



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

SZEMC-TRF-01 Rev. A/1

Report No.: SZCR240400156404

Page: 1 of 22

TEST REPORT

Application No.: SZCR2404001564AT
Applicant: Hon Lin Technology Co., Ltd.
Address of Applicant: 11F, No.32, Jihu Rd., NeiHu Dist., Taipei City, 114 Taiwan
Manufacturer: Foxconn Industrial Internet Co., Ltd
Address of Manufacturer: Building C1, Foxconn Technology Park, Donghuan 2nd Road 2nd Floor, Longhua Street, Longhua District, Shenzhen, 518109, Guangdong, China
Factory: Fuyu Precision Component Company Limited
Address of Factory: Lot M1, Lot F and Lot T1, Quang Chau Industrial Park, Van Trung Commune, Viet Yen District, Bac Giang Province, Viet Nam
Equipment Under Test (EUT):
EUT Name: LTE GPS Tracker
Model No.: QTS110GW
Trade Mark: Qualcomm Aware
FCC ID: 2AQ68-QTS110GW
Standard(s) : 47 CFR Part 2
47 CFR Part 22 subpart H
47 CFR Part 24 subpart E
Date of Receipt: 2024-04-28
Date of Test: 2024-05-11 to 2024-06-07
Date of Issue: 2024-06-20

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

Keny Xu

Keny Xu
EMC Laboratory Manager



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

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2024-06-20		Original

Authorized for issue by:				
		Calvin Weng		
		Calvin Weng/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

Remark: Final product will be equipped with normal SIM card or eSIM, which will not affect the EMC and RF performance according to declaration letter. For this project, normal SIM card was used to test.

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4 General Information

4.1 Details of E.U.T.

Power supply:	DC3.7V by li-ion battery Recharged input: DC5V/1.5A
Sample Type:	Mobile production
Support Network:	GPRS, EGPRS
Operation Frequency Band:	GSM850/PCS1900
Modulation Type:	GMSK for GPRS/EGPRS 8PSK for EGPRS
GPRS Class:	12
EGPRS Class:	12
Antenna Type:	PIFA antenna
Antenna Gain:	GSM850:3.53dBi, 1900: 2.65dBi

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	DC3.2 V
	VN	DC3.7 V
	VH	DC4.2 V

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	$\pm 5.4 \times 10^{-8}$
2	Duty cycle	$\pm 0.3\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF conducted power	$\pm 0.8\text{dB}$
5	RF power density	$\pm 0.4\text{dB}$
6	Conducted Spurious emissions	$\pm 2.7\text{dB}$
7	Radiated Spurious emission test	$\pm 3.1\text{dB}$ (Below 1GHz)
		$\pm 4.4\text{dB}$ (Above 1GHz)
8	Temperature test	$\pm 1^\circ\text{C}$
9	Humidity test	$\pm 3\%$
10	Supply voltages	$\pm 1.5\%$
11	Time	$\pm 3\%$



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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



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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	2024-03-20	2025-03-19
MXA Signal Analyzer	KEYSIGHT	N9020B	SEM004-24	2024-3-14	2025-3-13
Measurement Software	TST	TST PASS V2.0	N/A	N/A	N/A
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2024-3-27	2025-3-26
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2024-03-27	2025-03-26
Universal Radio Communication Tester	Anritsu	MT8000A	SEM010-10	2024-3-14	2025-3-13
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2024-3-19	2025-3-18
Power Sensor	KEYSIGHT	U2021XA	SEM009-15	2024-03-20	2025-03-19

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024-5-11	2027-5-10
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2024-03-15	2025-03-14
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22
Microwave system amplifier	Agilent	83017A	SEM005-25	2023-09-19	2024-09-18
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2023-07-07	2024-07-06
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2022-08-10	2024-08-09
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2024-03-15	2025-03-14
Signal Generator(9kHz-40GHz)	N5173B	MY53270267	Agilent	2023-9-19	2024-9-18
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2021-07-11	2024-07-10



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Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	SEM003-32	2021-09-26	2024-09-25
Pre-amplifier	Rohde & Schwarz	CH14-H052	SEM005-17	2024-03-15	2025-03-14
Substitution Antenna	Rohde & Schwarz	HF907	SEM003-06	2022-08-07	2024-08-06
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2024-03-27	2025-03-26

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	2024-03-22	2025-03-21



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6 Radio Spectrum Matter Test Results

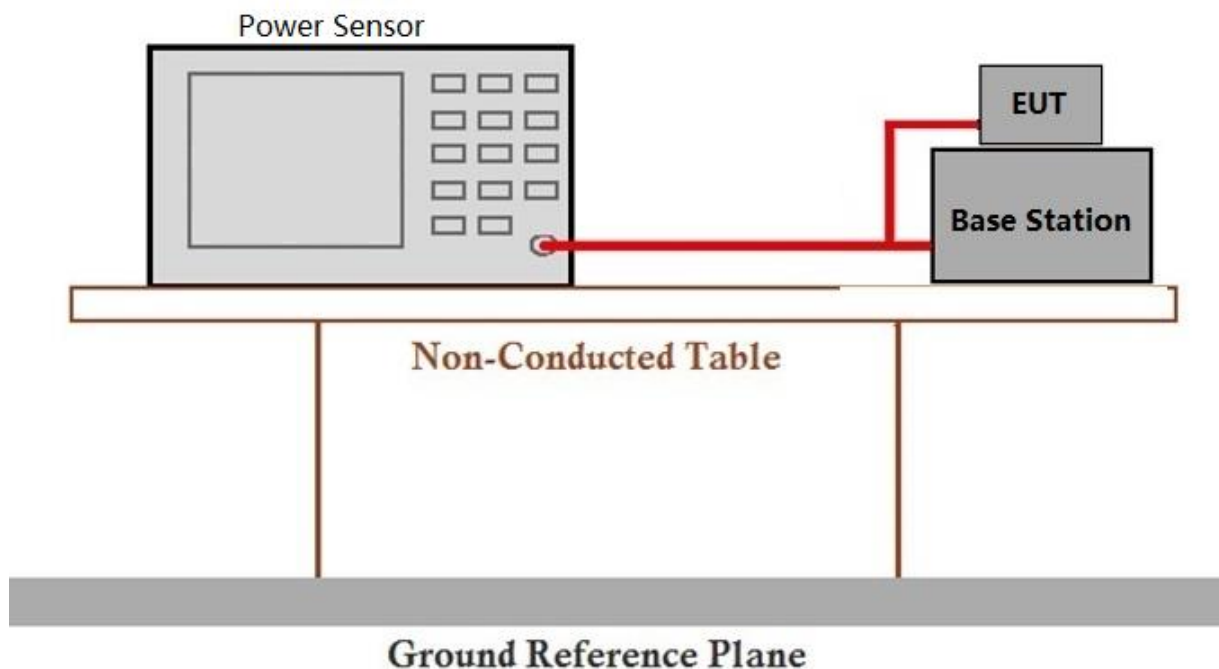
6.1 Effective (Isotropic) Radiated Power Output Data

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: 22 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar
 Test mode: 30: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 test data.

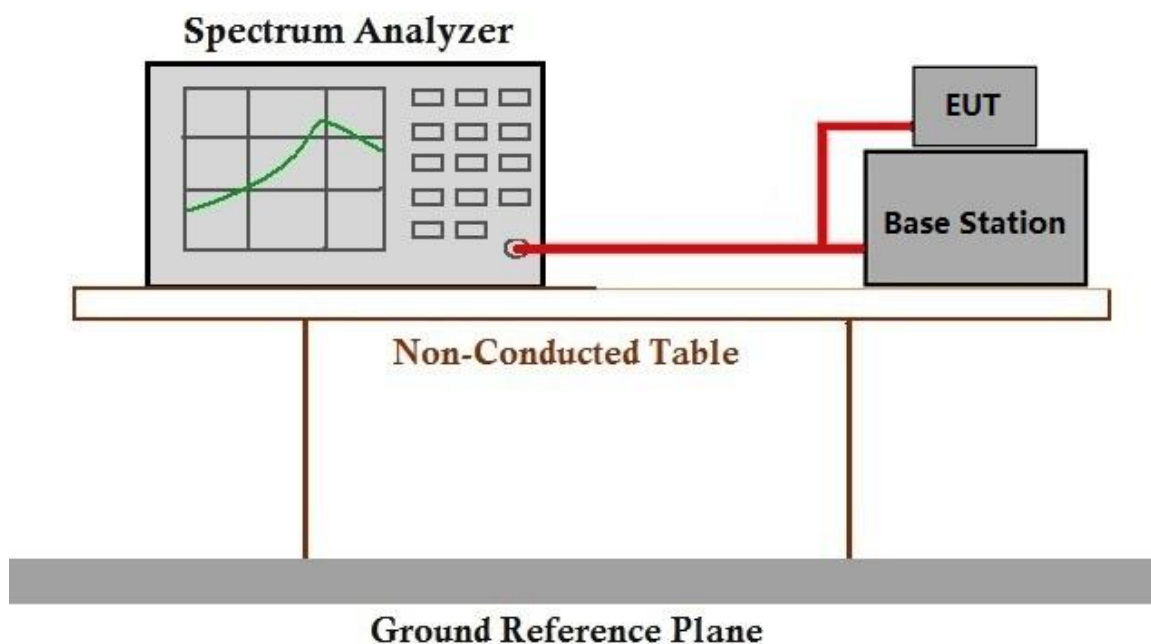
6.2 Peak-Average Ratio

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: 22 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar
 Test mode: 30: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 test data.

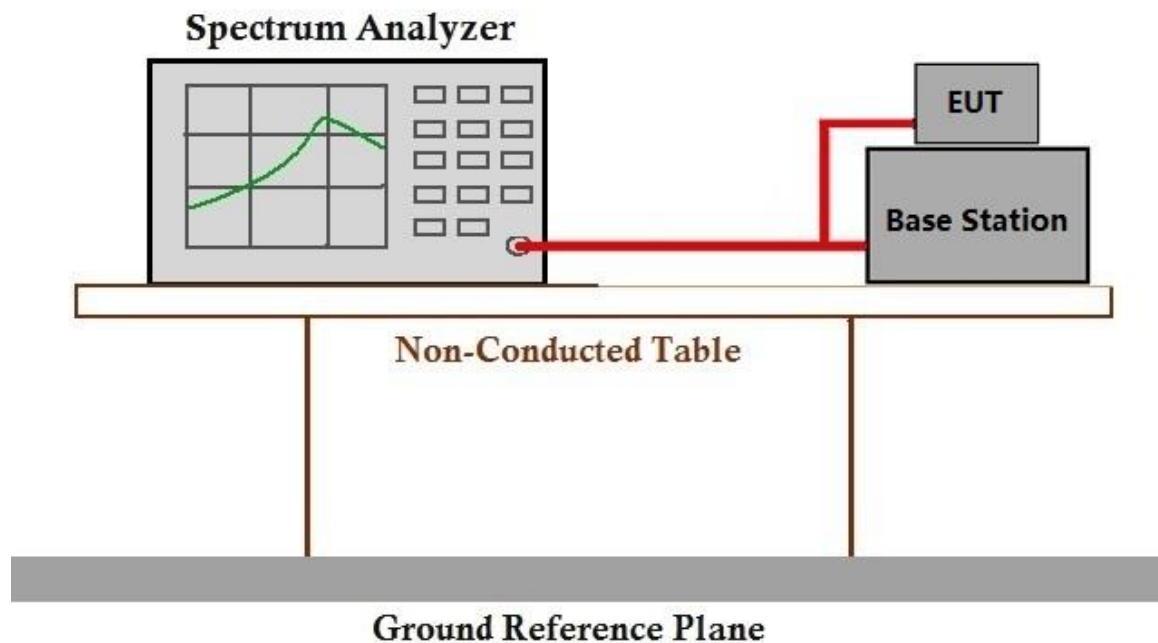
6.3 Bandwidth

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: 22 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar
 Test mode: 30: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 test data.



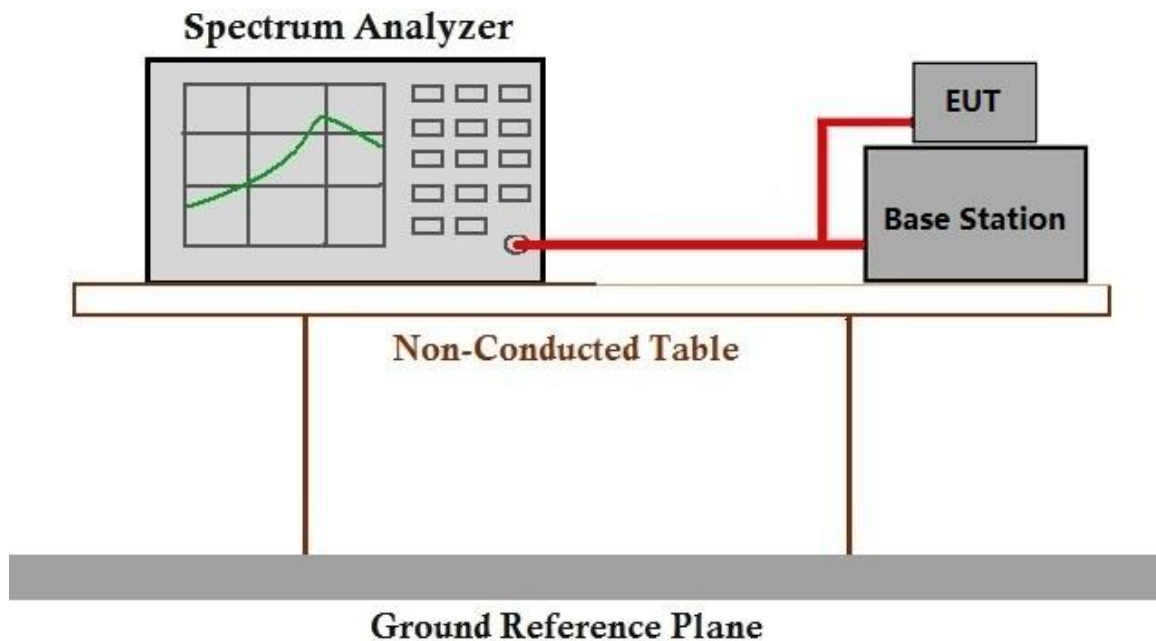
6.4 Band Edge Compliance

Test Requirement: §2.1051, §22.917, §24.238
 Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
 Limit: $\leq -13\text{dBm}/1\% \cdot \text{EBW}$, in 1 MHz bands immediately outside and adjacent to the frequency block.

6.4.1 E.U.T. Operation

Operating Environment:
 Temperature: 22 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar
 Test mode: 30: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 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: $\leq -13\text{dBm}$

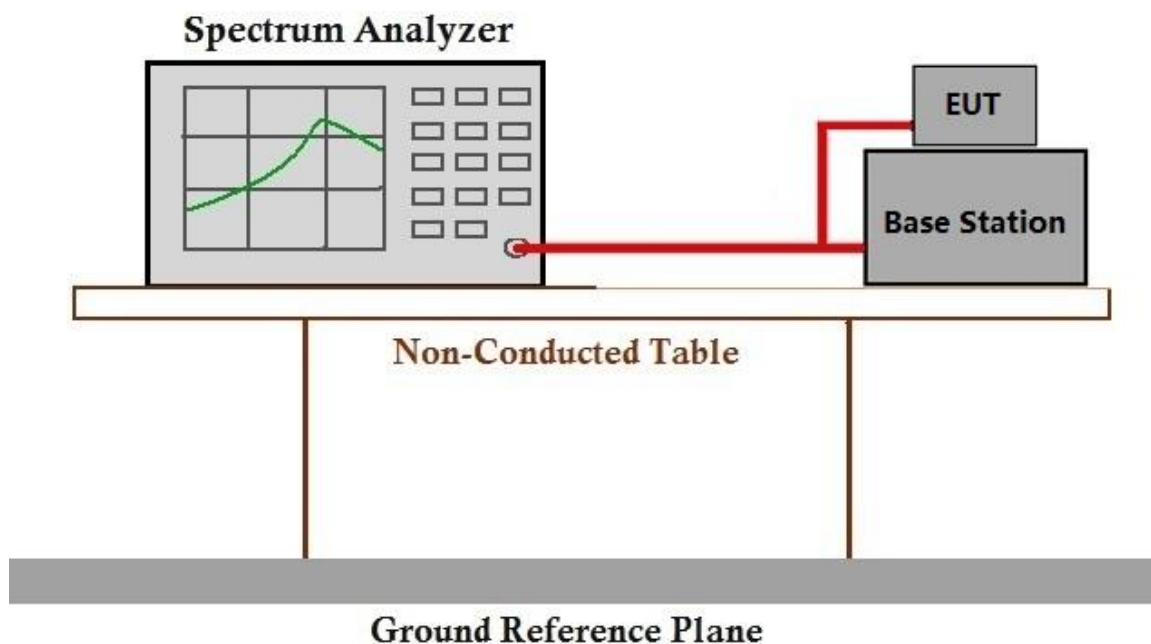
6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar

Test mode: 30: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 test data.

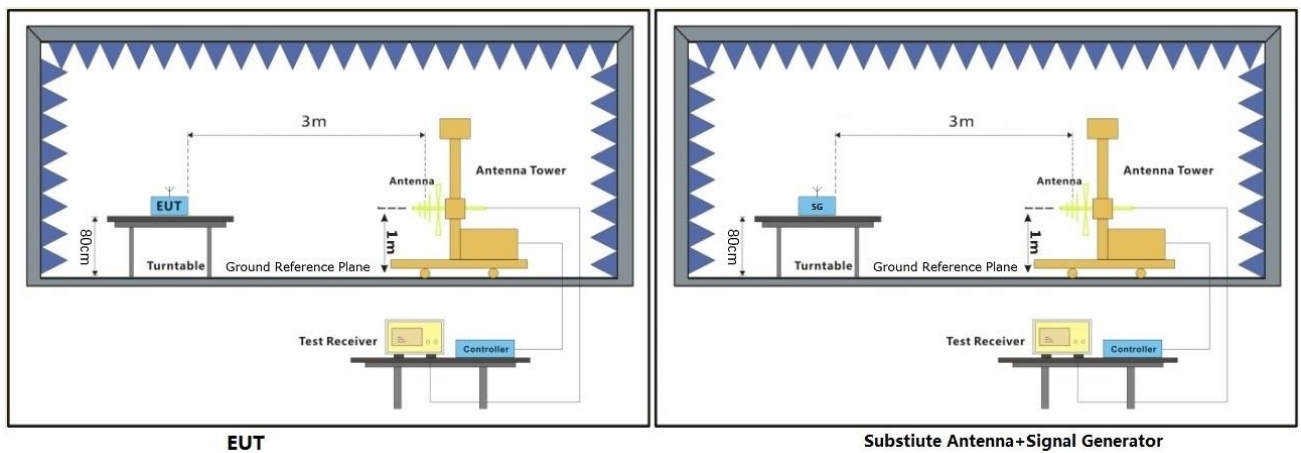
6.6 Field strength of spurious radiation

Test Requirement: §2.1051, §22.917, §24.238
 Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
 Limit: $\leq -13\text{dBm}$

6.6.1 E.U.T. Operation

Operating Environment:
 Temperature: 22 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar
 Test mode: 30:TX mode_Keep the EUT in transmitting mode

6.6.2 Test Setup Diagram



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 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.

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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
2401.685	-63.77	-13	-50.77	-66.75	2.6	5.58	Horizontal	Pass
3455.26	-64.39	-13	-51.39	-69.19	3.26	8.06	Horizontal	Pass
5015.753	-60.39	-13	-47.39	-66.28	4.26	10.15	Horizontal	Pass
2598.691	-65.15	-13	-52.15	-68.47	2.72	6.04	Vertical	Pass
3581.325	-64.15	-13	-51.15	-69.09	3.34	8.28	Vertical	Pass
5006.774	-60.5	-13	-47.5	-66.38	4.26	10.14	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
3222.054	-65.26	-13	-52.26	-69.63	3.11	7.48	Horizontal	Pass
4353.737	-64.69	-13	-51.69	-70.08	3.85	9.24	Horizontal	Pass
4979.933	-60.98	-13	-47.98	-66.84	4.25	10.11	Horizontal	Pass
2999.209	-65.03	-13	-52.03	-68.99	2.96	6.92	Vertical	Pass
3568.514	-64.37	-13	-51.37	-69.29	3.34	8.26	Vertical	Pass
5079.058	-61.05	-13	-48.05	-66.98	4.26	10.19	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
2756.98	-65.77	-13	-52.77	-69.35	2.81	6.39	Horizontal	Pass
3594.181	-64.7	-13	-51.7	-69.65	3.35	8.3	Horizontal	Pass
4997.811	-60.94	-13	-47.94	-66.82	4.26	10.14	Horizontal	Pass
2872.97	-65.95	-13	-52.95	-69.71	2.88	6.64	Vertical	Pass
3568.514	-64.54	-13	-51.54	-69.46	3.34	8.26	Vertical	Pass
5024.748	-61.17	-13	-48.17	-67.07	4.26	10.16	Vertical	Pass



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SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing & Calibration Laboratory

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.com.cn
中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编:518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

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GSM1900-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
2199.817	-67.34	-13	-54.34	-69.97	2.47	5.1	Horizontal	Pass
3449.074	-64.87	-13	-51.87	-69.65	3.26	8.04	Horizontal	Pass
4988.864	-60.81	-13	-47.81	-66.68	4.25	10.12	Horizontal	Pass
1989.803	-67.95	-13	-54.95	-70.26	2.34	4.65	Vertical	Pass
3091.97	-65.39	-13	-52.39	-69.52	3.02	7.15	Vertical	Pass
5115.591	-61.66	-13	-48.66	-67.61	4.26	10.21	Vertical	Pass

GSM1900-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
1266.823	-69.91	-13	-56.91	-72.48	1.83	4.4	Horizontal	Pass
2636.209	-67.09	-13	-54.09	-70.47	2.74	6.12	Horizontal	Pass
4988.864	-60.96	-13	-47.96	-66.83	4.25	10.12	Horizontal	Pass
2878.122	-65.71	-13	-52.71	-69.47	2.89	6.65	Vertical	Pass
3467.664	-65.22	-13	-52.22	-70.04	3.27	8.09	Vertical	Pass
5106.433	-61.23	-13	-48.23	-67.18	4.26	10.21	Vertical	Pass

GSM1900-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
2141.481	-67.97	-13	-54.97	-70.49	2.44	4.96	Horizontal	Pass
3536.687	-64.65	-13	-51.65	-69.56	3.31	8.22	Horizontal	Pass
5189.446	-62.05	-13	-49.05	-68.06	4.25	10.26	Horizontal	Pass
2747.118	-66.28	-13	-53.28	-69.83	2.81	6.36	Vertical	Pass
3581.325	-65.03	-13	-52.03	-69.97	3.34	8.28	Vertical	Pass
4988.864	-61.65	-13	-48.65	-67.52	4.25	10.12	Vertical	Pass

Note:

All modes have been tested and we found GPRS Test mode has the worst test result. Only record the worst test result.



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No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.com.cn
中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编:518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

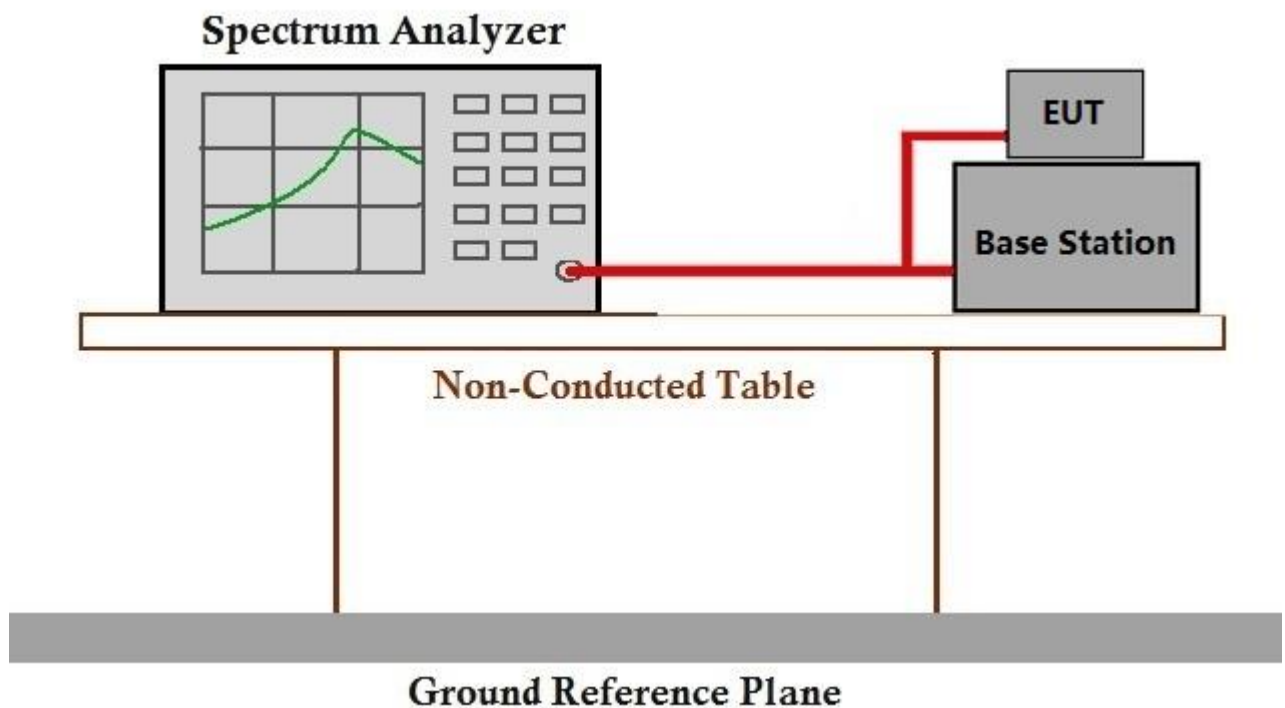
6.7 Frequency stability

Test Requirement: §2.1055, §22.355, §24.235
 Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
 Limit: $\leq \pm 2.5\text{ppm}$.

6.7.1 E.U.T. Operation

Operating Environment:
 Temperature: 22 °C Humidity: 52 % RH Atmospheric Pressure: 1020 mbar
 Test mode: 30: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 test data.

7 Test Setup Photo

Refer to Appendix – WWAN Test Setup Photo for SZCR2404001564AT

8 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for SZCR2404001564AT

-End of Report -

