# EMC
# TEST REPORT

**Report No.:** **160300092TWN-001**
**Model No.:** **PLTN-RB1V1**
**Issued Date:** **Apr. 18 , 2016**

| | |
|---|---|
| **Applicant:** | **Peloton Interactive LLC**<br>**158 West 27th Street Fourth Floor New York, NY 10001** |
| **Test Method/ Standard:** | **47 CFR FCC Part 15.247 & ANSI C63.10 2013**<br>**KDB 558074 D01 v03r05** |
| **Test Site:** | **93910** |
| **Test By:** | **Intertek Testing Services Taiwan Ltd.**<br>**No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,**<br>**Shiang-Shan District, Hsinchu City, Taiwan** |



Testing Laboratory
0597

**The test report was prepared by:**

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**These measurements were taken by:**

Wayne Chen/ Engineer

**The test report was reviewed by:**

**Name** Terry Hsu
**Title** Engineer

# Revision History

| Report No. | Issue Date | Revision Summary |
|---|---|---|
| 160300092TWN-001 | Apr. 18 , 2016 | Original report |

# Table of Contents

# 1. Summary of Test Data

| Test Requirement | Applicable Rule (Section 15.247) | Result |
|---|---|---|
| Minimum 6 dB Bandwidth | 15.247(a)(2) KDB 558074 D01 v03r05 | Pass |
| Maximum Peak Conducted Output Power | 15.247(b)(3) KDB 558074 D01 v03r05 | Pass |
| Power Spectral Density | 15.247(e) | Pass |
| Emissions In Non-Restricted Frequency Bands | 15.247(d) | Pass |
| Emissions In Restricted Frequency Bands (Radiated emission measurements) | 15.247(d), 15.205, 15.209 | Pass |
| Emission On The Band Edge | 15.247(d), 15.205 | Pass |
| AC Power Line Conducted Emission | 15.207 | Pass |
| Antenna Requirement | 15.203 | Pass |

# 2. General Information

## 2.1 Identification of the EUT

| | |
|---|---|
| Product: | Peloton Console |
| Model No: | PLTN-RB1V1 |
| Operating Frequency: | 2402 MHz ~ 2480 MHz |
| Channel Number: | 40 channels |
| Frequency of Each Channel: | 2402+2 k MHz, k＝0~39 |
| Access scheme: | GFSK |
| Rated Power: | DC 12 from adapter |
| Power Cord: | N/A |
| Sample Received: | Mar. 04, 2016 |
| Sample condition: | Workable |
| Test Date(s): | Mar. 07, 2016 ~ Mar. 18, 2016 |
| Note 1: | This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program. |
| Note 2: | When determining the test conclusion, the Measurement Uncertainty of test has been considered. |

## 2.2 Description of EUT

The EUT is a Peloton Console, and was defined as information technology equipment.

| | |
|---|---|
| Product SW version : | eng.RUBY.211 |
| Product HW version : | FP |
| Radio SW version : | eng.RUBY.211 |
| Radio HW version : | FP |
| Test SW Version : | eng.RUBY.211 |

For more detail features, please refer to user's Manual.

## 2.3 Antenna description

The EUT uses a permanently connected antenna.

| | |
|---|---|
| Antenna Gain | : -3.76 dBi |
| Antenna Type | : PIFA Antenna |
| Connector Type | : I-PEX |

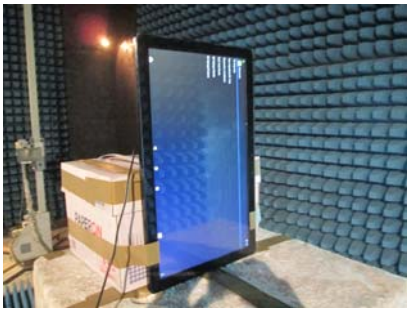
## 2.4 Operation mode

The EUT is supplied with DC 12 V from adapter (Test voltage: 120Vac, 60Hz).
TX-MODE is based on “Engineer mode” and the program can select different frequency and modulation.

The signal is maximized through rotation and placement in the three orthogonal axes.

**X axis**

**Y axis**



**Z axis**

After verifying three axes, we found the maximum electromagnetic field was occurred at Y axis. The final test data was executed under this configuration.

## 2.5 Applied test modes and channels

| Test items | Mode | Channel | Antenna |
|---|---|---|---|
| Minimum 6 dB Bandwidth | BT 4.0 | Low, Middle , High | Chain0 |
| Maximum peak conducted output power | BT 4.0 | Low, Middle , High | Chain0 |
| Power Spectral Density | BT 4.0 | Low, Middle , High | Chain0 |
| RF Antenna Conducted Spurious | BT 4.0 | Low, Middle , High | Chain0 |
| Radiated spurious Emission 9kHz~1GHz | Normal Link | | |
| Radiated Spurious Emission 10GHz~10th Harmonic | BT 4.0 | Low, Middle , High | Chain0 |
| Emission on the Band Edge | BT 4.0 | Low, Middle , High | Chain0 |
| AC Power Line Conducted Emission | Normal Link | | |

# 3. Minimum 6 dB Bandwidth

## 3.1 Operating environment

| | | |
|---|---|---|
| Temperature: | 25 | ℃ |
| Relative Humidity: | 50 | % |
| Atmospheric Pressure | 1008 | hPa |
| Requirement & Test method | 15.247(a)(2) KDB 558074 D01 v03r05 | |

## 3.2 Limit for minimum 6dB bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

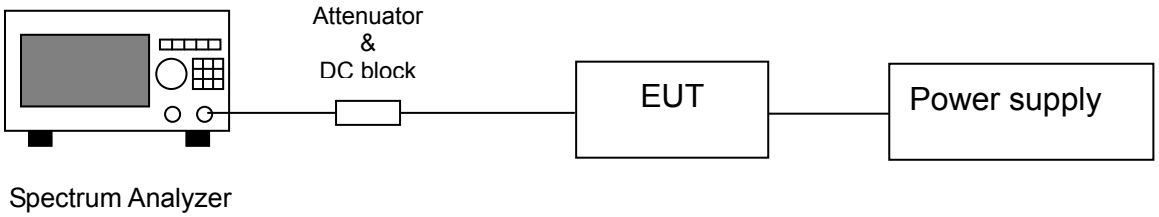
## 3.3 Measuring instrument setting

| Spectrum analyzer settings | |
|---|---|
| **Spectrum Analyzer function** | **Setting** |
| Detector | Peak |
| RBW | 100kHz |
| VBW | ≧3 x RBW |
| Sweep | Auto couple |
| Trace | Allow the trace to stabilize. |
| Span | Between two times and five times the occupied bandwidth |
| Attenuation | Auto |

## 3.4 Test procedure

1. The transmitter output was connected to the spectrum analyzer.
2. Test was performed in accordance with clause 8.1 option1 of KDB 558074 D01
3. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

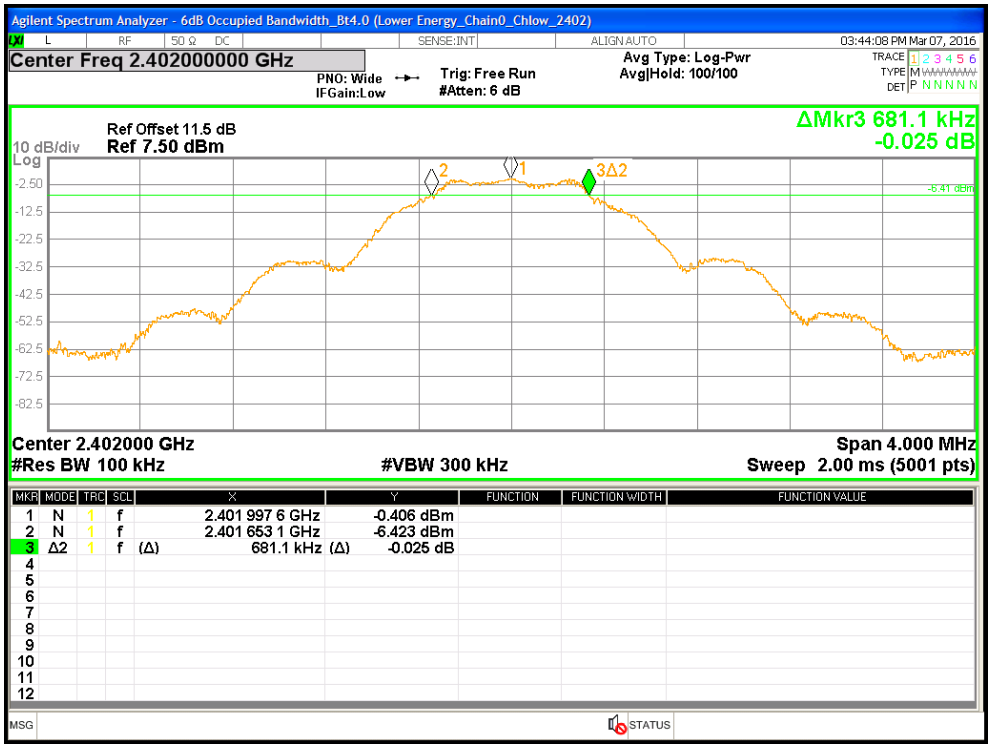
### 3.5 Test diagram



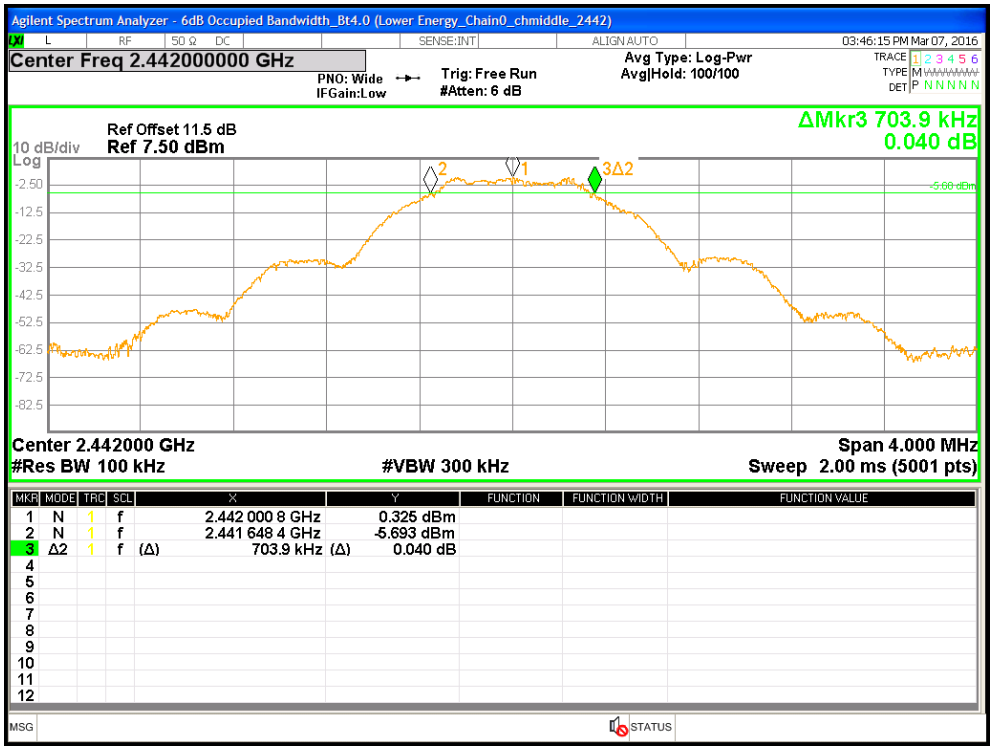

### 3.6 Test results

| Mode | Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) | Pass/Fail |
|---|---|---|---|---|---|
| BT4.0 | Low | 2402 | 0.681 | 0.5 | Pass |
| | Middle | 2442 | 0.703 | 0.5 | Pass |
| | High | 2480 | 0.682 | 0.5 | Pass |

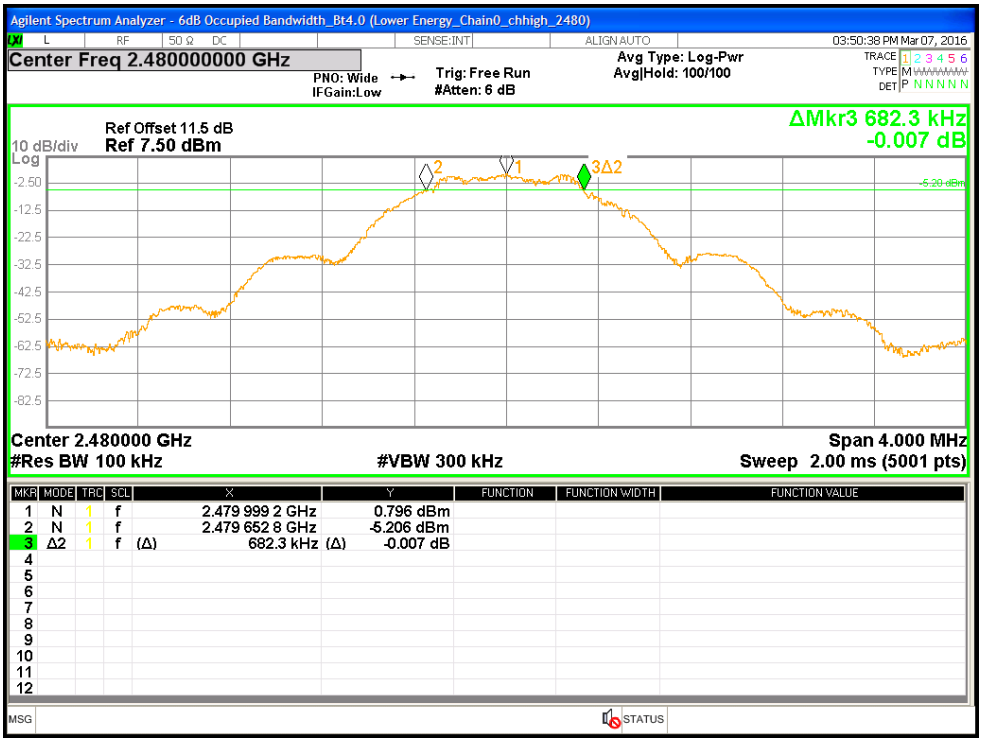
## Chain0 : 6dB Bandwidth @ Lower Energy mode Ch low




## Chain0 : 6dB Bandwidth @ Lower Energy mode Ch middle



## Chain0 : 6dB Bandwidth @ Lower Energy mode Ch high



# 4. Maximum Peak Conducted Output Power

## 4.1 Operating environment

| | | |
|---|---|---|
| Temperature: | 25 | ℃ |
| Relative Humidity: | 50 | % |
| Atmospheric Pressure | 1008 | hPa |
| Requirement & Test method | 15.247(b)(3)<br>KDB 558074 D01 v03r05 | |

## 4.2 Limit for maximum peak conducted output power

For systems using digital modulation in the 2400-2483.5 MHz: 1 Watt (30dBm)

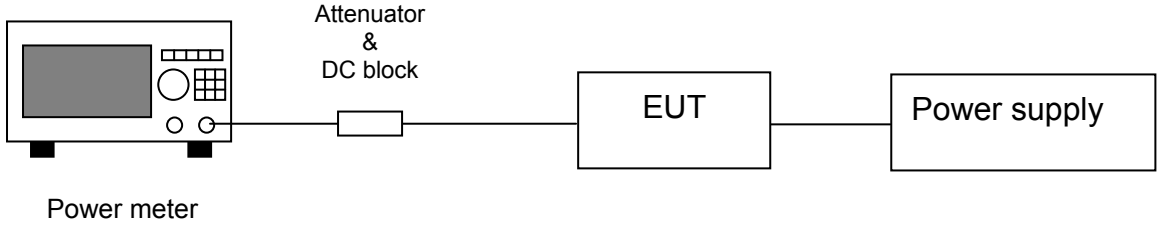
## 4.3 Measuring instrument setting

| **Power meter** | |
|---|---|
| **Power meter** | **Setting** |
| Bandwidth | 65MHz bandwidth is greater than the EUT emission bandwidth |
| Detector | Peak & Average |

## 4.4 Test procedure

Test procedures refer to clause 9.1.3 peak power meter method and clause 9.2.3.2 measurement using a gated RF average power meter of KDB 558074 D01.

## 4.5 Test diagram



### 4.6 Test result

| Mode | Channel | Frequency (MHz) | Maximum (PK) (dBm) | Maximum (PK) (mW) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| BT4.0 | Low | 2402 | 0.62 | 1.15 | 30 | -29.38 |
| | Middle | 2442 | 1.31 | 1.35 | 30 | -28.69 |
| | High | 2480 | 1.42 | 1.39 | 30 | -28.58 |

# 5. Power Spectral Density

## 5.1 Operating environment

| | | |
|---|---|---|
| Temperature: | 25 | ℃ |
| Relative Humidity: | 50 | % |
| Atmospheric Pressure | 1008 | hPa |
| Requirement & Test method | 15.247(e)<br>KDB 558074 D01 v03r05 | |

## 5.2 Limit for power spectrum density

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission

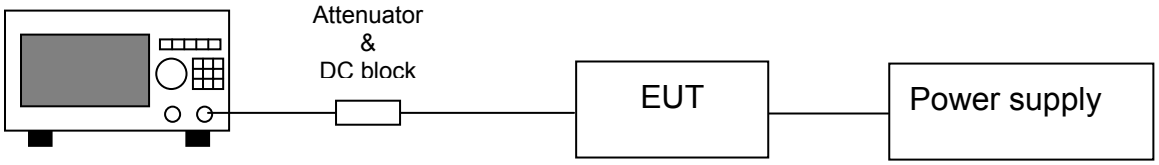
## 5.3 Measuring instrument setting

| Spectrum analyzer settings | |
|---|---|
| **Spectrum Analyzer function** | **Setting** |
| Detector | Peak |
| RBW | ≧3 kHz |
| VBW | ≧3 x RBW |
| Sweep | Auto couple |
| Trace | Max hold |
| Span | 1.5 times x 6dB bandwidth |
| Attenuation | Auto |

### 5.4 Test procedure

1. Test procedure refer to clause 10.2 method PKPSD (peak PSD) of KDB 558074 D01 and clause E) 2) b) measure.
2. Using the maximum conducted output power in the fundamental emission demonstrates compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Use the peak marker function to determine the maximum amplitude level within the RBW.

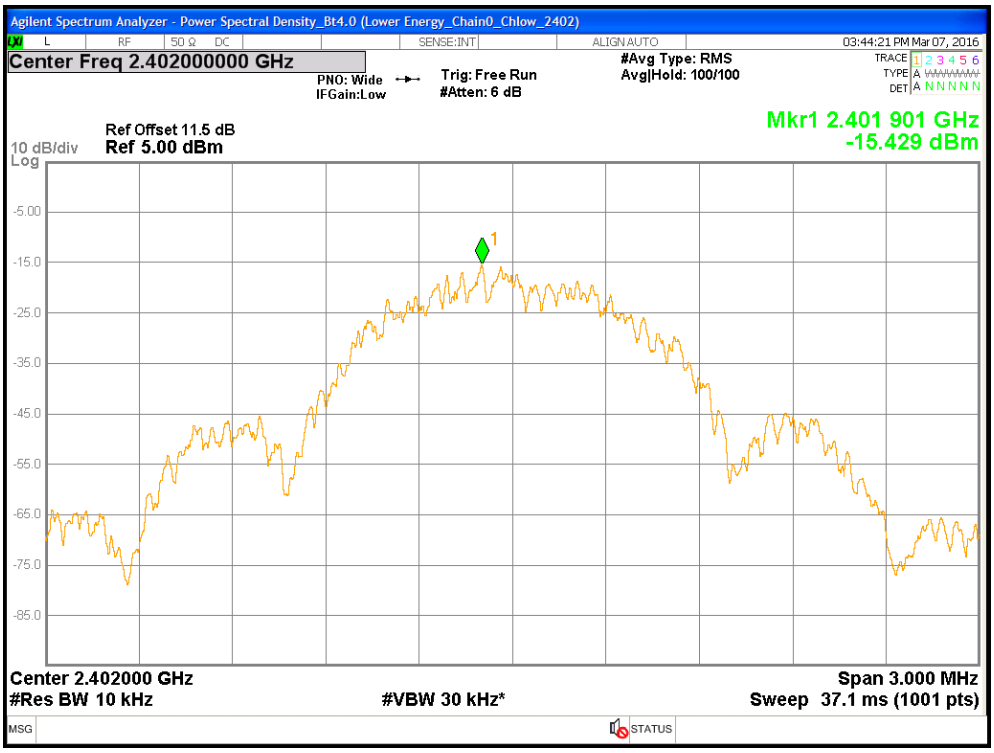
### 5.5 Test diagram



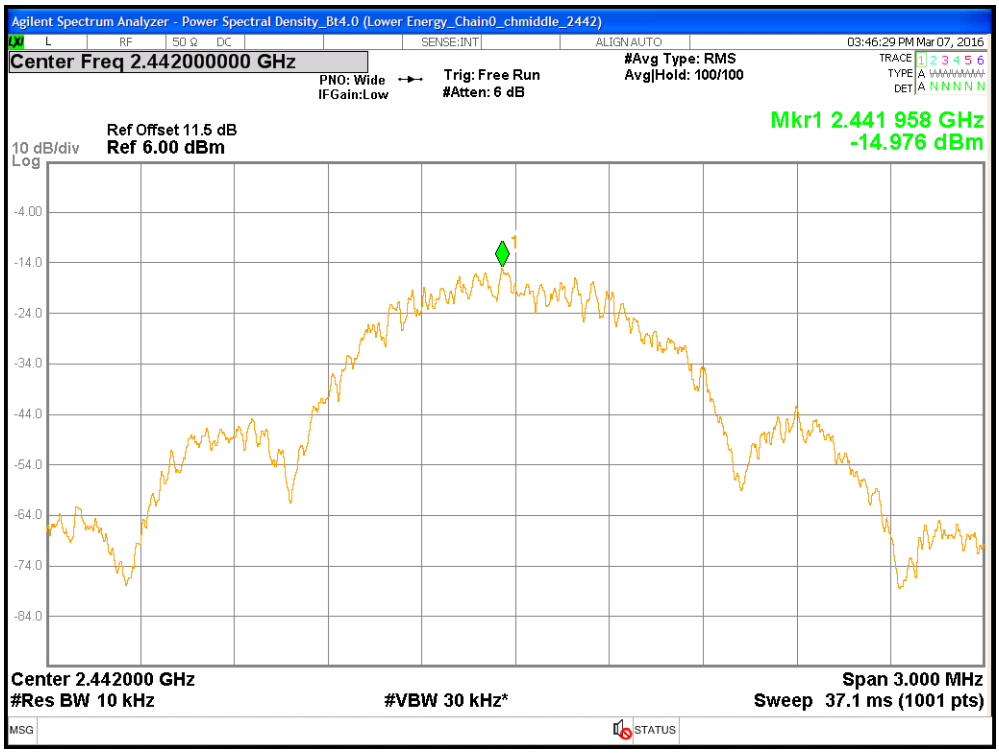

### 5.6 Test results

| Mode | Channel | Frequency (MHz) | RBW factor | PSD in 10kHz | PSD in 3kHz | | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| | | | | | (dBm) | (mW) | | |
| BT 4.0 | Low | 2402 | 5.23 | -15.429 | -20.66 | 0.01 | 8 | -28.66 |
| | Middle | 2442 | 5.23 | -14.976 | -20.20 | 0.01 | 8 | -28.20 |
| | High | 2480 | 5.23 | -15.141 | -20.37 | 0.01 | 8 | -28.37 |

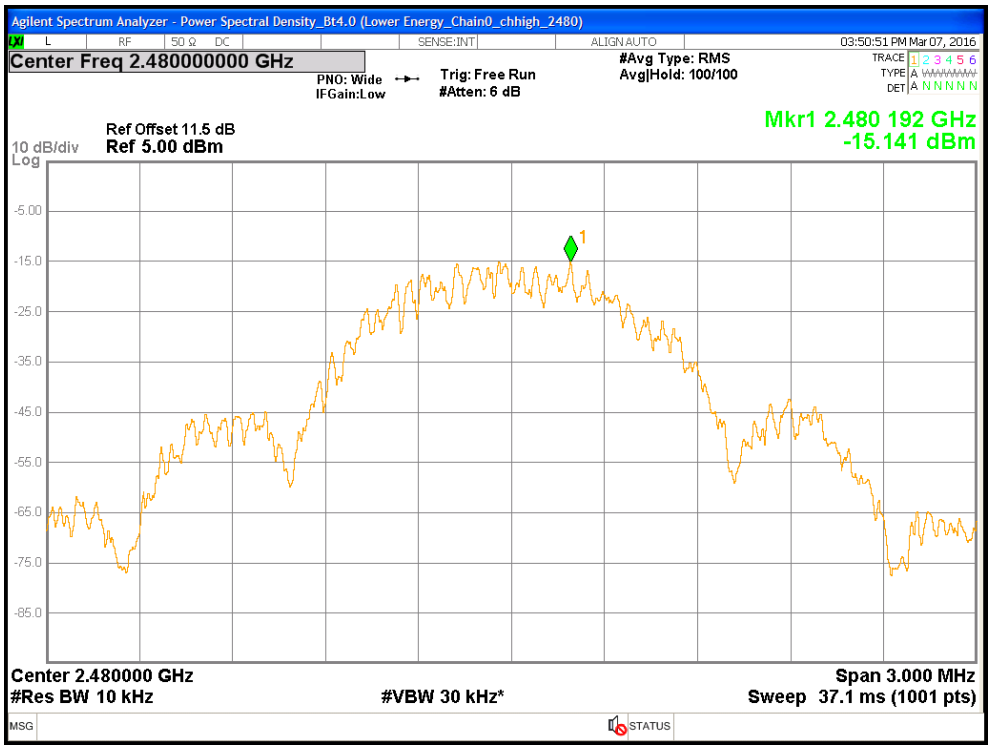
## Chain0 : Power Spectral Density @ Lower Energy mode Ch low




## Chain0 : Power Spectral Density @ Lower Energy mode Ch middle



## Chain0 : Power Spectral Density @ Lower Energy mode Ch high



# 6. Emissions In Non-Restricted Frequency Bands

## 6.1 Operating environment

| | | |
|---|---|---|
| Temperature: | 20 | ℃ |
| Relative Humidity: | 55 | % |
| Atmospheric Pressure | 1008 | hPa |
| Requirement | 15.247(d) | |

## 6.2 Limit for emissions in non-restricted frequency bands

The peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz

## 6.3 Measuring instruments setting

**Reference level measurement**

| Spectrum analyzer settings | |
|---|---|
| **Spectrum Analyzer function** | **Setting** |
| Detector | Peak |
| RBW | ≧100 kHz |
| VBW | ≧3 x RBW |
| Sweep | Auto couple |
| Trace | Max hold |
| Span | ≧1.5 time 6dB bandwidth |
| Attenuation | Auto |

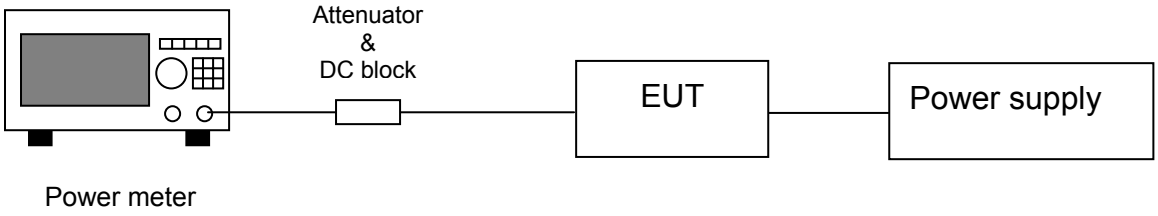
**Emission level measurement**

| Spectrum analyzer settings | |
|---|---|
| **Spectrum Analyzer function** | **Setting** |
| Detector | Peak |
| RBW | ≧100 kHz |
| VBW | ≧3 x RBW |
| Sweep | Auto couple |
| Trace | Max hold |
| Attenuation | Auto |

## 6.4 Test procedure

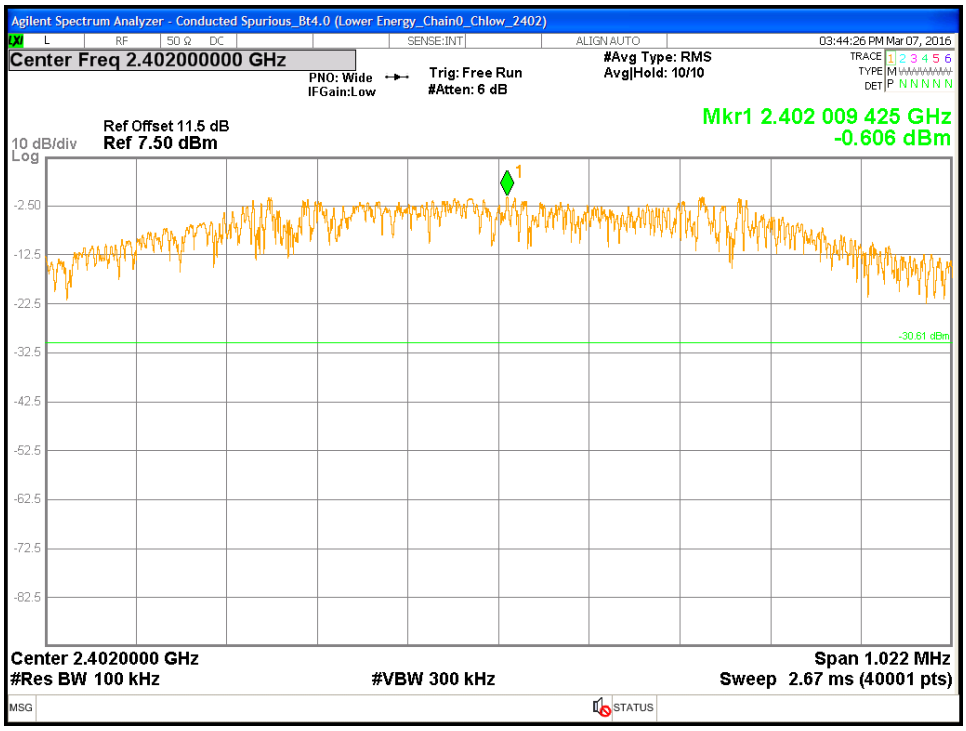
1. The procedure was used in antenna-port conducted and connected to the spectrum analyzer.
2. Set instrument center frequency to center frequency
3. Use the parameter configured in clause 6.3 to measure
4. Use the peak marker function to determine the maximum amplitude level.

## 6.5 Test diagram

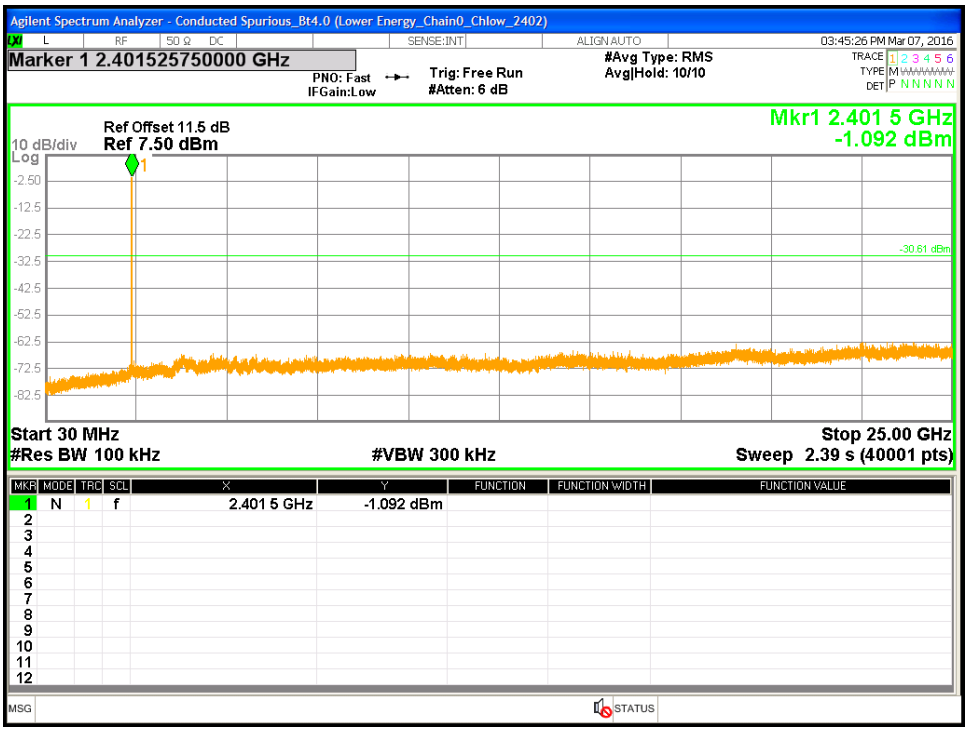


## 6.6 Test results

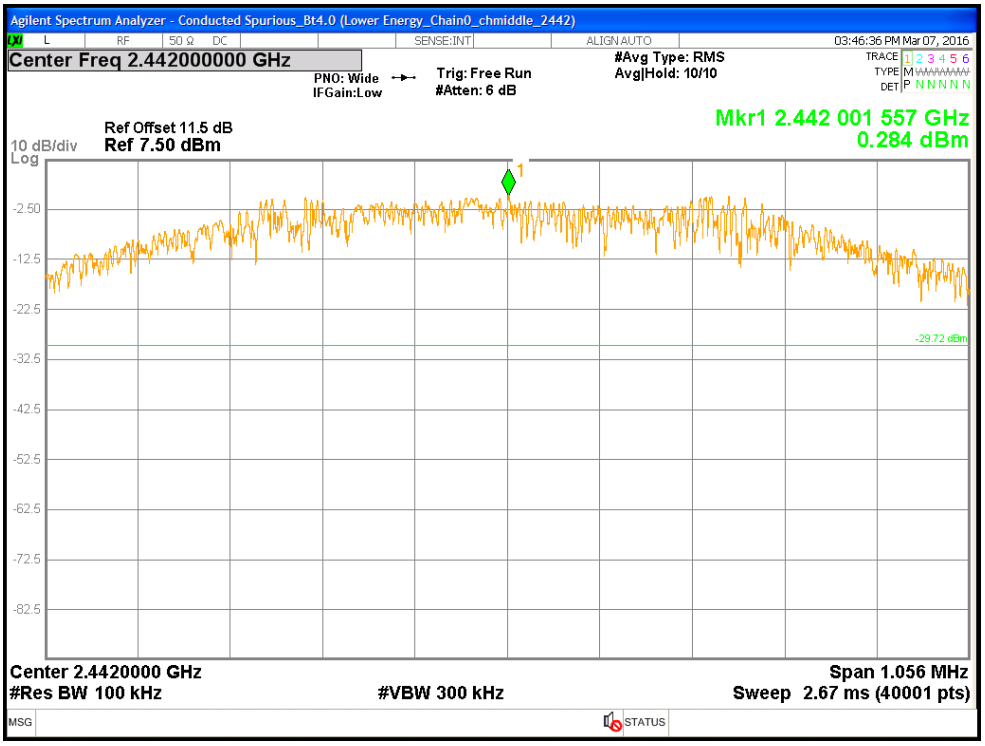
Chain0 : Conducted Spurious @ Lower Energy mode Ch low



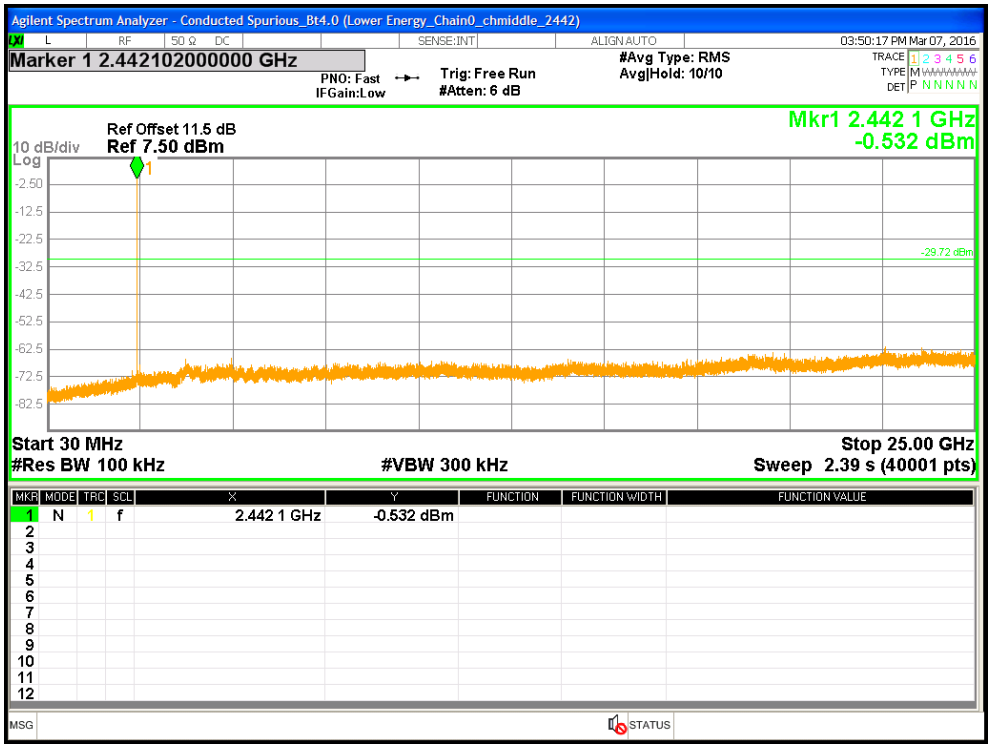

Chain0 : Conducted Spurious @ Lower Energy mode Ch low



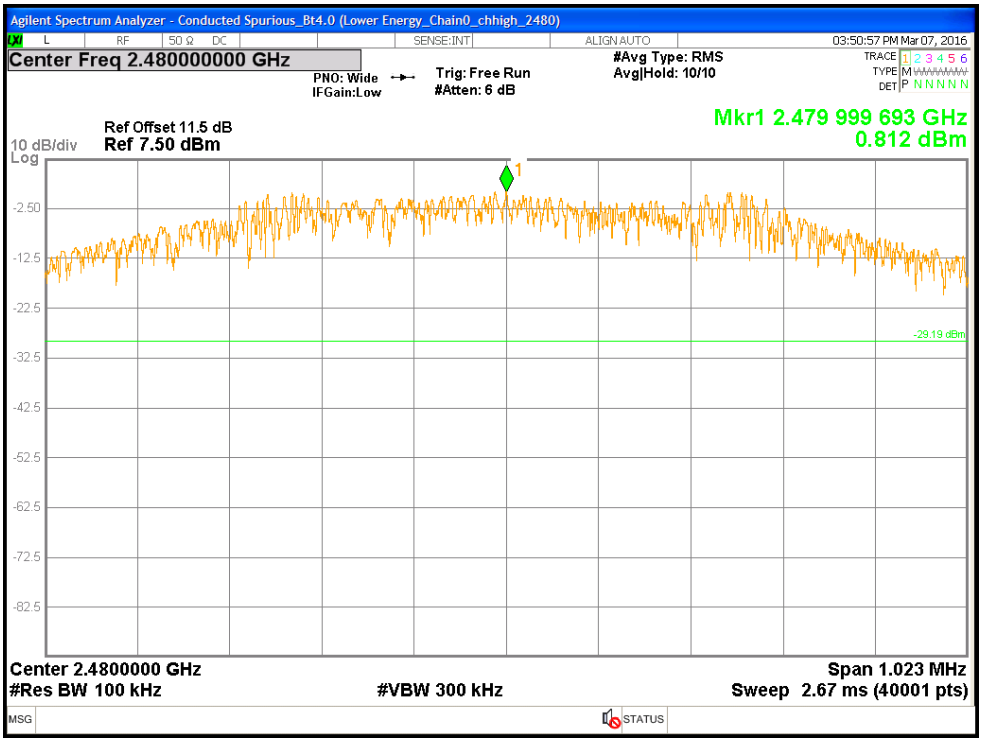
## Chain0 : Conducted Spurious @ Lower Energy mode Ch middle



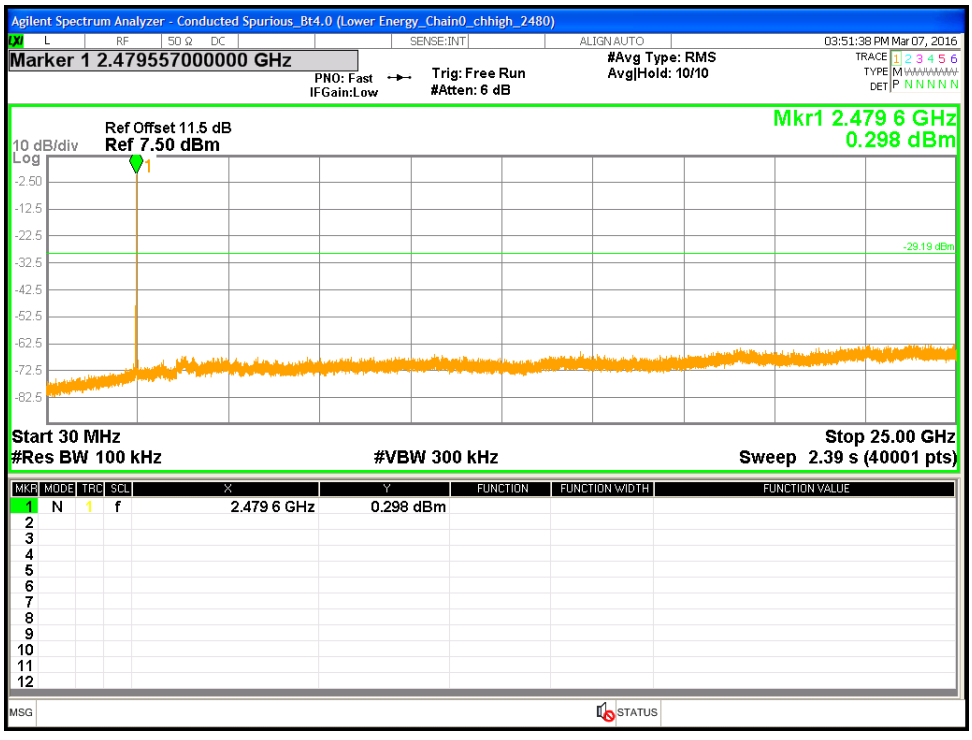

## Chain0 : Conducted Spurious @ Lower Energy mode Ch middle



## Chain0 : Conducted Spurious @ Lower Energy mode Ch high




## Chain0 : Conducted Spurious @ Lower Energy mode Ch high



# 7. Emissions In Restricted Frequency Bands (Radiated emission measurements)

## 7.1 Operating environment

| | | |
|---|---|---|
| Temperature: | 20 | ℃ |
| Relative Humidity: | 55 | % |
| Atmospheric Pressure | 1008 | hPa |
| Requirement | 15.247(d), 15.205, 15.209 | |

## 7.2 Limit for emission in restricted frequency bands (Radiated emission measurement)

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

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

## 7.3 Measuring instrument setting

### Below 1GHz measurement

| Receiver settings | |
|---|---|
| **Receiver function** | **Setting** |
| Detector | QP |
| RBW | 9-150 kHz ; 200-300 Hz<br>0.15-30 MHz; 9-10 kHz<br>30-1000 MHz; 100-120 kHz |
| VBW | ≧3 x RBW |
| Sweep | Auto couple |
| Attenuation | Auto |

### Above 1GHz measurement

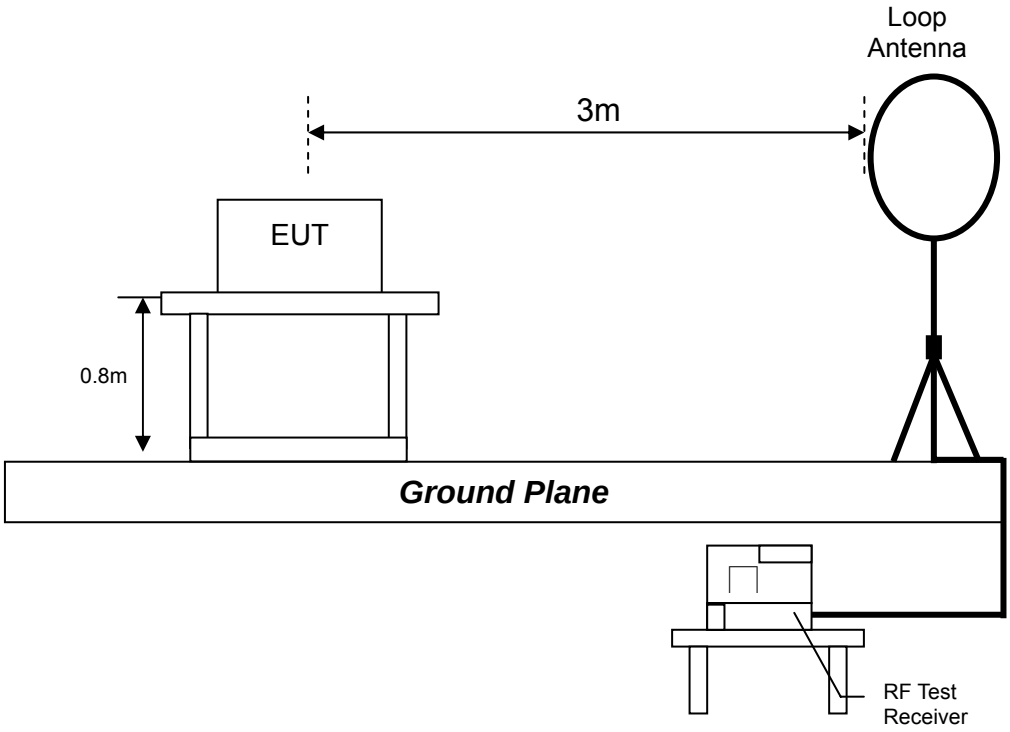
| Spectrum analyzer settings | |
|---|---|
| **Spectrum Analyzer function** | **Setting** |
| Detector | Peak |
| RBW | 1MHz |
| VBW | 3MHz for Peak; 10Hz for Average |
| Sweep | Auto couple |
| Start Frequency | 1GHz |
| Stop Frequency | Tenth harmonic |
| Attenuation | Auto |

### 7.4 Test procedure

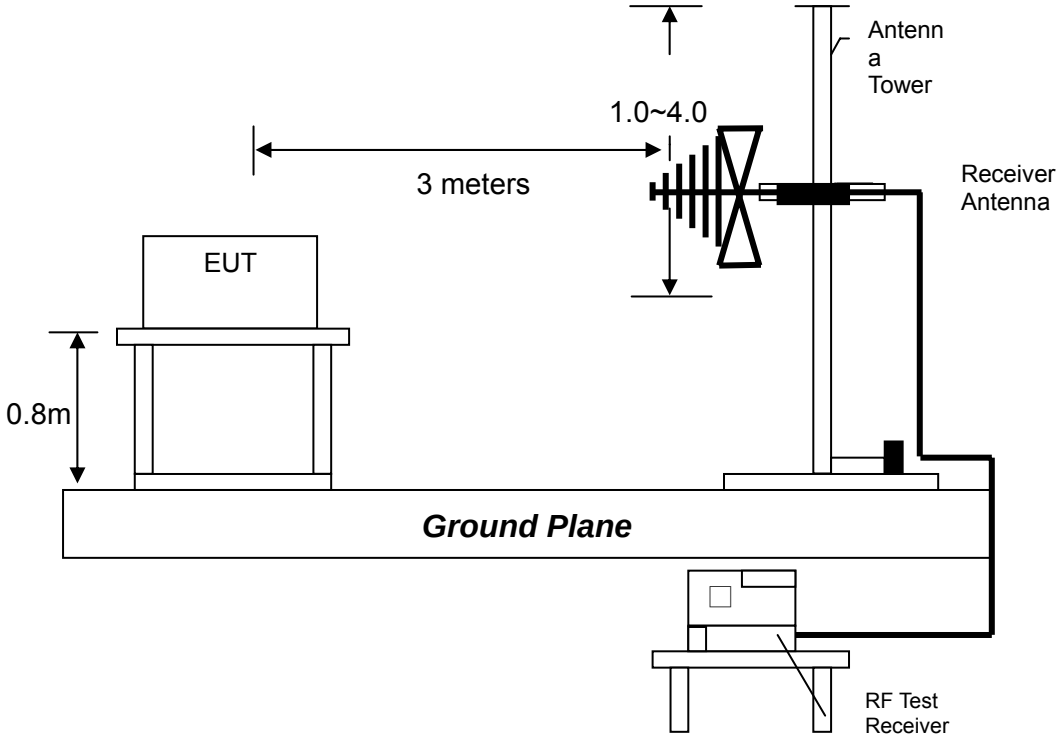
1. Configure the EUT according to ANSI C63.10: 2013 The EUT was placed on the top of the turntable 1.5 meter above ground for above 1GHz and placed on the top of the turntable 0.8 meter above ground for below 1GHz. The center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the companion devices. The turntable was rotated by 360 degree to find the position of the maximum emission level.
3. The height of the receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of the both horizontal and vertical polarization
4. If find the frequencies above the limit or below within 3dB, the antenna tower was scan (from 1m to 4m) and then the turntable was rotated to find the maximum reading.
5. Set the test-receiver system to peak or CISPR quasi-peak detector with specified bandwidth under maximum hold mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3dB lower than the average limit specified then testing will be stopped and peak values of the EUT will be reported. Otherwise, the emissions which do not have 3dB margin will be measured using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, The emissions level of the EUT in peak mode was lower than average limit, then testing will be stopped and peak values of the EUT will be reported, otherwise, the emission will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be quasi-peak measured by receiver.

## 7.5 Test configuration

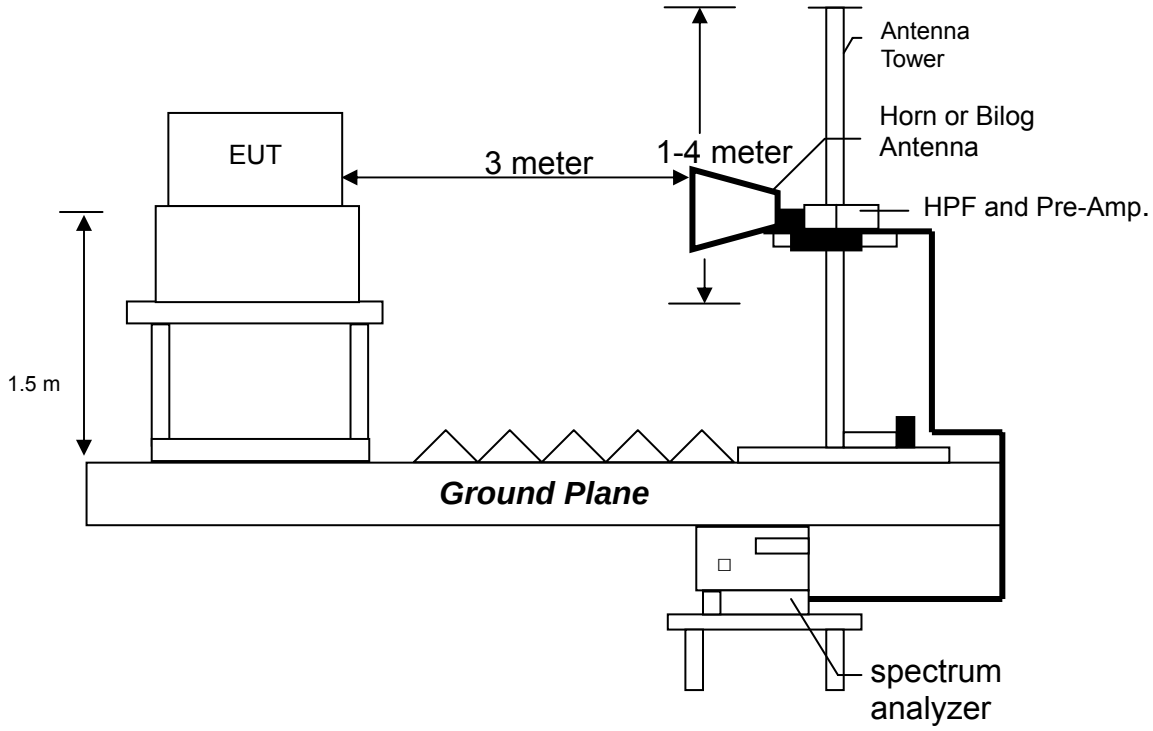
### 7.5.1 Radiated emission from 9kHz to 30MHz uses Loop Antenna:



### 7.5.2 Radiated emission below 1GHz using Bilog Antenna




### 7.5.3 Radiated emission above 1GHz using Horn Antenna



## 7.6 Test result

### 7.6.1 Measurement results: frequencies 9kHz to 30MHz

The test was performed on EUT under GFSK continuously transmitting mode. The worst case occurred at Tx High channel

EUT : PLTN-RB1V1
Test mode : TX mode High channel

| Frequency (MHz) | Detection value | factor (dB/m) | Reading (dBμV) | Value (dBμV/m) | Limit @ 3m (dBμV/m) | Tolerance (dB) |
|---|---|---|---|---|---|---|
| 0.12 | QP | 20.77 | 9.10 | 29.87 | 106.02 | -76.15 |
| 3.49 | QP | 21.62 | 13.55 | 35.17 | 69.54 | -34.37 |
| 27.02 | QP | 22.19 | 16.26 | 38.45 | 69.54 | -31.09 |
| Remark: Corr. Factor = Antenna Factor + Cable Loss | | | | | | |

### 7.6.2 Measurement results: frequencies below 1 GHz

The test was performed on EUT under GFSK continuously transmitting mode. The worst case occurred at Tx Middle channel

EUT :PLTN-RB1V1
Worst Case : GFSK at Tx Middle channel

| Antenna Polarized (V/H) | Freq. (MHz) | Receiver Detector | Corr. Factor (dB/m) | Reading (dBμV) | Corrected Level (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Vertical | 43.58 | QP | 14.49 | 12.74 | 27.23 | 40.00 | -12.77 |
| Vertical | 136.70 | QP | 13.75 | 24.76 | 38.51 | 43.50 | -4.99 |
| Vertical | 239.52 | QP | 13.83 | 20.92 | 34.75 | 46.00 | -11.25 |
| Vertical | 293.84 | QP | 15.52 | 10.49 | 26.01 | 46.00 | -19.99 |
| Vertical | 518.88 | QP | 20.94 | 10.68 | 31.63 | 46.00 | -14.37 |
| Vertical | 831.22 | QP | 26.45 | 6.62 | 33.07 | 46.00 | -12.93 |
| Horizontal | 134.76 | QP | 13.53 | 26.11 | 39.64 | 43.50 | -3.86 |
| Horizontal | 206.54 | QP | 12.54 | 21.72 | 34.26 | 43.50 | -9.24 |
| Horizontal | 253.10 | QP | 14.17 | 27.10 | 41.28 | 46.00 | -4.72 |
| Horizontal | 289.96 | QP | 15.36 | 18.13 | 33.49 | 46.00 | -12.51 |
| Horizontal | 396.66 | QP | 18.30 | 9.41 | 27.70 | 46.00 | -18.30 |
| Horizontal | 862.26 | QP | 26.89 | 5.30 | 32.18 | 46.00 | -13.82 |

Remark: Corr. Factor = Antenna Factor + Cable Loss

### 7.6.3 Measurement results: frequency above 1GHz

EUT :PLTN-RB1V1
Test Condition : Tx at Middle channel

| Mode | Frequency (MHz) | Spectrum Analyzer Detector | Ant. Pol. (H/V) | Preamp. Gain (dB) | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| Ch Low | 4804 | PK | V | 40.13 | -0.10 | 42.27 | 42.17 | 54.00 | -11.83 |
| | 4804 | PK | H | 40.13 | -0.10 | 42.84 | 42.74 | 54.00 | -11.26 |

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

EUT :PLTN-RB1V1
Test Condition : Tx at Middle channel

| Mode | Frequency (MHz) | Spectrum Analyzer Detector | Ant. Pol. (H/V) | Preamp. Gain (dB) | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| Ch Middle | 4884 | PK | V | 39.99 | 0.16 | 42.89 | 43.05 | 54.00 | -10.95 |
| | 4884 | PK | H | 39.99 | 0.16 | 44.02 | 44.18 | 54.00 | -9.82 |

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

EUT :PLTN-RB1V1
Test Condition : Tx at Middle channel

| Mode | Frequency (MHz) | Spectrum Analyzer Detector | Ant. Pol. (H/V) | Preamp. Gain (dB) | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| Ch High | 4960 | PK | V | 39.84 | 0.41 | 41.07 | 41.48 | 54.00 | -12.52 |
| | 4960 | PK | H | 39.84 | 0.41 | 42.34 | 42.75 | 54.00 | -11.25 |

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

# 8. Emission On Band Edge

## 8.1 Operating environment

| | | |
|---|---|---|
| Temperature: | 25 | ℃ |
| Relative Humidity: | 50 | % |
| Atmospheric Pressure | 1008 | hPa |
| Requirement | 15.247(d), 15.205, | |

## 8.2 Measuring instrument setting

| Spectrum analyzer settings | |
|---|---|
| **Spectrum Analyzer function** | **Setting** |
| Detector | Peak |
| RBW | 1MHz |
| VBW | 3MHz for Peak; 10Hz for Average |
| Sweep | Auto couple |
| Restrict bands | 2310~2390MHz |
| | 2483.5 ~2500MHz |
| Attenuation | Auto |

## 8.3 Test procedure

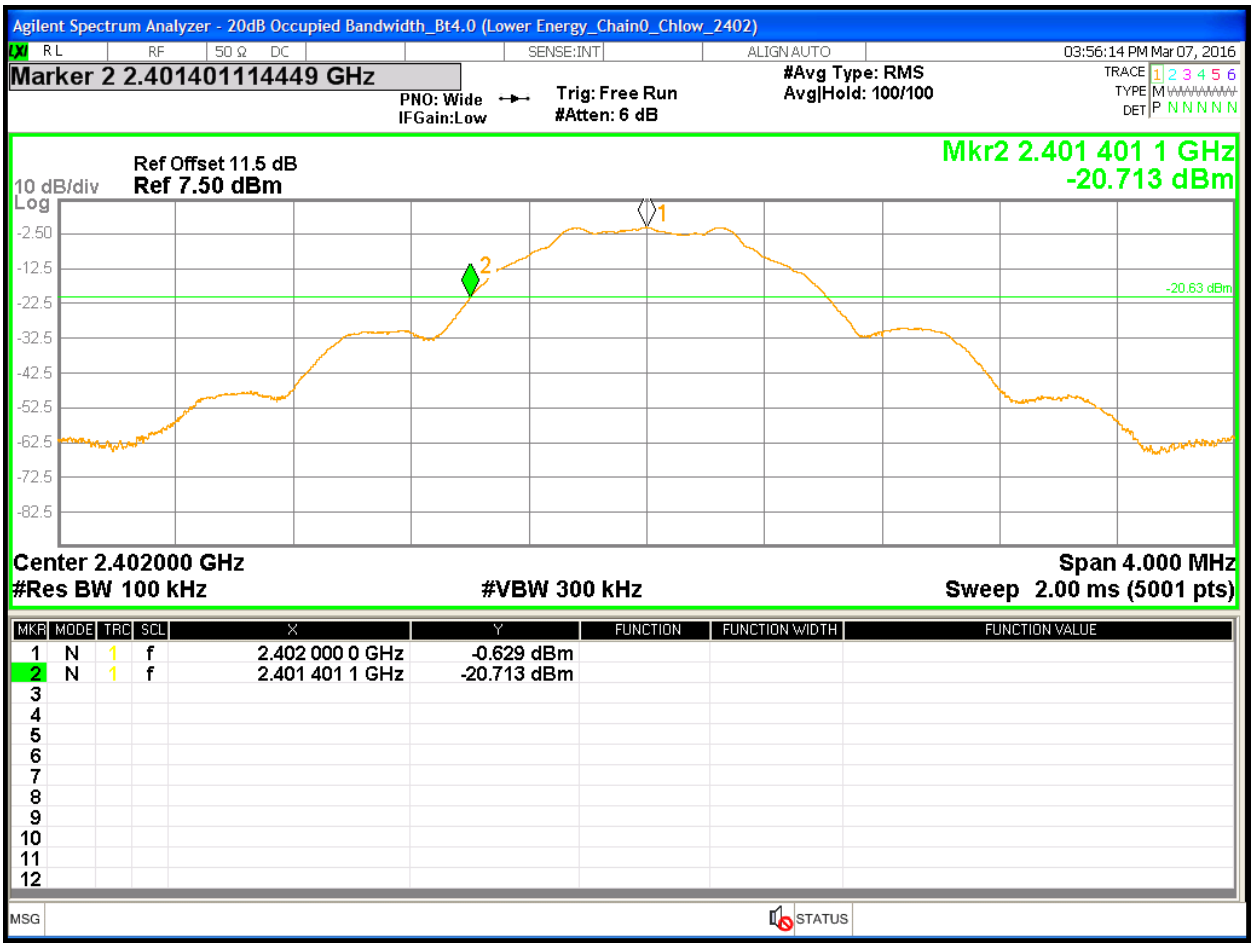
The test procedure is the same as clause 7.4

## 8.4 Test results

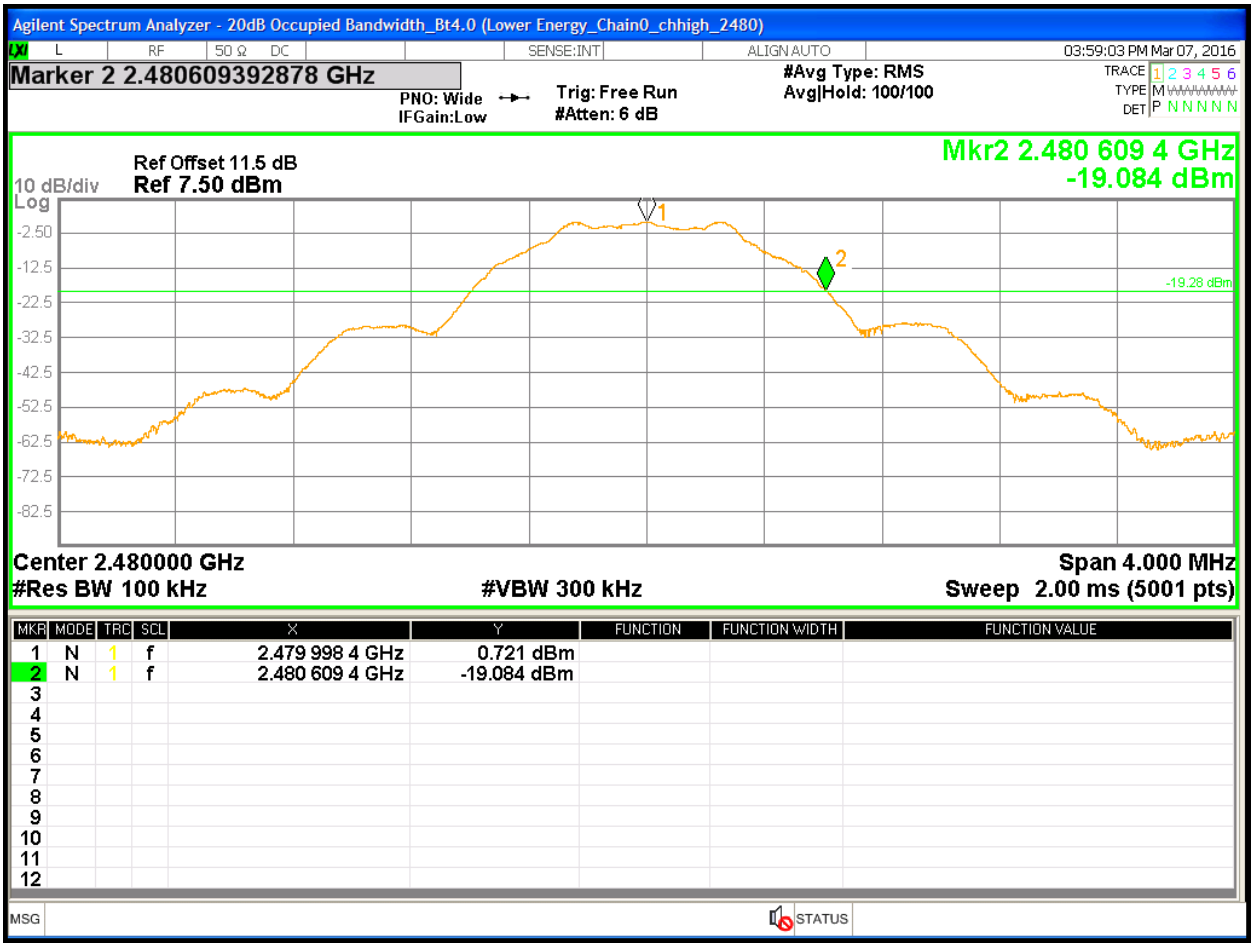
EUT :PLTN-RB1V1
Test Condition : Tx at Middle channel

| Mode | Frequency (MHz) | Spectrum Analyzer Detector | Ant. Pol. (H/V) | Correction Factor (dB/m) | Reading (dBμV) | Corrected Reading (dBμV/m) | Limit @ 3 m (dBμV/m) | Margin (dB) | Restricted band (MHz) |
|---|---|---|---|---|---|---|---|---|---|
| BT4.0 | 2389.40 | PK | V | 33.85 | 26.96 | 60.81 | 74 | -13.19 | 2310~2390 |
| | 2390.00 | AV | V | 33.85 | 14.64 | 48.49 | 54 | -5.51 | |
| | 2483.50 | PK | V | 34.30 | 27.43 | 61.73 | 74 | -12.27 | 2483.5~2500 |
| | 2483.50 | AV | V | 34.30 | 17.80 | 52.10 | 54 | -1.90 | |
| Remark: Correction Factor = Antenna Factor + Cable Loss | | | | | | | | | |

20dB Bandwidth @ Lower Energy mode Ch low



20dB Bandwidth @ Lower Energy mode Ch high



# 10. AC Power Line Conducted Emission

## 10.1 Operating environment

| | | |
|---|---|---|
| Temperature: | 20 | ℃ |
| Relative Humidity: | 58 | % |
| Atmospheric Pressure | 1009 | hPa |
| Requirement | 15.207 | |

## 10.2 Limit for AC power line conducted emission

| Freq. (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Q.P. | Ave. |
| 0.15~0.50 | 66 – 56* | 56 – 46* |
| 0.50~5.00 | 56 | 46 |
| 5.00~30.0 | 60 | 50 |

## 10.3 Measuring instrument setting

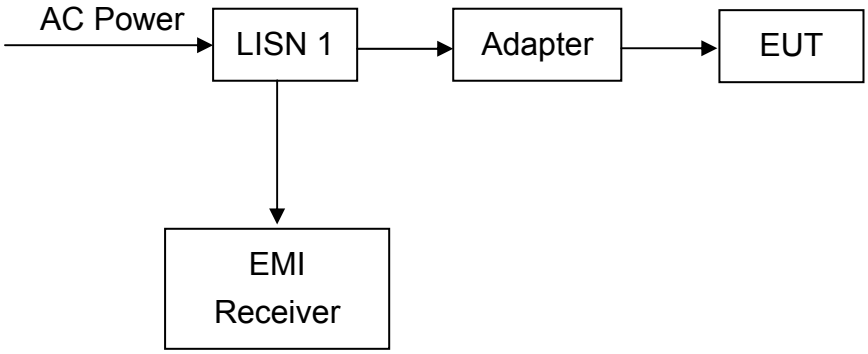
| Receiver settings | |
|---|---|
| **Receiver function** | **Setting** |
| Detector | QP |
| Start frequency | 0.15MHz |
| Stop frequency | 30MHz |
| IF bandwidth | 9 kHz |
| Attenuation | 10dB |

## 10.4 Test procedure

1. Configure the EUT according to ANSI C63.10:2013. The EUT or host of EHT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network.

3. All the companion devices are connected to the other LISN. The LISN should provide 50Uh/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30MHz was searched
5. Set the test-receiver system to peak detector and specified bandwidth with maximum hold mode.
6. The measurement has to be done between each power line and ground at the power terminal.

**10.5 Test diagram**



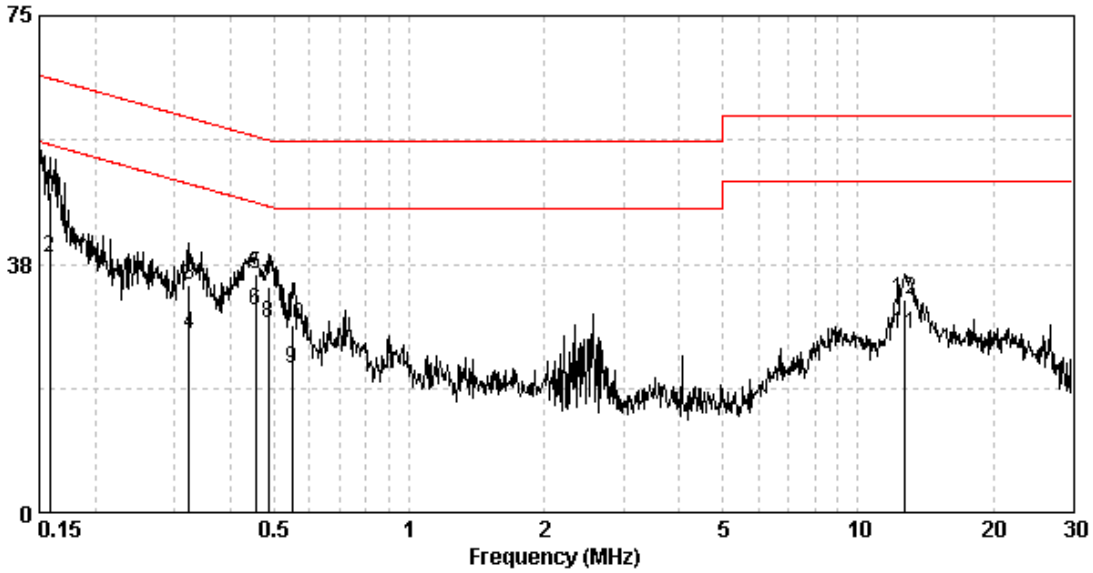

**Note:** The EUT was tested while in normal communication mode.

## 10.6 Test results

Phase: Live Line
Model No.: PLTN-RB1V1
Test Condition: Normal communication

| Frequency (MHz) | Corr. Factor (dB) | Level Qp (dBuV) | Limit Qp (dBuV) | Level AV (dBuV) | Limit Av (dBuV) | Margin (dB) Qp | Av |
|---|---|---|---|---|---|---|---|
| 0.158 | 9.74 | 48.46 | 65.56 | 38.34 | 55.56 | -17.10 | -17.22 |
| 0.323 | 9.73 | 34.28 | 59.62 | 26.80 | 49.62 | -25.33 | -22.82 |
| 0.454 | 9.73 | 35.99 | 56.80 | 30.55 | 46.80 | -20.81 | -16.26 |
| 0.486 | 9.73 | 34.09 | 56.23 | 28.65 | 46.23 | -22.14 | -17.58 |
| 0.549 | 9.75 | 28.33 | 56.00 | 21.59 | 46.00 | -27.67 | -24.41 |
| 12.649 | 9.89 | 32.20 | 60.00 | 26.79 | 50.00 | -27.80 | -23.21 |

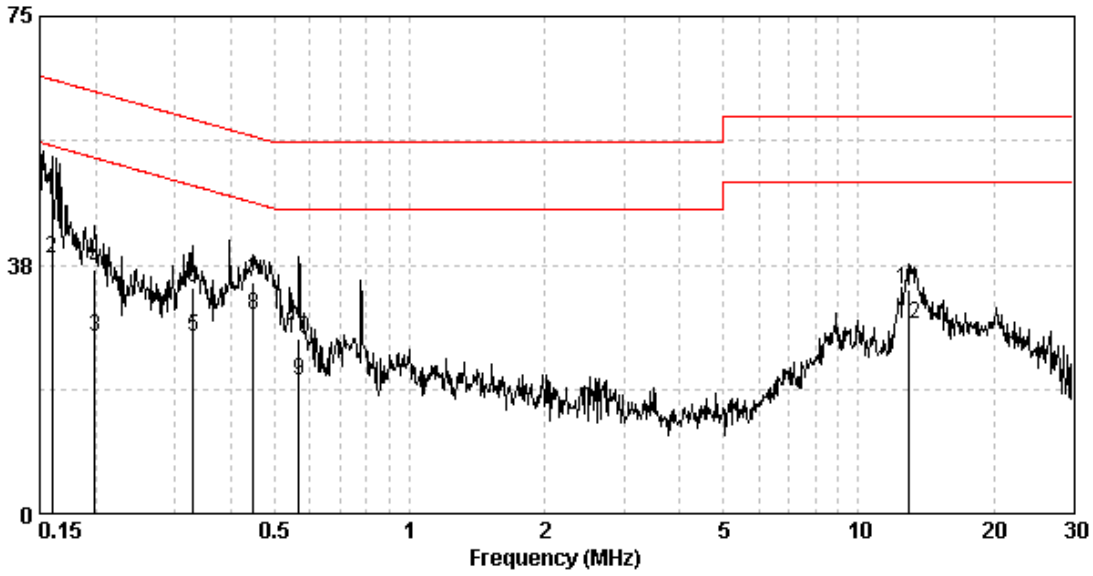
Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase: Neutral Line
Model No.: PLTN-RB1V1
Test Condition: Normal communication

| Frequency (MHz) | Corr. Factor (dB) | Level Qp (dBuV) | Limit Qp (dBuV) | Level AV (dBuV) | Limit Av (dBuV) | Margin (dB) Qp | Av |
|---|---|---|---|---|---|---|---|
| 0.160 | 9.74 | 47.34 | 65.47 | 38.39 | 55.47 | -18.13 | -17.08 |
| 0.199 | 9.74 | 36.83 | 63.67 | 26.64 | 53.67 | -26.84 | -27.02 |
| 0.330 | 9.73 | 34.01 | 59.44 | 26.74 | 49.44 | -25.43 | -22.70 |
| 0.449 | 9.73 | 34.91 | 56.89 | 30.03 | 46.89 | -21.98 | -16.86 |
| 0.567 | 9.75 | 26.35 | 56.00 | 19.96 | 46.00 | -29.65 | -26.04 |
| 12.920 | 9.92 | 33.85 | 60.00 | 28.46 | 50.00 | -26.15 | -21.54 |

Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



## Appendix A: Test equipment list

| Equipment | Brand | Model No. | Serial No. | Calibration Date | Next Calibration Date |
|---|---|---|---|---|---|
| ESCI EMI Test Receiver | Rohde & Schwarz | ESCI | 100018 | 2015/12/02 | 2016/11/30 |
| Spectrum Analyzer | Rohde & Schwarz | FSP30 | 100137 | 2015/08/18 | 2016/08/16 |
| Horn Antenna (1-18G) | SHWARZBECK | BBHA 9120 D | 9120D-456 | 2014/08/29 | 2017/08/27 |
| Horn Antenna (14-42G) | SHWARZBECK | BBHA 9170 | BBHA9170159 | 2014/09/16 | 2017/09/14 |
| Broadband Antenna | SHWARZBECK | VULB 9168 | 9168-172 | 2013/08/08 | 2016/08/06 |
| Pre-Amplifier | EMC Co. | EMC12635SE | 980205 | 2015/10/7 | 2016/10/05 |
| Pre-Amplifier | MITEQ | JS4-26004000--27-8A | 828825 | 2015/09/15 | 2016/09/13 |
| Power Meter | Anritsu | ML2495A | 0844001 | 2015/11/11 | 2016/11/09 |
| Power Sensor | Anritsu | MA2411B | 0738452 | 2015/11/11 | 2016/11/09 |
| Two-Line V-Network | Rohde & Schwarz | ENV216 | 101159 | 2015/06/08 | 2016/06/06 |
| Artificial Mains Network (LISN) | Schaffner | MN2050D | 1586 | 2015/05/27 | 2016/05/25 |
| CON-1 Cable | SUHNER | BNC / RG-58 | 1521946 | 2015/05/09 | 2016/05/07 |
| Test software | Audix | e3 | 4.2004-1-12k | NCR | NCR |
| Signal Analyzer | Agilent | N9030A | MY51380492 | 2015/09/21 | 2016/09/19 |
| 966-2(A) Cable 9kHz~26.5GHz | SUHNER | SMA / EX 100 | N/A | 2015/05/06 | 2016/05/05 |
| 966-2(B) Cable 9kHz~26.5GHz | SUHNER | SMA / SUCOFLEX 104P | CB0005 | 2015/05/06 | 2016/05/04 |

| Equipment | Brand | Model No. | Serial No. | Calibration Date | Next Calibration Date |
|---|---|---|---|---|---|
| RF Cable 9kHz~26.5GHz | SUHNER | SUCOFLEX 102 | CB0006 | 2015/05/06 | 2016/05/05 |
| 966-2_3m Semi-Anechoic Chamber | 966_2 | CEM-966_2 | N/A | 2016/02/24 | 2017/02/22 |
| Hight Pass Filter | Reactel | 7HS-3G/18G-S 11 | N/A | 2015/06/06 | 2016/06/04 |
| Active Loop Antenna | SCHWARZBECK MESS-ELEKTRO NIC | FMZB1519 | 1519-067 | 2016/03/03 | 2017/03/02 |
| EMI Test Receiver | Rohde & Schwarz | ESR-7 | 101232 | 2015/12/02 | 2016/11/30 |
| Test software | ADT | Radiated test system | 7.5.14 | NCR | NCR |

Note: No Calibration Required (NCR).

## Appendix B: Measurement Uncertainty

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

| Item | Uncertainty |
|---|---|
| Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m | 5.14 dB |
| Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m | 5.22 dB |
| Vertically polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m | 3.64 dB |
| Horizontally polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m | 3.64 dB |
| Vertically polarized Radiated disturbances from 18GHz~40GHz in a semi-anechoic chamber at a distance of 3m | 2.7 dB |
| Horizontally polarized Radiated disturbances from 18GHz~40GHz in a semi-anechoic chamber at a distance of 3m | 2.7 dB |
| Radiated disturbances from 9kHz~30MHz in a semi-anechoic chamber at a distance of 3m | 3.53 dB |
| Emission on the Band Edge Test | 3.64 dB |
| RF Antenna Conducted Spurious Test | 0.85 dB |
| Maximum Output Power Test | 0.42 dB |
| 20dB Bandwidth Test | 0.85 dB |
| Carrier Frequency Separation Test | 0.85 dB |
| Number of Hopping Frequencies Test | 0.85 dB |
| Time of Occupancy (Dwell Time) Test | 0.85 dB |
| AC Power Line Conducted Emission | 2.47 dB |