FCC RF Test Report

APPLICANT	:	Motorola Solutions Inc.
EQUIPMENT 1	:	1)EVOLVE SMART HANDHELD W STD BATTERY 2)EVOLVE SMART HANDHELD W HICAP BATT
EQUIPMENT 2	:	EVOLVE-I IS SMART HANDHELD W IS HICAP BATT
BRAND NAME	:	Motorola Solutions
MODEL NAME 1	:	EVOLVE
MODEL NAME 2	:	EVOLVE-i
MODEL NUMBER 1	:	1)HK2136A 2)HK2156A
MODEL NUMBER 2	:	HK2137A
FCC ID	:	AZ489FT7134
STANDARD	:	47 CFR Part 2, Part 27 Subpart Q
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S)	:	Aug. 24, 2021 ~ Dec. 31, 2021

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

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

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alexwang

Approved by: Alex Wang / Manager

ACCREDITED
Cert #5145.02

Sporton International Inc. (Kunshan)

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APPENDIX B. TEST RESULTS OF RADIATED TEST
APPENDIX C. TEST SETUP PHOTOGRAPHS
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG052616-22B	Rev. 01	Initial issue of report	Sep. 28, 2021
FG052616-22B	Rev. 02	Add the information for EVOLVE sample	Nov. 18, 2021
FG052616-22B	Rev. 03	Update Conducted test data	Feb. 07, 2022
FG052616-22B	Rev. 04	Update the Equipment 1's name	Jun. 14, 2022

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	—	Report Only	-
3.5	§27.50 (k)(4)	Peak-to-Average Ratio	<13dB	PASS	
3.6	§27.50 (k)(3)	EIRP	EIRP < 1W (30dBm)	PASS	-
3.7	§2.1049	Occupied Bandwidth	—	Report Only	-
3.8	§2.1051 §27.53 (n)(2)	Conducted Band Edge Measurement	-13dBm/MHz	PASS	-
3.9	§2.1051 §27.53 (n)(2)	Conducted Spurious Emission	-13dBm/MHz	PASS	-
3.10	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Within the band	PASS	-
4.4	§2.1053 §27.53 (n)(2)	Radiated Spurious Emission	-13dBm/MHz	PASS	Under limit 33.38 dB at 6984.000 MHz

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

Motorola Solutions Inc.
8000 West Sunrise Boulevard, Fort Lauderdale, Florida

1.2 Manufacturer

Motorola Solutions Malaysia Sdn. Bhd.
Plot 2A, Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia.

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment 1	1)EVOLVE SMART HANDHELD W STD BATTERY 2)EVOLVE SMART HANDHELD W HICAP BATT
Equipment 2	EVOLVE-i IS SMART HANDHELD W IS HICAP BATT
Brand Name	Motorola Solutions
Model Name 1	EVOLVE
Model Name 2	EVOLVE-i
Model Number 1	1)HK2136A 2)HK2156A
Model Number 2	HK2137A
FCC ID	AZ489FT7134
IMEI Code	conducted: 354850210002473 Radiation: 352366190005842/352366195005847
HW Version	PVT
SW Version	EVOLVE-userdebug 10 QKQ1.200623.002 D01.01.43 release-keys
EUT Stage	Identical Prototype

Remark: According to the Product Equality Declaration as Appendix D about the difference between EVOLVE and EVOLVE-i, the test result is not affected by two samples, we only performed testing with EVOLVE-i sample.

1.4 Product Specification of Equipment Under Test

Product Feature	
Tx/Rx Frequency	LTE Band 42: 3450 MHz ~ 3550 MHz
Bandwidth	5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	LTE Band 42 : 20.30 dBm
Antenna Gain	LTE Band 42 : 1.0 dBi
Type of Modulation	QPSK / 16QAM

1.5 Modification of EUT

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

1.6 Maximum EIRP Power and Emission Designator

LTE Band 42		QPSK		16QAM	
BW (MHz)	Frequency Range (MHz)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)
20	3460 ~ 3540	0.1349	17M9G7D	0.1045	17M9W7D

Note: Based on engineering evaluation, only the maximum bandwidth and the worst modulation test results are shown in the report.

1.7 Specification of Accessory

Accessories Information				
MUC Charger base	**Brand Name**	Motorola	**Model Name**	PMPN4563A
	Description	CHGR DESKTOP MULTI UNIT EXT PS BASE		
AC Adapter MUC (US)	**Brand Name**	Motorola	**Model Name**	PMPN4564A
	Power Rating	I/P: 100 - 240Vac, 1.3A, O/P: 15Vdc, 6A		
Power Supply	**Brand Name**	Motorola	**P/N**	PS000242A01
AC Adapter1 (US) Micro-USB rapid-rate plug-in charger	**Brand Name**	Motorola	**P/N**	PS000150A11
	Power Rating	I/P: 100 - 240Vac, 0.25A, O/P: 5Vdc, 1.5A		
DC Adapter 2 Vehicular Power Adapter (VPA)	**Brand Name**	Motorola	**P/N**	PMPN4169A
	Power Rating	I/P: 10.8 – 33.0Vac, 1.1A, O/P: 5Vdc, 1.5A		
Battery 1	**Brand Name**	Motorola Solutions	**P/N**	BT000593A01
	Rated	5800mAh		
Battery 2	**Brand Name**	Motorola Solutions	**P/N**	BT000592A01
	Rated	2900mAh		
Battery 3	**Brand Name**	Motorola Solutions	**P/N**	BT000594A01
	Rated	5800mAh		
Earpiece	**Brand Name**	Motorola Solutions	**P/N**	PMLN8191A
	Signal Line	1.128meter, non-shielded cable, without ferrite core		
Remote Speaker	**Brand Name**	Motorola Solutions	**P/N**	PMMN4125B

Microphone 1	**Signal Line**	0.54 meter(normal), 2.5 meter (stretch) shielded cable, without ferrite core		
BT Wired Speaker Mic (WM500)	**Brand Name**	Motorola Solutions	**P/N**	PMMN4127A
Bluetooth Earpiece	**Brand Name**	Motorola Solutions	**P/N**	PMLN7851A(EP900)
Belt Clip Holster	**Brand Name**	Motorola Solutions	**Model Name**	PMLN6970A
Belt Clip Holster (Short)	**Brand Name**	Motorola Solutions	**Model Name**	NTN8266B
Belt Clip Holster (Long)	**Brand Name**	Motorola Solutions	**Model Name**	PMLN7965A

Remark: Battery 1 and Battery 2 are for EVOLVE sample, Battery 3 is for EVOLVE-i Sample.

1.8 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 FAX : +86-512-57900958		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	03CH04-KS TH01-KS	CN1257	314309

1.9 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24a

1.10 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 27 Subpart Q
- ANSI C63.26-2015
- FCC KDB 971168 Power Meas License Digital Systems D01 v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

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

2 Test Configuration of Equipment Under Test

2.1 Test Mode

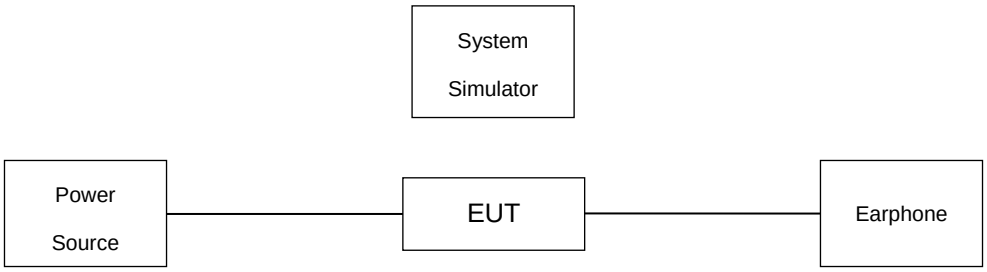
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Cases	Band	Bandwidth (MHz)	Modulation	RB #	Test Channel
		eg. 5M, 10M, 15M, 20M	eg. QPSK, 16QAM	1RB, Partial RB, Full RB	L/M/H
Max. Output Power	LTE Band 42	5M, 10M, 15M, 20M	QPSK, 16QAM	1RB, Partial RB, Full RB	L, M, H
Peak-to-Average Ratio	LTE Band 42	20M	QPSK, 16QAM	Full RB	M
E.I.R.P	LTE Band 42	5M, 10M, 15M, 20M	QPSK, 16QAM	1RB, Partial RB, Full RB	L, M, H
26dB and 99% Bandwidth	LTE Band 42	20M	QPSK, 16QAM	Full RB	M
Conducted Band Edge	LTE Band 42	5M, 10M, 15M, 20M	QPSK, 16QAM	1RB, Full RB	L, H
Conducted Spurious Emission	LTE Band 42	5M, 10M, 15M, 20M	QPSK	1RB	L, M, H
Frequency Stability	LTE Band 42	20M	QPSK	1RB	L, H
Radiated Spurious Emission	LTE Band 42	Worst case from maximum power			M

Note:
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



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	Base Station	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss 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.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 8.22 dB.

Example :

Offset(dB) = RF cable loss(dB).

= 8.22 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 42 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	42190	42590	42990
	Frequency	3460	3500	3540
15	Channel	42165	42590	43015
	Frequency	3457.5	3500	3542.5
10	Channel	42140	42590	43040
	Frequency	3455	3500	3545
5	Channel	42115	42590	43065
	Frequency	3452.5	3500	3547.5

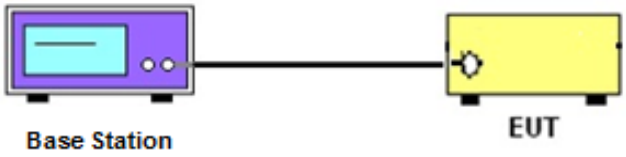
3 Conducted Test Items

3.1 Measuring Instruments

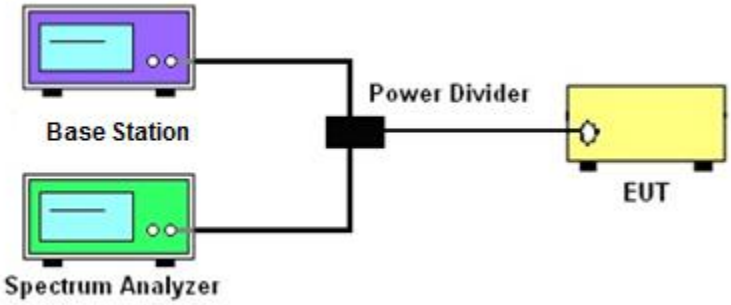
See list of measuring instruments of this test report.

3.2 Test Setup

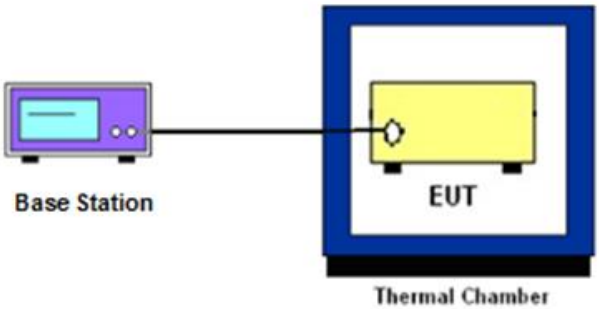
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied / 26dB Bandwidth ,Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power Measurement

3.4.1 Description of the Conducted Output Power 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.

3.4.2 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.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

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

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.6 EIRP

3.6.1 Description of EIRP Limit

§ 27.50 (k)(3)

Mobile devices are limited to 1Watt (30 dBm) EIRP. Mobile devices operating in these bands must employ a means for limiting power to the minimum necessary for successful communications

3.6.2 Test Procedures

1. According to KDB 412172 D01 Power Approach,
2. 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

3.7 Occupied Bandwidth

3.7.1 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.

3.7.2 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.

3.8 Conducted Band Edge Measurement

3.8.1 Description of Conducted Band Edge Measurement

§ 27.53 (n)(2)

For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

Compliance with this paragraph is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz.

3.8.2 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 RBW ≥ 1% EBW but limited to a maximum of 200 kHz in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz and 5 MHz removed from the band edge, set RBW ≥ 500KHz.
6. Beyond the 5 MHz removed from the band edge, set RBW = 1MHz.
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. Checked that all the results comply with the emission limit line.

3.9 Conducted Spurious Emission Measurement

3.9.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges shall not exceed −13 dBm/MHz.

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

3.9.2 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. 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 RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. Checked that all the results comply with the emission limit line.

3.10 Frequency Stability Measurement

3.10.1 Description of Frequency Stability Measurement

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

3.10.2 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.

3.10.3 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.

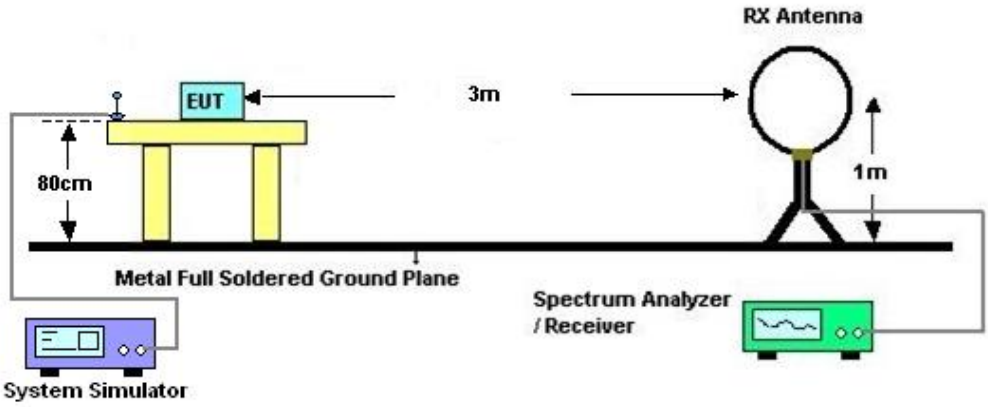
4 Radiated Test Items

4.1 Measuring Instruments

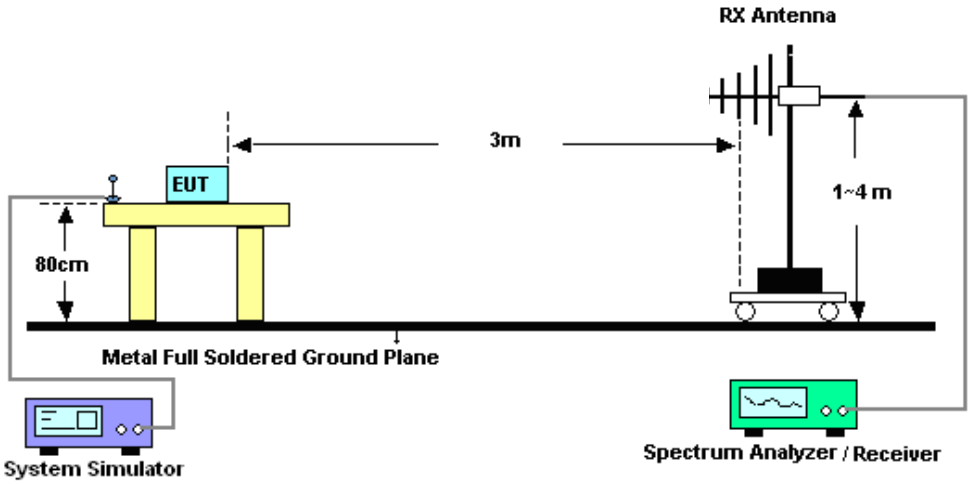
See list of measuring instruments of this test report.

4.2 Test Setup

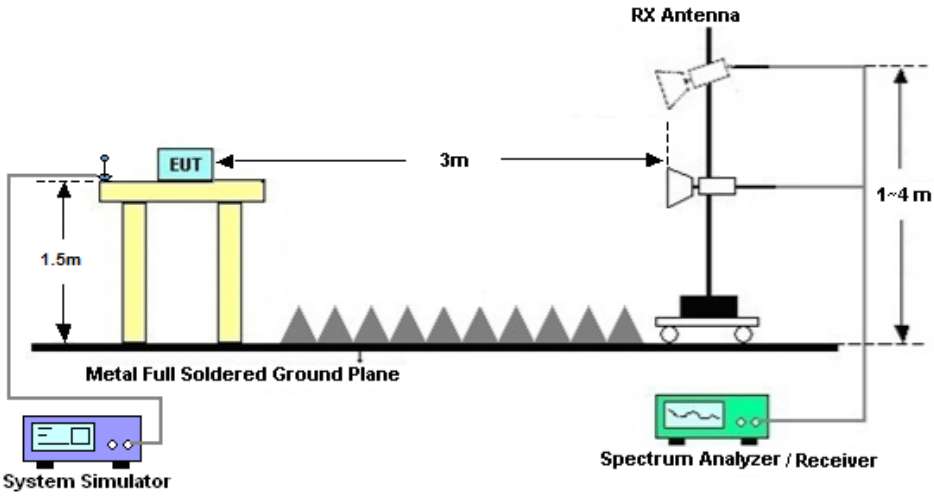
4.2.1 For radiated test below 30MHz



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 shall not exceed −13 dBm/MHz.

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

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.
   EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
   ERP (dBm) = EIRP - 2.15
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Nov. 01, 2020	Aug. 24, 2021~ Sep. 06, 2021	Oct. 31, 2021	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	Aug. 27, 2020	Aug. 24, 2021~ Sep. 06, 2021	Aug. 26, 2021	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	Aug. 26, 2021		Aug. 25, 2022	Conducted (TH01-KS)
Temperature &hu midity chamber	Hongzhan	LP-150U	H2014011 440	-40~+150°C 20%~95%RH	Jul. 12, 2021	Aug. 24, 2021~ Sep. 06, 2021	Jul. 11, 2022	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 14, 2021	Dec. 31, 2021	Oct. 13, 2022	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	Aug. 26, 2021	Dec. 31, 2021	Aug. 25, 2022	Conducted (TH01-KS)
Temperature &hu midity chamber	Hongzhan	LP-150U	H2014011 440	-40~+150°C 20%~95%RH	Jul. 12, 2021	Dec. 31, 2021	Jul. 11, 2022	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY551502 44	10Hz-44G,MAX 30dB	Apr. 13, 2021	Aug. 24, 2021	Apr. 12, 2022	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 01, 2020	Aug. 24, 2021	Oct. 31, 2021	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 30, 2021	Aug. 24, 2021	May 29, 2022	Radiation (03CH04-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 01, 2020	Aug. 24, 2021	Oct. 31, 2021	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Jan. 06, 2021	Aug. 24, 2021	Jan. 05, 2022	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 06, 2021	Aug. 24, 2021	Jan. 05, 2022	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 07, 2021	Aug. 24, 2021	Jan. 06, 2022	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1Ghz-18Ghz	Jan. 06, 2021	Aug. 24, 2021	Jan. 05, 2022	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY572801 06	500MHz~26.5G Hz	Oct. 14, 2020	Aug. 24, 2021	Oct. 13, 2021	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Aug. 24, 2021	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Aug. 24, 2021	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Aug. 24, 2021	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.3dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.8dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.8dB**

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

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power) and EIRP

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel				42190	42590	42990			
Frequency (MHz)				3460	3500	3540	L	M	H
20	QPSK	1	0	19.81	20.3	19.74	0.1205	0.1349	0.1186
20	QPSK	1	99	19.63	19.64	19.56	0.1156	0.1159	0.1138
20	QPSK	100	0	18.8	18.83	18.65	0.0955	0.0962	0.0923
20	16QAM	1	0	19.12	19.19	19.17	0.1028	0.1045	0.104
Channel				42165	42590	43015	EIRP(W)		
Frequency (MHz)				3457.5	3500	3542.5	L	M	H
15	QPSK	1	0	20.24	20.24	20.12	0.133	0.133	0.1294
15	16QAM	1	0	18.98	19.05	18.94	0.0995	0.1012	0.0986
Channel				42140	42590	43040	EIRP(W)		
Frequency (MHz)				3455	3500	3545	L	M	H
10	QPSK	1	0	20.14	20.14	20.07	0.13	0.13	0.1279
10	16QAM	1	0	18.82	18.92	18.8	0.0959	0.0982	0.0955
Channel				42115	42590	43065	EIRP(W)		
Frequency (MHz)				3452.5	3500	3547.5	L	M	H
5	QPSK	1	0	20.03	20.05	20	0.1268	0.1274	0.1259
5	16QAM	1	0	18.92	19.04	18.91	0.0982	0.1009	0.0979

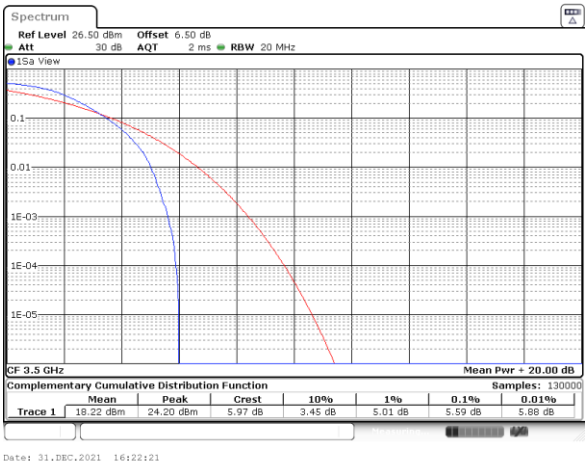
LTE Band 42

Peak-to-Average Ratio

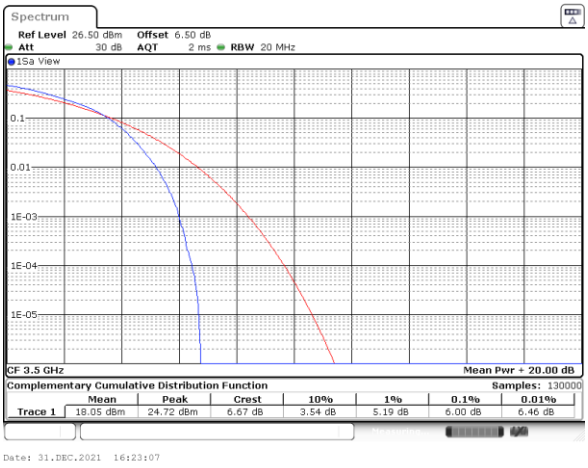
Mode	LTE Band 42 / 20MHz		
Mod.	QPSK	16QAM	Limit: 13dB
RB Size	Full RB	Full RB	Result
Middle CH	5.59	6.00	PASS

LTE Band 42/ 20MHz

Middle Channel / Full RB / QPSK



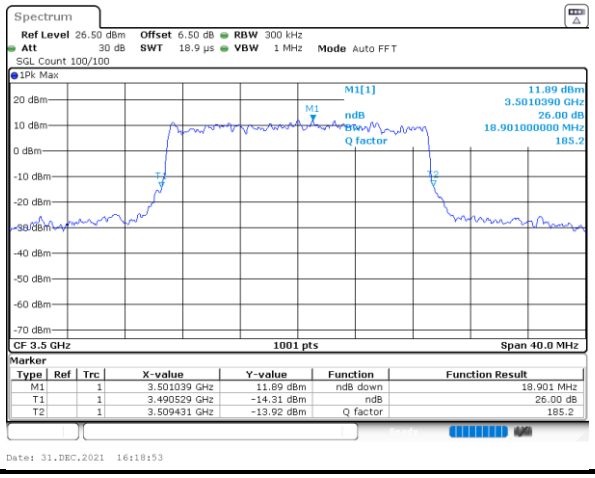
Middle Channel / Full RB / 16QAM

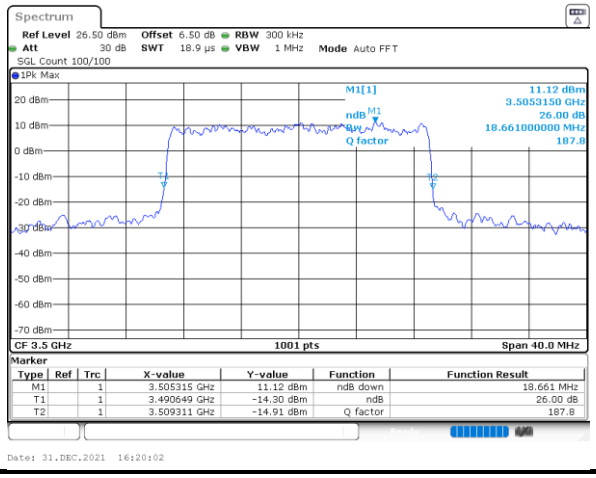


26dB Bandwidth

Mode	LTE Band 42 : 26dB BW(MHz)	
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	18.90	18.66

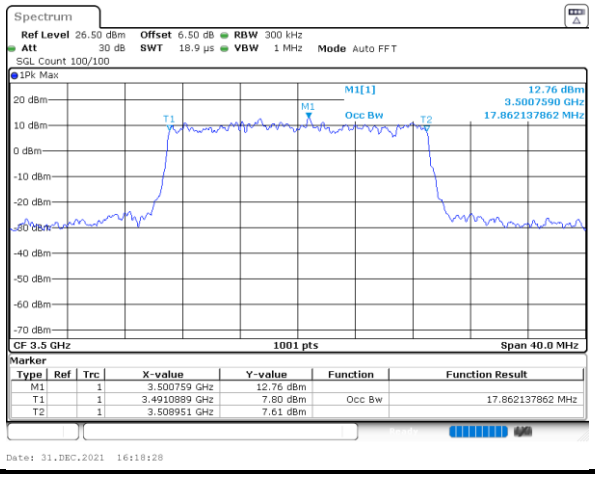
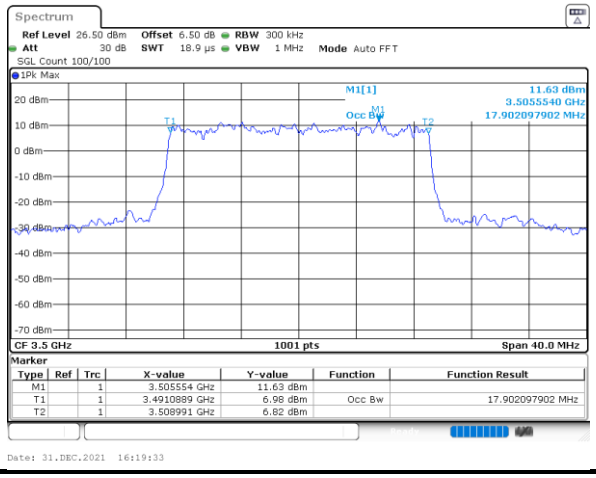
LTE Band 42	
Middle Channel / 20MHz / QPSK	Middle Channel / 20MHz / 16QAM





Occupied Bandwidth

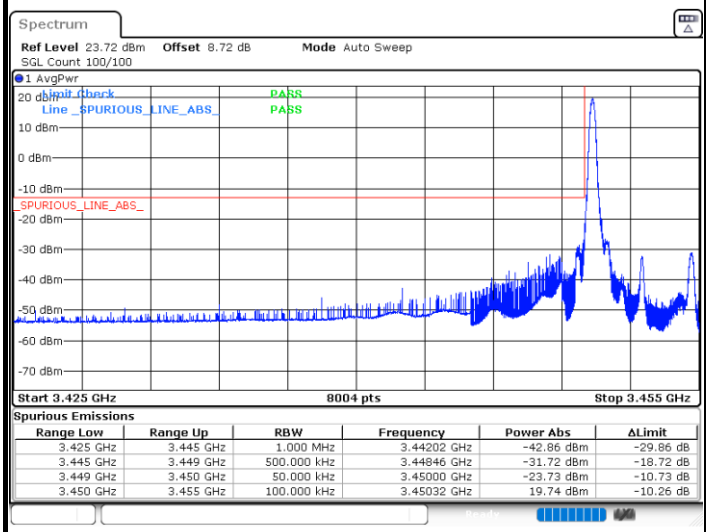
Mode	LTE Band 42 : 99%OBW(MHz)	
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	17.86	17.90

LTE Band 42	
Middle Channel / 20MHz / QPSK	Middle Channel / 20MHz / 16QAM
	

Conducted Band Edge

LTE Band 42 / 5MHz / QPSK

Lowest Band Edge / 1 RB

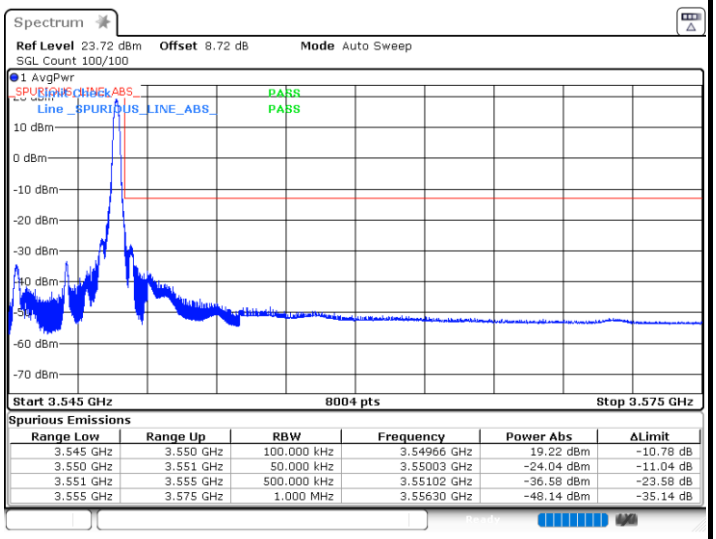


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44202 GHz	-42.86 dBm	-29.86 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44846 GHz	-31.72 dBm	-18.72 dB
3.449 GHz	3.450 GHz	50.000 kHz	3.45000 GHz	-23.73 dBm	-10.73 dB
3.450 GHz	3.455 GHz	100.000 kHz	3.45032 GHz	19.74 dBm	-10.26 dB

Date: 31.DEC.2021 14:42:16

Highest Band Edge / 1 RB

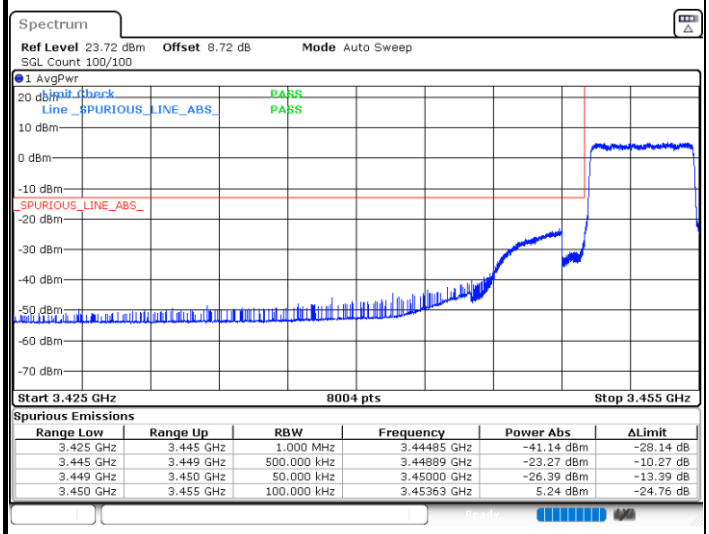


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.545 GHz	3.550 GHz	100.000 kHz	3.54966 GHz	19.22 dBm	-10.78 dB
3.550 GHz	3.551 GHz	50.000 kHz	3.55003 GHz	-24.04 dBm	-11.04 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55102 GHz	-36.58 dBm	-23.58 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55630 GHz	-48.14 dBm	-35.14 dB

Date: 31.DEC.2021 14:58:04

Lowest Band Edge / Full RB

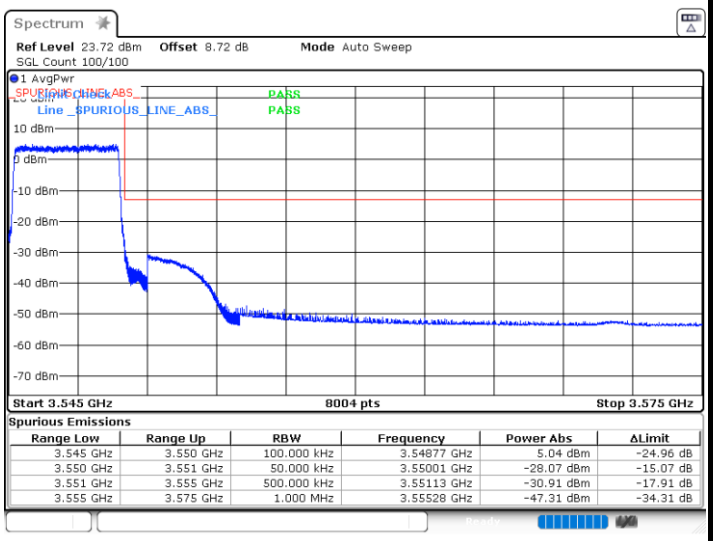


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44485 GHz	-41.14 dBm	-28.14 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44889 GHz	-23.27 dBm	-10.27 dB
3.449 GHz	3.450 GHz	50.000 kHz	3.45000 GHz	-26.39 dBm	-13.39 dB
3.450 GHz	3.455 GHz	100.000 kHz	3.45363 GHz	5.24 dBm	-24.76 dB

Date: 31.DEC.2021 14:46:06

Highest Band Edge / Full RB



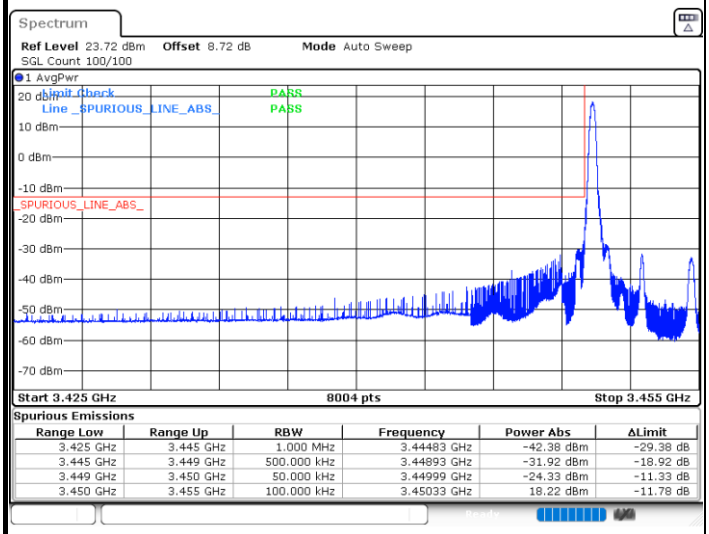
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.545 GHz	3.550 GHz	100.000 kHz	3.54877 GHz	5.04 dBm	-24.96 dB
3.550 GHz	3.551 GHz	50.000 kHz	3.55001 GHz	-28.07 dBm	-15.07 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55113 GHz	-30.91 dBm	-17.91 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55528 GHz	-47.31 dBm	-34.31 dB

Date: 31.DEC.2021 14:53:39

LTE Band 42 / 5MHz / 16QAM

Lowest Band Edge / 1RB

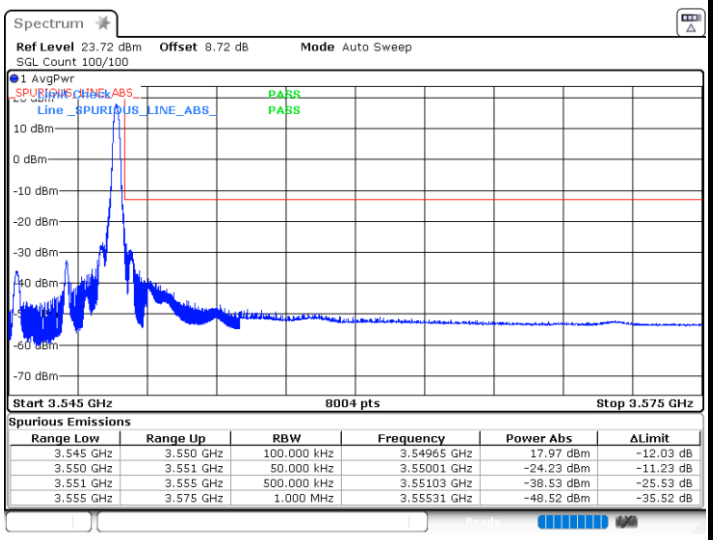


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44483 GHz	-42.38 dBm	-29.38 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44893 GHz	-31.92 dBm	-18.92 dB
3.449 GHz	3.450 GHz	50.000 kHz	3.44999 GHz	-24.33 dBm	-11.33 dB
3.450 GHz	3.455 GHz	100.000 kHz	3.45033 GHz	18.22 dBm	-11.78 dB

Date: 31.DEC.2021 14:42:52

Highest Band Edge / 1 RB

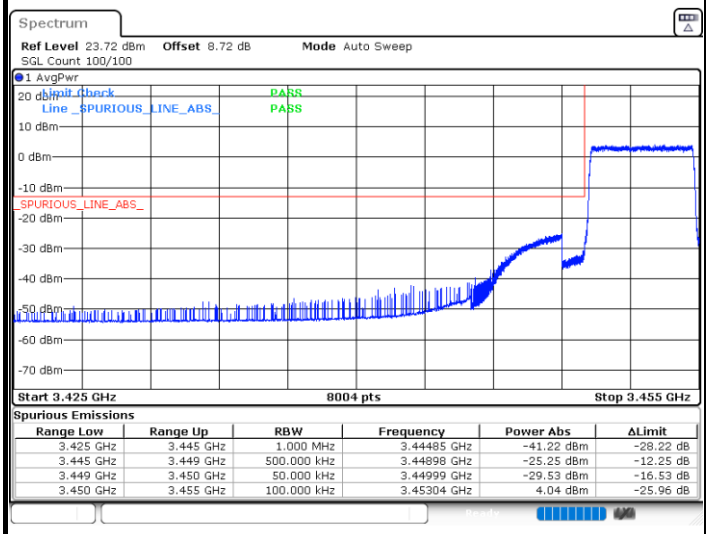


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.545 GHz	3.550 GHz	100.000 kHz	3.54965 GHz	17.97 dBm	-12.03 dB
3.550 GHz	3.551 GHz	50.000 kHz	3.55001 GHz	-24.23 dBm	-11.23 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55103 GHz	-38.53 dBm	-25.53 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55531 GHz	-48.52 dBm	-35.52 dB

Date: 31.DEC.2021 14:59:03

Lowest Band Edge / Full RB

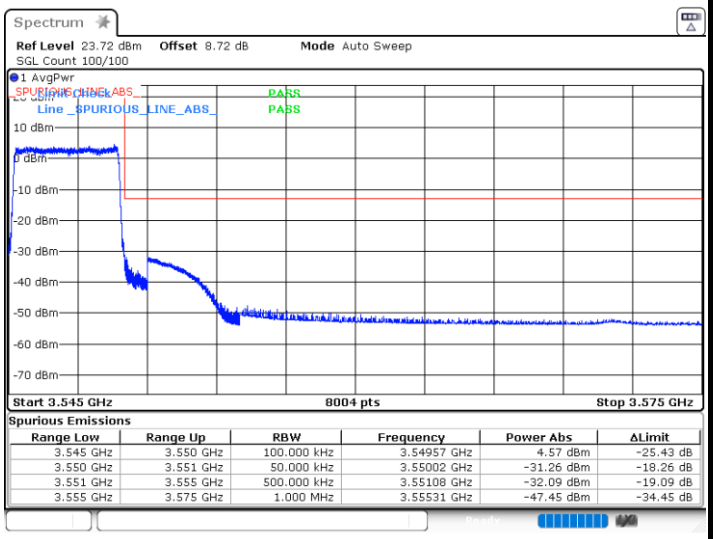


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44485 GHz	-41.22 dBm	-28.22 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44898 GHz	-25.25 dBm	-12.25 dB
3.449 GHz	3.450 GHz	50.000 kHz	3.44999 GHz	-29.53 dBm	-16.53 dB
3.450 GHz	3.455 GHz	100.000 kHz	3.45304 GHz	4.04 dBm	-25.96 dB

Date: 31.DEC.2021 14:47:11

Highest Band Edge / Full RB



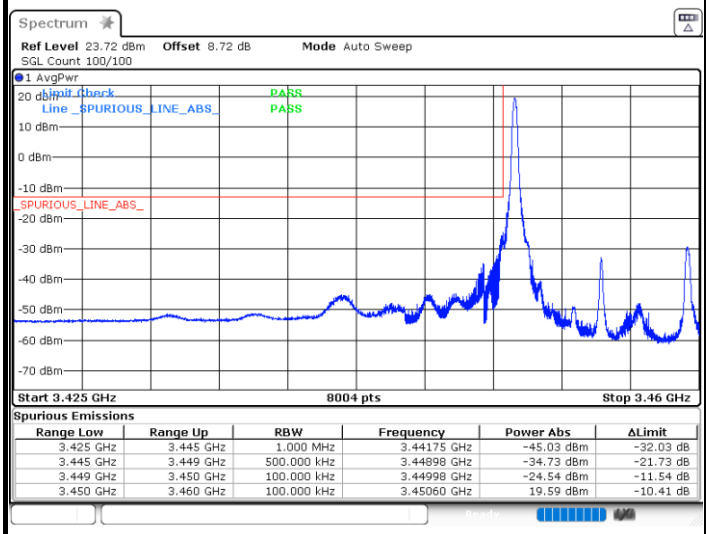
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.545 GHz	3.550 GHz	100.000 kHz	3.54957 GHz	4.57 dBm	-25.43 dB
3.550 GHz	3.551 GHz	50.000 kHz	3.55002 GHz	-31.26 dBm	-18.26 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55108 GHz	-32.09 dBm	-19.09 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55531 GHz	-47.45 dBm	-34.45 dB

Date: 31.DEC.2021 14:54:45

LTE Band 42 / 10MHz / QPSK

Lowest Band Edge / 1 RB

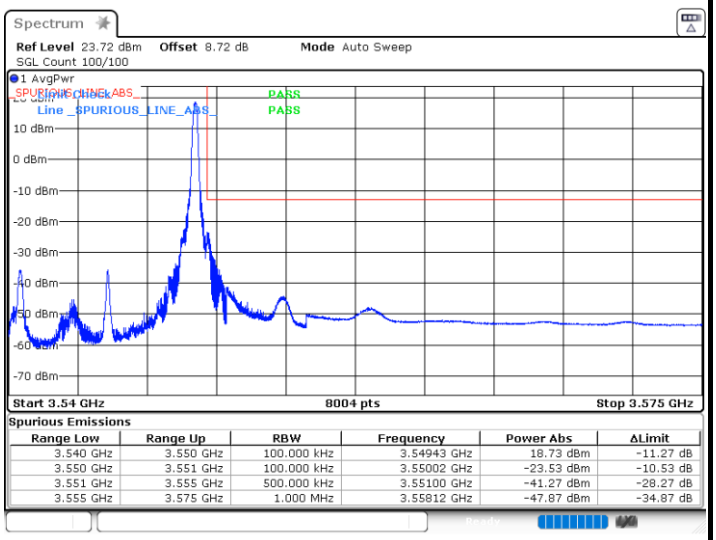


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44175 GHz	-45.03 dBm	-32.03 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44898 GHz	-34.73 dBm	-21.73 dB
3.449 GHz	3.450 GHz	100.000 kHz	3.44998 GHz	-24.54 dBm	-11.54 dB
3.450 GHz	3.460 GHz	100.000 kHz	3.45060 GHz	19.59 dBm	-10.41 dB

Date: 31.DEC.2021 15:02:07

Highest Band Edge / 1 RB

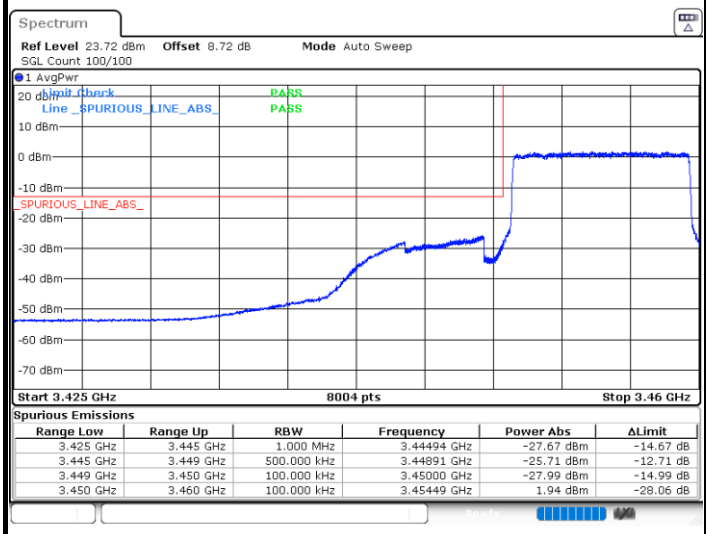


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.540 GHz	3.550 GHz	100.000 kHz	3.54943 GHz	18.73 dBm	-11.27 dB
3.550 GHz	3.551 GHz	100.000 kHz	3.55002 GHz	-23.53 dBm	-10.53 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55100 GHz	-41.27 dBm	-28.27 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55812 GHz	-47.87 dBm	-34.87 dB

Date: 31.DEC.2021 15:20:56

Lowest Band Edge / Full RB

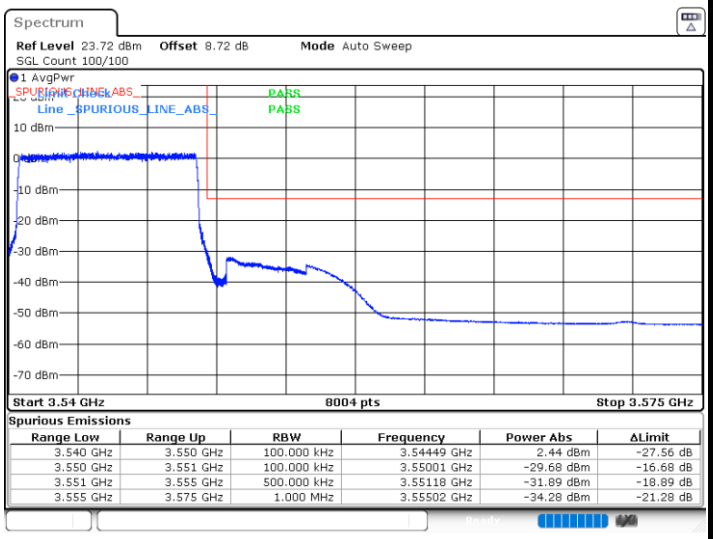


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44494 GHz	-27.67 dBm	-14.67 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44891 GHz	-25.71 dBm	-12.71 dB
3.449 GHz	3.450 GHz	100.000 kHz	3.45000 GHz	-27.99 dBm	-14.99 dB
3.450 GHz	3.460 GHz	100.000 kHz	3.45449 GHz	1.94 dBm	-28.06 dB

Date: 31.DEC.2021 15:03:39

Highest Band Edge / Full RB



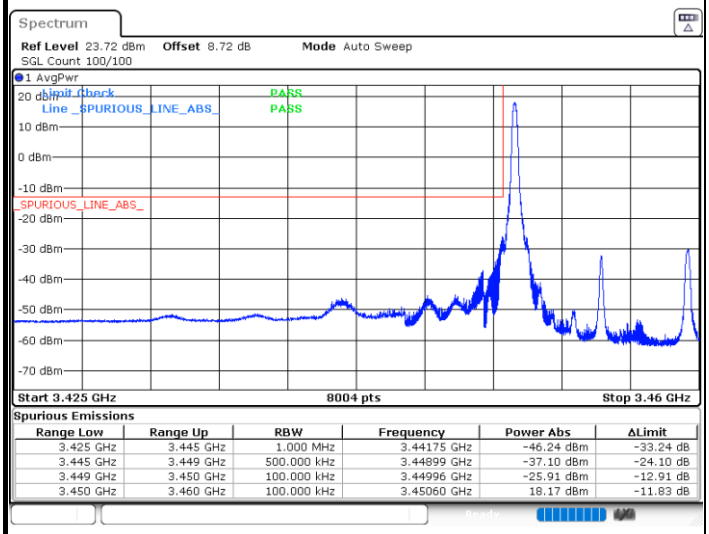
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.540 GHz	3.550 GHz	100.000 kHz	3.54449 GHz	2.44 dBm	-27.56 dB
3.550 GHz	3.551 GHz	100.000 kHz	3.55001 GHz	-29.68 dBm	-16.68 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55118 GHz	-31.89 dBm	-18.89 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55502 GHz	-34.28 dBm	-21.28 dB

Date: 31.DEC.2021 15:22:14

LTE Band 42 / 10MHz / 16QAM

Lowest Band Edge / 1 RB

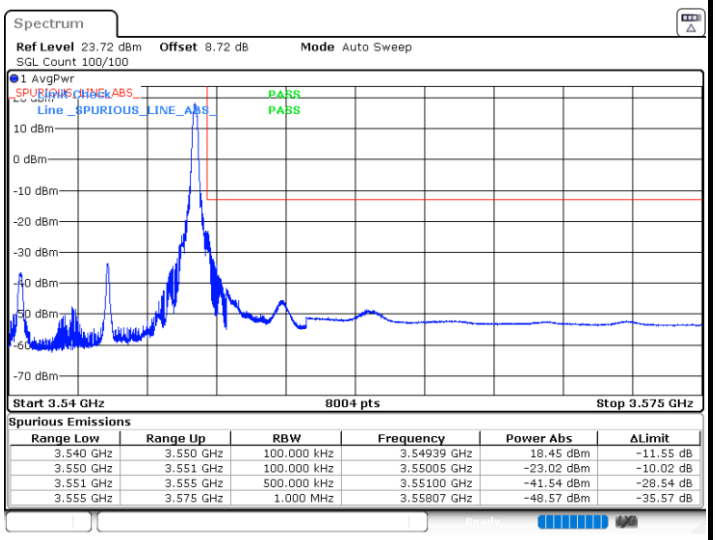


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44175 GHz	-46.24 dBm	-33.24 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44899 GHz	-37.10 dBm	-24.10 dB
3.449 GHz	3.450 GHz	100.000 kHz	3.44996 GHz	-25.91 dBm	-12.91 dB
3.450 GHz	3.460 GHz	100.000 kHz	3.45060 GHz	18.17 dBm	-11.83 dB

Date: 31.DEC.2021 15:02:53

Highest Band Edge / 1 RB

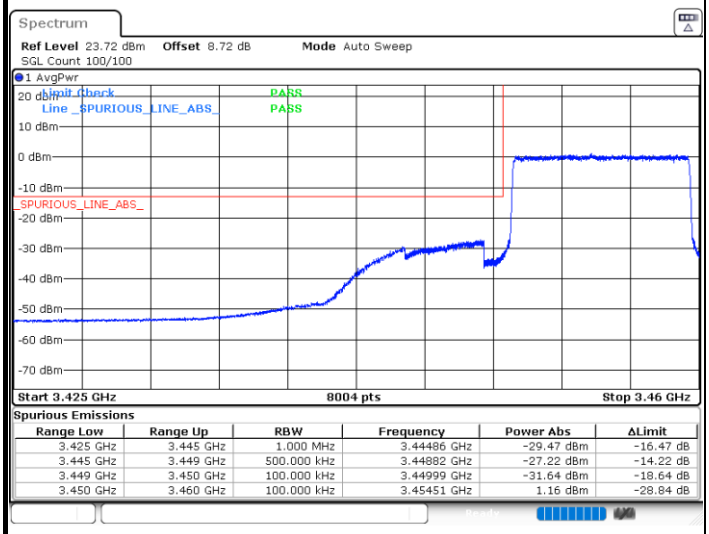


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.540 GHz	3.550 GHz	100.000 kHz	3.54939 GHz	18.45 dBm	-11.55 dB
3.550 GHz	3.551 GHz	100.000 kHz	3.55005 GHz	-23.02 dBm	-10.02 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55100 GHz	-41.54 dBm	-28.54 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55807 GHz	-48.57 dBm	-35.57 dB

Date: 31.DEC.2021 15:21:34

Lowest Band Edge / Full RB

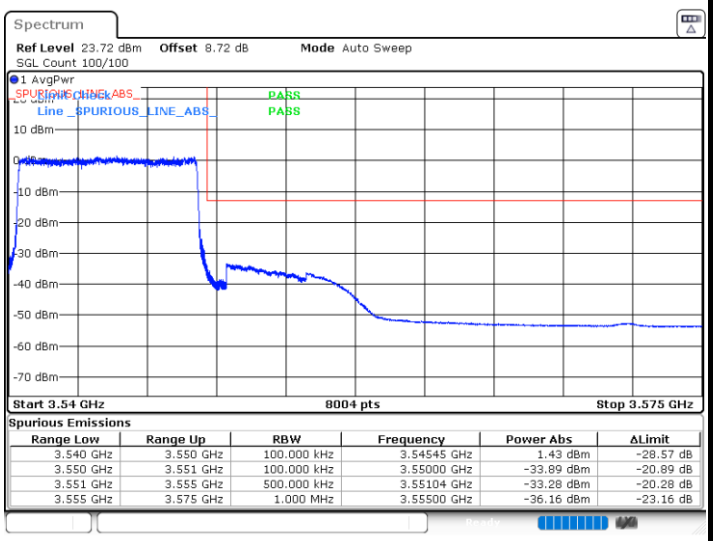


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44486 GHz	-29.47 dBm	-16.47 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44882 GHz	-27.22 dBm	-14.22 dB
3.449 GHz	3.450 GHz	100.000 kHz	3.44999 GHz	-31.64 dBm	-18.64 dB
3.450 GHz	3.460 GHz	100.000 kHz	3.45451 GHz	1.16 dBm	-28.84 dB

Date: 31.DEC.2021 15:04:19

Highest Band Edge / Full RB



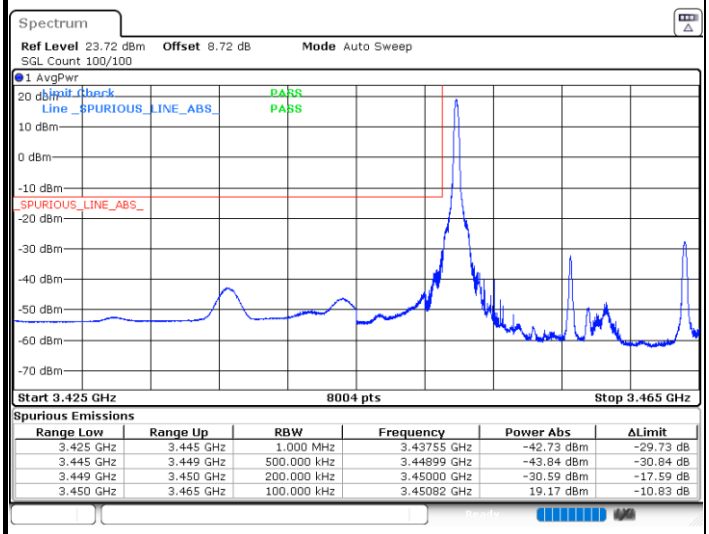
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.540 GHz	3.550 GHz	100.000 kHz	3.54545 GHz	1.43 dBm	-28.57 dB
3.550 GHz	3.551 GHz	100.000 kHz	3.55000 GHz	-33.89 dBm	-20.89 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55104 GHz	-33.28 dBm	-20.28 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55500 GHz	-36.16 dBm	-23.16 dB

Date: 31.DEC.2021 15:23:07

LTE Band 42 / 15MHz / QPSK

Lowest Band Edge / 1 RB

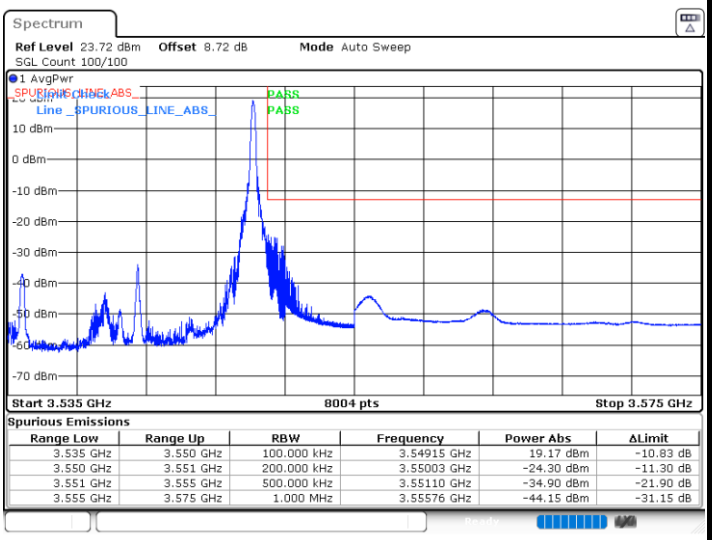


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.43755 GHz	-42.73 dBm	-29.73 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44899 GHz	-43.84 dBm	-30.84 dB
3.449 GHz	3.450 GHz	200.000 kHz	3.45000 GHz	-30.59 dBm	-17.59 dB
3.450 GHz	3.465 GHz	100.000 kHz	3.45082 GHz	19.17 dBm	-10.83 dB

Date: 31.DEC.2021 15:46:45

Highest Band Edge / 1 RB

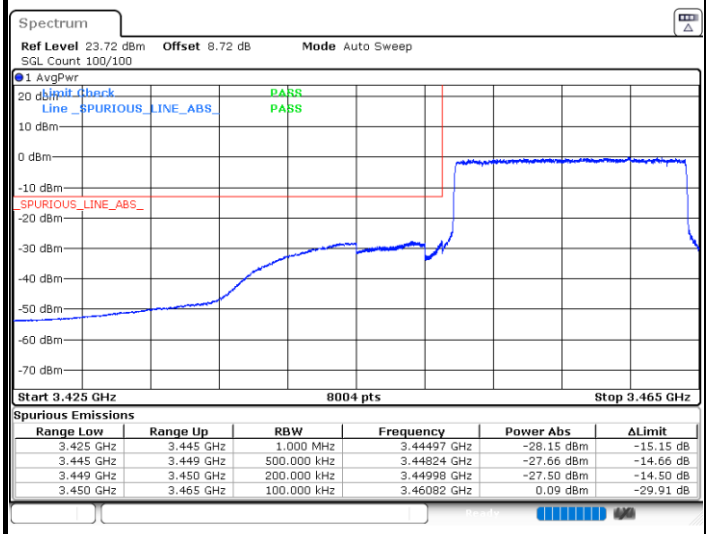


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.535 GHz	3.550 GHz	100.000 kHz	3.54915 GHz	19.17 dBm	-10.83 dB
3.550 GHz	3.551 GHz	200.000 kHz	3.55003 GHz	-24.30 dBm	-11.30 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55110 GHz	-34.90 dBm	-21.90 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55576 GHz	-44.15 dBm	-31.15 dB

Date: 31.DEC.2021 16:00:21

Lowest Band Edge / Full RB

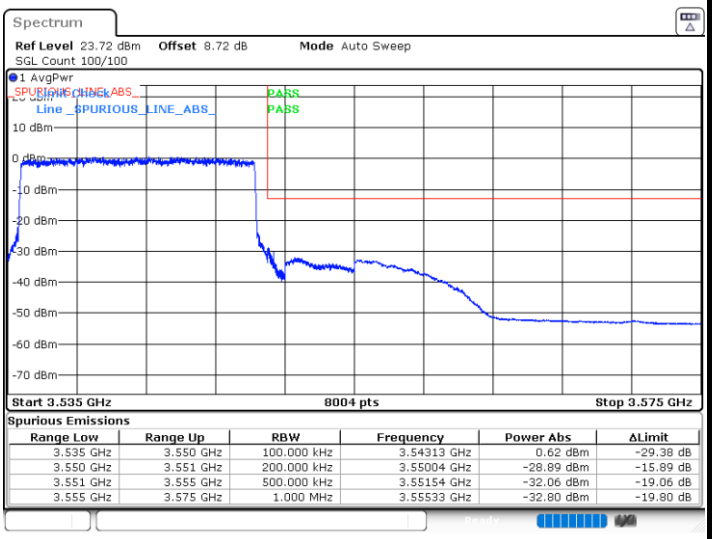


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44497 GHz	-28.15 dBm	-15.15 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44824 GHz	-27.66 dBm	-14.66 dB
3.449 GHz	3.450 GHz	200.000 kHz	3.44998 GHz	-27.50 dBm	-14.50 dB
3.450 GHz	3.465 GHz	100.000 kHz	3.46082 GHz	0.09 dBm	-29.91 dB

Date: 31.DEC.2021 15:56:28

Highest Band Edge / Full RB



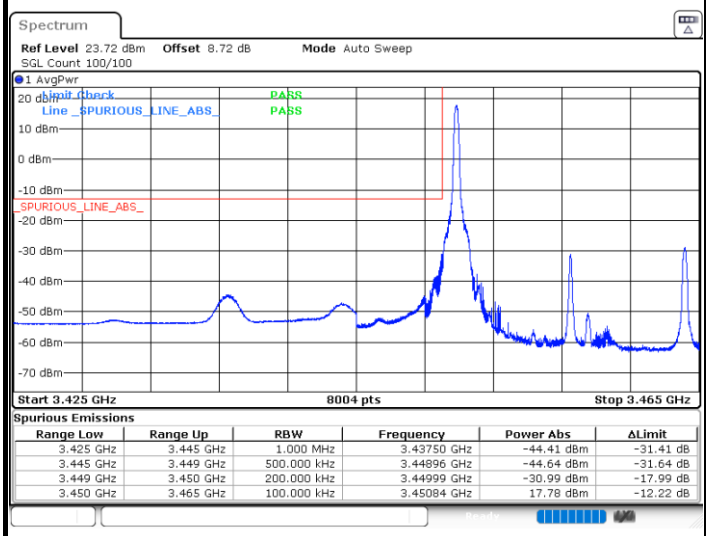
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.535 GHz	3.550 GHz	100.000 kHz	3.54313 GHz	0.62 dBm	-29.38 dB
3.550 GHz	3.551 GHz	200.000 kHz	3.55004 GHz	-28.89 dBm	-15.89 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55154 GHz	-32.06 dBm	-19.06 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55533 GHz	-32.80 dBm	-19.80 dB

Date: 31.DEC.2021 16:01:56

LTE Band 42 / 15MHz / 16QAM

Lowest Band Edge / 1 RB

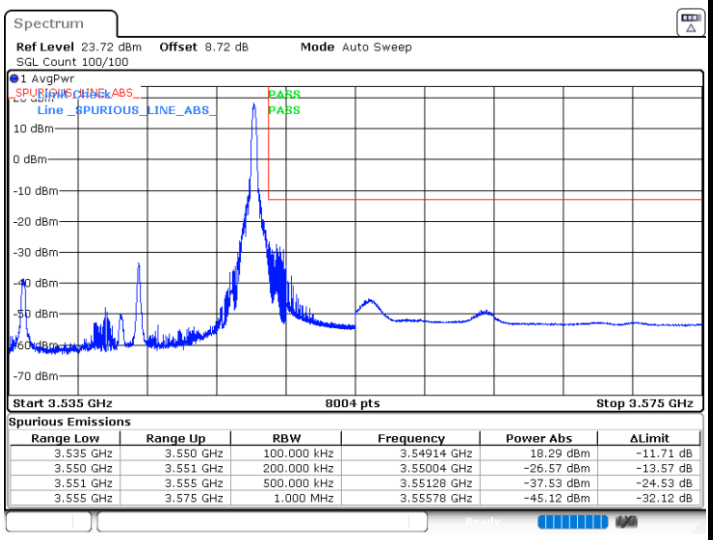


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.43750 GHz	-44.41 dBm	-31.41 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44896 GHz	-44.64 dBm	-31.64 dB
3.449 GHz	3.450 GHz	200.000 kHz	3.44999 GHz	-30.99 dBm	-17.99 dB
3.450 GHz	3.465 GHz	100.000 kHz	3.45084 GHz	17.78 dBm	-12.22 dB

Date: 31.DEC.2021 15:47:38

Highest Band Edge / 1 RB

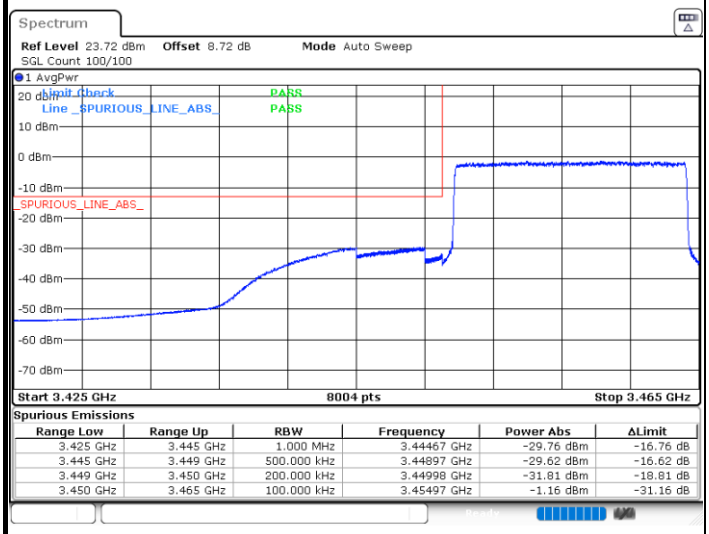


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.535 GHz	3.550 GHz	100.000 kHz	3.54914 GHz	18.29 dBm	-11.71 dB
3.550 GHz	3.551 GHz	200.000 kHz	3.55004 GHz	-26.57 dBm	-13.57 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55128 GHz	-37.53 dBm	-24.53 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55578 GHz	-45.12 dBm	-32.12 dB

Date: 31.DEC.2021 16:01:14

Lowest Band Edge / Full RB

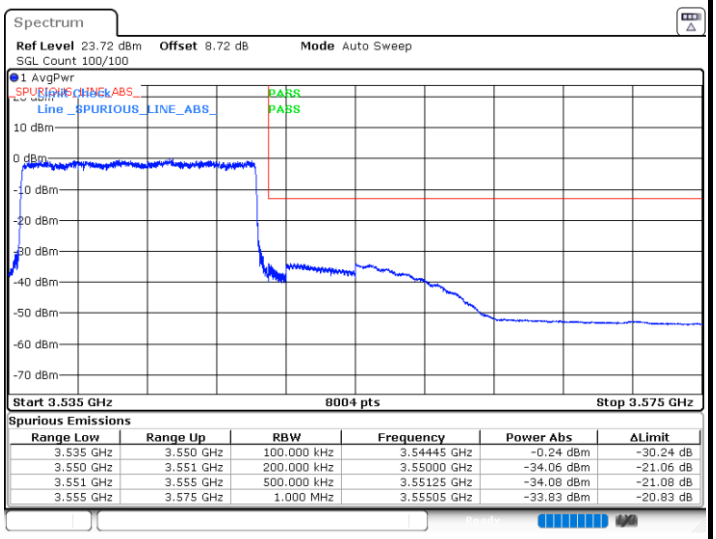


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44467 GHz	-29.76 dBm	-16.76 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44897 GHz	-29.62 dBm	-16.62 dB
3.449 GHz	3.450 GHz	200.000 kHz	3.44998 GHz	-31.81 dBm	-18.81 dB
3.450 GHz	3.465 GHz	100.000 kHz	3.45497 GHz	-1.16 dBm	-31.16 dB

Date: 31.DEC.2021 15:55:35

Highest Band Edge / Full RB



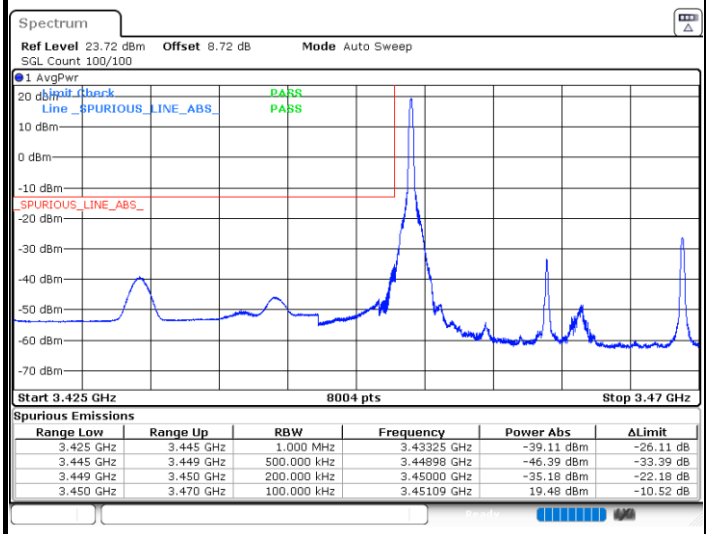
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.535 GHz	3.550 GHz	100.000 kHz	3.54445 GHz	-0.24 dBm	-30.24 dB
3.550 GHz	3.551 GHz	200.000 kHz	3.55000 GHz	-34.06 dBm	-21.06 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55125 GHz	-34.08 dBm	-21.08 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55505 GHz	-33.83 dBm	-20.83 dB

Date: 31.DEC.2021 16:02:35

LTE Band 42 / 20MHz / QPSK

Lowest Band Edge / 1 RB

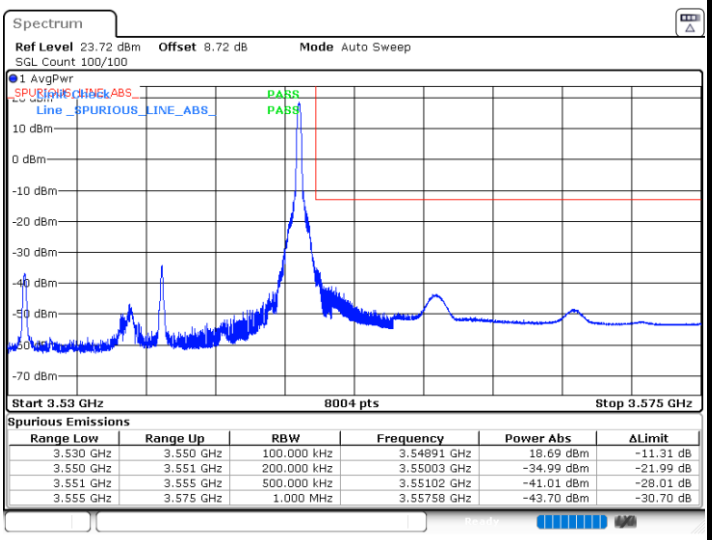


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.43325 GHz	-39.11 dBm	-26.11 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44898 GHz	-46.39 dBm	-33.39 dB
3.449 GHz	3.450 GHz	200.000 kHz	3.45000 GHz	-35.18 dBm	-22.18 dB
3.450 GHz	3.470 GHz	100.000 kHz	3.45109 GHz	19.48 dBm	-10.52 dB

Date: 31.DEC.2021 16:05:34

Highest Band Edge / 1 RB

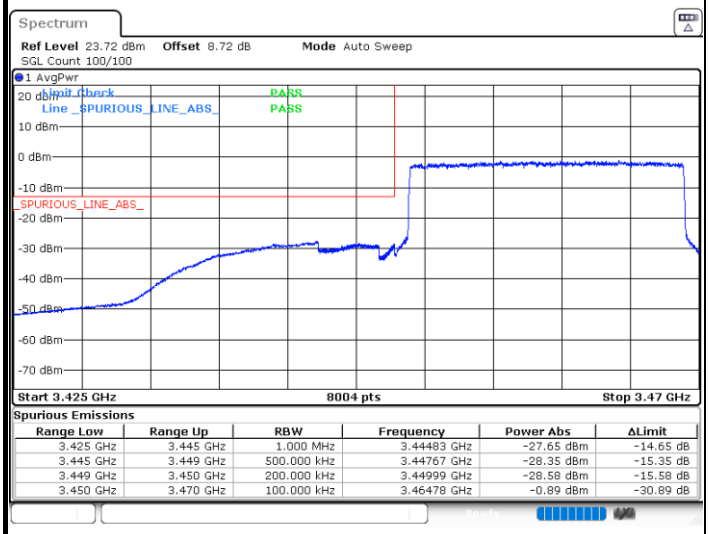


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.530 GHz	3.550 GHz	100.000 kHz	3.54891 GHz	18.69 dBm	-11.31 dB
3.550 GHz	3.551 GHz	200.000 kHz	3.55003 GHz	-34.99 dBm	-21.99 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55102 GHz	-41.01 dBm	-28.01 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55758 GHz	-43.70 dBm	-30.70 dB

Date: 31.DEC.2021 16:12:26

Lowest Band Edge / Full RB

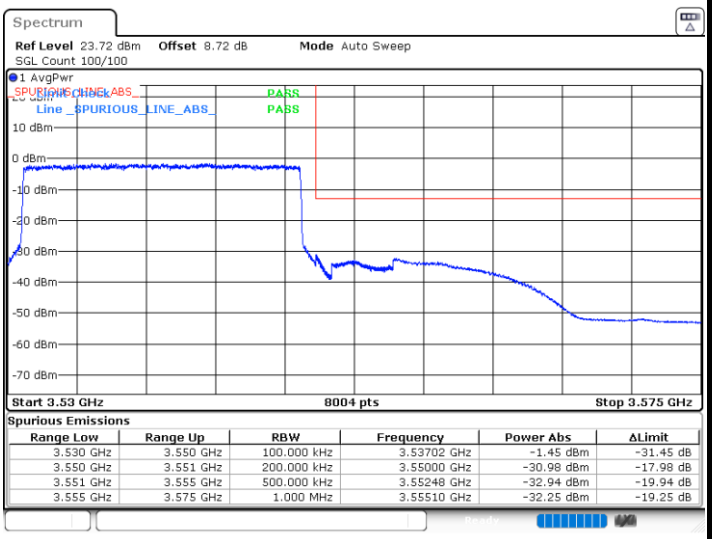


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44483 GHz	-27.65 dBm	-14.65 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44767 GHz	-28.35 dBm	-15.35 dB
3.449 GHz	3.450 GHz	200.000 kHz	3.44999 GHz	-28.58 dBm	-15.58 dB
3.450 GHz	3.470 GHz	100.000 kHz	3.46478 GHz	-0.89 dBm	-30.89 dB

Date: 31.DEC.2021 16:08:26

Highest Band Edge / Full RB



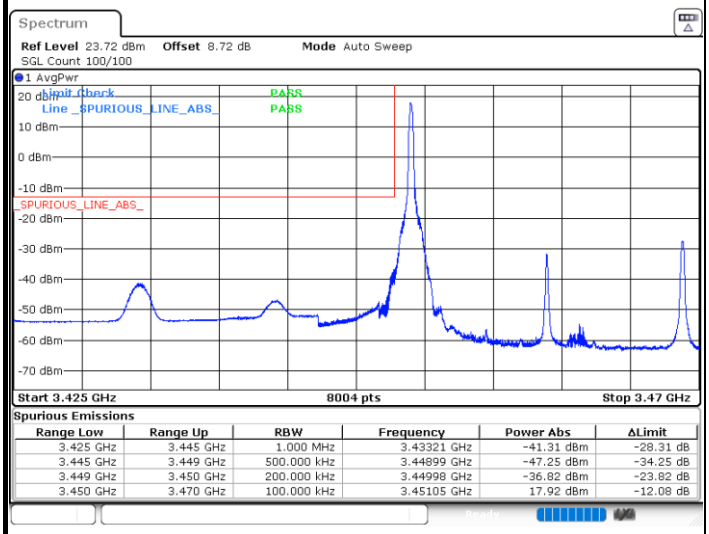
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.530 GHz	3.550 GHz	100.000 kHz	3.53702 GHz	-1.45 dBm	-31.45 dB
3.550 GHz	3.551 GHz	200.000 kHz	3.55000 GHz	-30.98 dBm	-17.98 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55248 GHz	-32.94 dBm	-19.94 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55510 GHz	-32.25 dBm	-19.25 dB

Date: 31.DEC.2021 16:15:31

LTE Band 42 / 20MHz / 16QAM

Lowest Band Edge / 1 RB

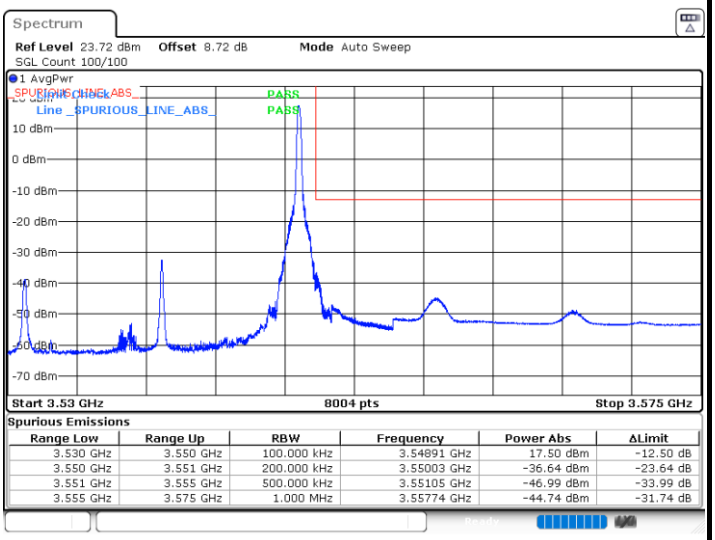


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.43321 GHz	-41.31 dBm	-28.31 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44899 GHz	-47.25 dBm	-34.25 dB
3.449 GHz	3.450 GHz	200.000 kHz	3.44998 GHz	-36.82 dBm	-23.82 dB
3.450 GHz	3.470 GHz	100.000 kHz	3.45105 GHz	17.92 dBm	-12.08 dB

Date: 31.DEC.2021 16:06:31

Highest Band Edge / 1 RB

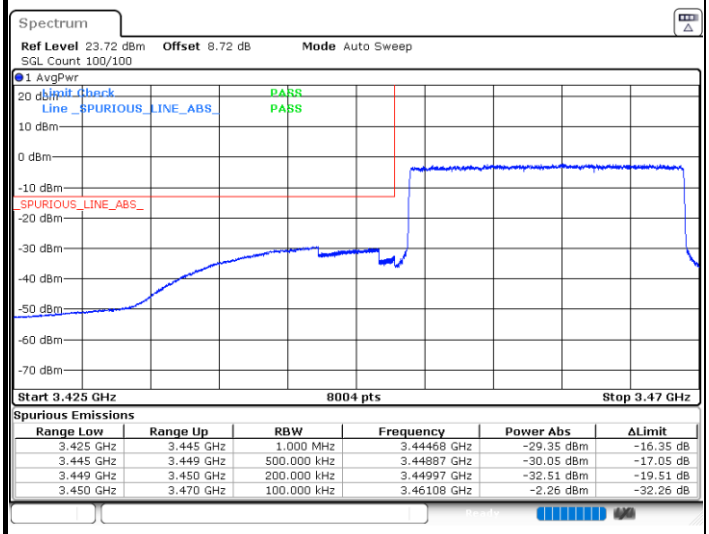


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.530 GHz	3.550 GHz	100.000 kHz	3.54891 GHz	17.50 dBm	-12.50 dB
3.550 GHz	3.551 GHz	200.000 kHz	3.55003 GHz	-36.64 dBm	-23.64 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55105 GHz	-46.99 dBm	-33.99 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55774 GHz	-44.74 dBm	-31.74 dB

Date: 31.DEC.2021 16:13:17

Lowest Band Edge / Full RB

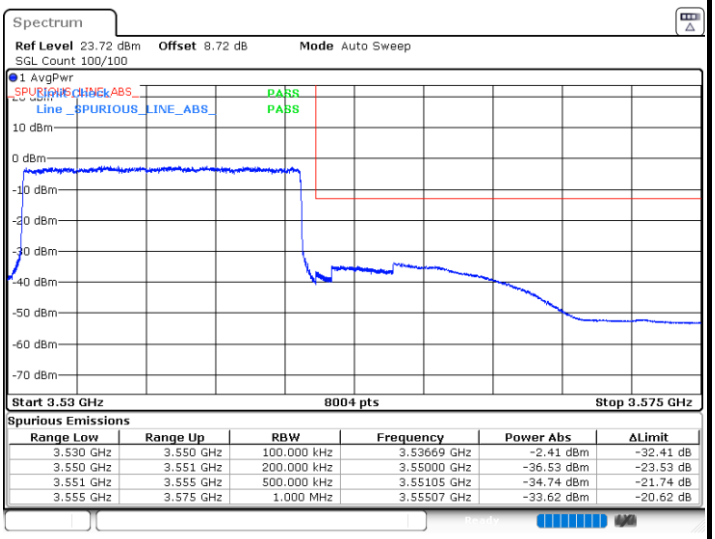


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.425 GHz	3.445 GHz	1.000 MHz	3.44468 GHz	-29.35 dBm	-16.35 dB
3.445 GHz	3.449 GHz	500.000 kHz	3.44887 GHz	-30.05 dBm	-17.05 dB
3.449 GHz	3.450 GHz	200.000 kHz	3.44997 GHz	-32.51 dBm	-19.51 dB
3.450 GHz	3.470 GHz	100.000 kHz	3.46108 GHz	-2.26 dBm	-32.26 dB

Date: 31.DEC.2021 16:07:30

Highest Band Edge / Full RB



Spurious Emissions

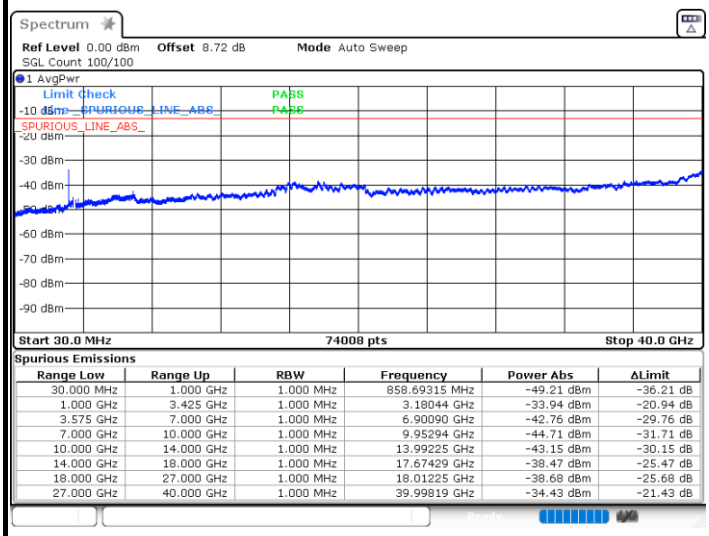
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
3.530 GHz	3.550 GHz	100.000 kHz	3.53669 GHz	-2.41 dBm	-32.41 dB
3.550 GHz	3.551 GHz	200.000 kHz	3.55000 GHz	-36.53 dBm	-23.53 dB
3.551 GHz	3.555 GHz	500.000 kHz	3.55105 GHz	-34.74 dBm	-21.74 dB
3.555 GHz	3.575 GHz	1.000 MHz	3.55507 GHz	-33.62 dBm	-20.62 dB

Date: 31.DEC.2021 16:14:47

Conducted Spurious Emission

LTE Band 42 / 5MHz

Lowest Channel / QPSK

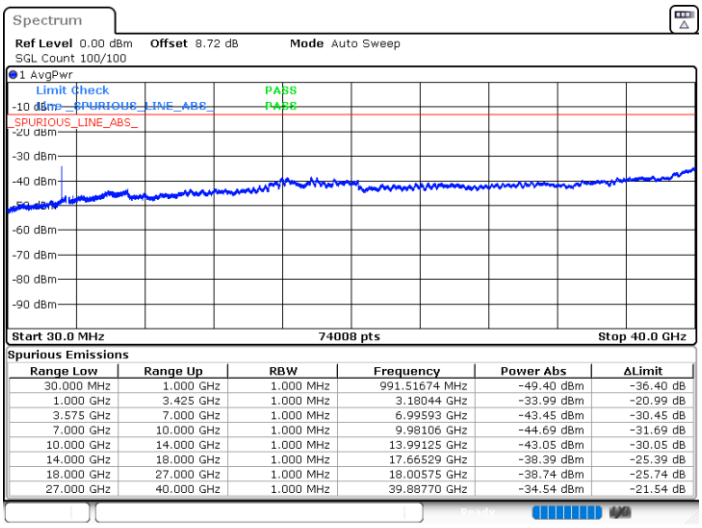


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	858.69315 MHz	-49.21 dBm	-36.21 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-33.94 dBm	-20.94 dB
3.575 GHz	7.000 GHz	1.000 MHz	6.90090 GHz	-42.76 dBm	-29.76 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.95294 GHz	-44.71 dBm	-31.71 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.99225 GHz	-43.15 dBm	-30.15 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.67429 GHz	-38.47 dBm	-25.47 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.01225 GHz	-38.68 dBm	-25.68 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.99819 GHz	-34.43 dBm	-21.43 dB

Date: 31.DEC.2021 14:41:08

Middle Channel / QPSK

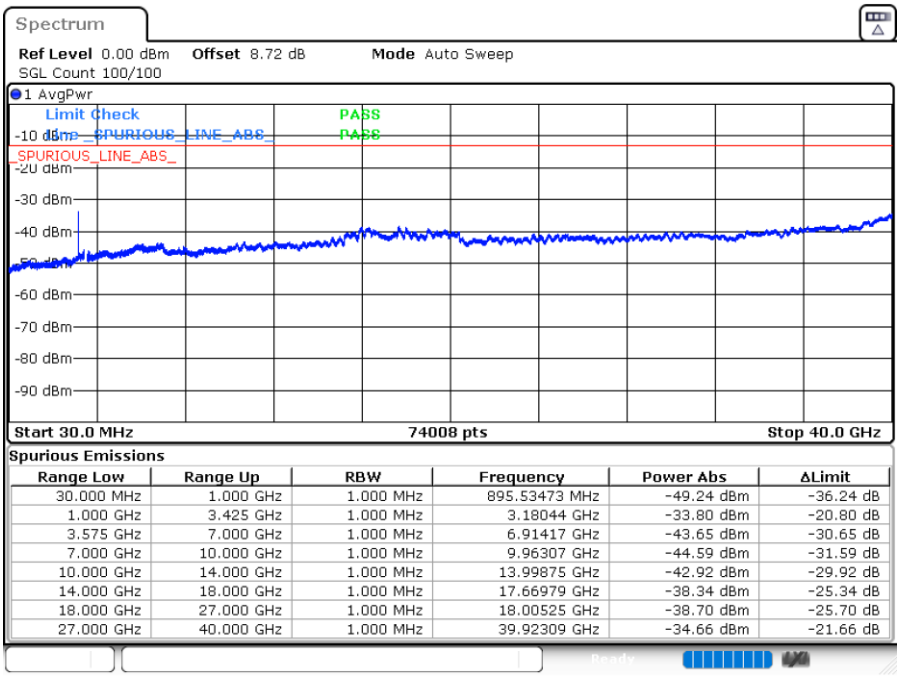


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	991.51674 MHz	-49.40 dBm	-36.40 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-33.99 dBm	-20.99 dB
3.575 GHz	7.000 GHz	1.000 MHz	6.99593 GHz	-43.45 dBm	-30.45 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.98106 GHz	-44.69 dBm	-31.69 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.99125 GHz	-43.05 dBm	-30.05 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.66529 GHz	-38.39 dBm	-25.39 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.00575 GHz	-38.74 dBm	-25.74 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.88770 GHz	-34.54 dBm	-21.54 dB

Date: 31.DEC.2021 14:48:44

Highest Channel / QPSK



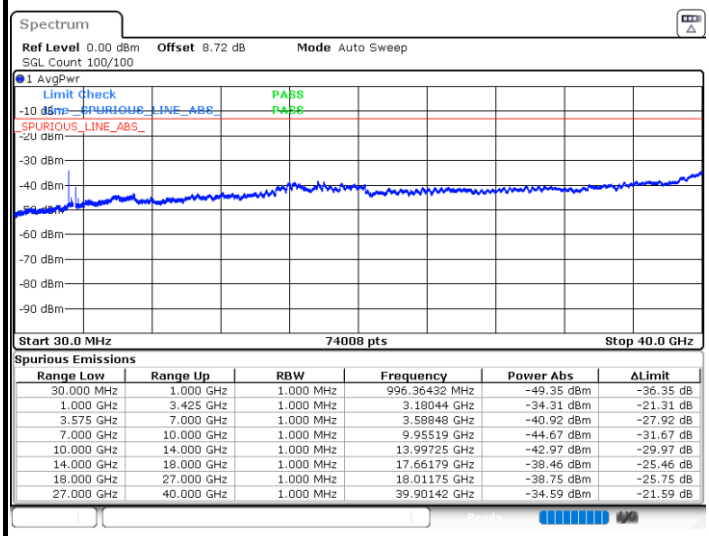
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	895.53473 MHz	-49.24 dBm	-36.24 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-33.80 dBm	-20.80 dB
3.575 GHz	7.000 GHz	1.000 MHz	6.91417 GHz	-43.65 dBm	-30.65 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.96307 GHz	-44.59 dBm	-31.59 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.99875 GHz	-42.92 dBm	-29.92 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.66979 GHz	-38.34 dBm	-25.34 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.00525 GHz	-38.70 dBm	-25.70 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.92309 GHz	-34.66 dBm	-21.66 dB

Date: 31.DEC.2021 14:50:15

LTE Band 42 / 10MHz

Lowest Channel / QPSK

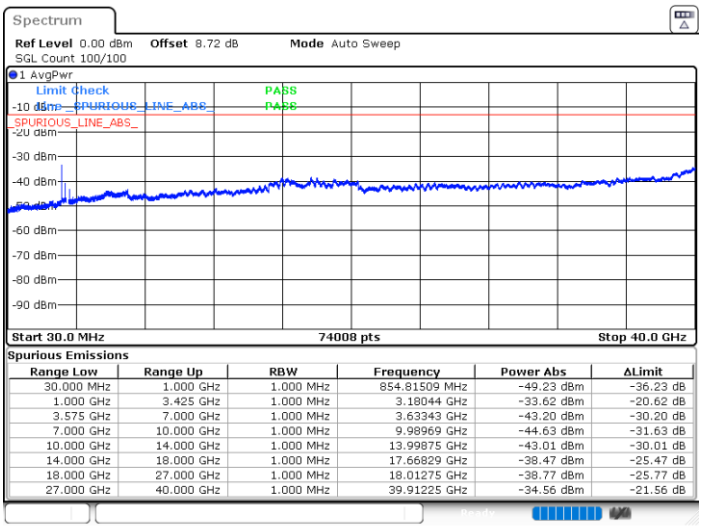


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	996.36432 MHz	-49.35 dBm	-36.35 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-34.31 dBm	-21.31 dB
3.575 GHz	7.000 GHz	1.000 MHz	3.58848 GHz	-40.92 dBm	-27.92 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.95519 GHz	-44.67 dBm	-31.67 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.99725 GHz	-42.97 dBm	-29.97 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.66179 GHz	-38.46 dBm	-25.46 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.01175 GHz	-38.75 dBm	-25.75 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.90142 GHz	-34.59 dBm	-21.59 dB

Date: 31.DEC.2021 15:01:01

Middle Channel / QPSK

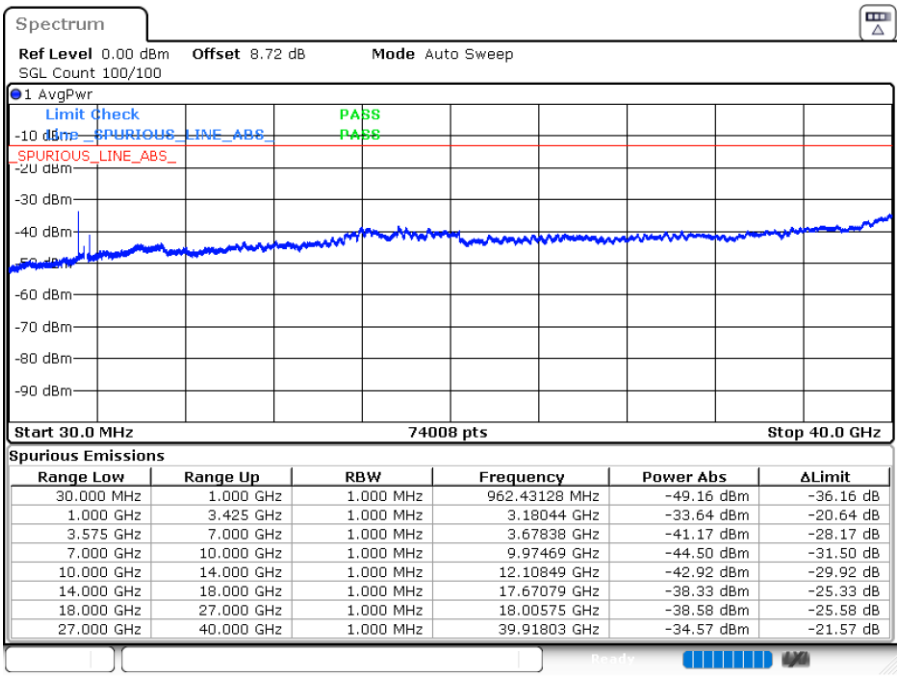


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	854.81509 MHz	-49.23 dBm	-36.23 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-33.62 dBm	-20.62 dB
3.575 GHz	7.000 GHz	1.000 MHz	3.63343 GHz	-43.20 dBm	-30.20 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.98969 GHz	-44.63 dBm	-31.63 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.99875 GHz	-43.01 dBm	-30.01 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.66829 GHz	-38.47 dBm	-25.47 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.01275 GHz	-38.77 dBm	-25.77 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.91225 GHz	-34.56 dBm	-21.56 dB

Date: 31.DEC.2021 15:18:20

Highest Channel / QPSK



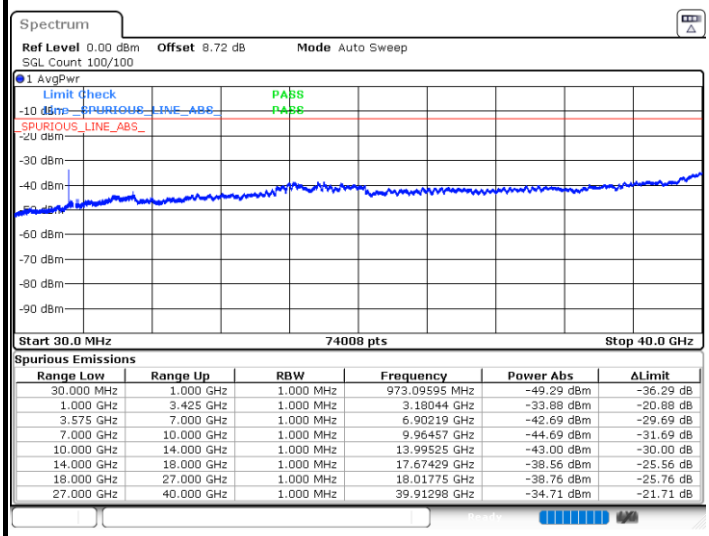
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	962.43128 MHz	-49.16 dBm	-36.16 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-33.64 dBm	-20.64 dB
3.575 GHz	7.000 GHz	1.000 MHz	3.67838 GHz	-41.17 dBm	-28.17 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.97469 GHz	-44.50 dBm	-31.50 dB
10.000 GHz	14.000 GHz	1.000 MHz	12.10849 GHz	-42.92 dBm	-29.92 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.67079 GHz	-38.33 dBm	-25.33 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.00575 GHz	-38.58 dBm	-25.58 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.91803 GHz	-34.57 dBm	-21.57 dB

Date: 31.DEC.2021 15:19:55

LTE Band 42 / 15MHz

Lowest Channel / QPSK

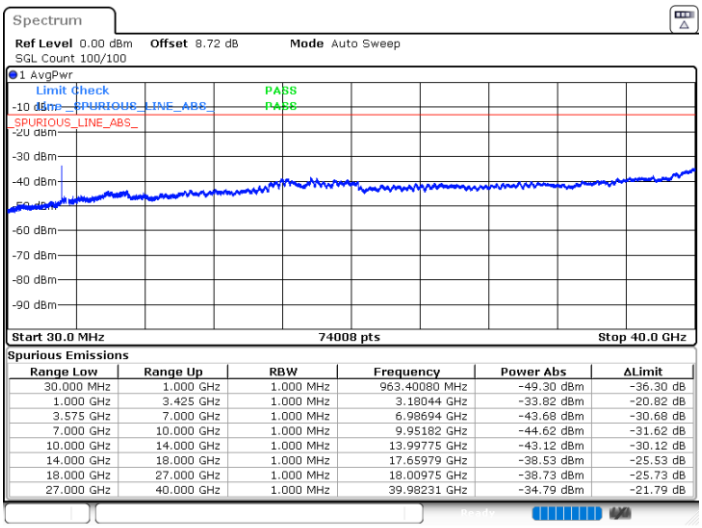


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	973.09595 MHz	-49.29 dBm	-36.29 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-33.88 dBm	-20.88 dB
3.575 GHz	7.000 GHz	1.000 MHz	6.90219 GHz	-42.69 dBm	-29.69 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.96457 GHz	-44.69 dBm	-31.69 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.99525 GHz	-43.00 dBm	-30.00 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.67429 GHz	-38.56 dBm	-25.56 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.01775 GHz	-38.76 dBm	-25.76 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.91298 GHz	-34.71 dBm	-21.71 dB

Date: 31.DEC.2021 15:45:06

Middle Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	963.40080 MHz	-49.30 dBm	-36.30 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-33.82 dBm	-20.82 dB
3.575 GHz	7.000 GHz	1.000 MHz	6.98694 GHz	-43.68 dBm	-30.68 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.95182 GHz	-44.62 dBm	-31.62 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.99775 GHz	-43.12 dBm	-30.12 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.65979 GHz	-38.53 dBm	-25.53 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.00975 GHz	-38.73 dBm	-25.73 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.98231 GHz	-34.79 dBm	-21.79 dB

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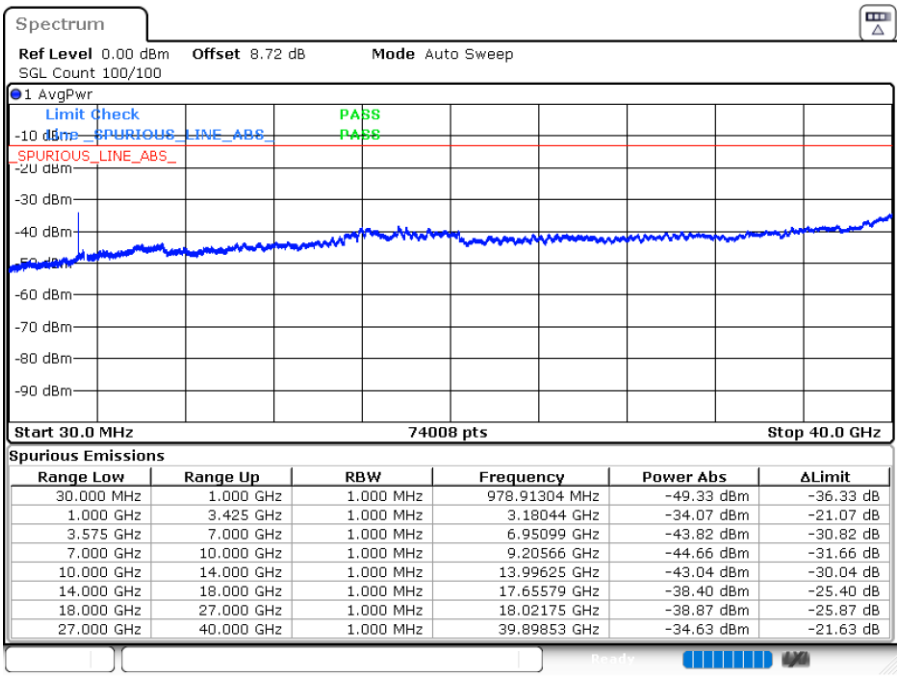
Highest Channel / QPSK



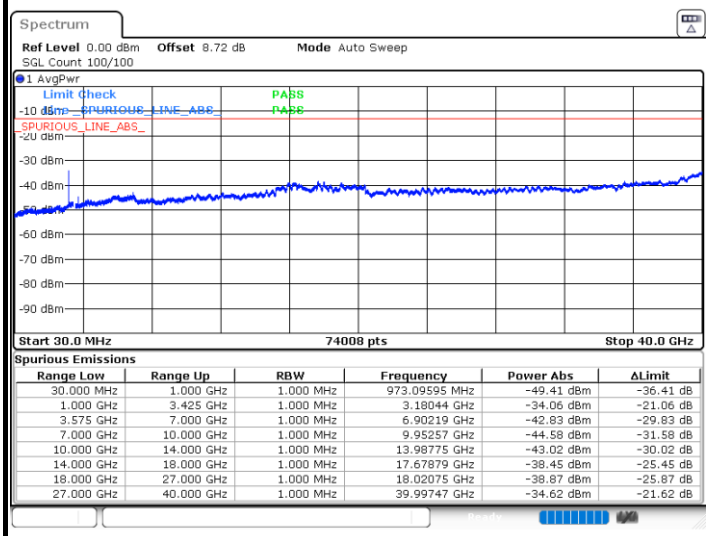
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	978.91304 MHz	-49.33 dBm	-36.33 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-34.07 dBm	-21.07 dB
3.575 GHz	7.000 GHz	1.000 MHz	6.95099 GHz	-43.82 dBm	-30.82 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.20566 GHz	-44.66 dBm	-31.66 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.99625 GHz	-43.04 dBm	-30.04 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.65579 GHz	-38.40 dBm	-25.40 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.02175 GHz	-38.87 dBm	-25.87 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.89853 GHz	-34.63 dBm	-21.63 dB

Date: 31.DEC.2021 15:59:41

LTE Band 42 / 20MHz

Lowest Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	973.09595 MHz	-49.41 dBm	-36.41 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-34.06 dBm	-21.06 dB
3.575 GHz	7.000 GHz	1.000 MHz	6.90219 GHz	-42.83 dBm	-29.83 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.95257 GHz	-44.58 dBm	-31.58 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.98775 GHz	-43.02 dBm	-30.02 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.67879 GHz	-38.45 dBm	-25.45 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.02075 GHz	-38.87 dBm	-25.87 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.99747 GHz	-34.62 dBm	-21.62 dB

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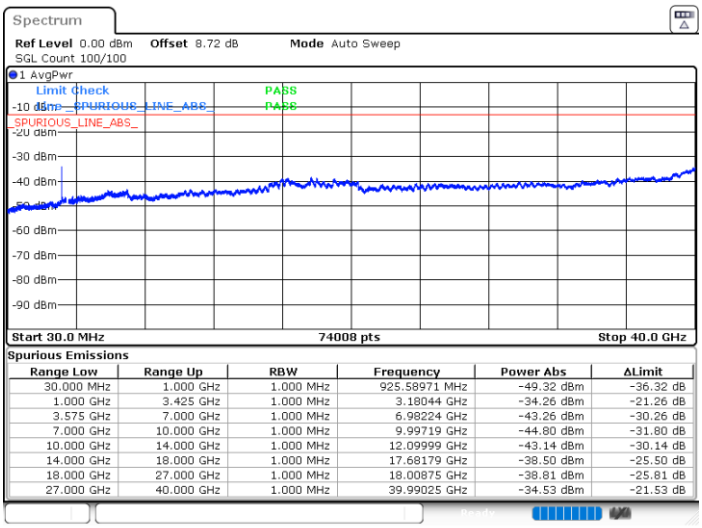
Middle Channel / QPSK

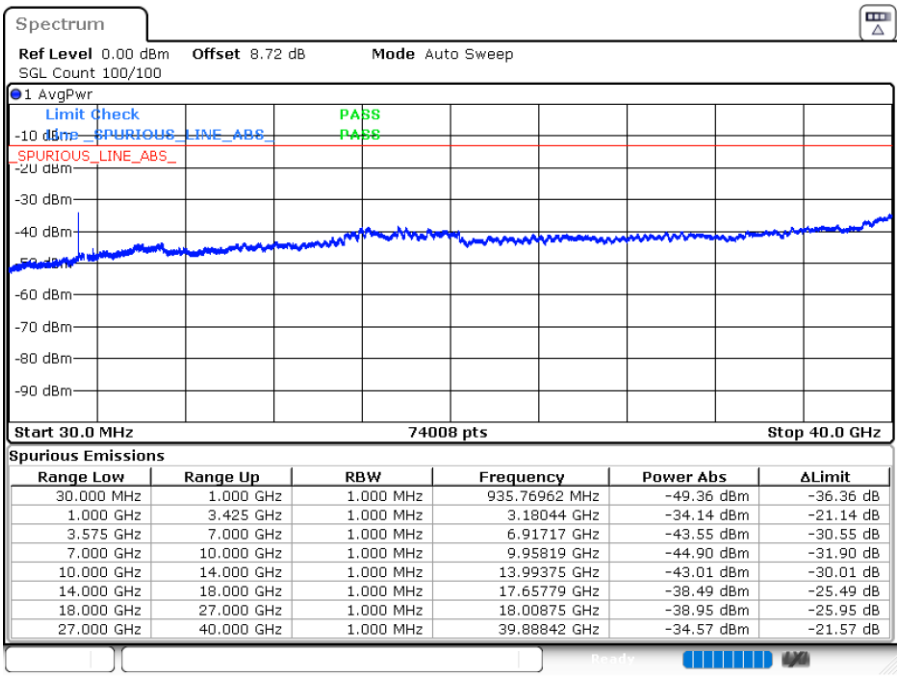


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	925.58971 MHz	-49.32 dBm	-36.32 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-34.26 dBm	-21.26 dB
3.575 GHz	7.000 GHz	1.000 MHz	6.98224 GHz	-43.26 dBm	-30.26 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.99719 GHz	-44.80 dBm	-31.80 dB
10.000 GHz	14.000 GHz	1.000 MHz	12.09999 GHz	-43.14 dBm	-30.14 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.68179 GHz	-38.50 dBm	-25.50 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.00875 GHz	-38.81 dBm	-25.81 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.99025 GHz	-34.53 dBm	-21.53 dB

Date: 31.DEC.2021 16:10:09

Highest Channel / QPSK



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	935.76962 MHz	-49.36 dBm	-36.36 dB
1.000 GHz	3.425 GHz	1.000 MHz	3.18044 GHz	-34.14 dBm	-21.14 dB
3.575 GHz	7.000 GHz	1.000 MHz	6.91717 GHz	-43.55 dBm	-30.55 dB
7.000 GHz	10.000 GHz	1.000 MHz	9.95819 GHz	-44.90 dBm	-31.90 dB
10.000 GHz	14.000 GHz	1.000 MHz	13.99375 GHz	-43.01 dBm	-30.01 dB
14.000 GHz	18.000 GHz	1.000 MHz	17.65779 GHz	-38.49 dBm	-25.49 dB
18.000 GHz	27.000 GHz	1.000 MHz	18.00875 GHz	-38.95 dBm	-25.95 dB
27.000 GHz	40.000 GHz	1.000 MHz	39.88842 GHz	-34.57 dBm	-21.57 dB

Date: 31.DEC.2021 16:11:39

Frequency Stability

Test Conditions		LTE Band 42 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0023	PASS
40	Normal Voltage	0.0016	
30	Normal Voltage	0.0002	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0015	
0	Normal Voltage	0.0017	
-10	Normal Voltage	0.0013	
-20	Normal Voltage	0.0009	
-30	Normal Voltage	0.0006	
20	Maximum Voltage	0.0007	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0011	

Note:

1. Normal Voltage =3.85 V. ; Battery End Point (BEP) =3.3 V. ; Maximum Voltage =4.4 V.
2. Note: The frequency fundamental emissions stay within the authorized frequency block.

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

LTE Band 42 / 20MHz / QPSK								
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	6984	-46.89	-13	-33.89	-56.34	3.56	13.01	H
	10473.27	-58.64	-13	-45.64	-68.16	3.92	13.44	H
	13962	-58.18	-13	-45.18	-67.22	4.39	13.43	H
	6984	-46.38	-13	-33.38	-55.83	3.56	13.01	V
	10473.27	-58.93	-13	-45.93	-68.45	3.92	13.44	V
	13962	-58.49	-13	-45.49	-67.53	4.39	13.43	V

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

Appendix D. Product Equality Declaration

Date: October 22, 2021

Product Equality Declaration

We, Motorola Solutions Inc. CORPORATION, declare on our sole responsibility for the product of EVOLVE and EVOLVE-i as below:

There is no difference between P3 and PVT HW version, and, the difference of EVOLVE-i and EVOLVE is RF section is same only with extra protection components in EVOLVE-i.

i) Both SKUs share the same PCB with all traces.

ii) EVOLVE-i SKU will have protection circuits with fuse and Zener diode (BOM different).

iii) EVOLVE SKU the fuse will become 0 ohm and Zener diodes will be not populated.

iv) The RF sections are the same for both EVOLVE-i and EVOLVE SKUs.

Except listings above, the others are all the same.

Should you have any questions or comments regarding this matter, please have my best attention.

Sincerely yours,

Contact Person: Hasrolnizam Bin Mohd Mokhtar

COMPANY: Motorola Solutions Malaysia Sdn Bhd

Tel: +60(4) 2241066

Fax: N/A

E-Mail: hasrolnizam.mohdmokhtar@motorolasolutions.com