



# TEST REPORT

**APPLICANT** : LEXI Devices, Inc.  
**PRODUCT NAME** : BR30 Bulb-Smart Color & Tunable White  
**MODEL NAME** : 10012  
**BRAND NAME** : LEXI  
**FCC ID** : 2ATOT10012  
**STANDARD(S)** : 47 CFR Part 15 Subpart C  
**RECEIPT DATE** : 2021-01-07  
**TEST DATE** : 2021-01-07 to 2021-01-13  
**ISSUE DATE** : 2021-02-20

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Qijie Xiao

Approved by: Elvis Wang  
Elvis Wang

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| Change History |            |                   |
|----------------|------------|-------------------|
| Version        | Date       | Reason for change |
| 1.0            | 2021-02-20 | First edition     |



# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

|                              |                                                                                                                 |
|------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>            | LEXI Devices, Inc.                                                                                              |
| <b>Applicant Address:</b>    | 2342 Shattuck Ave, #260, Berkeley, CA 94704 US                                                                  |
| <b>Manufacturer:</b>         | LEEDARSON LIGHTING CO., LTD.                                                                                    |
| <b>Manufacturer Address:</b> | Xingtai Industrial Zone, Economic Development Zone, Changtai County, Zhangzhou city, Fujian Province, P.R.China |

## 1.2. Equipment Under Test (EUT) Description

|                                   |                                                        |
|-----------------------------------|--------------------------------------------------------|
| <b>Product Name:</b>              | BR30 Bulb-Smart Color & Tunable White                  |
| <b>Serial No:</b>                 | (N/A, marked #1 by test site)                          |
| <b>Hardware Version:</b>          | V2.1                                                   |
| <b>Software Version:</b>          | V100                                                   |
| <b>Modulation Type:</b>           | GFSK                                                   |
| <b>Operating Frequency Range:</b> | 2402MHz - 2480MHz (40 channels, at intervals of 2MHz); |
| <b>Bluetooth Version:</b>         | Bluetooth 4.2 LE                                       |
| <b>Antenna Type:</b>              | internal antenna                                       |
| <b>Antenna Gain:</b>              | 0.15dBi                                                |

**Note 1:** The EUT contains Bluetooth Module operating at 2.4GHz ISM band; the frequencies is  $F(\text{MHz})=2402+2*n$  ( $0 \leq n \leq 39$ ). The lowest, middle, highest channel numbers of the Bluetooth Module used and tested in this report are separately 0 (2402MHz), 20 (2442MHz) and 39 (2480MHz).

**Note 2:** The EUT connected to the serial port of the computer with a serial communication cable, we use the dedicated software to control the EUT continuous transmission.

**Note 3:** For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

### 1.3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

| No | Identity                         | Document Title          |
|----|----------------------------------|-------------------------|
| 1  | 47 CFR Part 15 (10-1-15 Edition) | Radio Frequency Devices |

Test detailed items/section required by FCC rules and results are as below:

| No. | Section           | Description                               | Test Date     | Test Engineer | Result |
|-----|-------------------|-------------------------------------------|---------------|---------------|--------|
| 1   | 15.203            | Antenna Requirement                       | N/A           | N/A           | PASS   |
| 2   | 15.247(b)         | Peak Output Power                         | Jan. 06, 2021 | Stefan Sun    | PASS   |
| 3   | 15.247(a)         | Bandwidth                                 | Jan. 13, 2021 | Stefan Sun    | PASS   |
| 4   | 15.247(d)         | Conducted Spurious Emission and Band Edge | Jan. 06, 2021 | Stefan Sun    | PASS   |
| 5   | 15.247(e)         | Power spectral density (PSD)              | Jan. 06, 2021 | Stefan Sun    | PASS   |
| 6   | 15.247(d)         | Restricted Frequency Bands                | Jan. 08, 2021 | Yaming Luo    | PASS   |
| 7   | 15.207            | Conducted Emission                        | Jan. 13, 2021 | Yaming Luo    | PASS   |
| 8   | 15.209, 15.247(d) | Radiated Emission                         | Jan. 08, 2021 | Yaming Luo    | PASS   |

**Note:** The tests were performed according to the method of measurements prescribed in ANSIC63.10-2013 and KDB558074 D01 15.247 Meas Guidance v05r02.

### 1.4. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

|                             |          |
|-----------------------------|----------|
| Temperature (°C):           | 15 - 35  |
| Relative Humidity (%):      | 30 - 60  |
| Atmospheric Pressure (kPa): | 86 - 106 |



## **2. 47 CFR Part 15C Requirements**

### **2.1. Antenna requirement**

#### **2.1.1. Applicable Standard**

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

#### **2.1.2. Result: Compliant**

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

## 2.2. Peak Output Power

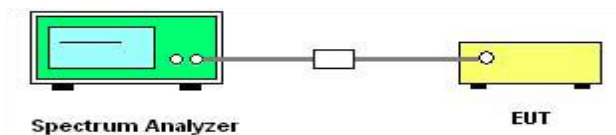
### 2.2.1. Requirement

According to FCC section 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: The maximum peak conducted output power of the intentional radiator shall not exceed 1 Watt.

### 2.2.2. Test Description

The measured output power was calculated by the reading of the spectrum analyzer and calibration.

#### A. Test Setup:



The EUT (Equipment under the test) is coupled to the Spectrum analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading, all test result in Spectrum analyzer.

#### B. Equipments List:

Please refer ANNEX A (1.5).

### 2.2.3. Test procedure

The measured output power was calculated by the reading of the spectrum analyzer and calibration. Following is the test procedure for Peak Output Power test on the spectrum analyzer:

- Set analyzer center frequency to channel center frequency.
- Set the RBW to 3MHz
- Set VBW to 8MHz
- Set span to 6MHz
- Sweep time to auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.



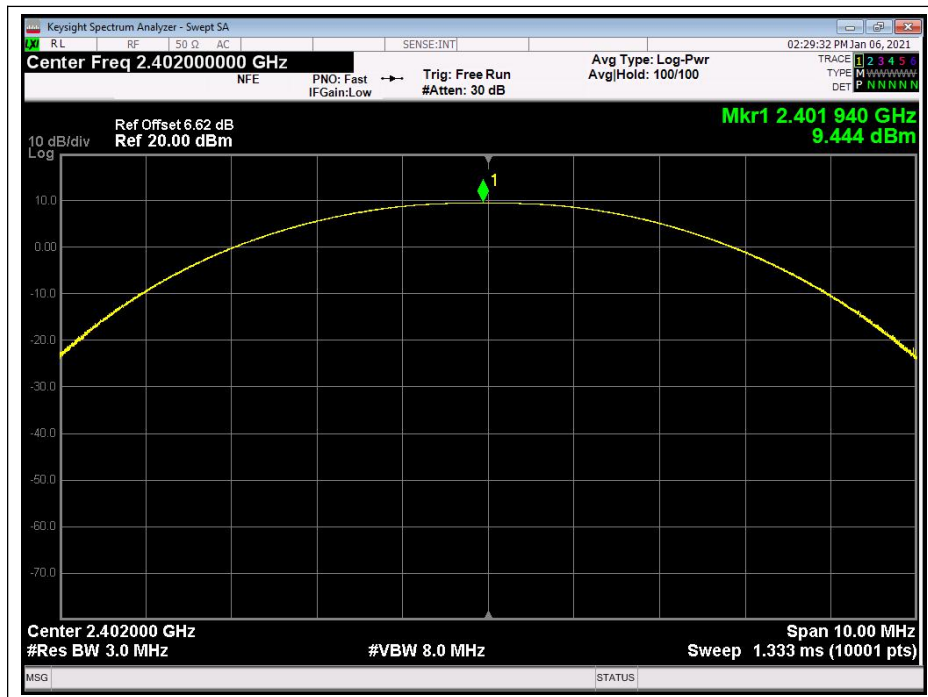
#### 2.2.4. Test Result

The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

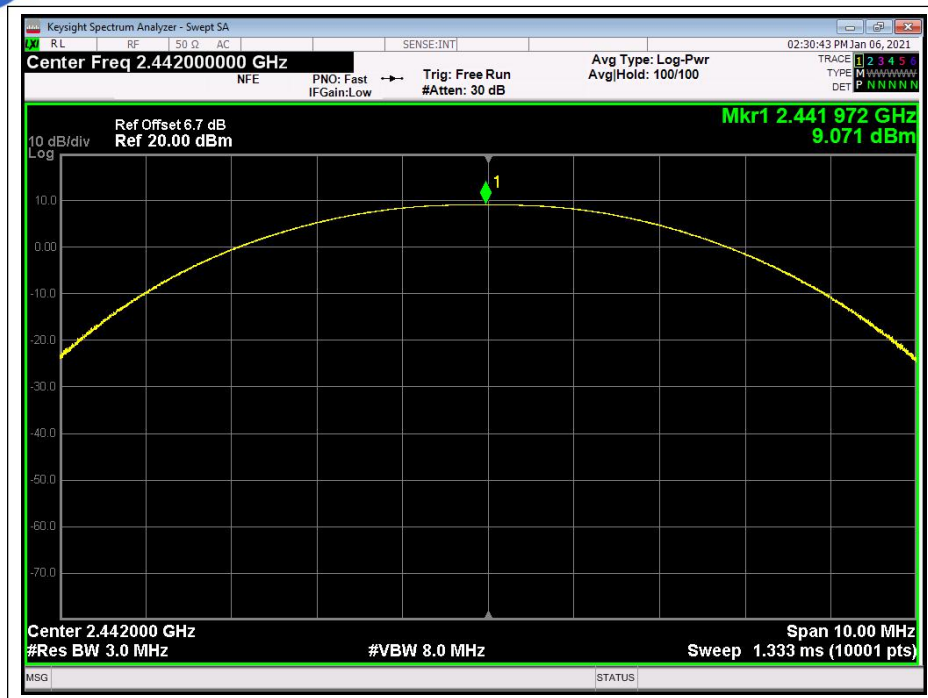
##### A. Test Verdict:

| Channel | Frequency (MHz) | Measured Output Peak Power |       | Limit |   | Verdict |
|---------|-----------------|----------------------------|-------|-------|---|---------|
|         |                 | dBm                        | W     | dBm   | W |         |
| 0       | 2402            | 9.444                      | 0.009 | 30    | 1 | PASS    |
| 20      | 2442            | 9.071                      | 0.008 |       |   | PASS    |
| 39      | 2480            | 9.626                      | 0.009 |       |   | PASS    |

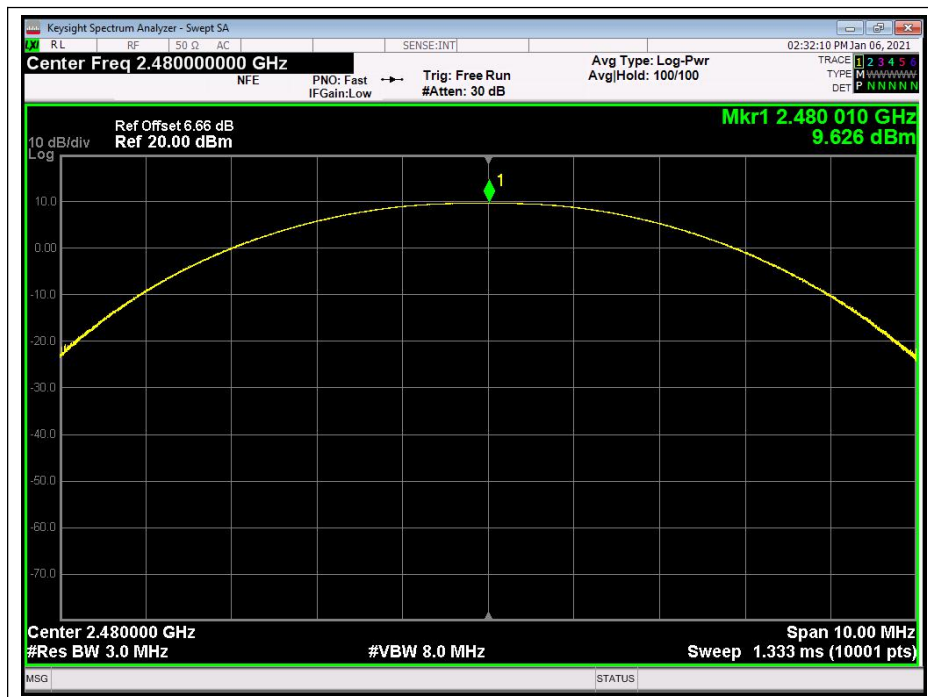
##### B. Test Plots:



(Channel 0, 2402MHz)



(Channel 20, 2442MHz)



(Channel 39, 2480MHz)

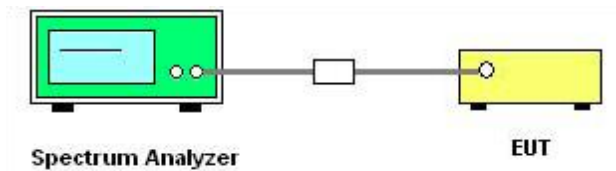
## 2.3. 6dB Bandwidth

### 2.3.1. Requirement

According to FCC section 15.247(a) (2), Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 2.3.2. Test Description

#### A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

#### B. Equipments List:

Please refer ANNEX A(1.5).

### 2.3.3. Test procedure

The steps for the first option are as follows:

(1) Set analyzer center frequency to channel center frequency.

- a) Set RBW = 100 kHz.
- b) Set the VBW=300 kHz.
- c) Detector = peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple
- f) Allow the trace to stabilize.
- g) 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.



(2) The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e.,  $RBW = 100\text{ kHz}$ ,  $VBW \geq 3 \times RBW$ , and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be  $\geq 6\text{ dB}$ .

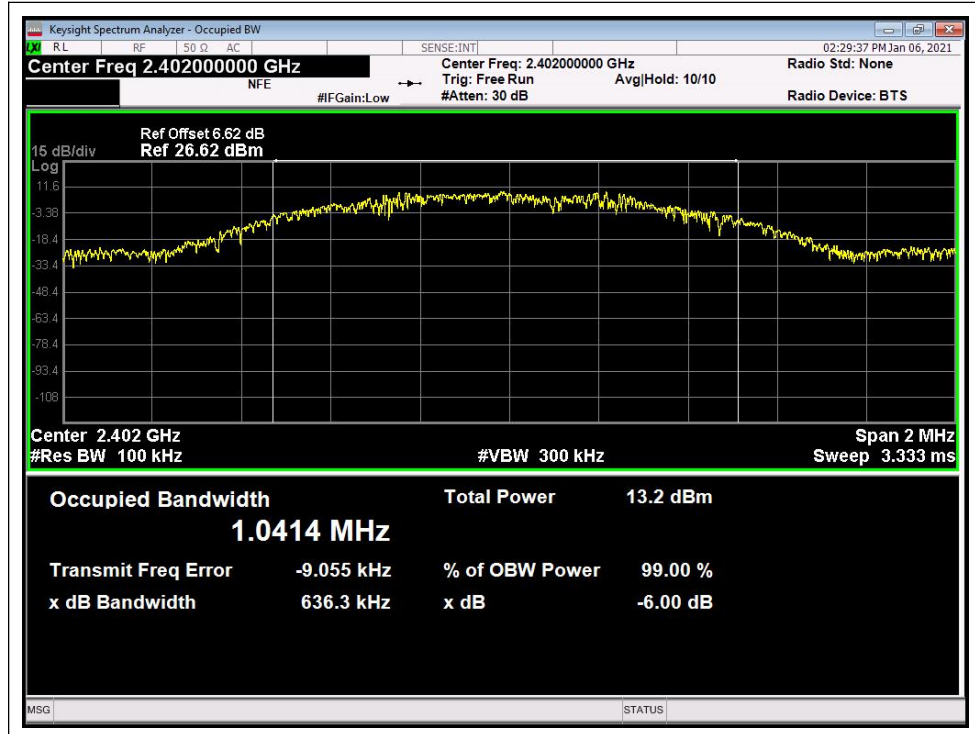
#### 2.3.4. Test Result

The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the module.

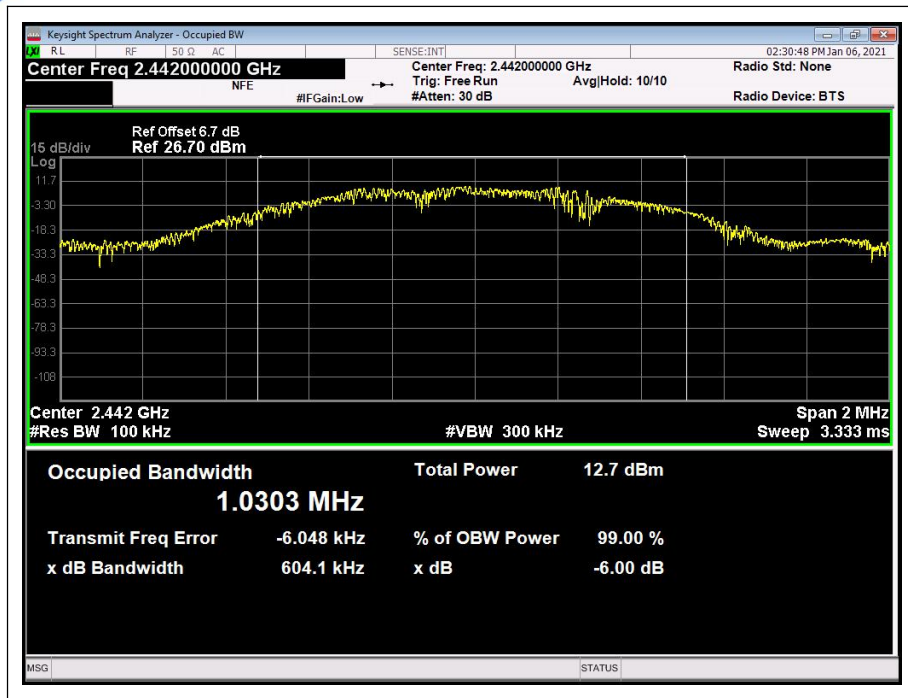
##### A. Test Verdict:

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Limits(kHz) | Result |
|---------|-----------------|----------------------|-------------|--------|
| 0       | 2402            | 0.636                | $\geq 500$  | PASS   |
| 20      | 2442            | 0.604                | $\geq 500$  | PASS   |
| 39      | 2480            | 0.625                | $\geq 500$  | PASS   |

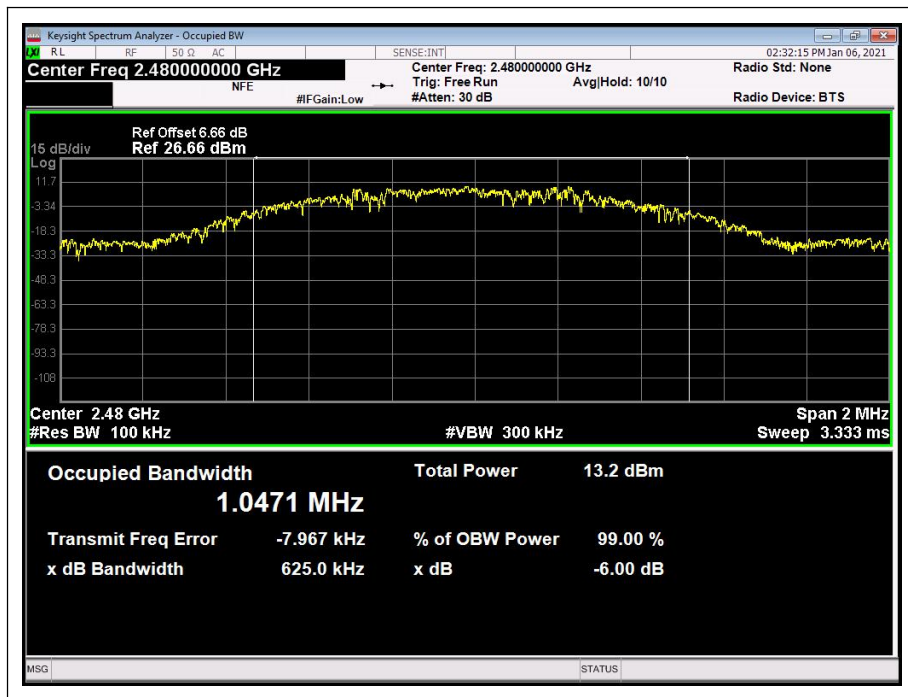
##### B. Test Plots:



(Channel 0: 2402MHz)



(Channel 20: 2442 MHz)



(Channel 39: 2480MHz)

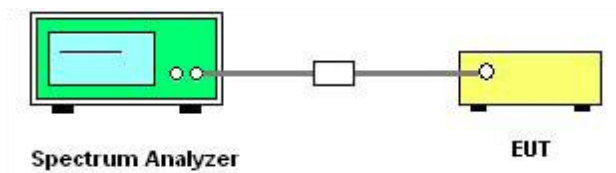
## 2.4. Conducted Spurious Emissions and Band Edge

### 2.4.1. Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

### 2.4.2. Test Description

#### A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

#### B. Equipments List:

Please refer ANNEX A (1.5).

### 2.4.3. Test Procedure

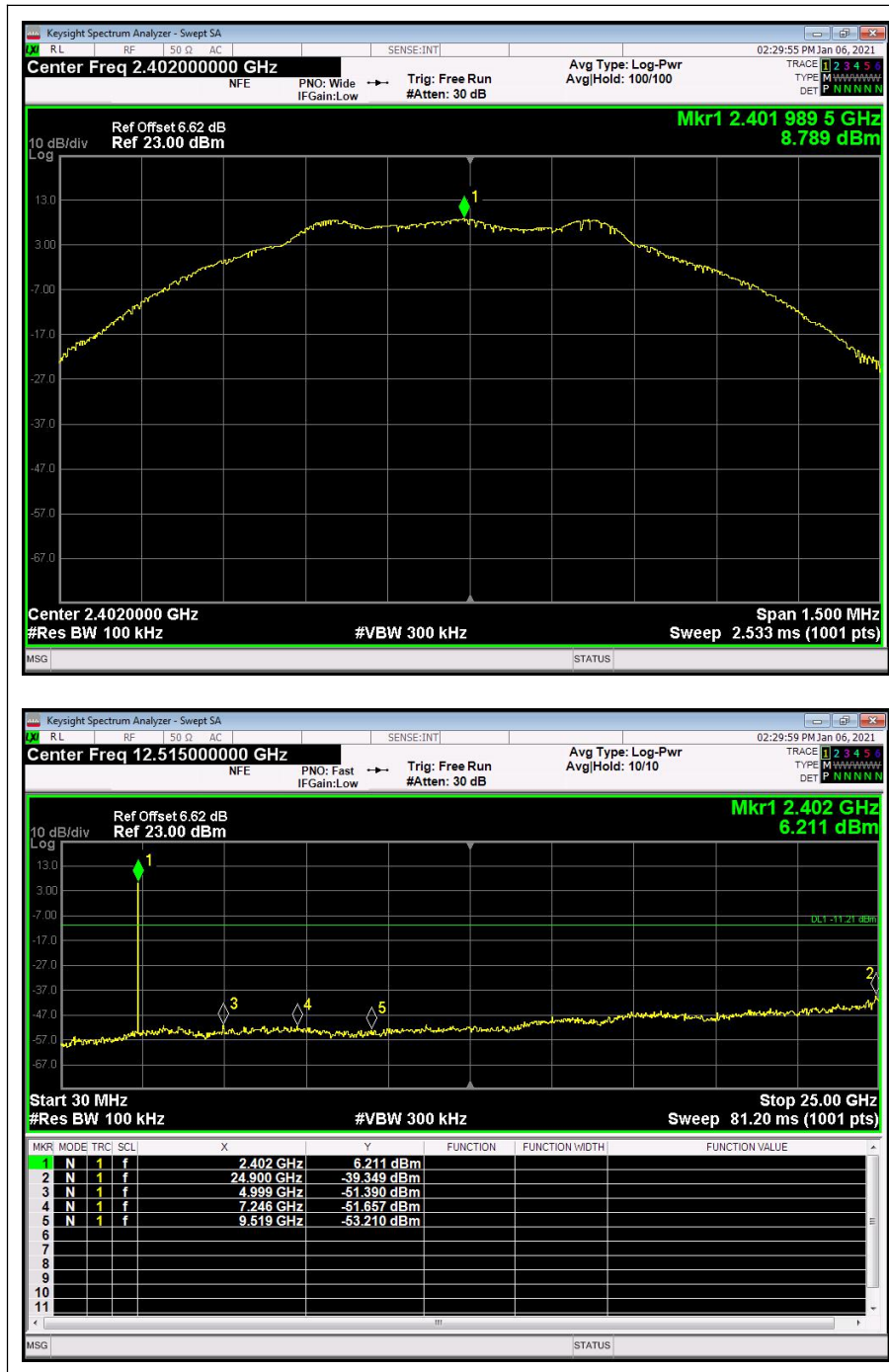
The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100kHz and 300kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

### 2.4.4. Test Result

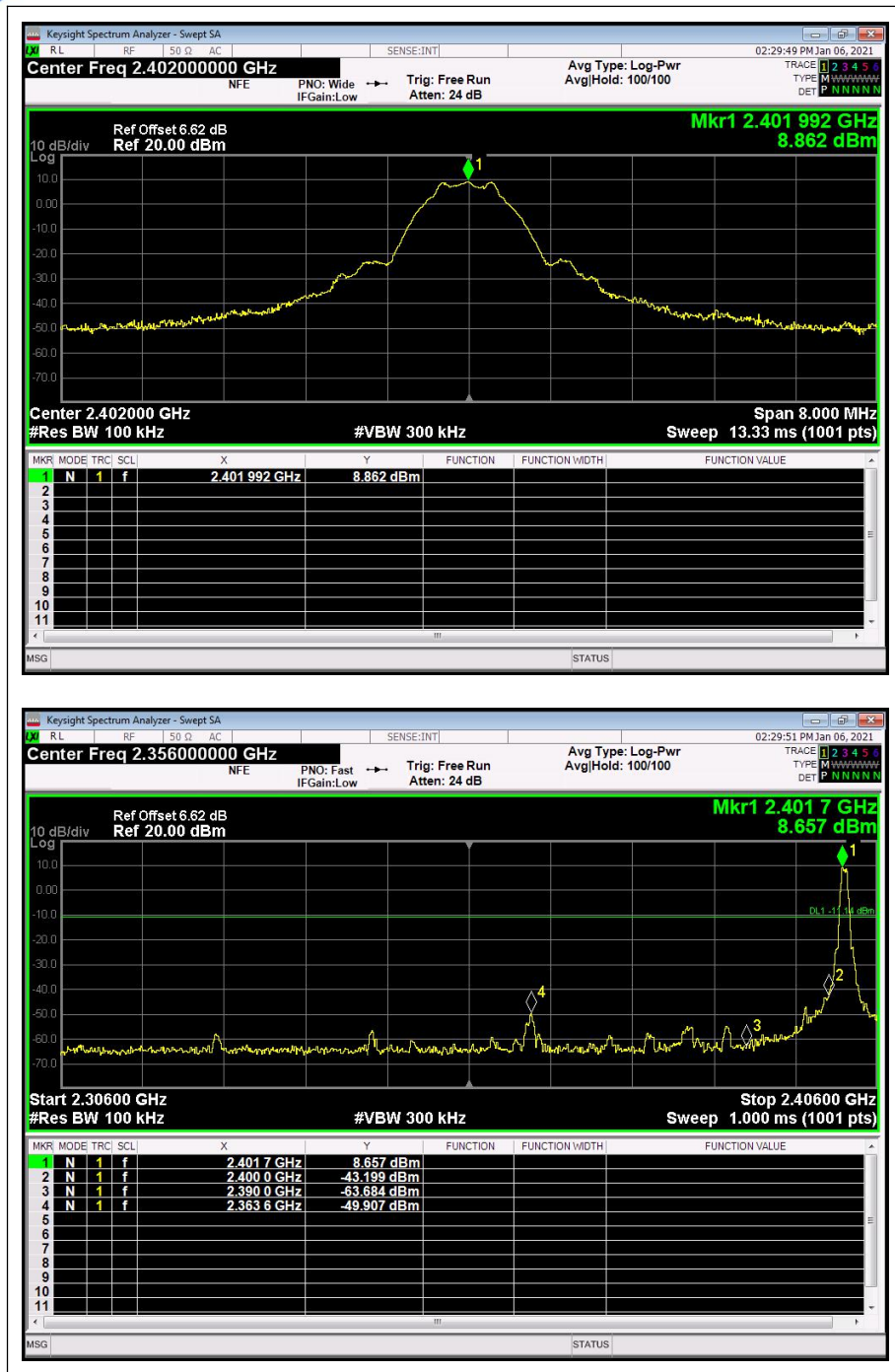
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

**A. Test Plots:**

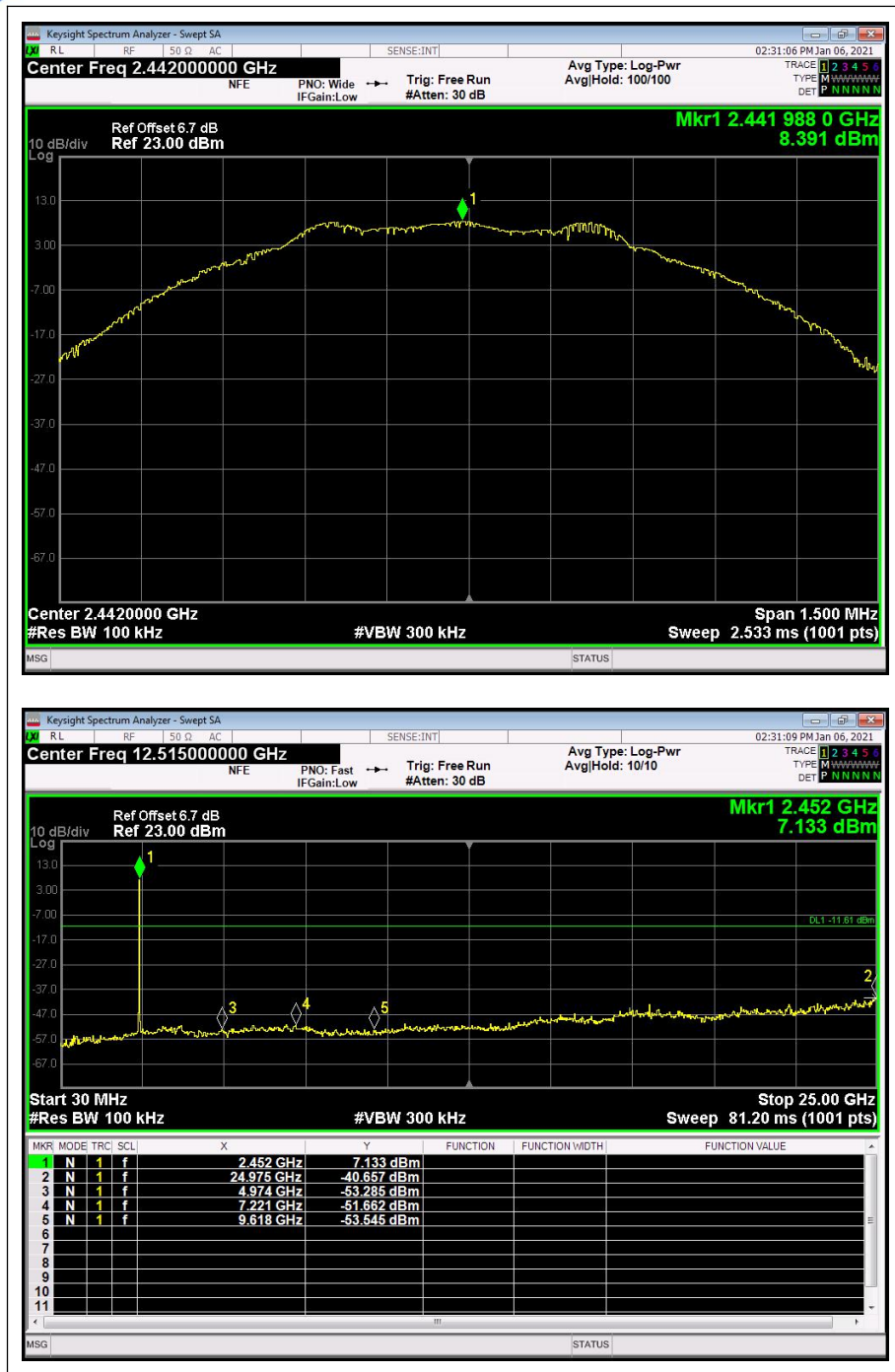
**Note:** the power of the Module transmitting frequency should be ignored.



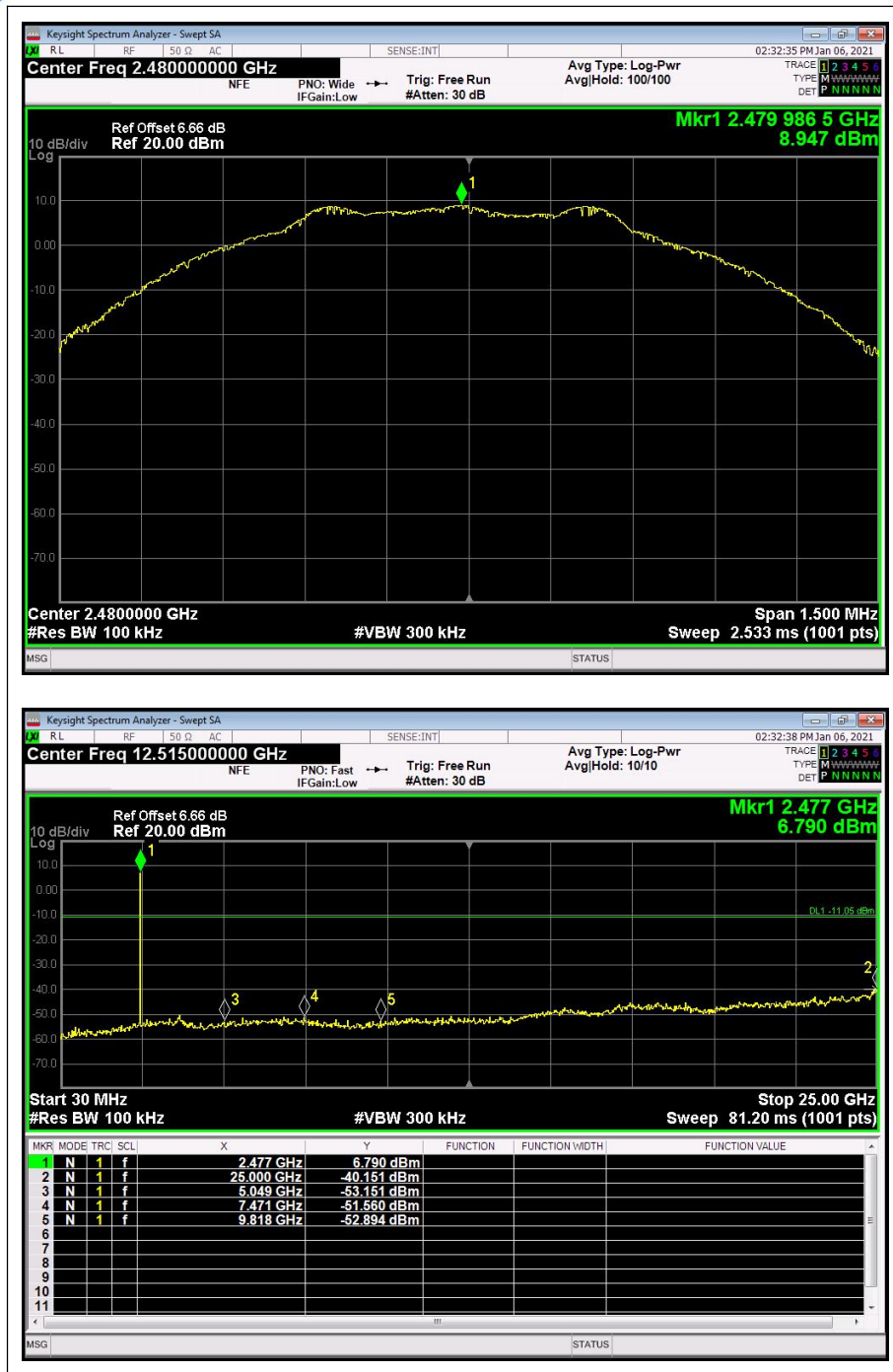
(Channel = 0, 30MHz to 25GHz)



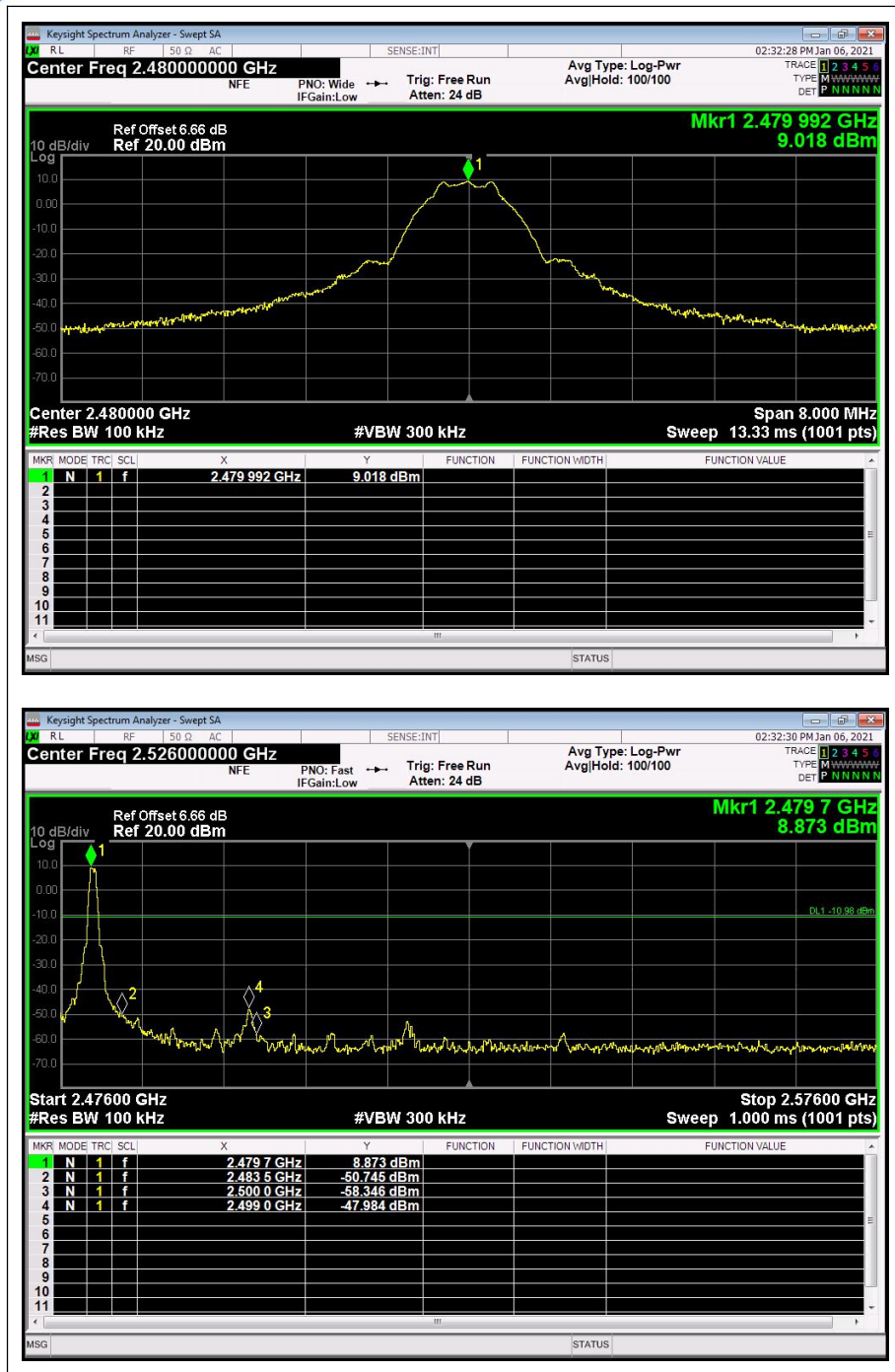
(Band Edge, Channel = 0)



(Channel = 20, 30MHz to 25GHz)



(Channel = 39, 30MHz to 25GHz)



(Band Edge, Channel = 39)

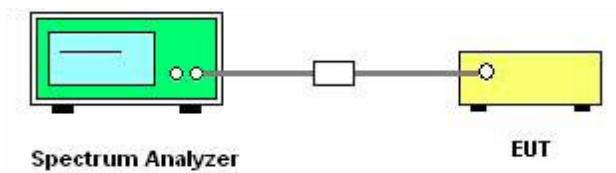
## 2.5. Power spectral density (PSD)

### 2.5.1. Requirement

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### 2.5.2. Test Description

#### A. Test Set:



The EUT is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

#### B. Equipments List:

Please refer ANNEX A (1.5).

### 2.5.3. Test procedure

The measured power spectral density was calculated by the reading of the spectrum analyzer and calibration. Following is the test procedure for PSD test:

- Set analyzer center frequency to channel center frequency.
- Set the span to 1.5 times DTS
- Set the RBW to 3 kHz
- Set the VBW to 10 kHz
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.



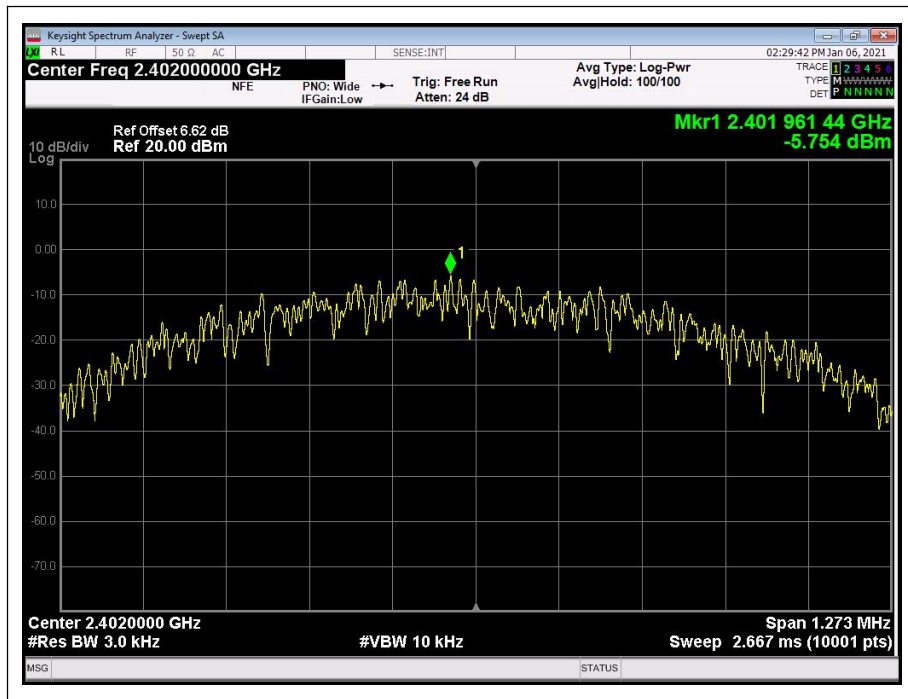
#### 2.5.4. Test Result

The lowest, middle and highest channels are tested.

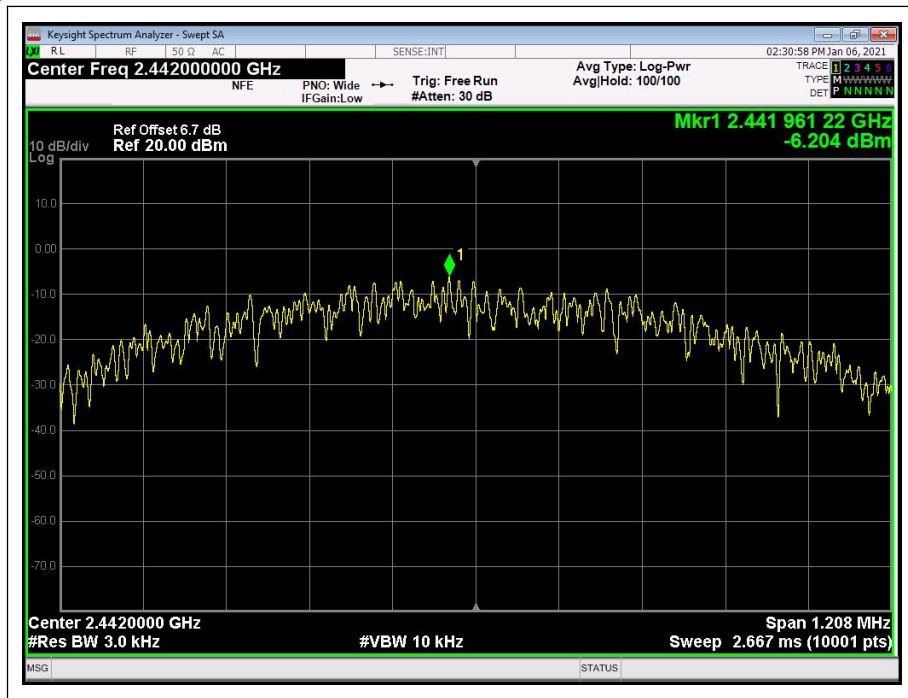
##### A. Test Verdict:

| Spectral power density (dBm/3kHz)     |                 |                         |                  |         |
|---------------------------------------|-----------------|-------------------------|------------------|---------|
| Channel                               | Frequency (MHz) | Measured PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
| 0                                     | 2402            | -5.754                  | 8                | PASS    |
| 20                                    | 2442            | -6.204                  | 8                | PASS    |
| 39                                    | 2480            | -5.632                  | 8                | PASS    |
| Measurement uncertainty: $\pm 1.3$ dB |                 |                         |                  |         |

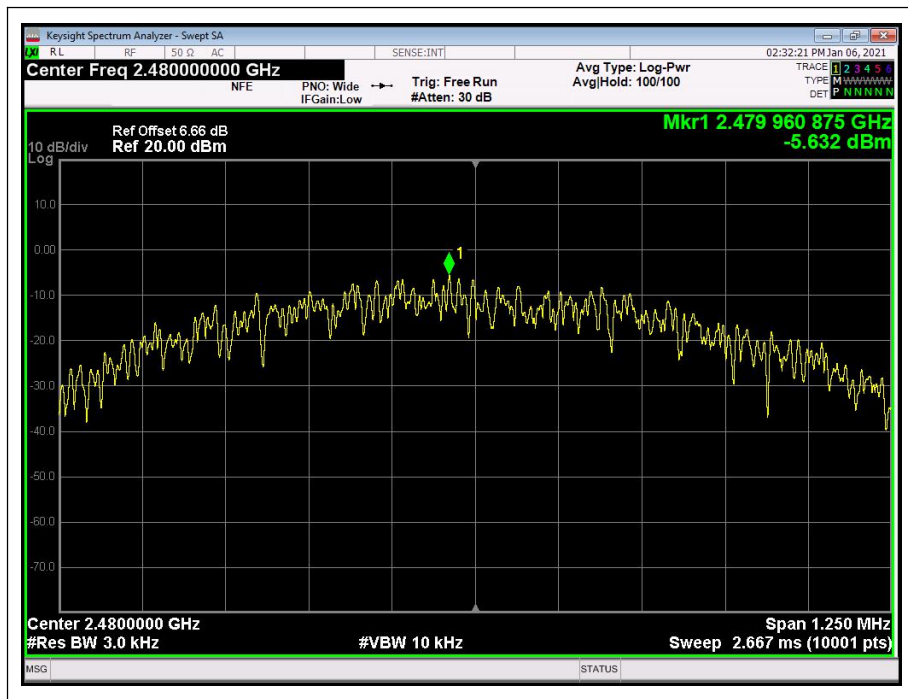
##### B. Test Plots:



(Channel = 0, 2402MHz)



(Channel = 19, 2440MHz)



(Channel = 39, 2480MHz)

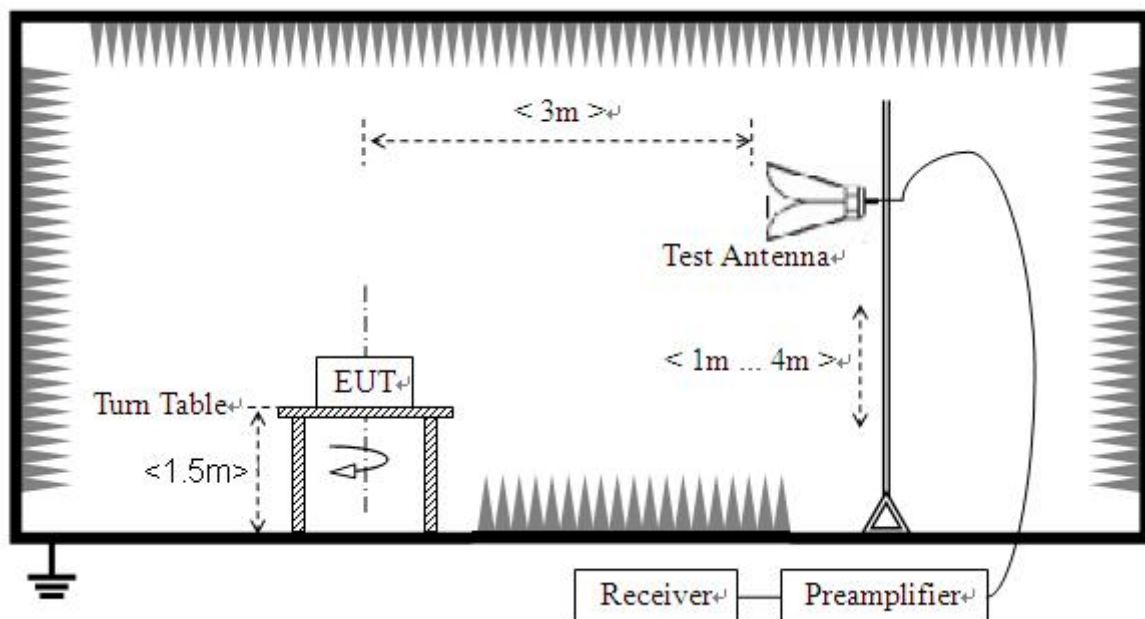
## 2.6. Restricted Frequency Bands

### 2.6.1. Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

### 2.6.2. Test Description

#### A. Test Setup



- The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.



- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasipeak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.
- 4. All modes of operation were investigated and the worst-case emissions are reported.

## B. Equipments List:

Please refer ANNEX B(4).



### 2.6.3. Test Result

The lowest and highest channels are tested to verify Restricted Frequency Bands.

The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V/m}] = U_R + A_T + A_{\text{Factor}} [\text{dB}]; A_T = L_{\text{Cable loss}} [\text{dB}] - G_{\text{preamp}} [\text{dB}]$$

$A_T$ : Total correction Factor except Antenna

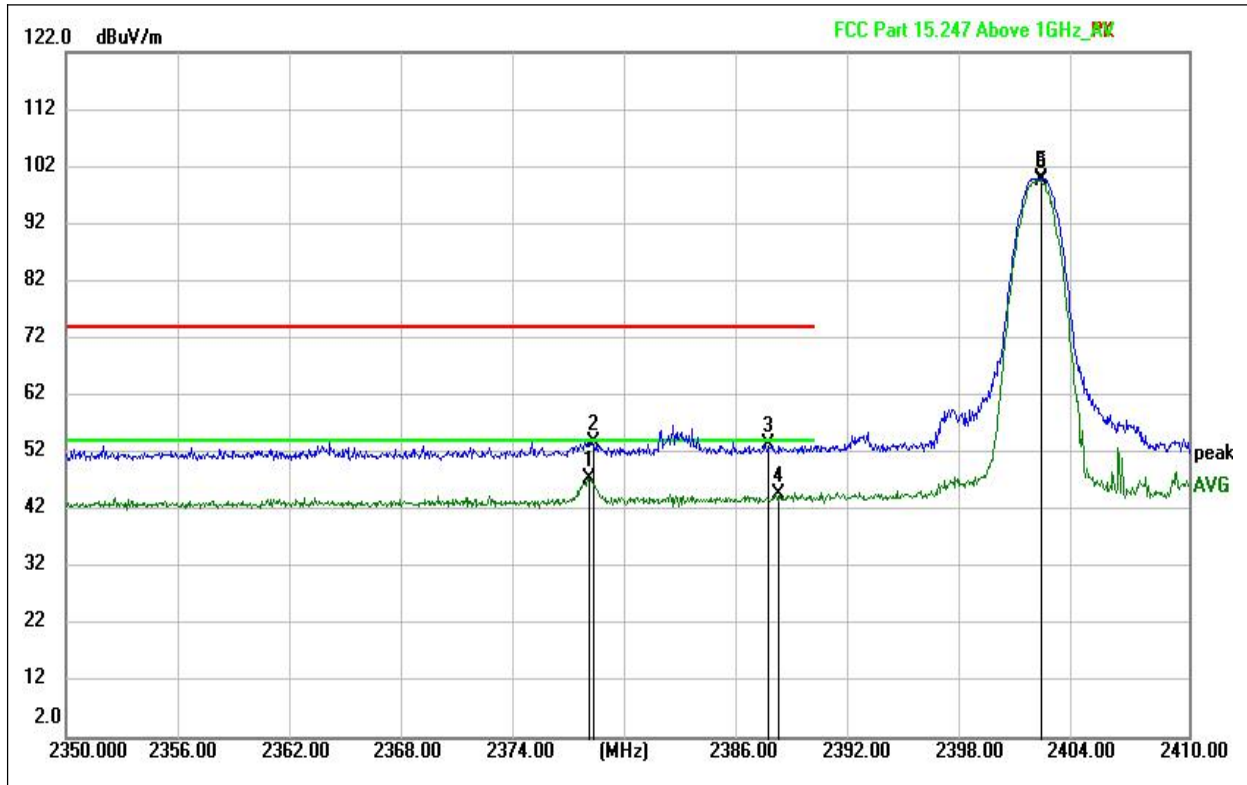
$U_R$ : Receiver Reading

$G_{\text{preamp}}$ : Preamplifier Gain

$A_{\text{Factor}}$ : Antenna Factor at 3m

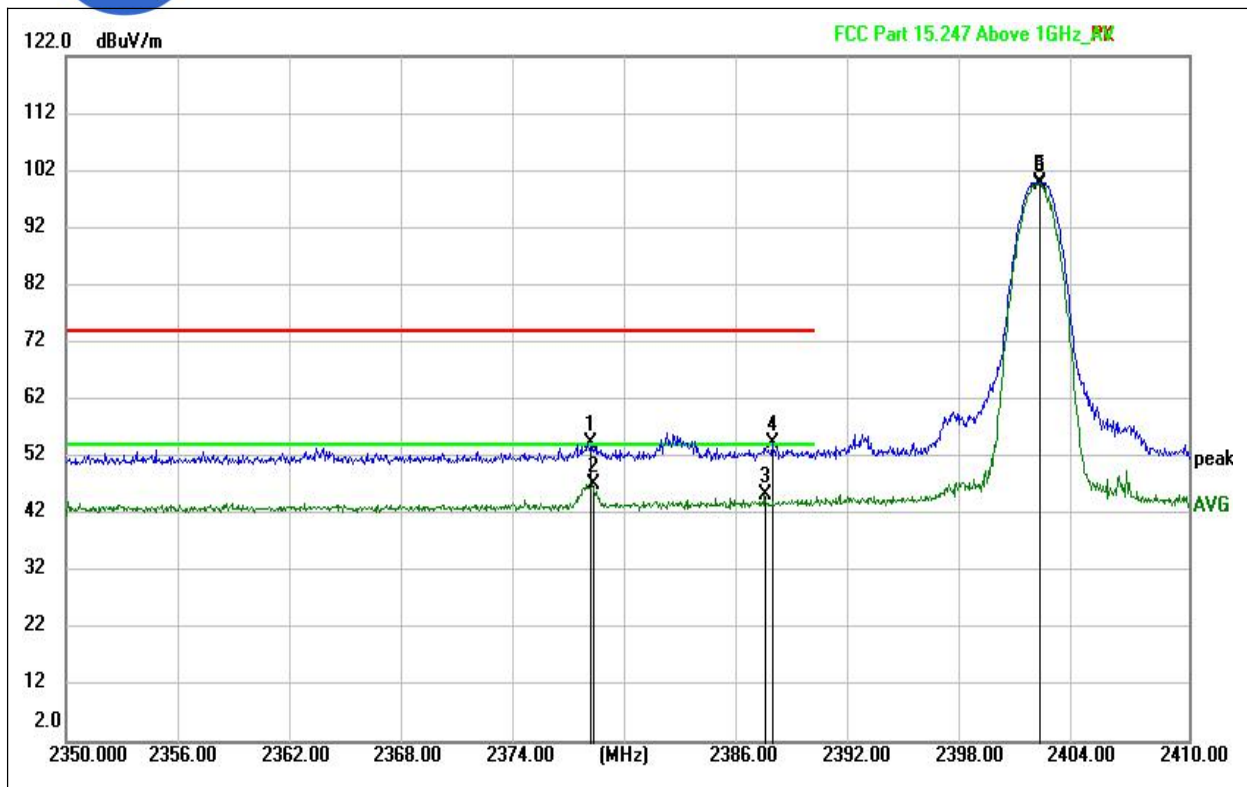


## Test Plots:



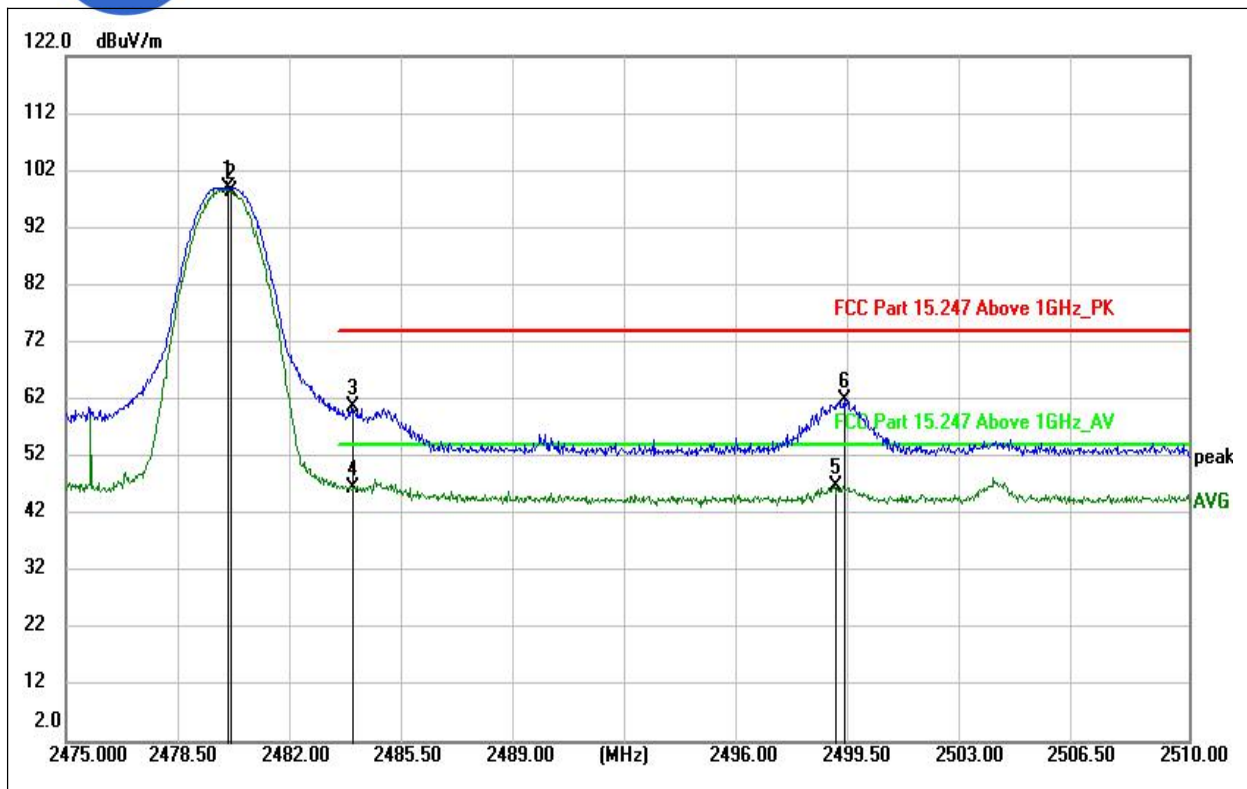
(BLE 1M PHY\_2402MHz, Antenna Horizontal)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 2377.960        | 7.17           | 40.21         | 47.38          | 54.00          | -6.62       | AVG  | H   |
| 2378.155        | 13.62          | 40.21         | 53.83          | 74.00          | -20.17      | peak | H   |
| 2387.473        | 12.50          | 40.77         | 53.27          | 74.00          | -20.73      | peak | H   |
| 2387.983        | 3.75           | 40.81         | 44.56          | 54.00          | -9.44       | AVG  | H   |
| 2402.000        | 58.20          | 41.60         | 99.80          | N/A            | N/A         | peak | H   |
| 2402.000        | 57.82          | 41.60         | 99.42          | N/A            | N/A         | AVG  | H   |



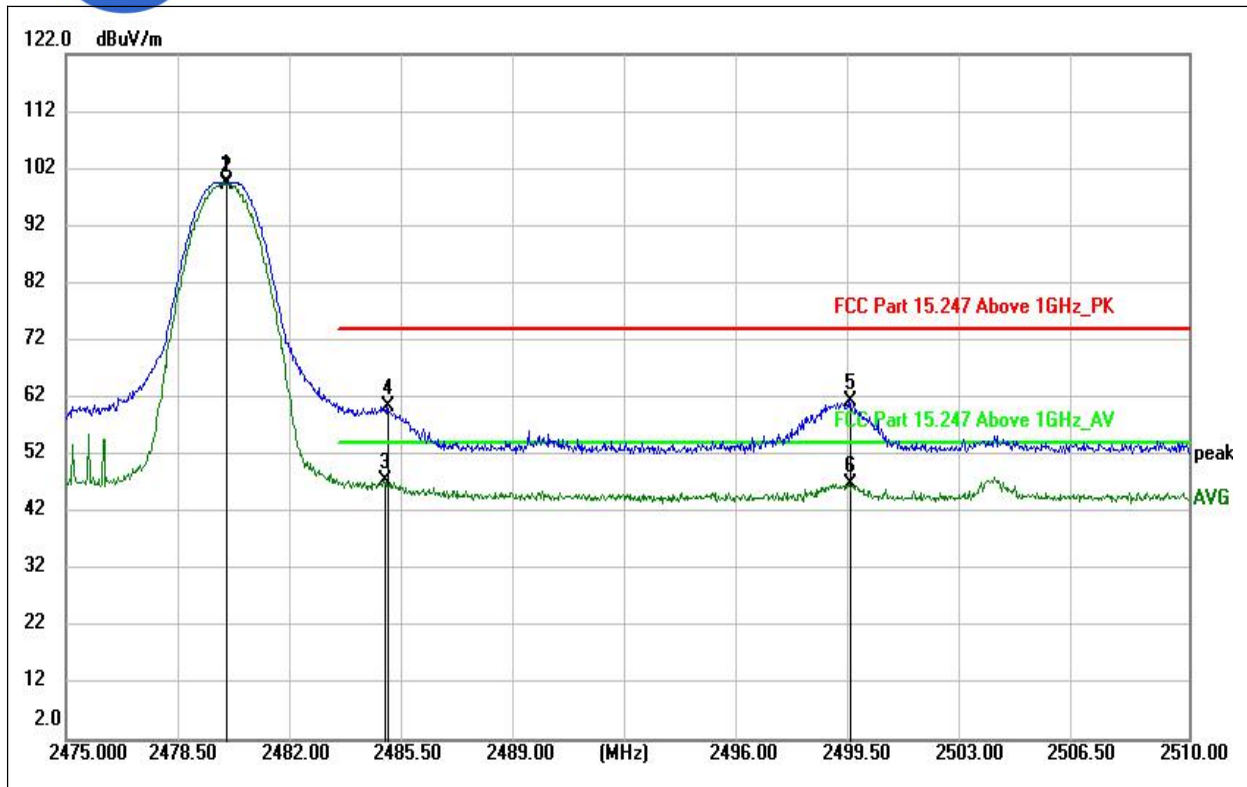
(LE 1M PHY\_2402MHz, Antenna Vertical)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 2377.966        | 13.97          | 40.21         | 54.18          | 74.00          | -19.82      | peak | V   |
| 2378.167        | 6.95           | 40.21         | 47.16          | 54.00          | -6.84       | AVG  | V   |
| 2387.353        | 4.36           | 40.76         | 45.12          | 54.00          | -8.88       | AVG  | V   |
| 2387.773        | 13.39          | 40.80         | 54.19          | 74.00          | -19.81      | peak | V   |
| 2402.000        | 58.29          | 41.60         | 99.89          | N/A            | N/A         | peak | V   |
| 2402.000        | 57.86          | 41.60         | 99.46          | N/A            | N/A         | AVG  | V   |



(LE 1M PHY\_2480MHz, Antenna Horizontal)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 2480.000        | 57.12          | 41.77         | 98.89          | N/A            | N/A         | peak | H   |
| 2480.000        | 56.66          | 41.77         | 98.43          | N/A            | N/A         | AVG  | H   |
| 2483.913        | 19.03          | 41.75         | 60.78          | 74.00          | -13.22      | peak | H   |
| 2483.943        | 4.67           | 41.75         | 46.42          | 54.00          | -7.58       | AVG  | H   |
| 2498.950        | 5.25           | 41.47         | 46.72          | 54.00          | -7.28       | AVG  | H   |
| 2499.278        | 20.23          | 41.47         | 61.70          | 74.00          | -12.30      | peak | H   |



(LE 1M PHY\_2480MHz, Antenna Vertical)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 2480.000        | 57.75          | 41.77         | 99.52          | N/A            | N/A         | peak | V   |
| 2480.000        | 57.51          | 41.77         | 99.28          | N/A            | N/A         | AVG  | V   |
| 2484.924        | 5.56           | 41.72         | 47.28          | 54.00          | -6.72       | AVG  | V   |
| 2485.043        | 18.73          | 41.72         | 60.45          | 74.00          | -13.55      | peak | V   |
| 2499.449        | 19.76          | 41.48         | 61.24          | 74.00          | -12.76      | peak | V   |
| 2499.465        | 5.15           | 41.48         | 46.63          | 54.00          | -7.37       | AVG  | V   |

## 2.7. Conducted Emission

### 2.7.1. Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

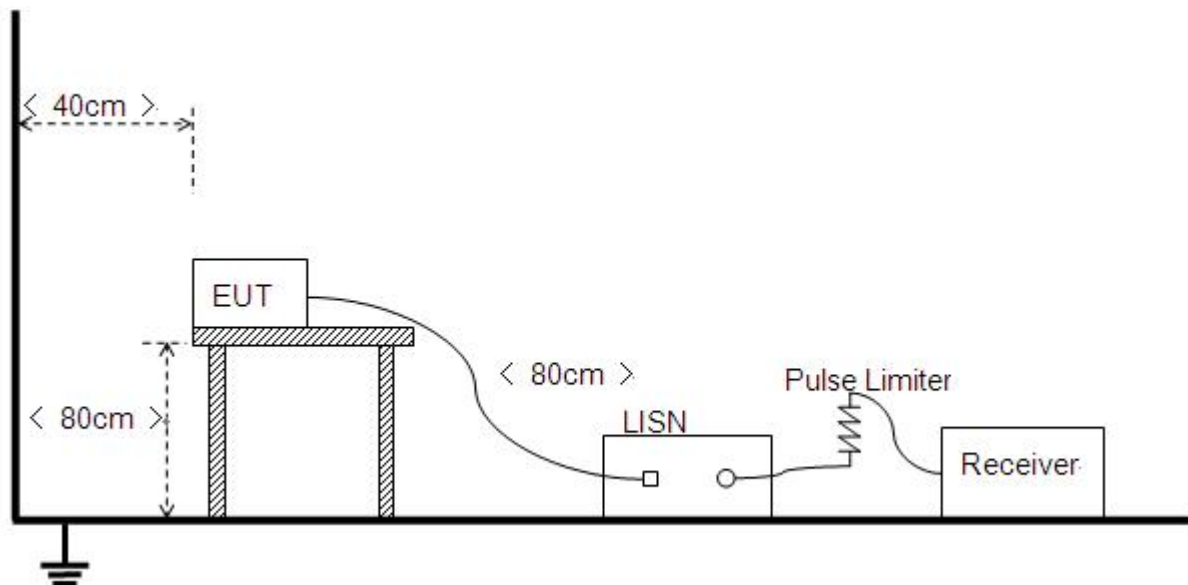
| Frequency<br>(MHz) | range | Conducted Limit (dB $\mu$ V) |          |
|--------------------|-------|------------------------------|----------|
|                    |       | Quai-peak                    | Average  |
| 0.15 - 0.50        |       | 66 to 56                     | 56 to 46 |
| 0.50 - 5           |       | 56                           | 46       |
| 5 - 30             |       | 60                           | 50       |

NOTE:

- (a) The lower limit shall apply at the band edges.
- (b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

### 2.7.2. Test Description

#### A. Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.



**B. Equipments List:**

Please refer ANNEX A(1.5).

**2.7.3. Test Result**

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

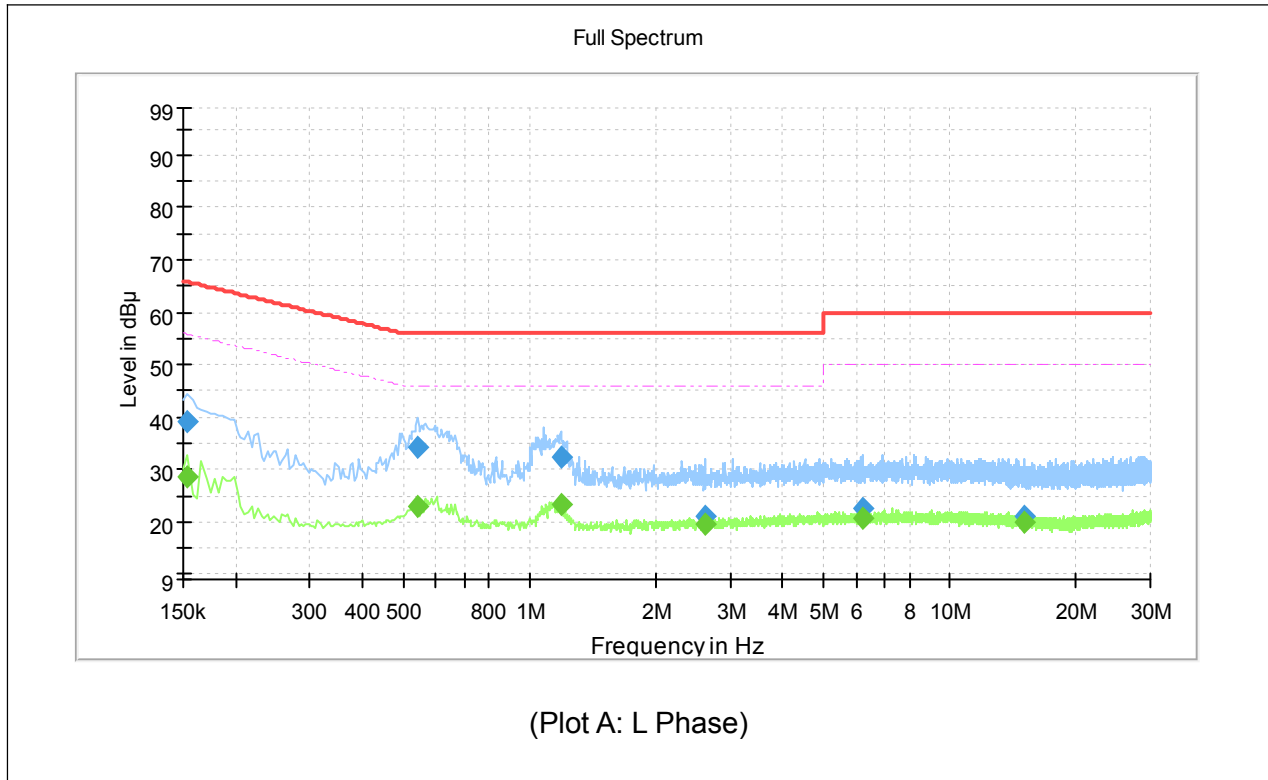
**Note:** Both of the test voltage AC 120V/60Hz and AC 230V/50Hz were considered and tested respectively, only the results of the worst case AC 120V/60Hz were recorded in this report.

**A. Test setup:**

The EUT configuration of the emission tests is EUT + Link.

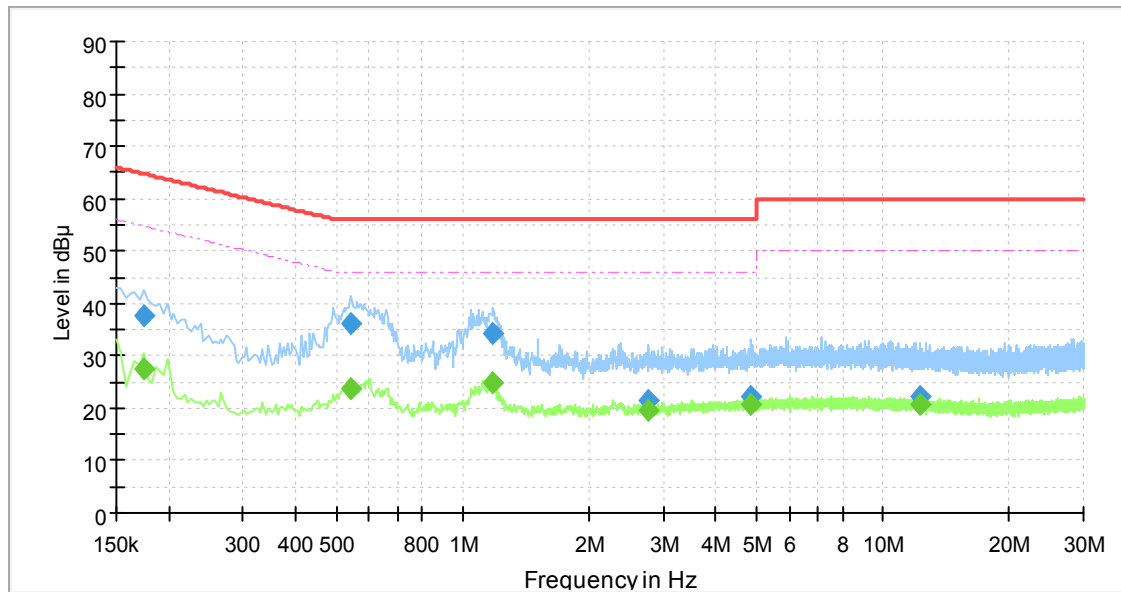
**Note:** The test voltage is AC 120V/60Hz.

## B. Test Plots:



| Frequency (MHz) | QuasiPeak (dBμV) | Average (dBμV) | Limit (dBμV) | Margin (dB) | Corr. (dB) | Line | Verdict |
|-----------------|------------------|----------------|--------------|-------------|------------|------|---------|
| 0.154000        | ---              | 28.55          | 55.78        | 27.23       | 10.2       | L1   | PASS    |
| 0.154000        | 39.10            | ---            | 65.78        | 26.68       | 10.2       | L1   | PASS    |
| 0.542000        | ---              | 22.87          | 46.00        | 23.13       | 10.2       | L1   | PASS    |
| 0.542000        | 34.20            | ---            | 56.00        | 21.80       | 10.2       | L1   | PASS    |
| 1.186000        | ---              | 23.37          | 46.00        | 22.63       | 10.3       | L1   | PASS    |
| 1.186000        | 32.31            | ---            | 56.00        | 23.69       | 10.3       | L1   | PASS    |
| 2.618000        | 20.96            | ---            | 56.00        | 35.04       | 10.3       | L1   | PASS    |
| 2.618000        | ---              | 19.37          | 46.00        | 26.63       | 10.3       | L1   | PASS    |
| 6.202000        | 22.52            | ---            | 60.00        | 37.48       | 10.4       | L1   | PASS    |
| 6.202000        | ---              | 20.78          | 50.00        | 29.22       | 10.4       | L1   | PASS    |
| 14.982000       | ---              | 19.94          | 50.00        | 30.06       | 10.8       | L1   | PASS    |
| 14.982000       | 21.19            | ---            | 60.00        | 38.81       | 10.8       | L1   | PASS    |

Full Spectrum



(Plot B: N Phase)

| Frequency (MHz) | QuasiPeak (dBμV) | Average (dBμV) | Limit (dBμV) | Margin (dB) | Corr. (dB) | Line | Verdict |
|-----------------|------------------|----------------|--------------|-------------|------------|------|---------|
| 0.174000        | ---              | 27.40          | 54.77        | 27.37       | 10.2       | N    | PASS    |
| 0.174000        | 37.83            | ---            | 64.77        | 26.93       | 10.2       | N    | PASS    |
| 0.542000        | ---              | 23.77          | 46.00        | 22.23       | 10.2       | N    | PASS    |
| 0.542000        | 36.20            | ---            | 56.00        | 19.80       | 10.2       | N    | PASS    |
| 1.182000        | ---              | 24.68          | 46.00        | 21.32       | 10.3       | N    | PASS    |
| 1.182000        | 34.27            | ---            | 56.00        | 21.73       | 10.3       | N    | PASS    |
| 2.758000        | 21.65            | ---            | 56.00        | 34.35       | 10.3       | N    | PASS    |
| 2.758000        | ---              | 19.74          | 46.00        | 26.26       | 10.3       | N    | PASS    |
| 4.866000        | 22.34            | ---            | 56.00        | 33.66       | 10.4       | N    | PASS    |
| 4.866000        | ---              | 20.67          | 46.00        | 25.33       | 10.4       | N    | PASS    |
| 12.294000       | ---              | 20.62          | 50.00        | 29.38       | 10.6       | N    | PASS    |
| 12.294000       | 22.10            | ---            | 60.00        | 37.90       | 10.6       | N    | PASS    |



## 2.8. Radiated Emission

### 2.8.1. Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength ( $\mu\text{V/m}$ ) | Measurement Distance (m) |
|-----------------|------------------------------------|--------------------------|
| 0.009 - 0.490   | 2400/F(kHz)                        | 300                      |
| 0.490 - 1.705   | 24000/F(kHz)                       | 30                       |
| 1.705 - 30.0    | 30                                 | 30                       |
| 30 - 88         | 100                                | 3                        |
| 88 - 216        | 150                                | 3                        |
| 216 - 960       | 200                                | 3                        |
| Above 960       | 500                                | 3                        |

Note:

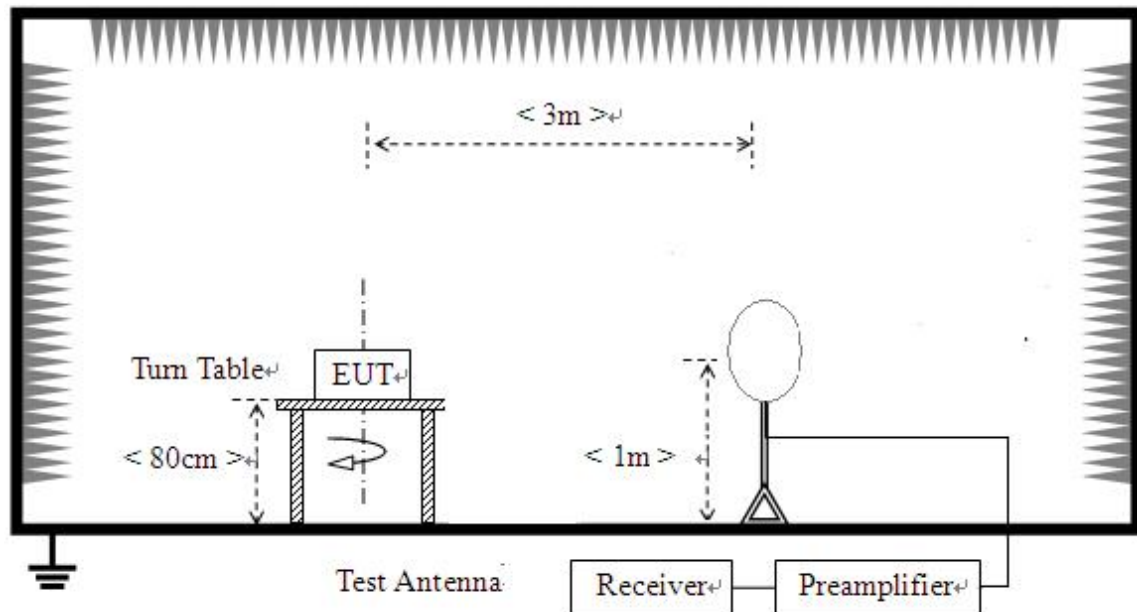
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

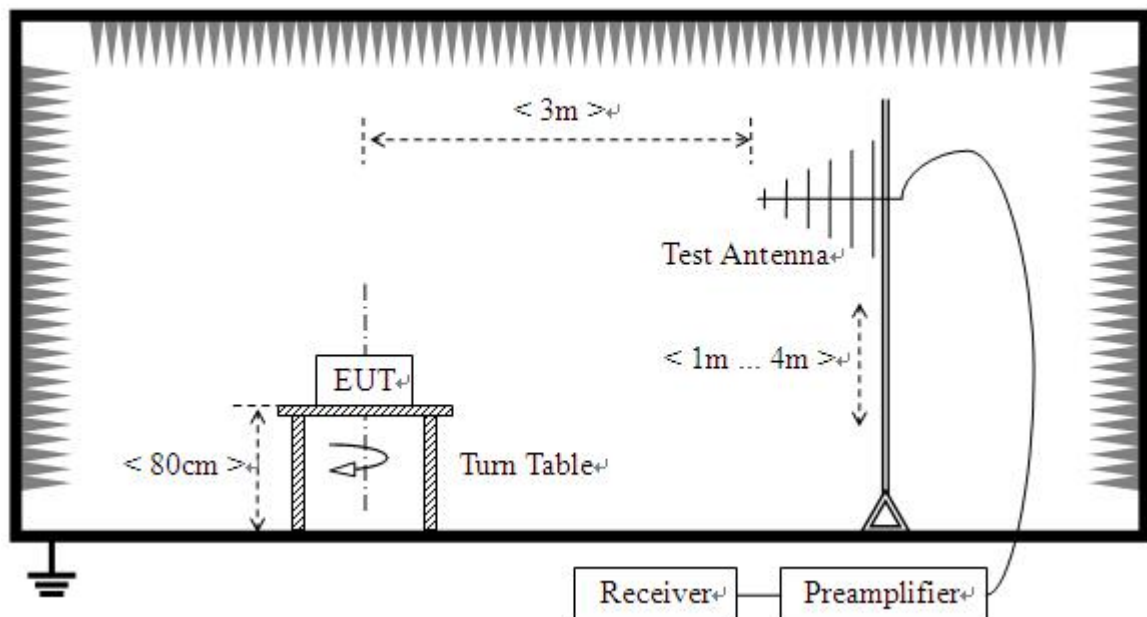
## 2.8.2. Test Description

### A. Test Setup:

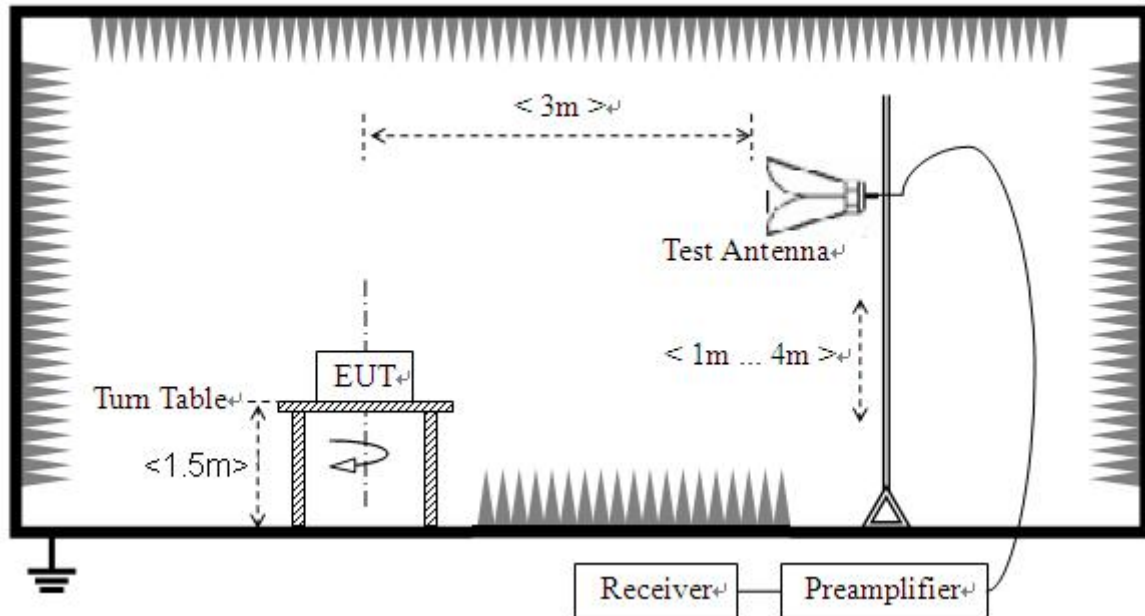
- 1) For radiated emissions from 9kHz to 30MHz



- 2) For radiated emissions from 30MHz to 1GHz



### 3) For radiated emissions above 1GHz



The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz. Test site have a minimum area of the ground plane covered with RF absorbing material as specified in Figure 6 of ANSI C63.4: 2014.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10:2013. For radiated emissions below or equal to 1GHz, The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10:2013.

#### For Radiated emission below 30MHz:

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



Maximum Hold Mode.

**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

**For Radiated emission above 30MHz:**

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasipeak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

**B. Equipments List:**

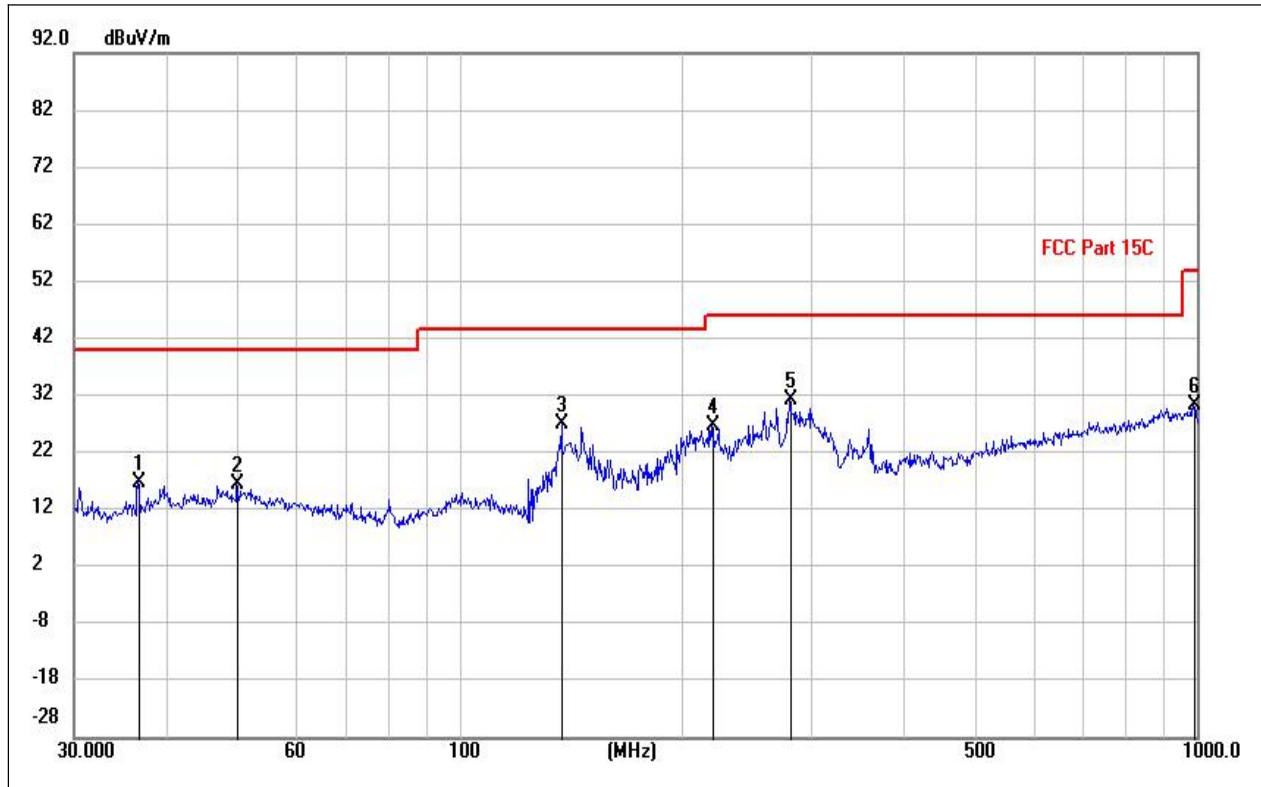
Please refer ANNEX B(4).



### 2.8.3. Test Result

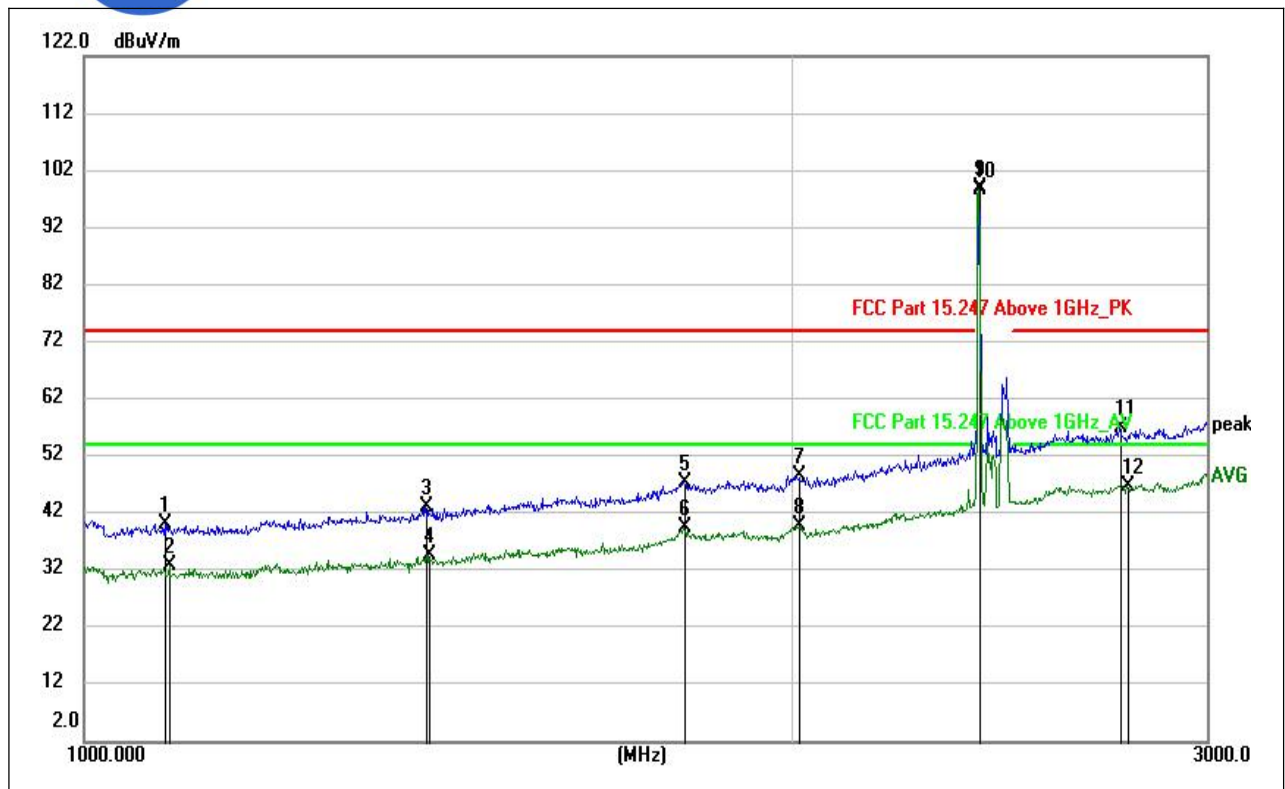
**Note1:** For the frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

**Note2:** For the frequency, which started from 18GHz to 40GHz, was pre-scanned and the result which was 10dB lower than the limit was not recorded.



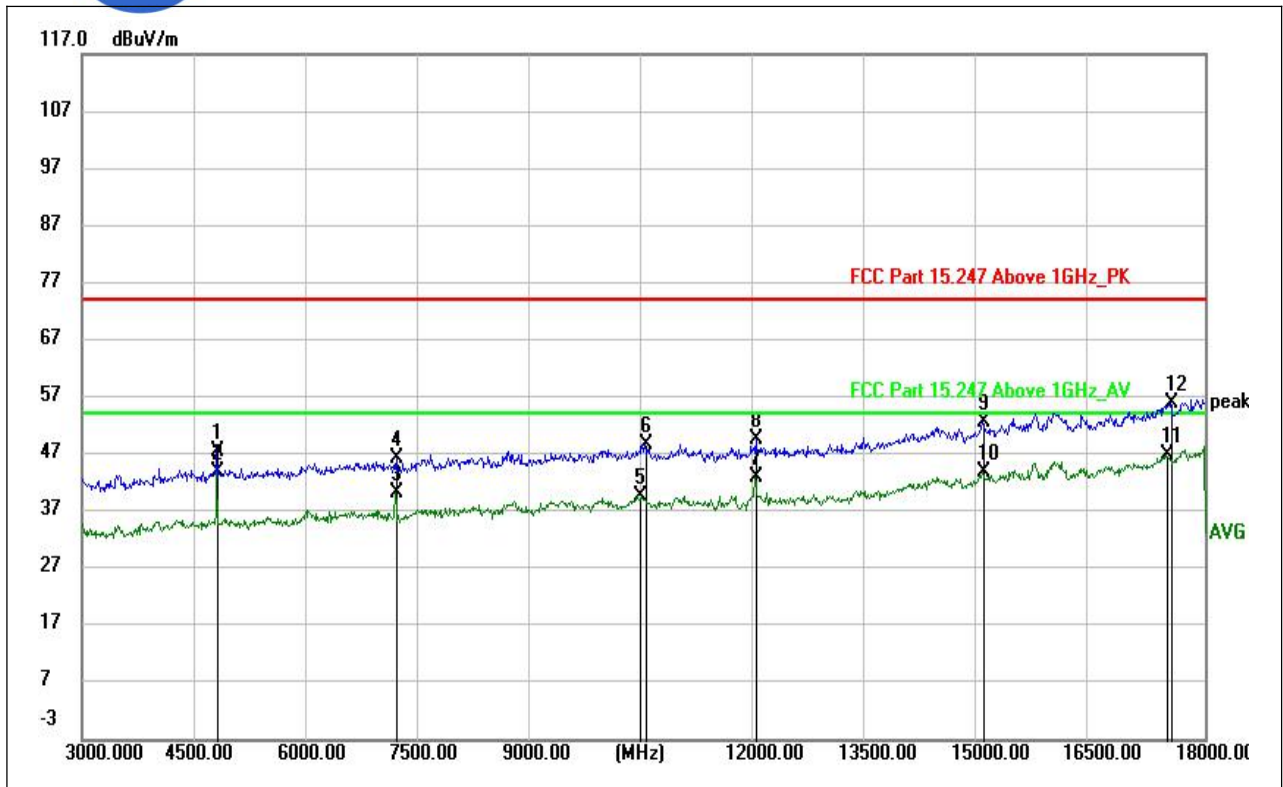
(LE 1M PHY\_2402MHz, Antenna Horizontal, 30MHz to 1GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 36.6953         | 3.23           | 13.43         | 16.66          | 40.00          | -23.34      | peak | H   |
| 50.0040         | 0.21           | 16.20         | 16.41          | 40.00          | -23.59      | peak | H   |
| 137.5407        | 15.72          | 11.39         | 27.11          | 43.50          | -16.39      | peak | H   |
| 220.4625        | 11.91          | 14.71         | 26.62          | 46.00          | -19.38      | peak | H   |
| 280.7613        | 14.54          | 16.62         | 31.16          | 46.00          | -14.84      | peak | H   |
| 992.8373        | 1.62           | 28.59         | 30.21          | 54.00          | -23.79      | peak | H   |



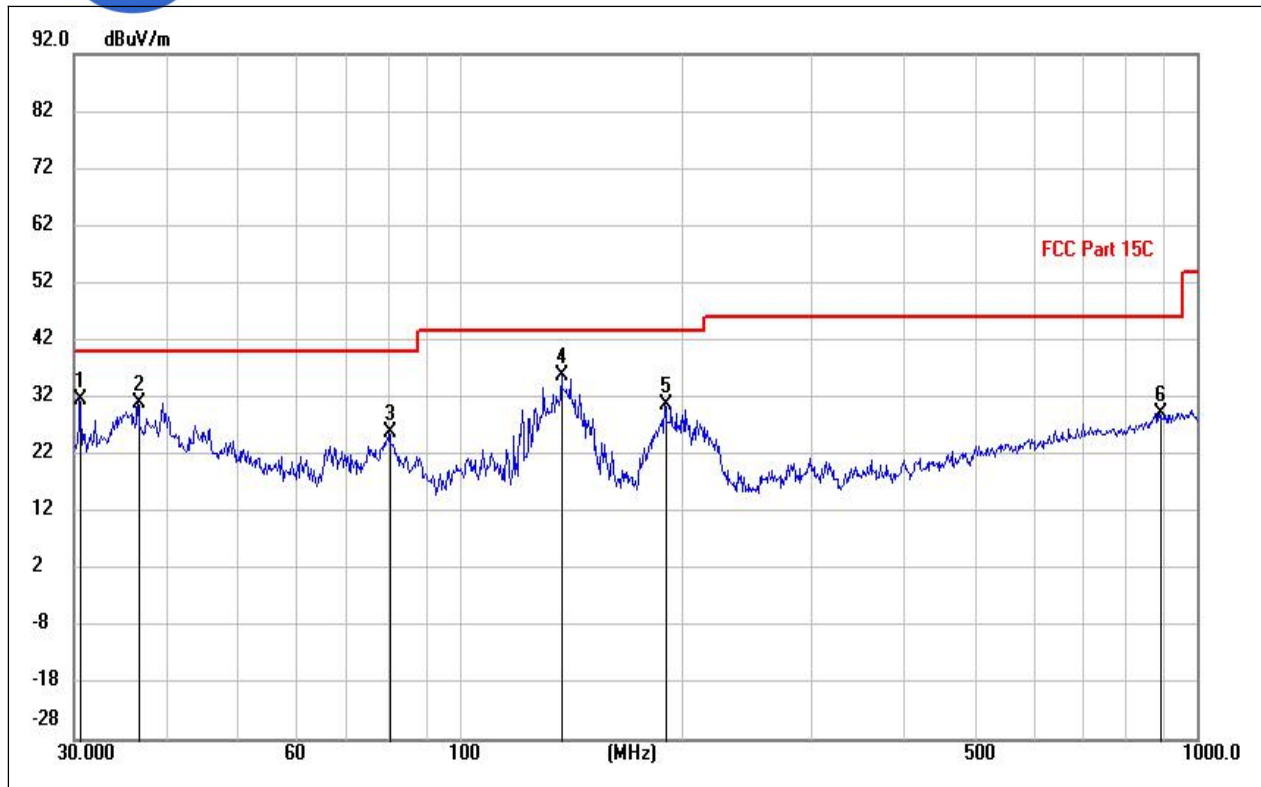
(LE 1M PHY \_2402MHz, Antenna Horizontal, 1GHz to 3GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 1083.264        | 11.21          | 28.89         | 40.10          | 74.00          | -33.90      | peak | H   |
| 1087.975        | 3.92           | 28.98         | 32.90          | 54.00          | -21.10      | AVG  | H   |
| 1397.894        | 11.23          | 31.92         | 43.15          | 74.00          | -30.85      | peak | H   |
| 1402.586        | 2.73           | 31.90         | 34.63          | 54.00          | -19.37      | AVG  | H   |
| 1799.651        | 10.73          | 36.75         | 47.48          | 74.00          | -26.52      | peak | H   |
| 1799.651        | 2.81           | 36.75         | 39.56          | 54.00          | -14.44      | AVG  | H   |
| 2011.172        | 11.56          | 36.99         | 48.55          | 74.00          | -25.45      | peak | H   |
| 2011.172        | 2.86           | 36.99         | 39.85          | 54.00          | -14.15      | AVG  | H   |
| 2402.015        | 57.31          | 41.60         | 98.91          | N/A            | N/A         | peak | H   |
| 2402.015        | 57.07          | 41.60         | 98.67          | N/A            | N/A         | AVG  | H   |
| 2757.112        | 13.39          | 43.75         | 57.14          | 74.00          | -16.86      | peak | H   |
| 2777.329        | 3.70           | 43.07         | 46.77          | 54.00          | -7.23       | AVG  | H   |



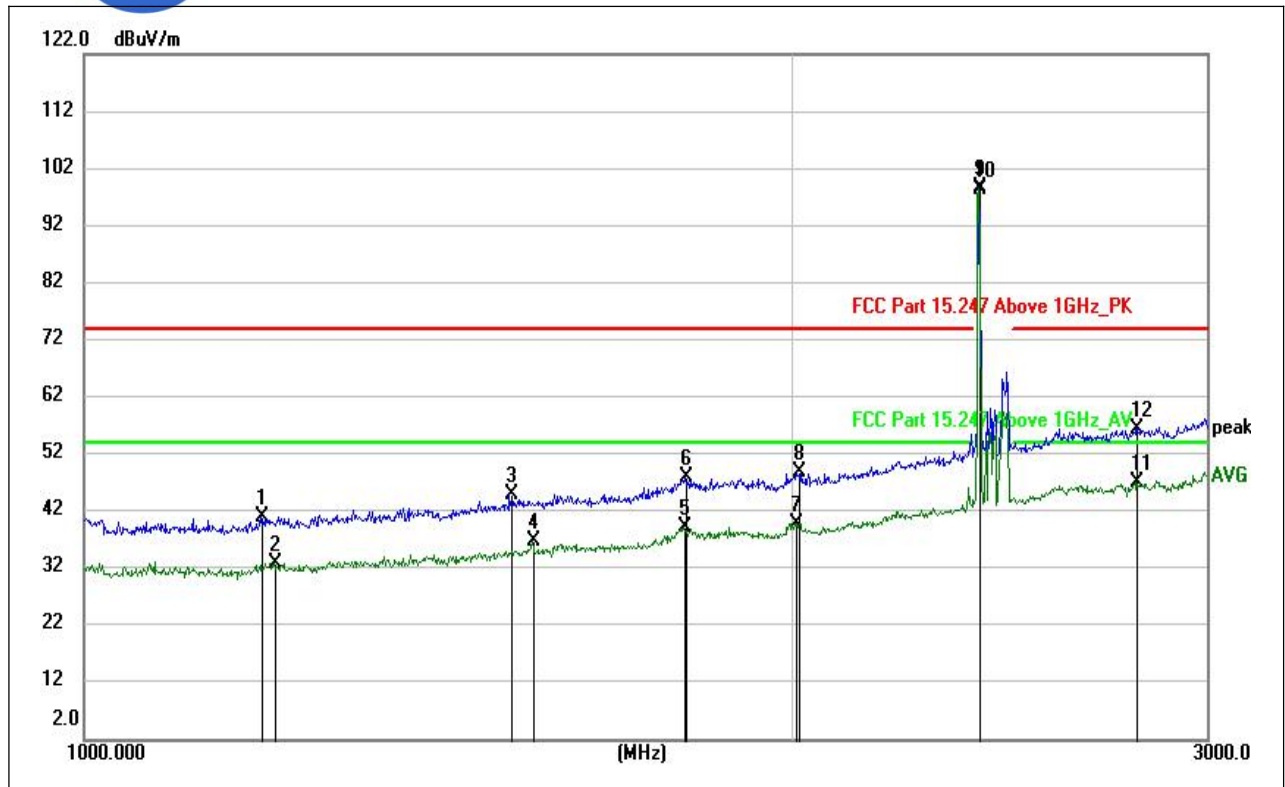
(LE 1M PHY \_2402MHz, Antenna Horizontal, 3GHz to 18GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 4803.750        | 50.72          | -3.34         | 47.38          | 74.00          | -26.62      | peak | H   |
| 4803.750        | 47.16          | -3.34         | 43.82          | 54.00          | -10.18      | AVG  | H   |
| 7206.000        | 40.68          | -0.41         | 40.27          | 54.00          | -13.73      | AVG  | H   |
| 7206.750        | 46.55          | -0.40         | 46.15          | 74.00          | -27.85      | peak | H   |
| 10450.500       | 36.81          | 2.78          | 39.59          | 54.00          | -14.41      | AVG  | H   |
| 10531.500       | 45.92          | 2.68          | 48.60          | 74.00          | -25.40      | peak | H   |
| 12009.000       | 39.17          | 3.91          | 43.08          | 54.00          | -10.92      | AVG  | H   |
| 12011.250       | 45.66          | 3.93          | 49.59          | 74.00          | -24.41      | peak | H   |
| 15043.500       | 42.06          | 10.43         | 52.49          | 74.00          | -21.51      | peak | H   |
| 15043.500       | 33.40          | 10.43         | 43.83          | 54.00          | -10.17      | AVG  | H   |
| 17497.500       | 32.92          | 13.91         | 46.83          | 54.00          | -7.17       | AVG  | H   |
| 17542.500       | 42.24          | 13.60         | 55.84          | 74.00          | -18.16      | peak | H   |



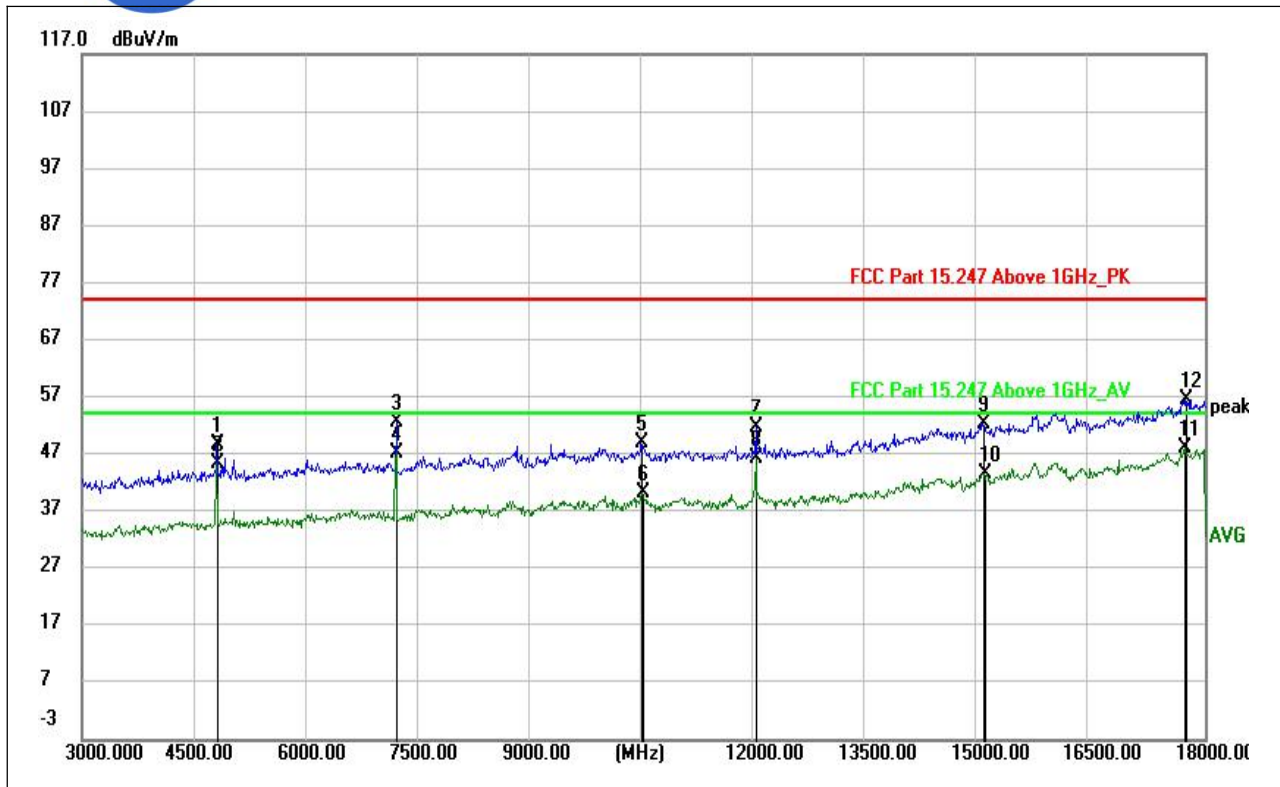
(LE 1M PHY \_2402MHz, Antenna Vertical, 30MHz to 1GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 30.6271         | 18.70          | 12.78         | 31.48          | 40.00          | -8.52       | peak | V   |
| 36.6825         | 17.44          | 13.42         | 30.86          | 40.00          | -9.14       | peak | V   |
| 80.5312         | 15.11          | 10.72         | 25.83          | 40.00          | -14.17      | peak | V   |
| 137.7579        | 24.23          | 11.47         | 35.70          | 43.50          | -7.80       | peak | V   |
| 190.3382        | 17.16          | 13.48         | 30.64          | 43.50          | -12.86      | peak | V   |
| 890.8840        | 6.66           | 22.41         | 29.07          | 46.00          | -16.93      | peak | V   |



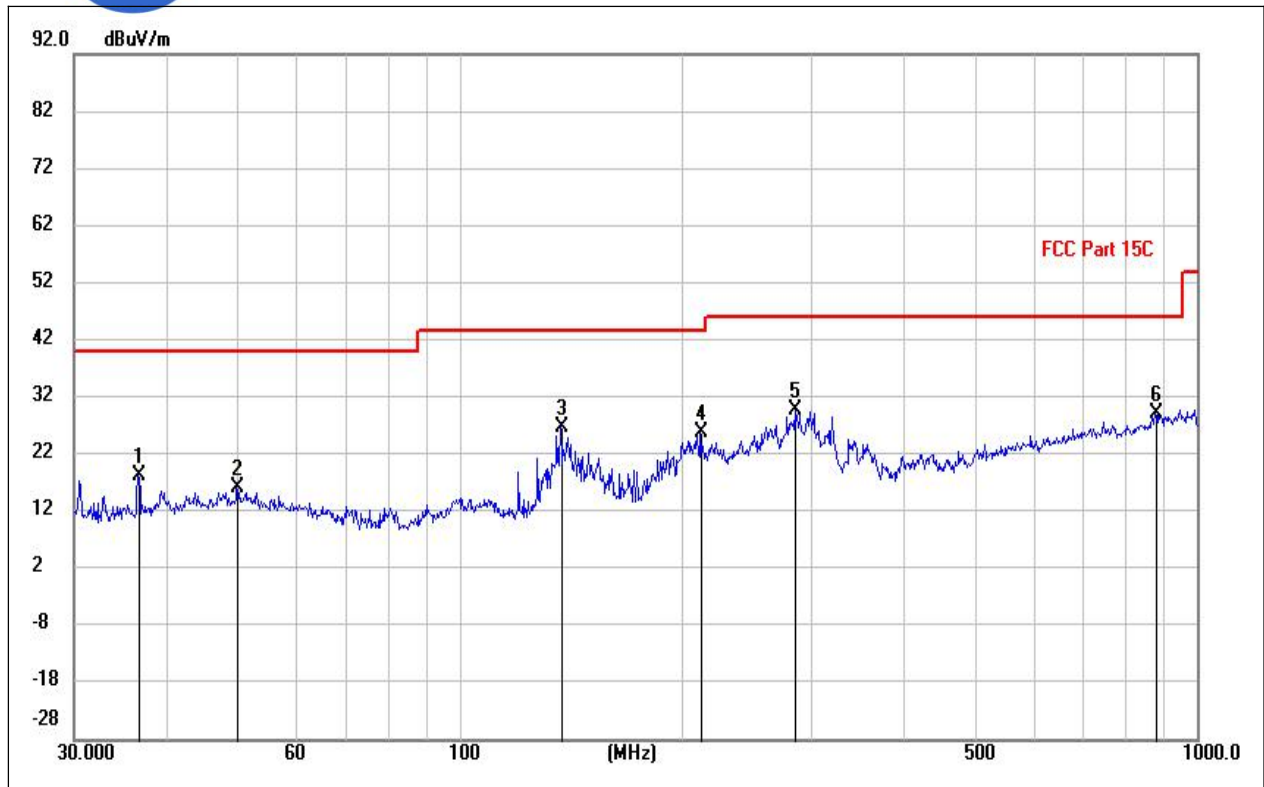
(LE 1M PHY \_2402MHz, Antenna Vertical , 1GHz to 3GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 1190.080        | 10.95          | 30.03         | 40.98          | 74.00          | -33.02      | peak | V   |
| 1205.210        | 2.38           | 30.44         | 32.82          | 54.00          | -21.18      | AVG  | V   |
| 1518.120        | 12.17          | 32.90         | 45.07          | 74.00          | -28.93      | peak | V   |
| 1551.590        | 3.63           | 33.28         | 36.91          | 54.00          | -17.09      | AVG  | V   |
| 1799.552        | 2.59           | 36.75         | 39.34          | 54.00          | -14.66      | AVG  | V   |
| 1800.541        | 11.10          | 36.75         | 47.85          | 74.00          | -26.15      | peak | V   |
| 2006.978        | 2.66           | 37.22         | 39.88          | 54.00          | -14.12      | AVG  | V   |
| 2011.172        | 11.84          | 36.99         | 48.83          | 74.00          | -25.17      | peak | V   |
| 2402.015        | 57.04          | 41.60         | 98.64          | N/A            | N/A         | peak | V   |
| 2402.015        | 56.84          | 41.60         | 98.44          | N/A            | N/A         | AVG  | V   |
| 2801.539        | 2.34           | 44.63         | 46.97          | 54.00          | -7.03       | AVG  | V   |
| 2801.846        | 11.87          | 44.60         | 56.47          | 74.00          | -17.53      | peak | V   |



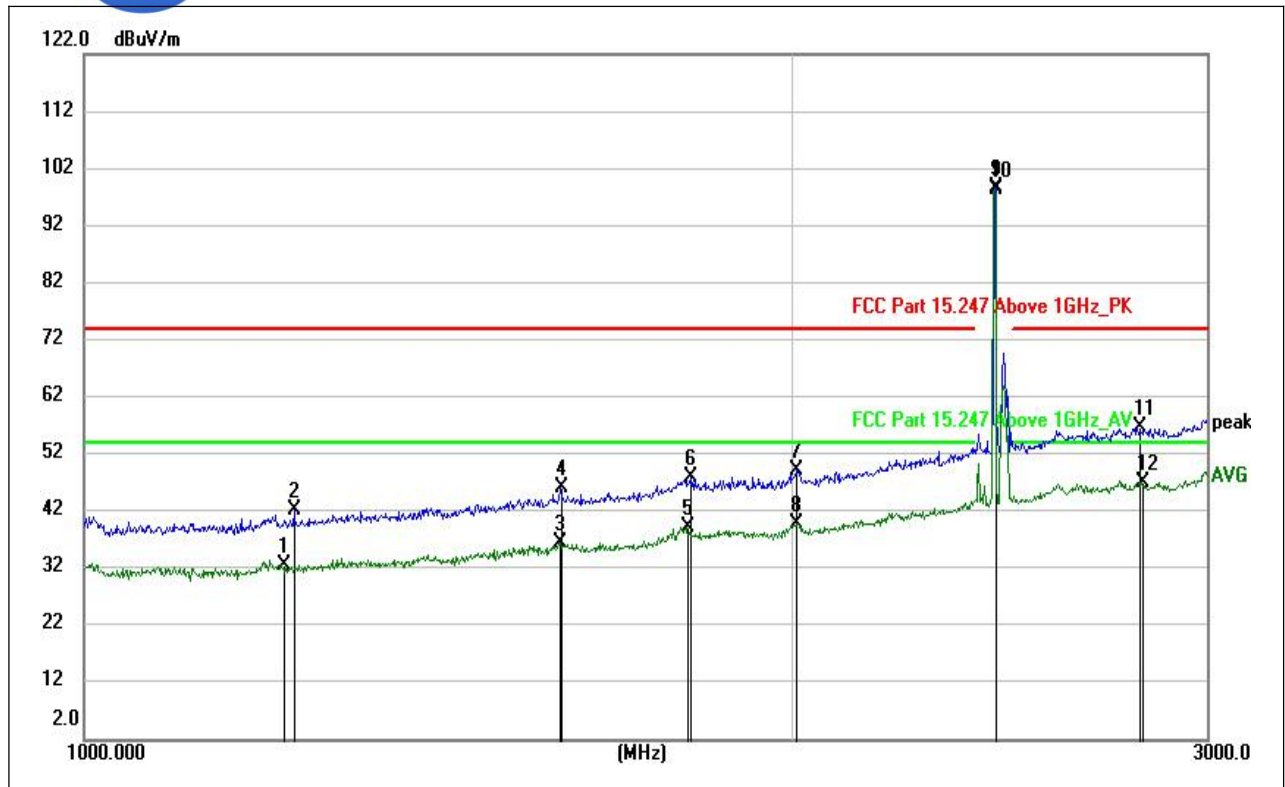
(LE 1M PHY \_2402MHz, Antenna Vertical, 3GHz to 18GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 4803.750        | 52.10          | -3.34         | 48.76          | 74.00          | -25.24      | peak | V   |
| 4803.750        | 48.82          | -3.34         | 45.48          | 54.00          | -8.52       | AVG  | V   |
| 7206.000        | 53.09          | -0.41         | 52.68          | 74.00          | -21.32      | peak | V   |
| 7206.000        | 47.68          | -0.41         | 47.27          | 54.00          | -6.73       | AVG  | V   |
| 10481.250       | 45.68          | 3.36          | 49.04          | 74.00          | -24.96      | peak | V   |
| 10494.750       | 36.86          | 3.43          | 40.29          | 54.00          | -13.71      | AVG  | V   |
| 12009.000       | 47.00          | 4.58          | 51.58          | 74.00          | -22.42      | peak | V   |
| 12009.000       | 41.64          | 4.58          | 46.22          | 54.00          | -7.78       | AVG  | V   |
| 15039.750       | 41.91          | 10.42         | 52.33          | 74.00          | -21.67      | peak | V   |
| 15054.000       | 33.51          | 10.17         | 43.68          | 54.00          | -10.32      | AVG  | V   |
| 17738.250       | 33.06          | 15.10         | 48.16          | 54.00          | -5.84       | AVG  | V   |
| 17755.500       | 41.25          | 15.26         | 56.51          | 74.00          | -17.49      | peak | V   |



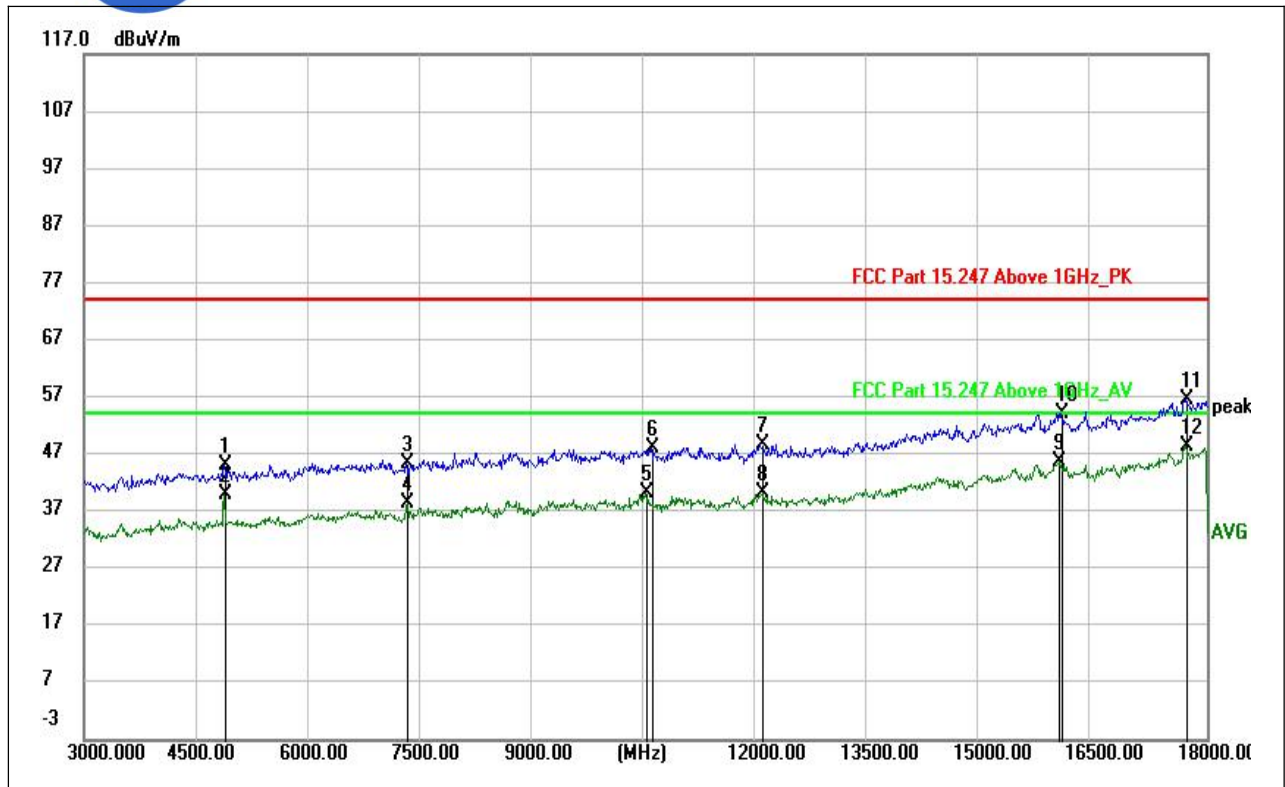
(LE 1M PHY \_2442MHz, Antenna Horizontal, 30MHz to 1GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 36.7597         | 4.91           | 13.46         | 18.37          | 40.00          | -21.63      | peak | H   |
| 49.9777         | 0.07           | 16.19         | 16.26          | 40.00          | -23.74      | peak | H   |
| 137.2276        | 15.57          | 11.26         | 26.83          | 43.50          | -16.67      | peak | H   |
| 212.8285        | 12.45          | 13.43         | 25.88          | 43.50          | -17.62      | peak | H   |
| 285.4268        | 14.09          | 15.66         | 29.75          | 46.00          | -16.25      | peak | H   |
| 879.5543        | 1.40           | 27.68         | 29.08          | 46.00          | -16.92      | peak | H   |



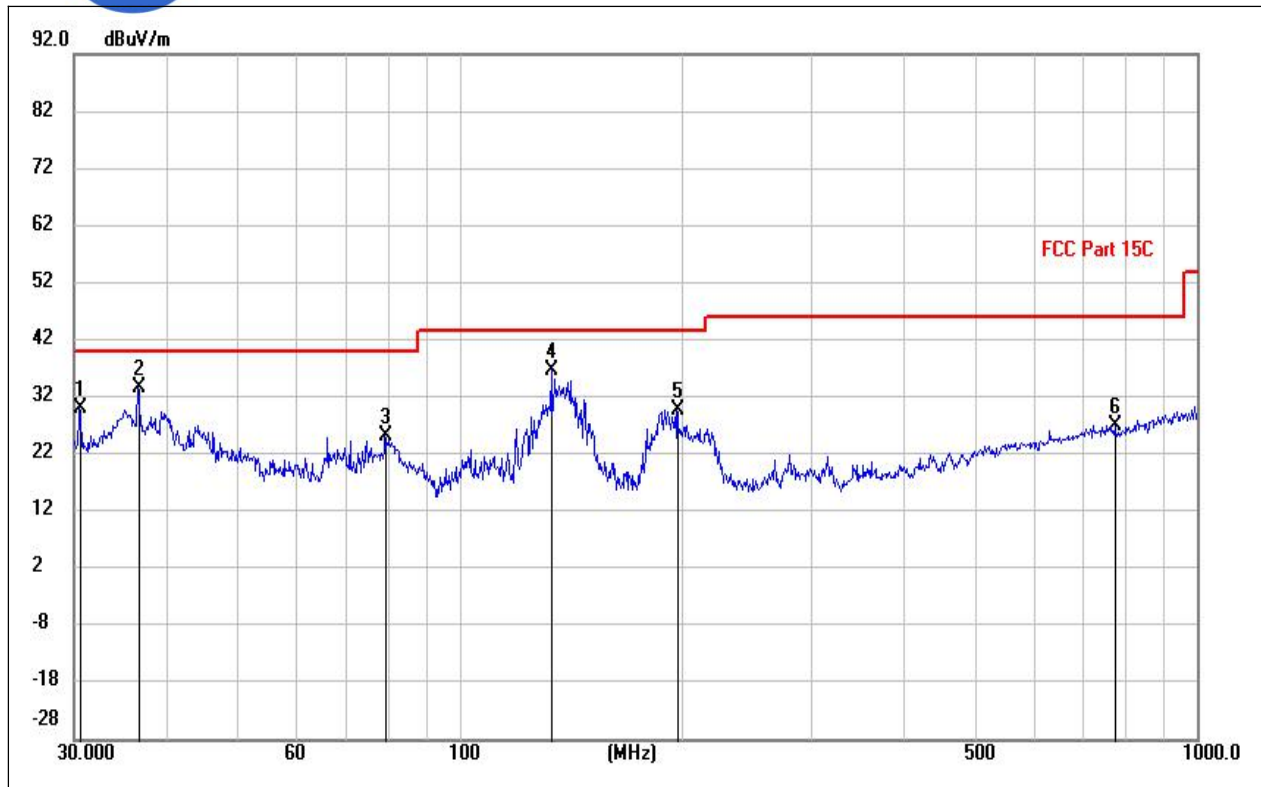
(LE 1M PHY \_2442MHz, Antenna Horizontal, 1GHz to 3GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 1214.782        | 2.68           | 30.03         | 32.71          | 54.00          | -21.29      | AVG  | H   |
| 1228.673        | 12.36          | 29.89         | 42.25          | 74.00          | -31.75      | peak | H   |
| 1592.694        | 2.70           | 33.90         | 36.60          | 54.00          | -17.40      | AVG  | H   |
| 1595.759        | 12.21          | 34.04         | 46.25          | 74.00          | -27.75      | peak | H   |
| 1804.204        | 2.61           | 36.50         | 39.11          | 54.00          | -14.89      | AVG  | H   |
| 1810.956        | 11.81          | 36.04         | 47.85          | 74.00          | -26.15      | peak | H   |
| 2008.632        | 12.20          | 37.13         | 49.33          | 74.00          | -24.67      | peak | H   |
| 2008.632        | 2.69           | 37.13         | 39.82          | 54.00          | -14.18      | AVG  | H   |
| 2442.049        | 57.94          | 40.80         | 98.74          | N/A            | N/A         | peak | H   |
| 2442.049        | 57.46          | 40.80         | 98.26          | N/A            | N/A         | AVG  | H   |
| 2807.238        | 12.65          | 44.12         | 56.77          | 74.00          | -17.23      | peak | H   |
| 2815.268        | 3.76           | 43.43         | 47.19          | 54.00          | -6.81       | AVG  | H   |



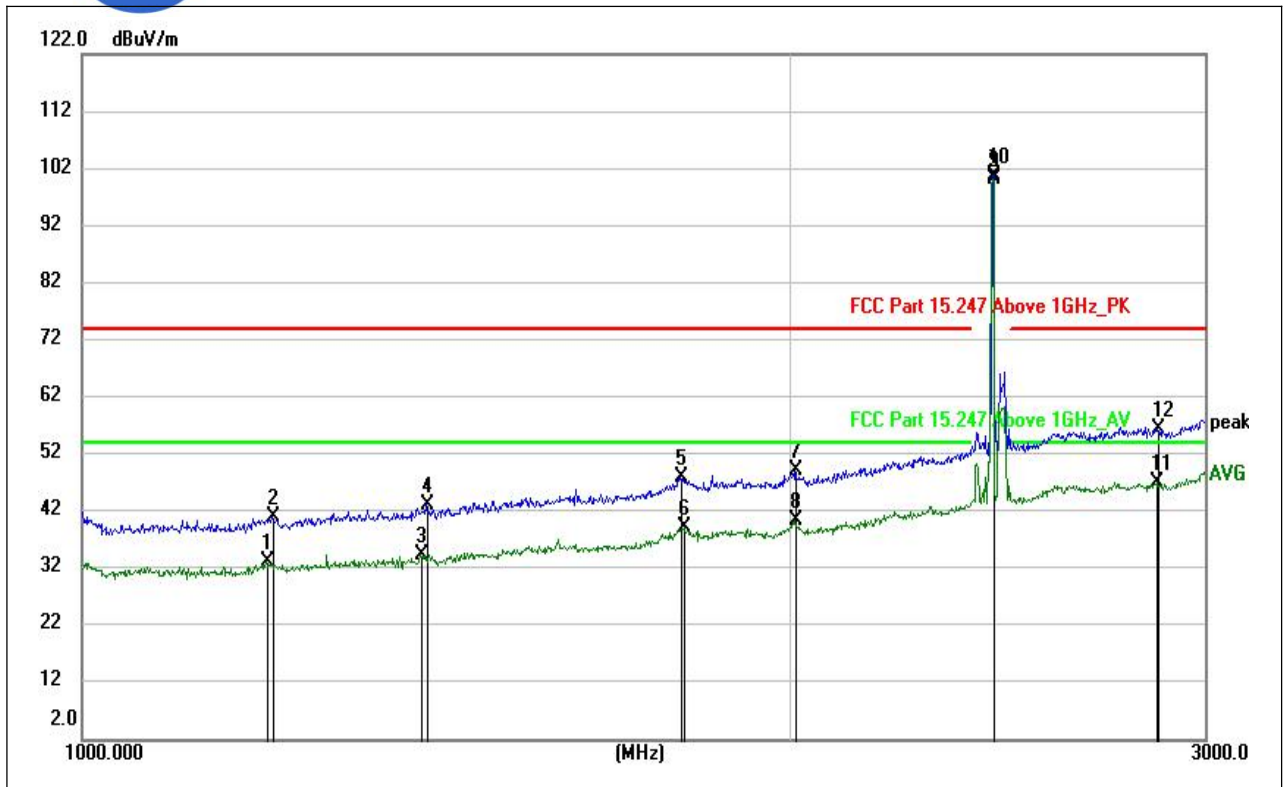
(LE 1M PHY \_2442MHz, Antenna Horizontal, 3GHz to 18GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 4884.500        | 47.84          | -2.82         | 45.02          | 74.00          | -28.98      | peak | H   |
| 4884.500        | 42.91          | -2.82         | 40.09          | 54.00          | -13.91      | AVG  | H   |
| 7326.250        | 45.66          | -0.24         | 45.42          | 74.00          | -28.58      | peak | H   |
| 7326.000        | 38.78          | -0.24         | 38.54          | 54.00          | -15.46      | AVG  | H   |
| 10514.250       | 37.72          | 2.61          | 40.33          | 54.00          | -13.67      | AVG  | H   |
| 10581.750       | 45.30          | 2.76          | 48.06          | 74.00          | -25.94      | peak | H   |
| 12052.500       | 44.37          | 4.38          | 48.75          | 74.00          | -25.25      | peak | H   |
| 12069.000       | 36.17          | 4.23          | 40.40          | 54.00          | -13.60      | AVG  | H   |
| 16028.250       | 33.96          | 11.87         | 45.83          | 54.00          | -8.17       | AVG  | H   |
| 16065.000       | 42.83          | 11.45         | 54.28          | 74.00          | -19.72      | peak | H   |
| 17722.500       | 41.82          | 14.77         | 56.59          | 74.00          | -17.41      | peak | H   |
| 17722.500       | 33.60          | 14.77         | 48.37          | 54.00          | -5.63       | AVG  | H   |



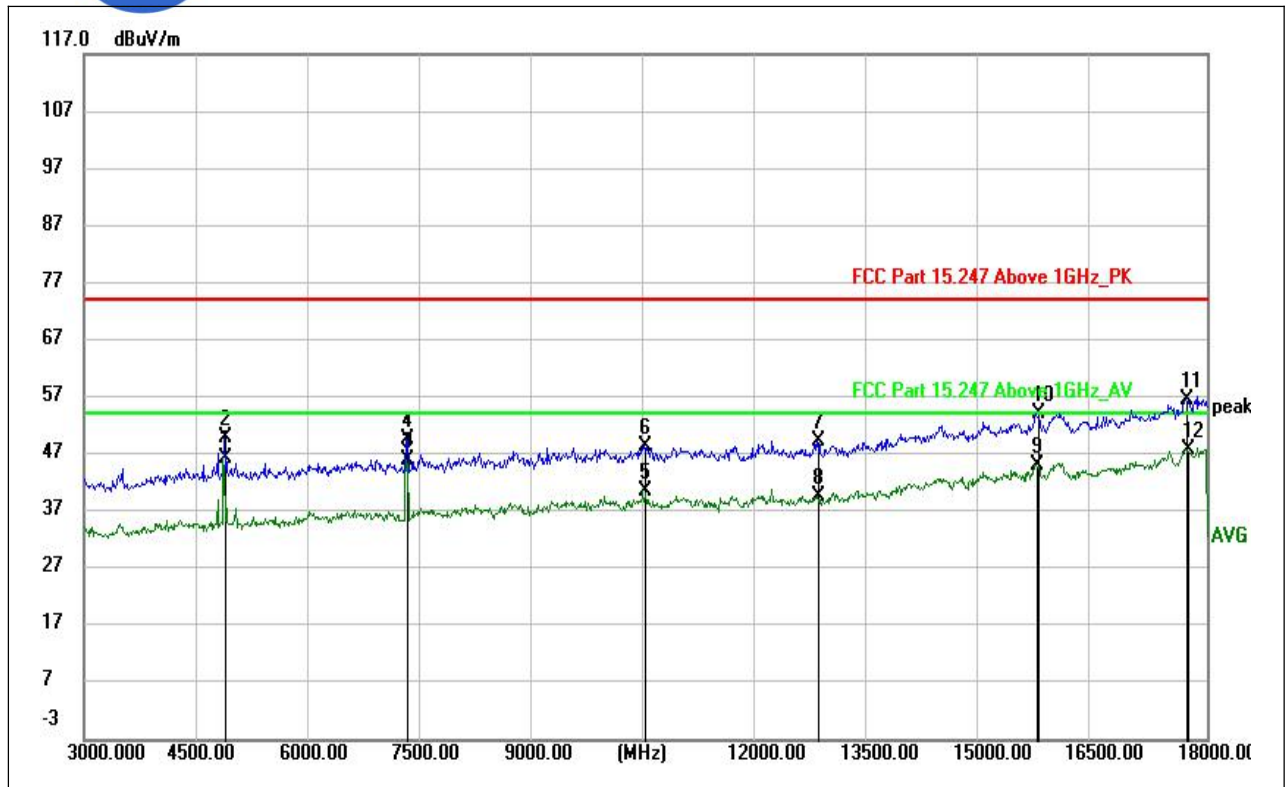
(LE 1M PHY \_2442MHz, Antenna Vertical, 30MHz to 1GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 30.5360         | 17.18          | 12.94         | 30.12          | 40.00          | -9.88       | peak | V   |
| 36.7533         | 20.29          | 13.46         | 33.75          | 40.00          | -6.25       | peak | V   |
| 79.4931         | 14.59          | 10.61         | 25.20          | 40.00          | -14.80      | peak | V   |
| 133.2445        | 25.49          | 11.14         | 36.63          | 43.50          | -6.87       | peak | V   |
| 197.5808        | 15.88          | 13.82         | 29.70          | 43.50          | -13.80      | peak | V   |
| 774.1584        | 1.07           | 26.09         | 27.16          | 46.00          | -18.84      | peak | V   |



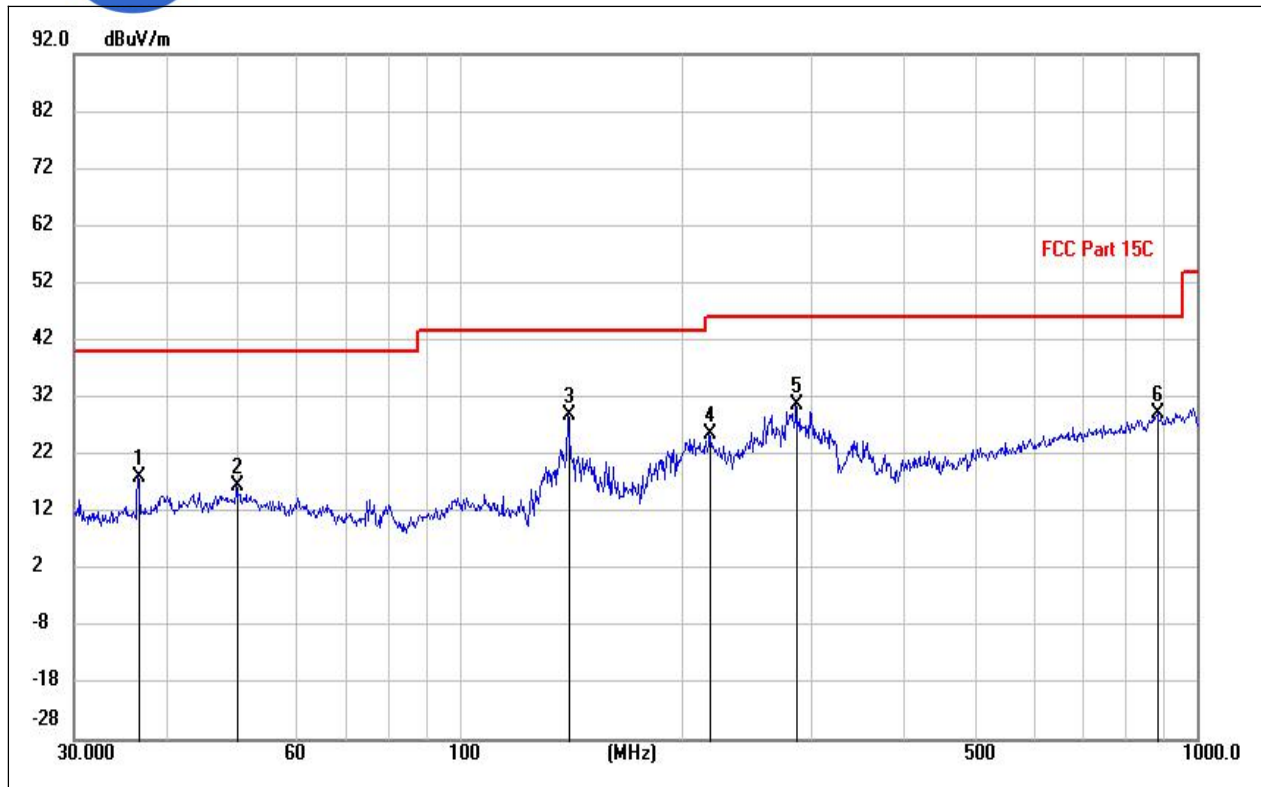
(LE 1M PHY \_2442MHz, Antenna Vertical , 1GHz to 3GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 1199.003        | 2.50           | 30.63         | 33.13          | 54.00          | -20.87      | AVG  | V   |
| 1204.946        | 10.64          | 30.45         | 41.09          | 74.00          | -32.91      | peak | V   |
| 1393.448        | 2.71           | 31.73         | 34.44          | 54.00          | -19.56      | AVG  | V   |
| 1401.431        | 11.17          | 31.95         | 43.12          | 74.00          | -30.88      | peak | V   |
| 1797.971        | 11.46          | 36.63         | 48.09          | 74.00          | -25.91      | peak | V   |
| 1802.322        | 2.46           | 36.63         | 39.09          | 54.00          | -14.91      | AVG  | V   |
| 2009.736        | 12.24          | 37.07         | 49.31          | 74.00          | -24.69      | peak | V   |
| 2009.736        | 3.39           | 37.07         | 40.46          | 54.00          | -13.54      | AVG  | V   |
| 2442.049        | 59.45          | 40.80         | 100.25         | N/A            | N/A         | AVG  | V   |
| 2442.317        | 59.98          | 40.80         | 100.78         | N/A            | N/A         | peak | V   |
| 2862.989        | 2.85           | 44.14         | 46.99          | 54.00          | -7.01       | AVG  | V   |
| 2864.877        | 12.26          | 44.20         | 56.46          | 74.00          | -17.54      | peak | V   |



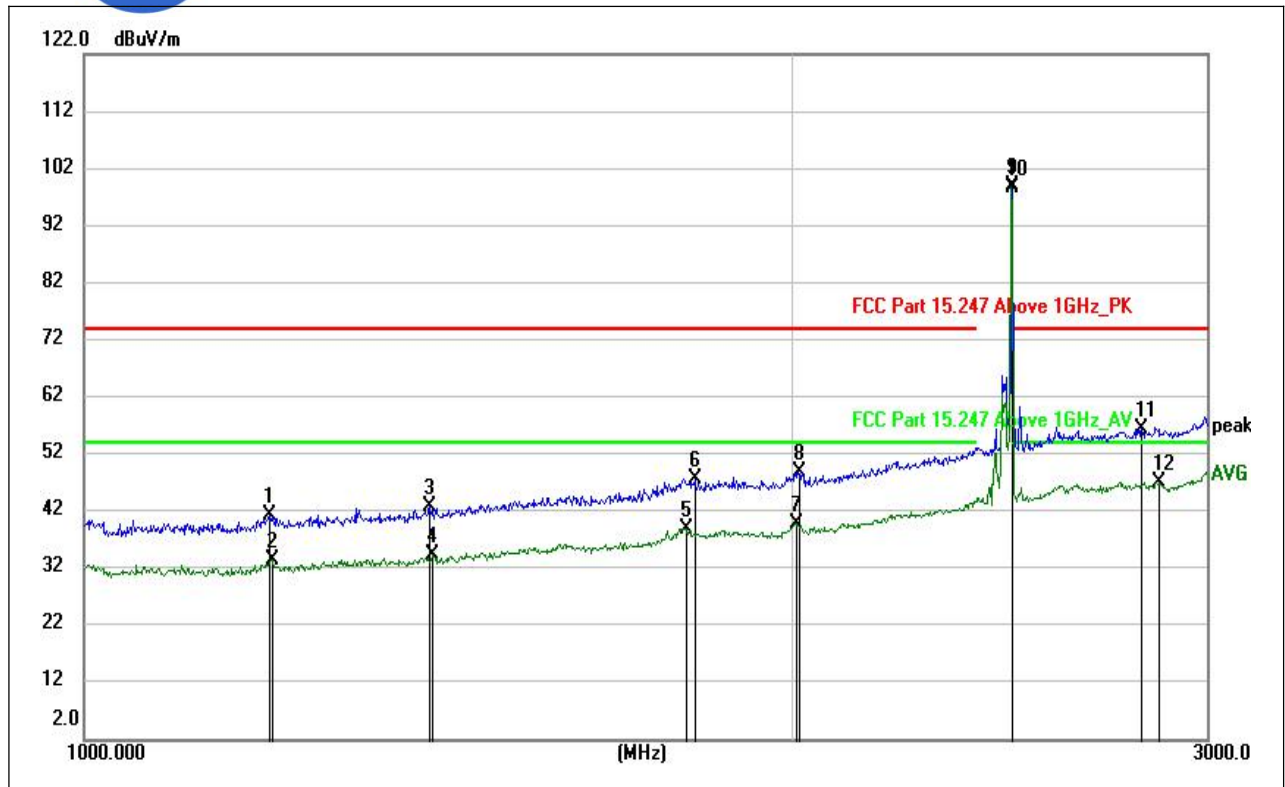
(LE 1M PHY \_2442MHz, Antenna Vertical, 3GHz to 18GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 4884.500        | 49.12          | -2.82         | 46.30          | 54.00          | -7.70       | AVG  | V   |
| 4884.250        | 52.87          | -2.82         | 50.05          | 74.00          | -23.95      | peak | V   |
| 7326.250        | 46.34          | -0.24         | 46.10          | 54.00          | -7.90       | AVG  | V   |
| 7326.000        | 49.94          | -0.24         | 49.70          | 74.00          | -24.30      | peak | V   |
| 10490.250       | 37.17          | 3.40          | 40.57          | 54.00          | -13.43      | AVG  | V   |
| 10495.500       | 44.88          | 3.43          | 48.31          | 74.00          | -25.69      | peak | V   |
| 12804.000       | 44.32          | 4.91          | 49.23          | 74.00          | -24.77      | peak | V   |
| 12804.000       | 34.71          | 4.91          | 39.62          | 54.00          | -14.38      | AVG  | V   |
| 15732.000       | 33.85          | 11.33         | 45.18          | 54.00          | -8.82       | AVG  | V   |
| 15741.750       | 43.13          | 11.12         | 54.25          | 74.00          | -19.75      | peak | V   |
| 17733.000       | 41.43          | 14.99         | 56.42          | 74.00          | -17.58      | peak | V   |
| 17754.750       | 32.62          | 15.27         | 47.89          | 54.00          | -6.11       | AVG  | V   |



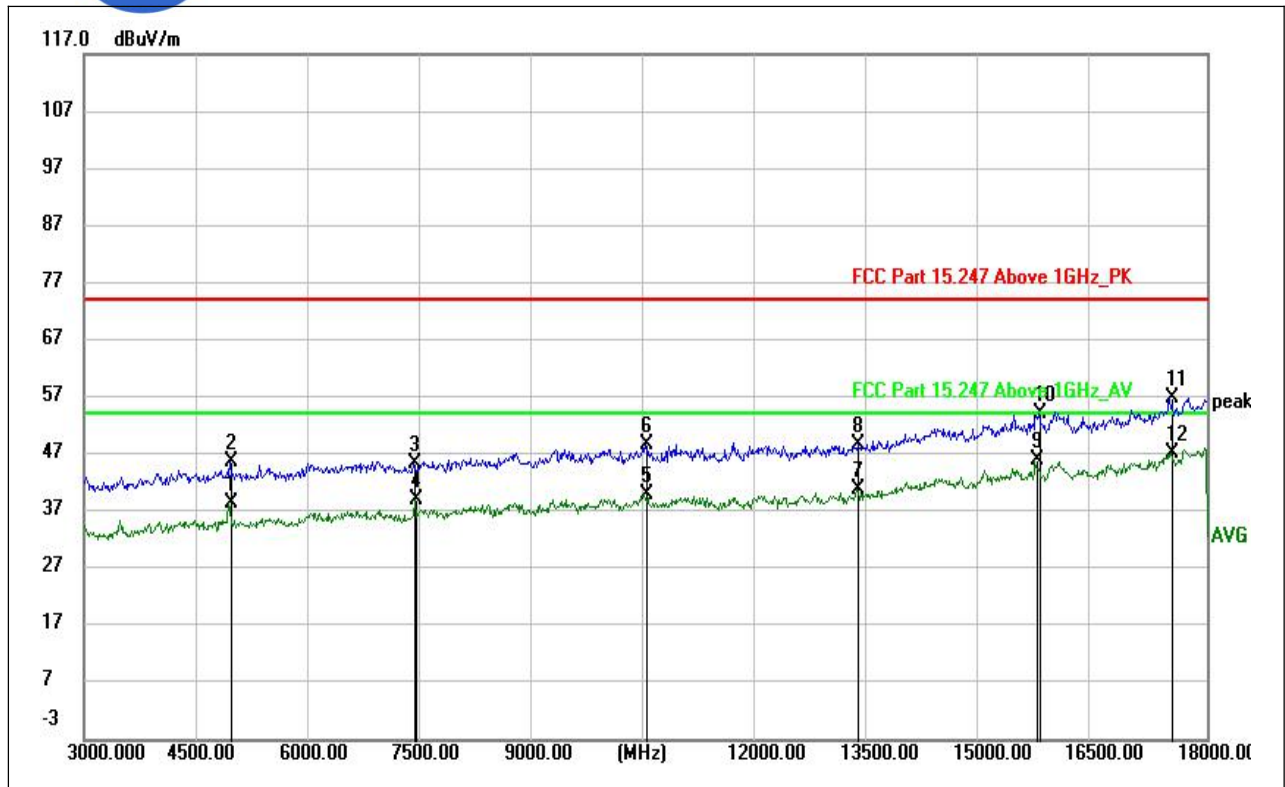
(LE 1M PHY \_2480MHz, Antenna Horizontal, 30MHz to 1GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 36.7146         | 4.50           | 13.44         | 17.94          | 40.00          | -22.06      | peak | H   |
| 49.9865         | 0.17           | 16.19         | 16.36          | 40.00          | -23.64      | peak | H   |
| 140.6130        | 16.93          | 11.87         | 28.80          | 43.50          | -14.70      | peak | H   |
| 218.6916        | 11.15          | 14.35         | 25.50          | 46.00          | -20.50      | peak | H   |
| 286.5298        | 14.95          | 15.67         | 30.62          | 46.00          | -15.38      | peak | H   |
| 885.4338        | 1.26           | 27.75         | 29.01          | 46.00          | -16.99      | peak | H   |



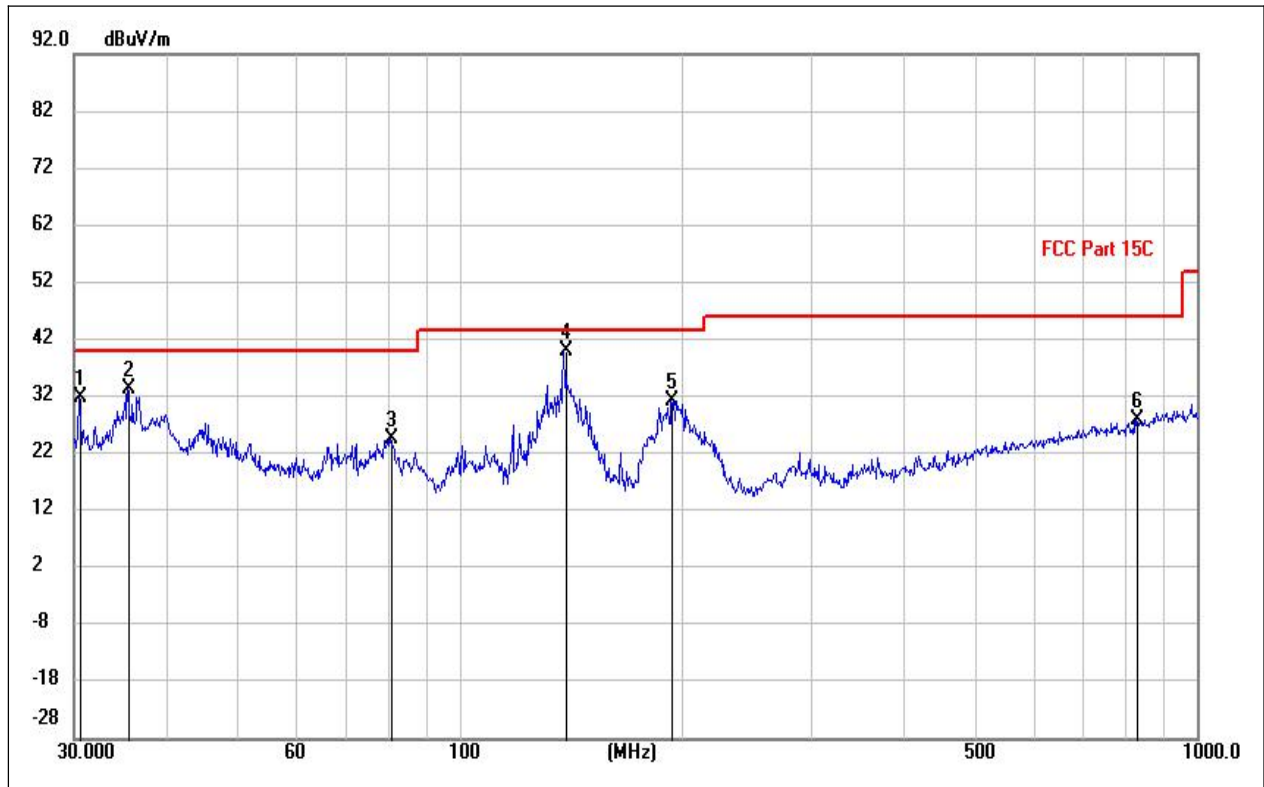
(LE 1M PHY \_2480MHz, Antenna Horizontal, 1GHz to 3GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 1198.740        | 10.62          | 30.61         | 41.23          | 74.00          | -32.77      | peak | H   |
| 1201.377        | 2.88           | 30.63         | 33.51          | 54.00          | -20.49      | AVG  | H   |
| 1402.663        | 10.95          | 31.90         | 42.85          | 74.00          | -31.15      | peak | H   |
| 1405.748        | 2.61           | 31.79         | 34.40          | 54.00          | -19.60      | AVG  | H   |
| 1799.948        | 2.27           | 36.78         | 39.05          | 54.00          | -14.95      | AVG  | H   |
| 1817.833        | 12.08          | 35.55         | 47.63          | 74.00          | -26.37      | peak | H   |
| 2004.554        | 2.52           | 37.35         | 39.87          | 54.00          | -14.13      | AVG  | H   |
| 2011.945        | 11.88          | 36.95         | 48.83          | 74.00          | -25.17      | peak | H   |
| 2478.005        | 57.21          | 41.77         | 98.98          | N/A            | N/A         | peak | H   |
| 2478.005        | 56.82          | 41.77         | 98.59          | N/A            | N/A         | AVG  | H   |
| 2814.804        | 13.06          | 43.46         | 56.52          | 74.00          | -17.48      | peak | H   |
| 2861.574        | 3.04           | 44.09         | 47.13          | 54.00          | -6.87       | AVG  | H   |



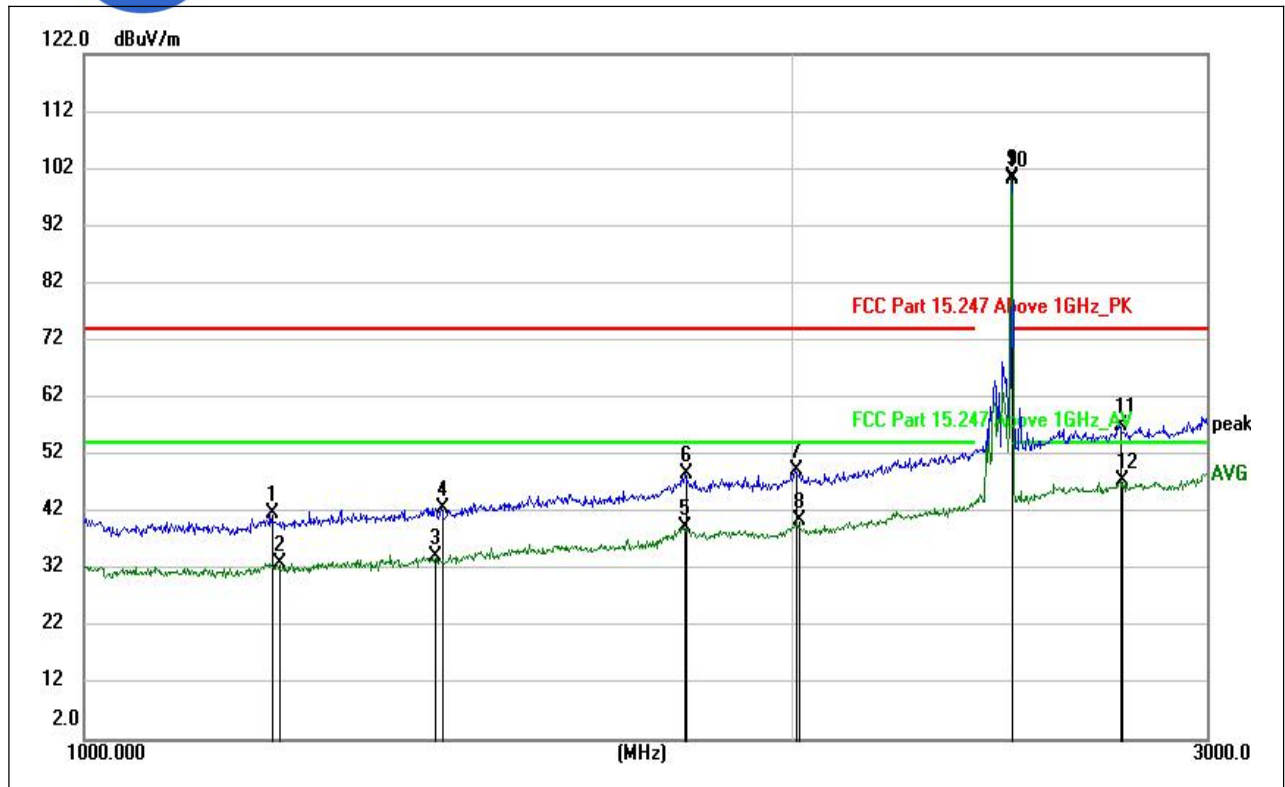
(LE 1M PHY \_2480MHz, Antenna Horizontal, 3GHz to 18GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 4959.750        | 41.47          | -3.06         | 38.41          | 54.00          | -15.59      | AVG  | H   |
| 4960.500        | 48.69          | -3.07         | 45.62          | 74.00          | -28.38      | peak | H   |
| 7416.000        | 45.86          | -0.50         | 45.36          | 74.00          | -28.64      | peak | H   |
| 7439.250        | 39.32          | -0.32         | 39.00          | 54.00          | -15.00      | AVG  | H   |
| 10509.750       | 37.33          | 2.58          | 39.91          | 54.00          | -14.09      | AVG  | H   |
| 10514.250       | 46.20          | 2.61          | 48.81          | 74.00          | -25.19      | peak | H   |
| 13330.500       | 34.58          | 6.18          | 40.76          | 54.00          | -13.24      | AVG  | H   |
| 13346.250       | 42.46          | 6.38          | 48.84          | 74.00          | -25.16      | peak | H   |
| 15723.750       | 34.72          | 11.20         | 45.92          | 54.00          | -8.08       | AVG  | H   |
| 15755.250       | 43.26          | 10.82         | 54.08          | 74.00          | -19.92      | peak | H   |
| 17525.250       | 42.86          | 13.88         | 56.74          | 74.00          | -17.26      | peak | H   |
| 17532.750       | 33.51          | 13.75         | 47.26          | 54.00          | -6.74       | AVG  | H   |



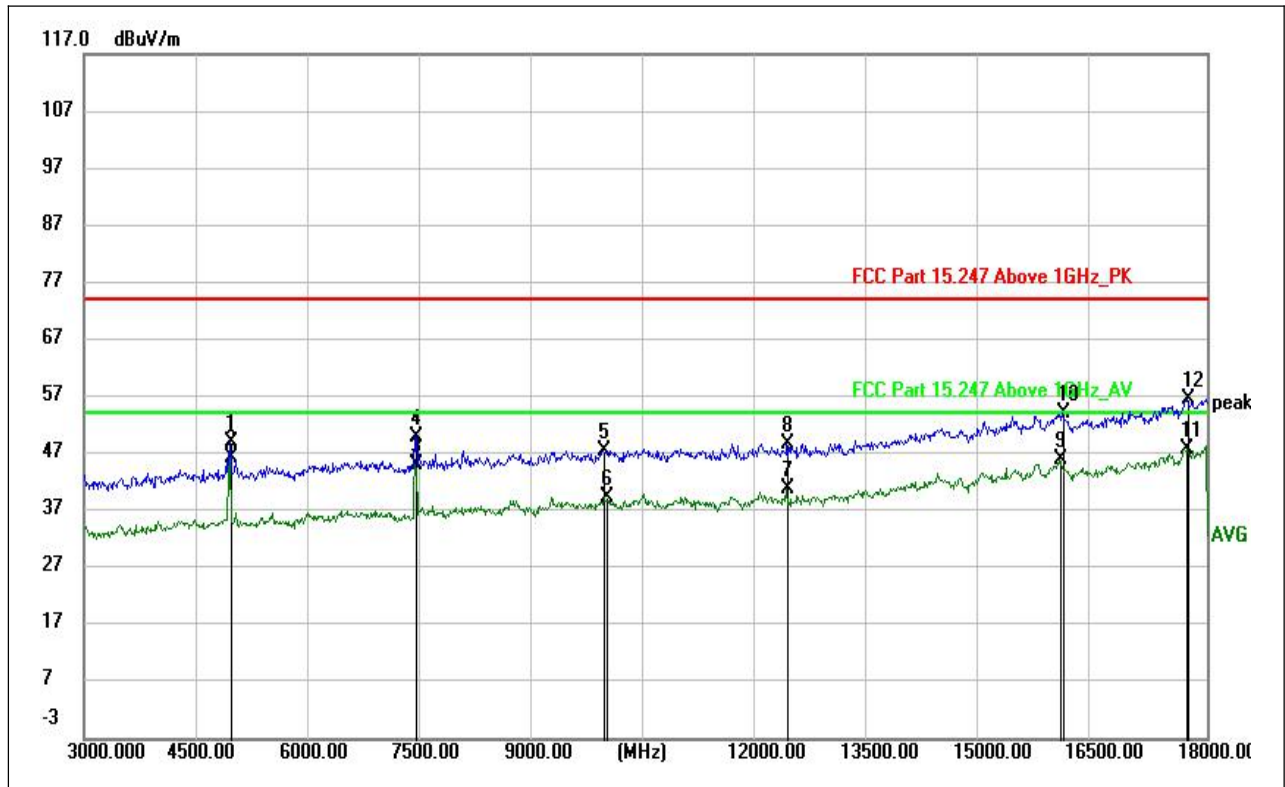
(LE 1M PHY \_2480MHz, Antenna Vertical, 30MHz to 1GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 30.5467         | 18.97          | 12.92         | 31.89          | 40.00          | -8.11       | peak | V   |
| 35.5491         | 20.61          | 12.89         | 33.50          | 40.00          | -6.50       | peak | V   |
| 80.7432         | 14.14          | 10.60         | 24.74          | 40.00          | -15.26      | peak | V   |
| 138.8735        | 28.19          | 11.69         | 39.88          | 43.50          | -3.62       | peak | V   |
| 194.0788        | 17.97          | 13.31         | 31.28          | 43.50          | -12.22      | peak | V   |
| 828.8002        | 1.46           | 26.48         | 27.94          | 46.00          | -18.06      | peak | V   |



(LE 1M PHY \_2480MHz, Antenna Vertical , 1GHz to 3GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 1201.905        | 11.18          | 30.60         | 41.78          | 74.00          | -32.22      | peak | V   |
| 1209.854        | 2.56           | 30.24         | 32.80          | 54.00          | -21.20      | AVG  | V   |
| 1409.382        | 2.52           | 31.65         | 34.17          | 54.00          | -19.83      | AVG  | V   |
| 1419.483        | 11.28          | 31.31         | 42.59          | 74.00          | -31.41      | peak | V   |
| 1799.651        | 2.57           | 36.75         | 39.32          | 54.00          | -14.68      | AVG  | V   |
| 1800.343        | 11.71          | 36.76         | 48.47          | 74.00          | -25.53      | peak | V   |
| 2007.088        | 12.10          | 37.21         | 49.31          | 74.00          | -24.69      | peak | V   |
| 2011.724        | 3.46           | 36.96         | 40.42          | 54.00          | -13.58      | AVG  | V   |
| 2480.184        | 58.82          | 41.76         | 100.58         | N/A            | N/A         | peak | V   |
| 2480.184        | 58.41          | 41.76         | 100.17         | N/A            | N/A         | AVG  | V   |
| 2755.901        | 13.19          | 43.80         | 56.99          | 74.00          | -17.01      | peak | V   |
| 2759.992        | 3.72           | 43.65         | 47.37          | 54.00          | -6.63       | AVG  | V   |



(LE 1M PHY \_2480MHz, Antenna Vertical, 3GHz to 18GHz)

| Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Pol |
|-----------------|----------------|---------------|----------------|----------------|-------------|------|-----|
| 4959.750        | 51.97          | -2.88         | 49.09          | 74.00          | -24.91      | peak | V   |
| 4959.750        | 49.07          | -2.88         | 46.19          | 54.00          | -7.81       | AVG  | V   |
| 7439.250        | 45.55          | -0.36         | 45.19          | 54.00          | -8.81       | AVG  | V   |
| 7440.000        | 50.41          | -0.35         | 50.06          | 74.00          | -23.94      | peak | V   |
| 9941.250        | 45.04          | 2.57          | 47.61          | 74.00          | -26.39      | peak | V   |
| 9980.250        | 36.73          | 2.60          | 39.33          | 54.00          | -14.67      | AVG  | V   |
| 12399.000       | 36.52          | 4.35          | 40.87          | 54.00          | -13.13      | AVG  | V   |
| 12401.250       | 44.32          | 4.34          | 48.66          | 74.00          | -25.34      | peak | V   |
| 16041.750       | 34.35          | 11.64         | 45.99          | 54.00          | -8.01       | AVG  | V   |
| 16077.750       | 42.82          | 11.25         | 54.07          | 74.00          | -19.93      | peak | V   |
| 17724.750       | 32.94          | 14.81         | 47.75          | 54.00          | -6.25       | AVG  | V   |
| 17754.750       | 41.38          | 15.27         | 56.65          | 74.00          | -17.35      | peak | V   |



## Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

| Test items                   | Uncertainty          |
|------------------------------|----------------------|
| Peak Output Power            | $\pm 2.22\text{dB}$  |
| Power spectral density (PSD) | $\pm 2.22\text{dB}$  |
| Bandwidth                    | $\pm 5\%$            |
| Conducted Spurious Emission  | $\pm 2.77\text{ dB}$ |
| Restricted Frequency Bands   | $\pm 5\%$            |
| Radiated Emission            | $\pm 3.1\text{dB}$   |
| Conducted Emission           | $\pm 1.8\text{dB}$   |

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



## Annex B Testing Laboratory Information

### 1. Identification of the Responsible Testing Laboratory

|                            |                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------|
| <b>Laboratory Name:</b>    | Kehu-Morlab Test Laboratory                                                              |
| <b>Laboratory Address:</b> | Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian) P.R. China |
| <b>Telephone:</b>          | +86 592 5612050                                                                          |
| <b>Facsimile:</b>          | +86 592 5612095                                                                          |

### 2. Identification of the Responsible Testing Location

|                 |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| <b>Name:</b>    | Kehu-Morlab Test Laboratory                                                              |
| <b>Address:</b> | Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian) P.R. China |

### 3. Accreditation Certificate

|                                       |                                                                          |
|---------------------------------------|--------------------------------------------------------------------------|
| <b>Accredited Testing Laboratory:</b> | The FCC designation number is CN1249.<br>( Kehu-Morlab Test Laboratory ) |
|---------------------------------------|--------------------------------------------------------------------------|

### 4. Test Equipments Utilized

#### 4.1 Conducted Test Equipments

| No.                                 | Equipment Name              | Serial No. | Model No. | Manufacturer | Cal.Due Date |
|-------------------------------------|-----------------------------|------------|-----------|--------------|--------------|
| 1                                   | MXA Signal Analyzer         | MY57150136 | N9030A    | Keysight     | 2021. 03.08  |
| 2                                   | RF cable<br>(30MHz-26.5GHz) | RF01       | N/A       | Morlab       | 2021.03.06   |
| 3                                   | Coaxial cable               | RF02       | N/A       | Morlab       | 2021.03.06   |
| 4                                   | SMA connector               | RF03       | N/A       | Xingbo       | N/A          |
| <b>Software Version: MW 2.0.0.0</b> |                             |            |           |              |              |

**4.2 Conducted Emission Test Equipments**

| No. | Equipment Name | Serial No. | Type   | Manufacturer | Cal.Due Date |
|-----|----------------|------------|--------|--------------|--------------|
| 1   | EMI Receiver   | 102174     | ESR3   | R&S          | 2021.03.15   |
| 2   | LISN           | 101338     | ENV432 | R&S          | 2021.03.09   |

**4.3 Auxiliary Test Equipment**

| No. | Equipment Name | Model No. | Brand Name | Manufacturer | Cal.Due Date |
|-----|----------------|-----------|------------|--------------|--------------|
| 1   | Computer       | E75       | Think Pad  | Lenovo       | N/A          |

**4.4 List of Software Used**

| Description | Manufacturer | Software Version |
|-------------|--------------|------------------|
| Test system | CAICT        | Eagle 2.0        |
| EMC32       | R&S          | V10.00.00        |

**4.5 Radiated Test Equipments**

| No. | Equipment Name                            | Serial No.        | Type                  | Manufacturer | Cal.Due Date |
|-----|-------------------------------------------|-------------------|-----------------------|--------------|--------------|
| 1   | Anechoic Chamber                          | N/A               | 9m*6m*6m              | ETS-Lindgren | 2022.07.20   |
| 2   | Receiver                                  | 101799            | ESR7                  | R&S          | 2021.03.15   |
| 3   | Signal Analyzer                           | 101294            | FSV40                 | R&S          | 2021.06.04   |
| 4   | Active Ring Antenna                       | FMZB 1513<br>#269 | FMZB 1513             | Schwarzbeck  | 2022.01.18   |
| 5   | Linear Log Periodic<br>Broad Band Antenna | 949               | VULB 9163             | Schwarzbeck  | 2021.09.24   |
| 6   | Ultra-Wideband Horn<br>Antenna            | 102615            | HF907                 | R&S          | 2022.01.18   |
| 7   | Steatite Antennas                         | 17868             | QSH-SL-18<br>-26-S-20 | Seibersdorf  | 2021.03.23   |
| 8   | Ultra-Wideband Horn<br>Antenna            | 17989             | QSH-26-40             | Schwarzbeck  | 2021.03.23   |
| 9   | RF Switch and Control<br>Platform         | N/A               | RSC                   | CDSI         | N/A          |
| 10  | Coaxial cable<br>(N male)<br>(9kHz -3GHz) | EMC02             | N/A                   | Morlab       | 2021.03.23   |
| 11  | Coaxial cable<br>(N male)                 | EMC03             | N/A                   | Morlab       | 2021.03.23   |



|    |                                             |             |                    |        |            |
|----|---------------------------------------------|-------------|--------------------|--------|------------|
|    | (9kHz -3GHz)                                |             |                    |        |            |
| 12 | Coaxial cable<br>(N male)<br>(1GHz-26.5GHz) | EMC04       | N/A                | Morlab | 2021.03.23 |
| 13 | Coaxial cable<br>(N male)<br>(1GHz-26.5GHz) | EMC05       | N/A                | Morlab | 2021.03.23 |
| 14 | Pre-amplifier<br>(1GHz-18GHz)               | 8810011     | PAP-1G18           | CDSI   | 2021.03.23 |
| 15 | Pre-amplifier<br>(18GHz-40GHz)              | 17021-17024 | PAP-1840           | CDSI   | 2021.03.23 |
| 16 | High Pass Filter                            | EMC21       | HFP-1.0/18<br>G-60 | CDSI   | 2021.03.23 |
| 17 | High Pass Filter                            | EMC22       | HFP-3.0/18<br>G-60 | CDSI   | 2021.03.23 |

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