

TEST REPORT

Report No.: BCTC2203264445-6E

Applicant: Emdoor Information Co.,Ltd.

Product Name: Rugged Tablet

Model/Type
reference: EM-I16H

Tested Date: 2022-03-31 to 2022-04-11

Issued Date: 2022-04-11



Shenzhen BCTC Testing Co., Ltd.



FCC ID:2A37Q-EM-I16H

Product Name: Rugged Tablet

Trademark: Emdoor

Model/Type reference: EM-I16H
EM-I16HH,W16H,W16HH

Prepared For: Emdoor Information Co.,Ltd.

Address: 3/F, Bldg 5th, Wonderful Life Wisdom Valley TechnoPark, No.83 Dabao Rd, Xin'an Sub-district, Bao'an District, Shenzhen518101, Guangdong Province, China

Manufacturer: Emdoor Information Co.,Ltd.

Address: 3/F, Bldg 5th, Wonderful Life Wisdom Valley TechnoPark, No.83 Dabao Rd, Xin'an Sub-district, Bao'an District, Shenzhen518101, Guangdong Province, China

Prepared By: Shenzhen BCTC Testing Co., Ltd.

Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

Sample Received Date: 2022-03-31

Sample tested Date: 2022-03-31 to 2022-04-11

Issue Date: 2022-04-11

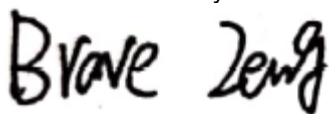
Report No.: BCTC2203264445-6E

Test Standards: FCC CFR Title 47 Part 2
FCC CFR Title 47 Part24
FCC CFR Title 47 Part27

Test Results: PASS

Remark: This is radio test report.

Tested by:



Brave Zeng/ Project Handler

Approved by:



Zero Zhou/Reviewer

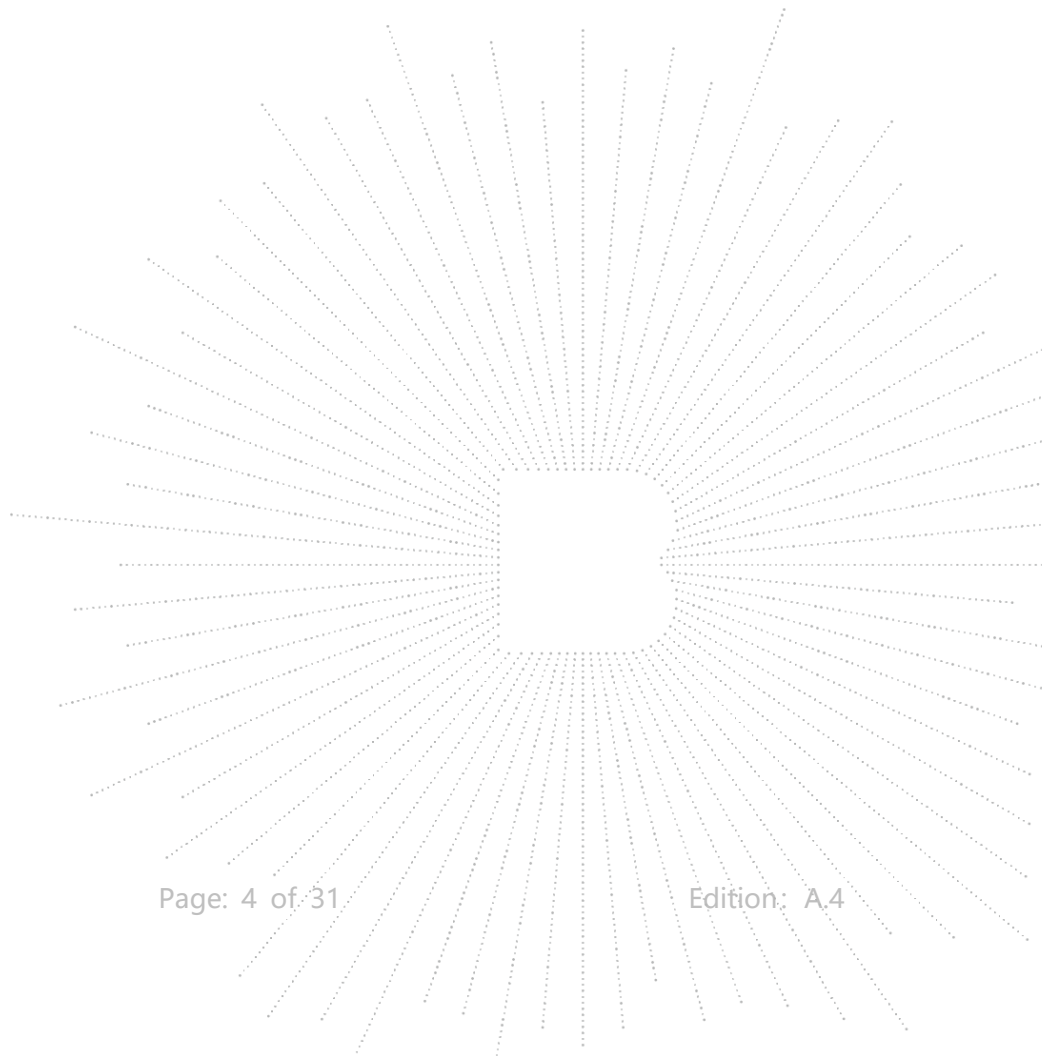
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(Note: N/A Means Not Applicable)



1. Version

Report No.	Issue Date	Description	Approved
BCTC2203264445-6E	2022-04-11	Original	Valid

2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No	Results
1	RF Exposure	§1.1307,§2.1093	PASS
2	RF Output Power	§22.913 (a), §24.232 (c), §27.50 (d),	PASS
3	Peak-to-average Ratio(PAR) of Transmitter	§24.232(d),§22.913, §27.50(d),	PASS
4	Emission Bandwidth	§22.917 (b), §24.238(b), §27.53(g)	PASS
5	Spurious Emissions at Antenna Terminal	§22.917 (a), §24.238 (a), §27.53(g),§27.53(h)	PASS
6	Spurious Radiation Emissions	§22.917 (a), §24.238 (a), §27.53(g),§27.53(h)	PASS
7	Out of Band Emissions	§22.917 (a), §24.238 (a), §27.53(g),§27.53(h)	PASS
8	Frequency Stability	§22.355, §24.235, §27.54	PASS

3. 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	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	3m chamber Radiated spurious emission(9KHz-30MHz)	U=3.7dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
5	Conducted Emission (150kHz-30MHz)	U=3.20dB
6	Conducted Adjacent channel power	U=1.38dB
7	Conducted output power uncertainty Above 1G	U=1.576dB
8	Conducted output power uncertainty below 1G	U=1.28dB
9	humidity uncertainty	U=5.3%
10	Temperature uncertainty	U=0.59°C

4. Product Information And Test Setup

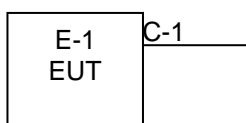
4.1 Product Information

Model/Type reference:	EM-I16H EM-I16HH,W16H,W16HH
Model differences:	All the model are the same circuit and RF module, except model names.
Hardware Version:	N/A
Software Version:	N/A
Tx Frequency:	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 12: 699 MHz ~ 716 MHz
Rx Frequency:	LTE Band 2: 1930 MHz ~ 1990 MHz LTE Band 4: 2110 MHz ~ 2155 MHz LTE Band 12: 729 MHz ~ 746 MHz
Bandwidth:	LTE Band 2: 1.4MHz /3MHz /5MHz /10MHz /15MHz /20MHz LTE Band 4: 1.4MHz /3MHz /5MHz /10MHz /15MHz /20MHz LTE Band 12: 1.4MHz /3MHz /5MHz /10MHz
Maximum Output Power to Antenna:	LTE Band 2: 21.19dBm LTE Band 4: 22.61dBm LTE Band 12: 24.68dBm
99% Occupied Bandwidth:	LTE Band 2: 17M9G7D LTE Band 4: 18M0G7D LTE Band 12: 9M02G7D
Type of Modulation:	QPSK/16QAM
Antenna Type:	Internal Antenna
Antenna Gain:	LTE Band 2: 1.5dBi LTE Band 4: 1.5dBi LTE Band 12: 0.5dBi
Connecting I/O Port(s):	Please refer to the User's Manual
Ratings:	AC 120V/60Hz/DC 3.7V
Adapter:	Model:AW018WR-0500300UH Inout:100-240V~50/60 0.5A Output:DC 5V 3A

4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.

Radiated Spurious Emission



4.2 Emission Designator

LTE Band 2	QPSK		16QAM	
BW(MHz)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)
1.4	1M10G7D	0.173	1M10W7D	0.138
3	2M70G7D	0.168	2M71W7D	0.148
5	4M52G7D	0.163	4M53W7D	0.131
10	8M98G7D	0.176	8M98W7D	0.161
15	13M5G7D	0.173	13M4W7D	0.157
20	17M9G7D	0.186	17M9W7D	0.150

LTE Band 4	QPSK		16QAM	
BW(MHz)	Emission Designator (99%OBW)	Maximum EIRP(W)	Emission Designator (99%OBW)	Maximum EIRP(W)
1.4	1M10G7D	0.177	1M09W7D	0.136
3	2M70G7D	0.182	2M69W7D	0.142
5	4M51G7D	0.173	4M54W7D	0.131
10	8M96G7D	0.174	8M98W7D	0.142
15	13M5G7D	0.175	13M5W7D	0.143
20	18M0G7D	0.182	17M9W7D	0.144

LTE Band 12	QPSK		16QAM	
BW(MHz)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)
1.4	1M09G7D	0.201	1M10W7D	0.156
3	2M70G7D	0.195	2M70W7D	0.163
5	4M52G7D	0.191	4M53W7D	0.157
10	9M02G7D	0.198	8M99W7D	0.166

4.3 Description Operation Frequency

LTE Band 2(1.4MHz)		LTE Band 2(3MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
18607	1850.7	18615	1851.5
18900	1880	18900	1880
19193	1909.3	19185	1908.5
LTE Band 2(5MHz)		LTE Band 2(10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
18625	1852.5	18650	1855
18900	1880	18900	1880
19175	1907.5	19150	1905
LTE Band 2(15MHz)		LTE Band 2(20MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
18675	1857.5	18700	1860
18900	1880	18900	1880
19125	1902.5	19100	1900

LTE Band 4(1.4MHz)		LTE Band 4(3MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
19957	1710.7	19965	1711.5
20175	1732.5	20175	1732.5
20393	1754.3	20385	1753.5
LTE Band 4(5MHz)		LTE Band 4(10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
19975	1712.5	20000	1715
20175	1732.5	20175	1732.5
20375	1752.5	20350	1750
LTE Band 4(15MHz)		LTE Band 4(20MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
20025	1717.5	20050	1720
20175	1732.5	20175	1732.5
20325	1747.5	20300	1745

LTE Band 12(1.4MHz)		LTE Band 12(3MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
23017	699.7	23025	700.5
23095	707.5	23095	707.5
23173	715.3	23165	714.5
LTE Band 12(5MHz)		LTE Band 12(10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
23035	701.5	23060	704
23095	707.5	23095	707.5
23155	713.5	23130	711

4.4 Test Mode

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Mode		
Band	Radiated TCs	Conducted TCs
LTE Band 2	QPSK Link (1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz)	16QAM Link (1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz)
LTE Band 4	QPSK Link (1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz)	16QAM Link (1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz)
LTE Band 12	QPSK Link (1.4MHz / 3MHz / 5MHz / 10MHz)	16QAM Link (1.4MHz / 3MHz / 5MHz / 10MHz)

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03 with maximum output power.

EUT Cable List and Details

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

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
/	/	/	/

Special Cable List and Details

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

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

Test Items	Band	Bandwidth (MHz)						Modulation		RB#			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max.Output Power	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v
26Db and 99% Bandwidth	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v
Conducted Band Edge	2	v	v	v	v	v	v	v	v	v	v	v	v	-	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	-	v
	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v
Conducted Spurious Emission	2	v	v	v	v	v	v	v	v	v	-	-	v	v	v
	4	v	v	v	v	v	v	v	v	v	-	-	v	v	v
	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v
Frequency stability	2	v	-	-	-	-	-	v	v	v	-	-	v	v	v
	4	v	-	-	-	-	-	v	v	v	-	-	v	v	v
	12	v	-	-	-	-	-	v	v	v	-	-	v	v	v
E.R.P./ E.I.R.P.	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v
Radiated Spurious Emission	2	v	-	-	-	-	-	v	v	v	-	-	v	v	v
	4	v	-	-	-	-	-	v	v	v	-	-	v	v	v
	12	v	-	-	-	-	-	v	v	v	-	-	v	v	v
Note	1.The mark “v “ means that this configuration is chosen for testing 2.The mark “-“ means that this bandwidth is not supported.														

4.5 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-1	Rugged Tablet	Emdoor	EM-I16H	EM-I16HH	EUT
E-2	Adapter	N/A	AW018WR-0500300UH	N/A	Auxiliary

Item	Shielded Type	Ferrite Core	Length	Note
C-1	N/A	N/A	0.3M	USB cable unshielded

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level. The spectrum analyzer offset is derived from RF cable loss and attenuator factor. Offset = RF cable loss + attenuator factor.

5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

FCC Test Firm Registration Number: 712850

IC Registered No.: 23583

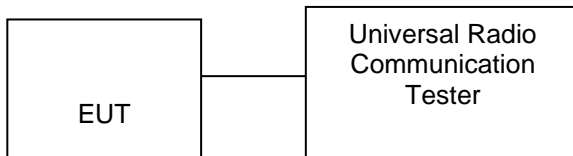
5.2 Test Instrument Used

Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
966 chamber	ChengYu	966 Room	966	Jun. 06. 2020	Jun. 05, 2023
Receiver	R&S	ESR3	102075	May 28, 2021	May 27, 2022
Receiver	R&S	ESRP	101154	May 28, 2021	May 27, 2022
Amplifier	SKET	LAPA_01G18G-45dB	\	May 28, 2021	May 27, 2022
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 28, 2021	May 27, 2022
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	942	Jun. 01, 2021	May 31, 2022
Horn Antenna	Schwarzbeck	BBHA9120D	1541	Jun. 02, 2021	Jun. 01, 2022
band rejection filter	ZBSF	ZBSF-C2441.5	1706003606	May 28, 2021	May 27, 2022
Horn antenna	Schwarzbeck	BBHA9170	822	Jun. 15, 2021	Jun. 14, 2022
Preamplifier	MITEQ	TTA1840-35-HG	2034381	May 28, 2021	May 27, 2022
Loop Antenna	Schwarzbeck	FMZB1519B	14	Jun. 02, 2021	Jun. 01, 2022
RF cables1 (9kHz-30MHz)	Huber+Suhner	9kHz-30MHz	B1702988-0008	May 28, 2021	May 27, 2022
RF cables2 (30MHz-1GHz)	Huber+Suhner	30MHz-1GHz	1486150	May 28, 2021	May 27, 2022
RF cables3 (1GHz-40GHz)	Huber+Suhner	1GHz-40GHz	1607106	May 28, 2021	May 27, 2022
Software	Frad	EZ-EMC	FA-03A2 RE	\	\
Spectrum Analyzer	Keysight	N9020A	MY49100060	May 28, 2021	May 27, 2022
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	\	May 28, 2021	May 27, 2022
Communication test set	R&S	CMW500	126173	Nov 12, 2021	Nov 11, 2022
Signal Generator	Keysight	N5182B	MY56200519	May 28, 2021	May 27, 2022
RF Room	SKET	RF Room	RF ROOM-1	Nov 05, 2021	Nov 04, 2022
Radio frequency control box	MAIWEI	MW200-RFCB	\	\	\
D.C. Power Supply	Keysight	E3642A	MY40003053	\	\
Programmable constant temperature and humidity test chamber	DGBELL	BTKS5-150C	\	Jul. 06, 2021	Jul. 05, 2022

6. RF Output Power

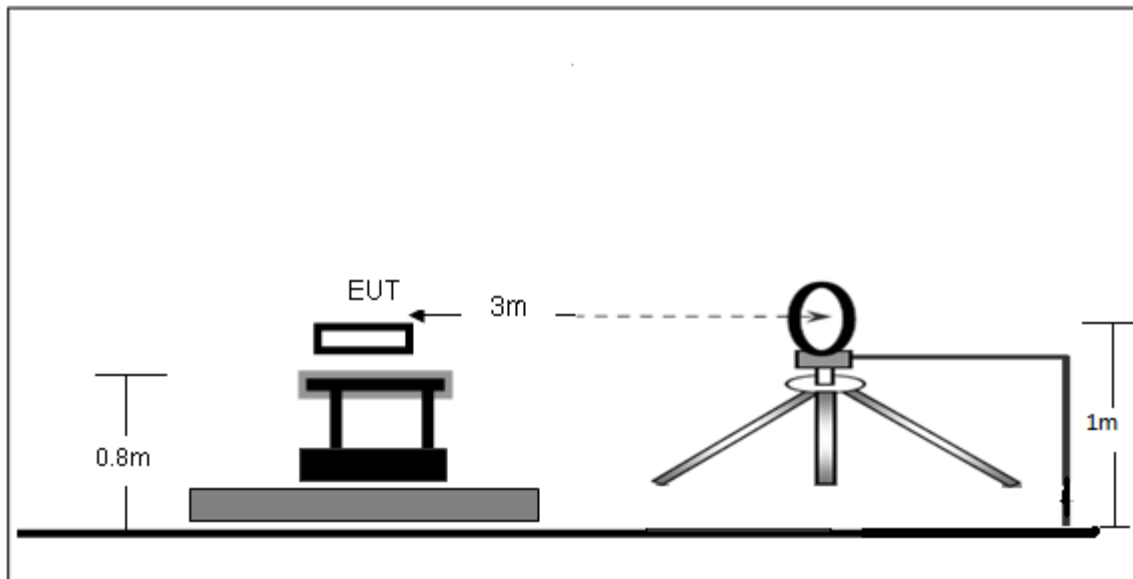
6.1 Block Diagram Of Test Setup

Conducted output power test method:

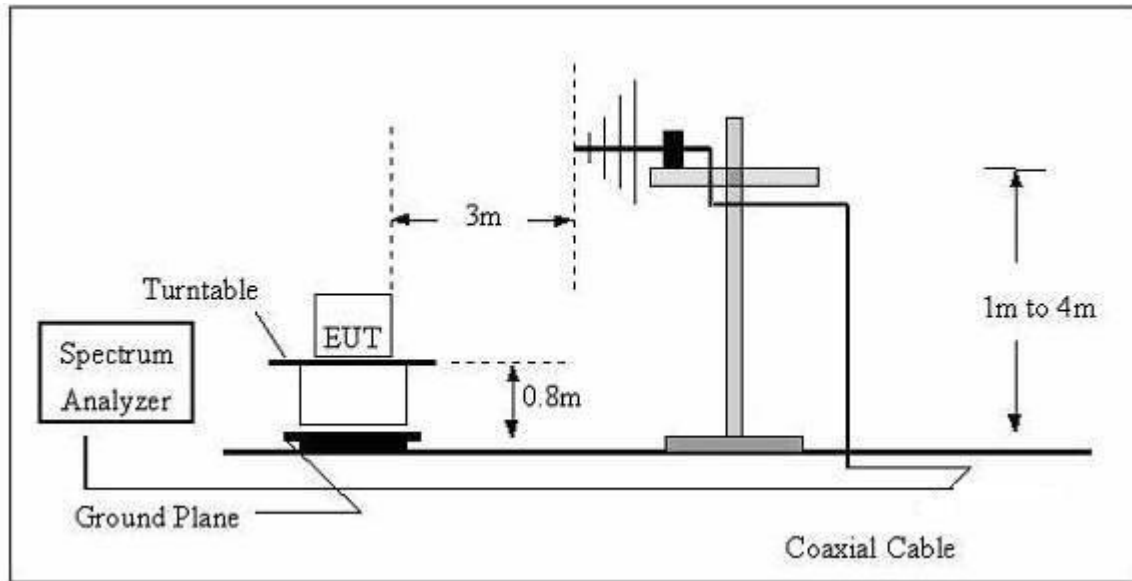


Radiated power test method:

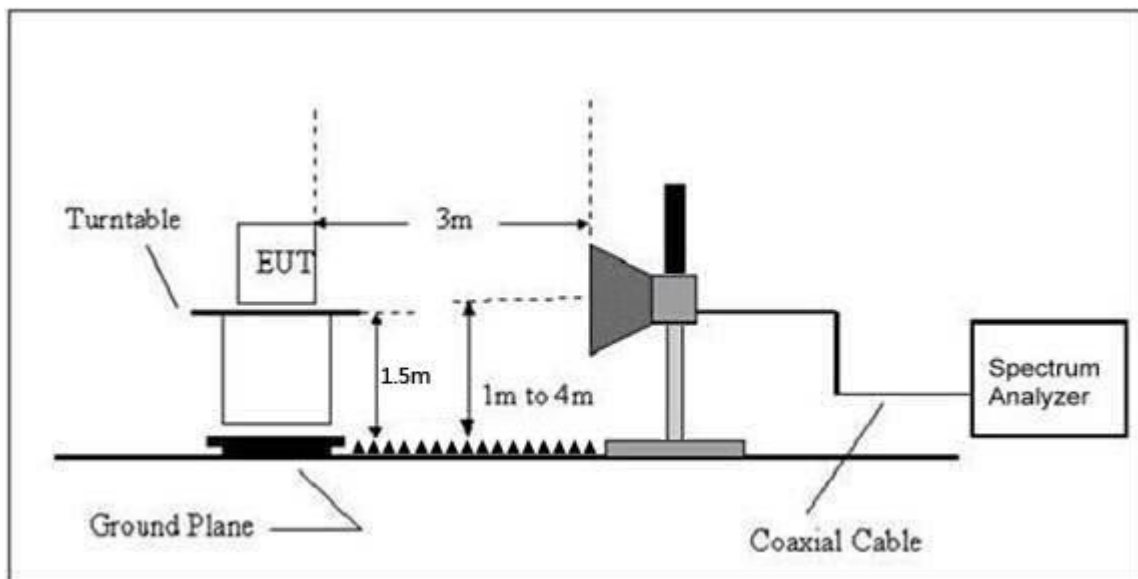
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



6.2 Limit

According to §22.913(a)(2), The ERP of mobile and portable stations transmitters and auxiliary test transmitters must not exceed 7 Watts.

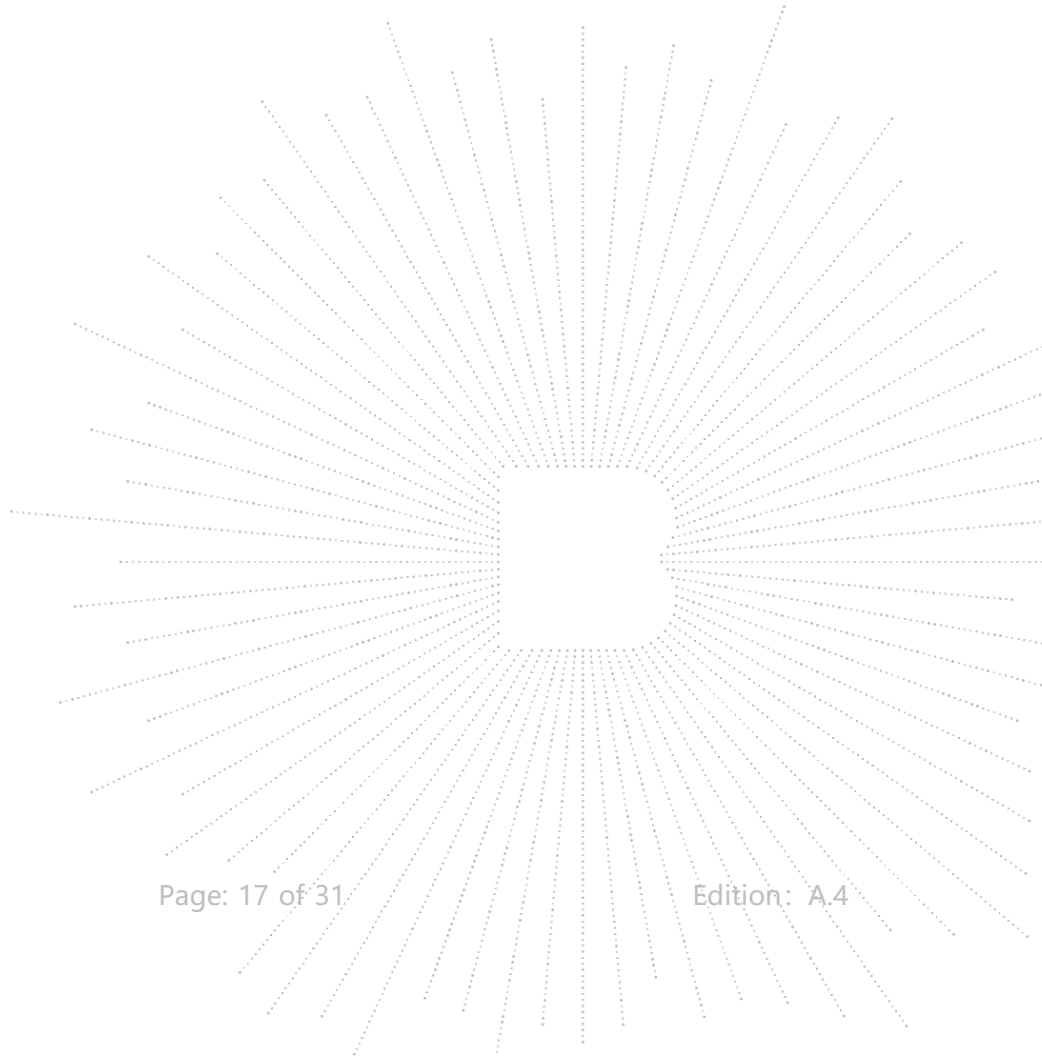
According to §24.232 (c), Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

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

6.3 Test procedure

Radiated power test method:

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



6.4 Test Result

Max Radiated Power:
FDD-LTE Band 2

Channel Bandwidth: 1.4MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	18.31	PASS
	MCK	17.45	PASS
	HCH	18.42	PASS
16QAM	LCH	17.87	PASS
	MCK	18.90	PASS
	HCH	17.91	PASS
Channel Bandwidth: 3MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	19.19	PASS
	MCK	18.20	PASS
	HCH	18.64	PASS
16QAM	LCH	17.92	PASS
	MCK	18.57	PASS
	HCH	17.55	PASS
Channel Bandwidth: 5MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	19.25	PASS
	MCK	18.17	PASS
	HCH	18.47	PASS
16QAM	LCH	17.69	PASS
	MCK	18.55	PASS
	HCH	17.65	PASS
Channel Bandwidth: 10MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	18.35	PASS
	MCK	17.91	PASS
	HCH	18.17	PASS
16QAM	LCH	17.91	PASS
	MCK	19.09	PASS
	HCH	18.60	PASS

Channel Bandwidth: 15MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	19.20	PASS
	MCK	18.07	PASS
	HCH	18.16	PASS
16QAM	LCH	17.31	PASS
	MCK	18.09	PASS
	HCH	17.59	PASS
Channel Bandwidth: 20MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	18.09	PASS
	MCK	17.66	PASS
	HCH	18.69	PASS
16QAM	LCH	17.34	PASS
	MCK	18.62	PASS
	HCH	17.87	PASS

FDD-LTE Band 4

Channel Bandwidth: 1.4MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	18.52	PASS
	MCK	17.80	PASS
	HCH	18.65	PASS
16QAM	LCH	18.26	PASS
	MCK	19.58	PASS
	HCH	18.61	PASS
Channel Bandwidth: 3MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	18.23	PASS
	MCK	18.43	PASS
	HCH	18.45	PASS
16QAM	LCH	18.60	PASS
	MCK	18.65	PASS
	HCH	17.92	PASS
Channel Bandwidth: 5MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	19.09	PASS
	MCK	18.14	PASS
	HCH	19.01	PASS
16QAM	LCH	18.83	PASS
	MCK	19.17	PASS
	HCH	18.03	PASS
Channel Bandwidth: 10MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	18.62	PASS
	MCK	18.34	PASS
	HCH	18.73	PASS
16QAM	LCH	18.47	PASS
	MCK	18.47	PASS
	HCH	18.40	PASS

Channel Bandwidth: 15MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	19.16	PASS
	MCK	18.81	PASS
	HCH	19.50	PASS
16QAM	LCH	17.98	PASS
	MCK	19.33	PASS
	HCH	18.25	PASS
Channel Bandwidth: 20MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	19.29	PASS
	MCK	18.16	PASS
	HCH	18.62	PASS
16QAM	LCH	17.73	PASS
	MCK	18.14	PASS
	HCH	17.68	PASS

FDD-LTE Band 12

Channel Bandwidth: 1.4MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	19.89	PASS
	MCK	19.05	PASS
	HCH	18.32	PASS
16QAM	LCH	18.99	PASS
	MCK	19.45	PASS
	HCH	18.54	PASS
Channel Bandwidth: 3MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	18.74	PASS
	MCK	18.61	PASS
	HCH	18.68	PASS
16QAM	LCH	18.57	PASS
	MCK	19.18	PASS
	HCH	18.97	PASS
Channel Bandwidth: 5MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	18.63	PASS
	MCK	19.09	PASS
	HCH	19.11	PASS
16QAM	LCH	18.44	PASS
	MCK	19.71	PASS
	HCH	19.20	PASS
Channel Bandwidth: 10MHz			
Modulation	Channel	E.I.R.P(dBm)	Verdict
QPSK	LCH	18.46	PASS
	MCK	18.86	PASS
	HCH	18.64	PASS
16QAM	LCH	18.43	PASS
	MCK	18.78	PASS
	HCH	18.78	PASS

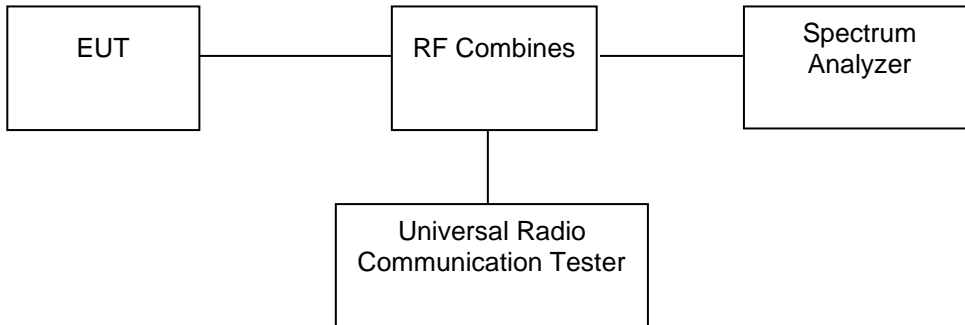
Max Conducted output Power:

Please refer to appendix A: Conducted Output Power

Test Result: Pass

7. Peak-To-Average Ratio(PAR) Of Transmitter

7.1 Block Diagram Of Test Setup



7.2 Limit

According to §24.232(d), Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

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

7.3 Test procedure

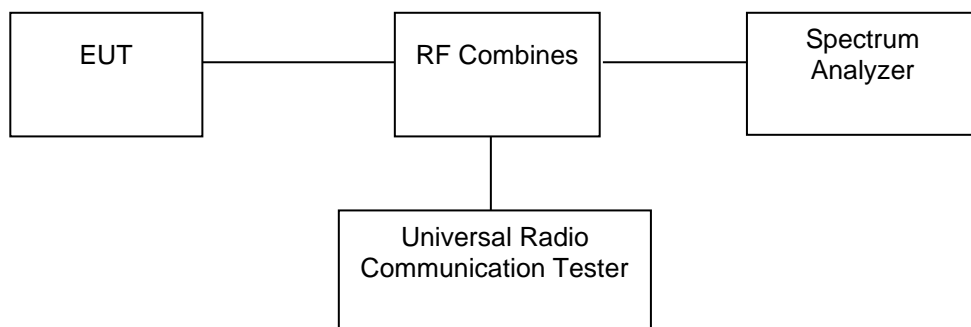
The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 30kHz and the peak-to-average ratio (PAR) of the transmission was recorded. Record the maximum PAPR level associated with a probability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

7.4 Test Result

Please refer to Appendix 3: Peak-to-Average Ratio
Test Result: Pass

8. Emission Bandwidth

8.1 Block Diagram Of Test Setup



8.2 Standard Applicable

According to §22.917(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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

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

8.3 Test procedure

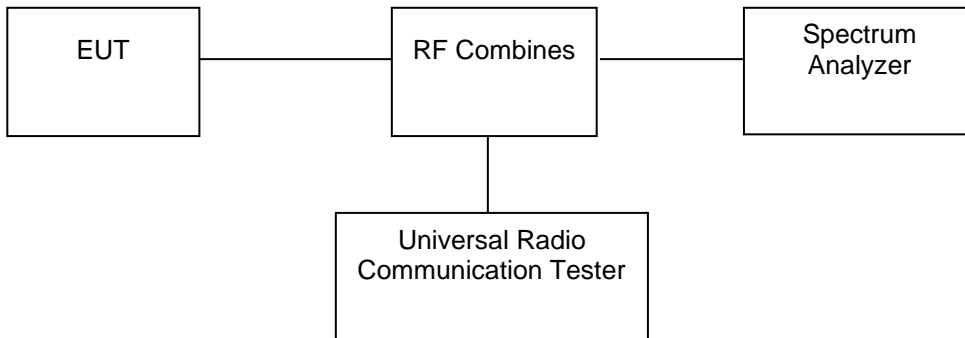
1. The testing follows FCC KDB 971168 D01v03 Section 4.2.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The 99% occupied bandwidth were measured, set RBW= 1% of OBW, VBW= 3*RBW, sample detector, trace maximum hold.
5. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.

8.4 Test Result

Please refer to Appendix 4: Occupied BandWidth
Test Result: Pass

9. Out of Band Emissions at Antenna Terminal

9.1 Block Diagram Of Test Setup



9.2 Limit

According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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

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

9.3 Test procedure

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

9.4 Test Result

Please refer to Appendix 5: Band Edge & Appendix 6: Out-of-band Emissions
Test Result: Pass

10. Spurious Radiated Emissions

10.1 Block Diagram Of Test Setup

(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



10.2 Limit

According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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

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

10.3 Test procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.
 2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
 3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
 4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.
- Spurious attenuation limit in dB
 $= 43 + 10 \log_{10}(\text{power out in Watts})$

10.4 Test Result

For FDD-LTE Band 2 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (1852.5MHz)						
70.00	-43.39	-15.71	-59.10	-13.00	-46.10	H
3705.00	-21.73	-16.25	-37.98	-13.00	-24.98	H
5557.50	-23.63	-10.50	-34.13	-13.00	-21.13	H
70.00	-44.55	-15.71	-60.26	-13.00	-47.26	V
3705.00	-20.67	-16.25	-36.92	-13.00	-23.92	V
5557.50	-25.05	-10.50	-35.55	-13.00	-22.55	V
Middle Channel (1880MHz)						
70.00	-42.61	-15.71	-58.32	-13.00	-45.32	H
3760.00	-18.78	-15.80	-34.58	-13.00	-21.58	H
5640.00	-25.28	-10.25	-35.53	-13.00	-22.53	H
70.00	-43.54	-15.71	-59.25	-13.00	-46.25	V
3760.00	-19.30	-15.80	-35.10	-13.00	-22.10	V
5640.00	-26.52	-10.25	-36.77	-13.00	-23.77	V
High Channel (1907.5MHz)						
70.00	-43.97	-15.71	-59.68	-13.00	-46.68	H
3815.00	-21.79	-15.79	-37.58	-13.00	-24.58	H
5722.50	-26.96	-10.56	-37.52	-13.00	-24.52	H
70.00	-44.42	-15.71	-60.13	-13.00	-47.13	V
3815.00	-21.80	-15.79	-37.59	-13.00	-24.59	V
5722.50	-23.08	-10.56	-33.64	-13.00	-20.64	V

For FDD-LTE Band 4 Mode

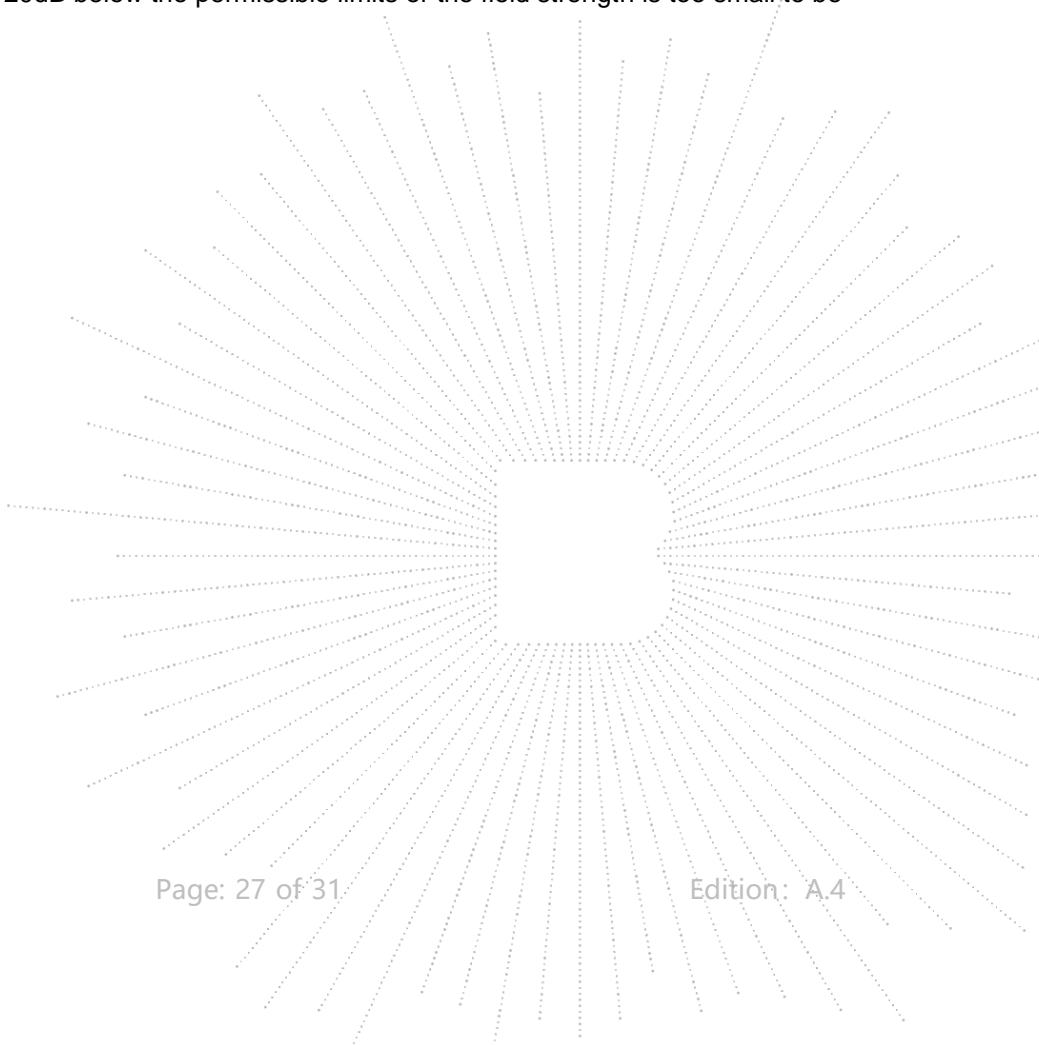
Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (1710.7MHz)						
70.00	-43.73	-15.71	-59.44	-13.00	-46.44	H
3421.40	-18.59	-17.10	-35.69	-13.00	-22.69	H
5132.10	-25.11	-10.65	-35.76	-13.00	-22.76	H
70.00	-41.93	-15.71	-57.64	-13.00	-44.64	V
3421.40	-20.75	-17.10	-37.85	-13.00	-24.85	V
5132.10	-24.19	-10.65	-34.84	-13.00	-21.84	V
Middle Channel (1732.5MHz)						
70.00	-43.65	-15.71	-59.36	-13.00	-46.36	H
3465.00	-19.53	-17.50	-37.03	-13.00	-24.03	H
5197.50	-26.43	-10.70	-37.13	-13.00	-24.13	H
70.00	-43.95	-15.71	-59.66	-13.00	-46.66	V
3465.00	-20.67	-17.50	-38.17	-13.00	-25.17	V
5197.50	-26.03	-10.70	-36.73	-13.00	-23.73	V
High Channel (1754.3MHz)						
70.00	-43.24	-15.71	-58.95	-13.00	-45.95	H
3508.60	-20.12	-15.10	-35.22	-13.00	-22.22	H
5262.90	-23.14	-10.70	-33.84	-13.00	-20.84	H
70.00	-43.52	-15.71	-59.23	-13.00	-46.23	V
3508.60	-19.60	-15.10	-34.70	-13.00	-21.70	V
5262.90	-23.66	-10.70	-34.36	-13.00	-21.36	V

For FDD-LTE Band 12 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (699.7MHz)						
70.00	-41.89	-15.71	-57.60	-13.00	-44.60	H
1399.40	-20.40	-24.50	-44.90	-13.00	-31.90	H
2099.10	-24.43	-22.00	-46.43	-13.00	-33.43	H
70.00	-42.01	-15.71	-57.72	-13.00	-44.72	V
1399.40	-21.33	-24.50	-45.83	-13.00	-32.83	V
2099.10	-23.48	-22.00	-45.48	-13.00	-32.48	V
Middle Channel (707.5MHz)						
70.00	-42.72	-15.71	-58.43	-13.00	-45.43	H
1415.00	-18.75	-24.40	-43.15	-13.00	-30.15	H
2122.50	-25.94	-22.50	-48.44	-13.00	-35.44	H
70.00	-41.00	-15.71	-56.71	-13.00	-43.71	V
1415.00	-19.73	-24.40	-44.13	-13.00	-31.13	V
2122.50	-23.15	-22.50	-45.65	-13.00	-32.65	V
High Channel (715.3MHz)						
70.00	-42.58	-15.71	-58.29	-13.00	-45.29	H
1430.60	-18.49	-24.15	-42.64	-13.00	-29.64	H
2145.90	-23.35	-22.65	-46.00	-13.00	-33.00	H
70.00	-42.51	-15.71	-58.22	-13.00	-45.22	V
1430.60	-19.70	-24.15	-43.85	-13.00	-30.85	V
2145.90	-26.35	-22.65	-49.00	-13.00	-36.00	V

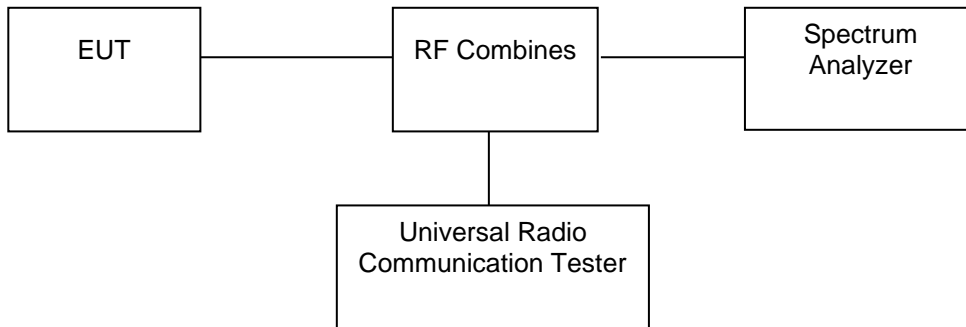
Note: Result=Reading+ Correct, Margin= Result- Limit

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



11. Frequency Stability

11.1 Block Diagram Of Test Setup



11.2 Limit

According to §22.917(b), The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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

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

11.3 Test procedure

The RF output terminal of the transmitter was connected to the input of the spectrum analyzer via a suitable attenuation. The RBW of the spectrum analyzer was set to 10kHz for GSM mode and 100kHz for WCDMA mode, VBW shall be at least 3 times the RBW, and the 26dB bandwidth was recorded.

11.4 Test Result

Please refer to Appendix 2: Frequency Stability
Test Result: Pass

12. EUT Photographs

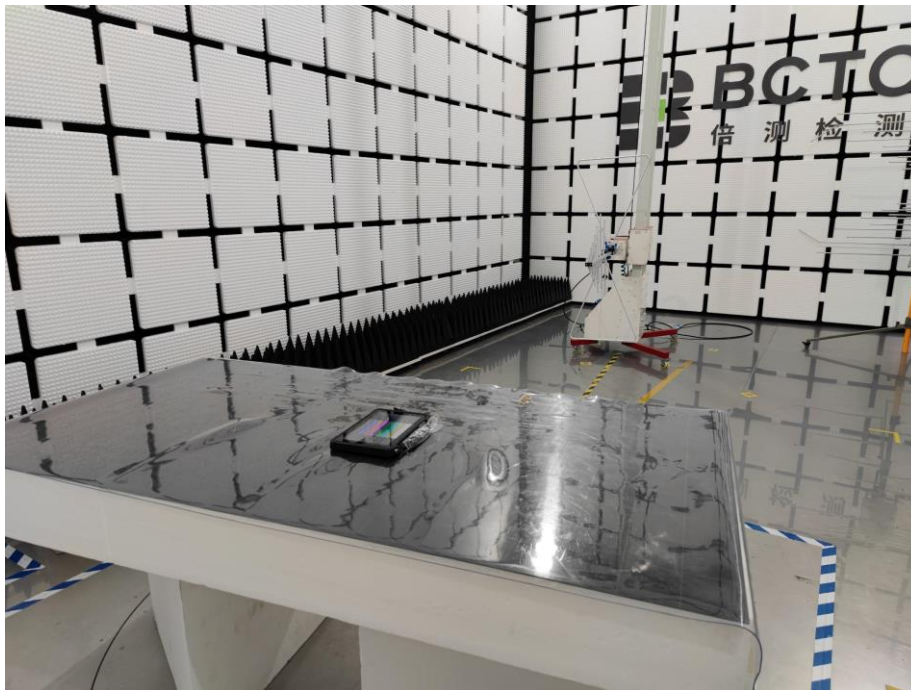
EUT Photo



NOTE: Appendix-Photographs Of EUT Constructional Details

13. EUT Test Setup Photographs

Radiated Measurement Photos



STATEMENT

- 1.The equipment lists are traceable to the national reference standards.
- 2.The test report can not be partially copied unless prior written approval is issued from our lab.
- 3.The test report is invalid without stamp of laboratory.
- 4.The test report is invalid without signature of person(s) testing and authorizing.
- 5.The test process and test result is only related to the Unit Under Test.
- 6.The quality system of our laboratory is in accordance with ISO/IEC17025.
- 7.If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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***** END *****