

ISED CABid: ES1909

Test Report No:

Lab. Company Number: 4621A

72691RRF.007

Partial Test Report

USA FCC Part 15.407, 15.209

CANADA RSS-247, RSS-Gen

| | |
|---|---|
| (*) Identification of item tested | Automotive Infotainment System |
| (*) Trademark | Mercedes-Benz |
| (*) Model and /or type reference | NTG7Q PREMIUMPLUS LF2 |
| Other identification of the product | FCC ID: 2AOUZNTG7QPRPLF2 IC: 23650-NTG7QPRPLF2 |
| (*) Features | FM/AM/DAB/DVBT, USB, Bluetooth, WLAN, GNSS HW version: D15 SW version: E444.204 |
| Applicant | CONTINENTAL AUTOMOTIVE TECHNOLOGIES GMBH VDO-Strasse 1, 64832 Babenhausen, Germany |
| Test method requested, standard | USA FCC Part 15.407 (10-1-21) Edition: Unlicensed National Information Infrastructure (U-NII) Devices. General technical requirements. USA FCC Part 15.209 (10-1-21) Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 amendment 2 (February 2021). Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices. |
| Approved by (name / position & signature) | José Manuel Gómez Galván EMC Consumer & RF Lab. Manager |
| Date of issue | 2023-08-03 |
| Report template No | FDT08_24 (*) "Data provided by the client" |

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Acronyms

| Acronym ID | Acronym Description |
|----------------|------------------------------|
| Detector | Detector used |
| Freq | Frequency |
| Freq Rng | Frequency Range |
| MP | Measurement Point |
| Mod | Modulation |
| Mode | Mode |
| Operation Band | Operation Band |
| Pol | Polarization |
| Port | Active Port |
| Unwanted Freq | Unwanted Emissions Frequency |
| Unwanted Lvl | Unwanted Emissions Level |

Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory, CABid: ES1909, with the appropriate scope of accreditation that covers the performed tests in this report.

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Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

The total uncertainty of the measurement system for the radiated emissions of EUT from 30 MHz to 1 GHz is: Measurement uncertainty $\leq \pm 5,35$ dB with factor ($k = 2$).

The total uncertainty of the measurement system for the radiated emissions of EUT from 1 GHz to 17 GHz is: Measurement uncertainty $\leq \pm 4,32$ dB with factor ($k = 2$).

The total uncertainty of the measurement system for the radiated emissions of EUT from 17 GHz to 40 GHz is: Measurement uncertainty $\leq \pm 5,55$ dB with factor ($k = 2$).

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample model NTG7Q PREMIUMPLUS LF2 consists of an Automotive head unit to be installed in cars with the following features: FM/AM/DAB/DVBT, USB, Bluetooth, WLAN and GNSS.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

| Id | Control Number | Description | Model | Serial N° | Date Reception | of | Application |
|------|----------------|--------------------------------|-----------------------|----------------|----------------|----|--------------------|
| S/01 | 72691_014.1 | Automotive Infotainment System | NTG7Q PREMIUMPLUS LF2 | COM620PB003702 | 24-05-2023 | | Element Under Test |
| S/01 | 72691L_2.1 | Harness Small | -- | --- | 2023-05-18 | | Auxiliary Element |
| S/01 | 74915_32.1 | 4 way cable-Fraka connector | -- | -- | 2023-03-07 | | Auxiliary Element |

Notes referenced to samples during the project:

| Id | Type |
|------|-----------|
| S/01 | Radiated. |

Test sample description

| Ports.....: | Port name and description | | Cable | | | | |
|---|--|--|--|-------------------------------------|-------------------------------------|-----------------------------------|--------------------------|
| | | | Specified max length [m] | Attached during test | Shielded | Coupled to patient ⁽³⁾ | |
| | Car Connector A | | >3m | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| | Car Connector B | | >3m | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| | Display Connector DID/PIP/RVC | | >3m | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| | USB Connector | | <3m | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| | Eth Connector | | 1,82 m | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| | BT/WLAN-Antenna | | >3m | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Supplementary information to the ports.....: | GNSS | | | | | | |
| Rated power supply | Voltage and Frequency | | Reference poles | | | | |
| | | | L1 | L2 | L3 | N | PE |
| | <input type="checkbox"/> | AC: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | DC: 12V car battery / attenuator (9.5-15.5 V normal operation) | | | | | | |
| Rated Power.....: | 12V | | | | | | |
| Clock frequencies.....: | See schematics | | | | | | |
| Other parameters | See technical description | | | | | | |
| Software version.....: | E444.204 | | | | | | |
| Hardware version | D15 | | | | | | |
| Dimensions in cm (W x H x D) ...: | 182 x 78 x 160 mm | | | | | | |
| Mounting position | <input type="checkbox"/> | Table top equipment | | | | | |
| | <input type="checkbox"/> | Wall/Ceiling mounted equipment | | | | | |
| | <input type="checkbox"/> | Floor standing equipment | | | | | |
| | <input type="checkbox"/> | Hand-held equipment | | | | | |
| | <input checked="" type="checkbox"/> | Other: Automotive Infotainment Head Unit | | | | | |
| Modules/parts.....: | Module/parts of test item | | Type | Manufacturer | | | |
| | N/A | | - | - | | | |
| Accessories (not part of the test item) | Description | | Type | Manufacturer | | | |
| | Display | | - | L.G. | | | |
| | HARM Neco RasPi / headless | | - | HBAS | | | |
| | Cable harness | | - | HBAS | | | |
| | BT/WLAN-Antenna | | - | Hirschmann | | | |
| Documents as provided by the applicant.....: | Description | | File name | Issue date | | | |
| | Technical Description | | Technical Description NTG7Q_A20 200717 SOP2 AllVariant_NXP DRAFT.pdf | A20 | | | |

| | | | |
|--|-------------------------|---|----|
| | Test set-up instruction | NTG7QTest setupScri pt_230313_ v3 4.pdf | v3 |
|--|-------------------------|---|----|

⁽³⁾ Only for Medical Equipment

Identification of the client

CONTINENTAL AUTOMOTIVE TECHNOLOGIES GMBH
VDO-Strasse 1, 64832 Babenhausen, Germany

Testing period and place

| | |
|----------------------|--|
| Test Location | DEKRA Testing and Certification S.A.U. |
| Date (start) | 2023-06-12 |
| Date (finish) | 2023-06-14 |

Document history

| Report number | Date | Description |
|---------------|------------|----------------|
| 72691RRF.007 | 2023-08-03 | First release. |

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

| | |
|--------------------------|------------------------------|
| Temperature | Min. = 15 °C Max. = 35 °C |
| Relative humidity | Min. = 20 % Max. = 75 % |

In the semianechoic chamber, the following limits were not exceeded during the test.

| | |
|--------------------------|------------------------------|
| Temperature | Min. = 15 °C Max. = 35 °C |
| Relative humidity | Min. = 20 % Max. = 75 % |

Remarks and comments

The tests have been performed by the technical personnel: Alvaro Gutierrez Naranjo.

Used instrumentation:

| Control No. | Equipment | Model | Manufacturer | Next Calibration |
|-------------|---|----------------|-------------------|------------------|
| 6165 | EMI TEST RECEIVER 9kHz-7GHz | ESR7 | ROHDE AND SCHWARZ | 2023-11-08 |
| 4657 | HORN ANTENNA 18-40GHz | BBHA 9170 | SCHWARZBECK | 2026-06-12 |
| 4578 | HYBRID BILOG ANTENNA 30MHz-6GHz | 3142E | ETS LINDGREN | 2026-06-01 |
| 8856 | PRE-AMPLIFIER G>30dB 18-40GHz | BLMA 1840-4A | BONN ELEKTRONIK | 2023-11-02 |
| 6142 | PRE-AMPLIFIER G>38dB 30MHz-6GHz | BLNA 0360-01N | BONN ELEKTRONIK | 2024-06-28 |
| 5705 | PRE-AMPLIFIER G>40dB 1-18 GHz | BLMA 0118-1M | BONN ELEKTRONIK | 2023-07-21 |
| 4825 | SEMIANECHOIC ABSORBER LINED CHAMBER | FACT 3 200 STP | ETS LINDGREN | N/A |
| 6668 | SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz | FSV40 | ROHDE AND SCHWARZ | 2024-12-14 |
| 4716 | SIGNAL AND SPECTRUM ANALYZER 2Hz-50GHz | FSW50 | ROHDE AND SCHWARZ | 2024-08-12 |
| 4848 | SOFTWARE FOR EMC/RF TESTING | EMC32 | ROHDE AND SCHWARZ | N/A |

Testing verdicts

| | |
|----------------|-----|
| Fail | F |
| Inconclusive | I |
| Not applicable | N/A |
| Not measured | N/M |
| Pass | P |

Summary

Common requirements for all bands

| FCC PART 15 PARAGRAPH / RSS-247 | | |
|---|---------|--------|
| Requirement – Test case | Verdict | Remark |
| Duty Cycle | N/M | |
| 99% Occupied Bandwidth | N/M | |
| 26 dB Emission Bandwidth (EBW) | N/M | |
| <u>Supplementary information and remarks:</u> | | |
| (1) Only radiated test has been requested. | | |

U-NII-1 Band: 5.15 - 5.25 GHz

| FCC PART 15 PARAGRAPH / RSS-247 | | | |
|---|--|--------|-----|
| Requirement – Test case | Verdict | Remark | |
| FCC 15.407 (a)(1)(iv) | Transmitter Maximum conducted Output Power | N/M | |
| RSS-247 6.2.1.1 | Transmitter Maximum Equivalent Isotropically Radiated Power EIRP | N/M | |
| FCC 15.407 (a)(1)(iv) | Transmitter Maximum Power Spectral Density | N/M | |
| RSS-247 6.2.1.1 | Transmitter EIRP Spectral Density | N/M | |
| FCC 15.407 (b)(1)(6) / RSS-247 6.2.1.2 | Transmitter Out of Band Radiated Emissions | P | (1) |
| FCC 15.407 (b)(1) / RSS-247 6.2.1.2 | Transmitter Band Edge Radiated Emissions | P | (1) |
| <u>Supplementary information and remarks:</u> | | | |
| (1) Only test requested. | | | |

B. U-NII-3 Band: 5.725 - 5.85 GHz

| FCC PART 15 PARAGRAPH / RSS-247 | | | |
|---|--|--------|-----|
| Requirement – Test case | Verdict | Remark | |
| FCC 15.407 (a)(3) / RSS-247 6.2.4.1 | Transmitter Maximum conducted Output Power | N/M | |
| FCC 15.407 (e) / RSS-247 6.2.4.1 | 6 dB bandwidth. | N/M | |
| FCC 15.407 (a)(3) / RSS-247 6.2.4.1 | Transmitter Maximum Power Spectral Density | N/M | |
| FCC 15.407 (b)(4) / RSS-247 6.2.4.2 | Transmitter Band Edge Radiated Emissions | P | (1) |
| FCC 15.407 (b)(4)(6) / RSS-247 6.2.4.2 | Transmitter Out of Band Radiated Emissions | P | (1) |
| <u>Supplementary information and remarks:</u> | | | |
| (1) Only test requested. | | | |

Appendix A: Tests results for the U-NII-1 Band 5.15–5.25 GHz

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| FCC 15.407 (B)(1) / RSS-247 6.2.1.2 TRANSMITTER BAND EDGE RADIATED EMISSIONS | 34 |

TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 13.2 V
 Type of Power Supply: External DC (Car battery / Alternator)

ANTENNA (*):

Type of Antenna: External.
 Maximum Declared Antenna Gain: +2.5 dBi

TEST FREQUENCIES (*):

| | | |
|---------------------------|---|-------------------------|
| Technology Tested: | WLAN (IEEE 802.11 a,n,ac) / U-NII-1 | |
| Modes: | 802.11a20: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps | |
| | 802.11n HT20: MCS0 to MCS7 | |
| | 802.11n HT40: MCS0 to MCS7 | |
| | 802.11ac VHT20: MCS0 to MCS9 | |
| | 802.11ac VHT40: MCS0 to MCS9 | |
| | 802.11ac VHT80: MCS0 to MCS9 | |
| Setting of cores / ports: | One port. | |
| Beamforming: | No. | |
| Frequency Range: | 5150 MHz to 5250 MHz | |
| Channel Spacing: | 20 MHz | |
| Transmit Channels | Channel | Channel Frequency (MHz) |
| | Low: 36 | 5180 |
| | Middle: 40 | 5200 |
| | High: 48 | 5240 |
| Channel Spacing: | 40 MHz | |
| Transmit Channels | Channel | Channel Frequency (MHz) |
| | Low: 38 | 5190 |
| | High: 46 | 5230 |
| Channel Spacing: | 80 MHz | |
| Transmit Channels | Middle: 42 | 5210 |

The test set-up was made in accordance to the general provisions of FCC Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.

The EUT was tested in the following operating mode:

- Continuously transmitting with a modulated carrier at maximum power in all required channels using the supported data rates/modulations types.

The field strength at the band edges was evaluated for each mode on the lowest and highest channels at the rated power for the channel under test.

For all modes, the EUT was configured in test mode using a software application. The application was used to enable a continuous transmission and to select the test channels as required. The client supplied instructions to configure the EUT. The customer supplied a document containing the setup instructions.

The worst cases for testing were identified for output power and spurious levels at the band edges which were selected based on preliminary testing that correspond to next data rates:

- 802.11 a20: 6 Mbps
- 802.11 n HT20: MCS0
- 802.11 n HT40: MCS0
- 802.11 ac VHT20: MCS0
- 802.11 ac VHT40: MCS0
- 802.11 ac VHT80: MCS0

RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1.5 m for the frequency range 17 GHz-26 GHz (17 GHz-40 GHz horn antenna).

For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

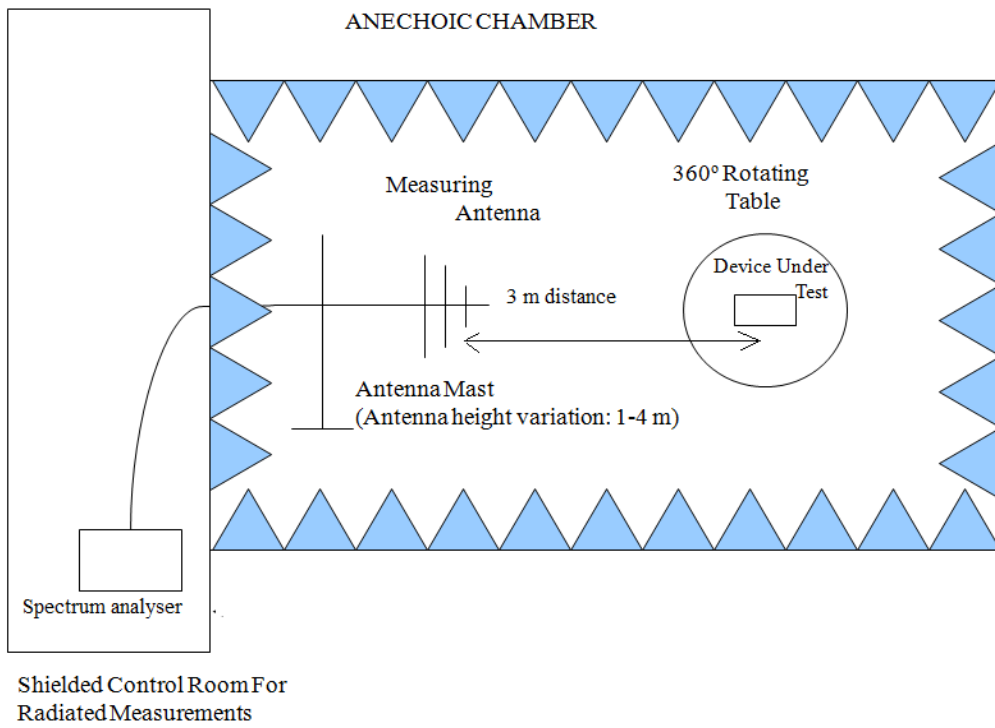
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

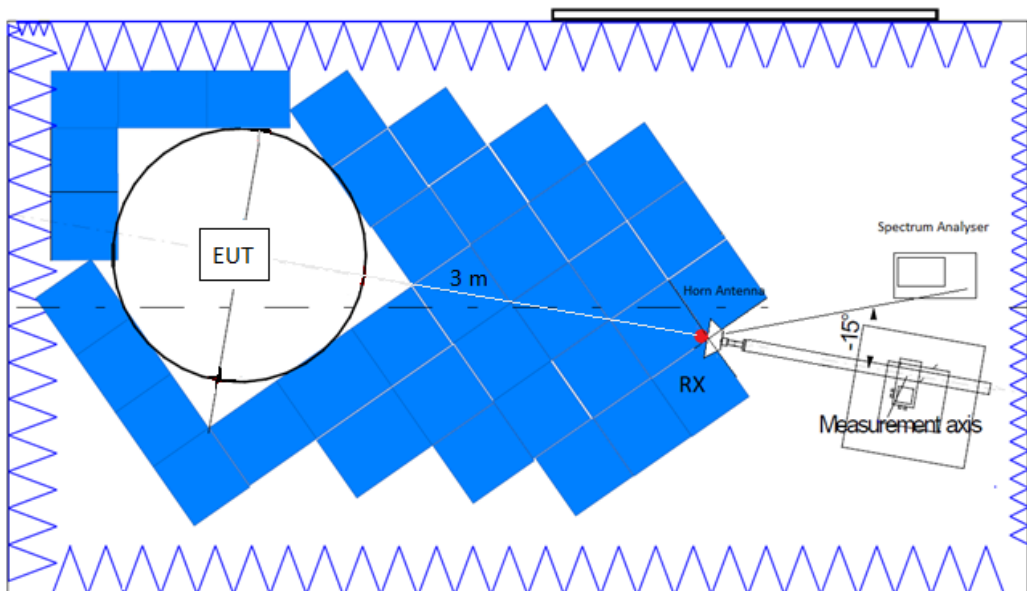
The final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor and cable loss.

A resolution bandwidth/video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

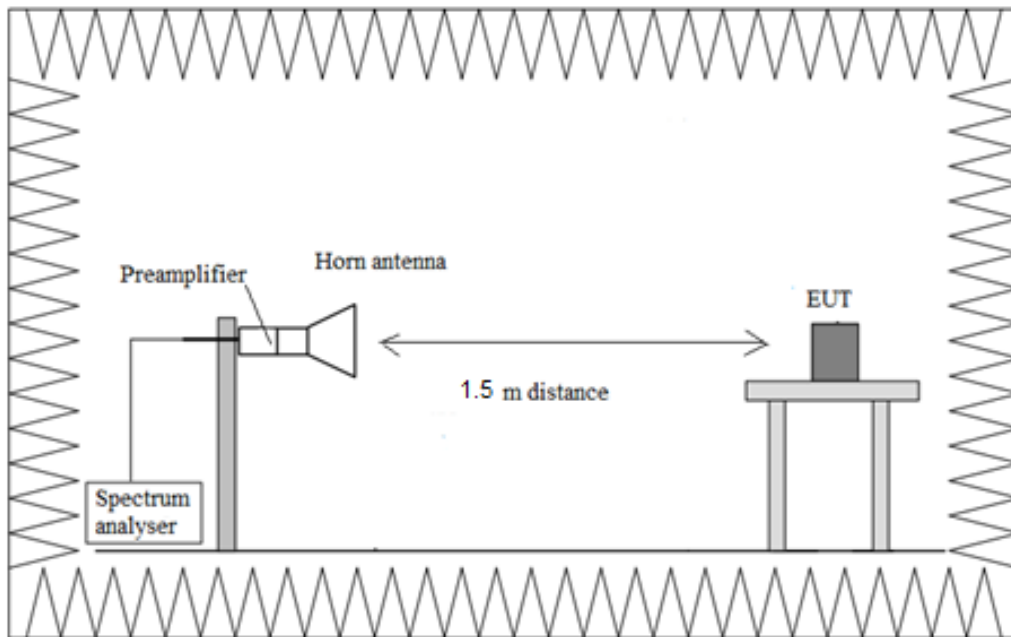
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup $f > 17$ GHz:



TEST CASES DETAILS

FCC 47 CFR Part 15.407 / RSS-247 / RSS-248

RSS-247 6.2.1.2 / FCC 15.407 (b) (1) (6) [Rse] Transmitter Out of Band Radiated Emissions For transmitters operating in the 5.15–5.25 GHz

Limits

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz (68.23 dBµV/m at 3 m distance).

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):

| Frequency Range (MHz) | Field strength (µV/m) | Field strength (dBµV/m) | Measurement distance (m) |
|-----------------------|-----------------------|-------------------------|--------------------------|
| 0.009-0.490 | 2400/F(kHz) | - | 300 |
| 0.490-1.705 | 24000/F(kHz) | - | 300 |
| 1.705 - 30.0 | 30 | - | 30 |
| 30 - 88 | 100 | 40 | 3 |
| 88 - 216 | 150 | 43.5 | 3 |
| 216 - 960 | 200 | 46 | 3 |
| 960 - 40000 | 500 | 54 | 3 |

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

Results

The field strength is calculated by adding a correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss, pre-amplifiers gain and the distance correction factor for measurements above 17 GHz performed at 1.5-meter distance.

Test performed on all the supported modes of the EUT, in the worst data rates after preliminary testing.

The worst-case mode was determined by measuring the e.i.r.p density (radiated). This worst-case mode is reported below.

Worst case: 802.11 a20 (6 Mbps)

Frequency range 30 MHz - 1 GHz (worst case):

The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

No spurious frequencies detected at less than 20 dB below the limit.

Frequency range 1 - 40 GHz (worst case):

Low, Middle and High Channels were measured for out-of-band emissions for the worst-case mode.

Spurious frequencies with peak levels above the average limit (54 dB μ V/m at 3 m) are measured with an average detector for checking compliance with the average limit.

- Low Channel: No spurious frequencies detected at less than 20 dB below the limit.
- Channel 40: No spurious frequencies detected at less than 20 dB below the limit.
- High Channel: No spurious frequencies detected at less than 20 dB below the limit.

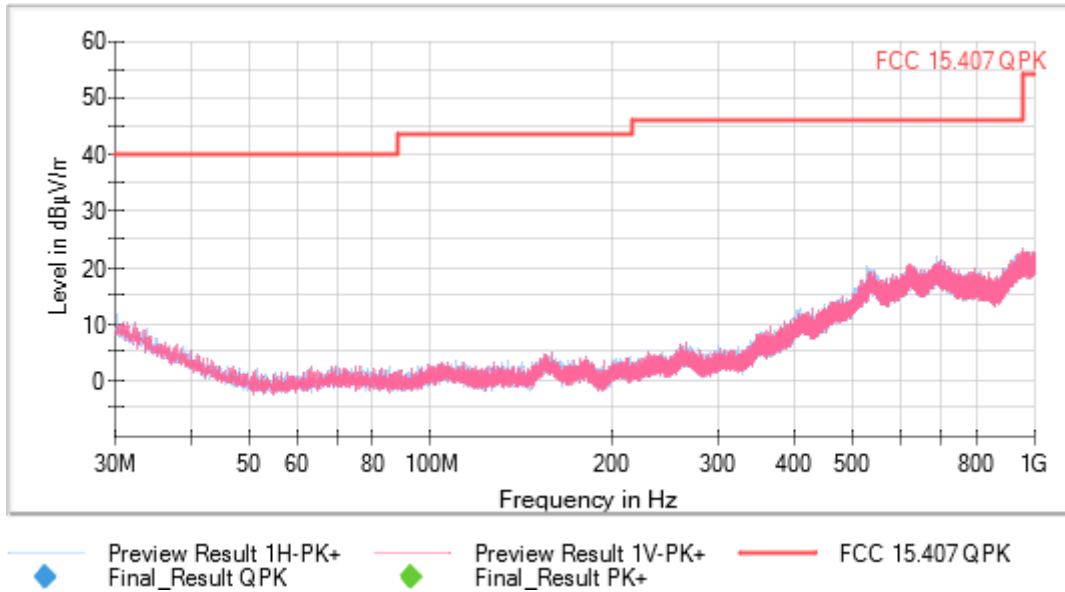
Verdict

Pass

Attachments

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [0.03, 1] Frequency MHz = 5180.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:



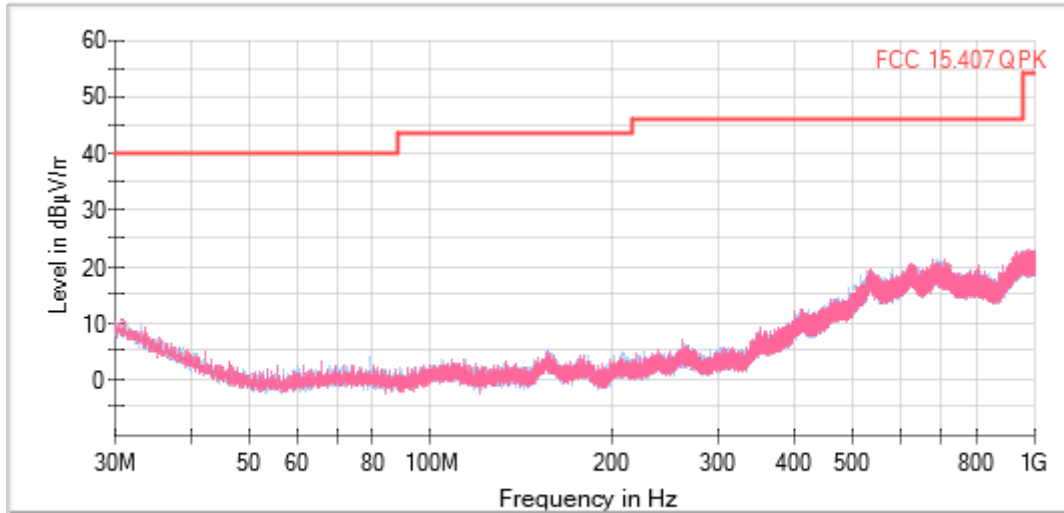
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|-------------------|------------|-----------|-----------|------------|--------|
| | Receiver: [ESR 7] | | | | | |
| | 30 MHz - 1 GHz | 30,312 kHz | PK+ | 100 kHz | 1 s | 0 dB |

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [0.03, 1] Frequency MHz = 5200.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:



◆ Preview Result 1H-PK+ Final_Result QPK
 ◆ Preview Result 1V-PK+ Final_Result PK+
 — FCC 15.407 QPK

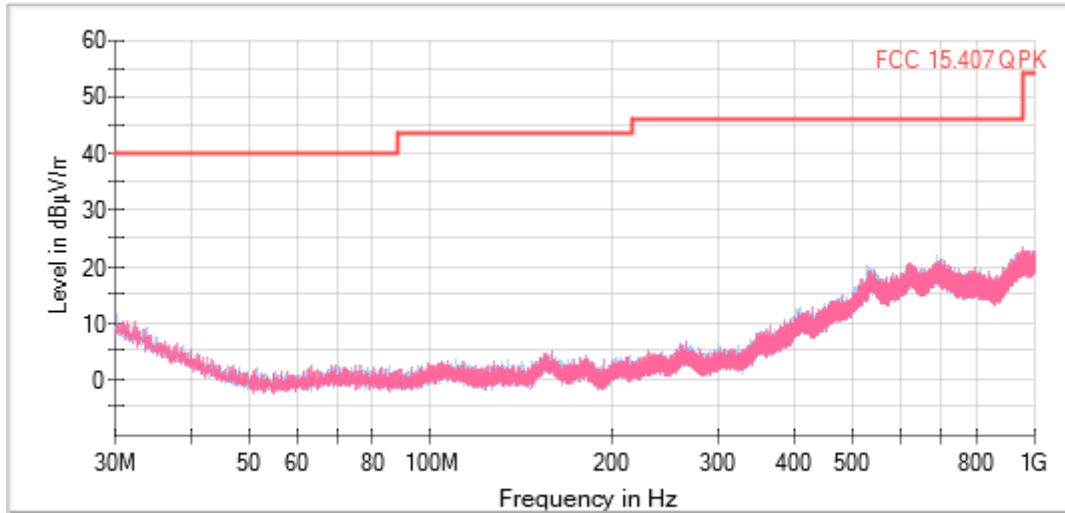
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|-------------------|------------|-----------|-----------|------------|--------|
| | Receiver: [ESR 7] | | | | | |
| | 30 MHz - 1 GHz | 30,312 kHz | PK+ | 100 kHz | 1 s | 0 dB |

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [0.03, 1] Frequency MHz = 5240.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:



◆ Preview Result 1H-PK+ Final_Result QPK
 ◆ Preview Result 1V-PK+ Final_Result PK+
 — FCC 15.407 QPK

Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|-------------------|------------|-----------|-----------|------------|--------|
| | Receiver: [ESR 7] | | | | | |
| | 30 MHz - 1 GHz | 30,312 kHz | PK+ | 100 kHz | 1 s | 0 dB |

Mode: SISO

Modulation: 802.11a (OFDM 6 Mbit/s)

Verdict

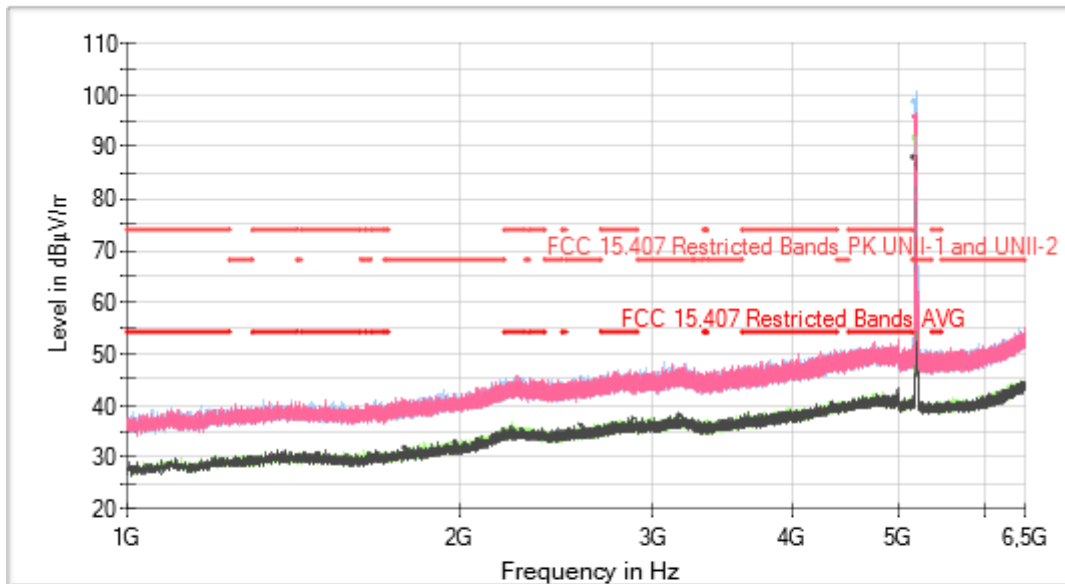
Pass

Attachments

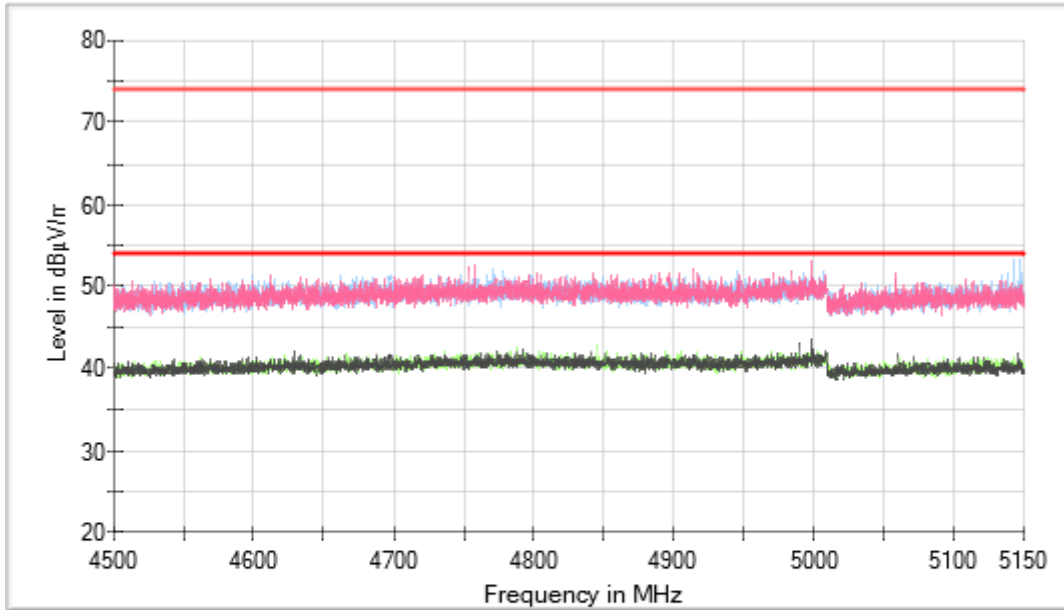
Operation Band MHz = [5150, 5250] Active Port = 1
Frequency Range GHz = [1, 6.5] Frequency MHz = 5180.00000
Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
Measurement Point = 1

Images:

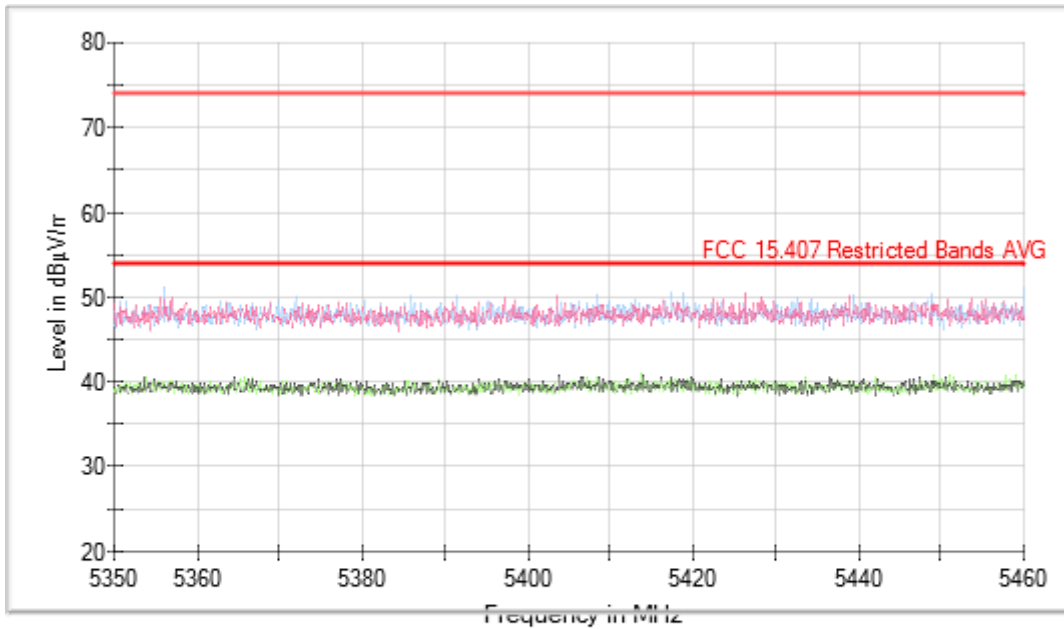
Full Spectrum



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG



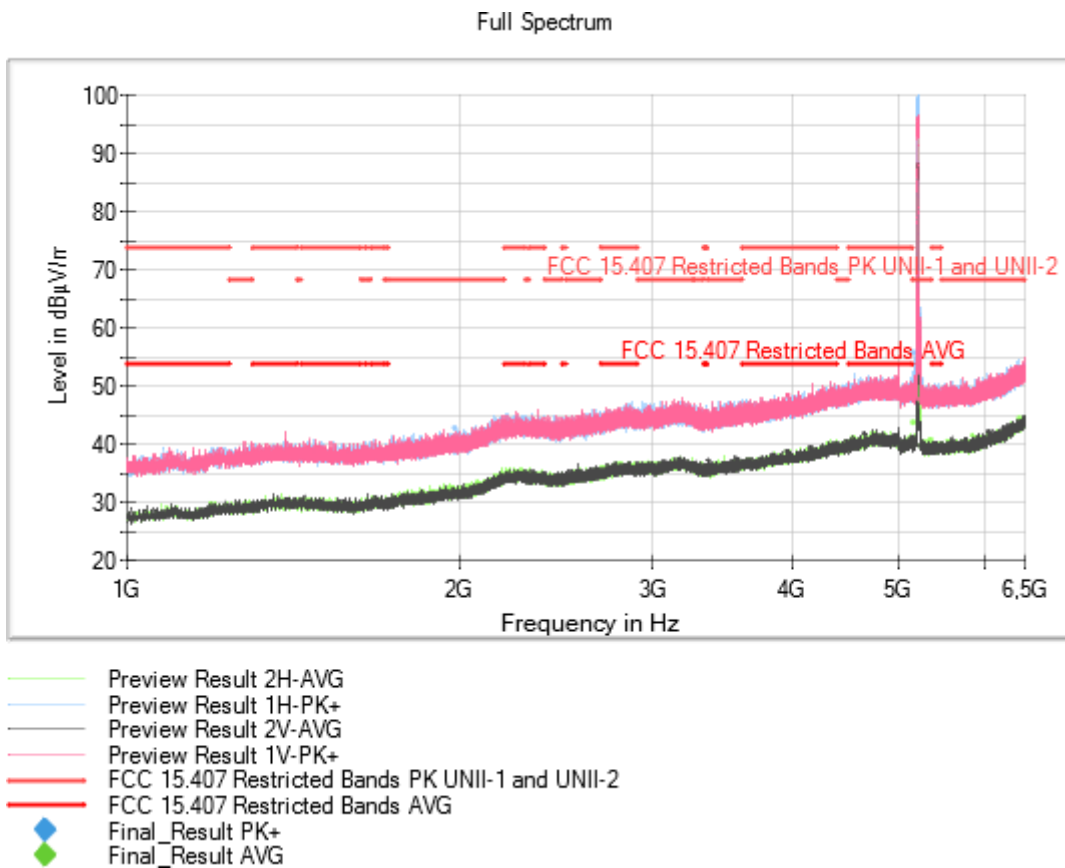
- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

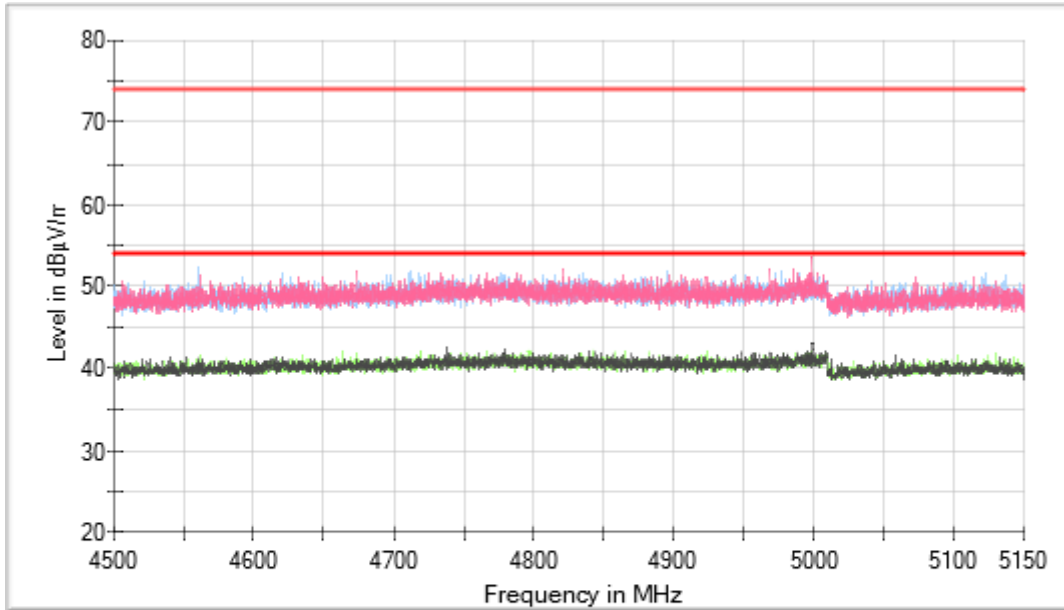


- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

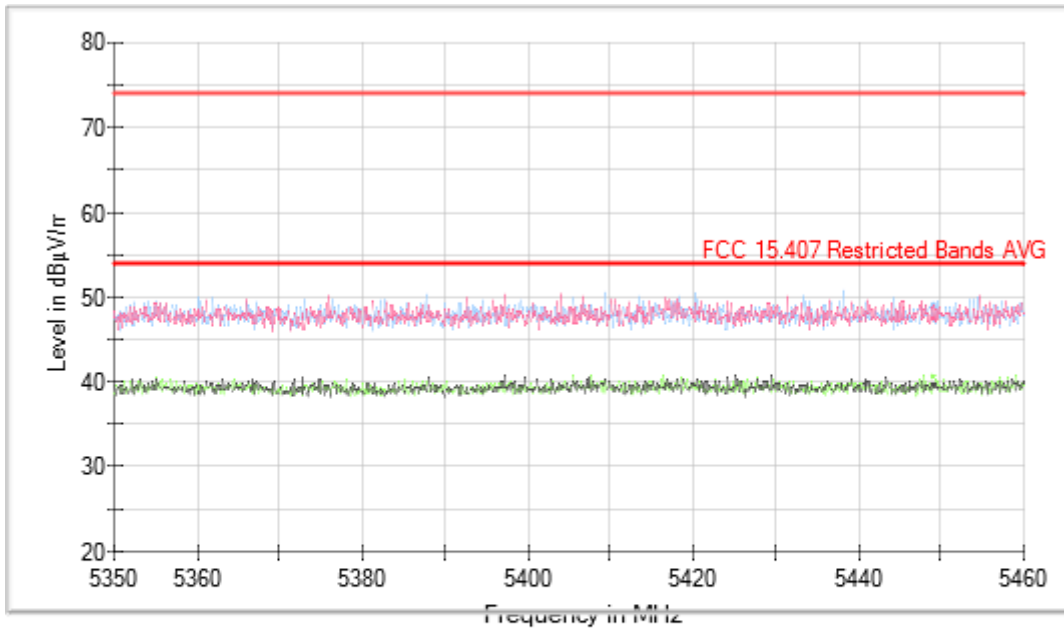
Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5200.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:





- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

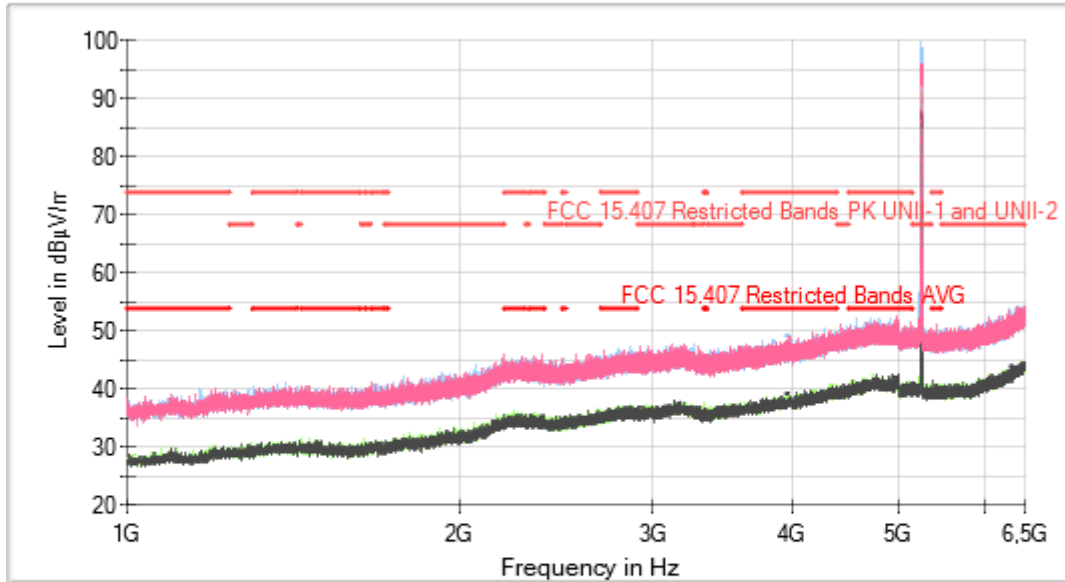


- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

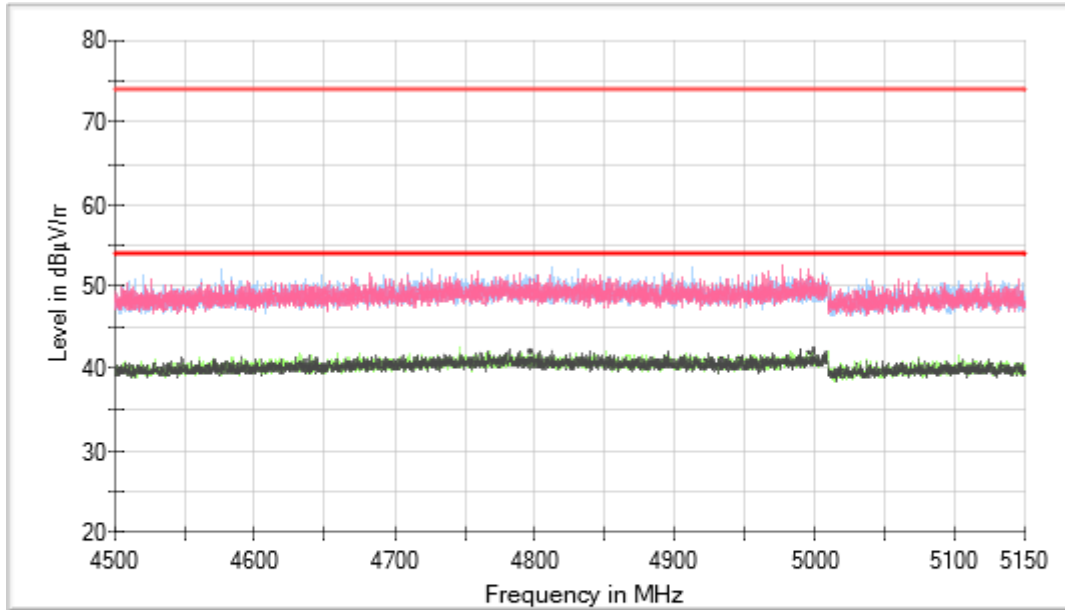
Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5240.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:

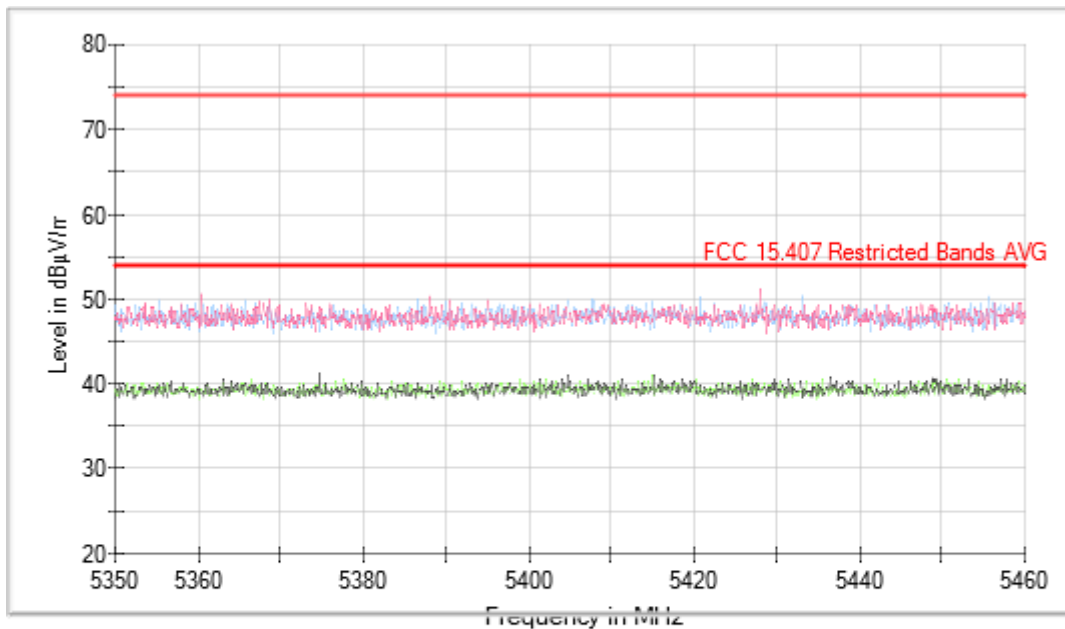
Full Spectrum



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG



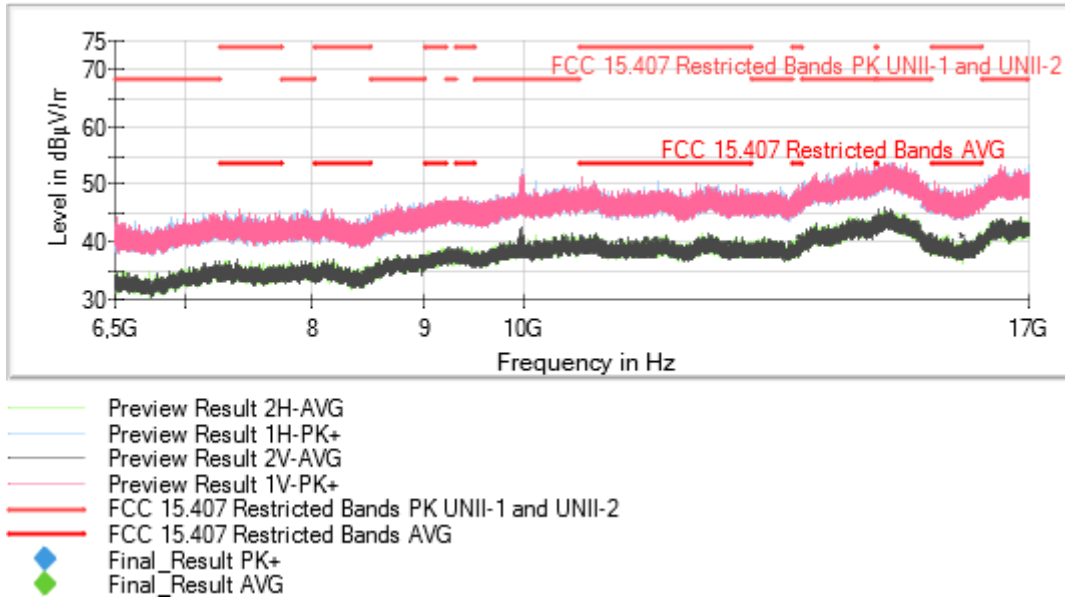
- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [6.5, 17] Frequency MHz = 5180.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:



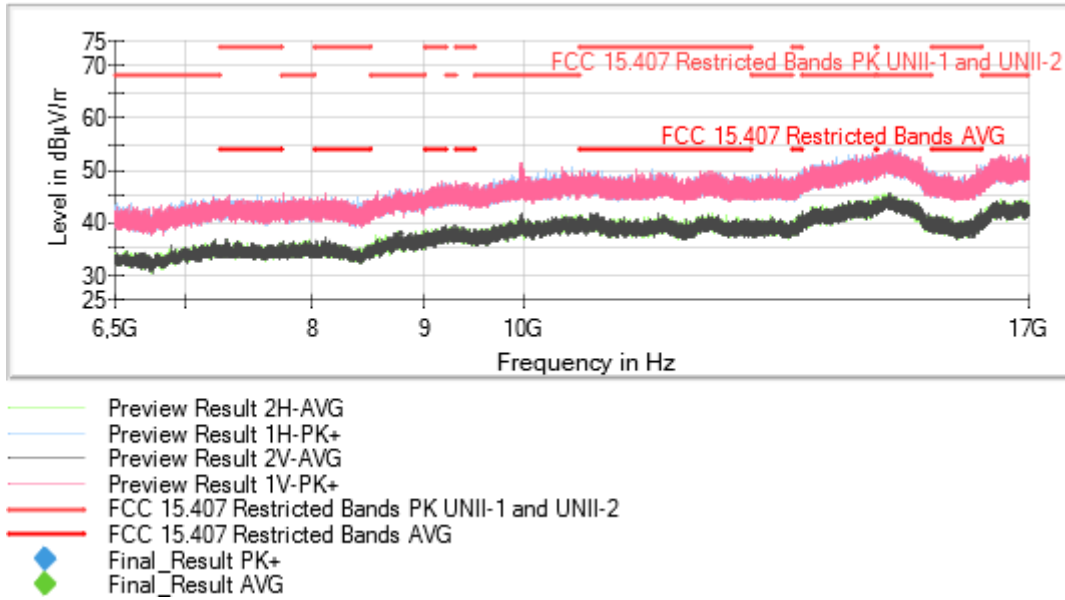
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-----------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 6,5 GHz - 17 GHz | 105 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [6.5, 17] Frequency MHz = 5200.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:



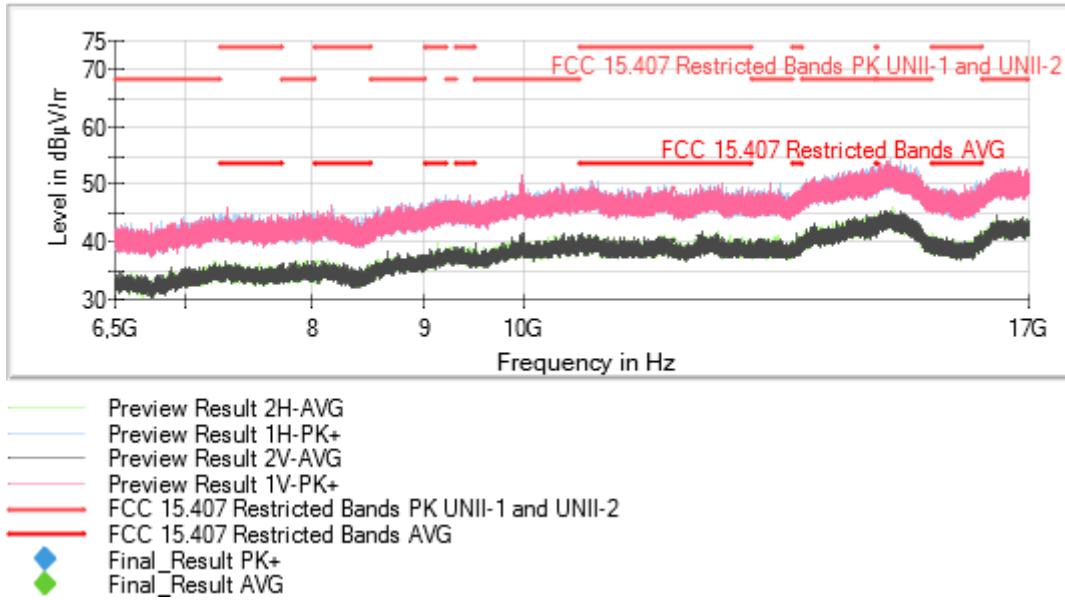
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-----------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 6,5 GHz - 17 GHz | 105 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [6.5, 17] Frequency MHz = 5240.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:



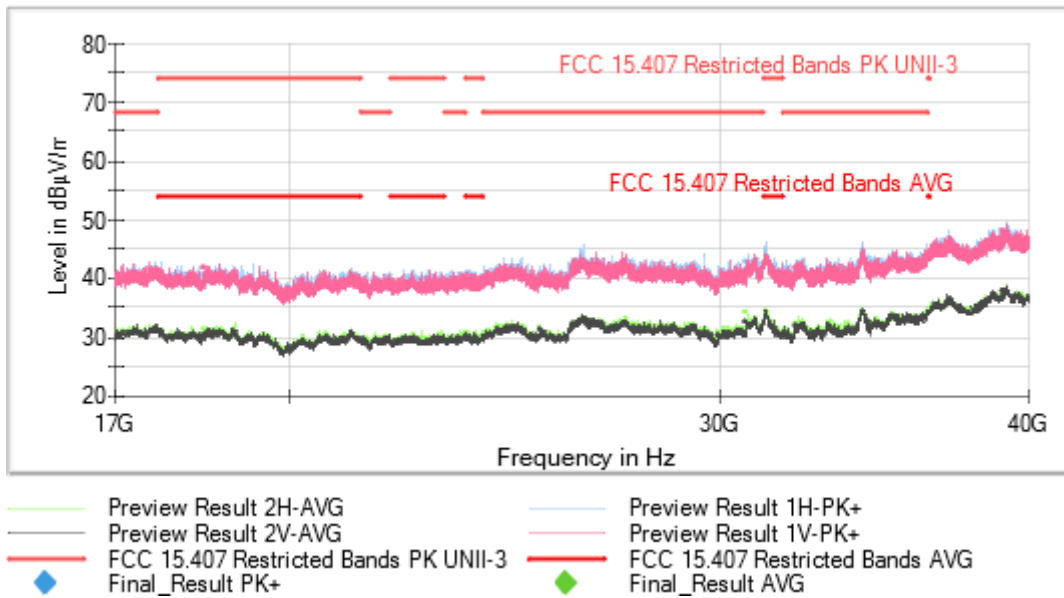
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-----------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 6,5 GHz - 17 GHz | 105 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [17, 40] Frequency MHz = 5180.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:



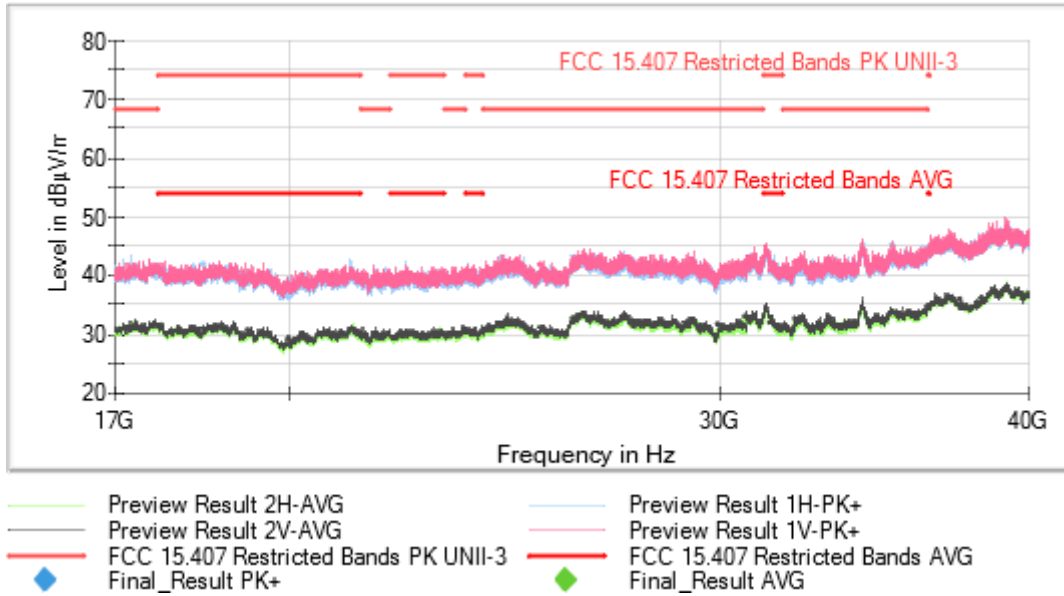
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-------------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 17 GHz - 40 GHz | 766,667 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [17, 40] Frequency MHz = 5200.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:



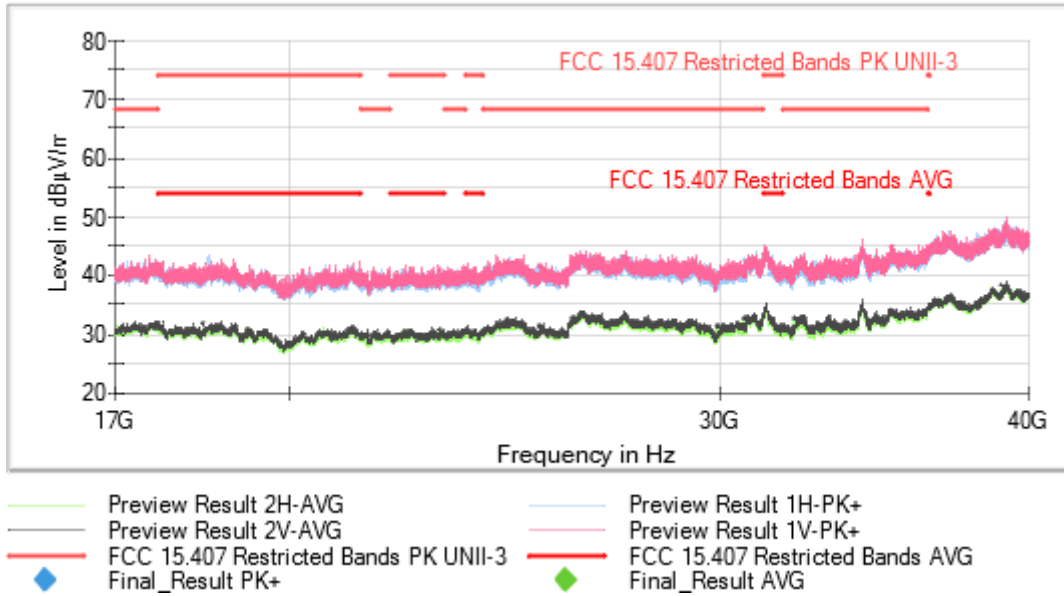
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-------------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 17 GHz - 40 GHz | 766,667 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [17, 40] Frequency MHz = 5240.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:



Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-------------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 17 GHz - 40 GHz | 766,667 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

FCC 15.407 (b)(1) / RSS-247 6.2.1.2 Transmitter Band Edge Radiated Emissions

Limits

For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p (68.23 dB μ V/m at 3 m distance).

Any unwanted emissions that fall into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth (i.e. 99% bandwidth), above 5250 MHz.

Radiated emissions which fall in the restricted bands, as defined in FCC §15.205(a), must also comply with the radiated emission limits specified in FCC §15.209(a) (see §15.205(c)):

| Frequency Range (MHz) | Magnetic field strength (μ A/m) | Field strength (μ V/m) | Field strength (dB μ V/m) | Measurement distance (m) |
|-----------------------|--------------------------------------|-----------------------------|-------------------------------|--------------------------|
| 0.009 - 0.490 | 6.37/F (F in kHz) | -- | - | 300 |
| 0.490 - 1.705 | 63.7/F (F in kHz) | -- | - | 30 |
| 1.705 - 30.000 | 0.08 | -- | - | 30 |
| 30 - 88 | -- | 100 | 40 | 3 |
| 88 - 216 | -- | 150 | 43.5 | 3 |
| 216 - 960 | -- | 200 | 46 | 3 |
| Above 960 | -- | 500 | 54 | 3 |

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table specified when measuring with peak detector function.

RSS-247:

Attenuation below the general field strength limits specified in RSS-Gen is not required.

Results

The field strength is calculated by adding a correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27dBm/MHz. There are restricted bands of operation below lower band edge at 5.15 GHz and also above the upper band edge at 5.35 GHz therefore the provisions of FCC Part 15.205 and RSS-Gen Section 8.9 apply in these restricted bands.

Field strength measurements using peak and average detectors performed in the restricted bands 4.5-5.15 GHz and 5.35-5.46 GHz.

Spurious frequencies falling inside the restricted bands with peak levels above the average limit (54 dB μ V/m at 3 m) are measured with an average detector for checking compliance with the average limit.

Frequency range 5250-5350 MHz is also measured (with peak detector) in order to ensure any unwanted emission falling inside this frequency range is attenuated below the channel power by at least 26 dB, when using a RBW between 1 and 5% of the 99% Occupied Bandwidth.

BAND EDGE EMISSIONS – Restricted Bands:

The Lower Band Edge and the Upper Band Edge were tested for all modes.

Modulation 802.11a (OFDM 6 Mbit/s)

Results

No spurious frequencies detected at less than 20 dB below the limit.

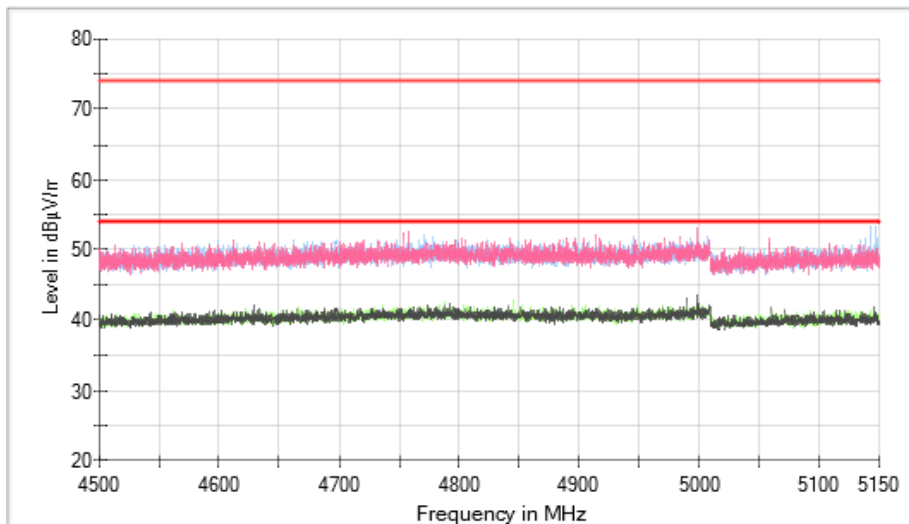
Verdict

Pass

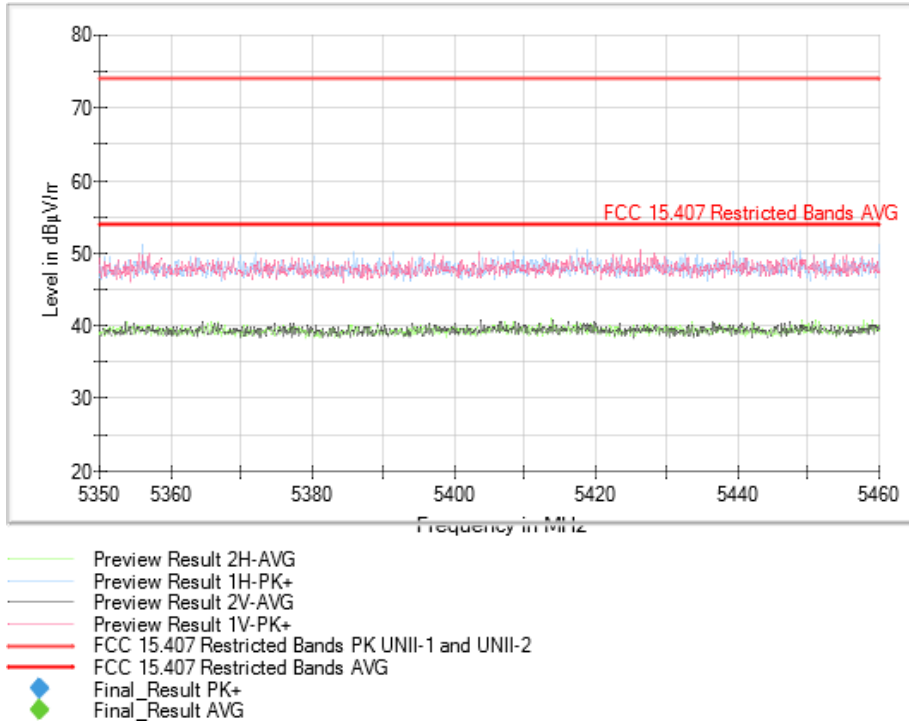
Attachments

Operation Band MHz = [5150, 5250] Active Port = 1
Frequency Range GHz = [1, 6.5] Frequency MHz = 5180.00000
Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
Measurement Point = 1

Images:

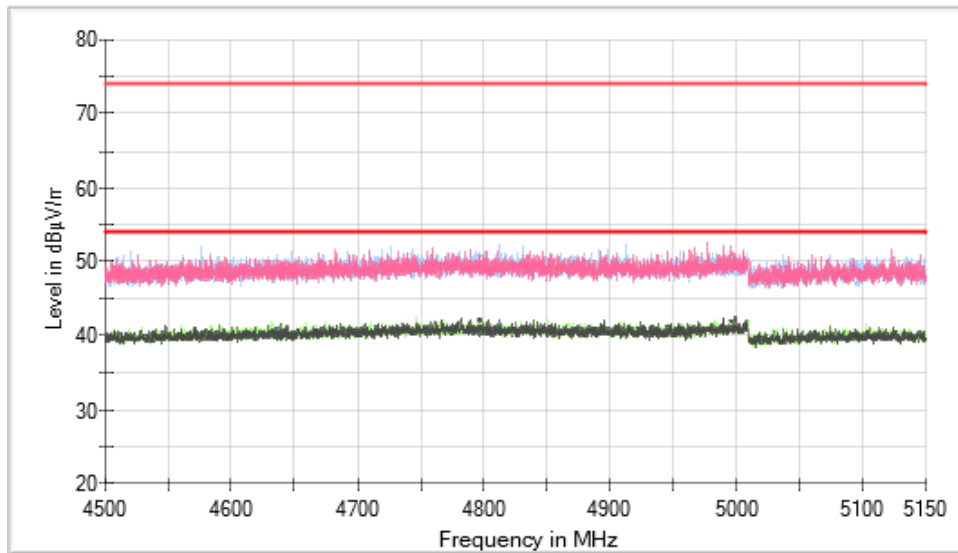


- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

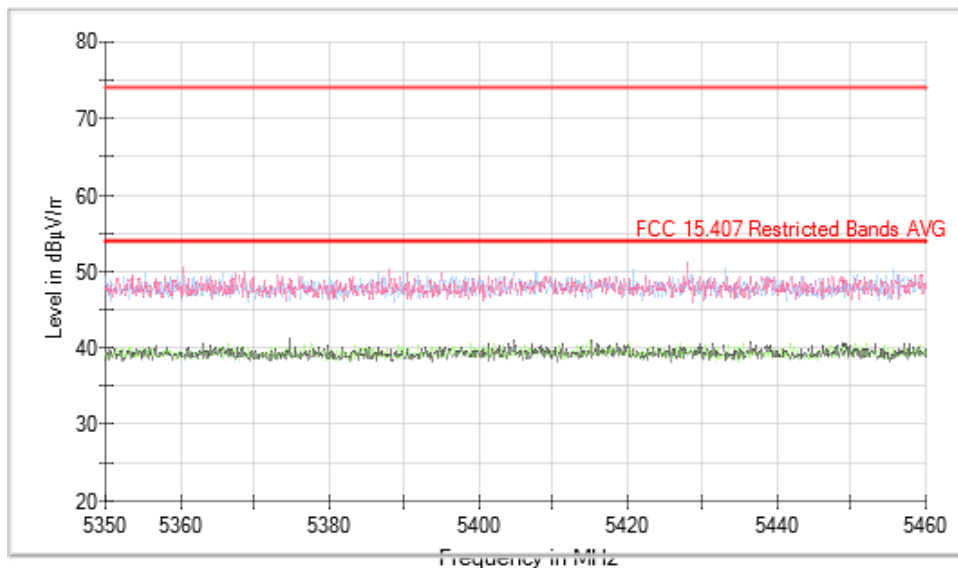


Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5240.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) Mode = SISO
 Measurement Point = 1

Images:



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

Mode: SISO

Modulation: 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Results

No spurious frequencies detected at less than 20 dB below the limit.

Verdict

Pass

Attachments

Operation Band MHz = [5150, 5250]

Active Port = 1

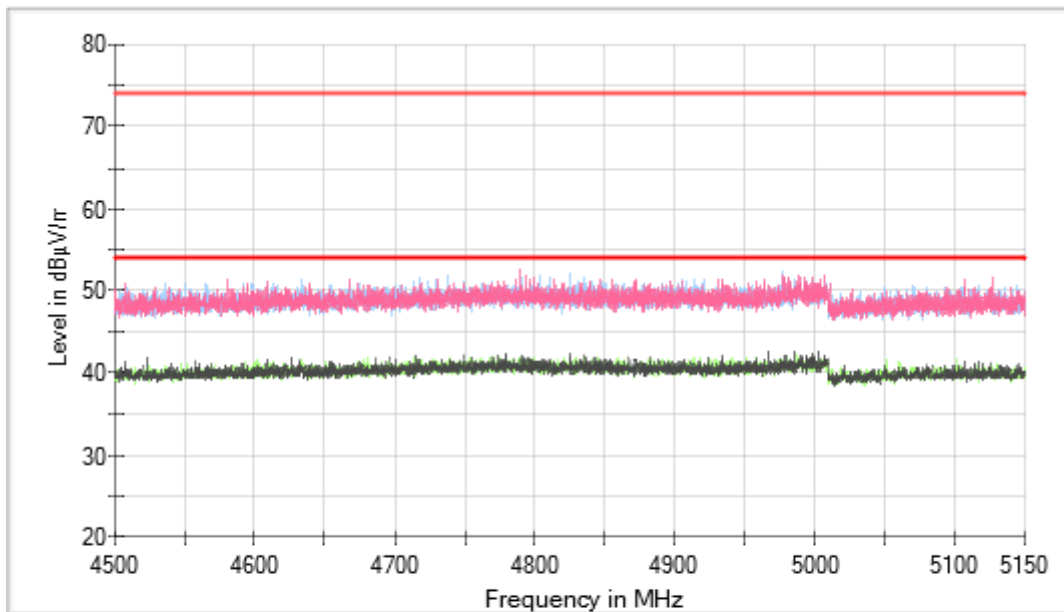
Frequency Range GHz = [1, 6.5]

Frequency MHz = 5180.00000

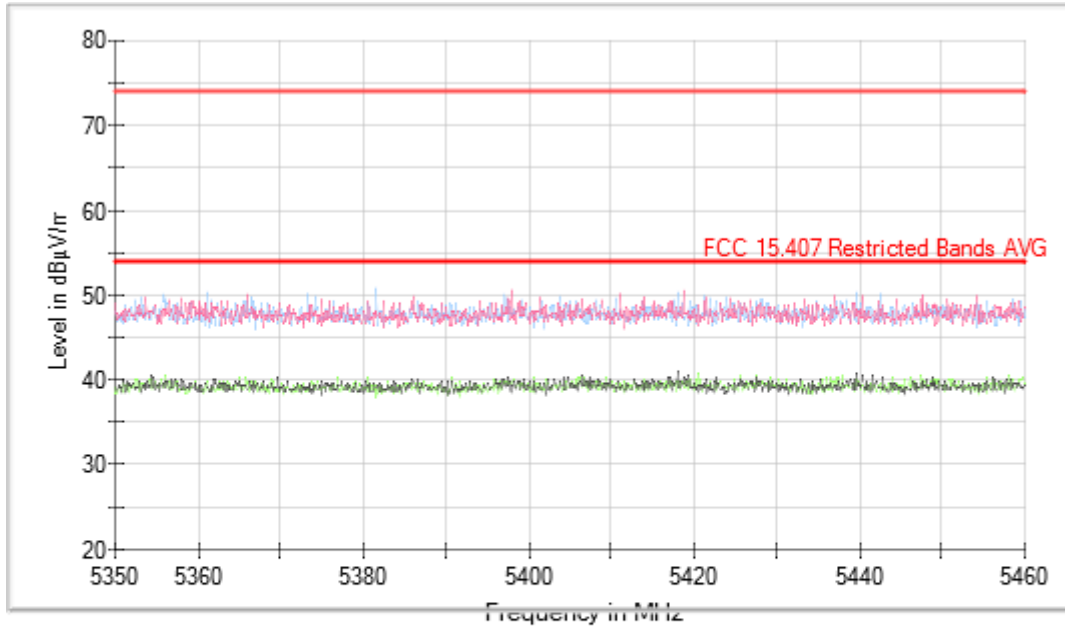
Modulation = 802.11n HT20 (OFDM MCS0 6.5 Mbit/s) Mode = SISO

Measurement Point = 1

Images:



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Operation Band MHz = [5150, 5250]

Active Port = 1

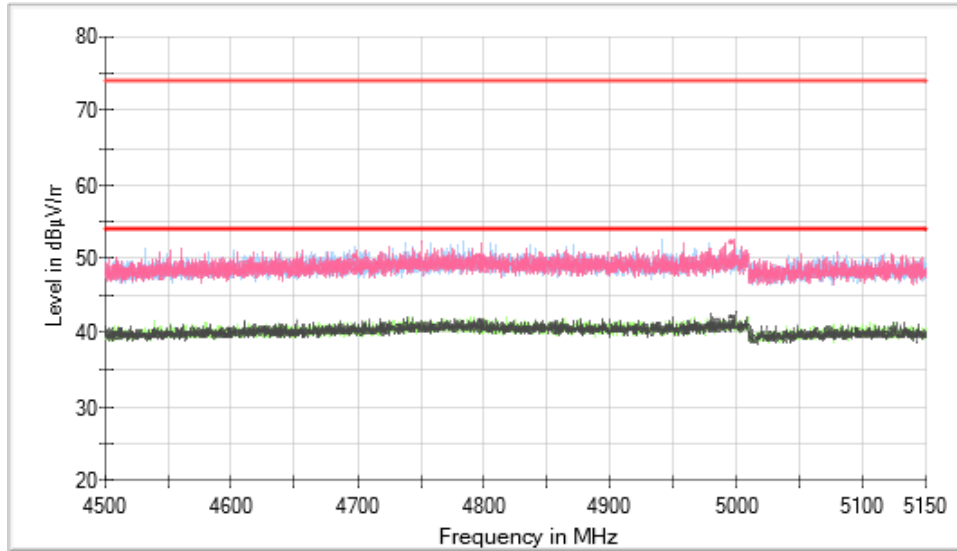
Frequency Range GHz = [1, 6.5]

Frequency MHz = 5240.00000

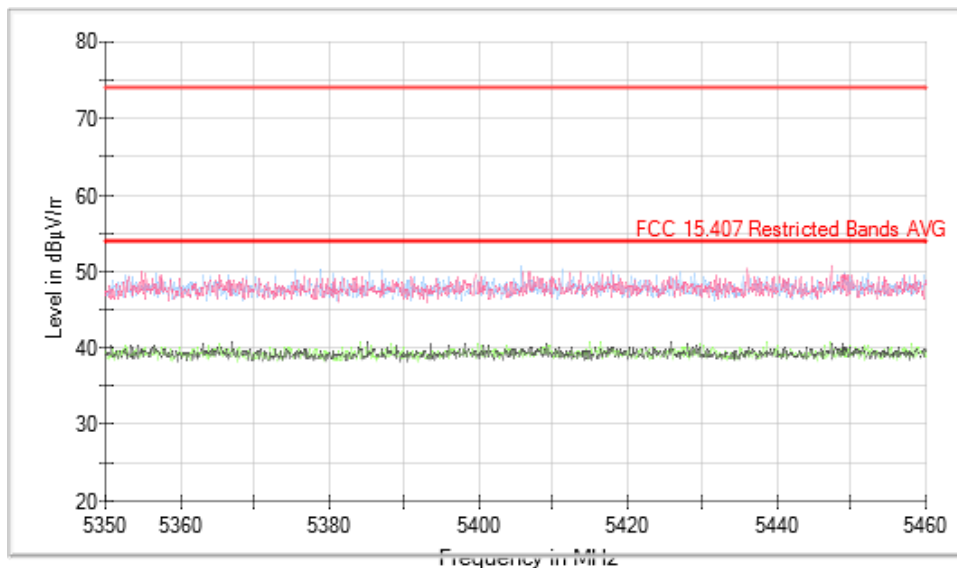
Modulation = 802.11n HT20 (OFDM MCS0 6.5 Mbit/s) Mode = SISO

Measurement Point = 1

Images:



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

Modulation 802.11ac VHT20 (OFDM MCS0)

Results

No spurious frequencies detected at less than 20 dB below the limit.

Verdict

Pass

Operation Band MHz = [5150, 5250]

Active Port = 1

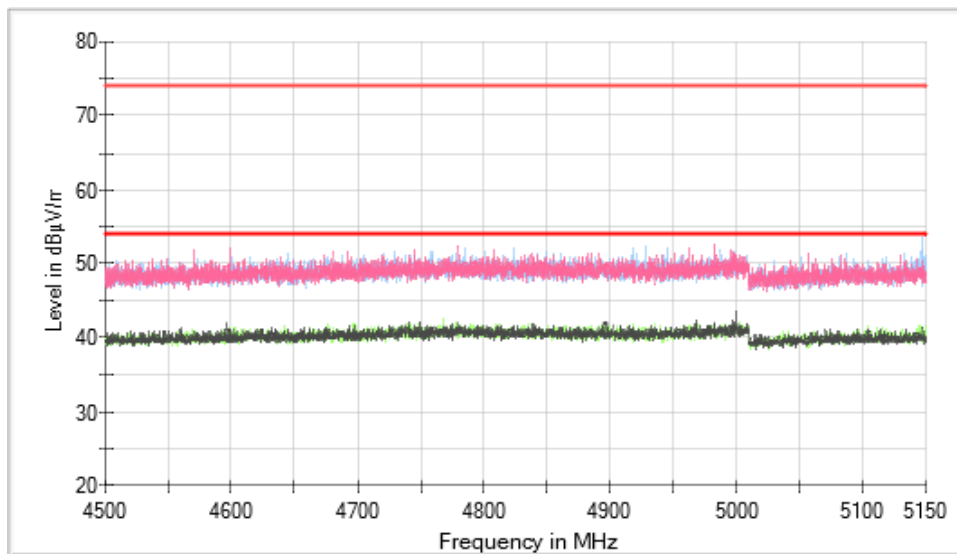
Frequency Range GHz = [1, 6.5]

Frequency MHz = 5180.00000

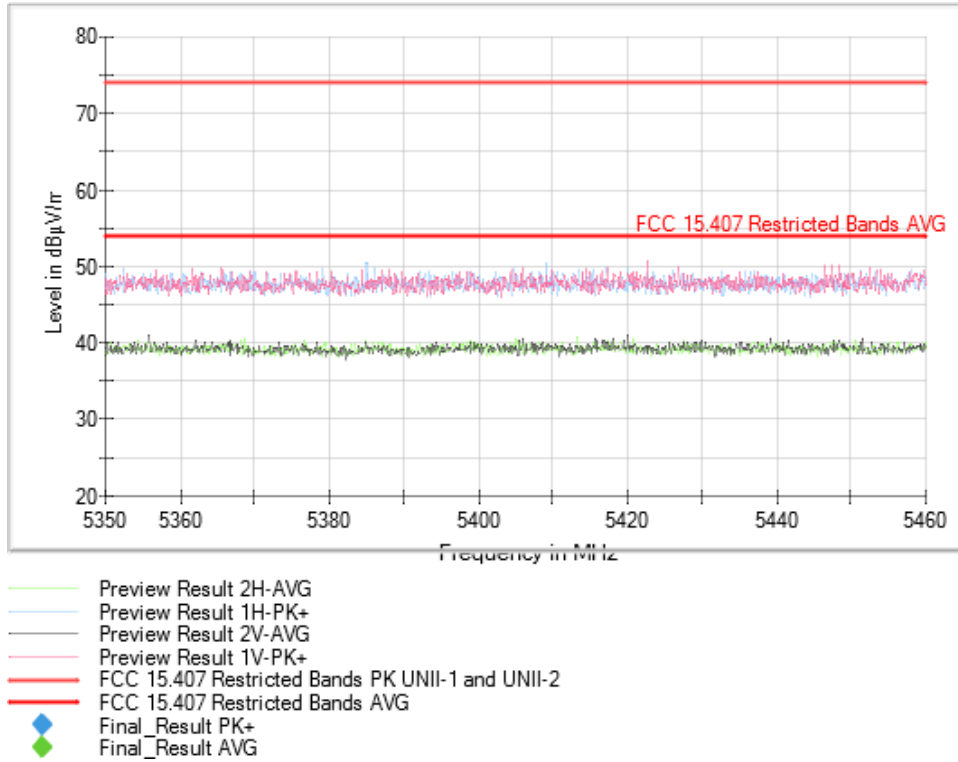
Modulation = 802.11ac VHT20 (OFDM MCS0) Mode = SISO

Measurement Point = 1

Images:

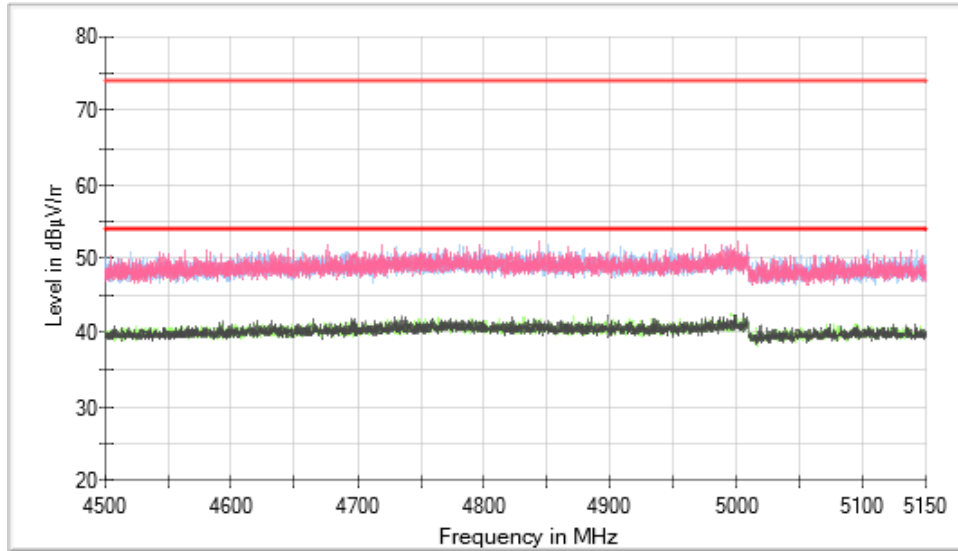


- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

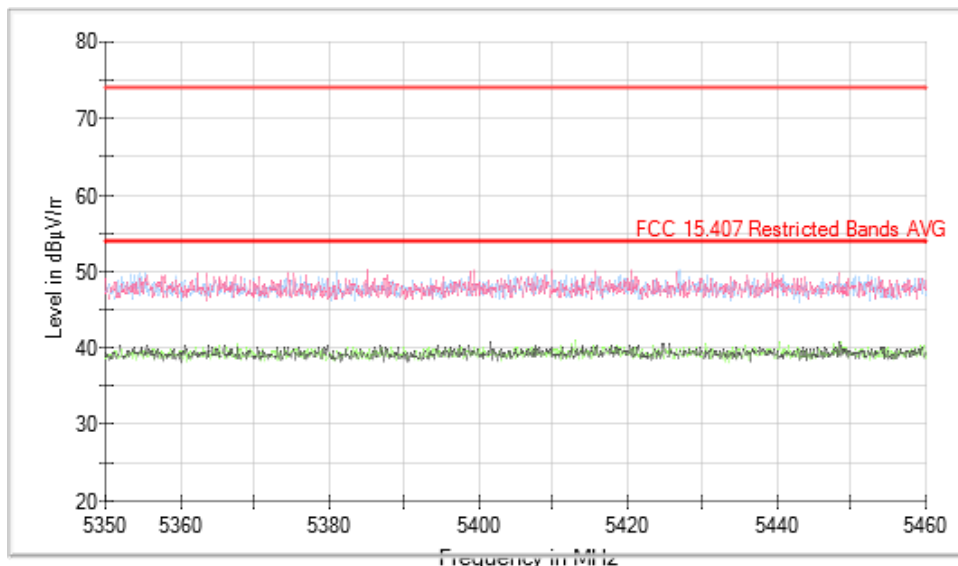


Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5240.00000
 Modulation = 802.11ac VHT20 (OFDM MCS0) Mode = SISO
 Measurement Point = 1

Images:



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

Mode: SISO

Modulation: 802.11ac VHT40 (OFDM MCS0)

Results

| Operation Band (MHz) | Port | Freq Rng (GHz) | Freq (MHz) | Unwanted Freq (MHz) | Unwanted Lvl (dBµV/m) | PoI | Detector |
|----------------------|------|----------------|------------|---------------------|-----------------------|-----|----------|
| [5150, 5250] | 1 | [1, 6.5] | 5190.00000 | 5149.000 | 42.20 | H | AVG |
| | | | | 5149.000 | 41.81 | H | AVG |

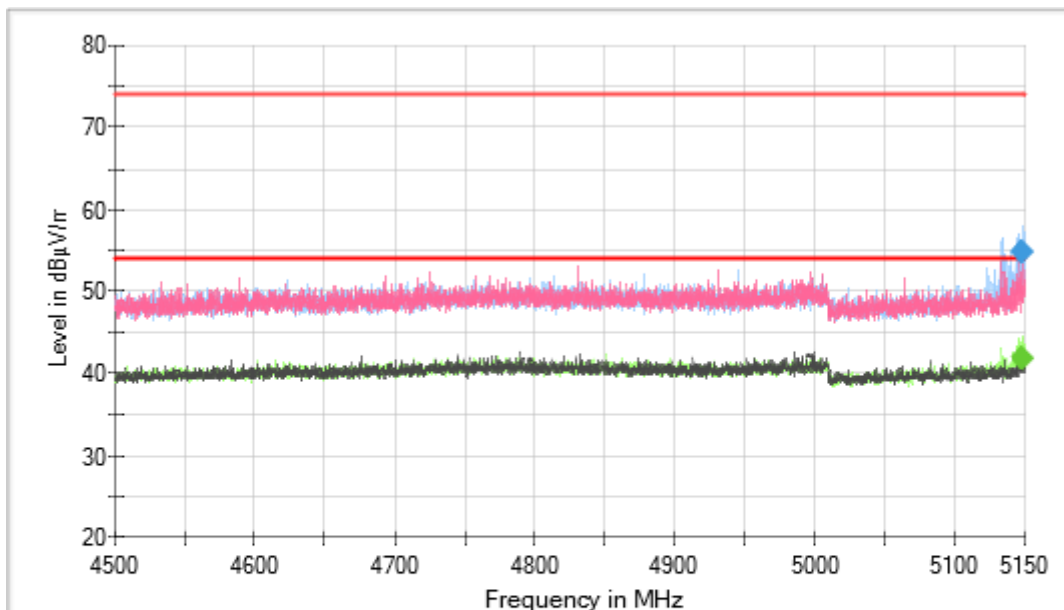
Verdict

Pass

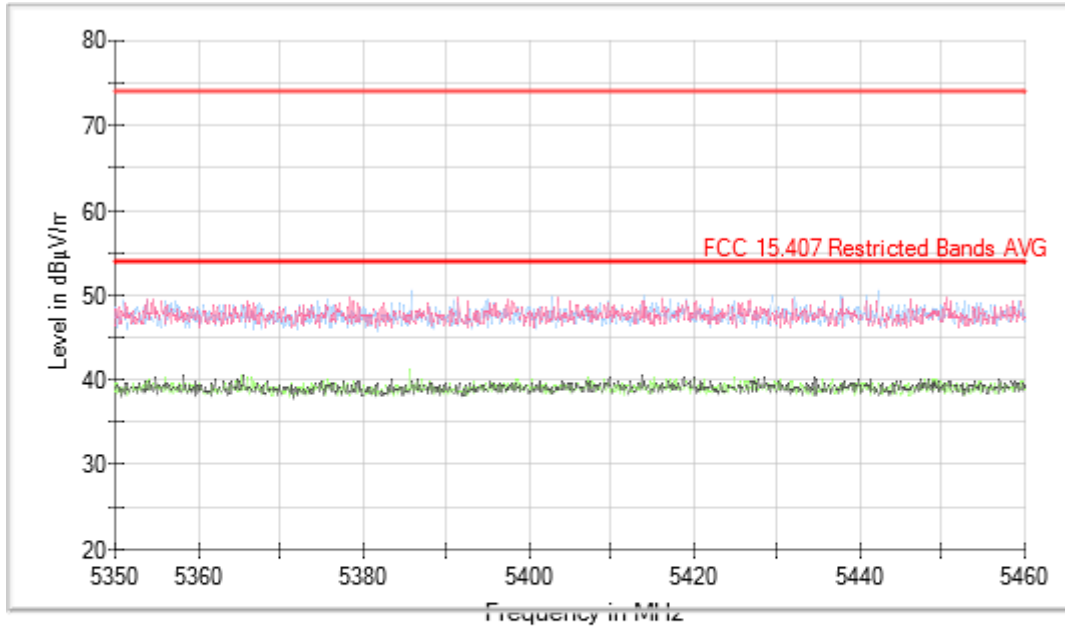
Attachments

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5190.00000
 Modulation = 802.11ac VHT40 (OFDM MCS0) Mode = SISO
 Measurement Point = 1

Images:



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Mode: SISO

Modulation: 802.11n HT40 (OFDM MCS0 13.5 Mbit/s)

Results

| Operation Band (MHz) | Port | Freq Rng (GHz) | Freq (MHz) | Unwanted Freq (MHz) | Unwanted Lvl (dBµV/m) | PoI | Detector |
|----------------------|------|----------------|------------|---------------------|-----------------------|-----|----------|
| [5150, 5250] | 1 | [1, 6.5] | 5190.00000 | 5147.800 | 42.52 | H | AVG |
| | | | | 5147.800 | 42.66 | H | AVG |

Verdict

Pass

Attachments

Operation Band MHz = [5150, 5250]

Active Port = 1

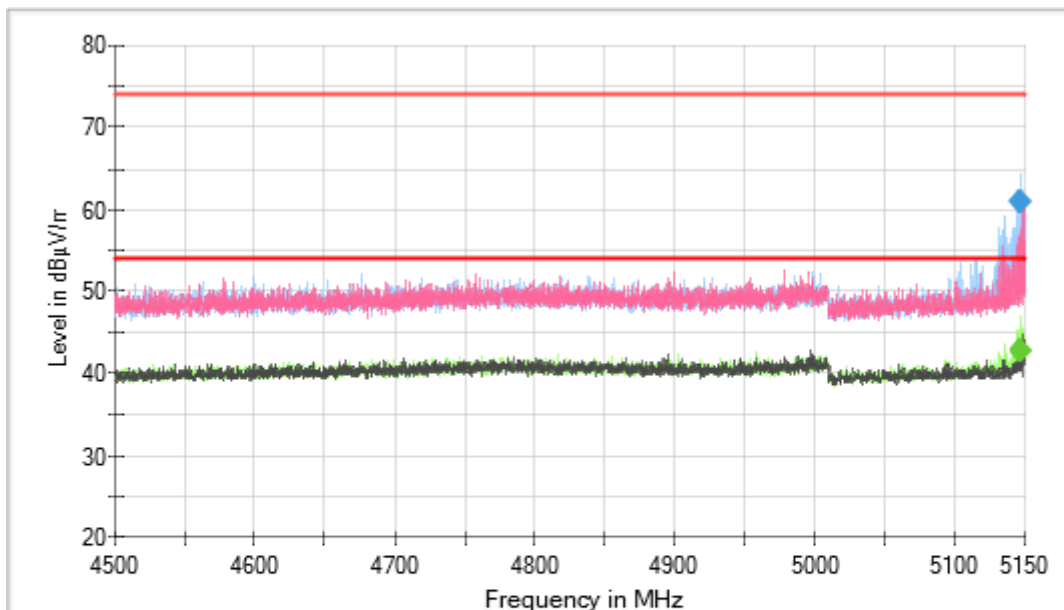
Frequency Range GHz = [1, 6.5]

Frequency MHz = 5190.00000

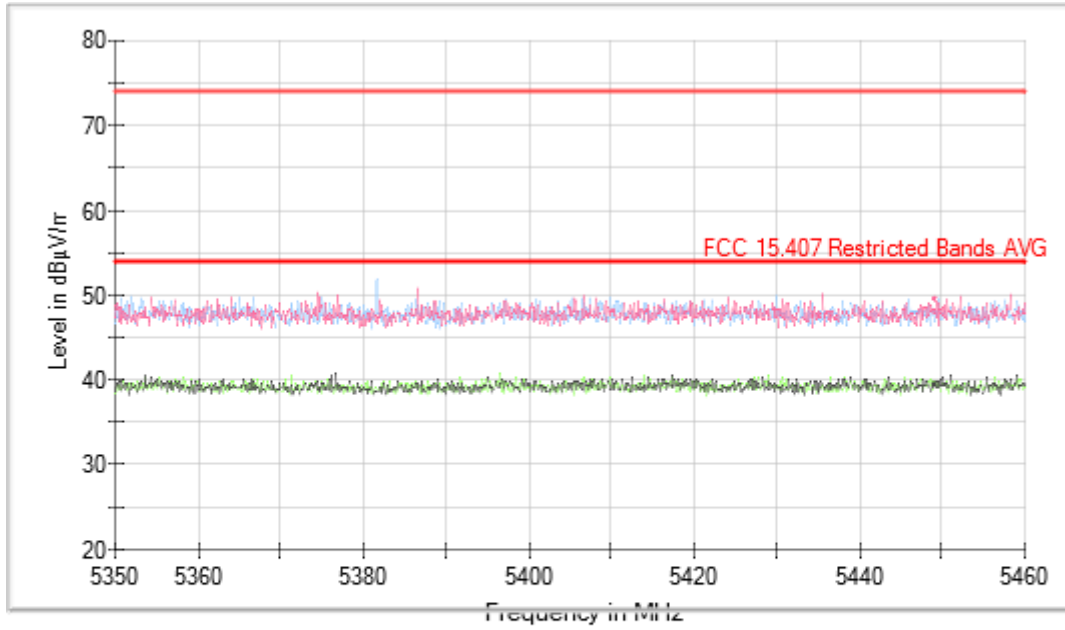
Modulation = 802.11n HT40 (OFDM MCS0 13.5 Mbit/s) Mode = SISO

Measurement Point = 1

Images:



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- Final_Result PK+
- Final_Result AVG

Operation Band MHz = [5150, 5250]

Active Port = 1

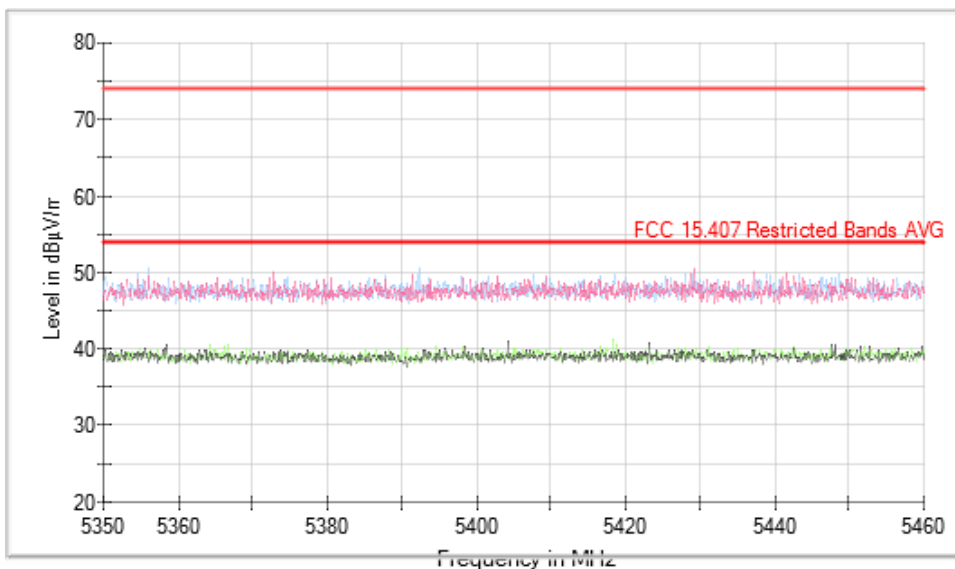
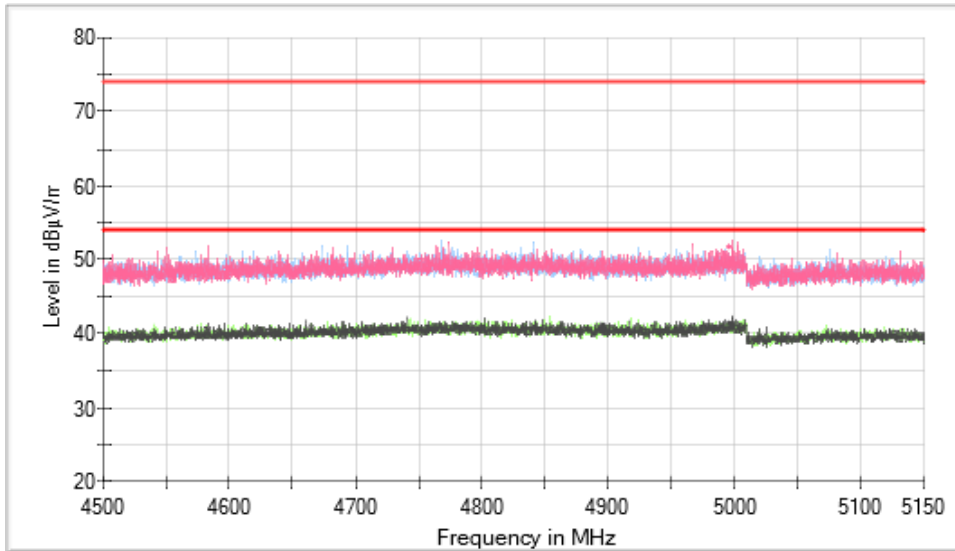
Frequency Range GHz = [1, 6.5]

Frequency MHz = 5230.00000

Modulation = 802.11n HT40 (OFDM MCS0 13.5 Mbit/s) Mode = SISO

Measurement Point = 1

Images:



Mode: SISO

Modulation: 802.11ac VHT80 (OFDM MCS0x1)

Results

| Operation Band (MHz) | Port | Freq Rng (GHz) | Freq (MHz) | Unwanted Freq (MHz) | Unwanted Lvl (dBµV/m) | Pol | Detector |
|----------------------|------|----------------|------------|---------------------|-----------------------|-----|----------|
| [5150, 5250] | 1 | [1, 6.5] | 5210.00000 | 5147.600 | 58.45 | V | PK |
| | | | | 5147.600 | 46.82 | V | AVG |

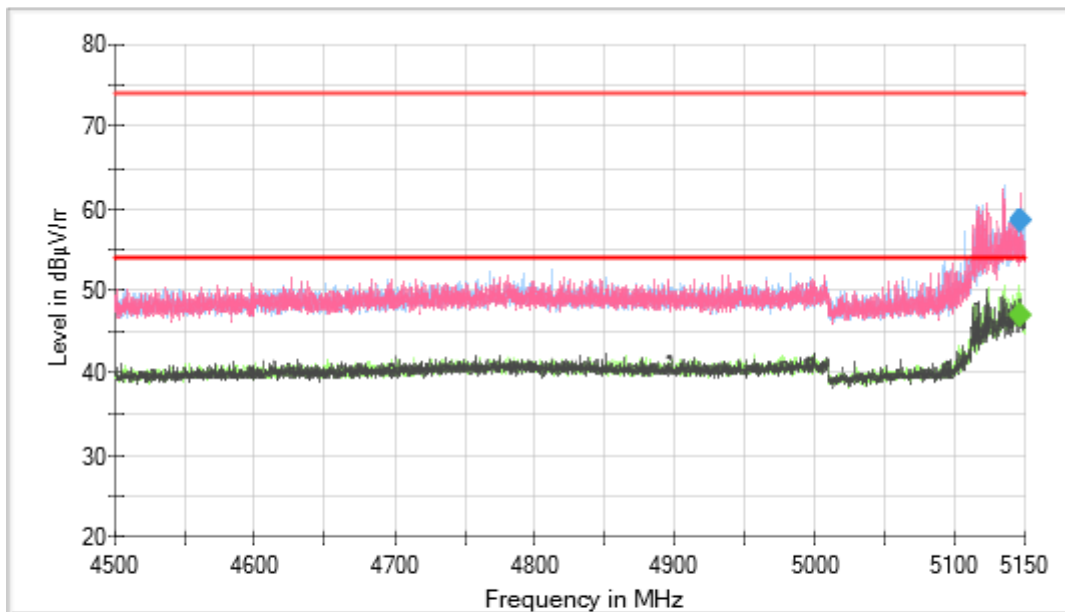
Verdict

Pass

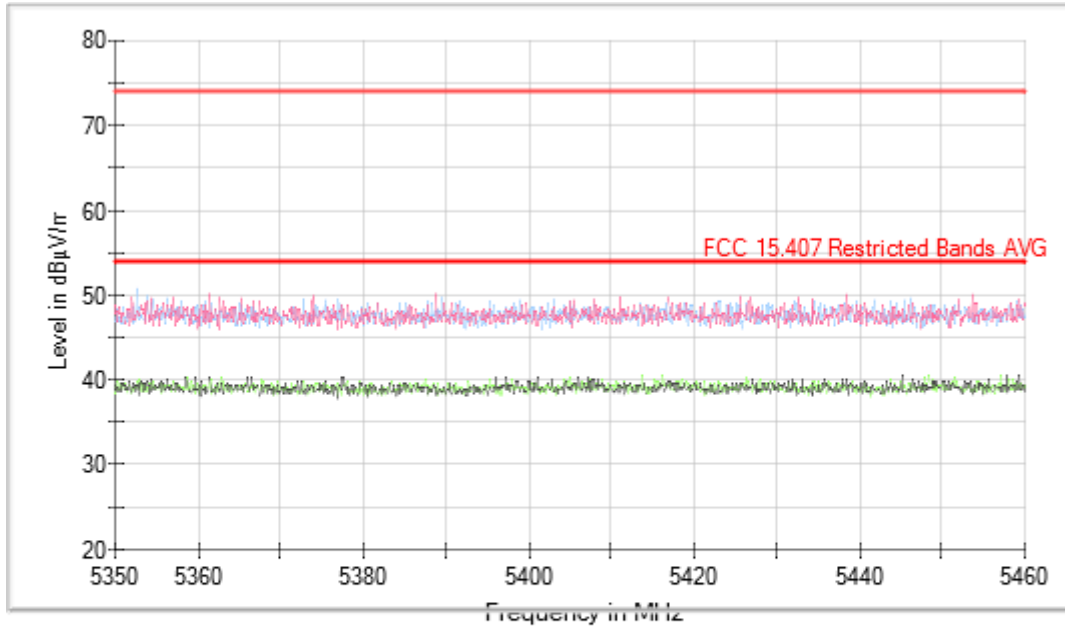
Attachments

Operation Band MHz = [5150, 5250] Active Port = 1
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5210.00000
 Modulation = 802.11ac VHT80 (OFDM MCS0x1) Mode = SISO
 Measurement Point = 1

Images:



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- ◆ Final_Result PK+
- ◆ Final_Result AVG



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- FCC 15.407 Restricted Bands AVG
- ◆ Final_Result PK+
- ◆ Final_Result AVG

Appendix B: Test results for the U-NII-3 Band 5.725 - 5.85 GHz

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| FCC 47 CFR PART 15.407 / RSS-247 / RSS-248 | 58 |
| <i>RSS-247 6.2.4.2 / FCC 15.407 (b) (4) (6) [Rse] Transmitter Out of Band Radiated Emissions For transmitters operating solely in the 5.725-5.850 GHz band</i> | 58 |

TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 13.2 V
 Type of Power Supply: External DC (Car battery / Alternator)

ANTENNA (*):

Type of Antenna: External.
 Maximum Declared Antenna Gain: +2.5 dBi

TEST FREQUENCIES (*):

| | | |
|---------------------------|---|-------------------------|
| Technology Tested: | WLAN (IEEE 802.11 a/n/ac): U-NII-3 band | |
| Modes: | 802.11a: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps | |
| | 802.11n HT20: MCS0 to MCS7 | |
| | 802.11n HT40: MCS0 to MCS7 | |
| | 802.11ac VHT20: MCS0 to MCS8 | |
| | 802.11ac VHT40: MCS0 to MCS9 | |
| | 802.11ac VHT80: MCS0 to MCS9 | |
| Setting of cores / ports: | One port. | |
| Beamforming: | No | |
| Frequency Range: | 5725 MHz to 5850 MHz | |
| Channel Spacing: | 20 MHz | |
| Transmit Channels | Channel | Channel Frequency (MHz) |
| | Low: 149 | 5745 |
| | Middle: 157 | 5785 |
| | High: 165 | 5825 |
| Channel Spacing: | 40 MHz | |
| Transmit Channels | Channel | Channel Frequency (MHz) |
| | Low: 151 | 5755 |
| | High: 159 | 5795 |
| Channel Spacing: | 80 MHz | |
| Transmit Channels | Middle: 155 | 5775 |

The test set-up was made in accordance to the general provisions of FCC Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.

The EUT was tested in the following operating mode:

- Continuously transmitting with a modulated carrier at maximum power in all required channels using the supported data rates/modulations types.

The field strength at the band edges was evaluated for each mode on the lowest and highest channels at the rated power for the channel under test.

For all modes, the EUT was configured in test mode using a software application. The application was used to enable a continuous transmission and to select the test channels as required. The client supplied instructions to configure the EUT. The customer supplied a document containing the setup instructions.

The worst cases for testing were identified for output power and spurious levels at the band edges which were selected based on preliminary testing that correspond to next data rates:

- 802.11 a20: 6 Mbps
- 802.11 n HT20: MCS0
- 802.11 n HT40: MCS0
- 802.11 ac VHT20: MCS0
- 802.11 ac VHT40: MCS0
- 802.11 ac VHT80: MCS0

RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1.5 m for the frequency range 17 GHz-26 GHz (17 GHz-40 GHz horn antenna).

For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

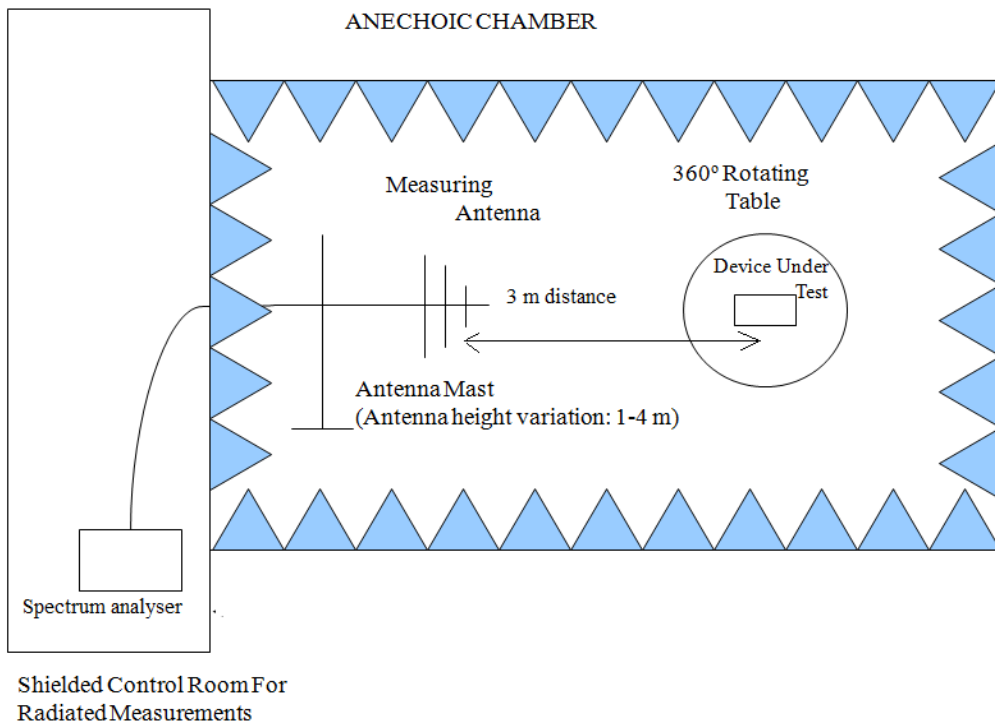
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

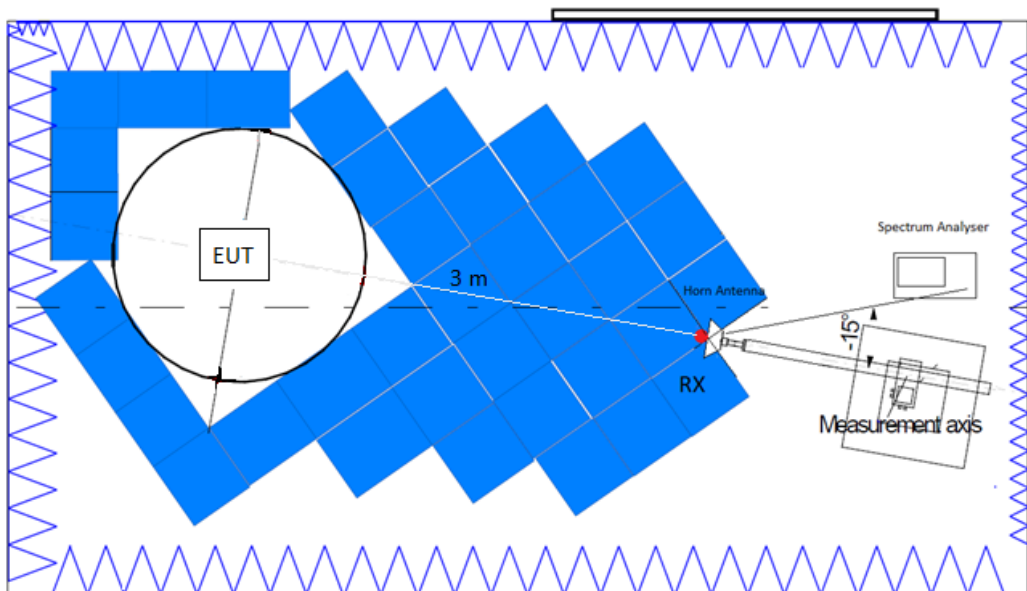
The final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor and cable loss.

A resolution bandwidth/video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

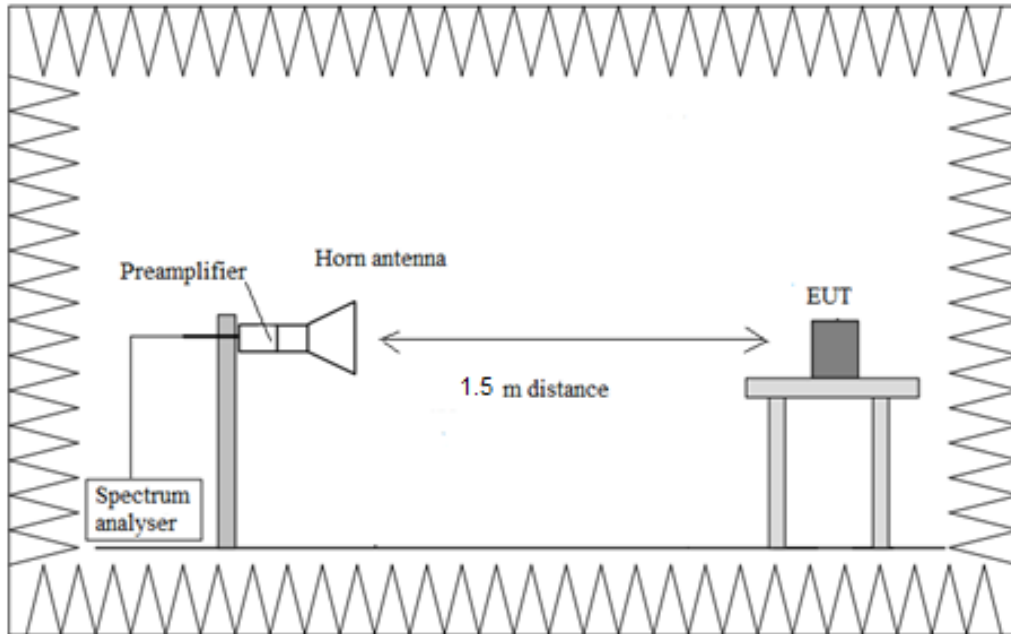
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup $f > 17$ GHz:



TEST CASES DETAILS

FCC 47 CFR Part 15.407 / RSS-247 / RSS-248

RSS-247 6.2.4.2 / FCC 15.407 (b) (4) (6) [Rse] Transmitter Out of Band Radiated Emissions For transmitters operating solely in the 5.725-5.850 GHz band

Limits

For transmitters operating in the 5.725–5.85 GHz band:

All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):

| Frequency Range (MHz) | Field strength (μ V/m) | Field strength (dB μ V/m) | Measurement distance (m) |
|-----------------------|-----------------------------|-------------------------------|--------------------------|
| 0.009-0.490 | 2400/F(kHz) | - | 300 |
| 0.490-1.705 | 24000/F(kHz) | - | 300 |
| 1.705 - 30.0 | 30 | - | 30 |
| 30 - 88 | 100 | 40 | 3 |
| 88 - 216 | 150 | 43.5 | 3 |
| 216 - 960 | 200 | 46 | 3 |
| 960 - 40000 | 500 | 54 | 3 |

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

Worst case: 802.11 a20 (6 Mbps)

Result

The results in this section show the maximum measured levels in the 1-40 GHz range except the 5.65-5.725 GHz and 5.85-5.925GHz adjacent bands. The results in these adjacent bands are reported in the next section.

Spurious frequencies with peak levels above the average limit (54 dB μ V/m at 3 m) are measured with an average detector for checking compliance with the average limit.

No spurious frequencies detected at less than 20 dB below the limit:

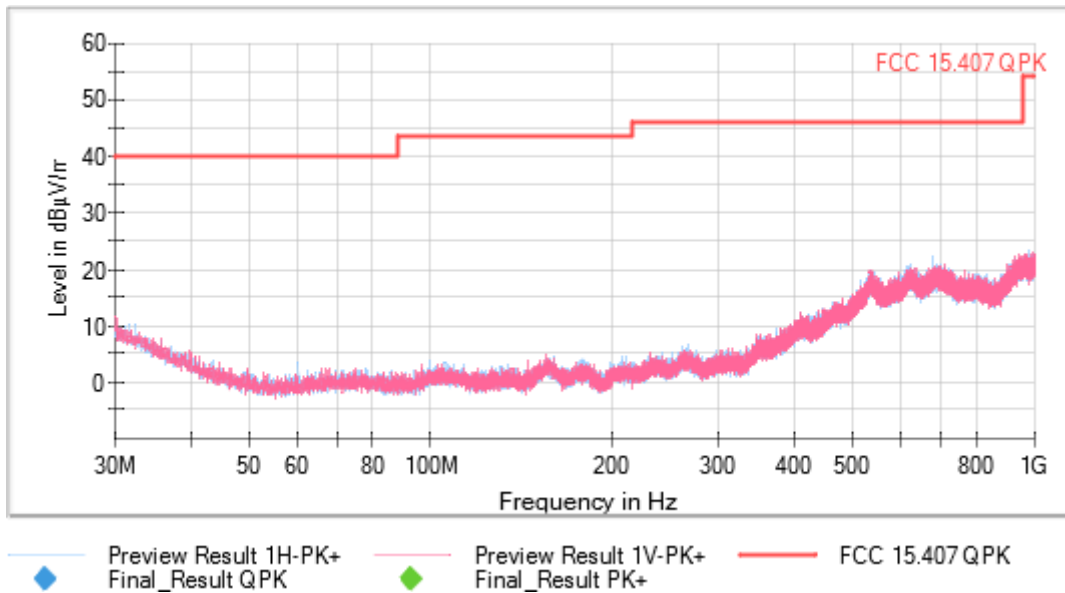
Verdict

Pass

Attachments

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [0.03, 1] Frequency MHz = 5745.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



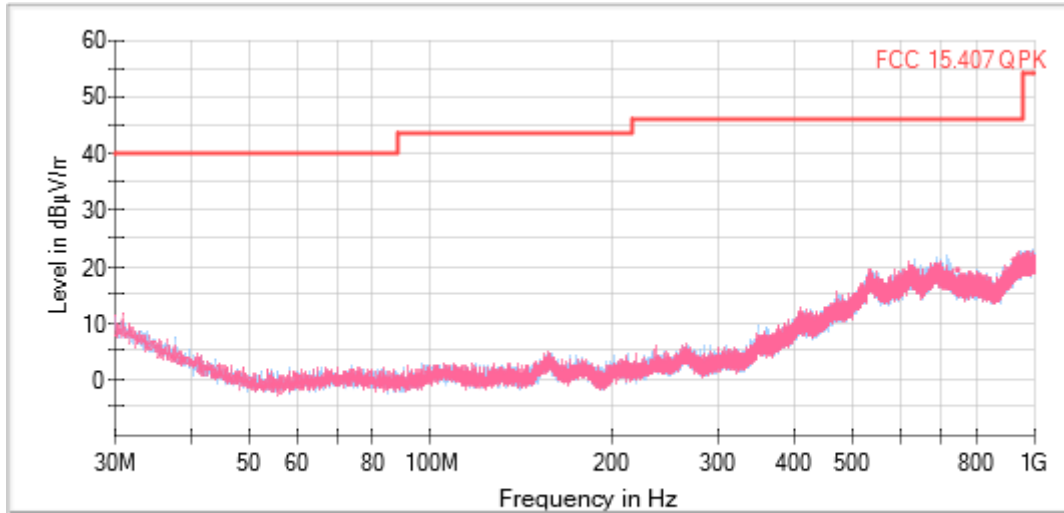
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|-------------------|------------|-----------|-----------|------------|--------|
| | Receiver: [ESR 7] | | | | | |
| | 30 MHz - 1 GHz | 30,312 kHz | PK+ | 100 kHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [0.03, 1] Frequency MHz = 5785.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



◆ Preview Result 1H-PK+ Final_Result QPK
 ◆ Preview Result 1V-PK+ Final_Result PK+
 — FCC 15.407 QPK

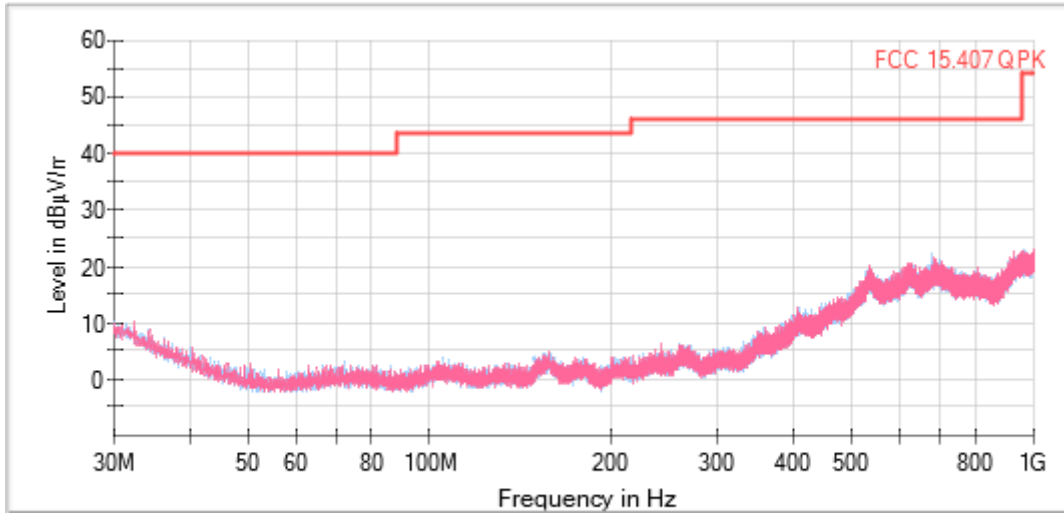
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|-------------------|------------|-----------|-----------|------------|--------|
| | Receiver: [ESR 7] | | | | | |
| | 30 MHz - 1 GHz | 30,312 kHz | PK+ | 100 kHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [0.03, 1] Frequency MHz = 5825.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



◆ Preview Result 1H-PK+ Final_Result QPK
 ◆ Preview Result 1V-PK+ Final_Result PK+
 — FCC 15.407 QPK

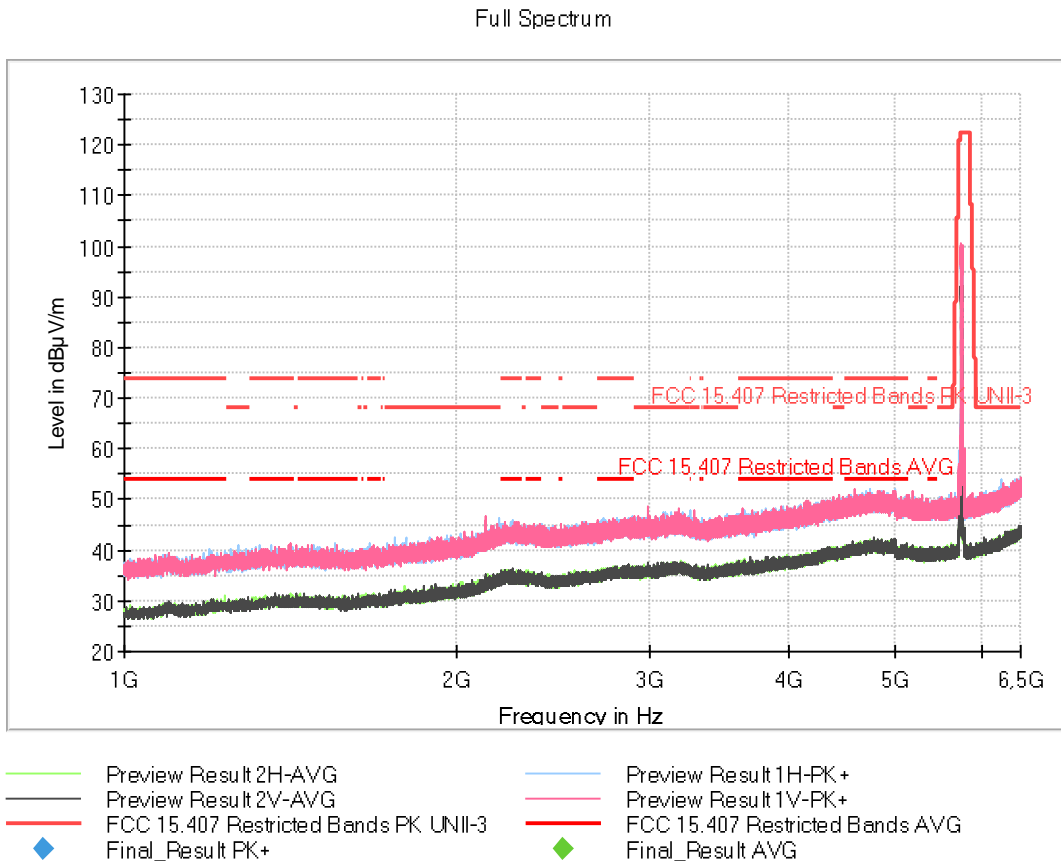
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|-------------------|------------|-----------|-----------|------------|--------|
| | Receiver: [ESR 7] | | | | | |
| | 30 MHz - 1 GHz | 30,312 kHz | PK+ | 100 kHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5745.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



The highest peak on the plot is the carrier frequency.

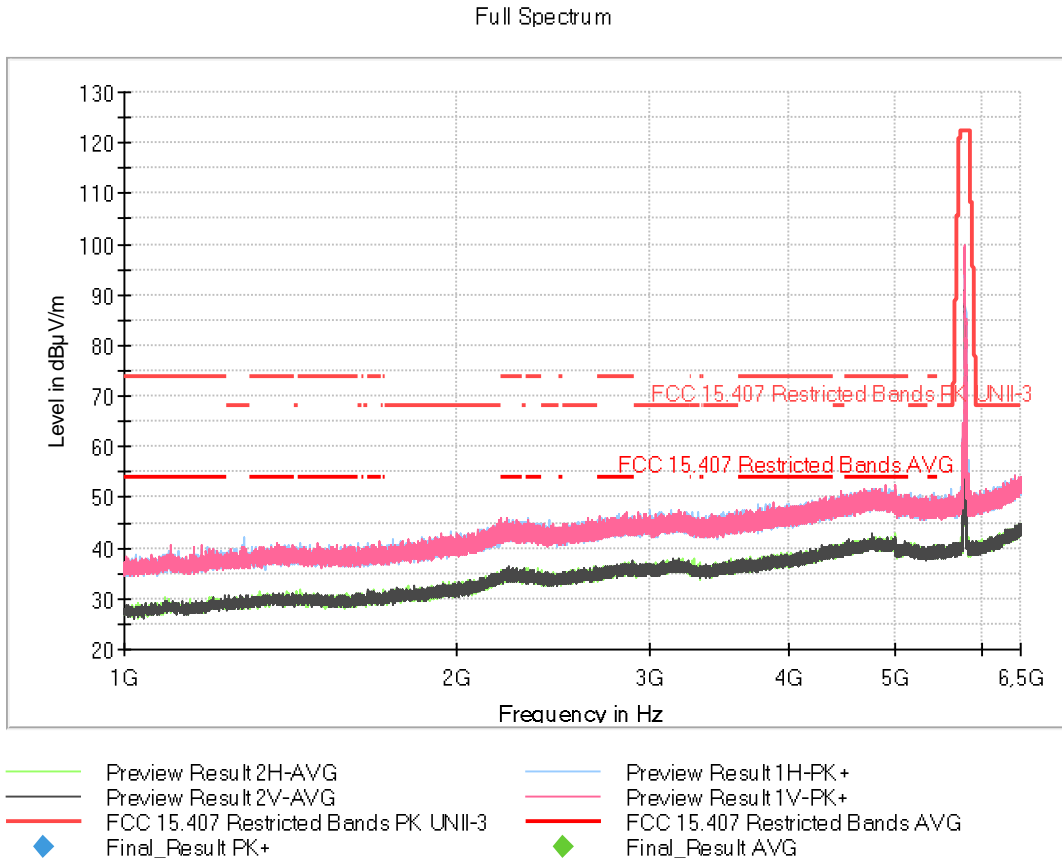
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-----------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 1 GHz – 6,5 GHz | 100 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5785.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



The highest peak on the plot is the carrier frequency.

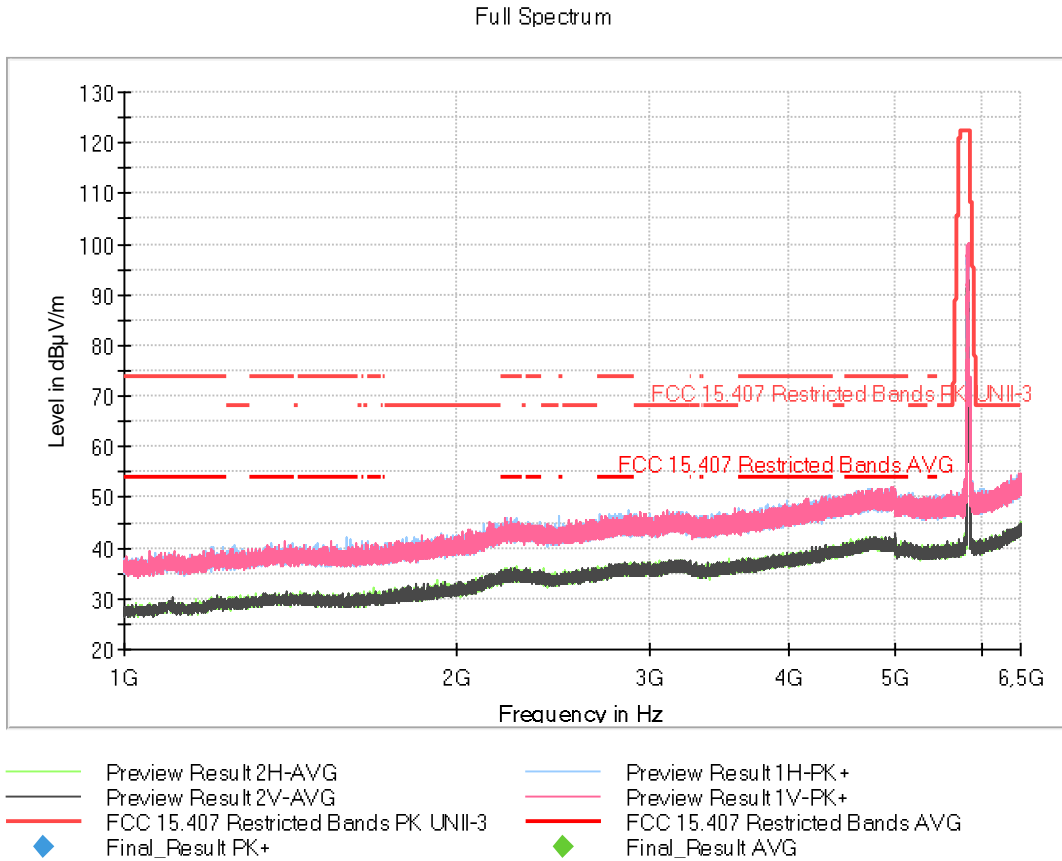
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-----------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 1 GHz – 6,5 GHz | 100 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5825.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



The highest peak on the plot is the carrier frequency.

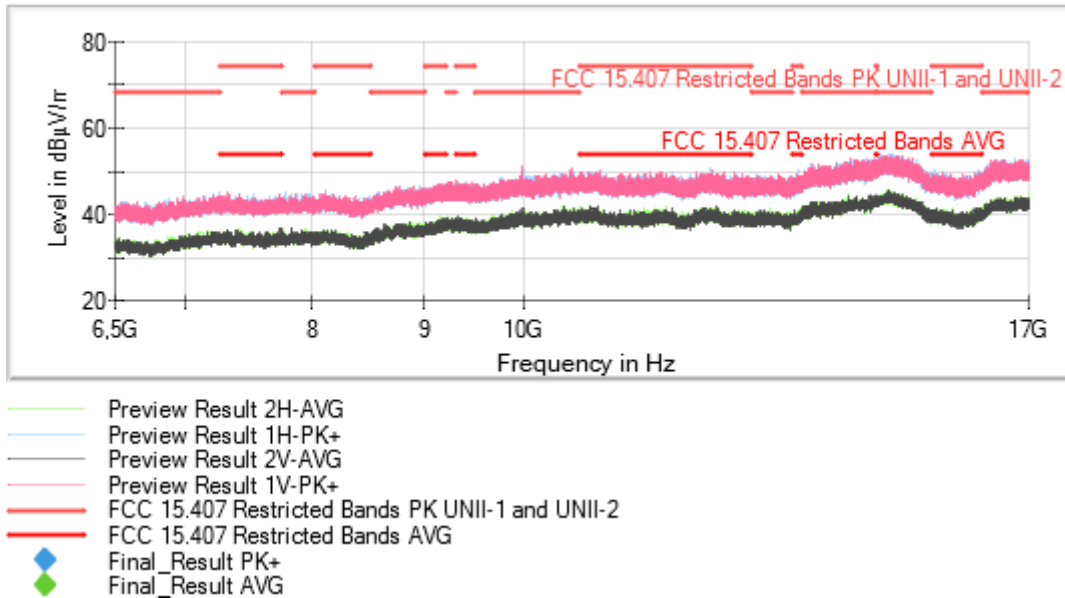
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-----------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 1 GHz – 6,5 GHz | 100 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [6.5, 17] Frequency MHz = 5745.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



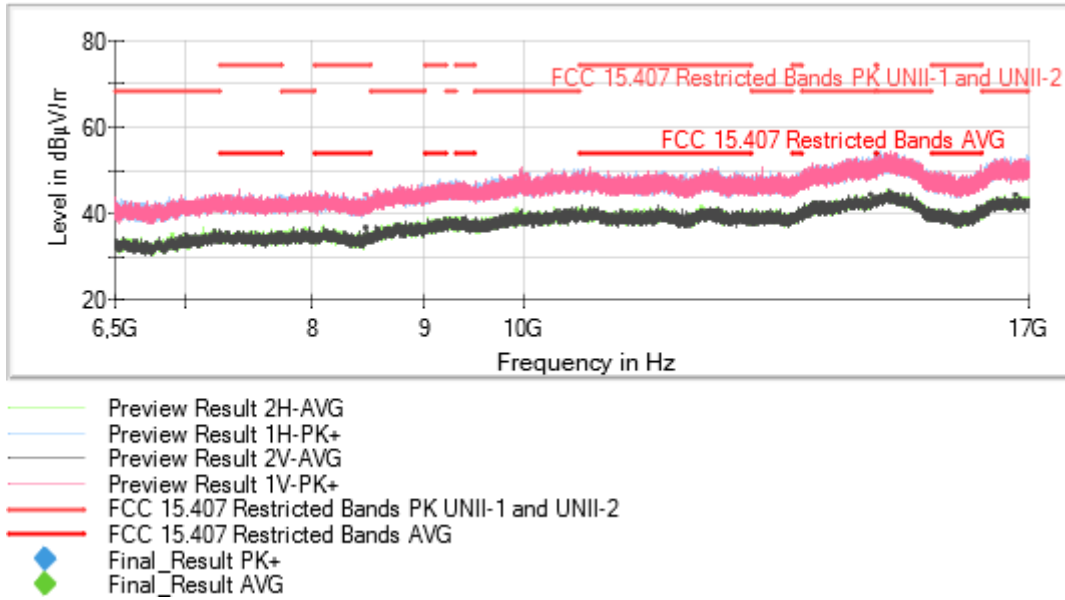
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-----------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 6,5 GHz - 17 GHz | 105 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [6.5, 17] Frequency MHz = 5785.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



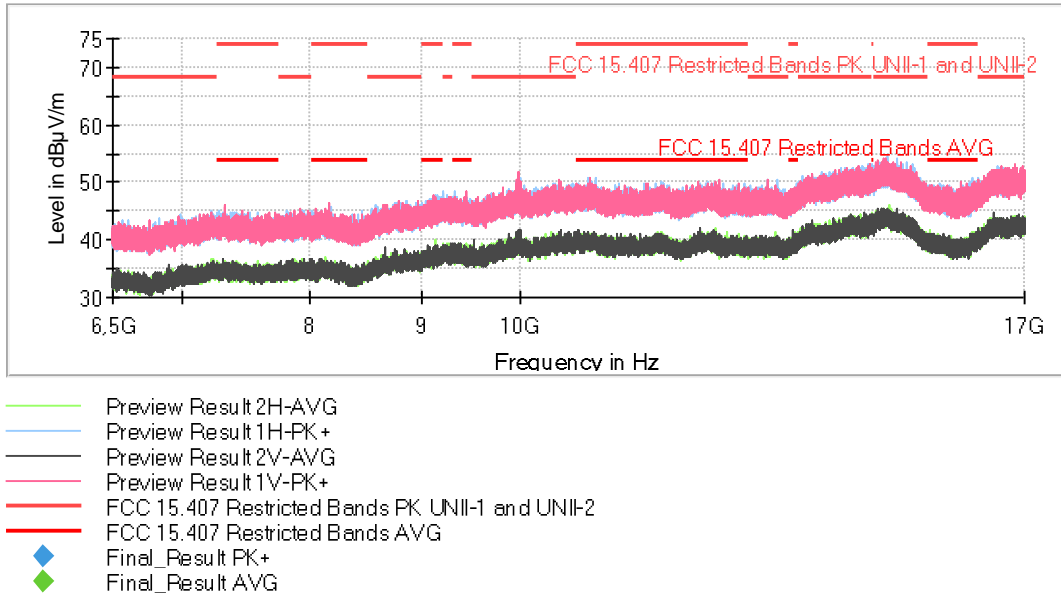
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-----------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 6,5 GHz - 17 GHz | 105 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [6.5, 17] Frequency MHz = 5825.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



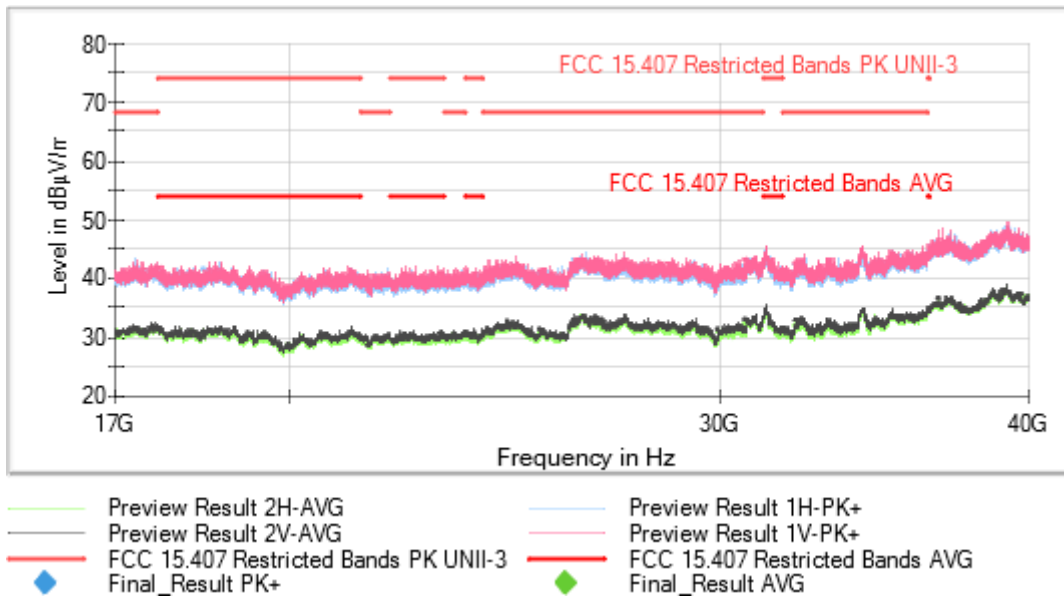
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-----------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 6,5 GHz - 17 GHz | 105 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [17, 40] Frequency MHz = 5745.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



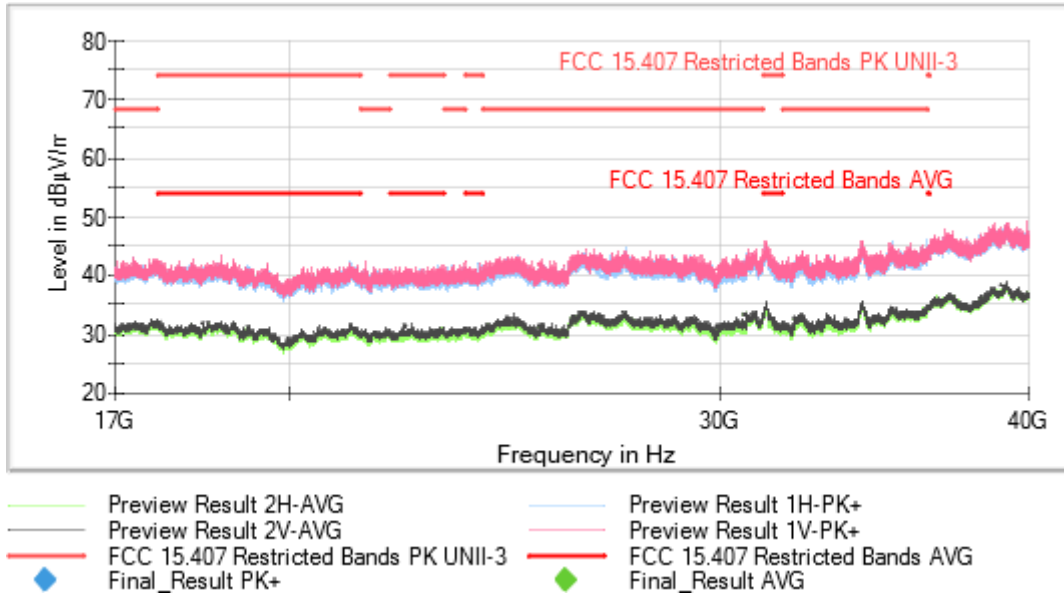
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-------------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 17 GHz - 40 GHz | 766,667 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [17, 40] Frequency MHz = 5785.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



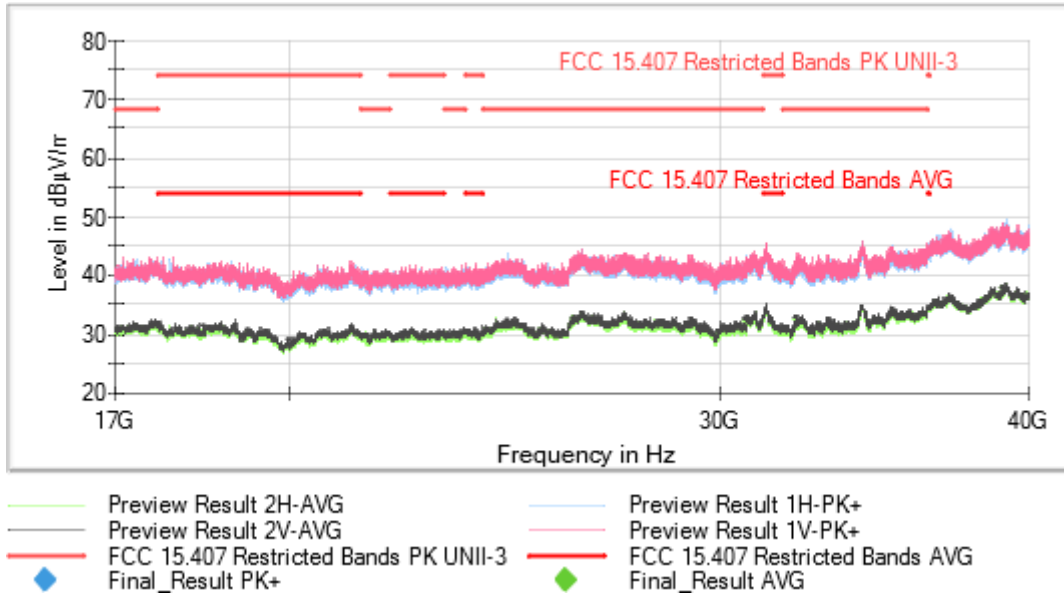
Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-------------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 17 GHz - 40 GHz | 766,667 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

Operation Band MHz = [5725, 5850] Active Port = 1
 Frequency Range GHz = [17, 40] Frequency MHz = 5825.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = SISO
 Measurement Point = 1

Images:



Tables:

Spectrum Analyzer Parameters

| | Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|--|--------------------|-------------|-----------|-----------|------------|--------|
| | Receiver: [FSW 50] | | | | | |
| | 17 GHz - 40 GHz | 766,667 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

BAND EDGE EMISSIONS

- **SISO 802.11 a20. Spurious emissions inside of the mask 5.65-5.925 GHz:**

- Low Channel:

No spurious frequencies found at less than 20 dB below the limit.

- Middle Channel:

No spurious frequencies found at less than 20 dB below the limit.

- High Channel:

No spurious frequencies found at less than 20 dB below the limit.

- **SISO 802.11 n20. Spurious emissions inside of the mask 5.65-5.925 GHz:**

- Low Channel:

No spurious frequencies found at less than 20 dB below the limit.

- Middle Channel:

No spurious frequencies found at less than 20 dB below the limit.

- High Channel:

No spurious frequencies found at less than 20 dB below the limit.

- **SISO 802.11 ac20. Spurious emissions inside of the mask 5.65-5.925 GHz:**

- Low Channel:

No spurious frequencies found at less than 20 dB below the limit.

- Middle Channel:

No spurious frequencies found at less than 20 dB below the limit.

- High Channel:

No spurious frequencies found at less than 20 dB below the limit.

- **SISO 802.11 n40. Spurious emissions inside of the mask 5.65-5.925 GHz:**

- Low Channel:

No spurious frequencies found at less than 20 dB below the limit.

- High Channel:

No spurious frequencies found at less than 20 dB below the limit.

- **SISO 802.11 ac40. Spurious emissions inside of the mask 5.65-5.925 GHz:**

- Low Channel:

No spurious frequencies found at less than 20 dB below the limit.

- High Channel:

No spurious frequencies found at less than 20 dB below the limit.

- **SISO 802.11 ac80. Spurious emissions inside of the mask 5.65-5.925 GHz:**

- Single Channel:

No spurious frequencies found at less than 20 dB below the limit.

Verdict

Pass

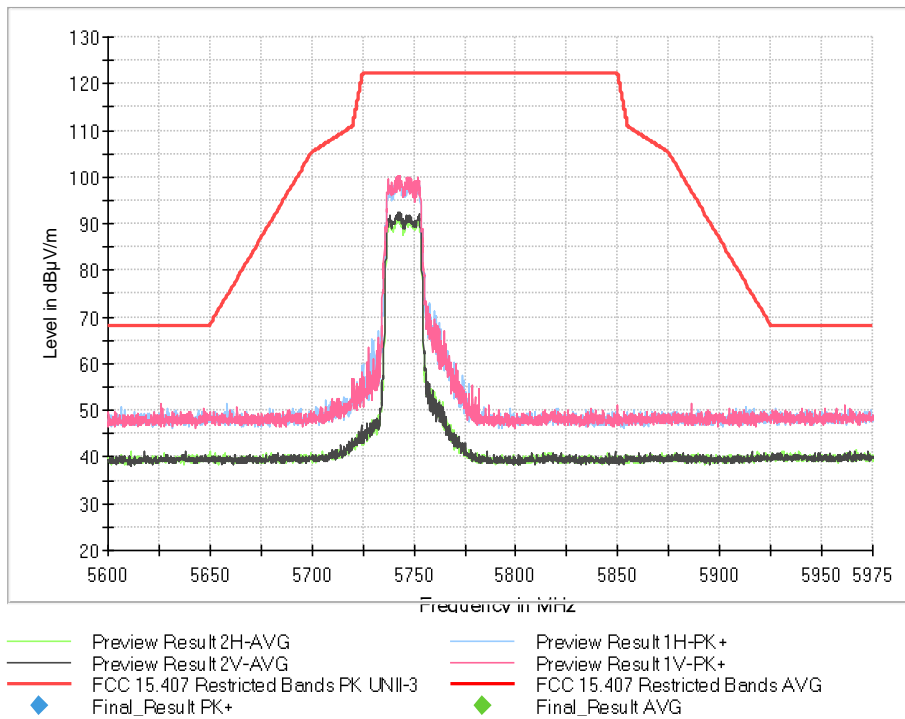
Attachments

Measurement settings:

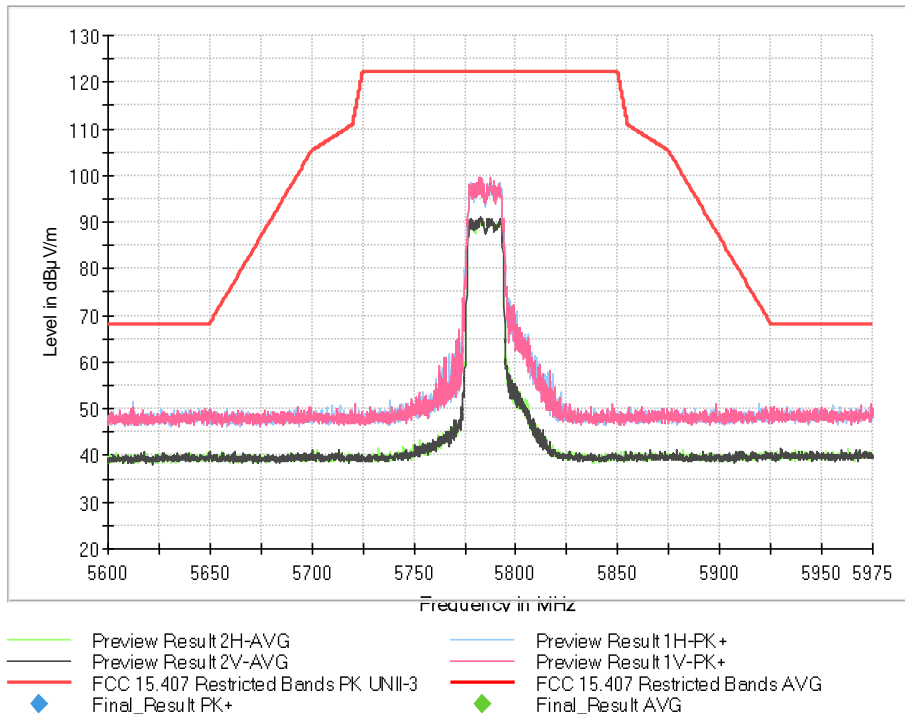
| Subrange | Step Size | Detectors | Bandwidth | Sweep Time | Preamp |
|---------------------------------------|------------|-----------|-----------|------------|--------|
| Receiver: [ESR 7] 30 MHz - 1 GHz | 30,312 kHz | PK+ | 100 kHz | 1 s | 0 dB |
| Receiver: [ESW 44] 1 GHz - 6,5 GHz | 100 kHz | PK+ ; AVG | 1 MHz | 1 s | 0 dB |

SISO 802.11 a20

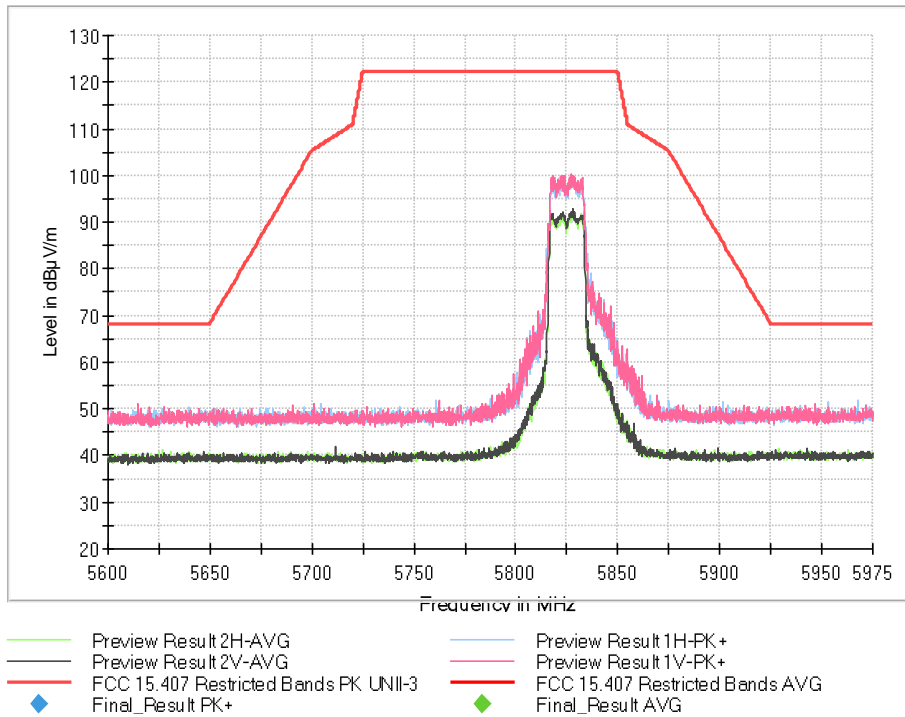
- Low Channel:



- Middle Channel:

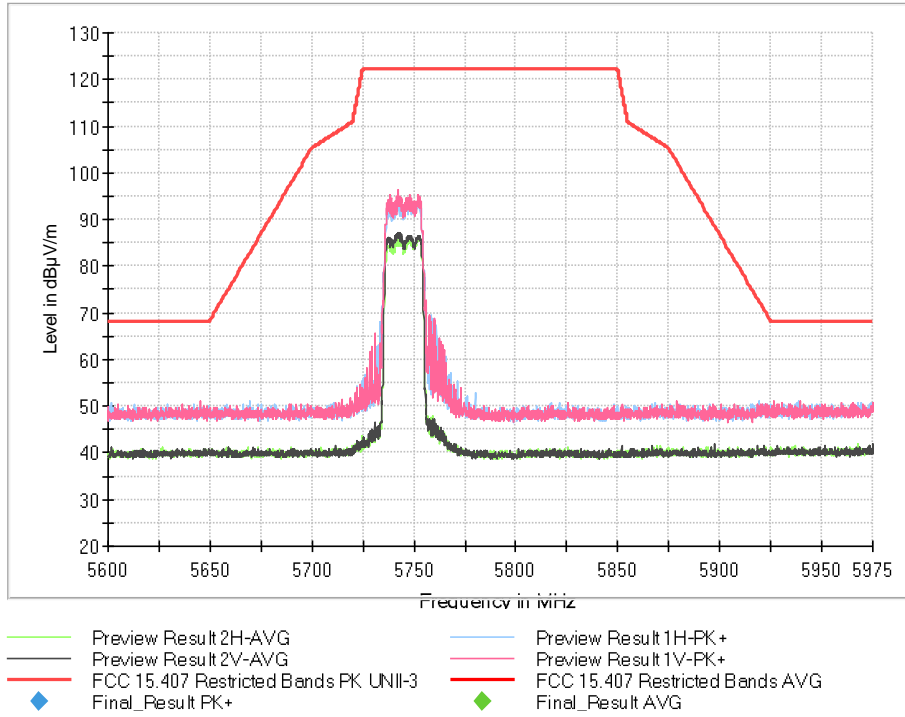


- High Channel:

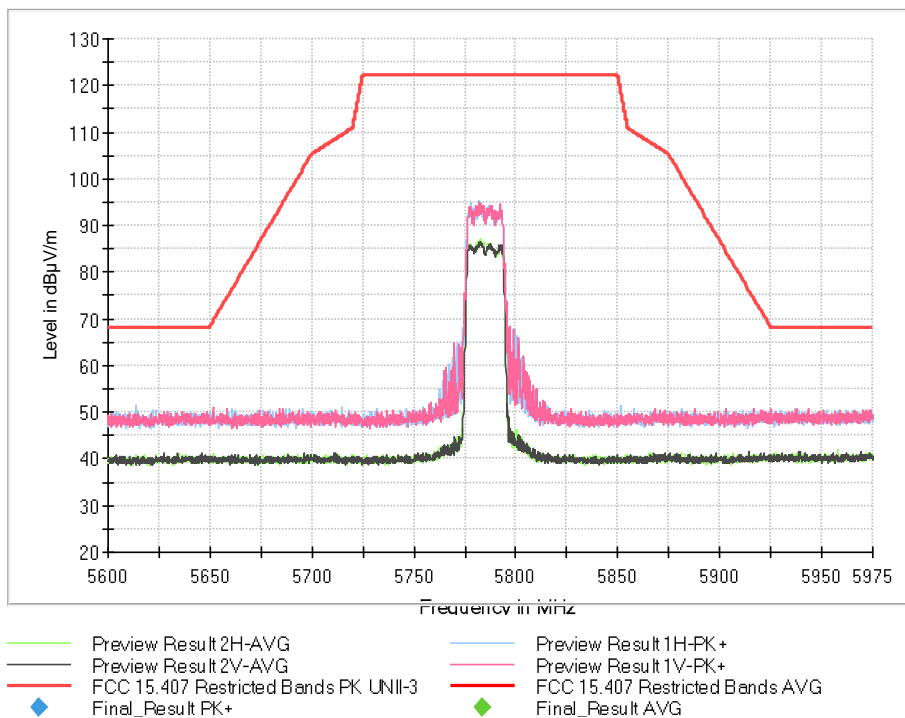


SISO 802.11 n20

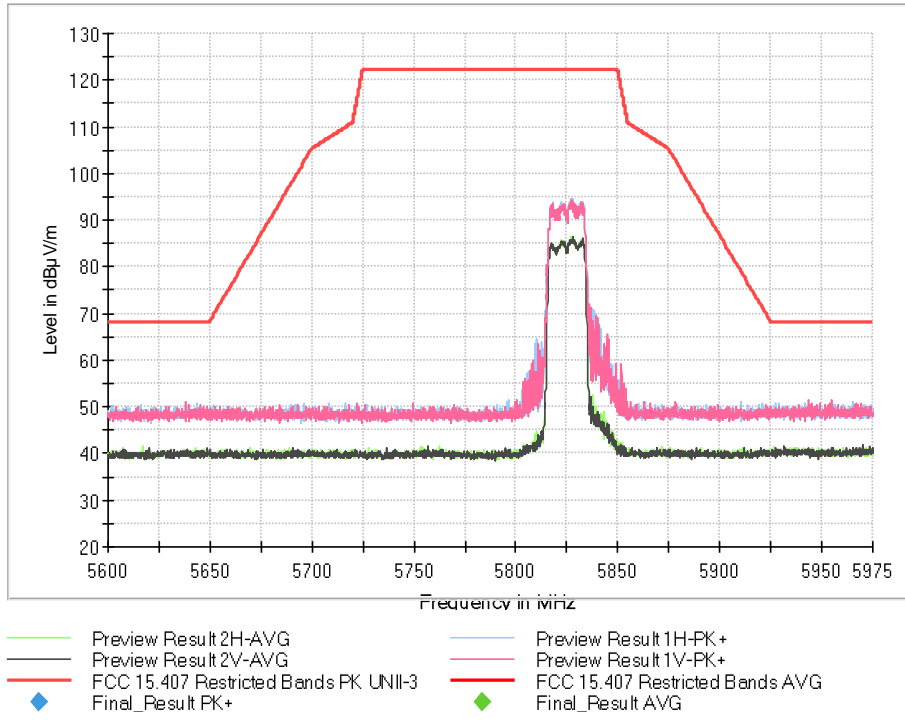
- Low Channel:



- Middle Channel:

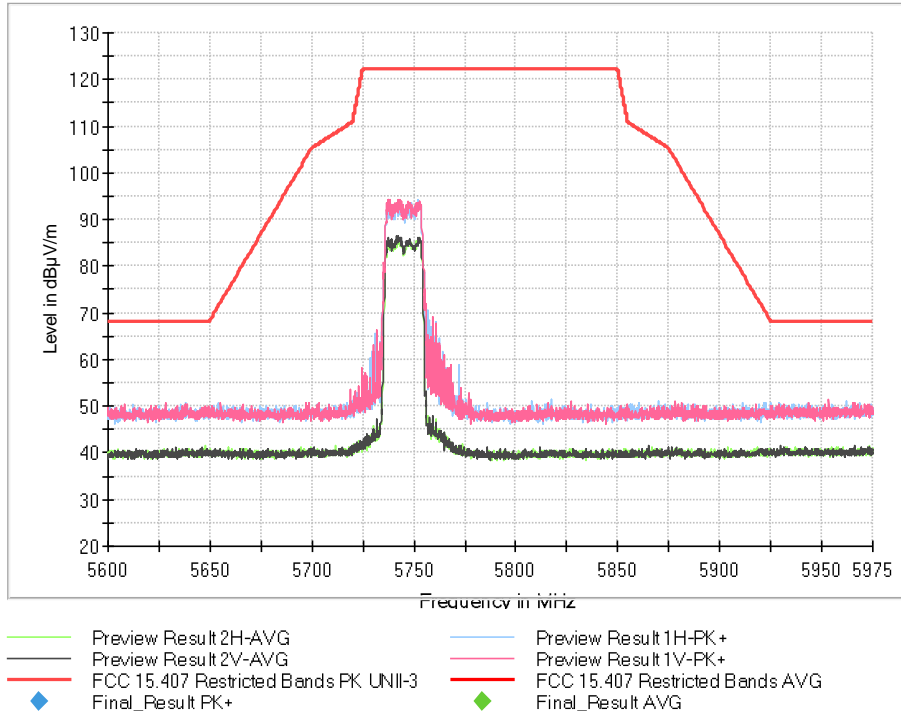


- High Channel:

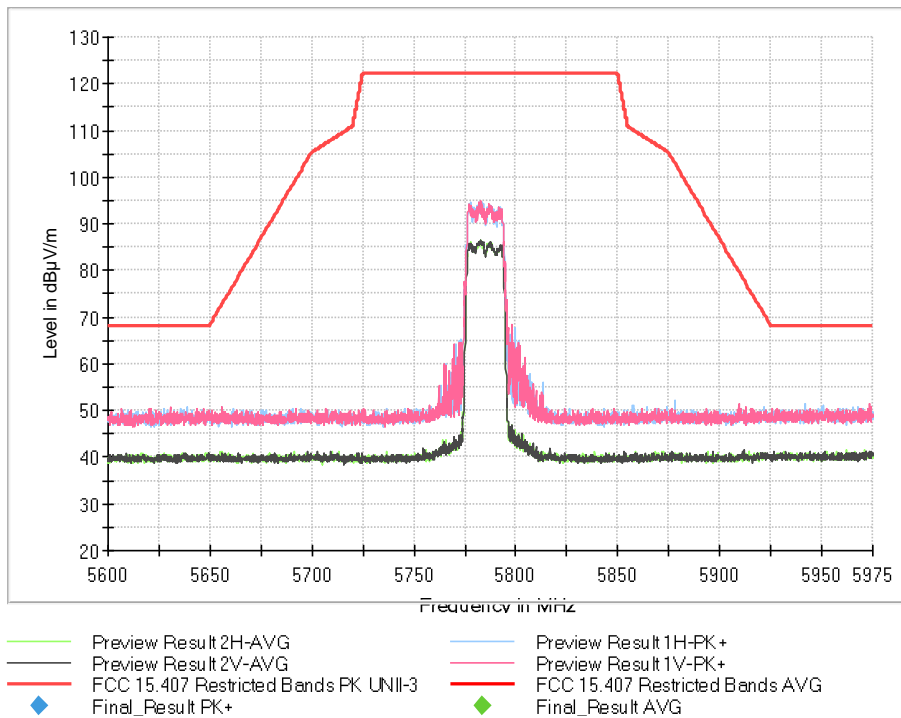


SISO 802.11 ac20

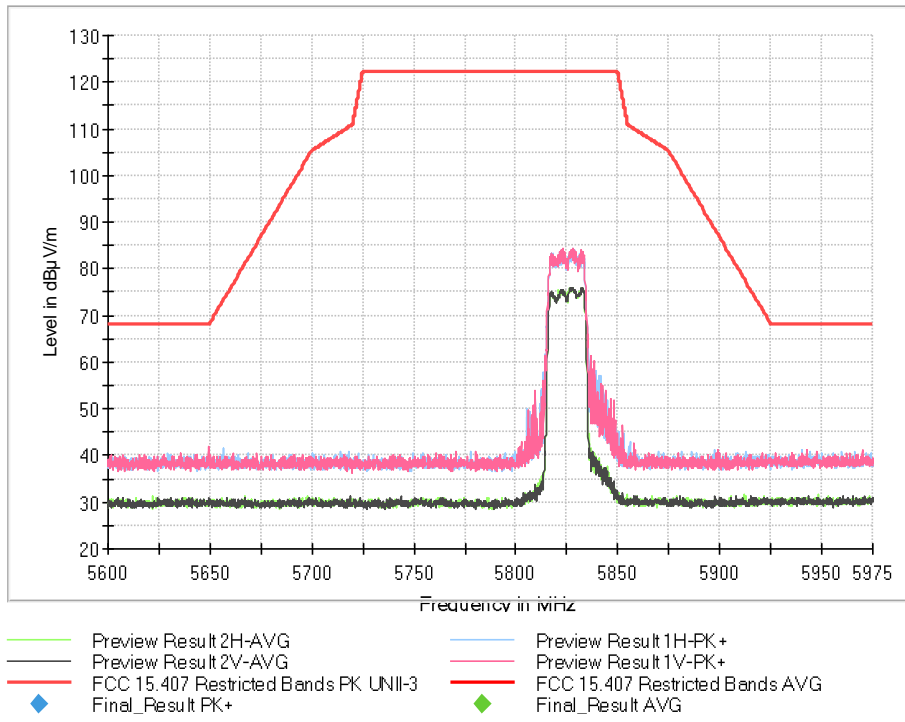
- Low Channel:



- Middle Channel:

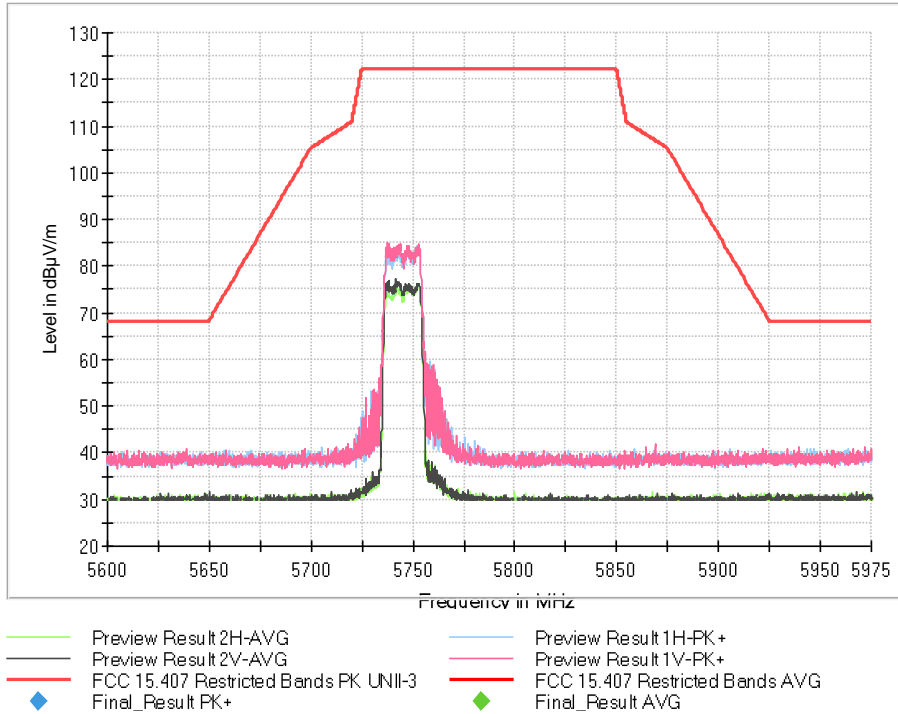


- High Channel:

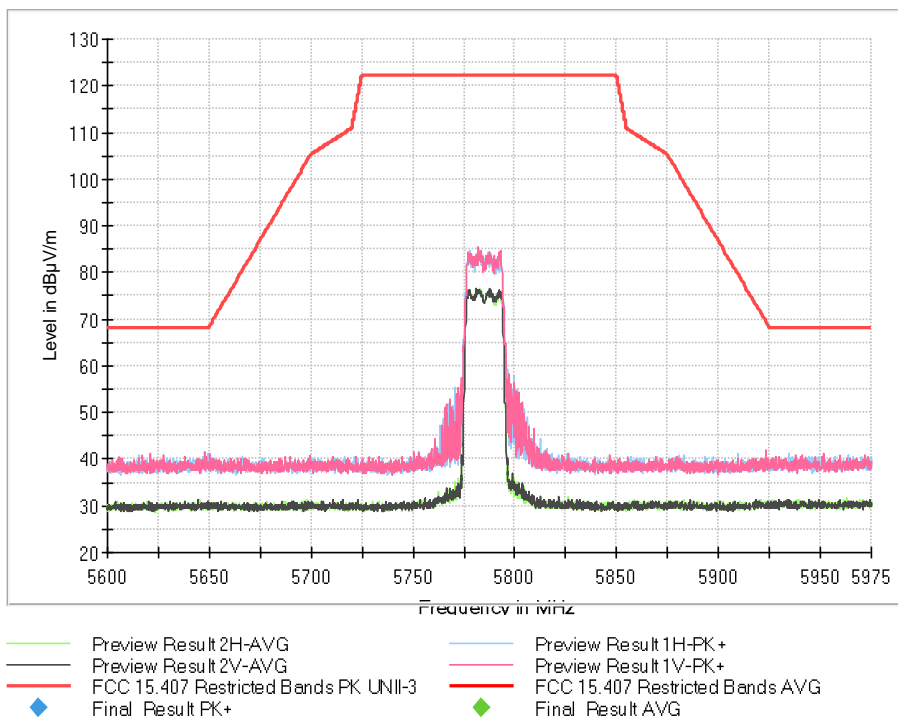


SISO 802.11 n40

- Low Channel:

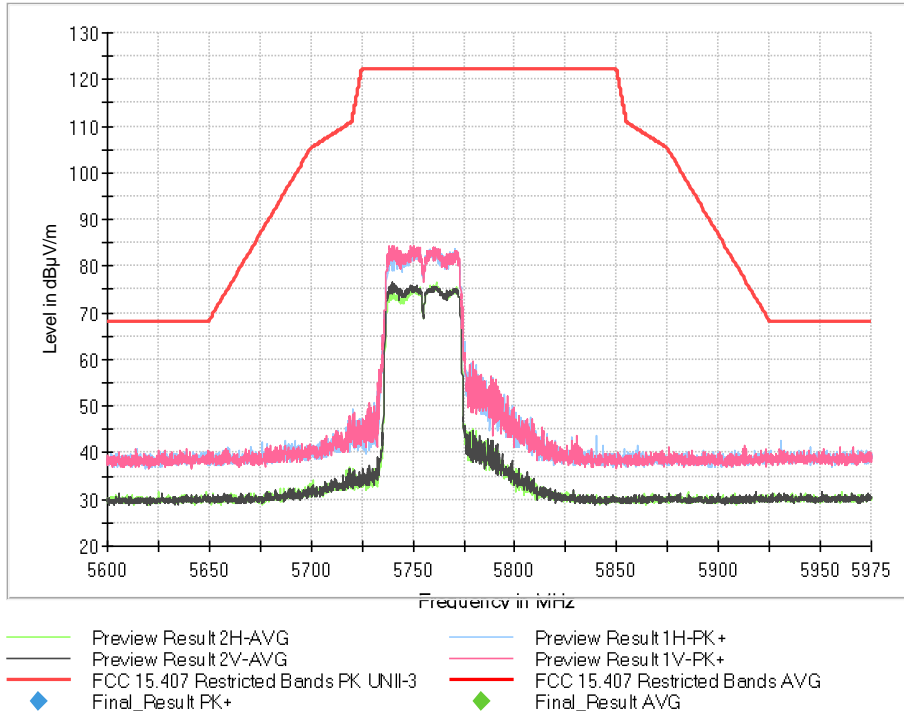


- High Channel:

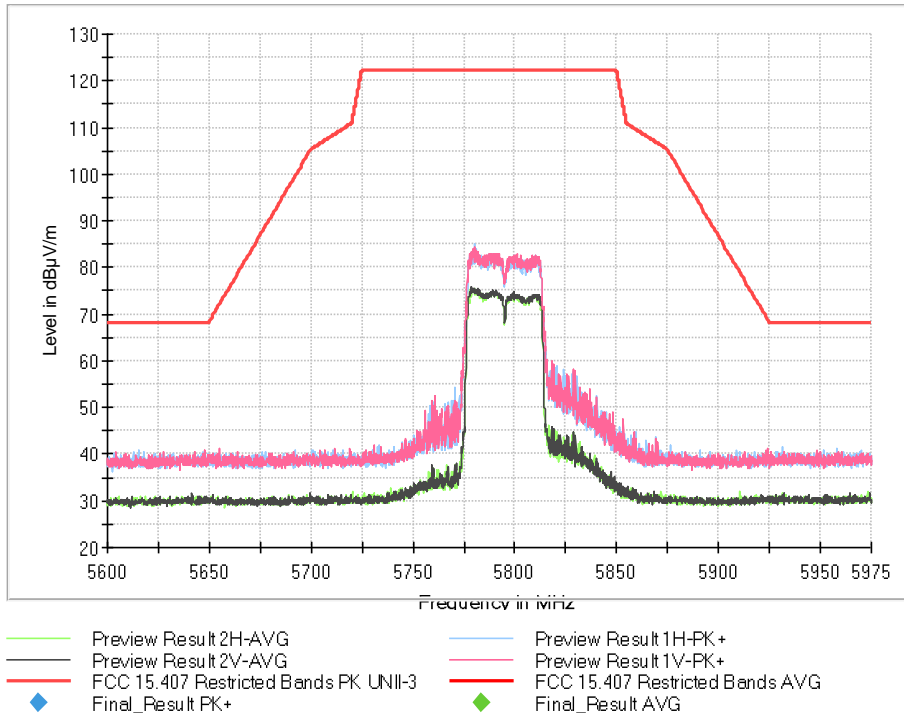


SISO 802.11 ac40

- Low Channel:



- High Channel:



SISO 802.11 ac80

- Single Channel:

