

# **RF TEST REPORT**

Product Name: Smart phone

Model Name: Luna

# FCC ID: 2AK6CLUNA

Issued For : Shanghai Unihertz E-Commerce Co., Ltd

Room 308, Building C, 508Chundong Rd, Minhang district Shanghai, China 201108

Issued By : Shenzhen LGT Test Service Co., Ltd. Room 205, Building 13, Zone B, Chen Hsong Industrial Park, No.177 Renmin West Road, Jinsha Community, Kengzi Street, Pingshan New District, Shenzhen, China

| Report Number:        | LGT23B010RF18                 |
|-----------------------|-------------------------------|
| Sample Received Date: | Feb. 09, 2023                 |
| Date of Test:         | Feb. 09, 2023 – Mar. 13, 2023 |
| Date of Issue:        | Mar. 13, 2023                 |

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# **TEST REPORT CERTIFICATION**

| Applicant      | Shanghai Unihertz E-Commerce Co., Ltd   |
|----------------|---|
| Address        | Room 308, Building C, 508Chundong Rd, Minhang district<br>Shanghai, China 201108  |
| Manufacturer   | Shenzhen OBLUE Communication Technology Co., Ltd.   |
| Address        | Room 702, Hepingdayou industrial and trade industrial park, No.<br>41, Yonghe Road, Heping Community, Fuhai Street, Baoan<br>District, Shenzhen City, China |
| Product Name   | Smart phone   |
| Trademark      | Unihertz, iHunt, 8849   |
| Model Name     | Luna  |
| Sample Status: | Normal  |

| APPLICABLE STANDARDS                     |              |  |  |  |  |  |  |  |
|--|--------------|--|--|--|--|--|--|--|
| STANDARD                                 | TEST RESULTS |  |  |  |  |  |  |  |
| FCC Part 22H and 24E, 27, 90             | PASS         |  |  |  |  |  |  |  |
| KDB 971168 D01 v03r01, ANSI C63.26(2015) | FASS         |  |  |  |  |  |  |  |

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| RADIATED SPURIOUS EMISSION                               | 523  |

# **Revision History**

| Rev. | Issue Date    | Contents      |
|------|---------------|---------------|
| 00   | Mar. 13, 2023 | Initial Issue |
|      |               |               |

# 1. TEST FACTORY & MEASUREMENT UNCERTAINTY

# 1.1 TEST FACTORY

| Company Name:             | Shenzhen LGT Test Service Co., Ltd.   |
|---------------------------|---|
| Address:                  | Room 205, Building 13, Zone B, Chen Hsong Industrial Park, No.177<br>Renmin West Road, Jinsha Community, Kengzi Street, Pingshan New<br>District, Shenzhen, China |
| Approximation Cortificato | FCC Registration No.: 746540  |
| Accreditation Certificate | A2LA Certificate No.: 6727.01   |

# **1.2 MEASUREMENT UNCERTAINTY**

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

| Parameter                             | Uncertainty |  |  |  |
|---------------------------------------|-------------|--|--|--|
| Occupied Channel Bandwidth            | ±3.2 %      |  |  |  |
| RF Output Power, Conducted            | ±0.87dB     |  |  |  |
| Power Spectral Density, Conducted     | ±2.11 dB    |  |  |  |
| Unwanted Emission, Conducted          | ±0.86dB     |  |  |  |
| All Emissions, Radiated (Below 1GHz)  | ±3.54dB     |  |  |  |
| All Emissions, Radiated (1GHz-18GHz)  | ±4.22dB     |  |  |  |
| All Emissions, Radiated (18GHz-25GHz) | ±4.81dB     |  |  |  |
| Temperature                           | ±0.5°C      |  |  |  |
| Humidity                              | ±2%         |  |  |  |

# 2. GENERAL INFORMATION

# 2.1 TECHNICAL SPECIFICATIONS AND REGULATIONS

# 2.1.1 PRODUCT DESCRIPTION

# A major technical description of EUT is described as following:

| Product Name        | Smart phone   |
|---------------------|---|
| Trademark           | Unihertz, iHunt, 8849   |
| Model Name          | Luna  |
| Series Model        | N/A   |
| Model Difference    | N/A   |
|                     | U.S. Bands:   |
|                     | LTE FDD Band 2  |
|                     | LTE FDD Band 4  |
|                     | LTE FDD Band 5  |
|                     | LTE FDD Band 7  |
|                     | LTE FDD Band 12   |
| Francisco de Davida | LTE FDD Band 13   |
| Frequency Bands     | LTE FDD Band 17   |
|                     | LTE FDD Band 25   |
|                     | LTE FDD Band 26   |
|                     | LTE TDD Band 38   |
|                     | LTE TDD Band 40   |
|                     | LTE TDD Band 41   |
|                     | LTE FDD Band 66   |
|                     | SIM 1 and SIM 2 is a chipset unit and tested as single chipset, SIM 1 |
| SIM Card            | is used to tested.  |
| Antenna             | PIFA  |
|                     | LTE FDD Band 2: 0.6   |
|                     | LTE FDD Band 4:0.7  |
|                     | LTE FDD Band 5:-3.9   |
|                     | LTE FDD Band 7:-1.4   |
|                     | LTE FDD Band 12:-3.7  |
|                     | LTE FDD Band 13:-4.0  |
| Antenna gain(dBi)   | LTE FDD Band 17:-2.5  |
|                     | LTE FDD Band 25:0.8   |
|                     | LTE FDD Band 26:-3.9  |
|                     | LTE TDD Band 38:-1  |
|                     | LTE TDD Band 40:-0.2  |
|                     | LTE TDD Band 41: -1   |
|                     | LTE FDD Band 66:0.7   |

| Battony parameter       | Capacity: 5000mAh              |  |  |  |  |  |
|-------------------------|--------------------------------|--|--|--|--|--|
| Battery parameter       | Rated Voltage: 3.87V           |  |  |  |  |  |
|                         | Model: HJ-FC010K7-US           |  |  |  |  |  |
|                         | Input: 100~240V, 50/60Hz, 0.6A |  |  |  |  |  |
| Adapter:                | Output: 5V, 2A                 |  |  |  |  |  |
|                         | OR 9V, 2A                      |  |  |  |  |  |
|                         | OR 12V, 1.5A                   |  |  |  |  |  |
| Extreme Vol. Limits     | 3.55V to 4.45V (Nominal 3.87V) |  |  |  |  |  |
| Extreme Temp. Tolerance | -0℃ to +40℃                    |  |  |  |  |  |
| Hardware version        | G68_V1.1                       |  |  |  |  |  |
| Software version        | Luna _2023013113               |  |  |  |  |  |

Note: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.

# 2.1.2 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

| Proc               | luct Specification Subjective To This Standard           |
|--------------------|--|
| FIO                | LTE Band 2:1850~1910MHz                                  |
|                    | LTE Band 2:1750~1755MHz                                  |
|                    | LTE Band 4: 1710/017330012                               |
|                    | LTE Band 7:2500~2570MHz                                  |
|                    | LTE Band 12: 699-716MHz                                  |
|                    | LTE Band 13: 777-787MHz                                  |
|                    | LTE Band 17:704~716MHz                                   |
| Tx Frequency       | LTE Band 25: 1850-1915MHz                                |
|                    | LTE Band 26: 814-824MHz                                  |
|                    | LTE Band 26: 824-849MHz                                  |
|                    | LTE Band 38: 2570-2620MHz                                |
|                    | LTE Band 40: 2305-2315/2350-2360MHz                      |
|                    | LTE Band 41: 2555-2655MHz                                |
|                    | LTE Band 66: 1710-1780MHz                                |
|                    | LTE Band 2: 1930-1990MHz                                 |
|                    | LTE Band 4: 2110-2155MHz                                 |
|                    | LTE Band 5: 869-894MHz                                   |
|                    | LTE Band 7: 2620-2690MHz                                 |
|                    | LTE Band 12: 729-746MHz                                  |
|                    | LTE Band 13: 746-756MHz                                  |
|                    | LTE Band 17: 734-746MHz                                  |
| Rx Frequency       | LTE Band 25: 1930-1995MHz                                |
| 1 5                | LTE Band 26: 859-869MHz                                  |
|                    | LTE Band 26: 869-894MHz                                  |
|                    | LTE Band 38: 2570-2620MHz                                |
|                    | LTE Band 40: 2305-2315MHz                                |
|                    | 2350-2360MHz   |
|                    | LTE Band 41: 2496-2690MHz                                |
|                    | LTE Band 66: 2110-2200MHz                                |
|                    | LTE Band 2: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz |
|                    | LTE Band 4: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz  |
|                    | LTE Band 5: 1.4MHz / 3MHz / 5MHz / 10MHz                 |
|                    | LTE Band 7: 5MHz / 10MHz / 15MHz /20MHz                  |
|                    | LTE Band 12: 1.4MHz / 3MHz / 5MHz / 10MHz                |
|                    | LTE Band 13: 5MHz / 10MHz                                |
| Bandwidth          | LTE Band 17: 5MHz / 10MHz                                |
|                    | LTE Band 25: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz |
|                    | LTE Band 26: 1.4MHz / 3MHz / 5MHz / 10MHz/15MHz          |
|                    | LTE Band 38: 5MHz / 10MHz / 15MHz /20MHz                 |
|                    | LTE Band 40: 5MHz / 10MHz                                |
|                    | LTE Band 41: 5MHz / 10MHz / 15MHz /20MHz                 |
|                    | LTE Band 66: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz /20MHz |
| Type of Modulation | QPSK /16QAM  |

# 2.1.3 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 v03r01 and ANSI C63.26 2015 Power Meas. License Digital Systems with maximum output power. Radiated measurements are performed by rotating the EUT in three different orthogonal test planes tofind the maximum emission. Remark:

- 1. The mark 'v'means that this configuration is chosen for testing
- 2. The mark '-'means that this bandwidth is not supported.
- 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated.

| ITEMS       | Band | Bandwidth (MHz) |   |   |    |    |    | Modu |       | Test<br>Channel |      |      |   |   |   |
|-------------|------|-----------------|---|---|----|----|----|------|-------|-----------------|------|------|---|---|---|
|             |      | 1.4             | 3 | 5 | 10 | 15 | 20 | QPSK | 16QAM | 1               | Half | Full | L | Μ | Н |
|             | 2    | v               | v | v | v  | v  | V  | V    | v     | v               | v    | v    | v | v | v |
|             | 4    | v               | v | > | v  | v  | v  | V    | v     | v               | v    | v    | v | v | v |
|             | 5    | v               | v | > | v  |    |    | V    | v     | v               | v    | v    | v | V | v |
|             | 7    |                 |   | v | v  | v  | V  | V    | v     | v               | v    | v    | v | v | v |
|             | 12   | v               | v | v | v  |    |    | V    | v     | v               | v    | v    | v | v | v |
|             | 13   |                 |   | v | v  |    |    | V    | v     | v               | v    | v    |   | v |   |
| Max. Output | 17   |                 |   | v | v  |    |    | V    | v     | v               | v    | v    | v | v | v |
| Power       | 25   | v               | v | v | v  | v  | V  | V    | v     | v               | v    | v    | v | v | v |
|             | 26   | v               | v | v | v  | v  |    | V    | v     | v               | v    | v    | v | v | v |
|             | 38   |                 |   | > | v  | v  | V  | V    | v     | v               | v    | v    | v | V | v |
|             | 40   |                 |   | > | v  |    |    | V    | v     | v               | v    | v    | v | V | v |
|             | 41   |                 |   | v | v  | v  | V  | V    | V     | v               | v    | v    | v | v | v |
|             | 66   | v               | v | > | v  | v  | V  | V    | v     | v               | v    | v    | v | V | v |
|             | 2    |                 |   |   |    |    | V  | V    | v     | v               |      | v    | v | v | v |
|             | 4    |                 |   |   |    |    | ٧  | V    | v     | v               |      | v    | v | V | v |
|             | 5    |                 |   |   | v  |    |    | V    | v     | v               |      | v    | v | V | v |
|             | 7    |                 |   |   |    |    | ٧  | V    | v     | v               |      | v    | v | V | v |
|             | 12   |                 |   |   | v  |    |    | V    | v     | v               |      | v    | v | V | v |
|             | 13   |                 |   |   | v  |    |    | V    | v     | v               |      | v    |   | V |   |
| Peak&Avera  | 17   |                 |   |   | ٧  |    |    | V    | v     | v               |      | v    | v | v | v |
| Ratio       | 25   |                 |   |   |    |    | V  | V    | v     | v               |      | v    | v | v | V |
|             | 26   |                 |   |   |    | v  |    | V    | v     | v               |      | v    | v | v | v |
|             | 38   |                 |   |   |    |    | V  | V    | v     | v               |      | v    | v | v | v |
|             | 40   |                 |   |   | v  |    |    | V    | v     | v               |      | v    |   | v |   |
|             | 41   |                 |   |   |    |    | V  | V    | v     | v               |      | v    | v | v | v |
|             | 66   |                 |   |   |    |    | v  | V    | v     | V               |      | v    | v | v | v |

|           | 0  |   |   | _ | _ |   |   |   | - |   |   |   |   |   |   |
|-----------|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|           | 2  | V | v | V | V | v | V | V | V |   |   | V | V | V | V |
|           | 4  | V | V | v | V | v | V | V | V |   |   | V | V | V | V |
|           | 5  | V | v | v | V |   |   | V | V |   |   | V | V | V | V |
|           | 7  |   |   | V | V | V | V | V | V |   |   | V | V | V | V |
|           | 12 | V | V | V | V |   |   | V | V |   |   | V | V | V | V |
|           | 13 |   |   | v | V |   |   | V | V |   |   | V |   | V |   |
| 26dB&99%  | 17 |   |   | v | V |   |   | V | V |   |   | V | V | V | V |
| Bandwidth | 25 | v | v | v | v | v | v | V | V |   |   | v | v | v | v |
|           | 26 | v | v | v | v | v |   | V | V |   |   | v | v | v | v |
|           | 38 |   |   | v | v | v | V | V | V | v | v | v | v | v | v |
|           | 40 |   |   | v | V |   |   | V | V | V | V | V | V | v | V |
|           | 41 |   |   | v | V | ۷ | V | V | V |   |   | V | V | V | V |
|           | 66 | V | V | v | V | V | V | V | V |   |   | V | V | V | V |
|           | 2  | V | V | v | V | V | V | V | V | V |   | V | V | V | V |
|           | 4  | V | v | v | V | V | V | V | V | V |   | V | V | V | V |
|           | 5  | V | v | v | V |   |   | V | V | V |   | V | V | V | V |
|           | 7  |   |   | V | V | ۷ | V | V | V | V |   | V | V | V | V |
|           | 12 | V | v | v | V |   |   | V | V | V |   | V | V | V | V |
| Conducted | 13 |   |   | v | V |   |   | V | V | v |   | v |   | V |   |
| Band Edge | 17 |   |   | v | v |   |   | V | V | v |   | v | v | v | v |
|           | 25 | V | v | v | v | v | V | V | V | v |   | v | V | v | v |
|           | 26 | V | v | v | v | v |   | V | V | v |   | v | V | v | v |
|           | 38 |   |   | v | v | v | V | V | V | v | v | v | V | v | v |
|           | 40 |   |   | v | v |   |   | V | V | v | v | v | v | v | v |
|           | 41 |   |   | v | v | v | V | V | V | v |   | v | v | v | v |
|           | 66 | v | v | v | v | v | v | V | v | v |   | v | v | v | v |
|           | 2  | v | v | v | v | v | ٧ | V | V | v |   |   | v | v | v |
|           | 4  | v | v | v | v | v | v | V | V | v |   |   | v | v | v |
|           | 5  | v | v | v | v |   |   | V | V | v |   |   | v | v | v |
|           | 7  |   |   | v | v | v | ۷ | V | V | v |   |   | v | v | v |
|           | 12 | v | v | v | v |   |   | V | V | v |   |   | v | v | v |
| Conducted | 13 |   |   | v | v |   |   | V | V | v |   |   |   | v |   |
| Spurious  | 17 |   |   | v | v |   |   | v | v | v |   |   | v | v | v |
| Emission  | 25 | v | v | v | v | v | v | V | v | v |   |   | v | v | v |
|           | 26 | v | v | v | v | v |   | V | v | v |   |   | v | v | v |
|           | 38 |   |   | v | v | v | v | V | V | v | v | v | v | v | v |
|           | 40 |   |   | v | v |   |   | V | v | v | v | v | v | v | v |
|           | 41 |   |   | v | v | v | v | V | V | v |   |   | v | v | v |
|           | 66 | v | v | v | v | v | v | V | V | v |   |   | v | v | v |

|           | 2  |   |   |   | v |   |   | v |   |   |   | v |   | v |   |
|-----------|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|           | 4  |   |   |   | v |   |   | V |   |   |   | v |   | v |   |
|           | 5  |   |   |   | v |   |   | V |   |   |   | v |   | v |   |
|           | 7  |   |   |   | v |   |   | V |   |   |   | v |   | v |   |
|           | 12 |   |   |   | v |   |   | V |   |   |   | v |   | v |   |
|           | 13 |   |   |   | v |   |   | V |   |   |   | v |   | v |   |
| Frequency | 17 |   |   |   | v |   |   | V |   |   |   | v |   | v |   |
| Stability | 25 |   |   |   | v |   |   | V |   |   |   | v |   | v |   |
|           | 26 |   |   |   | v |   |   | V |   |   |   | v |   | v |   |
|           | 38 |   |   |   | - |   | v | V | v | v |   | v | v | v | v |
|           | 40 |   |   |   | v |   | - | V | V | v |   | v | - | v |   |
|           | 41 |   |   |   | v |   |   | V |   |   |   | v |   | v |   |
|           | 66 |   |   |   | v |   |   | V |   |   |   | v |   | v |   |
|           | 2  | v | v | v | v | v | v | V | v | v | v | v | v | v | v |
|           | 4  | v | v | v | v | v | v | V | v | v | v | v | v | v | v |
|           | 5  | v | v | v | v |   |   | V | v | v | v | v | v | v | v |
|           | 7  |   |   | v | v | v | v | V | v | v | v | v | v | v | v |
|           | 12 | v | v | v | v |   |   | V | v | v | v | v | v | v | v |
|           | 13 |   |   | v | v |   |   | V | v | v | v | v |   | v |   |
| E.R.P.&   | 17 |   |   | v | v |   |   | V | v | v | v | v | v | v | v |
| E.I.R.P.  | 25 | v | v | v | v | v | v | V | v | v | v | v | v | v | v |
|           | 26 | v | v | v | v | v |   | V | v | v | v | v | v | v | v |
|           | 38 |   |   | v | v | v | v | V | v | v | v | v | v | v | v |
|           | 40 |   |   | v | v |   |   | V | v | v | v | v | v | v | v |
|           | 41 |   |   | v | v | v | v | V | v | v | v | v | v | v | v |
|           | 66 | v | v | v | v | v | v | V | v | v | v | v | v | v | v |
|           | 2  | v | v | v | v | v | v | V |   | v |   |   | v | v | v |
|           | 4  | v | v | v | v | v | V | V |   | v |   |   | v | v | v |
|           | 5  | v | v | v | v |   |   | V |   | v |   |   | v | v | v |
|           | 7  |   |   | v | v | v | ٧ | V |   | v |   |   | v | v | v |
|           | 12 | v | v | v | v |   |   | V |   | v |   |   | v | v | v |
| Radiated  | 13 |   |   | v | v |   |   | V |   | v |   |   |   | v |   |
| Spurious  | 17 |   |   | v | v |   |   | V |   | v |   |   | v | v | v |
| Emission  | 25 | v | v | v | v | v | v | V |   | v |   |   | v | v | v |
|           | 26 | v | v | v | v | v |   | V |   | v |   |   | v | v | v |
|           | 38 |   |   | v | v | v | v | V | v | v | v | v | v | v | v |
|           | 40 |   |   | v | v |   |   | V | v | v | v | v | v | v | v |
|           | 41 |   |   | v | v | v | v | V |   | v |   |   | v | v | v |
|           | 66 | v | v | v | v | v | v | V |   | v |   |   | v | v | v |

### 2.1.4 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for filing to comply with the 47 CFR Part 2, 24(E), 27.

#### 2.1.5 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with eut intended for fcc grant together.

## 2.1.6 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

# 2.1.7 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

# 2.1.8 CONFIGURATION OF EUT SYSTEM

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.



Table 2-1 Equipment Used in EUT System

|   | Item | Equipment | Model No. | Length | Note |
|---|------|-----------|-----------|--------|------|
| - | N/A  |           |           |        | N/A  |
|   |      |           |           |        |      |
|   |      |           |           |        |      |
|   |      |           |           |        |      |

Note:

(1) For detachable type I/O cable should be specified the length in cm in  $\[$ <sup>r</sup> Length  $\]$  column.

(2) "YES" is means "with core"; "NO" is means "without core".

# 2.1.9MEASUREMENT INSTRUMENTS

The radiated emission testing was performed according to the procedures of ANSI C63.26 2015 and FCC CFR 47 rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

| Radiated Test equipment                |                       |          |                   |            |            |  |  |  |  |
|--|-----------------------|----------|-------------------|------------|------------|--|--|--|--|
| Equipment                              | quipment Manufacturer |          | Serial No.        | Cal. Date  | Cal. Until |  |  |  |  |
| EMI Test<br>Receiver                   | R&S                   | ESU8     | 100372            | 2022.04.12 | 2023.04.11 |  |  |  |  |
| Active loop<br>Antenna                 | R&S                   | HFH2-Z2  | POS871398181      | 2022.06.02 | 2024.06.01 |  |  |  |  |
| Spectrum<br>Analyzer                   | Kesight               | N9010B   | MY60242508        | 2022.04.29 | 2023.04.28 |  |  |  |  |
| Bilog Antenna                          | SCHAFFNER             | CBL6112B | 2705              | 2022.06.05 | 2024.06.04 |  |  |  |  |
| Horn Antenna                           | SCHWARZBECK           | 3115     | 10SL0060          | 2022.06.02 | 2024.06.01 |  |  |  |  |
| Pre-<br>amplifier(0.1M-<br>3GHz)       | HP                    | 8447D    | 2727A05655        | 2022.04.11 | 2023.04.10 |  |  |  |  |
| Pre-amplifier(1-<br>26.5G)             | Agilent               | 8449B    | 3008A4722         | 2022.04.13 | 2023.04.12 |  |  |  |  |
| RE Cable (9K-<br>1G)                   | N.A                   | R01      | N.A               | 2022.05.05 | 2023.05.04 |  |  |  |  |
| RE Cable (1-<br>26G)                   | N.A                   | R02      | N.A               | 2022.05.05 | 2023.05.04 |  |  |  |  |
| Wireless<br>Communications<br>Test Set | R&S                   | CMW 500  | 137737            | 2022.04.29 | 2023.04.28 |  |  |  |  |
| Temperature &<br>Humidity              | KTJ                   | TA218B   | N.A               | 2022.05.05 | 2023.05.04 |  |  |  |  |
| Testing Software                       |                       | EMO      | C-I_V1.4.0.3_SKET |            |            |  |  |  |  |

| Conducted Test equipment               |              |                |                   |            |            |  |  |  |  |
|--|--------------|----------------|-------------------|------------|------------|--|--|--|--|
| Equipment                              | Manufacturer | Model No.      | Serial No.        | Cal. Date  | Cal. Until |  |  |  |  |
| Signal Analyzer                        | keysight     | N9010B         | MY60242508        | 2022.04.29 | 2023.04.28 |  |  |  |  |
| Wireless<br>Communications Test<br>Set | R&S          | CMW 500        | 137737            | 2022.04.29 | 2023.04.28 |  |  |  |  |
| MXG Vector Signal<br>Generator         | keysight     | N5182B         | MY59100717        | 2022.06.02 | 2023.06.01 |  |  |  |  |
| RF Automatic Test<br>system            | MW           | MW100-<br>RFCB | MW220324LG-<br>33 | 2022.04.29 | 2023.04.28 |  |  |  |  |
| Temperature & Humidity                 | KTJ          | TA218B         | N.A               | 2022.05.05 | 2023.05.04 |  |  |  |  |
| Temperature& Humidity<br>test chamber  | AISRY        | LX-1000L       | 171200018         | 2022.05.10 | 2023.05.09 |  |  |  |  |
| Attenuator                             | eastsheep    | 90db           | N.A               | 2022.04.29 | 2023.04.28 |  |  |  |  |
| Testing Software                       |              | MT             | \$8200_V2.0.0.0   |            |            |  |  |  |  |

# 3. CONDUCTED OUTPUT POWER 3.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

# **3.1.1 MEASUREMENT METHOD**

A system simulator was used to establish communication with the eut. Its parameters were set to force the eut transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

Configuration follows KDB 971168 D01 v03r01.

# 3.1.2 TEST SETUP



# 3.1.3 TEST PROCEDURES

- 1. The transmitter output port was connected to system simulator.
- 2. Set EUT at maximum power through the system simulator.
- 3. Select lowest/middle/highest channels for each band and different modulation.
- 4. Measure and record the power level from the system simulator.

#### 3.1.4 TEST RESULTS

Note: Test chart See Appendix II

# 4. PEAK-TO-AVERAGE RATIO

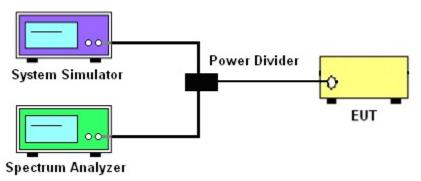
## 4.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

#### 4.1.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1.3 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.1.3 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

PAPR (dB) = PPk (dBm) - PAvg (dBm).

#### 4.1.2 TEST SETUP



#### 4.1.3 TEST PROCEDURES

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7 and ANSI C63.26 2015 Section 5.2.6.
- 2. The EUT was connected to spectrum and system simulator via a power divider
- 3. Select lowest, middle, and highest channels for each band and different modulation.
- 4. Set the test probe and measure the peak and average power of the spectrum analyzer
- 5. Record the deviation as Peak to Average Ratio.

|             | LTE    |        |        |        |         |         |  |  |  |  |
|-------------|--------|--------|--------|--------|---------|---------|--|--|--|--|
| LTE BW      | 1.4M   | 3M     | 5M     | 10M    | 15M     | 20M     |  |  |  |  |
| Span        | 3MHz   | 6MHz   | 10MHz  | 20MHz  | 30MHz   | 40MHz   |  |  |  |  |
| RBW         | 30kHz  | 30kHz  | 100kHz | 100kHz | 300kHz  | 300kHz  |  |  |  |  |
| VBW         | 100kHz | 100kHz | 300kHz | 300kHz | 1000kHz | 1000kHz |  |  |  |  |
| Detector    | PK/AVG | PK/AVG | PK/AVG | PK/AVG | PK/AVG  | PK/AVG  |  |  |  |  |
| Trace       | Max    | Max    | Max    | Max    | Max     | Max     |  |  |  |  |
| Sweep Count | Auto   | Auto   | Auto   | Auto   | Auto    | Auto    |  |  |  |  |

#### 4.1.4 TEST RESULTS

Note: Test chart See Appendix II

# 5. RADIATED POWER AND EFFECTIVE ISOTROPIC RADIATED POWER

### 5.1 DESCRIPTION OF THE ERP/EIRP MEASUREMENT

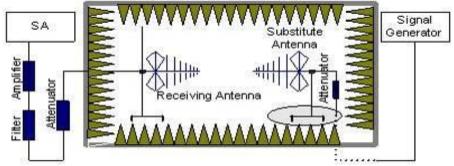
#### 5.1.1 MEASUREMENT METHOD

Effective radiated power output measurements by substitution method according to ANSI C63.26 2015, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems. Mobile and portable (hand-held) stations operating are limited to average ERP, Equivalent isotropic radiated power output measurements by substitution method according to ANSI C63.26 2015, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. Power Meas, Mobile and portable (hand-held) stations operating are limited to average EIRP.

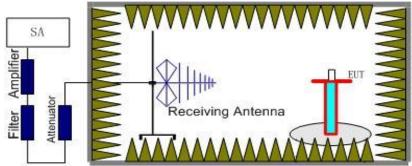
#### 5.1.2 TEST SETUP

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx ( dBuV ) +CL ( dB ) +SA ( dB ) +Gain ( dBi ) -107 ( dBuV to dBm ) The SA is calibrated using following setup.



b) EUT was placed on a 1.5m non-conductive stand at a 3 m test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 m from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: Power=PMea+ARpl

#### 5.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01v03r01 Section 5.6 and ANSI C63.26 2015 Section 5.2.

2. The EUT was placed on a non-conductive rotating platform 1.5 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with Peak detector.

3. During the measurement, the system simulator parameters were set to force the EUTtransmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 m in both horizontally and vertically polarized orientations.

4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to ANSI C63.26 2015. The EUT was replaced by dipole antenna (substitution antenna) at same location and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. EIRP=S.G Level+ Gain-Cable loss; ERP=S.G Level+ Gain-Cable loss-2.15.

5. RB Set greater than bandwidth, VB Set spectrum analyzer Maximum support.

#### 5.1.4 TEST RESULTS

Note: Test is divided into three directions, X/Y/Z. X pattern for the worst. Note: Test chart See Appendix II