

FCC Test Report

Report No.: RFDLK-WTW-P20070248-1

FCC ID: KA2APX2810A1

Test Model: DAP-X2810

Received Date: Jul. 14, 2020

Test Date: Jul. 28 ~ Nov. 24, 2020

Issued Date: Nov. 26, 2020

Applicant: D-Link Corporation

Address: 17595 Mt. Herrmann, Fountain Valley, California, United States, 92708

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, Taiwan

**FCC Registration /
Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

Table of Contents

| | |
|---|-----------|
| Release Control Record | 4 |
| 1 Certificate of Conformity | 5 |
| 2 Summary of Test Results | 6 |
| 2.1 Measurement Uncertainty | 6 |
| 2.2 Modification Record | 6 |
| 3 General Information | 7 |
| 3.1 General Description of EUT | 7 |
| 3.2 Description of Test Modes | 9 |
| 3.2.1 Test Mode Applicability and Tested Channel Detail | 10 |
| 3.3 Duty Cycle of Test Signal | 12 |
| 3.4 Description of Support Units | 14 |
| 3.4.1 Configuration of System under Test | 14 |
| 3.5 General Description of Applied Standards and References | 15 |
| 4 Test Types and Results | 16 |
| 4.1 Radiated Emission and Bandedge Measurement | 16 |
| 4.1.1 Limits of Radiated Emission and Bandedge Measurement | 16 |
| 4.1.2 Test Instruments | 18 |
| 4.1.3 Test Procedures | 19 |
| 4.1.4 Deviation from Test Standard | 19 |
| 4.1.5 Test Setup | 20 |
| 4.1.6 EUT Operating Conditions | 21 |
| 4.1.7 Test Results | 22 |
| 4.2 Conducted Emission Measurement | 46 |
| 4.2.1 Limits of Conducted Emission Measurement | 46 |
| 4.2.2 Test Instruments | 46 |
| 4.2.3 Test Procedures | 47 |
| 4.2.4 Deviation from Test Standard | 47 |
| 4.2.5 Test Setup | 47 |
| 4.2.6 EUT Operating Conditions | 47 |
| 4.2.7 Test Results | 48 |
| 4.3 Transmit Power Measurement | 54 |
| 4.3.1 Limits of Transmit Power Measurement | 54 |
| 4.3.2 Test Setup | 54 |
| 4.3.3 Test Instruments | 55 |
| 4.3.4 Test Procedure | 55 |
| 4.3.5 Deviation from Test Standard | 55 |
| 4.3.6 EUT Operating Conditions | 55 |
| 4.3.7 Test Results | 56 |
| 4.4 Occupied Bandwidth Measurement | 66 |
| 4.4.1 Test Setup | 66 |
| 4.4.2 Test Instruments | 66 |
| 4.4.3 Test Procedure | 66 |
| 4.4.4 Test Results | 67 |
| 4.5 Peak Power Spectral Density Measurement | 71 |
| 4.5.1 Limits of Peak Power Spectral Density Measurement | 71 |
| 4.5.2 Test Setup | 71 |
| 4.5.3 Test Instruments | 71 |
| 4.5.4 Test Procedures | 71 |
| 4.5.5 Deviation from Test Standard | 72 |
| 4.5.6 EUT Operating Conditions | 72 |
| 4.5.7 Test Results | 72 |
| 4.6 Frequency Stability | 80 |
| 4.6.1 Limit of Frequency Stability Measurement | 80 |

| | |
|---|-----------|
| 4.6.2 Test Setup | 80 |
| 4.6.3 Test Instruments | 80 |
| 4.6.4 Test Procedure | 80 |
| 4.6.5 Deviation from Test Standard | 80 |
| 4.6.6 EUT Operating Condition | 80 |
| 4.6.7 Test Results | 81 |
| 4.7 6 dB Bandwidth Measurement..... | 82 |
| 4.7.1 Limits of 6 dB Bandwidth Measurement..... | 82 |
| 4.7.2 Test Setup..... | 82 |
| 4.7.3 Test Instruments | 82 |
| 4.7.4 Test Procedure | 82 |
| 4.7.5 Deviation from Test Standard | 82 |
| 4.7.6 EUT Operating Condition | 82 |
| 4.7.7 Test Results | 83 |
| 5 Pictures of Test Arrangements..... | 85 |
| Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band) | 86 |
| Annex B- Band-edge measurement..... | 89 |
| Appendix – Information of the Testing Laboratories | 96 |

Release Control Record

| Issue No. | Description | Date Issued |
|-----------------------|------------------|---------------|
| RFDLK-WTW-P20070248-1 | Original Release | Nov. 26, 2020 |

1 Certificate of Conformity

Product: Nuclias Connect AX1800 Access Point

Brand: D-Link Corporation

Test Model: DAP-X2810

Sample Status: Engineering Sample

Applicant: D-Link Corporation

Test Date: Jul. 28 ~ Nov. 24, 2020

Standards: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Gina Liu , **Date:** Nov. 26, 2020
Gina Liu / Specialist

Approved by : Dylan Chiou , **Date:** Nov. 26, 2020
Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart E (Section 15.407) | | | |
|--|--|--------|---|
| FCC Clause | Test Item | Result | Remarks |
| 15.407(b)(6) | AC Power Conducted Emissions | Pass | Meet the requirement of limit. Minimum passing margin is -3.78 dB at 0.57796 MHz. |
| 15.407(b) (1/2/3/4(i/ii)/6) | Radiated Emissions & Band Edge Measurement | Pass | Meet the requirement of limit. Minimum passing margin is -1.0 dB at 5150 MHz and 17235 MHz and 17265 MHz and 17385 MHz. |
| 15.407(a)(1/2/3) | Max Average Transmit Power | Pass | Meet the requirement of limit. |
| --- | Occupied Bandwidth Measurement | - | Reference only |
| 15.407(a)(1/2/3) | Peak Power Spectral Density | Pass | Meet the requirement of limit. |
| 15.407(e) | 6 dB Bandwidth | Pass | Meet the requirement of limit. (U-NII-3 Band only) |
| 15.407(g) | Frequency Stability | Pass | Meet the requirement of limit. |
| 15.203 | Antenna Requirement | Pass | Antenna connector is i-pex(MHF) not a standard connector. |

Note:

- For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.
- For U-NII-1 band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3.
- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement | Frequency | Expanded Uncertainty (k=2) (±) |
|------------------------------------|--------------------|--------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz | 2.79 dB |
| Radiated Emissions up to 1 GHz | 9 kHz ~ 30 MHz | 3.04 dB |
| | 30 MHz ~ 200 MHz | 2.93 dB |
| | 200 MHz ~ 1000 MHz | 2.95 dB |
| Radiated Emissions above 1 GHz | 1 GHz ~ 18 GHz | 2.26 dB |
| | 18 GHz ~ 40 GHz | 1.94 dB |

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

| | |
|------------------------------|--|
| Product | Nuclias Connect AX1800 Access Point |
| Brand | D-Link Corporation |
| Test Model | DAP-X2810 |
| Status of EUT | Engineering Sample |
| Power Supply Rating | 12 Vdc (Adapter) |
| Modulation Type | 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA |
| Modulation Technology | OFDM, OFDMA |
| Transfer Rate | 802.11a: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6 Mbps 802.11n: up to 400 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201 Mbps |
| Operating Frequency | 5180 ~ 5240 MHz, 5745 ~ 5825 MHz |
| Number of Channel | 5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80) |
| Output Power | CDD Mode: 696.006 mW for 5180 ~ 5240 MHz 469.971 mW for 5745 ~ 5825 MHz Beamforming Mode: 307.864 mW for 5180 ~ 5240 MHz 235.002 mW for 5745 ~ 5825 MHz |
| Antenna Type | PIFA antenna with 4.3 dBi gain (Chain 1) PIFA antenna with 4.2 dBi gain (Chain 2) |
| Antenna Connector | i-pex(MHF) |
| Accessory Device | Refer to Note as below |
| Data Cable Supplied | N/A |

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

| Modulation Mode | Beamforming | TX Function |
|------------------|-------------|-------------|
| 802.11a | Not Support | 2TX (MIMO) |
| 802.11n (HT20) | Support | 2TX (MIMO) |
| 802.11n (HT40) | Support | 2TX (MIMO) |
| 802.11ac (VHT20) | Support | 2TX (MIMO) |
| 802.11ac (VHT40) | Support | 2TX (MIMO) |
| 802.11ac (VHT80) | Support | 2TX (MIMO) |
| 802.11ax (HE20) | Support | 2TX (MIMO) |
| 802.11ax (HE40) | Support | 2TX (MIMO) |
| 802.11ax (HE80) | Support | 2TX (MIMO) |

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40 / VHT80 and 802.11ax mode for HE20 / HE40 / HE80, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

*For 802.11n and 802.11ac and 802.11ax, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

2. The EUT contains following accessory devices.

| Product | Brand | Model | Description |
|---------------|-------|-----------------|---|
| Adapter 1 | ASIAN | WB-18Q12FU1(US) | I/P: 100-240 Vac, 50-60 Hz, 0.6 A O/P: 12 Vdc, 1.5 A |
| Adapter 2 | ASIAN | WA-30P12R | I/P: 100-240 Vac, 50-60 Hz, 0.9 A O/P: 12 Vdc, 2.5 A |
| Console cable | N/A | N/A | -- |

3. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.
5. The manufacturer announced that the device has two operating modes, access point mode and client mode. When switched to client mode, the U-NII-1 output power will follow the client mode power table, and comply with FCC Part 15E section 15.407 (a)(1)(iv) regulations .

3.2 Description of Test Modes

For 5180 ~ 5240 MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 36 | 5180 | 44 | 5220 |
| 40 | 5200 | 48 | 5240 |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 38 | 5190 | 46 | 5230 |

1 channel is provided for 802.11ac (VHT80) and 802.11ax (HE80):

| Channel | Frequency (MHz) |
|---------|-----------------|
| 42 | 5210 |

For 5745 ~ 5825 MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 149 | 5745 | 161 | 5805 |
| 153 | 5765 | 165 | 5825 |
| 157 | 5785 | | |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 151 | 5755 | 159 | 5795 |

1 channel is provided for 802.11ac (VHT80) and 802.11ax (HE80):

| Channel | Frequency (MHz) |
|---------|-----------------|
| 155 | 5775 |

3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable To | | | | Description |
|--------------------|---------------|-------|-----|------|-------------------------------|
| | RE≥1G | RE<1G | PLC | APCM | |
| A | √ | √ | √ | √ | EUT with Adapter (WB18Q12FU1) |
| B | - | √ | √ | - | EUT with POE |
| C | - | √ | √ | - | EUT with Adapter (WA-30P12R) |

Where **RE≥1G**: Radiated Emission above 1 GHz **RE<1G**: Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|-----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A | 5180-5240 | 802.11a | 36 to 48 | 36, 40, 48 | OFDM | BPSK | 6.0 |
| | | 802.11ax (HE20) | 36 to 48 | 36, 40, 48 | OFDMA | BPSK | MCS0 |
| | | 802.11ax (HE40) | 38 to 46 | 38, 46 | OFDMA | BPSK | MCS0 |
| | | 802.11ax (HE80) | 42 | 42 | OFDMA | BPSK | MCS0 |
| | 5745-5825 | 802.11a | 149 to 165 | 149, 157, 165 | OFDM | BPSK | 6.0 |
| | | 802.11ax (HE20) | 149 to 165 | 149, 157, 165 | OFDMA | BPSK | MCS0 |
| | | 802.11ax (HE40) | 151 to 159 | 151, 159 | OFDMA | BPSK | MCS0 |
| | | 802.11ax (HE80) | 155 | 155 | OFDMA | BPSK | MCS0 |

Radiated Emission Test (Below 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| A~C | 5180-5240 | 802.11a | 36 to 48 | 40 | OFDM | BPSK | 6.0 |

Power Line Conducted Emission Test:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| A~C | 5180-5240 | 802.11a | 36 to 48 | 40 | OFDM | BPSK | 6.0 |

Antenna Port Conducted Measurement:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A | 5180-5240 | 802.11a | 36 to 48 | 36, 40, 48 | OFDM | BPSK | 6.0 |
| | | 802.11n (HT20) | 36 to 48 | 36, 40, 48 | OFDM | BPSK | 6.5 |
| | | 802.11n (HT40) | 38 to 46 | 38, 46 | OFDM | BPSK | 13.5 |
| | | 802.11ac (VHT20) | 36 to 48 | 36, 40, 48 | OFDM | BPSK | 7.2 |
| | | 802.11ac (VHT40) | 38 to 46 | 38, 46 | OFDM | BPSK | 15.0 |
| | | 802.11ac (VHT80) | 42 | 42 | OFDM | BPSK | 29.3 |
| | | 802.11ax (HE20) | 36 to 48 | 36, 40, 48 | OFDMA | BPSK | MCS0 |
| | | 802.11ax (HE40) | 38 to 46 | 38, 46 | OFDMA | BPSK | MCS0 |
| | | 802.11ax (HE80) | 42 | 42 | OFDMA | BPSK | MCS0 |
| | 5745-5825 | 802.11a | 149 to 165 | 149, 157, 165 | OFDM | BPSK | 6.0 |
| | | 802.11n (HT20) | 149 to 165 | 149, 157, 165 | OFDM | BPSK | 6.5 |
| | | 802.11n (HT40) | 151 to 159 | 151, 159 | OFDM | BPSK | 13.5 |
| | | 802.11ac (VHT20) | 149 to 165 | 149, 157, 165 | OFDM | BPSK | 7.2 |
| | | 802.11ac (VHT40) | 151 to 159 | 151, 159 | OFDM | BPSK | 15.0 |
| | | 802.11ac (VHT80) | 155 | 155 | OFDM | BPSK | 29.3 |
| | | 802.11ax (HE20) | 149 to 165 | 149, 157, 165 | OFDMA | BPSK | MCS0 |
| | | 802.11ax (HE40) | 151 to 159 | 151, 159 | OFDMA | BPSK | MCS0 |
| | | 802.11ax (HE80) | 155 | 155 | OFDMA | BPSK | MCS0 |

Test Condition:

| Applicable To | Environmental Conditions | Input Power | Tested by |
|---------------|--------------------------|----------------|------------|
| RE \geq 1G | 22 deg. C, 67 % RH | 120 Vac, 60 Hz | Greg Lin |
| RE<1G | 22 deg. C, 67 % RH | 120 Vac, 60 Hz | Greg Lin |
| PLC | 25 deg. C, 75 % RH | 120 Vac, 60 Hz | Greg Lin |
| APCM | 25 deg. C, 60 % RH | 120 Vac, 60 Hz | Ivan Tseng |

3.3 Duty Cycle of Test Signal

MODULATION TYPE: BPSK

For 5180 ~ 5240 MHz

Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = $1.975/2.12 = 0.932$, Duty factor = $10 * \log(1/0.932) = 0.31$

802.11ax (HE20): Duty cycle = $5.4/5.75 = 0.939$, Duty factor = $10 * \log(1/0.939) = 0.27$

802.11ax (HE40): Duty cycle = $5.363/5.701 = 0.941$, Duty factor = $10 * \log(1/0.941) = 0.27$

802.11ax (HE80): Duty cycle = $5.375/5.85 = 0.919$, Duty factor = $10 * \log(1/0.919) = 0.37$



For 5745 ~ 5825 MHz:

Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = $1.97/2.12 = 0.929$, Duty factor = $10 * \log(1/0.929) = 0.32$

802.11ax (HE20): Duty cycle = $5.4/5.737 = 0.941$, Duty factor = $10 * \log(1/0.941) = 0.26$

802.11ax (HE40): Duty cycle = $5.376/5.776 = 0.931$, Duty factor = $10 * \log(1/0.931) = 0.31$

802.11ax (HE80): Duty cycle = $5.363/5.688 = 0.943$, Duty factor = $10 * \log(1/0.943) = 0.26$



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks |
|----|----------|----------|--------------|------------|--------------|--------------------|
| A. | Notebook | Lenovo | 81A4 | YD02TWF5 | PPD-QCNFA435 | -- |
| B. | POE | UBIQUITI | GP-H480-050G | N/A | N/A | Provided by client |
| C. | Load | N/A | N/A | N/A | N/A | -- |

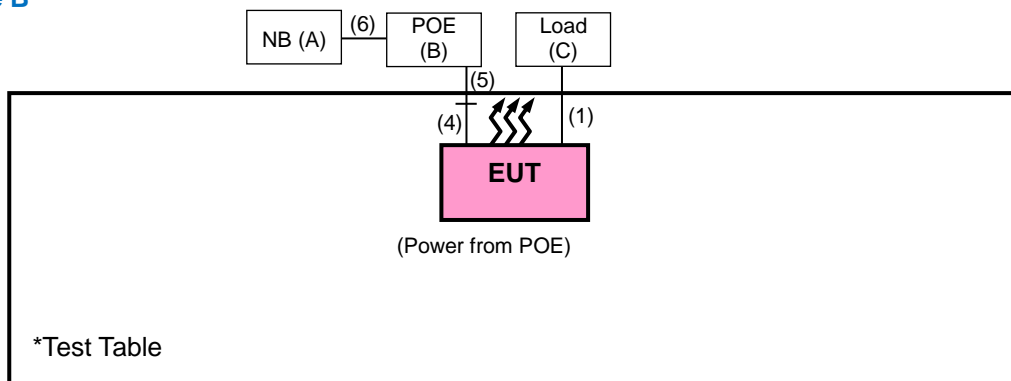
| ID | Cable Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|----|--------------------|------|------------|--------------------|--------------|----------------------|
| 1. | Console Cable | 1 | 1.8 | N | 0 | Accessory of the EUT |
| 2. | LAN Cable | 1 | 10 | N | 0 | RJ45 |
| 3. | Adapter Cable | 1 | 1.0 | N | 0 | Accessory of the EUT |
| 4. | LAN Cable | 1 | 1.5 | N | 0 | RJ45 |
| 5. | LAN Cable | 1 | 1.5 | N | 0 | RJ45 |
| 6. | LAN Cable | 1 | 1.0 | N | 0 | RJ45 |

Note:

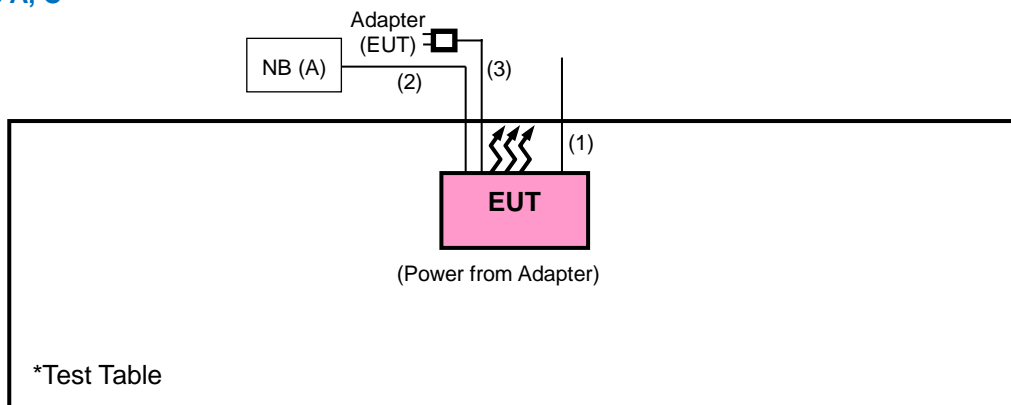
1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as communication partner to transfer data.

3.4.1 Configuration of System under Test

Mode B



Mode A, C



3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

| Frequencies (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009 ~ 0.490 | 2400/F (kHz) | 300 |
| 0.490 ~ 1.705 | 24000/F (kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Limits of Unwanted Emission Out of the Restricted Bands

| Applicable To | | Limit | |
|--|---|---|---|
| 789033 D02 General UNII Test Procedures New Rules v02r01 | | Field Strength at 3 m | |
| | | PK: 74 (dBµV/m) | AV: 54 (dBµV/m) |
| Frequency Band | Applicable To | EIRP Limit | Equivalent Field Strength at 3 m |
| 5150~5250 MHz | 15.407(b)(1) | PK: -27 (dBm/MHz) | PK: 68.2 (dBµV/m) |
| 5250~5350 MHz | 15.407(b)(2) | | |
| 5470~5725 MHz | 15.407(b)(3) | | |
| 5725~5850 MHz | <input checked="" type="checkbox"/> 15.407(b)(4)(i) | PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4} | PK: 68.2 (dBµV/m) ^{*1} PK:105.2 (dBµV/m) ^{*2} PK: 110.8 (dBµV/m) ^{*3} PK:122.2 (dBµV/m) ^{*4} |
| | <input type="checkbox"/> 15.407(b)(4)(ii) | Emission limits in section 15.247(d) | |

^{*1} beyond 75 MHz or more above of the band edge.

^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where } P \text{ is the eirp (Watts).}$$

4.1.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|--|------------------------------------|---|---------------------|-------------------------|
| Test Receiver KEYSIGHT | N9038A | MY55420137 | Apr. 16, 2020 | Apr. 15, 2021 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSV40 | 100980 | Apr. 20, 2020 | Apr. 19, 2021 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100039 | Jun. 12, 2020 | Jun. 11, 2021 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-160 | Nov. 07, 2019 | Nov. 06, 2020 |
| | | | Nov. 06, 2020 | Nov. 05, 2021 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-1169 | Nov. 24, 2019 | Nov. 23, 2020 |
| | | | Nov. 22, 2020 | Nov. 29, 2021 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | BBHA9170241 | Nov. 24, 2019 | Nov. 23, 2020 |
| | | | Nov. 22, 2020 | Nov. 29, 2021 |
| Preamplifier Agilent (Below 1GHz) | 8447D | 2944A10638 | Jun. 08, 2020 | Jun. 07, 2021 |
| Preamplifier Agilent (Above 1GHz) | 8449B | 3008A02367 | Feb. 18, 2020 | Feb. 17, 2021 |
| RF signal cable HUBER+SUHNER&EMCI | SUCOFLEX 104 & EMC104-SM-SM8000 | CABLE-CH9-02 (248780+171006) | Jan. 18, 2020 | Jan. 17, 2021 |
| RF signal cable HUBER+SUHNER | SUCOFLEX 104 | CABLE-CH9-(250795/ 4) | Jan. 18, 2020 | Jan. 17, 2021 |
| RF signal cable Woken | 8D-FB | Cable-CH9-01 | Jun. 08, 2020 | Jun. 07, 2021 |
| Software BV ADT | ADT_Radiated_ V7.6.15.9.5 | NA | NA | NA |
| Antenna Tower EMCO | 2070/2080 | 512.835.4684 | NA | NA |
| Turn Table EMCO | 2087-2.03 | NA | NA | NA |
| Antenna Tower & Turn BV ADT | AT100 | AT93021705 | NA | NA |
| Turn Table BV ADT | TT100 | TT93021705 | NA | NA |
| Turn Table Controller BV ADT | SC100 | SC93021705 | NA | NA |
| Boresight Antenna Fixture | FBA-01 | FBA-SIP01 | NA | NA |
| USB Wideband Power Sensor KEYSIGHT | U2021XA | MY55050005/MY551 90004/MY55190007/ MY55210005 | Jul. 13, 2020 | Jul. 12, 2021 |
| Temperature & Humidity Chamber GIANT FORCE | GTH-120-40-CP-AR | MAA1306-019 | Sep. 10, 2019 | Sep. 09, 2020 |
| | | | Sep. 09, 2020 | Sep. 08, 2021 |
| AC Power Source EEC | 6905S | 1991553 | NA | NA |
| Digital Multimeter Fluke | 87-III | 70360742 | Jun. 23, 2020 | Jun. 22, 2021 |
| Preamplifier EMCI | EMC 184045 | 980116 | Oct. 08, 2019 | Oct. 07, 2020 |
| | | | Oct. 07, 2020 | Oct. 06, 2021 |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 9.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

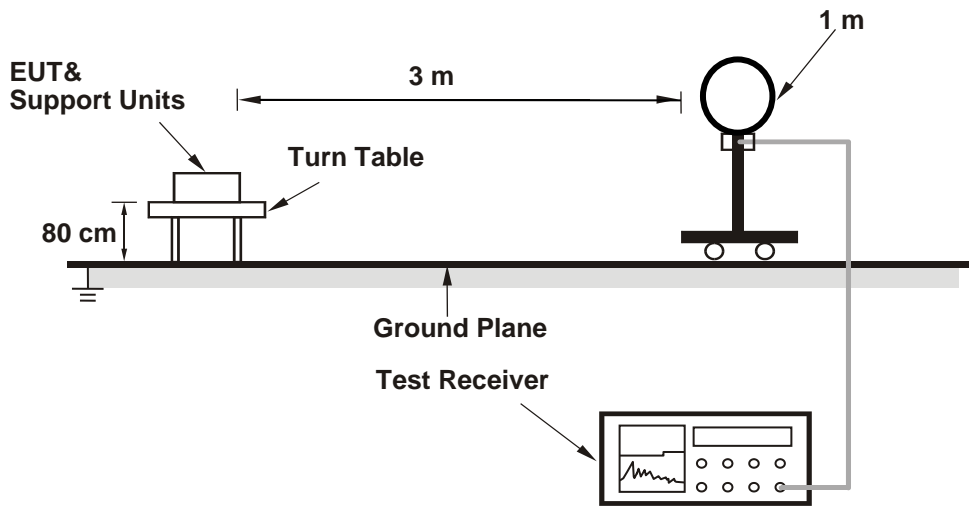
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
(11a: RBW = 1 MHz, VBW = 1 kHz ; 11ax (HE20): RBW = 1 MHz, VBW = 1 kHz ;
11ax (HE40): RBW = 1 MHz, VBW = 1 kHz ; 11ax (HE80): RBW = 1 MHz, VBW = 1 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

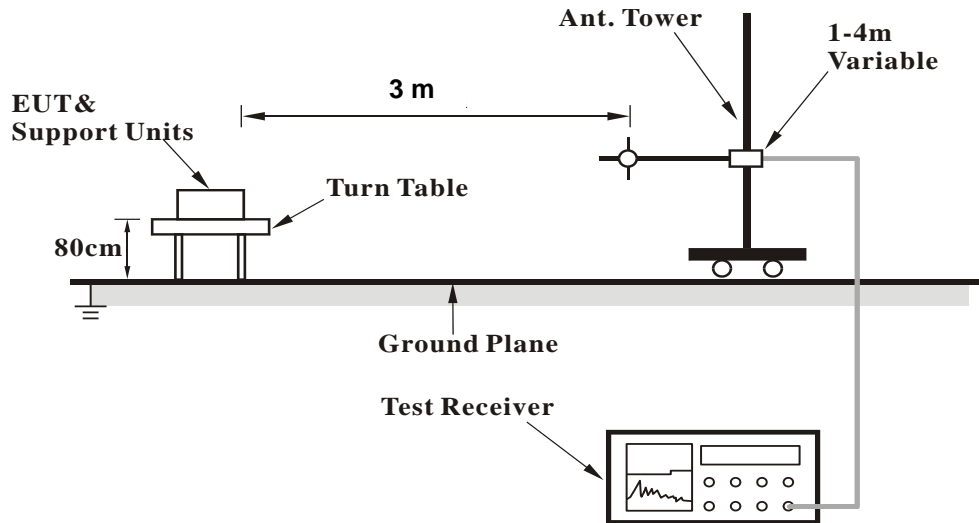
No deviation.

4.1.5 Test Setup

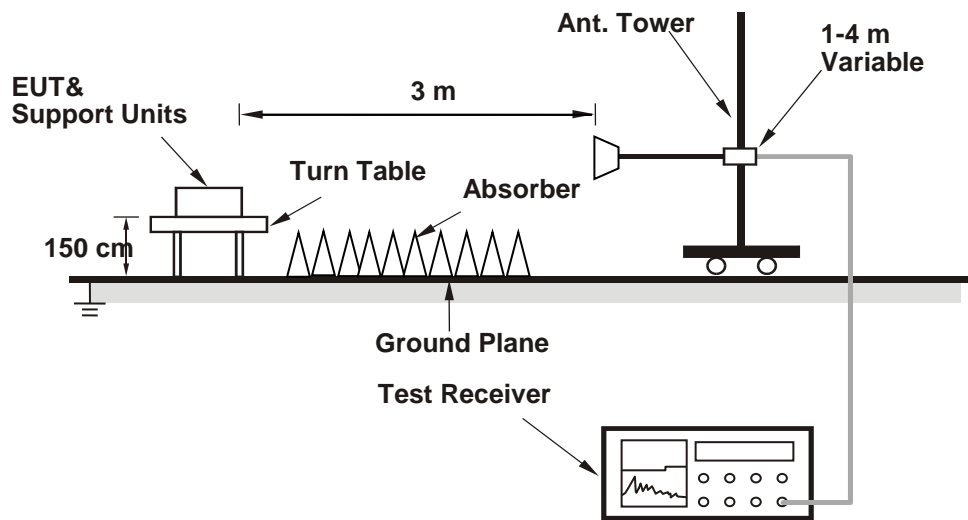
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data :

802.11a

| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 36 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 5150.00 | 62.5 PK | 74.0 | -11.5 | 2.85 H | 144 | 60.4 | 2.1 |
| 2 | 5150.00 | 48.7 AV | 54.0 | -5.3 | 2.85 H | 144 | 46.6 | 2.1 |
| 3 | *5180.00 | 112.5 PK | | | 2.85 H | 144 | 76.2 | 36.3 |
| 4 | *5180.00 | 101.5 AV | | | 2.85 H | 144 | 65.2 | 36.3 |
| 5 | #10360.00 | 55.5 PK | 68.2 | -12.7 | 1.31 H | 323 | 40.4 | 15.1 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 5150.00 | 66.4 PK | 74.0 | -7.6 | 2.58 V | 187 | 64.3 | 2.1 |
| 2 | 5150.00 | 53.0 AV | 54.0 | -1.0 | 2.58 V | 187 | 50.9 | 2.1 |
| 3 | *5180.00 | 118.0 PK | | | 2.58 V | 187 | 81.7 | 36.3 |
| 4 | *5180.00 | 107.8 AV | | | 2.58 V | 187 | 71.5 | 36.3 |
| 5 | #10360.00 | 55.8 PK | 68.2 | -12.4 | 2.56 V | 240 | 40.7 | 15.1 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 40 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5200.00 | 113.1 PK | | | 2.82 H | 137 | 76.9 | 36.2 |
| 2 | *5200.00 | 103.0 AV | | | 2.82 H | 137 | 66.8 | 36.2 |
| 3 | #10400.00 | 56.5 PK | 74.0 | -17.5 | 1.34 H | 327 | 41.3 | 15.2 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5200.00 | 119.5 PK | | | 2.31 V | 185 | 83.3 | 36.2 |
| 2 | *5200.00 | 109.4 AV | | | 2.31 V | 185 | 73.2 | 36.2 |
| 3 | #10400.00 | 56.9 PK | 68.2 | -11.3 | 2.54 V | 238 | 41.7 | 15.2 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.

| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 48 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5240.00 | 113.4 PK | | | 2.93 H | 152 | 77.3 | 36.1 |
| 2 | *5240.00 | 103.4 AV | | | 2.93 H | 152 | 67.3 | 36.1 |
| 3 | 5350.00 | 52.3 PK | 74.0 | -21.7 | 2.93 H | 152 | 50.3 | 2.0 |
| 4 | 5350.00 | 42.2 AV | 54.0 | -11.8 | 2.93 H | 152 | 40.2 | 2.0 |
| 5 | #10480.00 | 56.2 PK | 68.2 | -12.0 | 1.29 H | 317 | 41.1 | 15.1 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5240.00 | 118.4 PK | | | 2.37 V | 185 | 82.3 | 36.1 |
| 2 | *5240.00 | 108.3 AV | | | 2.37 V | 185 | 72.2 | 36.1 |
| 3 | 5350.00 | 54.3 PK | 74.0 | -19.7 | 2.37 V | 185 | 52.3 | 2.0 |
| 4 | 5350.00 | 43.5 AV | 54.0 | -10.5 | 2.37 V | 185 | 41.5 | 2.0 |
| 5 | #10480.00 | 56.9 PK | 68.2 | -11.3 | 2.63 V | 234 | 41.8 | 15.1 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|----------------|--------------------------|--------------|
| CHANNEL | TX Channel 149 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5745.00 | 111.1 PK | | | 3.50 H | 276 | 73.8 | 37.3 |
| 2 | *5745.00 | 100.7 AV | | | 3.50 H | 276 | 63.4 | 37.3 |
| 3 | 11490.00 | 58.3 PK | 74.0 | -15.7 | 1.43 H | 176 | 42.8 | 15.5 |
| 4 | 11490.00 | 46.2 AV | 54.0 | -7.8 | 1.43 H | 176 | 30.7 | 15.5 |
| 5 | #17235.00 | 66.0 PK | 68.2 | -2.2 | 1.99 H | 131 | 43.1 | 22.9 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5745.00 | 111.7 PK | | | 2.51 V | 91 | 74.4 | 37.3 |
| 2 | *5745.00 | 101.9 AV | | | 2.51 V | 91 | 64.6 | 37.3 |
| 3 | 11490.00 | 62.7 PK | 74.0 | -11.3 | 1.25 V | 78 | 47.2 | 15.5 |
| 4 | 11490.00 | 49.7 AV | 54.0 | -4.3 | 1.25 V | 78 | 34.2 | 15.5 |
| 5 | #17235.00 | 67.2 PK | 68.2 | -1.0 | 2.72 V | 88 | 44.3 | 22.9 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|----------------|--------------------------|--------------|
| CHANNEL | TX Channel 157 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5785.00 | 111.6 PK | | | 3.10 H | 282 | 74.1 | 37.5 |
| 2 | *5785.00 | 101.5 AV | | | 3.10 H | 282 | 64.0 | 37.5 |
| 3 | 11570.00 | 58.4 PK | 74.0 | -15.6 | 1.49 H | 181 | 43.2 | 15.2 |
| 4 | 11570.00 | 46.8 AV | 54.0 | -7.2 | 1.49 H | 181 | 31.6 | 15.2 |
| 5 | #17235.00 | 66.3 PK | 68.2 | -1.9 | 1.89 H | 129 | 43.4 | 22.9 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5785.00 | 112.7 PK | | | 3.72 V | 86 | 75.2 | 37.5 |
| 2 | *5785.00 | 102.5 AV | | | 3.72 V | 86 | 65.0 | 37.5 |
| 3 | 11570.00 | 64.1 PK | 74.0 | -9.9 | 1.18 V | 90 | 48.9 | 15.2 |
| 4 | 11570.00 | 51.4 AV | 54.0 | -2.6 | 1.18 V | 90 | 36.2 | 15.2 |
| 5 | #17355.00 | 66.8 PK | 68.2 | -1.4 | 2.73 V | 89 | 44.1 | 22.7 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|----------------|--------------------------|--------------|
| CHANNEL | TX Channel 165 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5825.00 | 111.3 PK | | | 2.64 H | 281 | 73.9 | 37.4 |
| 2 | *5825.00 | 101.2 AV | | | 2.64 H | 281 | 63.8 | 37.4 |
| 3 | 11650.00 | 58.4 PK | 74.0 | -15.6 | 1.51 H | 177 | 43.2 | 15.2 |
| 4 | 11650.00 | 46.3 AV | 54.0 | -7.7 | 1.51 H | 177 | 31.1 | 15.2 |
| 5 | #17475.00 | 66.3 PK | 68.2 | -1.9 | 1.89 H | 122 | 43.0 | 23.3 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5825.00 | 112.8 PK | | | 2.53 V | 93 | 75.4 | 37.4 |
| 2 | *5825.00 | 102.9 AV | | | 2.53 V | 93 | 65.5 | 37.4 |
| 3 | 11650.00 | 64.9 PK | 74.0 | -9.1 | 1.04 V | 75 | 49.7 | 15.2 |
| 4 | 11650.00 | 52.0 AV | 54.0 | -2.0 | 1.04 V | 75 | 36.8 | 15.2 |
| 5 | #17475.00 | 66.7 PK | 68.2 | -1.5 | 2.53 V | 88 | 43.4 | 23.3 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ax (HE20)

| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 36 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 5150.00 | 62.3 PK | 74.0 | -11.7 | 2.79 H | 141 | 60.2 | 2.1 |
| 2 | 5150.00 | 48.5 AV | 54.0 | -5.5 | 2.79 H | 141 | 46.4 | 2.1 |
| 3 | *5180.00 | 109.1 PK | | | 2.79 H | 141 | 72.8 | 36.3 |
| 4 | *5180.00 | 96.4 AV | | | 2.79 H | 141 | 60.1 | 36.3 |
| 5 | #10360.00 | 55.7 PK | 68.2 | -12.5 | 1.24 H | 326 | 40.6 | 15.1 |

| Antenna Polarity & Test Distance : Vertical at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 5150.00 | 66.4 PK | 74.0 | -7.6 | 2.44 V | 185 | 64.3 | 2.1 |
| 2 | 5150.00 | 52.7 AV | 54.0 | -1.3 | 2.44 V | 185 | 50.6 | 2.1 |
| 3 | *5180.00 | 115.5 PK | | | 2.44 V | 185 | 79.2 | 36.3 |
| 4 | *5180.00 | 102.8 AV | | | 2.44 V | 185 | 66.5 | 36.3 |
| 5 | #10360.00 | 56.4 PK | 68.2 | -11.8 | 2.67 V | 233 | 41.3 | 15.1 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 40 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5200.00 | 112.3 PK | | | 2.78 H | 153 | 76.1 | 36.2 |
| 2 | *5200.00 | 99.5 AV | | | 2.78 H | 153 | 63.3 | 36.2 |
| 3 | #10400.00 | 56.5 PK | 68.2 | -11.7 | 1.36 H | 324 | 41.3 | 15.2 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5200.00 | 118.6 PK | | | 2.41 V | 186 | 82.4 | 36.2 |
| 2 | *5200.00 | 105.8 AV | | | 2.41 V | 186 | 69.6 | 36.2 |
| 3 | #10400.00 | 57.1 PK | 68.2 | -11.1 | 2.55 V | 232 | 41.9 | 15.2 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 48 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5240.00 | 112.2 PK | | | 2.88 H | 147 | 76.1 | 36.1 |
| 2 | *5240.00 | 99.0 AV | | | 2.88 H | 147 | 62.9 | 36.1 |
| 3 | 5350.00 | 52.3 PK | 74.0 | -21.7 | 2.88 H | 147 | 50.3 | 2.0 |
| 4 | 5350.00 | 40.4 AV | 54.0 | -13.6 | 2.88 H | 147 | 38.4 | 2.0 |
| 5 | #10480.00 | 56.2 PK | 68.2 | -12.0 | 1.25 H | 311 | 41.1 | 15.1 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5240.00 | 118.6 PK | | | 2.37 V | 183 | 82.5 | 36.1 |
| 2 | *5240.00 | 105.3 AV | | | 2.37 V | 183 | 69.2 | 36.1 |
| 3 | 5350.00 | 54.9 PK | 74.0 | -19.1 | 2.37 V | 183 | 52.9 | 2.0 |
| 4 | 5350.00 | 42.8 AV | 54.0 | -11.2 | 2.37 V | 183 | 40.8 | 2.0 |
| 5 | #10480.00 | 56.9 PK | 68.2 | -11.3 | 2.51 V | 233 | 41.8 | 15.1 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|----------------|--------------------------|--------------|
| CHANNEL | TX Channel 149 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5745.00 | 115.2 PK | | | 3.00 H | 281 | 77.9 | 37.3 |
| 2 | *5745.00 | 102.6 AV | | | 3.00 H | 281 | 65.3 | 37.3 |
| 3 | 11490.00 | 57.8 PK | 74.0 | -16.2 | 1.77 H | 178 | 42.3 | 15.5 |
| 4 | 11490.00 | 44.8 AV | 54.0 | -9.2 | 1.77 H | 178 | 29.3 | 15.5 |
| 5 | #17235.00 | 65.8 PK | 68.2 | -2.4 | 2.07 H | 125 | 42.9 | 22.9 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5745.00 | 117.0 PK | | | 2.40 V | 95 | 79.7 | 37.3 |
| 2 | *5745.00 | 104.0 AV | | | 2.40 V | 95 | 66.7 | 37.3 |
| 3 | 11490.00 | 62.7 PK | 74.0 | -11.3 | 1.07 V | 76 | 47.2 | 15.5 |
| 4 | 11490.00 | 49.9 AV | 54.0 | -4.1 | 1.07 V | 76 | 34.4 | 15.5 |
| 5 | #17235.00 | 67.1 PK | 68.2 | -1.1 | 2.84 V | 90 | 44.2 | 22.9 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|----------------|--------------------------|--------------|
| CHANNEL | TX Channel 157 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5785.00 | 114.3 PK | | | 2.68 H | 279 | 76.8 | 37.5 |
| 2 | *5785.00 | 100.6 AV | | | 2.68 H | 279 | 63.1 | 37.5 |
| 3 | 11570.00 | 60.1 PK | 74.0 | -13.9 | 1.07 H | 312 | 44.9 | 15.2 |
| 4 | 11570.00 | 47.2 AV | 54.0 | -6.8 | 1.07 H | 312 | 32.0 | 15.2 |
| 5 | #17355.00 | 66.2 PK | 68.2 | -2.0 | 1.96 H | 130 | 43.5 | 22.7 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5785.00 | 115.2 PK | | | 2.26 V | 101 | 77.7 | 37.5 |
| 2 | *5785.00 | 102.7 AV | | | 2.26 V | 101 | 65.2 | 37.5 |
| 3 | 11570.00 | 62.5 PK | 74.0 | -11.5 | 2.70 V | 90 | 47.3 | 15.2 |
| 4 | 11570.00 | 49.9 AV | 54.0 | -4.1 | 2.70 V | 90 | 34.7 | 15.2 |
| 5 | #17355.00 | 67.1 PK | 68.2 | -1.1 | 2.82 V | 85 | 44.4 | 22.7 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|----------------|--------------------------|--------------|
| CHANNEL | TX Channel 165 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5825.00 | 112.3 PK | | | 2.80 H | 281 | 74.9 | 37.4 |
| 2 | *5825.00 | 99.1 AV | | | 2.80 H | 281 | 61.7 | 37.4 |
| 3 | 11650.00 | 60.0 PK | 74.0 | -14.0 | 1.62 H | 308 | 44.8 | 15.2 |
| 4 | 11650.00 | 47.4 AV | 54.0 | -6.6 | 1.62 H | 308 | 32.2 | 15.2 |
| 5 | #17475.00 | 66.5 PK | 68.2 | -1.7 | 2.03 H | 128 | 43.2 | 23.3 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5825.00 | 115.0 PK | | | 2.43 V | 98 | 77.6 | 37.4 |
| 2 | *5825.00 | 101.7 AV | | | 2.43 V | 98 | 64.3 | 37.4 |
| 3 | 11650.00 | 63.6 PK | 74.0 | -10.4 | 2.82 V | 88 | 48.4 | 15.2 |
| 4 | 11650.00 | 49.8 AV | 54.0 | -4.2 | 2.82 V | 88 | 34.6 | 15.2 |
| 5 | #17475.00 | 67.0 PK | 68.2 | -1.2 | 2.80 V | 87 | 43.7 | 23.3 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ax (HE40)

| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 38 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 5150.00 | 60.5 PK | 74.0 | -13.5 | 2.81 H | 146 | 58.4 | 2.1 |
| 2 | 5150.00 | 47.5 AV | 54.0 | -6.5 | 2.81 H | 146 | 45.4 | 2.1 |
| 3 | *5190.00 | 99.7 PK | | | 2.81 H | 146 | 63.5 | 36.2 |
| 4 | *5190.00 | 87.4 AV | | | 2.81 H | 146 | 51.2 | 36.2 |
| 5 | #10380.00 | 56.1 PK | 68.2 | -12.1 | 1.26 H | 321 | 40.9 | 15.2 |

| Antenna Polarity & Test Distance : Vertical at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 5150.00 | 64.9 PK | 74.0 | -9.1 | 2.42 V | 184 | 62.8 | 2.1 |
| 2 | 5150.00 | 52.7 AV | 54.0 | -1.3 | 2.42 V | 184 | 50.6 | 2.1 |
| 3 | *5190.00 | 106.6 PK | | | 2.42 V | 184 | 70.4 | 36.2 |
| 4 | *5190.00 | 93.7 AV | | | 2.42 V | 184 | 57.5 | 36.2 |
| 5 | #10380.00 | 56.8 PK | 74.0 | -17.2 | 2.53 V | 248 | 41.6 | 15.2 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 46 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5230.00 | 109.3 PK | | | 2.76 H | 134 | 73.1 | 36.2 |
| 2 | *5230.00 | 96.4 AV | | | 2.76 H | 134 | 60.2 | 36.2 |
| 3 | 5350.00 | 52.7 PK | 74.0 | -21.3 | 2.76 H | 134 | 50.7 | 2.0 |
| 4 | 5350.00 | 41.4 AV | 54.0 | -12.6 | 2.76 H | 134 | 39.4 | 2.0 |
| 5 | #10460.00 | 55.6 PK | 68.2 | -12.6 | 1.26 H | 336 | 40.5 | 15.1 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5230.00 | 115.7 PK | | | 2.53 V | 186 | 79.5 | 36.2 |
| 2 | *5230.00 | 102.7 AV | | | 2.53 V | 186 | 66.5 | 36.2 |
| 3 | 5350.00 | 55.9 PK | 74.0 | -18.1 | 2.53 V | 186 | 53.9 | 2.0 |
| 4 | 5350.00 | 44.7 AV | 54.0 | -9.3 | 2.53 V | 186 | 42.7 | 2.0 |
| 5 | #10460.00 | 56.7 PK | 68.2 | -11.5 | 2.45 V | 236 | 41.6 | 15.1 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|----------------|------------------------------|--------------|
| CHANNEL | TX Channel 151 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5755.00 | 111.1 PK | | | 3.33 H | 278 | 73.8 | 37.3 |
| 2 | *5755.00 | 99.2 AV | | | 3.33 H | 278 | 61.9 | 37.3 |
| 3 | 11510.00 | 60.4 PK | 74.0 | -13.6 | 1.57 H | 312 | 45.1 | 15.3 |
| 4 | 11510.00 | 47.7 AV | 54.0 | -6.3 | 1.57 H | 312 | 32.4 | 15.3 |
| 5 | #17265.00 | 66.2 PK | 68.2 | -2.0 | 1.97 H | 127 | 43.2 | 23.0 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5755.00 | 113.4 PK | | | 2.27 V | 98 | 76.1 | 37.3 |
| 2 | *5755.00 | 100.6 AV | | | 2.27 V | 98 | 63.3 | 37.3 |
| 3 | 11510.00 | 61.2 PK | 74.0 | -12.8 | 1.08 V | 85 | 45.9 | 15.3 |
| 4 | 11510.00 | 48.6 AV | 54.0 | -5.4 | 1.08 V | 85 | 33.3 | 15.3 |
| 5 | #17265.00 | 67.2 PK | 68.2 | -1.0 | 2.95 V | 89 | 44.2 | 23.0 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.

| | | | |
|------------------------|----------------|--------------------------|--------------|
| CHANNEL | TX Channel 159 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5795.00 | 113.4 PK | | | 3.11 H | 280 | 75.9 | 37.5 |
| 2 | *5795.00 | 100.7 AV | | | 3.11 H | 280 | 63.2 | 37.5 |
| 3 | 11590.00 | 60.6 PK | 74.0 | -13.4 | 1.59 H | 302 | 45.5 | 15.1 |
| 4 | 11590.00 | 47.7 AV | 54.0 | -6.3 | 1.59 H | 302 | 32.6 | 15.1 |
| 5 | #17385.00 | 65.9 PK | 68.2 | -2.3 | 1.99 H | 130 | 43.4 | 22.5 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5795.00 | 114.9 PK | | | 2.26 V | 97 | 77.4 | 37.5 |
| 2 | *5795.00 | 101.7 AV | | | 2.26 V | 97 | 64.2 | 37.5 |
| 3 | 11590.00 | 61.9 PK | 74.0 | -12.1 | 2.63 V | 93 | 46.8 | 15.1 |
| 4 | 11590.00 | 48.5 AV | 54.0 | -5.5 | 2.63 V | 93 | 33.4 | 15.1 |
| 5 | #17385.00 | 67.2 PK | 68.2 | -1.0 | 2.66 V | 87 | 44.7 | 22.5 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.

802.11ax (HE80)

| | | | |
|------------------------|---------------|--------------------------|--------------|
| CHANNEL | TX Channel 42 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 5150.00 | 58.3 PK | 74.0 | -15.7 | 2.80 H | 142 | 56.2 | 2.1 |
| 2 | 5150.00 | 45.2 AV | 54.0 | -8.8 | 2.80 H | 142 | 43.1 | 2.1 |
| 3 | *5210.00 | 95.7 PK | | | 2.80 H | 142 | 59.5 | 36.2 |
| 4 | *5210.00 | 82.4 AV | | | 2.80 H | 142 | 46.2 | 36.2 |
| 5 | 5350.00 | 52.2 PK | 74.0 | -21.8 | 2.80 H | 142 | 50.2 | 2.0 |
| 6 | 5350.00 | 40.6 AV | 54.0 | -13.4 | 2.80 H | 142 | 38.6 | 2.0 |
| 7 | #10420.00 | 55.0 PK | 68.2 | -13.2 | 1.35 H | 331 | 39.8 | 15.2 |

| Antenna Polarity & Test Distance : Vertical at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 5150.00 | 66.1 PK | 74.0 | -7.9 | 2.30 V | 186 | 64.0 | 2.1 |
| 2 | 5150.00 | 52.7 AV | 54.0 | -1.3 | 2.30 V | 186 | 50.6 | 2.1 |
| 3 | *5210.00 | 101.8 PK | | | 2.30 V | 186 | 65.6 | 36.2 |
| 4 | *5210.00 | 88.6 AV | | | 2.30 V | 186 | 52.4 | 36.2 |
| 5 | 5350.00 | 52.9 PK | 74.0 | -21.1 | 2.30 V | 186 | 50.9 | 2.0 |
| 6 | 5350.00 | 42.3 AV | 54.0 | -11.7 | 2.30 V | 186 | 40.3 | 2.0 |
| 7 | #10420.00 | 55.6 PK | 68.2 | -12.6 | 2.59 V | 235 | 40.4 | 15.2 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| | | | |
|------------------------|----------------|--------------------------|--------------|
| CHANNEL | TX Channel 155 | DETECTOR FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | Average (AV) |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5775.00 | 109.5 PK | | | 3.15 H | 285 | 72.0 | 37.5 |
| 2 | *5775.00 | 97.5 AV | | | 3.15 H | 285 | 60.0 | 37.5 |
| 3 | 11550.00 | 59.4 PK | 74.0 | -14.6 | 1.61 H | 315 | 44.1 | 15.3 |
| 4 | 11550.00 | 47.3 AV | 54.0 | -6.7 | 1.61 H | 315 | 32.0 | 15.3 |
| 5 | #17325.00 | 66.3 PK | 68.2 | -1.9 | 2.03 H | 122 | 43.5 | 22.8 |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | *5775.00 | 111.2 PK | | | 2.63 V | 95 | 73.7 | 37.5 |
| 2 | *5775.00 | 99.0 AV | | | 2.63 V | 95 | 61.5 | 37.5 |
| 3 | 11550.00 | 59.9 PK | 74.0 | -14.1 | 1.27 V | 85 | 44.6 | 15.3 |
| 4 | 11550.00 | 47.6 AV | 54.0 | -6.4 | 1.27 V | 85 | 32.3 | 15.3 |
| 5 | #17325.00 | 67.1 PK | 68.2 | -1.1 | 3.03 V | 85 | 44.3 | 22.8 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

802.11a

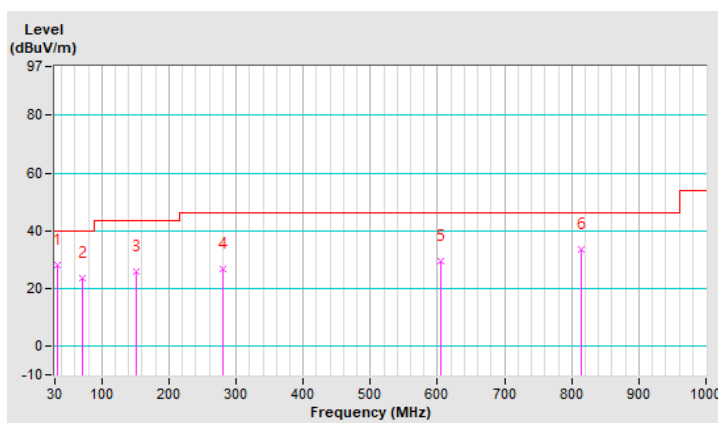
Mode A

| | | | |
|------------------------|---------------|--------------------------|-----------------|
| CHANNEL | TX Channel 40 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 33.88 | 27.9 QP | 40.0 | -12.1 | 1.50 H | 108 | 38.5 | -10.6 |
| 2 | 70.74 | 23.6 QP | 40.0 | -16.4 | 1.25 H | 59 | 34.7 | -11.1 |
| 3 | 152.22 | 25.7 QP | 43.5 | -17.8 | 1.00 H | 115 | 34.4 | -8.7 |
| 4 | 281.23 | 26.5 QP | 46.0 | -19.5 | 1.00 H | 82 | 33.9 | -7.4 |
| 5 | 605.21 | 29.4 QP | 46.0 | -16.6 | 1.25 H | 56 | 30.1 | -0.7 |
| 6 | 814.73 | 33.4 QP | 46.0 | -12.6 | 1.50 H | 2 | 30.4 | 3.0 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



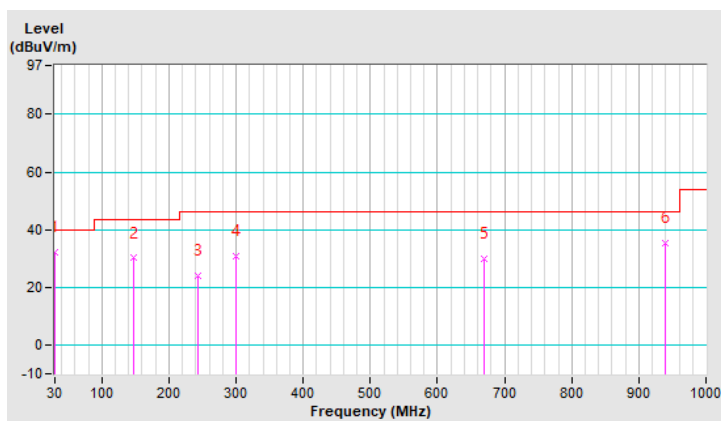
| | | | |
|------------------------|---------------|--------------------------|-----------------|
| CHANNEL | TX Channel 40 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 30.00 | 32.2 QP | 40.0 | -7.8 | 1.25 V | 341 | 42.7 | -10.5 |
| 2 | 146.40 | 30.1 QP | 43.5 | -13.4 | 1.00 V | 109 | 38.8 | -8.7 |
| 3 | 242.43 | 23.8 QP | 46.0 | -22.2 | 1.50 V | 65 | 33.1 | -9.3 |
| 4 | 299.66 | 30.8 QP | 46.0 | -15.2 | 1.00 V | 272 | 37.9 | -7.1 |
| 5 | 669.23 | 30.1 QP | 46.0 | -15.9 | 1.25 V | 223 | 29.8 | 0.3 |
| 6 | 938.89 | 35.2 QP | 46.0 | -10.8 | 1.00 V | 43 | 29.9 | 5.3 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



Mode B

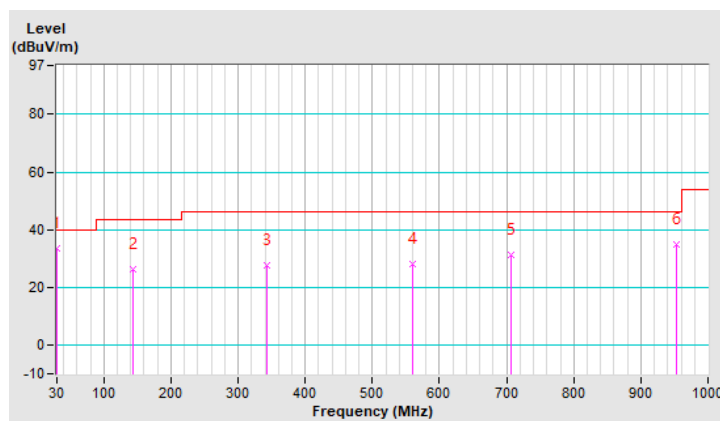
| | | | |
|------------------------|---------------|--------------------------|-----------------|
| CHANNEL | TX Channel 40 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |

Antenna Polarity & Test Distance : Horizontal at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 30.00 | 33.7 QP | 40.0 | -6.3 | 1.25 H | 28 | 44.2 | -10.5 |
| 2 | 142.52 | 26.2 QP | 43.5 | -17.3 | 1.00 H | 126 | 35.2 | -9.0 |
| 3 | 343.31 | 27.5 QP | 46.0 | -18.5 | 1.50 H | 156 | 33.6 | -6.1 |
| 4 | 559.62 | 28.0 QP | 46.0 | -18.0 | 1.00 H | 12 | 30.0 | -2.0 |
| 5 | 707.06 | 31.1 QP | 46.0 | -14.9 | 1.00 H | 265 | 30.2 | 0.9 |
| 6 | 953.44 | 35.1 QP | 46.0 | -10.9 | 1.25 H | 337 | 29.5 | 5.6 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



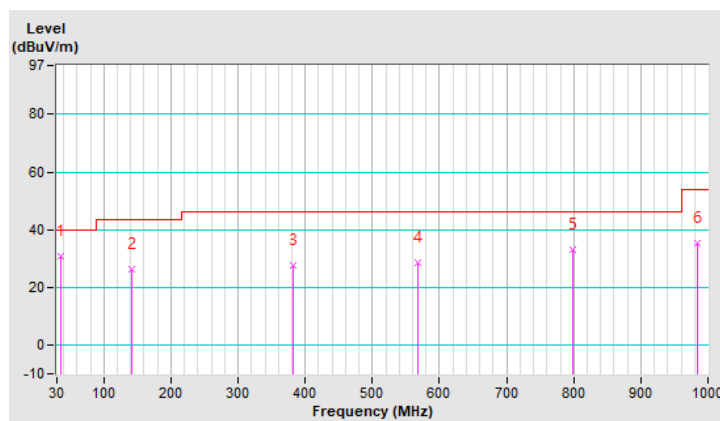
| | | | |
|------------------------|---------------|--------------------------|-----------------|
| CHANNEL | TX Channel 40 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBUV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 36.79 | 30.9 QP | 40.0 | -9.1 | 1.25 V | 244 | 41.1 | -10.2 |
| 2 | 140.58 | 26.4 QP | 43.5 | -17.1 | 1.00 V | 181 | 35.6 | -9.2 |
| 3 | 381.14 | 27.5 QP | 46.0 | -18.5 | 1.50 V | 239 | 32.7 | -5.2 |
| 4 | 568.35 | 28.4 QP | 46.0 | -17.6 | 1.00 V | 32 | 30.1 | -1.7 |
| 5 | 798.24 | 33.0 QP | 46.0 | -13.0 | 1.00 V | 357 | 30.2 | 2.8 |
| 6 | 984.48 | 35.5 QP | 54.0 | -18.5 | 1.25 V | 252 | 29.6 | 5.9 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



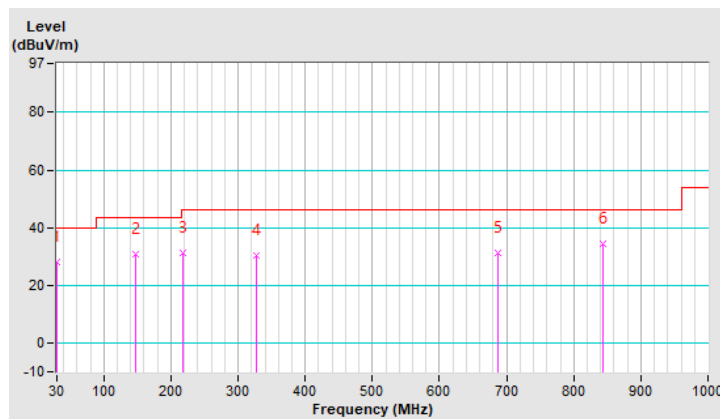
Mode C

| | | | |
|------------------------|---------------|--------------------------|-----------------|
| CHANNEL | TX Channel 40 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |

| Antenna Polarity & Test Distance : Horizontal at 3 m | | | | | | | | |
|--|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | 30.00 | 28.1 QP | 40.0 | -11.9 | 1.25 H | 10 | 38.6 | -10.5 |
| 2 | 146.40 | 30.9 QP | 43.5 | -12.6 | 1.50 H | 105 | 39.6 | -8.7 |
| 3 | 218.18 | 31.1 QP | 46.0 | -14.9 | 1.00 H | 282 | 42.1 | -11.0 |
| 4 | 326.82 | 30.5 QP | 46.0 | -15.5 | 1.00 H | 151 | 36.9 | -6.4 |
| 5 | 686.69 | 31.3 QP | 46.0 | -14.7 | 1.25 H | 150 | 30.6 | 0.7 |
| 6 | 843.83 | 34.5 QP | 46.0 | -11.5 | 1.00 H | 235 | 31.0 | 3.5 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



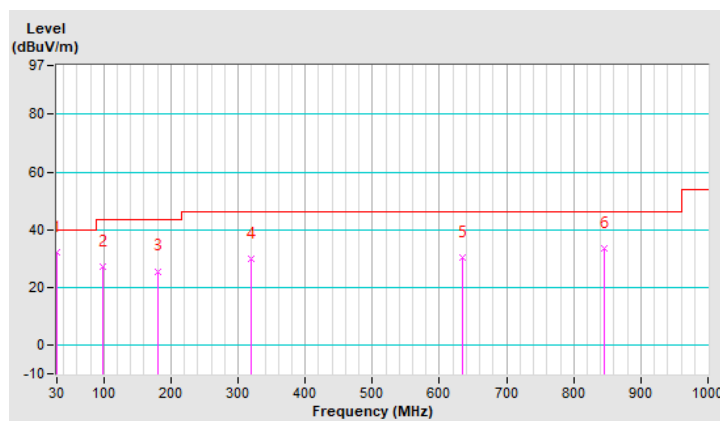
| | | | |
|------------------------|---------------|--------------------------|-----------------|
| CHANNEL | TX Channel 40 | DETECTOR FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz | | |

Antenna Polarity & Test Distance : Vertical at 3 m

| No | Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|----|-----------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| 1 | 30.00 | 32.3 QP | 40.0 | -7.7 | 1.25 V | 296 | 42.8 | -10.5 |
| 2 | 97.90 | 27.2 QP | 43.5 | -16.3 | 1.00 V | 184 | 41.0 | -13.8 |
| 3 | 180.35 | 25.6 QP | 43.5 | -17.9 | 1.00 V | 18 | 35.7 | -10.1 |
| 4 | 319.06 | 29.9 QP | 46.0 | -16.1 | 1.00 V | 38 | 36.5 | -6.6 |
| 5 | 634.31 | 30.2 QP | 46.0 | -15.8 | 1.00 V | 293 | 30.3 | -0.1 |
| 6 | 844.80 | 33.4 QP | 46.0 | -12.6 | 1.50 V | 274 | 29.9 | 3.5 |

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

| Frequency (MHz) | Conducted Limit (dBuV) | |
|-----------------|------------------------|---------|
| | Quasi-Peak | Average |
| 0.15 - 0.5 | 66 - 56 | 56 - 46 |
| 0.50 - 5.0 | 56 | 46 |
| 5.0 - 30.0 | 60 | 50 |

- Note: 1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|---|--------------------------|----------------|---------------------|-------------------------|
| Test Receiver ROHDE & SCHWARZ | ESCI | 100613 | Dec. 11, 2019 | Dec. 10, 2020 |
| RF signal cable (with 10dB PAD) Woken | 5D-FB | Cable-cond1-01 | Sep. 05, 2019 | Sep. 04, 2020 |
| | | | Sep. 04, 2020 | Sep. 03, 2021 |
| LISN ROHDE & SCHWARZ (EUT) | ENV216 | 101826 | Feb. 20, 2020 | Feb. 19, 2021 |
| V-LISN SCHWARZBECK (Peripheral) | NNBL 8226-2 | 8226-142 | Jul. 31, 2020 | Jul. 30, 2021 |
| Software ADT | BV ADT_Cond_ V7.3.7.3 | NA | NA | NA |

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 1 (Conduction 1).
 3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

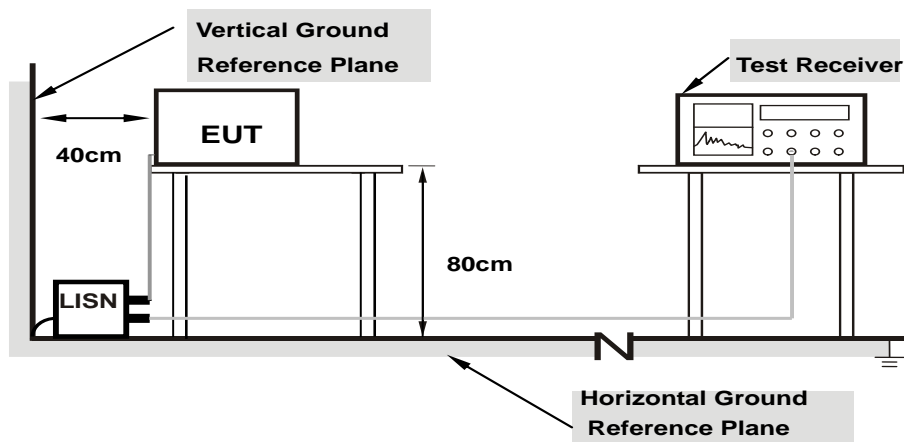
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit -20 dB) was not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

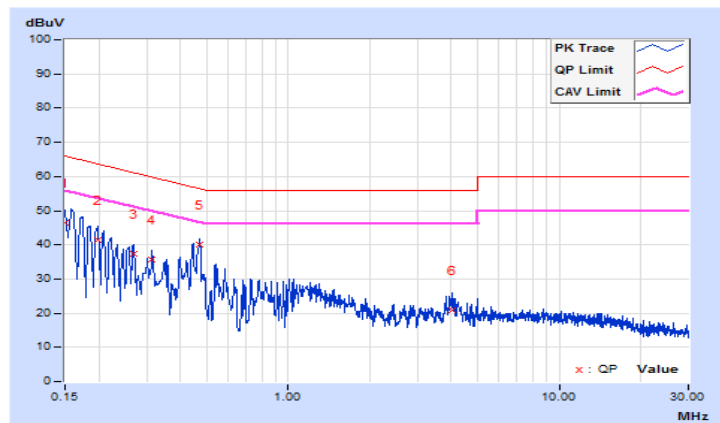
4.2.7 Test Results

| | | | |
|------------------------|----------------|---|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 75%RH |
| Tested by | Greg Lin | Test Date | 2020/8/7 |
| Test Mode | Mode A | | |

| Phase Of Power : Line (L) | | | | | | | | | | |
|---------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | | Emission Level (dBuV) | | Limit (dBuV) | | Margin (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15000 | 9.63 | 36.82 | 21.94 | 46.45 | 31.57 | 66.00 | 56.00 | -19.55 | -24.43 |
| 2 | 0.19780 | 9.62 | 31.96 | 18.31 | 41.58 | 27.93 | 63.70 | 53.70 | -22.12 | -25.77 |
| 3 | 0.26779 | 9.63 | 27.77 | 14.12 | 37.40 | 23.75 | 61.19 | 51.19 | -23.79 | -27.44 |
| 4 | 0.31400 | 9.64 | 25.92 | 14.19 | 35.56 | 23.83 | 59.86 | 49.86 | -24.30 | -26.03 |
| 5 | 0.47000 | 9.65 | 30.29 | 26.21 | 39.94 | 35.86 | 56.51 | 46.51 | -16.57 | -10.65 |
| 6 | 4.03800 | 9.79 | 11.12 | 2.44 | 20.91 | 12.23 | 56.00 | 46.00 | -35.09 | -33.77 |

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

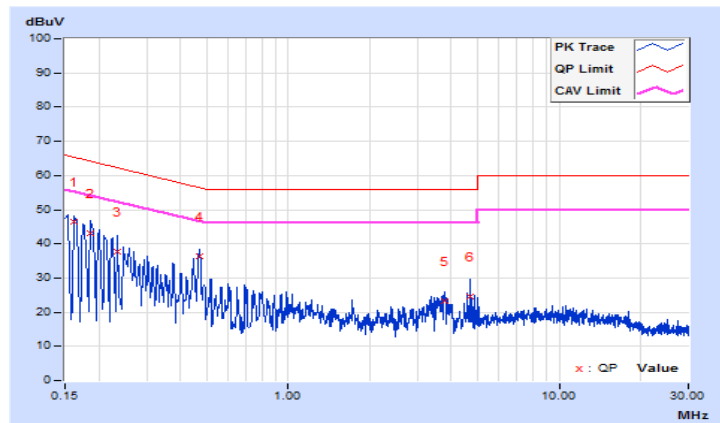


| | | | |
|------------------------|----------------|---|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 75%RH |
| Tested by | Greg Lin | Test Date | 2020/8/7 |
| Test Mode | Mode A | | |

| Phase Of Power : Neutral (N) | | | | | | | | | | |
|------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | | Emission Level (dBuV) | | Limit (dBuV) | | Margin (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.16200 | 9.66 | 36.67 | 22.40 | 46.33 | 32.06 | 65.36 | 55.36 | -19.03 | -23.30 |
| 2 | 0.18600 | 9.65 | 33.52 | 18.53 | 43.17 | 28.18 | 64.21 | 54.21 | -21.04 | -26.03 |
| 3 | 0.23400 | 9.65 | 28.05 | 11.47 | 37.70 | 21.12 | 62.31 | 52.31 | -24.61 | -31.19 |
| 4 | 0.47000 | 9.67 | 26.69 | 20.50 | 36.36 | 30.17 | 56.51 | 46.51 | -20.15 | -16.34 |
| 5 | 3.79400 | 9.81 | 13.55 | 3.01 | 23.36 | 12.82 | 56.00 | 46.00 | -32.64 | -33.18 |
| 6 | 4.67000 | 9.83 | 14.68 | 3.55 | 24.51 | 13.38 | 56.00 | 46.00 | -31.49 | -32.62 |

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

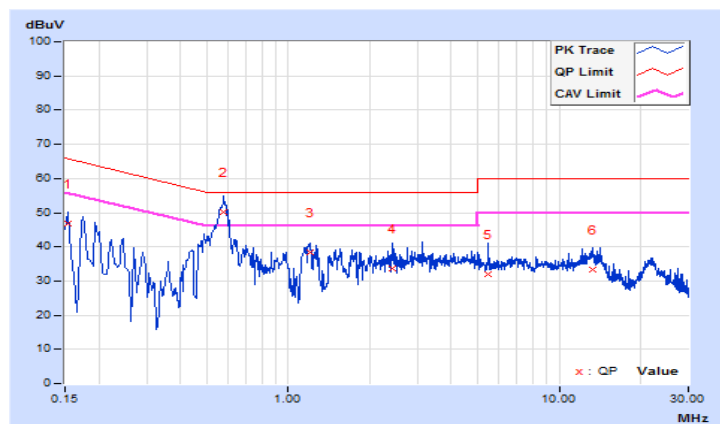


| | | | |
|------------------------|----------------|---|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 75%RH |
| Tested by | Greg Lin | Test Date | 2020/11/23 |
| Test Mode | Mode B | | |

| Phase Of Power : Line (L) | | | | | | | | | | |
|---------------------------|-----------------|------------------------|----------------------|--------------|-----------------------|--------------|--------------|--------------|--------------|--------------|
| No | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | | Emission Level (dBuV) | | Limit (dBuV) | | Margin (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15400 | 9.58 | 37.29 | 26.63 | 46.87 | 36.21 | 65.78 | 55.78 | -18.91 | -19.57 |
| 2 | 0.57796 | 9.59 | 40.59 | 32.63 | 50.18 | 42.22 | 56.00 | 46.00 | -5.82 | -3.78 |
| 3 | 1.19800 | 9.61 | 28.81 | 20.77 | 38.42 | 30.38 | 56.00 | 46.00 | -17.58 | -15.62 |
| 4 | 2.41400 | 9.64 | 24.00 | 16.37 | 33.64 | 26.01 | 56.00 | 46.00 | -22.36 | -19.99 |
| 5 | 5.46200 | 9.68 | 22.45 | 16.40 | 32.13 | 26.08 | 60.00 | 50.00 | -27.87 | -23.92 |
| 6 | 13.26200 | 9.75 | 23.53 | 17.11 | 33.28 | 26.86 | 60.00 | 50.00 | -26.72 | -23.14 |

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

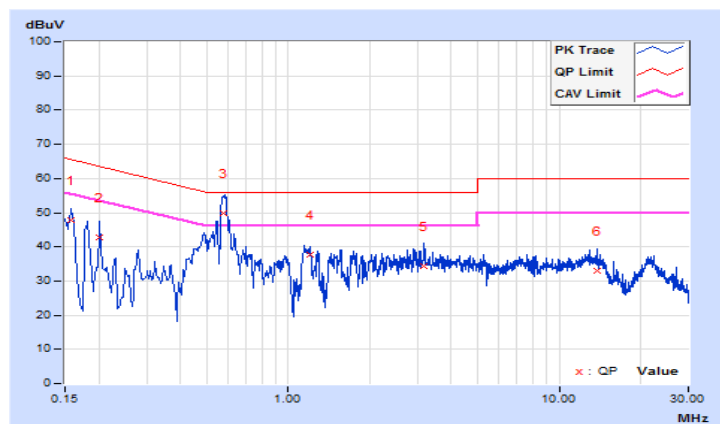


| | | | |
|------------------------|----------------|---|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 75%RH |
| Tested by | Greg Lin | Test Date | 2020/11/23 |
| Test Mode | Mode B | | |

| Phase Of Power : Neutral (N) | | | | | | | | | | |
|------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | | Emission Level (dBuV) | | Limit (dBuV) | | Margin (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15770 | 9.56 | 38.19 | 26.41 | 47.75 | 35.97 | 65.58 | 55.58 | -17.83 | -19.61 |
| 2 | 0.20200 | 9.57 | 33.18 | 17.14 | 42.75 | 26.71 | 63.53 | 53.53 | -20.78 | -26.82 |
| 3 | 0.57342 | 9.57 | 40.37 | 32.30 | 49.94 | 41.87 | 56.00 | 46.00 | -6.06 | -4.13 |
| 4 | 1.19800 | 9.58 | 28.07 | 20.31 | 37.65 | 29.89 | 56.00 | 46.00 | -18.35 | -16.11 |
| 5 | 3.16600 | 9.63 | 24.73 | 17.87 | 34.36 | 27.50 | 56.00 | 46.00 | -21.64 | -18.50 |
| 6 | 13.88600 | 9.78 | 23.28 | 16.52 | 33.06 | 26.30 | 60.00 | 50.00 | -26.94 | -23.70 |

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

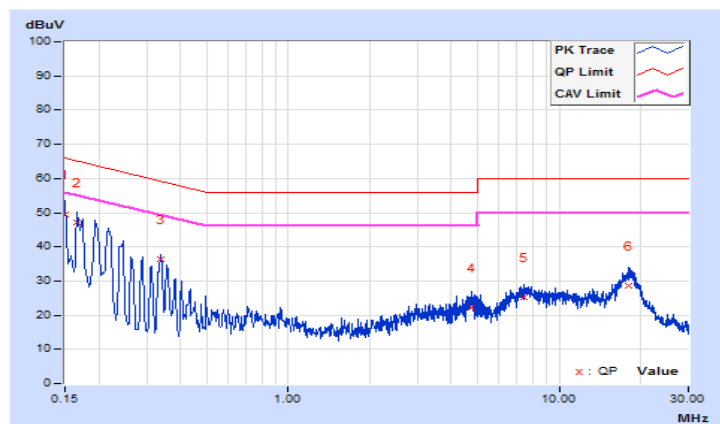


| | | | |
|------------------------|----------------|---|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 75%RH |
| Tested by | Greg Lin | Test Date | 2020/8/7 |
| Test Mode | Mode C | | |

| Phase Of Power : Line (L) | | | | | | | | | | |
|---------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | | Emission Level (dBuV) | | Limit (dBuV) | | Margin (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15000 | 9.63 | 39.96 | 26.21 | 49.59 | 35.84 | 66.00 | 56.00 | -16.41 | -20.16 |
| 2 | 0.16600 | 9.63 | 37.61 | 26.04 | 47.24 | 35.67 | 65.16 | 55.16 | -17.92 | -19.49 |
| 3 | 0.33800 | 9.64 | 26.70 | 24.56 | 36.34 | 34.20 | 59.25 | 49.25 | -22.91 | -15.05 |
| 4 | 4.77000 | 9.80 | 12.46 | 3.66 | 22.26 | 13.46 | 56.00 | 46.00 | -33.74 | -32.54 |
| 5 | 7.39400 | 9.84 | 15.34 | 7.89 | 25.18 | 17.73 | 60.00 | 50.00 | -34.82 | -32.27 |
| 6 | 17.99000 | 9.91 | 18.82 | 12.39 | 28.73 | 22.30 | 60.00 | 50.00 | -31.27 | -27.70 |

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

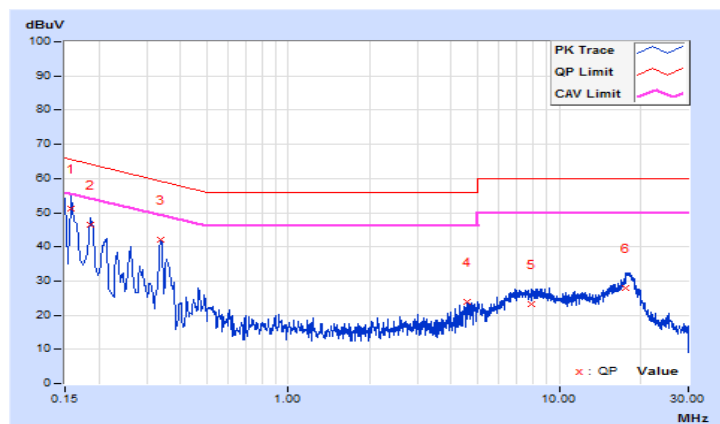


| | | | |
|------------------------|----------------|---|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 75%RH |
| Tested by | Greg Lin | Test Date | 2020/8/7 |
| Test Mode | Mode C | | |

| Phase Of Power : Neutral (N) | | | | | | | | | | |
|------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | | Emission Level (dBuV) | | Limit (dBuV) | | Margin (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15800 | 9.66 | 41.54 | 28.07 | 51.20 | 37.73 | 65.57 | 55.57 | -14.37 | -17.84 |
| 2 | 0.18600 | 9.65 | 36.93 | 21.45 | 46.58 | 31.10 | 64.21 | 54.21 | -17.63 | -23.11 |
| 3 | 0.33800 | 9.66 | 32.36 | 29.18 | 42.02 | 38.84 | 59.25 | 49.25 | -17.23 | -10.41 |
| 4 | 4.56600 | 9.83 | 13.94 | 2.58 | 23.77 | 12.41 | 56.00 | 46.00 | -32.23 | -33.59 |
| 5 | 7.86200 | 9.88 | 13.39 | 5.78 | 23.27 | 15.66 | 60.00 | 50.00 | -36.73 | -34.34 |
| 6 | 17.70600 | 10.01 | 17.79 | 11.24 | 27.80 | 21.25 | 60.00 | 50.00 | -32.20 | -28.75 |

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

| Operation Band | EUT Category | | Limit |
|----------------|--------------|-----------------------------------|---|
| U-NII-1 | | Outdoor Access Point | 1 Watt (30 dBm) (Max. e.i.r.p \leq 125 mW (21 dBm) at any elevation angle above 30 degrees as measured from the horizon) |
| | | Fixed point-to-point Access Point | 1 Watt (30 dBm) |
| | √ | Indoor Access Point | 1 Watt (30 dBm) |
| | √ | Mobile and Portable client device | 250 mW (24 dBm) |
| U-NII-2A | | | 250 mW (24 dBm) or 11 dBm + 10 log B* |
| U-NII-2C | | | 250 mW (24 dBm) or 11 dBm + 10 log B* |
| U-NII-3 | | √ | 1 Watt (30 dBm) |

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

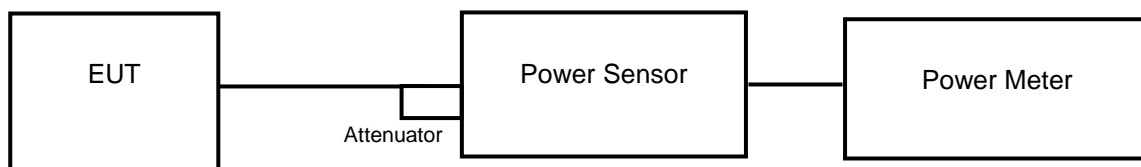
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20 MHz channel widths with $N_{ANT} \geq 5$.

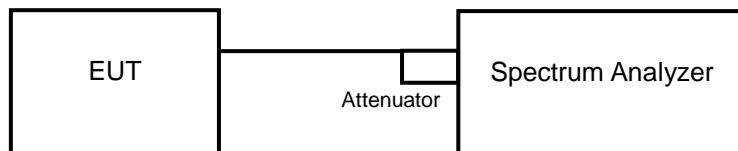
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.3.2 Test Setup

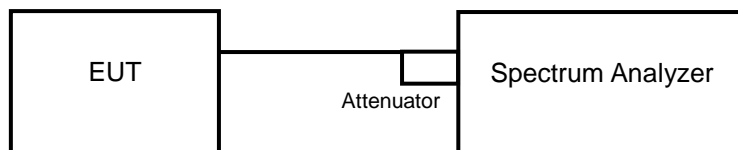
<Power Output Measurement>



or



<26 dB Bandwidth>



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

<802.11a, 802.11n (HT20), 802.11n (HT40), 802.11ax (HE20), 802.11ax (HE40)>

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

<802.11ac (VHT80), 802.11ax (HE80)>

- a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99 % occupied bandwidth) of the signal.
- b. Set sweep trigger to “free run”.
- c. Set RBW = 1 MHz.
- d. Set VBW \geq 3 MHz
- e. Number of points in sweep \geq 2 Span / RBW.
- f. Sweep time \leq (number of points in sweep) * T
- g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
- h. Detector = RMS.
- i. Trace mode = max hold.
- j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
- k. 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 spectrum

26 dB Bandwidth

- a. Set RBW = approximately 1 % of the emission bandwidth.
- b. Set the VBW > RBW.
- c. Detector = Peak.
- d. Trace mode = max hold.
- e. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Results

Power Output:

<AP Mode>

CDD Mode

802.11a

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 21.19 | 20.53 | 244.502 | 23.88 | 30 | Pass |
| 40 | 5200 | 25.50 | 25.33 | 696.006 | 28.43 | 30 | Pass |
| 48 | 5240 | 24.58 | 24.27 | 554.379 | 27.44 | 30 | Pass |
| 149 | 5745 | 22.74 | 22.52 | 366.58 | 25.64 | 30 | Pass |
| 157 | 5785 | 22.88 | 22.59 | 375.64 | 25.75 | 30 | Pass |
| 165 | 5825 | 22.23 | 22.04 | 327.065 | 25.15 | 30 | Pass |

802.11n (HT20)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 20.67 | 20.33 | 224.576 | 23.51 | 30 | Pass |
| 40 | 5200 | 25.17 | 24.28 | 596.768 | 27.76 | 30 | Pass |
| 48 | 5240 | 24.51 | 24.20 | 545.515 | 27.37 | 30 | Pass |
| 149 | 5745 | 23.64 | 23.54 | 457.15 | 26.60 | 30 | Pass |
| 157 | 5785 | 22.23 | 22.03 | 326.697 | 25.14 | 30 | Pass |
| 165 | 5825 | 21.19 | 21.06 | 259.166 | 24.14 | 30 | Pass |

802.11n (HT40)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 15.27 | 14.77 | 63.643 | 18.04 | 30 | Pass |
| 46 | 5230 | 24.97 | 24.51 | 596.539 | 27.76 | 30 | Pass |
| 151 | 5755 | 22.91 | 22.78 | 385.105 | 25.86 | 30 | Pass |
| 159 | 5795 | 23.37 | 23.20 | 426.2 | 26.30 | 30 | Pass |

802.11ac (VHT20)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 20.63 | 20.30 | 222.763 | 23.48 | 30 | Pass |
| 40 | 5200 | 25.14 | 24.22 | 590.829 | 27.71 | 30 | Pass |
| 48 | 5240 | 24.47 | 24.16 | 540.513 | 27.33 | 30 | Pass |
| 149 | 5745 | 23.68 | 23.61 | 462.961 | 26.66 | 30 | Pass |
| 157 | 5785 | 22.26 | 22.10 | 330.448 | 25.19 | 30 | Pass |
| 165 | 5825 | 21.23 | 21.11 | 261.861 | 24.18 | 30 | Pass |

802.11ac (VHT40)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 15.24 | 14.76 | 63.342 | 18.02 | 30 | Pass |
| 46 | 5230 | 24.93 | 24.28 | 579.088 | 27.63 | 30 | Pass |
| 151 | 5755 | 22.95 | 22.83 | 389.109 | 25.90 | 30 | Pass |
| 159 | 5795 | 23.43 | 23.31 | 434.582 | 26.38 | 30 | Pass |

802.11ac (VHT80)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | 13.21 | 12.82 | 40.084 | 16.03 | 30 | Pass |
| 155 | 5775 | 23.43 | 23.34 | 436.067 | 26.40 | 30 | Pass |

802.11ax (HE20)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 20.71 | 20.36 | 226.403 | 23.55 | 30 | Pass |
| 40 | 5200 | 25.20 | 24.52 | 614.27 | 27.88 | 30 | Pass |
| 48 | 5240 | 24.55 | 24.22 | 549.343 | 27.40 | 30 | Pass |
| 149 | 5745 | 23.77 | 23.65 | 469.971 | 26.72 | 30 | Pass |
| 157 | 5785 | 22.35 | 22.12 | 334.72 | 25.25 | 30 | Pass |
| 165 | 5825 | 21.31 | 21.16 | 265.824 | 24.25 | 30 | Pass |

802.11ax (HE40)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 15.30 | 14.80 | 64.084 | 18.07 | 30 | Pass |
| 46 | 5230 | 24.97 | 24.59 | 601.791 | 27.79 | 30 | Pass |
| 151 | 5755 | 23.01 | 22.97 | 398.139 | 26.00 | 30 | Pass |
| 159 | 5795 | 23.51 | 23.34 | 440.163 | 26.44 | 30 | Pass |

802.11ax (HE80)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | 13.25 | 12.89 | 40.588 | 16.08 | 30 | Pass |
| 155 | 5775 | 23.52 | 23.41 | 444.186 | 26.48 | 30 | Pass |

Beamforming Mode

802.11n (HT20)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 17.66 | 17.32 | 112.296 | 20.50 | 28.74 | Pass |
| 40 | 5200 | 22.16 | 21.27 | 298.405 | 24.75 | 28.74 | Pass |
| 48 | 5240 | 21.50 | 21.19 | 272.776 | 24.36 | 28.74 | Pass |
| 149 | 5745 | 20.63 | 20.53 | 228.591 | 23.59 | 28.74 | Pass |
| 157 | 5785 | 19.22 | 19.02 | 163.36 | 22.13 | 28.74 | Pass |
| 165 | 5825 | 18.18 | 18.05 | 129.592 | 21.13 | 28.74 | Pass |

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30-(7.26-6) = 28.74 \text{ dBm}$.

802.11n (HT40)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 12.26 | 11.76 | 31.824 | 15.03 | 28.74 | Pass |
| 46 | 5230 | 21.96 | 21.50 | 298.29 | 24.75 | 28.74 | Pass |
| 151 | 5755 | 19.90 | 19.77 | 192.566 | 22.85 | 28.74 | Pass |
| 159 | 5795 | 20.36 | 20.19 | 213.115 | 23.29 | 28.74 | Pass |

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30-(7.26-6) = 28.74 \text{ dBm}$.

802.11ac (VHT20)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 17.62 | 17.29 | 111.389 | 20.47 | 28.74 | Pass |
| 40 | 5200 | 22.13 | 21.21 | 295.435 | 24.70 | 28.74 | Pass |
| 48 | 5240 | 21.46 | 21.15 | 270.275 | 24.32 | 28.74 | Pass |
| 149 | 5745 | 20.67 | 20.60 | 231.496 | 23.65 | 28.74 | Pass |
| 157 | 5785 | 19.25 | 19.09 | 165.236 | 22.18 | 28.74 | Pass |
| 165 | 5825 | 18.22 | 18.10 | 130.94 | 21.17 | 28.74 | Pass |

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (7.26 - 6) = 28.74 \text{ dBm}$.

802.11ac (VHT40)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 12.23 | 11.75 | 31.673 | 15.01 | 28.74 | Pass |
| 46 | 5230 | 21.92 | 21.27 | 289.564 | 24.62 | 28.74 | Pass |
| 151 | 5755 | 19.94 | 19.82 | 194.568 | 22.89 | 28.74 | Pass |
| 159 | 5795 | 20.42 | 20.30 | 217.306 | 23.37 | 28.74 | Pass |

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (7.26 - 6) = 28.74 \text{ dBm}$.

802.11ac (VHT80)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | 10.20 | 9.81 | 20.043 | 13.02 | 28.74 | Pass |
| 155 | 5775 | 20.42 | 20.33 | 218.049 | 23.39 | 28.74 | Pass |

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30 - (7.26 - 6) = 28.74 \text{ dBm}$.

802.11ax (HE20)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 17.71 | 17.36 | 113.47 | 20.55 | 28.74 | Pass |
| 40 | 5200 | 22.20 | 21.52 | 307.864 | 24.88 | 28.74 | Pass |
| 48 | 5240 | 21.55 | 21.22 | 275.324 | 24.40 | 28.74 | Pass |
| 149 | 5745 | 20.76 | 20.64 | 235.002 | 23.71 | 28.74 | Pass |
| 157 | 5785 | 19.34 | 19.11 | 167.372 | 22.24 | 28.74 | Pass |
| 165 | 5825 | 18.30 | 18.15 | 132.921 | 21.24 | 28.74 | Pass |

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30-(7.26-6) = 28.74 \text{ dBm}$.

802.11ax (HE40)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 12.30 | 11.80 | 32.118 | 15.07 | 28.74 | Pass |
| 46 | 5230 | 21.97 | 21.59 | 301.61 | 24.79 | 28.74 | Pass |
| 151 | 5755 | 20.00 | 19.96 | 199.083 | 22.99 | 28.74 | Pass |
| 159 | 5795 | 20.50 | 20.33 | 220.097 | 23.43 | 28.74 | Pass |

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30-(7.26-6) = 28.74 \text{ dBm}$.

802.11ax (HE80)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | 10.25 | 9.89 | 20.342 | 13.08 | 28.74 | Pass |
| 155 | 5775 | 20.51 | 20.40 | 222.108 | 23.47 | 28.74 | Pass |

Note:

Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $30-(7.26-6) = 28.74 \text{ dBm}$.

<Client Mode>

802.11a

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 19.15 | 18.54 | 153.674 | 21.87 | 24 | Pass |
| 40 | 5200 | 19.01 | 18.85 | 150.411 | 21.77 | 24 | Pass |
| 48 | 5240 | 19.11 | 18.82 | 157.678 | 21.98 | 24 | Pass |

802.11n (HT20)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 19.73 | 19.26 | 178.306 | 22.51 | 24 | Pass |
| 40 | 5200 | 19.59 | 19.48 | 179.707 | 22.55 | 24 | Pass |
| 48 | 5240 | 19.51 | 19.18 | 172.125 | 22.36 | 24 | Pass |

802.11n (HT40)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 15.22 | 14.70 | 62.778 | 17.98 | 24 | Pass |
| 46 | 5230 | 20.88 | 20.49 | 234.405 | 23.70 | 24 | Pass |

802.11ac (VHT20)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 19.77 | 19.32 | 180.349 | 22.56 | 24 | Pass |
| 40 | 5200 | 19.62 | 19.50 | 180.747 | 22.57 | 24 | Pass |
| 48 | 5240 | 19.54 | 19.22 | 173.51 | 22.39 | 24 | Pass |

802.11ac (VHT40)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 15.24 | 14.73 | 63.136 | 18.00 | 24 | Pass |
| 46 | 5230 | 20.96 | 20.56 | 238.501 | 23.77 | 24 | Pass |

802.11ac (VHT80)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | 13.17 | 12.84 | 39.98 | 16.02 | 24 | Pass |

802.11ax (HE20)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 19.76 | 19.41 | 181.921 | 22.60 | 24 | Pass |
| 40 | 5200 | 19.70 | 19.58 | 184.107 | 22.65 | 24 | Pass |
| 48 | 5240 | 19.61 | 19.28 | 176.134 | 22.46 | 24 | Pass |

802.11ax (HE40)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 15.30 | 14.80 | 64.084 | 18.07 | 24 | Pass |
| 46 | 5230 | 21.02 | 20.64 | 242.351 | 23.84 | 24 | Pass |

802.11ax (HE80)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | 13.25 | 12.89 | 40.588 | 16.08 | 24 | Pass |

26 dB Bandwidth:
802.11a

| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) | |
|---------|-----------------|------------------------|---------|
| | | Chain 0 | Chain 1 |
| 36 | 5180 | 20.71 | 20.93 |
| 40 | 5200 | 39.07 | 43.51 |
| 48 | 5240 | 33.69 | 34.44 |

802.11ax (HE20)

| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) | |
|---------|-----------------|------------------------|---------|
| | | Chain 0 | Chain 1 |
| 36 | 5180 | 21.80 | 22.05 |
| 40 | 5200 | 41.95 | 37.68 |
| 48 | 5240 | 35.45 | 34.89 |

802.11ax (HE40)

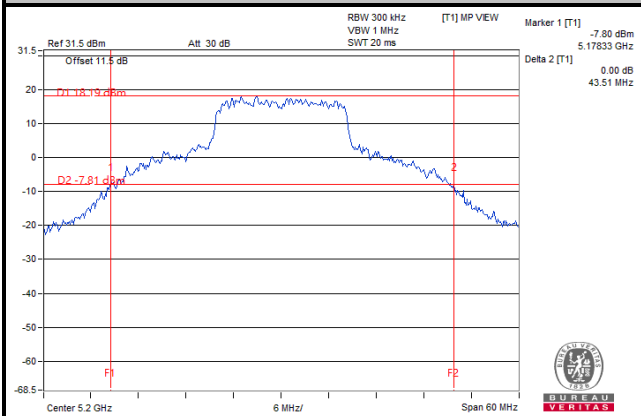
| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) | |
|---------|-----------------|------------------------|---------|
| | | Chain 0 | Chain 1 |
| 38 | 5190 | 42.24 | 42.26 |
| 46 | 5230 | 80.11 | 86.41 |

802.11ax (HE80)

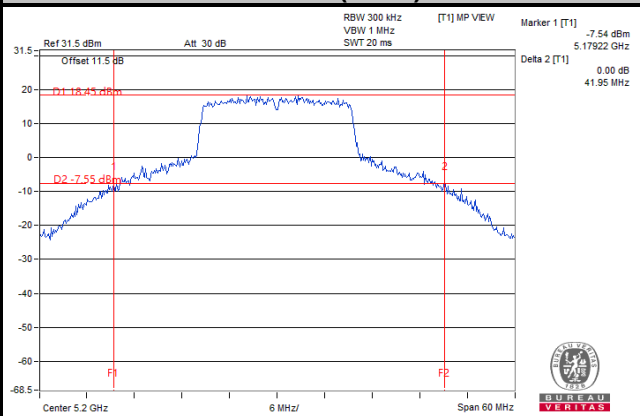
| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) | |
|---------|-----------------|------------------------|---------|
| | | Chain 0 | Chain 1 |
| 42 | 5210 | 82.82 | 82.90 |

Spectrum Plot of Worst Value

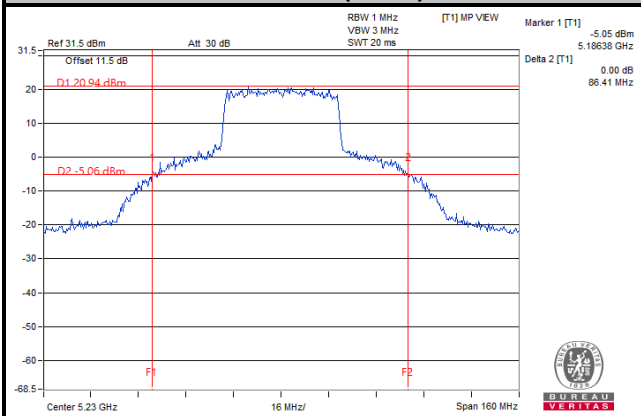
802.11a



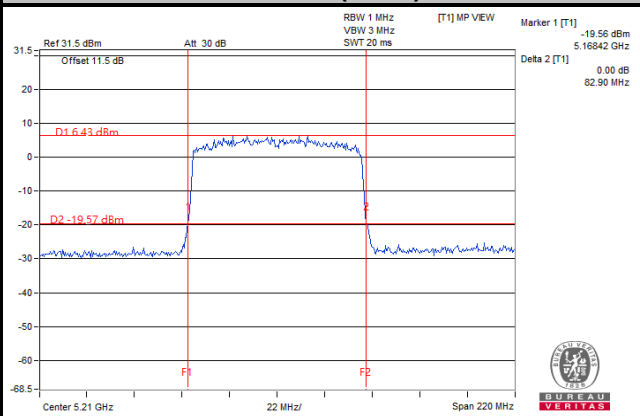
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.4 Test Results

802.11a

| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) | |
|---------|-------------------------|--------------------------|---------|
| | | Chain 0 | Chain 1 |
| 36 | 5180 | 16.44 | 16.44 |
| 40 | 5200 | 24.36 | 29.52 |
| 48 | 5240 | 17.76 | 19.08 |
| 149 | 5745 | 16.52 | 16.52 |
| 157 | 5785 | 16.44 | 16.44 |
| 165 | 5825 | 16.44 | 16.44 |

802.11ax (HE20)

| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) | |
|---------|-------------------------|--------------------------|---------|
| | | Chain 0 | Chain 1 |
| 36 | 5180 | 18.96 | 18.96 |
| 40 | 5200 | 22.08 | 19.92 |
| 48 | 5240 | 19.56 | 19.56 |
| 149 | 5745 | 19.08 | 19.08 |
| 157 | 5785 | 19.08 | 18.96 |
| 165 | 5825 | 19.08 | 19.08 |

802.11ax (HE40)

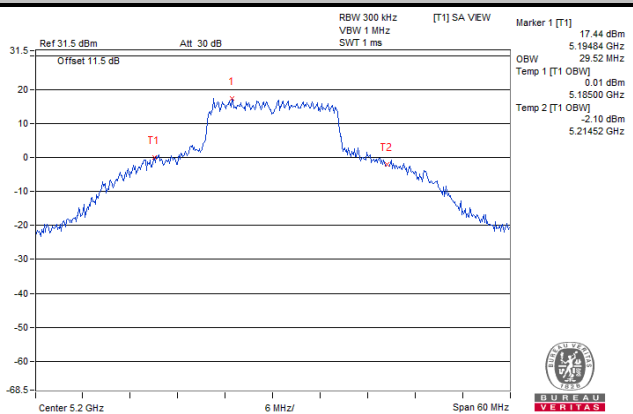
| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) | |
|---------|-------------------------|--------------------------|---------|
| | | Chain 0 | Chain 1 |
| 38 | 5190 | 37.92 | 38.04 |
| 46 | 5230 | 38.88 | 39.36 |
| 151 | 5755 | 38.16 | 38.16 |
| 159 | 5795 | 38.16 | 38.40 |

802.11ax (HE80)

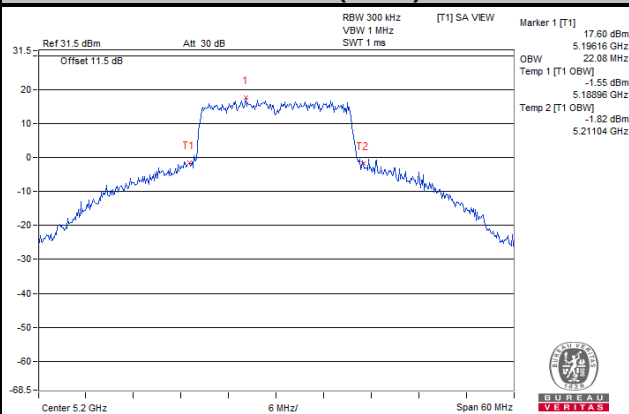
| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) | |
|---------|-------------------------|--------------------------|---------|
| | | Chain 0 | Chain 1 |
| 42 | 5210 | 77.28 | 77.28 |
| 155 | 5775 | 77.28 | 77.76 |

Spectrum Plot of Worst Value

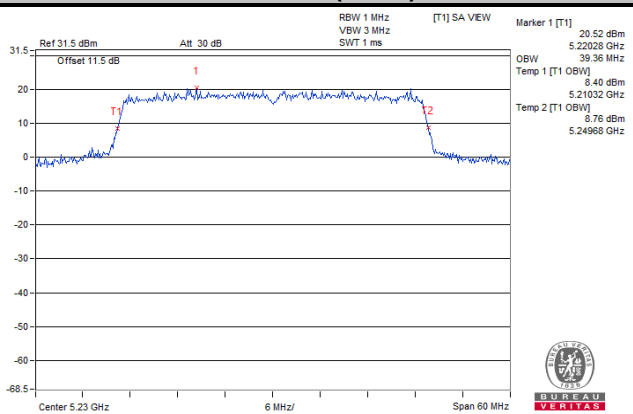
802.11a



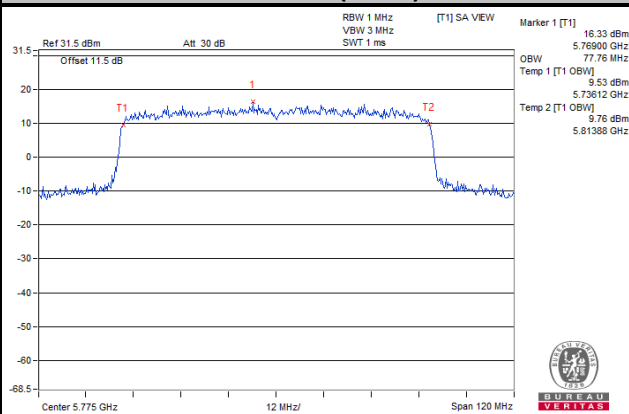
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)

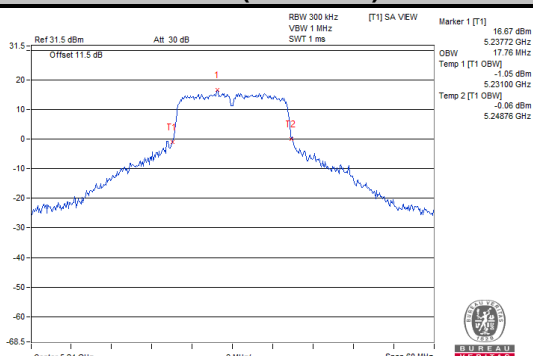


Chain 0

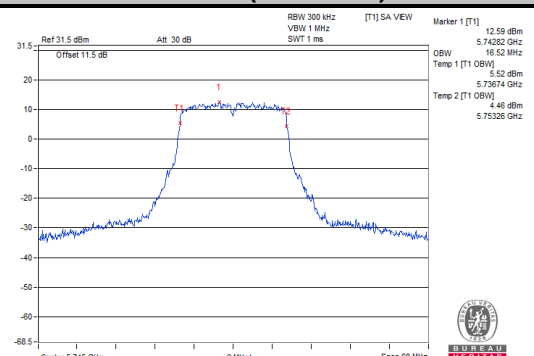
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

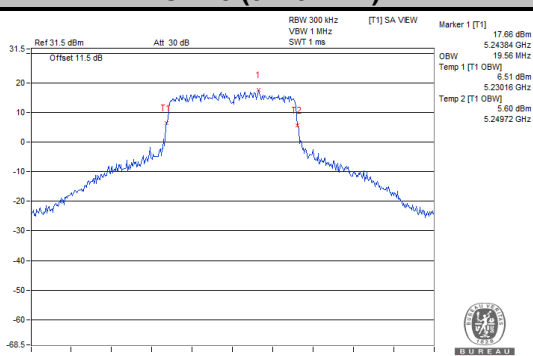


Ch 149 (5745 MHz)

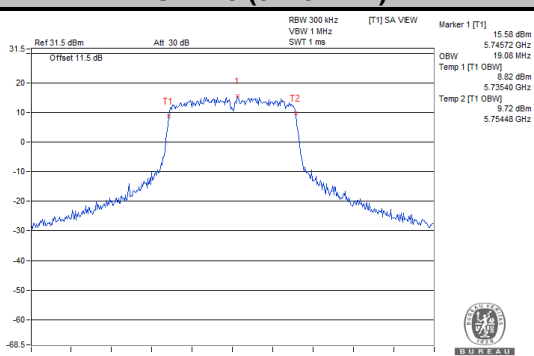


802.11ax (HE20)

Ch 48 (5240 MHz)

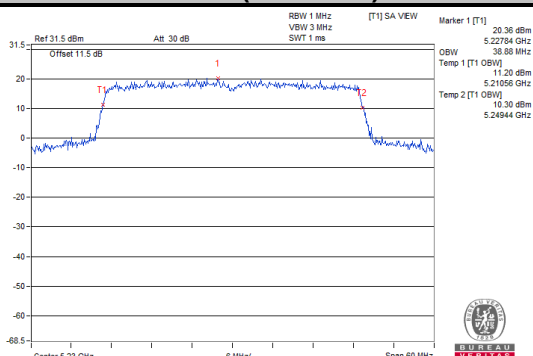


Ch 149 (5745 MHz)

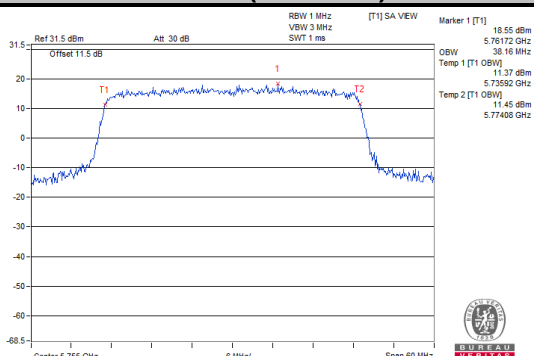


802.11ax (HE40)

Ch 46 (5230 MHz)

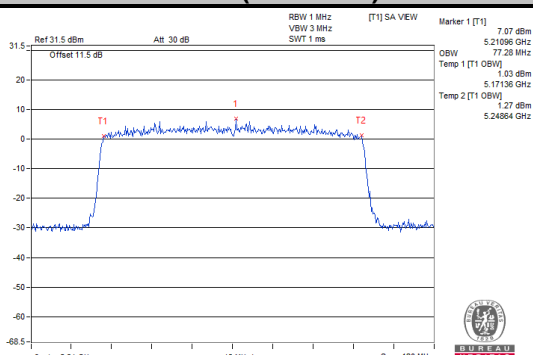


Ch 151 (5755 MHz)

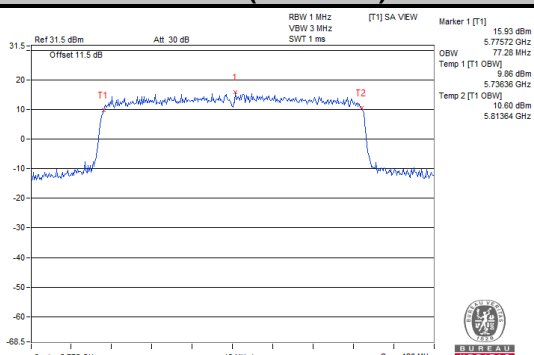


802.11ax (HE80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

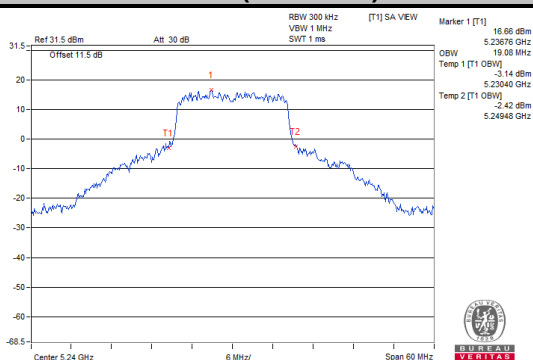


Chain 1

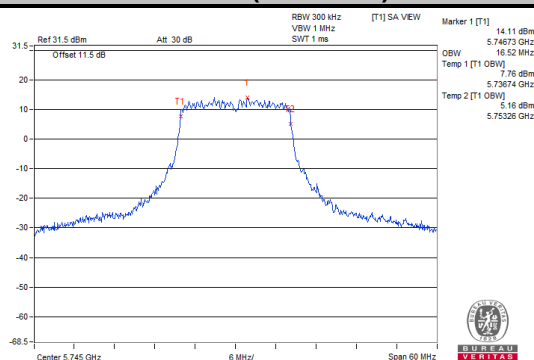
Spectrum Plot for Nearby DFS Band

802.11a

Ch 48 (5240 MHz)

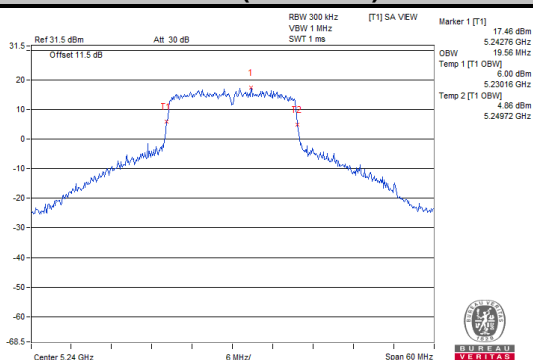


Ch 149 (5745 MHz)

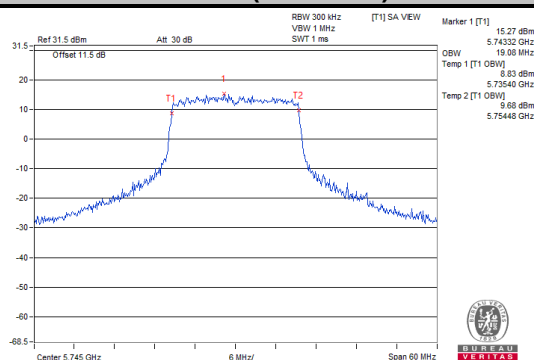


802.11ax (HE20)

Ch 48 (5240 MHz)

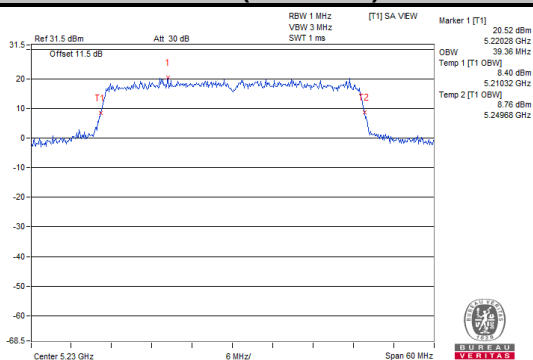


Ch 149 (5745 MHz)

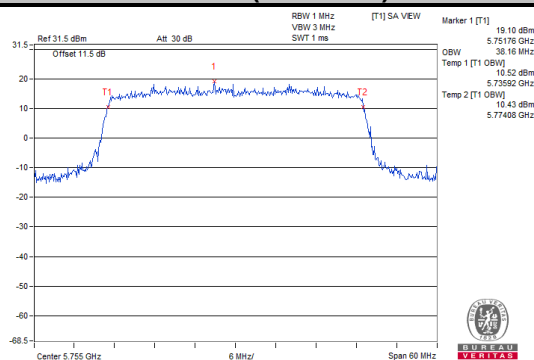


802.11ax (HE40)

Ch 46 (5230 MHz)

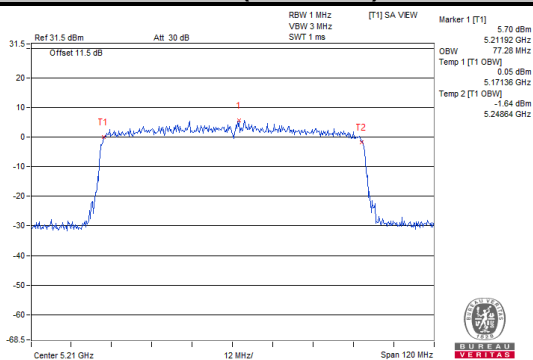


Ch 151 (5755 MHz)

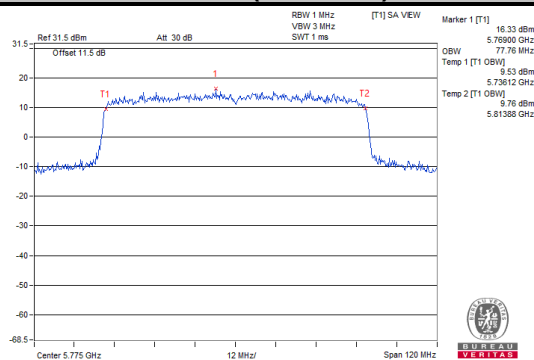


802.11ax (HE80)

Ch 42 (5210 MHz)



Ch 155 (5775 MHz)

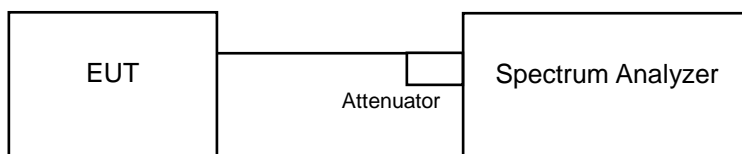


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

| Operation Band | EUT Category | | Limit |
|----------------|--------------|-----------------------------------|----------------|
| U-NII-1 | | Outdoor Access Point | 17 dBm/MHz |
| | | Fixed point-to-point Access Point | |
| | √ | Indoor Access Point | |
| | √ | Mobile and Portable client device | 11 dBm/MHz |
| U-NII-2A | | | 11 dBm/MHz |
| U-NII-2C | | | 11 dBm/MHz |
| U-NII-3 | | √ | 30 dBm/500 kHz |

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1 band:

Using method SA-2

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW \geq 3 RBW, Detector = RMS
3. Sweep time = auto, trigger set to "free run".
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value and add 10 log (1/duty cycle)

※ For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW \geq 1 RBW, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (raising) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500 \text{ kHz} / 300 \text{ kHz})$.
5. Sweep time = auto, trigger set to "free run".
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.5.7 Test Results

For U-NII-1 Band

<AP Mode>

802.11a

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 8.14 | 7.69 | 0.31 | 11.24 | 15.74 | Pass |
| 40 | 5200 | 11.98 | 12.32 | 0.31 | 15.47 | 15.74 | Pass |
| 48 | 5240 | 11.43 | 11.04 | 0.31 | 14.56 | 15.74 | Pass |

Note:

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (7.26 - 6) = 15.74 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 6.84 | 6.64 | 0.27 | 10.02 | 15.74 | Pass |
| 40 | 5200 | 11.28 | 9.94 | 0.27 | 13.94 | 15.74 | Pass |
| 48 | 5240 | 10.71 | 10.19 | 0.27 | 13.74 | 15.74 | Pass |

Note:

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17 - (7.26 - 6) = 15.74 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | -1.35 | -1.98 | 0.27 | 1.62 | 15.74 | Pass |
| 46 | 5230 | 7.80 | 7.69 | 0.27 | 11.02 | 15.74 | Pass |

Note:

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17-(7.26-6) = 15.74 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | -6.28 | -7.21 | 0.37 | -3.34 | 15.74 | Pass |

Note:

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $17-(7.26-6) = 15.74 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

<Client Mode>

802.11a

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 6.00 | 5.88 | 0.31 | 9.26 | 9.74 | Pass |
| 40 | 5200 | 5.94 | 5.74 | 0.31 | 9.16 | 9.74 | Pass |
| 48 | 5240 | 6.03 | 6.20 | 0.31 | 9.43 | 9.74 | Pass |

Note:

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $11 - (7.26 - 6) = 9.74 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 6.24 | 5.69 | 0.27 | 9.26 | 9.74 | Pass |
| 40 | 5200 | 6.07 | 6.10 | 0.27 | 9.37 | 9.74 | Pass |
| 48 | 5240 | 5.78 | 6.13 | 0.27 | 9.24 | 9.74 | Pass |

17Note:

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $11 - (7.26 - 6) = 9.74 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | -1.35 | -1.98 | 0.27 | 1.62 | 9.74 | Pass |
| 46 | 5230 | 4.59 | 4.31 | 0.27 | 7.73 | 9.74 | Pass |

Note:

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $11 - (7.26 - 6) = 9.74 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

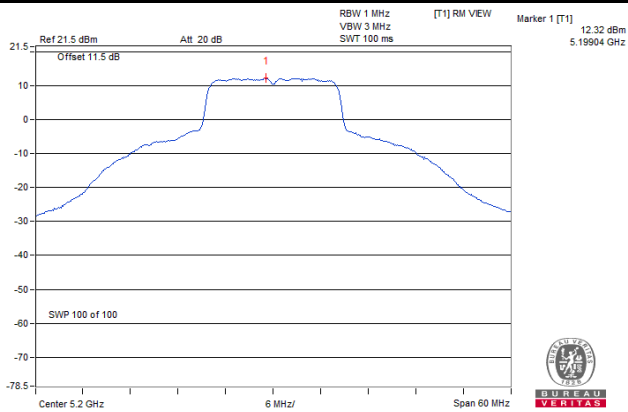
| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | -6.28 | -7.21 | 0.37 | -3.34 | 9.74 | Pass |

Note:

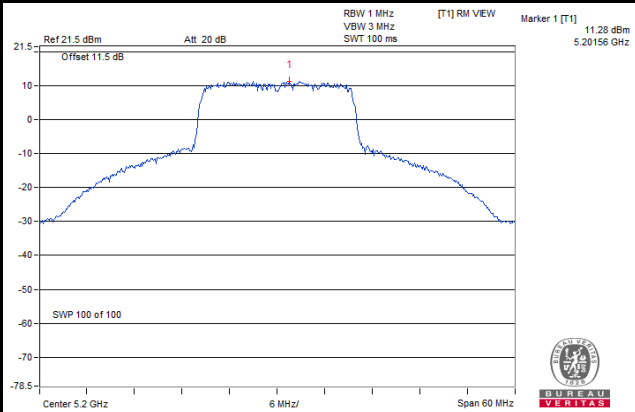
- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 \text{ dBi} > 6 \text{ dBi}$, so the power density limit shall be reduced to $11 - (7.26 - 6) = 9.74 \text{ dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

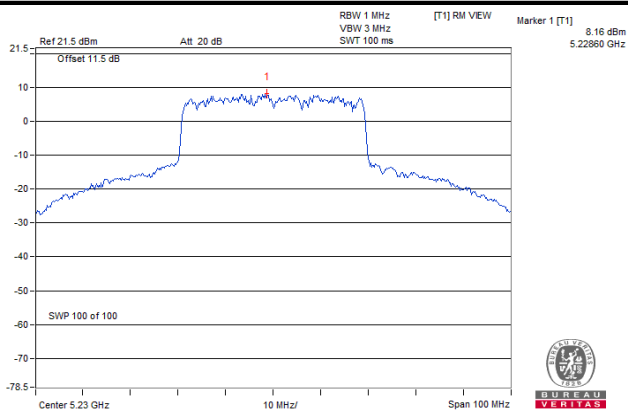
802.11a



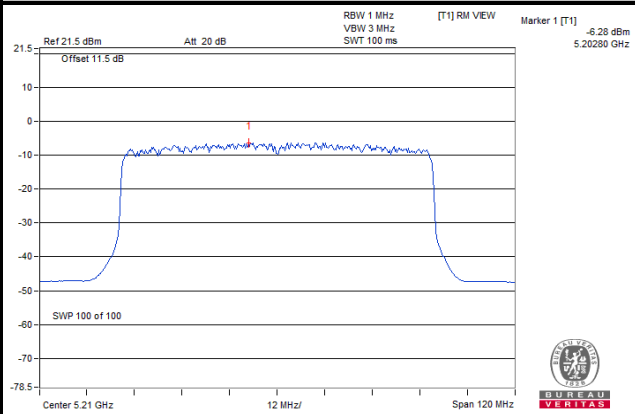
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



For U-NII-3 Band

802.11a

| TX Chain | Channel | Frequency (MHz) | PSD w/o Duty Factor | | 10 log (N=2) dB | Duty Factor (dB) | Total PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|----------|---------|-----------------|---------------------|---------------|-----------------|------------------|--|---------------------|-------------|
| | | | (dBm/300 kHz) | (dBm/500 kHz) | | | | | |
| 0 | 149 | 5745 | -0.38 | 1.84 | 3.01 | 0.32 | 5.17 | 28.74 | Pass |
| | 157 | 5785 | -0.09 | 2.13 | 3.01 | 0.32 | 5.46 | 28.74 | Pass |
| | 165 | 5825 | 0.47 | 2.69 | 3.01 | 0.32 | 6.02 | 28.74 | Pass |
| 1 | 149 | 5745 | 0.42 | 2.64 | 3.01 | 0.32 | 5.97 | 28.74 | Pass |
| | 157 | 5785 | 0.37 | 2.59 | 3.01 | 0.32 | 5.92 | 28.74 | Pass |
| | 165 | 5825 | 0.15 | 2.37 | 3.01 | 0.32 | 5.7 | 28.74 | Pass |

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 > 6$ dBi , so the power density limit shall be reduced to $30 - (7.26 - 6) = 28.74$ dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

| TX Chain | Channel | Frequency (MHz) | PSD | | 10 log (N=2) dB | Duty Factor (dB) | Total PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|----------|---------|-----------------|---------------|---------------|-----------------|------------------|--|---------------------|-------------|
| | | | (dBm/300 kHz) | (dBm/500 kHz) | | | | | |
| 0 | 149 | 5745 | -0.23 | 1.99 | 3.01 | 0.26 | 5.26 | 28.74 | Pass |
| | 157 | 5785 | -0.94 | 1.28 | 3.01 | 0.26 | 4.55 | 28.74 | Pass |
| | 165 | 5825 | -2.09 | 0.13 | 3.01 | 0.26 | 3.4 | 28.74 | Pass |
| 1 | 149 | 5745 | -0.51 | 1.71 | 3.01 | 0.26 | 4.98 | 28.74 | Pass |
| | 157 | 5785 | -1.39 | 0.83 | 3.01 | 0.26 | 4.1 | 28.74 | Pass |
| | 165 | 5825 | -2.54 | -0.32 | 3.01 | 0.26 | 2.95 | 28.74 | Pass |

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 > 6$ dBi , so the power density limit shall be reduced to $30 - (7.26 - 6) = 28.74$ dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

| TX Chain | Channel | Frequency (MHz) | PSD | | 10 log (N=2) dB | Duty Factor (dB) | Total PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|----------|---------|-----------------|---------------|---------------|-----------------|------------------|--|---------------------|-------------|
| | | | (dBm/300 kHz) | (dBm/500 kHz) | | | | | |
| 0 | 151 | 5755 | -3.07 | -0.85 | 3.01 | 0.31 | 2.47 | 28.74 | Pass |
| | 159 | 5795 | -2.74 | -0.52 | 3.01 | 0.31 | 2.8 | 28.74 | Pass |
| 1 | 151 | 5755 | -3.39 | -1.17 | 3.01 | 0.31 | 2.15 | 28.74 | Pass |
| | 159 | 5795 | -2.84 | -0.62 | 3.01 | 0.31 | 2.7 | 28.74 | Pass |

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 > 6$ dBi , so the power density limit shall be reduced to $30 - (7.26 - 6) = 28.74$ dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

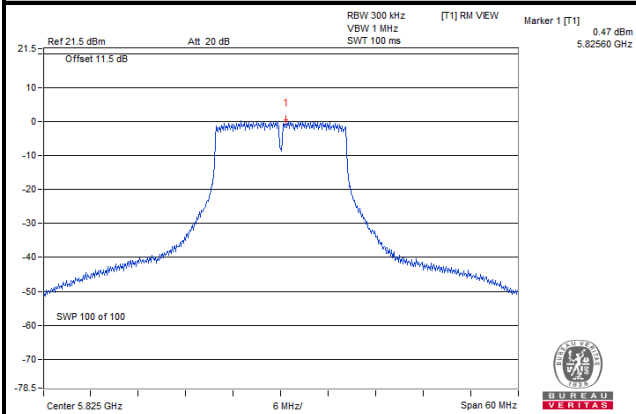
| TX Chain | Channel | Frequency (MHz) | PSD | | 10 log (N=2) dB | Duty Factor (dB) | Total PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|----------|---------|-----------------|---------------|---------------|-----------------|------------------|--|---------------------|-------------|
| | | | (dBm/300 kHz) | (dBm/500 kHz) | | | | | |
| 0 | 155 | 5775 | -4.79 | -2.57 | 3.01 | 0.26 | 0.7 | 28.74 | Pass |
| 1 | 155 | 5775 | -5.7 | -3.48 | 3.01 | 0.26 | -0.21 | 28.74 | Pass |

Note:

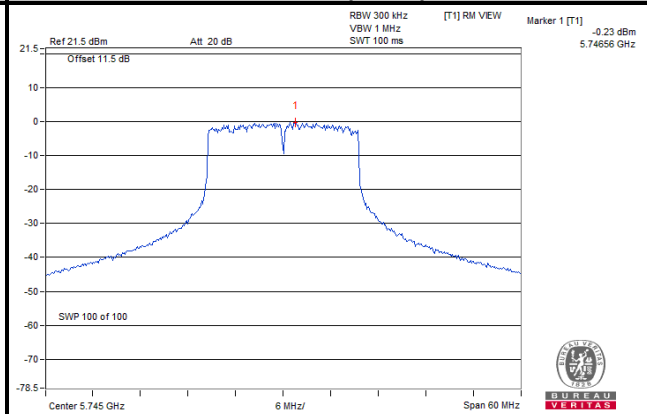
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.26 > 6$ dBi , so the power density limit shall be reduced to $30 - (7.26 - 6) = 28.74$ dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

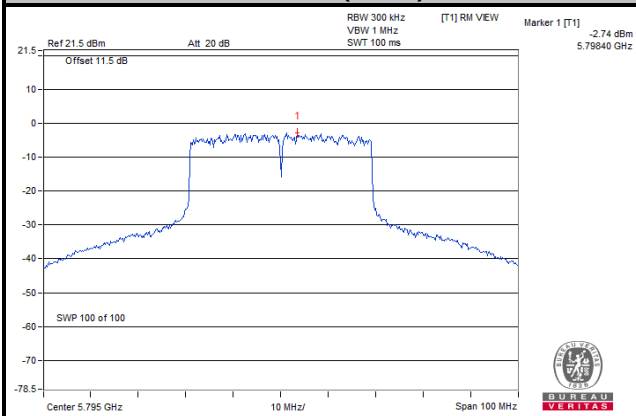
802.11a



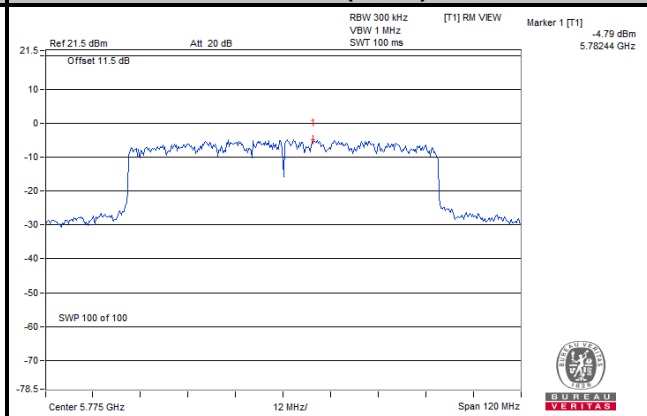
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)

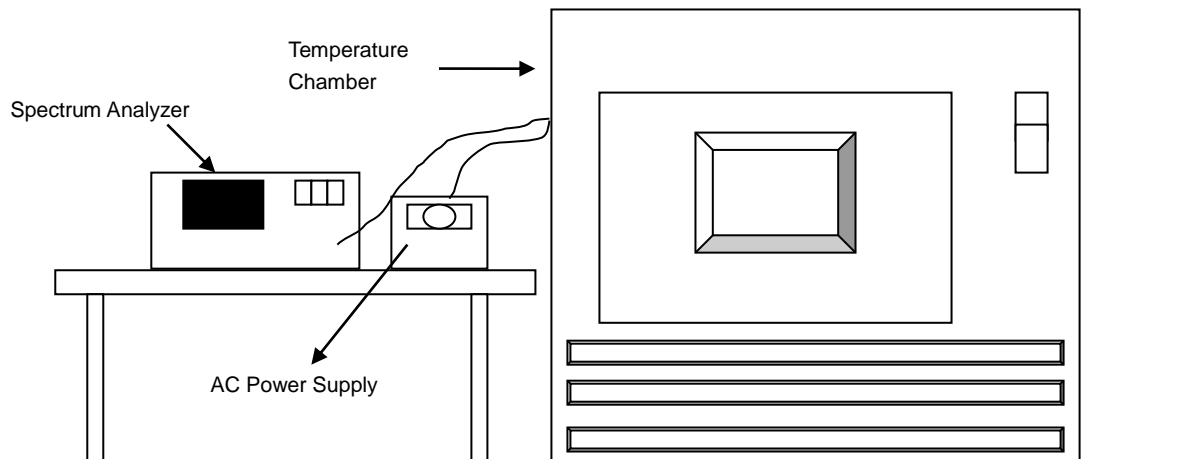


4.6 Frequency Stability

4.6.1 Limit of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation.

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 Test Results

| Frequency Stability Versus Temp. | | | | | | | | | |
|----------------------------------|--------------------|--------------------------|--------|--------------------------|--------|--------------------------|--------|--------------------------|--------|
| Operating Frequency: 5180MHz | | | | | | | | | |
| Temp. (°C) | Power Supply (Vac) | 0 Minute | | 2 Minute | | 5 Minute | | 10 Minute | |
| | | Measured Frequency (MHz) | Result | Measured Frequency (MHz) | Result | Measured Frequency (MHz) | Result | Measured Frequency (MHz) | Result |
| 40 | 120 | 5179.9965 | PASS | 5179.9968 | PASS | 5179.9922 | PASS | 5179.9947 | PASS |
| 30 | 120 | 5180.005 | PASS | 5180.0073 | PASS | 5180.0053 | PASS | 5180.0062 | PASS |
| 20 | 120 | 5179.9905 | PASS | 5179.9916 | PASS | 5179.9947 | PASS | 5179.9934 | PASS |
| 10 | 120 | 5179.9831 | PASS | 5179.9814 | PASS | 5179.9792 | PASS | 5179.9835 | PASS |
| 0 | 120 | 5180.003 | PASS | 5180.0028 | PASS | 5180.0025 | PASS | 5180.0044 | PASS |

| Frequency Stability Versus Voltage | | | | | | | | | |
|------------------------------------|--------------------|--------------------------|--------|--------------------------|--------|--------------------------|--------|--------------------------|--------|
| Operating Frequency: 5180MHz | | | | | | | | | |
| Temp. (°C) | Power Supply (Vdc) | 0 Minute | | 2 Minute | | 5 Minute | | 10 Minute | |
| | | Measured Frequency (MHz) | Result | Measured Frequency (MHz) | Result | Measured Frequency (MHz) | Result | Measured Frequency (MHz) | Result |
| 20 | 138 | 5179.9912 | PASS | 5179.9922 | PASS | 5179.9939 | PASS | 5179.994 | PASS |
| | 120 | 5179.9905 | PASS | 5179.9916 | PASS | 5179.9947 | PASS | 5179.9934 | PASS |
| | 102 | 5179.9897 | PASS | 5179.9907 | PASS | 5179.9953 | PASS | 5179.9928 | PASS |

4.7 6 dB Bandwidth Measurement

4.7.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

- Set resolution bandwidth (RBW) = 100 kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results

802.11a

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------|---------------------|-------------|
| | | Chain 0 | Chain 1 | | |
| 149 | 5745 | 15.81 | 16.08 | 0.5 | Pass |
| 157 | 5785 | 15.83 | 15.50 | 0.5 | Pass |
| 165 | 5825 | 15.70 | 15.51 | 0.5 | Pass |

802.11ax (HE20)

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------|---------------------|-------------|
| | | Chain 0 | Chain 1 | | |
| 149 | 5745 | 18.51 | 18.68 | 0.5 | Pass |
| 157 | 5785 | 18.45 | 18.12 | 0.5 | Pass |
| 165 | 5825 | 18.62 | 18.46 | 0.5 | Pass |

802.11ax (HE40)

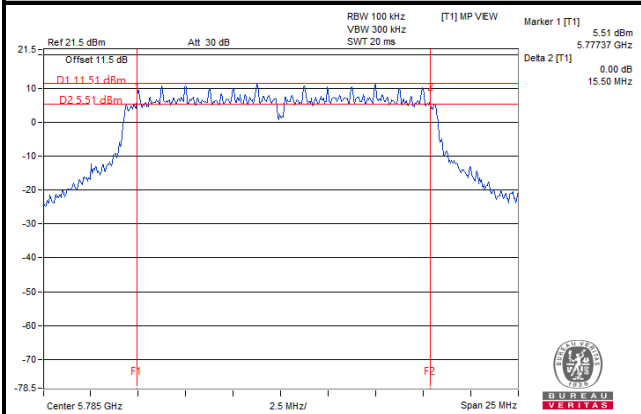
| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------|---------------------|-------------|
| | | Chain 0 | Chain 1 | | |
| 151 | 5755 | 38.08 | 37.91 | 0.5 | Pass |
| 159 | 5795 | 37.82 | 37.75 | 0.5 | Pass |

802.11ax (HE80)

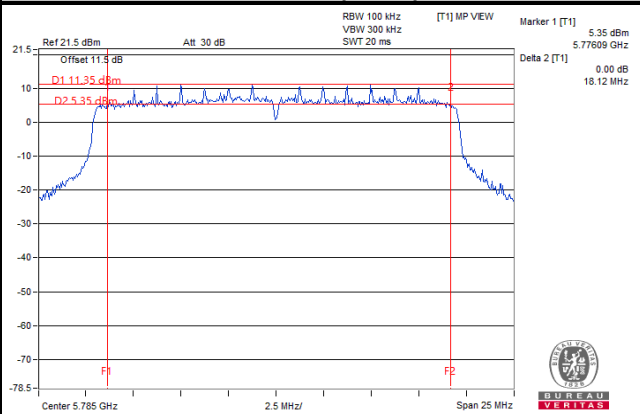
| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------|---------------------|-------------|
| | | Chain 0 | Chain 1 | | |
| 155 | 5775 | 75.49 | 71.83 | 0.5 | Pass |

Spectrum Plot of Worst Value

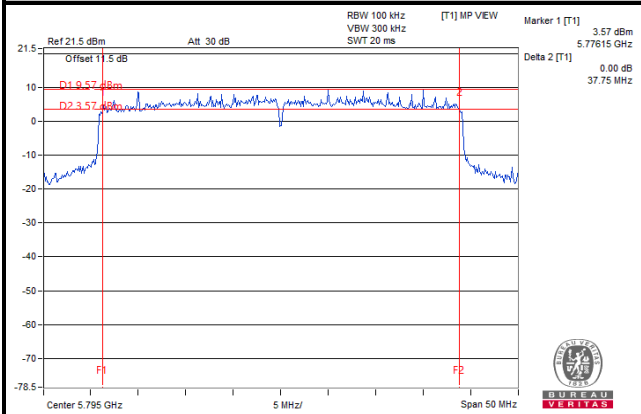
802.11a



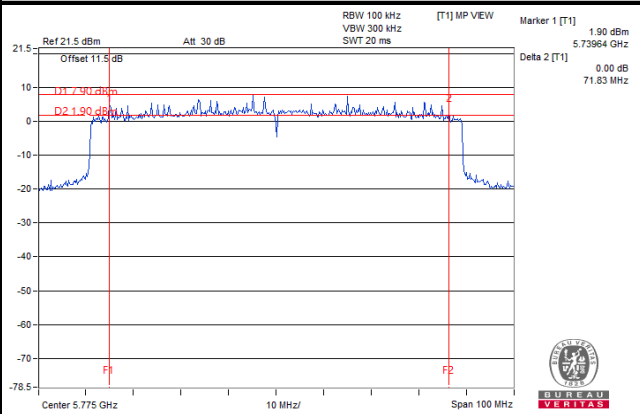
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



5 Pictures of Test Arrangements

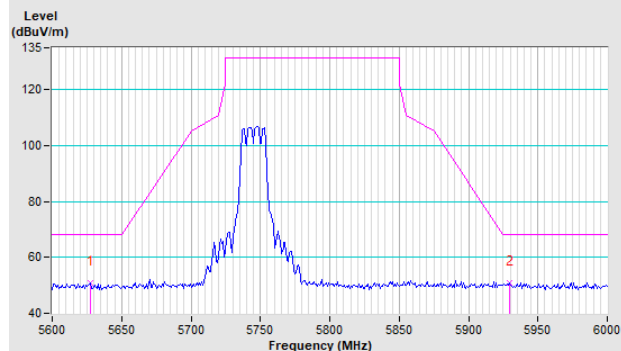
Please refer to the attached file (Test Setup Photo).

Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

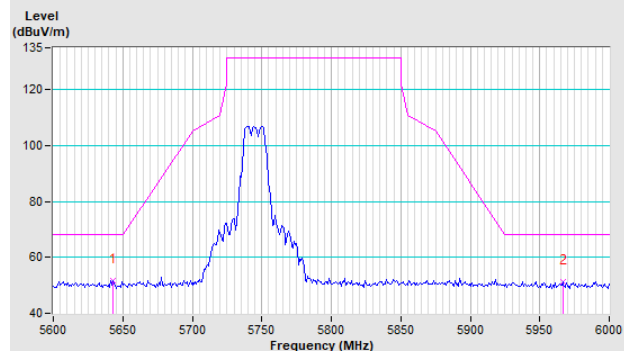
802.11a

CH 149 5745 MHz

Horizontal

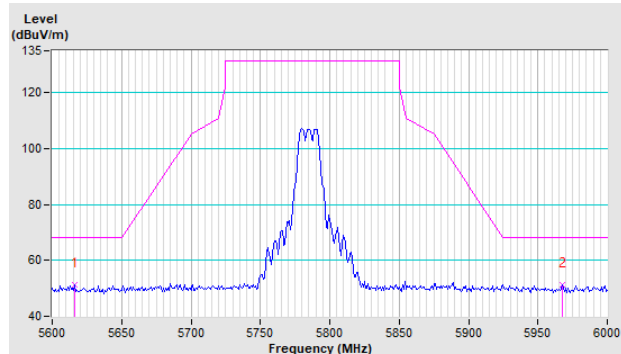


Vertical

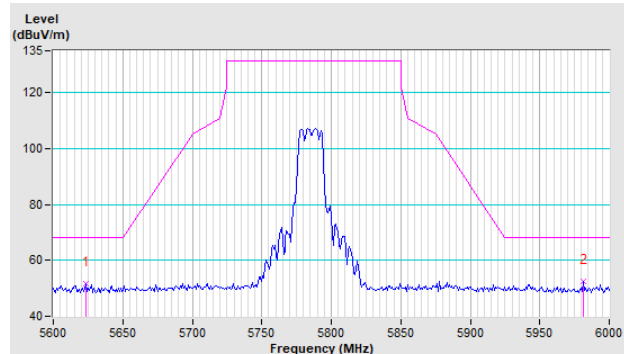


CH 157 5785 MHz

Horizontal

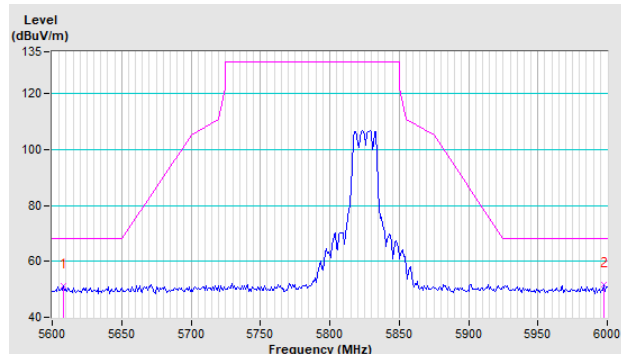


Vertical

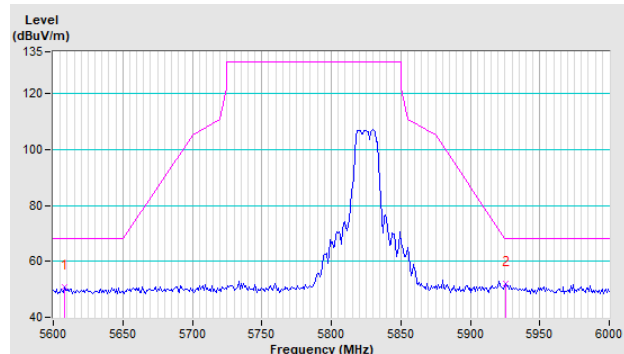


CH 165 5825 MHz

Horizontal



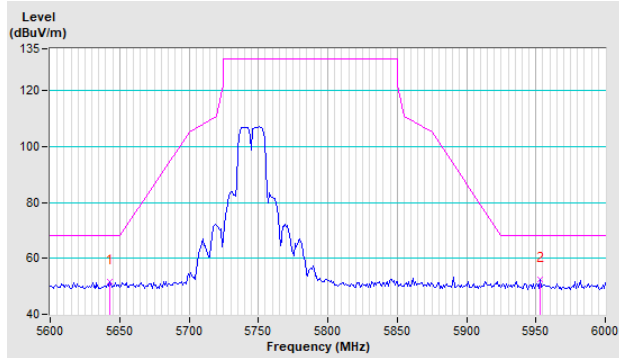
Vertical



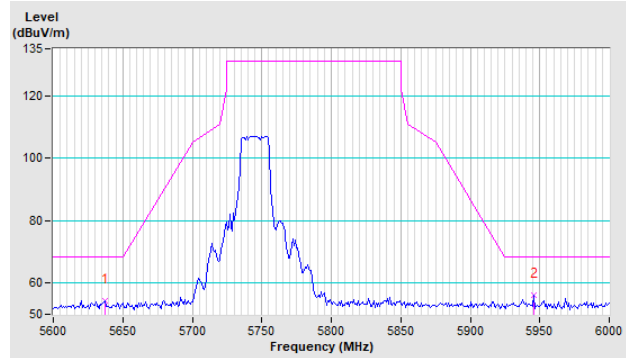
802.11ax (HE20)

CH 149 5745 MHz

Horizontal

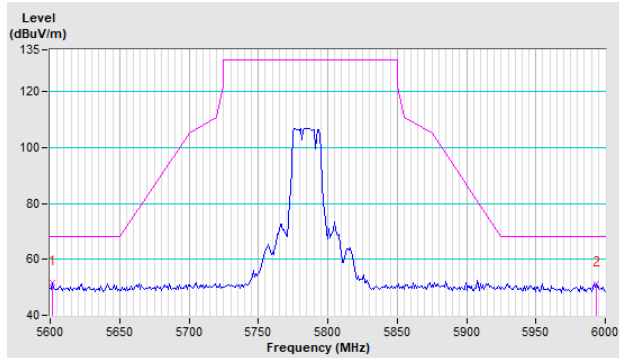


Vertical

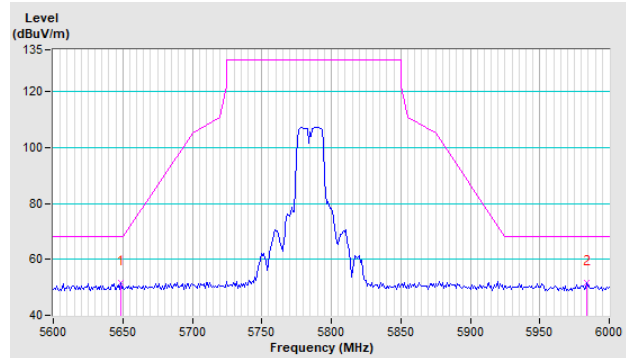


CH 157 5785 MHz

Horizontal

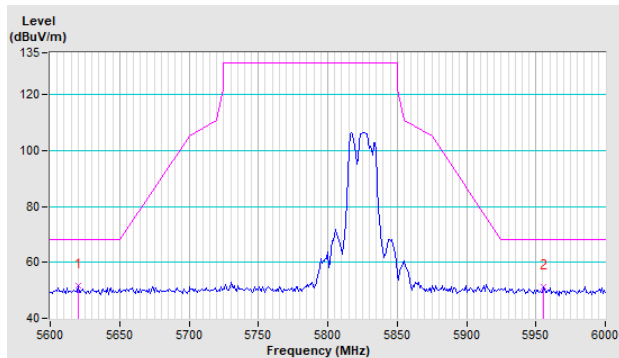


Vertical

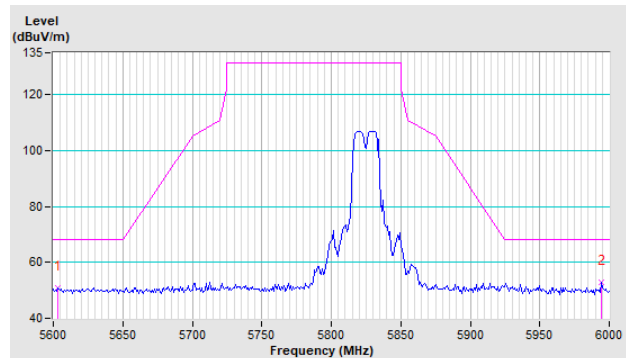


CH 165 5825 MHz

Horizontal



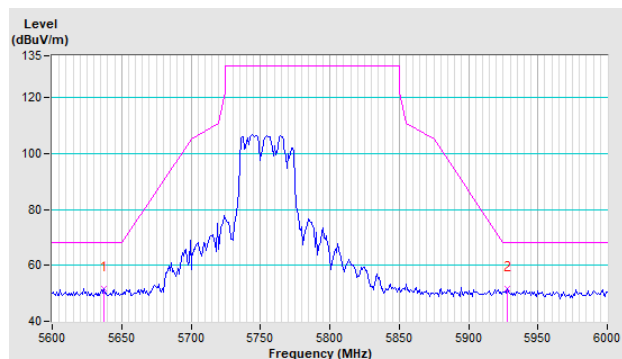
Vertical



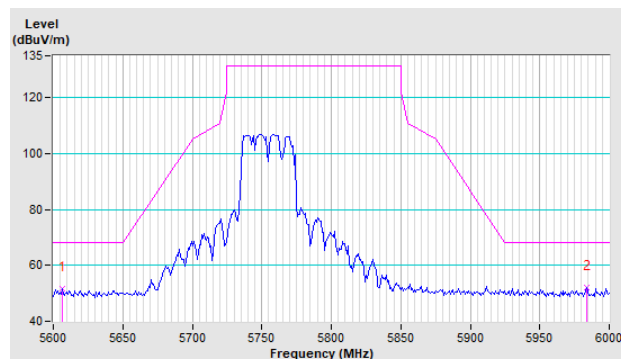
802.11ax (HE40)

CH 151 5755 MHz

Horizontal

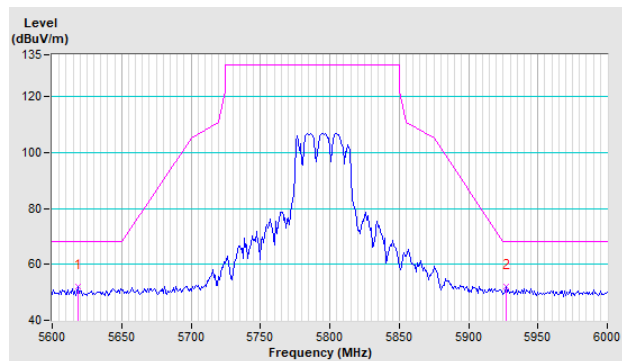


Vertical

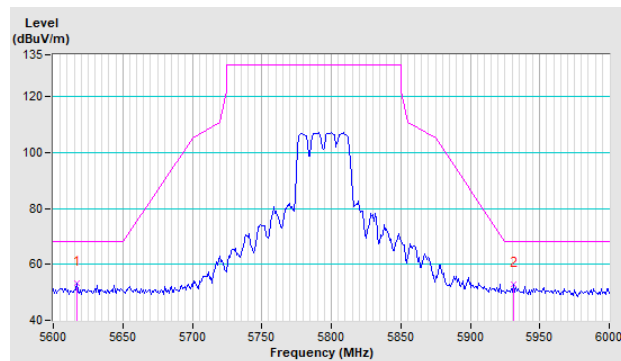


CH 159 5795 MHz

Horizontal



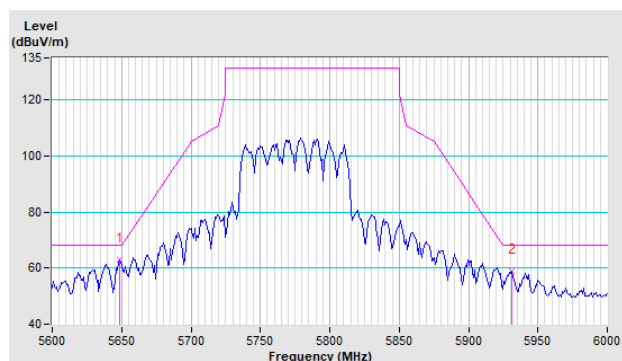
Vertical



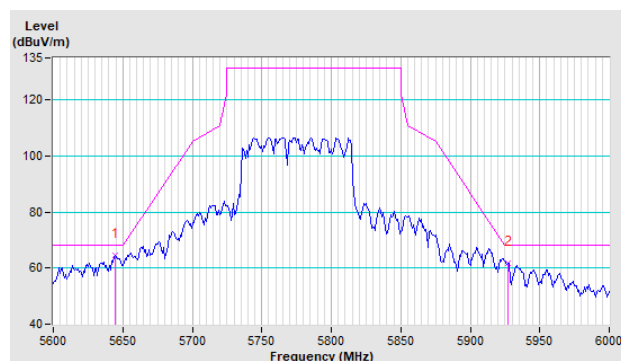
802.11ax (HE80)

CH 155 5775 MHz

Horizontal



Vertical



Annex B- Band-edge measurement

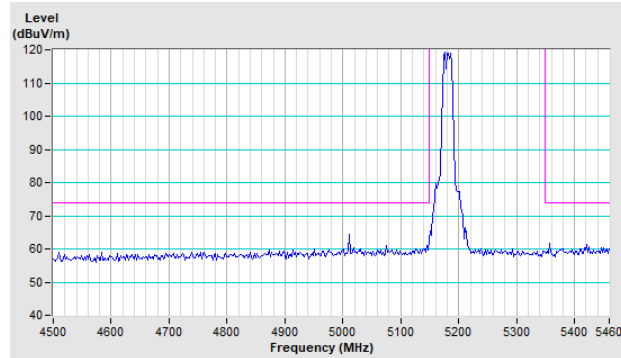
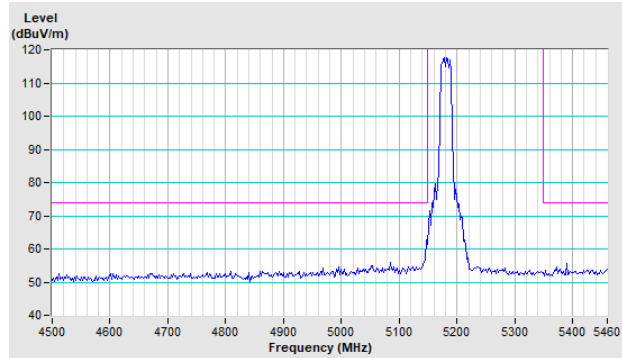
802.11a

CH 36 5180 MHz

Peak

Horizontal

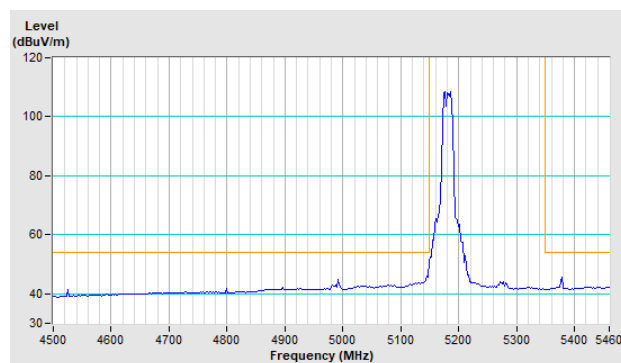
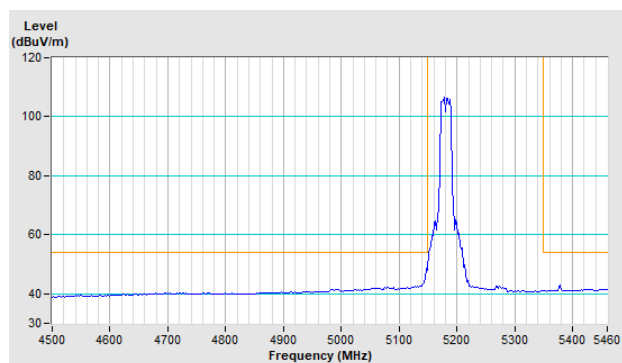
Vertical



Average

Horizontal

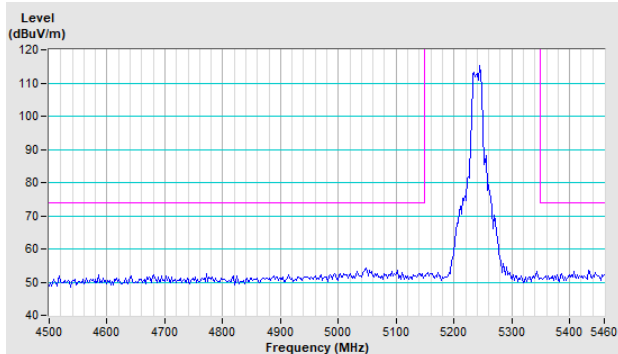
Vertical



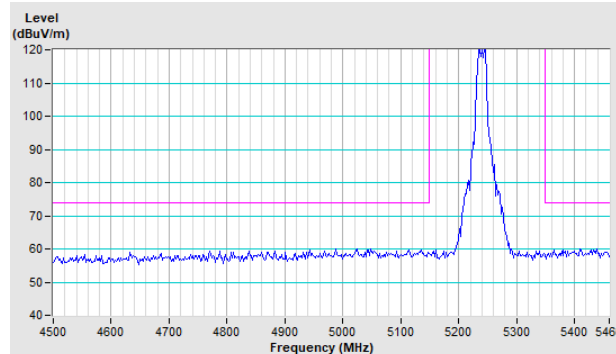
CH 48 5240 MHz

Peak

Horizontal

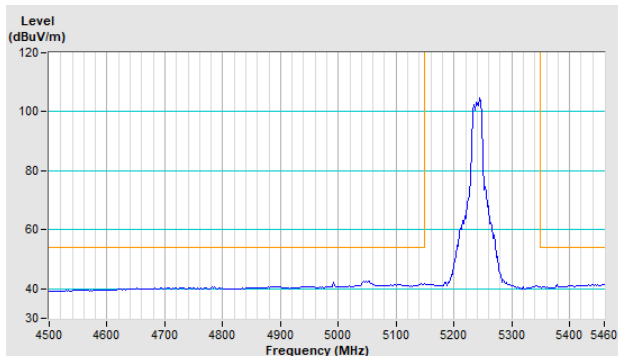


Vertical

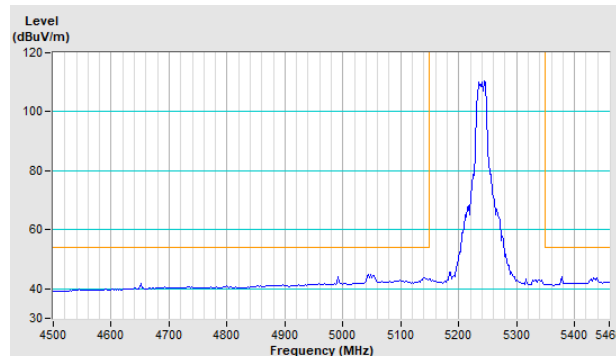


Average

Horizontal



Vertical

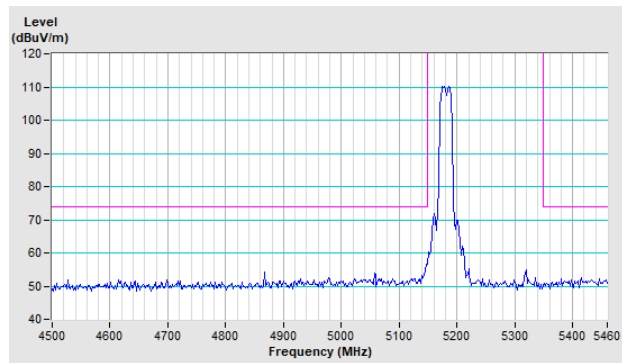


802.11ax (HE20)

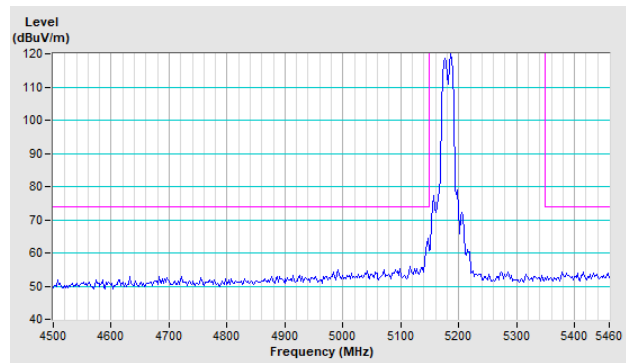
CH 36 5180 MHz

Peak

Horizontal

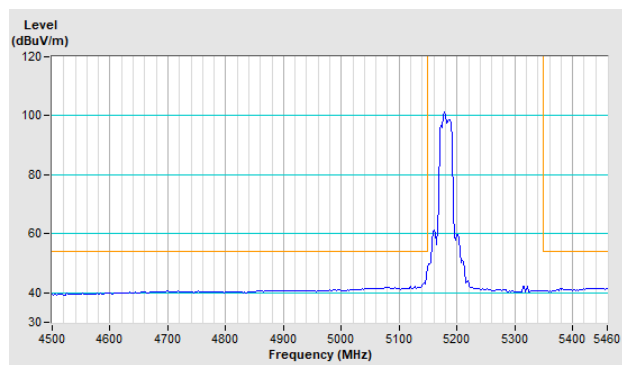


Vertical

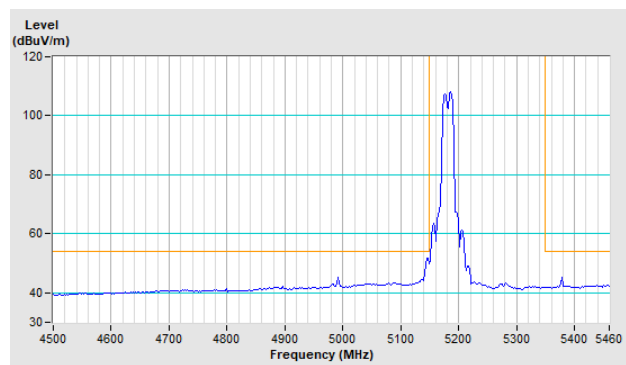


Average

Horizontal



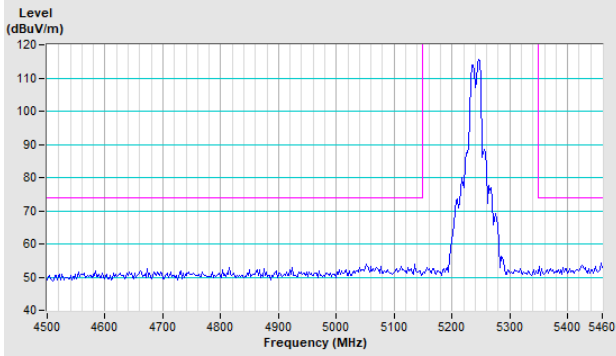
Vertical



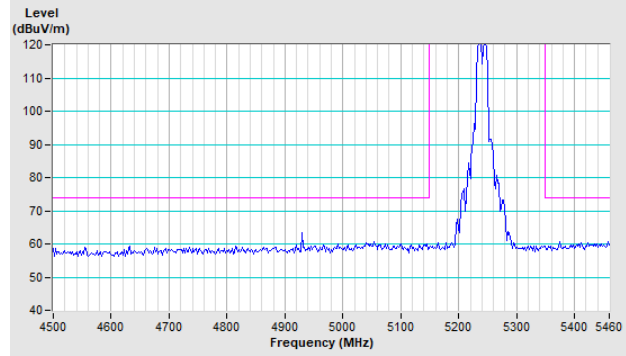
CH 48 5240 MHz

Peak

Horizontal

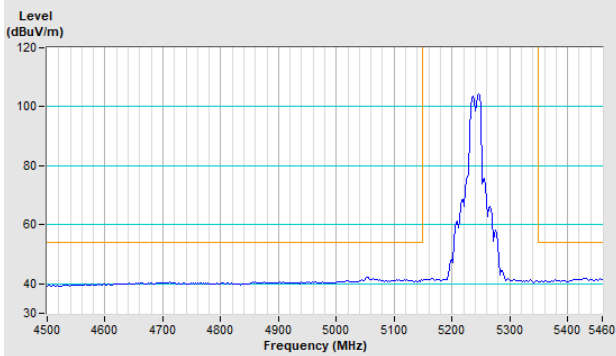


Vertical

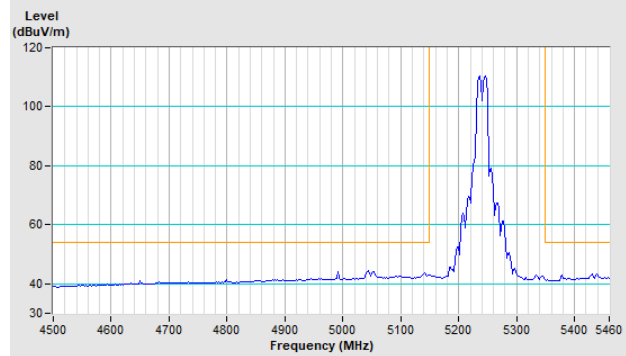


Average

Horizontal



Vertical

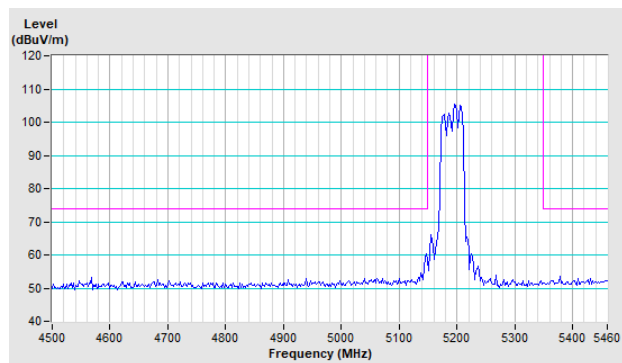


802.11ax (HE40)

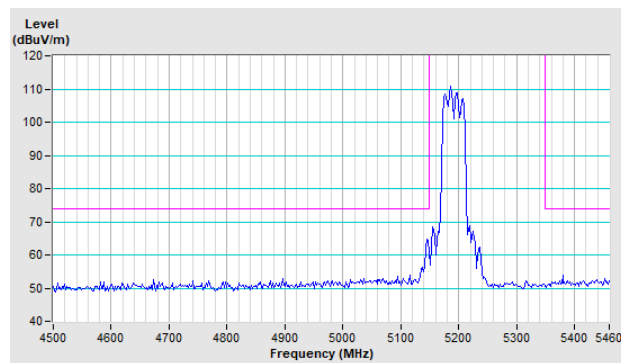
CH 38 5190 MHz

Peak

Horizontal

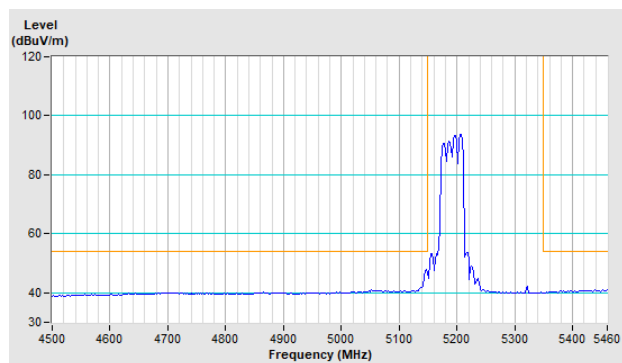


Vertical

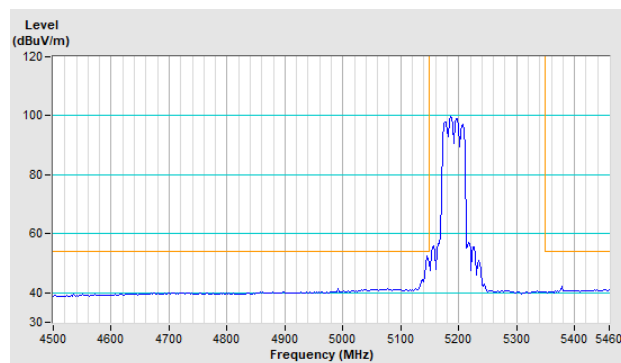


Average

Horizontal



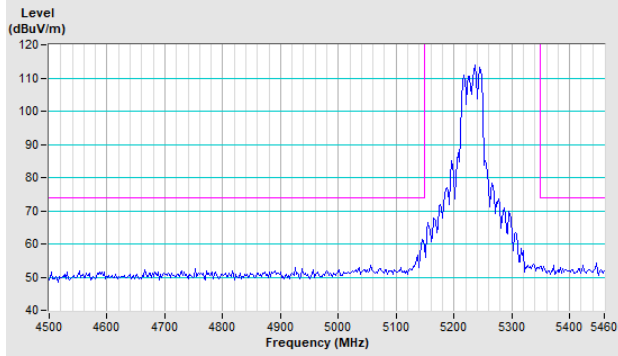
Vertical



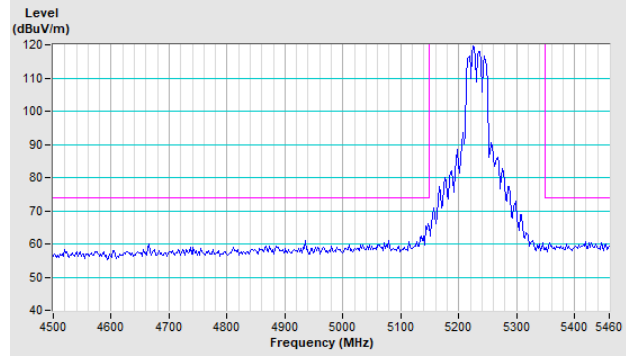
CH 46 5230 MHz

Peak

Horizontal

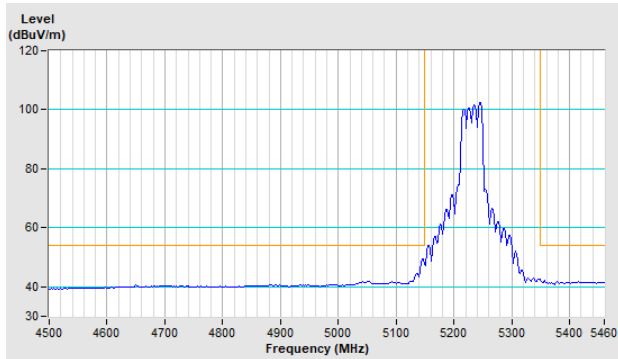


Vertical

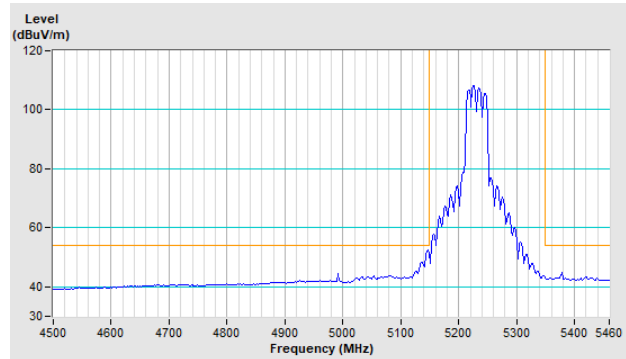


Average

Horizontal



Vertical

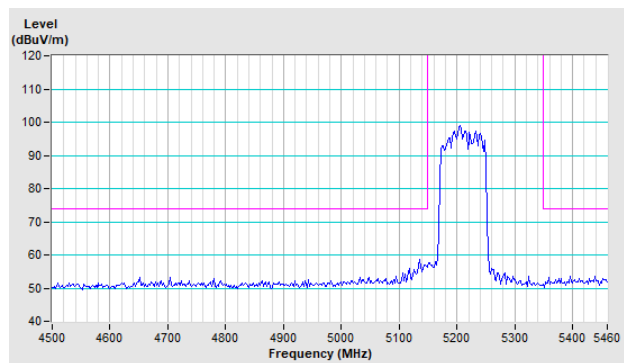


802.11ax (HE80)

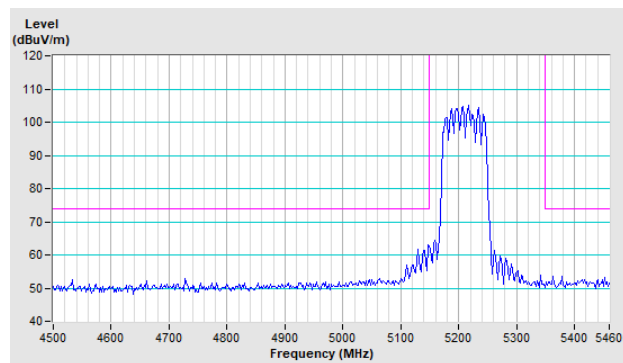
CH 42 5210 MHz

Peak

Horizontal

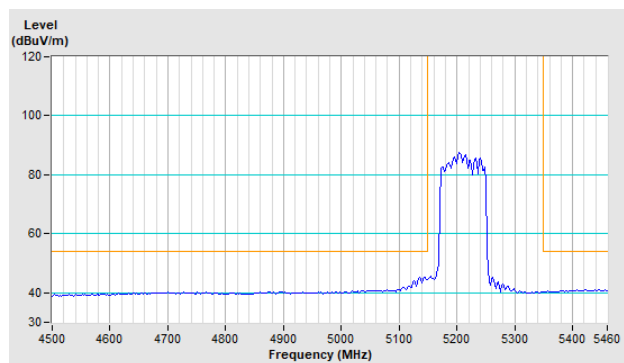


Vertical

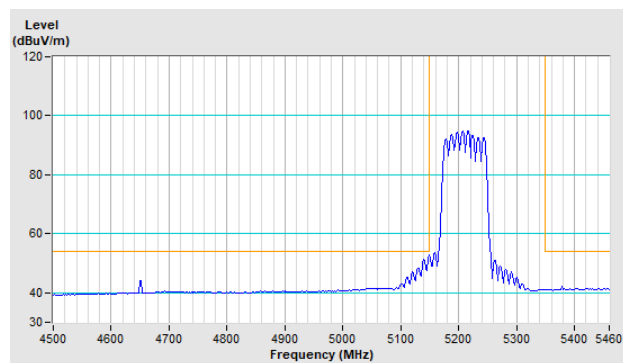


Average

Horizontal



Vertical



Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

--- END ---