



TEST REPORT

No. I16N01168-LTE

for

Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd

Smartphone

Model Name: Coolpad 3622A

FCC ID: R38YL3622A

with

Hardware Version: P2

Software Version: 091.00.160130

Issued Date: 2016-11-11

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

FCC 2.948 Listed: No. 342690

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I16N01168-LTE	Rev.0	1st edition	2016-11-11

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1. Test Laboratory

1.1. Testing Location

Company Name: CCTL ShenZhen, Telecommunication Technology Labs, Academy of
Telecommunication Research, MIIT
Address: TCL International E city No. 1001 Zhongshanyuan Road, Nanshan
District, Shenzhen, Guangdong, China
Postal Code: 518048
Telephone: +86(755)33322000
Fax: +86(755)33322000

1.2. Testing Environment

Normal Temperature: 15-35°C
Relative Humidity: 20-75%
Air pressure 980 - 1040 hPa

The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

1.3. Project data

Testing Start Date: 2016-10-11
Testing End Date: 2016-11-11

1.4. Signature

Lai Minghua
(Prepared this test report)

Shen Shaoming
(Reviewed this test report)

Ma Zhiguo
Deputy Director of the laboratory
(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Address /Post: Coolpad Information Harbor, 2nd Mengxi Road, Hi-Tech Industrial
Park(North), Nanshan district, Shenzhen, P.R.C
Contact Person: Li Amei
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Telephone: +86 13410415799
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2.2. Manufacturer Information

Company Name: Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Address /Post: Coolpad Information Harbor, 2nd Mengxi Road, Hi-Tech Industrial
Park(North), Nanshan district, Shenzhen, P.R.C
Contact Person: Li Amei
Contact Email: liamei@yulong.com
Telephone: +86 13410415799
Fax: /

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Smartphone
Model Name	Coolpad 3622A
FCC ID	R38YL3622A
Antenna	Integrated
Output power	30.23dBm maximum EIRP measured for LTE Band 2
Extreme vol. Limits	3.5VDC to 4.2VDC (nominal: 3.7VDC)
Extreme temp. Tolerance	-30°C to +50°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
S01	869630020000687	P2	091.00.160130

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE2	Charger

AE1

Model	CPLD-390
Manufacturer	ZHUHAI COSLIGHT BATTERY CO., LTD.
Capacitance	2200mAh

AE2

Model	CYSK05-050100
Manufacturer	JIANGSU CHENYANG ELECTRON CO.,LTD

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment Under Test (EUT) is a model HSDPA/HSUPA/UMTS Triband / GSM quadband / LTE mobile phone with integrated antenna. Manual and specifications of the EUT were provided to fulfil the test.



4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	15-10-1 Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	15-10-1 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	15-10-1 Edition
ANSI/TIA-603-C	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2004
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014
KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v02r02

5. LABORATORY ENVIRONMENT

Control room / conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber 2 (8.6 meters×6.1 meters×3.85 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

Semi-anechoic chamber 2 / Fully-anechoic chamber 3 (10 meters×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

6. SUMMARY OF TEST RESULTS

6.1. Summary of test results

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured
Location Column	A/B/C/D	The test is performed in test location A, B, C or D which are described in section 1.1 of this report

LTE Band 2

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	24.232(c)	A.1	P
2	Emission Limit	24.238(a), 2.1051	A.2	P
3	Frequency Stability	24.235, 2.1055	A.3	P
4	Occupied Bandwidth	2.1049(h)(i)	A.4	P
5	Emission Bandwidth	24.238(a)	A.5	P
6	Band Edge Compliance	24.238(a)	A.6	P
7	Conducted Spurious Emission	24.238, 2.1057	A.7	P
8	Peak to Average Power Ratio	24.232 (d)	A.8	P

LTE Band 4

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	27.50(d)(4)	A.1	P
2	Emission Limit	27.53(h), 2.1051	A.2	P
3	Frequency Stability	27.54, 2.1055	A.3	P
4	Occupied Bandwidth	2.1049(h)(i)	A.4	P
5	Emission Bandwidth	27.53(h)	A.5	P
6	Band Edge Compliance	27.53(h)	A.6	P
7	Conducted Spurious Emission	27.53(h), 2.1057	A.7	P
8	Peak to Average Power Ratio	27.50(a)	A.8	P

LTE Band 12

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	27.50(c)(10)	A.1	P
2	Emission Limit	27.53(g), 2.1051	A.2	P
3	Frequency Stability	27.54, 2.1055	A.3	P
4	Occupied Bandwidth	2.1049(h)(i)	A.4	P
5	Emission Bandwidth	27.53(g)	A.5	P
6	Band Edge Compliance	27.53(g)	A.6	P
7	Conducted Spurious Emission	27.53(g), 2.1057	A.7	P
8	Peak to Average Power Ratio	27.50(a)	A.8	P

6.2. Statements

The test cases listed in section 6.1 of this report for the EUT specified in section 3 were performed by CTTL according to the standards or reference documents in section 4.1

The EUT met all applicable requirements of the standards or reference documents in section 4.1.

This report only deals with the LTE functions among the features described in section 3.

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1	Test Receiver	ESCI	100701	R&S	2017.08.09
2	BiLog Antenna	VULB9163	9163 329	Schwarzbeck	2017.01.20
3	Horn Antenna	3117	00066577	ETS-Lindgren	2017.04.01
4	Universal Radio Communication Tester	CMW500	152499	R&S	2017.07.22
5	Spectrum Analyser	FSP40	100378	R&S	2016.12.18
6	Spectrum Analyzer	FSU	200679	R&S	2017.01.02
7	Temperature Chamber	SH-241	92007516	ESPECs	2016.11.30
8	DC Power Supply	U3606A	MY50450012	Agilent Technologies	2017.11.09

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: 24.232(c), 27.50(h)(2).

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation.

This result contains peak output power and ERP/EIRP measurements for the EUT.

In all cases, output power is within the specified limits.

A.1.2 Radiated

A.1.2.1 Description

This is the test for the maximum radiated power from the EUT.

Rule Part 22.913(a) specifies "Mobile stations are limited to 2.0 watts EIRP."

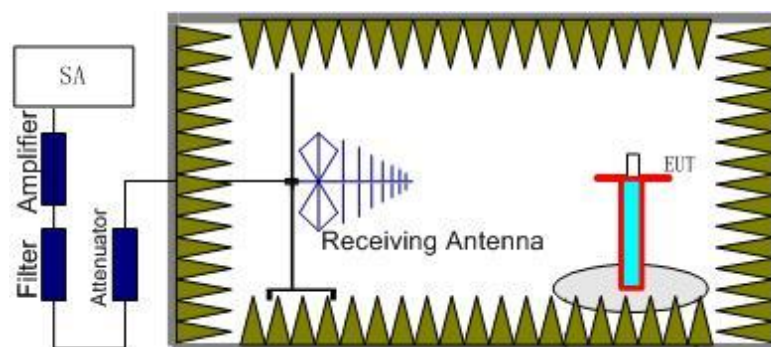
Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Rule Part 27.50(h)(2) specifies "Mobile stations are limited to 2.0 watts EIRP."

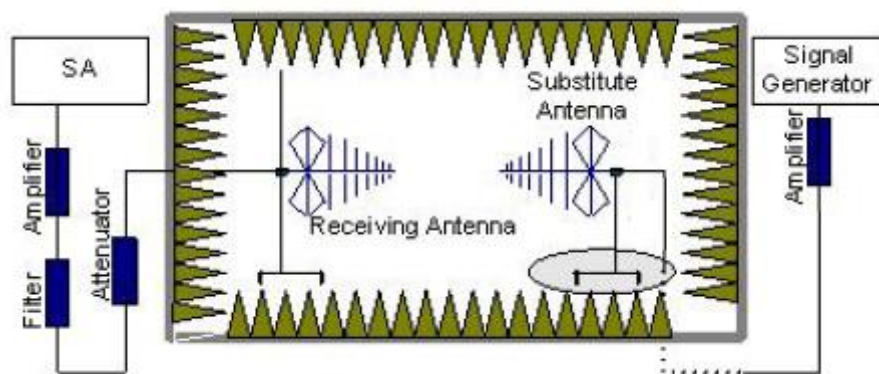
A.1.2.2 Method of Measurement

The measurements procedures in TIA-603C-2004 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.
The cable loss (P_{cl}), the substitution antenna Gain (G_a) and the amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{Mea} - P_{Ag} - P_{cl} - G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15$.

A.1.2.3 Measurement result

LTE Band 2- EIRP 24. 232(b)

Limits: $\leq 33\text{dBm}$ (2W)

LTE Band 2_1.4MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1850.70	-6.03	-29.40	6.86	30.23	33.00	H
1880.00	-7.40	-29.30	6.85	28.75	33.00	H
1909.30	-6.94	-29.30	6.84	29.20	33.00	H

LTE Band 2_3MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1851.50	-6.22	-29.40	6.86	30.04	33.00	H
1880.00	-7.31	-29.30	6.85	28.84	33.00	H
1908.50	-6.70	-29.30	6.84	29.44	33.00	H

LTE Band 2_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1852.50	-6.50	-29.40	6.86	29.76	33.00	H
1880.00	-7.66	-29.30	6.85	28.50	33.00	H
1907.50	-6.46	-29.30	6.84	29.68	33.00	H

LTE Band 2_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1855.00	-7.05	-29.40	6.86	29.21	33.00	H
1880.00	-8.27	-29.30	6.85	27.89	33.00	H
1905.00	-7.08	-29.30	6.84	29.06	33.00	H

LTE Band 2_15MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1857.50	-7.48	-29.40	6.86	28.79	33.00	H
1880.00	-9.00	-29.30	6.85	27.16	33.00	H
1902.50	-7.80	-29.30	6.84	28.34	33.00	H

LTE Band 2_20 MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1860.00	-8.72	-29.40	6.86	27.54	33.00	H
1880.00	-9.34	-29.30	6.85	26.81	33.00	H
1900.00	-8.51	-29.30	6.84	27.63	33.00	H

LTE Band 2 1.4MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1850.70	-6.91	-29.40	6.86	29.35	33.00	H
1880.00	-7.90	-29.30	6.85	28.25	33.00	H
1909.30	-6.35	-29.30	6.84	29.79	33.00	H

LTE Band 2 3MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1851.50	-7.01	-29.40	6.86	29.25	33.00	H
1880.00	-7.93	-29.30	6.85	28.23	33.00	H
1908.50	-6.45	-29.30	6.84	29.69	33.00	H

LTE Band 2 5MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1852.50	-8.33	-29.40	6.86	27.93	33.00	H
1880.00	-8.80	-29.30	6.85	27.35	33.00	H
1907.50	-6.46	-29.30	6.84	29.68	33.00	H

LTE Band 2 10MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1855.00	-8.42	-29.40	6.86	27.84	33.00	H
1880.00	-8.77	-29.30	6.85	27.38	33.00	H
1905.00	-6.89	-29.30	6.84	29.25	33.00	H

LTE Band 2 15MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1857.50	-8.58	-29.40	6.86	27.69	33.00	H
1880.00	-9.46	-29.30	6.85	26.69	33.00	H
1902.50	-7.00	-29.30	6.84	29.14	33.00	H

LTE Band 2 20 MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1860.00	-8.64	-29.40	6.86	27.62	33.00	H
1880.00	-9.64	-29.30	6.85	26.51	33.00	H
1900.00	-8.04	-29.30	6.84	28.10	33.00	H

$$\text{Peak EIRP (dBm)} = P_{\text{Mea}}(-6.03\text{dBm}) - (P_{\text{cl}} + P_{\text{Ag}}) (-29.40\text{dB}) - G_{\text{a}}(-6.86\text{dB}) = 30.23\text{dBm}$$

LTE Band 4- EIRP 27.50(d)

Limits: ≤30dBm (1W)

LTE Band 4_1.4MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1710.70	-11.86	-29.60	6.89	24.63	30.00	H
1732.50	-9.45	-29.60	6.88	27.03	30.00	H
1754.30	-8.75	-29.50	6.87	27.62	30.00	H

LTE Band 4_3MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1711.50	-12.44	-29.60	6.89	24.05	30.00	H
1732.50	-10.25	-29.60	6.88	26.23	30.00	H
1753.50	-9.62	-29.50	6.87	26.75	30.00	H

LTE Band 4_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1712.50	-12.45	-29.60	6.89	24.04	30.00	H
1732.50	-9.70	-29.60	6.88	26.78	30.00	H
1752.50	-10.15	-29.50	6.87	26.22	30.00	H

LTE Band 4_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1715	-17.19	-29.6	-6.89	19.30	30.00	H
1732.5	-15.3	-29.6	-6.88	21.18	30.00	H
1750.5	-15.91	-29.5	-6.87	20.46	30.00	H

LTE Band 4_15MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1717.50	-12.92	-29.60	6.89	23.57	30.00	H
1732.50	-11.84	-29.60	6.88	24.64	30.00	H
1747.50	-11.43	-29.50	6.87	24.94	30.00	H

LTE Band 4_20MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1720.00	-13.43	-29.60	6.89	23.06	30.00	H
1732.50	-12.52	-29.60	6.88	23.96	30.00	H
1745.00	-12.53	-29.50	6.87	23.84	30.00	H



LTE Band 4 1.4MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1710.70	-11.33	-29.60	6.89	25.16	30.00	H
1732.50	-9.49	-29.60	6.88	27.00	30.00	H
1754.30	-9.26	-29.50	6.87	27.12	30.00	H

LTE Band 4 3MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1711.50	-12.64	-29.60	6.89	23.85	30.00	H
1732.50	-10.72	-29.60	6.88	25.76	30.00	H
1753.50	-10.03	-29.50	6.87	26.34	30.00	H

LTE Band 4 5MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1712.50	-13.12	-29.60	6.89	23.37	30.00	H
1732.50	-10.49	-29.60	6.88	25.99	30.00	H
1752.50	-10.07	-29.50	6.87	26.30	30.00	H

LTE Band 4 10MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1715.00	-13.57	-29.60	6.89	22.92	30.00	H
1732.50	-11.47	-29.60	6.88	25.01	30.00	H
1750.50	-11.04	-29.50	6.87	25.33	30.00	H

LTE Band 4 15MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1717.50	-13.44	-29.60	6.89	23.05	30.00	H
1732.50	-12.69	-29.60	6.88	23.79	30.00	H
1747.50	-12.29	-29.50	6.87	24.08	30.00	H

LTE Band 4 20MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
1720.00	-13.78	-29.60	6.89	22.72	30.00	H
1732.50	-13.32	-29.60	6.88	23.16	30.00	H
1745.00	-12.95	-29.50	6.87	23.42	30.00	H

$$\text{Peak EIRP (dBm)} = P_{\text{Mea}}(-8.75\text{dBm}) - (P_{\text{cl}} + P_{\text{Ag}})(-29.50\text{dB}) - G_{\text{a}}(-6.87\text{dB}) = 27.62\text{dBm}$$

LTE Band 12 - ERP 27.50(c)(10)

Limits: ≤34.77dBm (3W)

LTE Band 12 1.4MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
699.70	-16.09	-34.80	7.90	2.15	24.46	34.77	V
707.50	-16.18	-34.70	7.75	2.15	24.12	34.77	V
715.30	-15.60	-34.70	7.69	2.15	24.64	34.77	V

LTE Band 12 3MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
700.50	-16.15	-34.80	7.90	2.15	24.40	34.77	V
707.50	-16.73	-34.70	7.75	2.15	23.57	34.77	V
714.50	-15.84	-34.70	7.69	2.15	24.41	34.77	V

LTE Band 12 5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
701.50	-16.43	-34.80	7.90	2.15	24.12	34.77	V
707.50	-16.73	-34.70	7.75	2.15	23.57	34.77	V
713.50	-16.18	-34.70	7.69	2.15	24.06	34.77	V

LTE Band 12 10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
704.00	-16.45	-34.80	7.76	2.15	23.96	34.77	V
707.50	-17.13	-34.70	7.75	2.15	23.17	34.77	V
711.00	-16.23	-34.70	7.70	2.15	24.02	34.77	V

LTE Band 12_1.4MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
699.70	-16.51	-34.80	7.90	2.15	24.05	34.77	H
707.50	-16.72	-34.70	7.75	2.15	23.58	34.77	H
715.30	-16.61	-34.70	7.69	2.15	23.63	34.77	H

LTE Band 12_3MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
700.50	-16.18	-34.80	7.90	2.15	24.37	34.77	H
707.50	-16.58	-34.70	7.75	2.15	23.72	34.77	H
714.50	-15.81	-34.70	7.69	2.15	24.43	34.77	H

LTE Band 12_5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
701.50	-16.18	-34.80	7.90	2.15	24.37	34.77	H
707.50	-16.63	-34.70	7.75	2.15	23.67	34.77	H
713.50	-15.97	-34.70	7.69	2.15	24.27	34.77	H

LTE Band 12_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
704.00	-16.31	-34.80	7.76	2.15	24.10	34.77	H
707.50	-16.86	-34.70	7.75	2.15	23.44	34.77	H
711.00	-16.08	-34.70	7.70	2.15	24.17	34.77	H

$$\text{Peak ERP (dBm)} = P_{\text{Mea}}(-15.60\text{dBm}) - (P_{\text{cl}} + P_{\text{Ag}}) (-34.70\text{dB}) - G_a(-7.69\text{dB}) - 2.15\text{dB} = 24.64\text{dBm}$$

A.2 EMISSION LIMIT

Reference

FCC: CFR 2.1051, 22.917, 24.238(a), 27.53(m).

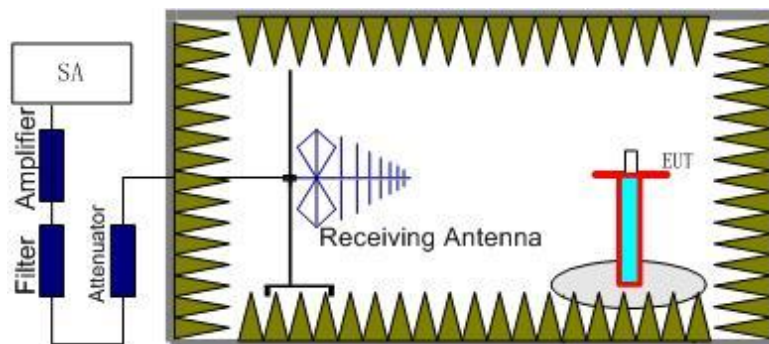
A.2.1 Measurement Method

The measurements procedures in TIA-603C-2004 are used. This measurement is carried out in fully-anechoic chamber FAC-3.

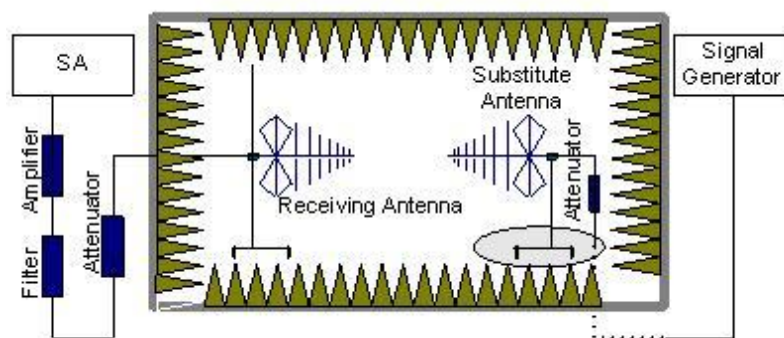
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz as outlined in Part 22.917, 24.238(a), Part 27.53(m). The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Bands 2, 4, 5, 7,12,17,30.

The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.

An amplifier should be connected in for the test.

The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{Mea} + P_{pl} + G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit: dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dB}$.

A.2.2 Measurement Limit

Part 22.917, 24.238(a), 27.53(m) all 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.

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Bands 2, 4, 5, 7, 12, 17, 30. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE Bands 2, 4, 5, 7, 12, 17, 30 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

LTE Band 2, 1.4MHz, QPSK, Channel 18607

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
16797.75	-46.47	2.90	13.16	-36.21	-13.00	H
17199.375	-46.42	2.90	13.52	-35.80	-13.00	H
17401.5	-47.35	2.90	14.57	-35.68	-13.00	H
17605.59375	-47.01	3.30	14.57	-35.74	-13.00	H
17780.8125	-46.58	3.30	14.57	-35.31	-13.00	H
17914.6875	-45.56	3.30	14.12	-34.74	-13.00	H

LTE Band 2, 1.4MHz, QPSK, Channel 18900

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
5626.875	-43.86	1.30	10.32	-34.84	-13.00	V
17278.125	-46.26	2.90	13.52	-35.64	-13.00	H
17518.96875	-46.45	3.30	14.57	-35.18	-13.00	H
17609.53125	-45.67	3.30	14.57	-34.40	-13.00	H
17775.5625	-45.11	3.30	14.57	-33.84	-13.00	H
17929.78125	-44.98	3.30	14.12	-34.16	-13.00	H

LTE Band 2, 1.4MHz, QPSK, Channel 19193

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
16822.6875	-46.32	2.90	13.16	-36.06	-13.00	H
17204.625	-47.06	2.90	13.52	-36.44	-13.00	H
17442.1875	-47.20	2.90	14.57	-35.53	-13.00	H
17644.3125	-47.35	3.30	14.57	-36.08	-13.00	H
17793.28125	-47.41	3.30	14.57	-36.14	-13.00	H
17930.4375	-45.82	3.30	14.12	-35.00	-13.00	H

LTE Band 2, 1.4MHz, 16QAM, Channel 18607

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
17204.625	-47.32	2.90	13.52	-36.70	-13.00	H
17297.8125	-47.40	2.90	13.52	-36.78	-13.00	H
17454	-47.64	2.90	14.57	-35.97	-13.00	H
17590.5	-47.54	3.30	14.57	-36.27	-13.00	H
17799.1875	-46.99	3.30	14.57	-35.72	-13.00	V
17920.59375	-46.35	3.30	14.12	-35.53	-13.00	H

LTE Band 2, 1.4MHz, 16QAM, Channel 18900

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
16799.71875	-47.01	2.90	13.16	-36.75	-13.00	V
17199.375	-47.25	2.90	13.52	-36.63	-13.00	H
17417.90625	-48.05	2.90	14.57	-36.38	-13.00	H
17606.25	-47.85	3.30	14.57	-36.58	-13.00	H
17748.65625	-47.18	3.30	14.57	-35.91	-13.00	H
17928.46875	-45.04	3.30	14.12	-34.22	-13.00	H

LTE Band 2, 1.4MHz, 16QAM, Channel 19193

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
17202.65625	-46.77	2.90	13.52	-36.15	-13.00	H
17363.4375	-47.05	2.90	13.52	-36.43	-13.00	H
17424.46875	-47.50	2.90	14.57	-35.83	-13.00	H
17598.375	-47.52	3.30	14.57	-36.25	-13.00	H
17778.1875	-46.79	3.30	14.57	-35.52	-13.00	H
17923.21875	-45.97	3.30	14.12	-35.15	-13.00	H

LTE Band 4, 1.4MHz QPSK, Channel 19957

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
17201.34375	-46.33	2.90	13.52	-35.71	-13.00	H
17360.8125	-46.07	2.90	13.52	-35.45	-13.00	H
17411.34375	-47.06	2.90	14.57	-35.39	-13.00	H
17606.90625	-46.53	3.30	14.57	-35.26	-13.00	H
17755.875	-46.14	3.30	14.57	-34.87	-13.00	H
17923.875	-45.13	3.30	14.12	-34.31	-13.00	H

LTE Band 4, 1.4MHz, QPSK, Channel 20175

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
17206.59375	-45.37	2.90	13.52	-34.75	-13.00	H
17279.4375	-45.87	2.90	13.52	-35.25	-13.00	V
17501.25	-45.98	3.30	14.57	-34.71	-13.00	H
17596.40625	-46.25	3.30	14.57	-34.98	-13.00	H
17826.09375	-45.47	3.30	14.57	-34.20	-13.00	H
17926.5	-43.95	3.30	14.12	-33.13	-13.00	H

LTE Band 4, 1.4MHz, QPSK, Channel 20393

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
17205.28125	-46.58	2.90	13.52	-35.96	-13.00	H
17288.625	-46.58	2.90	13.52	-35.96	-13.00	H
17461.875	-47.41	2.90	14.57	-35.74	-13.00	H
17545.21875	-46.25	3.30	14.57	-34.98	-13.00	H
17780.8125	-46.60	3.30	14.57	-35.33	-13.00	H
17917.3125	-44.70	3.30	14.12	-33.88	-13.00	H

LTE Band 4, 1.4MHz, 16QAM, Channel 19957

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
16829.90625	-46.73	2.90	13.16	-36.47	-13.00	H
17162.625	-46.74	2.90	13.52	-36.12	-13.00	H
17437.59375	-48.20	2.90	14.57	-36.53	-13.00	H
17596.40625	-47.36	3.30	14.57	-36.09	-13.00	H
17833.96875	-47.65	3.30	14.57	-36.38	-13.00	H
17916	-46.35	3.30	14.12	-35.53	-13.00	H

LTE Band 4, 1.4MHz, 16QAM, Channel 20175

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
16812.84375	-47.44	2.90	13.16	-37.18	-13.00	H
17205.28125	-46.80	2.90	13.52	-36.18	-13.00	V
17455.96875	-48.04	2.90	14.57	-36.37	-13.00	H
17616.75	-47.99	3.30	14.57	-36.72	-13.00	H
17782.125	-47.65	3.30	14.57	-36.38	-13.00	H
17921.25	-46.53	3.30	14.12	-35.71	-13.00	H

LTE Band 4, 1.4MHz, 16QAM, Channel 20393

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Polarization
16797.75	-46.48	2.90	13.16	-36.22	-13.00	V
17213.15625	-47.45	2.90	13.52	-36.83	-13.00	H
17453.34375	-48.44	2.90	14.57	-36.77	-13.00	H
17593.78125	-47.73	3.30	14.57	-36.46	-13.00	H
17737.5	-46.97	3.30	14.57	-35.70	-13.00	V
17920.59375	-46.03	3.30	14.12	-35.21	-13.00	H

LTE Band 12, 1.4MHz, QPSK, Channel 23017

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
1476.25	-64.16	3.73	-5.38	-64.66	-13.00	V
2156.88	-47.83	4.46	-5.07	-49.37	-13.00	V
2805.66	-57.98	5.07	-6.65	-58.55	-13.00	V
3503.27	-59.77	5.7	-8.2	-59.42	-13.00	H
4160.51	-59.8	6.17	-9.06	-59.06	-13.00	V
4893.62	-59.15	6.72	-9.79	-58.23	-13.00	H

LTE Band 12, 1.4MHz, QPSK, Channel 23095

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
2122.74	-41.2	4.41	-4.97	-42.79	-13.00	V
2960.97	-53.58	5.23	-6.93	-54.03	-13.00	V
3569.11	-61.13	5.69	-8.3	-60.67	-13.00	H
4322.5	-59.67	6.32	-9.22	-58.92	-13.00	V
4909.92	-59.64	6.73	-9.81	-58.71	-13.00	H
5658.37	-58.61	7.19	-10.57	-57.38	-13.00	V

LTE Band 12, 1.4MHz, QPSK, Channel 23173

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
1430.93	-58.1	3.61	-5.14	-58.72	-13.00	V
2146.02	-48.21	4.41	-5.04	-49.73	-13.00	V
2853.4	-58.18	5.11	-6.74	-58.7	-13.00	H
3555.51	-59.56	5.7	-8.28	-59.13	-13.00	H
4234.54	-59.12	6.24	-9.13	-58.38	-13.00	H
5070.66	-60.07	6.75	-10	-58.97	-13.00	V

LTE Band 12, 1.4MHz, 16QAM, Channel 23017

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
1491.7	-65.11	3.66	-5.46	-65.46	-13.00	V
2096.39	-60.58	4.39	-4.89	-62.23	-13.00	H
2779.24	-54.9	5.06	-6.6	-55.51	-13.00	V
3537.25	-60.05	5.74	-8.25	-59.69	-13.00	V
4256.35	-59.48	6.26	-9.16	-58.73	-13.00	V
4989.66	-60.48	6.77	-9.89	-59.51	-13.00	H

LTE Band 12, 1.4MHz 16QAM, Channel 23095

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
2122.64	-42.47	4.41	-4.97	-44.06	-13.00	V
2906.86	-55.29	5.14	-6.83	-55.75	-13.00	H
3535.98	-60.67	5.74	-8.25	-60.31	-13.00	H
4190.94	-59.91	6.2	-9.09	-59.17	-13.00	V
4891.48	-60.89	6.71	-9.79	-59.96	-13.00	H
5603.3	-60.2	7.17	-10.58	-58.94	-13.00	V

LTE Band 12, 1.4MHz, 16QAM, Channel 23173

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak ERP(dBm)	Limit (dBm)	Polarization
1536.06	-63.62	3.76	-5.44	-64.09	-13.00	H
2146.11	-47.42	4.41	-5.04	-48.94	-13.00	V
2914.69	-58.08	5.19	-6.85	-58.57	-13.00	V
3471.58	-59.73	5.65	-8.13	-59.4	-13.00	H
4161.77	-59.42	6.17	-9.06	-58.68	-13.00	V
5036.65	-60.28	6.82	-9.95	-59.3	-13.00	V

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 4.2$ dB, $k = 2$.

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