

## 6.5 Duty Cycle

### Limit

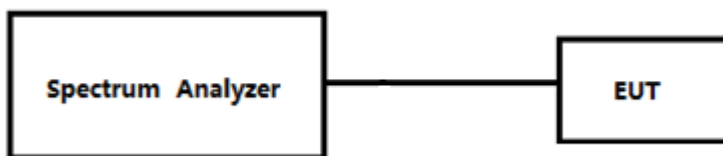
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle,  $x$ , and maximum-power transmission duration,  $T$ , are required for each tested mode of operation.

a)  $T$  refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

b) Duty cycle ( $x$ ), as used in this document, refers to the fraction of time over which the transmitter is on and is transmitting at its maximum power control level.

c) The term “maximum power control level” is intended to distinguish between operating power levels of the EUT and differences in power levels of individual symbols that occur with some modulation types such as quadrature amplitude modulation (QAM). During testing, the EUT is not required to transmit continuously its highest possible *symbol* power level. Rather, it shall transmit all of the symbols and shall do so at the highest power control level (i.e., highest operating power level) of the EUT.

### Test Configuration



### Test Method

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

a) A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on and off times of the transmitted signal.

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b) The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set  $RBW \geq EBW$  if possible; otherwise, set  $RBW$  to the largest available value. Set  $VBW \geq RBW$ . Set detector = peak or average. The zero-span measurement method shall not be used unless both  $RBW$  and  $VBW$  are  $> 50/T$ , where  $T$  is defined in II.B.1.a), and the number of sweep points across duration  $T$  exceeds 100. (For example, if  $VBW$  and/or  $RBW$  are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T \leq 16.7$  microseconds.)

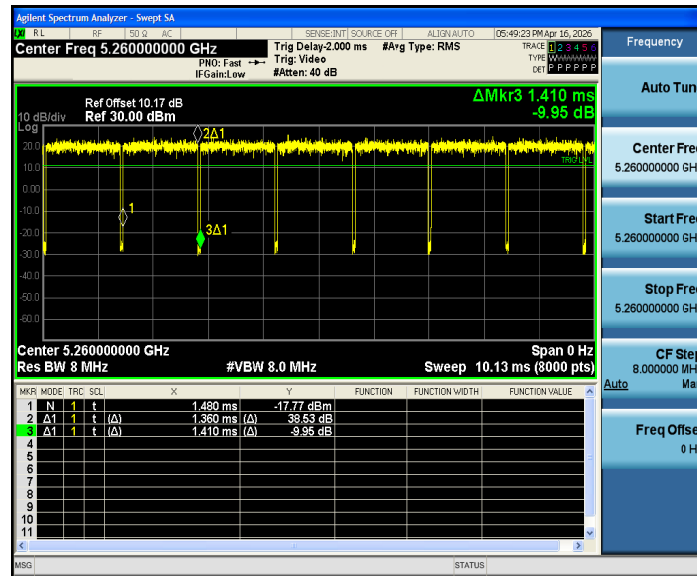
### Test Results

**PASS**

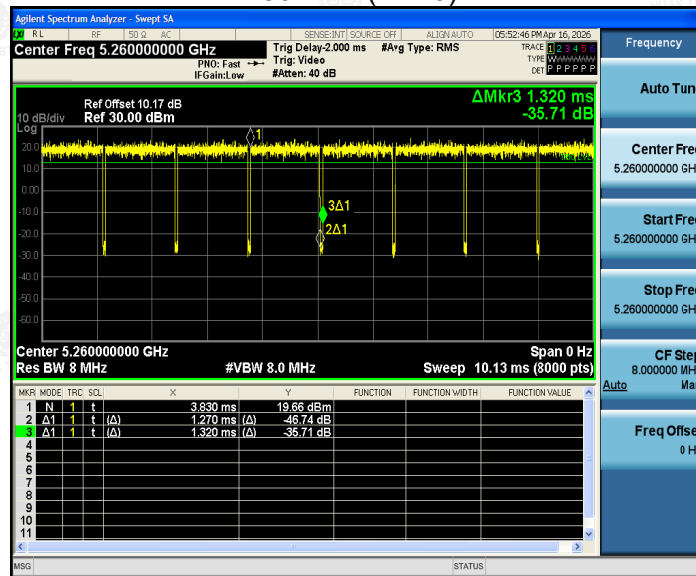
Antenna 1:  
Mode Test Duty Cycle: 5260-5320MHz

| Mode           | Duty Cycle |
|----------------|------------|
| 802.11a        | 0.9645     |
| 802.11n(HT20)  | 0.9621     |
| 802.11n(HT40)  | 0.9130     |
| 802.11ac(HT20) | 0.9549     |
| 802.11ac(HT40) | 0.9275     |
| 802.11ac(HT80) | 0.8649     |
| 802.11ax(HE20) | 0.9624     |
| 802.11ax(HE40) | 0.9265     |
| 802.11ax(HE80) | 0.8649     |

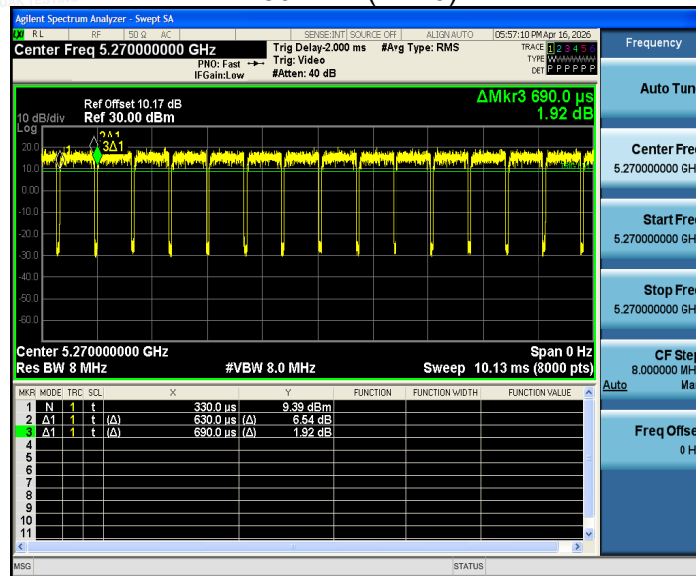
802.11a



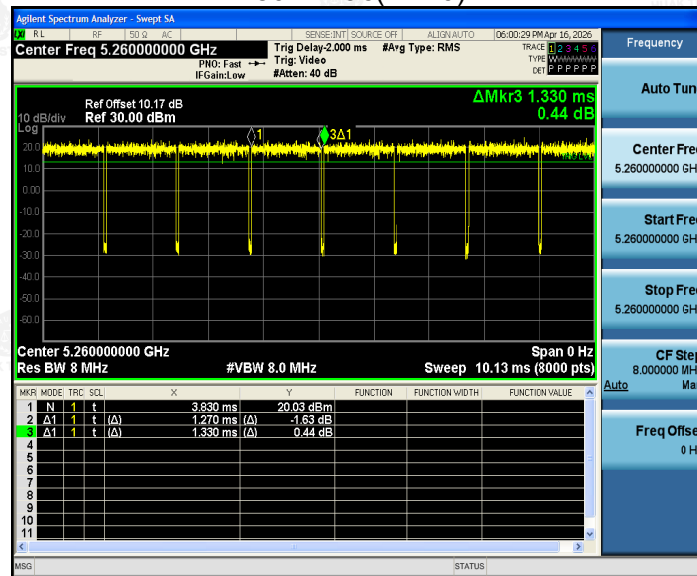
### 802.11n(HT20)



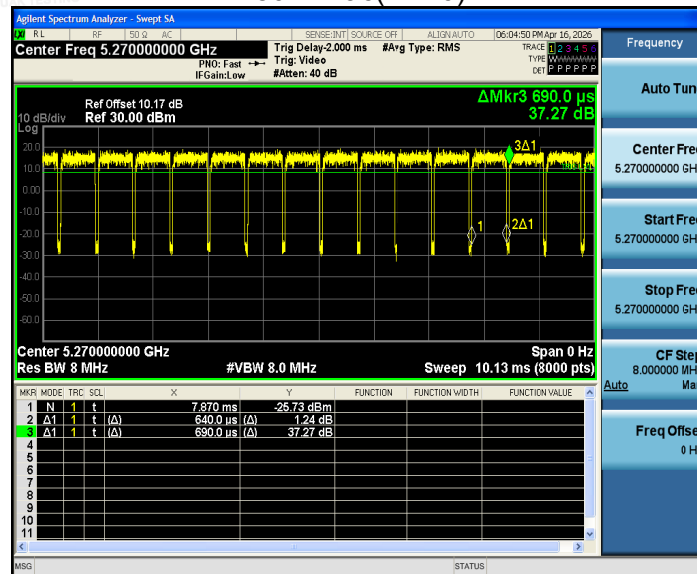
### 802.11n(HT40)



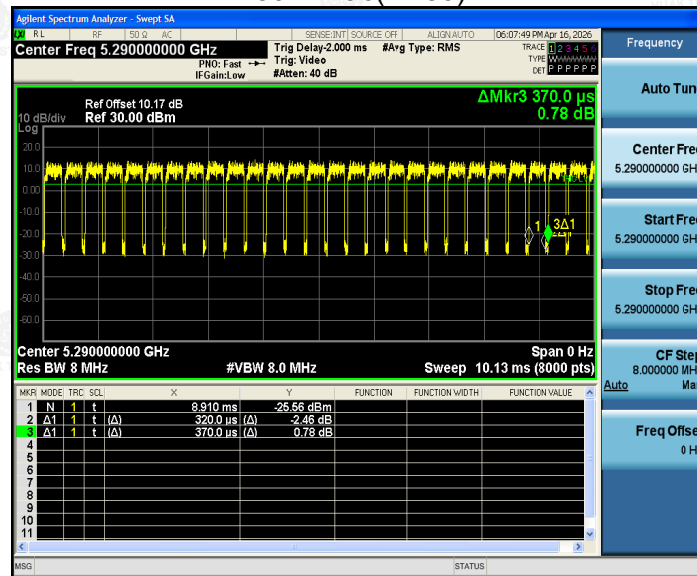
### 802.11ac(HT20)



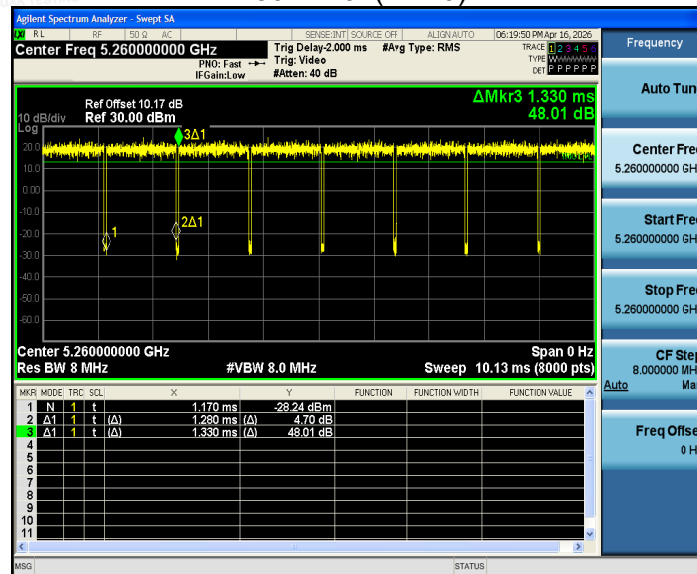
### 802.11ac(HT40)



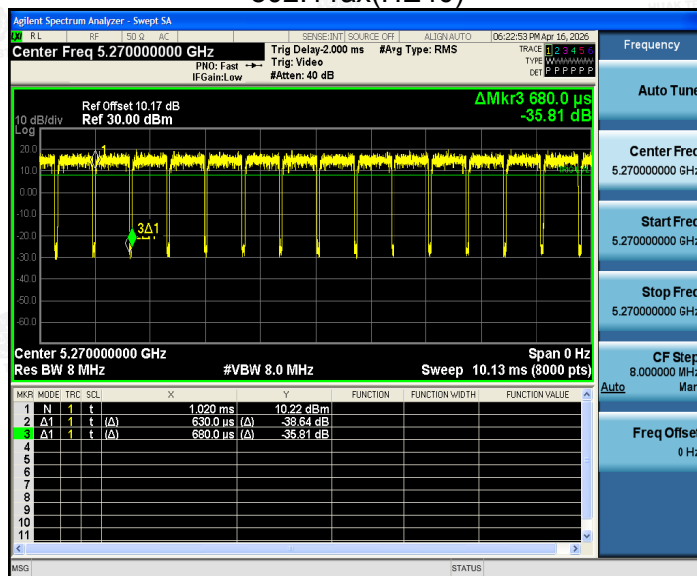
### 802.11ac(HT80)



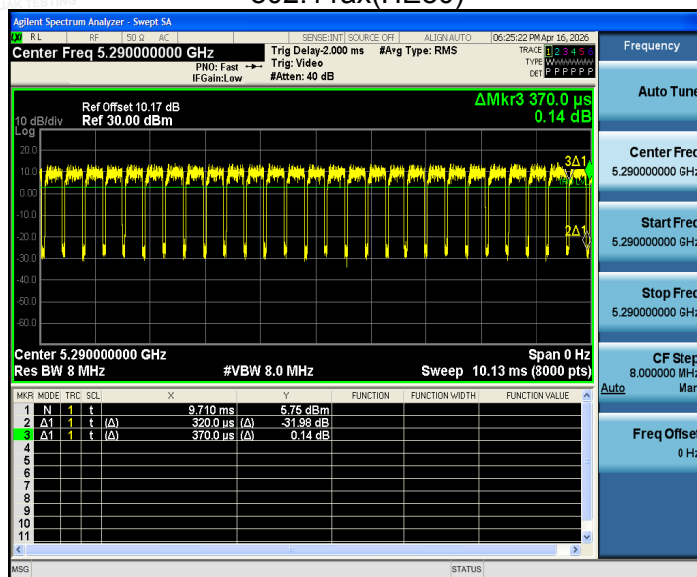
### 802.11ax(HE20)



### 802.11ax(HE40)



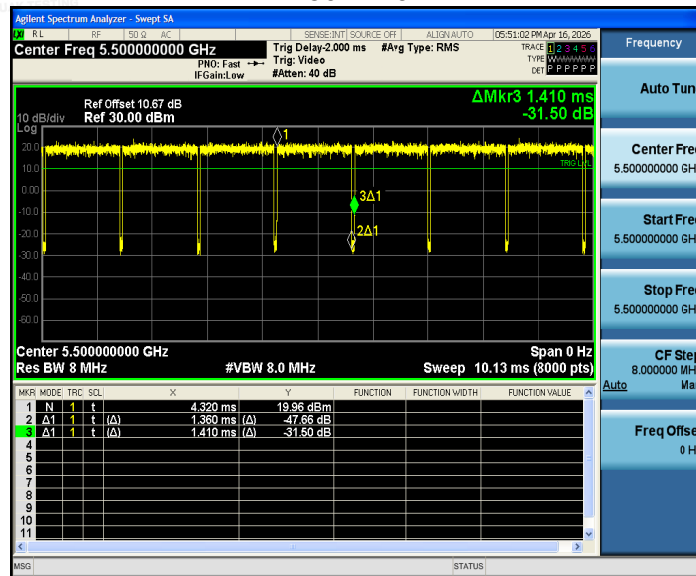
### 802.11ax(HE80)



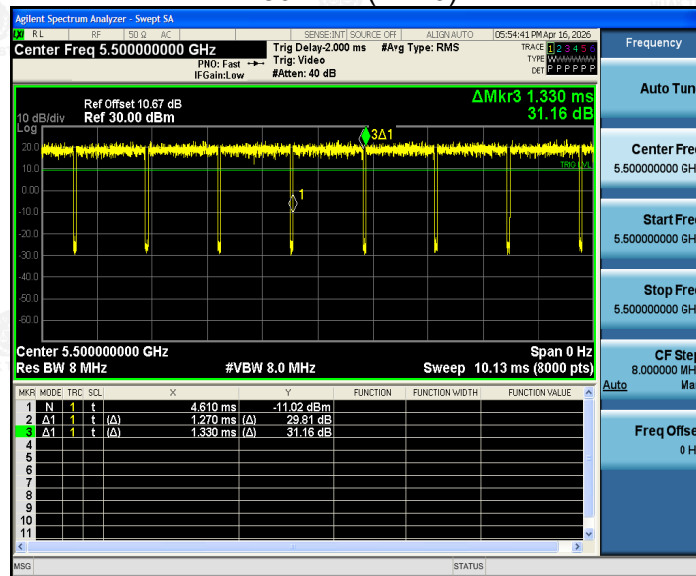
Mode Test Duty Cycle: 5500-5700MHz

| Mode           | Duty Cycle |
|----------------|------------|
| 802.11a        | 0.9645     |
| 802.11n(HT20)  | 0.9549     |
| 802.11n(HT40)  | 0.9130     |
| 802.11ac(HT20) | 0.9624     |
| 802.11ac(HT40) | 0.9275     |
| 802.11ac(HT80) | 0.8649     |
| 802.11ax(HE20) | 0.9624     |
| 802.11ax(HE40) | 0.9130     |
| 802.11ax(HE80) | 0.8378     |

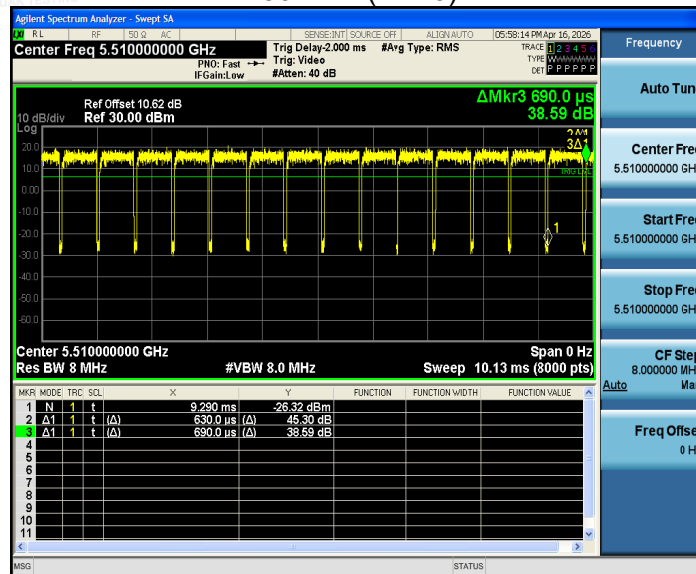
802.11a



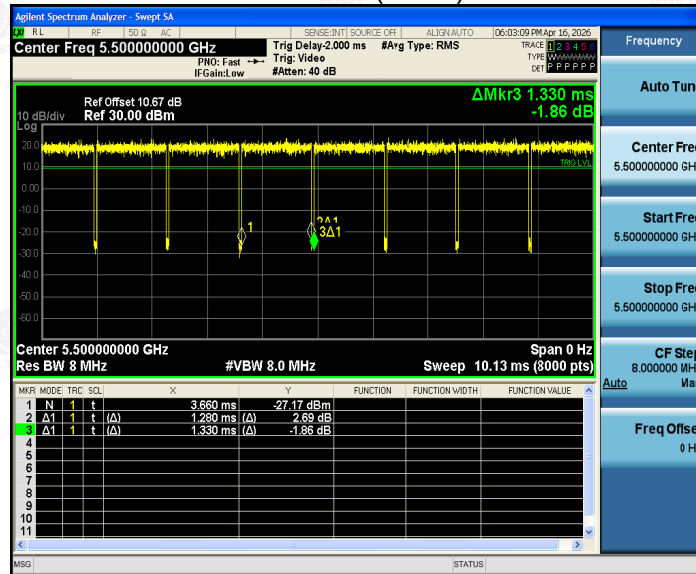
### 802.11n(HT20)



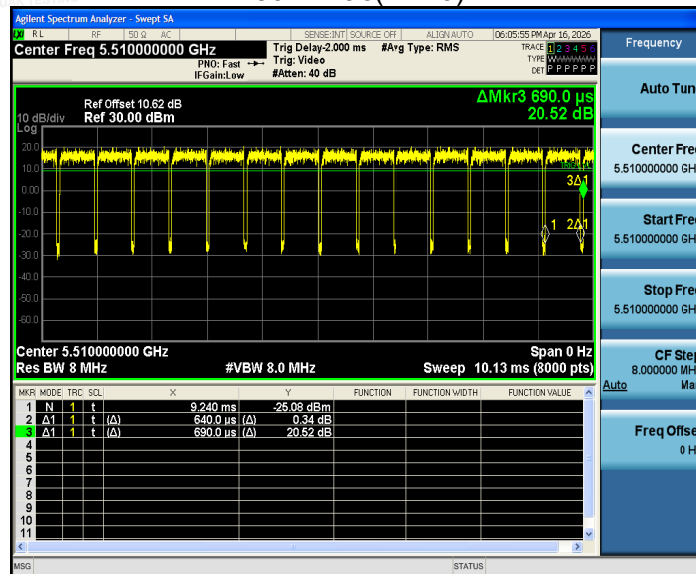
### 802.11n(HT40)



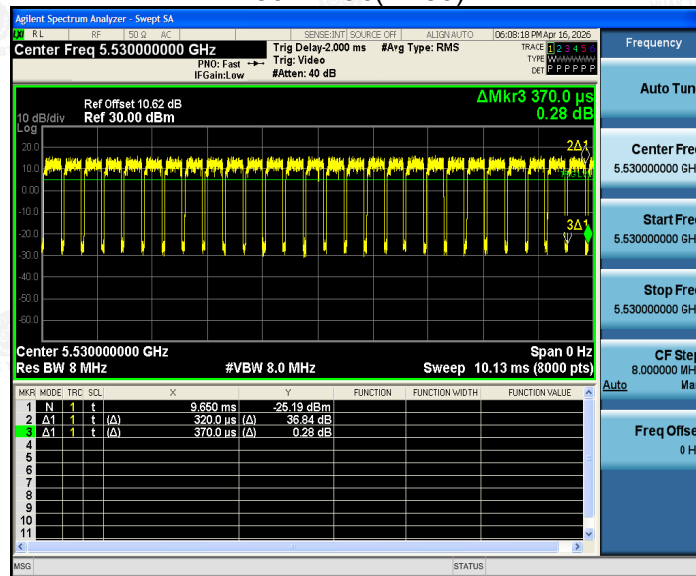
### 802.11ac(HT20)



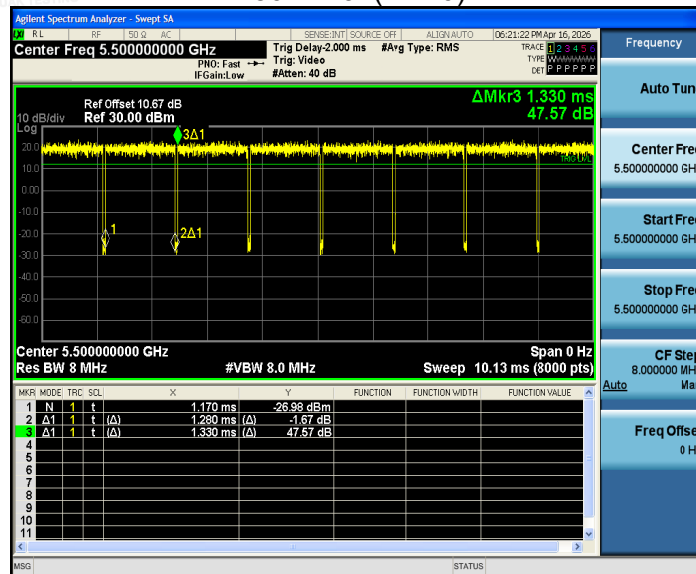
### 802.11ac(HT40)



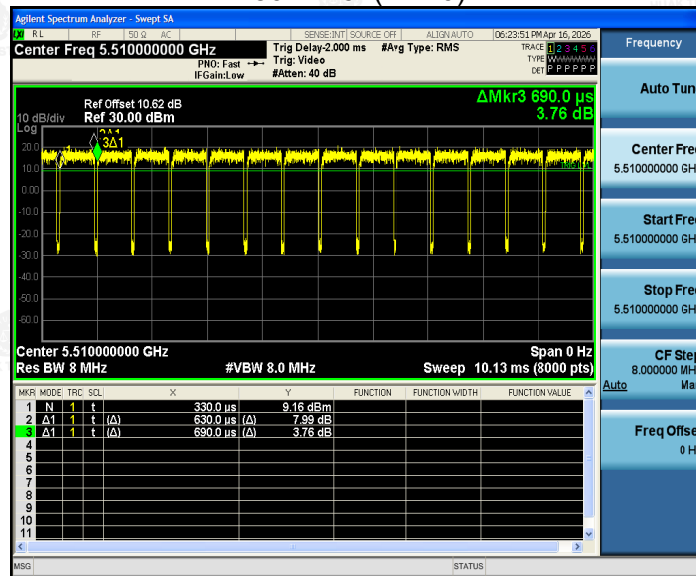
### 802.11ac(HT80)



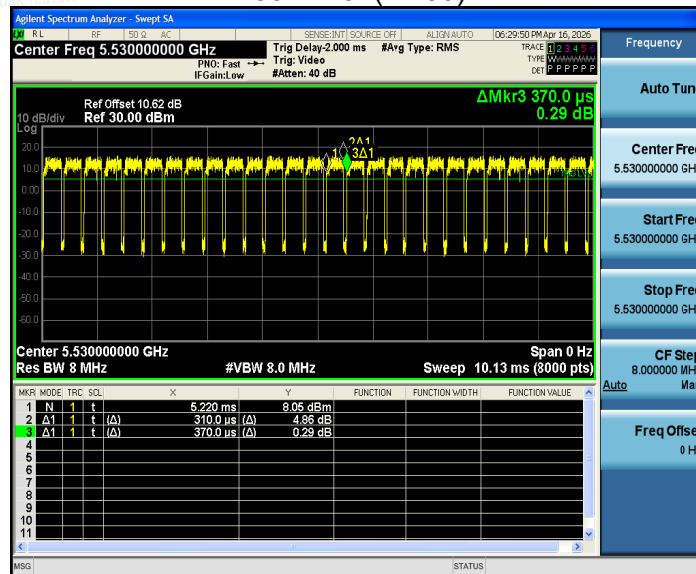
### 802.11ax(HE20)



### 802.11ax(HE40)



### 802.11ax(HE80)

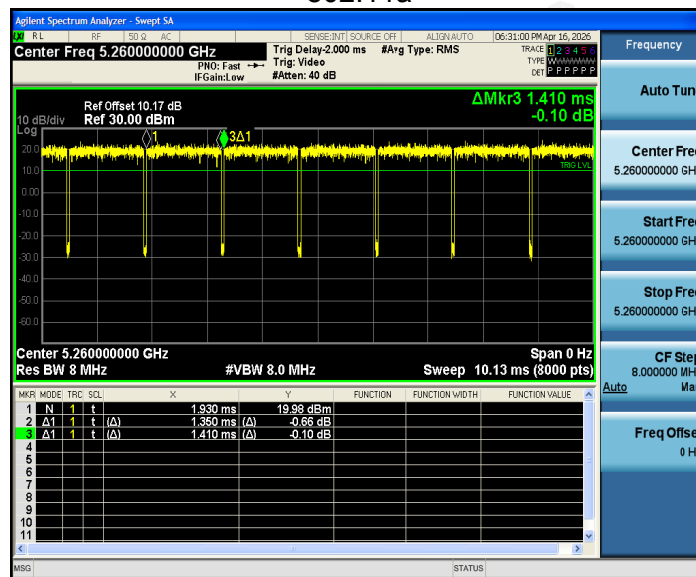


Antenna 2:

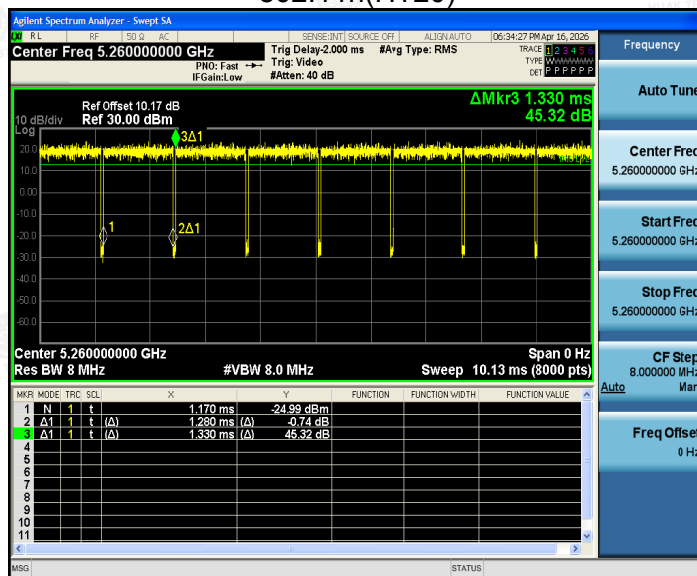
Mode Test Duty Cycle: 5260-5320MHz

| Mode           | Duty Cycle |
|----------------|------------|
| 802.11a        | 0.9574     |
| 802.11n(HT20)  | 0.9624     |
| 802.11n(HT40)  | 0.9130     |
| 802.11ac(HT20) | 0.9624     |
| 802.11ac(HT40) | 0.9275     |
| 802.11ac(HT80) | 0.8649     |
| 802.11ax(HE20) | 0.9549     |
| 802.11ax(HE40) | 0.9130     |
| 802.11ax(HE80) | 0.8649     |

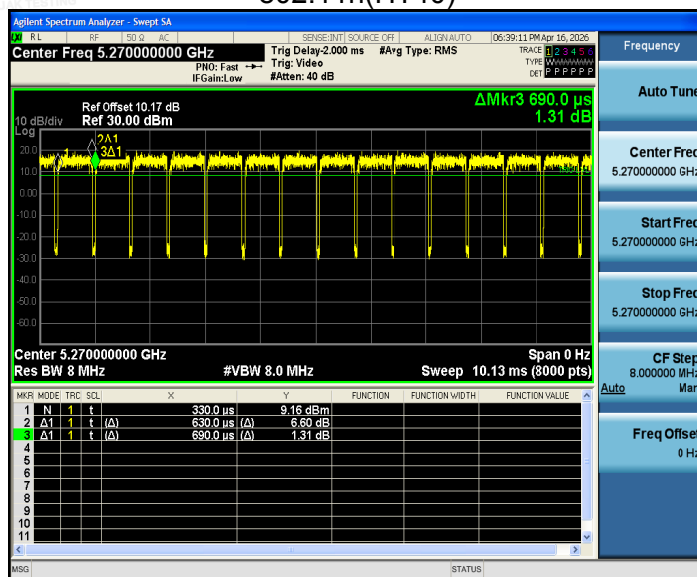
802.11a



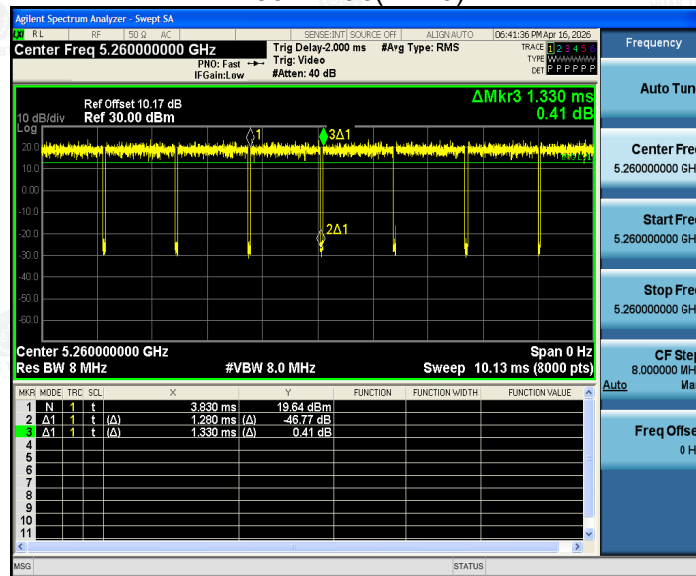
### 802.11n(HT20)



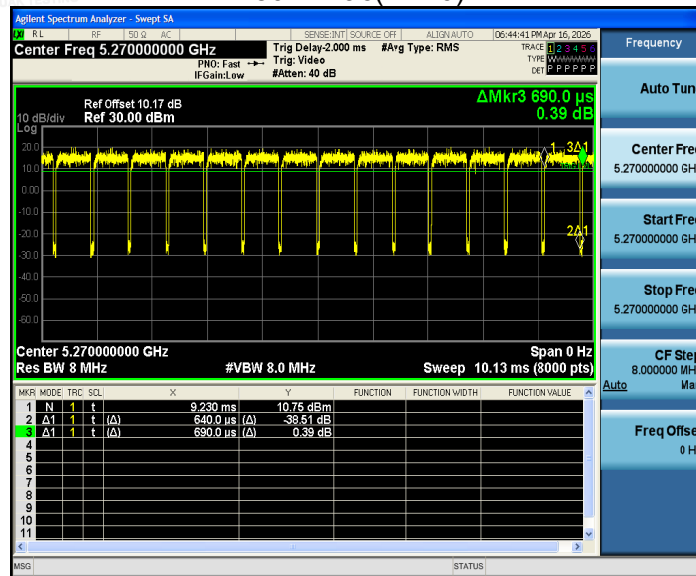
### 802.11n(HT40)



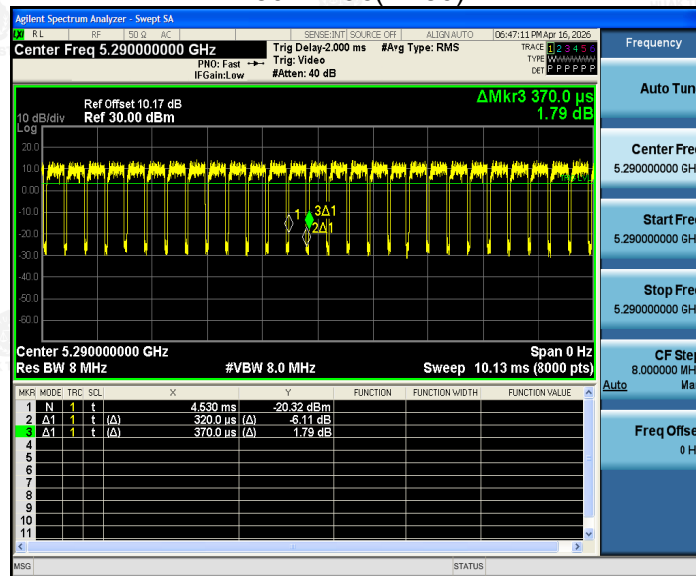
### 802.11ac(HT20)



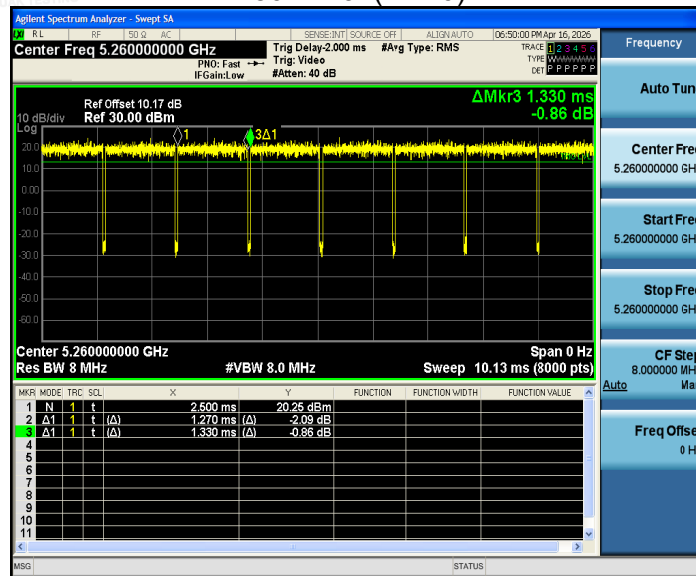
### 802.11ac(HT40)



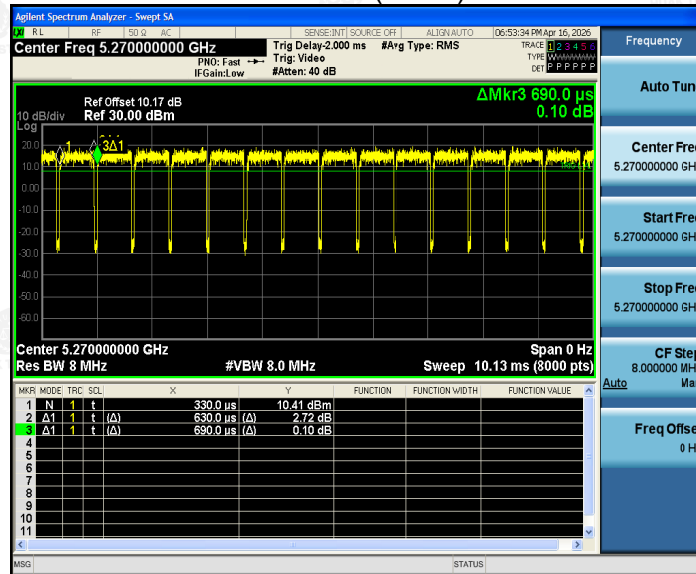
### 802.11ac(HT80)



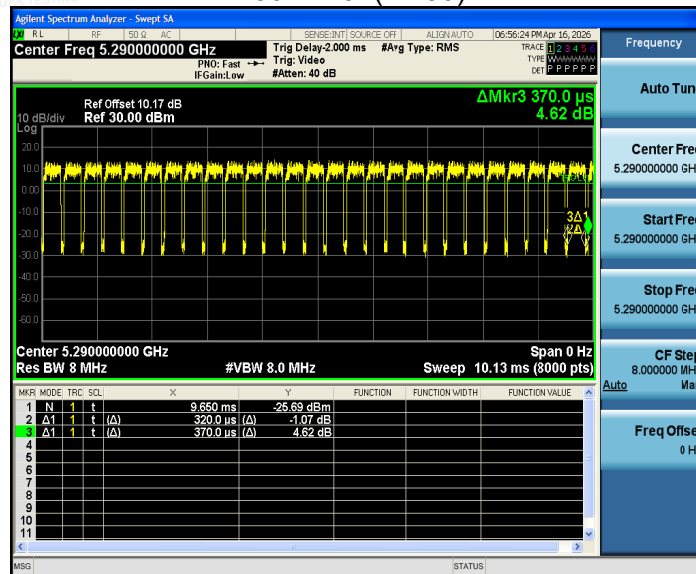
### 802.11ax(HE20)



### 802.11ax(HE40)



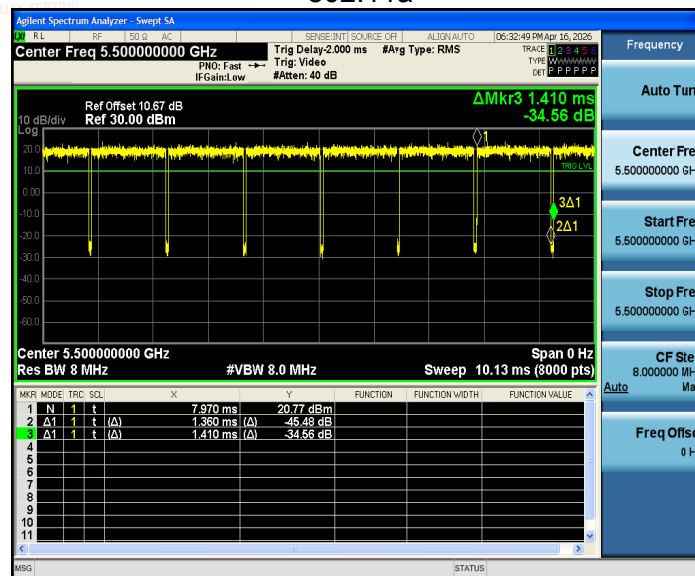
### 802.11ax(HE80)



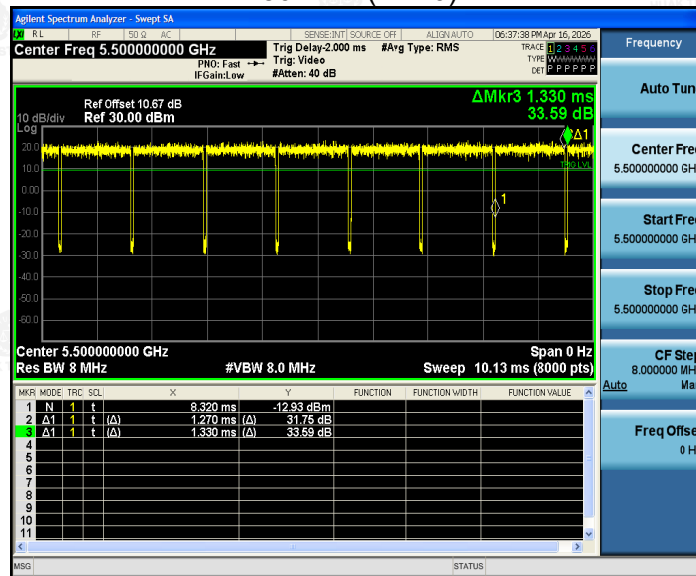
Mode Test Duty Cycle: 5500-5700MHz

| Mode           | Duty Cycle |
|----------------|------------|
| 802.11a        | 0.9645     |
| 802.11n(HT20)  | 0.9549     |
| 802.11n(HT40)  | 0.9265     |
| 802.11ac(HT20) | 0.9549     |
| 802.11ac(HT40) | 0.9130     |
| 802.11ac(HT80) | 0.8611     |
| 802.11ax(HE20) | 0.9621     |
| 802.11ax(HE40) | 0.9275     |
| 802.11ax(HE80) | 0.8649     |

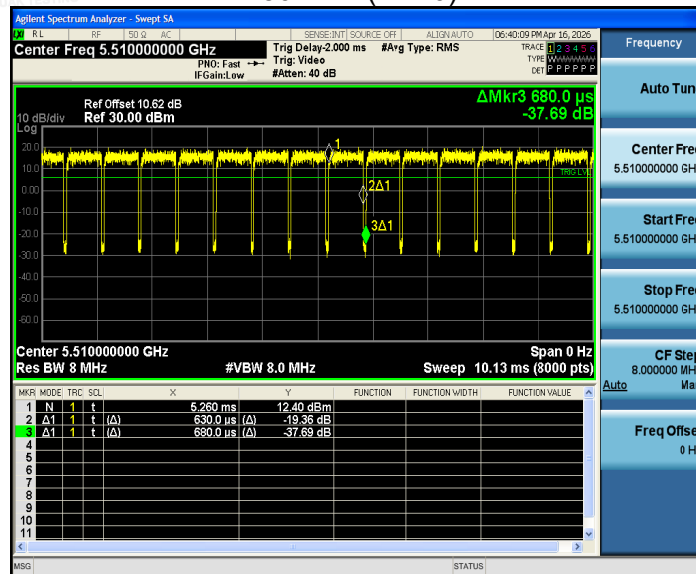
802.11a



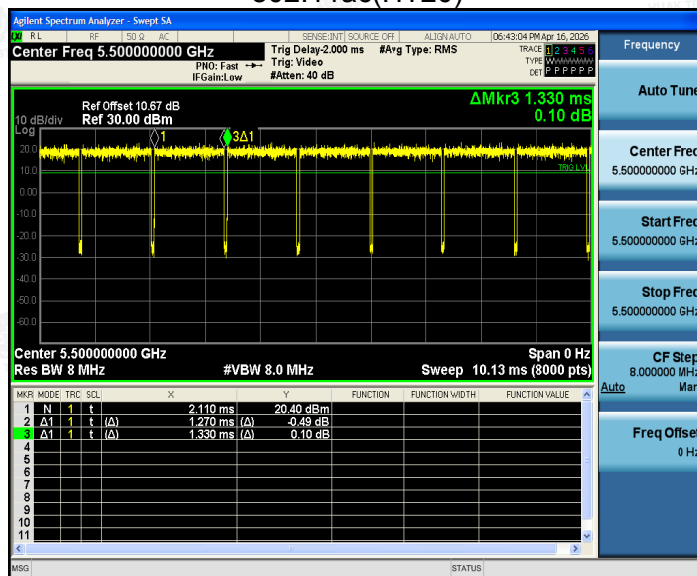
### 802.11n(HT20)



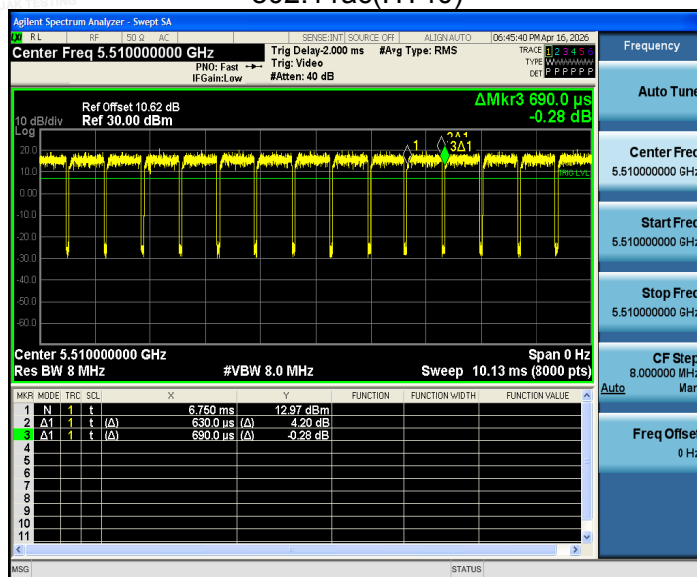
### 802.11n(HT40)



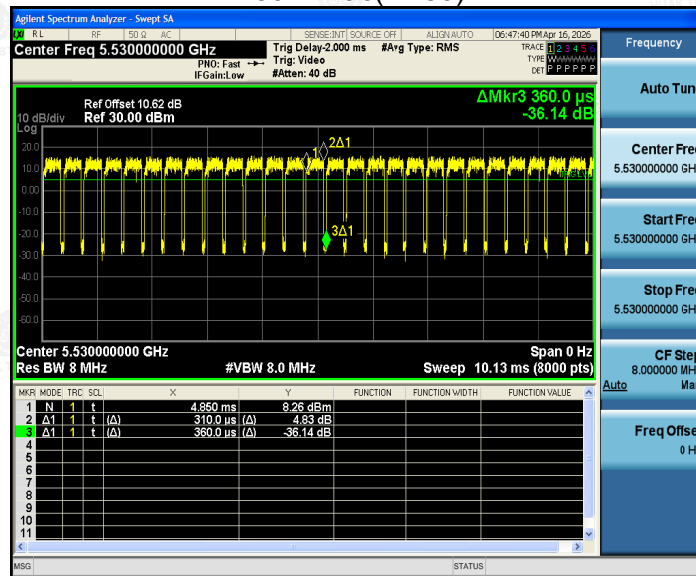
### 802.11ac(HT20)



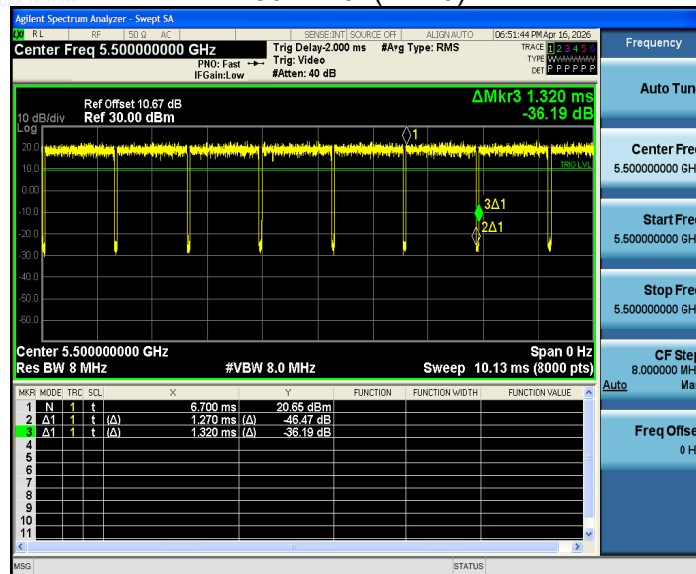
### 802.11ac(HT40)



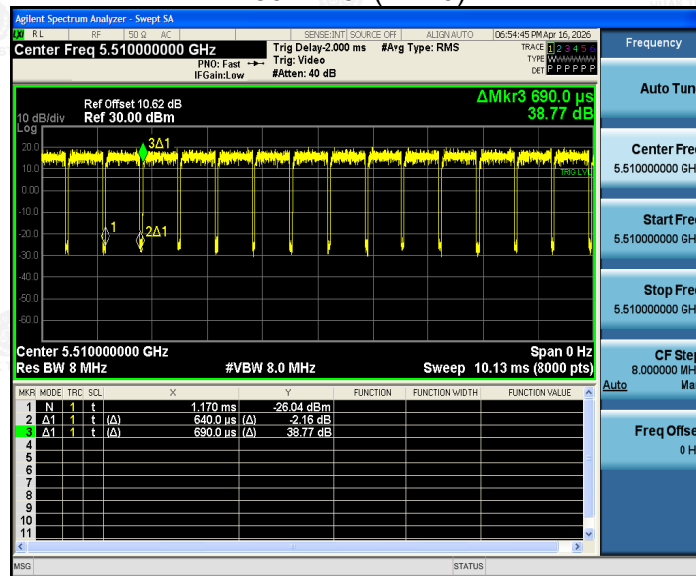
### 802.11ac(HT80)



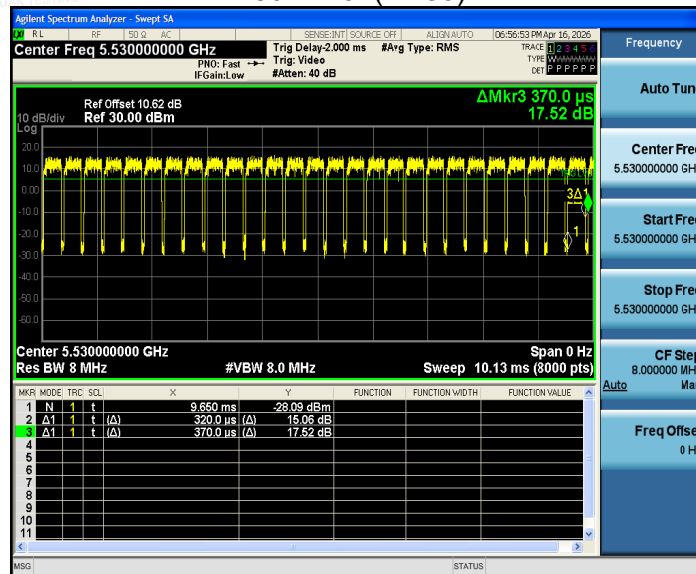
### 802.11ax(HE20)



### 802.11ax(HE40)

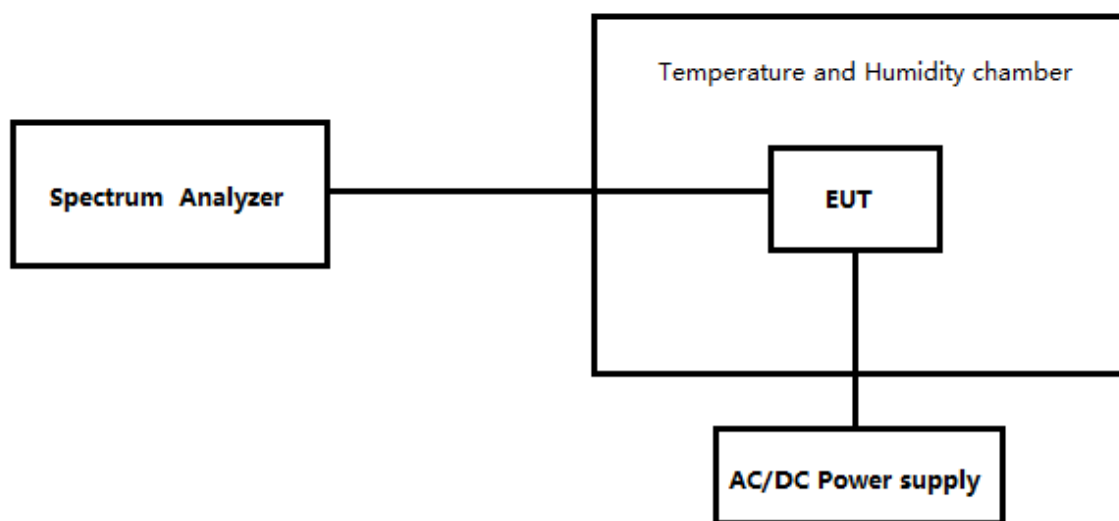


### 802.11ax(HE80)



**HUAK TESTING****6.6 Frequency Stability Measurement****Limit**

According to §15.407(g), Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

**Test Configuration****Test Procedure**

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.



HUAKE TESTING

## Test Results

### Antenna 1

| U-NII-1-(5250MHz-5350MHz) |                        |                           |                           |                  |                  |
|---------------------------|------------------------|---------------------------|---------------------------|------------------|------------------|
| Freq.(MHz)                | Center Frequency (MHz) | Frequency Deviation (MHz) | Frequency Stability (ppm) | Temperature (°C) | Voltage (V)      |
| 5260                      | 5259.987               | -0.013                    | -2.471                    | 25               | V <sub>min</sub> |
| 5260                      | 5260.002               | 0.002                     | 0.380                     | 25               | V <sub>max</sub> |
| 5260                      | 5259.991               | -0.009                    | -1.711                    | 25               | V <sub>nor</sub> |
| 5260                      | 5259.955               | -0.045                    | -8.555                    | -10              | V <sub>nor</sub> |
| 5260                      | 5260.013               | 0.013                     | 2.471                     | 40               | V <sub>nor</sub> |

| U-NII-1-(5470MHz-5725MHz) |                        |                           |                           |                  |                  |
|---------------------------|------------------------|---------------------------|---------------------------|------------------|------------------|
| Freq.(MHz)                | Center Frequency (MHz) | Frequency Deviation (MHz) | Frequency Stability (ppm) | Temperature (°C) | Voltage (V)      |
| 5500                      | 5499.963               | -0.037                    | -6.727                    | 25               | V <sub>min</sub> |
| 5500                      | 5500.015               | 0.015                     | 2.727                     | 25               | V <sub>max</sub> |
| 5500                      | 5499.977               | -0.023                    | -4.182                    | 25               | V <sub>nor</sub> |
| 5500                      | 5499.983               | -0.017                    | -3.091                    | -10              | V <sub>nor</sub> |
| 5500                      | 5500.021               | 0.021                     | 3.818                     | 40               | V <sub>nor</sub> |

### Antenna 2

| U-NII-1-(5250MHz-5350MHz) |                        |                           |                           |                  |                  |
|---------------------------|------------------------|---------------------------|---------------------------|------------------|------------------|
| Freq.(MHz)                | Center Frequency (MHz) | Frequency Deviation (MHz) | Frequency Stability (ppm) | Temperature (°C) | Voltage (V)      |
| 5260                      | 5260.033               | 0.033                     | 6.274                     | 25               | V <sub>min</sub> |
| 5260                      | 5259.998               | -0.002                    | -0.380                    | 25               | V <sub>max</sub> |
| 5260                      | 5260.018               | 0.018                     | 3.422                     | 25               | V <sub>nor</sub> |
| 5260                      | 5259.980               | -0.020                    | -3.802                    | -10              | V <sub>nor</sub> |
| 5260                      | 5260.009               | 0.009                     | 1.711                     | 40               | V <sub>nor</sub> |

| U-NII-1-(5470MHz-5725MHz) |                        |                           |                           |                  |                  |
|---------------------------|------------------------|---------------------------|---------------------------|------------------|------------------|
| Freq.(MHz)                | Center Frequency (MHz) | Frequency Deviation (MHz) | Frequency Stability (ppm) | Temperature (°C) | Voltage (V)      |
| 5500                      | 5500.022               | 0.022                     | 4.000                     | 25               | V <sub>min</sub> |
| 5500                      | 5500.006               | 0.006                     | 1.091                     | 25               | V <sub>max</sub> |
| 5500                      | 5499.987               | -0.013                    | -2.364                    | 25               | V <sub>nor</sub> |
| 5500                      | 5499.994               | -0.006                    | -1.091                    | -10              | V <sub>nor</sub> |
| 5500                      | 5500.026               | 0.026                     | 4.727                     | 40               | V <sub>nor</sub> |

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.

**Shenzhen HUAKE Testing Technology Co., Ltd.** Tel.: +86-0755-2302 9901 E-mail: info@huak.com Web.: www.huak.com

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

## 6.7 Radiated Undesirable Emission

### Limit

Radiated emissions from 9 kHz to 25 GHz were measured according to the methods defined in ANSI C63.10-2013. The EUT was placed above the ground plane, 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz. The inter face cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

1. For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725 MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725 MHz band shall not exceed an EIRP of -27 dBm/MHz.

2. KDB789033v02r01G)2)c) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.
3. According to §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:

| FREQUENCIES (MHz) | FIELD STRENGTH (microvolt/meter) | MEASUREMENT DISTANCE (meters) |
|-------------------|----------------------------------|-------------------------------|
| 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                             |

**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

4. In the emission table above, the tighter limit applies at the band edges.

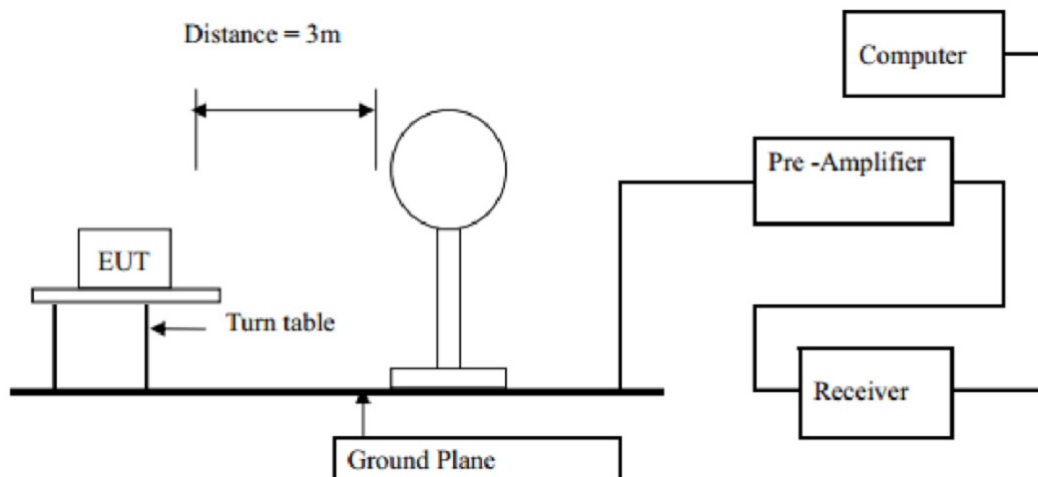
| Frequency (MHz) | Field Strength (μV/m at 3-meter) | Field Strength (dBμV/m at 3-meter) |
|-----------------|----------------------------------|------------------------------------|
| 30-88           | 100                              | 40                                 |
| 88-216          | 150                              | 43.5                               |
| 216-960         | 200                              | 46                                 |
| Above 960       | 500                              | 54                                 |



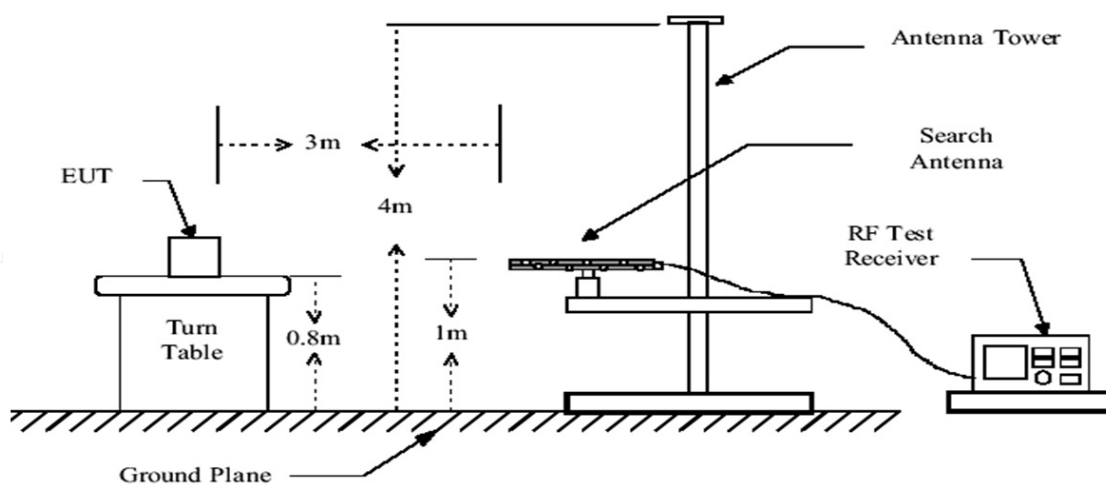
**HUAK TESTING**

**Test Configuration**

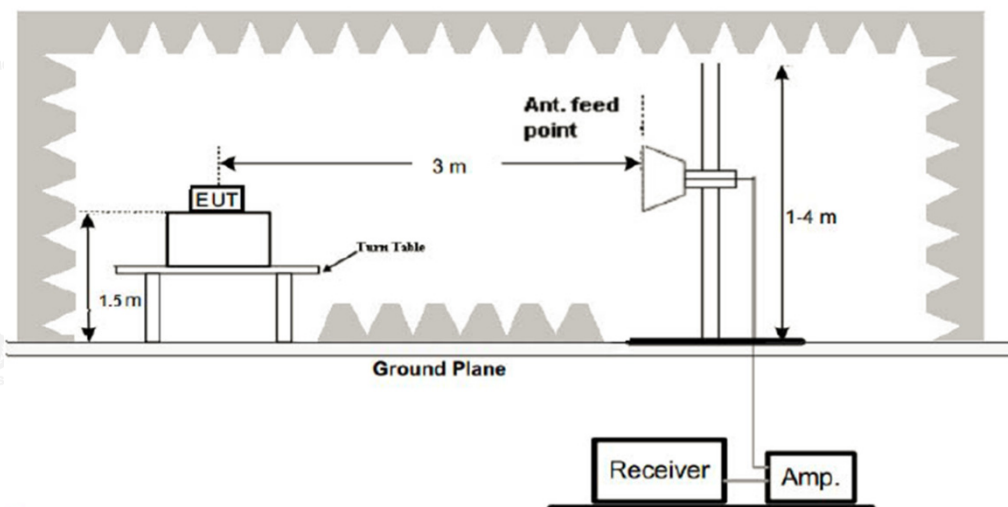
**Below 30MHz**



**Below 1GHz**



### Above 1 GHz



### Test Procedure

1. The EUT is placed on a turntable above ground plane, which is 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz/ VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / Sweep=AUTO

VBW=10Hz, when duty cycle is no less than 98 percent.

VBW  $\geq 1/T$ , when duty cycle is less than 98 percent, where is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

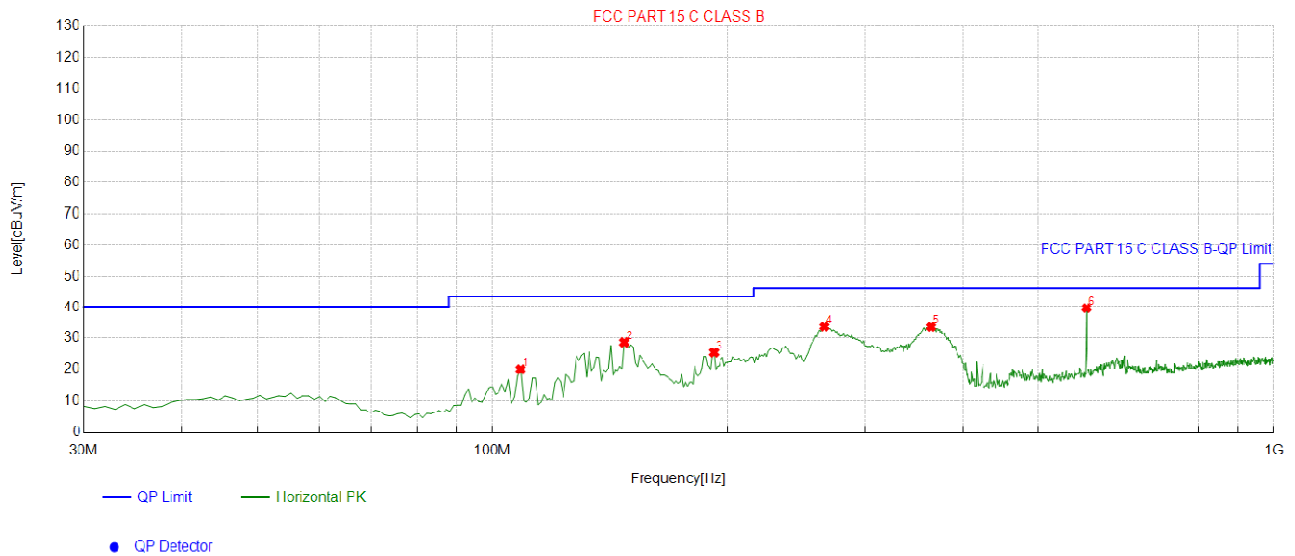
| Band                         | Duty Cycle(%) | T(ms) | 1/T(kHz) | VBW Setting |
|------------------------------|---------------|-------|----------|-------------|
| IEEE 802.11 a                | --            | --    | --       | 10Hz        |
| IEEE 802.11n/ac HT20/ax HE20 | --            | --    | --       | 10Hz        |
| IEEE 802.11n ac HT40/ax HE40 | --            | --    | --       | 10Hz        |
| IEEE 802.11ac HT80/ax HE80   | --            | --    | --       | 10Hz        |

7. Repeat above procedures until the measurements for all frequencies are complete.

### Below 1GHz Test Results

All modes have been tested, only the worst mode of GFSK Low channel TX is reflected.

Antenna polarity: Horizontal

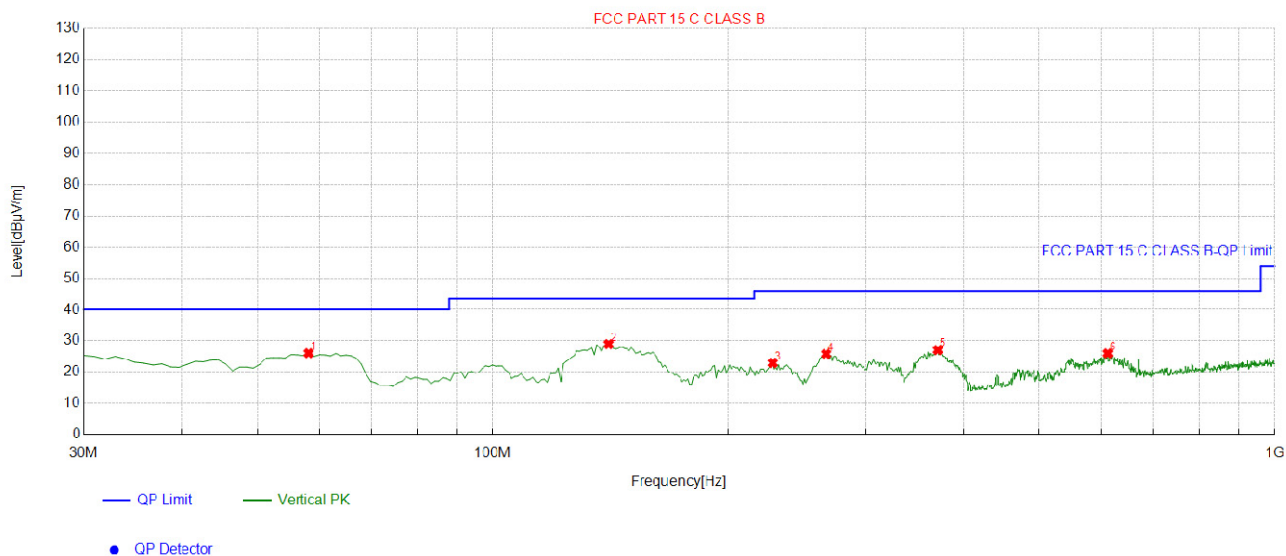


#### Suspected List

| NO. | Freq. [MHz] | Factor [dB] | Reading [dBμV/m] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|-------------|------------------|----------------|----------------|-------------|-------------|-----------|------------|
| 1   | 108.649     | -14.58      | 34.61            | 20.03          | 43.50          | 23.47       | 100         | 111       | Horizontal |
| 2   | 147.487     | -18.28      | 46.98            | 28.70          | 43.50          | 14.80       | 100         | 111       | Horizontal |
| 3   | 192.152     | -15.24      | 40.63            | 25.39          | 43.50          | 18.11       | 100         | 339       | Horizontal |
| 4   | 265.946     | -12.73      | 46.48            | 33.75          | 46.00          | 12.25       | 100         | 154       | Horizontal |
| 5   | 364.014     | -10.54      | 44.21            | 33.67          | 46.00          | 12.33       | 100         | 161       | Horizontal |
| 6   | 575.686     | -6.25       | 45.97            | 39.72          | 46.00          | 6.28        | 100         | 353       | Horizontal |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Antenna polarity: Vertical



#### Suspected List

| NO. | Freq. [MHz] | Factor [dB] | Reading [dBμV/m] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|-------------|------------------|----------------|----------------|-------------|-------------|-----------|----------|
| 1   | 58.158      | -13.92      | 39.98            | 26.06          | 40.00          | 13.94       | 100         | 275       | Vertical |
| 2   | 140.691     | -18.30      | 47.26            | 28.96          | 43.50          | 14.54       | 100         | 184       | Vertical |
| 3   | 228.078     | -14.00      | 36.94            | 22.94          | 46.00          | 23.06       | 100         | 122       | Vertical |
| 4   | 266.917     | -12.74      | 38.56            | 25.82          | 46.00          | 20.18       | 100         | 108       | Vertical |
| 5   | 370.811     | -10.61      | 37.69            | 27.08          | 46.00          | 18.92       | 100         | 126       | Vertical |
| 6   | 611.612     | -5.40       | 31.40            | 26.00          | 46.00          | 20.00       | 100         | 82        | Vertical |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

#### Harmonics and Spurious Emissions Frequency Range (9 kHz-30MHz)

| Frequency (MHz) | Level@3m (dBμV/m) | Limit@3m (dBμV/m) |
|-----------------|-------------------|-------------------|
| --              | --                | --                |
| --              | --                | --                |
| --              | --                | --                |
| --              | --                | --                |

**Note:** 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

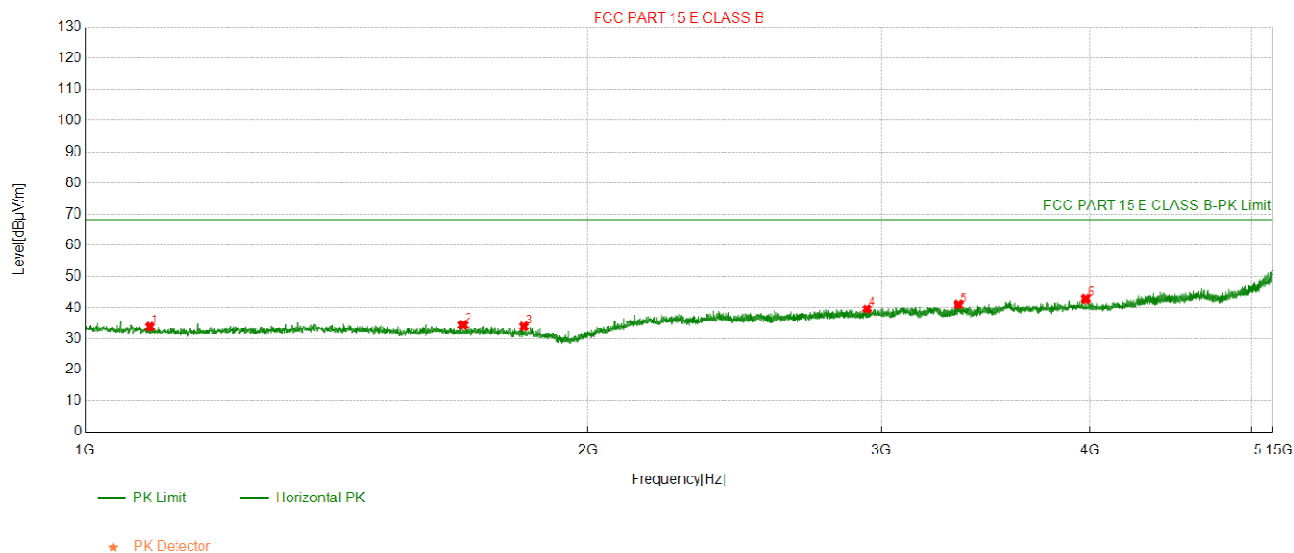
### Above 1GHz Test Results

#### 5250~5350MHz

All the test modes completed for test. Only the worst result was reported as below:

For 1GHz to 5.15GHz

Antenna polarity: Horizontal

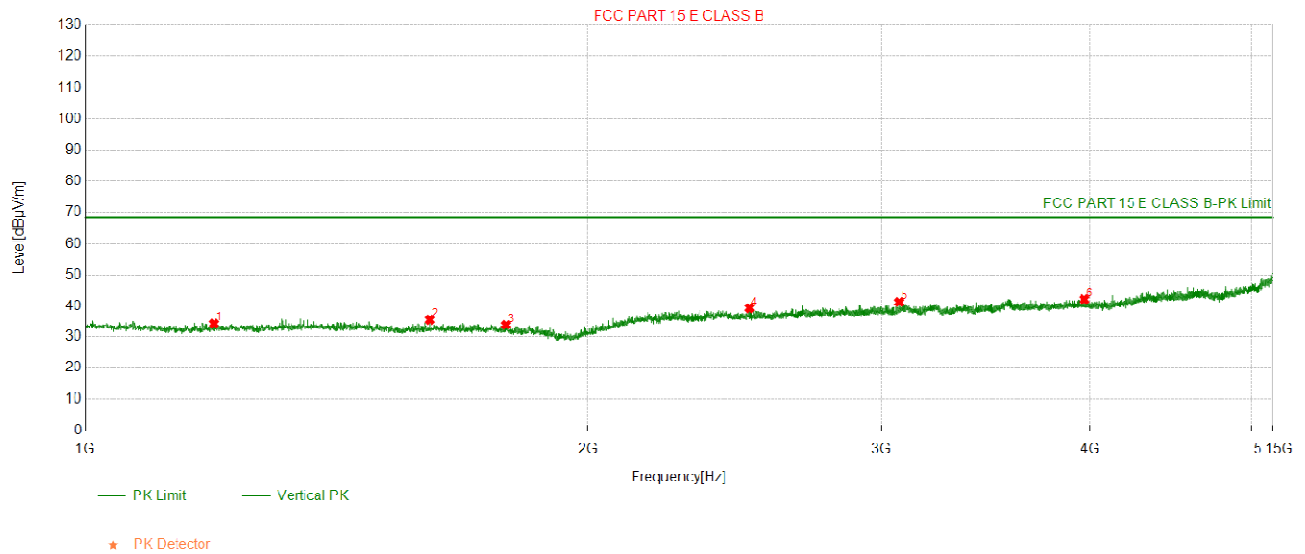


#### Suspected Data List

| NO. | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|------------|
| 1   | 1093.384    | 53.18            | 34.05             | -19.13      | 68.20             | 34.15          | 150         | 72        | Horizontal |
| 2   | 1683.988    | 52.94            | 34.58             | -18.36      | 68.20             | 33.62          | 150         | 293       | Horizontal |
| 3   | 1831.328    | 51.92            | 34.12             | -17.80      | 68.20             | 34.08          | 150         | 144       | Horizontal |
| 4   | 2940.734    | 52.86            | 39.72             | -13.14      | 68.20             | 28.48          | 150         | 26        | Horizontal |
| 5   | 3335.854    | 53.45            | 41.02             | -12.43      | 68.20             | 27.18          | 150         | 239       | Horizontal |
| 6   | 3977.093    | 52.74            | 42.91             | -9.83       | 68.20             | 25.29          | 150         | 72        | Horizontal |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Antenna polarity: Vertical

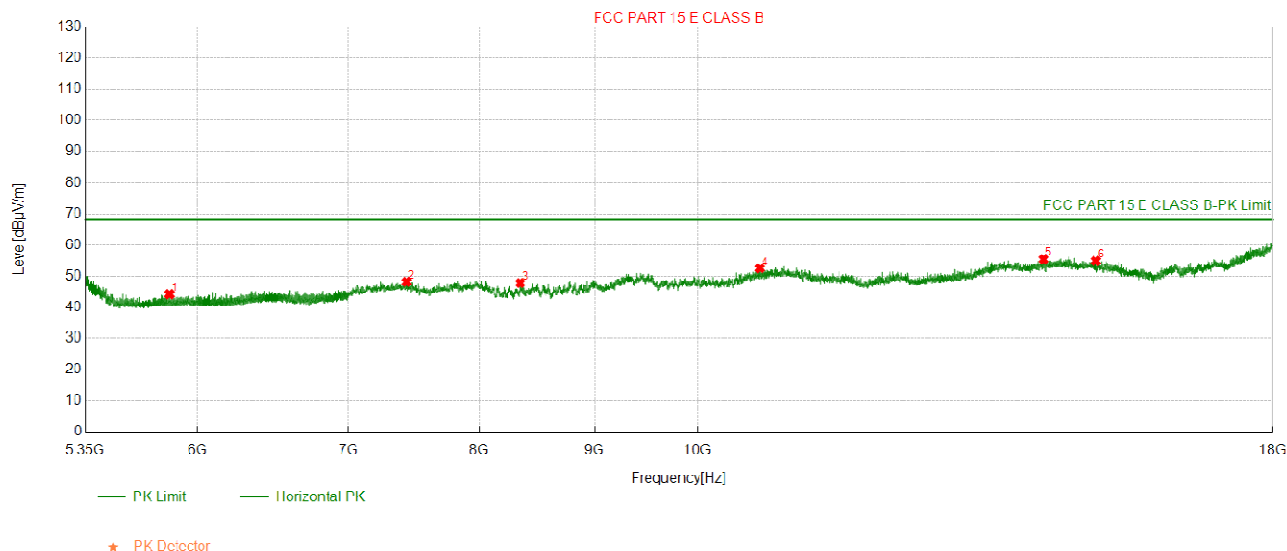


| Suspected Data List |             |                  |                   |             |                   |                |             |           |          |
|---------------------|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|----------|
| NO.                 | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1                   | 1194.239    | 53.19            | 34.30             | -18.89      | 68.20             | 33.90          | 150         | 146       | Vertical |
| 2                   | 1608.866    | 54.14            | 35.57             | -18.57      | 68.20             | 32.63          | 150         | 232       | Vertical |
| 3                   | 1786.919    | 51.86            | 33.87             | -17.99      | 68.20             | 34.33          | 150         | 57        | Vertical |
| 4                   | 2500.790    | 54.06            | 39.28             | -14.78      | 68.20             | 28.92          | 150         | 25        | Vertical |
| 5                   | 3074.377    | 53.89            | 41.26             | -12.63      | 68.20             | 26.94          | 150         | 271       | Vertical |
| 6                   | 3968.377    | 51.96            | 42.15             | -9.81       | 68.20             | 26.05          | 150         | 84        | Vertical |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

For 5.35GHz to 18GHz

Antenna polarity: Horizontal

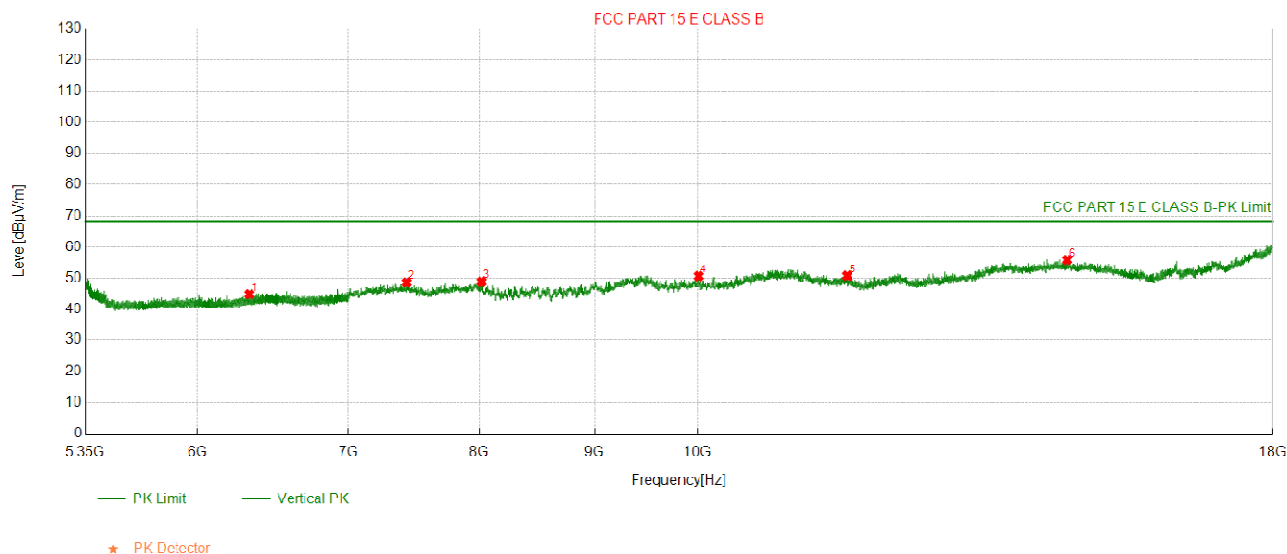


#### Suspected Data List

| NO. | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|------------|
| 1   | 5829.868    | 52.34            | 44.11             | -8.23       | 68.20             | 24.09          | 150         | 28        | Horizontal |
| 2   | 7427.943    | 51.16            | 48.12             | -3.04       | 68.20             | 20.08          | 150         | 352       | Horizontal |
| 3   | 8342.134    | 49.71            | 47.75             | -1.96       | 68.20             | 20.45          | 150         | 142       | Horizontal |
| 4   | 10656.766   | 50.69            | 52.44             | 1.75        | 68.20             | 15.76          | 150         | 94        | Horizontal |
| 5   | 14238.724   | 48.26            | 55.40             | 7.14        | 68.20             | 12.80          | 150         | 267       | Horizontal |
| 6   | 15017.602   | 48.59            | 54.89             | 6.30        | 68.20             | 13.31          | 150         | 30        | Horizontal |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Antenna polarity: Vertical

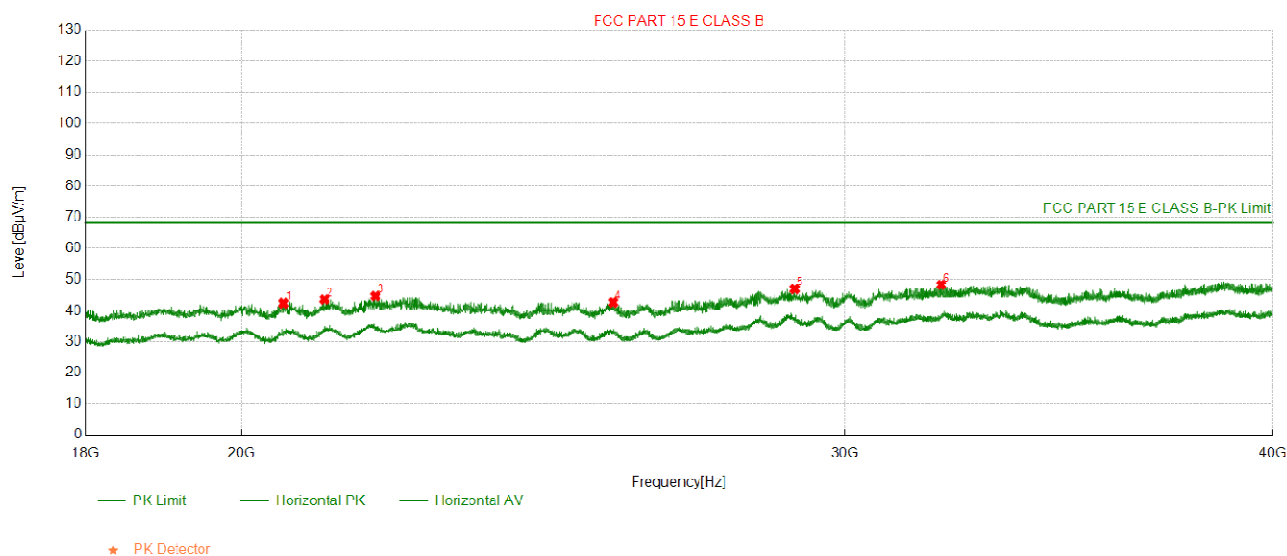


| Suspected Data List |             |                  |                   |             |                   |                |             |           |          |
|---------------------|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|----------|
| NO.                 | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1                   | 6326.898    | 52.02            | 44.73             | -7.29       | 68.20             | 23.47          | 150         | 108       | Vertical |
| 2                   | 7427.943    | 51.61            | 48.57             | -3.04       | 68.20             | 19.63          | 150         | 93        | Vertical |
| 3                   | 8019.802    | 50.62            | 48.82             | -1.80       | 68.20             | 19.38          | 150         | 190       | Vertical |
| 4                   | 10011.001   | 49.44            | 50.55             | 1.11        | 68.20             | 17.65          | 150         | 43        | Vertical |
| 5                   | 11651.265   | 47.75            | 50.70             | 2.95        | 68.20             | 17.50          | 150         | 267       | Vertical |
| 6                   | 14586.359   | 47.98            | 55.85             | 7.87        | 68.20             | 12.35          | 150         | 57        | Vertical |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

For 18GHz to 40GHz

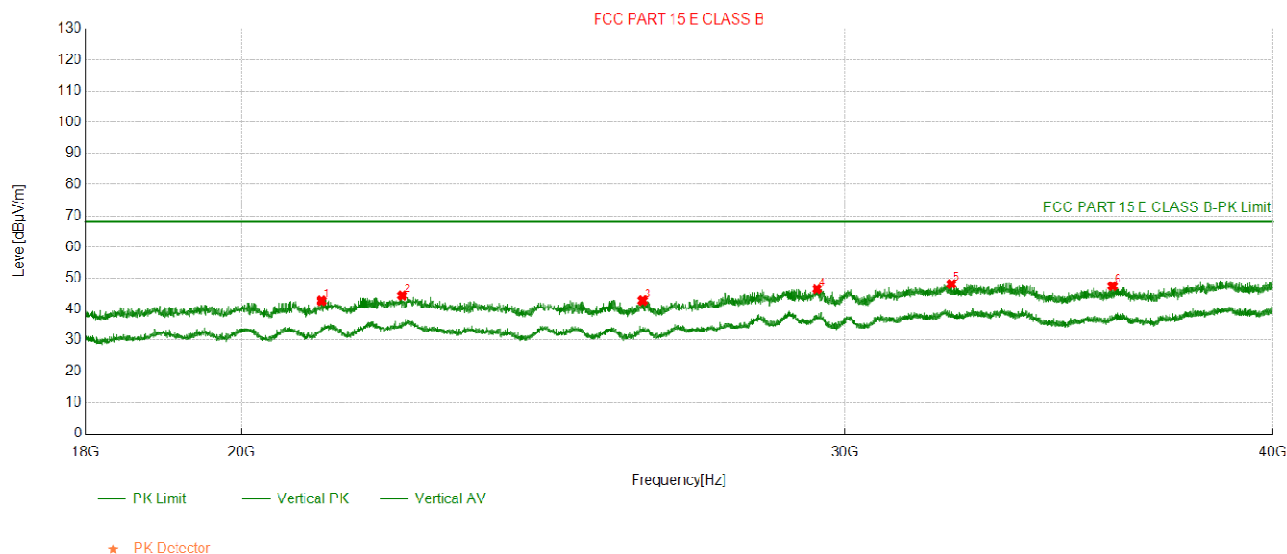
Antenna polarity: Horizontal



| Suspected Data List |             |                  |                   |             |                   |                |             |           |            |
|---------------------|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|------------|
| NO.                 | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1                   | 20567.657   | 36.49            | 42.40             | 5.91        | 68.20             | 25.80          | 150         | 70        | Horizontal |
| 2                   | 21139.714   | 38.29            | 43.60             | 5.31        | 68.20             | 24.60          | 150         | 250       | Horizontal |
| 3                   | 21876.788   | 38.97            | 44.60             | 5.63        | 68.20             | 23.60          | 150         | 70        | Horizontal |
| 4                   | 25665.567   | 36.44            | 42.65             | 6.21        | 68.20             | 25.55          | 150         | 340       | Horizontal |
| 5                   | 29001.100   | 37.78            | 46.81             | 9.03        | 68.20             | 21.39          | 150         | 40        | Horizontal |
| 6                   | 32002.200   | 38.40            | 48.13             | 9.73        | 68.20             | 20.07          | 150         | 40        | Horizontal |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Antenna polarity: Vertical



| Suspected Data List |             |                  |                   |             |                   |                |             |           |          |
|---------------------|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|----------|
| NO.                 | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1                   | 21097.910   | 37.33            | 42.65             | 5.32        | 68.20             | 25.55          | 150         | 180       | Vertical |
| 2                   | 22275.028   | 38.57            | 44.30             | 5.73        | 68.20             | 23.90          | 150         | 30        | Vertical |
| 3                   | 26180.418   | 36.02            | 42.70             | 6.68        | 68.20             | 25.50          | 150         | 120       | Vertical |
| 4                   | 29436.744   | 37.50            | 46.43             | 8.93        | 68.20             | 21.77          | 150         | 40        | Vertical |
| 5                   | 32222.222   | 37.98            | 48.03             | 10.05       | 68.20             | 20.17          | 150         | 130       | Vertical |
| 6                   | 35911.991   | 38.44            | 47.38             | 8.94        | 68.20             | 20.82          | 150         | 30        | Vertical |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



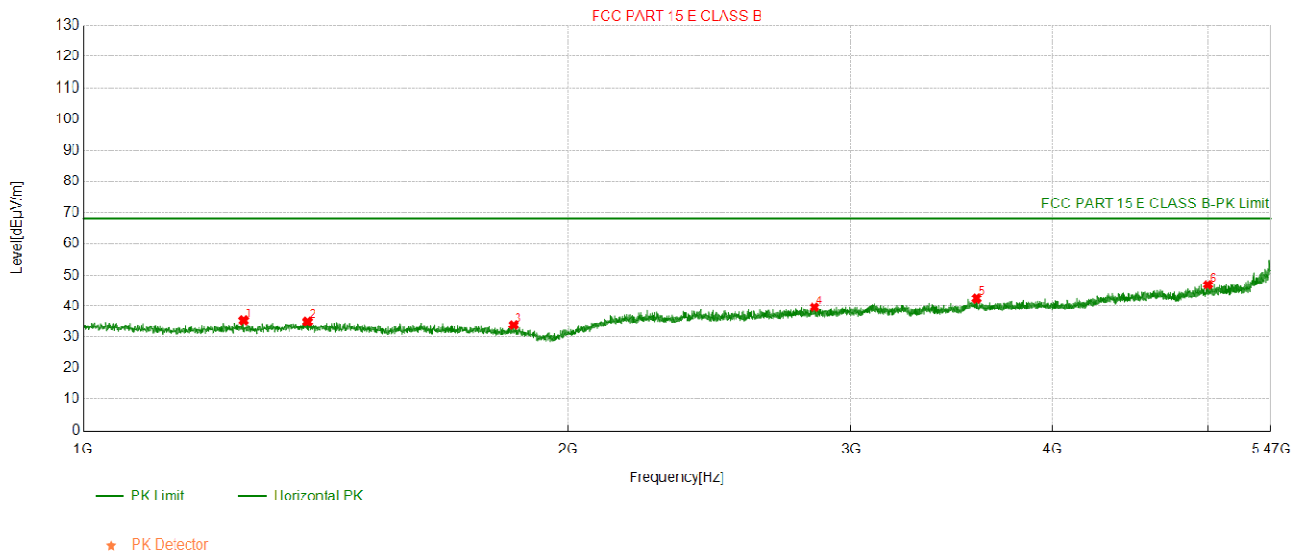
HUAKE TESTING

5470~5725MHz

All the test modes completed for test. Only the worst result was reported as below:

For 1GHz to 5.47GHz

Antenna polarity: Horizontal

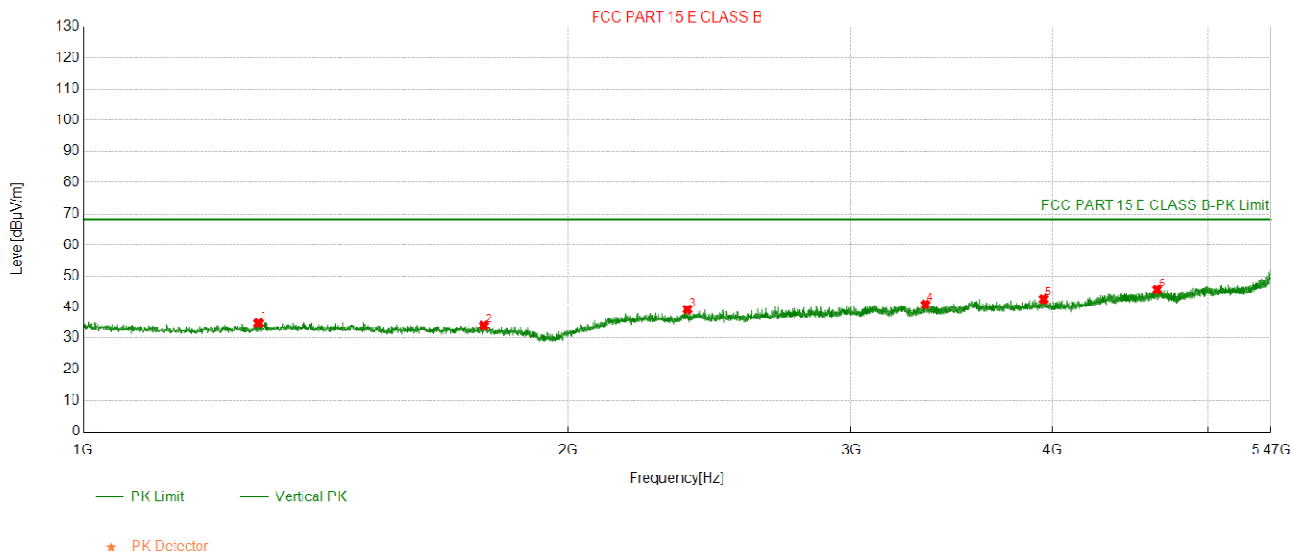


Suspected Data List

| NO. | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|------------|
| 1   | 1257.945    | 54.07            | 35.50             | -18.57      | 68.20             | 32.70          | 150         | 181       | Horizontal |
| 2   | 1378.200    | 53.22            | 35.11             | -18.11      | 68.20             | 33.09          | 150         | 118       | Horizontal |
| 3   | 1850.726    | 51.75            | 34.01             | -17.74      | 68.20             | 34.19          | 150         | 168       | Horizontal |
| 4   | 2845.848    | 53.14            | 39.70             | -13.44      | 68.20             | 28.50          | 150         | 159       | Horizontal |
| 5   | 3589.283    | 53.40            | 42.57             | -10.83      | 68.20             | 25.63          | 150         | 132       | Horizontal |
| 6   | 4997.474    | 51.42            | 46.94             | -4.48       | 68.20             | 21.26          | 150         | 60        | Horizontal |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Antenna polarity: Vertical



| Suspected Data List |             |                  |                   |             |                   |                |             |           |          |
|---------------------|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|----------|
| NO.                 | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1                   | 1284.767    | 53.30            | 34.82             | -18.48      | 68.20             | 33.38          | 150         | 152       | Vertical |
| 2                   | 1773.387    | 52.10            | 34.04             | -18.06      | 68.20             | 34.16          | 150         | 347       | Vertical |
| 3                   | 2372.874    | 53.73            | 39.21             | -14.52      | 68.20             | 28.99          | 150         | 75        | Vertical |
| 4                   | 3336.256    | 53.23            | 40.81             | -12.42      | 68.20             | 27.39          | 150         | 250       | Vertical |
| 5                   | 3949.601    | 52.30            | 42.52             | -9.78       | 68.20             | 25.68          | 150         | 226       | Vertical |
| 6                   | 4646.544    | 52.19            | 45.55             | -6.64       | 68.20             | 22.65          | 150         | 157       | Vertical |

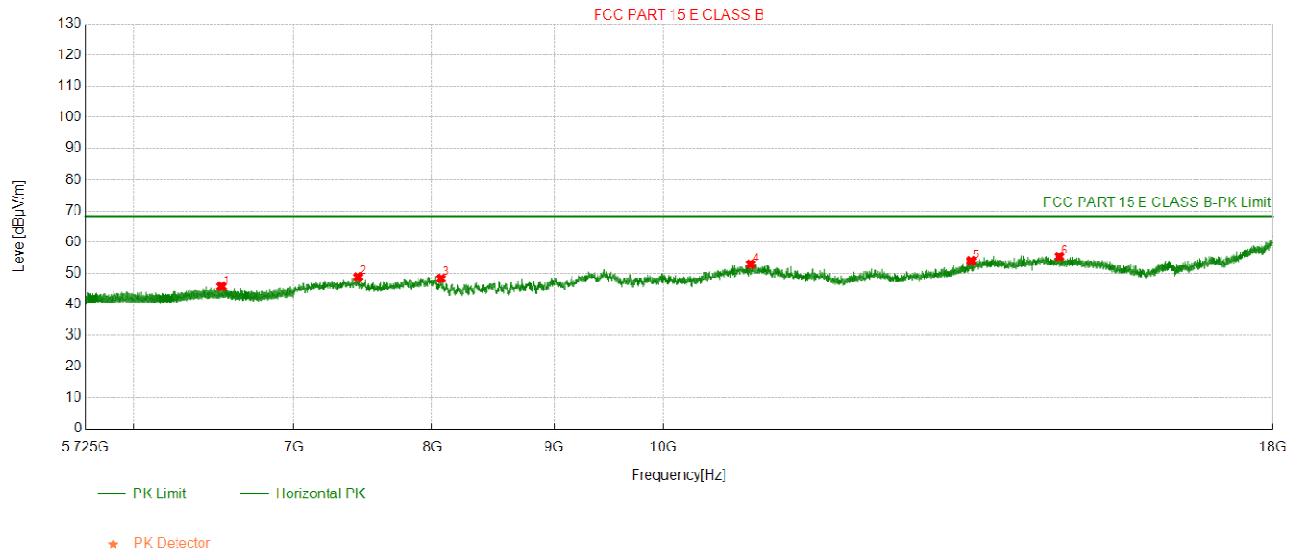
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



HUAKE TESTING

For 5.725GHz to 18GHz

Antenna polarity: Horizontal

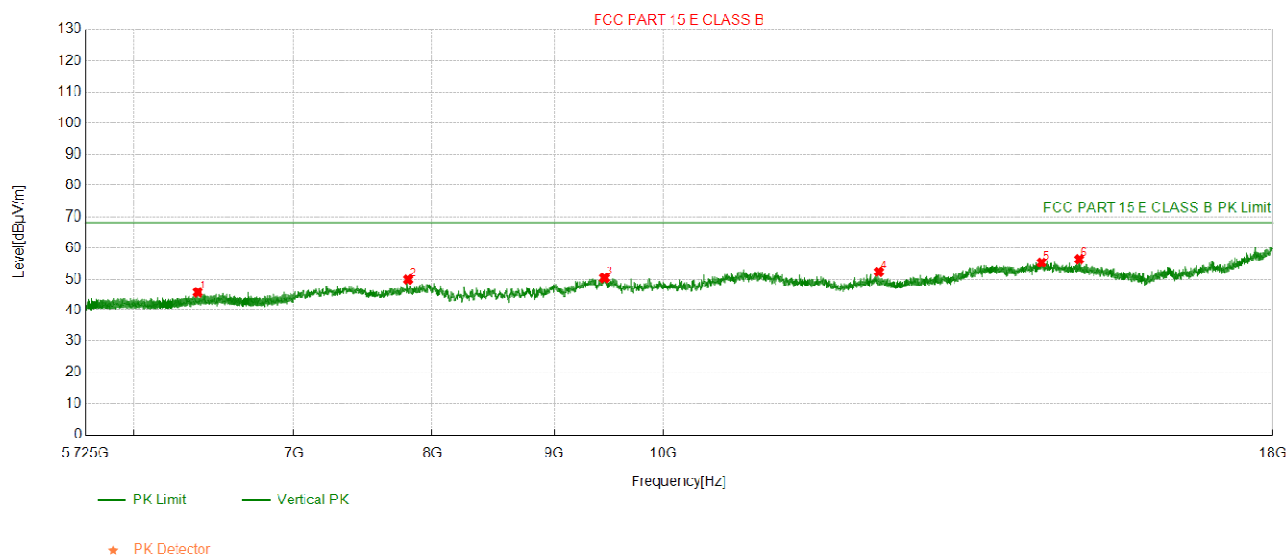


#### Suspected Data List

| NO. | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|------------|
| 1   | 6528.075    | 51.95            | 45.63             | -6.32       | 68.20             | 22.57          | 150         | 126       | Horizontal |
| 2   | 7446.645    | 51.77            | 48.74             | -3.03       | 68.20             | 19.46          | 150         | 125       | Horizontal |
| 3   | 8068.207    | 50.33            | 48.25             | -2.08       | 68.20             | 19.95          | 150         | 52        | Horizontal |
| 4   | 10875.688   | 50.40            | 52.80             | 2.40        | 68.20             | 15.40          | 150         | 255       | Horizontal |
| 5   | 13454.345   | 48.65            | 53.88             | 5.23        | 68.20             | 14.32          | 150         | 196       | Horizontal |
| 6   | 14644.664   | 47.49            | 55.28             | 7.79        | 68.20             | 12.92          | 150         | 341       | Horizontal |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Antenna polarity: Vertical



| Suspected Data List |             |                  |                   |             |                   |                |             |           |          |
|---------------------|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|----------|
| NO.                 | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1                   | 6381.818    | 52.75            | 45.75             | -7.00       | 68.20             | 22.45          | 150         | 230       | Vertical |
| 2                   | 7815.182    | 52.91            | 49.92             | -2.99       | 68.20             | 18.28          | 150         | 232       | Vertical |
| 3                   | 9445.545    | 50.20            | 50.40             | 0.20        | 68.20             | 17.80          | 150         | 43        | Vertical |
| 4                   | 12306.931   | 49.27            | 52.28             | 3.01        | 68.20             | 15.92          | 150         | 250       | Vertical |
| 5                   | 14398.240   | 47.96            | 55.38             | 7.42        | 68.20             | 12.82          | 150         | 241       | Vertical |
| 6                   | 14930.693   | 49.29            | 56.43             | 7.14        | 68.20             | 11.77          | 150         | 168       | Vertical |

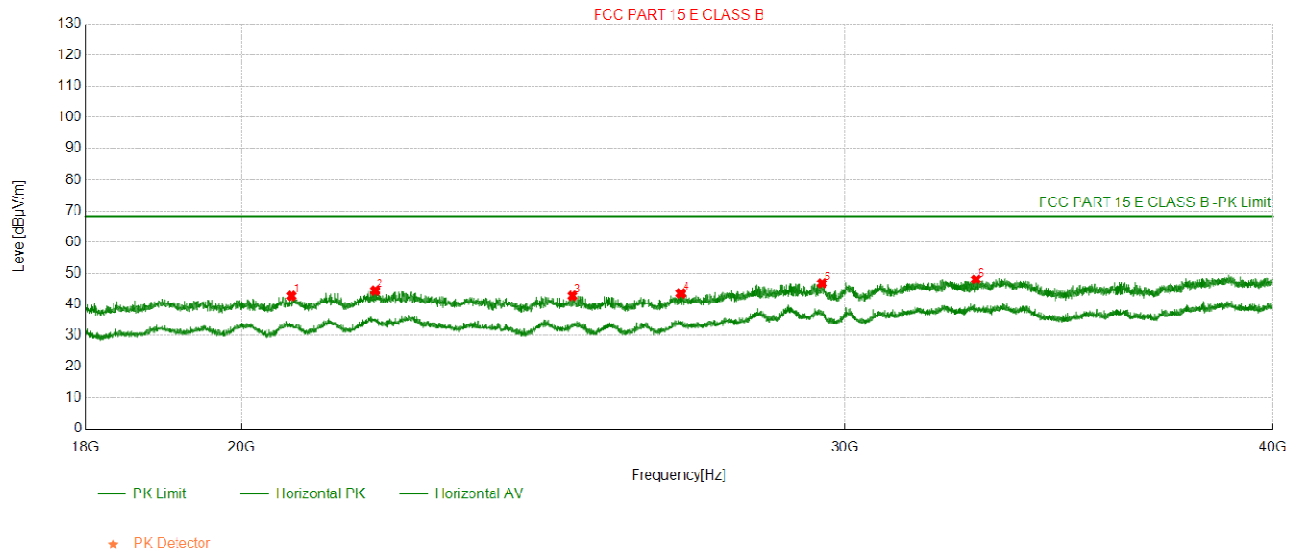
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



HUAKE TESTING

For 18GHz to 40GHz

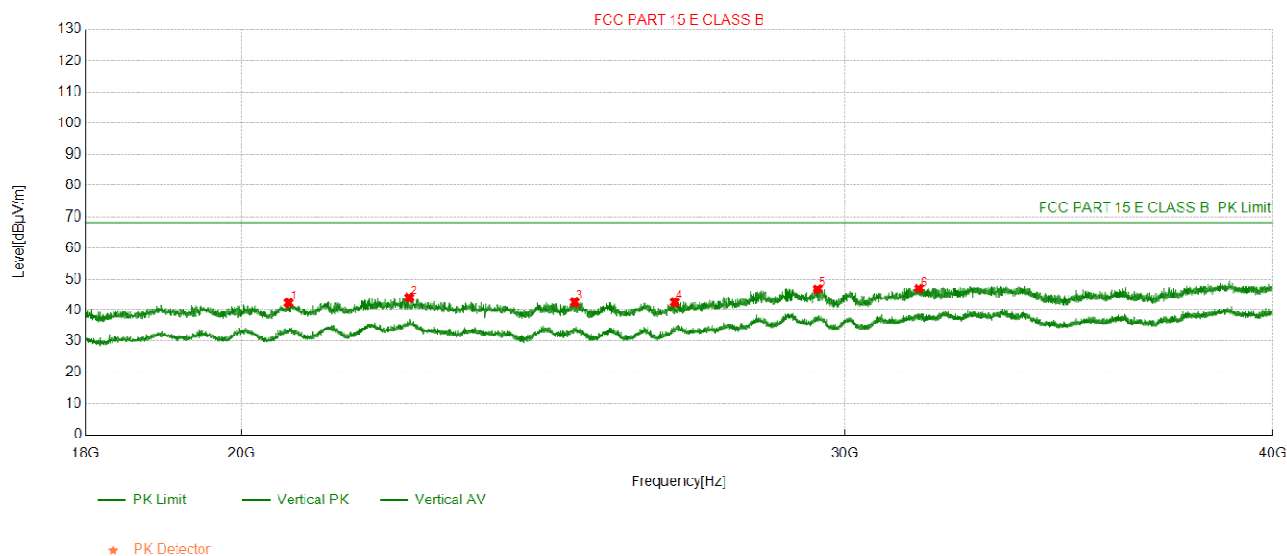
Antenna polarity: Horizontal



| Suspected Data List |             |                  |                   |             |                   |                |             |           |            |
|---------------------|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|------------|
| NO.                 | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1                   | 20675.468   | 36.85            | 42.64             | 5.79        | 68.20             | 25.56          | 150         | 330       | Horizontal |
| 2                   | 21874.587   | 38.64            | 44.27             | 5.63        | 68.20             | 23.93          | 150         | 190       | Horizontal |
| 3                   | 24974.697   | 36.28            | 42.66             | 6.38        | 68.20             | 25.54          | 150         | 240       | Horizontal |
| 4                   | 26864.686   | 36.05            | 43.42             | 7.37        | 68.20             | 24.78          | 150         | 50        | Horizontal |
| 5                   | 29540.154   | 37.72            | 46.62             | 8.90        | 68.20             | 21.58          | 150         | 180       | Horizontal |
| 6                   | 32759.076   | 37.31            | 47.93             | 10.62       | 68.20             | 20.27          | 150         | 110       | Horizontal |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Antenna polarity: Vertical



| Suspected Data List |             |                  |                   |             |                   |                |             |           |          |
|---------------------|-------------|------------------|-------------------|-------------|-------------------|----------------|-------------|-----------|----------|
| NO.                 | Freq. [MHz] | Reading [dBμV/m] | PK Level [dBμV/m] | Factor [dB] | PK Limit [dBμV/m] | PK Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1                   | 20638.064   | 36.58            | 42.41             | 5.83        | 68.20             | 25.79          | 150         | 130       | Vertical |
| 2                   | 22376.238   | 38.31            | 44.00             | 5.69        | 68.20             | 24.20          | 150         | 60        | Vertical |
| 3                   | 25009.901   | 36.19            | 42.61             | 6.42        | 68.20             | 25.59          | 150         | 0         | Vertical |
| 4                   | 26750.275   | 35.28            | 42.58             | 7.30        | 68.20             | 25.62          | 150         | 310       | Vertical |
| 5                   | 29447.745   | 37.91            | 46.83             | 8.92        | 68.20             | 21.37          | 150         | 130       | Vertical |
| 6                   | 31522.552   | 37.08            | 47.04             | 9.96        | 68.20             | 21.16          | 150         | 330       | Vertical |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

## 6.8 AC Power line Conducted Emissions

### Limit

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, 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 or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency Range<br>(MHz) | Limits<br>(dB $\mu$ V) |           |
|--------------------------|------------------------|-----------|
|                          | Quasi-peak             | Average   |
| 0.15 to 0.50             | 66 to 56*              | 56 to 46* |
| 0.50 to 5                | 56                     | 46        |
| 5 to 30                  | 60                     | 50        |

\* Decreases with the logarithm of the frequency.

### Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### Test Procedure

4. The EUT was placed on a table, which is 0.8m above ground plane.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Repeat above procedures until all frequency measured were complete.

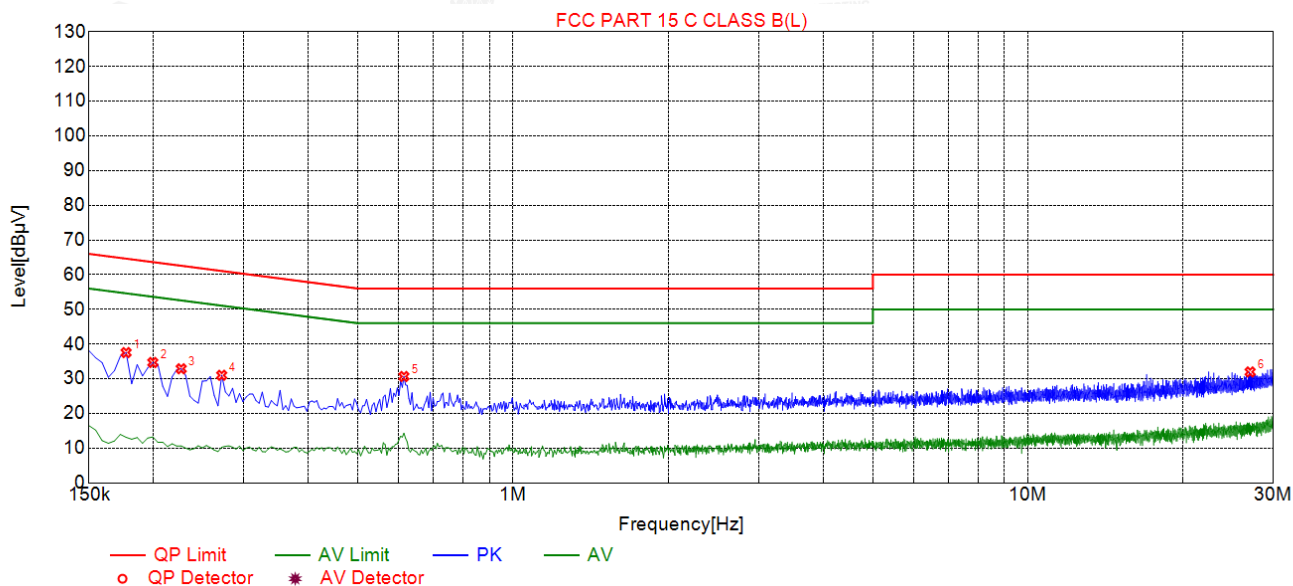
### Test Results

The initial step in collecting conducted data is a spectrum analyzer peaks can of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

## Test Data

All modes are tested; only the worst result of was reported as below:

Test Specification: Line



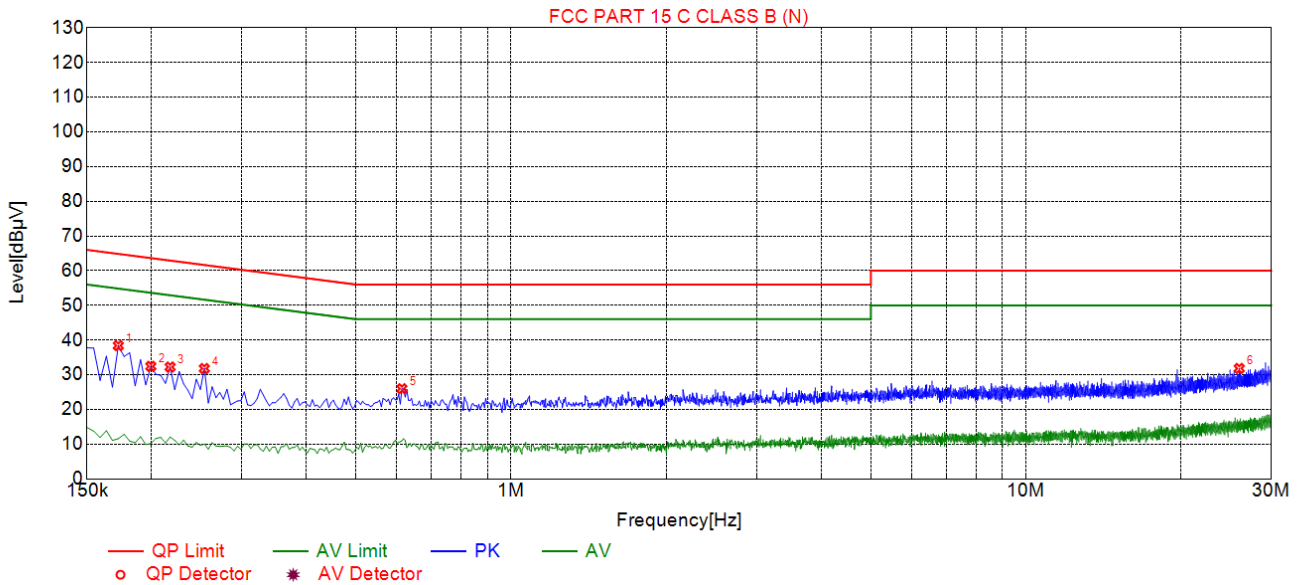
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBμV] | Factor<br>[dB] | Limit<br>[dBμV] | Margin<br>[dB] | Reading<br>[dBμV] | Detector | Type |
|-----|----------------|-----------------|----------------|-----------------|----------------|-------------------|----------|------|
| 1   | 0.1770         | 37.55           | 19.80          | 64.63           | 27.08          | 17.75             | PK       | L    |
| 2   | 0.1995         | 34.68           | 19.75          | 63.63           | 28.95          | 14.93             | PK       | L    |
| 3   | 0.2265         | 32.88           | 19.76          | 62.58           | 29.70          | 13.12             | PK       | L    |
| 4   | 0.2715         | 31.01           | 19.77          | 61.07           | 30.06          | 11.24             | PK       | L    |
| 5   | 0.6135         | 30.66           | 19.91          | 56.00           | 25.34          | 10.75             | PK       | L    |
| 6   | 27.0420        | 31.97           | 24.76          | 60.00           | 28.03          | 7.21              | PK       | L    |

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBμV] | Factor<br>[dB] | Limit<br>[dBμV] | Margin<br>[dB] | Reading<br>[dBμV] | Detector | Type |
|-----|----------------|-----------------|----------------|-----------------|----------------|-------------------|----------|------|
| 1   | 0.1725         | 38.39           | 19.86          | 64.84           | 26.45          | 18.53             | PK       | N    |
| 2   | 0.1995         | 32.43           | 19.75          | 63.63           | 31.20          | 12.68             | PK       | N    |
| 3   | 0.2175         | 32.24           | 19.76          | 62.91           | 30.67          | 12.48             | PK       | N    |
| 4   | 0.2535         | 31.80           | 19.79          | 61.64           | 29.84          | 12.01             | PK       | N    |
| 5   | 0.6135         | 25.98           | 19.95          | 56.00           | 30.02          | 6.03              | PK       | N    |
| 6   | 25.9890        | 31.83           | 24.39          | 60.00           | 28.17          | 7.44              | PK       | N    |

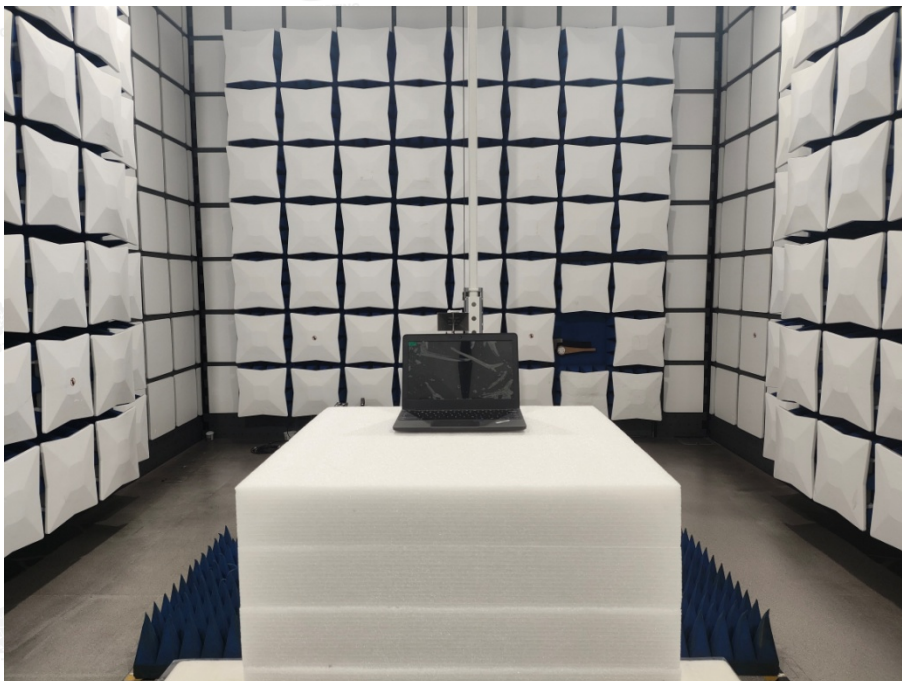
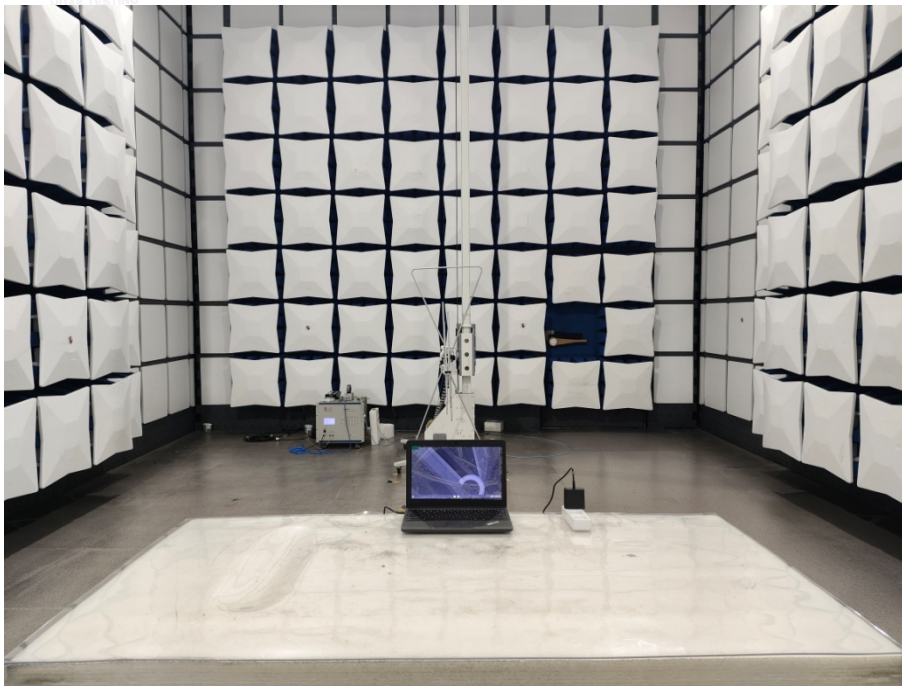
Remark: Margin = Limit - Level

Correction factor = Cable lose + LISN insertion loss

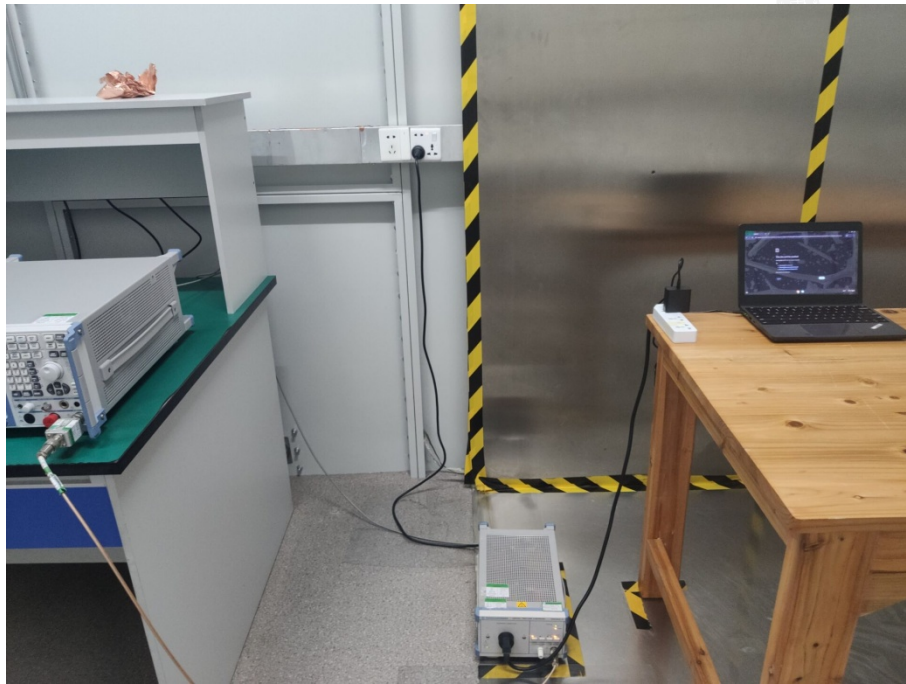
Level=Test receiver reading + correction factor

## 7. Test Setup Photos of the EUT

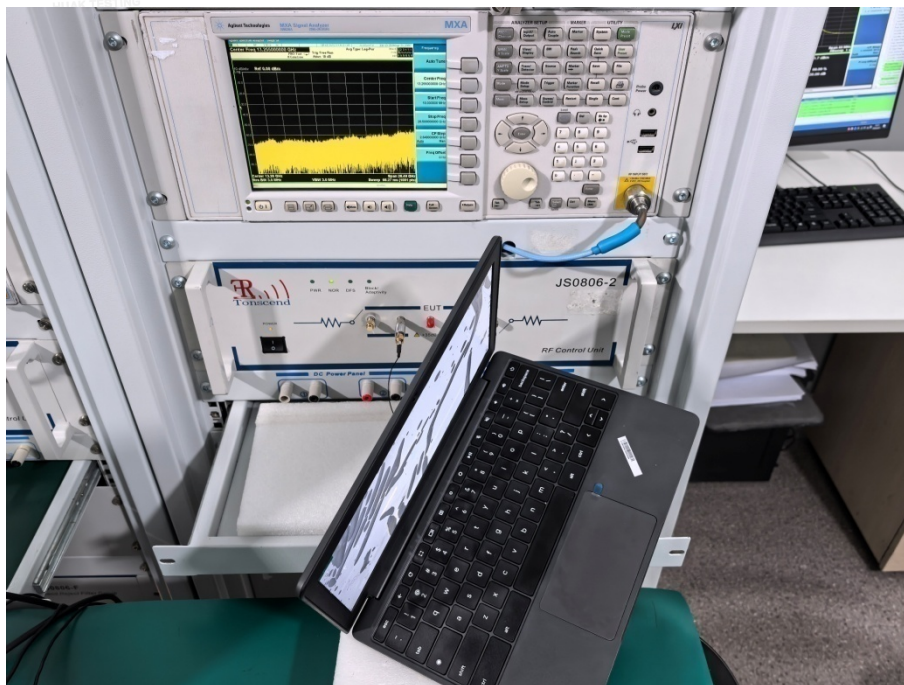
### Radiated Emission



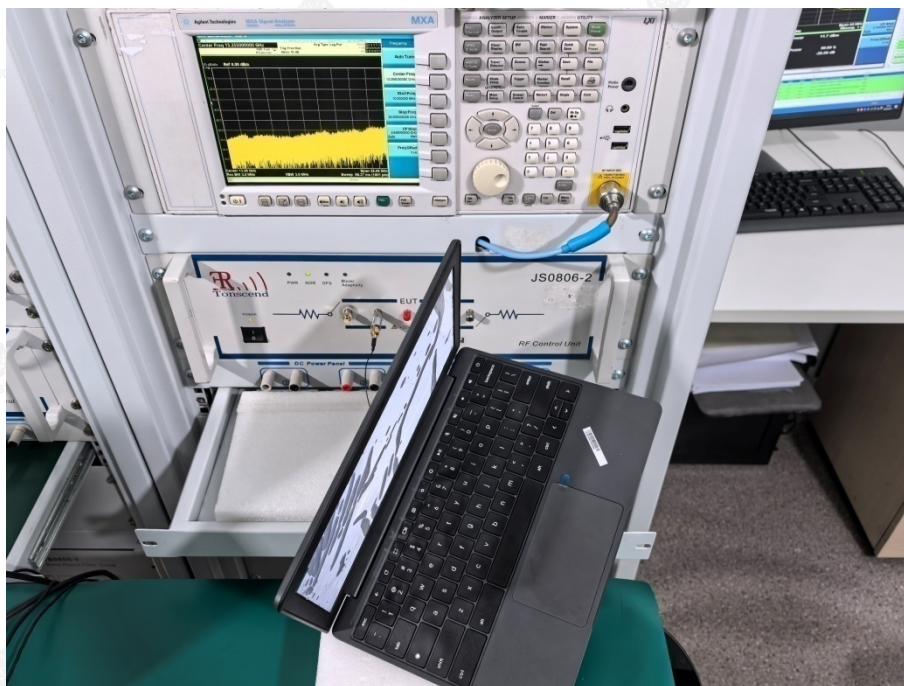
## AC Conducted Emission



## RF Conducted Emission ANT 1



## ANT 2



## 8. Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos

-----End of test report-----

