



# TEST REPORT

|                                                                                                                                                                                                         |                                                          |                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------|
| <b>Eurofins KCTL Co.,Ltd.</b><br>65, Sinwon-ro, Yeongtong-gu,<br>Suwon-si, Gyeonggi-do, 16677, Korea<br>TEL: 82-70-5008-1021 FAX: 82-505-299-8311<br><a href="http://www.kctl.co.kr">www.kctl.co.kr</a> | Report No.:<br><b>KR25-SRF0094-A</b><br>Page (1) of (48) | <div style="float: right; text-align: right;"> <b>KCTL</b> </div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------|

**1. Client**

- Name : YURA CORPORATION
- Address : 308, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
- Date of Receipt : 2025-03-04

**2. Use of Report** : Certification

**3. Name of Product / Model** : Built-In CAM / BLTN\_CAM2.5\_LX3

**4. Manufacturer / Country of Origin** : YURA CORPORATION / Korea

**5. FCC ID** : 2A8FF-BLTNCAM25

**6. IC Certificate No.** : 28921-BLTNCAM25

**7. Date of Test** : 2025-04-01 to 2025-04-22

**8. Location of Test** : ☒ Permanent Testing Lab ☐ On Site Testing  
 (Address: 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

**9. Test method used** : FCC Part 15 Subpart E, 15.407  
 RSS-247 Issue 3 August 2023  
 RSS-Gen Issue 5 February 2021

**10. Test Result** : Refer to the test result in the test report

|             |                                                                                                                                                                   |                                                                                                                                                                           |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Affirmation | Tested by<br><br><div style="display: flex; justify-content: space-between; align-items: center;"> <span>Name : Minki Kim</span> <span>(Signature) </span> </div> | Technical Manager<br><br><div style="display: flex; justify-content: space-between; align-items: center;"> <span>Name : Harim Lee</span> <span>(Signature) </span> </div> |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

2025-05-08

Eurofins KCTL Co.,Ltd.

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|                                                                                                                                                                                                         |                                                   |                                                                                     |
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| <b>Eurofins KCTL Co.,Ltd.</b><br>65, Sinwon-ro, Yeongtong-gu,<br>Suwon-si, Gyeonggi-do, 16677, Korea<br>TEL: 82-70-5008-1021 FAX: 82-505-299-8311<br><a href="http://www.kctl.co.kr">www.kctl.co.kr</a> | Report No.:<br>KR25-SRF0094-A<br>Page (2) of (48) |  |
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## REPORT REVISION HISTORY

| Date       | Revision          | Page No       |
|------------|-------------------|---------------|
| 2025-04-24 | Originally issued | -             |
| 2025-05-08 | Updated           | 3,10,25~26,48 |
|            |                   |               |
|            |                   |               |
|            |                   |               |

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Note. The report No. KR25-SRF0094 is superseded by the report No. KR25-SRF0094-A.

## General remarks for test reports

### Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

#### Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ Statement not required by the standard or client used for type testing

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## 1. General information

Client : YURA CORPORATION  
 Address : 308, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea  
 Manufacturer : YURA CORPORATION  
 Address : 308, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea  
 Laboratory : Eurofins KCTL Co.,Ltd.  
 Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea  
 Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132  
                               VCCI Registration No. : R-20080, G-20078, C-20059, T-20056  
                               CAB Identifier: KR0040  
                               ISED Number: 8035A  
                               KOLAS No.: KT231

## 2. Device information

Equipment under test : Built-In CAM  
 Model : BLTN\_CAM2.5\_LX3  
 Derivative model : BLTN\_CAM2.5\_NH2  
 Modulation technique : WIFI(802.11a/b/g/n/ac) : DSSS, OFDM  
 Number of channels : 2.4 GHz WLAN : 13 ch (20 MHz)  
                               5 GHz UNII-1 : 4 ch (20 MHz), 2 ch (40 MHz), 1 ch (80 MHz)  
 Power source : DC 12 V  
 Antenna specification : Ceramic Chip Antenna  
 Antenna gain : 2.4 GHz WLAN : 1.84 dB i  
                               5 GHz UNII-1 : 1.43 dB i  
 Frequency range : 2.4 GHz WLAN : 2 412 MHz ~ 2 472 MHz (802.11b/g/n\_HT20)  
                               5 GHz UNII-1 : 5 180 MHz ~ 5 240 MHz (802.11a/n/ac\_HT20/VHT20)  
                                                       5 190 MHz ~ 5 230 MHz (802.11n/ac\_HT40/VHT40)  
                                                       5 210 MHz (802.11ac\_VHT80)  
 Software version : 01.01.70.20  
 Hardware version : 1.00  
 Test device serial No. : (LX3)95720-P9100, (NH2) 95720-XH500  
 Operation temperature : -40 °C ~ 75 °C

## 2.1. Information about derivative model

The difference between basic model and derivative models is:

The basic and derivative models are the differences between filters, capacitors and resistors.

## 2.2. Frequency/channel operations

This device contains the following capabilities:

WLAN 5 GHz(802.11a/n\_HT20/40/ac\_VHT20/40/80)

### UNII-1

| Ch. | Frequency (MHz) |
|-----|-----------------|
| 36  | 5 180           |
| 40  | 5 200           |
| 48  | 5 240           |

Table 2.2.1. 802.11a/n/ac\_HT20/VHT20

### UNII-1

| Ch. | Frequency (MHz) |
|-----|-----------------|
| 38  | 5 190           |
| 46  | 5 230           |

Table 2.2.2. 802.11n/ac\_HT40/VHT40

### UNII-1

| Ch. | Frequency (MHz) |
|-----|-----------------|
| 42  | 5 210           |

Table 2.2.3 802.11ac\_VHT80

### 2.3. RF power setting in TEST SW

| Mode           | Frequency<br>[MHz] | RF Power setting value | Test Program  |
|----------------|--------------------|------------------------|---------------|
| 802.11a        | 5 180              | 12                     | CMD_adb shell |
|                | 5 200              | 12                     |               |
|                | 5 240              | 12                     |               |
| 802.11n_HT20   | 5 180              | 12                     |               |
|                | 5 200              | 12                     |               |
|                | 5 240              | 12                     |               |
| 802.11n_HT40   | 5 190              | 12                     |               |
|                | 5 230              | 12                     |               |
| 802.11ac_VHT20 | 5 180              | 12                     |               |
|                | 5 200              | 12                     |               |
|                | 5 240              | 12                     |               |
| 802.11ac_VHT40 | 5 190              | 12                     |               |
|                | 5 230              | 12                     |               |
| 802.11ac_VHT80 | 5 210              | 12                     |               |

## 2.4. Duty Cycle Factor

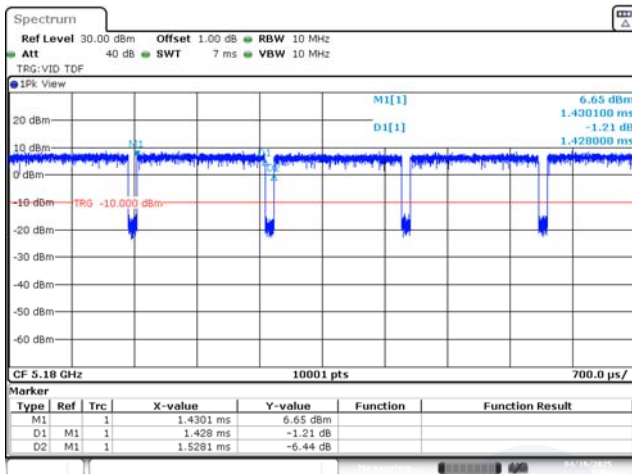
| Test mode      | Period<br>(ms) | T <sub>On</sub> time<br>(ms) | Duty cycle |       | Duty Cycle Factor<br>(dB) |
|----------------|----------------|------------------------------|------------|-------|---------------------------|
|                |                |                              | (Linear)   | (%)   |                           |
| 802.11a        | 1.528 1        | 1.428 0                      | 0.934 5    | 93.45 | 0.29                      |
| 802.11n_HT20   | 1.436 4        | 1.336 2                      | 0.930 2    | 93.02 | 0.31                      |
| 802.11n_HT40   | 0.764 4        | 0.664 0                      | 0.868 7    | 86.87 | 0.61                      |
| 802.11ac_VHT20 | 1.444 2        | 1.344 0                      | 0.930 6    | 93.06 | 0.31                      |
| 802.11ac_VHT40 | 0.768 0        | 0.668 0                      | 0.869 8    | 86.98 | 0.61                      |
| 802.11ac_VHT80 | 0.432 0        | 0.331 4                      | 0.767 1    | 76.71 | 1.15                      |

### Notes:

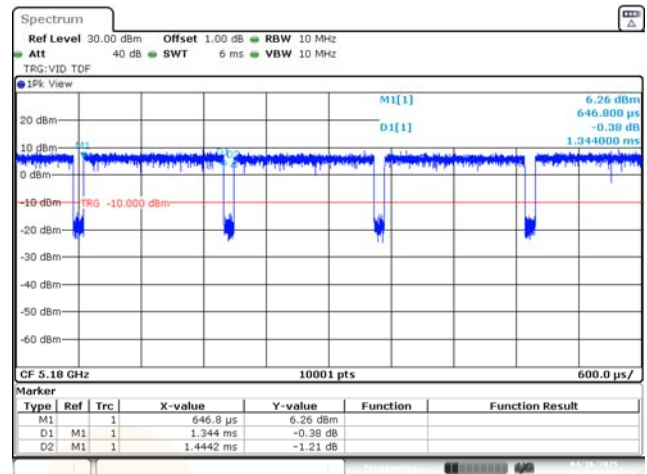
1. Duty cycle (Linear) = T<sub>On</sub> time / Period
2. DCF(Duty cycle factor) = 10log(1/duty cycle)
3. DCF is not compensated to average result if the duty cycle is more than 98%



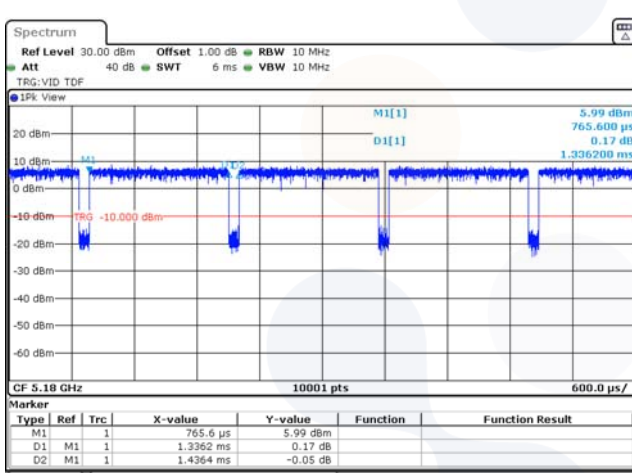
### 802.11a



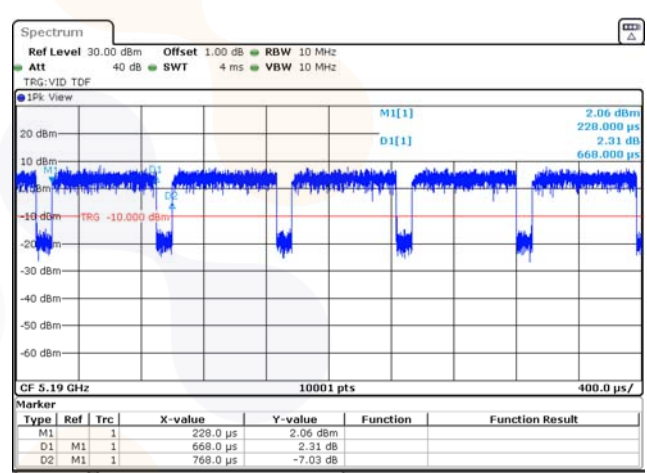
### 802.11ac\_VHT20



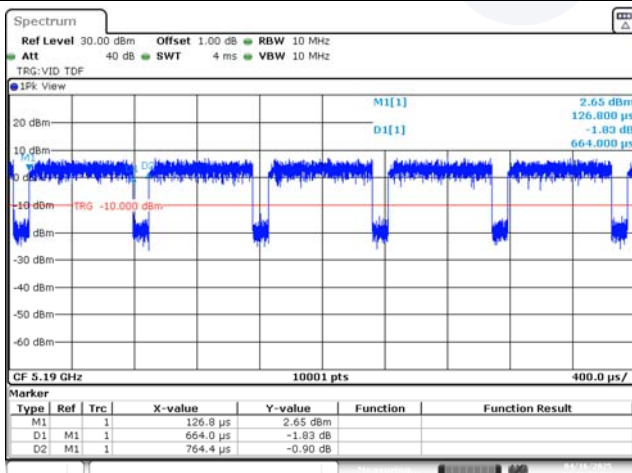
### 802.11n\_HT20



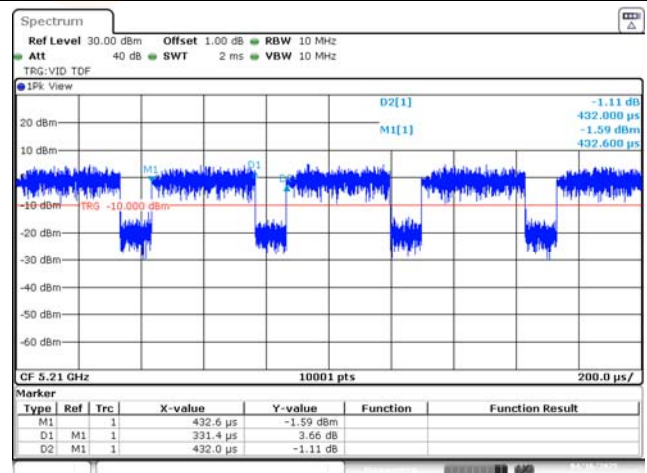
### 802.11ac\_VHT40



### 802.11n\_HT40



### 802.11ac\_VHT80





|                                                                                                                                                                                                                        |                                                              |                                                                                     |
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### 3. Antenna requirement

#### **Requirement of FCC part 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.

#### **Requirement of RSS-Gen Section 6.8:**

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dB i) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dB i) and the required impedance for each antenna type.

- The transmitter has permanently attached Ceramic Chip Antenna (Internal antenna) on board.
- The E.U.T Complies with the requirement of §15.203, §15.407.

#### 4. Summary of tests

| FCC Part section(s)                   | IC Rule Reference                                     | Parameter                      | Test Condition | Test results      |
|---------------------------------------|-------------------------------------------------------|--------------------------------|----------------|-------------------|
| 15.407(a)                             | RSS-247 Issue 2, 6.2                                  | Maximum conducted output power | Conducted      | Pass              |
| 15.407(a)                             | RSS-247 Issue 2, 6.2                                  | Maximum power spectral density |                | Pass              |
| 15.407(a)                             | RSS-Gen Issue 5, 6.7                                  | 26 dB Channel Bandwidth        |                | Pass              |
| 15.407(e)                             | RSS-247 Issue 2, 6.2.4                                | 6 dB Channel Bandwidth         |                | N/T <sup>1)</sup> |
| -                                     | RSS-Gen Issue 5, 6.7                                  | Occupied Bandwidth             |                | Pass              |
| 15.407(g)                             | RSS-247 Issue2, 6                                     | Frequency Stability            |                | Pass              |
| 15.207(a)                             | RSS-Gen (8.8)                                         | AC Conducted Emissions         |                | N/T <sup>2)</sup> |
| 15.407(b),<br>15.205(a),<br>15.209(a) | RSS-Gen Issue 5,<br>8.9, 8.10<br>RSS-247 Issue 2, 6.2 | Spurious emission              | Radiated       | Pass              |
|                                       |                                                       | Band-edge, restricted band     |                | Pass              |

**Notes:** (N/T: Not Tested, N/A: Not Applicable)

- The device has not been tested as it only supports UNII-1 band.
- The test was not conducted as the device is vehicle type.
- All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst-case emissions.
- According to exploratory test no any obvious emission were detected from 9 kHz to 30 MHz. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
- EUT was investigated in three orthogonal orientations X, Y and Z. it was determined that Y orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in Y orientation.
- The test procedure(s) in this report were performed in accordance as following.
  - ANSI C63.10-2013
  - KDB 789033 D02 v02r01
- Based on the baseline scan, the worst-case data rates were:
  - 802.11a mode : 6Mbps
  - 802.11n HT20 mode : MCS0
  - 802.11n HT40 mode : MCS0
  - 802.11ac\_VHT20 mode : MCS0
  - 802.11ac\_VHT40 mode : MCS0
  - 802.11ac\_VHT80 mode : MCS0

## 5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of  $k=2$  to indicated a 95 % level of confidence. The measurement data shown herein meets or exceeds the  $U_{CISPR}$  measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

| Parameter                                                  | Expanded uncertainty ( $\pm$ ) |        |
|------------------------------------------------------------|--------------------------------|--------|
| Maximum Peak Output Power                                  | 0.9 dB                         |        |
| Peak Power Spectral Density                                | 1.0 dB                         |        |
| Channel Bandwidth                                          | 0.1 %                          |        |
| Occupied Bandwidth                                         | 0.1 %                          |        |
| Frequency stability                                        | 0.03 ppm                       |        |
| Conducted spurious emission                                | 2.0 dB                         |        |
| Radiated spurious Emissions<br>(Bandedge, restricted band) | Below 30 MHz                   | 2.3 dB |
|                                                            | 30 MHz to 1 000 MHz            | 2.6 dB |
|                                                            | 1 000 MHz to 18 000 MHz        | 4.8 dB |
|                                                            | Above 18 000 MHz               | 4.8 dB |

## 6. Measurement results explanation example

The offset level is set in the spectrum analyzer to compensate the RF cable loss factor between EUT conducted output port and spectrum analyzer.

With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

| Frequency (MHz) | Factor(dB) | Frequency (MHz) | Factor (dB) |
|-----------------|------------|-----------------|-------------|
| 30              | 10.03      | 9 000           | 11.93       |
| 50              | 10.05      | 10 000          | 12.12       |
| 100             | 10.15      | 11 000          | 12.62       |
| 200             | 10.16      | 12 000          | 12.24       |
| 300             | 10.22      | 13 000          | 12.01       |
| 400             | 10.22      | 14 000          | 12.17       |
| 500             | 10.34      | 15 000          | 12.41       |
| 600             | 10.35      | 16 000          | 12.34       |
| 700             | 10.46      | 17 000          | 12.42       |
| 800             | 10.42      | 18 000          | 12.52       |
| 900             | 10.43      | 19 000          | 12.56       |
| 1 000           | 10.52      | 20 000          | 12.41       |
| 2 000           | 10.86      | 21 000          | 12.74       |
| 3 000           | 10.88      | 22 000          | 12.61       |
| 4 000           | 11.17      | 23 000          | 12.84       |
| 5 000           | 11.28      | 24 000          | 13.53       |
| 6 000           | 11.39      | 25 000          | 15.15       |
| 7 000           | 11.48      | 26 000          | 13.02       |
| 8 000           | 11.94      | 26 500          | 13.41       |

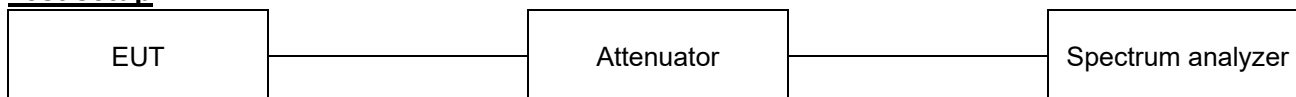
### Notes:

Offset(dB) = RF cable loss(dB) + Attenuator(dB)

## 7. Test results

### 7.1. Maximum conducted output power

#### Test setup



#### Limit

According to §15.407(a), RSS-247(6.2)

#### FCC

| Band    | EUT category                      | Conducted output power limit             |
|---------|-----------------------------------|------------------------------------------|
| UNII-1  | Outdoor access point              | 1 W (30 dB m)                            |
|         | Indoor access point               |                                          |
|         | Fixed point-to-point access point |                                          |
|         | √ Client device                   | 250 mW (23.98 dB m)                      |
| UNII-2A |                                   | 250 mW or 11 dB m + 10logB <sup>1)</sup> |
| UNII-2C |                                   | 250 mW or 11 dB m + 10logB <sup>1)</sup> |
| UNII-3  |                                   | 1 W (30 dB m)                            |

#### IC

| Band    | Maximum e.i.r.p. limit                      |
|---------|---------------------------------------------|
| UNII-1  | 200 mW or 10 + 10 logB <sup>2)</sup> , dB m |
| UNII-2A | 1 W or 17 dB m + 10logB <sup>2)</sup>       |
| UNII-2C | 1 W or 17 dB m + 10logB <sup>2)</sup>       |
| UNII-3  | 1 W (30 dB m)                               |

#### Note:

- 1) Conducted output power limit B is the 26 dB emission bandwidth.
- 2) Maximum e.i.r.p. limit B is the 99% emission bandwidth.

#### Test procedure

ANSI C63.10-2013-Section 12.3.2.4 or 12.3.3.1, 14.2  
 KDB 789033 D02 v02r01 - Section E.2.d) or E.3.a)

|                                                                                                                                                                                                                        |                                                               |                                                                                     |
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## **Test settings**

**Used test method is Section E.2.d)**

### **◆ KDB 789033 D02 v02r01**

#### **Section E.2.d)**

**Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction):**

- (i) Measure the duty cycle,  $x$ , of the transmitter output signal as described in II.B..
- (ii) Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- (iii) Set RBW = 1 MHz
- (iv) Set RBW  $\geq$  3 MHz
- (v) Number of points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ . (This ensures that bin-to-bin spacing is  $\leq \text{RBW} / 2$ , so that narrowband signals are not lost between frequency bins.)
- (vi) Sweep time = auto.
- (vii) Detector = power averaging (rms), if available. Otherwise use sample detector mode.
- (viii) Do not use sweep triggering. Allow the sweep to “free run.”
- (ix) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
- (x) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- (xi) Add  $10 \log (1/x)$ , where  $x$  is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add  $10 \log (1/0.25) = 6 \text{ dB}$  if the duty cycle is 25%.

## Test results

### Conducted Output Power

| Test mode      | Band   | Frequency (MHz) | Measured output power |          |               | FCC Limit (dB m) | IC Limit (dB m) |
|----------------|--------|-----------------|-----------------------|----------|---------------|------------------|-----------------|
|                |        |                 | Reading (dB m)        | DCF (dB) | Result (dB m) |                  |                 |
| 802.11a        | UNII 1 | 5 180           | 4.67                  | 0.29     | 4.96          | 23.98            | 22.40           |
|                |        | 5 200           | 4.81                  |          | 5.10          | 23.98            | 22.40           |
|                |        | 5 240           | 5.25                  |          | 5.54          | 23.98            | 22.40           |
| 802.11n HT20   | UNII 1 | 5 180           | 4.75                  | 0.31     | 5.06          | 23.98            | 22.63           |
|                |        | 5 200           | 4.83                  |          | 5.14          | 23.98            | 22.63           |
|                |        | 5 240           | 5.26                  |          | 5.57          | 23.98            | 22.63           |
| 802.11n HT40   | UNII-1 | 5 190           | 5.11                  | 0.61     | 5.72          | 23.98            | 23.01           |
|                |        | 5 230           | 5.50                  |          | 6.11          | 23.98            | 23.01           |
| 802.11ac VHT20 | UNII-1 | 5 180           | 4.87                  | 0.31     | 5.18          | 23.98            | 22.63           |
|                |        | 5 200           | 5.01                  |          | 5.32          | 23.98            | 22.63           |
|                |        | 5 240           | 5.58                  |          | 5.89          | 23.98            | 22.63           |
| 802.11ac VHT40 | UNII-1 | 5 190           | 5.42                  | 0.61     | 6.03          | 23.98            | 23.01           |
|                |        | 5 230           | 5.79                  |          | 6.40          | 23.98            | 23.01           |
| 802.11ac VHT80 | UNII-1 | 5 210           | 4.46                  | 1.15     | 5.61          | 23.98            | 23.01           |

### Note:

1. Conducted output power (dB m) = Average Reading (dB m) + DCF(dB)



## E.I.R.P.

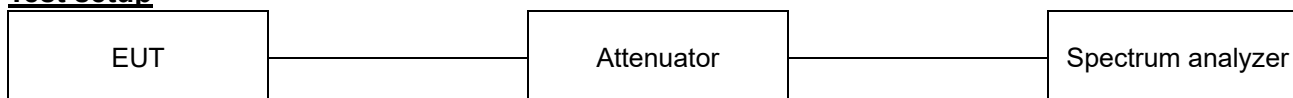
| Test mode      | Band   | Frequency (MHz) | Measured output power         |                 |                    | MAX e.i.r.p Limit (dB m) |
|----------------|--------|-----------------|-------------------------------|-----------------|--------------------|--------------------------|
|                |        |                 | Conducted output power (dB m) | ANT gain (dB i) | MAX e.i.r.p (dB m) |                          |
| 802.11a        | UNII 1 | 5 180           | 4.96                          | 1.43            | 6.39               | 22.40                    |
|                |        | 5 200           | 5.10                          |                 | 6.53               | 22.40                    |
|                |        | 5 240           | 5.54                          |                 | 6.97               | 22.40                    |
| 802.11n HT20   | UNII 1 | 5 180           | 5.06                          | 1.43            | 6.49               | 22.63                    |
|                |        | 5 200           | 5.14                          |                 | 6.57               | 22.63                    |
|                |        | 5 240           | 5.57                          |                 | 7.00               | 22.63                    |
| 802.11n HT40   | UNII-1 | 5 190           | 5.72                          | 1.43            | 7.15               | 23.01                    |
|                |        | 5 230           | 6.11                          |                 | 7.54               | 23.01                    |
| 802.11ac VHT20 | UNII-1 | 5 180           | 5.18                          | 1.43            | 6.61               | 22.63                    |
|                |        | 5 200           | 5.32                          |                 | 6.75               | 22.63                    |
|                |        | 5 240           | 5.89                          |                 | 7.32               | 22.63                    |
| 802.11ac VHT40 | UNII-1 | 5 190           | 6.03                          | 1.43            | 7.46               | 23.01                    |
|                |        | 5 230           | 6.40                          |                 | 7.83               | 23.01                    |
| 802.11ac VHT80 | UNII-1 | 5 210           | 5.61                          | 1.43            | 7.04               | 23.01                    |

### Notes:

1. E.I.R.P. Calculation: E.I.R.P. (dB m) = Conducted output power (dB m) + Antenna gain (dB i)

## 7.2. Maximum Power Spectral Density

### Test setup



### Limit

#### FCC

According to §15.407(a)

| Band    | EUT category |                                   | Limit            |
|---------|--------------|-----------------------------------|------------------|
| UNII-1  |              | Outdoor access point              | 17 dB m/MHz      |
|         |              | Indoor access point               |                  |
|         |              | Fixed point-to-point access point |                  |
|         | √            | Client device                     | 11 dB m /MHz     |
| UNII-2A |              |                                   | 11 dB m /MHz     |
| UNII-2C |              |                                   | 11 dB m /MHz     |
| UNII-3  |              |                                   | 30 dB m /500 kHz |

### IC

According to RSS-247(6.2)

| Band   | e.i.r.p. spectral density | Limit       |
|--------|---------------------------|-------------|
| UNII 1 | √                         | 10 dB m/MHz |

| Band    | Power spectral density | Limit            |
|---------|------------------------|------------------|
| UNII 2A |                        | 11 dB m /MHz     |
| UNII 2C |                        | 11 dB m /MHz     |
| UNII 3  |                        | 30 dB m /500 kHz |

### Test procedure

ANSI C63.10-2013 Section 12.3.2.2, 14.3.2.2

KDB 789033 D02 v02r01 – Section E and F

### Test settings

#### Section F

The rules requires “maximum power spectral density” measurements where the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission. Refer to III.A for additional guidance for devices that use channel aggregation.

1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power...” (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
2. Search function on the instrument to find the peak of the spectrum and record its value.
3. Adjustments to the peak value of the spectrum, if applicable:
  - a) If Method SA-2 or SA-2 Alternative was used, add  $10 \log (1/x)$ , where x is the duty cycle, to the peak of the spectrum.

- b) If Method SA-3 Alternative was used and the linear mode was used in II.E.2.g) (viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
4. The result is the Maximum PSD over 1 MHz reference bandwidth
5. For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the preceding procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in Section 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth(i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
- Set  $RBW \geq 1/T$ , where T is defined in II.B.I.a).
  - Set  $VBW \geq 3 RBW$ .
  - If measurement bandwidth of Maximum PSD is specified in 500 kHz, add  $10 \log (500 \text{ kHz}/RBW)$  to the measured result, whereas RBW (<500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
  - If measurement bandwidth of Maximum PSD is specified in 1 MHz, add  $10 \log (1 \text{ MHz}/RBW)$  to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
  - Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

**Note:**

- As a practical matter, it is recommended to use reduced RBW of 100 kHz for the II.F.5.c) and II.F.5.d), since  $RBW=100 \text{ kHz}$  is available on nearly all spectrum analyzers.
- Method SA-2 is used.

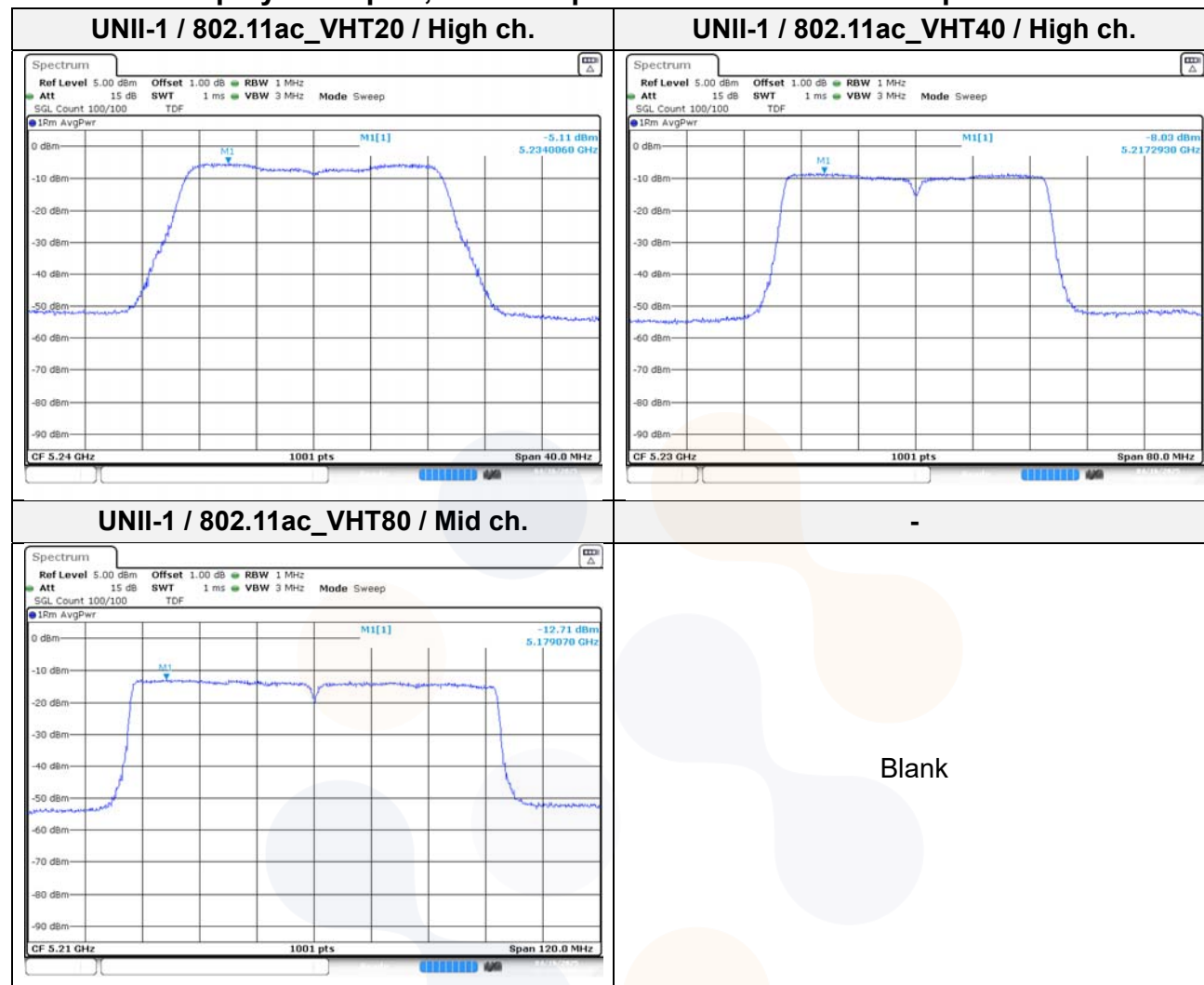
### Test results

| Test mode      | Band   | Frequency (MHz) | Measured PSD (dB m/MHz) | DCF (dB) | Maximum PSD (dB m/MHz) | ANT Gain (dB i) | E.I.R.P. PSD (dB m/MHz) | Limit (dB m/MHz) | E.I.R.P. Limit (dB m/MHz) |
|----------------|--------|-----------------|-------------------------|----------|------------------------|-----------------|-------------------------|------------------|---------------------------|
| 802.11a        | UNII 1 | 5 180           | -5.87                   | 0.29     | -5.58                  | 1.43            | -4.15                   | 11.00            | 10.00                     |
|                |        | 5 200           | -5.72                   |          | -5.43                  | 1.43            | -4.00                   | 11.00            | 10.00                     |
|                |        | 5 240           | -5.34                   |          | -5.05                  | 1.43            | -3.62                   | 11.00            | 10.00                     |
| 802.11n HT20   | UNII 1 | 5 180           | -6.05                   | 0.31     | -5.74                  | 1.43            | -4.31                   | 11.00            | 10.00                     |
|                |        | 5 200           | -6.07                   |          | -5.76                  | 1.43            | -4.33                   | 11.00            | 10.00                     |
|                |        | 5 240           | -5.53                   |          | -5.22                  | 1.43            | -3.79                   | 11.00            | 10.00                     |
| 802.11n HT40   | UNII 1 | 5 190           | -8.81                   | 0.61     | -8.20                  | 1.43            | -6.77                   | 11.00            | 10.00                     |
|                |        | 5 230           | -8.16                   |          | -7.55                  | 1.43            | -6.12                   | 11.00            | 10.00                     |
| 802.11ac VHT20 | UNII 1 | 5 180           | -6.04                   | 0.31     | -5.73                  | 1.43            | -4.30                   | 11.00            | 10.00                     |
|                |        | 5 200           | -5.74                   |          | -5.43                  | 1.43            | -4.00                   | 11.00            | 10.00                     |
|                |        | 5 240           | -5.11                   |          | -4.80                  | 1.43            | -3.37                   | 11.00            | 10.00                     |
| 802.11ac VHT40 | UNII 1 | 5 190           | -8.47                   | 0.61     | -7.86                  | 1.43            | -6.43                   | 11.00            | 10.00                     |
|                |        | 5 230           | -8.03                   |          | -7.42                  | 1.43            | -5.99                   | 11.00            | 10.00                     |
| 802.11ac VHT80 | UNII 1 | 5 210           | -12.71                  | 1.15     | -11.56                 | 1.43            | -10.13                  | 11.00            | 10.00                     |

### Notes:

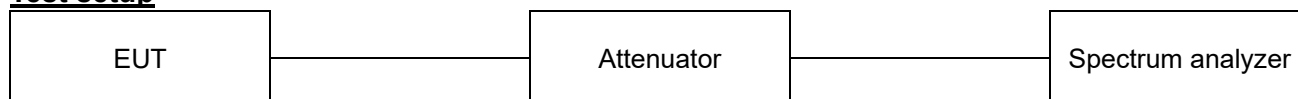
- Maximum PSD(dB m/MHz) = Measured PSD(dB m/MHz) + D.C.F(dB)
- E.I.R.P PSD (dB m/MHz) = Maximum PSD (dB m/MHz) + Antenna gain (dB i)

In order to simplify the report, attached plots were the worst case per bandwidth



### 7.3. 26 dB Bandwidth & 99% Bandwidth

#### Test setup



#### Limit

N/A

#### Test procedure

ANSI C63.10-2013 Section 12.4

KDB 789033 D02 v02r01 - Section C.1 (26 dB bandwidth)

KDB 789033 D02 v02r01 - Section D (99% bandwidth)

#### Test settings

##### 1. 26 dB Bandwidth

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the maximum 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. 99% Occupied Bandwidth

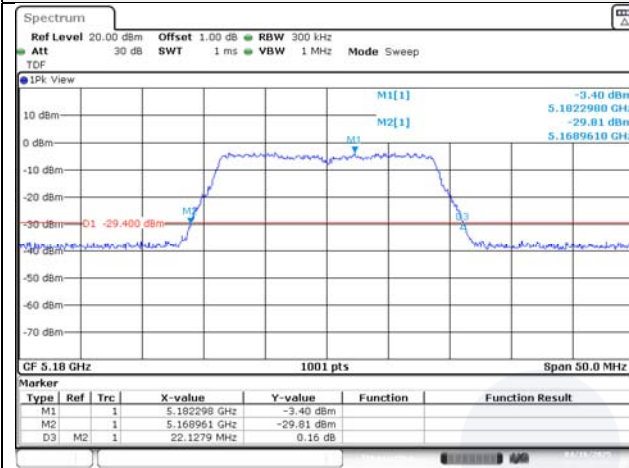
- Set center frequency to the nominal EUT channel center frequency.
- Set span = 1.5 times to 5.0 times the OBW.
- Set RBW = 1% to 5% of the OBW
- Set VBW  $\geq 3 \times$  RBW
- Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- Use the 99% power bandwidth function of the instrument (if available).
- If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

### Test results

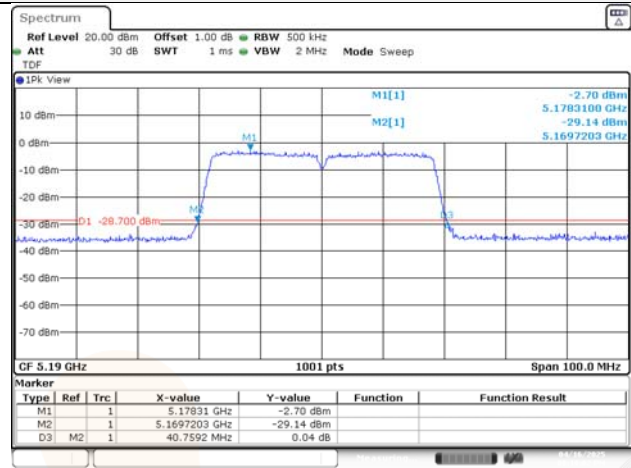
| Test mode         | Band   | Frequency(MHz) | 26 dB bandwidth (MHz) | 99% bandwidth (MHz) |
|-------------------|--------|----------------|-----------------------|---------------------|
| 802.11a           | UNII 1 | 5 180          | 21.93                 | 17.38               |
|                   |        | 5 200          | 22.03                 | 17.38               |
|                   |        | 5 240          | 21.93                 | 17.38               |
| 802.11n<br>HT20   | UNII 1 | 5 180          | 22.13                 | 18.33               |
|                   |        | 5 200          | 22.23                 | 18.38               |
|                   |        | 5 240          | 22.13                 | 18.38               |
| 802.11n<br>HT40   | UNII 1 | 5 190          | 40.66                 | 36.76               |
|                   |        | 5 230          | 40.56                 | 36.76               |
| 802.11ac<br>VHT20 | UNII 1 | 5 180          | 22.13                 | 18.33               |
|                   |        | 5 200          | 22.18                 | 18.33               |
|                   |        | 5 240          | 22.13                 | 18.38               |
| 802.11ac<br>VHT40 | UNII 1 | 5 190          | 40.76                 | 36.66               |
|                   |        | 5 230          | 40.76                 | 36.66               |
| 802.11ac<br>VHT80 | UNII 1 | 5 210          | 84.40                 | 76.12               |

In order to simplify the report, attached plots were the worst case per bandwidth  
**26 dB bandwidth**

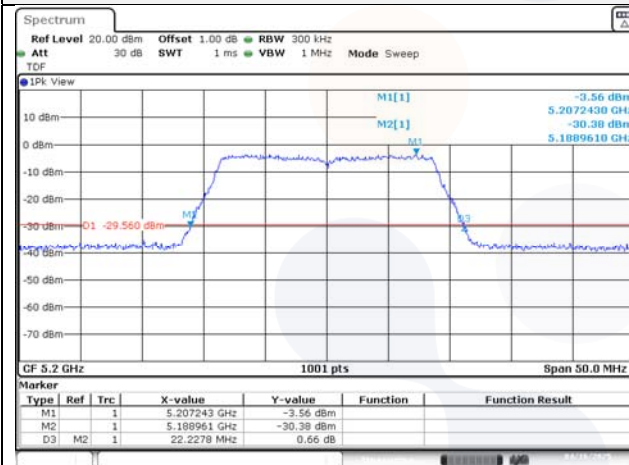
**UNII-1 / 802.11n\_HT20 / Low ch.**



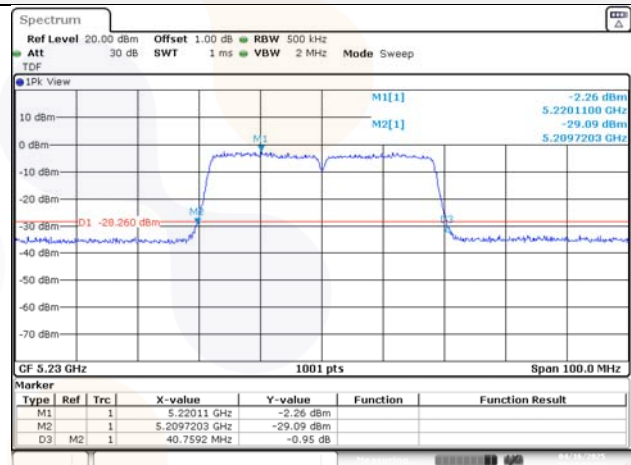
**UNII-1 / 802.11ac\_VHT40 / Low ch.**



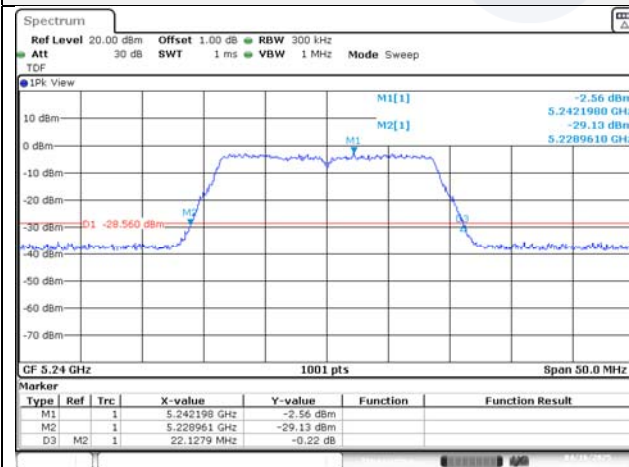
**UNII-1 / 802.11n\_HT20 / Mid ch.**



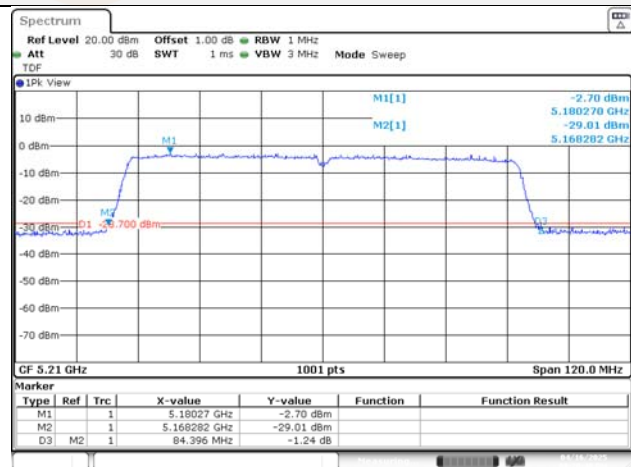
**UNII-1 / 802.11ac\_VHT40 / High ch.**



**UNII-1 / 802.11n\_HT20 / High ch.**



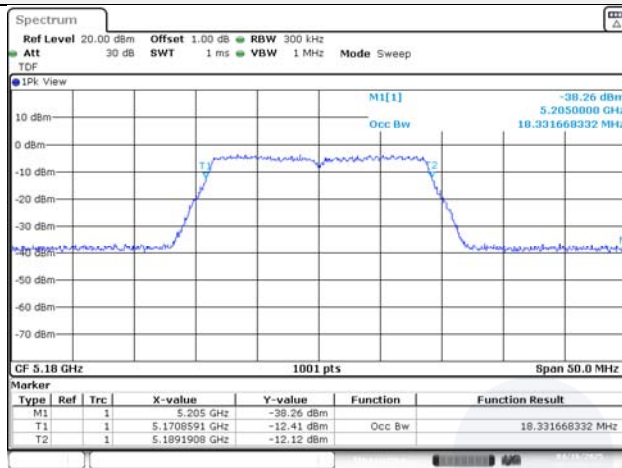
**UNII-1 / 802.11ac\_VHT80 / Mid ch.**



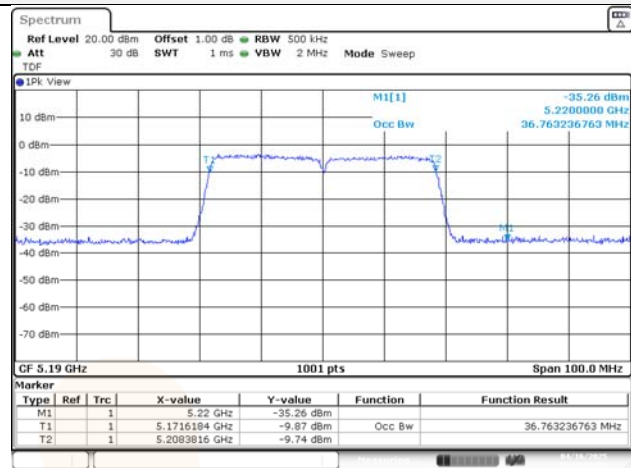


In order to simplify the report, attached plots were the worst case per bandwidth  
99% bandwidth

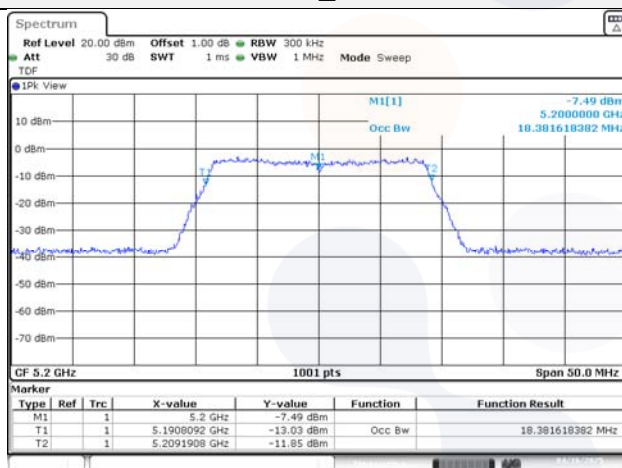
UNII-1 / 802.11n\_HT20 / Low ch.



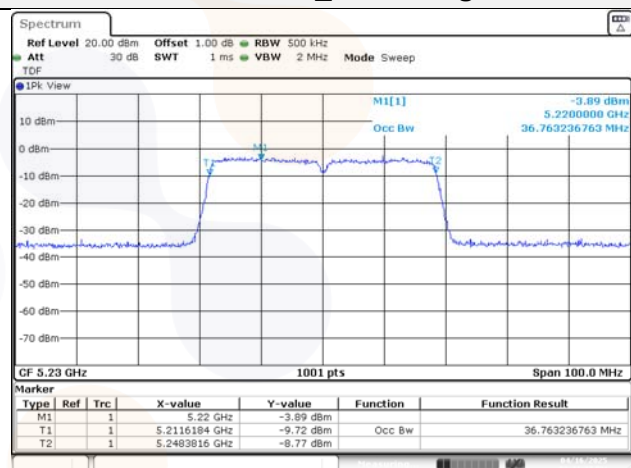
UNII-1 / 802.11n\_HT40 / Low ch.



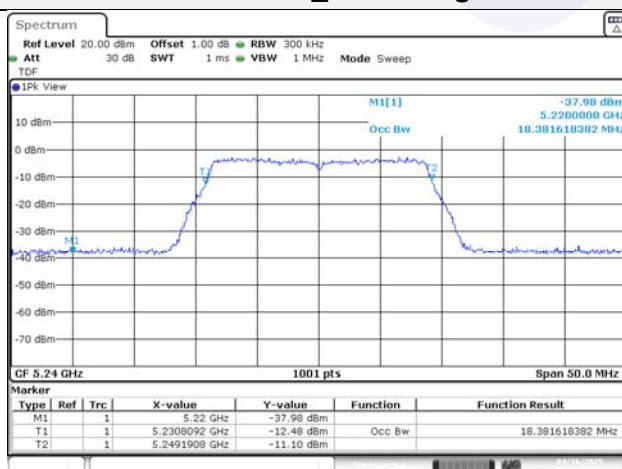
UNII-1 / 802.11n\_HT20 / Mid ch.



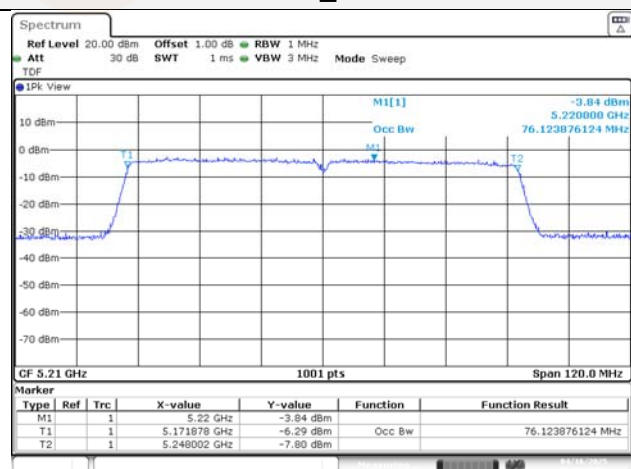
UNII-1 / 802.11n\_HT40 / High ch.



UNII-1 / 802.11n\_HT20 / High ch.

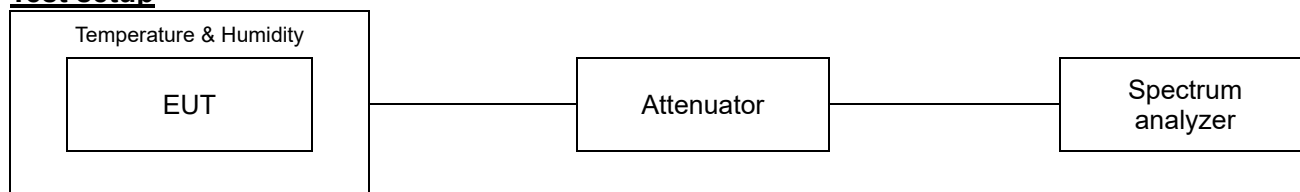


UNII-1 / 802.11ac\_VHT80 / Mid ch.



## 7.4. Frequency stability

### Test setup



### Limit

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

According to RSS-GEN(6.11),  
 For licence-exempt devices, the following conditions apply:

- (a) at the temperatures of -20°C (-4°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage
- (b) at the temperature of +20°C (+68°F) and at ±15% of the manufacturer's rated supply voltage

If the frequency stability limits are only met within a temperature range that is smaller than the range specified in (a) for licensed or licence-exempt devices, the frequency stability requirement will be deemed to be met if the transmitter is automatically prevented from operating outside this smaller temperature range and if the published operating characteristics for the equipment are revised to reflect this restricted temperature range.

If the device contains both licence and licence-exempt transmitter modules, the device's frequency stability shall be measured under the most stringent condition specified in the applicable RSS of the transmitter module.

In addition, if an unmodulated carrier is not available, the method used to measure frequency stability shall be described in the test report.

According to RSS-GEN(8.11),  
 If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80% of its permitted operating frequency band in order to minimize the possibility of out-of-band operation. In addition, its occupied bandwidth shall be entirely outside the restricted bands and the prohibited TV bands of 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-602 MHz, unless otherwise indicated.

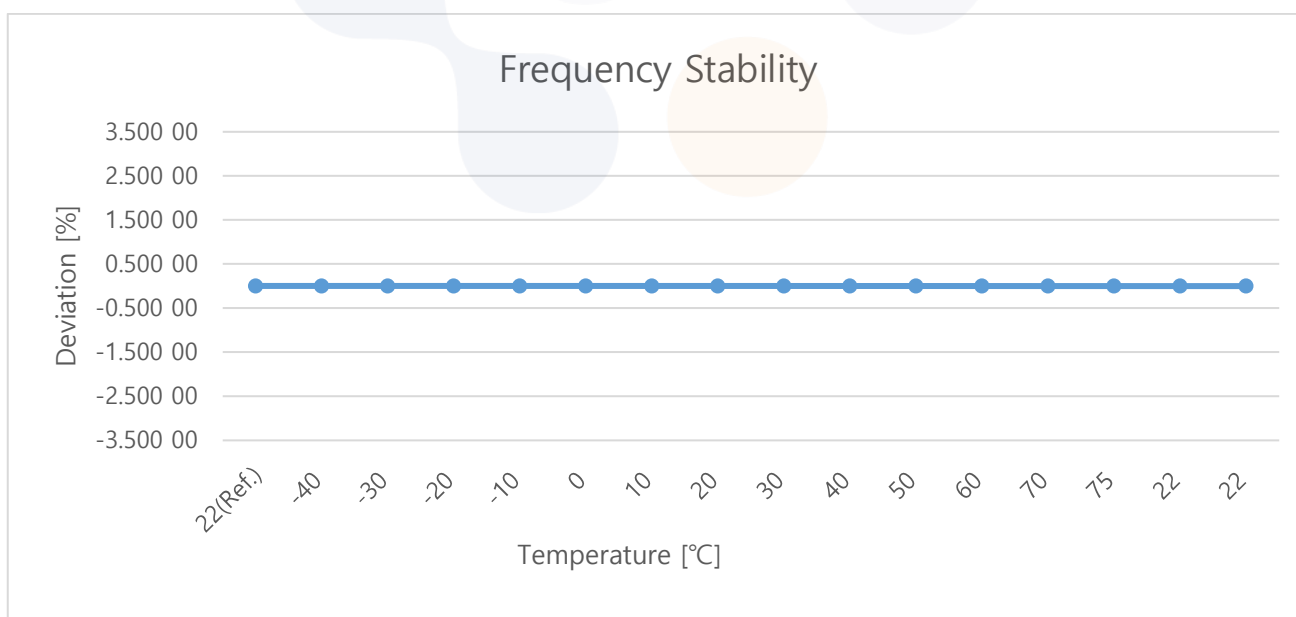
### Test procedure

ANSI C63.10-2013 - Section 6.8.1

### Test results

Test band : UNII-1  
 Frequency (Hz) : 5 180 000 000

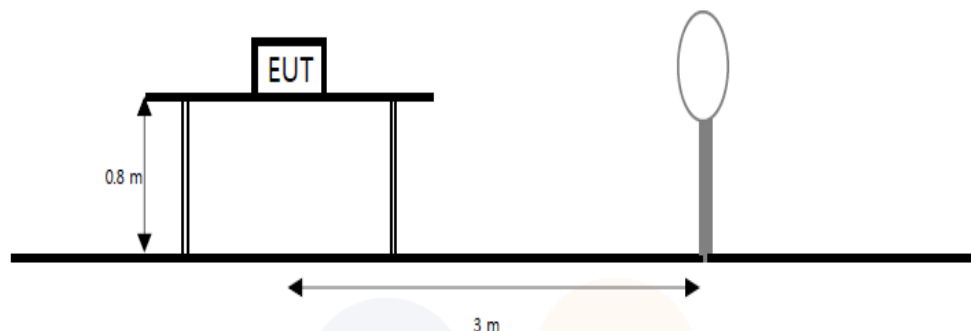
| Voltage (%) | Power (V) | Temp. (°C) | Frequency (Hz) | Frequency error (Hz) | Deviation |           |
|-------------|-----------|------------|----------------|----------------------|-----------|-----------|
|             |           |            |                |                      | (ppm)     | (%)       |
| 100         | 12.00     | 22(Ref.)   | 5 179 996 000  | -4 000               | -0.77     | -0.000 08 |
|             |           | -40        | 5 179 995 250  | -4 750               | -0.92     | -0.000 09 |
|             |           | -30        | 5 179 994 250  | -5 750               | -1.11     | -0.000 11 |
|             |           | -20        | 5 179 996 200  | -3 800               | -0.73     | -0.000 07 |
|             |           | -10        | 5 179 993 210  | -6 790               | -1.31     | -0.000 13 |
|             |           | 0          | 5 179 994 010  | -5 990               | -1.16     | -0.000 12 |
|             |           | 10         | 5 179 994 810  | -5 190               | -1.00     | -0.000 10 |
|             |           | 20         | 5 179 995 400  | -4 600               | -0.89     | -0.000 09 |
|             |           | 30         | 5 179 996 400  | -3 600               | -0.69     | -0.000 07 |
|             |           | 40         | 5 179 996 200  | -3 800               | -0.73     | -0.000 07 |
|             |           | 50         | 5 179 995 240  | -4 760               | -0.92     | -0.000 09 |
|             |           | 60         | 5 179 995 400  | -4 600               | -0.89     | -0.000 09 |
|             |           | 70         | 5 179 996 500  | -3 500               | -0.68     | -0.000 07 |
|             |           | 75         | 5 179 996 500  | -3 500               | -0.68     | -0.000 07 |
| 85          | 10.20     | 22         | 5 179 996 400  | -3 600               | -0.69     | -0.000 07 |
| 115         | 13.80     | 22         | 5 179 996 400  | -3 600               | -0.69     | -0.000 07 |



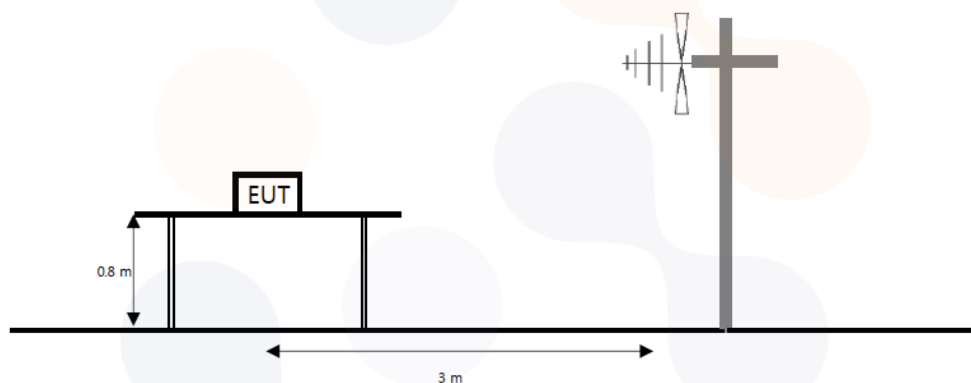
## 7.5. Spurious Emission, Band Edge and Restricted bands

### Test setup

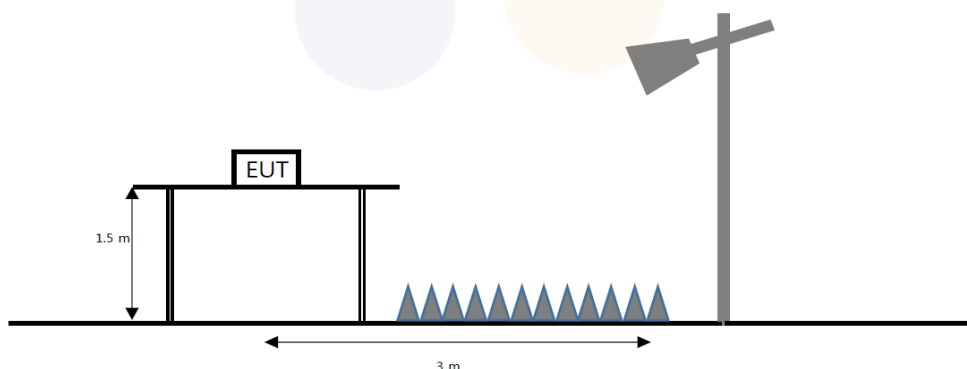
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions



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 from 1 GHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz emissions, whichever is lower.



**Limit  
FCC**

**According to 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   | 2 400/F(kHz)                       | 300                      |
| 0.490 - 1.705   | 24 000/F(kHz)                      | 30                       |
| 1.705 - 30      | 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., Section 15.231 and 15.241.

**According to section 15.205(a) and (b),**

only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                   | MHz                   | MHz               | GHz           |
|-----------------------|-----------------------|-------------------|---------------|
| 0.009 - 0.110         | 16.42 - 16.423        | 399.9 - 410       | 4.5 - 5.15    |
| 0.495 - 0.505         | 16.694 75 - 16.695 25 | 608 - 614         | 5.35 - 5.46   |
| 2.173 5 - 2.190 5     | 16.804 25 - 16.804 75 | 960 - 1 240       | 7.25 - 7.75   |
| 4.125 - 4.128         | 25.5 - 25.67          | 1 300 - 1 427     | 8.025 - 8.5   |
| 4.177 25 - 4.177 75   | 37.5 - 38.25          | 1 435 - 1 626.5   | 9.0 - 9.2     |
| 4.207 25 - 4.207 75   | 73 - 74.6             | 1 645.5 - 1 646.5 | 9.3 - 9.5     |
| 6.215 - 6.218         | 74.8 - 75.2           | 1 660 - 1 710     | 10.6 - 12.7   |
| 6.267 75 - 6.268 25   | 108 - 121.94          | 1 718.8 - 1 722.2 | 13.25 - 13.4  |
| 6.311 75 - 6.312 25   | 123 - 138             | 2 200 - 2 300     | 14.47 - 14.5  |
| 8.291 - 8.294         | 149.9 - 150.05        | 2 310 - 2 390     | 15.35 - 16.2  |
| 8.362 - 8.366         | 156.524 75 - 156.525  | 2 483.5 - 2 500   | 17.7 - 21.4   |
| 8.376 25 - 8.386 75   | 25                    | 2 690 - 2 900     | 22.01 - 23.12 |
| 8.414 25 - 8.414 75   | 156.7 - 156.9         | 3 260 - 3 267     | 23.6 - 24.0   |
| 12.29 - 12.293        | 162.012 5 - 167.17    | 3 332 - 3 339     | 31.2 - 31.8   |
| 12.519 75 - 12.520 25 | 167.72 - 173.2        | 3 345.8 - 3 358   | 36.43 - 36.5  |
| 12.576 75 - 12.577 25 | 240 - 285             | 3 600 - 4 400     | Above 38.6    |
| 13.36 - 13.41         | 322 - 335.4           |                   |               |

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in section 15.209. At frequencies equal to or less than 1 000 MHz, compliance with the limits in section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 MHz, compliance with the emission limits in section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in section 15.35 apply to these measurements.

**According to section 15.407(b),**

undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

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 e.i.r.p. of -27 dB m/MHz

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 e.i.r.p. of -27 dB m/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dB m/MHz.

For transmitters operating in the 5.725-5.85 GHz band: 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.

**IC**

**According to RSS-247(5.5),**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

**According to RSS-Gen(8.9),**

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

**Table 5- General field strength limits at frequencies above 30 MHz**

| Frequency(MHz) | Field strength<br>( $\mu\text{V}/\text{m}$ at 3 m) |
|----------------|----------------------------------------------------|
| 30 to 88       | 100                                                |
| 88 to 216      | 150                                                |
| 216 to 960     | 200                                                |
| Above 960      | 500                                                |

**Table 6- General field strength limits at frequencies below 30 MHz**

| Frequency                 | Magnetic field strength (H-Field)<br>( $\mu\text{A/m}$ ) | Measurement<br>distance(m) |
|---------------------------|----------------------------------------------------------|----------------------------|
| 9 – 490 kHz <sup>1)</sup> | 6.37/F (F in kHz)                                        | 300                        |
| 490 – 1705 kHz            | 63.7/F (F in kHz)                                        | 30                         |
| 1.705 - 30 MHz            | 0.08                                                     | 30                         |

**According to RSS-Gen(8.10),**

Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

- (a) The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).
- (b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.
- (c) Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.



**Table 7- Restricted frequency bands\***

| MHz                 | MHz                   | GHz           |
|---------------------|-----------------------|---------------|
| 0.090 - 0.110       | 149.9 - 150.05        | 9.0 - 9.2     |
| 0.495 - 0.505       | 156.52475 - 156.52525 | 9.3 - 9.5     |
| 2.1735 - 2.1905     | 156.7 - 156.9         | 10.6 - 12.7   |
| 3.020 - 3.026       | 162.0125 - 167.17     | 13.25 - 13.4  |
| 4.125 - 4.128       | 167.72 - 173.2        | 14.47 - 14.5  |
| 4.17725 - 4.17775   | 240 - 285             | 15.35 - 16.2  |
| 4.20725 - 4.20775   | 322 - 335.4           | 17.7 - 21.4   |
| 5.677 - 5.683       | 399.9 - 410           | 22.01 - 23.12 |
| 6.215 - 6.218       | 608 - 614             | 23.6 - 24.0   |
| 6.26775 - 6.26825   | 960 - 1427            | 31.2 - 31.8   |
| 6.31175 - 6.31225   | 1435 - 1626.5         | 36.43 - 36.5  |
| 8.291 - 8.294       | 1645.5 - 1646.5       | Above 38.6    |
| 8.362 - 8.366       | 1660 - 1710           |               |
| 8.37625 - 8.38675   | 1718.8 - 1722.2       |               |
| 8.41425 - 8.41475   | 2200 - 2300           |               |
| 12.29 - 12.293      | 2310 - 2390           |               |
| 12.51975 - 12.52025 | 2483.5 - 2500         |               |
| 12.57675 - 12.57725 | 2655 - 2900           |               |
| 13.36 - 13.41       | 3260 - 3267           |               |
| 16.42 - 16.423      | 3332 - 3339           |               |
| 16.69475 - 16.69525 | 3345.8 - 3358         |               |
| 16.80425 - 16.80475 | 3500 - 4400           |               |
| 25.5 - 25.67        | 4500 - 5150           |               |
| 37.5 - 38.25        | 5350 - 5460           |               |
| 73 - 74.6           | 7250 - 7750           |               |
| 74.8 - 75.2         | 8025 - 8500           |               |
| 108 - 138           | --                    |               |

\* Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

### **Test procedure**

ANSI C63.10-2013 Section 12.7.7.2, 12.7.5, 12.7.6  
 KDB 789033 D02 v02r01 – Section G

### **Test settings**

#### **Peak field strength measurements**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW  $\geq$  (3 $\times$ RBW)
4. Detector = peak
5. Sweep time = auto
6. Trace mode = max hold
7. Allow sweeps to continue until the trace stabilizes

**Table. RBW as a function of frequency**

| Frequency           | RBW                |
|---------------------|--------------------|
| 9 kHz to 150 kHz    | 200 Hz to 300 Hz   |
| 0.15 MHz to 30 MHz  | 9 kHz to 10 kHz    |
| 30 MHz to 1 000 MHz | 100 kHz to 120 kHz |
| > 1 000 MHz         | 1 MHz              |



|                                                                                                                                                                                                                        |                                                               |                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <p><b>Eurofins KCTL Co.,Ltd.</b><br/> 65, Sinwon-ro, Yeongtong-gu,<br/> Suwon-si, Gyeonggi-do, 16677, Korea<br/> TEL: 82-70-5008-1021 FAX: 82-505-299-8311<br/> <a href="http://www.kctl.co.kr">www.kctl.co.kr</a></p> | <p>Report No.:<br/> KR25-SRF0094-A<br/> Page (32) of (48)</p> |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|

## Average field strength measurements

### Trace averaging with continuous EUT transmission at full power

If the EUT can be configured or modified to transmit continuously ( $D \geq 98\%$ ), then the average emission levels shall be measured using the following method (with EUT transmitting continuously):

1. RBW = 1 MHz (unless otherwise specified).
2. VBW  $\geq (3 \times \text{RBW})$ .
3. Detector = RMS (power averaging), if  $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$ . Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
4. Averaging type = power (i.e., rms):
  - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
  - 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
5. Sweep time = auto.
6. Perform a trace average of at least 100 traces.

### Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT ( $D \geq 98\%$ ) cannot be achieved and the duty cycle is constant (duty cycle variations are less than  $\pm 2\%$ ), then the following procedure shall be used:

1. The EUT shall be configured to operate at the maximum achievable duty cycle.
2. Measure the duty cycle D of the transmitter output signal as described in 11.6.
3. RBW = 1 MHz (unless otherwise specified).
4. VBW  $\geq [3 \times \text{RBW}]$ .
5. Detector = RMS (power averaging), if  $[\text{span} / (\# \text{ of points in sweep})] \leq (\text{RBW} / 2)$ . Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
6. Averaging type = power (i.e., rms):
  - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
  - 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
7. Sweep time = auto.
8. Perform a trace average of at least 100 traces.
9. A correction factor shall be added to the measurement results prior to comparing with the emission limit 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:
  - 1) If power averaging (rms) mode was used in step f), then the applicable correction factor is  $[10 \log (1 / D)]$ , where D is the duty cycle.
  - 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is  $[20 \log (1 / D)]$ , where D is the duty cycle.
  - 3) If a specific emission is demonstrated to be continuous ( $D \geq 98\%$ ) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

|                                                                                                                                                                                                                        |                                                               |                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <p><b>Eurofins KCTL Co.,Ltd.</b><br/> 65, Sinwon-ro, Yeongtong-gu,<br/> Suwon-si, Gyeonggi-do, 16677, Korea<br/> TEL: 82-70-5008-1021 FAX: 82-505-299-8311<br/> <a href="http://www.kctl.co.kr">www.kctl.co.kr</a></p> | <p>Report No.:<br/> KR25-SRF0094-A<br/> Page (33) of (48)</p> |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|

## Band edge measurements

### Integration Method

For maximum emissions measurements, follow the procedures described in II.G.5., "Procedures for unwanted maximum Emissions Measurements above 1000 MHz. Except for the following changes:

1. Set RBW = 100 kHz
2. Set VBW  $\geq 3 \times$  RBW
3. Perform a band-power integration across the 1 MHz bandwidth in which the band edge emission level is to be measured. CAUTION: you must ensure that the spectrum analyzer or EMI receiver is set for peak detection and max-hold for this measurement.

For average emissions measurements, follow the procedures described in II.G.6., "Procedures for average unwanted Emissions Measurements above 1000 MHz. Except for the following changes:

1. Set RBW = 100 kHz
2. Set VBW  $\geq 3 \times$  RBW
3. Perform a band-power integration across the 1 MHz bandwidth in which the band edge emission level is to be measured.

### Notes:

1.  $f < 30$  MHz, extrapolation factor of 40 dB/decade of distance.  $F_d = 40 \log(D_m/D_s)$

$f \geq 30$  MHz, extrapolation factor of 20 dB/decade of distance.  $F_d = 20 \log(D_m/D_s)$

Where:

$F_d$  = Distance factor in dB

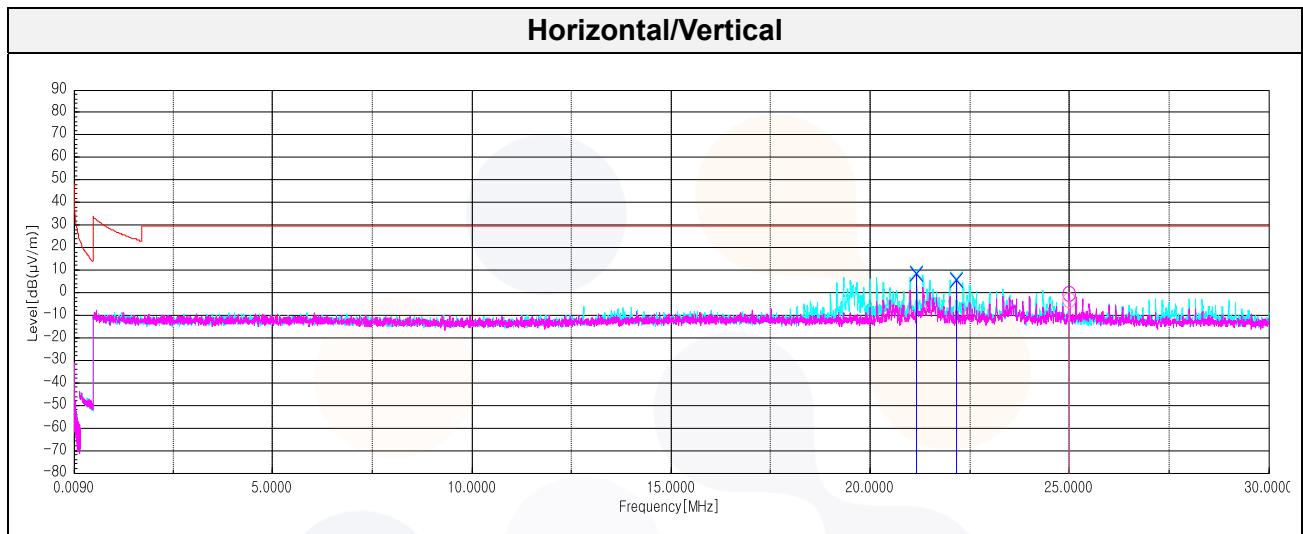
$D_m$  = Measurement distance in meters

$D_s$  = Specification distance in meters

2. Factors(dB) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or  $F_d$ (dB)
3. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
4. Average test would be performed if the peak result were greater than the average limit.
5. <sup>1)</sup> means restricted band.
6. Above 1 GHz the worst results between two antenna polarizations (H and V) were documented in the test report.
7. Below 30 MHz frequency range, In order to search for the worst result, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported. when the emission level was higher than 20 dB of the limit, then the following statement shall be made: "No spurious emissions were detected within 20 dB of the limit."
8. For above 1 GHz pre-scan to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.
9. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X kHz resulted in a level of Y dBμV/m, which is equivalent to  $Y - 51.5 = Z$  dBμA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

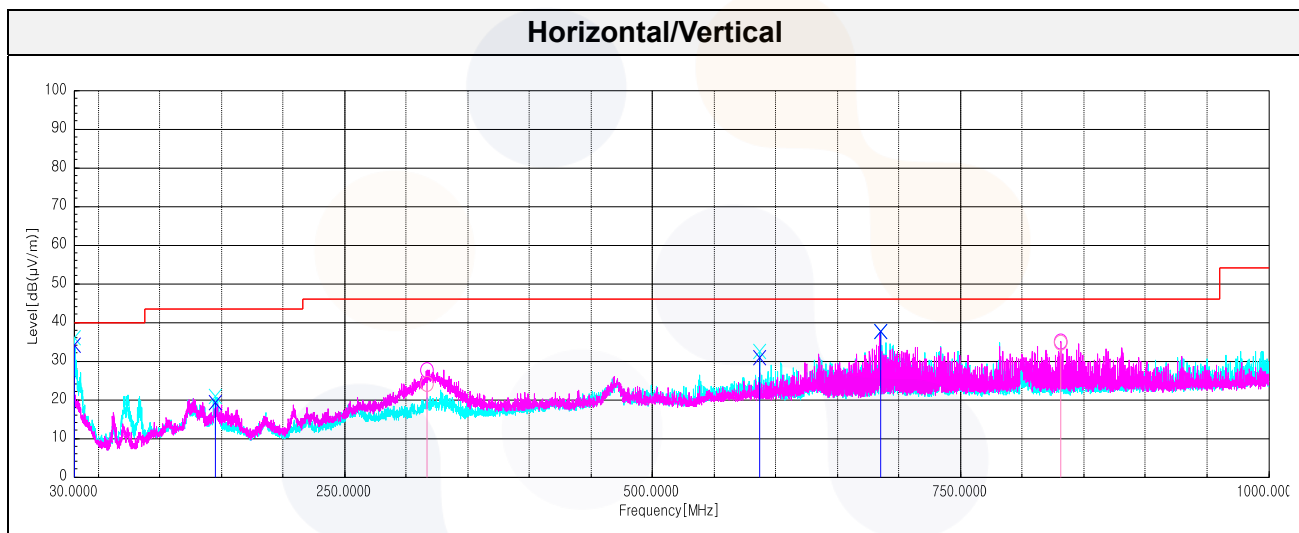
**Test results (Below 30 MHz) – Worst case: 802.11ac\_VHT40 / UNII-1\_5 230 MHz**

| Frequency              | Pol.  | Reading  | Ant. Factor | Amp.+Cable | Distance factor | Result     | Limit      | Margin |
|------------------------|-------|----------|-------------|------------|-----------------|------------|------------|--------|
| (MHz)                  | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB)            | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Quasi peak data</b> |       |          |             |            |                 |            |            |        |
| 21.16                  | V     | 59.90    | 20.77       | -32.47     | 40.00           | 8.20       | 29.54      | 21.34  |
| 22.16                  | V     | 56.80    | 20.83       | -32.44     | 40.00           | 5.19       | 29.54      | 24.35  |
| 25.00                  | H     | 47.80    | 21.00       | -32.35     | 40.00           | -3.55      | 29.54      | 33.09  |



**Test results (Below 1 000 MHz) – Worst case: 802.11ac\_VHT40 / UNII-1\_5 230 MHz**

| Frequency              | Pol.  | Reading  | Ant. Factor | Amp.+Cable | DCF  | Result     | Limit      | Margin |
|------------------------|-------|----------|-------------|------------|------|------------|------------|--------|
| (MHz)                  | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Quasi peak data</b> |       |          |             |            |      |            |            |        |
| 30.49                  | V     | 41.60    | 24.61       | -32.09     | -    | 34.12      | 40.00      | 5.88   |
| 144.95                 | V     | 33.60    | 17.11       | -31.50     | -    | 19.21      | 43.52      | 24.31  |
| 317.12                 | H     | 35.60    | 19.50       | -31.15     | -    | 23.95      | 46.02      | 22.07  |
| 586.90                 | V     | 37.30    | 24.50       | -30.99     | -    | 30.81      | 46.02      | 15.21  |
| 684.75                 | V     | 43.40    | 24.90       | -30.67     | -    | 37.63      | 46.02      | 8.39   |
| 831.46                 | H     | 38.70    | 25.80       | -29.81     | -    | 34.69      | 46.02      | 11.33  |



### Test results (Above 1 000 MHz)

#### UNII-1

#### 802.11a\_Lowest Channel (5 180 MHz)

| Frequency               | Pol.  | Reading  | Ant. Factor | Amp.+Cable | DCF  | Result     | Limit      | Margin |
|-------------------------|-------|----------|-------------|------------|------|------------|------------|--------|
| (MHz)                   | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Peak data</b>        |       |          |             |            |      |            |            |        |
| 5 146.88 <sup>1)</sup>  | H     | 44.60    | 33.20       | -26.64     | -    | 51.16      | 74.00      | 22.84  |
| 1 685.67 <sup>1)</sup>  | H     | 69.80    | 25.10       | -47.71     | -    | 47.19      | 74.00      | 26.81  |
| 10 324.52               | V     | 55.80    | 38.90       | -43.04     | -    | 51.66      | 68.20      | 16.54  |
| 15 597.16 <sup>1)</sup> | V     | 55.00    | 37.81       | -40.97     | -    | 51.84      | 74.00      | 22.16  |
| <b>Average Data</b>     |       |          |             |            |      |            |            |        |
| 5 146.88 <sup>1)</sup>  | H     | 32.97    | 33.20       | -26.64     | 0.29 | 39.82      | 54.00      | 14.18  |
| 15 597.16 <sup>1)</sup> | V     | 44.27    | 37.81       | -40.97     | 0.29 | 41.40      | 54.00      | 12.60  |

#### 802.11a\_Middle Channel (5 200 MHz)

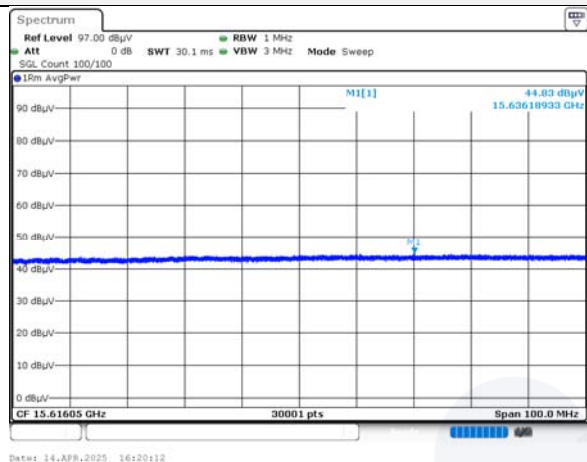
| Frequency               | Pol.  | Reading  | Ant. Factor | Amp.+Cable | DCF  | Result     | Limit      | Margin |
|-------------------------|-------|----------|-------------|------------|------|------------|------------|--------|
| (MHz)                   | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Peak data</b>        |       |          |             |            |      |            |            |        |
| 1 687.50 <sup>1)</sup>  | H     | 70.40    | 25.10       | -47.71     | -    | 47.79      | 74.00      | 26.21  |
| 10 278.90               | V     | 56.10    | 38.90       | -43.03     | -    | 51.97      | 68.20      | 16.23  |
| 15 636.19 <sup>1)</sup> | H     | 55.00    | 37.83       | -40.93     | -    | 51.90      | 74.00      | 22.10  |
| <b>Average Data</b>     |       |          |             |            |      |            |            |        |
| 15 636.19 <sup>1)</sup> | H     | 44.83    | 37.83       | -40.93     | 0.29 | 42.02      | 54.00      | 11.98  |

#### 802.11a\_Highest Channel (5 240 MHz)

| Frequency               | Pol.  | Reading  | Ant. Factor | Amp.+Cable | DCF  | Result     | Limit      | Margin |
|-------------------------|-------|----------|-------------|------------|------|------------|------------|--------|
| (MHz)                   | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Peak data</b>        |       |          |             |            |      |            |            |        |
| 1 686.77 <sup>1)</sup>  | H     | 70.30    | 25.10       | -47.71     | -    | 47.69      | 74.00      | 26.31  |
| 10 528.07               | V     | 55.50    | 38.90       | -43.12     | -    | 51.28      | 68.20      | 16.92  |
| 15 638.55 <sup>1)</sup> | V     | 56.00    | 37.82       | -40.92     | -    | 52.90      | 74.00      | 21.10  |
| <b>Average Data</b>     |       |          |             |            |      |            |            |        |
| 15 638.55 <sup>1)</sup> | V     | 44.61    | 37.82       | -40.92     | 0.29 | 41.80      | 54.00      | 12.20  |

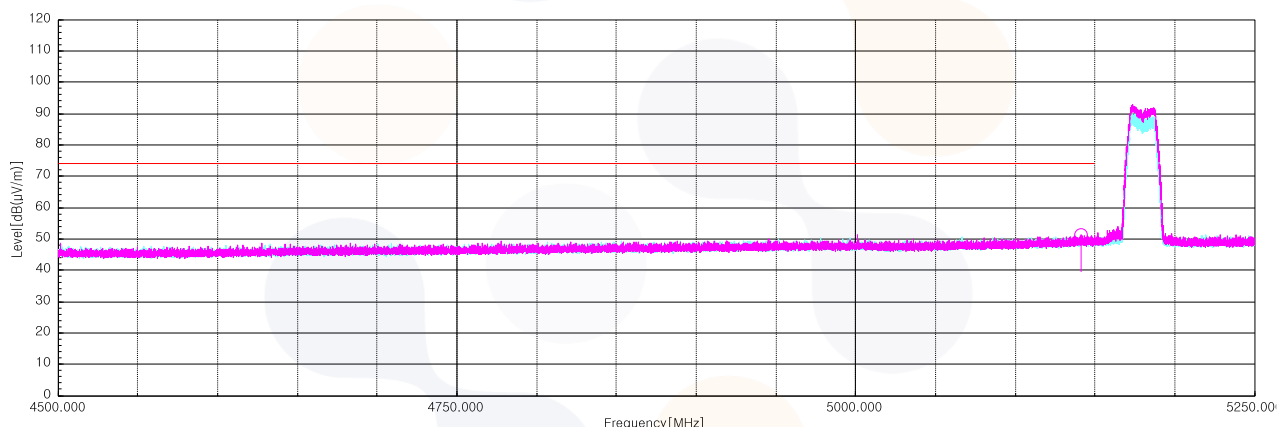
In order to simplify the report, attached plots were only the lowest margin condition  
**802.11a\_Middle Channel (5 200 MHz)**

### Average data



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### Horizontal/Vertical for Band-edge



**802.11n\_HT20\_Lowest Channel (5 180 MHz)**

| Frequency               | Pol.  | Reading  | Ant. Factor | Amp.+Cable | DCF  | Result     | Limit      | Margin |
|-------------------------|-------|----------|-------------|------------|------|------------|------------|--------|
| (MHz)                   | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Peak data</b>        |       |          |             |            |      |            |            |        |
| 5 142.61 <sup>1)</sup>  | H     | 44.70    | 33.20       | -26.65     | -    | 51.25      | 74.00      | 22.75  |
| 1 618.02 <sup>1)</sup>  | V     | 67.50    | 25.20       | -47.70     | -    | 45.00      | 74.00      | 29.00  |
| 10 335.25               | V     | 55.30    | 38.90       | -43.04     | -    | 51.16      | 68.20      | 17.04  |
| 15 397.84 <sup>1)</sup> | V     | 55.00    | 38.60       | -41.02     | -    | 52.58      | 74.00      | 21.42  |
| <b>Average Data</b>     |       |          |             |            |      |            |            |        |
| 5 142.61 <sup>1)</sup>  | H     | 33.21    | 33.20       | -26.65     | 0.31 | 40.07      | 54.00      | 13.93  |
| 15 397.84 <sup>1)</sup> | V     | 43.80    | 38.60       | -41.02     | 0.31 | 41.69      | 54.00      | 12.31  |

**802.11n\_HT20\_Middle Channel (5 200 MHz)**

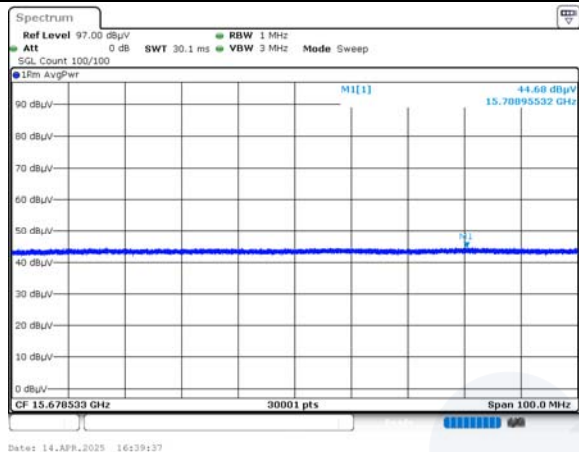
| Frequency               | Pol.  | Reading  | Ant. Factor | Amp.+Cable | DCF  | Result     | Limit      | Margin |
|-------------------------|-------|----------|-------------|------------|------|------------|------------|--------|
| (MHz)                   | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Peak data</b>        |       |          |             |            |      |            |            |        |
| 1 638.18                | H     | 67.40    | 25.20       | -47.71     | -    | 44.89      | 68.20      | 23.31  |
| 10 383.55               | H     | 55.40    | 38.73       | -43.05     | -    | 51.08      | 68.20      | 17.12  |
| 15 708.96 <sup>1)</sup> | V     | 55.30    | 37.90       | -40.84     | -    | 52.36      | 74.00      | 21.64  |
| <b>Average Data</b>     |       |          |             |            |      |            |            |        |
| 15 708.96 <sup>1)</sup> | V     | 44.68    | 37.90       | -40.84     | 0.31 | 42.05      | 54.00      | 11.95  |

**802.11n\_HT20\_Highest Channel (5 240 MHz)**

| Frequency               | Pol.  | Reading  | Ant. Factor | Amp.+Cable | DCF  | Result     | Limit      | Margin |
|-------------------------|-------|----------|-------------|------------|------|------------|------------|--------|
| (MHz)                   | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Peak data</b>        |       |          |             |            |      |            |            |        |
| 1 686.77 <sup>1)</sup>  | H     | 65.70    | 25.10       | -47.71     | -    | 43.09      | 74.00      | 30.91  |
| 10 502.77               | H     | 55.60    | 38.90       | -43.07     | -    | 51.43      | 68.20      | 16.77  |
| 15 753.71 <sup>1)</sup> | H     | 55.90    | 37.90       | -40.79     | -    | 53.01      | 74.00      | 20.99  |
| <b>Average Data</b>     |       |          |             |            |      |            |            |        |
| 15 753.71 <sup>1)</sup> | H     | 44.35    | 37.90       | -40.79     | 0.31 | 41.77      | 54.00      | 12.23  |

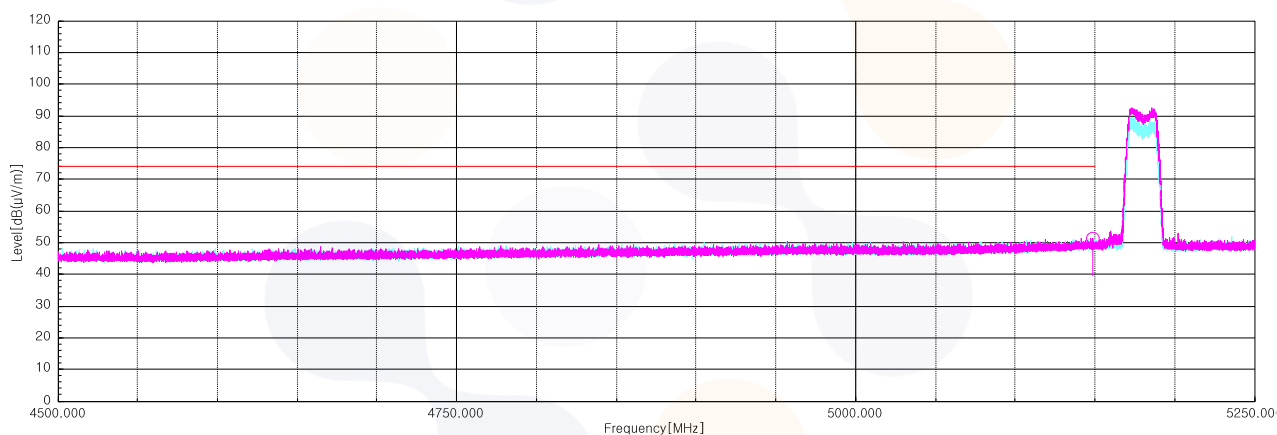
In order to simplify the report, attached plots were only the lowest margin condition  
802.11n\_HT20\_Lowest Channel (5 200 MHz)

### Average data



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### Horizontal/Vertical for Band-edge





**802.11n\_HT40\_Lowest Channel (5 190 MHz)**

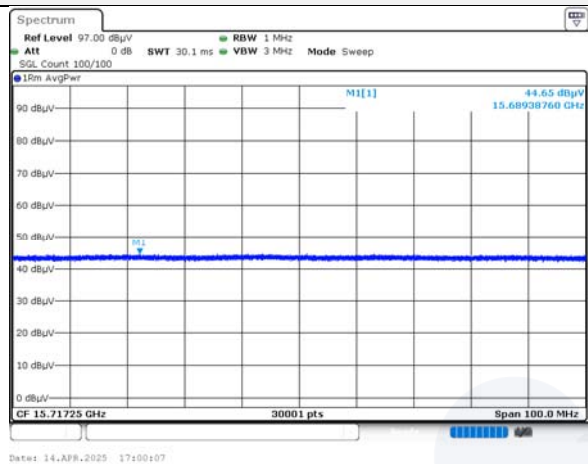
| Frequency               | Pol.  | Reading        | Ant. Factor | Amp.+Cable | DCF  | Result           | Limit            | Margin |
|-------------------------|-------|----------------|-------------|------------|------|------------------|------------------|--------|
| (MHz)                   | (V/H) | (dB( $\mu$ V)) | (dB)        | (dB)       | (dB) | (dB( $\mu$ V/m)) | (dB( $\mu$ V/m)) | (dB)   |
| <b>Peak data</b>        |       |                |             |            |      |                  |                  |        |
| 5 144.57 <sup>1)</sup>  | H     | 48.90          | 33.20       | -26.65     | -    | 55.45            | 74.00            | 18.55  |
| 1 668.62 <sup>1)</sup>  | H     | 68.40          | 25.10       | -47.71     | -    | 45.79            | 74.00            | 28.21  |
| 10 492.42               | V     | 55.50          | 38.98       | -43.06     | -    | 51.42            | 68.20            | 16.78  |
| 15 632.90 <sup>1)</sup> | V     | 55.80          | 37.83       | -40.93     | -    | 52.70            | 74.00            | 21.30  |
| <b>Average Data</b>     |       |                |             |            |      |                  |                  |        |
| 5 144.57 <sup>1)</sup>  | H     | 33.24          | 33.20       | -26.65     | 0.61 | 40.40            | 54.00            | 13.60  |
| 15 632.90 <sup>1)</sup> | V     | 44.53          | 37.83       | -40.93     | 0.61 | 42.04            | 54.00            | 11.96  |

**802.11n\_HT40\_Highest Channel (5 230 MHz)**

| Frequency               | Pol.  | Reading        | Ant. Factor | Amp.+Cable | DCF  | Result           | Limit            | Margin |
|-------------------------|-------|----------------|-------------|------------|------|------------------|------------------|--------|
| (MHz)                   | (V/H) | (dB( $\mu$ V)) | (dB)        | (dB)       | (dB) | (dB( $\mu$ V/m)) | (dB( $\mu$ V/m)) | (dB)   |
| <b>Peak data</b>        |       |                |             |            |      |                  |                  |        |
| 1 681.27 <sup>1)</sup>  | H     | 68.80          | 25.10       | -47.71     | -    | 46.19            | 74.00            | 27.81  |
| 10 456.77               | H     | 54.80          | 38.91       | -43.05     | -    | 50.66            | 68.20            | 17.54  |
| 15 689.39 <sup>1)</sup> | H     | 54.50          | 37.90       | -40.86     | -    | 51.54            | 74.00            | 22.46  |
| <b>Average Data</b>     |       |                |             |            |      |                  |                  |        |
| 15 689.39 <sup>1)</sup> | H     | 44.65          | 37.90       | -40.86     | 0.61 | 42.30            | 54.00            | 11.70  |

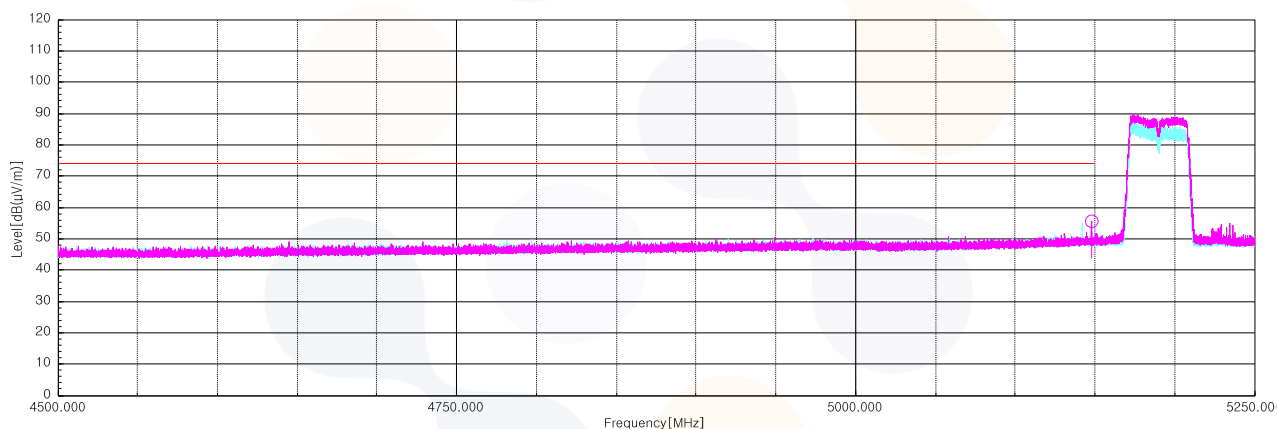
In order to simplify the report, attached plots were only the lowest margin condition  
**802.11n\_HT40\_Highest Channel (5 230 MHz)**

**Average data**



Blank

**Horizontal/Vertical for Band-edge**



**802.11ac\_VHT20\_Lowest Channel (5 180 MHz)**

| Frequency               | Pol.  | Reading  | Ant. Factor | Amp.+Cable | DCF  | Result     | Limit      | Margin |
|-------------------------|-------|----------|-------------|------------|------|------------|------------|--------|
| (MHz)                   | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Peak data</b>        |       |          |             |            |      |            |            |        |
| 5 143.62 <sup>1)</sup>  | H     | 44.90    | 33.20       | -26.65     | -    | 51.45      | 74.00      | 22.55  |
| 1 687.13 <sup>1)</sup>  | H     | 68.20    | 25.10       | -47.71     | -    | 45.59      | 74.00      | 28.41  |
| 10 341.00               | V     | 55.40    | 38.90       | -43.04     | -    | 51.26      | 68.20      | 16.94  |
| 15 573.89 <sup>1)</sup> | V     | 55.10    | 37.90       | -41.00     | -    | 52.00      | 74.00      | 22.00  |
| <b>Average Data</b>     |       |          |             |            |      |            |            |        |
| 5 143.62 <sup>1)</sup>  | H     | 32.98    | 33.20       | -26.65     | 0.31 | 39.84      | 54.00      | 14.16  |
| 15 573.89 <sup>1)</sup> | V     | 44.03    | 37.90       | -41.00     | 0.31 | 41.24      | 54.00      | 12.76  |

**802.11ac\_VHT20\_Middle Channel (5 200 MHz)**

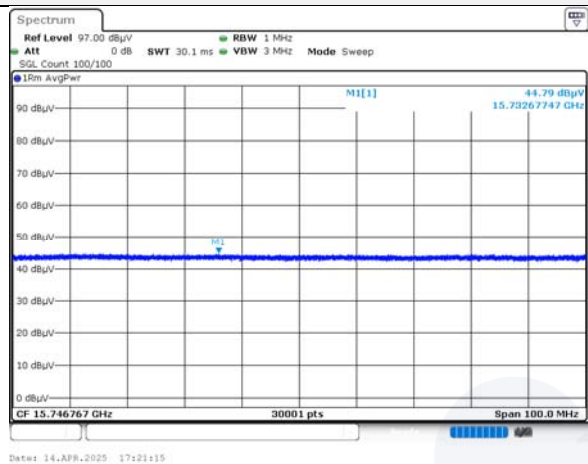
| Frequency               | Pol.  | Reading  | Ant. Factor | Amp.+Cable | DCF  | Result     | Limit      | Margin |
|-------------------------|-------|----------|-------------|------------|------|------------|------------|--------|
| (MHz)                   | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Peak data</b>        |       |          |             |            |      |            |            |        |
| 1 685.30 <sup>1)</sup>  | H     | 68.00    | 25.10       | -47.71     | -    | 45.39      | 74.00      | 28.61  |
| 10 353.65               | V     | 55.00    | 38.79       | -43.04     | -    | 50.75      | 68.20      | 17.45  |
| 15 640.87 <sup>1)</sup> | V     | 55.00    | 37.82       | -40.92     | -    | 51.90      | 74.00      | 22.10  |
| <b>Average Data</b>     |       |          |             |            |      |            |            |        |
| 15 640.87 <sup>1)</sup> | V     | 44.74    | 37.82       | -40.92     | 0.31 | 41.95      | 54.00      | 12.05  |

**802.11ac\_VHT20\_Highest Channel (5 240 MHz)**

| Frequency               | Pol.  | Reading  | Ant. Factor | Amp.+Cable | DCF  | Result     | Limit      | Margin |
|-------------------------|-------|----------|-------------|------------|------|------------|------------|--------|
| (MHz)                   | (V/H) | (dB(μV)) | (dB)        | (dB)       | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Peak data</b>        |       |          |             |            |      |            |            |        |
| 1 685.30 <sup>1)</sup>  | H     | 67.80    | 25.10       | -47.71     | -    | 45.19      | 74.00      | 28.81  |
| 10 499.70               | V     | 55.90    | 39.00       | -43.06     | -    | 51.84      | 68.20      | 16.36  |
| 15 732.68 <sup>1)</sup> | V     | 55.40    | 37.90       | -40.81     | -    | 52.49      | 74.00      | 21.51  |
| <b>Average Data</b>     |       |          |             |            |      |            |            |        |
| 15 732.68 <sup>1)</sup> | V     | 44.79    | 37.90       | -40.81     | 0.31 | 42.19      | 54.00      | 11.81  |

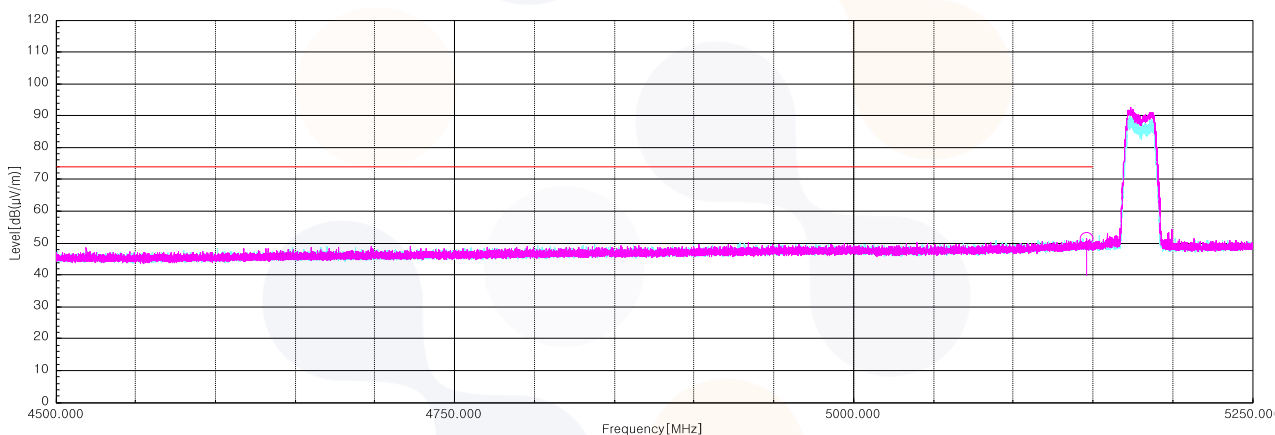
In order to simplify the report, attached plots were only the lowest margin condition  
802.11ac\_VHT20\_Highest Channel (5 240 MHz)

**Average data**



Blank

**Horizontal/Vertical for Band-edge**



**802.11ac\_VHT40\_Lowest Channel (5 190 MHz)**

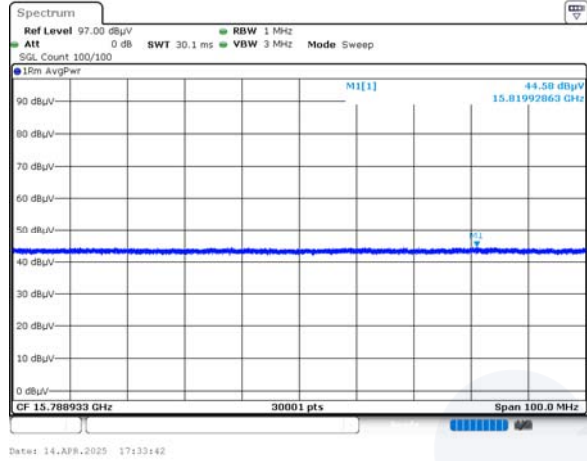
| Frequency               | Pol.  | Reading         | Ant. Factor | Amp.+Cable | DCF  | Result            | Limit             | Margin |
|-------------------------|-------|-----------------|-------------|------------|------|-------------------|-------------------|--------|
| (MHz)                   | (V/H) | (dB( $\mu V$ )) | (dB)        | (dB)       | (dB) | (dB( $\mu V/m$ )) | (dB( $\mu V/m$ )) | (dB)   |
| <b>Peak data</b>        |       |                 |             |            |      |                   |                   |        |
| 5 149.03 <sup>1)</sup>  | H     | 47.40           | 33.20       | -26.63     | -    | 53.97             | 74.00             | 20.03  |
| 1 687.50 <sup>1)</sup>  | H     | 67.70           | 25.10       | -47.71     | -    | 45.09             | 74.00             | 28.91  |
| 10 369.75               | H     | 55.10           | 38.76       | -43.04     | -    | 50.82             | 68.20             | 17.38  |
| 15 619.61 <sup>1)</sup> | V     | 55.70           | 37.86       | -40.95     | -    | 52.61             | 74.00             | 21.39  |
| <b>Average Data</b>     |       |                 |             |            |      |                   |                   |        |
| 5 149.03 <sup>1)</sup>  | H     | 33.10           | 33.20       | -26.63     | 0.61 | 40.28             | 54.00             | 13.72  |
| 15 619.61 <sup>1)</sup> | V     | 44.60           | 37.86       | -40.95     | 0.61 | 42.12             | 54.00             | 11.88  |

**802.11ac\_VHT40\_Highest Channel (5 230 MHz)**

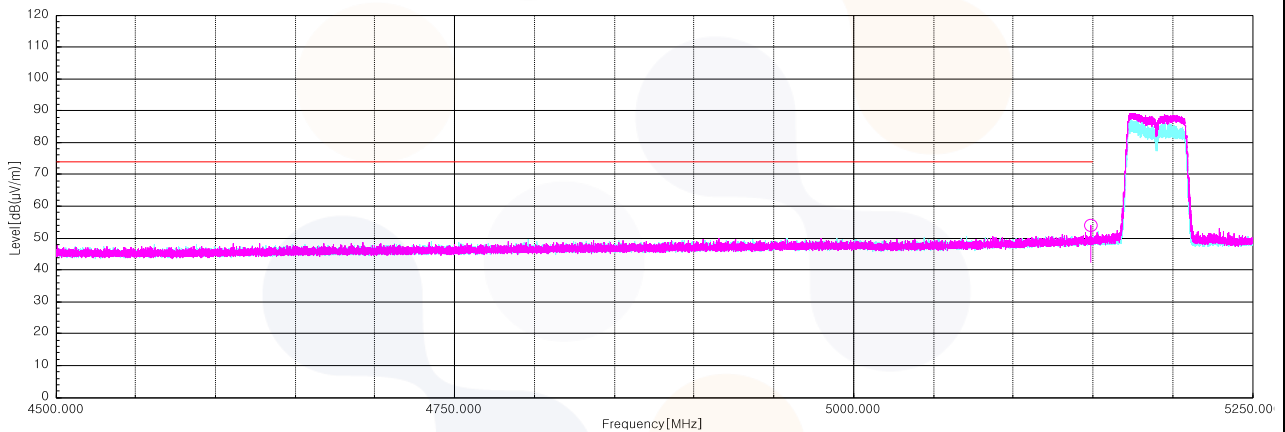
| Frequency               | Pol.  | Reading         | Ant. Factor | Amp.+Cable | DCF  | Result            | Limit             | Margin |
|-------------------------|-------|-----------------|-------------|------------|------|-------------------|-------------------|--------|
| (MHz)                   | (V/H) | (dB( $\mu V$ )) | (dB)        | (dB)       | (dB) | (dB( $\mu V/m$ )) | (dB( $\mu V/m$ )) | (dB)   |
| <b>Peak data</b>        |       |                 |             |            |      |                   |                   |        |
| 1 685.12 <sup>1)</sup>  | H     | 67.60           | 25.10       | -47.71     | -    | 44.99             | 74.00             | 29.01  |
| 10 431.85               | V     | 56.70           | 38.80       | -43.05     | -    | 52.45             | 68.20             | 15.75  |
| 15 819.93 <sup>1)</sup> | H     | 56.20           | 37.90       | -40.72     | -    | 53.38             | 74.00             | 20.62  |
| <b>Average Data</b>     |       |                 |             |            |      |                   |                   |        |
| 15 819.93 <sup>1)</sup> | H     | 44.58           | 37.90       | -40.72     | 0.61 | 42.37             | 54.00             | 11.63  |

In order to simplify the report, attached plots were only the lowest margin condition  
**802.11ac\_VHT40\_Highest Channel (5 230 MHz)**

**Average data**

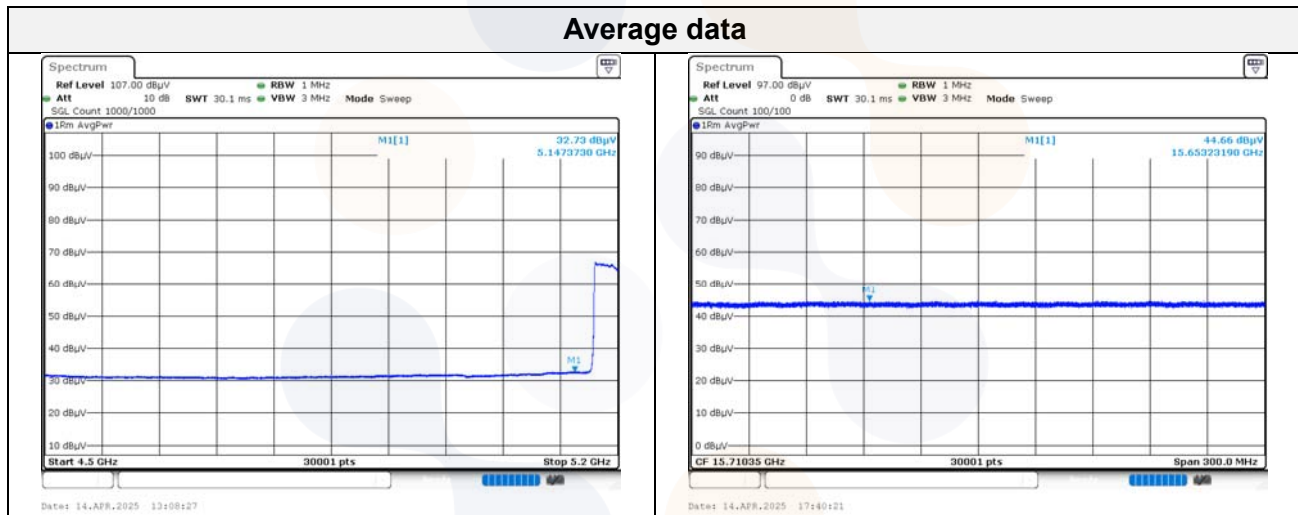


**Horizontal/Vertical for Band-edge**

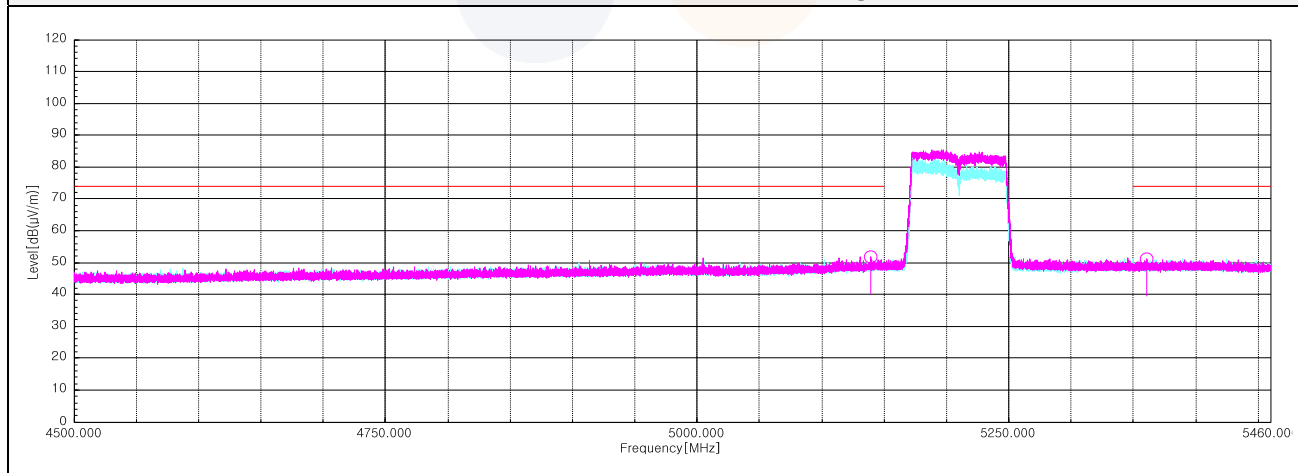


### 802.11ac\_VHT80\_Middle Channel (5 210 MHz)

| Frequency               | Pol.  | Reading        | Ant. Factor | Amp.+Cable | DCF  | Result           | Limit            | Margin |
|-------------------------|-------|----------------|-------------|------------|------|------------------|------------------|--------|
| (MHz)                   | (V/H) | (dB( $\mu$ V)) | (dB)        | (dB)       | (dB) | (dB( $\mu$ V/m)) | (dB( $\mu$ V/m)) | (dB)   |
| <b>Peak data</b>        |       |                |             |            |      |                  |                  |        |
| 5 147.37 <sup>1)</sup>  | H     | 45.20          | 33.20       | -26.64     | -    | 51.76            | 74.00            | 22.24  |
| 5 360.93 <sup>1)</sup>  | H     | 44.10          | 33.00       | -26.26     | -    | 50.84            | 74.00            | 23.16  |
| 1 666.60 <sup>1)</sup>  | H     | 68.30          | 25.10       | -47.71     | -    | 45.69            | 74.00            | 28.31  |
| 10 319.53               | H     | 56.70          | 38.90       | -43.04     | -    | 52.56            | 68.20            | 15.64  |
| 15 653.23 <sup>1)</sup> | V     | 55.50          | 37.90       | -40.91     | -    | 52.49            | 74.00            | 21.51  |
| <b>Average Data</b>     |       |                |             |            |      |                  |                  |        |
| 5 147.37 <sup>1)</sup>  | H     | 32.73          | 33.20       | -26.64     | 1.15 | 40.44            | 54.00            | 13.56  |
| 15 653.23 <sup>1)</sup> | V     | 44.66          | 37.90       | -40.91     | 1.15 | 42.80            | 54.00            | 11.20  |



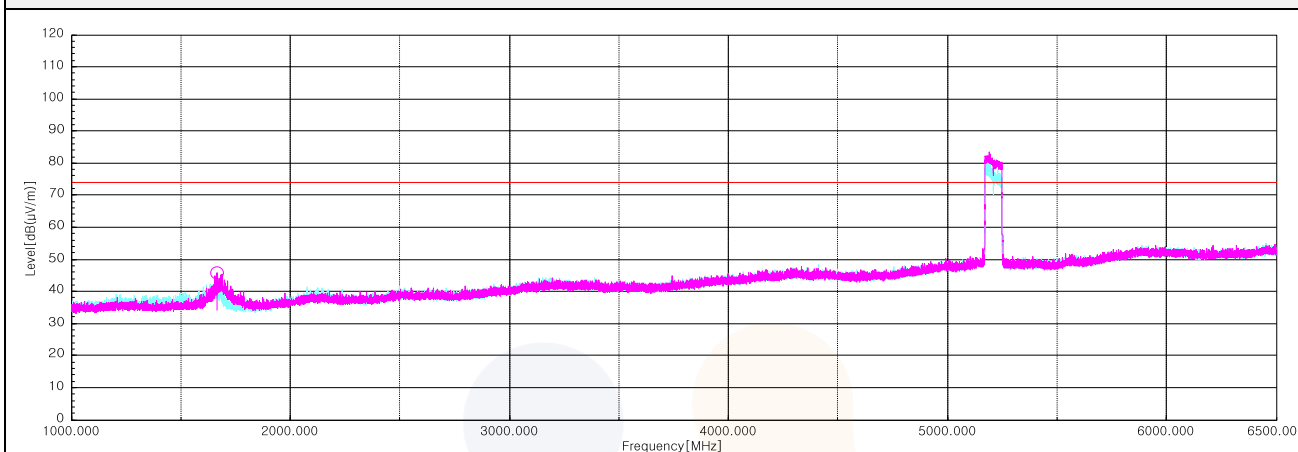
### Horizontal/Vertical for Band-edge



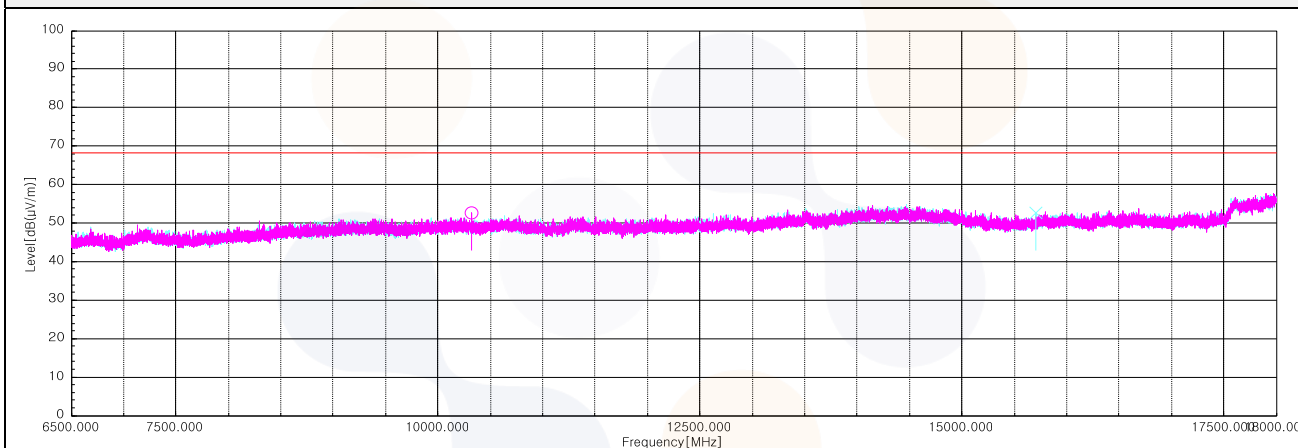
### **Plot of Harmonics and Spurious Emissions**

In order to simplify the report, attached plots were only the lowest margin condition  
**UNII-1\_802.11ac\_VHT80\_Middle Channel (5 210 MHz)**

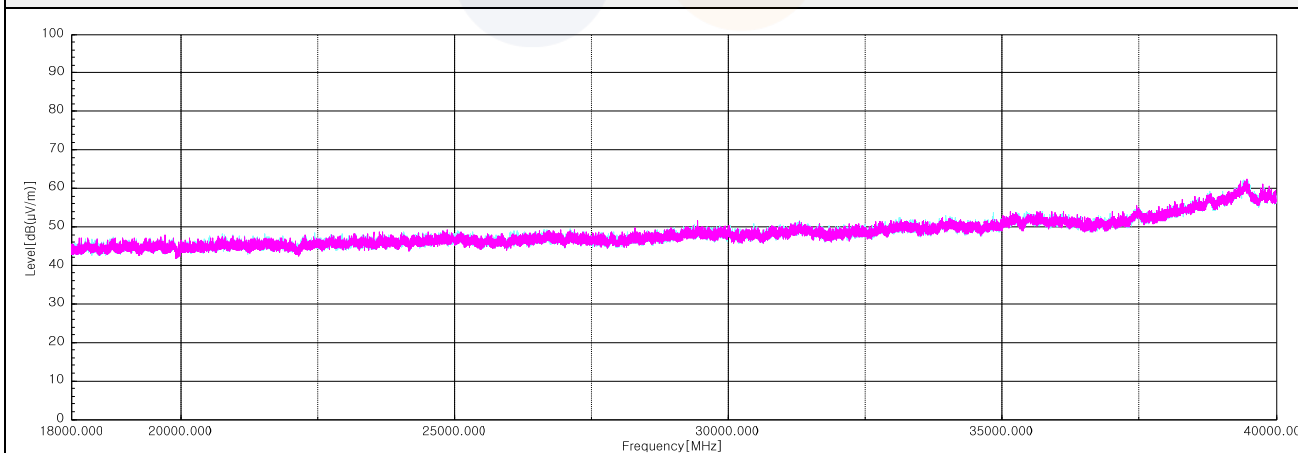
**Horizontal/Vertical for 1 GHz ~ 6.5 GHz**



**Horizontal/Vertical for 6.5 GHz ~ 18 GHz**



**Horizontal/Vertical for 18 GHz ~ 40 GHz**





|                                                                                                                                                                                                         |                                                    |                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Eurofins KCTL Co.,Ltd.</b><br>65, Sinwon-ro, Yeongtong-gu,<br>Suwon-si, Gyeonggi-do, 16677, Korea<br>TEL: 82-70-5008-1021 FAX: 82-505-299-8311<br><a href="http://www.kctl.co.kr">www.kctl.co.kr</a> | Report No.:<br>KR25-SRF0094-A<br>Page (48) of (48) |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------|

## 8. Measurement equipment

| Equipment Name         | Manufacturer                | Model No.                  | Serial No.             | Next Cal. Date |
|------------------------|-----------------------------|----------------------------|------------------------|----------------|
| Temp & Humid Chamber   | ESPEC                       | SH-642                     | 93016978               | 26.01.16       |
| Spectrum Analyzer      | R&S                         | FSV30                      | 101437                 | 26.01.16       |
| Attenuator             | HUBER+SUHNER                | 6610_SK-50-1/199_NE        | ATT06                  | 26.03.17       |
| Power Sensor           | R&S                         | NRP-Z81                    | 1137.9009.02-106223-bB | 25.04.24       |
| DC Power Supply        | TOYOTECH                    | TL305TP                    | 20100121               | 25.07.01       |
| Spectrum Analyzer      | R&S                         | FSVA40                     | 101575                 | 25.04.24       |
| Broadband PreAmplifier | SCHWARZBECK                 | BBV9718D                   | 57                     | 26.01.16       |
| Low Noise Amplifier    | TESTEK                      | TK-PA18H                   | 220124-L               | 25.10.11       |
| Low Noise Amplifier    | TESTEK                      | TK-PA1840H                 | 220133-L               | 25.10.14       |
| Horn Antenna           | SCHWARZBECK                 | BBHA9120D                  | 2763                   | 25.10.24       |
| Horn Antenna           | SCHWARZBECK                 | BBHA9170                   | 1267                   | 25.10.15       |
| High Pass Filter       | QOTANA TECHNOLOGIES         | DBHF0508004000A            | 23041800061            | 25.06.24       |
| Signal Generator       | R&S                         | SMB100A                    | 176206                 | 26.01.17       |
| High Pass Filter       | Vainwright Instruments GmbH | WHKX8-5655-6500-18000-40SS | SN8                    | 25.10.15       |
| Controller             | INNCO SYSTEMS               | CO3000                     | 1441/54370322/P        | -              |
| Antenna Mast           | INNCO SYSTEMS               | MA4640-XP-ET               | AM003                  | -              |
| Turn Device            | INNCO SYSTEMS               | DS1200-S-1t                | 0003                   | -              |

**End of test report**