SISO worst case:

SISO 802.11 a20

	Low Channel 36 (5180 MHz)	Middle Channel 40 (5200 MHz)	High Channel 48 (5240 MHz)
Maximum Average PSD (dBm/MHz)	-5,80	-6,06	-2,40
Duty Cycle Correction Factor (dB)	0.946		
Maximum AveragePSD Corrected (dBm/MHz)	-4.854	-5.114	-1.454
Maximum EIRP PSD Corrected (dBm/MHz)	-3.954	-4.214	-0.554
Measurement uncertainty (dB)	<±2.00		

SISO 802.11 n20 (HT20)

	Low Channel 36 (5180 MHz)	Middle Channel 40 (5200 MHz)	High Channel 48 (5240 MHz)
Maximum Average PSD (dBm/MHz)	-5,82	-6,23	-2,93
Duty Cycle Correction Factor (dB)	1.007		
Maximum Average PSD Corrected (dBm/MHz)	-4.813	-5.223	-1.923
Maximum EIRP PSD Corrected (dBm/MHz)	-3.913	-4.323	-1.023
Measurement uncertainty (dB)	<±2.00		

SISO 802.11 ac20 (HT20)

	Low Channel 36 (5180 MHz)	Middle Channel 40 (5200 MHz)	High Channel 48 (5240 MHz)
Maximum Average PSD (dBm/MHz)	-5.95	-6.31	-2.92
Duty Cycle Correction Factor (dB)	1.002		
Maximum Average PSD Corrected (dBm/MHz)	-4.948	-5.308	-1.918
Maximum EIRP PSD Corrected (dBm/MHz)	-4.048	-4.408	-1.018
Measurement uncertainty (dB)	<±2.00		

SISO 802.11 n40 (HT40)

	Low Channel 38 (5190 MHz)	High Channel 46 (5230 MHz)
Maximum Average PSD (dBm/MHz)	-11.35	-8.65
Duty Cycle Correction Factor (dB)	1.851	
Maximum Average PSD Corrected (dBm/MHz)	-9.499	-6.791
Maximum EIRP PSD Corrected (dBm/MHz)	-8.599	-5.899
Measurement uncertainty (dB)	<±2.00	

SISO 802.11 ac40 (VHT40)

	Low Channel 38 (5190 MHz)	High Channel 46 (5230 MHz)
Maximum Average PSD (dBm/MHz)	-11.65	-8.30
Duty Cycle Correction Factor (dB)	1.837	
Maximum Average PSD Corrected (dBm/MHz)	-9.813	-6.463
Maximum EIRP PSD Corrected (dBm/MHz)	-8.913	-5.563
Measurement uncertainty (dB)	<±2.00	

SISO 802.11 ac80 (VHT80)

	Low Channel 42 (5210 MHz)
Maximum Average PSD (dBm/MHz)	-13.75
Duty Cycle Correction Factor (dB)	3.202
Maximum Average PSD Corrected (dBm/MHz)	-10.548
Maximum EIRP PSD Corrected (dBm/MHz)	-9.648
Measurement uncertainty (dB)	<±2.00

Verdict: PASS

MIMO worst case:

MIMO 802.11 ac20 (VHT20)

	Low Channel MHz		Middle Channel MHz		High Channel MHz	
	WLAN0_CORE-MIMO_Port1	WLAN0_CORE-MIMO_Port4	WLAN0_CORE-MIMO_Port1	WLAN0_CORE-MIMO_Port4	WLAN0_CORE-MIMO_Port1	WLAN0_CORE-MIMO_Port4
Maximum Average Conducted Power Spectral Density (dBm/MHz)	-5.28	-5.57	-6.95	-6.29	-6.93	-6.20
Duty Cycle Correction Factor (dB)	1.002	1.001	1.002	1.001	1.002	1.001
Maximum PSD Corrected (dBm/MHz)	-4.278	-4.569	-5.948	-5.289	-5.928	-5.199
Maximum PSD (dBm/MHz)	-1.268	-1.559	-2.938	-2.279	-2.918	-2.189
Maximum PSD E.I.R.P. (dBm/MHz)	1.932	0.741	0.262	0.021	0.282	0.111
Measurement uncertainty (dB)	<±2.00					

NOTE: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

Verdict: PASS

FCC 15.407 (b)(1)(6) / RSS-247 6.2.1.2. Out of Band Radiated Emissions

SPECIFICATION:

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 situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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

All tests were performed in a semi-anechoic chamber at a distance of 1m for the frequency range 1 GHz-40 GHz and a distance of 3m for frequency range 30MHz-1GHz.

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

The worst case was determined by measuring the eirp density (radiated). Test performed on the worst case:

SISO worst case:

- Preliminary tests determined the SISO worst case: WLAN1_CORE-0_Port3.

  Worst case: **802.11 a20** (bit rate of 6 Mbps).

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

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

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
32.5705	35.43	V	Quasi Peak	<± 5.07
55.9475	33.85	V	Quasi Peak	<± 5.07
58.7120	37.49	V	Quasi Peak	<± 5.07
60.1670	34.65	V	Quasi Peak	<± 5.07
66.2780	36.87	V	Quasi Peak	<± 5.07
145.2360	28.31	V	Quasi Peak	<± 5.07
774.9600	32.68	H	Quasi Peak	<± 5.07

Frequency range 1 - 40 GHz (SISO worst case):

The results in the next tables show the maximum measured levels in the 1-40 GHz frequency range.

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

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

- **SISO 802.11 a20 (SISO worst case):**

  - LOW CHANNEL. Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
5.3746	49.35	V	Peak	<± 5.13
10.359	66.06	V	Peak	<± 4.99

  - MIDDLE CHANNEL. Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
5.3742	48.78	V	Peak	<± 5.13
10.399	67.78	V	Peak	<± 4.99

  - HIGH CHANNEL. Spurious frequencies detected at less than 20 dB below the limit:

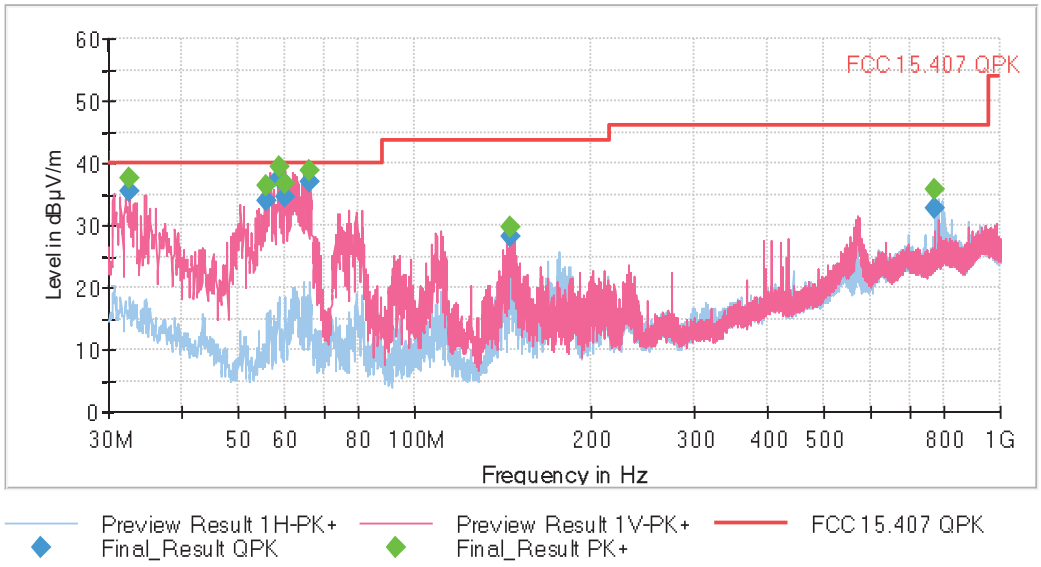
Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
10.481	62.12	V	Peak	<± 4.99

Verdict: PASS

SISO worst case:

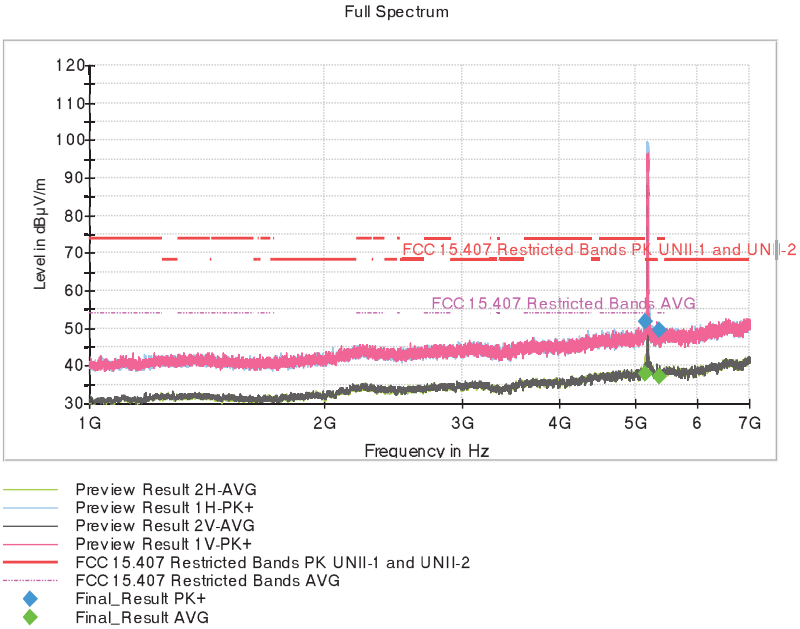
FREQUENCY RANGE 30 MHz - 1 GHz (SISO worst case):

This plot is valid for the Low, Middle and High Channels and all the modulation modes.



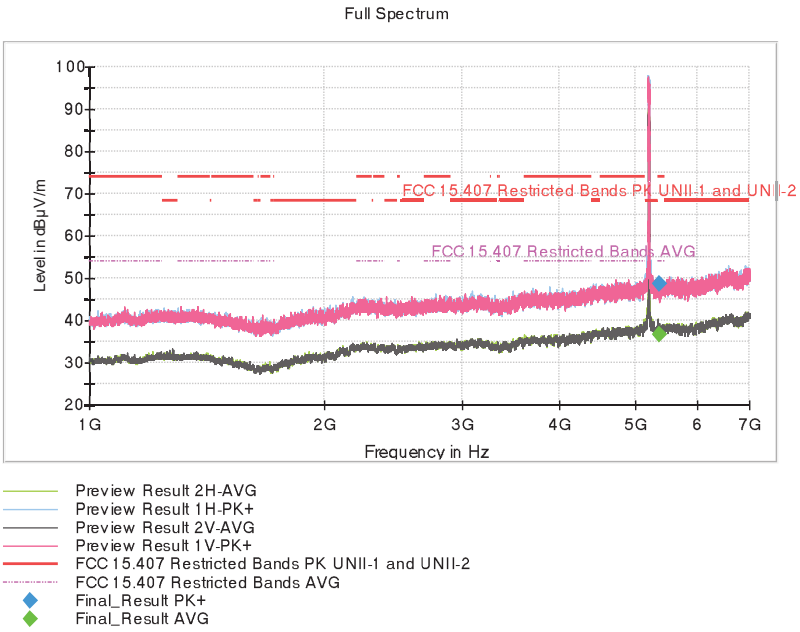
FREQUENCY RANGE 1 - 7 GHz (SISO worst case):

- Low Channel:



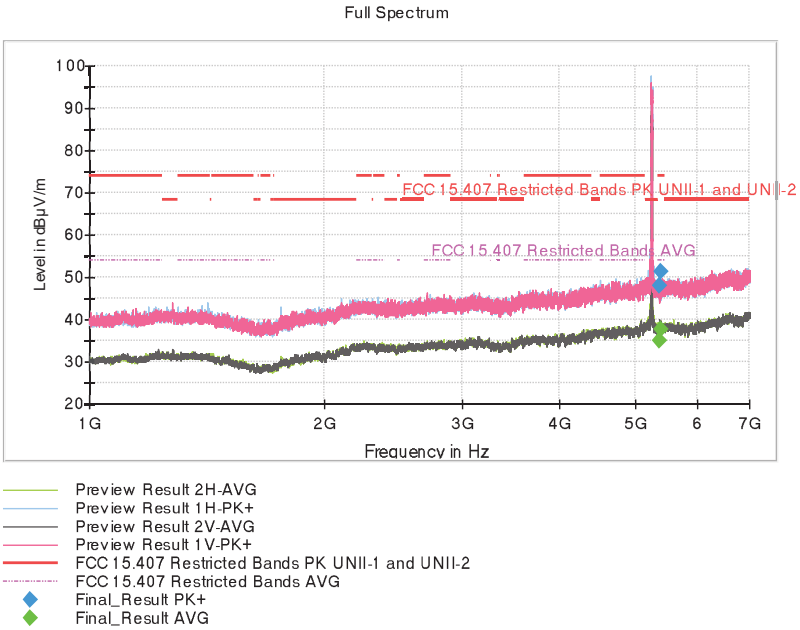
Note: The peak shown in the plot above the limit is the carrier frequency.

- Middle Channel:



Note: The peak shown in the plot above the limit is the carrier frequency.

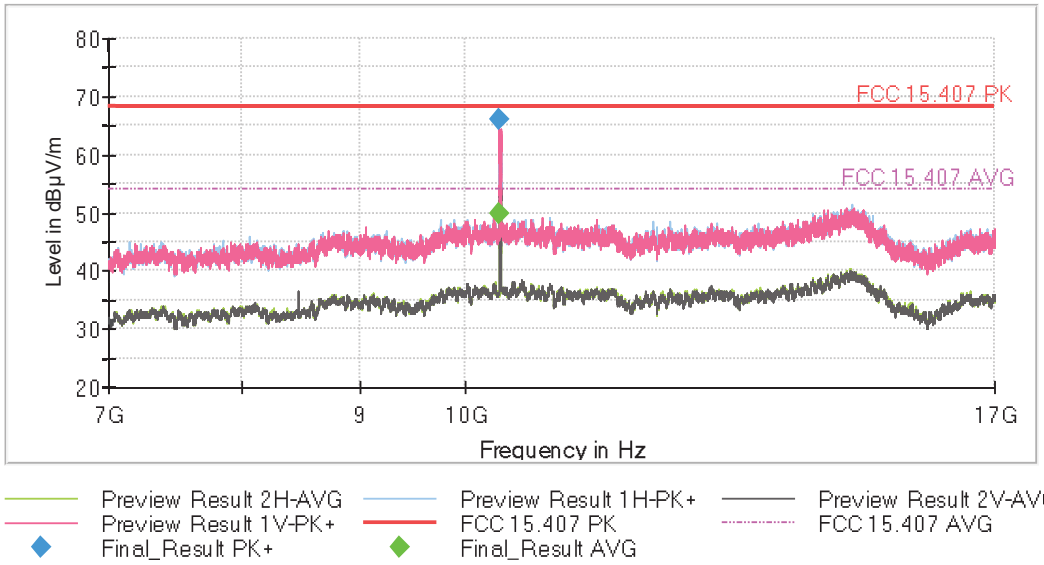
- High Channel:



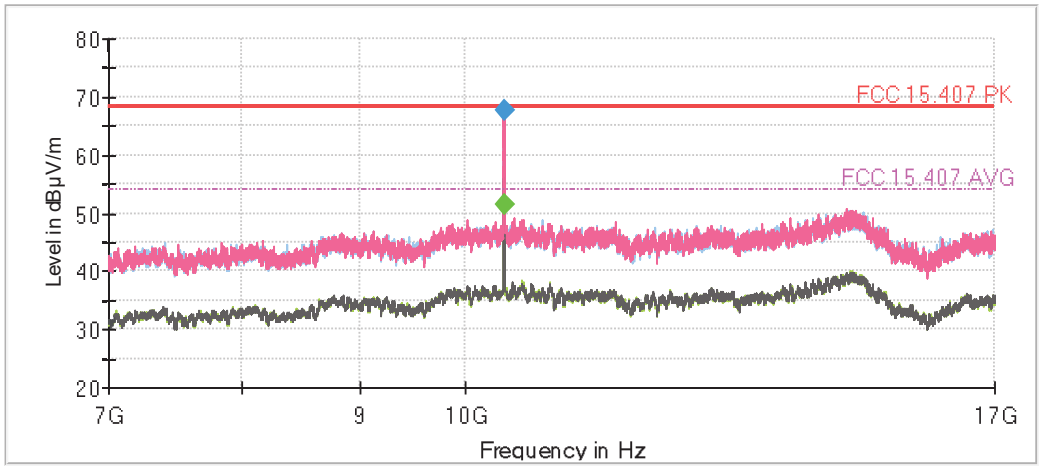
Note: The peak shown in the plot above the limit is the carrier frequency.

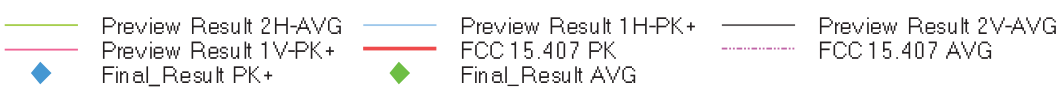
FREQUENCY RANGE 7 - 17 GHz (SISO worst case):

- Low Channel:

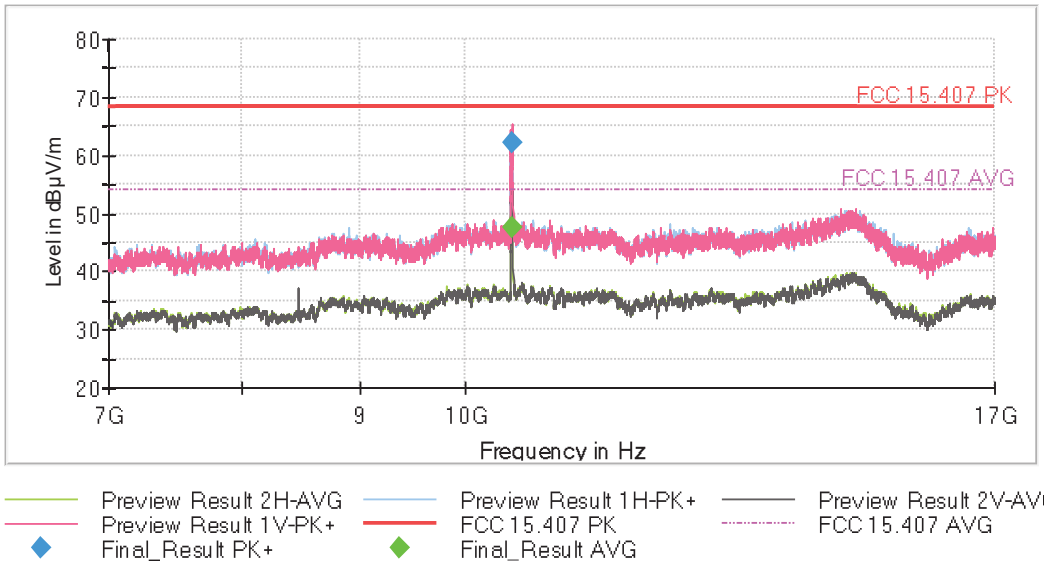


- Middle Channel:



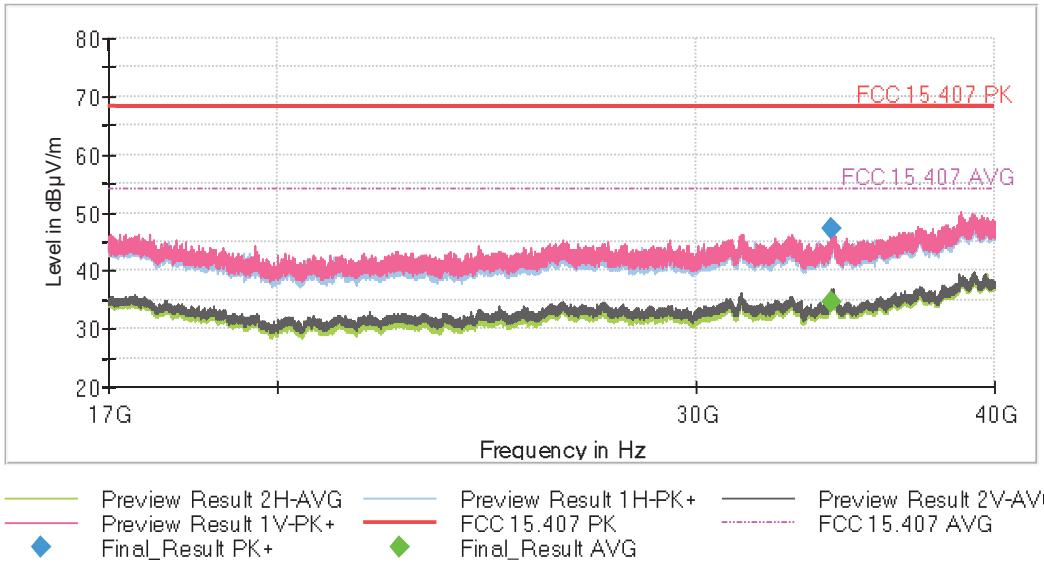


- High Channel:

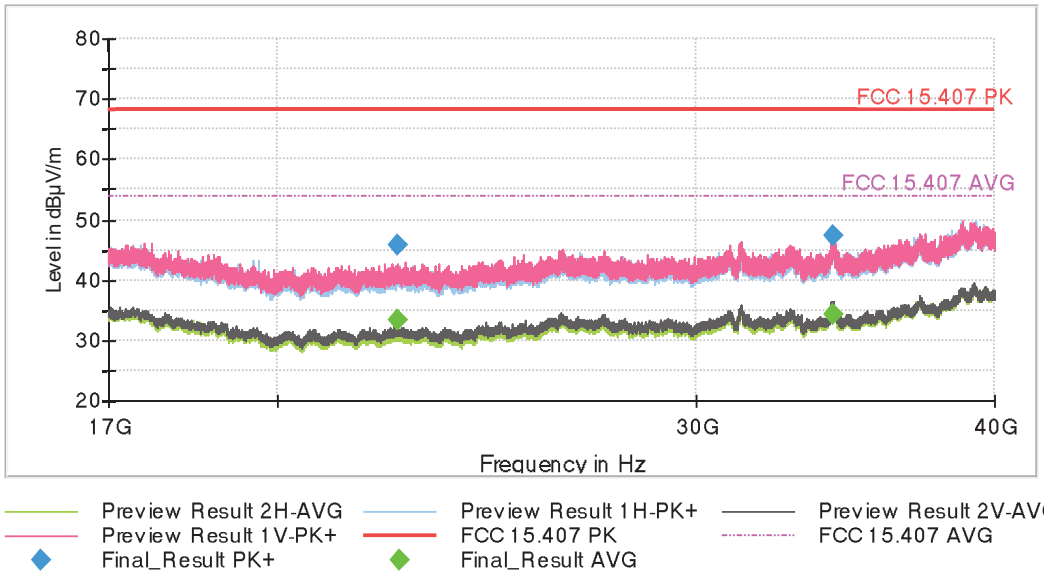


FREQUENCY RANGE 17 - 40 GHz (SISO worst case):

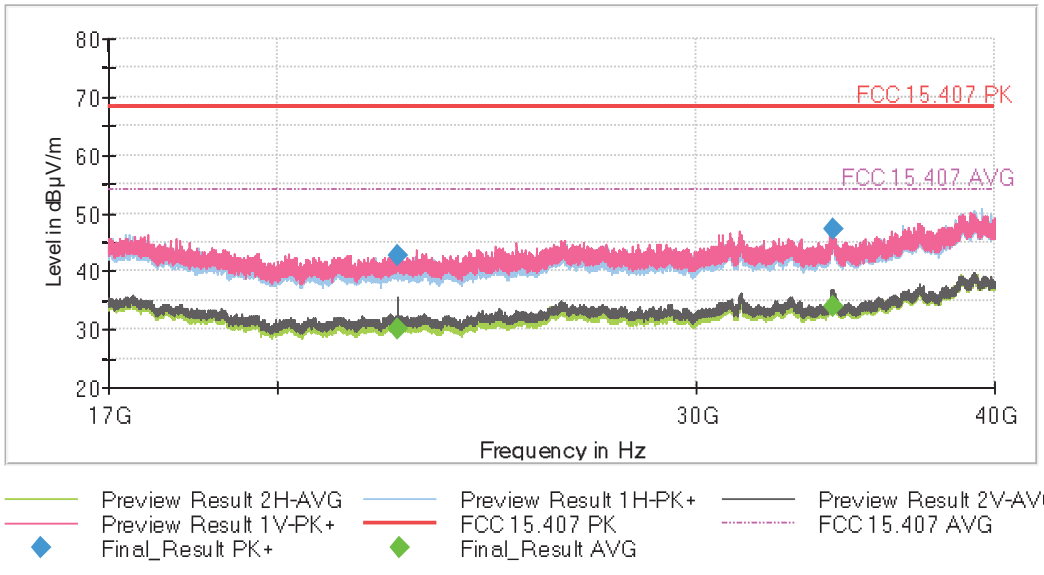
- Low Channel:



- Middle Channel:



- High Channel:



MIMO worst case:

- Preliminary tests determined the MIMO worst case: WLAN0_CORE-MIMO_Port1 & Port4.

Worst case: **802.11 n20** (index of MCS8).

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

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

Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
32.5220	29.29	V	Quasi Peak	<± 5.07
55.9960	36.07	V	Quasi Peak	<± 5.07
58.6635	34.87	V	Quasi Peak	<± 5.07
64.7745	38.06	V	Quasi Peak	<± 5.07
66.2780	37.26	V	Quasi Peak	<± 5.07
148.0490	25.98	V	Quasi Peak	<± 5.07
774.9600	34.71	H	Quasi Peak	<± 5.07

Frequency range 1 - 40 GHz (MIMO worst case):

The results in the next tables show the maximum measured levels in the 1-40 GHz frequency range.

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

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

- **MIMO 802.11 n20 (MIMO worst case):**

- LOW CHANNEL. Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
10.3595	63.04	H	Peak	<± 4.99

- MIDDLE CHANNEL. Spurious frequencies detected at less than 20 dB below the limit:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
10.3955	58.45	H	Peak	<± 4.99

- HIGH CHANNEL. Spurious frequencies detected at less than 20 dB below the limit:

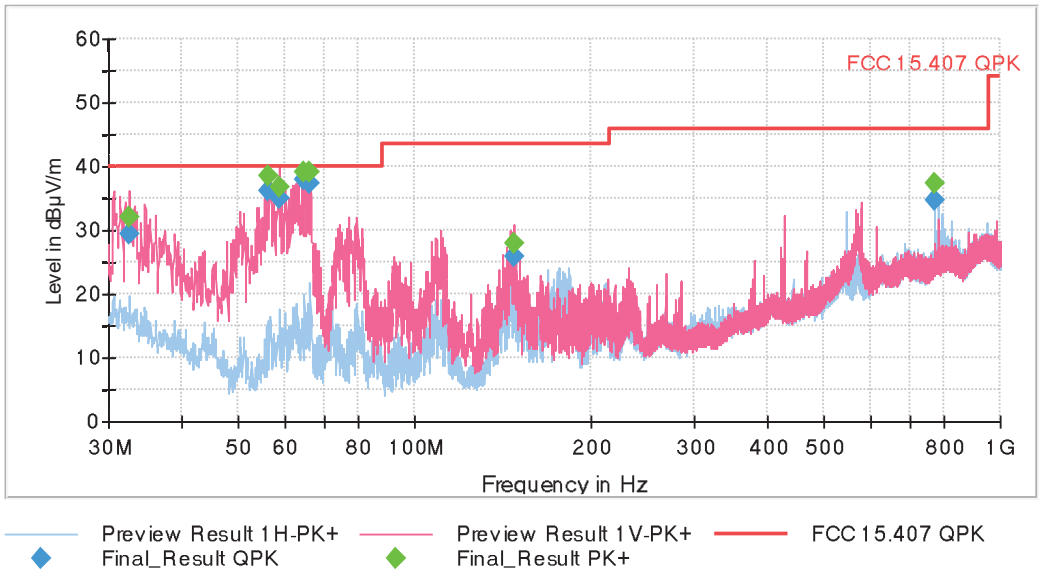
Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
10.476	60.27	H	Peak	<± 4.99

Verdict: PASS

MIMO worst case:

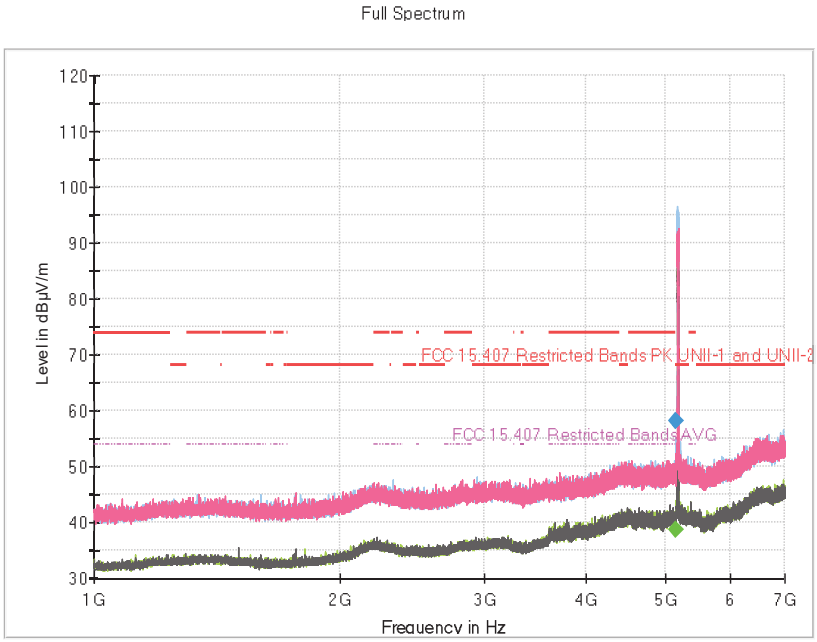
FREQUENCY RANGE 30 MHz - 1 GHz (MIMO worst case):

This plot is valid for the Low, Middle and High Channels and all the modulation modes.



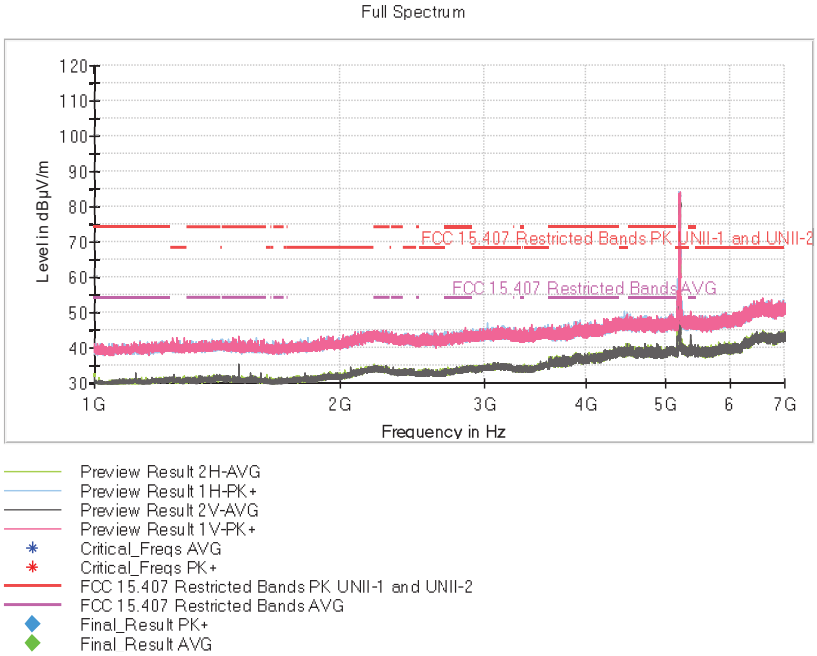
FREQUENCY RANGE 1 - 7 GHz (MIMO worst case):

- Low Channel:



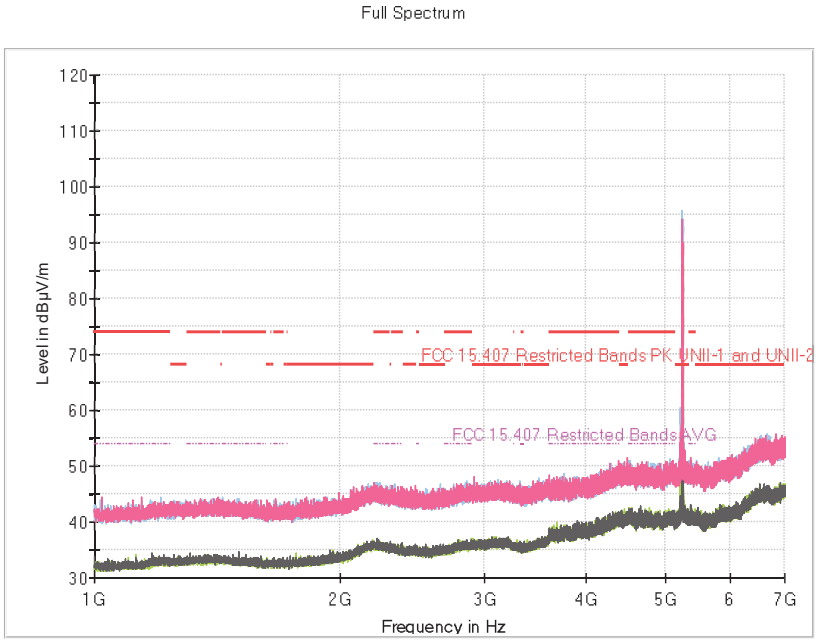
Note: The peak shown in the plot above the limit is the carrier frequency.

- Middle Channel:



Note: The peak shown in the plot above the limit is the carrier frequency.

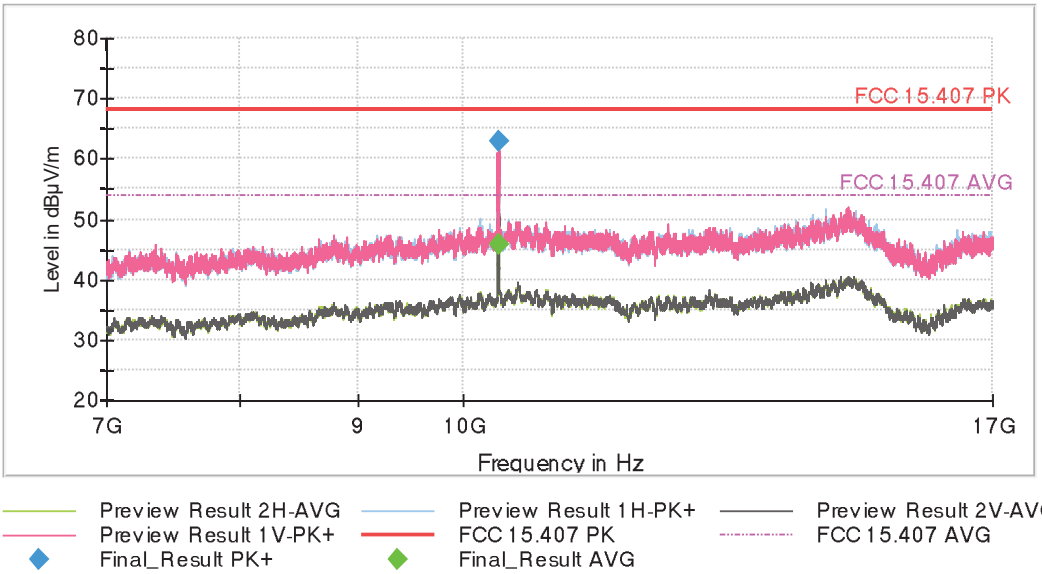
- High Channel:



Note: The peak shown in the plot above the limit is the carrier frequency.

FREQUENCY RANGE 7 - 17 GHz (MIMO worst case):

- Low Channel:



- Middle Channel: