



REPORT No.: SZ24050196W04

# TEST REPORT

**APPLICANT** : POCKETALK CORPORATION

**PRODUCT NAME** : POCKETALK S2 Plus

**MODEL NAME** : PTS2P

**BRAND NAME** : POCKETALK

**FCC ID** : 2BGXA-PTS2P

**STANDARD(S)** : 47 CFR Part 15 Subpart E

**RECEIPT DATE** : 2024-05-29

**TEST DATE** : 2024-06-20 to 2024-07-18

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# DIRECTORY

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| Change History |            |                   |
|----------------|------------|-------------------|
| Version        | Date       | Reason for change |
| 1.0            | 2024-08-12 | First edition     |
|                |            |                   |



# 1. Summary of Test Result

| No. | Section      | Description                    | Test Date     | Test Engineer | Result | Method Determination /Remark |
|-----|--------------|--------------------------------|---------------|---------------|--------|------------------------------|
| 1   | 15.203       | Antenna Requirement            | N/A           | N/A           | PASS   | No deviation                 |
| 2   | ANSI C63.10  | Duty Cycle of the Test Signal  | Jun. 20, 2024 | Lin Haoyang   | PASS   | No deviation                 |
| 3   | 15.407(a)    | Maximum Conducted Output Power | Jun. 20, 2024 | Lin Haoyang   | PASS   | No deviation                 |
| 4   | 15.407(a)(e) | Emission Bandwidth             | Jun. 20, 2024 | Lin Haoyang   | PASS   | No deviation                 |
| 5   | 15.407(a)    | Peak Power Spectral Density    | Jun. 20, 2024 | Lin Haoyang   | PASS   | No deviation                 |
| 6   | 15.407(g)    | Frequency Stability            | Jun. 20, 2024 | Lin Haoyang   | PASS   | No deviation                 |
| 7   | 15.407(h)    | DFS                            | Jul. 08, 2024 | Lin Haoyang   | PASS   | No deviation                 |
| 8   | 15.207       | Conducted Emission             | Jun. 04, 2024 | Wang Deyong   | PASS   | No deviation                 |
| 9   | 15.407(b)    | Restricted Frequency Bands     | Jul. 12, 2024 | Li Hanbin     | PASS   | No deviation                 |
| 10  | 15.407(b)    | Radiated Emission              | Jul. 18, 2024 | Li Hanbin     | PASS   | No deviation                 |

**Note 1:** The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2013.

**Note 2:** These RF tests were performed according to the method of measurements prescribed in KDB 789033 D02 v02r01.

**Note 3:** These RF tests were performed according to the method of measurements prescribed in KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02.

**Note 4:** Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

**Note 5:** When the test result is a critical value, we will use the measurement uncertainty give the



judgment result based on the 95% confidence intervals.

## 1.1. Testing Applied Standards

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

- 47 CFR Part 15 Subpart E Radio Frequency Devices



## 1.2. Test Equipment List

### 1.2.1 Conducted Test Equipment

| Equipment                 | Serial No. | Type        | Manufacturer    | Cal. Date  | Due Date   |
|---------------------------|------------|-------------|-----------------|------------|------------|
| EXA Signal Analyzer       | MY53470836 | N9010A      | Agilent         | 2024.02.19 | 2025.02.18 |
| USB Wideband Power Sensor | MY54180008 | U2021XA     | Agilent         | 2023.10.17 | 2024.10.16 |
| Temperature Chamber       | 12108015   | DTL-003S101 | YOMA            | 2023.09.19 | 2024.09.18 |
| RF Cable (30MHz-26GHz)    | CB01       | RF01        | Morlab          | N/A        | N/A        |
| Coaxial Cable             | CB02       | RF02        | Morlab          | N/A        | N/A        |
| SMA Connector             | CN01       | RF03        | HUBER-SUHNER    | N/A        | N/A        |
| Attenuator                | MTJ6004-10 | 10dB        | MTJ cooperation | N/A        | N/A        |

### 1.2.2 Conducted Emission Test Equipment

| Equipment                    | Serial No.         | Type        | Manufacturer | Cal. Date  | Due Date   |
|------------------------------|--------------------|-------------|--------------|------------|------------|
| Receiver                     | MY56400093         | N9038A      | KEYSIGHT     | 2024.01.25 | 2025.01.24 |
| LISN                         | 8127449            | NSLK 8127   | Schwarzbeck  | 2024.02.02 | 2025.02.01 |
| Pulse Limiter (10dB)         | VTSD 9561 F-B #206 | VTSD 9561-F | Schwarzbeck  | 2024.05.30 | 2025.05.29 |
| RF Coaxial Cable (DC-100MHz) | BNC                | MRE04       | Qualwave     | N/A        | N/A        |

### 1.2.3 List of Software Used

| Description    | Manufacturer | Software Version |
|----------------|--------------|------------------|
| Test System    | MaiWei       | 2.0.0.0          |
| Morlab EMCR    | Morlab       | V1.2             |
| TS+ -[JS32-CE] | Tonscend     | V2.5.0.0         |

**1.2.4 Radiated Test Equipment**

| Equipment                      | Serial No.       | Type                | Manufacturer | Cal. Date  | Due Date   |
|--------------------------------|------------------|---------------------|--------------|------------|------------|
| Signal Analyzer                | MY56060145       | N9020A              | Agilent      | 2024.05.30 | 2025.05.29 |
| Test Antenna - Bi-Log          | 9163-519         | VULB 9163           | Schwarzbeck  | 2024.06.22 | 2025.06.21 |
| Test Antenna - Loop            | 1519-022         | FMZB1519            | Schwarzbeck  | 2024.06.03 | 2025.06.02 |
| Test Antenna – Horn            | 01774            | BBHA 9120D          | Schwarzbeck  | 2024.06.22 | 2025.06.21 |
| Test Antenna – Horn            | BBHA9170<br>#773 | BBHA9170            | Schwarzbeck  | 2024.06.22 | 2025.06.21 |
| Preamplifier<br>(10MHz-6GHz)   | 46732            | S10M100L38<br>02    | LUCIX CORP.  | 2024.05.30 | 2025.05.29 |
| Preamplifier<br>(2GHz-18GHz)   | 61171/61172      | S020180L32<br>03    | LUCIX CORP.  | 2024.05.30 | 2025.05.29 |
| Preamplifier<br>(18GHz-40GHz)  | DS77209          | DCLNA0118-<br>40C-S | Decentest    | 2024.05.30 | 2025.05.29 |
| RF Coaxial Cable<br>(DC-18GHz) | MRE001           | PE330               | Pasternack   | 2024.05.30 | 2025.05.29 |
| RF Coaxial Cable<br>(DC-18GHz) | MRE002           | CLU18               | Pasternack   | 2024.05.30 | 2025.05.29 |
| RF Coaxial Cable<br>(DC-18GHz) | MRE003           | CLU18               | Pasternack   | 2023.06.27 | 2024.06.26 |
| RF Coaxial Cable<br>(DC-40GHz) | 22290045         | QA360-40-<br>KK-0.5 | Qualwave     | N/A        | N/A        |
| RF Coaxial Cable<br>(DC-40GHz) | 22290046         | QA360-40-<br>KKF-2  | Qualwave     | N/A        | N/A        |
| RF Coaxial Cable<br>(DC-18GHz) | 22120181         | QA500-18-<br>NN-5   | Qualwave     | N/A        | N/A        |
| Notch Filter                   | N/A              | WRCG-<br>5150-5350  | Wainwright   | N/A        | N/A        |
| Notch Filter                   | N/A              | WRCG-<br>5470-5725  | Wainwright   | N/A        | N/A        |
| Anechoic Chamber               | N/A              | 9m*6m*6m            | CRT          | 2022.05.10 | 2025.05.09 |



### 1.3. Measurement Uncertainty

| Test Items                 | Uncertainty         | Remark                   |
|----------------------------|---------------------|--------------------------|
| Peak Output Power          | $\pm 2.22\text{dB}$ | Confidence levels of 95% |
| Power Spectral Density     | $\pm 2.22\text{dB}$ | Confidence levels of 95% |
| Bandwidth                  | $\pm 5\%$           | Confidence levels of 95% |
| Restricted Frequency Bands | $\pm 5\%$           | Confidence levels of 95% |
| Radiated Emission          | $\pm 2.95\text{dB}$ | Confidence levels of 95% |
| Conducted Emission         | $\pm 2.44\text{dB}$ | Confidence levels of 95% |

### 1.4. Testing Laboratory

|                                   |                                                                                                                                  |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Laboratory Name                   | Shenzhen Morlab Communications Technology Co., Ltd.                                                                              |
| Laboratory Address                | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China |
| Telephone                         | +86 755 36698555                                                                                                                 |
| Facsimile                         | +86 755 36698525                                                                                                                 |
| FCC Designation Number            | CN1192                                                                                                                           |
| FCC Test Firm Registration Number | 226174                                                                                                                           |



## 2. General Description

### 2.1. Information of Applicant and Manufacturer

|                             |                                                                                                                                            |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>            | POCKETALK CORPORATION                                                                                                                      |
| <b>Applicant Address</b>    | 4F Hamamatsucho PREX, 2-2-12 Shiba, Minato-ku, Tokyo 105-0014, Japan                                                                       |
| <b>Manufacturer</b>         | JENESIS (SHEN ZHEN) CO., LTD.                                                                                                              |
| <b>Manufacturer Address</b> | 6th Floor, Building A, No.2 Luozhu Industrial Avenue, Luozhu Community, Shiyan Street, Bao'an District, Shenzhen City, Guangdong Province. |

### 2.2. Information of EUT

|                                   |                                                      |                                        |
|-----------------------------------|------------------------------------------------------|----------------------------------------|
| <b>Product Name:</b>              | POCKETALK S2 Plus                                    |                                        |
| <b>Sample No.:</b>                | 4#                                                   |                                        |
| <b>Hardware Version:</b>          | V1.0                                                 |                                        |
| <b>Software Version:</b>          | V1.0.5                                               |                                        |
| <b>Modulation Technology:</b>     | OFDM                                                 |                                        |
| <b>Modulation Mode:</b>           | 802.11a                                              |                                        |
| <b>Operating Frequency Range:</b> | 5180MHz-5240MHz; 5260MHz-5320MHz;<br>5500MHz-5720MHz |                                        |
| <b>Antenna Type:</b>              | PIFA Antenna                                         |                                        |
| <b>Antenna Gain:</b>              | 5180MHz-5240MHz                                      | 2.07dBi                                |
|                                   | 5260MHz-5320MHz                                      | 1.30dBi                                |
|                                   | 5500MHz-5720MHz                                      | 2.81dBi                                |
| <b>Accessory Information:</b>     | Battery                                              |                                        |
|                                   | Brand Name:                                          | N/A                                    |
|                                   | Model No.:                                           | PT305070                               |
|                                   | Serial No.:                                          | N/A                                    |
|                                   | Capacity:                                            | 1550mAh                                |
|                                   | Rated Voltage:                                       | 3.8V                                   |
|                                   | Charge Limit:                                        | 4.35V                                  |
|                                   | Manufacturer:                                        | Guangdong Pow-Tech New Power Co., Ltd. |



|                               |               |                                        |
|-------------------------------|---------------|----------------------------------------|
| <b>Accessory Information:</b> | AC Adapter 1  |                                        |
|                               | Brand Name:   | FLYPOWER                               |
|                               | Model No.:    | PS06CA050K1000UU                       |
|                               | Serial No.:   | N/A                                    |
|                               | Rated Output: | 5V $\overline{=}$ 1A                   |
|                               | Rated Input:  | 100-240V $\sim$ 50/60Hz, 0.25A         |
|                               | Manufacturer: | Shenzhen Flypower Technology Co., Ltd. |
|                               | AC Adapter 2  |                                        |
|                               | Brand Name:   | FLYPOWER                               |
|                               | Model No.:    | PS06CA050K1000JU                       |
|                               | Serial No.:   | N/A                                    |
|                               | Rated Output: | 5V $\overline{=}$ 1A                   |
|                               | Rated Input:  | 100-240V $\sim$ 50/60Hz, 0.25A         |
|                               | Manufacturer: | Shenzhen Flypower Technology Co., Ltd. |
|                               | USB Cable     |                                        |
|                               | Model No.:    | N/A                                    |
|                               | Manufacturer: | Guangdong Pow-Tech New Power Co., Ltd. |

**Note 1:** We use the dedicated software to control the EUT continuous transmission.

**Note 2:** For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



## 2.3.Channel List of EUT

| (U-NII-1) 5180MHz-5240MHz  |            |                 |            |                 |
|----------------------------|------------|-----------------|------------|-----------------|
| Bandwidth                  | Channel    | Frequency (MHz) | Channel    | Frequency (MHz) |
| 20MHz                      | <b>36</b>  | <b>5180</b>     | 40         | 5200            |
|                            | <b>44</b>  | <b>5220</b>     | <b>48</b>  | <b>5240</b>     |
| (U-NII-2A) 5260MHz-5320MHz |            |                 |            |                 |
| Bandwidth                  | Channel    | Frequency (MHz) | Channel    | Frequency (MHz) |
| 20MHz                      | <b>52</b>  | <b>5260</b>     | 56         | 5280            |
|                            | <b>60</b>  | <b>5300</b>     | <b>64</b>  | <b>5320</b>     |
| (U-NII-2C) 5500MHz-5720MHz |            |                 |            |                 |
| Bandwidth                  | Channel    | Frequency (MHz) | Channel    | Frequency (MHz) |
| 20MHz                      | <b>100</b> | <b>5500</b>     | 105        | 5520            |
|                            | 108        | 5540            | 112        | 5560            |
|                            | 116        | 5580            | <b>120</b> | <b>5600</b>     |
|                            | 124        | 5620            | 128        | 5640            |
|                            | 132        | 5660            | 136        | 5680            |
|                            | 140        | 5700            | <b>144</b> | <b>5720</b>     |

**Note 1:** The black bold channels were selected for test.



## 2.4. Test Configuration of EUT

### 2.4.1. Modulation Type and Data Rate of EUT

| Mode    | Bandwidth (MHz) | Modulation Technology | Modulation Type | Data Rate                            | RU Size |
|---------|-----------------|-----------------------|-----------------|--------------------------------------|---------|
| 802.11a | 20              | OFDM                  | <b>BPSK</b>     | <b>6/9/12/18/24/36/48/54</b><br>Mbps | N/A     |
|         |                 |                       | QPSK            |                                      |         |
|         |                 |                       | 16QAM           |                                      |         |
|         |                 |                       | 64QAM           |                                      |         |

**Note1:** The worst-case mode (bold face) in all data rates has been determined during the pre-scan, only the test data of the worst-case were recorded in this report.

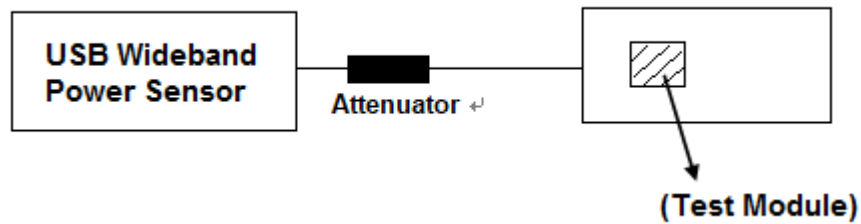
## 2.5. Test Conditions

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

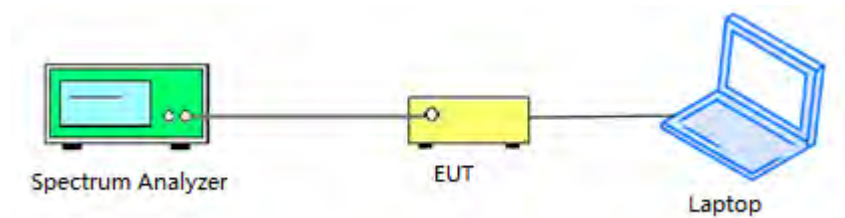
## 2.6. Test Setup Layout Diagram

### 2.6.1. Conducted Measurement

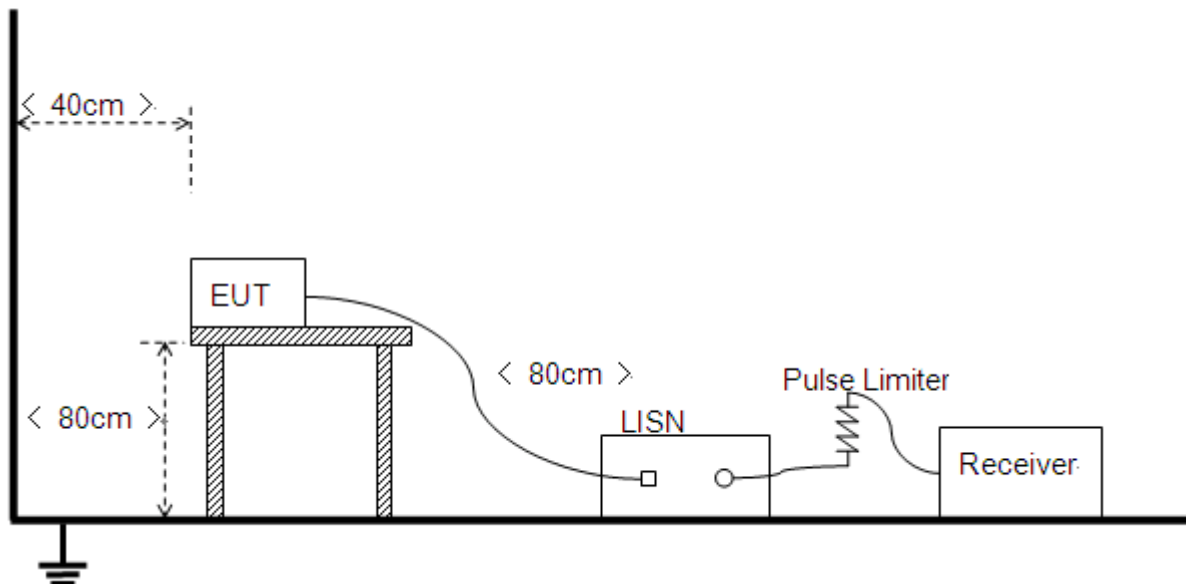
For power item that BW below 80MHz system:



For power item that BW equal or above 80MHz and other items:



### 2.6.2. Conducted Emission Measurement

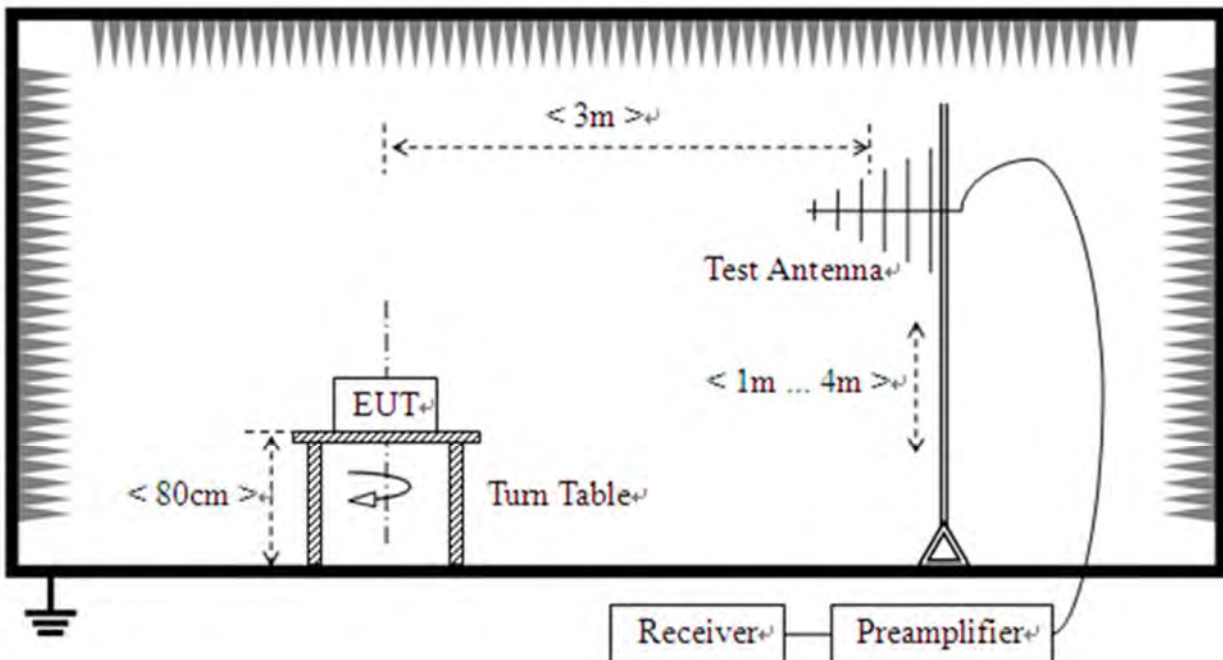


### 2.6.3.Radiation Measurement

1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to 1GHz



3) For radiated emissions above 1GHz





## 3. Test Results

### 3.1. Antenna Requirement

#### 3.1.1. Requirement

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.

#### 3.1.2. Test Result

| Antenna location                                                                  | Antenna Type                                                                                                                                                                                                                                                                                                      | Coupling Method                                                                                                                                                                       |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Internal<br><input type="checkbox"/> External | <input type="checkbox"/> FPC Antenna<br><input type="checkbox"/> Spring Antenna<br><input type="checkbox"/> Ceramic Antenna<br><input type="checkbox"/> Integrated Antenna<br><input type="checkbox"/> Dipole Antenna<br><input type="checkbox"/> PCB Antenna<br><input checked="" type="checkbox"/> PIFA Antenna | <input checked="" type="checkbox"/> I-PEX Connector<br><input type="checkbox"/> SMA Connector<br><input type="checkbox"/> RP-SMA Connector<br><input type="checkbox"/> Metal Shrapnel |



## 3.2. Duty Cycle of Test Signal

### 3.2.1. Requirement

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be used to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration ( $T$ ) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed  $T$  at any time that data are being acquired (i.e., no transmitter OFF-time is to be considered).

When continuous transmission cannot be achieved and sweep triggering/signal gating cannot be implemented, alternative procedures are provided that can be used to measure the average power; however, they will require an additional measurement of the transmitter duty cycle ( $D$ ). Within this sub clause, the duty cycle refers to the fraction of time over which the transmitter is ON and is transmitting at its maximum power control level. The duty cycle is considered to be constant if variations are less than  $\pm 2\%$ ; otherwise, the duty cycle is considered to be non constant.

### 3.2.2. Test Result

Refer to Annex A.1 in this report.



### 3.3. Maximum Conducted Output Power

#### 3.3.1. Requirement

(1) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250mW provided the maximum antenna gain does not exceed 6dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or  $11\text{dBm} + 10 \log B$ , where B is the 26 dB emission bandwidth in megahertz.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

(4) According to KDB662911D01 Measure-and-sum technique, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in units that are directly proportional to power.

(5) According to KDB 662911 D01, the directional gain =  $G_{\text{ANT}} + 10\log(N_{\text{ANT}})\text{dBi}$ , where  $G_{\text{ANT}}$  is the antenna gain in dBi,  $N_{\text{ANT}}$  is the number of outputs.

#### 3.3.2. Test Procedures

The EUT (Equipment under the test) which is coupled to the USB Wideband Power Sensor; 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 USB Wideband Power Sensor.

##### For ac (VHT80) mode power

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.



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### **3.3.3.Test Setup Layout**

Refer to chapter 2.6.1 in this report.

### **3.3.4.Test Result**

Refer to Annex A.2 in this report.



## 3.4. Emission Bandwidth

### 3.4.1. Requirement

For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement. Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### 3.4.1. Test Procedures

1. KDB 789033 Section C) 1) Emission Bandwidth was used in order to prove compliance
  - a) Set RBW = approximately 1% of the emission bandwidth.
  - b) Set VBW > RBW.
  - c) Detector = Peak.
  - d) Trace mode = max hold.
  - e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
2. KDB 789033 Section C) 2) minimum emission bandwidth for the band 5.725-5.85GHz was used in order to prove compliance.

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

  - a) Set RBW = 100 kHz.
  - b) Set video bandwidth (VBW)  $\geq 3 \times$  RBW.
  - 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.



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#### **3.4.2.Test Setup Layout**

Refer to chapter 2.6.1 in this report.

#### **3.4.3.Test Result**

Refer to Annex A.3 in this report.



## 3.5. Peak Power Spectral Density

### 3.5.1. Requirement

(1) For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

(3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30dBm in any 500kHz band.

If transmitting antennas of directional gain greater than 6dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

(4) According to KDB662911D01 Measure-and-sum technique, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in units that are directly proportional to power.

(5) According to KDB 662911 D01, the directional gain =  $G_{ANT} + 10\log(N_{ANT})$  dBi, where  $G_{ANT}$  is the antenna gain in dBi,  $N_{ANT}$  is the number of outputs.

### 3.5.2. Test Procedures

KDB 789033 Section F) Maximum Power Spectral Density (PSD) Method SA-3 was used in order to prove compliance

- 1) Set span to encompass the entire 26-dB emission bandwidth
  - 2) Set RBW = 1MHz. Set VBW  $\geq$  3MHz
  - 3) Number of points in sweep  $\geq$  2 Span / RBW. Sweep time = auto
  - 4) Detector = Average
  - 5) Trace mode=Max hold
- Record the max value

### 3.5.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

### 3.5.4. Test Result

Refer to Annex A.4 in this report.



## **3.6. Frequency Stability**

### **3.6.1. Requirement**

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.

### **3.6.2. Test Procedures**

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between 5°C to 40°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

### **3.6.3. Test Result**

Refer to Annex A.5 in this report.

## 3.7. Dynamic Frequency Selection

### 3.7.1. Requirement

According to FCC section 15.407(h), (1) Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW. (2)

Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating with any part of its 26 dB emission bandwidth in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems. Operators shall only use equipment with a DFS mechanism that is turned on when operating in these bands. The device must sense for radar signals at 100 percent of its emission bandwidth. The minimum DFS detection threshold for devices with a maximum e.i.r.p. of 200 mW to 1 W is -64 dBm. For devices that operate with less than 200 mW e.i.r.p. and a power spectral density of less than 10 dBm in a 1 MHz band, the minimum detection threshold is -62 dBm. The detection threshold is the received power averaged over 1 microsecond referenced to a 0 dBi antenna. For the initial channel setting, the manufacturers shall be permitted to provide for either random channel selection or manual channel selection.

A U-NII network will employ a DFS function to detect signals from radar systems and to avoid co-channel operation with these systems. This applies to the 5250-5350 MHz and/or 5470-5725 MHz bands.<sup>1</sup>

Within the context of the operation of the DFS function, a U-NII device will operate in either Master Mode or Client Mode. U-NII devices operating in Client Mode can only operate in a network controlled by a U-NII device operating in Master Mode.<sup>2</sup>

Tables 1 and 2 shown below summarize the information contained in sections 5.1.1 and 5.1.2.

**Table 1: Applicability of DFS Requirements Prior to Use of a Channel**

| Requirement                     | Operational Mode |                                |                             |
|---------------------------------|------------------|--------------------------------|-----------------------------|
|                                 | Master           | Client Without Radar Detection | Client With Radar Detection |
| Non-Occupancy Period            | Yes              | Not required                   | Yes                         |
| DFS Detection Threshold         | Yes              | Not required                   | Yes                         |
| Channel Availability Check Time | Yes              | Not required                   | Not required                |
| U-NII Detection Bandwidth       | Yes              | Not required                   | Yes                         |

**Table 2: Applicability of DFS requirements during normal operation**

| Requirement | Operational Mode |
|-------------|------------------|
|-------------|------------------|



|                                   | Master | Client Without Radar Detection |
|-----------------------------------|--------|--------------------------------|
| DFS Detection Threshold           | Yes    | Not required                   |
| Channel Closing Transmission Time | Yes    | Yes                            |
| Channel Move Time                 | Yes    | Yes                            |
| U-NII Detection Bandwidth         | Yes    | Not required                   |

| Additional requirements for devices with multiple bandwidth modes                                                                                                                                                                                                                                                                                     | Master Device or Client with Radar Detection | Client Without Radar Detection                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------------|
| U-NII Detection Bandwidth and Statistical Performance Check                                                                                                                                                                                                                                                                                           | All BW modes must be tested                  | Not required                                         |
| Channel Move Time and Channel Closing Transmission Time                                                                                                                                                                                                                                                                                               | Test using widest BW mode available          | Test using the widest BW mode available for the link |
| All other tests                                                                                                                                                                                                                                                                                                                                       | Any single BW mode                           | Not required                                         |
| Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency. |                                              |                                                      |

The operational behavior and individual DFS requirements that are associated with these modes are as follows:

#### Master Devices

- The Master Device will use DFS in order to detect Radar Waveforms with received signal strength above the DFS Detection Threshold in the 5250 – 5350 MHz and 5470 – 5725 MHz bands. DFS is not required in the 5150 – 5250 MHz or 5725 – 5825 MHz bands.
- Before initiating a network on a Channel, the Master Device will perform a Channel Availability Check for specified time duration (Channel Availability Check Time) to ensure that there is no radar system operating on the Channel, using DFS described under subsection a) above.
- The Master Device initiates a U-NII network by transmitting control signals that will enable other U-NII devices to Associate with the Master Device.
- During normal operation, the Master Device will monitor the Channel (In-Service Monitoring) to ensure that there is no radar system operating on the Channel, using DFS described under a).
- If the Master Device has detected a Radar Waveform during In-Service Monitoring as described under d), the Operating Channel of the U-NII network is no longer an Available Channel. The Master Device will instruct all associated Client Device(s) to stop transmitting on this Channel within the Channel Move Time. The transmissions during the Channel Move Time will be limited to the Channel Closing Transmission Time.
- Once the Master Device has detected a Radar Waveform it will not utilize the Channel for the duration of the Non-Occupancy Period. 3.



g) If the Master Device delegates the In-Service Monitoring to a Client Device, then the combination will be tested to the requirements described under d) through f) above.

#### Client Devices

a) A Client Device will not transmit before having received appropriate control signals from a Master Device.

b) A Client Device will stop all its transmissions whenever instructed by a Master Device to which it is associated and will meet the Channel Move Time and Channel Closing Transmission Time requirements. The Client Device will not resume any transmissions until it has again received control signals from a Master Device.

c) If a Client Device is performing In-Service Monitoring and detects a Radar Waveform above the DFS Detection Threshold, it will inform the Master Device. This is equivalent to the Master Device detecting the Radar Waveform and d) through f) of section 5.1.1 apply.

d) Irrespective of Client Device or Master Device detection the Channel Move Time and Channel Closing Transmission Time requirements remain the same.

e) The client test frequency must be monitored to ensure no transmission of any type has occurred for 30 minutes. Note: If the client moves with the master, the device is considered compliant if nothing appears in the client non-occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear.

#### DFS Detection Thresholds

Table 3 below provides the DFS Detection Thresholds for Master Devices as well as Client Devices incorporating In-Service Monitoring.

**Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection**

| Maximum Transmit Power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Value (See Notes 1, 2, and 3) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| EIRP $\geq$ 200 mill watt                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -64 dBm                       |
| EIRP < 200 mill watt and<br>power spectral density < 10 dBm/MHz                                                                                                                                                                                                                                                                                                                                                                                                                                         | -62 dBm                       |
| EIRP < 200 mill watt that do not meet the power spectral<br>density requirement                                                                                                                                                                                                                                                                                                                                                                                                                         | -64 dBm                       |
| Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.<br>Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.<br>Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01. |                               |

#### Response Requirements

Table 4 provides the response requirements for Master and Client Devices incorporating DFS.

**Table 4: DFS Response Requirement Values**

| Parameter                         | Value                                                                                                  |
|-----------------------------------|--------------------------------------------------------------------------------------------------------|
| Non-occupancy period              | Minimum 30 minutes                                                                                     |
| Channel Availability Check Time   | 60 seconds                                                                                             |
| Channel Move Time                 | 10 seconds<br>See Note 1.                                                                              |
| Channel Closing Transmission Time | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2. |
| U-NII Detection Bandwidth         | Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.                                |

**Note 1:** Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

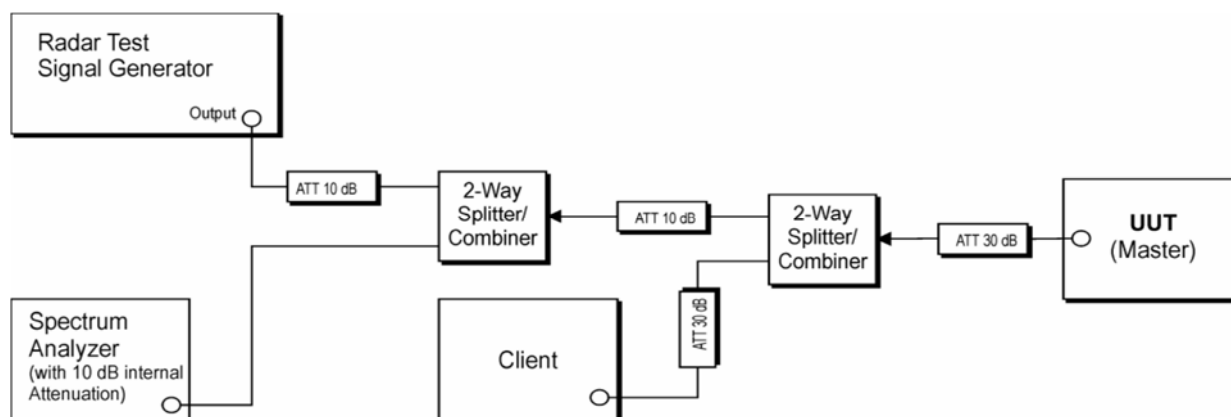
**Note 2:** The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

**Note 3:** During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

### 3.7.2.Test Description

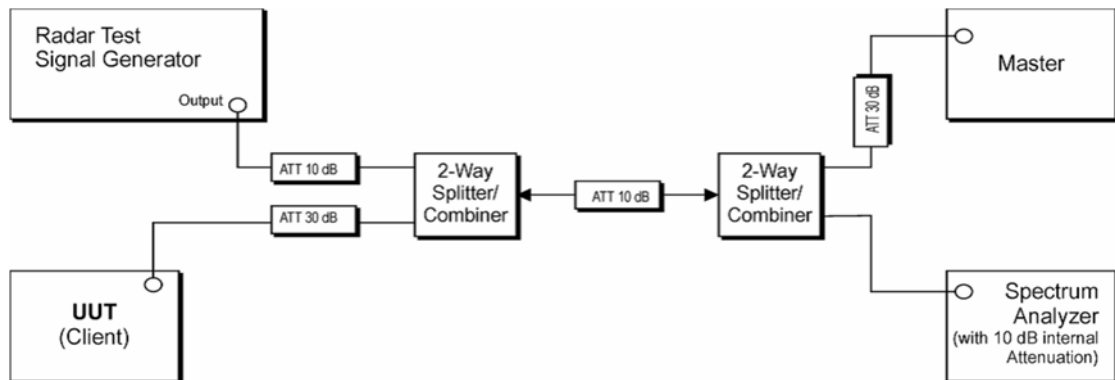
According to Section 7.2 of KDB 905462 D02 V01R01

#### 1. Setup for Master with injection at the Master



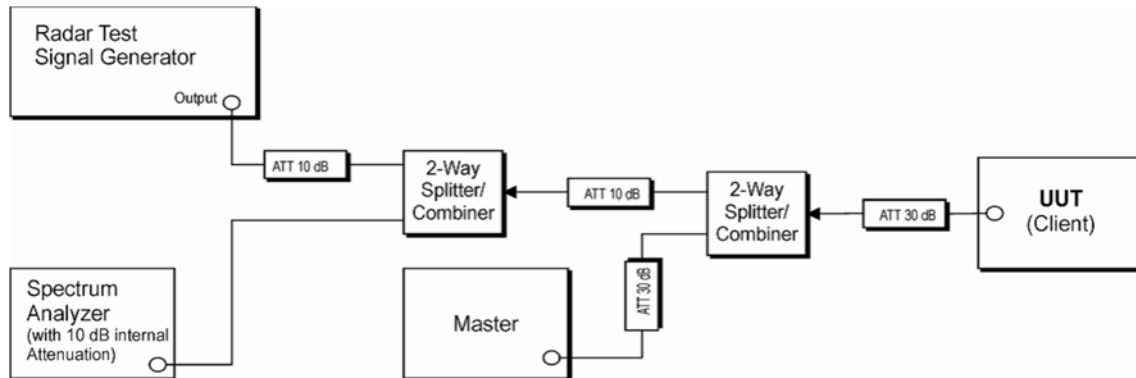
(Example Conducted Setup where UUT is a Master and Radar Test Waveforms are injected into the Master)

#### 2. Setup for Client with injection at the Master



(Example Conducted Setup where UUT is a Client and Radar Test Waveforms are injected into the Master)

### 3. Setup for Client with injection at the Client



(Example Conducted Setup where UUT is a Client and Radar Test Waveforms are injected into the Client)

### 3.7.3.Information of Companion Device

|                 |               |
|-----------------|---------------|
| Product Name:   | Router        |
| Manufacturer:   | ASUS          |
| FCC ID:         | MSQ-RTAXJF00  |
| Device Type:    | Master Device |
| Operating Mode: | Master Mode   |
| Serial No:      | M3IAJF201046  |
| Antenna Gain:   | 2.0dBi        |

### 3.7.4.Test Result

Refer to Annex A.6 in this report.

## 3.8. Conducted Emission

### 3.8.1. 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 Range (MHz) | 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.

### 3.8.2. Test Procedures

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.

### 3.8.3. Test Setup Layout

Refer to chapter 2.6.2 in this report.

### 3.8.4. Test Result

Refer to Annex A.7 in this report.

## 3.9. Restricted Frequency Bands

### 3.9.1. Requirement

The peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.
- (2) For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.
- (3) For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:
  - (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

The following formula is used to convert the equipment isotropic radiated power(e.i.r.p.) to field strength (dBμV/m);

$$E = 1000000 \times \sqrt{30P} / 3 \mu\text{V/m}$$

where P is the EIRP in Watts

Therefore: -27 dBm/MHz = 68.23 dBuV/m



Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. 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                        |

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. 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).

### 3.9.2.Test Procedures

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

KDB 789033 Section H) 3)5)6(d)) was used in order to prove compliance

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

### 3.9.3.Test Setup Layout

Refer to chapter 2.6.3 in this report.

### 3.9.4.Test Result

Refer to Annex A.8 in this report.

## 3.10. Radiated Emission

### 3.10.1.Requirement

The peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.
- (2) For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.
- (3) For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

The following formula is used to convert the equipment isotropic radiated power(e.i.r.p.) to field strength (dBμV/m);

$$E = 1000000 \times \sqrt{30P} / 3 \mu\text{V/m}$$

where P is the EIRP in Watts

Therefore: -27 dBm/MHz = 68.23 dBuV/m

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. 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 (μV/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                        |



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. 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).

### **3.10.2.Test Procedures**

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 30MHz, the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9kHz-90 kHz, 110kHz-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements and as applicable for average measurements.

The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions. For measurements above 1 GHz, keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

### **3.10.3.Test Setup Layout**

Refer to chapter 2.6.3 in this report.

### **3.10.4.Test Result**

Refer to Annex A.9 in this report.



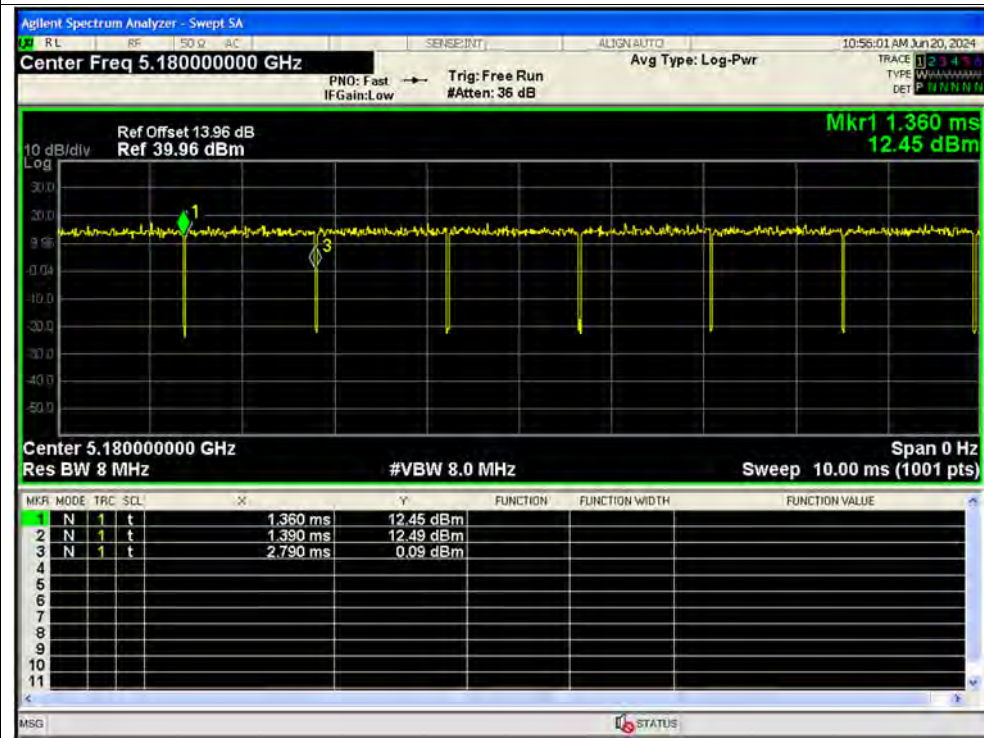
## Annex A Test Data and Result

### A.1. Duty Cycle of Test Signal

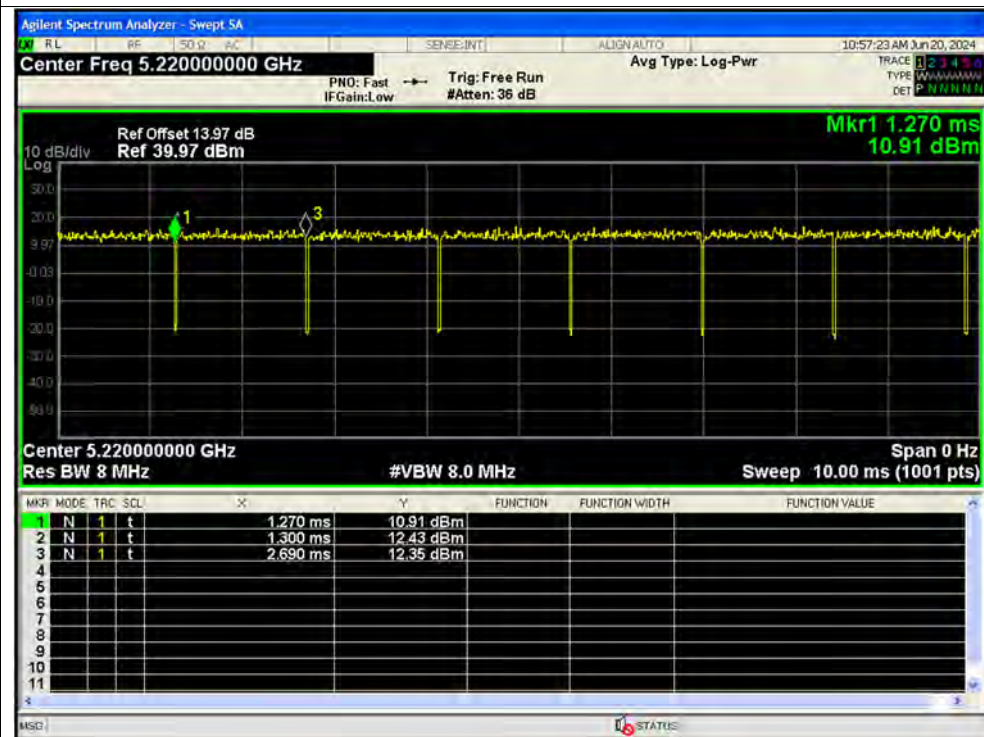
| Condition | Mode | Frequency<br>(MHz) | Antenna | Duty Cycle<br>(%) | Correction Factor<br>(dB) | 1/T<br>(kHz) |
|-----------|------|--------------------|---------|-------------------|---------------------------|--------------|
| NVNT      | a    | 5180               | Ant1    | 97.9              | 0.09                      | 0.71         |
| NVNT      | a    | 5220               | Ant1    | 97.89             | 0.09                      | 0.72         |
| NVNT      | a    | 5240               | Ant1    | 97.89             | 0.09                      | 0.72         |
| NVNT      | a    | 5260               | Ant1    | 97.2              | 0.12                      | 0.72         |
| NVNT      | a    | 5300               | Ant1    | 97.2              | 0.12                      | 0.72         |
| NVNT      | a    | 5320               | Ant1    | 97.2              | 0.12                      | 0.72         |
| NVNT      | a    | 5500               | Ant1    | 97.2              | 0.12                      | 0.72         |
| NVNT      | a    | 5600               | Ant1    | 97.2              | 0.12                      | 0.72         |
| NVNT      | a    | 5720               | Ant1    | 97.2              | 0.12                      | 0.72         |

## Test Graphs

## Duty Cycle NVNT a 5180MHz Ant1



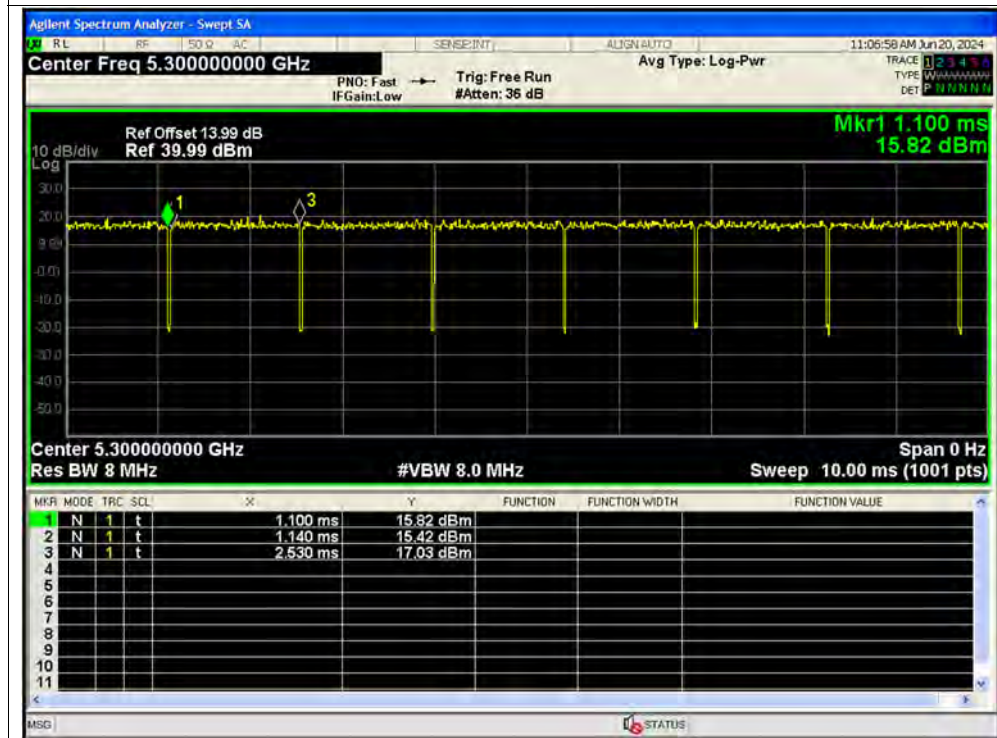
## Duty Cycle NVNT a 5220MHz Ant1



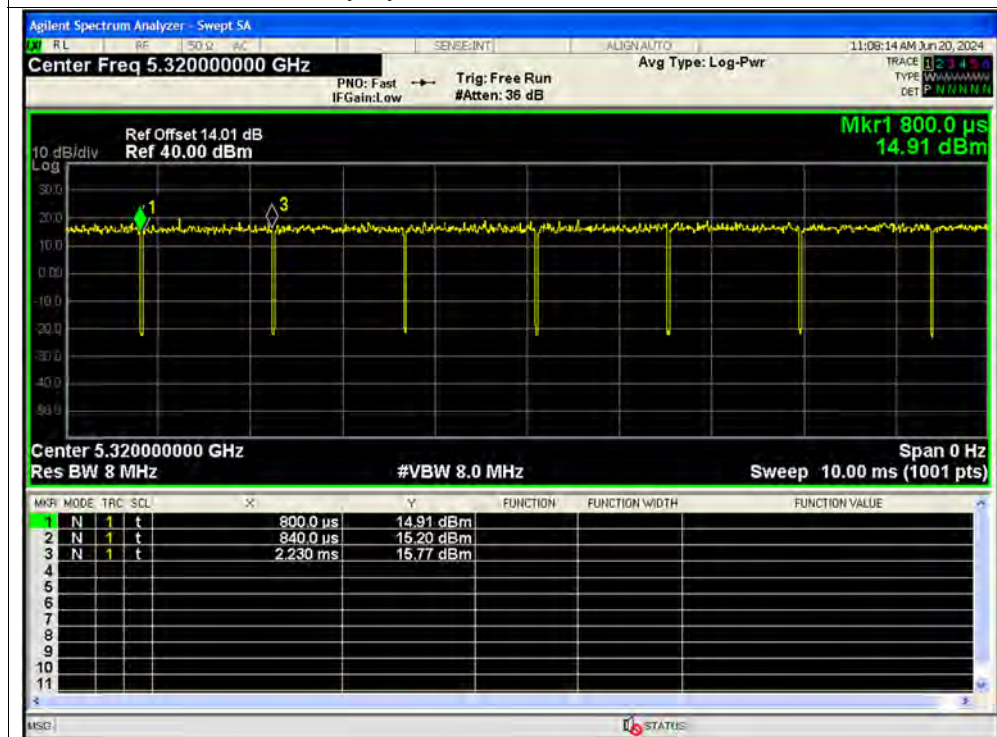


E-mail: [service@morlab.cn](mailto:service@morlab.cn)

## Duty Cycle NVNT a 5300MHz Ant1

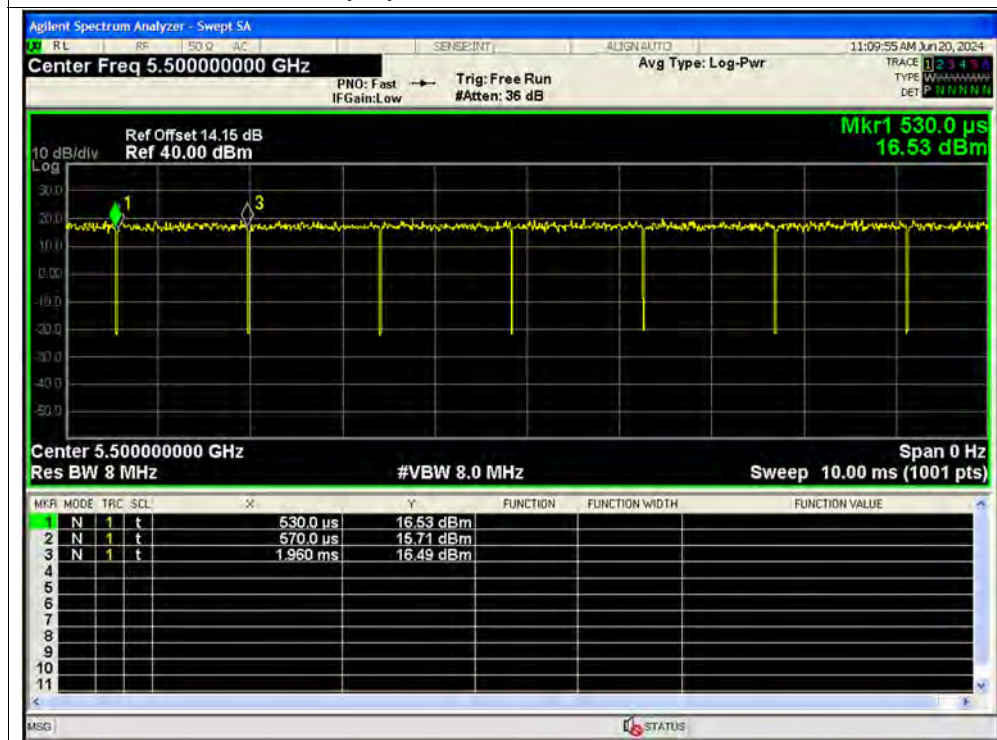


## Duty Cycle NVNT a 5320MHz Ant1

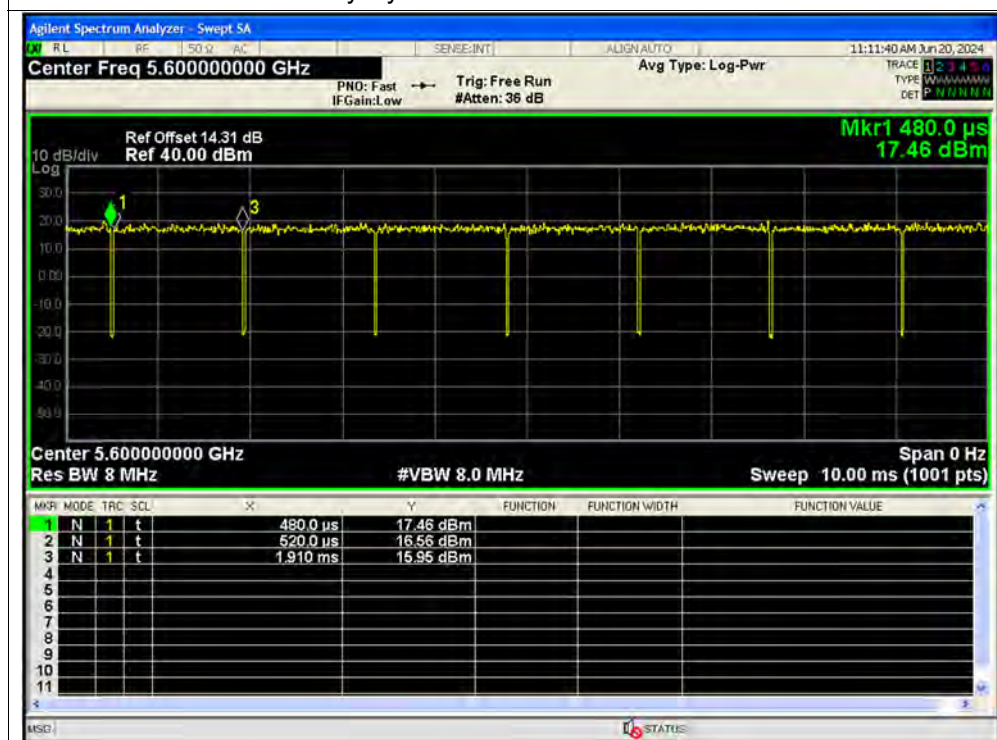




## Duty Cycle NVNT a 5500MHz Ant1

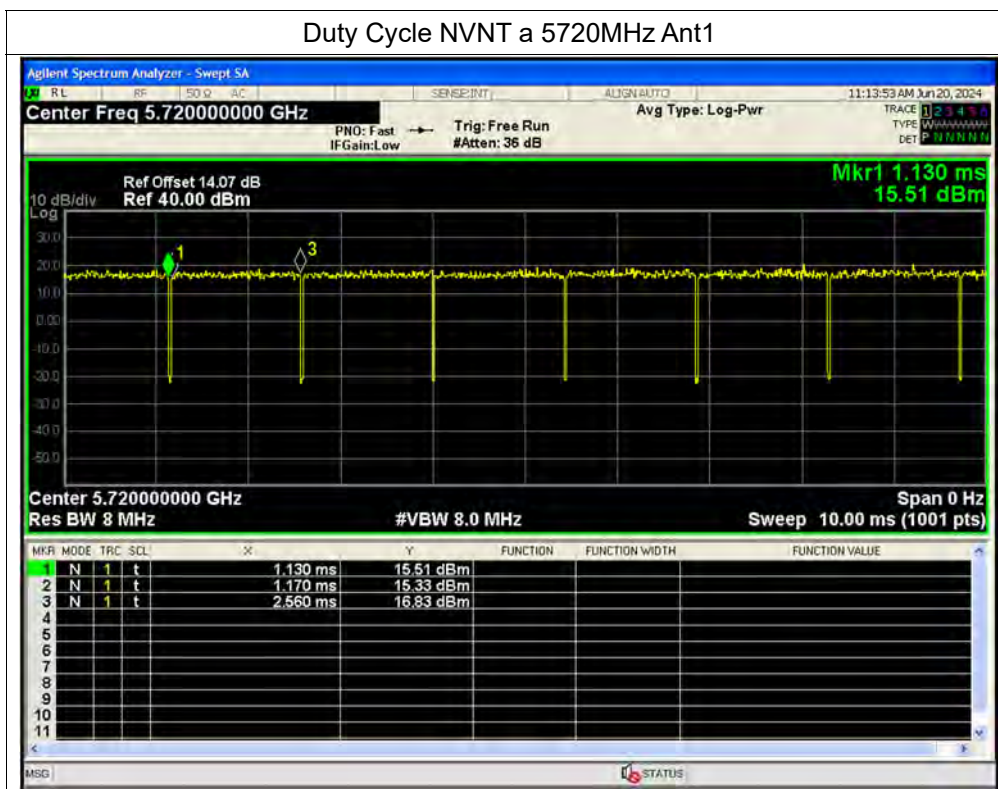


## Duty Cycle NVNT a 5600MHz Ant1





Duty Cycle NVNT a 5720MHz Ant1



**A.2. Maximum Conducted Output Power**

| Condition | Mode | Frequency (MHz) | Antenna | Total Conducted Power (dBm) | Total Conducted Power (mW) | Limit Conducted (dBm) | Verdict |
|-----------|------|-----------------|---------|-----------------------------|----------------------------|-----------------------|---------|
| NVNT      | a    | 5180            | Ant1    | 12.53                       | 0.01791                    | 24                    | Pass    |
| NVNT      | a    | 5220            | Ant1    | 11.8                        | 0.01514                    | 24                    | Pass    |
| NVNT      | a    | 5240            | Ant1    | 12.01                       | 0.01589                    | 24                    | Pass    |
| NVNT      | a    | 5260            | Ant1    | 11.59                       | 0.01442                    | 24                    | Pass    |
| NVNT      | a    | 5300            | Ant1    | 12.19                       | 0.01656                    | 24                    | Pass    |
| NVNT      | a    | 5320            | Ant1    | 11.58                       | 0.01439                    | 24                    | Pass    |
| NVNT      | a    | 5500            | Ant1    | 13.67                       | 0.02328                    | 24                    | Pass    |
| NVNT      | a    | 5600            | Ant1    | 13.87                       | 0.02438                    | 24                    | Pass    |
| NVNT      | a    | 5720            | Ant1    | 13.01                       | 0.02000                    | 24                    | Pass    |

**A.3. Emission Bandwidth**

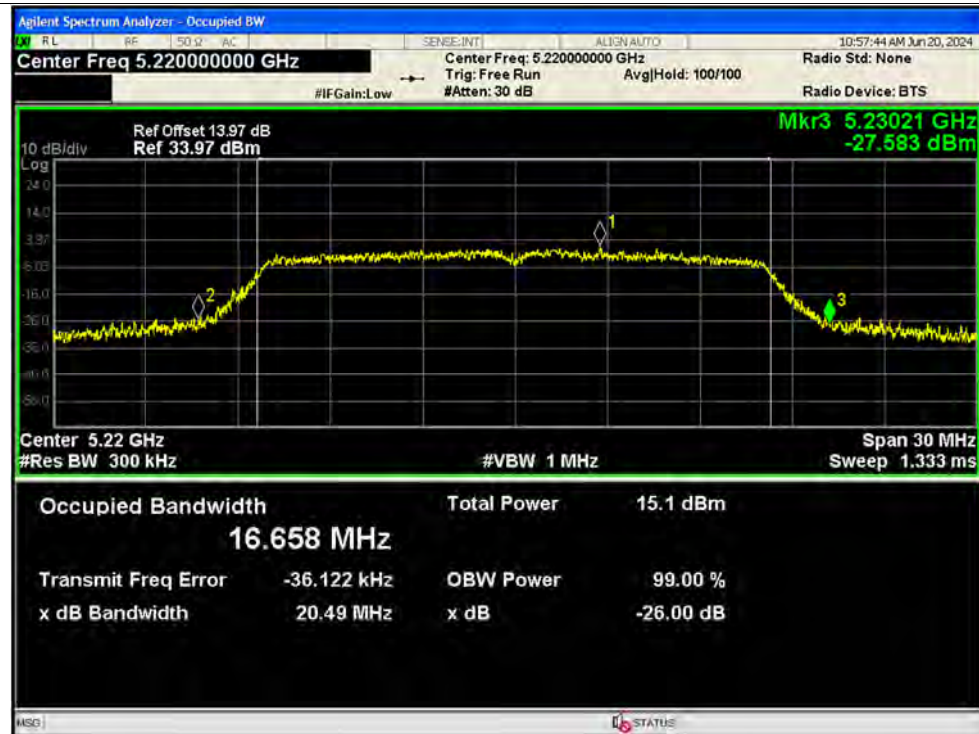
| Condition | Mode | Frequency (MHz) | Antenna | -26 dB Bandwidth (MHz) |
|-----------|------|-----------------|---------|------------------------|
| NVNT      | a    | 5180            | Ant1    | 25.191                 |
| NVNT      | a    | 5220            | Ant1    | 20.493                 |
| NVNT      | a    | 5240            | Ant1    | 21.093                 |
| NVNT      | a    | 5260            | Ant1    | 20.856                 |
| NVNT      | a    | 5300            | Ant1    | 26.471                 |
| NVNT      | a    | 5320            | Ant1    | 24.761                 |
| NVNT      | a    | 5500            | Ant1    | 25.051                 |
| NVNT      | a    | 5600            | Ant1    | 24.109                 |
| NVNT      | a    | 5720            | Ant1    | 25.915                 |

## Test Graphs

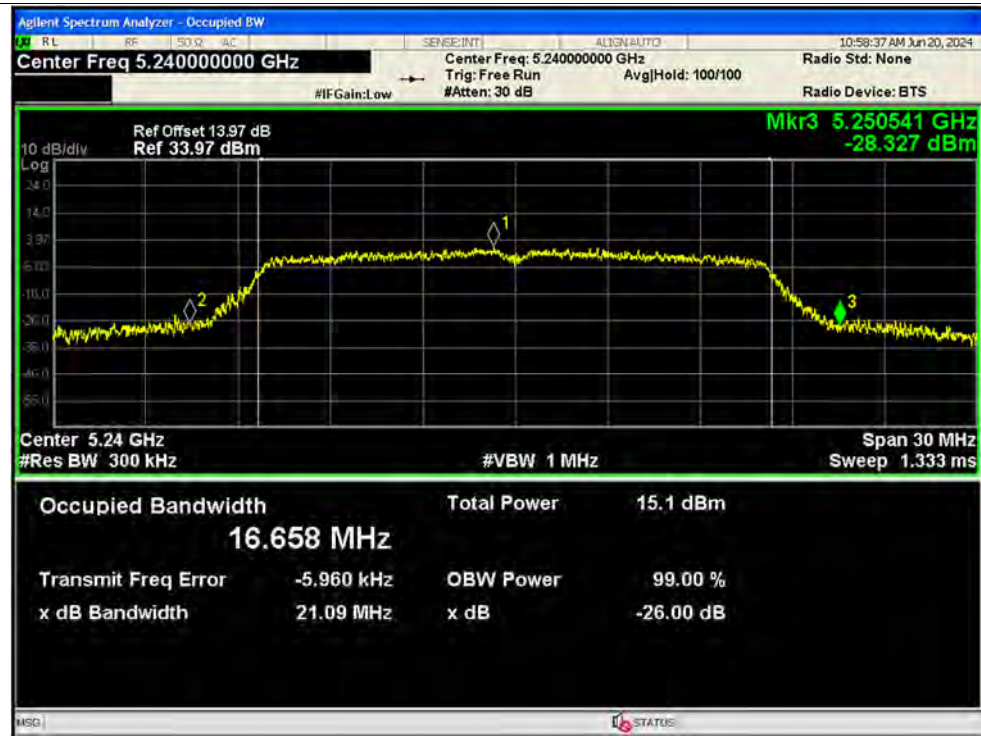
## -26dB Bandwidth NVNT a 5180MHz Ant1



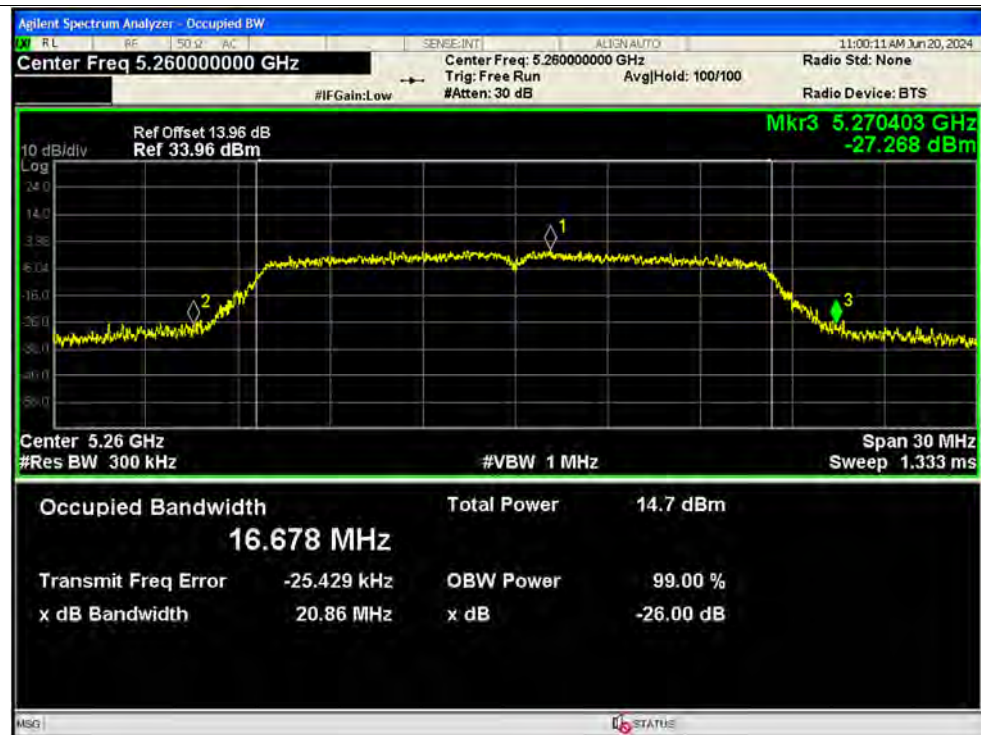
## -26dB Bandwidth NVNT a 5220MHz Ant1



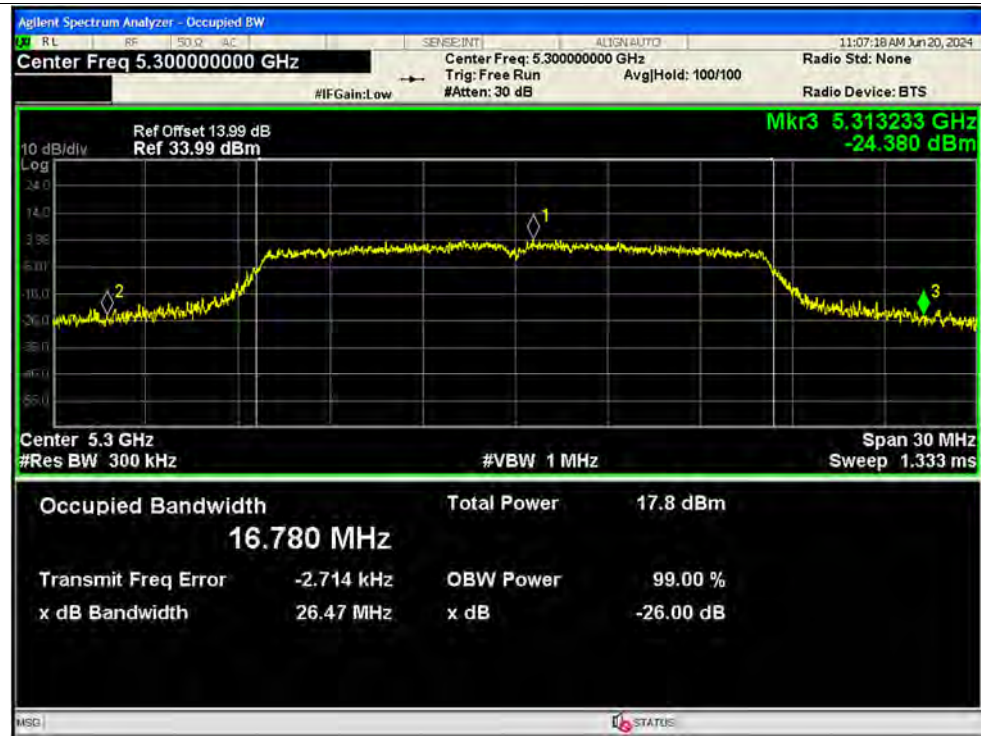
## -26dB Bandwidth NVNT a 5240MHz Ant1



## -26dB Bandwidth NVNT a 5260MHz Ant1



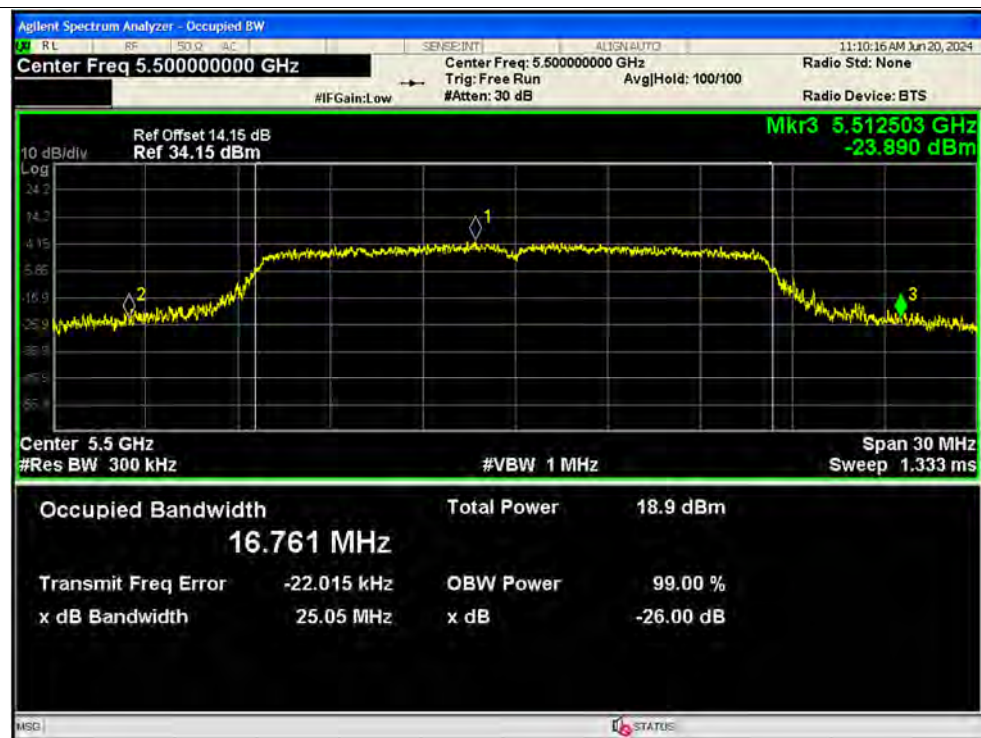
## -26dB Bandwidth NVNT a 5300MHz Ant1



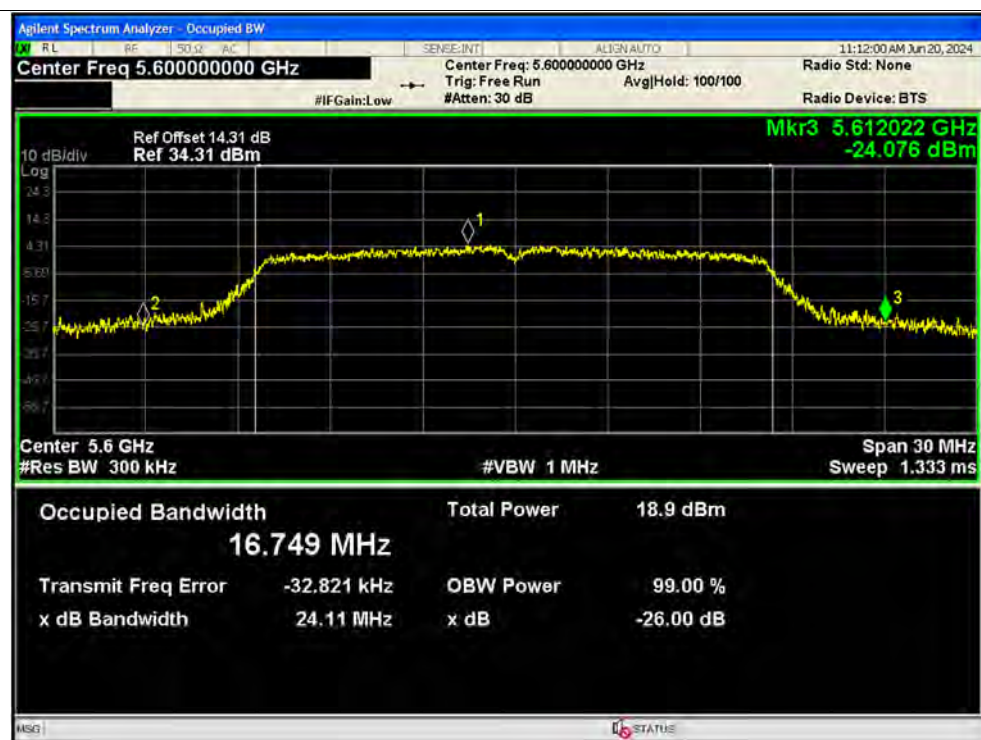
## -26dB Bandwidth NVNT a 5320MHz Ant1



## -26dB Bandwidth NVNT a 5500MHz Ant1

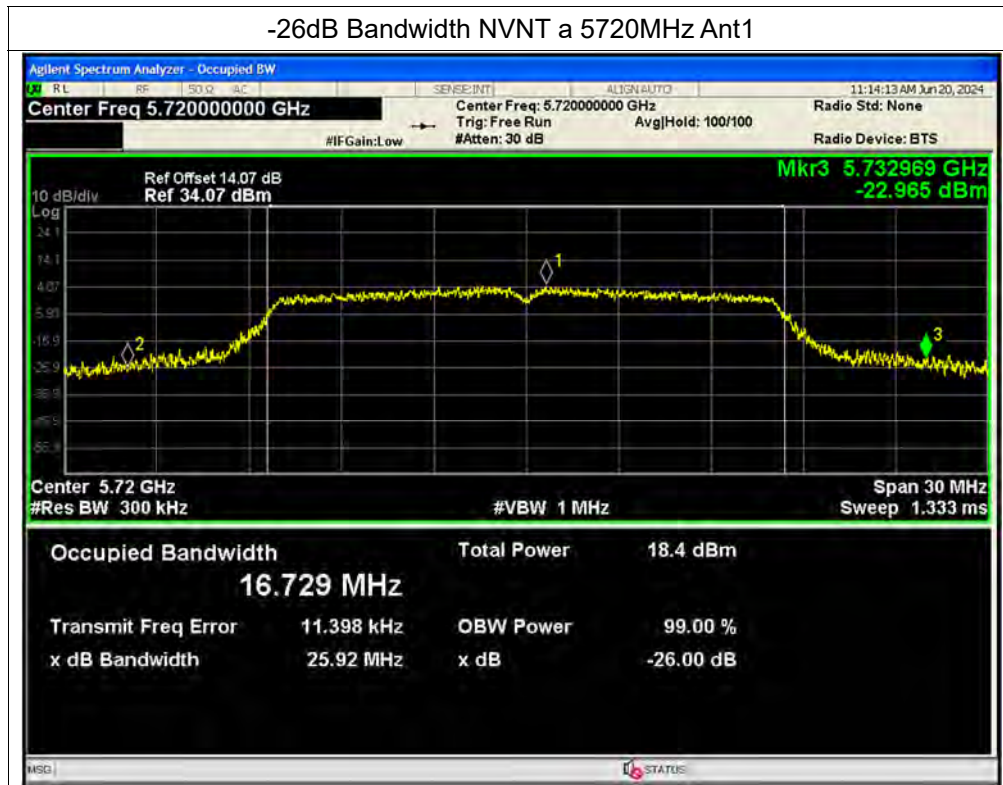


## -26dB Bandwidth NVNT a 5600MHz Ant1





## -26dB Bandwidth NVNT a 5720MHz Ant1

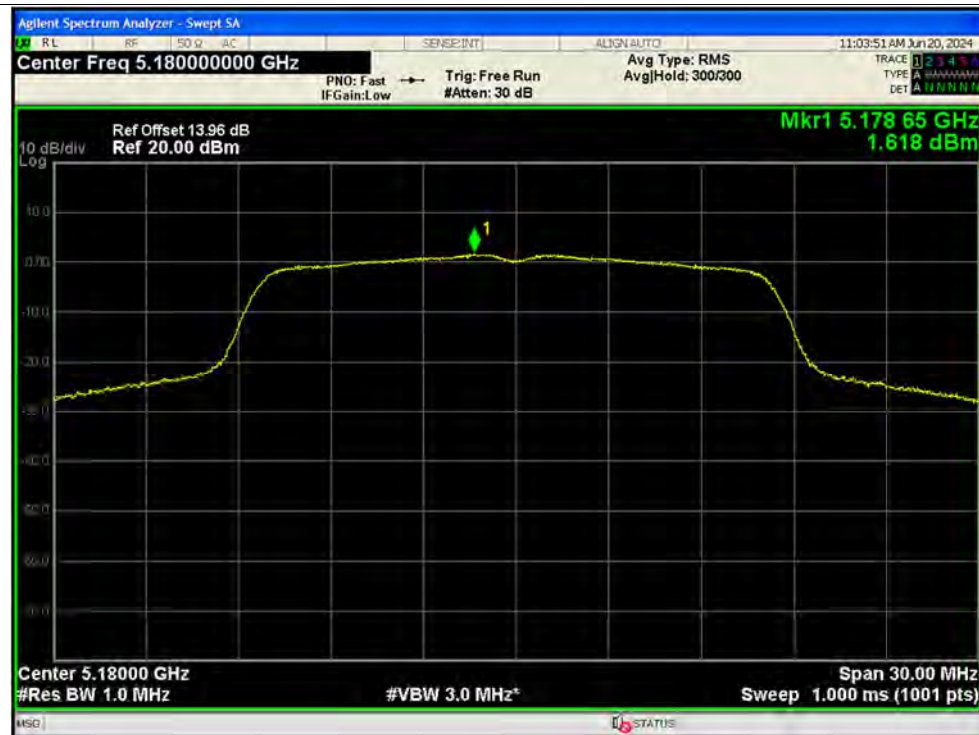


**A.4. Peak Power Spectral Density**

| Condition | Mode | Frequency (MHz) | Antenna | Conducted PSD (dBm) | Duty Factor (dB) | Total Conducted PSD (dBm) | Limit Conducted (dBm) | Verdict |
|-----------|------|-----------------|---------|---------------------|------------------|---------------------------|-----------------------|---------|
| NVNT      | a    | 5180            | Ant1    | 1.62                | 0.09             | 1.71                      | 11                    | Pass    |
| NVNT      | a    | 5220            | Ant1    | 1.11                | 0.09             | 1.20                      | 11                    | Pass    |
| NVNT      | a    | 5240            | Ant1    | 1.61                | 0.09             | 1.70                      | 11                    | Pass    |
| NVNT      | a    | 5260            | Ant1    | 0.86                | 0.12             | 0.98                      | 11                    | Pass    |
| NVNT      | a    | 5300            | Ant1    | 1.72                | 0.12             | 1.84                      | 11                    | Pass    |
| NVNT      | a    | 5320            | Ant1    | 1.58                | 0.12             | 1.70                      | 11                    | Pass    |
| NVNT      | a    | 5500            | Ant1    | 3.00                | 0.12             | 3.12                      | 11                    | Pass    |
| NVNT      | a    | 5600            | Ant1    | 2.94                | 0.12             | 3.06                      | 11                    | Pass    |
| NVNT      | a    | 5720            | Ant1    | 2.40                | 0.12             | 2.52                      | 11                    | Pass    |

## Test Graphs

## PSD NVNT a 5180MHz Ant1



## PSD NVNT a 5220MHz Ant1



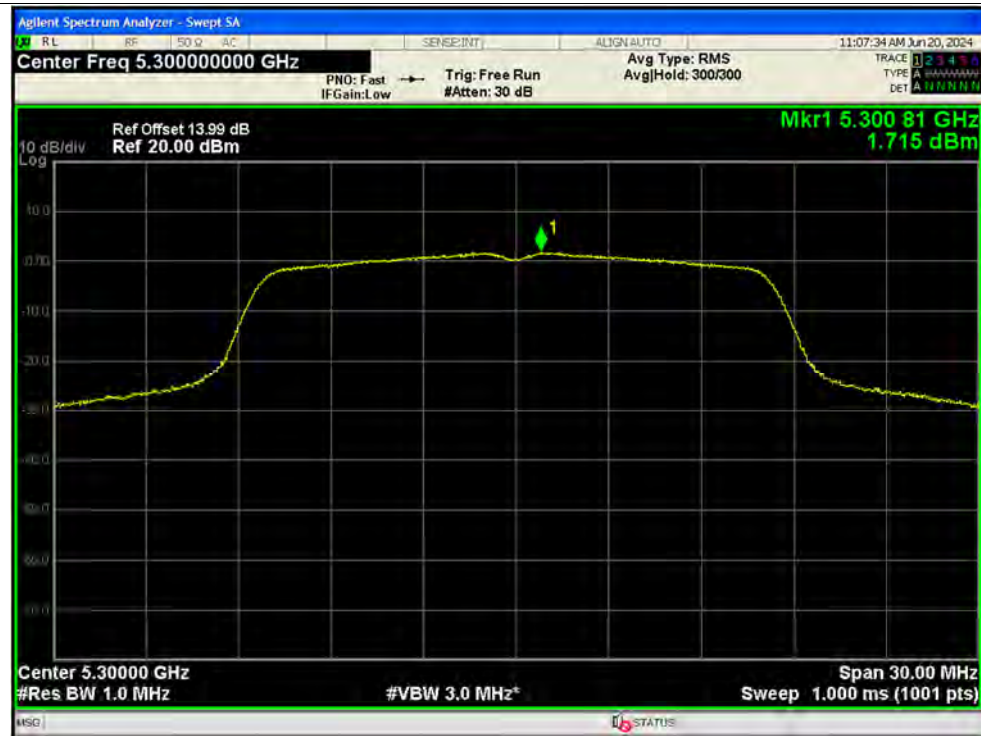
PSD NVNT a 5240MHz Ant1



PSD NVNT a 5260MHz Ant1



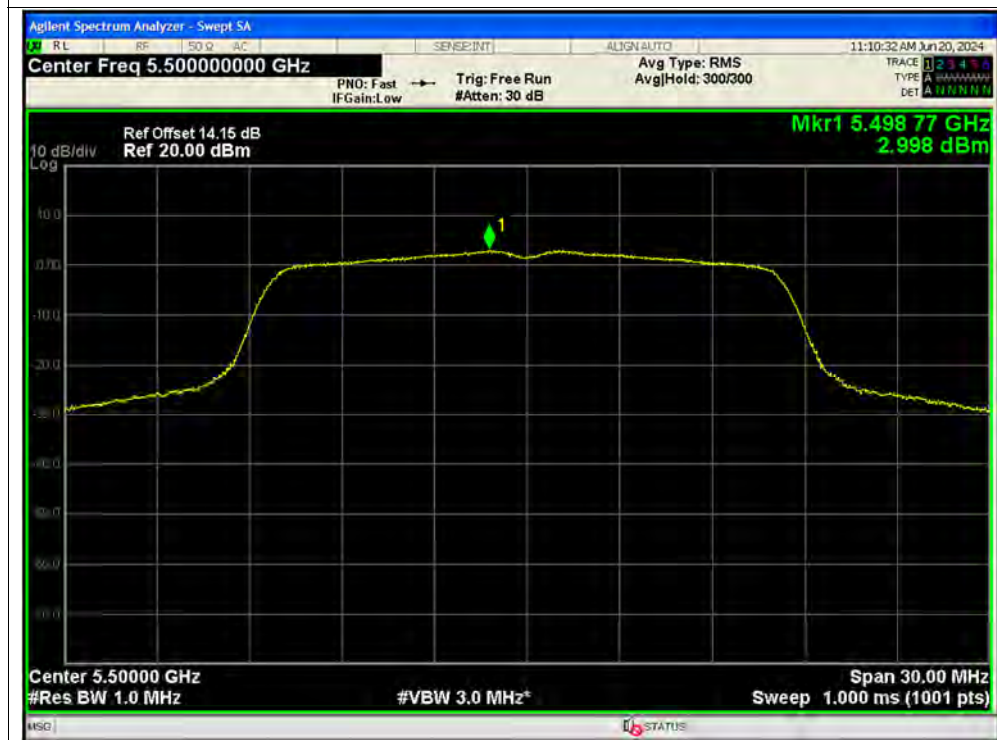
PSD NVNT a 5300MHz Ant1



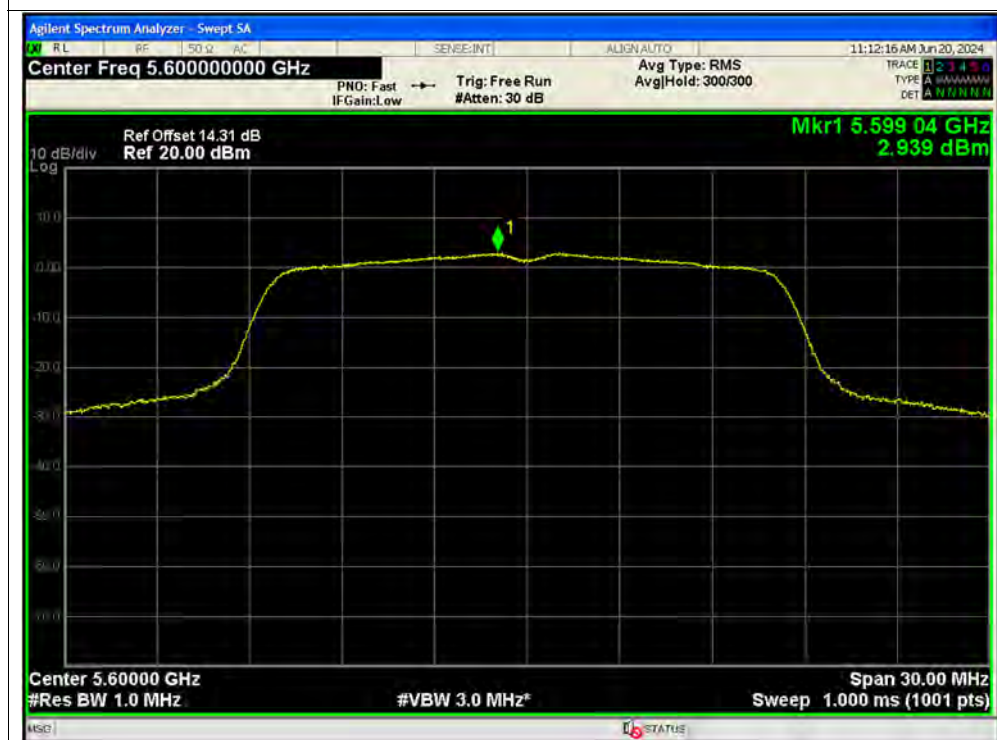
PSD NVNT a 5320MHz Ant1



PSD NVNT a 5500MHz Ant1

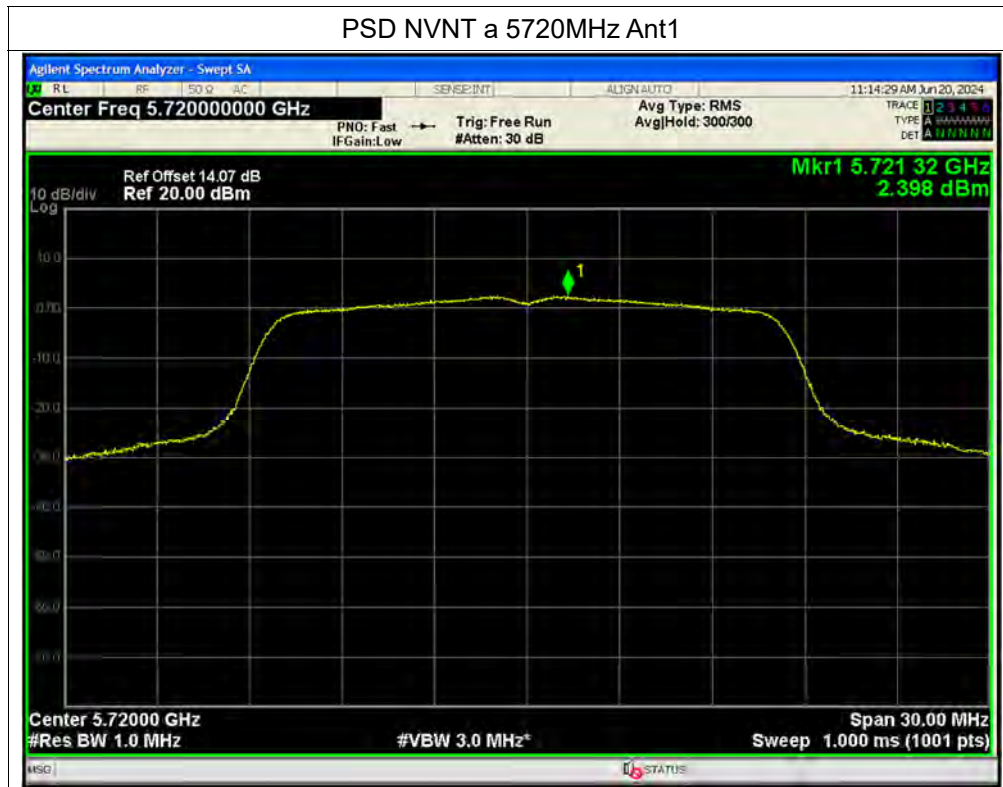


PSD NVNT a 5600MHz Ant1





PSD NVNT a 5720MHz Ant1



**A.5. Frequency Stability**

| Condition | Mode    | Frequency (MHz) | Antenna | Measured Frequency (MHz) | Frequency Error (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
|-----------|---------|-----------------|---------|--------------------------|----------------------|-----------------|-------------|---------|
| 20C 3V    | Carrier | 5180            | Ant1    | 5179.974                 | -26000               | -5.02           | 25          | Pass    |
| 20C 3.8V  | Carrier | 5180            | Ant1    | 5179.975                 | -25000               | -4.83           | 25          | Pass    |
| 20C 4.35V | Carrier | 5180            | Ant1    | 5179.974                 | -26000               | -5.02           | 25          | Pass    |
| 0C 3.8V   | Carrier | 5180            | Ant1    | 5179.975                 | -25000               | -4.83           | 25          | Pass    |
| 10C 3.8V  | Carrier | 5180            | Ant1    | 5179.974                 | -26000               | -5.02           | 25          | Pass    |
| 30C 3.8V  | Carrier | 5180            | Ant1    | 5179.975                 | -25000               | -4.83           | 25          | Pass    |
| 40C 3.8V  | Carrier | 5180            | Ant1    | 5179.975                 | -25000               | -4.83           | 25          | Pass    |
| 20C 3V    | Carrier | 5260            | Ant1    | 5259.975                 | -25000               | -4.75           | 25          | Pass    |
| 20C 3.8V  | Carrier | 5260            | Ant1    | 5259.975                 | -25000               | -4.75           | 25          | Pass    |
| 20C 4.35V | Carrier | 5260            | Ant1    | 5259.975                 | -25000               | -4.75           | 25          | Pass    |
| 0C 3.8V   | Carrier | 5260            | Ant1    | 5259.975                 | -25000               | -4.75           | 25          | Pass    |
| 10C 3.8V  | Carrier | 5260            | Ant1    | 5259.975                 | -25000               | -4.75           | 25          | Pass    |
| 30C 3.8V  | Carrier | 5260            | Ant1    | 5259.975                 | -25000               | -4.75           | 25          | Pass    |
| 40C 3.8V  | Carrier | 5260            | Ant1    | 5259.975                 | -25000               | -4.75           | 25          | Pass    |
| 20C 3V    | Carrier | 5500            | Ant1    | 5499.974                 | -26000               | -4.73           | 25          | Pass    |
| 20C 3.8V  | Carrier | 5500            | Ant1    | 5499.974                 | -26000               | -4.73           | 25          | Pass    |
| 20C 4.35V | Carrier | 5500            | Ant1    | 5499.974                 | -26000               | -4.73           | 25          | Pass    |
| 0C 3.8V   | Carrier | 5500            | Ant1    | 5499.974                 | -26000               | -4.73           | 25          | Pass    |
| 10C 3.8V  | Carrier | 5500            | Ant1    | 5499.974                 | -26000               | -4.73           | 25          | Pass    |
| 30C 3.8V  | Carrier | 5500            | Ant1    | 5499.974                 | -26000               | -4.73           | 25          | Pass    |
| 40C 3.8V  | Carrier | 5500            | Ant1    | 5499.974                 | -26000               | -4.73           | 25          | Pass    |



REPORT No.: SZ24050196W04

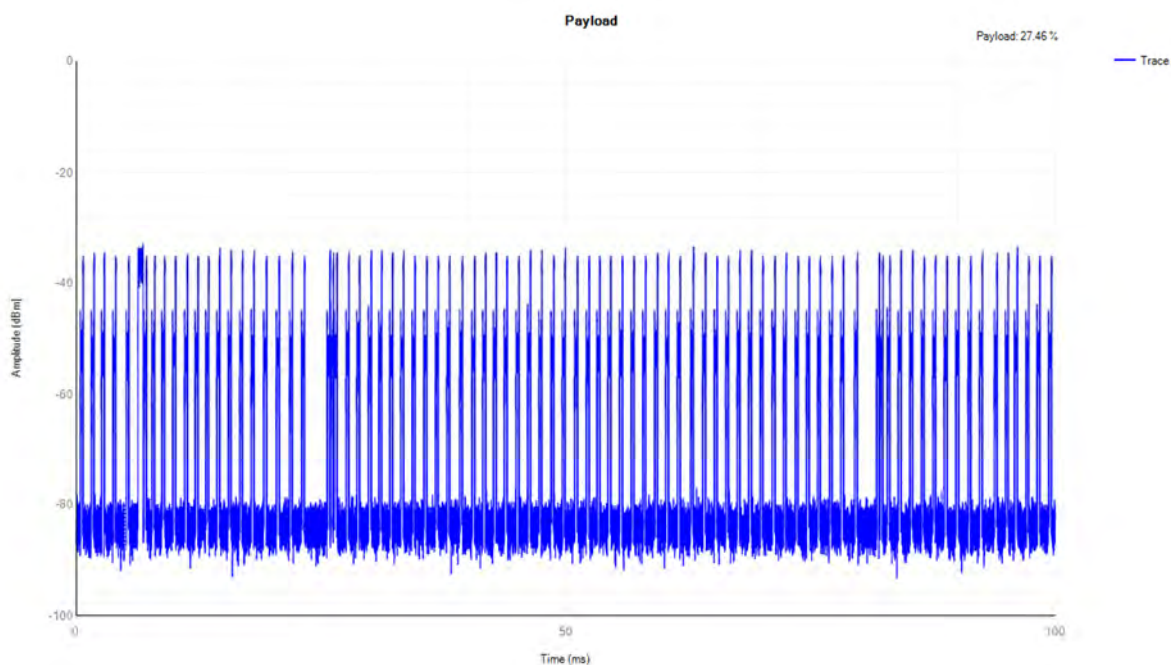
#### A.6. Dynamic Frequency Selection

Payload

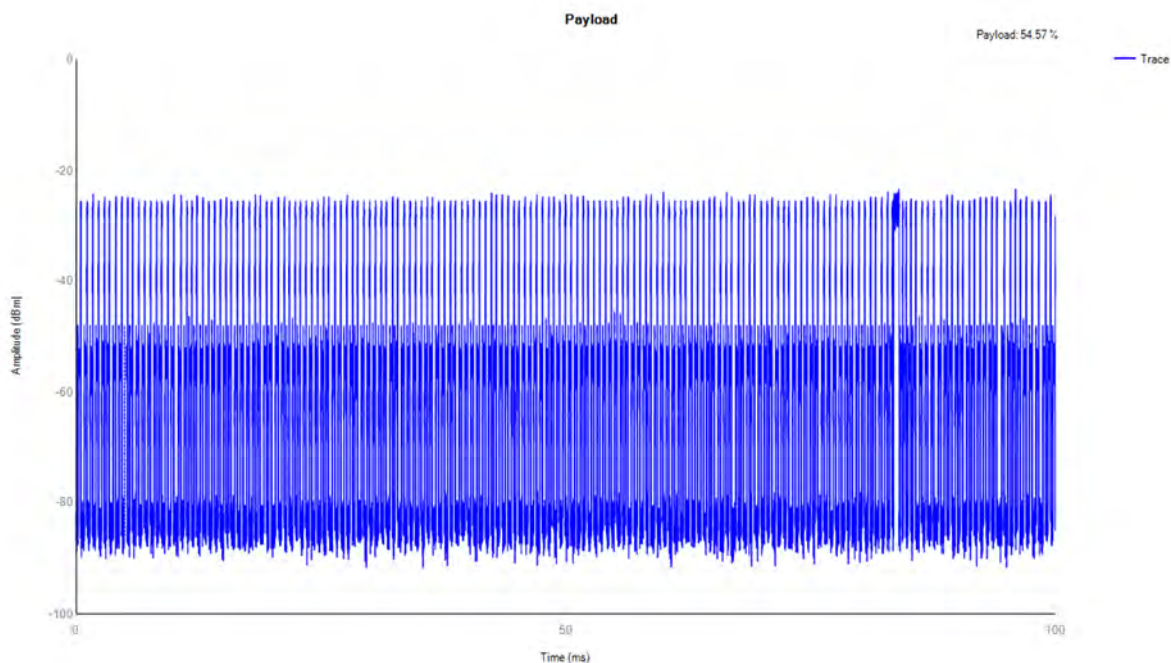
| Mode | Frequency (MHz) | Result | Verdict |
|------|-----------------|--------|---------|
| a    | 5260            | 27.46  | Pass    |
| a    | 5500            | 54.57  | Pass    |

### Test Graphs

#### a 5260MHz Payload



#### a 5500MHz Payload





REPORT No.: SZ24050196W04

Detection Thresholds

| Mode | Frequency (MHz) | Type       | Result         | Verdict |
|------|-----------------|------------|----------------|---------|
| a    | 5260            | DFS_FCC_T0 | See test Graph | Pass    |
| a    | 5500            | DFS_FCC_T0 | See test Graph | Pass    |

Spectrum analyzer settings:

Span: Zero

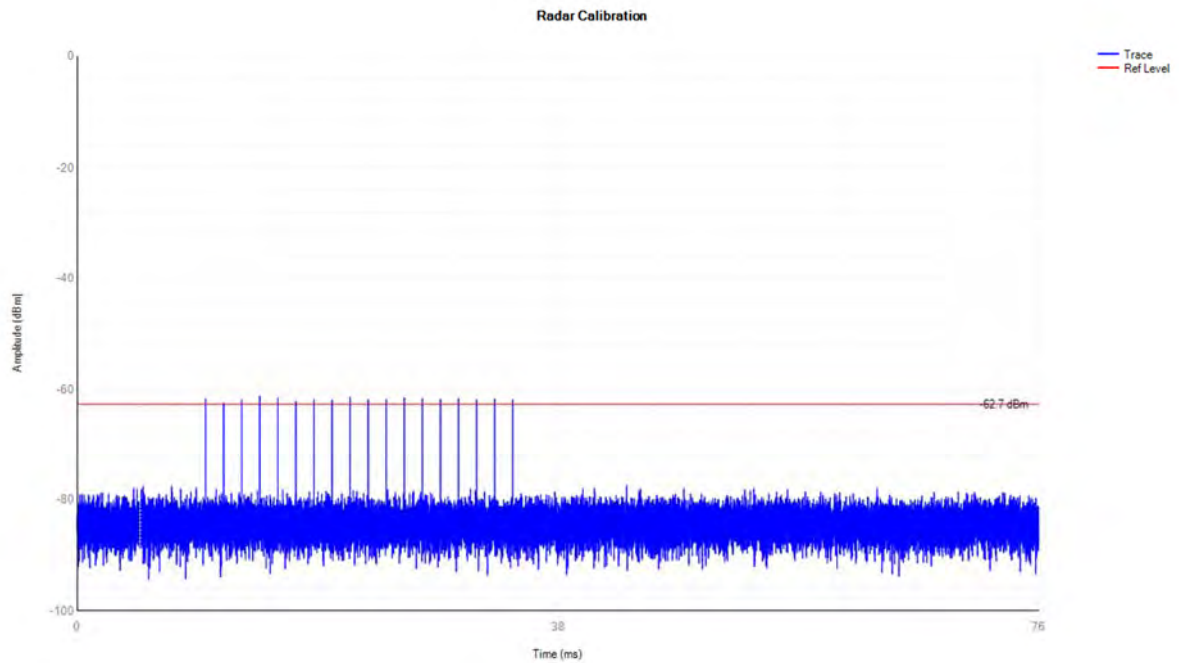
Detector Type: Peak

RBW: 3MHz

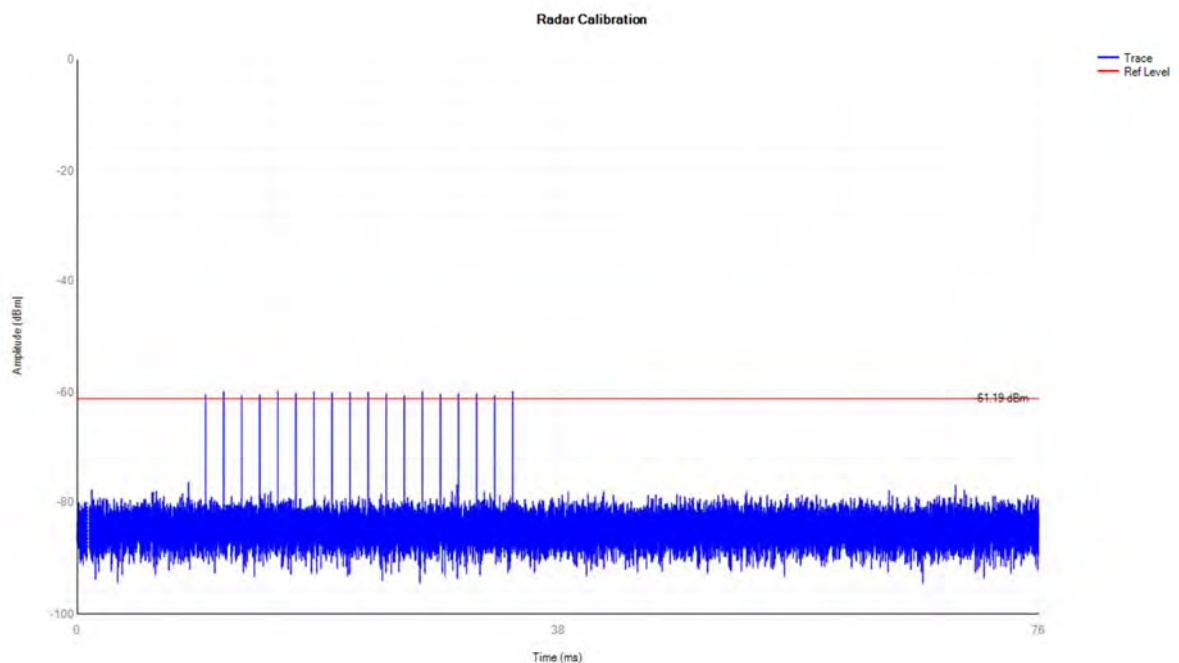
VBW: 3MHz

## Test Graphs

## 5260MHz DFS\_FCC\_T0



## 5500MHz DFS\_FCC\_T0





## Channel Move Time and Channel Closing Transmission Time

| Mode | Frequency (MHz) | Channel Move Time (s) | Limit Channel Move Time (s) | Close Transmission Time (s) | Limit Close Transmission Time (s) | Close Transmission Time after 200ms(s) | Limit Close Transmission Time after 200ms (s) | Verdict |
|------|-----------------|-----------------------|-----------------------------|-----------------------------|-----------------------------------|----------------------------------------|-----------------------------------------------|---------|
| a    | 5260            | 0.772                 | 10                          | 0.014                       | 0.26                              | 0.007                                  | 0.06                                          | Pass    |
| a    | 5500            | 0.832                 | 10                          | 0.053                       | 0.26                              | 0.009                                  | 0.06                                          | Pass    |

Spectrum analyzer settings:

Span: Zero

Detector type: Peak

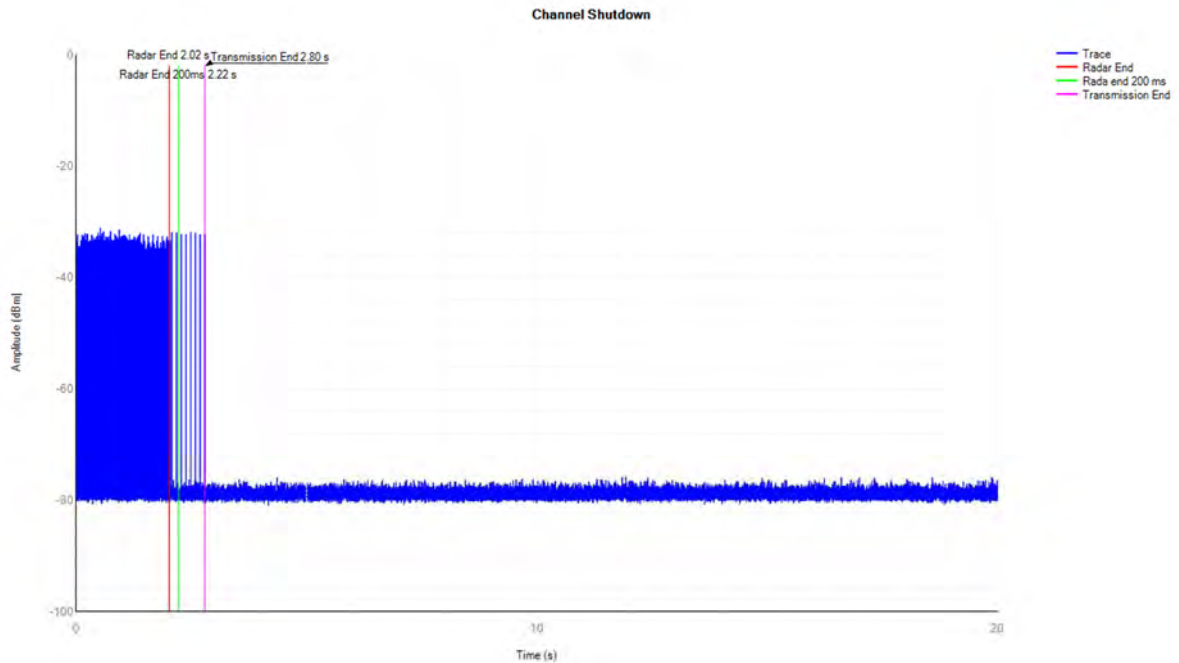
RBW: 3MHz

VBW: 3MHz

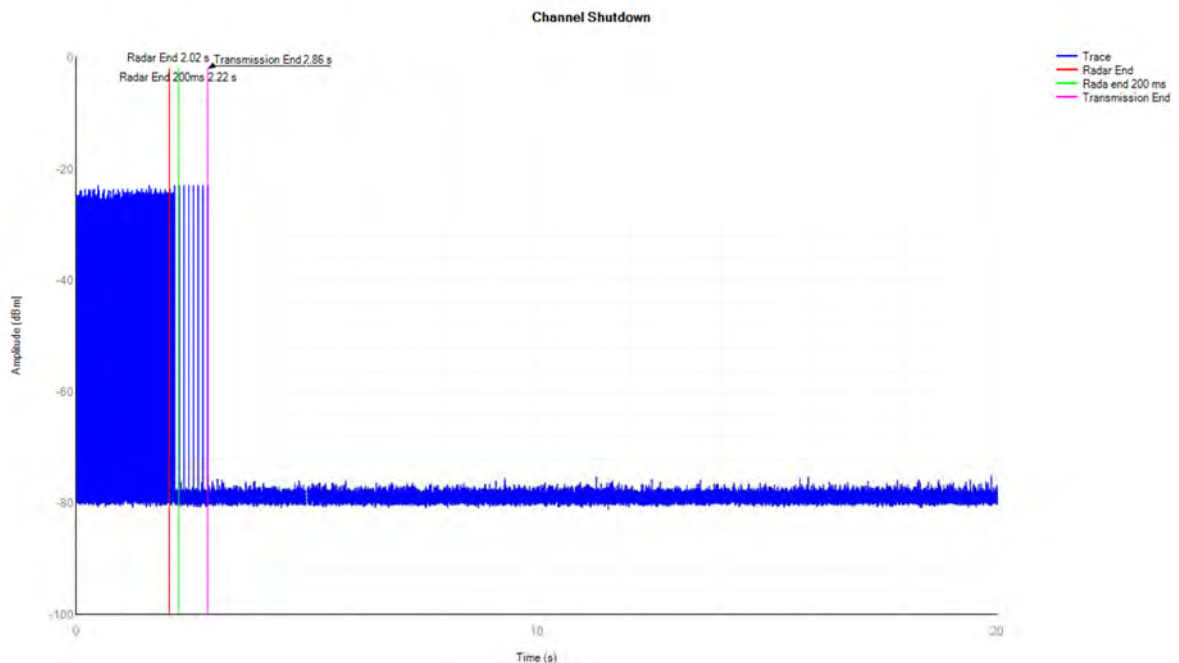
Sweep time: 20s

## Test Graphs

## a 5260MHz Shutdown



## a 5500MHz Shutdown



Note: The signal above the noise floor after the radar signal ends is the signal which leaked from other channels that have been moved following the Master device.



## Non-Occupancy Period

| Mode | Frequency (MHz) | Result         | Verdict |
|------|-----------------|----------------|---------|
| a    | 5500            | See test Graph | Pass    |

Spectrum analyzer settings:

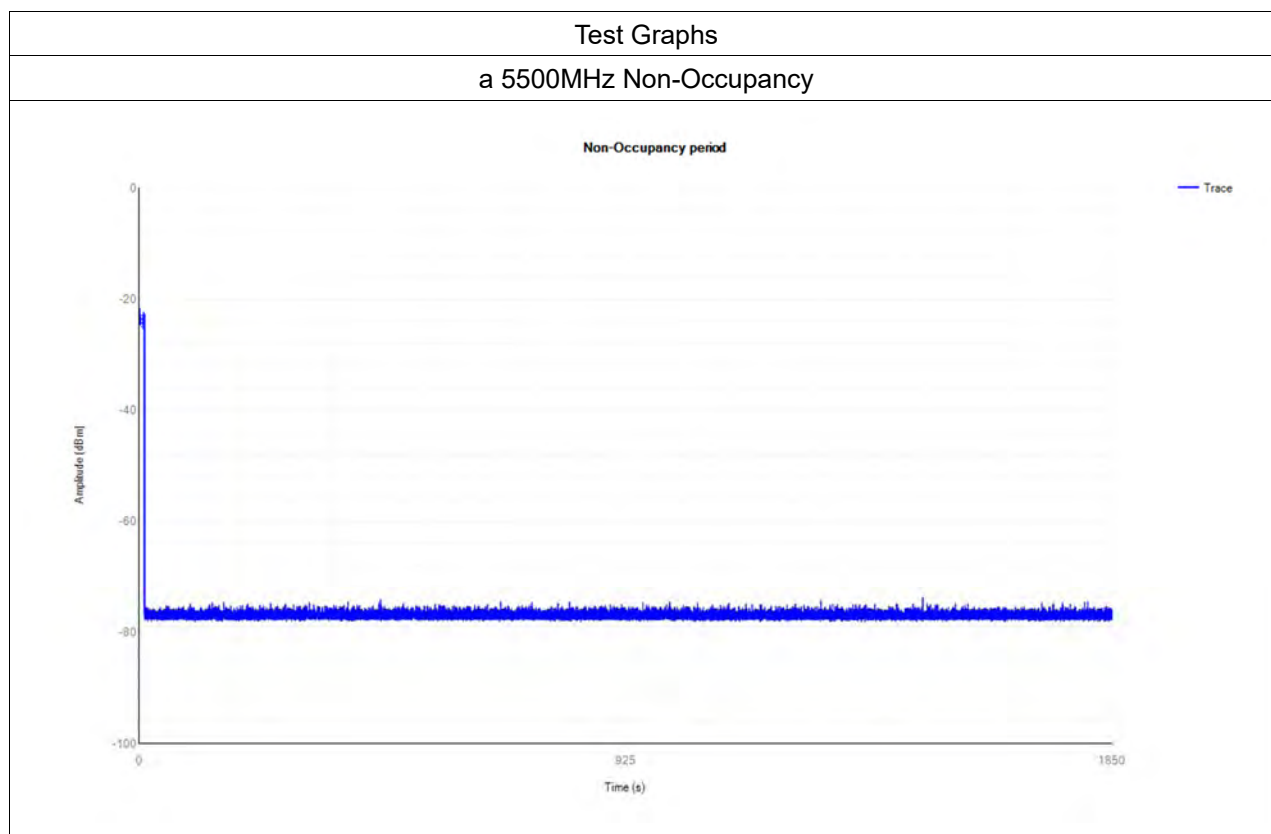
Span: Zero

Detector type: Peak

RBW: 3MHz

VBW: 3MHz

Sweep time: 1850s





### A.7. Conducted Emission

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. Set RBW=9kHz, VBW=30kHz. 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:

Test Mode: EUT + Adapter + USB cable +WIFI TX

Test voltage: AC 120V/60Hz

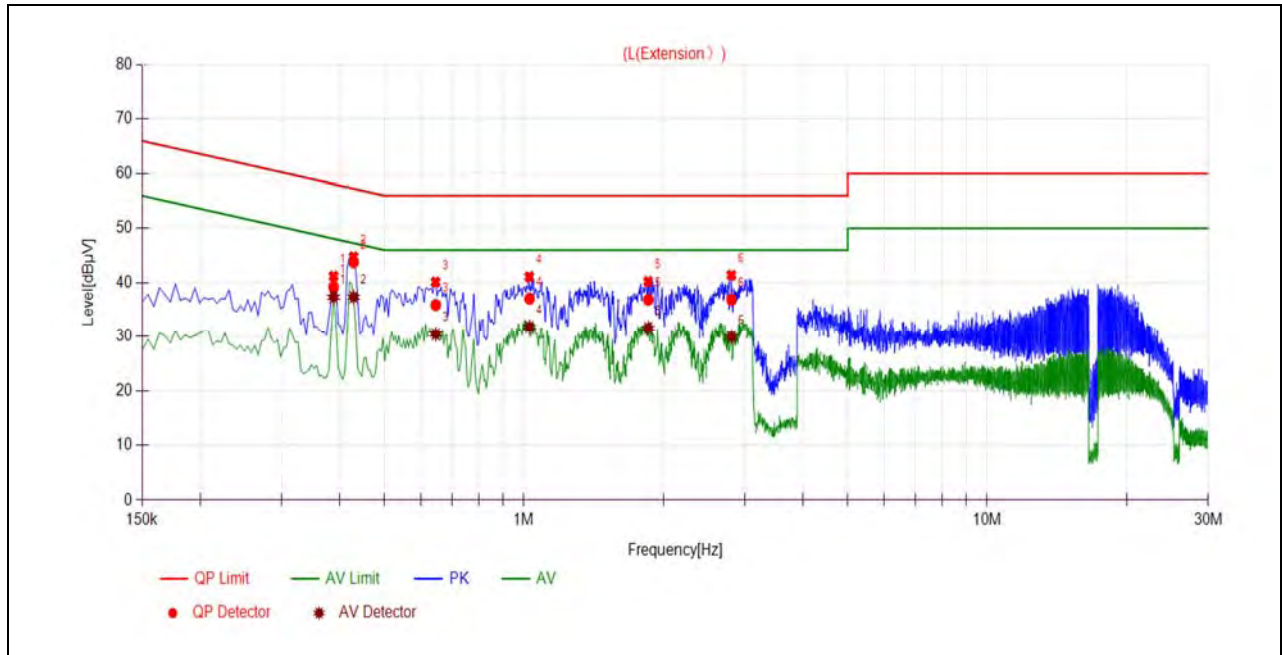
The measurement results are obtained as below:

$$E \text{ [dB}\mu\text{V]} = U_R + L_{\text{Cable loss}} \text{ [dB]} + A_{\text{Factor}}$$

$U_R$ : Receiver Reading

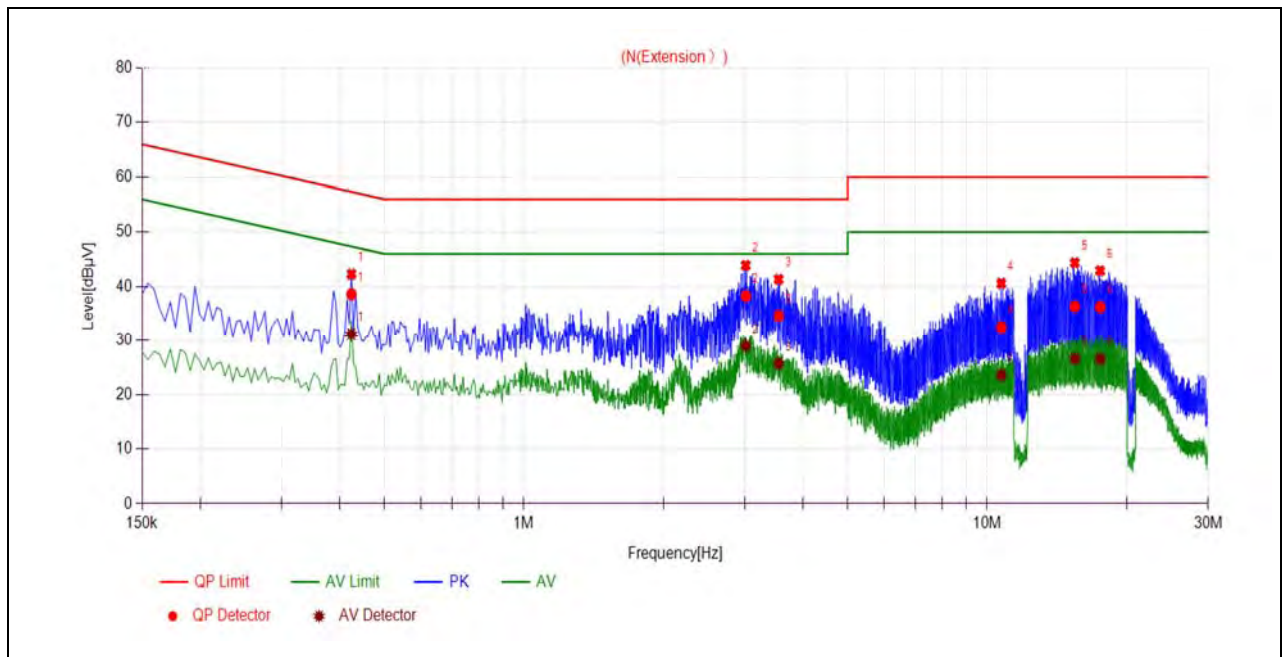
$A_{\text{Factor}}$ : Voltage division factor of LISN

## B. Test Plot:



(L Phase)

| No. | Fre.<br>(MHz) | Emission Level (dBμV) |         | Limit (dBμV) |         | Power-line | Verdict |
|-----|---------------|-----------------------|---------|--------------|---------|------------|---------|
|     |               | Quai-peak             | Average | Quai-peak    | Average |            |         |
| 1   | 0.3884        | 39.21                 | 37.33   | 58.10        | 48.10   | Line       | PASS    |
| 2   | 0.4291        | 43.80                 | 37.34   | 57.27        | 47.27   |            | PASS    |
| 3   | 0.6453        | 35.87                 | 30.43   | 56.00        | 46.00   |            | PASS    |
| 4   | 1.0285        | 37.04                 | 31.78   | 56.00        | 46.00   |            | PASS    |
| 5   | 1.8563        | 36.85                 | 31.57   | 56.00        | 46.00   |            | PASS    |
| 6   | 2.8068        | 36.87                 | 29.93   | 56.00        | 46.00   |            | PASS    |



(N Phase)

| No. | Fre.<br>(MHz) | Emission Level (dBμV) |         | Limit (dBμV) |         | Power-line | Verdict |
|-----|---------------|-----------------------|---------|--------------|---------|------------|---------|
|     |               | Quai-peak             | Average | Quai-peak    | Average |            |         |
| 1   | 0.4243        | 38.61                 | 31.20   | 57.36        | 47.36   | Neutral    | PASS    |
| 2   | 3.0148        | 38.28                 | 28.97   | 56.00        | 46.00   |            | PASS    |
| 3   | 3.5489        | 34.62                 | 25.68   | 56.00        | 46.00   |            | PASS    |
| 4   | 10.7310       | 32.48                 | 23.56   | 60.00        | 50.00   |            | PASS    |
| 5   | 15.4651       | 36.34                 | 26.59   | 60.00        | 50.00   |            | PASS    |
| 6   | 17.5385       | 36.24                 | 26.54   | 60.00        | 50.00   |            | PASS    |



### A.8. Restricted Frequency Bands

The lowest and highest channels are tested to verify the 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

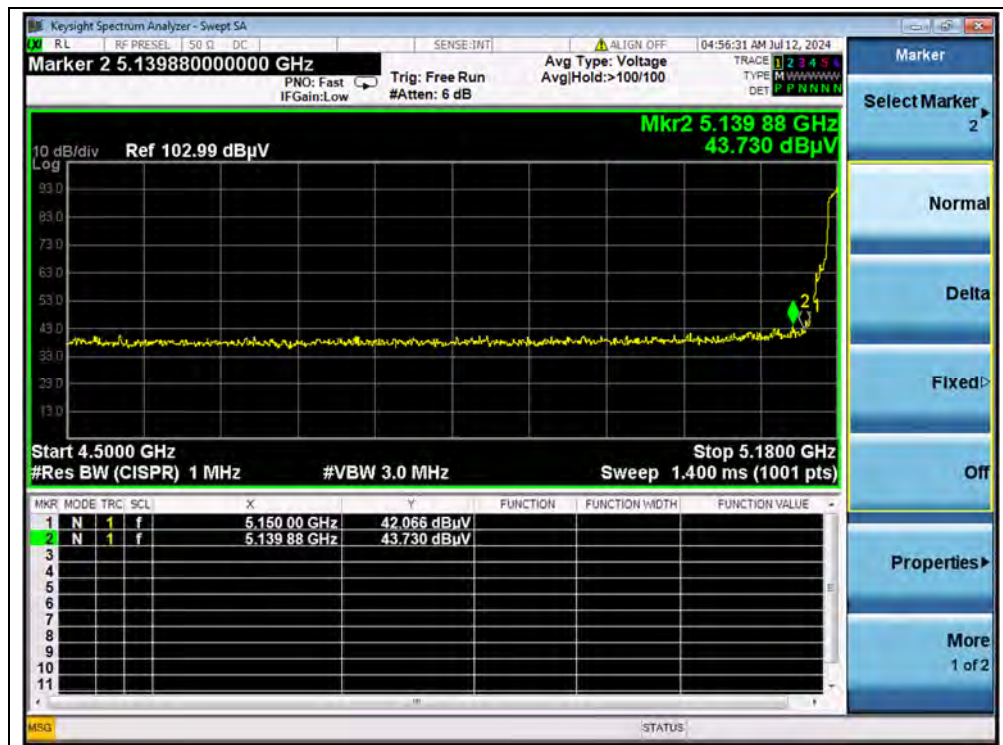
$A_{\text{Factor}}$ : Antenna Factor at 3m

**Note 1:** Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

**Note 2** All test modes and bandwidth were considered and evaluated respectively by performing full test, only the worst data were recorded for each bandwidth.

#### 802.11a Mode

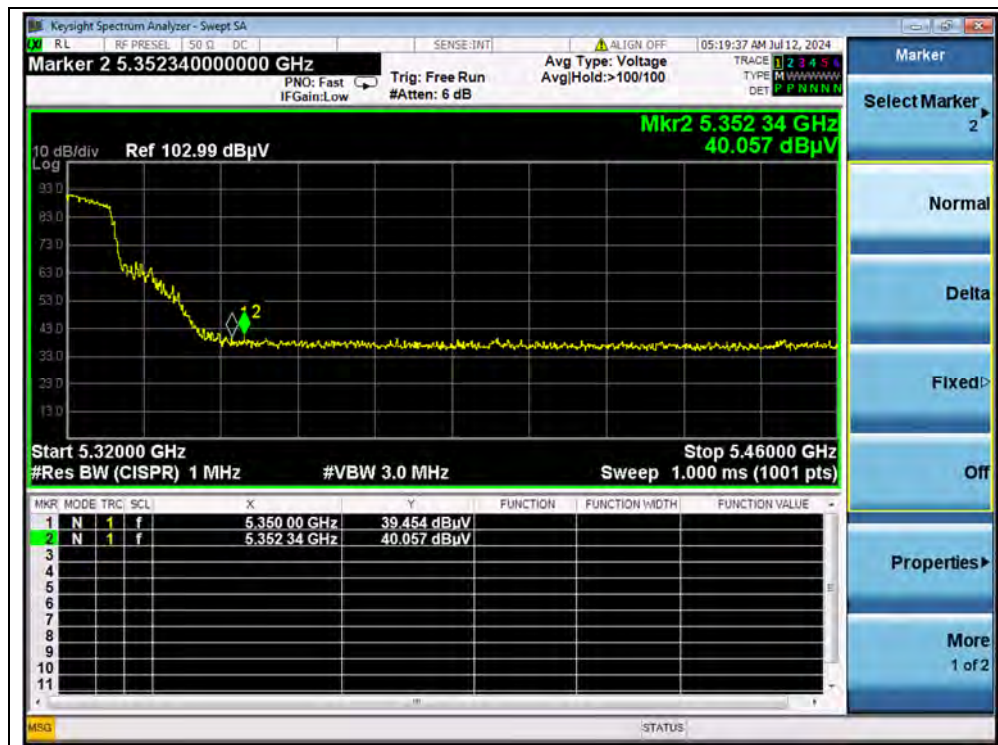
| Channel | Frequency<br>(MHz) | Detector | Receiver<br>Reading<br>$U_R$<br>(dB $\mu$ V) | $A_T$<br>(dB) | $A_{\text{Factor}}$<br>(dB@3m) | Max.<br>Emission<br>E<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Verdict |
|---------|--------------------|----------|----------------------------------------------|---------------|--------------------------------|-----------------------------------------|-------------------------|---------|
|         |                    | PK/ AV   |                                              |               |                                |                                         |                         |         |
| 36      | 5139.88            | PK       | 43.73                                        | -<br>21.29    | 32.20                          | 54.64                                   | 74                      | PASS    |
| 36      | 5101.80            | AV       | 36.42                                        | -<br>21.29    | 32.20                          | 47.33                                   | 54                      | PASS    |
| 64      | 5352.34            | PK       | 40.06                                        | -<br>20.66    | 32.20                          | 51.60                                   | 74                      | PASS    |
| 64      | 5449.92            | AV       | 32.51                                        | -<br>20.66    | 32.20                          | 44.05                                   | 54                      | PASS    |
| 100     | 5075.00            | PK       | 41.33                                        | -<br>20.24    | 32.20                          | 53.29                                   | 74                      | PASS    |
| 100     | 5422.00            | AV       | 32.54                                        | -<br>20.24    | 32.20                          | 44.50                                   | 54                      | PASS    |
| 144     | 5725.00            | PK       | 45.15                                        | -<br>20.24    | 32.20                          | 57.11                                   | 68.23                   | PASS    |



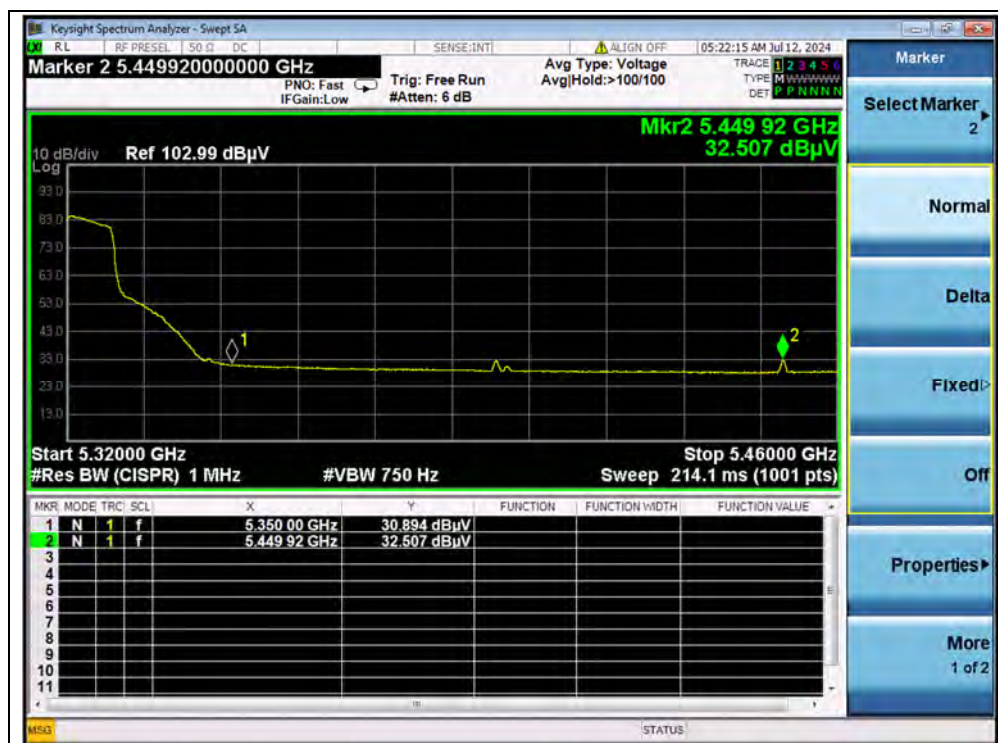
(PEAK, Channel 36, 802.11a)



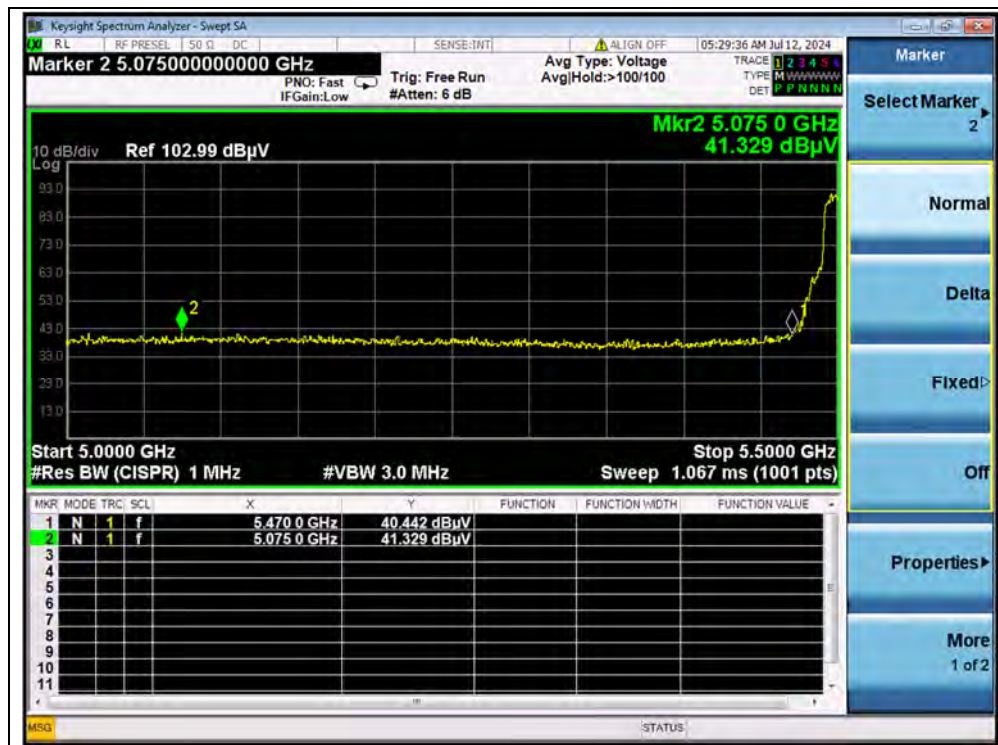
(AVERAGE, Channel 36, 802.11a)



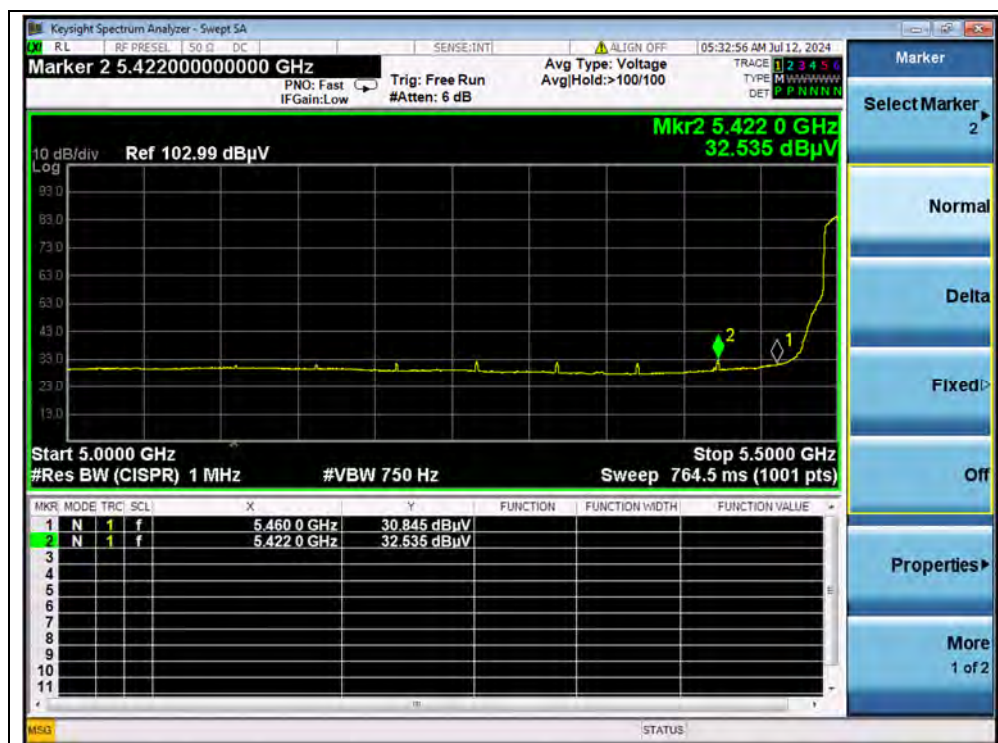
(PEAK, Channel 64, 802.11a)



(AVERAGE, Channel 64, 802.11a)



(PEAK, Channel 100, 802.11a)



(AVERAGE, Channel 100, 802.11a)





### A.9. Radiated Emission

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak (or average) limit, it is unnecessary to perform an quasi-peak measurement (or average).

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

During the test, the total correction Factor  $A_T$  and  $A_{\text{Factor}}$  were built in test software.

**Note1:** All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

**Note2:** For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

**Note3:** For the frequency, which started from 18GHz to 40GHz harmonic of the highest frequency, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

**Note 4:** All test modes and bandwidth were considered and evaluated respectively by performing full test, only the worst data were recorded for each bandwidth.

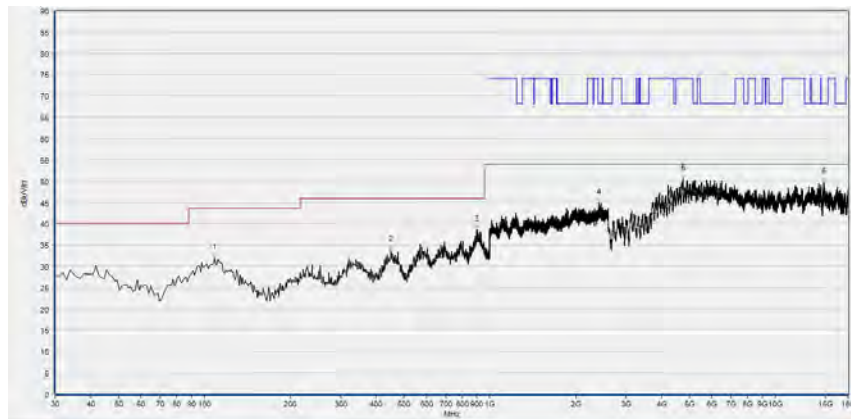
Field strength of fundamental:

| Frequency (MHz) | Reading_Peak (dB $\mu$ V/m) | Antenna Factor (dB) | Path Loss (dB) | Final_Peak (dB $\mu$ V/m) | Antenna Polarity |
|-----------------|-----------------------------|---------------------|----------------|---------------------------|------------------|
| 5322.80         | 80.82                       | 32.20               | -20.66         | 92.36                     | Horizontal       |

The field strength (the lowest) of fundamenta is more than 20dB higher than the unwanted emissions, in accordance with FCC part 15.215(b).

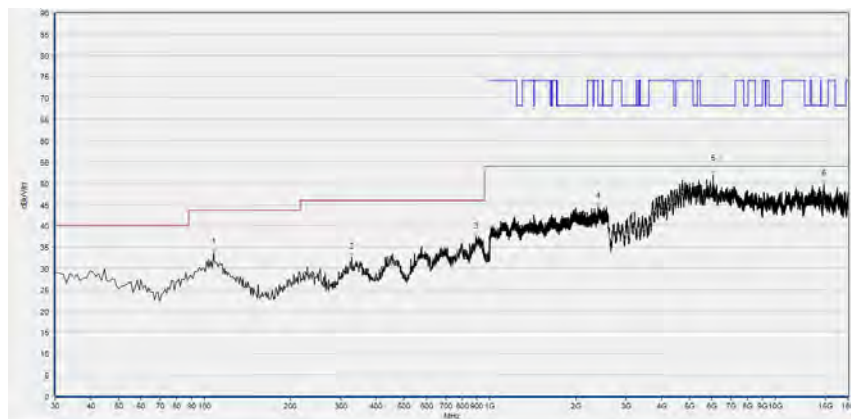
**802.11a Mode**

## Plot for Channel 44



| Fre. (MHz) | PK<br>(dBμV/m) | QP<br>(dBμV/m) | AV<br>(dBμV/m) | Limit-PK<br>(dBμV/m) | Limit-QP<br>(dBμV/m) | Limit-AV<br>(dBμV/m) | Antenna    | Verdict |
|------------|----------------|----------------|----------------|----------------------|----------------------|----------------------|------------|---------|
| 108.570    | 31.95          | N/A            | N/A            | N/A                  | 43.50                | N/A                  | Horizontal | PASS    |
| 450.010    | 33.80          | N/A            | N/A            | N/A                  | 46.00                | N/A                  | Horizontal | PASS    |
| 898.150    | 38.52          | N/A            | N/A            | N/A                  | 46.00                | N/A                  | Horizontal | PASS    |
| 2410.133   | 44.90          | N/A            | N/A            | 68.23                | N/A                  | N/A                  | Horizontal | PASS    |
| 4749.840   | 50.50          | N/A            | N/A            | 74.00                | N/A                  | 54.00                | Horizontal | PASS    |
| 14772.160  | 49.84          | N/A            | N/A            | 68.23                | N/A                  | N/A                  | Horizontal | PASS    |

(Antenna Horizontal, 30MHz to 18GHz)

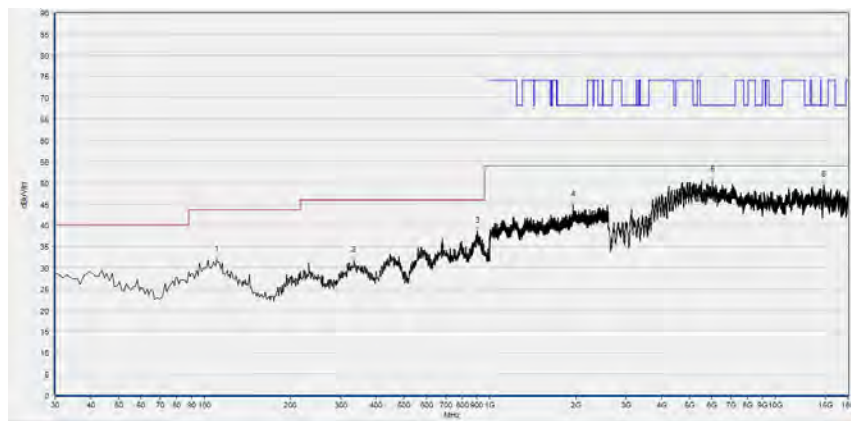


| Fre. (MHz) | PK<br>(dBμV/m) | QP<br>(dBμV/m) | AV<br>(dBμV/m) | Limit-PK<br>(dBμV/m) | Limit-QP<br>(dBμV/m) | Limit-AV<br>(dBμV/m) | Antenna  | Verdict |
|------------|----------------|----------------|----------------|----------------------|----------------------|----------------------|----------|---------|
| 107.600    | 33.75          | N/A            | N/A            | N/A                  | 43.50                | N/A                  | Vertical | PASS    |
| 328.760    | 32.46          | N/A            | N/A            | N/A                  | 46.00                | N/A                  | Vertical | PASS    |
| 894.270    | 37.36          | N/A            | N/A            | N/A                  | 46.00                | N/A                  | Vertical | PASS    |
| 2401.600   | 44.42          | N/A            | N/A            | 68.23                | N/A                  | N/A                  | Vertical | PASS    |
| 6046.520   | 51.83          | N/A            | N/A            | 68.23                | N/A                  | N/A                  | Vertical | PASS    |
| 14778.320  | 49.80          | N/A            | N/A            | 68.23                | N/A                  | N/A                  | Vertical | PASS    |

(Antenna Vertical, 30MHz to 18GHz)

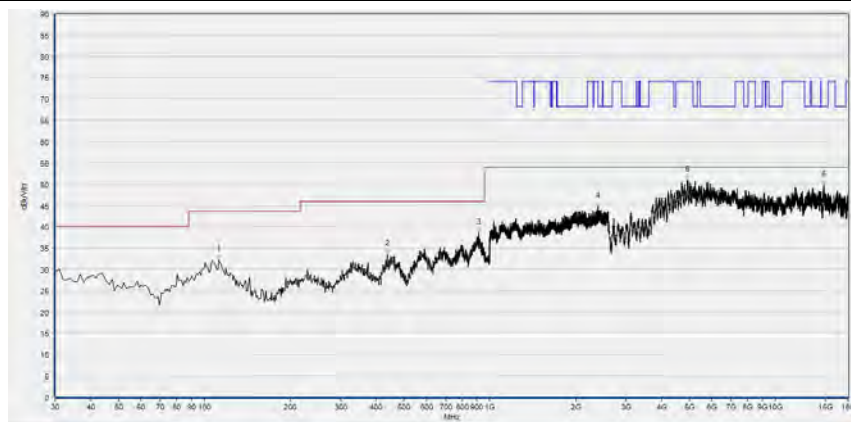


Plot for Channel 60



| Fre. (MHz) | PK (dBμV/m) | QP (dBμV/m) | AV (dBμV/m) | Limit-PK (dBμV/m) | Limit-QP (dBμV/m) | Limit-AV (dBμV/m) | Antenna    | Verdict |
|------------|-------------|-------------|-------------|-------------------|-------------------|-------------------|------------|---------|
| 110.510    | 31.84       | N/A         | N/A         | N/A               | 43.50             | N/A               | Horizontal | PASS    |
| 334.580    | 31.72       | N/A         | N/A         | N/A               | 46.00             | N/A               | Horizontal | PASS    |
| 905.910    | 38.50       | N/A         | N/A         | N/A               | 46.00             | N/A               | Horizontal | PASS    |
| 1954.667   | 44.72       | N/A         | N/A         | 68.23             | N/A               | N/A               | Horizontal | PASS    |
| 6024.960   | 50.36       | N/A         | N/A         | 68.23             | N/A               | N/A               | Horizontal | PASS    |
| 14769.080  | 49.45       | N/A         | N/A         | 68.23             | N/A               | N/A               | Horizontal | PASS    |

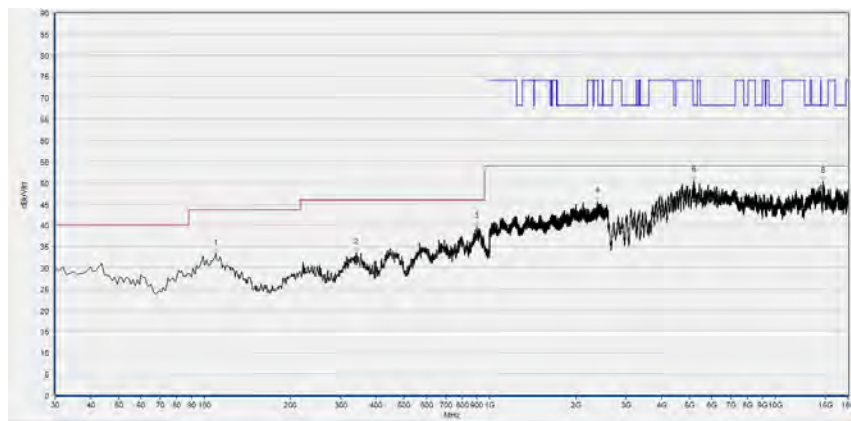
(Antenna Horizontal, 30MHz to 18GHz)



| Fre. (MHz) | PK (dBμV/m) | QP (dBμV/m) | AV (dBμV/m) | Limit-PK (dBμV/m) | Limit-QP (dBμV/m) | Limit-AV (dBμV/m) | Antenna  | Verdict |
|------------|-------------|-------------|-------------|-------------------|-------------------|-------------------|----------|---------|
| 112.450    | 32.23       | N/A         | N/A         | N/A               | 43.50             | N/A               | Vertical | PASS    |
| 438.370    | 33.57       | N/A         | N/A         | N/A               | 46.00             | N/A               | Vertical | PASS    |
| 912.700    | 38.50       | N/A         | N/A         | N/A               | 46.00             | N/A               | Vertical | PASS    |
| 2397.867   | 44.73       | N/A         | N/A         | 68.23             | N/A               | N/A               | Vertical | PASS    |
| 4925.400   | 50.90       | N/A         | N/A         | 74.00             | N/A               | 54.00             | Vertical | PASS    |
| 14818.360  | 49.83       | N/A         | N/A         | 68.23             | N/A               | N/A               | Vertical | PASS    |

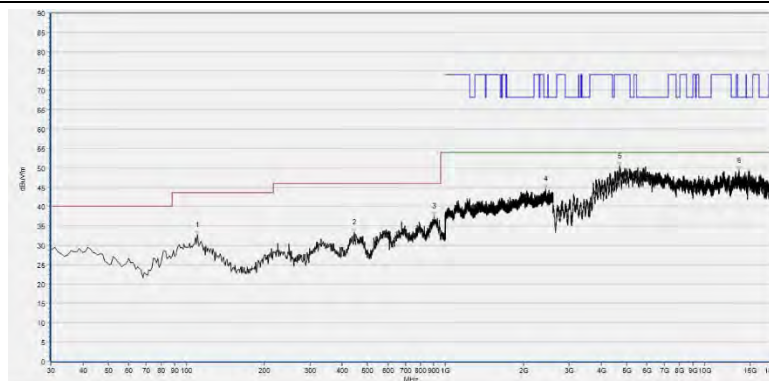
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel 120



| Fre. (MHz) | PK (dBμV/m) | QP (dBμV/m) | AV (dBμV/m) | Limit-PK (dBμV/m) | Limit-QP (dBμV/m) | Limit-AV (dBμV/m) | Antenna    | Verdict |
|------------|-------------|-------------|-------------|-------------------|-------------------|-------------------|------------|---------|
| 113.420    | 31.92       | N/A         | N/A         | N/A               | 43.50             | N/A               | Horizontal | PASS    |
| 449.040    | 34.42       | N/A         | N/A         | N/A               | 46.00             | N/A               | Horizontal | PASS    |
| 900.090    | 38.24       | N/A         | N/A         | N/A               | 46.00             | N/A               | Horizontal | PASS    |
| 2400.000   | 44.28       | N/A         | N/A         | 68.23             | N/A               | N/A               | Horizontal | PASS    |
| 5535.240   | 50.75       | N/A         | N/A         | 68.23             | N/A               | N/A               | Horizontal | PASS    |
| 11907.760  | 49.41       | N/A         | N/A         | 74.00             | N/A               | 54.00             | Horizontal | PASS    |

(Antenna Horizontal, 30MHz to 18GHz)



| Fre. (MHz) | PK (dBμV/m) | QP (dBμV/m) | AV (dBμV/m) | Limit-PK (dBμV/m) | Limit-QP (dBμV/m) | Limit-AV (dBμV/m) | Antenna  | Verdict |
|------------|-------------|-------------|-------------|-------------------|-------------------|-------------------|----------|---------|
| 110.510    | 32.70       | N/A         | N/A         | N/A               | 43.50             | N/A               | Vertical | PASS    |
| 445.160    | 33.41       | N/A         | N/A         | N/A               | 46.00             | N/A               | Vertical | PASS    |
| 905.910    | 37.55       | N/A         | N/A         | N/A               | 46.00             | N/A               | Vertical | PASS    |
| 2431.467   | 44.64       | N/A         | N/A         | 68.23             | N/A               | N/A               | Vertical | PASS    |
| 4703.640   | 50.46       | N/A         | N/A         | 74.00             | N/A               | 54.00             | Vertical | PASS    |
| 13583.280  | 49.19       | N/A         | N/A         | 68.23             | N/A               | N/A               | Vertical | PASS    |

(Antenna Vertical, 30MHz to 18GHz)

END OF REPORT