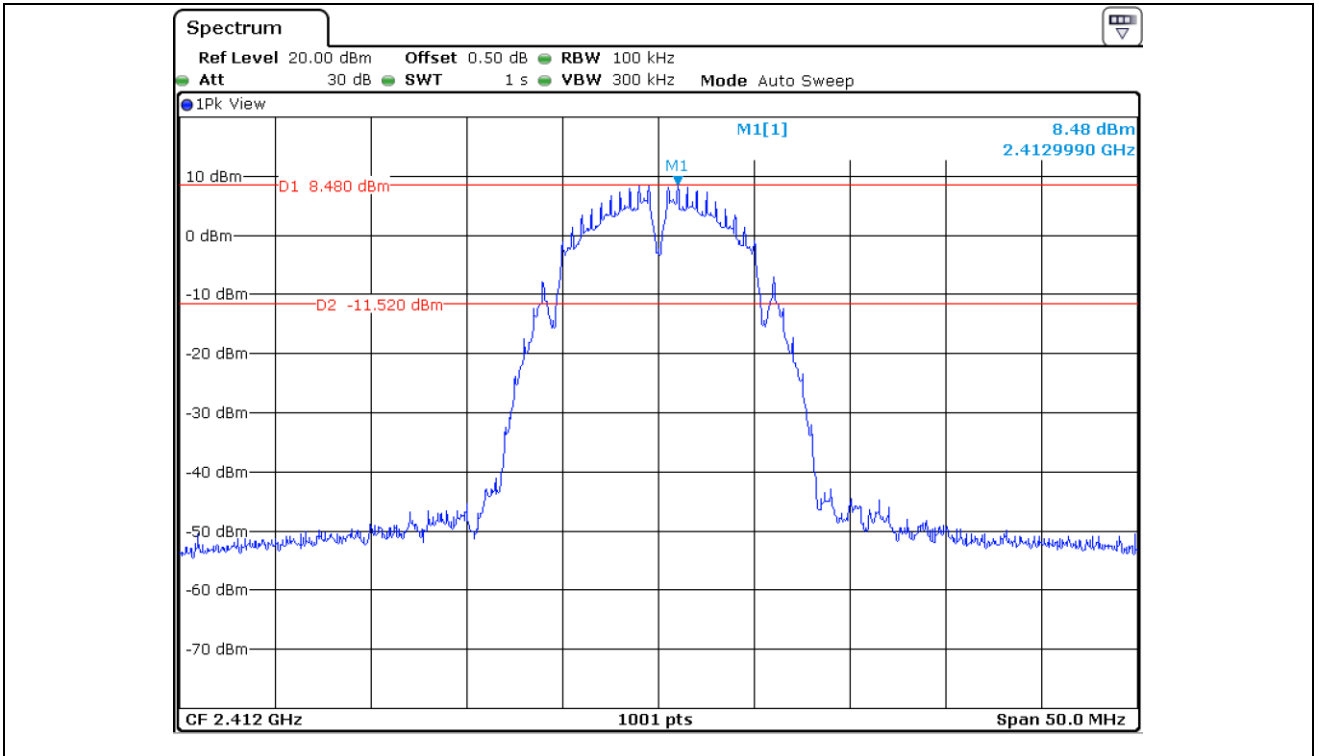
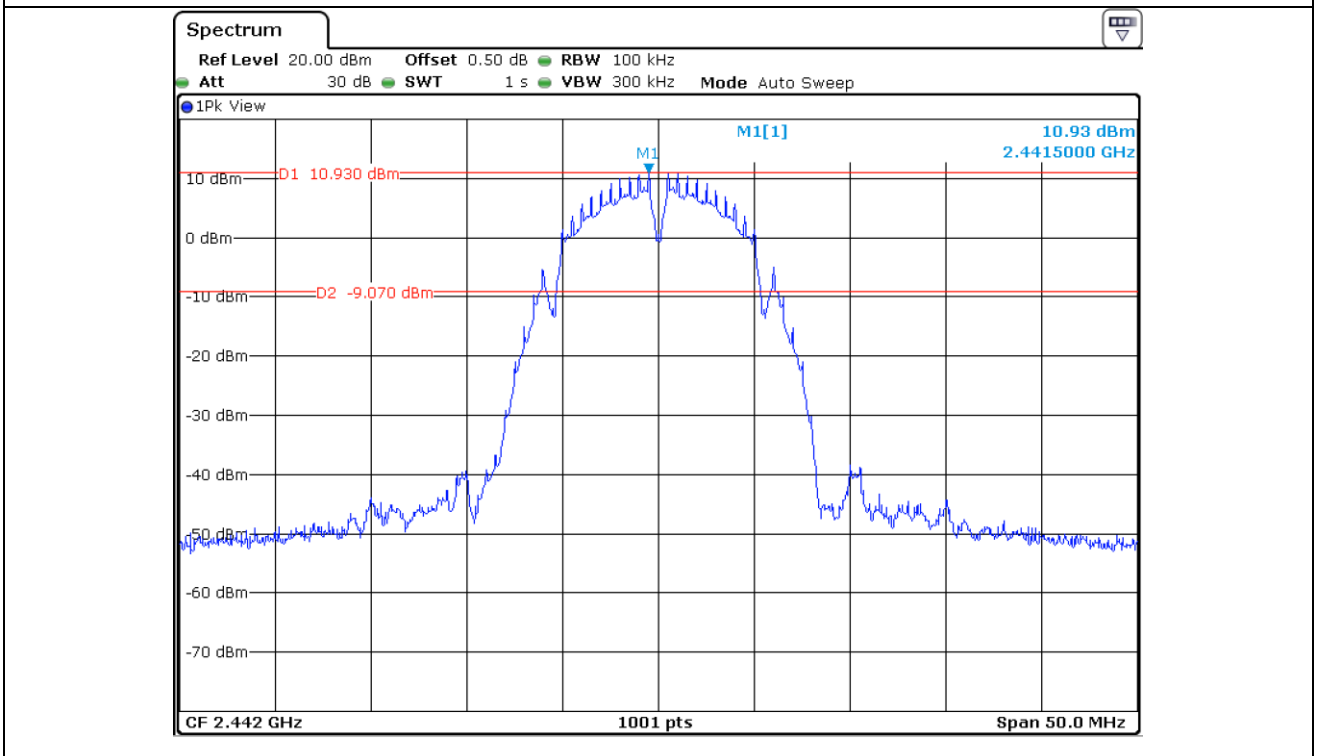


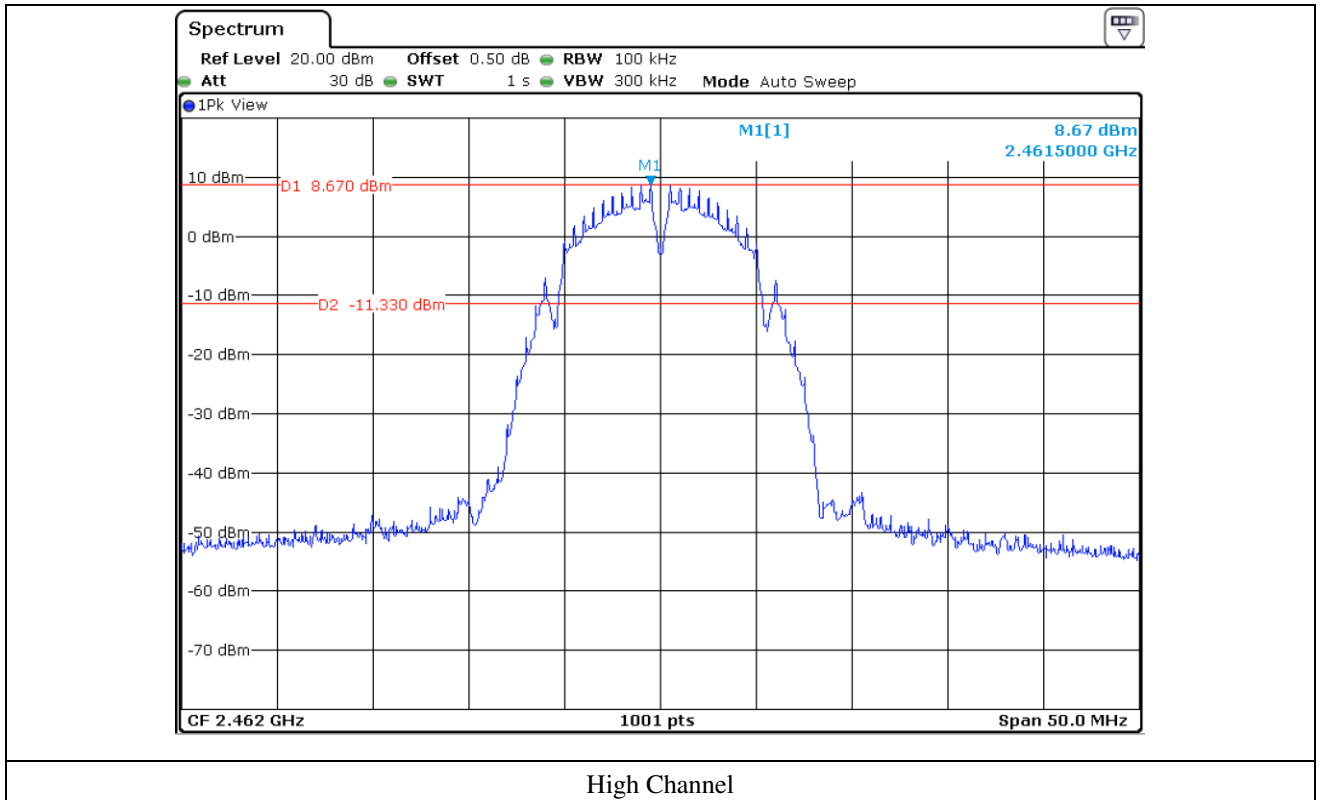
9.5.1.1.4 Test data for Antenna 3



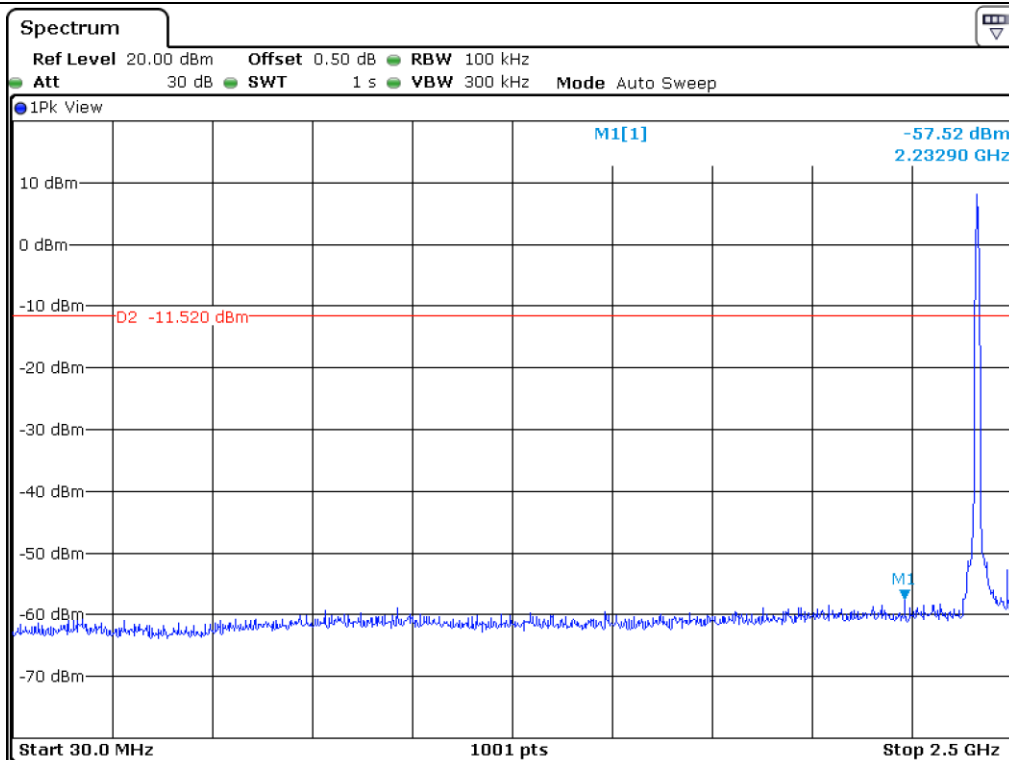
Low Channel



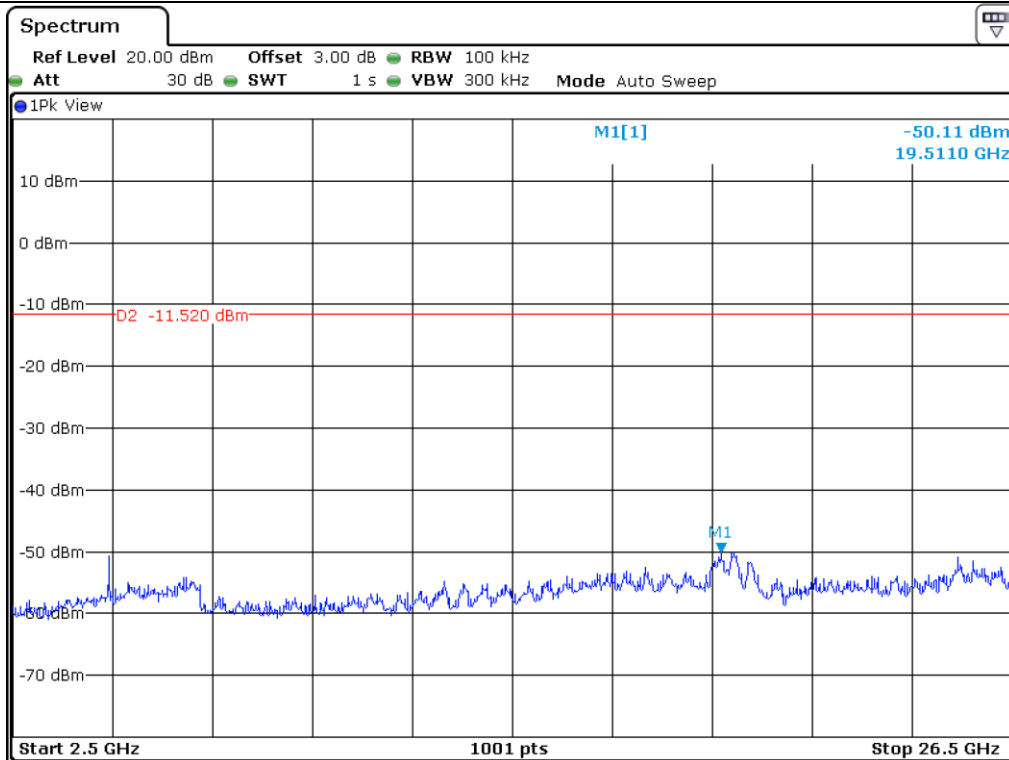
Middle Channel



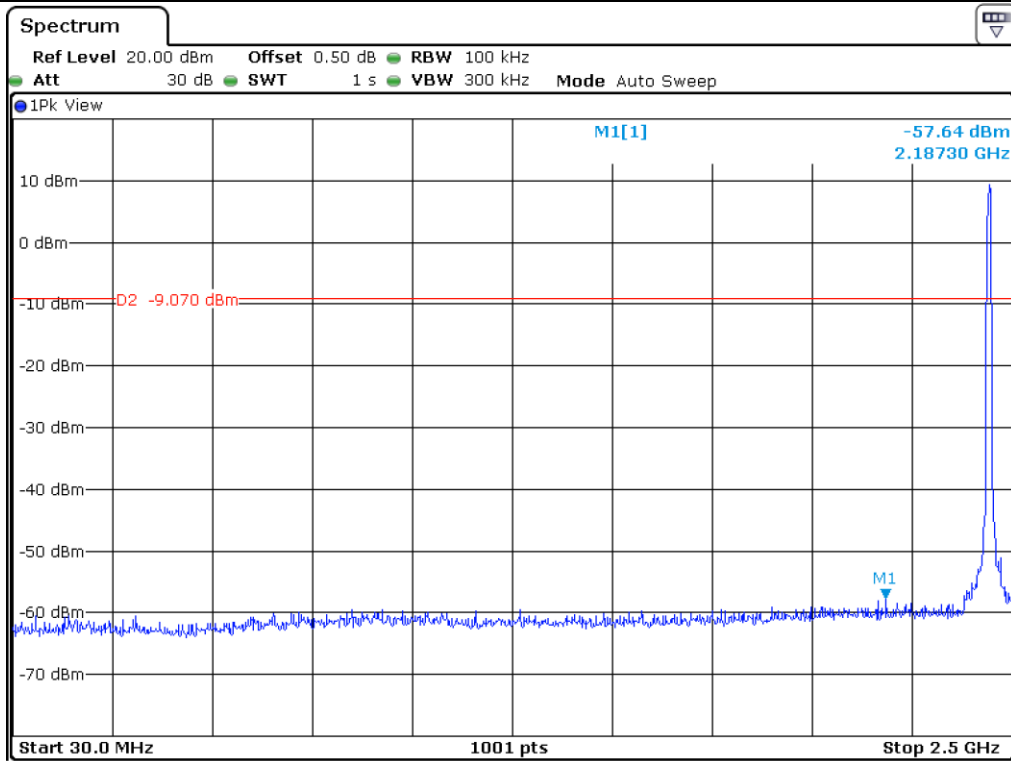
High Channel



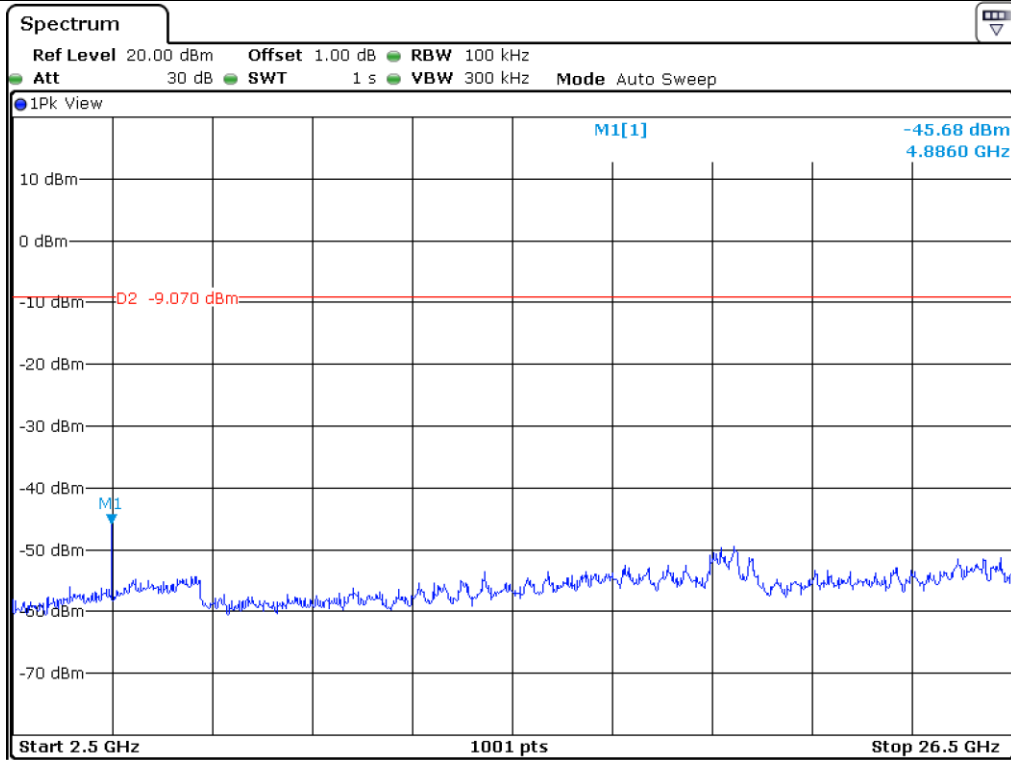
Low Channel



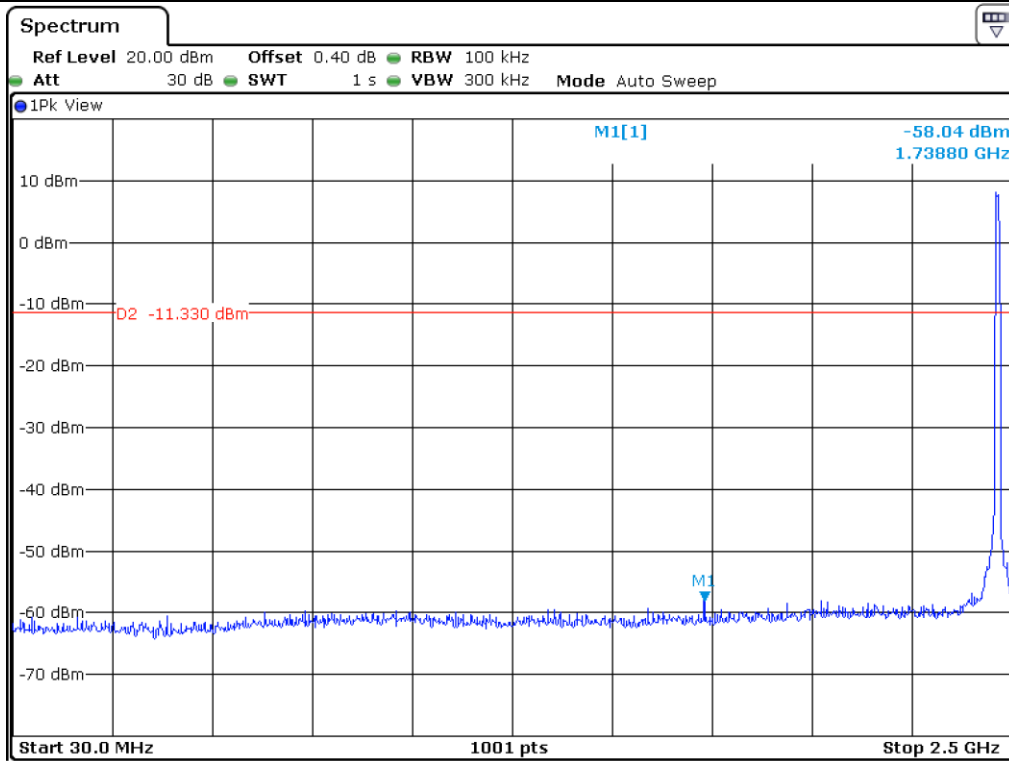
Low Channel



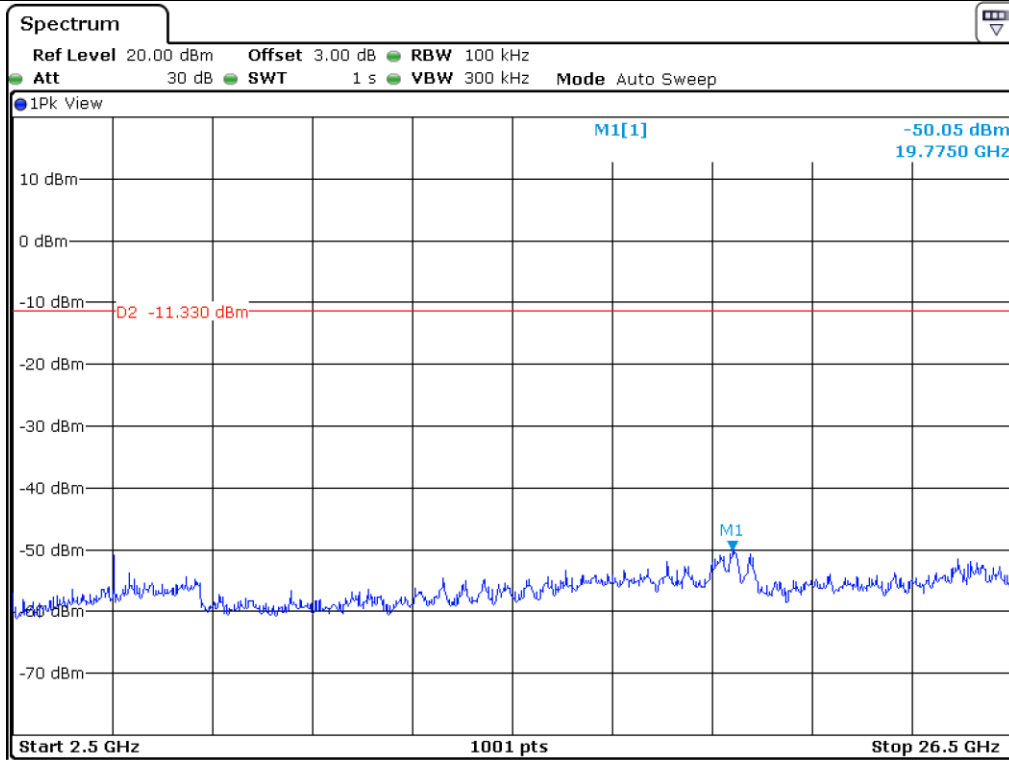
Middle Channel



Middle Channel



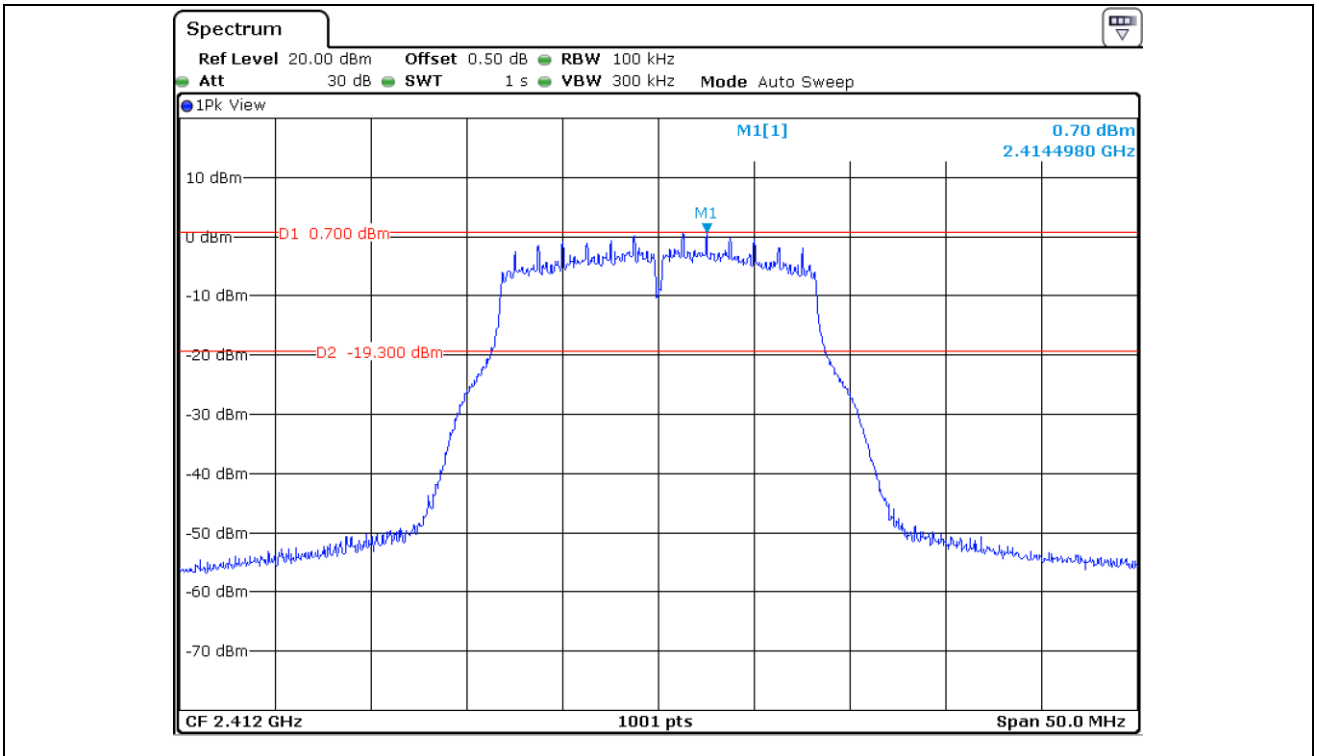
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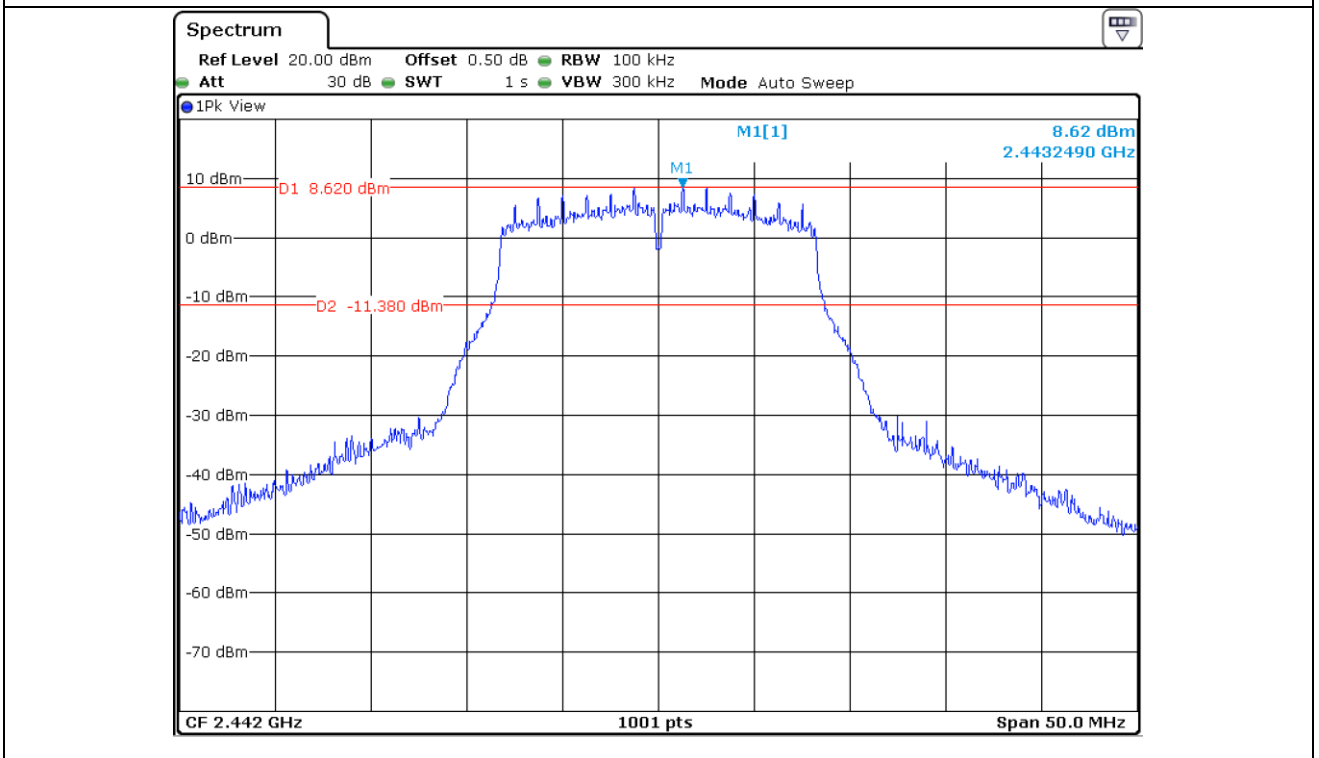
High Channel

9.5.1.2 Test data for 802.11g WLAN Mode

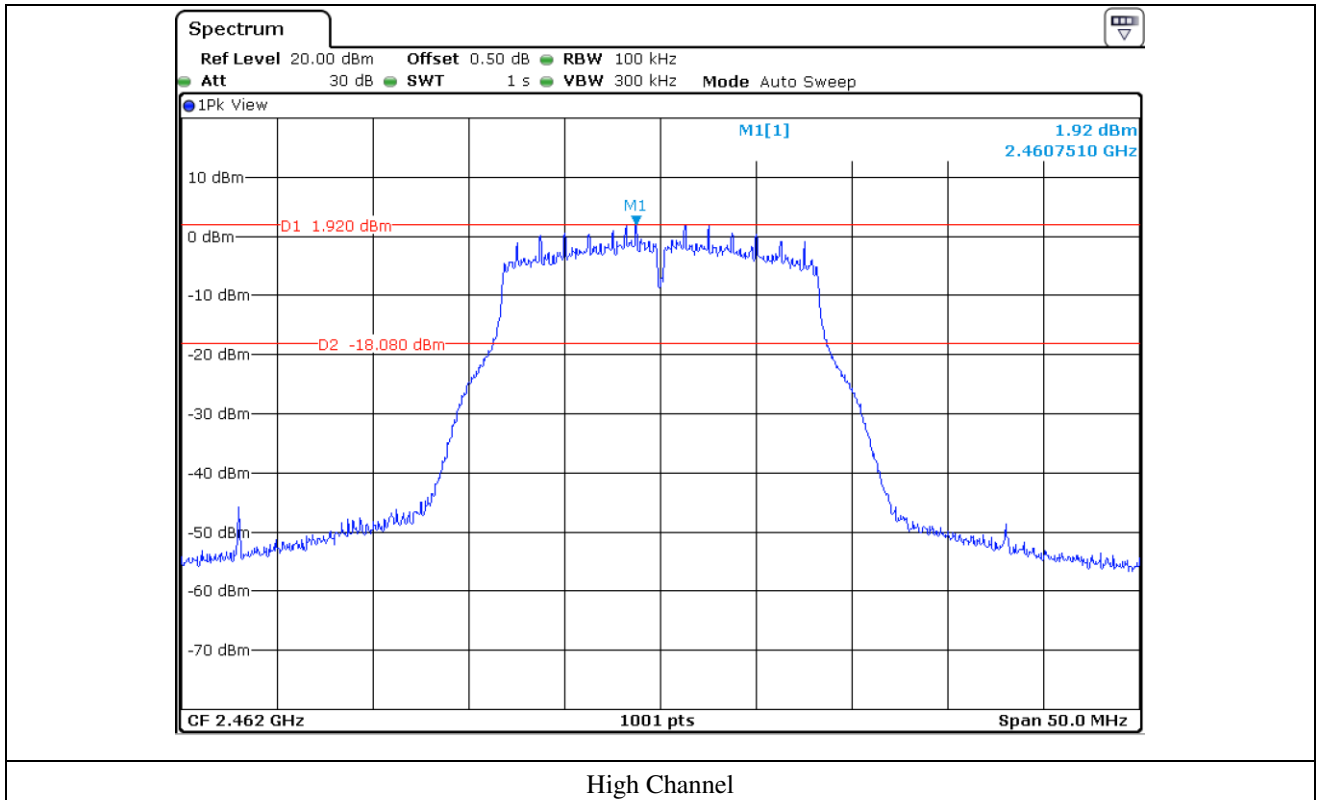
9.5.1.2.1 Test data for Antenna 0

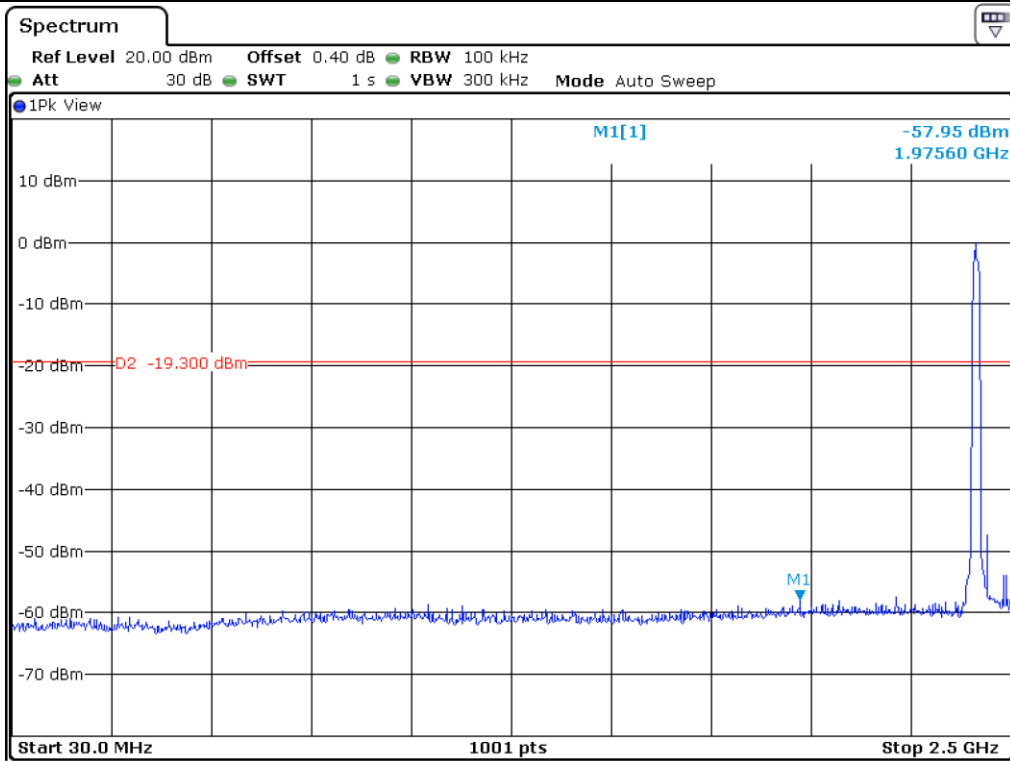


Low Channel

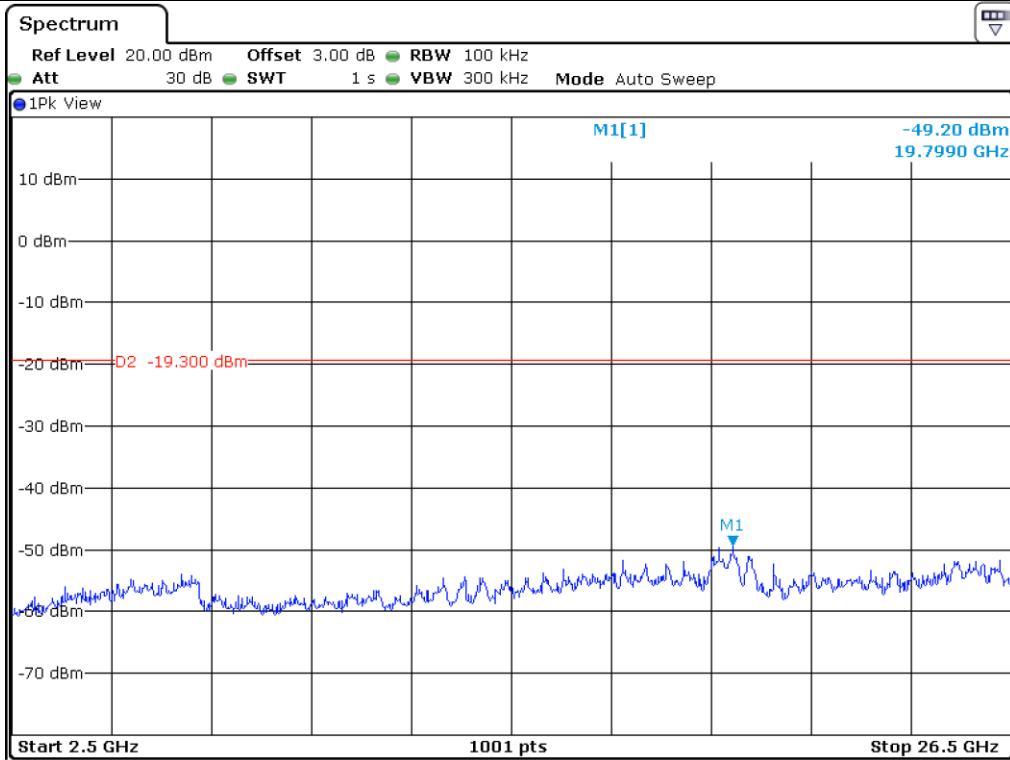


Middle Channel

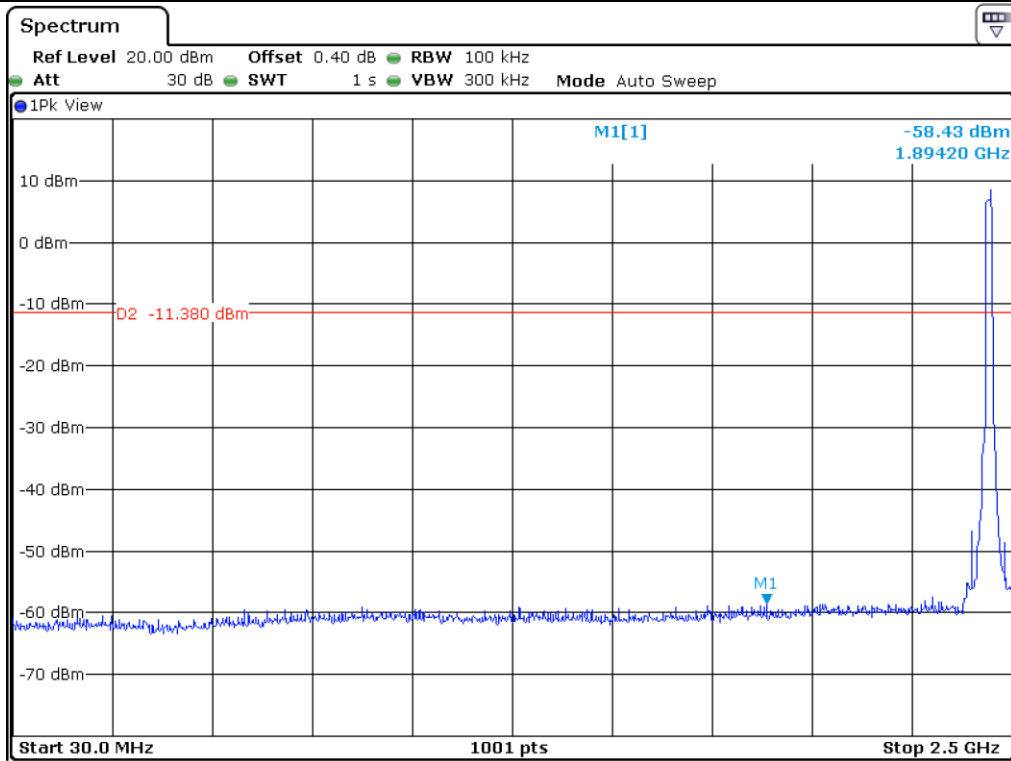




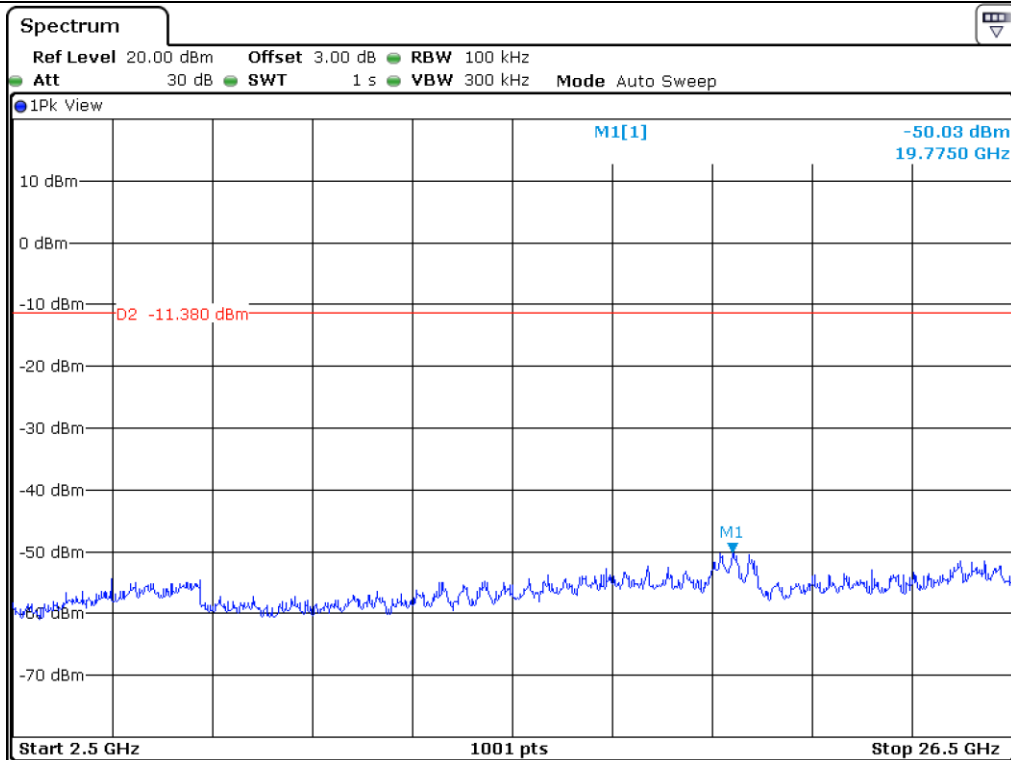
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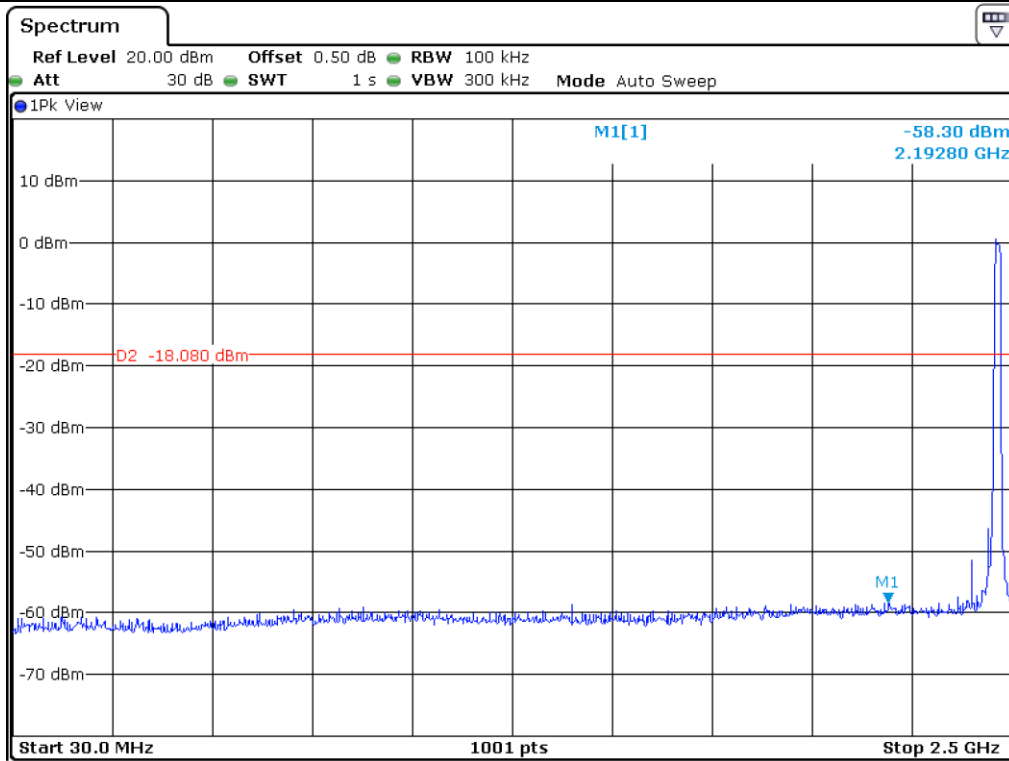
Low Channel



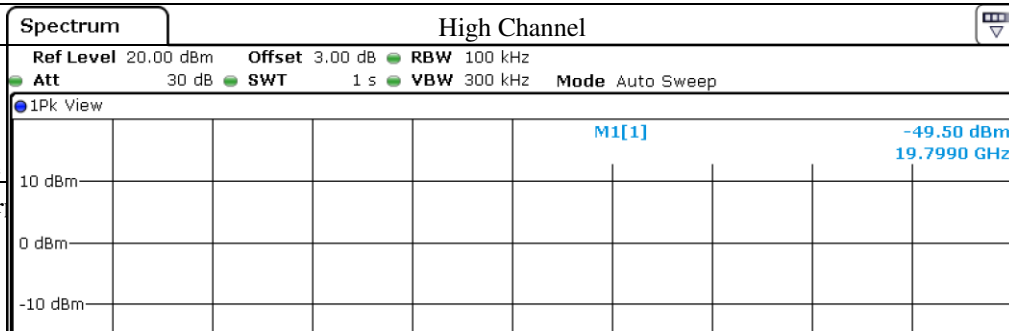
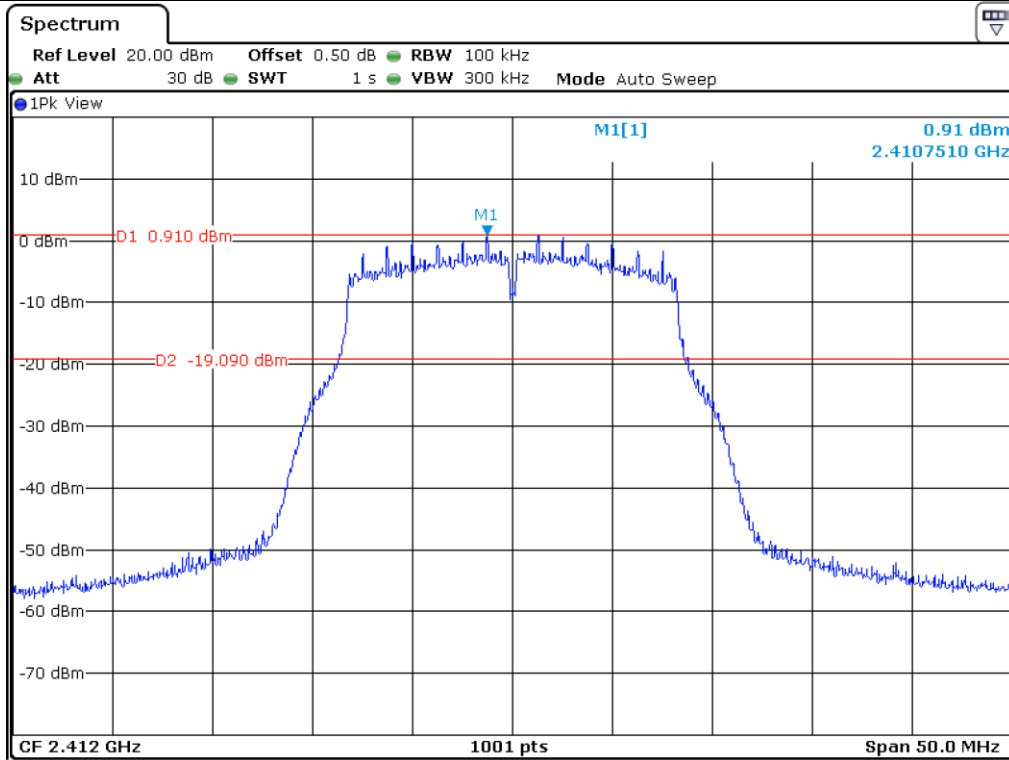
Middle Channel



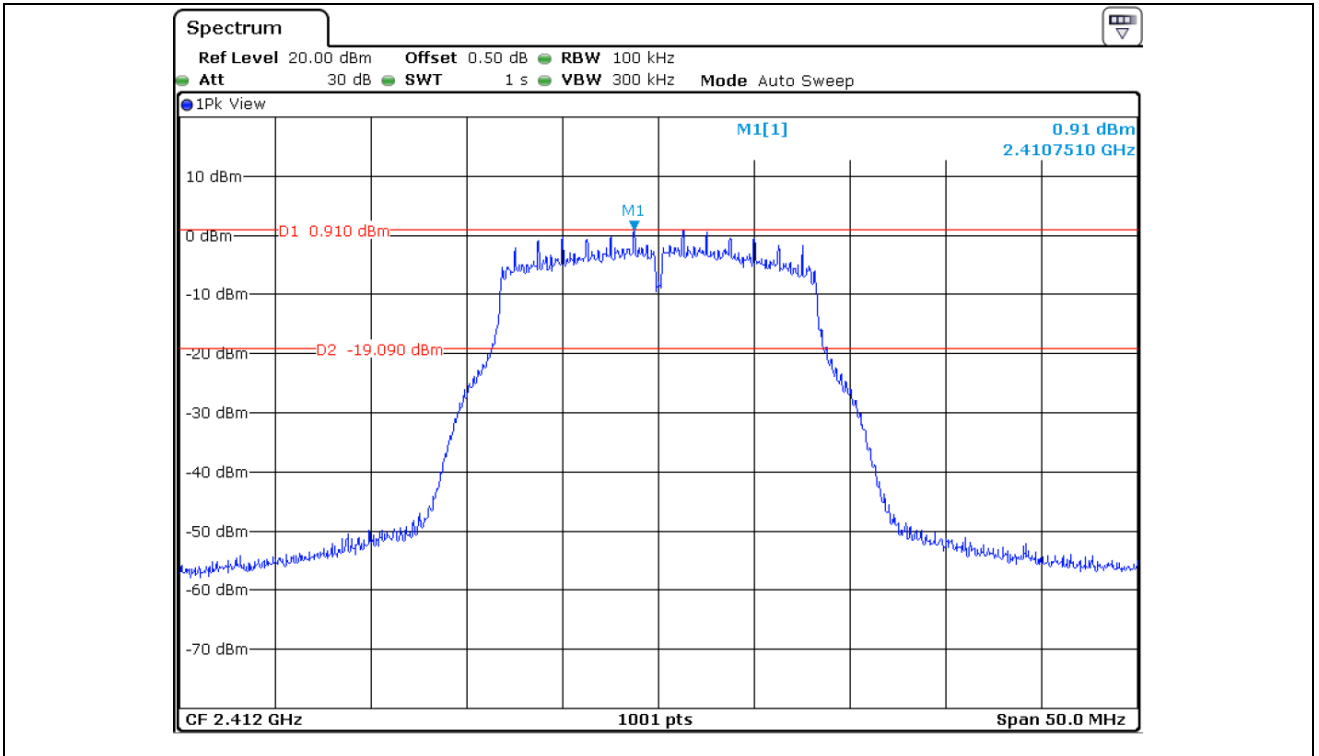
Middle Channel



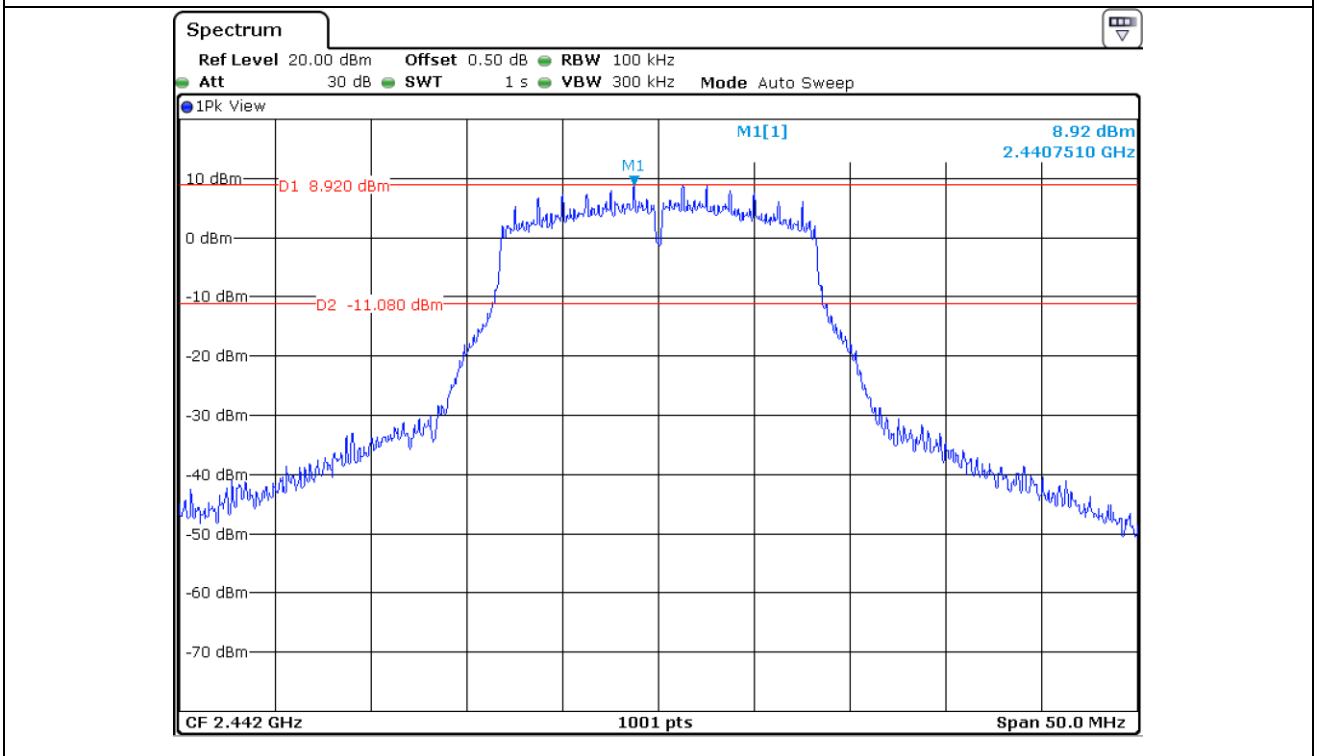
High Channel



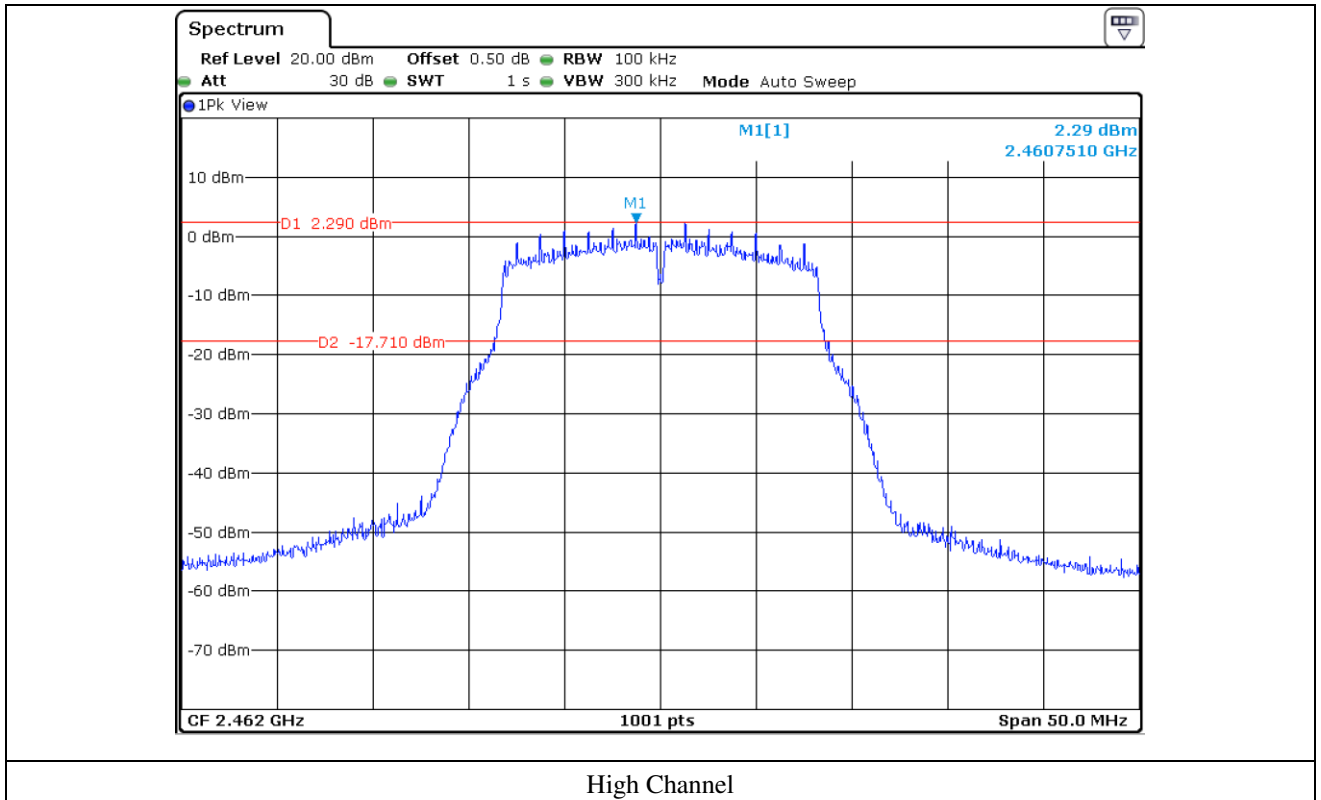
9.5.1.2.2 Test data for Antenna 1

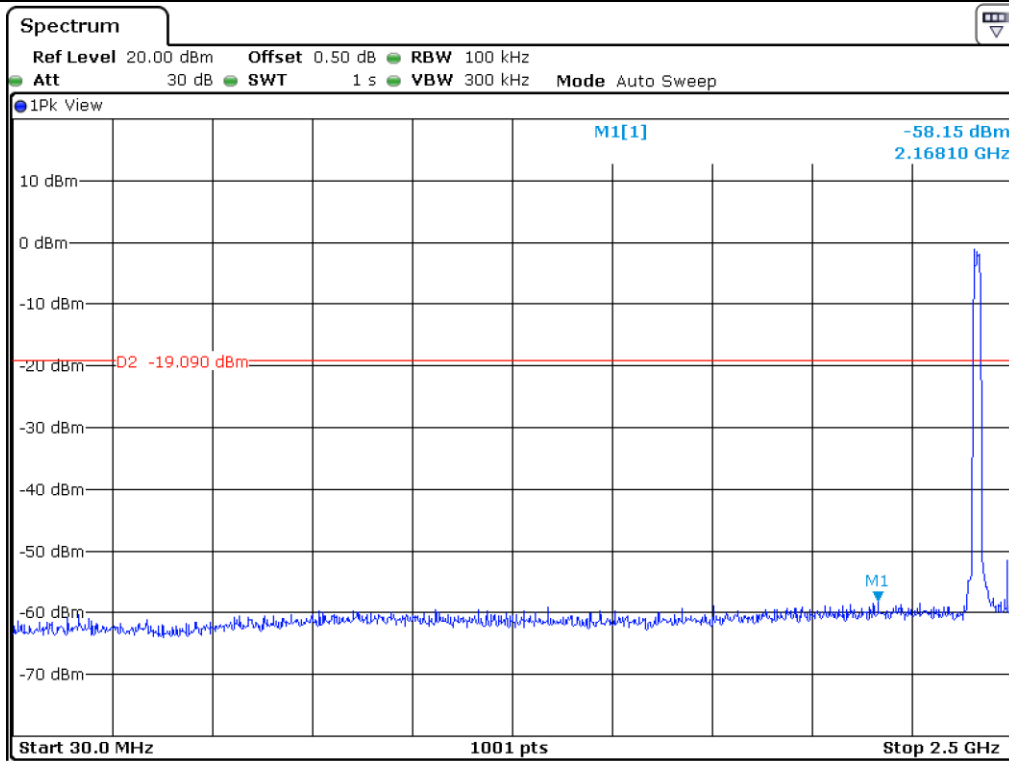


Low Channel

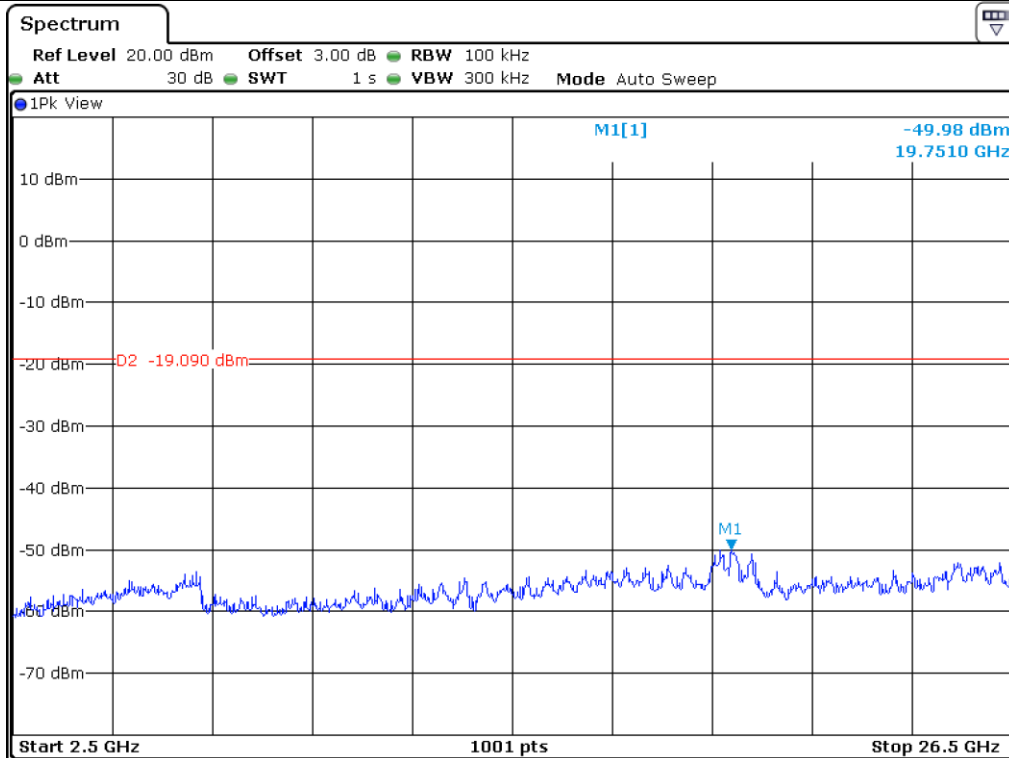


Middle Channel

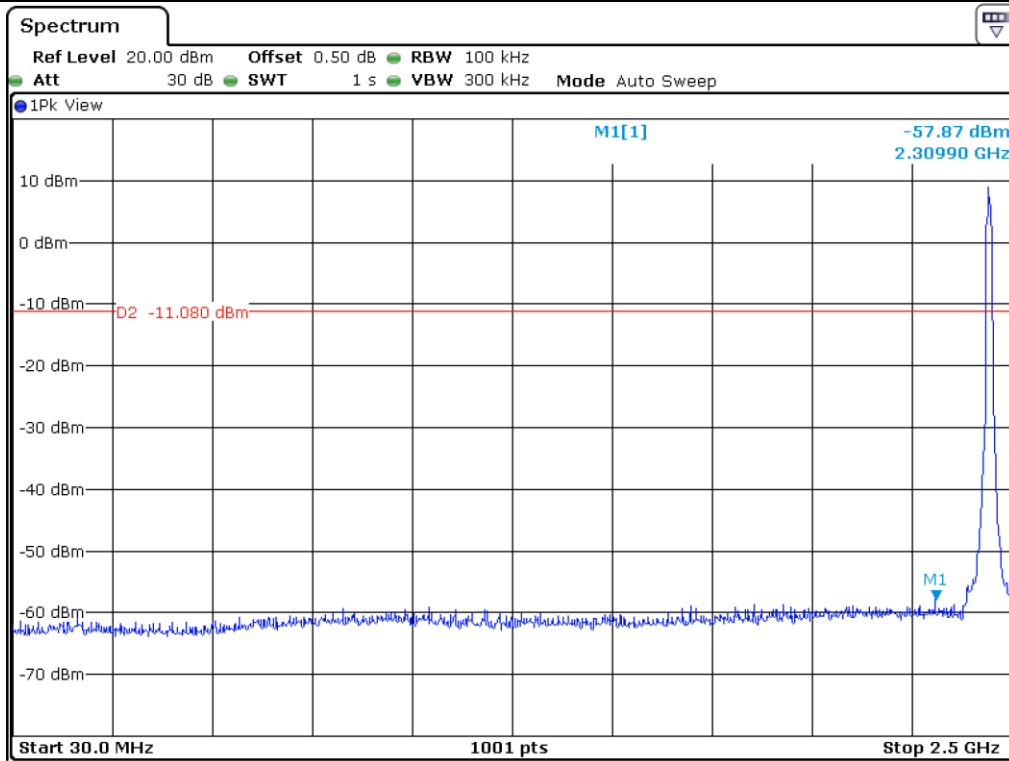




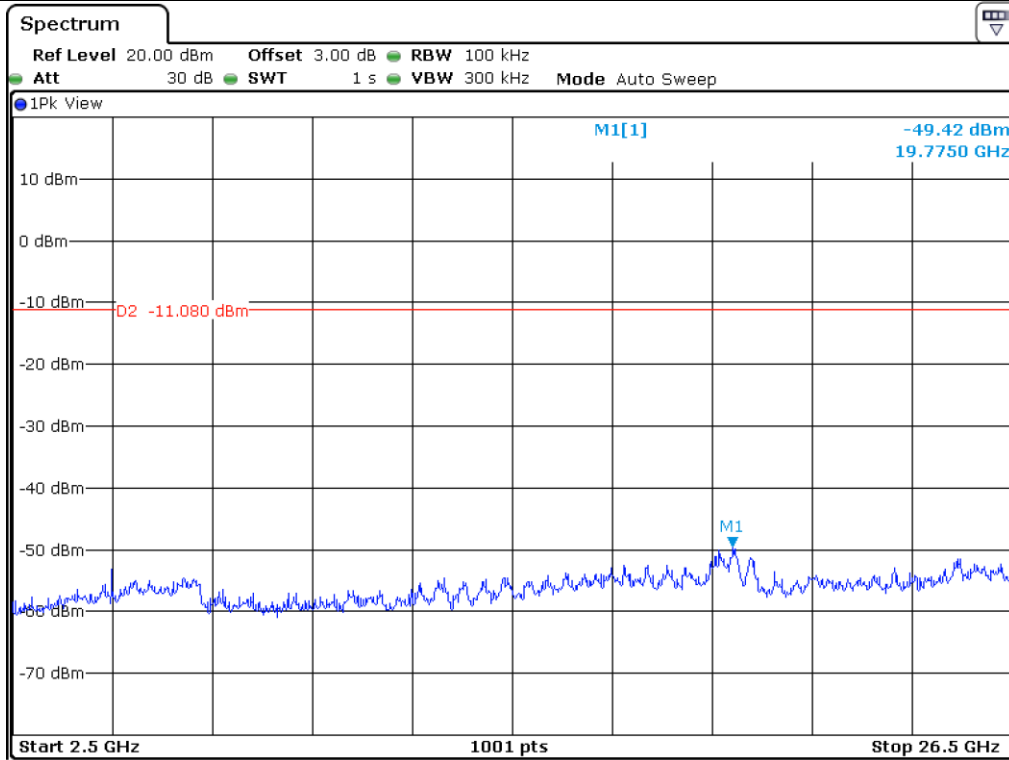
Low Channel



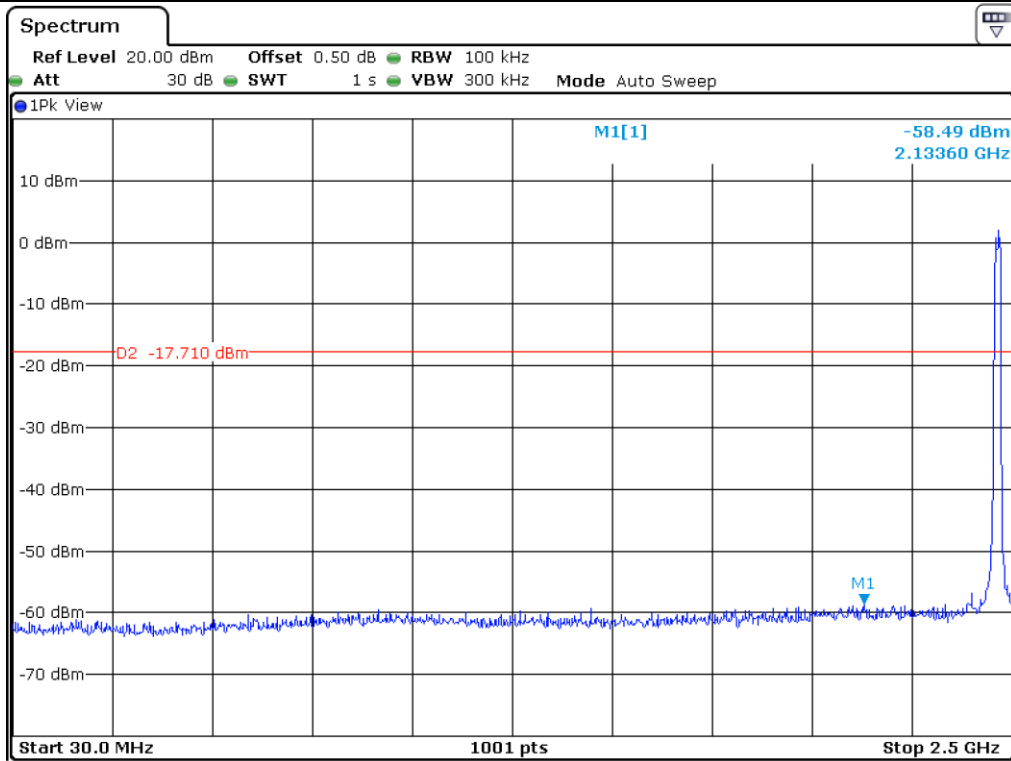
Low Channel



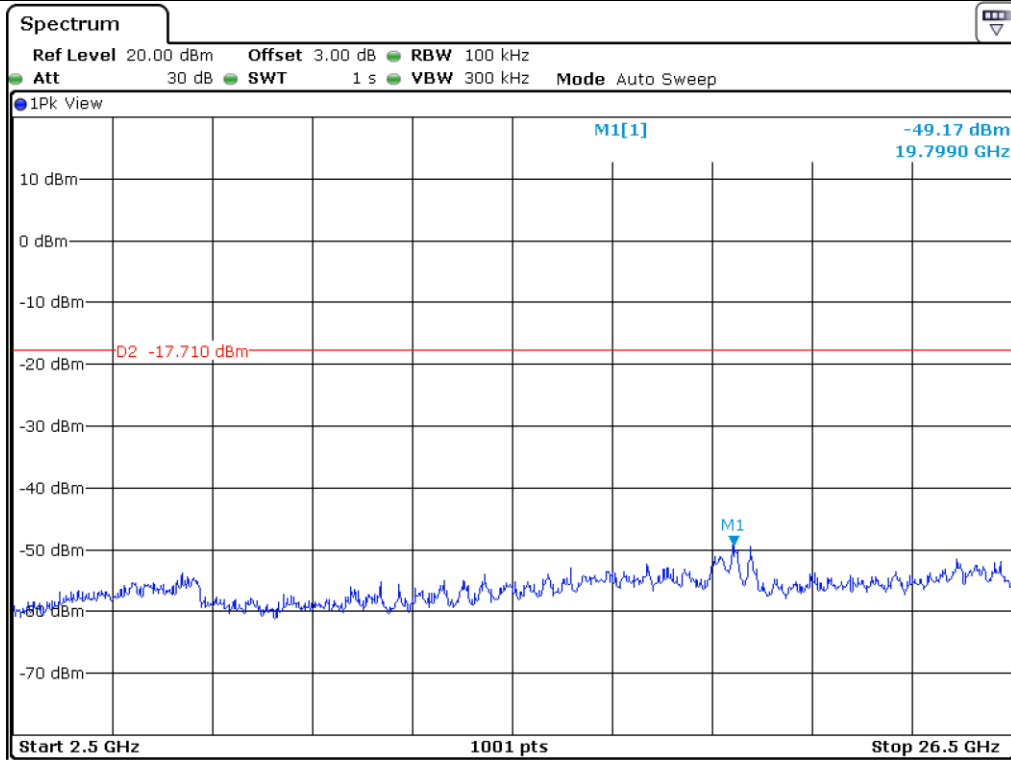
Middle Channel



Middle Channel

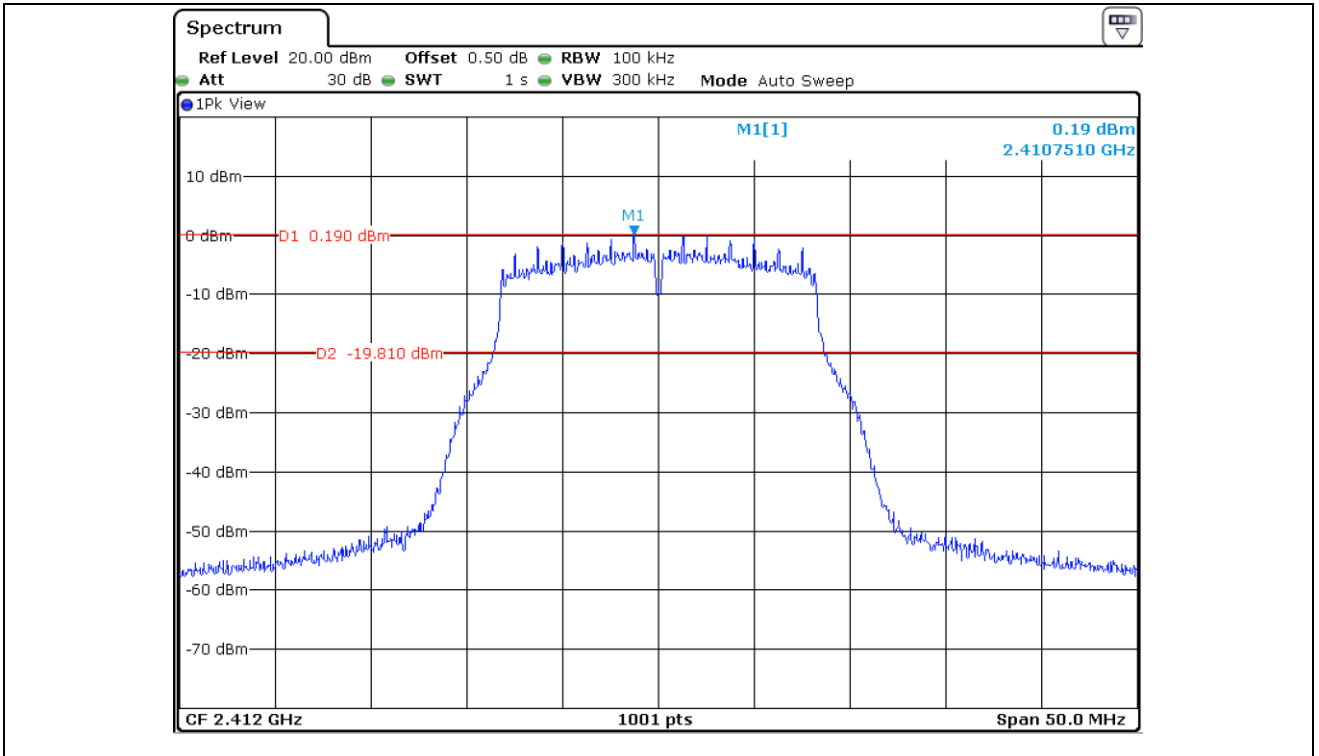


High Channel

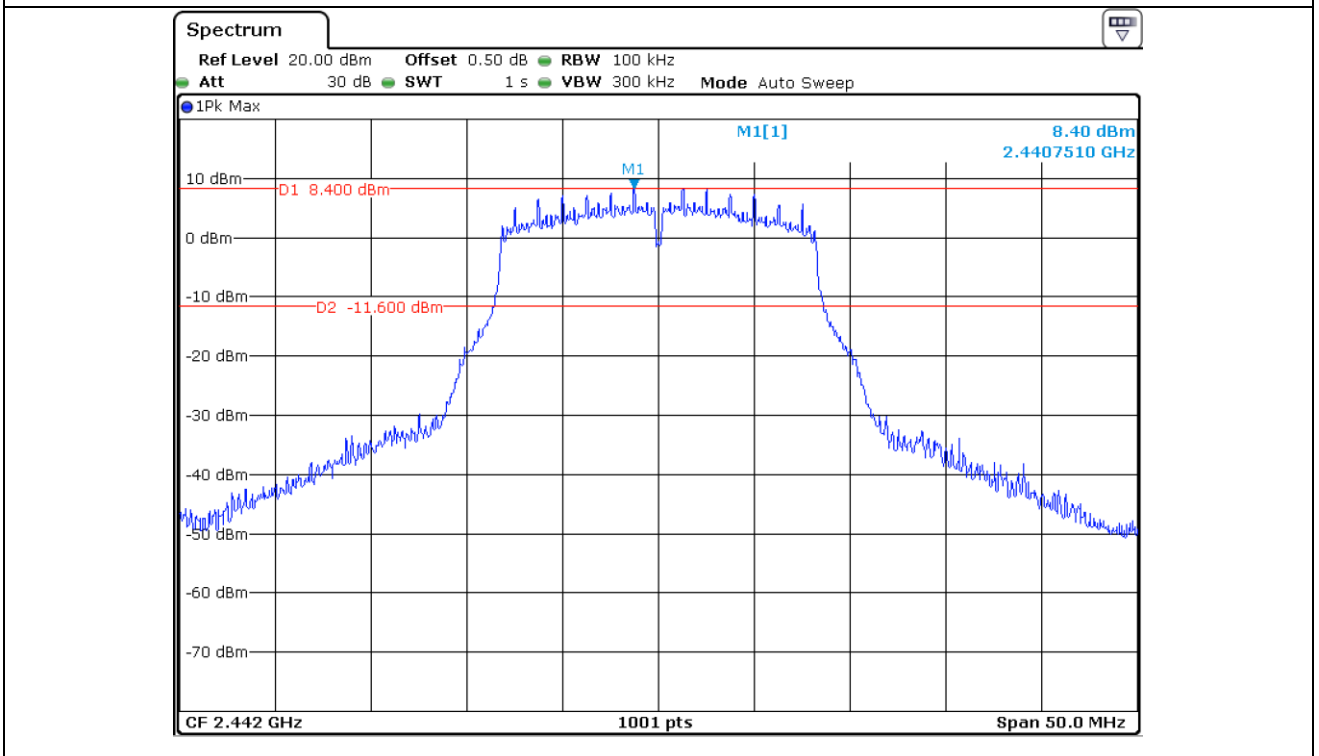


High Channel

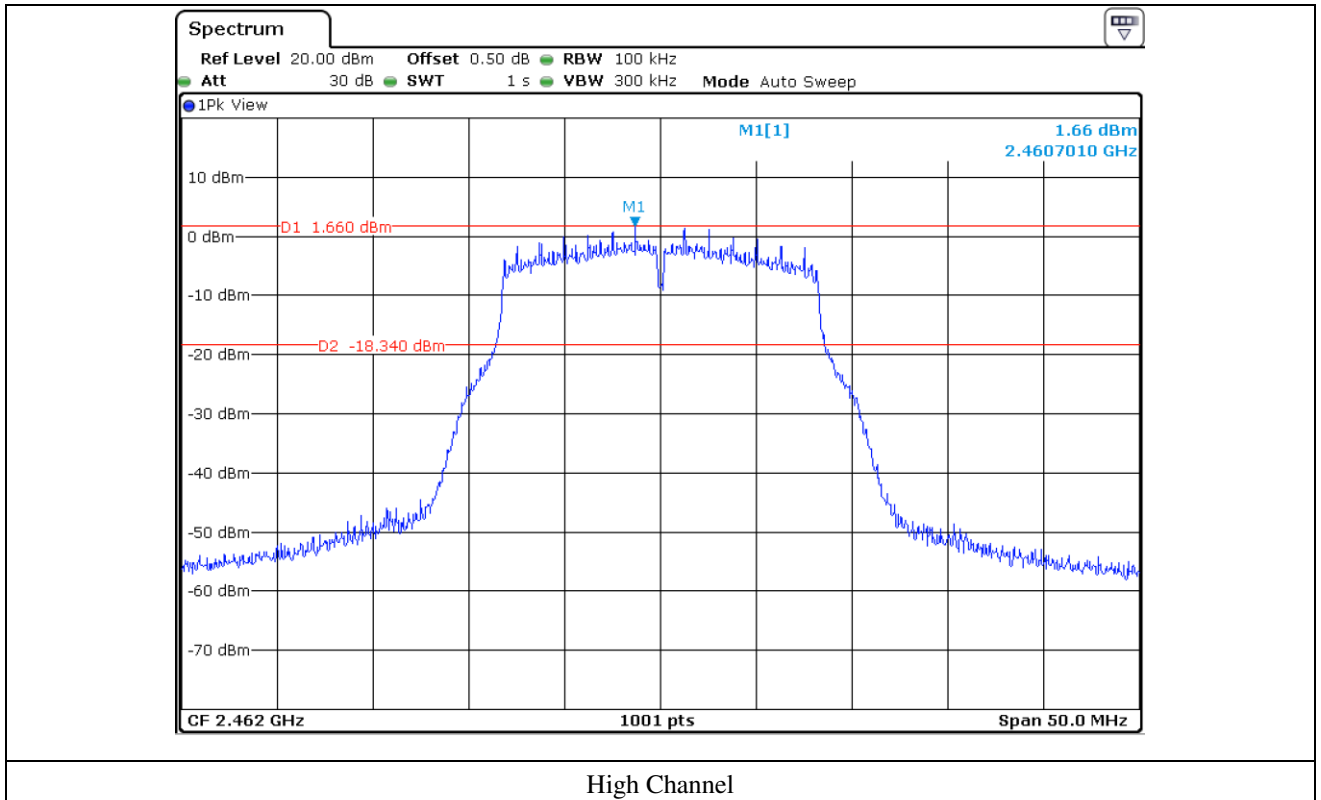
9.5.1.2.3 Test data for Antenna 2



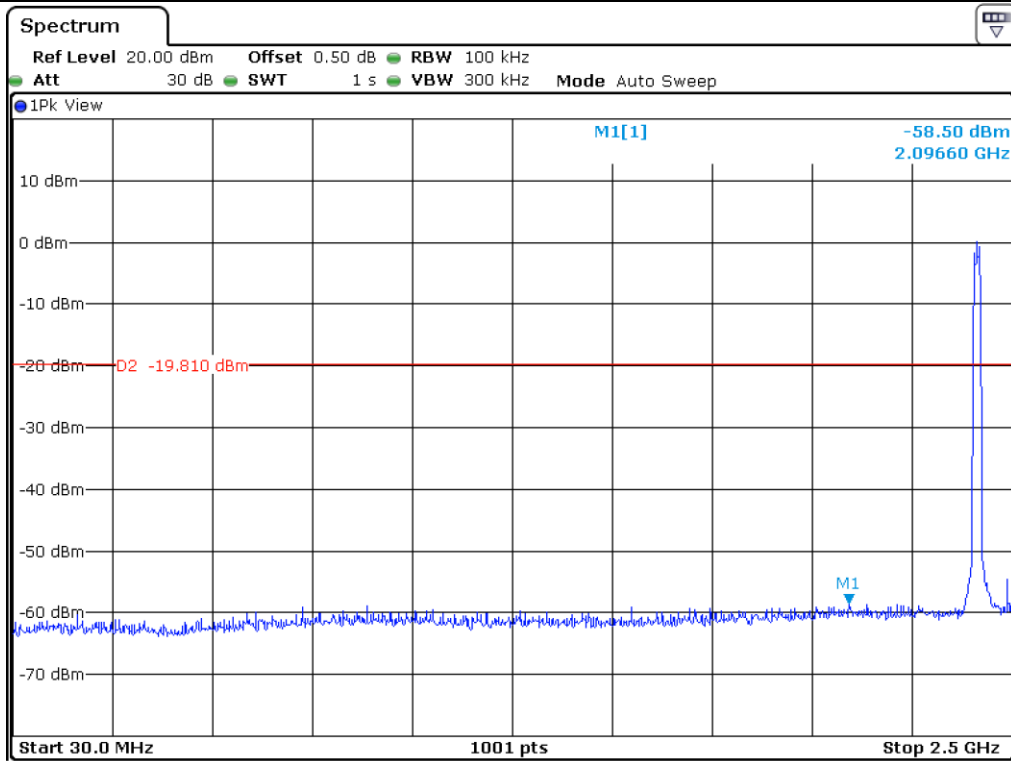
Low Channel



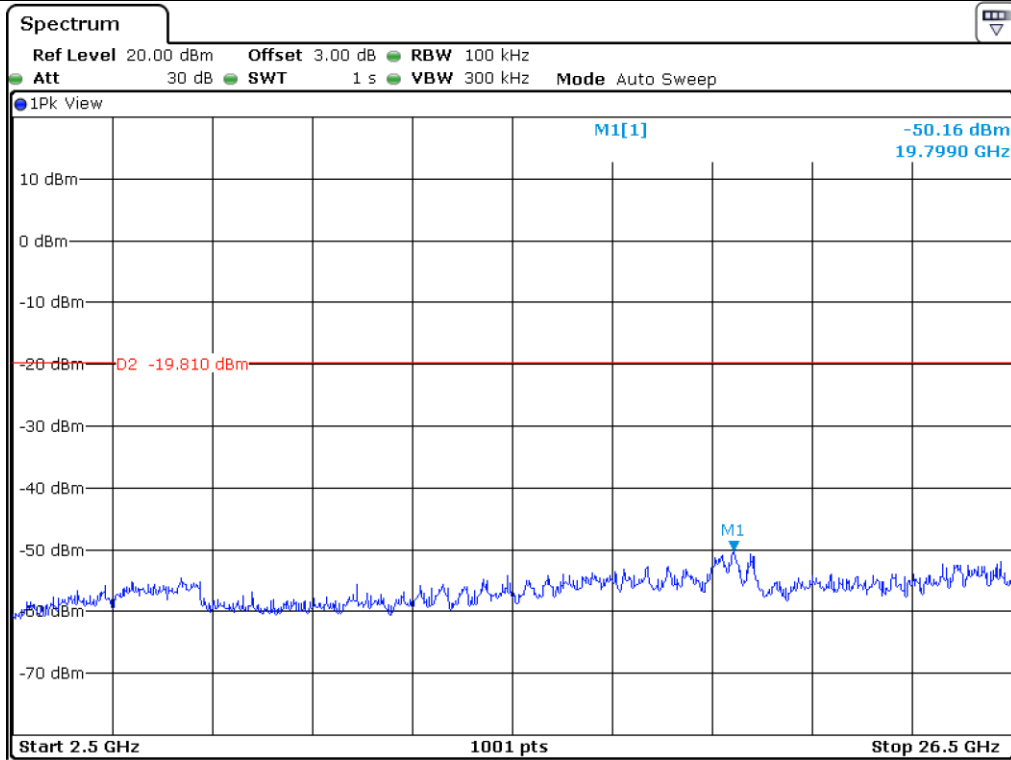
Middle Channel



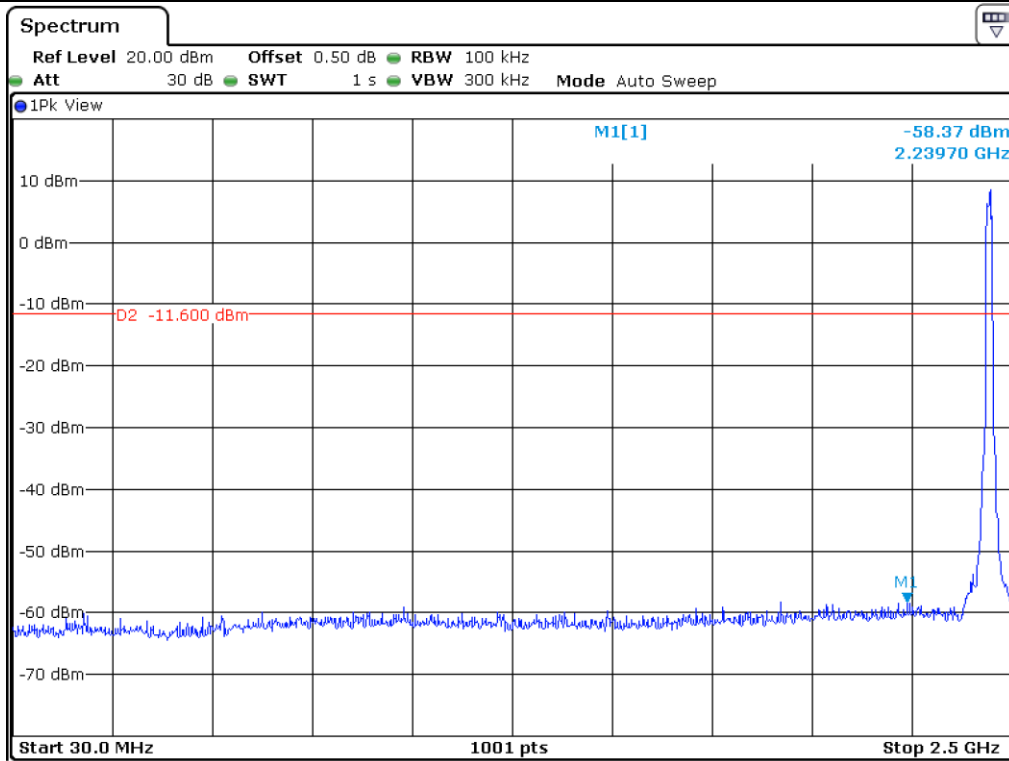
High Channel



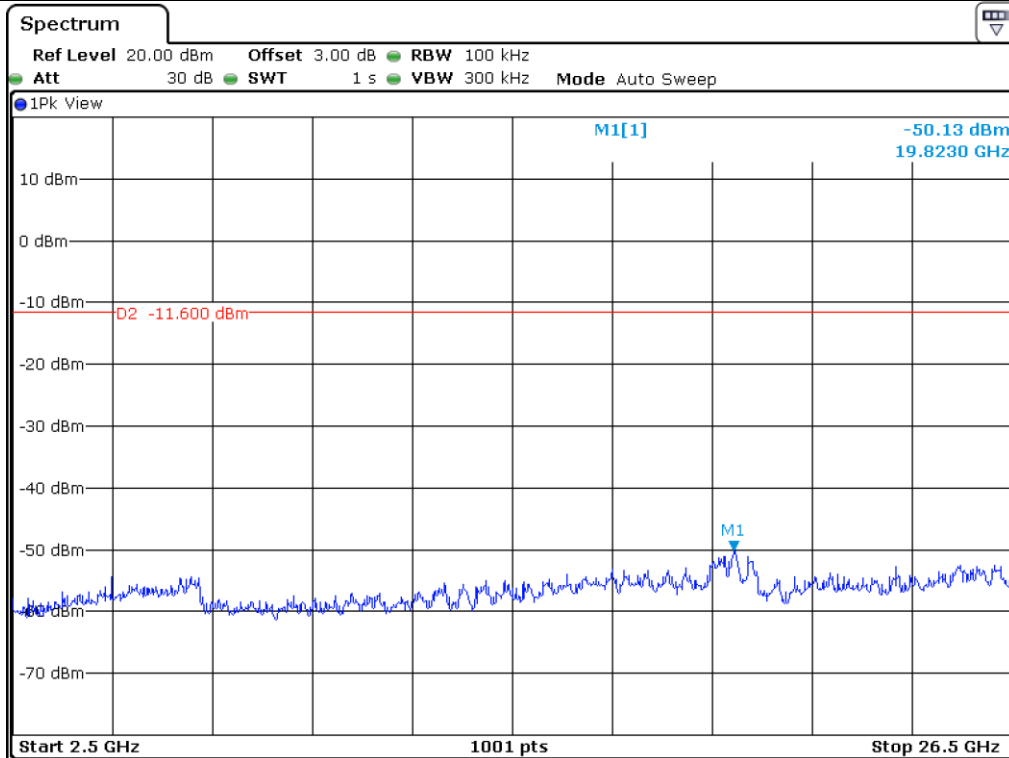
Low Channel



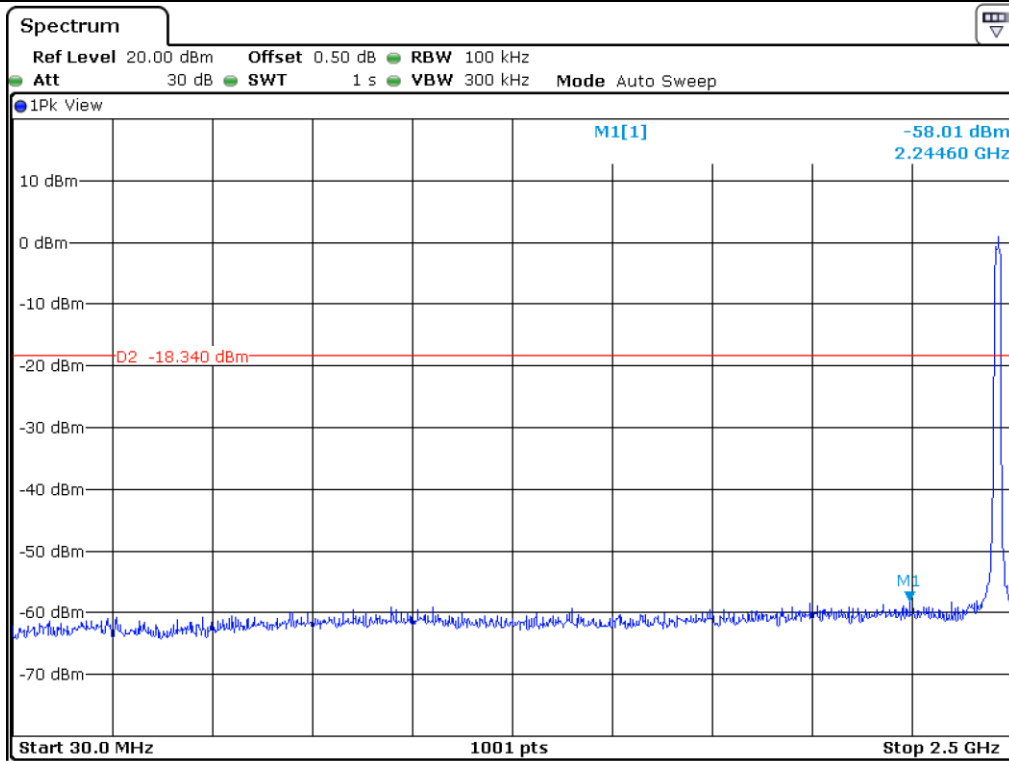
Low Channel



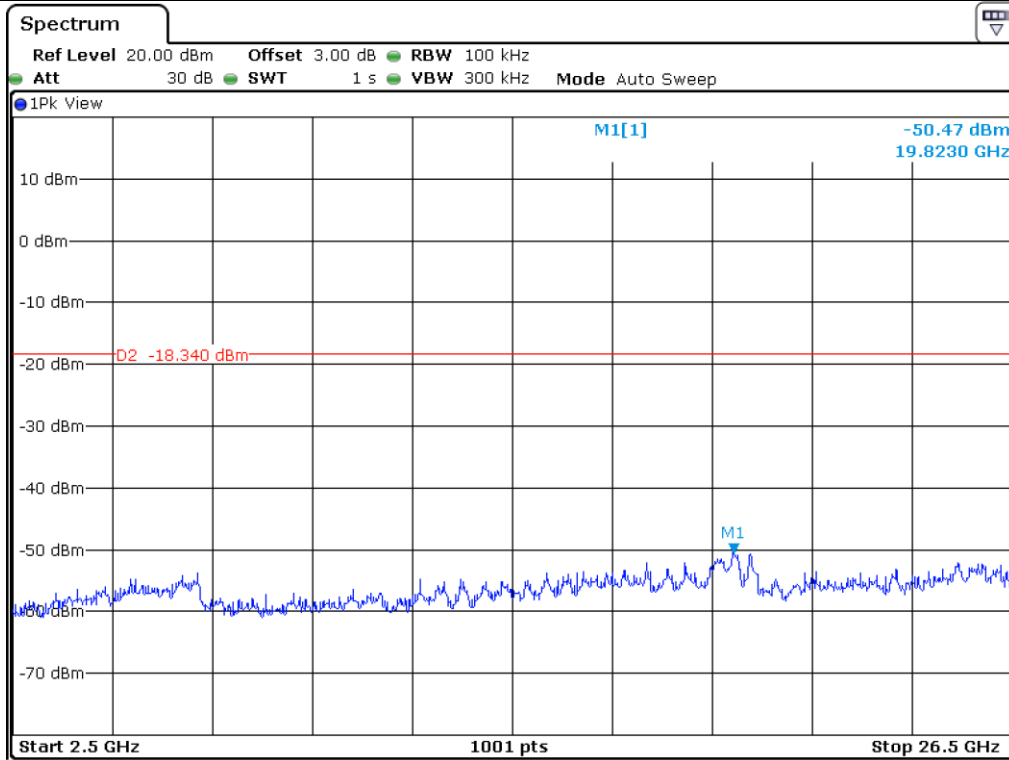
Middle Channel



Middle Channel

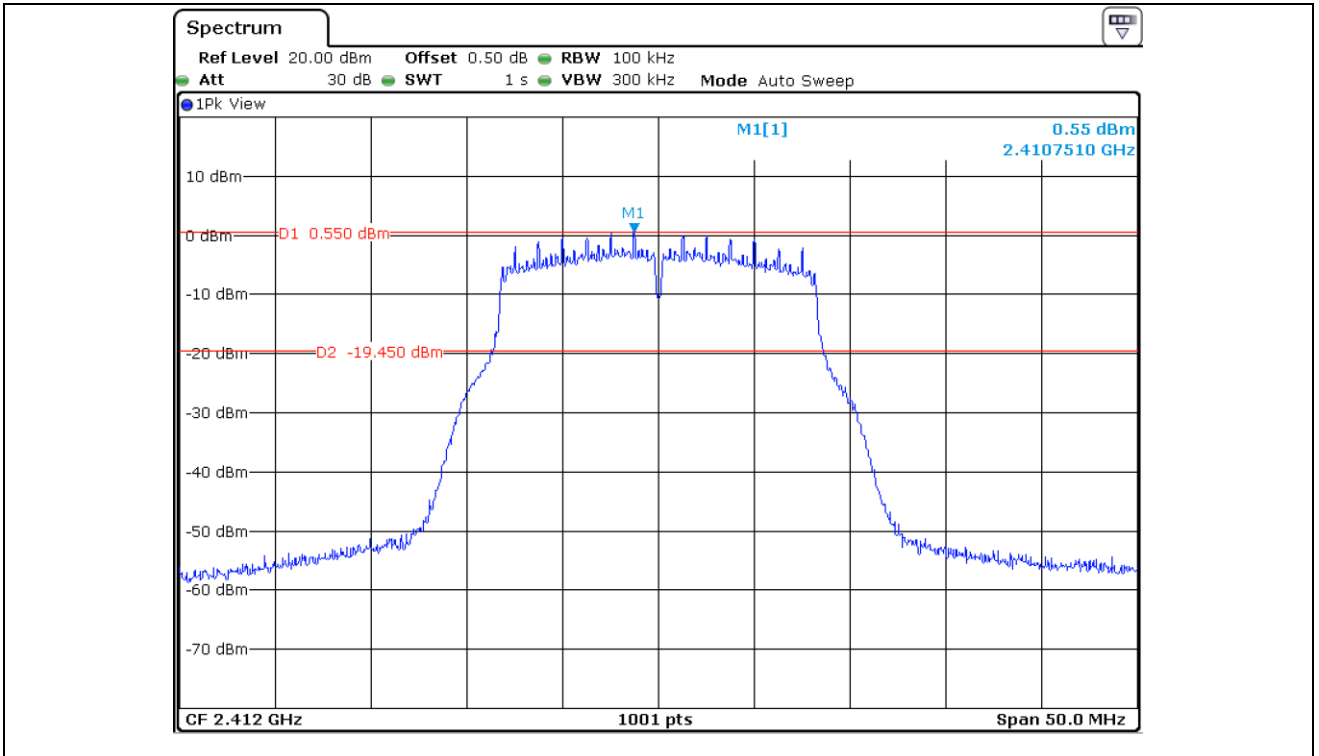


High Channel

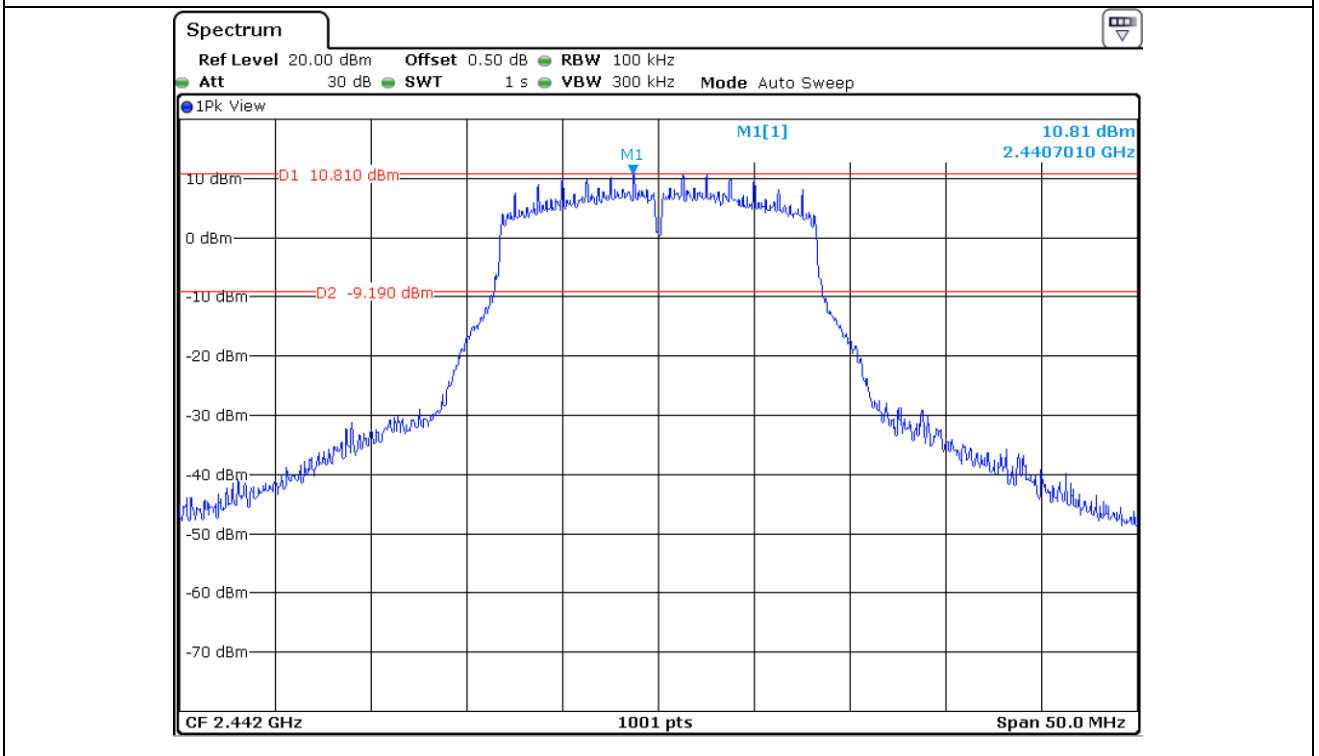


High Channel

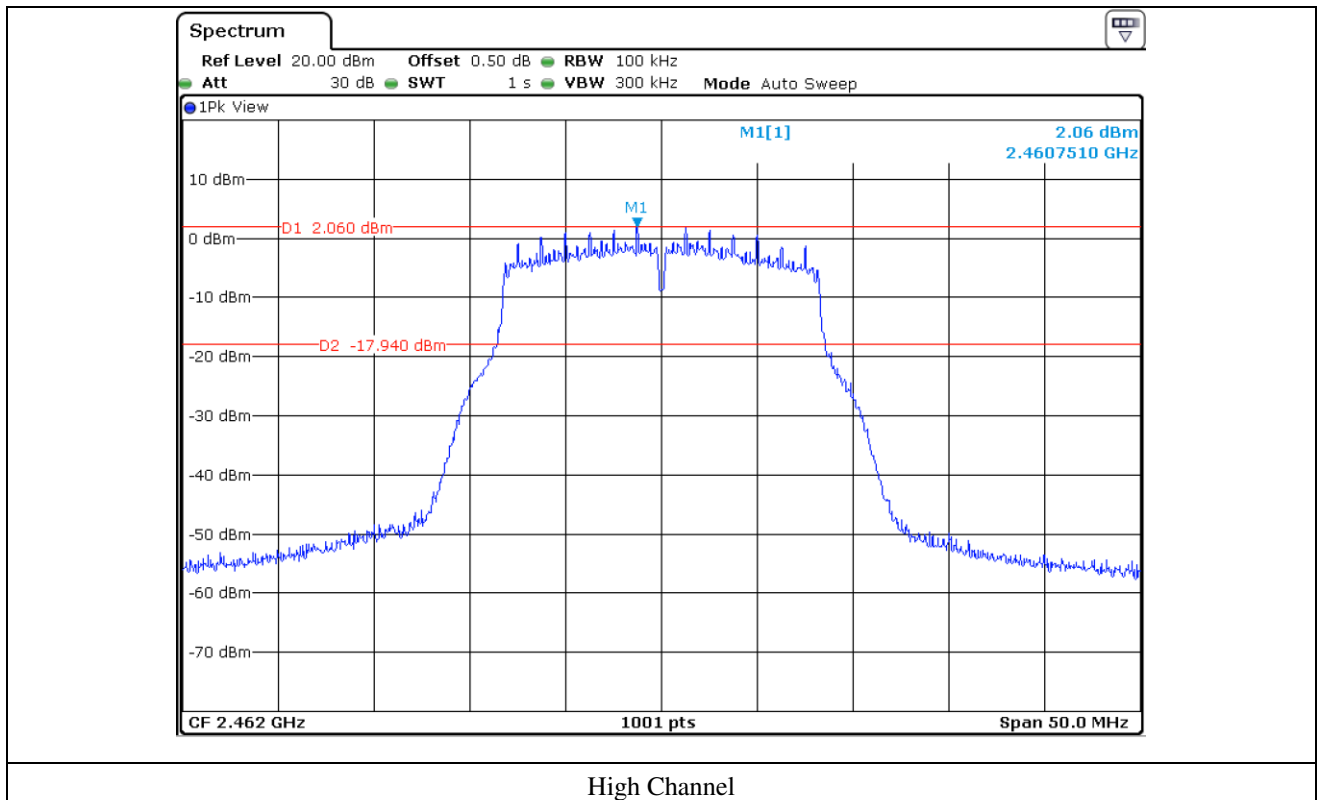
9.5.1.2.4 Test data for Antenna 3

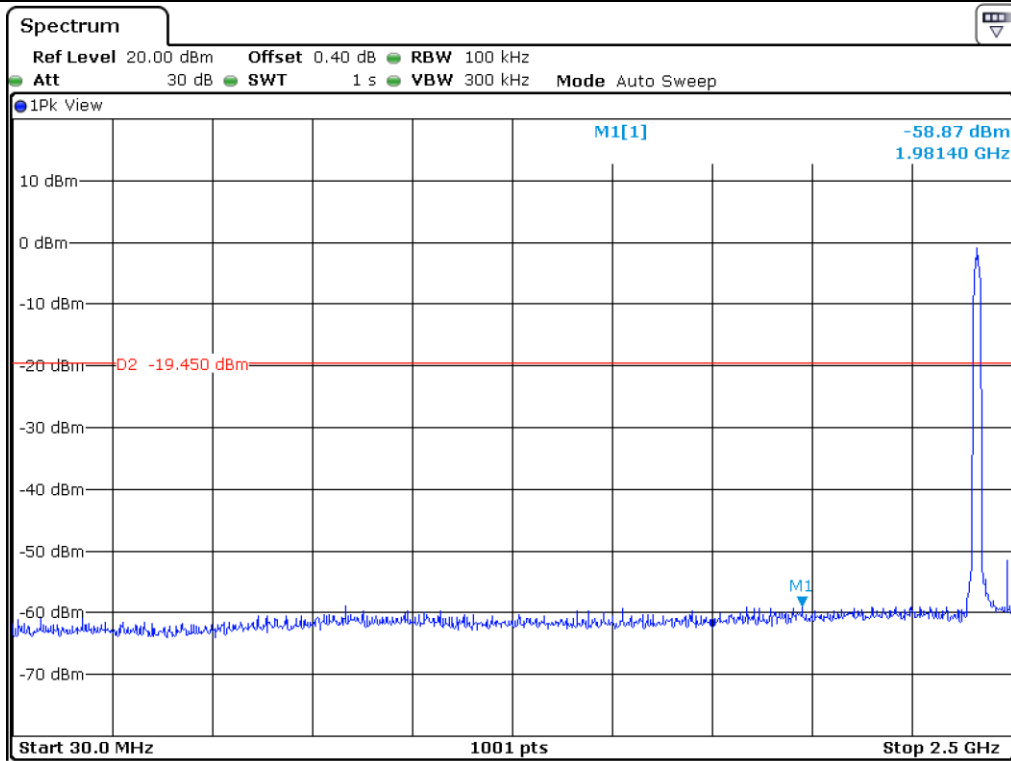


Low Channel

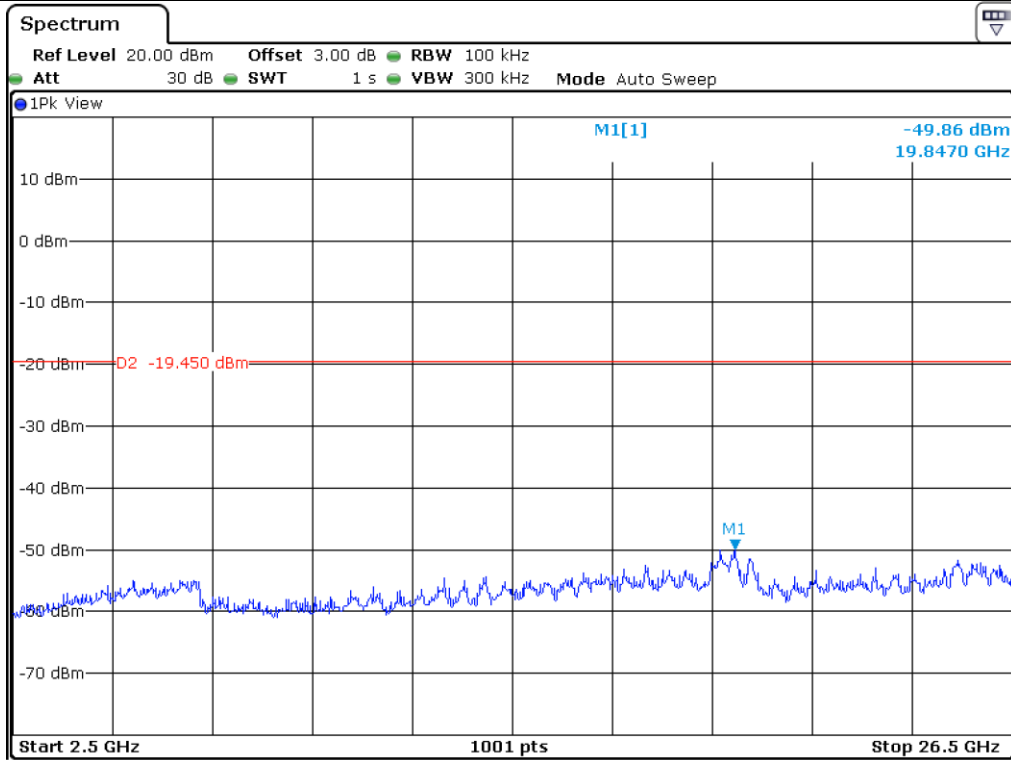


Middle Channel

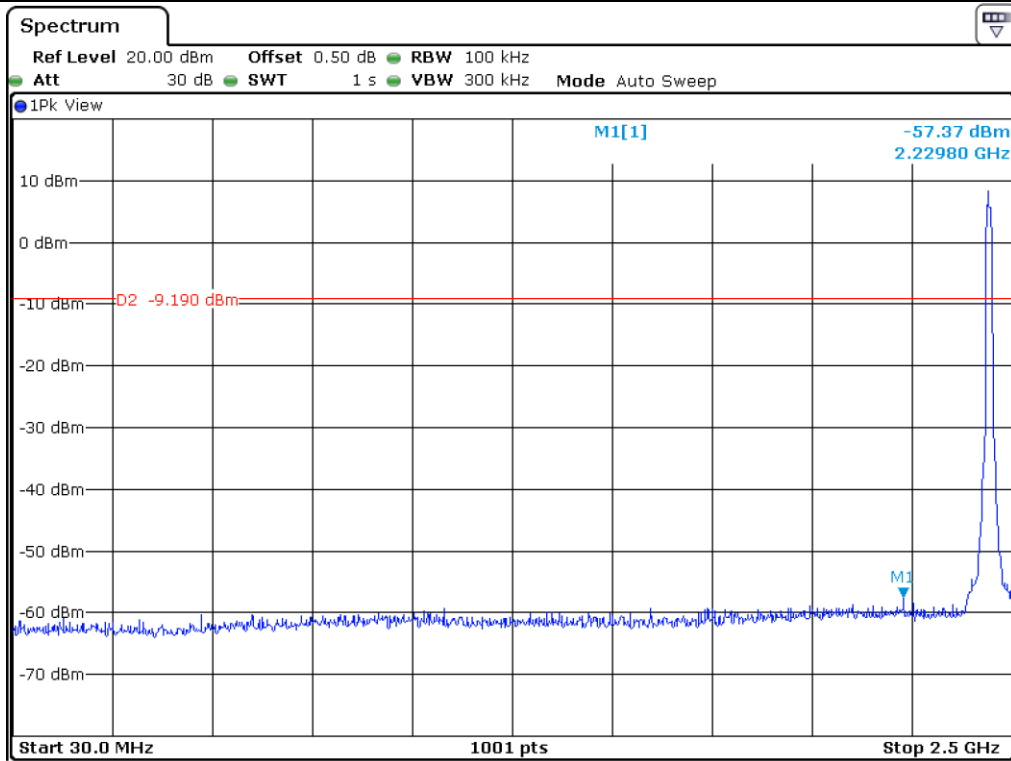




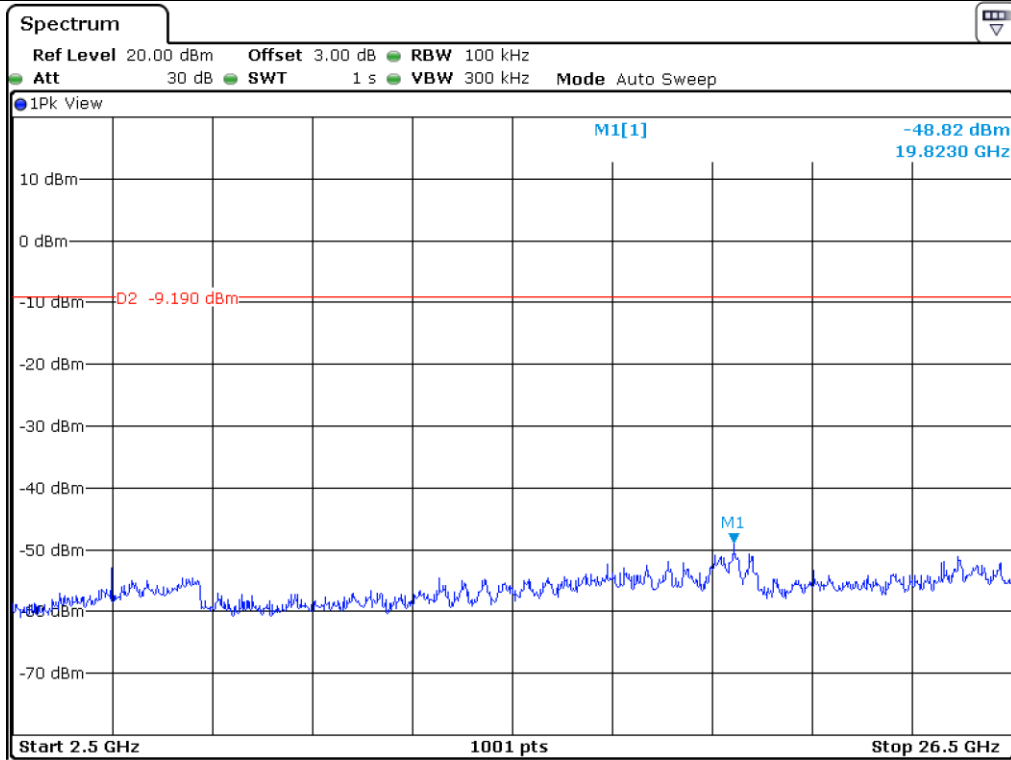
Low Channel



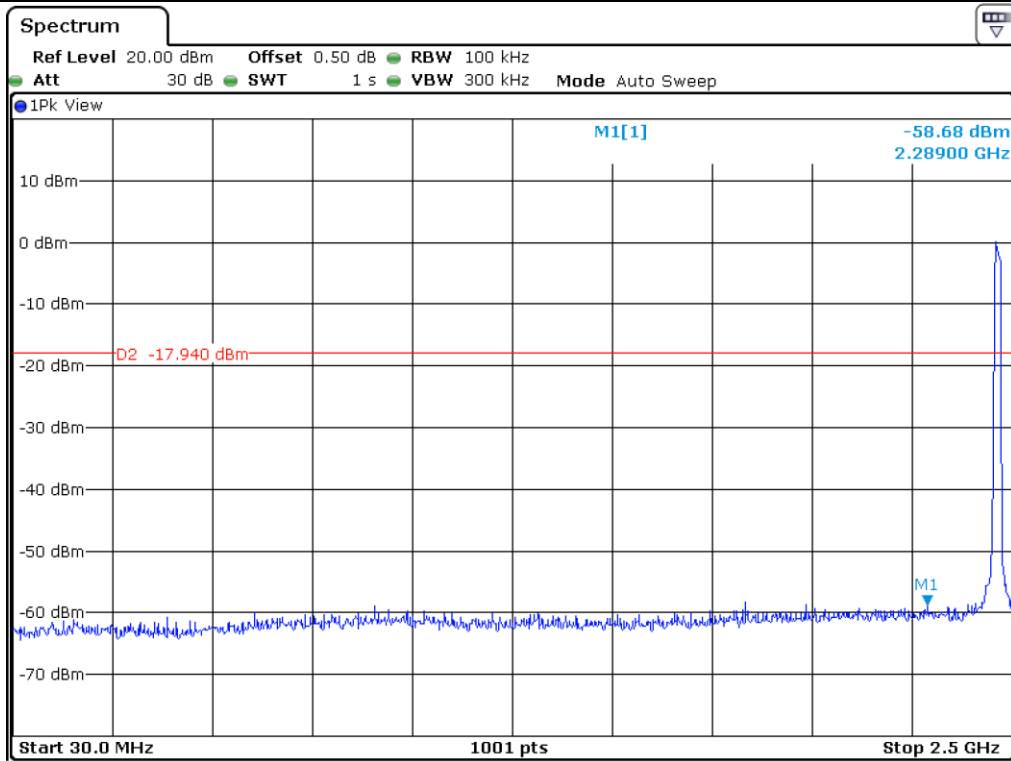
Low Channel



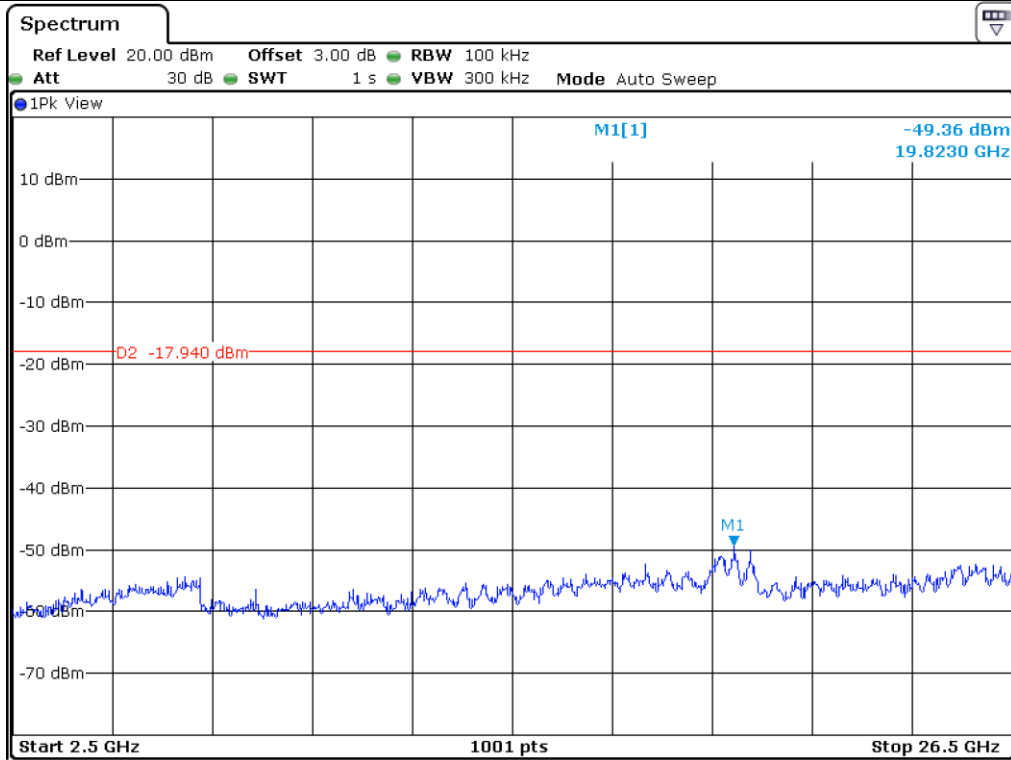
Middle Channel



Middle Channel



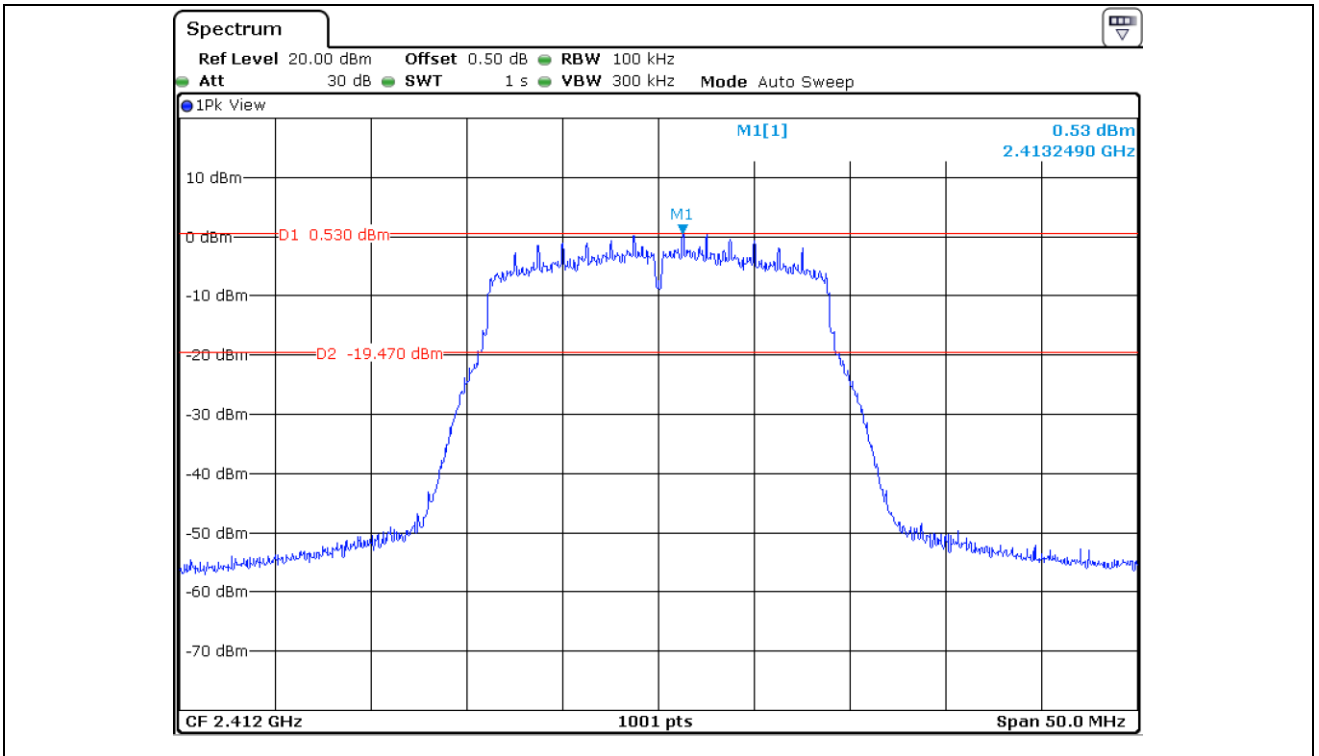
High Channel



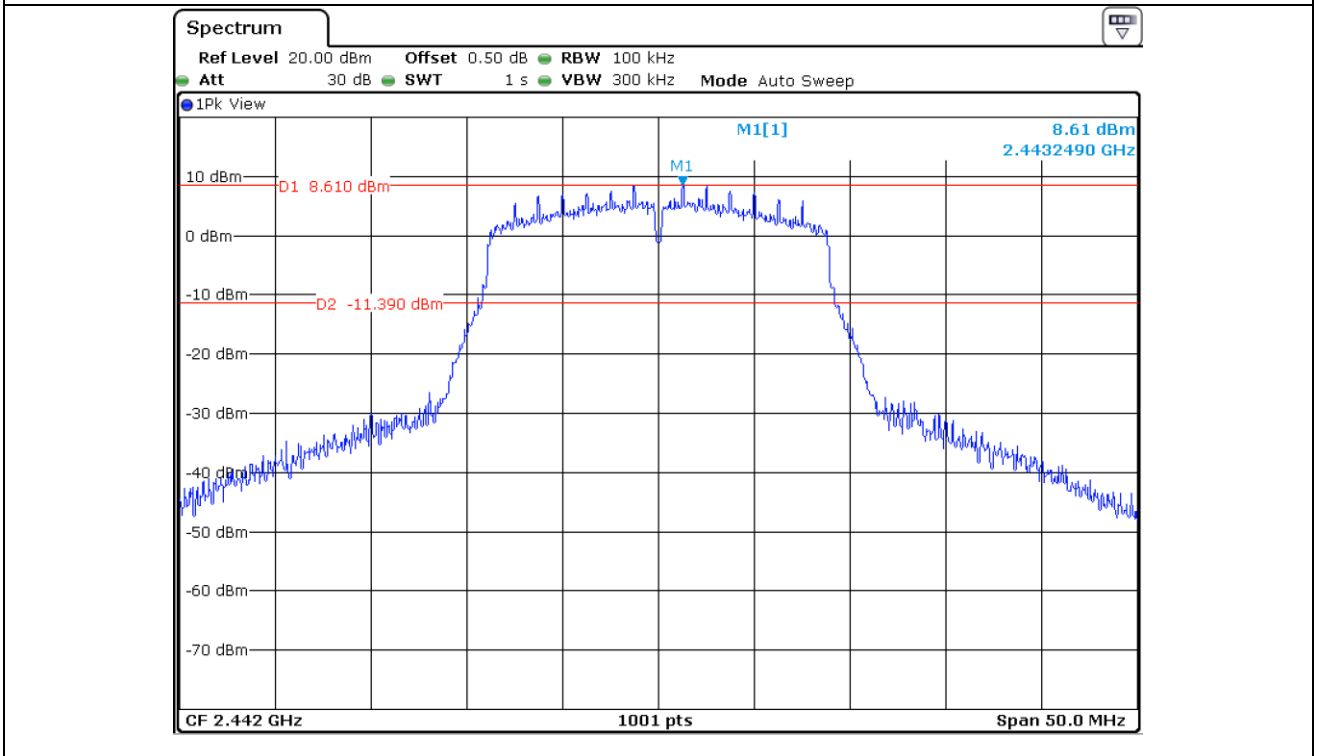
High Channel

9.5.1.3 Test data for 802.11n_HT20 WLAN Mode

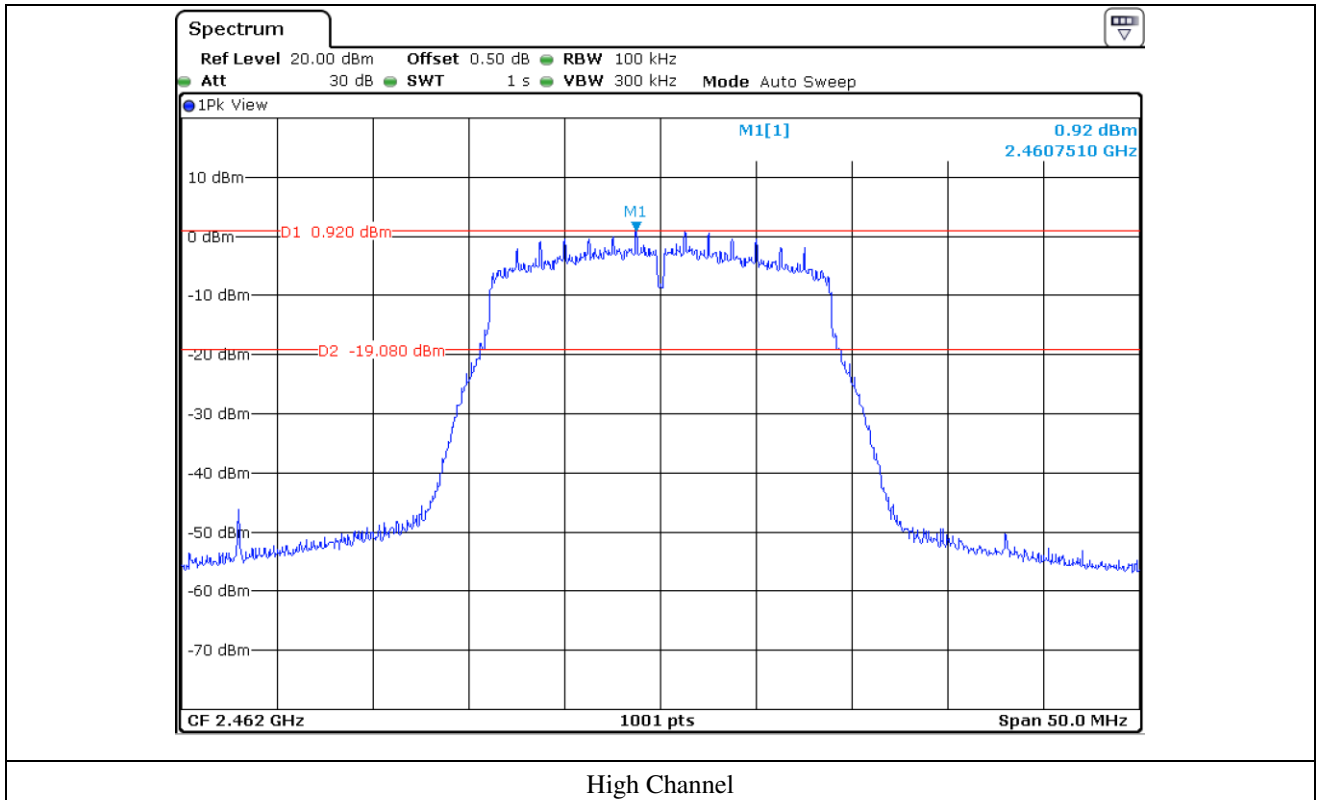
9.5.1.3.1 Test data for Antenna 0

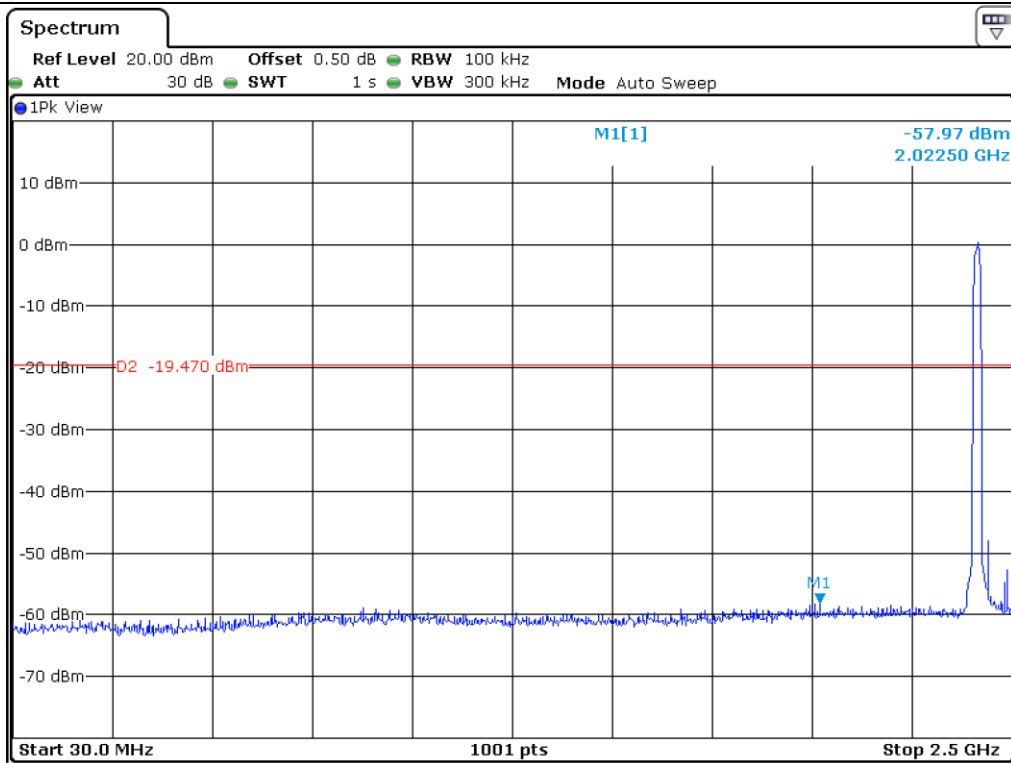


Low Channel

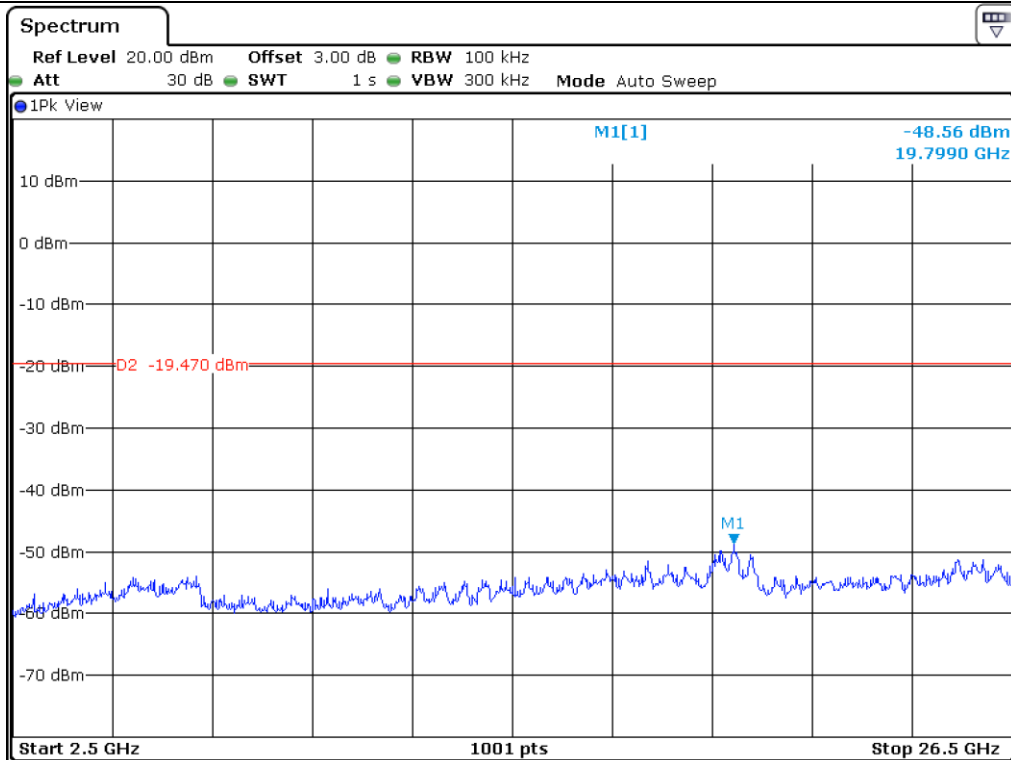


Middle Channel

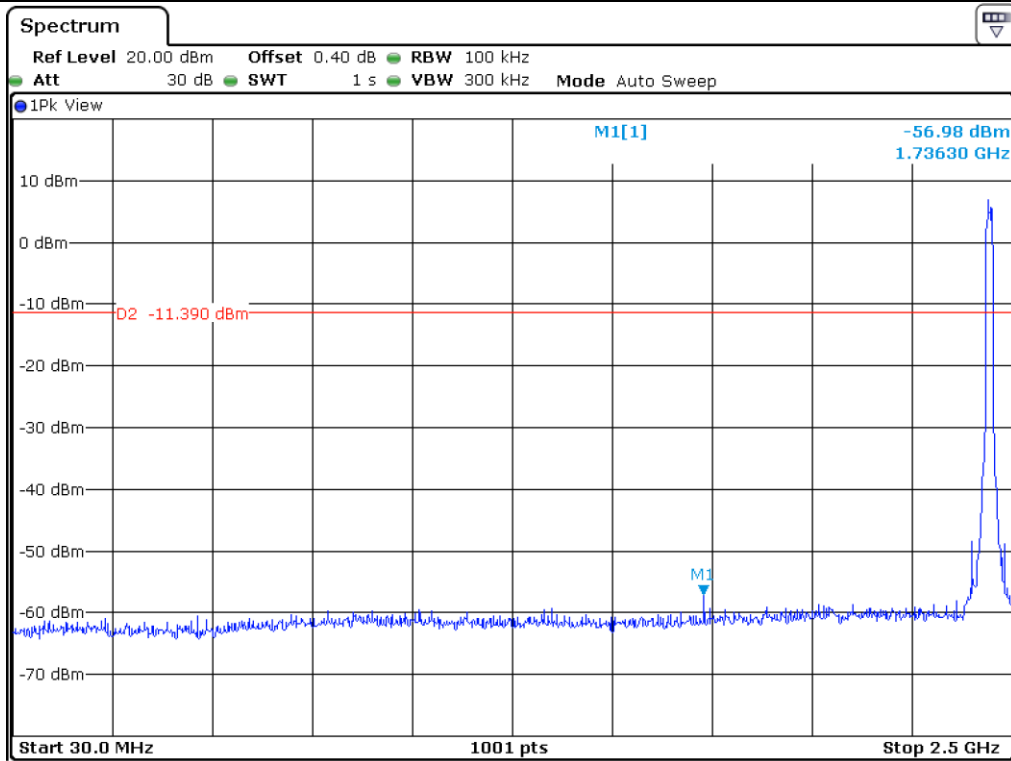




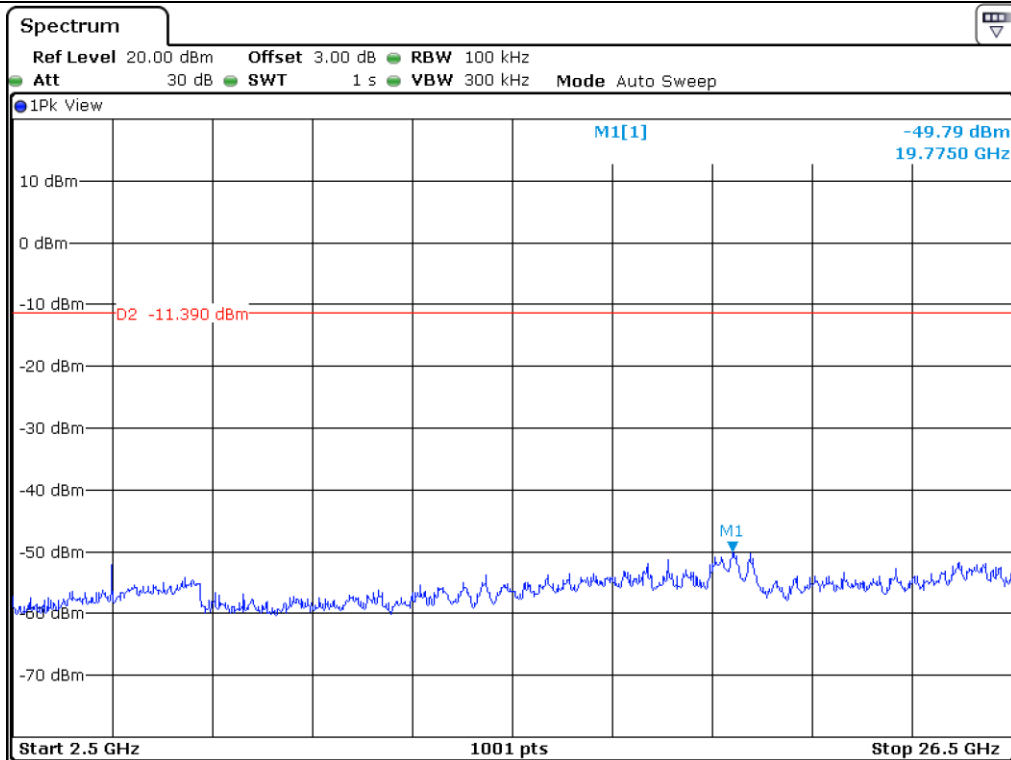
Low Channel



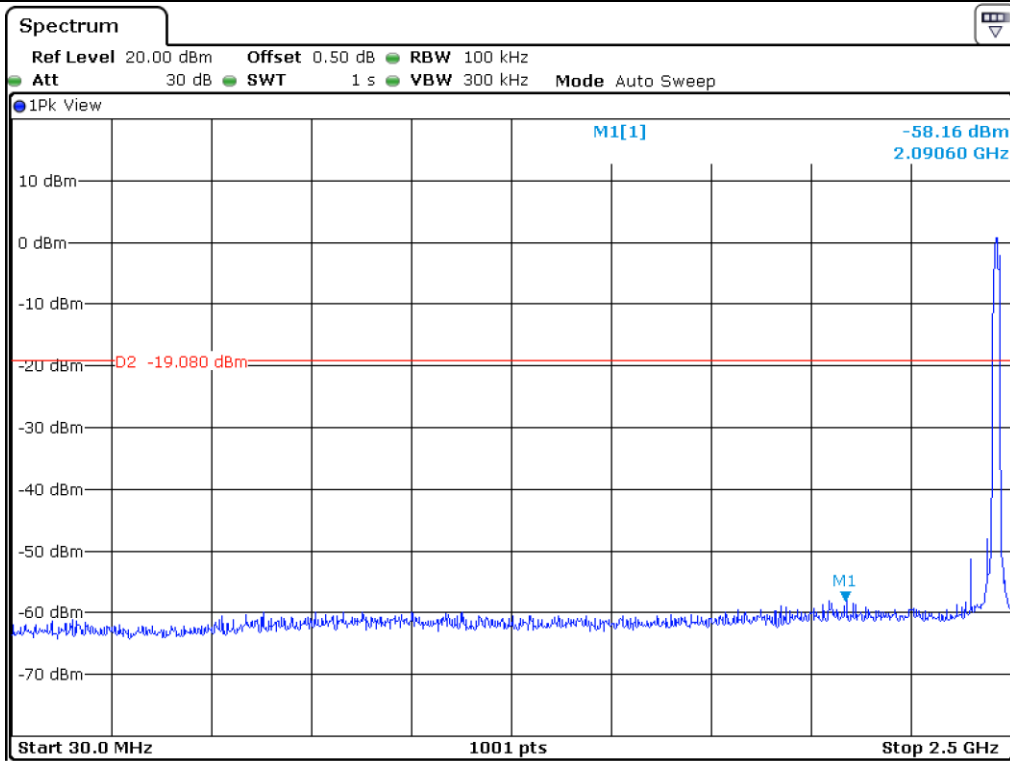
Low Channel



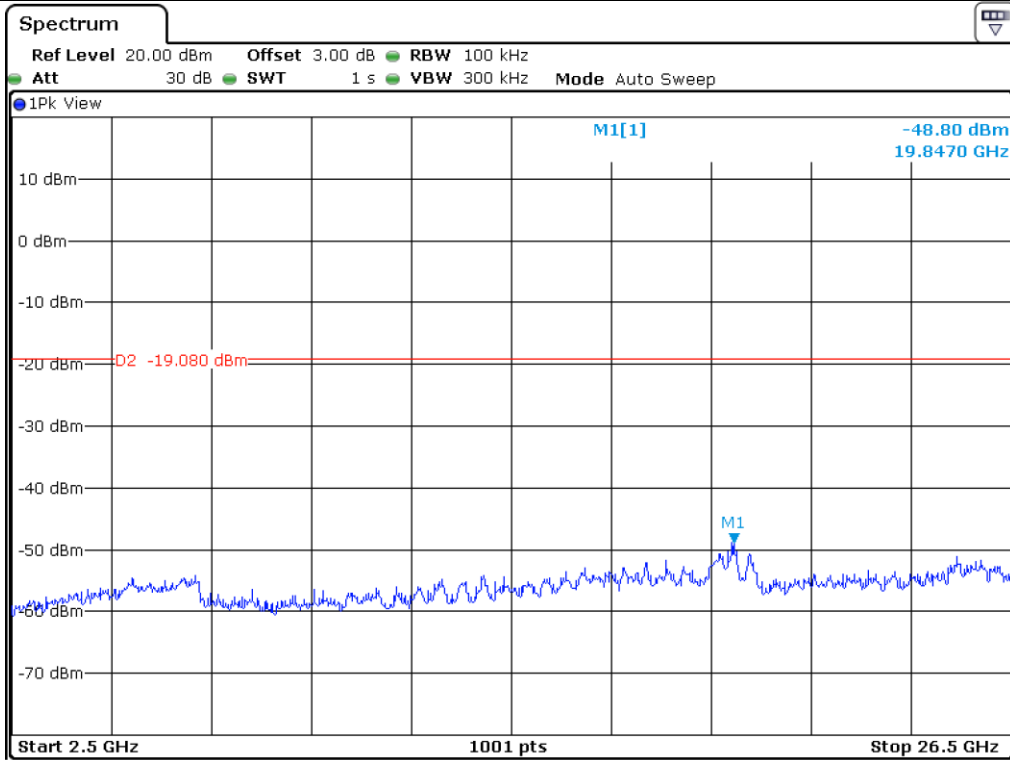
Middle Channel



Middle Channel

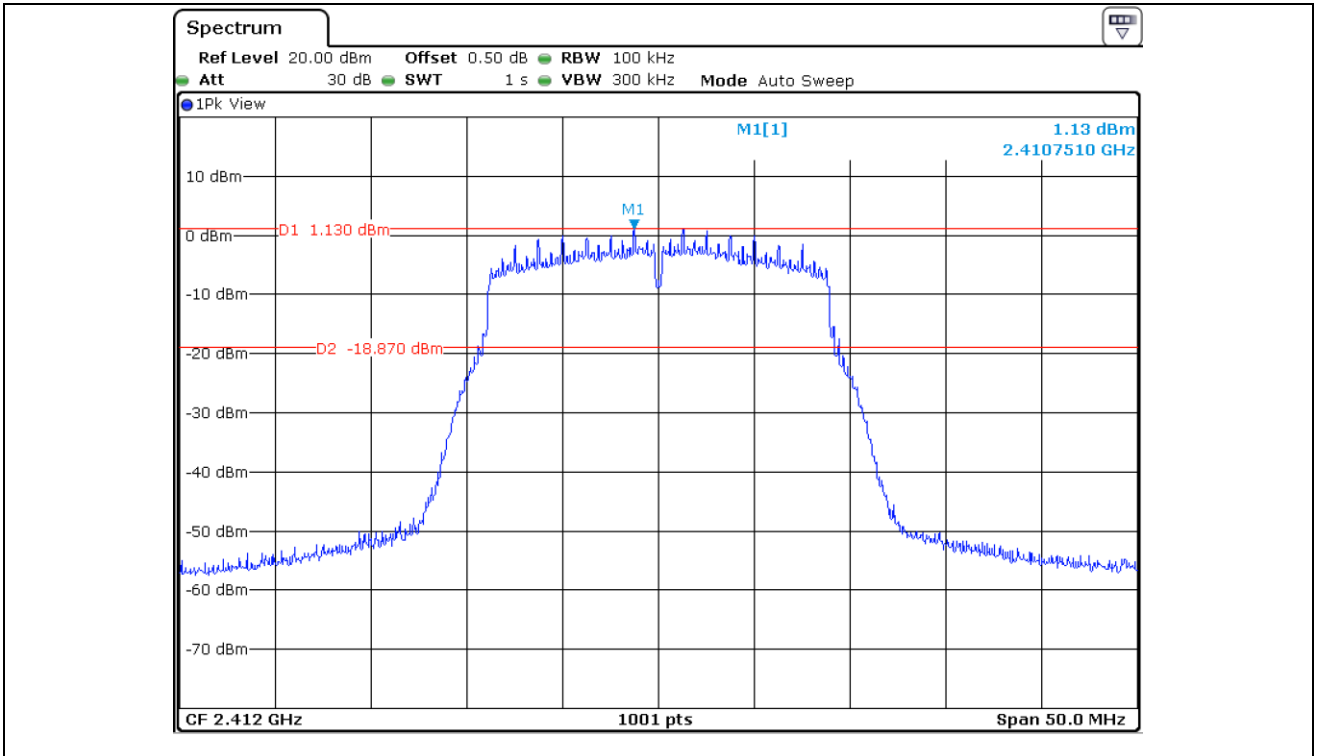


High Channel

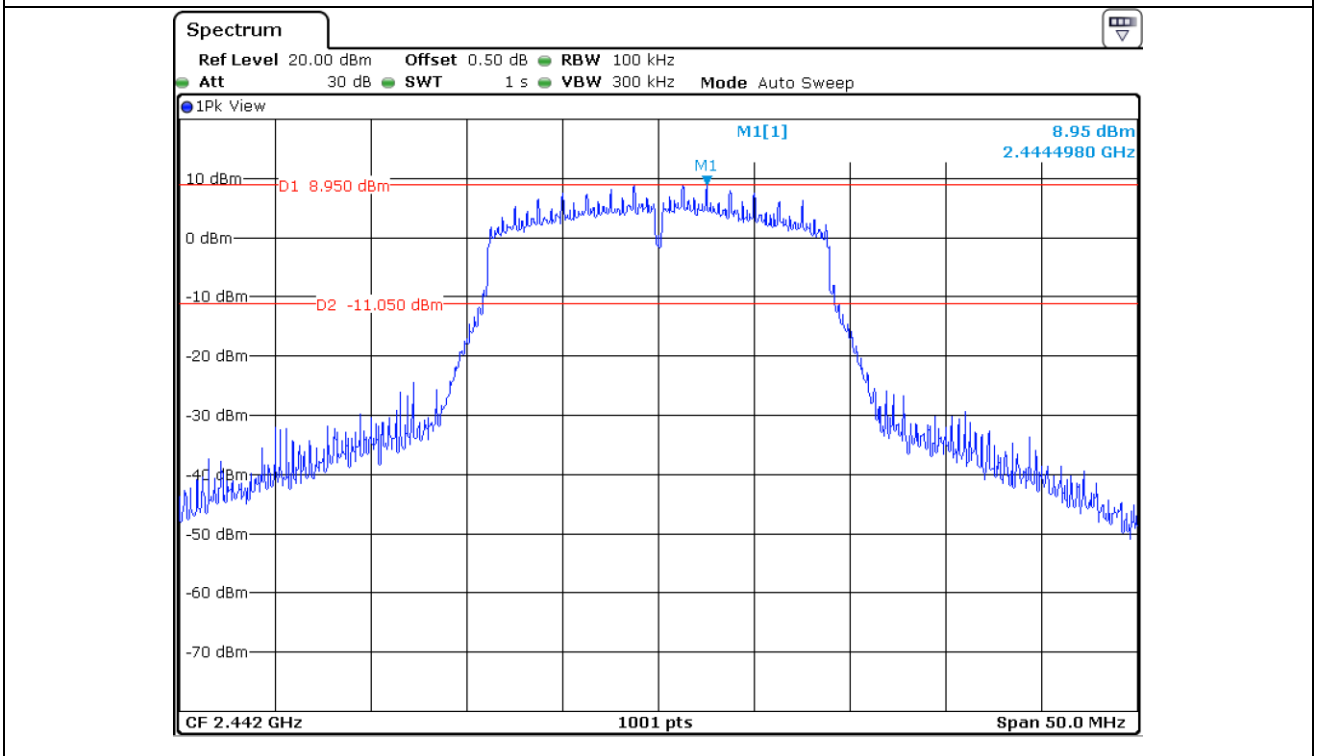


High Channel

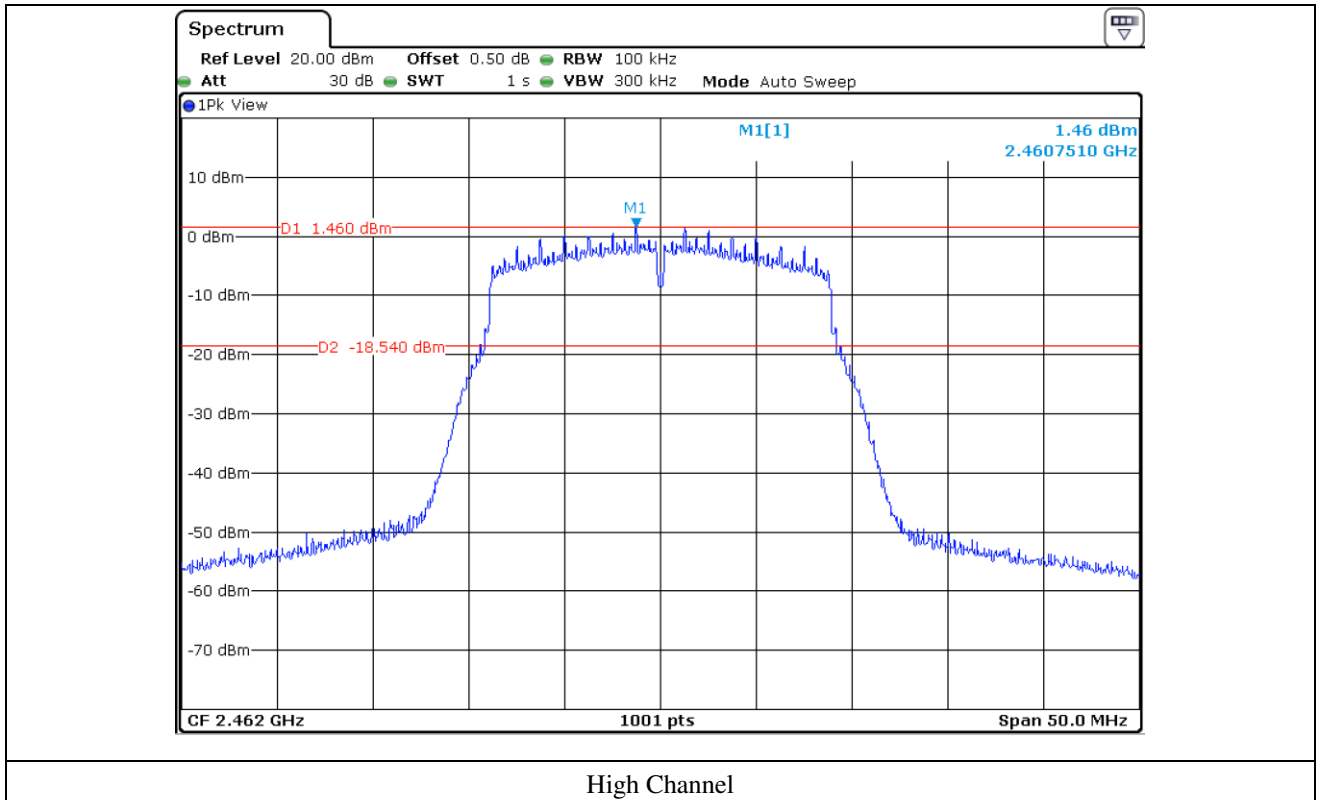
9.5.1.3.2 Test data for Antenna 1

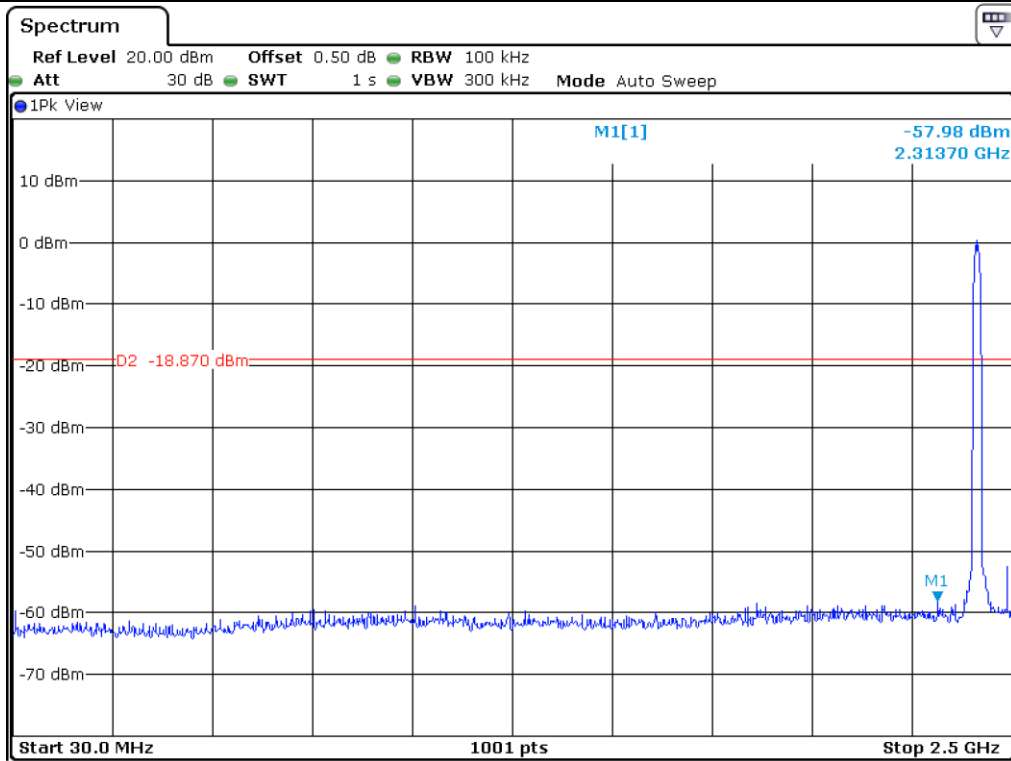


Low Channel

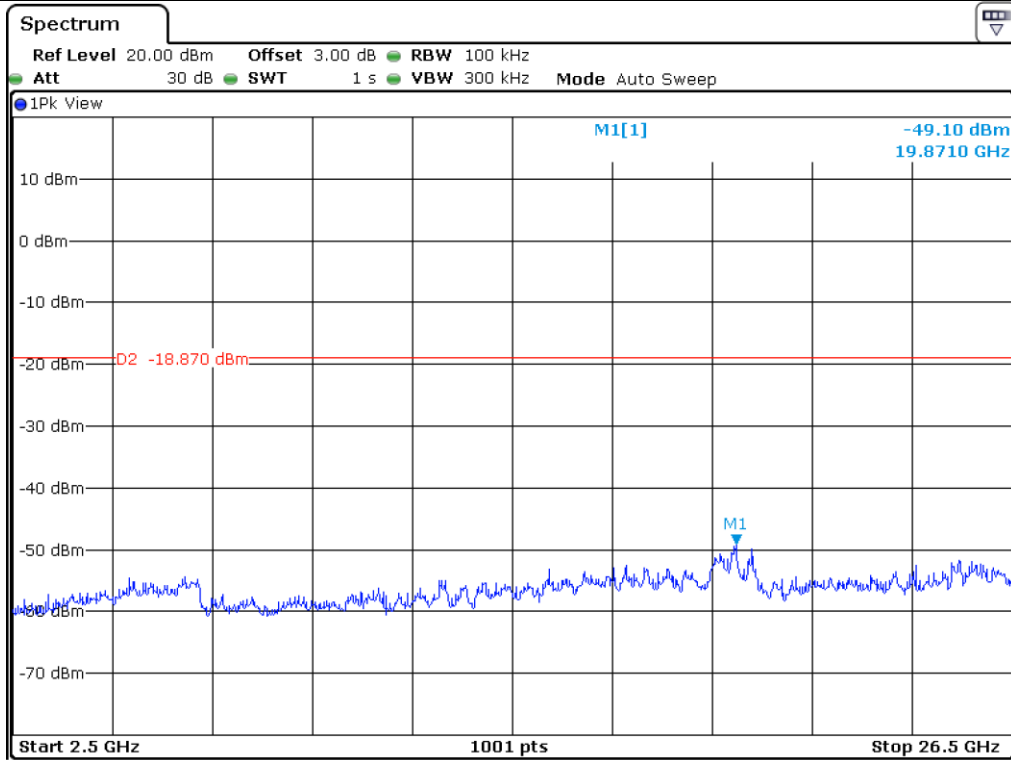


Middle Channel

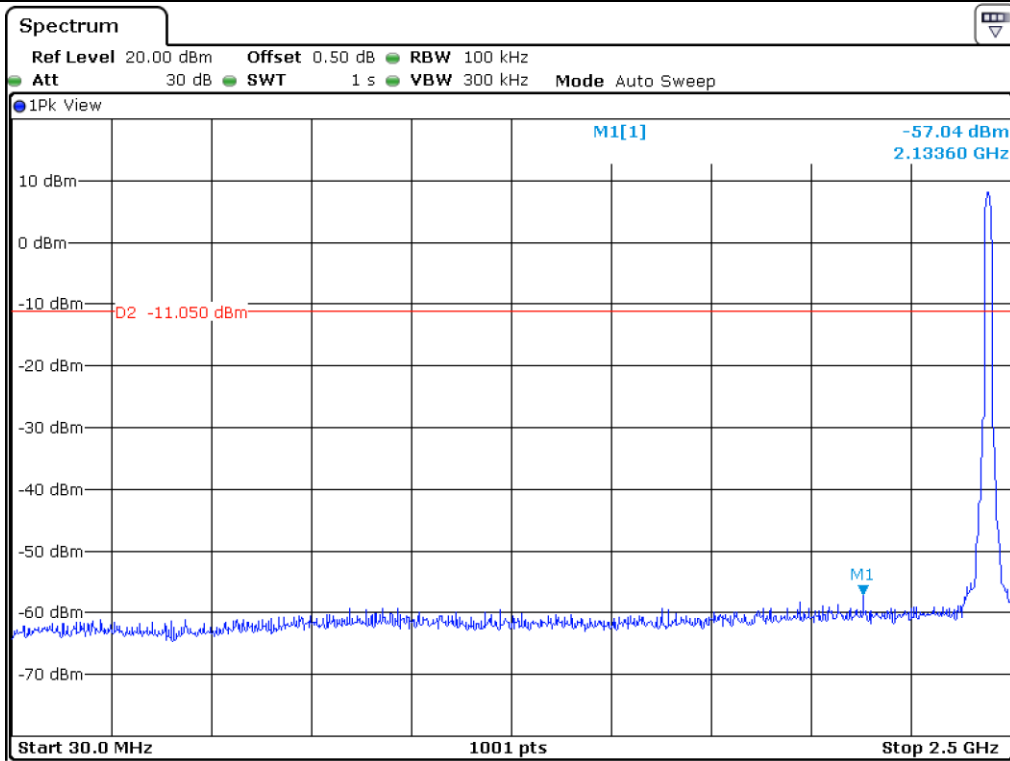




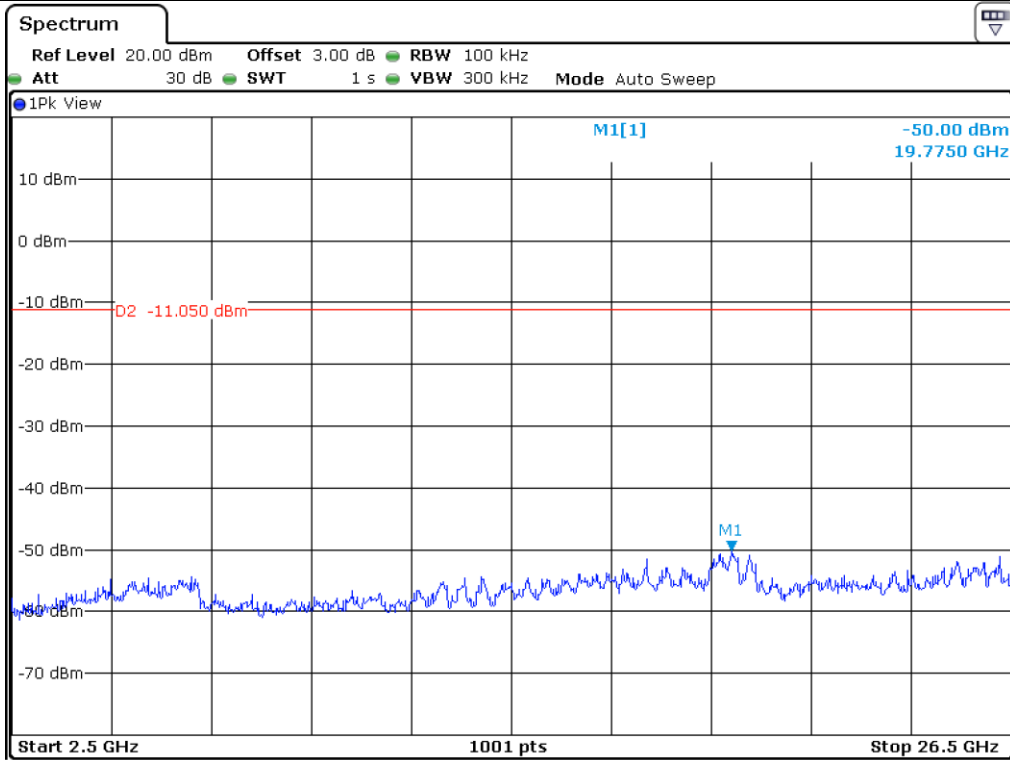
Low Channel



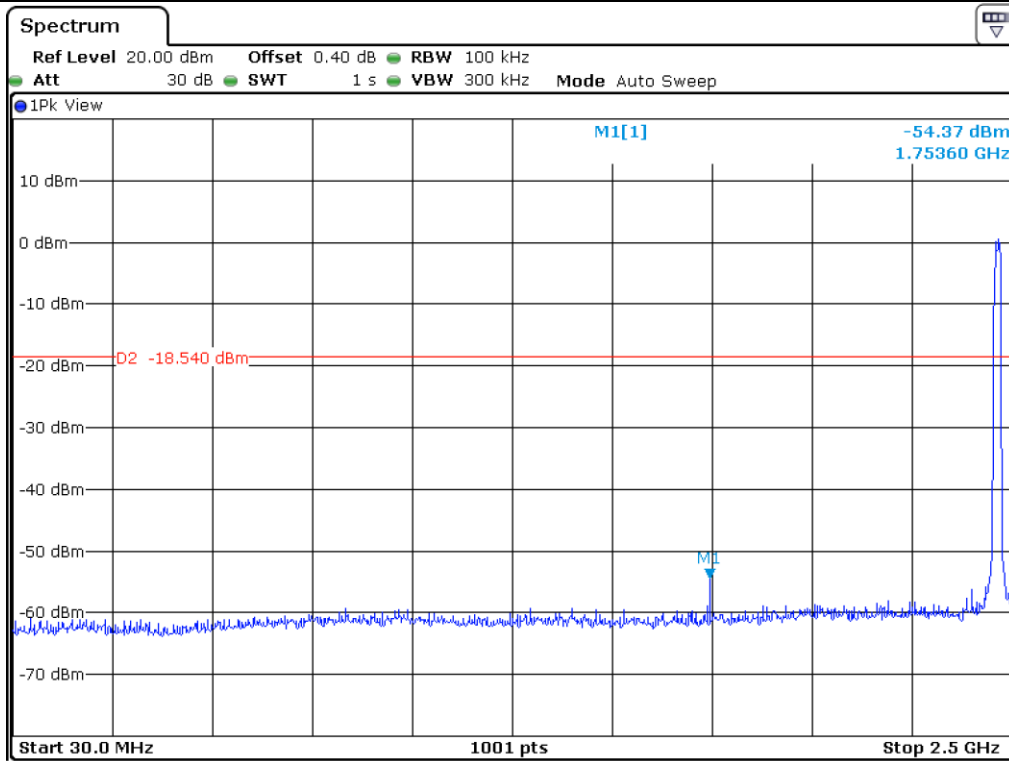
Low Channel



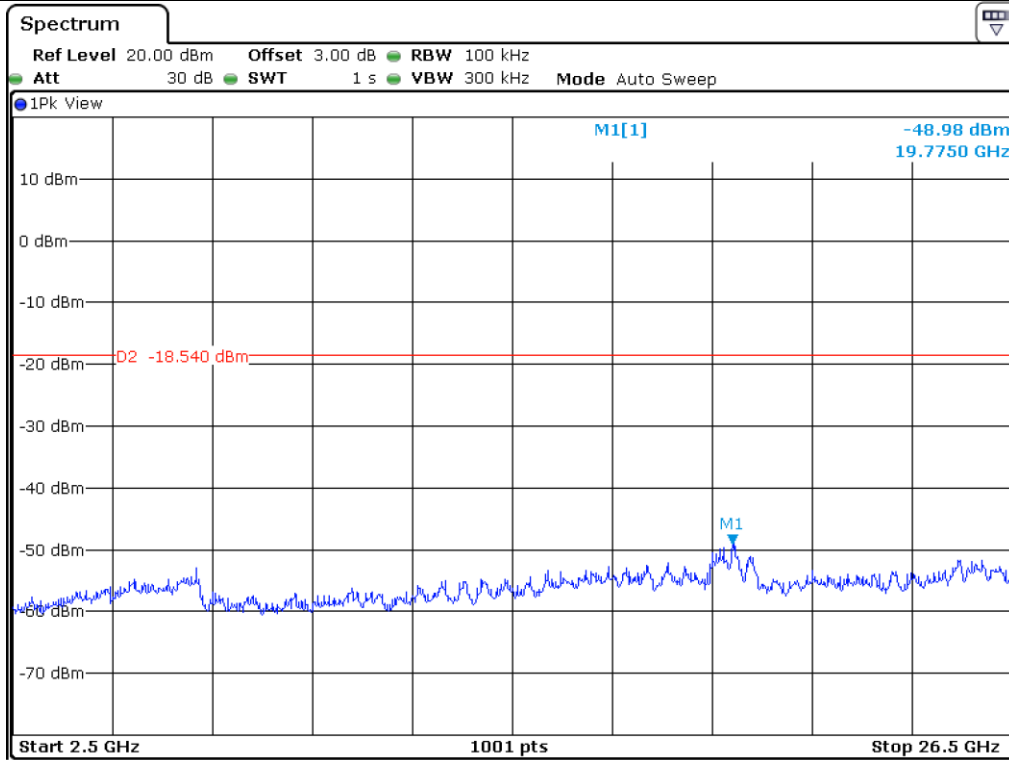
Middle Channel



Middle Channel

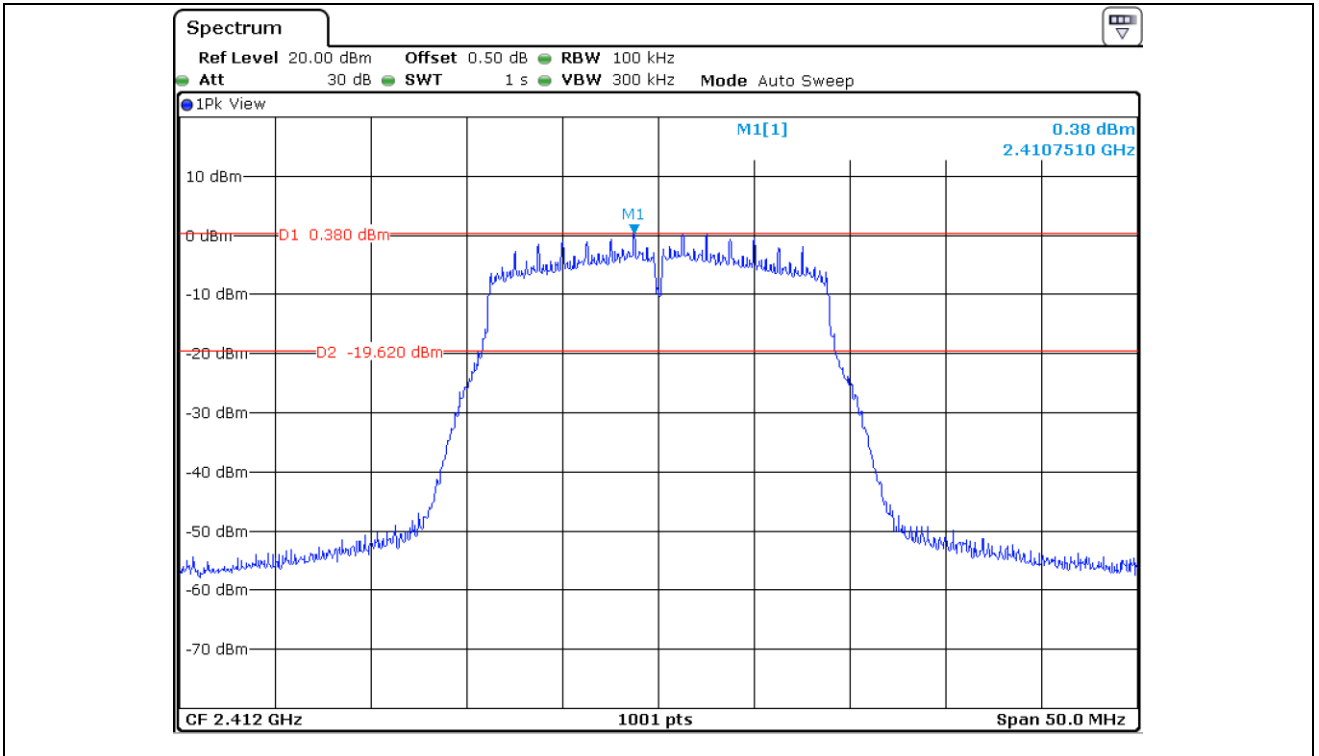


High Channel

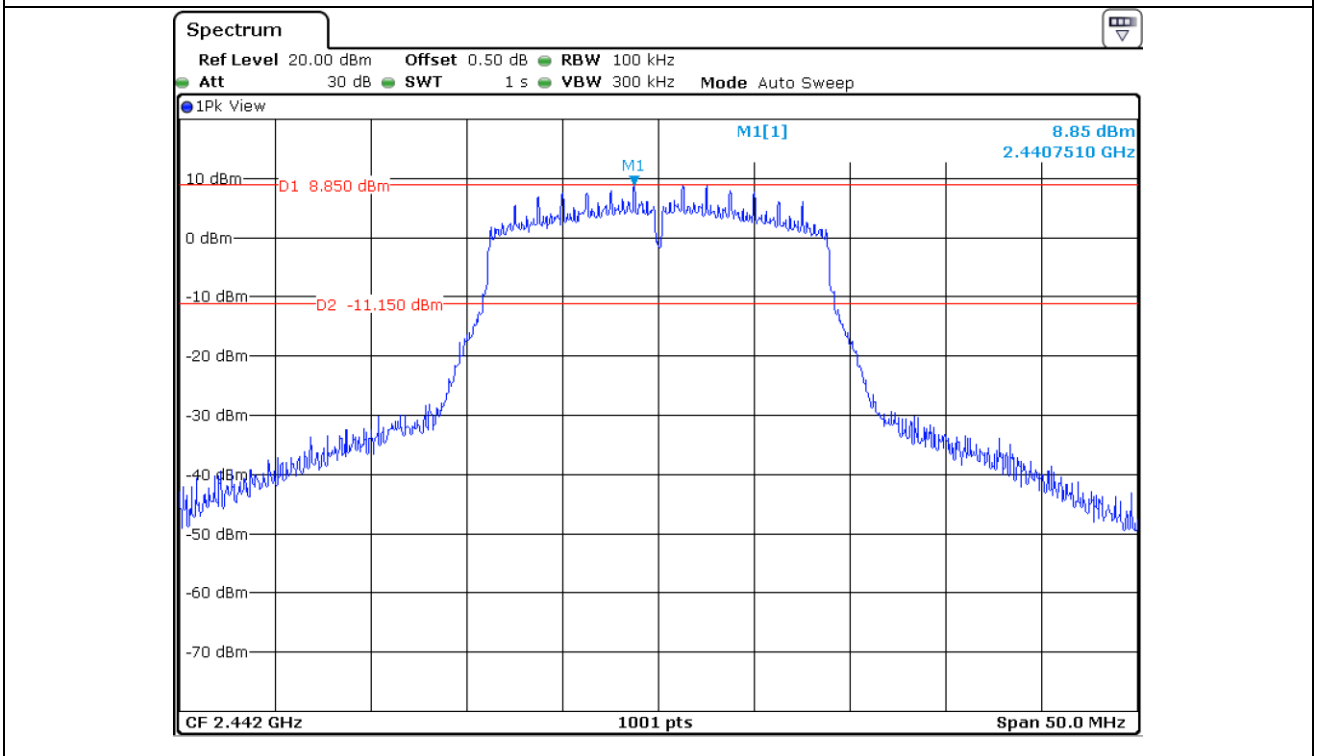


High Channel

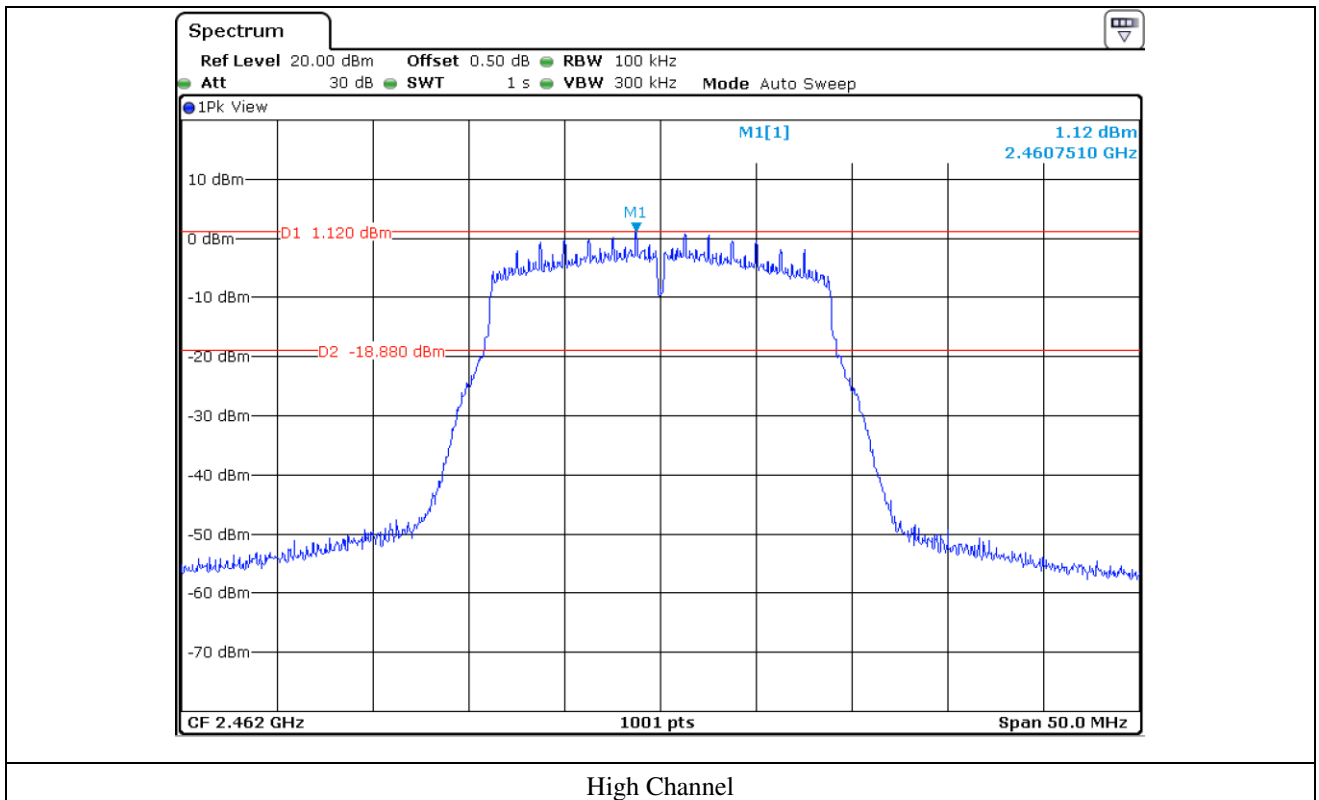
9.5.1.3.3 Test data for Antenna 2

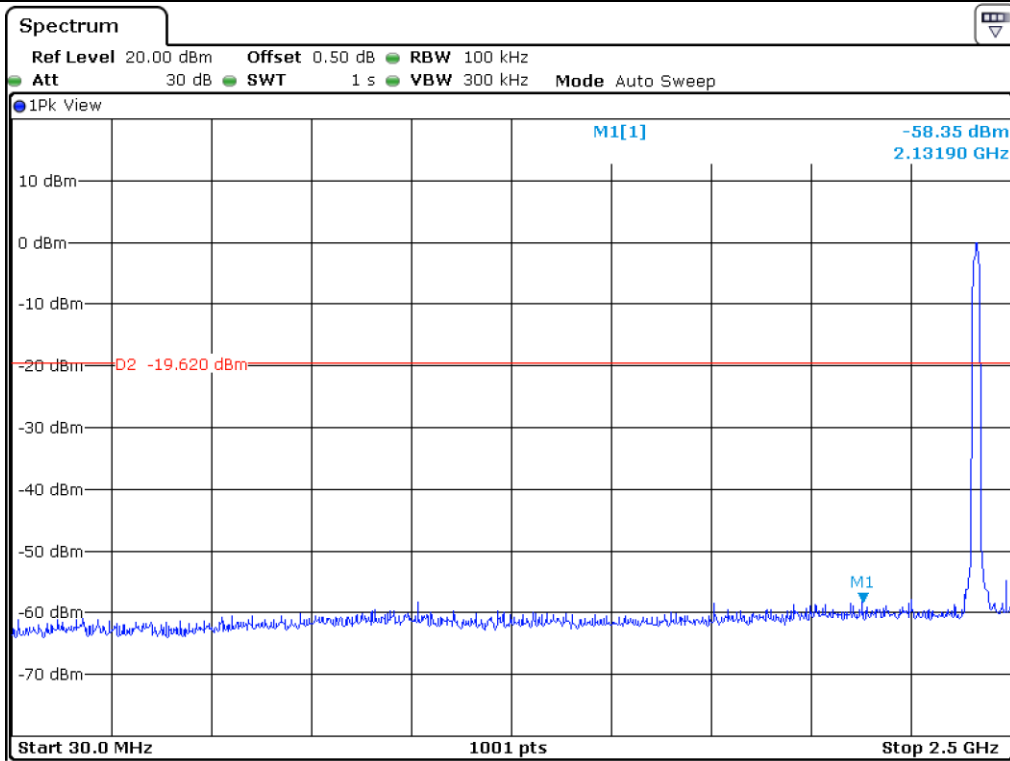


Low Channel

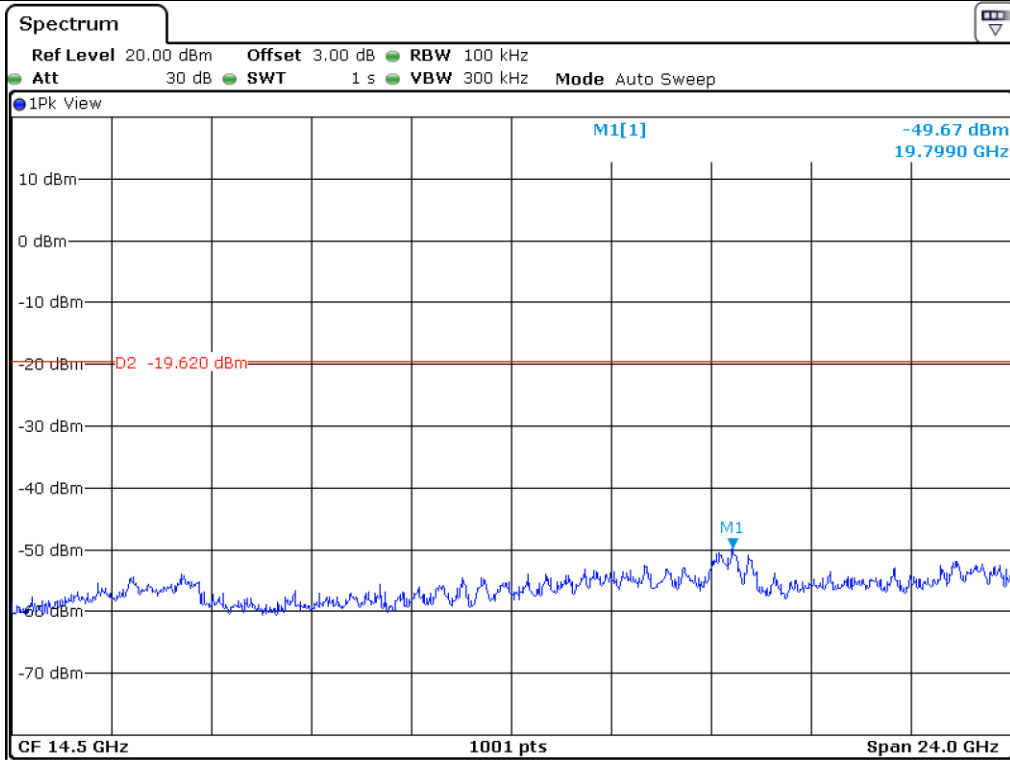


Middle Channel

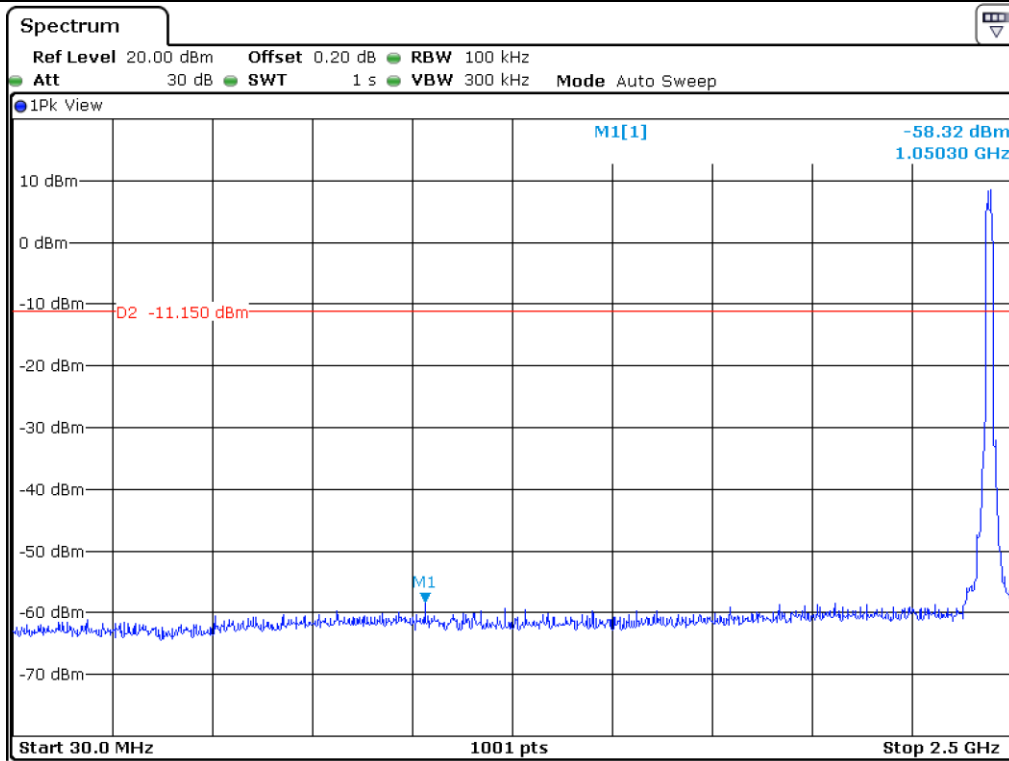




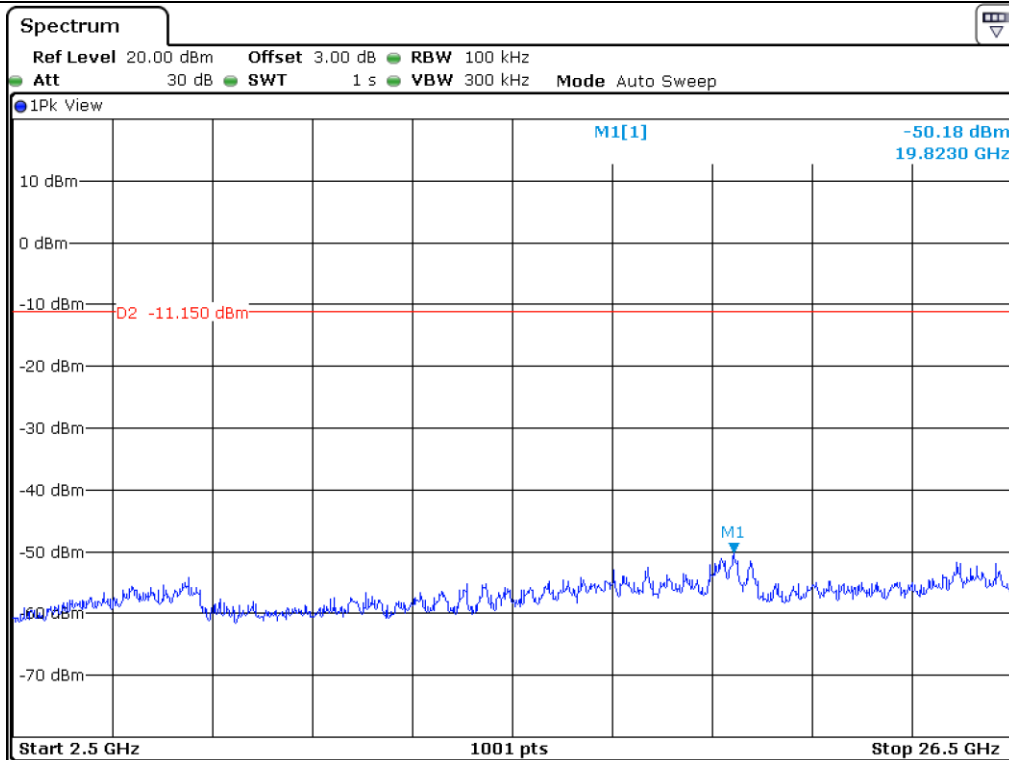
Low Channel



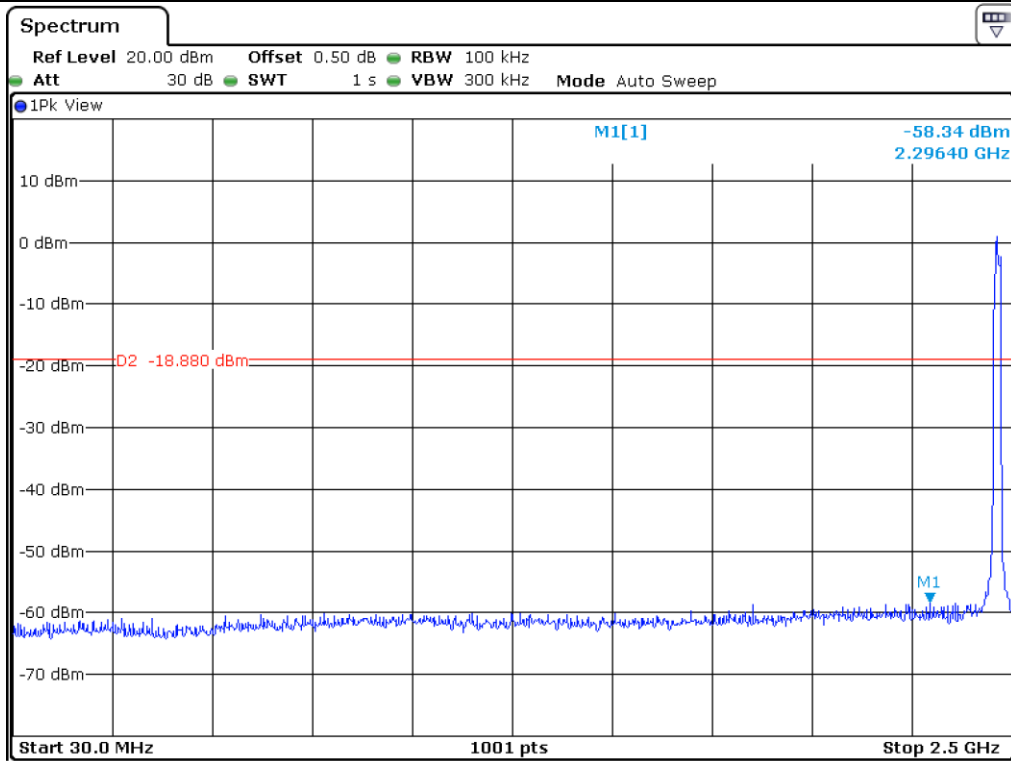
Low Channel



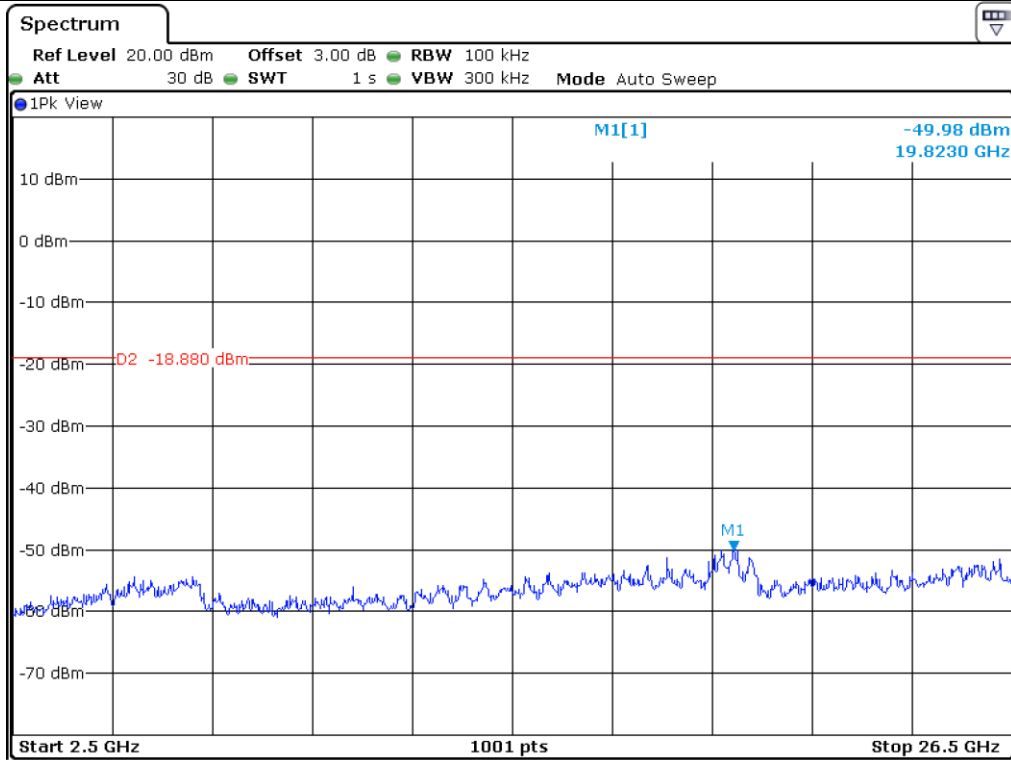
Middle Channel



Middle Channel

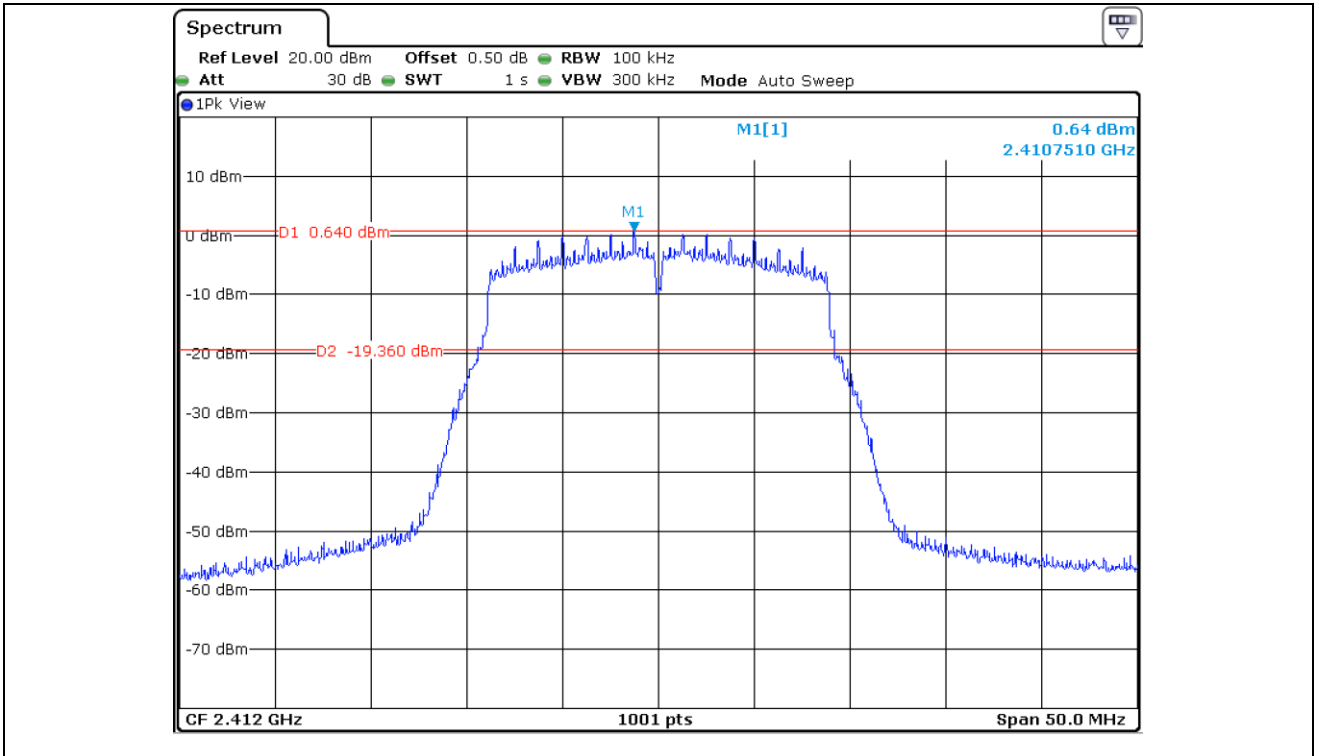


High Channel

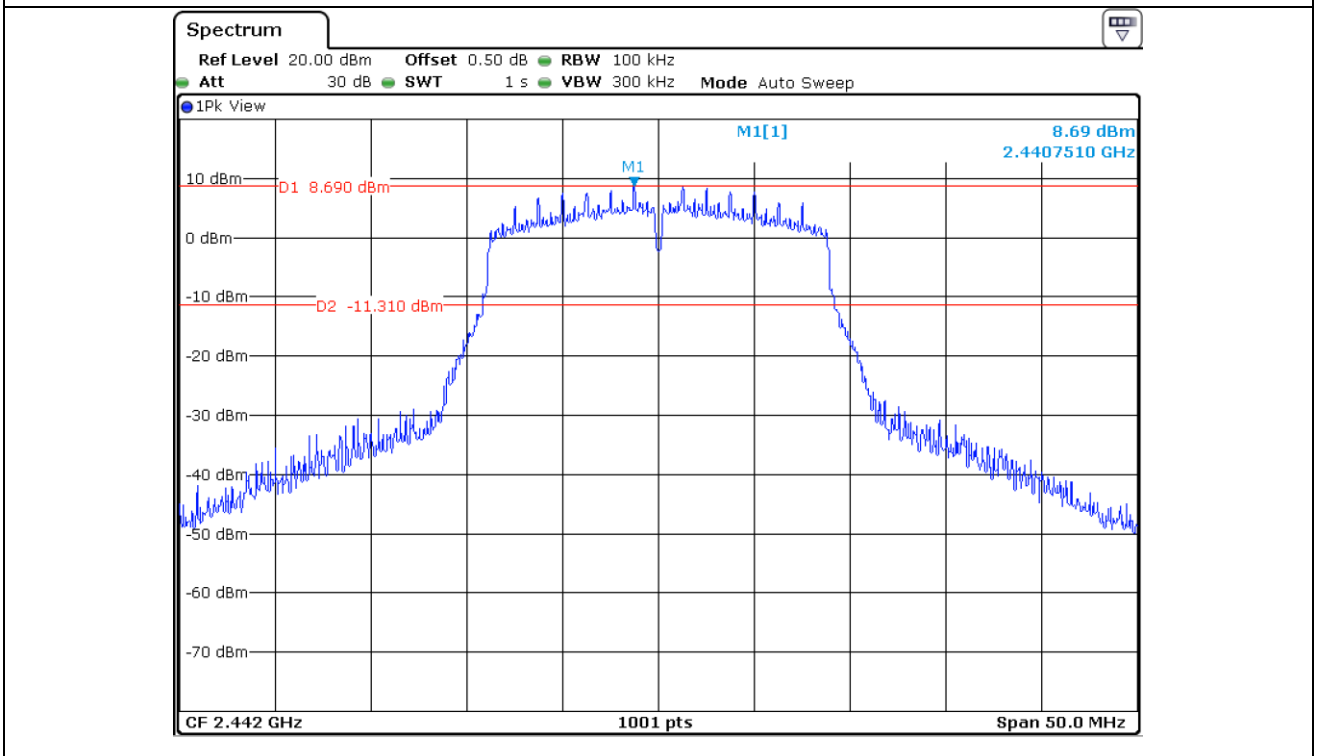


High Channel

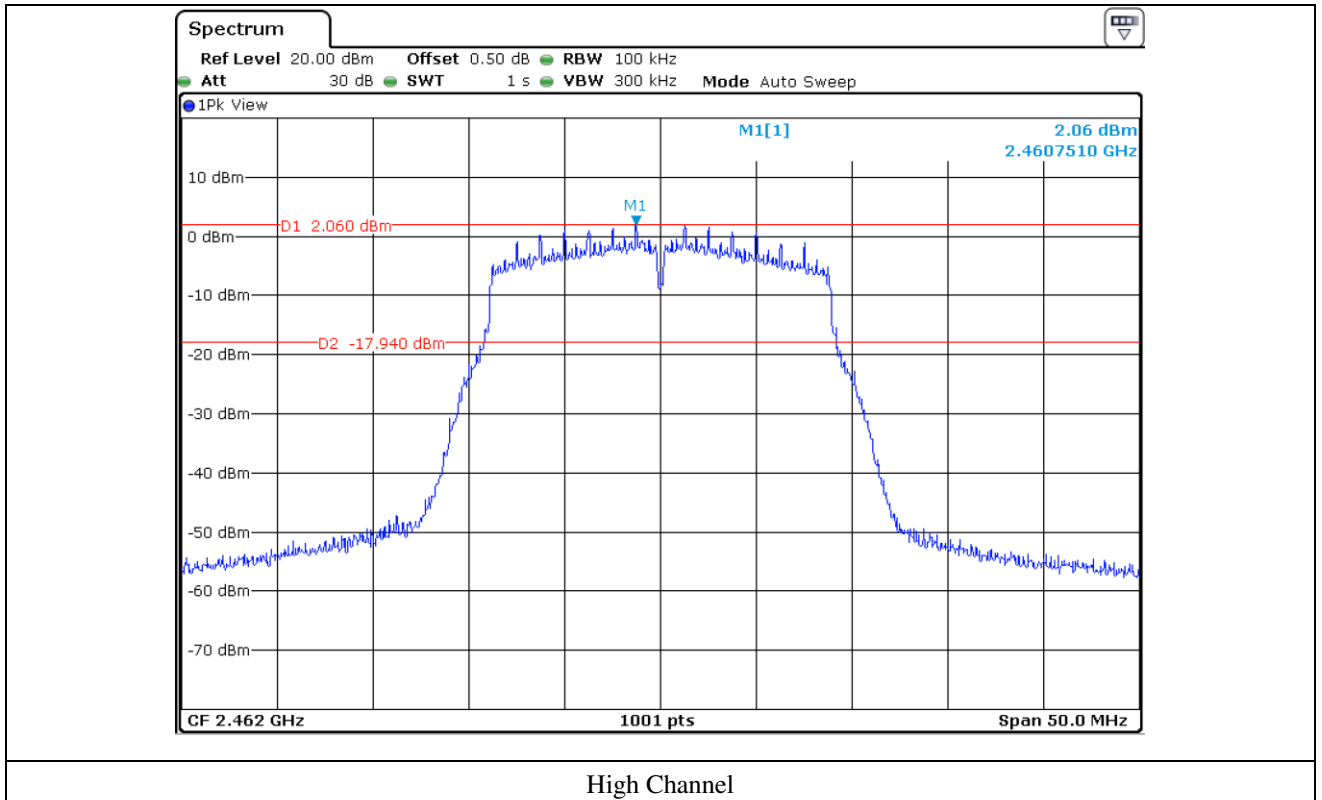
9.5.1.3.4 Test data for Antenna 3

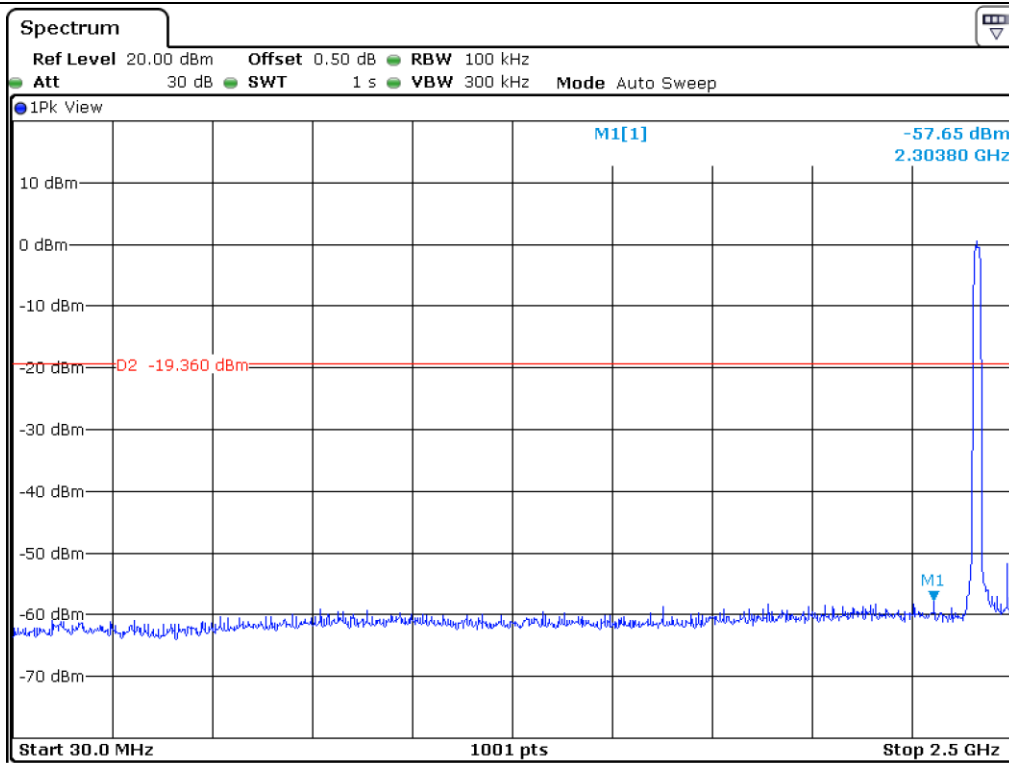


Low Channel

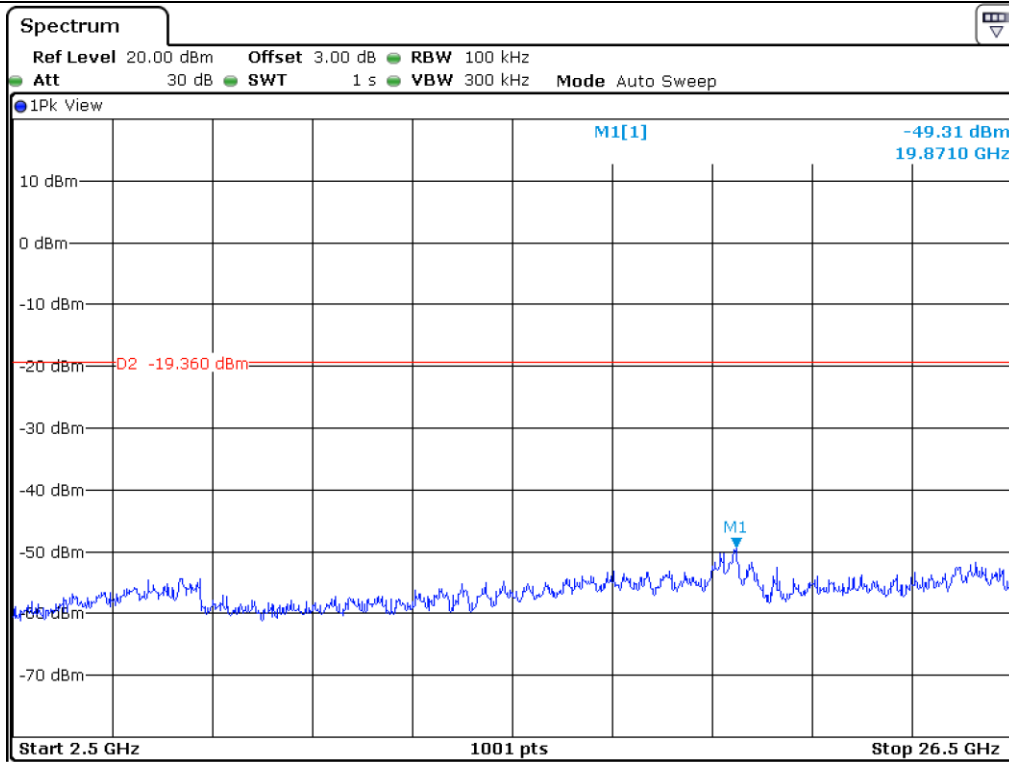


Middle Channel

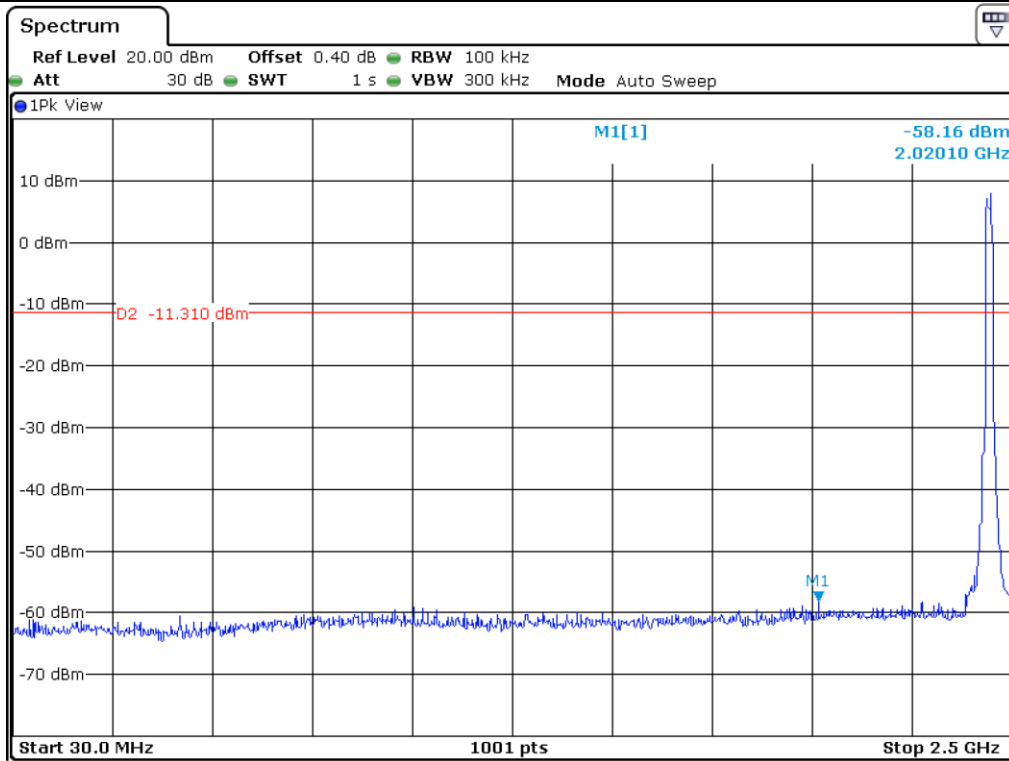




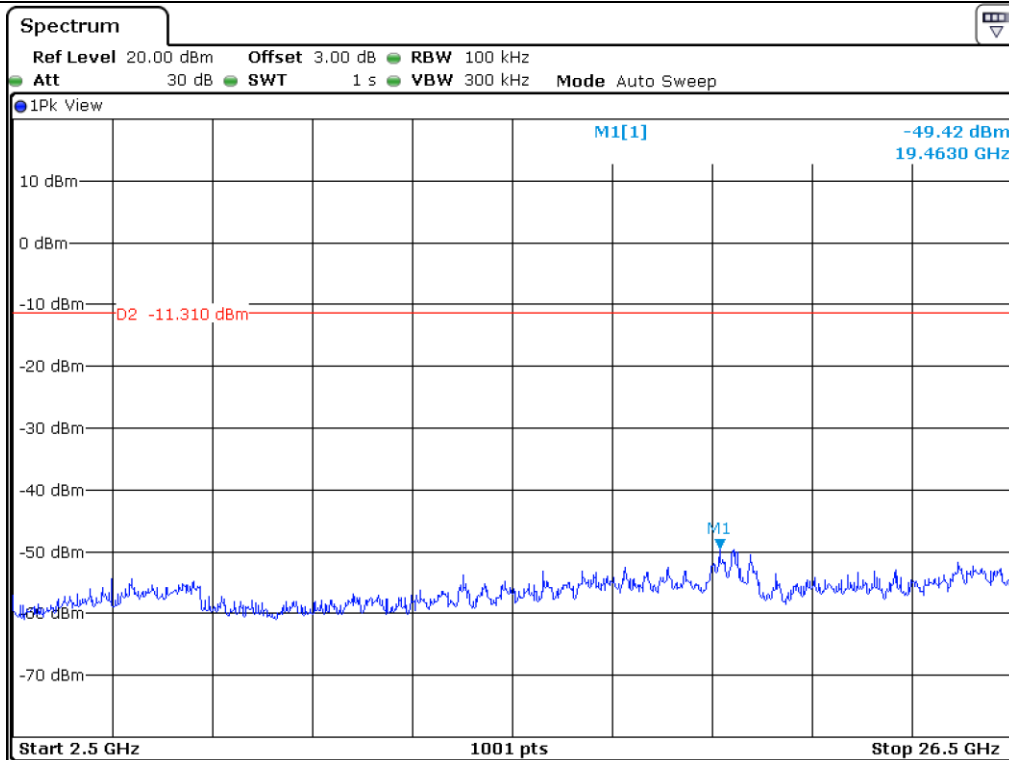
Low Channel



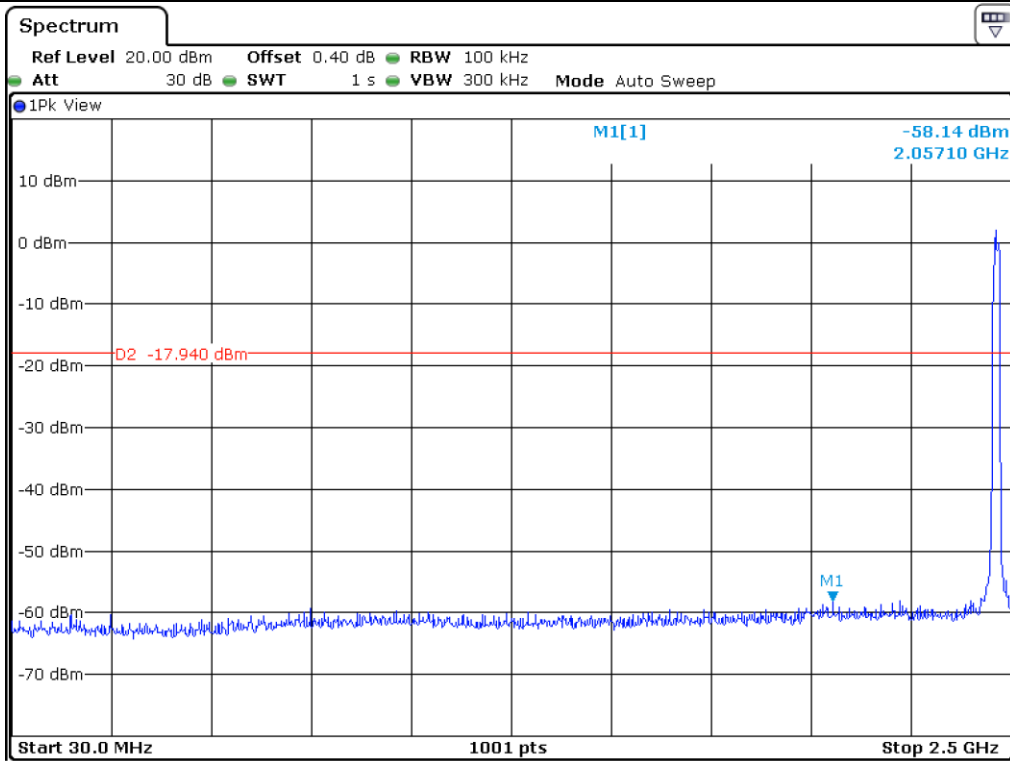
Low Channel



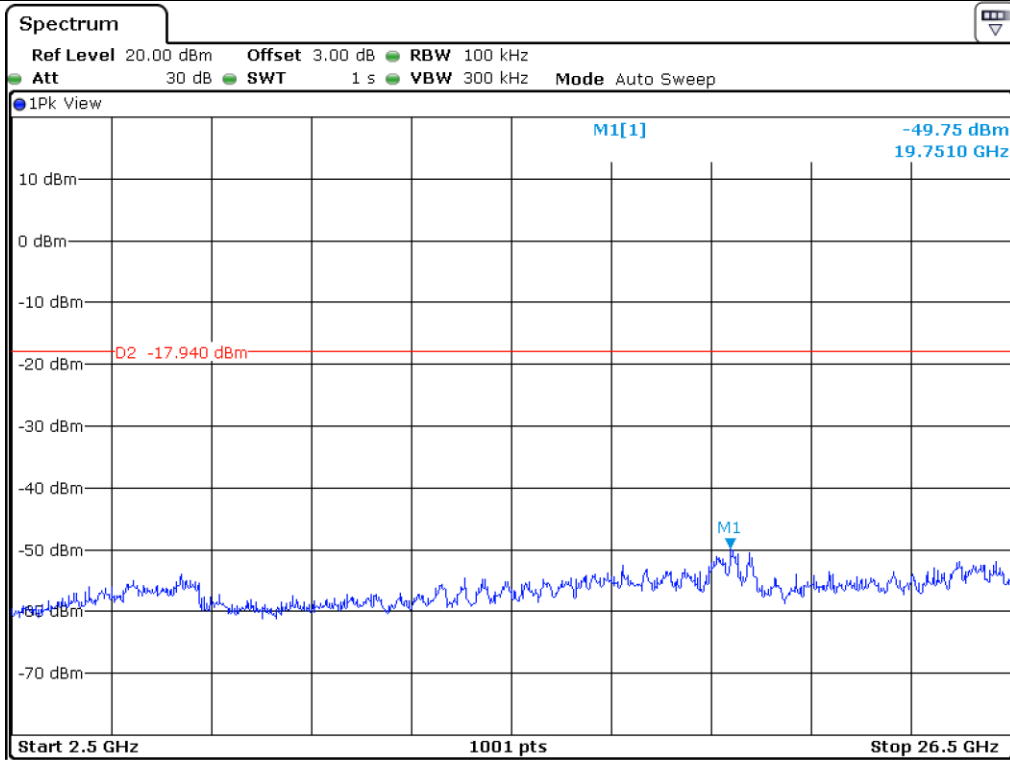
Middle Channel



Middle Channel



High Channel



High Channel

9.6 Test data for radiated emission

9.6.1 Radiated Emission which fall in the Restricted Band

9.6.1.1 Test data for Service Port

9.6.1.1.1 Test data for 802.11b WLAN Mode

9.6.1.1.1.1 Test data for Multiple Transmit (Worst case)

- Test Date : June 29, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	55.78	Peak	H	27.20	11.00	40.20	53.78	74.00	20.22
	54.05	Average	H				52.05	54.00	1.95
2 387.65	52.48	Peak	V	27.20	11.00	40.20	50.48	74.00	23.52
	42.94	Average	V				40.94	54.00	13.06
Test Data for High Channel									
2 483.58	55.99	Peak	H	27.20	11.00	40.20	53.99	74.00	20.01
	54.43	Average	H				52.43	54.00	1.57
2 483.53	47.52	Peak	V	27.20	11.00	40.20	45.52	74.00	28.48
	40.88	Average	V				38.88	54.00	15.12

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



Tested by: Min-Gu, Ji / Project Engineer

9.6.1.1.2 Test data for 802.11g WLAN Mode

9.6.1.1.2.1 Test data for Multiple Transmit (Worst case)

- Test Date : June 29, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 389.99	69.54	Peak	H	27.20	11.00	40.20	67.54	74.00	6.46
	52.91	Average	H				50.91	54.00	3.09
2 389.99	65.82	Peak	V				63.82	74.00	10.18
	49.99	Average	V				47.99	54.00	6.01
Test Data for High Channel									
2 483.50	72.32	Peak	H	27.20	11.00	40.20	70.32	74.00	3.68
	54.48	Average	H				52.48	54.00	1.52
2 483.58	64.49	Peak	V				62.49	74.00	11.51
	47.65	Average	V				45.65	54.00	8.35

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



Tested by: Min-Gu, Ji / Project Engineer

9.6.1.1.3 Test data for 802.11n_HT20 WLAN Mode

9.6.1.1.3.1 Test data for Multiple Transmit (Worst case)

- . Test Date : June 29, 2016
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 30 MHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 389.93	69.26	Peak	H	27.10	11.00	40.20	67.16	74.00	6.84
	53.37	Average	H				51.27	54.00	2.73
2 389.93	66.69	Peak	V				64.59	74.00	9.41
	50.50	Average	V				48.40	54.00	5.60
Test Data for High Channel									
2 483.53	71.26	Peak	H	27.10	11.00	40.20	69.16	74.00	4.84
	53.79	Average	H				51.69	54.00	2.31
2 483.52	67.89	Peak	V				65.79	74.00	8.21
	48.93	Average	V				46.83	54.00	7.17

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



Tested by: Min-Gu, Ji / Project Engineer

9.6.2 Spurious & Harmonic Radiated Emission

9.6.2.1 Test data for Service Port

9.6.2.1.1 Test data for 802.11b WLAN Mode

9.6.2.1.1.1 Test data for Multiple Transmit (Worst case)

- Test Date : June 29, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED


Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	44.48	Peak	H	30.60	9.30	43.40	40.98	74.00	33.02
	29.51	Average	H				26.01	54.00	27.99
	44.48	Peak	V				40.98	74.00	33.02
	28.52	Average	V				25.02	54.00	28.98
Test Data for Middle Channel									
4 884.00	43.36	Peak	H	30.70	9.30	43.40	41.16	74.00	32.84
	29.07	Average	H				25.65	54.00	28.35
	44.58	Peak	V				40.93	74.00	33.07
	28.96	Average	V				25.31	54.00	28.69
Test Data for High Channel									
4 924.00	44.46	Peak	H	30.80	9.30	43.40	41.16	74.00	32.84
	28.95	Average	H				25.65	54.00	28.35
	44.23	Peak	V				40.93	74.00	33.07
	28.61	Average	V				25.31	54.00	28.69

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$


Tested by: Min-Gu, Ji / Project Engineer

9.6.2.1.2 Test data for 802.11g WLAN Mode

9.6.2.1.2.1 Test data for Multiple Transmit (Worst case)

- . Test Date : June 29, 2016
- . Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Result : PASSED


Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	44.24	Peak	H	30.60	9.30	43.40	40.74	74.00	33.26
	29.36	Average	H				25.86	54.00	28.14
	58.12	Peak	V				54.62	74.00	19.38
	36.99	Average	V				33.49	54.00	20.51
Test Data for Middle Channel									
4 884.00	59.67	Peak	H	30.70	9.30	43.40	56.27	74.00	17.73
	37.45	Average	H				34.05	54.00	19.95
	58.62	Peak	V				55.22	74.00	18.78
	36.49	Average	V				33.09	54.00	20.91
Test Data for High Channel									
4 924.00	44.25	Peak	H	30.80	9.30	43.40	40.95	74.00	33.05
	28.37	Average	H				25.07	54.00	28.93
	57.89	Peak	V				54.59	74.00	19.41
	36.51	Average	V				33.21	54.00	20.79

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



Tested by: Min-Gu, Ji / Project Engineer

9.6.2.1.3 Test data for 802.11n_HT20 WLAN Mode

9.6.2.1.3.1 Test data for Multiple Transmit (Worst case)

- Test Date : June 29, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED


Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	41.35	Peak	H	30.60	9.30	43.40	37.85	74.00	36.15
	25.90	Average	H				22.40	54.00	31.60
	40.84	Peak	V				37.34	74.00	36.66
	25.76	Average	V				22.26	54.00	31.74
Test Data for Middle Channel									
4 884.00	41.56	Peak	H	30.70	9.30	43.40	38.16	74.00	35.84
	25.94	Average	H				22.54	54.00	31.46
	41.98	Peak	V				38.58	74.00	35.42
	26.03	Average	V				22.63	54.00	31.37
Test Data for High Channel									
4 924.00	41.49	Peak	H	30.80	9.30	43.40	38.19	74.00	35.81
	25.89	Average	H				22.59	54.00	31.41
	41.87	Peak	V				38.57	74.00	35.43
	25.89	Average	V				22.59	54.00	31.41

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Pre-Amplifier Gain}$$



Tested by: Min-Gu, Ji / Project Engineer

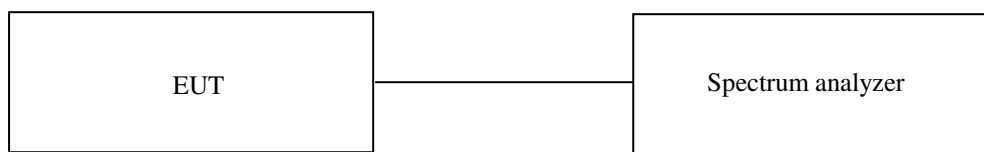
10. SPURIOUS EMISSION - RECEIVER

10.1 Operating environment

Temperature : 24 °C
 Relative humidity : 45 % R.H.

10.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



10.3 Test set-up for radiated measurement

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

10.4 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ - FSV40	Rohde & Schwarz	Signal Analyzer	101009	May. 31, 2016 (1Y)
■ - ESCI	Rohde & Schwarz	Test Receiver	101012	Apr. 06, 2016 (1Y)
■ - 310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 05, 2016 (1Y)
■ - SCU-18	Rohde & Schwarz	Pre-Amplifier	10041	Nov. 23, 2015 (1Y)
■ - DT3000	Innco System	Turn Table	930611	N/A
■ - MA-4000XPET	Innco System	Antenna Master	MA4000/509/37211215/L	N/A
■ - VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Apr. 15, 2016 (2Y)
■ - BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ - BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Aug. 31, 2015 (2Y)

All test equipment used is calibrated on a regular basis.

10.5 Test data

10.5.1 Test data for Below 30 MHz

- Test Date : July 01, 2016
- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	Emission Level(dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
Any emissions were not observed from the EUT.								

10.5.2 Test data for 30 MHz ~ 1 000 MHz

- Test Date : July 01, 2016
- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	Emission Level(dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
Any emissions were not observed from the EUT.								

10.5.3 Test data for above 1 GHz

- Test Date : July 01, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	Emission Level(dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
Any emissions were not observed from the EUT.								



Tested by: Min-Gu, Ji / Project Engineer

11. PEAK POWER SPECTRAL DENSITY

11.1 Operating environment

Temperature : 24 °C
 Relative humidity : 46 % R.H.

11.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 3 kHz, the video bandwidth is set to 3 times the resolution bandwidth.



11.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - FSV40	Rohde & Schwarz	Signal Analyzer	101009	May. 31, 2016 (1Y)

All test equipment used is calibrated on a regular basis.