



FCC Test Report

FCC ID: 2A7RP-AT319S

Applicant: HANWEI ELECTRONICS GROUP CORPORATION
Address: No.169, Xue Song Road National Hi-Tech Zone, Zhengzhou, 450001, China
Manufacturer: HANWEI ELECTRONICS GROUP CORPORATION
Address: No.169, Xue Song Road National Hi-Tech Zone, Zhengzhou, 450001, China
EUT: ALCOHOL TESTER
Trade Mark: N/A
Model Number: AT319S
Date of Receipt: Jun. 09, 2022
Test Date: Jun. 09, 2022 – Jul. 21, 2022
Date of Report: Jul. 21, 2022
Prepared By: Shenzhen DL Testing Technology Co., Ltd.
Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
Applicable Standards: FCC CFR Title 47 Part27
FCC CFR Title 47 Part24 Subpart E
TIA-603 Rev E 2016
FCC KDB 971168 D01 Power Meas. License Digital Systems v03v01
ANSI C63.26:2015
Test Result: Pass
Report Number: DL-20220708027E

Prepared (Test Engineer): Pxing Huang
Reviewer (Supervisor): Jack Bu
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This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.

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**1. TEST SUMMARY**

Test Items	Test Requirement	Result
Conducted RF Output Power	2.1046, 24.232, 27.50(d) (c)	PASS
Peak to Average Ratio	2.1046, 24.232, 27.50(d) (c)	PASS
99% & -26 dB Occupied Bandwidth	2.1049	PASS
Frequency Stability	2.1055, 24.235, 2.1053, 27.53(h), 27.54	PASS
Conducted Out of Band Emissions	2.1051, 24.238,, 27.53(h) (g)	PASS
Band Edge	2.1051, 24.238,, 27.53(h) (g)	PASS
Transmitter Radiated Power (EIPR/ERP)	2.1046, 24.232, 27.50(d) (c)	PASS
Radiated Out of Band Emissions	2.1051, 24.238,, 27.53(h) (g)	PASS

**2. GENERAL PRODUCT INFORMATION****2.1. Description of Device (EUT)**

Product Name:	ALCOHOL TESTER
Trademark	N/A
Model No.:	AT319S
Test Model:	AT319S
Model Difference	N/A
Operation Frequency:	LTE Band 2: Tx: 1850.00 - 1910.00MHz; Rx: 1930.00 - 1990.00MHz LTE Band 4: Tx: 1710.00 - 1755.00MHz; Rx: 2110.00 - 2155.00MHz LTE Band 12: Tx: 699.00 - 716.00MHz; Rx: 728.00 - 746.00MHz
Modulation technology:	LTE Mode with QPSK,16QAM
Antenna Type:	Internal Antenna
Antenna gain:	1dBi
Power supply:	AC 110-240V 50/60Hz
LTE Category	1
Hardware Version	HV10
Software Version	SV10



2.2. Product Function

Refer to Technical Construction Form and User Manual.

2.3. Independent Operation Modes

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	Bandwidth:(MHz)1.4/3/5/10/15/20MHz Modulation: QPSK/16QAM RB:1/50%/100%	Bandwidth:(MHz)1.4/3/5/10/15/20MHz Modulation: QPSK/16QAM RB:1/50%/100%
LTE Band 4	Bandwidth:(MHz)1.4/3/5/10/15/20MHz Modulation: QPSK/16QAM RB:1/50%/100%	Bandwidth:(MHz)1.4/3/5/10/15/20MHz Modulation: QPSK/16QAM RB:1/50%/100%
LTE Band12	Bandwidth:(MHz)1.4/3/5/10MHz Modulation: QPSK/16QAM RB:1/50%/100%	Bandwidth:(MHz)1.4/3/5/10MHz Modulation: QPSK/16QAM RB:1/50%/100%

Note: LTE Category is Cat1, So the bandwidth 10M/15M/20M does not support QAM16.



Test Channel(MHz)			
Band	Low	Middle	High
LTE Band 2	1850.7	1880	1909.3
LTE Band 4	1710.7	1732.5	1754.3
LTE Band 12	699.7	707.5	715.3

Note: for LTE mode, if the bandwidth is different, the test frequency is changed.

3. TEST SITES

3.1. Test Facilities

Site Description

Name of Firm : Shenzhen DL Testing Technology Co., Ltd.

Site Location : 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

3.2. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$



3.3. List of Test and Measurement Instruments

3.3.1. For conducted emission at the mains terminals test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
843 Shielded Room	ChengYu	843 Room	843	Nov. 25, 2019	Nov. 24, 2022
EMI Receiver	R&S	ESR	101421	Nov. 06, 2021	Nov. 05, 2022
LISN	R&S	ENV216	102417	Nov. 06, 2021	Nov. 05, 2022
843 Cable 1#	ChengYu	CE Cable	001	Nov. 06, 2021	Nov. 05, 2022
843 Cable 1#	FUJIKURA	843C1#	001	Nov. 06, 2021	Nov. 05, 2022

3.3.2. For radiated test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Nov. 06, 2021	Nov. 05, 2022
Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Nov. 06, 2021	Nov. 05, 2022
Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Nov. 06, 2021	Nov. 05, 2022
Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Nov. 06, 2021	Nov. 05, 2022
Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Nov. 06, 2021	Nov. 05, 2022
Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Nov. 06, 2021	Nov. 05, 2022
Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Nov. 06, 2021	Nov. 05, 2022
Amplifier(18GHz-40GHz)	Quanjuda	DLE-161	97	Nov. 06, 2021	Nov. 05, 2022
Loop Antenna(9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Nov. 06, 2021	Nov. 05, 2022
RF cables1 (9kHz-1GHz)	ChengYu	966	004	Nov. 06, 2021	Nov. 05, 2022
RF cables2 (1GHz-40GHz)	ChengYu	966	003	Nov. 06, 2021	Nov. 05, 2022
Antenna connector	Florida RF Labs	N/A	RF 01#	Nov. 06, 2021	Nov. 05, 2022
Power probe	KEYSIGHT	U2021XA	MY55210018	Nov. 06, 2021	Nov. 05, 2022
Signal Analyzer	Agilent	N9020A	MY55370280	Nov. 06, 2021	Nov. 05, 2022
Test Receiver	R&S	ESU 40	100376	Nov. 06, 2021	Nov. 05, 2022
D.C. Power Supply	LongWei	PS-305D	010964729	Nov. 06, 2021	Nov. 05, 2022
Signal Amplifier	DAZE	ZN3380B	11235	Nov. 06, 2021	Nov. 05, 2022
High Pass filter	KANGMAI	WHKX1.0/1.5G-10SS	40	Nov. 06, 2021	Nov. 05, 2022
Filter	COM-MW	ZBSF-C836.5-25-X	BCTC042	Nov. 06, 2021	Nov. 05, 2022
Filter	COM-MW	ZBSF-C1747.5-75-X2	BCTC045	Nov. 06, 2021	Nov. 05, 2022
Filter	COM-MW	ZBSF-C1880-60-X2	BCTC047	Nov. 06, 2021	Nov. 05, 2022
Splitter	Agilent	11435B	1125162	Nov. 06, 2021	Nov. 05, 2022

RF CONDUCTED TEST

System Simulator	Agilent	E5515C	GB43130252	Nov. 06, 2021	Nov. 05, 2022
Spectrum Analyzer	Agilent	N9020A	MY45108040	Nov. 06, 2021	Nov. 05, 2022
DC Power Supply	LongWei	PS-305D	010965682	Nov. 06, 2021	Nov. 05, 2022
Constant temperature and humidity box	GF	GTH-800-40-2P	MAA9906-012	Nov. 06, 2021	Nov. 05, 2022
Universal radio communication tester	R&S	CMW500	115295	Nov. 06, 2021	Nov. 05, 2022



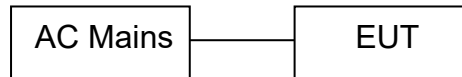
4. TEST SET-UP

4.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

4.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



4.3. Test Environment:

Ambient conditions in the test laboratory:

Items	Actual
Temperature (°C)	21~23
Humidity (%RH)	50~65



5. EMISSION TEST RESULTS

5.1. Conducted RF Output Power

5.1.1. Limit

According to FCC section 2.1046, FCC part 24.232, 27.50(d)(c), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

5.1.2. Test Setup

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power.

5.1.3. Test Result

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

Pass, the table and plot please see annex.

The conducted power tables are as follows:



Average Conducted Power						
Band	LTE Band 2			Channel/Frequency (MHz)		
Bandwidth	Modulation	RB size	RB offset	18607/1850.7	18900/1880	19193/1909.3
1.4MHz	QPSK	1	0	22.79	22.70	22.94
		1	2	23.00	22.80	23.04
		1	5	22.81	22.65	22.95
		6	0	22.66	22.89	22.46
	16QAM	1	0	21.73	21.84	21.78
		1	2	21.96	22.04	21.91
		1	5	21.72	21.86	21.81
		6	0	21.36	21.49	21.69
Bandwidth	Modulation	RB size	RB offset	18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	22.78	22.69	22.97
		1	7	22.71	22.71	23.06
		1	14	22.72	22.67	23.01
		15	0	22.69	22.69	22.79
	16QAM	1	0	22.03	21.94	21.80
		1	7	22.04	21.87	21.83
		1	14	21.96	21.85	21.82
		15	0	21.59	21.79	21.42
Bandwidth	Modulation	RB size	RB offset	18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	22.66	22.71	22.81
		1	13	22.77	22.77	22.87
		1	24	22.64	22.65	22.79
		25	0	22.69	22.69	23.85
	16QAM	1	0	21.94	21.91	22.11
		1	13	22.07	21.88	22.19
		1	24	21.93	21.83	22.10
		25	0	21.57	21.89	21.48



Average Conducted Power						
Band	LTE Band 2			Channel/Frequency (MHz)		
Bandwidth	Modulation	RB size	RB offset	18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	22.76	22.79	22.96
		1	25	22.86	22.91	23.14
		1	49	22.80	22.74	23.03
		50	0	22.39	22.49	22.69
Bandwidth	Modulation	RB size	RB offset	18675/1857.5	18900/1880	19125/1902.5
15MHz	QPSK	1	0	22.68	22.74	22.82
		1	38	22.78	22.74	22.98
		1	74	22.63	22.55	22.88
		75	0	22.46	22.77	22.36
Bandwidth	Modulation	RB size	RB offset	18700/1860	18900/1880	19100/1900
20MHz	QPSK	1	0	22.58	22.68	22.50
		1	38	22.97	22.94	22.98
		1	74	22.52	22.49	22.70
		100	0	22.49	22.57	22.63

Note: Measurement Uncertainty: ± 2.6 dB.



Average Conducted Power						
Band	LTE Band 4			Channel/Frequency (MHz)		
Bandwidth	Modulation	RB size	RB offset	19957/1710.7	20175/1732.5	20393/1754.3
1.4MHz	QPSK	1	0	22.70	22.71	22.90
		1	2	22.90	22.91	23.10
		1	5	22.67	22.72	22.84
		6	0	22.74	22.77	22.73
	16QAM	1	0	21.80	21.59	21.63
		1	2	22.00	21.76	21.77
		1	5	21.80	21.60	21.65
		6	0	21.73	21.70	21.77
Bandwidth	Modulation	RB size	RB offset	19965/1711.5	20175/1732.5	20385/1753.5
3MHz	QPSK	1	0	22.76	22.70	22.90
		1	7	22.76	22.70	22.96
		1	14	22.71	22.73	22.93
		15	0	22.69	22.47	22.39
	16QAM	1	0	21.94	21.89	21.61
		1	7	21.95	21.86	21.64
		1	14	21.94	21.90	21.64
		15	0	21.69	21.58	21.67
Bandwidth	Modulation	RB size	RB offset	19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	22.70	22.64	22.71
		1	13	22.77	22.74	22.81
		1	24	22.60	22.67	22.70
		25	0	22.69	22.11	22.84
	16QAM	1	0	21.90	21.84	21.85
		1	13	21.95	21.92	21.92
		1	24	21.83	21.88	21.85
		25	0	21.59	21.69	21.77



Average Conducted Power						
Band	LTE Band 4			Channel/Frequency (MHz)		
Bandwidth	Modulation	RB size	RB offset	20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	22.78	22.74	22.92
		1	25	22.81	22.87	23.02
		1	49	22.65	22.79	22.91
		50	0	22.59	22.63	22.44
Bandwidth	Modulation	RB size	RB offset	20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	22.68	22.57	22.79
		1	38	22.66	22.73	22.97
		1	74	22.49	22.71	22.82
		75	0	22.71	22.49	22.86
Bandwidth	Modulation	RB size	RB offset	20050/1720	20175/1732.5	20300/1745
20MHz	QPSK	1	0	22.47	22.45	22.47
		1	50	22.78	22.93	22.93
		1	99	22.42	22.58	22.61
		100	0	22.36	22.56	22.39

Note: Measurement Uncertainty: ± 2.6 dB.



Average Conducted Power						
Band	LTE Band 12			Channel/Frequency (MHz)		
Bandwidth	Modulation	RB size	RB offset	23017/699.7	23095/707.5	23173/715.3
1.4MHz	QPSK	1	0	23.04	23.47	23.32
		1	2	23.12	23.36	23.62
		1	5	22.86	23.47	23.48
		6	0	23.22	23.16	22.99
	16QAM	1	0	22.44	21.70	22.06
		1	2	22.50	21.80	22.88
		1	5	22.28	21.56	22.45
		6	0	22.17	22.00	21.91
Bandwidth	Modulation	RB size	RB offset	23025/700.5	23095/707.5	23165/714.5
3MHz	QPSK	1	0	23.15	22.99	22.95
		1	7	23.00	23.12	23.02
		1	14	22.83	22.93	23.20
		15	0	22.17	22.05	22.18
	16QAM	1	0	22.44	21.82	22.26
		1	7	22.31	22.00	22.63
		1	14	22.21	21.84	22.11
		15	0	21.30	21.09	21.89
Bandwidth	Modulation	RB size	RB offset	23035/701.5	23095/707.5	23155/713.5
5MHz	QPSK	1	0	22.99	22.84	22.96
		1	12	22.86	23.04	22.97
		1	24	22.84	22.82	23.07
		25	0	22.07	22.69	22.79
	16QAM	1	0	22.12	22.38	22.10
		1	12	22.04	21.90	22.30
		1	24	21.51	21.54	22.58
		25	0	21.16	21.73	21.57
Bandwidth	Modulation	RB size	RB offset	23060/704	23095/707.5	23130/711
10MHz	QPSK	1	0	22.90	22.64	22.64
		1	24	23.33	23.44	22.68
		1	49	22.84	22.88	22.43
		50	0	22.76	22.01	22.53

Note: Measurement Uncertainty: ± 2.6 dB.



5.2. -26dB and 99% Occupied Bandwidth

5.2.1. Limit

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth,

5.2.2. Test Setup

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power.

5.2.3. Test Result

Pass, the table and plot please see annex.

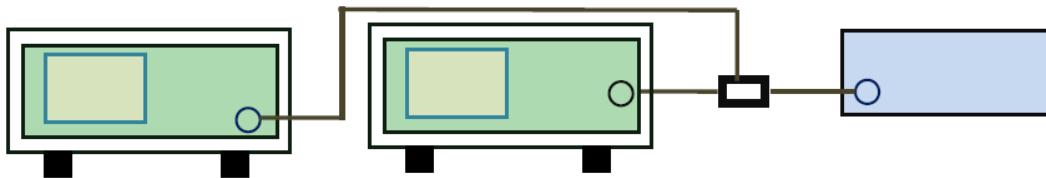


5.3. Peak to Average Ratio

5.3.1. Limit

According to FCC section 2.1046, FCC part 24.232, 27.50(d)(c) the peak to average ratio(PAR) of the transmission may not exceed 13dB.

5.3.2. Test Setup



5.3.3. Test Procedure

According with KDB 971168 v03r01

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > 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. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. 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

5.3.4. Test Result

Pass, the table and plot please see annex.

Measurement data as follows:



Band	Bandwidth (MHz)	Channel	Conducted power(dBm)		Peak-Average Ratio(PAR)	Limit (dB)	Result
			Peak	Average			
LTE Band 2 (QPSK)	1.4	Low	25.35	23.00	2.35	≤13	Pass
		Middle	25.14	22.80	2.34	≤13	Pass
		High	25.35	23.04	2.31	≤13	Pass
	3	Low	25.25	22.78	2.47	≤13	Pass
		Middle	25.47	22.71	2.76	≤13	Pass
		High	25.16	23.06	2.10	≤13	Pass
	5	Low	25.41	22.77	2.64	≤13	Pass
		Middle	25.83	22.77	3.06	≤13	Pass
		High	25.58	22.87	2.71	≤13	Pass
	10	Low	25.81	22.86	2.95	≤13	Pass
		Middle	25.87	22.91	2.96	≤13	Pass
		High	25.13	23.14	1.99	≤13	Pass
	15	Low	25.16	22.78	2.38	≤13	Pass
		Middle	25.21	22.74	2.47	≤13	Pass
		High	25.36	22.98	2.38	≤13	Pass
	20	Low	25.35	22.97	2.38	≤13	Pass
		Middle	25.74	22.94	2.80	≤13	Pass
		High	25.13	22.98	2.15	≤13	Pass
LTE Band 2 (16QAM)	1.4	Low	25.68	21.96	3.72	≤13	Pass
		Middle	25.36	22.04	3.32	≤13	Pass
		High	25.24	21.91	3.33	≤13	Pass
	3	Low	25.17	22.04	3.13	≤13	Pass
		Middle	25.56	21.94	3.62	≤13	Pass
		High	25.03	21.83	3.20	≤13	Pass
	5	Low	25.82	22.07	3.75	≤13	Pass
		Middle	25.18	21.91	3.27	≤13	Pass
		High	25.61	22.19	3.42	≤13	Pass



Band	Bandwidth (MHz)	Channel	Conducted power(dBm)		Peak-Average Ratio(PAR)	Limit (dB)	Result
			Peak	Average			
LTE Band 4 (QPSK)	1.4	Low	25.73	22.90	2.83	≤13	Pass
		Middle	25.47	22.91	2.56	≤13	Pass
		High	25.55	23.10	2.45	≤13	Pass
	3	Low	25.22	22.76	2.46	≤13	Pass
		Middle	25.23	22.73	2.50	≤13	Pass
		High	25.07	22.96	2.11	≤13	Pass
	5	Low	25.25	22.77	2.48	≤13	Pass
		Middle	25.12	22.74	2.38	≤13	Pass
		High	25.32	22.81	2.51	≤13	Pass
	10	Low	25.88	22.81	3.07	≤13	Pass
		Middle	25.33	22.87	2.46	≤13	Pass
		High	25.78	23.02	2.76	≤13	Pass
	15	Low	25.41	22.68	2.73	≤13	Pass
		Middle	25.73	22.73	3.00	≤13	Pass
		High	25.84	22.97	2.87	≤13	Pass
	20	Low	25.56	22.78	2.78	≤13	Pass
		Middle	25.54	22.93	2.61	≤13	Pass
		High	25.75	22.93	2.82	≤13	Pass
LTE Band 4 (16QAM)	1.4	Low	25.12	22.00	3.12	≤13	Pass
		Middle	25.63	21.76	3.87	≤13	Pass
		High	25.78	21.77	4.01	≤13	Pass
	3	Low	25.64	21.95	3.69	≤13	Pass
		Middle	25.76	21.90	3.86	≤13	Pass
		High	25.53	21.64	3.89	≤13	Pass
	5	Low	25.84	21.95	3.89	≤13	Pass
		Middle	25.72	21.92	3.80	≤13	Pass
		High	25.26	21.92	3.34	≤13	Pass



Band	Bandwidth (MHz)	Channel	Conducted power(dBm)		Peak-Average Ratio(PAR)	Limit (dB)	Result
			Peak	Average			
LTE Band 12 (QPSK)	1.4	Low	25.03	23.22	1.81	≤13	Pass
		Middle	25.65	23.47	2.18	≤13	Pass
		High	25.44	23.62	1.82	≤13	Pass
	3	Low	25.48	23.15	2.33	≤13	Pass
		Middle	25.12	23.12	2.00	≤13	Pass
		High	25.16	23.20	1.96	≤13	Pass
	5	Low	25.32	22.99	2.33	≤13	Pass
		Middle	25.74	23.04	2.70	≤13	Pass
		High	25.23	23.07	2.16	≤13	Pass
	10	Low	25.28	23.33	1.95	≤13	Pass
		Middle	25.24	23.44	1.80	≤13	Pass
		High	25.16	22.68	2.48	≤13	Pass
LTE Band 12 (16QAM)	1.4	Low	25.22	22.50	2.72	≤13	Pass
		Middle	25.68	22.00	3.68	≤13	Pass
		High	25.31	22.88	2.43	≤13	Pass
	3	Low	25.27	22.44	2.83	≤13	Pass
		Middle	25.66	22.00	3.66	≤13	Pass
		High	25.43	22.63	2.80	≤13	Pass
	5	Low	25.48	22.12	3.36	≤13	Pass
		Middle	25.21	22.38	2.83	≤13	Pass
		High	25.23	22.58	2.65	≤13	Pass



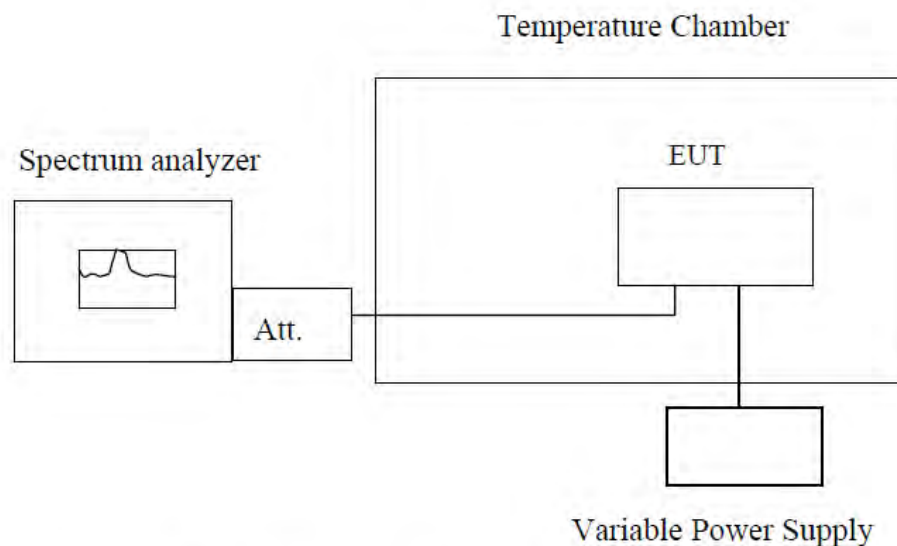
5.4. Frequency Stability

5.4.1. Limit

According to FCC section 2.1055, 2.1053, 24.235, FCC section 27.53(h), 27.54 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from -40°C to $+80^{\circ}\text{C}$ at intervals of not more than 10°C .
- (b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

5.4.2. Test Setup



Note : Measurement setup for testing on Antenna connector

The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber.

The EUT is commanded by the System Simulator (SS) to operate at the maximum output power

5.4.3. Test Result

The nominal, highest and lowest extreme voltages are separately 120VAC, 132VAC and 108VAC which are specified by the applicant; the normal temperature here used is 25°C . The frequency deviation limit of 850MHz band is $\pm 2.5\text{ppm}$, and 1900MHz is $\pm 1\text{ppm}$

For LTE mode, only test the max bandwidth.

The table and plot please see annex.



Test Conditions			Frequency Deviation			Result
Band	Power(Vdc)	Temperature(°C)	Frequency Error(Hz)	ppm	Limit	
LTE Band 2 Bandwidth 20MHz QPSK Middle channel 1880MHz	120	-40	43	0.0217	±1	PASS
	120	-30	28	0.0138		
	120	-20	68	0.0353		
	120	-10	87	0.0431		
	120	0	93	0.0472		
	120	10	75	0.0368		
	120	20	82	0.0425		
	120	30	74	0.0394		
	120	40	81	0.0436		
	120	50	71	0.0371		
	120	60	3	0.0012		
	120	70	91	0.0483		
	120	80	88	0.0465		
	132	25	30	0.0166		
	120	25	43	0.0227		
	108	25	85	0.0454		
LTE Band 2 Bandwidth 5MHz 16QAM Middle channel 1880MHz	120	-40	41	0.0221	±1	PASS
	120	-30	12	0.0063		
	120	-20	92	0.0495		
	120	-10	50	0.0245		
	120	0	90	0.0469		
	120	10	30	0.0147		
	120	20	78	0.0426		
	120	30	93	0.0432		
	120	40	64	0.0323		
	120	50	57	0.0346		
	120	60	85	0.0472		
	120	70	87	0.0452		
	120	80	9	0.0048		
	132	25	56	0.0330		
	120	25	15	0.0017		
	108	25	74	0.0371		



Test Conditions			Frequency Deviation			Result
Band	Power(Vdc)	Temperature(°C)	Frequency Error(Hz)	ppm	Limit	
LTE Band 4 Bandwidth 15MHz QPSK Middle channel 1732.5MHz	120	-40	48	0.0238	±1	PASS
	120	-30	32	0.0143		
	120	-20	82	0.0436		
	120	-10	17	0.0047		
	120	0	8	0.0023		
	120	10	47	0.0249		
	120	20	74	0.0439		
	120	30	21	0.0180		
	120	40	27	0.0145		
	120	50	74	0.0468		
	120	60	36	0.0220		
	120	70	69	0.0346		
	120	80	29	0.0156		
	132	25	93	0.0524		
	120	25	88	0.0568		
LTE Band 4 Bandwidth 5MHz 16QAM Middle channel 1732.5MHz	108	25	16	0.0042	±1	PASS
	120	-40	93	0.0528		
	120	-30	65	0.0363		
	120	-20	99	0.0571		
	120	-10	64	0.0349		
	120	0	85	0.0496		
	120	10	52	0.0302		
	120	20	43	0.0247		
	120	30	10	0.0054		
	120	40	76	0.0435		
	120	50	70	0.0406		
	120	60	54	0.0313		
	120	70	20	0.0112		
	120	80	66	0.0384		
	132	25	56	0.0323		
	120	25	87	0.0508		
	108	25	68	0.0394		

Note: Measurement Uncertainty: ±20Hz.



Test Conditions			Frequency Deviation			Result
Band	Power(Vdc)	Temperature(°C)	Frequency Error(Hz)	ppm	Limit	
LTE Band 12 Bandwidth 10MHz QPSK Middle channel 707.5MHz	120	-40	32	0.0441	±1	PASS
	120	-30	39	0.0552		
	120	-20	71	0.1004		
	120	-10	79	0.1116		
	120	0	51	0.0724		
	120	10	22	0.0315		
	120	20	41	0.0572		
	120	30	80	0.1125		
	120	40	71	0.1006		
	120	50	53	0.0754		
	120	60	50	0.0702		
	120	70	55	0.0772		
	120	80	50	0.0707		
	132	25	80	0.1125		
	120	25	35	0.0496		
	108	25	33	0.0463		
LTE Band 12 Bandwidth 5MHz 16QAM Middle channel 707.5MHz	120	-40	28	0.0395	±1	PASS
	120	-30	58	0.0814		
	120	-20	56	0.0785		
	120	-10	25	0.0341		
	120	0	44	0.0623		
	120	10	59	0.0835		
	120	20	68	0.0964		
	120	30	57	0.0828		
	120	40	76	0.1037		
	120	50	35	0.0440		
	120	60	22	0.0337		
	120	70	74	0.1052		
	120	80	24	0.0361		
	132	25	58	0.0853		
	120	25	57	0.0832		
	108	25	48	0.0644		

Note: Measurement Uncertainty: ±20Hz.

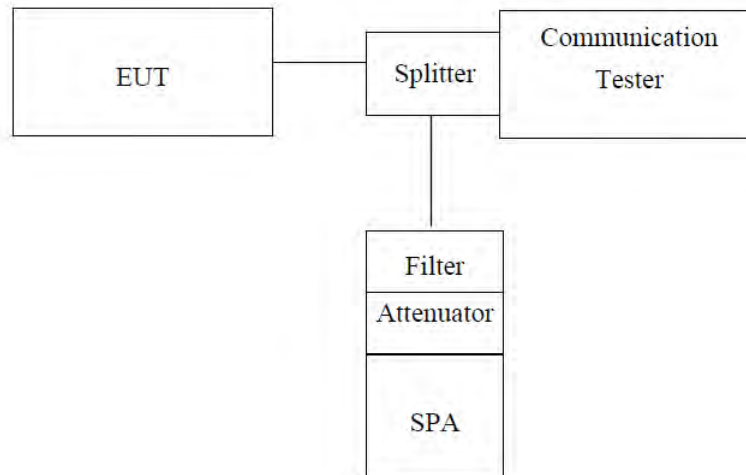


5.5. Conducted Spurious Emissions

5.5.1. Limit

According to FCC section 2.1051, 24.238, 27.53(h)(g) 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. This calculated to be -13dBm.

5.5.2. Test Setup



Note: Measurement setup for testing on Antenna connector

5.5.3. Measurement Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 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.

For the out of band: Set the RBW 100KHz for below 1GHz, and RBW 1MHz for above 1GHz, VBW = 100KHz, Start=30MHz, Stop= 10th harmonic.

Limit = -13dBm

5.5.4. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

For LTE mode, the plot only show the min and max bandwidth's data.

Pass, the table and plot please see annex.

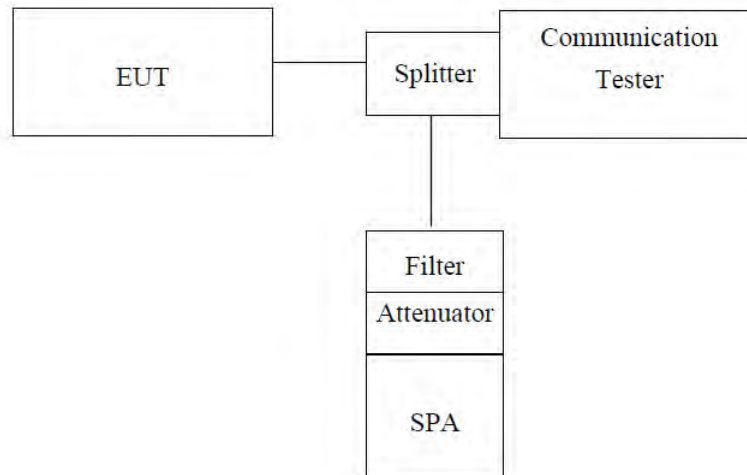


5.6. Conducted Out of Band Emissions

5.6.1. Limit

According to and FCC section 2.1051, 24.238, 27.53(h)(g) in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

5.6.2. Test Setup



Note: Measurement setup for testing on Antenna connector

5.6.3. Measurement Procedure

The EUT, which is powered by the adapter, is coupled to the Spectrum Analyzer and the System Simulator with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the System Simulator to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the System Simulator.

RBW is set to 15 kHz, VBW is set to 51 kHz for LTE Band 2, LTE Band 4

RBW is set to 30 kHz, VBW is set to 100 kHz for LTE Band 2, LTE Band 4

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 2, LTE Band 4

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 2, LTE Band 4

RBW is set to 150 kHz, VBW is set to 510 kHz for LTE Band 2, LTE Band 4 (15MHz).

RBW is set to 200 kHz, VBW is set to 620 kHz for LTE Band 2, LTE Band 4 (20MHz)

5.6.4. Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

Pass, the table and plot please see annex.



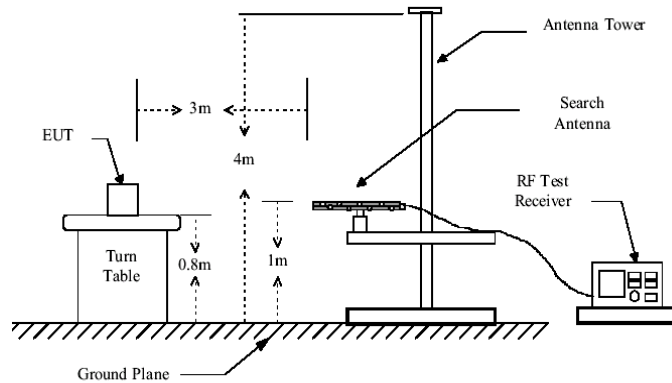
5.7. Transmitter Radiated Power (EIRP/ERP)

5.7.1. Limit

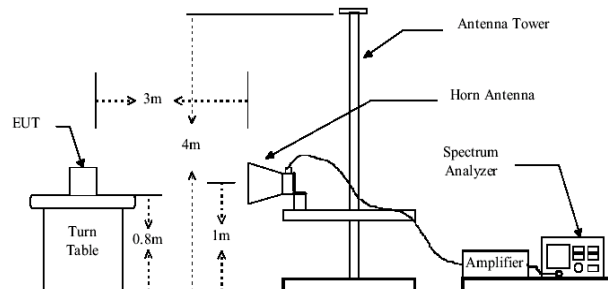
According to FCC section 2.1046, 24.232, FCC section 27.50(d)(c) the broadband PCS mobile station is limited to 2 Watts e.i.r.p. peak power.

5.7.2. Test Setup

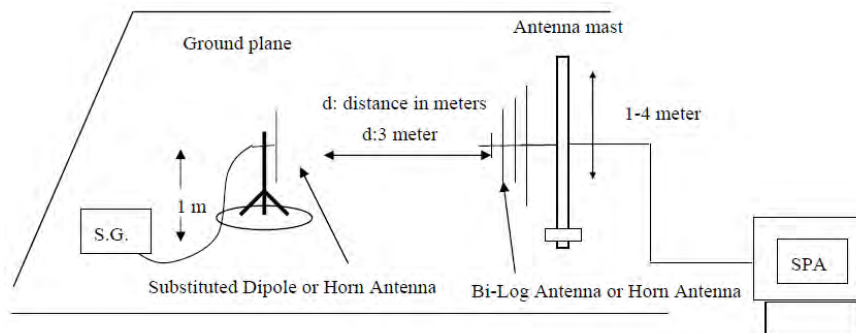
Below 1GHz



Above 1GHz



Substituted method:



5.7.3. Measurement Procedure

The EUT was placed on a 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. All tests were conducted in a Full-Anechoic Chamber.

During the measurement, the EUT was in communication with the station. The highest emission was



recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 699.7 –715.3MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:

EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

$$ERP = EIRP - 2.15dB$$

$$EIRP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

5.7.4. Test Result

Pass, the table and plot please see annex.



EUT mode	Channel	Antenna Pol.	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Result
LTE BAND 2 1.4MHz QPSK	Lowest	V	5.36	19.35	2.54	22.17	33.00	Pass
		H	5.85	19.35	2.54	22.66		
	Middle	V	5.14	19.51	2.62	22.03	33.00	Pass
		H	5.33	19.51	2.62	22.22		
	Highest	V	5.23	19.96	2.69	22.50	33.00	Pass
		H	5.65	19.96	2.69	22.92		
LTE BAND 2 3MHz QPSK	Lowest	V	5.41	19.35	2.54	22.22	33.00	Pass
		H	5.56	19.35	2.54	22.37		
	Middle	V	5.32	19.51	2.62	22.21	33.00	Pass
		H	5.82	19.51	2.62	22.71		
	Highest	V	5.64	19.96	2.69	22.91	33.00	Pass
		H	5.82	19.96	2.69	23.09		
LTE BAND 2 5MHz QPSK	Lowest	V	5.66	19.35	2.54	22.47	33.00	Pass
		H	5.75	19.35	2.54	22.56		
	Middle	V	5.52	19.51	2.62	22.41	33.00	Pass
		H	5.37	19.51	2.62	22.26		
	Highest	V	5.31	19.96	2.69	22.58	33.00	Pass
		H	5.75	19.96	2.69	23.02		
LTE BAND 2 10MHz QPSK	Lowest	V	5.56	19.35	2.54	22.37	33.00	Pass
		H	5.68	19.35	2.54	22.49		
	Middle	V	5.81	19.51	2.62	22.70	33.00	Pass
		H	5.36	19.51	2.62	22.25		
	Highest	V	5.72	19.96	2.69	22.99	33.00	Pass
		H	5.67	19.96	2.69	22.94		
LTE BAND 2 15MHz QPSK	Lowest	V	5.43	19.35	2.54	22.24	33.00	Pass
		H	5.55	19.35	2.54	22.36		
	Middle	V	5.32	19.51	2.62	22.21	33.00	Pass
		H	5.28	19.51	2.62	22.17		
	Highest	V	5.63	19.96	2.69	22.90	33.00	Pass
		H	5.61	19.96	2.69	22.88		
LTE BAND 2 20MHz QPSK	Lowest	V	5.65	19.35	2.54	22.46	33.00	Pass
		H	5.76	19.35	2.54	22.57		
	Middle	V	5.53	19.51	2.62	22.42	33.00	Pass
		H	5.38	19.51	2.62	22.27		
	Highest	V	5.51	19.96	2.69	22.78	33.00	Pass
		H	5.74	19.96	2.69	23.01		



EUT mode	Channel	Antenna Pol.	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Result
LTE BAND 2 1.4MHz 16QAM	Lowest	V	5.42	19.35	2.54	22.23	33.00	Pass
		H	5.53	19.35	2.54	22.34		
	Middle	V	6.35	19.51	2.62	23.24	33.00	Pass
		H	5.28	19.51	2.62	22.17		
	Highest	V	5.63	19.96	2.69	22.90	33.00	Pass
		H	5.61	19.96	2.69	22.88		
LTE BAND 2 3MHz 16QAM	Lowest	V	5.33	19.35	2.54	22.14	33.00	Pass
		H	5.48	19.35	2.54	22.29		
	Middle	V	6.22	19.51	2.62	23.11	33.00	Pass
		H	5.16	19.51	2.62	22.05		
	Highest	V	5.58	19.96	2.69	22.85	33.00	Pass
		H	5.56	19.96	2.69	22.83		
LTE BAND 2 5MHz 16QAM	Lowest	V	5.53	19.35	2.54	22.34	33.00	Pass
		H	5.68	19.35	2.54	22.49		
	Middle	V	6.44	19.51	2.62	23.33	33.00	Pass
		H	6.16	19.51	2.62	23.05		
	Highest	V	5.78	19.96	2.69	23.05	33.00	Pass
		H	5.66	19.96	2.69	22.93		



EUT mode	Channel	Antenna Pol.	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Result
LTE BAND 4 1.4MHz QPSK	Lowest	V	5.45	19.35	2.54	22.26	30.00	Pass
		H	5.17	19.35	2.54	21.98		
	Middle	V	6.63	19.51	2.62	23.52	30.00	Pass
		H	5.14	19.51	2.62	22.03		
	Highest	V	5.58	19.96	2.69	22.85	30.00	Pass
		H	5.51	19.96	2.69	22.78		
LTE BAND 4 3MHz QPSK	Lowest	V	5.26	19.35	2.54	22.07	30.00	Pass
		H	5.38	19.35	2.54	22.19		
	Middle	V	5.26	19.51	2.62	22.15	30.00	Pass
		H	5.08	19.51	2.62	21.97		
	Highest	V	5.44	19.96	2.69	22.71	30.00	Pass
		H	5.43	19.96	2.69	22.70		
LTE BAND 4 5MHz QPSK	Lowest	V	5.47	19.35	2.54	22.28	30.00	Pass
		H	5.55	19.35	2.54	22.36		
	Middle	V	5.42	19.51	2.62	22.31	30.00	Pass
		H	5.24	19.51	2.62	22.13		
	Highest	V	5.66	19.96	2.69	22.93	30.00	Pass
		H	5.62	19.96	2.69	22.89		
LTE BAND 4 10MHz QPSK	Lowest	V	4.97	19.33	2.52	21.78	30.00	Pass
		H	5.16	19.33	2.52	21.97		
	Middle	V	5.37	19.5	2.6	22.27	30.00	Pass
		H	5.26	19.5	2.6	22.16		
	Highest	V	5.64	19.94	2.71	22.87	30.00	Pass
		H	5.57	19.94	2.71	22.80		
LTE BAND 4 15MHz QPSK	Lowest	V	4.93	19.33	2.52	21.74	30.00	Pass
		H	5.15	19.33	2.52	21.96		
	Middle	V	5.37	19.5	2.6	22.27	30.00	Pass
		H	5.22	19.5	2.6	22.12		
	Highest	V	5.64	19.94	2.71	22.87	30.00	Pass
		H	5.57	19.94	2.71	22.80		
LTE BAND 4 20MHz QPSK	Lowest	V	4.96	19.33	2.52	21.77	30.00	Pass
		H	5.13	19.33	2.52	21.94		
	Middle	V	5.37	19.5	2.6	22.27	30.00	Pass
		H	5.25	19.5	2.6	22.15		
	Highest	V	5.64	19.94	2.71	22.87	30.00	Pass
		H	5.56	19.94	2.71	22.79		



EUT mode	Channel	Antenna Pol.	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Result
LTE BAND 4 1.4MHz 16QAM	Lowest	V	5.43	19.35	2.54	22.24	30.00	Pass
		H	5.54	19.35	2.54	22.35		
	Middle	V	6.39	19.51	2.62	23.28	30.00	Pass
		H	5.23	19.51	2.62	22.12		
	Highest	V	5.64	19.96	2.69	22.91	30.00	Pass
		H	5.62	19.96	2.69	22.89		
LTE BAND 4 3MHz 16QAM	Lowest	V	5.36	19.35	2.54	22.17	30.00	Pass
		H	5.48	19.35	2.54	22.29		
	Middle	V	5.24	19.51	2.62	22.13	30.00	Pass
		H	5.13	19.51	2.62	22.02		
	Highest	V	5.58	19.96	2.69	22.85	30.00	Pass
		H	5.56	19.96	2.69	22.83		
LTE BAND 4 5MHz 16QAM	Lowest	V	5.44	19.35	2.54	22.25	30.00	Pass
		H	5.36	19.35	2.54	22.17		
	Middle	V	5.37	19.51	2.62	22.26	30.00	Pass
		H	5.25	19.51	2.62	22.14		
	Highest	V	5.15	19.96	2.69	22.42	30.00	Pass
		H	5.69	19.96	2.69	22.96		



EUT mode	Channel	Antenna Pol.	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)	Result
LTE BAND 12 1.4MHz QPSK	Lowest	V	5.48	19.35	2.54	20.14	34.77	Pass
		H	5.56	19.35	2.54	20.22		
	Middle	V	6.24	19.51	2.62	20.98	34.77	Pass
		H	5.23	19.51	2.62	19.97		
	Highest	V	5.67	19.96	2.69	20.79	34.77	Pass
		H	5.61	19.96	2.69	20.73		
LTE BAND 12 3MHz QPSK	Lowest	V	5.35	19.35	2.54	20.01	34.77	Pass
		H	5.46	19.35	2.54	20.12		
	Middle	V	5.28	19.51	2.62	20.02	34.77	Pass
		H	5.14	19.51	2.62	19.88		
	Highest	V	5.56	19.96	2.69	20.68	34.77	Pass
		H	5.51	19.96	2.69	20.63		
LTE BAND 12 5MHz QPSK	Lowest	V	5.43	19.35	2.54	20.09	34.77	Pass
		H	5.57	19.35	2.54	20.23		
	Middle	V	5.63	19.51	2.62	20.37	34.77	Pass
		H	5.22	19.51	2.62	19.96		
	Highest	V	5.65	19.96	2.69	20.77	34.77	Pass
		H	5.61	19.96	2.69	20.73		
LTE BAND 12 10MHz QPSK	Lowest	V	5.43	19.35	2.54	20.09	34.77	Pass
		H	5.56	19.35	2.54	20.22		
	Middle	V	5.47	19.51	2.62	20.21	34.77	Pass
		H	5.25	19.51	2.62	19.99		
	Highest	V	5.61	19.96	2.69	20.73	34.77	Pass
		H	5.63	19.96	2.69	20.75		
LTE BAND 12 1.4MHz 16QAM	Lowest	V	5.27	19.35	2.54	19.93	34.77	Pass
		H	5.46	19.35	2.54	20.12		
	Middle	V	5.24	19.51	2.62	19.98	34.77	Pass
		H	5.16	19.51	2.62	19.9		
	Highest	V	5.51	19.96	2.69	20.63	34.77	Pass
		H	5.58	19.96	2.69	20.7		
LTE BAND 12 3MHz 16QAM	Lowest	V	5.36	19.35	2.54	20.02	34.77	Pass
		H	5.72	19.35	2.54	20.38		
	Middle	V	5.21	19.51	2.62	19.95	34.77	Pass
		H	5.15	19.51	2.62	19.89		
	Highest	V	5.58	19.96	2.69	20.7	34.77	Pass
		H	5.56	19.96	2.69	19.93		
LTE BAND 12 5MHz 16QAM	Lowest	V	5.35	19.35	2.54	20.01	34.77	Pass
		H	5.42	19.35	2.54	20.08		
	Middle	V	5.28	19.51	2.62	20.02	34.77	Pass
		H	5.16	19.51	2.62	19.9		
	Highest	V	5.56	19.96	2.69	20.68	34.77	Pass
		H	5.52	19.96	2.69	20.14		



5.8. Radiated Out of Band Emissions

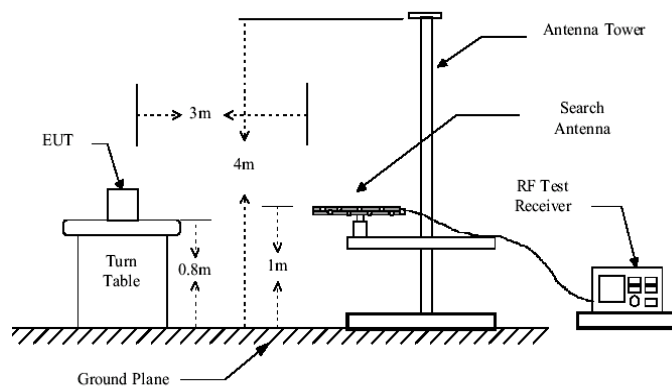
5.8.1. Limit

According to FCC section 2.1051, 24.238, 27.53(h)(g) 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 $43 + 10 \cdot \log(P)$ dB. This calculated to be -13dBm.

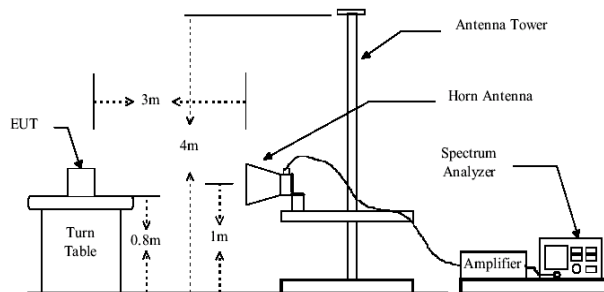
The spurious emission with frequency band 1900 according to FCC section 2.1057.

5.8.2. Test Setup

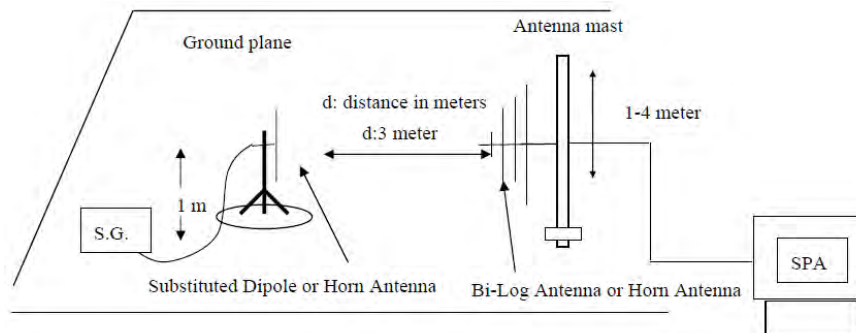
Below 1GHz



Above 1GHz



Substituted method:





5.8.3. Measurement Procedure

The EUT was placed on a non-conductive, The measurement antenna was placed at a distance of 3 meters from the EUT. 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. all test in Full-Anechoic Chamber.

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.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$EIRP \text{ (Level)} = S.G. \text{ output (dBm)} + \text{Antenna Gain(dBi)} - \text{Cable Loss (dB)}$

Note: Measurement Uncertainty: $\pm 3.6 \text{ dB}$.

The data show only the worst results(QPSK/ Vertical), and the other results are very low and not shown in the report.

5.8.4. Test Result



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
LTE BAND 2 1.4MHz Lowest	87.57	Vertical	-75.18	3.35	0.38	-72.21	-13	PASS
	3701.40	Vertical	-45.96	7.76	3.75	-41.95		
	5552.10	Vertical	-47.18	9.84	4.94	-42.28		
	7402.80	Vertical	-39.54	10.21	5.32	-34.65		
	9253.50	Vertical	-42.32	11.36	6.02	-36.98		
	11104.20	Vertical	-44.48	14.52	6.68	-36.64		
LTE BAND 2 1.4MHz Middle	88.98	Vertical	-75.14	3.35	0.38	-72.17	-13	PASS
	3760.00	Vertical	-47.23	7.76	3.75	-43.22		
	5640.00	Vertical	-46.85	9.84	4.94	-41.95		
	7520.00	Vertical	-42.56	10.21	5.32	-37.67		
	9400.00	Vertical	-41.92	11.36	6.02	-36.58		
	11280.00	Vertical	-45.88	14.52	6.68	-38.04		
LTE BAND 2 1.4MHz Highest	88.76	Vertical	-75.03	3.35	0.38	-72.06	-13	PASS
	3819.60	Vertical	-46.87	7.79	3.53	-42.61		
	5729.40	Vertical	-41.35	9.88	5.02	-36.49		
	7639.20	Vertical	-37.53	10.25	5.54	-32.82		
	9549.00	Vertical	-44.48	11.38	6.16	-39.26		
	11458.80	Vertical	-46.82	14.56	6.72	-38.98		
LTE BAND 2 3MHz Lowest	87.79	Vertical	-75.13	3.35	0.38	-72.16	-13	PASS
	3700.40	Vertical	-45.97	7.76	3.75	-41.96		
	5550.60	Vertical	-46.32	9.84	4.94	-41.42		
	7400.80	Vertical	-39.24	10.21	5.32	-34.35		
	9251.00	Vertical	-42.62	11.36	6.02	-37.28		
	11101.20	Vertical	-44.18	14.52	6.68	-36.34		
LTE BAND 2 3MHz Middle	88.24	Vertical	-74.36	3.35	0.38	-71.39	-13	PASS
	3760.00	Vertical	-47.02	7.76	3.75	-43.01		
	5640.00	Vertical	-46.68	9.84	4.94	-41.78		
	7520.00	Vertical	-42.24	10.21	5.32	-37.35		
	9400.00	Vertical	-41.76	11.36	6.02	-36.42		
	11280.00	Vertical	-45.63	14.52	6.68	-37.79		
LTE BAND 2 3MHz Highest	88.78	Vertical	-74.65	3.35	0.38	-71.68	-13	PASS
	3819.60	Vertical	-46.62	7.79	3.53	-42.36		
	5729.40	Vertical	-41.19	9.88	5.02	-36.33		
	7639.20	Vertical	-37.37	10.25	5.54	-32.66		
	9549.00	Vertical	-44.15	11.38	6.16	-38.93		
	11458.80	Vertical	-46.56	14.56	6.72	-38.72		



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
LTE BAND 2 5MHz Lowest	87.67	Vertical	-74.15	3.35	0.38	-71.18	-13	PASS
	3700.40	Vertical	-45.76	7.76	3.75	-41.75		
	5550.60	Vertical	-46.83	9.84	4.94	-41.93		
	7400.80	Vertical	-39.38	10.21	5.32	-34.49		
	9251.00	Vertical	-42.67	11.36	6.02	-37.33		
	11101.20	Vertical	-44.22	14.52	6.68	-36.38		
LTE BAND 2 5MHz Middle	88.53	Vertical	-74.76	3.35	0.38	-71.79	-13	PASS
	3760.00	Vertical	-47.01	7.76	3.75	-43.00		
	5640.00	Vertical	-46.66	9.84	4.94	-41.76		
	7520.00	Vertical	-42.27	10.21	5.32	-37.38		
	9400.00	Vertical	-41.72	11.36	6.02	-36.38		
	11280.00	Vertical	-45.66	14.52	6.68	-37.82		
LTE BAND 2 5MHz Highest	88.15	Vertical	-74.64	3.35	0.38	-71.67	-13	PASS
	3819.60	Vertical	-46.62	7.79	3.53	-42.36		
	5729.40	Vertical	-41.16	9.88	5.02	-36.30		
	7639.20	Vertical	-37.37	10.25	5.54	-32.66		
	9549.00	Vertical	-44.15	11.38	6.16	-38.93		
	11458.80	Vertical	-46.54	14.56	6.72	-38.70		
LTE BAND 2 10MHz Lowest	87.87	Vertical	-74.76	3.35	0.38	-71.79	-13	PASS
	3700.40	Vertical	-45.93	7.76	3.75	-41.92		
	5550.60	Vertical	-46.78	9.84	4.94	-41.88		
	7400.80	Vertical	-39.25	10.21	5.32	-34.36		
	9251.00	Vertical	-42.63	11.36	6.02	-37.29		
	11101.20	Vertical	-44.14	14.52	6.68	-36.30		
LTE BAND 2 10MHz Middle	88.89	Vertical	-74.73	3.35	0.38	-71.76	-13	PASS
	3760.00	Vertical	-47.07	7.76	3.75	-43.06		
	5640.00	Vertical	-46.65	9.84	4.94	-41.75		
	7520.00	Vertical	-42.36	10.21	5.32	-37.47		
	9400.00	Vertical	-41.72	11.36	6.02	-36.38		
	11280.00	Vertical	-45.64	14.52	6.68	-37.80		
LTE BAND 2 10MHz Highest	88.67	Vertical	-74.76	3.35	0.38	-71.79	-13	PASS
	3819.60	Vertical	-46.68	7.79	3.53	-42.42		
	5729.40	Vertical	-41.16	9.88	5.02	-36.30		
	7639.20	Vertical	-37.42	10.25	5.54	-32.71		
	9549.00	Vertical	-44.23	11.38	6.16	-39.01		
	11458.80	Vertical	-46.68	14.56	6.72	-38.84		



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
LTE BAND 2 15MHz Lowest	87.87	Vertical	-74.53	3.35	0.38	-71.56	-13	PASS
	3700.40	Vertical	-45.64	7.76	3.75	-41.63		
	5550.60	Vertical	-46.74	9.84	4.94	-41.84		
	7400.80	Vertical	-39.23	10.21	5.32	-34.34		
	9251.00	Vertical	-42.68	11.36	6.02	-37.34		
	11101.20	Vertical	-44.12	14.52	6.68	-36.28		
LTE BAND 2 15MHz Middle	88.89	Vertical	-74.58	3.35	0.38	-71.61	-13	PASS
	3760.00	Vertical	-46.94	7.76	3.75	-42.93		
	5640.00	Vertical	-46.53	9.84	4.94	-41.63		
	7520.00	Vertical	-42.22	10.21	5.32	-37.33		
	9400.00	Vertical	-41.64	11.36	6.02	-36.30		
	11280.00	Vertical	-45.58	14.52	6.68	-37.74		
LTE BAND 2 15MHz Highest	88.45	Vertical	-74.53	3.35	0.38	-71.56	-13	PASS
	3819.60	Vertical	-46.55	7.79	3.53	-42.29		
	5729.40	Vertical	-41.04	9.88	5.02	-36.18		
	7639.20	Vertical	-37.36	10.25	5.54	-32.65		
	9549.00	Vertical	-44.12	11.38	6.16	-38.90		
	11458.80	Vertical	-46.58	14.56	6.72	-38.74		
LTE BAND 2 20MHz Lowest	87.79	Vertical	-74.55	3.35	0.38	-71.58	-13	PASS
	3700.40	Vertical	-45.64	7.76	3.75	-41.63		
	5550.60	Vertical	-46.76	9.84	4.94	-41.86		
	7400.80	Vertical	-39.28	10.21	5.32	-34.39		
	9251.00	Vertical	-42.63	11.36	6.02	-37.29		
	11101.20	Vertical	-44.18	14.52	6.68	-36.34		
LTE BAND 2 20MHz Middle	88.11	Vertical	-74.55	3.35	0.38	-71.58	-13	PASS
	3760.00	Vertical	-46.93	7.76	3.75	-42.92		
	5640.00	Vertical	-46.54	9.84	4.94	-41.64		
	7520.00	Vertical	-42.22	10.21	5.32	-37.33		
	9400.00	Vertical	-41.67	11.36	6.02	-36.33		
	11280.00	Vertical	-45.56	14.52	6.68	-37.72		
LTE BAND 2 20MHz Highest	88.54	Vertical	-74.54	3.35	0.38	-71.57	-13	PASS
	3819.60	Vertical	-46.51	7.79	3.53	-42.25		
	5729.40	Vertical	-41.03	9.88	5.02	-36.17		
	7639.20	Vertical	-37.38	10.25	5.54	-32.67		
	9549.00	Vertical	-44.16	11.38	6.16	-38.94		
	11458.80	Vertical	-46.52	14.56	6.72	-38.68		



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
LTE BAND 4 1.4MHz Lowest	87.56	Vertical	-74.76	3.35	0.38	-71.79	-13	PASS
	3421.40	Vertical	-45.73	7.76	3.75	-41.72		
	5132.10	Vertical	-46.83	9.84	4.94	-41.93		
	6842.80	Vertical	-39.38	10.21	5.32	-34.49		
	8553.50	Vertical	-42.62	11.36	6.02	-37.28		
	10264.20	Vertical	-44.27	14.52	6.68	-36.43		
LTE BAND 4 1.4MHz Middle	88.98	Vertical	-74.76	3.35	0.38	-71.79	-13	PASS
	3465.00	Vertical	-47.05	7.76	3.75	-43.04		
	5197.50	Vertical	-46.62	9.84	4.94	-41.72		
	6930.00	Vertical	-42.22	10.21	5.32	-37.33		
	8662.50	Vertical	-41.74	11.36	6.02	-36.40		
	10395.00	Vertical	-45.66	14.52	6.68	-37.82		
LTE BAND 4 1.4MHz Highest	88.81	Vertical	-74.61	3.35	0.38	-71.64	-13	PASS
	3508.60	Vertical	-46.68	7.79	3.53	-42.42		
	5262.90	Vertical	-41.12	9.88	5.02	-36.26		
	7017.20	Vertical	-37.37	10.25	5.54	-32.66		
	8771.50	Vertical	-44.16	11.38	6.16	-38.94		
	10525.80	Vertical	-46.55	14.56	6.72	-38.71		
LTE BAND 4 3MHz Lowest	87.67	Vertical	-74.71	3.35	0.38	-71.74	-13	PASS
	3423.00	Vertical	-45.76	7.76	3.75	-41.75		
	5134.50	Vertical	-46.83	9.84	4.94	-41.93		
	6846.00	Vertical	-39.38	10.21	5.32	-34.49		
	8557.50	Vertical	-42.64	11.36	6.02	-37.30		
	10269.00	Vertical	-44.21	14.52	6.68	-36.37		
LTE BAND 4 3MHz Middle	88.83	Vertical	-74.73	3.35	0.38	-71.76	-13	PASS
	3508.60	Vertical	-47.08	7.76	3.75	-43.07		
	5262.90	Vertical	-46.62	9.84	4.94	-41.72		
	7017.20	Vertical	-42.24	10.21	5.32	-37.35		
	8771.50	Vertical	-41.76	11.36	6.02	-36.42		
	10525.80	Vertical	-45.61	14.52	6.68	-37.77		
LTE BAND 4 3MHz Highest	88.66	Vertical	-74.63	3.35	0.38	-71.66	-13	PASS
	3507.00	Vertical	-46.68	7.79	3.53	-42.42		
	5260.50	Vertical	-41.13	9.88	5.02	-36.27		
	7014.00	Vertical	-37.37	10.25	5.54	-32.66		
	8767.50	Vertical	-44.15	11.38	6.16	-38.93		
	10521.00	Vertical	-46.56	14.56	6.72	-38.72		



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
LTE BAND 4 5MHz Lowest	87.79	Vertical	-74.63	3.35	0.38	-71.66	-13	PASS
	3425.00	Vertical	-45.71	7.76	3.75	-41.70		
	5137.50	Vertical	-46.88	9.84	4.94	-41.98		
	6850.00	Vertical	-39.36	10.21	5.32	-34.47		
	8562.50	Vertical	-42.67	11.36	6.02	-37.33		
	10275.00	Vertical	-44.13	14.52	6.68	-36.29		
LTE BAND 4 5MHz Middle	88.62	Vertical	-74.65	3.35	0.38	-71.68	-13	PASS
	3423.00	Vertical	-47.02	7.76	3.75	-43.01		
	5134.50	Vertical	-46.66	9.84	4.94	-41.76		
	6846.00	Vertical	-42.24	10.21	5.32	-37.35		
	8557.50	Vertical	-41.62	11.36	6.02	-36.28		
	10269.00	Vertical	-45.66	14.52	6.68	-37.82		
LTE BAND 4 5MHz Highest	88.61	Vertical	-74.68	3.35	0.38	-71.71	-13	PASS
	3505.00	Vertical	-46.65	7.79	3.53	-42.39		
	5257.50	Vertical	-41.16	9.88	5.02	-36.30		
	7010.00	Vertical	-37.34	10.25	5.54	-32.63		
	8762.50	Vertical	-44.18	11.38	6.16	-38.96		
	10515.00	Vertical	-46.57	14.56	6.72	-38.73		
LTE BAND 4 10MHz Lowest	87.78	Vertical	-74.63	3.35	0.38	-71.66	-13	PASS
	3430.00	Vertical	-45.72	7.76	3.75	-41.71		
	5145.00	Vertical	-46.88	9.84	4.94	-41.98		
	6860.00	Vertical	-39.36	10.21	5.32	-34.47		
	8575.00	Vertical	-42.61	11.36	6.02	-37.27		
	10290.00	Vertical	-44.17	14.52	6.68	-36.33		
LTE BAND 4 10MHz Middle	88.57	Vertical	-74.66	3.35	0.38	-71.69	-13	PASS
	3505.00	Vertical	-47.02	7.76	3.75	-43.01		
	5257.50	Vertical	-46.68	9.84	4.94	-41.78		
	7010.00	Vertical	-42.27	10.21	5.32	-37.38		
	8762.50	Vertical	-41.65	11.36	6.02	-36.31		
	10515.00	Vertical	-45.66	14.52	6.68	-37.82		
LTE BAND 4 10MHz Highest	88.82	Vertical	-74.26	3.35	0.38	-71.29	-13	PASS
	3500.00	Vertical	-46.68	7.79	3.53	-42.42		
	5250.00	Vertical	-41.12	9.88	5.02	-36.26		
	7000.00	Vertical	-37.36	10.25	5.54	-32.65		
	8750.00	Vertical	-44.14	11.38	6.16	-38.92		
	10500.00	Vertical	-46.57	14.56	6.72	-38.73		



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
LTE BAND 4 15MHz Lowest	87.62	Vertical	-74.62	3.35	0.38	-71.65	-13	PASS
	3435.00	Vertical	-45.66	7.76	3.75	-41.65		
	5152.50	Vertical	-46.78	9.84	4.94	-41.88		
	6870.00	Vertical	-39.34	10.21	5.32	-34.45		
	8587.50	Vertical	-42.63	11.36	6.02	-37.29		
	10305.00	Vertical	-44.15	14.52	6.68	-36.31		
LTE BAND 4 15MHz Middle	88.42	Vertical	-74.62	3.35	0.38	-71.65	-13	PASS
	3505.00	Vertical	-46.97	7.76	3.75	-42.96		
	5257.50	Vertical	-46.56	9.84	4.94	-41.66		
	7010.00	Vertical	-42.23	10.21	5.32	-37.34		
	8762.50	Vertical	-41.65	11.36	6.02	-36.31		
	10515.00	Vertical	-45.56	14.52	6.68	-37.72		
LTE BAND 4 15MHz Highest	88.65	Vertical	-74.57	3.35	0.38	-71.60	-13	PASS
	3495.00	Vertical	-46.51	7.79	3.53	-42.25		
	5242.50	Vertical	-41.16	9.88	5.02	-36.30		
	6990.00	Vertical	-37.32	10.25	5.54	-32.61		
	8737.50	Vertical	-44.18	11.38	6.16	-38.96		
	10485.00	Vertical	-46.56	14.56	6.72	-38.72		
LTE BAND 4 20MHz Lowest	87.79	Vertical	-74.61	3.35	0.38	-71.64	-13	PASS
	3440.00	Vertical	-45.66	7.76	3.75	-41.65		
	5160.00	Vertical	-46.36	9.84	4.94	-41.46		
	6880.00	Vertical	-39.34	10.21	5.32	-34.45		
	8600.00	Vertical	-42.63	11.36	6.02	-37.29		
	10320.00	Vertical	-44.15	14.52	6.68	-36.31		
LTE BAND 4 20MHz Middle	88.12	Vertical	-74.66	3.35	0.38	-71.69	-13	PASS
	3505.00	Vertical	-46.91	7.76	3.75	-42.90		
	5257.50	Vertical	-46.53	9.84	4.94	-41.63		
	7010.00	Vertical	-42.28	10.21	5.32	-37.39		
	8762.50	Vertical	-41.66	11.36	6.02	-36.32		
	10515.00	Vertical	-45.55	14.52	6.68	-37.71		
LTE BAND 4 20MHz Highest	88.77	Vertical	-74.51	3.35	0.38	-71.54	-13	PASS
	3490.00	Vertical	-46.39	7.79	3.53	-42.13		
	5235.00	Vertical	-41.63	9.88	5.02	-36.77		
	6980.00	Vertical	-37.64	10.25	5.54	-32.93		
	8725.00	Vertical	-44.18	11.38	6.16	-38.96		
	10470.00	Vertical	-46.51	14.56	6.72	-38.67		



Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
LTE BAND 12 1.4MHz Lowest	87.56	Vertical	-74.38	3.35	0.38	-71.41	-13	PASS
	1399.40	Vertical	-45.36	7.76	3.75	-41.35		
	2099.10	Vertical	-46.44	9.84	4.94	-41.54		
	2798.80	Vertical	-39.11	10.21	5.32	-34.22		
	3498.50	Vertical	-42.48	11.36	6.02	-37.14		
	4198.20	Vertical	-43.39	14.52	6.68	-35.55		
LTE BAND 12 1.4MHz Middle	88.87	Vertical	-74.37	3.35	0.38	-71.40	-13	PASS
	1415.00	Vertical	-46.82	7.76	3.75	-42.81		
	2122.50	Vertical	-46.46	9.84	4.94	-41.56		
	2830.00	Vertical	-42.07	10.21	5.32	-37.18		
	3537.50	Vertical	-41.53	11.36	6.02	-36.19		
	4245.00	Vertical	-45.21	14.52	6.68	-37.37		
LTE BAND 12 1.4MHz Highest	88.54	Vertical	-74.36	3.35	0.38	-71.39	-13	PASS
	1430.60	Vertical	-46.48	7.79	3.53	-42.22		
	2145.90	Vertical	-40.94	9.88	5.02	-36.08		
	2861.20	Vertical	-37.26	10.25	5.54	-32.55		
	3576.50	Vertical	-43.93	11.38	6.16	-38.71		
	4291.80	Vertical	-46.35	14.56	6.72	-38.51		
LTE BAND 12 3MHz Lowest	87.67	Vertical	-73.56	3.35	0.38	-70.59	-13	PASS
	1401.00	Vertical	-44.97	7.76	3.75	-40.96		
	2101.50	Vertical	-46.05	9.84	4.94	-41.15		
	2802.00	Vertical	-38.73	10.21	5.32	-33.84		
	3502.50	Vertical	-42.39	11.36	6.02	-37.05		
	4203.00	Vertical	-43.44	14.52	6.68	-35.60		
LTE BAND 12 3MHz Middle	88.58	Vertical	-74.46	3.35	0.38	-71.49	-13	PASS
	1415.00	Vertical	-46.81	7.76	3.75	-42.80		
	2122.50	Vertical	-46.47	9.84	4.94	-41.57		
	2830.00	Vertical	-42.16	10.21	5.32	-37.27		
	3537.50	Vertical	-41.53	11.36	6.02	-36.19		
	4245.00	Vertical	-45.48	14.52	6.68	-37.64		
LTE BAND 12 3MHz Highest	88.78	Vertical	-74.36	3.35	0.38	-71.39	-13	PASS
	1429.00	Vertical	-46.43	7.79	3.53	-42.17		
	2143.50	Vertical	-40.18	9.88	5.02	-35.32		
	2858.00	Vertical	-37.28	10.25	5.54	-32.57		
	3572.50	Vertical	-44.37	11.38	6.16	-39.15		
	4287.00	Vertical	-46.46	14.56	6.72	-38.62		

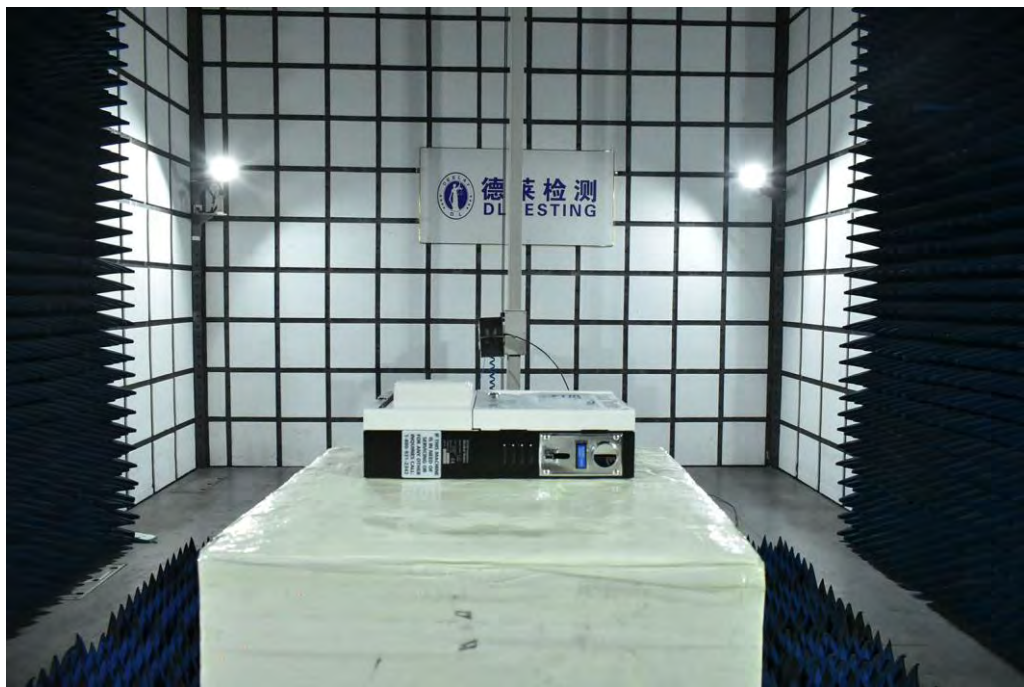
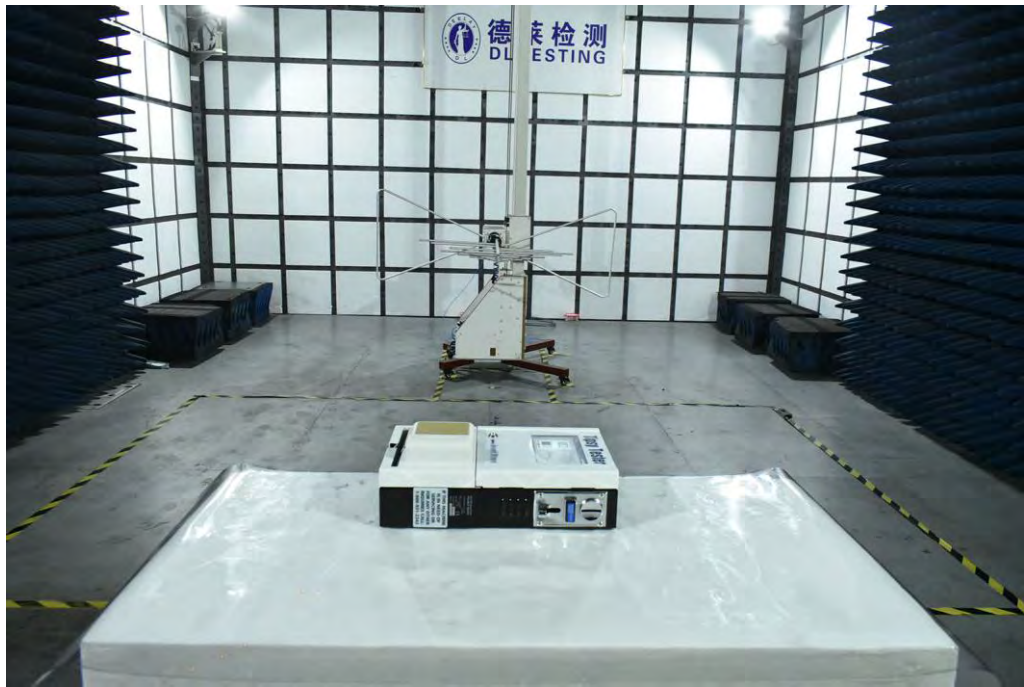


Band	Frequency (MHz)	Spurious Emission					Limit (dBm)	Result
		Polarization	S.G. output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Level (dBm)		
LTE BAND 12 5MHz Lowest	87.55	Vertical	-74.08	3.35	0.38	-71.11	-13	PASS
	1403.00	Vertical	-45.34	7.76	3.75	-41.33		
	2104.50	Vertical	-46.42	9.84	4.94	-41.52		
	2806.00	Vertical	-39.06	10.21	5.32	-34.17		
	3507.50	Vertical	-42.37	11.36	6.02	-37.03		
	4209.00	Vertical	-43.83	14.52	6.68	-35.99		
LTE BAND 12 5MHz Middle	88.16	Vertical	-74.05	3.35	0.38	-71.08	-13	PASS
	1415.00	Vertical	-46.64	7.76	3.75	-42.63		
	2122.50	Vertical	-46.26	9.84	4.94	-41.36		
	2830.00	Vertical	-41.85	10.21	5.32	-36.96		
	3537.50	Vertical	-41.36	11.36	6.02	-36.02		
	4245.00	Vertical	-45.24	14.52	6.68	-37.40		
LTE BAND 12 5MHz Highest	88.87	Vertical	-74.03	3.35	0.38	-71.06	-13	PASS
	1427.00	Vertical	-46.27	7.79	3.53	-42.01		
	2140.50	Vertical	-40.86	9.88	5.02	-36.00		
	2854.00	Vertical	-37.07	10.25	5.54	-32.36		
	3567.50	Vertical	-43.82	11.38	6.16	-38.60		
	4281.00	Vertical	-46.23	14.56	6.72	-38.39		
LTE BAND 12 10MHz Lowest	87.75	Vertical	-74.08	3.35	0.38	-71.11	-13	PASS
	1408.00	Vertical	-45.34	7.76	3.75	-41.33		
	2112.00	Vertical	-46.43	9.84	4.94	-41.53		
	2816.00	Vertical	-39.63	10.21	5.32	-34.74		
	3520.00	Vertical	-42.31	11.36	6.02	-36.97		
	4224.00	Vertical	-43.88	14.52	6.68	-36.04		
LTE BAND 12 10MHz Middle	88.35	Vertical	-74.23	3.35	0.38	-71.26	-13	PASS
	1415.00	Vertical	-46.76	7.76	3.75	-42.75		
	2122.50	Vertical	-46.34	9.84	4.94	-41.44		
	2830.00	Vertical	-42.05	10.21	5.32	-37.16		
	3537.50	Vertical	-41.47	11.36	6.02	-36.13		
	4245.00	Vertical	-45.36	14.52	6.68	-37.52		
LTE BAND 12 10MHz Highest	88.75	Vertical	-74.38	3.35	0.38	-71.41	-13	PASS
	1422.00	Vertical	-46.36	7.79	3.53	-42.10		
	2133.00	Vertical	-40.42	9.88	5.02	-35.56		
	2844.00	Vertical	-37.13	10.25	5.54	-32.42		
	3555.00	Vertical	-43.92	11.38	6.16	-38.70		
	4266.00	Vertical	-46.38	14.56	6.72	-38.54		



6. PHOTOGRAPHS OF TEST SET-UP

Radiated Measurement Photos





7. PHOTOGRAPHS OF THE EUT









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