# *EVALUATION REPORT*

## *for Certification*

**Manufacturer: S-Tech Won Inc.**
**Sanggadong-303, 423, Sanho-daero, Gumi-si,**
**Gyeongsangbuk-do, Republic of Korea**
**Attn: Mr. Sang-Tae Kim / CEO**

**Date of Issue: Jun. 21, 2024**
**Order Number: GETEC-C1-24-229**
**Test Report Number: GETEC-E3-24-084**
**Test Site: GUMI UNIVERSITY EMC CENTER**
**CAB Designation Number: KR0033**

| | |
|---|---|
| **APPLICANT** | **: Summit Technology** |
| **ADDRESS** | **: 130, Digitial-ro, Namsung Plaza suite 611, Geumcheon-gu, Seoul, South Korea** |
| **CONTACT PERSON** | **: Mr. Yong-seong Park / Senior Director** |

| | |
|---|---|
| **Rule Part(s)** | **: FCC Part 15 Subpart E-UNII Devices § 15.407** |
| **Test Method** | **: ANSI C63.10 (2020)** |
| **Equipment Class** | **: Unlicensed National Information Infrastructure(NII)** |
| **EUT Type** | **: Touch Screen Controller** |
| **Type of Authority** | **: Certification** |
| **Model Name** | **: TDC-8300** |

**This equipment has been shown to be in compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10 (2020)**

**I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the vest of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.**

**Tested by,**

**Jong-Wook Park, Senior Engineer**
**GUMI UNIVERSITY EMC CENTER**

**Reviewed by,**

**Hyun Kim, Technical Manager**
**GUMI UNIVERSITY EMC CENTER**



This test report only contains the result of a specific sample supplied by applicant for the testing.
It is not allowed to copy this report even partly without the approval of EMC center

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# Version

| Test Report No. | Date | Description |
|---|---|---|
| GETEC-E3-24-084 | Jun. 21, 2024 | - First Approval Report |

# CONTENTS

1. GENERAL INFORMATION ..... 5
2. INTRODUCTION ..... 6
3. PRODUCT INFORMATION ..... 7
3.1 DESCRIPTION OF EUT ..... 7
3.2 DEFINITION OF MODELS ..... 7
3.3 SUPPORT EQUIPMENT / CABLES USED ..... 8
3.4 MODIFICATION ITEM(S) ..... 8
4. ANTENNA REQUIREMENT - §15.203 ..... 9
4.1 DESCRIPTION OF ANTENNA ..... 9
5. DESCRIPTION OF TESTS ..... 9
5.1 TEST CONDITION ..... 9
6. REFERENCES STANDARDS ..... 9
7. SUMMARY OF TEST RESULTS ..... 10
8. 26 DB BANDWIDTH MEASUREMENT ..... 11
8.1 OPERATING ENVIRONMENT ..... 11
8.2 TEST SET-UP (LAYOUT) ..... 11
8.3 LIMIT ..... 11
8.4 TEST EQUIPMENT USED ..... 11
8.5 TEST TEST PROCEDURE ..... 11
8.6 TEST RESULT ..... 12
9. 6 DB BANDWIDTH MEASUREMENT ..... 19
9.1 OPERATING ENVIRONMENT ..... 19
9.2 TEST SET-UP (LAYOUT) ..... 19
9.3 LIMIT ..... 19
9.4 TEST EQUIPMENT USED ..... 19
9.5 TEST PROCEDURE ..... 19
9.6 TEST RESULT ..... 20
10. MAXIMUM CONDUCTED OUTPUT POWER ..... 27
10.1 OPERATING ENVIRONMENT ..... 27
10.2 TEST SET-UP (LAYOUT) ..... 27
10.3 LIMIT ..... 27
10.4 TEST EQUIPMENT USED ..... 27
10.5 TEST PROCEDURE ..... 27
10.6 TEST RESULT ..... 28
11. POWER SPECTRAL DENSITY MEASUREMENT ..... 31
11.1 OPERATING ENVIRONMENT ..... 31
11.2 TEST SET-UP (LAYOUT) ..... 31
11.3 LIMIT ..... 31
11.4 TEST EQUIPMENT USED ..... 31
11.5 TEST PROCEDURE ..... 31
11.6 TEST RESULT ..... 32
12. FREQUENCY STABILITY ..... 39

13. AC POWER LINE CONDUCTED EMISSION ..... 48
13.1 OPERATING ENVIRONMENT ..... 49
13.2 TEST SET-UP ..... 49
13.3 MEASUREMENT UNCERTAINTY ..... 49
13.4 LIMIT ..... 50
13.5 TEST EQUIPMENT USED ..... 50
13.6 TEST DATA FOR CONDUCTED EMISSION ..... 50
14. RADIATED SPURIOUS & RESTRICTED BAND EDGE EMISSION ..... 55
14.1 OPERATING ENVIRONMENT ..... 56
14.2 TEST SET-UP ..... 56
14.3 MEASUREMENT UNCERTAINTY ..... 56
14.4 LIMIT ..... 57
14.5 TEST EQUIPMENT USED ..... 57
14.6 TEST DATA FOR RADIATED SPURIOUS EMISSION & RADIATED RESTRICTED BAND EDGE EMISSION ..... 58
15. SAMPLE CALCULATIONS ..... 64
15.1 EXAMPLE 1 : ..... 64
15.2 EXAMPLE 2 : ..... 64
16. RECOMMENDATION & CONCLUSION ..... 65

***Scope:*** *Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and / or unintentional radiators for compliance with technical rules and regulations of the Federal Communications Commission.*

**1. General Information**

**Applicant: Summit Technology**

**Applicant Address: 130, Digitial-ro, Namsung Plaza suite 611, Geumcheon-gu, Seoul, South Korea**

**Manufacturer: S-Tech Won Inc.**

**Manufacturer Address: Sanggadong-303, 423, Sanho-daero, Gumi-si, Gyeongsangbuk-do, Republic of Korea**

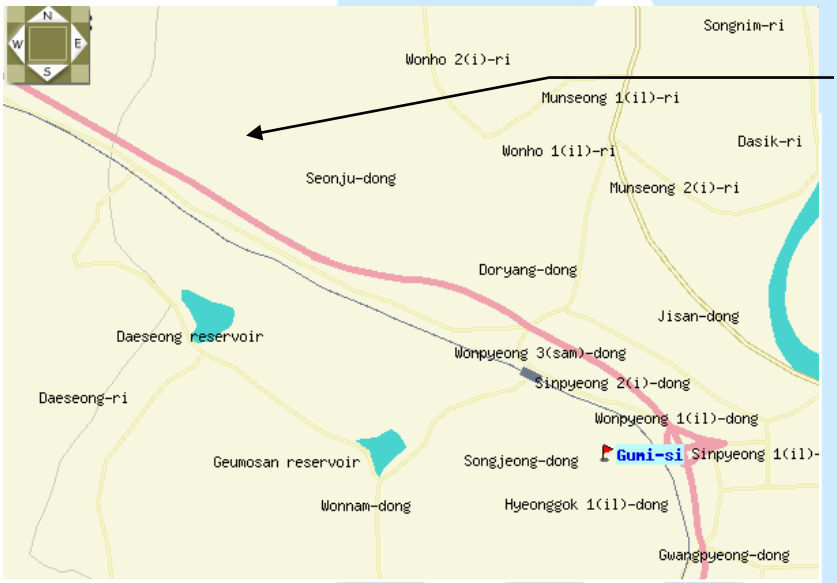
**Contact Person: Mr. Sang-Tae Kim / CEO**

- **FCC ID.** 2AT6QTDC8300
- **Equipment Class** Unlicensed National Information Infrastructure(NII)
- **EUT Type** Touch Screen Controller
- **Model Name** TDC-8300
- **Rule Part(s)** FCC Part 15 Subpart E-UNII Devices § 15.407
- **Test Method** ANSI C63.10 (2020)
- **Type of Authority** Certification
- **Test Procedure(s)** ANSI C63.10 (2020), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01(Dec. 14,2017)
- **Dates of Test** May 13, 2024 ~ Jun. 21, 2024
- **Place of Test** **GUMI UNIVERSITY EMC CENTER** (FCC Test firm Registration No.: 269701) 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 730-711, Republic of Korea
- **Test Report Number** GETEC-E3-24-083
- **Dates of Issue** Jun. 21, 2024

## 2. Introduction

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Nose Emissions From Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2009) was used in determining radiated and conducted emissions emanating from **Summit Technology Touch Screen Controller (Model name: TDC-8300)**

These measurement tests were conducted at **GUMI UNIVERSITY EMC CENTER**.
The site address is 37 Yaeun-ro, Gumi-si, Gyeongsangbuk-do, 730-711, Republic of Korea
This test site is one of the highest point of GUMI UNIVERSITY at about 200 kilometers away from Seoul city and 40 kilometers away from Daege city. It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures. The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI C63.10 (2020)




**GUMI UNIVERSITY EMC CENTER**
37 Yaeun-ro, Gumi-si,
Gyeongsangbuk-do, 730-711,
Republic of Korea
Tel: +82-54-440-1195
Fax: +82-54-440-1199

Fig 1. The map above shows the Gumi University in vicinity area.

# 3. Product Information

## 3.1 Description of EUT

The Equipment under Test (EUT) is the **Summit Technology Touch Screen Controller (Model Name: TDC-8300) FCC ID.: 2AT6QTDC8300**

| | | |
|---|---|---|
| -. Equipment | : Touch Screen Controller | |
| -. Model name | : TDC-8300 | |
| -. Serial number | : Proto type | |
| -. Electrical Rating | : DC 3.7 V (Lithium-polymer battery) | |
| -. Manufacturer | : S-Tech Won Inc. | |
| -. Frequency Range (DTS band) | TX 20 MHz BW: | 2412 MHz - 2462 MHz |
| | 40 MHz BW: | 2422 MHz - 2462 MHz |
| | RX 20 MHz BW: | 2412 MHz - 2462 MHz |
| | 40 MHz BW | 2422 MHz - 2462 MHz |
| -. Frequency Range (UNII band) | TX 20 MHz BW: | 5180 MHz - 5240 MHz (UNII 1) / 5260 MHz - 5320 MHz (UNII 2A)<br>5500 MHz - 5720 MHz (UNII 2C) / 5745 MHz - 5825 MHz (UNII 3) |
| | 40 MHz BW: | 5190 MHz - 5230 MHz (UNII 1) / 5270 MHz - 5310 MHz (UNII 2A)<br>5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3) |
| | 80 MHz BW: | 5210 Mhz (UNII 1) / 5290 MHz (UNII 2A) /<br>5530 MHz - 5690 MHz (UNII 2C) / 5775 MHz (UNII 3) |
| | RX 20 MHz BW: | 5180 MHz - 5240 MHz (UNII 1) / 5260 MHz - 5320 MHz (UNII 2A)<br>5500 MHz - 5720 MHz (UNII 2C) / 5745 MHz - 5825 MHz (UNII 3) |
| | 40 MHz BW: | 5190 MHz - 5230 MHz (UNII 1) / 5270 MHz - 5310 MHz (UNII 2A)<br>5510 MHz - 5710 MHz (UNII 2C) / 5755 MHz - 5795 MHz (UNII 3) |
| | 80 MHz BW: | 5210 Mhz (UNII 1) / 5290 MHz (UNII 2A) /<br>5530 MHz - 5690 MHz (UNII 2C) / 5775 MHz (UNII 3) |
| -. Modulation | : BPSK, QPSK, QAM, CCK, OFDM | |
| -. Antenna Specification | : Antenna type : FPCB antenna<br>Gain : | |

| Freq. (MHz) | 2400 | 2420 | 2440 | 2460 | 2480 | 2500 |
|---|---|---|---|---|---|---|
| Gain (dBi) | 0.73 | 1.23 | 1.88 | 2.22 | 2.25 | 1.25 |

| Freq. (MHz) | 5150 | 5250 | 5350 | 5490 | 5725 | 5825 |
|---|---|---|---|---|---|---|
| Gain (dBi) | 1.22 | 1.07 | 0.26 | 1.41 | 2.24 | 2.07 |

| | |
|---|---|
| -. Type (DFS) | : Client (without radar detection) |

## 3.2 Definition of models

-None.

### 3.3 Support Equipment / Cables used

3.3.1 Used Support Equipment

| Description | Manufacturer | Model Name | S/N & FCC ID. |
|---|---|---|---|
| Notebook Computer 1) | SAMSUNG | NT500R3W | S/N: 0Q2V91JJ100096T<br>FCC ID.: N/A |

Note)
1) The Support Equipment use only setting to the test mode.

3.3.2 System configuration

| Description | Manufacturer | Model Name | S/N & FCC ID. |
|---|---|---|---|
| AC/DC adapter1) | DEE VAN ENTERPRISE CO., LTD. | DSA-18QFB FUS A | N/A |
| AC/DC adapter2) | DEE VAN ENTERPRISE CO., LTD. | DSA-10PF06-05 FUS 050200 | N/A |

1) Input: 100-240 V, 50/60 Hz, 0.8 A
Output: DC 5 V, 3 A / DC 9 V, 2 A / DC 12 V, 1.5 A
2) Input: 100-240 V, 50/60 Hz, 0.3 A
Output: DC 5 V, 2 A, 10W

3.3.3 Used Cable(s)

| Cable Name | Condition | Description |
|---|---|---|
| USB cable | Connected to EUT and AC/DC adapter | 1.5 m shielded with a ferrite core |

### 3.4 Modification Item(s)

-. None

## 4. Antenna Requirement - §15.203

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the applicant can be used with the device. The use of permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with this requirement.

### 4.1 Description of Antenna

The **Summit Technology Touch Screen Controller.** comply with the requirement of §15.203 with a FPCB antenna permanently attached to the transmitter.

## 5. Description of tests

### 5.1 Test Condition

The EUT was installed, arranged and operated in a manner that is most representative of equipment as typically used.

The measurements were carried out while varying operating modes and cable positions within typically arrangement to determine maximum emission level.

The representative and worst test mode(s) were noted in the test report.

- Test Voltage / Frequency: 3.7 V / DC

- Operating condition during the test(s) :
  -. Continuous RF transmitting mode with nominal maximum RF output power.
  -. Operating channel frequency and modulation technology

| Mode | | Available channel | Frequency | Modulation Technology |
|---|---|---|---|---|
| NII | 802.11a | 36 ~ 165 | 5 180 ~ 5 825 MHz | OFDM |
| | 802.11n | 36 ~ 165 | 5 180 ~ 5 825 MHz | OFDM |
| | 802.11ac | 36 ~ 165 | 5 180 ~ 5 825 MHz | OFDM |

-. EUT set condition (Test Software)

| | |
|---|---|
| **Test Software** | Android Debug Bridge |
| **Test Software version** | N/A |

## 6. References Standards

- FCC Part 15 (2009) Subpart E-UNII Devices §15.407
- ANSI C63.10 (2020): American National Standard for Testing Unlicensed Wireless Devices
- KDB 789033 D02 General UNII Test Procedures New Rules v01r04 (May 2, 2017): Guidance for compliance testing of unlicensed national information infrastructure (UNII) devices (Part 15, Subpart E)

## 7. SUMMARY OF TEST RESULTS

| FCC Part Section(s) | Test Description | Test Result |
|---|---|---|
| §15.407<br>(for Power Measurement) | 26 dB Bandwidth | Pass |
| §15.407(e) | 6 dB Bandwidth | Pass |
| §15.407(a) | Maximum Conducted Output Power | Pass |
| §15.407(h)1 | Transmit Power Control (TPC) | N/A[1)] |
| §15.407(a) | Peak Power Spectral Density | Pass |
| §15.407(g) | Frequency Stability | Pass |
| §15.207 | AC Conducted Emissions<br>150 kHz - 30 MHz | Pass |
| §15.407(b) | Undesirable Emissions | Pass |
| §15.205, § 15.407(b)(5),(6) | General Field Strength Limits<br>(Restricted Bands and Radiated Emission Limits) | Pass |

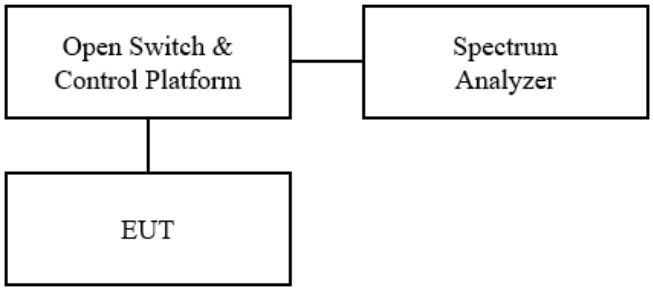
1) E.I.R.P of EUT is less than the 500 mW.
Therefore, TPC test is not required for systems with an e.i.r.p of less than 500 mW

## 8. 26 dB Bandwidth Measurement

### 8.1 Operating environment

| | | |
|---|---|---|
| Temperature | : | 22.3 °C |
| Relative Humidity | : | 49.7 % R.H. |

### 8.2 Test Set-up (Layout)




### 8.3 Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

### 8.4 Test Equipment used

| | Model Name | Manufacturer | Description | Serial Number | Due to Calibration |
|---|---|---|---|---|---|
| ■ - | FSV | Rohde & Schwarz | Spectrum Analyzer | 101552 | Apr. 04, 2025 |
| ■ - | OSP120 | Rohde & Schwarz | Open Switch and control platform | 101329 | Apr. 05, 2025 |
| ■ - | J12J103539-00-2 | JUNFLON | RF Test Cable (OSP_DUT1) | AUG-03-21-066 | N/A |
| ■ - | J12J103539-00-3 | JUNFLON | RF Test Cable (OSP_RX) | AUG-03-21-074 | N/A |
| ■ - | WMS 32 | Rohde & Schwarz | Testing Software | VER11.70.00 | N/A |

### 8.5 Test Test Procedure

a) Set RBW = 200 kHz
b) Set the video bandwidth (VBW) ≥ 600 kHz
c) Detector = Max Peak
d) Trace mode = Max Hold
e) Sweep = Auto
f) Allow the trace to stabilize
g) 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 %.

**8.6 Test result**

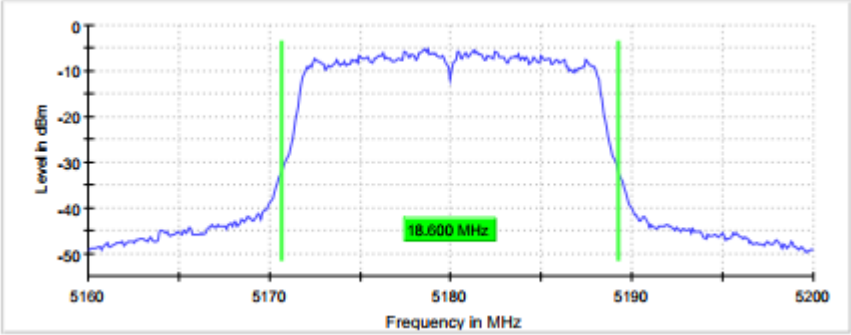
-. Test Date : Jun. 21, 2024
-. Reference Standard : Part 15 Subpart E, Sec. 15.407(for power measurement)
-. Test Procedure(s) : ANSI C63.10 (2020), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01(Dec. 14,2017)
-. Operating Condition : 802.11a/n/ac
-. Power Source : DC 3.7 V

**802.11a**

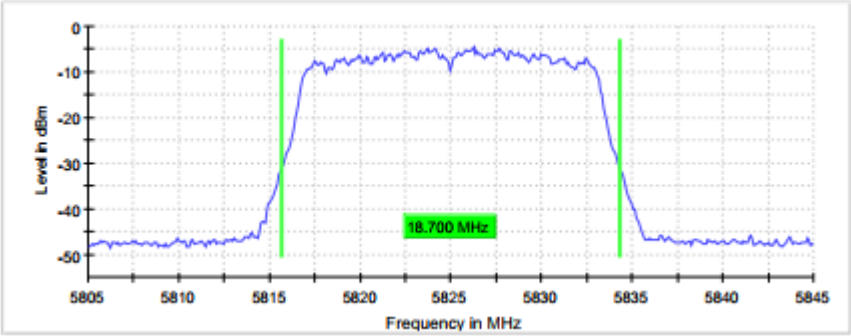
| Frequency (MHz) | Channel No. | 26 dB Bandwidth (MHz) | Min. Limit (MHz) | Result |
|---|---|---|---|---|
| 5180 | 36 | 18.60 | N/A | Complies |
| 5200 | 40 | 18.40 | N/A | Complies |
| 5240 | 48 | 18.60 | N/A | Complies |
| 5260 | 52 | 18.60 | N/A | Complies |
| 5300 | 60 | 18.40 | N/A | Complies |
| 5320 | 64 | 18.50 | N/A | Complies |
| 5500 | 100 | 18.40 | N/A | Complies |
| 5580 | 116 | 18.40 | N/A | Complies |
| 5720 | 144 | 18.60 | N/A | Complies |
| 5745 | 149 | 18.50 | N/A | Complies |
| 5785 | 157 | 18.60 | N/A | Complies |
| 5825 | 165 | 18.70 | N/A | Complies |

**Test Plot on Configuration : 802.11a**

5180 MHz (36 ch)




5825 MHz (165 ch)



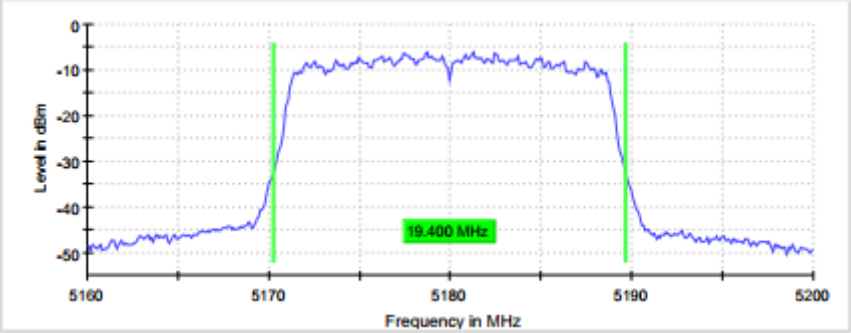

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11n**

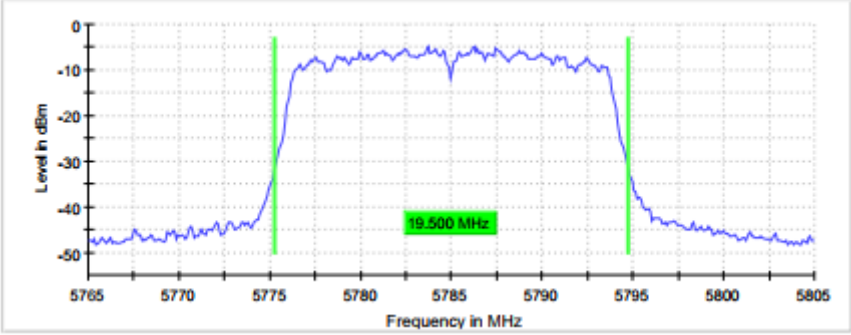
| Frequency (MHz) | Channel No. | 26 dB Bandwidth (MHz) | Min. Limit (MHz) | Result |
|---|---|---|---|---|
| 5180 | 36 | 19.40 | N/A | Complies |
| 5200 | 40 | 19.40 | N/A | Complies |
| 5240 | 48 | 19.40 | N/A | Complies |
| 5260 | 52 | 19.40 | N/A | Complies |
| 5300 | 60 | 19.30 | N/A | Complies |
| 5320 | 64 | 19.40 | N/A | Complies |
| 5500 | 100 | 19.40 | N/A | Complies |
| 5580 | 116 | 19.40 | N/A | Complies |
| 5720 | 144 | 19.40 | N/A | Complies |
| 5745 | 149 | 19.20 | N/A | Complies |
| 5785 | 157 | 19.50 | N/A | Complies |
| 5825 | 165 | 19.30 | N/A | Complies |

**Test Plot on Configuration : 802.11n**

5180 MHz (36 ch)




5785 MHz (157 ch)



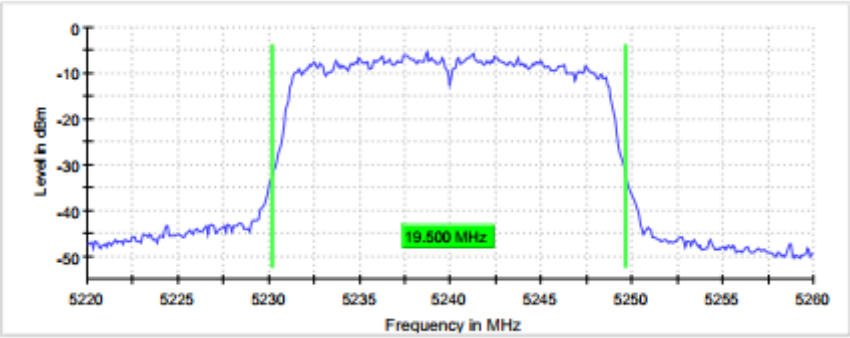

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11ac**

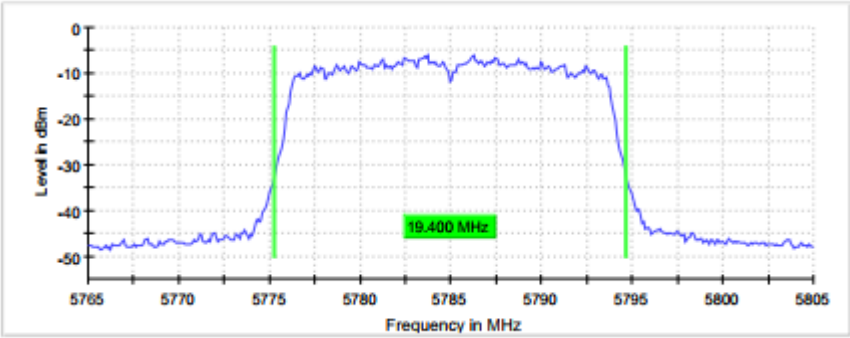
| Frequency (MHz) | Channel No. | 26 dB Bandwidth (MHz) | Min. Limit (MHz) | Result |
|---|---|---|---|---|
| 5180 | 36 | 19.40 | N/A | Complies |
| 5200 | 40 | 19.40 | N/A | Complies |
| 5240 | 48 | 19.50 | N/A | Complies |
| 5260 | 52 | 19.40 | N/A | Complies |
| 5300 | 60 | 19.40 | N/A | Complies |
| 5320 | 64 | 19.30 | N/A | Complies |
| 5500 | 100 | 19.40 | N/A | Complies |
| 5580 | 116 | 19.40 | N/A | Complies |
| 5720 | 144 | 19.40 | N/A | Complies |
| 5745 | 149 | 19.40 | N/A | Complies |
| 5785 | 157 | 19.40 | N/A | Complies |
| 5825 | 165 | 19.40 | N/A | Complies |

**Test Plot on Configuration : 802.11n**

5240 MHz (48 ch)




5785 MHz (157 ch)



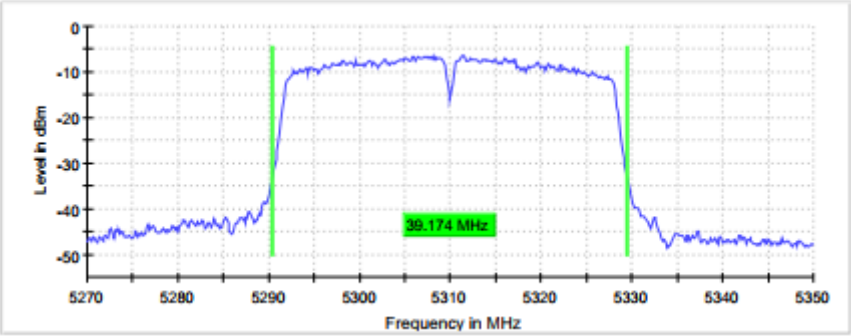

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11n_HT40**

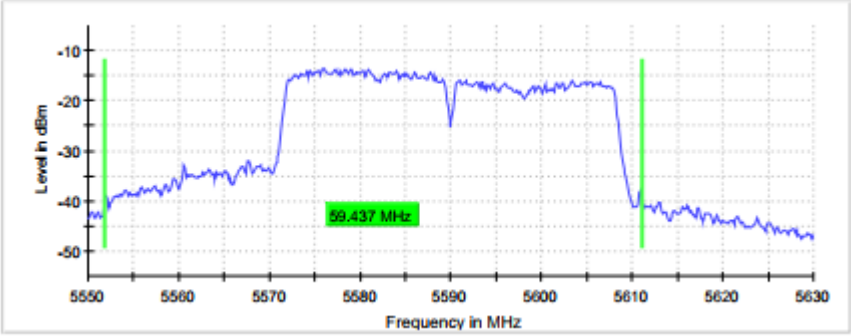
| Frequency (MHz) | Channel No. | 26 dB Bandwidth (MHz) | Min. Limit (MHz) | Result |
|---|---|---|---|---|
| 5190 | 38 | 39.024 | N/A | Complies |
| 5230 | 46 | 38.874 | N/A | Complies |
| 5270 | 54 | 38.874 | N/A | Complies |
| 5310 | 62 | 39.174 | N/A | Complies |
| 5510 | 102 | 39.024 | N/A | Complies |
| 5590 | 110 | 56.437 | N/A | Complies |
| 5710 | 142 | 38.874 | N/A | Complies |
| 5755 | 151 | 38.574 | N/A | Complies |
| 5795 | 159 | 39.174 | N/A | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5310 MHz (62 ch)




5590 MHz (110 ch)



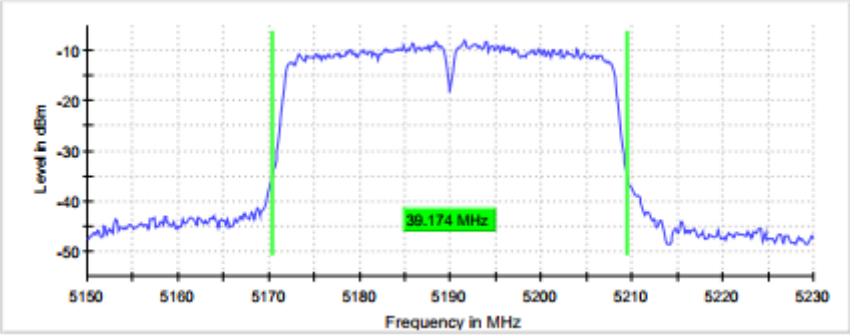

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11ac_VHT40**

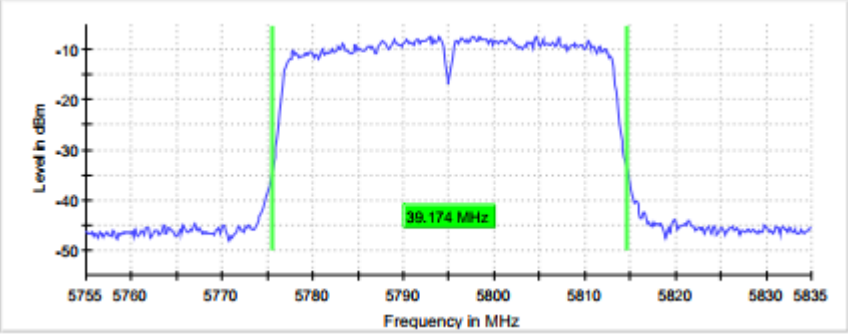
| Frequency (MHz) | Channel No. | 26 dB Bandwidth (MHz) | Min. Limit (MHz) | Result |
|---|---|---|---|---|
| 5190 | 38 | 39.174 | N/A | Complies |
| 5230 | 46 | 39.024 | N/A | Complies |
| 5270 | 54 | 39.174 | N/A | Complies |
| 5310 | 62 | 38.874 | N/A | Complies |
| 5510 | 102 | 39.174 | N/A | Complies |
| 5590 | 110 | 38.874 | N/A | Complies |
| 5710 | 142 | 38.724 | N/A | Complies |
| 5755 | 151 | 38.874 | N/A | Complies |
| 5795 | 159 | 39.174 | N/A | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5190 MHz (38 ch)




5795 MHz (159 ch)



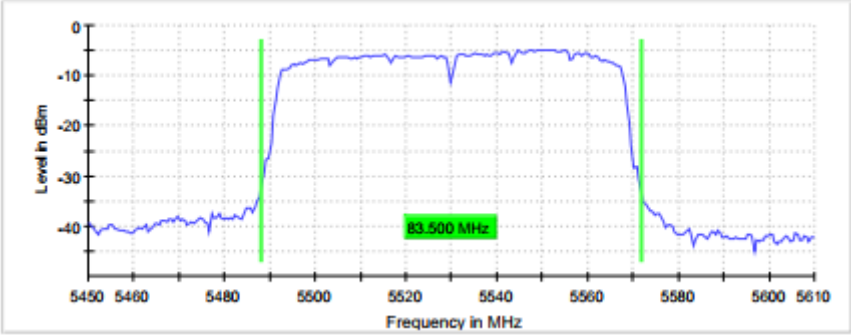

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11ac_VHT80**

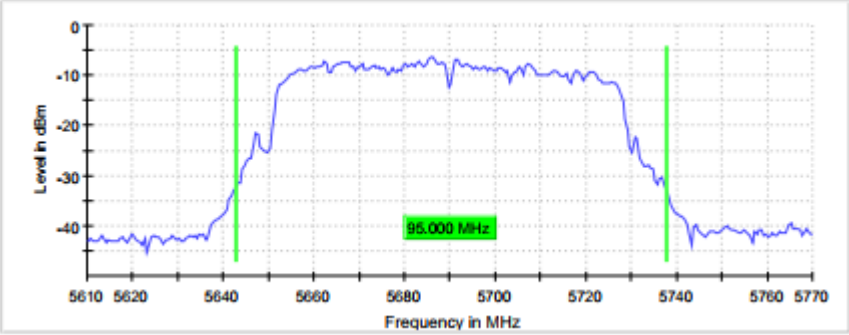
| Frequency (MHz) | Channel No. | 26 dB Bandwidth (MHz) | Min. Limit (MHz) | Result |
|---|---|---|---|---|
| 5210 | 42 | 82.50 | N/A | Complies |
| 5290 | 58 | 82.50 | N/A | Complies |
| 5530 | 106 | 83.50 | N/A | Complies |
| 5610 | 122 | 83.50 | N/A | Compies |
| 5690 | 138 | 95.00 | N/A | Complies |
| 5775 | 155 | 82.50 | N/A | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5530 MHz (106 ch)




5690 MHz (138 ch)



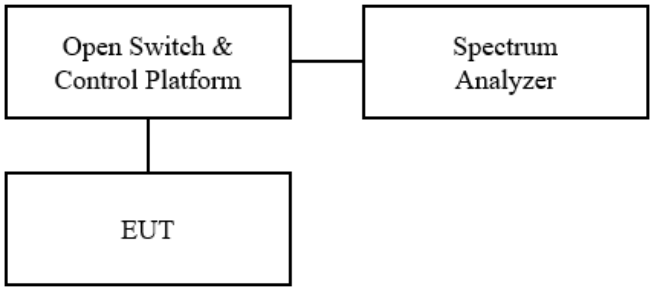

**Note: In order to simplify the report, attached plots were only the most wide channel.**

## 9. 6 dB Bandwidth Measurement

### 9.1 Operating environment

| | | |
|---|---|---|
| Temperature | : | 22.3 °C |
| Relative Humidity | : | 49.7 % R.H. |

### 9.2 Test Set-up (Layout)




### 9.3 Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

### 9.4 Test Equipment used

| | Model Name | Manufacturer | Description | Serial Number | Due to Calibration |
|---|---|---|---|---|---|
| ■ - | FSV | Rohde & Schwarz | Spectrum Analyzer | 101552 | Apr. 04, 2025 |
| ■ - | OSP120 | Rohde & Schwarz | Open Switch and control platform | 101329 | Apr. 05, 2025 |
| ■ - | J12J103539-00-2 | JUNFLON | RF Test Cable (OSP_DUT1) | AUG-03-21-066 | N/A |
| ■ - | J12J103539-00-3 | JUNFLON | RF Test Cable (OSP_RX) | AUG-03-21-074 | N/A |
| ■ - | WMS 32 | Rohde & Schwarz | Testing Software | VER11.70.00 | N/A |

### 9.5 Test Procedure

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 x RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

**9.6 Test result**

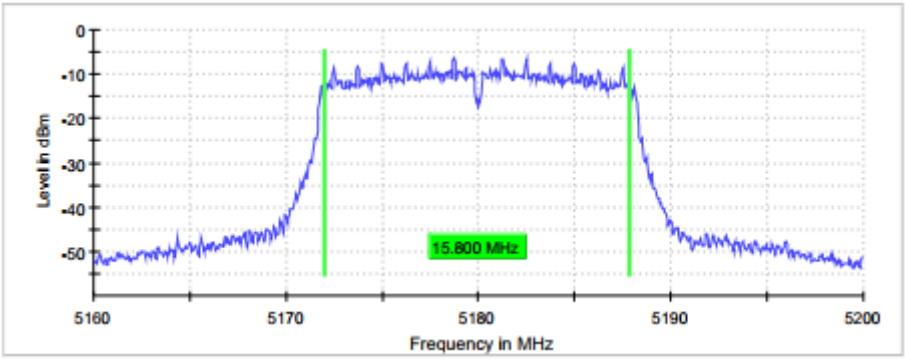
-. Test Date : Jun. 21, 2024
-. Reference Standard : Part 15 Subpart E, Sec. 15.407(e)
-. Test Procedure(s) : ANSI C63.10 (2020), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01(Dec. 14,2017)
-. Operating Condition : 802.11a/n/ac
-. Power Source : DC 3.7 V

**802.11a**

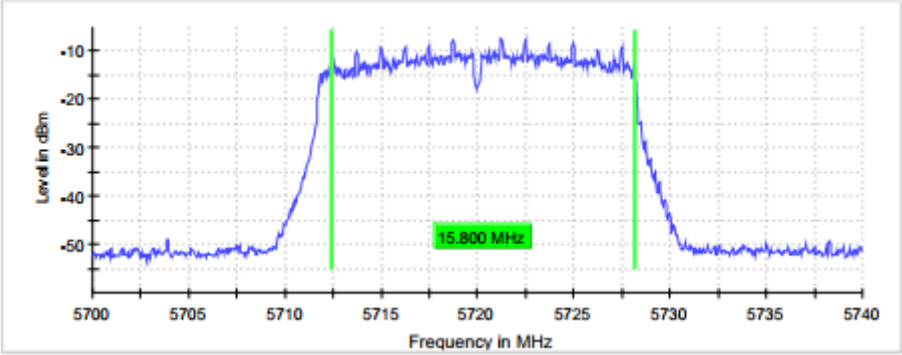
| Frequency (MHz) | Channel No. | Measured Bandwidth (MHz) | Minimum Bandwidth (MHz) | Result |
|---|---|---|---|---|
| 5180 | 36 | 15.80 | N/A | Complies |
| 5200 | 40 | 15.40 | N/A | Complies |
| 5240 | 48 | 15.75 | N/A | Complies |
| 5260 | 52 | 15.75 | N/A | Complies |
| 5300 | 60 | 15.40 | N/A | Complies |
| 5320 | 64 | 15.40 | N/A | Complies |
| 5500 | 100 | 15.55 | N/A | Complies |
| 5580 | 116 | 15.40 | N/A | Complies |
| 5720 | 144 | 15.80 | N/A | Complies |
| 5745 | 149 | 15.55 | N/A | Complies |
| 5785 | 157 | 15.75 | N/A | Complies |
| 5825 | 165 | 15.40 | N/A | Complies |

**Test Plot on Configuration : 802.11a**

5180 MHz (36 ch)




5720 MHz (144 ch)



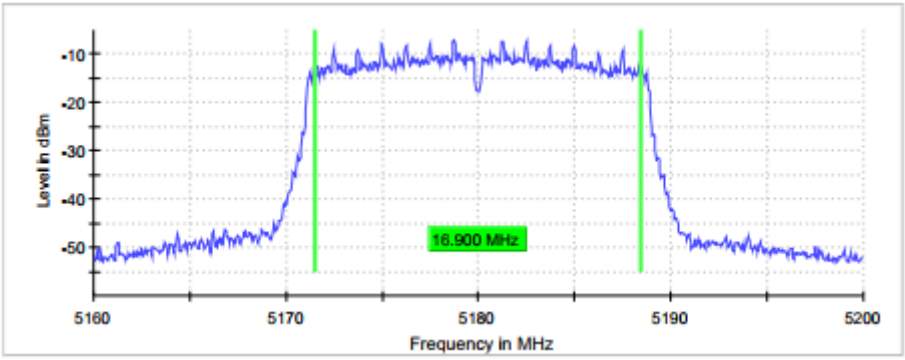

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11n**

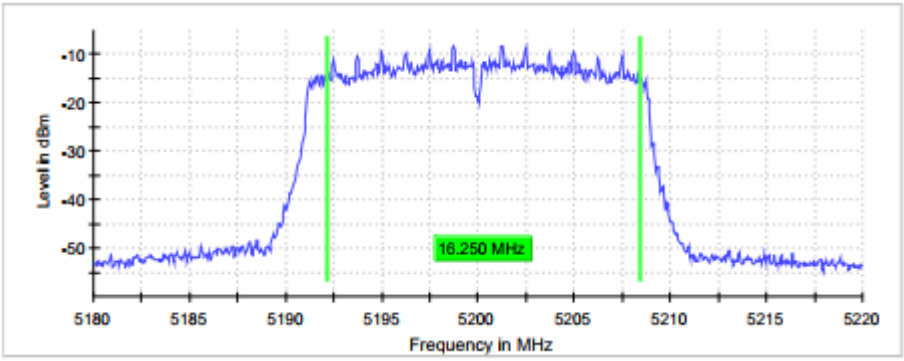
| Frequency (MHz) | Channel No. | Measured Bandwidth (MHz) | Minimum Bandwidth (MHz) | Result |
|---|---|---|---|---|
| 5180 | 36 | 16.90 | N/A | Complies |
| 5200 | 40 | 16.25 | N/A | Complies |
| 5240 | 48 | 15.55 | N/A | Complies |
| 5260 | 52 | 16.00 | N/A | Complies |
| 5300 | 60 | 15.40 | N/A | Complies |
| 5320 | 64 | 16.05 | N/A | Complies |
| 5500 | 100 | 15.75 | N/A | Complies |
| 5580 | 116 | 15.40 | N/A | Complies |
| 5720 | 144 | 16.05 | N/A | Complies |
| 5745 | 149 | 15.75 | N/A | Complies |
| 5785 | 157 | 16.65 | N/A | Complies |
| 5825 | 165 | 16.05 | N/A | Complies |

**Test Plot on Configuration : 802.11n**

5180 MHz (36 ch)




5200 MHz (40 ch)



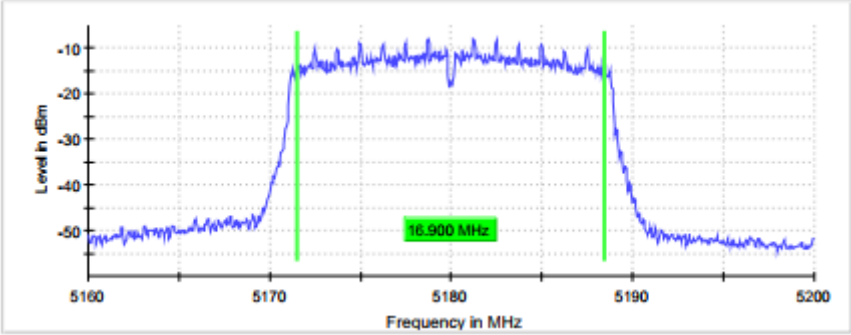

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11ac**

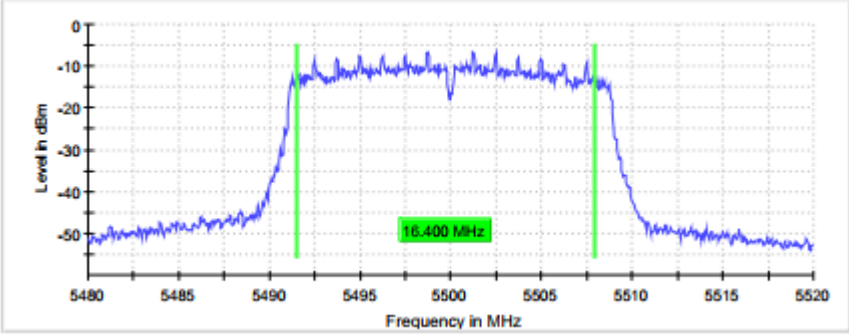
| Frequency (MHz) | Channel No. | Measured Bandwidth (MHz) | Minimum Bandwidth (MHz) | Result |
|---|---|---|---|---|
| 5180 | 36 | 16.90 | N/A | Complies |
| 5200 | 40 | 16.40 | N/A | Complies |
| 5240 | 48 | 16.00 | N/A | Complies |
| 5260 | 52 | 16.05 | N/A | Complies |
| 5300 | 60 | 15.20 | N/A | Complies |
| 5320 | 64 | 16.00 | N/A | Complies |
| 5500 | 100 | 16.40 | N/A | Complies |
| 5580 | 116 | 16.05 | N/A | Complies |
| 5720 | 144 | 16.15 | N/A | Complies |
| 5745 | 149 | 15.20 | N/A | Complies |
| 5785 | 157 | 16.05 | N/A | Complies |
| 5825 | 165 | 16.05 | N/A | Complies |

**Test Plot on Configuration : 802.11n**

5180 MHz (36 ch)




5500 MHz (100 ch)



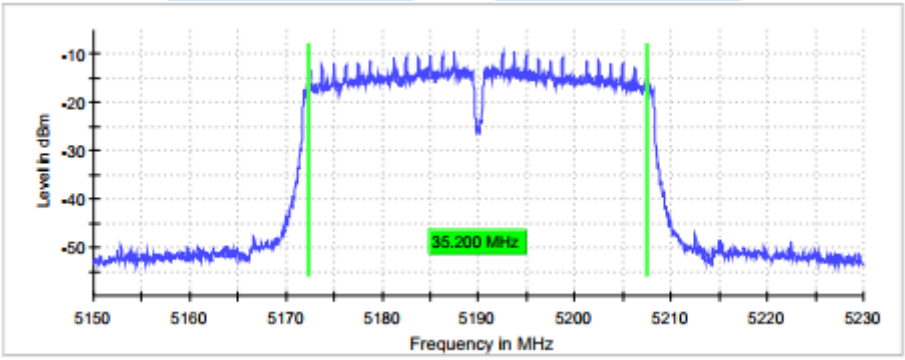

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11n_HT40**

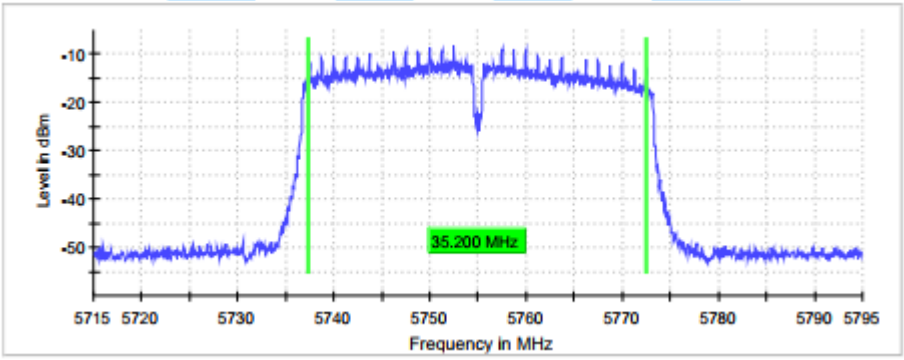
| Frequency (MHz) | Channel No. | Measured Bandwidth (MHz) | Minimum Bandwidth (MHz) | Result |
|---|---|---|---|---|
| 5190 | 38 | 35.20 | N/A | Complies |
| 5230 | 46 | 35.20 | N/A | Complies |
| 5270 | 54 | 35.20 | N/A | Complies |
| 5310 | 62 | 35.20 | N/A | Complies |
| 5510 | 102 | 35.20 | N/A | Complies |
| 5550 | 110 | 35.80 | N/A | Complies |
| 5710 | 142 | 35.15 | N/A | Complies |
| 5755 | 151 | 35.20 | N/A | Complies |
| 5795 | 159 | 35.20 | N/A | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5190 MHz (38 ch)




5755 MHz (151 ch)



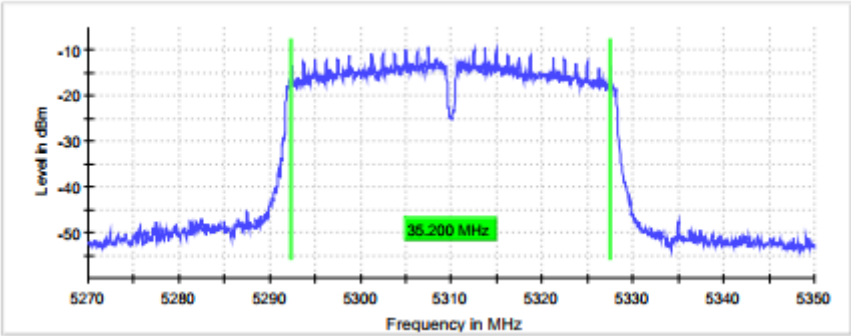

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11ac_VHT40**

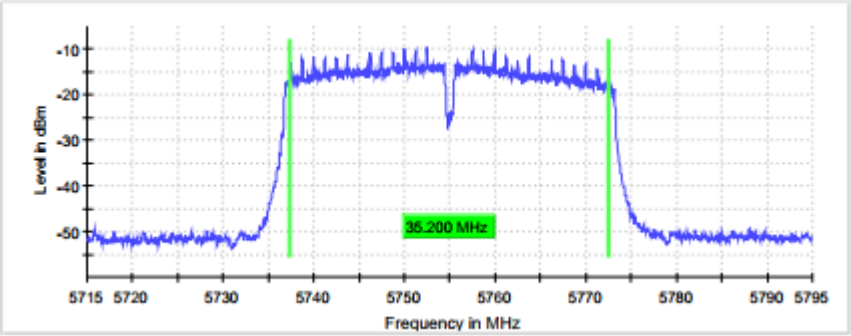
| Frequency (MHz) | Channel No. | Measured Bandwidth (MHz) | Minimum Bandwidth (MHz) | Result |
|---|---|---|---|---|
| 5190 | 38 | 35.20 | N/A | Complies |
| 5230 | 46 | 35.20 | N/A | Complies |
| 5270 | 54 | 35.20 | N/A | Complies |
| 5310 | 62 | 35.20 | N/A | Complies |
| 5510 | 102 | 35.20 | N/A | Complies |
| 5590 | 110 | 35.20 | N/A | Complies |
| 5710 | 142 | 35.15 | N/A | Complies |
| 5755 | 151 | 35.20 | N/A | Complies |
| 5795 | 159 | 35.20 | N/A | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5310 MHz (62 ch)




5755 MHz (151 ch)



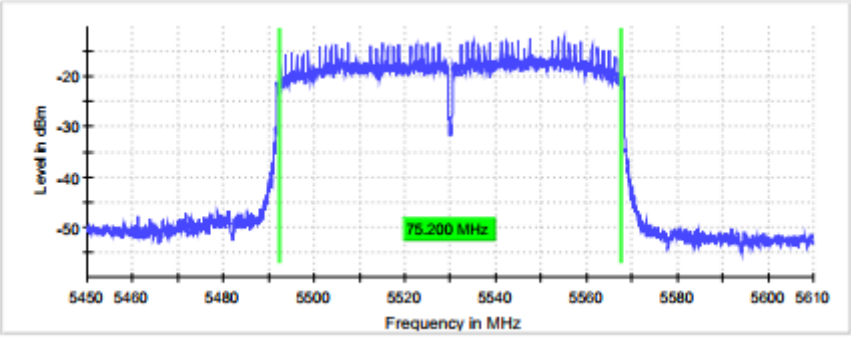

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11ac_VHT80**

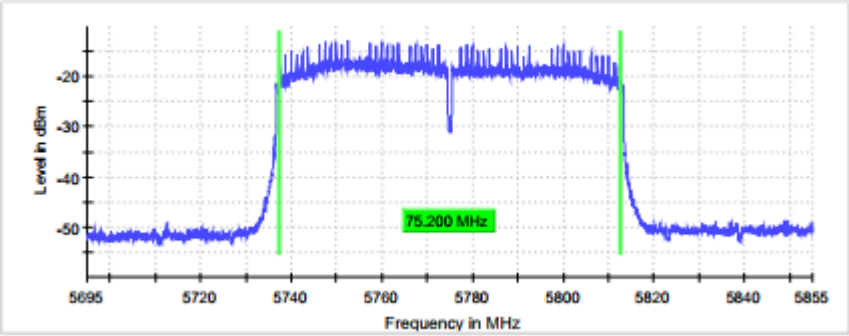
| Frequency (MHz) | Channel No. | Measured Bandwidth (MHz) | Minimum Bandwidth (MHz) | Result |
|---|---|---|---|---|
| 5210 | 42 | 75.15 | N/A | Complies |
| 5290 | 58 | 75.15 | N/A | Complies |
| 5530 | 106 | 75.20 | N/A | Complies |
| 5610 | 122 | 75.20 | N/A | Complies |
| 5690 | 138 | 67.65 | N/A | Complies |
| 5775 | 155 | 75.20 | N/A | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5530 MHz (106 ch)




5775 MHz (48 ch)



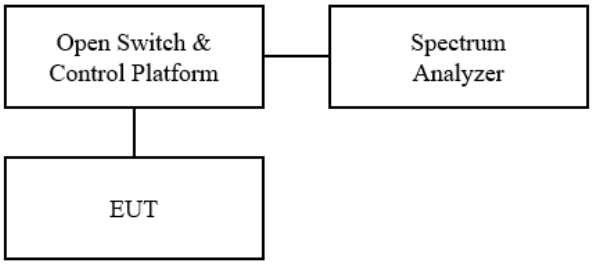

**Note: In order to simplify the report, attached plots were only the most wide channel.**

## 10. Maximum Conducted Output Power

### 10.1 Operating environment

Temperature : 22.3 °C
Relative Humidity : 49.7 % R.H.

### 10.2 Test Set-up (Layout)




### 10.3 Limit

For the 5.15-5.25 GHz band, 5.25-5.35 GHz and 5.47-5.725 GHz the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.
5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

### 10.4 Test Equipment used

| | Model Name | Manufacturer | Description | Serial Number | Due to Calibration |
|---|---|---|---|---|---|
| ■ - | FSV | Rohde & Schwarz | Spectrum Analyzer | 101552 | Apr. 04, 2025 |
| ■ - | OSP120 | Rohde & Schwarz | Open Switch and control platform | 101329 | Apr. 05, 2025 |
| ■ - | J12J103539-00-2 | JUNFLON | RF Test Cable (OSP_DUT1) | AUG-03-21-066 | N/A |
| ■ - | J12J103539-00-3 | JUNFLON | RF Test Cable (OSP_RX) | AUG-03-21-074 | N/A |
| ■ - | WMS 32 | Rohde & Schwarz | Testing Software | VER11.70.00 | N/A |

### 10.5 Test Procedure

a) Measure the duty cycle.
b) Set span to encompass the 26 dB EBW of the signal.
c) RBW = 1 MHz.
d) VBW ≥ 3 MHz.
e) Number of points in sweep ≥ 2*span/RBW.
f) Sweep time = auto.
g) Detector = RMS.
h) Do not use sweep triggering. Allow the sweep to “free run”.
i) Trace average at least 100 traces in power averaging(RMS) mode
j) Integrated bandwidth = OBW
k) Add 10log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

**10.6 Test Result**

-. Test Date : Jun. 21, 2024
-. Reference Standard : Part 15 Subpart E, Sec. 15.407(a)
-. Test Procedure(s) : ANSI C63.10 (2020), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01(Dec. 14,2017)
-. Operating Condition : 802.11a/n/ac
-. Power Source : DC 3.7 V

**802.11a**

| Frequency (MHz) | Channel No. | Measured Power (dBm) | DutyCycle (%) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| 5180 | 36 | 5.4 | 92.927 | 23.98 | Complies |
| 5200 | 40 | 4.5 | 92.740 | 23.98 | Complies |
| 5240 | 48 | 4.7 | 92.714 | 23.98 | Complies |
| 5260 | 52 | 4.9 | 92.627 | 23.98 | Complies |
| 5300 | 60 | 5.2 | 92.626 | 23.98 | Complies |
| 5320 | 64 | 4.7 | 92.643 | 23.98 | Complies |
| 5500 | 100 | 4.4 | 92.676 | 23.98 | Complies |
| 5580 | 116 | 6.1 | 92.683 | 23.98 | Complies |
| 5720 | 144 | 4.0 | 92.800 | 23.98 | Complies |
| 5745 | 149 | 4.5 | 92.676 | 30 | Complies |
| 5785 | 157 | 4.1 | 92.904 | 30 | Complies |
| 5825 | 165 | 5.4 | 92.626 | 30 | Complies |

**802.11n_HT20**

| Frequency (MHz) | Channel No. | Measured Power (dBm) | DutyCycle (%) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| 5180 | 36 | 4.4 | 92.251 | 23.98 | Complies |
| 5200 | 40 | 3.7 | 92.313 | 23.98 | Complies |
| 5240 | 48 | 3.7 | 92.304 | 23.98 | Complies |
| 5260 | 52 | 4.1 | 92.296 | 23.98 | Complies |
| 5300 | 60 | 3.8 | 92.329 | 23.98 | Complies |
| 5320 | 64 | 3.9 | 92.253 | 23.98 | Complies |
| 5500 | 100 | 3.5 | 92.329 | 23.98 | Complies |
| 5580 | 116 | 5.2 | 92.274 | 23.98 | Complies |
| 5720 | 144 | 5.6 | 92.232 | 23.98 | Complies |
| 5745 | 149 | 5.8 | 92.095 | 30 | Complies |
| 5785 | 157 | 5.3 | 92.274 | 30 | Complies |
| 5825 | 165 | 6.8 | 92.233 | 30 | Complies |

**802.11ac_VHT20**

| Frequency (MHz) | Channel No. | Measured Power (dBm) | DutyCycle (%) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| 5180 | 36 | 3.2 | 92.285 | 23.98 | Complies |
| 5200 | 40 | 4.5 | 92.288 | 23.98 | Complies |
| 5240 | 48 | 4.9 | 92.292 | 23.98 | Complies |
| 5260 | 52 | 2.8 | 92.352 | 23.98 | Complies |
| 5300 | 60 | 5.2 | 92.250 | 23.98 | Complies |
| 5320 | 64 | 5.2 | 92.177 | 23.98 | Complies |
| 5500 | 100 | 4.6 | 92.314 | 23.98 | Complies |
| 5580 | 116 | 3.6 | 92.297 | 23.98 | Complies |
| 5720 | 144 | 4.1 | 92.268 | 23.98 | Complies |
| 5745 | 149 | 4.6 | 92.281 | 30 | Complies |
| 5785 | 157 | 4.3 | 92.311 | 30 | Complies |
| 5825 | 165 | 5.5 | 92.324 | 30 | Complies |

**802.11n_HT40**

| Frequency (MHz) | Channel No. | Measured Power (dBm) | DutyCycle (%) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| 5190 | 38 | 4.8 | 84.954 | 23.98 | Complies |
| 5230 | 46 | 6.5 | 85.152 | 23.98 | Complies |
| 5270 | 54 | 4.4 | 84.990 | 23.98 | Complies |
| 5310 | 62 | 6.0 | 81.912 | 23.98 | Complies |
| 5510 | 102 | 3.0 | 84.960 | 23.98 | Complies |
| 5590 | 118 | 4.1 | 85.185 | 23.98 | Complies |
| 5710 | 142 | 5.0 | 84.918 | 23.98 | Complies |
| 5755 | 151 | 5.6 | 85.121 | 30 | Complies |
| 5795 | 159 | 6.0 | 85.365 | 30 | Complies |

**802.11ac_VHT40**

| Frequency (MHz) | Channel No. | Measured Power (dBm) | DutyCycle (%) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| 5190 | 38 | 3.6 | 83.391 | 23.98 | Complies |
| 5230 | 46 | 5.5 | 83.280 | 23.98 | Complies |
| 5270 | 54 | 2.8 | 83.479 | 23.98 | Complies |
| 5310 | 62 | 5.1 | 83.494 | 23.98 | Complies |
| 5510 | 102 | 4.1 | 83.411 | 23.98 | Complies |
| 5590 | 118 | 2.6 | 83.426 | 23.98 | Complies |
| 5710 | 142 | 3.0 | 83.524 | 23.98 | Complies |
| 5755 | 151 | 4.1 | 83.603 | 30 | Complies |
| 5795 | 159 | 4.7 | 83.333 | 30 | Complies |

**802.11ac_VHT80**

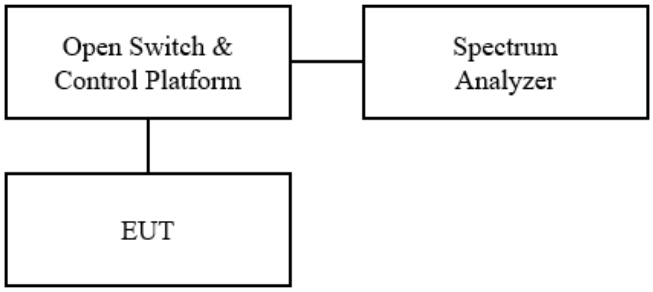
| Frequency (MHz) | Channel No. | Measured Power (dBm) | DutyCycle (%) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| 5210 | 42 | 4.1 | 71.406 | 23.98 | Complies |
| 5290 | 58 | 3.5 | 71.398 | 23.98 | Complies |
| 5530 | 106 | 4.7 | 71.481 | 23.98 | Complies |
| 5610 | 122 | 5.3 | 71.545 | 23.98 | Complies |
| 5690 | 138 | 2.0 | 71.677 | 23.98 | Complies |
| 5775 | 155 | 4.3 | 71.493 | 30 | Complies |

# 11. Power Spectral Density Measurement

## 11.1 Operating Environment

| | | |
|---|---|---|
| Temperature | : | 22.3 °C |
| Relative Humidity | : | 49.7 % R.H. |

## 11.2 Test Set-up (Layout)




## 11.3 Limit

For the 5.15-5.25 GHz band, 5.25-5.35 GHz and 5.47-5.725 GHz the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.
5.725-5.85 GHz the maximum power spectral density shall not exceed 30 dBm in any 1 megahertz band.

## 11.4 Test Equipment used

| | Model Name | Manufacturer | Description | Serial Number | Due to Calibration |
|---|---|---|---|---|---|
| ■ - | FSV | Rohde & Schwarz | Spectrum Analyzer | 101552 | Apr. 04, 2025 |
| ■ - | OSP120 | Rohde & Schwarz | Open Switch and control platform | 101329 | Apr. 05, 2025 |
| ■ - | J12J103539-00-2 | JUNFLON | RF Test Cable (OSP_DUT1) | AUG-03-21-066 | N/A |
| ■ - | J12J103539-00-3 | JUNFLON | RF Test Cable (OSP_RX) | AUG-03-21-074 | N/A |
| ■ - | WMS 32 | Rohde & Schwarz | Testing Software | VER11.70.00 | N/A |

## 11.5 Test Procedure

a) Set span to encompass the entire emission bandwidth(EBW) of the signal.
b) RBW = 1 MHz(510 kHz for UNII 3)
c) VBW ≥ 3 MHz
d) Number of points in sweep ≥ 2*span/RBW.
e) Sweep time = auto.
f) Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector mode.
g) Do not use sweep triggering. Allow the sweep to “free run”.
h) Trace average at least 100 traces in power averaging(RMS) mode
i) Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
j) If Method SA-2 was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.

**11.6 Test Result**

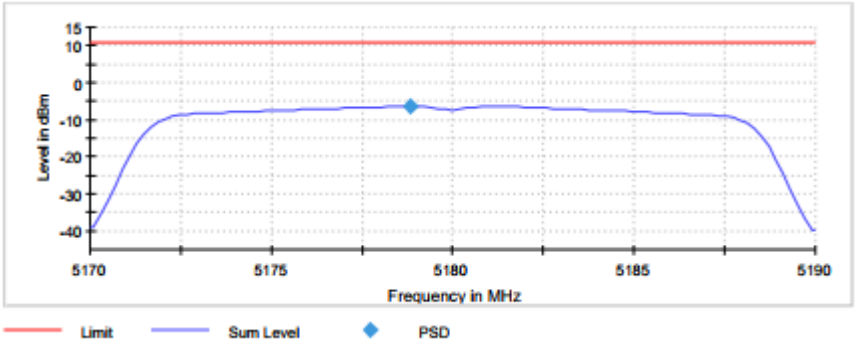
-. Test Date : Jun. 21, 2024
-. Reference Standard : Part 15 Subpart E, Sec. 15.407(a)
-. Test Procedure(s) : ANSI C63.10 (2020), KDB 789033 D02 General U-NII Test Procedures New Rules v02r01(Dec. 14,2017)
-. Operating Condition : 802.11a/n/ac
-. Power Source : DC 3.7 V

**802.11a**

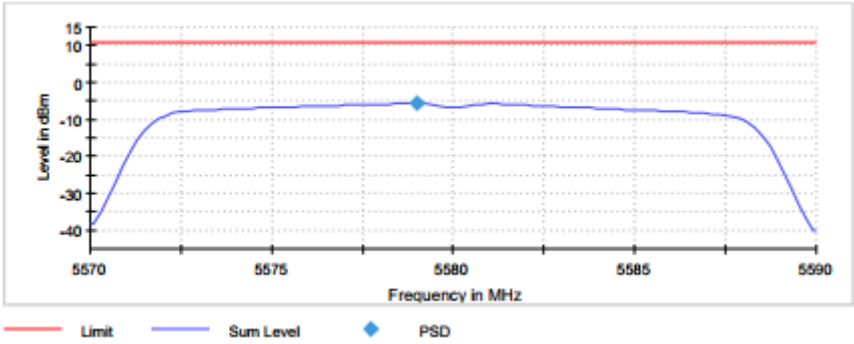
| Frequency (MHz) | Channel No. | Measured Power Density (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| 5180 | 36 | -6.347 | 11 | Complies |
| 5200 | 40 | -6.648 | 11 | Complies |
| 5240 | 48 | -7.120 | 11 | Complies |
| 5260 | 52 | -6.877 | 11 | Complies |
| 5300 | 60 | -6.755 | 11 | Complies |
| 5320 | 64 | -6.816 | 11 | Complies |
| 5500 | 100 | -7.022 | 11 | Complies |
| 5580 | 116 | -5.657 | 11 | Complies |
| 5720 | 144 | -7.611 | 11 | Complies |
| 5745 | 149 | -9.962 | 30 | Complies |
| 5785 | 157 | -10.268 | 30 | Complies |
| 5825 | 165 | -8.733 | 30 | Complies |

**Test Plot on Configuration : 802.11a**

5180 MHz (36 ch)




5580 MHz (116 ch)



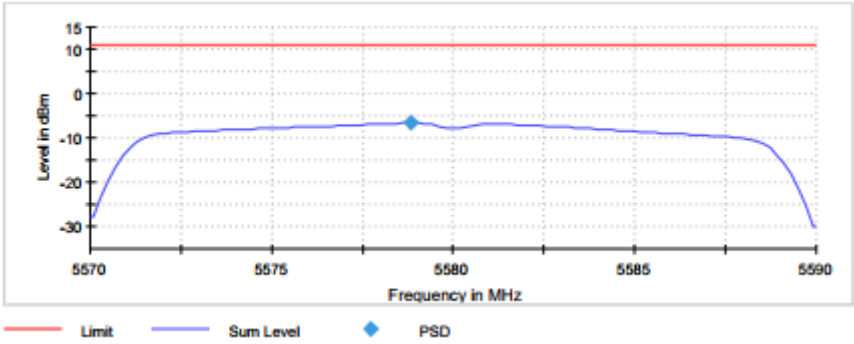

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11n_HT20**

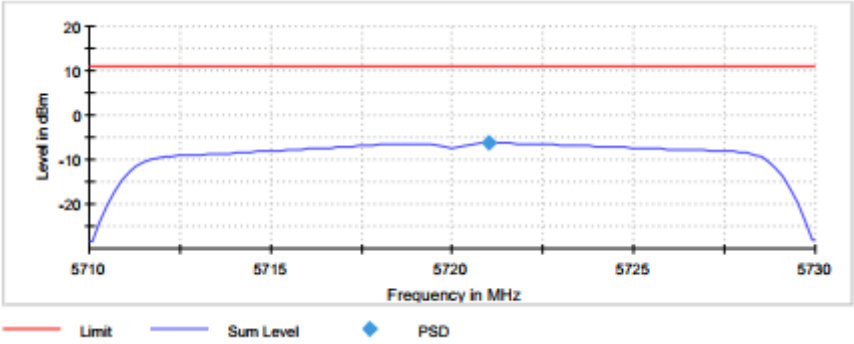
| Frequency (MHz) | Channel No. | Measured Power Density (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| 5180 | 36 | -7.360 | 11 | Complies |
| 5200 | 40 | -8.601 | 11 | Complies |
| 5240 | 48 | -8.413 | 11 | Complies |
| 5260 | 52 | -8.294 | 11 | Complies |
| 5300 | 60 | -8.105 | 11 | Complies |
| 5320 | 64 | -8.289 | 11 | Complies |
| 5500 | 100 | -8.046 | 11 | Complies |
| 5580 | 116 | -6.653 | 11 | Complies |
| 5720 | 144 | -6.231 | 11 | Complies |
| 5745 | 149 | -8.835 | 30 | Complies |
| 5785 | 157 | -9.280 | 30 | Complies |
| 5825 | 165 | -7.835 | 30 | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5580 MHz (116 ch)




5720 MHz (144 ch)



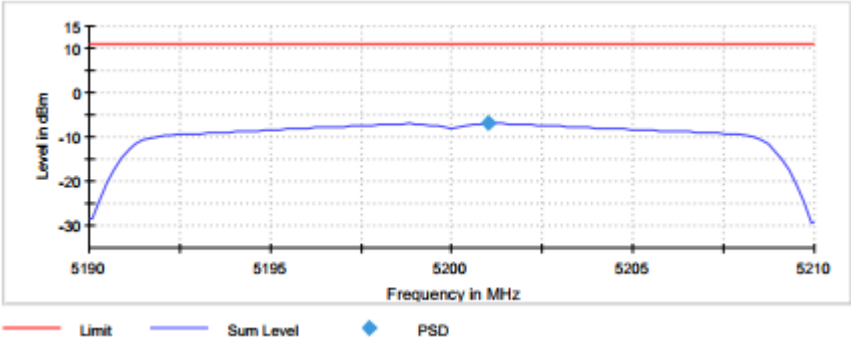

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11ac_VHT20**

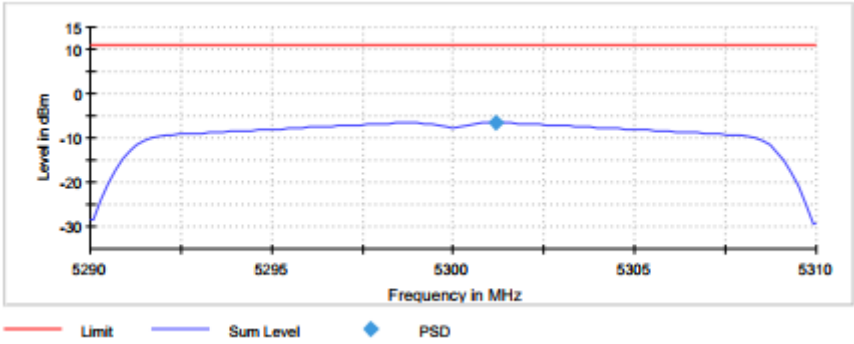
| Frequency (MHz) | Channel No. | Measured Power Density (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| 5180 | 36 | -8.191 | 11 | Complies |
| 5200 | 40 | -6.925 | 11 | Complies |
| 5240 | 48 | -7.063 | 11 | Complies |
| 5260 | 52 | -9.074 | 11 | Complies |
| 5300 | 60 | -6.545 | 11 | Complies |
| 5320 | 64 | -6.931 | 11 | Complies |
| 5500 | 100 | -7.036 | 11 | Complies |
| 5580 | 116 | -8.248 | 11 | Complies |
| 5720 | 144 | -7.734 | 11 | Complies |
| 5745 | 149 | -10.052 | 30 | Complies |
| 5785 | 157 | -10.469 | 30 | Complies |
| 5825 | 165 | -8.949 | 30 | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5200 MHz (40 ch)




5300 MHz (60 ch)



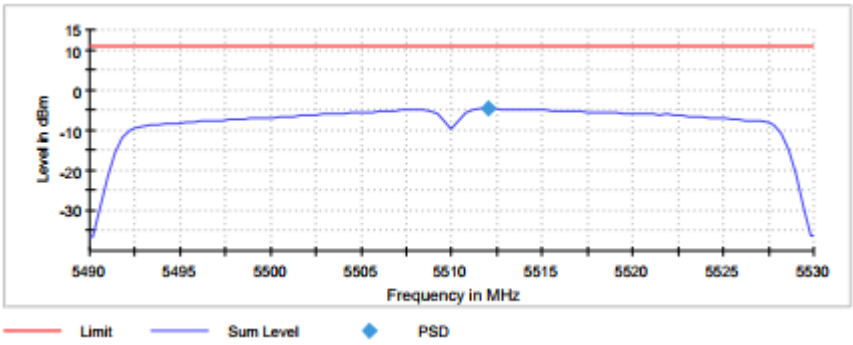

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11n_HT40**

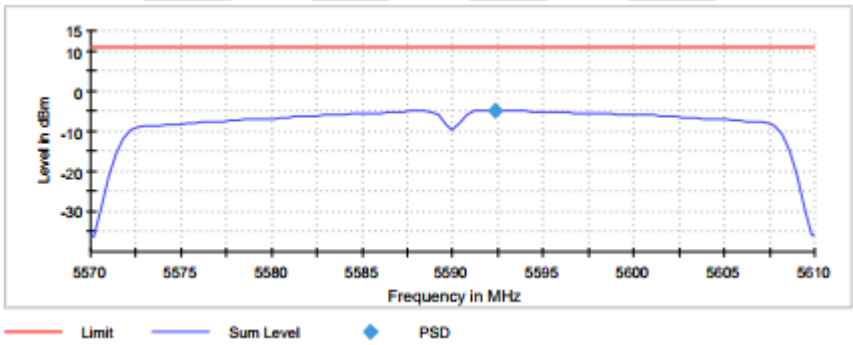
| Frequency (MHz) | Channel No. | Measured Power Density (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| 5190 | 38 | | 11 | Complies |
| 5230 | 46 | | 11 | Complies |
| 5270 | 54 | | 11 | Complies |
| 5310 | 62 | | 11 | Complies |
| 5510 | 102 | | 11 | Complies |
| 5590 | 110 | | 11 | Complies |
| 5710 | 142 | | 11 | Complies |
| 5755 | 151 | | 30 | Complies |
| 5795 | 159 | | 30 | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5510 MHz (102 ch)




5590 MHz (110 ch)



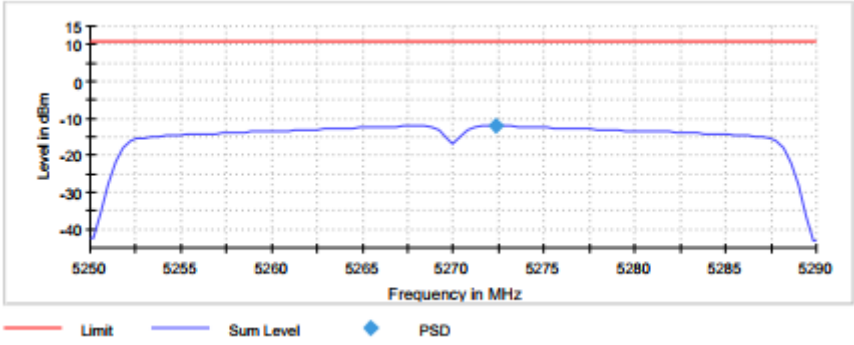

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11ac_VHT40**

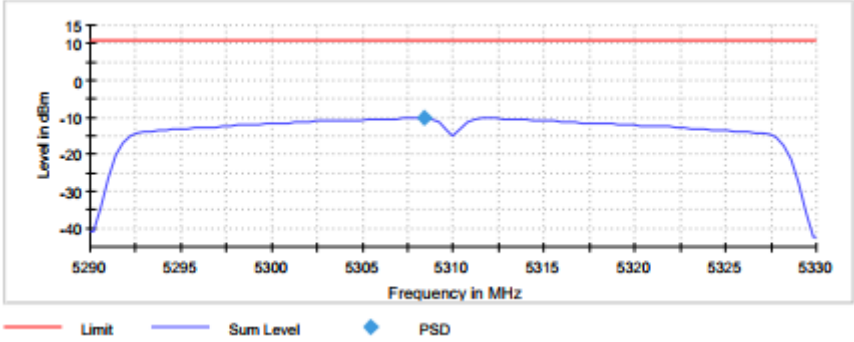
| Frequency (MHz) | Channel No. | Measured Power Density (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| 5190 | 38 | -11.303 | 11 | Complies |
| 5230 | 46 | -9.728 | 11 | Complies |
| 5270 | 54 | -12.053 | 11 | Complies |
| 5310 | 62 | -10.152 | 11 | Complies |
| 5510 | 102 | -10.709 | 11 | Complies |
| 5590 | 110 | -12.280 | 11 | Complies |
| 5710 | 142 | -11.158 | 11 | Complies |
| 5755 | 151 | -13.642 | 30 | Complies |
| 5795 | 159 | -13.234 | 30 | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5230 MHz (46 ch)




5310 MHz (62 ch)



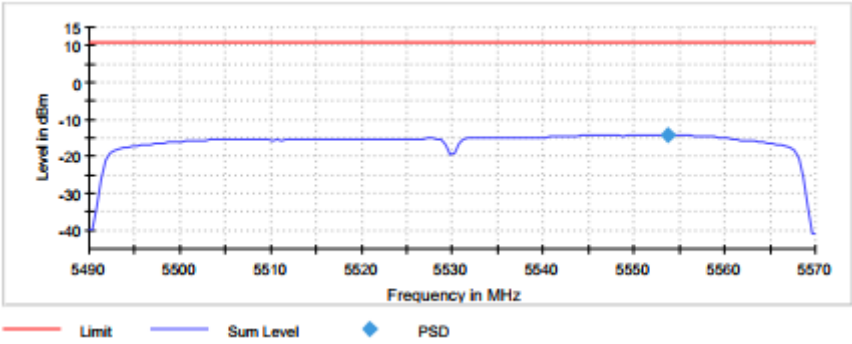

**Note: In order to simplify the report, attached plots were only the most wide channel.**

**802.11ac_VHT80**

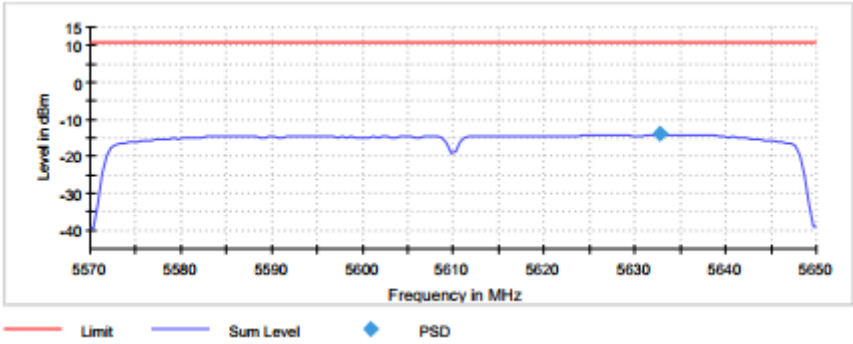
| Frequency (MHz) | Channel No. | Measured Power Density (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| 5210 | 42 | -14.862 | 11 | Complies |
| 5290 | 58 | -15.384 | 11 | Complies |
| 5530 | 106 | -14.129 | 11 | Complies |
| 5610 | 122 | -14.025 | 11 | Complies |
| 5690 | 138 | -16.497 | 11 | Complies |
| 5775 | 155 | -17.506 | 30 | Complies |

**Test Plot on Configuration : 802.11n_HT40**

5530 MHz (106 ch)




5610 MHz (122 ch)




**Note: In order to simplify the report, attached plots were only the most wide channel.**

## 12. Frequency Stability

The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between 0 °C and 50 °C. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

**802.11a_Sartup (UNII 1 / 5 180 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 3.7 | 0 | 5180019103 | 19103 |
| | | 10 | 5180002605 | 2605 |
| | | 20 | 5179999132 | -868 |
| | | 30 | 5179988712 | -11288 |
| | | 40 | 5179980029 | -19971 |
| Min. | 3.7[1)] | 20 | 5179979161 | -20839 |
| Max | 4.2 | 20 | 5179999132 | -868 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

1) This EUT enters low-power mode at 3.6V and powers down.

**802.11a_2 minutes (UNII 1 / 5 180 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 3.7 | 0 | 5180019971 | 19971 |
| | | 10 | 5180005210 | 5210 |
| | | 20 | 5179998263 | -1737 |
| | | 30 | 5179986975 | -13025 |
| | | 40 | 5179980029 | -19971 |
| Min. | 3.7 | 20 | 5179979161 | -20839 |
| Max | 4.2 | 20 | 5179987844 | -12156 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_5 minutes (UNII 1 / 5 180 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 3.7 | 0 | 5180022576 | 22576 |
| | | 10 | 5180007815 | 7815 |
| | | 20 | 5179997395 | -2605 |
| | | 30 | 5179986975 | -13025 |
| | | 40 | 5179980029 | -19971 |
| Min. | 3.7 | 20 | 5179979161 | -20839 |
| Max | 4.2 | 20 | 5179985239 | -14761 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_10 minutes (UNII 1 / 5 180 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 3.7 | 0 | 5180020839 | 20839 |
| | | 10 | 5180009551 | 9551 |
| | | 20 | 5179997395 | -2605 |
| | | 30 | 5179986975 | -13025 |
| | | 40 | 5179980029 | -19971 |
| Min. | 3.7 | 20 | 5179979161 | -20839 |
| Max | 4.2 | 20 | 5179983502 | -16498 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_Startup (UNII 2A / 5 260 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 3.7 | 0 | 5260019971 | 19971 |
| | | 10 | 5260002605 | 2605 |
| | | 20 | 5259998263 | -1737 |
| | | 30 | 5259987844 | -12156 |
| | | 40 | 5259980029 | -19971 |
| Min. | 3.7 | 20 | 5259979161 | -20839 |
| Max | 4.2 | 20 | 5259987844 | -12156 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_2 minutes (UNII 2A / 5 260 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 3.7 | 0 | 5260020839 | 20839 |
| | | 10 | 5260005210 | 5210 |
| | | 20 | 5259997395 | -2605 |
| | | 30 | 5259986975 | -13025 |
| | | 40 | 5259979161 | -20839 |
| Min. | 3.7 | 20 | 5259979161 | -20839 |
| Max | 4.2 | 20 | 5259987844 | -12156 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_5 minutes (UNII 2A / 5 260 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 3.7 | 0 | 5260021708 | 21708 |
| | | 10 | 5260007815 | 7815 |
| | | 20 | 5259997395 | -2605 |
| | | 30 | 5259986107 | -13893 |
| | | 40 | 5259979161 | -20839 |
| Min. | 3.7 | 20 | 5259979161 | -20839 |
| Max | 4.2 | 20 | 5259984370 | -15630 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_10 minutes (UNII 2A / 5 260 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 3.7 | 0 | 5260020839 | 20839 |
| | | 10 | 5260010420 | 10420 |
| | | 20 | 5259997395 | -2605 |
| | | 30 | 5259986107 | -13893 |
| | | 40 | 5259980029 | -19971 |
| Min. | 3.7 | 20 | 5259979161 | -20839 |
| Max | 4.2 | 20 | 5259982634 | -17366 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_Startup (UNII 2C / 5 500 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 5 | 0 | 5500019971 | 19971 |
| | | 10 | 5500001737 | 1737 |
| | | 20 | 5499997395 | -2605 |
| | | 30 | 5499986107 | -13893 |
| | | 40 | 5499978292 | -21708 |
| Min. | 3.7 | 20 | 5499978292 | -21708 |
| Max | 4.2 | 20 | 5499985239 | -14761 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_2 minutes (UNII 2C / 5 500 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 5 | 0 | 5500020839 | 20839 |
| | | 10 | 5500005210 | 5210 |
| | | 20 | 5499994790 | -5210 |
| | | 30 | 5499985239 | -14761 |
| | | 40 | 5499978292 | -21708 |
| Min. | 3.7 | 20 | 5499978292 | -21708 |
| Max | 4.2 | 20 | 5499987844 | -12156 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_5 minutes (UNII 2C / 5 500 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 5 | 0 | 5500021708 | 21708 |
| | | 10 | 5500006946 | 6946 |
| | | 20 | 5499995658 | -4342 |
| | | 30 | 5499985239 | -14761 |
| | | 40 | 5499978292 | -21708 |
| Min. | 3.7 | 20 | 5499978292 | -21708 |
| Max | 4.2 | 20 | 5499984370 | -15630 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_10 minutes (UNII 2C / 5 500 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 5 | 0 | 5500020839 | 20839 |
| | | 10 | 5500009551 | 9551 |
| | | 20 | 5499995658 | -4342 |
| | | 30 | 5499985239 | -14761 |
| | | 40 | 5499978292 | -21708 |
| Min. | 3.7 | 20 | 5499978292 | -21708 |
| Max | 4.2 | 20 | 5499981766 | -18234 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_Startup (UNII 3 / 5 745 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 5 | 0 | 5745021708 | 21708 |
| | | 10 | 5745002605 | 2605 |
| | | 20 | 5744997395 | -2605 |
| | | 30 | 5744985239 | -14761 |
| | | 40 | 5744977424 | -22576 |
| Min. | 3.7 | 20 | 5744977424 | -22576 |
| Max | 4.2 | 20 | 5744985239 | -14761 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_2 minutes (UNII 3 / 5 745 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 5 | 0 | 5745021708 | 21708 |
| | | 10 | 5745005078 | 5078 |
| | | 20 | 5744995658 | -4342 |
| | | 30 | 5744985239 | -14761 |
| | | 40 | 5744977424 | -22576 |
| Min. | 3.7 | 20 | 5744977424 | -22576 |
| Max | 4.2 | 20 | 5744989580 | -10420 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_5 minutes (UNII 3 / 5 745 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 5 | 0 | 5745022576 | 22576 |
| | | 10 | 5745008683 | 8683 |
| | | 20 | 5744995658 | -4342 |
| | | 30 | 5744984370 | -15630 |
| | | 40 | 5744977424 | -22576 |
| Min. | 3.7 | 20 | 5744977424 | -22576 |
| Max | 4.2 | 20 | 5744984370 | -15630 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**802.11a_10 minutes (UNII 3 / 5 745 000 000 Hz)**

| Voltage (%) | Power (VDC) | Temp. (°C) | Frequency (Hz) | Frequency Error (Hz) |
|---|---|---|---|---|
| 100 | 5 | 0 | 5745022576 | 22576 |
| | | 10 | 5745001420 | 1420 |
| | | 20 | 5744996527 | -3473 |
| | | 30 | 5744984370 | -15630 |
| | | 40 | 5744977424 | -22576 |
| Min. | 3.7 | 20 | 5744977424 | -22576 |
| Max | 4.2 | 20 | 5744981766 | -18234 |

Note:
Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

## 13. AC Power line Conducted emission

**-Test Description**

The Line conducted emission test facility is inside a 4 m × 8 m × 2.5 m shielded enclosure. (Test firm Registration Number: 269701)

The EUT was placed on a non-conducting 1.0 m by 1.5 m table, which is 0.8 m in height and 0.4 m away from the vertical wall of the shielded enclosure.

The EUT is powered from the Rohde & Schwarz LISN (ENV216) and the support equipment is powered from the Rohde & Schwarz LISN (ENV216). Powers to the LISN are filtered by high-current high insertion loss power line filter.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.

The RF output of the LISN was connected to the EMI test receiver (Rohde & Schwarz, ESCI).

Exploratory measurements were conducted to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.

Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Exploratory measurements were scanned using Peak mode of EMI Test receiver from 150 kHz to 30 MHz with 20 ms sweep time. The final measurements were measured with Quasi-Peak and Average mode.

The bandwidth of EMI Test Receiver was set to 9 kHz. Interface cables were connected to the available interface ports of the test unit. Excess cable lengths were bundled at center with 30 cm ~ 40 cm.

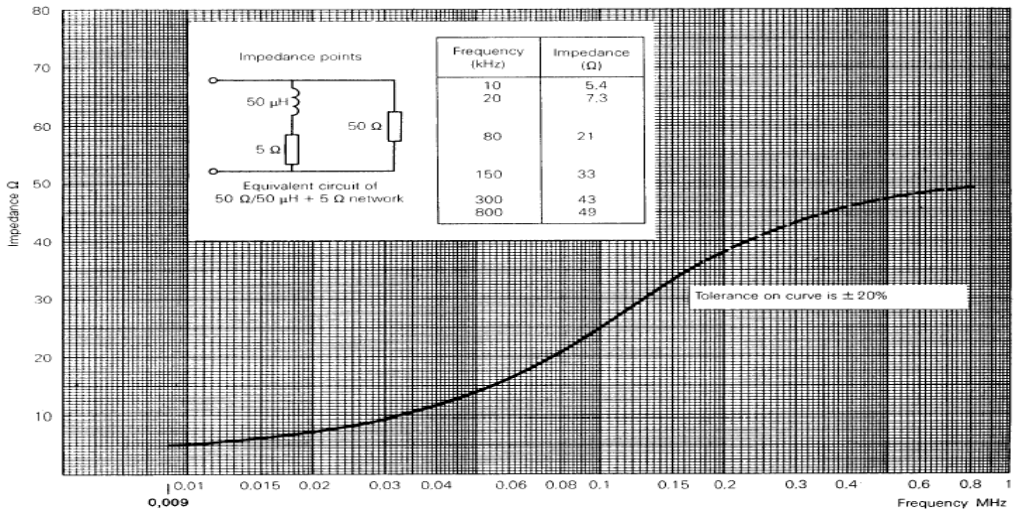



Fig 2. Impedance of LISN

### 13.1 Operating Environment

Temperature : 23.2 °C
Relative Humidity : 44.1 % R.H.

### 13.2 Test Set-up

The conducted emission measurements were performed in the shielded room.
The EUT was placed on wooden table, 0.8 m heights above the floor, 0.4 m from the reference ground plane (GRP) wall and 0.8 m from AMN & ISN.
AMN is bonded on horizontal reference ground plane.
The ground plane, which was electrically bonded to the shield room, ground system and all power lines entering the shield room, were filtered.

### 13.3 Measurement Uncertainty

The measurement uncertainty was calculated in accordance with ISO "Guide to the expression of uncertainty in measurement."
The measurement uncertainty was given with a confidence of 95 %.

| Test Items | Uncertainty | Remark |
|---|---|---|
| Conducted emission (9 kHz ~ 150 kHz) | 3.69 dB | Confidence level of approximately 95 % ($k$ = 2) |
| Conducted emission (150 kHz ~ 30 MHz) | 3.32 dB | Confidence level of approximately 95 % ($k$ = 2) |

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.
The listed uncertainties are the worst case uncertainty for the entire range of measurement. please note that the uncertainty values are provided for informational purposes only are not used in determining the PASS/FAIL results

**13.4 Limit**

| RFI Conducted | FCC Limit(dBμV/m) Class B | |
|---|---|---|
| Freq. Range | Quasi-Peak | Average |
| 150 kHz ~ 0.5 MHz | 66 ~ 56* | 56 ~ 46* |
| 0.5 MHz ~ 5 MHz | 56 | 46 |
| 5 MHz ~ 30 MHz | 60 | 50 |
| *Limits decreases linearly with the logarithm of frequency. | | |

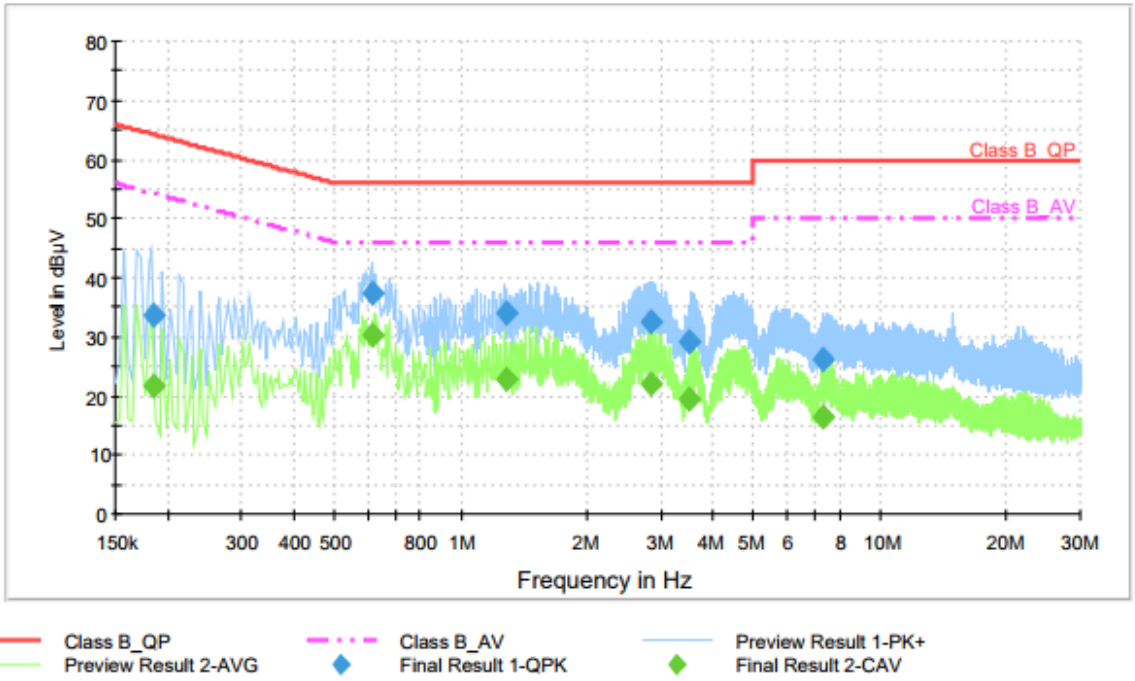
**13.5 Test Equipment used**

| | Model Name | Manufacturer | Description | Serial Number | Due to Calibration |
|---|---|---|---|---|---|
| ■- | ESCI | Rohde & Schwarz | EMI test receiver | 100237 | Apr. 03, 2025 |
| □- | ENV216 | Rohde & Schwarz | LISN | 100172 | Apr. 03, 2025 |
| ■- | ENV216 | Rohde & Schwarz | LISN | 100173 | Apr. 03, 2025 |
| ■- | EMC 32 | Rohde & Schwarz | Testing Software | VER8.53 | N/A |

**13.6 Test data for Conducted Emission**

-. Test Date : May 31, 2024
-. Reference Standard : Part 15 Subpart C, Sec. 15.207
-. Test Procedure(s) : ANSI C63.10 (2020)
-. Operating Condition : Charging mode
-. Power Source : AC 120 V / 60 Hz
-. Frequency rage : 0.15 MHz to 30 MHz
-. Line : AC Power Line (Live and Neutral)
-. Comment :

EUT with cradle_Adaptor: DSA-10PF06-05 FUS



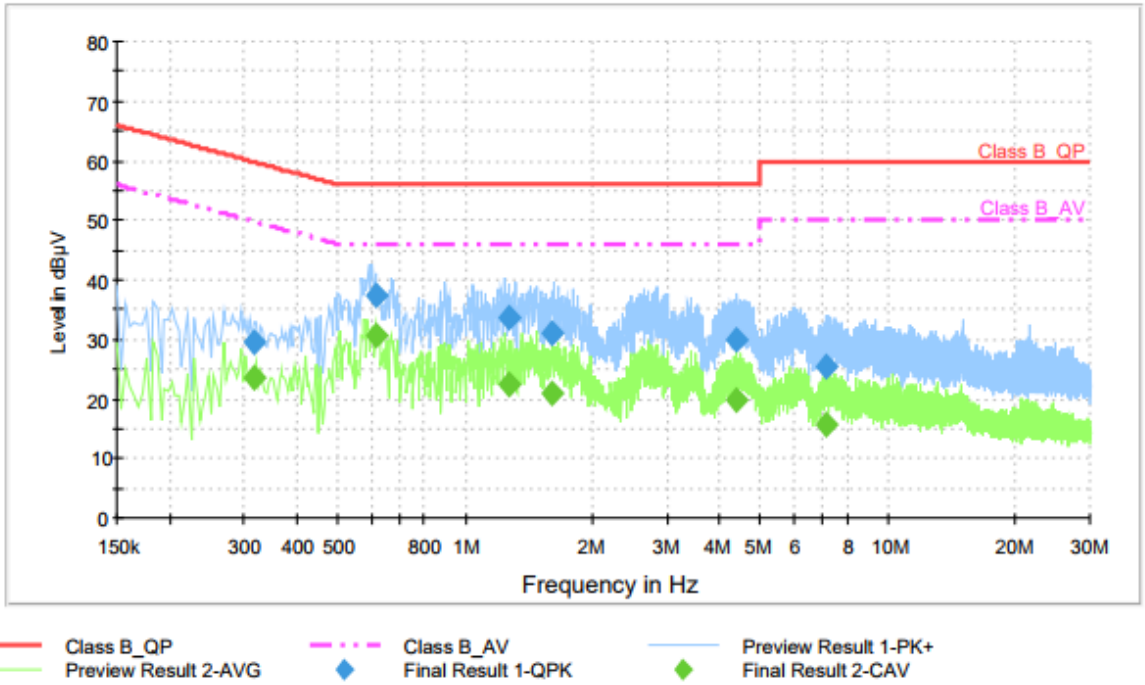

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|---|---|
| 0.184081 | 33.8 | 1000.0 | 9.000 | Off | N | 9.4 | 30.5 | 64.3 | |
| 0.613175 | 37.4 | 1000.0 | 9.000 | Off | N | 9.5 | 18.6 | 56.0 | |
| 1.278144 | 34.0 | 1000.0 | 9.000 | Off | L1 | 9.5 | 22.0 | 56.0 | |
| 2.832194 | 32.3 | 1000.0 | 9.000 | Off | L1 | 9.5 | 23.7 | 56.0 | |
| 3.510744 | 29.2 | 1000.0 | 9.000 | Off | L1 | 9.5 | 26.8 | 56.0 | |
| 7.344350 | 26.3 | 1000.0 | 9.000 | Off | L1 | 9.6 | 33.7 | 60.0 | |

## Final Result 2

| Frequency (MHz) | CAverage (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|---|---|
| 0.184081 | 21.7 | 1000.0 | 9.000 | Off | N | 9.4 | 32.6 | 54.3 | |
| 0.613175 | 30.2 | 1000.0 | 9.000 | Off | N | 9.5 | 15.8 | 46.0 | |
| 1.278144 | 22.7 | 1000.0 | 9.000 | Off | L1 | 9.5 | 23.3 | 46.0 | |
| 2.832194 | 22.0 | 1000.0 | 9.000 | Off | L1 | 9.5 | 24.0 | 46.0 | |
| 3.510744 | 19.4 | 1000.0 | 9.000 | Off | L1 | 9.5 | 26.6 | 46.0 | |
| 7.344350 | 16.3 | 1000.0 | 9.000 | Off | L1 | 9.6 | 33.7 | 50.0 | |

EUT without cradle_Adaptor: DSA-10PF06-05 FUS



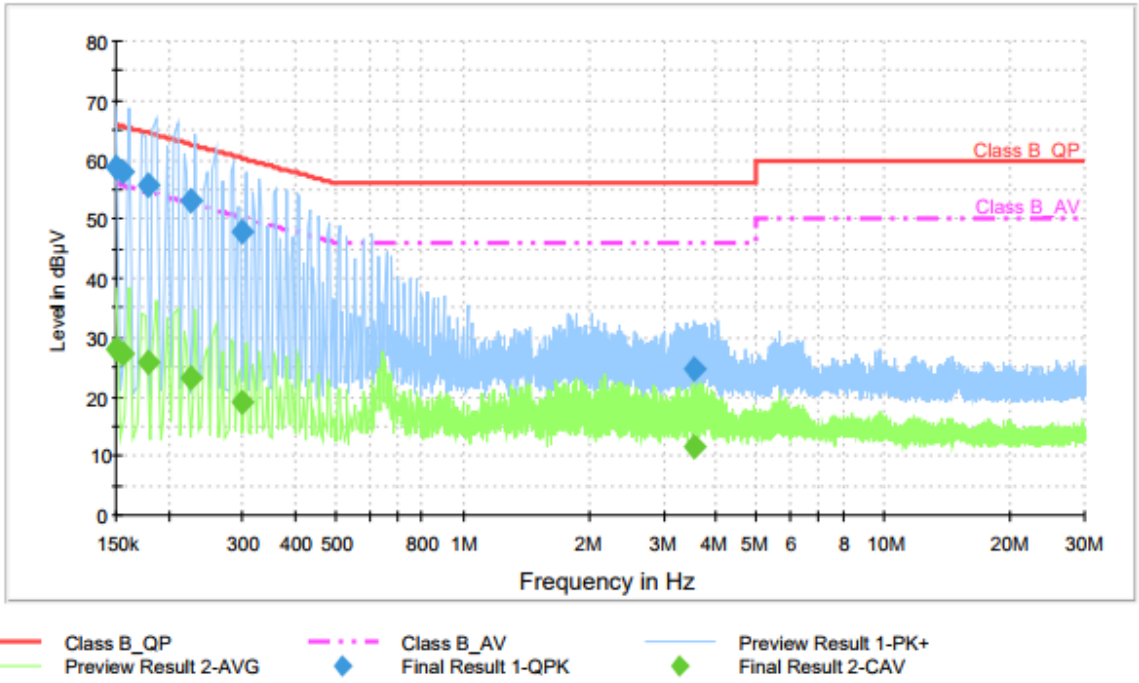

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|---|---|
| 0.316019 | 29.7 | 1000.0 | 9.000 | Off | N | 9.4 | 30.1 | 59.8 | |
| 0.614519 | 37.6 | 1000.0 | 9.000 | Off | N | 9.5 | 18.4 | 56.0 | |
| 1.274756 | 33.5 | 1000.0 | 9.000 | Off | L1 | 9.5 | 22.5 | 56.0 | |
| 1.600075 | 31.0 | 1000.0 | 9.000 | Off | L1 | 9.5 | 25.0 | 56.0 | |
| 4.380662 | 29.7 | 1000.0 | 9.000 | Off | L1 | 9.5 | 26.3 | 56.0 | |
| 7.176712 | 25.3 | 1000.0 | 9.000 | Off | L1 | 9.6 | 34.7 | 60.0 | |

## Final Result 2

| Frequency (MHz) | CAverage (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|---|---|
| 0.316019 | 23.6 | 1000.0 | 9.000 | Off | N | 9.4 | 26.2 | 49.8 | |
| 0.614519 | 30.5 | 1000.0 | 9.000 | Off | N | 9.5 | 15.5 | 46.0 | |
| 1.274756 | 22.5 | 1000.0 | 9.000 | Off | L1 | 9.5 | 23.5 | 46.0 | |
| 1.600075 | 21.0 | 1000.0 | 9.000 | Off | L1 | 9.5 | 25.0 | 46.0 | |
| 4.380662 | 19.7 | 1000.0 | 9.000 | Off | L1 | 9.5 | 26.3 | 46.0 | |
| 7.176712 | 15.7 | 1000.0 | 9.000 | Off | L1 | 9.6 | 34.3 | 50.0 | |

EUT with cradle_Adaptor: DSA-18QFB FUS A



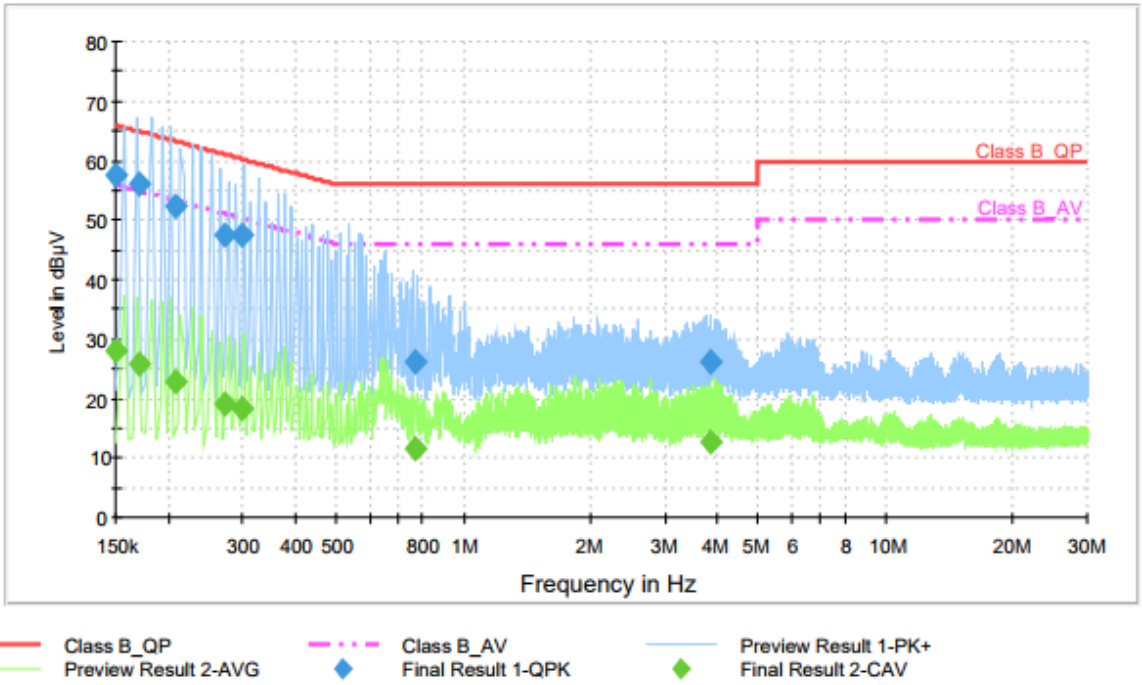

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|---|---|
| 0.150000 | 58.6 | 1000.0 | 9.000 | Off | N | 9.4 | 7.4 | 66.0 | |
| 0.155812 | 57.8 | 1000.0 | 9.000 | Off | N | 9.4 | 7.9 | 65.7 | |
| 0.178200 | 55.8 | 1000.0 | 9.000 | Off | N | 9.4 | 8.7 | 64.6 | |
| 0.226706 | 53.0 | 1000.0 | 9.000 | Off | N | 9.4 | 9.6 | 62.6 | |
| 0.297600 | 47.9 | 1000.0 | 9.000 | Off | N | 9.4 | 12.4 | 60.3 | |
| 3.540594 | 24.6 | 1000.0 | 9.000 | Off | N | 9.5 | 31.4 | 56.0 | |

## Final Result 2

| Frequency (MHz) | CAverage (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|---|---|
| 0.150000 | 27.9 | 1000.0 | 9.000 | Off | N | 9.4 | 28.1 | 56.0 | |
| 0.155812 | 27.4 | 1000.0 | 9.000 | Off | N | 9.4 | 28.2 | 55.7 | |
| 0.178200 | 25.7 | 1000.0 | 9.000 | Off | N | 9.4 | 28.9 | 54.6 | |
| 0.226706 | 23.3 | 1000.0 | 9.000 | Off | N | 9.4 | 29.3 | 52.6 | |
| 0.297600 | 19.1 | 1000.0 | 9.000 | Off | N | 9.4 | 31.2 | 50.3 | |
| 3.540594 | 11.4 | 1000.0 | 9.000 | Off | N | 9.5 | 34.6 | 46.0 | |

EUT without cradle_Adaptor: DSA-18QFB FUS A




## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|---|---|
| 0.150000 | 57.7 | 1000.0 | 9.000 | Off | N | 9.4 | 8.3 | 66.0 | |
| 0.170738 | 56.2 | 1000.0 | 9.000 | Off | N | 9.4 | 8.7 | 64.9 | |
| 0.208050 | 52.2 | 1000.0 | 9.000 | Off | N | 9.4 | 11.1 | 63.3 | |
| 0.271481 | 47.4 | 1000.0 | 9.000 | Off | N | 9.4 | 13.7 | 61.1 | |
| 0.297600 | 47.4 | 1000.0 | 9.000 | Off | N | 9.4 | 12.9 | 60.3 | |
| 0.766694 | 26.0 | 1000.0 | 9.000 | Off | N | 9.5 | 30.0 | 56.0 | |
| 3.847900 | 26.0 | 1000.0 | 9.000 | Off | N | 9.5 | 30.0 | 56.0 | |

## Final Result 2

| Frequency (MHz) | CAverage (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) | Comment |
|---|---|---|---|---|---|---|---|---|---|
| 0.150000 | 28.2 | 1000.0 | 9.000 | Off | N | 9.4 | 27.8 | 56.0 | |
| 0.170738 | 26.0 | 1000.0 | 9.000 | Off | N | 9.4 | 29.0 | 54.9 | |
| 0.208050 | 22.7 | 1000.0 | 9.000 | Off | N | 9.4 | 30.6 | 53.3 | |
| 0.271481 | 19.1 | 1000.0 | 9.000 | Off | N | 9.4 | 32.0 | 51.1 | |
| 0.297600 | 18.3 | 1000.0 | 9.000 | Off | N | 9.4 | 32.0 | 50.3 | |
| 0.766694 | 11.6 | 1000.0 | 9.000 | Off | N | 9.5 | 34.4 | 46.0 | |
| 3.847900 | 12.7 | 1000.0 | 9.000 | Off | N | 9.5 | 33.3 | 46.0 | |

## 14. Radiated Spurious & Restricted Band Edge Emission

Exploratory Radiated measurements were conducted at the 3m semi anechoic chamber in order to identify the highest emission by operating the EUT in a range of typical modes of operation, cable positions, system configuration and arrangement.
Based on exploratory measurements, the final measurements were conducted at the worst test conditions.

Final measurements of below 1GHz were made at 3m or 10 m Chamber that complies with CISPR 16/ANSI C63.10.
Above 1GHz final measurements were conducted at the 3m Chamber only.

For measurements above 1GHz, the bottom side of 3m chamber was installed with absorbers in order to meet SVSWR Limit.
Exploratory measurements were scanned using Peak mode of EMI Test receiver and final measurements were measured with Quasi-Peak mode (Below 1GHz) and Peak & Average mode (Above 1GHz).

The measurements were performed by rotating the EUT 360° and adjusting the receive antenna height from 1.0 m to 4.0 m. All frequencies were investigated in both horizontal and vertical antenna polarity.

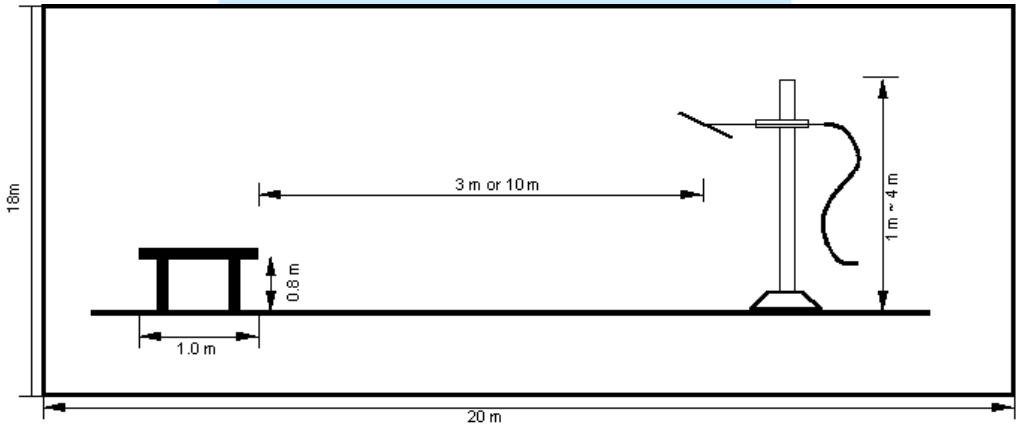



Fig 3. Dimensions of test site (Below 1GHz)

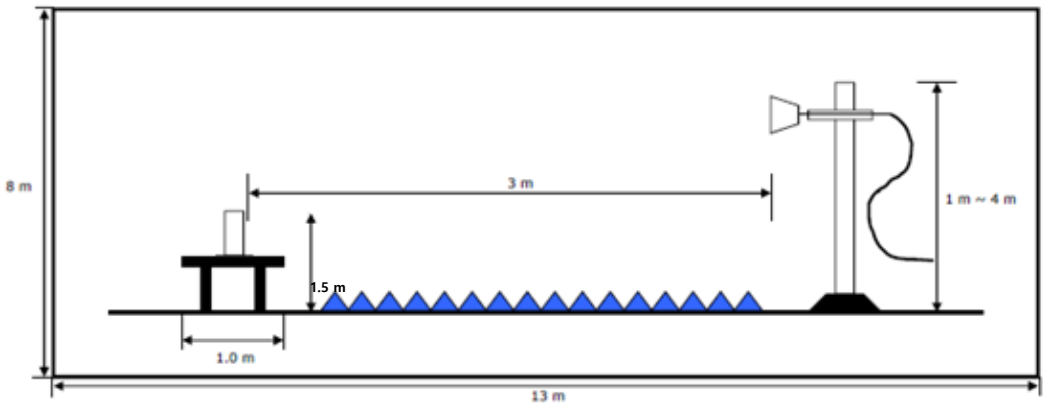



Fig 4. Dimensions of test site (Above 1GHz)

**14.1 Operating environment**

Temperature : 28.4 ℃
Relative humidity : 50.8 % R.H.

**14.2 Test set-up**

A preliminary and final measurement was at 3 m anechoic chamber.
The EUT was placed on a non-conducting table.
For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane.
For emission measurements above 1 GHz, the table height is 1.5 m above the reference ground plane.

The turntable with EUT was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels.
This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

**14.3 Measurement uncertainty**

The measurement uncertainty was calculated in accordance with ISO "Guide to the expression of uncertainty in measurement".
The measurement uncertainty was given with a confidence of 95 %.

| Test items(Anechoic Chamber) | Uncertainty | Remark |
|---|---|---|
| Radiated emission (30 MHz ~ 300 MHz, 3 m, Vertical) | 4.78 dB | Confidence level of approximately 95 % ($k$ = 2) |
| Radiated emission (30 MHz ~ 300 MHz, 3 m, Horizontal) | 4.77 dB | Confidence level of approximately 95 % ($k$ = 2) |
| Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Vertical) | 6.20 dB | Confidence level of approximately 95 % ($k$ = 2) |
| Radiated emission (300 MHz ~ 1 000 MHz, 3 m, Horizontal) | 5.12 dB | Confidence level of approximately 95 % ($k$ = 2) |
| Radiated emission (1 000 MHz ~ 6 000 MHz, 3 m, V/H) | 5.77 dB | Confidence level of approximately 95 % (k = 2) |
| Radiated emission (6 000 MHz ~ 18 000 MHz, 3 m, V/H) | 4.88 dB | Confidence level of approximately 95 % ($k$ = 2) |
| Radiated emission (18 000 MHz ~ 26 000 MHz, 3 m, V/H) | 5.03 dB | Confidence level of approximately 95 % ($k$ = 2) |

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.
The listed uncertainties are the worst case uncertainty for the entire range of measurement. please note that the uncertainty values are provided for informational purposes only are not used in determining the PASS/FAIL results

**14.4 Limit**

20 dB in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (microvolt/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009 ~ 0.490 | 2 400/F (kHz) | 300 |
| 0.490 ~ 1.705 | 2 400/F (kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

**14.5 Test Equipment used**

| | Model Name | Manufacturer | Description | Serial Number | Due to Calibration |
|---|---|---|---|---|---|
| ■ - | ESW44 | Rohde & Schwarz | EMI Test Receiver | 103354 | Apr. 03, 2025 |
| ■ - | HFH2-Z2 | Rohde & Schwarz | Loop Antenna | 100041 | Apr. 05, 2025 |
| ■ - | VULB9160 | Schwarzbeck | Broadband Test Antenna | 3313 | Apr. 19, 2025 |
| ■ - | HF907 | Rohde & Schwarz | Horn Antenna | 103197 | Jan. 24, 2025 |
| ■ - | BBHA9170 | Schwarzbeck | Horn Antenna | 766 | Apr. 09, 2025 |
| ■ - | MCU066 | maturo GmbH | Position Controller | 1390306 | N/A |
| ■ - | TT2.5SI | maturo GmbH | Turntable | 1390307 | N/A |
| ■ - | CO3000 | Innco system GmbH | Position Controller | CO3000/1804/4 2760218/P | N/A |
| ■ - | MA4640-XP-ET | Innco system GmbH | Antenna Mast | 5580916 | N/A |
| ■ - | 310N | Sonoma Instrument | Amplifier | 187164 | Apr. 03, 2025 |
| ■ - | TK-PA18H | TESTEK | Low Noise Amplifier | 220107L | Apr. 02, 2025 |
| ■ - | TK-PA1840H | TESTEK | Amplifier | 170007-L | Apr. 08, 2025 |
| ■ - | WHKX3.0/18G-10SS | WAINWRIGHT INSTRUMENTS | High pass filter | SN31 | Apr. 04, 2025 |
| ■- | EMC 32 | Rohde & Schwarz | Testing Software | VER10.50.10 | N/A |

**14.6 Test data for Radiated Spurious Emission & Radiated Restricted Band Edge Emission**

-. Test Date : May 21 , 2024 ~ Jun. 17, 2024
-. Reference Standard : Part 15 Subpart E, Sec. 15.407(b)
-. Measuring Distance : 3 m
-. Resolution Bandwidth : 200 Hz, 9 kHz(Below 30 MHz) / 120 kHz(30 MHz ~ 1GHz) / 1 MHz(Above 1GHz)
-. Detector mode : Quasi Peak detector mode / Peak detector mode / Average detector mode
-. Power Source : DC 3.7 V
-. Note : Through three orthogonal axes were investigated and the worst case is report

**Radiated Spurious Emission (9 kHz to 30 MHz)**

**※ The reading of emissions are attenuated more than 10 dB below the permissible limits.**

**Radiated Spurious Emission (30 MHz to 1 000 MHz)**

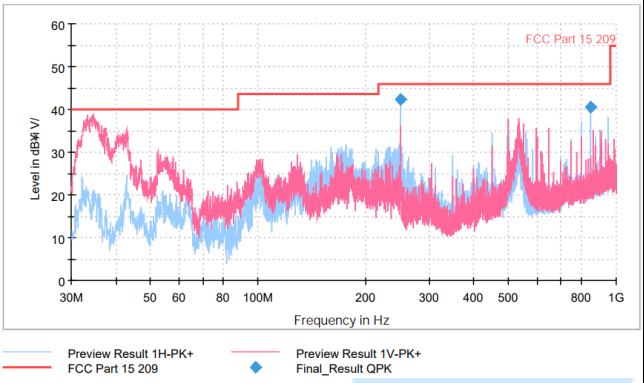
| 802.11 Standard | Ch. | Frequency [MHz] | Pol. | Reading [dBuV] | Transducer Factor [dB] | Test Result [dBuV/m] | Limits [dBuV/m] | Margin [dB] | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| a | 60 | 248.99 | H | 59.44 | -17.20 | 42.24 | 46.02 | 3.78 | QPK |
| | 48 | 799.97 | H | 46.46 | -3.40 | 43.06 | 46.02 | 2.96 | QPK |
| n (HT20) | 60 | 248.99 | H | 59.44 | -17.20 | 42.24 | 46.02 | 3.81 | QPK |
| | 48 | 799.97 | H | 46.53 | -3.40 | 43.13 | 46.02 | 2.89 | QPK |
| n (HT40) | 151 | 248.99 | H | 58.89 | -17.20 | 41.69 | 46.02 | 4.33 | QPK |
| | 38 | 799.97 | H | 45.97 | -3.40 | 42.57 | 46.02 | 3.45 | QPK |
| ac (VHT20) | 40 | 248.98 | H | 59.42 | -17.20 | 42.22 | 46.02 | 3.80 | QPK |
| | 144 | 799.97 | H | 45.9 | -3.40 | 42.50 | 46.02 | 3.52 | QPK |
| ac (VHT40) | 142 | 248.99 | H | 58.88 | -17.20 | 41.68 | 46.02 | 4.34 | QPK |
| | 151 | 799.97 | H | 46.03 | -3.40 | 42.63 | 46.02 | 3.39 | QPK |
| ac (VHT80) | 42 | 248.99 | H | 58.81 | -17.20 | 41.61 | 46.02 | 4.41 | QPK |
| | 42 | 799.97 | H | 46.42 | -3.40 | 43.02 | 46.02 | 3.00 | QPK |

Note:

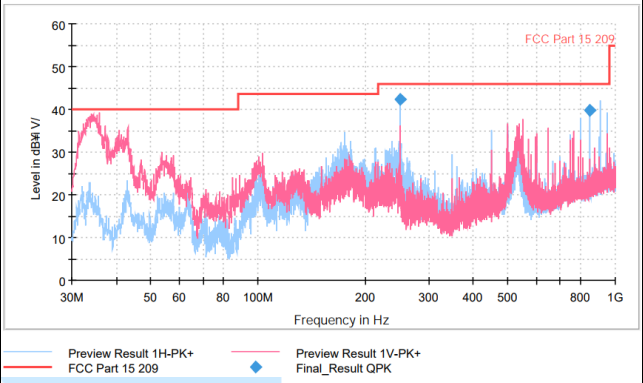
Test Result = Reading + AF+AMP / CL
Where, AF : Antenna Collection Factor,
AMP / CL = Cable loss + Preamplifier gain + High Pass Filter
Pol.: H(Horizontal), V(Vertical)

**Test Plot on Configuration**

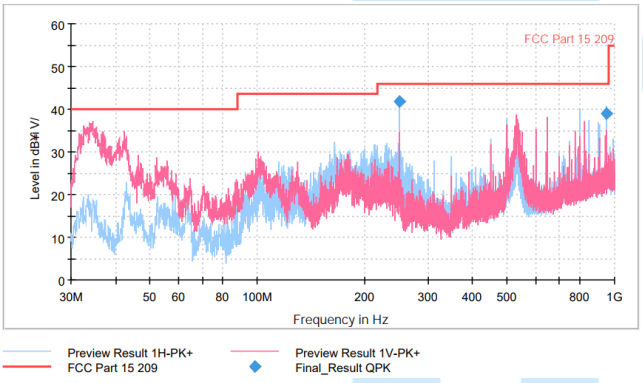
802.11a_60 ch



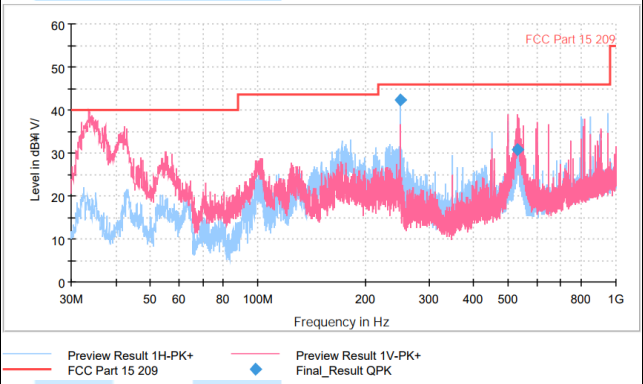

802.11n(HT20)_60 ch



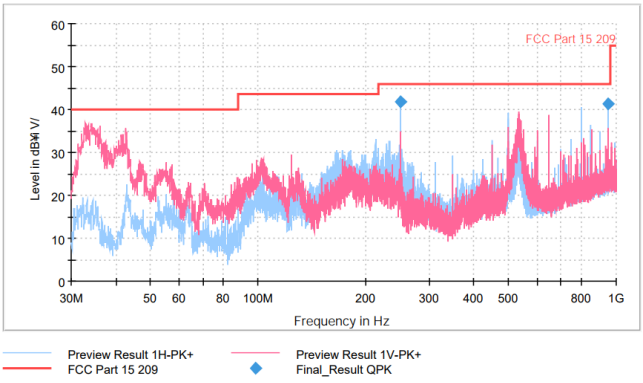

802.11n(HT40)_151 ch



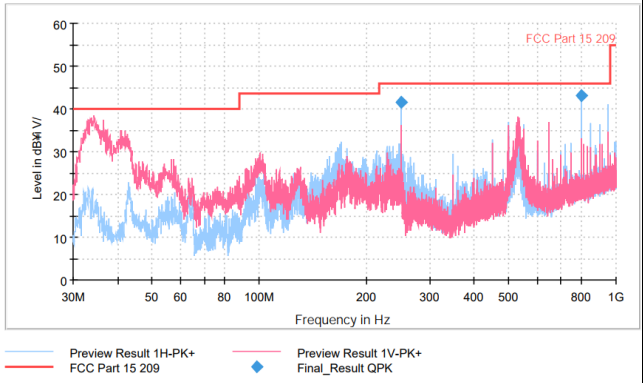

802.11ac(VHT20)_144 ch




802.11ac (VAT40)_142 ch




802.11ac (VAT80)_42 ch




**Note 1): To simplify the report, only plots of representative channels are attached.**

**Radiated Spurious Emission (1 GHz to 40 GHz)**

| 802.11 Standard | Ch. | Frequency [MHz] | Pol. | Reading [dBuV] | Transducer Factor [dB] | Test Result [dBuV/m] | Limits [dBuV/m] | Margin [dB] | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| a | 116 | 11156.30 | V | 42.20 | 7.80 | 50.00 | 54.00 | 4.00 | AV |
| n (HT20) | 116 | 11164.63 | V | 42.55 | 7.70 | 50.25 | 54.00 | 3.75 | AV |
| n (HT40) | 110 | 11184.03 | V | 41.81 | 7.50 | 49.31 | 54.00 | 4.69 | AV |
| ac (VHT20) | 116 | 11164.36 | V | 42.78 | 7.70 | 50.48 | 54.00 | 3.52 | AV |
| ac (VHT40) | 110 | 11174.40 | V | 41.91 | 7.60 | 49.51 | 54.00 | 4.49 | AV |
| ac (VHT80) | 106 | 11058.06 | V | 35.27 | 7.50 | 42.77 | 54.00 | 11.23 | AV |

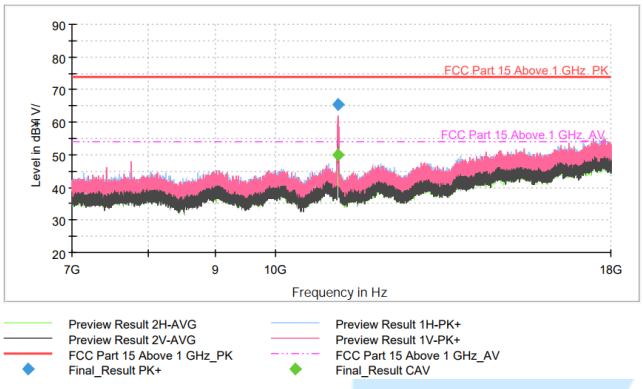
Note:

Test Result = Reading + AF+AMP / CL
Where, AF : Antenna Collection Factor,
AMP / CL = Cable loss + Preamplifier gain + High Pass Filter
Pol.: H(Horizontal), V(Vertical)

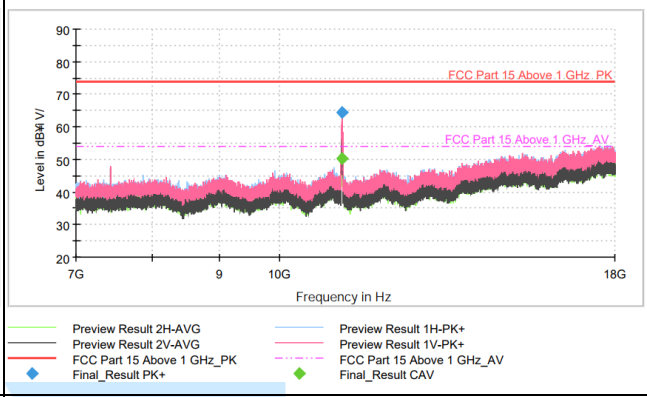
**※ If the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.**

**Test Plot on Configuration**

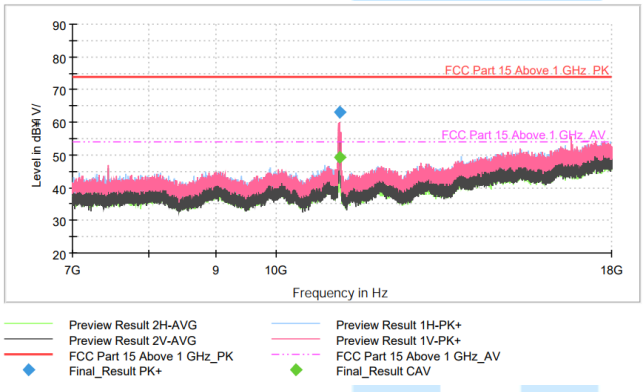
802.11a_116 ch



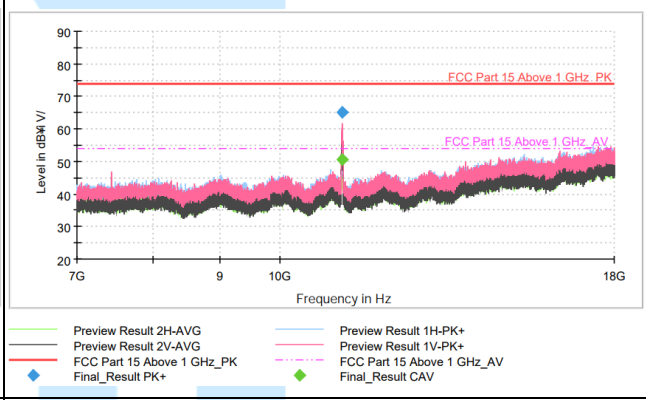

802.11n(HT20)_116 ch



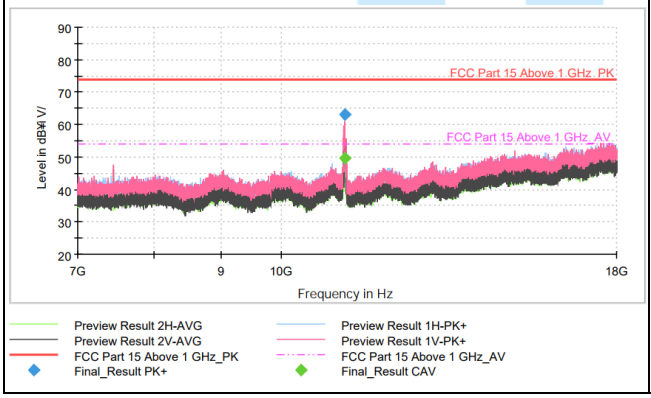

802.11n(HT40)_110 ch



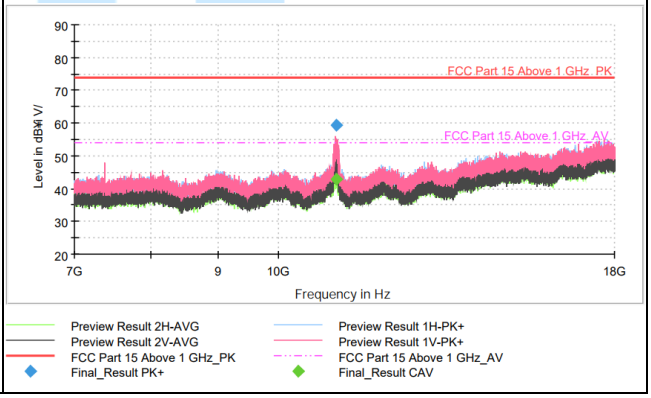

802.11ac(VHT20)_116 ch




802.11ac (VAT40)_110 ch




802.11ac (VAT80)_106 ch




**Note 1): To simplify the report, only plots of representative channels are attached.**

**Radiated Restricted Band Edge Emission**

-. Test Date : Jun. 13-17, 2024
-. Reference Standard : Part 15 subpart E, Sec. 15.407(b)
-. Measuring Distance : 3 m
-. Resolution Bandwidth : 1 MHz
-. Detector mode : Peak detector mode / Average detector mode
-. Power Source : DC 3.7 V
-. Note : Through three orthogonal axes were investigated and the worst case is report

| 802.11 Standard | Ch. | Frequency [MHz] | Pol. | Reading [dBuV] | Transducer Factor [dB] | Test Result [dBuV/m] | Limits [dBuV/m] | Margin [dB] | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| a | 36 | N/A | | | | | | | |
| | 64 | 5351.20 | V | | -0.20 | 64.65 | 74.00 | 9.35 | PK |
| | 100 | 5468.48 | V | | 0.40 | 48.66 | 54.00 | 5.34 | AV |
| n (HT20) | 36 | N/A | | | | | | | |
| | 64 | 5352.40 | V | | -0.20 | 64.22 | 74.00 | 9.78 | PK |
| | 100 | 5469.68 | V | | 0.40 | 49.69 | 54.00 | 4.31 | AV |
| n (HT40) | 38 | 5150.00 | V | | 0.20 | 42.93 | 54.00 | 11.07 | AV |
| | 62 | 5350.00 | V | | -0.20 | 50.44 | 54.00 | 3.56 | AV |
| | 102 | 5467.28 | V | | 0.30 | 49.16 | 54.00 | 4.84 | AV |
| ac (VHT20) | 36 | N/A | | | | | | | |
| | 64 | 5350.00 | V | | -0.20 | 42.34 | 54.00 | 11.66 | AV |
| | 100 | 5469.83 | V | | 0.40 | 41.57 | 54.00 | 12.43 | AV |
| ac (VHT40) | 38 | 5148.80 | V | | 0.10 | 38.01 | 54.00 | 15.99 | AV |
| | 62 | 5350.00 | V | | -0.20 | 46.37 | 54.00 | 7.63 | AV |
| | 102 | 5469.97 | V | | 0.40 | 46.69 | 54.00 | 7.31 | AV |
| ac (VHT80) | 42 | 5149.27 | V | | 0.20 | 41.78 | 54.00 | 12.22 | AV |
| | 58 | 5352.00 | V | | -0.20 | 49.08 | 54.00 | 4.92 | AV |
| | 106 | 5467.43 | V | | 0.30 | 48.48 | 54.00 | 5.52 | AV |

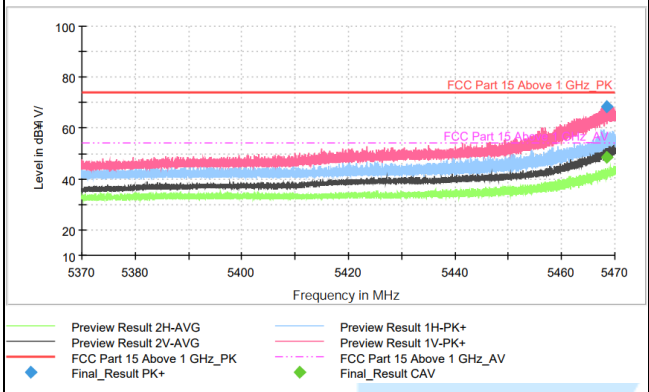
Note:

Test Result = Reading + AF+AMP / CL
Where, AF : Antenna Collection Factor,
AMP / CL = Cable loss + Preamplifier gain + High Pass Filter
Pol.: H(Horizontal), V(Vertical)

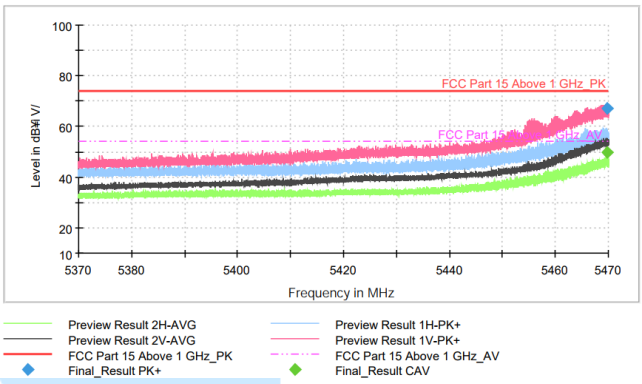
**※ If the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.**

**Test Plot on Configuration**

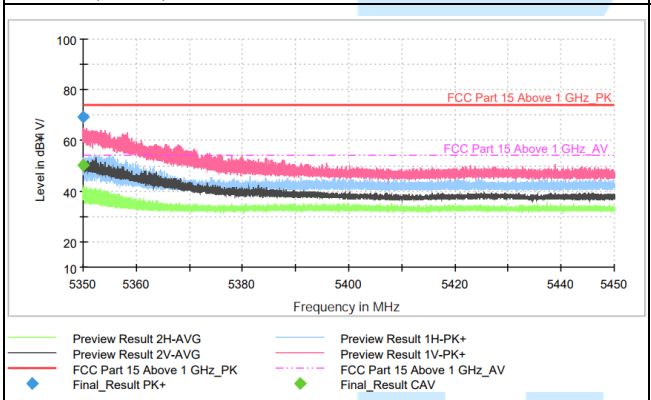
802.11a_100 ch



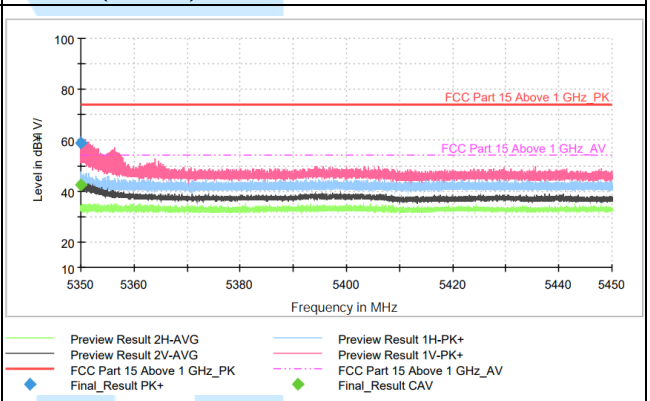

802.11n(HT20)_100 ch



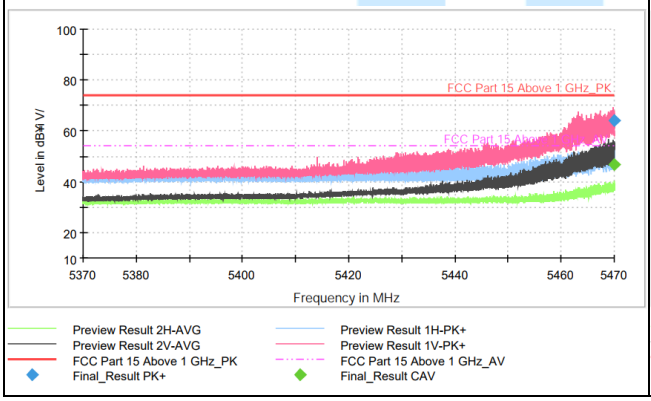

802.11n(HT40)_62 ch



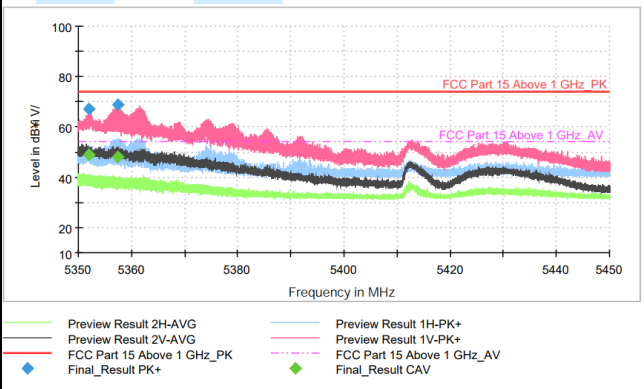

802.11ac(VHT20)_116 ch




802.11ac (VAT40)_102 ch




802.11ac (VAT80)_58 ch




**Note 1): To simplify the report, only plots of representative channels are attached.**

## 15. Sample Calculations

**dBμV = 20 Log $_{10}$(μV/m)**
**dBμV = dBm + 107**
**μV = 10 $^{(dB\mu V/20)}$**

### 15.1 Example 1 :

■ **20.3 MHz**

| | |
|---|---|
| **Class B Limit** | **= 250 μV = 48 dBμV** |
| **Reading** | **= 39.2 dBμV** |
| **10 $^{(39.2dB\mu V/20)}$** | **= 91.2 μV** |
| **Margin** | **= 48 dBμV - 39.2 dBμV** |
| | **= 8.8 dB** |

### 15.2 Example 2 :

■ **66.7 MHz**

| | |
|---|---|
| **Class B Limit** | **= 100 μV/m = 40.0 dBμV/m** |
| **Reading** | **= 31.0 dBμV** |
| **Antenna Factor + Cable Loss = 5.8 dB** | |
| **Total** | **= 36.8 dBμV/m** |
| **Margin** | **= 40.0 dBμV/m – 36.8 dBμV/m** |
| | **= 3.2 dB** |

## 16. Recommendation & Conclusion

The data collected shows that the **Summit Technology Touch Screen Controller (Model Name: TDC-8300)** was complies with §15.407 of the FCC Rules.

**- The end -**