# FCC Test Report

| | | |
|---|---|---|
| **FCC ID** | : | **PRDRX0E** |
| **Equipment** | : | **2.4G wireless dongle** |
| **Model No.** | : | **RXE** |
| **Brand Name** | : | **Acrox / hp** |
| **Applicant** | : | **ACROX Technologies Co., Ltd.** |
| **Address** | : | **4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C.** |
| **Standard** | : | **47 CFR FCC Part 15.249** |
| **Received Date** | : | **Mar. 24, 2016** |
| **Tested Date** | : | **Mar. 24 ~ Mar. 25, 2016** |

**We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.**

**Approved & Reviewed by:**

**Gary Chang / Manager**

Testing Laboratory
2732

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# Release Record

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| FR632401 | Rev. 01 | Initial issue | Apr. 01, 2016 |

# Summary of Test Results

| FCC Rules | Test Items | Measured | Result |
|---|---|---|---|
| 15.207 | AC Power Line Conducted Emissions | [dBuV]: 0.159MHz<br>54.83 (Margin -10.69dB) - QP | Pass |
| 15.249(a) | Field Strength of Fundamental | Meet the requirement of limit | Pass |
| 15.249(a)(d) | Field Strength of Harmonics and Emissions Radiated outside of the Specified Frequency Bands | Meet the requirement of limit | Pass |
| 15.215(c) | 20dB bandwidth | Meet the requirement of limit | Pass |
| 15.203 | Antenna Requirement | Meet the requirement of limit | Pass |

# 1 General Description

## 1.1 Information

### 1.1.1 Specification of the Equipment under Test (EUT)

| RF General Information | | | | |
|---|---|---|---|---|
| Frequency Range (MHz) | Modulation | Ch. Freq. (MHz) | Channel Number | Data Rate |
| 2400-2483.5 | FSK | 2408-2474 | 1-34 [34] | 1 Mbps |

### 1.1.2 Antenna Details

| Ant. No. | Type | Gain (dBi) | Connector | Remark |
|---|---|---|---|---|
| 1 | PCB | -5 | N/A | --- |

### 1.1.3 Power Supply Type of Equipment under Test (EUT)

| Power Supply Type | 5Vdc from host. |
|---|---|

### 1.1.4 Accessories

N/A

### 1.1.5 Channel List

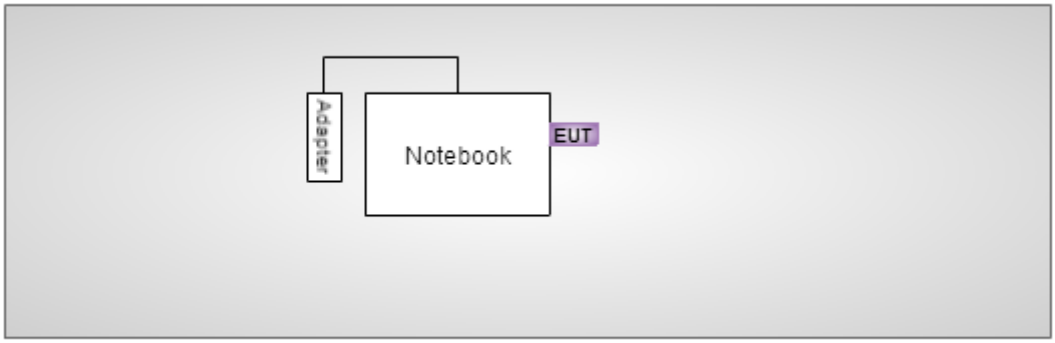
| Frequency band (MHz) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 1 | 2408 | 10 | 2436 | 19 | 2444 | 28 | 2462 |
| 2 | 2410 | 11 | 2428 | 20 | 2446 | 29 | 2464 |
| 3 | 2412 | 12 | 2430 | 21 | 2448 | 30 | 2466 |
| 4 | 2414 | 13 | 2432 | 22 | 2450 | 31 | 2468 |
| 5 | 2416 | 14 | 2434 | 23 | 2452 | 32 | 2470 |
| 6 | 2418 | 15 | 2436 | 24 | 2454 | 33 | 2472 |
| 7 | 2420 | 16 | 2438 | 25 | 2456 | 34 | 2474 |
| 8 | 2422 | 17 | 2440 | 26 | 2458 | --- | --- |
| 9 | 2424 | 18 | 2442 | 27 | 2460 | --- | --- |

## 1.2 Local Support Equipment List

| Support Equipment List | | | | | | |
|---|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **S/N** | **FCC ID** | **Signal cable / Length (m)** |
| 1 | Notebook | DELL | Latitude E6440 | 4NF4Z52 | DoC | --- |

## 1.3 Test Setup Chart

**Test Setup Diagram**



## 1.4 The Equipment List

| Test Item | RF Conducted | | | | |
|---|---|---|---|---|---|
| Test Site | (TH01-WS) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | R&S | FSV40 | 101063 | Feb. 17, 2016 | Feb. 16, 2017 |
| Power Meter | Anritsu | ML2495A | 1241002 | Sep. 21, 2015 | Sep. 20, 2016 |
| Power Sensor | Anritsu | MA2411B | 1207366 | Sep. 21, 2015 | Sep. 20, 2016 |
| DC POWER SOURCE | GW INSTEK | GPC-3060D | EM884797 | Oct. 20, 2015 | Oct. 19, 2016 |
| Measurement Software | Sporton | Sporton_1 | 1.3.30 | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

| Test Item | Radiated Emission | | | | |
|---|---|---|---|---|---|
| Test Site | 966 chamber1 / (03CH01-WS) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | R&S | FSV40 | 101498 | Dec. 13, 2015 | Dec. 12, 2016 |
| Receiver | R&S | ESR3 | 101658 | Nov. 04, 2015 | Nov. 03, 2016 |
| Bilog Antenna | SCHWARZBECK | VULB9168 | VULB9168-522 | Aug. 20, 2015 | Aug. 19, 2016 |
| Horn Antenna 1G-18G | SCHWARZBECK | BBHA 9120 D | BBHA 9120 D 1096 | Dec. 16, 2015 | Dec. 15, 2016 |
| Horn Antenna 18G-40G | SCHWARZBECK | BBHA 9170 | BBHA 9170517 | Nov. 04, 2015 | Nov. 03, 2016 |
| Loop Antenna | R&S | HFH2-Z2 | 11900 | Nov. 16, 2015 | Nov. 15, 2016 |
| Loop Antenna Cable | KOAX KABEL | 101354-BW | 101354-BW | Dec. 10, 2015 | Dec. 09, 2016 |
| Preamplifier | Burgeon | BPA-530 | SN:100219 | Sep. 10, 2015 | Sep. 09, 2016 |
| Preamplifier | Agilent | 83017A | MY39501308 | Oct. 02, 2015 | Oct. 01, 2016 |
| Preamplifier | EMC | EMC184045B | 980192 | Sep. 01, 2015 | Aug. 31, 2016 |
| RF Cable | HUBER+SUHNER | SUCOFLEX104 | MY16014/4 | Dec. 10, 2015 | Dec. 09, 2016 |
| RF Cable | HUBER+SUHNER | SUCOFLEX104 | MY16019/4 | Dec. 10, 2015 | Dec. 09, 2016 |
| RF Cable | HUBER+SUHNER | SUCOFLEX104 | MY16139/4 | Dec. 10, 2015 | Dec. 09, 2016 |
| LF cable 3M | Woken | CFD400NL-LW | CFD400NL-001 | Dec. 10, 2015 | Dec. 09, 2016 |
| LF cable 10M | Woken | CFD400NL-LW | CFD400NL-002 | Dec. 10, 2015 | Dec. 09, 2016 |
| Measurement Software | AUDIX | e3 | 6.120210g | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

| Test Item | Conducted Emission | | | | |
|---|---|---|---|---|---|
| Test Site | Conduction room 1 / (CO01-WS) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| EMC Receiver | R&S | ESCS 30 | 100169 | Oct. 21, 2015 | Oct. 20, 2016 |
| LISN | SCHWARZBECK | Schwarzbeck 8127 | 8127-667 | Nov. 13, 2015 | Nov. 12, 2016 |
| RF Cable-CON | EMC | EMCCFD300-BM-BM-6000 | 50821 | Dec. 21, 2015 | Dec. 20, 2016 |
| Measurement Software | AUDIX | e3 | 6.120210k | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

## 1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.249
ANSI C63.10-2013

## 1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

| Measurement Uncertainty | |
|---|---|
| **Parameters** | **Uncertainty** |
| Bandwidth | ±34.134 Hz |
| AC conducted emission | ±2.92 dB |
| Radiated emission ≤ 1GHz | ±3.66 dB |
| Radiated emission > 1GHz | ±5.63 dB |

# 2 Test Configuration

## 2.1 Testing Condition

| Test Item | Test Site | Ambient Condition | Tested By |
|---|---|---|---|
| AC Conduction | CO01-WS | 17°C / 60% | Sky Huang |
| Radiated Emissions | 03CH01-WS | 20-22°C / 61-63% | Felix Sung |
| RF Conducted | TH01-WS | 22°C / 61% | Brad Wu |

- FCC site registration No.: 181692
- IC site registration No.: 10807A-1

## 2.2 The Worst Test Modes and Channel Details

| Test item | Mode | Test Frequency (MHz) | Data Rate | Test Configuration |
|---|---|---|---|---|
| AC Power Line Conducted Emissions | FSK | 2408 | 1 Mbps | --- |
| Field Strength of Fundamental | FSK | 2408, 2440, 2474 | 1 Mbps | --- |
| Radiated Emissions ≤ 1GHz | FSK | 2408 | 1 Mbps | --- |
| Radiated Emissions > 1GHz | FSK | 2408, 2440, 2474 | 1 Mbps | --- |
| 20dB bandwidth | FSK | 2408, 2440, 2474 | 1 Mbps | --- |

# 3 Transmitter Test Results

## 3.1 Conducted Emissions

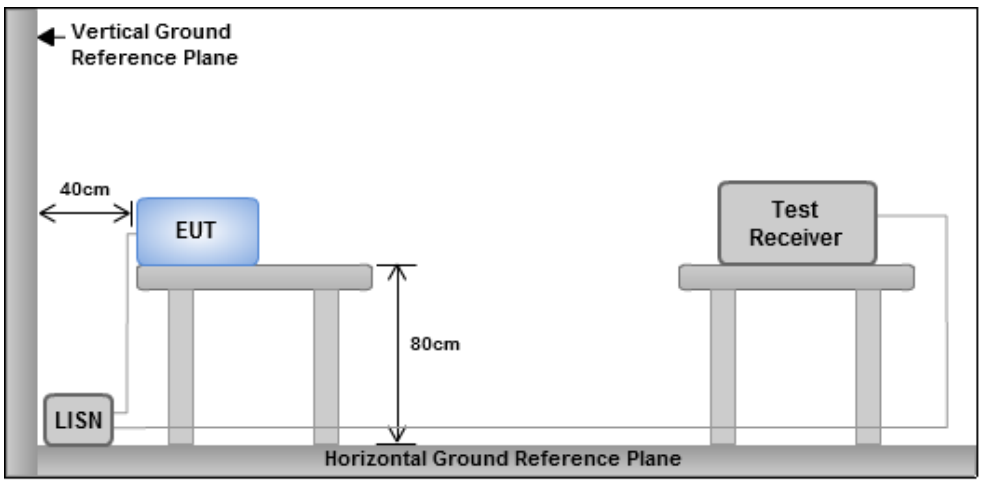
### 3.1.1 Limit of Conducted Emissions

| Conducted Emissions Limit | | |
|---|---|---|
| **Frequency Emission (MHz)** | **Quasi-Peak** | **Average** |
| 0.15-0.5 | 66 - 56 * | 56 - 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |
| Note 1: * Decreases with the logarithm of the frequency. | | |

### 3.1.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

### 3.1.3 Test Setup

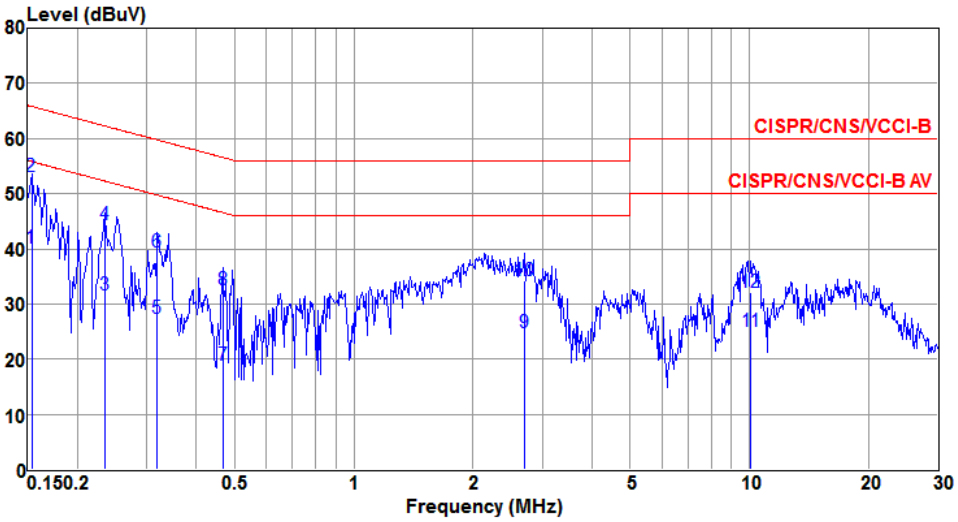



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

### 3.1.4 Test Result of Conducted Emissions

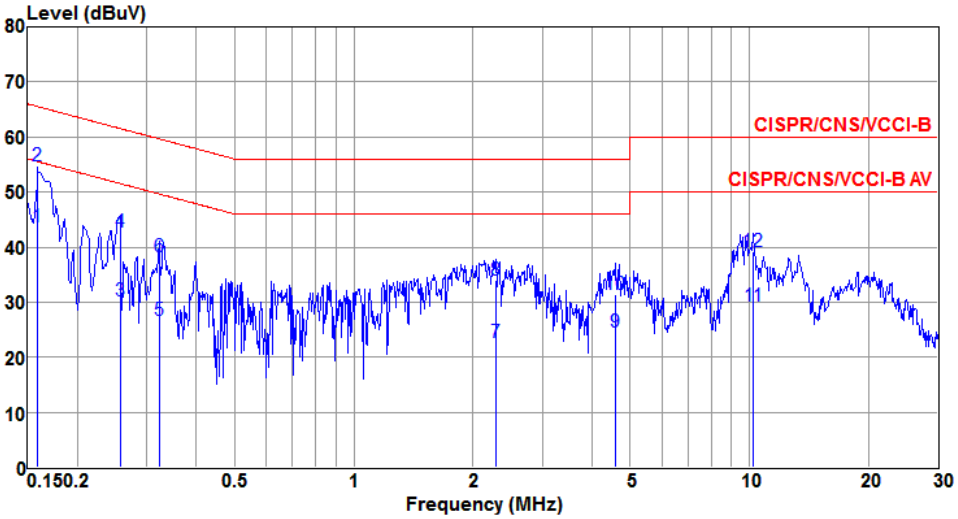
| Power Phase | Line | Test Freq. (MHz) | 2408 |
|---|---|---|---|




| | Freq | Level | Limit Line | Over Limit | Read Level | LISN factor | cable loss | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dBuV | dB | dB | |
| 1 | 0.153 | 40.08 | 55.82 | -15.74 | 39.95 | 0.11 | 0.02 | Average |
| 2@ | 0.153 | 53.10 | 65.82 | -12.72 | 52.97 | 0.11 | 0.02 | QP |
| 3 | 0.234 | 31.71 | 52.30 | -20.59 | 31.58 | 0.11 | 0.02 | Average |
| 4 | 0.234 | 44.32 | 62.30 | -17.98 | 44.19 | 0.11 | 0.02 | QP |
| 5 | 0.318 | 27.27 | 49.75 | -22.48 | 27.12 | 0.12 | 0.03 | Average |
| 6 | 0.318 | 39.42 | 59.75 | -20.33 | 39.27 | 0.12 | 0.03 | QP |
| 7 | 0.466 | 18.96 | 46.58 | -27.62 | 18.79 | 0.13 | 0.04 | Average |
| 8 | 0.466 | 32.52 | 56.58 | -24.06 | 32.35 | 0.13 | 0.04 | QP |
| 9 | 2.692 | 24.74 | 46.00 | -21.26 | 24.47 | 0.17 | 0.10 | Average |
| 10 | 2.692 | 34.18 | 56.00 | -21.82 | 33.91 | 0.17 | 0.10 | QP |
| 11 | 10.072 | 25.03 | 50.00 | -24.97 | 24.63 | 0.24 | 0.16 | Average |
| 12 | 10.072 | 32.14 | 60.00 | -27.86 | 31.74 | 0.24 | 0.16 | QP |

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

| Power Phase | Neutral | Test Freq. (MHz) | 2408 |
|---|---|---|---|




| | Freq | Level | Limit Line | Over Limit | Read Level | LISN factor | cable loss | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dBuV | dB | dB | |
| 1 | 0.159 | 43.76 | 55.52 | -11.76 | 43.62 | 0.12 | 0.02 | Average |
| 2@ | 0.159 | 54.83 | 65.52 | -10.69 | 54.69 | 0.12 | 0.02 | QP |
| 3 | 0.256 | 30.28 | 51.56 | -21.28 | 30.15 | 0.11 | 0.02 | Average |
| 4 | 0.256 | 42.75 | 61.56 | -18.81 | 42.62 | 0.11 | 0.02 | QP |
| 5 | 0.322 | 26.60 | 49.66 | -23.06 | 26.44 | 0.13 | 0.03 | Average |
| 6 | 0.322 | 38.22 | 59.66 | -21.44 | 38.06 | 0.13 | 0.03 | QP |
| 7 | 2.285 | 22.61 | 46.00 | -23.39 | 22.35 | 0.17 | 0.09 | Average |
| 8 | 2.285 | 33.96 | 56.00 | -22.04 | 33.70 | 0.17 | 0.09 | QP |
| 9 | 4.574 | 24.66 | 46.00 | -21.34 | 24.35 | 0.18 | 0.13 | Average |
| 10 | 4.574 | 31.37 | 56.00 | -24.63 | 31.06 | 0.18 | 0.13 | QP |
| 11 | 10.233 | 29.16 | 50.00 | -20.84 | 28.73 | 0.27 | 0.16 | Average |
| 12 | 10.233 | 39.20 | 60.00 | -20.80 | 38.77 | 0.27 | 0.16 | QP |

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

## 3.2 Radiated Emission

This section includes field strength of fundamental, field strength of harmonics and emissions radiated outside of the operating frequency bands.

### 3.2.1 Limit of field strength of fundamental and field strength of harmonics

| Fundamental Frequency | Field strength of fundamental (millivolts/meter) | Field strength of harmonics (microvolts/meter) |
|---|---|---|
| 902–928 MHz | 50 | 500 |
| 2400–2483.5 MHz | 50 | 500 |
| 5725–5875 MHz | 50 | 500 |
| 24.0–24.25 GHz | 250 | 2500 |

### 3.2.2 Limit of Unwanted Emissions

Emissions 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 §15.209, whichever is the lesser attenuation.

| Radiated emission limits in §15.209 | | | |
|---|---|---|---|
| **Frequency Range (MHz)** | **Field Strength (uV/m)** | **Field Strength (dBuV/m)** | **Measure Distance (m)** |
| 0.009~0.490 | 2400/F(kHz) | 48.5 - 13.8 | 300 |
| 0.490~1.705 | 24000/F(kHz) | 33.8 - 23 | 30 |
| 1.705~30.0 | 30 | 29 | 30 |
| 30~88 | 100 | 40 | 3 |
| 88~216 | 150 | 43.5 | 3 |
| 216~960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |

**Note 1:**
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit
**Note 2:**
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

### 3.2.3 Test Procedures

1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

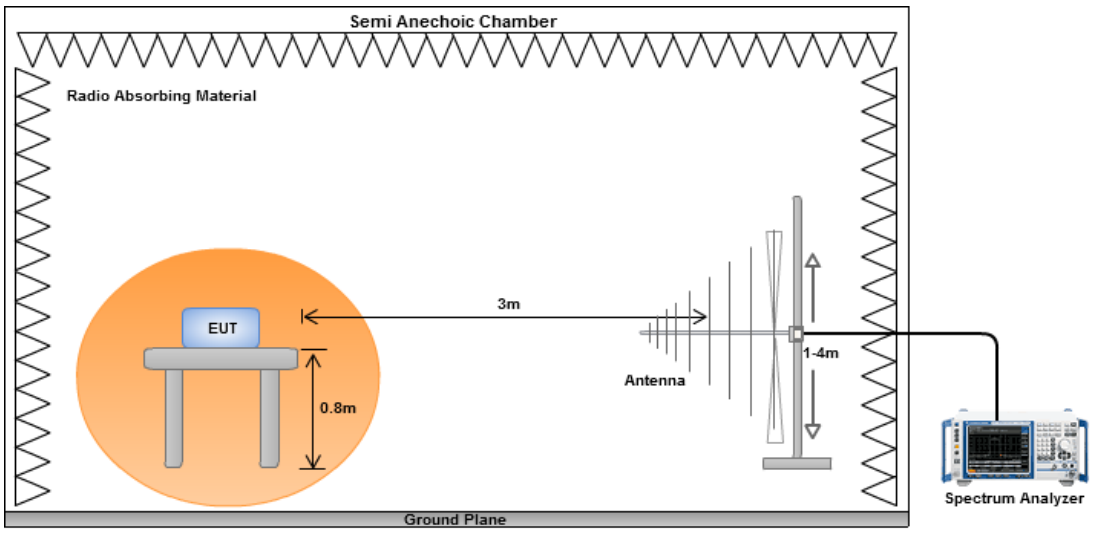
1. Radiated emission below 1GHz
   120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission
2. Radiated emission above 1GHz / Peak value except fundamental
   RBW=1MHz, VBW=3MHz and Peak detector

   Radiated emission above 1GHz / Average value for field strength of fundamental and harmonics
   The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
3. $$20\log(\text{Duty cycle}) = 20\log\frac{20^{*}\ 0.15652\ \text{ms}}{100\ \text{ms}} = -30.09\text{dB}$$

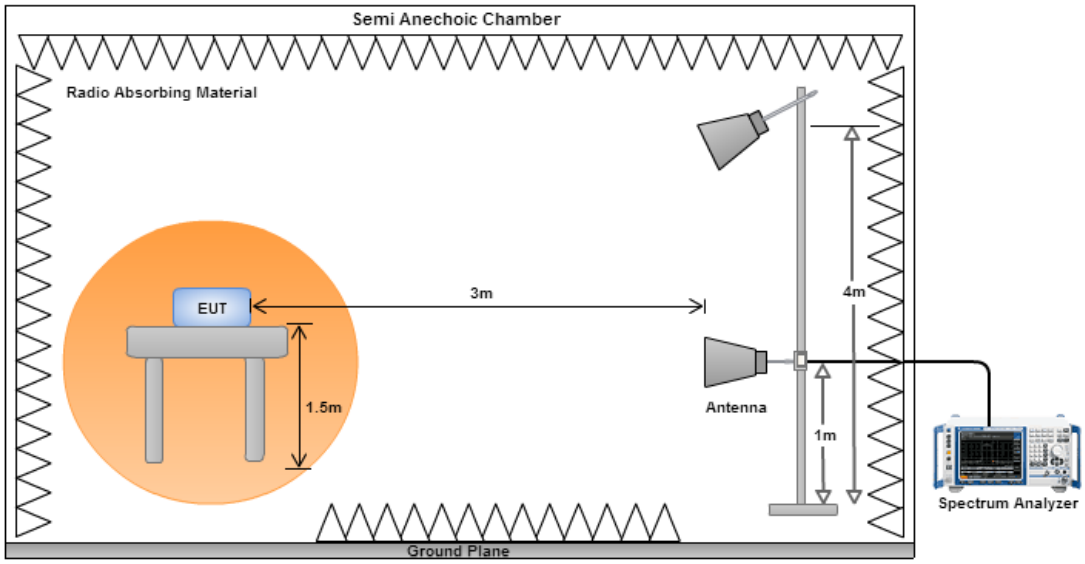
   Please see page 24 for plotted duty
4. Radiated emission above 1GHz / Average value for other emissions
   RBW=1MHz, VBW=10Hz and Peak detector
5. Radiated emission Peak value for fundamental
   RBW=3MHz, VBW=10MHz and Peak detector

### 3.2.4 Test Setup

**Radiated Emissions below 1 GHz**

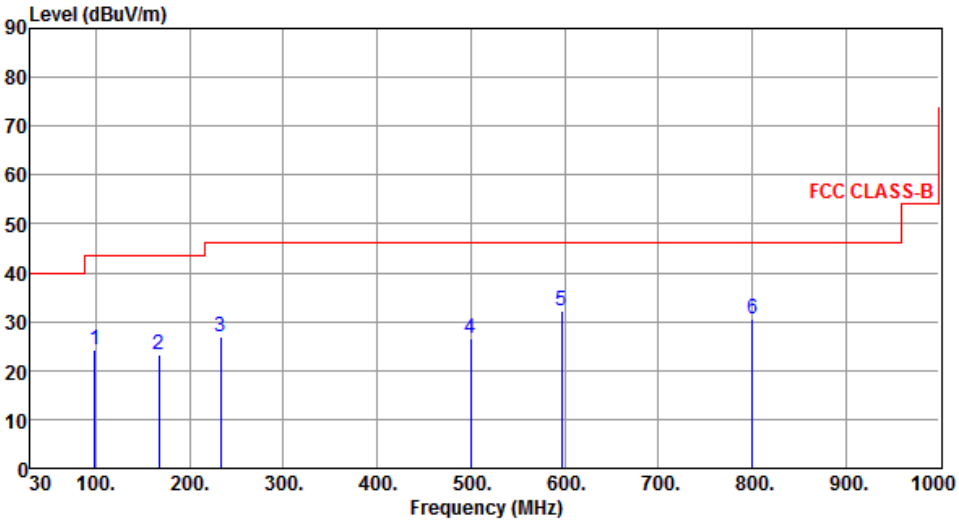



**Radiated Emissions above 1 GHz**



## 3.2.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)

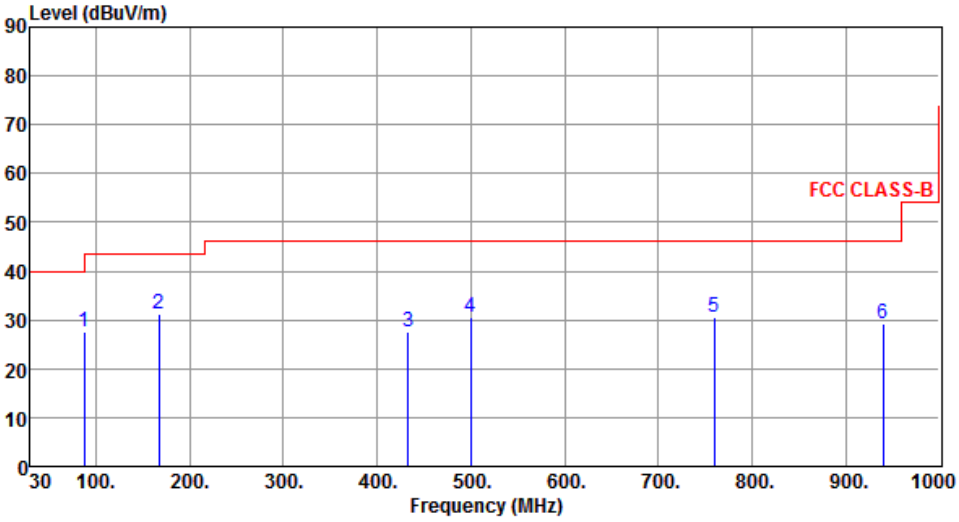
| **Modulation** | FSK | **Test Freq. (MHz)** | 2408 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 98.87 | 24.29 | 43.50 | -19.21 | 45.79 | -21.50 | Peak | --- | --- |
| 2 | 166.77 | 23.12 | 43.50 | -20.38 | 40.07 | -16.95 | Peak | --- | --- |
| 3 | 232.73 | 26.91 | 46.00 | -19.09 | 45.33 | -18.42 | Peak | --- | --- |
| 4 | 499.48 | 26.68 | 46.00 | -19.32 | 37.81 | -11.13 | Peak | --- | --- |
| 5 | 596.48 | 32.09 | 46.00 | -13.91 | 41.67 | -9.58 | Peak | --- | --- |
| 6 | 800.18 | 30.40 | 46.00 | -15.60 | 36.92 | -6.52 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

| Modulation | FSK | Test Freq. (MHz) | 2408 |
|---|---|---|---|
| Polarization | Vertical | | |

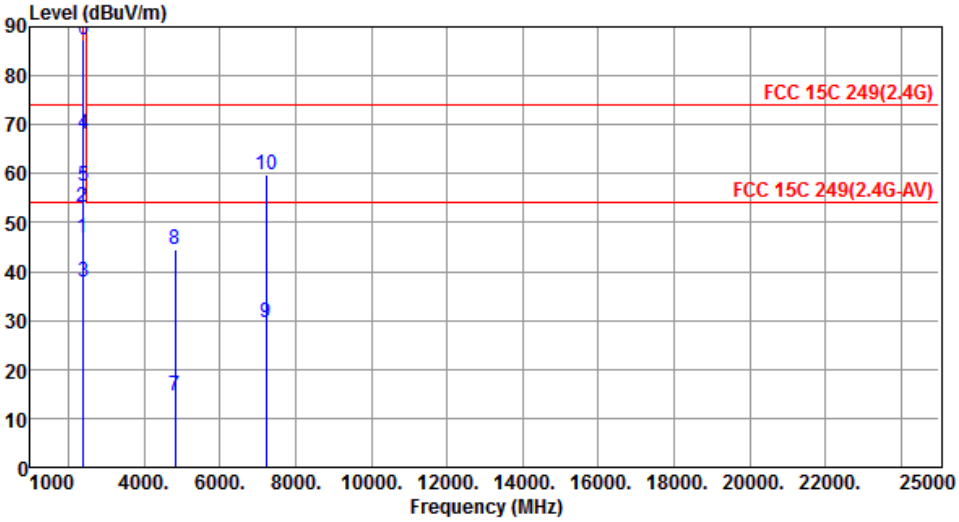



| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 87.23 | 27.62 | 40.00 | -12.38 | 50.14 | -22.52 | Peak | --- | --- |
| 2 | 166.77 | 31.37 | 43.50 | -12.13 | 48.32 | -16.95 | Peak | --- | --- |
| 3 | 433.52 | 27.54 | 46.00 | -18.46 | 40.11 | -12.57 | Peak | --- | --- |
| 4 | 499.48 | 30.68 | 46.00 | -15.32 | 41.81 | -11.13 | Peak | --- | --- |
| 5 | 759.44 | 30.57 | 46.00 | -15.43 | 37.42 | -6.85 | Peak | --- | --- |
| 6 | 939.86 | 29.07 | 46.00 | -16.93 | 33.71 | -4.64 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

## 3.2.6 Transmitter Radiated Unwanted Emissions (Above 1GHz)

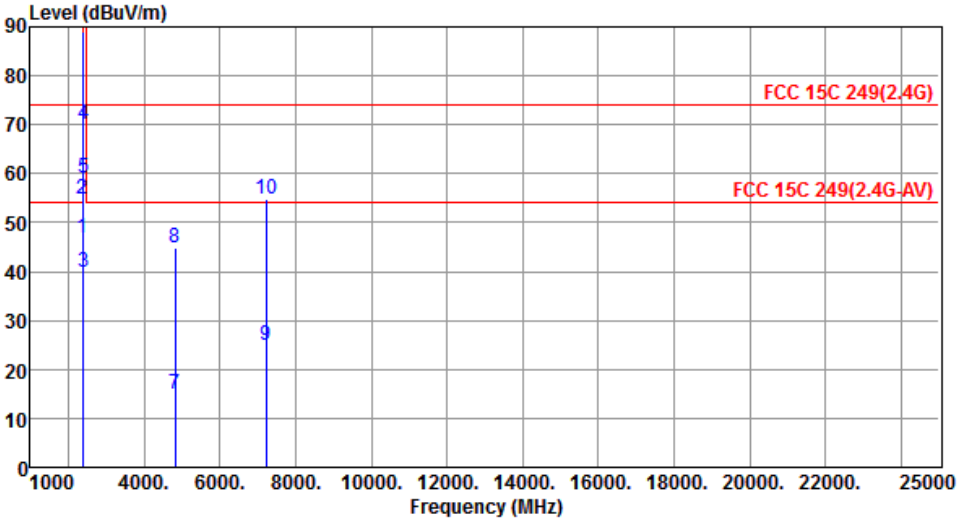
| **Modulation** | FSK | **Test Freq. (MHz)** | 2408 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2390.00 | 46.94 | 54.00 | -7.06 | 50.29 | -3.35 | Average | 191 | 196 |
| 2 | 2390.00 | 53.06 | 74.00 | -20.94 | 56.41 | -3.35 | Peak | 191 | 196 |
| 3 | 2396.00 | 37.87 | 54.00 | -16.13 | 41.18 | -3.31 | Average | 191 | 196 |
| 4 | 2396.00 | 67.96 | 74.00 | -6.04 | 71.27 | -3.31 | Peak | 191 | 196 |
| 5 | 2408.00 | 57.42 | 94.00 | -36.58 | 60.68 | -3.26 | Average | 191 | 196 |
| 6 | 2408.00 | 87.51 | 114.00 | -26.49 | 90.77 | -3.26 | Peak | 191 | 196 |
| 7 | 4816.00 | 14.47 | 54.00 | -39.53 | 10.91 | 3.56 | Average | 100 | 350 |
| 8 | 4816.00 | 44.56 | 74.00 | -29.44 | 41.00 | 3.56 | Peak | 100 | 350 |
| 9 | 7224.00 | 29.59 | 54.00 | -24.41 | 21.20 | 8.39 | Average | 100 | 217 |
| 10 | 7224.00 | 59.68 | 74.00 | -14.32 | 51.29 | 8.39 | Peak | 100 | 217 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

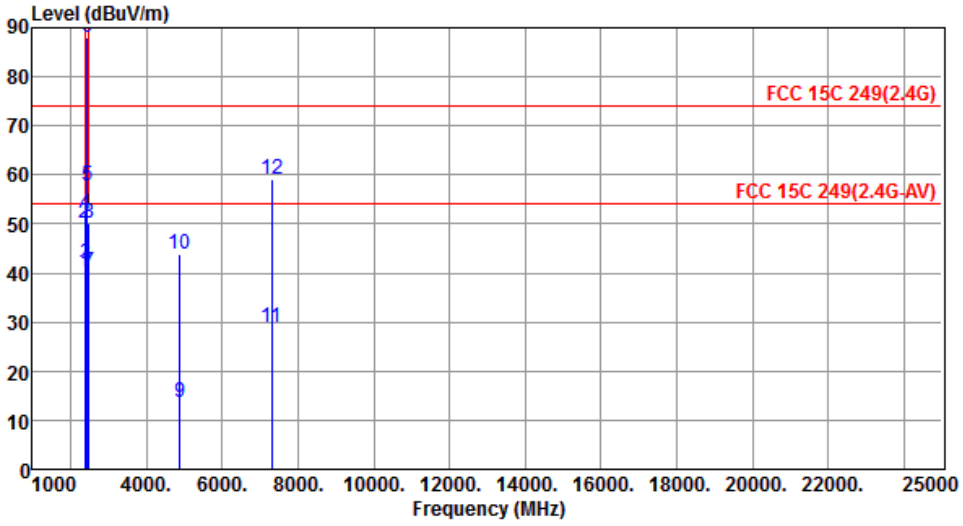
| Modulation | FSK | Test Freq. (MHz) | 2408 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2390.00 | 46.67 | 54.00 | -7.33 | 50.02 | -3.35 | Average | 331 | 33 |
| 2 | 2390.00 | 54.87 | 74.00 | -19.13 | 58.22 | -3.35 | Peak | 331 | 33 |
| 3 | 2396.00 | 39.93 | 54.00 | -14.07 | 43.24 | -3.31 | Average | 331 | 33 |
| 4 | 2396.00 | 70.02 | 74.00 | -3.98 | 73.33 | -3.31 | Peak | 331 | 33 |
| 5 | 2408.00 | 59.07 | 94.00 | -34.93 | 62.33 | -3.26 | Average | 331 | 33 |
| 6 | 2408.00 | 89.16 | 114.00 | -24.84 | 92.42 | -3.26 | Peak | 331 | 33 |
| 7 | 4816.00 | 14.84 | 54.00 | -39.16 | 11.28 | 3.56 | Average | 100 | 32 |
| 8 | 4816.00 | 44.93 | 74.00 | -29.07 | 41.37 | 3.56 | Peak | 100 | 32 |
| 9 | 7224.00 | 24.81 | 54.00 | -29.19 | 16.42 | 8.39 | Average | 289 | 250 |
| 10 | 7224.00 | 54.90 | 74.00 | -19.10 | 46.51 | 8.39 | Peak | 289 | 250 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

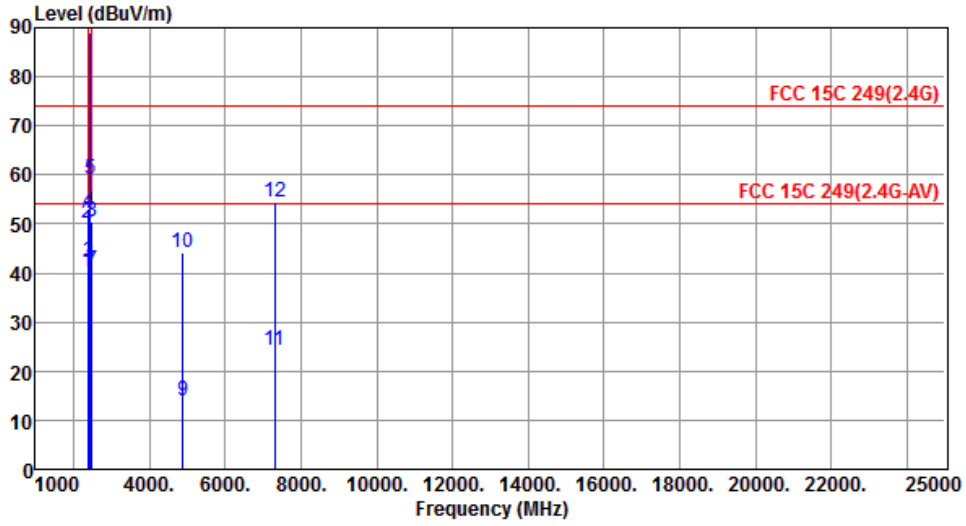
| Modulation | FSK | Test Freq. (MHz) | 2440 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2390.00 | 40.12 | 54.00 | -13.88 | 43.47 | -3.35 | Average | 144 | 201 |
| 2 | 2390.00 | 50.05 | 74.00 | -23.95 | 53.40 | -3.35 | Peak | 144 | 201 |
| 3 | 2400.00 | 41.94 | 54.00 | -12.06 | 45.24 | -3.30 | Average | 144 | 201 |
| 4 | 2400.00 | 52.02 | 74.00 | -21.98 | 55.32 | -3.30 | Peak | 144 | 201 |
| 5 | 2440.00 | 57.92 | 94.00 | -36.08 | 61.05 | -3.13 | Average | 144 | 201 |
| 6 | 2440.00 | 88.01 | 114.00 | -25.99 | 91.14 | -3.13 | Peak | 144 | 201 |
| 7 | 2483.50 | 40.15 | 54.00 | -13.85 | 43.08 | -2.93 | Average | 144 | 201 |
| 8 | 2483.50 | 50.31 | 74.00 | -23.69 | 53.24 | -2.93 | Peak | 144 | 201 |
| 9 | 4880.00 | 13.69 | 54.00 | -40.31 | 9.92 | 3.77 | Average | 100 | 336 |
| 10 | 4880.00 | 43.78 | 74.00 | -30.22 | 40.01 | 3.77 | Peak | 100 | 336 |
| 11 | 7320.00 | 28.92 | 54.00 | -25.08 | 20.49 | 8.43 | Average | 100 | 272 |
| 12 | 7320.00 | 59.01 | 74.00 | -14.99 | 50.58 | 8.43 | Peak | 100 | 272 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

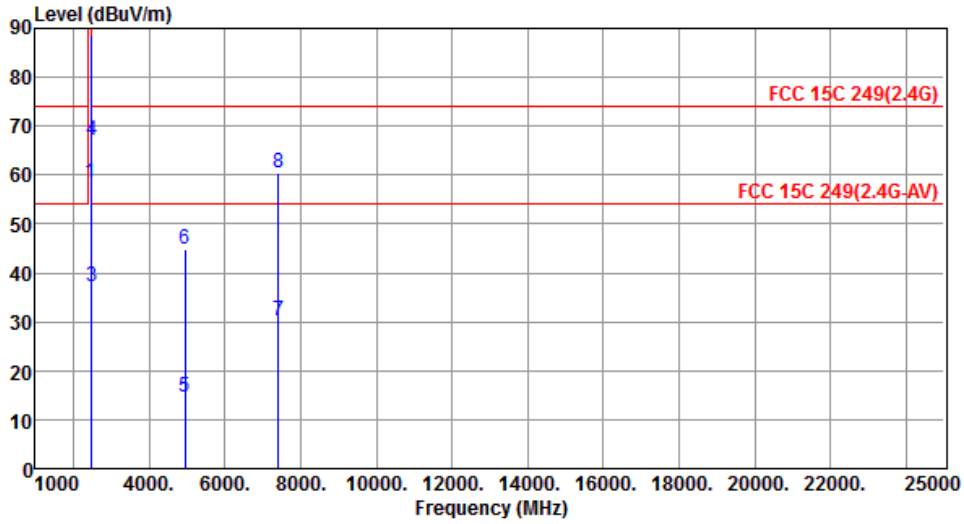
| Modulation | FSK | Test Freq. (MHz) | 2440 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2390.00 | 40.21 | 54.00 | -13.79 | 43.56 | -3.35 | Average | 361 | 163 |
| 2 | 2390.00 | 50.17 | 74.00 | -23.83 | 53.52 | -3.35 | Peak | 361 | 163 |
| 3 | 2400.00 | 42.04 | 54.00 | -11.96 | 45.34 | -3.30 | Average | 361 | 163 |
| 4 | 2400.00 | 52.62 | 74.00 | -21.38 | 55.92 | -3.30 | Peak | 361 | 163 |
| 5 | 2440.00 | 58.95 | 94.00 | -35.05 | 62.08 | -3.13 | Average | 361 | 163 |
| 6 | 2440.00 | 89.04 | 114.00 | -24.96 | 92.17 | -3.13 | Peak | 361 | 163 |
| 7 | 2483.50 | 40.51 | 54.00 | -13.49 | 43.44 | -2.93 | Average | 361 | 163 |
| 8 | 2483.50 | 50.59 | 74.00 | -23.41 | 53.52 | -2.93 | Peak | 361 | 163 |
| 9 | 4880.00 | 14.00 | 54.00 | -40.00 | 10.23 | 3.77 | Average | 100 | 46 |
| 10 | 4880.00 | 44.09 | 74.00 | -29.91 | 40.32 | 3.77 | Peak | 100 | 46 |
| 11 | 7320.00 | 24.31 | 54.00 | -29.69 | 15.88 | 8.43 | Average | 100 | 307 |
| 12 | 7320.00 | 54.40 | 74.00 | -19.60 | 45.97 | 8.43 | Peak | 100 | 307 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

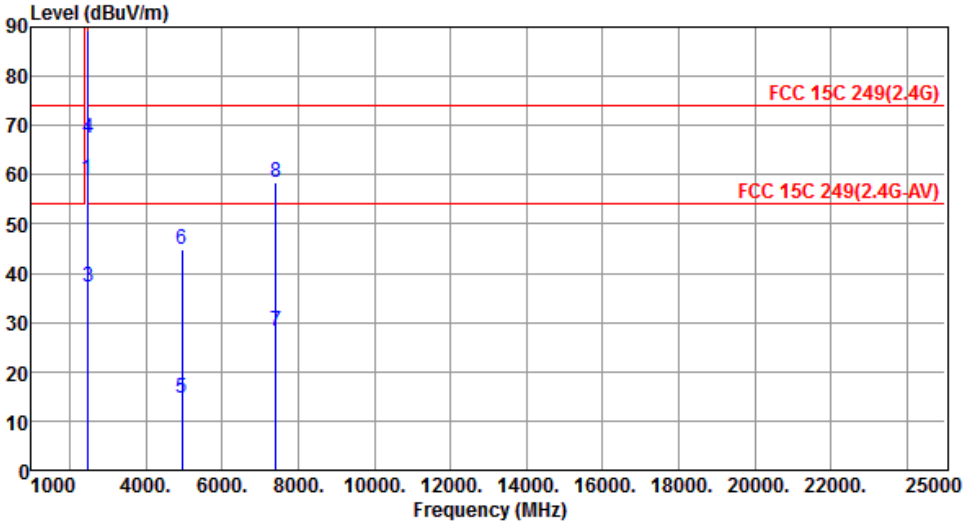
| Modulation | FSK | Test Freq. (MHz) | 2474 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2474.00 | 58.43 | 94.00 | -35.57 | 61.41 | -2.98 | Average | 220 | 338 |
| 2 | 2474.00 | 88.52 | 114.00 | -25.48 | 91.50 | -2.98 | Peak | 220 | 338 |
| 3 | 2483.50 | 37.06 | 54.00 | -16.94 | 39.99 | -2.93 | Average | 220 | 338 |
| 4 | 2483.50 | 67.15 | 74.00 | -6.85 | 70.08 | -2.93 | Peak | 220 | 338 |
| 5 | 4948.00 | 14.61 | 54.00 | -39.39 | 10.61 | 4.00 | Average | 100 | 341 |
| 6 | 4948.00 | 44.70 | 74.00 | -29.30 | 40.70 | 4.00 | Peak | 100 | 341 |
| 7 | 7422.00 | 30.32 | 54.00 | -23.68 | 21.80 | 8.52 | Average | 226 | 265 |
| 8 | 7422.00 | 60.41 | 74.00 | -13.59 | 51.89 | 8.52 | Peak | 226 | 265 |

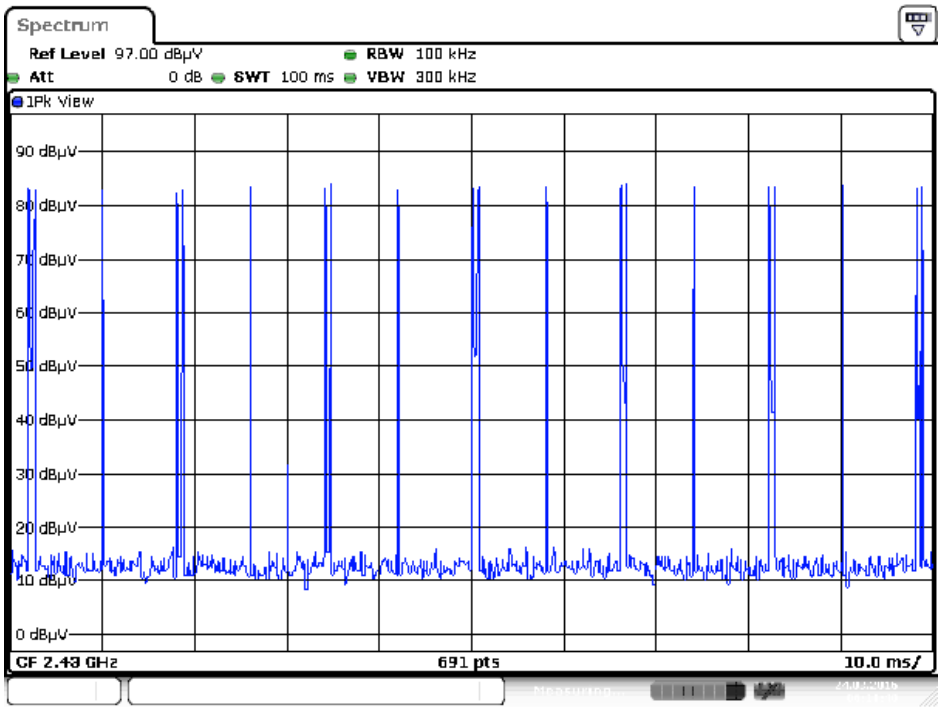
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| Modulation | FSK | Test Freq. (MHz) | 2474 |
|---|---|---|---|
| Polarization | Vertical | | |

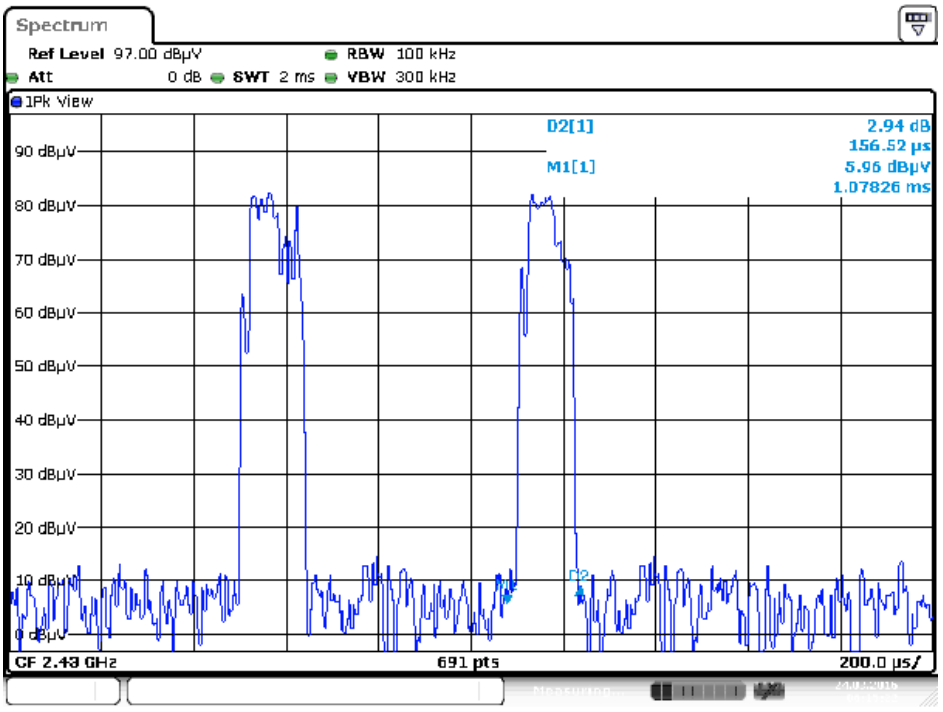



| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2474.00 | 59.17 | 94.00 | -34.83 | 62.15 | -2.98 | Average | 305 | 160 |
| 2 | 2474.00 | 89.26 | 114.00 | -24.74 | 92.24 | -2.98 | Peak | 305 | 160 |
| 3 | 2483.50 | 37.23 | 54.00 | -16.77 | 40.16 | -2.93 | Average | 305 | 160 |
| 4 | 2483.50 | 67.32 | 74.00 | -6.68 | 70.25 | -2.93 | Peak | 305 | 160 |
| 5 | 4948.00 | 14.72 | 54.00 | -39.28 | 10.72 | 4.00 | Average | 100 | 163 |
| 6 | 4948.00 | 44.81 | 74.00 | -29.19 | 40.81 | 4.00 | Peak | 100 | 163 |
| 7 | 7422.00 | 28.23 | 54.00 | -25.77 | 19.71 | 8.52 | Average | 289 | 258 |
| 8 | 7422.00 | 58.32 | 74.00 | -15.68 | 49.80 | 8.52 | Peak | 289 | 258 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).




Date: 24.MAR.2016 06:11:40




Date: 24.MAR.2016 06:15:22

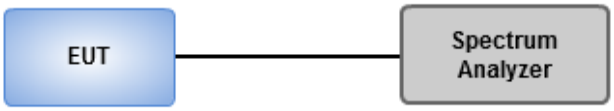
$$20\log(\text{Duty cycle}) = 20\log\frac{20^{*}\ 0.15652\ \text{ms}}{100\ \text{ms}} = -30.09\text{dB}$$

## 3.3 20dB and Occupied Bandwidth

### 3.3.1 Test Procedures

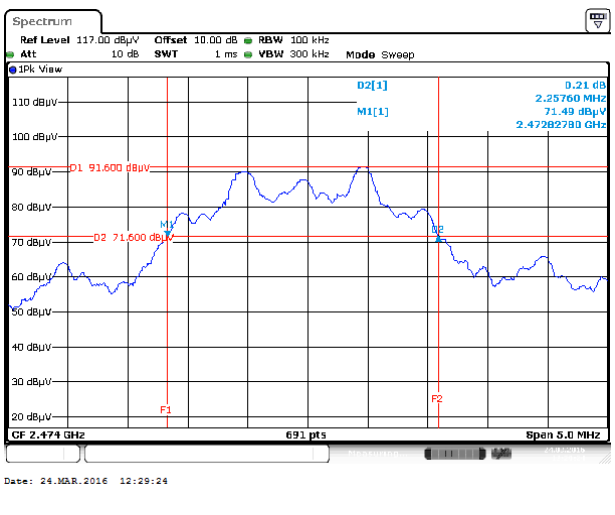
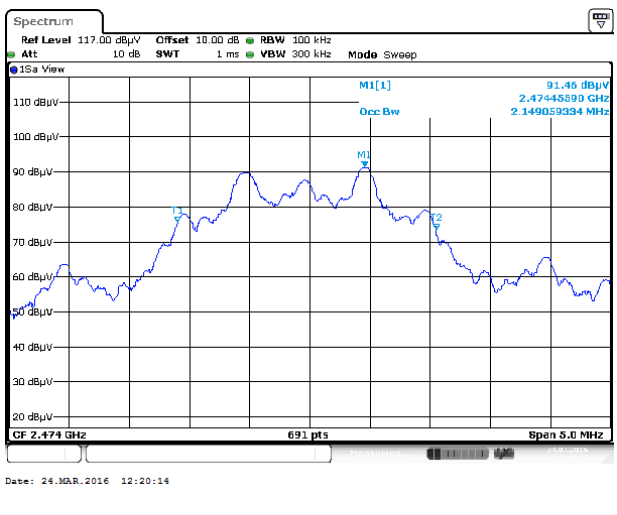
1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak(20 dB bandwidth) / Sample(Occupied bandwidth), Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20dB relative to the maximum level measured in the fundamental emission.
5. Use the occupied measurement function of specturm analyzer to measure 99% occupied bandwidth

### 3.3.2 Test Setup




### 3.3.3 20dB and Occupied Bandwidth

| Freq. (MHz) | 20dB Bandwidth (MHz) | Occupied Bandwidth (MHz) |
|---|---|---|
| 2408 | 2.23 | 2.16 |
| 2440 | 2.22 | 2.44 |
| 2474 | 2.26 | 2.47 |

| Worst Plot of 20dB Bandwidth | Worst Plot of Occupied Bandwidth |
|---|---|
|  |  |

# 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp, it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website http://www.icertifi.com.tw.

| **Linkou** | **Kwei Shan** | **Kwei Shan Site II** |
|---|---|---|
| Tel: 886-2-2601-1640 | Tel: 886-3-271-8666 | Tel: 886-3-271-8640 |
| No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C. | No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C. | No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C. |

If you have any suggestion, please feel free to contact us as below information

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Email: ICC_Service@icertifi.com.tw

**==END==**