| | | | | |
|---|---|---|---|---|
| **Prüfbericht-Nr.:** *Test report No.:* | **50064681 005** | **Auftrags-Nr.:** *Order No.:* | 164074884 | Seite 1 von 19 *Page 1 of 19* |
| **Kunden-Referenz-Nr.:** *Client reference No.:* | N/A | **Auftragsdatum:** *Order date.:* | 26.09.2016 | |
| **Auftraggeber:** *Client:* | **BBB Inc.** 28, Yatap-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, South Korea | | | |
| **Prüfgegenstand:** *Test item:* | Mobile Phone | | | |
| **Bezeichnung / Typ-Nr.:** *Identification / Type No.:* | EZ-100 (elemark™, mobihealth) | | | |
| **Auftrags-Inhalt:** *Order content:* | FCC Certification | | | |
| **Prüfgrundlage:** *Test specification:* | CFR47 FCC Part 27 | | | |
| **Wareneingangsdatum:** *Date of receipt:* | 08.08.2016 | Please refer to photo documents | | |
| **Prüfmuster-Nr.:** *Test sample No.:* | STR16098108I-2 | | | |
| **Prüfzeitraum:** *Testing period:* | 08.08.2016 - 07.12.2016 | | | |
| **Ort der Prüfung:** *Place of testing:* | Shenzhen SEM.Test Technology Co., Ltd. | | | |
| **Prüflaboratorium:** *Testing laboratory:* | TÜV Rheinland (Shenzhen) Co., Ltd. | | | |
| **Prüfergebnis*:** *Test result*:* | Pass | | | |

| **geprüft von** / *tested by:* | | | **kontrolliert von** / *reviewed by:* | | |
|---|---|---|---|---|---|
| 29.12.2016 | Lin Lin / Project Manager | | 29.12.2016 | Sam Lin / Technical Certifier | |
| **Datum** *Date* | **Name/Stellung** *Name/Position* | **Unterschrift** *Signature* | **Datum** *Date* | **Name/Stellung** *Name/Position* | **Unterschrift** *Signature* |

**Sonstiges** / *Other:*

FCC ID: 2AKGP-EZ100

| | |
|---|---|
| **Zustand des Prüfgegenstandes bei Anlieferung:** *Condition of the test item at delivery:* | Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged:* |

| | | | | | |
|---|---|---|---|---|---|
| * Legende: | 1 = sehr gut | 2 = gut | 3 = befriedigend | 4 = ausreichend | 5 = mangelhalt |
| | P(ass) = entspricht o.g. Prüfgrundlage(n) | | F(ail) = entspricht nicht o.g. Prüfgrundlage(n) | N/A = nicht anwendbar | N/T = nicht getestet |
| Legend: | 1 = very good | 2 = good | 3 = satisfactory | 4 = sufficient | 5 = poor |
| | P(ass) = passed a.m. test specifications(s) | | F(ail) = failed a.m. test specifications(s) | N/A = not applicable | N/T = not tested |

# Test Summary

**5.1.1 RADIATED POWER**
*RESULT:* *Pass*

**5.1.2 OCCUPIED BANDWIDTH**
*RESULT:* *Pass*

**5.1.3 SPURIOUS EMISSIONS AND BANDEDGE AT ANTENNA TERMINALS**
*RESULT:* *Pass*

**5.1.4 RADIATED SPURIOUS EMISSIONS**
*RESULT:* *Pass*

**5.1.5 FREQUENCY STABILITY**
*RESULT:* *Pass*

**5.1.6 PEAK-AVERAGE RATIO**
*RESULT:* *Pass*

# Table of Contents

# 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 LTE Band 4
Appendix B: Test Results of LTE Band 7

# 2 Test Sites

## 2.1 Test Facilities

Shenzhen SEM.Test Technology Co., Ltd.
1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, China

FCC Registration No.: 934118

The tests at the test sites have been conducted under the supervision of a TÜV engineer.

## 2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Shenzhen SEM.Test Technology Co., Ltd.

| Description | Manufacturer | Model | Serial No. | Cal Date | Due. Date |
|---|---|---|---|---|---|
| Communication Tester | Rohde & Schwarz | CMW500 | 148650 | 2016-06-04 | 2017-06-03 |
| GSM Tester | Rohde & Schwarz | CMU200 | 104036 | 2016-06-04 | 2017-06-03 |
| Spectrum Analyzer | Agilent | E4407B | MY41440400 | 2016-06-04 | 2017-06-03 |
| Spectrum Analyzer | Agilent | N9020A | US47140102 | 2016-06-04 | 2017-06-03 |
| Signal Generator | Agilent | 83752A | 3610A01453 | 2016-06-04 | 2017-06-03 |
| Vector Signal Generator | Agilent | N5182A | MY47070202 | 2016-06-04 | 2017-06-03 |
| Power Divider | Weinschel | 1506A | PM204 | 2016-06-04 | 2017-06-03 |
| Power Divider | RF-Lambda | RFLT4W5M18G | 14110400027 | 2016-06-04 | 2017-06-03 |
| Spectrum Analyzer | Rohde & Schwarz | FSP30 | 836079/035 | 2016-06-04 | 2017-06-03 |
| EMI Test Receiver | Rohde & Schwarz | ESVB | 825471/005 | 2016-06-04 | 2017-06-03 |
| Amplifier | Agilent | 8447F | 3113A06717 | 2016-06-04 | 2017-06-03 |
| Amplifier | C&D | PAP-1G18 | 2002 | 2016-06-04 | 2017-06-03 |
| Loop Antenna | Schwarz beck | FMZB 1516 | 9773 | 2016-06-04 | 2017-06-03 |
| Broadband Antenna | Schwarz beck | VULB9163 | 9163-333 | 2016-06-04 | 2017-06-03 |
| Horn Antenna | ETS | 3117 | 00086197 | 2016-06-04 | 2017-06-03 |
| Horn Antenna | ETS | 3116B | 00088203 | 2016-06-04 | 2017-06-03 |
| Horn Antenna | Schwarbeck | BBHA9170 | BBHA9170582 | 2016-06-04 | 2017-06-03 |
| Temperature Chamber cycling | Zhongjian | YX-KHWS150A | ZJI130929 | 2016-11-18 | 2017-11-17 |

## 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 basics 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

| Item | Conditions | Extended Uncertainty |
|---|---|---|
| RF Output Power | Conducted | ±0.42dB |
| Occupied Bandwidth | Conducted | ±1.5% |
| Frequency Stability | Conducted | 2.3% |
| Conducted Spurious Emission | Conducted | ±2.17dB |
| Transmitter Spurious Emissions | Radiated | ±5.1dB |

## 2.6 Location of Original Data

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

## 2.7 Status of Facility Used for Testing

The Shenzhen SEM.Test Technology Co., Ltd. Test facility located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, 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 Mobile Phone which supports Bluetooth V4.0 (dual mode) and WiFi 802.11 b/g/n/ wireless technology. This report is only for LTE functions of PCE. Other functions with different technologies are reported in the related reports.

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 Description of EUT | |
|---|---|
| Product Name: | Mobile Phone |
| Brand Name: | elemark™, mobihealth |
| Model No.: | EZ-100 |
| Rated Voltage: | DC 3.8V |
| Battery Capacity: | 3000mAh |
| Software Version: | l3501_65u_l1_20160928175345 |
| Hardware Version: | l3501-MB-V2 |
| Type of Product | Protable Device |
| LTE | |
| Support Networks: | LTE |
| Category: | 5 |
| Support Bands: | FDD-LTE Band 4, 7 |
| Frequency Range: | FDD-LTE Band 4: Tx: 1710-1755MHz, Rx: 2110-2155MHz |
| | FDD-LTE Band 7: Tx: 2500-2570MHz, Rx: 2620-2690MHz |
| Operation Bandwidth: | FDD-LTE Band 4: 1.4/3/5/10/15/20MHz<br>FDD-LTE Band 7: 5/10/15/20MHz |
| Modulation Type: | QPSK, 16QAM |
| Antenna Type: | Internal Antenna |
| Antenna Gain: | FDD-LTE Band 4: 1.90dBi<br>FDD-LTE Band 7: 2.76dBi |

Table 4: RF Channel and Frequency of LTE

| Support Band | Bandwidth (MHz) | Channel Frequency (L/M/H) (MHz) | Channel Number (L/M/H) |
|---|---|---|---|
| LTE Band 4 | 1.4 | 1710.7/1732.5/1754.3 | 19957/20175/20393 |
| | 3 | 1711.5/1732.5/1753.5 | 19965/20175/20385 |
| | 5 | 1712.5/1732.5/1752.5 | 19975/20175/20375 |
| | 10 | 1715.0/1732.5/1750.0 | 20000/20175/20350 |
| | 15 | 1717.5/1732.5/1747.5 | 20025/20175/20325 |
| | 20 | 1720.0/1732.5/1745.0 | 20050/20175/20300 |
| LTE Band 7 | 5 | 2502.5/2535.0/2567.5 | 20775/21100/21425 |
| | 10 | 2505.0/2535.0/2565.0 | 20800/21100/21400 |
| | 15 | 2507.5/2535.0/2562.5 | 20825/21100/21375 |
| | 20 | 2510.0/2535.0/2560.0 | 20850/21100/21350 |

## 3.3 Independent Operation Modes

| Test Mode | Description | Remark |
|---|---|---|

| | | |
|---|---|---|
| TM1 | LTE Band 4 | Low, Middle, High Channels |
| TM2 | LTE Band 7 | Low, Middle, High Channels |

## 3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

## 3.5 Submitted Documents

- Application Form
- Block Diagram
- Schematics
- Technical Description
- FCC/IC Label and Location Info
- Photo Document
- User Manual

# 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.

## 4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in KDB 971168 D01 and ANSI/TIA-603-D.

## 4.3 Special Accessories and Auxiliary Equipment

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## 4.4 Test Setup Diagram

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

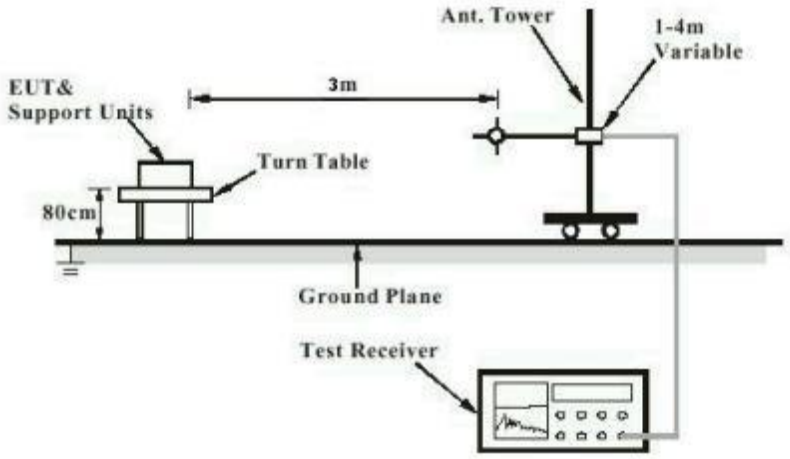


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

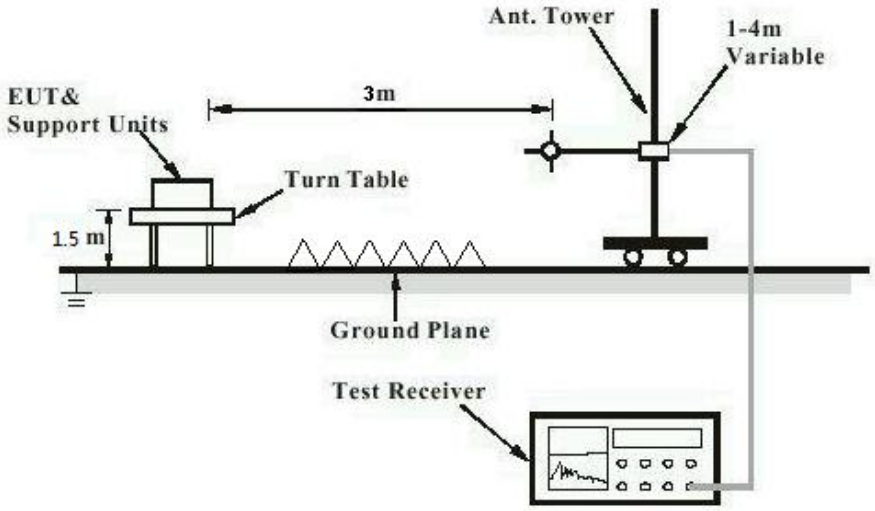
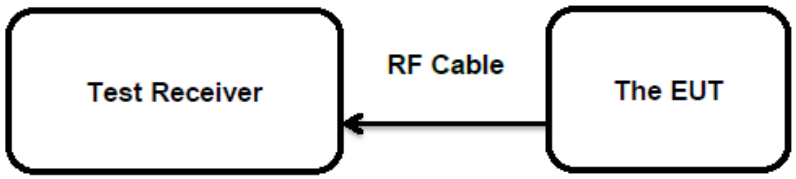



Diagram of Measurement Configuration for Conducted Transmitter Measurement



# 5 Test Results

## 5.1 Transmitter Requirement & Test Suites

### 5.1.1 Radiated Power

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 27.50 (d) (4)<br>FCC Part 27.50 (h) (2) |
| Limits | : | ≤ 1W EIRP (LTE Band 4)<br>≤ 2W EIRP (LTE Band 7) |
| Kind of test site | : | 3m Full-anechoic Chamber |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | 26.10.2016 |
| Input voltage | : | Fully charged Lithium battery |
| Operation mode | : | TM1 to TM12 |
| Ambient temperature | : | 25 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

Refer to 50064681 005 Appendix A for LTE Band 4 detail test data.
Refer to 50064681 005 Appendix B for LTE Band 7 detail test data.

### 5.1.2 Occupied Bandwidth

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 2.1049 |
| Limits | : | N/A (99% bandwidth and 26dB bandwidth) |
| Kind of test site | : | Shielded Room |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | 26.10.2016 |
| Input voltage | : | Fully charged Lithium battery |
| Operation mode | : | TM1 to TM12 |
| Ambient temperature | : | 25 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

Refer to 50064681 005 Appendix A for LTE Band 4 detail test data.
Refer to 50064681 005 Appendix B for LTE Band 7 detail test data.

### 5.1.3 Spurious Emissions and Bandedge at Antenna Terminals

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 2.1051<br>FCC Part 27.53 (h)<br>FCC Part 27.53 (m) (4) |
| Limits | : | Less than -13dBm for LTE Band 4<br>The attenuation factor shall be not less than -10dBm on all frequencies between the channel edge and 5 megahertz from the channel edge, -13dBm on all frequencies between 5 megahertz and X megahertz from the channel edge, and -25dBm on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth, In addition, the attenuation factor shall not be less that -13dBm on all frequencies between 2490.5 MHz and 2496 MHz and -25dBm at or below 2490.5 MHz for LTE Band 7 |
| Kind of test site | : | Shielded Room |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | 26.10.2016 |
| Input voltage | : | Fully charged Lithium battery |
| Operation mode | : | TM1 to TM12 |
| Ambient temperature | : | 25 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

Refer to 50064681 005 Appendix A for LTE Band 4 detail test data.
Refer to 50064681 005 Appendix B for LTE Band 7 detail test data.

### 5.1.4 Radiated Spurious Emissions

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 2.1053<br>FCC Part 27.53 (h) (1)<br>FCC Part 27.53 (m) (4) |
| Limits | : | Less than -13dBm for LTE Band 4<br>The attenuation factor shall be not less than -10dBm on all frequencies between the channel edge and 5 megahertz from the channel edge, -13dBm on all frequencies between 5 megahertz and X megahertz from the channel edge, and -25dBm on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth, In addition, the attenuation factor shall not be less that -13dBm on all frequencies between 2490.5 MHz and 2496 MHz and -25dBm at or below 2490.5 MHz for LTE Band 7 |
| Kind of test site | : | 3m Semi-anechoic Chamber & 3m Full-anechoic Chamber |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | 26.10.2016 |
| Input voltage | : | Fully charged Lithium battery |
| Operation mode | : | TM1 to TM12 |
| Ambient temperature | : | 25 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

Refer to 50064681 005 Appendix A for LTE Band 4 detail test data.
Refer to 50064681 005 Appendix B for LTE Band 7 detail test data.

### 5.1.5 Frequency Stability

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part2.1055<br>FCC Part 27.54 |
| Limits | : | Within assigned bands |
| Kind of test site | : | Shielded Room |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | 26.10.2016 |
| Input voltage | : | Fully charged Lithium battery |
| Operation mode | : | TM1 to TM12 |
| Ambient temperature | : | 25 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

Refer to 50064681 005 Appendix A for LTE Band 4 detail test data.
Refer to 50064681 005 Appendix B for LTE Band 7 detail test data.

### 5.1.6 Peak-Average Ratio

**RESULT:** **Pass**

**Test Specification**

| | | |
|---|---|---|
| Test standard | : | FCC Part 27.50 (d) (5) |
| Limits | : | <13dB |
| Kind of test site | : | Shielded Room |

**Test Setup**

| | | |
|---|---|---|
| Date of testing | : | 26.10.2016 |
| Input voltage | : | Fully charged Lithium battery |
| Operation mode | : | TM1 to TM12 |
| Ambient temperature | : | 25 ℃ |
| Relative humidity | : | 56 % |
| Atmospheric pressure | : | 101 kPa |

Refer to 50064681 005 Appendix A for LTE Band 4 detail test data.
Refer to 50064681 005 Appendix B for LTE Band 7 detail test data.