

# FCC Test Report

Equipment : Interactive Digital Signage Computer Module  
Brand Name : **Elo** or   
Model No. : ELO-KIT-ECMG2-AND  
FCC ID : RBWECMA  
Standard : 47 CFR FCC Part 15.247  
Operating Band : 2400 MHz – 2483.5 MHz  
FCC Classification : DTS  
Applicant : **Elo Touch Solutions, Inc.**  
1033 McCarthy Blvd, Milpitas, CA95035, USA

The product sample received on Oct. 03, 2015 and completely tested on Nov. 23, 2015. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

  
Kevin Liang / Assistant Manager

## Table of Contents

|          |                                                  |           |
|----------|--------------------------------------------------|-----------|
| <b>1</b> | <b>GENERAL DESCRIPTION .....</b>                 | <b>5</b>  |
| 1.1      | Information.....                                 | 5         |
| 1.2      | Support Equipment.....                           | 7         |
| 1.3      | Testing Applied Standards .....                  | 7         |
| 1.4      | Testing Location Information .....               | 7         |
| 1.5      | Measurement Uncertainty .....                    | 8         |
| <b>2</b> | <b>TEST CONFIGURATION OF EUT.....</b>            | <b>9</b>  |
| 2.1      | The Worst Case Modulation Configuration .....    | 9         |
| 2.2      | The Worst Case Power Setting Parameter .....     | 9         |
| 2.3      | The Worst Case Measurement Configuration.....    | 10        |
| 2.4      | Test Setup Diagram .....                         | 11        |
| <b>3</b> | <b>TRANSMITTER TEST RESULT .....</b>             | <b>12</b> |
| 3.1      | AC Power-line Conducted Emissions .....          | 12        |
| 3.2      | 6dB Bandwidth .....                              | 15        |
| 3.3      | RF Output Power.....                             | 17        |
| 3.4      | Power Spectral Density .....                     | 19        |
| 3.5      | Transmitter Bandedge Emissions .....             | 21        |
| 3.6      | Transmitter Unwanted Emissions.....              | 24        |
| <b>4</b> | <b>TEST EQUIPMENT AND CALIBRATION DATA .....</b> | <b>35</b> |

### **APPENDIX A. TEST PHOTOS**

### **APPENDIX B. PHOTOGRAPHS OF EUT**

## Summary of Test Result

| Conformance Test Specifications |                  |                                                       |                                                                                                            |                                                                |          |
|---------------------------------|------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------|
| Report Clause                   | Ref. Std. Clause | Description                                           | Measured                                                                                                   | Limit                                                          | Result   |
| 1.1.2                           | 15.203           | Antenna Requirement                                   | Antenna connector mechanism complied                                                                       | FCC 15.203                                                     | Complied |
| 3.1                             | 15.207           | AC Power-line Conducted Emissions                     | [dBuV]: 16.310MHz<br>33.98 (Margin 16.02dB) - AV<br>38.93 (Margin 21.07dB) - QP                            | FCC 15.207                                                     | Complied |
| 3.2                             | 15.247(a)        | 6dB Bandwidth                                         | LE: 664.3000kHz                                                                                            | ≥500kHz                                                        | Complied |
| 3.3                             | 15.247(b)        | RF Output Power (Maximum Peak Conducted Output Power) | Power [dBm]<br>LE: 1.17                                                                                    | Power [dBm]<br>LE:30                                           | Complied |
| 3.4                             | 15.247(e)        | Power Spectral Density                                | PSD [dBm/100kHz]<br>LE: -15.84                                                                             | PSD [dBm/3kHz]: 8                                              | Complied |
| 3.5                             | 15.247(d)        | Transmitter Bandedge Emissions                        | Restricted Bands<br>[dBuV/m at 3m]: 2489.60MHz<br>57.53 (Margin 16.47dB) - PK<br>46.57 (Margin 7.43B) - AV | Non-Restricted Bands: > 20 dBc<br>Restricted Bands: FCC 15.209 | Complied |
| 3.6                             | 15.247(d)        | Transmitter Unwanted Emissions                        | Restricted Bands<br>[dBuV/m at 3m]: 4804MHz<br>50.39 (Margin 23.61dB) - PK<br>41.61 (Margin 12.39dB) - AV  | Non-Restricted Bands: > 20 dBc<br>Restricted Bands: FCC 15.209 | Complied |



SPORTON INTERNATIONAL INC.  
TEL : 886-3-327-3456  
FAX : 886-3-327-0973

# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

| RF General Information                                                                                                                                             |                   |                     |                |                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------|----------------|-----------------------|
| Frequency Range (MHz)                                                                                                                                              | Bluetooth Version | Ch. Frequency (MHz) | Channel Number | RF Output Power (dBm) |
| 2400-2483.5                                                                                                                                                        | v4.0 LE           | 2402-2480           | 0-39 [40]      | 1.17                  |
| Note 1: Bluetooth LE (Low Energy) using GFSK modulation for DTS digital modulation.<br>Note 2: RF output power specifies that Maximum Peak Conducted Output Power. |                   |                     |                |                       |

### 1.1.2 Antenna Information

| Antenna Category                    |                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | Integral antenna (antenna permanently attached)                                                                                                                                                                                                                                                                   |
| <input type="checkbox"/>            | Temporary RF connector provided                                                                                                                                                                                                                                                                                   |
| <input type="checkbox"/>            | No temporary RF connector provided<br>Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path. |
| <input checked="" type="checkbox"/> | External antenna (dedicated antennas)                                                                                                                                                                                                                                                                             |
| <input checked="" type="checkbox"/> | Single power level with corresponding antenna(s).                                                                                                                                                                                                                                                                 |
| <input type="checkbox"/>            | Multiple power level and corresponding antenna(s).                                                                                                                                                                                                                                                                |

| Antenna General Information |           |           |                  |               |            |
|-----------------------------|-----------|-----------|------------------|---------------|------------|
| No.                         | Ant. Cat. | Ant. Type | Ant. Connector   | Ant. Model    | Gain (dBi) |
| 1                           | External  | Dipole    | SMA Male Reverse | AN2450-4828RS | 2.0        |

**1.1.3 Type of EUT**

| Identify EUT                        |                                                                                                                                   |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| EUT Serial Number                   | N/A                                                                                                                               |
| Presentation of Equipment           | <input type="checkbox"/> Production ; <input type="checkbox"/> Pre-Production ; <input checked="" type="checkbox"/> Prototype     |
| Type of EUT                         |                                                                                                                                   |
| <input checked="" type="checkbox"/> | Stand-alone                                                                                                                       |
| <input type="checkbox"/>            | Combined (EUT where the radio part is fully integrated within another device)<br>Combined Equipment – Brand Name / Model No.: ... |
| <input type="checkbox"/>            | Plug-in radio (EUT intended for a variety of host systems)<br>Host System – Brand Name / Model No.: ...                           |
| <input type="checkbox"/>            | Other:                                                                                                                            |

**1.1.4 Test Signal Duty Cycle**

| Operated Mode for Worst Duty Cycle                                          |                                       |
|-----------------------------------------------------------------------------|---------------------------------------|
| <input checked="" type="checkbox"/> Operated test mode for worst duty cycle |                                       |
| Test Signal Duty Cycle (x)                                                  | Power Duty Factor [dB] – (10 log 1/x) |
| <input checked="" type="checkbox"/> 69.77% - test mode single channel – LE  | 1.56                                  |

**1.1.5 EUT Operational Condition**

|                          |                                                        |                                              |                                         |
|--------------------------|--------------------------------------------------------|----------------------------------------------|-----------------------------------------|
| <b>Supply Voltage</b>    | <input type="checkbox"/> AC mains                      | <input checked="" type="checkbox"/> DC       |                                         |
| <b>Type of DC Source</b> | <input checked="" type="checkbox"/> External DC supply | <input type="checkbox"/> External AC adapter | <input type="checkbox"/> Li-ion Battery |

## 1.2 Support Equipment

| Support Equipment - RF Conducted |           |            |            |        |
|----------------------------------|-----------|------------|------------|--------|
| No.                              | Equipment | Brand Name | Model Name | FCC ID |
| 1                                | Notebook  | DELL       | E5540      | DoC    |
| 2                                | Adapter   | DELL       | HA65NM130  | DoC    |

| Support Equipment - AC Conduction and Radiated Emission |                 |            |            |        |
|---------------------------------------------------------|-----------------|------------|------------|--------|
| No.                                                     | Equipment       | Brand Name | Model Name | FCC ID |
| 1                                                       | DC Power Supply | GW         | GPS-3030DD | DoC    |

## 1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2013
- ♦ FCC KDB 558074 D01 v03r03
- ♦ FCC KDB 662911 v02r01

## 1.4 Testing Location Information

| Testing Location                      |        |                                                                                                                      |               |                  |
|---------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------|---------------|------------------|
| ☒                                     | HWA YA | ADD : No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang,<br>Tao Yuan City, Taiwan, R.O.C. |               |                  |
|                                       |        | TEL : 886-3-327-3456      FAX : 886-3-327-0973                                                                       |               |                  |
| Test Site Registration Number: 636805 |        |                                                                                                                      |               |                  |
| Test Condition                        |        | Test Site No.                                                                                                        | Test Engineer | Test Environment |
| AC Conduction                         |        | CO04-HY                                                                                                              | Anthony       | 21°C / 62%       |
| RF Conducted                          |        | TH01-HY                                                                                                              | Howard        | 24°C / 64%       |
| Radiated Emission                     |        | 03CH09-HY                                                                                                            | Terry         | 22.4°C / 58%     |

## 1.5 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           |               |             |
|-----------------------------------|---------------|-------------|
| Test Item                         |               | Uncertainty |
| AC power-line conducted emissions |               | ±2.3 dB     |
| Emission bandwidth, 6dB bandwidth |               | ±0.6 %      |
| RF output power, conducted        |               | ±0.1 dB     |
| Power density, conducted          |               | ±0.6 dB     |
| Unwanted emissions, conducted     | 9 – 150 kHz   | ±0.4 dB     |
|                                   | 0.15 – 30 MHz | ±0.4 dB     |
|                                   | 30 – 1000 MHz | ±0.6 dB     |
|                                   | 1 – 18 GHz    | ±0.5 dB     |
|                                   | 18 – 40 GHz   | ±0.5 dB     |
|                                   | 40 – 200 GHz  | N/A         |
| All emissions, radiated           | 9 – 150 kHz   | ±2.5 dB     |
|                                   | 0.15 – 30 MHz | ±2.3 dB     |
|                                   | 30 – 1000 MHz | ±2.6 dB     |
|                                   | 1 – 18 GHz    | ±3.6 dB     |
|                                   | 18 – 40 GHz   | ±3.8 dB     |
|                                   | 40 – 200 GHz  | N/A         |
| Temperature                       |               | ±0.8 °C     |
| <b>Humidity</b>                   |               | ±5 %        |
| DC and low frequency voltages     |               | ±0.9%       |
| Time                              |               | ±1.4 %      |
| Duty Cycle                        |               | ±0.6 %      |



## 2 Test Configuration of EUT

### 2.1 The Worst Case Modulation Configuration

| Worst Modulation Used for Conformance Testing                                                                                                                               |                                    |           |                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------|-----------------|
| Bluetooth Version                                                                                                                                                           | Transmit Chains (N <sub>TX</sub> ) | Data Rate | Modulation Mode |
| LE                                                                                                                                                                          | 1                                  | 1 Mbps    | LE-1Mbps        |
| Note 1: Bluetooth LE (Low Energy) using GFSK modulation for DTS digital modulation.<br>Note 2: Modulation modes consist below configuration:<br>DSSS LE-1Mbps: GFSK (1Mbps) |                                    |           |                 |

### 2.2 The Worst Case Power Setting Parameter

| The Worst Case Power Setting Parameter |          |          |          |
|----------------------------------------|----------|----------|----------|
| Test Software Version                  | QRCT     |          |          |
| Modulation Mode                        | 2402 MHz | 2440 MHz | 2480 MHz |
| LE,1Mbps                               | Default  | Default  | Default  |

## 2.3 The Worst Case Measurement Configuration

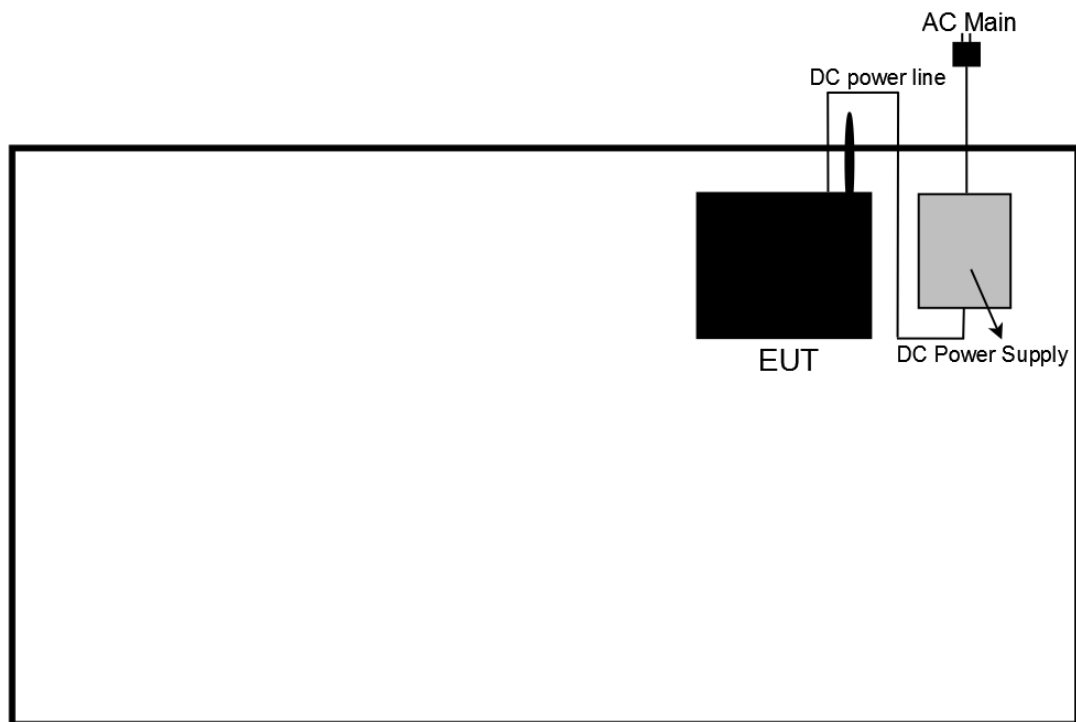
| The Worst Case Mode for Following Conformance Tests |                                                                                         |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>Tests Item</b>                                   | AC power-line conducted emissions                                                       |
| <b>Condition</b>                                    | AC power-line conducted measurement for line and neutral<br>Test Voltage: 120Vac / 60Hz |
| <b>Operating Mode</b>                               | Operating Mode Description                                                              |
| <b>1</b>                                            | Bluetooth Mode                                                                          |

| The Worst Case Mode for Following Conformance Tests |                                                         |
|-----------------------------------------------------|---------------------------------------------------------|
| <b>Tests Item</b>                                   | RF Output Power, Power Spectral Density, 6 dB Bandwidth |
| <b>Test Condition</b>                               | Conducted measurement at transmit chains                |
| <b>Modulation Mode</b>                              | LE-1Mbps                                                |

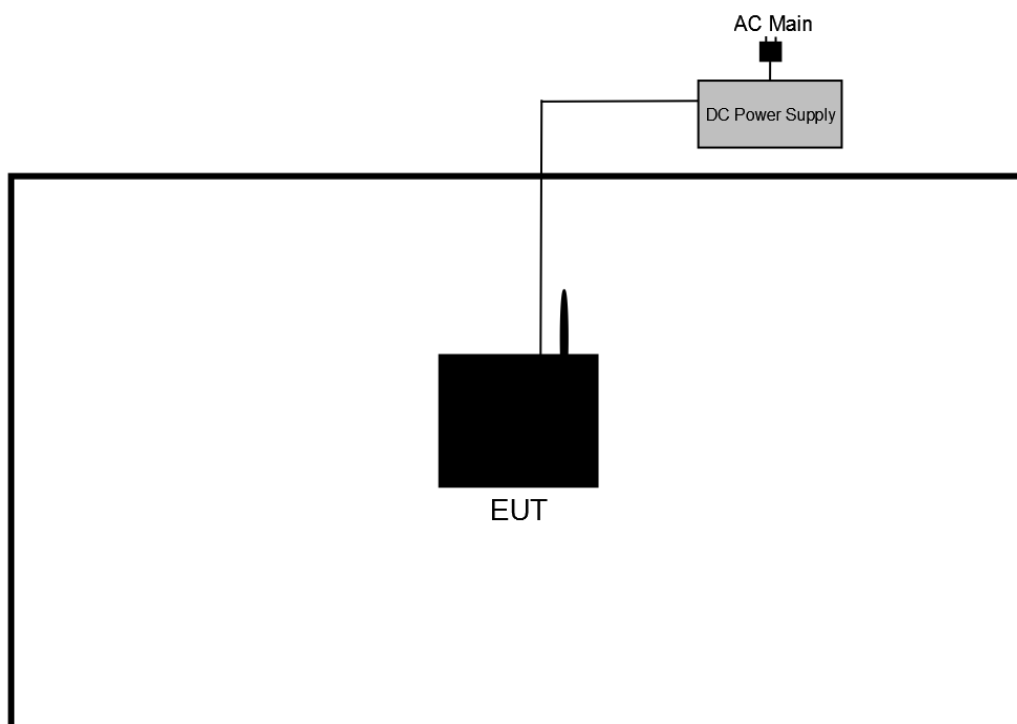
| The Worst Case Mode for Following Conformance Tests |                                                                                                                         |                                                                                      |                                                                                       |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Tests Item</b>                                   | Transmitter Radiated Unwanted Emissions<br>Transmitter Radiated Bandedge Emissions                                      |                                                                                      |                                                                                       |
| <b>Test Condition</b>                               | Radiated measurement                                                                                                    |                                                                                      |                                                                                       |
| <b>User Position</b>                                | <input checked="" type="checkbox"/> EUT will be placed in fixed position.                                               |                                                                                      |                                                                                       |
|                                                     | <input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions.                        |                                                                                      |                                                                                       |
|                                                     | <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. |                                                                                      |                                                                                       |
| <b>Operating Mode</b>                               | Operating Mode Description                                                                                              |                                                                                      |                                                                                       |
| <b>1</b>                                            | Bluetooth Mode                                                                                                          |                                                                                      |                                                                                       |
| <b>Modulation Mode</b>                              | LE-1Mbps                                                                                                                |                                                                                      |                                                                                       |
| <b>Orthogonal Planes of EUT</b>                     | <b>X Plane</b>                                                                                                          | <b>Y Plane</b>                                                                       | <b>Z Plane</b>                                                                        |
|                                                     |                                      |  |  |
| <b>Worst Planes of EUT</b>                          |                                                                                                                         |                                                                                      | V                                                                                     |

## 2.4 Test Setup Diagram

**Test Setup Diagram – AC Line Conducted Emission Test**



**Test Setup Diagram - Radiated Test**



### 3 Transmitter Test Result

### 3.1 AC Power-line Conducted Emissions

### 3.1.1 AC Power-line Conducted Emissions Limit

| AC Power-line 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.

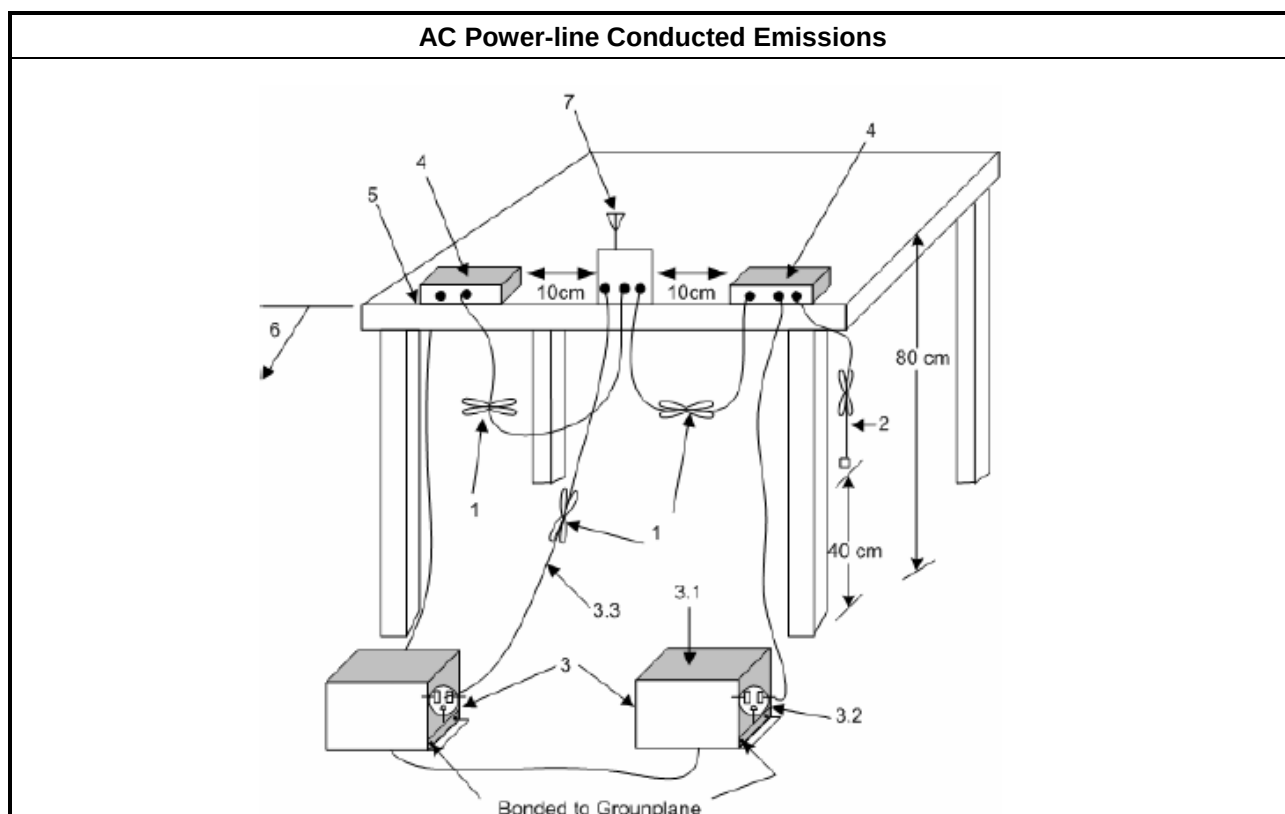
### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

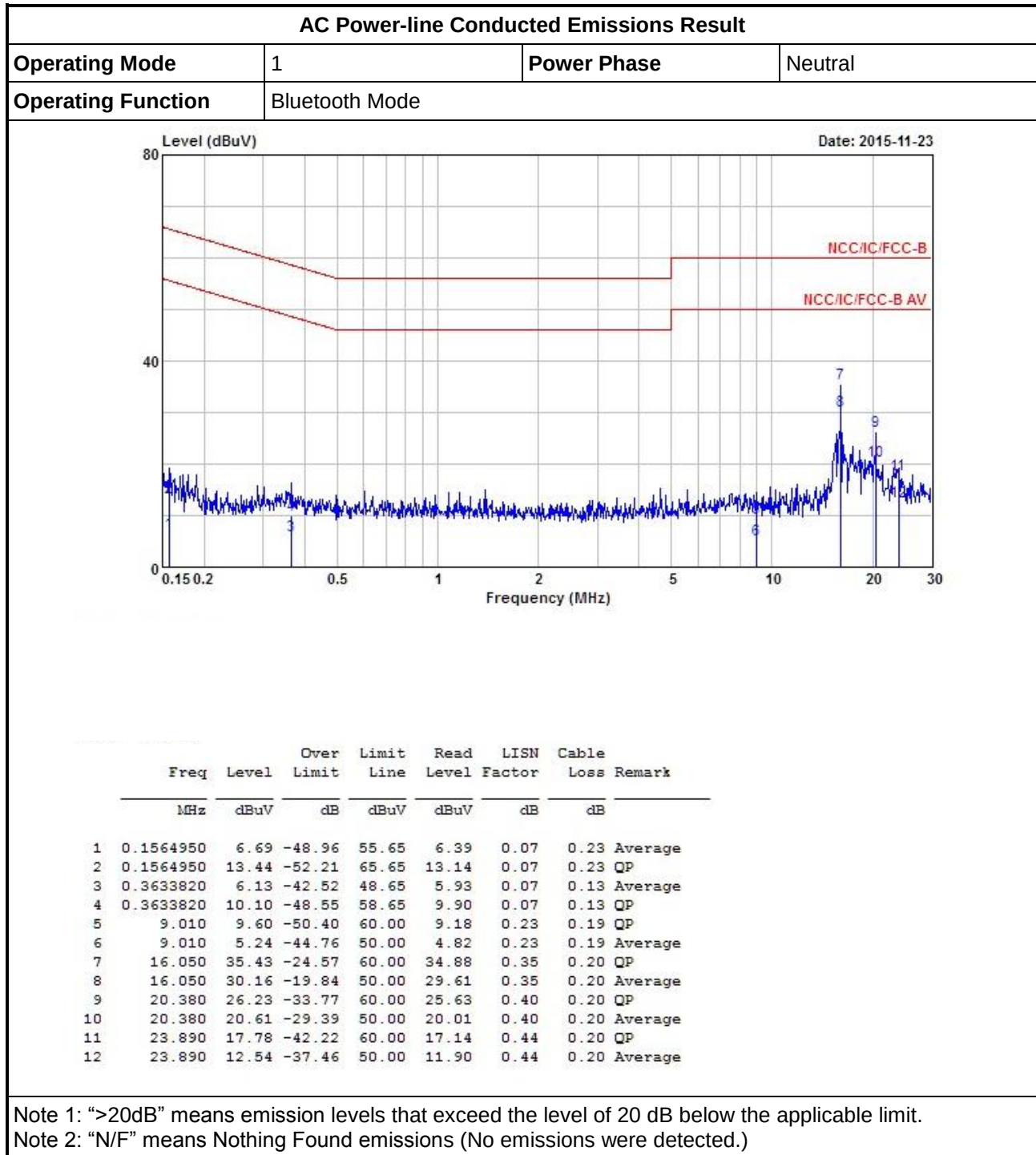
### 3.1.3 Test Procedures

| Test Method                                                                                                      |
|------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions. |

### 3.1.4 Test Setup

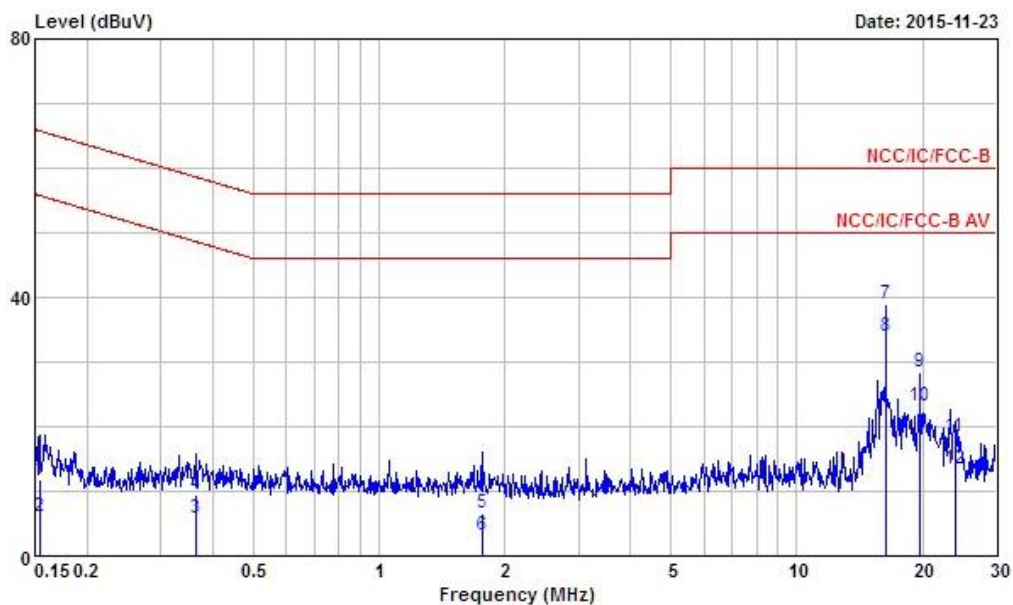


### 3.1.5 Test Result of AC Power-line Conducted Emissions



**AC Power-line Conducted Emissions Result**

|                    |                |             |      |
|--------------------|----------------|-------------|------|
| Operating Mode     | 1              | Power Phase | Line |
| Operating Function | Bluetooth Mode |             |      |



|    | Freq      | Level | Over   | Limit | Read  | LISN   | Cable | Remark  |
|----|-----------|-------|--------|-------|-------|--------|-------|---------|
|    | MHz       | dBuV  | Limit  | Line  | Level | Factor | Loss  |         |
|    |           |       | dB     | dBuV  | dBuV  | dB     | dB    |         |
| 1  | 0.1540270 | 11.83 | -53.95 | 65.78 | 11.56 | 0.05   | 0.22  | QP      |
| 2  | 0.1540270 | 5.93  | -49.85 | 55.78 | 5.66  | 0.05   | 0.22  | Average |
| 3  | 0.3633820 | 5.68  | -42.97 | 48.65 | 5.48  | 0.07   | 0.13  | Average |
| 4  | 0.3633820 | 9.55  | -49.10 | 58.65 | 9.35  | 0.07   | 0.13  | QP      |
| 5  | 1.760     | 6.69  | -49.31 | 56.00 | 6.33  | 0.10   | 0.26  | QP      |
| 6  | 1.760     | 3.07  | -42.93 | 46.00 | 2.71  | 0.10   | 0.26  | Average |
| 7  | 16.310    | 38.93 | -21.07 | 60.00 | 38.41 | 0.32   | 0.20  | QP      |
| 8  | 16.310    | 33.98 | -16.02 | 50.00 | 33.46 | 0.32   | 0.20  | Average |
| 9  | 19.740    | 28.52 | -31.48 | 60.00 | 27.96 | 0.36   | 0.20  | QP      |
| 10 | 19.740    | 23.06 | -26.94 | 50.00 | 22.50 | 0.36   | 0.20  | Average |
| 11 | 23.890    | 18.45 | -41.55 | 60.00 | 17.86 | 0.39   | 0.20  | QP      |
| 12 | 23.890    | 13.37 | -36.63 | 50.00 | 12.78 | 0.39   | 0.20  | Average |

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

## 3.2 6dB Bandwidth

### 3.2.1 6dB Bandwidth Limit

| 6dB Bandwidth Limit                                 |                                |
|-----------------------------------------------------|--------------------------------|
| <b>Systems using digital modulation techniques:</b> |                                |
| <input checked="" type="checkbox"/>                 | 6 dB bandwidth $\geq$ 500 kHz. |

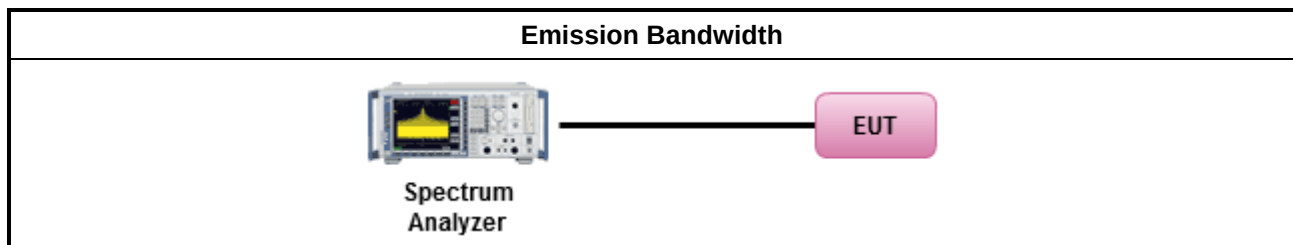
### 3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.2.3 Test Procedures

| Test Method                         |                                                                                                     |
|-------------------------------------|-----------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | For the emission bandwidth shall be measured using one of the options below:                        |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 8.1 Option 1 for 6 dB bandwidth measurement.                        |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 8.2 Option 2 for 6 dB bandwidth measurement.                        |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.                                  |
| <input checked="" type="checkbox"/> | For conducted measurement.                                                                          |
| <input checked="" type="checkbox"/> | The EUT supports single transmit chain and measurements performed on this transmit chain.           |
| <input type="checkbox"/>            | The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case. |

### 3.2.4 Test Setup

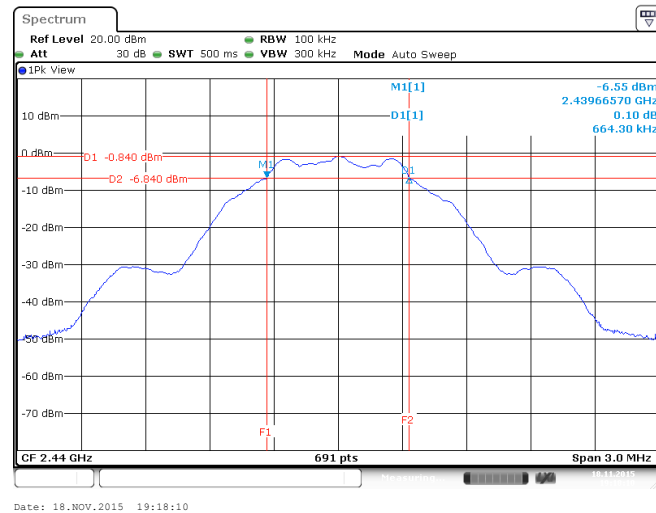


### 3.2.5 Test Result of Emission Bandwidth

| Emission Bandwidth Result |             |                     |                     |
|---------------------------|-------------|---------------------|---------------------|
| Modulation Mode           | Freq. (MHz) | 99% Bandwidth (kHz) | 6dB Bandwidth (kHz) |
| LE-1Mbps                  | 2402        | 1089.7250           | 672.9000            |
| LE-1Mbps                  | 2440        | 1085.3835           | 664.3000            |
| LE-1Mbps                  | 2480        | 1089.7250           | 672.9000            |
| Limit                     |             | N/A                 | ≥500 kHz            |
| Result                    |             | Complied            |                     |

#### Worst Emission Bandwidth Plots

##### LE-1Mbps





### 3.3 RF Output Power

#### 3.3.1 RF Output Power Limit

| RF Output Power Limit for Digital Modulation Systems                                                                                                                                                     |                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <b>Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit</b>                                                                                                                       |                                                                                                |
| <input checked="" type="checkbox"/>                                                                                                                                                                      | 2400-2483.5 MHz Band:                                                                          |
| <input checked="" type="checkbox"/>                                                                                                                                                                      | If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)                                       |
| <input type="checkbox"/>                                                                                                                                                                                 | Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm |
| <b>e.i.r.p. Power Limit:</b>                                                                                                                                                                             |                                                                                                |
| <input checked="" type="checkbox"/>                                                                                                                                                                      | 2400-2483.5 MHz Band                                                                           |
| <input checked="" type="checkbox"/>                                                                                                                                                                      | Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)                                |
| $P_{Out}$ = maximum peak conducted output power or maximum conducted output power in dBm,<br>$G_{TX}$ = the maximum transmitting antenna directional gain in dBi.<br>$P_{eirp}$ = e.i.r.p. Power in dBm. |                                                                                                |

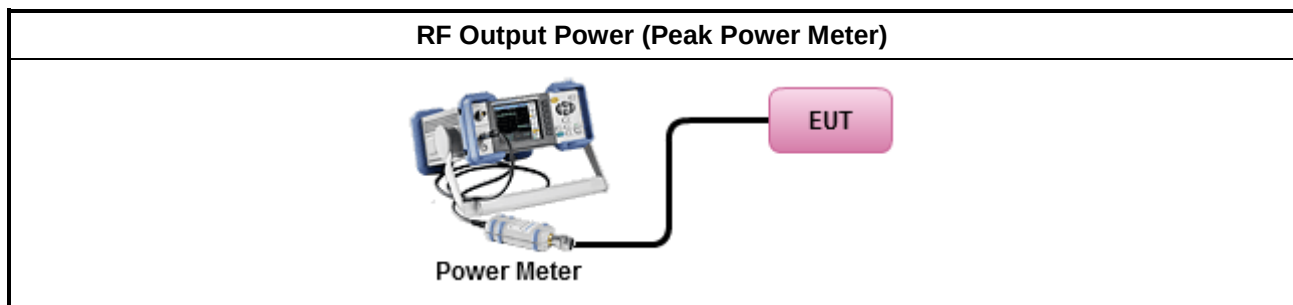
#### 3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.3.3 Test Procedures

| Test Method                         |                                                                                                     |
|-------------------------------------|-----------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Maximum Peak Conducted Output Power                                                                 |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 11.9.1.3) for peak power meter.                                        |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 11.9.1.1) for spectrum analyzer - (RBW $\geq$ EBW).                    |
| <input checked="" type="checkbox"/> | For conducted measurement.                                                                          |
| <input checked="" type="checkbox"/> | The EUT supports single transmit chain and measurements performed on this transmit chain.           |
| <input type="checkbox"/>            | The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case. |

#### 3.3.4 Test Setup



**3.3.5 Test Result of Maximum Peak Conducted Output Power**

| Maximum Peak Conducted Output Power Result |             |                       |             |                    |            |            |
|--------------------------------------------|-------------|-----------------------|-------------|--------------------|------------|------------|
| Condition                                  |             | RF Output Power (dBm) |             |                    |            |            |
| Modulation Mode                            | Freq. (MHz) | RF Output Power       | Power Limit | Antenna Gain (dBi) | EIRP Power | EIRP Limit |
| LE-1Mbps                                   | 2402        | 0.16                  | 30          | 2.0                | 2.16       | 36         |
| LE-1Mbps                                   | 2440        | 1.17                  | 30          | 2.0                | 3.17       | 36         |
| LE-1Mbps                                   | 2480        | 0.42                  | 30          | 2.0                | 2.42       | 36         |
| <b>Result</b>                              |             | <b>Complied</b>       |             |                    |            |            |

**3.3.6 Test Result of Maximum Average Conducted Output Power**

| Maximum Average Conducted Output Power Result |             |                       |                  |                 |                    |            |
|-----------------------------------------------|-------------|-----------------------|------------------|-----------------|--------------------|------------|
| Condition                                     |             | RF Output Power (dBm) |                  |                 |                    |            |
| Modulation Mode                               | Freq. (MHz) | Average Power         | Duty Factor (dB) | RF Output Power | Antenna Gain (dBi) | EIRP Power |
| LE-1Mbps                                      | 2402        | -2.5                  | 1.56             | -0.94           | 2.0                | 1.06       |
| LE-1Mbps                                      | 2440        | -1.43                 | 1.56             | 0.13            | 2.0                | 2.13       |
| LE-1Mbps                                      | 2480        | -2.05                 | 1.56             | -0.49           | 2.0                | 1.51       |
| <b>Result</b>                                 |             | <b>Complied</b>       |                  |                 |                    |            |

### 3.4 Power Spectral Density

#### 3.4.1 Power Spectral Density Limit

| Power Spectral Density Limit        |                                                |
|-------------------------------------|------------------------------------------------|
| <input checked="" type="checkbox"/> | Power Spectral Density (PSD) $\leq$ 8 dBm/3kHz |

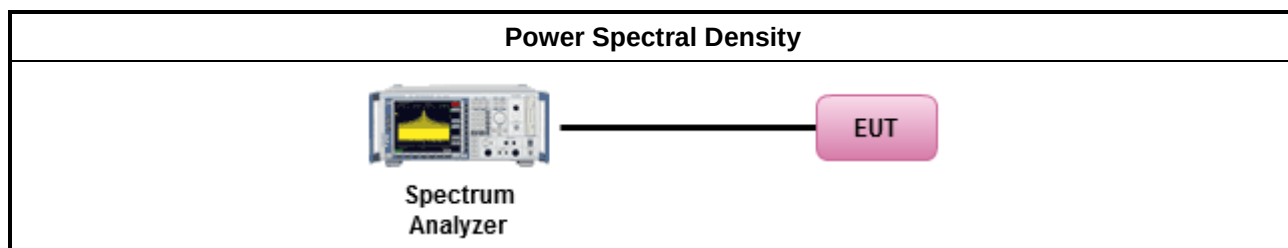
#### 3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.4.3 Test Procedures

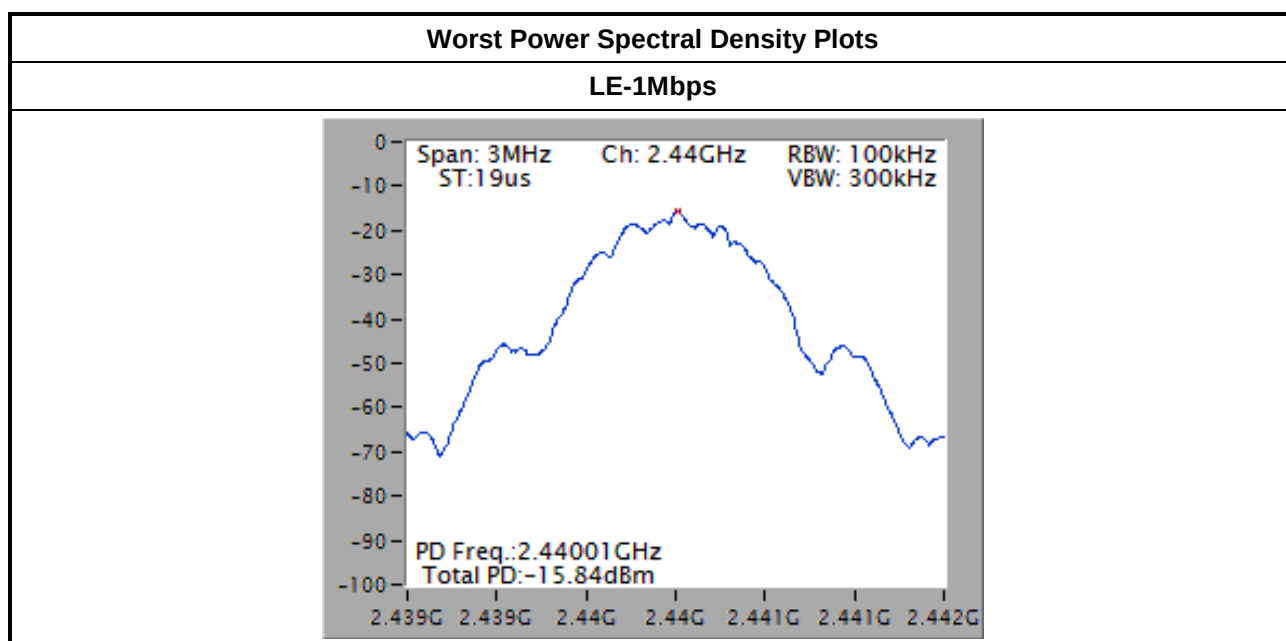
| Test Method                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option). |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 10.2 Method PKPSD (RBW=3-100kHz;detector=peak)..<br>[duty cycle $\geq$ 98% or external video / power trigger]                                                                                                                                                                                                                                                                                                                                                                                                        |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 10.3 Method AVGPS-1 (spectral trace averaging).                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 10.4 Method AVGPS-1 Alt. (slow sweep speed)<br>duty cycle < 98% and average over on/off periods with duty factor                                                                                                                                                                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 10.5 Method AVGPS-2 (spectral trace averaging).                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 10.6 Method AVGPS-2 Alt. (slow sweep speed)                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <input checked="" type="checkbox"/> | For conducted measurement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <input checked="" type="checkbox"/> | The EUT supports single transmit chain and measurements performed on this transmit chain.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>            | The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

#### 3.4.4 Test Setup



### 3.4.5 Test Result of Power Spectral Density

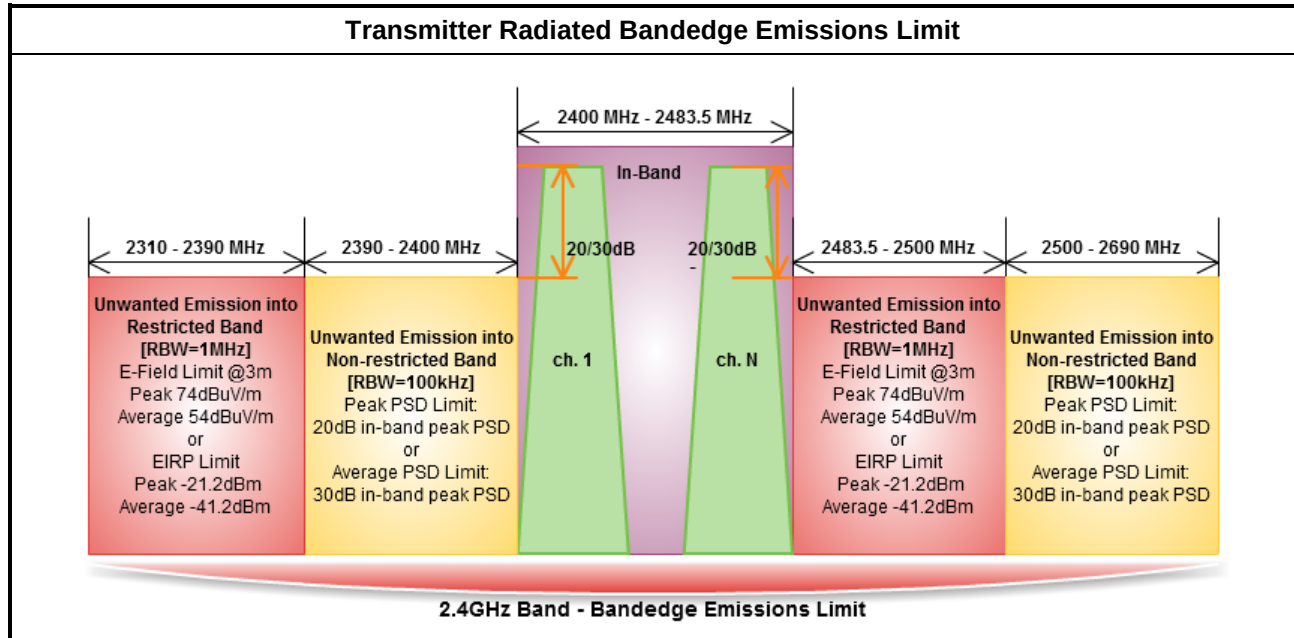
| Power Spectral Density Result |             |                  |                      |
|-------------------------------|-------------|------------------|----------------------|
| Modulation Mode               | Freq. (MHz) | PSD (dBm/100kHz) | PSD Limit (dBm/3kHz) |
| LE-1Mbps                      | 2402        | -17.62           | 8                    |
| LE-1Mbps                      | 2440        | -15.84           | 8                    |
| LE-1Mbps                      | 2480        | -18.68           | 8                    |
| Result                        |             | Complied         |                      |



Note: 15.2dBm has been offset for 3kHz data.

### 3.5 Transmitter Bandedge Emissions

#### 3.5.1 Transmitter Radiated Bandedge Emissions Limit



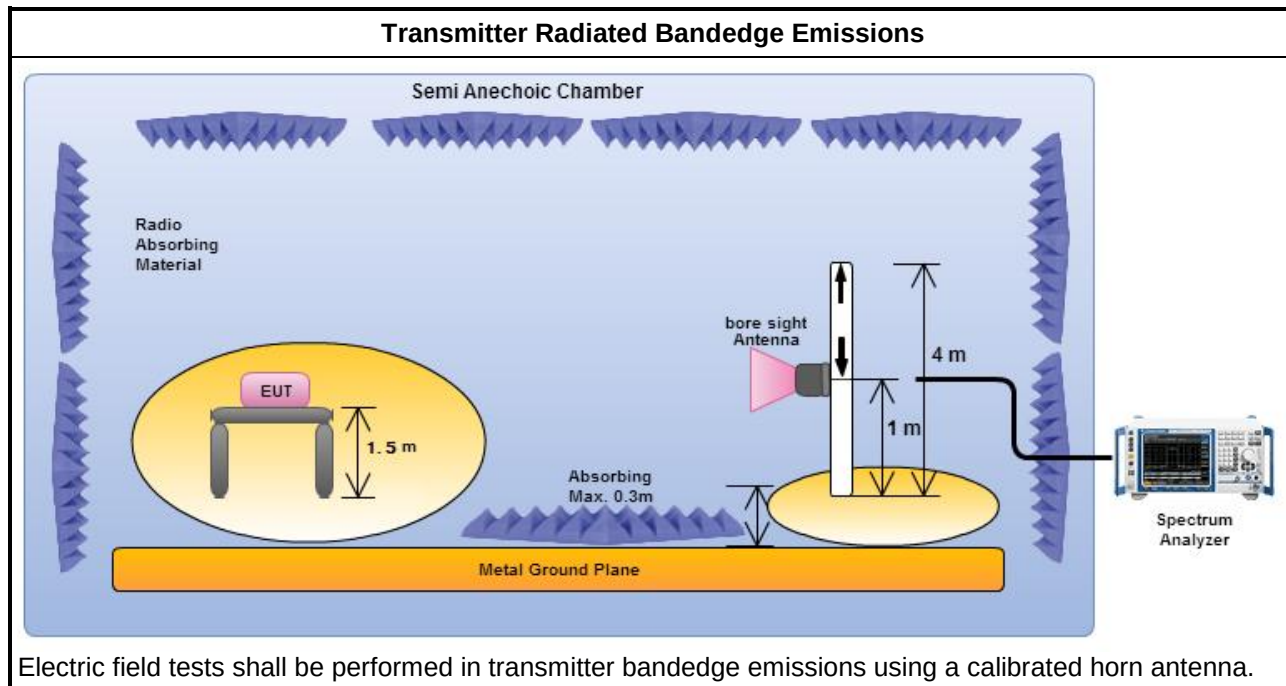
#### 3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.5.3 Test Procedures

| Test Method                         |                                                                                                                                                                        |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].                                                                                |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.10 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band. |
| <input checked="" type="checkbox"/> | For the transmitter unwanted emissions shall be measured using following options below:                                                                                |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 11 for unwanted emissions into non-restricted bands.                                                                                   |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 12 for unwanted emissions into restricted bands.                                                                                       |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq$ 98%)                                                                          |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).                                                                                     |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW $\geq$ 1/T).                                                                                            |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 4.1.4.2.3 (Reduced VBW). VBW $\geq$ 1/T, where T is pulse time.                                                                           |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.                                                                                              |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 11.3 and 12.2.4 measurement procedure peak limit.                                                                                      |
| <input checked="" type="checkbox"/> | For the transmitter bandedge emissions shall be measured using following options below:                                                                                |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).                    |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.10 for band-edge testing.                                                                                                               |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.10.6.2 for marker-delta method for band-edge measurements.                                                                              |
| <input checked="" type="checkbox"/> | For radiated measurement, refer as FCC KDB 558074, clause 12.2.7 and ANSI C63.10, clause 6.6. Test distance is 3m.                                                     |
| <input type="checkbox"/>            | For conducted measurement, refer as FCC KDB 558074, clause 12.2.2.                                                                                                     |

### 3.5.4 Test Setup



### 3.5.5 Transmitter Radiated Bandedge Emissions

| 2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Non-restricted Band) |                 |                  |                               |             |                                |                |            |      |
|------------------------------------------------------------------------------|-----------------|------------------|-------------------------------|-------------|--------------------------------|----------------|------------|------|
| Modulation                                                                   | N <sub>TX</sub> | Test Freq. (MHz) | In-band PSD [i] (dBuV/100kHz) | Freq. (MHz) | Out-band PSD [o] (dBuV/100kHz) | [i] – [o] (dB) | Limit (dB) | Pol. |
| LE-1Mbps                                                                     | 1               | 2402             | 101.50                        | 2399.96     | 46.91                          | 54.59          | 20         | H    |
| LE-1Mbps                                                                     | 1               | 2480             | 98.95                         | 2516.32     | 46.37                          | 52.58          | 20         | H    |

Note 1: Measurement worst emissions of receive antenna polarization

| 2400-2483.5MHz Transmitter Radiated Bandedge Emissions (Restricted Band) |                 |             |                      |                |                   |                   |                |                   |                   |      |
|--------------------------------------------------------------------------|-----------------|-------------|----------------------|----------------|-------------------|-------------------|----------------|-------------------|-------------------|------|
| Modulation Mode                                                          | N <sub>TX</sub> | Freq. (MHz) | Measure Distance (m) | Freq. (MHz) PK | Level (dBuV/m) PK | Limit (dBuV/m) PK | Freq. (MHz) AV | Level (dBuV/m) AV | Limit (dBuV/m) AV | Pol. |
| LE-1Mbps                                                                 | 1               | 2402        | 3                    | 2371.00        | 56.73             | 74                | 2388.13        | 46.05             | 54                | H    |
| LE-1Mbps                                                                 | 1               | 2480        | 3                    | 2493.60        | 57.53             | 74                | 2489.60        | 46.57             | 54                | H    |

Note 1: Measurement worst emissions of receive antenna polarization.  
 Note 2: Average emission setting: RBW=1MHz; VBW ≥ 1/T, where T is "Pulse On Time", e.g., LE VBW≥1/625us, VBW=3kHz.

### 3.6 Transmitter Unwanted Emissions

#### 3.6.1 Transmitter Radiated Unwanted Emissions Limit

| Restricted Band Emissions Limit |                       |                         |                      |
|---------------------------------|-----------------------|-------------------------|----------------------|
| 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: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

| Un-restricted Band Emissions Limit |            |
|------------------------------------|------------|
| RF output power procedure          | Limit (dB) |
| Peak output power procedure        | 20         |
| Average output power procedure     | 30         |

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

#### 3.6.2 Measuring Instruments

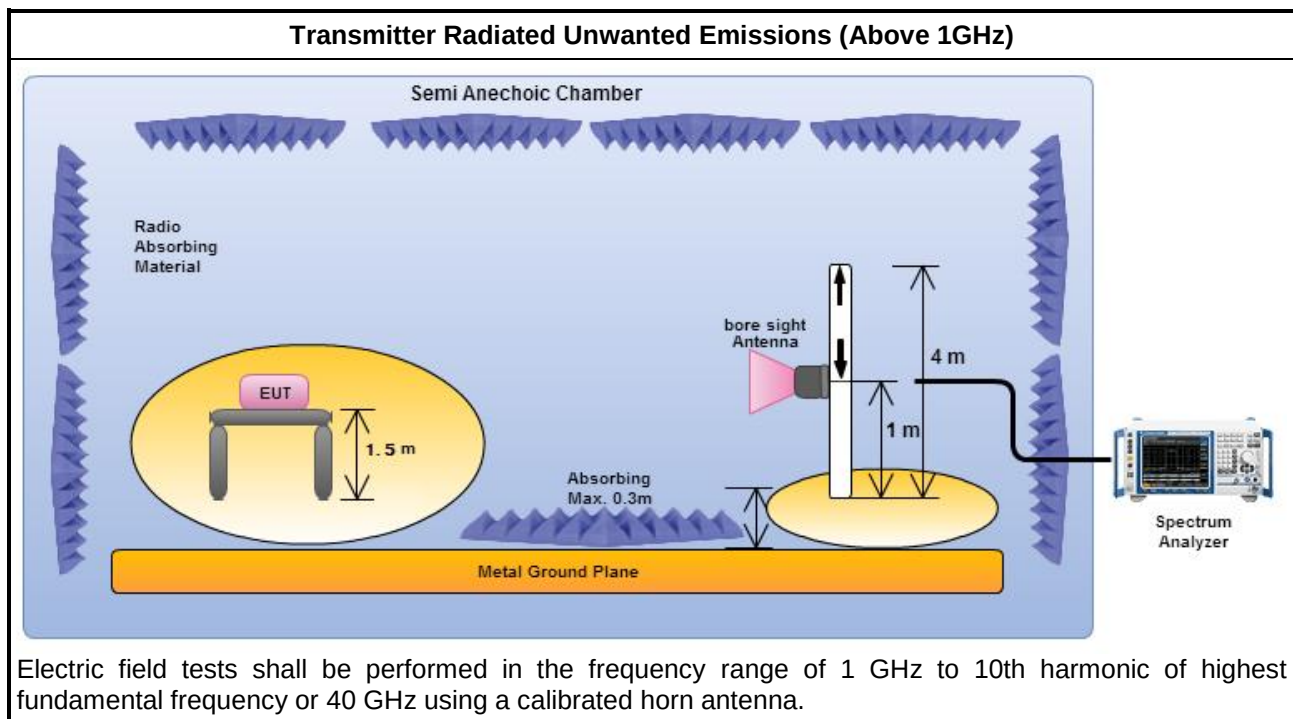
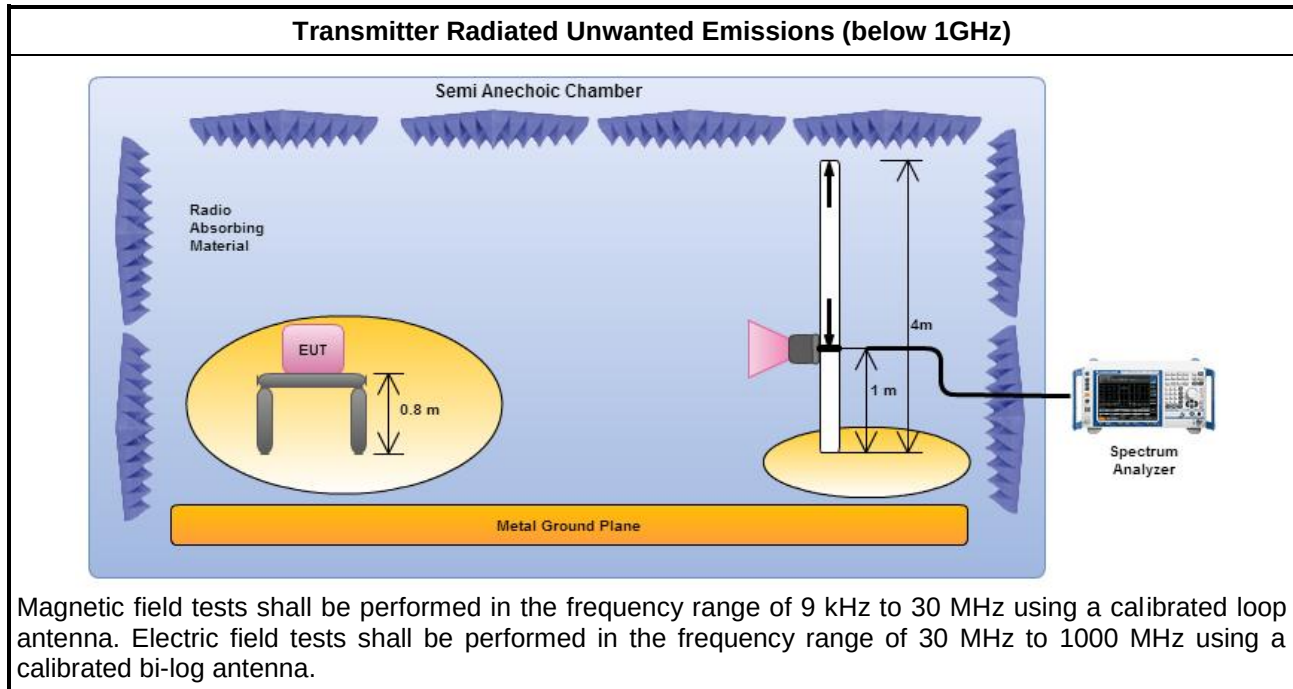
Refer a test equipment and calibration data table in this test report.



### 3.6.3 Test Procedures

| Test Method                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements). |
| <input checked="" type="checkbox"/> | The average emission levels shall be measured in [duty cycle $\geq 98$ or duty factor].                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | For the transmitter unwanted emissions shall be measured using following options below:                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 11 for unwanted emissions into non-restricted bands.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 12 for unwanted emissions into restricted bands.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq 98\%$ )                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW $\geq 1/T$ ).                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 4.1.4.2.3 (Reduced VBW). VBW $\geq 1/T$ , where T is pulse time.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 11.3 and 12.2.4 measurement procedure peak limit.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 12.2.3 measurement procedure Quasi-Peak limit.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <input checked="" type="checkbox"/> | For radiated measurement, refer as FCC KDB 558074, clause 12.2.7.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1 GHz and test distance is 3m.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | For conducted and cabinet radiation measurement, refer as FCC KDB 558074, clause 12.2.2.                                                                                                                                                                                                                                                                                                                                                                                                                                    |

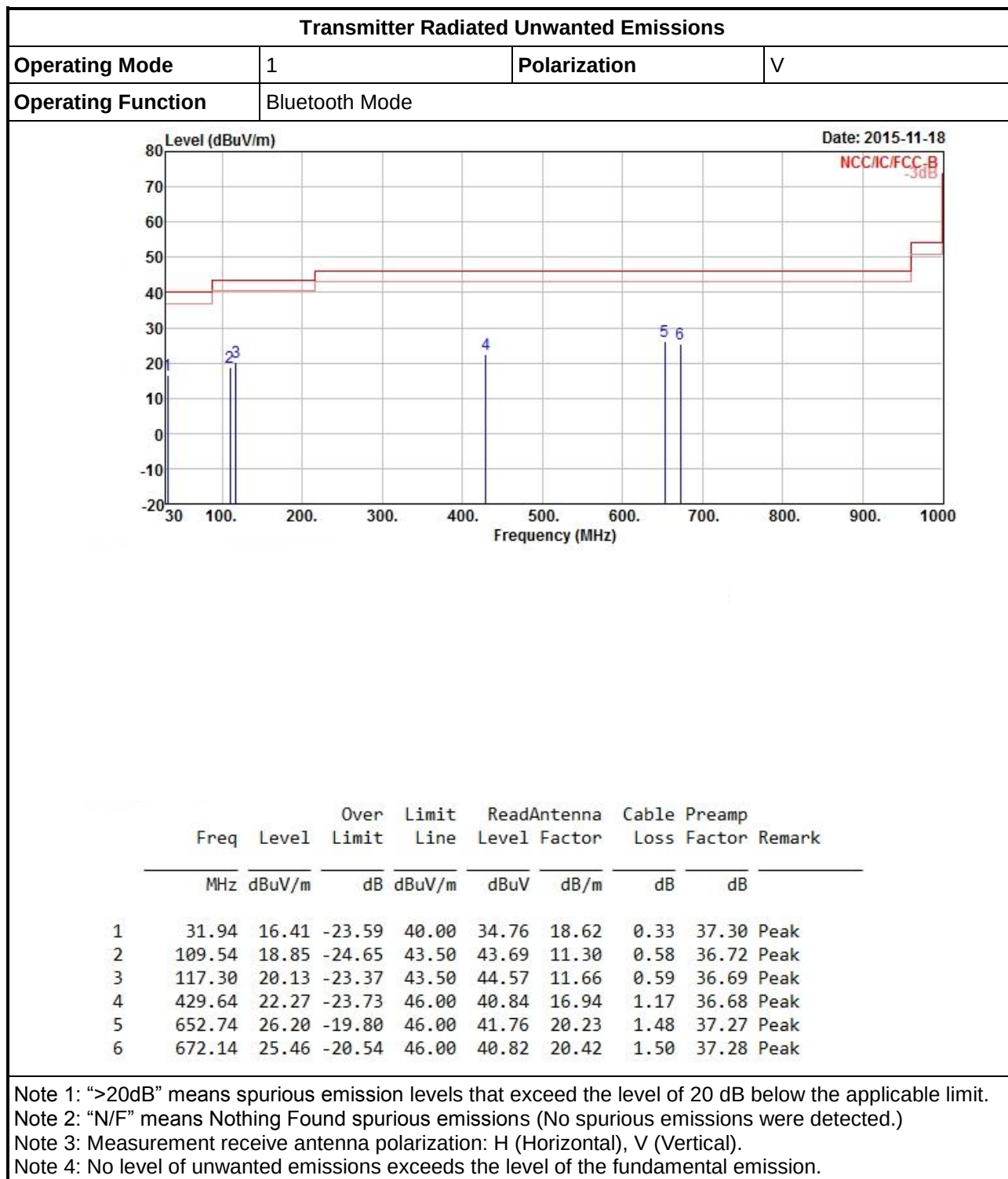
### 3.6.4 Test Setup



### 3.6.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

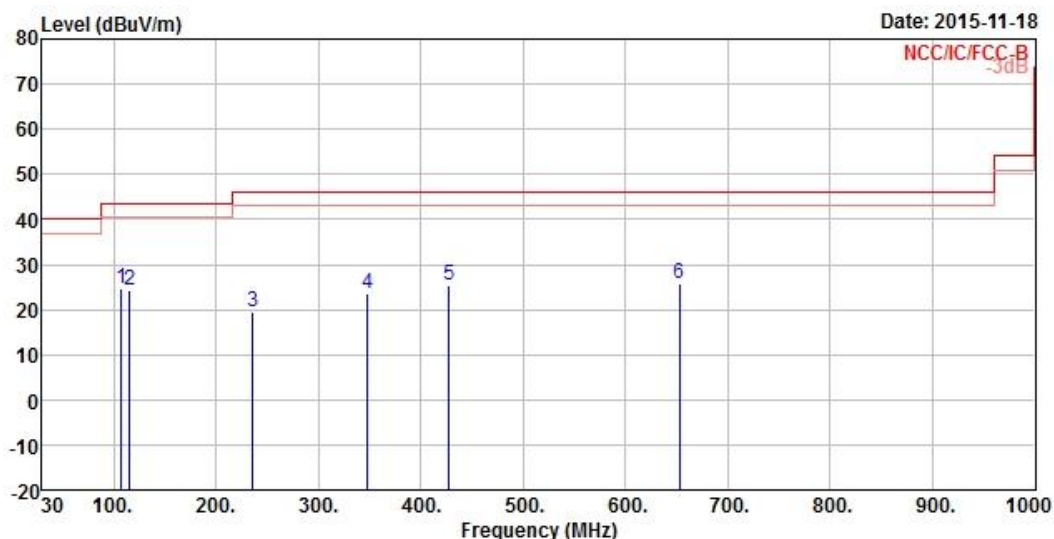
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

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



## Transmitter Radiated Unwanted Emissions

|                    |                |              |   |
|--------------------|----------------|--------------|---|
| Operating Mode     | 1              | Polarization | H |
| Operating Function | Bluetooth Mode |              |   |



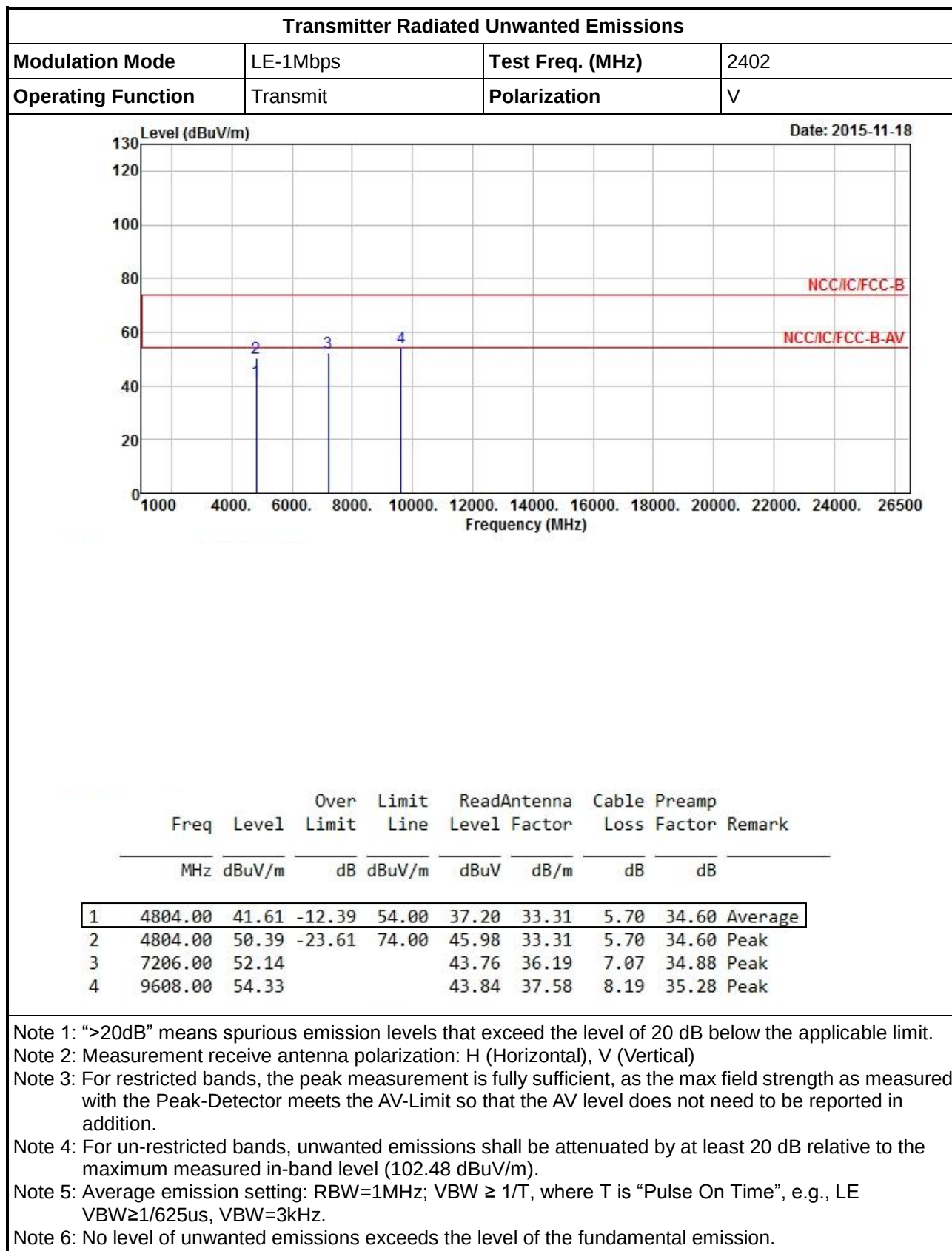
|   | Freq   | Level  | Over<br>Limit | Limit<br>Line | ReadAntenna<br>Level | Cable<br>Loss | Preamp<br>Factor | Remark     |
|---|--------|--------|---------------|---------------|----------------------|---------------|------------------|------------|
|   | MHz    | dBuV/m | dB            | dBuV/m        | dBuV                 | dB/m          | dB               | dB         |
| 1 | 107.60 | 24.82  | -18.68        | 43.50         | 49.84                | 11.12         | 0.58             | 36.72 Peak |
| 2 | 115.36 | 24.36  | -19.14        | 43.50         | 48.89                | 11.57         | 0.59             | 36.69 Peak |
| 3 | 235.64 | 19.54  | -26.46        | 46.00         | 43.63                | 11.44         | 0.85             | 36.38 Peak |
| 4 | 348.16 | 23.54  | -22.46        | 46.00         | 43.84                | 15.14         | 1.04             | 36.48 Peak |
| 5 | 427.70 | 25.21  | -20.79        | 46.00         | 43.81                | 16.90         | 1.17             | 36.67 Peak |
| 6 | 652.74 | 25.65  | -20.35        | 46.00         | 41.21                | 20.23         | 1.48             | 37.27 Peak |

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

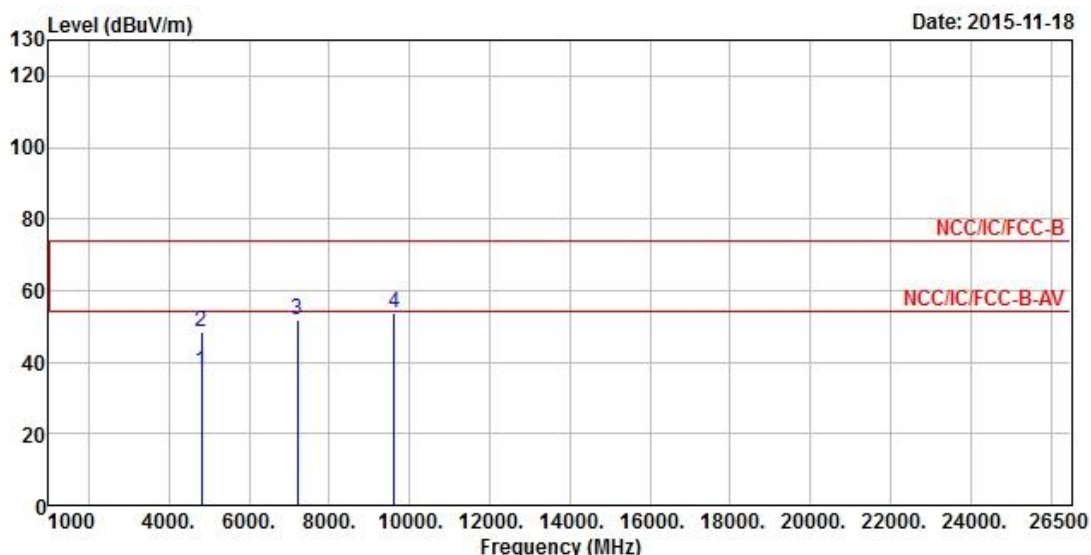
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

**3.6.7 Transmitter Radiated Unwanted Emissions (Above 1GHz)**


**Transmitter Radiated Unwanted Emissions**

|                           |          |                         |      |
|---------------------------|----------|-------------------------|------|
| <b>Modulation Mode</b>    | LE-1Mbps | <b>Test Freq. (MHz)</b> | 2402 |
| <b>Operating Function</b> | Transmit | <b>Polarization</b>     | H    |



|   | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Cable Factor | Preamp Loss | Remark        |
|---|---------|--------|------------|------------|-------------------|--------------|-------------|---------------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m         | dB          | dB            |
| 1 | 4804.00 | 37.36  | -16.64     | 54.00      | 32.95             | 33.31        | 5.70        | 34.60 Average |
| 2 | 4804.00 | 48.35  | -25.65     | 74.00      | 43.94             | 33.31        | 5.70        | 34.60 Peak    |
| 3 | 7206.00 | 51.70  |            |            | 43.32             | 36.19        | 7.07        | 34.88 Peak    |
| 4 | 9608.00 | 53.60  |            |            | 43.11             | 37.58        | 8.19        | 35.28 Peak    |

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (102.48 dBuV/m).

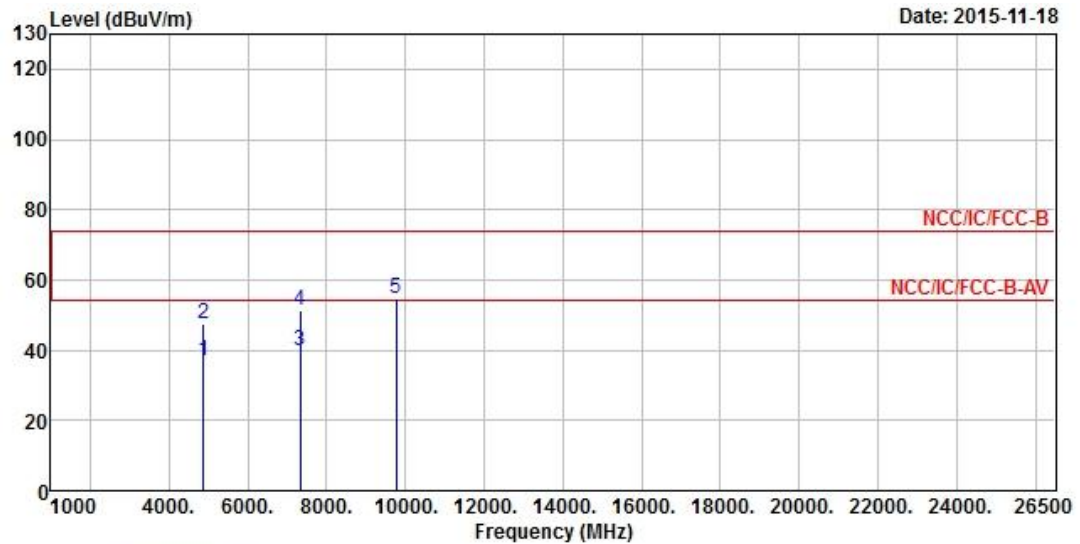
Note 5: Average emission setting: RBW=1MHz; VBW  $\geq 1/T$ , where T is "Pulse On Time", e.g., LE VBW $\geq 1/625\mu s$ , VBW=3kHz.

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.



**Transmitter Radiated Unwanted Emissions**

|                           |          |                         |      |
|---------------------------|----------|-------------------------|------|
| <b>Modulation Mode</b>    | LE-1Mbps | <b>Test Freq. (MHz)</b> | 2440 |
| <b>Operating Function</b> | Transmit | <b>Polarization</b>     | V    |

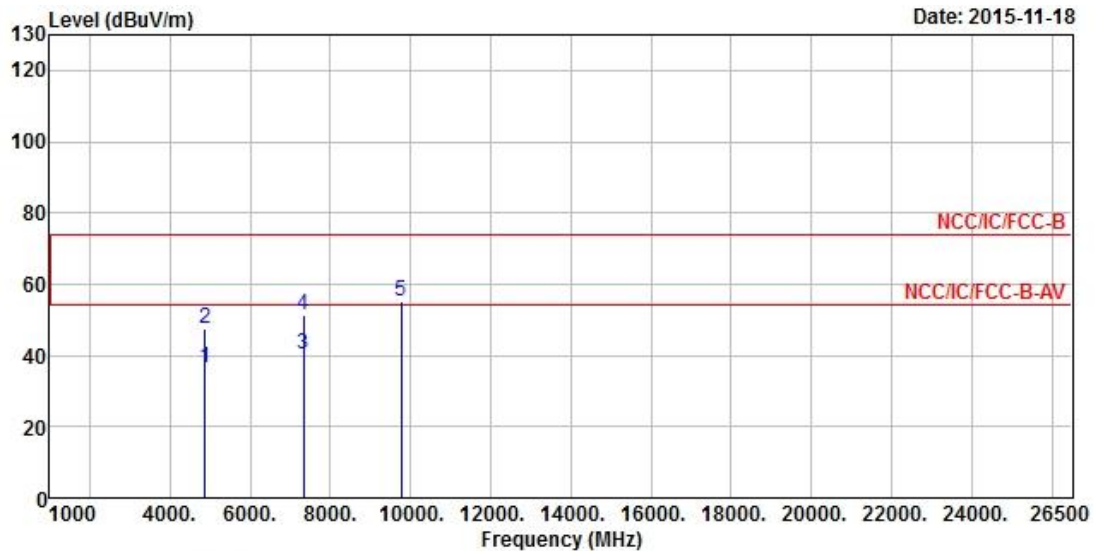


|   | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Cable Factor | Preamp Loss | Remark        |
|---|---------|--------|------------|------------|-------------------|--------------|-------------|---------------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m         | dB          | dB            |
| 1 | 4880.00 | 36.71  | -17.29     | 54.00      | 32.19             | 33.38        | 5.72        | 34.58 Average |
| 2 | 4880.00 | 47.63  | -26.37     | 74.00      | 43.11             | 33.38        | 5.72        | 34.58 Peak    |
| 3 | 7320.00 | 39.95  | -14.05     | 54.00      | 31.36             | 36.36        | 7.14        | 34.91 Average |
| 4 | 7320.00 | 51.18  | -22.82     | 74.00      | 42.59             | 36.36        | 7.14        | 34.91 Peak    |
| 5 | 9760.00 | 54.70  |            |            | 44.17             | 37.55        | 8.28        | 35.30 Peak    |

- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
- Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
- Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
- Note 4: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (101.89 dBuV/m).
- Note 5: Average emission setting: RBW=1MHz; VBW  $\geq 1/T$ , where T is "Pulse On Time", e.g., LE VBW $\geq 1/625\mu s$ , VBW=3kHz.
- Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

**Transmitter Radiated Unwanted Emissions**

|                           |          |                         |      |
|---------------------------|----------|-------------------------|------|
| <b>Modulation Mode</b>    | LE-1Mbps | <b>Test Freq. (MHz)</b> | 2440 |
| <b>Operating Function</b> | Transmit | <b>Polarization</b>     | H    |



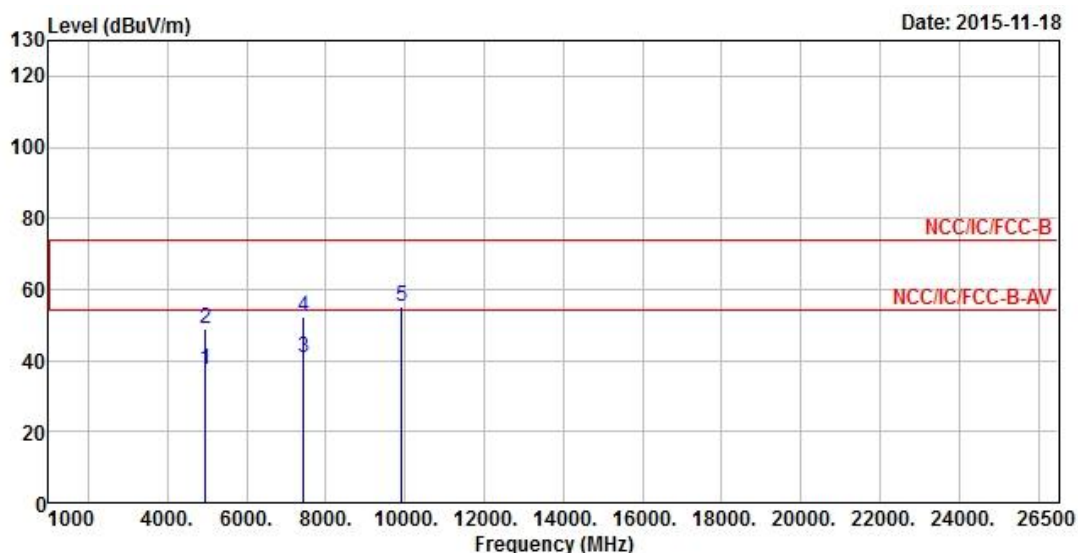
|   | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Cable Factor | Preamp Loss | Remark        |
|---|---------|--------|------------|------------|-------------------|--------------|-------------|---------------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m         | dB          | dB            |
| 1 | 4880.00 | 36.31  | -17.69     | 54.00      | 31.79             | 33.38        | 5.72        | 34.58 Average |
| 2 | 4880.00 | 47.25  | -26.75     | 74.00      | 42.73             | 33.38        | 5.72        | 34.58 Peak    |
| 3 | 7320.00 | 40.10  | -13.90     | 54.00      | 31.51             | 36.36        | 7.14        | 34.91 Average |
| 4 | 7320.00 | 51.54  | -22.46     | 74.00      | 42.95             | 36.36        | 7.14        | 34.91 Peak    |
| 5 | 9760.00 | 55.16  |            |            | 44.63             | 37.55        | 8.28        | 35.30 Peak    |

- Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.
- Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
- Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
- Note 4: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (101.89 dBuV/m).
- Note 5: Average emission setting: RBW=1MHz; VBW  $\geq 1/T$ , where T is "Pulse On Time", e.g., LE VBW $\geq 1/625\mu s$ , VBW=3kHz.
- Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.



**Transmitter Radiated Unwanted Emissions**

|                           |          |                         |      |
|---------------------------|----------|-------------------------|------|
| <b>Modulation Mode</b>    | LE-1Mbps | <b>Test Freq. (MHz)</b> | 2480 |
| <b>Operating Function</b> | Transmit | <b>Polarization</b>     | V    |



|   | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Cable Factor | Preamp Loss | Remark        |
|---|---------|--------|------------|------------|-------------------|--------------|-------------|---------------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m         | dB          | dB            |
| 1 | 4960.00 | 37.64  | -16.36     | 54.00      | 32.95             | 33.47        | 5.78        | 34.56 Average |
| 2 | 4960.00 | 48.94  | -25.06     | 74.00      | 44.25             | 33.47        | 5.78        | 34.56 Peak    |
| 3 | 7440.00 | 40.78  | -13.22     | 54.00      | 31.99             | 36.53        | 7.21        | 34.95 Average |
| 4 | 7440.00 | 52.33  | -21.67     | 74.00      | 43.54             | 36.53        | 7.21        | 34.95 Peak    |
| 5 | 9920.00 | 55.30  |            |            | 44.73             | 37.51        | 8.37        | 35.31 Peak    |

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

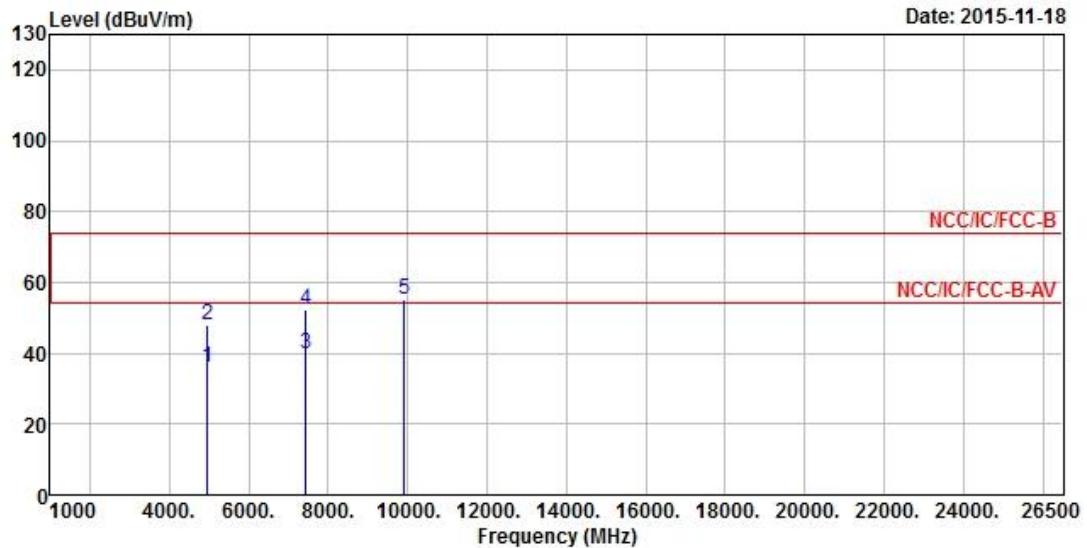
Note 4: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.92 dBuV/m).

Note 5: Average emission setting: RBW=1MHz; VBW  $\geq 1/T$ , where T is "Pulse On Time", e.g., LE VBW $\geq 1/625\mu s$ , VBW=3kHz.

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

**Transmitter Radiated Unwanted Emissions**

|                           |          |                         |      |
|---------------------------|----------|-------------------------|------|
| <b>Modulation Mode</b>    | LE-1Mbps | <b>Test Freq. (MHz)</b> | 2480 |
| <b>Operating Function</b> | Transmit | <b>Polarization</b>     | H    |



|   | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Cable Factor | Preamp Loss | Preamp Factor | Remark  |
|---|---------|--------|------------|------------|-------------------|--------------|-------------|---------------|---------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m         | dB          | dB            |         |
| 1 | 4960.00 | 35.97  | -18.03     | 54.00      | 31.28             | 33.47        | 5.78        | 34.56         | Average |
| 2 | 4960.00 | 47.82  | -26.18     | 74.00      | 43.13             | 33.47        | 5.78        | 34.56         | Peak    |
| 3 | 7440.00 | 40.00  | -14.00     | 54.00      | 31.21             | 36.53        | 7.21        | 34.95         | Average |
| 4 | 7440.00 | 52.19  | -21.81     | 74.00      | 43.40             | 36.53        | 7.21        | 34.95         | Peak    |
| 5 | 9920.00 | 55.12  |            |            | 44.55             | 37.51        | 8.37        | 35.31         | Peak    |

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 3: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 4: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level (99.92 dBuV/m).

Note 5: Average emission setting: RBW=1MHz; VBW  $\geq 1/T$ , where T is "Pulse On Time", e.g., LE VBW $\geq 1/625\mu s$ , VBW=3kHz.

Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

## 4 Test Equipment and Calibration Data

| Instrument   | Manufacturer                   | Model No. | Serial No.     | Characteristics | Calibration Date | Remark        |
|--------------|--------------------------------|-----------|----------------|-----------------|------------------|---------------|
| EMC Receiver | R&S                            | ESCS 30   | 100174         | 9kHz ~ 2.75GHz  | Apr. 15. 2015    | AC Conduction |
| LISN         | SCHWARZBECK<br>MESS-ELEKTRONIK | NSLK 8127 | 8127-477       | 9kHz ~ 30MHz    | Jan. 22, 2015    | AC Conduction |
| RF Cable-CON | HUBER+SUHNER                   | RG213/U   | 07611832020001 | 9kHz ~ 30MHz    | Oct. 30, 2015    | AC Conduction |
| EMI Filter   | LINDGREN                       | LRE-2030  | 2651           | < 450 Hz        | NCR              | AC Conduction |

Note: Calibration Interval of instruments listed above is one year. NCR: No Calibration Request.

| Instrument        | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark       |
|-------------------|--------------|-----------|------------|-----------------|------------------|--------------|
| Spectrum Analyzer | R&S          | FSV 40    | 101500     | 9KHz~40GHz      | May 06, 2015     | RF Conducted |
| Signal Generator  | R&S          | SMR40     | 100116     | 10MHz ~ 40GHz   | Jul. 28, 2015    | RF Conducted |
| Power Sensor      | Anritsu      | MA2411B   | 0917017    | 300MHz ~ 40GHz  | Feb. 17, 2015    | RF Conducted |
| Power Meter       | Anritsu      | ML2495A   | 0949003    | 300MHz ~ 40GHz  | Feb. 17, 2015    | RF Conducted |
| DC Power Source   | G.W.         | GPC-6030D | C671845    | DC 1V ~ 60V     | Jul. 22, 2015    | RF Conducted |

Note: Calibration Interval of instruments listed above is one year.

| Instrument               | Manufacturer | Model No.      | Serial No.  | Characteristics    | Calibration Date | Remark    |
|--------------------------|--------------|----------------|-------------|--------------------|------------------|-----------|
| 3m Semi Anechoic Chamber | TDK          | SAC-3M         | 03CH09-HY   | 30MHz ~ 1GHz<br>3m | Jul. 01, 2015    | Radiation |
| 3m Semi Anechoic Chamber | TDK          | SAC-3M         | 03CH09-HY   | 1GHz ~ 18GHz<br>3m | Jul. 01, 2015    | Radiation |
| Amplifier                | EMC          | EMC9135        | 980232      | 9kHz ~ 1.0GHz      | Jan 27, 2015     | Radiation |
| Amplifier                | Agilent      | 8449B          | 3008A02373  | 1GHz ~ 26.5GHz     | Sep. 10, 2015    | Radiation |
| Spectrum                 | KEYSIGHT     | N9010A         | MY54200885  | 10Hz ~ 44GHz       | Jul. 15, 2015    | Radiation |
| Bilog Antenna            | TESEQ        | CBL 6112D      | 35418       | 30MHz ~ 1GHz       | Mar. 30, 2015    | Radiation |
| Horn Antenna             | AARONIA AG   | POWERLOG 70180 | 05192       | 1GHz ~ 18GHz       | Jan. 05, 2015    | Radiation |
| Horn Antenna             | SCHWARZBECK  | BBHA9170       | BBHA9170614 | 18GHz ~ 40GHz      | Dec. 29, 2014    | Radiation |
| RF Cable-R03m            | Jye Bao      | RG142          | CB021       | 9kHz ~ 1GHz        | Jul. 23, 2015    | Radiation |
| RF Cable-high            | Jye Bao      | RG142          | 03CH09-HY   | 1GHz ~ 40GHz       | Jul. 23, 2015    | Radiation |
| Turn Table               | Chain Tek    | T-200S         | 1308028     | 0 ~ 360 degree     | N/A              | Radiation |
| Antenna Mast             | Chain Tek    | MBS-400        | 1308049     | 1 ~ 4 m            | N/A              | Radiation |

Note: Calibration Interval of instruments listed above is one year.

| Instrument   | Manufacturer  | Model No. | Serial No. | Characteristics | Calibration Date | Remark    |
|--------------|---------------|-----------|------------|-----------------|------------------|-----------|
| Loop Antenna | ROHDE&SCHWARZ | HFH2-Z2   | 100330     | 9 kHz~30 MHz    | Nov. 10, 2014    | Radiation |

Note: Calibration Interval of instruments listed above is two year.