



**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.: SZEM171001110308  
Page: 1 of 33

## **TEST REPORT**

**Application No.:** SZEM1710011103RG  
**Applicant:** Saygus  
**Address of Applicant:** 10421 South Jordan Gateway, Suite 500, South Jordan, UT 84095  
**Manufacturer:** Saygus  
**Address of Manufacturer:** 10421 South Jordan Gateway, Suite 500, South Jordan, UT 84095  
**Factory:** Smart Gadgets (Shenzhen) , LTD  
**Address of Factory:** 912 Building 1 A, Hezheng-Huiyi Cheng, Xinhua Road, Xixiang Baoan District, Shenzhen, China

**Equipment Under Test (EUT):**

**EUT Name:** Saygus smartphone V-Squared  
**Model No.:** SG02  
**Trade mark:** Saygus  
**Standard(s) :** 47 CFR Part 15, Subpart C 15.225  
**Date of Receipt:** 2017-12-01  
**Date of Test:** 2017-12-04 to 2018-01-11  
**Date of Issue:** 2018-01-18

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

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



Keny Xu

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              |         | 2018-01-18 |          | Original |
|                 |         |            |          |          |
|                 |         |            |          |          |

|                          |  |                                                                                     |  |  |
|--------------------------|--|-------------------------------------------------------------------------------------|--|--|
| Authorized for issue by: |  |                                                                                     |  |  |
|                          |  |    |  |  |
|                          |  | Gray Gao /Project Engineer                                                          |  |  |
|                          |  |  |  |  |
|                          |  | Eric Fu /Reviewer                                                                   |  |  |



## 2 Test Summary

| Radio Spectrum Technical Requirement |                                  |        |                                  |        |
|--------------------------------------|----------------------------------|--------|----------------------------------|--------|
| Item                                 | Standard                         | Method | Requirement                      | Result |
| Antenna Requirement                  | 47 CFR Part 15, Subpart C 15.225 | N/A    | 47 CFR Part 15, Subpart C 15.203 | Pass   |

| Radio Spectrum Matter Part                          |                                  |                                    |                                              |        |
|-----------------------------------------------------|----------------------------------|------------------------------------|----------------------------------------------|--------|
| Item                                                | Standard                         | Method                             | Requirement                                  | Result |
| Conducted Emissions at AC Power Line (150kHz-30MHz) | 47 CFR Part 15, Subpart C 15.225 | ANSI C63.10 (2013) Section 6.2     | 47 CFR Part 15, Subpart C 15.207             | Pass   |
| 20dB Bandwidth                                      | 47 CFR Part 15, Subpart C 15.225 | ANSI C63.10 (2013) Section 6.9     | 47 CFR Part 15, Subpart C 15.215             | Pass   |
| Emission Mask                                       | 47 CFR Part 15, Subpart C 15.225 | ANSI C63.10 (2013) Section 6.4     | 47 CFR Part 15, Subpart C 15.225(a)&(b)&(C)  | Pass   |
| Frequency tolerance                                 | 47 CFR Part 15, Subpart C 15.225 | ANSI C63.10 (2013) Section 6.8     | 47 CFR Part 15, Subpart C 15.225(e)          | Pass   |
| Radiated Emissions(9kHz-30MHz)                      | 47 CFR Part 15, Subpart C 15.225 | ANSI C63.10 (2013) Section 6.4&6.5 | 47 CFR Part 15, Subpart C 15.225(d) & 15.209 | Pass   |
| Radiated Emissions(30MHz-1GHz)                      | 47 CFR Part 15, Subpart C 15.225 | ANSI C63.10 (2013) Section 6.4&6.5 | 47 CFR Part 15, Subpart C 15.225(d) & 15.209 | Pass   |



### 3 Contents

|                                                                          | Page |
|--------------------------------------------------------------------------|------|
| 1 COVER PAGE .....                                                       | 1    |
| 2 TEST SUMMARY .....                                                     | 3    |
| 3 CONTENTS .....                                                         | 4    |
| 4 GENERAL INFORMATION .....                                              | 6    |
| 4.1 DETAILS OF E.U.T. ....                                               | 6    |
| 4.2 DESCRIPTION OF SUPPORT UNITS .....                                   | 6    |
| 4.3 MEASUREMENT UNCERTAINTY .....                                        | 6    |
| 4.4 TEST LOCATION.....                                                   | 7    |
| 4.5 TEST FACILITY.....                                                   | 7    |
| 4.6 DEVIATION FROM STANDARDS.....                                        | 7    |
| 4.7 ABNORMALITIES FROM STANDARD CONDITIONS .....                         | 7    |
| 5 EQUIPMENT LIST.....                                                    | 8    |
| 6 RADIO SPECTRUM MATTER TEST RESULTS.....                                | 10   |
| 6.1 ANTENNA REQUIREMENT .....                                            | 10   |
| 6.1.1 Test Requirement: .....                                            | 10   |
| 6.1.2 Conclusion .....                                                   | 10   |
| 7 RADIO SPECTRUM MATTER TEST RESULTS.....                                | 11   |
| 7.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ).....             | 11   |
| 7.1.1 E.U.T. Operation .....                                             | 11   |
| 7.1.2 Test Setup Diagram.....                                            | 11   |
| 7.1.3 Measurement Procedure and Data.....                                | 12   |
| 7.2 20DB BANDWIDTH .....                                                 | 15   |
| 7.2.1 E.U.T. Operation .....                                             | 15   |
| 7.2.2 Test Setup Diagram.....                                            | 15   |
| 7.2.3 Measurement Procedure and Data.....                                | 16   |
| 7.3 EMISSION MASK .....                                                  | 17   |
| 7.3.1 E.U.T. Operation .....                                             | 18   |
| 7.3.2 Test Setup Diagram.....                                            | 18   |
| 7.3.3 Measurement Procedure and Data.....                                | 18   |
| 7.4 FREQUENCY TOLERANCE .....                                            | 19   |
| 7.4.1 E.U.T. Operation .....                                             | 19   |
| 7.4.2 Test Setup Diagram.....                                            | 19   |
| 7.4.3 Measurement Procedure and Data.....                                | 20   |
| 7.5 RADIATED EMISSIONS(9KHZ-30MHZ).....                                  | 21   |
| 7.5.1 E.U.T. Operation .....                                             | 22   |
| 7.5.2 Test Setup Diagram.....                                            | 22   |
| 7.5.3 Measurement Procedure and Data.....                                | 22   |
| 7.6 RADIATED EMISSIONS(30MHZ-1GHZ).....                                  | 25   |
| 7.6.1 E.U.T. Operation .....                                             | 26   |
| 7.6.2 Test Setup Diagram.....                                            | 26   |
| 7.6.3 Measurement Procedure and Data.....                                | 27   |
| 8 PHOTOGRAPHS.....                                                       | 31   |
| 8.1 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ) TEST SETUP ..... | 31   |
| 8.2 RADIATED EMISSIONS(9KHZ-30MHZ) TEST SETUP .....                      | 31   |



|     |                                                 |    |
|-----|-------------------------------------------------|----|
| 8.3 | RADIATED EMISSIONS(30MHZ-1GHZ) TEST SETUP ..... | 32 |
| 8.4 | EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS).....    | 33 |

## 4 General Information

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

|               |                                                                              |
|---------------|------------------------------------------------------------------------------|
| Power supply: | AC input: 100-240V 50/60Hz 0.5A<br>DC output: 5V 2.4A or 9V 1.7A or 12V 1.3A |
| Cable:        | USB cable: 100cm shielded<br>earphone cable: 110cm unshield                  |

### 4.2 Description of Support Units

The EUT has been tested as an independent unit.

### 4.3 Measurement Uncertainty

| No. | Item                            | Measurement Uncertainty |
|-----|---------------------------------|-------------------------|
| 1   | Radio Frequency                 | $7.25 \times 10^{-8}$   |
| 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 (Below 1GHz)      |
|     |                                 | 4.8dB (Above 1GHz)      |
| 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 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

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

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **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

| Radiated Emissions(9kHz-30MHz)       |                      |                 |              |            |              |
|--------------------------------------|----------------------|-----------------|--------------|------------|--------------|
| Equipment                            | Manufacturer         | Model No        | Inventory No | Cal Date   | Cal Due Date |
| 10m Semi-Anechoic Chamber            | SAEMC                | FSAC1018        | SEM001-03    | 2017-05-10 | 2018-05-09   |
| Measurement Software                 | AUDIX                | e3 V8.2014-6-27 | N/A          | N/A        | N/A          |
| Coaxial Cable                        | SGS                  | N/A             | SEM029-01    | 2017-07-13 | 2018-07-12   |
| EMI Test Receiver (9kHz-3GHz)        | Rohde & Schwarz      | ESR             | SEM004-03    | 2017-04-14 | 2018-04-13   |
| Trilog-Broadband Antenna(30MHz-1GHz) | Schwarzbeck          | VULB9168        | SEM003-18    | 2016-01-26 | 2019-01-25   |
| Pre-amplifier                        | Sonoma Instrument Co | 310N            | SEM005-03    | 2017-06-05 | 2018-06-04   |
| Active Loop Antenna                  | ETS-Lindgren         | 6502            | SEM003-08    | 2017-08-22 | 2020-08-21   |

| Radiated Emissions(30MHz-1GHz)       |                      |                 |              |            |              |
|--------------------------------------|----------------------|-----------------|--------------|------------|--------------|
| Equipment                            | Manufacturer         | Model No        | Inventory No | Cal Date   | Cal Due Date |
| 10m Semi-Anechoic Chamber            | SAEMC                | FSAC1018        | SEM001-03    | 2017-05-10 | 2018-05-09   |
| Measurement Software                 | AUDIX                | e3 V8.2014-6-27 | N/A          | N/A        | N/A          |
| Coaxial Cable                        | SGS                  | N/A             | SEM029-01    | 2017-07-13 | 2018-07-12   |
| EMI Test Receiver (9kHz-3GHz)        | Rohde & Schwarz      | ESR             | SEM004-03    | 2017-04-14 | 2018-04-13   |
| Trilog-Broadband Antenna(30MHz-1GHz) | Schwarzbeck          | VULB9168        | SEM003-18    | 2016-01-26 | 2019-01-25   |
| Pre-amplifier                        | Sonoma Instrument Co | 310N            | SEM005-03    | 2017-06-05 | 2018-06-04   |
| Active Loop Antenna                  | ETS-Lindgren         | 6502            | SEM003-08    | 2017-08-22 | 2020-08-21   |

| Conducted Emissions 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    | 2017-05-10 | 2018-05-09   |
| Measurement Software                                | AUDIX            | e3 V5.4.1221d | N/A          | N/A        | N/A          |
| Coaxial Cable                                       | SGS              | N/A           | SEM024-01    | 2017-07-13 | 2018-07-12   |
| LISN                                                | Rohde & Schwarz  | ENV216        | SEM007-01    | 2017-09-27 | 2018-09-26   |
| LISN                                                | ETS-LINDGREN     | 3816/2        | SEM007-02    | 2017-04-14 | 2018-04-13   |
| EMI Test Receiver                                   | Rohde & Schwarz  | ESCI          | SEM004-02    | 2017-04-14 | 2018-04-13   |



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

Report No.: SZEM171001110308

Page: 9 of 33

| 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    | 2017-09-29 | 2018-09-28   |
| Humidity/ Temperature Indicator | Shanghai Meteorological Industry Factory  | ZJ1-2B   | SEM002-04    | 2017-09-29 | 2018-09-28   |
| Humidity/ Temperature Indicator | Mingle                                    | N/A      | SEM002-08    | 2017-09-29 | 2018-09-28   |
| Barometer                       | Changchun Meteorological Industry Factory | DYM3     | SEM002-01    | 2017-04-18 | 2018-04-17   |



## 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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an 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 0dBi.

## 7 Radio Spectrum Matter Test Results

### 7.1 Conducted Emissions 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.

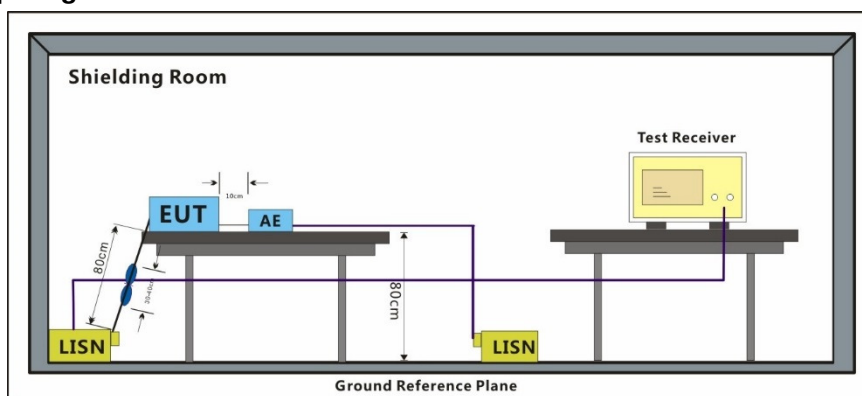
#### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 20.2 °C Humidity: 34.1 % RH Atmospheric Pressure: 1020 mbar

The worst case c:Charge + TX mode\_Keep the EUT in charging and transmitting with modulation mode.  
for final test:

#### 7.1.2 Test Setup Diagram



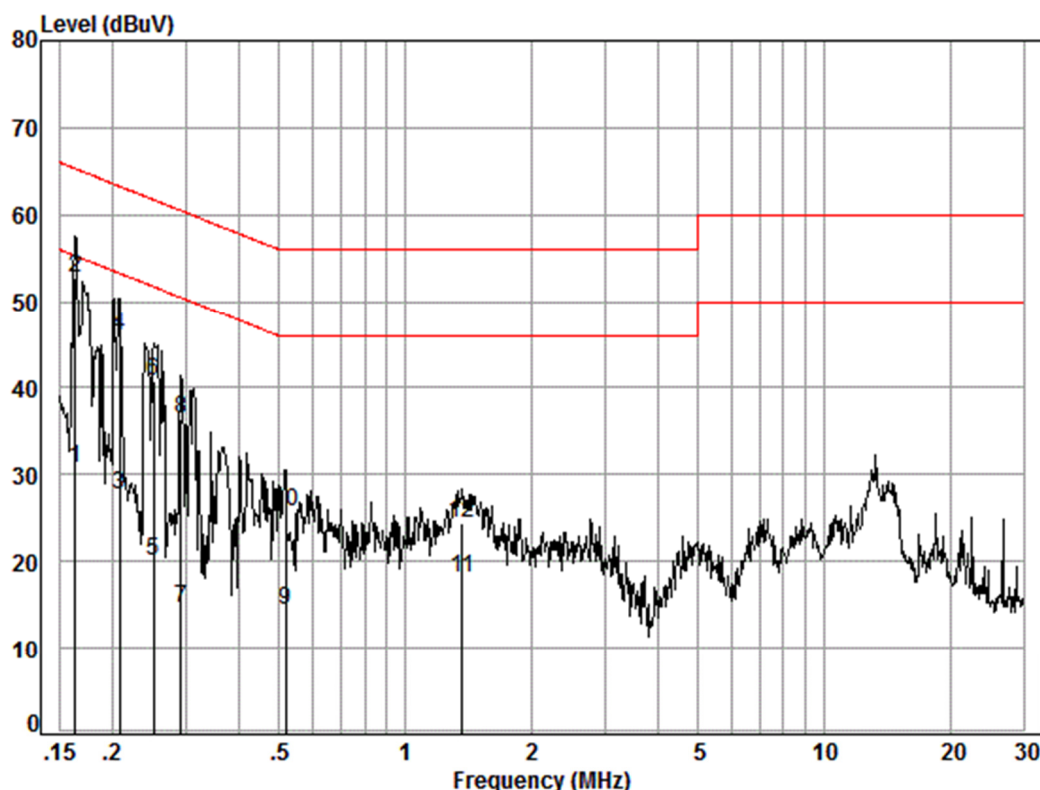


### **7.1.3 Measurement Procedure and Data**

- 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.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

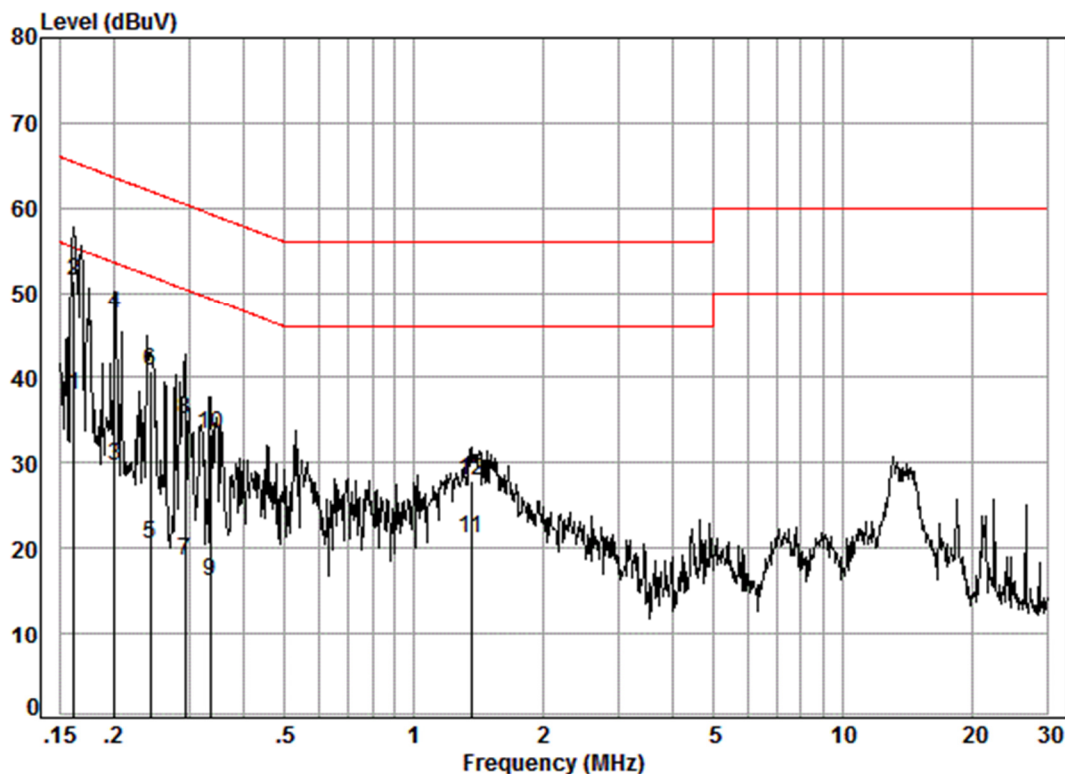
Mode:c; Line:Live Line



Site : Shielding Room  
Condition: Line  
Job No. : 11103RG  
Test mode: C

|    | Freq | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark  |
|----|------|------------|-------------|------------|-------|------------|------------|---------|
|    | MHz  | dB         | dB          | dBuV       | dBuV  | dBuV       | dB         |         |
| 1  | 0.16 | 0.02       | 9.52        | 21.24      | 30.78 | 55.30      | -24.52     | Average |
| 2  | 0.16 | 0.02       | 9.52        | 43.17      | 52.71 | 65.30      | -12.59     | QP      |
| 3  | 0.21 | 0.02       | 9.50        | 18.24      | 27.76 | 53.27      | -25.51     | Average |
| 4  | 0.21 | 0.02       | 9.50        | 36.49      | 46.01 | 63.27      | -17.26     | QP      |
| 5  | 0.25 | 0.01       | 9.51        | 10.46      | 19.98 | 51.73      | -31.75     | Average |
| 6  | 0.25 | 0.01       | 9.51        | 31.24      | 40.76 | 61.73      | -20.97     | QP      |
| 7  | 0.29 | 0.01       | 9.51        | 5.17       | 14.69 | 50.50      | -35.81     | Average |
| 8  | 0.29 | 0.01       | 9.51        | 26.95      | 36.47 | 60.50      | -24.03     | QP      |
| 9  | 0.52 | 0.01       | 9.50        | 4.96       | 14.47 | 46.00      | -31.53     | Average |
| 10 | 0.52 | 0.01       | 9.50        | 16.32      | 25.83 | 56.00      | -30.17     | QP      |
| 11 | 1.37 | 0.02       | 9.51        | 8.56       | 18.09 | 46.00      | -27.91     | Average |
| 12 | 1.37 | 0.02       | 9.51        | 14.87      | 24.40 | 56.00      | -31.60     | QP      |

Mode:c; Line:Neutral Line



Site : Shielding Room

Condition: Neutral

Job No. : 11103RG

Test mode: C

|    | Freq | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark  |
|----|------|------------|-------------|------------|-------|------------|------------|---------|
|    | MHz  | dB         | dB          | dBuV       | dBuV  | dBuV       | dB         |         |
| 1  | 0.16 | 0.02       | 9.59        | 28.23      | 37.84 | 55.38      | -17.54     | Average |
| 2  | 0.16 | 0.02       | 9.59        | 41.77      | 51.38 | 65.38      | -14.00     | QP      |
| 3  | 0.20 | 0.02       | 9.57        | 20.13      | 29.72 | 53.58      | -23.86     | Average |
| 4  | 0.20 | 0.02       | 9.57        | 37.89      | 47.48 | 63.58      | -16.10     | QP      |
| 5  | 0.24 | 0.01       | 9.58        | 10.97      | 20.56 | 52.00      | -31.44     | Average |
| 6  | 0.24 | 0.01       | 9.58        | 31.12      | 40.71 | 62.00      | -21.29     | QP      |
| 7  | 0.29 | 0.01       | 9.58        | 8.98       | 18.57 | 50.46      | -31.89     | Average |
| 8  | 0.29 | 0.01       | 9.58        | 25.45      | 35.04 | 60.46      | -25.42     | QP      |
| 9  | 0.34 | 0.01       | 9.58        | 6.49       | 16.08 | 49.31      | -33.23     | Average |
| 10 | 0.34 | 0.01       | 9.58        | 23.80      | 33.39 | 59.31      | -25.92     | QP      |
| 11 | 1.36 | 0.02       | 9.63        | 11.43      | 21.08 | 46.00      | -24.92     | Average |
| 12 | 1.36 | 0.02       | 9.63        | 18.28      | 27.93 | 56.00      | -28.07     | QP      |

## 7.2 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215

Test Method: ANSI C63.10 (2013) Section 6.9

Measurement Distance: 10m

Limit: N/A

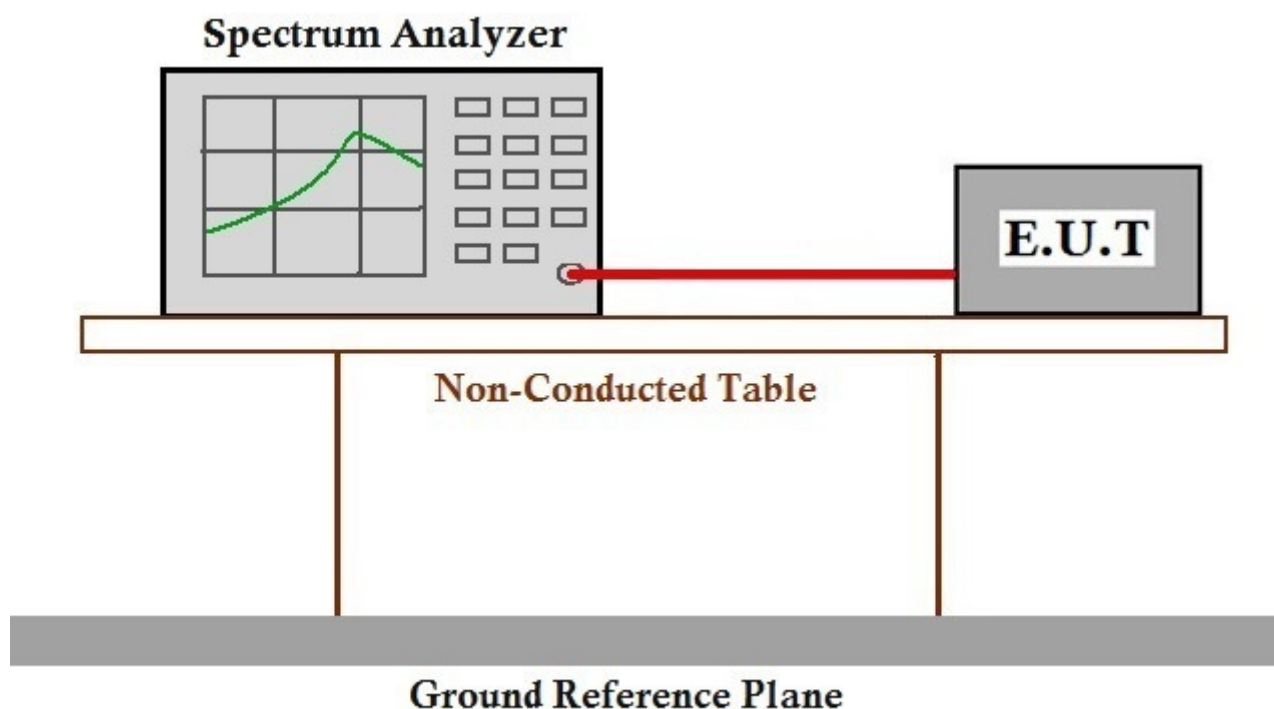
### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23 °C Humidity: 53 % RH Atmospheric Pressure: 1020 mbar

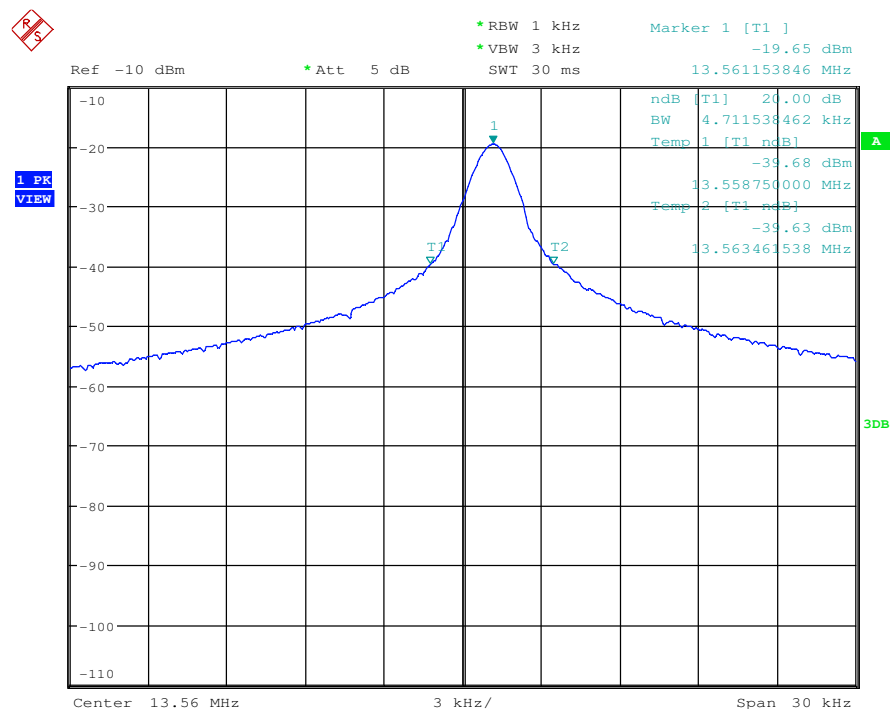
Test mode a:TX mode\_Keep the EUT in transmitting with modulation mode.

### 7.2.2 Test Setup Diagram





### 7.2.3 Measurement Procedure and Data





### **7.3 Emission Mask**

Test Requirement 47 CFR Part 15, Subpart C 15.225(a)&(b)&(C )

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

Measurement Distance: 3m

Limit:

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15.848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

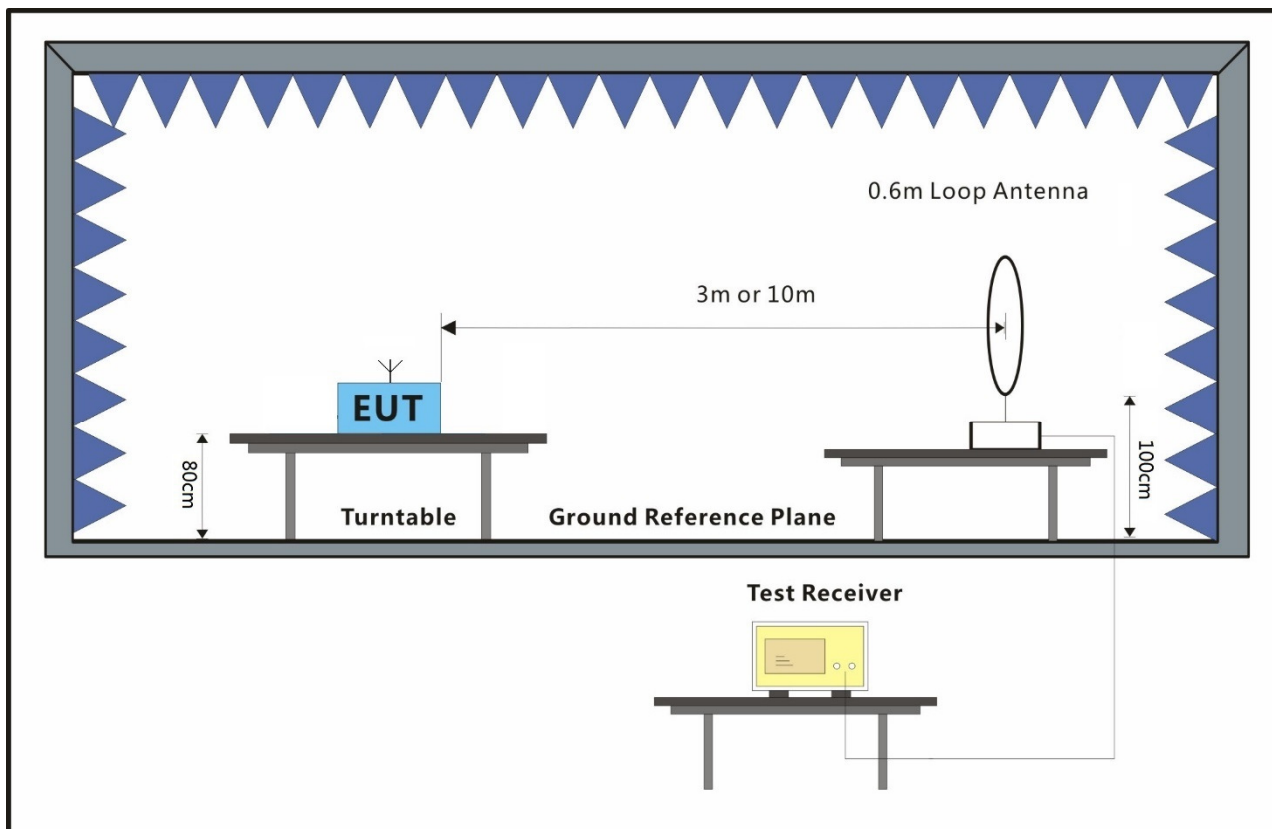
### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 21.8 °C Humidity: 50.9 % RH Atmospheric Pressure: 1025 mbar

Test mode a:TX mode\_Keep the EUT in transmitting with modulation mode.

### 7.3.2 Test Setup Diagram



### 7.3.3 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

The test level of the fundamental signal is below the limit of general spurious emission (refer to item 7.5 in this report), so the items is no need to perform.

## 7.4 Frequency tolerance

Test Requirement 47 CFR Part 15, Subpart C 15.225(e)

Test Method: ANSI C63.10 (2013) Section 6.8

Measurement Distance: 10m

Limit: 1.356kHz

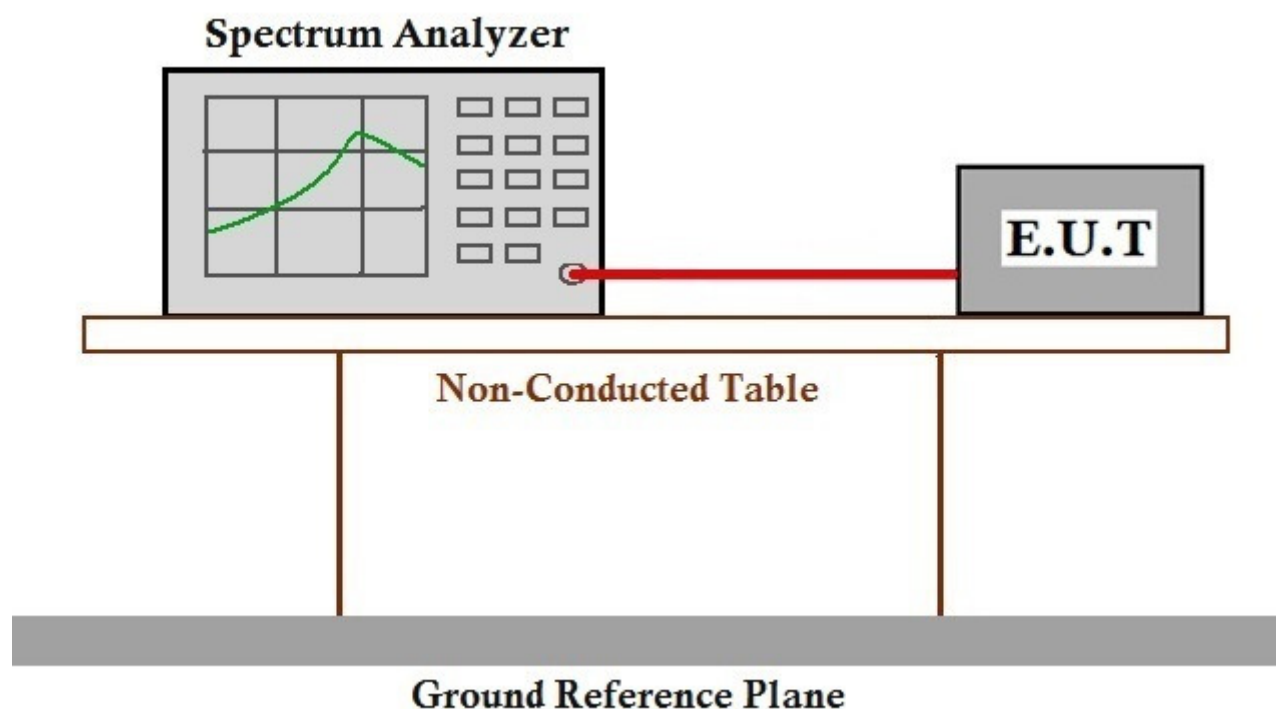
### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 54 % RH Atmospheric Pressure: 1020 mbar

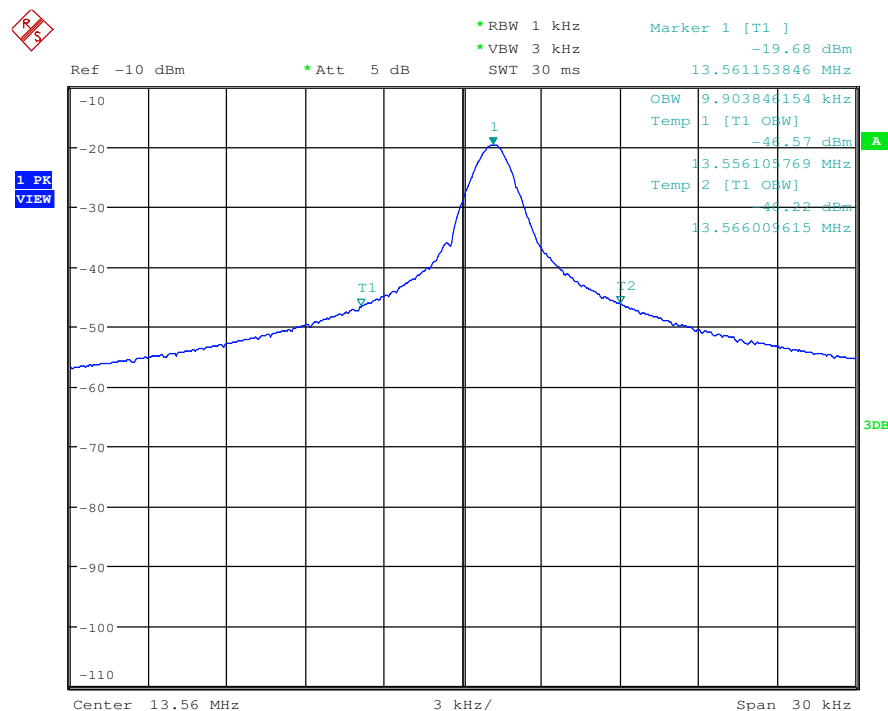
Test mode a:TX mode\_Keep the EUT in transmitting with modulation mode.

### 7.4.2 Test Setup Diagram





#### 7.4.3 Measurement Procedure and Data





## 7.5 Radiated Emissions(9kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

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

Measurement Distance: 10m

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                                |

### 7.5.1 E.U.T. Operation

Operating Environment:

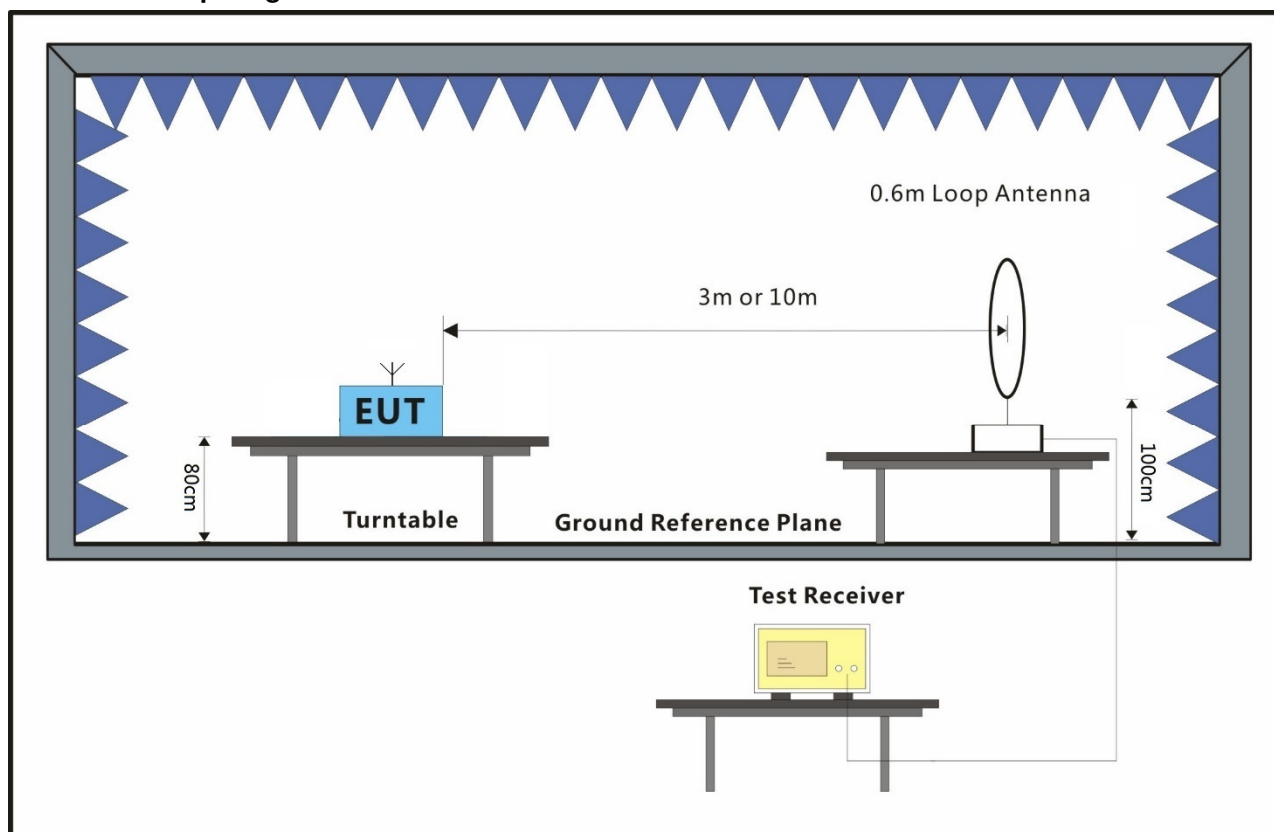
Temperature: 23 °C

Humidity: 54 % RH

Atmospheric Pressure: 1020 mbar

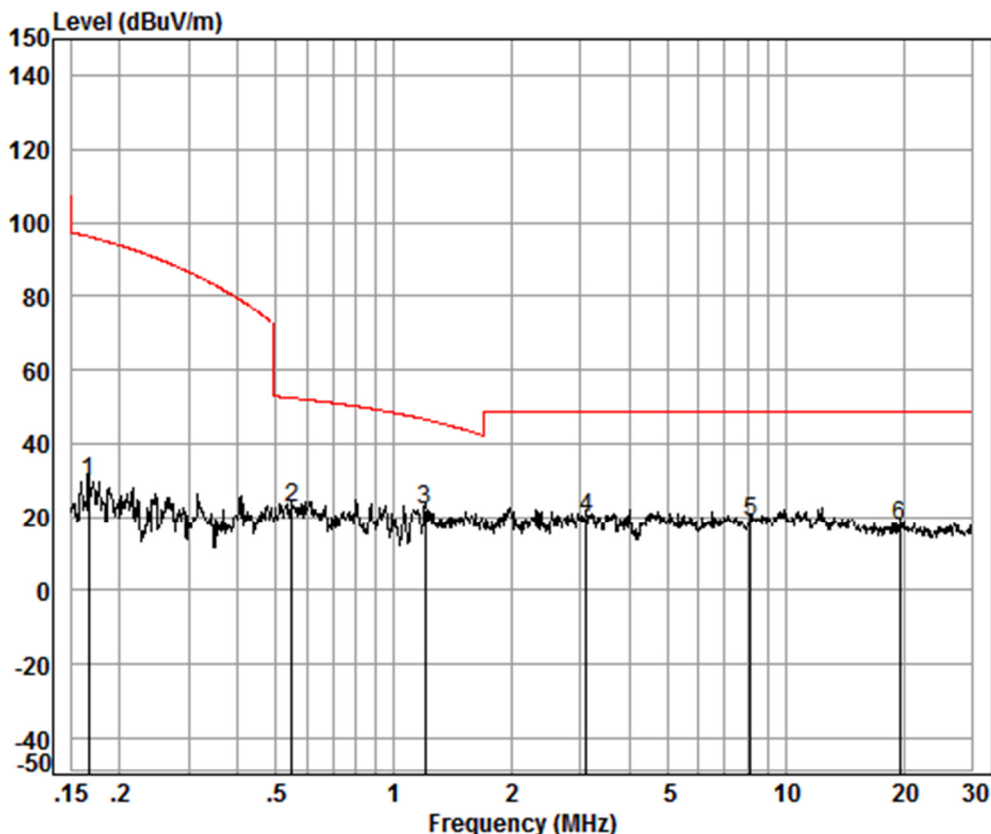
Test mode c: TX mode

### 7.5.2 Test Setup Diagram



### 7.5.3 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

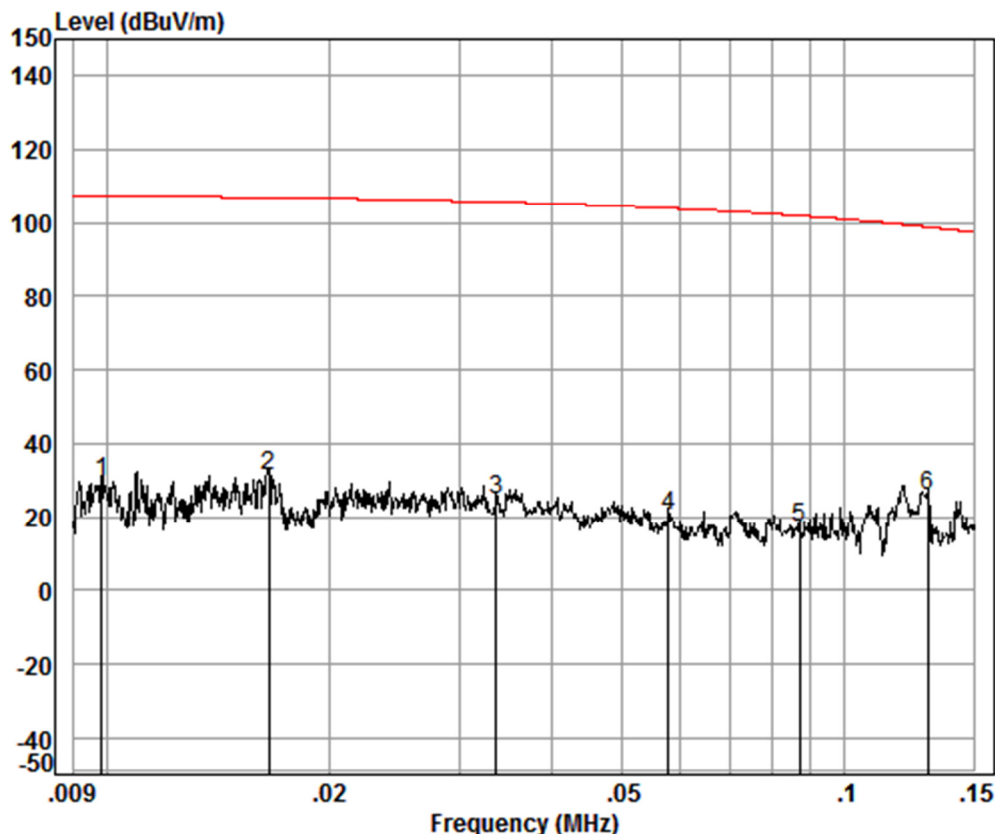


Condition: 10m

Job No. : 11103RG

Test Mode: c

|      | Freq  | Cable Loss | Ant Factor | Preamplifier | Read Level | Level  | Limit  | Over   |
|------|-------|------------|------------|--------------|------------|--------|--------|--------|
|      | MHz   | dB         | dB/m       | dB           | dBuV       | dBuV/m | dBuV/m | dB     |
| 1    | 0.17  | 0.07       | 11.76      | 32.50        | 50.46      | 29.79  | 96.28  | -66.49 |
| 2    | 0.55  | 0.13       | 11.77      | 32.48        | 43.05      | 22.47  | 52.36  | -29.89 |
| 3 pp | 1.20  | 0.26       | 12.03      | 32.45        | 42.24      | 22.08  | 46.53  | -24.45 |
| 4    | 3.11  | 0.38       | 12.19      | 32.47        | 39.85      | 19.95  | 48.63  | -28.68 |
| 5    | 8.15  | 0.47       | 11.05      | 32.49        | 39.38      | 18.41  | 48.63  | -30.22 |
| 6    | 19.64 | 0.67       | 9.56       | 32.52        | 39.97      | 17.68  | 48.63  | -30.95 |



Condition: 10m

Job No. : 11103RG

Test Mode: c

|      | Freq | Cable | Ant    | Preamp | Read  | Level  | Limit  | Over   |
|------|------|-------|--------|--------|-------|--------|--------|--------|
|      | MHz  | Loss  | Factor | Factor | Level | Level  | Line   | Limit  |
|      | MHz  | dB    | dB/m   | dB     | dBuV  | dBuV/m | dBuV/m | dB     |
| 1    | 0.01 | 0.29  | 19.40  | 32.42  | 42.15 | 29.42  | 107.54 | -78.12 |
| 2    | 0.02 | 0.24  | 16.17  | 32.49  | 47.34 | 31.26  | 107.06 | -75.80 |
| 3    | 0.03 | 0.16  | 13.52  | 32.50  | 43.69 | 24.87  | 105.82 | -80.95 |
| 4    | 0.06 | 0.11  | 12.29  | 32.51  | 40.51 | 20.40  | 104.08 | -83.68 |
| 5    | 0.09 | 0.06  | 12.05  | 32.52  | 37.53 | 17.12  | 101.98 | -84.86 |
| 6 pp | 0.13 | 0.06  | 11.81  | 32.51  | 46.36 | 25.72  | 98.90  | -73.18 |



## **7.6 Radiated Emissions(30MHz-1GHz)**

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

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

Measurement Distance: 10m

Limit:

| Frequency     | Field strength<br>(microvolt/meter) | Limit<br>(dBuV/m) | Remark     | Measurement<br>distance (m) |
|---------------|-------------------------------------|-------------------|------------|-----------------------------|
| 30MHz-88MHz   | 100                                 | 40.0              | Quasi-peak | 3                           |
| 88MHz-216MHz  | 150                                 | 43.5              | Quasi-peak | 3                           |
| 216MHz-960MHz | 200                                 | 46.0              | Quasi-peak | 3                           |
| 960MHz-1GHz   | 500                                 | 54.0              | Quasi-peak | 3                           |

### 7.6.1 E.U.T. Operation

Operating Environment:

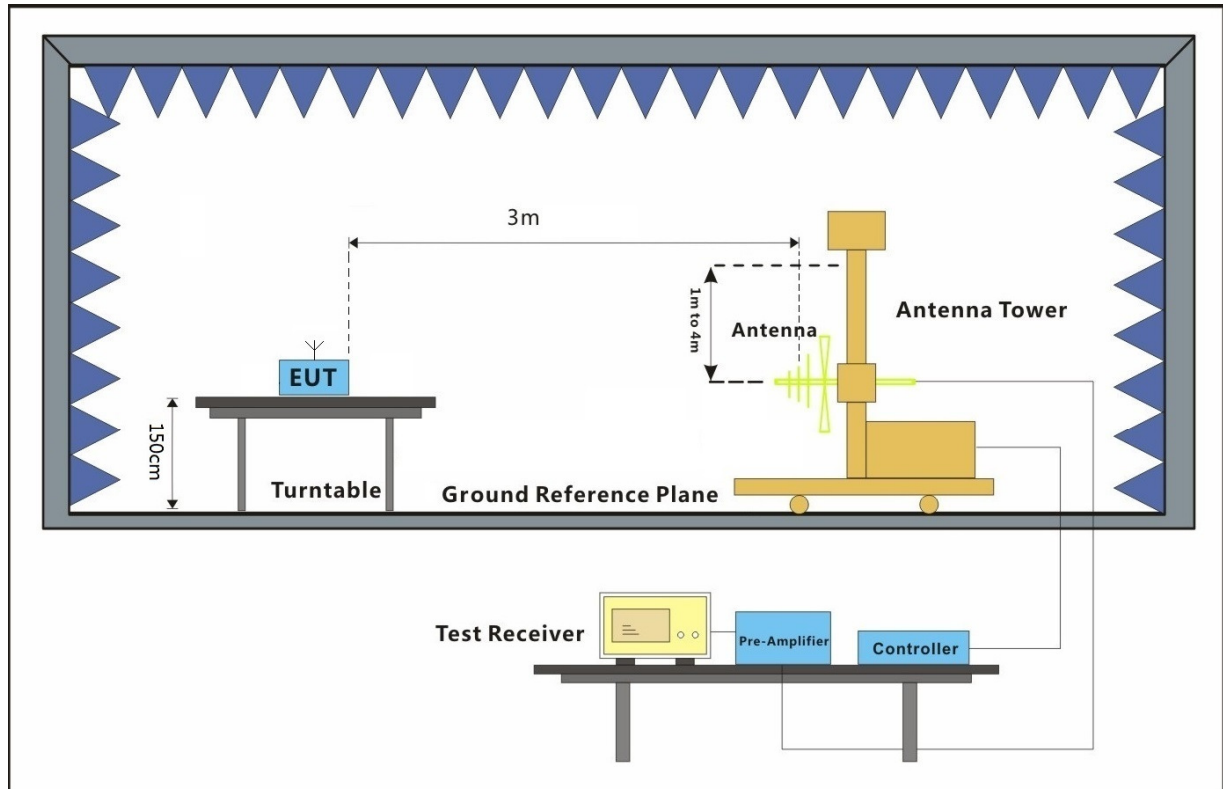
Temperature: 23 °C

Humidity: 54 % RH

Atmospheric Pressure: 1020 mbar

Test mode c: TX mode

### 7.6.2 Test Setup Diagram



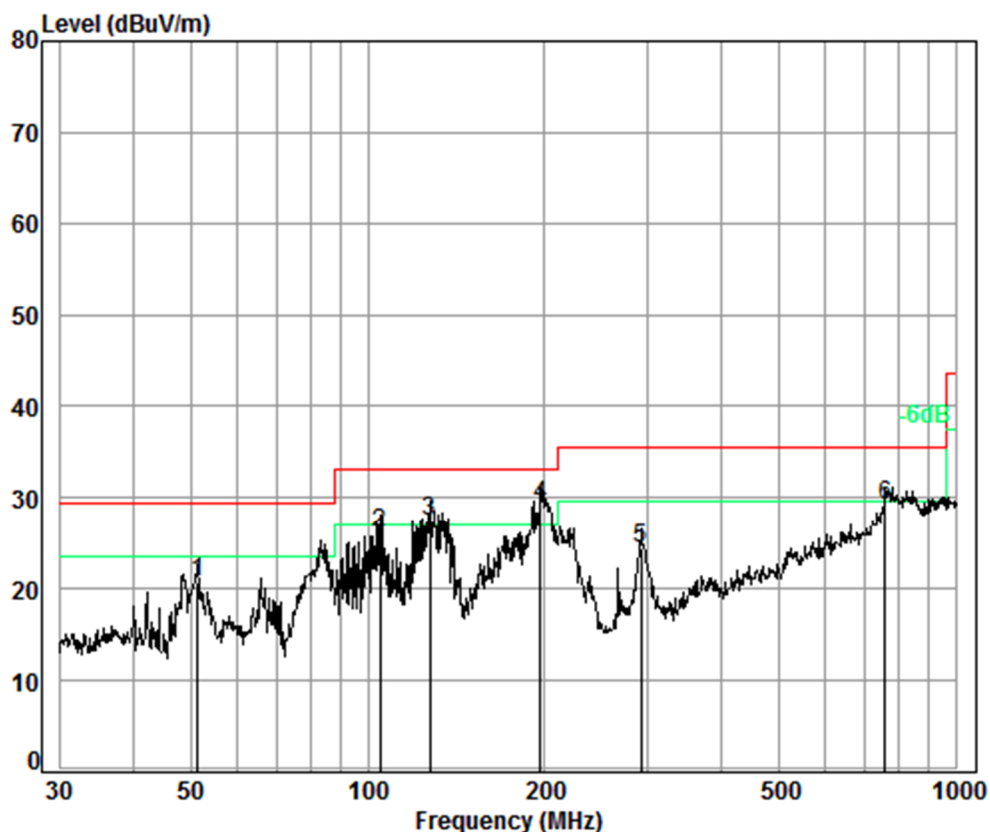


### **7.6.3 Measurement Procedure and Data**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. 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.
- d. 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.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. 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.
- g. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

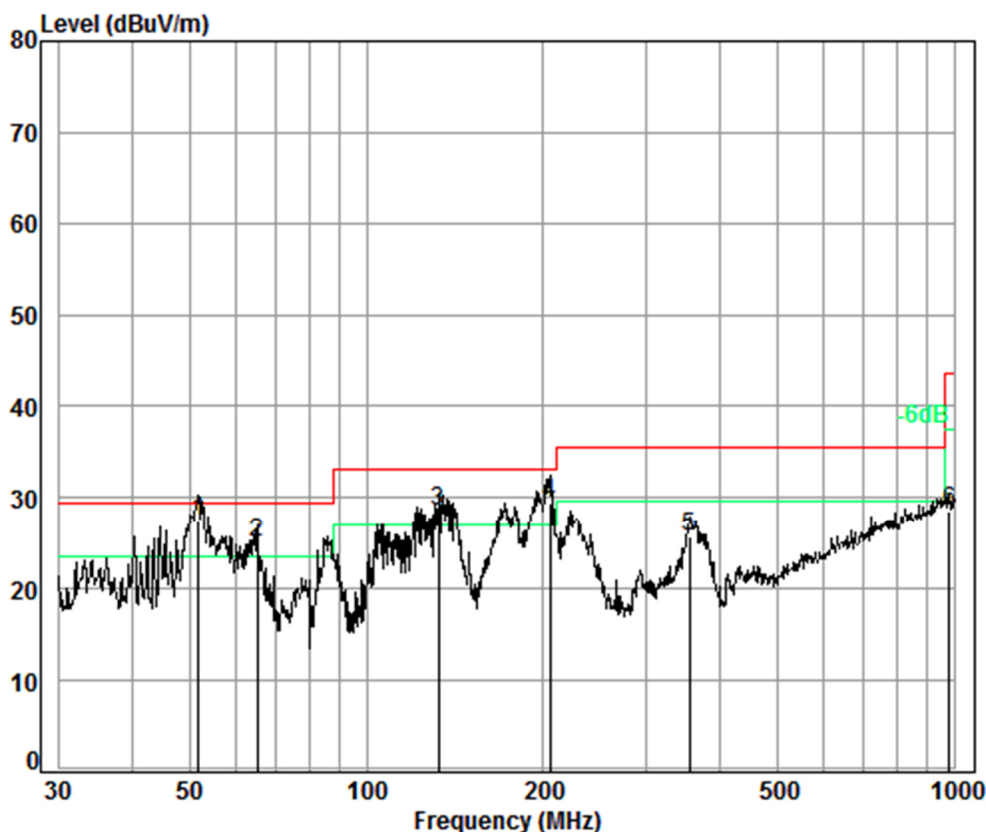
Mode:c; Polarization:Horizontal



Condition: 10m HORIZONTAL  
EUT : 11103RG  
Test Mode: c

|      | 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    | 51.48  | 6.93       | 12.66      | 32.42         | 33.44      | 20.61  | 29.50      | -8.89      |
| 2    | 104.90 | 7.23       | 9.88       | 32.54         | 41.51      | 26.08  | 33.10      | -7.02      |
| 3    | 127.66 | 7.34       | 11.91      | 32.48         | 40.78      | 27.55  | 33.10      | -5.55      |
| 4 pp | 196.51 | 7.58       | 9.46       | 32.46         | 44.70      | 29.28  | 33.10      | -3.82      |
| 5    | 291.04 | 8.03       | 12.44      | 32.39         | 36.42      | 24.50  | 35.60      | -11.10     |
| 6    | 758.04 | 9.20       | 20.86      | 32.26         | 31.34      | 29.14  | 35.60      | -6.46      |

Mode:c; Polarization:Vertical



Condition: 10m VERTICAL

EUT : 11103RG

Test Mode: c

|      |        | Cable | Ant    | Preamp | Read  | Limit  | Over         |
|------|--------|-------|--------|--------|-------|--------|--------------|
|      | Freq   | Loss  | Factor | Factor | Level | Level  | Limit        |
|      | MHz    | dB    | dB/m   | dB     | dBuV  | dBuV/m | dB           |
| 1 pp | 51.84  | 6.94  | 12.63  | 32.43  | 40.26 | 27.40  | 29.50 -2.10  |
| 2    | 65.34  | 6.99  | 10.93  | 32.46  | 39.60 | 25.06  | 29.50 -4.44  |
| 3    | 132.69 | 7.37  | 12.23  | 32.47  | 41.34 | 28.47  | 33.10 -4.63  |
| 4    | 204.96 | 7.63  | 9.41   | 32.46  | 44.88 | 29.46  | 33.10 -3.64  |
| 5    | 354.18 | 8.27  | 13.93  | 32.35  | 35.97 | 25.82  | 35.60 -9.78  |
| 6    | 979.18 | 9.60  | 22.82  | 30.77  | 26.96 | 28.61  | 43.50 -14.89 |

Remark:

1) 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

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-Documents.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.



2) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

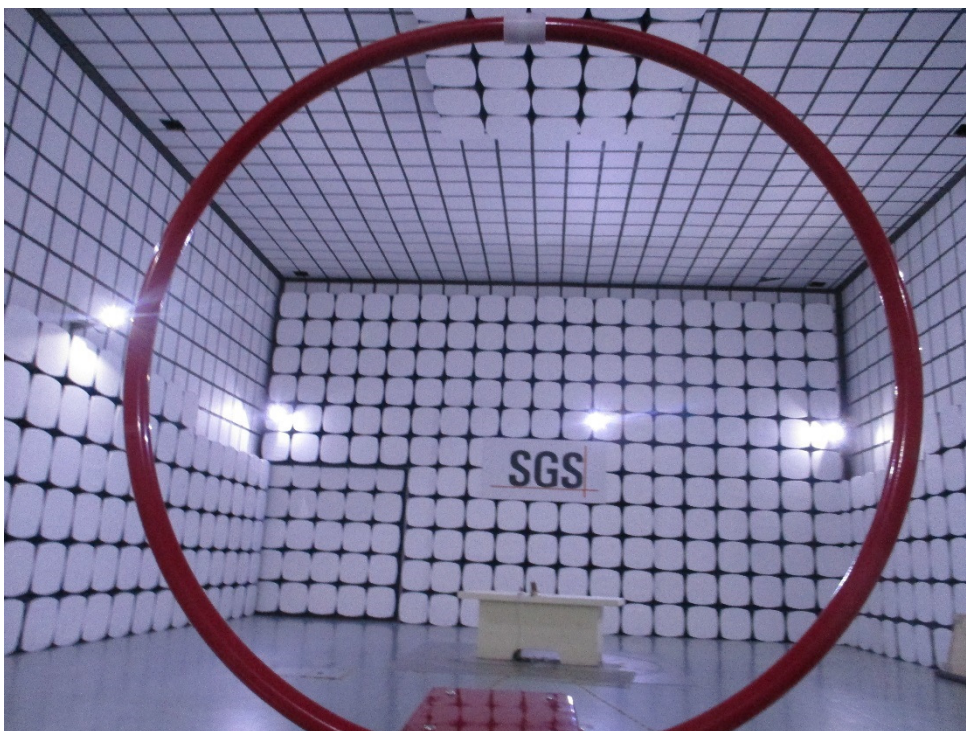
3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

## 8 Photographs

### 8.1 Conducted Emissions at AC Power Line (150kHz-30MHz) Test Setup



### 8.2 Radiated Emissions(9kHz-30MHz) Test Setup



### 8.3 Radiated Emissions(30MHz-1GHz) Test Setup





#### **8.4 EUT Constructional Details (EUT Photos)**

Refer to Appendix A - Photographs of EUT Test Setup Details for SZEM1710011103RG.

- End of the Report -