FCC RF Test Report

APPLICANT	:	Relay, Inc.
EQUIPMENT	:	Relay
BRAND NAME	:	Relay
MODEL NAME	:	RY2268
FCC ID	:	2AMBHRY2268
STANDARD	:	47 CFR Part 2, 90(R)
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S)	:	Dec. 14, 2023 ~ Apr. 18, 2024

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26 and shown compliance with the applicable technical standards.

This report contains data that were produced under subcontract by Sporton International Inc. (ShenZhen).

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia

ACCREDITED
Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

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APPENDIX A. TEST RESULTS OF CONDUCTED TEST

APPENDIX B. TEST RESULTS OF RADIATED TEST

APPENDIX C. TEST SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG250507C	Rev. 01	Initial issue of report	May 30, 2024

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.2	§2.1046	Conducted Output Power	—	Reporting only	-
	§90.542 (a)(7)	Effective Radiated Power	ERP < 3Watt	PASS	-
3.3	-	Peak-to-Average Ratio	—	Reporting only	-
3.4	§2.1049	Occupied Bandwidth	—	Reporting only	-
3.5	§2.1053 §90.543 (e)(2)(3)	Conducted Band Edge Measurement	Refer standard	PASS	-
3.6	§2.1051 §90.210(n)	Emission Mask	Mask B	PASS	-
3.7	§2.1053 §90.543 (e)(3)	Conducted Spurious Emission	< $43+10\log_{10}$(P[Watts])	PASS	-
3.8	§2.1055 §90.539 (e)	Frequency Stability Temperature & Voltage	< ±1.25 ppm	PASS	-
4.4	§2.1053 §90.543 (e)(3) §90.543 (f)	Radiated Spurious Emission	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 22.15 dB at 1576.000 MHz

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Applicant

Relay, Inc.
4200 Six Forks Rd, Suite 1800, Raleigh, NC 27609, USA

1.2 Manufacturer

Relay, Inc.
4200 Six Forks Rd, Suite 1800, Raleigh, NC 27609, USA

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Relay
Brand Name	Relay
Model Name	RY2268
FCC ID	2AMBHRY2268
Tx Frequency	LTE Band 14: 788 MHz ~ 798 MHz
Rx Frequency	LTE Band 14: 758 MHz ~ 768 MHz
Bandwidth	5MHz / 10MHz
Maximum Output Power to Antenna	23.78 dBm
Antenna Gain	1.21 dBi
Type of Modulation	QPSK / 16QAM / 64QAM
IMEI Code	Conducted: 004400152020000 Radiation: 990007570009388/990007570004066
HW Version	v01
EUT Stage	Identical Prototype

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

1.4 Maximum ERP Power, and Emission Designator

LTE Band 14		QPSK		16QAM/64QAM	
BW (MHz)	**Frequency Range (MHz)**	**Maximum ERP(W)**	**Emission Designator (99%OBW)**	**Maximum ERP(W)**	**Emission Designator (99%OBW)**
5	**790.5~795.5**	0.1905	4M50G7D	0.1567	4M49W7D
10	**793**	0.1923	9M03G7D	0.1535	9M07W7D

Note: All modulations have been tested, only the worst test results of PSK & QAM are shown in the report.

1.5 Testing Site

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

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS	CN1257	314309

Sporton International Inc. (ShenZhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International Inc. (ShenZhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	TH01-SZ	CN1256	421272

Test data subcontracted: Test cases in section 3.2~3.8 of this report.

1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-KS	AUDIX	E3	210616

1.7 Applied Standards

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

- 47 CFR Part 2, Part 90(R)
- ANSI C63.26
- KDB 971168 D01 Power Meas License Digital Systems v03r01
- KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

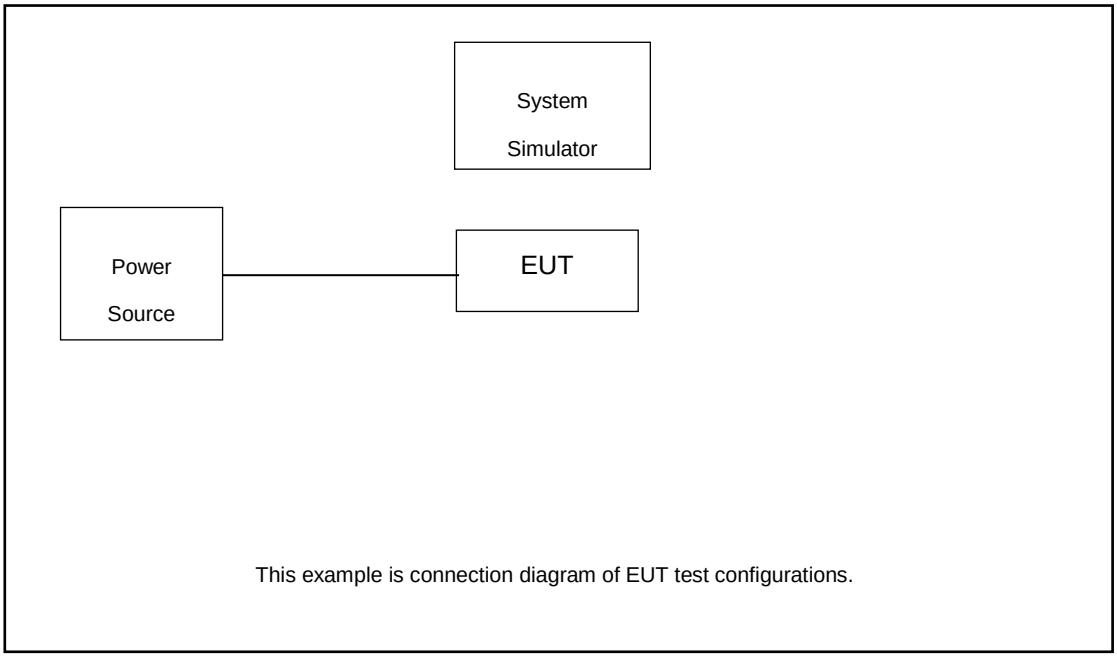
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (Y-Plane)

Conducted Test Cases	Band	Bandwidth (MHz)						Modulation				RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Max. Output Power	14	-	-	v	-	-	-	v	v	v	-	v		v	v	v	v
	14	-	-		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	
	14	-	-		v	-	-	v	v		-			v		v	
Conducted Band Edge	14	-	-	v		-	-	v	v	v	-	v		v	v		v
	14	-	-		v	-	-	v	v	v	-	v		v	v		v
Emission Mask	14	-	-	v		-	-	v	v	v	-	v		v	v	v	v
	14	-	-		v	-	-	v	v	v	-	v		v		v	
Conducted Spurious Emission	14	-	-	v		-	-	v			-	v			v	v	v
	14	-	-		v	-	-	v			-	v				v	
Frequency Stability	14	-	-		v	-	-	v			-			v		v	
E.R.P	14	-	-	v		-	-	v	v	v	-	v	v	v	v	v	v
	14	-	-		v	-	-	v	v	v	-	v	v	v		v	
Radiated Spurious Emission	14	-	-	v	v	-	-	v			-	v			v	v	v
Note	1. The mark “v “ means that this configuration is chosen for testing 2. The mark “-“ means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.																

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW INSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m

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 4.0 dB and 10dB attenuator.

Example :

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

= 4.0 + 10 = 14.0 (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

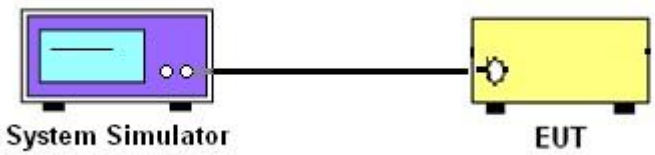
3 Conducted Test Items

3.1 Measuring Instruments

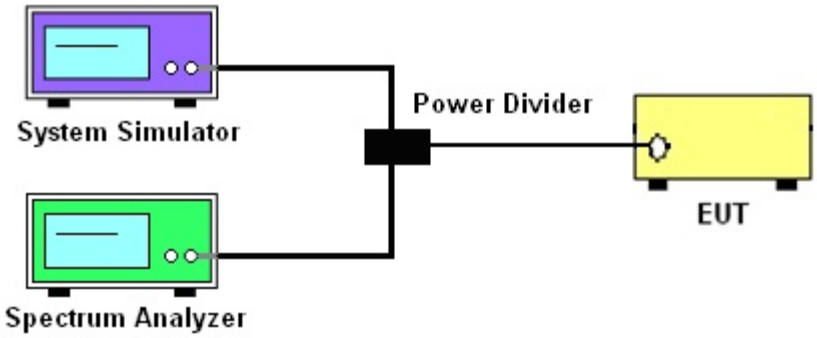
See list of measuring instruments of this test report.

3.1.1 Test Setup

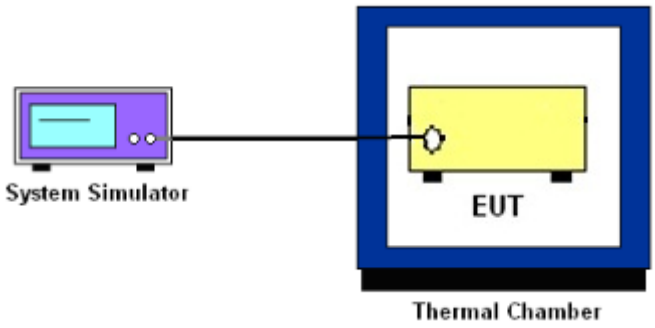
3.1.2 Conducted Output Power



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 and ERP

3.2.1 Description of the Conducted Output Power Measurement and ERP

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

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

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.2.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.3 Peak-to-Average Ratio

3.3.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.3.2 Test Procedures

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

3.4 Occupied Bandwidth

3.4.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.
   (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.5 Conducted Band Edge Measurement

3.5.1 Description of Conducted Band Edge Measurement

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

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

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

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

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. Checked that all the results comply with the emission limit line.

   Example:

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

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

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

3.6 Emission Mask

3.6.1 Description of Emission Mask

<Emission Mask B>.

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

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

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

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

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
5. Set spectrum analyzer with RMS detector.
6. Taking the record of maximum spurious emission.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

3.7 Conducted Spurious Emission Measurement

3.7.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30MHz up to a frequency including its 10th harmonic.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and base station via power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's, for under 1GHz RBW = 100kHz, VBW = 300kHz and for above 1GHz RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. Set spectrum analyzer with RMS detector.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

3.8 Frequency Stability Measurement

3.8.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±1.25 ppm of the center frequency.

3.8.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.8.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5.
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

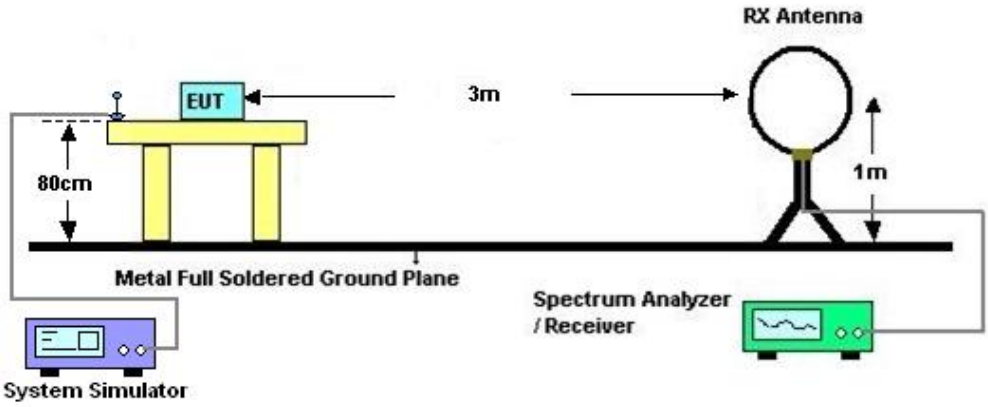
4 Radiated Test Items

4.1 Measuring Instruments

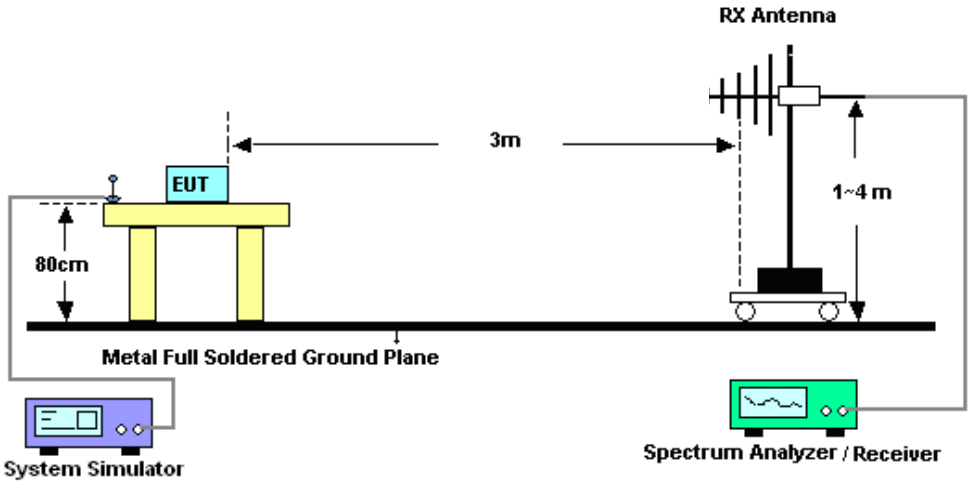
See list of measuring instruments of this test report.

4.2 Test Setup

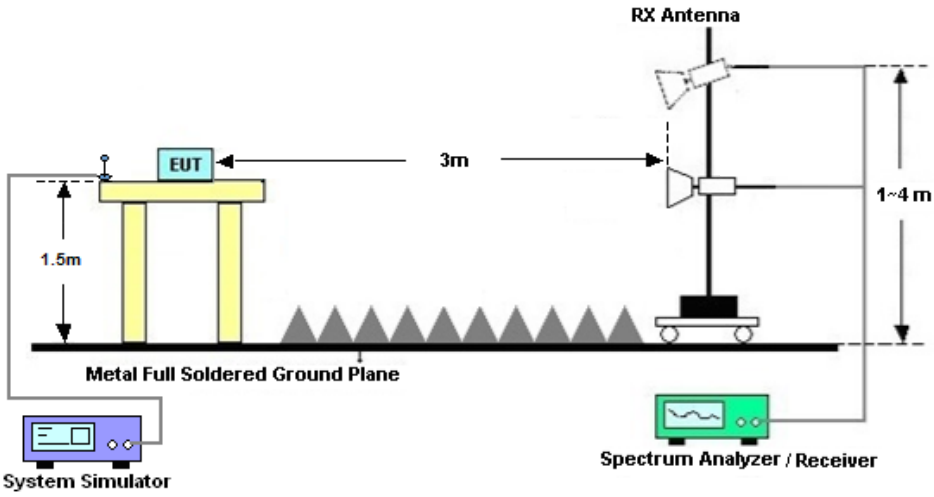
4.2.1 For radiated test below 30MHz



4.2.2 For radiated test from 30MHz to 1GHz



4.2.3 For radiated test above 1GHz



4.3 Test Result of Radiated Test

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.

Please refer to Appendix B.

4.4 Radiated Spurious Emission Measurement

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559–1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 06, 2023	Dec. 14, 2023 ~Dec. 15, 2023	Apr. 05, 2024	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04265	60.06.020.0077	0.4GHz~26.5GHz	Dec. 25, 2022	Dec. 14, 2023 ~Dec. 15, 2023	Dec. 24, 2023	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 05, 2023	Dec. 14, 2023 ~Dec. 15, 2023	Jul. 04, 2024	Conducted (TH01-SZ)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 10, 2023	Mar. 06, 2024 ~Apr. 18, 2024	Oct. 09, 2024	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	59913	30MHz-1GHz	Aug. 19, 2023	Mar. 06, 2024 ~Apr. 18, 2024	Aug. 18, 2024	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 10, 2023	Mar. 06, 2024 ~Apr. 18, 2024	Oct. 09, 2024	Radiation (03CH04-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00251694	1GHz~18GHz	Jul. 12, 2023	Mar. 06, 2024 ~Apr. 18, 2024	Jul. 11, 2024	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2024	Mar. 06, 2024 ~Apr. 18, 2024	Jan. 04, 2025	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	380827	9KHz-1GHz	Jul. 06, 2023	Mar. 06, 2024 ~Apr. 18, 2024	Jul. 05, 2024	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2024	Mar. 06, 2024 ~Apr. 18, 2024	Jan. 04, 2025	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18GA	060840	1Ghz-18Ghz	Oct. 10, 2023	Mar. 06, 2024 ~Apr. 18, 2024	Oct. 09, 2024	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 10, 2023	Mar. 06, 2024 ~Apr. 18, 2024	Oct. 09, 2024	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 06, 2024 ~Apr. 18, 2024	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 06, 2024 ~Apr. 18, 2024	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 06, 2024 ~Apr. 18, 2024	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Measurement Uncertainty

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

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Spurious Emission & Bandedge	±1.34 dB
Occupied Channel Bandwidth	±0.012 MHz
Conducted Power	±1.34 dB
Peak to Average Ratio	±1.34 dB
Frequency Stability	±1.3 Hz

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.82 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.56 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.54 dB

---------- THE END ----------

Appendix A. Test Results of Conducted Test

Test Engineer :	Hank Lin	Temperature :	24~26℃
		Relative Humidity :	50~53%

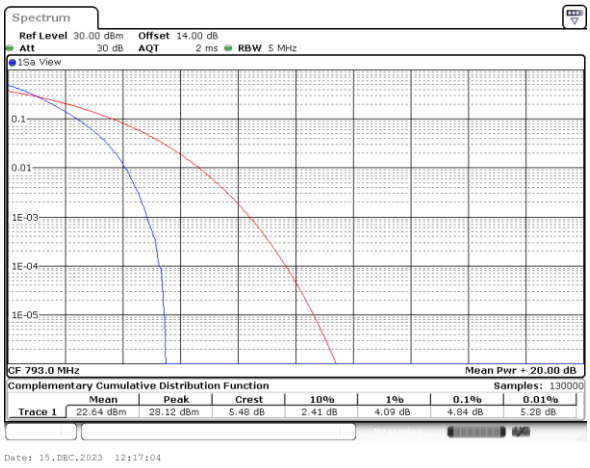
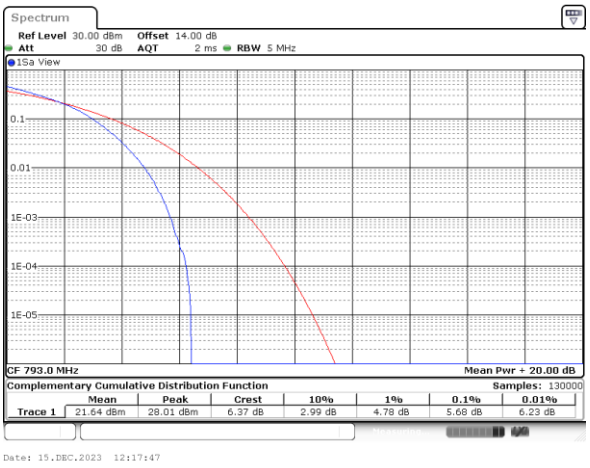
Conducted Output Power(Average power) and ERP

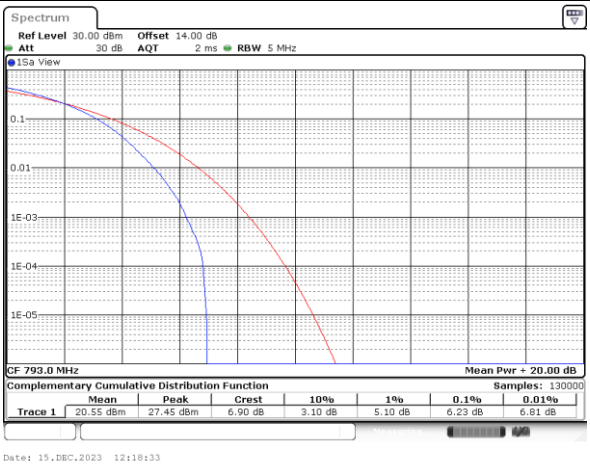
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	ERP(W)		
Channel				23330					
Frequency (MHz)				793				M	
10	QPSK	1	0		23.78			0.1923	
10	QPSK	1	49		23.64			0.1862	
10	QPSK	50	0		22.70			0.1500	
10	16QAM	1	0		22.80			0.1535	
10	64QAM	1	0		21.81			0.1222	
Channel				23305	23330	23355	ERP(W)		
Frequency (MHz)				790.5	793	795.5	L	M	H
5	QPSK	1	0	23.72	23.74	23.71	0.1897	0.1905	0.1892
5	16QAM	1	0	22.89	22.81	22.81	0.1567	0.1538	0.1538

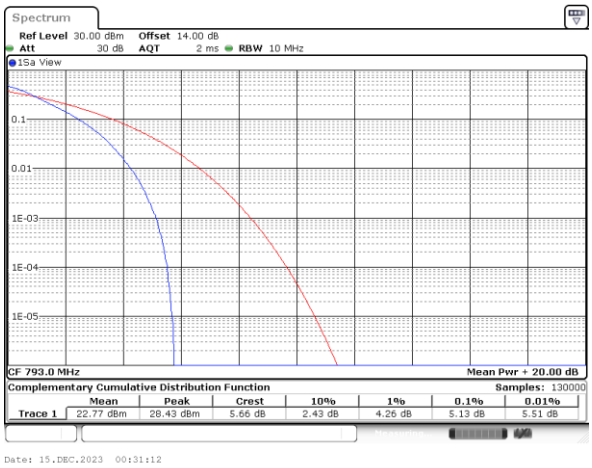
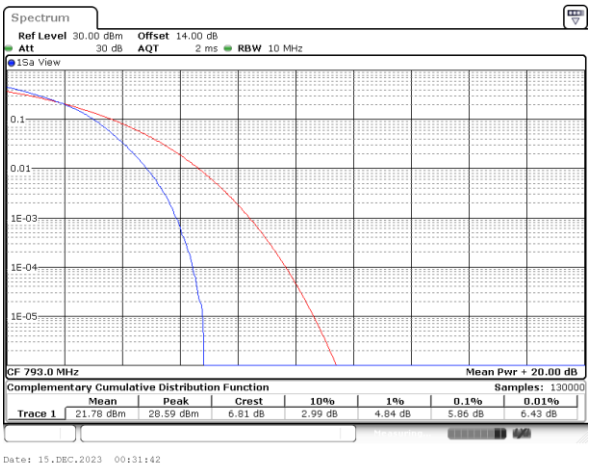
LTE Band 14

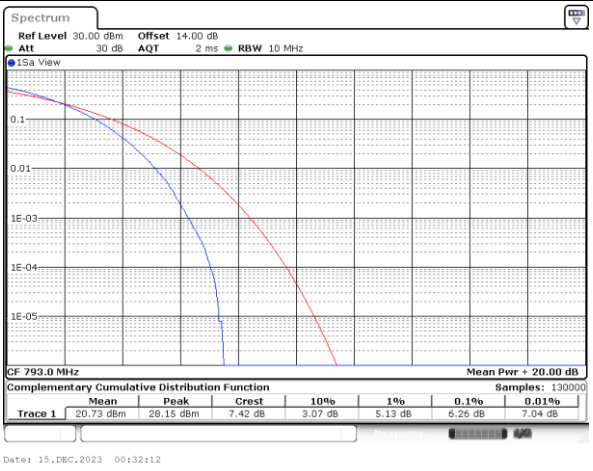
Peak-to-Average Ratio

Mode	LTE Band 14 / 5MHz			
Mod.	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Result
Middle CH	4.84	5.68	6.23	PASS
Mode	LTE Band 14 / 10MHz			
Mod.	QPSK	16QAM	64QAM	Limit: 13dB
RB Size	Full RB	Full RB	Full RB	Result
Middle CH	5.13	5.86	6.26	PASS

LTE Band 14 / 5MHz / QPSK	LTE Band 14 / 5MHz / 16QAM
Middle Channel / Full RB	Middle Channel / Full RB
	

LTE Band 14 / 5MHz / 64QAM
Middle Channel / Full RB


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

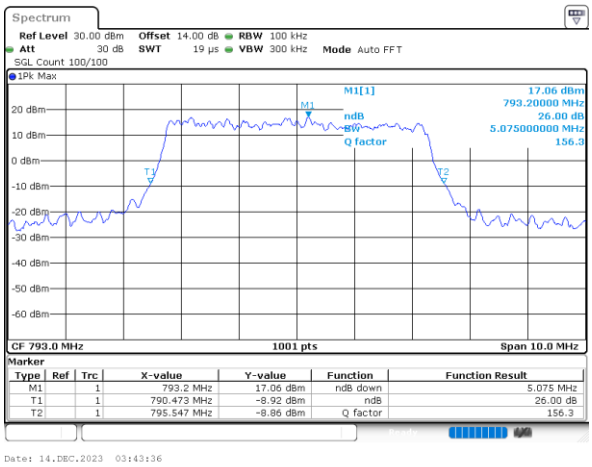
LTE Band 14 / 10MHz / 64QAM
Middle Channel / Full RB


26dB Bandwidth

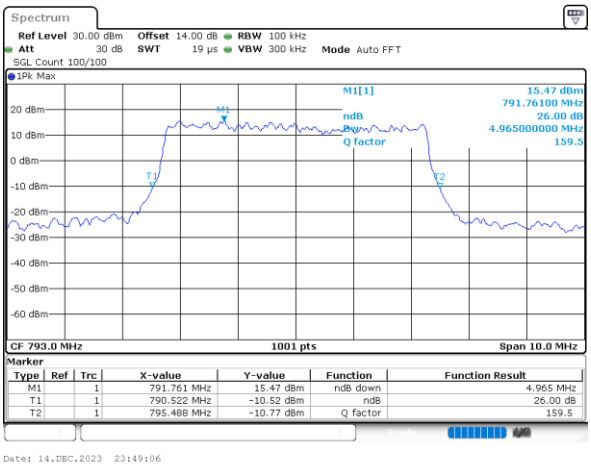
Mode	LTE Band 14 : 26dB BW(MHz)			
BW	5MHz		10MHz	
Mod.	QPSK	16QAM	QPSK	16QAM
Middle CH	5.08	4.97	9.89	9.91

LTE Band 14

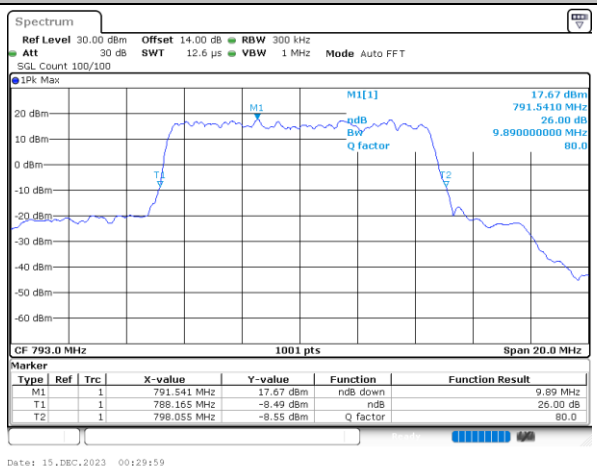
Middle Channel / 5MHz / QPSK



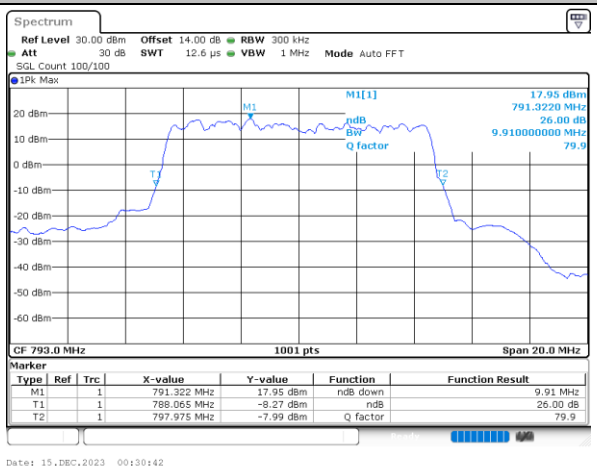
Middle Channel / 5MHz / 16QAM



Middle Channel / 10MHz / QPSK



Middle Channel / 10MHz / 16QAM

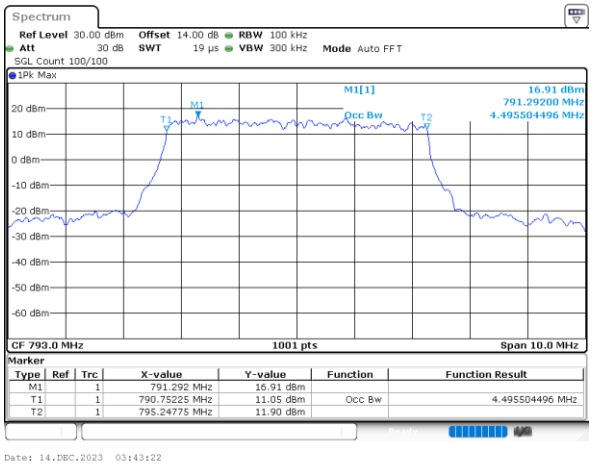


Occupied Bandwidth

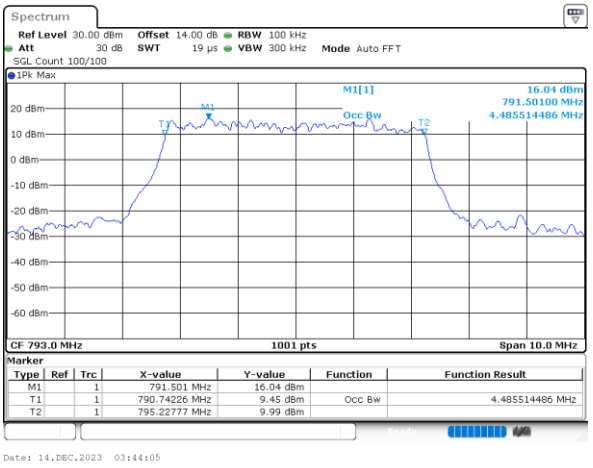
Mode	LTE Band 14 : 99%OBW(MHz)			
BW	5MHz		10MHz	
Mod.	QPSK	16QAM	QPSK	16QAM
Middle CH	4.50	4.49	9.03	9.07

LTE Band 14

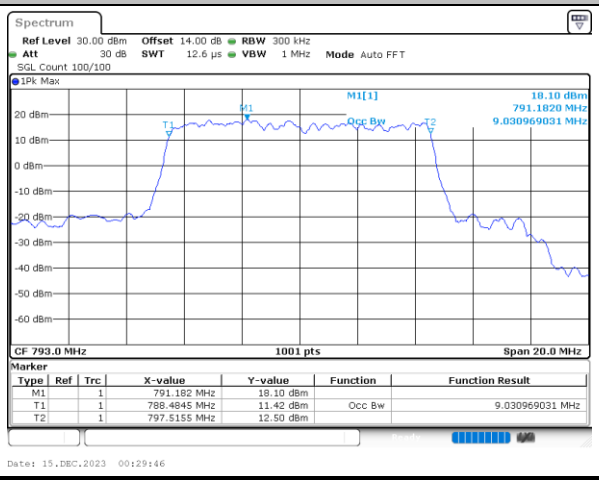
Middle Channel / 5MHz / QPSK



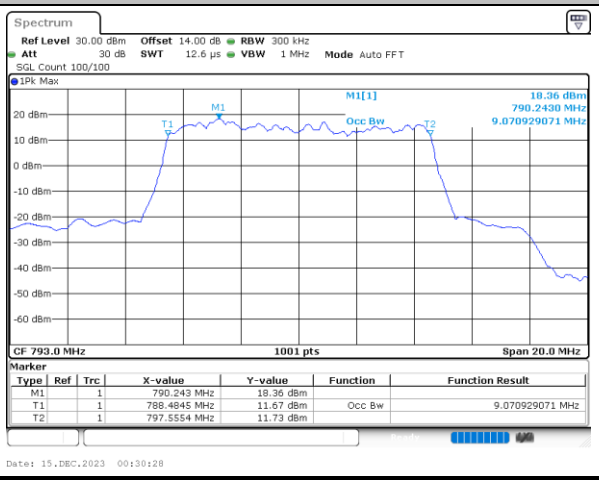
Middle Channel / 5MHz / 16QAM



Middle Channel / 10MHz / QPSK



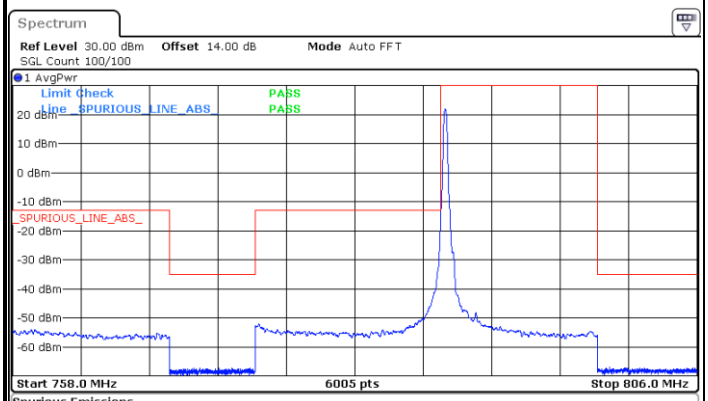
Middle Channel / 10MHz / 16QAM



Conducted Band Edge

LTE Band 14 / 5MHz / QPSK

Lowest Band Edge / 1 RB

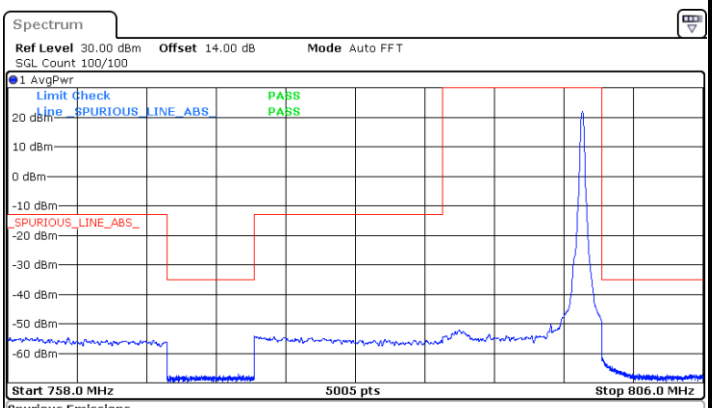


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.31319 MHz	-54.19 dBm	-41.19 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.12444 MHz	-67.27 dBm	-32.27 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-18.76 dBm	-5.76 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.32418 MHz	21.97 dBm	-8.03 dB
799.000 MHz	806.000 MHz	6.250 kHz	799.86364 MHz	-67.12 dBm	-32.12 dB

Date: 14.DEC.2023 03:04:47

Highest Band Edge / 1 RB

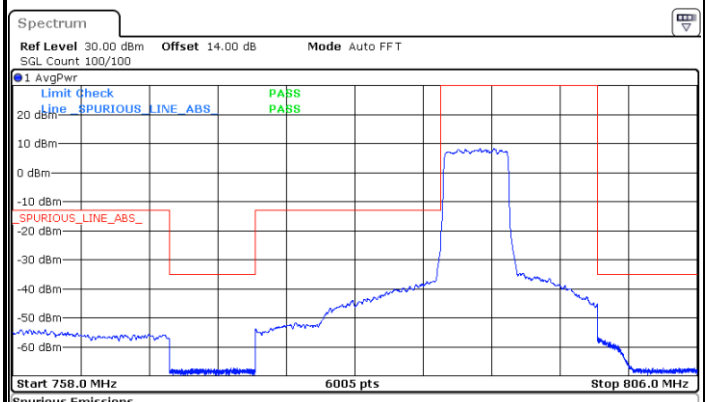


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.26923 MHz	-54.72 dBm	-41.72 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.93606 MHz	-67.10 dBm	-32.10 dB
775.000 MHz	788.000 MHz	100.000 kHz	775.00649 MHz	-54.30 dBm	-41.30 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.67582 MHz	21.85 dBm	-8.15 dB
799.000 MHz	806.000 MHz	6.250 kHz	799.03846 MHz	-61.36 dBm	-26.36 dB

Date: 14.DEC.2023 23:50:03

Lowest Band Edge / Full RB

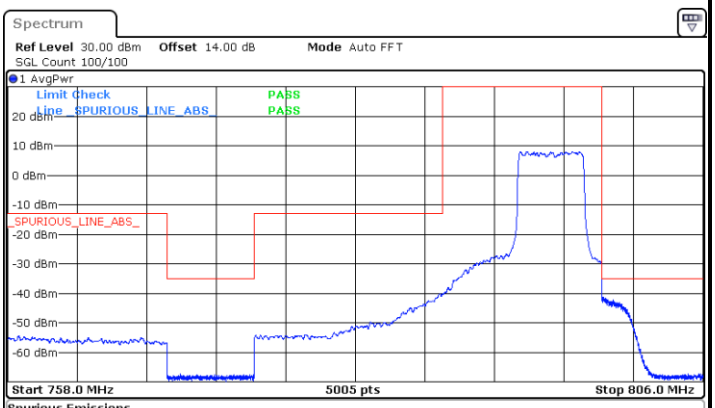


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.19231 MHz	-54.05 dBm	-41.05 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.31634 MHz	-67.20 dBm	-32.20 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-26.87 dBm	-13.87 dB
788.000 MHz	799.000 MHz	100.000 kHz	791.75275 MHz	8.16 dBm	-21.84 dB
799.000 MHz	806.000 MHz	6.250 kHz	799.04545 MHz	-56.85 dBm	-21.85 dB

Date: 14.DEC.2023 03:08:30

Highest Band Edge / Full RB



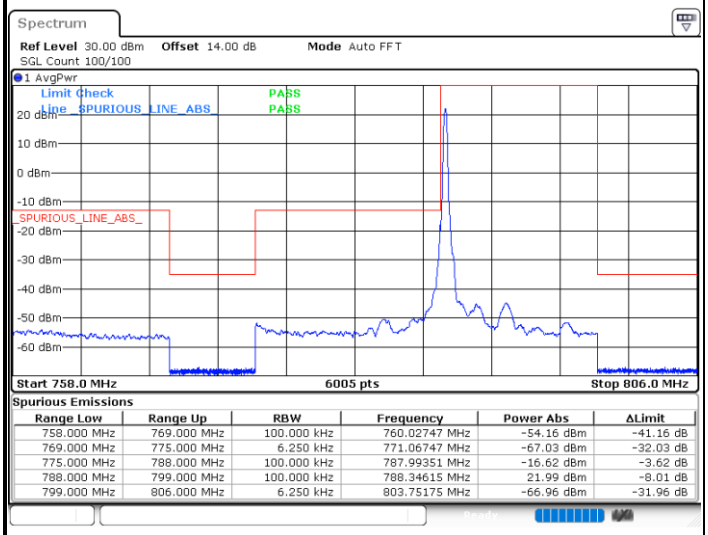
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	758.75275 MHz	-54.40 dBm	-41.40 dB
769.000 MHz	775.000 MHz	6.250 kHz	769.90809 MHz	-67.34 dBm	-32.34 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-40.19 dBm	-27.19 dB
788.000 MHz	799.000 MHz	100.000 kHz	793.85165 MHz	7.96 dBm	-22.04 dB
799.000 MHz	806.000 MHz	6.250 kHz	799.00350 MHz	-41.07 dBm	-6.07 dB

Date: 14.DEC.2023 23:53:49

LTE Band 14 / 5MHz / 16QAM

Lowest Band Edge / 1 RB

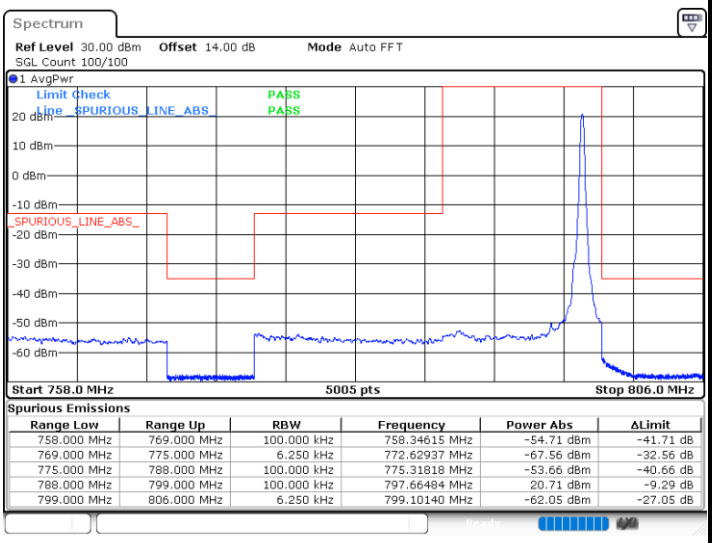


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	760.02747 MHz	-54.16 dBm	-41.16 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.06747 MHz	-67.03 dBm	-32.03 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-16.62 dBm	-3.62 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.34615 MHz	21.99 dBm	-8.01 dB
799.000 MHz	806.000 MHz	6.250 kHz	803.75175 MHz	-66.96 dBm	-31.96 dB

Date: 14.DEC.2023 03:05:46

Highest Band Edge / 1 RB

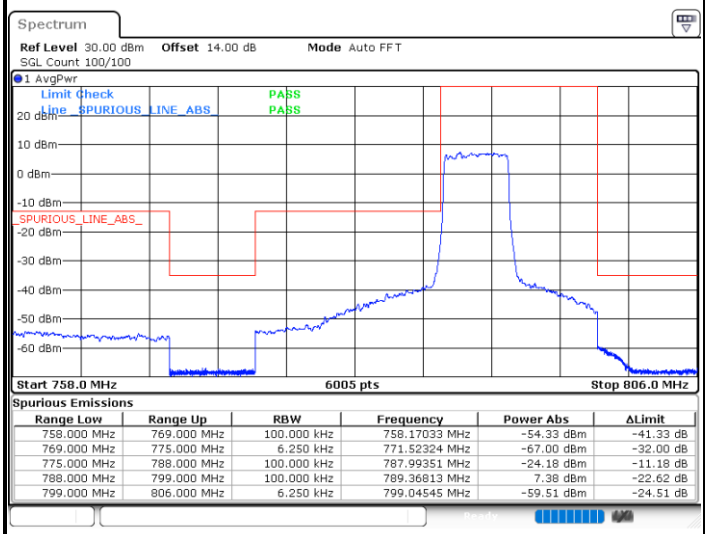


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	758.34615 MHz	-54.71 dBm	-41.71 dB
769.000 MHz	775.000 MHz	6.250 kHz	772.62937 MHz	-67.56 dBm	-32.56 dB
775.000 MHz	788.000 MHz	100.000 kHz	775.31818 MHz	-53.66 dBm	-40.66 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.66484 MHz	20.71 dBm	-9.29 dB
799.000 MHz	806.000 MHz	6.250 kHz	799.10140 MHz	-62.05 dBm	-27.05 dB

Date: 14.DEC.2023 23:51:05

Lowest Band Edge / Full RB

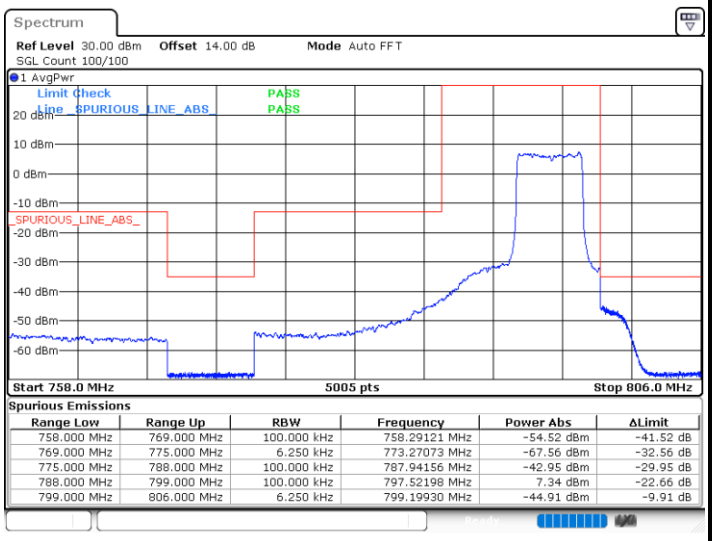


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	758.17033 MHz	-54.33 dBm	-41.33 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.52324 MHz	-67.00 dBm	-32.00 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-24.18 dBm	-11.18 dB
788.000 MHz	799.000 MHz	100.000 kHz	789.36813 MHz	7.38 dBm	-22.62 dB
799.000 MHz	806.000 MHz	6.250 kHz	799.04545 MHz	-59.51 dBm	-24.51 dB

Date: 14.DEC.2023 03:09:28

Highest Band Edge / Full RB



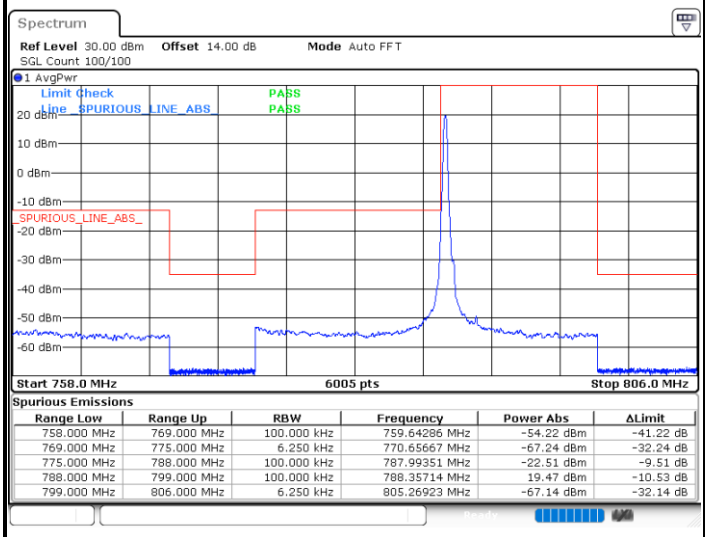
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	758.29121 MHz	-54.52 dBm	-41.52 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.27073 MHz	-67.56 dBm	-32.56 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.94156 MHz	-42.95 dBm	-29.95 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.52198 MHz	7.34 dBm	-22.66 dB
799.000 MHz	806.000 MHz	6.250 kHz	799.19930 MHz	-44.91 dBm	-9.91 dB

Date: 15.DEC.2023 11:57:28

LTE Band 14 / 5MHz / 64QAM

Lowest Band Edge / 1 RB

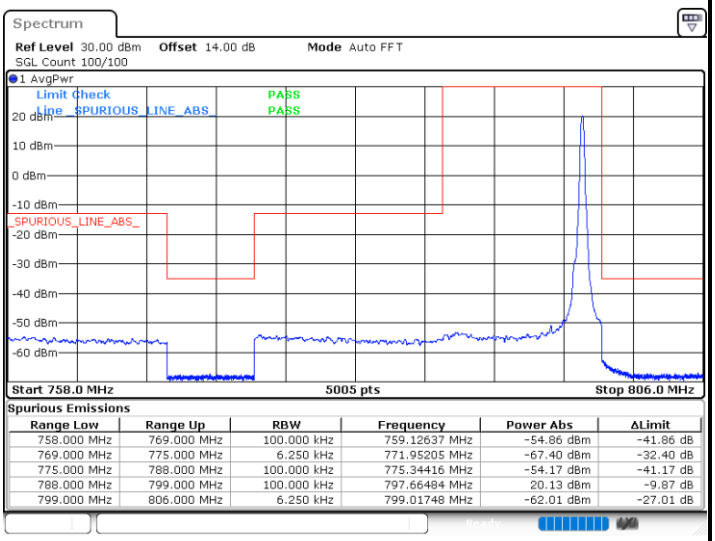


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.64286 MHz	-54.22 dBm	-41.22 dB
769.000 MHz	775.000 MHz	6.250 kHz	770.65667 MHz	-67.24 dBm	-32.24 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-22.51 dBm	-9.51 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.35714 MHz	19.47 dBm	-10.53 dB
799.000 MHz	806.000 MHz	6.250 kHz	805.26923 MHz	-67.14 dBm	-32.14 dB

Date: 14.DEC.2023 03:07:31

Highest Band Edge / 1 RB

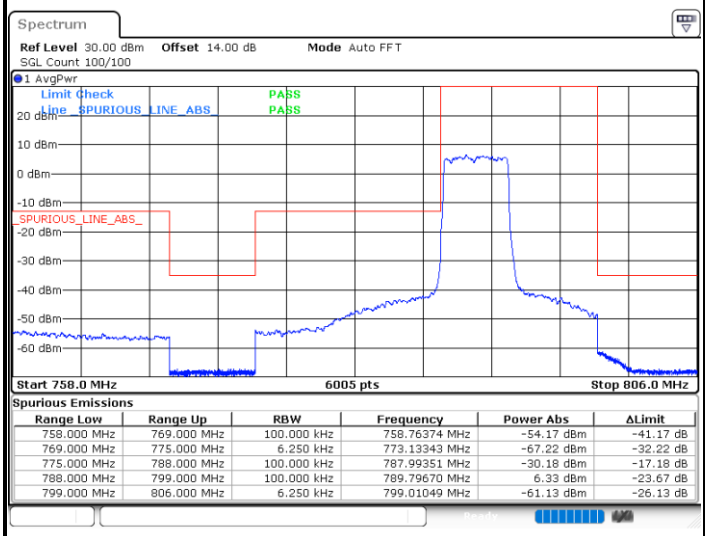


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.12637 MHz	-54.86 dBm	-41.86 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.95205 MHz	-67.40 dBm	-32.40 dB
775.000 MHz	788.000 MHz	100.000 kHz	775.34416 MHz	-54.17 dBm	-41.17 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.66484 MHz	20.13 dBm	-9.87 dB
799.000 MHz	806.000 MHz	6.250 kHz	799.01748 MHz	-62.01 dBm	-27.01 dB

Date: 14.DEC.2023 23:52:50

Lowest Band Edge / Full RB

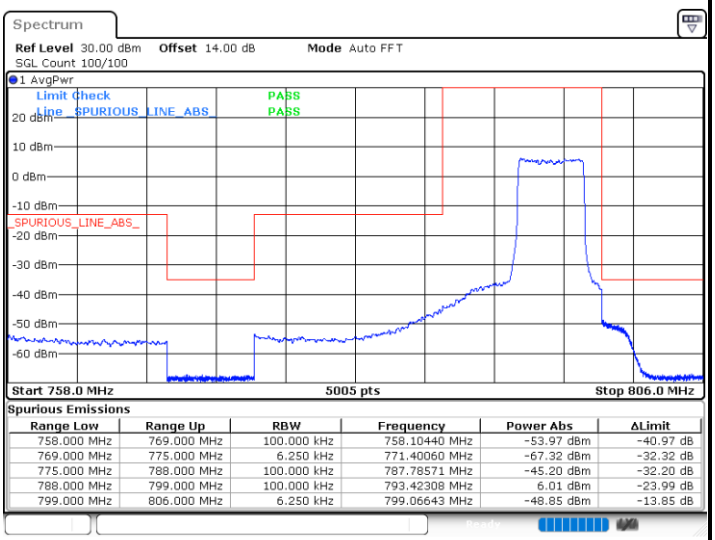


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	758.76374 MHz	-54.17 dBm	-41.17 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.13343 MHz	-67.22 dBm	-32.22 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-30.18 dBm	-17.18 dB
788.000 MHz	799.000 MHz	100.000 kHz	789.79670 MHz	6.33 dBm	-23.67 dB
799.000 MHz	806.000 MHz	6.250 kHz	799.01049 MHz	-61.13 dBm	-26.13 dB

Date: 14.DEC.2023 03:10:30

Highest Band Edge / Full RB



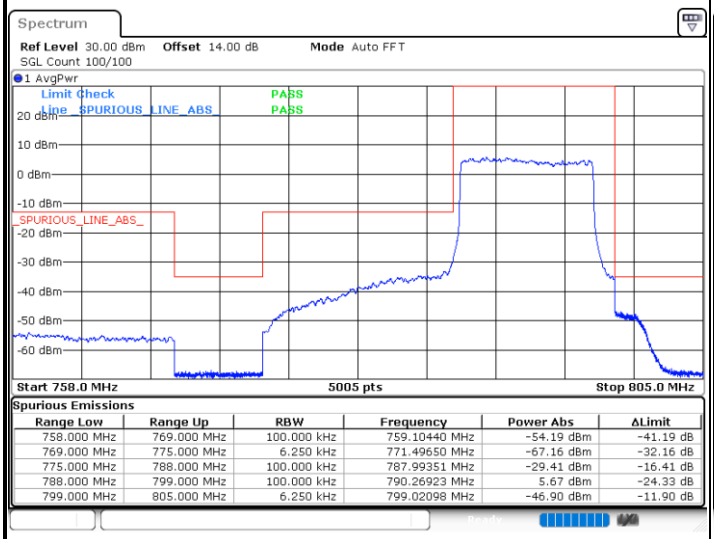
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	758.10440 MHz	-53.97 dBm	-40.97 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.40060 MHz	-67.32 dBm	-32.32 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.78571 MHz	-45.20 dBm	-32.20 dB
788.000 MHz	799.000 MHz	100.000 kHz	793.42308 MHz	6.01 dBm	-23.99 dB
799.000 MHz	806.000 MHz	6.250 kHz	799.06643 MHz	-48.85 dBm	-13.85 dB

Date: 14.DEC.2023 23:58:09

LTE Band 14 / 10MHz / QPSK

Band Edge / Full RB



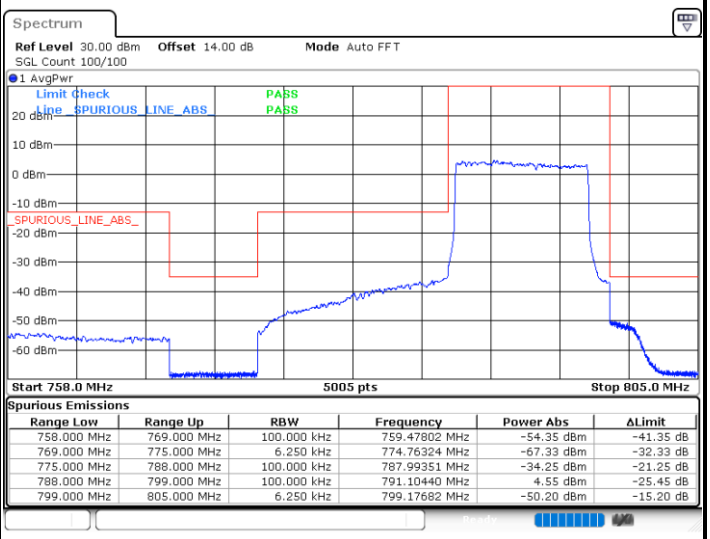
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.10440 MHz	-54.19 dBm	-41.19 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.49650 MHz	-67.16 dBm	-32.16 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-29.41 dBm	-16.41 dB
788.000 MHz	799.000 MHz	100.000 kHz	790.26923 MHz	5.67 dBm	-24.33 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.02098 MHz	-46.90 dBm	-11.90 dB

Date: 15.DEC.2023 00:17:14

LTE Band 14 / 10MHz / 16QAM

Band Edge / Full RB



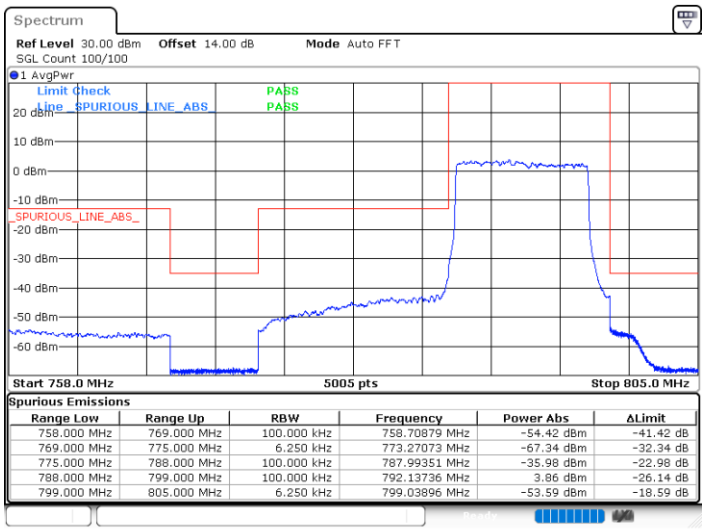
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.47802 MHz	-54.35 dBm	-41.35 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.76324 MHz	-67.33 dBm	-32.33 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-34.25 dBm	-21.25 dB
788.000 MHz	799.000 MHz	100.000 kHz	791.10440 MHz	4.55 dBm	-25.45 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.17682 MHz	-50.20 dBm	-15.20 dB

Date: 15.DEC.2023 00:18:22

LTE Band 14 / 10MHz / 64QAM

Band Edge / Full RB



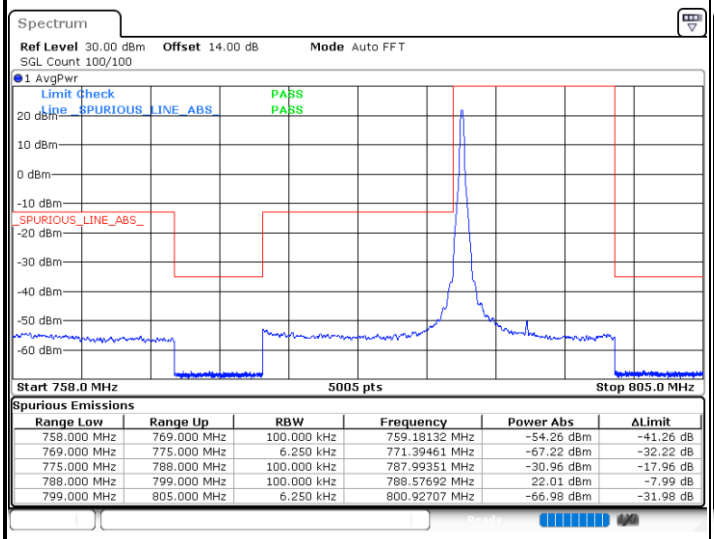
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	758.70879 MHz	-54.42 dBm	-41.42 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.27073 MHz	-67.34 dBm	-32.34 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-35.98 dBm	-22.98 dB
788.000 MHz	799.000 MHz	100.000 kHz	792.13736 MHz	3.86 dBm	-26.14 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.03896 MHz	-53.59 dBm	-18.59 dB

Date: 15.DEC.2023 00:19:30

LTE Band 14 / 10MHz / QPSK

Band Edge / 1 RB0



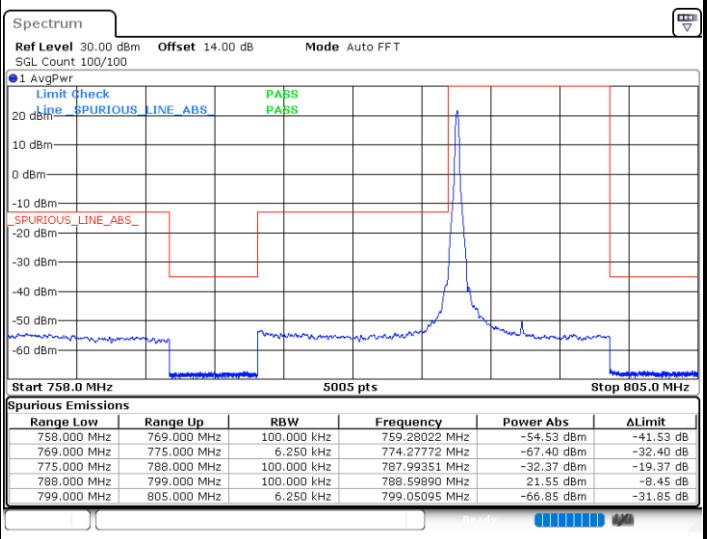
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.18132 MHz	-54.26 dBm	-41.26 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.39461 MHz	-67.22 dBm	-32.22 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-30.96 dBm	-17.96 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.57692 MHz	22.01 dBm	-7.99 dB
799.000 MHz	805.000 MHz	6.250 kHz	800.92707 MHz	-66.98 dBm	-31.98 dB

Date: 15.DEC.2023 00:10:25

LTE Band 14 / 10MHz / 16QAM

Band Edge / 1 RB0



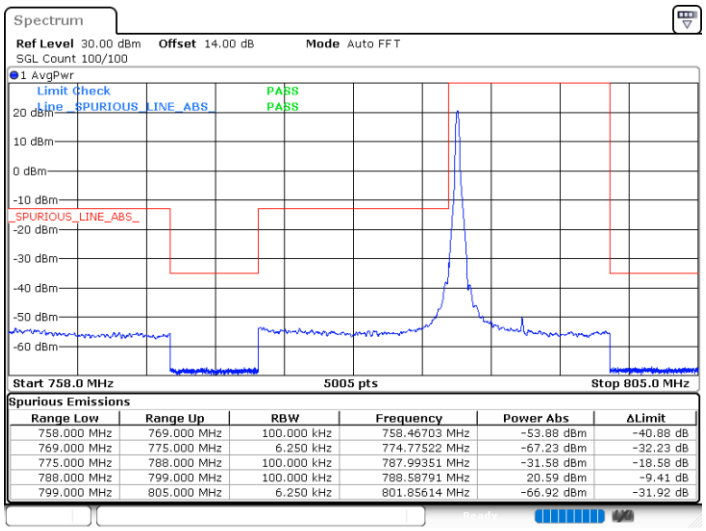
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.28022 MHz	-54.53 dBm	-41.53 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.27772 MHz	-67.40 dBm	-32.40 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-32.37 dBm	-19.37 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.59890 MHz	21.55 dBm	-8.45 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.05095 MHz	-66.85 dBm	-31.85 dB

Date: 15.DEC.2023 00:11:33

LTE Band 14 / 10MHz / 64QAM

Band Edge / 1 RB0



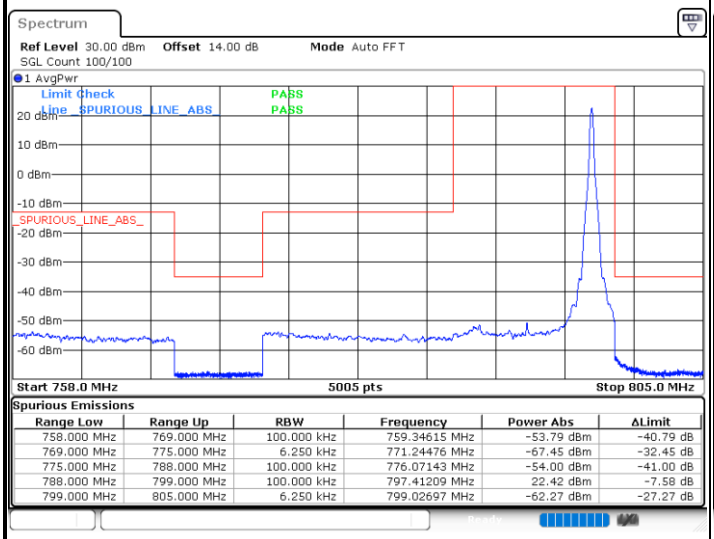
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	758.46703 MHz	-53.88 dBm	-40.88 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.77522 MHz	-67.23 dBm	-32.23 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.99351 MHz	-31.58 dBm	-18.58 dB
788.000 MHz	799.000 MHz	100.000 kHz	788.58791 MHz	20.59 dBm	-9.41 dB
799.000 MHz	805.000 MHz	6.250 kHz	801.85614 MHz	-66.92 dBm	-31.92 dB

Date: 15.DEC.2023 00:12:41

LTE Band 14 / 10MHz / QPSK

Band Edge / 1 RBmax



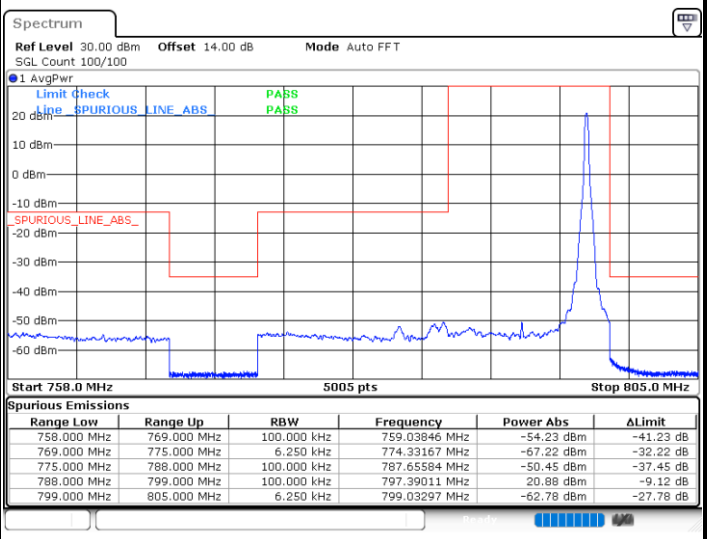
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.34615 MHz	-53.79 dBm	-40.79 dB
769.000 MHz	775.000 MHz	6.250 kHz	771.24476 MHz	-67.45 dBm	-32.45 dB
775.000 MHz	788.000 MHz	100.000 kHz	776.07143 MHz	-54.00 dBm	-41.00 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.41209 MHz	22.42 dBm	-7.58 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.02697 MHz	-62.27 dBm	-27.27 dB

Date: 15.DEC.2023 00:16:06

LTE Band 14 / 10MHz / 16QAM

Band Edge / 1 RBmax



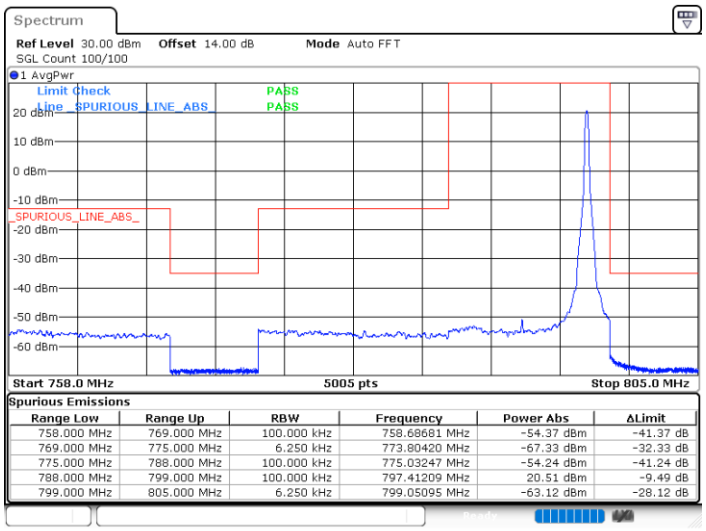
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	759.03846 MHz	-54.23 dBm	-41.23 dB
769.000 MHz	775.000 MHz	6.250 kHz	774.33167 MHz	-67.22 dBm	-32.22 dB
775.000 MHz	788.000 MHz	100.000 kHz	787.65584 MHz	-50.45 dBm	-37.45 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.39011 MHz	20.88 dBm	-9.12 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.03297 MHz	-62.78 dBm	-27.78 dB

Date: 15.DEC.2023 00:14:58

LTE Band 14 / 10MHz / 64QAM

Band Edge / 1 RBmax



Spurious Emissions

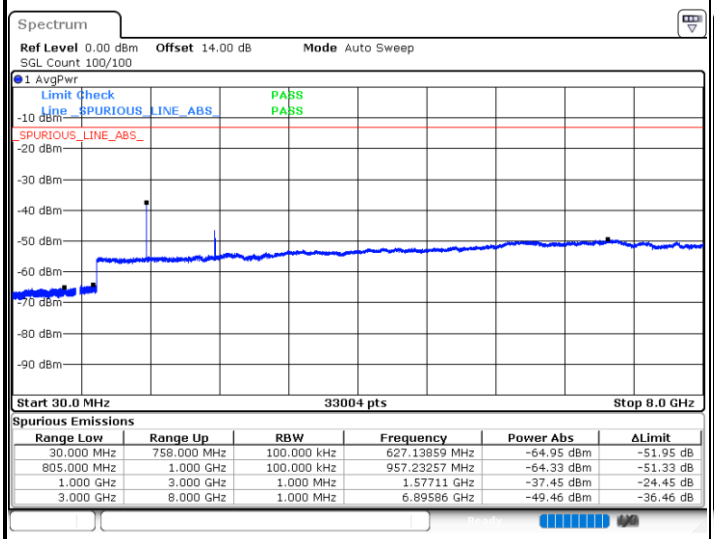
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
758.000 MHz	769.000 MHz	100.000 kHz	758.68681 MHz	-54.37 dBm	-41.37 dB
769.000 MHz	775.000 MHz	6.250 kHz	773.80420 MHz	-67.33 dBm	-32.33 dB
775.000 MHz	788.000 MHz	100.000 kHz	775.03247 MHz	-54.24 dBm	-41.24 dB
788.000 MHz	799.000 MHz	100.000 kHz	797.41209 MHz	20.51 dBm	-9.49 dB
799.000 MHz	805.000 MHz	6.250 kHz	799.05095 MHz	-63.12 dBm	-28.12 dB

Date: 15.DEC.2023 00:13:50

Conducted Spurious Emission

LTE Band 14 / 5MHz

Lowest Channel / QPSK

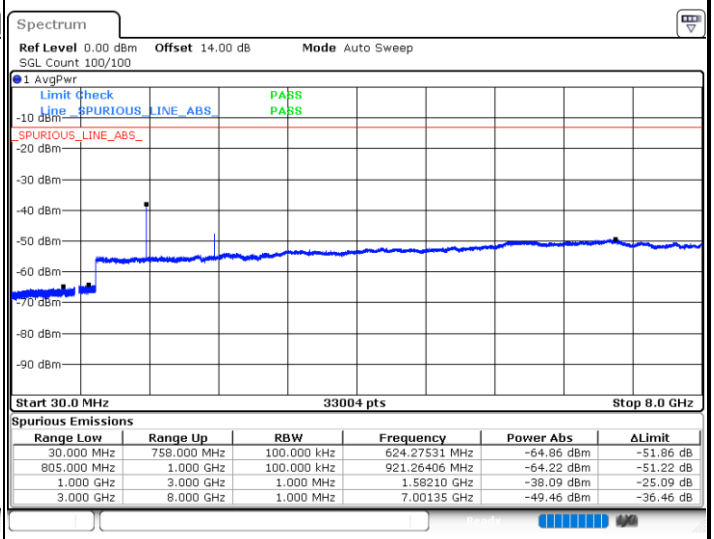


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	627.13859 MHz	-64.95 dBm	-51.95 dB
805.000 MHz	1.000 GHz	100.000 kHz	957.23257 MHz	-64.33 dBm	-51.33 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.57711 GHz	-37.45 dBm	-24.45 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.89586 GHz	-49.46 dBm	-36.46 dB

Date: 14.DEC.2023 03:20:34

Middle Channel / QPSK

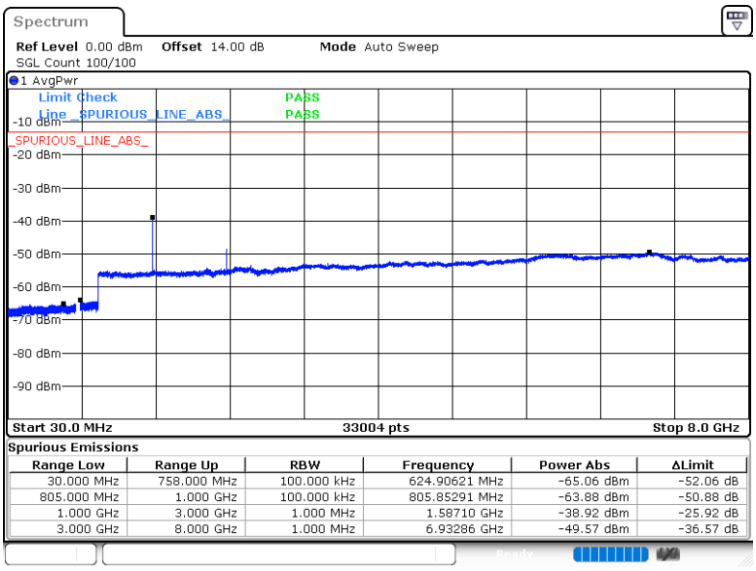


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	624.27531 MHz	-64.86 dBm	-51.86 dB
805.000 MHz	1.000 GHz	100.000 kHz	921.26406 MHz	-64.22 dBm	-51.22 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.58210 GHz	-38.09 dBm	-25.09 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.00135 GHz	-49.46 dBm	-36.46 dB

Date: 14.DEC.2023 03:34:36

Highest Channel / QPSK

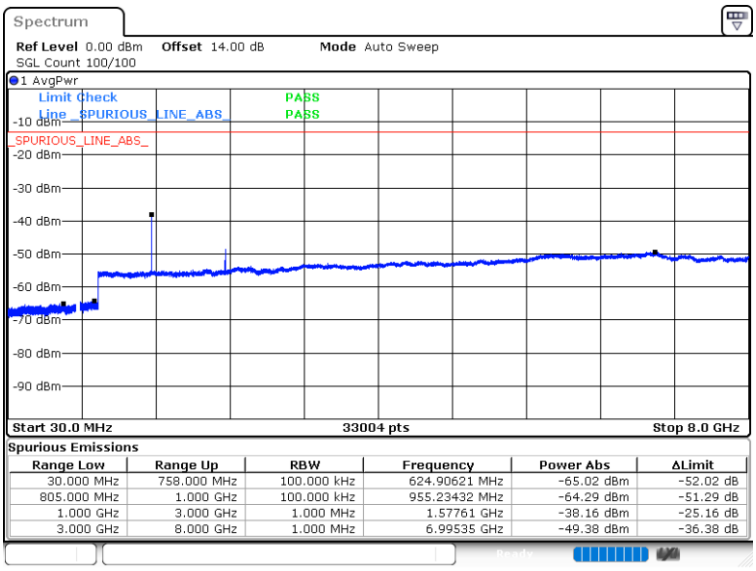


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	624.90621 MHz	-65.06 dBm	-52.06 dB
805.000 MHz	1.000 GHz	100.000 kHz	805.85291 MHz	-63.88 dBm	-50.88 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.58710 GHz	-38.92 dBm	-25.92 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.93286 GHz	-49.57 dBm	-36.57 dB

Date: 15.DEC.2023 00:09:15

LTE Band 14 / 10MHz
Middle Channel / QPSK



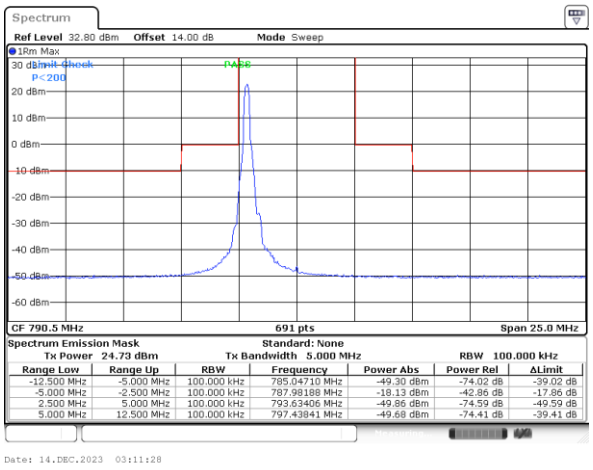
Spurious Emissions

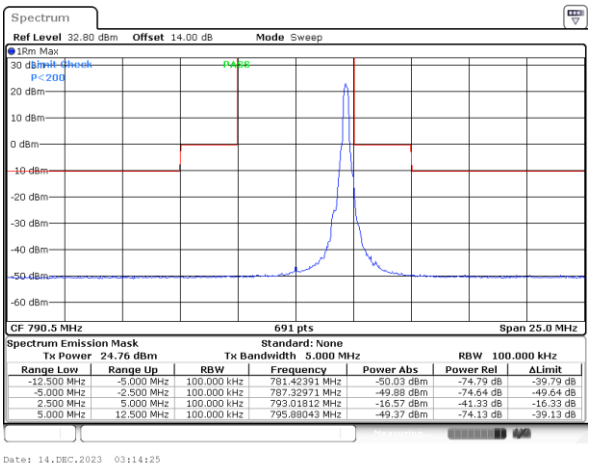
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	758.000 MHz	100.000 kHz	624.90621 MHz	-65.02 dBm	-52.02 dB
805.000 MHz	1.000 GHz	100.000 kHz	955.23432 MHz	-64.29 dBm	-51.29 dB
1.000 GHz	3.000 GHz	1.000 MHz	1.57761 GHz	-38.16 dBm	-25.16 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.99535 GHz	-49.38 dBm	-36.38 dB

Mask

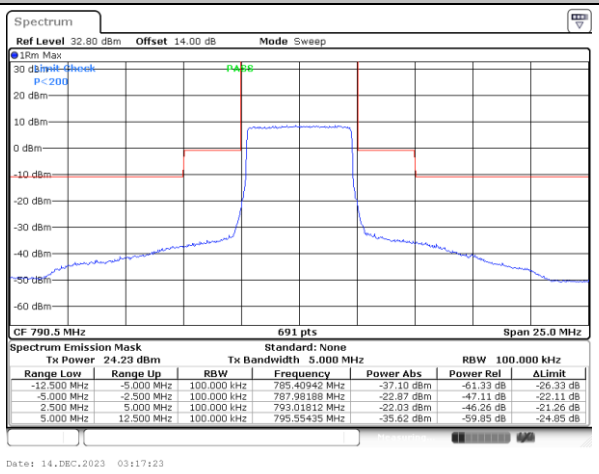
LTE Band 14 / 5MHz / QPSK

Lowest Channel / 1RB



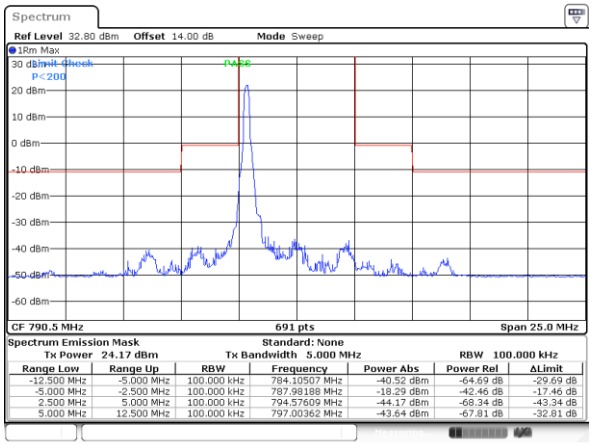


Lowest Channel / Full RB



LTE Band 14 / 5MHz / 16QAM

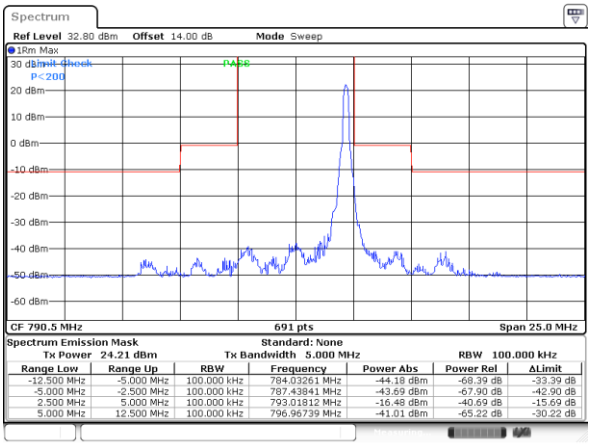
Lowest Channel / 1RB



Spectrum Emission Mask Standard: None
Tx Power 24.17 dBm Tx Bandwidth 5.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-12.500 MHz	-5.000 MHz	100.000 kHz	784.10507 MHz	-40.52 dBm	-64.69 dB	-29.69 dB
-5.000 MHz	-2.500 MHz	100.000 kHz	787.98188 MHz	-18.29 dBm	-42.46 dB	-17.46 dB
2.500 MHz	5.000 MHz	100.000 kHz	794.57609 MHz	-44.17 dBm	-68.34 dB	-43.34 dB
5.000 MHz	12.500 MHz	100.000 kHz	797.00362 MHz	-43.64 dBm	-67.81 dB	-32.81 dB

Date: 14.DEC.2023 03:12:28

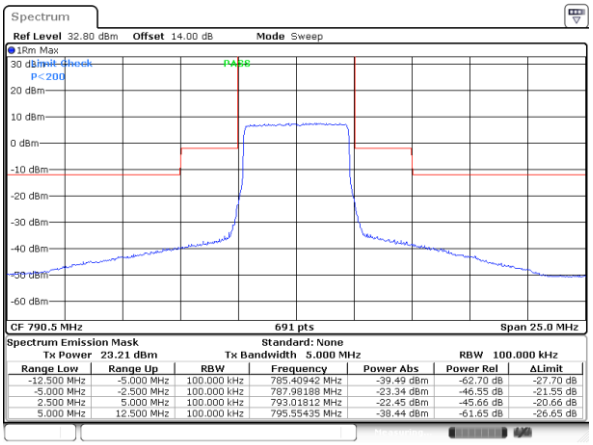


Spectrum Emission Mask Standard: None
Tx Power 24.21 dBm Tx Bandwidth 5.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-12.500 MHz	-5.000 MHz	100.000 kHz	784.03261 MHz	-44.18 dBm	-68.39 dB	-33.39 dB
-5.000 MHz	-2.500 MHz	100.000 kHz	787.43841 MHz	-43.69 dBm	-67.90 dB	-42.90 dB
2.500 MHz	5.000 MHz	100.000 kHz	793.01812 MHz	-16.48 dBm	-40.69 dB	-15.69 dB
5.000 MHz	12.500 MHz	100.000 kHz	796.96739 MHz	-41.01 dBm	-65.22 dB	-30.22 dB

Date: 14.DEC.2023 03:15:26

Lowest Channel / Full RB



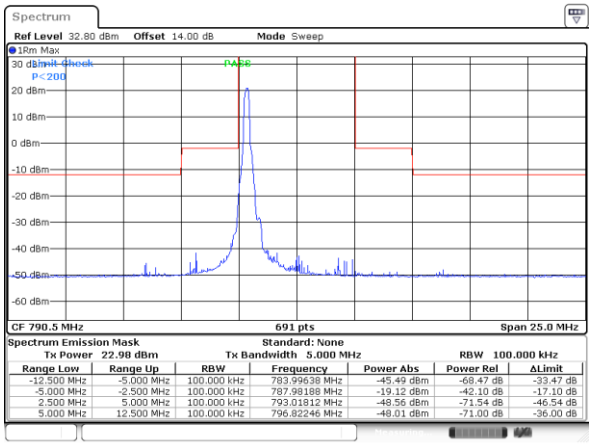
Spectrum Emission Mask Standard: None
Tx Power 23.21 dBm Tx Bandwidth 5.000 MHz RBW 100.000 kHz

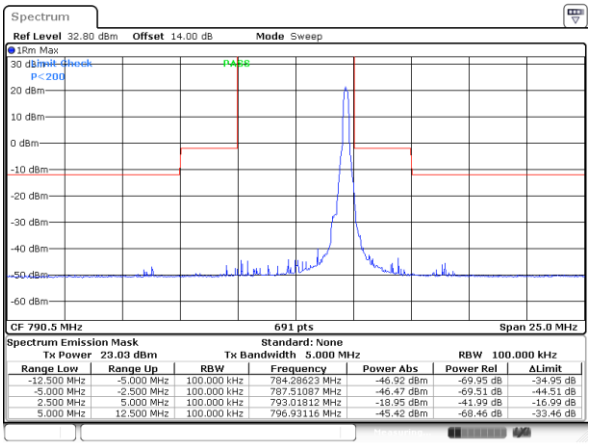
Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-12.500 MHz	-5.000 MHz	100.000 kHz	785.40942 MHz	-39.49 dBm	-62.70 dB	-27.70 dB
-5.000 MHz	-2.500 MHz	100.000 kHz	787.98188 MHz	-23.34 dBm	-46.55 dB	-21.55 dB
2.500 MHz	5.000 MHz	100.000 kHz	793.01812 MHz	-22.45 dBm	-45.66 dB	-20.66 dB
5.000 MHz	12.500 MHz	100.000 kHz	795.55435 MHz	-38.44 dBm	-61.65 dB	-26.65 dB

Date: 14.DEC.2023 03:18:24

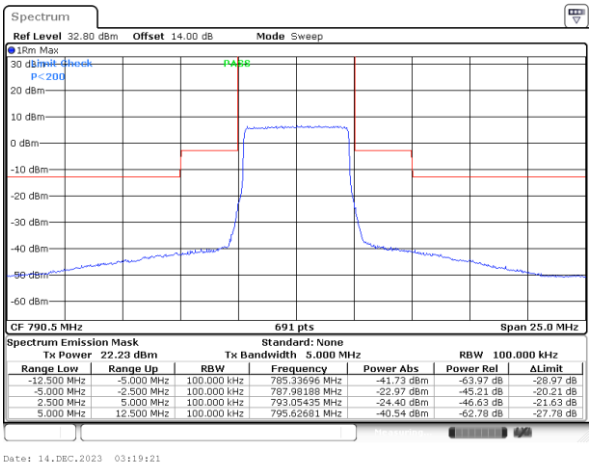
LTE Band 14 / 5MHz / 64QAM

Lowest Channel / 1RB



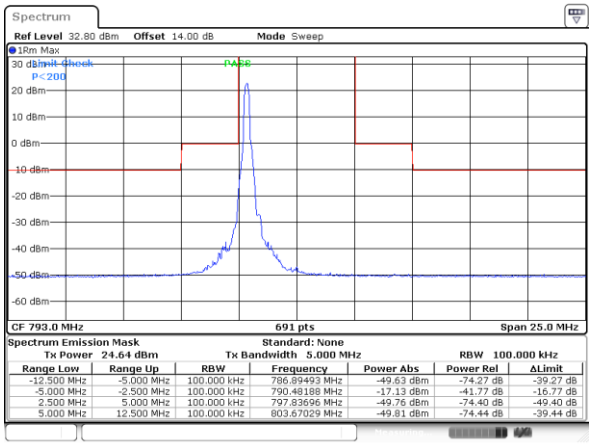


Lowest Channel / Full RB



LTE Band 14 / 5MHz / QPSK

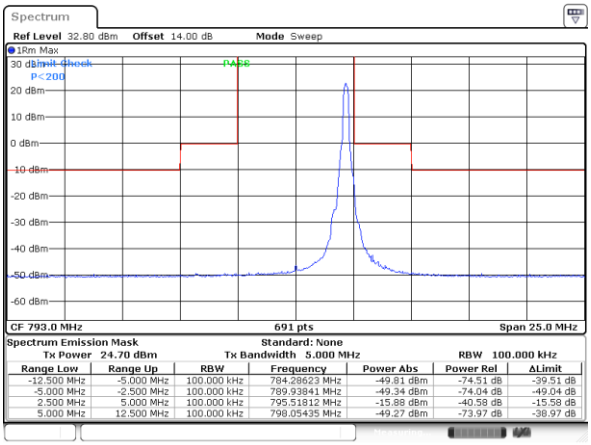
Middle Channel / 1RB



Spectrum Emission Mask Standard: None
Tx Power 24.64 dBm Tx Bandwidth 5.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-12.500 MHz	-5.000 MHz	100.000 kHz	786.89493 MHz	-49.63 dBm	-74.27 dB	-39.27 dB
-5.000 MHz	-2.500 MHz	100.000 kHz	790.48188 MHz	-17.13 dBm	-41.77 dB	-16.77 dB
2.500 MHz	5.000 MHz	100.000 kHz	797.83696 MHz	-49.76 dBm	-74.40 dB	-49.40 dB
5.000 MHz	12.500 MHz	100.000 kHz	803.67029 MHz	-49.81 dBm	-74.44 dB	-39.44 dB

Date: 14.DEC.2023 03:35:18

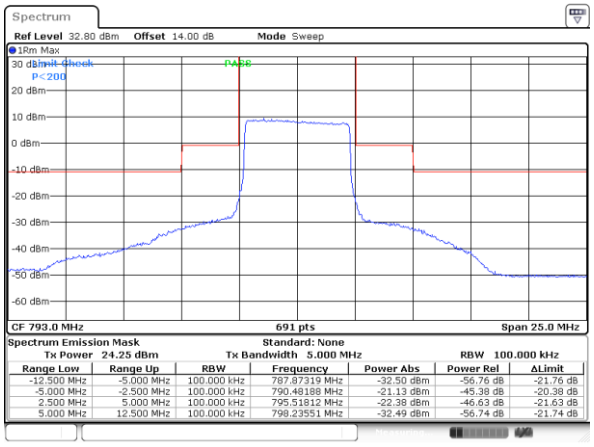


Spectrum Emission Mask Standard: None
Tx Power 24.70 dBm Tx Bandwidth 5.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-12.500 MHz	-5.000 MHz	100.000 kHz	784.28623 MHz	-49.81 dBm	-74.51 dB	-39.51 dB
-5.000 MHz	-2.500 MHz	100.000 kHz	789.93841 MHz	-49.34 dBm	-74.04 dB	-49.04 dB
2.500 MHz	5.000 MHz	100.000 kHz	795.51812 MHz	-15.88 dBm	-40.58 dB	-15.58 dB
5.000 MHz	12.500 MHz	100.000 kHz	798.05435 MHz	-49.27 dBm	-73.97 dB	-38.97 dB

Date: 14.DEC.2023 03:38:09

Middle Channel / Full RB



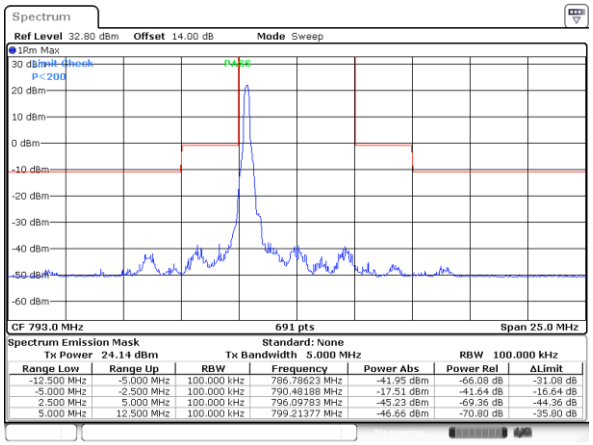
Spectrum Emission Mask Standard: None
Tx Power 24.25 dBm Tx Bandwidth 5.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-12.500 MHz	-5.000 MHz	100.000 kHz	787.87319 MHz	-32.50 dBm	-56.76 dB	-21.76 dB
-5.000 MHz	-2.500 MHz	100.000 kHz	790.48188 MHz	-21.13 dBm	-45.38 dB	-20.38 dB
2.500 MHz	5.000 MHz	100.000 kHz	795.51812 MHz	-22.38 dBm	-46.63 dB	-21.63 dB
5.000 MHz	12.500 MHz	100.000 kHz	798.23551 MHz	-32.49 dBm	-56.74 dB	-21.74 dB

Date: 14.DEC.2023 03:41:00

LTE Band 14 / 5MHz / 16QAM

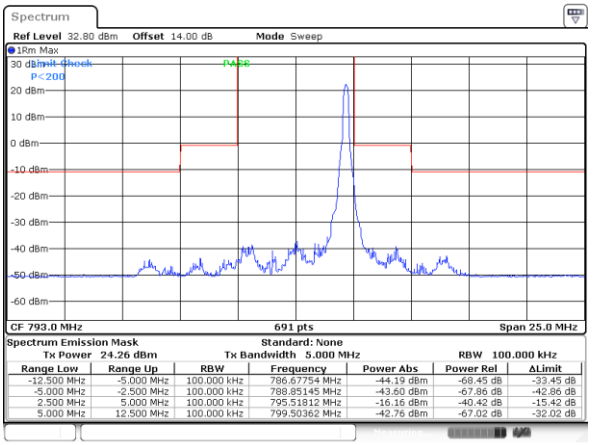
Middle Channel / 1RB



Spectrum Emission Mask Standard: None
Tx Power 24.14 dBm Tx Bandwidth 5.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-12.500 MHz	-5.000 MHz	100.000 kHz	786.78623 MHz	-41.95 dBm	-66.08 dB	-31.08 dB
-5.000 MHz	-2.500 MHz	100.000 kHz	790.48188 MHz	-17.51 dBm	-41.64 dB	-16.64 dB
2.500 MHz	5.000 MHz	100.000 kHz	796.09783 MHz	-45.23 dBm	-69.36 dB	-44.36 dB
5.000 MHz	12.500 MHz	100.000 kHz	799.21377 MHz	-46.66 dBm	-70.80 dB	-35.80 dB

Date: 14.DEC.2023 03:36:15

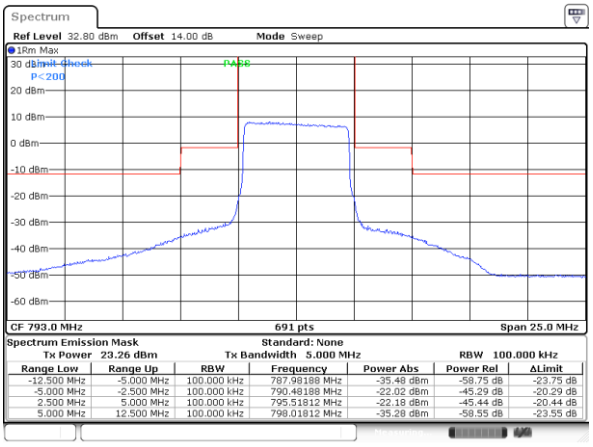


Spectrum Emission Mask Standard: None
Tx Power 24.26 dBm Tx Bandwidth 5.000 MHz RBW 100.000 kHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-12.500 MHz	-5.000 MHz	100.000 kHz	786.67754 MHz	-44.19 dBm	-68.45 dB	-33.45 dB
-5.000 MHz	-2.500 MHz	100.000 kHz	788.85145 MHz	-43.60 dBm	-67.86 dB	-42.86 dB
2.500 MHz	5.000 MHz	100.000 kHz	795.51812 MHz	-16.16 dBm	-40.42 dB	-15.42 dB
5.000 MHz	12.500 MHz	100.000 kHz	799.50362 MHz	-42.76 dBm	-67.02 dB	-32.02 dB

Date: 14.DEC.2023 03:39:06

Middle Channel / Full RB



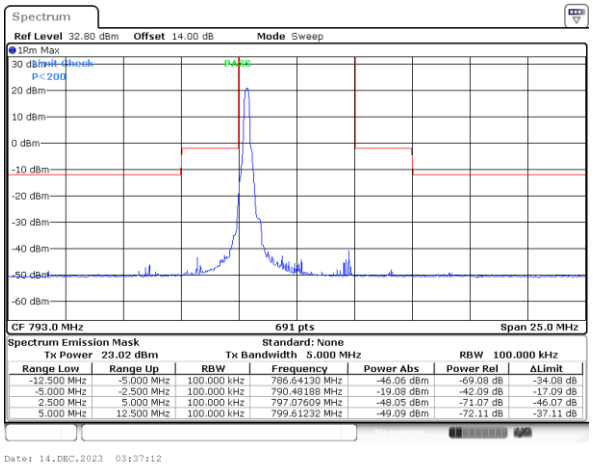
Spectrum Emission Mask Standard: None
Tx Power 23.26 dBm Tx Bandwidth 5.000 MHz RBW 100.000 kHz

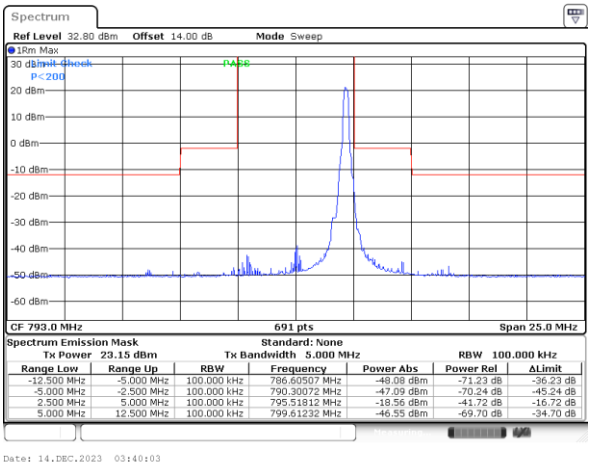
Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-12.500 MHz	-5.000 MHz	100.000 kHz	787.98188 MHz	-35.48 dBm	-58.75 dB	-23.75 dB
-5.000 MHz	-2.500 MHz	100.000 kHz	790.48188 MHz	-22.02 dBm	-45.29 dB	-20.29 dB
2.500 MHz	5.000 MHz	100.000 kHz	795.51812 MHz	-22.18 dBm	-45.44 dB	-20.44 dB
5.000 MHz	12.500 MHz	100.000 kHz	798.01812 MHz	-35.28 dBm	-58.55 dB	-23.55 dB

Date: 14.DEC.2023 03:41:57

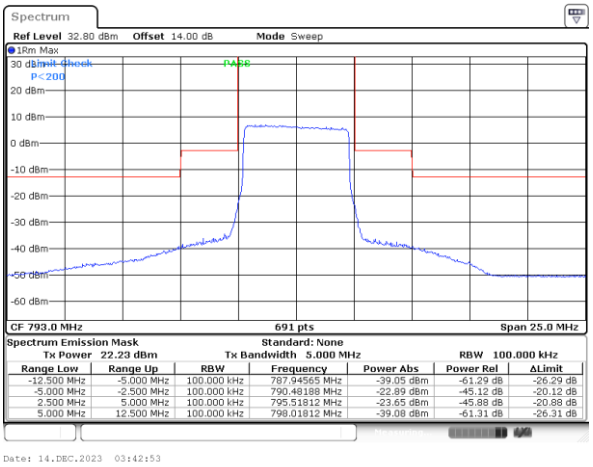
LTE Band 14 / 5MHz / 64QAM

Middle Channel / 1RB



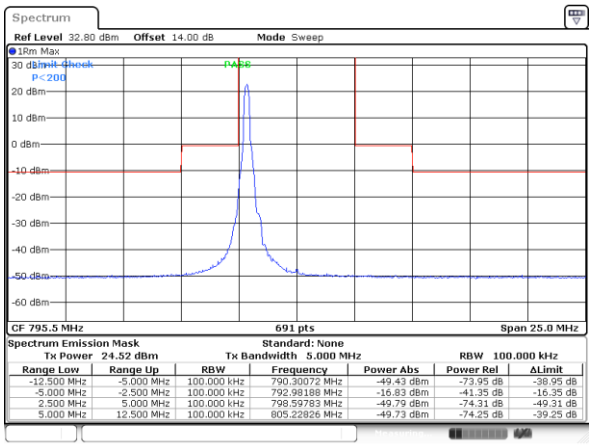


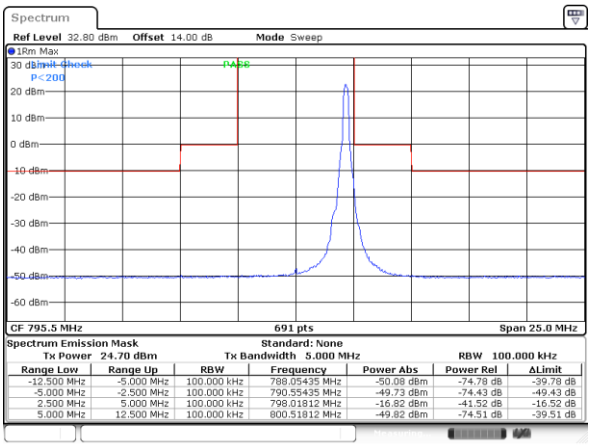
Middle Channel / Full RB



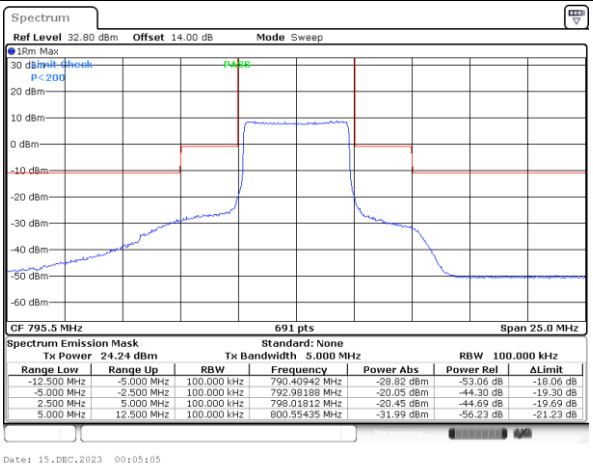
LTE Band 14 / 5MHz / QPSK

Highest Channel / 1RB



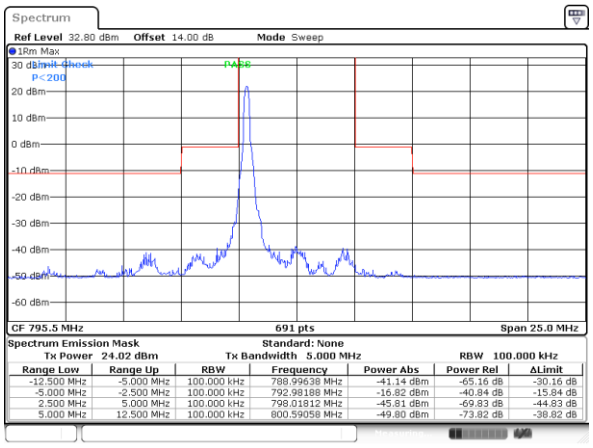


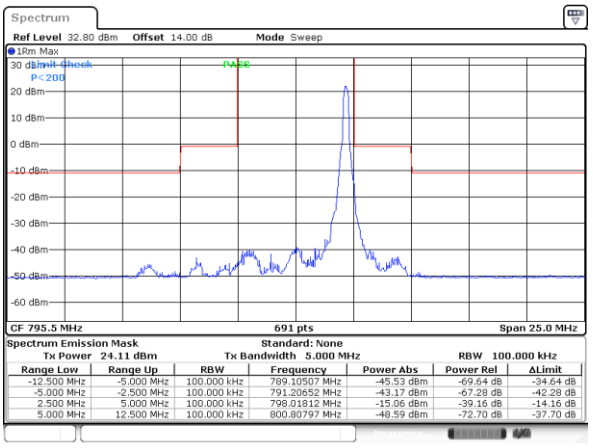
Highest Channel / Full RB



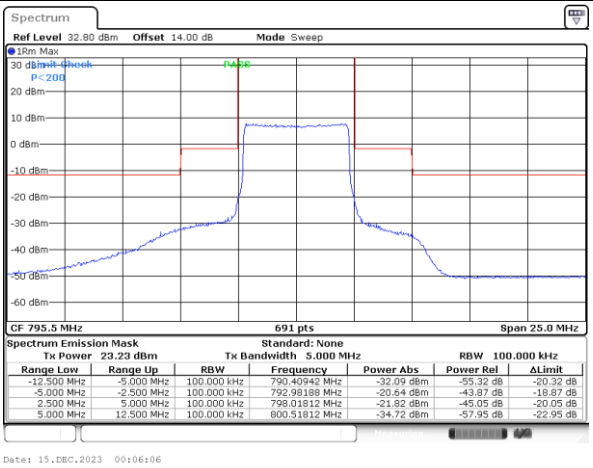
LTE Band 14 / 5MHz / 16QAM

Highest Channel / 1RB



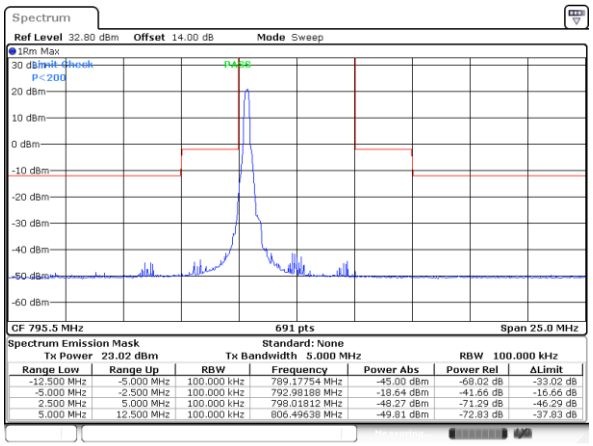


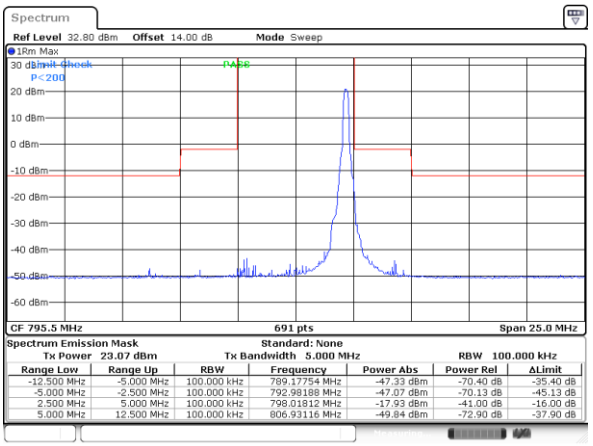
Highest Channel / Full RB



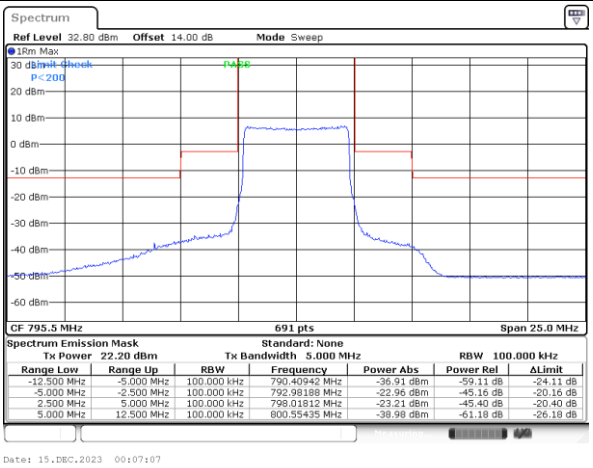
LTE Band 14 / 5MHz / 64QAM

Highest Channel / 1RB



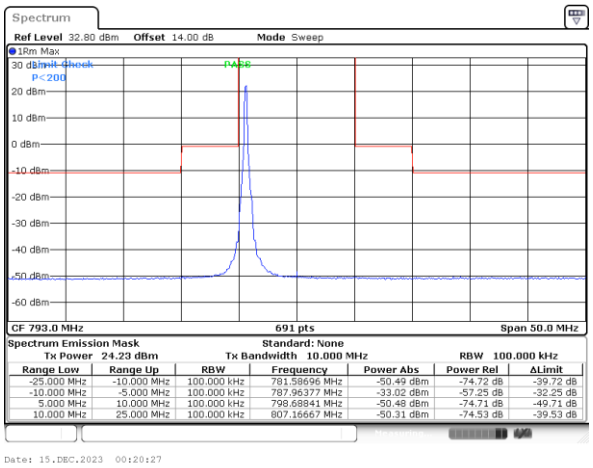


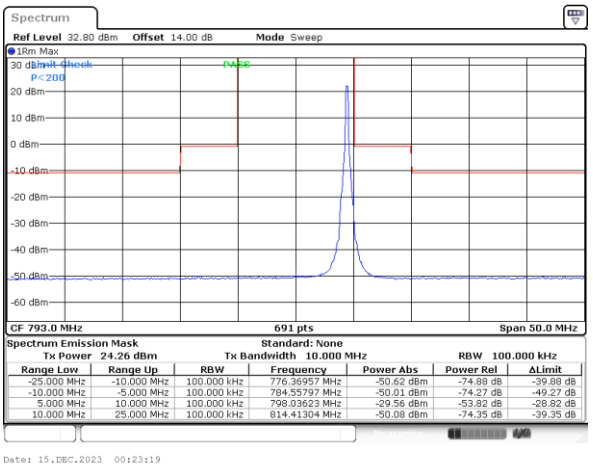
Highest Channel / Full RB



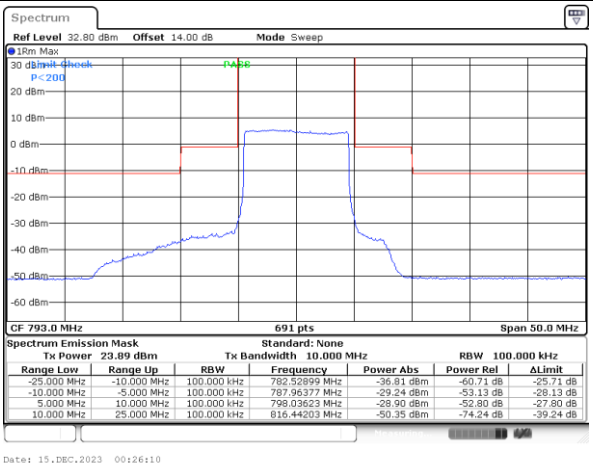
LTE Band 14 / 10MHz / QPSK

Middle Channel / 1RB



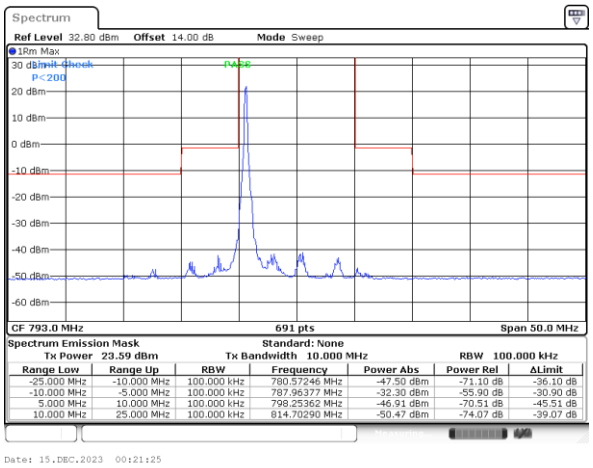


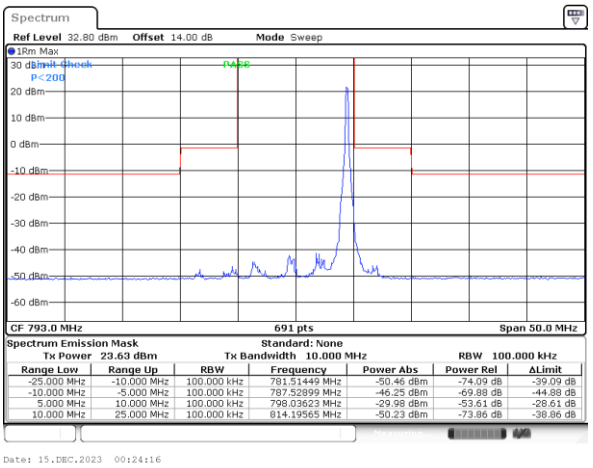
Middle Channel / Full RB



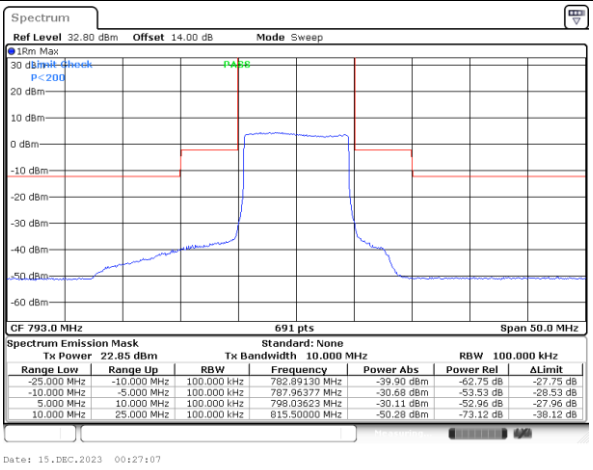
LTE Band 14 / 10MHz / 16QAM

Middle Channel / 1RB



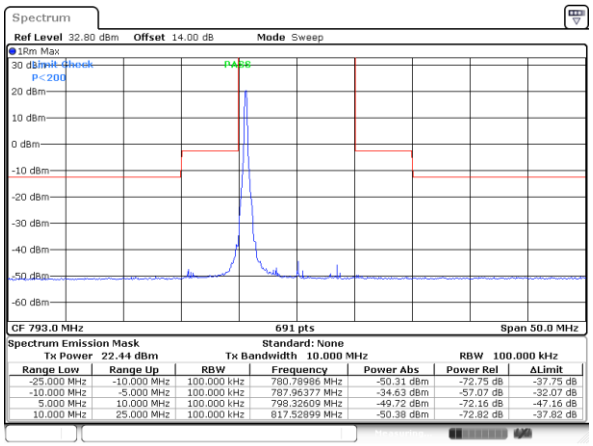


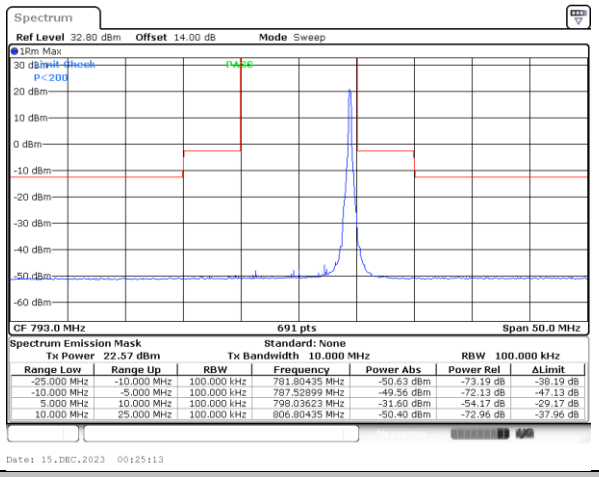
Middle Channel / Full RB



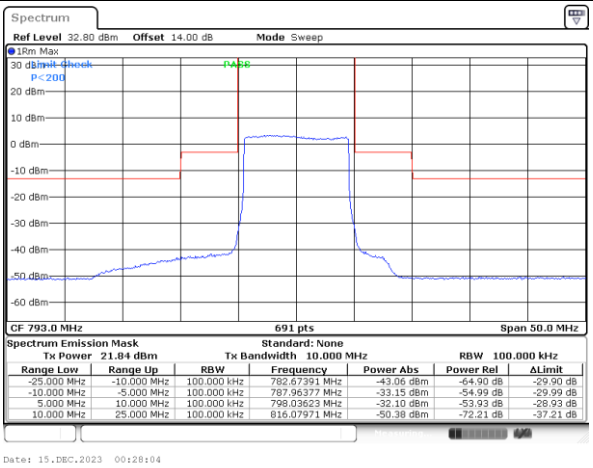
LTE Band 14 / 10MHz / 64QAM

Middle Channel / 1RB





Middle Channel / Full RB



Frequency Stability

Test Conditions		LTE Band 14 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	1.25ppm
		Deviation (ppm)	Result
50	Normal Voltage	0.0001	PASS
40	Normal Voltage	0.0010	
30	Normal Voltage	0.0013	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0016	
0	Normal Voltage	0.0006	
-10	Normal Voltage	0.0009	
-20	Normal Voltage	0.0014	
-30	Normal Voltage	0.0013	
20	Maximum Voltage	0.0004	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0005	

Note:

1. Normal Voltage = 3.85 V. ; Battery End Point (BEP) = 3.6 V. ; Maximum Voltage = 4.4 V.
2. The frequency fundamental emissions stay within the authorized frequency block.

Appendix B. Test Results of Radiated Test

Field Strength of Spurious Radiated

Test Engineer :	Chris	Temperature :	23~25℃
		Relative Humidity :	41~42%

LTE Band 14 / 5MHz / QPSK								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	1576	-67.40	-42.15	-25.25	-70.03	1.09	5.87	H
	2368	-62.46	-13	-49.46	-64.86	1.37	5.92	H
	3152	-60.93	-13	-47.93	-64.82	1.64	7.68	H
	1576	-65.86	-42.15	-23.71	-68.49	1.09	5.87	V
	2368	-61.18	-13	-48.18	-63.58	1.37	5.92	V
	3152	-61.04	-13	-48.04	-64.93	1.64	7.68	V
Middle	1584	-67.86	-42.15	-25.71	-70.49	1.09	5.87	H
	2376	-63.18	-13	-50.18	-65.58	1.37	5.92	H
	3160	-60.71	-13	-47.71	-64.60	1.64	7.68	H
	1584	-66.87	-42.15	-24.72	-69.50	1.09	5.87	V
	2376	-61.37	-13	-48.37	-63.77	1.37	5.92	V
	3160	-60.30	-13	-47.30	-64.19	1.64	7.68	V
Highest	1584	-67.81	-42.15	-25.66	-70.44	1.09	5.87	H
	2376	-62.97	-13	-49.97	-65.37	1.37	5.92	H
	3176	-61.34	-13	-48.34	-65.23	1.64	7.68	H
	1584	-66.94	-42.15	-24.79	-69.57	1.09	5.87	V
	2376	-61.29	-13	-48.29	-63.69	1.37	5.92	V
	3176	-61.28	-13	-48.28	-65.17	1.64	7.68	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)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1576	-66.23	-42.15	-24.08	-68.86	1.09	5.87	H
	2368	-62.66	-13	-49.66	-65.06	1.37	5.92	H
	3152	-60.87	-13	-47.87	-64.76	1.64	7.68	H
	1576	-64.30	-42.15	-22.15	-66.93	1.09	5.87	V
	2368	-60.93	-13	-47.93	-63.33	1.37	5.92	V
	3152	-60.85	-13	-47.85	-64.74	1.64	7.68	V

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