



8. Conducted Spurious Emission

8.1 Operating environment

Temperature : 25 °C

Relative humidity : 46 %

8.2 Measurement method

Standard : §15.247 (d)

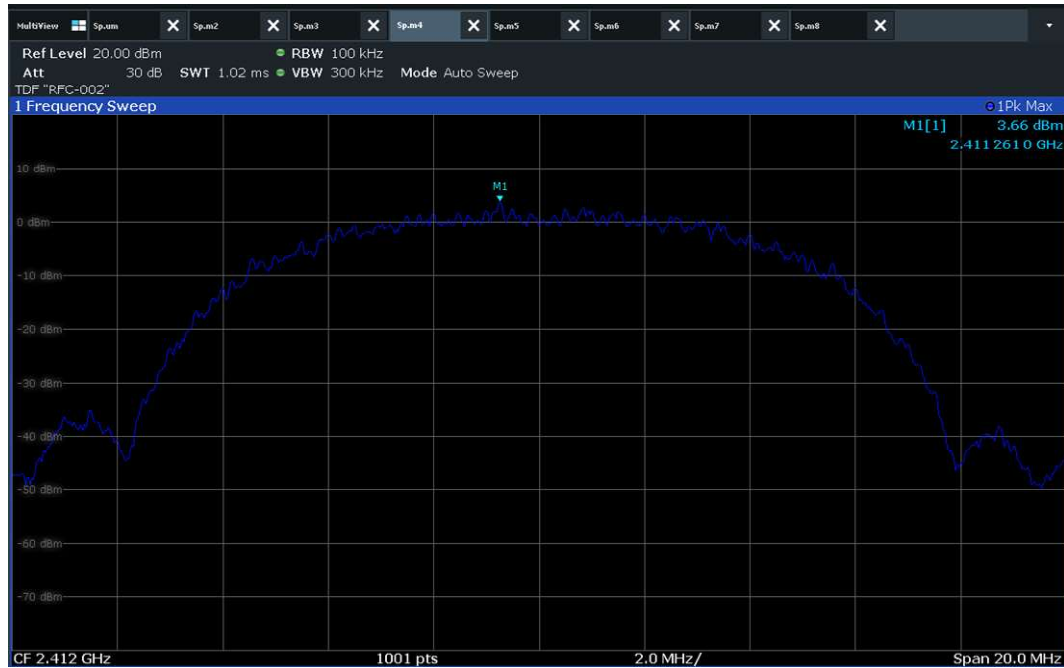
8.3 Test data

Operating mode : Transmit mode

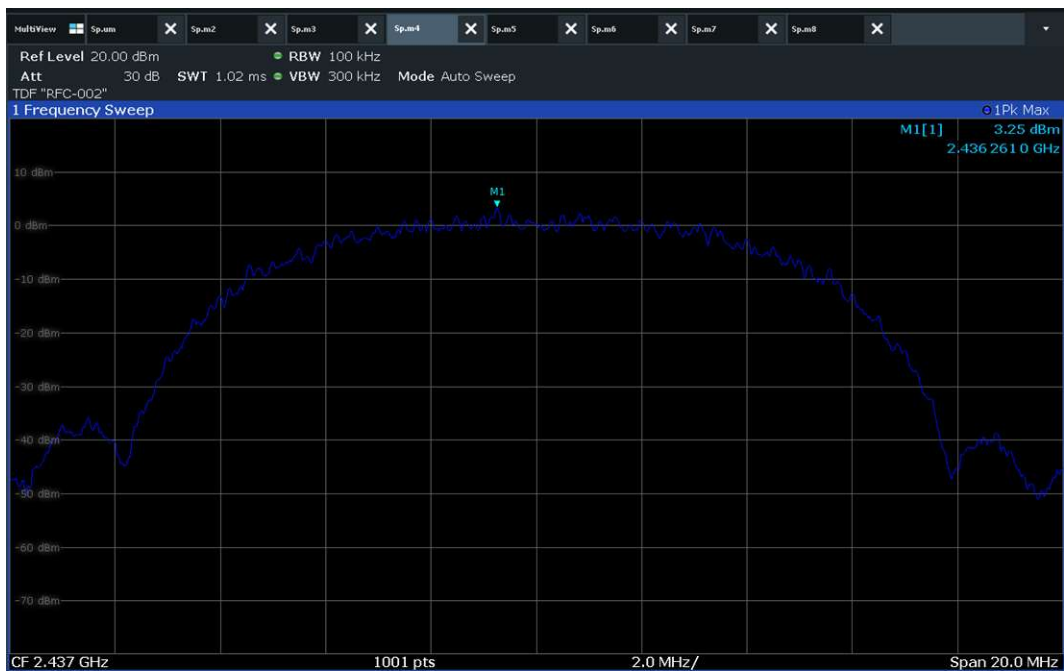
Test Result : Pass

8.3.1 Measured Results

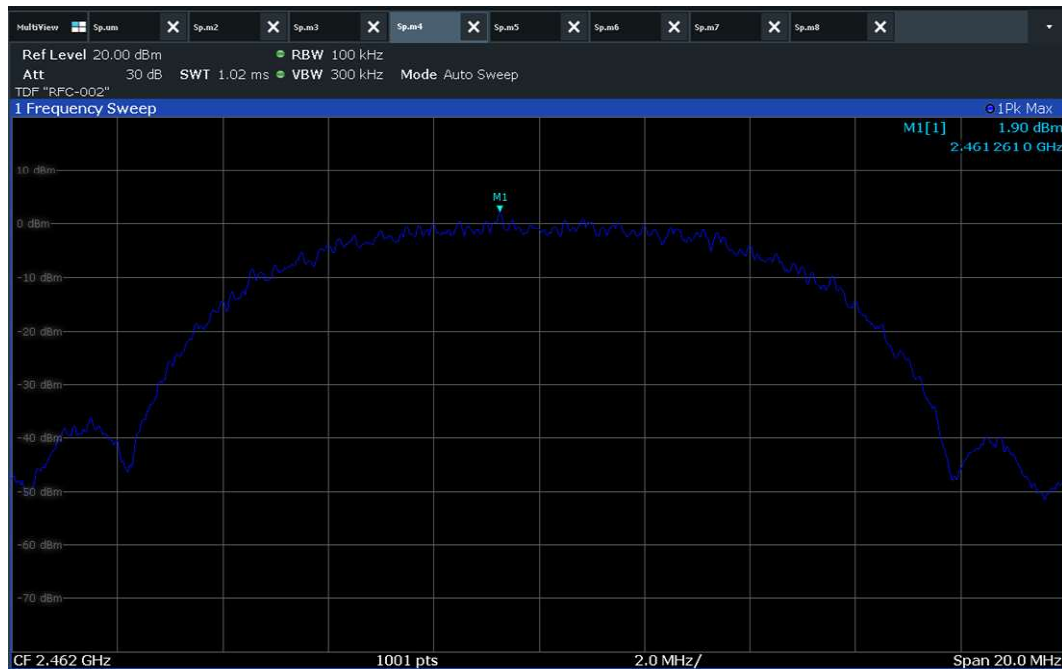
8.3.1.1 Reference level measurement for 802.11b



Low CH

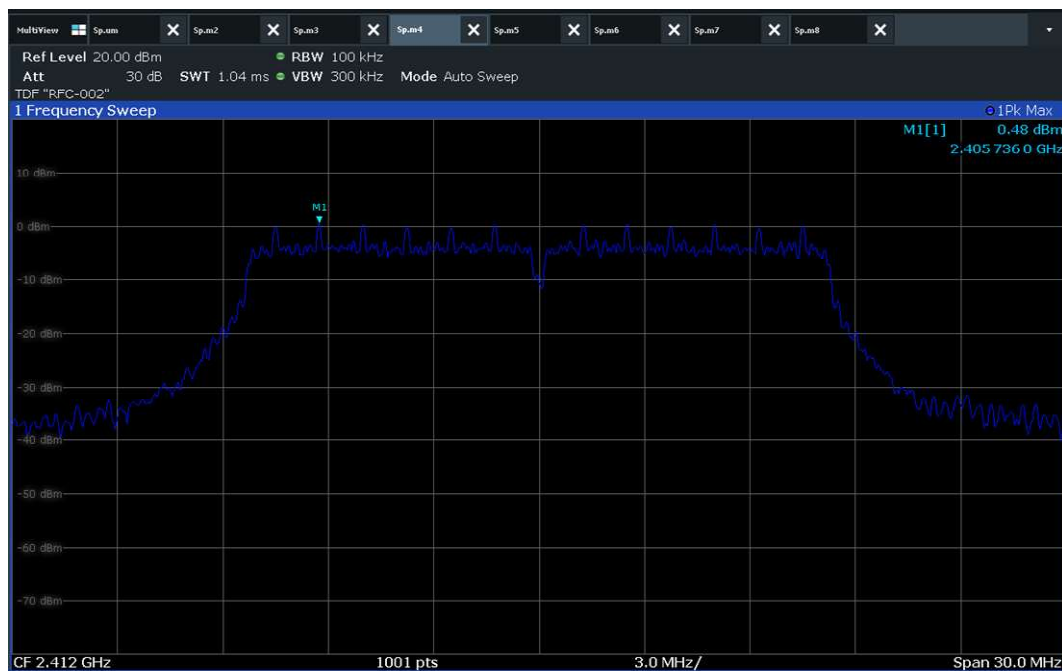


Mid CH

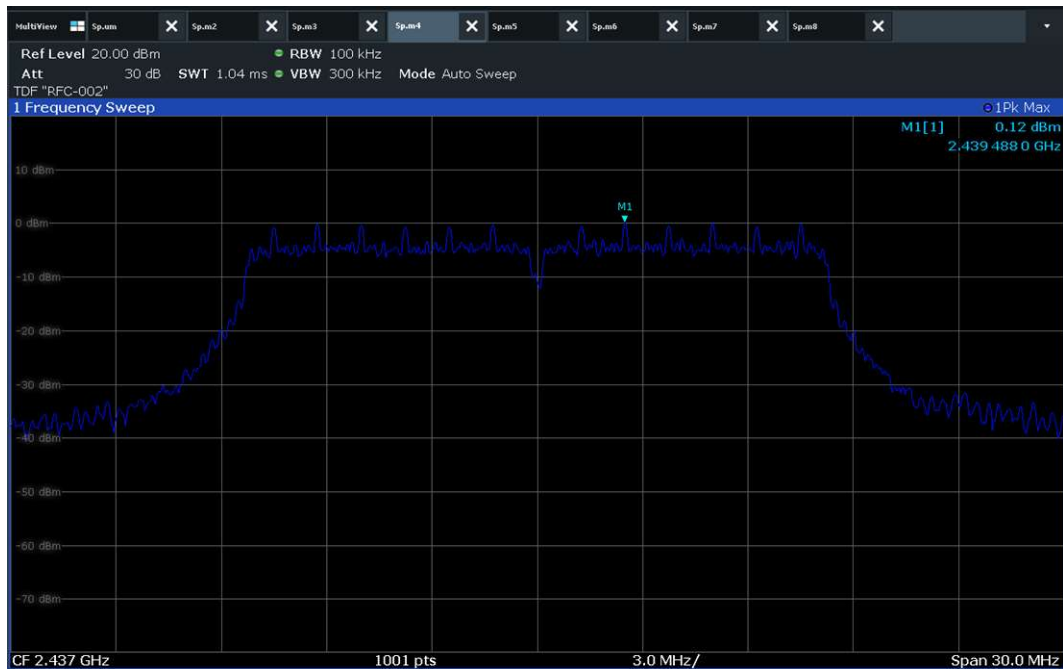


High CH

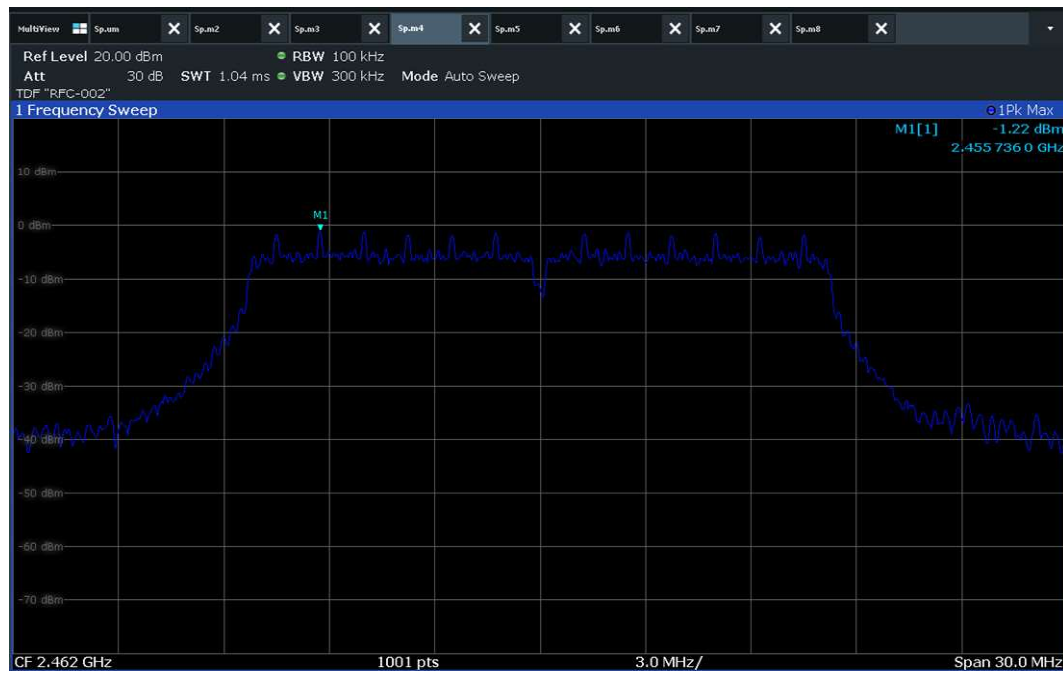
8.3.1.2 Reference level measurement for 802.11g



Low CH

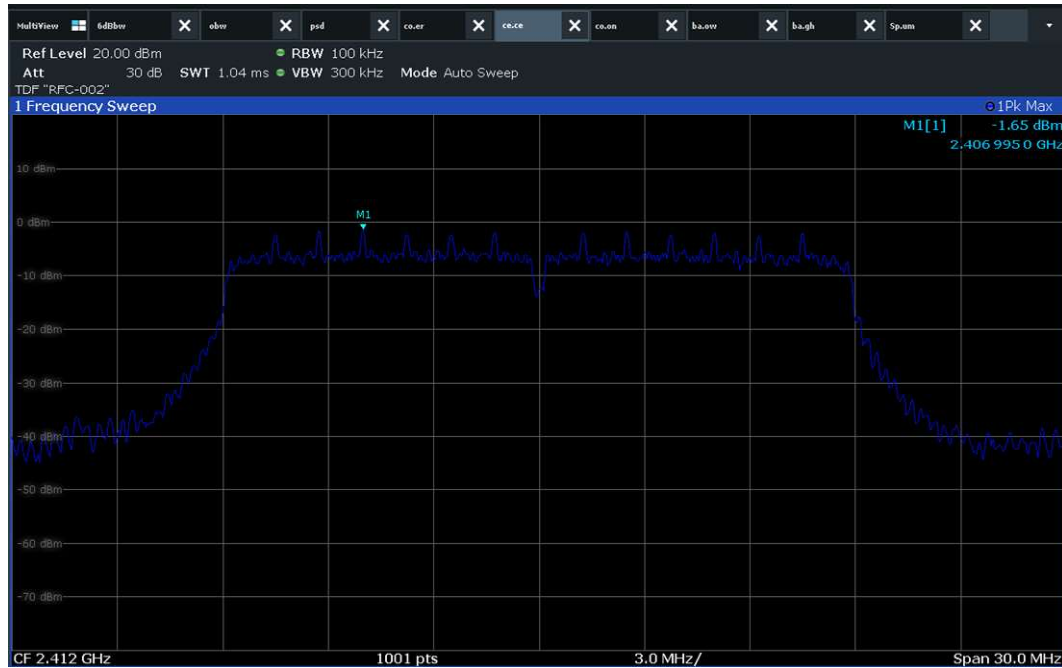


Mid CH

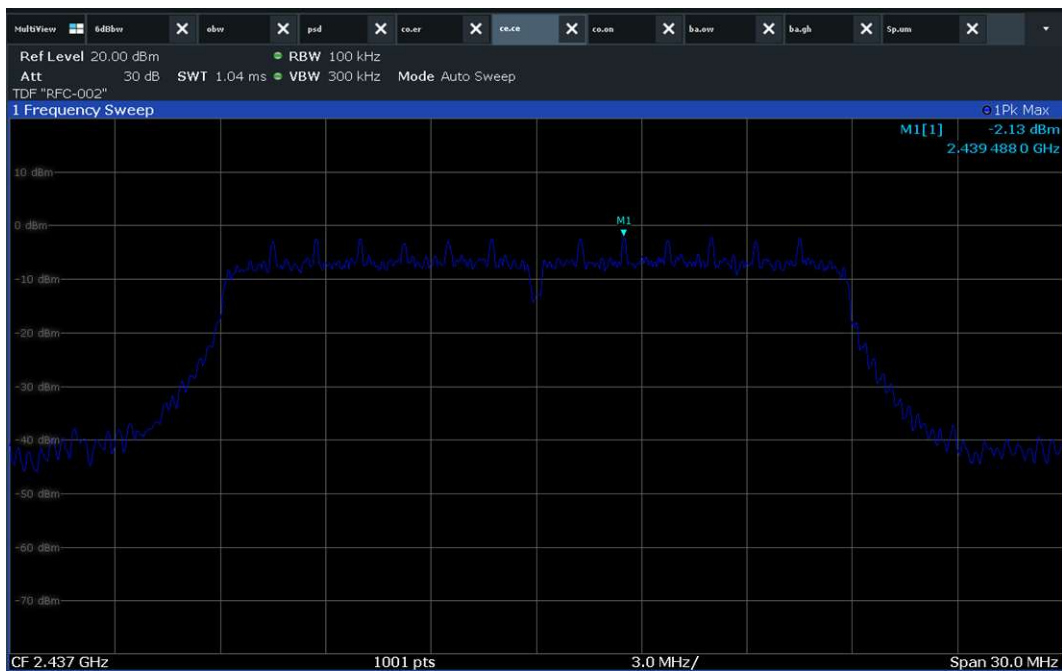


High CH

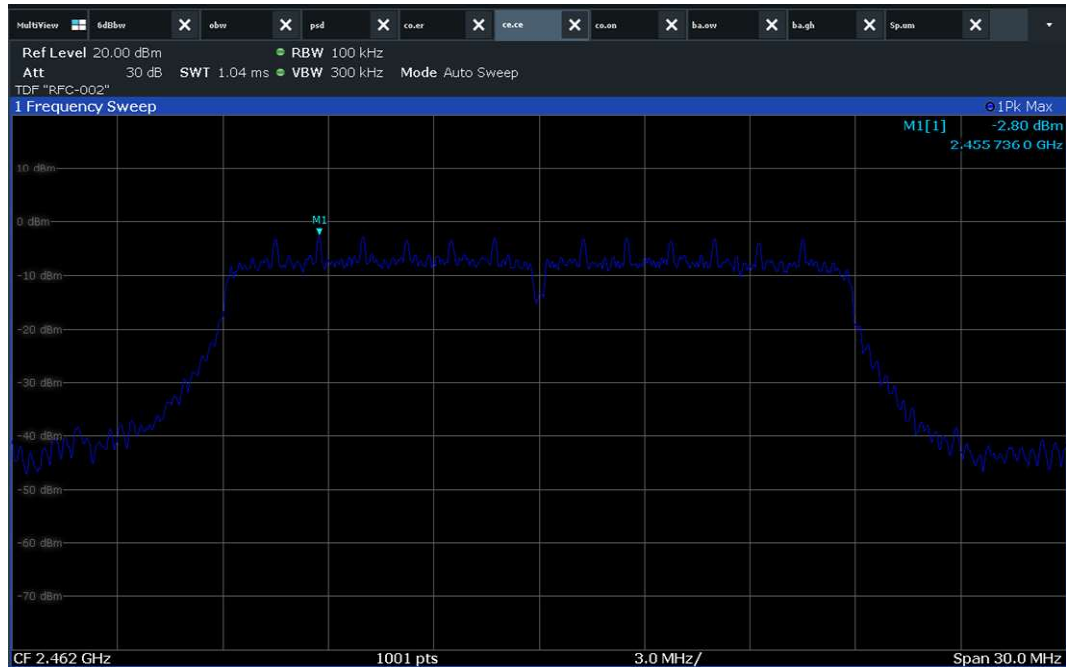
8.3.1.3 Reference level measurement for 802.11n(HT20)



Low CH

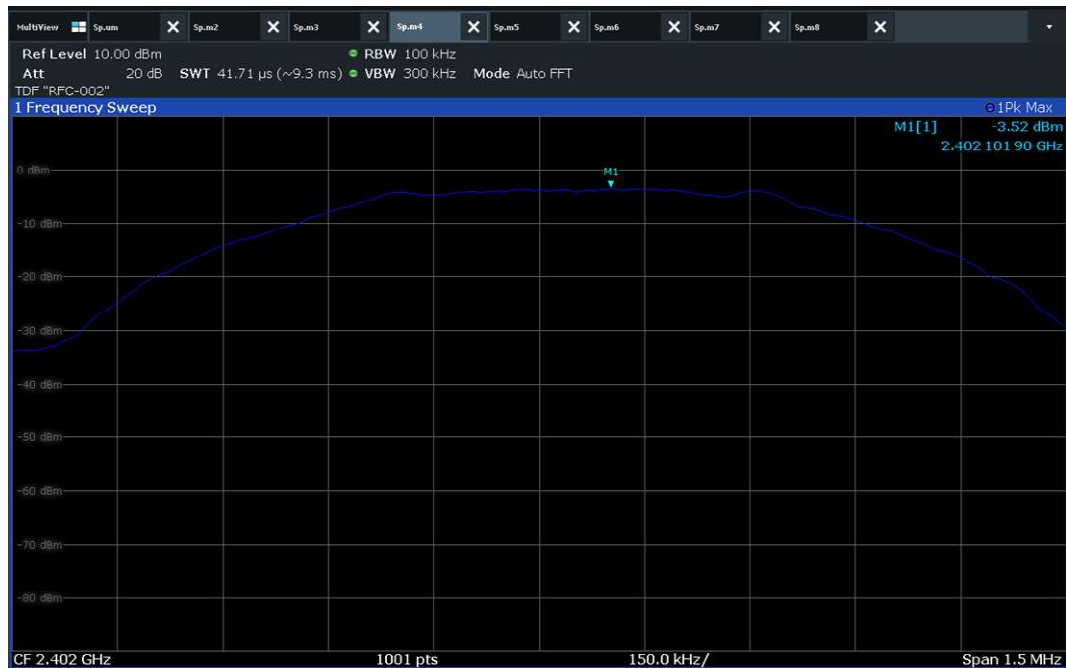


Mid CH

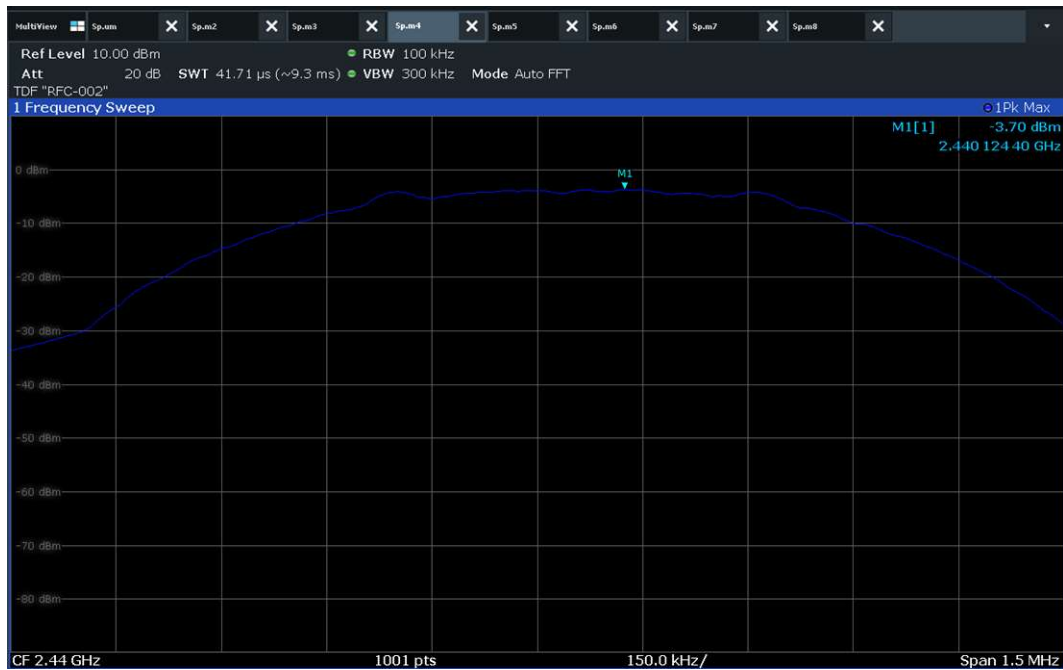


High CH

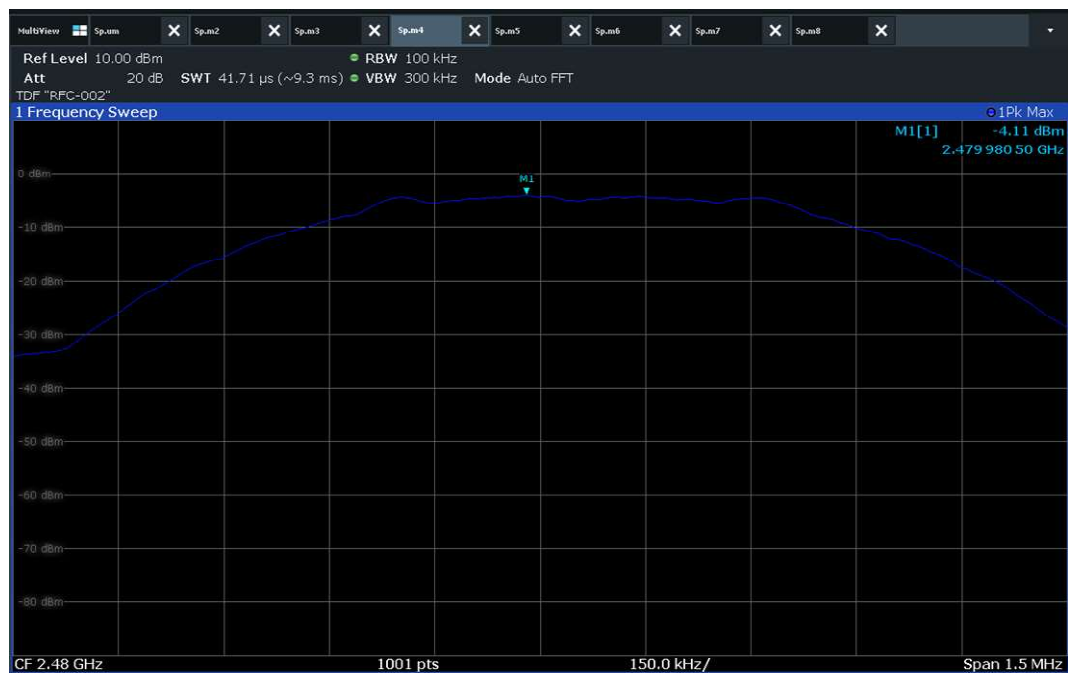
8.3.1.4 Reference level measurement for Bluetooth LE 1Mbps



Low CH

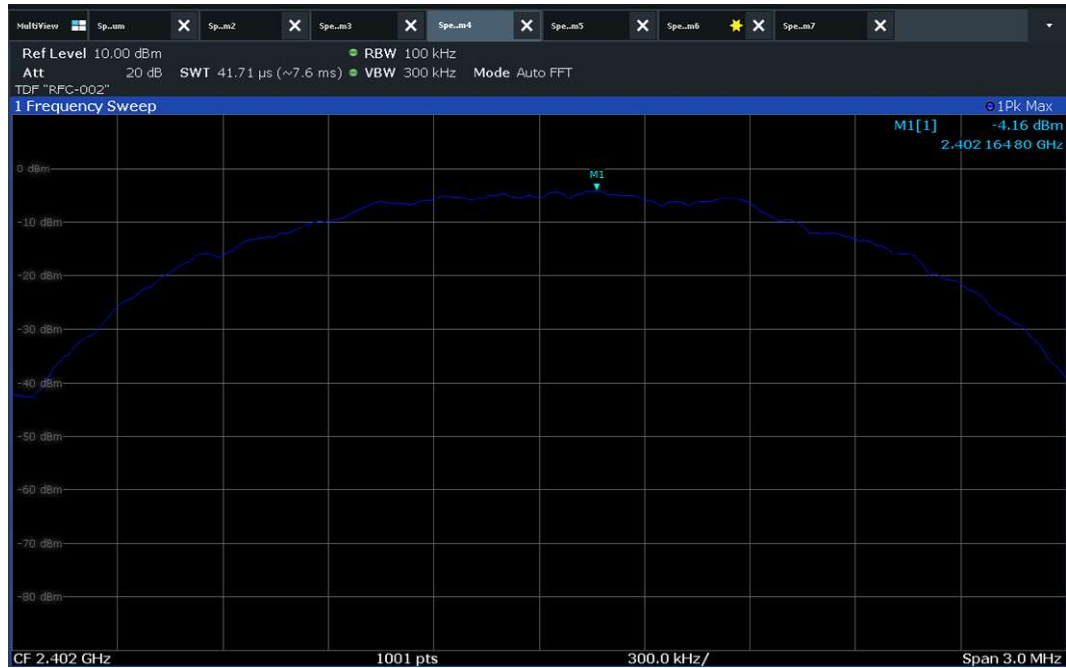


Mid CH

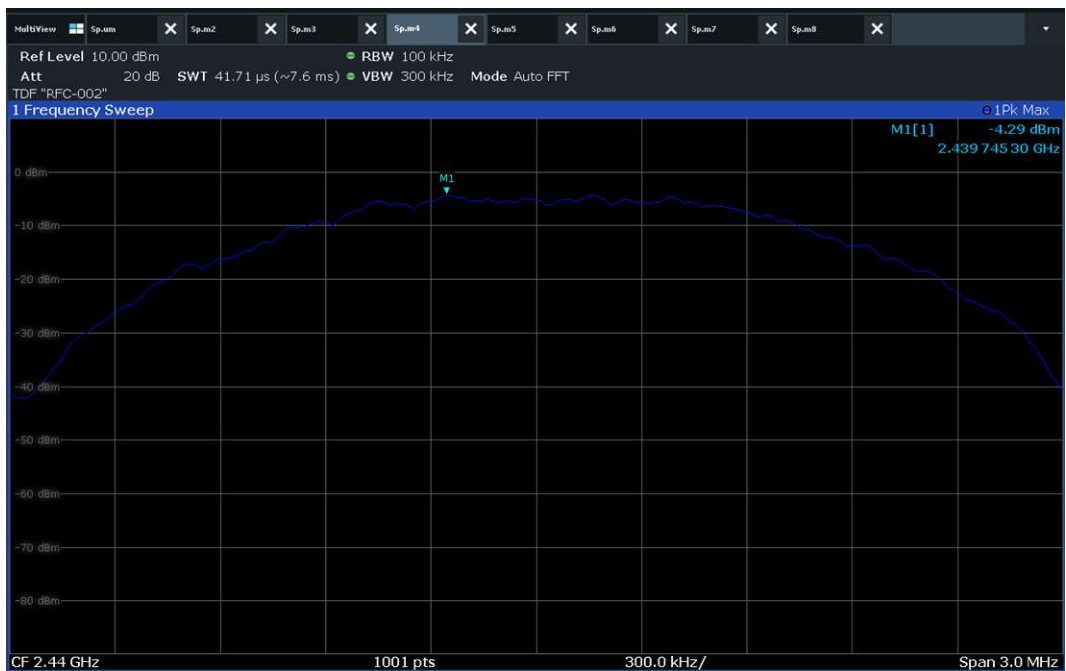


High CH

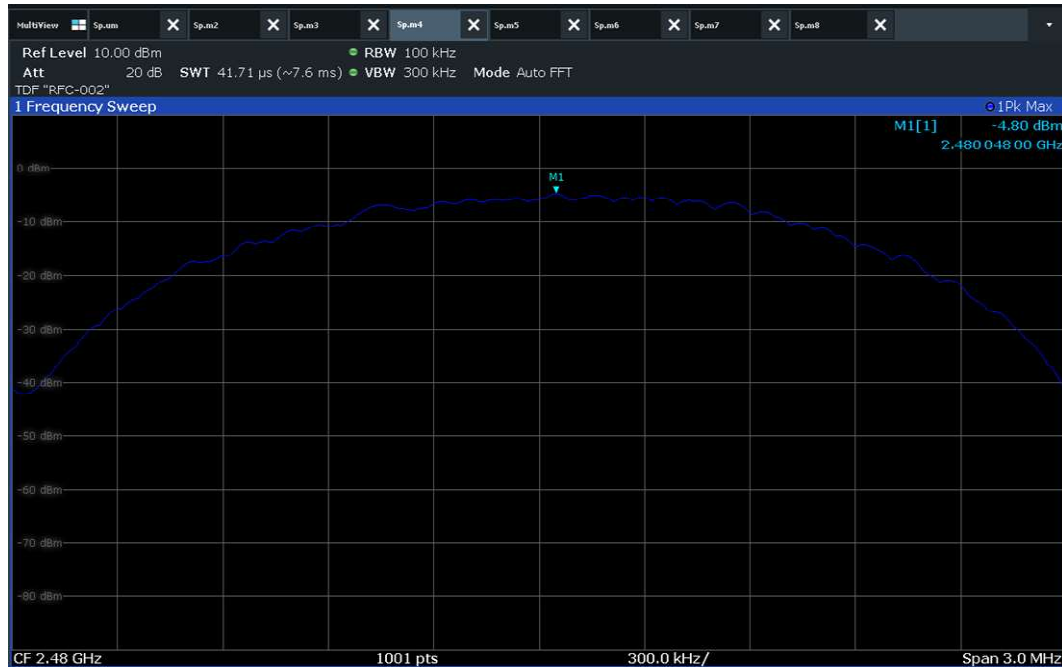
8.3.1.5 Reference level measurement for Bluetooth LE 2Mbps



Low CH

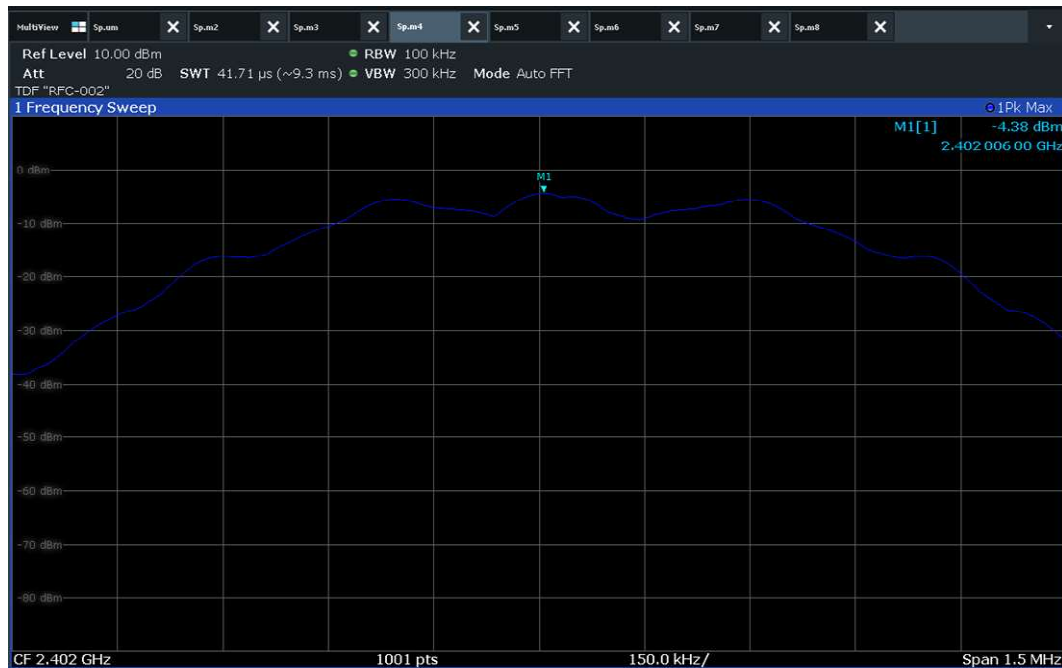


Mid CH

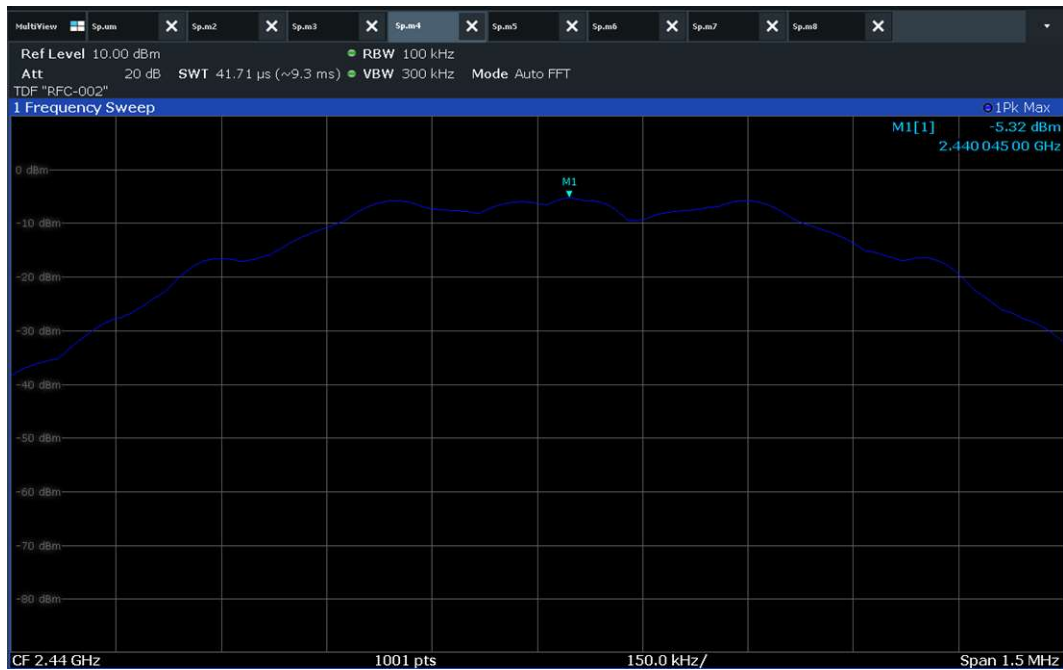


High CH

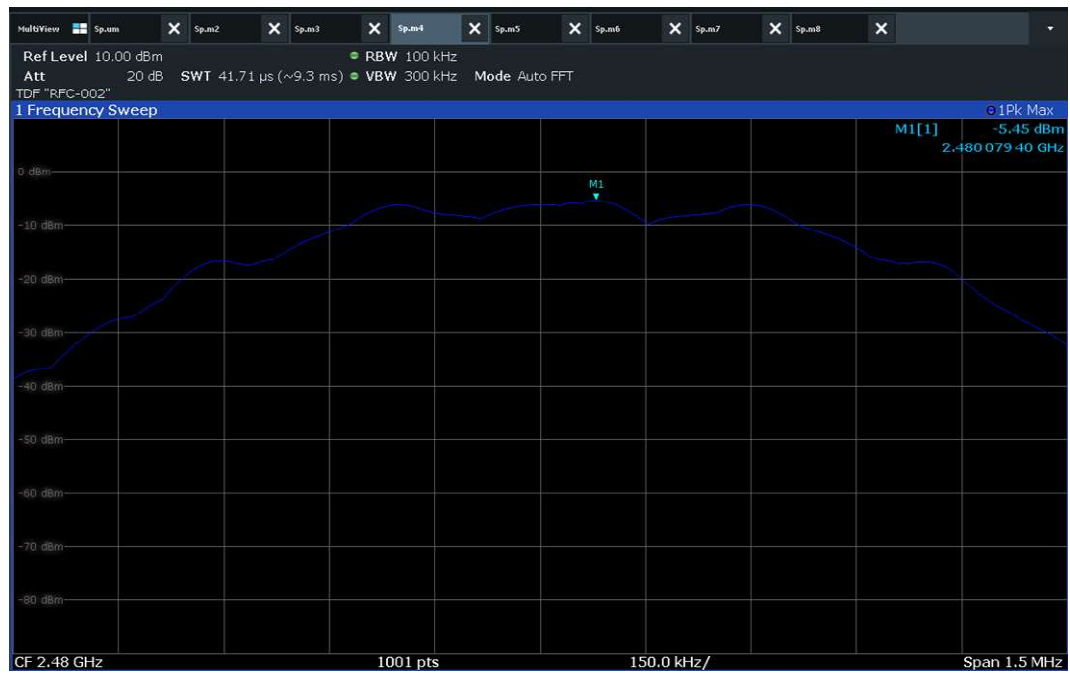
8.3.1.6 Reference level measurement for Bluetooth LE Coded 500kbps



Low CH



Mid CH

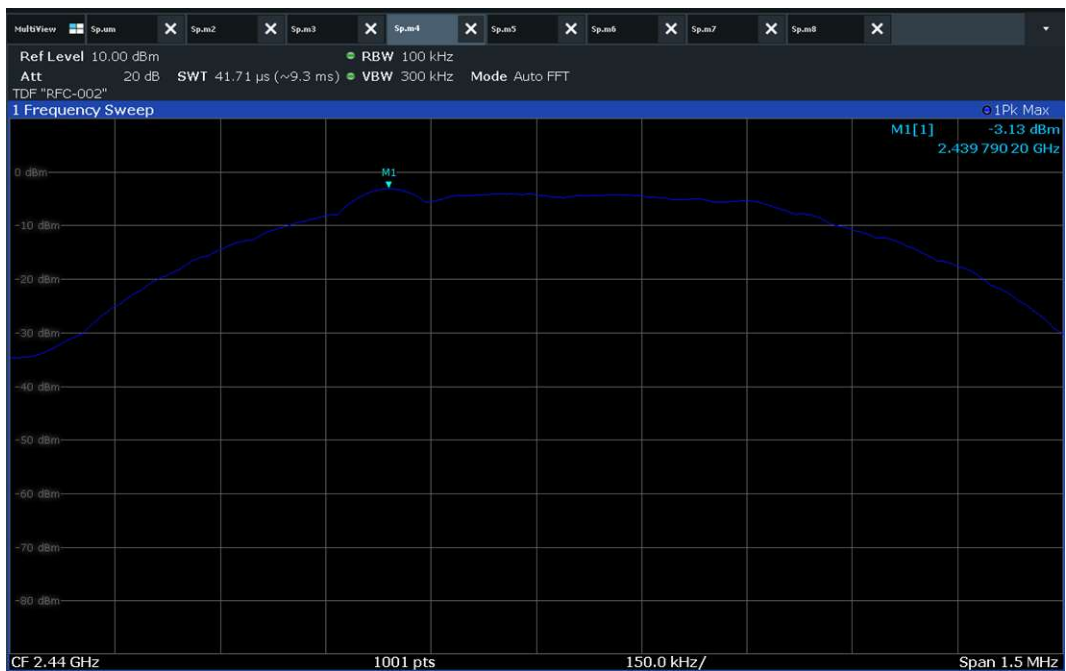


High CH

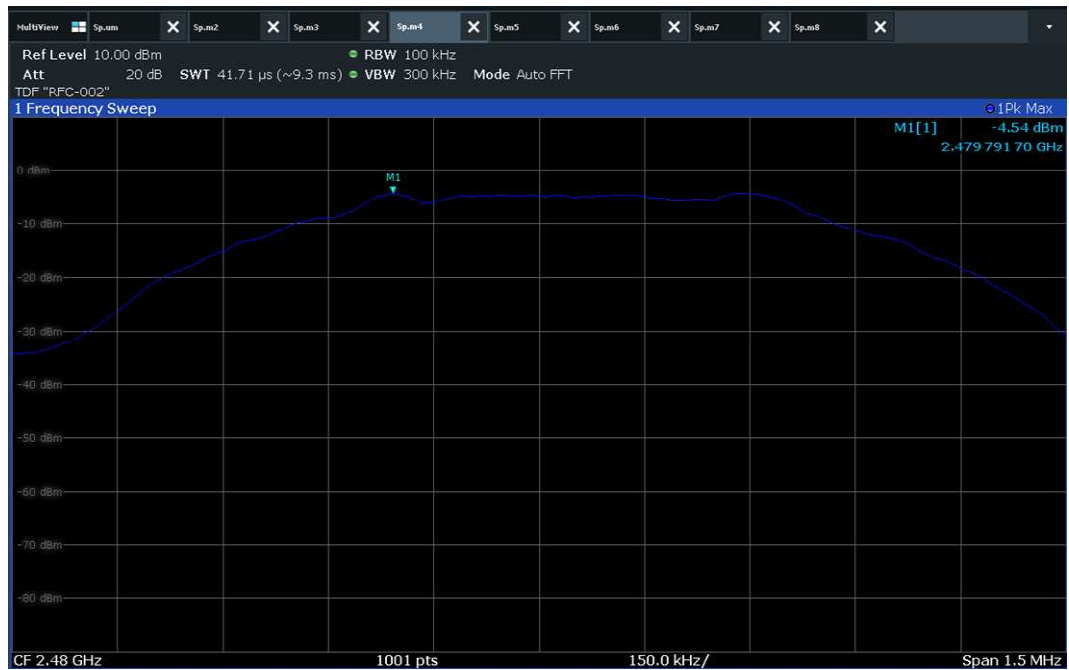
8.3.1.7 Reference level measurement for Bluetooth LE Coded 125kbps



Low CH

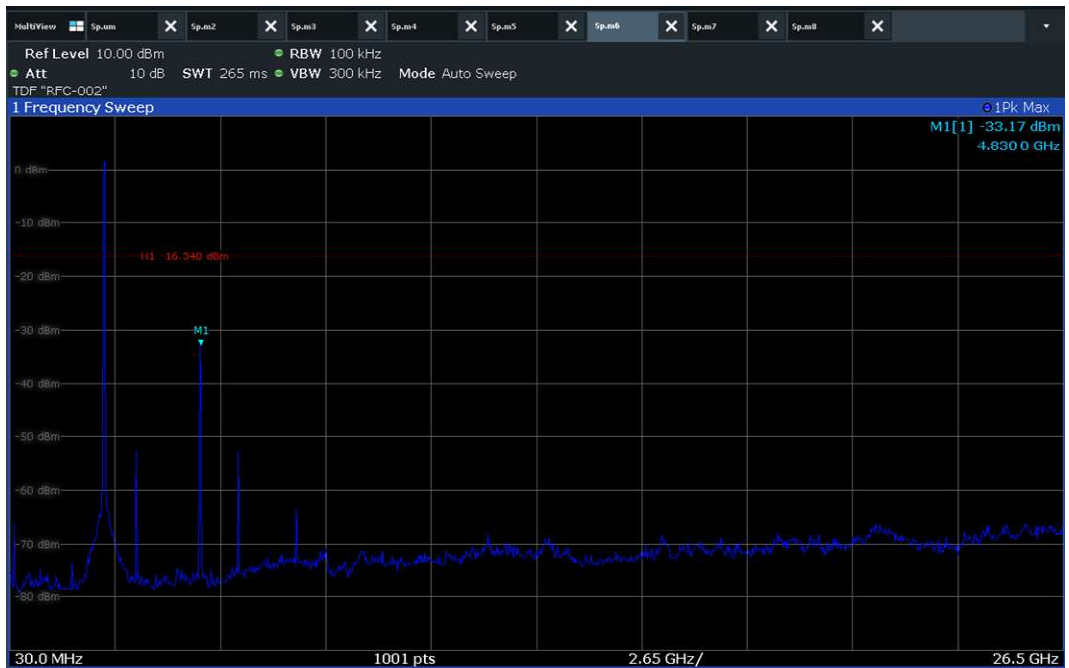


Mid CH

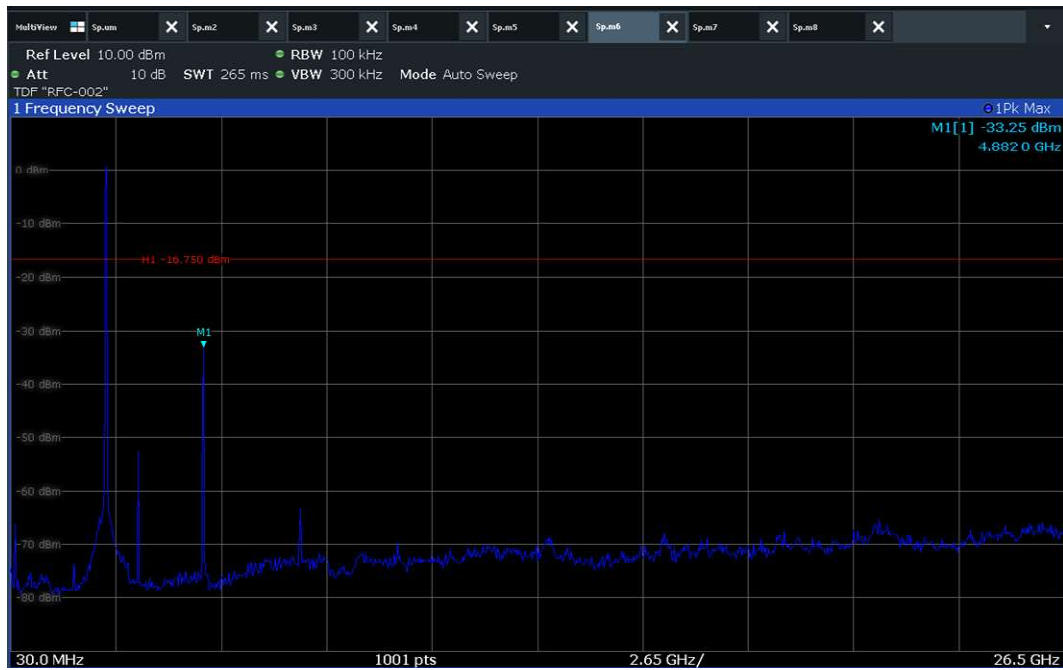


High CH

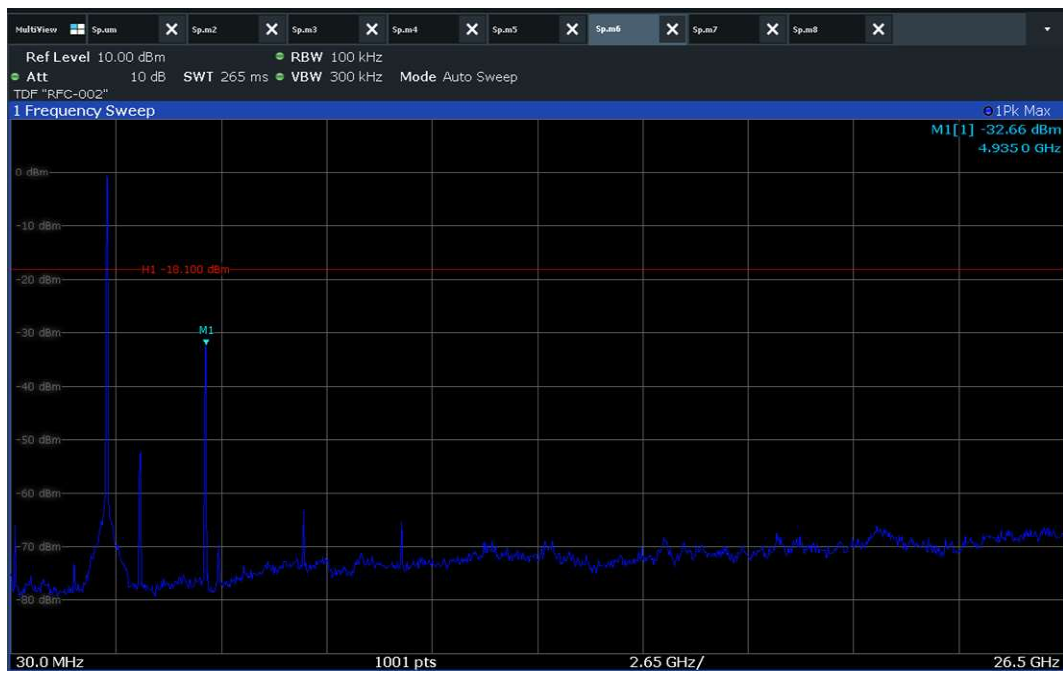
8.3.1.8 Unwanted Emissions In Non-Restricted Frequency Bands for 802.11b



Low CH

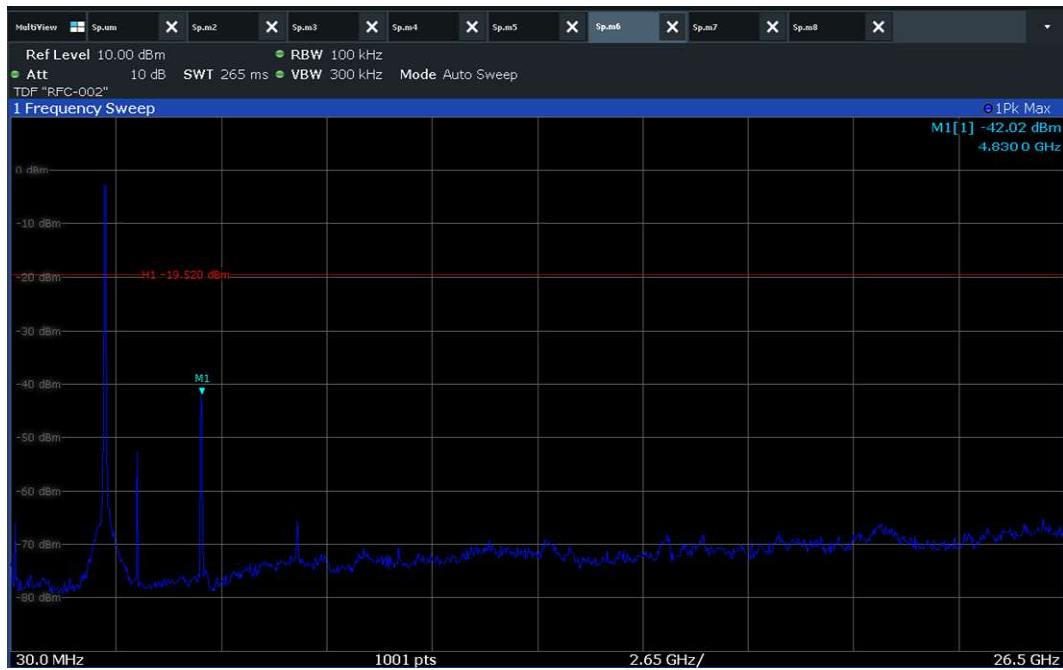


Mid CH

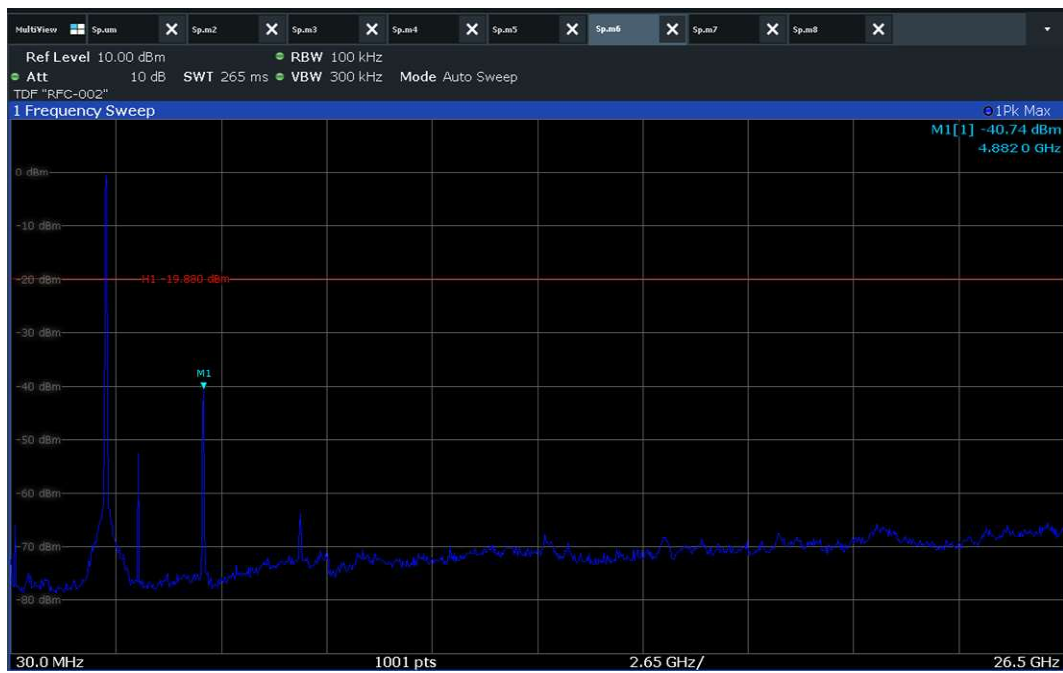


High CH

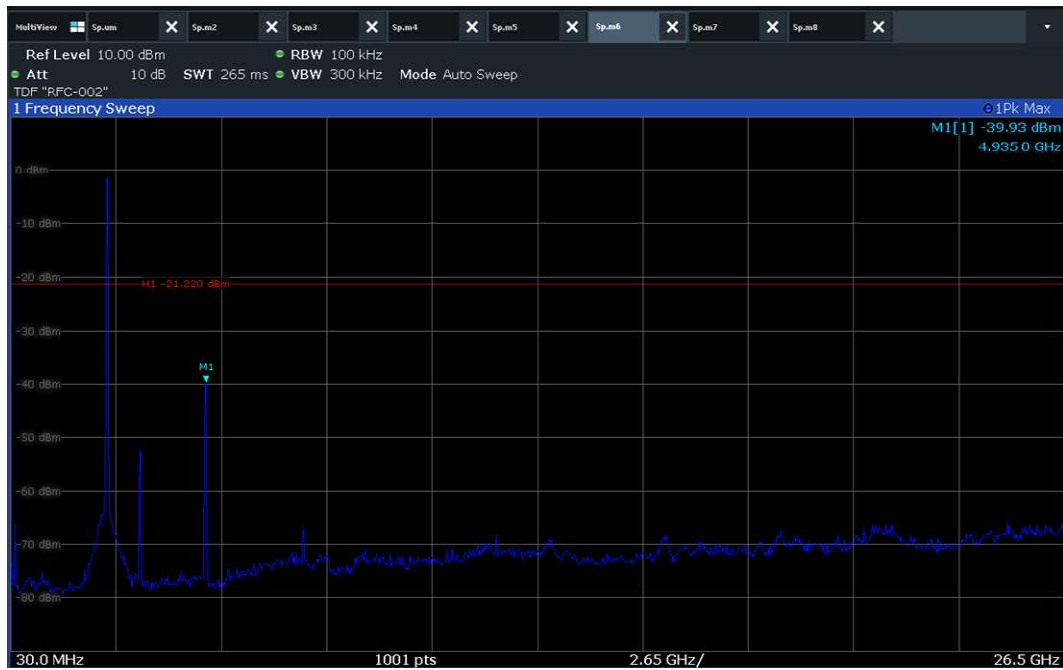
8.3.1.9 Unwanted Emissions In Non-Restricted Frequency Bands for 802.11g



Low CH

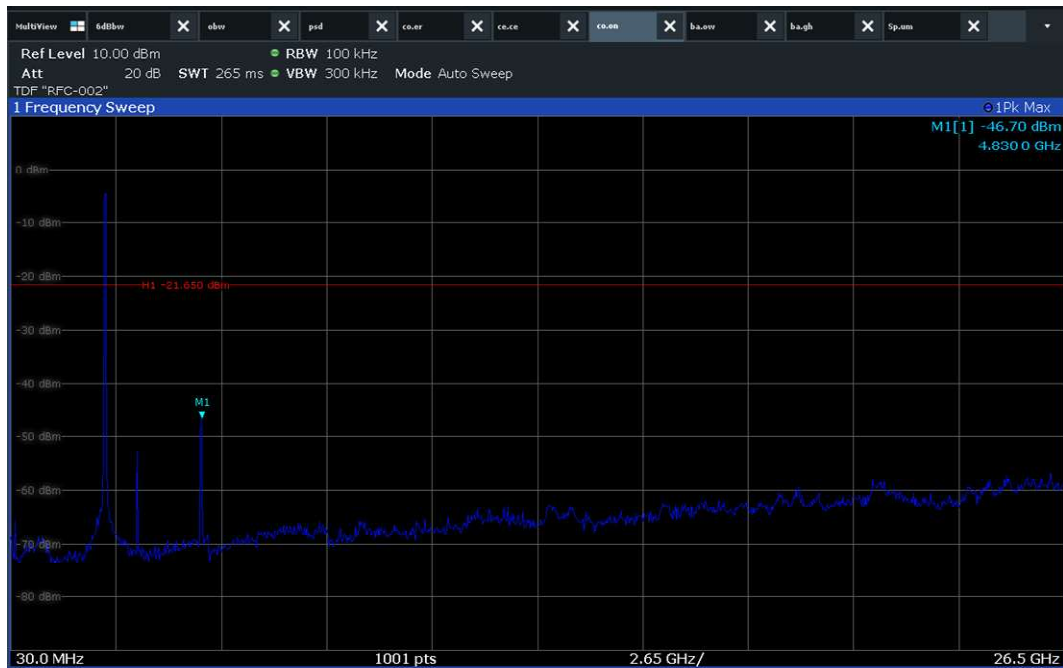


Mid CH

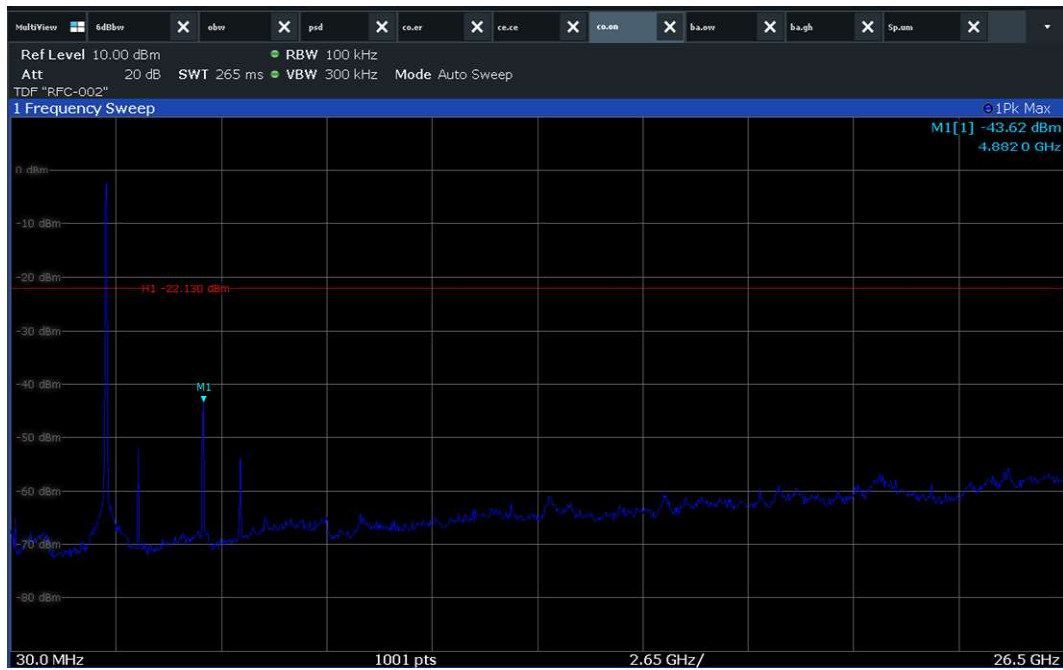


High CH

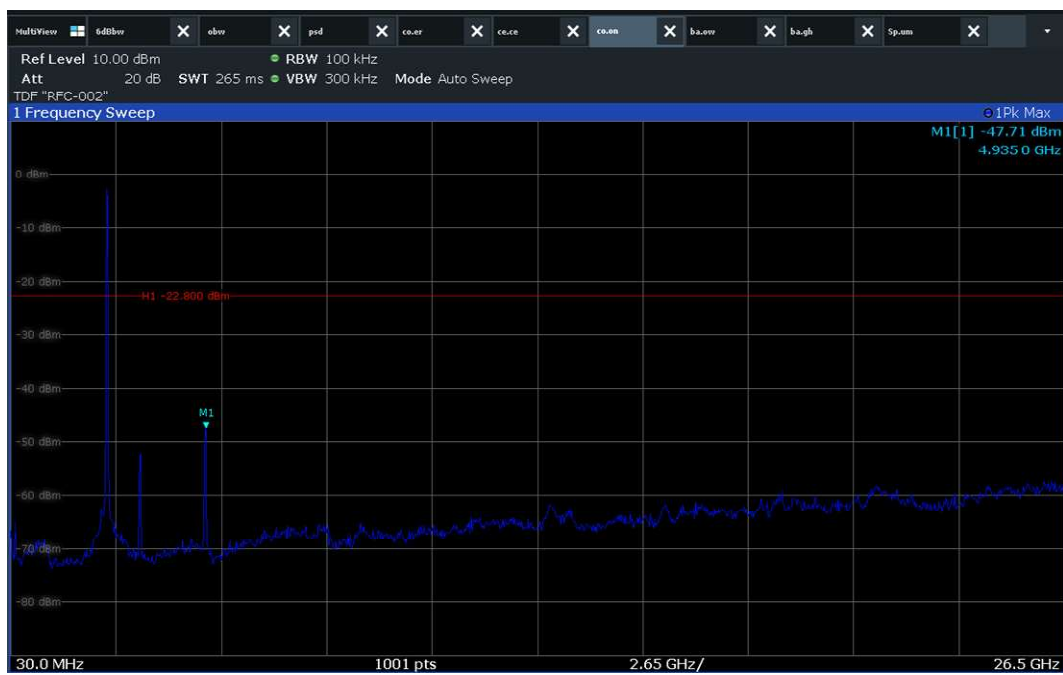
8.3.1.10 Unwanted Emissions In Non-Restricted Frequency Bands for 802.11n(HT20)



Low CH

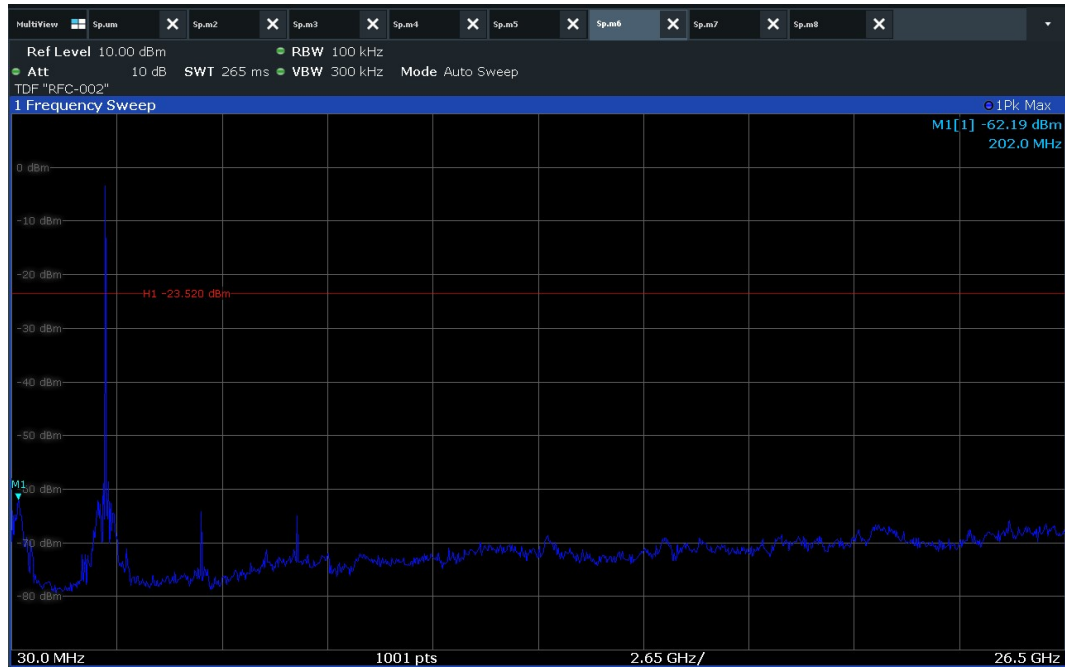


Mid CH

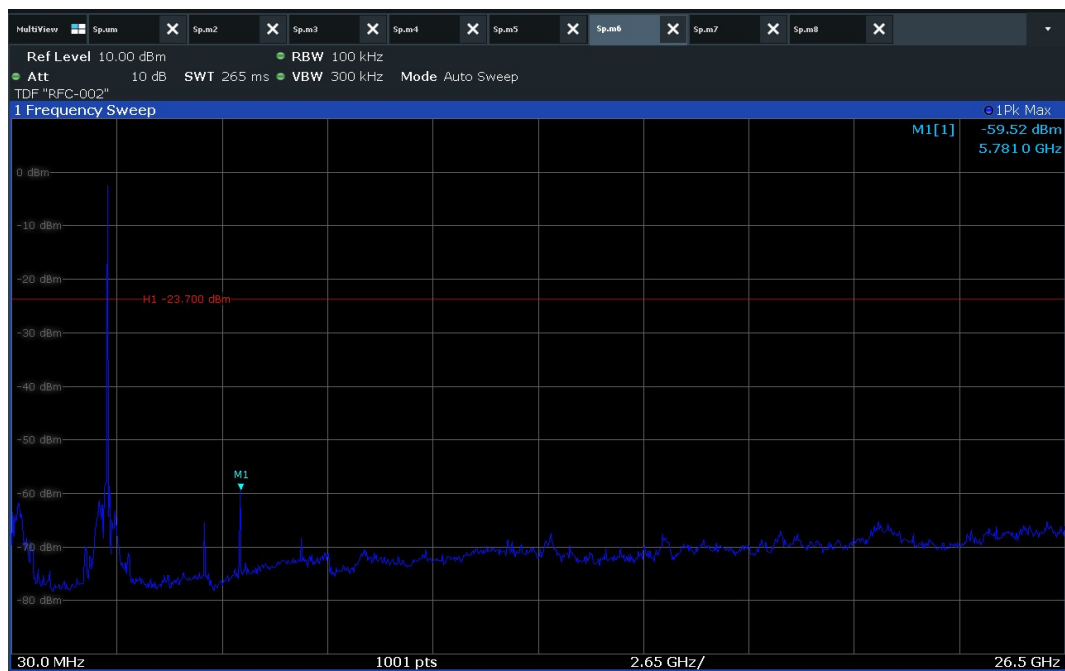


High CH

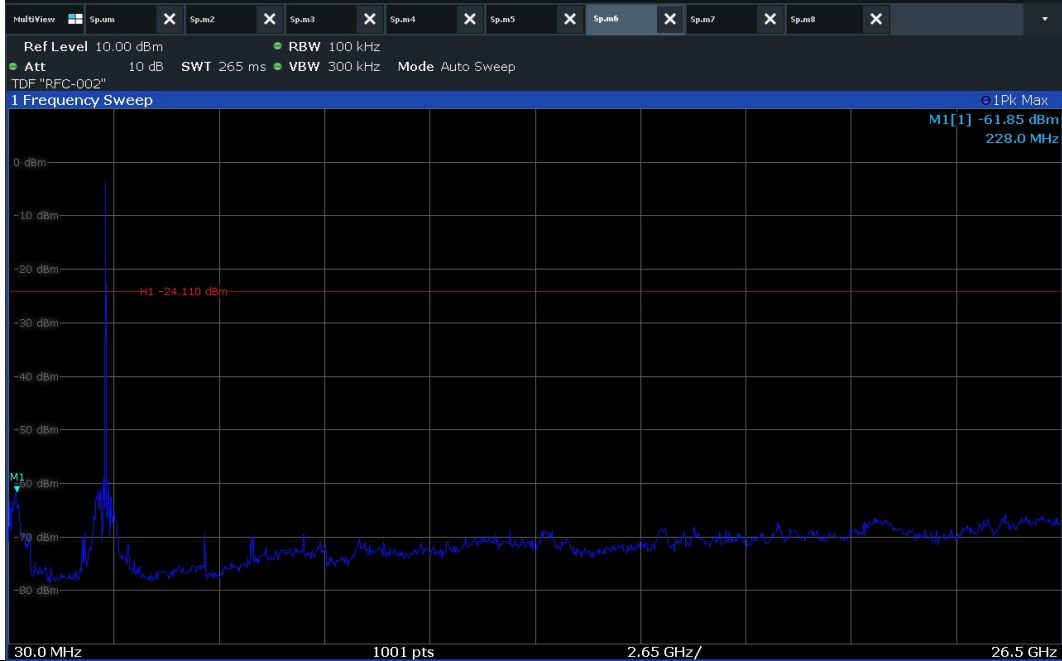
8.3.1.11 Unwanted Emissions In Non-Restricted Frequency Bands for Bluetooth LE 1Mbps



Low CH

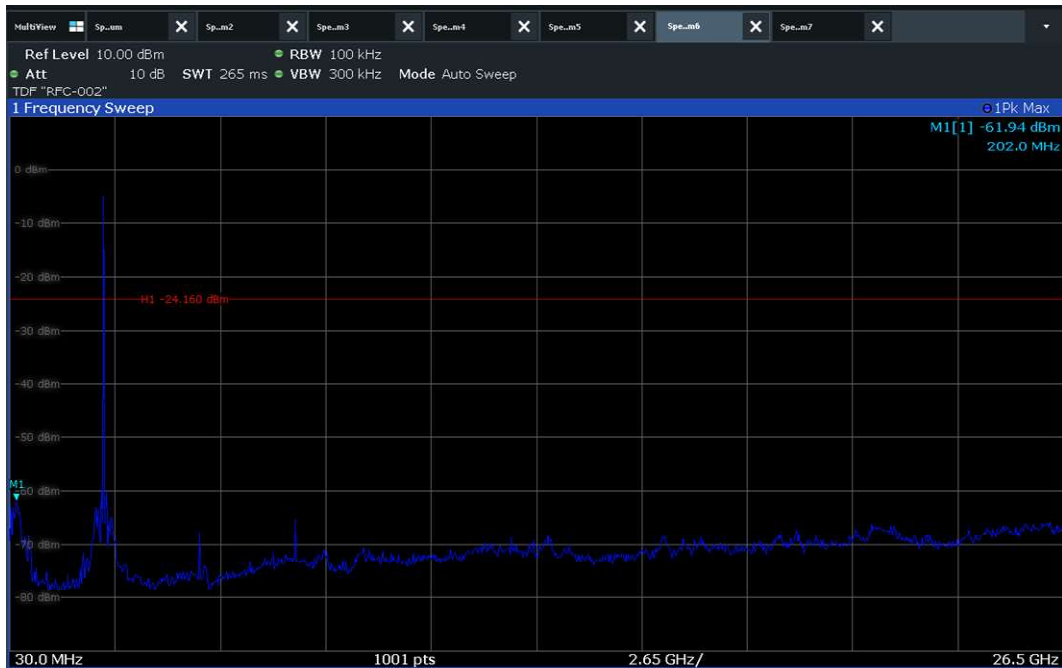


Mid CH

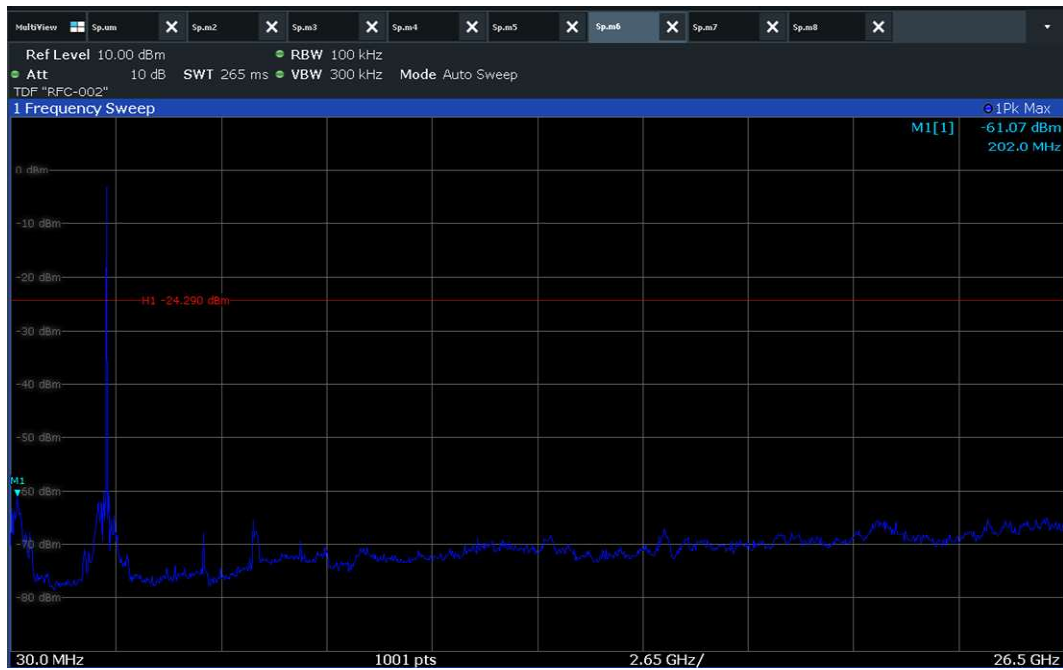


High CH

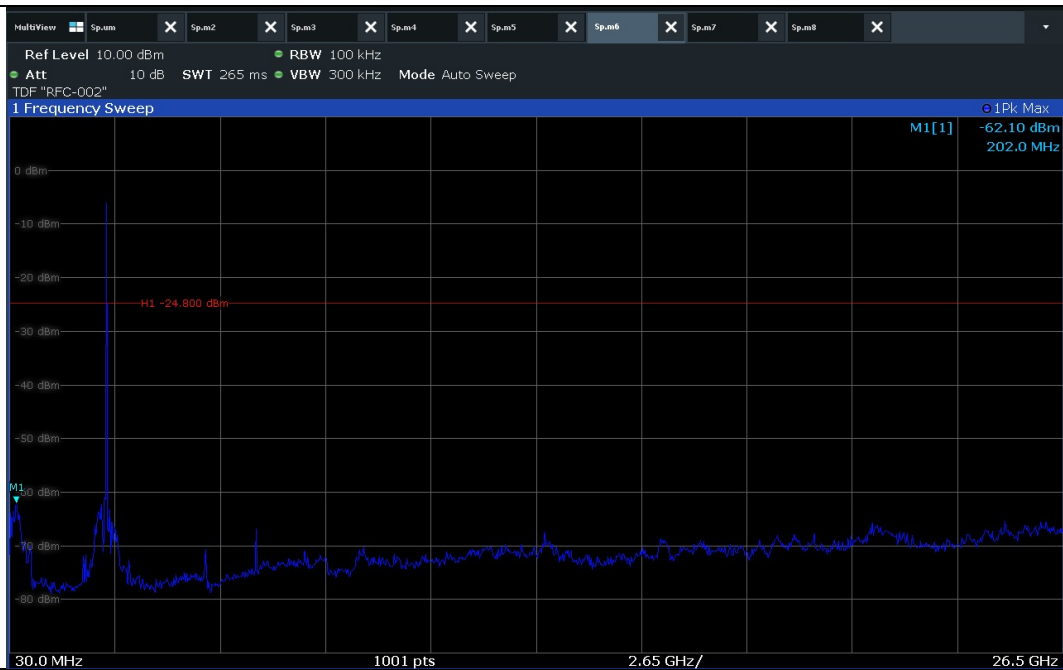
8.3.1.12 Unwanted Emissions In Non-Restricted Frequency Bands for Bluetooth LE 2Mbps



Low CH

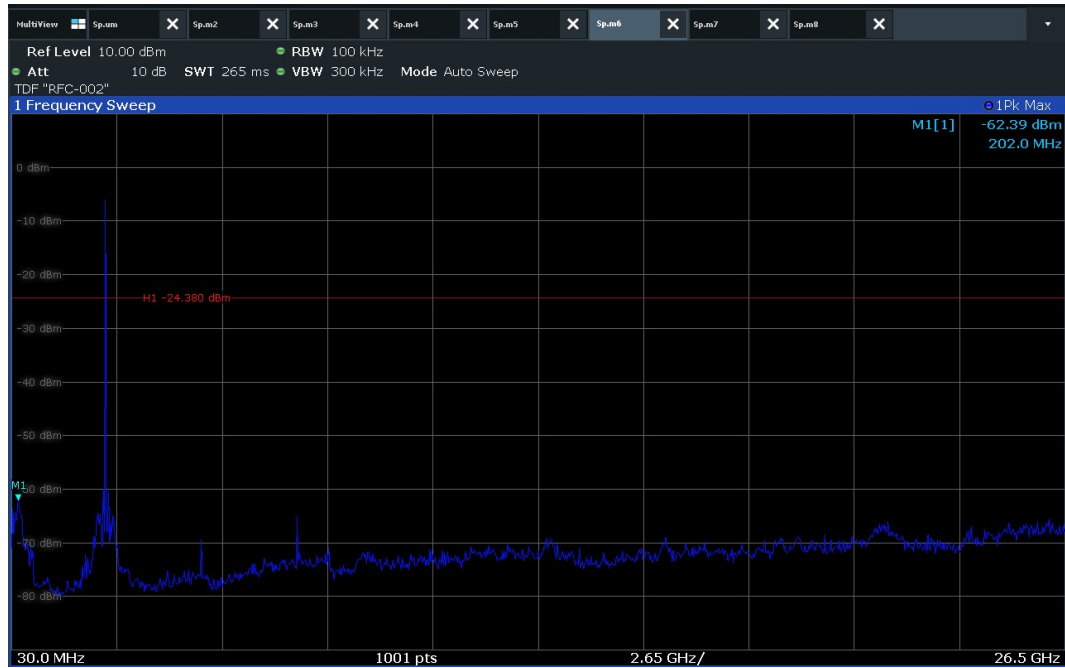


Mid CH

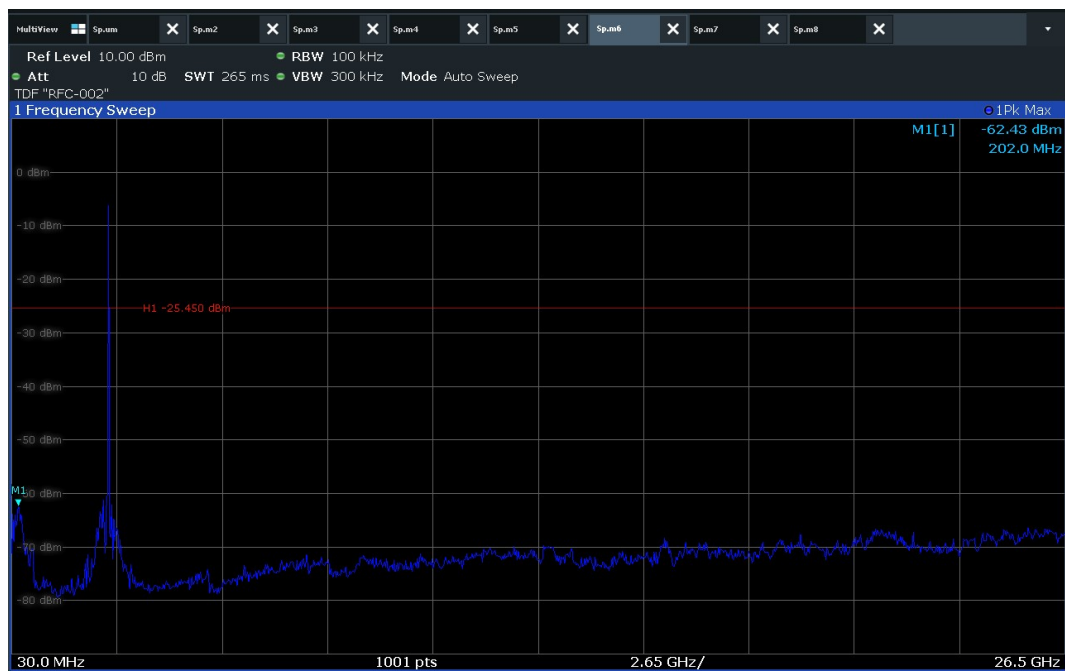


High CH

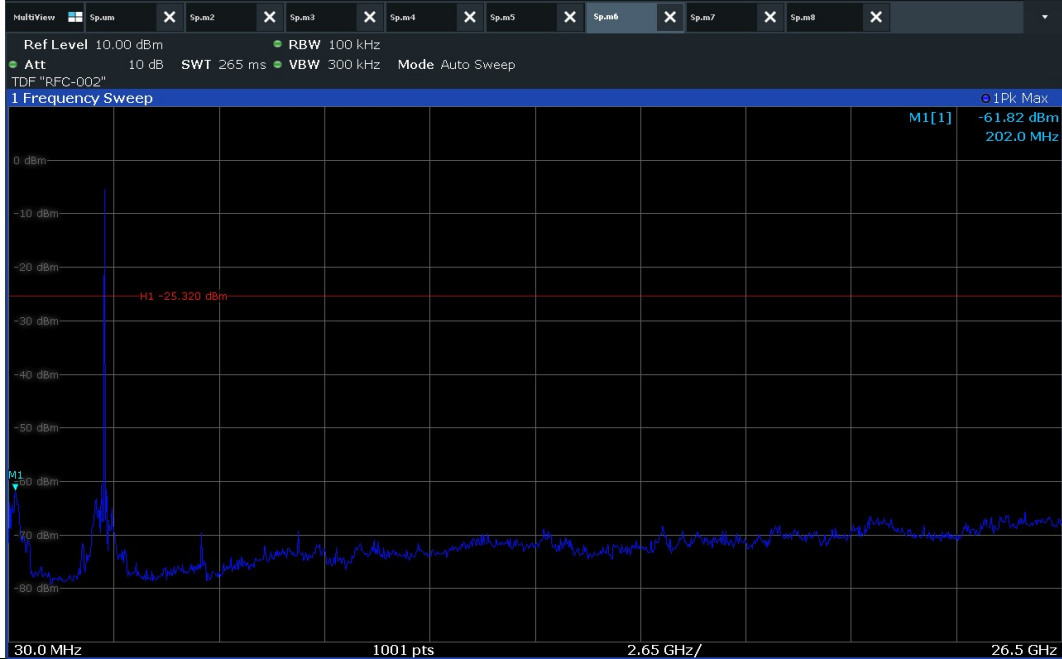
8.3.1.13 Unwanted Emissions In Non-Restricted Frequency Bands for Bluetooth LE Coded 500kbps



Low CH



Mid CH

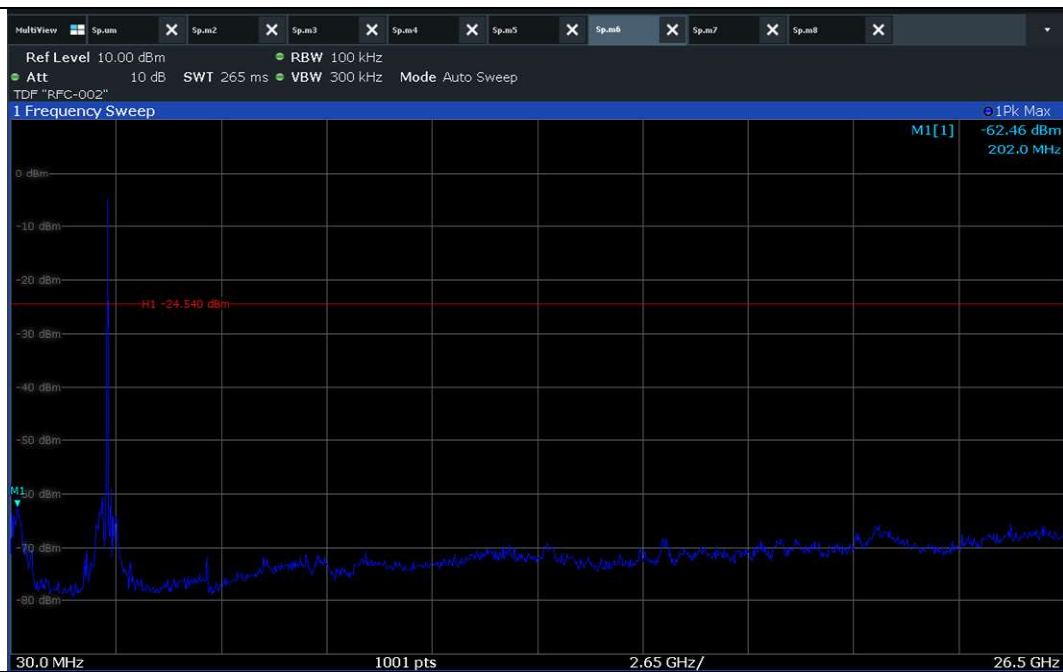
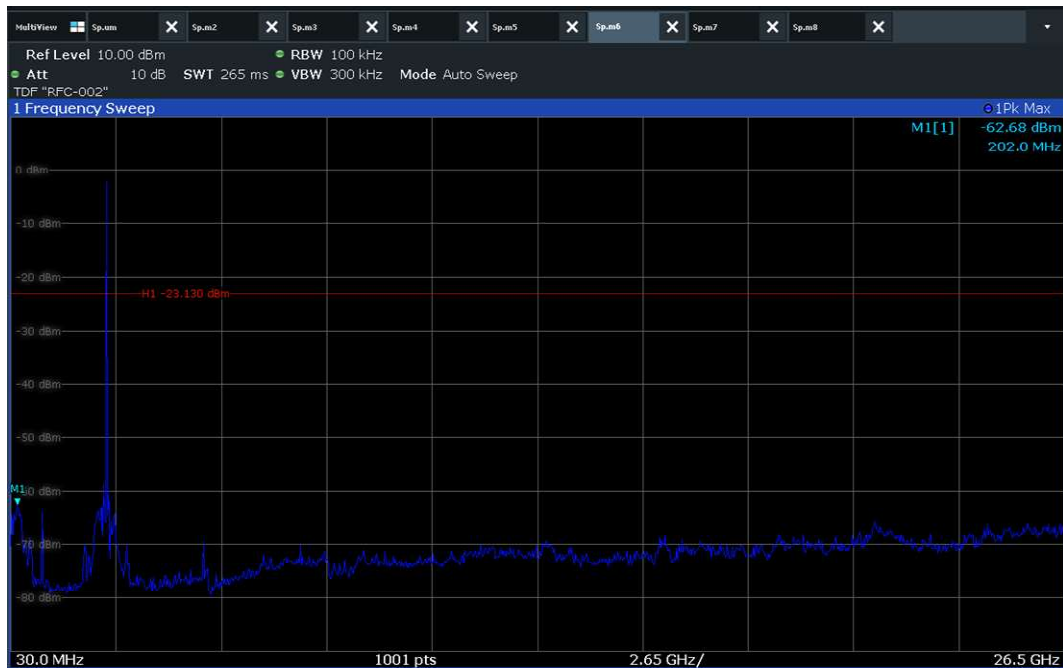


High CH

8.3.1.14 Unwanted Emissions In Non-Restricted Frequency Bands for Bluetooth LE Coded 125kbps

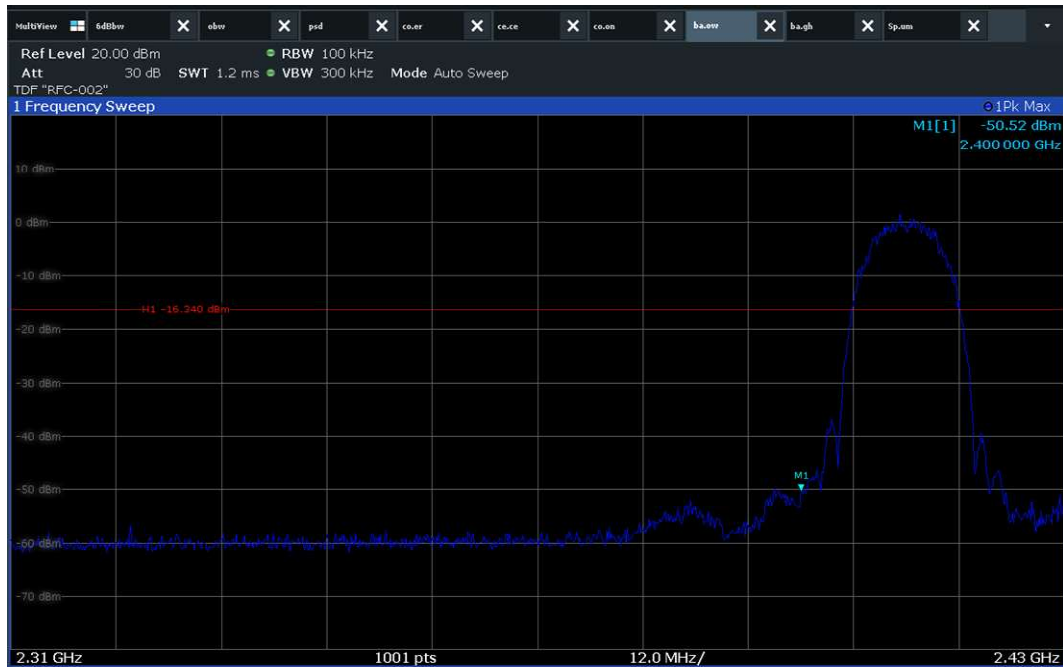


Low CH

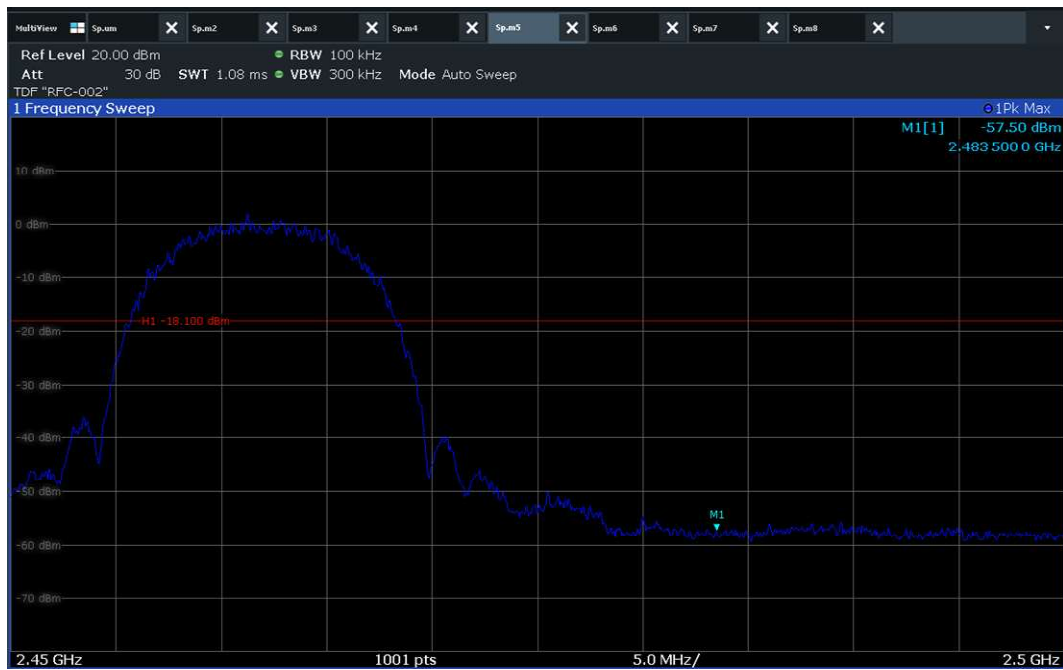




8.3.1.15 Band Edge for 802.11b



Low CH



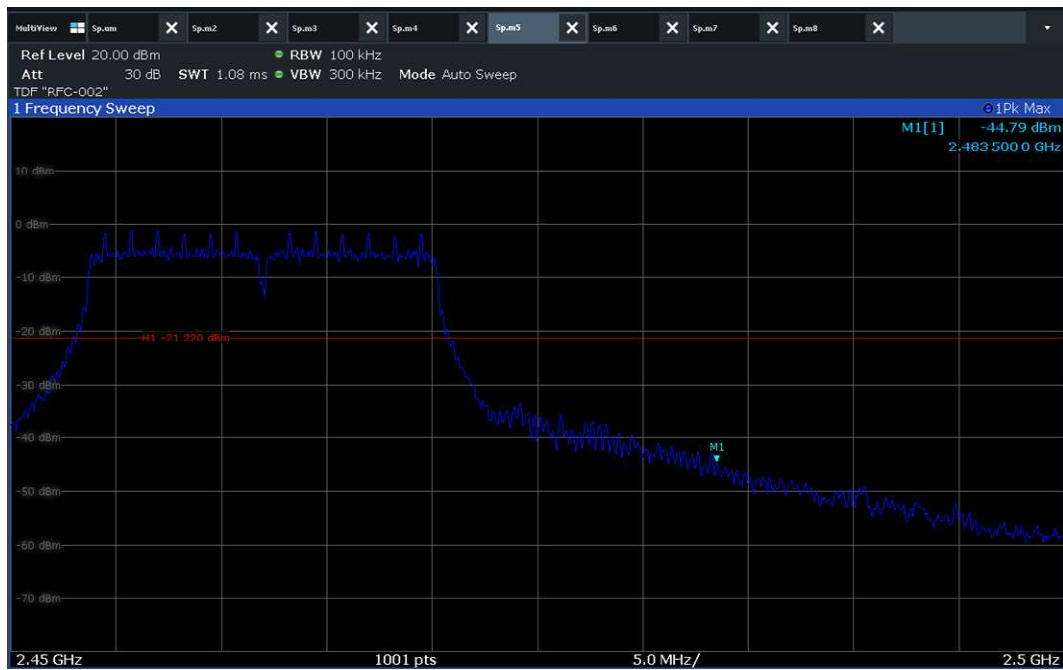
High CH



8.3.1.16 Band Edge for 802.11g



Low CH

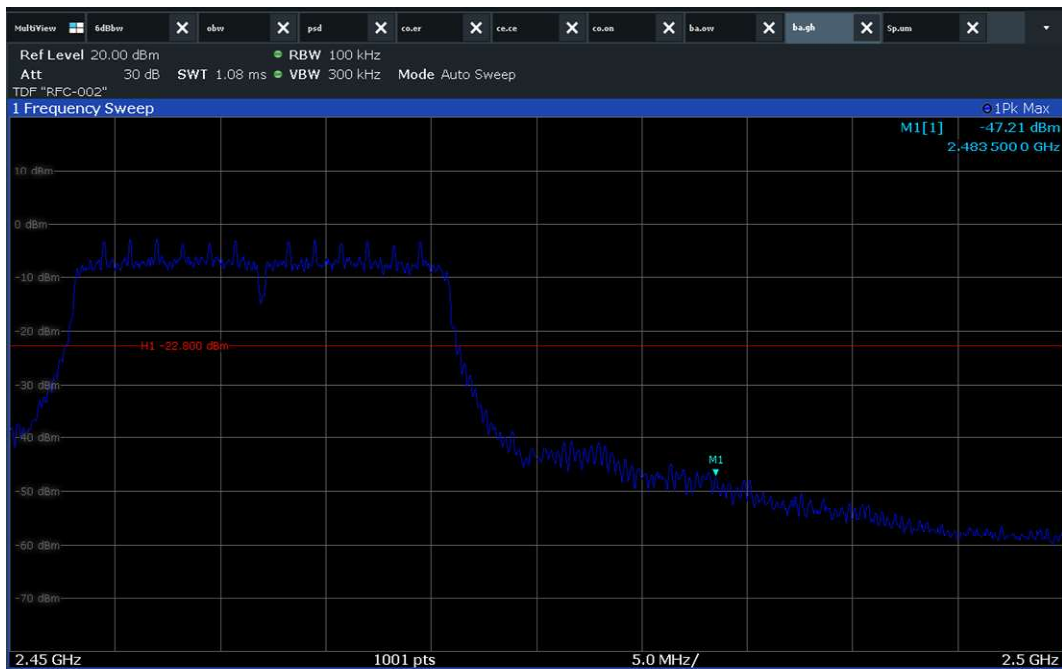


High CH

8.3.1.17 Band Edge for 802.11n(HT20)



Low CH



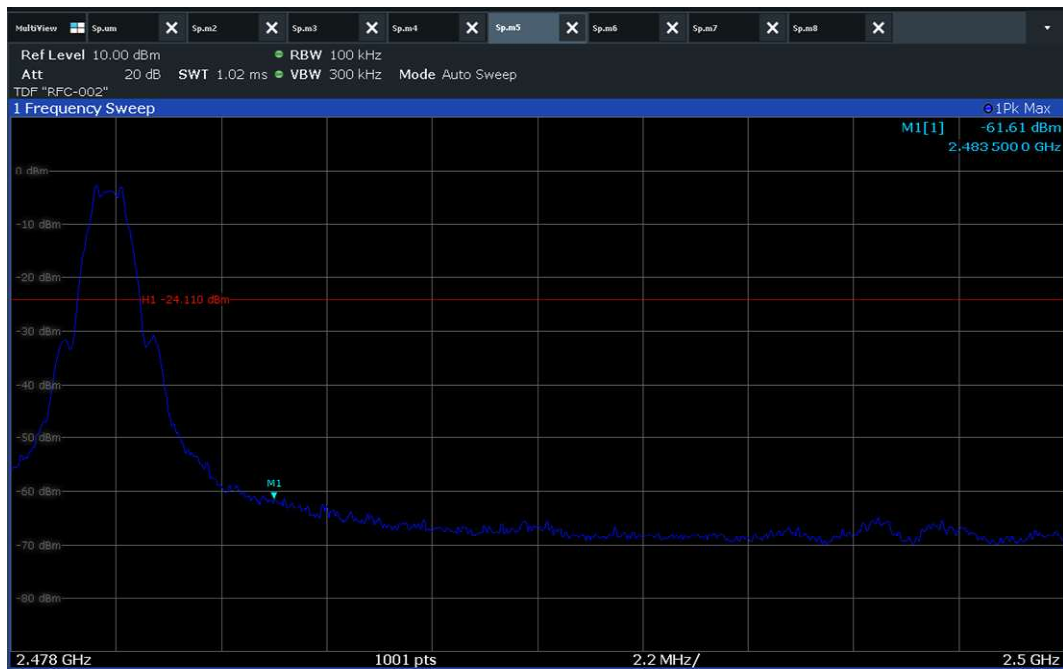
High CH



8.3.1.18 Band Edge for Bluetooth LE 1Mbps

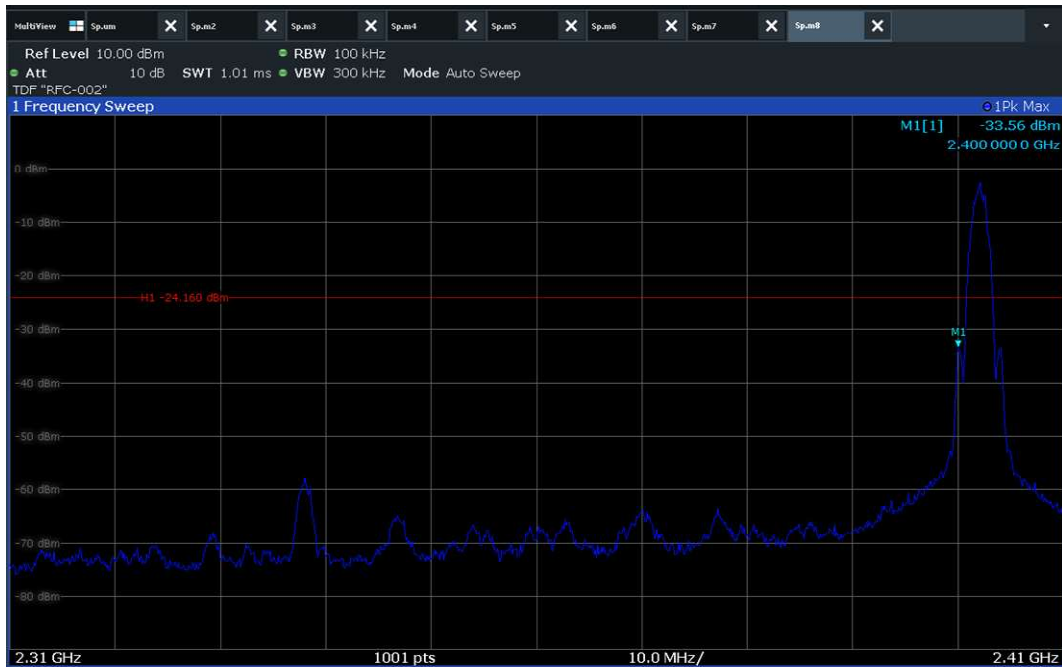


Low CH

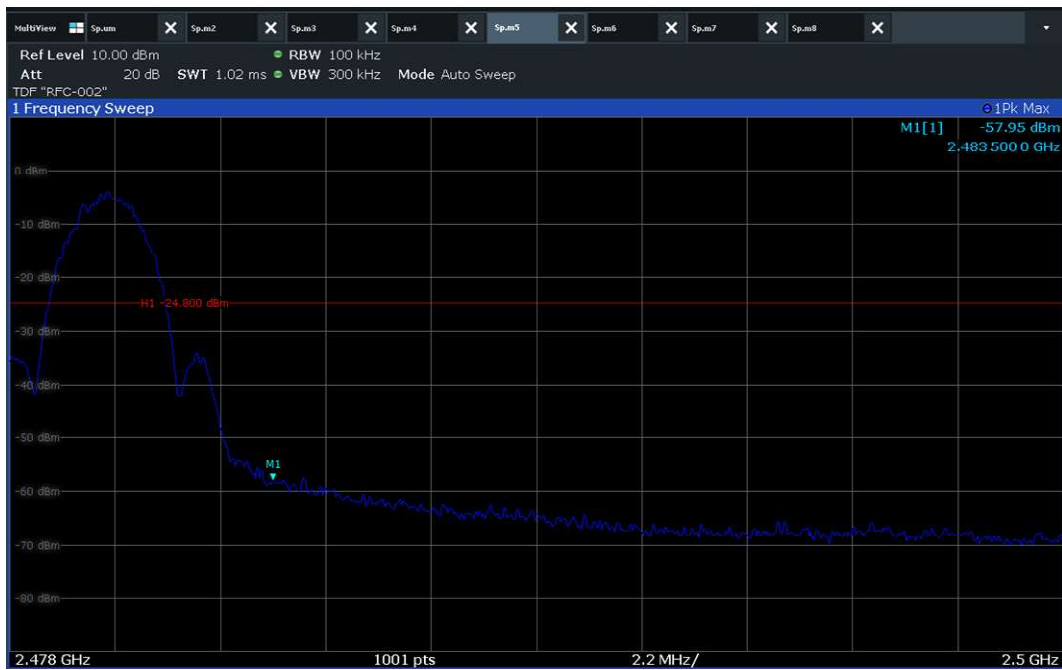


High CH

8.3.1.19 Band Edge for Bluetooth LE 2Mbps

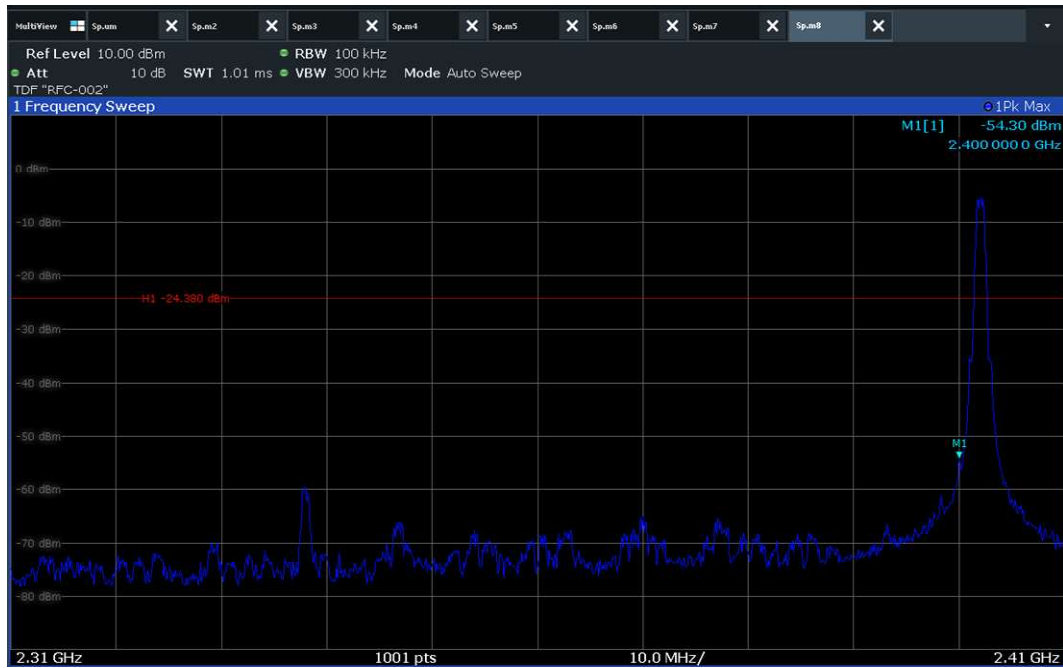


Low CH

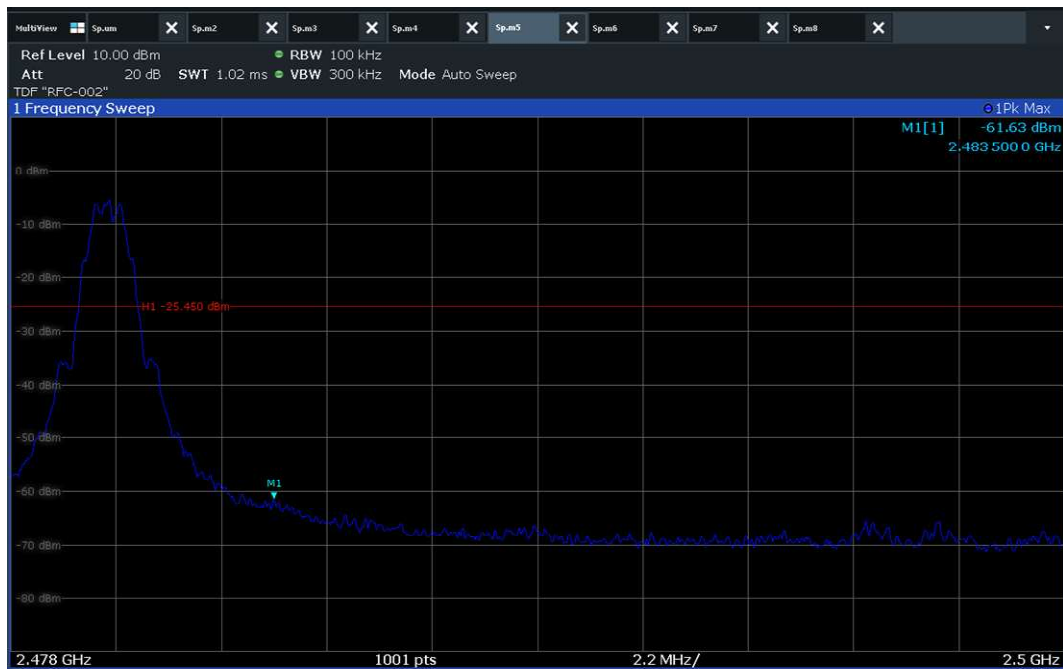


High CH

8.3.1.20 Band Edge for Bluetooth LE Coded 500kbps

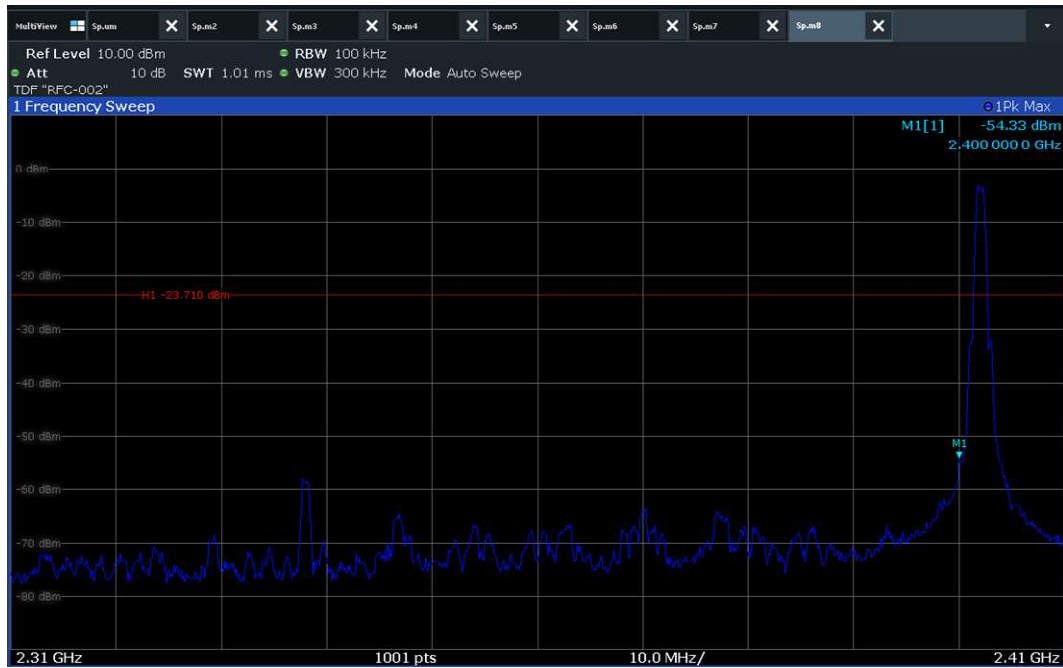


Low CH

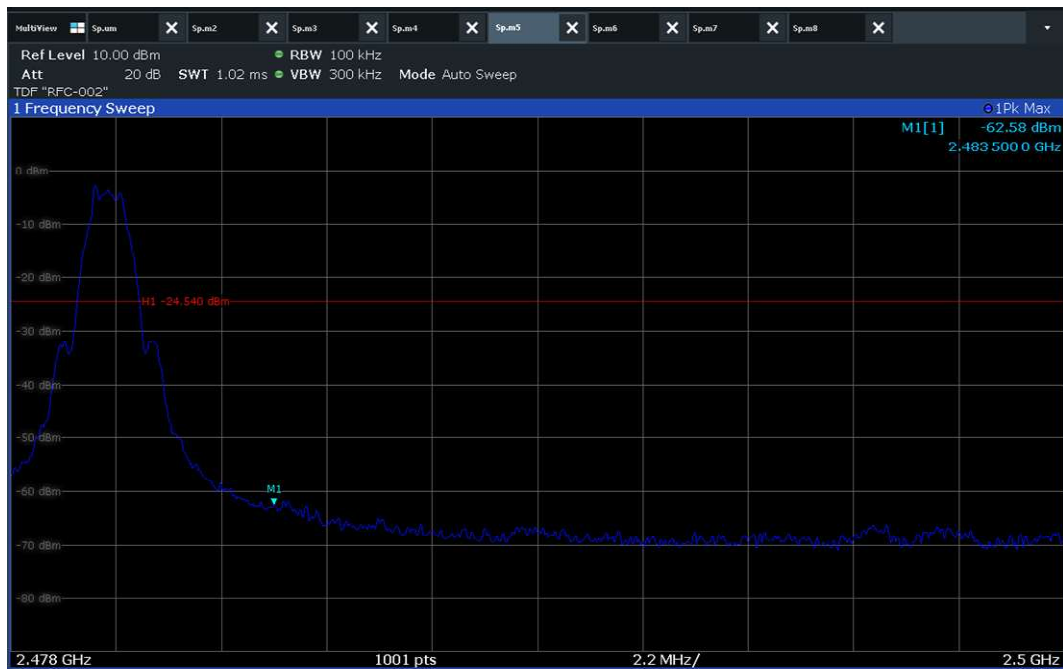


High CH

8.3.1.21 Band Edge for Bluetooth LE Coded 125kbps



Low CH



High CH

9. Radiated Spurious Emission

9.1 Operating environment

Temperature : 24 °C

Relative humidity : 45 %

9.2 Measurement method

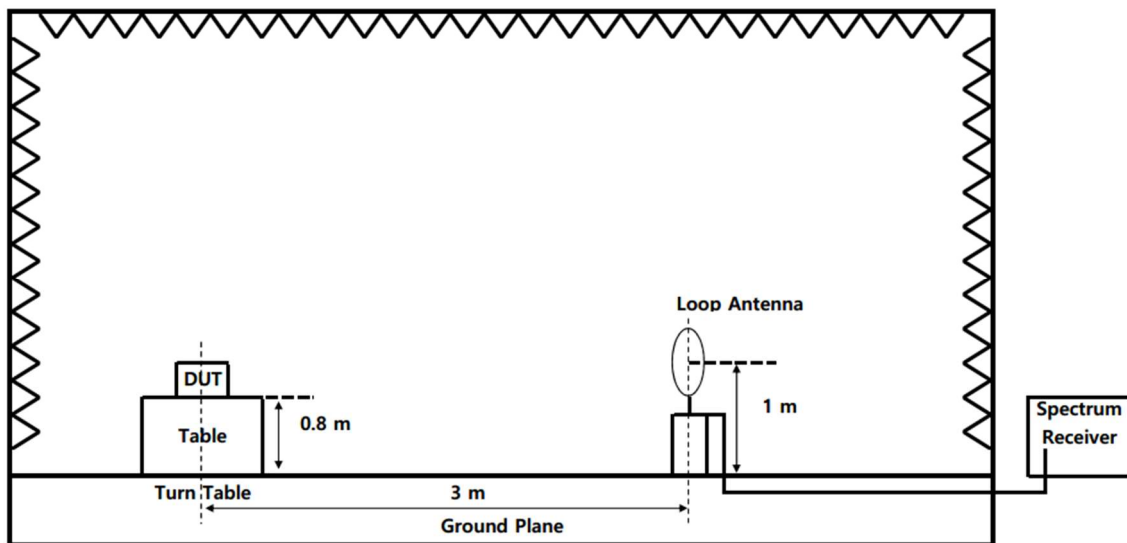
Standard : §15.247 (d), §15.209, §15.205

9.3 Test setup

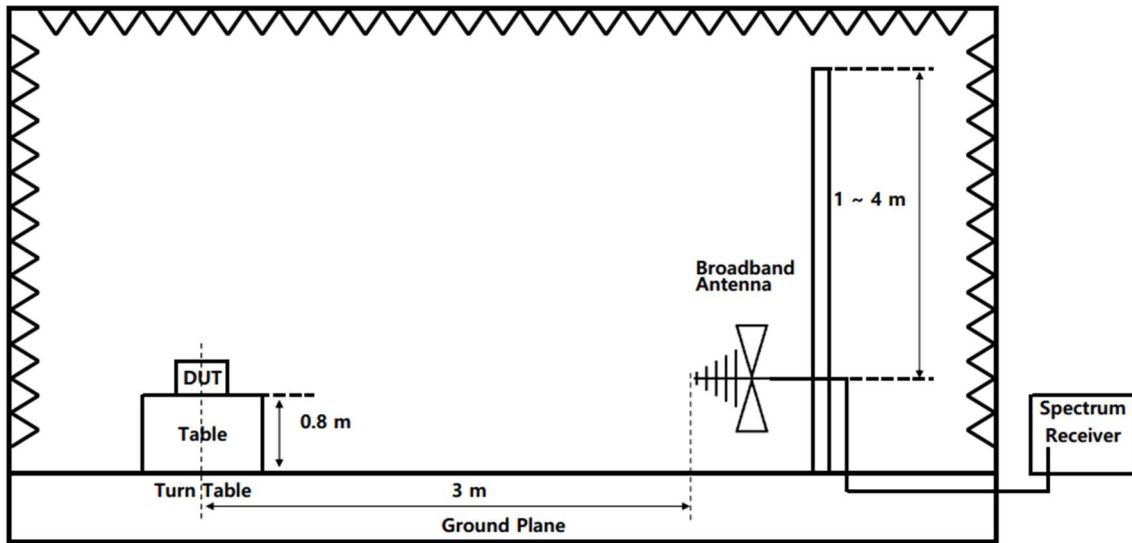
The radiated emissions measurements were performed on the 3 m, Semi-Anechoic Chamber. The EUT was placed on a non-conductive turntable above the ground plane.

The frequency spectrum from 9 kHz 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.

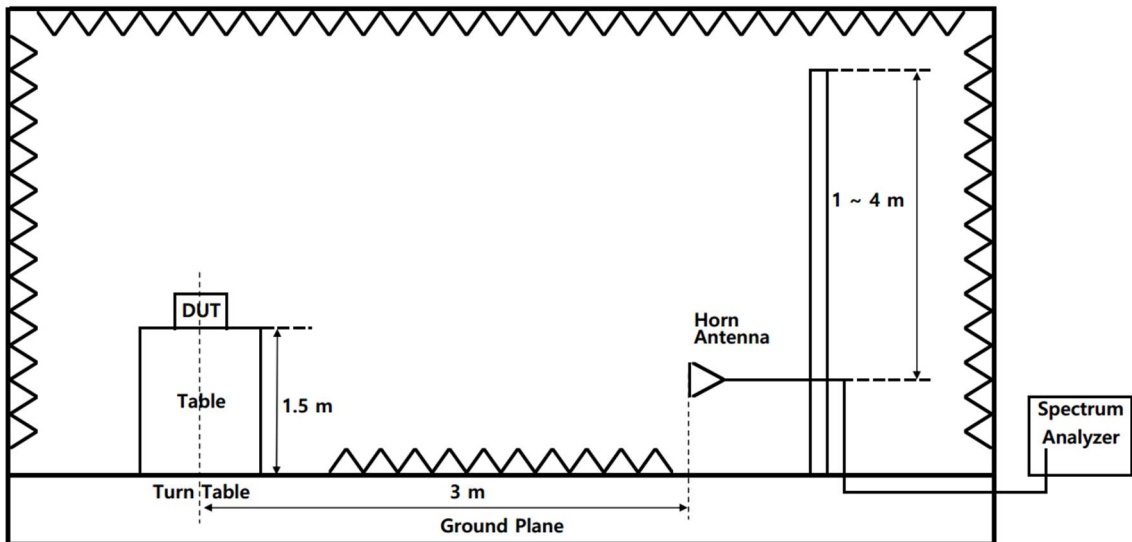
9.3.1 Below 30 MHz



9.3.2 30 MHz to 1 GHz



9.3.3 Above 1 GHz





9.4 Test data

Operating mode : Transmit mode

Test Result : Pass

9.4.1 Measurement Result for 802.11b

9.4.1.1 Measurement Results for Restricted Band

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
2 389.74	29.80	Peak	H	-14.50	44.30	73.98	29.68
	9.20	Average	H		23.70	53.98	30.28
High CH							
2 499.31	26.23	Peak	H	-14.10	40.33	73.98	33.65
	9.52	Average	H		23.62	53.98	30.36

※ Ant. Pol. : Antenna Polarization

※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain

※ Result = Reading + Corr. Factor

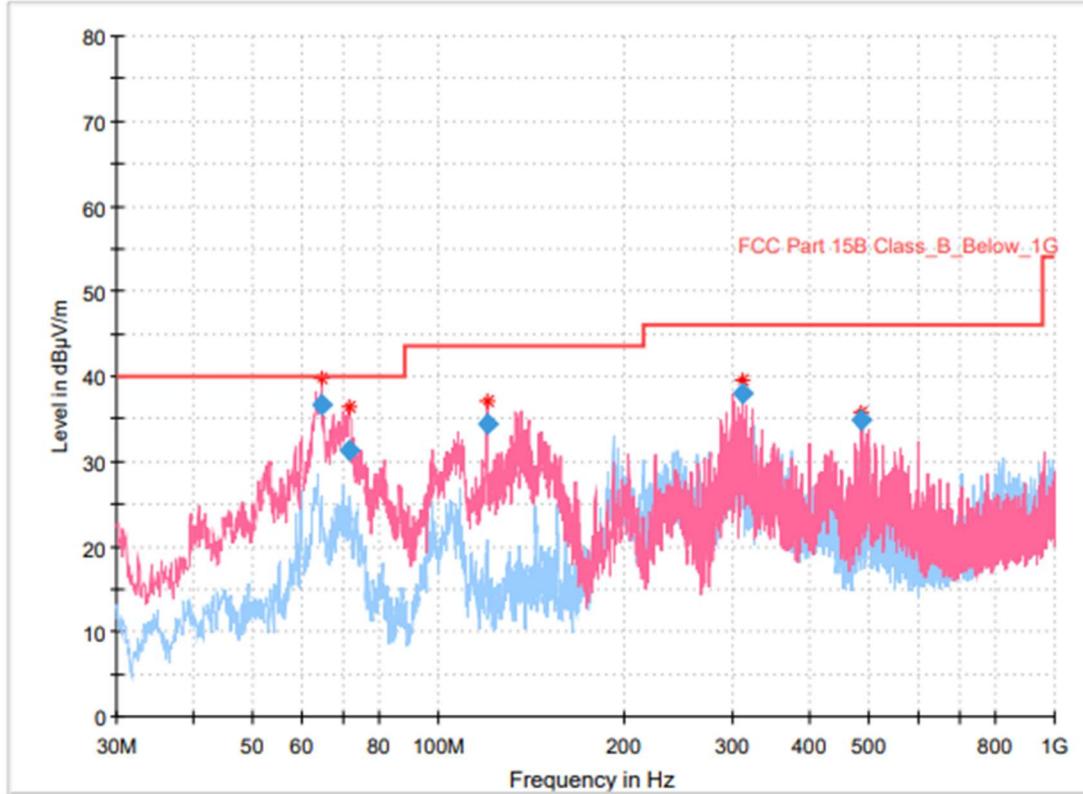
※ Margin = Limit - Result

9.4.1.2 Measurement Results for Below 30 MHz

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
It was not found any emissions peaks found from the EUT.							
Mid CH							
It was not found any emissions peaks found from the EUT.							
High CH							
It was not found any emissions peaks found from the EUT.							



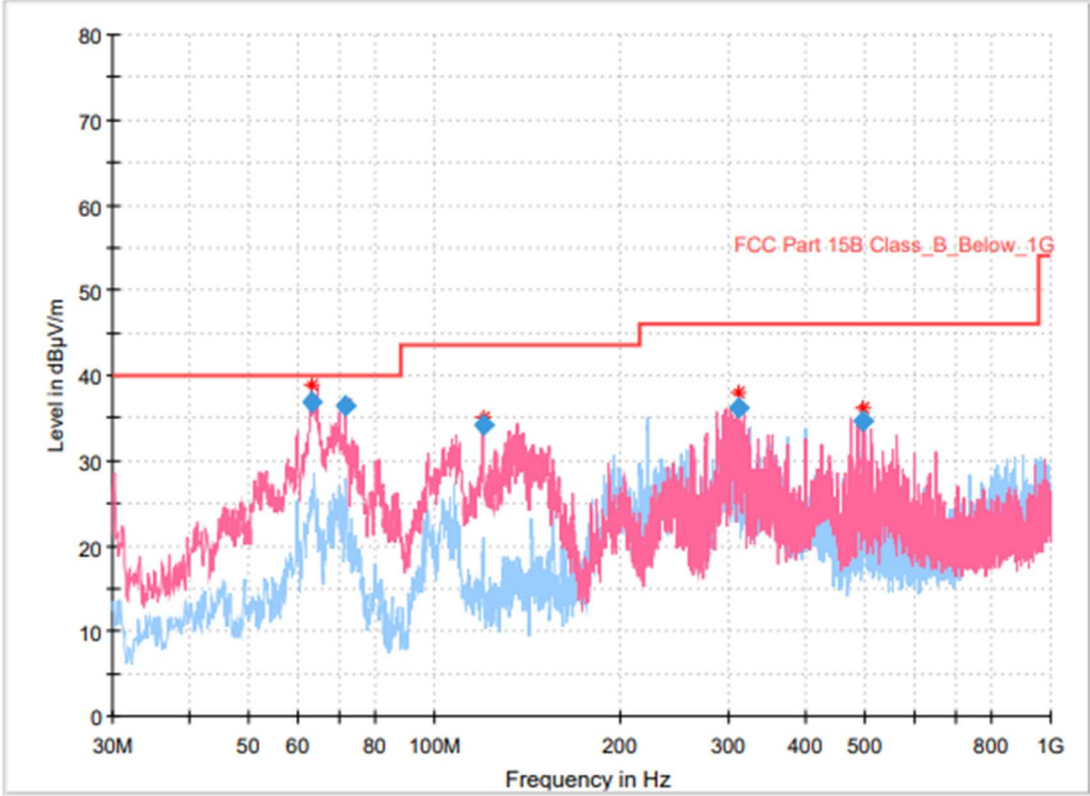
9.4.1.3 Measurement Results for Below 1 GHz



Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
64.629000	36.64	40.00	3.36	1000.0	120.000	100.1	V	236.0	-24.4
71.516000	31.36	40.00	8.64	1000.0	120.000	100.1	V	343.0	-26.9
119.919000	34.35	43.50	9.15	1000.0	120.000	100.1	V	303.0	-25.9
311.785000	37.90	46.00	8.10	1000.0	120.000	100.1	V	250.0	-20.3
486.773000	34.96	46.00	11.04	1000.0	120.000	100.1	V	303.0	-15.4

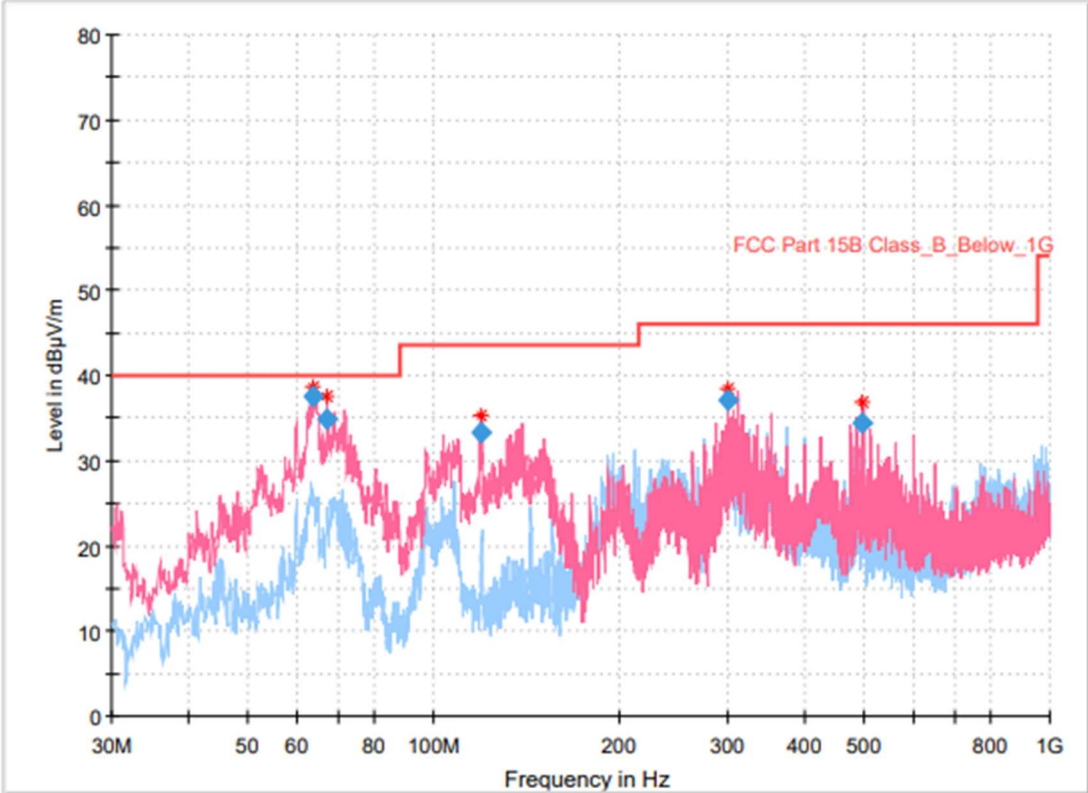
Low



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
63.271000	36.84	40.00	3.16	1000.0	120.000	100.1	V	297.0	-24.0
71.807000	36.38	40.00	3.62	1000.0	120.000	100.1	V	283.0	-27.0
119.822000	34.29	43.50	9.21	1000.0	120.000	100.1	V	215.0	-25.9
311.203000	36.23	46.00	9.77	1000.0	120.000	100.1	V	270.0	-20.3
497.249000	34.75	46.00	11.25	1000.0	120.000	100.1	V	283.0	-15.2

Mid



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
63.853000	37.65	40.00	2.35	1000.0	120.000	100.1	V	312.0	-24.2
67.151000	34.75	40.00	5.25	1000.0	120.000	100.1	V	271.0	-25.2
119.725000	33.36	43.50	10.14	1000.0	120.000	100.1	V	201.0	-25.9
299.660000	37.09	46.00	8.91	1000.0	120.000	100.1	V	256.0	-20.7
497.249000	34.51	46.00	11.49	1000.0	120.000	100.1	V	312.0	-15.2

High



9.4.1.4 Measurement Results for Above 1 GHz

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
4 823.30	50.75	Peak	H	-3.80	54.55	73.98	19.43
	44.62	Average	H		48.42	53.98	5.56
7 235.60	51.56	Peak	V	0.80	50.76	73.98	23.22
	43.02	Average	V		42.22	53.98	11.76
9 647.90	49.42	Peak	V	3.70	45.72	73.98	28.26
	39.00	Average	V		35.30	53.98	18.68
Mid CH							
4 874.30	56.87	Peak	H	-3.40	60.27	73.98	13.71
	49.03	Average	H		52.43	53.98	1.55
5 999.70	44.44	Peak	H	-2.00	46.44	73.98	27.54
	36.78	Average	H		38.78	53.98	15.20
7 312.10	51.27	Peak	V	0.70	50.57	73.98	23.41
	44.89	Average	V		44.19	53.98	9.79
9 748.20	48.78	Peak	V	3.90	44.88	73.98	29.10
	36.29	Average	V		32.39	53.98	21.59



High CH							
4 923.60	55.19	Peak	H	-3.20	58.39	73.98	15.59
	47.81	Average	H		51.01	53.98	2.97
5 999.70	41.32	Peak	H	-2.00	43.32	73.98	30.66
	31.73	Average	H		33.73	53.98	20.25
7 386.90	49.15	Peak	H	0.90	48.25	73.98	25.73
	40.58	Average	H		39.68	53.98	14.30
9 848.50	47.30	Peak	V	4.10	43.20	73.98	30.78
	33.86	Average	V		29.76	53.98	24.22

- ※ Ant. Pol. : Antenna Polarization
- ※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain
- ※ Result = Reading + Corr. Factor
- ※ Margin = Limit - Result



9.4.2 Measurement Result for 802.11g

9.4.2.1 Measurement Results for Restricted Band

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
2 389.58	32.48	Peak	H	-14.50	46.98	73.98	27.00
	15.07	Average	H		29.57	53.98	24.41
High CH							
2 484.34	29.27	Peak	H	-14.10	43.37	73.98	30.61
	12.87	Average	H		26.97	53.98	27.01

※ Ant. Pol. : Antenna Polarization

※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain

※ Result = Reading + Corr. Factor

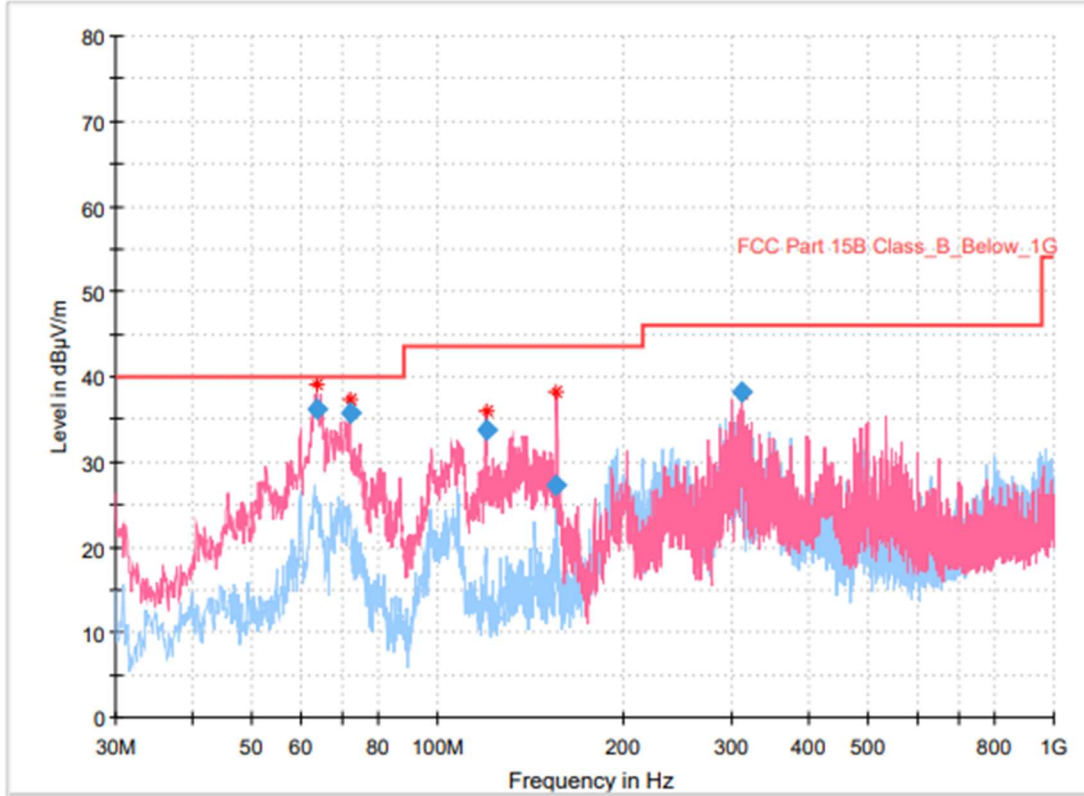
※ Margin = Limit - Result

9.4.2.2 Measurement Results for Below 30 MHz

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
It was not found any emissions peaks found from the EUT.							
Mid CH							
It was not found any emissions peaks found from the EUT.							
High CH							
It was not found any emissions peaks found from the EUT.							



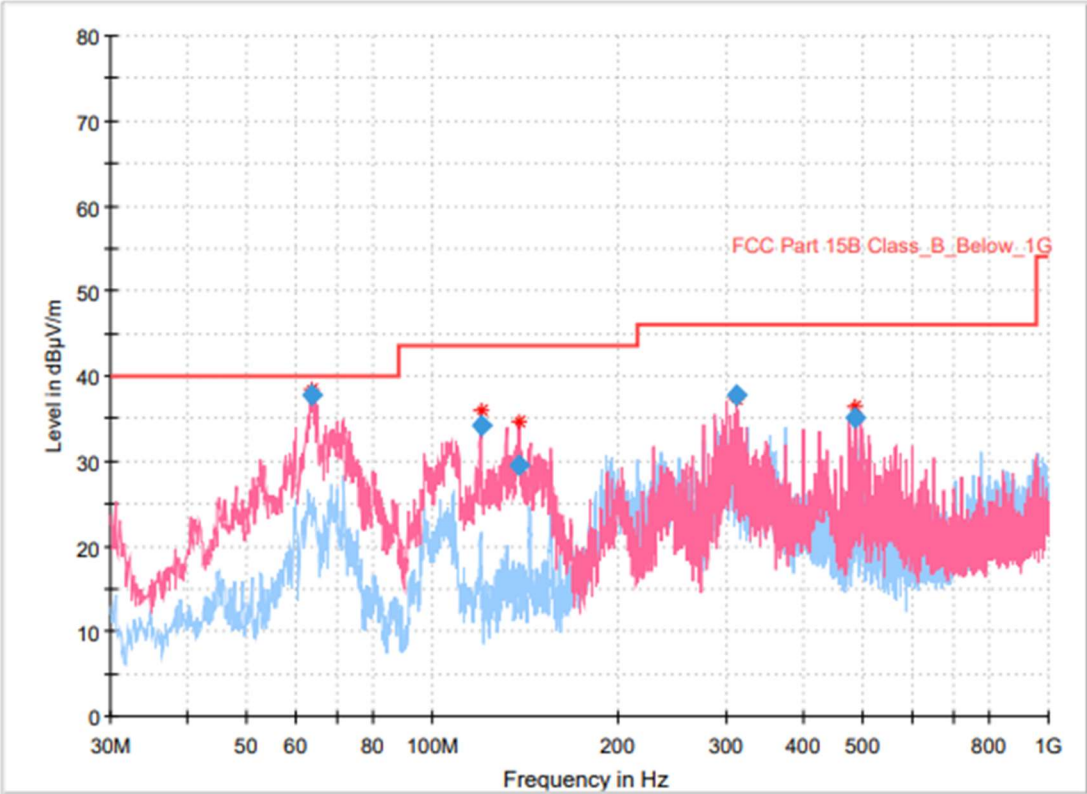
9.4.2.3 Measurement Results for Below 1 GHz



Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
63.659000	36.25	40.00	3.75	1000.0	120.000	100.1	V	330.0	-24.1
72.001000	35.77	40.00	4.23	1000.0	120.000	100.1	V	315.0	-27.0
119.822000	33.83	43.50	9.67	1000.0	120.000	100.1	V	287.0	-25.9
156.197000	27.30	43.50	16.20	1000.0	120.000	100.1	V	4.0	-26.9
311.688000	38.22	46.00	7.78	1000.0	120.000	100.1	V	273.0	-20.3

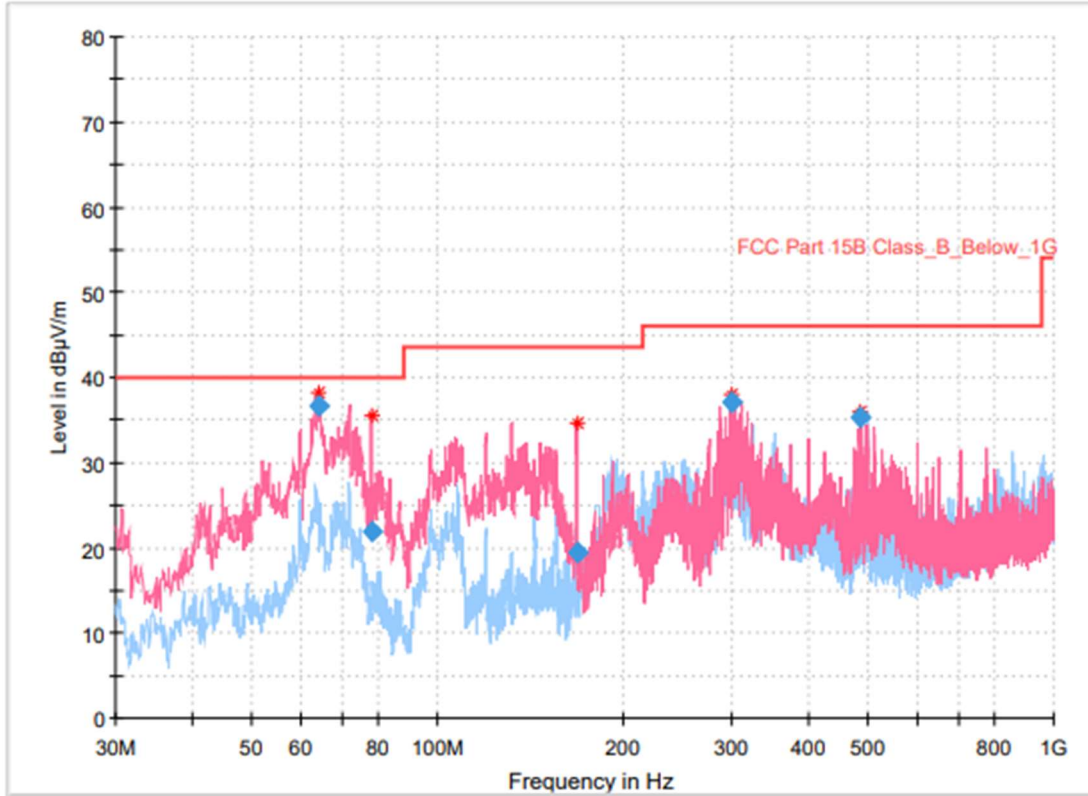
Low



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
63.853000	37.73	40.00	2.27	1000.0	120.000	100.1	V	255.0	-24.2
119.919000	34.15	43.50	9.35	1000.0	120.000	100.1	V	255.0	-25.9
138.543000	29.41	43.50	14.09	1000.0	120.000	100.1	V	187.0	-27.3
311.785000	37.84	46.00	8.16	1000.0	120.000	100.1	V	241.0	-20.3
486.773000	34.99	46.00	11.01	1000.0	120.000	100.1	V	313.0	-15.4

Mid



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
64.241000	36.57	40.00	3.43	1000.0	120.000	100.1	V	300.0	-24.3
78.112000	21.82	40.00	18.18	1000.0	120.000	100.1	V	62.0	-29.1
168.225000	19.48	43.50	24.02	1000.0	120.000	100.1	V	2.0	-26.4
299.854000	36.99	46.00	9.01	1000.0	120.000	100.1	V	245.0	-20.7
485.221000	35.33	46.00	10.67	1000.0	120.000	100.1	V	286.0	-15.4

High



9.4.2.4 Measurement Results for Above 1 GHz

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
4 831.80	51.02	Peak	H	-3.70	54.72	73.98	19.26
	37.86	Average	H		41.56	53.98	12.42
5 999.70	43.48	Peak	H	-2.00	45.48	73.98	28.50
	35.62	Average	H		37.62	53.98	16.36
7 240.70	49.75	Peak	V	0.80	48.95	73.98	25.03
	36.32	Average	V		35.52	53.98	18.46
9 647.90	49.10	Peak	V	3.70	45.40	73.98	28.58
	33.74	Average	V		30.04	53.98	23.94
Mid CH							
4 872.60	52.23	Peak	H	-3.50	55.73	73.98	18.25
	40.02	Average	H		43.52	53.98	10.46
5 999.70	42.71	Peak	H	-2.00	44.71	73.98	29.27
	34.87	Average	H		36.87	53.98	17.11
7 312.10	50.88	Peak	V	0.70	50.18	73.98	23.80
	36.31	Average	V		35.61	53.98	18.37
9 755.00	47.08	Peak	V	3.90	43.18	73.98	30.80
	33.72	Average	V		29.82	53.98	24.16



High CH							
4 915.10	58.04	Peak	H	-3.30	61.34	73.98	12.64
	45.03	Average	H		48.33	53.98	5.65
7 381.80	54.22	Peak	H	0.90	53.32	73.98	20.66
	41.43	Average	H		40.53	53.98	13.45
9 846.80	47.75	Peak	V	4.10	43.65	73.98	30.33
	34.18	Average	V		30.08	53.98	23.90

- ※ Ant. Pol. : Antenna Polarization
- ※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain
- ※ Result = Reading + Corr. Factor
- ※ Margin = Limit - Result



9.4.3 Measurement Result for 802.11n (HT20)

9.4.3.1 Measurement Results for Restricted Band

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
2 389.78	35.00	Peak	H	-14.50	49.50	73.98	24.48
	16.35	Average	H		30.85	53.98	23.13
High CH							
2 484.58	31.60	Peak	H	-14.10	45.70	73.98	28.28
	15.16	Average	H		29.26	53.98	24.72

※ Ant. Pol. : Antenna Polarization

※ Corr. Factor. : Antenna Factor + Cable Loss - Amplifier Gain

※ Result = Reading + Corr. Factor

※ Margin = Limit - Result

9.4.3.2 Measurement Results for Below 30 MHz

Frequency (MHz)	Reading (dBμV)	Detector	Ant. Pol. (H/V)	Corr. Factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low CH							
It was not found any emissions peaks found from the EUT.							
Mid CH							
It was not found any emissions peaks found from the EUT.							
High CH							
It was not found any emissions peaks found from the EUT.							