

TEST REPORT

Application No.: SHEM2011009384CR
FCC ID: ESVEVOLVE
Applicant: Bosch Security Systems Inc
Address of Applicant: 130 Perinton Parkway, Fairport, NY, USA
Manufacturer: Bosch Security Systems Inc
Address of Manufacturer: 130 Perinton Parkway, Fairport, NY, USA
Factory: Speaker Electronic(Jiashan) Co.,Ltd
Address of Factory: No. 8 Development Zone Road, Huimin Sub-district, Jiashan County, Zhejiang, 314112, P.R. China

Equipment Under Test (EUT):**EUT Name:** EVOLVE Portable Column Loudspeaker**Model No.:** EVOLVE Portable Column Loudspeaker

EVOLVE 50M

Add Model No.:EVOLVE 50M-XX, EVOLVE 50M-XX-XX, Refer to Page 2

Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.

Trade mark:

Electro-Voice

Standard(s) :

47 CFR Part 15, Subpart C 15.247

Date of Receipt:

2020-11-06

Date of Test:

2020-11-17 to 2020-11-28

Date of Issue:

2020-11-30

| | |
|---------------------|--------------|
| Test Result: | Pass* |
|---------------------|--------------|

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

parlam zhan

Parlam Zhan
E&E Section 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.

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1. The X range can indicate the regional variances, external colors, accessories, possibly generations, and blank (if we need to use)
2. Please note that X can be a blank space if we only need a single digit at the end like EVOLVE 50M-W.
3. The table below indicates the current model variations to be used on the certification with the notation above in item 1 and 2.

| Model Name: | Sales area: | Difference: |
|------------------|-------------|---|
| EVOLVE 50M-SB-US | US | box volume is larger |
| EVOLVE 50M-SB-EU | EU AP | box volume is larger |
| EVOLVE 50M-SW | global | The exterior is white box volume is larger |



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

Report No.: SHEM201100938402
Page: 3 of 32

| Revision Record | | | |
|------------------------|--------------------|-------------|---------------|
| Version | Description | Date | Remark |
| 00 | original | 2020-11-30 | |
| | | | |
| | | | |

| | | | | |
|---------------------------------|--|-----------------------------------|--|--|
| Authorized for issue by: | | | | |
| | | Bill Wu | | |
| | | Bill Wu / Project Engineer | | |
| | | Parlam Zhan | | |
| | | Parlam Zhan / Reviewer | | |



2 Test Summary

| Item | FCC Requirement | Method | Result |
|---|--|--|--------|
| Conducted Peak Output Power | 47 CFR Part 15, Subpart C 15.247(b)(3) | ANSI C63.10 (2013) Section 11.9.1 | Pass |
| Radiated Emissions which fall in the restricted bands | 47 CFR Part 15, Subpart C 15.209 & 15.247(d) | ANSI C63.10 (2013) Section 6.10.5 | Pass |
| Radiated Spurious Emissions | 47 CFR Part 15, Subpart C 15.209 & 15.247(d) | ANSI C63.10 (2013) Section 6.4,6.5,6.6 | Pass |

Remark: This C2PC only added the RJ45 connector on the function board So we just fully retest Output Power and RSE for this product, other test data reference to original report SHEM190801642902.

Declaration of EUT Family Grouping:

Note: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model EVOLVE 50M was tested since their differences were the model name.

3 Contents

| | Page |
|--|------|
| 1 COVER PAGE..... | 1 |
| 2 TEST SUMMARY..... | 4 |
| 3 CONTENTS..... | 5 |
| 4 GENERAL INFORMATION | 6 |
| 4.1 DETAILS OF E.U.T..... | 6 |
| 4.2 DESCRIPTION OF SUPPORT UNITS..... | 6 |
| 4.3 POWER LEVEL SETTING USING IN TEST: | 6 |
| 4.4 MEASUREMENT UNCERTAINTY | 7 |
| 4.5 TEST LOCATION | 8 |
| 4.6 TEST FACILITY | 8 |
| 4.7 DEVIATION FROM STANDARDS | 8 |
| 4.8 ABNORMALITIES FROM STANDARD CONDITIONS..... | 8 |
| 5 EQUIPMENT LIST | 9 |
| 6 RADIO SPECTRUM TECHNICAL REQUIREMENT | 10 |
| 6.1 CONDUCTED PEAK OUTPUT POWER | 10 |
| 6.2 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS..... | 11 |
| 6.3 RADIATED SPURIOUS EMISSIONS | 19 |
| 7 TEST SETUP PHOTOGRAPHS..... | 30 |
| 8 EUT CONSTRUCTIONAL DETAILS..... | 30 |
| APPENDIX B FOR SHEM201100938402..... | 30 |

4 General Information

4.1 Details of E.U.T.

Power supply: AC 100-240V~50-60Hz
Test voltage: AC 120V/60Hz
Antenna Gain: 3.3dBi(Provided by client)
Antenna Type: PCB Antenna
Bluetooth Version: V5.0 Dual mode
Channel Spacing: 2MHz
Modulation Type: GFSK
Number of Channels: 40
Operation Frequency: 2402MHz to 2480MHz

4.2 Description of Support Units

| Description | Manufacturer | Model No. | Serial No. |
|----------------------|--------------|----------------|------------|
| Blue Test3 (For CSR) | / | 2.5.0 | / |
| Laptop | Lenovo | ThinkPad X100e | / |

4.3 Power level setting using in test:

| Channel | BLE |
|---------|---------|
| 0 | Default |
| 19 | Default |
| 39 | Default |

4.4 Measurement Uncertainty

| No. | Item | Measurement Uncertainty |
|-----|---------------------------------|-------------------------|
| 1 | Radio Frequency | 8.4×10^{-8} |
| 2 | Timeout | 2s |
| 3 | Duty Cycle | 0.37% |
| 4 | Occupied Bandwidth | 3% |
| 5 | RF Conducted Power | 0.6dB |
| 6 | RF Power Density | 2.9dB |
| 7 | Conducted Spurious Emissions | 0.75dB |
| 8 | RF Radiated Power | 5.1dB (Below 1GHz) |
| | | 4.9dB (Above 1GHz) |
| 9 | Radiated Spurious Emission Test | 4.2dB (Below 30MHz) |
| | | 4.5dB (30MHz-1GHz) |
| | | 5.1dB (1GHz-18GHz) |
| | | 5.4dB (Above 18GHz) |
| 10 | Temperature Test | 1°C |
| 11 | Humidity Test | 3% |
| 12 | Supply Voltages | 1.5% |
| 13 | Time | 3% |

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

4.6 Test Facility

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

- CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2017 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.

- NVLAP (LAB CODE: 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

- FCC (Designation Number: CN5033)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

- ISED (CAB Identifier: CN0020)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

- VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

| Equipment | Manufacturer | Model No | Inventory No | Cal Date | Cal Due Date |
|---------------------------|--------------|-------------------------------|-----------------------|------------|--------------|
| RF Conducted Test | | | | | |
| Spectrum Analyzer | R&S | FSP-30 | SHEM002-1 | 2019-12-20 | 2020-12-19 |
| Spectrum Analyzer | Agilent | N9020A | SHEM181-1 | 2020-08-13 | 2021-08-12 |
| Signal Generator | R&S | SMR20 | SHEM006-1 | 2020-08-13 | 2021-08-12 |
| Signal Generator | Agilent | N5182A | SHEM182-1 | 2020-08-13 | 2021-08-12 |
| Communication Tester | R&S | CMW270 | SHEM183-1 | 2020-08-13 | 2021-08-12 |
| Switcher | Tonscend | JS0806 | SHEM184-1 | 2020-08-13 | 2021-08-12 |
| Power Sensor | Keysight | U2021XA * 4 | SHEM184-1 | 2020-08-13 | 2021-08-12 |
| Splitter | Anritsu | MA1612A | SHEM185-1 | / | / |
| Coupler | e-meca | 803-S-1 | SHEM186-1 | / | / |
| High-low Temp Cabinet | Suzhou Zhihe | TL-40 | SHEM087-1 | 2018-09-25 | 2021-09-24 |
| AC Power Stabilizer | APC | KDF-31020T-V0-F0 | SHEM216-1 | 2019-12-20 | 2020-12-19 |
| DC Power Supply | MCH | MCH-303A | SHEM210-1 | 2019-12-20 | 2020-12-19 |
| Conducted test Cable | / | RF01~RF04 | / | 2019-12-20 | 2020-12-19 |
| Test software | Tonscend | JS Tonscend BT/WIFI System | Version: 2.6 | / | / |
| RF Radiated Test | | | | | |
| EMI test Receiver | R&S | ESU40 | SHEM051-1 | 2019-12-20 | 2020-12-19 |
| Spectrum Analyzer | R&S | FSP-30 | SHEM002-1 | 2019-12-20 | 2020-12-19 |
| Loop Antenna (9kHz-30MHz) | Schwarzbeck | FMZB1519 | SHEM135-1 | 2019-12-20 | 2020-12-19 |
| Antenna (25MHz-2GHz) | Schwarzbeck | VULB9168 | SHEM048-1 | 2019-10-14 | 2021-10-13 |
| Antenna (25MHz-2GHz) | Schwarzbeck | VULB9168 | SHEM202-1 | 2019-04-30 | 2021-04-29 |
| Horn Antenna (1-18GHz) | Schwarzbeck | HF906 | SHEM009-1 | 2017-10-24 | 2020-10-23 |
| Horn Antenna (1-18GHz) | Schwarzbeck | BBHA9120D | SHEM050-1 | 2019-10-14 | 2021-10-13 |
| Horn Antenna (14-40GHz) | Schwarzbeck | BBHA 9170 | SHEM049-1 | 2017-10-31 | 2020-10-30 |
| Pre-amplifier (9KHz-2GHz) | CLAVIIO | BDLNA-0001 | SHEM164-1 | 2020-08-13 | 2021-08-12 |
| Pre-amplifier (1-18GHz) | CLAVIIO | BDLNA-0118 | SHEM050-2 | 2020-08-13 | 2021-08-12 |
| High-amplifier (14-40GHz) | Schwarzbeck | 10001 | SHEM049-2 | 2019-12-20 | 2020-12-19 |
| Signal Generator | R&S | SMR40 | SHEM058-1 | 2020-08-13 | 2021-08-12 |
| Band Filter | LORCH | 9BRX-875/X150 | SHEM156-1 | / | / |
| Band Filter | LORCH | 13BRX-1950/X500 | SHEM083-2 | / | / |
| Band Filter | LORCH | 5BRX-2400/X200 | SHEM155-1 | / | / |
| Band Filter | LORCH | 5BRX-5500/X1000 | SHEM157-2 | / | / |
| High pass Filter | Wainwright | WHK3.0/18G | SHEM157-1 | / | / |
| High pass Filter | Wainwright | WHKS1700 | SHEM157-3 | / | / |
| Semi/Fully Anechoic | ST | 11*6*6M | SHEM078-2 | 2020-05-25 | 2023-05-24 |
| RE test Cable | / | RE01, RE02, RE06 | / | 2019-12-20 | 2020-12-19 |
| Test software | ESE | E3 | Version: 6.111221a | / | / |

6 Radio Spectrum Technical Requirement

6.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

| Frequency range(MHz) | Output power of the intentional radiator(watt) |
|----------------------|--|
| 902-928 | 1 for ≥ 50 hopping channels |
| | 0.25 for $25 \leq$ hopping channels < 50 |
| | 1 for digital modulation |
| 2400-2483.5 | 1 for ≥ 75 non-overlapping hopping channels |
| | 0.125 for all other frequency hopping systems |
| | 1 for digital modulation |
| 5725-5850 | 1 for frequency hopping systems and digital modulation |

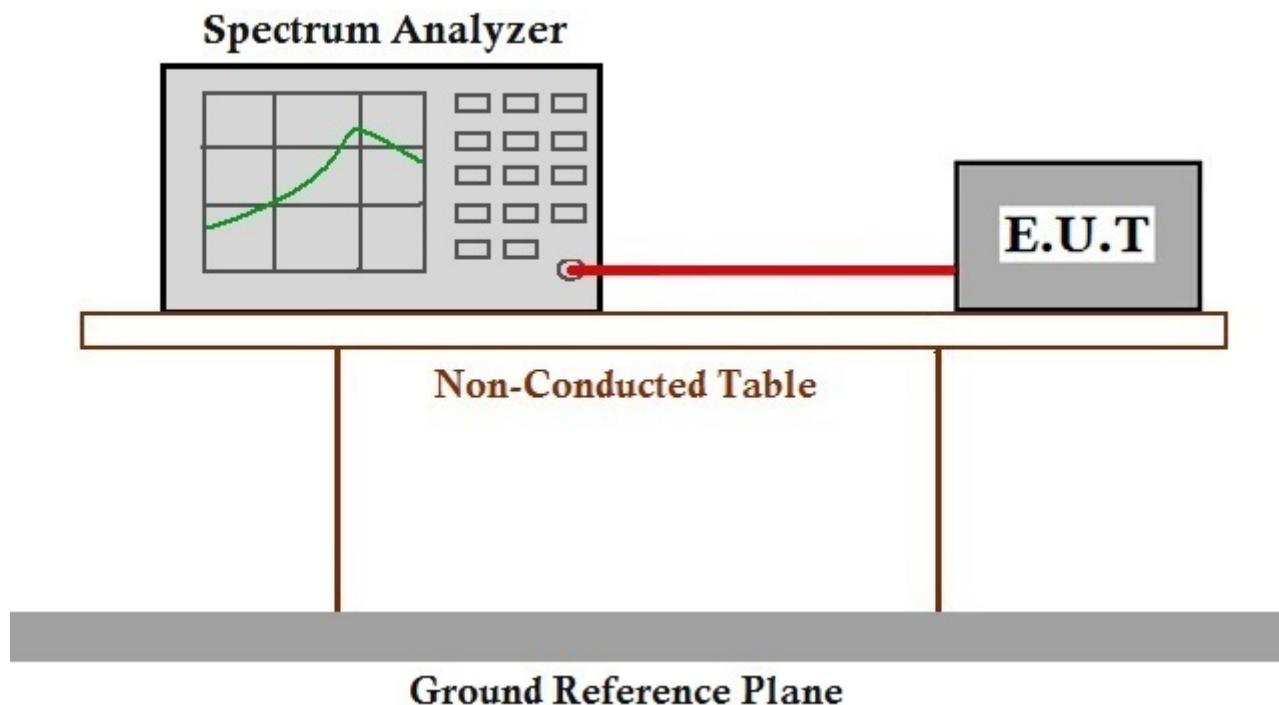
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

Test mode c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

6.1.2 Test Setup Diagram



6.1.3 Measurement Procedure and Data

The detailed test data see: Appendix B for SHEM201100938402

6.2 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Limit:

| Frequency(MHz) | Field strength(microvolts/meter) | Measurement distance(meters) |
|----------------|----------------------------------|------------------------------|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

6.2.1 E.U.T. Operation

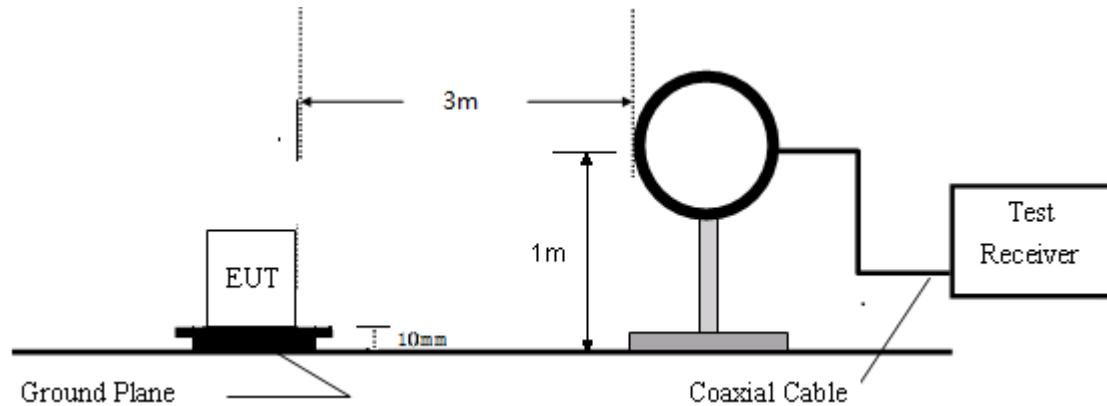
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

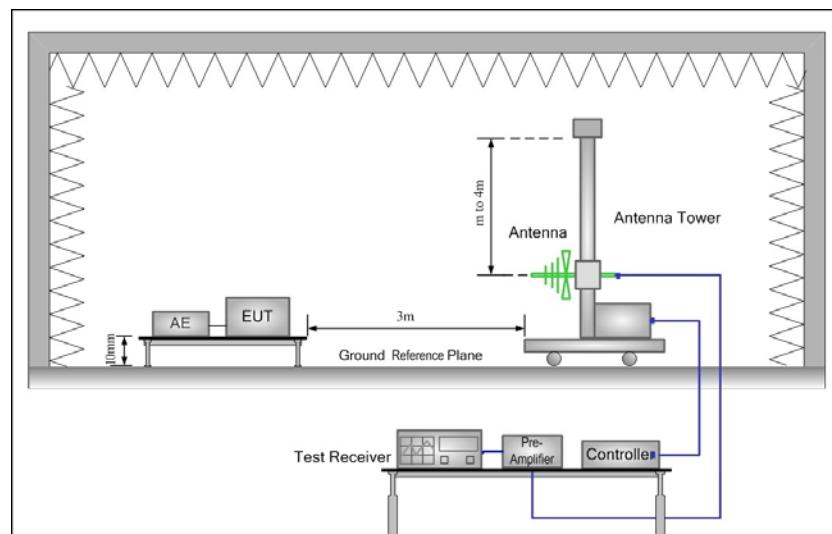
Test mode c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

6.2.2 Test Setup Diagram

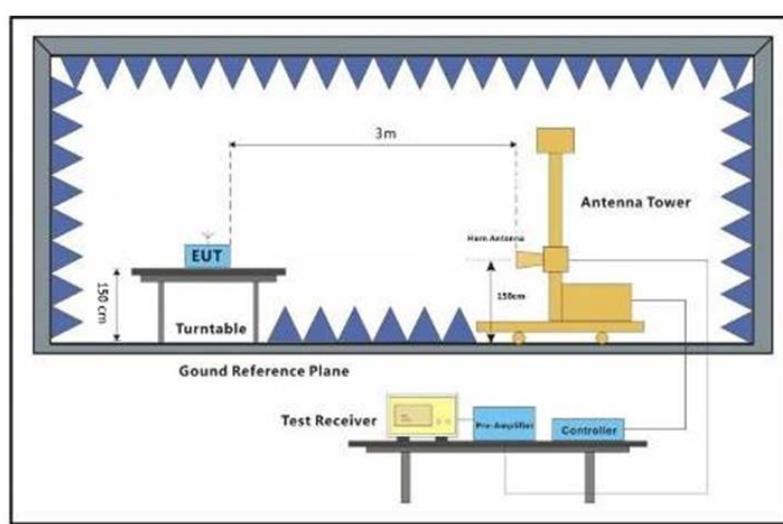
Below 30MHz



30MHz-1GHz



Above 1GHz



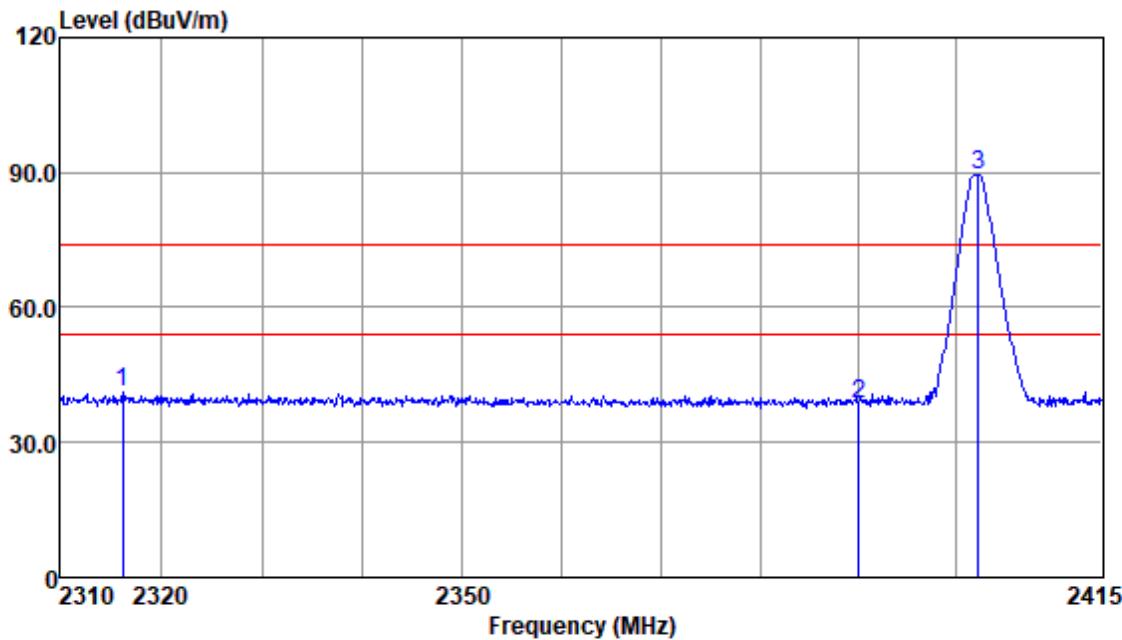
6.2.3 Measurement Procedure and Data

- 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.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

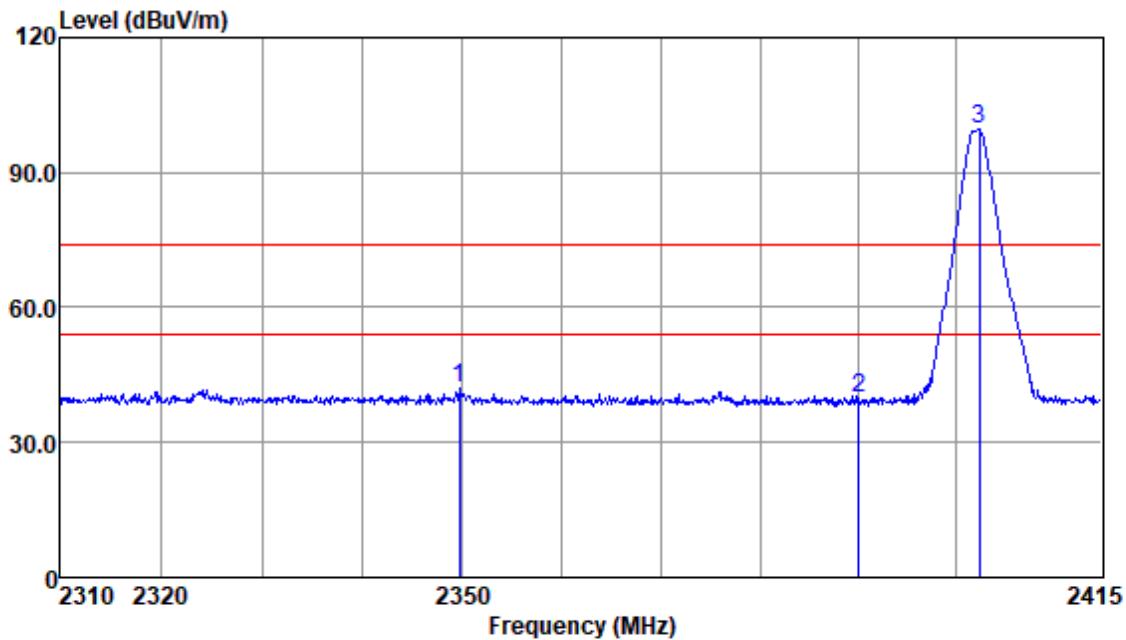


Antenna Polarity :HORIZONTAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|------------|------------|--------|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2316.17 | 49.59 | 25.93 | 2.99 | 37.36 | 41.15 | 74.00 | -32.85 | Peak |
| 2390.00 | 46.63 | 26.03 | 3.15 | 37.40 | 38.41 | 74.00 | -35.59 | Peak |
| 2402.26 | 97.84 | 26.05 | 3.14 | 37.40 | 89.63 | 74.00 | 15.63 | Peak |

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

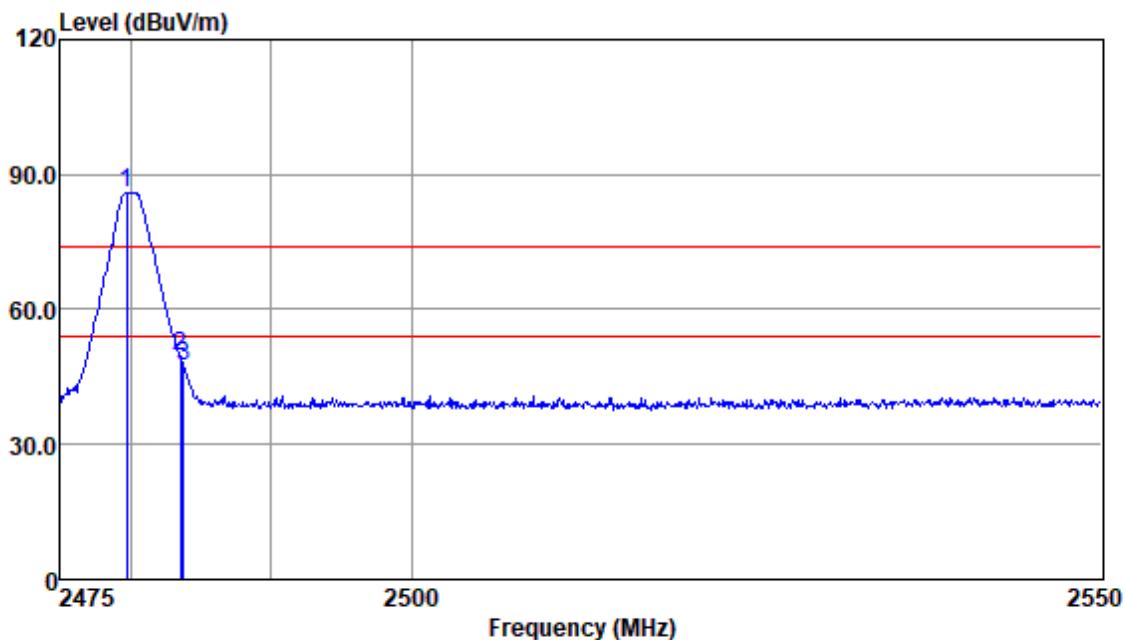


Antenna Polarity :VERTICAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|------------|------------|--------|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2349.67 | 50.54 | 25.98 | 3.10 | 37.37 | 42.25 | 74.00 | -31.75 | Peak |
| 2390.00 | 47.93 | 26.03 | 3.15 | 37.40 | 39.71 | 74.00 | -34.29 | Peak |
| 2402.37 | 107.87 | 26.05 | 3.14 | 37.40 | 99.66 | 74.00 | 25.66 | Peak |

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

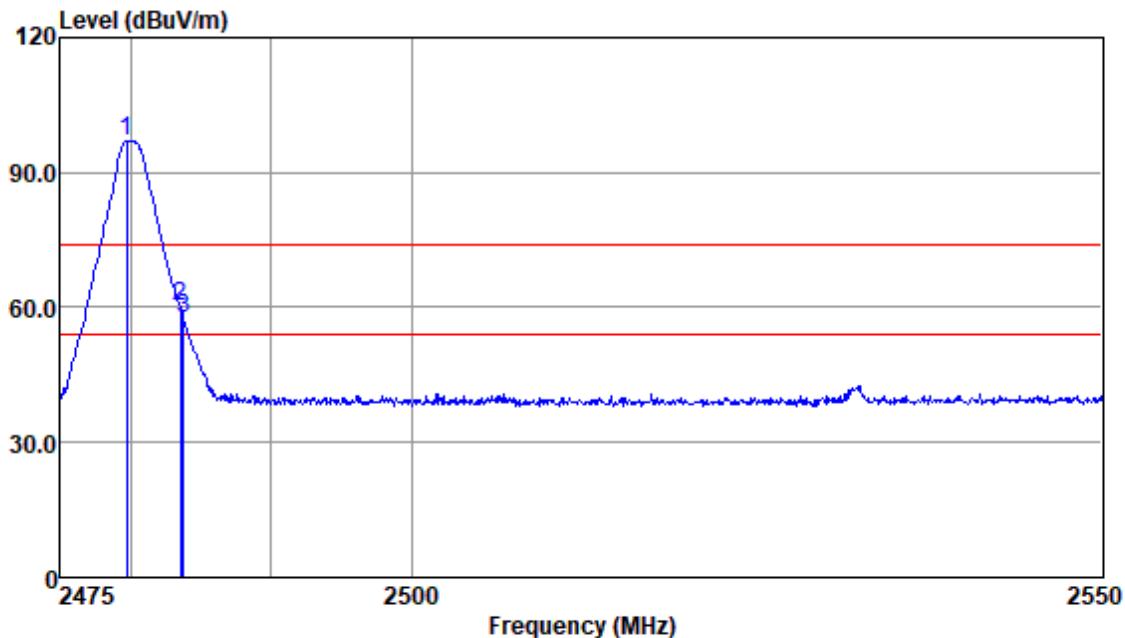


Antenna Polarity :HORIZONTAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Emission Limit Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|---------------------|------------|--------|
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 2479.73 | 94.36 | 26.17 | 3.14 | 37.57 | 86.10 | 74.00 | 12.10 | Peak |
| 2483.50 | 57.73 | 26.18 | 3.14 | 37.57 | 49.48 | 74.00 | -24.52 | Peak |
| 2483.73 | 55.54 | 26.18 | 3.14 | 37.57 | 47.29 | 74.00 | -26.71 | Peak |

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:High

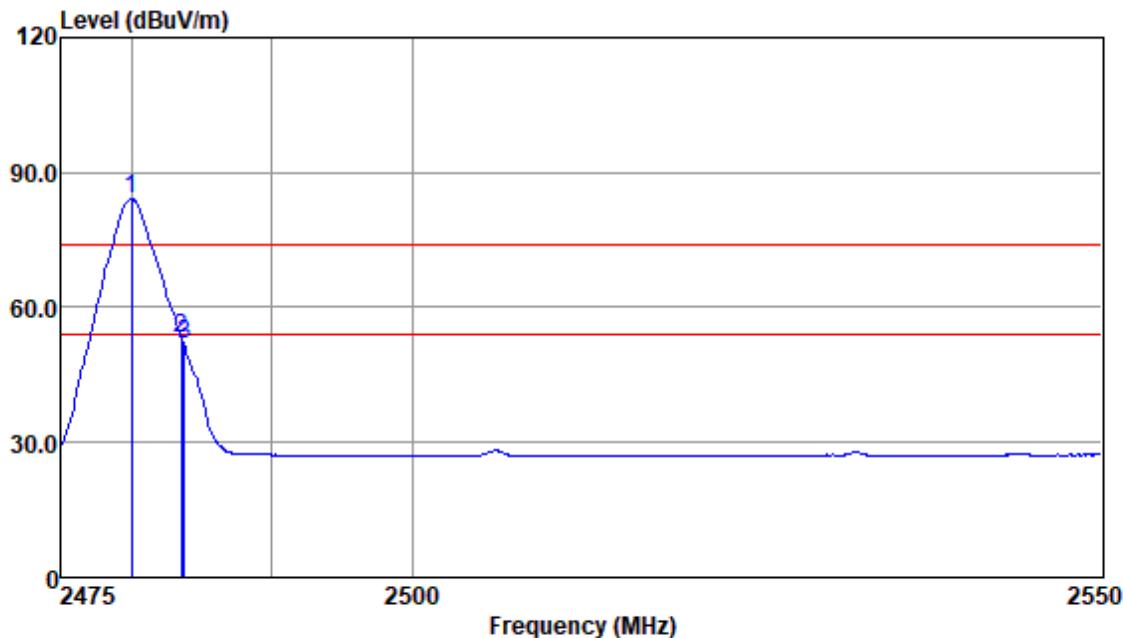


Antenna Polarity :VERTICAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Emission Limit | Over Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|----------------|-----------|------------|--------|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | | |
| 2479.73 | 105.32 | 26.17 | 3.14 | 37.57 | 97.06 | 74.00 | 23.06 | | Peak |
| 2483.50 | 68.55 | 26.18 | 3.14 | 37.57 | 60.30 | 74.00 | -13.70 | | Peak |
| 2483.73 | 65.79 | 26.18 | 3.14 | 37.57 | 57.54 | 74.00 | -16.46 | | Peak |

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:High



Antenna Polarity : VERTICAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|------------|------------|---------|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 2479.96 | 92.35 | 26.17 | 3.14 | 37.57 | 84.09 | 54.00 | 30.09 | Average |
| 2483.50 | 61.60 | 26.18 | 3.14 | 37.57 | 53.35 | 54.00 | -0.65 | Average |
| 2483.73 | 60.04 | 26.18 | 3.14 | 37.57 | 51.79 | 54.00 | -2.21 | Average |

Note: Emission Level = Read Level + Antenna Factor + Cable loss - Preamp Factor

6.3 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

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

Limit:

| Frequency(MHz) | Field strength(microvolts/meter) | Measurement distance(meters) |
|----------------|----------------------------------|------------------------------|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

6.3.1 E.U.T. Operation

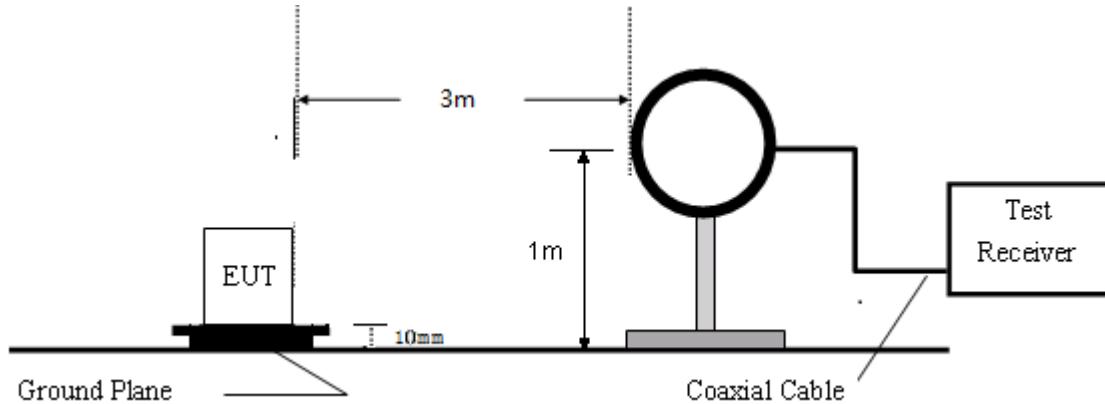
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1002 mbar

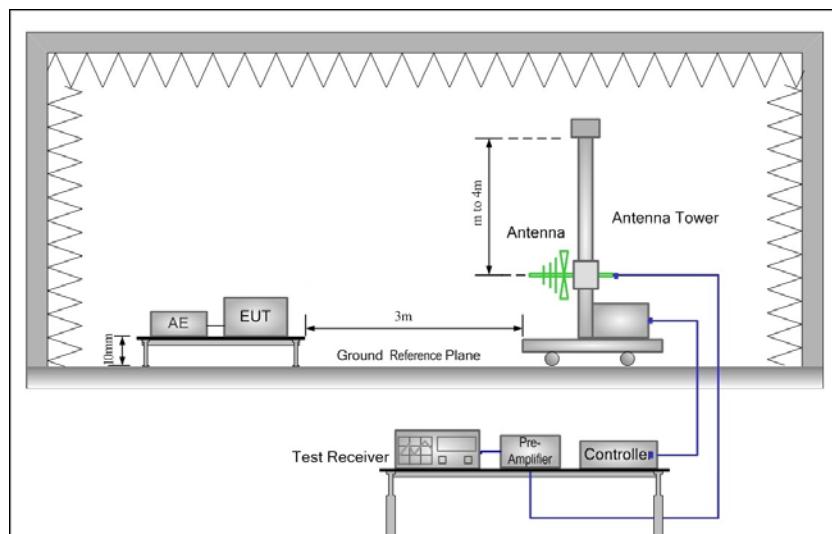
Test mode c:TX mode_Keep the EUT in continuously transmitting mode with GFSK modulation

6.3.2 Test Setup Diagram

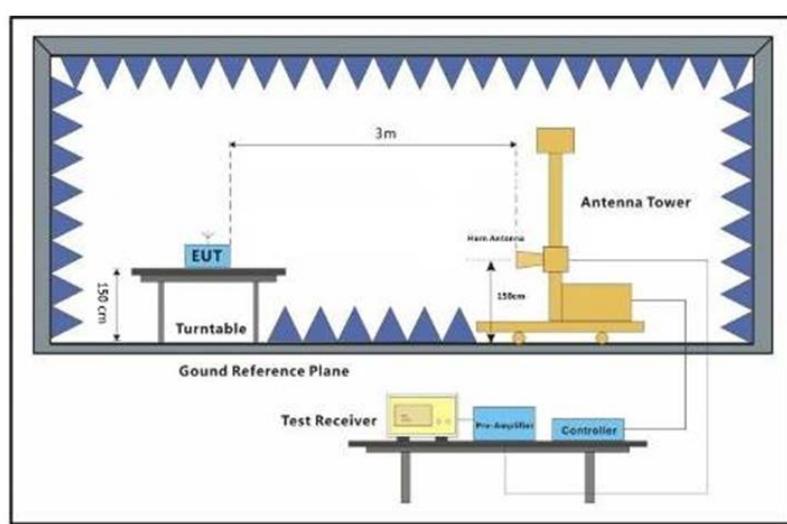
Below 30MHz



30MHz-1GHz



Above 1GHz



6.3.3 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.

Remark:

1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

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

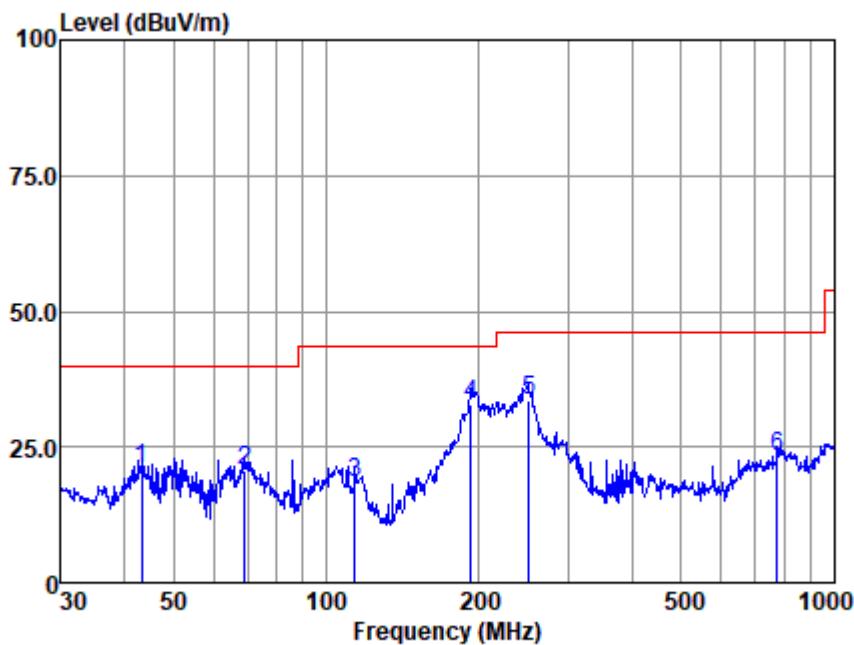
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

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

4) 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown

Below 1GHz

Mode:c; Polarization:Horizontal



Antenna Polarity :HORIZONTAL

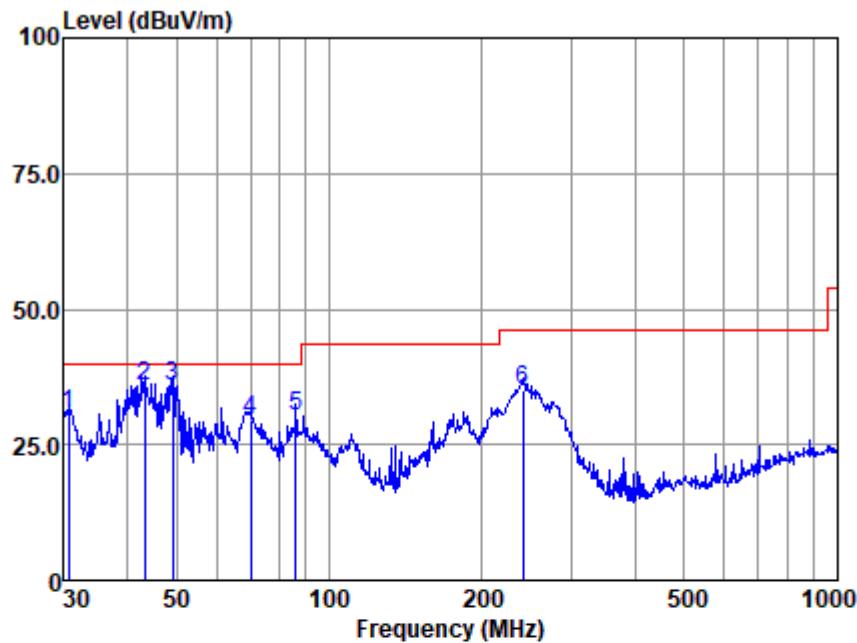
EUT/Project :9377CR

Test mode :b

| | Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---|---------|------------|----------------|------------|---------------|----------------|------------|------------|--------|
| | MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 1 | 43.353 | 48.88 | 13.40 | 0.98 | 42.30 | 20.96 | 40.00 | -19.04 | QP |
| 2 | 69.114 | 50.01 | 11.83 | 1.17 | 42.30 | 20.71 | 40.00 | -19.29 | QP |
| 3 | 113.714 | 48.69 | 10.44 | 1.44 | 42.27 | 18.30 | 43.50 | -25.20 | QP |
| 4 | 193.095 | 62.74 | 10.30 | 1.96 | 42.20 | 32.80 | 43.50 | -10.70 | QP |
| 5 | 250.301 | 61.74 | 11.70 | 2.21 | 42.10 | 33.55 | 46.00 | -12.45 | QP |
| 6 | 774.158 | 39.31 | 22.20 | 3.65 | 42.00 | 23.16 | 46.00 | -22.84 | QP |

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Vertical



Antenna Polarity : VERTICAL

EUT/Project : 9377CR

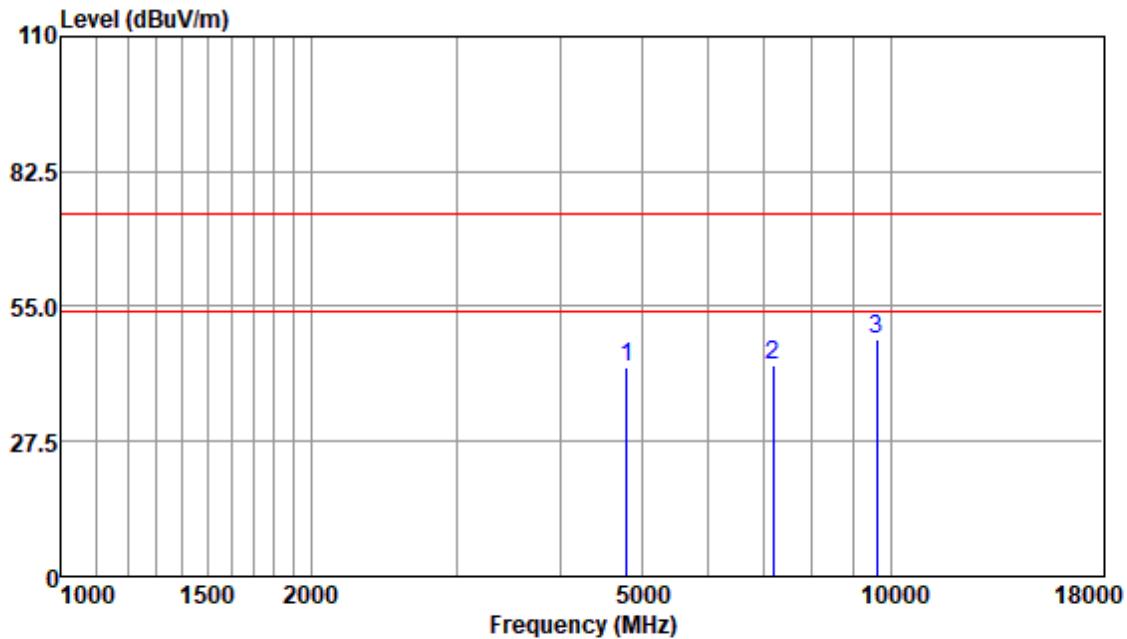
Test mode : b

| Freq | Read | Antenna | Cable | Preamp | Emission | Limit | Over | Remark |
|------|---------|---------|-------|--------|----------|--------|-------|-----------|
| | Level | Factor | Loss | Factor | Level | Line | Limit | |
| | MHz | dBuV | dB/m | dB | dBuV/m | dBuV/m | dB | |
| 1 | 30.638 | 59.85 | 12.23 | 0.85 | 42.39 | 30.54 | 40.00 | -9.46 QP |
| 2 | 43.353 | 63.65 | 13.40 | 0.98 | 42.30 | 35.73 | 40.00 | -4.27 QP |
| 3 | 49.187 | 63.40 | 13.67 | 1.03 | 42.30 | 35.80 | 40.00 | -4.20 QP |
| 4 | 70.090 | 59.10 | 11.70 | 1.17 | 42.30 | 29.67 | 40.00 | -10.33 QP |
| 5 | 85.898 | 63.18 | 8.29 | 1.25 | 42.30 | 30.42 | 40.00 | -9.58 QP |
| 6 | 240.830 | 64.22 | 10.93 | 2.19 | 42.12 | 35.22 | 46.00 | -10.78 QP |

Note: Emission Level = Read Level + Antenna Factor + Cable loss - Preamp Factor

Above 1GHz

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low

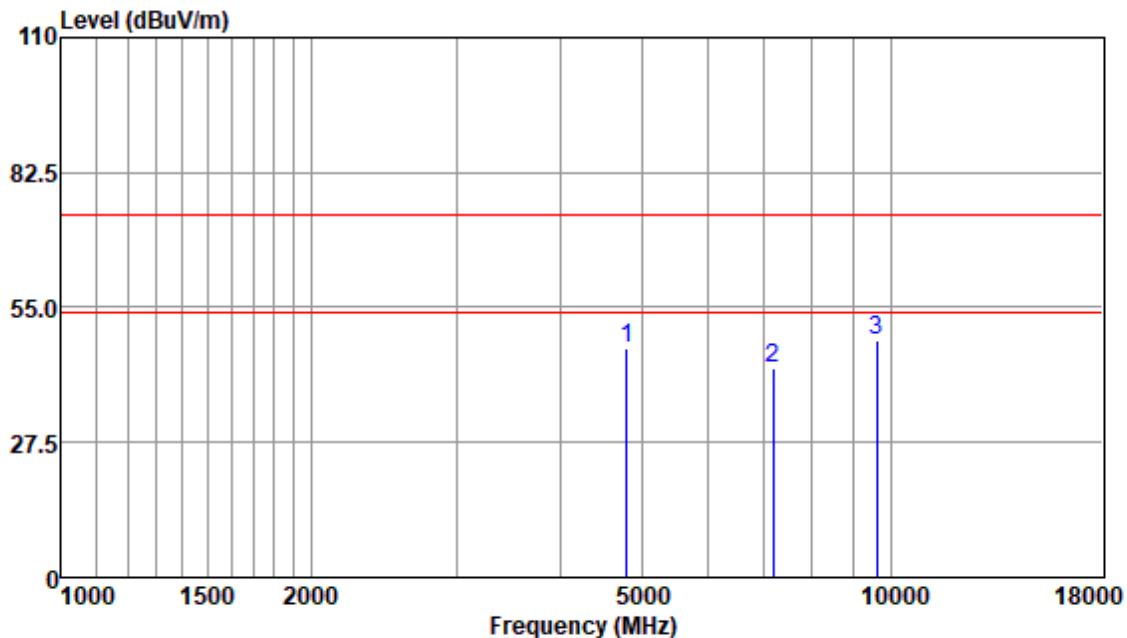


Antenna Polarity :HORIZONTAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|------------|------------|--------|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4804.00 | 42.53 | 33.72 | 5.09 | 38.71 | 42.63 | 74.00 | -31.37 | Peak |
| 7206.00 | 38.15 | 36.28 | 5.75 | 37.18 | 43.00 | 74.00 | -31.00 | Peak |
| 9608.00 | 38.12 | 37.70 | 6.78 | 34.18 | 48.42 | 74.00 | -25.58 | Peak |

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:Low

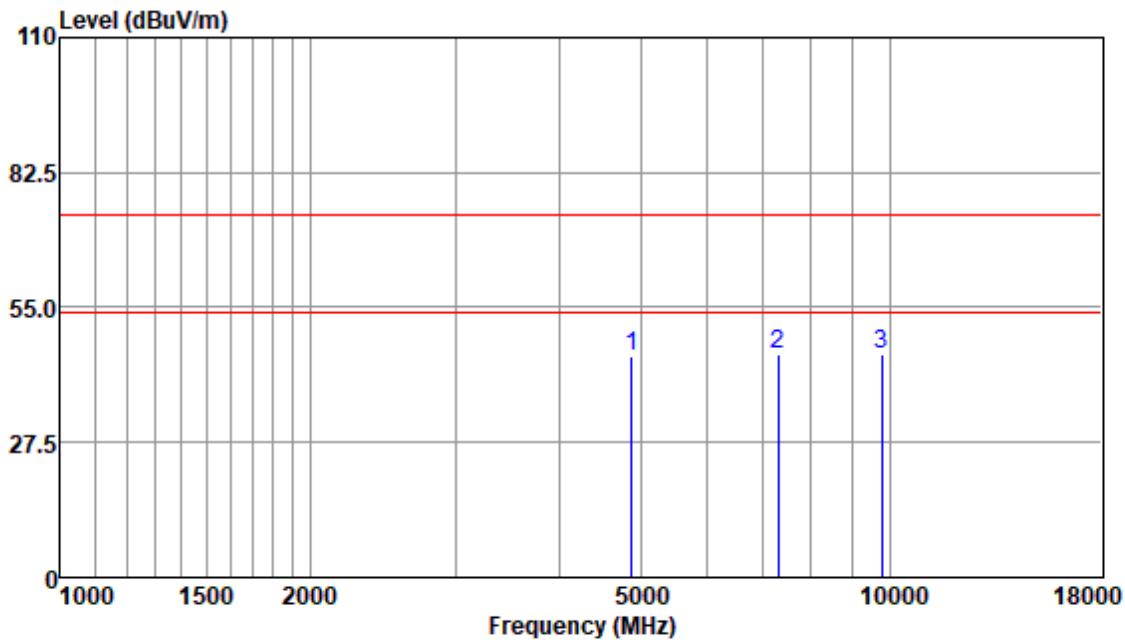


Antenna Polarity :VERTICAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Emission Limit | Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|----------------|--------|------------|--------|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | dB | |
| 4804.00 | 46.44 | 33.72 | 5.09 | 38.71 | 46.54 | 74.00 | -27.46 | Peak | |
| 7206.00 | 37.68 | 36.28 | 5.75 | 37.18 | 42.53 | 74.00 | -31.47 | Peak | |
| 9608.00 | 38.03 | 37.70 | 6.78 | 34.18 | 48.33 | 74.00 | -25.67 | Peak | |

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle

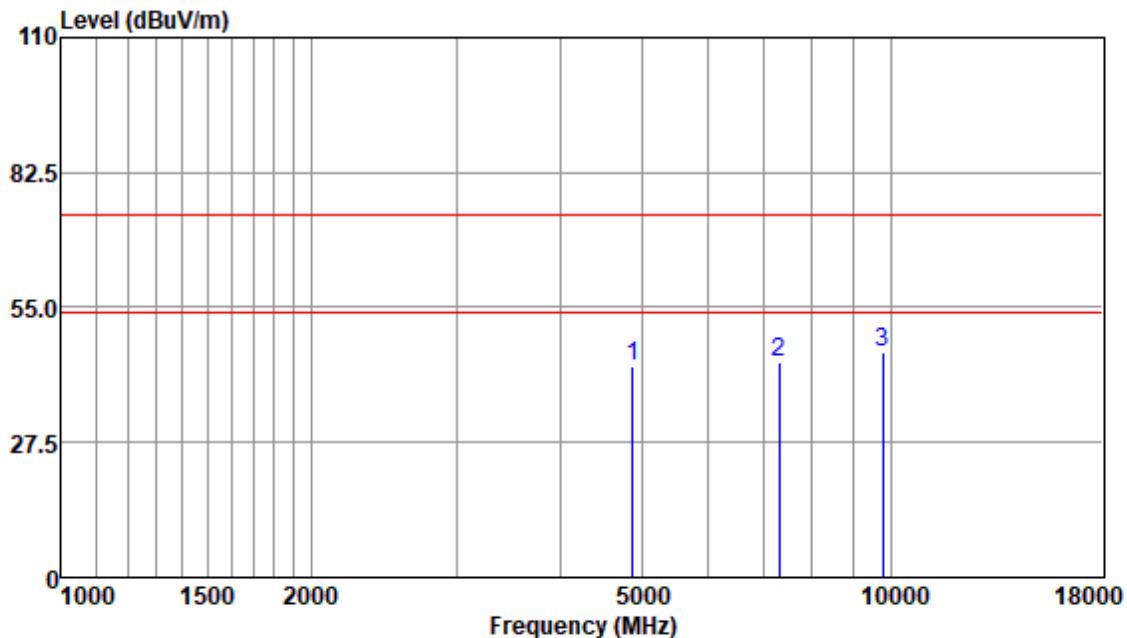


Antenna Polarity :HORIZONTAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|------------|------------|--------|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4880.00 | 45.36 | 33.93 | 4.48 | 38.78 | 44.99 | 74.00 | -29.01 | Peak |
| 7320.00 | 40.30 | 36.47 | 5.80 | 37.10 | 45.47 | 74.00 | -28.53 | Peak |
| 9760.00 | 35.36 | 37.68 | 6.48 | 34.15 | 45.37 | 74.00 | -28.63 | Peak |

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:middle

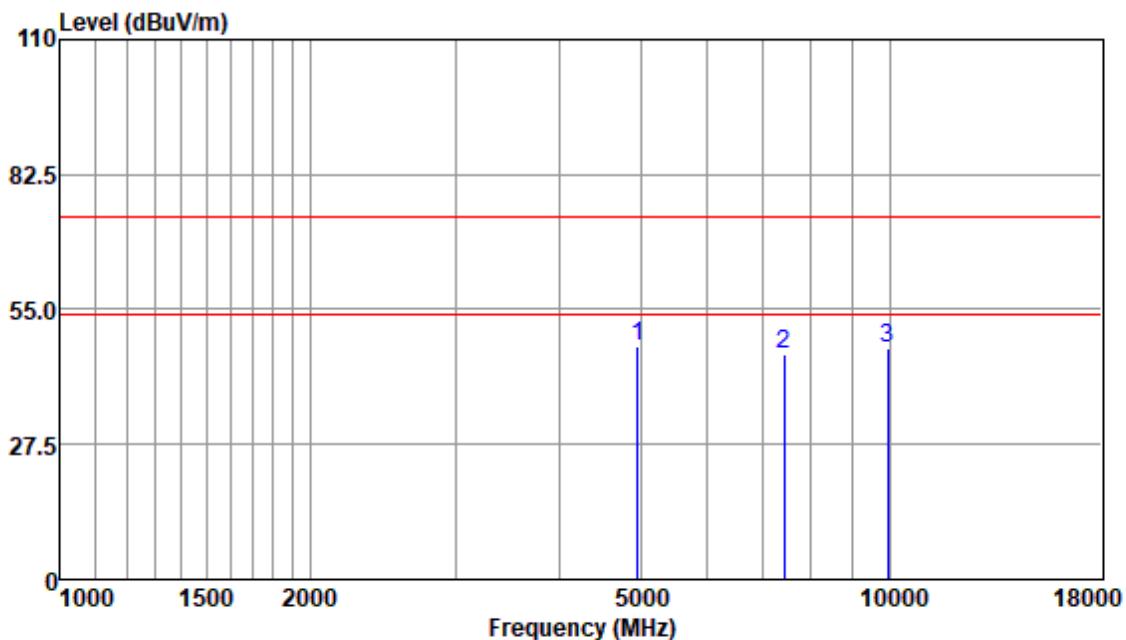


Antenna Polarity :VERTICAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|------------|------------|--------|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4880.00 | 43.27 | 33.93 | 4.48 | 38.78 | 42.90 | 74.00 | -31.10 | Peak |
| 7320.00 | 38.66 | 36.47 | 5.80 | 37.10 | 43.83 | 74.00 | -30.17 | Peak |
| 9760.00 | 36.03 | 37.68 | 6.48 | 34.15 | 46.04 | 74.00 | -27.96 | Peak |

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Horizontal; Modulation:GFSK; ; Channel:High

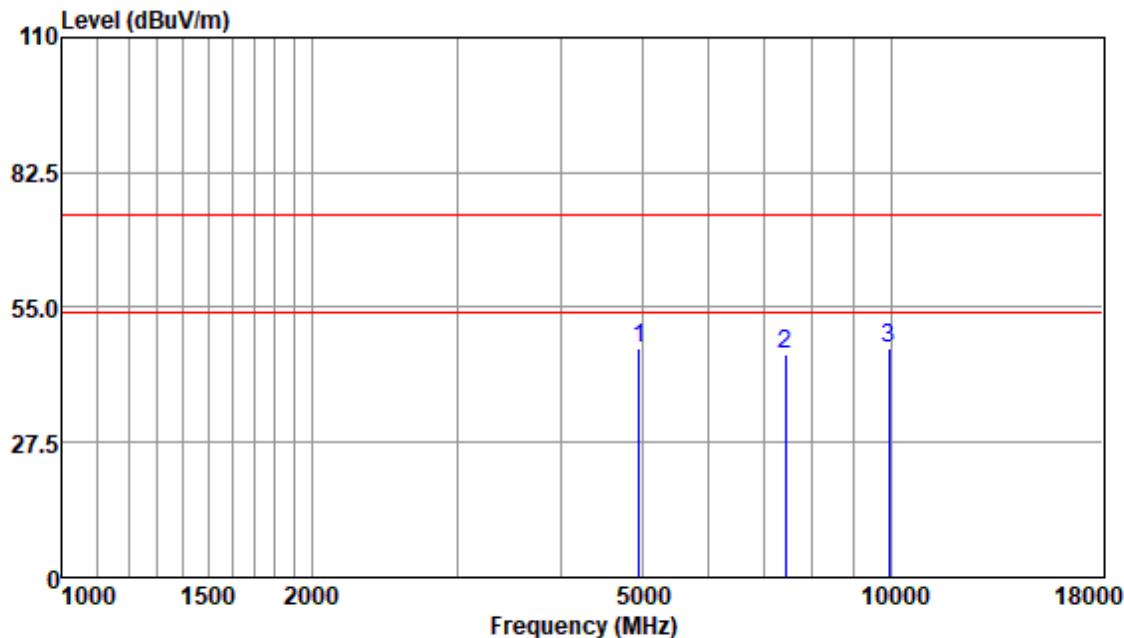


Antenna Polarity :HORIZONTAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|------------|------------|--------|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4960.00 | 47.40 | 33.98 | 5.04 | 38.87 | 47.55 | 74.00 | -26.45 | Peak |
| 7440.00 | 40.24 | 36.40 | 6.09 | 37.03 | 45.70 | 74.00 | -28.30 | Peak |
| 9920.00 | 36.76 | 37.81 | 6.53 | 34.11 | 46.99 | 74.00 | -27.01 | Peak |

Note: Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:c; Polarization:Vertical; Modulation:GFSK; ; Channel:High



Antenna Polarity : VERTICAL

| Freq | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limit Line | Over Limit | Remark |
|---------|------------|----------------|------------|---------------|----------------|------------|------------|--------|
| MHz | dBuv | dB/m | dB | dB | dBuv/m | dBuv/m | dB | |
| 4960.00 | 46.54 | 33.98 | 5.04 | 38.87 | 46.69 | 74.00 | -27.31 | Peak |
| 7440.00 | 39.80 | 36.40 | 6.09 | 37.03 | 45.26 | 74.00 | -28.74 | Peak |
| 9920.00 | 36.65 | 37.81 | 6.53 | 34.11 | 46.88 | 74.00 | -27.12 | Peak |

Note: Emission Level = Read Level + Antenna Factor + Cable loss - Preamp Factor



7 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

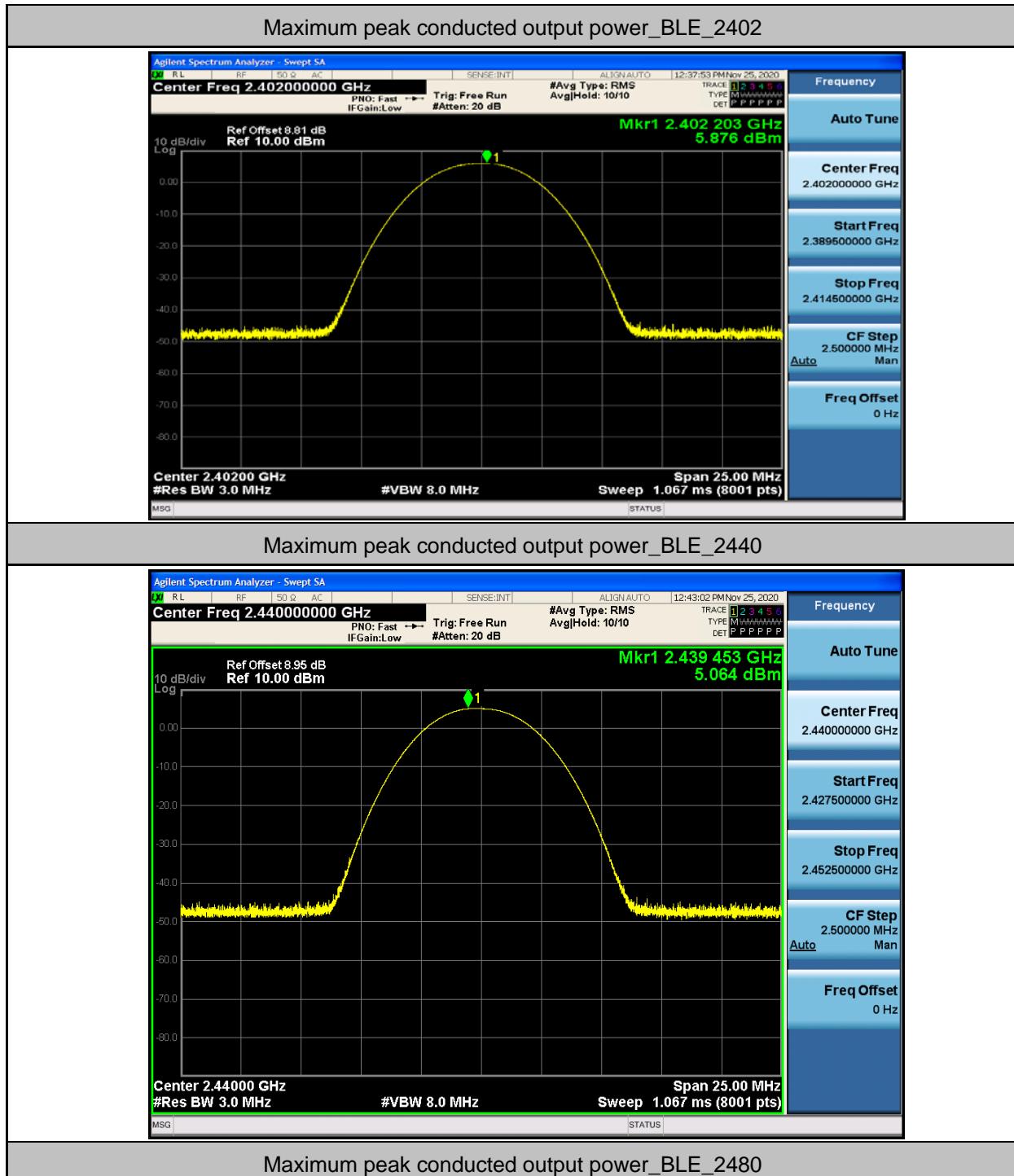
8 EUT Constructional Details

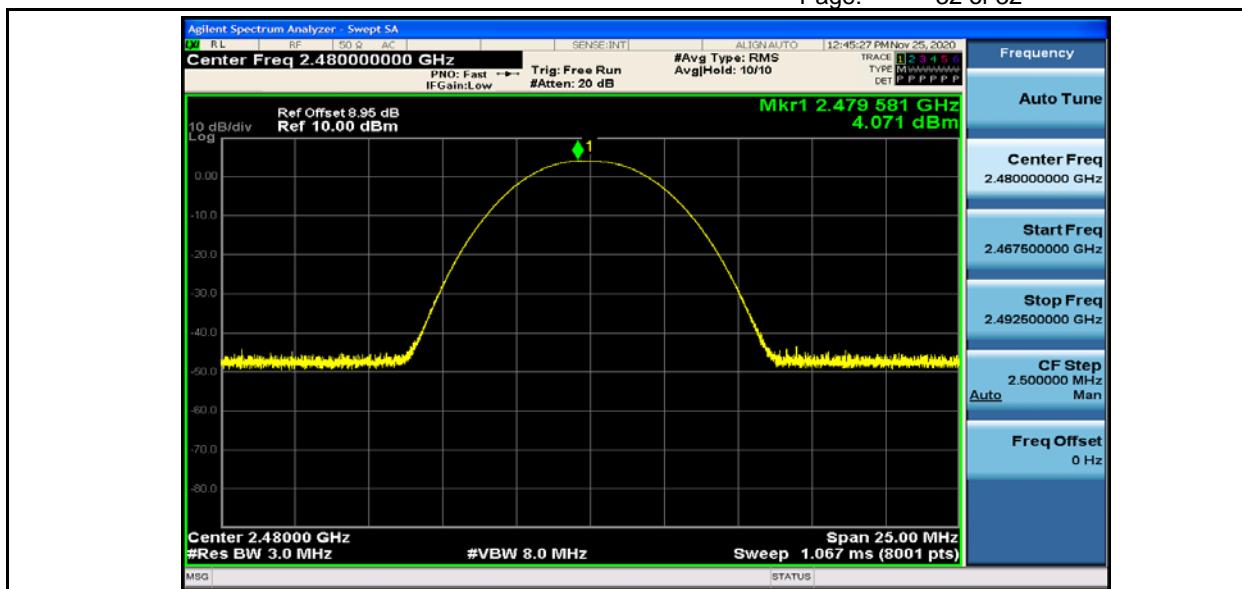
Refer to the < External Photos > & < Internal Photos >.

Appendix B for SHEM201100938402

1. Maximum peak conducted output power

| Test Mode | Test Channel | Power[dBm] | Limit[dBm] | Verdict |
|-----------|--------------|------------|------------|---------|
| BLE | 2402 | 5.88 | 30 | PASS |
| BLE | 2440 | 5.06 | 30 | PASS |
| BLE | 2480 | 4.07 | 30 | PASS |





- End of the Report -