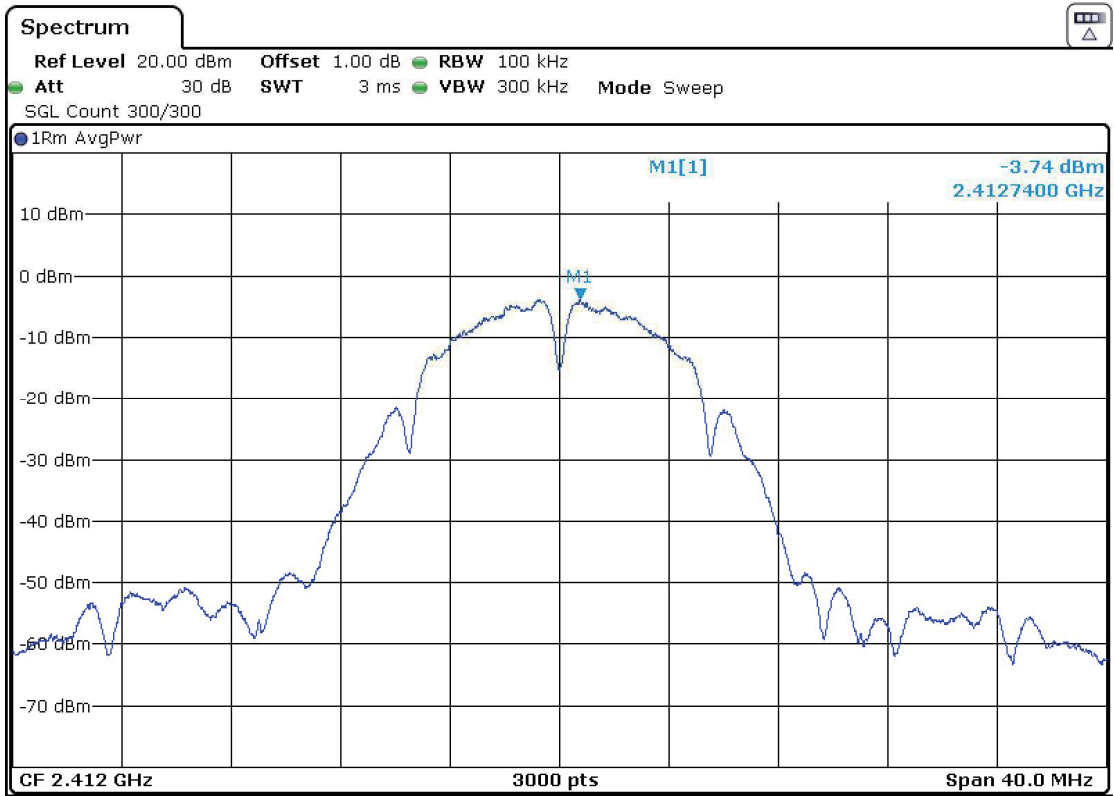


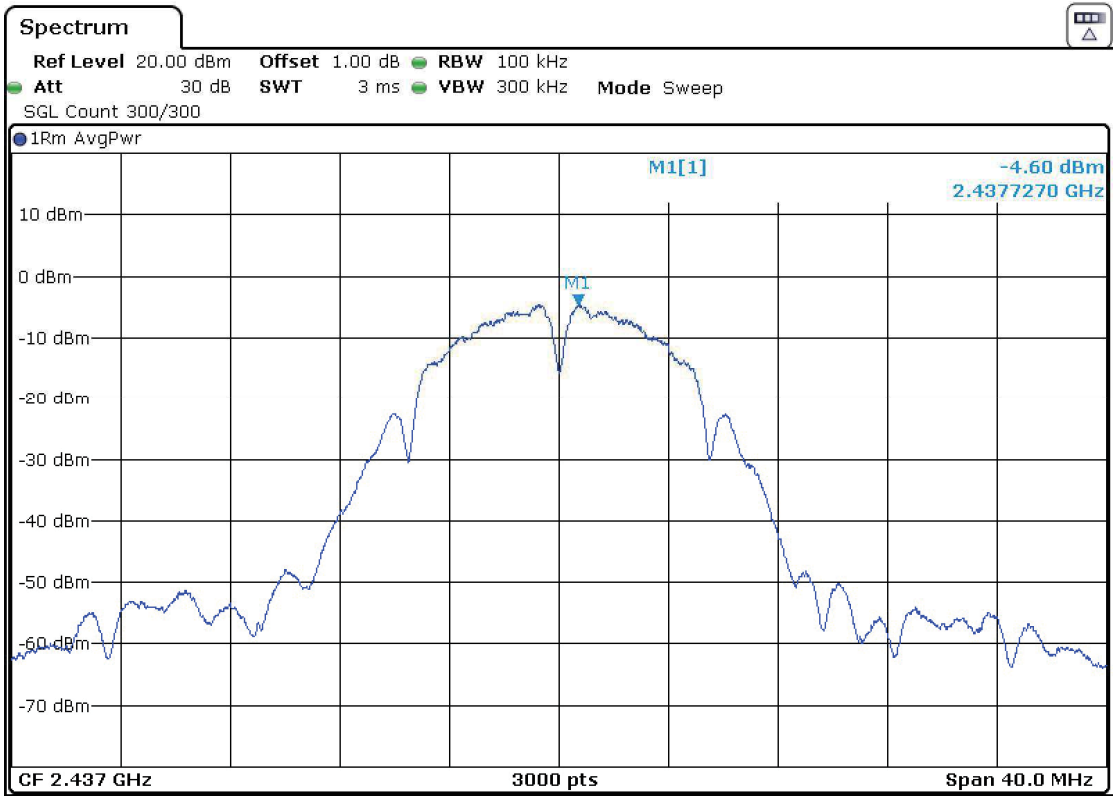
SISO CORE0_Port2 Antenna:

- Mode 802.11 b – Power Spectral Density

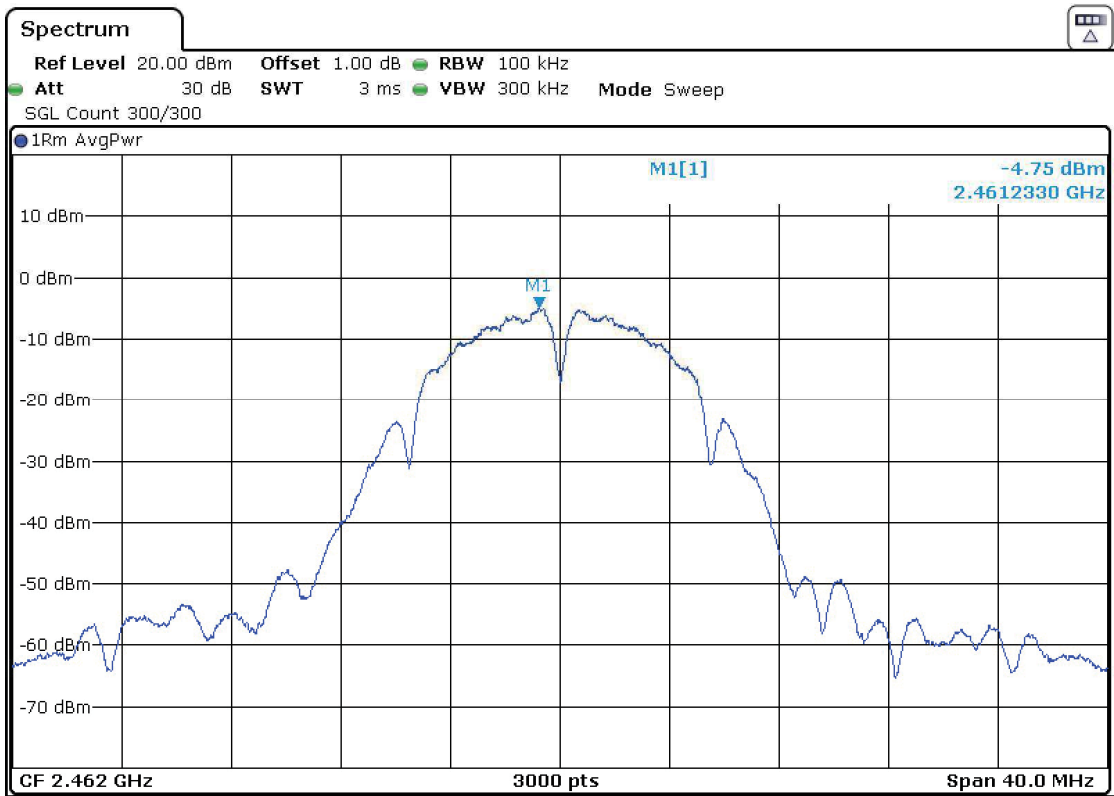
- Low Channel:



- Middle Channel:

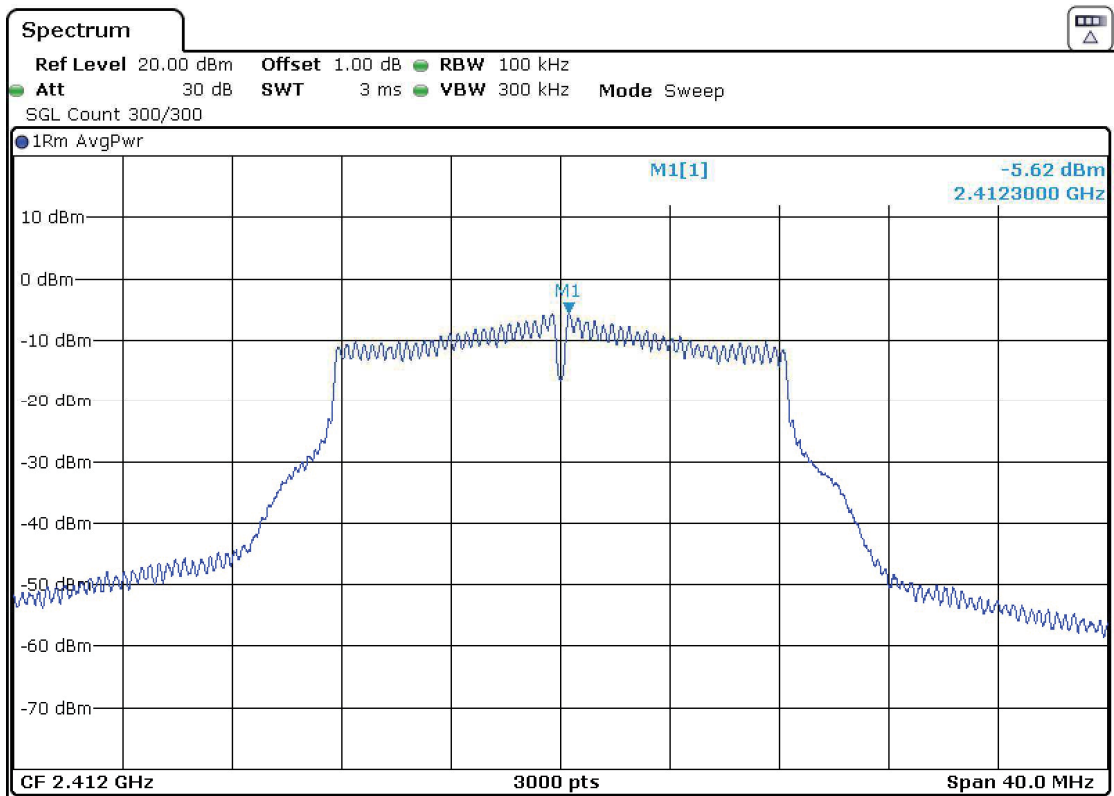


- High Channel:

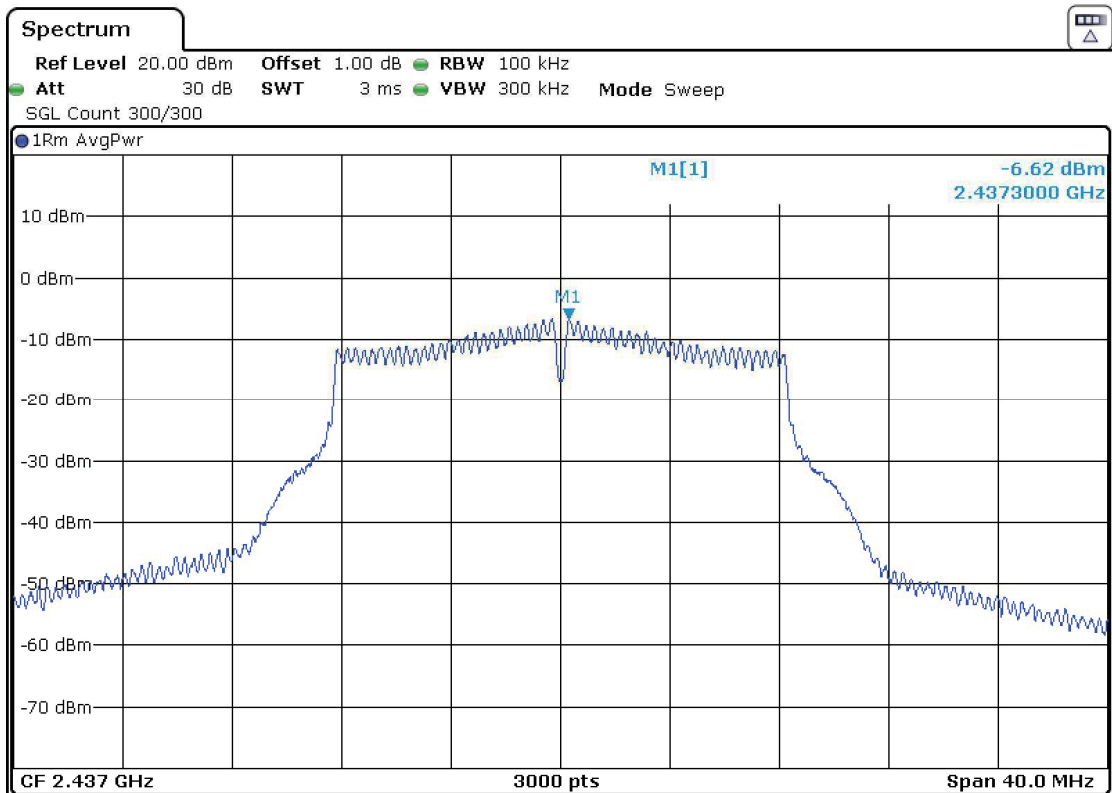


• Mode 802.11 g – Power Spectral Density

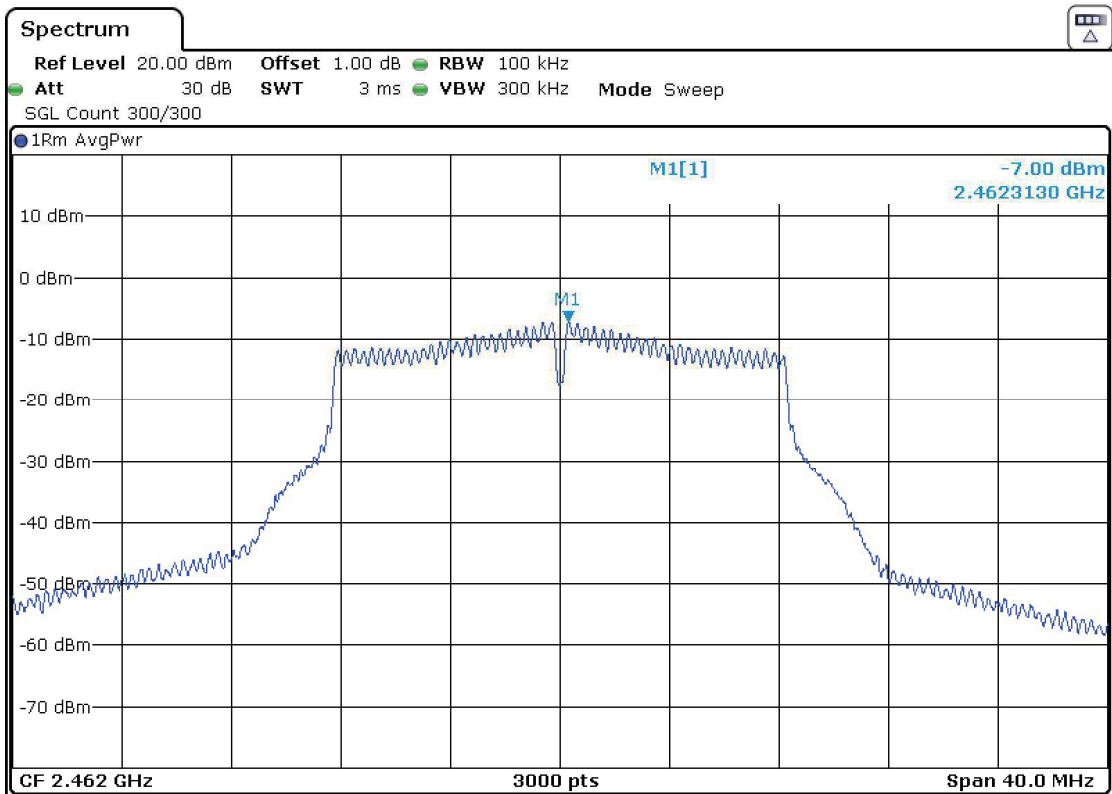
- Low Channel:



- Middle Channel:

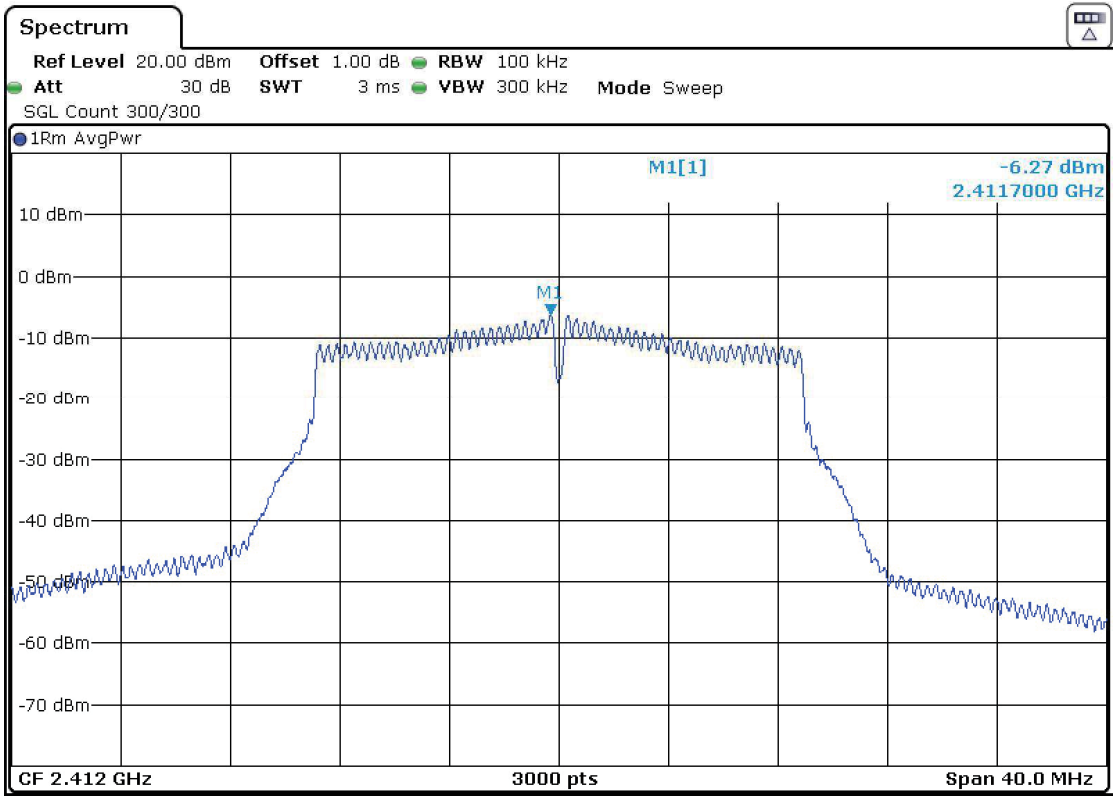


- High Channel:

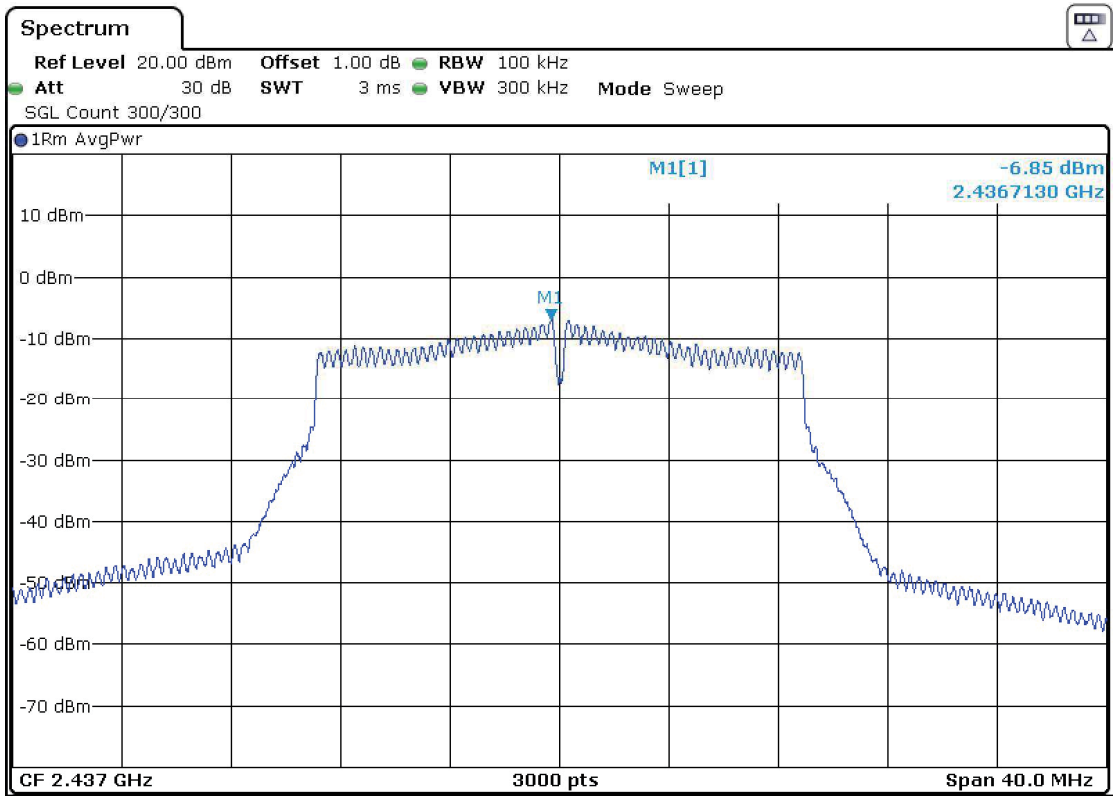


• Mode 802.11 n20 – Power Spectral Density

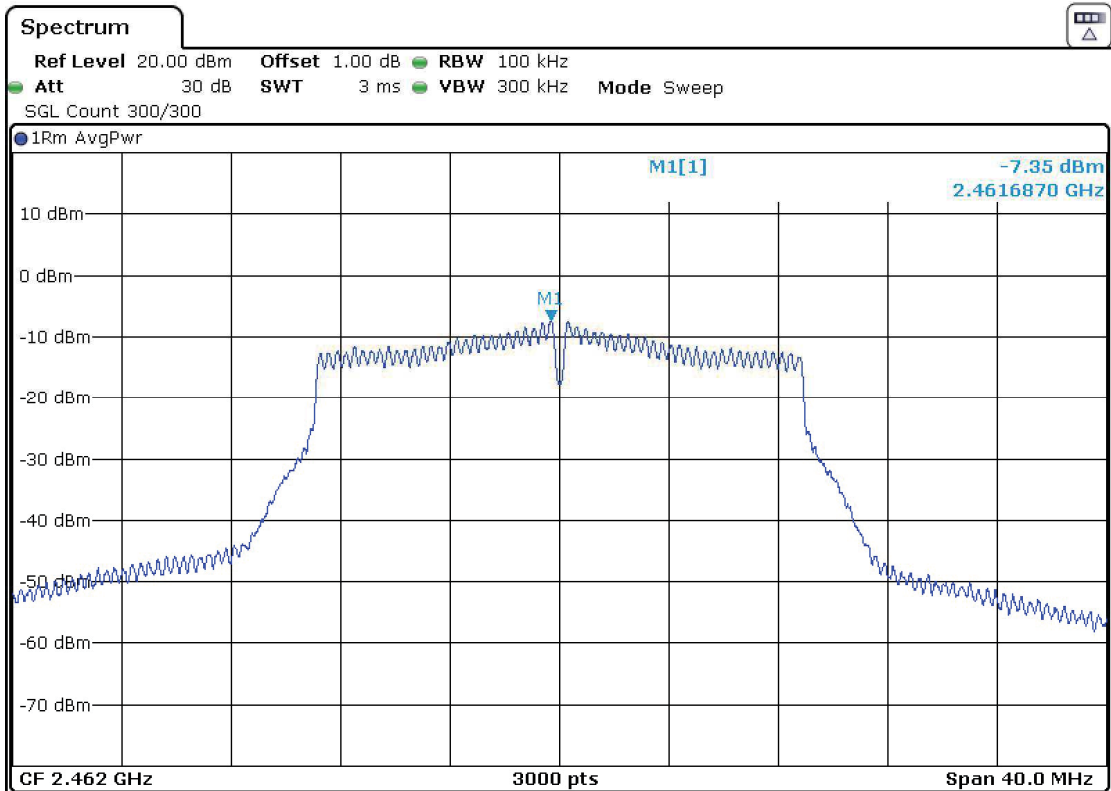
- Low Channel:



- Middle Channel:



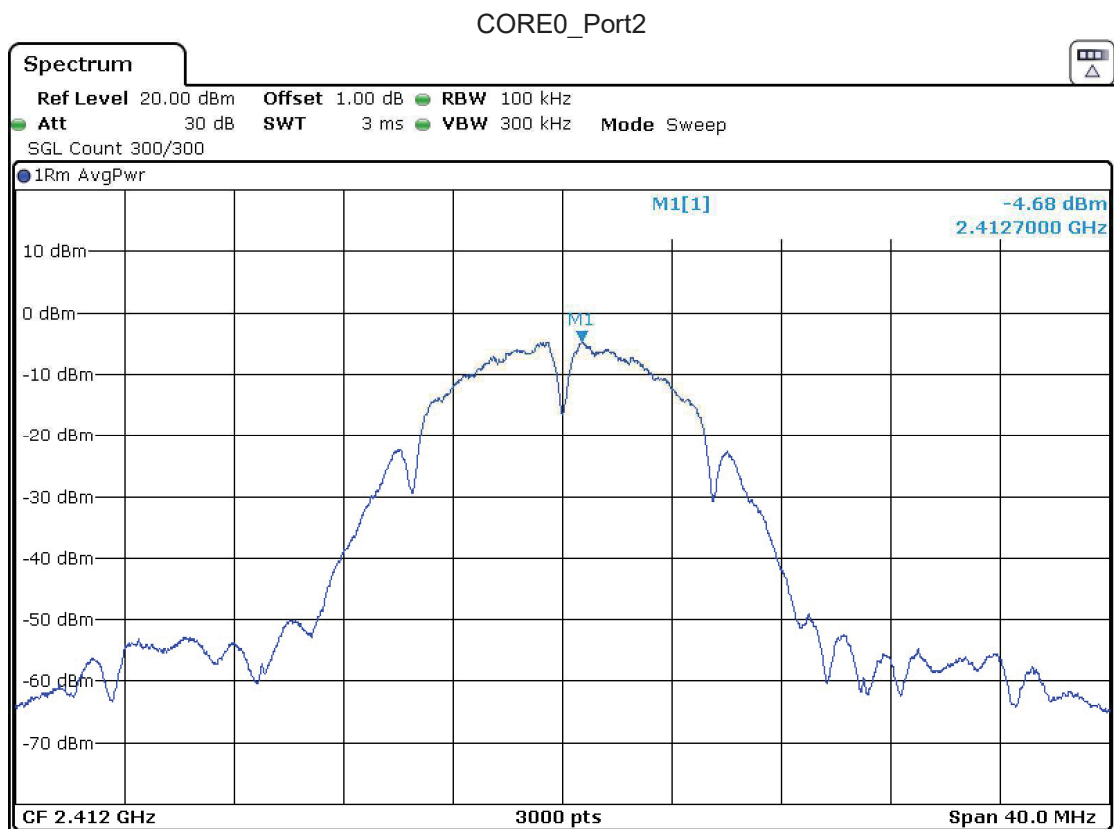
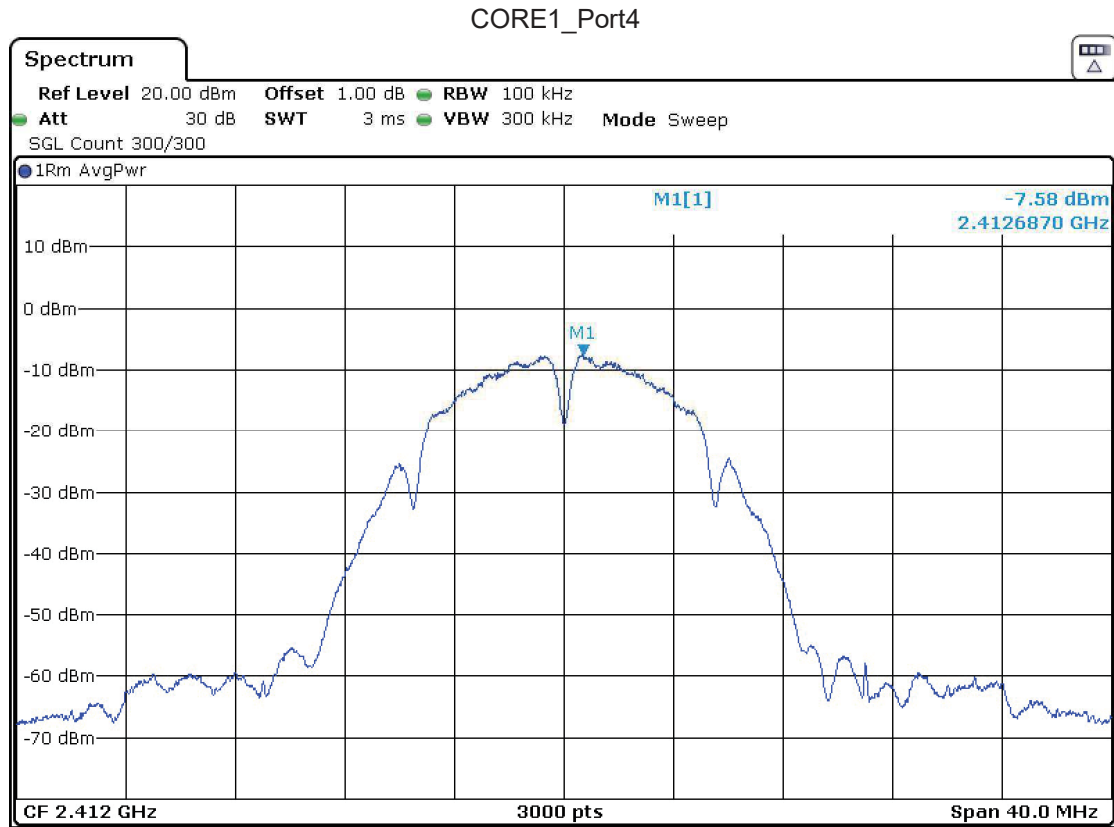
- High Channel:



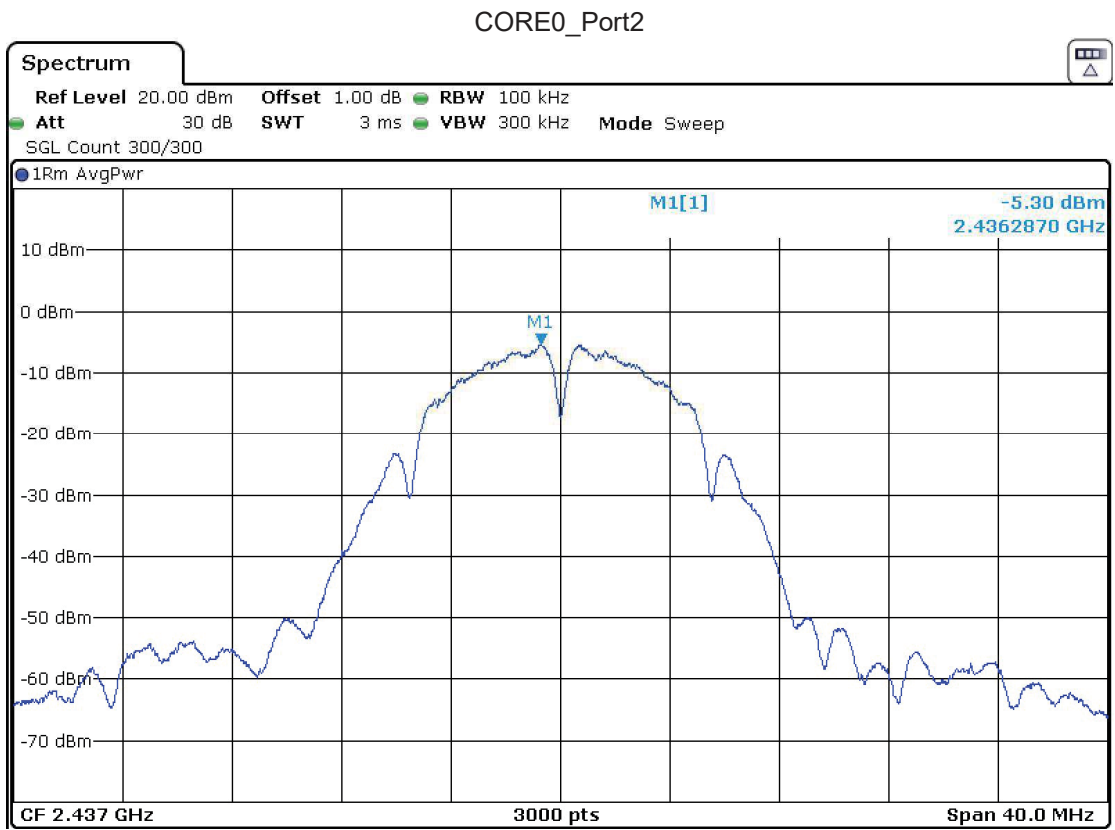
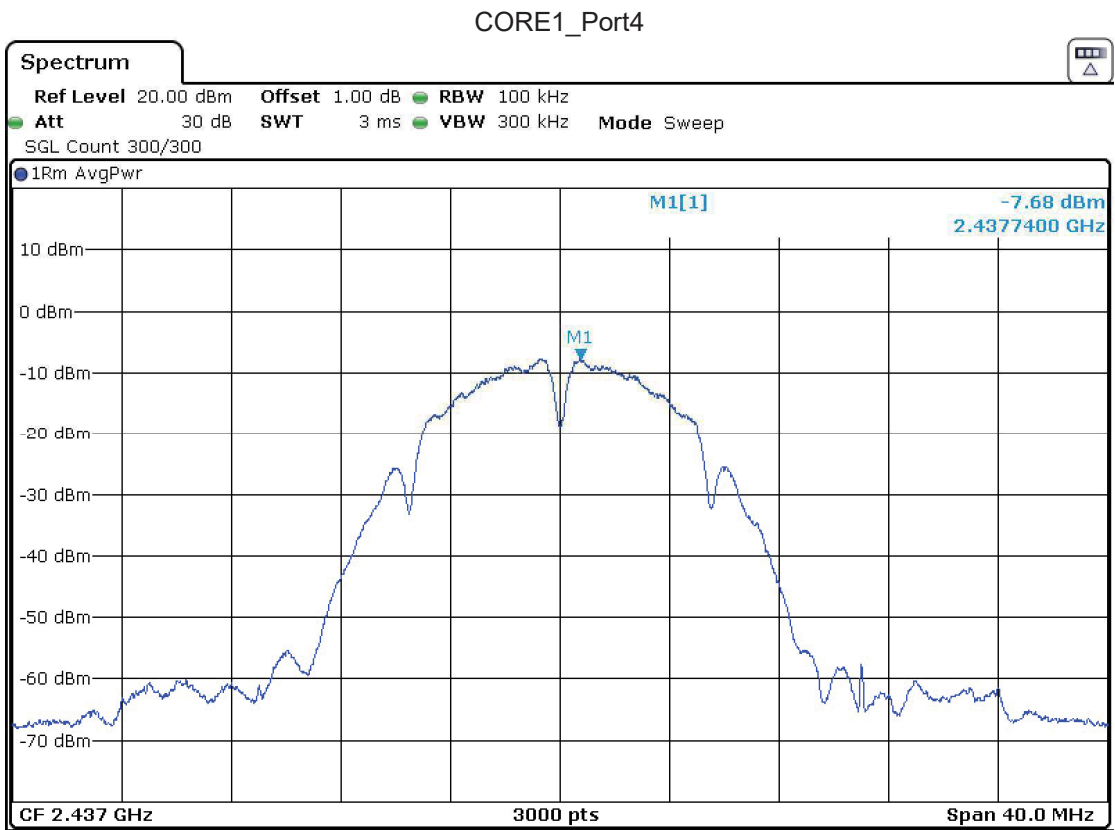
MIMO – CORE1_Port4 Antenna & CORE0_Port2 Antenna:

- **Mode 802.11 b – Power Spectral Density**

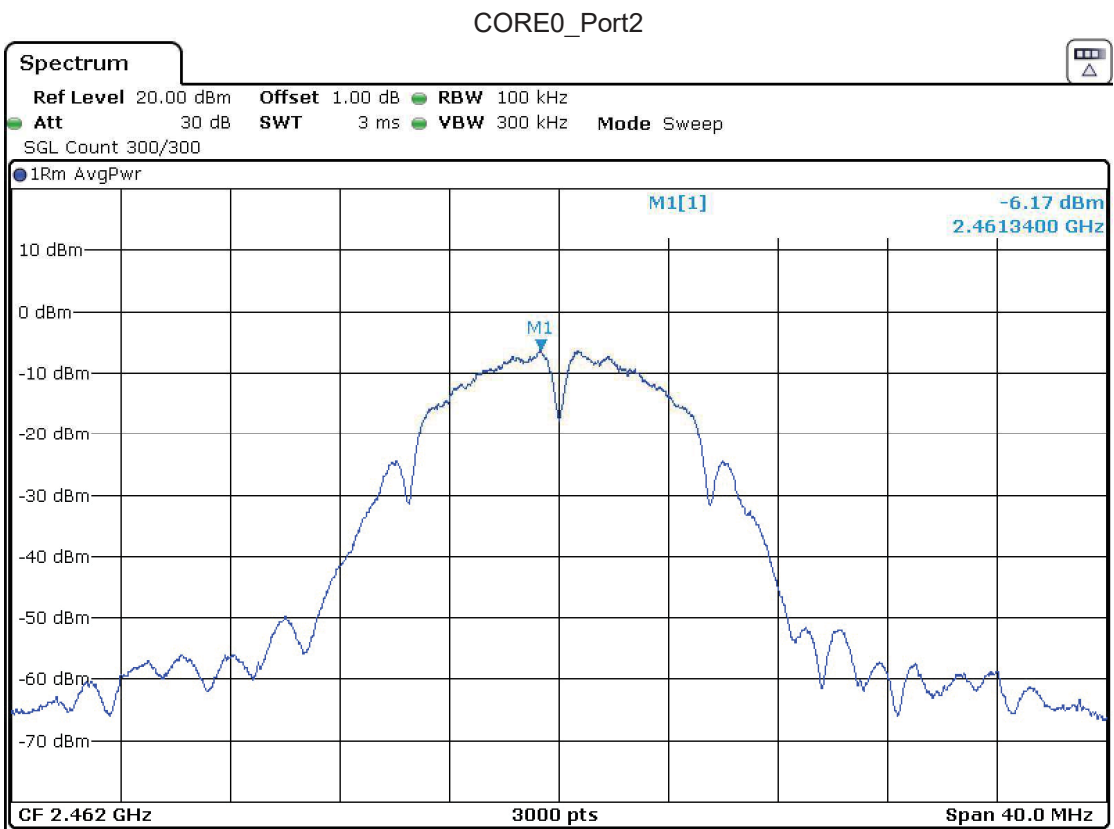
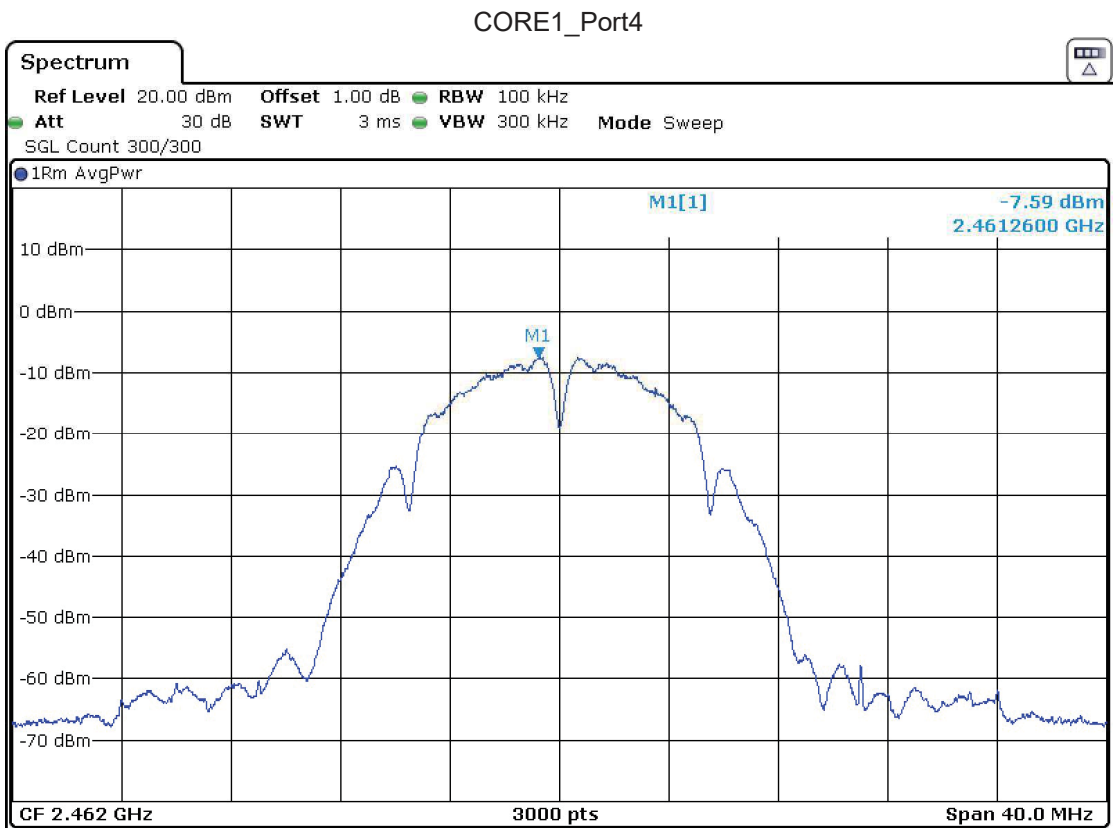
- Low Channel:



- Middle Channel:



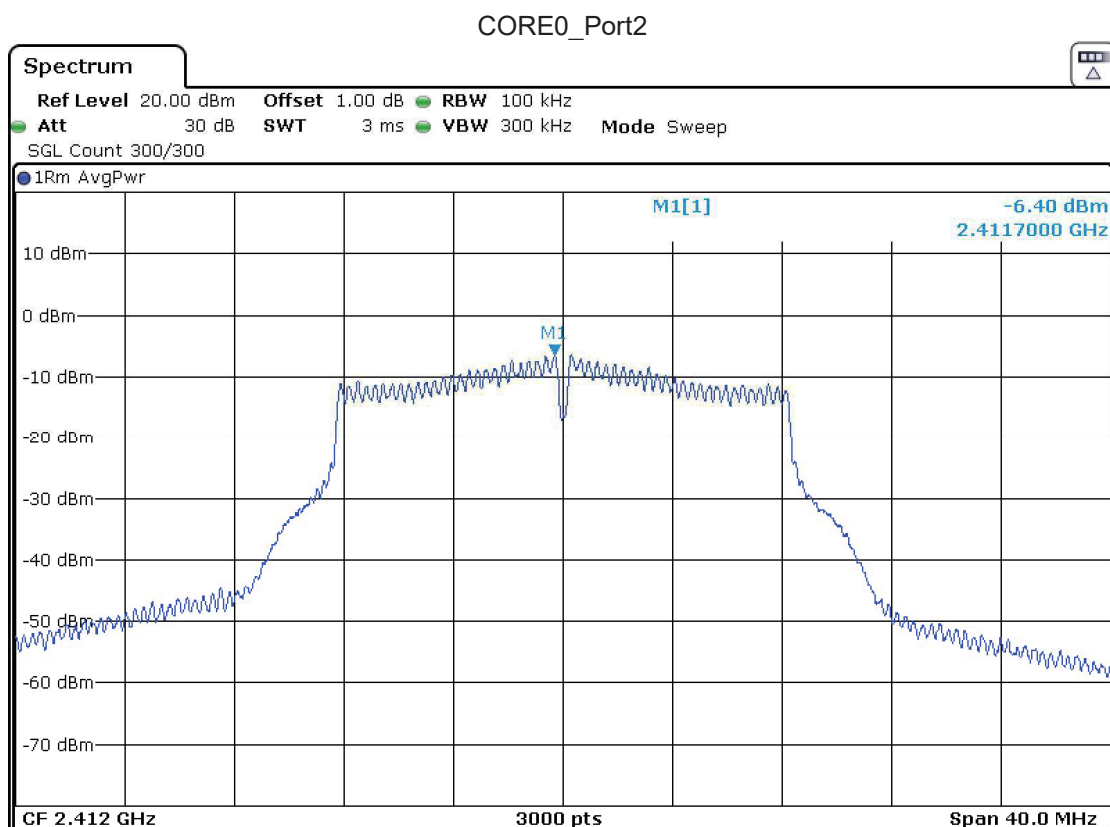
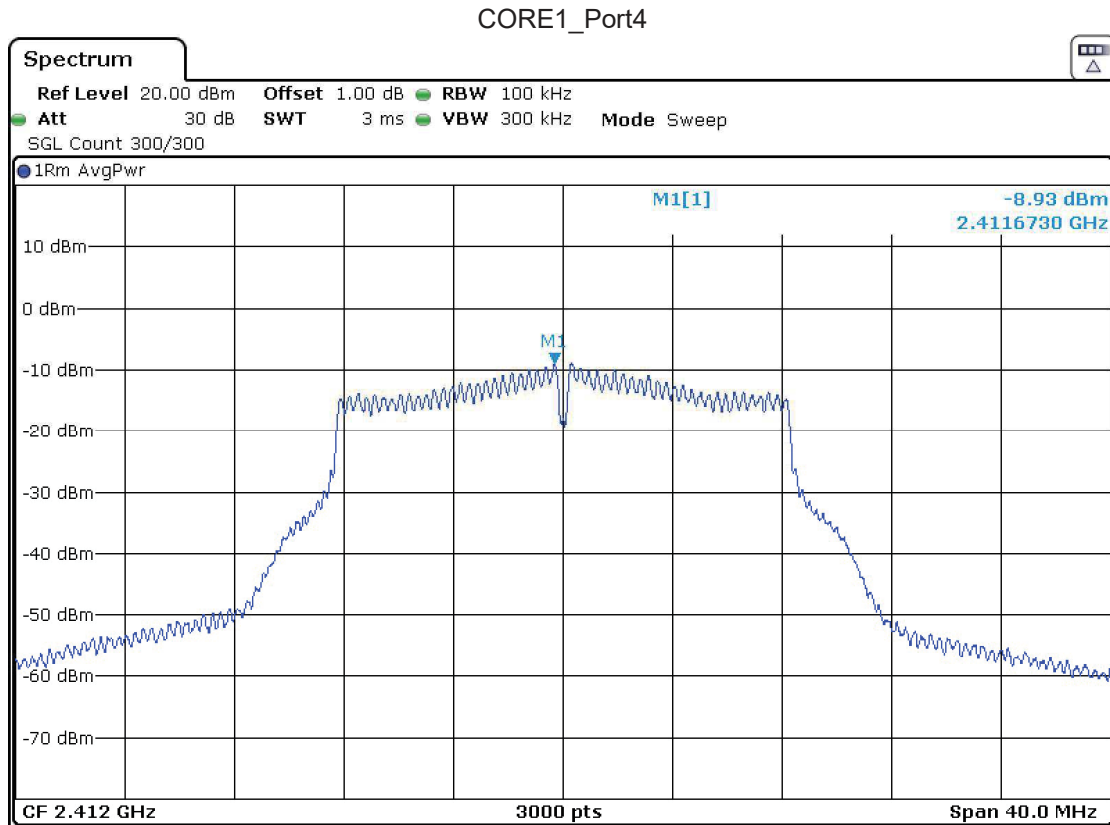
- High Channel:



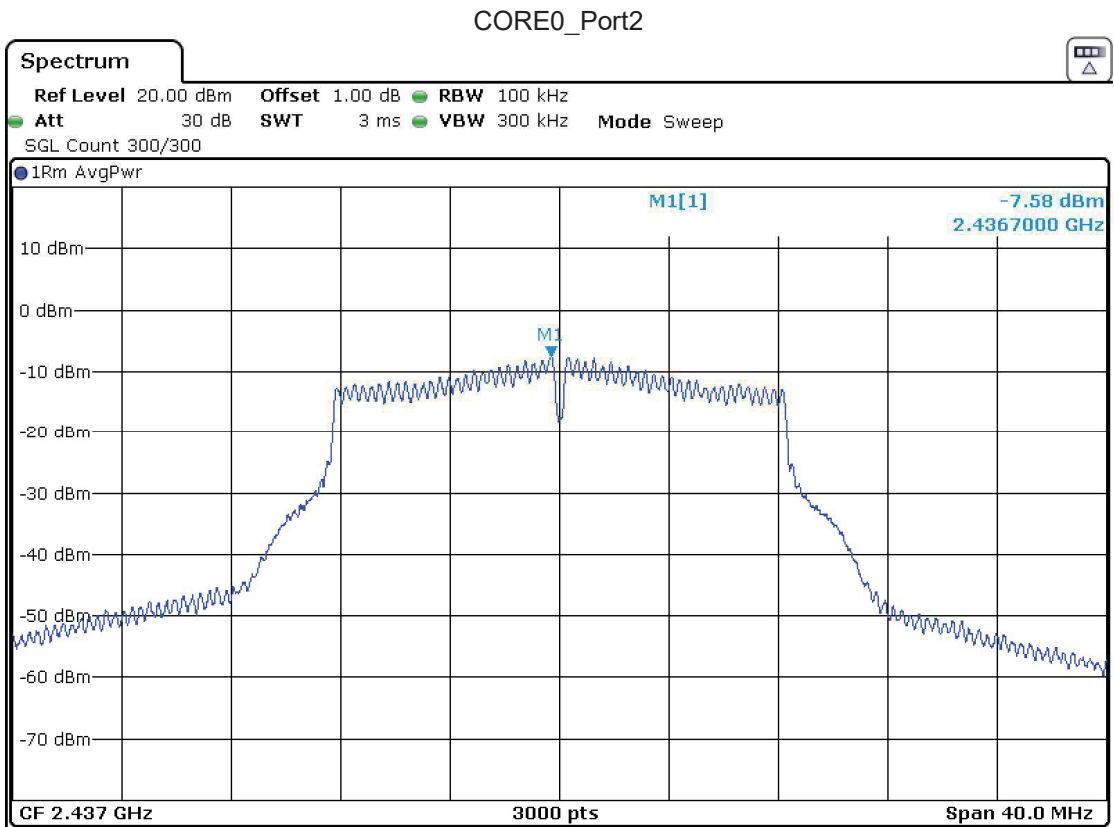
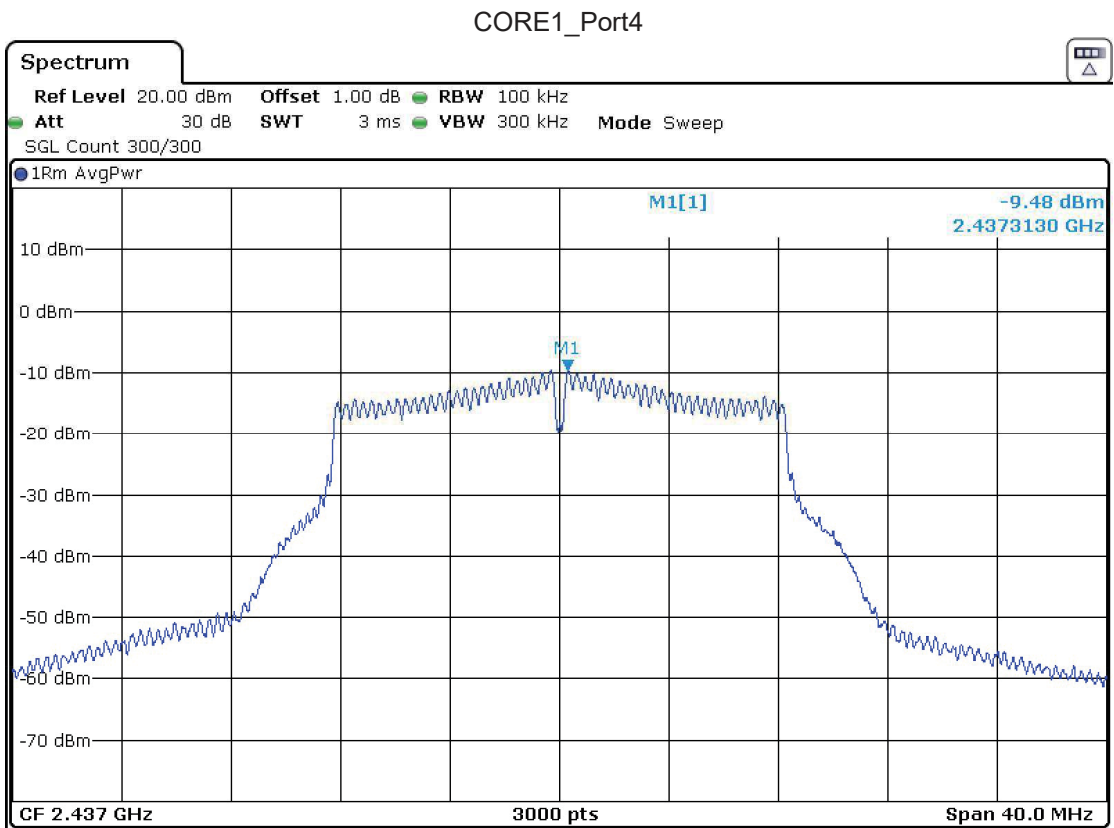
MIMO – CORE1_Port4 Antenna & CORE0_Port2 Antenna:

- **Mode 802.11 g – Power Spectral Density**

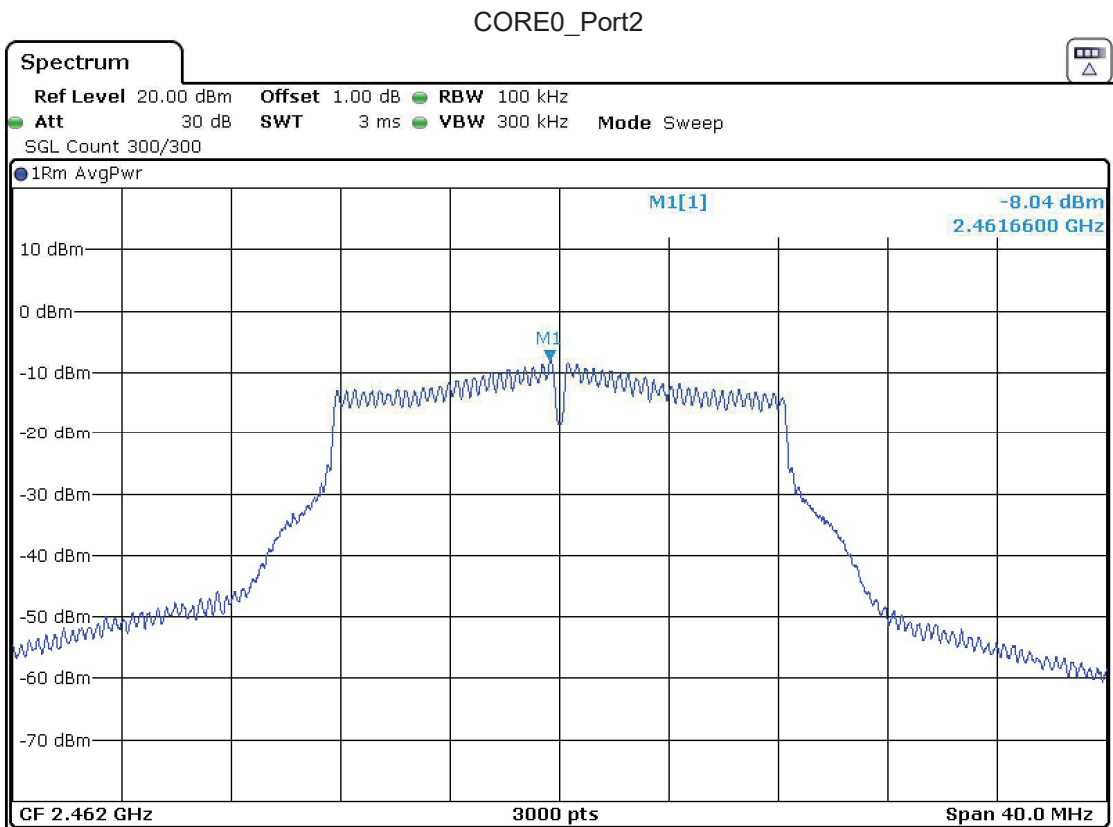
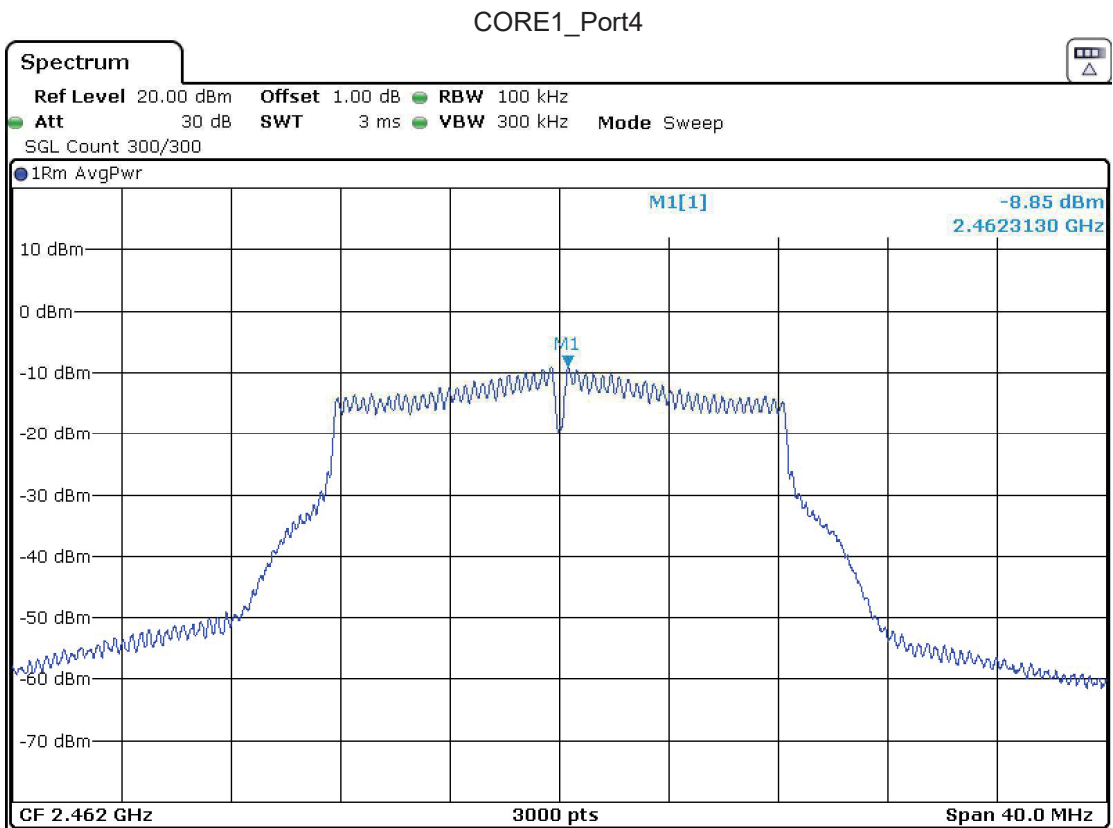
- Low Channel:



- Middle Channel:



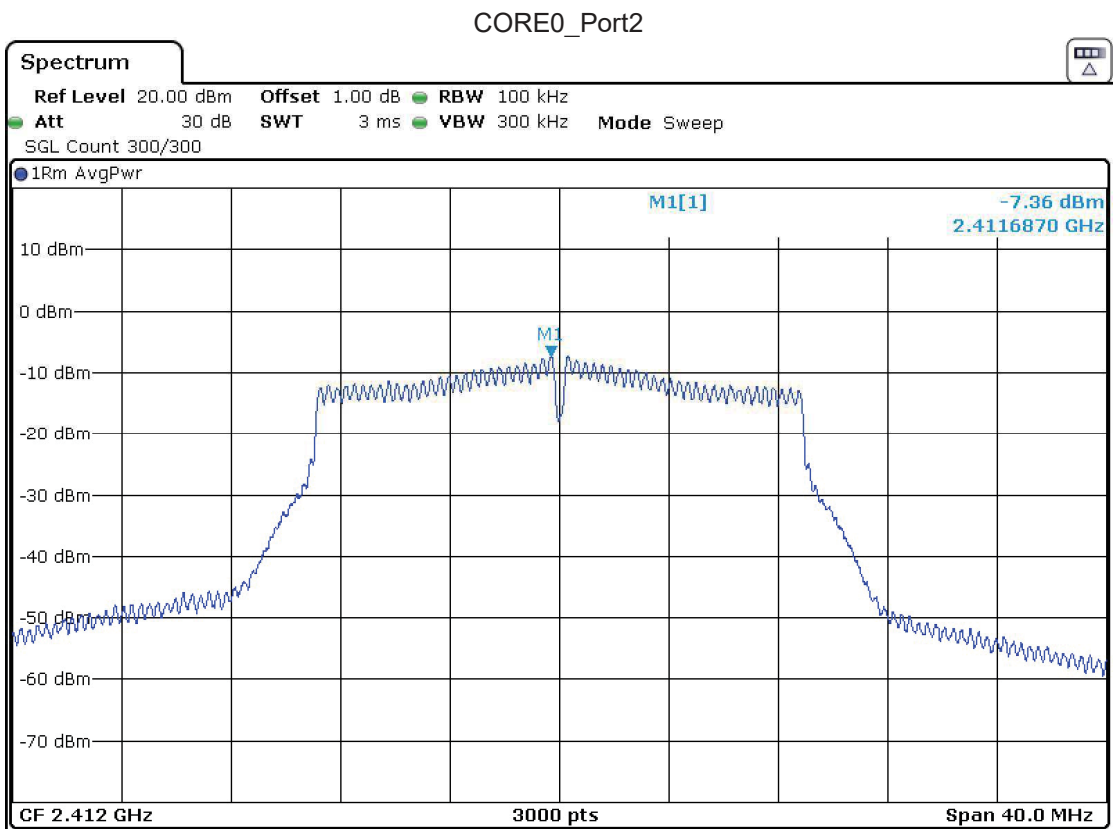
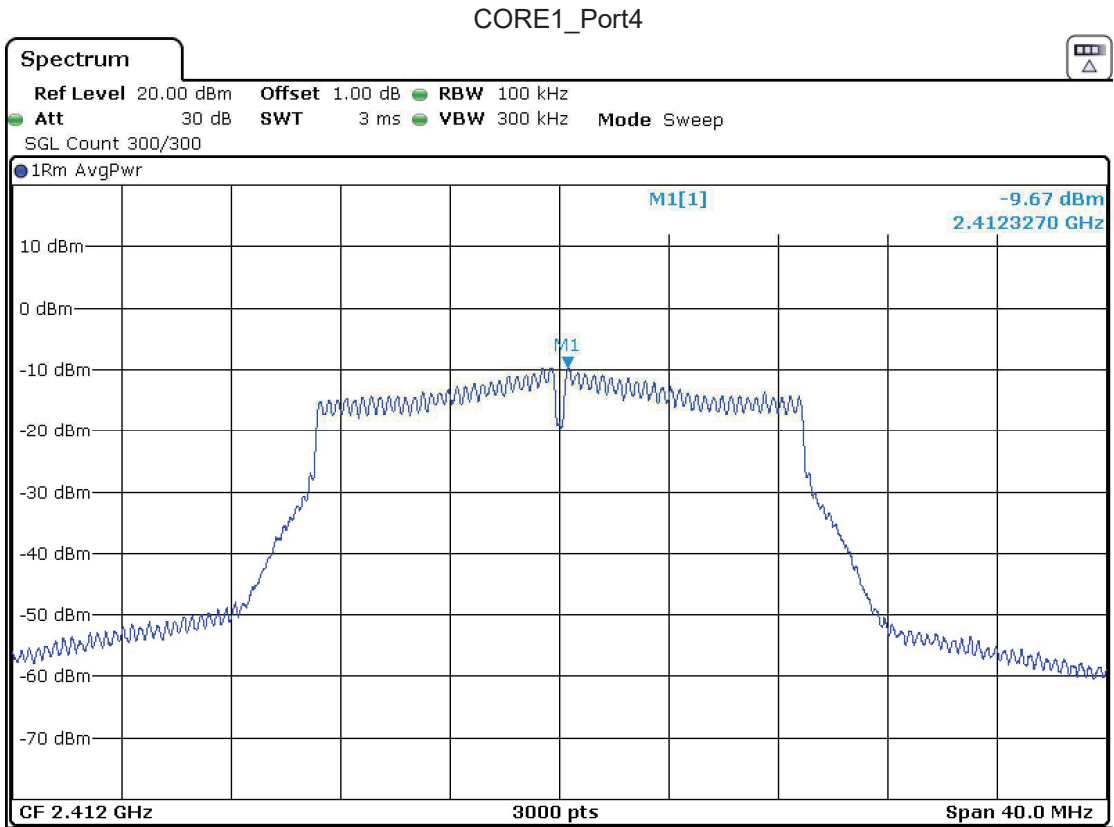
- High Channel:



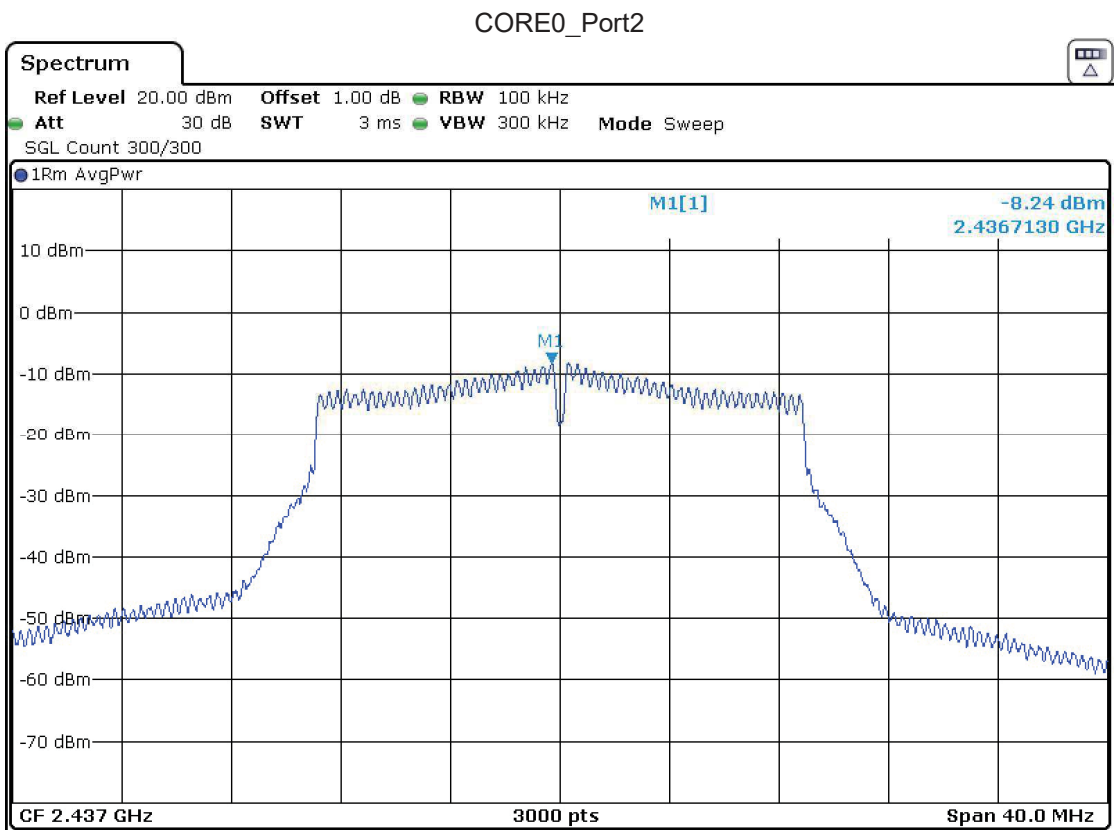
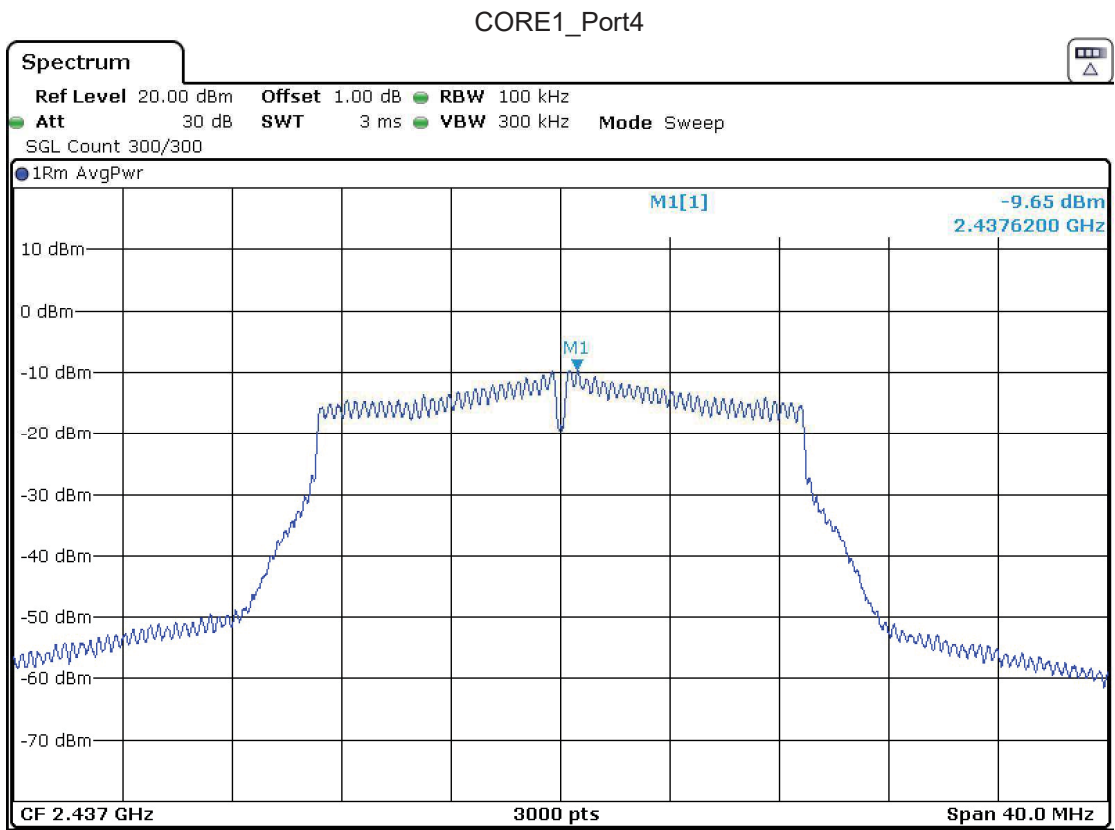
MIMO – CORE1_Port4 Antenna & CORE0_Port2 Antenna:

- Mode 802.11 n20 – Power Spectral Density

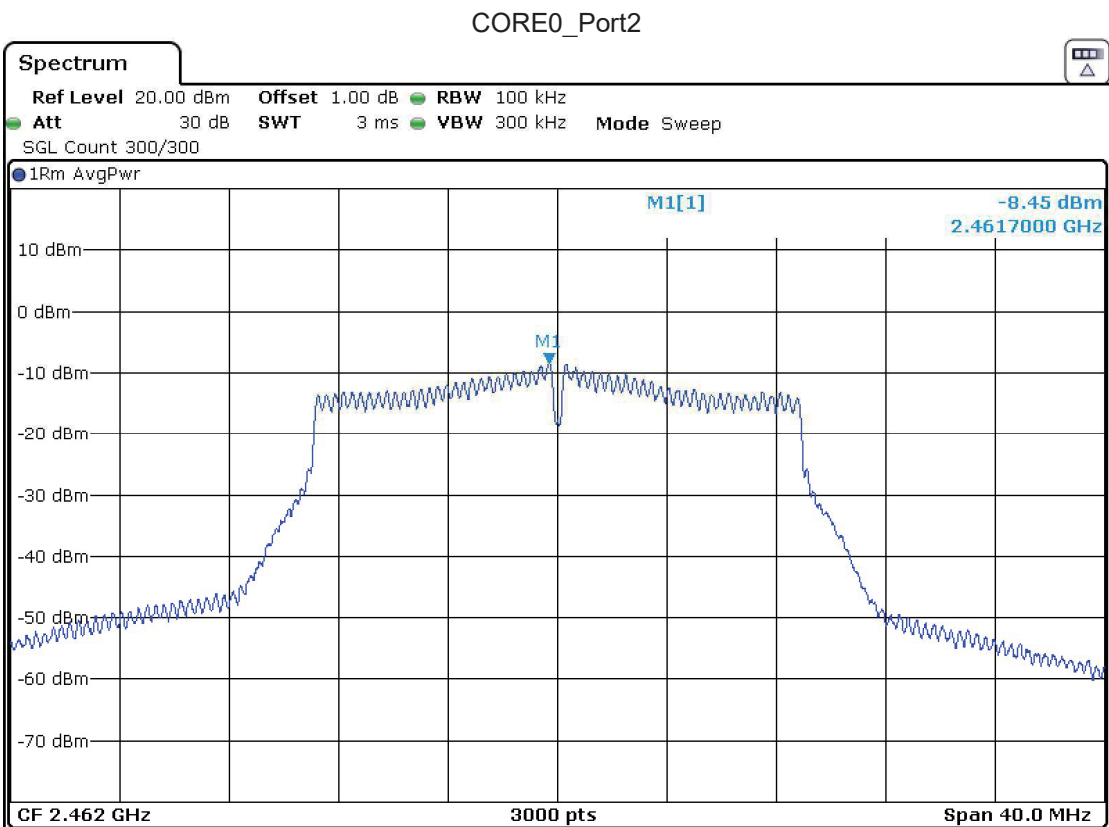
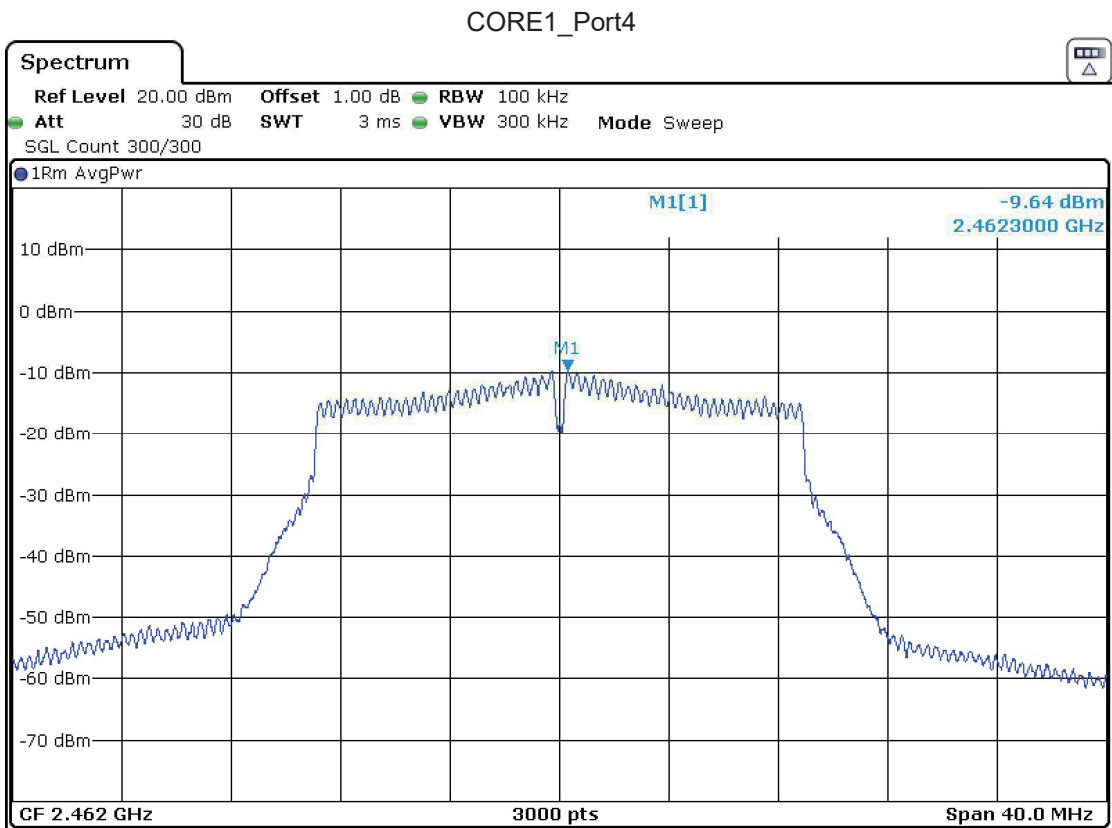
- Low Channel:



- Middle Channel:



- High Channel:



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 ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	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 360° 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-26 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)
374.9805	28.93	46	V	Quasi-peak	<± 5.08
389.4335	24.76	46	V	Quasi-peak	<± 5.08
500.0135	36.74	46	H	Quasi-peak	<± 5.08
625.0465	24.06	46	H	Quasi-peak	<± 5.08
783.1565	22.21	46	H	Quasi-peak	<± 5.08
875.0155	31.50	46	H	Quasi-peak	<± 5.08

- 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)
2.389	56.73	H	Peak	<±4.11
	44.69		Average	<±4.11
4824	40.22	V	Peak	<±5.13
5645	39.46	H	Peak	<±5.13
7234	43.24	V	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBμV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.484	56.57	H	Peak	<±4.11
	44.73		Average	<±4.11
4.874	40.20	V	Peak	<±5.13
5.6455	41.70	V	Peak	<±5.13
14.8915	45.29	V	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBμV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.4885	56.28	H	Peak	<±4.11
	44.69		Average	<±4.11
4.924	40.91	V	Peak	<±5.13
5.645	38.49	V	Peak	<±5.13
9.6625	44.98	V	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.3895	57.93	V	Peak	<±4.11
	46.36		Average	<±4.11
5.6455	45.14	V	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
5.645	41.44	V	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.482	60	H	Peak	<±4.11
	46.09		Average	<±4.11

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

Spurious frequency (GHz)	Emission Level (dBμV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.388	57.59	V	Peak	<±4.11
	45.72		Average	<±4.11

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

Verdict: PASS

SISO CORE0_Port2 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)
500.0135	37.43	46	H	Quasi-peak	<± 5.08

- 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)
2.3875	56.22	V	Peak	<±4.11
	44.75		Average	<±4.11
4.8235	43.20	V	Peak	<±5.13
5.6455	42.68	H	Peak	<±5.13
7.237	46.98	H	Peak	<±5.13

- 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	45.94	V	Peak	<±5.13
5.6455	43.61	H	Peak	<±5.13
7.309	44.04	H	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBμV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.486	55.91	H	Peak	<±4.11
	44.73		Average	<±4.11
4.924	46.24	V	Peak	<±5.13
5.6455	42.50	V	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.3885	58.51	V	Peak	<±4.11
	47.06		Average	<±4.11
4.9995	38.19	V	Peak	<±5.13
5.6455	41.37	H	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
5.0005	35.48	V	Peak	<±5.13
5.6455	42.20	H	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.485	58.23	H	Peak	<±4.11
	45.61		Average	<±4.11
4.9995	39.85	V	Peak	<±5.13
5.6455	40.98	H	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBμV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.389	57.20	V	Peak	<±4.11
	45.77		Average	<±4.11

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

Spurious frequency (GHz)	Emission Level (dBμV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.484	57.28	H	Peak	<±4.11
	45.43		Average	<±4.11

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)
74.9805	26.11	46	V	Quasi-peak	<± 5.08
500.0135	36.31	46	H	Quasi-peak	<± 5.08
832.7235	31.01	46	V	Quasi-peak	<± 5.08
875.0155	31.73	46	H	Quasi-peak	<± 5.08

- **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)
2.3895	56.63	V	Peak	<±4.11
	44.80		Average	<±4.11
5.6455	39.46	V	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBμV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.3895	55.44	H	Peak	<±3.70
	44.71		Average	<±3.70
4.874	47.23	V	Peak	<±3.70

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

Spurious frequency (GHz)	Emission Level (dBμV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.4845	55.66	V	Peak	<±4.11
	44.75		Average	<±4.11
4.9235	44.15	V	Peak	<±5.13

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 g.

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 g (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. Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.3895	58.80	V	Peak	<±4.11
	46.29		Average	<±4.11
4.823	45.85	V	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.3895	56.46	V	Peak	<±4.11
	44.75		Average	<±4.11
4.8725	43.24	V	Peak	<±5.13

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

Spurious frequency (GHz)	Emission Level (dBµV/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.484	56.30	V	Peak	<±4.11
	44.97		Average	<±4.11
4.9285	42.71	V	Peak	<±5.13

Verdict: PASS

- **Mode 802.11 n20**

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 dB μ V/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. Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (GHz)	Emission Level (dB μ V/m)	Polarization	Detector	Measurement Uncertainty (dB)
2.4835	55.95	H	Peak	< $\pm$ 4.11
	45.50		Average	< $\pm$ 4.11

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.

