

# TEST REPORT

of

FCC Part 15 Subpart E §15.407

FCC ID: 2BG62-PABLOXF40

Equipment Under Test : Drone  
Model Name : PabloX F40  
Variant Model Name(s) : -  
Applicant : PABLO AIR Co., Ltd.  
Manufacturer : PABLO AIR Co., Ltd.  
Date of Receipt : 2024.06.14  
Date of Test(s) : 2024.06.18 ~ 2024.07.04  
Date of Issue : 2024.07.04

In the configuration tested, the EUT complied with the standards specified above.  
This test report does not assure KOLAS accreditation.

- 1) The results of this test report are effective only to the items tested.
- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
- 3) This test report cannot be reproduced, except in full, without prior written permission of the Company.
- 4) The data marked ※ in this report was provided by the customer and may affect the validity of the test results.

We are responsible for all the information of this test report except for the data(※) provided by the customer.

Tested by:

  
Demian Kim

Technical  
Manager:

  
Jinhyoung Cho

**SGS Korea Co., Ltd. Gunpo Laboratory**



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Report Number: F690501-RF-RTL005234

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## 1. General Information

### 1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

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### 1.2. Details of Applicant

Applicant : PABLO AIR Co., Ltd.

Address : 5F, 82, Venture-ro, Yeonsu-gu, Incheon, Republic of Korea, 22013

Contact Person : Yoon, Jun-han

Phone No. : +82 70 5222 6968

### 1.3. Details of Manufacturer

Company : PABLO AIR Co., Ltd.

Address : 5F, 82, Venture-ro, Yeonsu-gu, Incheon, Republic of Korea, 22013

### 1.4. Description of EUT

|                           |                                                                                                                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Kind of Product           | Drone                                                                                                                                            |
| Model Name                | PabloX F40                                                                                                                                       |
| Approved Module           | FCC ID: 2AD56HLK-RM58S                                                                                                                           |
| Variant Model Names       | -                                                                                                                                                |
| Serial Number             | 001                                                                                                                                              |
| Power Supply              | DC 14.8 V                                                                                                                                        |
| Frequency Range           | 5 745 MHz ~ 5 825 MHz (Band 3: 11a/n_HT20, 11ac_VHT20)<br>5 755 MHz ~ 5 795 MHz (Band 3: 11n_HT40, 11ac_VHT40)<br>5 775 MHz (Band 3: 11ac_VHT80) |
| Modulation Technique      | OFDM                                                                                                                                             |
| Number of Channels        | 5 channels (Band 3: 11a/n_HT20, 11ac_VHT20)<br>2 channels (Band 3: 11n_HT40, 11ac_VHT40)<br>1 channel (Band 3: 11ac_VHT80)                       |
| Antenna Type              | Wire Antenna                                                                                                                                     |
| Antenna Gain <sup>*</sup> | 2.67 dBi                                                                                                                                         |
| H/W Version               | 4.0.1                                                                                                                                            |
| S/W Version               | 1.0.1                                                                                                                                            |
| FVIN                      | N/A                                                                                                                                              |

## **1.5. Automatically Discontinue Transmission**

### **1.5.1. Limit of Automatically Discontinue Transmission**

The device shall automatically discontinue transmission in case of either absence of information to transmit or operating failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

### **1.5.2. Test Result of Automatically Discontinue Transmission**

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

## 1.6. Test Equipment List

| Equipment                | Manufacturer                | Model                                | S/N                    | Cal. Date     | Cal. Interval | Cal. Due      |
|--------------------------|-----------------------------|--------------------------------------|------------------------|---------------|---------------|---------------|
| Signal Generator         | R&S                         | SMA100B                              | 106887                 | Oct. 06, 2023 | Annual        | Oct. 06, 2024 |
| Spectrum Analyzer        | R&S                         | FSW8                                 | 101659                 | May 28, 2024  | Annual        | May 28, 2025  |
| Spectrum Analyzer        | Agilent                     | N9020A                               | MY53421758             | Sep. 01, 2023 | Annual        | Sep. 01, 2024 |
| Spectrum Analyzer        | Agilent                     | N9030A                               | US51350132             | Nov. 27, 2023 | Annual        | Nov. 27, 2024 |
| Attenuator               | AEROFLEX / INMET            | 40AH2W-6                             | 3                      | Mar. 18, 2024 | Annual        | Mar. 18, 2025 |
| High Pass Filter         | Wainwright Instrument GmbH  | WHKX3.0/18G-10SS                     | 21                     | Jun. 07, 2024 | Annual        | Jun. 07, 2025 |
| High Pass Filter         | Wainwright Instrument GmbH  | WHNX7.5/26.5G-6SS                    | 15                     | Jun. 07, 2024 | Annual        | Jun. 07, 2025 |
| Low Pass Filter          | Mini-Circuits               | NLP-1200+                            | V 8979400903-1         | May 17, 2024  | Annual        | May 17, 2025  |
| Low Pass Filter          | WT MICROWAVE INC            | WT-A1700-LS                          | WT151207001            | Apr. 08, 2024 | Annual        | Apr. 08, 2025 |
| Power Meter              | Anritsu                     | ML2495A                              | 1223004                | May 29, 2024  | Annual        | May 29, 2025  |
| Power Sensor             | Anritsu                     | MA2411B                              | 1207272                | May 29, 2024  | Annual        | May 29, 2025  |
| DC Power Supply          | R&S                         | HMP2020                              | 022802107              | Oct. 31, 2023 | Annual        | Oct. 31, 2024 |
| Preamplifier             | H.P.                        | 8447F                                | 2944A03909             | Aug. 04, 2023 | Annual        | Aug. 04, 2024 |
| Signal Conditioning Unit | R&S                         | SCU-18F                              | 101058                 | Dec. 07, 2023 | Annual        | Dec. 07, 2024 |
| Pre Amplifier            | MITEQ Inc.                  | JS44-18004000-35-8P                  | 1546891                | Oct. 06, 2023 | Annual        | Oct. 06, 2024 |
| Loop Antenna             | Schwarzbeck Mess-Elektronik | FMZB 1519                            | 1519-039               | Aug. 21, 2023 | Biennial      | Aug. 21, 2025 |
| Bilog Antenna            | Schwarzbeck Mess-Elektronik | VULB 9163                            | 9163-396               | Apr. 02, 2024 | Biennial      | Apr. 02, 2026 |
| Horn Antenna             | R&S                         | HF906                                | 100326                 | Feb. 19, 2024 | Annual        | Feb. 19, 2025 |
| Horn Antenna             | Schwarzbeck Mess-Elektronik | BBHA 9170                            | BBHA9170223            | Oct. 10, 2023 | Annual        | Oct. 10, 2024 |
| EMI Test Receiver        | R&S                         | ESU26                                | 100109                 | Jan. 16, 2024 | Annual        | Jan. 16, 2025 |
| Turn Table               | Innco systems GmbH          | DS 1200 S                            | N/A                    | N.C.R.        | N/A           | N.C.R.        |
| Controller               | Innco systems GmbH          | CONTROLLER CO3000-4P                 | CO3000/963/383 30516/L | N.C.R.        | N/A           | N.C.R.        |
| Antenna Mast             | Innco systems GmbH          | MA4640-XP-ET                         | MA4640/536/383 30516/L | N.C.R.        | N/A           | N.C.R.        |
| Anechoic Chamber         | SY Corporation              | L × W × H<br>(9.6 m × 6.4 m × 6.6 m) | N/A                    | N.C.R.        | N/A           | N.C.R.        |
| Coaxial Cable            | SENSORVIEW                  | NMST-13A26-NMST-5 m                  | TPC2402190004          | Apr. 03, 2024 | Semi-Annual   | Oct. 03, 2024 |
| Coaxial Cable            | SENSORVIEW                  | NMST-13A26-NMST-10 m                 | TPC2402190001          | Apr. 03, 2024 | Semi-Annual   | Oct. 03, 2024 |
| Coaxial Cable            | RFONE                       | PL360P-292M292M-1.5M-A               | 20200324002            | Apr. 12, 2024 | Semi-Annual   | Oct. 12, 2024 |

## 1.7. Summary of Test Result

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 15 Subpart E |                                         |                        |
|-----------------------------------------|-----------------------------------------|------------------------|
| Section in FCC                          | Test Item(s)                            | Result                 |
| 15.205(a)<br>15.209(a)<br>15.407(b)(4)  | Transmitter Radiated Spurious Emissions | Complied               |
| 15.407(a)                               | 26 dB Bandwidth & 99 % Bandwidth        | Complied <sup>1)</sup> |
| 15.407(e)                               | 6 dB Bandwidth                          | Complied <sup>1)</sup> |
| 15.407(a)(3)                            | Maximum Conducted Output Power          | Complied               |
| 15.407(a)(3)                            | Maximum Power Spectral Density          | Complied <sup>1)</sup> |
| 15.207                                  | AC Power Line Conducted Emission        | N/A <sup>2)</sup>      |

### Note;

1) The EUT uses the approved module. Other test items were complied with module test report.

- Module FCC ID: 2AD56HLK-RM58S
- Test Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.
- Test report number: WTX19X10074455W-1

2) The AC power line test was not performed because the EUT use battery power for operation and which do not operate from the AC power lines.

## 1.8. Test Procedure(s)

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 789033 D02 General UNII Test Procedures New Rules v02r01 were used in the measurement of the DUT.

## 1.9. Sample Calculation

Where relevant, the following sample calculation is provided:

### 1.9.1. Conducted Test

Offset value (dB) = Attenuator (dB) + Cable loss (dB)

### 1.9.2. Radiation Test

Field strength level (dB $\mu$ V/m)

= Measured level (dB $\mu$ V) + Antenna factor (dB/m) + Cable loss (dB) - Amplifier gain (dB)

## 1.10. Information of Software for test

- Using the software of QATool 0.0.1.58 to test for the WLAN.

### 1.11. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Parameter                          | Uncertainty |         |
|------------------------------------|-------------|---------|
| Maximum Conducted Output Power     | 0.34 dB     |         |
| Radiated Emission, 9 kHz to 30 MHz | H           | 3.60 dB |
|                                    | V           | 3.60 dB |
| Radiated Emission, below 1 GHz     | H           | 4.60 dB |
|                                    | V           | 4.90 dB |
| Radiated Emission, above 1 GHz     | H           | 3.90 dB |
|                                    | V           | 3.80 dB |

All measurement uncertainty values are shown with a coverage factor  $k = 2$  to indicate a 95 % level of confidence

### 1.12. Test Report Revision

| Revision | Report Number        | Date of Issue | Description |
|----------|----------------------|---------------|-------------|
| 0        | F690501-RF-RTL005234 | 2024.07.04    | Initial     |

### 1.13. Test Mode

| Mode       | Bandwidth (MHz) | Data rate with highest output power |
|------------|-----------------|-------------------------------------|
| 11a        | 20              | 6 Mbps                              |
| 11n_HT20   | 20              | MCS0                                |
| 11n_HT40   | 40              | MCS0                                |
| 11ac_VHT80 | 80              | MCS0                                |

Radiated emission below 1 GHz was performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emission above 1 GHz was performed with the EUT set to transmit Low/Middle/High Channels.

## 1.14. Duty Cycle of EUT

Regarding to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, II.B, the maximum duty cycles of all modes were investigated and set the spectrum analyzer as below.  
 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  $> 50/T$  and the number of sweep points across duration T exceeds 100.

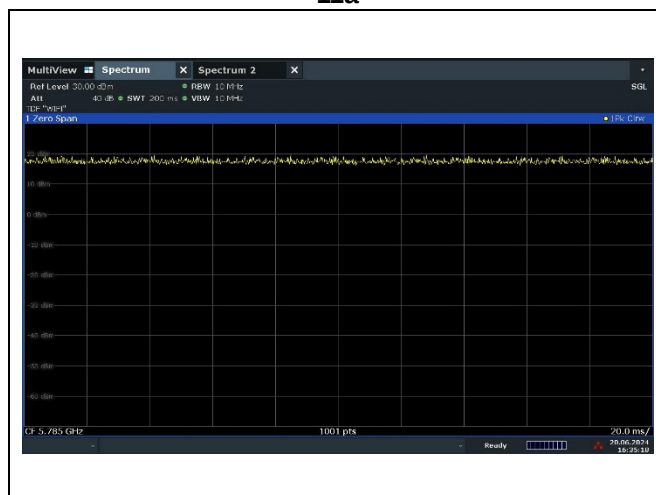
| Mode       | Data Rate | Duty Cycle (%) | Correction Factor (dB) |
|------------|-----------|----------------|------------------------|
| 11a        | 6 Mbps    | 100            | -                      |
| 11n_HT20   | MCS0      | 100            | -                      |
| 11n_HT40   | MCS0      | 100            | -                      |
| 11ac_VHT80 | MCS0      | 100            | -                      |

### Remark;

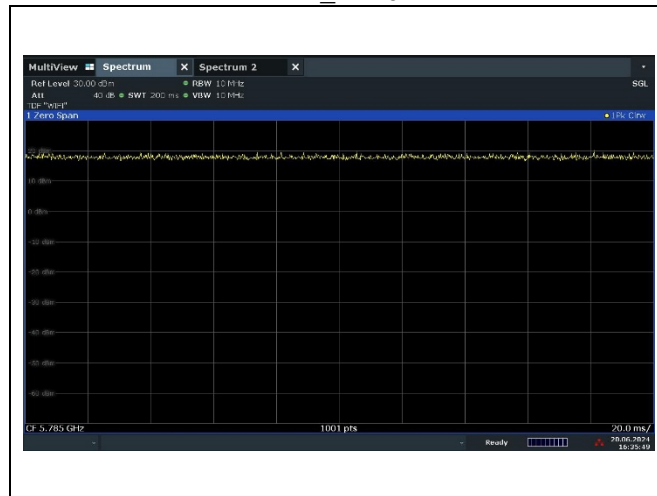
- As measured duty cycles of EUT, all of mode and data rate keep constant period and are converted to log scale (power averaging) to compensate correction factor to result of average test items.
- Duty Cycle (%) = (Tx on time / Tx on + off time) x 100
- Correction Factor (dB) = 10 log (1 / Duty Cycle)
- Duty cycle is over 98 %, compensation is no required.

### - Test plots

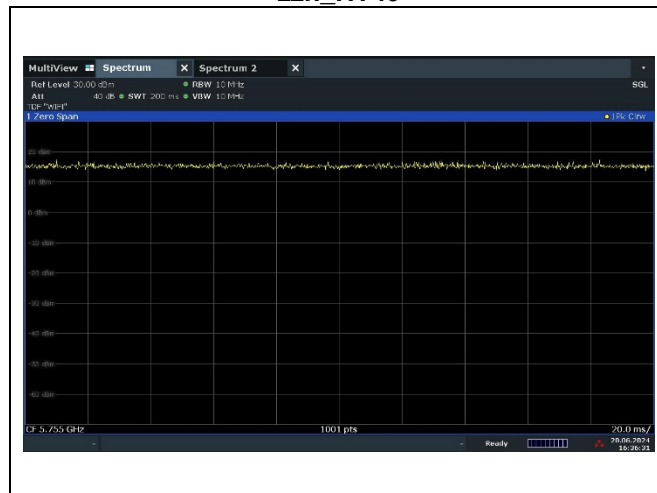
**11a**



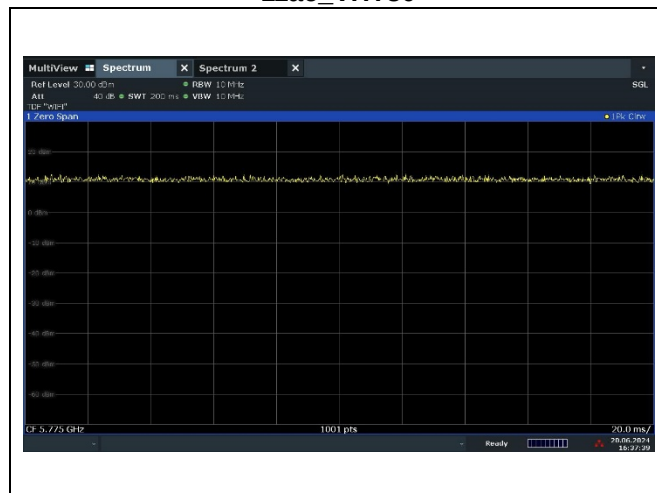
### 11n\_HT20



### 11n\_HT40



### 11ac\_VHT80

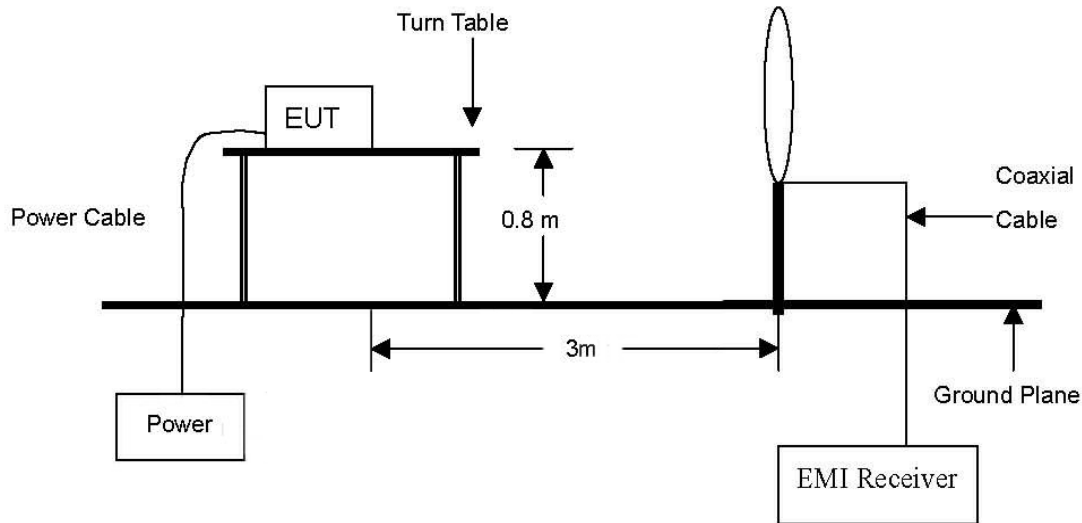


## 2. Transmitter Radiated Spurious Emissions

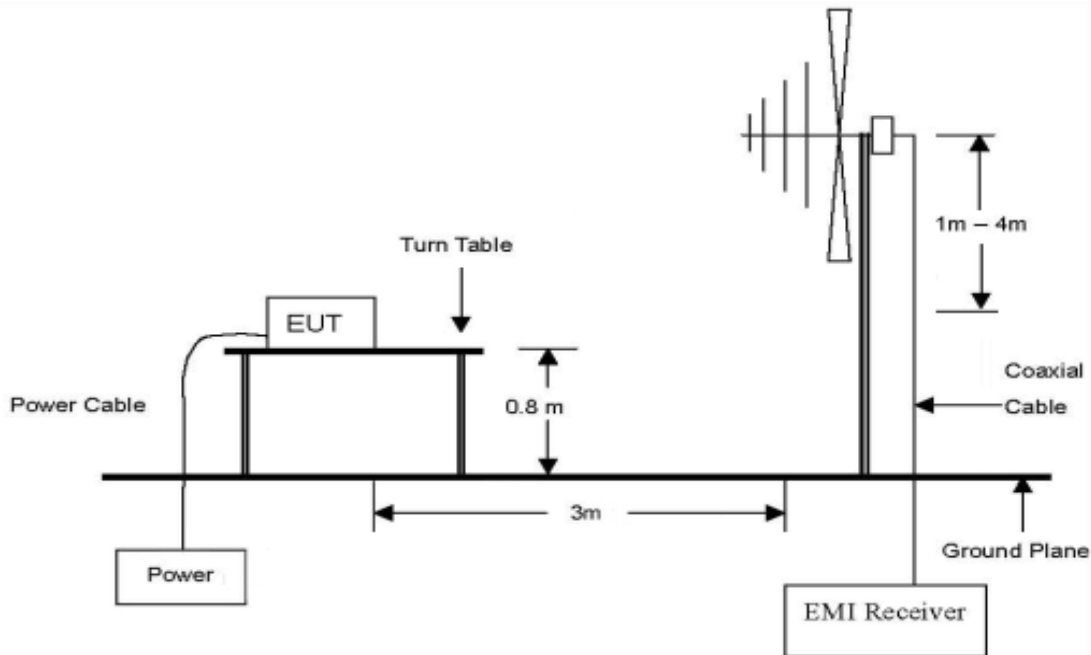
### 2.1. Test Setup

#### 2.1.1. Transmitter radiated spurious emissions

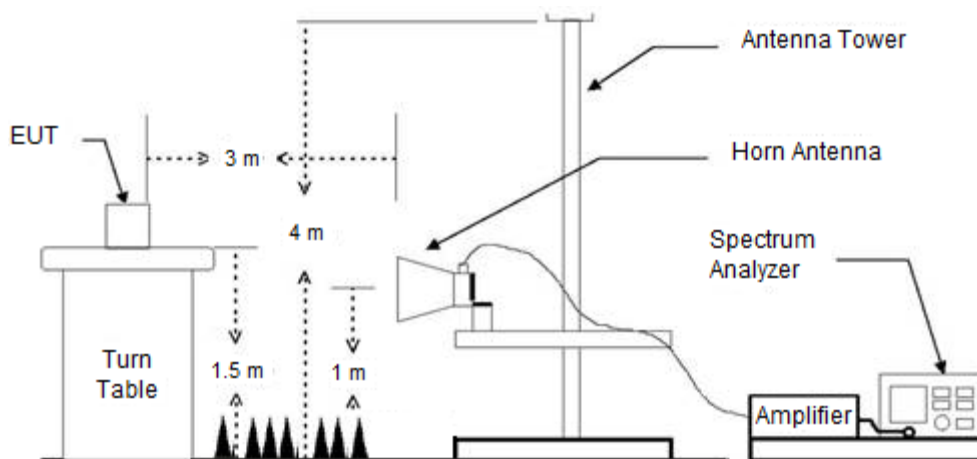
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission. The spurious emissions were investigated from 1 GHz to the 10th harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.



## 2.2. Limit

According to § 15.407(b)

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of -27 dB m/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dB m/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 dB m/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 dB m/MHz at the band edge.

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:

| Frequency (MHz) | Field Strength ( $\mu\text{V/m}$ ) | Measurement Distance (Meters) |
|-----------------|------------------------------------|-------------------------------|
| 0.009-0.490     | 2 400/F(kHz)                       | 300                           |
| 0.490-1.705     | 24 000/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                             |

\*\* 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., §§15.231 and 15.241.

## 2.3. Test Procedures

Radiated spurious emissions from the EUT were measured according to the dictates in section G of KDB 789033 D02 General UNII Test Procedures New Rules v02r01 and ANSI C63.10-2013.

### 2.3.1. Test Procedures for emission below 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to average or quasi peak detect function and Specified Bandwidth with Maximum Hold Mode.

### 2.3.2. Test Procedures for emission from above 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site below 1 GHz and 1.5 meter above the ground at a 3 meter anechoic chamber test site above 1 GHz. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a bi-log antenna, a horn antenna and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. For measurements below 1 GHz resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.
6. For measurements Above 1 GHz resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

- II.G.4. Unwanted emissions measurements below 1 GHz.

Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

- II.G.5. Unwanted maximum emissions measurements above 1 GHz.

Peak emission levels are measured by setting the analyzer as follows:

Set to RBW = 1 MHz, VBW  $\geq$  3 MHz, Detector = Peak, Sweep time = auto, Trace mode = Max hold.

- II.G.6. Average unwanted emissions measurements above 1 GHz.

Set to RBW = 1 MHz, VBW  $\geq$  3 MHz, Detector = power averaging (rms), Averaging type = power averaging (rms), Sweep time = auto, Perform a trace average of at least 100 traces. If the transmission is continuous, If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle. For example, with 50 % duty cycle, at least 200 traces shall be averaged.

If tests are performed with the EUT transmitting at a duty cycle less than 98 %, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle. The correction factor is computed as follows:

- If power averaging (rms) mode was used in II.G.6.c)(iv), the correction factor is  $10 \log (1 / x)$ , where x is the duty cycle. For example, if the transmit duty cycle was 50 %, then 3 dB must be added to the measured emission levels.

- The radiation test of the EUT was investigated in three orthogonal orientations X, Y, and Z described in the test setup photo. All radiated testing of EUT was performed with worst case axis.

## 2.4. Test Result

Ambient temperature :  $(23 \pm 1) ^\circ\text{C}$   
 Relative humidity : 47 % R.H.

### 2.4.1. Radiated Spurious Emission below 1 000 MHz

The frequency spectrum from 9 kHz to 1 000 MHz was investigated. All reading values are peak values.

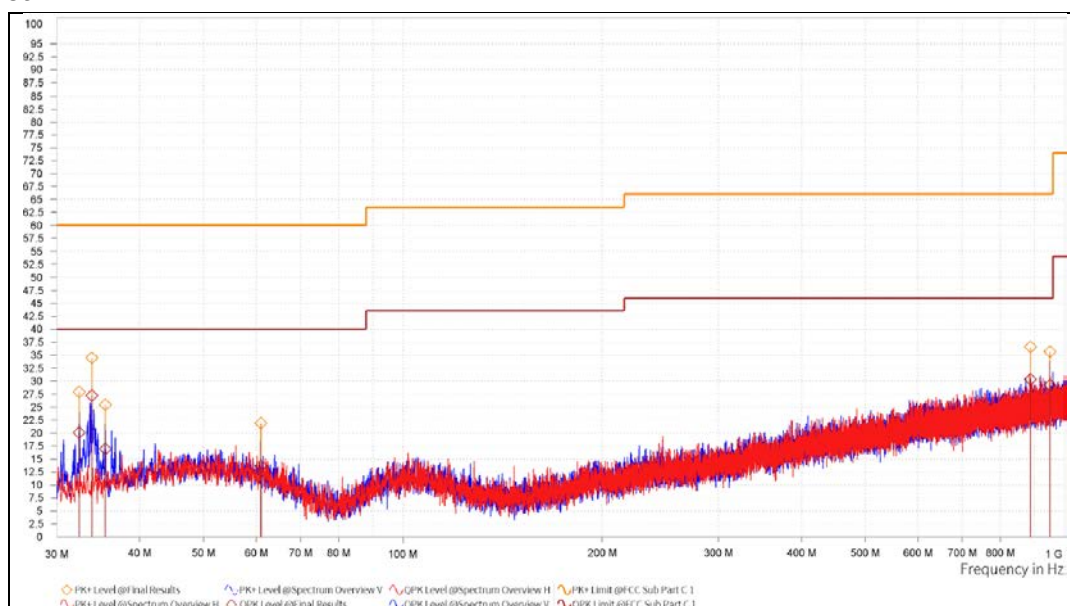
#### 11n\_HT20 (Band 3) / High channel

| Radiated Emissions |                                |                | Ant<br>Pol. | Correction<br>(dB/m) | Total                                  | Limit                                 |                |
|--------------------|--------------------------------|----------------|-------------|----------------------|----------------------------------------|---------------------------------------|----------------|
| Frequency<br>(MHz) | Reading<br>(dB $\mu\text{V}$ ) | Detect<br>Mode |             |                      | Actual<br>(dB $\mu\text{V}/\text{m}$ ) | Limit<br>(dB $\mu\text{V}/\text{m}$ ) | Margin<br>(dB) |
| 32.43              | 31.80                          | Quasi<br>Peak  | V           | -11.78               | 20.02                                  | 40.00                                 | 19.98          |
| 33.88              | 38.47                          | Quasi<br>Peak  | V           | -11.27               | 27.20                                  | 40.00                                 | 12.80          |
| 887.97             | 27.66                          | Quasi<br>Peak  | H           | 2.67                 | 30.33                                  | 46.00                                 | 15.67          |
| 950.69             | 26.06                          | Quasi<br>Peak  | V           | 3.15                 | 29.21                                  | 46.00                                 | 16.79          |

#### Remark;

1. Spurious emissions for all channels and modes were investigated and almost the same below 1 GHz.
2. Test from 30 MHz to 1 000 MHz was performed using the software of ELEKTRA(V5.02) from Rohde & Schwarz GmbH & Co. KG.
3. Radiated spurious emission measurement as below.  
 (Actual = Reading + Correction)  
 (Correction = Antenna Factor + AMP Factor + Cable Loss)
4. According to §15.31(o), emission levels are not report much lower than the limits by over 20 dB.

#### - Test plot



## 2.4.2. Radiated Spurious Emission above 1 000 MHz

### 11a (Band 3)

#### A. Low Channel (5 745 MHz)

| Radiated Emissions |                |             | Ant. | Correction Factors |         | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|---------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 5 644.28           | 17.95          | Peak        | V    | 34.10              | 9.71    | 61.76           | 68.23          | 6.47        |
| 5 679.95           | 18.05          | Peak        | V    | 34.10              | 9.72    | 61.87           | 90.39          | 28.52       |
| 5 715.42           | 17.78          | Peak        | V    | 34.13              | 9.76    | 61.67           | 109.55         | 47.88       |
| 5 725.00           | 21.93          | Peak        | V    | 34.15              | 9.79    | 65.87           | 122.23         | 56.36       |

| Radiated Emissions |                |             | Ant. | Correction Factors |             | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|-------------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | AMP+CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| Above 1 000.00     | Not detected   | -           | -    | -                  | -           | -               | -              | -           |

#### B. Middle Channel (5 785 MHz)

| Radiated Emissions |                |             | Ant. | Correction Factors |             | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|-------------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | AMP+CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| Above 1 000.00     | Not detected   | -           | -    | -                  | -           | -               | -              | -           |

#### C. High Channel (5 825 MHz)

| Radiated Emissions |                |             | Ant. | Correction Factors |         | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|---------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 5 852.94           | 17.87          | Peak        | V    | 34.41              | 9.92    | 62.20           | 115.52         | 53.32       |
| 5 855.00           | 18.50          | Peak        | V    | 34.41              | 9.91    | 62.82           | 110.83         | 48.01       |
| 5 898.92           | 18.76          | Peak        | V    | 34.50              | 9.87    | 63.13           | 87.53          | 24.40       |
| 5 933.80           | 19.18          | Peak        | V    | 34.57              | 9.93    | <b>63.68</b>    | 68.23          | 4.55        |

| Radiated Emissions |                |             | Ant. | Correction Factors |             | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|-------------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | AMP+CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| Above 1 000.00     | Not detected   | -           | -    | -                  | -           | -               | -              | -           |

### 11n\_HT20 (Band 3)

#### A. Low Channel (5 745 MHz)

| Radiated Emissions |                      |             | Ant. | Correction Factors |         | Total                 | Limit                |             |
|--------------------|----------------------|-------------|------|--------------------|---------|-----------------------|----------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
| 5 649.20           | 18.00                | Peak        | V    | 34.10              | 9.71    | 61.81                 | 68.23                | 6.42        |
| 5 699.02           | 18.70                | Peak        | V    | 34.10              | 9.72    | 62.52                 | 104.50               | 41.98       |
| 5 719.93           | 21.10                | Peak        | V    | 34.14              | 9.78    | 65.02                 | 110.81               | 45.79       |
| 5 725.00           | 23.93                | Peak        | V    | 34.15              | 9.79    | 67.87                 | 122.23               | 54.36       |

| Radiated Emissions |                      |             | Ant. | Correction Factors |             | Total                 | Limit                |             |
|--------------------|----------------------|-------------|------|--------------------|-------------|-----------------------|----------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | AMP+CL (dB) | Actual (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
| Above 1 000.00     | Not detected         | -           | -    | -                  | -           | -                     | -                    | -           |

#### B. Middle Channel (5 785 MHz)

| Radiated Emissions |                      |             | Ant. | Correction Factors |             | Total                 | Limit                |             |
|--------------------|----------------------|-------------|------|--------------------|-------------|-----------------------|----------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | AMP+CL (dB) | Actual (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
| Above 1 000.00     | Not detected         | -           | -    | -                  | -           | -                     | -                    | -           |

#### C. High Channel (5 825 MHz)

| Radiated Emissions |                      |             | Ant. | Correction Factors |         | Total                 | Limit                |             |
|--------------------|----------------------|-------------|------|--------------------|---------|-----------------------|----------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
| 5 850.42           | 19.69                | Peak        | V    | 34.40              | 9.93    | 64.02                 | 121.27               | 57.25       |
| 5 861.72           | 18.37                | Peak        | V    | 34.42              | 9.89    | 62.68                 | 108.95               | 46.27       |
| 5 899.26           | 18.49                | Peak        | V    | 34.50              | 9.87    | 62.86                 | 87.28                | 24.42       |
| 5 937.00           | 20.12                | Peak        | V    | 34.57              | 9.94    | <b>64.63</b>          | 68.23                | 3.60        |

| Radiated Emissions |                      |             | Ant. | Correction Factors |             | Total                 | Limit                |             |
|--------------------|----------------------|-------------|------|--------------------|-------------|-----------------------|----------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | AMP+CL (dB) | Actual (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
| Above 1 000.00     | Not detected         | -           | -    | -                  | -           | -                     | -                    | -           |

**11n\_HT40 (Band 3)**

A. Low Channel (5 755 MHz)

| Radiated Emissions |                |             | Ant. | Correction Factors |         | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|---------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 5 643.46           | 19.36          | Peak        | V    | 34.10              | 9.71    | 63.17           | 68.23          | 5.06        |
| 5 685.08           | 19.43          | Peak        | V    | 34.10              | 9.72    | 63.25           | 94.19          | 30.94       |
| 5 719.31           | 26.84          | Peak        | V    | 34.14              | 9.77    | 70.75           | 110.63         | 39.88       |
| 5 723.82           | 29.01          | Peak        | V    | 34.15              | 9.79    | 72.95           | 119.54         | 46.59       |

| Radiated Emissions |                |             | Ant. | Correction Factors |             | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|-------------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | AMP+CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| Above 1 000.00     | Not detected   | -           | -    | -                  | -           | -               | -              | -           |

B. High Channel (5 795 MHz)

| Radiated Emissions |                |             | Ant. | Correction Factors |         | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|---------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 5 850.00           | 16.74          | Peak        | V    | 34.40              | 9.93    | 61.07           | 122.23         | 61.16       |
| 5 869.11           | 17.92          | Peak        | V    | 34.44              | 9.87    | 62.23           | 106.88         | 44.65       |
| 5 877.08           | 18.41          | Peak        | V    | 34.45              | 9.85    | 62.71           | 103.69         | 40.98       |
| 5 927.25           | 19.24          | Peak        | V    | 34.55              | 9.92    | <b>63.71</b>    | 68.23          | 4.52        |

| Radiated Emissions |                |             | Ant. | Correction Factors |             | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|-------------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | AMP+CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| Above 1 000.00     | Not detected   | -           | -    | -                  | -           | -               | -              | -           |

### 11ac\_VHT80 (Band 3)

#### A. Middle Channel (5 775 MHz)

| Radiated Emissions |                |             | Ant. | Correction Factors |         | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|---------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 5 620.60           | 19.05          | Peak        | V    | 34.10              | 9.68    | 62.83           | 68.23          | 5.40        |
| 5 696.62           | 24.38          | Peak        | V    | 34.10              | 9.72    | 68.20           | 102.73         | 34.53       |
| 5 714.65           | 25.46          | Peak        | V    | 34.13              | 9.76    | 69.35           | 109.33         | 39.98       |
| 5 722.27           | 24.10          | Peak        | V    | 34.14              | 9.78    | 68.02           | 116.00         | 47.98       |
| 5 853.97           | 21.12          | Peak        | V    | 34.41              | 9.92    | 65.45           | 113.18         | 47.73       |
| 5 857.89           | 20.33          | Peak        | V    | 34.42              | 9.90    | 64.65           | 110.02         | 45.37       |
| 5 875.00           | 18.44          | Peak        | V    | 34.45              | 9.85    | 62.74           | 105.23         | 42.49       |
| 5 960.30           | 19.62          | Peak        | V    | 34.62              | 9.96    | <b>64.20</b>    | 68.35          | 4.15        |

| Radiated Emissions |                |             | Ant. | Correction Factors |             | Total           | Limit          |             |
|--------------------|----------------|-------------|------|--------------------|-------------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | AMP+CL (dB) | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| Above 1 000.00     | Not detected   | -           | -    | -                  | -           | -               | -              | -           |

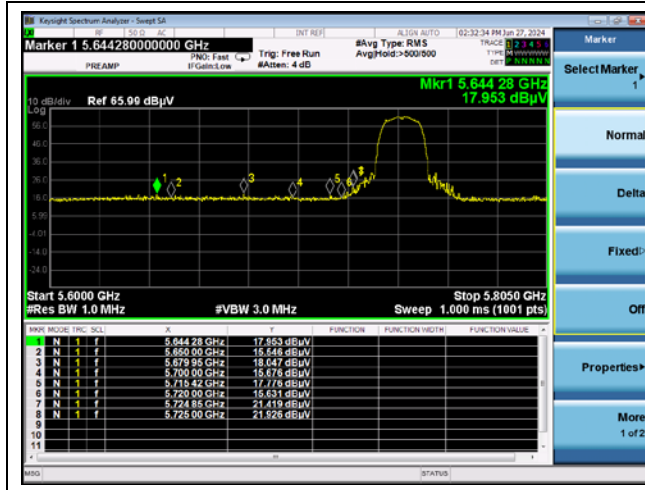
#### Remark;

1. “\*” means the restricted band.
2. Radiated emissions measured in frequency above 1 000 MHz were made with an instrument using Peak / average detector mode if frequency was in restricted band. Otherwise the frequency was out of restricted band, only peak detector should be used.
3. Actual = Reading + AF + CL + (DF) or Reading + AF + AMP + CL + (DF).
4. If frequency was out of restricted band, the calculation method for peak limit is same as below.  
68.23 dBμV/m = EIRP - 20 log (d) + 104.77 = -27 - 20 log (3) + 104.77
5. In case of the emissions within ±75 MHz from band edge of band 3, limit should be adjusted to emission mask of 15.407(4)(i).
6. According to § 15.31(o), emission levels are not reported much lower than the limits by over 20 dB.
7. The maximized peak measured value complies with the average limit, to perform an average measurement is unnecessary.

## - Test plots

### 11a

Low channel Band edge (Peak) - Band 3

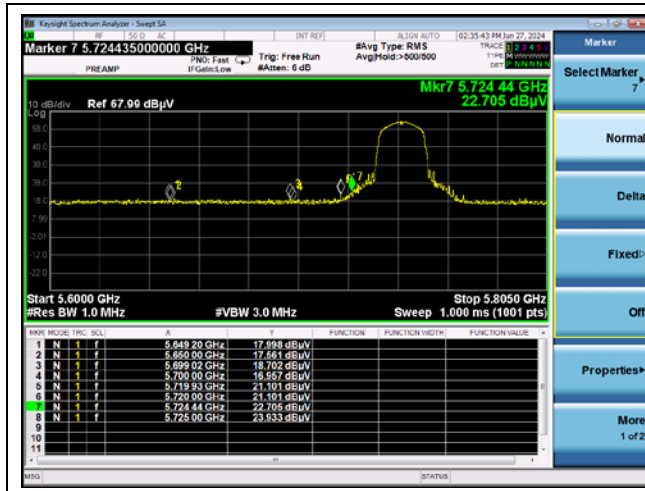


High channel Band edge (Peak) - Band 3

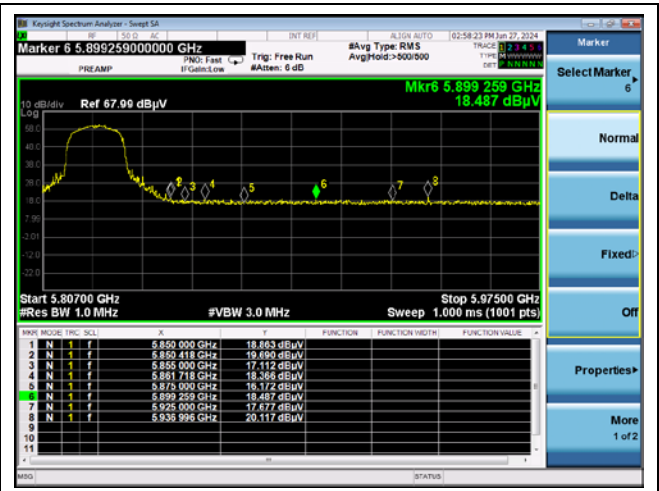


### 11n\_HT20

Low channel Band edge (Peak) - Band 3

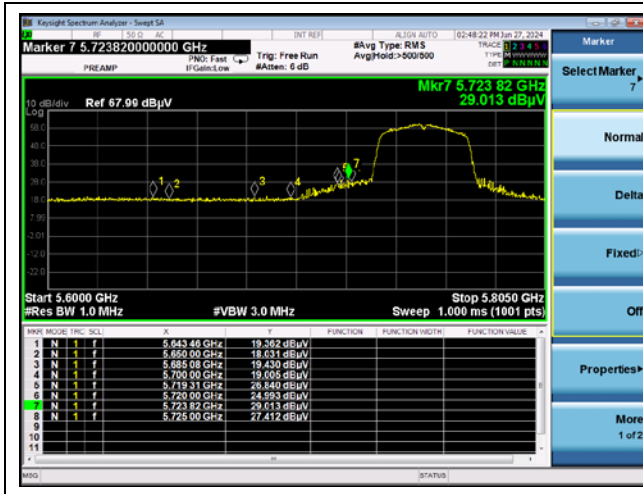


High channel Band edge (Peak) - Band 3

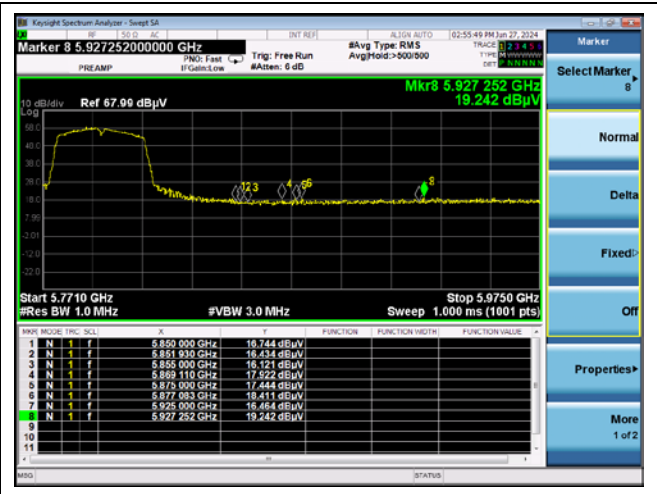


### 11n\_HT40

Low channel Band edge (Peak) - Band 3

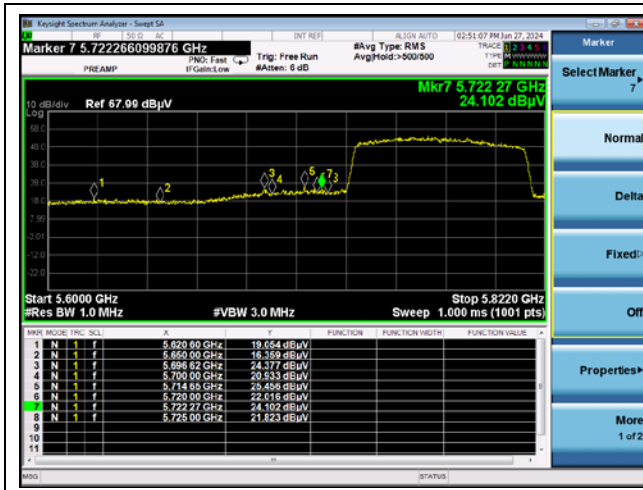


High channel Band edge (Peak) - Band 3

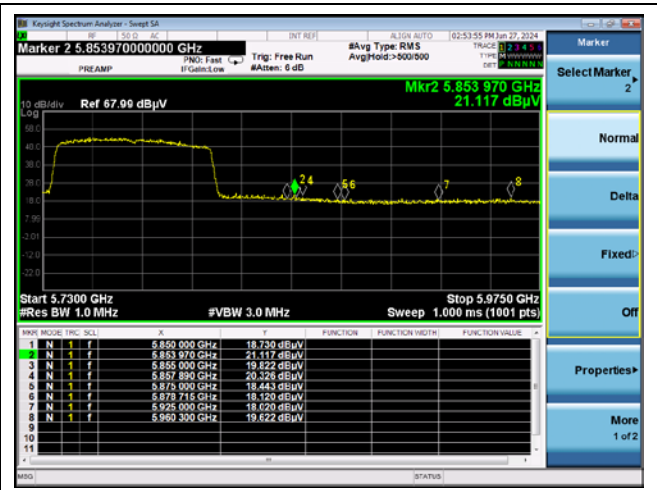


### 11ac\_VHT80

Middle channel Band edge (Peak) - Band 3

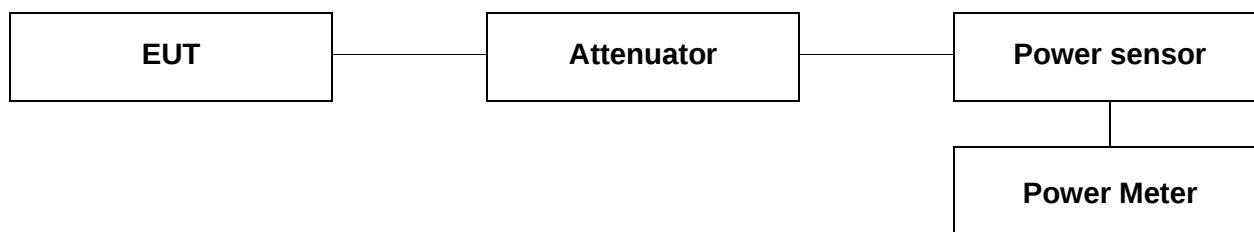


Middle channel Band edge (Peak) - Band 3



### 3. Maximum Conducted Output Power

#### 3.1. Test Setup



#### 3.2. Limit

According to 15.407(a)(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. In addition, the maximum power spectral density shall not exceed 30 dB m in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dB i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### 3.3. Test Procedure

1. This measurement settings are specified in section II.E.3.a of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied:
  - The EUT is configured to transmit continuously or to transmit with a consistent duty cycle.
  - At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
  - The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
3. If the transmitter does not transmit continuously, measure the duty cycle,  $x$ , of the transmitter output signal as described in section II.B.
4. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
5. Adjust the measurement in dB m by adding  $10 \log (1/x)$  where  $x$  is the duty cycle (e.g.,  $10 \log (1/0.25)$  if the duty cycle is 25 %).

### 3.4. Test Result

Ambient temperature : (23 ± 1) °C  
Relative humidity : 47 % R.H.

#### Test mode: 11a

| Band    | Frequency (MHz) | Data Rate | Average Power (dB m) | Duty Cycle Correction Factor (dB) | Average Power Result (dB m) |
|---------|-----------------|-----------|----------------------|-----------------------------------|-----------------------------|
| U-NII 3 | 5 745           | 6 Mbps    | 11.14                | -                                 | 11.14                       |
|         | 5 785           |           | 10.42                |                                   | 10.42                       |
|         | 5 825           |           | 10.82                |                                   | 10.82                       |

| Band    | FCC Limit       |                    |                     |              |
|---------|-----------------|--------------------|---------------------|--------------|
|         | Frequency (MHz) | Fixed Limit (dB m) | Antenna Gain (dB i) | Limit (dB m) |
| U-NII 3 | 5 745           | 30                 | 2.67                | 30           |
|         | 5 785           |                    |                     |              |
|         | 5 825           |                    |                     |              |

#### Remark;

1. Average Power Result (dB m) = Average Power (dB m) + Duty Cycle Correction Factor (dB)
2. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

**Test mode: 11n\_HT20**

| Band    | Frequency (MHz) | Data Rate | Average Power (dB m) | Duty Cycle Correction Factor (dB) | Average Power Result (dB m) |
|---------|-----------------|-----------|----------------------|-----------------------------------|-----------------------------|
| U-NII 3 | 5 745           | MCS0      | 10.63                | -                                 | 10.63                       |
|         | 5 785           |           | 10.59                |                                   | 10.59                       |
|         | 5 825           |           | 11.25                |                                   | 11.25                       |

| Band    | FCC Limit       |                    |                     |              |
|---------|-----------------|--------------------|---------------------|--------------|
|         | Frequency (MHz) | Fixed Limit (dB m) | Antenna Gain (dB i) | Limit (dB m) |
| U-NII 3 | 5 745           | 30                 | 2.67                | 30           |
|         | 5 785           |                    |                     |              |
|         | 5 825           |                    |                     |              |

**Remark;**

1. Average Power Result (dB m) = Average Power (dB m) + Duty Cycle Correction Factor (dB)
2. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

**Test mode: 11n\_HT40**

| Band    | Frequency (MHz) | Data Rate | Average Power (dB m) | Duty Cycle Correction Factor (dB) | Average Power Result (dB m) |
|---------|-----------------|-----------|----------------------|-----------------------------------|-----------------------------|
| U-NII 3 | 5 755           | MCS0      | 10.68                | -                                 | 10.68                       |
|         | 5 795           |           | 10.99                |                                   | 10.99                       |

| Band    | FCC Limit       |                    |                     |              |
|---------|-----------------|--------------------|---------------------|--------------|
|         | Frequency (MHz) | Fixed Limit (dB m) | Antenna Gain (dB i) | Limit (dB m) |
| U-NII 3 | 5 755           | 30                 | 2.67                | 30           |
|         | 5 795           |                    |                     |              |

**Remark;**

1. Average Power Result (dB m) = Average Power (dB m) + Duty Cycle Correction Factor (dB)
2. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

**Test mode: 11ac\_VHT80**

| Band    | Frequency (MHz) | Data Rate | Average Power (dB m) | Duty Cycle Correction Factor (dB) | Average Power Result (dB m) |
|---------|-----------------|-----------|----------------------|-----------------------------------|-----------------------------|
| U-NII 3 | 5 775           | MCS0      | 10.84                | -                                 | 10.84                       |

| Band    | FCC Limit       |                    |                     |              |
|---------|-----------------|--------------------|---------------------|--------------|
|         | Frequency (MHz) | Fixed Limit (dB m) | Antenna Gain (dB i) | Limit (dB m) |
| U-NII 3 | 5 775           | 30                 | 2.67                | 30           |

**Remark;**

1. Average Power Result (dB m) = Average Power (dB m) + Duty Cycle Correction Factor (dB)
2. E.I.R.P. (dB m) = Average Power Result (dB m) + Antenna Gain (dB i)

## 4. Antenna Requirement

### 4.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section §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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. And according to FCC 47 CFR Section §15.407(a) if transmitting antennas of directional gain greater than 6 dB i are used, the maximum conducted power and the maximum power spectral density shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dB i.

### 4.2. Antenna Connected Construction

Antenna used in this product is Wire Antenna with gain of 2.67 dB i.

**- End of the Test Report -**