



**SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch**

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

Report No.: SZEM180300235001
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TEST REPORT

Application No.: SZEM1803002350CR(GZEM1803001481IT)
Applicant: Gree Electric Appliances, Inc. of Zhuhai
Address of Applicant: Jinji West Rd, Qianshan, Zhuhai, 519070, Guangdong P.R. China
Manufacturer: Gree Electric Appliances, Inc. of Zhuhai
Address of Manufacturer: Jinji West Rd, Qianshan, Zhuhai, 519070, Guangdong P.R. China
Factory: Gree Electric Appliances, Inc. of Zhuhai
Address of Factory: Jinji West Rd, Qianshan, Zhuhai, 519070, Guangdong P.R. China
Equipment Under Test (EUT):
EUT Name: LTE DTU
Model No.: IE60-33/CF2
FCC ID: 2ADAP-IE6033CF2
IC: 12478A-IE6033CF2
Standard(s) : 47 CFR Part 2(2017)
47 CFR Part 22 subpart H
47 CFR Part 24 subpart E
RSS-Gen Issue 4
RSS-132 Issue 3
RSS-133 Issue 6
(only for Effective (Isotropic) Radiated Power Output Data and Field strength
of spurious radiation)
Date of Receipt: 2018-03-29
Date of Test: 2018-04-26
Date of Issue: 2018-05-02

Test Result:	Pass
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* In the configuration tested, the EUT complied with the standards specified above.



Kenx Xu

EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2018-05-02		Original

Authorized for issue by:			
			
		Vincent Chen/Project Engineer	
			
		Eric Fu /Reviewer	

2 Test Summary

Test Item	FCC Rule No.	IC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913, §24.232	RSS-132 §5.4, RSS-133 §6.4	FCC: ERP≤7W(WCDMAband V) EIRP ≤ 2 W(WCDMA band II) IC: EIRP≤11.5W(WCDMAband V) EIRP ≤ 2 W(WCDMA band II)	PASS
Field strength of spurious radiation	§2.1051, §22.917, §24.238	RSS-132 §5.5, RSS-133 §6.5	≤ -13dBm	PASS

Remark:

Model No.: IE60-33/CF2

This test report (Ref. No.: SZEM180300235001) is only valid with the original test report (Ref. No.: SZEM171201265901).

Compared with the original report, this report just changed the information of the power supply part of the component replacement, the surface screen printing and the line fine tuning, this change does not involve the module's RF circuit, and the RF circuit principle part has not changed. As below show:

- 1.Components replacement: replace the flake capacitor 0805 10uF ± 10%/16V in the schematic diagram by electrolytic capacitor 220uF ± 20%/6.3V (C13 and C59) , adjustment purpose: increase the capacitor value of power circuit output side, and to provide sufficient power supply to ensure energy dissipation while the main board is switching frequency range, thus avoiding any risks. It is related to power supply only, RF circuit of module is not involved, the RF circuit principle is unchanged.
- 2.Components shift: shift the flake electrolytic capacitor 1210 100uF ± 20%/6.3V (C39) from the reverse side of PCB board to the front. Adjustment purpose: according to the production craft requirements of the company, this location will interfere the usage of tin carrier, therefore, please shift it to avoid interference. It will not involve the RF circuit of module, and the RF circuit principle is unchanged.
- 3.Other alterations are minor adjustments about the silk print on the surface and circuit. Adjustment purpose: for the convenience of production and installation debugging. RF circuit of module is not involved, and the RF circuit principle is unchanged.

Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for fully retest.

Therefore in this report Effective (Isotropic) Radiated Power Output Data and Field strength of spurious radiation were fully retested on model IE60-33/CF2 and shown the data in this report, other tests data please refer to original report SZEM171201265901.

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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 12V
Sample Type:	Fixed production
UMTS Operation Frequency Band:	UMTS FDD Band II/V
Modulation Type:	QPSK
Supported Channel Bandwidth:	5 MHz
WCDMA Release Version:	R99
HSDPA Release Version:	Release 10
HSUPA Release Version:	Release 6
UMTS Power Class:	Level 3
Designation of Emissions	UMTS band II: 4M19F9W UMTS band V: 4M18F9W
Antenna Type:	Detachable Antenna
Antenna Gain:	2.5dBi
Extreme temp. Tolerance:	-30 °C to +50 °C
Extreme vol. Limits:	10.2VDC to 13.80VDC (nominal: 12.0VDC)

4.2 Test Frequency

Test Mode	RF Channel		
	Low (L)	Middle (M)	High (H)
WCDMA Band V	Channel 4132	Channel 4182	Channel 4233
	826.4MHz	836.4 MHz	846.6 MHz
Test Mode	RF Channel		
	Low (L)	Middle (M)	High (H)
WCDMA Band II	Channel 9262	Channel 9400	Channel 9538
	1852.4 MHz	1880.0 MHz	1907.6 MHz

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Adapter	GREE Electric Appliances, Inc. of Zhuhai	GPE-12125	/

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25×10^{-8}
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	2.84dB
6	Conducted Spurious emissions	0.75dB
7	RF Radiated power	4.5dB (below 1GHz)
		4.8dB (above 1GHz)
8	Radiated Spurious emission test	4.5dB (Below 1GHz)
		4.8dB (Above 1GHz)
9	Temperature test	1 °C
10	Humidity test	3%
11	Supply voltages	1.5%
12	Time	3%

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

RF Conducted Test					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2017-09-27	2018-09-26
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2017-09-27	2018-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2017-07-13	2018-07-12
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2017-09-27	2018-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2017-09-27	2018-09-26
Audio Analyzer	Rohde & Schwarz	UPL	SEM0093	2017-09-27	2018-09-26
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	W005-02	2016-03-06	2017-03-06
Wireless Communication Tester	Rohde & Schwarz	CMW500	W005-03	2016-03-06	2017-03-06
Splitter	MACOM	2090-6214-00	SEL0226	2016-03-06	2017-03-06

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2017-09-27	2018-09-26
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Trilog-Broadband Antenna(30M-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-28
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2017-04-14	2018-04-13
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2017-07-13	2018-07-12



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General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2017-09-29	2018-09-28
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2017-09-29	2018-09-28
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2017-09-29	2018-09-28
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2017-04-18	2018-04-17

6 Radio Spectrum Matter Test Results

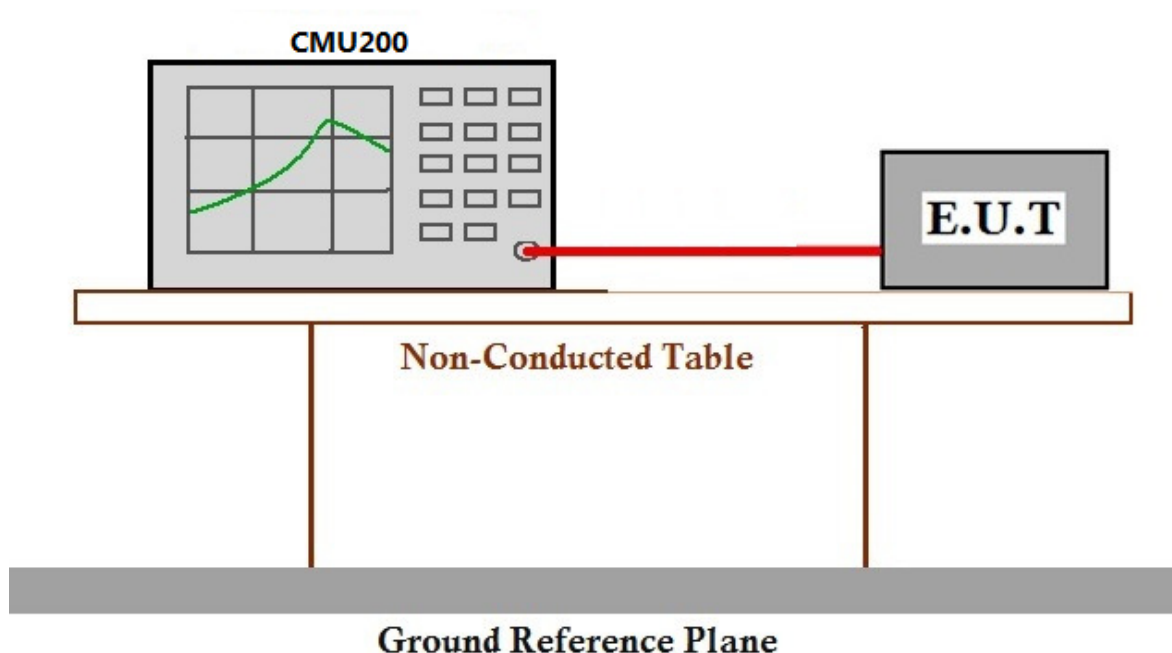
6.1 Effective (Isotropic) Radiated Power Output Data

Test Requirement: §2.1046, §22.913, §24.232, RSS-132 §5.4, RSS-133 §6.4
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: FCC:
ERP≤7W(WCDMA band V)
EIRP ≤ 2 W(WCDMA band II)
IC:
EIRP≤11.5W(WCDMA band V)
EIRP ≤ 2 W(WCDMA band II)

6.1.1 E.U.T. Operation

Operating Environment:
Temperature: 18.6 °C Humidity: 29.1 % RH Atmospheric Pressure: 1025 mbar
Test mode a: Tx mode, Keep the EUT in transmitting mode.

6.1.2 Test Setup Diagram



6.1.3 Measurement Data

Test band: WCDMA Band V						
Test mode	Test Channel	Conducted output power (dBm)	Antenna gain (dBd)	Antenna gain (dBi)	FCC: ERP (dBm)	IC: EIRP (dBm)
RMC	LCH	21.5	0.35	2.50	21.85	24.00
	MCH	21.55	0.35	2.50	21.90	24.05
	HCH	21.53	0.35	2.50	21.88	24.03
UMTS/TM2	LCH_SubTest-1	21.6	0.35	2.50	21.95	24.10
	LCH_SubTest-2	21.49	0.35	2.50	21.84	23.99
	LCH_SubTest-3	21.47	0.35	2.50	21.82	23.97
	LCH_SubTest-4	21.51	0.35	2.50	21.86	24.01
	MCH_SubTest-1	21.54	0.35	2.50	21.89	24.04
	MCH_SubTest-2	21.6	0.35	2.50	21.95	24.10
	MCH_SubTest-3	21.47	0.35	2.50	21.82	23.97
	MCH_SubTest-4	21.45	0.35	2.50	21.80	23.95
	HCH_SubTest-1	21.65	0.35	2.50	22.00	24.15
	HCH_SubTest-2	21.61	0.35	2.50	21.96	24.11
	HCH_SubTest-3	21.59	0.35	2.50	21.94	24.09
	HCH_SubTest-4	21.64	0.35	2.50	21.99	24.14
UMTS/TM3	LCH_SubTest-1	21.49	0.35	2.50	21.84	23.99
	LCH_SubTest-2	21.46	0.35	2.50	21.81	23.96
	LCH_SubTest-3	21.51	0.35	2.50	21.86	24.01
	LCH_SubTest-4	21.47	0.35	2.50	21.82	23.97
	MCH_SubTest-1	21.51	0.35	2.50	21.86	24.01
	MCH_SubTest-2	21.6	0.35	2.50	21.95	24.10
	MCH_SubTest-3	21.58	0.35	2.50	21.93	24.08
	MCH_SubTest-4	21.57	0.35	2.50	21.92	24.07
	HCH_SubTest-1	21.46	0.35	2.50	21.81	23.96
	HCH_SubTest-2	21.53	0.35	2.50	21.88	24.03
	HCH_SubTest-3	21.55	0.35	2.50	21.90	24.05
	HCH_SubTest-4	21.56	0.35	2.50	21.91	24.06
Conclusion: ERP limit for FCC is 7W(38.45dBm) and EIRP limit for IC is 11.5W(40.61dBm), so the test is pass						

Note:

- 1) dBd= dBi-2.15
- 2) ERP= Conducted output power+Antenna gain (dBd)
- 3) EIRP= Conducted output power+Antenna gain (dBi)

Test band: WCDMA Band II					
Test mode	Test Channel	Conducted output power (dBm)	Antenna gain (dBi)	FCC: EIRP (dBm)	IC: EIRP (dBm)
RMC	LCH	21.46	2.50	23.96	23.96
	MCH	21.47	2.50	23.97	23.97
	HCH	21.54	2.50	24.04	24.04
HSDPA	LCH_SubTest-1	21.64	2.50	24.14	24.14
	LCH_SubTest-2	21.51	2.50	24.01	24.01
	LCH_SubTest-3	21.59	2.50	24.09	24.09
	LCH_SubTest-4	21.58	2.50	24.08	24.08
	MCH_SubTest-1	21.57	2.50	24.07	24.07
	MCH_SubTest-2	21.65	2.50	24.15	24.15
	MCH_SubTest-3	21.64	2.50	24.14	24.14
	MCH_SubTest-4	21.62	2.50	24.12	24.12
	HCH_SubTest-1	21.63	2.50	24.13	24.13
	HCH_SubTest-2	21.49	2.50	23.99	23.99
	HCH_SubTest-3	21.58	2.50	24.08	24.08
	HCH_SubTest-4	21.52	2.50	24.02	24.02
HSUPA	LCH_SubTest-1	21.63	2.50	24.13	24.13
	LCH_SubTest-2	21.6	2.50	24.1	24.1
	LCH_SubTest-3	21.61	2.50	24.11	24.11
	LCH_SubTest-4	21.52	2.50	24.02	24.02
	MCH_SubTest-1	21.52	2.50	24.02	24.02
	MCH_SubTest-2	21.61	2.50	24.11	24.11
	MCH_SubTest-3	21.52	2.50	24.02	24.02
	MCH_SubTest-4	21.46	2.50	23.96	23.96
	HCH_SubTest-1	21.53	2.50	24.03	24.03
	HCH_SubTest-2	21.65	2.50	24.15	24.15
	HCH_SubTest-3	21.51	2.50	24.01	24.01
	HCH_SubTest-4	21.61	2.50	24.11	24.11
Conclusion: EIRP limit for FCC and IC is 2W(33.01dBm), so the test is pass					

Note:

1) EIRP= Conducted output power+Antenna gain (dBi)

6.2 Field strength of spurious radiation

Test Requirement: §2.1051, §22.917, §24.238, RSS-132 §5.5, RSS-133 §6.5

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: $\leq -13\text{dBm}$

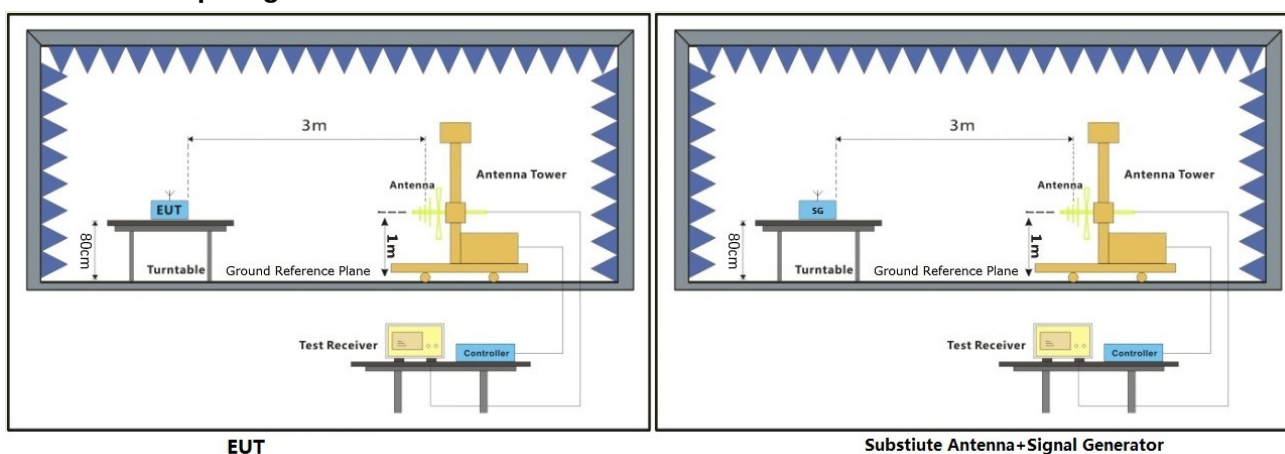
6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 18.6 °C Humidity: 29.1 % RH Atmospheric Pressure: 1025 mbar

Test mode a: Tx mode, Keep the EUT in transmitting mode.

6.2.2 Test Setup Diagram



6.2.3 Measurement Procedure and Data

Test Procedure:

- (1) On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
- (2) The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
- (3) The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- (4) The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- (5) The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
- (6) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- (7) The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
- (8) The maximum signal level detected by the measuring receiver shall be noted.
- (9) The measurement shall be repeated with the test antenna set to horizontal polarization.
- (10) Replace the antenna with a proper Antenna (substitution antenna).
- (11) The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
- (12) The substitution antenna shall be connected to a calibrated signal generator.
- (13) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- (14) The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- (15) The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- (16) The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- (17) The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

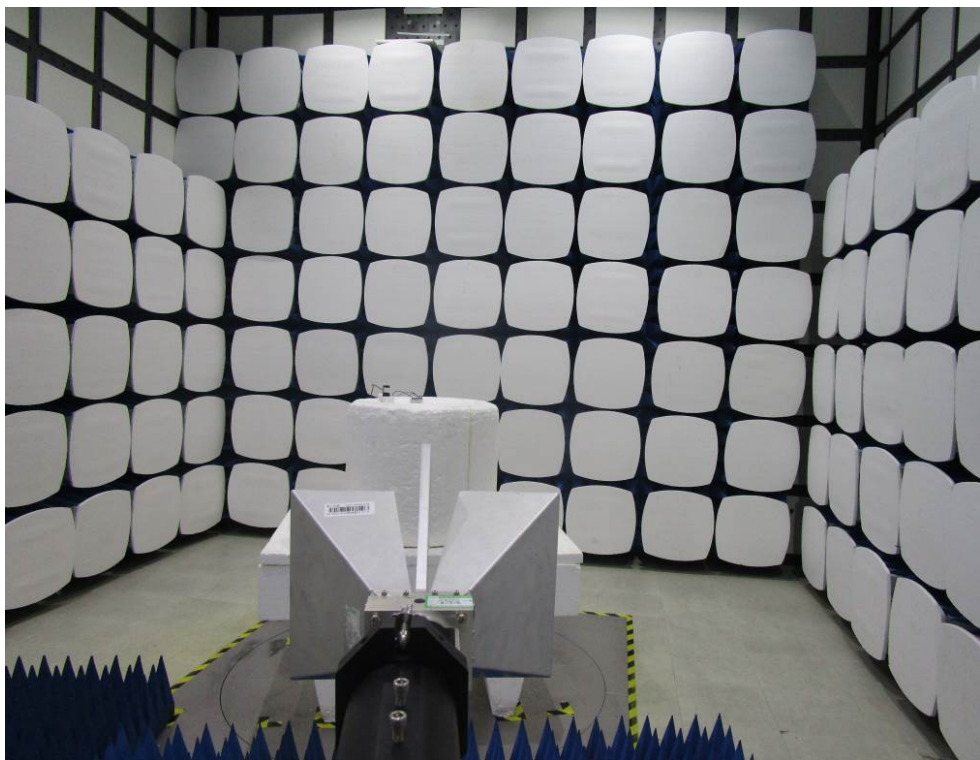
WCDMA Band 2- Middle channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization (H/V)	Result
3815.2	-47.2	0.71	7.6	-40.31	-13	-27.31	Horizontal	Pass
5722.8	-48.36	0.85	10.3	-38.91	-13	-25.91	Horizontal	Pass
7630.4	-52.96	0.99	13.2	-40.75	-13	-27.75	Horizontal	Pass
3815.2	-48.36	0.71	7.6	-41.47	-13	-28.47	Vertical	Pass
5722.8	-51.18	0.85	10.3	-41.73	-13	-28.73	Vertical	Pass
7630.4	-53.89	0.99	13.2	-41.68	-13	-28.68	Vertical	Pass

WCDMA Band 5-Middle channel								
Frequency (MHz)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization (H/V)	Result
1672.8	-56.6	0.52	6	-51.12	-13	-38.12	Horizontal	Pass
2509.2	-58.04	0.59	5.3	-53.33	-13	-40.33	Horizontal	Pass
3345.6	-53.95	0.65	6.2	-48.4	-13	-35.4	Horizontal	Pass
1672.8	-54.16	0.52	6	-48.68	-13	-35.68	Vertical	Pass
2509.2	-54.93	0.59	5.3	-50.22	-13	-37.22	Vertical	Pass
3345.6	-54.52	0.65	6.2	-48.97	-13	-35.97	Vertical	Pass

Note: All modes have been tested and we found RMC test mode has the worst test result. Only record the worst test result.

7 Photographs

7.1 Radiated Emissions (Above 1GHz) Test Setup



7.2 EUT Constructional Details (EUT Photos)

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1803002350CR.

- End of the Report -