



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

No. 1 Workshop, M-10, Middle section, Science & Technology Park,  
Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053  
Fax: +86 (0) 755 2671 0594  
Email: ee.shenzhen@sgs.com

Report No.: SZEM170300179204  
Page: 1 of 30

## **TEST REPORT**

**Application No.:** SZEM1703001792CR  
**Applicant:** ADMOBILIZE LLC  
**Address of Applicant:** 1680 Michigan Avenue Suite 918, Miami Beach, Florida, United States  
**Manufacturer:** EMBEST TECHNOLOGY CO.,LTD.  
**Address of Manufacturer:** Tower B 4/F, Shanshui Building, Nanshan Yungu Innovation Industry Park, Liuxian Ave.No.1183, Nanshan District, Shenzhen, Guangdong, China  
**Factory:** EMBEST TECHNOLOGY CO.,LTD.  
**Address of Factory:** Tower B 4/F, Shanshui Building, Nanshan Yungu Innovation Industry Park, Liuxian Ave.No.1183, Nanshan District, Shenzhen, Guangdong, China  
**Equipment Under Test (EUT):**  
**EUT Name:** MATRIX Creator  
**Model No.:** MATRIX.C1.US  
**FCC ID:** 2ALM5-MTXC1  
**Standards:** 47 CFR Part 15, Subpart C 15.249  
**Date of Receipt:** 2017-03-15  
**Date of Test:** 2017-03-17 to 2017-04-18  
**Date of Issue:** 2017-04-27

|                      |              |
|----------------------|--------------|
| <b>Test Result :</b> | <b>Pass*</b> |
|----------------------|--------------|

\* In the configuration tested, the EUT complied with the standards specified above.



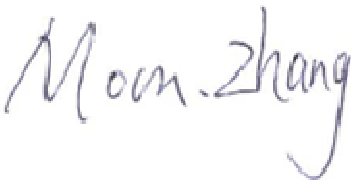
Jack Zhang  
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



| Revision Record |         |            |          |          |
|-----------------|---------|------------|----------|----------|
| Version         | Chapter | Date       | Modifier | Remark   |
| 01              |         | 2017-04-27 |          | Original |
|                 |         |            |          |          |
|                 |         |            |          |          |

|                          |                                                                                     |            |      |
|--------------------------|-------------------------------------------------------------------------------------|------------|------|
| Authorized for issue by: |                                                                                     |            |      |
| Tested By                |    |            |      |
|                          | Moon Zhang /Project Engineer                                                        | 2017-04-18 | Date |
| Checked By               |  |            |      |
|                          | Eric Fu /Reviewer                                                                   | 2017-04-27 | Date |



## 2 Test Summary

| Radio Spectrum Technical Requirement |                                  |        |                                              |        |
|--------------------------------------|----------------------------------|--------|----------------------------------------------|--------|
| Item                                 | Standard                         | Method | Requirement                                  | Result |
| Antenna Requirement                  | 47 CFR Part 15, Subpart C 15.203 | N/A    | 47 CFR Part 15, Subpart C 15.203 & 15.247(c) | Pass   |

| Radio Spectrum Matter Part                           |                                  |                                        |                                                       |        |
|------------------------------------------------------|----------------------------------|----------------------------------------|-------------------------------------------------------|--------|
| Item                                                 | Standard                         | Method                                 | Requirement                                           | Result |
| Conducted Disturbance at AC Power Line(150kHz-30MHz) | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.2         | 47 CFR Part 15, Subpart C 15.207                      | Pass   |
| Field Strength of the Fundamental Signal(15.249(a))  | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.5&6.6     | 47 CFR Part 15, Subpart C 15.249(a)                   | Pass   |
| Radiated Emissions                                   | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.4&6.5&6.6 | 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)     | Pass   |
| Restricted Band Around Fundamental Frequency         | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.4&6.5&6.6 | 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209 | Pass   |
| 20dB Bandwidth                                       | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.9         | 47 CFR Part 15, Subpart C 15.215                      | Pass   |



### 3 Contents

|                                                                           | Page |
|---------------------------------------------------------------------------|------|
| 1 COVER PAGE .....                                                        | 1    |
| 2 TEST SUMMARY .....                                                      | 3    |
| 3 CONTENTS .....                                                          | 4    |
| 4 GENERAL INFORMATION .....                                               | 5    |
| 4.1 DETAILS OF E.U.T. ....                                                | 5    |
| 4.2 DESCRIPTION OF SUPPORT UNITS .....                                    | 5    |
| 4.3 MEASUREMENT UNCERTAINTY .....                                         | 5    |
| 4.4 TEST LOCATION .....                                                   | 6    |
| 4.5 TEST FACILITY .....                                                   | 6    |
| 4.6 DEVIATION FROM STANDARDS .....                                        | 6    |
| 4.7 ABNORMALITIES FROM STANDARD CONDITIONS .....                          | 6    |
| 5 EQUIPMENT LIST .....                                                    | 7    |
| 6 RADIO SPECTRUM MATTER TEST RESULTS .....                                | 9    |
| 6.1 ANTENNA REQUIREMENT .....                                             | 9    |
| 6.1.1 Test Requirement: .....                                             | 9    |
| 6.1.2 Conclusion .....                                                    | 9    |
| 6.2 CONDUCTED DISTURBANCE AT AC POWER LINE(150kHz-30MHz) .....            | 10   |
| 6.2.1 E.U.T. Operation .....                                              | 10   |
| 6.2.2 Measurement Procedure and Data .....                                | 10   |
| 6.3 FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL(15.249(A)) .....             | 13   |
| 6.3.1 E.U.T. Operation .....                                              | 13   |
| 6.3.2 Measurement Procedure and Data .....                                | 13   |
| 6.4 RADIATED EMISSIONS .....                                              | 15   |
| 6.4.1 E.U.T. Operation .....                                              | 15   |
| 6.4.2 Measurement Procedure and Data .....                                | 15   |
| 6.5 RESTRICTED BAND AROUND FUNDAMENTAL FREQUENCY .....                    | 21   |
| 6.5.1 E.U.T. Operation .....                                              | 22   |
| 6.5.2 Measurement Procedure and Data .....                                | 22   |
| 6.6 20dB BANDWIDTH .....                                                  | 27   |
| 6.6.1 E.U.T. Operation .....                                              | 27   |
| 6.6.2 Measurement Data .....                                              | 27   |
| 7 PHOTOGRAPHS .....                                                       | 29   |
| 7.1 CONDUCTED DISTURBANCE AT AC POWER LINE(150kHz-30MHz) TEST SETUP ..... | 29   |
| 7.2 RADIATED EMISSIONS TEST SETUP .....                                   | 29   |
| 7.3 EUT CONSTRUCTIONAL DETAILS .....                                      | 30   |

## 4 General Information

### 4.1 Details of E.U.T.

|                      |                  |
|----------------------|------------------|
| Operation Frequency: | 908.4MHz, 916MHz |
| Modulation:          | GFSK             |
| Antenna Type:        | Chip Antenna     |
| Antenna Gain:        | 1.2dBi           |
| Power supply:        | Input: DC 5V     |

### 4.2 Description of Support Units

| Description     | Manufacturer            | Model No.      | Serial No.      |
|-----------------|-------------------------|----------------|-----------------|
| Adapter         | Apple                   | A1357 W010A051 | REF. No.SEA0500 |
| Micro USB Cable | PHILIPS                 | SWR2101        | REF. No.SEA0700 |
| Raspberry Pi    | Raspberry Pi Foundation | Raspberry Pi 3 | --              |

### 4.3 Measurement Uncertainty

| No. | Item                            | Measurement Uncertainty |
|-----|---------------------------------|-------------------------|
| 1   | Radio Frequency                 | 7.25 x 10 <sup>-8</sup> |
| 2   | Duty cycle                      | 0.37%                   |
| 3   | Occupied Bandwidth              | 3%                      |
| 4   | RF conducted power              | 0.75dB                  |
| 5   | RF power density                | 2.84dB                  |
| 6   | Conducted Spurious emissions    | 0.75dB                  |
| 7   | RF Radiated power               | 4.5dB (below 1GHz)      |
|     |                                 | 4.8dB (above 1GHz)      |
| 8   | Radiated Spurious emission test | 4.5dB (30MHz-1GHz)      |
|     |                                 | 4.8dB (1GHz-18GHz)      |
| 9   | Temperature test                | 1 °C                    |
| 10  | Humidity test                   | 3%                      |
| 11  | Supply voltages                 | 1.5%                    |
| 12  | Time                            | 3%                      |



#### **4.4 Test Location**

All tests were performed at:

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

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.  
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

#### **4.5 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

#### **4.6 Deviation from Standards**

None

#### **4.7 Abnormalities from Standard Conditions**

None



## 5 Equipment List

| Conducted Disturbance at AC Power Line(150kHz-30MHz) |                                    |                 |              |            |              |
|------------------------------------------------------|------------------------------------|-----------------|--------------|------------|--------------|
| Equipment                                            | Manufacturer                       | Model No        | Inventory No | Cal Date   | Cal Due Date |
| Shielding Room                                       | ZhongYu Electron                   | GB-88           | SEM001-06    | 2016-05-13 | 2017-05-13   |
| LISN                                                 | Rohde & Schwarz                    | ENV216          | SEM007-01    | 2016-10-09 | 2017-10-09   |
| LISN                                                 | ETS-LINDGREN                       | 3816/2          | SEM007-02    | 2017-04-14 | 2018-04-14   |
| 8 Line ISN                                           | Fischer Custom Communications Inc. | FCC-TLISN-T8-02 | EMC0120      | 2016-09-28 | 2017-09-28   |
| 4 Line ISN                                           | Fischer Custom Communications Inc. | FCC-TLISN-T4-02 | EMC0121      | 2016-09-28 | 2017-09-28   |
| 2 Line ISN                                           | Fischer Custom                     | FCC-TLISN-T2-02 | EMC0122      | 2016-09-28 | 2017-09-28   |

| 20dB Bandwidth    |                 |          |              |            |              |
|-------------------|-----------------|----------|--------------|------------|--------------|
| Equipment         | Manufacturer    | Model No | Inventory No | Cal Date   | Cal Due Date |
| DC Power Supply   | ZhaoXin         | RXN-305D | SEM011-02    | 2016-10-09 | 2017-10-09   |
| Spectrum Analyzer | Rohde & Schwarz | FSP      | SEM004-06    | 2016-10-09 | 2017-10-09   |
| Power Meter       | Rohde & Schwarz | NRVS     | SEM014-02    | 2016-10-09 | 2017-10-09   |

| Radiated Emissions             |                      |          |              |            |              |
|--------------------------------|----------------------|----------|--------------|------------|--------------|
| Equipment                      | Manufacturer         | Model No | Inventory No | Cal Date   | Cal Due Date |
| 3m Semi-Anechoic Chamber       | ETS-LINDGREN         | N/A      | SEM001-01    | 2016-05-13 | 2017-05-13   |
| EMI Test Receiver              | Agilent Technologies | N9038A   | SEM004-05    | 2016-10-09 | 2017-10-09   |
| BiConiLog Antenna (26-3000MHz) | ETS-LINDGREN         | 3142C    | SEM003-01    | 2014-11-01 | 2017-11-01   |
| Double-ridged horn (1-18GHz)   | ETS-LINDGREN         | 3117     | SEM003-11    | 2015-10-17 | 2018-10-17   |
| Horn Antenna (18-26GHz)        | ETS-LINDGREN         | 3160     | SEM003-12    | 2014-11-24 | 2017-11-24   |



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

Report No.: SZEM170300179204

Page: 8 of 30

| General used equipment          |                                           |          |              |            |              |
|---------------------------------|-------------------------------------------|----------|--------------|------------|--------------|
| Equipment                       | Manufacturer                              | Model No | Inventory No | Cal Date   | Cal Due Date |
| Humidity/ Temperature Indicator | Shanghai Meteorological Industry Factory  | ZJ1-2B   | SEM002-03    | 2016-10-12 | 2017-10-12   |
| Humidity/ Temperature Indicator | Shanghai Meteorological Industry Factory  | ZJ1-2B   | SEM002-04    | 2016-10-12 | 2017-10-12   |
| Humidity/ Temperature Indicator | Mingle                                    | N/A      | SEM002-08    | 2016-10-12 | 2017-10-12   |
| Barometer                       | Changchun Meteorological Industry Factory | DYM3     | SEM002-01    | 2016-05-18 | 2017-05-18   |

## 6 Radio Spectrum Matter Test Results

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

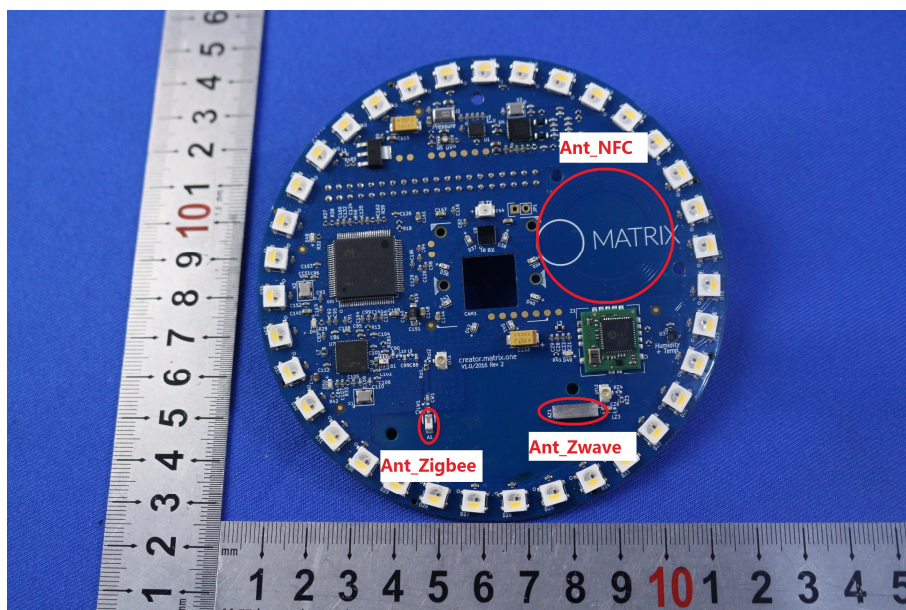
#### 6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.2dBi.





## 6.2 Conducted Disturbance at AC Power Line(150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

| Frequency range (MHz) | Limit (dBuV) |           |
|-----------------------|--------------|-----------|
|                       | Quasi-peak   | Average   |
| 0.15-0.5              | 66 to 56*    | 56 to 46* |
| 0.5-5                 | 56           | 46        |
| 5-30                  | 60           | 50        |

\* Decreases with the logarithm of the frequency.

### 6.2.1 E.U.T. Operation

Operating Environment:

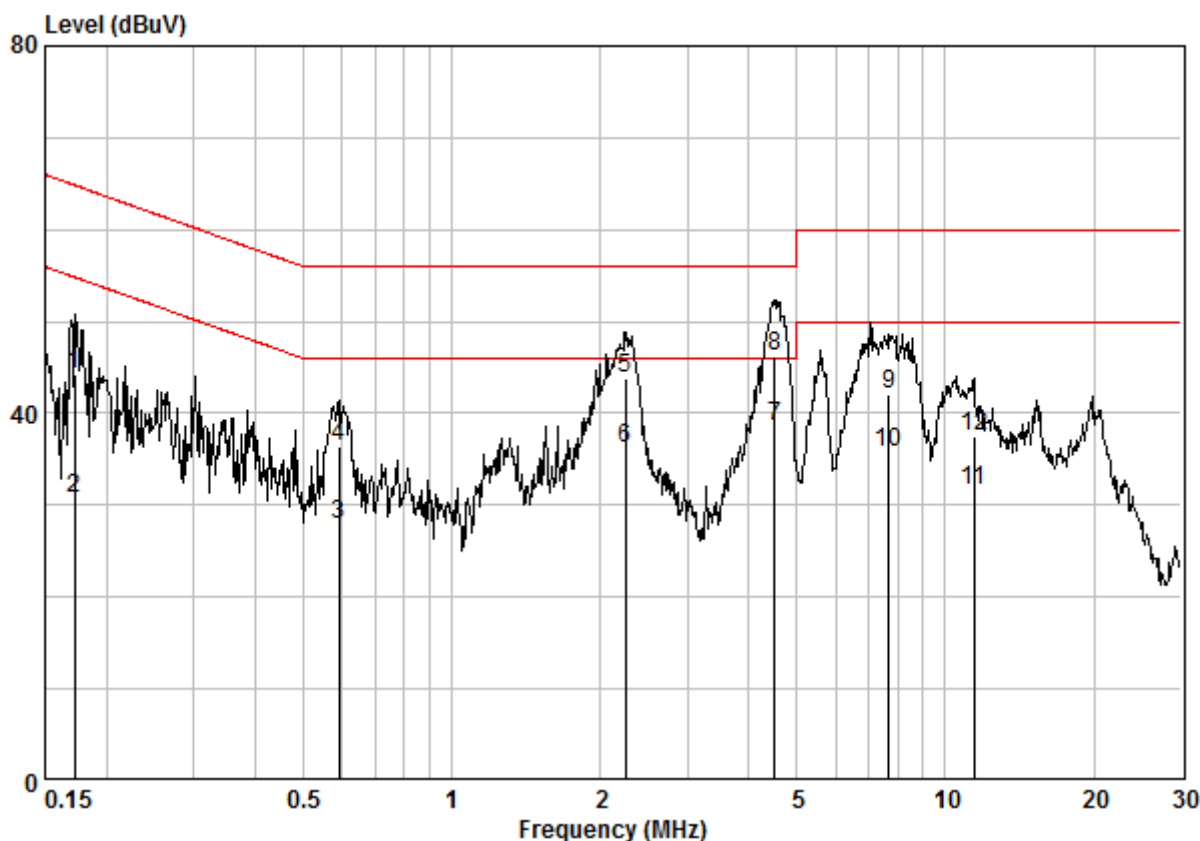
Temperature: 25 °C Humidity: 55 % RH Atmospheric Pressure: 1015 mbar

Test mode: e:TX mode\_Keep the EUT in transmitting mode(Z-WARE)

### 6.2.2 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

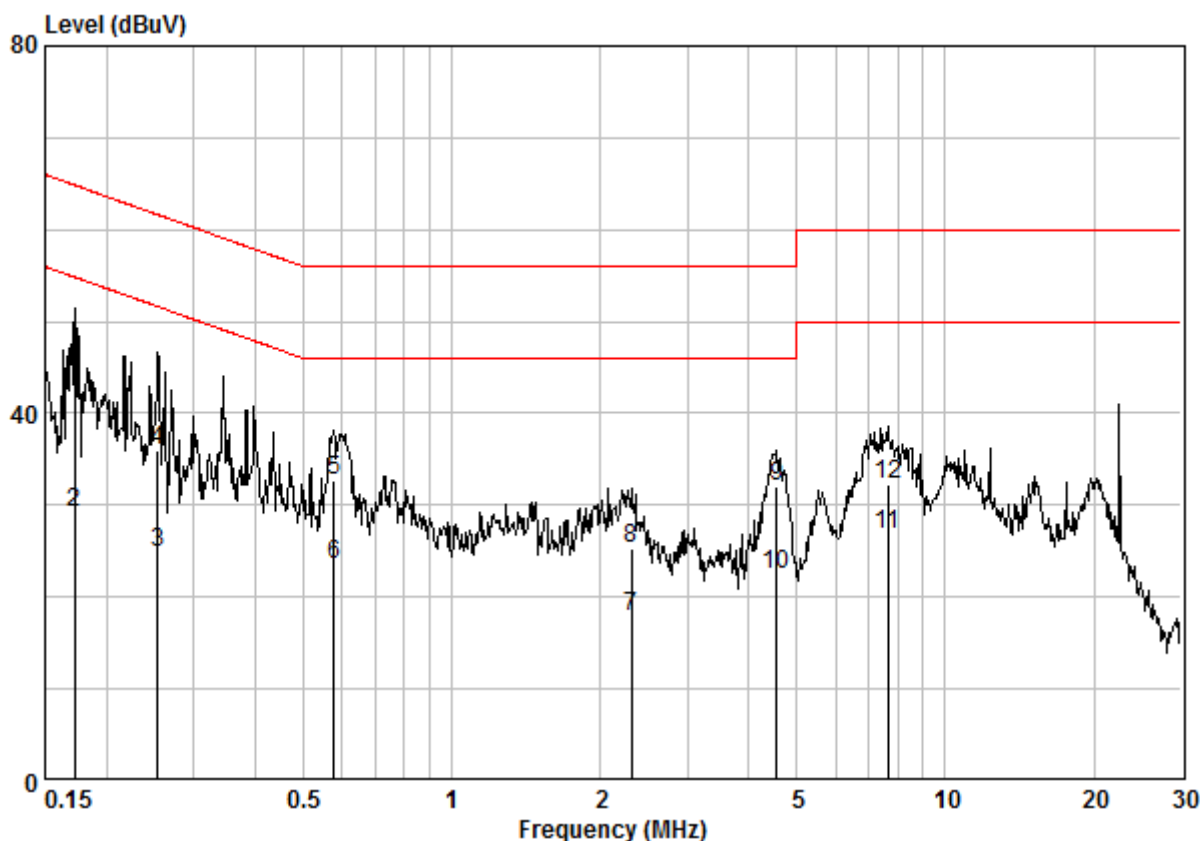
Mode:e; Line:Live Line



Site : Shielding Room  
Condition : CE LINE  
Job No. : 01792CR  
Test Mode : e

|     | Freq    | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark  |
|-----|---------|------------|-------------|------------|-------|------------|------------|---------|
|     | MHz     | dB         | dB          | dBuV       | dBuV  | dBuV       | dB         |         |
| 1   | 0.17215 | 0.02       | 9.64        | 34.67      | 44.33 | 64.86      | -20.52     | QP      |
| 2   | 0.17215 | 0.02       | 9.64        | 20.99      | 30.65 | 54.86      | -24.21     | AVERAGE |
| 3   | 0.59164 | 0.02       | 9.65        | 18.27      | 27.94 | 46.00      | -18.06     | AVERAGE |
| 4   | 0.59164 | 0.02       | 9.65        | 26.64      | 36.31 | 56.00      | -19.69     | QP      |
| 5   | 2.249   | 0.03       | 9.68        | 34.20      | 43.91 | 56.00      | -12.09     | QP      |
| 6   | 2.249   | 0.03       | 9.68        | 26.46      | 36.16 | 46.00      | -9.84      | AVERAGE |
| 7 @ | 4.501   | 0.02       | 9.73        | 28.78      | 38.52 | 46.00      | -7.48      | AVERAGE |
| 8   | 4.501   | 0.02       | 9.73        | 36.42      | 46.17 | 56.00      | -9.83      | QP      |
| 9   | 7.687   | 0.09       | 9.81        | 32.09      | 41.99 | 60.00      | -18.01     | QP      |
| 10  | 7.687   | 0.09       | 9.81        | 25.82      | 35.72 | 50.00      | -14.28     | AVERAGE |
| 11  | 11.438  | 0.15       | 9.89        | 21.50      | 31.53 | 50.00      | -18.47     | AVERAGE |
| 12  | 11.438  | 0.15       | 9.89        | 27.48      | 37.51 | 60.00      | -22.49     | QP      |

Mode:e; Line:Neutral Line



Site : Shielding Room  
Condition : CE NEUTRAL  
Job No. : 01792CR  
Test Mode : e

|    | Freq    | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark  |
|----|---------|------------|-------------|------------|-------|------------|------------|---------|
|    | MHz     | dB         | dB          | dBuV       | dBuV  | dBuV       | dB         |         |
| 1  | 0.17215 | 0.02       | 9.63        | 33.93      | 43.58 | 64.86      | -21.27     | QP      |
| 2  | 0.17215 | 0.02       | 9.63        | 19.45      | 29.10 | 54.86      | -25.75     | AVERAGE |
| 3  | 0.25345 | 0.02       | 9.63        | 15.20      | 24.85 | 51.64      | -26.79     | AVERAGE |
| 4  | 0.25345 | 0.02       | 9.63        | 26.30      | 35.95 | 61.64      | -25.70     | QP      |
| 5  | 0.57617 | 0.02       | 9.63        | 23.12      | 32.77 | 56.00      | -23.23     | QP      |
| 6  | 0.57617 | 0.02       | 9.63        | 13.98      | 23.63 | 46.00      | -22.37     | AVERAGE |
| 7  | 2.309   | 0.03       | 9.66        | 8.26       | 17.95 | 46.00      | -28.05     | AVERAGE |
| 8  | 2.309   | 0.03       | 9.66        | 15.52      | 25.21 | 56.00      | -30.79     | QP      |
| 9  | 4.549   | 0.02       | 9.71        | 22.30      | 32.02 | 56.00      | -23.98     | QP      |
| 10 | 4.549   | 0.02       | 9.71        | 12.72      | 22.45 | 46.00      | -23.55     | AVERAGE |
| 11 | 7.646   | 0.09       | 9.79        | 16.94      | 26.82 | 50.00      | -23.18     | AVERAGE |
| 12 | 7.646   | 0.09       | 9.79        | 22.41      | 32.29 | 60.00      | -27.71     | QP      |



### 6.3 Field Strength of the Fundamental Signal(15.249(a))

Test Requirement 47 CFR Part 15, Subpart C 15.249(a)  
Test Method: ANSI C63.10 (2013) Section 6.5&6.6  
Measurement Distance: 3m  
Limit:

| Frequency     | Limit (dBuV/m @3m) | Remark     |
|---------------|--------------------|------------|
| 902MHz-928MHz | 94.0               | Quasi-Peak |

#### 6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 54 % RH Atmospheric Pressure: 1015 mbar  
Test mode: e:TX mode\_Keep the EUT in transmitting mode(Z-WARE)

#### 6.3.2 Measurement Procedure and Data

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- Test the EUT in the lowest channel,the middle channel,the Highest channel.
- The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- Repeat above procedures until all frequencies measured was complete.



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

Report No.: SZEM170300179204

Page: 14 of 30

Mode : e

| Frequency<br>(MHz) | Cable<br>Loss<br>(dB) | Antenna<br>Factor<br>(dB/m) | Preamp<br>Factor<br>(dB) | Read<br>Level<br>(dBuV) | Level<br>(dBuV/m) | Limit Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | Polarization |
|--------------------|-----------------------|-----------------------------|--------------------------|-------------------------|-------------------|------------------------|-----------------------|--------------|
| 908.4              | 3.61                  | 23.23                       | 26.75                    | 85.77                   | 85.86             | 94.00                  | -8.14                 | Horizontal   |
| 908.4              | 3.61                  | 23.23                       | 26.75                    | 80.70                   | 80.79             | 94.00                  | -13.21                | Vertical     |
| 916.0              | 3.62                  | 23.26                       | 26.71                    | 83.37                   | 83.54             | 94.00                  | -10.46                | Horizontal   |
| 916.0              | 3.62                  | 23.26                       | 26.71                    | 81.28                   | 81.45             | 94.00                  | -12.55                | Vertical     |



## 6.4 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)

Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6

Measurement Distance: 3m

Limit:

| Frequency(MHz) | Field strength<br>(microvolts/meter) | Limit<br>(dBuV/m) | Detector | Measurement Distance<br>(meters) |
|----------------|--------------------------------------|-------------------|----------|----------------------------------|
| 0.009-0.490    | 2400/F(kHz)                          | -                 | -        | 300                              |
| 0.490-1.705    | 24000/F(kHz)                         | -                 | -        | 30                               |
| 1.705-30       | 30                                   | -                 | -        | 30                               |
| 30-88          | 100                                  | 40.0              | QP       | 3                                |
| 88-216         | 150                                  | 43.5              | QP       | 3                                |
| 216-960        | 200                                  | 46.0              | QP       | 3                                |
| 960-1000       | 500                                  | 54.0              | QP       | 3                                |
| Above 1000     | 500                                  | 54.0              | AV       | 3                                |

### 6.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 53 % RH Atmospheric Pressure: 1015 mbar

Test mode: e:TX mode\_Keep the EUT in transmitting mode(Z-WARE)

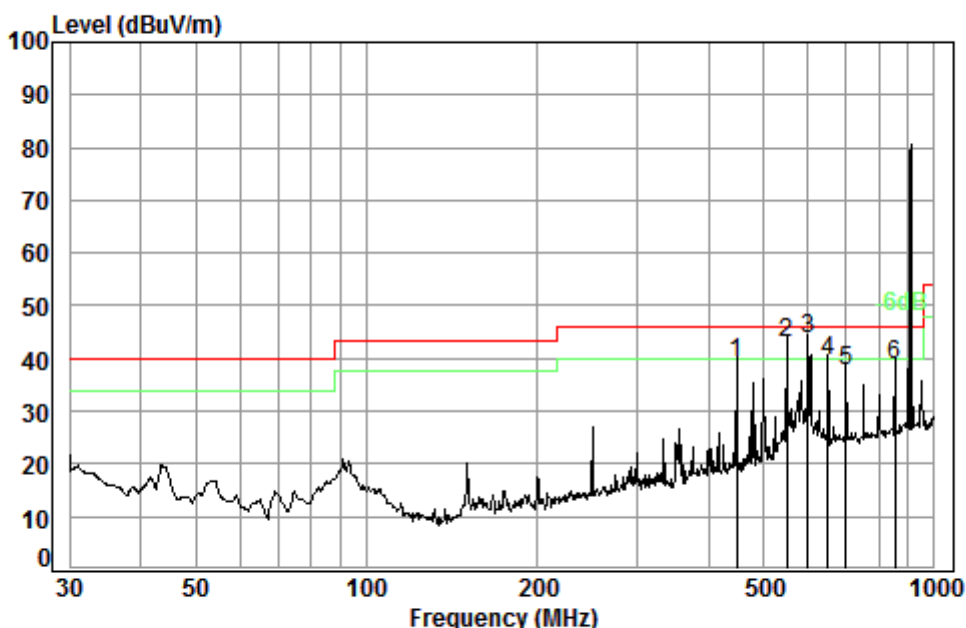
### 6.4.2 Measurement Procedure and Data

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- Test the EUT in the lowest channel,the middle channel,the Highest channel.
- The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- Repeat above procedures until all frequencies measured was complete.



Emissions Below 1GHz:

|                 |          |         |      |          |
|-----------------|----------|---------|------|----------|
| Test frequency: | 908.4MHz | Remark: | Peak | Vertical |
|-----------------|----------|---------|------|----------|



Condition: 3m VERTICAL

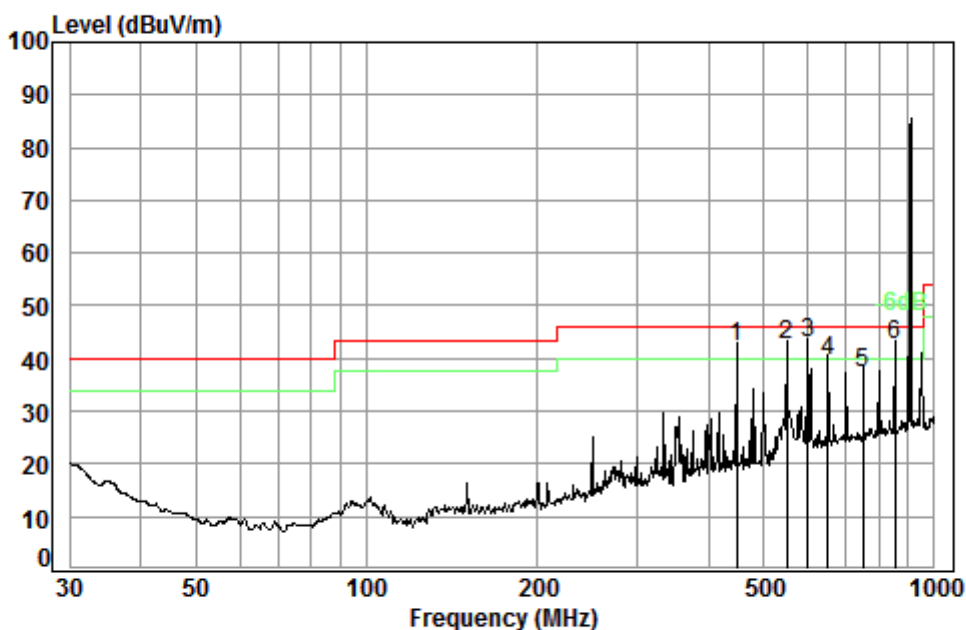
Job No. : 01792CR

Test mode: TX-908.4MHz

|      | Freq   | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level  | Limit Line | Over Limit |
|------|--------|------------|------------|---------------|------------|--------|------------|------------|
|      | MHz    | dB         | dB/m       | dB            | dBuV       | dBuV/m | dBuV/m     | dB         |
| 1    | 449.56 | 2.41       | 16.89      | 27.44         | 47.45      | 39.31  | 46.00      | -6.69      |
| 2    | 549.02 | 2.65       | 18.88      | 27.62         | 49.13      | 43.04  | 46.00      | -2.96      |
| 3 pp | 599.32 | 2.70       | 19.78      | 27.54         | 48.61      | 43.55  | 46.00      | -2.45      |
| 4    | 649.66 | 2.80       | 20.60      | 27.47         | 43.63      | 39.56  | 46.00      | -6.44      |
| 5    | 699.30 | 2.90       | 21.59      | 27.41         | 40.58      | 37.66  | 46.00      | -8.34      |
| 6    | 851.04 | 3.41       | 22.42      | 27.02         | 39.96      | 38.77  | 46.00      | -7.23      |



|                 |          |         |      |            |
|-----------------|----------|---------|------|------------|
| Test frequency: | 908.4MHz | Remark: | Peak | Horizontal |
|-----------------|----------|---------|------|------------|



Condition: 3m HORIZONTAL  
Job No. : 01792CR  
Test mode: TX-908.4MHz

|      | Freq   | Cable Loss | Ant Factor | Preamp Factor | Read Level | Limit Level | Over Limit |
|------|--------|------------|------------|---------------|------------|-------------|------------|
|      | MHz    | dB         | dB/m       | dB            | dBuV       | dBuV/m      | dB         |
| 1    | 449.56 | 2.41       | 16.89      | 27.44         | 50.27      | 42.13       | -3.87      |
| 2    | 549.02 | 2.65       | 18.88      | 27.62         | 48.60      | 42.51       | -3.49      |
| 3 pp | 599.32 | 2.70       | 19.78      | 27.54         | 47.97      | 42.91       | -3.09      |
| 4    | 649.66 | 2.80       | 20.60      | 27.47         | 43.66      | 39.59       | -6.41      |
| 5    | 750.11 | 3.06       | 21.70      | 27.35         | 39.90      | 37.31       | -8.69      |
| 6    | 851.04 | 3.41       | 22.42      | 27.02         | 43.65      | 42.46       | -3.54      |

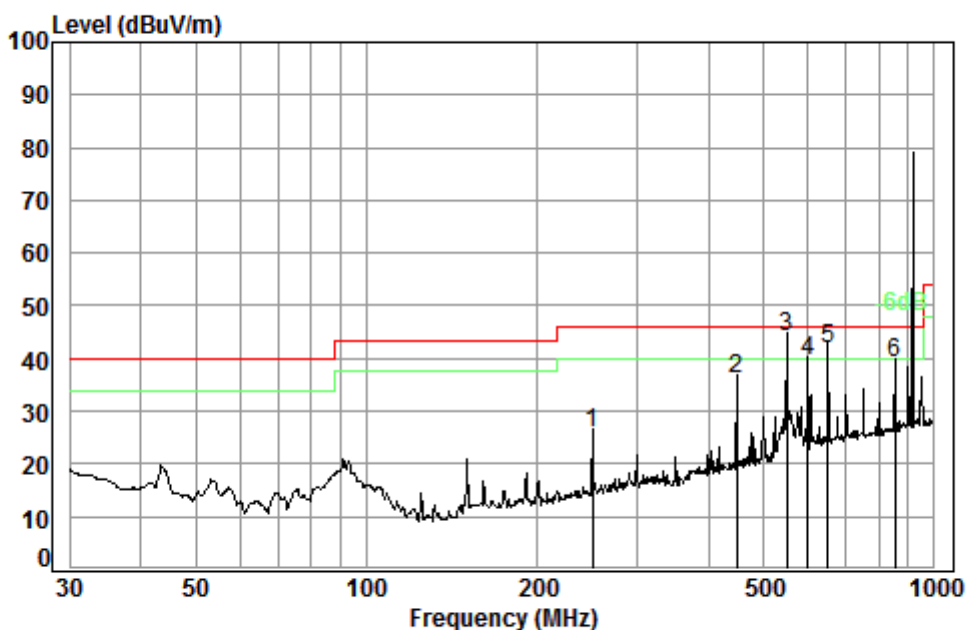


SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch

Report No.: SZEM170300179204

Page: 18 of 30

|                 |        |         |      |          |
|-----------------|--------|---------|------|----------|
| Test frequency: | 916MHz | Remark: | Peak | Vertical |
|-----------------|--------|---------|------|----------|



Condition: 3m VERTICAL

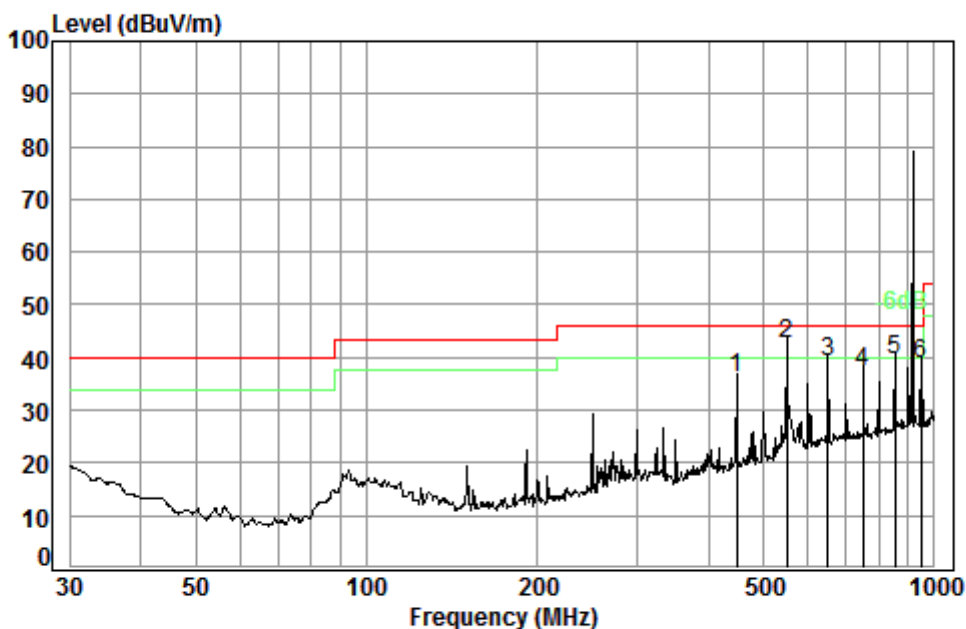
Job No. : 01792CR

Test mode: TX-916MHz

|      | Freq   | Cable<br>Loss | Ant<br>Factor | Preamp<br>Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit |
|------|--------|---------------|---------------|------------------|---------------|--------|---------------|---------------|
|      | MHz    | dB            | dB/m          | dB               | dBuV          | dBuV/m | dBuV/m        | dB            |
| 1    | 250.30 | 1.68          | 12.31         | 26.54            | 38.34         | 25.79  | 46.00         | -20.21        |
| 2    | 449.56 | 2.41          | 16.89         | 27.44            | 44.15         | 36.01  | 46.00         | -9.99         |
| 3 pp | 549.02 | 2.65          | 18.88         | 27.62            | 50.03         | 43.94  | 46.00         | -2.06         |
| 4    | 599.32 | 2.70          | 19.78         | 27.54            | 44.46         | 39.40  | 46.00         | -6.60         |
| 5    | 649.66 | 2.80          | 20.60         | 27.47            | 45.85         | 41.78  | 46.00         | -4.22         |
| 6    | 851.04 | 3.41          | 22.42         | 27.02            | 40.25         | 39.06  | 46.00         | -6.94         |



|                 |        |         |      |            |
|-----------------|--------|---------|------|------------|
| Test frequency: | 916MHz | Remark: | Peak | Horizontal |
|-----------------|--------|---------|------|------------|



Condition: 3m HORIZONTAL

Job No. : 01792CR

Test mode: TX-916MHz

|      |        | Cable | Ant    | Preamp | Read  | Limit  | Over  |
|------|--------|-------|--------|--------|-------|--------|-------|
|      | Freq   | Loss  | Factor | Factor | Level | Level  | Limit |
|      | MHz    | dB    | dB/m   | dB     | dBuV  | dBuV/m | dB    |
| 1    | 449.56 | 2.41  | 16.89  | 27.44  | 44.17 | 36.03  | 46.00 |
| 2 pp | 549.02 | 2.65  | 18.88  | 27.62  | 48.71 | 42.62  | 46.00 |
| 3    | 649.66 | 2.80  | 20.60  | 27.47  | 43.28 | 39.21  | 46.00 |
| 4    | 750.11 | 3.06  | 21.70  | 27.35  | 40.01 | 37.42  | 46.00 |
| 5    | 851.04 | 3.41  | 22.42  | 27.02  | 40.75 | 39.56  | 46.00 |
| 6    | 948.76 | 3.65  | 23.30  | 26.54  | 38.55 | 38.96  | 46.00 |



**Emission Above 1GHz:**

| Test mode:      | Transmitting    | Test Frequency:       | 908.4MHz           |                   |                | Remark:             | Peak            |              |
|-----------------|-----------------|-----------------------|--------------------|-------------------|----------------|---------------------|-----------------|--------------|
| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB/m) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 1816.800        | 27.130          | 4.83                  | 38.02              | 48.94             | 42.88          | 74.00               | -31.12          | Vertical     |
| 2725.200        | 30.290          | 5.66                  | 37.93              | 54.74             | 52.76          | 74.00               | -21.24          | Vertical     |
| 3633.600        | 32.590          | 6.41                  | 37.96              | 44.92             | 45.96          | 74.00               | -28.04          | Vertical     |
| 4542.000        | 33.680          | 7.34                  | 38.27              | 44.93             | 47.68          | 74.00               | -26.32          | Vertical     |
| 5450.400        | 34.990          | 8.97                  | 37.94              | 45.52             | 51.54          | 74.00               | -22.46          | Vertical     |
| 9084.000        | 36.750          | 10.72                 | 35.36              | 41.30             | 53.41          | 74.00               | -20.59          | Horizontal   |
| 1816.800        | 27.130          | 4.83                  | 38.02              | 48.81             | 42.75          | 74.00               | -31.25          | Horizontal   |
| 2725.200        | 30.290          | 5.66                  | 37.93              | 55.08             | 53.10          | 74.00               | -20.90          | Horizontal   |
| 3633.600        | 32.590          | 6.41                  | 37.96              | 43.80             | 44.84          | 74.00               | -29.16          | Horizontal   |
| 4542.000        | 33.680          | 7.34                  | 38.27              | 44.99             | 47.74          | 74.00               | -26.26          | Horizontal   |

| Test mode:      | Transmitting    | Test Frequency:       | 916MHz             | Remark:           | Peak           |                     |                 |              |
|-----------------|-----------------|-----------------------|--------------------|-------------------|----------------|---------------------|-----------------|--------------|
| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB/m) | Preamp Factor (dB) | Read Level (dBuV) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 1832.000        | 27.190          | 4.85                  | 38.02              | 48.89             | 42.91          | 74.00               | -31.09          | Vertical     |
| 2748.000        | 30.390          | 5.68                  | 37.93              | 55.86             | 54.00          | 74.00               | -20.00          | Vertical     |
| 3664.000        | 32.680          | 6.44                  | 37.97              | 45.12             | 46.27          | 74.00               | -27.73          | Vertical     |
| 4580.000        | 33.750          | 7.40                  | 38.29              | 45.65             | 48.51          | 74.00               | -25.49          | Vertical     |
| 6412.000        | 35.030          | 9.01                  | 37.89              | 44.41             | 50.56          | 74.00               | -23.44          | Vertical     |
| 9160.000        | 36.890          | 10.77                 | 35.32              | 41.20             | 53.54          | 74.00               | -20.46          | Horizontal   |
| 1832.000        | 27.190          | 4.85                  | 38.02              | 48.62             | 42.64          | 74.00               | -31.36          | Horizontal   |
| 2748.000        | 30.390          | 5.68                  | 37.93              | 55.73             | 53.87          | 74.00               | -20.13          | Horizontal   |
| 3664.000        | 32.680          | 6.44                  | 37.97              | 45.07             | 46.22          | 74.00               | -27.78          | Horizontal   |
| 5496.000        | 34.400          | 8.25                  | 38.40              | 45.04             | 49.29          | 74.00               | -24.71          | Horizontal   |

**Note:**

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$
- As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.



## 6.5 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6

Measurement Distance: 3m

Limit:

| Frequency                                                                                                                                                                                                                                                     | Limit (dBuV/m @3m) | Remark           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------|
| 30MHz-88MHz                                                                                                                                                                                                                                                   | 40.0               | Quasi-peak Value |
| 88MHz-216MHz                                                                                                                                                                                                                                                  | 43.5               | Quasi-peak Value |
| 216MHz-960MHz                                                                                                                                                                                                                                                 | 46.0               | Quasi-peak Value |
| 960MHz-1GHz                                                                                                                                                                                                                                                   | 54.0               | Quasi-peak Value |
| Above 1GHz                                                                                                                                                                                                                                                    | 54.0               | Average Value    |
| Above 1GHz                                                                                                                                                                                                                                                    | 74.0               | Peak Value       |
| Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation. |                    |                  |



#### **6.5.1 E.U.T. Operation**

Operating Environment:

Temperature: 23 °C Humidity: 53 % RH Atmospheric Pressure: 1015 mbar

Test mode: e:TX mode\_Keep the EUT in transmitting mode(Z-WARE)

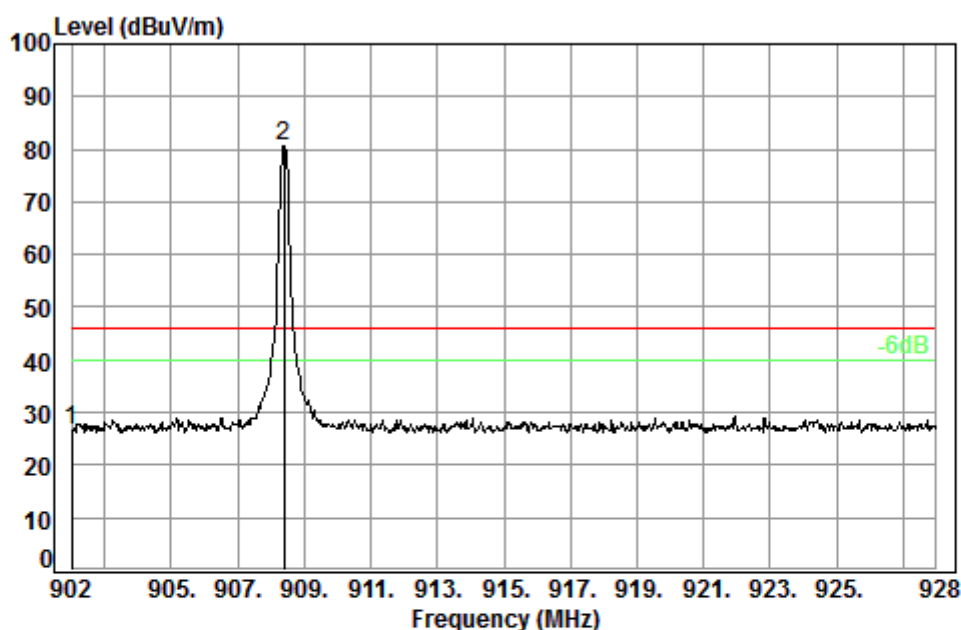
#### **6.5.2 Measurement Procedure and Data**

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel,the middle channel,the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.



Test plot as follows:

|                 |          |         |      |          |
|-----------------|----------|---------|------|----------|
| Test frequency: | 908.4MHz | Remark: | Peak | Vertical |
|-----------------|----------|---------|------|----------|



Condition: 3m VERTICAL

Job No. : 01792CR

Test mode: TX-908.4MHz

|      | Freq   | Cable Loss | Ant Factor | Preamp Factor | Read Level | Limit Level | Limit Line | Over Limit |
|------|--------|------------|------------|---------------|------------|-------------|------------|------------|
|      | MHz    | dB         | dB/m       | dB            | dBuV       | dBuV/m      | dBuV/m     | dB         |
| 1    | 902.00 | 3.60       | 23.21      | 26.75         | 26.69      | 26.75       | 46.00      | -19.25     |
| 2 pp | 908.40 | 3.61       | 23.23      | 26.75         | 80.70      | 80.79       | 46.00      | 34.79      |
| 3    | 928.00 | 3.63       | 23.30      | 26.64         | 26.47      | 26.76       | 46.00      | -19.24     |

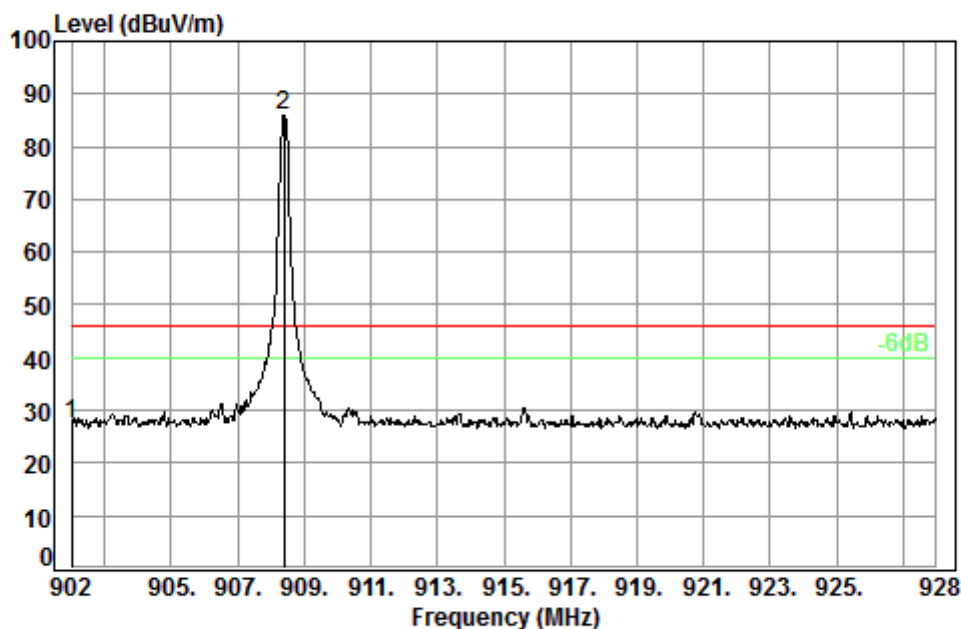


SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch

Report No.: SZEM170300179204

Page: 24 of 30

|                 |          |         |      |            |
|-----------------|----------|---------|------|------------|
| Test frequency: | 908.4MHz | Remark: | Peak | Horizontal |
|-----------------|----------|---------|------|------------|



Condition: 3m HORIZONTAL

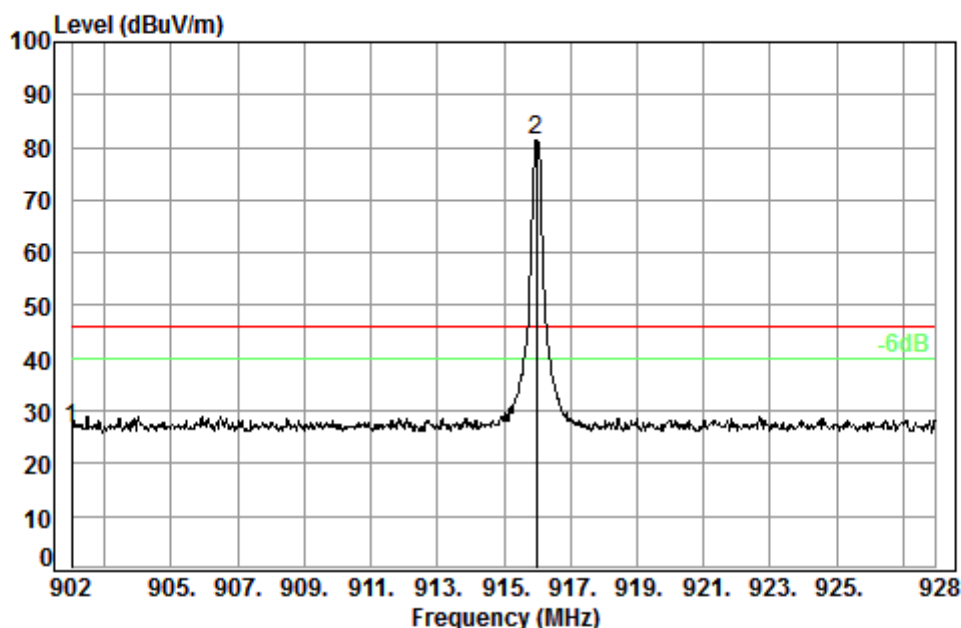
Job No. : 01792CR

Test mode: TX-908.4MHz

|      |        | Cable | Ant    | Preamp | Read  | Limit  | Over   |
|------|--------|-------|--------|--------|-------|--------|--------|
|      | Freq   | Loss  | Factor | Factor | Level | Level  | Limit  |
|      | MHz    | dB    | dB/m   | dB     | dBuV  | dBuV/m | dBuV/m |
| 1    | 902.00 | 3.60  | 23.21  | 26.75  | 27.50 | 27.56  | 46.00  |
| 2 pp | 908.40 | 3.61  | 23.23  | 26.75  | 85.77 | 85.86  | 46.00  |
| 3    | 928.00 | 3.63  | 23.30  | 26.64  | 27.39 | 27.68  | 46.00  |



|                 |        |         |      |          |
|-----------------|--------|---------|------|----------|
| Test frequency: | 916MHz | Remark: | Peak | Vertical |
|-----------------|--------|---------|------|----------|



Condition: 3m VERTICAL

Job No. : 01792CR

Test mode: TX-916MHz

|      | Freq   | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level  | Limit Line | Over Limit |
|------|--------|------------|------------|---------------|------------|--------|------------|------------|
|      | MHz    | dB         | dB/m       | dB            | dBuV       | dBuV/m | dBuV/m     | dB         |
| 1    | 902.00 | 3.60       | 23.21      | 26.75         | 26.47      | 26.53  | 46.00      | -19.47     |
| 2 pp | 915.99 | 3.62       | 23.26      | 26.71         | 81.28      | 81.45  | 46.00      | 35.45      |
| 3    | 928.00 | 3.63       | 23.30      | 26.64         | 27.59      | 27.88  | 46.00      | -18.12     |

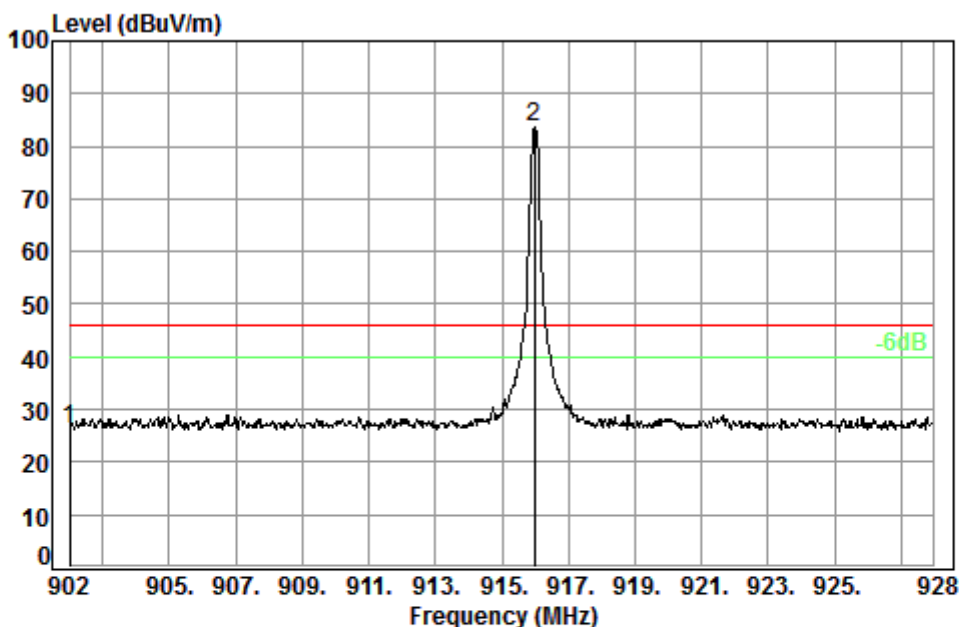


SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch

Report No.: SZEM170300179204

Page: 26 of 30

|                 |        |         |      |            |
|-----------------|--------|---------|------|------------|
| Test frequency: | 916MHz | Remark: | Peak | Horizontal |
|-----------------|--------|---------|------|------------|



Condition: 3m HORIZONTAL

Job No. : 01792CR

Test mode: TX-916MHz

|      |        | Cable | Ant    | Preamp | Read  | Limit  | Over   |
|------|--------|-------|--------|--------|-------|--------|--------|
|      | Freq   | Loss  | Factor | Factor | Level | Level  | Limit  |
|      | MHz    | dB    | dB/m   | dB     | dBuV  | dBuV/m | dBuV/m |
| 1    | 902.00 | 3.60  | 23.21  | 26.75  | 26.28 | 26.34  | 46.00  |
| 2 pp | 915.99 | 3.62  | 23.26  | 26.71  | 83.37 | 83.54  | 46.00  |
| 3    | 928.00 | 3.63  | 23.30  | 26.64  | 27.62 | 27.91  | 46.00  |

Note:

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

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor



## **6.6 20dB Bandwidth**

Test Requirement 47 CFR Part 15, Subpart C 15.215  
Test Method: ANSI C63.10 (2013) Section 6.9  
Limit: N/A

### **6.6.1 E.U.T. Operation**

Operating Environment:

Temperature: 23 °C Humidity: 56 % RH Atmospheric Pressure: 1020 mbar

Test mode: e:TX mode\_Keep the EUT in transmitting mode(Z-WARE)

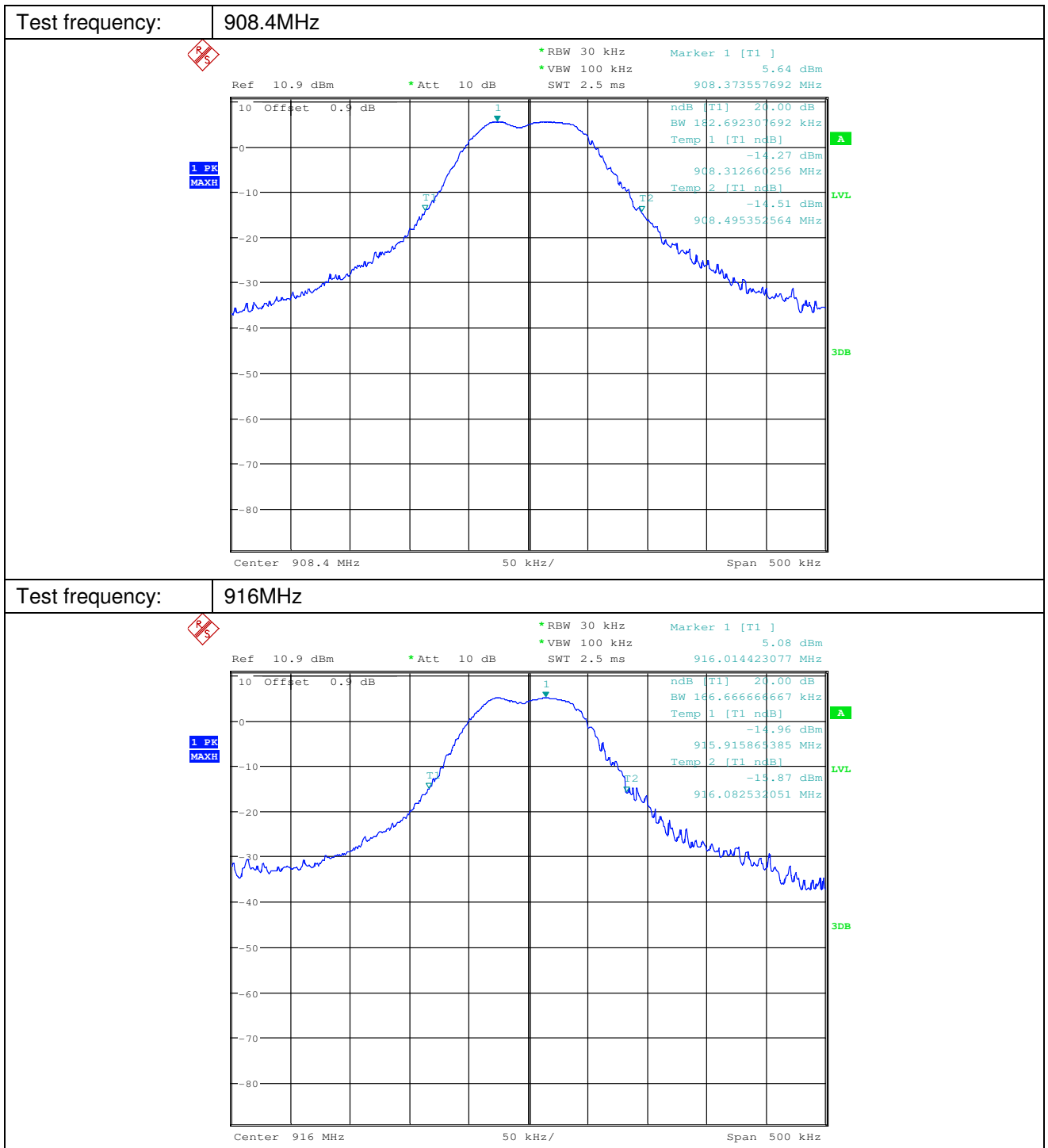
### **6.6.2 Measurement Data**



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

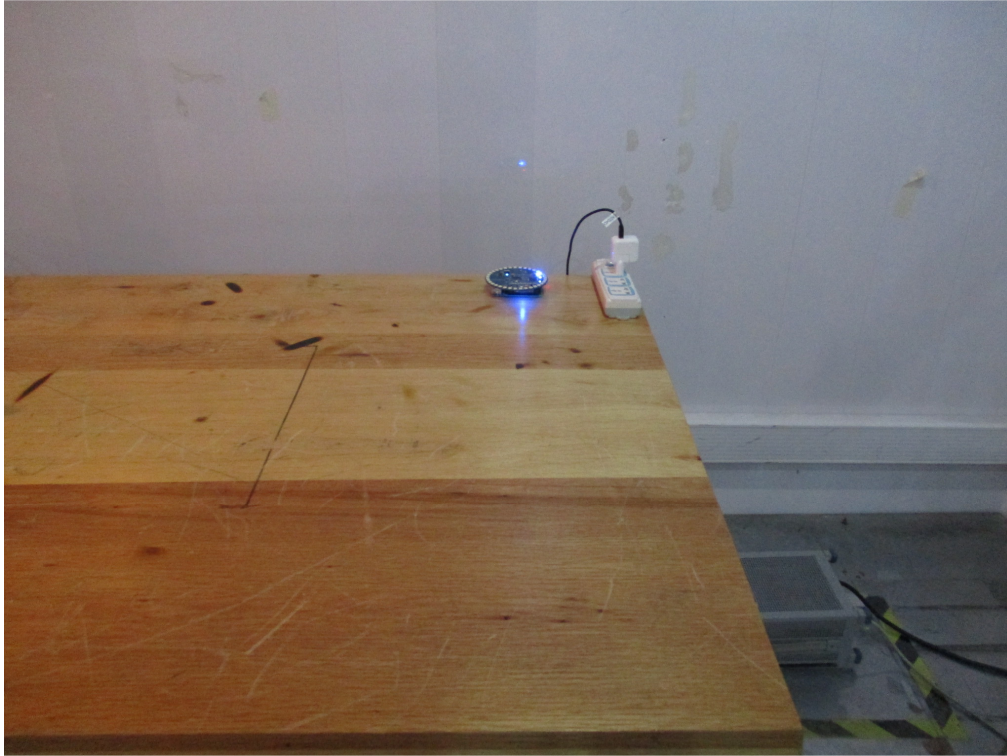
Report No.: SZEM170300179204

Page: 28 of 30



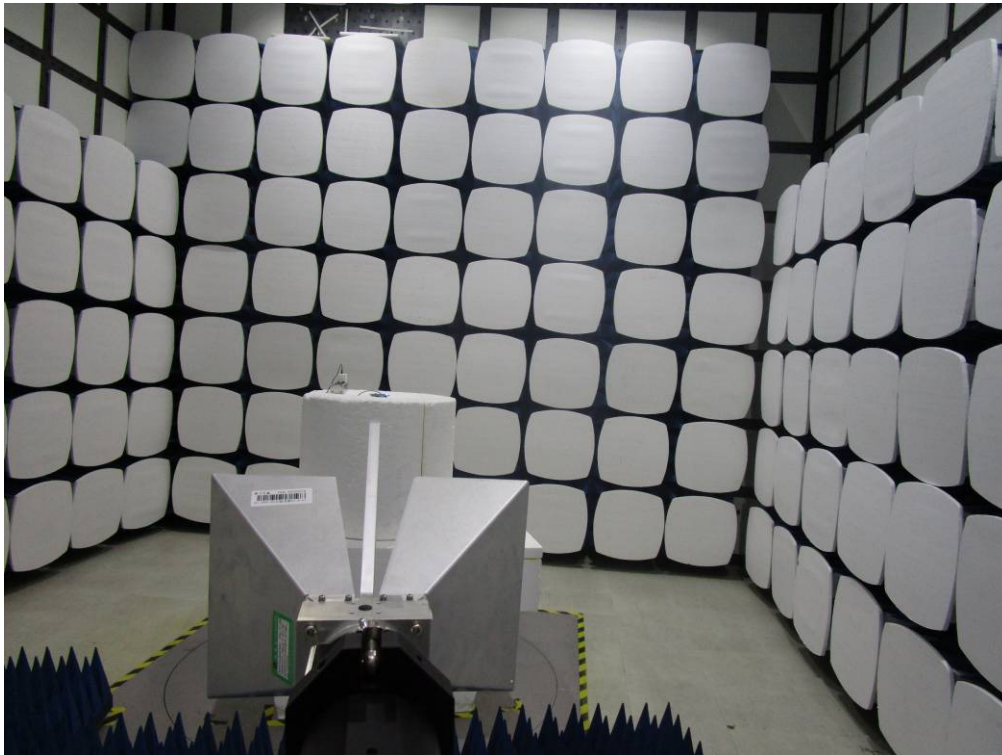
## 7 Photographs

### 7.1 Conducted Disturbance at AC Power Line(150kHz-30MHz) Test Setup



### 7.2 Radiated Emissions Test Setup





### **7.3 EUT Constructional Details**

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1703001792CR.