FCC Part 24E & 27
Measurement and Test Report

For

Guardian Band lnc.

437 Dimmocks Mill Rd.Hillsborough, NC 27278

FCC ID: 2AROTGB

FCC Rules:	FCC Part 24E, FCC Part 27
Product Description:	Guardian Band
Tested Model:	G|B
Report No.:	STR18098240I-2
Sample Receipt Date:	2018-09-19
Tested Date:	2018-09-20 to 2018-10-17
Issued Date:	2018-10-17
Tested By:	Jason Su / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager

Prepared By:

Shenzhen SEM Test Technology Co., Ltd.
1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C.（518101）
Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

TABLE OF CONTENTS

1. GENERAL INFORMATION 3
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 3
1.2 TEST STANDARDS 5
1.3 TEST METHODOLOGY 5
1.4 TEST FACILITY 5
1.5 EUT SETUP AND TEST MODE 6
1.6 MEASUREMENT UNCERTAINTY 7
1.7 TEST EQUIPMENT LIST AND DETAILS 7
2. SUMMARY OF TEST RESULTS 8
3. RF EXPOSURE 9
3.1 STANDARD APPLICABLE 9
3.2 TEST RESULT 9
4. RF OUTPUT POWER 10
4.1 STANDARD APPLICABLE 10
4.2 TEST PROCEDURE 10
4.3 ENVIRONMENTAL CONDITIONS 10
4.4 SUMMARY OF TEST RESULTS/PLOTS 11
5. PEAK-TO-AVERAGE RATIO (PAR) OF TRANSMITTER 15
5.1 STANDARD APPLICABLE 15
5.2 TEST PROCEDURE 15
5.3 ENVIRONMENTAL CONDITIONS 15
5.4 SUMMARY OF TEST RESULTS 15
6. EMISSION BANDWIDTH 16
6.1 STANDARD APPLICABLE 16
6.2 TEST PROCEDURE 16
6.3 ENVIRONMENTAL CONDITIONS 16
6.4 SUMMARY OF TEST RESULTS/PLOTS 16
7. OUT OF BAND EMISSIONS AT ANTENNA TERMINAL 17
7.1 STANDARD APPLICABLE 17
7.2 TEST PROCEDURE 17
7.3 ENVIRONMENTAL CONDITIONS 17
7.4 SUMMARY OF TEST RESULTS/PLOTS 18
8. SPURIOUS RADIATED EMISSIONS 19
8.1 STANDARD APPLICABLE 19
8.2 TEST PROCEDURE 19
8.3 ENVIRONMENTAL CONDITIONS 19
8.4 SUMMARY OF TEST RESULTS/PLOTS 19
9. FREQUENCY STABILITY 28
9.1 STANDARD APPLICABLE 28
9.2 TEST PROCEDURE 28
9.3 ENVIRONMENTAL CONDITIONS 29
9.4 SUMMARY OF TEST RESULTS/PLOTS 29

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	Guardian Band lnc.
Address of applicant:	437 Dimmocks Mill Rd.Hillsborough, NC 27278
Manufacturer:	Shenzhen eIoT Technology Co.,Ltd.
Address of manufacturer:	North Wing of 2F, Building 2, Vision Business Park, No.9 High-Tech Park South Ninth Avenue, Nanshan District, Shenzhen.China

General Description of EUT:	
Product Name:	Guardian Band
Brand Name:	Guardian Band
Model No.:	G|B
Hardware version:	G6_V2.0
Software version:	/
Rated Voltage:	DC 3.8V Li-ion Battery
Battery:	440mAh
Adapter Model:	Model: A31-501000 Input:AC100-240V 50/60Hz 0.35A Output: DC5V 1A
Device Category:	Portable Device
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT: Main board	
4G	
Support Networks:	FDD-LTE
Support Band:	FDD-LTE Band 2, 4, 12
Uplink Frequency:	FDD-LTE Band 2: Tx: 1850-1910MHz, FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 12: Tx: 699-716MHz,
Downlink Frequency:	FDD-LTE Band 2: Rx: 1930-1990MHz, FDD-LTE Band 4: Rx: 2110-2155MHz, FDD-LTE Band 12: Rx: 729-746MHz,
RF Output Power:	FDD-LTE Band 2: 23.05dBm, FDD-LTE Band 4: 23.38dBm, FDD-LTE Band 12: 24.18dBm,
Type of Emission:	FDD-LTE Band 2: 17M9G7D, 17M9W7D FDD-LTE Band 4: 17M8G7D, 17M8W7D FDD-LTE Band 12: 8M94G7D, 8M93W7D
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 2: 1.20dBi, FDD-LTE Band 4: 1.30dBi, FDD-LTE Band 12: 0.8dBi,

1.2 Test Standards

The following report is prepared on behalf of the Guardian Band lnc. in accordance with FCC Part 24 subpart E and FCC Part 27 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 22 subpart H, FCC Part 24 subpart E and FCC Part 27 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI/TIA-603-D: 2010 and ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 971168 D01 Power Meas License Digital Systems v03 shall be performed also.

1.4 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	FDD-LTE Band 2	Low, Middle, High Channels
TM2	FDD-LTE Band 4	Low, Middle, High Channels
TM3	FDD-LTE Band 12	Low, Middle, High Channels

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	0.6	Unshielded	Without Core

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
/	/	/	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Frequency Stability	Conducted	2.3%
Transmitter Spurious Emissions	Conducted	±0.42dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2018-05-22	2019-05-21
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2018-05-22	2019-05-21
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2018-05-22	2019-05-21
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2018-05-22	2019-05-21
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2018-05-22	2019-05-21
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2018-05-22	2019-05-21
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2018-05-22	2019-05-21
SEMT-1082	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2018-05-22	2019-05-21
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2018-05-22	2019-05-21
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2018-05-22	2019-05-21
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2018-05-22	2019-05-21
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2018-05-22	2019-05-21
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-08	2020-06-07
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-08	2020-06-07
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-08	2020-06-07
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2017-06-08	2020-06-07
SEMT-1168	Pre-amplifier	Direction Systems Inc.	PAP-0126	14141-12838	2018-05-22	2019-05-21
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2018-05-22	2019-05-21
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2018-05-22	2019-05-21
SEMT-1170	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2018-03-19	2021-03-18

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 1.1307, § 2.1093	RF Exposure	Compliant
§ 24.232 (c), §27.50	RF Output Power	Compliant
§ 24.51, § 27.50	Peak-to-average Ratio (PAR) of Transmitter	Compliant
§ 24.238 (b), § 27.53	Emission Bandwidth	Compliant
§ 24.238 (a), § 27.53	Spurious Emissions at Antenna Terminal	Compliant
§ 24.238 (a) , § 27.53	Spurious Radiation Emissions	Compliant
§ 24.238 (a) , § 27.53	Out of Band Emissions	Compliant
§ 24.235, § 27.54	Frequency Stability	Compliant

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the SAR report.

4. RF Output Power

4.1 Standard Applicable

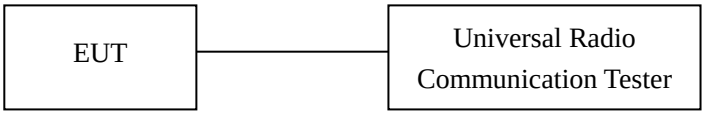
According to §24.232 (c), Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(d)(4), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

According to §27.50(c)(10), Portable stations (hand-held devices) in the 698-746 MHz band are limited to 3 watts ERP.

4.2 Test Procedure

Conducted output power test method:



Radiated power test method:

1.The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.

2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.

4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

4.3 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.4 Summary of Test Results/Plots

Max. Radiated Power:

FDD-LTE Band 2

Channel Bandwidth: 1.4 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	20.65	PASS
	MCH	20.74	PASS
	HCH	20.65	PASS
16QAM	LCH	20.71	PASS
	MCH	20.78	PASS
	HCH	20.97	PASS
Channel Bandwidth: 3 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	20.98	PASS
	MCH	20.78	PASS
	HCH	20.87	PASS
16QAM	LCH	20.98	PASS
	MCH	21.02	PASS
	HCH	21.08	PASS
Channel Bandwidth: 5 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	21.67	PASS
	MCH	21.35	PASS
	HCH	21.17	PASS
16QAM	LCH	21.28	PASS
	MCH	21.71	PASS
	HCH	21.69	PASS
Channel Bandwidth: 10 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	21.74	PASS
	MCH	21.65	PASS
	HCH	21.17	PASS
16QAM	LCH	21.71	PASS
	MCH	21.69	PASS
	HCH	21.47	PASS

Channel Bandwidth: 15 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	21.41	PASS
	MCH	21.32	PASS
	HCH	21.44	PASS
16QAM	LCH	21.65	PASS
	MCH	21.47	PASS
	HCH	21.98	PASS
Channel Bandwidth: 20 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	21.61	PASS
	MCH	21.14	PASS
	HCH	21.47	PASS
16QAM	LCH	21.42	PASS
	MCH	21.14	PASS
	HCH	21.72	PASS

FDD-LTE Band 4

Channel Bandwidth: 1.4 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	21.32	PASS
	MCH	21.14	PASS
	HCH	21.47	PASS
16QAM	LCH	21.58	PASS
	MCH	21.41	PASS
	HCH	21.33	PASS
Channel Bandwidth: 3 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	20.78	PASS
	MCH	20.69	PASS
	HCH	20.38	PASS
16QAM	LCH	20.92	PASS
	MCH	20.36	PASS
	HCH	20.47	PASS

Channel Bandwidth: 5 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	21.15	PASS
	MCH	21.21	PASS
	HCH	21.41	PASS
16QAM	LCH	21.31	PASS
	MCH	21.44	PASS
	HCH	21.32	PASS
Channel Bandwidth: 10 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	21.36	PASS
	MCH	21.47	PASS
	HCH	21.02	PASS
16QAM	LCH	21.21	PASS
	MCH	21.41	PASS
	HCH	21.02	PASS
Channel Bandwidth: 15 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	21.65	PASS
	MCH	21.02	PASS
	HCH	21.14	PASS
16QAM	LCH	21.30	PASS
	MCH	21.41	PASS
	HCH	21.08	PASS
Channel Bandwidth: 20 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
QPSK	LCH	21.32	PASS
	MCH	21.47	PASS
	HCH	21.52	PASS
16QAM	LCH	21.08	PASS
	MCH	21.01	PASS
	HCH	21.11	PASS

FDD-LTE Band 12

Channel Bandwidth: 1.4 MHz			
Modulation	Channel	E.r.p [dBm]	Verdict
QPSK	LCH	20.79	PASS
	MCH	20.47	PASS
	HCH	20.76	PASS
16QAM	LCH	20.61	PASS
	MCH	20.36	PASS
	HCH	20.71	PASS
Channel Bandwidth: 3 MHz			
Modulation	Channel	E.r.p [dBm]	Verdict
QPSK	LCH	20.69	PASS
	MCH	20.74	PASS
	HCH	20.61	PASS
16QAM	LCH	20.71	PASS
	MCH	20.66	PASS
	HCH	20.58	PASS
Channel Bandwidth: 5 MHz			
Modulation	Channel	E.r.p [dBm]	Verdict
QPSK	LCH	20.65	PASS
	MCH	20.44	PASS
	HCH	20.42	PASS
16QAM	LCH	20.71	PASS
	MCH	20.65	PASS
	HCH	20.66	PASS
Channel Bandwidth: 10 MHz			
Modulation	Channel	E.r.p [dBm]	Verdict
QPSK	LCH	20.72	PASS
	MCH	20.36	PASS
	HCH	20.54	PASS
16QAM	LCH	20.69	PASS
	MCH	20.83	PASS
	HCH	20.77	PASS

Max. Conducted Output Power

Please refer to Appendix A: Average Power Output Data

Test result: Pass

5. Peak-to-average Ratio (PAR) of Transmitter

5.1 Standard Applicable

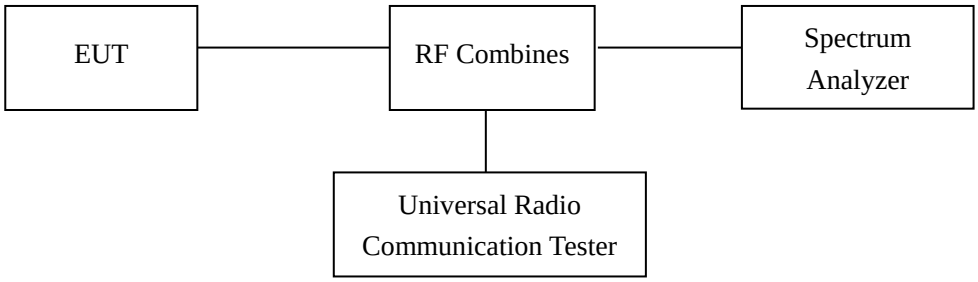
According to §24.232(d), Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. 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.

According to §27.50(B), the peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

5.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the peak-to-average ratio (PAR) of the transmission was recorded. Record the maximum PAPR level associated with a probability of 0.1%.

Test Configuration for the emission bandwidth testing:



5.3 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.4 Summary of Test Results

Please refer to Appendix B: Peak-to-Average Ratio

Test result: Pass

6. Emission Bandwidth

6.1 Standard Applicable

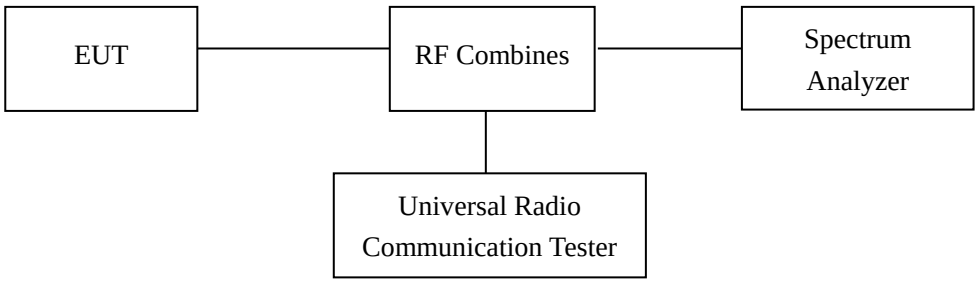
According to §24.238(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

According to §27.53, The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

6.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the 26dB bandwidth was recorded.

Test Configuration for the emission bandwidth testing:



6.3 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

6.4 Summary of Test Results/Plots

Please refer to Appendix C: 26dB Bandwidth and Occupied Bandwidth

Test result: Pass

7. Out of Band Emissions at Antenna Terminal

7.1 Standard Applicable

According to §24.238(a), The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

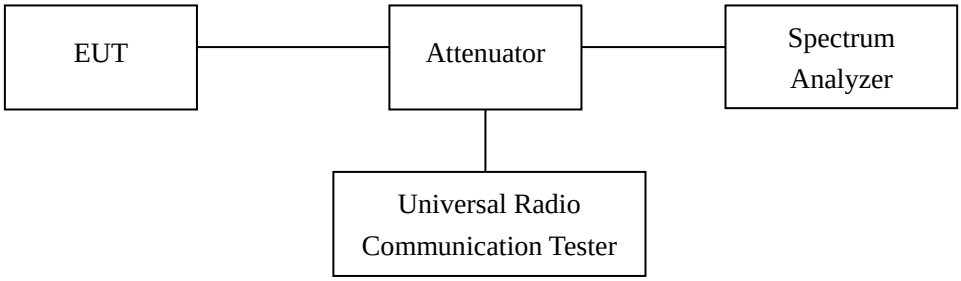
According to §27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

According to §27.53 (m)(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.

7.2 Test Procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 100kHz and 1MHz for the scan frequency from 30MHz to 1GHz and the scan frequency from 1GHz to up to 10th harmonic.

Test Configuration for the out of band emissions testing:



7.3 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	54%
ATM Pressure:	1018 mbar

7.4 Summary of Test Results/Plots

Please refer to Appendix D & E: Band Edge & Conducted Spurious Emission

Test result: Pass

8. Spurious Radiated Emissions

8.1 Standard Applicable

According to §24.238(a), The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §27.53 (h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

According to §27.53 (g) the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

8.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA-603-D: 2010 and ANSI C63.4-2014 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious attenuation limit in dB =43+10 Log_{10} (power out in Watts)

8.3 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	54%
ATM Pressure:	1012 mbar

8.4 Summary of Test Results/Plots

According to the data below, the FCC Part 22.917 and 24.238 standards, and had the worst margin of:

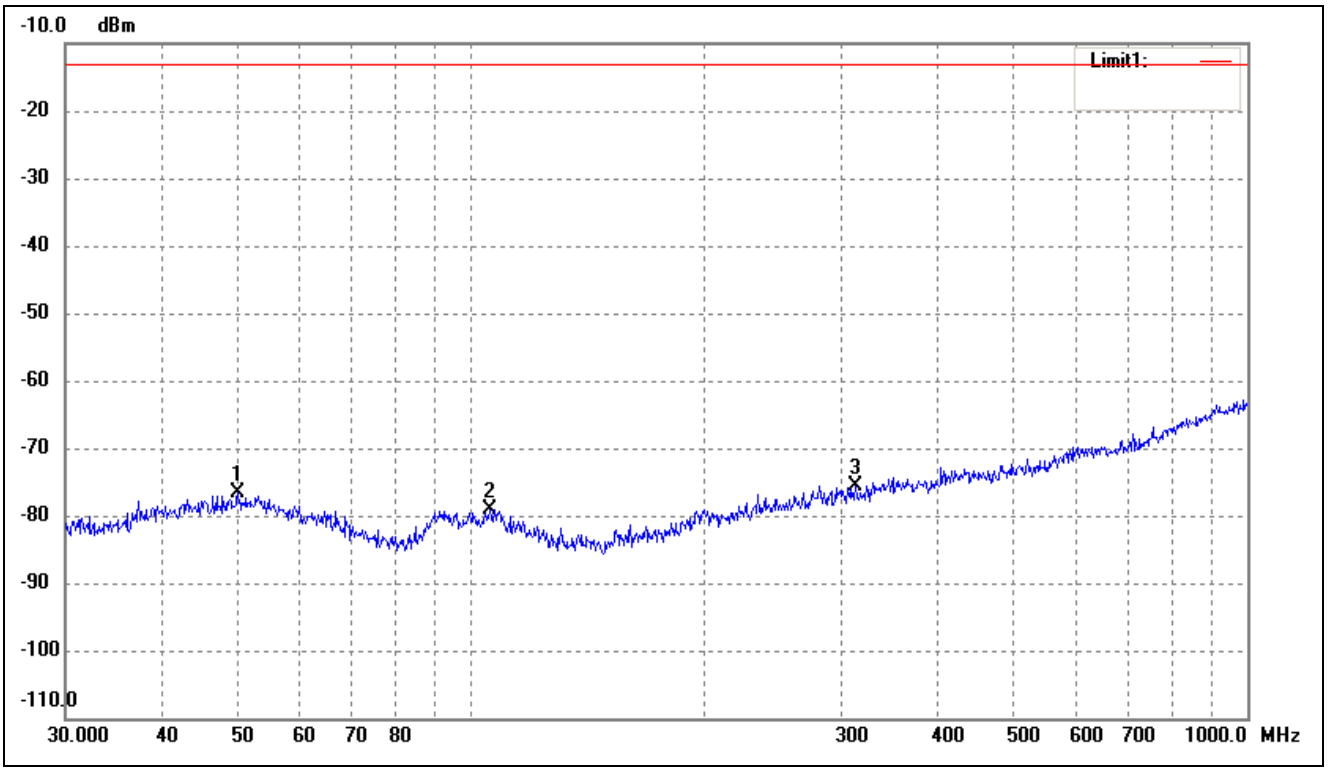
Note: 1. this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

2. All test modes (different bandwidth and different modulation) are performed, but only the worst case is recorded in this report.

Spurious Emission From 30MHz to 1GHz

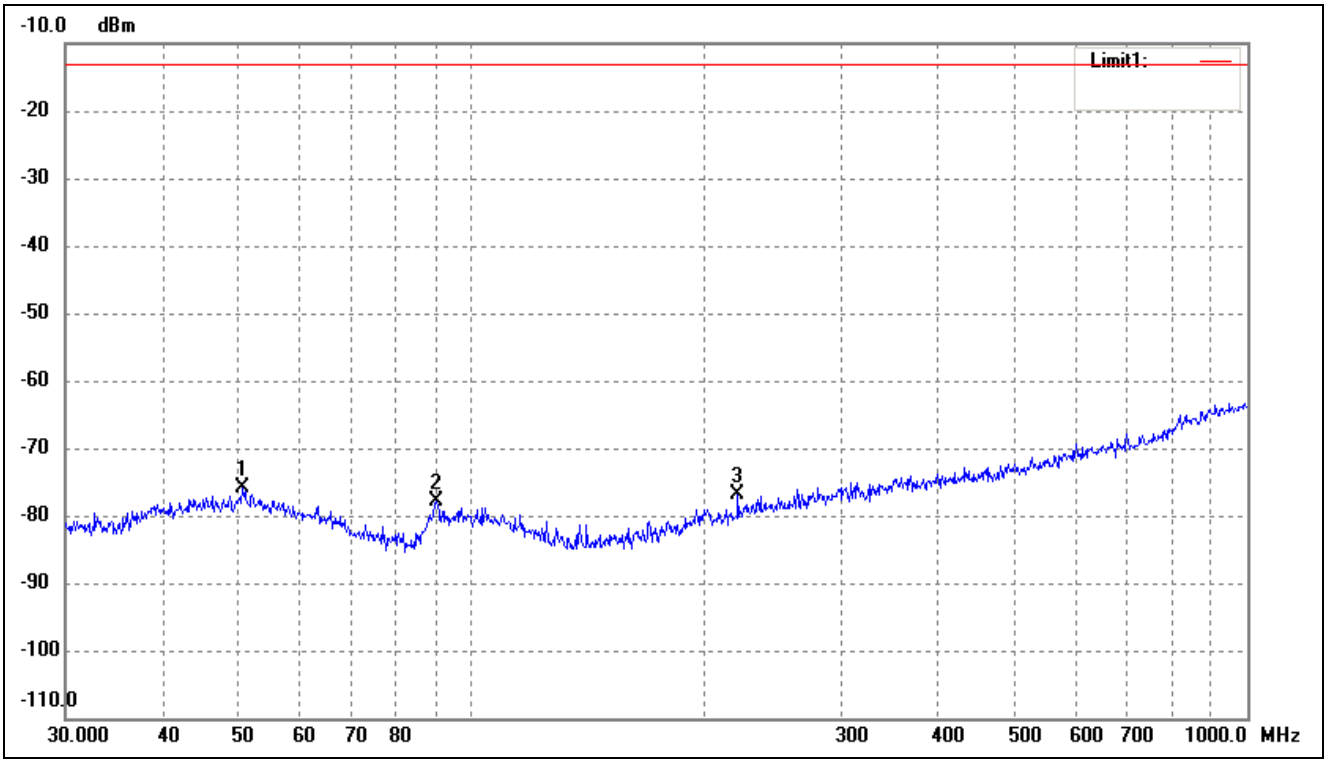
For FDD_LTE Band 2 Mode

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	50.0566	-76.70	0.20	-76.50	-13.00	-63.50	ERP
2	105.6415	-77.51	-1.64	-79.15	-13.00	-66.15	ERP
3	312.1794	-77.01	1.51	-75.50	-13.00	-62.50	ERP

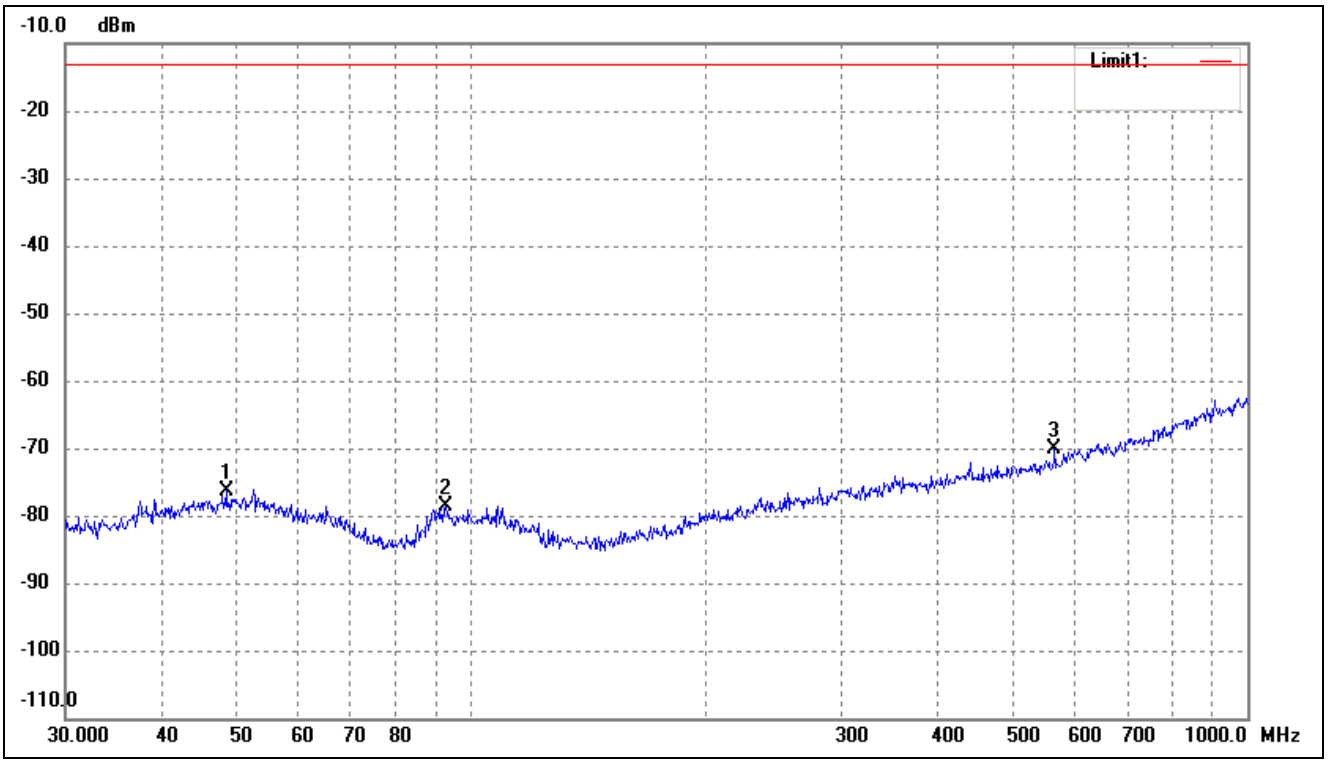
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	50.7637	-76.20	0.21	-75.99	-13.00	-62.99	ERP
2	90.2205	-76.22	-1.64	-77.86	-13.00	-64.86	ERP
3	220.6171	-75.86	-1.13	-76.99	-13.00	-63.99	ERP

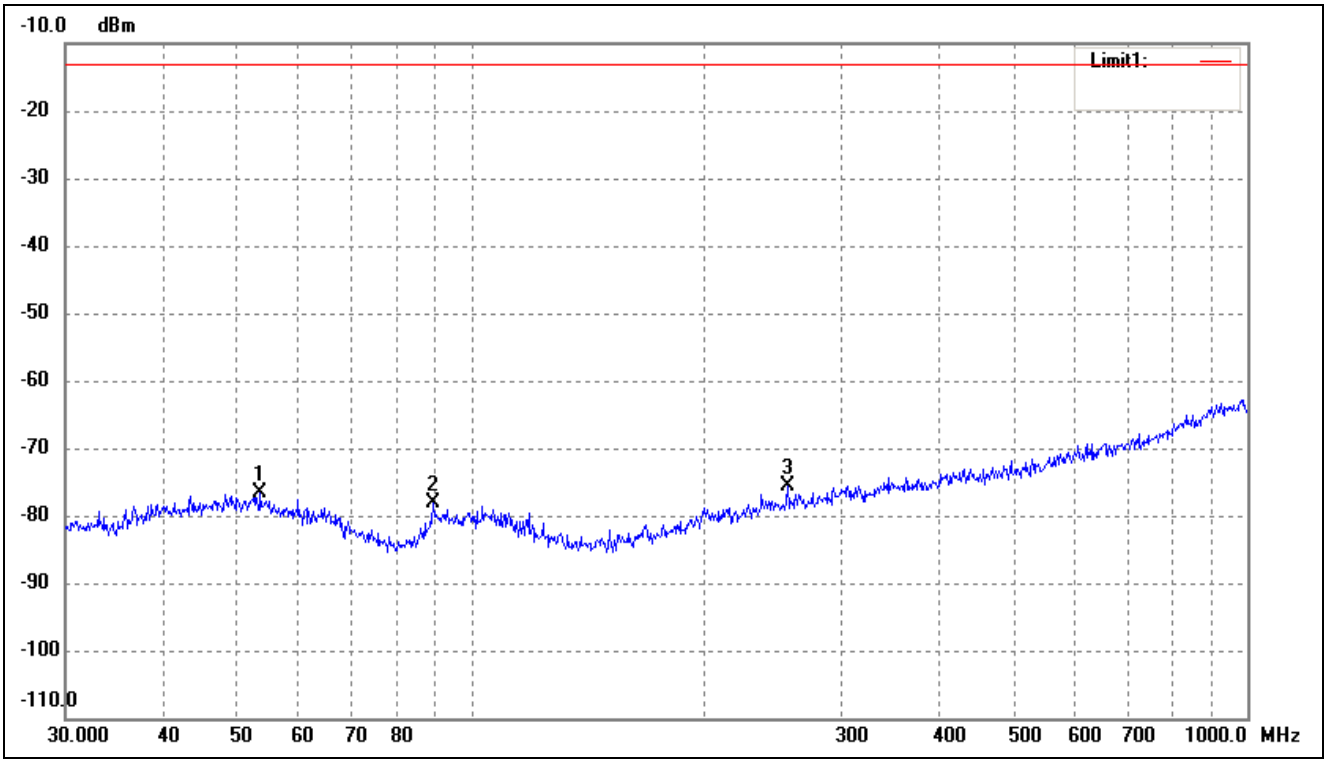
For FDD_LTE Band 4 Mode

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	48.3318	-76.52	0.16	-76.36	-13.00	-63.36	ERP
2	92.7872	-76.56	-2.16	-78.72	-13.00	-65.72	ERP
3	564.6389	-75.60	5.43	-70.17	-13.00	-57.17	ERP

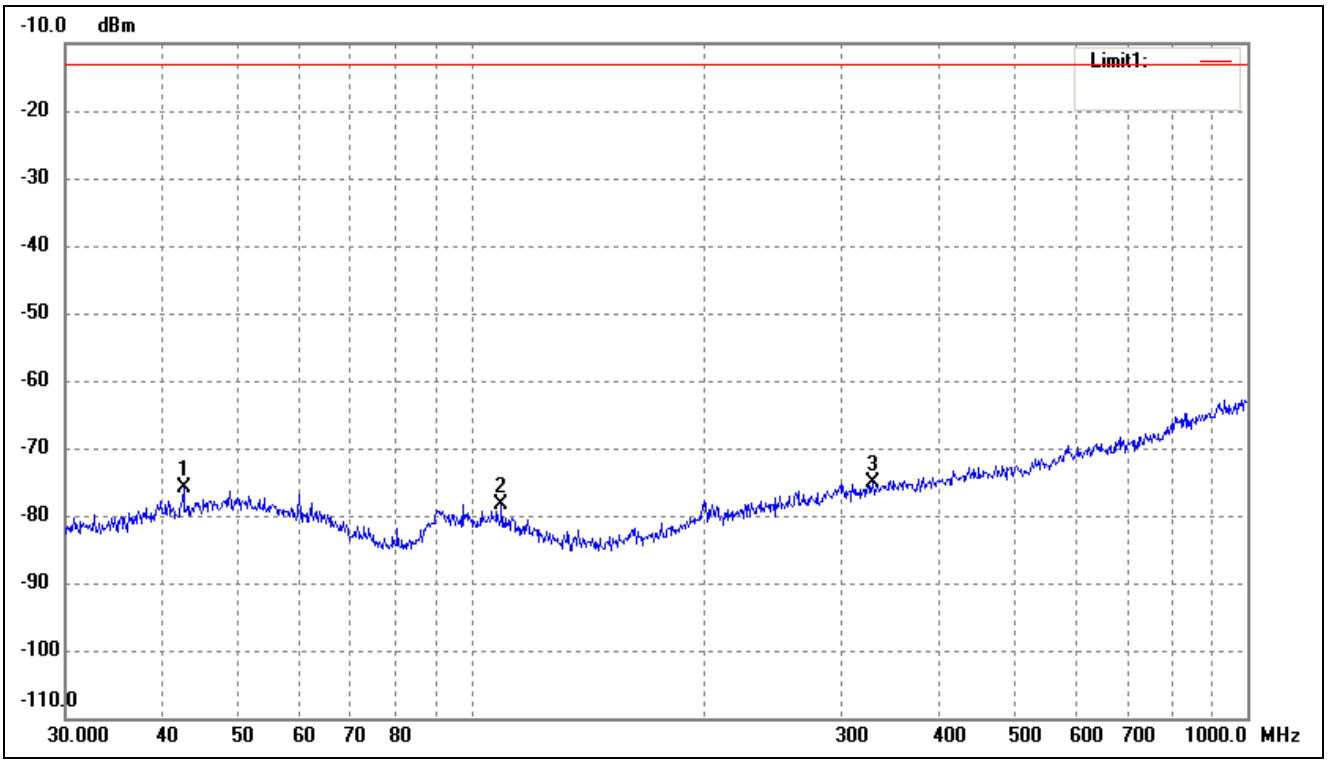
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	53.5052	-76.55	-0.01	-76.56	-13.00	-63.56	ERP
2	89.2764	-76.06	-2.16	-78.22	-13.00	-65.22	ERP
3	255.6231	-75.76	0.25	-75.51	-13.00	-62.51	ERP

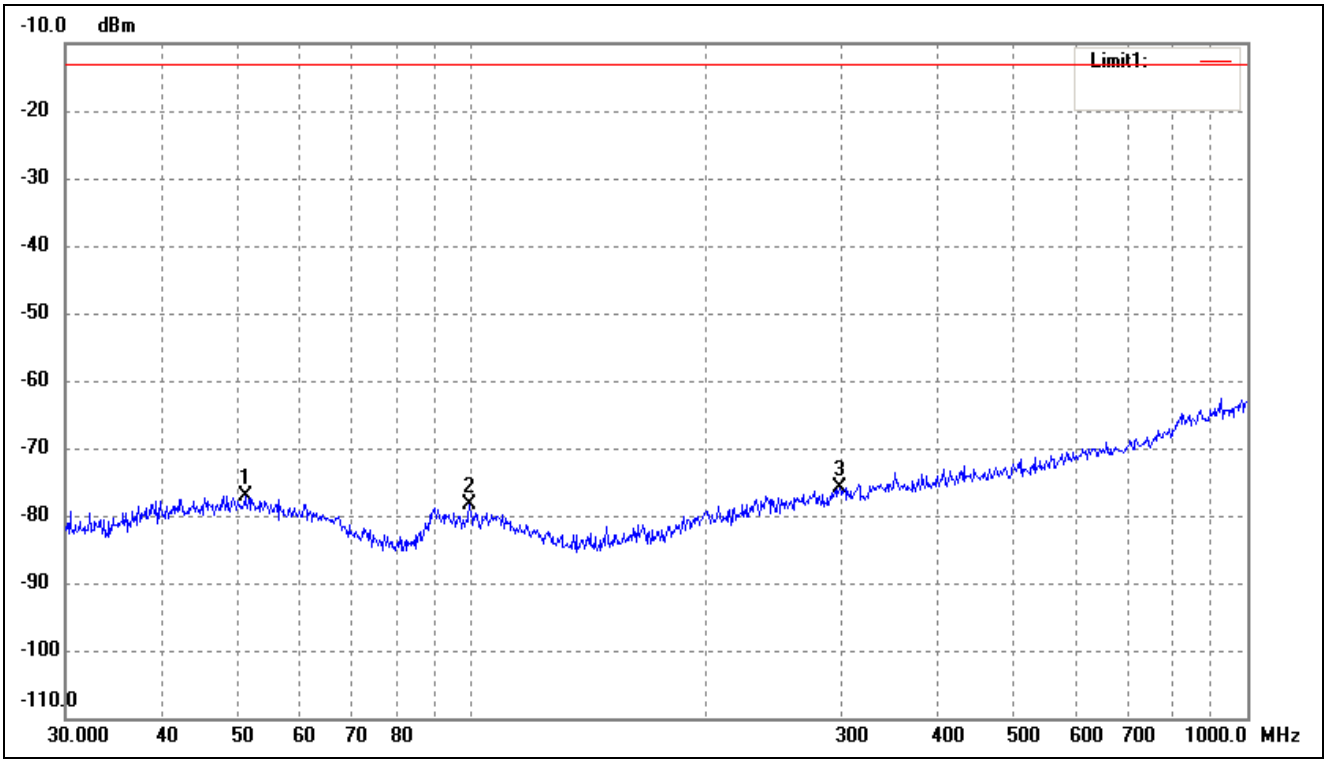
For FDD_LTE Band 12Mode

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	42.6000	-75.47	-0.40	-75.87	-13.00	-62.87	ERP
2	109.4116	-76.38	-2.00	-78.38	-13.00	-65.38	ERP
3	329.0390	-77.18	2.10	-75.08	-13.00	-62.08	ERP

Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	51.1209	-77.26	0.21	-77.05	-13.00	-64.05	ERP
2	99.5281	-76.21	-2.06	-78.27	-13.00	-65.27	ERP
3	298.2681	-77.52	1.64	-75.88	-13.00	-62.88	ERP

Note: Margin= (Reading+ Correct)- Limit

Spurious Emissions Above 1GHz

For FDD_LTE Band 2 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1852.5MHz)						
3705.00	-39.4	9.92	-29.48	-13	-16.48	H
5557.50	-46.69	13.47	-33.22	-13	-20.22	H
3705.00	-40.8	9.92	-30.88	-13	-17.88	V
5557.50	-47.18	13.47	-33.71	-13	-20.71	V
Middle Channel (1880.0MHz)						
3760.00	-41.71	10.08	-31.63	-13	-18.63	H
5640.00	-47.18	13.53	-33.65	-13	-20.65	H
3760.00	-39.58	10.08	-29.5	-13	-16.5	V
5640.00	-49.13	13.53	-35.6	-13	-22.6	V
High Channel (1907.5MHz)						
3815.00	-40.35	9.92	-30.43	-13	-17.43	H
5722.50	-49.12	13.47	-35.65	-13	-22.65	H
3815.00	-40.4	9.92	-30.48	-13	-17.48	V
5722.50	-49.28	13.47	-35.81	-13	-22.81	V

For FDD_LTE Band 4 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1712.5MHz)						
3425.00	-34.09	8.65	-25.44	-13	-12.44	H
5137.50	-43.13	12.03	-31.1	-13	-18.1	H
3425.00	-36.75	8.65	-28.1	-13	-15.1	V
5137.50	-44.42	12.03	-32.39	-13	-19.39	V
Middle Channel (1732.5MHz)						
3465.00	-34	8.91	-25.09	-13	-12.09	H
5197.50	-44.36	12.29	-32.07	-13	-19.07	H
3465.00	-36.38	8.91	-27.47	-13	-14.47	V
5197.50	-42.79	12.29	-30.5	-13	-17.5	V
High Channel (1752.5MHz)						
3505.00	-37.19	9.11	-28.08	-13	-15.08	H
5257.50	-41.62	12.56	-29.06	-13	-16.06	H
3505.00	-35.97	9.11	-26.86	-13	-13.86	V
5257.50	-41.69	12.56	-29.13	-13	-16.13	V

For FDD_LTE Band 12 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (669.7MHz)						
1339.40	-34.97	4.01	-30.96	-13	-17.96	H
2009.10	-38.16	7.32	-30.84	-13	-17.84	H
1339.40	-35.17	4.01	-31.16	-13	-18.16	V
2009.10	-36.72	7.32	-29.4	-13	-16.4	V
Middle Channel (707.5MHz)						
1415.00	-34.55	4.11	-30.44	-13	-17.44	H
2122.50	-39.85	7.54	-32.31	-13	-19.31	H
1415.00	-35.25	4.11	-31.14	-13	-18.14	V
2122.50	-37.32	7.54	-29.78	-13	-16.78	V
High Channel (715.3MHz)						
1430.6	-36.63	4.35	-32.28	-13	-19.28	H
2145.9	-37.64	7.88	-29.76	-13	-16.76	H
1430.6	-32.18	4.35	-27.83	-13	-14.83	V
2145.9	-37.86	7.88	-29.98	-13	-16.98	V

Note: Result=Reading+ Correct, Margin= Result- Limit

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

9. Frequency Stability

9.1 Standard Applicable

According to §24.235, The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

According to §27.54 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

9.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

Temperature:	Supply Voltage
20°C	DC 3.3-4.2V declared by manufacturer
-30°C to +50°C	Normal

9.3 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

9.4 Summary of Test Results/Plots

Please refer to Appendix F: Frequency Stability

Test result: Pass

******* END OF REPORT *******