



FCC TEST REPORT

FCC ID: 2A8JV-IPDA099

On Behalf of

Guangzhou Munbyn Information Technology Co., Ltd.

Android Barcode Scanner

Model No.: IPDA099, IPDA061, MC01, MC02, MC03, MC04, MC05

Prepared for : Guangzhou Munbyn Information Technology Co., Ltd.
Address : Unit L3A01-4, No. 31-6, Xicha Road, Baiyun District, Guangzhou

Prepared By : Shenzhen PSI Testing Co., Ltd.
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TABLE OF CONTENTS

Description	Page
1 TEST SUMMARY	5
2 GENERAL INFORMATION	6
2.1 GENERAL DESCRIPTION OF EUT	6
2.2 RELATED SUBMITTAL(S) / GRANT (S)	7
2.3 TEST METHODOLOGY	7
2.4 TEST FACILITY	7
2.5 ACCESSORIES OF DEVICE (EUT)	7
2.6 TESTED SUPPORTING SYSTEM DETAILS	7
2.7 TEST CONDITIONS	7
2.8 MEASUREMENT UNCERTAINTY	8
3 TEST INSTRUMENTS LIST	9
4 SYSTEM TEST CONFIGURATION	10
4.1 TEST MODE	10
4.2 CONFIGURATION OF TESTED SYSTEM	10
4.3 TRANSMITTER RADIATED POWER (EIRP/ERP)	11
4.4 PEAK-TO-AVERAGE RATIO	14
4.5 OCCUPY BANDWIDTH	15
4.6 MODULATION CHARACTERISTIC	16
4.7 OUT OF BAND EMISSION AT ANTENNA TERMINALS	16
4.8 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT	17
4.9 FREQUENCY STABILITY	35
4.10 PHOTOS OF TEST SETUP	36

TEST REPORT DECLARATION

Applicant : Guangzhou Munbyn Information Technology Co., Ltd.
 Address : Unit L3A01-4, No. 31-6, Xicha Road, Baiyun District, Guangzhou
 Manufacturer : Guangzhou Munbyn Information Technology Co., Ltd.
 Address : Unit L3A01-4, No. 31-6, Xicha Road, Baiyun District, Guangzhou
 EUT Description : Android Barcode Scanner
 (A) Model No. : IPDA099, IPDA061, MC01, MC02, MC03, MC04, MC05
 (B) Trademark : NAXA, HENA



Measurement Standard Used:

- FCC CFR Title 47 Part 2**
- FCC CFR Title 47 Part 22 Subpart H**
- FCC CFR Title 47 Part 24 Subpart E**
- FCC CFR Title 47 Part 27**
- ANSI C63.26:2015**

The device described above is tested by Shenzhen PSI Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The test results are contained in this test report and Shenzhen PSI Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen PSI Testing Co., Ltd.

Tested by (name + signature).....: Felix Pang 
 Test Engineer
 Approved by (name + signature).....: Simple Guan 
 Project Manager
 Date of issue.....: July 24, 2024

Revision History

Revision	Issue Date	Revisions	Revised By
V0	July 24, 2024	Initial released Issue	Felix Pang



1 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Pass* (Please refer to SAR Report)
Transmitter Radiated Power (EIRP/ERP)	Part 2.1046 part22.913(a) (5) Part 24.232 (c) Part 27.50 (d)(4) Part 27.50 (h)/(c)	Pass
Peak-To-Average Ratio	Part 2.1046 Part 22.913(d) Part 24.232 (d) Part 27.50(d) Part 27.50 (c)	Pass
Modulation Characteristics	Part 2.1047	N/A
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238 Part 27.53(a)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)/(m)/(g)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)/(m)/(g)	Pass
Frequency stability	Part 2.1055(a)(1)(b) Part 2.1055(d)(1)(2) Part 27.54	Pass

Note: 1. Pass: The EUT complies with the essential requirements in the standard.

2. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

3. N/A indicates not applicable.

2 General Information

2.1 General Description of EUT

Description of Device (EUT)

Description	:	Android Barcode Scanner
Model Number	:	IPDA099, IPDA061, MC01, MC02, MC03, MC04, MC05
Diff	:	All models are same with electrical parameters and internal circuit structure, but only differ in appearance color and model name (this information provided by the customer). All tests are made with the M17QF18M model.
Test Voltage	:	DC 5V from adapter, DC 3.8V from battery

Support Networks	:	LTE
Support Bands	:	FDD LTE: Band 2/4/5/7/13/17 TDD LTE: Band 38/41
Channel Bandwidth	:	LTE Band 2: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 13: 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz
TX Frequency	:	LTE Band 2: 1850 ~ 1910MHz LTE Band 4: 1710 ~ 1755MHz LTE Band 5: 824 ~ 849MHz LTE Band 7: 2500~2570MHz LTE Band 13: 777~787MHz LTE Band 17: 704 ~716 MHz LTE Band 38: 2570~2620MHz LTE Band 41: 2496~2690MHz
Modulation type	:	QPSK, 16QAM
Antenna type	:	FPC Antenna
Antenna Type	:	Maximum Gain is 0.6dBi for LTE Band 2 Maximum Gain is -1.2dBi for LTE Band 4 Maximum Gain is -6.1dBi for LTE Band 5 Maximum Gain is -1.1dBi for LTE Band 7 Maximum Gain is -8.0dBi for LTE Band 13 Maximum Gain is -8.0dBi for LTE Band 17 Maximum Gain is -0.8dBi for LTE Band 38 Maximum Gain is -0.8dBi for LTE Band 41
Software version	:	20221206.185812
Hardware version	:	V1.0.
Remark:	:	1. The worst-case simultaneous transmission configuration was evaluated with no non-compliance found. Results in this report are only for 2G function, and there is no other transmitter involved. 2. The product has two antennas, one of which is a diversity antenna with only receiving function. 3. The product contains two SIM card slots, both of which have been tested and only reflect the data of SIM card slot 1.

2.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H, Part 27 and Part 24 subpart E of the FCC CFR 47 Rules.

2.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

2.4 Test Facility

Shenzhen PSI Testing Co., Ltd.
1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

September 21, 2023 File on Federal Communication Commission
Registration Number: 916281

September 21, 2023 Certificated by IC
Registration Number: 31123
CAB identifier: CN0158

2.5 Accessories of Device (EUT)

Accessories : N/A
Manufacturer : N/A
Model : N/A
Ratings : N/A

2.6 Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification
1.	N/A	N/A	N/A	N/A	N/A

2.7 Test Conditions

Items	Required
Temperature range:	15-35°C
Humidity range:	25-75%
Pressure range:	86-106kPa

2.8 Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.17dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	2.74dB(Polarize: V)
	2.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 18GHz)	4.29dB(Polarize: V)
	4.82dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31dB(Polarize: V)
	4.30dB(Polarize: H)
Uncertainty for radio frequency	48.24KHz
Uncertainty for conducted RF Power	0.41dB
Uncertainty for Power Spectral Density	0.39 dB
Occupied-Bandwidth	968Hz
Conducted-Spurious Emission	1.26dB

3 Test Instruments list

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware Version	Last Cal.	Cal. Interval
1.	9*6*6 anechoic chamber	SKET	9*6*6	N/A	/	2022.12.20	3 Year
2.	Test Receiver	Rohde&Schwarz	ESCI 7	101032/003	4.42 SP3	2023.12.19	1 Year
3.	L.I.S.N.#1	Rohde&Schwarz	ENV216	102282	/	2023.12.19	1 Year
4.	L.I.S.N.#2	RFT	NNB111	13835240	/	2023.12.19	1 Year
5.	Loop Antenna	Schwarz beck	FMZB 1519B	00128	/	2023.04.03	2 Year
6.	Bilog Antenna	Schwarz beck	VULB 9168	01448	/	2022.12.26	2 Year
7.	Spectrum Analyzer	Rohde&Schwarz	FSV-40N	101648	3.70	2023.12.19	1 Year
8.	Horn Antenna	Schwarz beck	BBHA 9120 D	02706	/	2022.12.26	2 Year
9.	Amplifier	SKET	LAPA_01G1 8G-45dB	SK20220329 01	/	2023.12.19	1 Year
10.	Horn Antenna	Schwarz beck	BBHA 9170	00946	/	2022.12.25	2 Year
11.	Amplifier	SKET	LNPA_0118 G-45	SK20200108 01	/	2023.12.19	1 Year
12.	RF Power Probe	Rohde&Schwarz	NRP-Z11	1138.3004.02 -1111533-Fz	/	2023.12.19	1 Year
13.	RF Sensor Unit	Tachoy	TR1029-2	20220428P0 08	/	2023.12.19	1 Year
14.	Spectrum Analyzer	Agilent	N9020A	MY51281067	A.14.03	2023.12.19	1 Year
15.	Temp. & Humid Chamber	Auchno	9606	/	/	2023.12.19	1 Year
16.	Regulated DC Power Supply	Xinouhua	ADC120V10 A	20221125163 8		2023.12.19	1 Year

For Test Software Information

Item	Software Name	Manufacturer	Version
RE	EZ EMC	Farad	PSI-3A1
RF	RTS	TACHOY	V1.0.0

4 System test configuration

4.1 Test mode

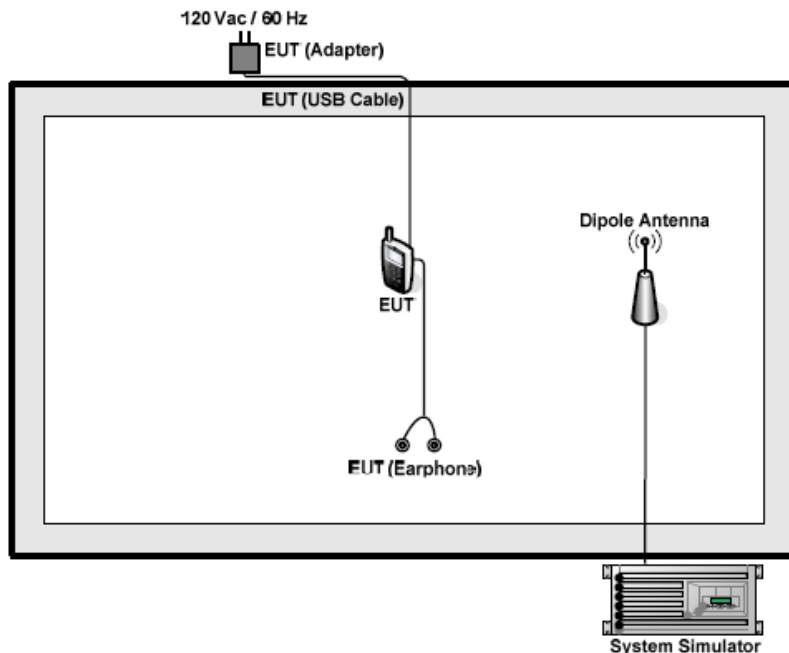
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
LTE Band 2	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 4	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 5	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 7	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 12	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 17	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 38	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 41	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link

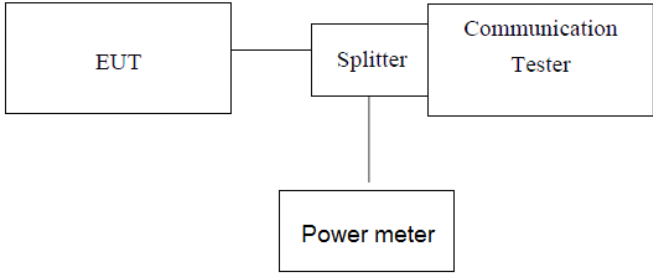
Note: Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03r1 with maximum output power.

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

4.2 Configuration of Tested System



4.3 Transmitter Radiated Power (EIRP/ERP)

Test Requirement:	FCC part22.913(a) (5), FCC part24.232(b) and FCC Part 27.50 (d)(4)/(h)/(c)
Test Method:	ANSI C63.26:2015
Limit:	LTE Band 2: 2W(33.01dBm) LTE Band 4: 1W(30.00dBm) LTE Band 5: 7W(38.45dBm) LTE Band 7: 2W(33.01dBm) LTE Band 12: 3W(34.77dBm) LTE Band 17: 3W(34.77dBm) LTE Band 38: 2W(33.01dBm) LTE Band 41: 2W(33.01dBm)
Test setup:	 <p style="text-align: center;"><i>Note: Measurement setup for testing on Antenna connector</i></p>
Test Procedure:	<p>Description of the Conducted Output Power Measurement</p> <p>The EUT is coupled to the SS with attenuator through power splitter; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. A system simulator is used to establish communication with the EUT, and its parameters are set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.</p> <p>The relevant equation for determining the conducted measured value is:</p> $\text{Conducted Output Power Value (dBm)} = \text{Measured Value (dBm)} + \text{Path Loss (dB)}$ <p>where:</p> <p>Conducted Output Power Value = final conducted measured value in the conducted power test, in dBm; Measured Value = measured conducted power received by spectrum analyzer or power meter, in dBm;</p> <p>Path Loss = signal attenuation in the connecting cable between the transmitter and spectrum analyzer or power meter, including external cable loss, in dB;</p> <p>During the test, the data of Path Loss (dB) is added in the spectrum analyzer or power meter, so Measured Value (dBm) is the final values which contains the data of Path Loss (dB).</p> <p>For example:</p> <p>In the conducted output power test, when measured value for GSM850 is 24.7 dBm, and path loss is 8.5 dB, then final conducted output power value is:</p> $\text{Conducted Output Power Value (dBm)} = 24.7 \text{ dBm} + 8.5 \text{ dB} = 33.2 \text{ dBm}$

Description of the Transmitter Radiated Power Measurement

In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).

Final measurement calculation as below:

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$$

where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW; GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP); dBd (ERP)=dBi (EIRP) -2.15 dB

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

For example:

In the EIRP test, when PMeas value for GSM1900 is 30.2 dBm, LC is 0.6 dB, and GT is -3.4 dB, then final EIRP value is:

$$\text{EIRP for GSM1900} = 30.2 \text{ dBm} - 3.4 \text{ dBi} - 0.6 \text{ dB} = 26.2 \text{ dBm}$$

The relevant equation for determining the ERP/EIRP from the radiated RF output power is:

$$\text{ERP/EIRP (dBm)} = \text{SA Read Value (dBm)} + \text{Correction Factor (dB)}$$

where:

ERP/EIRP = effective or equivalent radiated power, in dBm;

SA Read Value = measured transmitter power received by EMI receiver or spectrum analyzer, in dBm; Correction Factor = total correction factor including cable loss, in dB;

During the test, the data of Correction Factor (dB) is added in the EMI receiver or spectrum analyzer, so SA Read Value (dBm) is the final values which contains the data of Correction Factor (dB).

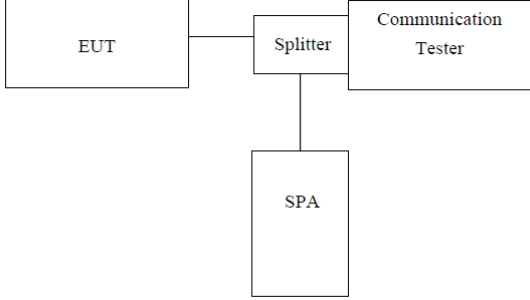
For example:

In the ERP test, when SA read value for GSM850 is 21dBm, and

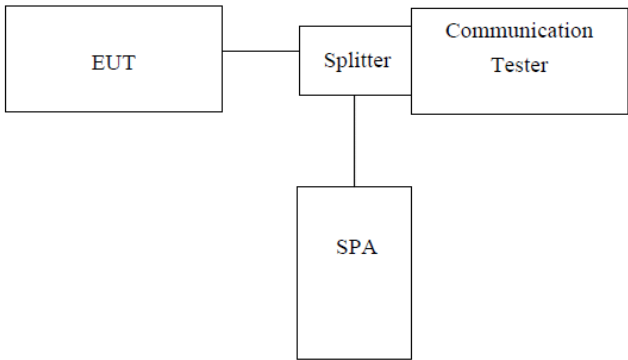
	correction factor is 8dB, then final ERP value for GSM850 is: ERP (dBm) = 21dBm + 8dB = 29dBm
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass (Please refer to ANNEX for the test results)



4.4 Peak-to-Average Ratio

Test Requirement:	Part 22.913(d), FCC part24.232(d) and FCC part27.50(d)(5)/(c)
Test Method:	ANSI C63.26:2015
Test Limit:	Used complementary cumulative distribution function (CCDF) of analyzer to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time
Test setup:	 <pre> graph LR EUT[EUT] --- Splitter[Splitter] Splitter --- CT[Communication Tester] Splitter --- SPA[SPA] </pre> <p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Test Procedure:	<ol style="list-style-type: none"> 1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7. 2. The EUT was connected to spectrum and system simulator via a power divider 3. Using the CCDF measurement of spectrum analyzer; 4. Set $RBW \geq OBW$ or specified reference bandwidth; 5. Set the number of counts to a value that stabilizes the measured CCDF curve; 6. Set the measurement interval as 1ms 7. Record the maximum PAPR level associated with a probability of 0.1%.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass (Please refer to ANNEX for the test results)

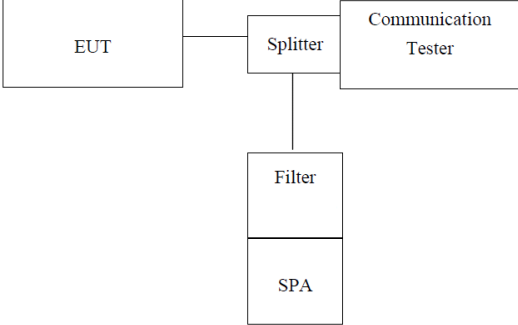
4.5 Occupy Bandwidth

Test Requirement:	FCC part22.913(a), FCC part24.232(b) and FCC part27.53(a)
Test Method:	ANSI C63.26:2015
Test setup:	 <p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Test Procedure:	<ol style="list-style-type: none"> 1.The EUT's output RF connector was connected with a short cable to the spectrum analyzer, set center frequency to channel center frequency. 2.RBW was set to about 1%-5% of emission OBW, VBW\geq 3 X RBW. 3.Set spectrum analyzer detection mode to peak, and the trace mode to max hold. 4. Use the 99% OBW function, The 99% power OBW can be found on the plot, determine the "-26dB amplitude" as equal to reference value -26dB.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass (Please refer to ANNEX for the test results)

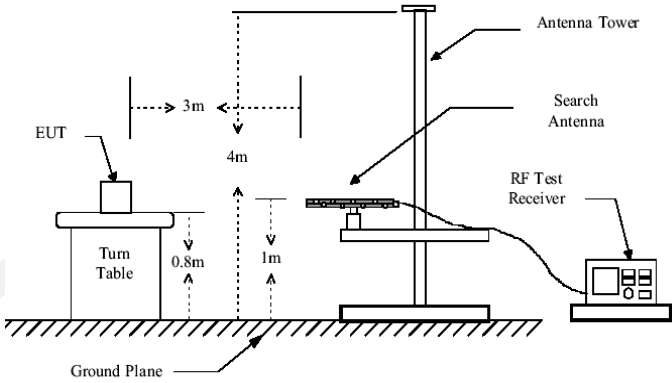
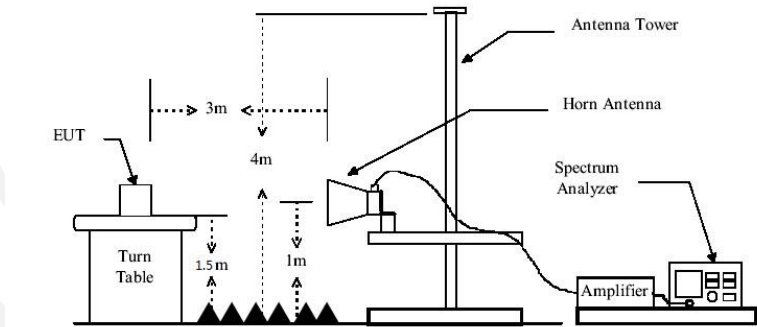
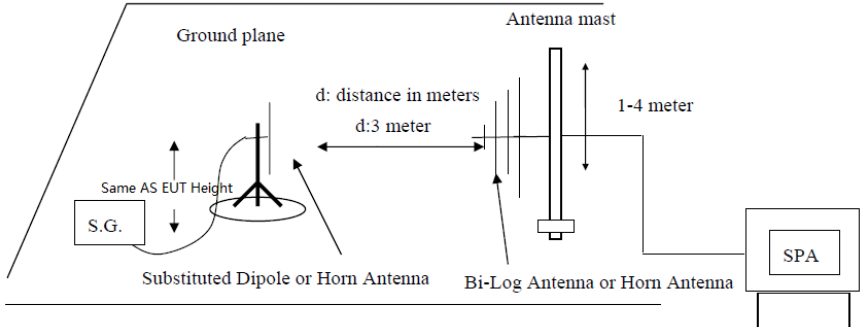
4.6 MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 24E & Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

4.7 Out of band emission at antenna terminals

Test Requirement:	FCC part22.913(a), FCC part24.238(a), FCC part27.53(h)/(m)/(g)
Test Method:	ANSI C63.26:2015
Limit:	-13dBm Band 7/41: -25dBm
Test setup:	 <p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Test Procedure:	<ol style="list-style-type: none"> 1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW=1MHz, VBW = 3MHz, Start=30MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass (Please refer to ANNEX for the test results)

4.8 Field strength of spurious radiation measurement

Test Requirement:	FCC part22.913(a), FCC part24.238(a), FCC part27.53(h)/(m)/(g)
Test Method:	ANSI C63.26:2015
Limit:	Band 2/4/5/13/17:-13dBm Band 13: -40dBm(1559-1610MHz) Band 7/38/41:-25dBm
Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p>  <p>Substituted method:</p> 

Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. 3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. $\text{ERP / EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}$
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data(Worst case):

QPSK Mode:

Test mode:	LTE Band 2(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3860.41	V	-37.10	-13.00	Pass
5792.54	V	-39.61		
7723.49	V	-38.49		
9653.83	V	-43.10		
11584.46	V	---		
3862.64	H	-39.23	-13.00	Pass
5793.19	H	-42.90		
7721.58	H	-45.37		
9653.01	H	-46.18		
11583.62	H	---		
Test mode:	LTE Band 2(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3919.32	V	-37.29	-13.00	Pass
5880.12	V	-39.11		
7840.53	V	-38.32		
9800.59	V	-43.47		
11759.88	V	---		
3920.60	H	-38.59	-13.00	Pass
5880.35	H	-42.22		
7840.59	H	-44.45		
9799.43	H	-46.49		
11759.83	H	---		
Test mode:	LTE Band 2(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3978.43	V	-36.87	-13.00	Pass
5967.32	V	-39.74		
7956.76	V	-37.81		
9946.03	V	-42.93		
11936.36	V	---		
3978.41	H	-38.76	-13.00	Pass
5968.62	H	-42.41		
7957.70	H	-44.62		
9946.96	H	-46.05		
11935.35	H	---		

Test mode:	LTE Band 4(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4222.03	V	-36.85	-13.00	Pass
6330.70	V	-39.16		
8442.67	V	-37.56		
10553.87	V	-42.90		
12664.70	V	---		
4221.42	H	-39.11	-13.00	Pass
6333.31	H	-42.97		
8442.75	H	-44.97		
10554.48	H	-46.03		
12664.38	H	---		
Test mode:	LTE Band 4(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4265.36	V	-36.67	-13.00	Pass
6398.03	V	-39.10		
8530.50	V	-37.87		
10662.79	V	-43.01		
12794.59	V	---		
4264.76	H	-39.35	-13.00	Pass
6398.08	H	-42.29		
8530.23	H	-44.84		
10662.75	H	-46.01		
12795.73	H	---		
Test mode:	LTE Band 4(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4308.60	V	-36.36	-13.00	Pass
6462.98	V	-39.20		
8616.64	V	-37.97		
10771.02	V	-43.65		
12926.34	V	---		
4308.18	H	-39.24	-13.00	Pass
6463.14	H	-42.17		
8616.72	H	-44.63		
10772.14	H	-45.95		
12926.03	H	---		

Test mode:	LTE Band 5(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1740.15	V	-36.28	-13.00	Pass
2609.41	V	-36.91		
3480.30	V	-37.50		
4347.96	V	-38.09		
5217.46	V	---		
1739.72	H	-36.33	-13.00	Pass
2608.81	H	-36.95		
3479.07	H	-37.40		
4349.20	H	-37.95		
5217.47	H	---		
Test mode:	LTE Band 5(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1762.71	V	-36.64	-13.00	Pass
2645.17	V	-36.66		
3525.57	V	-37.49		
4407.49	V	-38.32		
5289.37	V	---		
1762.90	H	-36.73	-13.00	Pass
2644.61	H	-36.82		
3525.54	H	-36.72		
4407.68	H	-37.99		
5289.19	H	---		
Test mode:	LTE Band 5(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1787.09	V	-36.61	-13.00	Pass
2680.41	V	-37.04		
3573.92	V	-36.77		
4466.03	V	-37.74		
5360.33	V	---		
1786.43	H	-36.77	-13.00	Pass
2679.17	H	-36.57		
3572.89	H	-37.36		
4466.26	H	-38.49		
5360.00	H	---		

Test mode:	LTE Band 7(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5246.48	V	-37.05	-25.00	Pass
7866.85	V	-39.72		
10488.69	V	-37.65		
13113.53	V	-43.56		
15735.79	V	---		
5243.77	H	-38.61	-25.00	Pass
7868.85	H	-42.49		
10488.89	H	-44.84		
13111.19	H	-45.71		
15734.08	H	---		
Test mode:	LTE Band 7(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5310.38	V	-37.29	-25.00	Pass
7965.59	V	-39.11		
10620.07	V	-38.28		
13274.57	V	-43.33		
15929.37	V	---		
5309.53	H	-38.69	-25.00	Pass
7965.47	H	-42.38		
10620.35	H	-44.88		
13274.52	H	-46.16		
15930.36	H	---		
Test mode:	LTE Band 7(5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5375.73	V	-37.28	-25.00	Pass
8061.86	V	-39.80		
10749.42	V	-38.19		
13438.01	V	-43.56		
16125.47	V	---		
5374.85	H	-38.71	-25.00	Pass
8062.55	H	-42.93		
10750.33	H	-44.92		
13437.91	H	-46.41		
16124.86	H	---		

Test mode:	LTE Band 13(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1587.32	V	-47.80	-40.00	Pass
5004.75	V	-36.22	-13.00	Pass
7507.27	V	-34.74		
10010.16	V	-32.03		
12512.20	V	-29.40		
15015.02	V	-37.68		
1587.36	H	-48.41	-40.00	Pass
5005.07	H	-35.19	-13.00	Pass
7507.21	H	-31.94		
10009.63	H	-30.51		
12512.42	H	-38.89		
15015.04	H	-36.03		
Test mode:	LTE Band 13(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1594.49	V	-48.11	-40.00	Pass
5069.91	V	-35.45	-13.00	Pass
7605.05	V	-35.03		
10140.16	V	-32.64		
12674.88	V	-29.39		
15209.68	V	-38.06		
1594.82	H	-47.75	-40.00	Pass
5069.89	H	-34.59	-13.00	Pass
7605.11	H	-32.27		
10139.77	H	-30.08		
12674.88	H	-38.71		
15209.73	H	-35.84		
Test mode:	LTE Band 13(5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1579.62	V	-47.48	-40.00	Pass
5134.80	V	-35.58	-13.00	Pass
7702.43	V	-34.66		
10269.87	V	-32.93		
12837.21	V	-29.83		
15404.96	V	-38.41		
1579.63	H	-47.53	-40.00	Pass
5135.15	H	-34.89	-13.00	Pass
7702.25	H	-31.84		
10269.75	H	-30.27		
12837.41	H	-38.51		
15404.62	H	-35.56		

Test mode:	LTE Band 17(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1473.54	V	-36.20	-13.00	Pass
2210.12	V	-37.15		
2946.79	V	-37.46		
3683.91	V	-37.89		
4419.03	V	---		
1474.00	H	-36.97	-13.00	Pass
2210.42	H	-36.64		
2946.44	H	-37.10		
3681.47	H	-38.40		
4417.50	H	---		
Test mode:	LTE Band 17(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1479.51	V	-36.92	-13.00	Pass
2220.55	V	-36.79		
2960.36	V	-37.54		
3700.07	V	-38.31		
4440.23	V	---		
1479.35	H	-36.38	-13.00	Pass
2219.97	H	-37.16		
2959.61	H	-37.16		
3700.65	H	-38.19		
4440.42	H	---		
Test mode:	LTE Band 17(5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1487.33	V	-36.33	-13.00	Pass
2230.82	V	-37.13		
2973.69	V	-36.77		
3716.76	V	-38.56		
4461.06	V	---		
1486.72	H	-36.32	-13.00	Pass
2230.08	H	-37.37		
2974.12	H	-37.34		
3717.71	H	-38.59		
4460.43	H	---		

Test mode:	LTE Band 38(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5145.35	V	-37.22	-25.00	Pass
7717.17	V	-39.53		
10288.74	V	-37.95		
12863.39	V	-43.06		
15435.15	V	---		
5146.43	H	-39.36	-25.00	Pass
7717.84	H	-42.67		
10291.31	H	-45.01		
12863.35	H	-45.54		
15434.20	H	---		
Test mode:	LTE Band 38(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5190.72	V	-37.17	-25.00	Pass
7785.54	V	-39.63		
10379.39	V	-37.74		
12974.80	V	-43.72		
15569.36	V	---		
5189.85	H	-38.60	-25.00	Pass
7784.43	H	-42.46		
10379.84	H	-44.97		
12974.69	H	-46.30		
15569.92	H	---		
Test mode:	LTE Band 38(5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5234.50	V	-37.01	-25.00	Pass
7852.63	V	-39.63		
10469.88	V	-38.24		
13087.18	V	-43.35		
15705.08	V	---		
5235.14	H	-38.70	-25.00	Pass
7852.40	H	-42.71		
10469.97	H	-44.96		
13088.01	H	-46.33		
15704.75	H	---		

Test mode:	LTE Band 41(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5006.28	V	-36.71	-25.00	Pass
7507.85	V	-39.14		
10008.52	V	-37.55		
12513.51	V	-43.05		
15014.37	V	---		
5004.48	H	-39.01	-25.00	Pass
7507.33	H	-42.58		
10010.58	H	-44.49		
12512.20	H	-45.91		
15014.42	H	---		
Test mode:	LTE Band 41(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5190.12	V	-36.89	-25.00	Pass
7785.44	V	-39.71		
10379.64	V	-38.21		
12975.46	V	-42.93		
15569.63	V	---		
5190.38	H	-39.26	-25.00	Pass
7784.95	H	-42.27		
10380.58	H	-44.66		
12975.58	H	-45.84		
15570.20	H	---		
Test mode:	LTE Band 41(5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5374.82	V	-36.32	-25.00	Pass
8062.80	V	-39.44		
10749.67	V	-38.26		
13437.16	V	-43.67		
16124.60	V	---		
5375.60	H	-39.42	-25.00	Pass
8062.12	H	-42.48		
10750.09	H	-44.80		
13437.44	H	-46.24		
16124.74	H	---		

Remark :

- 1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
- 2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
- 3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

Measurement Data(Worst case):

16 QAM Mode:

Test mode:	LTE Band 2 (1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3860.38	V	-36.61	-13.00	Pass
5793.01	V	-39.02		
7723.42	V	-37.99		
9654.71	V	-42.88		
11585.17	V	---		
3861.30	H	-39.43	-13.00	Pass
5790.69	H	-42.72		
7721.31	H	-44.55		
9652.97	H	-45.68		
11585.49	H	---		
Test mode:	LTE Band 2 (1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3919.61	V	-36.37	-13.00	Pass
5880.12	V	-38.98		
7839.55	V	-38.46		
9799.72	V	-43.63		
11759.77	V	---		
3919.87	H	-39.17	-13.00	Pass
5880.27	H	-42.10		
7839.30	H	-45.34		
9800.04	H	-46.24		
11760.54	H	---		
Test mode:	LTE Band 2 (1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3977.89	V	-36.98	-13.00	Pass
5967.62	V	-39.24		
7956.83	V	-37.91		
9947.08	V	-43.16		
11936.50	V	---		
3978.35	H	-39.57	-13.00	Pass
5967.24	H	-42.12		
7957.34	H	-44.53		
9946.94	H	-46.03		
11935.24	H	---		

Test mode:	LTE Band 4(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4221.23	V	-37.18	-13.00	Pass
6333.42	V	-39.21		
8442.71	V	-37.81		
10553.74	V	-43.16		
12663.62	V	---		
4222.47	H	-39.16	-13.00	Pass
6332.58	H	-42.71		
8444.04	H	-44.48		
10552.11	H	-46.35		
12665.29	H	---		
Test mode:	LTE Band 4(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4265.34	V	-36.56	-13.00	Pass
6398.03	V	-39.29		
8529.34	V	-38.21		
10662.73	V	-42.93		
12795.33	V	---		
4264.90	H	-39.41	-13.00	Pass
6396.94	H	-42.37		
8529.49	H	-44.44		
10662.85	H	-46.08		
12794.43	H	---		
Test mode:	LTE Band 4(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4308.57	V	-37.21	-13.00	Pass
6463.53	V	-39.81		
8617.09	V	-38.22		
10772.21	V	-43.33		
12926.45	V	---		
4308.73	H	-39.11	-13.00	Pass
6463.56	H	-42.43		
8616.83	H	-45.17		
10771.18	H	-46.03		
12925.65	H	---		

Test mode:	LTE Band 5(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1738.72	V	-36.71	-13.00	Pass
2609.23	V	-37.24		
3477.82	V	-36.81		
4347.36	V	-37.91		
5218.50	V	---		
1737.97	H	-37.02	-13.00	Pass
2608.24	H	-37.28		
3478.97	H	-36.67		
4349.24	H	-38.30		
5217.30	H	---		
Test mode:	LTE Band 5(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1763.65	V	-36.91	-13.00	Pass
2645.07	V	-36.91		
3525.68	V	-37.31		
4407.40	V	-38.69		
5288.61	V	---		
1762.33	H	-36.91	-13.00	Pass
2644.95	H	-37.28		
3526.27	H	-36.72		
4407.49	H	-38.20		
5289.36	H	---		
Test mode:	LTE Band 5(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1786.75	V	-36.81	-13.00	Pass
2679.60	V	-36.45		
3573.75	V	-37.18		
4465.99	V	-37.87		
5360.07	V	---		
1787.28	H	-36.42	-13.00	Pass
2679.37	H	-36.55		
3573.82	H	-36.64		
4466.09	H	-38.41		
5359.77	H	---		

Test mode:	LTE Band 7(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5245.55	V	-36.75	-25.00	Pass
7867.15	V	-39.60		
10490.62	V	-37.78		
13113.71	V	-43.00		
15736.21	V	---		
5244.27	H	-38.74	-25.00	Pass
7867.51	H	-42.75		
10489.59	H	-44.58		
13111.43	H	-45.85		
15736.17	H	---		
Test mode:	LTE Band 7(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5309.98	V	-36.86	-25.00	Pass
7964.66	V	-39.47		
10619.37	V	-38.35		
13274.33	V	-43.41		
15929.62	V	---		
5309.37	H	-39.45	-25.00	Pass
7964.99	H	-42.14		
10619.65	H	-45.30		
13275.12	H	-45.75		
15929.61	H	---		
Test mode:	LTE Band 7(5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5375.62	V	-37.01	-25.00	Pass
8062.50	V	-39.42		
10749.38	V	-37.81		
13436.80	V	-43.22		
16124.54	V	---		
5374.30	H	-39.36	-25.00	Pass
8062.50	H	-42.32		
10749.53	H	-44.55		
13437.79	H	-45.66		
16125.34	H	---		

Test mode:	LTE Band 13(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1587.32	V	-47.59	-40.00	Pass
5004.83	V	-35.75	-13.00	Pass
7507.58	V	-35.44		
10009.87	V	-32.40		
12512.18	V	-29.75		
15014.69	V	-38.23		
1587.35	V	-48.03		
5005.06	H	-34.36	-13.00	Pass
7507.27	H	-31.72		
10009.65	H	-30.03		
12512.69	H	-38.90		
15014.61	H	-36.09		
Test mode:	LTE Band 13(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1594.49	V	-48.11	-40.00	Pass
5069.89	V	-36.23	-13.00	Pass
7604.74	V	-34.69		
10139.65	V	-32.63		
12674.92	V	-29.60		
15209.96	V	-38.66		
1594.52	V	-48.33		
5069.70	H	-34.95	-13.00	Pass
7604.60	H	-32.25		
10139.87	H	-30.12		
12675.08	H	-38.82		
15209.61	H	-35.37		
Test mode:	LTE Band 13(5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1579.62	V	-47.51	-40.00	Pass
5135.14	V	-35.44	-13.00	Pass
7702.41	V	-35.26		
10270.09	V	-31.98		
12837.51	V	-29.10		
15405.19	V	-37.74		
1579.58	V	-47.85		
5134.95	H	-34.86	-13.00	Pass
7702.12	H	-32.16		
10270.12	H	-30.58		
12837.64	H	-38.91		
15404.62	H	-35.99		

Test mode:	LTE Band 17(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1473.83	V	-36.64	-13.00	Pass
2209.29	V	-37.28		
2946.67	V	-37.41		
3681.70	V	-37.72		
4417.58	V	---		
1471.84	H	-36.35	-13.00	Pass
2209.22	H	-37.12		
2945.85	H	-37.39		
3681.06	H	-37.72		
4419.92	H	---		
Test mode:	LTE Band 17(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1479.25	V	-36.19	-13.00	Pass
2220.33	V	-36.54		
2959.99	V	-37.34		
3700.15	V	-38.31		
4440.42	V	---		
1479.32	H	-36.89	-13.00	Pass
2220.40	H	-37.29		
2959.62	H	-36.85		
3700.62	H	-38.68		
4439.28	H	---		
Test mode:	LTE Band 17(5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1487.11	V	-36.50	-13.00	Pass
2231.02	V	-36.96		
2974.45	V	-37.44		
3717.20	V	-38.39		
4460.81	V	---		
1486.31	H	-36.48	-13.00	Pass
2230.92	H	-36.47		
2974.05	H	-37.07		
3717.73	H	-38.40		
4460.65	H	---		

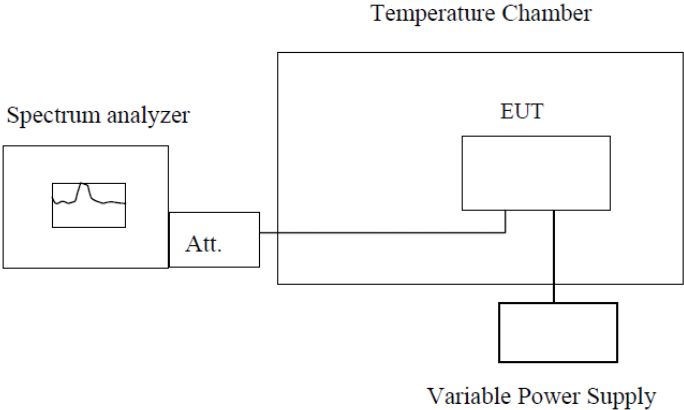
Test mode:	LTE Band 38 (5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5144.84	V	-36.97	-25.00	Pass
7717.88	V	-39.62		
10289.98	V	-38.13		
12863.27	V	-43.50		
15434.80	V	---		
5146.37	H	-39.38	-25.00	Pass
7716.79	H	-42.33		
10290.79	H	-45.25		
12862.31	H	-46.42		
15436.44	H	---		
Test mode:	LTE Band 38 (5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5189.27	V	-37.28	-25.00	Pass
7784.87	V	-39.46		
10380.61	V	-38.08		
12974.99	V	-43.06		
15569.95	V	---		
5189.58	H	-39.36	-25.00	Pass
7784.41	H	-42.92		
10379.35	H	-44.69		
12975.39	H	-45.90		
15570.21	H	---		
Test mode:	LTE Band 38 (5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5235.17	V	-37.08	-25.00	Pass
7851.77	V	-39.63		
10469.58	V	-38.36		
13088.19	V	-43.58		
15704.74	V	---		
5235.26	H	-39.12	-25.00	Pass
7852.08	H	-42.55		
10470.22	H	-44.81		
13087.17	H	-46.22		
15704.38	H	---		

Test mode:	LTE Band 41 (5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5004.75	V	-36.51	-25.00	Pass
7506.05	V	-39.86		
10009.26	V	-38.36		
12513.43	V	-43.42		
15014.55	V	---		
5005.24	H	-38.72	-25.00	Pass
7507.15	H	-43.05		
10011.44	H	-44.65		
12513.40	H	-46.26		
15013.99	H	---		
Test mode:	LTE Band 41 (5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5190.27	V	-36.35	-25.00	Pass
7785.51	V	-39.44		
10380.24	V	-37.81		
12974.65	V	-43.81		
15570.60	V	---		
5189.27	H	-39.12	-25.00	Pass
7785.13	H	-42.92		
10379.41	H	-44.86		
12975.62	H	-45.61		
15569.79	H	---		
Test mode:	LTE Band 41 (5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
5375.15	V	-36.37	-25.00	Pass
8061.83	V	-39.28		
10750.71	V	-37.87		
13438.10	V	-43.51		
16125.62	V	---		
5375.75	H	-39.29	-25.00	Pass
8062.87	H	-42.26		
10749.53	H	-45.04		
13437.49	H	-46.47		
16124.49	H	---		

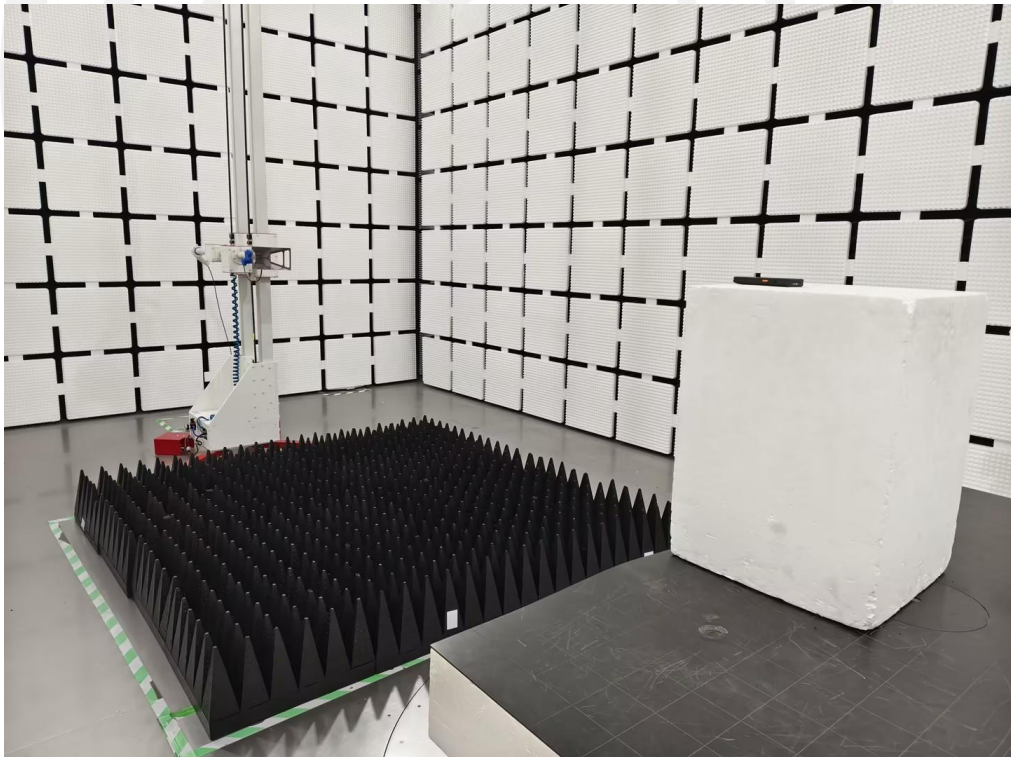
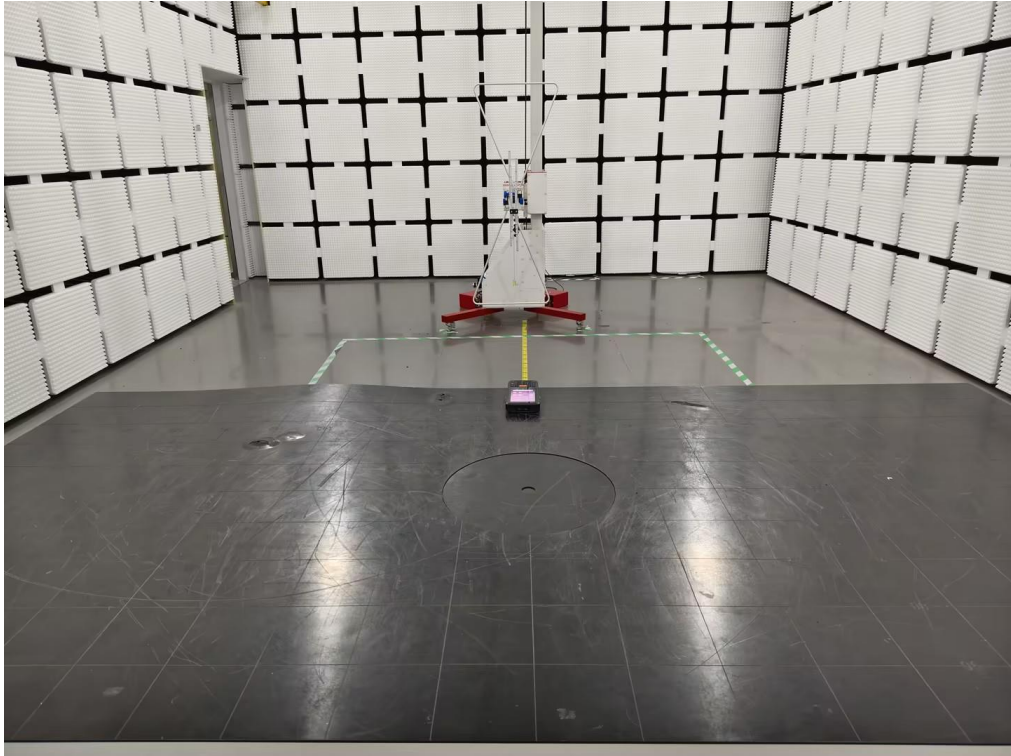
Remark :

- 1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
- 2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
- 3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

4.9 Frequency stability

Test Requirement:	FCC Part 2.1055(a)(1)(b), FCC Part2.1055(d)(1)(2), FCC Part 27.54
Test Method:	ANSI C63.26:2015
Limit:	2.5ppm(Part 22) Within the authorized bands of operation(Part 24, Part 27)
Test setup:	 <p style="text-align: center;">Temperature Chamber</p> <p style="text-align: center;">Spectrum analyzer</p> <p style="text-align: center;">Att.</p> <p style="text-align: center;">EUT</p> <p style="text-align: center;">Variable Power Supply</p> <p>Note : Measurement setup for testing on Antenna connector</p>
Test procedure:	<ol style="list-style-type: none"> 1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass (Please refer to ANNEX for the test results)

4.10 Photos of test setup



-----End-----