



# FCC REPORT

Report Reference No.....	<b>CHTEW19110022</b>	Report verification: <input checked="" type="checkbox"/>
Project No.....	<b>SHT1908014005EW</b>	
FCC ID .....	<b>2ATTZ-SUNBEAM-F1</b>	Report No: CHTEW19110022
Applicant's name .....	<b>Basic,Inc.</b>	
Address.....	17688 County Road 558,Memphis,Missouri,United States	
Manufacturer.....	Basic,Inc.	
Address.....	17688 County Road 558,Memphis,Missouri,United States	
Test item description .....	<b>Basic Feature Phone</b>	
Trade Mark .....	Sunbeam	
Model/Type reference.....	F1	
Listed Model(s) .....	-	
Standard .....	<b>FCC CFR Title 47 Part 2</b> <b>FCC CFR Title 47 Part 22</b> <b>FCC CFR Title 47 Part 24</b> <b>FCC CFR Title 47 Part 27</b>	
Date of receipt of test sample.....	Oct 11, 2019	
Date of testing.....	Oct 12, 2019- Nov 04, 2019	
Date of issue.....	Nov 05, 2019	
Result.....	<b>Pass</b>	
Compiled by ( position+printedname+signature)....	File administrators Silvia Li	
Supervised by (position+printedname+signature)....	Project Engineer Aaron Fang	
Approved by (position+printedname+signature)....	Manager Hans Hu	
Testing Laboratory Name .....	<b>Shenzhen Huatongwei International Inspection Co., Ltd.</b>	
Address.....	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
<b>Shenzhen Huatongwei International Inspection Co., Ltd. All rights reserved.</b>		
This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Huatongwei International Inspection Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Huatongwei International Inspection Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.		
The test report merely correspond to the test sample.		

## Contents

<b><u>1. TEST STANDARDS AND REPORT VERSION</u></b>	<b>3</b>
1.1. Applicable Standards	3
1.2. Report version information	3
<b><u>2. TEST DESCRIPTION</u></b>	<b>4</b>
<b><u>3. SUMMARY</u></b>	<b>5</b>
3.1. Client Information	5
3.2. Product Description	5
3.3. Operation state	7
3.4. EUT operation mode	8
3.5. EUT configuration	9
3.6. Modifications	9
<b><u>4. TEST ENVIRONMENT</u></b>	<b>10</b>
4.1. Address of the test laboratory	10
4.2. Test Facility	10
4.3. Equipments Used during the Test	11
4.4. Environmental conditions	12
4.5. Statement of the measurement uncertainty	12
<b><u>5. TEST CONDITIONS AND RESULTS</u></b>	<b>13</b>
5.1. Conducted Output Power	13
5.2. Peak-to-Average Ratio	14
5.3. 99% Occupied Bandwidth & 26 dB Bandwidth	15
5.4. Band Edge	16
5.5. Conducted Spurious Emissions	17
5.6. Frequency stability VS Temperature measurement	18
5.7. Frequency stability VS Voltage measurement	19
5.8. ERP and EIRP	20
5.9. Radiated Spurious Emission	29
<b><u>6. TEST SETUP PHOTOS OF THE EUT</u></b>	<b>46</b>
<b><u>7. EXTERNAL AND INTERNAL PHOTOS OF THE EUT</u></b>	<b>46</b>
<b><u>8. APPENDIX REPORT</u></b>	<b>46</b>

## 1. **TEST STANDARDS AND REPORT VERSION**

### 1.1. **Applicable Standards**

The tests were performed according to following standards:

[FCC Rules Part 2](#): FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[FCC Rules Part 22](#): PUBLIC MOBILE SERVICES

[FCC Rules Part 24](#): PERSONAL COMMUNICATIONS SERVICES

[FCC Rules Part 27](#): MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

[ANSI C63.26: 2015](#): American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

[KDB 971168 D01 Power Meas License Digital Systems v03](#): MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

### 1.2. **Report version information**

Revision No.	Date of issue	Description
N/A	2019-11-05	Original

## 2. Test Description

Test Item	Section in CFR 47	Result	Test Engineer
Conducted Output Power	Part 2.1046 Part 22.913(a) Part 24.232(c) Part 27.50	Pass	Jiongsheng Feng
Peak-to-Average Ratio	Part 24.232 Part 27.50	Pass	Jiongsheng Feng
99% Occupied Bandwidth & 26 dB Bandwidth	Part 2.1049 Part 22.917(b) Part 24.238(b) Part 27.53	Pass	Jiongsheng Feng
Band Edge	Part 2.1051 Part 22.917 Part 24.238 Part 27.53	Pass	Jiongsheng Feng
Conducted Spurious Emissions	Part 2.1051 Part 22.917 Part 24.238 Part 27.53	Pass	Jiongsheng Feng
Frequency stability VS Temperature	Part 2.1055(a)(1)(b) Part 22.355 Part 24.235 Part 27.54	Pass	Jiongsheng Feng
Frequency stability VS Voltage	Part 2.1055(d)(1)(2) Part 22.355 Part 24.235 Part 27.54	Pass	Jiongsheng Feng
ERP and EIRP	Part 22.913(a) Part 24.232(b) Part 27.50	Pass	Pan Xie
Radiated Spurious Emissions	Part 2.1053 Part 22.917 Part 24.238 Part 27.53	Pass	Pan Xie

Note: The measurement uncertainty is not included in the test result.

### 3. SUMMARY

#### 3.1. Client Information

Applicant:	Basic,Inc.
Address:	17688 County Road 558,Memphis,Missouri,United States
Manufacturer:	Basic,Inc.
Address:	17688 County Road 558,Memphis,Missouri,United States

#### 3.2. Product Description

Name of EUT:	Basic Feature Phone
Trade Mark:	Sunbeam
Model No.:	F1
Listed Model(s):	-
IMEI Code:	Conducted: 359863101000287 Radiated: 359863101000163
SIM Information:	Support One SIM Card
Power supply:	DC 3.7V
Adapter information:	Model:XH005W050100USCD Input: 100-240V a.c., 50/60Hz, 0.2A Output: 5.0V d.c., 1.0A
Hardware version:	QS3912_MAINPCB_V1.0
Software version:	Sunbeam_F1V_V1.0

#### 4G

Operation Band:	<input checked="" type="checkbox"/> FDD Band 2 <input checked="" type="checkbox"/> FDD Band 12	<input checked="" type="checkbox"/> FDD Band 4 <input checked="" type="checkbox"/> FDD Band 13	<input checked="" type="checkbox"/> FDD Band 5
Transmit frequency:	FDD Band 2: FDD Band 4: FDD Band 5: FDD Band 12: FDD Band 13:	1850.7 MHz – 1909.3 MHz 1710.7 MHz – 1754.3 MHz 824.7 MHz – 848.3 MHz 699.7 MHz – 715.3 MHz 779.5 MHz – 784.5 MHz	
Receive frequency:	FDD Band 2: FDD Band 4: FDD Band 5: FDD Band 12: FDD Band 13:	1930.7 MHz – 1989.3 MHz 2110.7 MHz – 2154.3 MHz 869.7 MHz – 893.3 MHz 729.7 MHz – 745.3 MHz 748.5 MHz – 753.5 MHz	
Channel bandwidth:	FDD Band 2: FDD Band 4: FDD Band 5: FDD Band 12: FDD Band 13:	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz 1.4MHz, 3MHz, 5MHz, 10MHz 1.4MHz, 3MHz, 5MHz, 10MHz 5MHz, 10MHz	
Power Class:	Class 3		

Modulation type:	QPSK, 16QAM
Antenna type	FPC Antenna
Antenna Gain	Band2:1.50dBi Band4:1.00dBi Band5:-0.30dBi Band12:0.53dBi Band13:0.11dBi

### 3.3. Operation state

#### ➤ Test frequency list

FDD Band 2	Test Frequency ID	Bandwidth [MHz]	N <sub>UL</sub>	Frequency of Uplink [MHz]	N <sub>DL</sub>	Frequency of Downlink [MHz]
	1.4	18607	1850.7	607	1930.7	
	3	18615	1851.5	615	1931.5	
	5	18625	1852.5	625	1932.5	
	10	18650	1855	650	1935	
	15 <sup>[1]</sup>	18675	1857.5	675	1937.5	
	20 <sup>[1]</sup>	18700	1860	700	1940	
	1.4/3/5/10/15 <sup>[1]</sup> /20 <sup>[1]</sup>	18900	1880	900	1960	
	1.4	19193	1909.3	1193	1989.3	
FDD Band 4	3	19185	1908.5	1185	1988.5	
	5	19175	1907.5	1175	1987.5	
	10	19150	1905	1150	1985	
	15 <sup>[1]</sup>	19125	1902.5	1125	1982.5	
	20 <sup>[1]</sup>	19100	1900	1100	1980	
	NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.					
	Test Frequency ID	Bandwidth [MHz]	N <sub>UL</sub>	Frequency of Uplink [MHz]	N <sub>DL</sub>	Frequency of Downlink [MHz]
	1.4	19957	1710.7	1957	2110.7	
	3	19965	1711.5	1965	2111.5	
FDD Band 5	5	19975	1712.5	1975	2112.5	
	10	20000	1715	2000	2115	
	15	20025	1717.5	2025	2117.5	
	20	20050	1720	2050	2120	
	1.4/3/5/10/15/20	20175	1732.5	2175	2132.5	
	1.4	20393	1754.3	2393	2154.3	
	3	20385	1753.5	2385	2153.5	
	5	20375	1752.5	2375	2152.5	
	10	20350	1750	2350	2150	
	15	20325	1747.5	2325	2147.5	
	20	20300	1745	2300	2145	
FDD Band 12	Test Frequency ID	Bandwidth [MHz]	N <sub>UL</sub>	Frequency of Uplink [MHz]	N <sub>DL</sub>	Frequency of Downlink [MHz]
	1.4	20407	824.7	2407	869.7	
	3	20415	825.5	2415	870.5	
	5	20425	826.5	2425	871.5	
	10 <sup>[1]</sup>	20450	829	2450	874	
	1.4/3/5 <sup>[1]</sup>	20525	836.5	2525	881.5	
	1.4	20643	848.3	2643	893.3	
	3	20635	847.5	2635	892.5	
	5	20625	846.5	2625	891.5	
	10 <sup>[1]</sup>	20600	844	2600	889	
FDD Band 13	NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.					
	Test Frequency ID	Bandwidth [MHz]	N <sub>UL</sub>	Frequency of Uplink [MHz]	N <sub>DL</sub>	Frequency of Downlink [MHz]
	Low Range	5 <sup>[1]</sup>	23205	779.5	5205	748.5
		10 <sup>[1]</sup>	23230	782	5230	751
	Mid Range	5 <sup>[1]</sup> /10 <sup>[1]</sup>	23230	782	5230	751
		5 <sup>[1]</sup>	23255	784.5	5255	753.5
		10 <sup>[1]</sup>	23230	782	5230	751
	NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.					

### 3.4. EUT operation mode

For RF test items												
The EUT has been tested under typical operating condition. Testing was performed by configuring EUT to maximum output power status.												

Test Items	Band	Bandwidth (MHz)						Modulation		RB #		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full
Conducted Output Power	2	○	○	○	○	○	○	○	○	○	○	○
	4	○	○	○	○	○	○	○	○	○	○	○
	5	○	○	○	○	-	-	○	○	○	○	○
	12	○	○	○	○	-	-	○	○	○	○	○
	13	-	-	○	○	-	-	○	○	○	○	○
Peak-to-Average Ratio	2	○	○	○	○	○	○	○	○	○	-	○
	4	○	○	○	○	○	○	○	○	○	-	○
	5	○	○	○	○	-	-	○	○	○	-	○
	12	○	○	○	○	-	-	○	○	○	-	○
	13	-	-	○	○	-	-	○	○	○	-	○
99% Occupied Bandwidth & 26 dB Bandwidth	2	○	○	○	○	○	○	○	○	-	-	○
	4	○	○	○	○	○	○	○	○	-	-	○
	5	○	○	○	○	-	-	○	○	-	-	○
	12	○	○	○	○	-	-	○	○	○	-	○
	13	-	-	○	○	-	-	○	○	-	-	○
Band Edge	2	○	○	○	○	○	○	○	○	○	-	○
	4	○	○	○	○	○	○	○	○	○	-	○
	5	○	○	○	○	-	-	○	○	○	-	○
	12	○	○	○	○	-	-	○	○	○	-	○
	13	-	-	○	○	-	-	○	○	○	-	○
Conducted Spurious Emission	2	○	○	○	○	○	○	○	○	○	-	-
	4	○	○	○	○	○	○	○	○	○	-	-
	5	○	○	○	○	-	-	○	○	○	-	-
	12	○	○	○	○	-	-	○	○	○	-	-
	13	-	-	○	○	-	-	○	○	○	-	-
Frequency Stability	2	○	○	○	○	○	○	○	○	-	-	○
	4	○	○	○	○	○	○	○	○	-	-	○
	5	○	○	○	○	-	-	○	○	-	-	○
	12	○	○	○	○	-	-	○	○	-	-	○
	13	-	-	○	○	-	-	○	○	-	-	○
ERP and EIRP	2	○	○	○	○	○	○	○	○	○	-	-
	4	○	○	○	○	○	○	○	○	○	-	-
	5	○	○	○	○	-	-	○	○	○	-	-
	12	○	○	○	○	-	-	○	○	○	-	-
	13	-	-	○	○	-	-	○	○	○	-	-
Radiated Spurious Emission	2	○	○	○	○	○	○	○	-	○	-	-
	4	○	○	○	○	○	○	○	-	○	-	-
	5	○	○	○	○	-	-	○	-	○	-	-
	12	○	○	○	○	-	-	○	○	○	-	-
	13	-	-	○	○	-	-	○	-	○	-	-
Remark	1. The mark “○” means that this configuration is chosen for testing 2. The mark “-” means that this bandwidth is not test. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.											

### 3.5. EUT configuration

**The following peripheral devices and interface cables were connected during the measurement:**

- - supplied by the manufacturer
- - supplied by the lab

○	/	Manufacturer:	/
		Model No.:	/
○	/	Manufacturer:	/
		Model No.:	/

### 3.6. Modifications

No modifications were implemented to meet testing criteria.

## 4. **TEST ENVIRONMENT**

### 4.1. **Address of the test laboratory**

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

### 4.2. **Test Facility**

#### **CNAS-Lab Code: L1225**

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### **A2LA-Lab Cert. No.: 3902.01**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

#### **FCC-Registration No.: 762235**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files.

#### **IC-Registration No.:5377A**

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No.: 5377A.

#### **ACA**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

### 4.3. Equipments Used during the Test

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal and spectrum Analyzer	R&S	HTWE0242	FSV40	100048	2019/10/26	2020/10/25
●	Spectrum Analyzer	Agilent	HTWE0286	N9020A	MY50510187	2019/10/26	2020/10/25
●	Radio communication tester	R&S	HTWE0287	CMW500	137688-Lv	2019/10/26	2020/10/25
●	Test software	Tonscend	N/A	JS1120	N/A	N/A	N/A

#### ● Radiated Spurious Emission

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	N/A	2018/09/27	2021/09/26
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2019/10/26	2020/10/25
●	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2018/04/02	2021/04/01
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0123	VULB9163	538	2018/04/04	2021/04/03
●	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2017/04/01	2020/03/31
●	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2018/11/14	2019/11/13
●	Broadband Preamplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2019/05/23	2020/05/22
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2019/05/10	2020/5/09
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2019/05/10	2020/5/09
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-03	6m 3GHz RG Serisa	N/A	2019/05/10	2020/5/09
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2019/05/10	2020/5/09
●	RF Connection Cable	HUBER+SUHNER	HTWE0121-01	6m 18GHz S Serisa	N/A	2019/05/10	2020/5/09
●	EMI Test Software	Audix		E3	N/A	N/A	N/A

#### 4.4. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Voltage	VN=Nominal Voltage	DC 3.70V
	VL=Lower Voltage	DC 3.60V
	VH=Higher Voltage	DC 4.20V
Temperature	TN=Normal Temperature	25 °C
	Extreme Temperature	From -30° to + 50° centigrade
Humidity	30~60 %	
Air Pressure	950-1050 hPa	

#### 4.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.51 dB	(1)
Transmitter power Radiated	2.66dB for <1GHz 3.44dB for >1GHz	(1)
Conducted spurious emissions 9kHz~40GHz	0.51 dB	(1)
Radiated spurious emissions	2.66dB for <1GHz 3.44dB for >1GHz	(1)
Occupied Bandwidth	15Hz for <1GHz 70Hz for >1GHz	(1)
Frequency error	15Hz for <1GHz 70Hz for >1GHz	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=1.96$ .

## 5. **TEST CONDITIONS AND RESULTS**

### 5.1. Conducted Output Power

#### LIMIT

N/A

#### TEST CONFIGURATION



Communication Tester

#### TEST PROCEDURE

1. The EUT output port was connected to communication tester.
2. Set EUT at maximum power through communication tester.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power.

#### TEST MODE:

Please refer to the clause 3.3

#### TEST RESULTS

Passed       Not Applicable

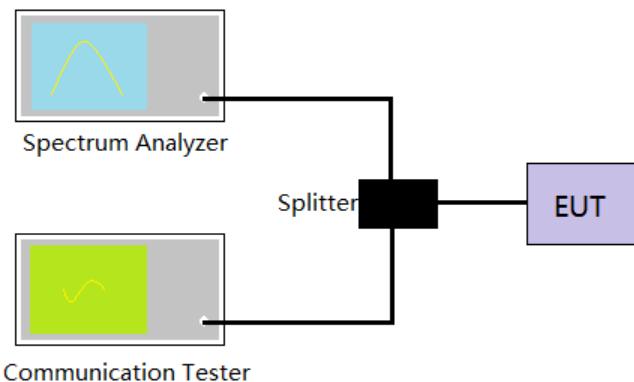
Refer to appendix A on the section 8 appendix report

## 5.2. Peak-to-Average Ratio

### LIMIT

13dB

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter
2. Set EUT in maximum power output.
3. Center Frequency = Carrier frequency, RBW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed.
  - i. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.
  - ii. For burst transmissions, the spectrum analyzer is set to use an internal “RF Burst” trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the “on time” of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power
6. Record the maximum PAPR level associated with a probability of 0.1%.

### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

Passed       Not Applicable

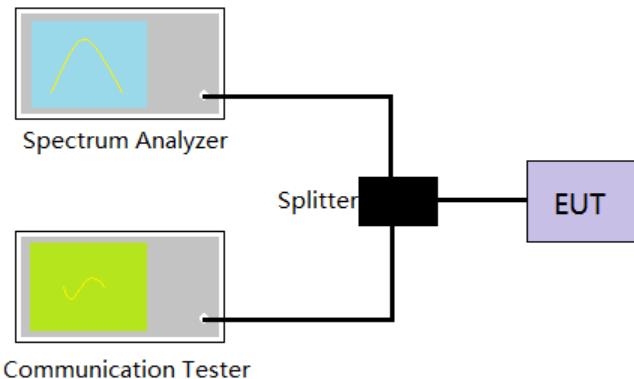
Refer to appendix B on the section 8 appendix report

### 5.3. 99% Occupied Bandwidth & 26 dB Bandwidth

#### LIMIT

N/A

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter
2. Set EUT in maximum power output.
3. Spectrum analyzer setting as follow:  
Center Frequency= Carrier frequency, RBW=1% to 5% of the anticipated OBW, VBW= 3 \* RBW, Detector=Peak,  
Trace maximum hold.
4. Record the value of 99% Occupied bandwidth and 26dB bandwidth.

#### TEST MODE:

Please refer to the clause 3.3

#### TEST RESULTS

Passed       Not Applicable

Refer to appendix C on the section 8 appendix report

## 5.4. Band Edge

### LIMIT

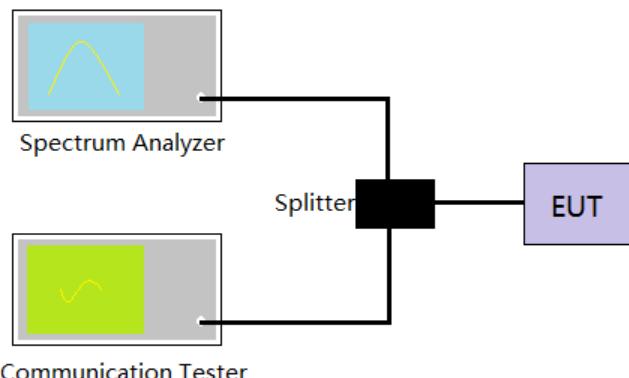
Part 24.238 and Part 22.917 and Part 27.53 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

### LTE Band 7

Part 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.

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter
2. Set EUT in maximum power output.
3. The band edges of low and high channels were measured.
4. Spectrum analyzer setting as follow:  
RBW= no less than 1% of the OBW, VBW =3 \* RBW, Sweep time= Auto
5. Record the test plot.

### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

Passed       Not Applicable

Refer to appendix D on the section 8 appendix report

## 5.5. Conducted Spurious Emissions

### LIMIT

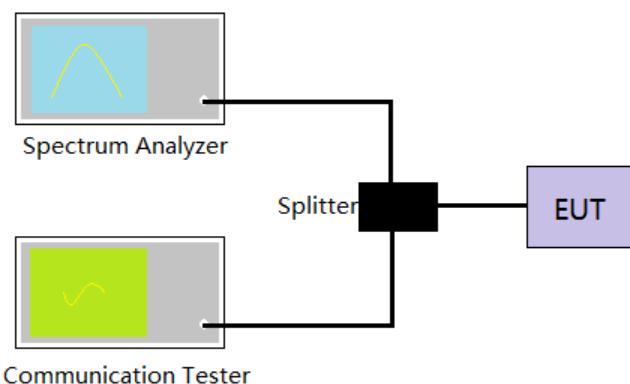
Part 24.238 and Part 22.917 and Part 27.53 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

### LTE Band 7

Part 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 than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Limit <-25 dBm

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT was connected to the spectrum analyzer and communication tester via a power splitter
2. Set EUT in maximum power output.
3. Spectrum analyzer setting as follow:
  - Below 1GHz, RBW=100KHz, VBW = 300KHz, Detector=Peak, Sweep time= Auto
  - Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peak, Sweep time= Auto
  - Scan frequency range up to 10<sup>th</sup> harmonic.
4. Record the test plot.

### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

Passed       Not Applicable

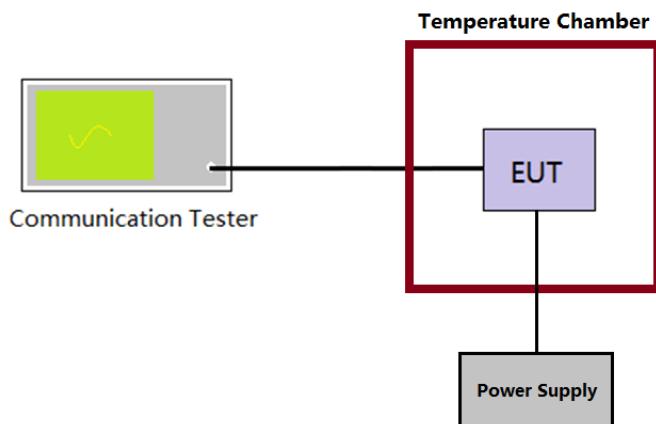
Refer to appendix E on the section 8 appendix report

## 5.6. Frequency stability VS Temperature measurement

### LIMIT

2.5ppm

### TEST CONFIGURATION



### TEST PROCEDURE

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. The EUT output port was connected to communication tester.
3. The EUT was placed inside the temperature chamber.
4. Turn EUT off and set the chamber temperature to  $-30^{\circ}\text{C}$ . After the temperature stabilized for approximately 30 minutes recorded the frequency.
5. Repeat step 4 measure with  $10^{\circ}\text{C}$  increased per stage until the highest temperature of  $+50^{\circ}\text{C}$  reached.

### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

Passed       Not Applicable

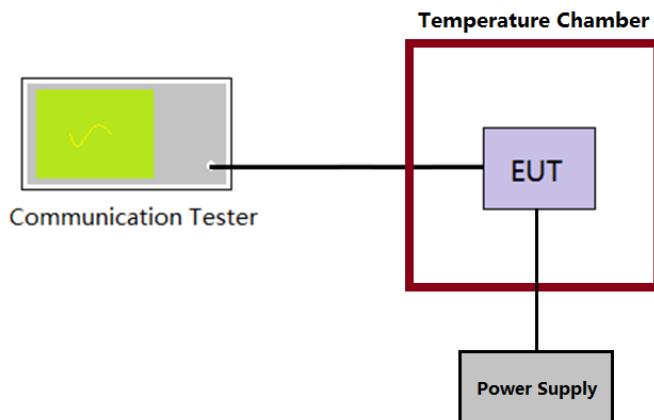
Refer to appendix F on the section 8 appendix report

## 5.7. Frequency stability VS Voltage measurement

### LIMIT

2.5ppm

### TEST CONFIGURATION



### TEST PROCEDURE

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. The EUT output port was connected to communication tester.
3. The EUT was placed inside the temperature chamber at 25°C
4. The power supply voltage to the EUT was varied  $\pm 15\%$  of the nominal value measured at the input to the EUT
5. Record the maximum frequency change.

### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

Passed       Not Applicable

Refer to appendix F on the section 8 appendix report

## 5.8. ERP and EIRP

### LIMIT

LTE Band 2: 2W(33dBm) EIRP

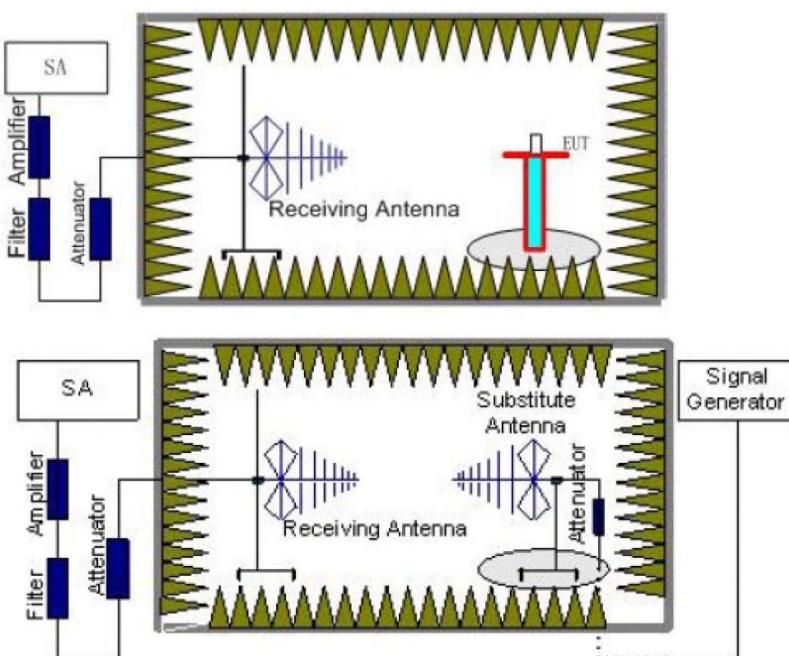
LTE Band 4: 1W(30dBm) EIRP

LTE Band 5: 7W(38.50dBm) ERP

LTE Band 12: 3W(34.77dBm) ERP

LTE Band 13: 30W(44.77dBm) ERP

### TEST CONFIGURATION



### TEST PROCEDURE

1. Place the EUT in the center of the turntable.
  - a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
  - b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
2. Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.
3. The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
4. Receiver or Spectrum set as follow:
 

Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto

Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peck, Sweep time=Auto
5. Each emission under consideration shall be evaluated:
  - a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
  - b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.

- c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
- d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
- e) Record the measured emission amplitude level and frequency

6. Repeat step 5 for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.

7. Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.

8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.

9. Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.

10. For each emission that was detected and measured in the initial test

- a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
- b) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step 5 and step 6.
- c) Record the output power level of the signal generator when equivalence is achieved in step b).

11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.

12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

$$Pe = Ps(dBm) - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

where

Pe = equivalent emission power in dBm

Ps = source (signal generator) power in dBm

*NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.*

13. Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from:

$$\text{gain (dBd)} = \text{gain (dBi)} - 2.15 \text{ dB}$$

If necessary, the antenna gain can be calculated from calibrated antenna factor information

14. Provide the complete measurement results as a part of the test report.

**TEST MODE:**

Please refer to the clause 3.3

**TEST RESULTS**

Passed       Not Applicable

LTE Band 2-1.4MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	20.51	18.08	≤33.00	PASS
	Mid	20.70	18.03		
	High	20.35	18.04		
16QAM	Low	20.09	17.71	≤33.00	PASS
	Mid	20.29	17.70		
	High	19.93	17.73		

LTE Band 2-3MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	20.46	17.98	≤33.00	PASS
	Mid	20.67	18.02		
	High	20.30	18.00		
16QAM	Low	20.23	17.85	≤33.00	PASS
	Mid	20.37	17.77		
	High	19.93	17.76		

LTE Band 2-5MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	20.68	18.20	≤33.00	PASS
	Mid	20.87	18.13		
	High	20.56	18.15		
16QAM	Low	20.28	17.82	≤33.00	PASS
	Mid	20.46	17.80		
	High	20.09	17.82		

LTE Band 2-10MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	20.68	18.22	≤33.00	PASS
	Mid	20.86	18.15		
	High	20.55	18.19		
16QAM	Low	20.28	17.85	≤33.00	PASS
	Mid	20.45	17.84		
	High	20.08	17.85		

LTE Band 2-15MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	20.60	18.10	≤33.00	PASS
	Mid	20.81	18.12		
	High	20.47	18.13		
16QAM	Low	20.39	17.97	≤33.00	PASS
	Mid	20.51	17.90		
	High	20.06	17.87		

LTE Band 2-20MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	20.64	18.13	≤33.00	PASS
	Mid	20.87	18.17		
	High	20.53	18.17		
16QAM	Low	20.45	18.05	≤33.00	PASS
	Mid	20.56	17.93		
	High	20.10	17.89		

LTE Band 4-1.4MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.58	19.95	≤30.00	PASS
	Mid	21.86	20.19		
	High	21.76	19.90		
16QAM	Low	21.03	19.54	≤30.00	PASS
	Mid	21.28	19.79		
	High	21.16	19.53		

LTE Band 4-3MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.69	19.95	≤30.00	PASS
	Mid	21.84	20.13		
	High	21.69	19.86		
16QAM	Low	21.10	19.65	≤30.00	PASS
	Mid	21.34	19.66		
	High	21.24	19.58		

LTE Band 4-5MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.83	20.08	≤30.00	PASS
	Mid	22.07	20.32		
	High	21.96	20.04		
16QAM	Low	21.22	19.63	≤30.00	PASS
	Mid	21.45	20.01		
	High	21.30	19.60		

LTE Band 4-10MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.72	20.04	≤30.00	PASS
	Mid	21.98	20.28		
	High	21.87	19.99		
16QAM	Low	21.14	19.61	≤30.00	PASS
	Mid	21.38	19.85		
	High	21.24	19.58		

LTE Band 4-15MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.84	20.03	≤30.00	PASS
	Mid	21.96	20.21		
	High	21.81	19.94		
16QAM	Low	21.21	19.71	≤30.00	PASS
	Mid	21.44	19.79		
	High	21.32	19.62		

LTE Band 4-20MHz					
Modulation	Channel	EIRP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.86	20.04	≤30.00	PASS
	Mid	22.02	20.23		
	High	21.86	19.95		
16QAM	Low	21.21	19.72	≤30.00	PASS
	Mid	21.50	19.78		
	High	21.38	19.66		

LTE Band 5-1.4MHz					
Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.68	20.25	≤38.50	PASS
	Mid	21.70	20.56		
	High	21.68	20.44		
16QAM	Low	21.29	19.86	≤38.50	PASS
	Mid	21.25	20.21		
	High	21.26	20.05		

LTE Band 5-3MHz					
Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.93	20.14	≤38.50	PASS
	Mid	21.81	20.44		
	High	21.67	20.28		
16QAM	Low	21.31	20.00	≤38.50	PASS
	Mid	21.28	20.16		
	High	21.28	20.01		

LTE Band 5-5MHz					
Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.84	20.20	≤38.50	PASS
	Mid	21.75	20.50		
	High	21.61	20.31		
16QAM	Low	21.42	20.01	≤38.50	PASS
	Mid	21.34	20.31		
	High	21.32	20.17		

LTE Band 5-10MHz					
Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.82	20.21	≤38.50	PASS
	Mid	21.73	20.51		
	High	21.61	20.32		
16QAM	Low	21.39	19.91	≤38.50	PASS
	Mid	21.36	20.27		
	High	21.37	20.11		

LTE Band 12-1.4MHz					
Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.35	19.71	≤34.77	PASS
	Mid	21.47	19.88		
	High	21.42	19.72		
16QAM	Low	20.98	19.53	≤34.77	PASS
	Mid	21.13	19.69		
	High	21.11	19.55		

LTE Band 12-3MHz					
Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.30	19.71	≤34.77	PASS
	Mid	21.44	19.89		
	High	21.34	19.69		
16QAM	Low	21.05	19.57	≤34.77	PASS
	Mid	21.13	19.73		
	High	21.11	19.57		

LTE Band 12-5MHz					
Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.20	19.65	≤34.77	PASS
	Mid	21.32	19.81		
	High	21.29	19.66		
16QAM	Low	21.09	19.60	≤34.77	PASS
	Mid	21.22	19.77		
	High	21.19	19.62		

LTE Band 12-10MHz					
Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.29	19.69	≤34.77	PASS
	Mid	21.43	19.86		
	High	21.34	19.68		
16QAM	Low	21.07	19.57	≤34.77	PASS
	Mid	21.27	19.75		
	High	21.24	19.61		

LTE Band 13-5MHz					
Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Low	21.19	19.58	<44.77	PASS
	Mid	21.66	19.55		
	High	21.42	19.55		
16QAM	Low	21.04	19.51	<44.77	PASS
	Mid	21.47	19.49		
	High	21.26	19.51		

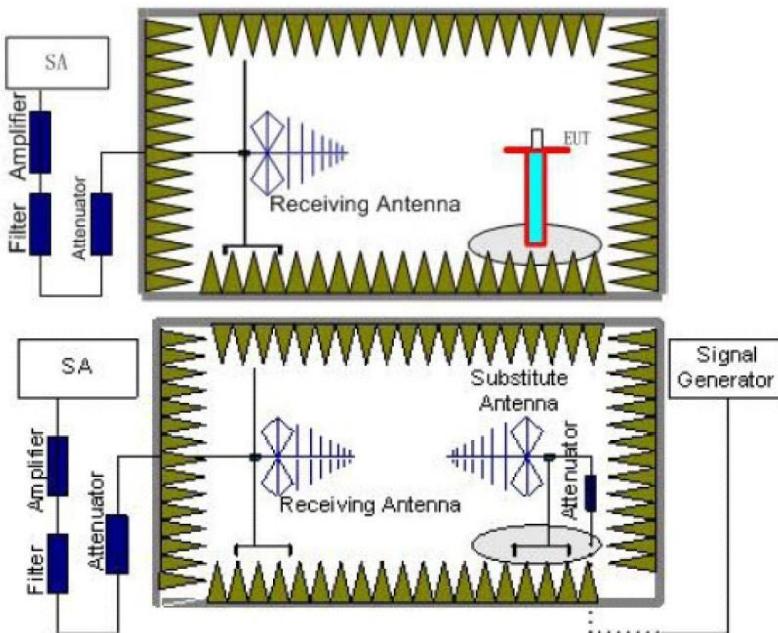
LTE Band 13-10MHz					
Modulation	Channel	ERP (dBm)		Limit (dBm)	Result
		Vertical	Horizontal		
QPSK	Mid	21.19	19.54	<44.77	PASS
16QAM	Mid	21.58	19.51		PASS

## 5.9. Radiated Spurious Emission

### LIMIT

LTE Band 2/4/5/12/13: -13dBm;

### TEST CONFIGURATION



### TEST PROCEDURE

1. Place the EUT in the center of the turntable.
  - a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
  - b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
2. Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.
3. The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
4. Receiver or Spectrum set as follow:
 

Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto

Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peak, Sweep time=Auto
5. Each emission under consideration shall be evaluated:
  - a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
  - b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
  - c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
  - d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
  - e) Record the measured emission amplitude level and frequency
6. Repeat step 5 for each emission frequency with the measurement antenna oriented in both the horizontal

and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.

7. Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.
8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
9. Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.
10. For each emission that was detected and measured in the initial test
  - a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
  - b) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step 5 and step 6.
  - c) Record the output power level of the signal generator when equivalence is achieved in step b).
11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.
12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:
$$Pe = Ps(dBm) - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$
where  
 $Pe$  = equivalent emission power in dBm  
 $Ps$  = source (signal generator) power in dBm  
*NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.*
13. Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from:
$$\text{gain (dBd)} = \text{gain (dBi)} - 2.15 \text{ dB}.$$
If necessary, the antenna gain can be calculated from calibrated antenna factor information
14. Provide the complete measurement results as a part of the test report.

**TEST MODE:**

Please refer to the clause 3.3

**TEST RESULTS**

Passed

Not Applicable

LTE Band 2-1.4MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3701.40	Vertical	-36.18	≤-13.00	Pass
	5552.10	V	-39.95		
	7402.80	V	-40.83		
	3701.40	Horizontal	-36.96	≤-13.00	Pass
	5552.10	H	-40.68		
	7402.80	H	-41.45		
Mid	3760.00	Vertical	-35.59	≤-13.00	Pass
	5640.00	V	-39.40		
	7520.00	V	-40.31		
	3760.00	Horizontal	-36.25	≤-13.00	Pass
	5640.00	H	-40.10		
	7520.00	H	-40.90		
High	3818.60	Vertical	-34.59	≤-13.00	Pass
	5727.90	V	-38.49		
	7637.20	V	-39.45		
	3818.60	Horizontal	-35.90	≤-13.00	Pass
	5727.90	H	-39.77		
	7637.20	H	-40.62		

LTE Band 2-3MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3703.00	Vertical	-33.95	≤-13.00	Pass
	5554.50	V	-36.66		
	7406.00	V	-38.12		
	3703.00	Horizontal	-34.32	≤-13.00	Pass
	5554.50	H	-37.90		
	7406.00	H	-39.64		
Mid	3760.00	Vertical	-32.16	≤-13.00	Pass
	5640.00	V	-34.98		
	7520.00	V	-36.28		
	3760.00	Horizontal	-32.83	≤-13.00	Pass
	5640.00	H	-36.86		
	7520.00	H	-38.44		
High	3817.00	Vertical	-30.53	≤-13.00	Pass
	5725.50	V	-33.79		
	7634.00	V	-35.51		
	3817.00	Horizontal	-31.26	≤-13.00	Pass
	5725.50	H	-35.67		
	7634.00	H	-36.34		

LTE Band 2-5MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3705.00	Vertical	-28.77	≤-13.00	Pass
	5557.50	V	-31.12		
	7410.00	V	-33.51		
	3705.00	Horizontal	-32.60	≤-13.00	Pass
	5557.50	H	-38.05		
	7410.00	H	-37.51		
Mid	3760.00	Vertical	-29.63	≤-13.00	Pass
	5640.00	V	-32.71		
	7520.00	V	-34.89		
	3760.00	Horizontal	-34.59	≤-13.00	Pass
	5640.00	H	-39.40		
	7520.00	H	-38.54		
High	3815.00	Vertical	-31.79	≤-13.00	Pass
	5722.50	V	-34.25		
	7630.00	V	-36.22		
	3815.00	Horizontal	-36.14	≤-13.00	Pass
	5722.50	H	-40.84		
	7630.00	H	-39.64		

LTE Band 2-10MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3710.00	Vertical	-30.35	≤-13.00	Pass
	5565.00	V	-33.47		
	7420.00	V	-35.28		
	3710.00	Horizontal	-38.34	≤-13.00	Pass
	5565.00	H	-42.34		
	7420.00	H	-41.37		
Mid	3760.00	Vertical	-32.06	≤-13.00	Pass
	5640.00	V	-34.90		
	7520.00	V	-37.00		
	3760.00	Horizontal	-39.47	≤-13.00	Pass
	5640.00	H	-44.02		
	7520.00	H	-42.70		
High	3810.00	Vertical	-32.70	≤-13.00	Pass
	5715.00	V	-36.33		
	7620.00	V	-38.65		
	3810.00	Horizontal	-38.11	≤-13.00	Pass
	5715.00	H	-43.23		
	7620.00	H	-41.65		

LTE Band 2-15MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3715.00	Vertical	-31.54	≤-13.00	Pass
	5572.50	V	-35.28		
	7430.00	V	-37.53		
	3715.00	Horizontal	-39.21	≤-13.00	Pass
	5572.50	H	-44.26		
	7430.00	H	-42.53		
Mid	3760.00	Vertical	-32.36	≤-13.00	Pass
	5640.00	V	-36.06		
	7520.00	V	-38.26		
	3760.00	Horizontal	-38.17	≤-13.00	Pass
	5640.00	H	-43.18		
	7520.00	H	-41.92		
High	3805.00	Vertical	-31.50	≤-13.00	Pass
	5707.50	V	-34.45		
	7610.00	V	-36.67		
	3805.00	Horizontal	-39.53	≤-13.00	Pass
	5707.50	H	-45.39		
	7610.00	H	-44.19		

LTE Band 2-20MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3720.00	Vertical	-32.85	≤-13.00	Pass
	5580.00	V	-35.99		
	7440.00	V	-37.83		
	3720.00	Horizontal	-39.97	≤-13.00	Pass
	5580.00	H	-45.81		
	7440.00	H	-44.54		
Mid	3760.00	Vertical	-33.18	≤-13.00	Pass
	5640.00	V	-36.30		
	7520.00	V	-38.12		
	3760.00	Horizontal	-40.26	≤-13.00	Pass
	5640.00	H	-46.05		
	7520.00	H	-44.76		
High	3800.00	Vertical	-32.19	≤-13.00	Pass
	5700.00	V	-34.98		
	7600.00	V	-37.17		
	3800.00	Horizontal	-40.57	≤-13.00	Pass
	5700.00	H	-46.34		
	7600.00	H	-45.01		

## Remark:

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

LTE Band 4-1.4MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3421.40	Vertical	-33.75	≤-13.00	Pass
	5132.10	V	-39.01		
	6842.80	V	-39.93		
	3421.40	Horizontal	-34.79	≤-13.00	Pass
	5132.10	H	-39.98		
	6842.80	H	-40.76		
Mid	3465.00	Vertical	-32.97	≤-13.00	Pass
	5197.50	V	-38.28		
	6930.00	V	-39.24		
	3465.00	Horizontal	-33.84	≤-13.00	Pass
	5197.50	H	-39.21		
	6930.00	H	-40.03		
High	3508.60	Vertical	-31.64	≤-13.00	Pass
	5262.90	V	-37.07		
	7017.20	V	-38.09		
	3508.60	Horizontal	-32.75	≤-13.00	Pass
	5262.90	H	-38.17		
	7017.20	H	-39.05		

LTE Band 4-3MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3423.00	Vertical	-33.30	≤-13.00	Pass
	5134.50	V	-38.55		
	6846.00	V	-39.56		
	3423.00	Horizontal	-34.07	≤-13.00	Pass
	5134.50	H	-40.26		
	6846.00	H	-40.64		
Mid	3465.00	Vertical	-35.04	≤-13.00	Pass
	5197.50	V	-40.29		
	6930.00	V	-40.90		
	3465.00	Horizontal	-37.40	≤-13.00	Pass
	5197.50	H	-42.61		
	6930.00	H	-43.37		
High	3507.00	Vertical	-36.21	≤-13.00	Pass
	5260.50	V	-41.35		
	7014.00	V	-41.91		
	3507.00	Horizontal	-39.01	≤-13.00	Pass
	5260.50	H	-44.43		
	7014.00	H	-44.70		

LTE Band 4-5MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3425.00	Vertical	-38.34	≤-13.00	Pass
	5137.50	V	-42.92		
	6850.00	V	-44.04		
	3425.00	Horizontal	-39.86	≤-13.00	Pass
	5137.50	H	-45.23		
	6850.00	H	-45.38		
Mid	3465.00	Vertical	-38.98	≤-13.00	Pass
	5197.50	V	-43.52		
	6930.00	V	-44.61		
	3465.00	Horizontal	-40.61	≤-13.00	Pass
	5197.50	H	-45.84		
	6930.00	H	-45.96		
High	3505.00	Vertical	-39.90	≤-13.00	Pass
	5257.50	V	-44.36		
	7010.00	V	-45.41		
	3505.00	Horizontal	-41.21	≤-13.00	Pass
	5257.50	H	-46.41		
	7010.00	H	-46.44		

LTE Band 4-10MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3430.00	Vertical	-41.53	≤-13.00	Pass
	5145.00	V	-45.36		
	6860.00	V	-46.02		
	3430.00	Horizontal	-41.47	≤-13.00	Pass
	5145.00	H	-46.65		
	6860.00	H	-46.65		
Mid	3465.00	Vertical	-41.72	≤-13.00	Pass
	5197.50	V	-45.54		
	6930.00	V	-46.55		
	3465.00	Horizontal	-41.68	≤-13.00	Pass
	5197.50	H	-46.82		
	6930.00	H	-46.81		
High	3500.00	Vertical	-41.98	≤-13.00	Pass
	5250.00	V	-45.78		
	7000.00	V	-46.78		
	3500.00	Horizontal	-41.88	≤-13.00	Pass
	5250.00	H	-47.01		
	7000.00	H	-46.97		

LTE Band 4-15MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3435.00	Vertical	-42.67	≤-13.00	Pass
	5152.50	V	-46.48		
	6870.00	V	-47.33		
	3435.00	Horizontal	-43.18	≤-13.00	Pass
	5152.50	H	-48.23		
	6870.00	H	-49.23		
Mid	3465.00	Vertical	-44.80	≤-13.00	Pass
	5197.50	V	-48.48		
	6930.00	V	-49.21		
	3465.00	Horizontal	-44.83	≤-13.00	Pass
	5197.50	H	-49.57		
	6930.00	H	-50.50		
High	3495.00	Vertical	-46.37	≤-13.00	Pass
	5242.50	V	-49.90		
	6990.00	V	-50.56		
	3495.00	Horizontal	-46.20	≤-13.00	Pass
	5242.50	H	-50.86		
	6990.00	H	-52.88		

LTE Band 4-20MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	3440.00	Vertical	-53.93	≤-13.00	Pass
	5160.00	V	-51.62		
	6880.00	V	-52.02		
	3440.00	Horizontal	-47.69	≤-13.00	Pass
	5160.00	H	-57.26		
	6880.00	H	-59.31		
Mid	3465.00	Vertical	-60.82	≤-13.00	Pass
	5197.50	V	-54.90		
	6930.00	V	-55.11		
	3465.00	Horizontal	-52.05	≤-13.00	Pass
	5197.50	H	-61.72		
	6930.00	H	-61.71		
High	3490.00	Vertical	-62.78	≤-13.00	Pass
	5235.00	V	-56.16		
	6980.00	V	-56.26		
	3490.00	Horizontal	-53.14	≤-13.00	Pass
	5235.00	H	-62.76		
	6980.00	H	-62.69		

## Remark:

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

LTE Band 5-1.4MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	1649.40	Vertical	-35.97	≤-13.00	Pass
	2474.10	V	-43.45		
	3298.80	V	-44.12		
	1649.40	Horizontal	-37.46	≤-13.00	Pass
	2474.10	H	-45.20		
	3298.80	H	-45.72		
Mid	1673.00	Vertical	-35.53	≤-13.00	Pass
	2509.50	V	-43.03		
	3346.00	V	-43.64		
	1673.00	Horizontal	-37.01	≤-13.00	Pass
	2509.50	H	-44.77		
	3346.00	H	-45.32		
High	1696.60	Vertical	-35.02	≤-13.00	Pass
	2544.90	V	-42.62		
	3393.20	V	-43.25		
	1696.60	Horizontal	-35.25	≤-13.00	Pass
	2544.90	H	-42.41		
	3393.20	H	-43.62		

LTE Band 5-3MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	1651.00	Vertical	-34.10	≤-13.00	Pass
	2476.50	V	-41.76		
	3302.00	V	-42.52		
	1651.00	Horizontal	-34.65	≤-13.00	Pass
	2476.50	H	-41.84		
	3302.00	H	-43.14		
Mid	1673.00	Vertical	-33.65	≤-13.00	Pass
	2509.50	V	-41.33		
	3346.00	V	-42.12		
	1673.00	Horizontal	-33.84	≤-13.00	Pass
	2509.50	H	-41.19		
	3346.00	H	-42.52		
High	1695.00	Vertical	-32.66	≤-13.00	Pass
	2542.50	V	-40.43		
	3390.00	V	-41.26		
	1695.00	Horizontal	-33.10	≤-13.00	Pass
	2542.50	H	-40.50		
	3390.00	H	-41.93		

LTE Band 5-5MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	1653.00	Vertical	-30.82	≤-13.00	Pass
	2479.50	V	-39.28		
	3306.00	V	-39.75		
	1653.00	Horizontal	-33.54	≤-13.00	Pass
	2479.50	H	-40.92		
	3306.00	H	-42.28		
Mid	1673.00	Vertical	-31.15	≤-13.00	Pass
	2509.50	V	-39.59		
	3346.00	V	-40.04		
	1673.00	Horizontal	-33.69	≤-13.00	Pass
	2509.50	H	-41.04		
	3346.00	H	-42.40		
High	1693.00	Vertical	-31.56	≤-13.00	Pass
	2539.50	V	-39.96		
	3386.00	V	-40.39		
	1693.00	Horizontal	-32.92	≤-13.00	Pass
	2539.50	H	-40.32		
	3386.00	H	-41.79		

LTE Band 5-10MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	1658.00	Vertical	-31.04	≤-13.00	Pass
	2487.00	V	-39.52		
	3316.00	V	-40.01		
	1658.00	Horizontal	-33.51	≤-13.00	Pass
	2487.00	H	-40.88		
	3316.00	H	-42.26		
Mid	1673.00	Vertical	-31.49	≤-13.00	Pass
	2509.50	V	-39.94		
	3346.00	V	-40.40		
	1673.00	Horizontal	-33.70	≤-13.00	Pass
	2509.50	H	-41.03		
	3346.00	H	-42.41		
High	1688.00	Vertical	-31.72	≤-13.00	Pass
	2532.00	V	-40.15		
	3376.00	V	-40.60		
	1688.00	Horizontal	-33.88	≤-13.00	Pass
	2532.00	H	-41.20		
	3376.00	H	-42.55		

## Remark:

1. "Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

LTE Band 12-1.4MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	1399.40	Vertical	-34.97	≤-13.00	Pass
	2099.10	V	-40.77		
	2798.80	V	-42.27		
	1399.40	Horizontal	-36.30	≤-13.00	Pass
	2099.10	H	-41.42		
	2798.80	H	-42.99		
Mid	1415.00	Vertical	-34.10	≤-13.00	Pass
	2122.50	V	-39.95		
	2830.00	V	-41.40		
	1415.00	Horizontal	-35.24	≤-13.00	Pass
	2122.50	H	-40.71		
	2830.00	H	-42.12		
High	1430.60	Vertical	-32.83	≤-13.00	Pass
	2145.90	V	-38.61		
	2861.20	V	-40.34		
	1430.60	Horizontal	-33.78	≤-13.00	Pass
	2145.90	H	-39.75		
	2861.20	H	-41.32		

LTE Band 12-3MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	1401.00	Vertical	-32.15	≤-13.00	Pass
	2101.50	V	-38.03		
	2802.00	V	-39.85		
	1401.00	Horizontal	-32.94	≤-13.00	Pass
	2101.50	H	-38.93		
	2802.00	H	-39.71		
Mid	1415.00	Vertical	-30.64	≤-13.00	Pass
	2122.50	V	-36.61		
	2830.00	V	-38.51		
	1415.00	Horizontal	-34.36	≤-13.00	Pass
	2122.50	H	-40.08		
	2830.00	H	-40.80		
High	1429.00	Vertical	-31.67	≤-13.00	Pass
	2143.50	V	-37.54		
	2858.00	V	-39.40		
	1429.00	Horizontal	-35.47	≤-13.00	Pass
	2143.50	H	-41.12		
	2858.00	H	-41.69		

LTE Band 12-5MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	1403.00	Vertical	-32.42	≤-13.00	Pass
	2104.50	V	-38.18		
	2806.00	V	-39.94		
	1403.00	Horizontal	-35.98	≤-13.00	Pass
	2104.50	H	-41.60		
	2806.00	H	-42.10		
Mid	1415.00	Vertical	-32.80	≤-13.00	Pass
	2122.50	V	-38.68		
	2830.00	V	-40.41		
	1415.00	Horizontal	-36.84	≤-13.00	Pass
	2122.50	H	-42.29		
	2830.00	H	-42.76		
High	1427.00	Vertical	-33.72	≤-13.00	Pass
	2140.50	V	-39.52		
	2854.00	V	-41.21		
	1427.00	Horizontal	-37.60	≤-13.00	Pass
	2140.50	H	-43.01		
	2854.00	H	-43.44		

LTE Band 12-10MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	1408.00	Vertical	-34.37	≤-13.00	Pass
	2112.00	V	-40.14		
	2816.00	V	-41.79		
	1408.00	Horizontal	-38.58	≤-13.00	Pass
	2112.00	H	-43.93		
	2816.00	H	-44.22		
Mid	1415.00	Vertical	-35.10	≤-13.00	Pass
	2122.50	V	-40.83		
	2830.00	V	-42.44		
	1415.00	Horizontal	-39.33	≤-13.00	Pass
	2122.50	H	-45.13		
	2830.00	H	-45.33		
High	1422.00	Vertical	-36.16	≤-13.00	Pass
	2133.00	V	-41.83		
	2844.00	V	-43.39		
	1422.00	Horizontal	-40.24	≤-13.00	Pass
	2133.00	H	-45.99		
	2844.00	H	-46.15		

## Remark:

1. "Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

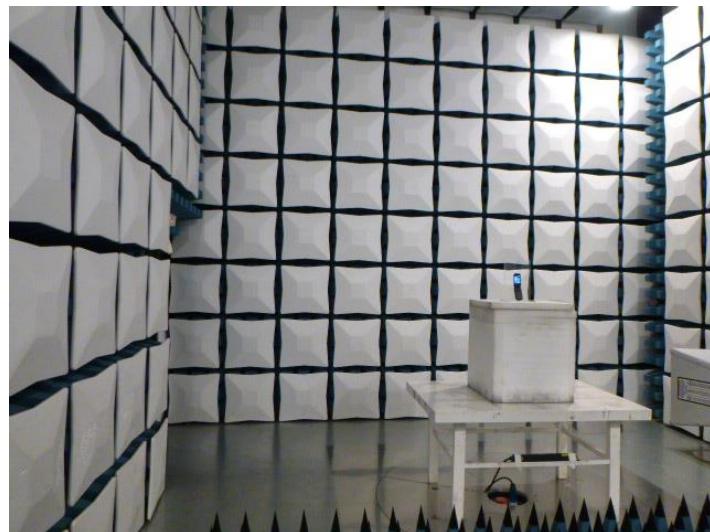
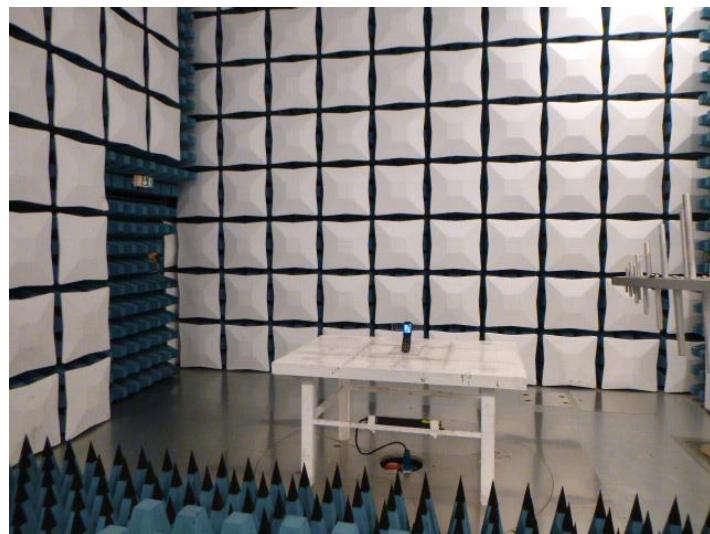
LTE Band 13-5MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Low	1559.00	Vertical	-36.60	≤-13.00	Pass
	2338.50	V	-39.73		
	3118.00	V	-41.40		
	1559.00	Horizontal	-38.55	≤-13.00	Pass
	2338.50	H	-41.27		
	3118.00	H	-42.78		
Mid	1564.00	Vertical	-35.34	≤-13.00	Pass
	2346.00	V	-38.71		
	3128.00	V	-40.41		
	1564.00	Horizontal	-37.03	≤-13.00	Pass
	2346.00	H	-40.04		
	3128.00	H	-41.61		
High	1569.00	Vertical	-33.22	≤-13.00	Pass
	2353.50	V	-36.78		
	3138.00	V	-38.57		
	1569.00	Horizontal	-35.62	≤-13.00	Pass
	2353.50	H	-38.71		
	3138.00	H	-39.95		

LTE Band 13-10MHz					
Channel	Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
		Polarization	Level (dBm)		
Mid	1564.00	Vertical	-35.01	<-13.00	Pass
	2346.00	V	-38.47		
	3128.00	V	-40.16		
	1564.00	Horizontal	-36.75	<-13.00	Pass
	2346.00	H	-39.63		
	3128.00	H	-40.82		

## Remark:

1. Remark"---" means that the emission level is too low to be measured
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report

## 6. TEST SETUP PHOTOS OF THE EUT



## 7. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Refere to the test report No.: CHTEW19110021

## 8. APPENDIX REPORT