

|  |  |  |   |  |
|--|--|--|---|--|
| <b>Prüfbericht-Nr.:</b><br><i>Test report no.:</i>   | <b>CN231MZ2 002</b>  | <b>Auftrags-Nr.:</b><br><i>Order no.:</i>  | <b>168422304</b>                                | <b>Seite 1 von 25</b><br><i>Page 1 of 25</i> |
| <b>Kunden-Referenz-Nr.:</b><br><i>Client reference no.:</i>  | N/A  | <b>Auftragsdatum:</b><br><i>Order date:</i>  | 2023-04-11                                      |  |
| <b>Auftraggeber:</b><br><i>Client:</i>   | <b>TCL Communication Ltd.</b><br>5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong |  |   |  |
| <b>Prüfgegenstand:</b><br><i>Test item:</i>  | Keyboard   |  |   |  |
| <b>Bezeichnung / Typ-Nr.:</b><br><i>Identification / Type no.:</i>   | KB9466X<br>(Trademark: TCL)  |  |   |  |
| <b>Auftrags-Inhalt:</b><br><i>Order content:</i>   | Test Report  |  |   |  |
| <b>Prüfgrundlage:</b><br><i>Test specification:</i>  | CFR47 FCC Part 15: Subpart C Section 15.247  |  |   |  |
| <b>Wareneingangsdatum:</b><br><i>Date of sample receipt:</i>   | 2023-04-11   | Please refer to Photo Document   |   |  |
| <b>Prüfmuster-Nr.:</b><br><i>Test sample no.:</i>  | A003464562-001<br>A003444039-001~002   |  |   |  |
| <b>Prüfzeitraum:</b><br><i>Testing period:</i>   | 2023-04-27 - 2023-05-11  |  |   |  |
| <b>Ort der Prüfung:</b><br><i>Place of testing:</i>  | TÜV Rheinland<br>(Shenzhen) Co., Ltd.  |  |   |  |
| <b>Prüflaboratorium:</b><br><i>Testing laboratory:</i>   | TÜV Rheinland<br>(Shenzhen) Co., Ltd.  |  |   |  |
| <b>Prüfergebnis*:</b><br><i>Test result*:</i>  | Pass   |  |   |  |
| <b>geprüft von:</b><br><i>tested by:</i>   | <u>X <i>Breeze Jiang</i></u>   | <b>genehmigt von:</b><br><i>authorized by:</i>                                     | <u>X <i>Lin Lin</i></u>                         |  |
| <b>Datum:</b><br><i>Date:</i>  | 2023-05-29<br><small>Signed by: Breeze Jiang</small>   | <b>Ausstellungsdatum:</b><br><i>Issue date:</i>                                    | 2023-05-29<br><small>Signed by: Lin Lin</small> |  |
| <b>Stellung / Position:</b>  | <b>Sachverständige(r)/Expert</b>   | <b>Stellung / Position:</b>  | <b>Sachverständige(r)/Expert</b>                |  |
| <b>Sonstiges / Other:</b>  |  |  |   |  |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br><i>Condition of the test item at delivery:</i>   |  | Prüfmuster vollständig und unbeschädigt<br><i>Test item complete and undamaged</i> |   |  |
| * Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet<br>* Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested   |  |  |   |  |
| <b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b><br><i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i> |  |  |   |  |

v05

## Anmerkungen

### Remarks

|          |   |
|----------|---|
| <b>1</b> | <p>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system.</p> <p>Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</p> <p><i>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.</i></p> <p><i>Detallierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</i></p>  |
| <b>2</b> | <p>As contractually agreed, this document has been signed digitally only. TÜV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TÜV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged.</p> <p><i>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben.</i></p>   |
| <b>3</b> | <p>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</p> <p><i>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</i></p>   |
| <b>4</b> | <p>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</p> <p><i>Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezueglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.</i></p> |

## Test Summary

**5.1.1 ANTENNA REQUIREMENT***RESULT: Pass***5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER***RESULT: Pass***5.1.3 99% BANDWIDTH***RESULT: Pass***5.1.4 20DB BANDWIDTH***RESULT: Pass***5.1.5 CARRIER FREQUENCY SEPARATION***RESULT: Pass***5.1.6 NUMBER OF HOPPING FREQUENCY***RESULT: Pass***5.1.7 TIME OF OCCUPANCY***RESULT: Pass***5.1.8 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH***RESULT: Pass***5.1.9 RADIATED SPURIOUS EMISSION***RESULT: Pass***5.1.10 CONDUCTED EMISSION ON AC MAINS***RESULT: Pass*

## Contents

|               |   |           |
|---------------|---|-----------|
| <b>1</b>      | <b>GENERAL REMARKS .....</b>  | <b>5</b>  |
| <b>1.1</b>    | <b>COMPLEMENTARY MATERIALS .....</b>                                    | <b>5</b>  |
| <b>2</b>      | <b>TEST SITES .....</b>   | <b>6</b>  |
| <b>2.1</b>    | <b>TEST FACILITIES .....</b>  | <b>6</b>  |
| <b>2.2</b>    | <b>LIST OF TEST AND MEASUREMENT INSTRUMENTS.....</b>                    | <b>6</b>  |
| <b>2.3</b>    | <b>TRACEABILITY .....</b>   | <b>7</b>  |
| <b>2.4</b>    | <b>CALIBRATION .....</b>  | <b>7</b>  |
| <b>2.5</b>    | <b>MEASUREMENT UNCERTAINTY.....</b>                                     | <b>7</b>  |
| <b>2.6</b>    | <b>LOCATION OF ORIGINAL DATA.....</b>                                   | <b>7</b>  |
| <b>2.7</b>    | <b>STATUS OF FACILITY USED FOR TESTING.....</b>                         | <b>8</b>  |
| <b>3</b>      | <b>GENERAL PRODUCT INFORMATION .....</b>                                | <b>9</b>  |
| <b>3.1</b>    | <b>PRODUCT FUNCTION AND INTENDED USE.....</b>                           | <b>9</b>  |
| <b>3.2</b>    | <b>RATINGS AND SYSTEM DETAILS .....</b>                                 | <b>9</b>  |
| <b>3.3</b>    | <b>INDEPENDENT OPERATION MODES .....</b>                                | <b>10</b> |
| <b>3.4</b>    | <b>NOISE GENERATING AND NOISE SUPPRESSING PARTS .....</b>               | <b>10</b> |
| <b>3.5</b>    | <b>SUBMITTED DOCUMENTS.....</b>   | <b>11</b> |
| <b>4</b>      | <b>TEST SET-UP AND OPERATION MODES .....</b>                            | <b>12</b> |
| <b>4.1</b>    | <b>PRINCIPLE OF CONFIGURATION SELECTION .....</b>                       | <b>12</b> |
| <b>4.2</b>    | <b>TEST OPERATION AND TEST SOFTWARE .....</b>                           | <b>12</b> |
| <b>4.3</b>    | <b>SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT .....</b>                | <b>12</b> |
| <b>4.4</b>    | <b>COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE .....</b>                  | <b>12</b> |
| <b>4.5</b>    | <b>TEST SETUP DIAGRAM .....</b>   | <b>13</b> |
| <b>5</b>      | <b>TEST RESULTS .....</b>   | <b>15</b> |
| <b>5.1</b>    | <b>TRANSMITTER REQUIREMENT &amp; TEST SUITES .....</b>                  | <b>15</b> |
| <b>5.1.1</b>  | <i>Antenna Requirement .....</i>  | <i>15</i> |
| <b>5.1.2</b>  | <i>Maximum Peak Conducted Output Power .....</i>                        | <i>16</i> |
| <b>5.1.3</b>  | <i>99% Bandwidth .....</i>  | <i>17</i> |
| <b>5.1.4</b>  | <i>20dB Bandwidth .....</i>   | <i>18</i> |
| <b>5.1.5</b>  | <i>Carrier Frequency Separation.....</i>                                | <i>19</i> |
| <b>5.1.6</b>  | <i>Number of Hopping Frequency .....</i>                                | <i>20</i> |
| <b>5.1.7</b>  | <i>Time of Occupancy .....</i>  | <i>21</i> |
| <b>5.1.8</b>  | <i>Conducted Spurious Emissions Measured in 100 kHz Bandwidth .....</i> | <i>22</i> |
| <b>5.1.9</b>  | <i>Radiated Spurious Emission .....</i>                                 | <i>23</i> |
| <b>5.1.10</b> | <i>Conducted Emission on AC Mains .....</i>                             | <i>24</i> |
| <b>6</b>      | <b>PHOTOGRAPHS OF THE TEST SET-UP .....</b>                             | <b>25</b> |
| <b>7</b>      | <b>LIST OF TABLES.....</b>  | <b>25</b> |

# 1 General Remarks

## 1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results of FCC Part 15C

Appendix B: Photographs of the Test Set-up

## 2 Test Sites

### 2.1 Test Facilities

**TÜV Rheinland (Shenzhen) Co., Ltd.**

No.362, Huanguan Middle Road, Songyuansha Community, Guanhu Subdistrict, Longhua District, Shenzhen 518110, Guangdong, China

FCC Accreditation Designation No.: CN1260

### 2.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

| Radio Spectrum Testing (SRD-Tonscend)          |              |                   |              |            |
|--|--------------|-------------------|--------------|------------|
| Equipment                                      | Manufacturer | Model             | Serial No.   | Cal. until |
| EXA Signal Analyzer, Multi-touch               | Keysight     | N9010B            | MY60241175   | 2023-10-10 |
| MXG X-Series RF Vector Signal Generator        | Keysight     | N5182B            | MY61250137   | 2023-10-10 |
| EXG X-Series Microwave Analog Signal Generator | Keysight     | N5173B            | MY61250141   | 2023-10-10 |
| DC power supply                                | Keysight     | E3642A            | MY61276100   | 2023-10-10 |
| Power Control Unit                             | Tonscend     | JS0806-4ADC       | N/A          | 2023-10-10 |
| Automation Control Unit                        | Tonscend     | JS0806-2          | 21C8060396   | 2023-10-10 |
| Test Software                                  | Tonscend     | JS1120-3          | N/A          | N/A        |
| Control PC                                     | Lenovo       | TianYi510S-071MB  | YLX23JMF     | N/A        |
| Shielding Room 8#                              | Albatross    | SR8               | APC17151-SR8 | 2024-06-22 |
| Unwanted Emission Testing (TS9975)             |              |                   |              |            |
| Equipment                                      | Manufacturer | Model             | Serial No.   | Cal. until |
| EMI Test Receiver                              | R&S          | ESR 7             | 102021       | 2023-08-02 |
| Signal Analyzer                                | R&S          | FSV 40            | 101439       | 2023-08-01 |
| System Controller Interface                    | R&S          | SCI-100           | S10010038    | N/A        |
| Filterbank                                     | R&S          | Wlan              | 100759       | 2023-08-01 |
| OSP  | R&S          | OSP 120           | 102040       | N/A        |
| Pre-amplifier                                  | R&S          | SCU08F1           | 08320031     | 2023-08-02 |
| Amplifier                                      | R&S          | SCU-18F           | 180070       | 2023-08-02 |
| Amplifier                                      | R&S          | SCU40A            | 100475       | 2023-08-02 |
| Trilog Broadband Antenna (30 MHz - 7 GHz)      | Schwarzbeck  | VULB 9162         | 193          | 2024-08-06 |
| Double-Ridged Antenna (1 -18 GHz)              | ETS-LINDGREN | 3117              | 00218717     | 2024-08-06 |
| Wideband Ridged Horn Antenna (18-40 GHz)       | Steatite     | QMS-00880         | 19067        | 2024-08-27 |
| Active Loop Antenna                            | Schwarzbeck  | FMZB 1513         | 302          | 2023-08-06 |
| Test software                                  | R&S          | EMC32 (V10.60.10) | N/A          | N/A        |
| Control PC                                     | Dell         | OptiPlex 7050     | 36NV9P2      | N/A        |

|                          |           |        |              |            |
|--------------------------|-----------|--------|--------------|------------|
| 3m Semi-Anechoic Chamber | Albatross | SAC-3m | APC17151-SAC | 2024-06-22 |
|--------------------------|-----------|--------|--------------|------------|

| Conducted Emission       |              |                     |            |            |
|--------------------------|--------------|---------------------|------------|------------|
| Equipment                | Manufacturer | Model No.           | Serial No. | Cal. Until |
| EMI Test Receiver        | R&S          | ESR3                | 102680     | 2024-02-23 |
| Artificial Mains Network | R&S          | ENV216              | 101445     | 2024-02-23 |
| EMC32 test software      | R&S          | EMC32(Ver.10.50.00) | N/A        | N/A        |

## 2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

## 2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

## 2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

**Table 2: Measurement Uncertainty**

| Parameter  | Uncertainty (k=2)     |
|--|-----------------------|
| Occupied Channel Bandwidth                             | ± 2.08 %              |
| RF output power, conducted                             | ± 0.99 dB             |
| Unwanted Emissions, conducted                          | ± 0.89 dB             |
| All emissions, radiated                                | ± 4.17 dB             |
| Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz) | ± 3.70 dB / ± 3.30 dB |

## 2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

## **2.7 Status of Facility Used for Testing**

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at No.362, Huanguan Middle Road, Songyuansha Community, Guanhu Subdistrict, Longhua District, Shenzhen 518110, Guangdong, China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.



## 3 General Product Information

### 3.1 Product Function and Intended Use

The EUT is a Keyboard which supports Classic Bluetooth wireless technology.

The EUT has two battery, Same parameter, the difference is different manufacturers, Differential test in SDOC report.

For details refer to the User Manual, Technical Description and Circuit Diagram.

### 3.2 Ratings and System Details

**Table 3: Technical Specification of EUT**

| General Information of EUT                    | Value  |
|---|--|
| Kind of Equipment:                            | Keyboard   |
| Type Designation:                             | KB9466X  |
| Trade Mark:                                   | TCL  |
| FCC ID:                                       | 2ACCJB203  |
| Operating Voltage:                            | Internal battery operated (3.7Vdc)<br>or Charging by PC USB Port (PC input voltage 120Vac, 60Hz) |
| Operating Temperature Range:                  | 0 °C ~ 40 °C   |
| Battery 1#:                                   | Model: 381633<br>Rating: DC 3.7V, 200mAh<br>Manufacturer: TMB                                    |
| Battery 2#:                                   | Model: 371740PL<br>Rating: DC 3.7V, 200mAh<br>Manufacturer: GAOYUAN                              |
| Technical Specification of Bluetooth BR & EDR |  |
| Operating Frequency:                          | 2402 MHz to 2480 MHz   |
| Type of Modulation:                           | GFSK, $\pi/4$ -DQPSK, 8DPSK  |
| Channel Number:                               | 79 channels  |
| Channel Separation:                           | 1MHz   |
| Antenna Type:                                 | PCB Layout Antenna   |
| Antenna Gain:                                 | 3.129 dBi  |

**Table 4: RF Channel and Frequency of Bluetooth BR & EDR**

| RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) |
|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 0          | <b>2402.00</b>  | 20         | 2422.00         | 40         | 2442.00         | 60         | 2462.00         |
| 1          | 2403.00         | 21         | 2423.00         | 41         | 2443.00         | 61         | 2463.00         |
| 2          | 2404.00         | 22         | 2424.00         | 42         | 2444.00         | 62         | 2464.00         |
| 3          | 2405.00         | 23         | 2425.00         | 43         | 2445.00         | 63         | 2465.00         |
| 4          | 2406.00         | 24         | 2426.00         | 44         | 2446.00         | 64         | 2466.00         |
| 5          | 2407.00         | 25         | 2427.00         | 45         | 2447.00         | 65         | 2467.00         |
| 6          | 2408.00         | 26         | 2428.00         | 46         | 2448.00         | 66         | 2468.00         |
| 7          | 2409.00         | 27         | 2429.00         | 47         | 2449.00         | 67         | 2469.00         |
| 8          | 2410.00         | 28         | 2430.00         | 48         | 2450.00         | 68         | 2470.00         |
| 9          | 2411.00         | 29         | 2431.00         | 49         | 2451.00         | 69         | 2471.00         |
| 10         | 2412.00         | 30         | 2432.00         | 50         | 2452.00         | 70         | 2472.00         |
| 11         | 2413.00         | 31         | 2433.00         | 51         | 2453.00         | 71         | 2473.00         |
| 12         | 2414.00         | 32         | 2434.00         | 52         | 2454.00         | 72         | 2474.00         |
| 13         | 2415.00         | 33         | 2435.00         | 53         | 2455.00         | 73         | 2475.00         |
| 14         | 2416.00         | 34         | 2436.00         | 54         | 2456.00         | 74         | 2476.00         |
| 15         | 2417.00         | 35         | 2437.00         | 55         | 2457.00         | 75         | 2477.00         |
| 16         | 2418.00         | 36         | 2438.00         | 56         | 2458.00         | 76         | 2478.00         |
| 17         | 2419.00         | 37         | 2439.00         | 57         | 2459.00         | 77         | 2479.00         |
| 18         | 2420.00         | 38         | 2440.00         | 58         | 2460.00         | 78         | <b>2480.00</b>  |
| 19         | 2421.00         | 39         | <b>2441.00</b>  | 59         | 2461.00         |            |                 |

Test frequencies are lowest channel: 2402 MHz, middle channel: 2441 MHz and highest channel: 2480 MHz for Bluetooth BR & EDR

### 3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Bluetooth transmitting mode
  - 1) Low Channel
  - 2) Middle Channel
  - 3) High Channel
- B. On, Transmitting on Hopping channel
- C. On, Normal Operation + Charging by PC USB Port
- D. Off

### 3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

### 3.5 Submitted Documents

- Application Form
- FCC/IC Label and Location Info
- Schematics
- Operation Description
- Block Diagram
- PCB Layout

## 4 Test Set-up and Operation Modes

### 4.1 Principle of Configuration Selection

**Radio Spectrum:** The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### 4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model KB9466X in this report.

Note: Fully test battery 1# and partial test battery 2# on Conducted Emissions item.

### 4.3 Special Accessories and Auxiliary Equipment

Table 5: Auxiliary Equipment Used during Test

| Description | Manufacturer | Model  | S/N       |
|-------------|--------------|--------|-----------|
| Laptop      | Lenovo       | T480   | PF-16A6N8 |
| Notebook PC | Lenovo       | E4-IML | LR0C852   |
| USB Cable   | --           | --     | --        |

### 4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

## 4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

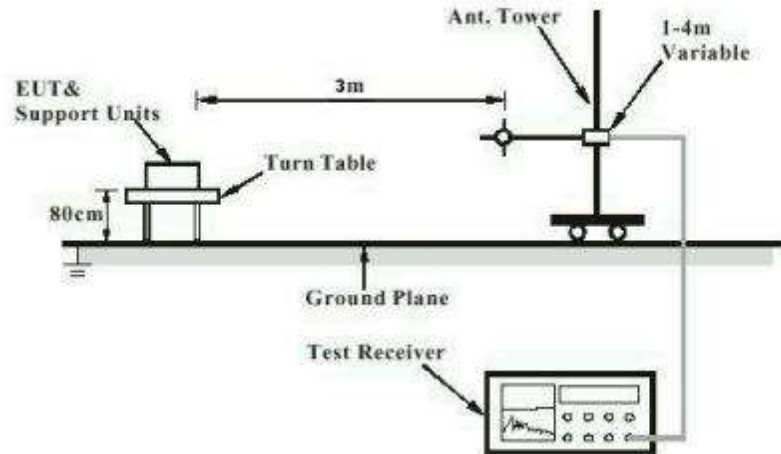


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

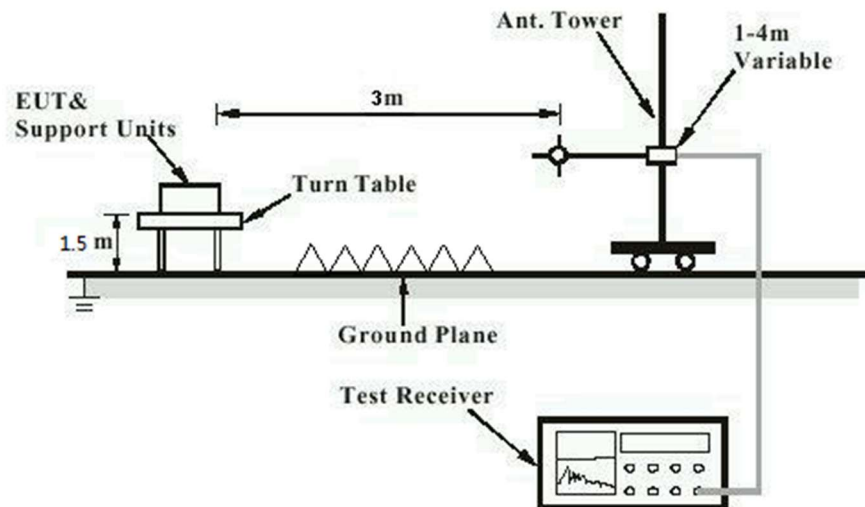


Diagram of Measurement Configuration for Conducted Transmitter Measurement

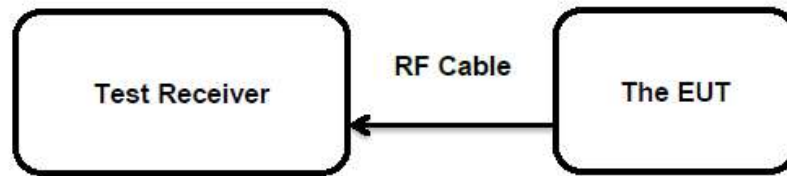
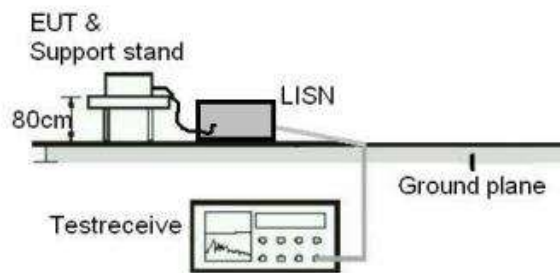


Diagram of Measurement Configuration for Mains Conduction Measurement



## 5 Test Results

### 5.1 Transmitter Requirement & Test Suites

#### 5.1.1 Antenna Requirement

RESULT:

Pass

**Test Specification**

Test standard : FCC Part 15.247(b)(4) and Part 15.203

According to the manufacturer declared, the EUT has a PCB Layout Antenna, the directional gain of antenna is 3.129 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

## 5.1.2 Maximum Peak Conducted Output Power

**RESULT:**
**Pass**
**Test Specification**

Test standard : FCC Part 15.247(b)(1)  
 Basic standard : ANSI C63.10: 2013  
 Limits : FHSS < 0.125 Watts  
 Kind of test site : Shielded Room

**Test Setup**

Date of testing : 2023-04-27  
 Input voltage : Internal battery operated (3.7Vdc)  
 Operation mode : A  
 Test channel : Low / Middle / High  
 Ambient temperature : 25.3 °C  
 Relative humidity : 52 %  
 Atmospheric pressure : 101 kPa

**Table 6: Test Result of Maximum Peak Conducted Output Power**

| Test Mode                     | Test Channel (MHz) | Measured Peak Power |        | Limit (W) |
|-------------------------------|--------------------|---------------------|--------|-----------|
|                               |                    | (dBm)               | (W)    |           |
| GFSK (BR)                     | 2402.0             | 6.61                | 0.0046 | < 0.125   |
|                               | 2441.0             | 6.56                | 0.0045 |           |
|                               | 2480.0             | 6.41                | 0.0044 |           |
| <b>Maximum Measured Value</b> |                    | 6.61                | 0.0046 |           |

| Test Mode                     | Test Channel (MHz) | Measured Peak Power |        | Limit (W) |
|-------------------------------|--------------------|---------------------|--------|-----------|
|                               |                    | (dBm)               | (W)    |           |
| 8DPSK (EDR)                   | 2402.0             | 6.78                | 0.0048 | < 0.125   |
|                               | 2441.0             | 6.65                | 0.0046 |           |
|                               | 2480.0             | 6.69                | 0.0047 |           |
| <b>Maximum Measured Value</b> |                    | 6.78                | 0.0048 |           |

Note:

- 1) The cable loss is taken into account in results.
- 2) Antenna gain(G): 3.129 dBi



**Prüfbericht - Nr.: CN231MZZ 002**

Test Report No.:

Seite 17 von 25

Page 17 of 25

### 5.1.3 99% Bandwidth

**RESULT:****Pass****Test Specification**

Test standard : FCC Part 15.247(a)  
Basic standard : ANSI C63.10: 2013  
Kind of test site : Shielded Room

**Test Setup**

Date of testing : 2023-04-27  
Input voltage : Internal battery operated (3.7Vdc)  
Operation mode : A  
Test channel : Low / Middle / High  
Ambient temperature : 25.3 °C  
Relative humidity : 52 %  
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

**Prüfbericht - Nr.: CN231MZ2 002**

Test Report No.:

Seite 18 von 25

Page 18 of 25

### 5.1.4 20dB Bandwidth

**RESULT:****Pass****Test Specification**

Test standard : FCC Part 15.247(a)(1)  
Basic standard : ANSI C63.10: 2013  
Kind of test site : Shielded Room

**Test Setup**

Date of testing : 2023-04-27  
Input voltage : Internal battery operated (3.7Vdc)  
Operation mode : A  
Test channel : Low / Middle / High  
Ambient temperature : 25.3 °C  
Relative humidity : 52 %  
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

## 5.1.5 Carrier Frequency Separation

**RESULT:****Pass****Test Specification**

|                   |  |
|-------------------|--|
| Test standard     | : FCC Part 15.247(a)(1)  |
| Basic standard    | : ANSI C63.10: 2013  |
| Limits            | : $\geq 25\text{kHz}$ or 2/3 of 20dB bandwidth, whichever is greater |
| Kind of test site | : Shielded Room  |

**Test Setup**

|                      |                                      |
|----------------------|--------------------------------------|
| Date of testing      | : 2023-04-27                         |
| Input voltage        | : Internal battery operated (3.7Vdc) |
| Operation mode       | : B                                  |
| Test channel         | : Low / Middle / High                |
| Ambient temperature  | : 25.3 °C                            |
| Relative humidity    | : 52 %                               |
| Atmospheric pressure | : 101 kPa                            |

For the measurement records, refer to the appendix A.

### 5.1.6 Number of Hopping Frequency

**RESULT:****Pass****Test Specification**

|                   |                                      |
|-------------------|--------------------------------------|
| Test standard     | : FCC part 15.247(a)(1)(iii)         |
| Basic standard    | : ANSI C63.10: 2013                  |
| Limits            | : $\geq 15$ non-overlapping channels |
| Kind of test site | : Shielded Room                      |

**Test Setup**

|                      |                                      |
|----------------------|--------------------------------------|
| Date of testing      | : 2023-04-27                         |
| Input voltage        | : Internal battery operated (3.7Vdc) |
| Operation mode       | : B                                  |
| Ambient temperature  | : 25.3 °C                            |
| Relative humidity    | : 52 %                               |
| Atmospheric pressure | : 101 kPa                            |

For the measurement records, refer to the appendix A.

## 5.1.7 Time of Occupancy

**RESULT:****Pass****Test Specification**

|                   |   |                            |
|-------------------|---|----------------------------|
| Test standard     | : | FCC part 15.247(a)(1)(iii) |
| Basic standard    | : | ANSI C63.10: 2013          |
| Limits            | : | < 0.4s                     |
| Kind of test site | : | Shielded Room              |

**Test Setup**

|                      |   |                                    |
|----------------------|---|------------------------------------|
| Date of testing      | : | 2023-04-27                         |
| Input voltage        | : | Internal battery operated (3.7Vdc) |
| Operation mode       | : | B                                  |
| Test channel         | : | Low / Middle / High                |
| Ambient temperature  | : | 25.3 °C                            |
| Relative humidity    | : | 52 %                               |
| Atmospheric pressure | : | 101 kPa                            |

For the measurement records, refer to the appendix A.

## 5.1.8 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

**RESULT:****Pass****Test Specification**

|                   |  |
|-------------------|--|
| Test standard     | : FCC Part 15.247(d)   |
| Basic standard    | : ANSI C63.10: 2013  |
| Limits            | : 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power);<br>In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a) |
| Kind of test site | : Shielded Room  |

**Test Setup**

|                      |                                      |
|----------------------|--------------------------------------|
| Date of testing      | : 2023-04-27                         |
| Input voltage        | : Internal battery operated (3.7Vdc) |
| Operation mode       | : A                                  |
| Test channel         | : Low / Middle / High                |
| Ambient temperature  | : 25.3 °C                            |
| Relative humidity    | : 52 %                               |
| Atmospheric pressure | : 101 kPa                            |

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix A.

## 5.1.9 Radiated Spurious Emission

**RESULT:****Pass****Test Specification**

|                   |   |  |
|-------------------|---|--|
| Test standard     | : | FCC Part 15.247(d) & FCC Part 15.205     |
| Basic standard    | : | ANSI C63.10: 2013                        |
| Limits            | : | Refer to 15.209(a) of FCC part 15.247(d) |
| Kind of test site | : | 3m Semi-anechoic Chamber                 |

**Test Setup**

|                      |   |                                    |
|----------------------|---|------------------------------------|
| Date of testing      | : | 2023-04-27 to 2023-04-28           |
| Input voltage        | : | Internal battery operated (3.7Vdc) |
| Operation mode       | : | A                                  |
| Test channel         | : | Low / Middle / High                |
| Ambient temperature  | : | Refer to test result               |
| Relative humidity    | : | Refer to test result               |
| Atmospheric pressure | : | 101 kPa                            |

**Remark:**

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix A.

### 5.1.10 Conducted Emission on AC Mains

**RESULT:****Pass****Test Specification**

|                   |                      |
|-------------------|----------------------|
| Test standard     | : FCC Part 15.207(a) |
| Basic standard    | : ANSI C63.10: 2013  |
| Frequency range   | : 0.15 – 30MHz       |
| Limits            | : FCC Part 15.207(a) |
| Kind of test site | : Shielded Room      |

**Test Setup**

|                      |   |
|----------------------|---|
| Date of testing      | : 2023-05-08  |
| Input voltage        | : Charging by PC USB Port (PC input voltage 120Vac, 60Hz) |
| Operation mode       | : C   |
| Ambient temperature  | : 23.2 °C   |
| Relative humidity    | : 50.6 %  |
| Atmospheric pressure | : 101 kPa   |

For the measurement records, refer to the appendix A.



## 6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix B.

## 7 List of Tables

|  |    |
|--|----|
| Table 1: List of Test and Measurement Equipment.....             | 6  |
| Table 2: Measurement Uncertainty.....                            | 7  |
| Table 3: Technical Specification of EUT.....                     | 9  |
| Table 4: RF Channel and Frequency of Bluetooth BR & EDR.....     | 10 |
| Table 5: Auxiliary Equipment Used during Test.....               | 12 |
| Table 6: Test Result of Maximum Peak Conducted Output Power..... | 16 |