TEST REPORT

Application No.:	SZCR2311003882AT
Applicant:	Shenzhen Jimi IoT Co., Ltd.
Address of Applicant:	3-4/F, Block A, Building#7, Shenzhen International Innovation Valley, Dashi 1st Road, Nanshan District Shenzhen China
Manufacturer:	Shenzhen Jimi IoT Co., Ltd.
Address of Manufacturer:	3-4/F, Block A, Building#7, Shenzhen International Innovation Valley, Dashi 1st Road, Nanshan District Shenzhen China
Factory:	Huizhou Newthinking Electronics Co., Ltd.
Address of Factory:	The third&sixth floor, 1&2 Factory Buildings, Jimi Industrial Park, No.101 Jinfu Road, Xiaojinkou street, Huicheng District, Huizhou
Equipment Under Test (EUT):	
EUT Name:	Module
Model No.:	XQ200U-LA
FCC ID:	2AMLF-XQ200U-LA
Standard(s) :	47 CFR Part 2 47 CFR Part 22 subpart H 47 CFR Part 24 subpart E
Date of Receipt:	2023-12-07
Date of Test:	2023-12-08-2023-12-11
Date of Issue:	2023-12-16
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

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Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2023-12-16		Original

Authorized for issue by:				
		Darren Yuan **Darren Yuan/Project Engineer**		
		Eric Fu **Eric Fu/Reviewer**		

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2 Test Summary

Test Item	FCC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913, §24.232	ERP≤7W(GSM850) EIRP≤2W(PCS1900)	PASS
Peak-Average Ratio	§24.232	≤13dB	PASS
Bandwidth	§2.1049(h)	OBW: No limit EBW: No limit	PASS
Band Edge Compliance	§2.1051, §22.917, §24.238	≤ -13dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	PASS
Spurious emissions at antenna terminals	§2.1051, §22.917, §24.238	≤ -13dBm	PASS
Field strength of spurious radiation	§2.1051, §22.917, §24.238	≤ -13dBm	PASS
Frequency stability	§2.1055, §22.355, §24.235	≤ ±2.5ppm.	PASS

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3 Contents

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4 General Information

4.1 Details of E.U.T.

Power supply:	Powered by 4VDC
Support Network:	GPRS
Operation Frequency Band:	GSM850/PCS1900
Modulation Type:	GMSK for GPRS
Antenna Type:	PIFA Antenna
Antenna Gain:	GSM850: 6.0dBi; PCS1900: 3.0dBi
Cable Loss (for RF conducted test):	GSM850: 0.8dB PCS1900: 1.5dB

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Test Frequency

Test mode:	TX	RF Channel		
		Low (L)	Middle (M)	High (H)
GSM850	TX	Channel 128	Channel 190	Channel 251
		824.2MHz	836.6 MHz	848.8 MHz
Test mode:	TX	RF Channel		
		Low (L)	Middle (M)	High (H)
PCS1900	TX	Channel 512	Channel 661	Channel 810
		1850.2MHz	1880.0 MHz	1909.8 MHz

4.3 Test Environment

Environment Parameter	Selected Values During Tests	
Temperature:	TL	-30°C
	TN	+20°C
	TH	+50°C
Voltage:	VL	3.4 Vdc
	VN	4.0 Vdc
	VH	4.6 Vdc

NOTE: VL= lower extreme test voltage
VN= nominal voltage
VH= upper extreme test voltage
TL= lower extreme test temperature
TN= normal temperature
TH= upper extreme test temperature

4.4 Description of Support Units

The EUT has been tested independent unit.

4.5 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	± 5.4 x 10^{-8}
2	Duty cycle	± 0.3%
3	Occupied Bandwidth	± 3%
4	RF conducted power	± 0.8dB
5	RF power density	± 0.4dB
6	Conducted Spurious emissions	± 2.7dB
7	Radiated Spurious emission test	± 3.1dB (Below 1GHz)
		± 4.4dB (Above 1GHz)
8	Temperature test	± 1°C
9	Humidity test	± 3%
10	Supply voltages	± 1.5%
11	Time	± 3%

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4.6 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, Nanshan District, Shenzhen, Guangdong, China. 518057.

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

No tests were sub-contracted.

4.7 Test Facility

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

• 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 (Member No. 1937)

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. Shenzhen EMC laboratory 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: CN1336

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

Designation Number: CN1336. Test Firm Registration Number: 787754.

• Innovation, Science and Economic Development Canada

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

CAB identifier: CN0006.

IC#: 4620C.

4.8 Deviation from Standards

None

4.9 Abnormalities from Standard Conditions

None

5 Equipment List

RF conducted test					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date**	**Cal. Due date**
Programmable DC Source	Chroma	62024P-80-60	SEM011-09	2023/07/11	2024/07/10
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2023/03/21	2024/03/20
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2023/07/11	2024/07/10
Measurement Software	TST	TST PASS V2.0	N/A	N/A	N/A
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2023/07/11	2024/07/10
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2023/03/28	2024/03/27
Power Sensor	KEYSIGHT	U2021XA	SEM009-15	2023/03/21	2024/03/20

RE in Chamber					
Test Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date**	**Cal. Due date**
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	SEM003-33	2021/9/25	2024/9/24
MXE EMI receiver	Agilent	N9038A	SEM004-05	2023/07/11	2024/07/10
Pre-amplifier	HP	8447D	SEM005-02	2023/07/11	2024/07/10
Spectrum Analyzer	Rohde & Schwarz	101288	SEM004-08	2023/07/11	2024/07/10
Low Noise Amplifier	CLAVIIO	BDLNA-0118-352810	SEM005-05	2023/07/11	2024/07/10
Substitution Antenna	Schwarzbeck	VULB9168	SEM003-18	2022/08/07	2025/08/06
Signal Generator(9kHz-40GHz)	N5173B	MY53270267	Agilent	2023/07/11	2024/07/10
Pre-amplifier	HP	8447D	SEM005-02	2023/07/11	2024/07/10
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2021/7/11	2024/7/10
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	SEM003-32	2021/9/26	2024/9/25
Double-ridged waveguide horn	ETS-LINDGREN	3117	SEM003-34	2021/9/25	2024/9/24
Spectrum Analyzer	Rohde & Schwarz	101288	SEM004-08	2023/07/11	2024/07/10
Low Noise Amplifier	CLAVIIO	BDLNA-0118-352810	SEM005-05	2023/07/11	2024/07/10
Pre-amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2023/07/11	2024/07/10

Pre-amplifier	Rohde & Schwarz	CH14-H052	SEM005-17	2023/07/11	2024/07/10
Substitution Antenna	ETS-Lindgren	3142C	SEM003-01	2023/06/25	2026/06/24
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2023/03/28	2024/03/27

General used equipment					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2023-07-28	2024-07-27
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2023-07-28	2024-07-27
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2023-03-23	2024-03-22

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6 Radio Spectrum Matter Test Results

6.1 Effective (Isotropic) Radiated Power Output Data

Test Requirement: §2.1046, §22.913, §24.232

Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01

Limit: ERP≤7W(GSM850)

EIRP ≤ 2W(PCS1900)

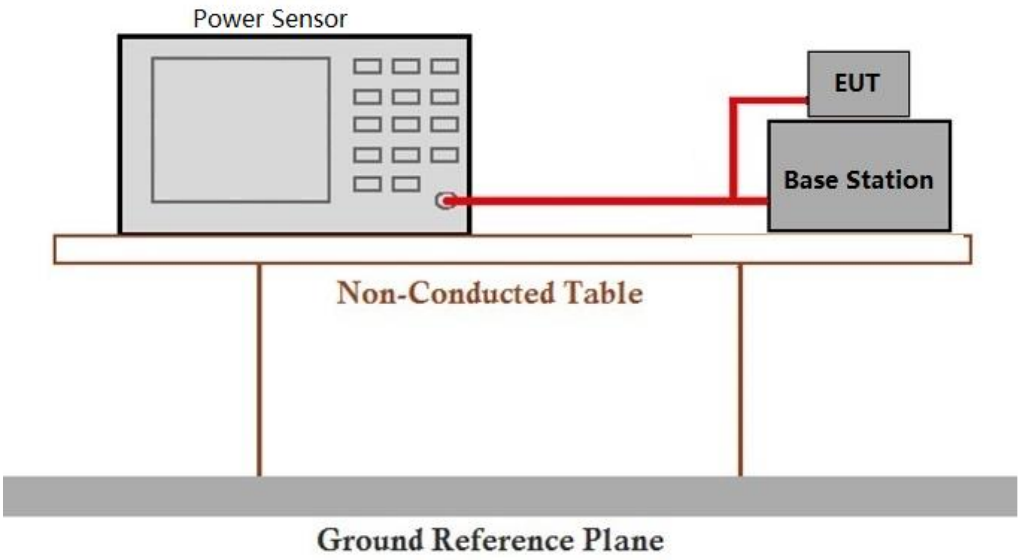
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 20.8 °C Humidity: 51.1 % RH Atmospheric Pressure: 1010 mbar

Test mode: 00: TX mode_Keep the EUT in transmitting mode

6.1.2 Test Setup Diagram



6.1.3 Measurement Data

Please refer to Appendix for GSM RF power test data.

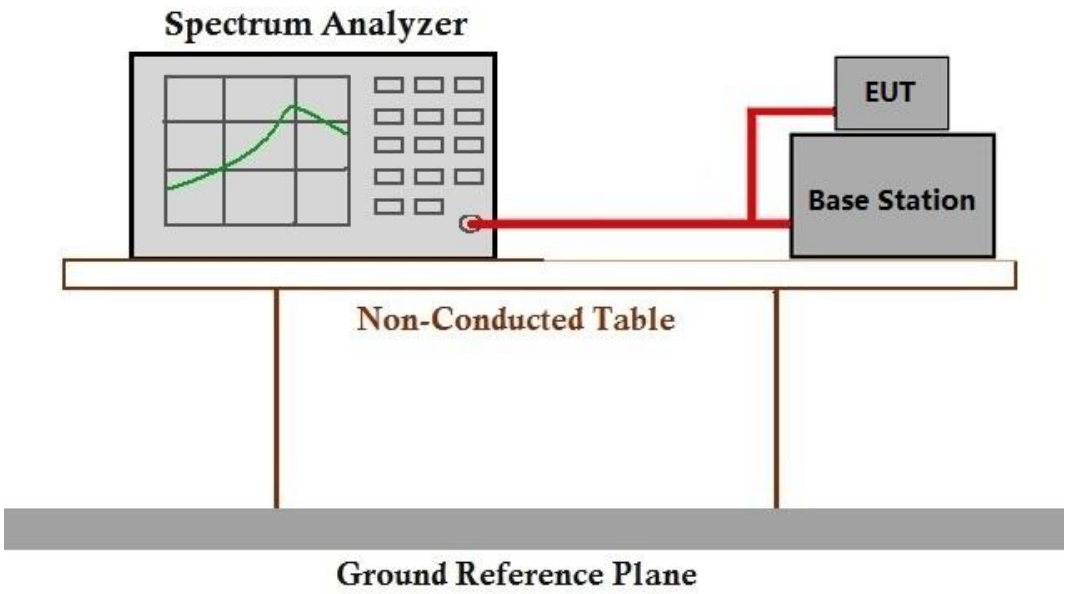
6.2 Peak-Average Ratio

Test Requirement: §24.232
Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
Limit: ≤13dB

6.2.1 E.U.T. Operation

Operating Environment:
Temperature: 20.8 °C Humidity: 51.1 % RH Atmospheric Pressure: 1010 mbar
Test mode: 00: TX mode_Keep the EUT in transmitting mode

6.2.2 Test Setup Diagram



6.2.3 Measurement Data

Please refer to Appendix for GSM PAR test data.

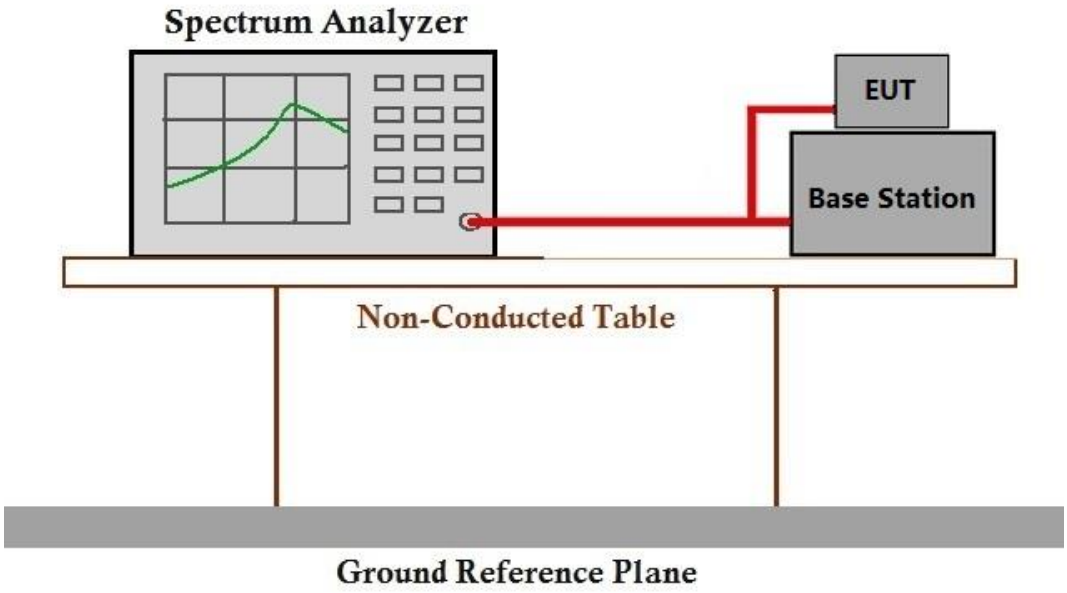
6.3 Bandwidth

Test Requirement: §2.1049(h), §22.917, §24.238
Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
Limit: OBW: No limit
EBW: No limit

6.3.1 E.U.T. Operation

Operating Environment:
Temperature: 20.8 °C Humidity: 51.1 % RH Atmospheric Pressure: 1010 mbar
Test mode: 00: TX mode_Keep the EUT in transmitting mode

6.3.2 Test Setup Diagram



6.3.3 Measurement Data

Please refer to Appendix for GSM bandwidth test data.

6.4 Band Edge Compliance

Test Requirement: §2.1051, §22.917, §24.238

Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01

Limit: ≤ -13dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.

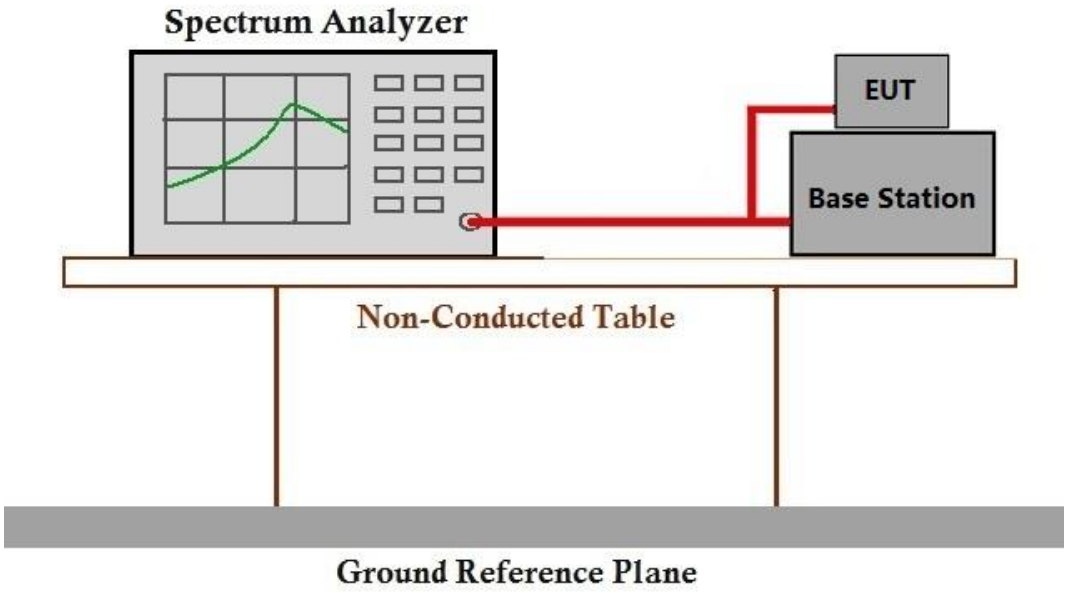
6.4.1 E.U.T. Operation

Operating Environment:

Temperature: 20.8 °C Humidity: 51.1 % RH Atmospheric Pressure: 1010 mbar

Test mode: 00: TX mode_Keep the EUT in transmitting mode

6.4.2 Test Setup Diagram



6.4.3 Measurement Data

Please refer to Appendix for GSM CSE test data.

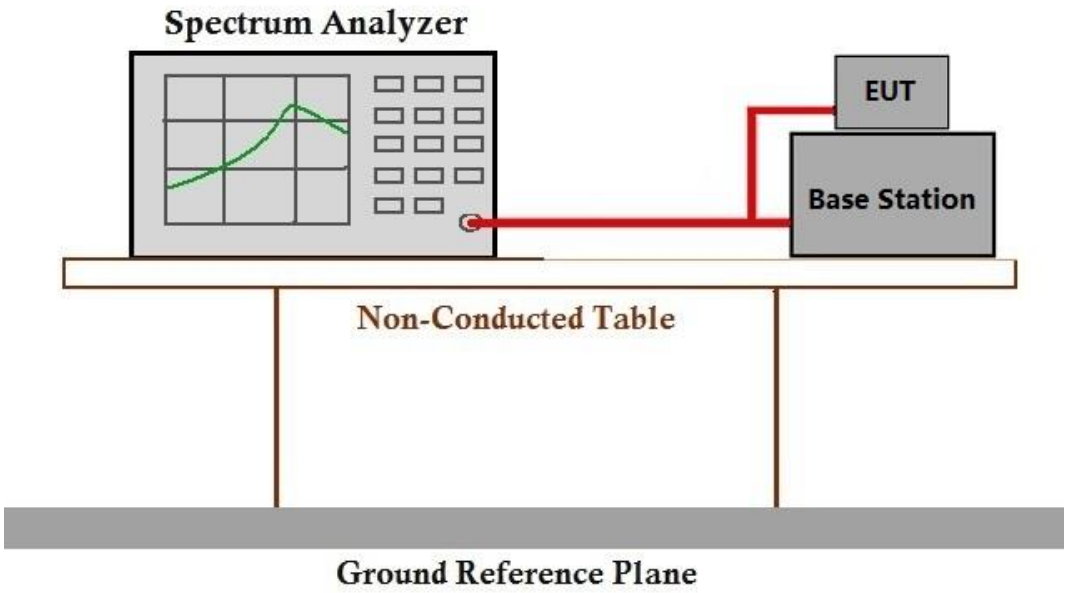
6.5 Spurious emissions at antenna terminals

Test Requirement: §2.1051, §22.917, §24.238
Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
Limit: ≤ -13dBm

6.5.1 E.U.T. Operation

Operating Environment:
Temperature: 20.8 °C Humidity: 51.1 % RH Atmospheric Pressure: 1010 mbar
Test mode: 00: TX mode_Keep the EUT in transmitting mode

6.5.2 Test Setup Diagram



6.5.3 Measurement Data

Please refer to Appendix for GSM CSE test data.

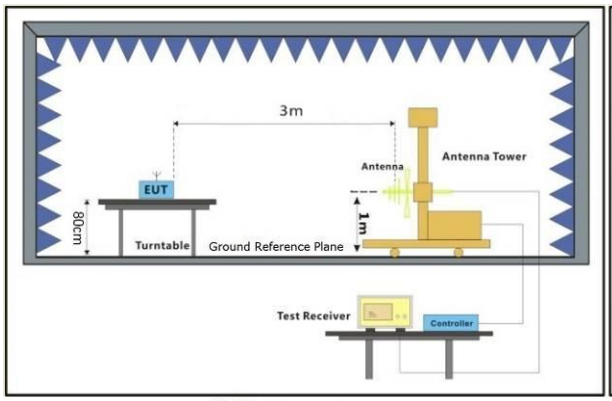
6.6 Field strength of spurious radiation

Test Requirement: §2.1051, §22.917, §24.238
Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
Limit: ≤ -13dBm

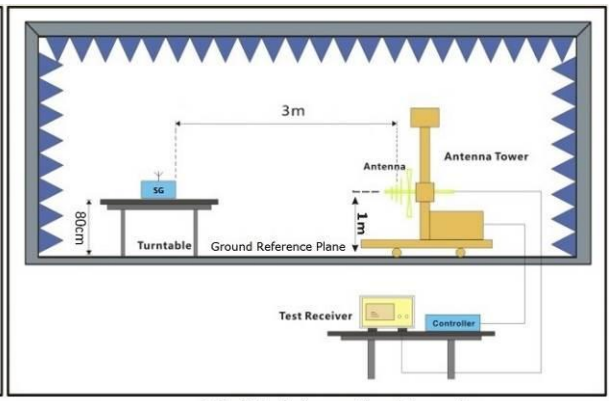
6.6.1 E.U.T. Operation

Operating Environment:
Temperature: 20.8 °C Humidity: 51.1 % RH Atmospheric Pressure: 1010 mbar
Test mode: 00: TX mode_Keep the EUT in transmitting mode

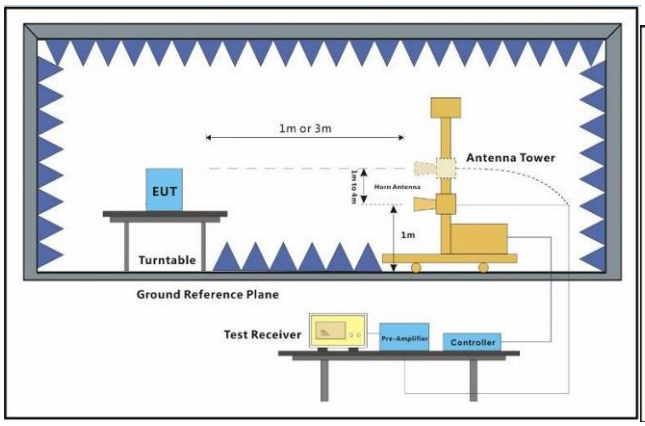
6.6.2 Test Setup Diagram



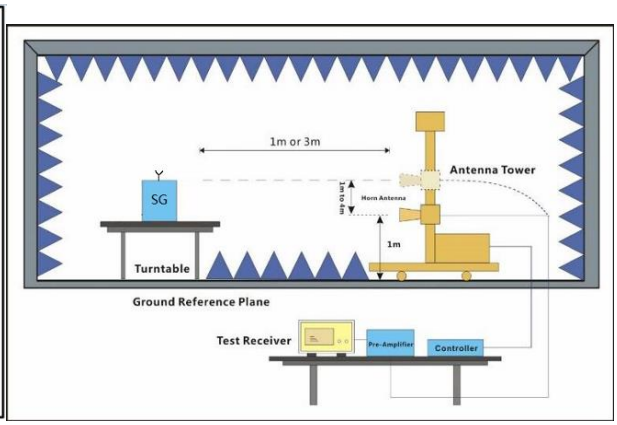
EUT



Substiute Antenna+Signal Generator



EUT



Substiute Antenna+Signal Generator

6.6.3 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 than 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.

GSM850-Low channel								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
1652.8	-40.78	-13	-27.78	-44.665	1.995	5.88	Horizontal	Pass
2479.2	-48.25	-13	-35.25	-48.37	2.35	4.62	Horizontal	Pass
3305.6	-53.04	-13	-40.04	-54.85	2.96	6.92	Horizontal	Pass
1652.8	-47.82	-13	-34.82	-49.555	1.995	5.88	Vertical	Pass
2479.2	-50.3	-13	-37.3	-50.42	2.35	4.62	Vertical	Pass
3305.6	-53.27	-13	-40.27	-55.08	2.96	6.92	Vertical	Pass

GSM850-Middle channel								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
1672.8	-39.68	-13	-26.68	-43.565	1.995	5.88	Horizontal	Pass
2509.2	-52.35	-13	-39.35	-53.365	2.655	5.82	Horizontal	Pass
3345.6	-50.1	-13	-37.1	-51.91	2.96	6.92	Horizontal	Pass
1672.8	-49.1	-13	-36.1	-50.835	1.995	5.88	Vertical	Pass
2509.2	-51.5	-13	-38.5	-52.515	2.655	5.82	Vertical	Pass
3345.6	-49.3	-13	-36.3	-51.11	2.96	6.92	Vertical	Pass

GSM850-High channel								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
1693.2	-39.36	-13	-26.36	-43.245	1.995	5.88	Horizontal	Pass
2539.8	-49.24	-13	-36.24	-50.255	2.655	5.82	Horizontal	Pass
3386.4	-50.12	-13	-37.12	-51.93	2.96	6.92	Horizontal	Pass
1693.2	-47.17	-13	-34.17	-48.905	1.995	5.88	Vertical	Pass
2539.8	-49.3	-13	-36.3	-50.315	2.655	5.82	Vertical	Pass
3386.4	-51.37	-13	-38.37	-53.18	2.96	6.92	Vertical	Pass

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PCS1900-Low channel								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
3704.8	-50.63	-13	-37.63	-55.51	3.29	8.17	Horizontal	Pass
5557.2	-47.01	-13	-34.01	-53.22	4.24	10.45	Horizontal	Pass
7409.6	-46.29	-13	-33.29	-53.23	4.19	11.13	Horizontal	Pass
3704.8	-51.09	-13	-38.09	-55.97	3.29	8.17	Vertical	Pass
5557.2	-48.3	-13	-35.3	-54.51	4.24	10.45	Vertical	Pass
7409.6	-45.62	-13	-32.62	-52.56	4.19	11.13	Vertical	Pass

PCS1900-Middle channel								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-50.35	-13	-37.35	-55.23	3.29	8.17	Horizontal	Pass
5640	-48.94	-13	-35.94	-55.15	4.24	10.45	Horizontal	Pass
7520	-44.84	-13	-31.84	-52.365	4.215	11.74	Horizontal	Pass
3760	-50.51	-13	-37.51	-55.39	3.29	8.17	Vertical	Pass
5640	-48.2	-13	-35.2	-54.41	4.24	10.45	Vertical	Pass
7520	-45.61	-13	-32.61	-53.135	4.215	11.74	Vertical	Pass

PCS1900-High channel								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
3815.2	-49.83	-13	-36.83	-54.71	3.29	8.17	Horizontal	Pass
5722.8	-48.79	-13	-35.79	-55	4.24	10.45	Horizontal	Pass
7630.4	-43.58	-13	-30.58	-51.105	4.215	11.74	Horizontal	Pass
3815.2	-50.96	-13	-37.96	-55.84	3.29	8.17	Vertical	Pass
5722.8	-48.97	-13	-35.97	-55.18	4.24	10.45	Vertical	Pass
7630.4	-43.73	-13	-30.73	-51.255	4.215	11.74	Vertical	Pass

6.7 Frequency stability

Test Requirement: §2.1055, §22.355, §24.235

Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01

Limit: ≤ ±2.5ppm.

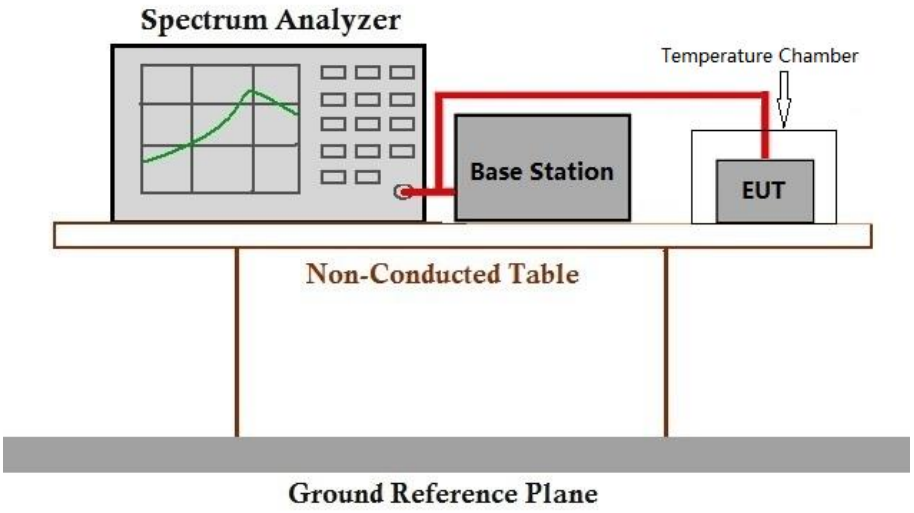
6.7.1 E.U.T. Operation

Operating Environment:

Temperature: 20.8 °C Humidity: 51.1 % RH Atmospheric Pressure: 1010 mbar

Test mode: 00: TX mode_Keep the EUT in transmitting mode

6.7.2 Test Setup Diagram



6.7.3 Measurement Data

Please refer to Appendix for GSM FE test data.

7 Test Setup Photo

Refer to Appendix - Test Setup Photo for SZCR2311003882AT

8 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for SZCR2311003882AT

-End of Report -

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