

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

Report No.: SZCR240200059401
Rev.: 01
Page: 1 of 39

TEST REPORT

Application No.: SZCR2402000594WM
Applicant: Xiaomi Communications Co., Ltd.
Address of Applicant: #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer: Xiaomi Communications Co., Ltd.
Address of Manufacturer: #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
EUT Description: Mobile Phone
Model No.: 2404APC5FG
Trade Mark: POCO
FCC ID: 2AFZZPC5FG
Standards: 47 CFR Part 2
47 CFR Part 22
47 CFR Part 24
47 CFR Part 27
Date of Receipt: 2024/03/04
Date of Test: 2024/03/04 to 2024/03/18
Date of Issue: 2024/03/26

| | |
|----------------------|---------------|
| Test Result : | PASS * |
|----------------------|---------------|

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Keny Xu
Laboratory Manager



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Report No.: SZCR240200059401

Rev.: 01

Page: 2 of 39

1 Version

| Revision Record | | | | |
|-----------------|---------|------------|----------|----------|
| Version | Chapter | Date | Modifier | Remark |
| 01 | | 2024/03/26 | | Original |

| | |
|-------------|--|
| Prepared By |  (Jack Huang) / Test Engineer |
| Checked By |  (Flora Wang) / Reviewer |

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

Report No.: SZCR240200059401

Rev.: 01

Page: 3 of 39

Contents

| | | |
|-----|---|----|
| 1 | Version | 2 |
| 2 | Test Summary | 5 |
| 2.1 | GSM 850/UMTS Band 5 | 5 |
| 2.2 | LTE Band 5 | 6 |
| 2.3 | GSM 1900/UMTS Band 2 | 7 |
| 2.4 | LTE Band 2 | 8 |
| 2.5 | UMTS Band 4 | 9 |
| 2.6 | LTE Band 4 /66 | 10 |
| 2.7 | LTE Band 7 | 11 |
| 2.8 | LTE Band 38/41 | 12 |
| 3 | General Information | 13 |
| 3.1 | Details of Client | 13 |
| 3.2 | Test Location | 13 |
| 3.3 | Test Facility | 13 |
| 3.4 | General Description of EUT | 14 |
| 3.5 | Test Mode | 15 |
| 3.6 | Test Environment | 15 |
| 3.7 | Description of Support Units | 15 |
| 3.8 | Technical Specification | 16 |
| 3.9 | Test Frequencies | 19 |
| 4 | Description of Tests | 24 |
| 4.1 | Conducted Output Power | 24 |
| 4.2 | Effective (Isotropic) Radiated Power of Transmitter | 25 |
| 4.3 | Occupied Bandwidth | 26 |
| 4.4 | Band Edge at Antenna Terminals | 27 |
| 4.5 | Spurious And Harmonic Emissions at Antenna Terminal | 28 |
| 4.6 | Peak-Average Ratio | 29 |
| 4.7 | Field Strength of Spurious Radiation | 30 |
| 4.8 | Frequency Stability / Temperature Variation | 31 |
| 4.9 | Test Setups | 32 |



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

Report No.: SZCR240200059401
Rev.: 01
Page: 4 of 39

| | | |
|-------|-------------------------------|----|
| 4.9.1 | Test Setup 1 | 32 |
| 4.9.2 | Test Setup 2 | 32 |
| 4.9.3 | Test Setup 3 | 33 |
| 4.10 | Test Conditions | 34 |
| 5 | Main Test Instruments | 36 |
| 6 | Measurement Uncertainty | 38 |
| 7 | Appendixes | 39 |



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Report No.: SZCR240200059401
Rev.: 01
Page: 5 of 39

2 Test Summary

2.1 GSM 850/UMTS Band 5

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict |
|--|--|---|-------------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §22.913(a)(5) | ERP ≤ 7 W | Section 1 of Appendix B.1&B.5 | Pass |
| Peak-Average Ratio | §22.913(d) | Limit≤13 dB | Section 4 of Appendix B.1&B.5 | Pass |
| Bandwidth | §2.1049 | OBW: No limit. EBW: No limit. | Section 3 of Appendix B.1&B.5 | Pass |
| Band Edges Compliance | §2.1051, §22.917(a) | ≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. | Section 5 of Appendix B.1&B.5 | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §22.917(a) | FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges. | Section 5 of Appendix B.1&B.5 | Pass |
| Field Strength of Spurious Radiation | §2.1053, §22.917(a) | FCC: ≤ -13 dBm/100 kHz. | Section 6 of Appendix B.1&B.5 | Pass |
| Frequency Stability | §2.1055(a)(1)(b) §2.1055(d)(2) §22.355 | ±2.5ppm. | Section 2 of Appendix B.1&B.5 | Pass |



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Report No.: SZCR240200059401

Rev.: 01

Page: 6 of 39

2.2 LTE Band 5

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict |
|--|--|---|---------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §22.913(a)(5) | $ERP \leq 7 \text{ W}$ | Section 1 of Appendix B.8 | Pass |
| Peak-Average Ratio | §22.913(d) | Limit $\leq 13 \text{ dB}$ | Section 5 of Appendix B.8 | Pass |
| Bandwidth | §2.1049 | OBW: No limit. EBW: No limit. | Section 4 of Appendix B.8 | Pass |
| Band Edges Compliance | §2.1051, §22.917(a) | $\leq -13 \text{ dBm}/1\% \cdot \text{EBW}$, in 1 MHz bands immediately outside and adjacent to the frequency block. | Section 6 of Appendix B.8 | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §22.917(a) | FCC: $\leq -13 \text{ dBm}/100 \text{ kHz}$, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges. | Section 6 of Appendix B.8 | Pass |
| Field Strength of Spurious Radiation | §2.1053, §22.917(a) | FCC: $\leq -13 \text{ dBm}/100 \text{ kHz}$. | Section 3 of Appendix B.8 | Pass |
| Frequency Stability | §2.1055(a)(1)(b) §2.1055(d)(2) §22.355 | $\pm 2.5 \text{ ppm}$. | Section 2 of Appendix B.8 | Pass |



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Report No.: SZCR240200059401

Rev.: 01

Page: 7 of 39

2.3 GSM 1900/UMTS Band 2

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict |
|--|--|---|-------------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §24.232(c) | EIRP ≤ 2 W | Section 1 of Appendix B.2&B.3 | Pass |
| Peak-Average Ratio | §24.232(d) | Limit ≤ 13 dB | Section 4 of Appendix B.2&B.3 | Pass |
| Bandwidth | §2.1049 | OBW: No limit. EBW: No limit. | Section 3 of Appendix B.2&B.3 | Pass |
| Band Edges Compliance | §2.1051, §24.238(a) | ≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. | Section 5 of Appendix B.2&B.3 | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §24.238(a) | ≤ -13 dBm/1 MHz, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges. | Section 5 of Appendix B.2&B.3 | Pass |
| Field Strength of Spurious Radiation | §2.1053, §24.238(a) | ≤ -13 dBm/1 MHz. | Section 6 of Appendix B.2&B.3 | Pass |
| Frequency Stability | §2.1055(a)(1)(b) §2.1055(d)(2) §24.235 | Within authorized bands of operation/frequency block. | Section 2 of Appendix B.2&B.3 | Pass |



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Rev.: 01
Page: 8 of 39

2.4 LTE Band 2

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict |
|--|--|--|---------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §24.232(c) | $EIRP \leq 2\text{ W}$ | Section 1 of Appendix B.6 | Pass |
| Peak-Average Ratio | §24.232(d) | Limit $\leq 13\text{ dB}$ | Section 5 of Appendix B.6 | Pass |
| Bandwidth | §2.1049 | OBW: No limit. EBW: No limit. | Section 4 of Appendix B.6 | Pass |
| Band Edges Compliance | §2.1051, §24.238(a) | $\leq -13\text{ dBm}/1\% \cdot \text{EBW}$, in 1 MHz bands immediately outside and adjacent to the frequency block. | Section 6 of Appendix B.6 | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §24.238(a) | $\leq -13\text{ dBm}/1\text{ MHz}$, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges. | Section 6 of Appendix B.6 | Pass |
| Field Strength of Spurious Radiation | §2.1053, §24.238(a) | $\leq -13\text{ dBm}/1\text{ MHz}$. | Section 3 of Appendix B.6 | Pass |
| Frequency Stability | §2.1055(a)(1)(b) §2.1055(d)(2) §24.235 | Within authorized bands of operation/frequency block. | Section 2 of Appendix B.6 | Pass |



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Report No.: SZCR240200059401

Rev.: 01

Page: 9 of 39

2.5 UMTS Band 4

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict |
|--|---|--|---------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §27.50(d)(4) | $EIRP \leq 1\text{ W}$ | Section 1 of Appendix B.4 | Pass |
| Peak-Average Ratio | §27.50(d)(5) | Limit $\leq 13\text{ dB}$ | Section 4 of Appendix B.4 | Pass |
| Bandwidth | §2.1049 | OBW: No limit. EBW: No limit. | Section 3 of Appendix B.4 | Pass |
| Band Edges Compliance | §2.1051, §27.53(h) | $\leq -13\text{ dBm}/1\% \cdot \text{EBW}$, in 1 MHz bands immediately outside and adjacent to the frequency block. | Section 5 of Appendix B.4 | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §27.53(h) | $\leq -13\text{ dBm}/1\text{ MHz}$, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges. | Section 5 of Appendix B.4 | Pass |
| Field Strength of Spurious Radiation | §2.1053, §27.53(h) | $\leq -13\text{ dBm}/1\text{ MHz}$. | Section 6 of Appendix B.4 | Pass |
| Frequency Stability | §2.1055(a)(1)(b) §2.1055(d)(2) §27.54 | Within authorized bands of operation/frequency block. | Section 2 of Appendix B.4 | Pass |



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Report No.: SZCR240200059401

Rev.: 01

Page: 10 of 39

2.6 LTE Band 4 /66

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict |
|--|---|--|--------------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §27.50(d)(4) | $EIRP \leq 1\text{ W}$ | Section 1 of Appendix B.7&B.12 | Pass |
| Peak-Average Ratio | §27.50(d)(5) | Limit $\leq 13\text{ dB}$ | Section 5 of Appendix B.7&B.12 | Pass |
| Bandwidth | §2.1049 | OBW: No limit. EBW: No limit. | Section 4 of Appendix B.7&B.12 | Pass |
| Band Edges Compliance | §2.1051, §27.53(h) | $\leq -13\text{ dBm}/1\%*EBW$, in 1 MHz bands immediately outside and adjacent to the frequency block. | Section 6 of Appendix B.7&B.12 | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §27.53(h) | $\leq -13\text{ dBm}/1\text{ MHz}$, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges. | Section 6 of Appendix B.7&B.12 | Pass |
| Field Strength of Spurious Radiation | §2.1053, §27.53(h) | $\leq -13\text{ dBm}/1\text{ MHz}$. | Section 3 of Appendix B.7&B.12 | Pass |
| Frequency Stability | §2.1055(a)(1)(b) §2.1055(d)(2) §27.54 | Within authorized bands of operation/frequency block. | Section 2 of Appendix B.7&B.12 | Pass |



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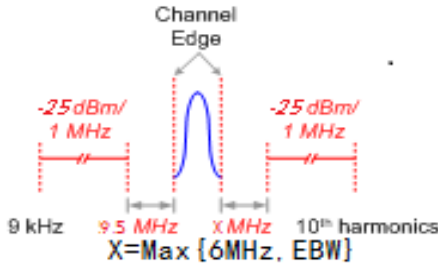
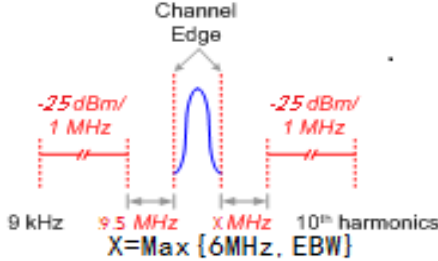
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Rev.: 01

Page: 11 of 39

2.7 LTE Band 7

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict |
|--|---|--|---------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §27.50(h)(2) | $EIRP \leq 2W$ | Section 1 of Appendix B.9 | Pass |
| Peak-Average Ratio | --- | ≤ 13 dB | Section 5 of Appendix B.9 | Pass |
| Bandwidth | §2.1049 | OBW: No limit. EBW: No limit. | Section 4 of Appendix B.9 | Pass |
| Band Edges Compliance | §2.1051, §27.53(m4) | For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. | Section 6 of Appendix B.9 | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §27.53(m) |  | Section 6 of Appendix B.9 | Pass |
| Field Strength of Spurious Radiation | §2.1053, §27.53(m) |  | Section 3 of Appendix B.9 | Pass |
| Frequency Stability | §2.1055(a)(1)(b) §2.1055(d)(2) §27.54 | Within authorized bands of operation/frequency block. | Section 2 of Appendix B.9 | Pass |



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Report No.: SZCR240200059401

Rev.: 01

Page: 12 of 39

2.8 LTE Band 38/41

| Test Item | FCC Rule No. | Requirements | Test Result | Verdict |
|--|---|--|---------------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §27.50(h)(2) | $EIRP \leq 2W$ | Section 1 of Appendix B.10&B.11 | Pass |
| Peak-Average Ratio | --- | ≤ 13 dB | Section 4 of Appendix B.10&B.11 | Pass |
| Bandwidth | §2.1049 | OBW: No limit. EBW: No limit. | Section 3 of Appendix B.10&B.11 | Pass |
| Band Edges Compliance | §2.1051, §27.53(m4) | For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. | Section 5 of Appendix B.10&B.11 | Pass |
| Spurious Emission at Antenna Terminals | §2.1051, §27.53(m) | | Section 5 of Appendix B.10&B.11 | Pass |
| Field Strength of Spurious Radiation | §2.1053, §27.53(m) | | Section 6 of Appendix B.10&B.11 | Pass |
| Frequency Stability | §2.1055(a)(1)(b) §2.1055(d)(2) §27.54 | Within authorized bands of operation/frequency block. | Section 2 of Appendix B.10&B.11 | Pass |



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Report No.: SZCR240200059401
Rev.: 01
Page: 13 of 39

3 General Information

3.1 Details of Client

| | |
|--------------------------|---|
| Applicant: | Xiaomi Communications Co., Ltd. |
| Address of Applicant: | #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085 |
| Manufacturer: | Xiaomi Communications Co., Ltd. |
| Address of Manufacturer: | #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085 |

3.2 Test Location

| | |
|----------------|---|
| Company: | SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch |
| Address: | No. 1 Workshop, M-10, Middle section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China |
| Post code: | 518057 |
| Test engineer: | Xing Guo, Jinhua Wei |

3.3 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 Branch 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.

• **Innovation, Science and Economic Development Canada**

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

CAB identifier: CN0006.

IC#: 4620C.

• **FCC –Designation Number: CN1336**

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

Designation Number: CN1336.

Test Firm Registration Number: 787754



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Report No.: SZCR240200059401
Rev.: 01
Page: 14 of 39

3.4 General Description of EUT

| | | | |
|--|--|--|---|
| EUT Description: | Mobile Phone | | |
| Model No.: | 2404APC5FG | | |
| Trade Mark: | POCO | | |
| Hardware Version: | 1351N19A | | |
| Software Version: | Xiaomi HyperOS 1.0 | | |
| Power Supply: | DC 3.84V from internal rechargeable battery which can be charged by AC/DC adapter. | | |
| IMEI: | RF Conducted | Sample1: 860919070009964(IMEI1)/860919070009972(IMEI2) Sample2: 860919070007760(IMEI1)/860919070007778(IMEI2) | |
| | RSE | Sample1: 860919070009865(IMEI1)/860919070009873(IMEI2) | |
| Antenna Type: | PIFA Antenna | | |
| Antenna Gain: | GSM850: | -6dBi (Ant1) -5.1dBi (Ant4) | GSM1900: 0.1dBi (Ant1) -0.2dBi (Ant4) |
| | WCDMA Band II: | 0.1dBi (Ant1) -0.2dBi (Ant4) | WCDMA Band IV: 0dBi (Ant1) -2.1dBi (Ant4) |
| | WCDMA Band V: | -6dBi (Ant1) -5.1dBi (Ant4) | |
| | LTE Band 2: | 0.1dBi (Ant1) -0.2dBi (Ant4) | LTE Band 4: 0dBi (Ant1) -2.1dBi (Ant4) |
| | LTE Band 5: | -5.9dBi (Ant1) -5.1dBi (Ant4) | LTE Band 7: -0.2dBi (Ant1) -3.3dBi (Ant4) |
| | LTE Band 38: | -0.7dBi (Ant1) -3.2dBi (Ant4) | LTE Band 41: -0.2dBi (Ant1) -3.1dBi (Ant4) |
| | LTE Band 66: | 0dBi (Ant1) -2.1dBi (Ant4) | |
| | Note: The antenna gain are derived from the gain information report provided by the manufacturer. | | |
| RF Cable: | 9kHz ~ 30MHz (0.3dB) | 30MHz ~ 1000MHz (0.6dB) | 1000MHz ~ 2000MHz (0.8dB) |
| | 2000MHz ~ 4000MHz (1.1dB) | 4000MHz ~ 6000MHz (1.8dB) | 6000MHz ~ 12750MHz (2.6dB) |
| | Above 12750MHz (3.5dB) | | |
| Remark: 1.As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information. 2. All antennas of EIRP(ERP) & RSE are tested, and only the worst data is presented. | | | |



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Report No.: SZCR240200059401
Rev.: 01
Page: 15 of 39

3.5 Test Mode

| Test Mode | Test Modes Description |
|--|---------------------------------------|
| GSM/TM1 | GSM system, GSM/GPRS, GMSK modulation |
| GSM/TM2 | GSM system, EGPRS, 8PSK modulation |
| UMTS/TM1 | UMTS system, WCDMA, QPSK modulation |
| LTE/TM1 | LTE system, QPSK modulation |
| LTE/TM2 | LTE system, 16QAM modulation |
| LTE/TM3 | LTE system, 64QAM modulation |
| Remark: The test mode(s) are selected according to relevant radio technology specifications. | |

3.6 Test Environment

| Environment Parameter | 101.0 kPa Selected Values During Tests | |
|------------------------|--|-----------------------------------|
| Relative Humidity | 44-46 % RH Ambient | |
| Value | Temperature(°C) | Voltage(V) |
| NTNV | 22~23 | 3.84 |
| LTLV | -30 | 3.6 |
| LTHV | -30 | 4.3 |
| HTLV | 50 | 3.6 |
| HTHV | 50 | 4.3 |
| Remark: | | |
| NV: Normal Voltage | LV: Low Extreme Test Voltage | HV: High Extreme Test Voltage |
| NT: Normal Temperature | LT: Low Extreme Test Temperature | HT: High Extreme Test Temperature |

3.7 Description of Support Units

The EUT has been tested as an independent unit.



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Report No.: SZCR240200059401

Rev.: 01

Page: 16 of 39

3.8 Technical Specification

| Characteristics | Description | | |
|-----------------------------|---|---|---|
| Radio System Type | <input checked="" type="checkbox"/> GSM | <input checked="" type="checkbox"/> UMTS | <input checked="" type="checkbox"/> LTE |
| Supported Frequency Range | Band | TX | RX |
| | GSM850 | 824 to 849 MHz | 869 to 894 MHz |
| | GSM1900 | 1850 to 1910 MHz | 1930 to 1990 MHz |
| | UMTS Band II | 1850 to 1910 MHz | 1930 to 1990 MHz |
| | UMTS Band IV | 1710 to 1755 MHz | 2110 to 2155 MHz |
| | UMTS Band V | 824 to 849 MHz | 869 to 894 MHz |
| | LTE Band 2 | 1850 to 1910 MHz | 1930 to 1990 MHz |
| | LTE Band 4 | 1710 to 1755 MHz | 2110 to 2155 MHz |
| | LTE Band 5 | 824 to 849 MHz | 869 to 894 MHz |
| | LTE Band 7 | 2500 to 2570 MHz | 2620 to 2690 MHz |
| | LTE Band 38 | 2570 to 2620 MHz | 2570 to 2620 MHz |
| | LTE Band 41 | 2496 to 2690MHz | 2496 to 2690MHz |
| | LTE Band 66 | 1710 to 1780 MHz | 2110 to 2200 MHz |
| Supported Channel Bandwidth | GSM system: | <input checked="" type="checkbox"/> 0.2 MHz | |
| | UMTS system: | <input checked="" type="checkbox"/> 5 MHz | |
| | LTE Band 2 | <input checked="" type="checkbox"/> 1.4 MHz | <input checked="" type="checkbox"/> 3 MHz <input checked="" type="checkbox"/> 5 MHz <input checked="" type="checkbox"/> 10 MHz <input checked="" type="checkbox"/> 15 MHz <input checked="" type="checkbox"/> 20 MHz |
| | LTE Band 4 | <input checked="" type="checkbox"/> 1.4 MHz | <input checked="" type="checkbox"/> 3 MHz <input checked="" type="checkbox"/> 5 MHz <input checked="" type="checkbox"/> 10 MHz <input checked="" type="checkbox"/> 15 MHz <input checked="" type="checkbox"/> 20 MHz |
| | LTE Band 5 | <input checked="" type="checkbox"/> 1.4 MHz | <input checked="" type="checkbox"/> 3 MHz <input checked="" type="checkbox"/> 5 MHz <input checked="" type="checkbox"/> 10 MHz |
| | LTE Band 7 | <input checked="" type="checkbox"/> 5 MHz | <input checked="" type="checkbox"/> 10 MHz <input checked="" type="checkbox"/> 15 MHz <input checked="" type="checkbox"/> 20 MHz |
| | LTE Band 38 | <input checked="" type="checkbox"/> 5 MHz | <input checked="" type="checkbox"/> 10 MHz <input checked="" type="checkbox"/> 15 MHz <input checked="" type="checkbox"/> 20 MHz |
| | LTE Band 41 | <input checked="" type="checkbox"/> 5 MHz | <input checked="" type="checkbox"/> 10 MHz <input checked="" type="checkbox"/> 15 MHz <input checked="" type="checkbox"/> 20 MHz |
| | LTE Band 66 | <input checked="" type="checkbox"/> 1.4 MHz | <input checked="" type="checkbox"/> 3 MHz <input checked="" type="checkbox"/> 5 MHz <input checked="" type="checkbox"/> 10 MHz <input checked="" type="checkbox"/> 15MHz <input checked="" type="checkbox"/> 20MHz |
| | Note: WCDMA supports HSUPA, HSDPA, DC-HSDPA, HSPA+, but only the worst case was tested and the data displayed in this report. | | |
| Characteristics | Description | | |
| Designation of Emissions | GSM: | GMSK | 8PSK |



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Report No.: SZCR240200059401

Rev.: 01

Page: 17 of 39

| | | | |
|---|-------------|---------|-----------------|
| (Remark: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.) | GSM850 | 249KGXW | 246KG7W |
| | GSM1900 | 249KGXW | 261KG7W |
| | UMTS: | QPSK | |
| | Band II | 4M22F9W | |
| | Band IV | 4M20F9W | |
| | Band V | 4M23F9W | |
| | E-UTRA: | QPSK | 16QAM 64QAM |
| | LTE Band 2 | 1M12G7D | 1M12W7D 1M12W7D |
| | | 2M73G7D | 2M74W7D 2M74W7D |
| | | 4M55G7D | 4M55W7D 4M55W7D |
| | | 9M06G7D | 9M08W7D 9M08W7D |
| | | 13M6G7D | 13M6W7D 13M6W7D |
| | | 18M1G7D | 18M2W7D 18M2W7D |
| | LTE Band 4 | 1M11G7D | 1M12W7D 1M12W7D |
| | | 2M73G7D | 2M73W7D 2M73W7D |
| | | 4M55G7D | 4M56W7D 4M56W7D |
| | | 9M06G7D | 9M08W7D 9M08W7D |
| | | 13M6G7D | 13M6W7D 13M6W7D |
| | | 18M1G7D | 18M2W7D 18M2W7D |
| | LTE Band 5 | 1M11G7D | 1M12W7D 1M12W7D |
| | | 2M73G7D | 2M73W7D 2M73W7D |
| | | 4M54G7D | 4M55W7D 4M55W7D |
| | | 9M07G7D | 9M09W7D 9M09W7D |
| | LTE Band 7 | 4M55G7D | 4M56W7D 4M56W7D |
| | | 9M08G7D | 9M10W7D 9M10W7D |
| | | 13M6G7D | 13M6W7D 13M6W7D |
| | | 18M1G7D | 18M2W7D 18M2W7D |
| | LTE Band 38 | 4M56G7D | 4M57W7D 4M57W7D |
| | | 9M08G7D | 9M08W7D 9M08W7D |
| | | 13M6G7D | 13M6W7D 13M6W7D |
| | | 18M1G7D | 18M1W7D 18M1W7D |
| | LTE Band 41 | 4M55G7D | 4M56W7D 4M56W7D |



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Report No.: SZCR240200059401
Rev.: 01
Page: 18 of 39

| | | | | |
|--|-------------|---------|---------|---------|
| | | 9M09G7D | 9M09W7D | 9M09W7D |
| | | 13M6G7D | 13M7W7D | 13M7W7D |
| | | 18M1G7D | 18M1W7D | 18M1W7D |
| | LTE Band 66 | 1M12G7D | 1M12W7D | 1M12W7D |
| | | 2M73G7D | 2M75W7D | 2M75W7D |
| | | 4M58G7D | 4M59W7D | 4M59W7D |
| | | 9M11G7D | 9M10W7D | 9M10W7D |
| | | 13M7G7D | 13M7W7D | 13M7W7D |
| | | 18M2G7D | 18M2W7D | 18M2W7D |



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Report No.: SZCR240200059401
Rev.: 01
Page: 19 of 39

3.9 Test Frequencies

| Test Mode | TX / RX | RF Channel | | |
|-----------|---------|-------------|-------------|-------------|
| | | Low (L) | Middle (M) | High (H) |
| GSM850 | TX | Channel 128 | Channel 190 | Channel 251 |
| | | 824.2MHz | 836.6 MHz | 848.8 MHz |
| | RX | Channel 128 | Channel 190 | Channel 251 |
| | | 869.2 MHz | 881.6 MHz | 893.8 MHz |

| Test Mode | TX / RX | RF Channel | | |
|-----------|---------|-------------|-------------|-------------|
| | | Low (L) | Middle (M) | High (H) |
| GSM1900 | TX | Channel 512 | Channel 661 | Channel 810 |
| | | 1850.2MHz | 1880.0 MHz | 1909.8 MHz |
| | RX | Channel 512 | Channel 661 | Channel 810 |
| | | 1930.2 MHz | 1960.0 MHz | 1989.8 MHz |

| Test Mode | TX / RX | RF Channel | | |
|---------------|---------|--------------|--------------|--------------|
| | | Low (L) | Middle (M) | High (H) |
| WCDMA Band II | TX | Channel 9262 | Channel 9400 | Channel 9538 |
| | | 1852.4 MHz | 1880.0 MHz | 1907.6 MHz |
| | RX | Channel 9662 | Channel 9800 | Channel 9938 |
| | | 1932.4 MHz | 1960.0 MHz | 1987.6 MHz |

| Test Mode | TX / RX | RF Channel | | |
|---------------|---------|--------------|--------------|--------------|
| | | Low (L) | Middle (M) | High (H) |
| WCDMA Band IV | TX | Channel 1312 | Channel 1413 | Channel 1513 |
| | | 1712.4MHz | 1732.6 MHz | 1752.6 MHz |
| | RX | Channel 1537 | Channel 1638 | Channel 1738 |
| | | 2112.4 MHz | 2132.6 MHz | 2152.6 MHz |

| Test Mode | TX / RX | RF Channel | | |
|--------------|---------|--------------|--------------|--------------|
| | | Low (L) | Middle (M) | High (H) |
| WCDMA Band V | TX | Channel 4132 | Channel 4182 | Channel 4233 |
| | | 826.4MHz | 836.4 MHz | 846.6 MHz |
| | RX | Channel 4357 | Channel 4407 | Channel 4458 |
| | | 871.4 MHz | 881.4 MHz | 891.6 MHz |



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

Report No.: SZCR240200059401

Rev.: 01

Page: 20 of 39

| Test Mode | Bandwidth | TX / RX | RF Channel | | |
|------------|-----------|---------|---------------|---------------|---------------|
| | | | Low (L) | Middle (M) | High (H) |
| LTE Band 2 | 1.4MHz | TX | Channel 18607 | Channel 18900 | Channel 19193 |
| | | | 1850.7 MHz | 1880 MHz | 1909.3 MHz |
| | | RX | Channel 607 | Channel 900 | Channel 1193 |
| | | | 1930.7 MHz | 1960 MHz | 1989.3 MHz |
| | 3MHz | TX | Channel 18615 | Channel 18900 | Channel 19185 |
| | | | 1851.5 MHz | 1880 MHz | 1908.5 MHz |
| | | RX | Channel 615 | Channel 900 | Channel 1185 |
| | | | 1931.5 MHz | 1960 MHz | 1988.5 MHz |
| | 5MHz | TX | Channel 18625 | Channel 18900 | Channel 19175 |
| | | | 1852.5 MHz | 1880 MHz | 1907.5 MHz |
| | | RX | Channel 625 | Channel 900 | Channel 1175 |
| | | | 1932.5 MHz | 1960 MHz | 1987.5 MHz |
| | 10MHz | TX | Channel 18650 | Channel 18900 | Channel 19150 |
| | | | 1855 MHz | 1880 MHz | 1905 MHz |
| | | RX | Channel 650 | Channel 900 | Channel 1150 |
| | | | 1935 MHz | 1960 MHz | 1985 MHz |
| | 15MHz | TX | Channel 18675 | Channel 18900 | Channel 19125 |
| | | | 1857.5 MHz | 1880 MHz | 1902.5 MHz |
| | | RX | Channel 675 | Channel 900 | Channel 1125 |
| | | | 1937.5 MHz | 1960 MHz | 1982.5 MHz |
| | 20MHz | TX | Channel 18700 | Channel 18900 | Channel 19100 |
| | | | 1860 MHz | 1880 MHz | 1900 MHz |
| | | RX | Channel 700 | Channel 900 | Channel 1100 |
| | | | 1940 MHz | 1960 MHz | 1980 MHz |



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

Report No.: SZCR240200059401

Rev.: 01

Page: 21 of 39

| Test Mode | Bandwidth | TX / RX | RF Channel | | |
|------------|-----------|---------|-----------------------------|-----------------------------|-----------------------------|
| | | | Low (L) | Middle (M) | High (H) |
| LTE Band 4 | 1.4MHz | TX | Channel 19957 1710.7 MHz | Channel 20175 1732.5 MHz | Channel 20393 1754.3 MHz |
| | | RX | Channel 1975 2112.5 MHz | Channel 2175 2132.5MHz | Channel 2375 2152.5 MHz |
| | 3MHz | TX | Channel 19965 1711.5 MHz | Channel 20175 1732.5 MHz | Channel 20385 1753.5 MHz |
| | | RX | Channel 2000 2115 MHz | Channel 2175 2132.5MHz | Channel 2350 2150 MHz |
| | 5MHz | TX | Channel 19975 1712.5 MHz | Channel 20175 1732.5 MHz | Channel 20375 1752.5 MHz |
| | | RX | Channel 1975 2112.5 MHz | Channel 2175 2132.5MHz | Channel 2375 2152.5 MHz |
| | 10MHz | TX | Channel 20000 1715 MHz | Channel 20175 1732.5 MHz | Channel 20350 1750 MHz |
| | | RX | Channel 2000 2115 MHz | Channel 2175 2132.5MHz | Channel 2350 2150 MHz |
| | 15MHz | TX | Channel 20025 1717.5 MHz | Channel 20175 1732.5 MHz | Channel 20325 1747.5 MHz |
| | | RX | Channel 2025 2117.5 MHz | Channel 2175 2132.5MHz | Channel 2325 2147.5 MHz |
| | 20MHz | TX | Channel 20050 1720 MHz | Channel 20175 1732.5 MHz | Channel 20300 1745 MHz |
| | | RX | Channel 2050 2120 MHz | Channel 2175 2132.5MHz | Channel 2300 2145 MHz |

| Test Mode | Bandwidth | TX / RX | RF Channel | | |
|------------|-----------|---------|----------------------------|----------------------------|----------------------------|
| | | | Low (L) | Middle (M) | High (H) |
| LTE Band 5 | 1.4MHz | TX | Channel 20407 824.7 MHz | Channel 20525 836.5 MHz | Channel 20643 848.3 MHz |
| | | RX | Channel 2407 869.7 MHz | Channel 2525 881.5 MHz | Channel 2643 893.3 MHz |
| | 3MHz | TX | Channel 20415 825.5 MHz | Channel 20525 836.5 MHz | Channel 20635 847.5 MHz |
| | | RX | Channel 2415 870.5 MHz | Channel 2525 881.5 MHz | Channel 2635 892.5 MHz |
| | 5MHz | TX | Channel 20425 826.5 MHz | Channel 20525 836.5 MHz | Channel 20625 846.5 MHz |
| | | RX | Channel 2425 871.5 MHz | Channel 2525 881.5 MHz | Channel 2625 891.5 MHz |
| | 10MHz | TX | Channel 20450 829 MHz | Channel 20525 836.5 MHz | Channel 20600 844 MHz |
| | | RX | Channel 2450 874 MHz | Channel 2525 881.5 MHz | Channel 2600 889 MHz |



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Report No.: SZCR240200059401
Rev.: 01
Page: 22 of 39

| Test Mode | Bandwidth | TX / RX | RF Channel | | |
|------------|-----------|---------|---------------|---------------|---------------|
| | | | Low (L) | Middle (M) | High (H) |
| LTE Band 7 | 5MHz | TX | Channel 20775 | Channel 21100 | Channel 21425 |
| | | | 2502.5 MHz | 2535 MHz | 2567.5 MHz |
| | | RX | Channel 2775 | Channel 3100 | Channel 5825 |
| | | | 2622.5 MHz | 2655 MHz | 2687.5 MHz |
| | 10MHz | TX | Channel 20800 | Channel 21100 | Channel 21400 |
| | | | 2505 MHz | 2535 MHz | 2565 MHz |
| | | RX | Channel 2800 | Channel 3100 | Channel 3400 |
| | | | 2625 MHz | 2655 MHz | 2685 MHz |
| | 15MHz | TX | Channel 20825 | Channel 21100 | Channel 21375 |
| | | | 2507.5 MHz | 2535 MHz | 2562.5 MHz |
| | | RX | Channel 2825 | Channel 3100 | Channel 3375 |
| | | | 2627.5 MHz | 2655 MHz | 2682.5 MHz |
| | 20MHz | TX | Channel 20850 | Channel 21100 | Channel 21350 |
| | | | 2510 MHz | 2535 MHz | 2560 MHz |
| | | RX | Channel 2850 | Channel 3100 | Channel 3350 |
| | | | 2630 MHz | 2655 MHz | 2680 MHz |

| Test Mode | Bandwidth | TX / RX | RF Channel | | |
|-------------|-----------|---------|---------------|--------------|---------------|
| | | | Low (L) | Middle (M) | High (H) |
| LTE Band 38 | 5MHz | TX/RX | Channel 37775 | Channel38000 | Channel 38225 |
| | | | 2572.5 MHz | 2595 MHz | 2617.5 MHz |
| | 10MHz | TX/RX | Channel 37800 | Channel38000 | Channel 38200 |
| | | | 2575 MHz | 2595 MHz | 2615 MHz |
| | 15MHz | TX/RX | Channel 37825 | Channel38000 | Channel 38175 |
| | | | 2577.5 MHz | 2595 MHz | 2612.5 MHz |
| | 20MHz | TX/RX | Channel 37850 | Channel38000 | Channel 38150 |
| | | | 2580 MHz | 2595 MHz | 2610 MHz |

| Test Mode | Bandwidth | TX / RX | RF Channel | | |
|----------------------------|-----------|---------|---------------|--------------|---------------|
| | | | Low (L) | Middle (M) | High (H) |
| LTE Band 41 (2496-2690) | 5MHz | TX / RX | Channel 39675 | Channel40620 | Channel 41565 |
| | | | 2498.5 MHz | 2593 MHz | 2687.5 MHz |
| | 10MHz | TX / RX | Channel 39700 | Channel40620 | Channel 41540 |
| | | | 2501 MHz | 2593 MHz | 2685 MHz |
| | 15MHz | TX / RX | Channel 39725 | Channel40620 | Channel 41515 |
| | | | 2503.5 MHz | 2593 MHz | 2682.5 MHz |
| | 20MHz | TX / RX | Channel 39750 | Channel40620 | Channel 41490 |
| | | | 2506 MHz | 2593 MHz | 2680 MHz |



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Report No.: SZCR240200059401

Rev.: 01

Page: 23 of 39

| Test Mode | Bandwidth | TX / RX | RF Channel | | |
|------------|-----------|---------|----------------|----------------|----------------|
| | | | Low (L) | Middle (M) | High (H) |
| LTE Band66 | 1.4MHz | TX | Channel 131979 | Channel 132322 | Channel 132665 |
| | | | 1710.7 MHz | 1745 MHz | 1779.3 MHz |
| | | RX | Channel 66443 | Channel 66786 | Channel 67329 |
| | | | 2110.7 MHz | 2145MHz | 2199.3 MHz |
| | 3MHz | TX | Channel 131987 | Channel 132322 | Channel 132657 |
| | | | 1711.5 MHz | 1745 MHz | 1778.5MHz |
| | | RX | Channel 66451 | Channel 66786 | Channel 67321 |
| | | | 2111.5 MHz | 2145MHz | 2198.5MHz |
| | 5MHz | TX | Channel 131997 | Channel 132322 | Channel 132647 |
| | | | 1712.5 MHz | 1745 MHz | 1777.5 MHz |
| | | RX | Channel 66461 | Channel 66786 | Channel 67311 |
| | | | 2112.5 MHz | 2145MHz | 2197.5 MHz |
| | 10MHz | TX | Channel 132022 | Channel 132322 | Channel 132622 |
| | | | 1715 MHz | 1745 MHz | 1775 MHz |
| | | RX | Channel 66486 | Channel 66786 | Channel 67286 |
| | | | 2115 MHz | 2145MHz | 2195 MHz |
| | 15MHz | TX | Channel 132047 | Channel 132322 | Channel 132597 |
| | | | 1717.5 MHz | 1745 MHz | 1772.5 MHz |
| | | RX | Channel 66511 | Channel 66786 | Channel 67261 |
| | | | 2117.5 MHz | 2145MHz | 2192.5 MHz |
| | 20MHz | TX | Channel 132072 | Channel 132322 | Channel 132572 |
| | | | 1720 MHz | 1745 MHz | 1770 MHz |
| | | RX | Channel 66536 | Channel 66786 | Channel 67236 |
| | | | 2120 MHz | 2145MHz | 2190 MHz |



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Report No.: SZCR240200059401
Rev.: 01
Page: 24 of 39

4 Description of Tests

4.1 Conducted Output Power

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.2.1

The transmitter output was connected to a calibrated coaxial cable, attenuator and power meter, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The power output at the transmitter antenna port was determined by adding the value of the cable insertion loss to the power reading. The tests were performed at three frequencies (low channel, middle channel and high channel) and on the highest power levels, which can be setup on the transmitters.

Remark: Reference test setup 1



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Report No.: SZCR240200059401
Rev.: 01
Page: 25 of 39

4.2 Effective (Isotropic) Radiated Power of Transmitter

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.8.4

Calculate power in dBm by the following formula:

ERP (dBm) = Conducted Power (dBm) + antenna gain (dBd)

EIRP(dBm) = Conducted Power (dBm) + antenna gain (dBi)

EIRP=ERP+2.15dB



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Report No.: SZCR240200059401
Rev.: 01
Page: 26 of 39

4.3 Occupied Bandwidth

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 4.2 & 4.3

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel, middle channel and high channel). The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

Remark: Reference test setup 1

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7



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Report No.: SZCR240200059401
Rev.: 01
Page: 27 of 39

4.4 Band Edge at Antenna Terminals

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 6.0

The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at two frequencies (low channel and high channel). in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of 100kHz or 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed. The EUT emission bandwidth is measured as the width of the signal between two points, outside of which all emission are attenuated at least 26dB below the transmitter power. The video bandwidth of the spectrum analyzer was set at thrice the resolution bandwidth. Detector Mode was set to rms.

Remark: Reference test setup 1

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. $RBW \geq 1\%$ of the emission bandwidth
4. $VBW \geq 3 \times RBW$
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span}/RBW$
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize



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

Report No.: SZCR240200059401
Rev.: 01
Page: 28 of 39

4.5 Spurious And Harmonic Emissions at Antenna Terminal

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 6.0

The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyzer, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel and high channel). The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. 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 emission are attenuated at least 26 dB below the transmitter power.

Remark: Reference test setup 1

Test Settings

1. Start frequency was set to 9kHz and stop frequency was set to at least 10* the fundamental frequency (Separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings



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Report No.: SZCR240200059401
Rev.: 01
Page: 29 of 39

4.6 Peak-Average Ratio

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.7.2

A peak to average ratio measurement is performed at the conducted port of the EUT. For WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. The traces are generated with the spectrum analyzer set to zero span mode.

Remark: Reference test setup 1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power



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Report No.: SZCR240200059401
 Rev.: 01
 Page: 30 of 39

4.7 Field Strength of Spurious Radiation

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.8

Below 1GHz test procedure as below:

- 1). The EUT was powered ON and placed on a 80cm high table in the chamber. The antenna of the transmitter was extended to its maximum length.
- 2). The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3). Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4). Test the EUT in the lowest channel, the middle channel ,the Highest channel.
- 5). The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
- 6). Repeat above procedures until all frequencies measured was complete.
 $E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dB}\mu\text{V)} + (\text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)} - \text{AMP(dB)})$
 $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \log D - 104.8$; where D is the measurement distance in meters

Above 1GHz test procedure as below:

- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber
- 2) Calculate power in dBm by the following formula:
 $E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dB}\mu\text{V)} + (\text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)} - \text{AMP(dB)})$
 $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \log D - 104.8$; where D is the measurement distance in meters
- 3). Test the EUT in the lowest channel, the middle channel the Highest channel
- 4). The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
- 5). Repeat above procedures until all frequencies measured was complete

Remark1: Reference test setup 2

Remark2: The emission below 18G were measured at a 3m test distance, while emissions above 18GHz were measured at a 1m test distance. At a measurement distance of 1 meter the limit line was increased by $20 \cdot \log(3/1) = 9.54 \text{ dB}$.

Remark: Reference test setup 2

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & AMP. The basic equation with a sample calculation is as follows:

$\text{AF} = \text{Antenna Factor(dB/m)}$

$\text{Factor} = \text{Cable Factor(dB)} - \text{Preamplifier (dB)}$

$\text{Level} = \text{Reading Level} + \text{AF} + \text{Factor} - 95.26$

$\text{Margin} = \text{Limit} - \text{Level}$

- 2) Scan from 9kHz to 40GHz, The disturbance between 9KHz to 30MHz and 18GHz to 40GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

- 3) All modes have been tested, but only the worst case data displayed in this report.



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Report No.: SZCR240200059401
Rev.: 01
Page: 31 of 39

4.8 Frequency Stability / Temperature Variation

Measurement Procedure:

Frequency stability testing is performed in accordance with the guidelines of FCC KDB 971168 D01 V03r01; Section 9

. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Remark: Reference test setup 3



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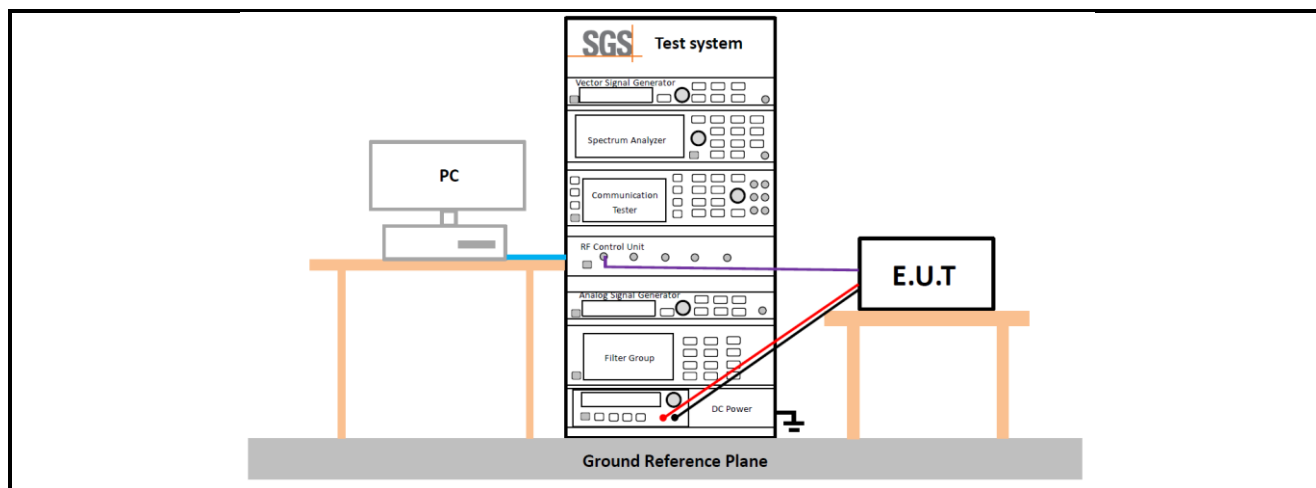


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Report No.: SZCR240200059401
Rev.: 01
Page: 32 of 39

4.9 Test Setups

4.9.1 Test Setup 1



4.9.2 Test Setup 2

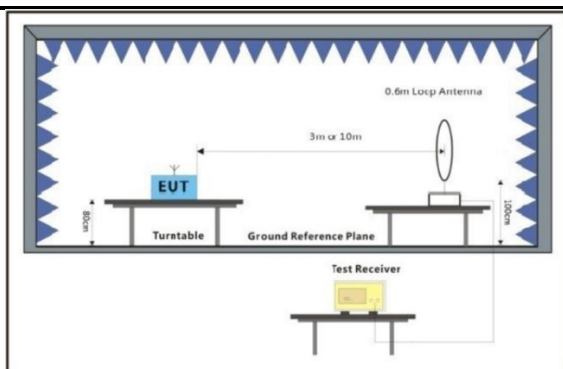


Figure 1. Below 30MHz

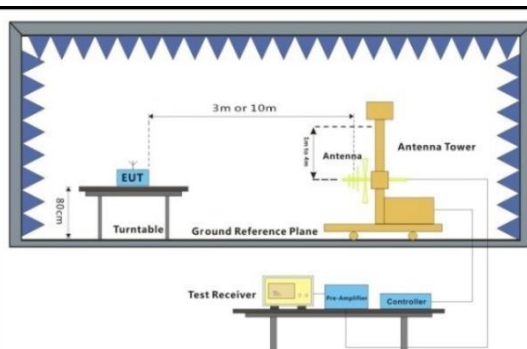


Figure 2. 30MHz to 1GHz

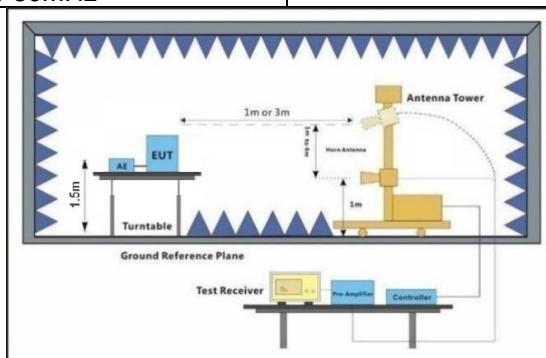


Figure 3. above 1GHz



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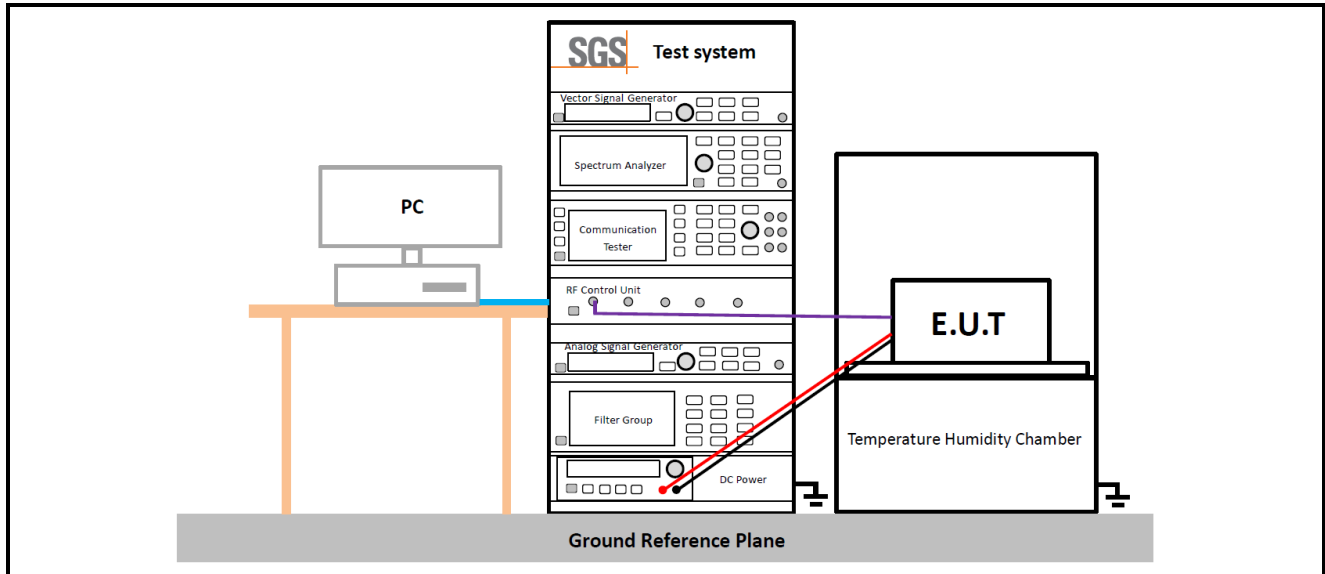
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Report No.: SZCR240200059401
Rev.: 01
Page: 33 of 39

4.9.3 Test Setup 3



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Report No.: SZCR240200059401

Rev.: 01

Page: 34 of 39

4.10 Test Conditions

| Transmit Output Power Data - Average Power, Total | |
|---|---|
| Test Case | Test Conditions |
| Test Environment | Ambient Climate & Rated Voltage |
| Test Setup | Test Setup 1 |
| RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| Test Mode | GSM/TM1;GSM/TM2;UMTS/TM1;LTE/TM1;LTE/TM2;LTE/TM3 |
| Peak-to-Average Ratio | |
| Test Case | Test Conditions |
| Test Environment | Ambient Climate & Rated Voltage |
| Test Setup | Test Setup 1 |
| RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| Test Mode | GSM/TM1;GSM/TM2;UMTS/TM1;LTE/TM1;LTE/TM2;LTE/TM3 |
| Bandwidth - Occupied Bandwidth | |
| Test Case | Test Conditions |
| Test Environment | Ambient Climate & Rated Voltage |
| Test Setup | Test Setup 1 |
| RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| Test Mode | GSM/TM1;GSM/TM2;UMTS/TM1;LTE/TM1;LTE/TM2;LTE/TM3 |
| Bandwidth - Emission Bandwidth | |
| Test Case | Test Conditions |
| Test Environment | Ambient Climate & Rated Voltage |
| Test Setup | Test Setup 1 |
| RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| Test Mode | GSM/TM1;GSM/TM2;UMTS/TM1;LTE/TM1;LTE/TM2;LTE/TM3 |
| Band Edges Compliance | |
| Test Case | Test Conditions |
| Test Environment | Ambient Climate & Rated Voltage |
| Test Setup | Test Setup 1 |
| RF Channels (TX) | L, H (L= low channel, H= high channel) |
| Test Mode | GSM/TM1;GSM/TM2;UMTS/TM1;LTE/TM1;LTE/TM2;LTE/TM3 |
| Spurious Emission at Antenna Terminals | |



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Report No.: SZCR240200059401

Rev.: 01

Page: 35 of 39

| Test Case | Test Conditions |
|--------------------------------------|--|
| Test Environment | Ambient Climate & Rated Voltage |
| Test Setup | Test Setup 1 |
| RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| Test Mode | GSM/TM1;GSM/TM2;UMTS/TM1;LTE/TM1;LTE/TM2;LTE/TM3 |
| Field Strength of Spurious Radiation | |
| Test Case | Test Conditions |
| Test Environment | Ambient Climate & Rated Voltage |
| Test Setup | Test Setup 2 |
| RF Channels (TX) | L, M, H (L= low channel, M= middle channel, H= high channel) |
| Test Mode | GSM/TM1;UMTS/TM1;LTE/TM1 Remark: All bandwidth and modulation of GSM/UMTS/LTE have been pre tested, and only the worst results are reflected in the report. |
| Frequency Stability | |
| Test Case | Test Conditions |
| Test Environment | (1) -30 °C to +50 °C with step 10 °C at Rated Voltage (2) VL, VN and VH of Rated Voltage at Ambient Climate. |
| Test Setup | Test Setup 3 |
| RF Channels (TX) | M (M= middle channel) |
| Test Mode | GSM/TM1;GSM/TM2;UMTS/TM1;LTE/TM1;LTE/TM2;LTE/TM3 The report only show the bandwidth with the worst case. |



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Report No.: SZCR240200059401
Rev.: 01
Page: 36 of 39

5 Main Test Instruments

| RF Test System | | | | | |
|---|---|-----------|---------------|---------------------------|------------------------------|
| Test Equipment | Manufacturer | Model No. | Inventory No. | Cal. date (yyyy/mm/dd) | Cal.Due date (yyyy/mm/dd) |
| Humidity/ Temperature Indicator | Shanghai Meteorological Industry Factory | HTC-1 | SZ-WRG-M-077 | 2023/05/25 | 2024/05/24 |
| Spectrum Analyzer | Rohde & Schwarz | FSV | SZ-WRG-M-012 | 2024/01/30 | 2025/01/29 |
| DC power supply | HYELEC | HY3005B | SZ-WRG-M-044 | 2023/09/14 | 2024/09/13 |
| Wideband Radio Communication Tester | Rohde & Schwarz | CMW500 | SZ-WRG-M-033 | 2024/01/30 | 2025/01/29 |
| Wideband Radio Communication Tester | Anritsu | MT8821C | SZ-WRG-M-042 | 2023/05/25 | 2024/05/24 |
| Programmable Temperature & Humidity Chamber | Votsch Industrietechnik GmbH | VT 4002 | SZ-WRG-M-017 | 2023/12/21 | 2024/12/20 |
| Signal Generator | KEYSIGHT | N5182A | SZ-WRG-M-041 | 2024/01/30 | 2025/01/29 |



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Report No.: SZCR240200059401

Rev.: 01

Page: 37 of 39

| Radiated spurious emissions | | | | | |
|---|--|-----------------------|---------------|-------------------------------|------------------------------|
| Test Equipment | Manufacturer | Model No. | Inventory No. | Cal. date (yyyy/mm/d d) | Cal.Due date (yyyy/mm/dd) |
| Trilog-Broadband Antenna | Schwarzbeck | VULB9168 | SEM003-33 | 2021/09/25 | 2024/09/24 |
| 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 | 2021/07/11 | 2024/07/10 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA 9120D | SEM003-32 | 2021/09/26 | 2024/09/25 |
| Double-ridged waveguide horn | ETS-LINDGREN | 3117 | SEM003-34 | 2021/09/25 | 2024/09/24 |
| 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 |



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Report No.: SZCR240200059401
Rev.: 01
Page: 38 of 39

6 Measurement Uncertainty

For a 95% confidence level ($k = 2$), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

| No. | Item | Measurement Uncertainty |
|-----|-------------------------------------|---------------------------------------|
| 1 | Total RF power, conducted | $\pm 0.41\text{dB}$ |
| 2 | RF power density, conducted | $\pm 1.96\text{dB}$ |
| 3 | Spurious emissions, conducted | $\pm 0.41\text{dB}$ |
| 4 | Radio Frequency | $\pm 7.10 \times 10^{-8} \text{ GHz}$ |
| 5 | Duty Cycle | $\pm 0.49\%$ |
| 6 | Occupied Bandwidth | $\pm 0.2\%$ |
| 7 | Radiated Spurious emission test(UE) | $\pm 3.1\text{dB}$ (Below 1GHz) |
| | | $\pm 4.4\text{dB}$ (Above 1GHz) |

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{\text{CISPR/ETSI}}$ (CISPR/ETSI Uncertainty), so the test results
 – compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
 – non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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Report No.: SZCR240200059401
Rev.: 01
Page: 39 of 39

7 Appendixes

| | |
|---------------|-------------------|
| Appendix A.1 | WWAN Setup Photos |
| Appendix B.1 | GSM 850 |
| Appendix B.2 | PCS 1900 |
| Appendix B.3 | WCDMA Band II |
| Appendix B.4 | WCDMA Band IV |
| Appendix B.5 | WCDMA Band V |
| Appendix B.6 | LTE Band 2 |
| Appendix B.7 | LTE Band 4 |
| Appendix B.8 | LTE Band 5 |
| Appendix B.9 | LTE Band 7 |
| Appendix B.10 | LTE Band 38 |
| Appendix B.11 | LTE Band 41 |
| Appendix B.12 | LTE Band 66 |

---End of Report---



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