

## FCC/IC Test Report

**Report No.:** LDF-ESH-P24010624B-1

**FCC ID:** DWN-SCER1

**IC ID:** 12049A-SCER1

**Product:** SCE-R1 FCC 433.42MHz

**Test Model:** 9029144

**Received Date:** Jan.10, 2024

**Test Date:** Jan.10 to Mar.04, 2024

**Issued Date:** Mar.07, 2024

**Applicant:** Somfy Systems, Inc. 121 Herrod Blvd. Dayton NJ 08810

**Address:** 121 Herrod Blvd. Dayton, NJ 08810

**Manufacturer:** Zhejiang Lianda Science and Technology Co., Ltd

**Address:** Technological and Industrial District 2# Road, Nanxun, Huzhou, Zhejiang, China 313009

**Issued By:** BUREAU VERITAS ADT (Shanghai) Corporation

**Lab Address:** No. 829, Xinzhuan Road, Shanghai, P.R.China (201612)



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### Release Control Record

| Issue No.            | Description      | Date Issued  |
|----------------------|------------------|--------------|
| LDF-ESH-P24010624B-1 | Original release | Mar.07, 2024 |

## 1 Certificate of Conformity

**Product:** SCE-R1 FCC 433.42MHz

**Brand:** --

**Test Model:** 9029144

**Applicant:** Somfy Systems, Inc. 121 Herrod Blvd. Dayton NJ 08810

**Test Date:** Jan.10 to Mar.04, 2024

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.231)

ANSI C63.10:2020

RSS-210, Issue 10 (2020-04)

RSS-Gen, Issue 5 (2021-02)

The above equipment has been tested by **BUREAU VERITAS ADT (Shanghai) Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :**



**, Date:**

Mar.07, 2024

Yan ZHOU

Project Engineer

**Approved by :**



Sean YU

RF Supervisor

**, Date:**

Mar.07, 2024

## 2 Summary of Test Results

The EUT has been tested according to the following specifications:

| 47 CFR FCC Part 15, Subpart C; RSS-210, Issue 10 (2020-04); RSS-Gen, Issue 5 (2021-02) |                                         |        |                                |
|----------------------------------------------------------------------------------------|-----------------------------------------|--------|--------------------------------|
| FCC Clause                                                                             | Test Item                               | Result | Remarks                        |
| 15.203                                                                                 | Antenna Requirement                     | PASS   | No antenna connector is used.  |
| 15.207<br>RSS GEN<br>8.8                                                               | AC Power Conducted Emission             | NA     | EUT is power by battery.       |
| 15.231(c)<br>RSS 210<br>A1.3                                                           | 20dB Spectrum Bandwidth                 | PASS   | Meet the requirement of limit. |
| 15.231(a)<br>RSS 210<br>A1.1                                                           | Dwell Time                              | PASS   | Meet the requirement of limit. |
| 15.231(e)<br>RSS 210<br>A1.2                                                           | Field Strength of Fundamental Emissions | PASS   | Meet the requirement of limit. |
| 15.240/<br>15.209<br>RSS GEN<br>8.9                                                    | Radiated Emissions Measurement          | PASS   | Meet the requirement of limit. |

### 2.1 Test Facility

**Laboratory Name:** Bureau Veritas ADT (ShangHai) Corporation

**Laboratory Address:** No.829, Xin Zhuan Road, Song Jiang District, Shanghai, China

**Test Location:** No.829, Xin Zhuan Road, Song Jiang District, Shanghai, China

**A2LA Lab Code:** 2343.01

**FCC-Recognized Accredited Testing Lab:** CN1213

**ISED Recognized Lab:** 6392A

**FCC Accredited Test Site Number:** 176467

## 2.2 Test Instruments

| Equipment                     | Manufacturer                      | Model No.   | Serial No. | Last Cal. | Next Cal. |
|-------------------------------|-----------------------------------|-------------|------------|-----------|-----------|
| Hybrid Antenna(30MHz-1GHz)    | Schwarzbeck                       | VULB9168    | E1A1012    | 8/17/2023 | 8/16/2025 |
| Horn Antenna(1GHz -18GHz)     | Schwarzbeck                       | BBHA9120D   | E1A1017    | 7/25/2022 | 7/24/2024 |
| Horn Antenna(18GHz-40GHz)     | Com-Power                         | AH-840      | E1A1040    | 7/25/2022 | 7/24/2024 |
| Pre-Amplifier(0.1MHz~1300MHz) | Agilent                           | 8447D       | E1A2001    | 2/18/2024 | 2/17/2025 |
| Pre-Amplifier(18GHz-40GHz)    | EMC<br>Instruments<br>Corporation | EMC184045SE | E1A2008    | 8/11/2023 | 8/10/2024 |
| EMI Test Receiver             | R&S                               | ESR7        | E1R1005    | 2/18/2024 | 2/17/2025 |
| EMI Test Spectrum             | Keysight                          | N9030B      | E1S1003    | 8/29/2023 | 8/28/2024 |
| Signal Analyzer               | Keysight                          | N9020A      | E1S1004    | 2/19/2024 | 2/18/2025 |
| LISN(signle phase)            | Rohde&Schwarz                     | ENV216      | E1L1011    | 9/1/2023  | 8/31/2024 |
| RF Control Unit               | Toscend                           | JS0806-2    | E1C5003    | N/A       | N/A       |
| Test Software                 | Toscend                           | JS32-CE     | 5.0.0.1    | N/A       | N/A       |
| Test Software                 | Toscend                           | JS32-RE     | 5.0.0      | N/A       | N/A       |
| Test Software                 | Toscend                           | JS1120-3    | V3.2.22    | N/A       | N/A       |

### 2.3 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

| Measurement                        | Frequency      | Expanded Uncertainty<br>( $k=2$ ) ( $\pm$ ) |
|------------------------------------|----------------|---------------------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 1.83 dB                                     |
| Radiated Emissions up to 1 GHz     | 30MHz ~ 1GHz   | 5.36 dB                                     |
| Radiated Emissions above 1 GHz     | 1GHz ~ 6GHz    | 3.47 dB                                     |
|                                    | 6GHz ~ 18GHz   | 3.75 dB                                     |
|                                    | 18GHz ~ 40GHz  | 3.30 dB                                     |

### 2.4 Modification Record

There were no modifications required for compliance.



### 3 General Information

#### 3.1 General Description of EUT

|                     |                          |
|---------------------|--------------------------|
| Product             | SCE-R1 FCC 433.42MHz     |
| Brand               | --                       |
| Test Model          | 9029144                  |
| Power Rating        | 3Vdc, Powered by battery |
| Modulation Type     | ASK                      |
| Operating Frequency | 433.42MHz                |
| Number of Channel   | 1                        |
| Antenna Type        | PCB antenna              |
| Antenna Gain        | -2.81 dB                 |
| Antenna Connector   | --                       |
| FVIN                | 01                       |

Note:

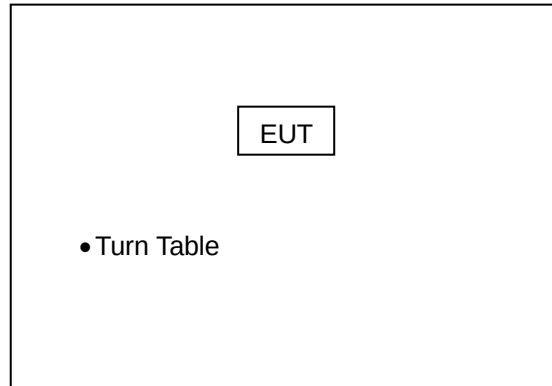
1. For more details, please refer to the User's manual of the EUT.

#### 3.2 Description of Test Modes

| CHANNEL | FREQUENCY  | MODULATION TYPE |
|---------|------------|-----------------|
| 1       | 433.42 MHz | ASK             |

### 3.3 DESCRIPTION OF SYSTEM UNDER TEST

#### RADIATED TEST CONFIGURATION



### 3.3.1 Test Mode Applicability:

| EUT<br>Configure<br>Mode | Applicable to       |                    |     |    |    | Description |
|--------------------------|---------------------|--------------------|-----|----|----|-------------|
|                          | RE<br>(9 kHz~30MHz) | RE<br>(30MHz~1GHz) | PLC | BW | DW |             |
| -                        | √                   | √                  | -   | √  | √  | -           |

Where **RE≥1G**: Radiated Emission above 1GHz      **RE< 1G**: Radiated Emission below 1GHz

**PLC**: Power Line Conducted Emission      **BW**: 20dB Spectrum Bandwidth

**DW**: Dwell Time

NOTE:

Pre-scanned tests, X, Y, Z in three orthogonal panels to determine the final configuration (Z plane as worst plane) from all possible combinations.

EUT is powered by battery, so PLC test result is NA.

#### Radiated Emission Test RE (9 kHz~30MHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | MODE | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TYPE |
|--------------------------|------|----------------------|-------------------|--------------------|
| -                        | TX   | 433.42MHz            | 433.42MHz         | ASK                |

#### Radiated Emission Test RE (30MHz~1GHz):

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | MODE | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TYPE |
|--------------------------|------|----------------------|-------------------|--------------------|
| -                        | TX   | 433.42MHz            | 433.42MHz         | ASK                |

#### Power Line Conducted Emission Test:

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | MODE | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TYPE |
|--------------------------|------|----------------------|-------------------|--------------------|
| -                        | -    | -                    | -                 | -                  |

Note: EUT is powered by battery.

### 20dB Spectrum Bandwidth

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | MODE | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TYPE |
|--------------------------|------|----------------------|-------------------|--------------------|
| -                        | TX   | 433.42MHz            | 433.42MHz         | ASK                |

### Dwell Time

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | MODE | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TYPE |
|--------------------------|------|----------------------|-------------------|--------------------|
| -                        | TX   | 433.42MHz            | 433.42MHz         | ASK                |

### 3.3.2 Test Condition:

| Applicable to    | Normal Environmental Conditions | Normal Input Power       |
|------------------|---------------------------------|--------------------------|
| RE (9 kHz~30MHz) | 23deg. C, 58%RH                 | 3Vdc, Powered by battery |
| RE (30MHz~1GHz)  | 23deg. C, 58%RH                 | 3Vdc, Powered by battery |
| PLC              | 23deg. C, 58%RH                 | 3Vdc, Powered by battery |
| BW               | 25deg. C, 60%RH                 | 3Vdc, Powered by battery |
| DW               | 25deg. C, 60%RH                 | 3Vdc, Powered by battery |

### 3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

### 3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standard:

**FCC Part 15, Subpart C (15.231)**

**ANSI C63.10:2020**

**RSS-210, Issue 10 (2020-04)**

**RSS-Gen, Issue 5 (2021-02)**

All relaxed test items have been performed and recorded as per the above standard.

## 4 Test Procedure and Results

### 4.1 AC Power Conducted Emission

#### 4.1.1 Limits

| Frequency (MHz) | Conducted Limit (dBuV) |         |
|-----------------|------------------------|---------|
|                 | Quasi-peak             | Average |
| 0.15 - 0.5      | 66 - 56                | 56 - 46 |
| 0.50 - 5.0      | 56                     | 46      |
| 5.0 - 30.0      | 60                     | 50      |

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

#### 4.1.2 Test Procedures

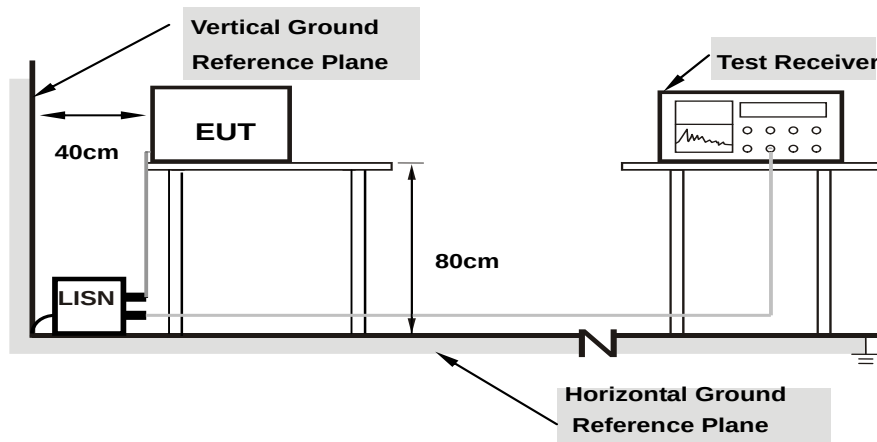
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

**NOTE:** The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

#### 4.1.3 Deviation from Test Standard

No deviation.

#### 4.1.4 Test Setup



**Note: 1.Support units were connected to second LISN.**

For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.5 EUT Operating Conditions

Same as 4.1.6.

#### 4.1.6 Test Results

NA. EUT is powered by battery.

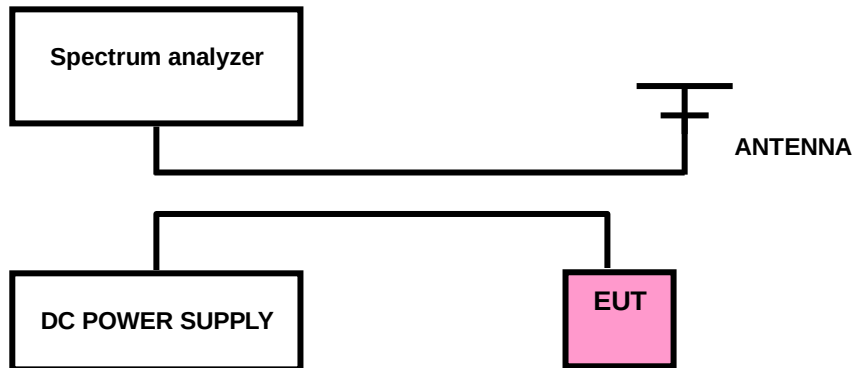


## 4.2 20dB Spectrum Bandwidth Measurement

### 4.2.1 Limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

### 4.2.2 Test Setup



### 4.2.3 Test Procedures

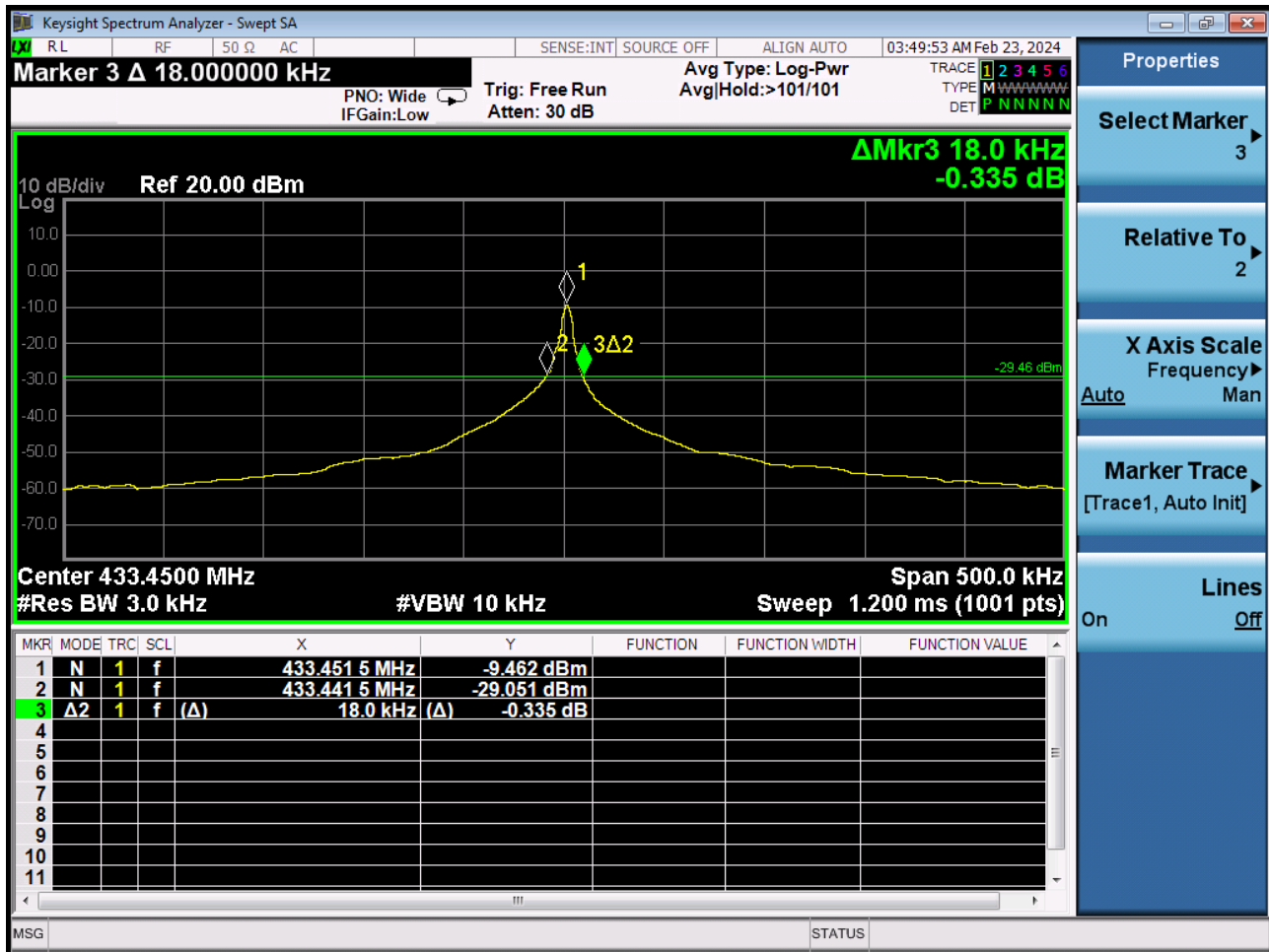
1. The resolution bandwidth of 3 kHz and the video bandwidth of 10 kHz were used.
2. EUT in peak Max hold mode.
3. Measured the spectrum width with power higher than 20dB below carrier.

### 4.2.4 Deviation of Test Standard

No deviation.

#### 4.2.5 Test Results

| Frequency(MHz) | 20dB bandwidth (kHz) | Limit(MHz) | Result |
|----------------|----------------------|------------|--------|
| 433.42         | 18.0                 | 1.0848     | Pass   |

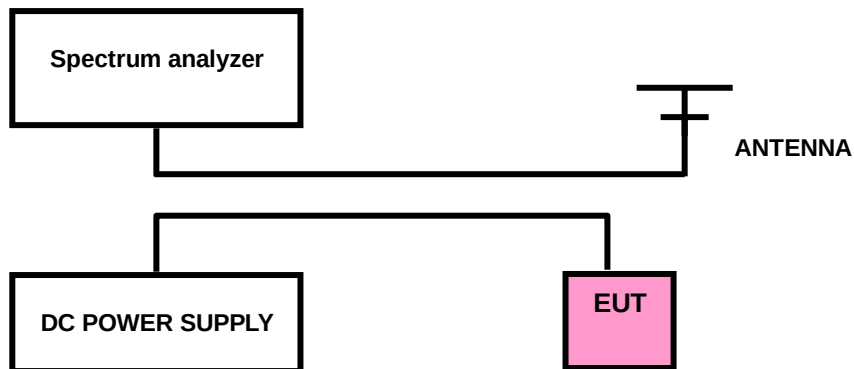


### 4.3 Dwell Time Measurement

#### 4.3.1 Limit

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

#### 4.3.2 Test Setup



#### 4.3.3 Test Procedures

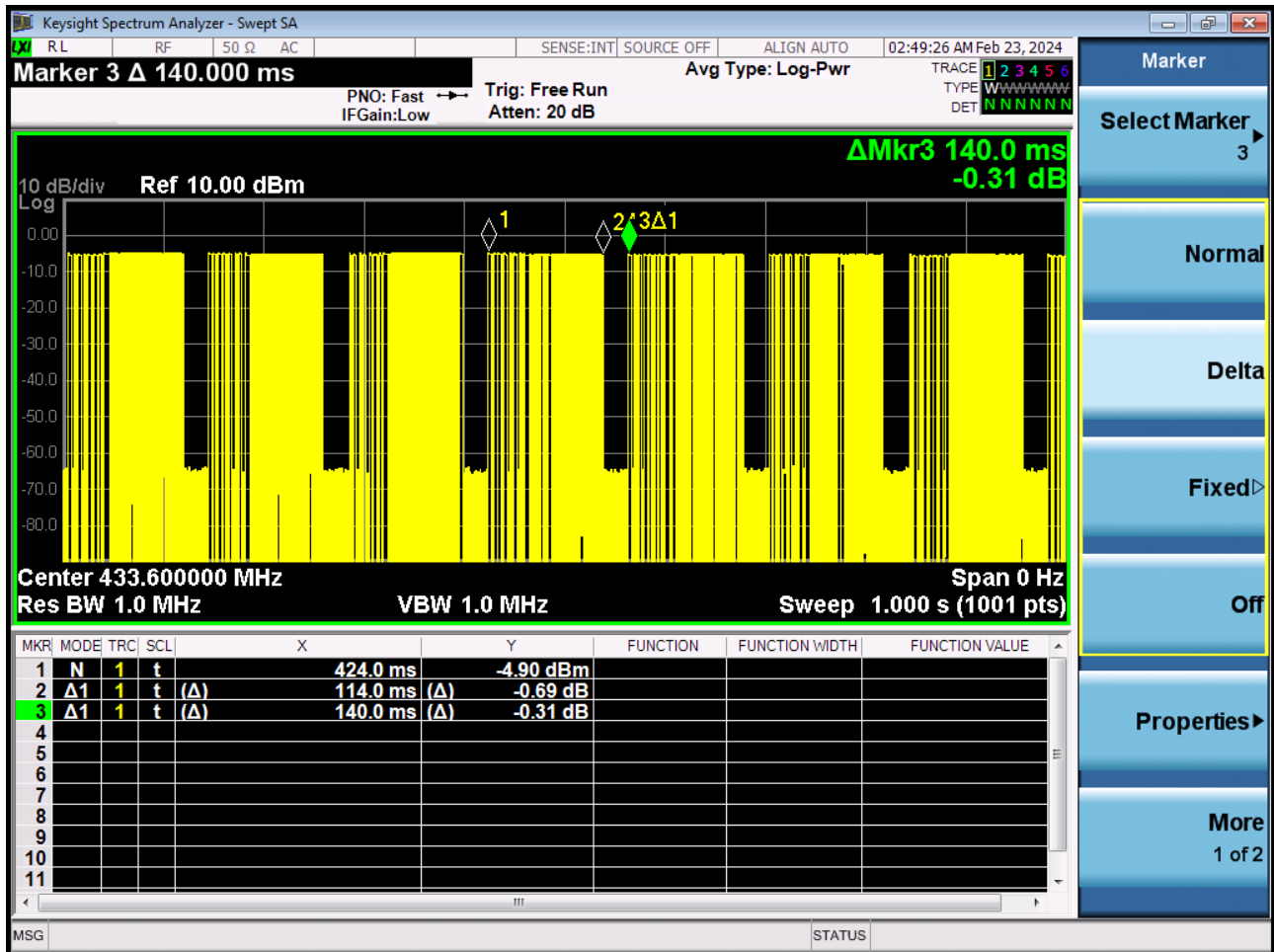
1. The resolution bandwidth of 10 kHz and the video bandwidth of 30 kHz were used.
2. EUT in peak Max hold mode.
3. Measured the spectrum width with power higher than 20dB below carrier.

#### 4.3.4 Deviation of Test Standard

No deviation.

#### 4.3.5 Test Results

| Frequency(MHz) | Transmission Time(s) | Limit(s) | Results |
|----------------|----------------------|----------|---------|
| 433.42         | 0.14                 | ≤5       | Pass    |



| Type of Pulse | Width of Pulse (ms) | Quantity of Pulse | Transmission Time (ms) | Total Time (Ton) (ms) |
|---------------|---------------------|-------------------|------------------------|-----------------------|
| Pulse 1       | 2.4                 | 7                 | 16.8                   | 139.6                 |
| Pulse 2       | 4.9                 | 1                 | 4.9                    |                       |
| Pulse 3       | 1.2                 | 12                | 14.4                   |                       |
| Pulse 4       | 0.65                | 13                | 8.45                   |                       |

| Transmission Time(ms) | Total Time(ms) | Duty Cycle(%) | Duty Cycle Factor |
|-----------------------|----------------|---------------|-------------------|
| 44.55                 | 139.6          | 31.9          | -9.92             |

Duty Cycle Factor=20\*log(Duty Cycle)



Note:

The measured pulse width (PW) is 0.65 ms.

$2/PW = 2/0.65 \text{ ms} = 3.08 \text{ KHz}$

RBW used for duty cycle testing =  $1 \text{ MHz} = 1000 \text{ KHz} > 3.08 \text{ KHz} (2/PW)$

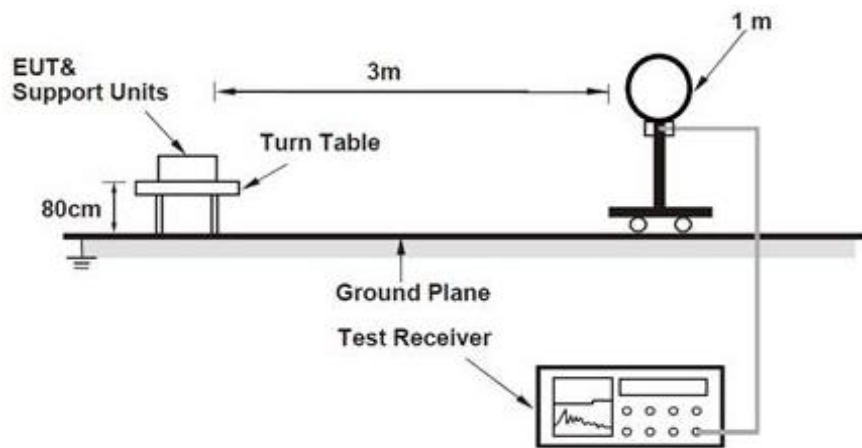
Therefore PDCF (pulse desensitization correction factor) is not required.

#### 4.4 Field Strength of Fundamental Emissions and Mask Measurement

##### 4.4.1 Test Limit

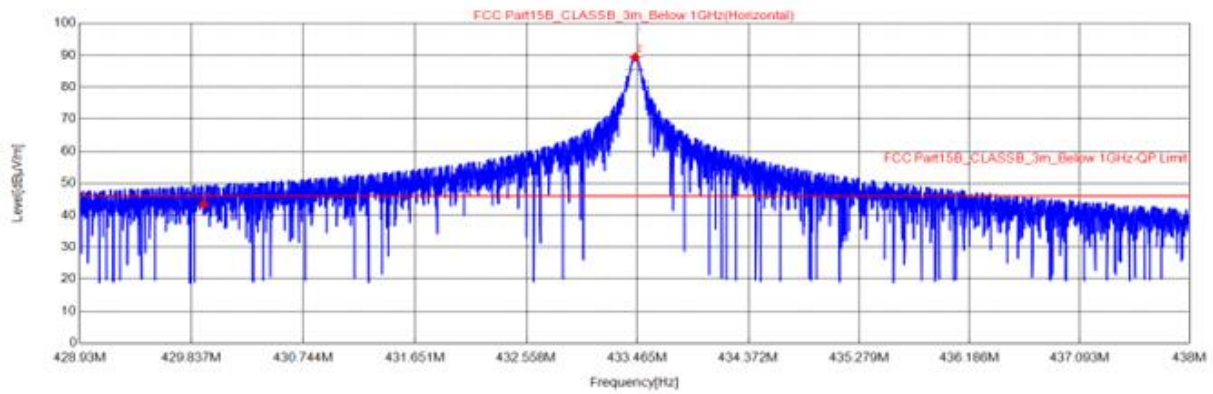
| Rules and specifications | FCC CFR 47 Part 15 section 15.225                                 |                                                    |                                                    |                                                   |
|--------------------------|-------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|---------------------------------------------------|
| Description              | Compliance with the spectrum mask is tested with RBW set to 9kHz. |                                                    |                                                    |                                                   |
| Freq. of Emission (MHz)  | Field Strength ( $\mu\text{V/m}$ ) at 30m                         | Field Strength ( $\text{dB}\mu\text{V/m}$ ) at 30m | Field Strength ( $\text{dB}\mu\text{V/m}$ ) at 10m | Field Strength ( $\text{dB}\mu\text{V/m}$ ) at 3m |
| 1.705~13.110             | 30                                                                | 29.5                                               | 48.58                                              | 69.5                                              |
| 13.110~13.410            | 106                                                               | 40.5                                               | 59.58                                              | 80.5                                              |
| 13.410~13.553            | 334                                                               | 50.5                                               | 69.58                                              | 90.5                                              |
| 13.553~13.567            | 15848                                                             | 84.0                                               | 103.08                                             | 124.0                                             |
| 13.567~13.710            | 334                                                               | 50.5                                               | 69.58                                              | 90.5                                              |
| 13.710~14.010            | 106                                                               | 40.5                                               | 59.58                                              | 80.5                                              |
| 14.010~30.000            | 30                                                                | 29.5                                               | 48.58                                              | 69.5                                              |

##### 4.4.2 Test Setup

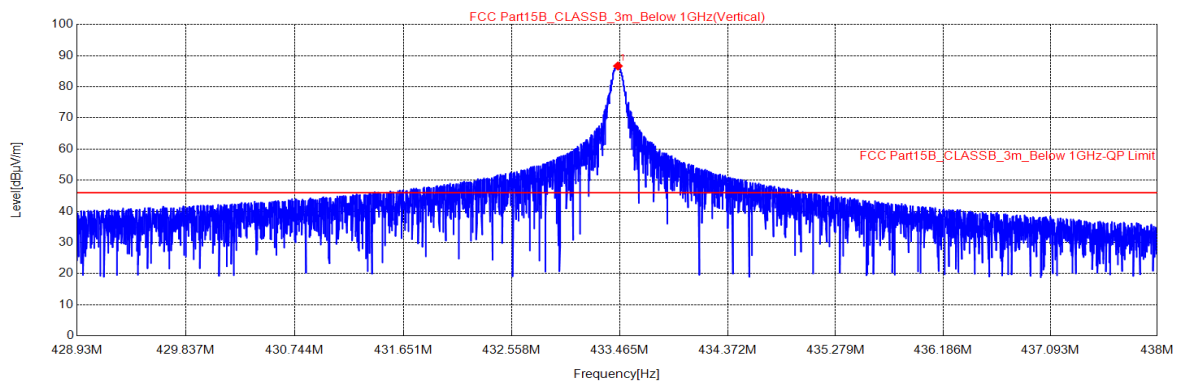


#### 4.4.3 Test Results

| Freq.<br>[MHz] | Reading<br>[dBμV/m] | Factor<br>[dB] | Duty<br>Cycle<br>Factor<br>[dB] | Level<br>[dBμV/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Polarity | Detector |
|----------------|---------------------|----------------|---------------------------------|-------------------|-------------------|----------------|----------|----------|
| 433.42         | 93.75               | -5.79          | -                               | 87.96             | 100.82            | 12.86          | H        | PK       |
| 433.42         | -                   | -              | -9.92                           | 78.04             | 80.82             | 2.78           | H        | AV       |



| Freq.<br>[MHz] | Reading<br>[dBμV/m] | Factor<br>[dB] | Duty<br>Cycle<br>Factor<br>[dB] | Level<br>[dBμV/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Polarity | Detector |
|----------------|---------------------|----------------|---------------------------------|-------------------|-------------------|----------------|----------|----------|
| 433.42         | 92.48               | -5.79          | -                               | 86.69             | 100.82            | 14.13          | V        | PK       |
| 433.42         | -                   | -              | -9.92                           | 76.77             | 80.82             | 4.05           | V        | AV       |



Margin [dB] = Limit [dBμV/m] – Level [dBμV/m]



#### 4.5 Radiated Emissions Measurement

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part15, must also comply with the radiated emission limits specified in Section 15.209(a).

| Frequency<br>(MHz)  | Frequency<br>(MHz)  | Frequency<br>(MHz) | Frequency<br>(GHz) |
|---------------------|---------------------|--------------------|--------------------|
| 0.090 - 0.110       | 16.42 - 16.423      | 399.9 - 410        | 4.5 - 5.15         |
| 1 0.495 - 0.505     | 16.69475 - 16.69525 | 608 - 614          | 5.35 - 5.46        |
| 2.1735 - 2.1905     | 16.80425 - 16.80475 | 960 - 1240         | 7.25 - 7.75        |
| 4.125 - 4.128       | 25.5 - 25.67        | 1300 - 1427        | 8.025 - 8.5        |
| 4.17725 - 4.17775   | 37.5 - 38.25        | 1435 - 1626.5      | 9.0 - 9.2          |
| 4.20725 - 4.20775   | 73 - 74.6           | 1645.5 - 1646.5    | 9.3 - 9.5          |
| 6.215 - 6.218       | 74.8 - 75.2         | 1660 - 1710        | 10.6 - 12.7        |
| 6.26775 - 6.26825   | 108 - 121.94        | 1718.8 - 1722.2    | 13.25 - 13.4       |
| 6.31175 - 6.31225   | 123 - 138           | 2200 - 2300        | 14.47 - 14.5       |
| 8.291 - 8.294       | 149.9 - 150.05      | 2310 - 2390        | 15.35 - 16.2       |
| 8.362 - 8.366       | 156.52475 - 156.525 | 2483.5 - 2500      | 17.7 - 21.4        |
| 8.37625 - 8.38675   | 156.7 - 156.9       | 2690 - 2900        | 22.01 - 23.12      |
| 8.41425 - 8.41475   | 162.0125 - 167.17   | 3260 - 3267        | 23.6 - 24.0        |
| 12.29 - 12.293      | 167.72 - 173.2      | 3332 - 3339        | 31.2 - 31.8        |
| 12.51975 - 12.52025 | 240 - 285           | 3345.8 - 3358      | 36.43 - 36.5       |
| 12.57675 - 12.57725 | 322 - 335.4         | 3600 - 4400        | (2)                |
| 13.36 - 13.41       | --                  | --                 | --                 |

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

### FCC Part 15 Subpart C Paragraph 15.209

| Frequency<br>[MHz] | Field Strength<br>[uV/m] | Measured 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                      | 3                             |
| 88 - 216           | 150                      | 3                             |
| 216 - 960          | 200                      | 3                             |
| Above 960          | 500                      | 3                             |

#### 4.5.1 Test Procedure Reference

ANSI C63.10 Section 6.3 (General Requirements)

#### 4.5.2 Test Procedures

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

| Receiver Parameter             | Setting             |
|--------------------------------|---------------------|
| Frequency Range: 9kHz~150kHz   | RBW 200Hz for QP    |
| Frequency Range: 150kHz~30MHz  | RBW 9kHz for QP     |
| Frequency Range: 30MHz~1000MHz | RBW 120kHz for Peak |

#### For Radiated emission below 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degree to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Both X and Y axes of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotate table was turned from 0 degree to 360 degree to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

#### For Radiated emission above 30MHz

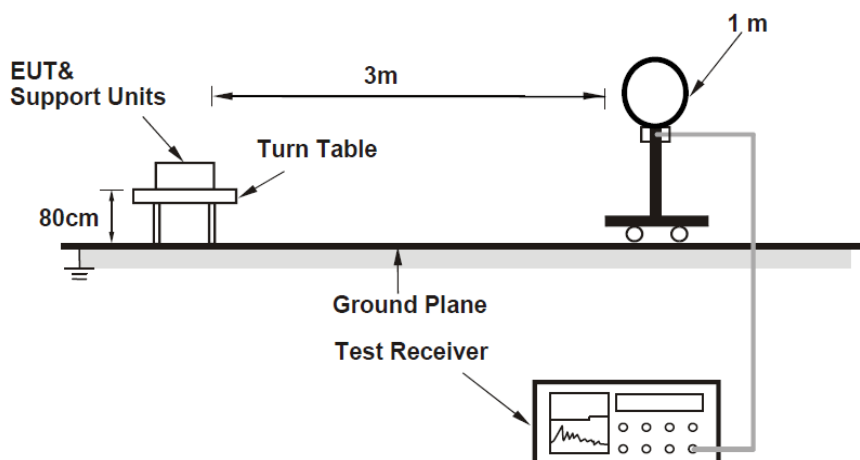
- The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

#### 4.5.3 Deviation from Test Standard

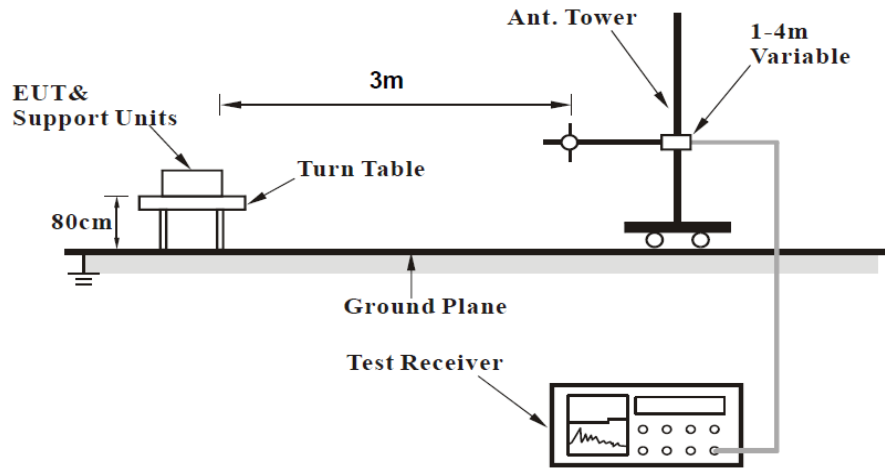
No deviation.

#### 4.5.4 Test Setup

##### For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.5.5 Test Results

##### Radiated Emissions Range 9kHz~30MHz

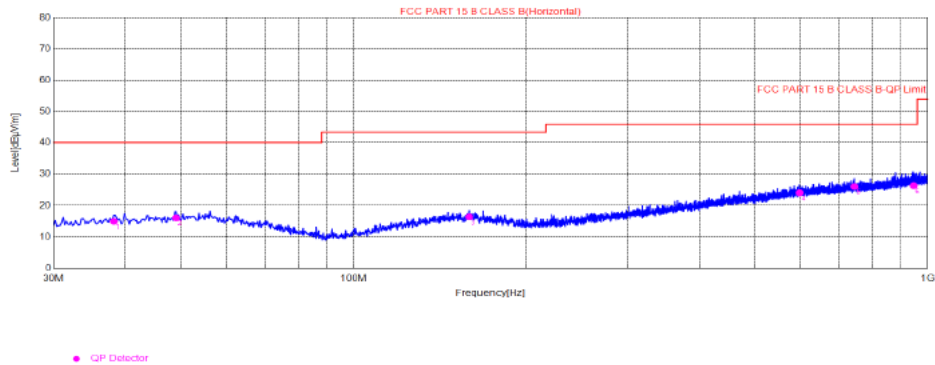
The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

## Radiated Emissions Range 30MHz~1GHz

Below is the worst test data

|                 |              |                   |                 |
|-----------------|--------------|-------------------|-----------------|
| Channel         | 433.92MHz    | Detector Function | Quasi-Peak (QP) |
| Frequency Range | 30MHz ~ 1GHz | Antenna Polarity  | Horizontal      |

Test Plot:



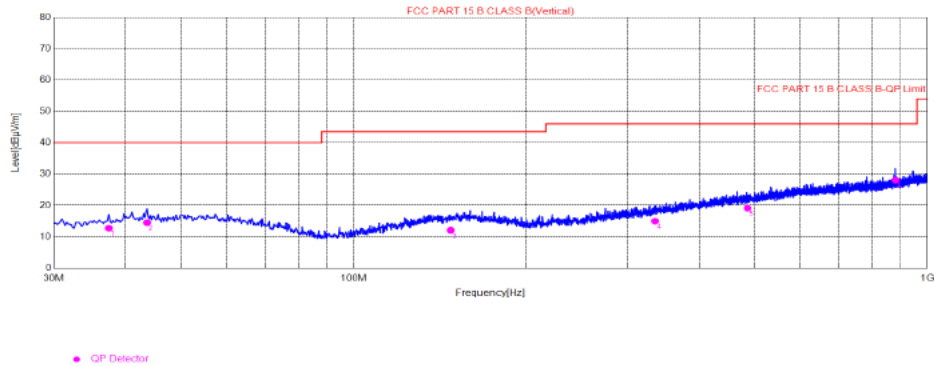
| Final Data List |             |                   |             |                |                |                |          |             |           |            |  |
|-----------------|-------------|-------------------|-------------|----------------|----------------|----------------|----------|-------------|-----------|------------|--|
| NO.             | Freq. [MHz] | QP Reading [dBμV] | Factor [dB] | Value [dBμV/m] | Limit [dBμV/m] | QP Margin [dB] | Detector | Height [cm] | Angle [°] | Polarity   |  |
| 1               | 38.15       | 25.53             | -10.59      | 14.94          | 40.00          | 25.06          | QP       | 203         | 227       | Horizontal |  |
| 2               | 49.01       | 25.75             | -9.69       | 16.06          | 40.00          | 23.94          | QP       | 188         | 15        | Horizontal |  |
| 3               | 158.82      | 25.75             | -9.37       | 16.38          | 43.50          | 27.12          | QP       | 192         | 8         | Horizontal |  |
| 4               | 598.61      | 25.74             | -1.68       | 24.06          | 46.00          | 21.94          | QP       | 188         | 274       | Horizontal |  |
| 5               | 744.89      | 26.17             | -0.12       | 26.05          | 46.00          | 19.95          | QP       | 203         | 66        | Horizontal |  |
| 6               | 946.07      | 23.54             | 2.79        | 26.33          | 46.00          | 19.67          | QP       | 211         | 236       | Horizontal |  |

### REMARKS:

- Emission Level(dBuV/m) = Spectrum reading (dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Limit value – Emission Level

|                 |              |                   |                 |
|-----------------|--------------|-------------------|-----------------|
| Channel         | 433.92MHz    | Detector Function | Quasi-Peak (QP) |
| Frequency Range | 30MHz ~ 1GHz | Antenna Polarity  | Vertical        |

Test Plot:



| Final Data List |             |                   |             |                |                |                |          |             |           |          |
|-----------------|-------------|-------------------|-------------|----------------|----------------|----------------|----------|-------------|-----------|----------|
| NO.             | Freq. [MHz] | QP Reading [dBμV] | Factor [dB] | Value [dBμV/m] | Limit [dBμV/m] | QP Margin [dB] | Detector | Height [cm] | Angle [°] | Polarity |
| 1               | 37.37       | 23.39             | -10.70      | 12.69          | 40.00          | 27.31          | QP       | 112         | 166       | Vertical |
| 2               | 43.58       | 24.59             | -10.10      | 14.49          | 40.00          | 25.51          | QP       | 105         | 173       | Vertical |
| 3               | 147.56      | 21.8              | -9.75       | 12.05          | 43.50          | 31.45          | QP       | 103         | 94        | Vertical |
| 4               | 334.97      | 22.11             | -7.15       | 14.96          | 46.00          | 31.04          | QP       | 112         | 306       | Vertical |
| 5               | 485.90      | 23.11             | -3.97       | 19.14          | 46.00          | 26.86          | QP       | 105         | 166       | Vertical |
| 6               | 879.53      | 26.54             | 1.47        | 28.01          | 46.00          | 17.99          | QP       | 112         | 47        | Vertical |

#### REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

## Radiated Emission Range 2<sup>th</sup> ~10<sup>th</sup> Harmonic

Below is the worst test data

|                 |               |                   |              |
|-----------------|---------------|-------------------|--------------|
| Channel         | 433.92MHz     | Detector Function | Peak (PK)    |
| Frequency Range | 0.8GHz ~ 6GHz |                   | Average (AV) |

| No. | Frequency (MHz) | Reading [dBuV/m] | Factor (dB) | Duty Cycle Factor [dB] | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Polarity | Detector |
|-----|-----------------|------------------|-------------|------------------------|-------------------------|----------------|-------------|------------------|----------|
| 1   | 867.8860        | 23.54            | 1.47        | -                      | 25.01                   | 80.82          | 55.81       | H                | PK       |
| 2   | 867.8860        | -                | -           | -9.92                  | 15.09                   | 60.82          | 45.73       | H                | AV       |
| 3   | 1300.9000       | 68.69            | -20.06      | -                      | 48.63                   | 74.00          | 25.37       | H                | PK       |
| 4   | 1300.9000       | -                | -           | -9.92                  | 38.71                   | 54.00          | 15.29       | H                | AV       |
| 5   | 1734.4000       | 67.87            | -20.46      | -                      | 47.41                   | 74.00          | 26.59       | H                | PK       |
| 6   | 1734.4000       | -                | -           | -9.92                  | 37.49                   | 54.00          | 16.51       | H                | AV       |
| 7   | 2167.9000       | 71.28            | -17.87      | -                      | 53.41                   | 74.00          | 20.59       | H                | PK       |
| 8   | 2167.9000       | -                | -           | -9.92                  | 43.49                   | 54.00          | 10.51       | H                | AV       |
| 9   | 2601.4000       | 63.12            | -17.71      | -                      | 45.41                   | 74.00          | 28.59       | H                | PK       |
| 10  | 2601.4000       | -                | -           | -9.92                  | 35.49                   | 54.00          | 18.51       | H                | AV       |
| 11  | 867.8860        | 26.54            | 1.47        | -                      | 28.01                   | 80.82          | 52.81       | V                | PK       |
| 12  | 867.8860        | -                | -           | -9.92                  | 18.09                   | 60.82          | 42.73       | V                | AV       |
| 13  | 1300.9000       | 67.98            | -20.06      | -                      | 47.92                   | 74.00          | 26.08       | V                | PK       |
| 14  | 1300.9000       | -                | -           | -9.92                  | 38.00                   | 54.00          | 16.00       | V                | AV       |
| 15  | 1734.4000       | 72.46            | -20.46      | -                      | 52.00                   | 74.00          | 22.00       | V                | PK       |
| 16  | 1734.4000       | -                | -           | -9.92                  | 42.08                   | 54.00          | 11.92       | V                | AV       |
| 17  | 2167.9000       | 76.50            | -17.87      | -                      | 58.63                   | 74.00          | 15.37       | V                | PK       |
| 18  | 2167.9000       | -                | -           | -9.92                  | 48.71                   | 54.00          | 5.29        | V                | AV       |
| 19  | 2601.4000       | 63.47            | -17.71      | -                      | 45.76                   | 74.00          | 28.24       | V                | PK       |
| 20  | 2601.4000       | -                | -           | -9.92                  | 35.84                   | 54.00          | 18.16       | V                | AV       |

### REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level



## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

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