

Test Report

| | |
|-----------------|--|
| Product Name | Secured Network Extension Device |
| Model No. | FEV-211F, FEV-212F, FEV-211F-AM, FEV-212F-AM (Main model) (for detail model no. refer to section 1.1 EUT Description) |
| FCC ID | TVE-3317E142 |
| Contains FCC ID | N7NEM75, N7NEM75S |

| | |
|-----------|--|
| Applicant | Fortinet, Inc. |
| Address | 909 Kifer Road, Sunnyvale, CA 94086, USA |

| | |
|-----------------|-----------------------|
| Date of Receipt | Jun. 14, 2022 |
| Issued Date | July 12, 2024 |
| Report No. | 2260415R-RFUSWL5V01-B |
| Report Version | V1.0 |



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report



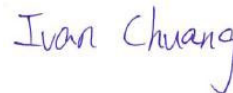
| | |
|---------------------|--|
| Product Name | Secured Network Extension Device |
| Applicant | Fortinet, Inc. |
| Address | 909 Kifer Road, Sunnyvale, CA 94086, USA |
| Manufacturer | Fortinet, Inc. |
| Model No. | FEV-211F, FEV-212F, FEV-211F-AM, FEV-212F-AM (Main model) (for detail model no. refer to section 1.1 EUT Description) |
| FCC ID | TVE-3317E142 |
| Contains FCC ID | N7NEM75, N7NEM75S |
| EUT Rated Voltage | DC 7-36Vdc (from Car Charger) AC 100-240Vdc (from Power Adapter) |
| EUT Test Voltage | DC 36V (from Car Charger), AC 120V / 60Hz (from Power Adapter) |
| Trade Name | Fortinet |
| Applicable Standard | FCC CFR Title 47 Part 15 Subpart E ANSI C63.4: 2014, ANSI C63.10: 2013 KDB Publication 789033 |
| Test Result | Complied |

Documented By :



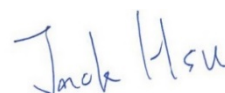
(Senior Project Specialist / Genie Chang)

Tested By :



(Senior Engineer / Ivan Chuang)

Approved By :



(Senior Engineer / Jack Hsu)

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Appendix 1: EUT Test Photographs
Appendix 2: Product Photos-Please refer to the file: 2260415R-Product Photos

Revision History

| Report No. | Version | Description | Issued Date |
|-----------------------|---------|--------------------------|---------------|
| 2260415R-RFUSWL5V01-B | V1.0 | Initial issue of report. | July 12, 2024 |

1. General Information

1.1. EUT Description

| | |
|-----------------------------|--|
| Product Name | Secured Network Extension Device |
| Trade Name | Fortinet |
| Model No. (Main model) | FEV-211F, FEV-212F FEV-211F-AM, FEV-212F-AM |
| Model No. (Series model) | FortiExtenderVehicle 211Fxxxxxxxxxx FORTIEXTENDERVEHICLE-211Fxxxxxxxxxx FEV-211Fxxxxxxxxxx FortiExtenderVehicle 212Fxxxxxxxxxx FORTIEXTENDERVEHICLE-212Fxxxxxxxxxx FEV-212Fxxxxxxxxxx FortiExtenderVehicle 211F-AMxxxxxxxxxx FORTIEXTENDERVEHICLE-211F-AMxxxxxxxxxx FEV-211F-AMxxxxxxxxxx FortiExtenderVehicle 212F-AMxxxxxxxxxx FORTIEXTENDERVEHICLE-212F-AMxxxxxxxxxx FEV-212F-AMxxxxxxxxxx (where “x” can be used “A-Z”, or “0-9”, or “-“, or blank for software purposes or marketing purposes only) |
| FCC ID | TVE-3317E142 |
| Contains FCC ID | N7NEM75, N7NEM75S |
| Frequency Range | 802.11a/n/ac-20 MHz: 5260-5320 MHz, 5500-5700 MHz, 5720 MHz 802.11n/ac-40 MHz: 5270-5310 MHz, 5510-5670 MHz, 5710 MHz 802.11ac-80 MHz: 5290 MHz, 5530-5690 MHz |
| Number of Channels | 802.11a/n/ac-20MHz: 16 CH, 802.11n/ac-40MHz: 8 CH, 802.11ac-80MHz: 4 CH |
| Data Rate | 802.11a: 6-54 Mbps, 802.11n: MCS0-MCS15, 802.11ac: MCS0-MCS9 |
| Type of Modulation | OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) |
| Channel Control | Auto |
| Car Charger | MFR: HUAI YANG CO., LTD M/N: HWR-SH-20230116-01 Non-shielded, 3m |

| | |
|---------------|---|
| Power Adapter | MFR: APD, M/N: WA-36W12R Input: 100-240V~50-60Hz, 0.9A Output: 12.0V=3.0A, 36.0W Cable Out: Non-shielded, 1.5m |
|---------------|---|

Note: The different models name are for the market segment.

Antenna List

| No. | Manufacturer | Part No. | Antenna Type | Peak Gain |
|-----|----------------------------------|-------------------------------------|--------------|--|
| 1 | ADVANCED WIRELESS & ANTENNA INC. | A8EEE-000003 | Dipole | 2.0 dBi for 2.4 GHz (BLE) |
| 2 | ADVANCED WIRELESS & ANTENNA INC. | A8EEE-000002 (Main) | Dipole | 3.5 dBi for 2.4 GHz (WLAN) 5.5 dBi for 5GHz (WLAN) |
| | | A8EEE-000002 (Aux) | | 3.5 dBi for 2.4 GHz (WLAN) 5.5 dBi for 5GHz (WLAN) |
| 3 | Master Wave Technology Co., Ltd. | 98619PRSX018 (Main) | Dipole | 3.19 dBi for 2.4 GHz (WLAN) 5.85 dBi for UNII-1, 2A (WLAN) 5.73 dBi for UNII-2C (WLAN) 5.03 dBi for UNII-3 (WLAN) |
| | | 98619PRSX018 (Aux) | | 3.19 dBi for 2.4 GHz (WLAN) 5.85 dBi for UNII-1, 2A (WLAN) 5.73 dBi for UNII-2C (WLAN) 5.03 dBi for UNII-3 (WLAN) |
| 4 | SENAO | MA1505.AK.008 (5 in 1, cable 5M) | PIFA | 1.99 dBi for WCDMA Band 2 2.64 dBi for WCDMA Band 4 0.86 dBi for WCDMA Band 5 1.99 dBi for LTE Band 2 2.64 dBi for LTE Band 4 0.86 dBi for LTE Band 5 1.23 dBi for LTE Band 7 -2.09 dBi for LTE Band 12 -1.98 dBi for LTE Band 13 -0.04 dBi for LTE Band 14 0.86 dBi for LTE Band 26 -0.91 dBi for LTE Band 30 1.23 dBi for LTE Band 41 -0.31 dBi for LTE Band 48 2.64 dBi for LTE Band 66 |

| | | | | |
|---|-------|---------------------------------------|------|--|
| 5 | SENAO | MA1505.AK.008 (5 in 1, cable 0.3M) | PIFA | 3.98 dBi for WCDMA Band 2 5.22 dBi for WCDMA Band 4 1.83 dBi for WCDMA Band 5 3.98 dBi for LTE Band 2 5.22 dBi for LTE Band 4 1.83 dBi for LTE Band 5 4.85 dBi for LTE Band 7 1.50 dBi for LTE Band 12 3.03 dBi for LTE Band 13 3.03 dBi for LTE Band 14 1.83 dBi for LTE Band 26 0.84 dBi for LTE Band 30 4.85 dBi for LTE Band 41 -0.07 dBi for LTE Band 48 5.22 dBi for LTE Band 66 |
|---|-------|---------------------------------------|------|--|

Note: The above EUT information is declared by the manufacturer.

| Directional gain for CDD Power | Directional gain for Beamforming Power |
|--------------------------------|--|
| 5.85 dBi for 5250-5350 MHz | 8.86 dBi for 5250-5350 MHz |
| 5.73 dBi for 5470-5725 MHz | 8.74 dBi for 5470-5725 MHz |

For CDD mode:

5250 MHz-5350 MHz: Directional Gain = 5.85 dBi

5470 MHz-5725 MHz: Directional Gain = 5.73 dBi

(Directional Gain = $G_{ANT\ MAX}$ + Array Gain, Array Gain = 0 dB for $N_{ANT} \leq 4$)

For Beamforming mode:

5250 MHz-5350 MHz: Directional Gain = 8.86 dBi

5470 MHz-5725 MHz: Directional Gain = 8.74 dBi

Directional Gain = $G_{ANT\ MAX}$ + Array Gain, Array Gain = $10 \cdot \log(2) = 3.01$ dB)

| Directional gain for PSD |
|----------------------------|
| 8.86 dBi for 5250-5350 MHz |
| 8.74 dBi for 5470-5725 MHz |

5250 MHz-5350 MHz: Directional Gain = 8.86 dBi

5470 MHz-5725 MHz: Directional Gain = 8.74 dBi

Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$ dBi

802.11a/n/ac-20 MHz Center Working Frequency of Each Channel:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| 52 | 5260 | 56 | 5280 | 60 | 5300 | 64 | 5320 |
| 100 | 5500 | 104 | 5520 | 108 | 5540 | 112 | 5560 |
| 116 | 5580 | 120 | 5600 | 124 | 5620 | 128 | 5640 |
| 132 | 5660 | 136 | 5680 | 140 | 5700 | 144 | 5720 |

802.11n/ac-40 MHz Center Working Frequency of Each Channel:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| 54 | 5270 | 62 | 5310 | 102 | 5510 | 110 | 5550 |
| 118 | 5590 | 126 | 5630 | 134 | 5670 | 142 | 5710 |

802.11ac-80 MHz Center Working Frequency of Each Channel:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| 58 | 5290 | 106 | 5530 | 122 | 5610 | 138 | 5690 |

Note:

1. This device is a Secured Network Extension Device with built-in Bluetooth V5.2, Wi-Fi and WWAN transceiver, this report is for 5GHz Wi-Fi UNII-2A and UNII-2C.
2. The different of each model is shown as below:

| Model No. | Description |
|--------------------|---|
| FEV-211F Series | Bluetooth + Wi-Fi + LTE module x1 (EM7565) Contains LTE module's FCC ID (N7NEM75) |
| FEV-212F Series | Bluetooth + Wi-Fi + LTE module x2 (EM7565) Contains LTE module's FCC ID (N7NEM75) |
| FEV-211F-AM Series | Bluetooth + Wi-Fi + LTE module x1 (EM7511) Contains LTE module's FCC ID (N7NEM75S) |
| FEV-212F-AM Series | Bluetooth + Wi-Fi + LTE module x2 (EM7511) Contains LTE module's FCC ID (N7NEM75S) |

3. The identification of test sample is FEV-212F-AM with A8EEE-000003, MA1505.AK.008 (5 in 1, cable 0.3M) and 98619PRSX018 antenna for UNII-2A and UNII-2C testing.
4. The radiation measurements are performed in X, Y and Z axis positioning, and only the worst case is shown in the report.
5. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
6. Lowest data rates are tested in each mode. Only worst case is shown in the report.
(802.11a is 6 Mbps 、802.11ac-20 MHz / 40 MHz / 80 MHz is MCS0)
7. The CDD mode and Beamforming mode are presented in the power output test item. For other test items, CDD mode is the worst case for the final test and shown in this report.
8. After evaluation and investigation, the worst case for Power Adapter and Car Charger is Power Adapter, so it was used to perform all testing and record in the test report.

9. The spectrum plot against conducted item only shows the worst case.
10. These tests were conducted on a sample for the purpose of demonstrating compliance of 802.11a/n/ac transmitter with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.

| | |
|-----------|--|
| Test Mode | Transmit (802.11a-CDD) |
| | Transmit (802.11ac-20 MHz-CDD) |
| | Transmit (802.11ac-40 MHz-CDD) |
| | Transmit (802.11ac-80 MHz-CDD) |
| | Transmit (802.11ac-20 MHz-Beamforming) |
| | Transmit (802.11ac-40 MHz-Beamforming) |
| | Transmit (802.11ac-80 MHz-Beamforming) |

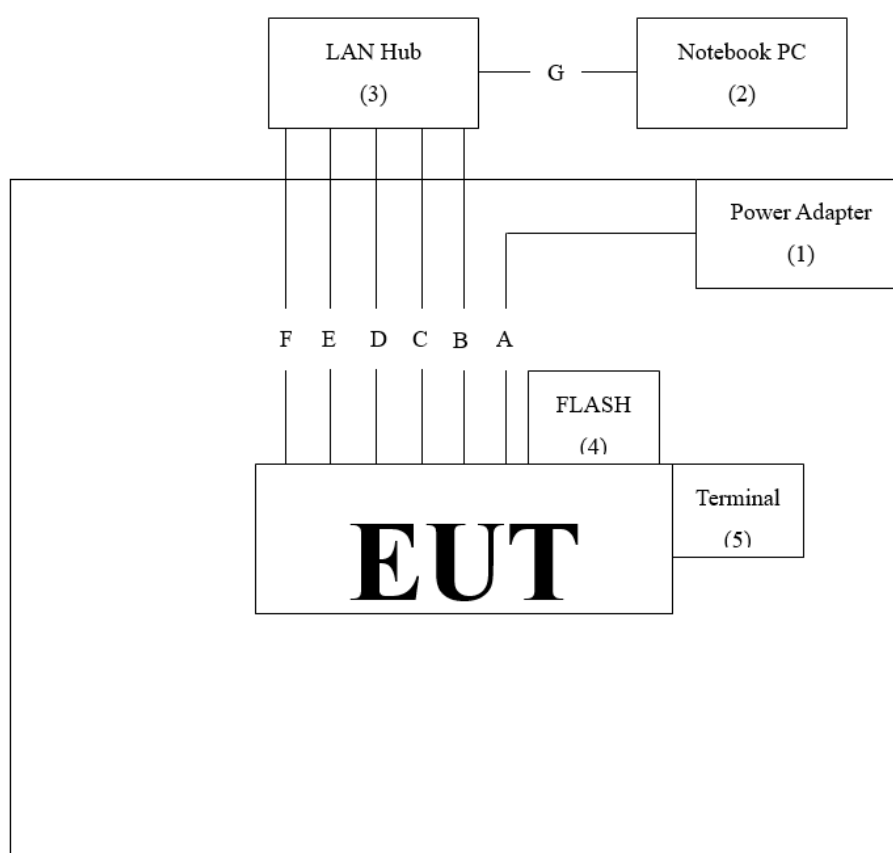
1.2. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system are:

| Product | Manufacturer | Model No. | Serial No. | Power Cord |
|-----------------|--------------|---------------|---------------|--------------------|
| 1 Power Adapter | APD | WA-36W12R | N/A | N/A |
| 2 Notebook PC | DELL | Latitude 5501 | 4H94P13 | N/A |
| 3 LAN Hub | TP-LINK | TL-SG108 | 2161597000480 | Non-Shielded, 1.5m |
| 4 FLASH | Kingston | DT100G3/8GB | N/A | N/A |
| 5 Terminal | N/A | N/A | N/A | N/A |

| Signal Cable Type | Signal cable Description |
|-------------------|--------------------------|
| A Power Cable | Non-Shielded, 1.5m |
| B LAN Cable | Non-Shielded, 3m |
| C LAN Cable | Non-Shielded, 2m |
| D LAN Cable | Non-Shielded, 2m |
| E LAN Cable | Non-Shielded, 2m |
| F LAN Cable | Non-Shielded, 2m |
| G LAN Cable | Non-Shielded, 2m |

1.3. Configuration of tested System



1.4. EUT Exercise Software

1. Setup the EUT as shown in Section 1.3.
2. Execute software “QSPR V5.0-00186” on the Notebook PC.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

| Performed Item | Items | Required | Actual |
|--------------------|------------------|----------|---------|
| Conducted Emission | Temperature (°C) | 10~40 °C | 24.4 °C |
| | Humidity (%RH) | 10~90 % | 47.2 % |
| Radiated Emission | Temperature (°C) | 10~40 °C | 24.7 °C |
| | Humidity (%RH) | 10~90 % | 58.2 % |
| Conductive | Temperature (°C) | 10~40 °C | 25.0 °C |
| | Humidity (%RH) | 10~90 % | 55.8 % |

USA : FCC Designation Number: TW0033

Canada : CAB Identifier Number: TW3023 / Company Number: 26930

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd

Address : No. 5-22, Ruishukeng Linkou District, New Taipei City, 24451, Taiwan

Performed Location : No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan, R.O.C.

Phone Number : +886-3-275-7255

Fax Number : +886-3-327-8031

Email Address : info.tw@dekra.comWebsite : <http://www.dekra.com.tw>

1.6. List of Test Equipment

For Conduction Measurements / HY-SR01

| | Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Due Date |
|---|--------------------|--------------|-----------|------------|------------|------------|
| V | EMI Test Receiver | R&S | ESR7 | 101601 | 2022.06.23 | 2023.06.22 |
| V | Two-Line V-Network | R&S | ENV216 | 101306 | 2022.05.23 | 2023.05.22 |
| V | Coaxial Cable | SUHNER | RG400_BNC | RF001 | 2021.09.08 | 2022.09.07 |

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "V" are used to measure the final test results.
3. Test Software Version: AUDIX e3 V9.

For Conducted Measurements / HY-SR02

| | Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Due Date |
|---|-------------------|--------------|-----------|---------------------------------|------------|------------|
| V | Spectrum Analyzer | R&S | FSV30 | 103466 | 2021.12.27 | 2022.12.26 |
| V | Power Meter | Anritsu | ML2496A | 1739004& 1726078& 1726079 | 2022.05.06 | 2023.05.05 |

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "V" are used to measure the final test results.
3. Test Software Version: RF Conducted Test Tools R3 V3.0.1.19.

For Radiated Measurements / HY-CB03

| | Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Due Date |
|---|-------------------|--------------|------------------|--------------|------------|------------|
| V | Loop Antenna | AMETEK | HLA6121 | 49611 | 2022.03.18 | 2023.03.17 |
| V | Bi-Log Antenna | SCHWARZBECK | VULB9168 | 9168-675 | 2021.08.11 | 2023.08.10 |
| V | Horn Antenna | ETS-Lindgren | 3117 | 00227700 | 2021.10.12 | 2022.10.11 |
| V | Horn Antenna | Com-Power | AH-840 | 101100 | 2021.10.04 | 2023.10.03 |
| V | Pre-Amplifier | SGH | 0301 | 20211007-10 | 2022.02.22 | 2023.02.21 |
| V | Pre-Amplifier | EMCI | EMC051835SE | 980313 | 2021.11.24 | 2022.11.23 |
| V | Pre-Amplifier | EMCI | EMC05820SE | 980309 | 2021.09.27 | 2022.09.26 |
| V | Pre-Amplifier | SGH | PRAMP184 | 20200705 | 2021.08.11 | 2022.08.10 |
| | Coaxial Cable | EMCI | EMC102-KM-KM-600 | 160312 | 2022.02.16 | 2023.02.15 |
| | Coaxial Cable | HUBER+SUHNER | SUCOFLEX 102 | MY3382/2 | 2022.02.16 | 2023.02.15 |
| V | EMI Test Receiver | R&S | ESR3 | 102793 | 2021.12.15 | 2022.12.14 |
| V | Spectrum Analyzer | R&S | FSV3044 | 101114 | 2022.02.11 | 2023.02.10 |
| V | Coaxial Cable | SGH | SGH18 | 2021005-3 | 2022.03.18 | 2023.03.17 |
| | Coaxial Cable | SGH | SGH18 | 202108-4 | | |
| | Coaxial Cable | SGH | SGH18 | 20110223-1 | | |
| | Coaxial Cable | SGH | HA800 | GD20110222-3 | | |

Note:

1. The test instruments marked with "V" are used to measure the final test results.
2. Test Software Version: AUDIX e3 V9.

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

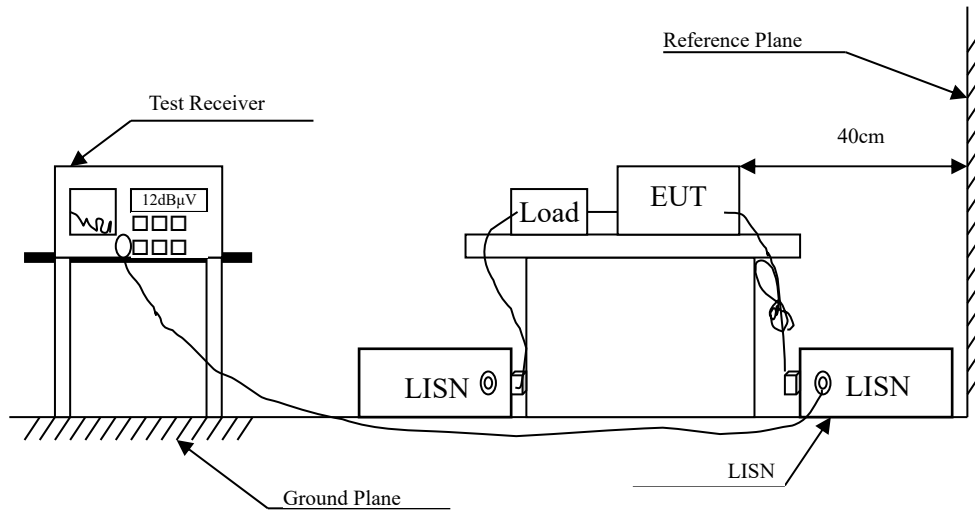
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

| Test Item | Uncertainty | |
|--------------------------------|------------------------------|------------------------------------|
| Conducted Emission | ± 3.42 dB | |
| Maximum conducted output power | Power Meter ± 0.89 dB | Spectrum Analyzer ± 2.06 dB |
| Peak Power Spectral Density | ± 2.06 dB | |
| Radiated Emission | Under 1 GHz ± 4.05 dB | Above 1 GHz ± 3.73 dB |
| Band Edge | Under 1 GHz ± 4.05 dB | Above 1 GHz ± 3.73 dB |
| Occupied Bandwidth | ± 1544.74 Hz | |
| Duty Cycle | ± 2.31 msec | |

2. Conducted Emission

2.1. Test Setup



2.2. Limits

| FCC Part 15 Subpart C Paragraph 15.207 (dBμV) Limit | | |
|---|--------|-------|
| Frequency MHz | Limits | |
| | QP | AV |
| 0.15 - 0.50 | 66-56 | 56-46 |
| 0.50-5.0 | 56 | 46 |
| 5.0 - 30 | 60 | 50 |

Remarks: In the above table, the tighter limit applies at the band edges.

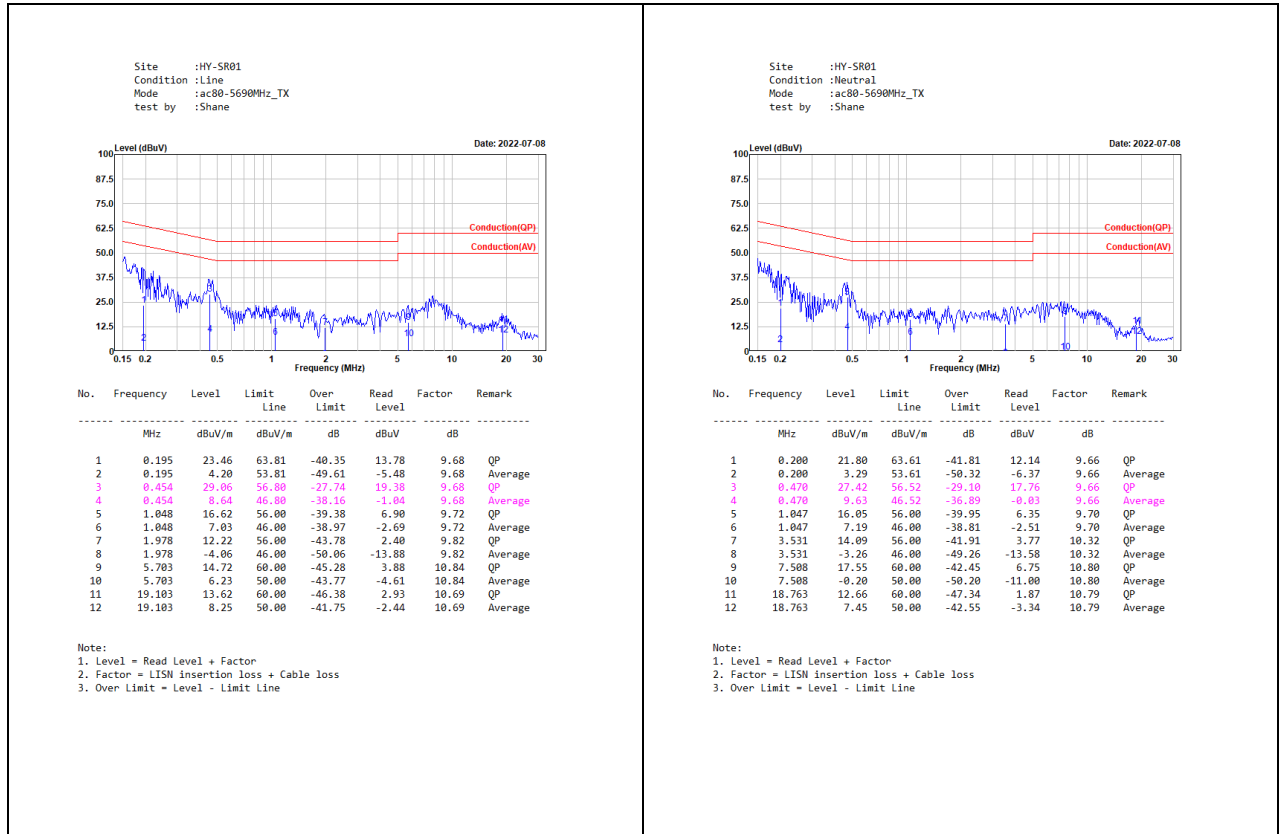
2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm / 50 μ H coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm / 50 μ H coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2014 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz.

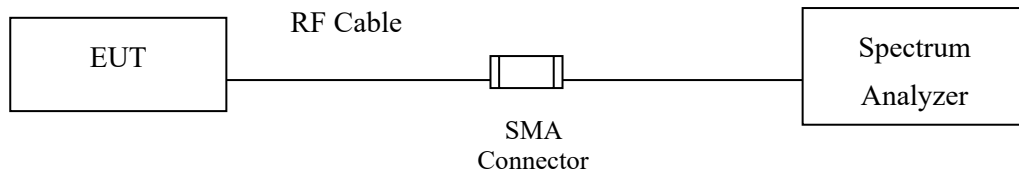
2.4. Test Result of Conducted Emission



3. Maximun conducted output power

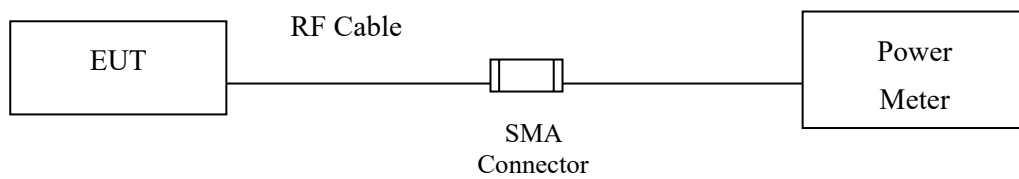
3.1. Test Setup

26dB Occupied Bandwidth

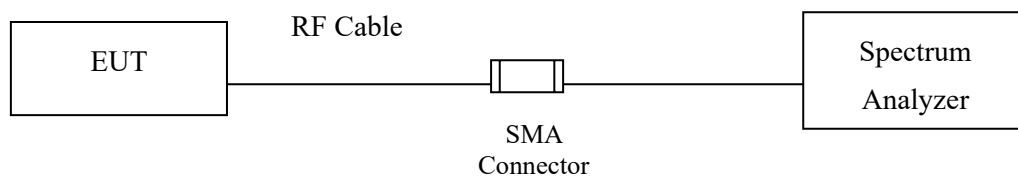


Conduction Power Measurement

Conduction Power Measurement (for 802.11an)



Conduction Power Measurement (for 802.11ac/ax)



3.2. Limits

For the band 5.15-5.25 GHz,

- (i) For an outdoor access point operating in the band 5.150-5.250 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. provided the maximum antenna Gain does not exceed 6 dBi. If transmitting antennas of directional Gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (ii) For an indoor access point operating in the band 5.150-5.250 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna Gain does not exceed 6 dBi. In addition. If transmitting antennas of directional Gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.150-5.250 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional Gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna Gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna Gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high Gain directional antennas are used exclusively for fixed, point-to-point operations.
- (iv) For mobile and portable client devices in the 5.150-5.250 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna Gain does not exceed 6 dBi. In addition. If transmitting antennas of directional Gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi.

For the 5.250-5.350 GHz and 5.470-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 99% emission bandwidth in megahertz. If transmitting antennas of directional Gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi.

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition. If transmitting antennas of directional Gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional Gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high Gain directional antennas are used exclusively for fixed, point-to-point operations.

The maximum conducted output power shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi.

For CDD mode:

5250 MHz-5350 MHz: Directional Gain = 5.85 dBi, Limit= 24 dBm

5470 MHz-5725 MHz: Directional Gain = 5.73 dBi, Limit= 24 dBm

(Directional Gain = $G_{ANT\ MAX}$ + Array Gain, Array Gain = 0 dB for $N_{ANT} \leq 4$)

For Beamforming mode:

5250 MHz-5350 MHz: Directional Gain = 8.86 dBi, Limit= 21.14 dBm

5470 MHz-5725 MHz: Directional Gain = 8.74 dBi, Limit= 21.26 dBm

(Directional Gain = $G_{ANT\ MAX}$ + Array Gain, Array Gain = $10 \cdot \log(2) = 3.01$ dB)

3.3. Test Procedure

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater than the 6dB BW of the emission under test. Maximum conducted output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

802.11an ($BW \leq 40\text{MHz}$) Maximum conducted output power using KDB 789033 section E)3)b) Method PM-G (Measurement using a gated RF average power meter)

Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth, (Anritsu / MA2411B video bandwidth: 65MHz)

802.11ac ($BW=80\text{MHz}$) Maximum conducted output power using KDB 789033 section E)2)b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep).

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D03 section D) procedure is used for measurements.

3.4. Test Result of Maximum conducted output power

Product : Secured Network Extension Device
 Test Item : Maximum conducted output power
 Test Mode : Transmit (802.11a-CDD)
 Test Date : 2022/06/29

Maximum conducted output power Measurement:

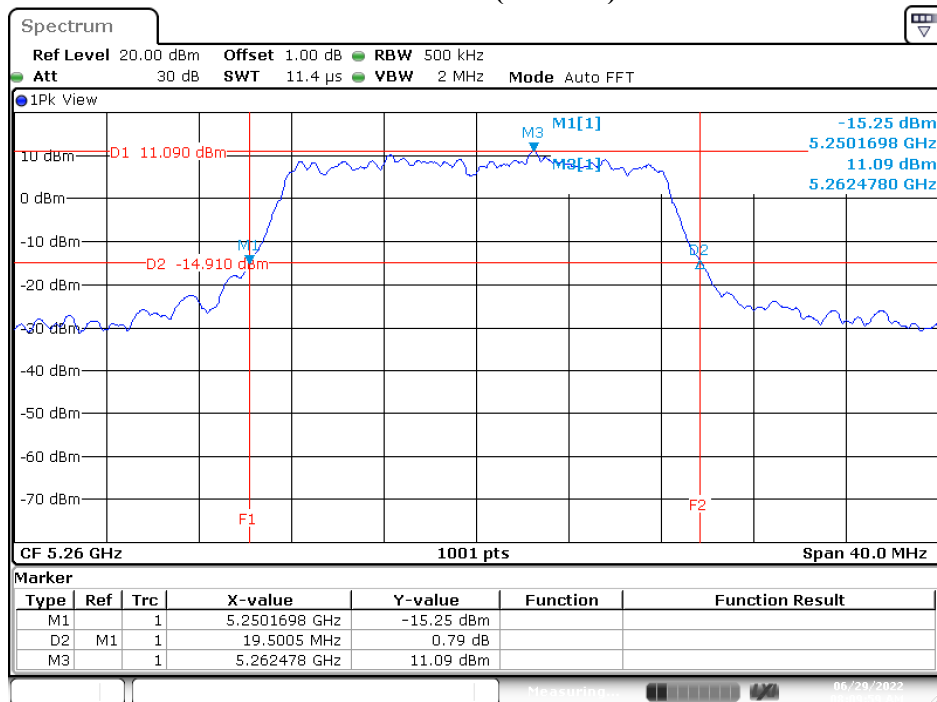
| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Chain A Power (dBm) | Chain B Power (dBm) | Output Power (dBm) | Output Power Limit | |
|-------------|--------------------|----------------------------|---------------------------|---------------------------|--------------------------|--------------------|---------------|
| | | | | | | (dBm) | dBm+10log(BW) |
| 52 | 5260 | 19.50 | 17.42 | 17.64 | 20.54 | 24 | 23.90 |
| 60 | 5300 | 19.66 | 17.34 | 17.96 | 20.67 | 24 | 23.94 |
| 64 | 5320 | 19.30 | 15.62 | 16.44 | 19.06 | 24 | 23.86 |
| 100 | 5500 | 19.42 | 15.97 | 15.54 | 18.77 | 24 | 23.88 |
| 116 | 5580 | 19.46 | 17.45 | 17.33 | 20.40 | 24 | 23.89 |
| 140 | 5700 | 19.46 | 13.53 | 13.92 | 16.74 | 24 | 23.89 |

Note:

1. Output Power Value (dBm) = $10 \cdot \text{LOG} (\text{Chain A(mW)} + \text{Chain B(mW)})$
2. 26 dB Bandwidth is the bandwidth of chain A or B whichever is less bandwidth, output power limitation is more stringent.

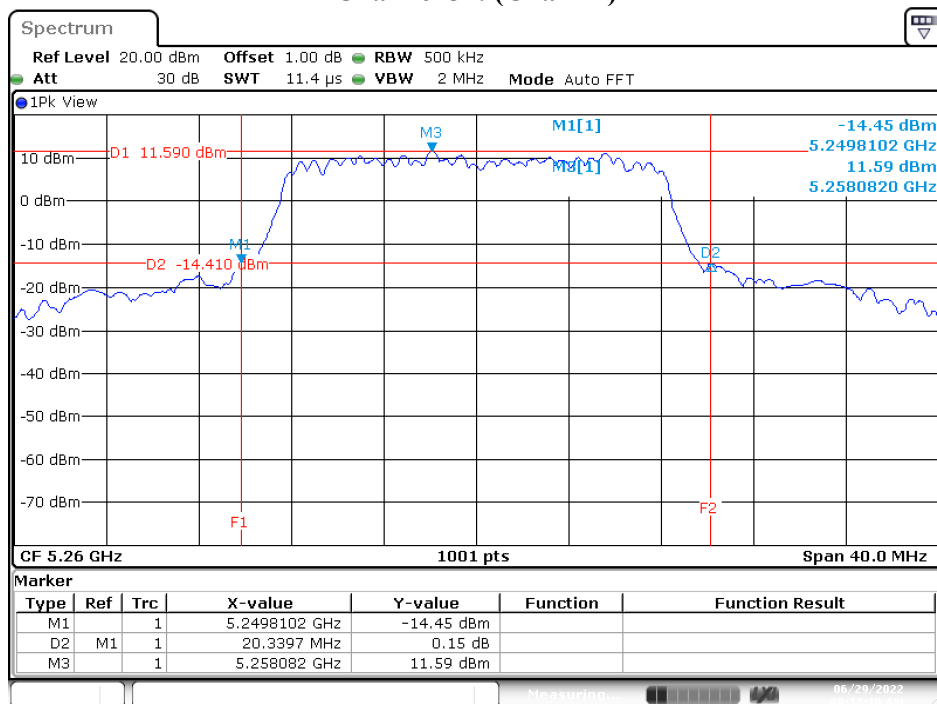
26dB Occupied Bandwidth:

Channel 52: (Chain A)



Date: 29 JUN 2022 08:09:59

Channel 52: (Chain B)



Date: 29 JUN 2022 08:11:19

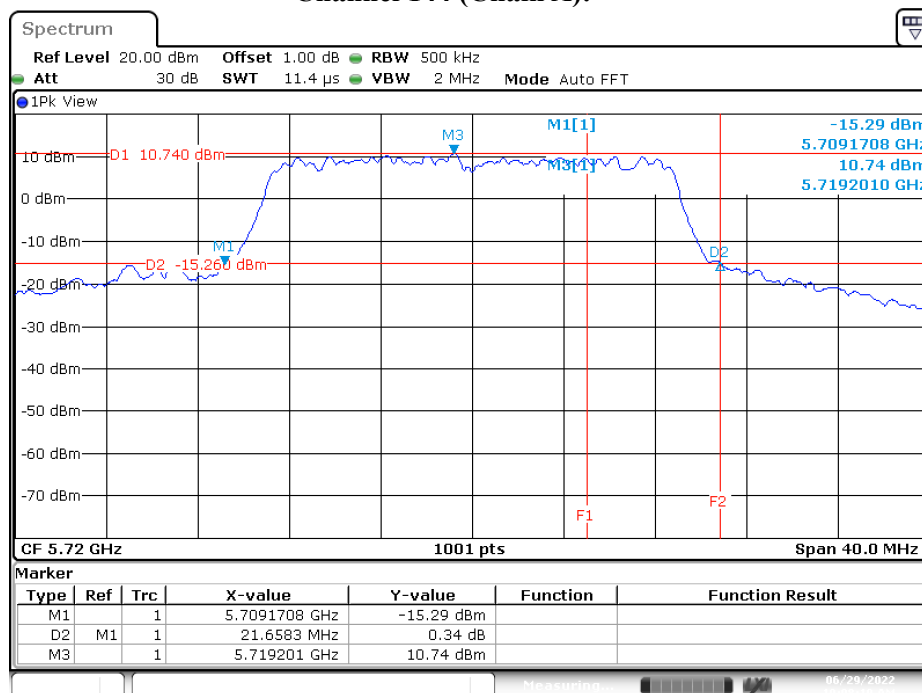
Product : Secured Network Extension Device
 Test Item : Maximum conducted output power
 Test Mode : Transmit (802.11ac-20 MHz-CDD)
 Test Date : 2022/06/29

Maximum conducted output power Measurement:

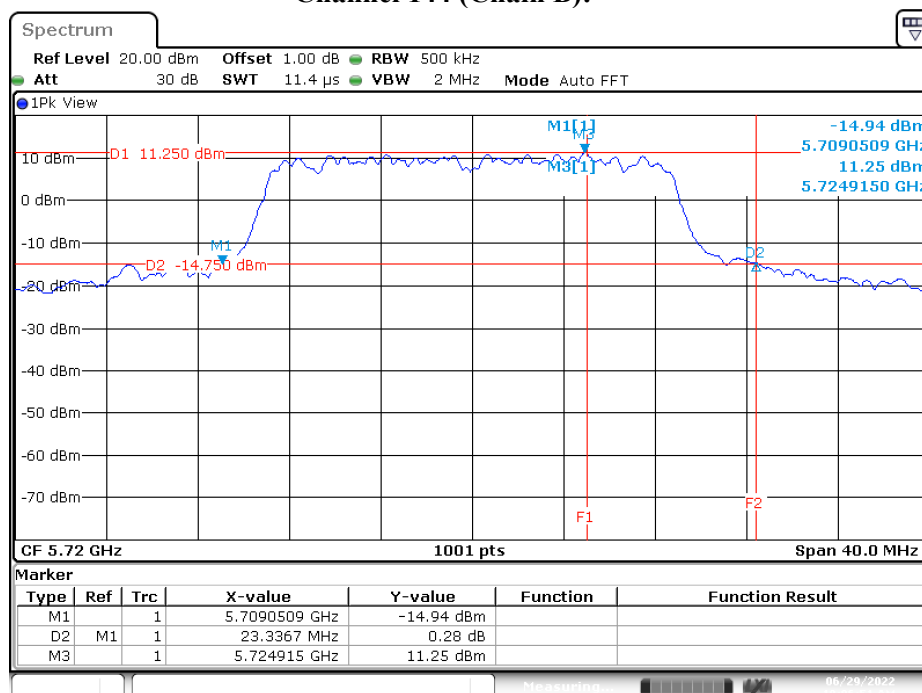
| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Chain A Power (dBm) | Chain B Power (dBm) | Output Power (dBm) | Duty factor (dB) | Output Power Limit | |
|---------------|--------------------|----------------------------|---------------------------|---------------------------|--------------------------|------------------------|--------------------|---------------|
| | | | | | | | (dBm) | dBm+10log(BW) |
| 52 | 5260 | 20.82 | 18.25 | 18.57 | 21.42 | -- | 24 | 24.18 |
| 60 | 5300 | 20.62 | 18.13 | 18.86 | 21.52 | -- | 24 | 24.14 |
| 64 | 5320 | 20.46 | 15.51 | 16.46 | 19.02 | -- | 24 | 24.11 |
| 100 | 5500 | 20.58 | 16.93 | 16.58 | 19.77 | -- | 24 | 24.13 |
| 116 | 5580 | 20.50 | 18.42 | 18.15 | 21.30 | -- | 24 | 24.12 |
| 140 | 5700 | 20.38 | 13.83 | 14.37 | 17.12 | -- | 24 | 24.09 |
| 144(U-NII-2C) | 5720 | 15.83 | 15.27 | 15.72 | 18.51 | 0.00 | 24 | 22.99 |
| 144(U-NII-3) | 5720 | -- | 9.71 | 10.04 | 12.89 | 0.00 | 30 | -- |

Note:

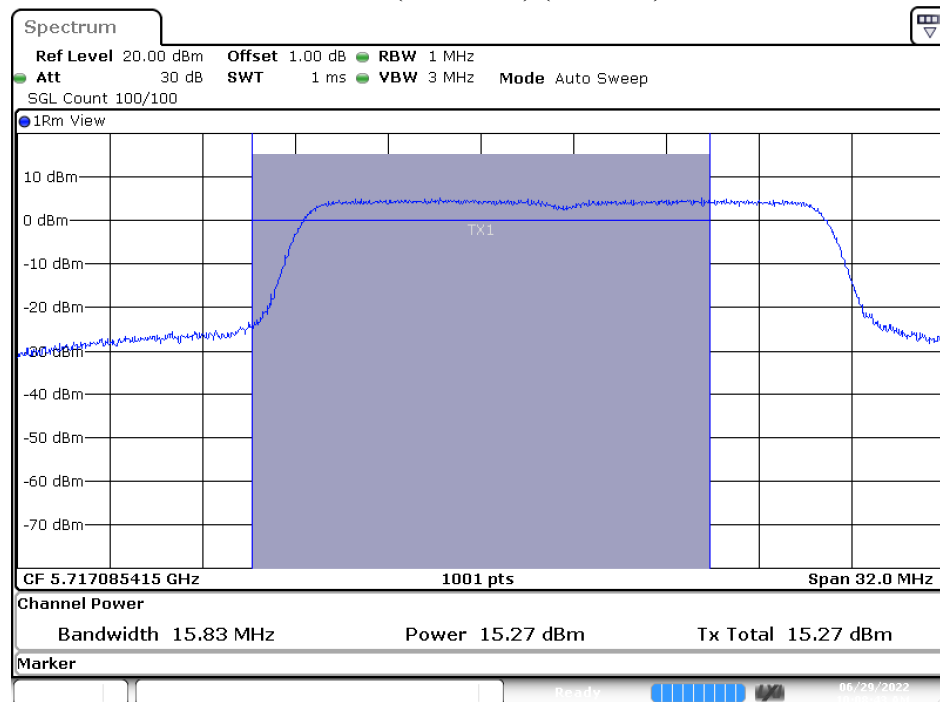
1. Output Power Value (dBm) = $10 \cdot \text{LOG}(\text{Chain A(mW)} + \text{Chain B(mW)})$
2. 26 dB Bandwidth is the bandwidth of chain A or B whichever is less bandwidth, output power limitation is more stringent.

26dB Occupied Bandwidth:**Channel 144 (Chain A):**

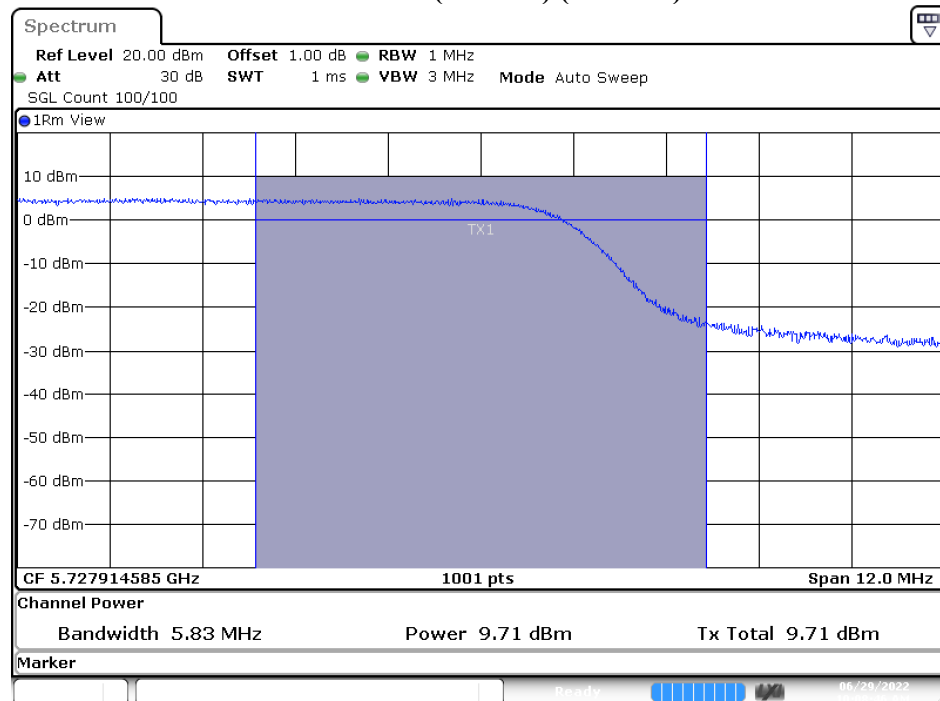
Date: 29 JUN 2022 10:08:11

Channel 144 (Chain B):

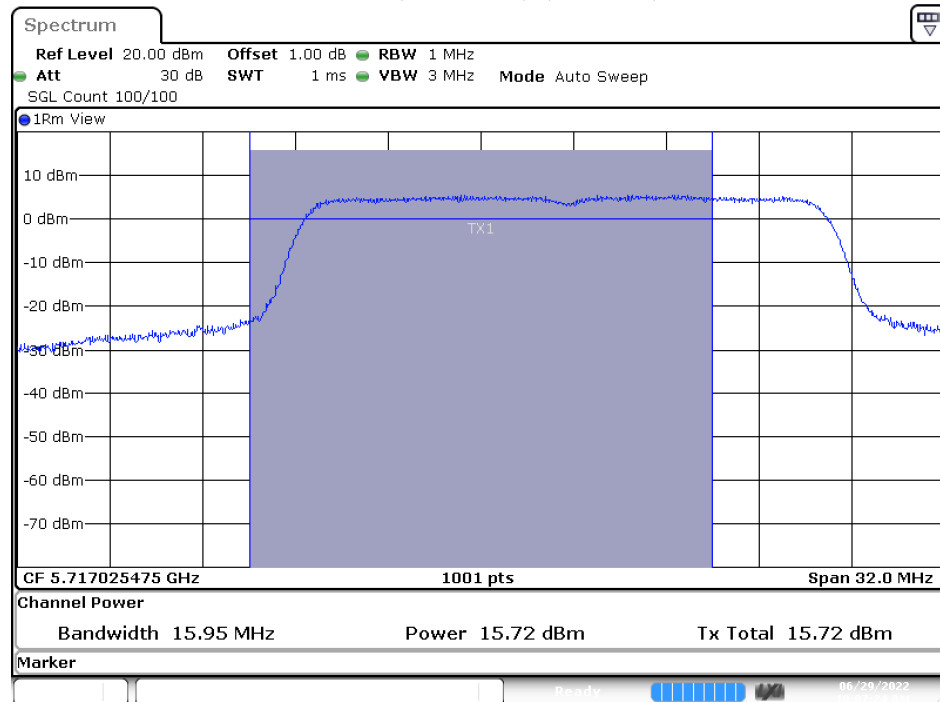
Date: 29 JUN 2022 10:06:51

Maximum conducted output power:**Channel 144 (U-NII-2C) (Chain A):**

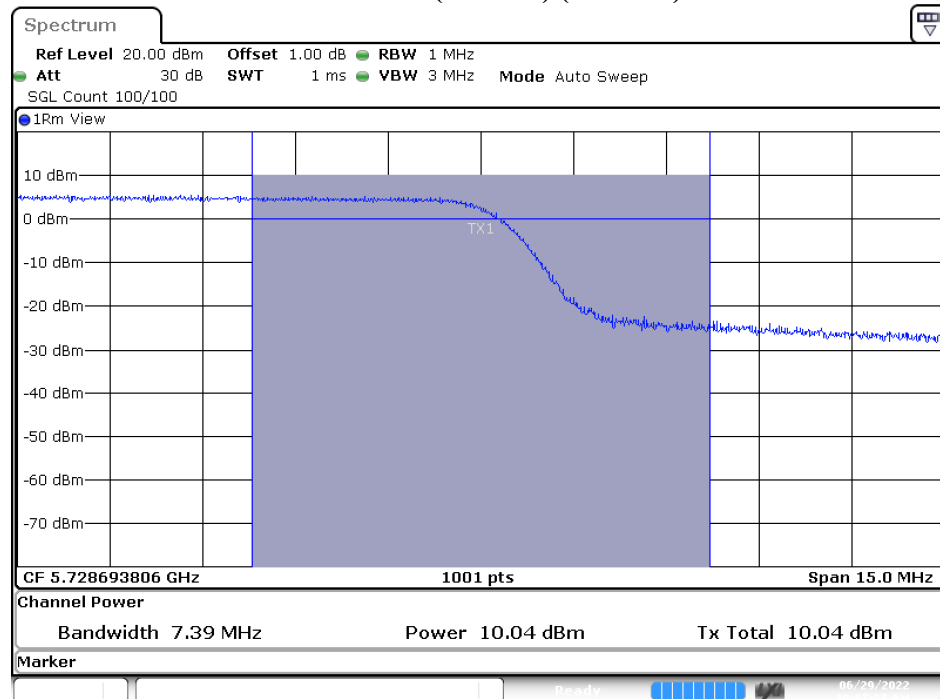
Date: 29.JUN.2022 10:08:44

Channel 144 (U-NII-3) (Chain A):

Date: 29.JUN.2022 10:08:47

Maximum conducted output power:**Channel 144 (U-NII-2C) (Chain B):**

Date: 29.JUN.2022 10:07:25

Channel 144 (U-NII-3) (Chain B):

Date: 29.JUN.2022 10:07:28

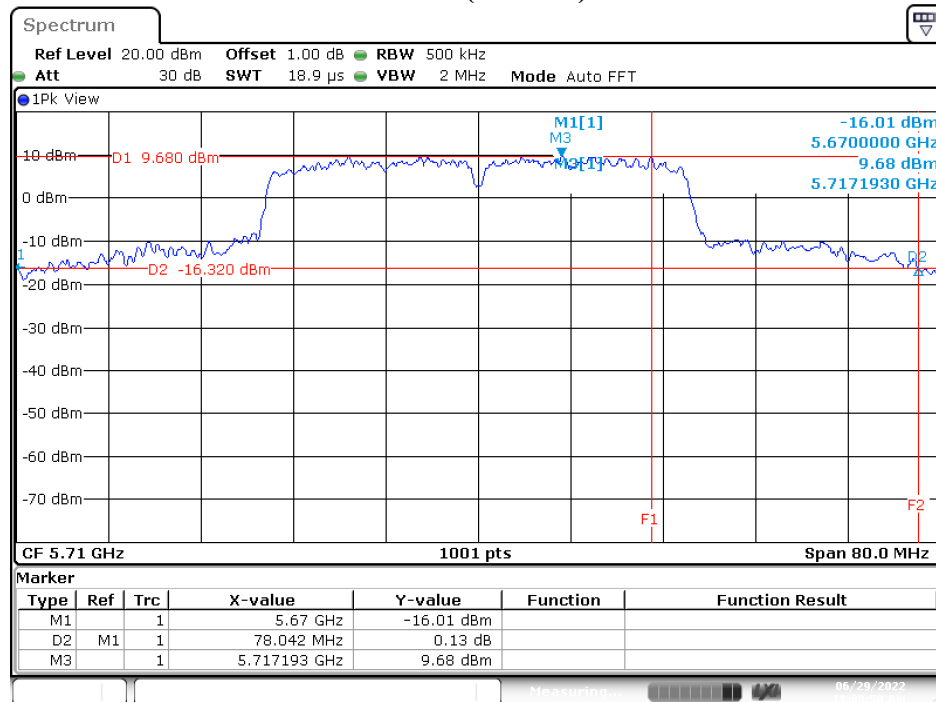
Product : Secured Network Extension Device
 Test Item : Maximum conducted output power
 Test Mode : Transmit (802.11ac-40 MHz-CDD)
 Test Date : 2022/06/29

Maximum conducted output power Measurement:

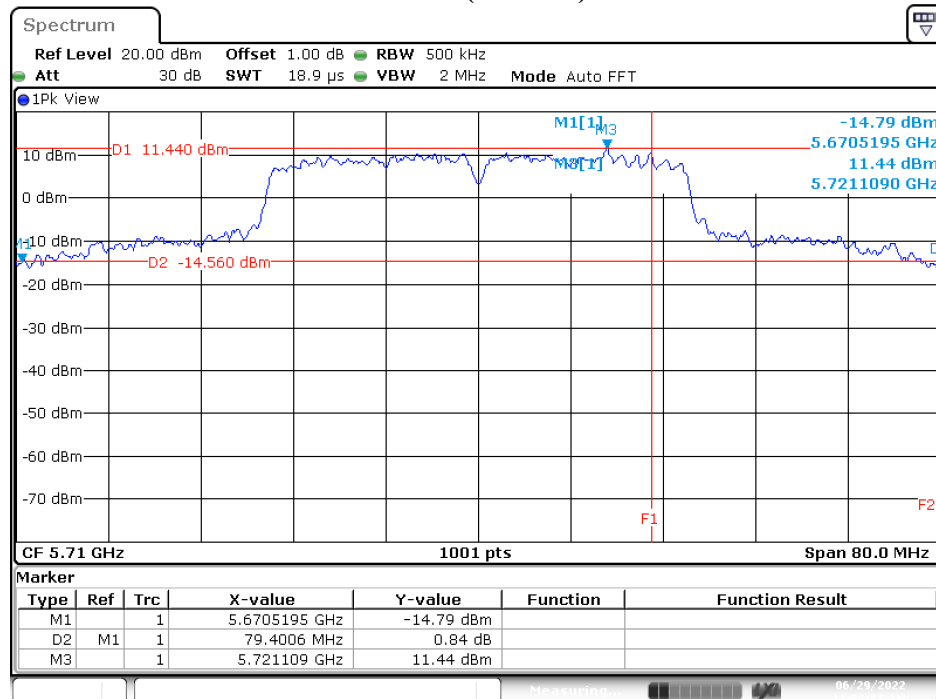
| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Chain A Power (dBm) | Chain B Power (dBm) | Output Power (dBm) | Duty factor (dB) | Output Power Limit | |
|---------------|--------------------|----------------------------|---------------------------|---------------------------|--------------------------|------------------------|--------------------|---------------|
| | | | | | | | (dBm) | dBm+10log(BW) |
| 54 | 5270 | 39.72 | 18.55 | 18.94 | 21.76 | -- | 24 | 26.99 |
| 62 | 5310 | 39.32 | 12.16 | 13.14 | 15.69 | -- | 24 | 26.95 |
| 102 | 5510 | 39.24 | 15.06 | 14.75 | 17.92 | -- | 24 | 26.94 |
| 110 | 5550 | 44.04 | 19.11 | 18.62 | 21.88 | -- | 24 | 27.44 |
| 134 | 5670 | 39.08 | 14.41 | 14.63 | 17.53 | -- | 24 | 26.92 |
| 142(U-NII-2C) | 5710 | 54.48 | 18.27 | 18.89 | 21.78 | 0.18 | 24 | 28.36 |
| 142(U-NII-3) | 5710 | -- | 7.49 | 7.82 | 10.84 | 0.18 | 30 | -- |

Note:

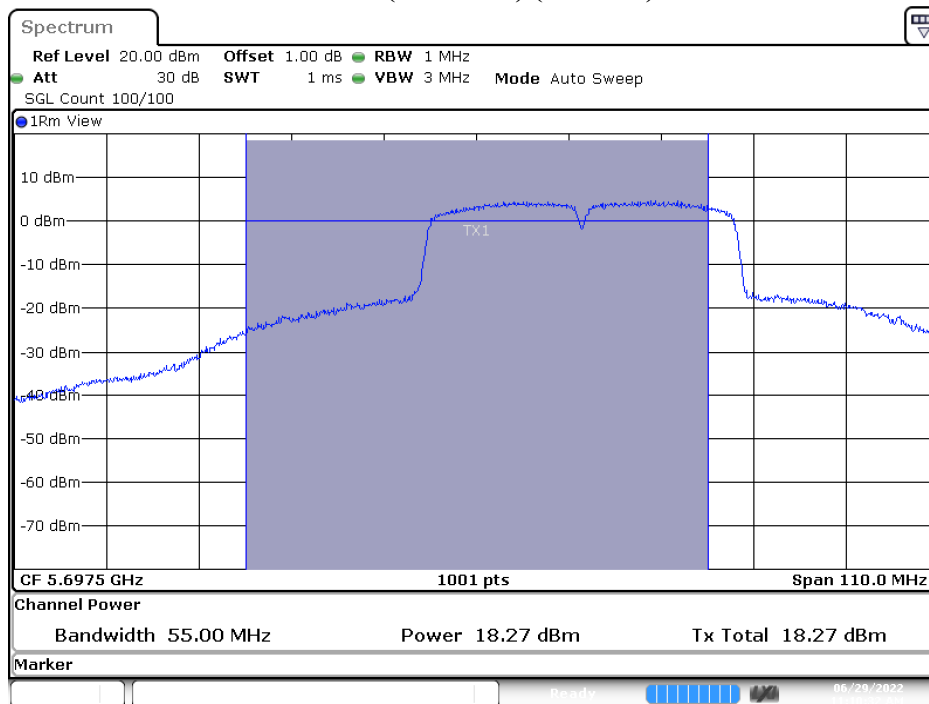
1. Output Power Value (dBm) = 10*LOG (Chain A(mW) + Chain B(mW))
2. 26 dB Bandwidth is the bandwidth of chain A or B whichever is less bandwidth, output power limitation is more stringent.

26dB Occupied Bandwidth:**Channel 142 (Chain A):**

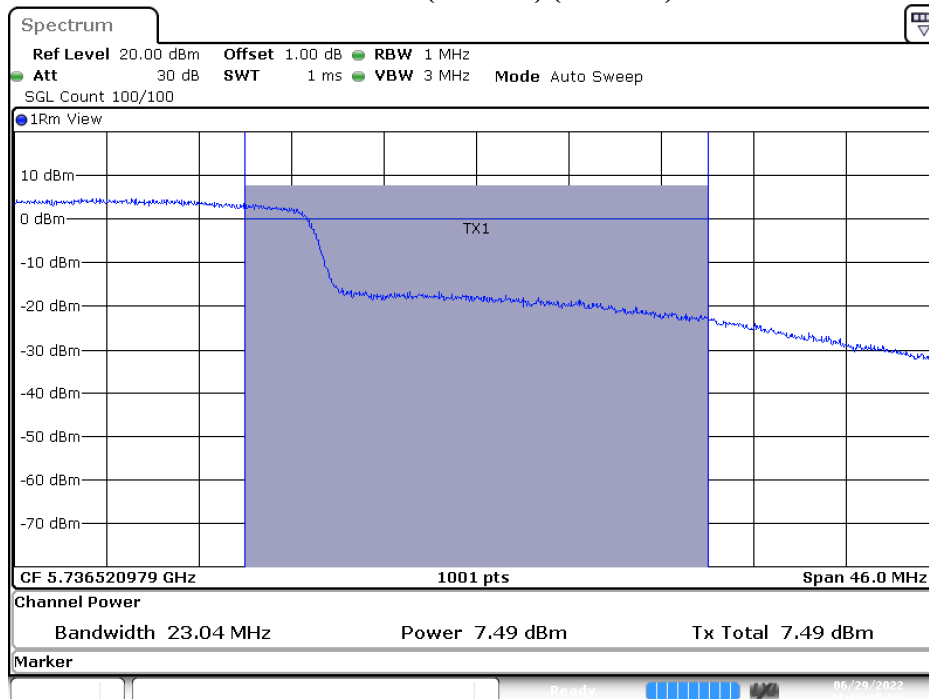
Date: 29 JUN 2022 11:09:59

Channel 142 (Chain B):

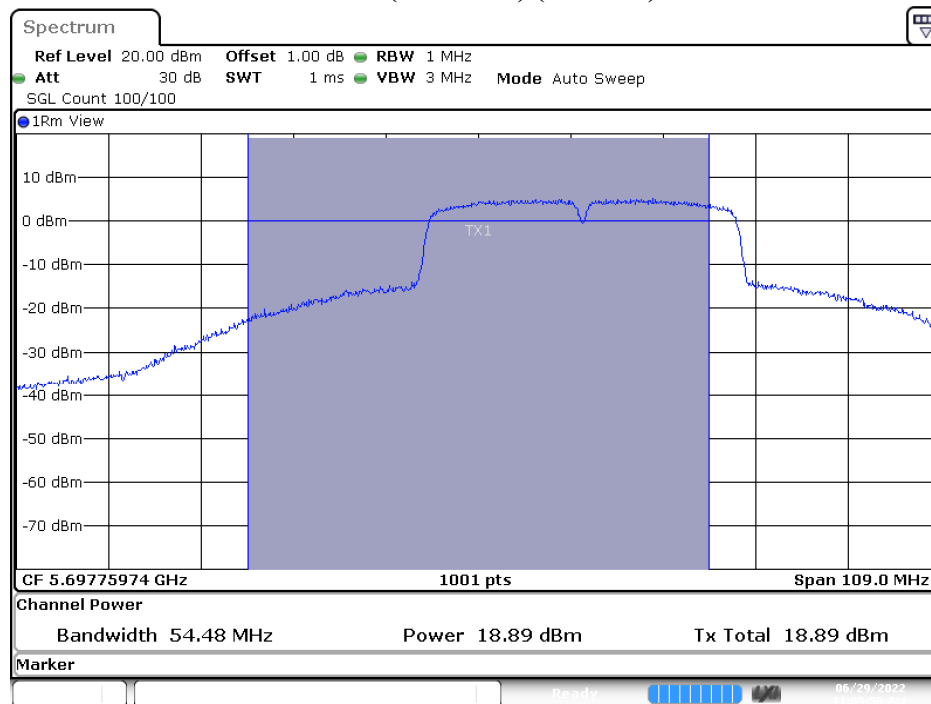
Date: 29 JUN 2022 11:08:23

Maximum conducted output power:**Channel 142(U-NII-2C) (Chain A):**

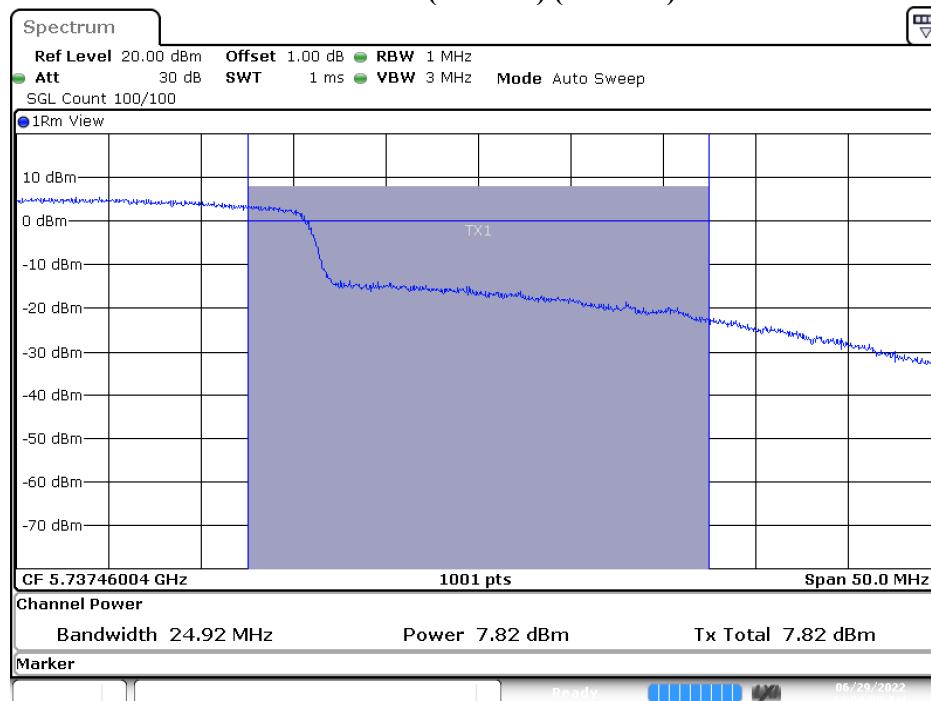
Date: 29 JUN 2022 11:10:33

Channel 142(U-NII-3) (Chain A):

Date: 29 JUN 2022 11:10:36

Maximum conducted output power:**Channel 142(U-NII-2C) (Chain B):**

Date: 29 JUN 2022 11:08:57

Channel 142(U-NII-3) (Chain B):

Date: 29 JUN 2022 11:09:00

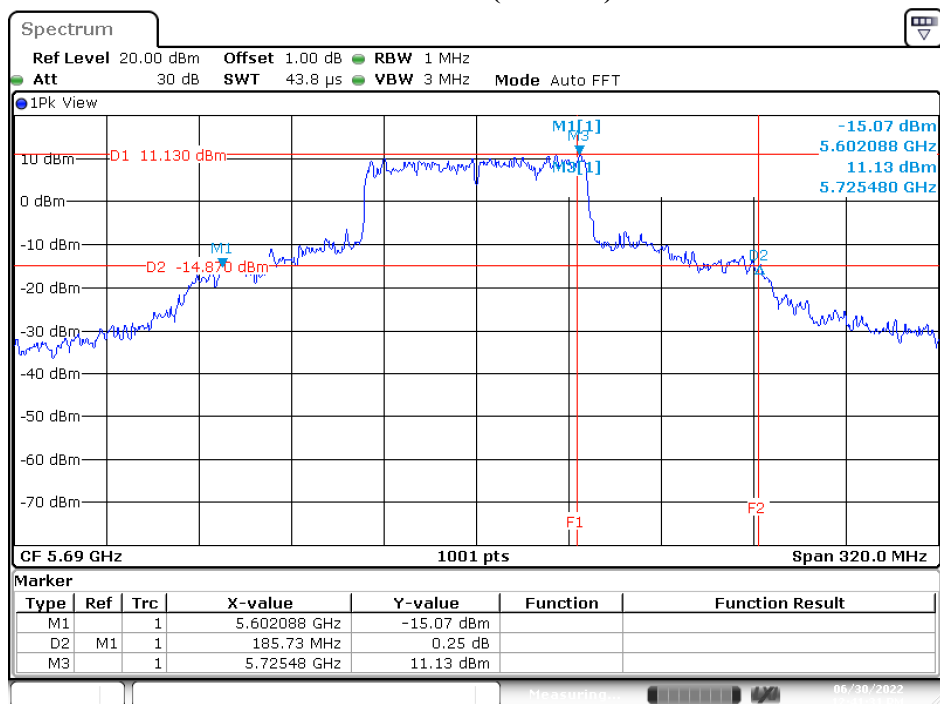
Product : Secured Network Extension Device
 Test Item : Maximum conducted output power
 Test Mode : Transmit (802.11ac-80 MHz-CDD)
 Test Date : 2022/06/30

Maximum conducted output power Measurement

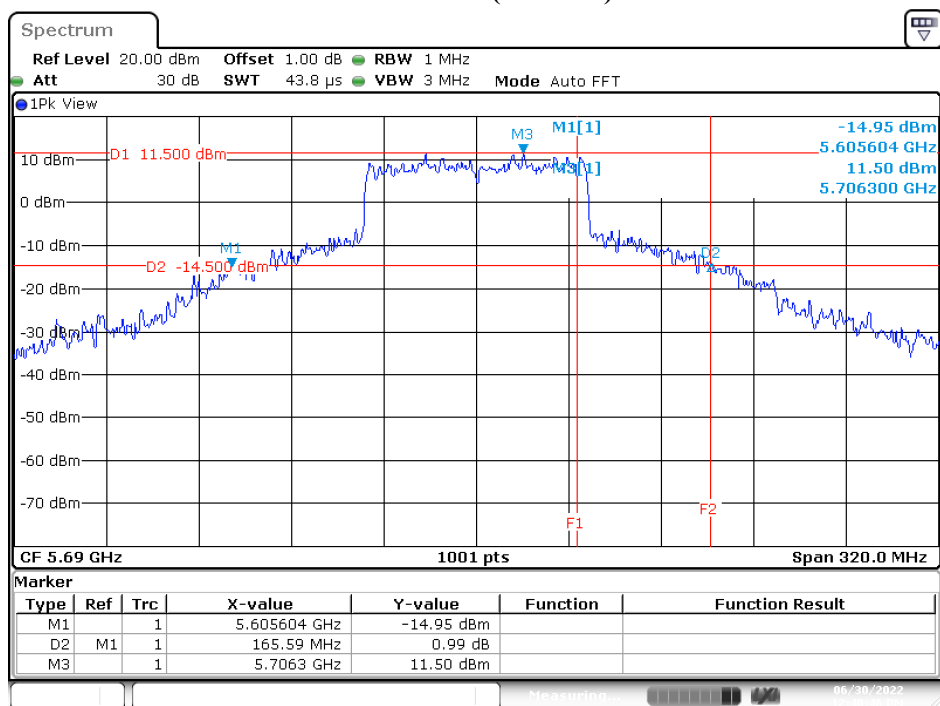
| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Chain A Power (dBm) | Chain B Power (dBm) | Output Power (dBm) | Duty factor (dB) | Output Power Limit | |
|---------------|--------------------|----------------------------|---------------------------|---------------------------|--------------------------|------------------------|--------------------|---------------|
| | | | | | | | (dBm) | dBm+10log(BW) |
| 58 | 5290 | 82.48 | 10.27 | 10.89 | 13.60 | -- | 24 | 30.16 |
| 106 | 5530 | 82.32 | 12.95 | 12.51 | 15.75 | -- | 24 | 30.15 |
| 122 | 5610 | 82.16 | 15.34 | 15.41 | 18.39 | -- | 24 | 30.15 |
| 138(U-NII-2C) | 5690 | 119.40 | 20.16 | 20.33 | 23.66 | 0.41 | 24 | 31.77 |
| 138(U-NII-3) | 5690 | -- | 7.79 | 7.51 | 11.07 | 0.41 | 30 | -- |

Note:

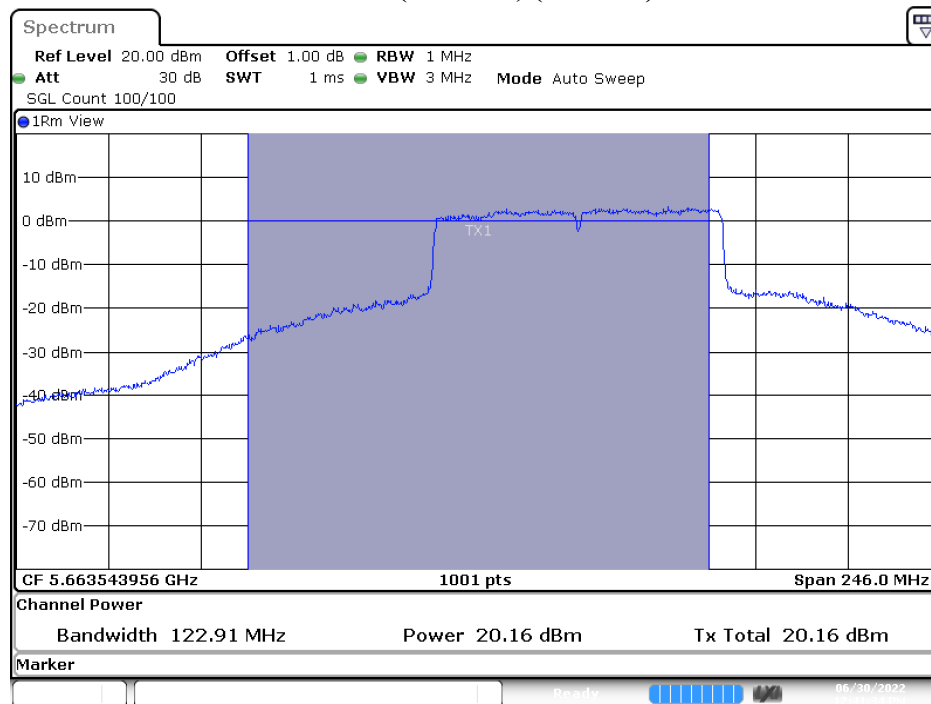
1. Output Power Value (dBm) = $10 \times \text{LOG} (\text{Chain A(mW)} + \text{Chain B(mW)})$
2. 26 dB Bandwidth is the bandwidth of chain A or B whichever is less bandwidth, output power limitation is more stringent.

26dB Occupied Bandwidth:**Channel 138 (Chain A):**

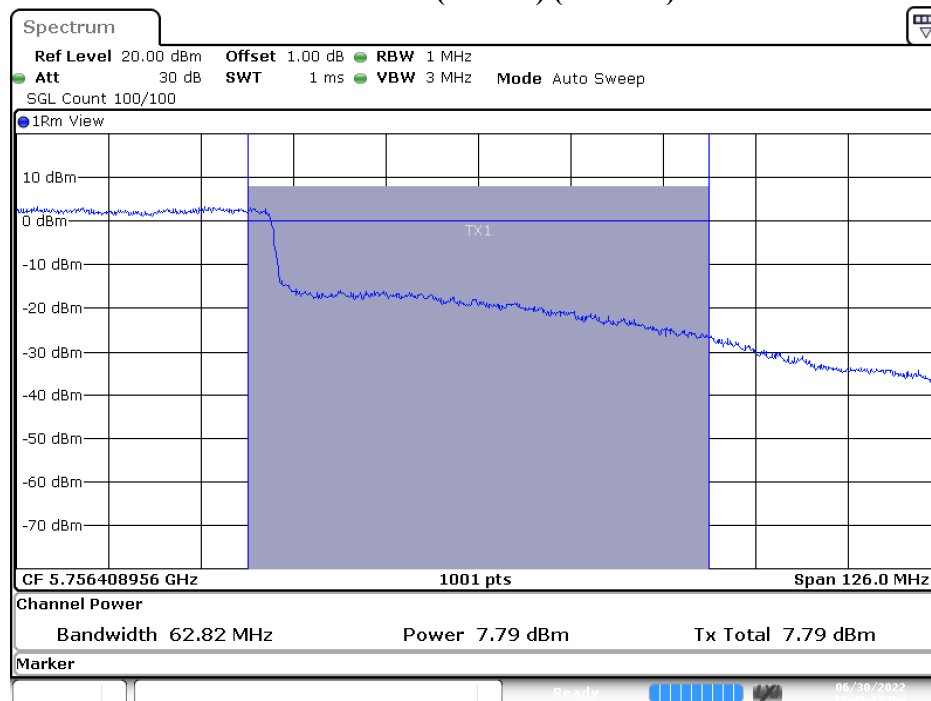
Date: 30.JUN.2022 12:41:32

Channel 138 (Chain B):

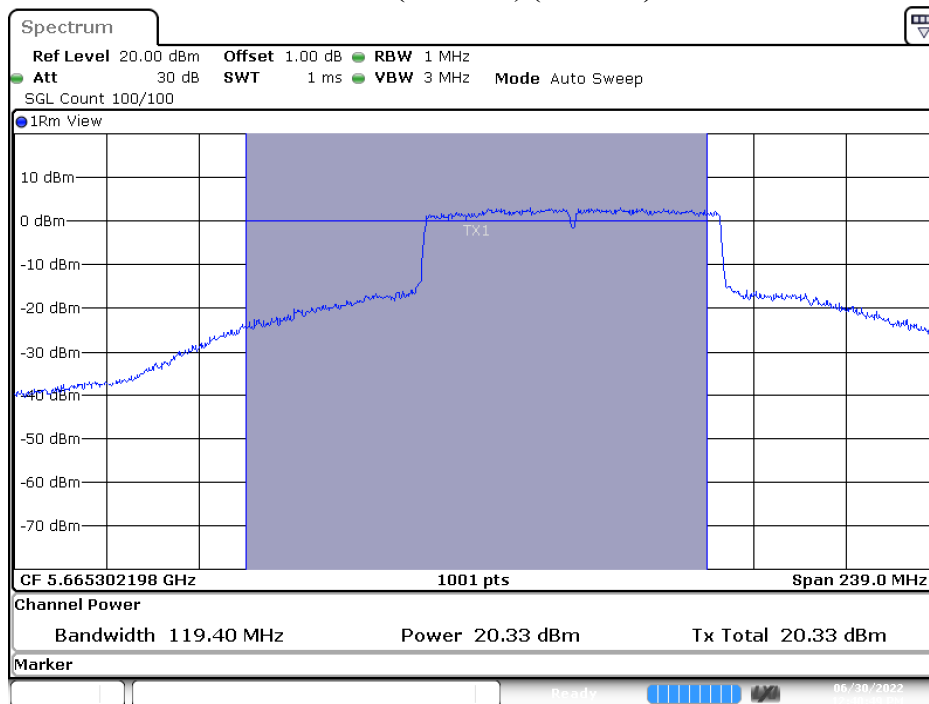
Date: 30.JUN.2022 12:40:46

Maximum conducted output power:**Channel 138 (U-NII-2C) (Chain A):**

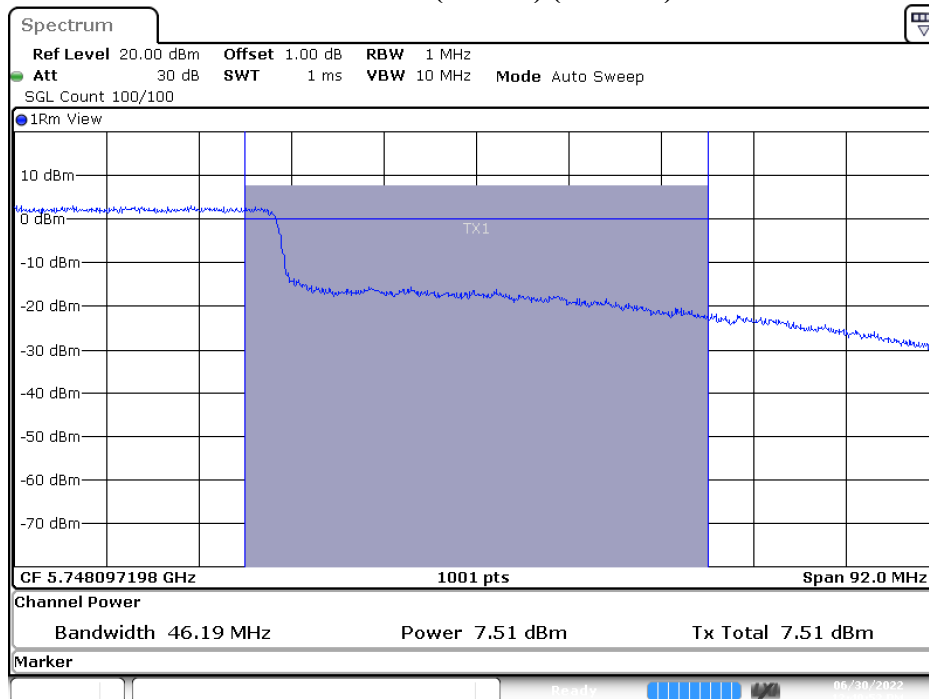
Date: 30 JUN.2022 12:41:35

Channel 138 (U-NII-3) (Chain A):

Date: 30 JUN.2022 12:41:38

Maximum conducted output power:**Channel 138 (U-NII-2C) (Chain B):**

Date: 30 JUN 2022 12:40:49

Channel 138 (U-NII-3) (Chain B):

Date: 30 JUN 2022 12:40:52

Product : Secured Network Extension Device
 Test Item : Maximum conducted output power
 Test Mode : Transmit (802.11ac-20 MHz-Beamforming)
 Test Date : 2022/06/29

Maximum conducted output power Measurement:

| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Chain A Power (dBm) | Chain B Power (dBm) | Output Power (dBm) | Duty factor (dB) | Output Power Limit | |
|---------------|--------------------|----------------------------|---------------------------|---------------------------|--------------------------|------------------------|--------------------|---------------|
| | | | | | | | (dBm) | dBm+10log(BW) |
| 52 | 5260 | 20.82 | 15.24 | 15.56 | 18.41 | -- | 21.14 | 24.18 |
| 60 | 5300 | 20.62 | 15.12 | 15.85 | 18.51 | -- | 21.14 | 24.14 |
| 64 | 5320 | 20.46 | 12.50 | 13.45 | 16.01 | -- | 21.14 | 24.11 |
| 100 | 5500 | 20.58 | 13.92 | 13.57 | 16.76 | -- | 21.26 | 24.13 |
| 116 | 5580 | 20.50 | 15.41 | 15.14 | 18.29 | -- | 21.26 | 24.12 |
| 140 | 5700 | 20.38 | 10.82 | 11.36 | 14.11 | -- | 21.26 | 24.09 |
| 144(U-NII-2C) | 5720 | 15.83 | 12.26 | 12.71 | 15.50 | 0.00 | 21.26 | 22.99 |
| 144(U-NII-3) | 5720 | -- | 6.70 | 7.03 | 9.88 | 0.00 | 27.49 | -- |

Note:

1. Output Power Value (dBm) = $10 \cdot \text{LOG} (\text{Chain A(mW)} + \text{Chain B(mW)})$
2. 26 dB Bandwidth is the bandwidth of chain A or B whichever is less bandwidth, output power limitation is more stringent.

Product : Secured Network Extension Device
 Test Item : Maximum conducted output power
 Test Mode : Transmit (802.11ac-40 MHz-Beamforming)
 Test Date : 2022/06/29

Maximum conducted output power Measurement:

| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Chain A Power (dBm) | Chain B Power (dBm) | Output Power (dBm) | Duty factor (dB) | Output Power Limit | |
|---------------|--------------------|----------------------------|---------------------------|---------------------------|--------------------------|------------------------|--------------------|---------------|
| | | | | | | | (dBm) | dBm+10log(BW) |
| 54 | 5270 | 39.72 | 15.54 | 15.93 | 18.75 | -- | 21.14 | 26.99 |
| 62 | 5310 | 39.32 | 9.15 | 10.13 | 12.68 | -- | 21.14 | 26.95 |
| 102 | 5510 | 39.24 | 12.05 | 11.74 | 14.91 | -- | 21.26 | 26.94 |
| 110 | 5550 | 44.04 | 16.10 | 15.61 | 18.87 | -- | 21.26 | 27.44 |
| 134 | 5670 | 39.08 | 11.40 | 11.62 | 14.52 | -- | 21.26 | 26.92 |
| 142(U-NII-2C) | 5710 | 54.48 | 15.26 | 15.88 | 18.77 | 0.18 | 21.26 | 28.36 |
| 142(U-NII-3) | 5710 | -- | 4.48 | 4.81 | 7.83 | 0.18 | 27.49 | 24.63 |

Note:

1. Output Power Value (dBm) = 10*LOG (Chain A(mW) + Chain B(mW))
2. 26 dB Bandwidth is the bandwidth of chain A or B whichever is less bandwidth, output power limitation is more stringent.

Product : Secured Network Extension Device
 Test Item : Maximum conducted output power
 Test Mode : Transmit (802.11ac-80 MHz-Beamforming)
 Test Date : 2022/06/29

Maximum conducted output power Measurement

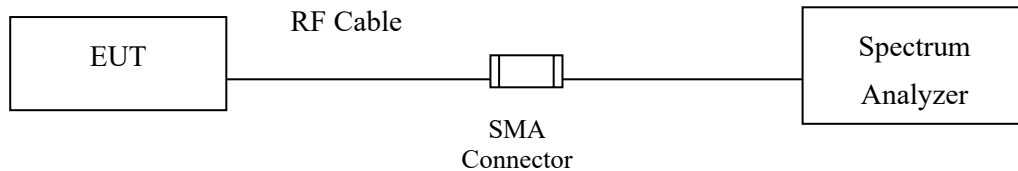
| Channel No. | Frequency (MHz) | 26dB Bandwidth (MHz) | Chain A Power (dBm) | Chain B Power (dBm) | Output Power (dBm) | Duty factor (dB) | Output Power Limit | |
|---------------|--------------------|----------------------------|---------------------------|---------------------------|--------------------------|------------------------|--------------------|---------------|
| | | | | | | | (dBm) | dBm+10log(BW) |
| 58 | 5290 | 82.48 | 7.26 | 7.88 | 10.59 | -- | 21.14 | 30.16 |
| 106 | 5530 | 82.32 | 9.94 | 9.50 | 12.74 | -- | 21.26 | 30.15 |
| 122 | 5610 | 82.16 | 12.33 | 12.40 | 15.38 | -- | 21.26 | 30.15 |
| 138(U-NII-2C) | 5690 | 119.40 | 17.15 | 17.32 | 20.66 | 0.41 | 21.26 | 31.77 |
| 138(U-NII-3) | 5690 | -- | 4.78 | 4.50 | 8.06 | 0.41 | 27.49 | -- |

Note:

1. Output Power Value (dBm) = 10*LOG (Chain A(mW) + Chain B(mW))
2. 26 dB Bandwidth is the bandwidth of chain A or B whichever is less bandwidth, output power limitation is more stringent.

4. Maximum Power Spectral Density

4.1. Test Setup



4.2. Limits

For the band 5.15-5.25 GHz,

- (i) For an outdoor access point operating in the band 5.150-5.250 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional Gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi.
- (ii) For an indoor access point operating in the band 5.150-5.250 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional Gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.150-5.250 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional Gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna Gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna

Gain

in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high Gain directional antennas are used exclusively for fixed, point-to-point operations.

- (iv) For mobile and portable client devices in the 5.150-5.250 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional Gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi.

For the 5.250-5.350 GHz and 5.470-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional Gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi.

For the band 5.725-5.850 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional Gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional Gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high Gain directional antennas are used exclusively for fixed, point-to-point operations.

The maximum conducted output power shall be reduced by the amount in dB that the directional Gain of the antenna exceeds 6 dBi.

5250 MHz-5350 MHz: Directional Gain = 8.86 dBi, Limit= 8.14 dBm

5470 MHz-5725 MHz: Directional Gain = 8.74 dBi, Limit= 8.26 dBm

Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$ dBi

4.3. Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

The Peak Power Spectral Density using KDB 789033 section F) procedure, Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer.

SA-1 method is selected to run the test.

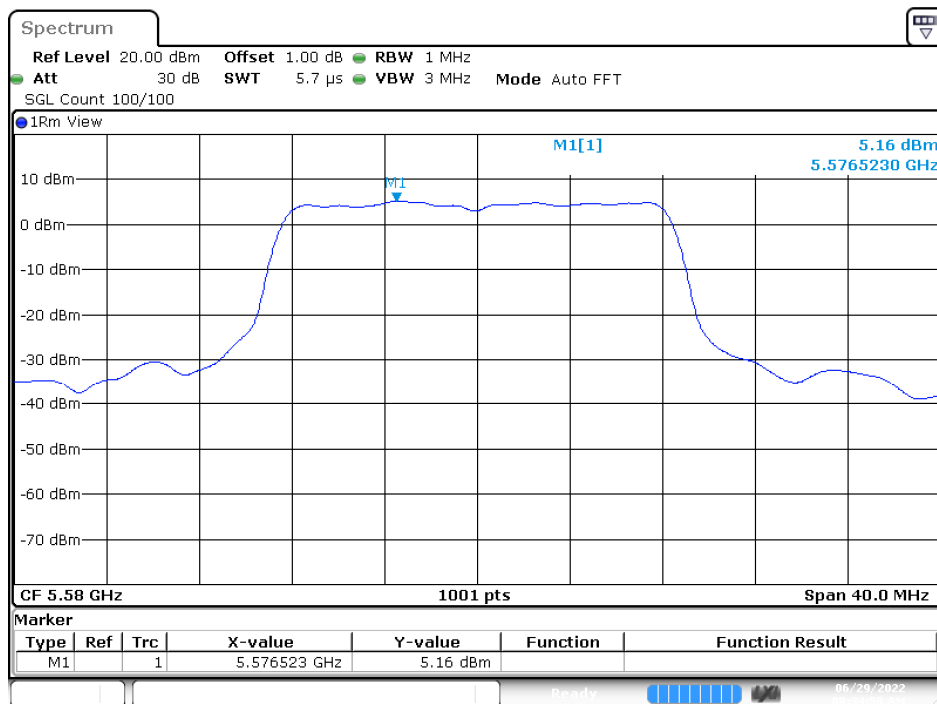
4.4. Test Result of Maximun Power Spectral Density

Product : Secured Network Extension Device
 Test Item : Maximun Power Spectral Density
 Test Mode : Transmit (802.11a-CDD)

| Channel No. | Frequency (MHz) | Data Rate (Mbps) | Chain | PPSD/MHz (dBm) | Duty factor (dB) | Total PPSP/MHz (dBm) | Limit (dBm) | Result |
|-------------|-----------------|------------------|-------|----------------|------------------|----------------------|-------------|--------|
| 52 | 5260 | 6 | A | 4.67 | 0.22 | 7.95 | 8.14 | Pass |
| | | | B | 4.77 | | | | |
| 60 | 5300 | 6 | A | 4.83 | 0.22 | 8.08 | 8.14 | Pass |
| | | | B | 4.87 | | | | |
| 64 | 5320 | 6 | A | 2.75 | 0.22 | 6.30 | 8.14 | Pass |
| | | | B | 3.38 | | | | |
| 100 | 5500 | 6 | A | 2.97 | 0.22 | 6.22 | 8.26 | Pass |
| | | | B | 3.02 | | | | |
| 116 | 5580 | 6 | A | 5.16 | 0.22 | 8.17 | 8.26 | Pass |
| | | | B | 4.71 | | | | |
| 140 | 5700 | 6 | A | 1.45 | 0.22 | 5.13 | 8.26 | Pass |
| | | | B | 2.32 | | | | |

Note: Total PPSP = 10*log(Chain A (mW) + Chain B (mW) + Duty factor.

Channel 116 (Chain A):



Date: 29 JUN 2022 08:34:59

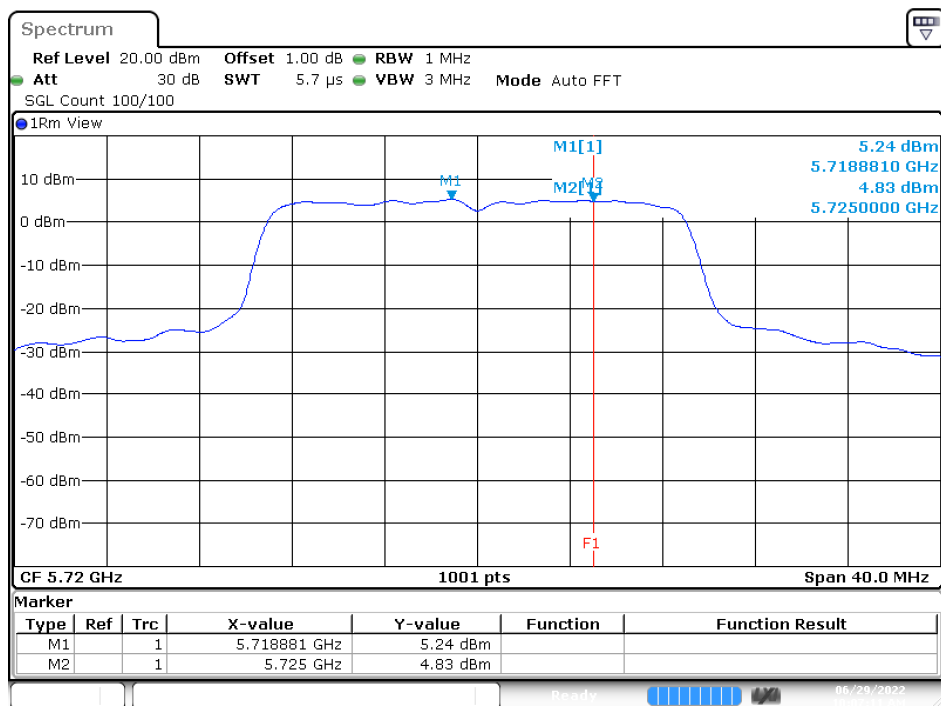
Product : Secured Network Extension Device
 Test Item : Maximun Power Spectral Density
 Test Mode : Transmit (802.11ac-20 MHz-CDD)

| Channel No. | Frequency (MHz) | Data Rate | Chain | PPSD/MHz (dBm) | Duty factor (dB) | Total PPST/MHz (dBm) | Limit (dBm) | Result |
|---------------|-----------------|-----------|-------|----------------|------------------|----------------------|-------------|--------|
| 52 | 5260 | MCS0 | A | 4.88 | 0.00 | 8.09 | 8.14 | Pass |
| | | | B | 5.28 | | | | |
| 60 | 5300 | MCS0 | A | 4.89 | 0.00 | 8.10 | 8.14 | Pass |
| | | | B | 5.29 | | | | |
| 64 | 5320 | MCS0 | A | 2.20 | 0.00 | 6.07 | 8.14 | Pass |
| | | | B | 3.78 | | | | |
| 100 | 5500 | MCS0 | A | 3.99 | 0.00 | 6.67 | 8.26 | Pass |
| | | | B | 3.31 | | | | |
| 116 | 5580 | MCS0 | A | 5.18 | 0.00 | 8.06 | 8.26 | Pass |
| | | | B | 4.92 | | | | |
| 140 | 5700 | MCS0 | A | 0.58 | 0.00 | 3.77 | 8.26 | Pass |
| | | | B | 0.94 | | | | |
| 144(U-NII-2C) | 5720 | MCS0 | A | 4.89 | 0.00 | 8.08 | 8.26 | Pass |
| | | | B | 5.24 | | | | |

| Channel No. | Frequency (MHz) | Data Rate | Chain | PPSD/MHz (dBm) | Duty factor (dB) | Total PPST/MHz (dBm) | Limit (dBm) | Result |
|--------------|-----------------|-----------|-------|----------------|------------------|----------------------|-------------|--------|
| 144(U-NII-3) | 5720 | MCS0 | A | 1.89 | 0.00 | 5.01 | 27.49 | Pass |
| | | | B | 2.11 | | | | |

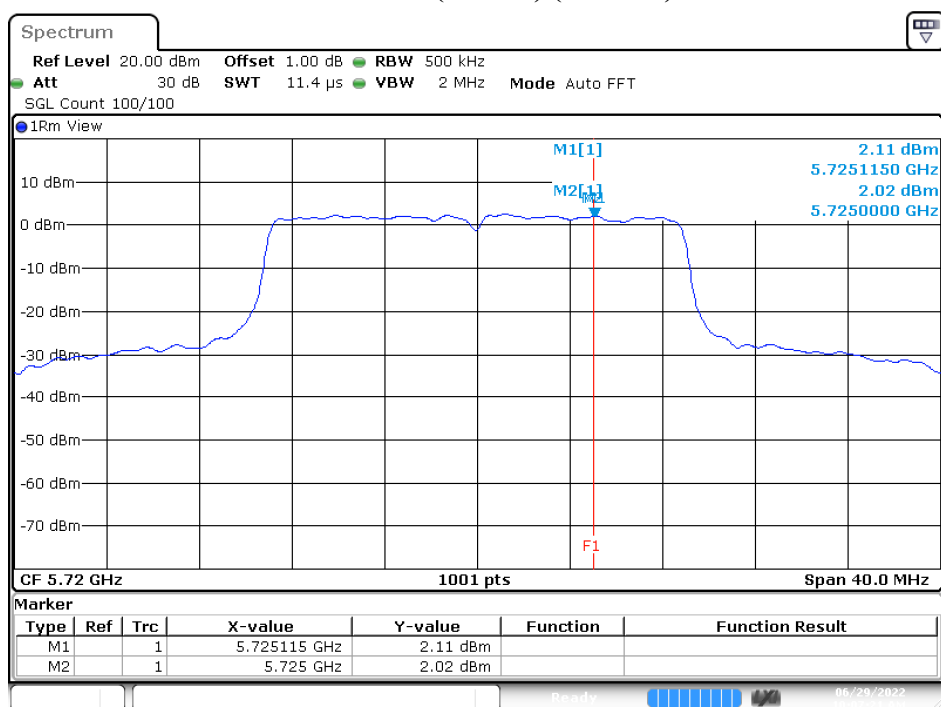
Note: Total PPST = 10*log(Chain A (mW) + Chain B (mW) + Duty factor

Channel 144 (U-NII-2C) (Chain B):



Date: 29.JUN.2022 10:07:11

Channel 144 (U-NII-3) (Chain B):



Date: 29.JUN.2022 10:07:22

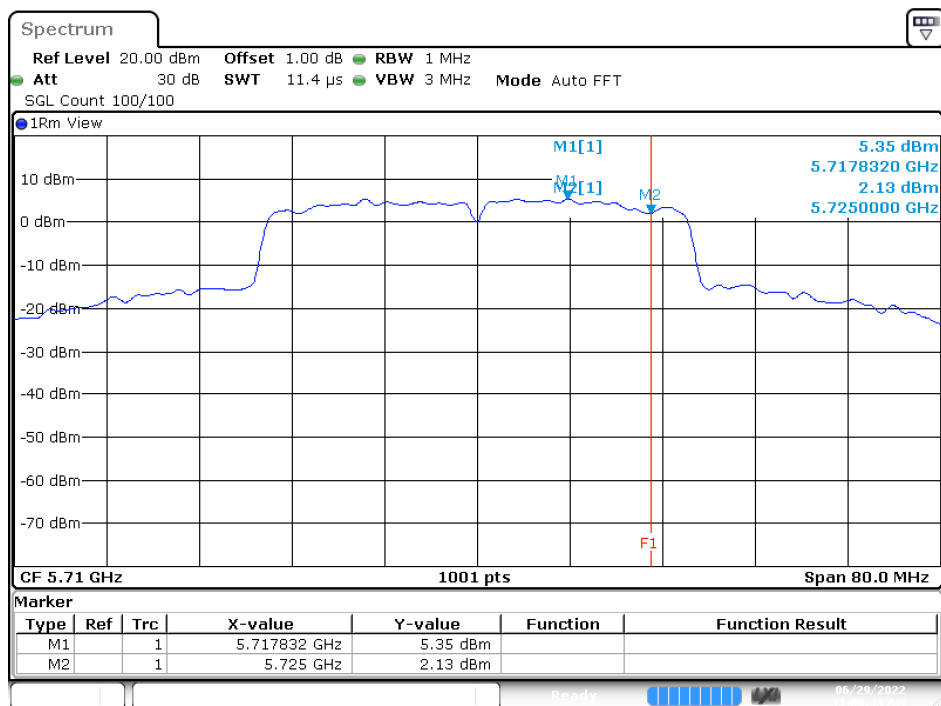
Product : Secured Network Extension Device
 Test Item : Maximun Power Spectral Density
 Test Mode : Transmit (802.11ac-40 MHz-CDD)

| Channel No. | Frequency (MHz) | Data Rate | Chain | PPSD/MHz (dBm) | Duty factor (dB) | Total PPSD/MHz (dBm) | Limit (dBm) | Result |
|---------------|-----------------|-----------|-------|----------------|------------------|----------------------|-------------|--------|
| 54 | 5270 | MCS0 | A | 1.95 | 0.18 | 5.86 | 8.14 | Pass |
| | | | B | 3.30 | | | | |
| 62 | 5310 | MCS0 | A | -4.06 | 0.18 | -0.41 | 8.14 | Pass |
| | | | B | -3.18 | | | | |
| 102 | 5510 | MCS0 | A | -0.78 | 0.18 | 2.19 | 8.26 | Pass |
| | | | B | -1.22 | | | | |
| 110 | 5550 | MCS0 | A | 2.87 | 0.18 | 5.85 | 8.26 | Pass |
| | | | B | 2.44 | | | | |
| 134 | 5670 | MCS0 | A | -1.97 | 0.18 | 1.62 | 8.26 | Pass |
| | | | B | -1.19 | | | | |
| 142(U-NII-2C) | 5710 | MCS0 | A | 4.22 | 0.18 | 8.01 | 8.26 | Pass |
| | | | B | 5.35 | | | | |

| Channel No. | Frequency (MHz) | Data Rate | Chain | PPSD/MHz (dBm) | Duty factor (dB) | Total PPSD/MHz (dBm) | Limit (dBm) | Result |
|--------------|-----------------|-----------|-------|----------------|------------------|----------------------|-------------|--------|
| 142(U-NII-3) | 5710 | MCS0 | A | 0.14 | 0.18 | 3.68 | 27.49 | Pass |
| | | | B | 0.82 | | | | |

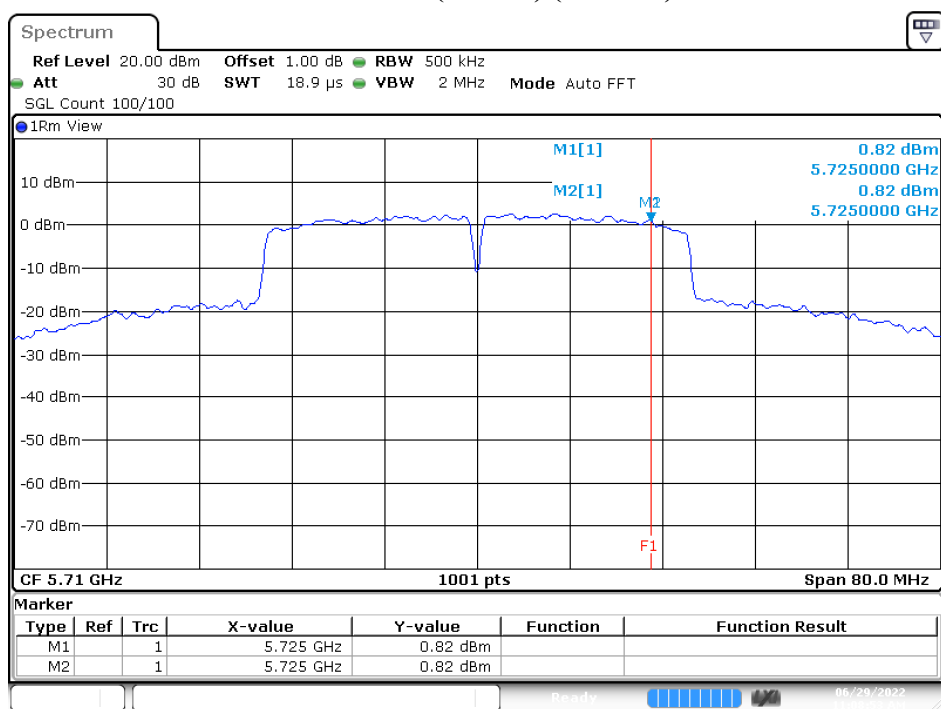
Note: Total PPSD = 10*log(Chain A (mW) + Chain B (mW) + Duty factor

Channel 142 (U-NII-2C) (Chain B):



Date: 29.JUN.2022 11:08:43

Channel 142 (U-NII-3) (Chain B):



Date: 29.JUN.2022 11:08:54

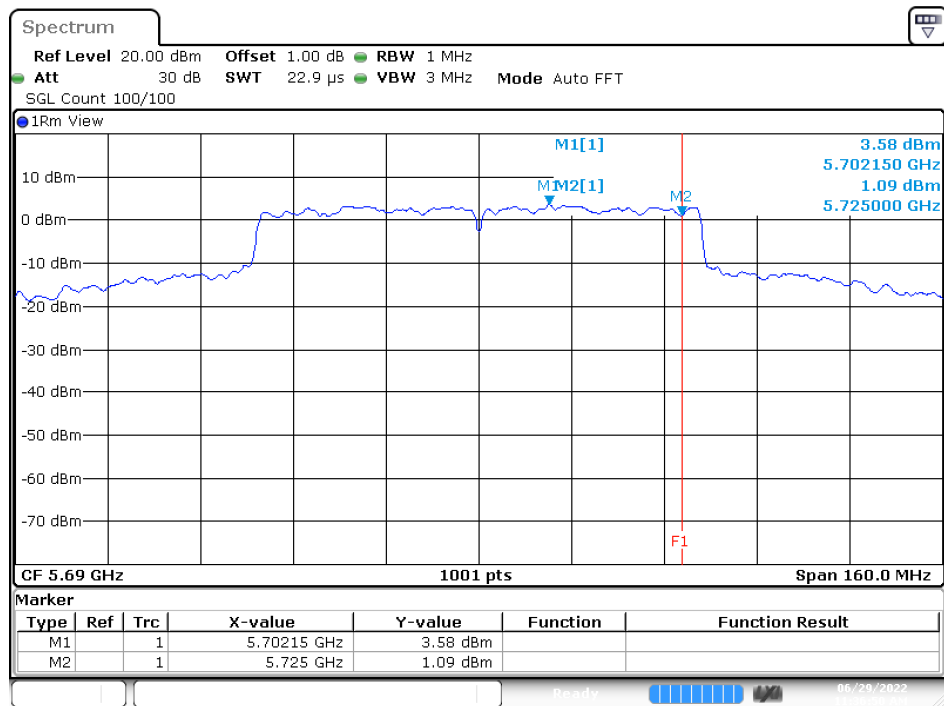
Product : Secured Network Extension Device
 Test Item : Maximun Power Spectral Density
 Test Mode : Transmit (802.11ac-80 MHz-CDD)

| Channel No. | Frequency (MHz) | Data Rate | Chain | PPSD/MHz (dBm) | Duty factor (dB) | Total PPSP/MHz (dBm) | Limit (dBm) | Result |
|---------------|-----------------|-----------|-------|----------------|------------------|----------------------|-------------|--------|
| 58 | 5290 | MCS0 | A | -9.21 | 0.41 | -5.34 | 8.14 | Pass |
| | | | B | -8.35 | | | | |
| 106 | 5530 | MCS0 | A | -6.00 | 0.41 | -2.89 | 8.26 | Pass |
| | | | B | -6.63 | | | | |
| 122 | 5610 | MCS0 | A | -3.89 | 0.41 | -0.28 | 8.26 | Pass |
| | | | B | -3.52 | | | | |
| 138(U-NII-2C) | 5690 | MCS0 | A | 3.36 | 0.41 | 6.89 | 8.26 | Pass |
| | | | B | 3.58 | | | | |

| Channel No. | Frequency (MHz) | Data Rate | Chain | PPSD/MHz (dBm) | Duty factor (dB) | Total PPSP/MHz (dBm) | Limit (dBm) | Result |
|--------------|-----------------|-----------|-------|----------------|------------------|----------------------|-------------|--------|
| 138(U-NII-3) | 5690 | MCS0 | A | -0.16 | 0.41 | 3.28 | 27.49 | Pass |
| | | | B | -0.11 | | | | |

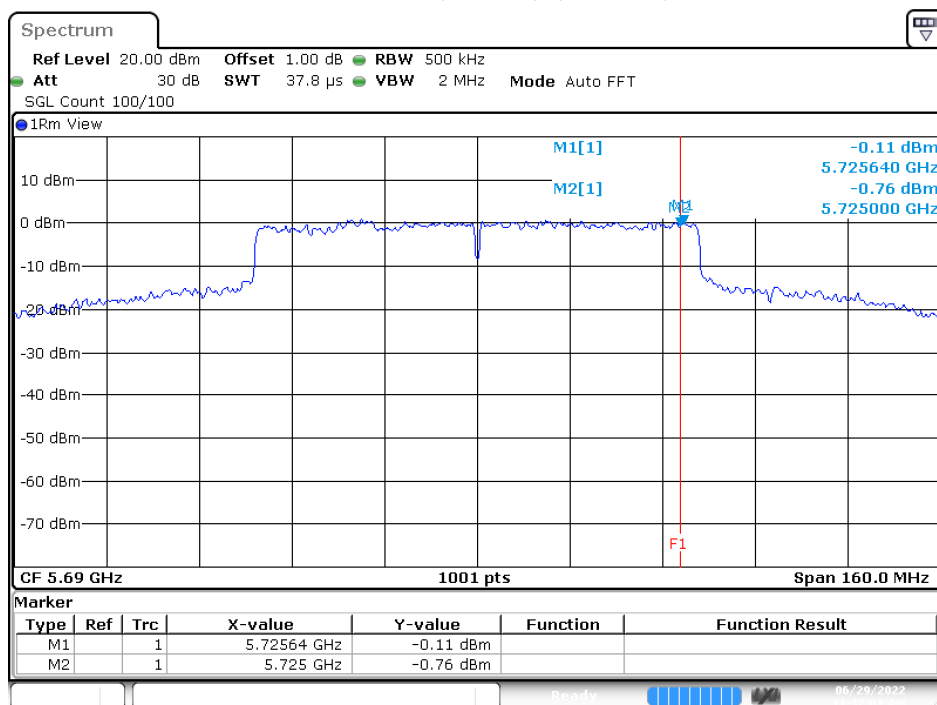
Note: Total PPSP = $10 \cdot \log(\text{Chain A (mW)} + \text{Chain B (mW)} + \text{Duty factor})$

Channel 138 (U-NII-2C) (Chain B):



Date: 29 JUN.2022 11:36:50

Channel 138 (U-NII-3) (Chain B):

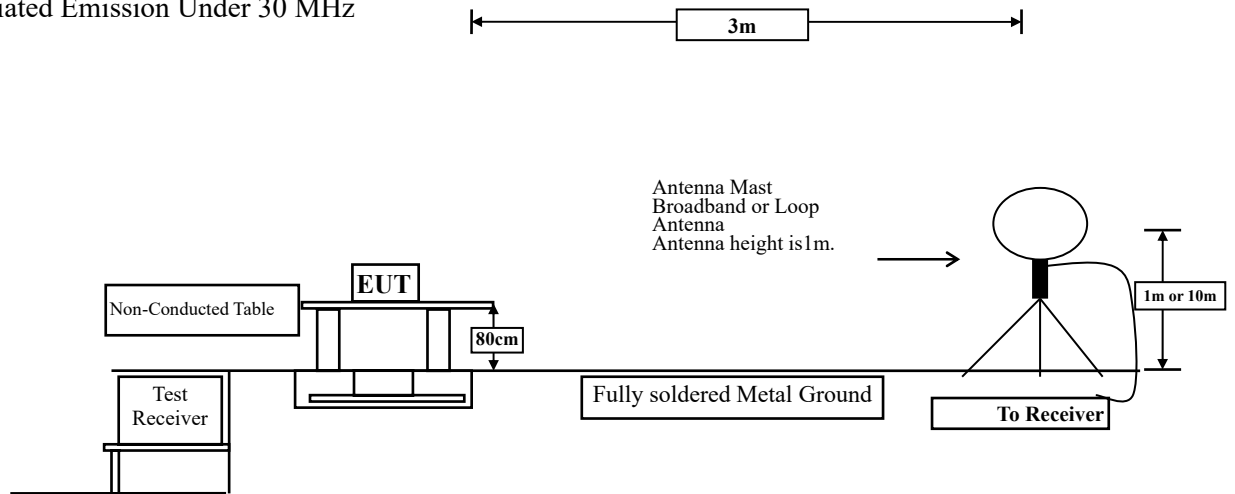


Date: 29 JUN.2022 11:37:02

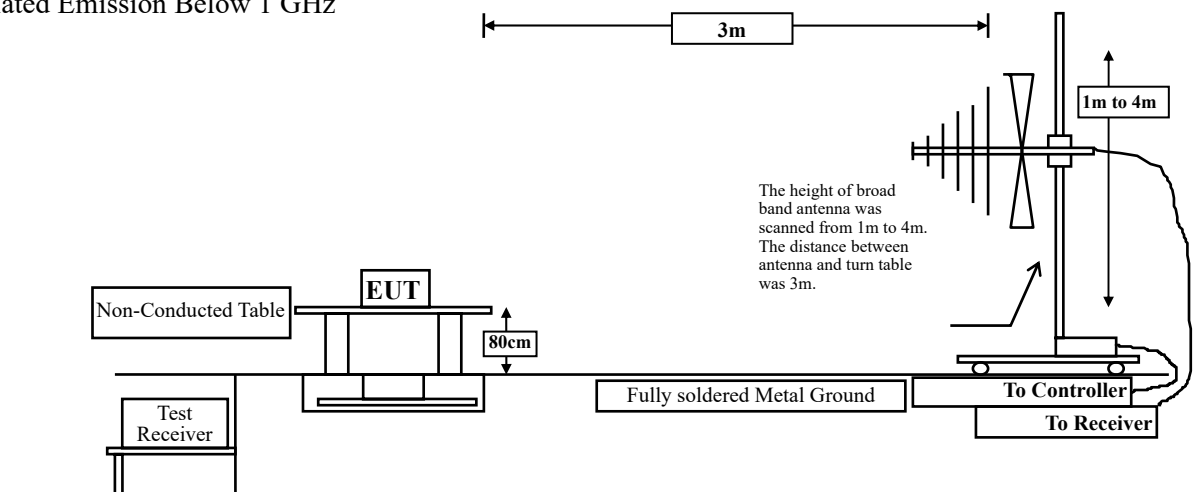
5. Radiated Emission

5.1. Test Setup

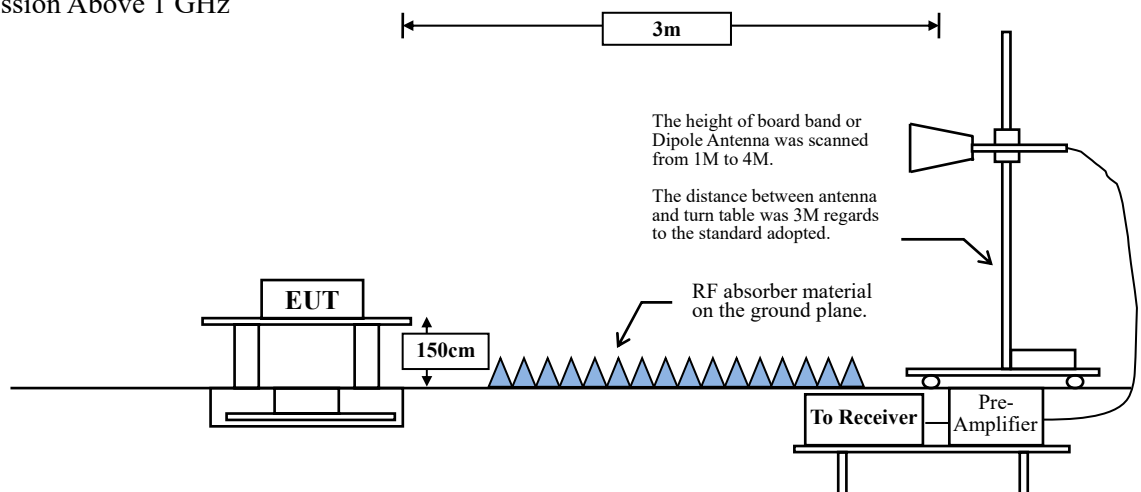
Radiated Emission Under 30 MHz



Radiated Emission Below 1 GHz



Radiated Emission Above 1 GHz



5.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

| FCC Part 15 Subpart C Paragraph 15.209(a) Limits | | |
|--|--------------------------------------|---------------------------------|
| Frequency MHz | Field strength (microvolts/meter) | Measurement distance (meter) |
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Remarks: E field strength (dB μ V/m) = 20 log E field strength (μ V/m)

5.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to FCC KDB-789033 test procedure for compliance to FCC 47CFR 15. 407 requirements.

Measuring the frequency range below 1 GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1 GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30 MHz setting on the field strength meter is 9 kHz and 30 MHz~1 GHz is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30 MHz are made using Loop Antenna and 30 MHz~1 GHz are made using broadband Bilog antenna and above 1 GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range from 9 kHz - 10th Harmonic of fundamental was investigated.

RBW and VBW Parameter setting:

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz.

RBW = 1 MHz.

VBW \geq 3 MHz.

According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

RBW = 1 MHz.

VBW = 10 Hz, when duty cycle \geq 98 %

VBW \geq 1/T, when duty cycle < 98 %

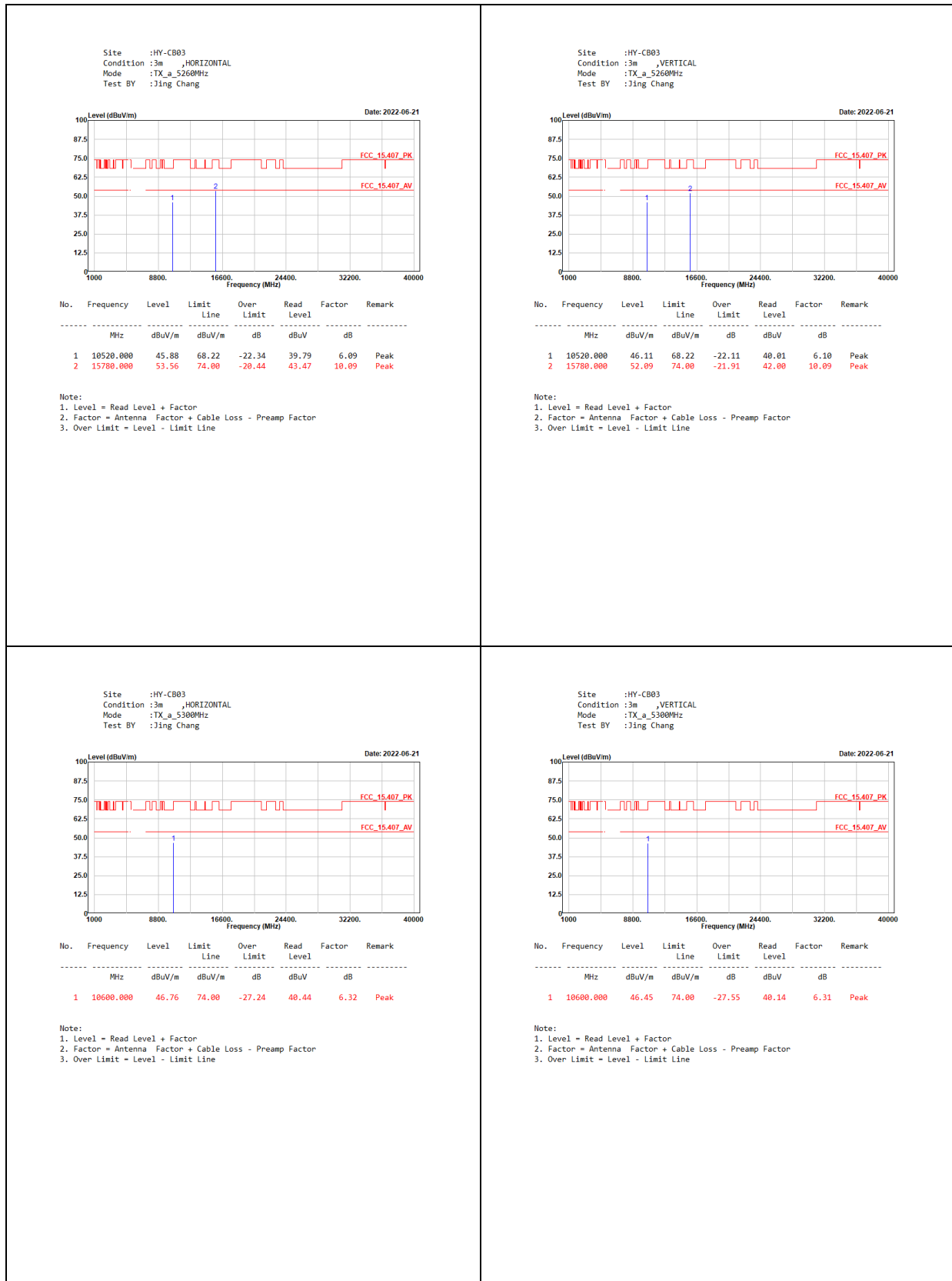
(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

CDD Mode:

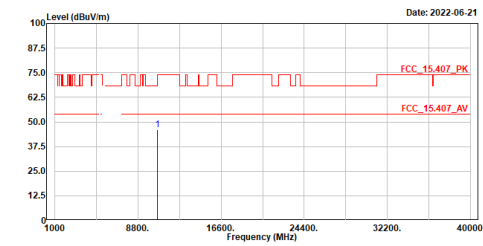
| 5 GHz band | Duty Cycle (%) | T (ms) | 1/T (Hz) | VBW (Hz) |
|-----------------|----------------|--------|----------|----------|
| 802.11a | 95.14 | 2.0550 | 487 | 500 |
| 802.11ac-20 MHz | 99.02 | 5.0500 | 198 | 10 |
| 802.11ac-40 MHz | 96.03 | 2.4200 | 413 | 500 |
| 802.11ac-80 MHz | 91.06 | 1.1200 | 893 | 1000 |

Note: Duty Cycle Refer to Section 7.

5.4. Test Result of Radiated Emission



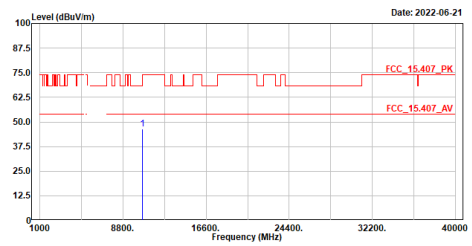
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_a_5320MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|--------|
| | MHz | dBuV/m | dBuV/m | Limit | Level | dB | |
| 1 | 10640.000 | 45.98 | 74.00 | -28.02 | 39.79 | 6.19 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

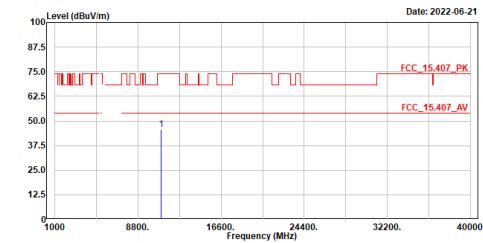
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_a_5320MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|--------|
| | MHz | dBuV/m | dBuV/m | Limit | Level | dB | |
| 1 | 10640.000 | 46.32 | 74.00 | -27.68 | 40.13 | 6.19 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

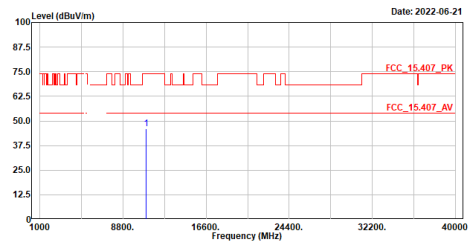
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_a_5580MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|--------|
| | MHz | dBuV/m | dBuV/m | Limit | Level | dB | |
| 1 | 11000.000 | 45.67 | 74.00 | -28.33 | 39.50 | 6.17 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

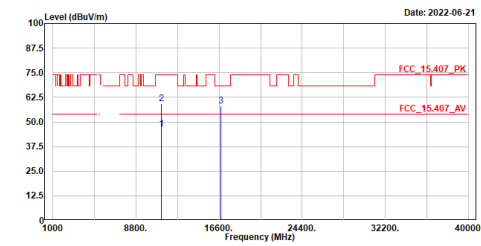
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_a_5580MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|--------|
| | MHz | dBuV/m | dBuV/m | Limit | Level | dB | |
| 1 | 11000.000 | 45.89 | 74.00 | -28.11 | 39.75 | 6.14 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

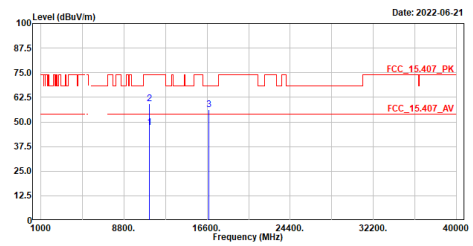
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_a_5580MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|---------|
| | MHz | dBuV/m | Line | Limit | Level | | |
| | | | dBuV/m | dB | dBuV | dB | |
| 1 | 11160.000 | 46.51 | 54.00 | -7.49 | 48.06 | 6.45 | Average |
| 2 | 11160.000 | 59.06 | 74.00 | -14.94 | 52.61 | 6.45 | Peak |
| 3 | 16740.000 | 58.05 | 68.22 | -10.17 | 45.48 | 12.57 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

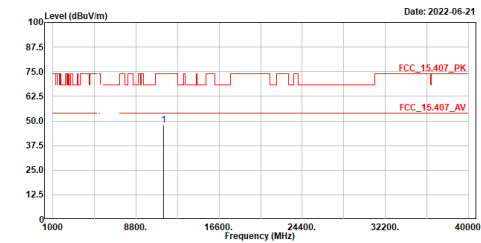
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_a_5580MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|---------|
| | MHz | dBuV/m | Line | Limit | Level | | |
| | | | dBuV/m | dB | dBuV | dB | |
| 1 | 11160.000 | 47.23 | 54.00 | -6.77 | 40.78 | 6.45 | Average |
| 2 | 11160.000 | 59.26 | 74.00 | -14.74 | 52.83 | 6.43 | Peak |
| 3 | 16740.000 | 56.14 | 68.22 | -12.08 | 43.57 | 12.57 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

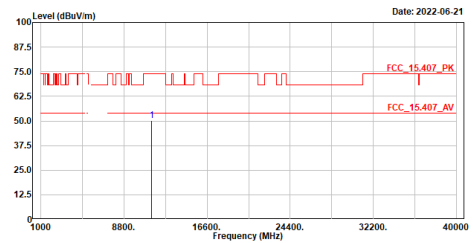
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_a_5780MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | | |
| | | | dBuV/m | dB | dBuV | dB | |
| 1 | 11400.000 | 48.08 | 74.00 | -25.92 | 41.24 | 6.84 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

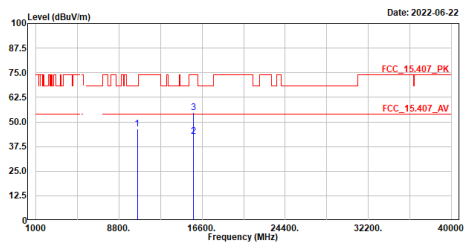
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_a_5780MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | | |
| | | | dBuV/m | dB | dBuV | dB | |
| 1 | 11400.000 | 50.36 | 74.00 | -23.64 | 43.53 | 6.83 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac20_5260MHz
Test BY :Ashton Chiu

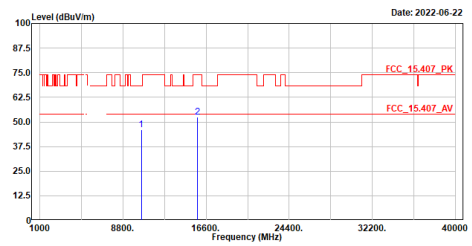


| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|---------|
| | MHz | dBuV/m | Line | Limit | Level | | |
| | | | dBuV/m | dB | dBuV | dB | |
| 1 | 10520.000 | 46.45 | 68.22 | -21.77 | 48.34 | 6.11 | Peak |
| 2 | 15780.000 | 42.59 | 54.00 | -11.41 | 32.50 | 10.09 | Average |
| 3 | 15780.000 | 54.66 | 74.00 | -19.34 | 44.55 | 10.11 | Peak |

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac20_5260MHz
Test BY :Ashton Chiu

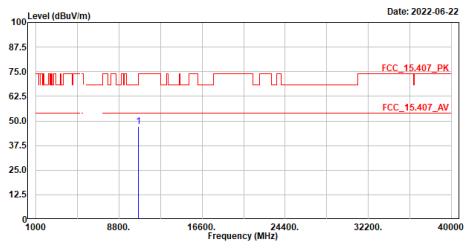


| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | | |
| | | | dBuV/m | dB | dBuV | dB | |
| 1 | 10520.000 | 46.13 | 68.22 | -22.09 | 40.02 | 6.11 | Peak |
| 2 | 15780.000 | 52.28 | 74.00 | -21.72 | 42.18 | 10.10 | Peak |

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac20_5380MHz
Test BY :Ashton Chiu

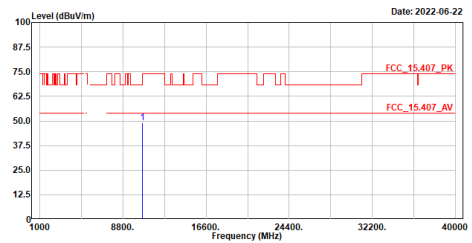


| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | | |
| | | | dBuV/m | dB | dBuV | dB | |
| 1 | 10600.000 | 47.19 | 74.00 | -26.81 | 48.88 | 6.31 | Peak |

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac20_5380MHz
Test BY :Ashton Chiu

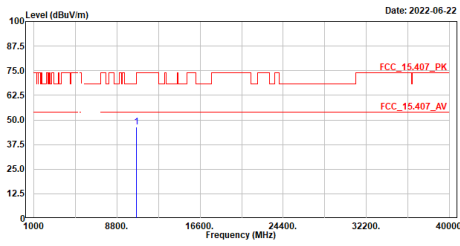


| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|--------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | | |
| | | | dBuV/m | dB | dBuV | dB | |
| 1 | 10600.000 | 49.07 | 74.00 | -24.93 | 42.76 | 6.31 | Peak |

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

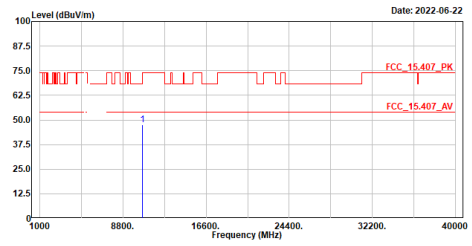
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac20_5320MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 10640.000 | 46.54 | 74.00 | -27.46 | 48.34 | 6.20 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

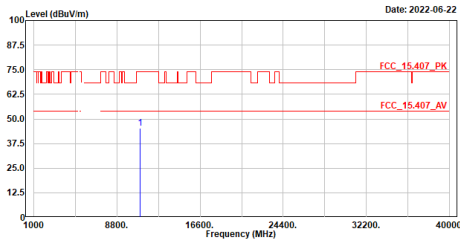
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac20_5320MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 10640.000 | 47.41 | 74.00 | -26.59 | 41.21 | 6.20 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

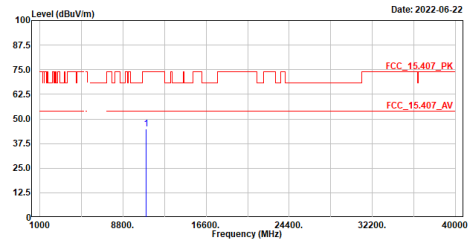
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac20_5500MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11000.000 | 45.34 | 74.00 | -28.66 | 39.20 | 6.14 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

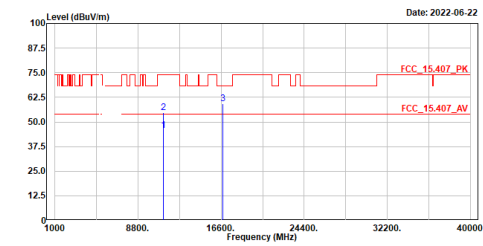
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac20_5500MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11000.000 | 44.91 | 74.00 | -29.09 | 38.77 | 6.14 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

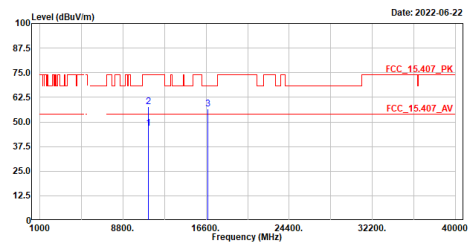
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac20_5580MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|---------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11160.000 | 45.60 | 54.00 | -8.40 | 39.15 | 6.45 | Average |
| 2 | 11160.000 | 54.84 | 74.00 | -19.16 | 48.39 | 6.45 | Peak |
| 3 | 16740.000 | 59.09 | 68.22 | -9.13 | 46.52 | 12.57 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

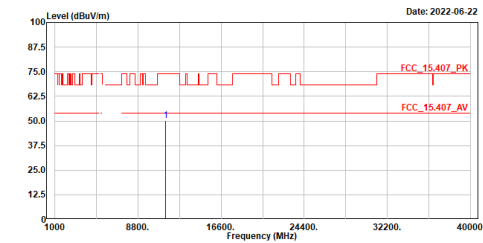
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac20_5580MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|---------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11160.000 | 46.96 | 54.00 | -7.04 | 40.51 | 6.45 | Average |
| 2 | 11160.000 | 57.62 | 74.00 | -16.38 | 51.19 | 6.43 | Peak |
| 3 | 16740.000 | 56.45 | 68.22 | -11.77 | 43.89 | 12.56 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

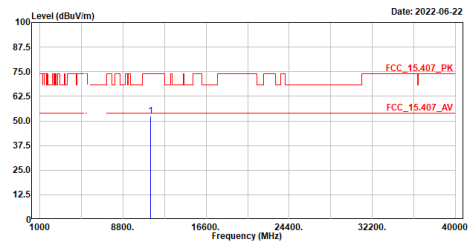
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac20_5780MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11400.000 | 50.04 | 74.00 | -23.96 | 43.20 | 6.84 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

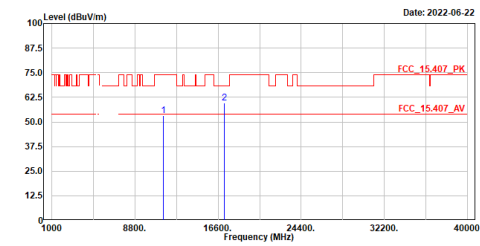
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac20_5780MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11400.000 | 52.60 | 74.00 | -21.40 | 45.77 | 6.83 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

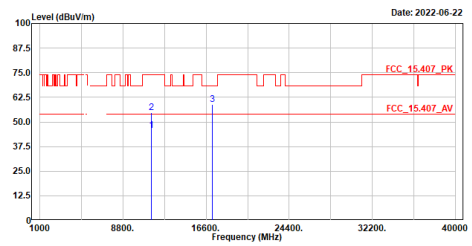
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac20.5720MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11440.000 | 53.12 | 74.00 | -20.88 | 46.19 | 6.93 | Peak |
| 2 | 17160.000 | 59.61 | 68.22 | -8.61 | 47.31 | 12.30 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

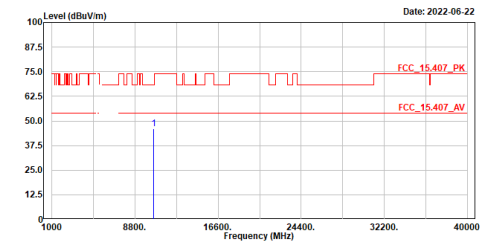
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac20.5720MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|---------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11440.000 | 45.70 | 54.00 | -8.30 | 38.75 | 6.95 | Average |
| 2 | 11440.000 | 54.89 | 74.00 | -19.11 | 47.94 | 6.95 | Peak |
| 3 | 17160.000 | 58.90 | 68.22 | -9.32 | 46.58 | 12.32 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

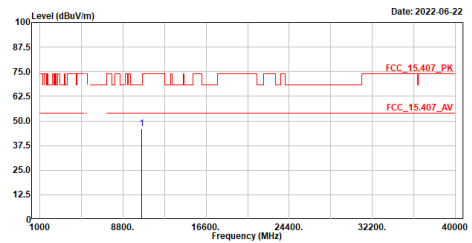
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac40.5270MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 10540.000 | 45.97 | 68.22 | -22.25 | 39.80 | 6.17 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

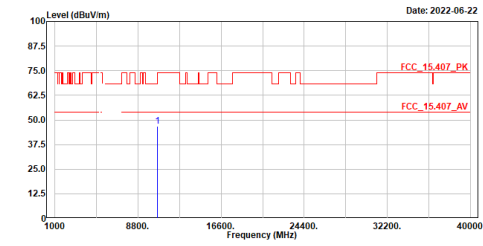
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac40.5270MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 10540.000 | 46.08 | 68.22 | -22.14 | 39.91 | 6.17 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

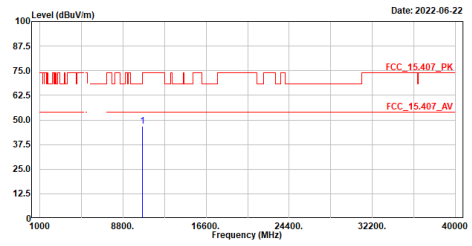
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac40.5310MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 10620.000 | 46.90 | 74.00 | -27.10 | 40.59 | 6.31 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

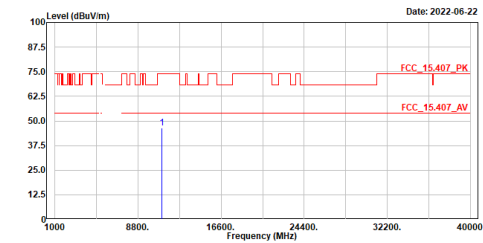
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac40.5310MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 10620.000 | 46.95 | 74.00 | -27.05 | 40.75 | 6.20 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

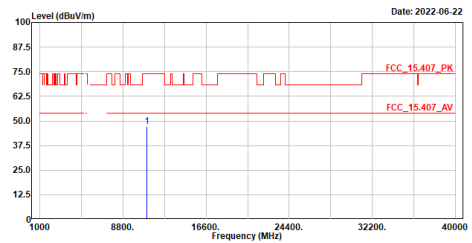
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac40.5510MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11020.000 | 46.29 | 74.00 | -27.71 | 40.16 | 6.13 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

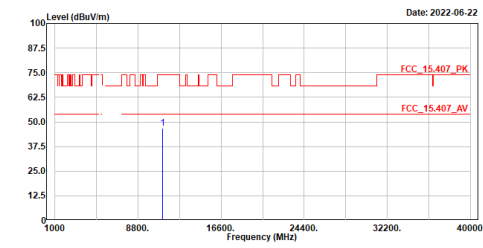
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac40.5510MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11020.000 | 47.11 | 74.00 | -26.89 | 40.98 | 6.13 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

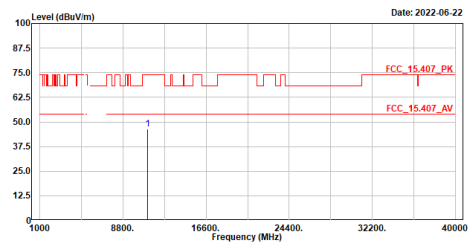
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac40_5550MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11100.000 | 46.67 | 74.00 | -27.33 | 48.32 | 6.35 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

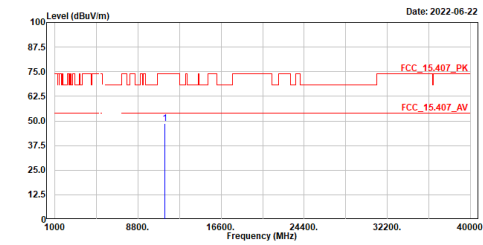
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac40_5550MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11100.000 | 46.33 | 74.00 | -27.67 | 48.01 | 6.32 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

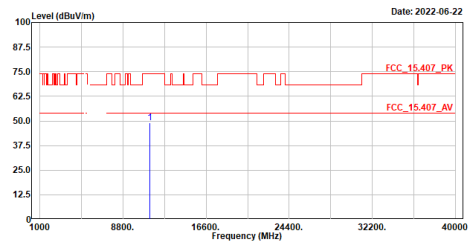
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac40_5670MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11340.000 | 48.61 | 74.00 | -25.39 | 41.82 | 6.79 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

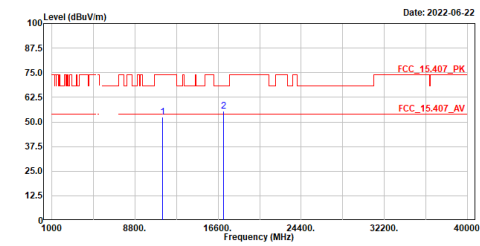
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac40_5670MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11340.000 | 49.14 | 74.00 | -24.86 | 42.35 | 6.79 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac40_5710MHz
Test BY :Jing Chang

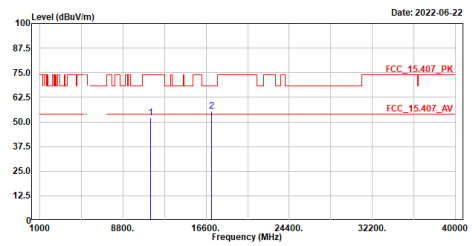


| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11420.000 | 52.43 | 74.00 | -21.57 | 45.56 | 6.87 | Peak |
| 2 | 17130.000 | 55.63 | 68.22 | -12.59 | 43.23 | 12.40 | Peak |

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac40_5710MHz
Test BY :Jing Chang

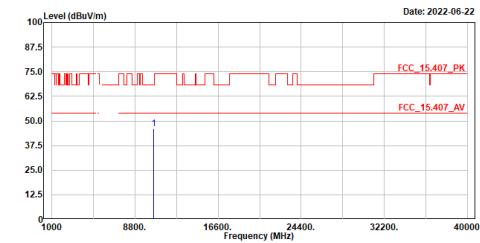


| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11420.000 | 52.25 | 74.00 | -21.75 | 45.33 | 6.92 | Peak |
| 2 | 17130.000 | 55.54 | 68.22 | -12.68 | 43.19 | 12.35 | Peak |

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac80_5290MHz
Test BY :Jing Chang

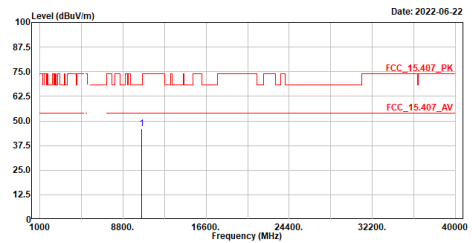


| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 10580.000 | 46.13 | 68.22 | -22.09 | 39.94 | 6.19 | Peak |

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac80_5290MHz
Test BY :Jing Chang

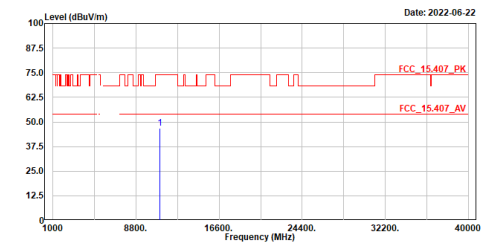


| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 10580.000 | 46.19 | 68.22 | -22.03 | 39.90 | 6.29 | Peak |

Note:

1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

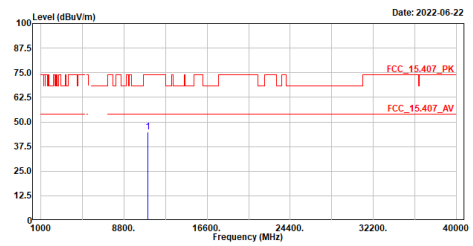
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac80_5530MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11060.000 | 46.89 | 74.00 | -27.11 | 40.59 | 6.30 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

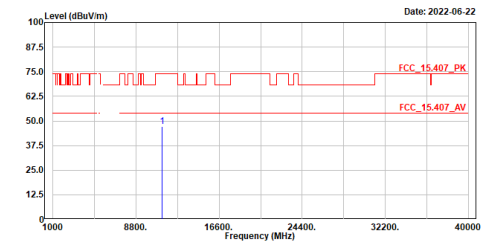
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac80_5530MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11060.000 | 45.04 | 74.00 | -28.96 | 38.82 | 6.22 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

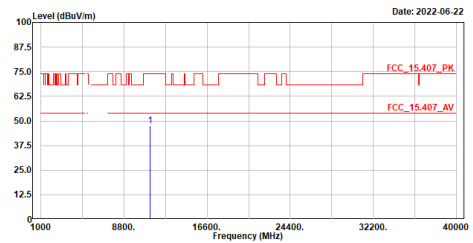
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac80_5610MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11220.000 | 47.08 | 74.00 | -26.92 | 40.56 | 6.52 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

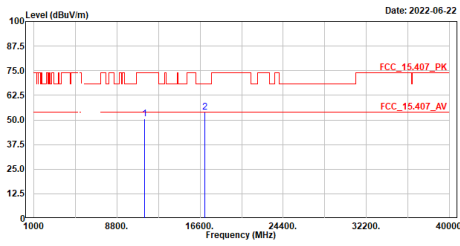
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac80_5610MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11220.000 | 47.68 | 74.00 | -26.32 | 41.10 | 6.58 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

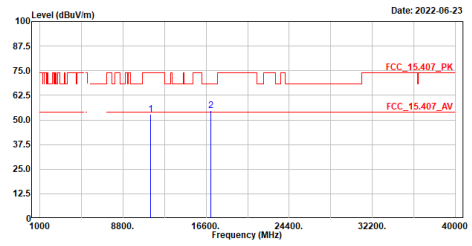
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac80_5690MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11380.000 | 50.55 | 74.00 | -23.45 | 43.73 | 6.82 | Peak |
| 2 | 17070.000 | 53.80 | 68.22 | -14.42 | 41.61 | 12.19 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

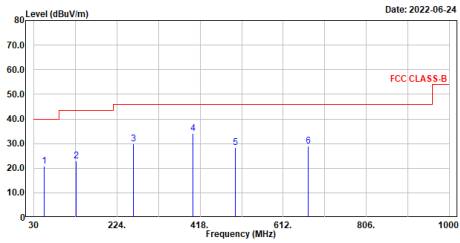
Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac80_5690MHz
Test BY :Jing Chang



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 11380.000 | 53.00 | 74.00 | -21.00 | 46.21 | 6.79 | Peak |
| 2 | 17070.000 | 54.90 | 68.22 | -13.32 | 42.50 | 12.40 | Peak |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

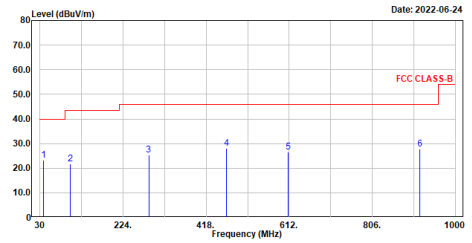
Site :HY-CB03
Condition :3m ,HORIZONTAL
Mode :TX_ac80_5690MHz
Test BY :Ashton Chiu



| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 53.280 | 20.75 | 40.00 | -19.25 | 45.19 | -24.44 | QP |
| 2 | 127.970 | 22.93 | 43.50 | -20.57 | 48.79 | -25.86 | QP |
| 3 | 262.800 | 29.80 | 46.00 | -16.20 | 55.13 | -25.33 | QP |
| 4 | 400.540 | 34.24 | 46.00 | -11.76 | 55.47 | -21.23 | QP |
| 5 | 499.480 | 28.43 | 46.00 | -17.57 | 47.00 | -18.57 | QP |
| 6 | 671.170 | 28.91 | 46.00 | -17.09 | 44.44 | -15.53 | QP |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

Site :HY-CB03
Condition :3m ,VERTICAL
Mode :TX_ac80_5690MHz
Test BY :Ashton Chiu



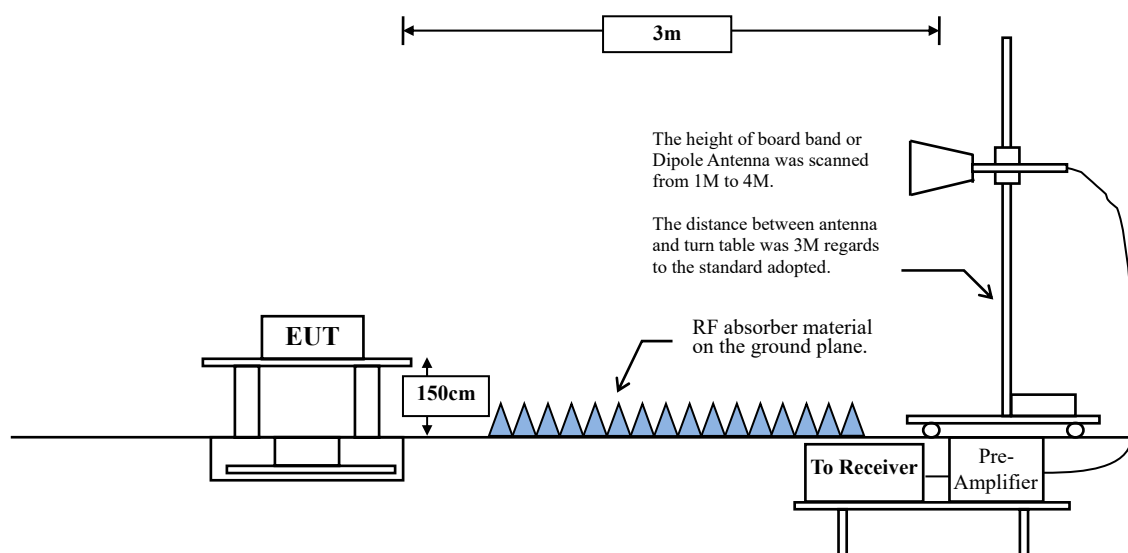
| No. | Frequency | Level | Limit | Over | Read | Factor | Remark |
|-----|-----------|--------|-------|--------|-------|--------|--------|
| | MHz | dBuV/m | Line | Limit | Level | dB | |
| 1 | 38.730 | 23.14 | 40.00 | -16.86 | 47.70 | -24.56 | QP |
| 2 | 100.810 | 21.81 | 43.50 | -21.69 | 50.80 | -28.99 | QP |
| 3 | 284.140 | 25.27 | 46.00 | -20.73 | 49.52 | -24.25 | QP |
| 4 | 465.530 | 28.20 | 46.00 | -17.80 | 47.64 | -19.44 | QP |
| 5 | 610.060 | 26.68 | 46.00 | -19.32 | 43.05 | -16.37 | QP |
| 6 | 916.580 | 27.87 | 46.00 | -18.13 | 40.05 | -12.18 | QP |

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.

6. Band Edge

6.1. Test Setup

RF Radiated Measurement:



6.2. Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section. Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

| FCC Part 15 Subpart C Paragraph 15.209 Limits | | |
|---|---------------------|-----------------------------|
| Frequency MHz | $\mu\text{V/m @3m}$ | $\text{dB}\mu\text{V/m@3m}$ |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

Remarks:

1. RF Voltage ($\text{dB}\mu\text{V}$) = $20 \log \text{RF Voltage } (\mu\text{V})$
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

6.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 on radiated measurement.

The bandwidth below 1 GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz. The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

RBW and VBW Parameter setting:

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz.

RBW = 1 MHz.

VBW \geq 3 MHz.

According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

RBW = 1 MHz.

VBW = 10 Hz, when duty cycle \geq 98 %

VBW \geq 1/T, when duty cycle < 98 %

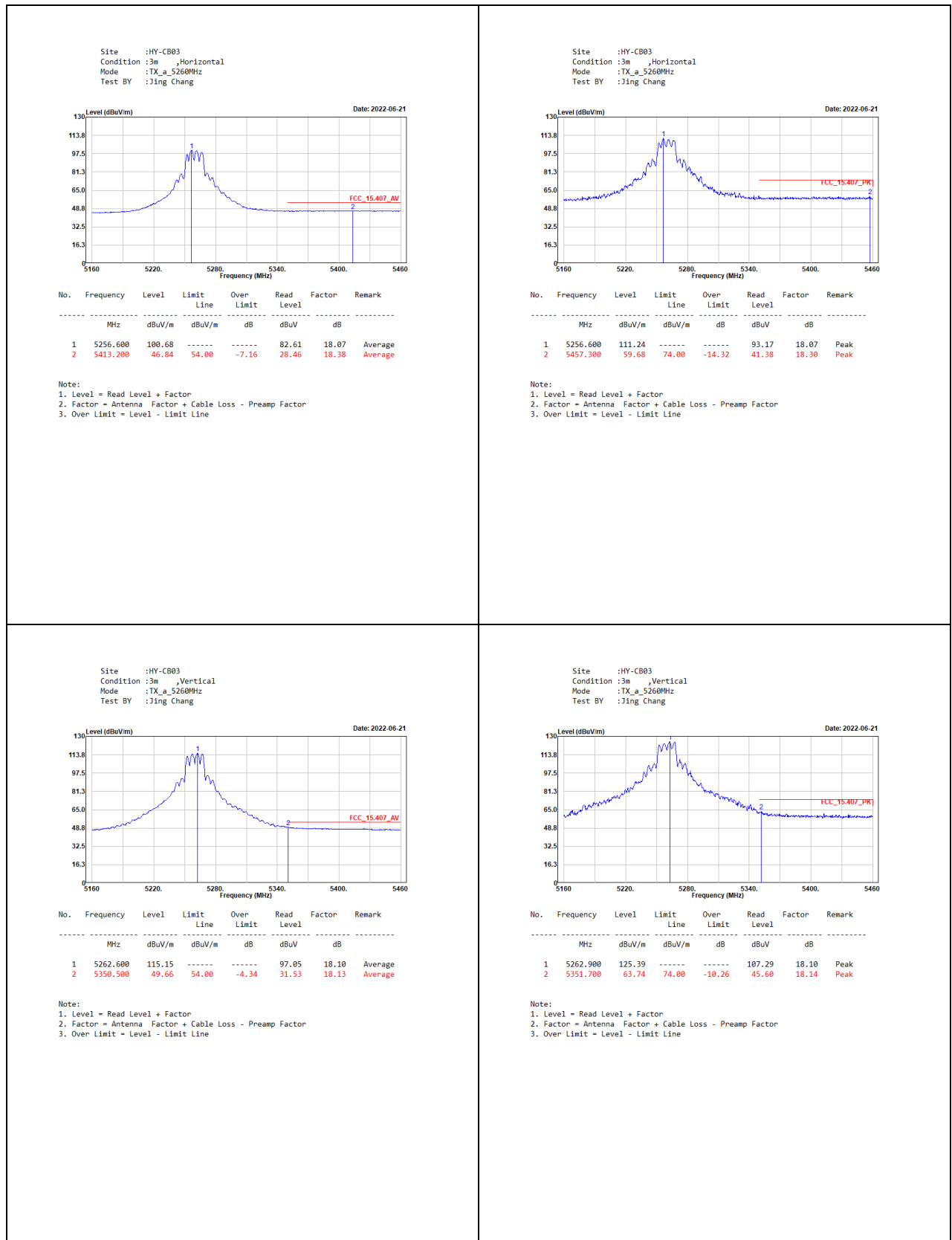
(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

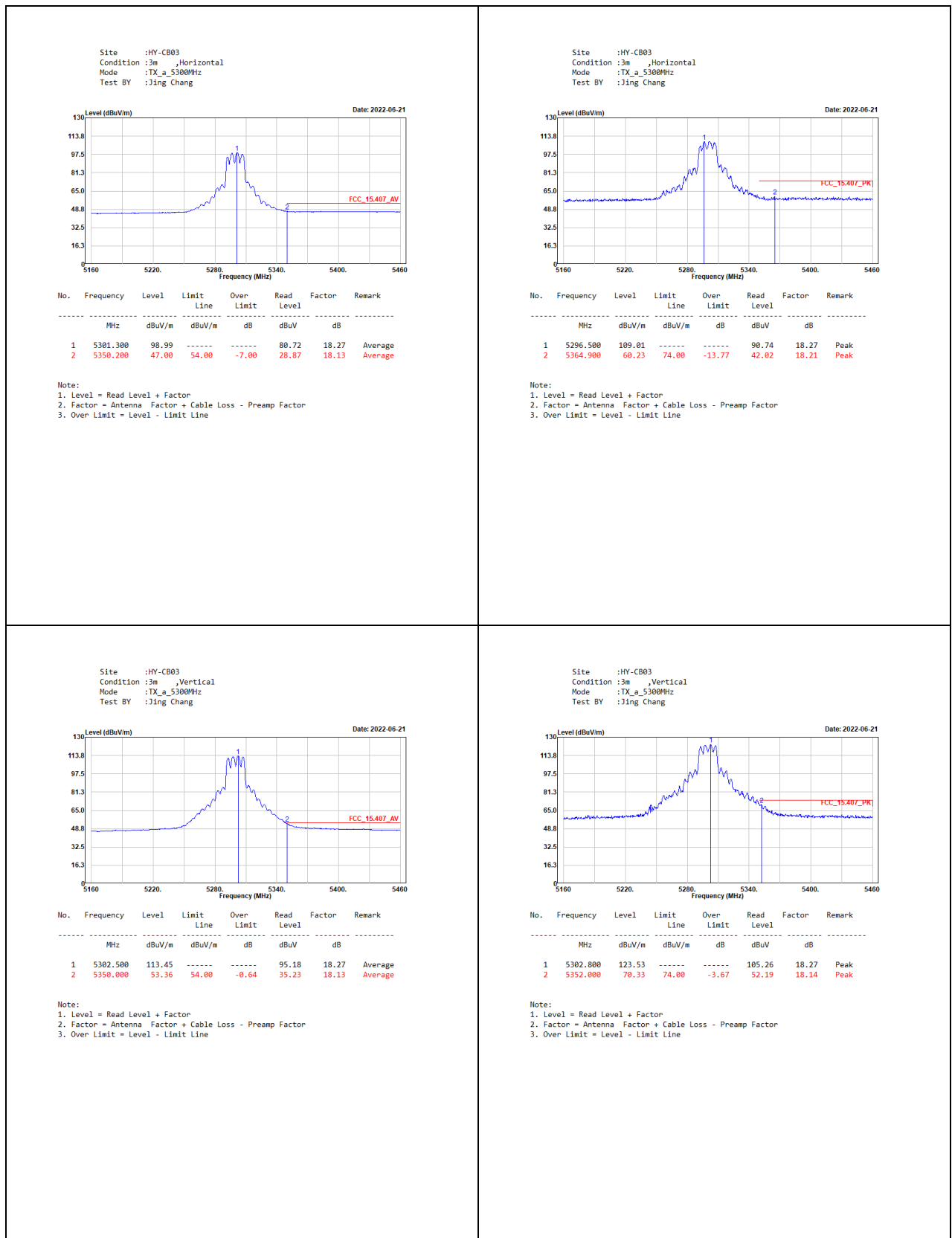
CDD Mode:

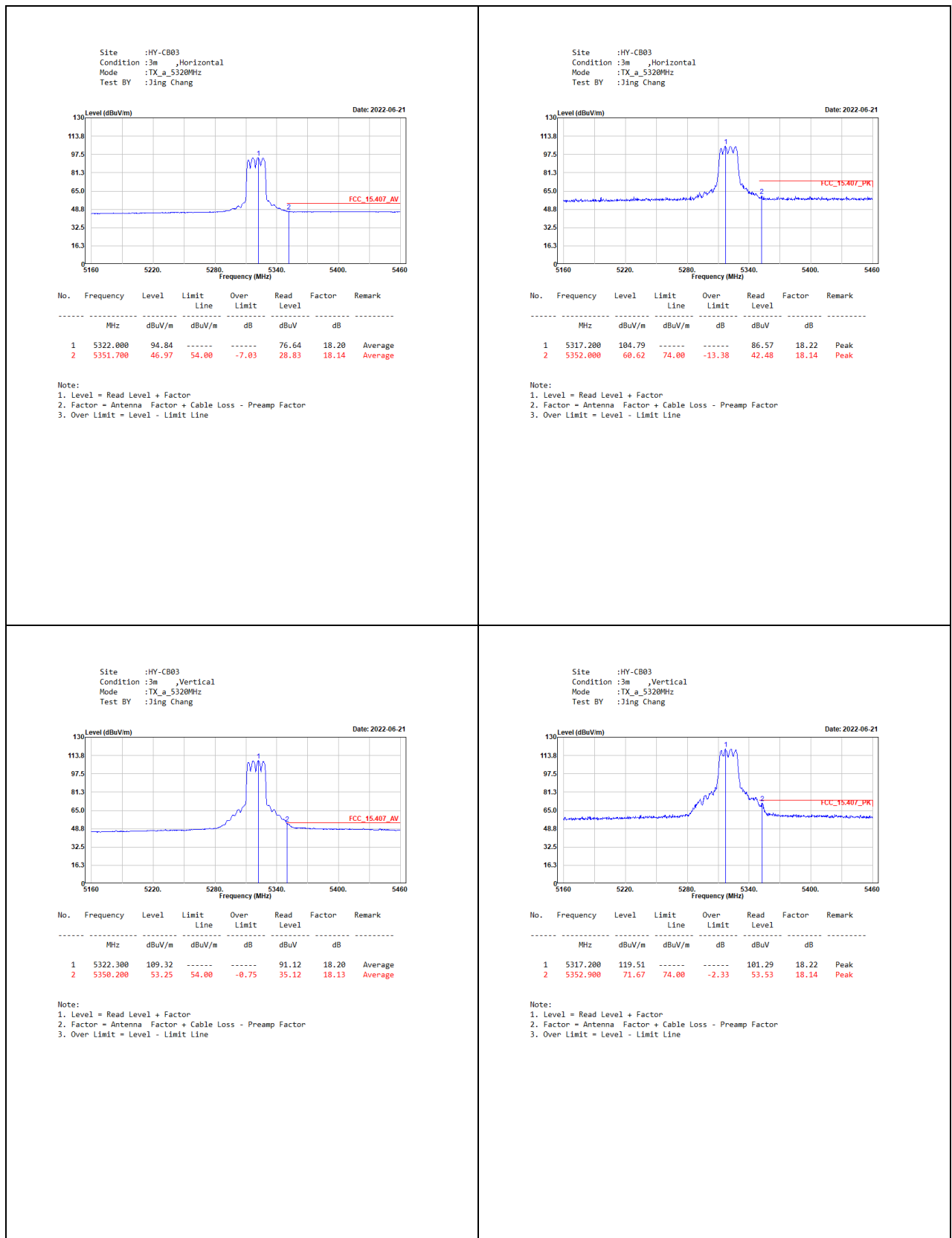
| 5 GHz band | Duty Cycle (%) | T (ms) | 1/T (Hz) | VBW (Hz) |
|-----------------|----------------|--------|----------|----------|
| 802.11a | 95.14 | 2.0550 | 487 | 500 |
| 802.11ac-20 MHz | 99.02 | 5.0500 | 198 | 10 |
| 802.11ac-40 MHz | 96.03 | 2.4200 | 413 | 500 |
| 802.11ac-80 MHz | 91.06 | 1.1200 | 893 | 1000 |

Note: Duty Cycle Refer to Section 7.

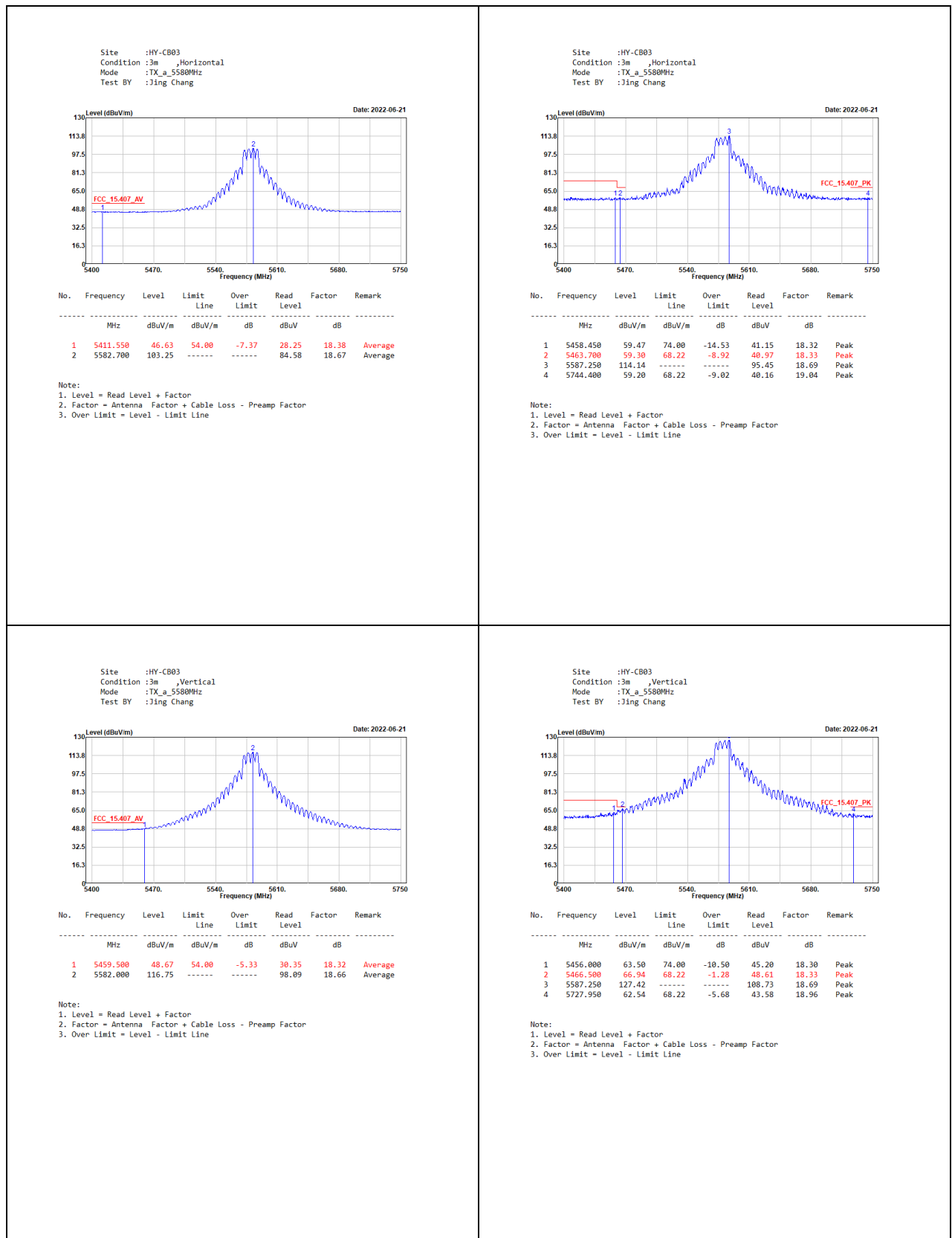
6.4. Test Result of Band Edge

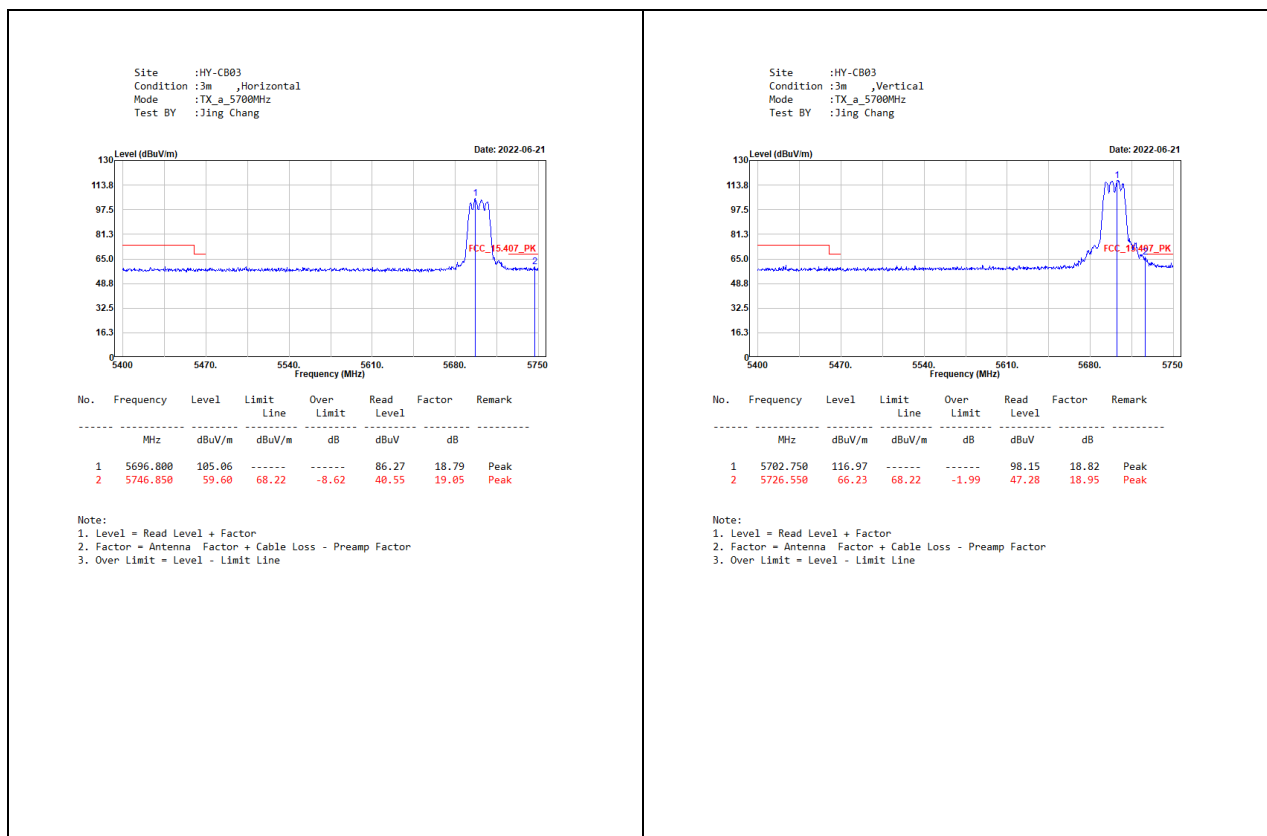


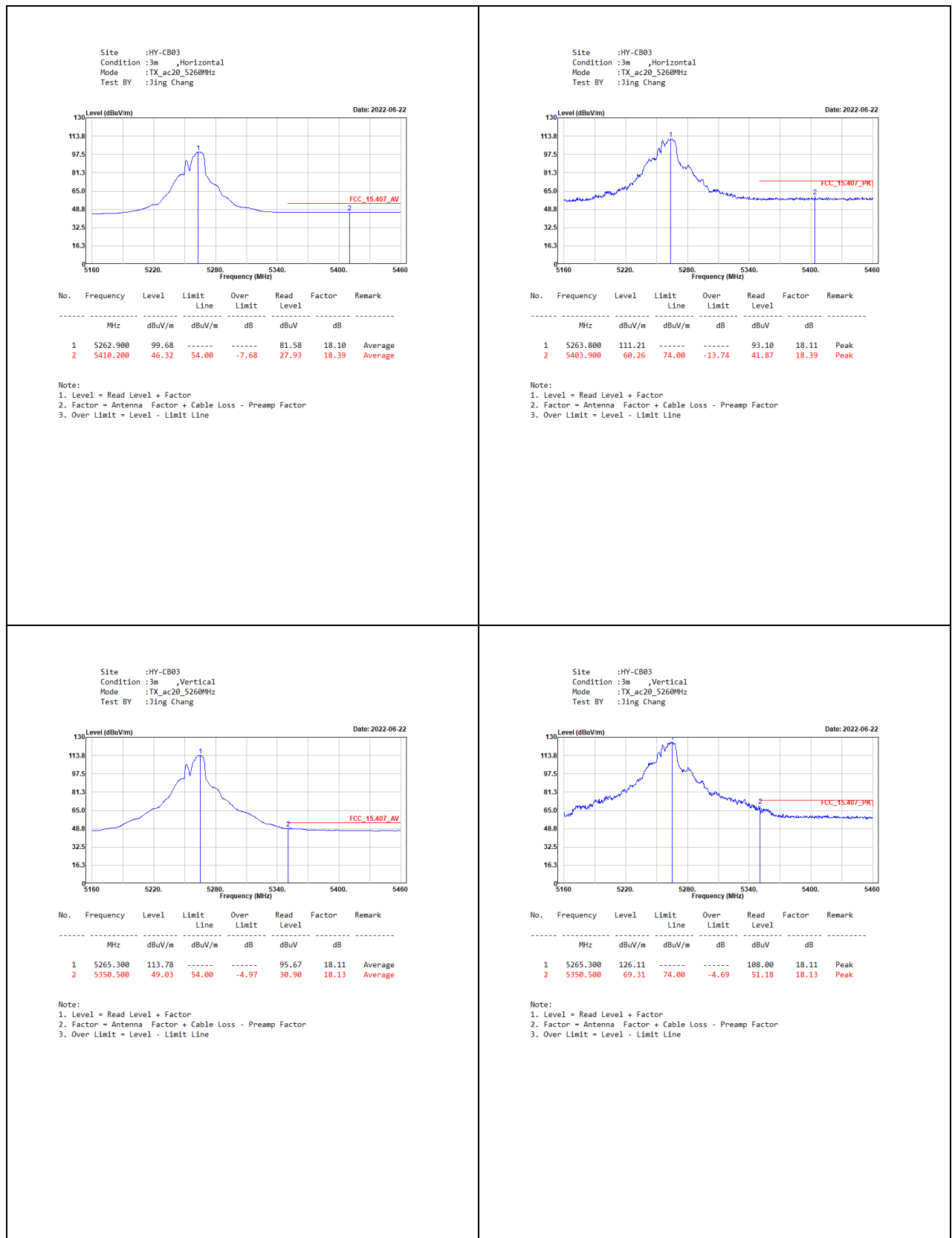


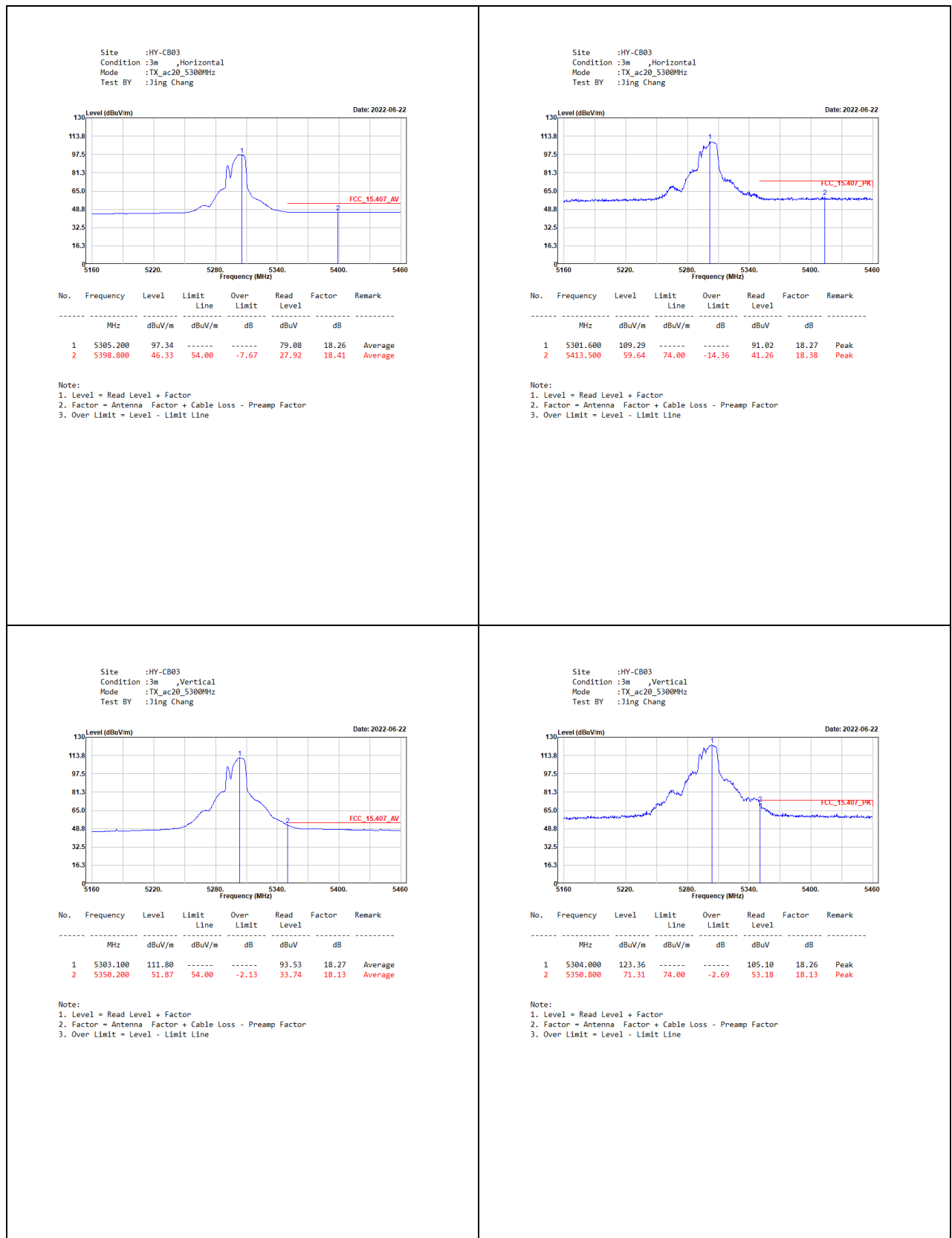


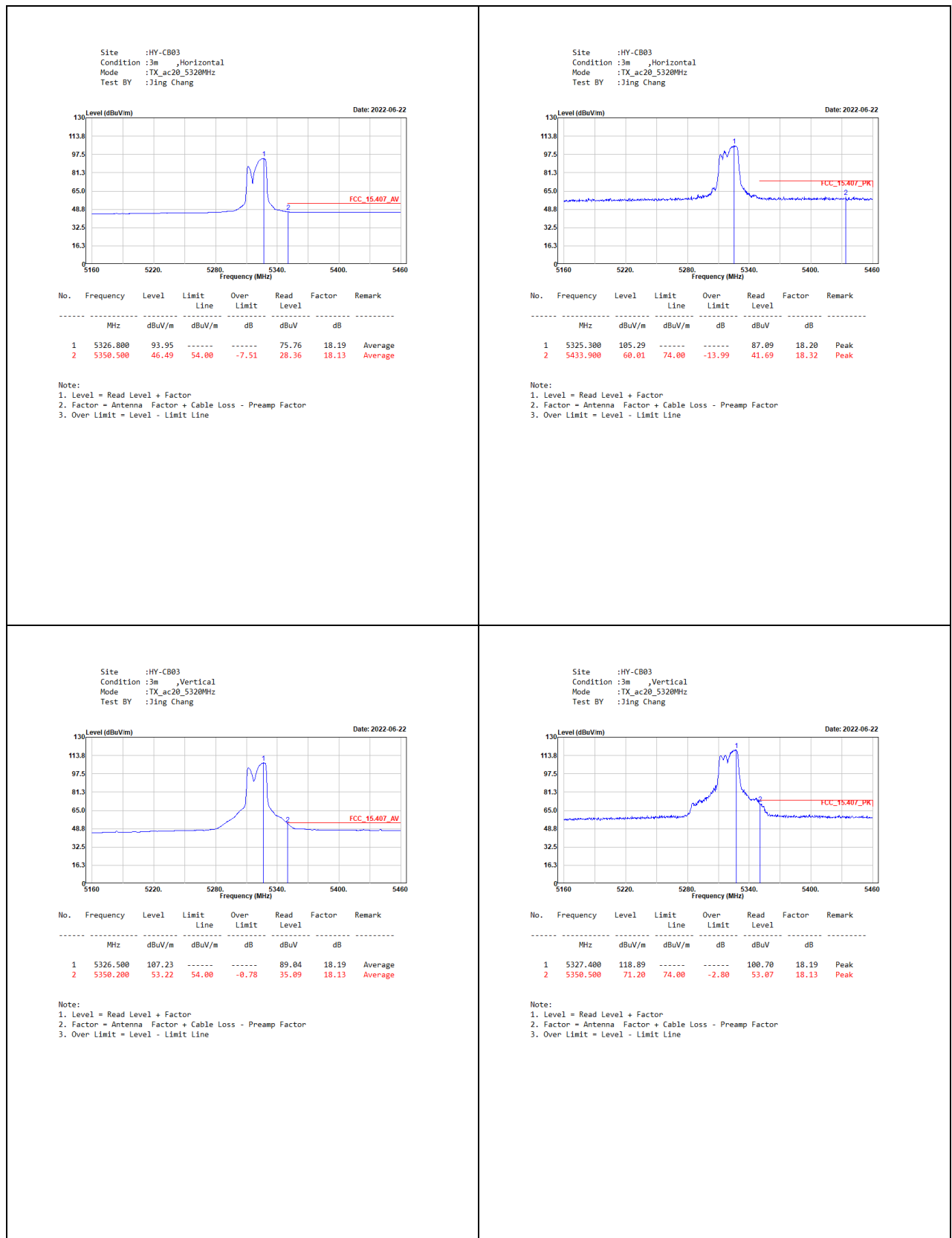


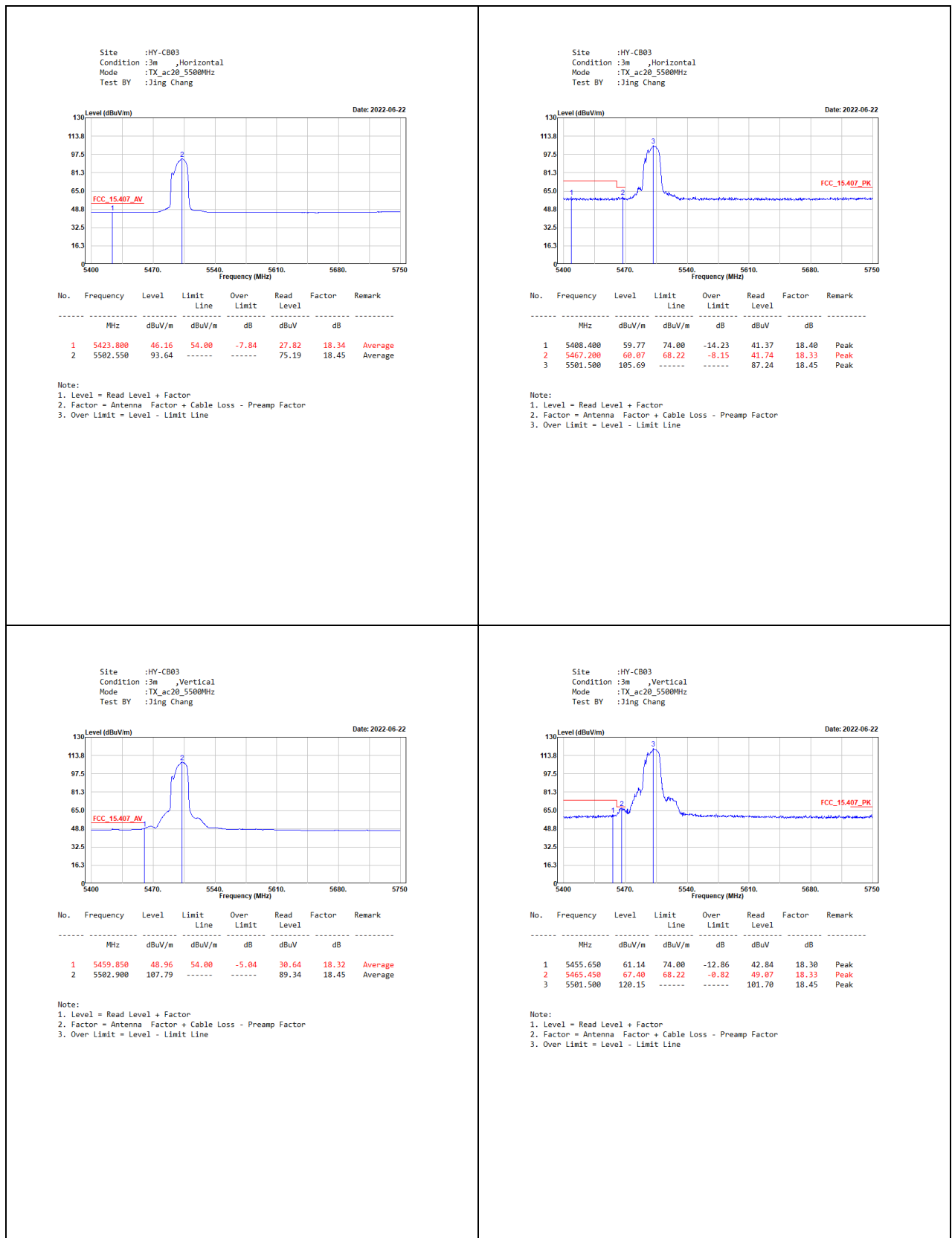


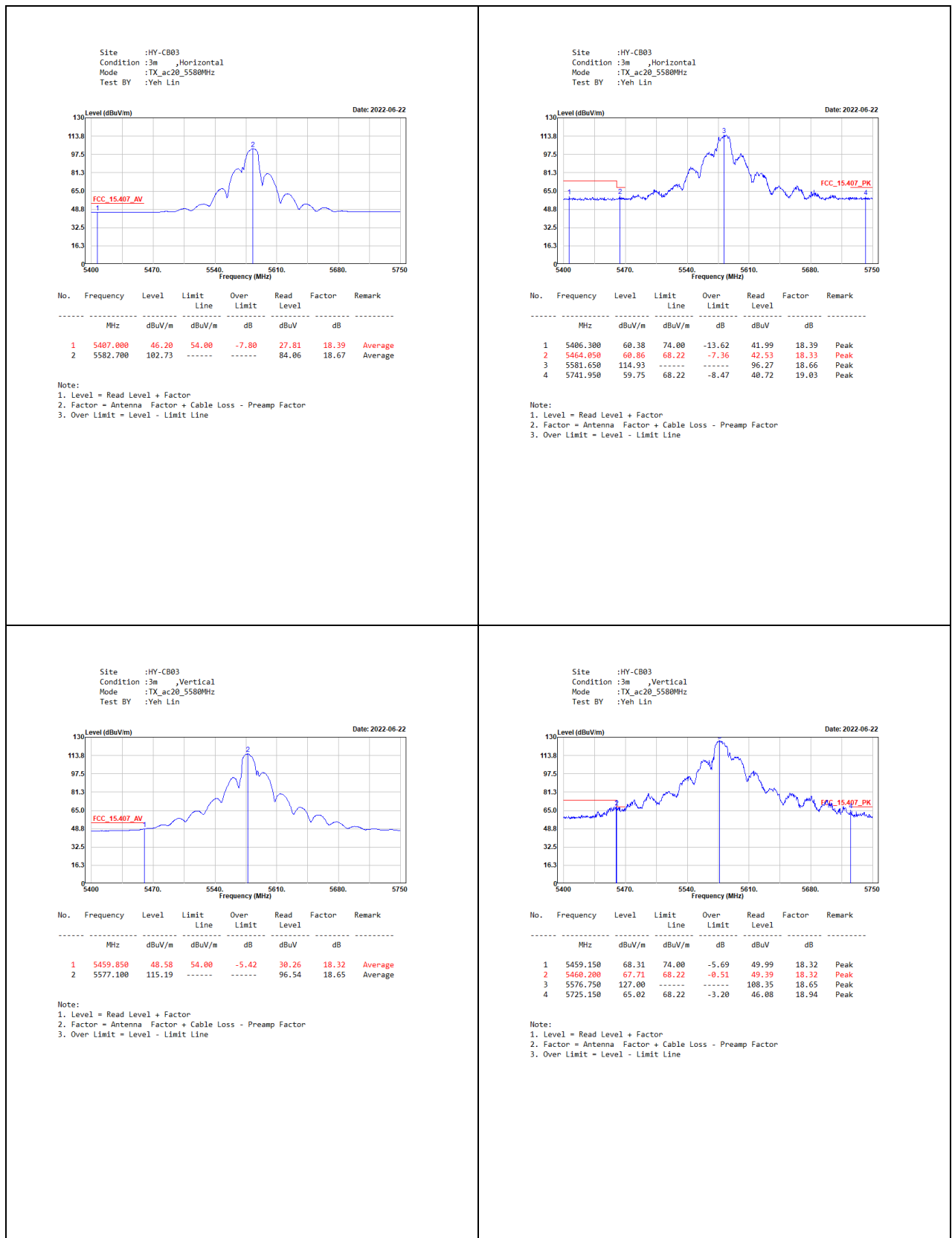


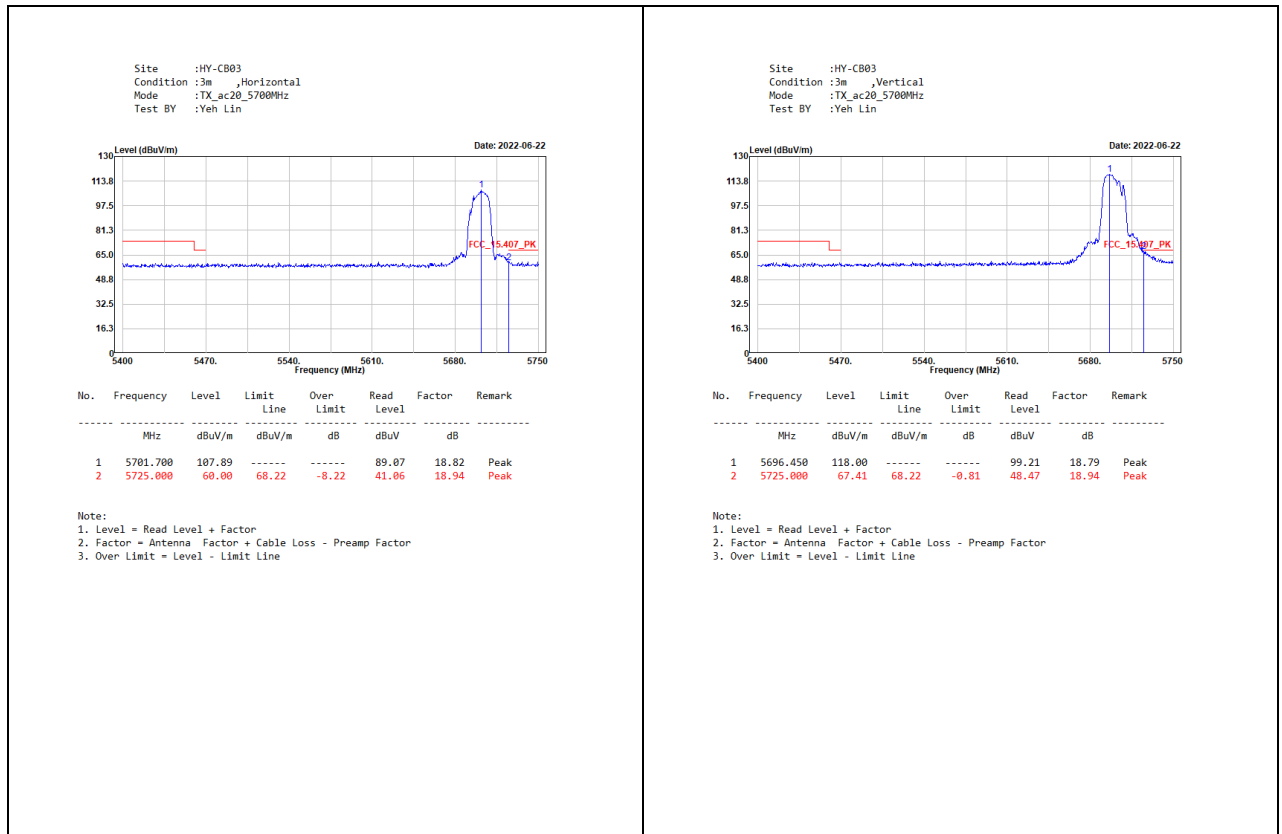


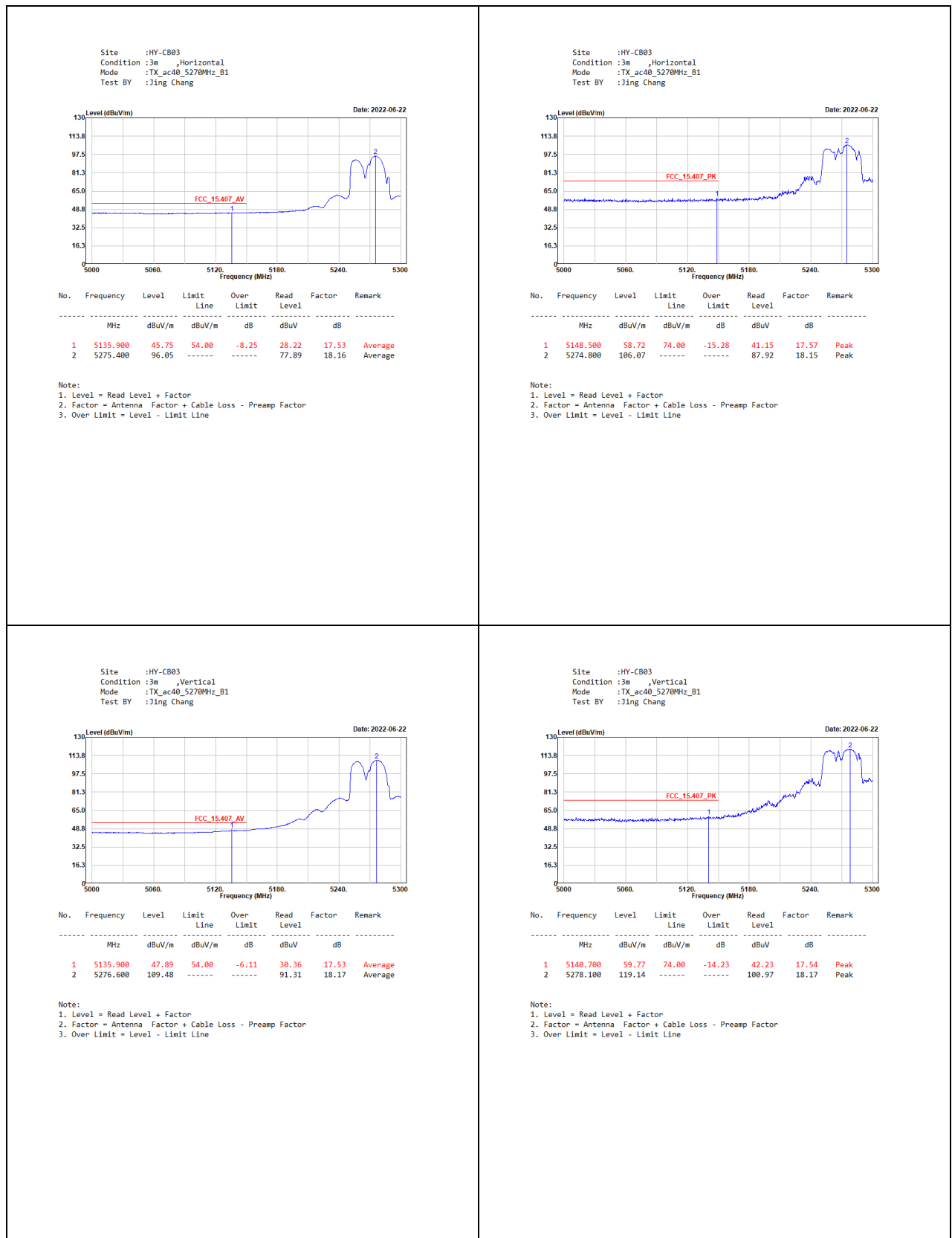


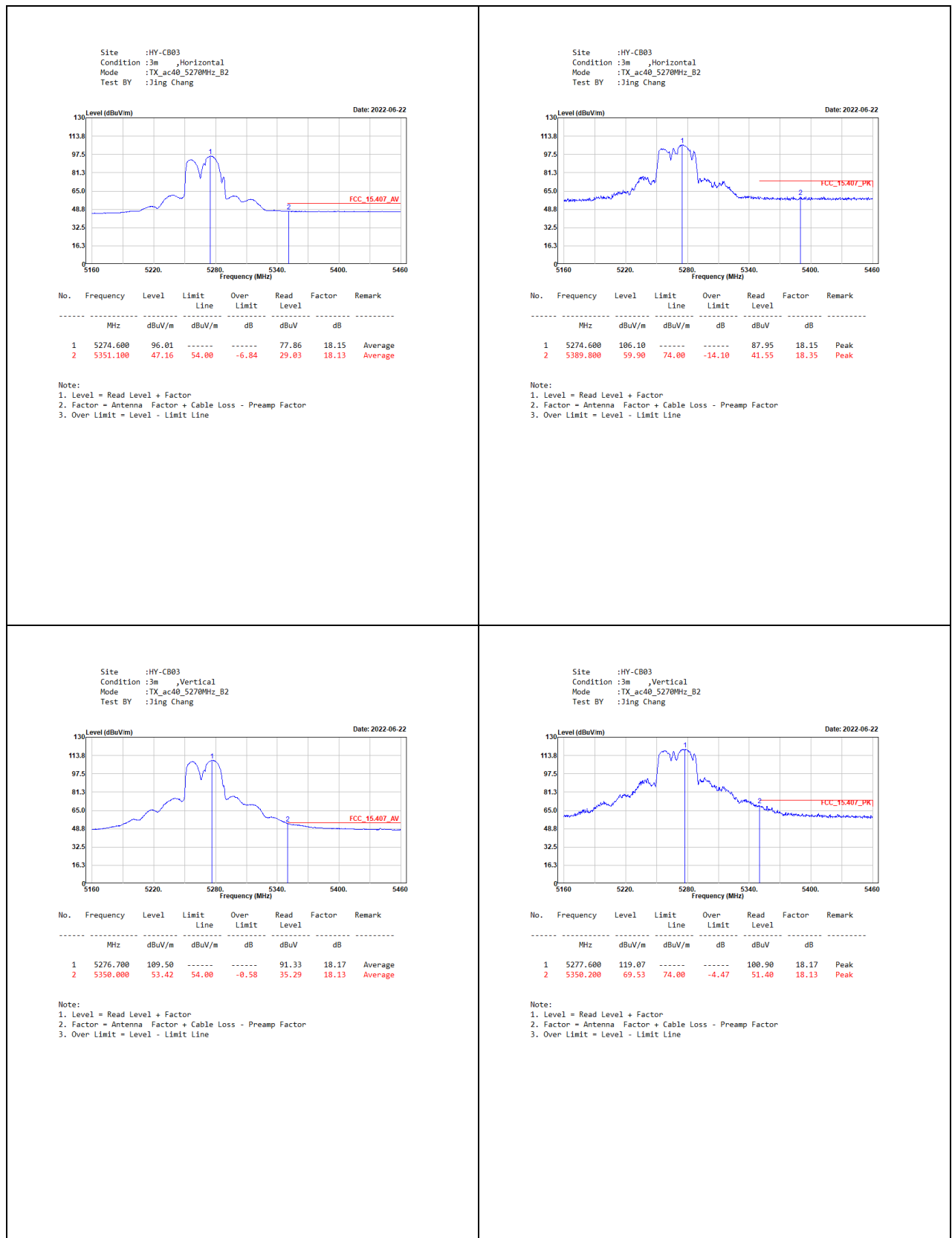


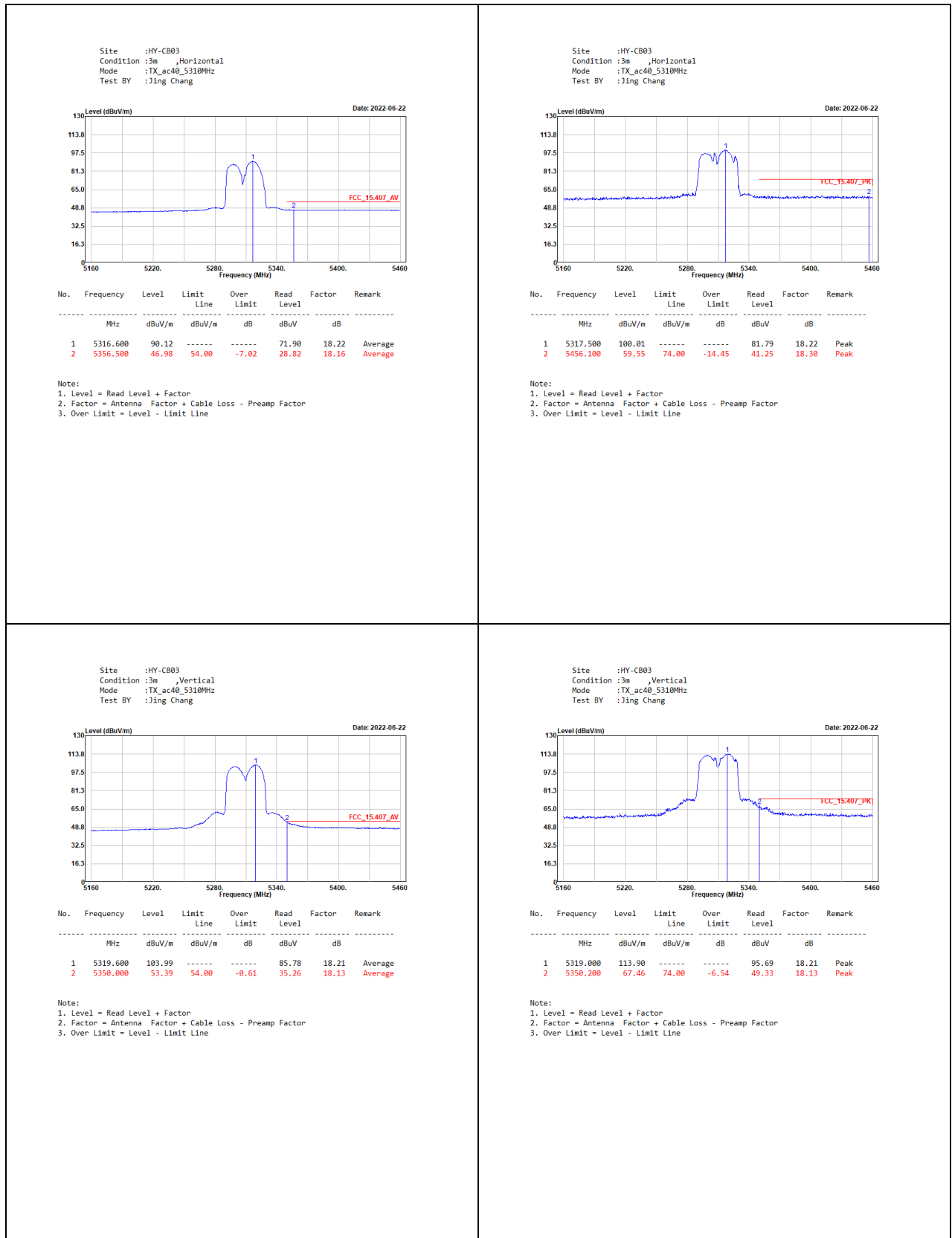


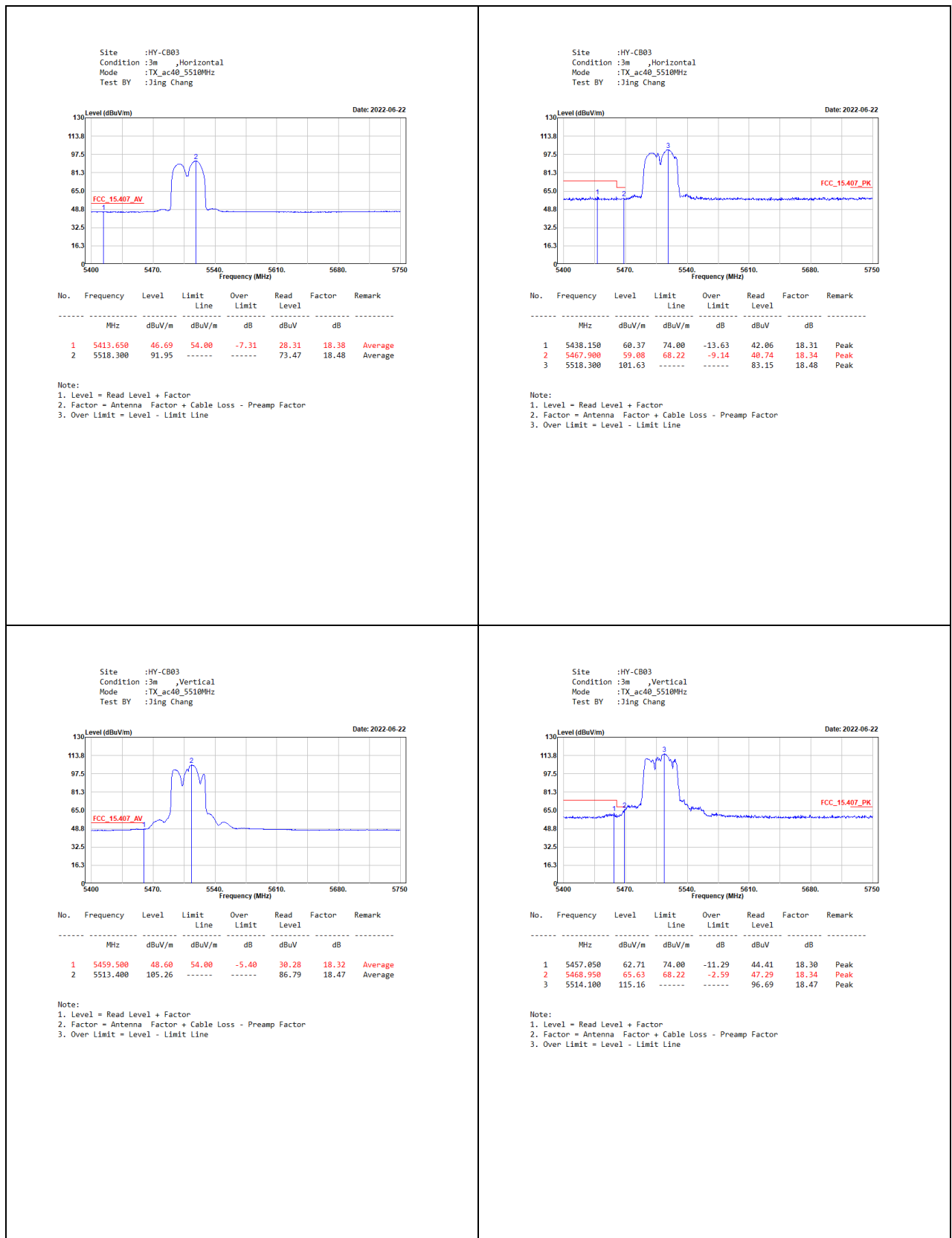


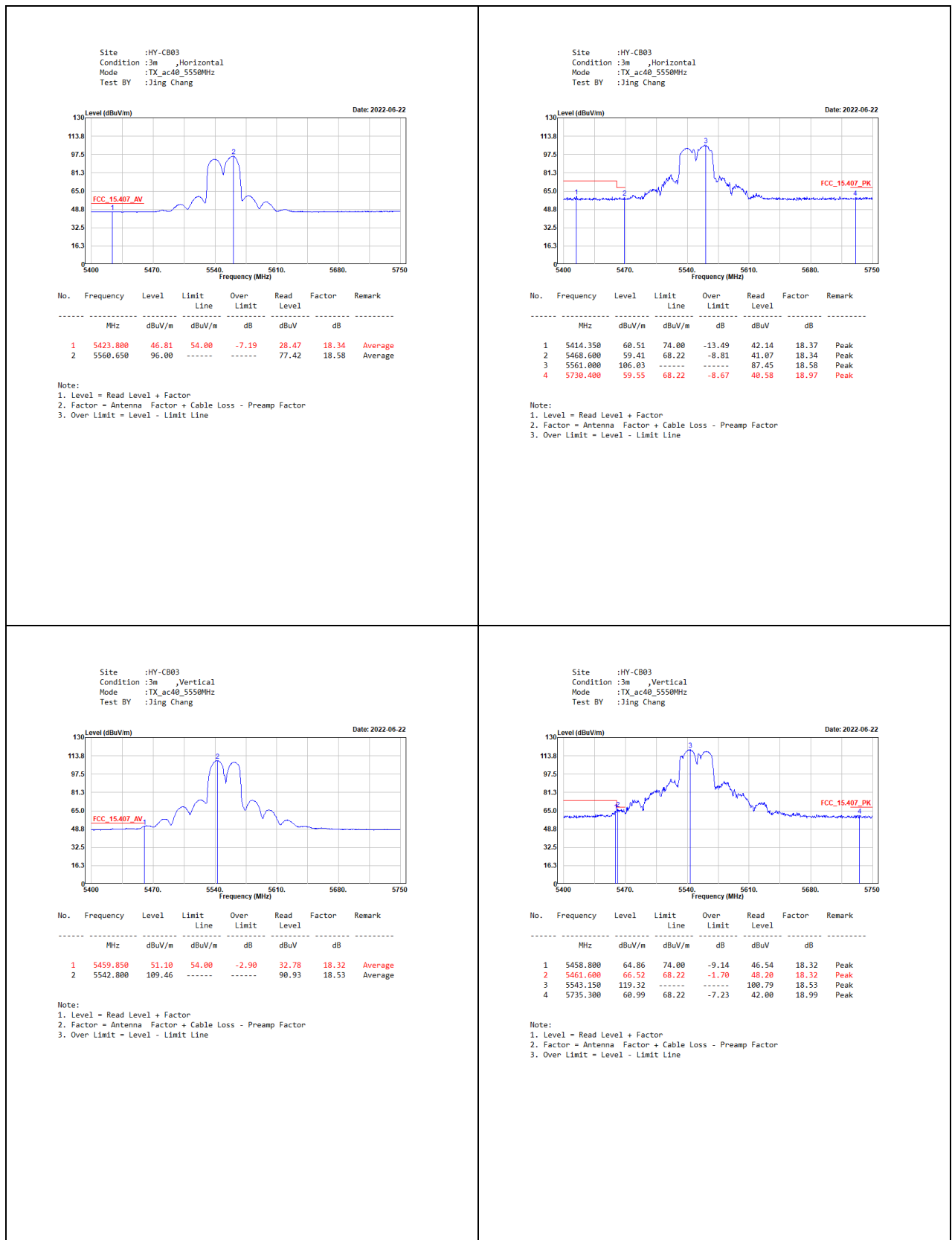


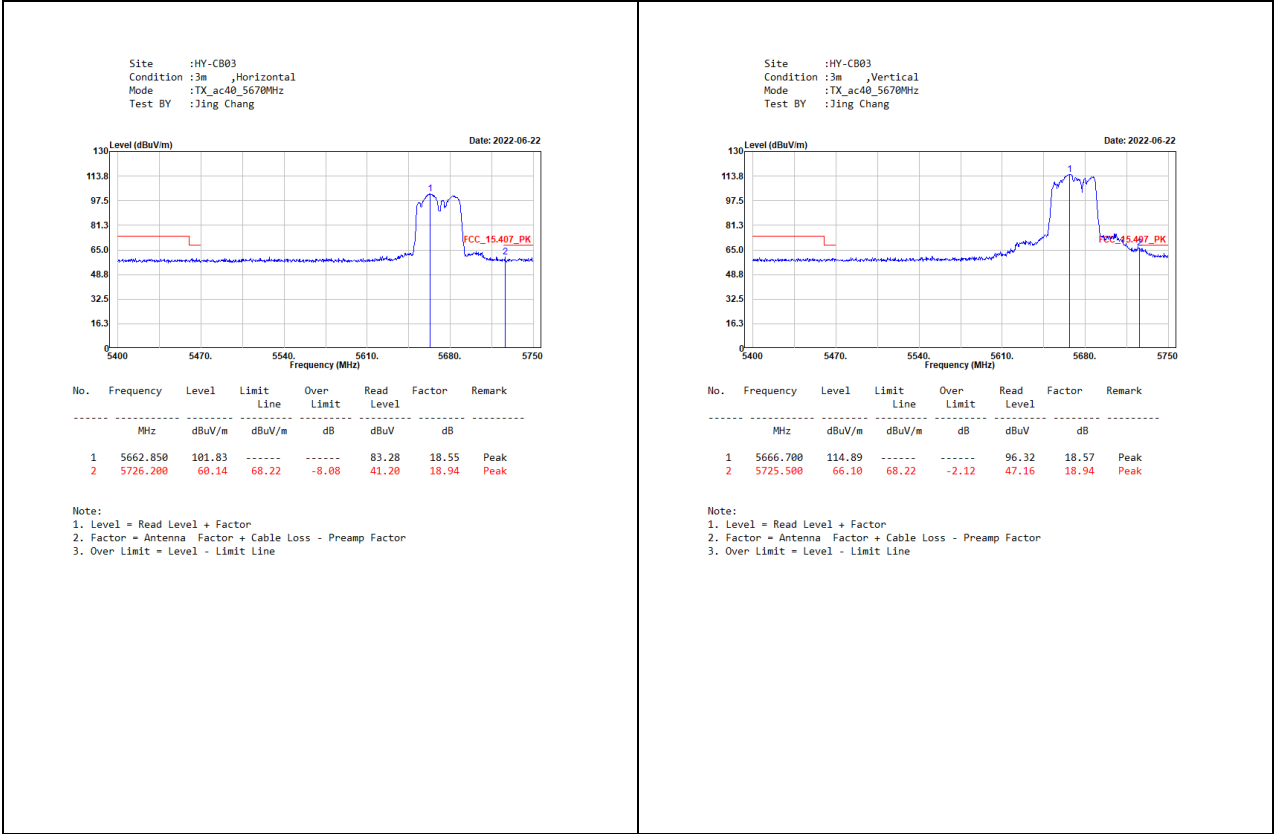






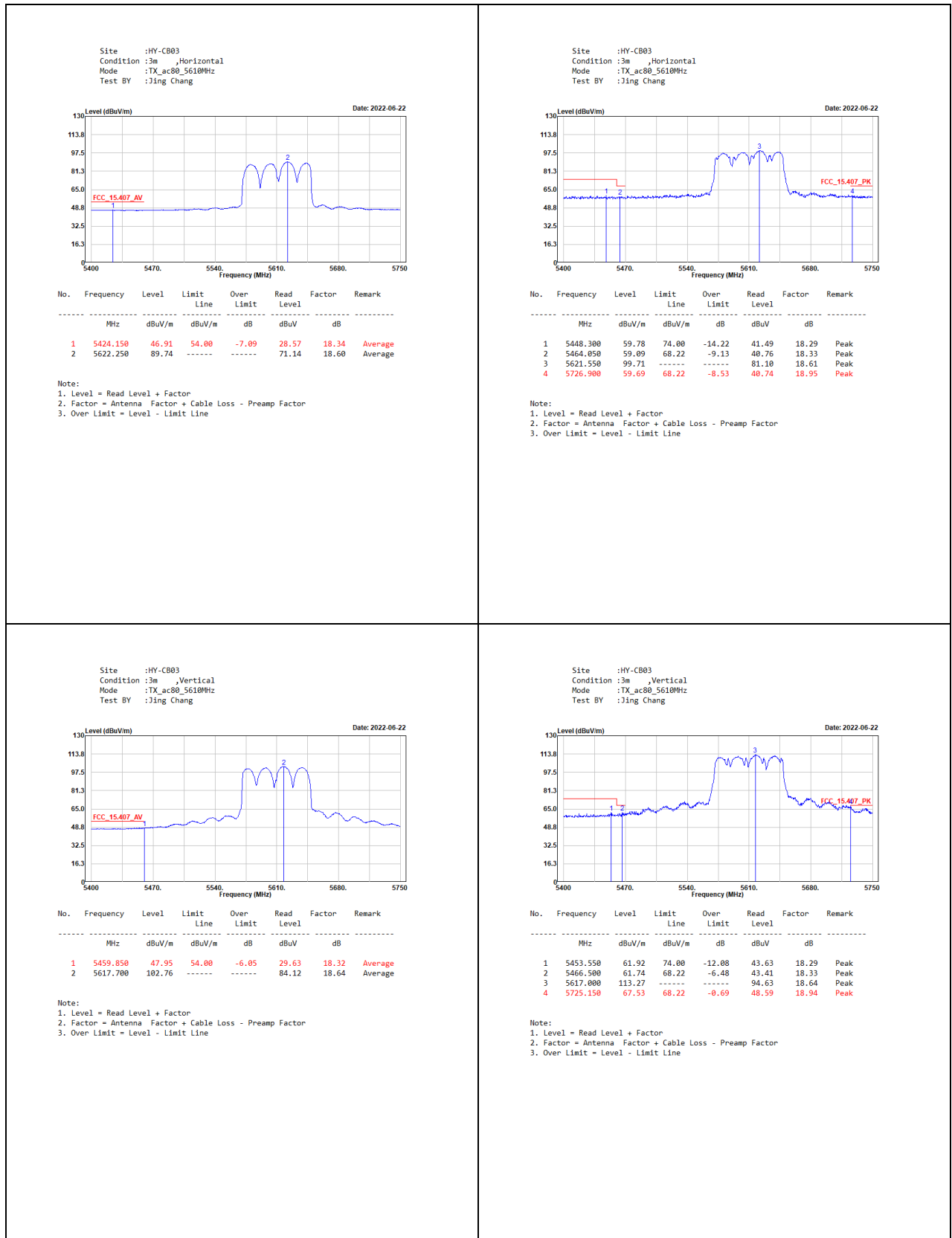






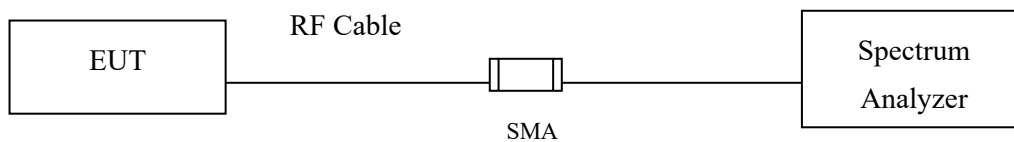






7. Duty Cycle

7.1. Test Setup



7.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to U-NII test procedure of KDB789033 for compliance to FCC 47CFR 15.407 requirements.

7.3. Test Result of Duty Cycle

Product : Secured Network Extension Device
Test Item : Duty Cycle
Test Mode : Transmit-CDD mode

Duty Cycle Formula:

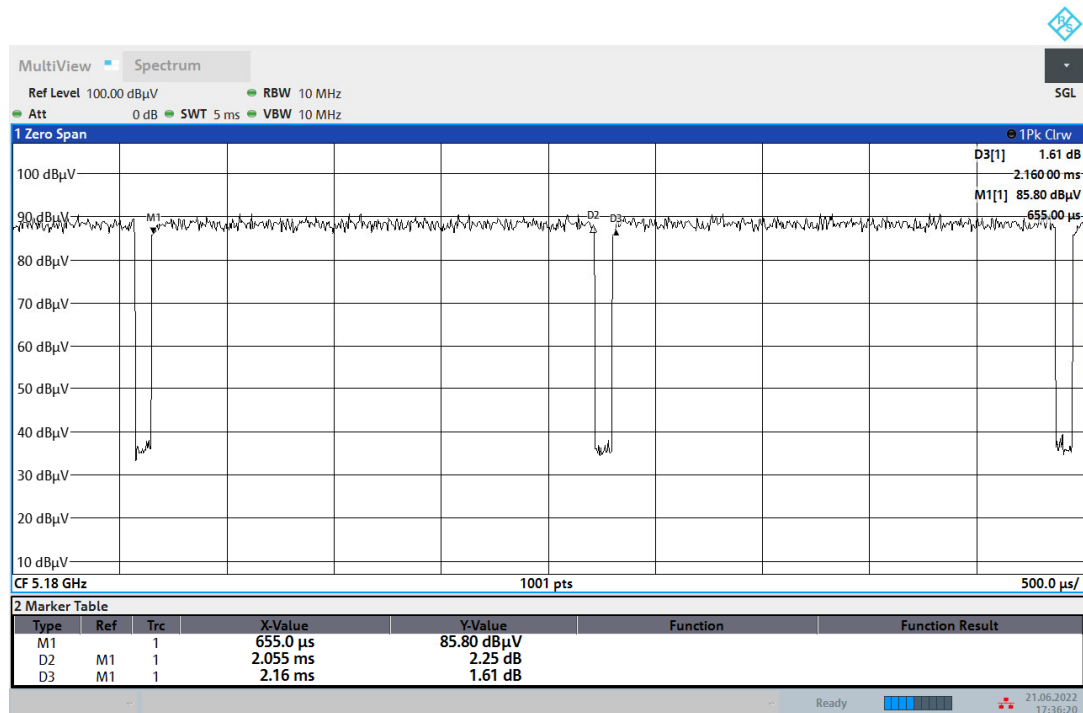
Duty Cycle = $T_{on} / (T_{on} + T_{off})$

Duty Factor = $10 \log (1/\text{Duty Cycle})$

Results:

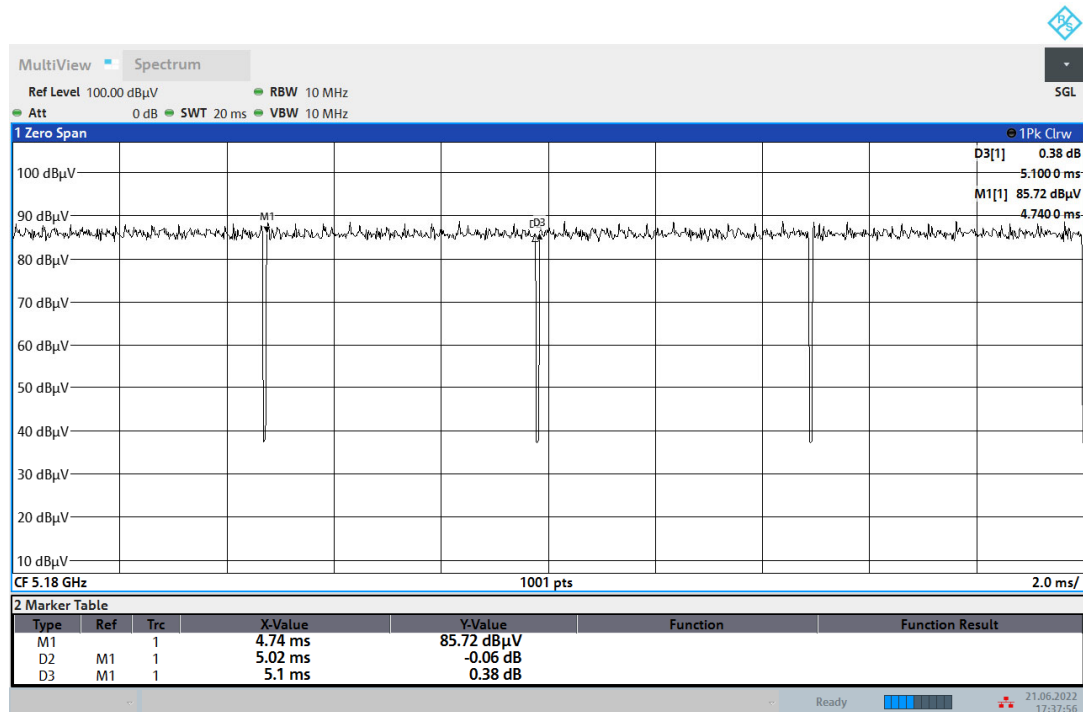
| 5 GHz band | Ton (ms) | Ton + Toff (ms) | Duty Cycle (%) | Duty Factor (dB) |
|-----------------|-------------|--------------------|-------------------|---------------------|
| 802.11a | 2.0550 | 2.1600 | 95.14 | 0.22 |
| 802.11ac-20 MHz | 5.0500 | 5.1000 | 99.02 | 0.04 |
| 802.11ac-40 MHz | 2.4200 | 2.5200 | 96.03 | 0.18 |
| 802.11ac-80 MHz | 1.1200 | 1.2300 | 91.06 | 0.41 |

802.11a



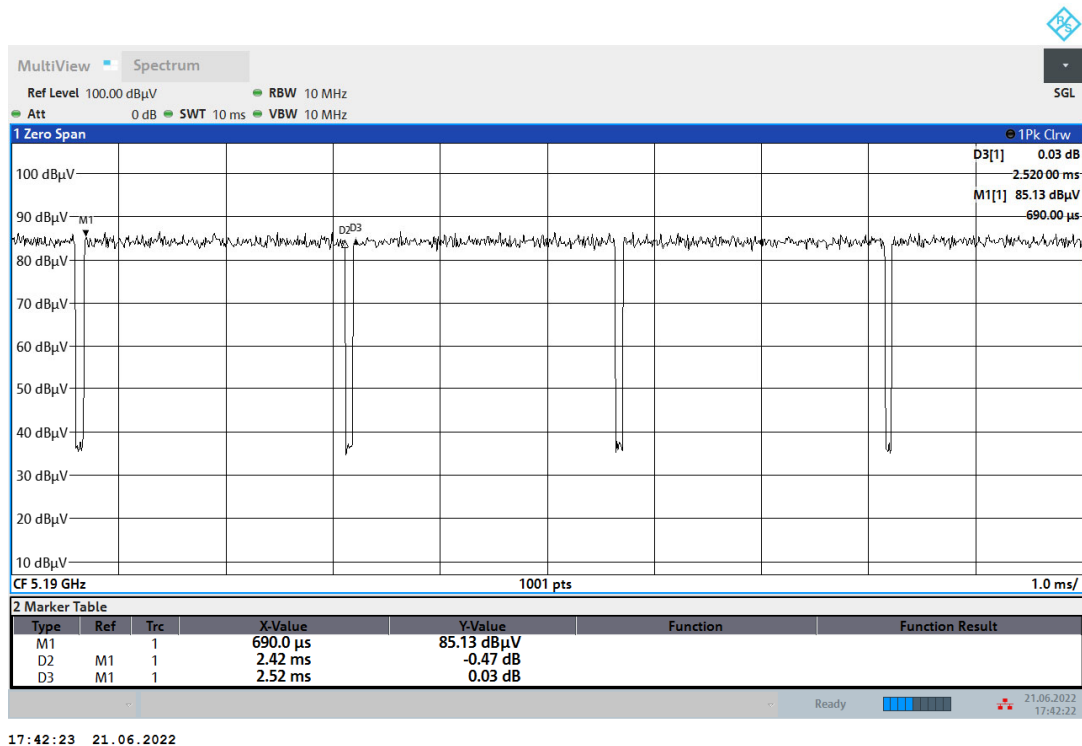
17:36:21 21.06.2022

802.11ac20



17:37:57 21.06.2022

802.11ac40



802.11ac80

