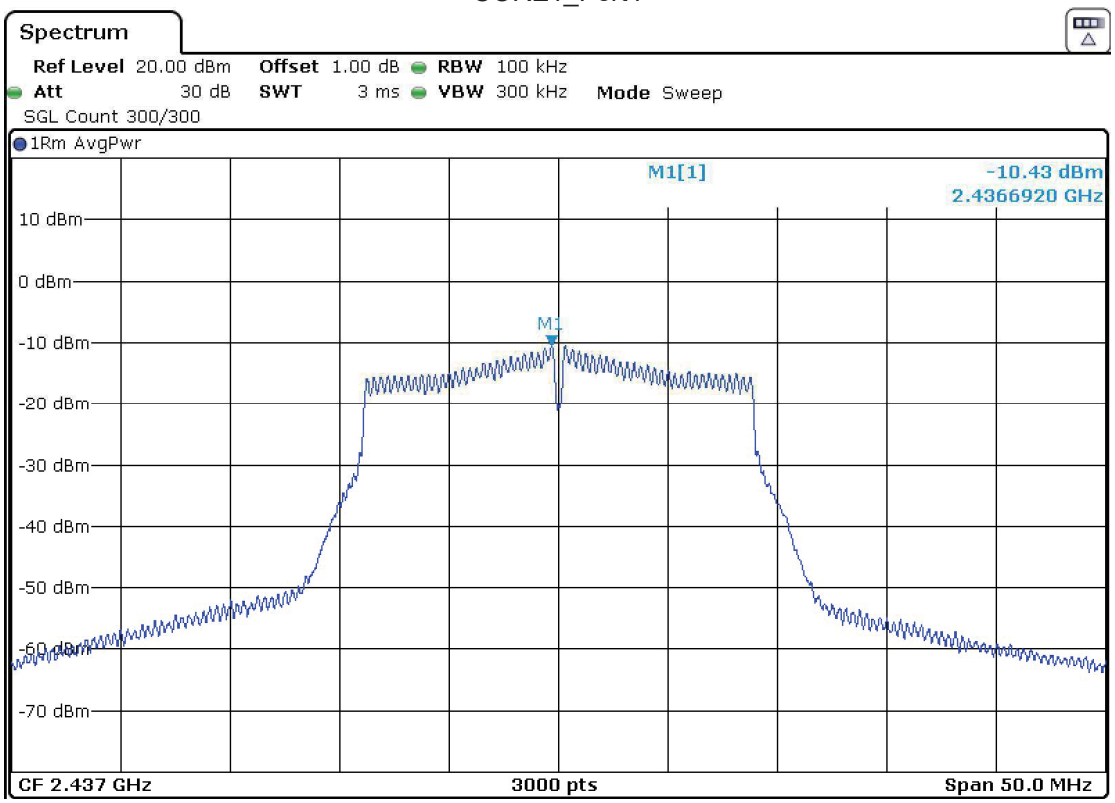
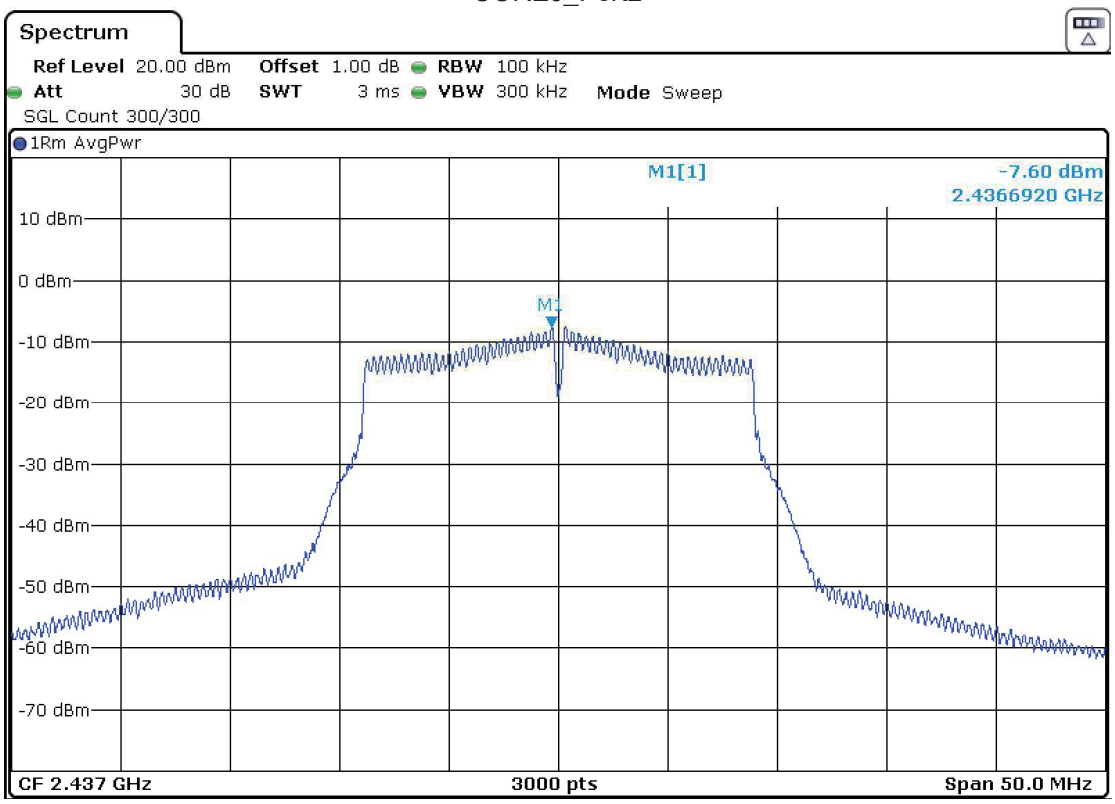
- Middle Channel:

CORE1_Port4

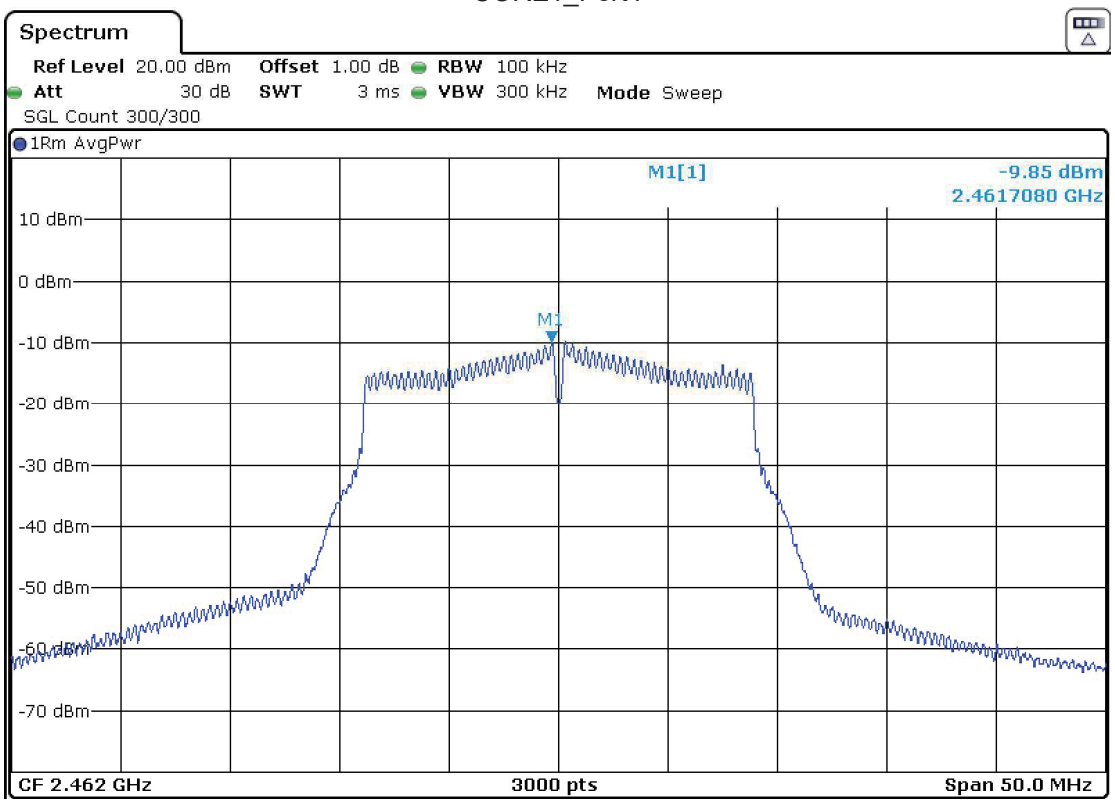


CORE0_Port2

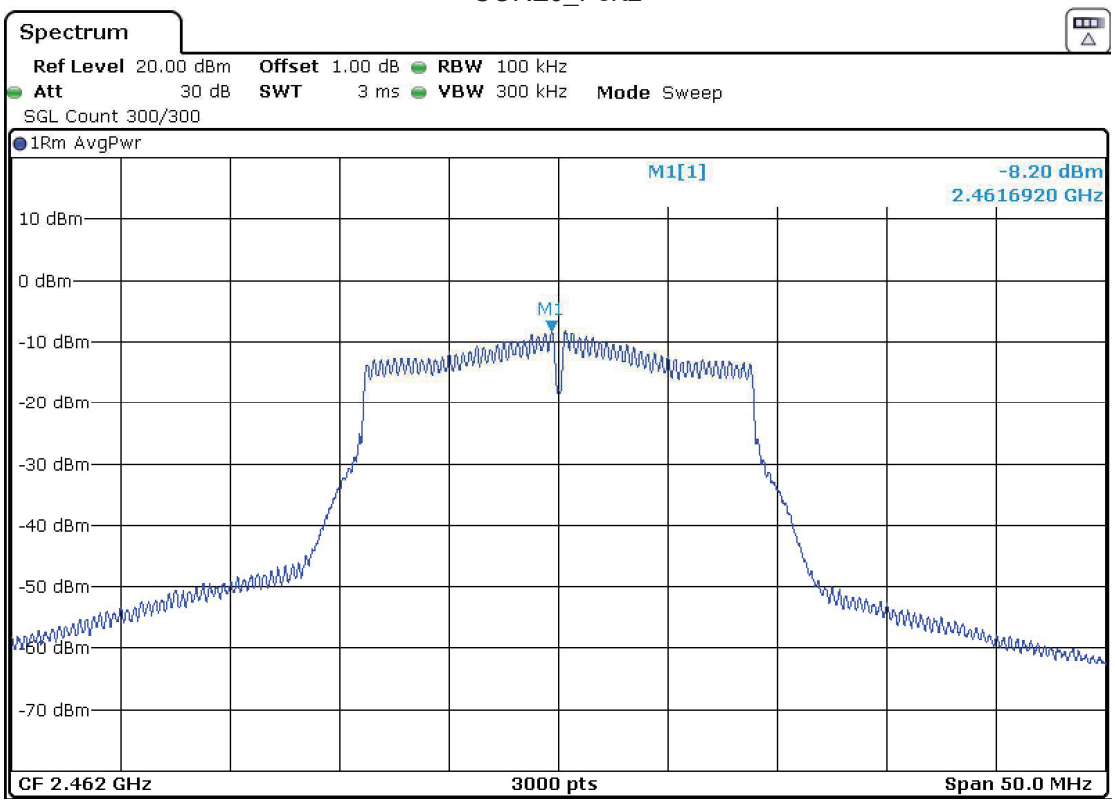


- High Channel:

CORE1_Port4



CORE0_Port2



FCC 15.247 (d) / RSS-247 5.5. Emission limitations radiated (Transmitter)

SPECIFICATION:

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) / RSS-Gen):

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)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	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 3 m for the frequency range 30 MHz-17 GHz and at distance of 1m for the frequency range 17 GHz-25 GHz.

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.

SISO CORE1_Port4 Antenna:

Frequency range 30 MHz - 1 GHz:

The spurious frequencies do not depend neither on the operating channel nor the modulation mode.

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Limit (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
31.9885	23.69	40	V	Quasi-peak	<± 4.99
749.9825	28	46	V	Quasi-peak	<± 4.99
500.0135	33.93	46	H	Quasi-peak	<± 4.99

- **Mode 802.11 b**

Frequency range 1 - 26 GHz:

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

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

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
4.824	42.57	H	Peak	<± 4.98

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
4.874	43.57	H	Peak	<± 4.98

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
7.3875	46.27	V	Peak	<± 4.98

Verdict: PASS

OFDM modes:

For spurious emissions in the range 30 MHz - 26 GHz (except field strength at the band edges that was performed for all modes) a preliminary scan was performed to determine the worst case mode.
Herein the results for the worst case mode: 802.11 n20.

Spurious emissions in the Restricted Bands 2.31-2.39 GHz and 2.4835-2.5 GHz are measured for all modes.

- **Mode 802.11 n20 (OFDM worst case for spurious emissions)**

Frequency range 1 - 26 GHz:

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

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

- LOW CHANNEL. No spurious frequencies at less than 20 dB below the limit.

- MIDDLE CHANNEL. No spurious frequencies at less than 20 dB below the limit.

- HIGH CHANNEL. No spurious frequencies at less than 20 dB below the limit.

1 GHz- 17 GHz. Measurement Uncertainty (dB): <± 4.98
17 GHz- 26.5 GHz. Measurement Uncertainty (dB): <± 5.08

Verdict: PASS

- **Mode 802.11 g**

  The results in the next tables show the maximum measured levels in the Restricted Bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

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

  - LOW CHANNEL. No spurious frequencies at less than 20 dB below the limit.

  - HIGH CHANNEL. No spurious frequencies at less than 20 dB below the limit.

1 GHz- 17 GHz. Measurement Uncertainty (dB): <± 4.98

Verdict: PASS

MIMO – CORE1_Port4 Antenna & CORE0_Port2 Antenna:

Frequency range 30 MHz - 1 GHz:

The spurious frequencies do not depend neither on the operating channel nor the modulation.

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Limit (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
500.0135	32.94	46	V	Quasi-peak	<± 4.99

- **Mode 802.11 b**

Frequency range 1 - 26 GHz:

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

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

- LOW CHANNEL. No spurious frequencies at less than 20 dB below the limit.

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
4.874	45.9	H	Peak	<± 4.98
7.3095	44.09	H	Peak	<± 4.98

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
4.924	43.71	H	Peak	<± 4.98
7.3875	46.52	V	Peak	<± 4.98
11.6735	49.9	V	Peak	<± 4.98

Verdict: PASS

OFDM modes:

For spurious emissions in the range 30 MHz - 26 GHz (except field strength at the band edges that was performed for all modes) a preliminary scan was performed to determine the worst case mode.
Herein the results for the worst case mode: 802.11 n20.

Spurious emissions in the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz are measured for all modes.

- **Mode 802.11 n20 (OFDM worst case for spurious emissions)**

Frequency range 1 - 26 GHz:

The results in the next tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

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

- LOW CHANNEL. No spurious frequencies at less than 20 dB below the limit.

- MIDDLE CHANNEL. No spurious frequencies at less than 20 dB below the limit.

- HIGH CHANNEL. No spurious frequencies at less than 20 dB below the limit.

1 GHz- 17 GHz. Measurement Uncertainty (dB): <± 4.98
17 GHz- 26.5 GHz. Measurement Uncertainty (dB): <± 5.08

Verdict: PASS

- **Mode 802.11 g**

The results in the next tables show the maximum measured levels in the Restricted Bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

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

- LOW CHANNEL. No spurious frequencies at less than 20 dB below the limit.

- HIGH CHANNEL. No spurious frequencies at less than 20 dB below the limit.

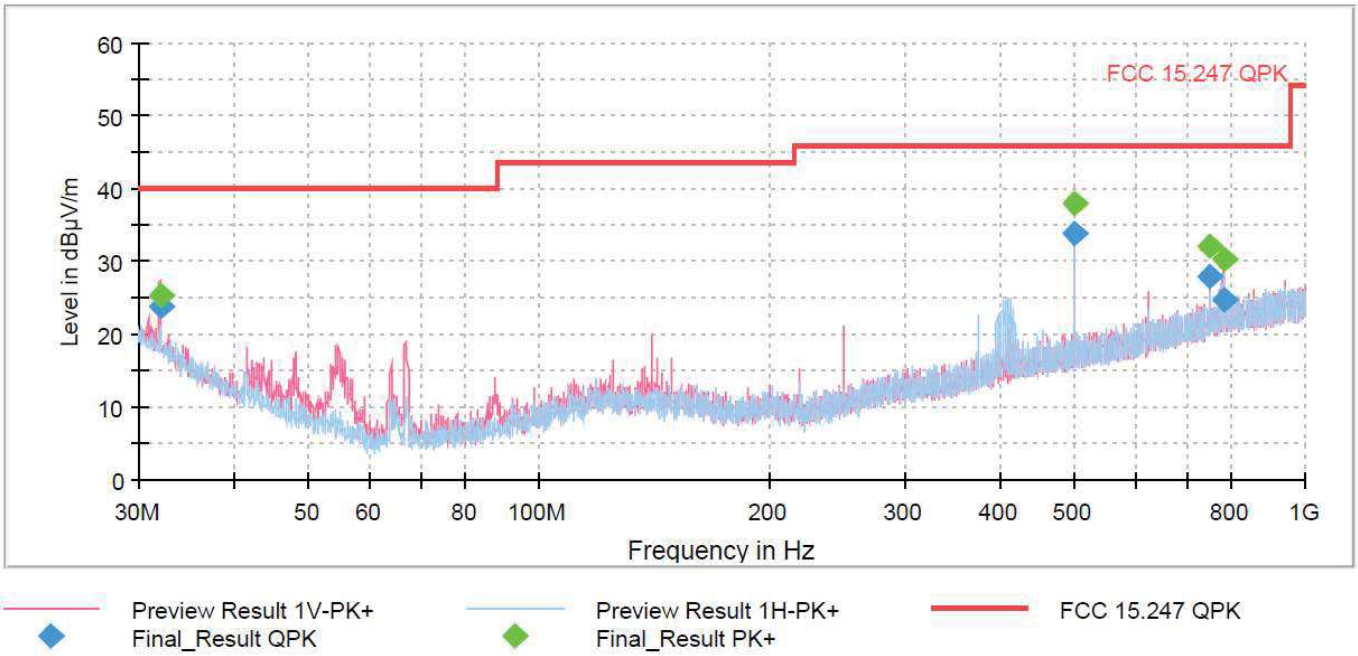
1 GHz- 17 GHz. Measurement Uncertainty (dB): <± 4.98

Verdict: PASS

SISO CORE1_Port4 Antenna:

FREQUENCY RANGE 30 MHz - 1 GHz:

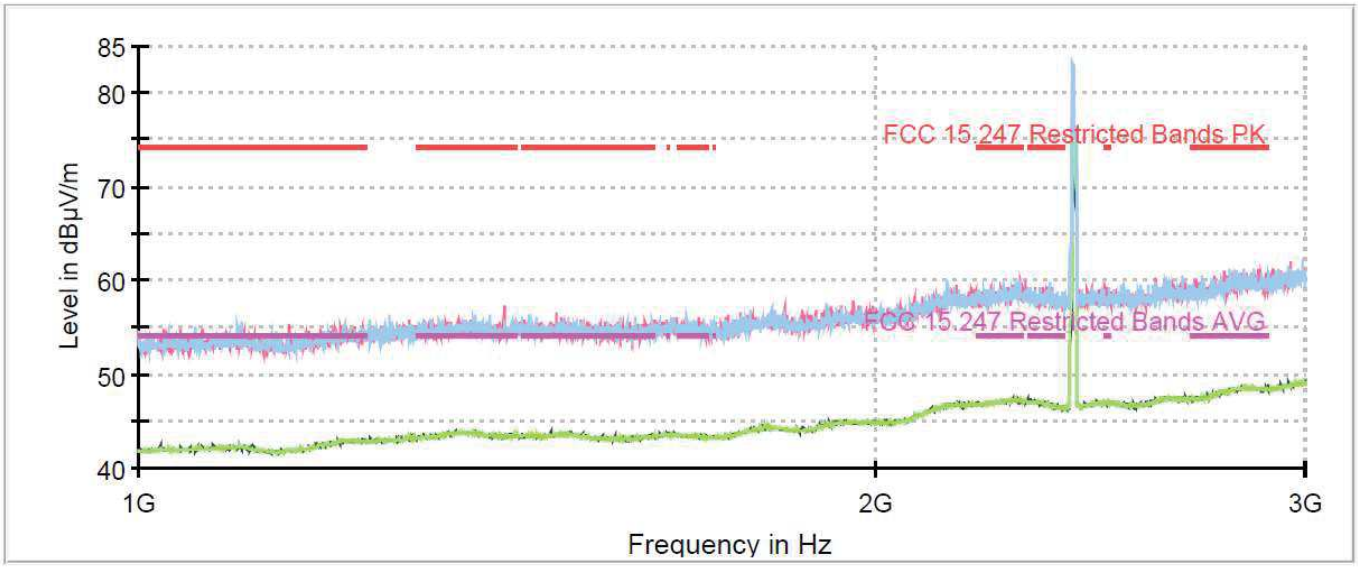
The spurious signals detected do not depend neither on the operating channel nor the modulation mode.



- **Mode 802.11 b**

FREQUENCY RANGE 1 - 3 GHz:

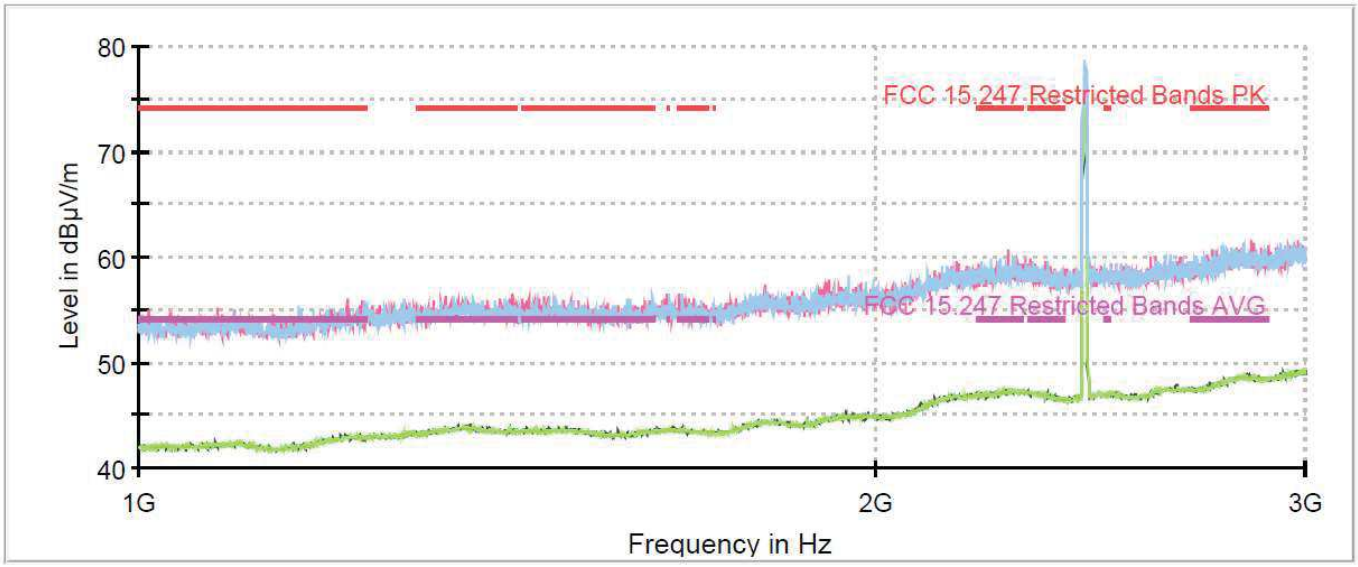
- Low Channel:



Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

The peak above the limit is the carrier frequency.

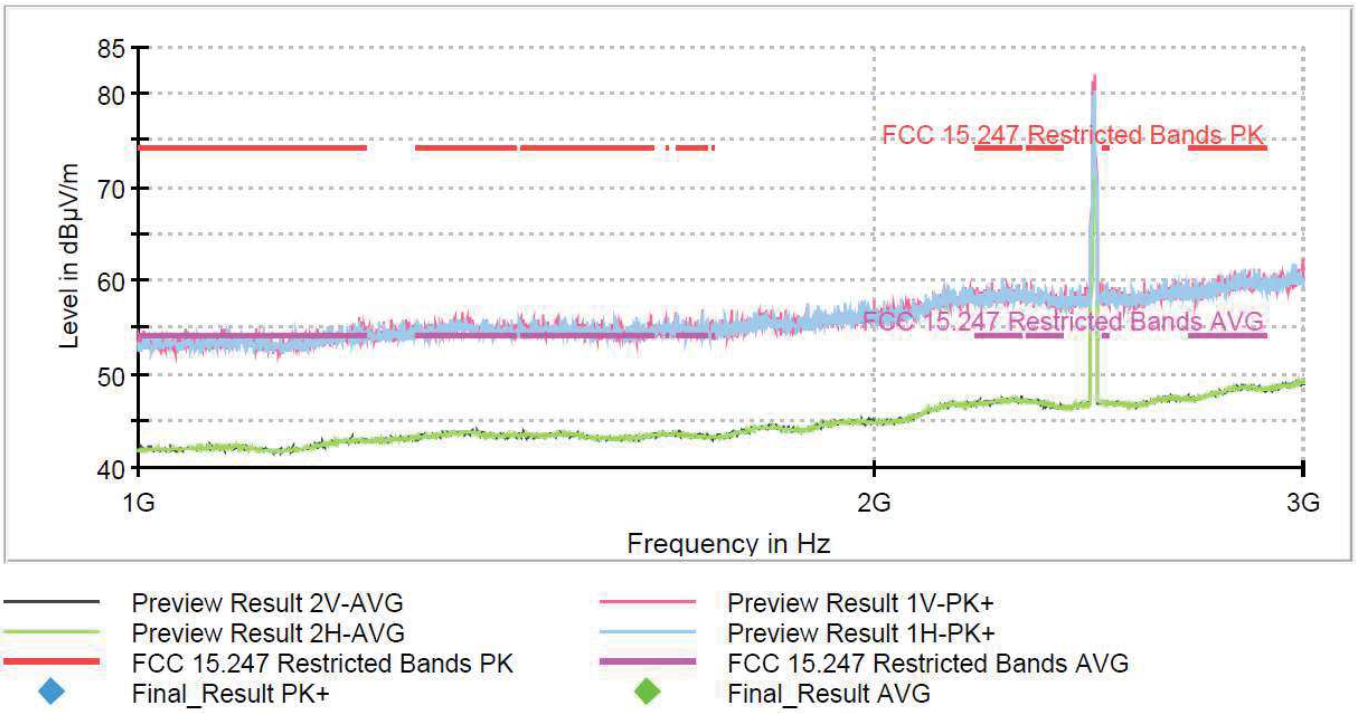
- Middle Channel:



Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

The peak above the limit is the carrier frequency.

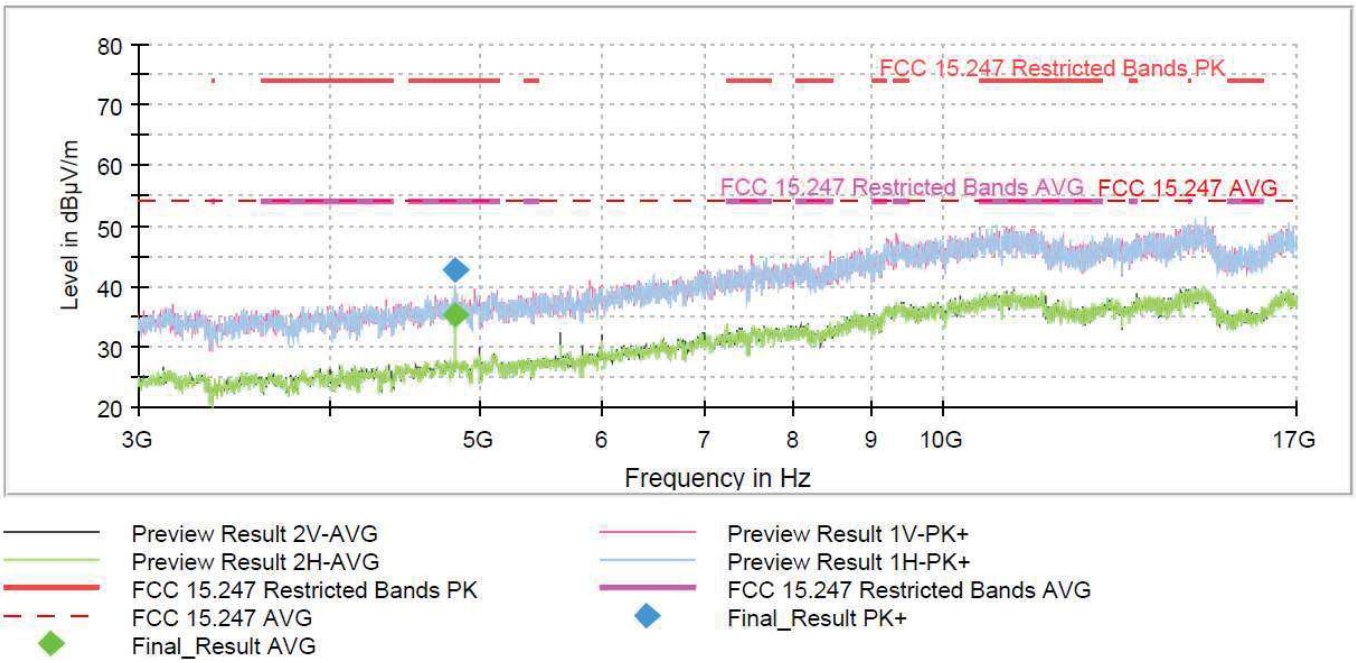
- High Channel:



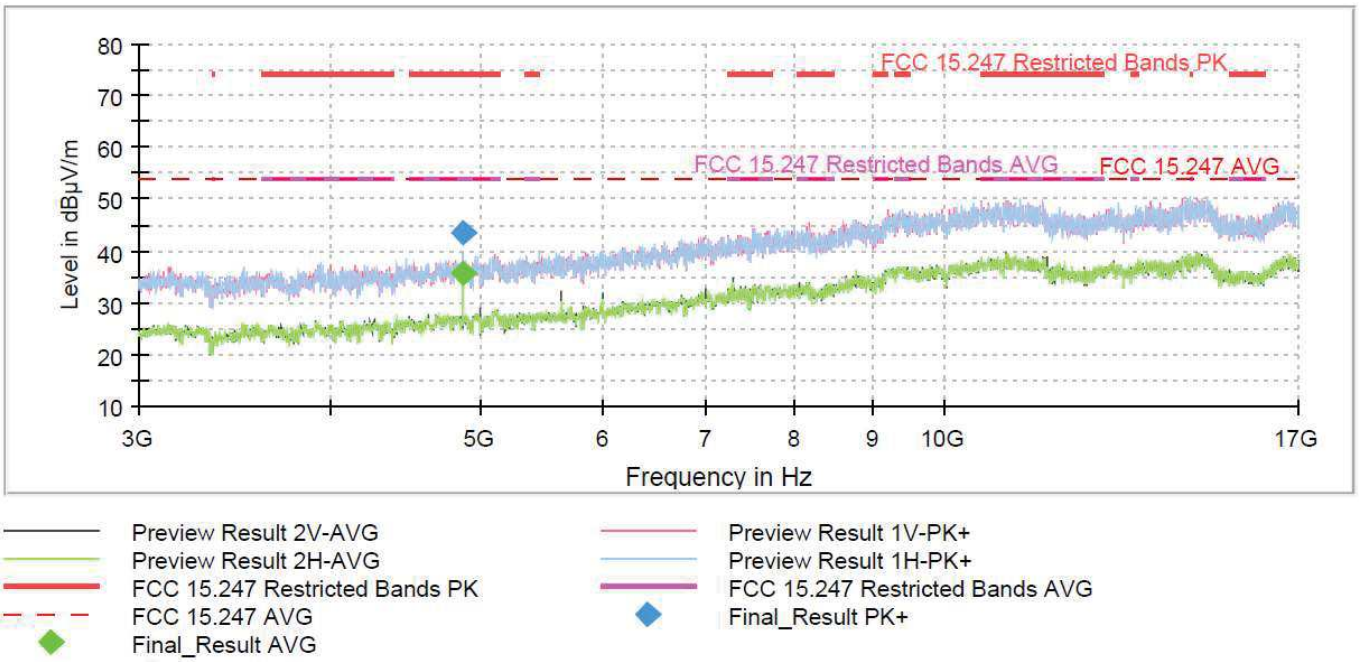
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 - 17 GHz:

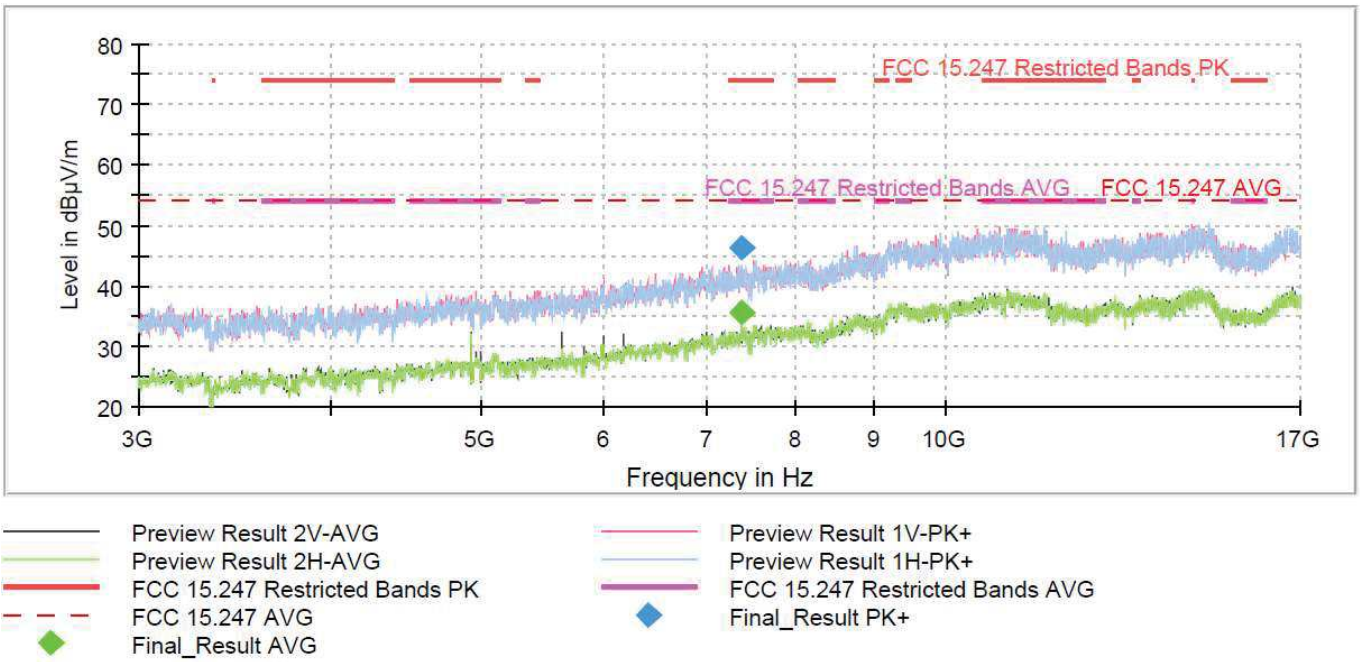
- Low Channel:



- Middle Channel:

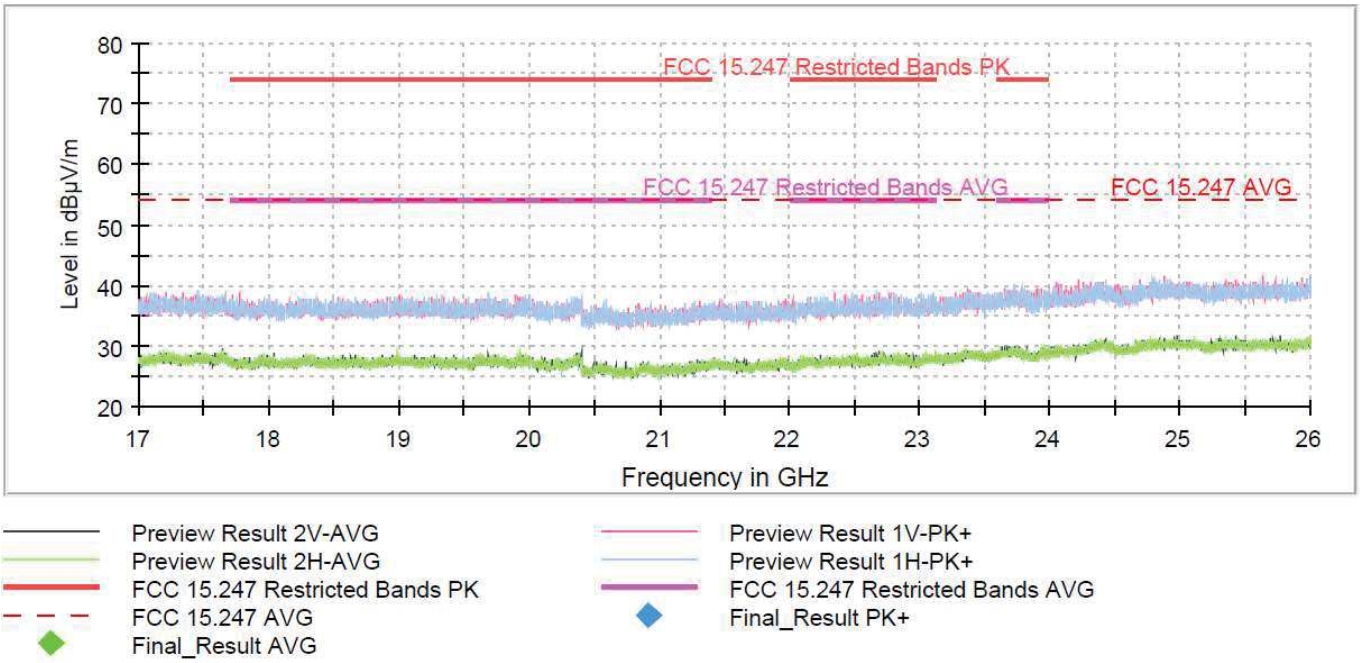


- High Channel:



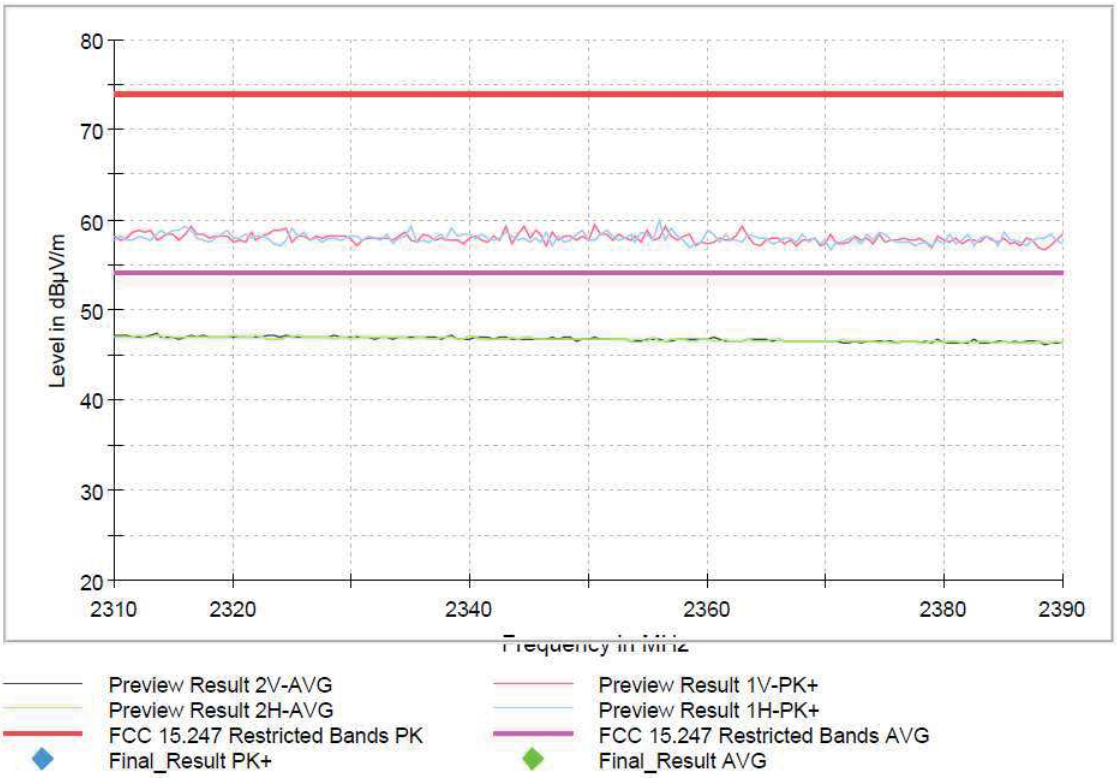
FREQUENCY RANGE 17 - 26 GHz:

The spurious signals detected do not depend on the operating channel.



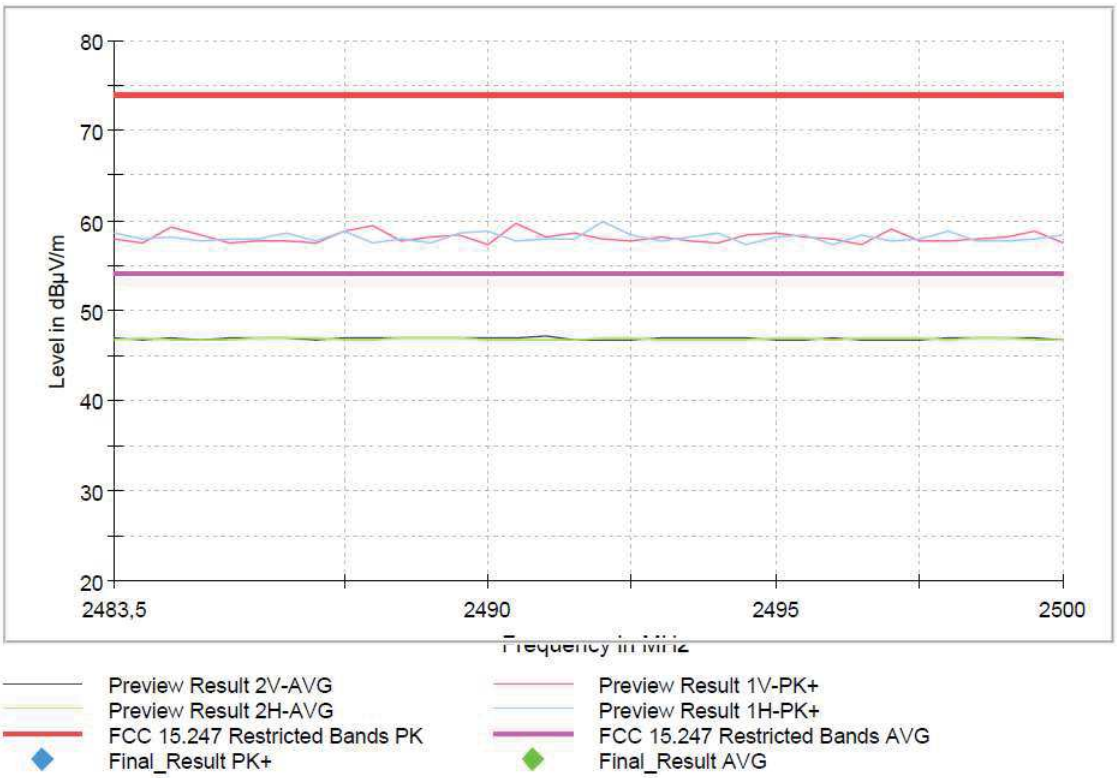
Restricted Band 2.31-2.39 GHz:

- Low Channel:



Restricted Band 2.4835-2.5 GHz:

- High Channel:

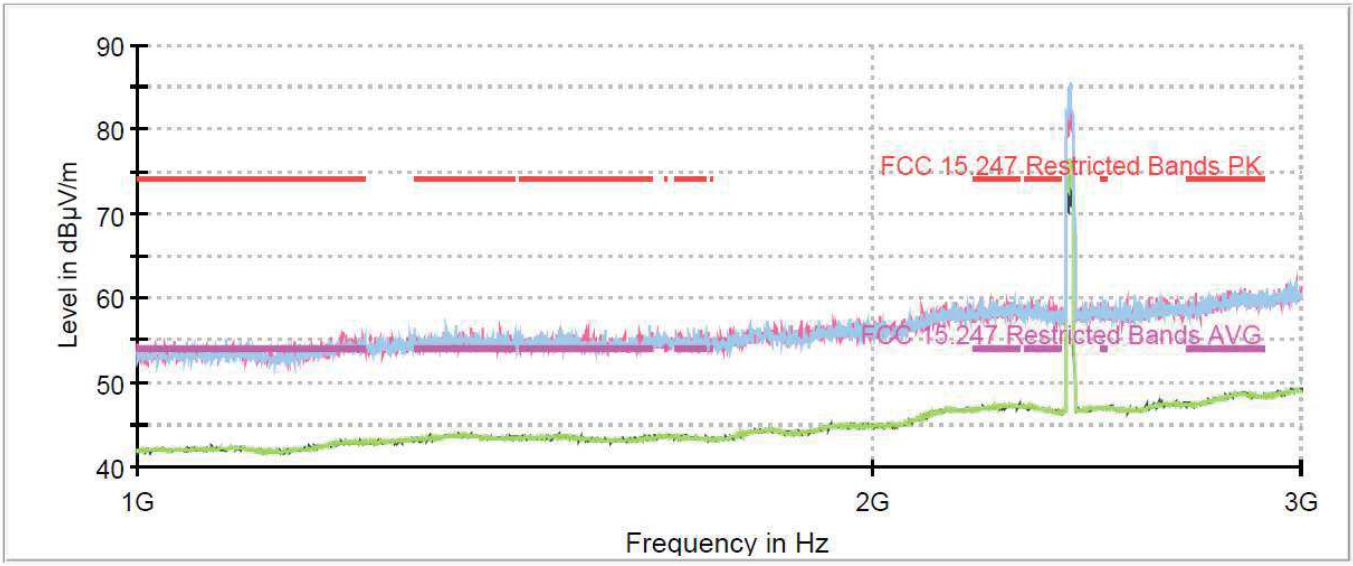


SISO CORE1_Port4 Antenna:

- **Mode 802.11 n20 (OFDM worst case for spurious emissions)**

FREQUENCY RANGE 1 - 3 GHz:

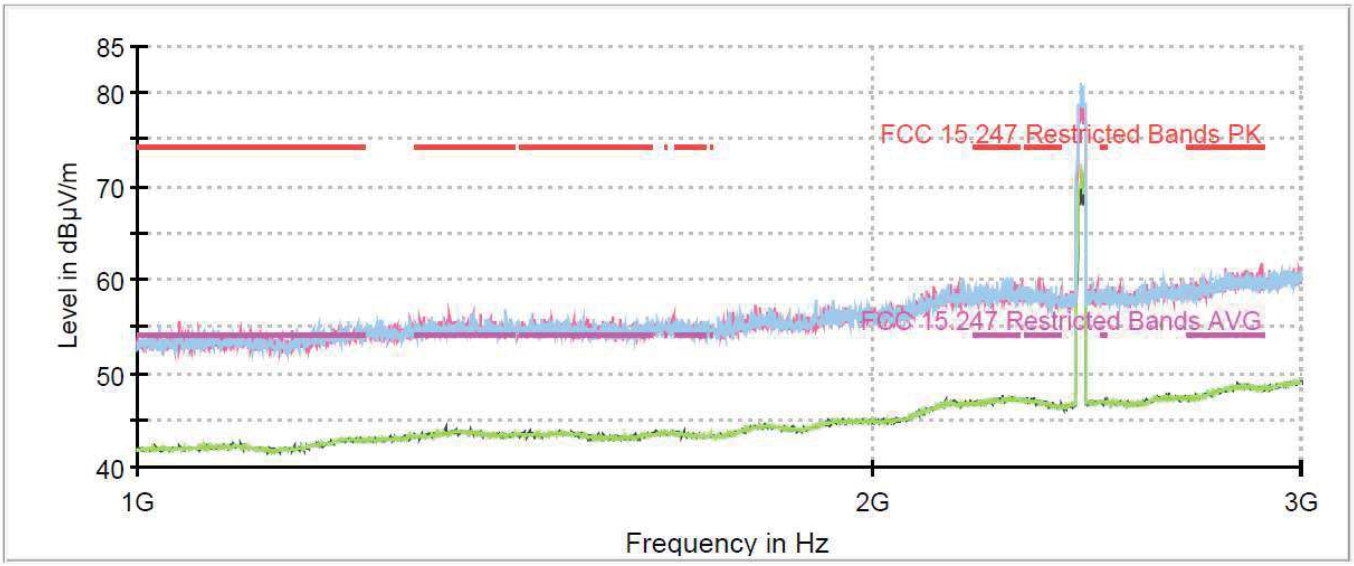
- Low Channel:



Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

The peak above the limit is the carrier frequency.

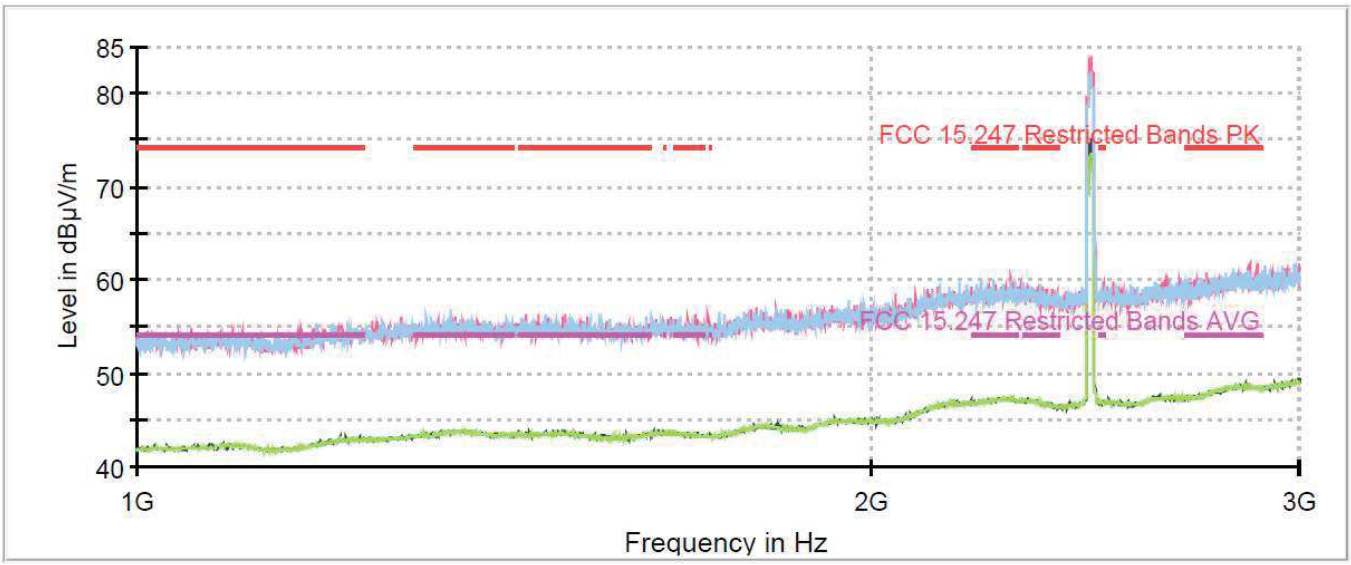
- Middle Channel:



Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

The peak above the limit is the carrier frequency.

- High Channel:

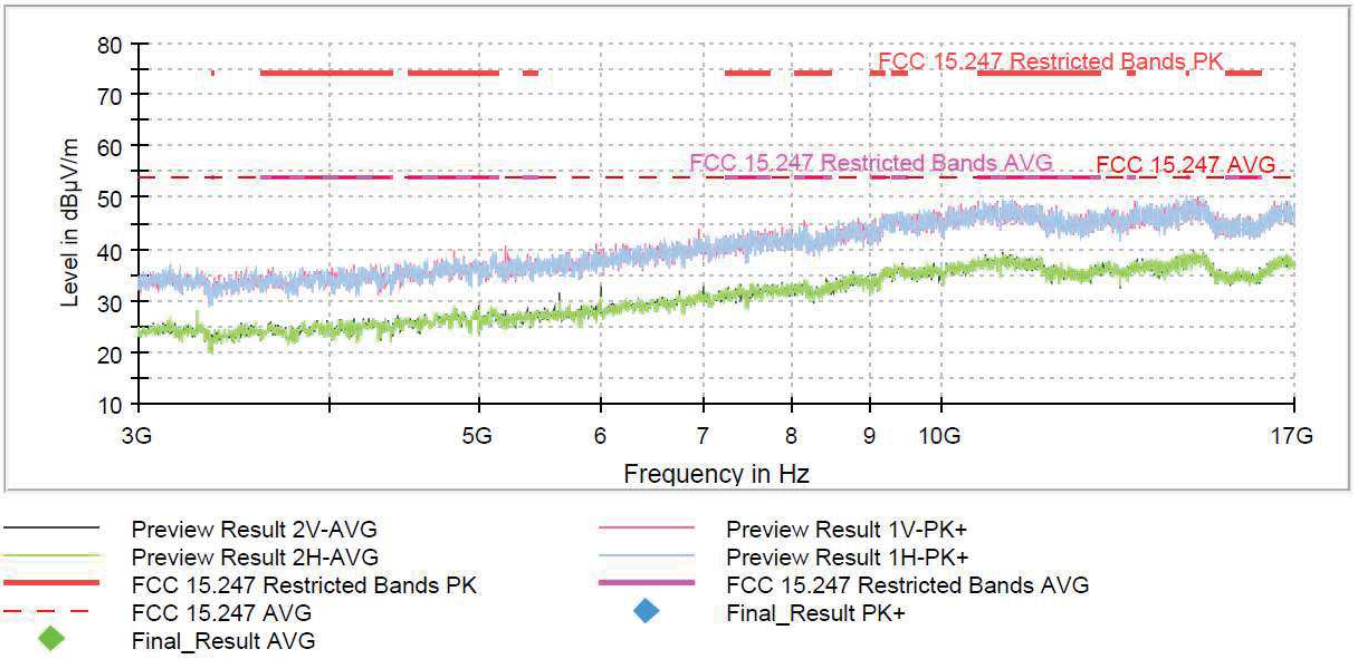


Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

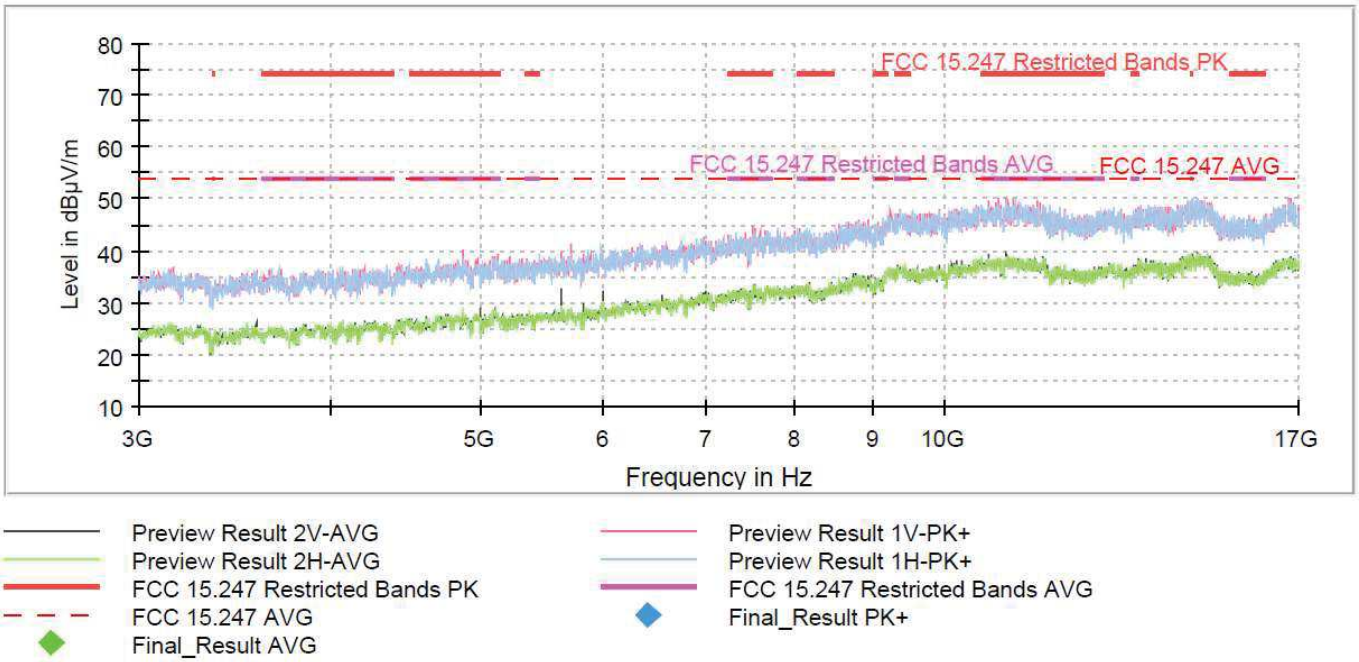
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 - 17 GHz:

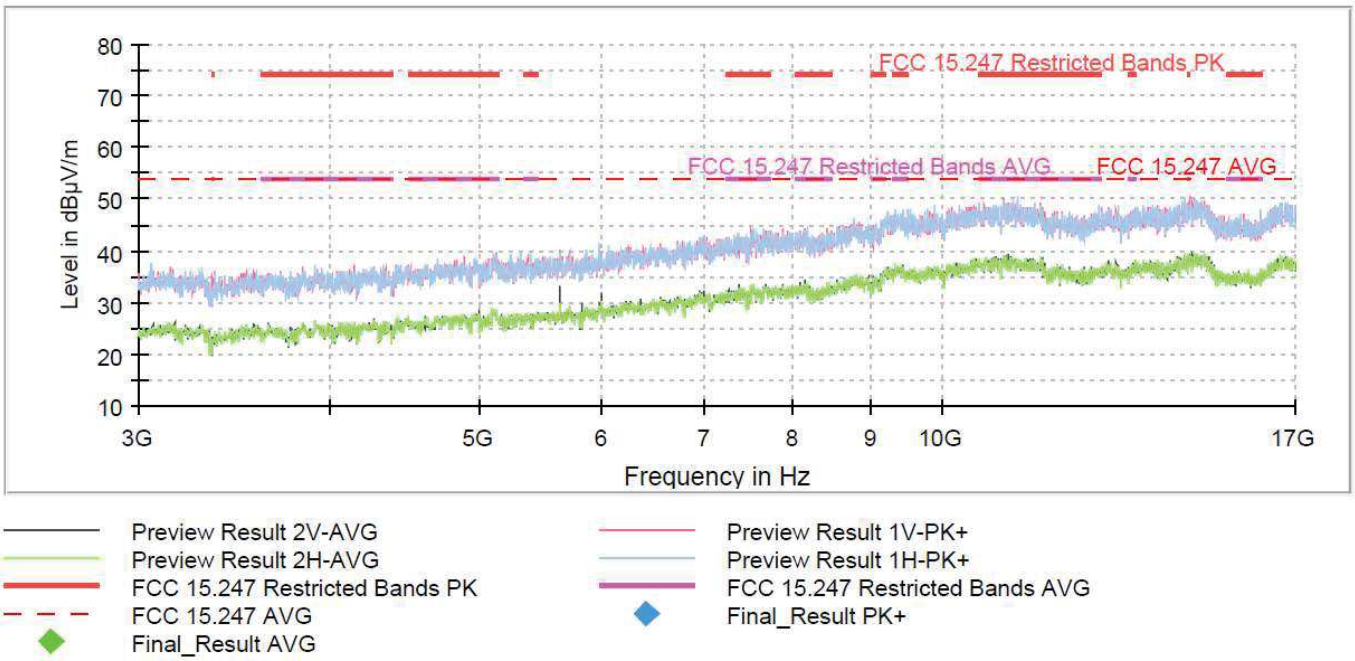
- Low Channel:



- Middle Channel:

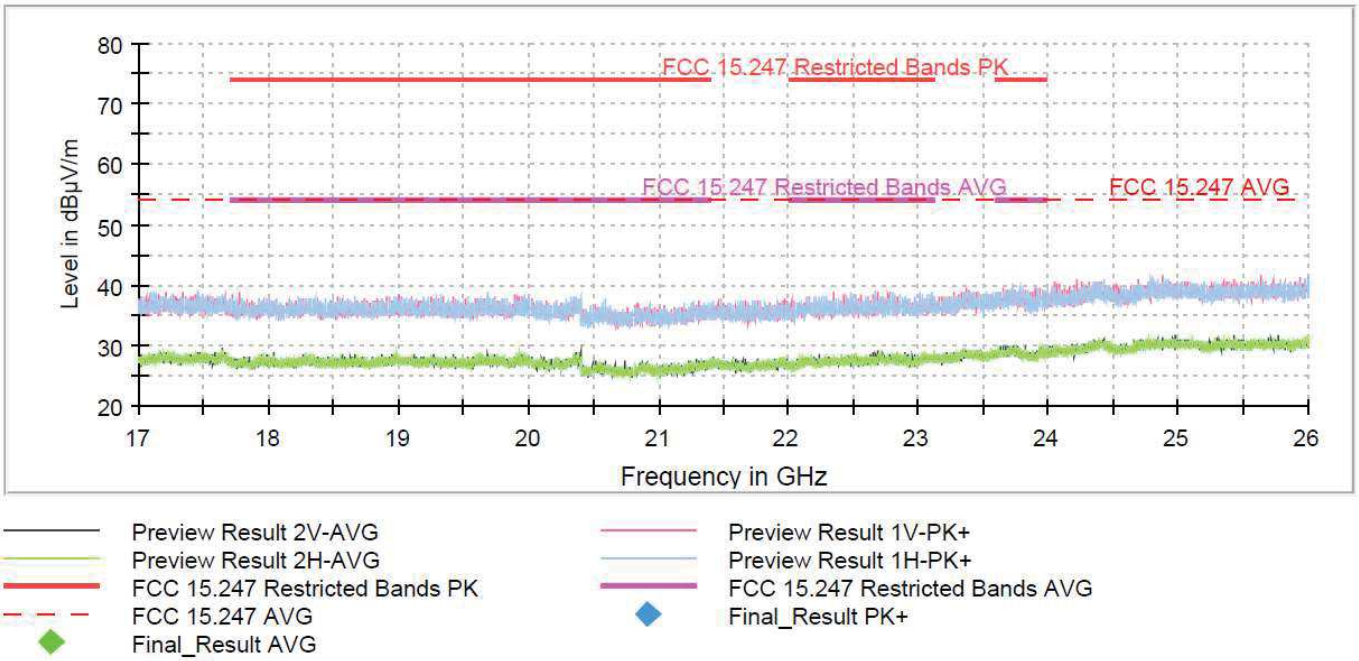


- High Channel:



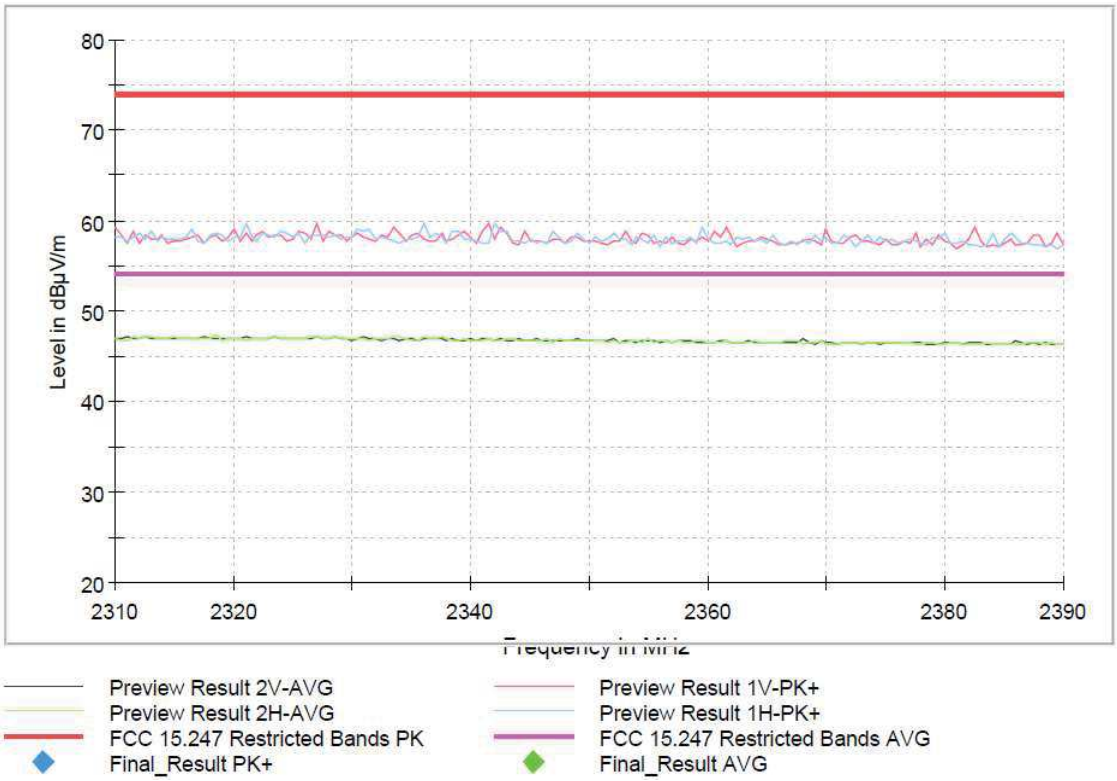
FREQUENCY RANGE 17 - 26 GHz:

The spurious signals detected do not depend on the operating channel.



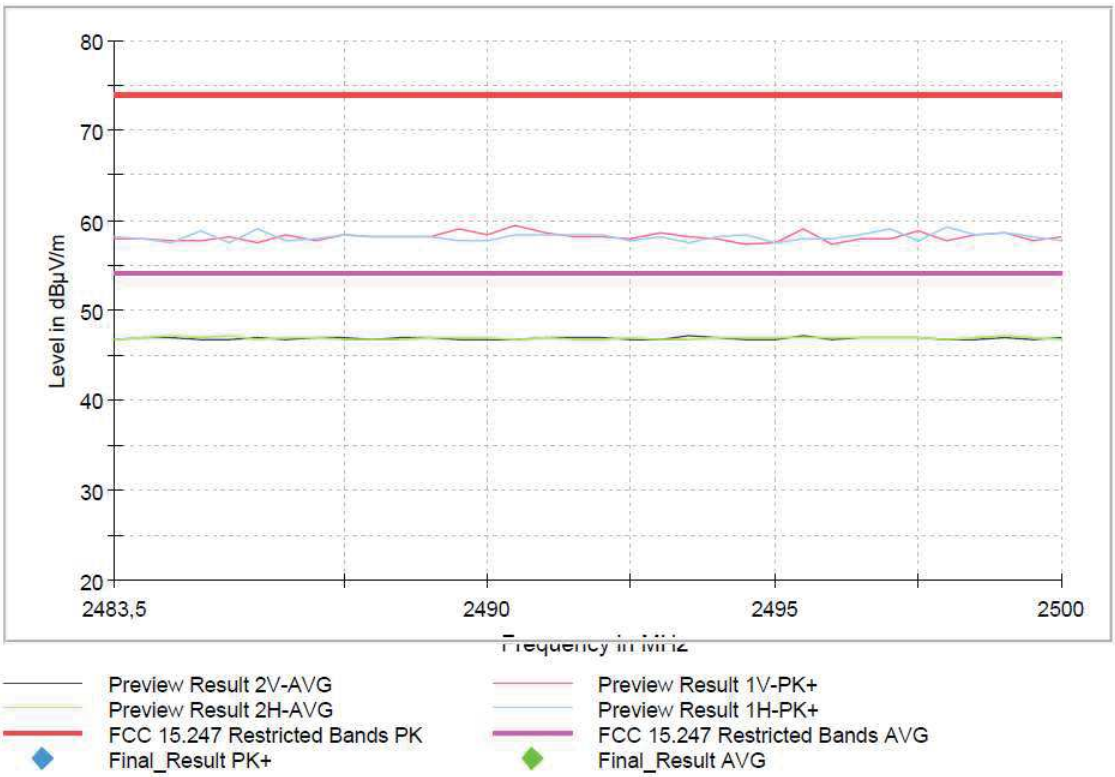
Restricted Band 2.31-2.39 GHz:

- Low Channel:



Restricted Band 2.4835-2.5 GHz:

- High Channel:

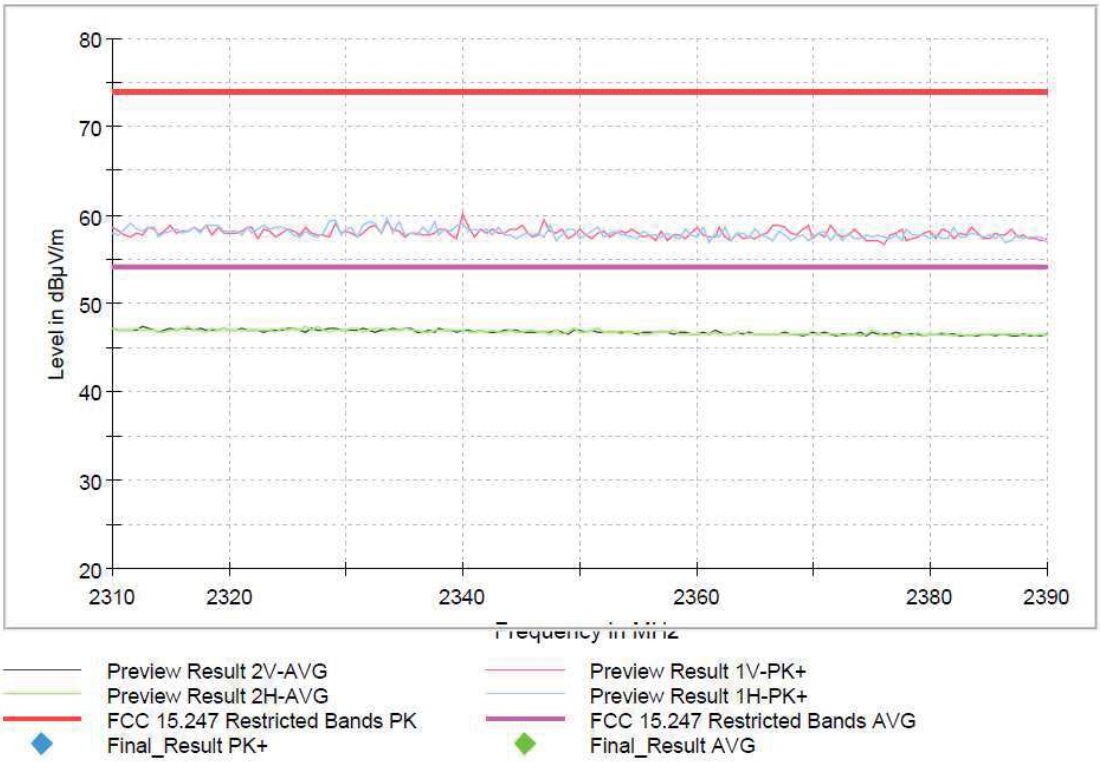


SISO CORE1_Port4 Antenna:

- **Mode 802.11 g**

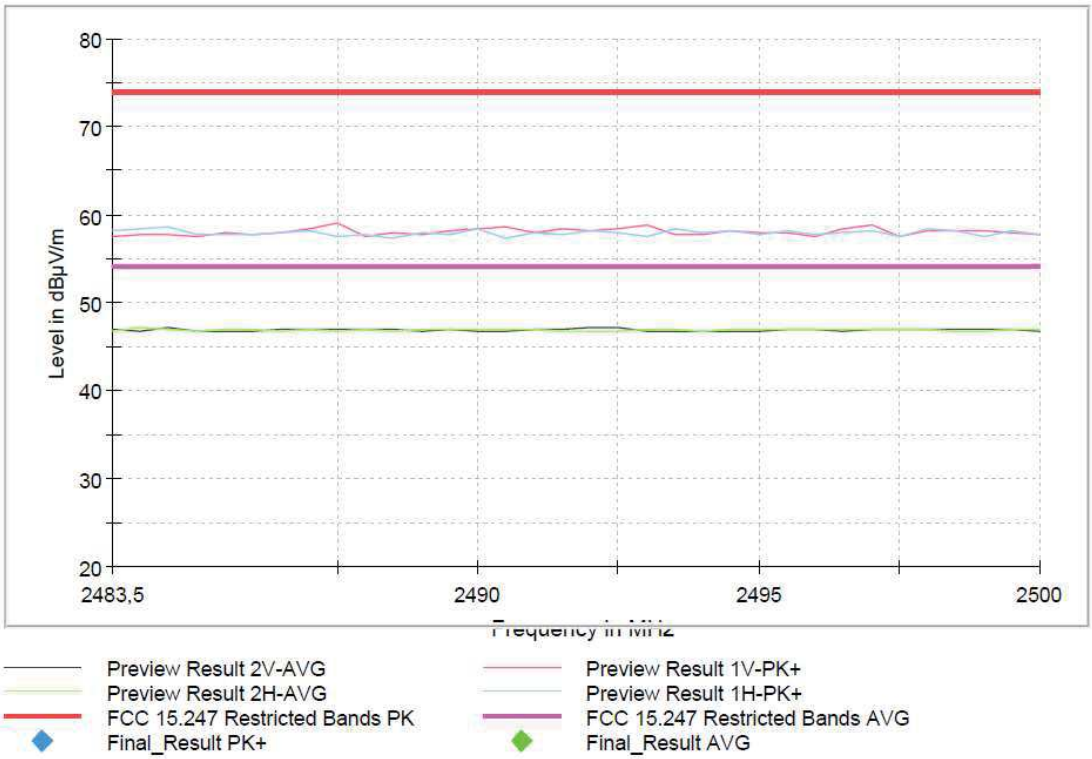
Restricted Band 2.31-2.39 GHz:

- Low Channel:



Restricted Band 2.4835-2.5 GHz:

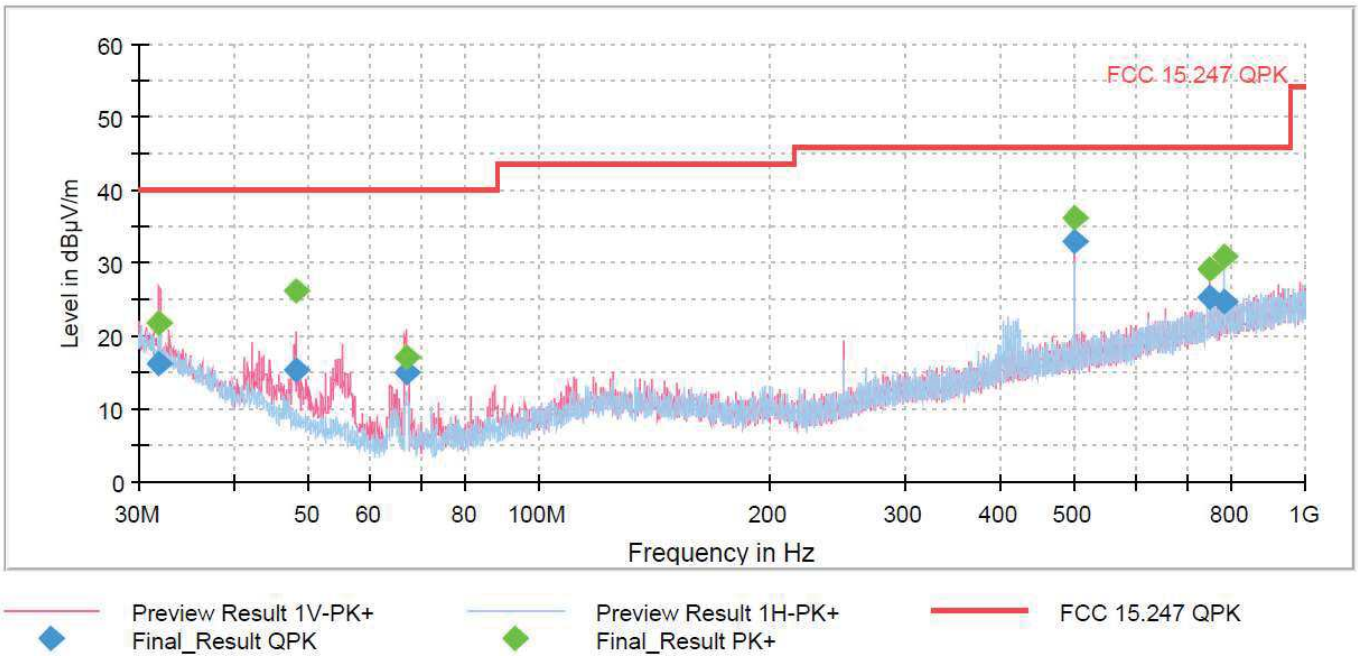
- High Channel:



MIMO – CORE1_Port4 Antenna & CORE0_Port2 Antenna:

FREQUENCY RANGE 30 MHz - 1 GHz:

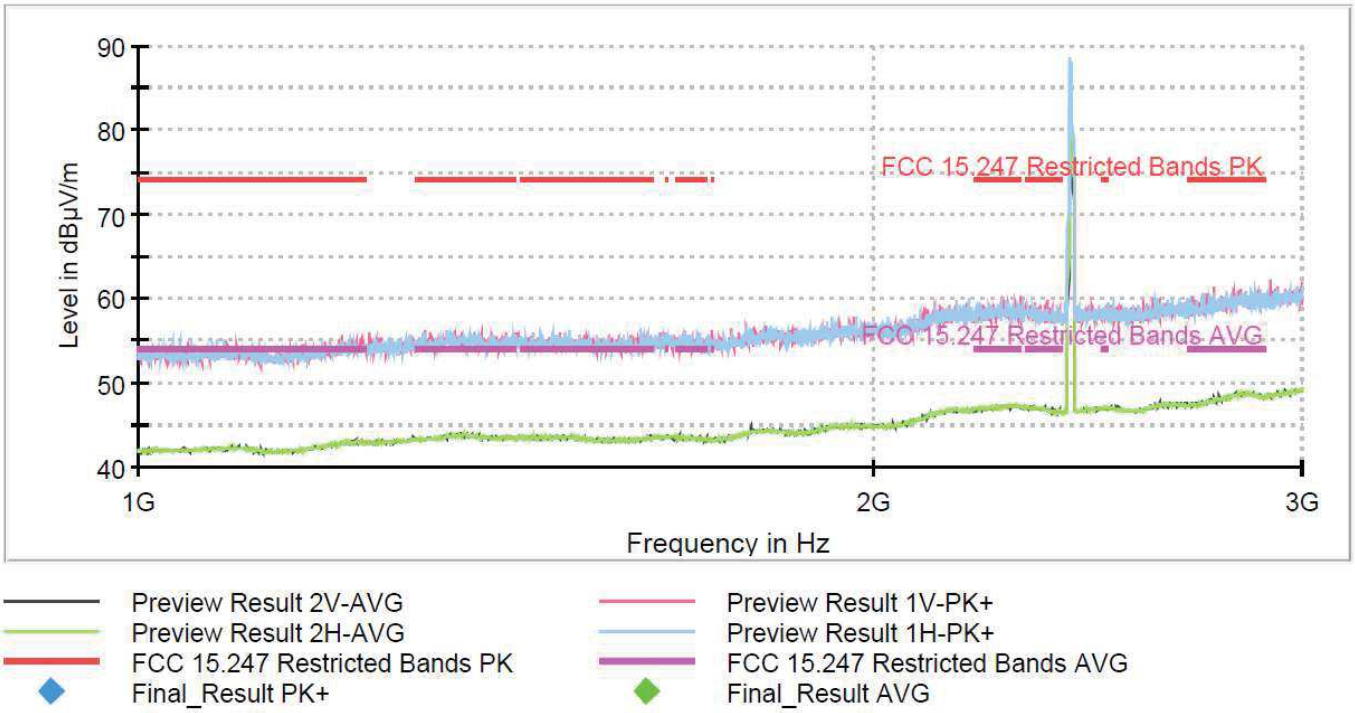
The spurious signals detected do not depend neither on the operating channel nor the modulation mode.



- **Mode 802.11 b**

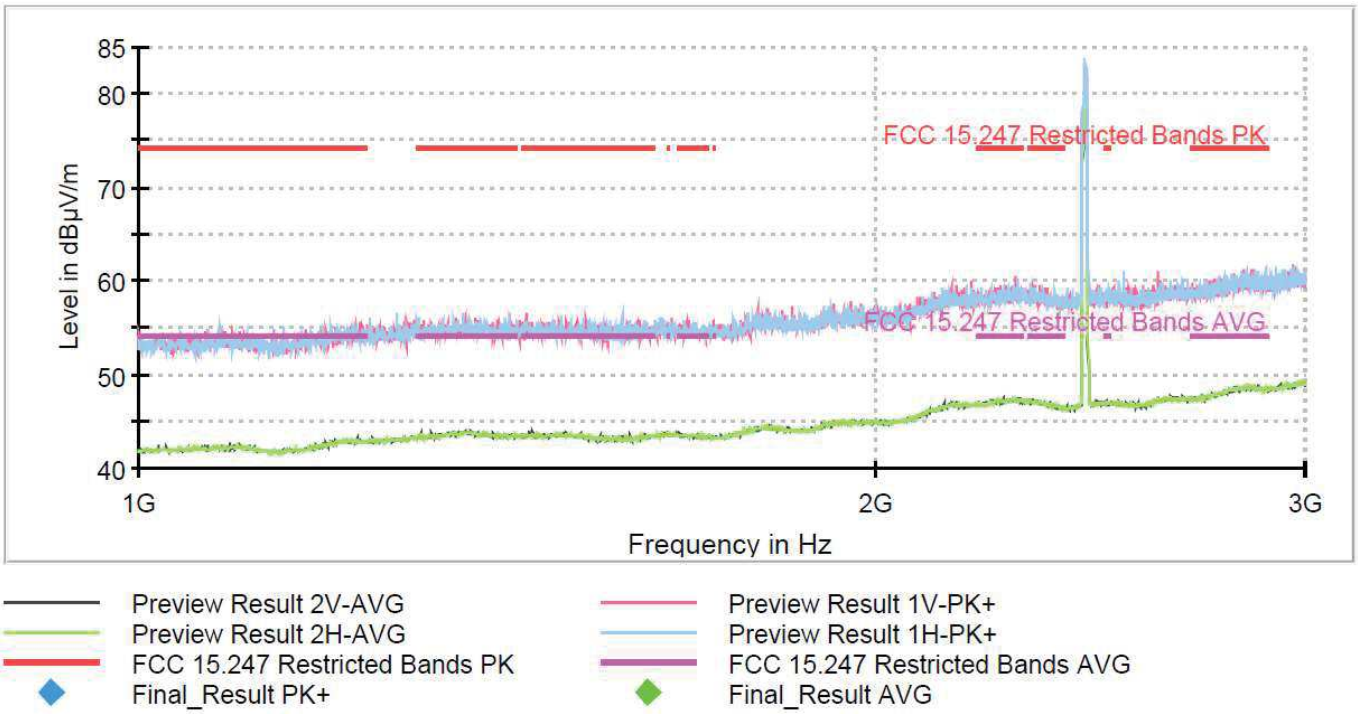
FREQUENCY RANGE 1 - 3 GHz:

- Low Channel:



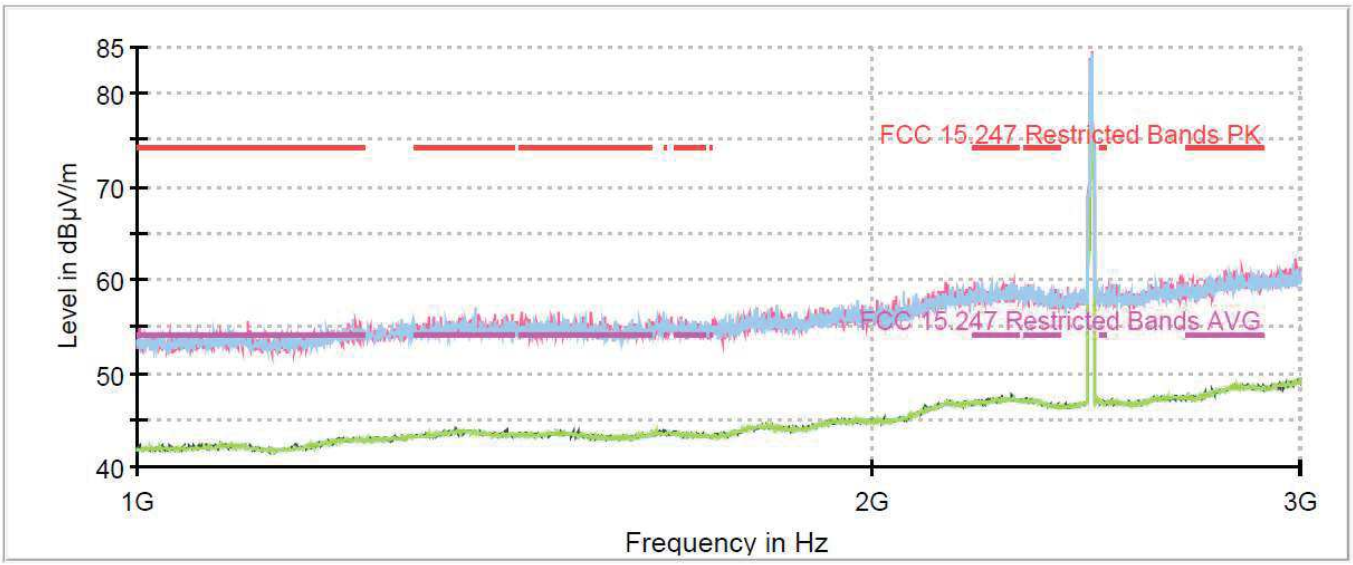
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

- High Channel:

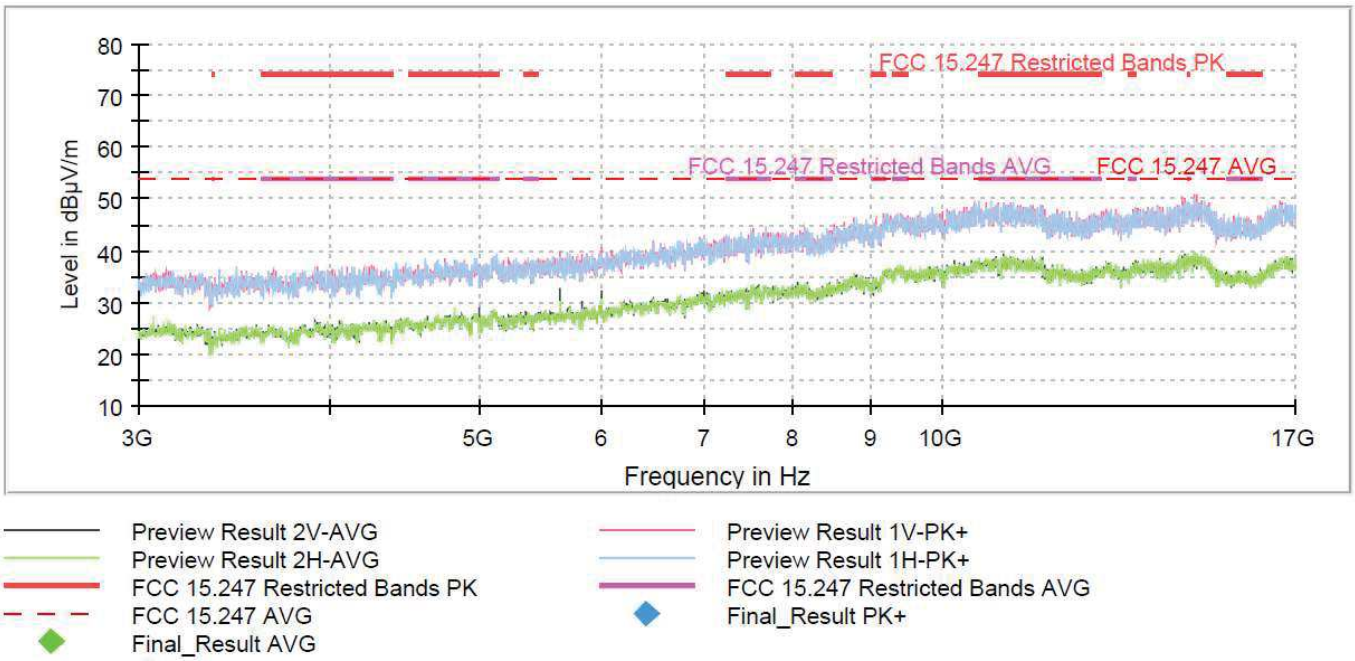


Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

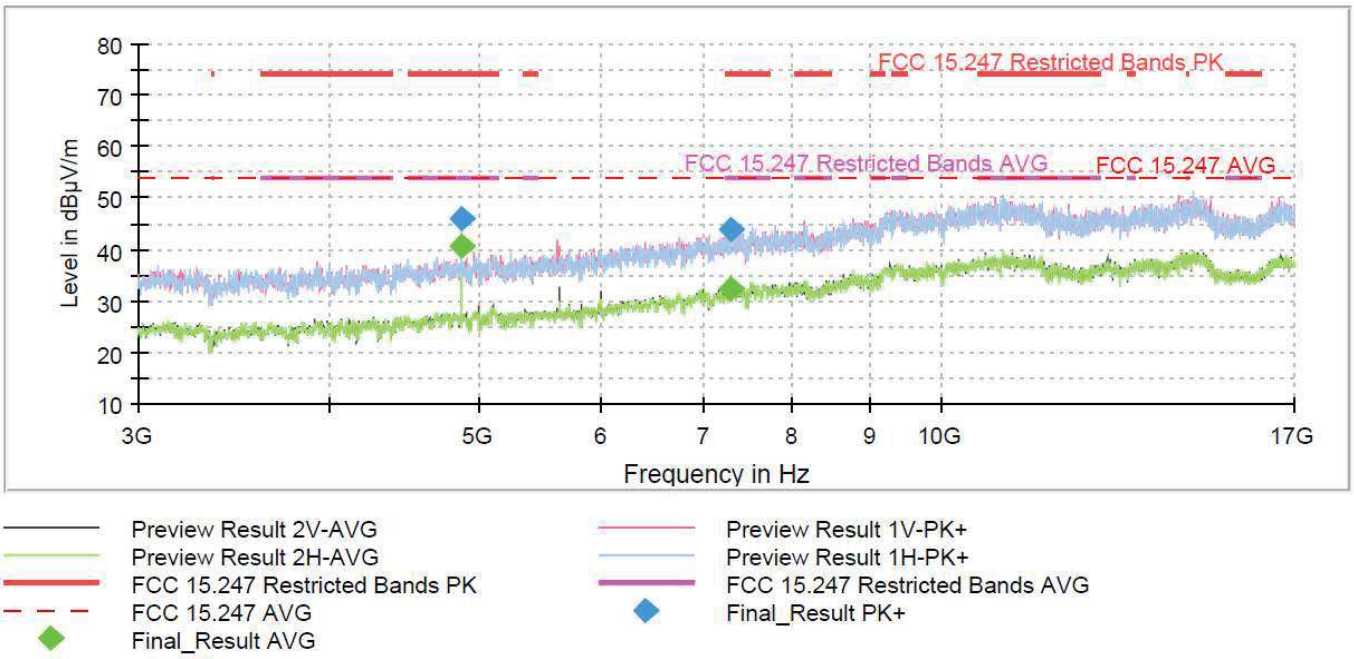
The peak above the limit is the carrier frequency.

FREQUENCY RANGE 3 - 17 GHz:

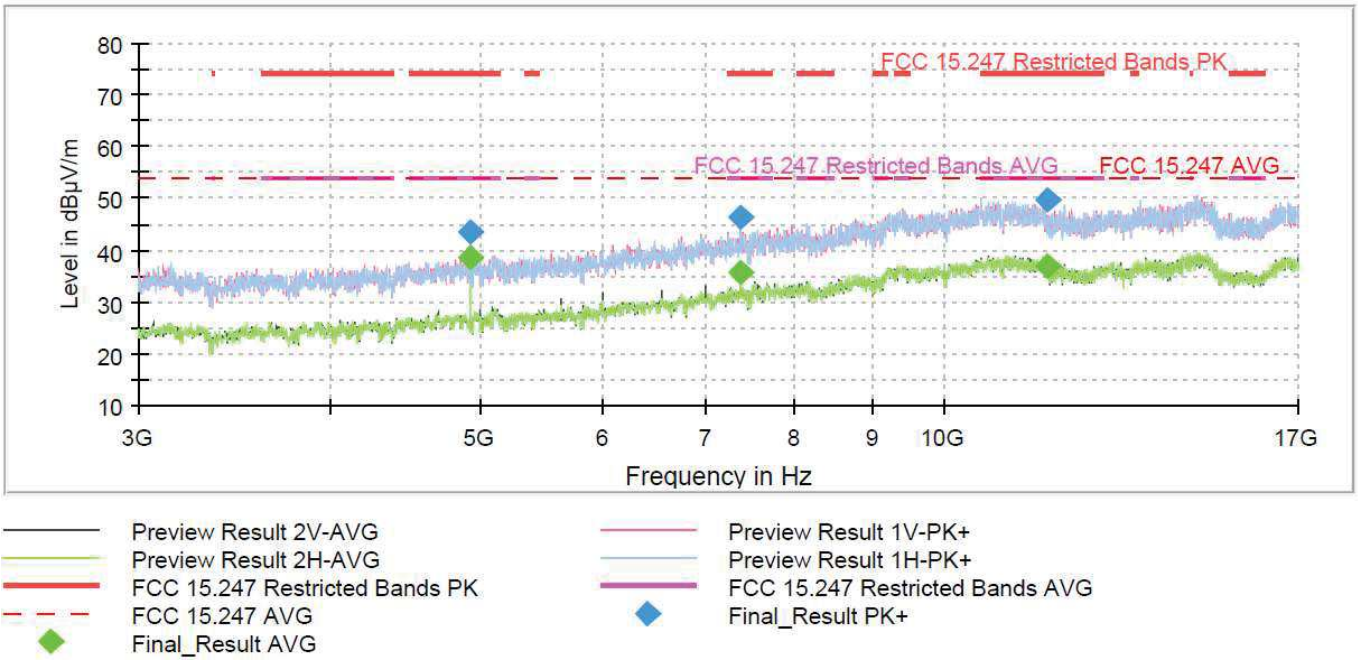
- Low Channel:



- Middle Channel:

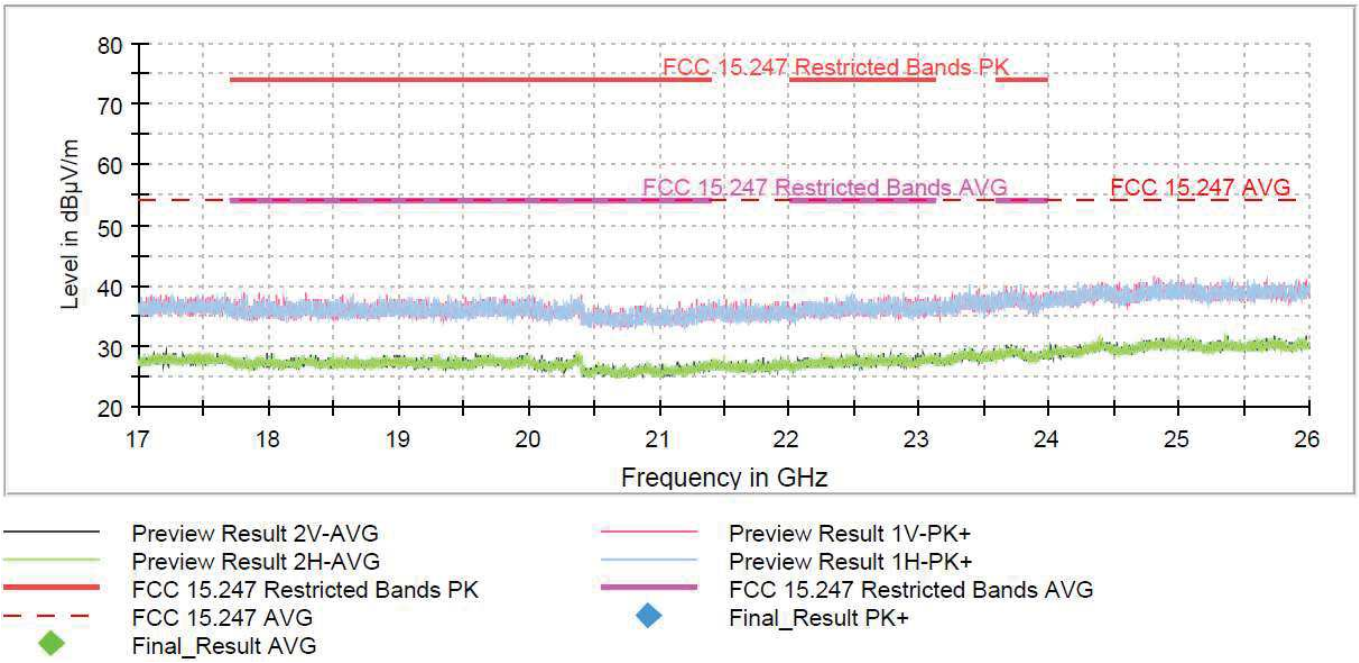


- High Channel:



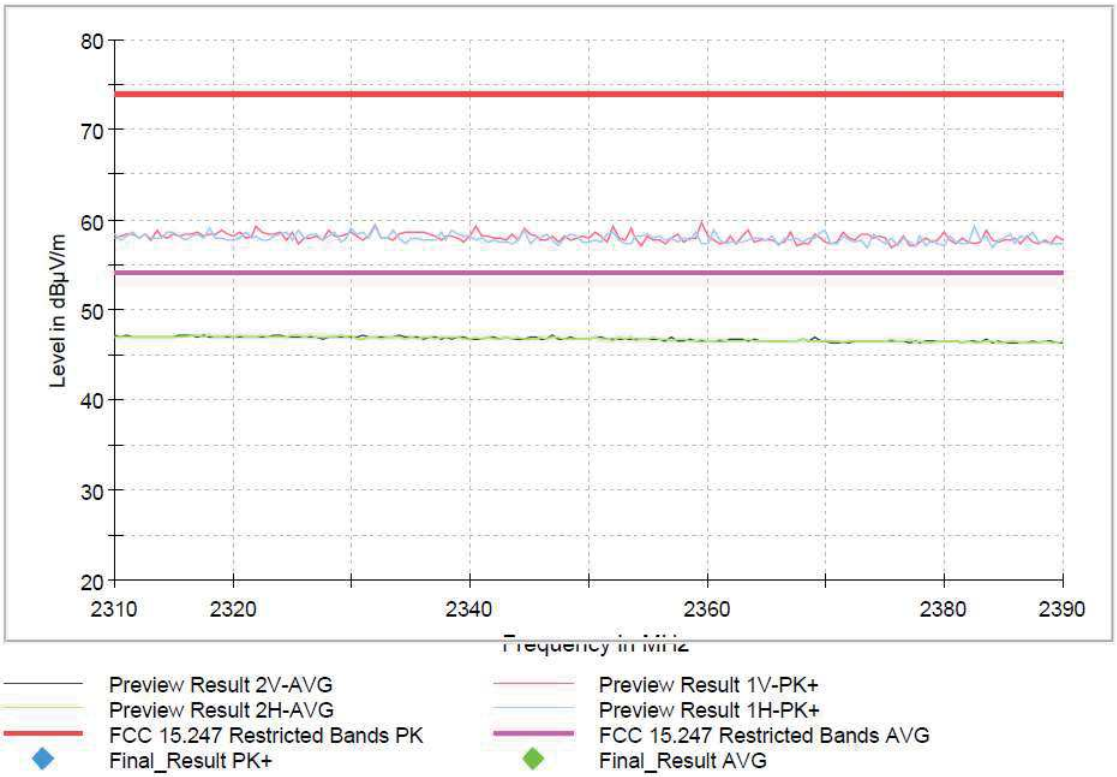
FREQUENCY RANGE 17 - 26 GHz:

The spurious signals detected do not depend on the operating channel.



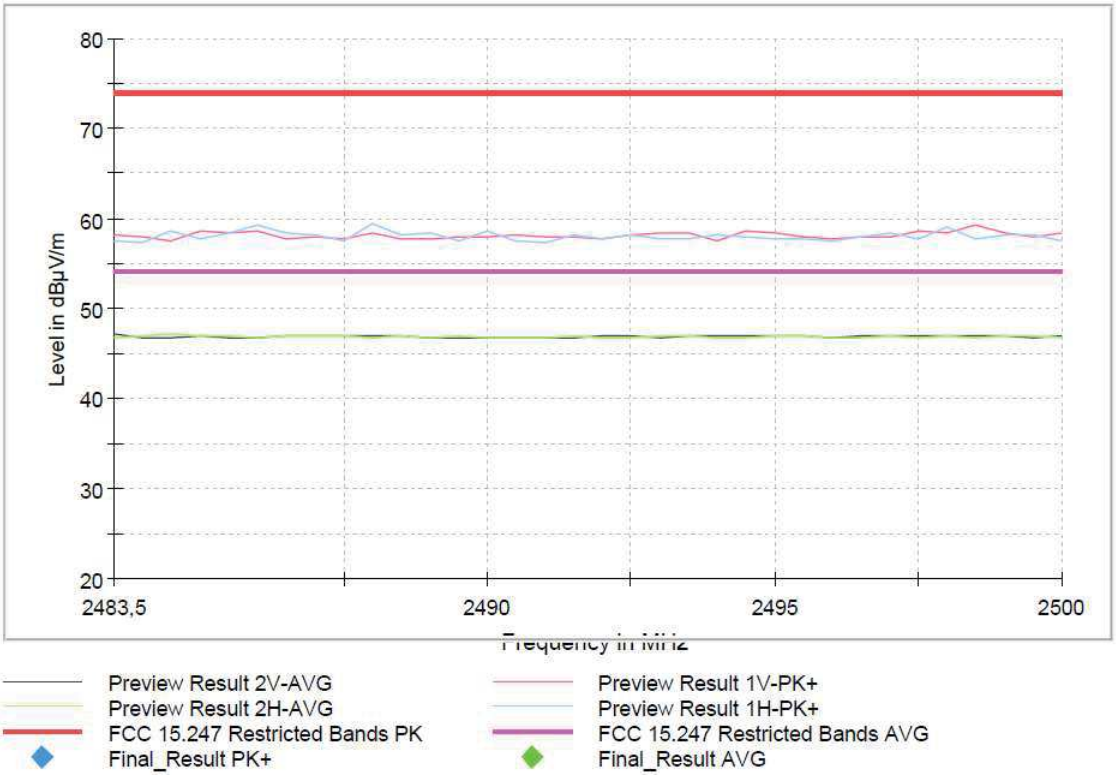
Restricted Band 2.31-2.39 GHz:

- Low Channel:



Restricted Band 2.4835-2.5 GHz:

- High Channel:

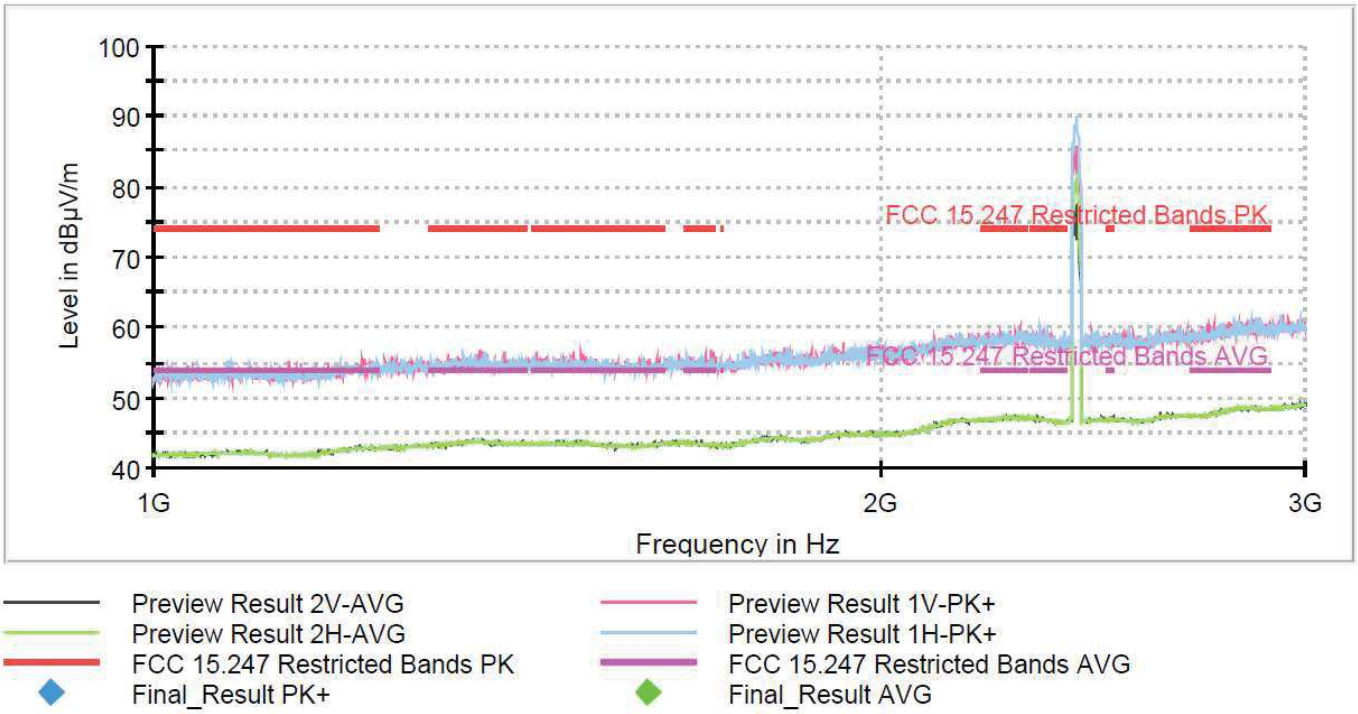


MIMO – CORE1_Port4 Antenna & CORE0_Port2 Antenna:

- **Mode 802.11 n20 (OFDM worst case for spurious emissions)**

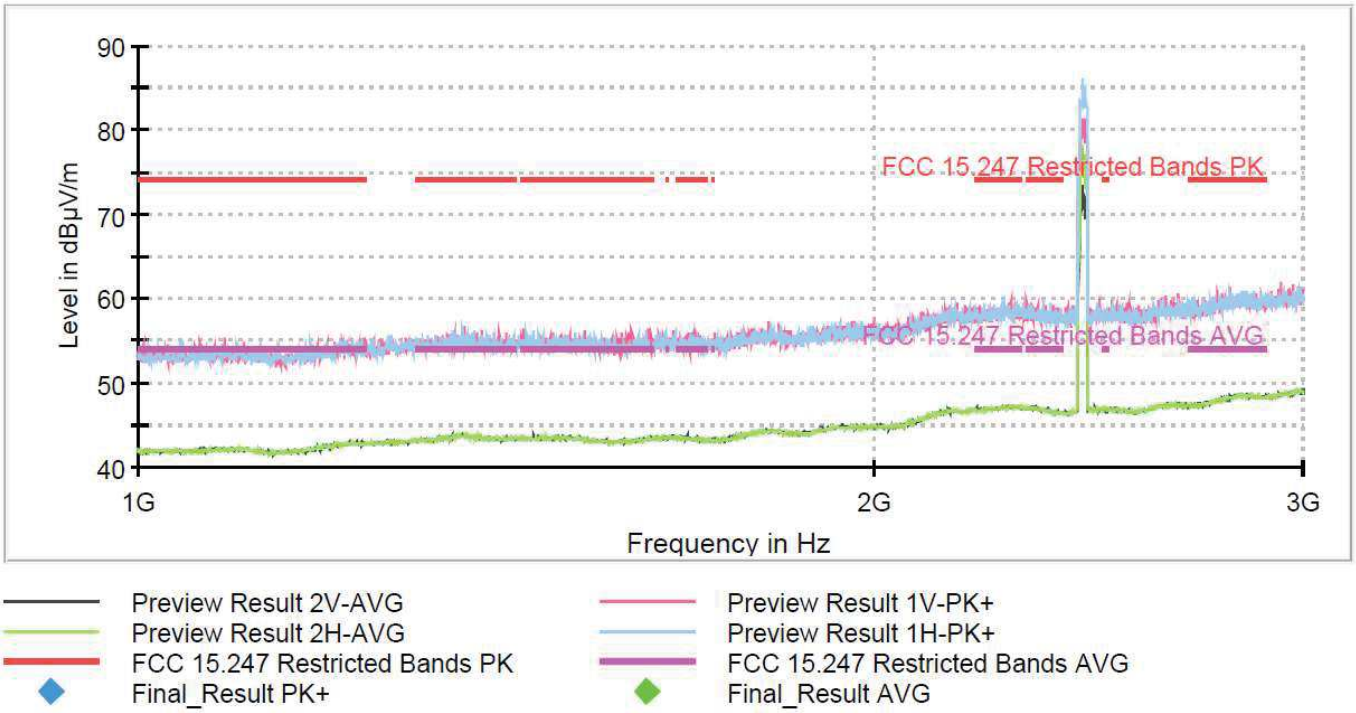
FREQUENCY RANGE 1 - 3 GHz:

- Low Channel:



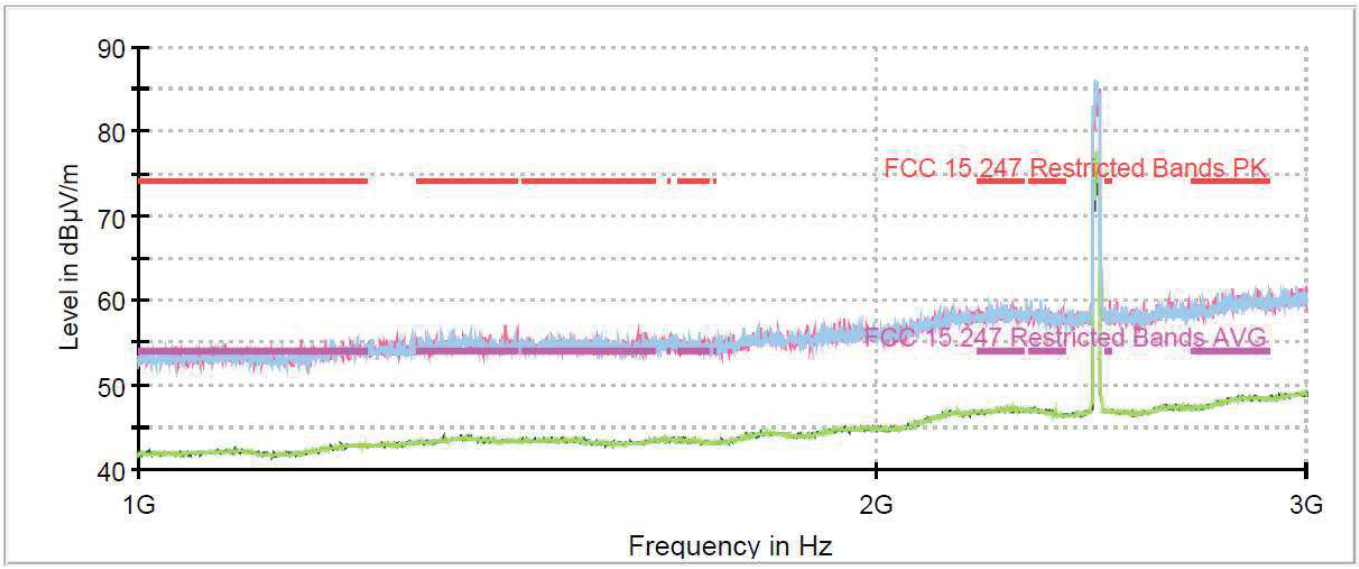
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

- High Channel:

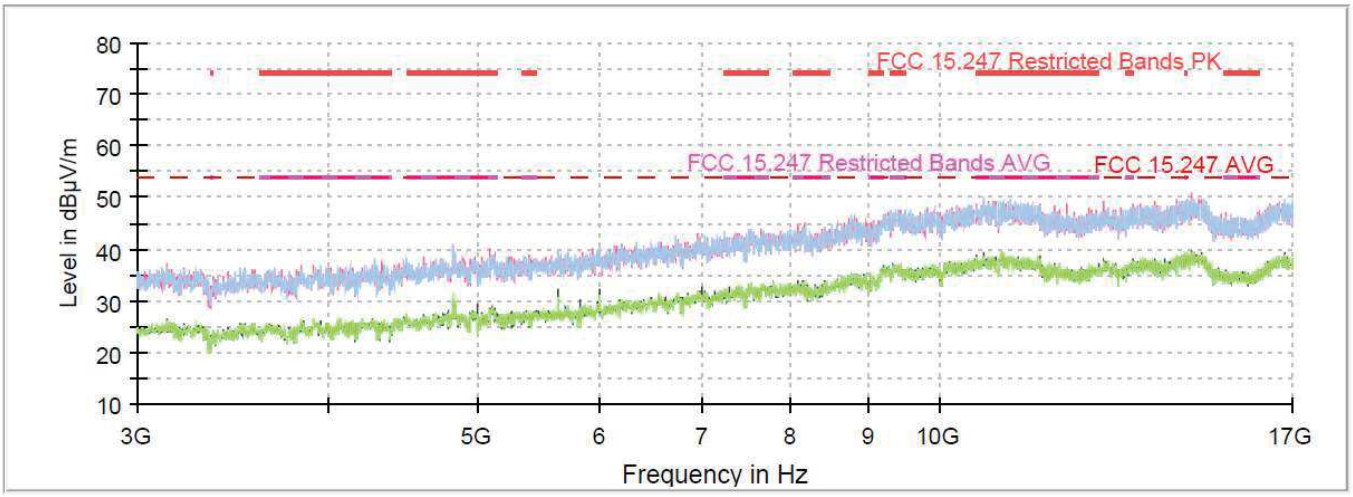


Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
Final_Result PK+
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result AVG

The peak above the limit is the carrier frequency.

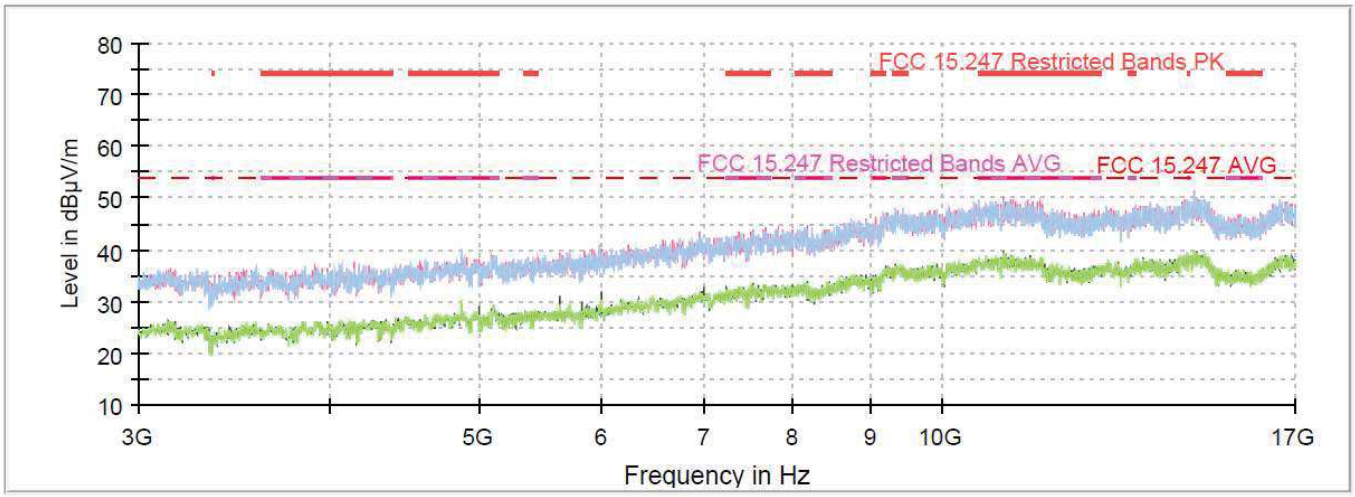
FREQUENCY RANGE 3 - 17 GHz:

- Low Channel:



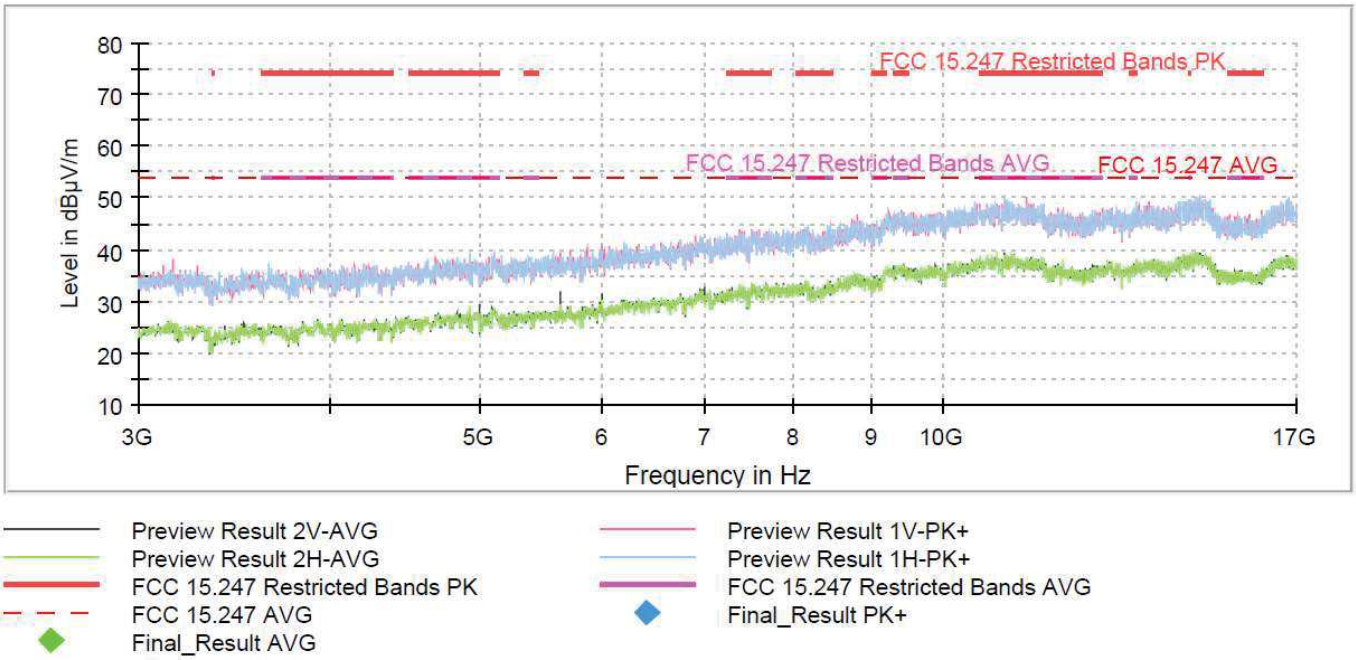
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
FCC 15.247 AVG
Final_Result AVG
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result PK+

- Middle Channel:



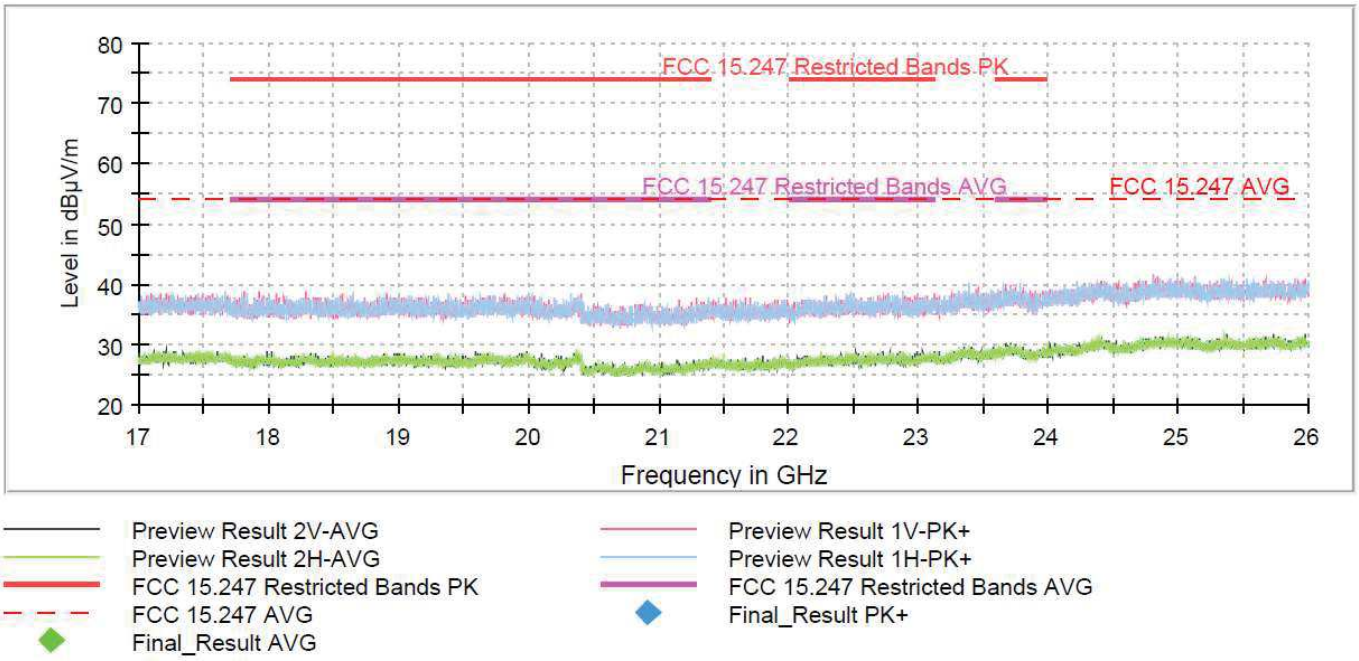
Preview Result 2V-AVG
Preview Result 2H-AVG
FCC 15.247 Restricted Bands PK
FCC 15.247 AVG
Final_Result AVG
Preview Result 1V-PK+
Preview Result 1H-PK+
FCC 15.247 Restricted Bands AVG
Final_Result PK+

- High Channel:



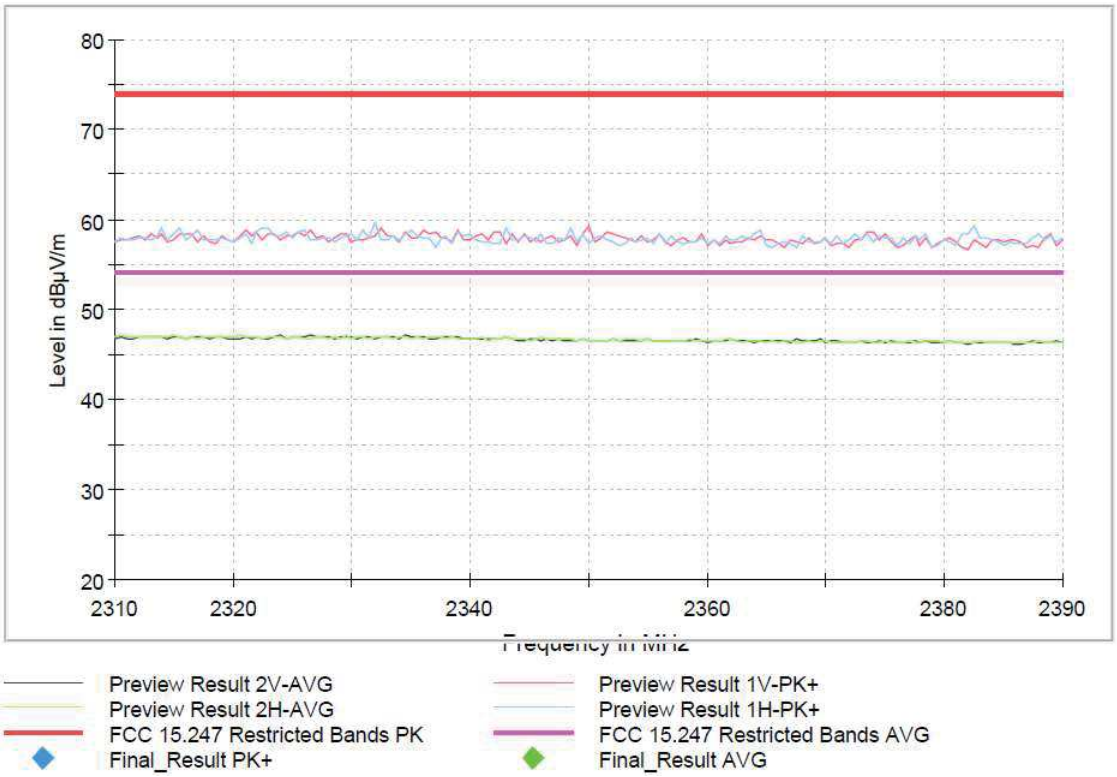
FREQUENCY RANGE 17 - 26 GHz:

The spurious signals detected do not depend on the operating channel.



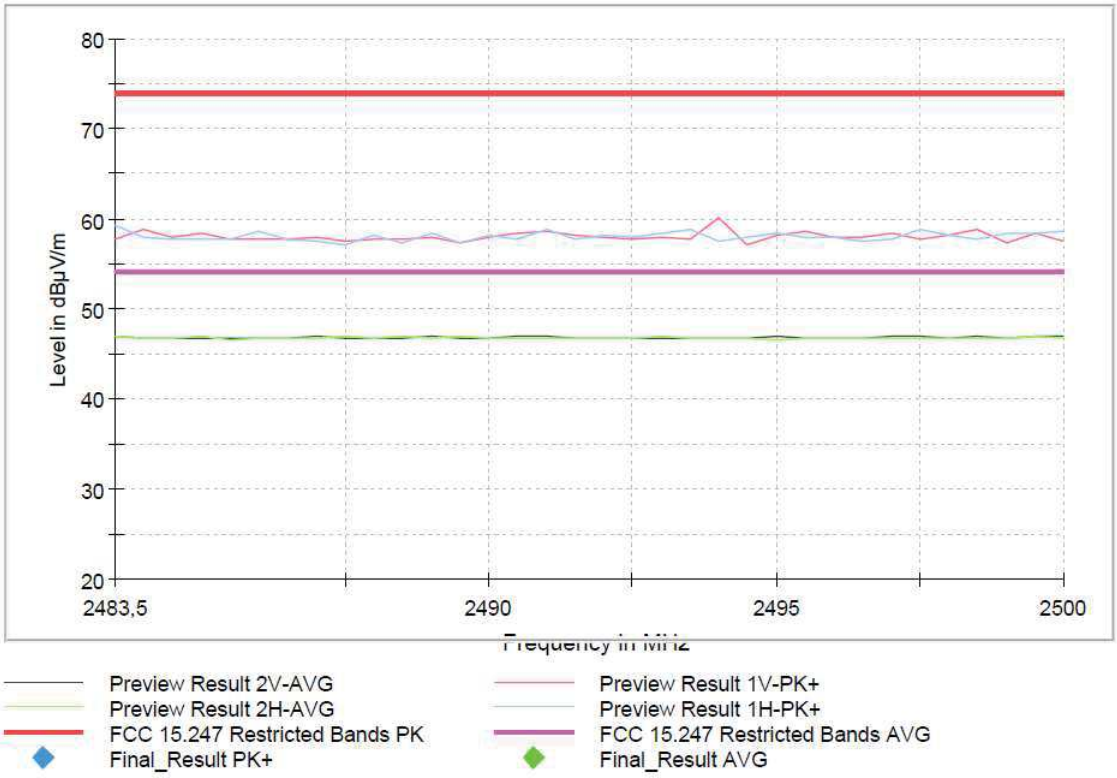
Restricted Band 2.31-2.39 GHz:

- Low Channel:



Restricted Band 2.4835-2.5 GHz:

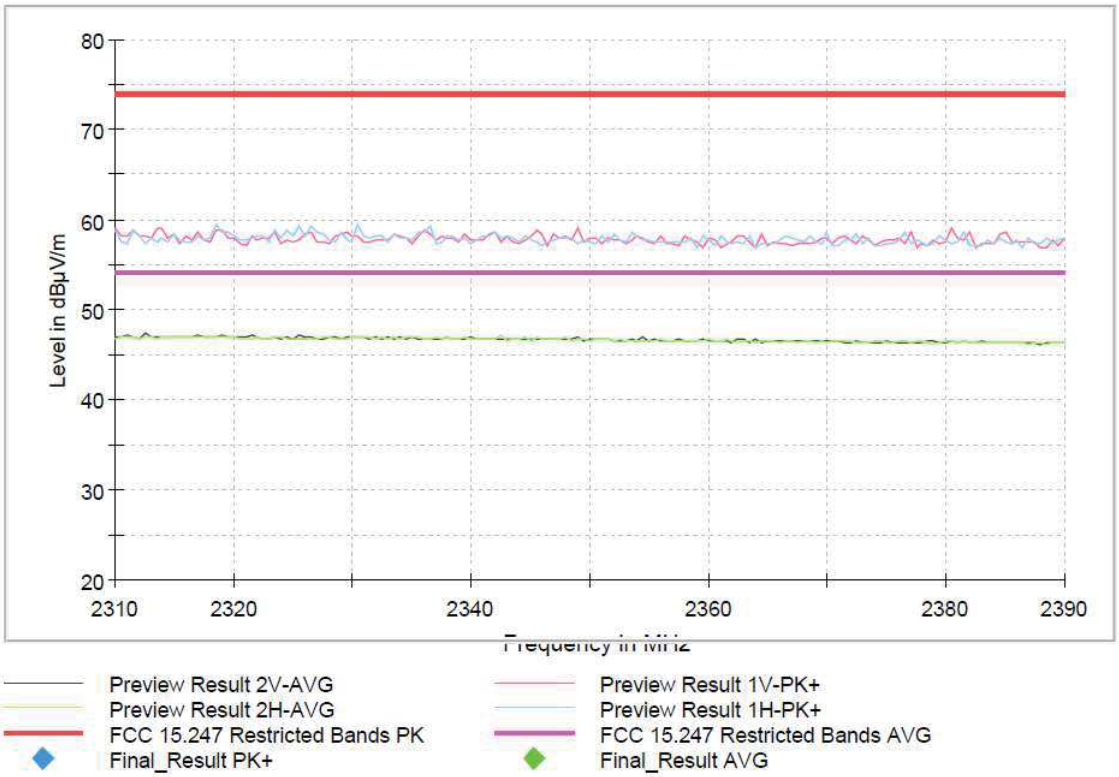
- High Channel:

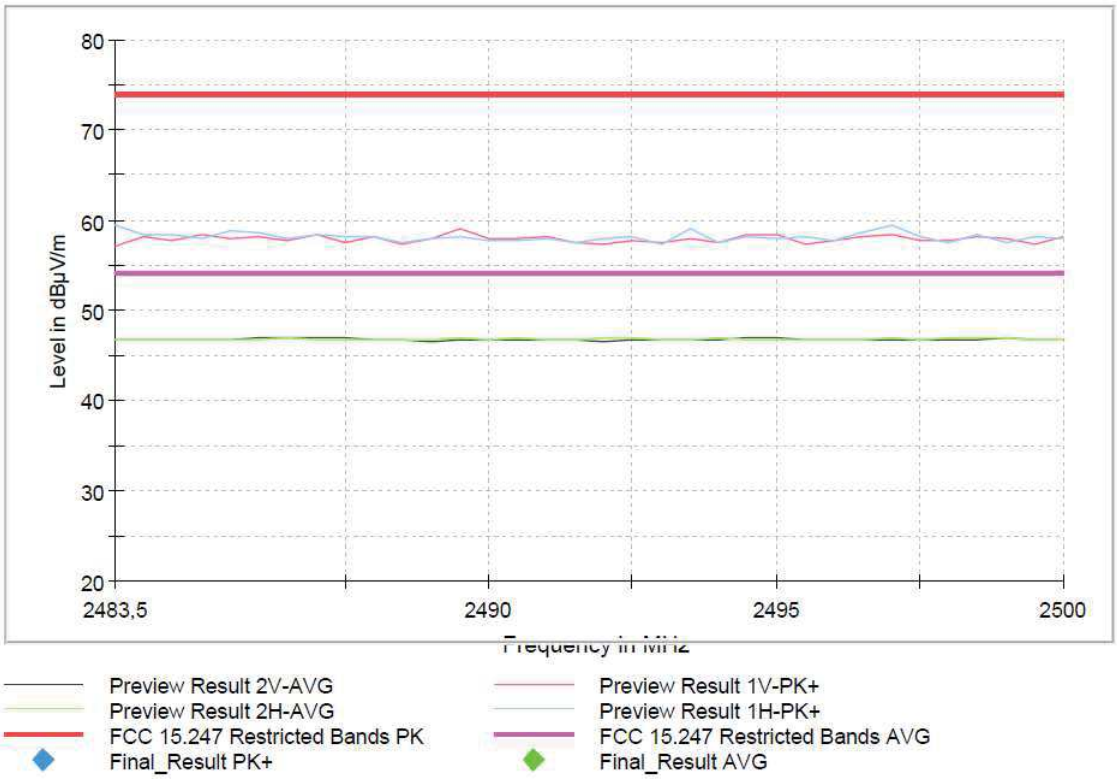


- **Mode 802.11 g**

Restricted Band 2.31-2.39 GHz:

- Low Channel:



Restricted Band 2.4835-2.5 GHz:

- High Channel: