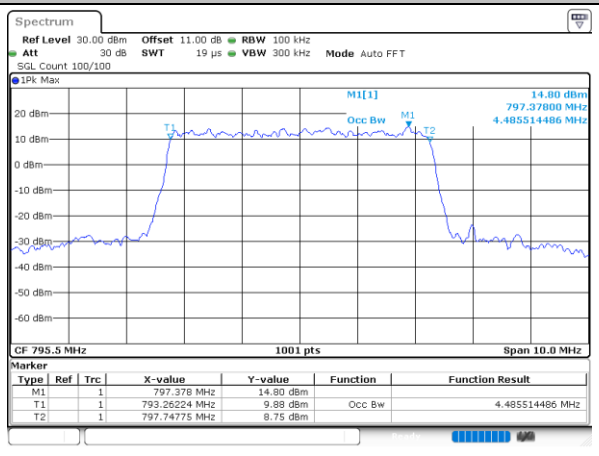
Middle Channel / 5MHz / QPSK



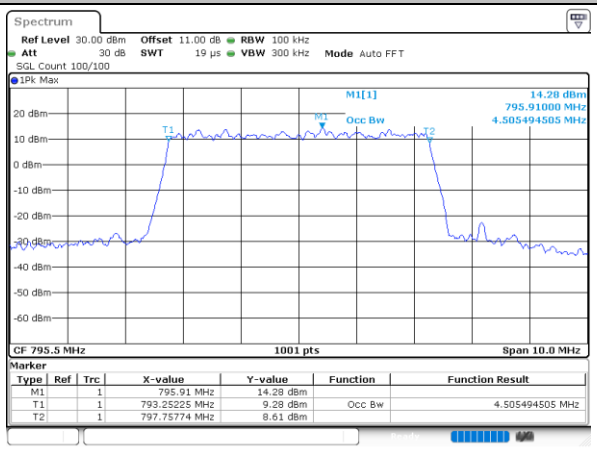
Middle Channel / 5MHz / 16QAM



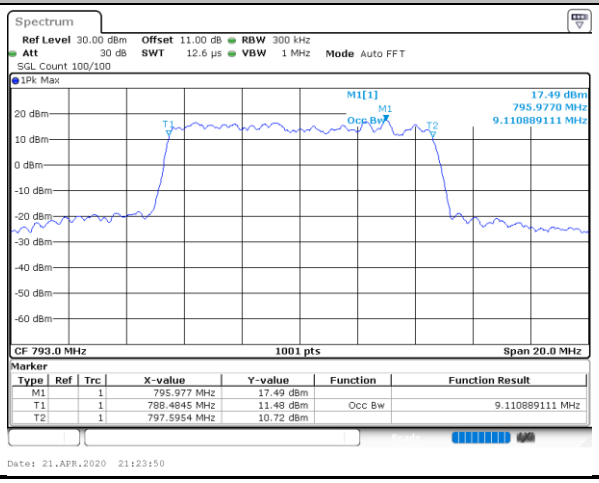
Highest Channel / 5MHz / QPSK

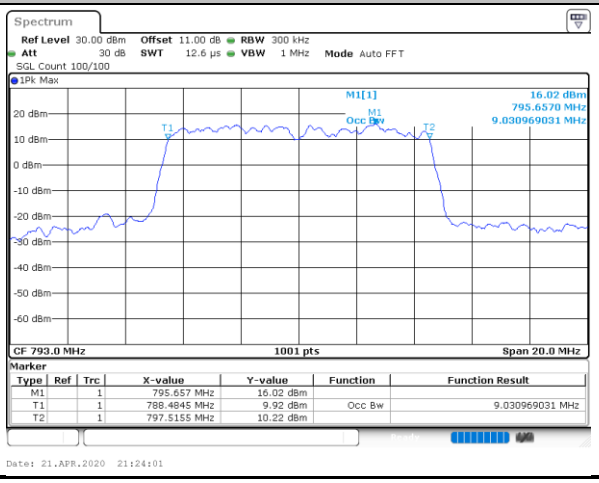


Highest Channel / 5MHz / 16QAM



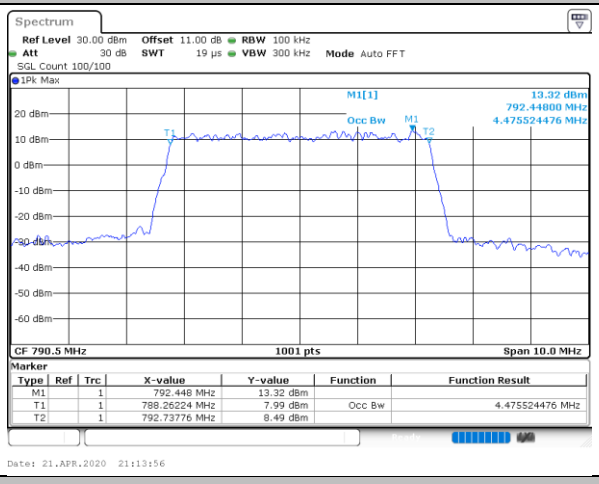
LTE Band 14	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**



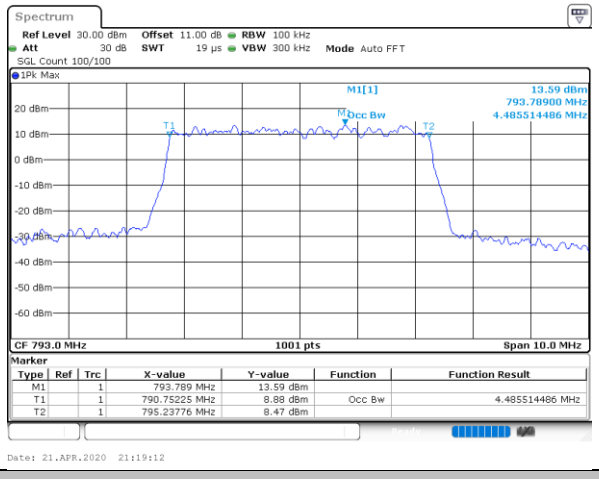


LTE Band 14

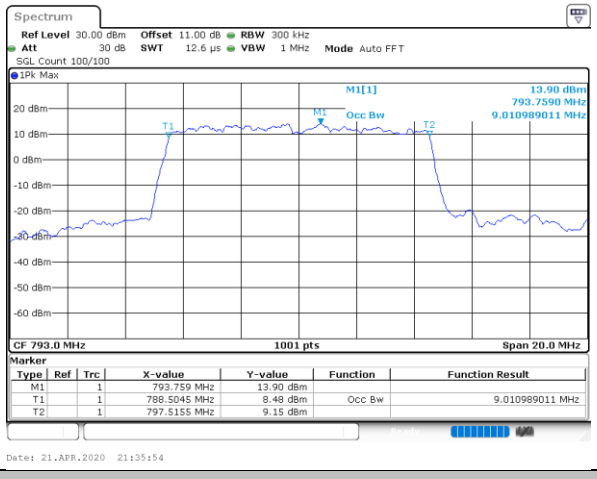
Lowest Channel / 5MHz / 64QAM



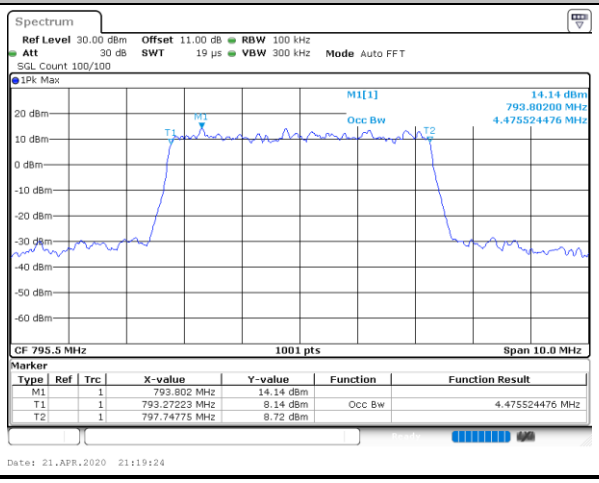
Middle Channel / 5MHz / 64QAM



Middle Channel / 10MHz / 64QAM



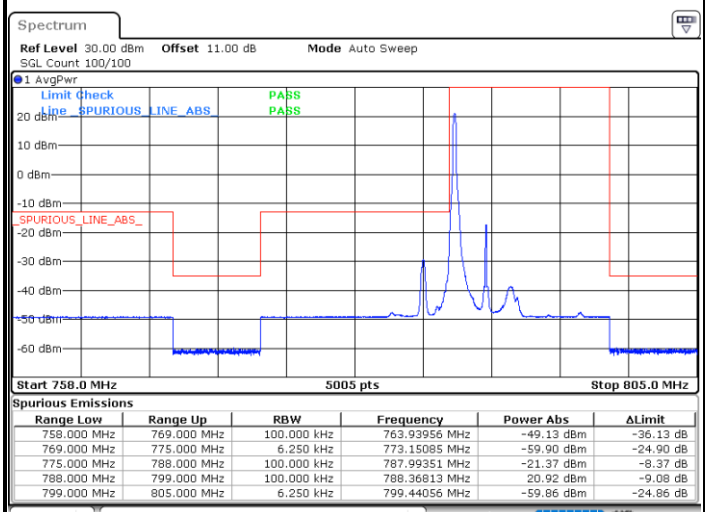
Highest Channel / 5MHz / 64QAM



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	763.93956 MHz	-49.13 dBm	-36.13 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.15085 MHz	-59.90 dBm	-24.90 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-21.37 dBm	-8.37 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.36813 MHz	20.92 dBm	-9.08 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.44056 MHz	-59.86 dBm	-24.86 dB

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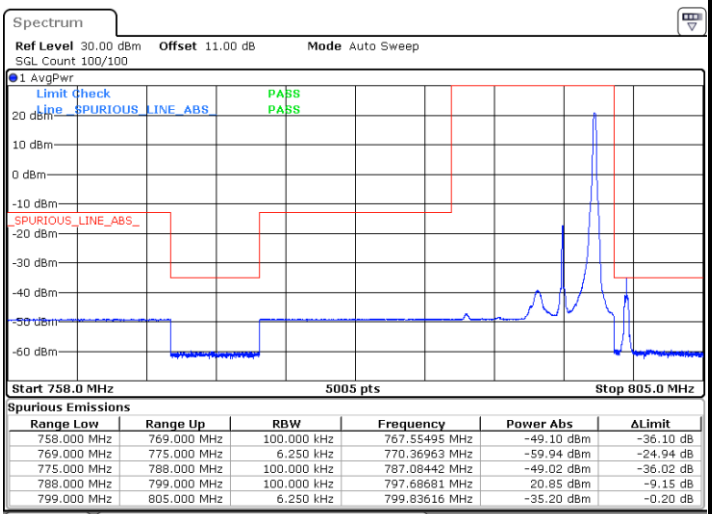
Highest Band Edge / 1 RB

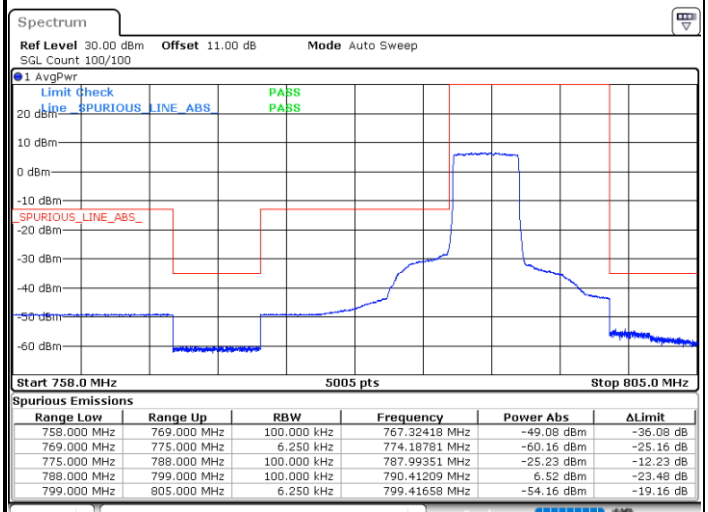


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	767.55495 MHz	-49.10 dBm	-36.10 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.36963 MHz	-59.94 dBm	-24.94 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.08442 MHz	-49.02 dBm	-36.02 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.68681 MHz	20.85 dBm	-9.15 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.83616 MHz	-35.20 dBm	-0.20 dB

Date: 21.APR.2020 21:12:24

Lowest Band Edge / Full RB

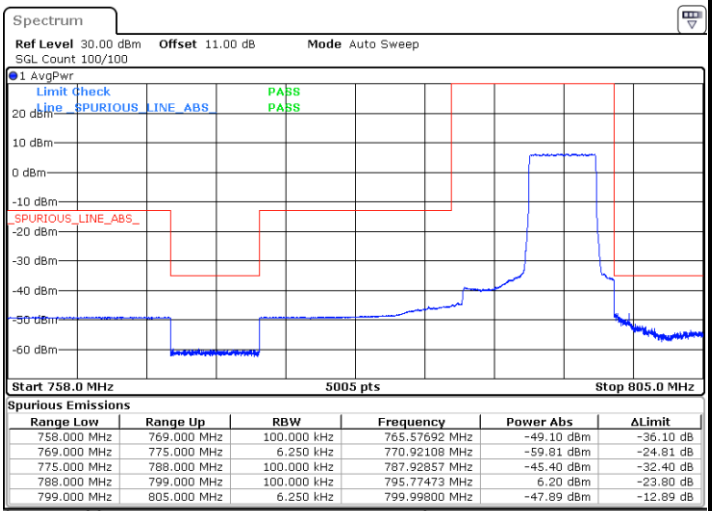


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	767.32418 MHz	-49.08 dBm	-36.08 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.18781 MHz	-60.16 dBm	-25.16 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-25.23 dBm	-12.23 dB
788.000 MHz	799.000 MHz	100.000 kHz	790.41209 MHz	6.52 dBm	-23.48 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.41658 MHz	-54.16 dBm	-19.16 dB

Date: 21.APR.2020 20:56:27

Highest Band Edge / Full RB



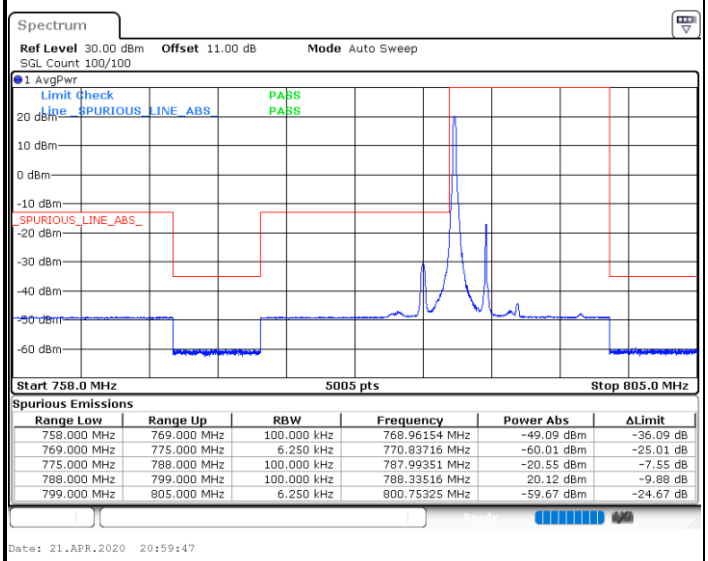
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	765.57692 MHz	-49.10 dBm	-36.10 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.92108 MHz	-59.81 dBm	-24.81 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.92857 MHz	-45.40 dBm	-32.40 dB
788.000 MHz	799.000 MHz	100.000 kHz	795.77473 MHz	6.20 dBm	-23.80 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.99800 MHz	-47.89 dBm	-12.89 dB

Date: 21.APR.2020 21:07:23

LTE Band 14 / 5MHz / 16QAM

Lowest Band Edge /1 RB

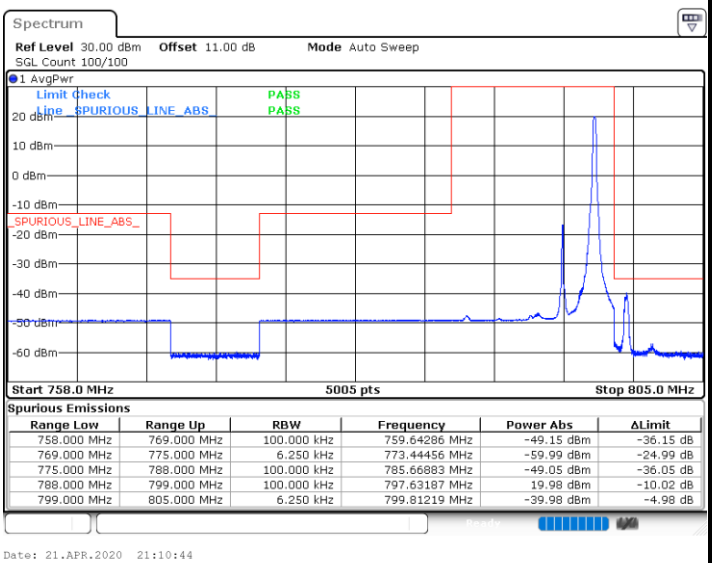


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	768.96154 MHz	-49.09 dBm	-36.09 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.83716 MHz	-60.01 dBm	-25.01 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-20.55 dBm	-7.55 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.33516 MHz	20.12 dBm	-9.88 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.75325 MHz	-59.67 dBm	-24.67 dB

Date: 21.APR.2020 20:59:47

Highest Band Edge / 1 RB

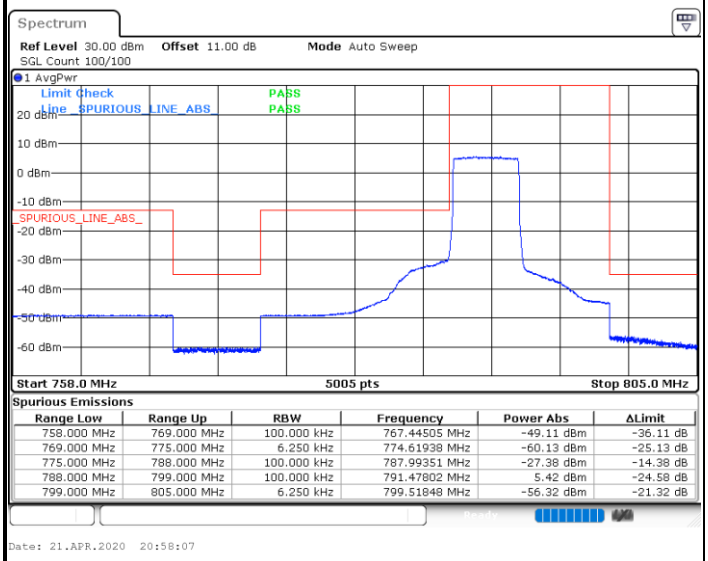


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.64286 MHz	-49.15 dBm	-36.15 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.44456 MHz	-59.99 dBm	-24.99 dB
775.000 MHz	788.000 MHz	100.000 kHz	785.66883 MHz	-49.05 dBm	-36.05 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.63187 MHz	19.98 dBm	-10.02 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.81219 MHz	-39.98 dBm	-4.98 dB

Date: 21.APR.2020 21:10:44

Lowest Band Edge / Full RB

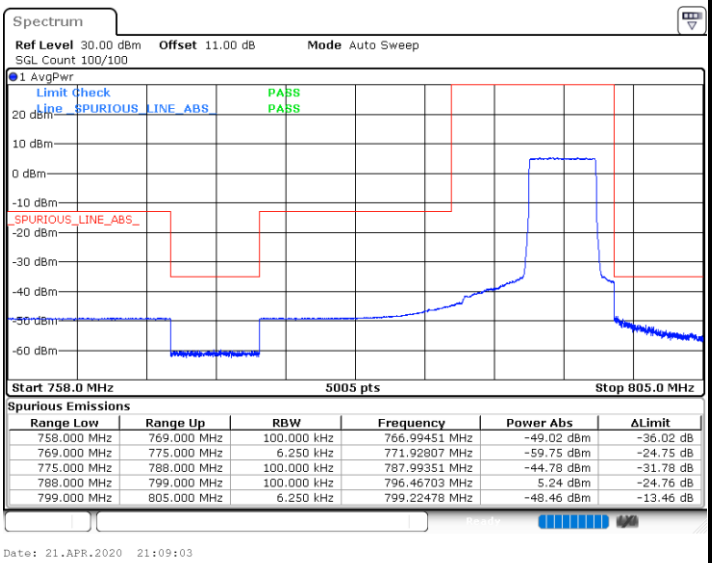


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	767.44505 MHz	-49.11 dBm	-36.11 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.61938 MHz	-60.13 dBm	-25.13 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-27.38 dBm	-14.38 dB
788.000 MHz	799.000 MHz	100.000 kHz	791.47802 MHz	5.42 dBm	-24.58 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.51848 MHz	-56.32 dBm	-21.32 dB

Date: 21.APR.2020 20:58:07

Highest Band Edge / Full RB



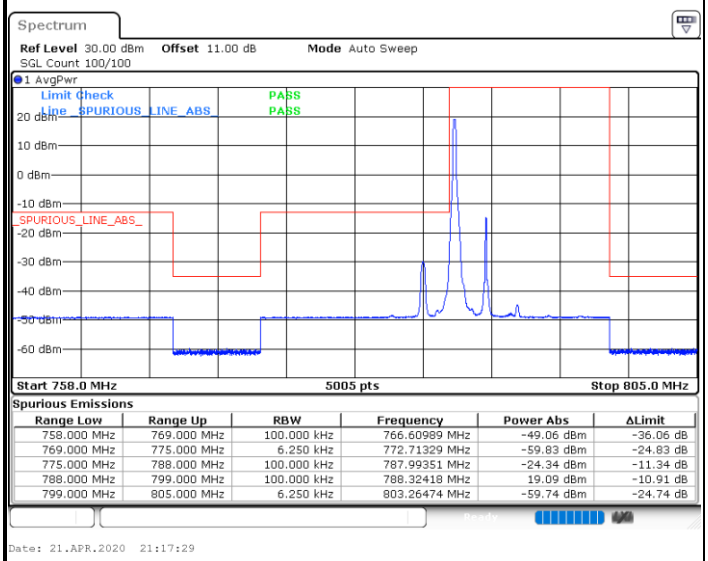
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	766.99451 MHz	-49.02 dBm	-36.02 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.92807 MHz	-59.75 dBm	-24.75 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-44.78 dBm	-31.78 dB
788.000 MHz	799.000 MHz	100.000 kHz	796.46703 MHz	5.24 dBm	-24.76 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.22478 MHz	-48.46 dBm	-13.46 dB

Date: 21.APR.2020 21:09:03

LTE Band 14 / 5MHz / 64QAM

Lowest Band Edge / 1 RB

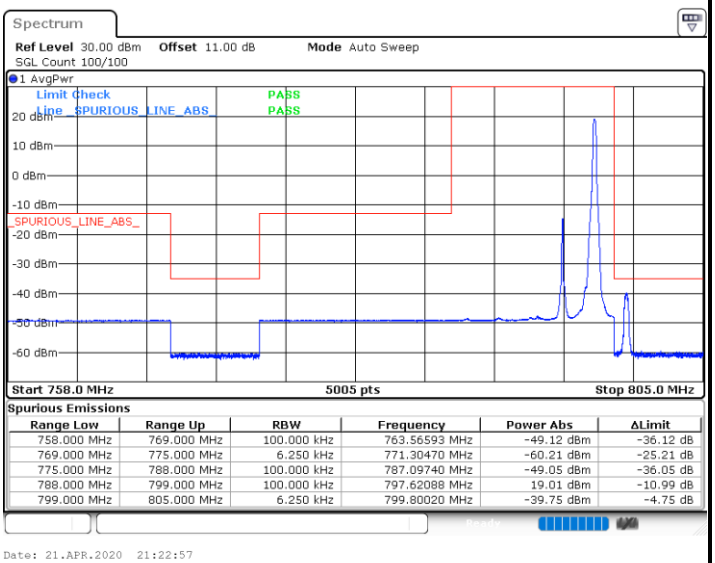


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	766.60989 MHz	-49.06 dBm	-36.06 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.71329 MHz	-59.83 dBm	-24.83 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-24.34 dBm	-11.34 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.32418 MHz	19.09 dBm	-10.91 dB
799.000 MHz	805.000 MHz	6.250 kHz	803.26474 MHz	-59.74 dBm	-24.74 dB

Date: 21.APR.2020 21:17:29

Highest Band Edge / 1 RB

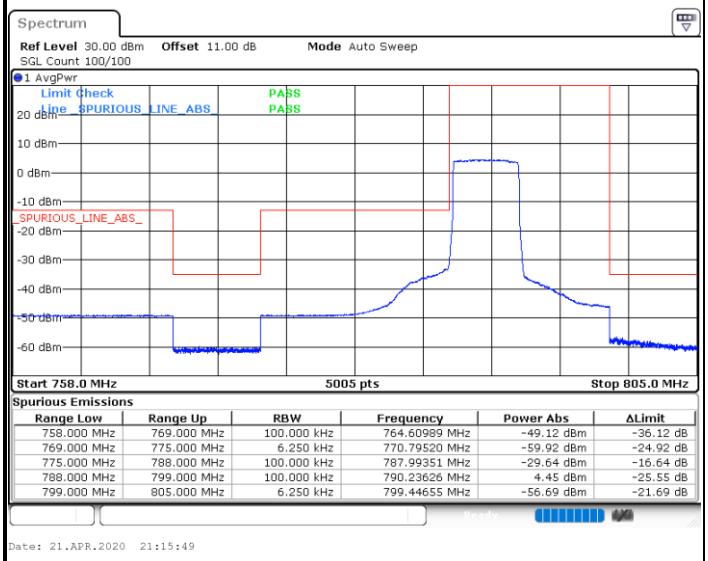


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	763.56593 MHz	-49.12 dBm	-36.12 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.30470 MHz	-60.21 dBm	-25.21 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.09740 MHz	-49.05 dBm	-36.05 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.62088 MHz	19.01 dBm	-10.99 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.80020 MHz	-39.75 dBm	-4.75 dB

Date: 21.APR.2020 21:22:57

Lowest Band Edge / Full RB

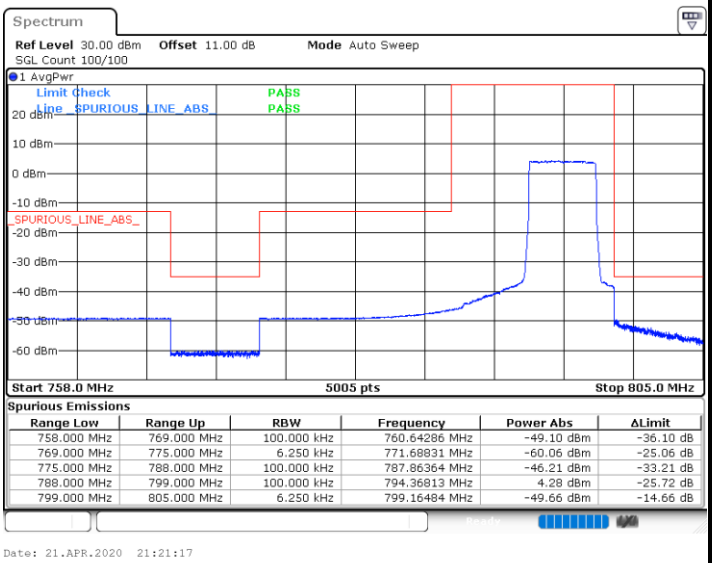


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	764.60989 MHz	-49.12 dBm	-36.12 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.79520 MHz	-59.92 dBm	-24.92 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-29.64 dBm	-16.64 dB
788.000 MHz	799.000 MHz	100.000 kHz	790.23626 MHz	4.45 dBm	-25.55 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.44655 MHz	-56.69 dBm	-21.69 dB

Date: 21.APR.2020 21:15:49

Highest Band Edge / Full RB

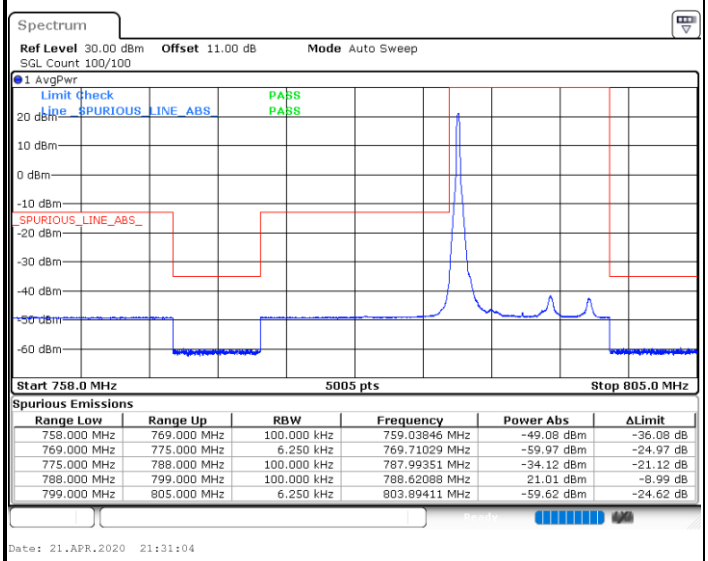


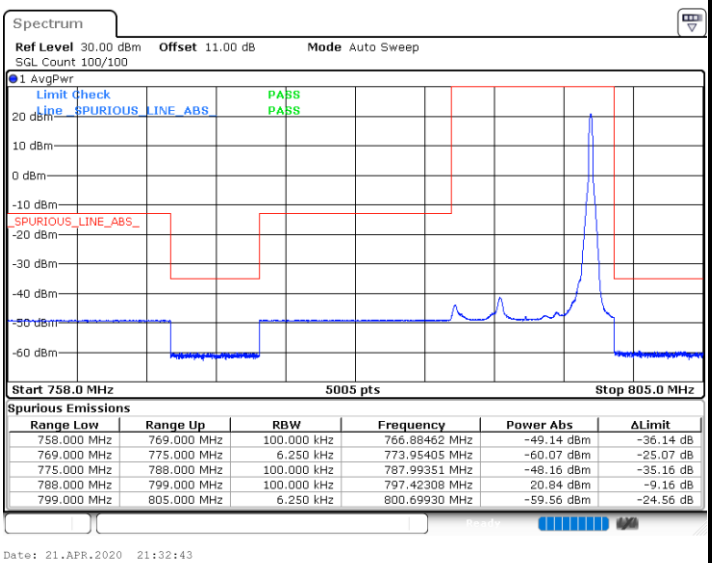
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	760.64286 MHz	-49.10 dBm	-36.10 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.68831 MHz	-60.06 dBm	-25.06 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.86364 MHz	-46.21 dBm	-33.21 dB
788.000 MHz	799.000 MHz	100.000 kHz	794.36813 MHz	4.28 dBm	-25.72 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.16484 MHz	-49.66 dBm	-14.66 dB

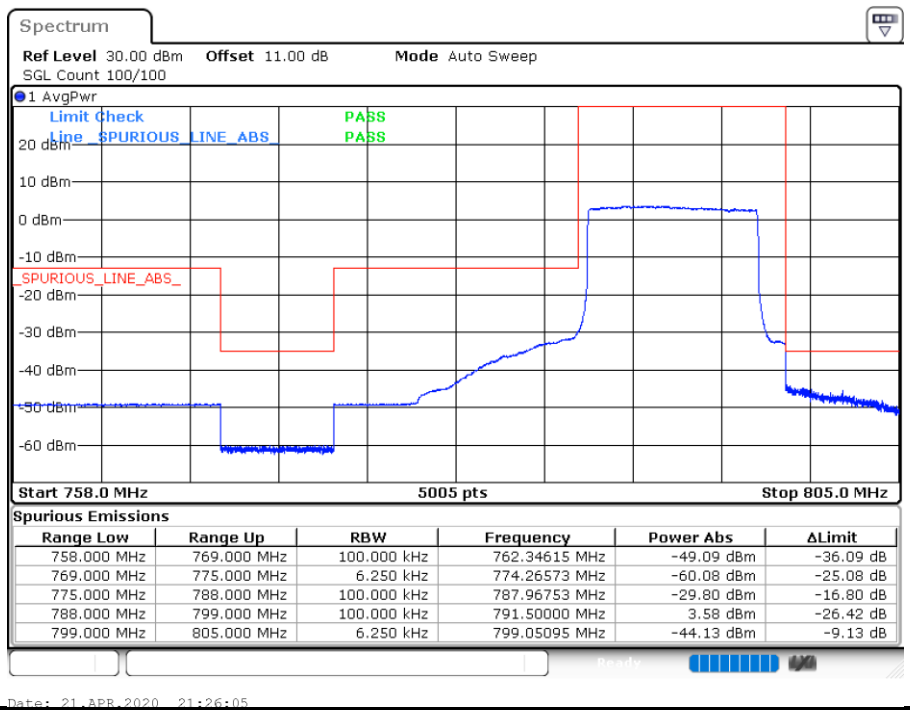
Date: 21.APR.2020 21:21:17

LTE Band 14 / 10MHz / QPSK	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**



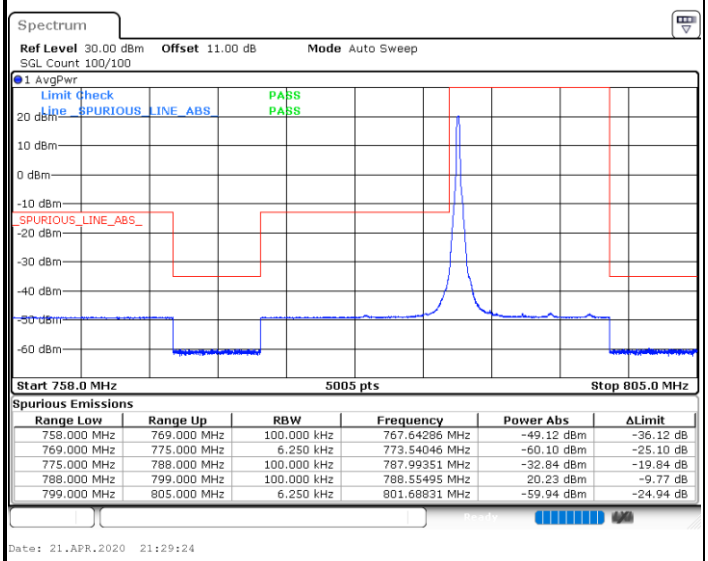


Band Edge / Full RB



LTE Band 14 / 10MHz / 16QAM

Lowest Band Edge / 1 RB

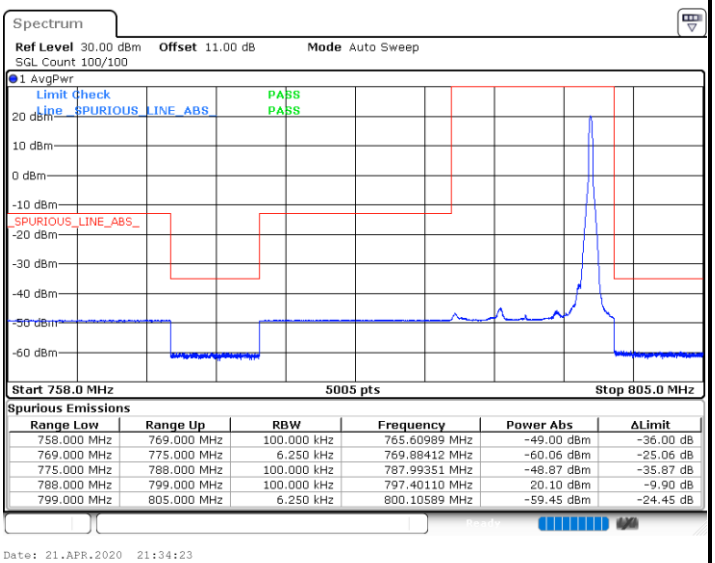


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	767.64286 MHz	-49.12 dBm	-36.12 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.54046 MHz	-60.10 dBm	-25.10 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-32.84 dBm	-19.84 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.55495 MHz	20.23 dBm	-9.77 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.68831 MHz	-59.94 dBm	-24.94 dB

Date: 21.APR.2020 21:29:24

Highest Band Edge / 1 RB

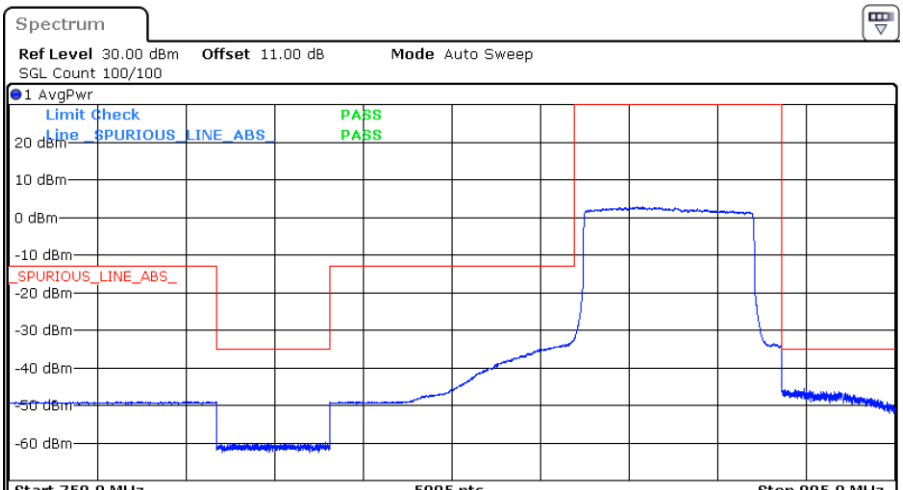


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	765.60989 MHz	-49.00 dBm	-36.00 dB
769.000 MHz	775.000 MHz	6.250 kHz	769.88412 MHz	-60.06 dBm	-25.06 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-48.87 dBm	-35.87 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.40110 MHz	20.10 dBm	-9.90 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.10589 MHz	-59.45 dBm	-24.45 dB

Date: 21.APR.2020 21:34:23

Band Edge / Full RB

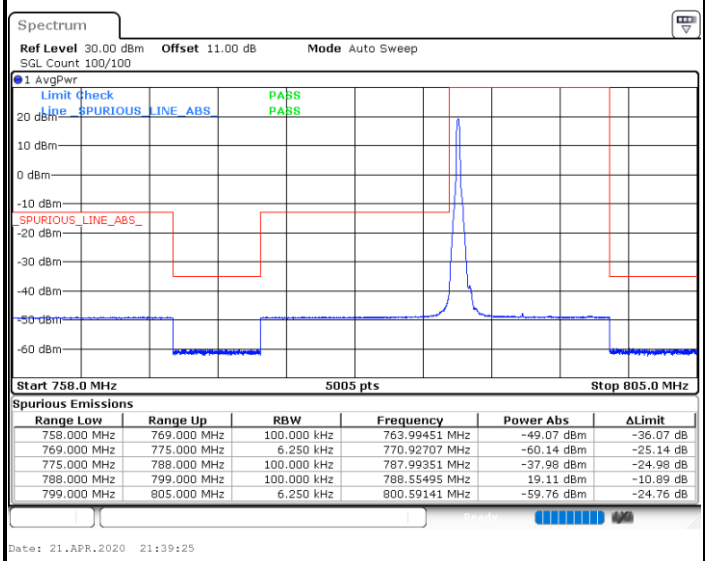


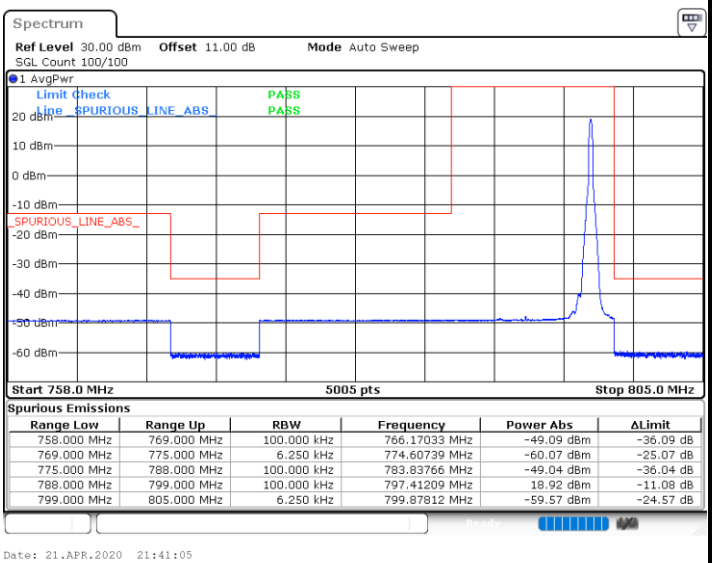
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	764.78571 MHz	-49.05 dBm	-36.05 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.76923 MHz	-59.98 dBm	-24.98 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-32.11 dBm	-19.11 dB
788.000 MHz	799.000 MHz	100.000 kHz	791.30220 MHz	2.73 dBm	-27.27 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.19580 MHz	-45.65 dBm	-10.65 dB

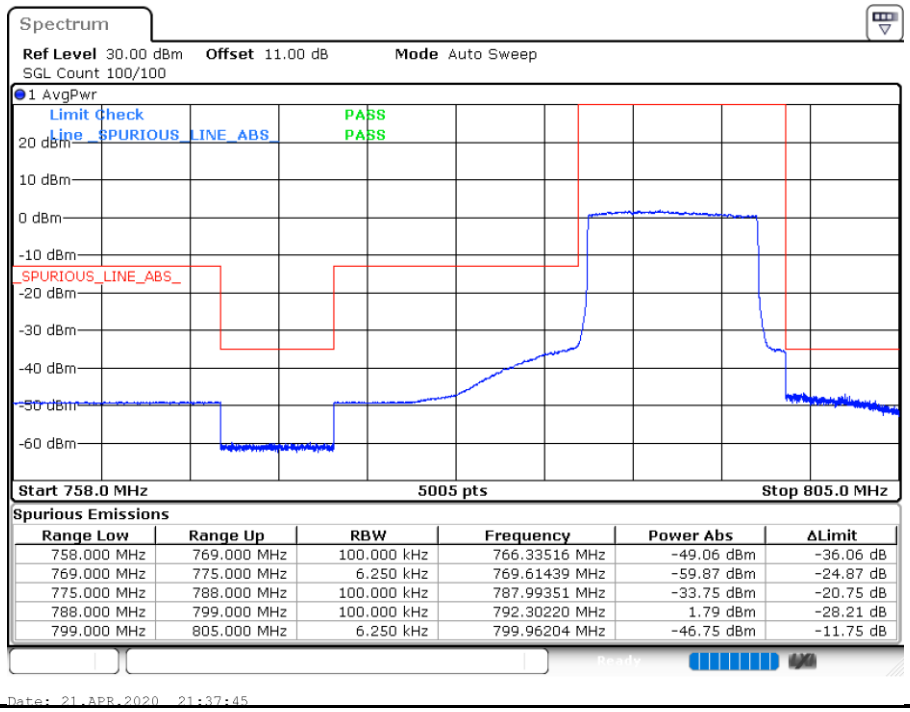
Date: 21.APR.2020 21:27:44

LTE Band 14 / 10MHz / 64QAM	
Lowest Band Edge / 1 RB	**Highest Band Edge / 1 RB**





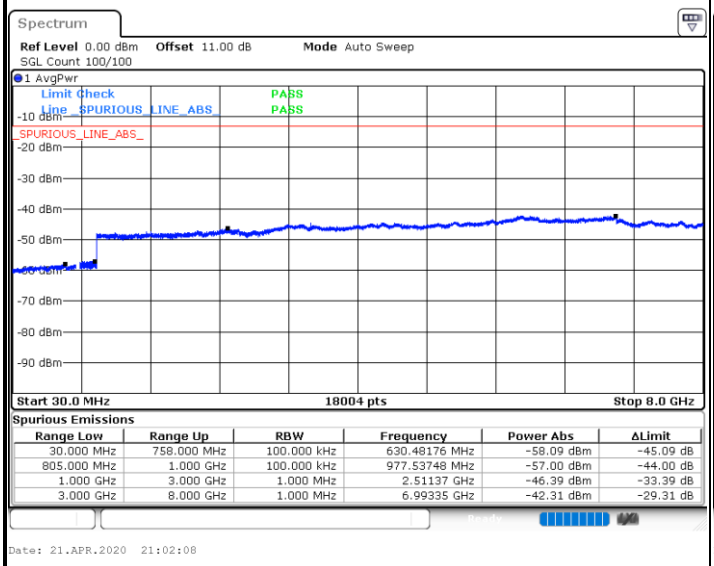
Band Edge / Full RB



Conducted Spurious Emission

LTE Band 14 / 5MHz

Lowest Channel / QPSK

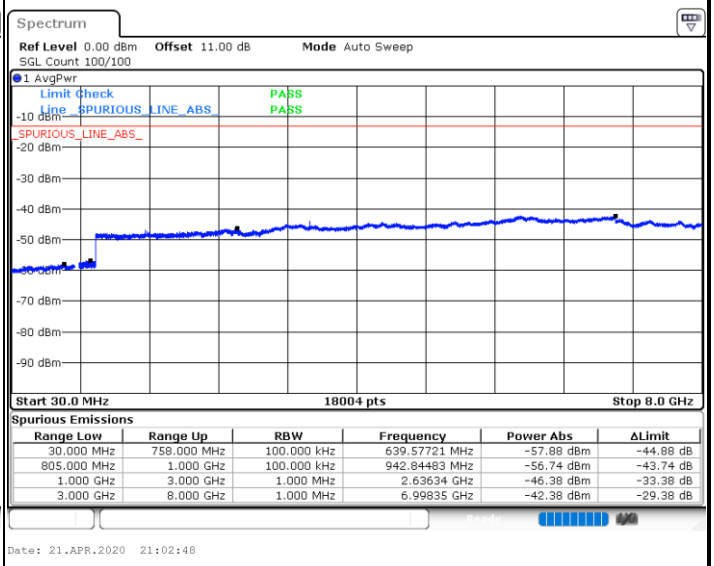


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	630.48176 MHz	-58.09 dBm	-45.09 dB
805.000 MHz	1.000 GHz	100.000 kHz	977.53748 MHz	-57.00 dBm	-44.00 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.51137 GHz	-46.39 dBm	-33.39 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99335 GHz	-42.31 dBm	-29.31 dB

Date: 21.APR.2020 21:02:08

Lowest Channel / 16QAM

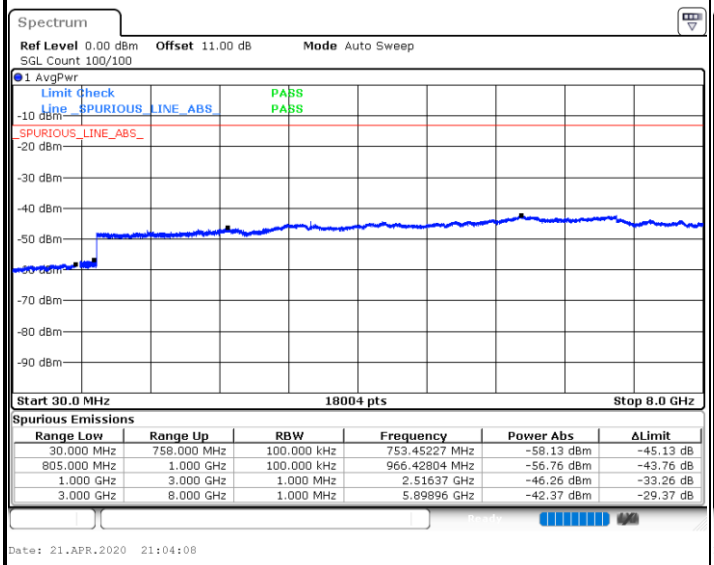


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	639.57721 MHz	-57.88 dBm	-44.88 dB
805.000 MHz	1.000 GHz	100.000 kHz	942.84483 MHz	-56.74 dBm	-43.74 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.63634 GHz	-46.38 dBm	-33.38 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99835 GHz	-42.38 dBm	-29.38 dB

Date: 21.APR.2020 21:02:48

Middle Channel / QPSK

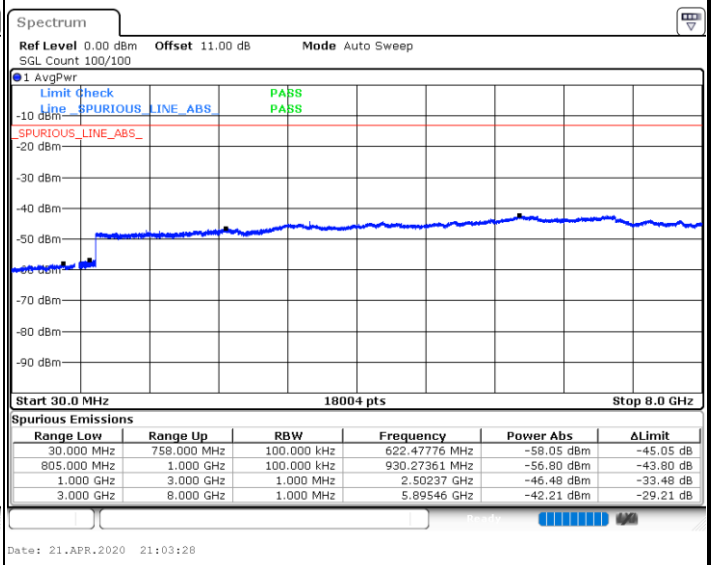


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	753.45227 MHz	-58.13 dBm	-45.13 dB
805.000 MHz	1.000 GHz	100.000 kHz	966.42804 MHz	-56.76 dBm	-43.76 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.51637 GHz	-46.26 dBm	-33.26 dB
3.000 GHz	8.000 GHz	1.000 MHz	5.89896 GHz	-42.37 dBm	-29.37 dB

Date: 21.APR.2020 21:04:08

Middle Channel / 16QAM



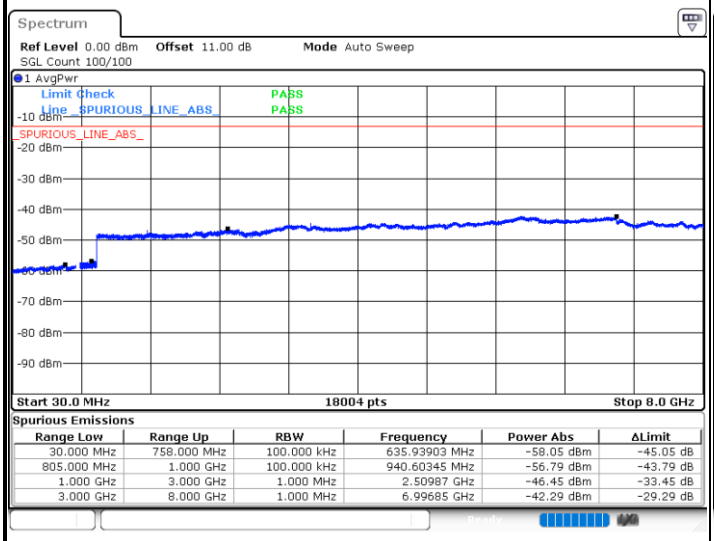
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	622.47776 MHz	-58.05 dBm	-45.05 dB
805.000 MHz	1.000 GHz	100.000 kHz	930.27361 MHz	-56.80 dBm	-43.80 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.50237 GHz	-46.48 dBm	-33.48 dB
3.000 GHz	8.000 GHz	1.000 MHz	5.89546 GHz	-42.21 dBm	-29.21 dB

Date: 21.APR.2020 21:03:28

LTE Band 14 / 5MHz

Highest Channel / QPSK

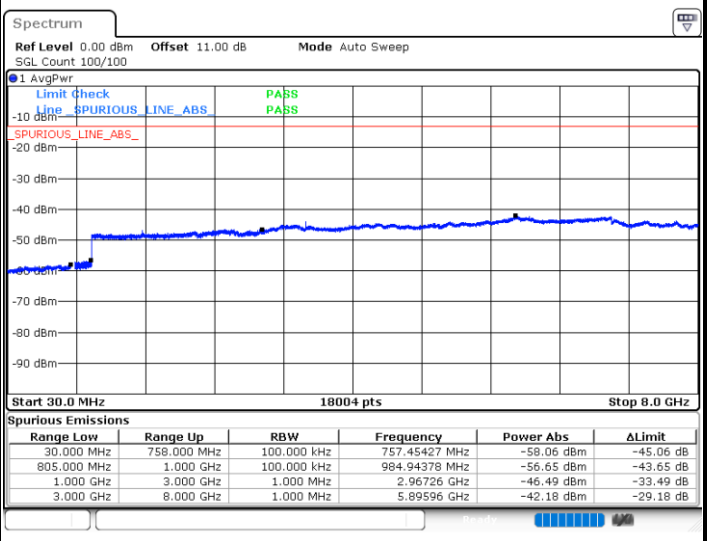


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	635.93903 MHz	-58.05 dBm	-45.05 dB
805.000 MHz	1.000 GHz	100.000 kHz	940.60345 MHz	-56.79 dBm	-43.79 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.50987 GHz	-46.45 dBm	-33.45 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99685 GHz	-42.29 dBm	-29.29 dB

Date: 21.APR.2020 21:13:04

Highest Channel / 16QAM



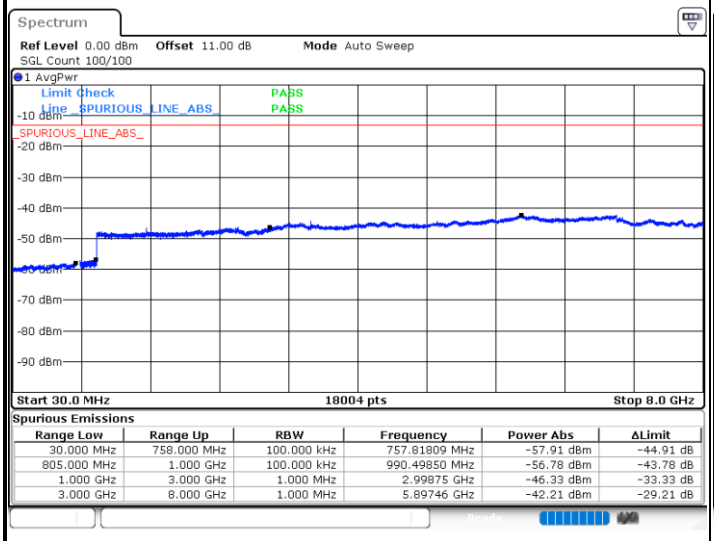
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	757.45427 MHz	-58.06 dBm	-45.06 dB
805.000 MHz	1.000 GHz	100.000 kHz	984.94378 MHz	-56.65 dBm	-43.65 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.96726 GHz	-46.49 dBm	-33.49 dB
3.000 GHz	8.000 GHz	1.000 MHz	5.89596 GHz	-42.18 dBm	-29.18 dB

Date: 21.APR.2020 21:13:44

LTE Band 14 / 10MHz

Middle Channel / QPSK

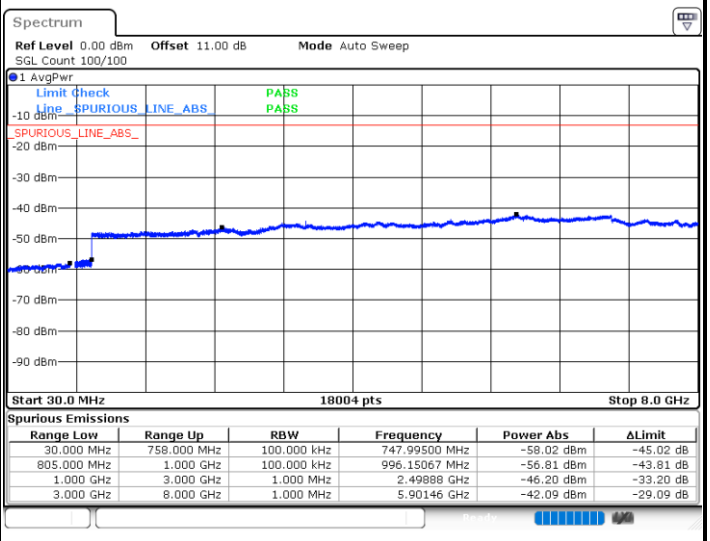


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	757.81809 MHz	-57.91 dBm	-44.91 dB
805.000 MHz	1.000 GHz	100.000 kHz	990.49850 MHz	-56.78 dBm	-43.78 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99875 GHz	-46.33 dBm	-33.33 dB
3.000 GHz	8.000 GHz	1.000 MHz	5.89746 GHz	-42.21 dBm	-29.21 dB

Date: 21.APR.2020 21:35:42

Middle Channel / 16QAM



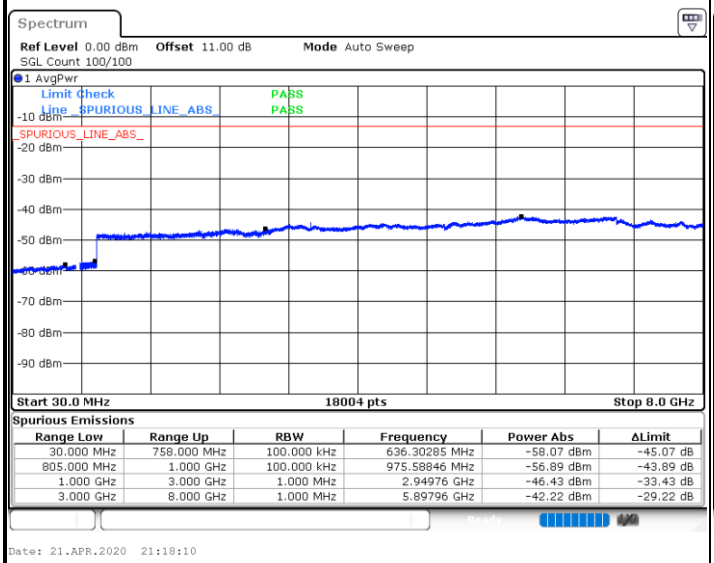
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	747.99500 MHz	-58.02 dBm	-45.02 dB
805.000 MHz	1.000 GHz	100.000 kHz	996.15067 MHz	-56.81 dBm	-43.81 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.49888 GHz	-46.20 dBm	-33.20 dB
3.000 GHz	8.000 GHz	1.000 MHz	5.90146 GHz	-42.09 dBm	-29.09 dB

Date: 21.APR.2020 21:35:03

LTE Band 14 / 5MHz

Lowest Channel / 64QAM

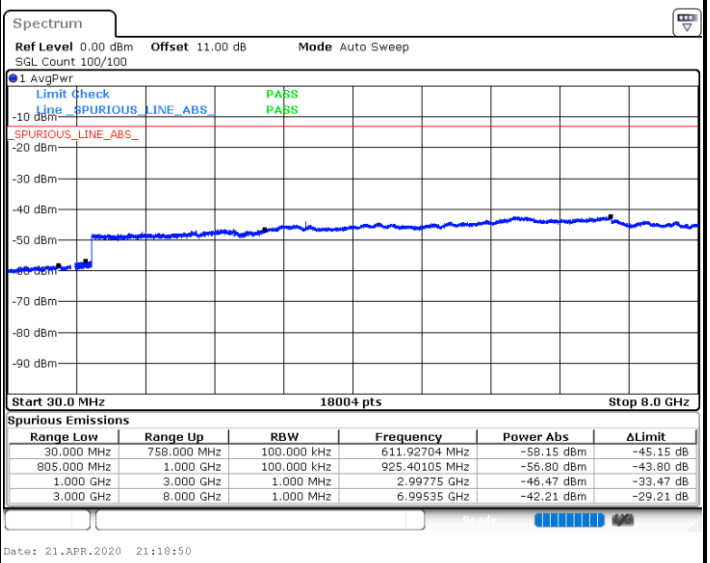


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	636.30285 MHz	-58.07 dBm	-45.07 dB
805.000 MHz	1.000 GHz	100.000 kHz	975.58846 MHz	-56.89 dBm	-43.89 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.94976 GHz	-46.43 dBm	-33.43 dB
3.000 GHz	8.000 GHz	1.000 MHz	5.89796 GHz	-42.22 dBm	-29.22 dB

Date: 21.APR.2020 21:18:10

Middle Channel / 64QAM

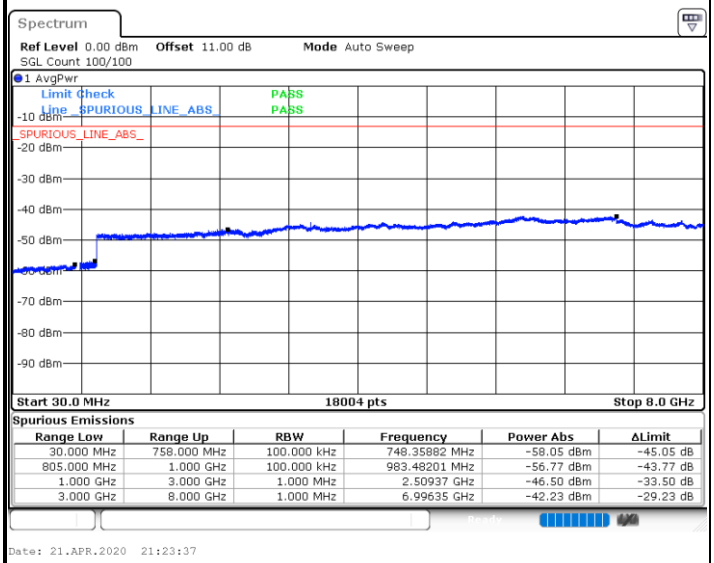


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	611.92704 MHz	-58.15 dBm	-45.15 dB
805.000 MHz	1.000 GHz	100.000 kHz	925.40105 MHz	-56.80 dBm	-43.80 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99775 GHz	-46.47 dBm	-33.47 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99535 GHz	-42.21 dBm	-29.21 dB

Date: 21.APR.2020 21:18:50

Highest Channel / 64QAM

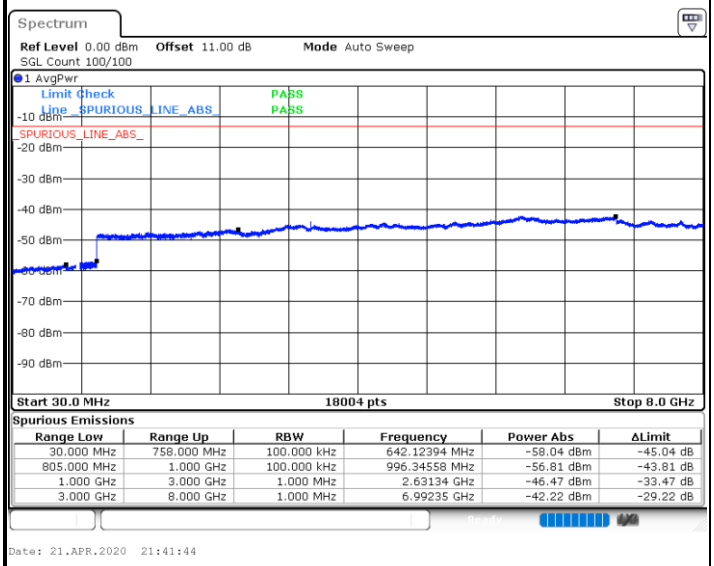


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	748.35882 MHz	-58.05 dBm	-45.05 dB
805.000 MHz	1.000 GHz	100.000 kHz	983.48201 MHz	-56.77 dBm	-43.77 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.50937 GHz	-46.50 dBm	-33.50 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99635 GHz	-42.23 dBm	-29.23 dB

Date: 21.APR.2020 21:23:37

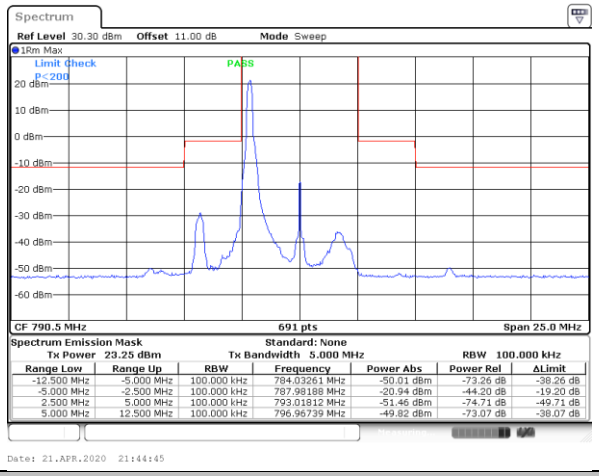
LTE Band 14 / 10MHz	
Middle Channel / 64QAM	

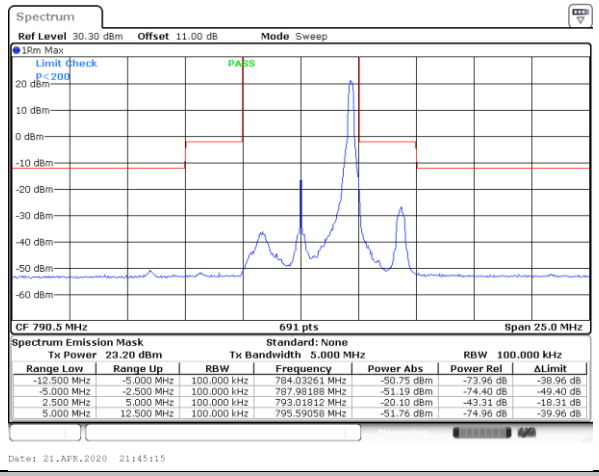


Mask

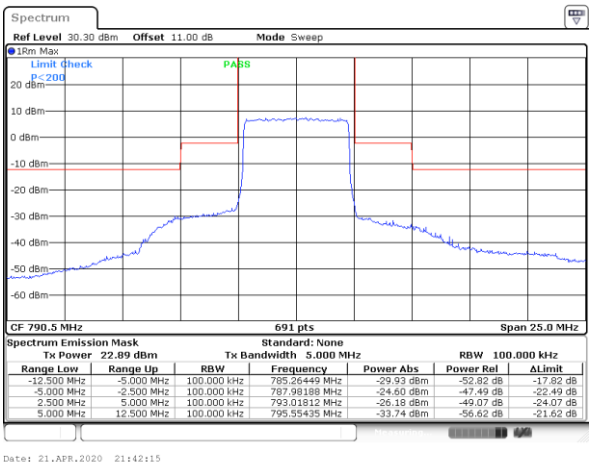
LTE Band 14 / 5MHz / QPSK

Lowest Channel / 1RB



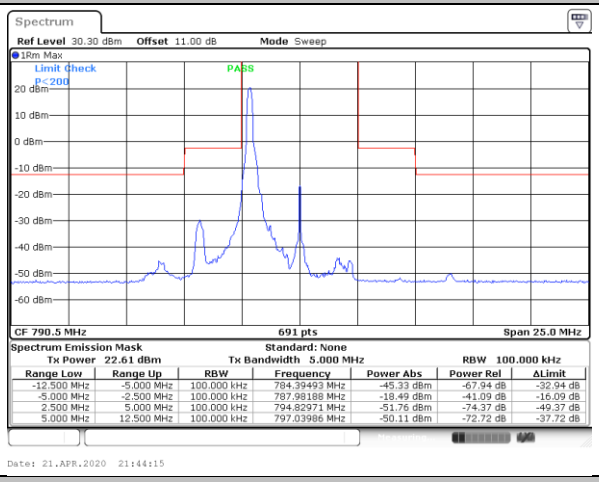


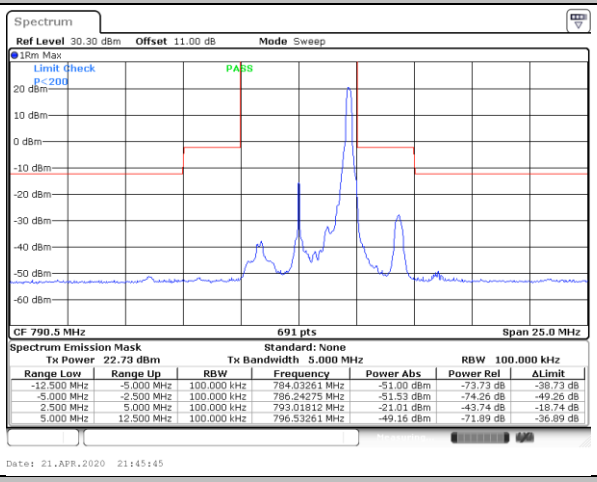
Lowest Channel / Full RB



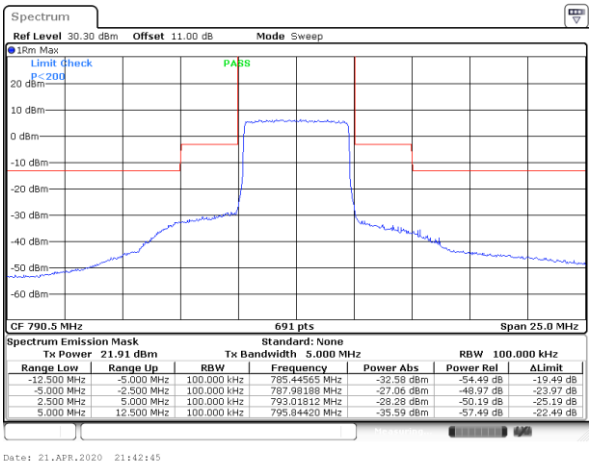
LTE Band 14 / 5MHz / 16QAM

Lowest Channel / 1RB



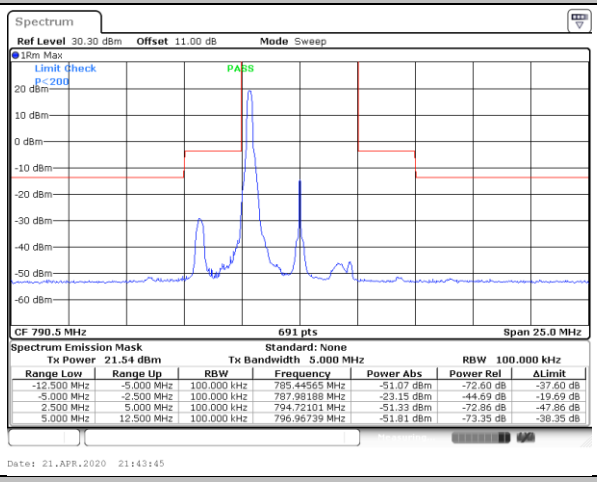


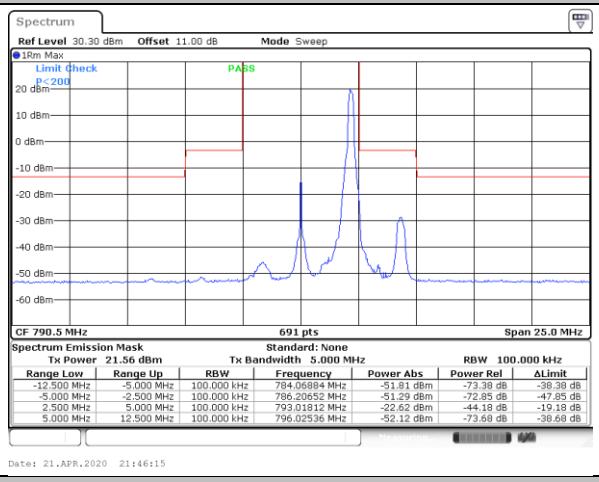
Lowest Channel / Full RB



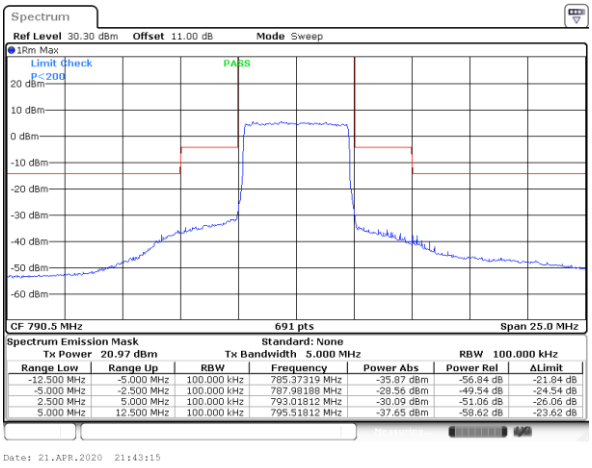
LTE Band 14 / 5MHz / 64QAM

Lowest Channel / 1RB



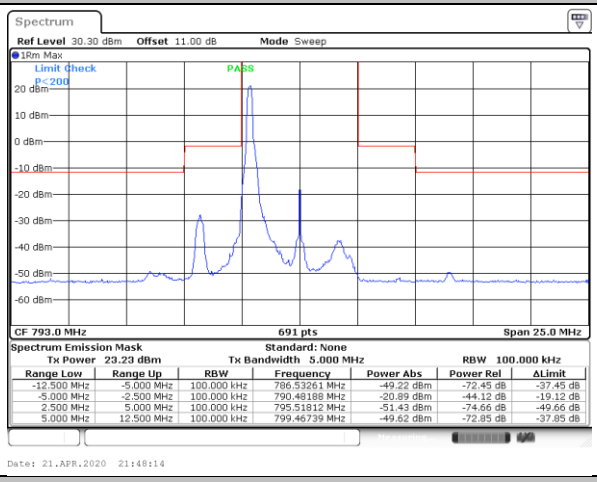


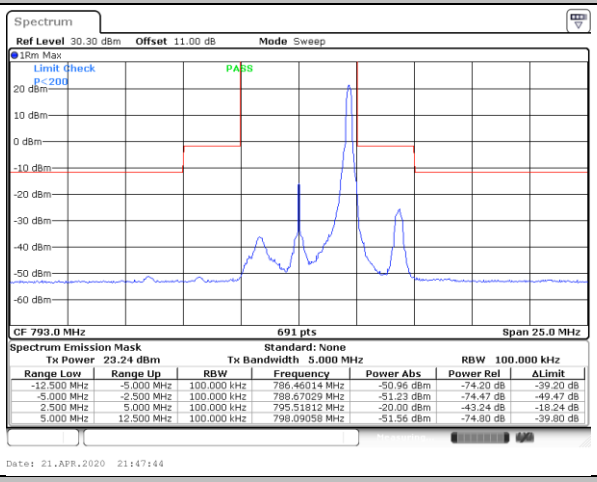
Lowest Channel / Full RB



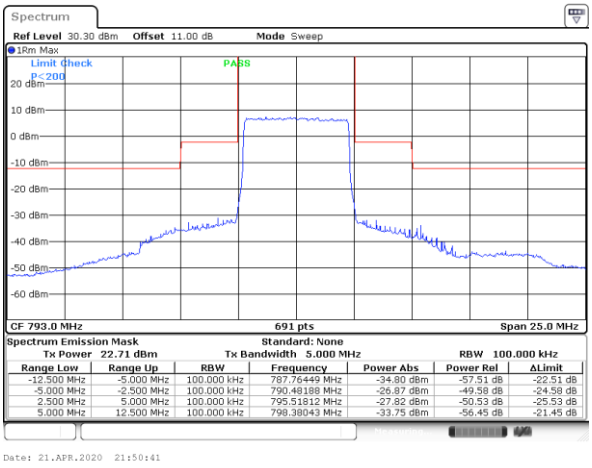
LTE Band 14 / 5MHz / QPSK

Middle Channel / 1RB



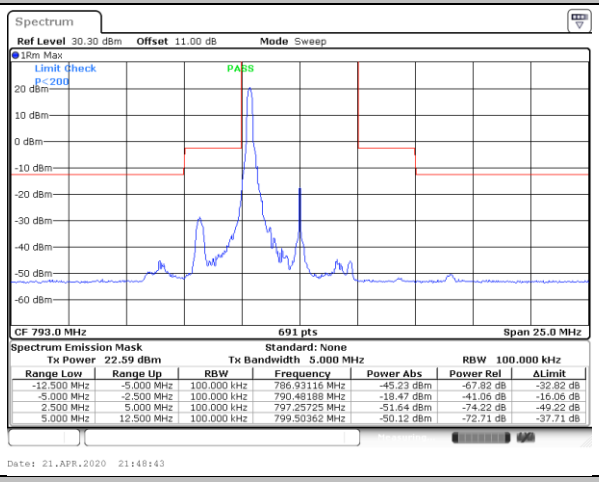


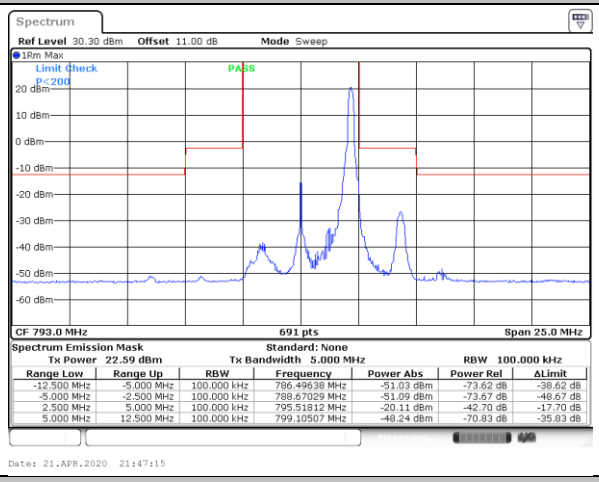
Middle Channel / Full RB



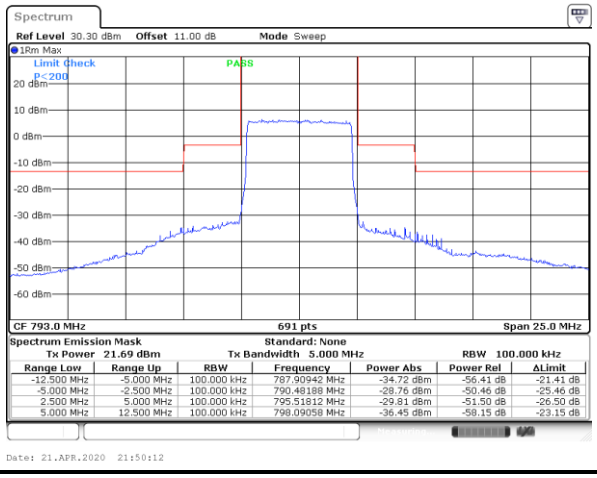
LTE Band 14 / 5MHz / 16QAM

Middle Channel / 1RB



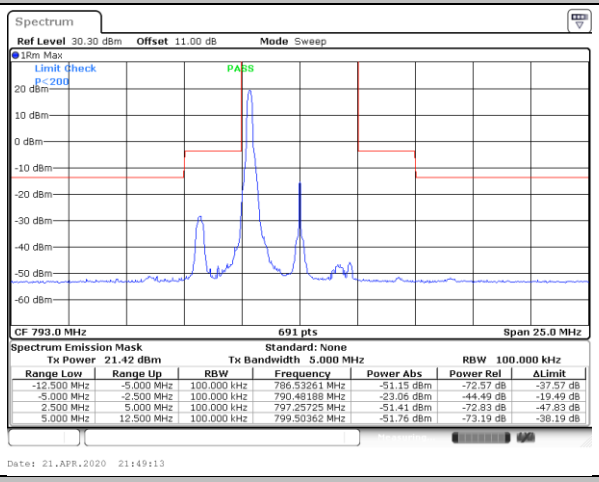


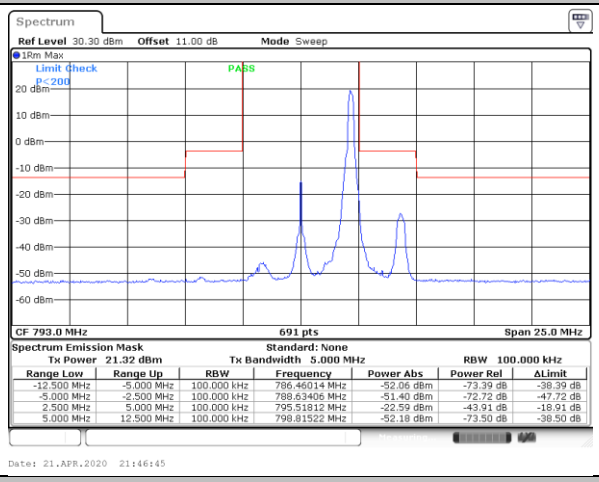
Middle Channel / Full RB



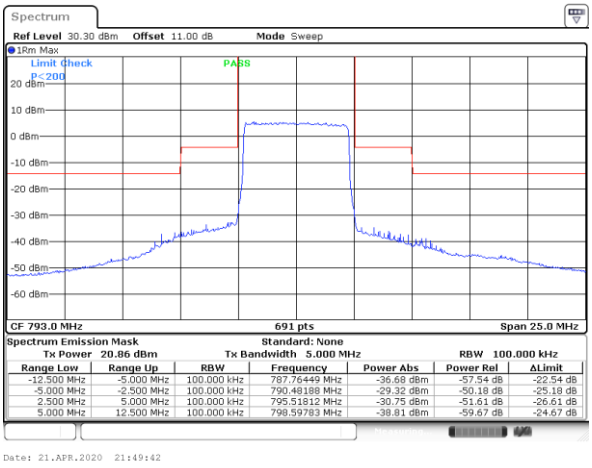
LTE Band 14 / 5MHz / 64QAM

Middle Channel / 1RB



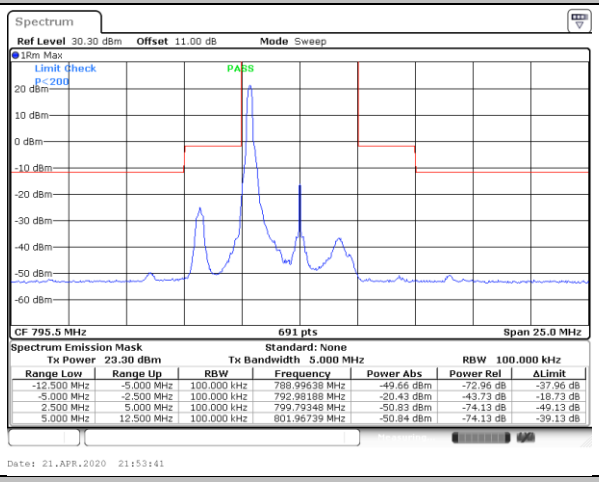


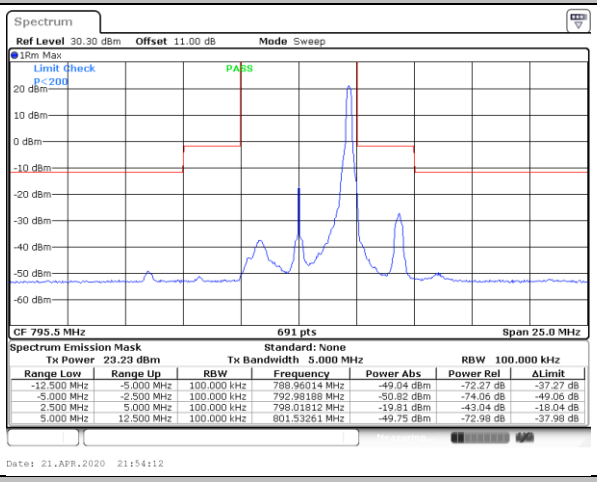
Middle Channel / Full RB



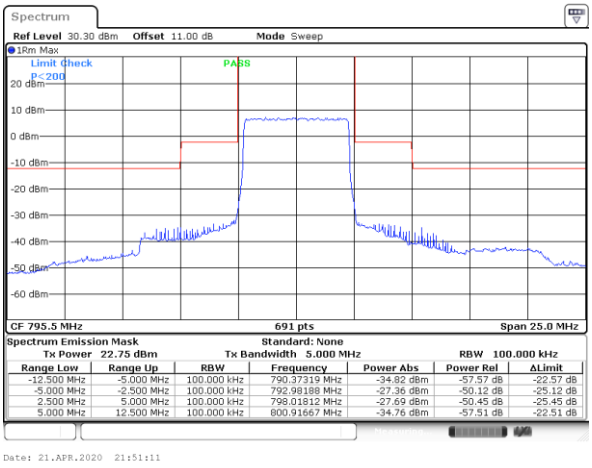
LTE Band 14 / 5MHz / QPSK

Highest Channel / 1RB



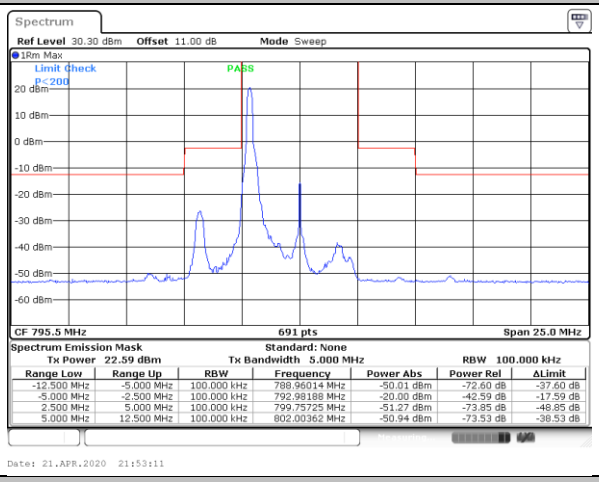


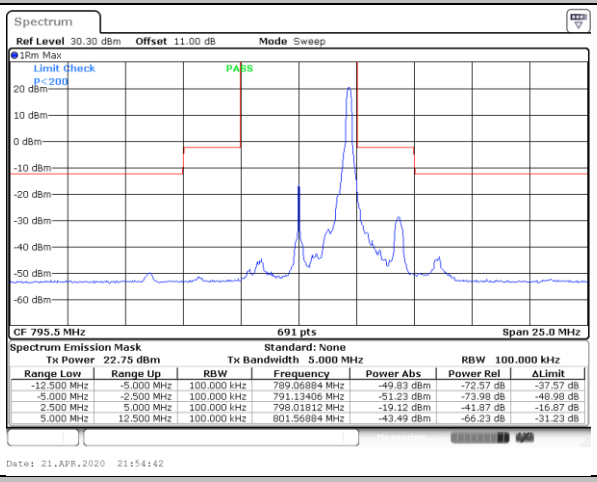
Highest Channel / Full RB



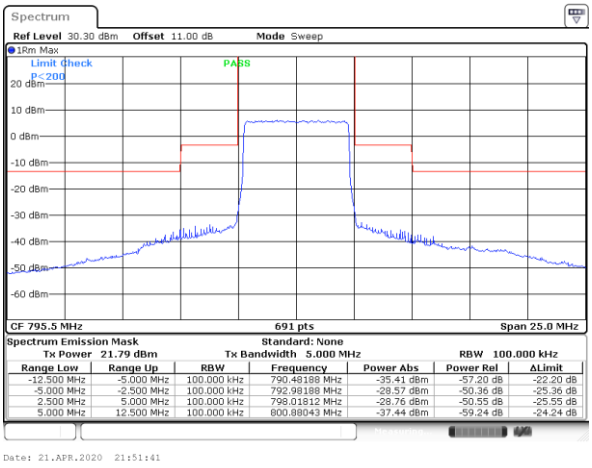
LTE Band 14 / 5MHz / 16QAM

Highest Channel / 1RB



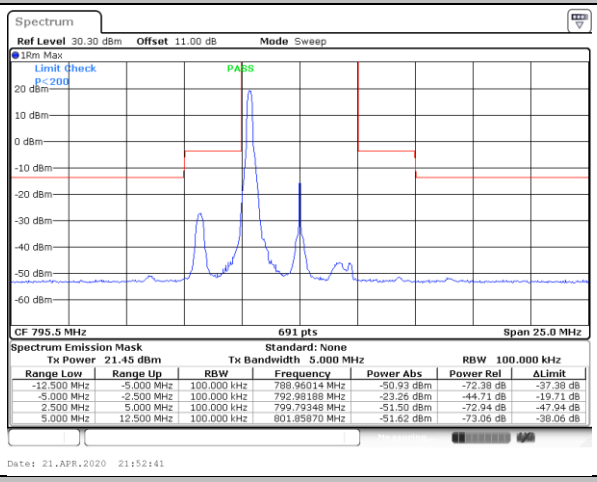


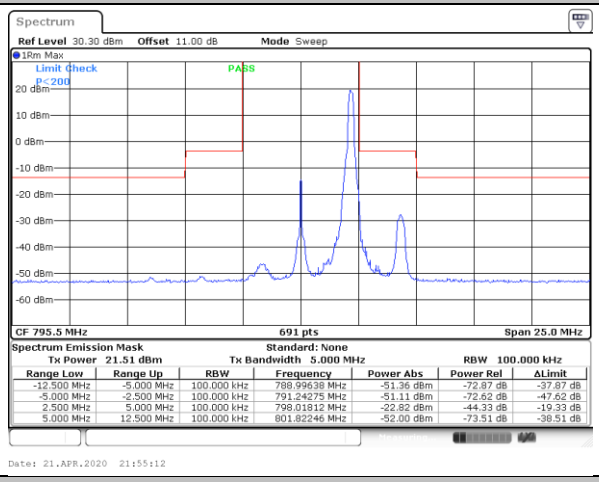
Highest Channel / Full RB



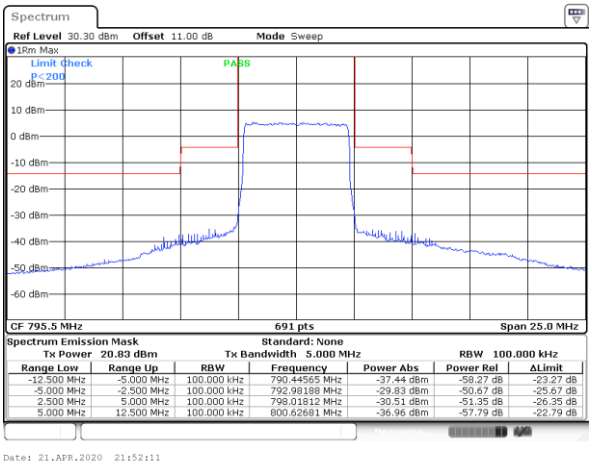
LTE Band 14 / 5MHz / 64QAM

Highest Channel / 1RB



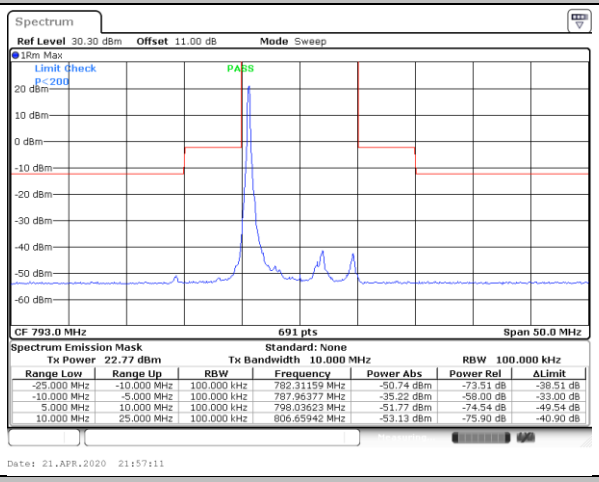


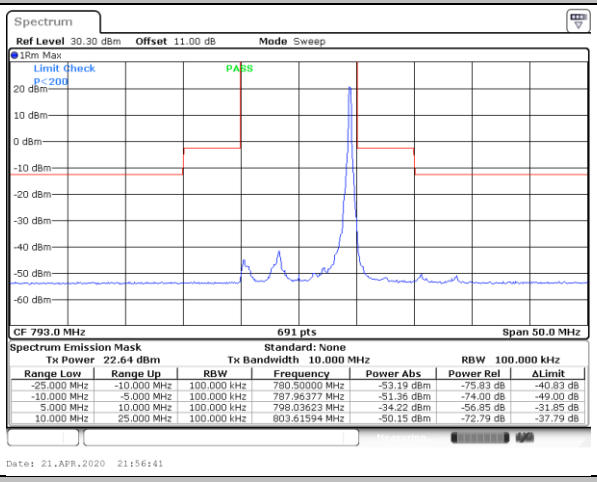
Highest Channel / Full RB



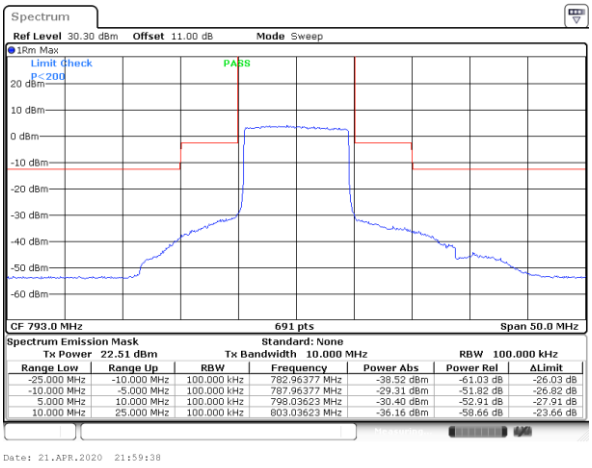
LTE Band 14 / 10MHz / QPSK

Middle Channel / 1RB



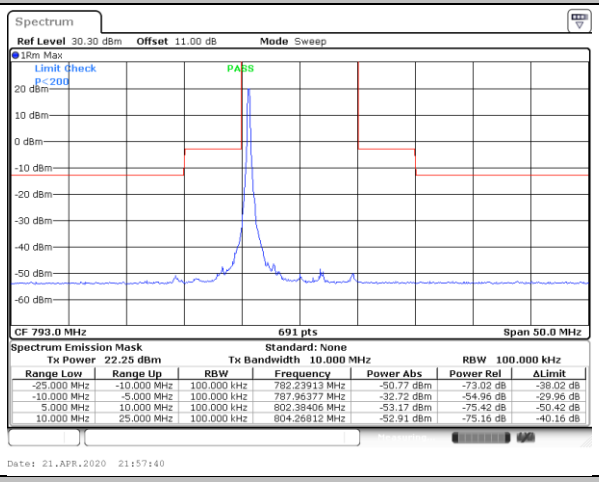


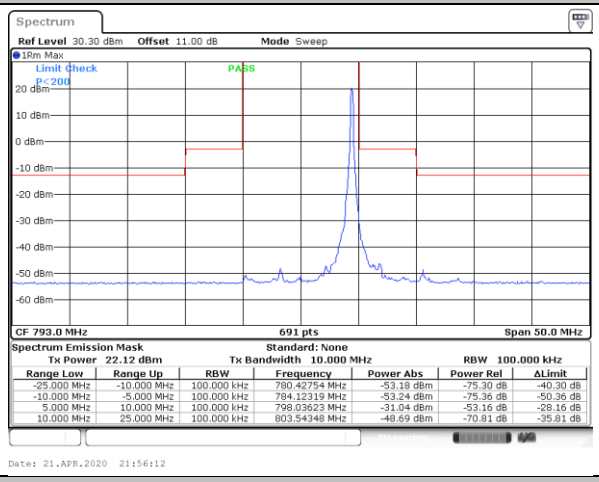
Middle Channel / Full RB



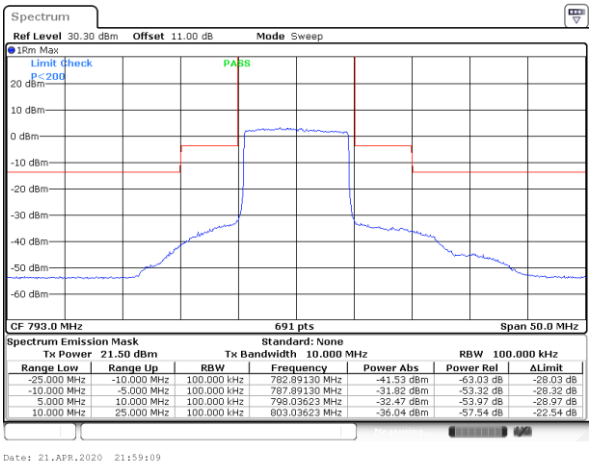
LTE Band 14 / 10MHz / 16QAM

Middle Channel / 1RB



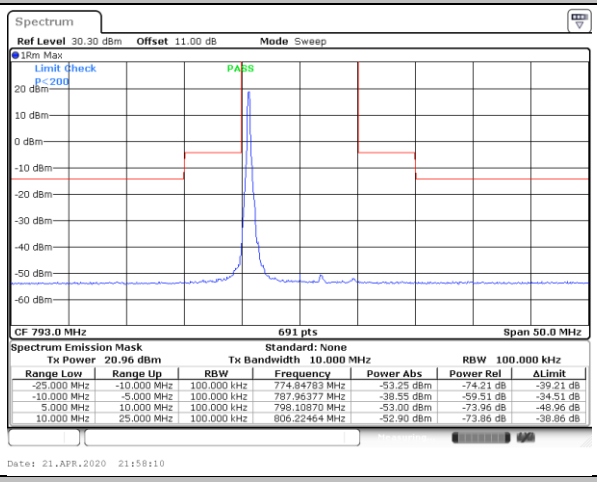


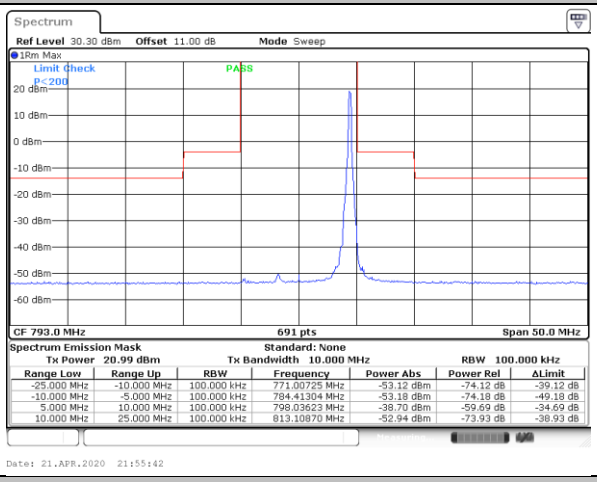
Middle Channel / Full RB



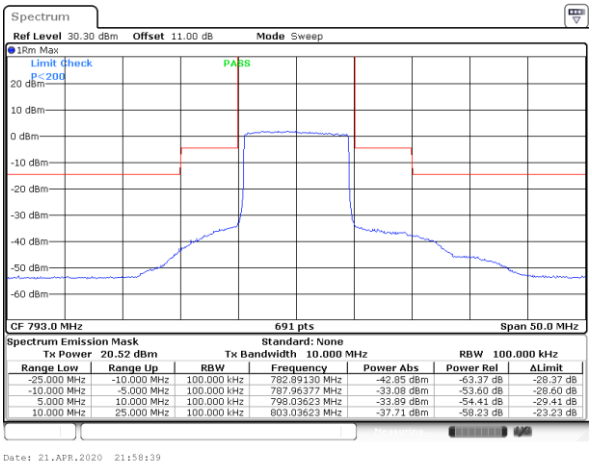
LTE Band 14 / 10MHz / 64QAM

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	0.0117	PASS
40	Normal Voltage	0.0020	
30	Normal Voltage	0.0146	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0134	
0	Normal Voltage	0.0189	
-10	Normal Voltage	0.0195	
-20	Normal Voltage	0.0183	
-30	Normal Voltage	0.0208	
20	Maximum Voltage	0.0164	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0000	

Note:

1. Normal Voltage =3.3 V.；Battery End Point (BEP) =3.1 V.；Maximum Voltage =3.6 V.

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

Appendix B. Test Results of ERP/EIRP and Radiated Test

ERP/EIRP

LTE Band 14 / 5MHz (Average) (GT - LC = 3 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	EIRP(dBm)	EIRP(W)	ERP(dBm)	ERP(W)
Lowest	QPSK	1	0	23.41	0.2193	24.26	0.2667
Middle		1	0	23.45	0.2213	24.30	0.2692
Highest		1	0	23.41	0.2193	24.26	0.2667
Lowest	16QAM	1	12	22.90	0.1950	23.75	0.2371
Middle		1	12	22.93	0.1963	23.78	0.2388
Highest		1	12	22.91	0.1954	23.76	0.2377
Lowest	64QAM	1	24	21.71	0.1483	22.56	0.1803
Middle		1	24	21.74	0.1493	22.59	0.1816
Highest		1	24	21.66	0.1466	22.51	0.1782
Limit	ERP < 3W			Result		PASS	

LTE Band 14 / 10MHz (Average) (GT - LC = 3 dB)							
Channel	Mode	RB		Conducted		ERP	
		Size	Offset	EIRP(dBm)	EIRP(W)	ERP(dBm)	ERP(W)
Lowest	QPSK	-	-	-	-	-	-
Middle		1	0	23.60	0.2291	24.45	0.2786
Highest		-	-	-	-	-	-
Lowest	16QAM	-	-	-	-	-	-
Middle		1	0	22.98	0.1986	23.83	0.2415
Highest		-	-	-	-	-	-
Lowest	64QAM	-	-	-	-	-	-
Middle		1	25	21.84	0.1528	22.69	0.1858
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	-61.61	-42.15	-19.46	-72.79	-63.6	0.95	5.09	H
	2368	-60.50	-13	-47.50	-77.03	-62.1	1.25	5.00	H
	3944	-52.66	-13	-39.66	-72.69	-57.3	1.74	8.53	H
									H
									H
									H
	1576	-61.51	-42.15	-19.36	-73.57	-63.5	0.95	5.09	V
	2368	-60.10	-13	-47.10	-77.03	-61.7	1.25	5.00	V
	3944	-51.56	-13	-38.56	-71.48	-56.2	1.74	8.53	V
									V
									V
									V
Middle	1584	-61.83	-42.15	-19.68	-73.28	-63.8	0.95	5.06	H
	2376	-60.57	-13	-47.57	-77.02	-62.2	1.25	5.03	H
	3952	-51.65	-13	-38.65	-71.56	-56.3	1.75	8.54	H
									H
									H
									H
									H
	1584	-62.53	-42.15	-20.38	-74.5	-64.5	0.95	5.06	V
	2376	-59.57	-13	-46.57	-76.99	-61.2	1.25	5.03	V
	3952	-51.15	-13	-38.15	-71.08	-55.8	1.75	8.54	V
									V
									V
									V

Highest	1584	-62.53	-42.15	-20.38	-73.71	-64.5	0.95	5.06	H
	2384	-59.85	-13	-46.85	-76.64	-61.5	1.25	5.05	H
	3968	-52.04	-13	-39.04	-71.93	-56.7	1.75	8.56	H
									H
									H
									H
									H
	1584	-62.93	-42.15	-20.78	-74.95	-64.9	0.95	5.06	V
	2384	-59.85	-13	-46.85	-76.93	-61.5	1.25	5.05	V
	3968	-53.04	-13	-40.04	-72.99	-57.7	1.75	8.56	V
									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	-60.41	-42.15	-18.26	-71.96	-62.4	0.95	5.09	H
	2368	-60.70	-13	-47.70	-77.12	-62.3	1.25	5.00	H
	3944	-49.56	-13	-36.56	-69.1	-54.2	1.74	8.53	H
									H
									H
									H
									H
	1576	-61.81	-42.15	-19.66	-73.72	-63.8	0.95	5.09	V
	2368	-60.10	-13	-47.10	-76.84	-61.7	1.25	5.00	V
	3944	-49.26	-13	-36.26	-69.27	-53.9	1.74	8.53	V
									V
									V
									V
									V

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