

## TEST REPORT

**Application No.:** SZEM2005003546CR  
**Applicant:** SHENZHEN JIPUSLE TECHNOLOGY CO., LTD  
**Address of Applicant:** 201, No. 20, Gushu Xijing Road, Gushu community, Xixiang street, Bao'an District, Shenzhen 518000 China  
**Manufacturer:** SHENZHEN JIPUSLE TECHNOLOGY CO., LTD  
**Address of Manufacturer:** 201, No. 20, Gushu Xijing Road, Gushu community, Xixiang street, Bao'an District, Shenzhen 518000 China  
**Factory:** SHENZHEN JIPUSLE TECHNOLOGY CO., LTD  
**Address of Factory:** 201, No. 20, Gushu Xijing Road, Gushu community, Xixiang street, Bao'an District, Shenzhen 518000 China  
**Equipment Under Test (EUT):**  
**EUT Name:** 2.4G Wireless Module  
**Model No.:** 2.4G-01, SPD200 ♣  
 ♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.  
**Trade Mark:** KINGPULSE  
**FCC ID:** 2AWGP24G-01MODEL  
**Standard(s) :** 47 CFR Part 15, Subpart C 15.249  
**Date of Receipt:** 2020-05-08  
**Date of Test:** 2020-05-14 to 2020-07-24  
**Date of Issue:** 2020-08-01

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

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

*Keny Xu*

Keny Xu  
 EMC Laboratory Manager



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| Revision Record |         |            |          |          |
|-----------------|---------|------------|----------|----------|
| Version         | Chapter | Date       | Modifier | Remark   |
| 01              |         | 2020-08-01 |          | Original |
|                 |         |            |          |          |
|                 |         |            |          |          |

|                          |  |                                                                                     |  |
|--------------------------|--|-------------------------------------------------------------------------------------|--|
| Authorized for issue by: |  |                                                                                     |  |
|                          |  |    |  |
|                          |  | <hr/> Damon Su /Project Engineer                                                    |  |
|                          |  |  |  |
|                          |  | <hr/> Eric Fu /Reviewer                                                             |  |



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## 2 Test Summary

| Radio Spectrum Technical Requirement |                                  |        |                                  |        |
|--------------------------------------|----------------------------------|--------|----------------------------------|--------|
| Item                                 | Standard                         | Method | Requirement                      | Result |
| Antenna Requirement                  | 47 CFR Part 15, Subpart C 15.249 | 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 15.249 | ANSI C63.10 (2013) Section 6.2         | 47 CFR Part 15, Subpart C 15.207                      | Pass   |
| 20dB Bandwidth                                       | 47 CFR Part 15, Subpart C 15.249 | ANSI C63.10 (2013) Section 6.9         | 47 CFR Part 15, Subpart C 15.215                      | 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   |
| 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   |
| 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   |

### Declaration of EUT Family Grouping:

Model No.: 2.4G-01, SPD200

Only the model 2.4G-01 was tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on model No.



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## 4 General Information

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

|                      |              |
|----------------------|--------------|
| Power Supply:        | DC 3V.       |
| Operation Frequency: | 2405-2477MHz |
| Modulation Type:     | GFSK         |
| Number of Channels:  | 52           |
| Antenna Type:        | PCB Antenna  |
| Antenna Gain:        | 0dBi         |

### Frequency List

| Channel No. | Frequency | Channel No. | Frequency | Channel No. | Frequency | Channel No. | Frequency |
|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|
| 1           | 2405      | 16          | 2429      | 34          | 2453      | 52          | 2477      |
| 2           | 2406      | 17          | 2430      | 35          | 2454      | /           | /         |
| 3           | 2407      | 18          | 2431      | 36          | 2455      | /           | /         |
| 4           | 2409      | 19          | 2433      | 37          | 2457      |             |           |
| 5           | 2410      | 20          | 2434      | 38          | 2458      |             |           |
| 6           | 2411      | 21          | 2435      | 39          | 2459      |             |           |
| 7           | 2413      | 22          | 2437      | 40          | 2461      |             |           |
| 8           | 2414      | 23          | 2438      | 41          | 2462      |             |           |
| 9           | 2415      | 24          | 2439      | 42          | 2463      |             |           |
| 10          | 2417      | 25          | 2441      | 43          | 2465      |             |           |
| 11          | 2418      | 26          | 2442      | 44          | 2466      |             |           |
| 12          | 2419      | 27          | 2443      | 45          | 2467      |             |           |
| 13          | 2421      | 28          | 2445      | 46          | 2469      |             |           |
| 14          | 2422      | 29          | 2446      | 47          | 2470      |             |           |
| 15          | 2423      | 30          | 2447      | 48          | 2471      |             |           |
| 16          | 2425      | 31          | 2449      | 49          | 2473      |             |           |
| 17          | 2426      | 32          | 2450      | 50          | 2474      |             |           |
| 18          | 2427      | 33          | 2451      | 51          | 2475      |             |           |

### 4.2 Description of Support Units

| Description     | Manufacturer | Model No. | Serial No.     |
|-----------------|--------------|-----------|----------------|
| DC power supply | ZHAOXIN      | RXN-305D  | REF.No.SEA2700 |



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### 4.3 Measurement Uncertainty

| No. | Item                            | Measurement Uncertainty              |
|-----|---------------------------------|--------------------------------------|
| 1   | Radio Frequency                 | $\pm 7.25 \times 10^{-8}$            |
| 2   | Duty cycle                      | $\pm 0.37\%$                         |
| 3   | Occupied Bandwidth              | $\pm 3\%$                            |
| 4   | Conduction emission             | $\pm 3.0\text{dB}$ (150kHz to 30MHz) |
| 5   | RF conducted power              | $\pm 0.75\text{dB}$                  |
| 6   | RF power density                | $\pm 2.84\text{dB}$                  |
| 7   | Conducted Spurious emissions    | $\pm 0.75\text{dB}$                  |
| 8   | RF Radiated power               | $\pm 4.5\text{dB}$ (Below 1GHz)      |
|     |                                 | $\pm 4.8\text{dB}$ (Above 1GHz)      |
| 9   | Radiated Spurious emission test | $\pm 4.5\text{dB}$ (Below 1GHz)      |
|     |                                 | $\pm 4.8\text{dB}$ (Above 1GHz)      |
| 10  | Temperature test                | $\pm 1^\circ\text{C}$                |
| 11  | Humidity test                   | $\pm 3\%$                            |
| 12  | Supply voltages                 | $\pm 1\%$                            |
| 13  | Time                            | $\pm 3\%$                            |

#### 4.4 Test Location

All tests were performed at:

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No tests were sub-contracted.

#### 4.5 Test Facility

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

- **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.

- **Innovation, Science and Economic Development Canada**

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

CAB identifier: CN0006.

IC#: 4620C.

#### 4.6 Deviation from Standards

None

#### 4.7 Abnormalities from Standard Conditions

None

## 5 Equipment List

| 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    | 2019-06-13 | 2022-06-12   |
| Measurement Software                                | AUDIX            | e3 V8.2014-6-27 | N/A          | N/A        | N/A          |
| Coaxial Cable                                       | SGS              | N/A             | SEM024-01    | 2020-07-10 | 2021-07-09   |
| LISN                                                | Rohde & Schwarz  | ENV216          | SEM007-01    | 2019-09-24 | 2020-09-23   |
| LISN                                                | ETS-LINDGREN     | 3816/2          | SEM007-02    | 2020-04-01 | 2021-03-31   |
| EMI Test Receiver                                   | Rohde & Schwarz  | ESCI            | SEM004-02    | 2020-03-24 | 2021-03-23   |

| 20dB Bandwidth                       |                 |                 |              |            |              |
|--------------------------------------|-----------------|-----------------|--------------|------------|--------------|
| Equipment                            | Manufacturer    | Model No        | Inventory No | Cal Date   | Cal Due Date |
| Shielding Room                       | SAEMC           | MSR733          | SEM001-09    | 2019-06-13 | 2022-06-12   |
| DC Power Supply                      | Rohde & Schwarz | NGSM 32/10      | SEM011-04    | 2020-03-24 | 2021-03-23   |
| Spectrum Analyzer                    | Rohde & Schwarz | FSP             | SEM004-06    | 2019-09-24 | 2020-09-23   |
| Measurement Software                 | TST             | TST PASS V1.0.5 | N/A          | N/A        | N/A          |
| Coaxial Cable                        | SGS             | N/A             | SEM031-02    | 2020-07-10 | 2021-07-09   |
| Attenuator                           | Huber+Suhner    | 6620_SMA-50-1   | SEM021-09    | N/A        | N/A          |
| Signal Generator                     | KEYSIGHT        | N5173B          | SEM006-05    | 2019-09-24 | 2020-09-23   |
| Power Meter                          | Rohde & Schwarz | NRVS            | SEM014-02    | 2019-09-24 | 2020-09-23   |
| Electric and Magnetic Field Analyzer | Narda           | EHP-50F         | SEM022-05    | 2019-11-28 | 2020-11-27   |

| Field Strength of the Fundamental Signal (15.249(a)) |                                    |                 |              |            |              |
|------------------------------------------------------|------------------------------------|-----------------|--------------|------------|--------------|
| Equipment                                            | Manufacturer                       | Model No        | Inventory No | Cal Date   | Cal Due Date |
| 3m Semi-Anechoic Chamber                             | AUDIX                              | N/A             | SEM001-02    | 2018-03-13 | 2021-03-12   |
| Measurement Software                                 | AUDIX                              | e3 V8.2014-6-27 | N/A          | N/A        | N/A          |
| Coaxial Cable                                        | SGS                                | N/A             | SEM026-01    | 2020-07-10 | 2021-07-09   |
| EXA Spectrum Analyzer                                | AgilentTechnologies Inc            | N9010A          | SEM004-12    | 2020-04-09 | 2021-04-08   |
| Horn Antenna                                         | Rohde & Schwarz                    | HF907           | SEM003-07    | 2018-04-13 | 2021-04-12   |
| Horn Antenna                                         | Schwarzbeck                        | BBHA 9170       | SEM003-15    | 2017-10-17 | 2020-10-16   |
| Pre-Amplifier                                        | Compliance Directions Systems Inc. | PAP-0126        | SEM004-11    | 2019-09-24 | 2020-09-23   |
| Pre-amplifier                                        | Rohde & Schwarz                    | CH14-H052       | SEM005-17    | 2020-04-01 | 2021-03-31   |



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|                     |                                          |             |           |            |            |
|---------------------|------------------------------------------|-------------|-----------|------------|------------|
| Pre-amplifier       | Compliance<br>Directions Systems<br>Inc. | PAP-2640-50 | SEM005-08 | 2020-04-01 | 2021-03-31 |
| DC Power Supply     | Zhao Xin                                 | KXN-6020D   | SEM011-08 | 2019-09-24 | 2020-09-23 |
| Active Loop Antenna | ETS-Lindgren                             | 6502        | SEM003-08 | 2017-08-22 | 2020-08-21 |

**Restricted Band Around Fundamental Frequency**

| Equipment                | Manufacturer                             | Model No        | Inventory No | Cal Date   | Cal Due Date |
|--------------------------|------------------------------------------|-----------------|--------------|------------|--------------|
| 3m Semi-Anechoic Chamber | AUDIX                                    | N/A             | SEM001-02    | 2018-03-13 | 2021-03-12   |
| Measurement Software     | AUDIX                                    | e3 V8.2014-6-27 | N/A          | N/A        | N/A          |
| Coaxial Cable            | SGS                                      | N/A             | SEM026-01    | 2020-07-10 | 2021-07-09   |
| EXA Spectrum Analyzer    | AgilentTechnologies Inc                  | N9010A          | SEM004-12    | 2020-04-09 | 2021-04-08   |
| Horn Antenna             | Rohde & Schwarz                          | HF907           | SEM003-07    | 2018-04-13 | 2021-04-12   |
| Horn Antenna             | Schwarzbeck                              | BBHA 9170       | SEM003-15    | 2017-10-17 | 2020-10-16   |
| Pre-Amplifier            | Compliance<br>Directions Systems<br>Inc. | PAP-0126        | SEM004-11    | 2019-09-24 | 2020-09-23   |
| Pre-amplifier            | Rohde & Schwarz                          | CH14-H052       | SEM005-17    | 2020-04-01 | 2021-03-31   |
| Pre-amplifier            | Compliance<br>Directions Systems<br>Inc. | PAP-2640-50     | SEM005-08    | 2020-04-01 | 2021-03-31   |
| DC Power Supply          | Zhao Xin                                 | KXN-6020D       | SEM011-08    | 2019-09-24 | 2020-09-23   |
| Active Loop Antenna      | ETS-Lindgren                             | 6502            | SEM003-08    | 2017-08-22 | 2020-08-21   |

**Radiated Emissions**

| Equipment                | Manufacturer                             | Model No        | Inventory No | Cal Date   | Cal Due Date |
|--------------------------|------------------------------------------|-----------------|--------------|------------|--------------|
| 3m Semi-Anechoic Chamber | AUDIX                                    | N/A             | SEM001-02    | 2018-03-13 | 2021-03-12   |
| Measurement Software     | AUDIX                                    | e3 V8.2014-6-27 | N/A          | N/A        | N/A          |
| Coaxial Cable            | SGS                                      | N/A             | SEM026-01    | 2020-07-10 | 2021-07-09   |
| EXA Spectrum Analyzer    | AgilentTechnologies Inc                  | N9010A          | SEM004-12    | 2020-04-09 | 2021-04-08   |
| Horn Antenna             | Rohde & Schwarz                          | HF907           | SEM003-07    | 2018-04-13 | 2021-04-12   |
| Horn Antenna             | Schwarzbeck                              | BBHA 9170       | SEM003-15    | 2017-10-17 | 2020-10-16   |
| Pre-Amplifier            | Compliance<br>Directions Systems<br>Inc. | PAP-0126        | SEM004-11    | 2019-09-24 | 2020-09-23   |
| Pre-amplifier            | Rohde & Schwarz                          | CH14-H052       | SEM005-17    | 2020-04-01 | 2021-03-31   |



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|                     |                                          |             |           |            |            |
|---------------------|------------------------------------------|-------------|-----------|------------|------------|
| Pre-amplifier       | Compliance<br>Directions Systems<br>Inc. | PAP-2640-50 | SEM005-08 | 2020-04-01 | 2021-03-31 |
| DC Power Supply     | Zhao Xin                                 | KXN-6020D   | SEM011-08 | 2019-09-24 | 2020-09-23 |
| Active Loop Antenna | ETS-Lindgren                             | 6502        | SEM003-08 | 2017-08-22 | 2020-08-21 |

| Radiated Emissions (below 1GHz) |                      |                 |              |            |              |
|---------------------------------|----------------------|-----------------|--------------|------------|--------------|
| Equipment                       | Manufacturer         | Model No        | Inventory No | Cal Date   | Cal Due Date |
| 3m Semi-Anechoic Chamber        | ETS-LINDGREN         | N/A             | SEM001-01    | 2017-08-05 | 2020-08-04   |
| Measurement Software            | AUDIX                | e3 V8.2014-6-27 | N/A          | N/A        | N/A          |
| Coaxial Cable                   | SGS                  | N/A             | SEM025-01    | 2019-07-12 | 2020-07-11   |
|                                 |                      |                 |              | 2020-07-10 | 2021-07-09   |
| MXE EMI receiver                | KEYSIGHT             | N9038A          | SEM004-15    | 2019-12-16 | 2020-12-15   |
| BiConiLog Antenna               | ETS-LINDGREN         | 3142C           | SEM003-02    | 2019-05-24 | 2022-05-23   |
| Pre-amplifier                   | Agilent Technologies | 8447D           | SEM005-01    | 2020-04-01 | 2021-03-31   |

| 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    | 2019-09-26 | 2020-09-25   |
| Humidity/ Temperature Indicator | Shanghai Meteorological Industry Factory  | ZJ1-2B   | SEM002-04    | 2019-09-26 | 2020-09-25   |
| Humidity/ Temperature Indicator | Mingle                                    | N/A      | SEM002-08    | 2019-09-26 | 2020-09-25   |
| Barometer                       | Changchun Meteorological Industry Factory | DYM3     | SEM002-01    | 2020-04-07 | 2021-04-06   |



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## 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

Limit:

15.203 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.

#### 6.1.2 Conclusion

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

Antenna location: Refer to External photos



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## 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: 23 °C Humidity: 56 % RH Atmospheric Pressure: 1005 mbar

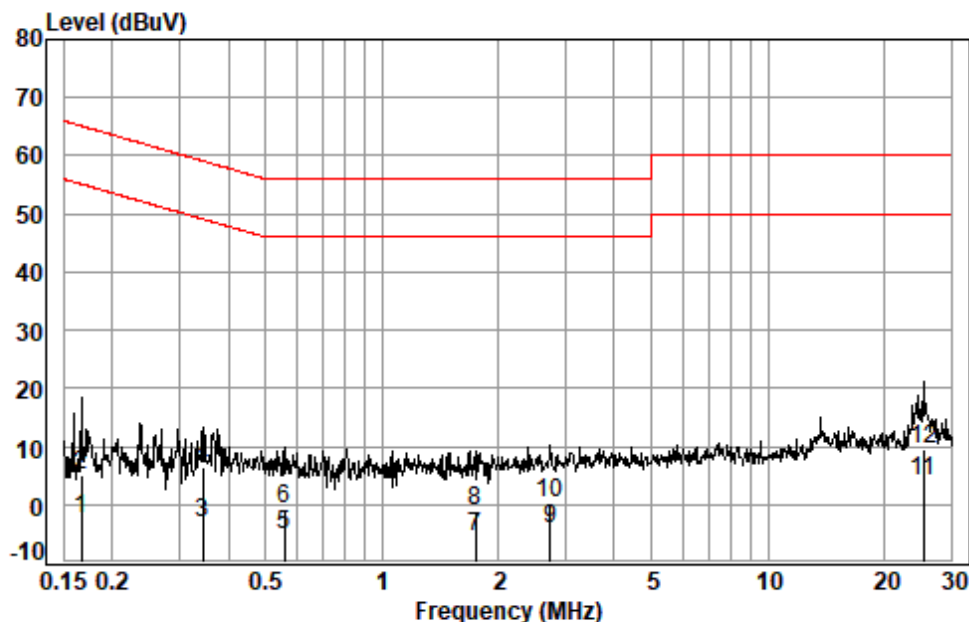
Test mode a:TX mode\_Keep the EUT in transmitting with modulation mode.

#### 7.1.2 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.

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

Mode:a; Line:Live Line



Site : Shielding Room

Condition: Line

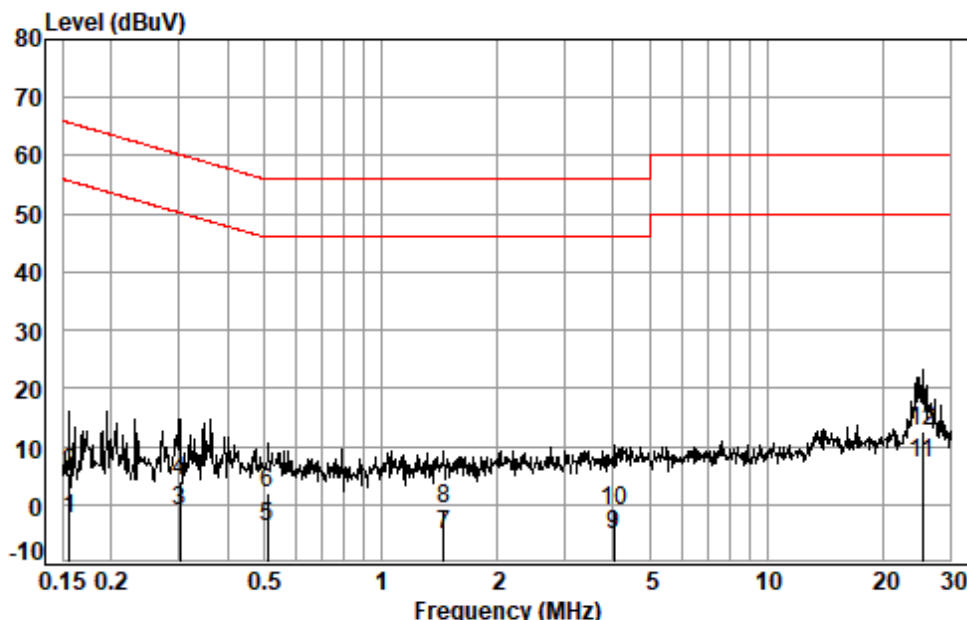
Job No. : 03546CR

Test mode:

|    | Freq    | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark  |
|----|---------|------------|-------------|------------|-------|------------|------------|---------|
|    | MHz     | dB         | dB          | dBuV       | dBuV  | dBuV       | dB         |         |
| 1  | 0.1668  | 0.01       | 9.68        | -12.03     | -2.34 | 55.12      | -57.46     | Average |
| 2  | 0.1668  | 0.01       | 9.68        | -4.77      | 4.92  | 65.12      | -60.20     | QP      |
| 3  | 0.3428  | 0.04       | 9.68        | -13.04     | -3.32 | 49.13      | -52.45     | Average |
| 4  | 0.3428  | 0.04       | 9.68        | -3.40      | 6.32  | 59.13      | -52.81     | QP      |
| 5  | 0.5581  | 0.07       | 9.69        | -14.91     | -5.15 | 46.00      | -51.15     | Average |
| 6  | 0.5581  | 0.07       | 9.69        | -10.38     | -0.62 | 56.00      | -56.62     | QP      |
| 7  | 1.7529  | 0.15       | 9.74        | -15.44     | -5.55 | 46.00      | -51.55     | Average |
| 8  | 1.7529  | 0.15       | 9.74        | -10.91     | -1.02 | 56.00      | -57.02     | QP      |
| 9  | 2.7356  | 0.16       | 9.77        | -13.97     | -4.04 | 46.00      | -50.04     | Average |
| 10 | 2.7356  | 0.16       | 9.77        | -9.50      | 0.43  | 56.00      | -55.57     | QP      |
| 11 | 25.3214 | 0.26       | 10.97       | -7.30      | 3.93  | 50.00      | -46.07     | Average |
| 12 | 25.3214 | 0.26       | 10.97       | -1.78      | 9.45  | 60.00      | -50.55     | QP      |



Mode:a; Line:Neutral Line



Site : Shielding Room

Condition: Neutral

Job No. : 03546CR

Test mode:

|    | Freq    | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark  |
|----|---------|------------|-------------|------------|-------|------------|------------|---------|
|    | MHz     | dB         | dB          | dBuV       | dBuV  | dBuV       | dB         |         |
| 1  | 0.1557  | 0.01       | 9.67        | -12.31     | -2.63 | 55.69      | -58.32     | Average |
| 2  | 0.1557  | 0.01       | 9.67        | -4.44      | 5.24  | 65.69      | -60.45     | QP      |
| 3  | 0.3019  | 0.04       | 9.67        | -10.86     | -1.15 | 50.19      | -51.34     | Average |
| 4  | 0.3019  | 0.04       | 9.67        | -5.53      | 4.18  | 60.19      | -56.01     | QP      |
| 5  | 0.5101  | 0.06       | 9.67        | -13.41     | -3.68 | 46.00      | -49.68     | Average |
| 6  | 0.5101  | 0.06       | 9.67        | -7.70      | 2.03  | 56.00      | -53.97     | QP      |
| 7  | 1.4562  | 0.13       | 9.71        | -15.08     | -5.24 | 46.00      | -51.24     | Average |
| 8  | 1.4562  | 0.13       | 9.71        | -10.53     | -0.69 | 56.00      | -56.69     | QP      |
| 9  | 4.0275  | 0.16       | 9.80        | -15.30     | -5.34 | 46.00      | -51.34     | Average |
| 10 | 4.0275  | 0.16       | 9.80        | -10.94     | -0.98 | 56.00      | -56.98     | QP      |
| 11 | 25.3214 | 0.26       | 10.74       | -3.89      | 7.11  | 50.00      | -42.89     | Average |
| 12 | 25.3214 | 0.26       | 10.74       | 1.75       | 12.75 | 60.00      | -47.25     | QP      |



### 7.2 20dB Bandwidth

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

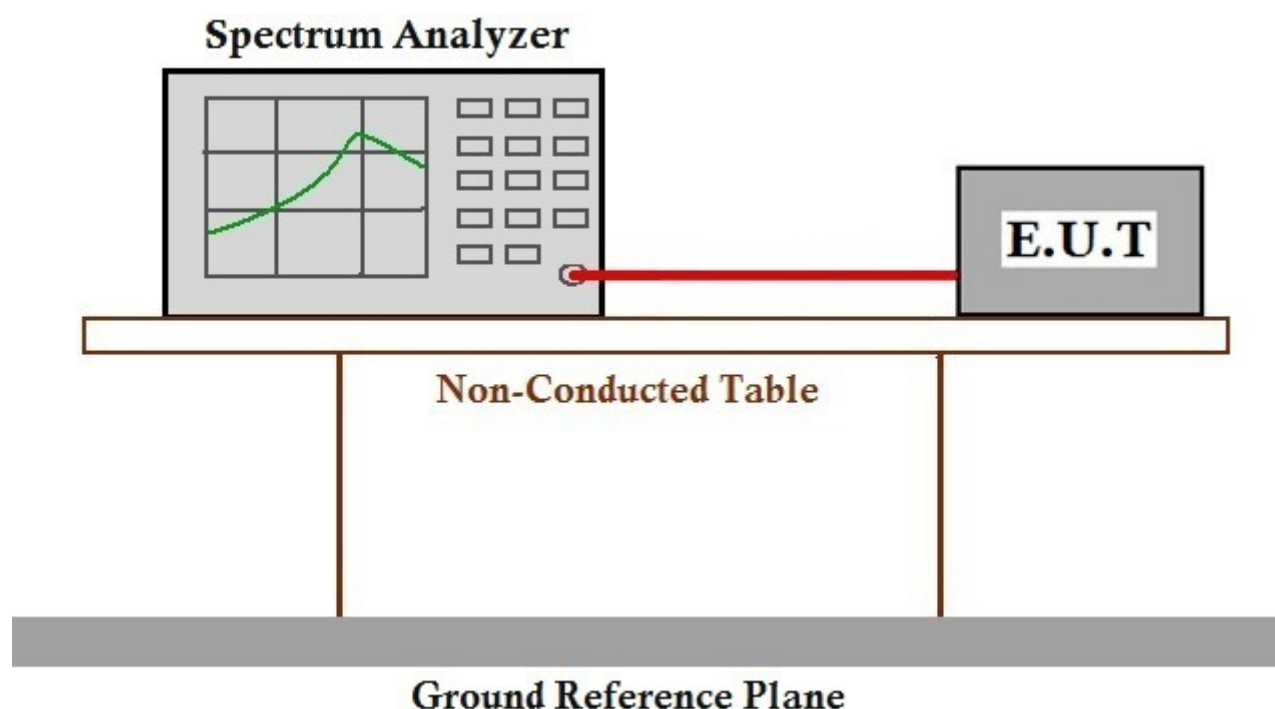
#### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 29.7 °C Humidity: 45.5 % RH Atmospheric Pressure: 1005 mbar

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

#### 7.2.2 Test Setup Diagram



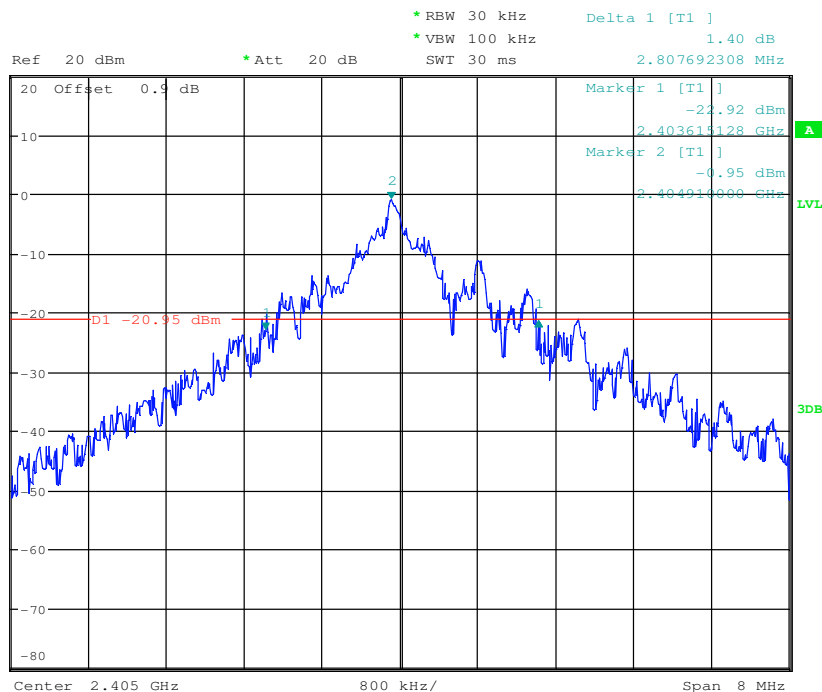
#### 7.2.3 Measurement Procedure and Data

| Test channel | 20dB bandwidth (MHz) | Results |
|--------------|----------------------|---------|
| Lowest       | 2.808                | Pass    |
| Middle       | 3.346                | Pass    |
| Highest      | 2.192                | Pass    |

Mode:a; Channel:Low



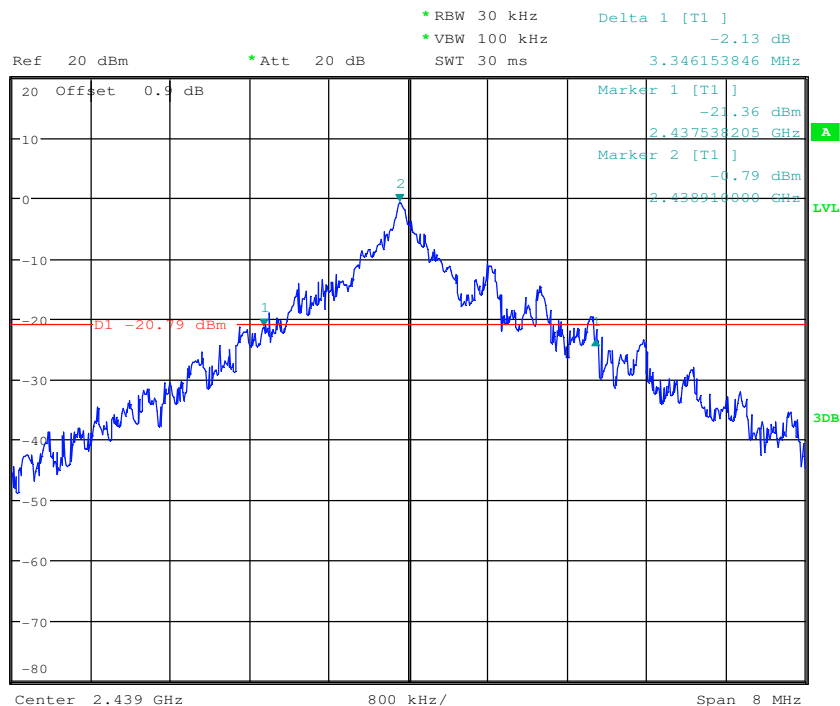
1 PK  
VIEW



Mode:a; Channel:middle



1 PK  
VIEW



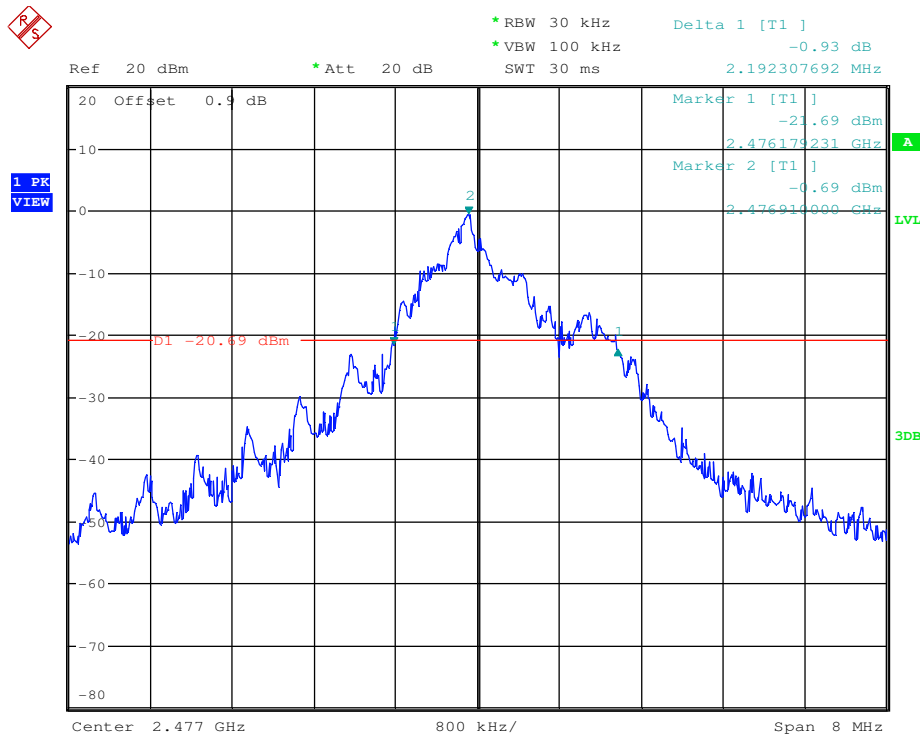
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Mode:a; Channel:High



### 7.3 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:

| Fundamental frequency(MHz) | Field strength of fundamental(millivolts/meter) | Field strength of harmonics(microvolts/meter) |
|----------------------------|-------------------------------------------------|-----------------------------------------------|
| 902-928                    | 50                                              | 500                                           |
| 2400-2483.5                | 50                                              | 500                                           |
| 5725-5875                  | 50                                              | 500                                           |
| 24000-24250                | 250                                             | 2500                                          |

Remark: The frequencies above 1000MHz 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 fundamental frequency in "902-928MHz", the field strength of fundamental is based on Quasi-Peak.

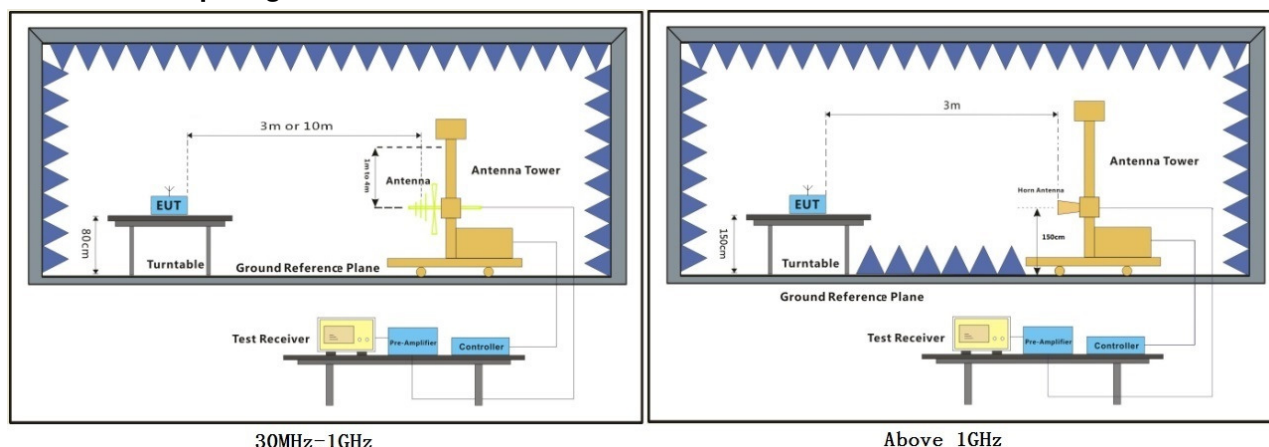
#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 24.7 °C Humidity: 57.4 % RH Atmospheric Pressure: 1010 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

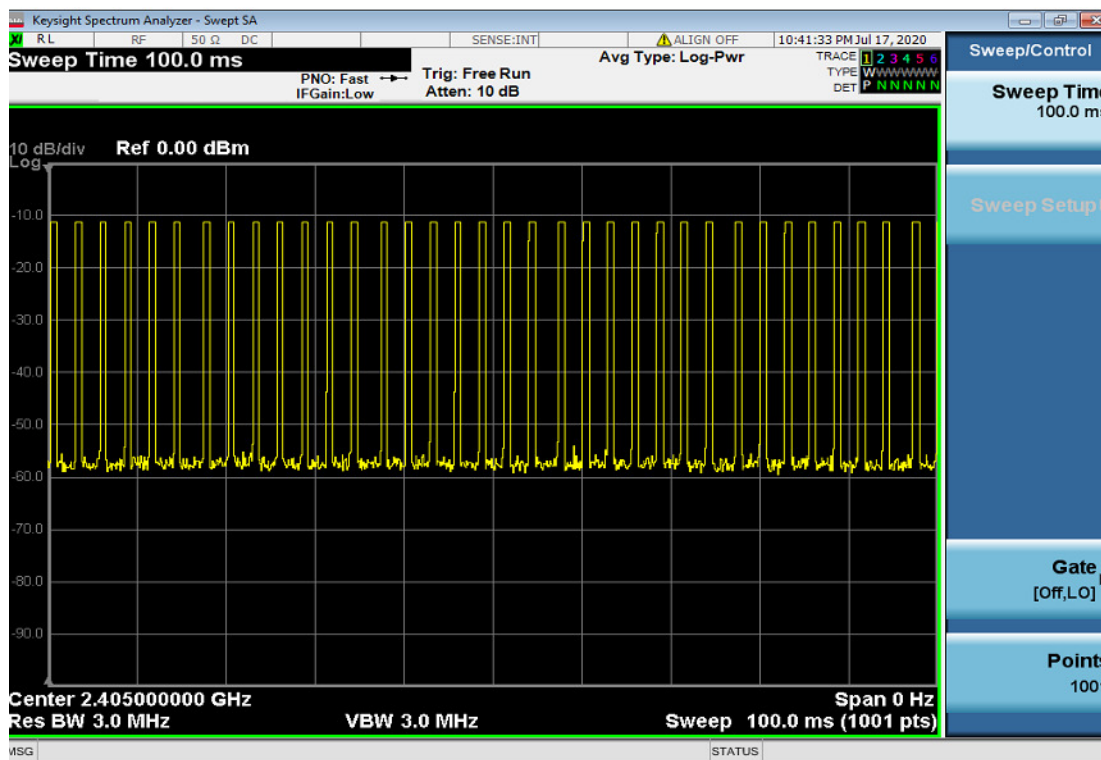
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 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.

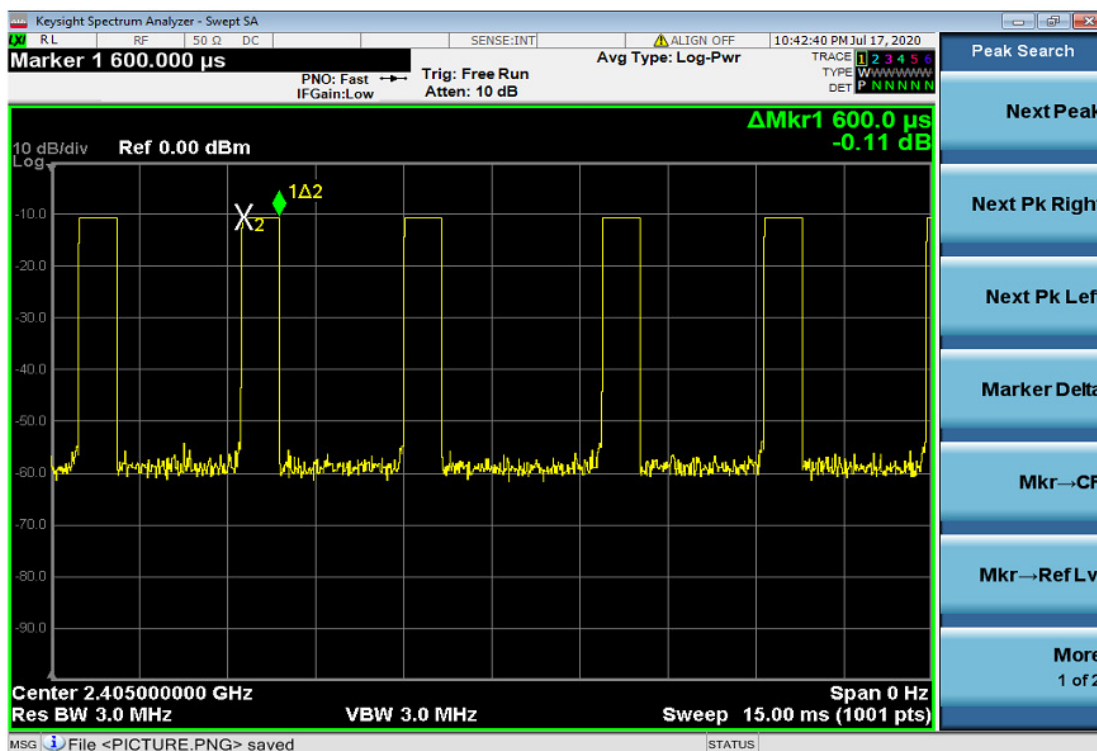
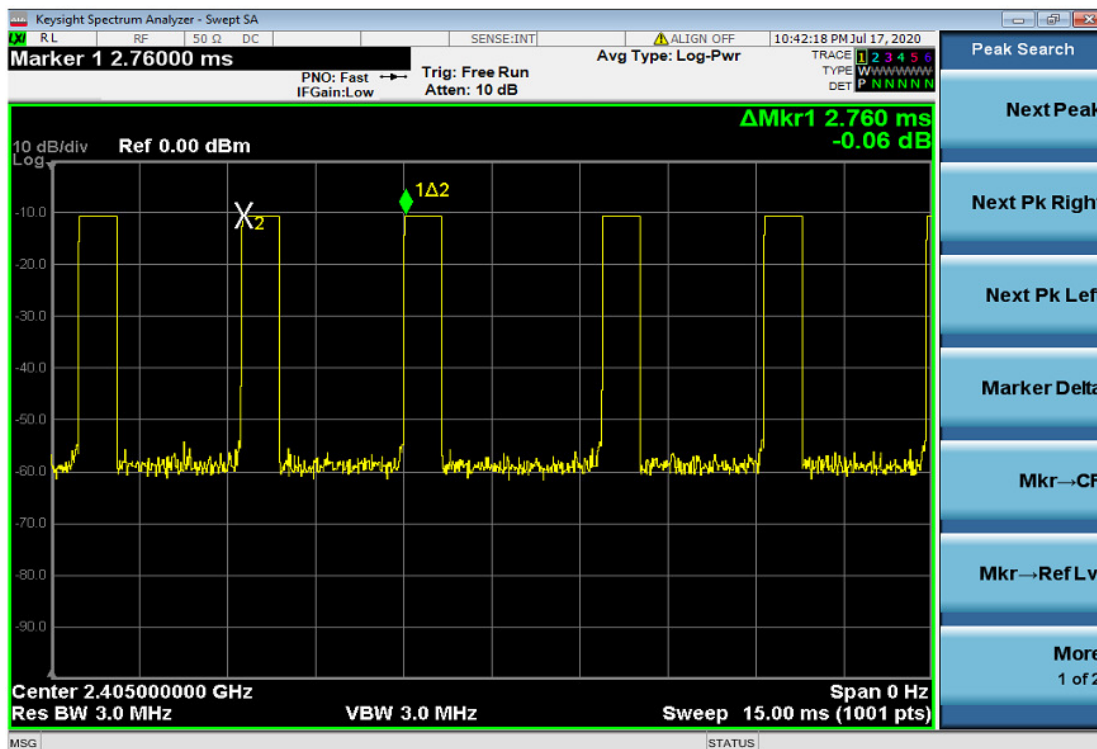
Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Average value:

|                    |                                  |
|--------------------|----------------------------------|
| Calculate Formula: | Average value=Peak value + PDCF  |
|                    | PDCF=20 log(Duty cycle)          |
|                    | Duty cycle= T on time / T period |
| Test data:         | Ton time =0.6ms                  |
|                    | T period =2.76ms                 |
|                    | PDCF value= -13.26dB             |

Duty cycle test plots:





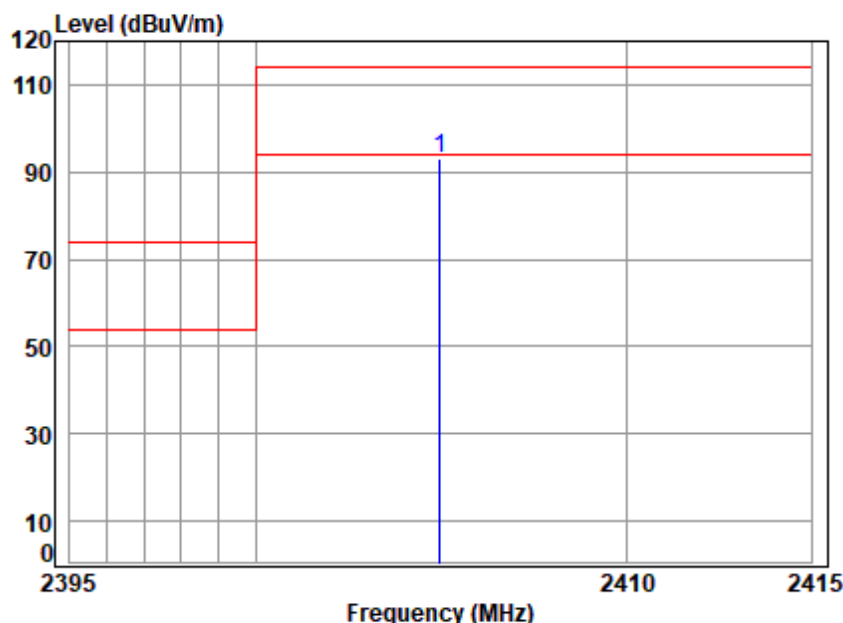
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Mode:a; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

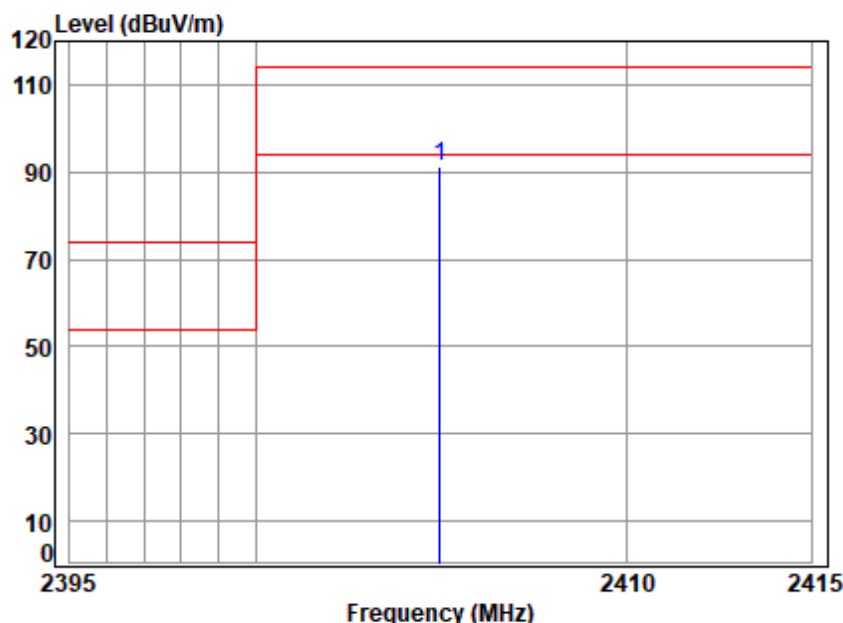
Job No : 03546CR

Mode : 2405 Field strength

|      |          | Cable  | Ant    | Preamp | Read   |        | Limit  | Over   |      |
|------|----------|--------|--------|--------|--------|--------|--------|--------|------|
| Freq | Loss     | Factor | Factor | Level  | Level  | Line   | Limit  | Remark |      |
| MHz  | dB       | dB/m   | dB     | dBuV   | dBuV/m | dBuV/m | dB     |        |      |
| 1    | 2404.961 | 4.37   | 28.54  | 40.98  | 101.17 | 93.10  | 114.00 | -20.90 | peak |



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



Site : chamber

Condition: 3m VERTICAL

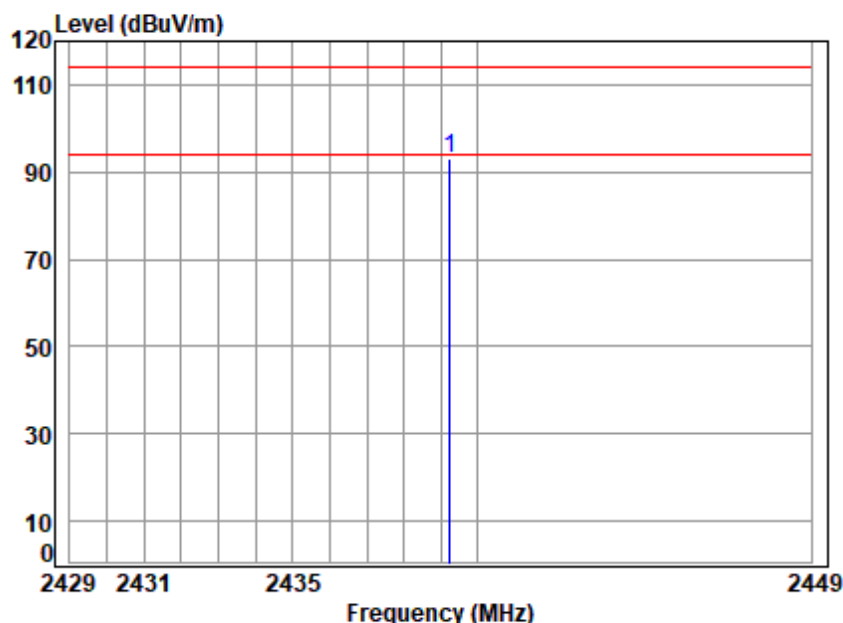
Job No : 03546CR

Mode : 2405 Field strength

|      |          | Cable  | Ant    | Preamp | Read   |        | Limit  | Over   |      |
|------|----------|--------|--------|--------|--------|--------|--------|--------|------|
| Freq | Loss     | Factor | Factor | Level  | Level  | Line   | Limit  | Remark |      |
| MHz  | dB       | dB/m   | dB     | dBuV   | dBuV/m | dBuV/m | dB     |        |      |
| 1    | 2404.961 | 4.37   | 28.54  | 40.98  | 99.44  | 91.37  | 114.00 | -22.63 | peak |



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



Site : chamber

Condition: 3m HORIZONTAL

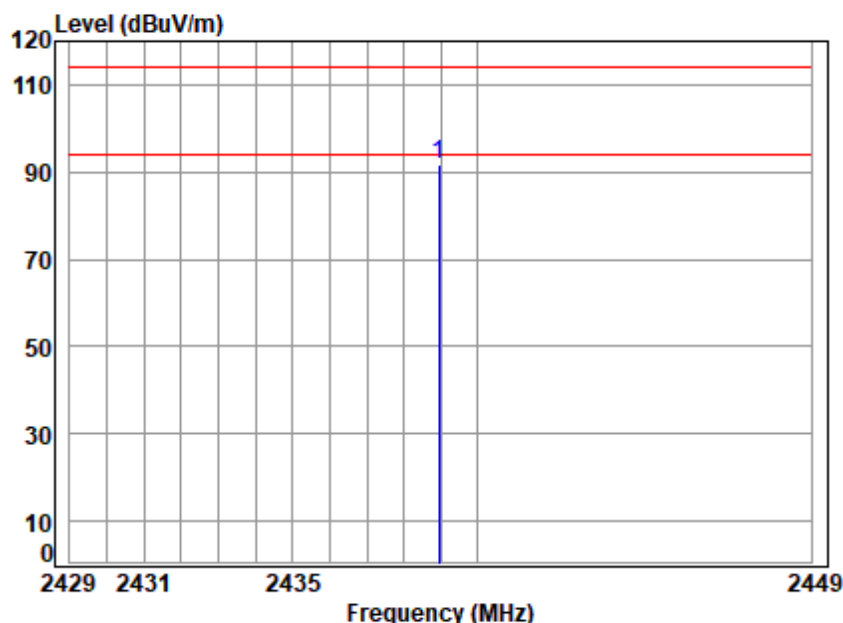
Job No : 03546CR

Mode : 2439 Field strength

|            |      | Cable  | Ant    | Preamp | Read   |        | Limit  | Over   |  |
|------------|------|--------|--------|--------|--------|--------|--------|--------|--|
| Freq       | Loss | Factor | Factor | Level  | Level  | Line   | Limit  | Remark |  |
| MHz        | dB   | dB/m   | dB     | dBuV   | dBuV/m | dBuV/m | dB     |        |  |
| 1 2439.240 | 4.42 | 28.60  | 40.99  | 101.03 | 93.06  | 114.00 | -20.94 | Peak   |  |



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



Site : chamber

Condition: 3m VERTICAL

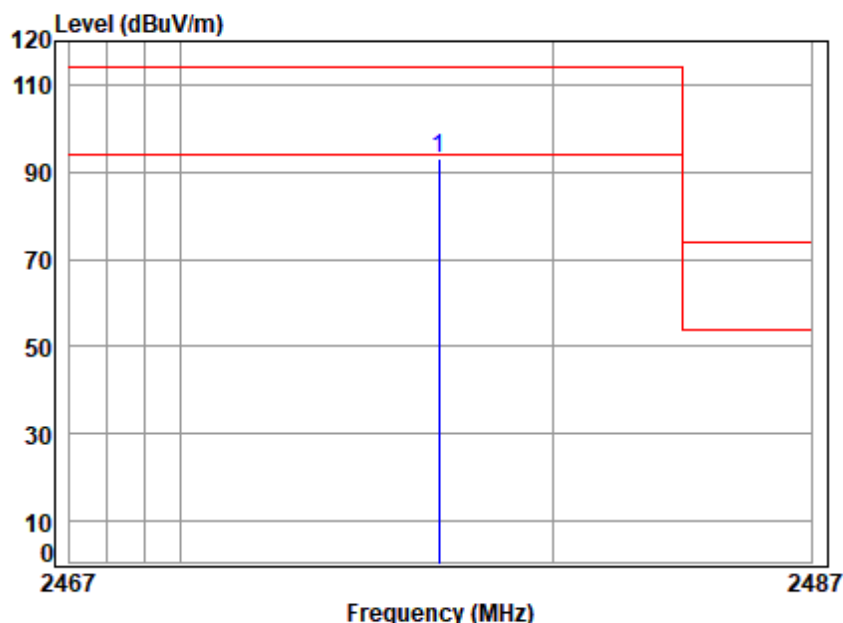
Job No : 03546CR

Mode : 2439 Field strength

|      |          | Cable  | Ant    | Preamp | Read   |        | Limit  | Over   |      |
|------|----------|--------|--------|--------|--------|--------|--------|--------|------|
| Freq | Loss     | Factor | Factor | Level  | Level  | Line   | Limit  | Remark |      |
| MHz  | dB       | dB/m   | dB     | dBuV   | dBuV/m | dBuV/m | dB     |        |      |
| 1    | 2438.939 | 4.42   | 28.60  | 40.99  | 99.57  | 91.60  | 114.00 | -22.40 | Peak |



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



Site : chamber

Condition: 3m HORIZONTAL

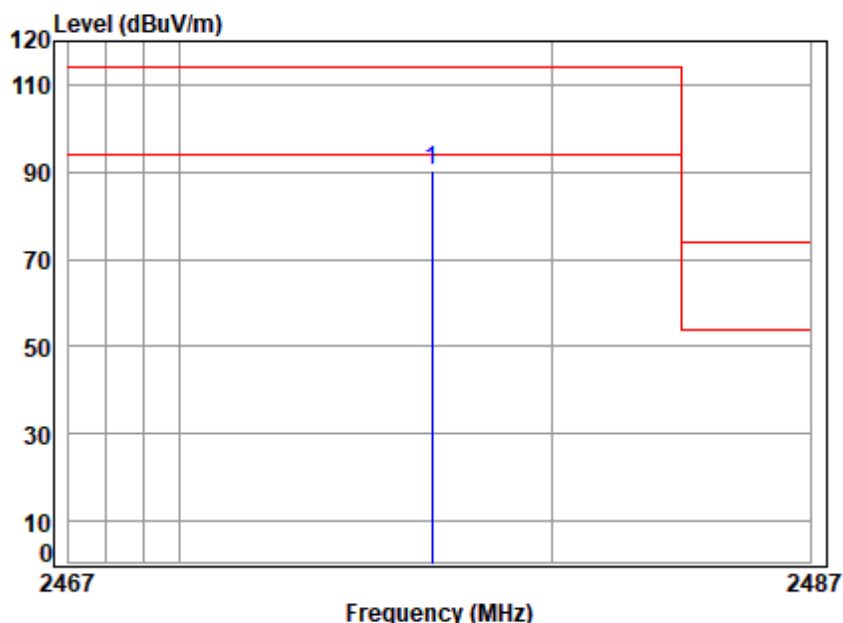
Job No : 03546CR

Mode : 2477 Field strength

|      |          | Cable  | Ant    | Preamp | Read   |        | Limit  | Over   |      |
|------|----------|--------|--------|--------|--------|--------|--------|--------|------|
| Freq | Loss     | Factor | Factor | Level  | Level  | Line   | Limit  | Remark |      |
| MHz  | dB       | dB/m   | dB     | dBuV   | dBuV/m | dBuV/m | dB     |        |      |
| 1    | 2476.949 | 4.48   | 28.66  | 41.01  | 100.90 | 93.03  | 114.00 | -20.97 | peak |



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



Site : chamber

Condition: 3m VERTICAL

Job No : 03546CR

Mode : 2477 Field strength

|            |      | Cable  | Ant    | Preamp | Read   |        | Limit  | Over   |  |
|------------|------|--------|--------|--------|--------|--------|--------|--------|--|
| Freq       | Loss | Factor | Factor | Level  | Level  | Line   | Limit  | Remark |  |
| MHz        | dB   | dB/m   | dB     | dBuV   | dBuV/m | dBuV/m | dB     |        |  |
| 1 2476.775 | 4.48 | 28.66  | 41.01  | 98.11  | 90.24  | 114.00 | -23.76 | peak   |  |



### 7.4 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.

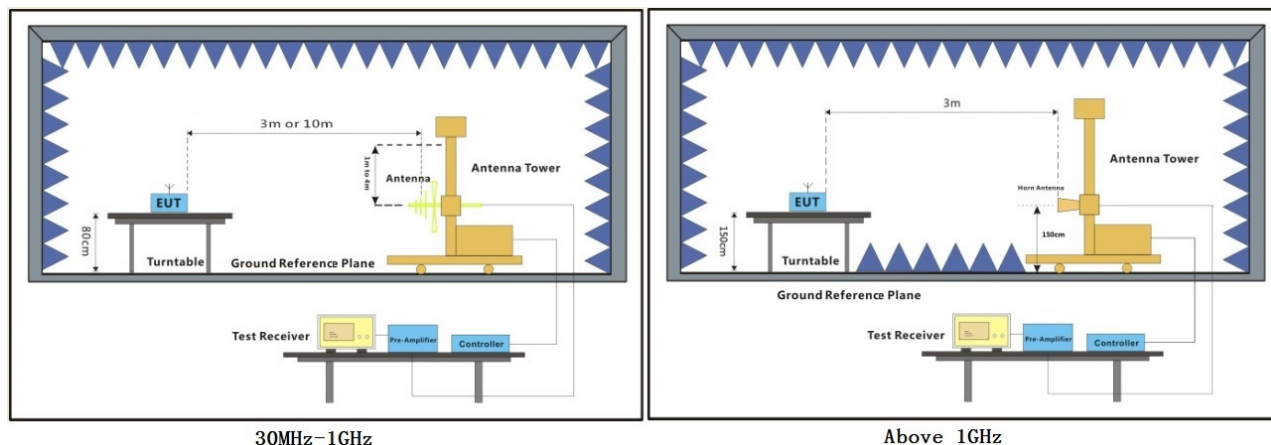
#### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23.3 °C Humidity: 56.3 % RH Atmospheric Pressure: 1005 mbar

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

#### 7.4.2 Test Setup Diagram

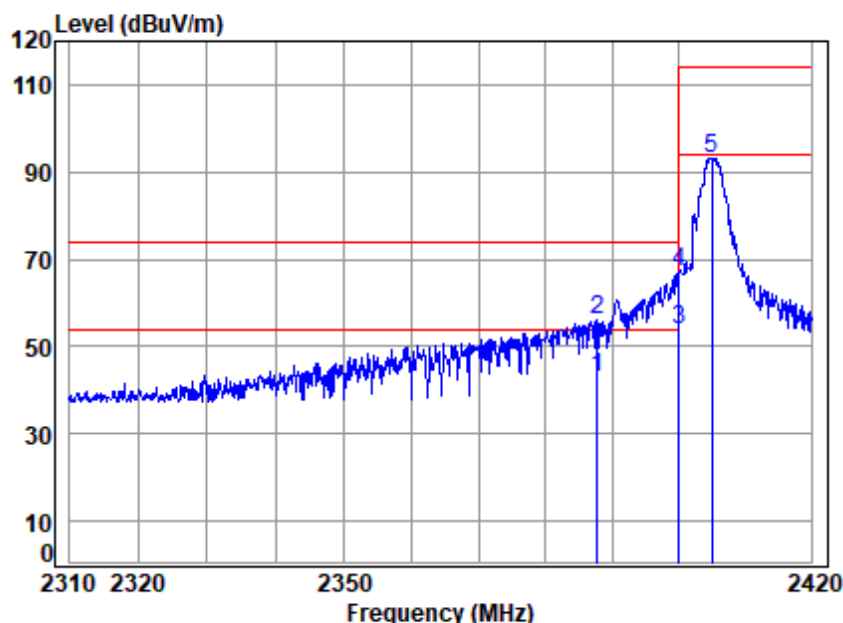


#### 7.4.3 Measurement Procedure and Data

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

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

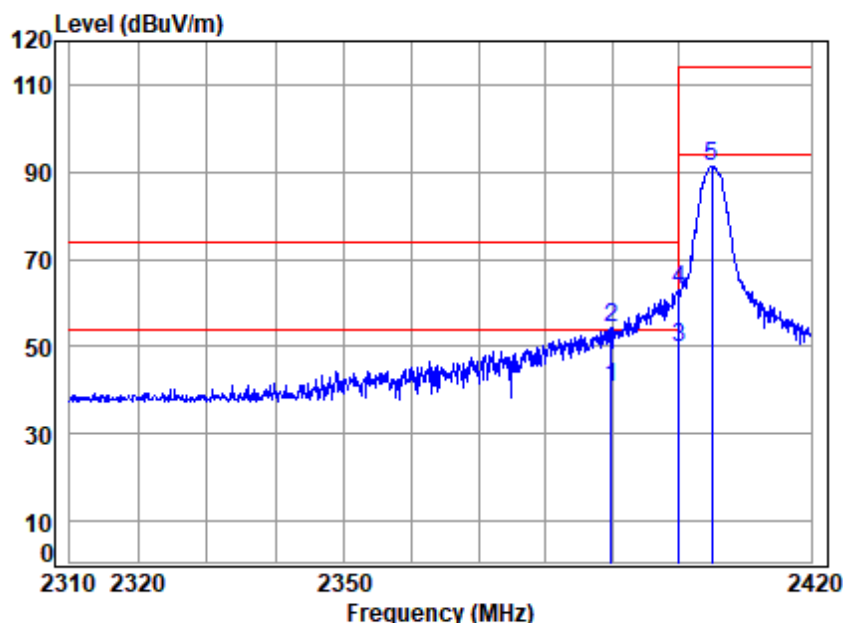


Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 03546CR  
Mode : 2405 Band edge

|   |          | Cable | Ant    | Preamp | Read   |        | Limit  | Over   |         |
|---|----------|-------|--------|--------|--------|--------|--------|--------|---------|
|   | Freq     | Loss  | Factor | Factor | Level  | Level  | Line   | Limit  | Remark  |
|   | MHz      | dB    | dB/m   | dB     | dBuV   | dBuV/m | dBuV/m | dB     |         |
| 1 | 2387.794 | 4.34  | 28.51  | 40.97  | 50.94  | 42.82  | 54.00  | -11.18 | Average |
| 2 | 2387.794 | 4.34  | 28.51  | 40.97  | 64.20  | 56.08  | 74.00  | -17.92 | Peak    |
| 3 | 2400.000 | 4.36  | 28.54  | 40.98  | 61.78  | 53.70  | 54.00  | -0.30  | Average |
| 4 | 2400.000 | 4.36  | 28.54  | 40.98  | 75.04  | 66.96  | 74.00  | -7.04  | peak    |
| 5 | 2404.961 | 4.37  | 28.54  | 40.98  | 101.17 | 93.10  | 114.00 | -20.90 | peak    |



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

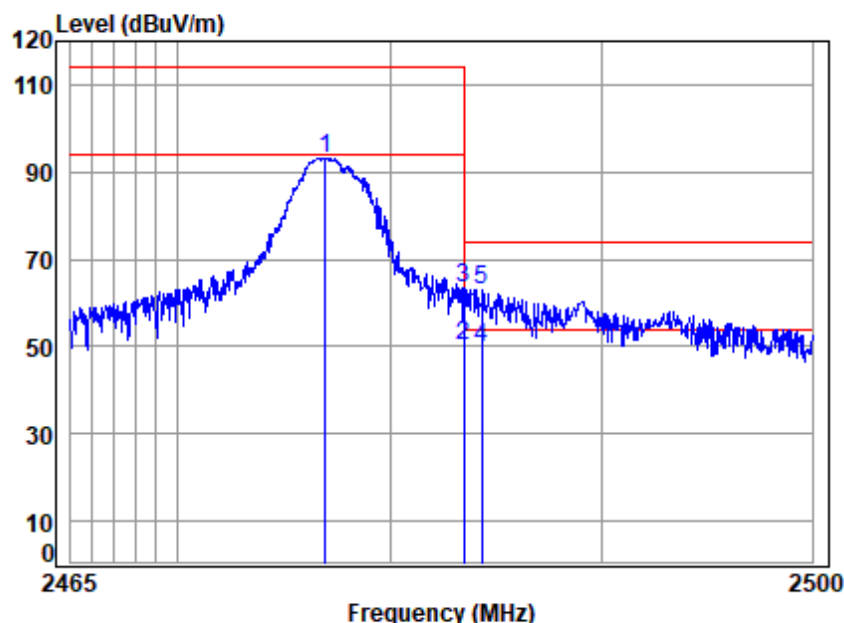


Site : chamber  
Condition: 3m VERTICAL  
Job No : 03546CR  
Mode : 2405 Band edge

|   | Freq     | Cable Loss | Ant Factor | Preamplifier Factor | Read Level | Level  | Limit Line | Over Limit | Remark  |
|---|----------|------------|------------|---------------------|------------|--------|------------|------------|---------|
|   | MHz      | dB         | dB/m       | dB                  | dBuV       | dBuV/m | dBuV/m     | dB         |         |
| 1 | 2389.905 | 4.34       | 28.52      | 40.97               | 48.94      | 40.83  | 54.00      | -13.17     | Average |
| 2 | 2389.905 | 4.34       | 28.52      | 40.97               | 62.20      | 54.09  | 74.00      | -19.91     | Peak    |
| 3 | 2400.000 | 4.36       | 28.54      | 40.98               | 57.63      | 49.55  | 54.00      | -4.45      | Average |
| 4 | 2400.000 | 4.36       | 28.54      | 40.98               | 70.89      | 62.81  | 74.00      | -11.19     | peak    |
| 5 | 2404.961 | 4.37       | 28.54      | 40.98               | 99.44      | 91.37  | 114.00     | -22.63     | peak    |



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

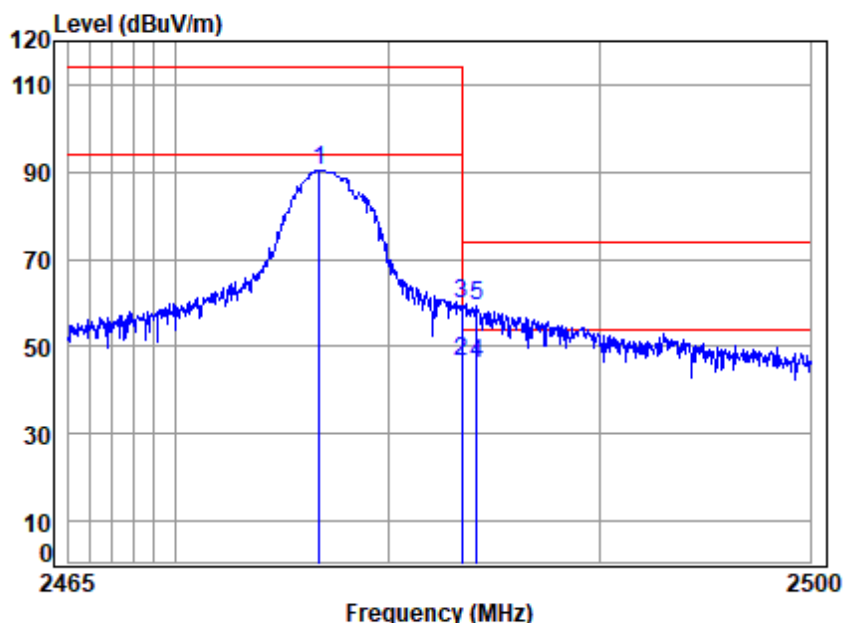


Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 03546CR  
Mode : 2477 Band edge

|   | Freq     | Cable Loss | Ant Factor | Preamplifier Factor | Read Level | Level  | Limit Line | Over Limit | Remark  |
|---|----------|------------|------------|---------------------|------------|--------|------------|------------|---------|
|   | MHz      | dB         | dB/m       | dB                  | dBuV       | dBuV/m | dBuV/m     | dB         |         |
| 1 | 2476.949 | 4.48       | 28.66      | 41.01               | 100.90     | 93.03  | 114.00     | -20.97     | peak    |
| 2 | 2483.500 | 4.49       | 28.67      | 41.01               | 58.10      | 50.25  | 54.00      | -3.75      | Average |
| 3 | 2483.500 | 4.49       | 28.67      | 41.01               | 71.36      | 63.51  | 74.00      | -10.49     | peak    |
| 4 | 2484.364 | 4.50       | 28.67      | 41.01               | 57.73      | 49.89  | 54.00      | -4.11      | Average |
| 5 | 2484.364 | 4.50       | 28.67      | 41.01               | 70.99      | 63.15  | 74.00      | -10.85     | Peak    |



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



Site : chamber

Condition: 3m VERTICAL

Job No : 03546CR

Mode : 2477 Band edge

|   |          | Cable | Ant    | Preamp | Read  |        | Limit  | Over   |         |
|---|----------|-------|--------|--------|-------|--------|--------|--------|---------|
|   | Freq     | Loss  | Factor | Factor | Level | Level  | Line   | Limit  | Remark  |
|   | MHz      | dB    | dB/m   | dB     | dBuV  | dBuV/m | dBuV/m | dB     |         |
| 1 | 2476.775 | 4.48  | 28.66  | 41.01  | 98.11 | 90.24  | 114.00 | -23.76 | peak    |
| 2 | 2483.500 | 4.49  | 28.67  | 41.01  | 54.34 | 46.49  | 54.00  | -7.51  | Average |
| 3 | 2483.500 | 4.49  | 28.67  | 41.01  | 67.60 | 59.75  | 74.00  | -14.25 | peak    |
| 4 | 2484.189 | 4.50  | 28.67  | 41.01  | 53.94 | 46.10  | 54.00  | -7.90  | Average |
| 5 | 2484.189 | 4.50  | 28.67  | 41.01  | 67.20 | 59.36  | 74.00  | -14.64 | Peak    |



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## 7.5 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                                |



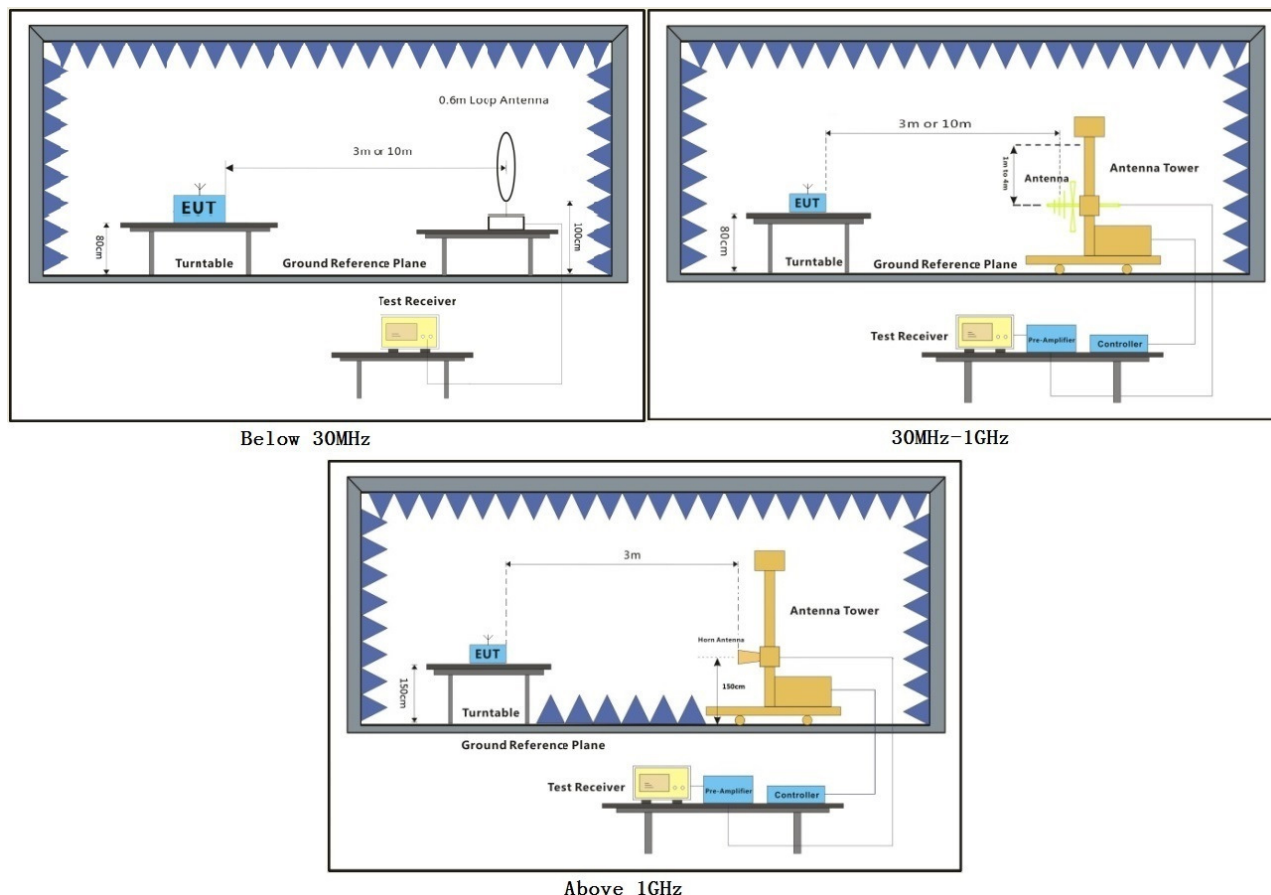
### 7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 24.7 °C Humidity: 57.4 % RH Atmospheric Pressure: 1010 mbar

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

### 7.5.2 Test Setup Diagram



### 7.5.3 Measurement Procedure and Data

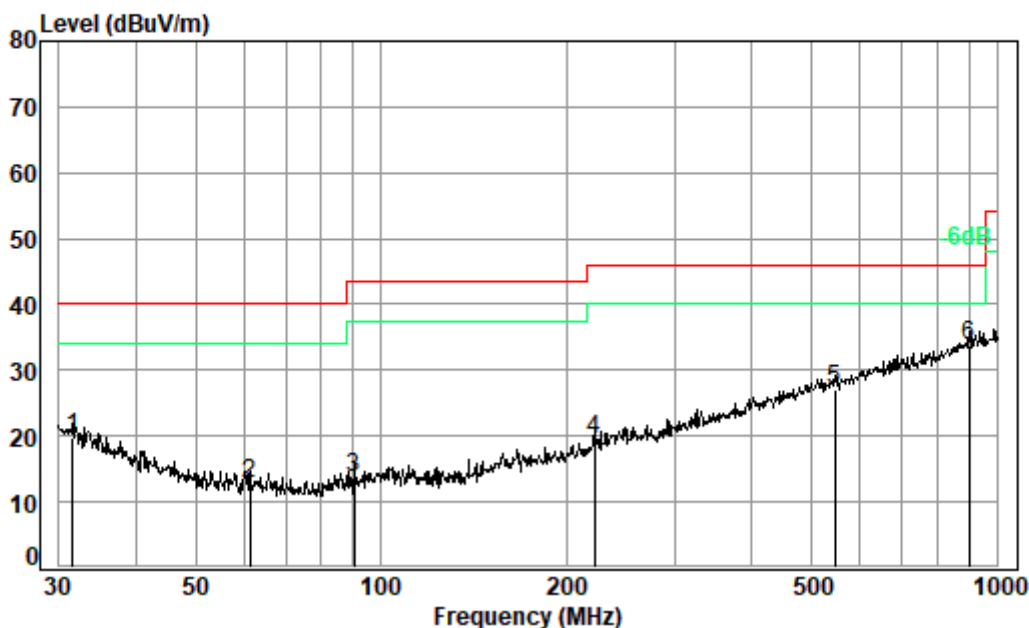
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 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 in the report.

30MHz~1GHz

Mode:a; Polarization:Horizontal



Condition: 3m HORIZONTAL

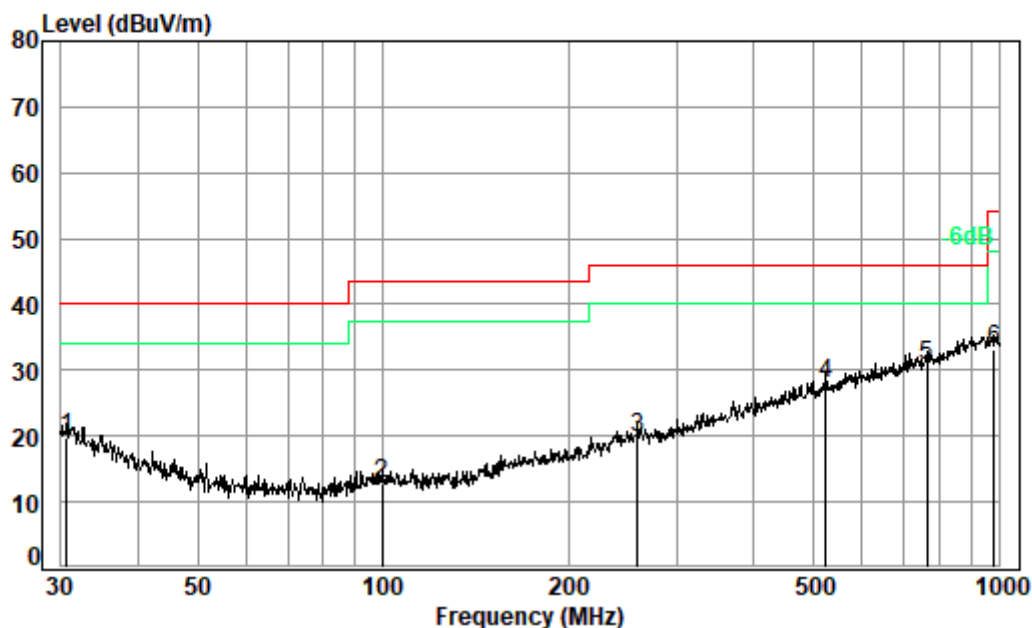
Job No. : 03546CR

Test Mode: a

|      | Freq   | Cable | Ant    | Preamp | Read  | Limit  | Over   |              |
|------|--------|-------|--------|--------|-------|--------|--------|--------------|
|      | MHz    | Loss  | Factor | Factor | Level | Level  | Line   | Limit Remark |
|      | MHz    | dB    | dB/m   | dB     | dBuV  | dBuV/m | dBuV/m | dB           |
| 1    | 31.62  | 0.60  | 21.59  | 27.73  | 25.40 | 19.86  | 40.00  | -20.14 QP    |
| 2    | 61.35  | 0.80  | 13.14  | 27.66  | 26.40 | 12.68  | 40.00  | -27.32 QP    |
| 3    | 90.54  | 1.11  | 13.15  | 27.62  | 27.17 | 13.81  | 43.50  | -29.69 QP    |
| 4    | 222.17 | 1.53  | 17.38  | 27.07  | 27.54 | 19.38  | 46.00  | -26.62 QP    |
| 5    | 545.18 | 2.65  | 25.55  | 27.96  | 26.88 | 27.12  | 46.00  | -18.88 QP    |
| 6 pp | 900.15 | 3.60  | 29.80  | 27.16  | 27.65 | 33.89  | 46.00  | -12.11 QP    |



Mode :a; Polarization: Vertical



Condition: 3m VERTICAL

Job No. : 03546CR

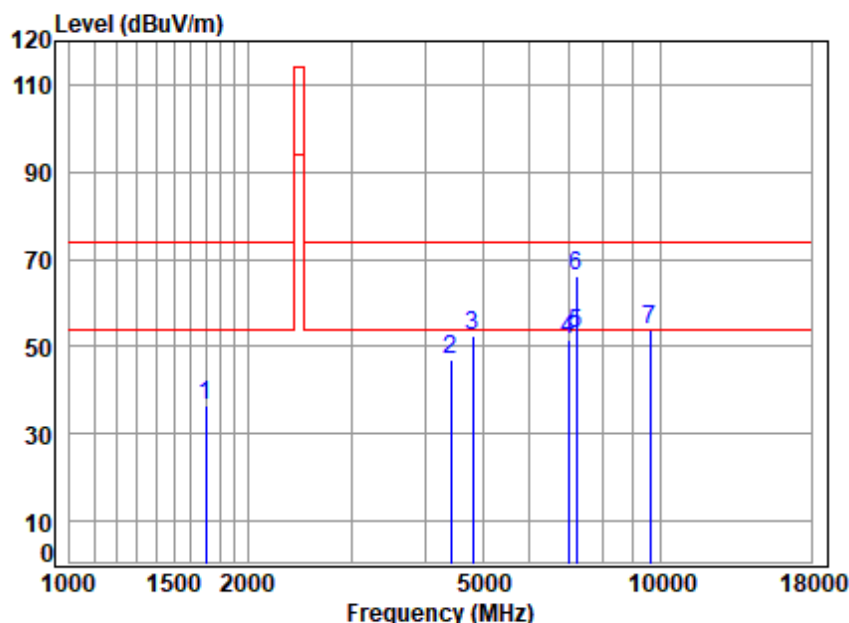
Test Mode: a

|      | Freq   | Cable | Ant    | Preamp | Read  | Limit  | Over   |              |
|------|--------|-------|--------|--------|-------|--------|--------|--------------|
|      | MHz    | Loss  | Factor | Factor | Level | Level  | Line   | Limit Remark |
|      | MHz    | dB    | dB/m   | dB     | dBuV  | dBuV/m | dBuV/m | dB           |
| 1    | 30.64  | 0.60  | 22.13  | 27.73  | 24.88 | 19.88  | 40.00  | -20.12 QP    |
| 2    | 99.53  | 1.20  | 13.96  | 27.61  | 25.36 | 12.91  | 43.50  | -30.59 QP    |
| 3    | 259.23 | 1.72  | 19.09  | 26.97  | 25.99 | 19.83  | 46.00  | -26.17 QP    |
| 4    | 524.55 | 2.63  | 25.13  | 27.89  | 28.03 | 27.90  | 46.00  | -18.10 QP    |
| 5 pp | 763.38 | 3.10  | 28.29  | 27.80  | 27.19 | 30.78  | 46.00  | -15.22 QP    |
| 6    | 982.62 | 3.68  | 30.22  | 26.74  | 26.05 | 33.21  | 54.00  | -20.79 QP    |



### Above 1GHz

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



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 03546CR  
Mode : 2405 TX RSE

|   | Freq     | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level  | Limit Line | Over Limit | Remark  |
|---|----------|------------|------------|---------------|------------|--------|------------|------------|---------|
|   | MHz      | dB         | dB/m       | dB            | dBuV       | dBuV/m | dBuV/m     | dB         |         |
| 1 | 1702.042 | 3.43       | 26.68      | 40.63         | 46.89      | 36.37  | 74.00      | -37.63     | peak    |
| 2 | 4417.841 | 6.68       | 33.60      | 42.49         | 49.00      | 46.79  | 74.00      | -27.21     | peak    |
| 3 | 4810.000 | 7.10       | 34.17      | 42.77         | 53.94      | 52.44  | 74.00      | -21.56     | peak    |
| 4 | 6995.172 | 8.54       | 36.49      | 41.69         | 48.43      | 51.77  | 74.00      | -22.23     | peak    |
| 5 | 7215.000 | 8.75       | 36.41      | 41.57         | 49.35      | 52.94  | 54.00      | -1.06      | Average |
| 6 | 7215.000 | 8.75       | 36.41      | 41.57         | 62.61      | 66.20  | 74.00      | -7.80      | peak    |
| 7 | 9620.000 | 10.80      | 37.52      | 38.56         | 44.24      | 54.00  | 74.00      | -20.00     | peak    |

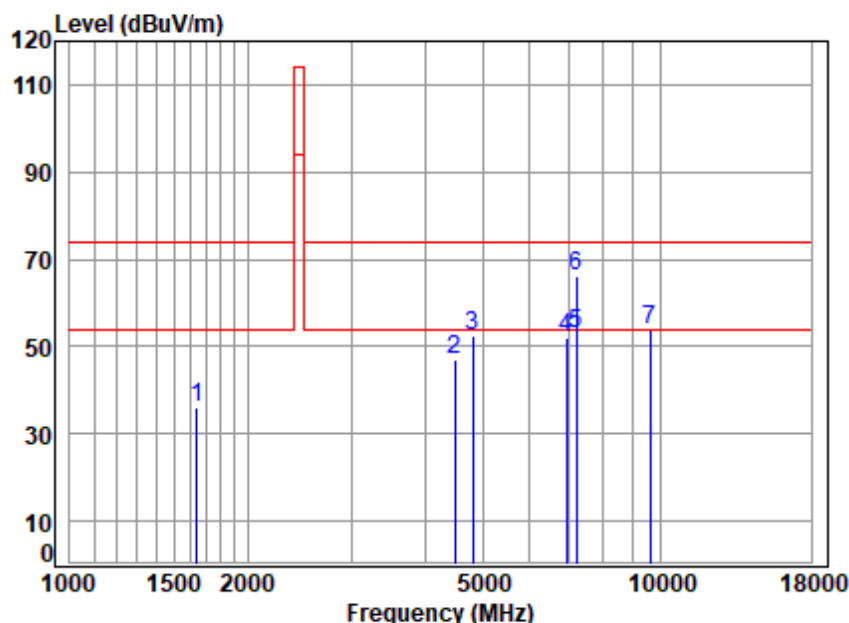


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Mode:a; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



Site : chamber  
Condition: 3m VERTICAL  
Job No : 03546CR  
Mode : 2405 TX RSE

|   | Freq     | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level  | Limit Line | Over Limit | Remark  |
|---|----------|------------|------------|---------------|------------|--------|------------|------------|---------|
|   | MHz      | dB         | dB/m       | dB            | dBuV       | dBuV/m | dBuV/m     | dB         |         |
| 1 | 1644.019 | 3.38       | 26.44      | 40.60         | 46.93      | 36.15  | 74.00      | -37.85     | peak    |
| 2 | 4495.125 | 6.76       | 33.60      | 42.55         | 49.01      | 46.82  | 74.00      | -27.18     | peak    |
| 3 | 4810.000 | 7.10       | 34.17      | 42.77         | 54.06      | 52.56  | 74.00      | -21.44     | peak    |
| 4 | 6934.778 | 8.51       | 36.32      | 41.72         | 48.69      | 51.80  | 74.00      | -22.20     | peak    |
| 5 | 7215.000 | 8.75       | 36.41      | 41.57         | 49.48      | 53.07  | 54.00      | -0.93      | Average |
| 6 | 7215.000 | 8.75       | 36.41      | 41.57         | 62.74      | 66.33  | 74.00      | -7.67      | peak    |
| 7 | 9620.000 | 10.80      | 37.52      | 38.56         | 44.21      | 53.97  | 74.00      | -20.03     | peak    |

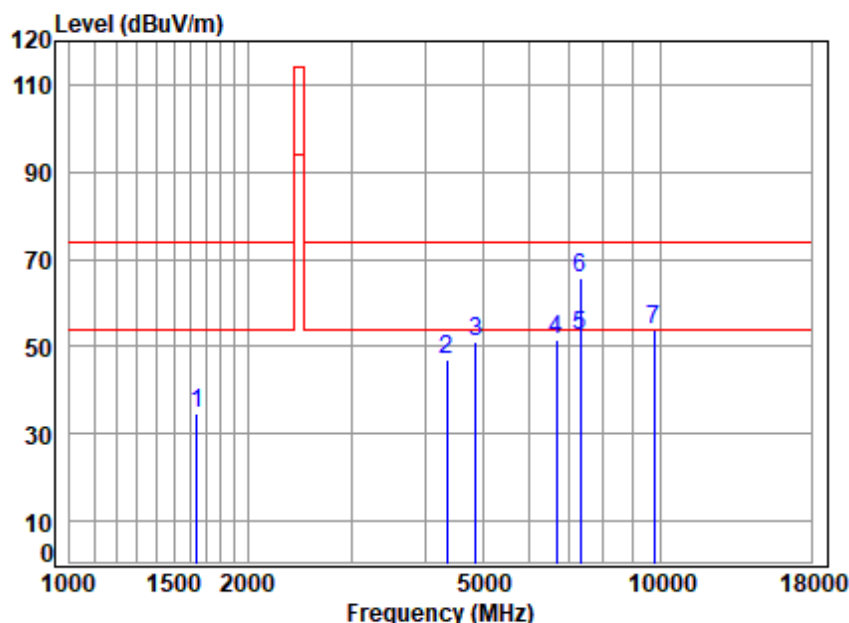


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Mode:a; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle

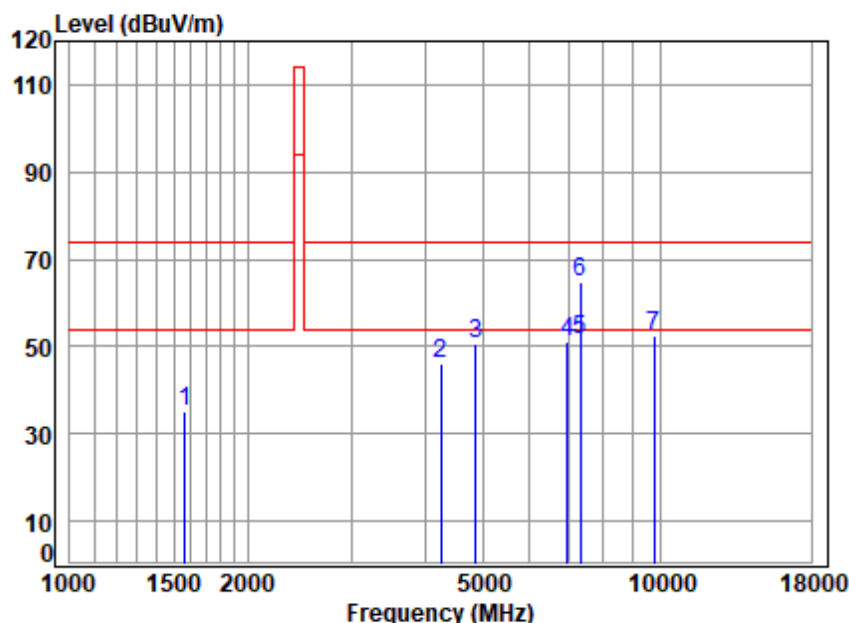


Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 03546CR  
Mode : 2439 TX RSE

|   | Freq     | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level  | Limit Line | Over Limit | Remark  |
|---|----------|------------|------------|---------------|------------|--------|------------|------------|---------|
|   | MHz      | dB         | dB/m       | dB            | dBuV       | dBuV/m | dBuV/m     | dB         |         |
| 1 | 1644.019 | 3.38       | 26.44      | 40.60         | 45.58      | 34.80  | 74.00      | -39.20     | peak    |
| 2 | 4354.454 | 6.63       | 33.60      | 42.44         | 49.06      | 46.85  | 74.00      | -27.15     | peak    |
| 3 | 4878.000 | 7.17       | 34.29      | 42.82         | 52.35      | 50.99  | 74.00      | -23.01     | peak    |
| 4 | 6659.763 | 8.37       | 35.56      | 41.86         | 49.59      | 51.66  | 74.00      | -22.34     | peak    |
| 5 | 7317.000 | 8.84       | 36.37      | 41.52         | 48.76      | 52.45  | 54.00      | -1.55      | Average |
| 6 | 7317.000 | 8.84       | 36.37      | 41.52         | 62.02      | 65.71  | 74.00      | -8.29      | peak    |
| 7 | 9756.000 | 10.76      | 37.55      | 38.35         | 43.67      | 53.63  | 74.00      | -20.37     | peak    |



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



Site : chamber  
Condition: 3m VERTICAL  
Job No : 03546CR  
Mode : 2439 TX RSE

|   | Freq     | Cable Loss | Ant Factor | Preamp Factor | Read Level | Level  | Limit Line | Over Limit | Remark  |
|---|----------|------------|------------|---------------|------------|--------|------------|------------|---------|
|   | MHz      | dB         | dB/m       | dB            | dBuV       | dBuV/m | dBuV/m     | dB         |         |
| 1 | 1565.191 | 3.32       | 26.10      | 40.55         | 46.38      | 35.25  | 74.00      | -38.75     | peak    |
| 2 | 4242.641 | 6.52       | 33.60      | 42.35         | 48.31      | 46.08  | 74.00      | -27.92     | peak    |
| 3 | 4878.000 | 7.17       | 34.29      | 42.82         | 51.87      | 50.51  | 74.00      | -23.49     | peak    |
| 4 | 6954.852 | 8.52       | 36.38      | 41.71         | 47.99      | 51.18  | 74.00      | -22.82     | peak    |
| 5 | 7317.000 | 8.84       | 36.37      | 41.52         | 47.78      | 51.47  | 54.00      | -2.53      | Average |
| 6 | 7317.000 | 8.84       | 36.37      | 41.52         | 61.04      | 64.73  | 74.00      | -9.27      | peak    |
| 7 | 9756.000 | 10.76      | 37.55      | 38.35         | 42.70      | 52.66  | 74.00      | -21.34     | peak    |

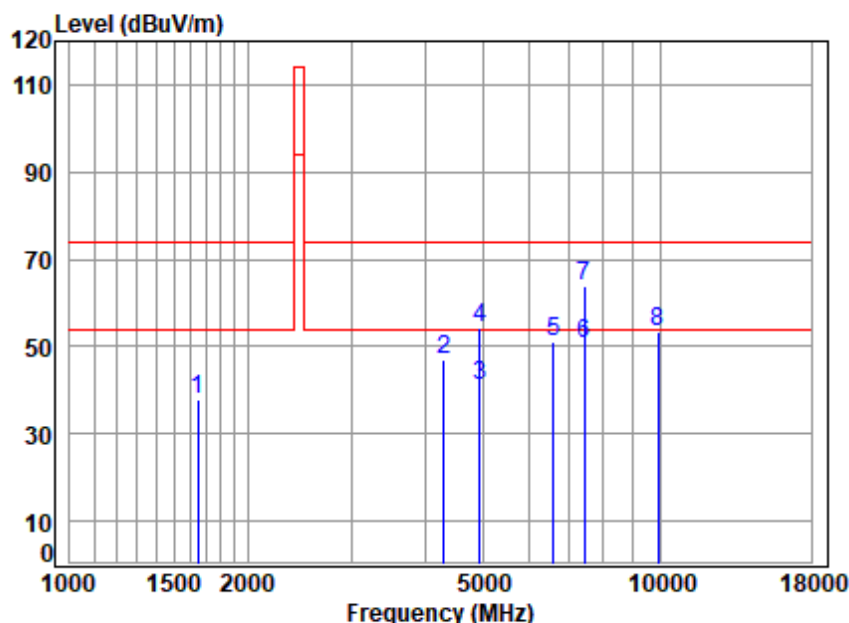


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Mode:a; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



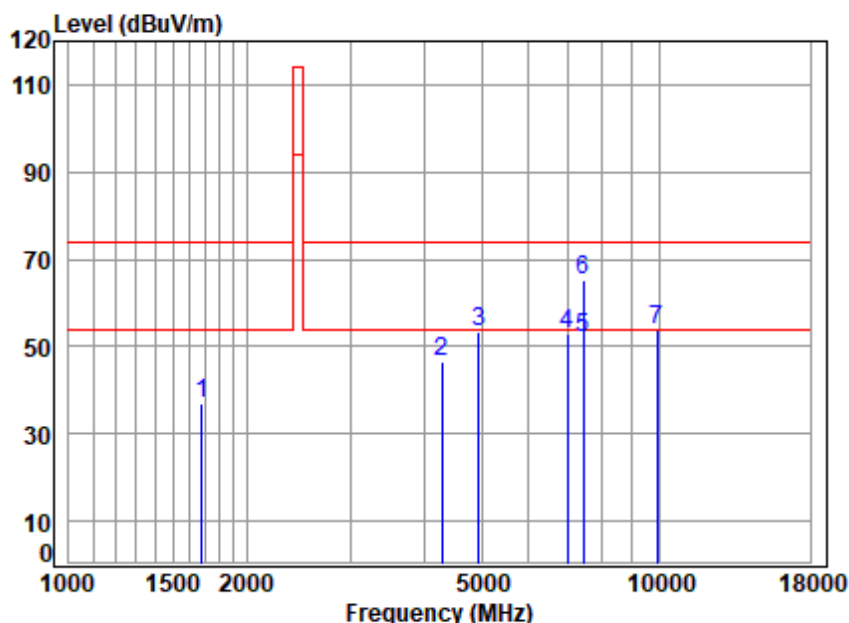
Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 03546CR  
Mode : 2477 TX RSE

|   | Freq     | Cable<br>Loss | Ant<br>Factor | Preamp<br>Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit | Remark  |
|---|----------|---------------|---------------|------------------|---------------|--------|---------------|---------------|---------|
|   | MHz      | dB            | dB/m          | dB               | dBuV          | dBuV/m | dBuV/m        | dB            |         |
| 1 | 1648.778 | 3.39          | 26.46         | 40.60            | 48.74         | 37.99  | 74.00         | -36.01        | peak    |
| 2 | 4304.400 | 6.58          | 33.60         | 42.40            | 49.33         | 47.11  | 74.00         | -26.89        | peak    |
| 3 | 4954.000 | 7.25          | 34.42         | 42.87            | 42.17         | 40.97  | 54.00         | -13.03        | Average |
| 4 | 4954.000 | 7.25          | 34.42         | 42.87            | 55.43         | 54.23  | 74.00         | -19.77        | peak    |
| 5 | 6602.265 | 8.33          | 35.39         | 41.89            | 49.40         | 51.23  | 74.00         | -22.77        | peak    |
| 6 | 7431.000 | 8.95          | 36.33         | 41.47            | 46.85         | 50.66  | 54.00         | -3.34         | Average |
| 7 | 7431.000 | 8.95          | 36.33         | 41.47            | 60.11         | 63.92  | 74.00         | -10.08        | peak    |
| 8 | 9908.000 | 10.72         | 37.58         | 38.13            | 43.11         | 53.28  | 74.00         | -20.72        | peak    |



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



Site : chamber  
Condition: 3m VERTICAL  
Job No : 03546CR  
Mode : 2477 TX RSE

|      |          | Cable | Ant    | Preamp | Read  | Limit  | Over   |               |
|------|----------|-------|--------|--------|-------|--------|--------|---------------|
| Freq |          | Loss  | Factor | Factor | Level | Level  | Line   | Limit         |
|      | MHz      | dB    | dB/m   | dB     | dBuV  | dBuV/m | dBuV/m | dB            |
| 1    | 1677.621 | 3.41  | 26.58  | 40.62  | 47.40 | 36.77  | 74.00  | -37.23 peak   |
| 2    | 4291.977 | 6.57  | 33.60  | 42.39  | 48.80 | 46.58  | 74.00  | -27.42 peak   |
| 3    | 4954.000 | 7.25  | 34.42  | 42.87  | 54.76 | 53.56  | 74.00  | -20.44 peak   |
| 4    | 6995.172 | 8.54  | 36.49  | 41.69  | 49.39 | 52.73  | 74.00  | -21.27 peak   |
| 5    | 7431.000 | 8.95  | 36.33  | 41.47  | 48.22 | 52.03  | 54.00  | -1.97 Average |
| 6    | 7431.000 | 8.95  | 36.33  | 41.47  | 61.48 | 65.29  | 74.00  | -8.71 peak    |
| 7    | 9908.000 | 10.72 | 37.58  | 38.13  | 43.62 | 53.79  | 74.00  | -20.21 peak   |



## 8 Photographs

### 8.1 Test Setup

Refer to Setup Photos

### 8.2 EUT Constructional Details (EUT Photos)

Refer to EUT external and internal photos

- End of the Report -