

10.5 Test data for 802.11n_HT20 RLAN Mode

10.5.1 Test data for Antenna 0

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Operating condition : Highest Output Power Transmitting Mode

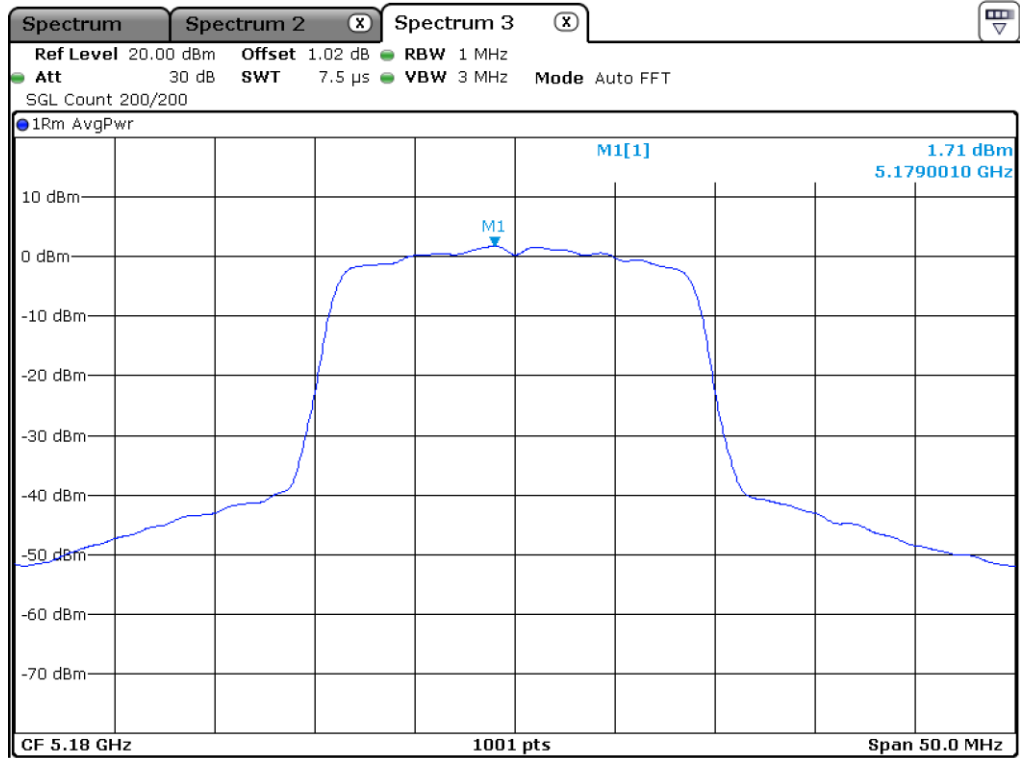
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	1.71	11.00	9.29
	Middle	5 220.00	1.77	11.00	9.23
	High	5 240.00	1.75	11.00	9.25
5 250 ~ 5 350	Low	5 260.00	1.46	11.00	9.54
	Middle	5 300.00	1.38	11.00	9.62
	High	5 320.00	1.55	11.00	9.45
5 470 ~ 5 725	Low	5 500.00	1.28	11.00	9.72
	Middle	5 580.00	1.45	11.00	9.55
	High	5 700.00	1.34	11.00	9.66
5 725 ~ 5 850	Low	5 745.00	-1.66	30.00	31.66
	Middle	5 785.00	-1.85	30.00	31.85
	High	5 825.00	-1.92	30.00	31.92

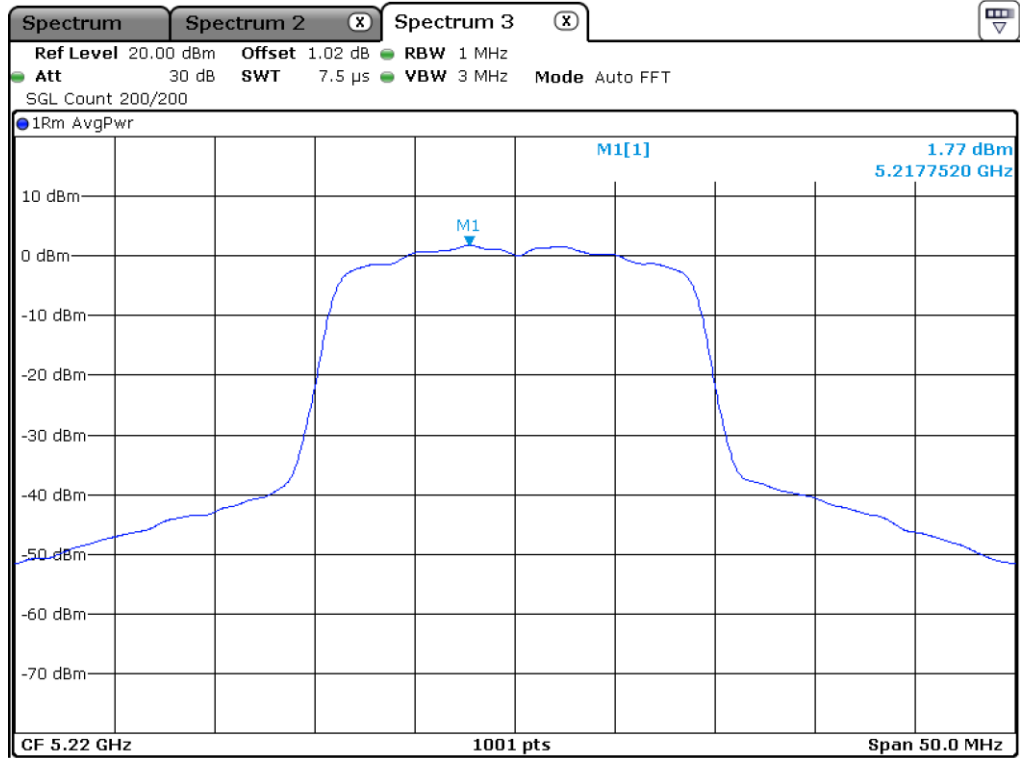
Remark: See next page for measurement data.



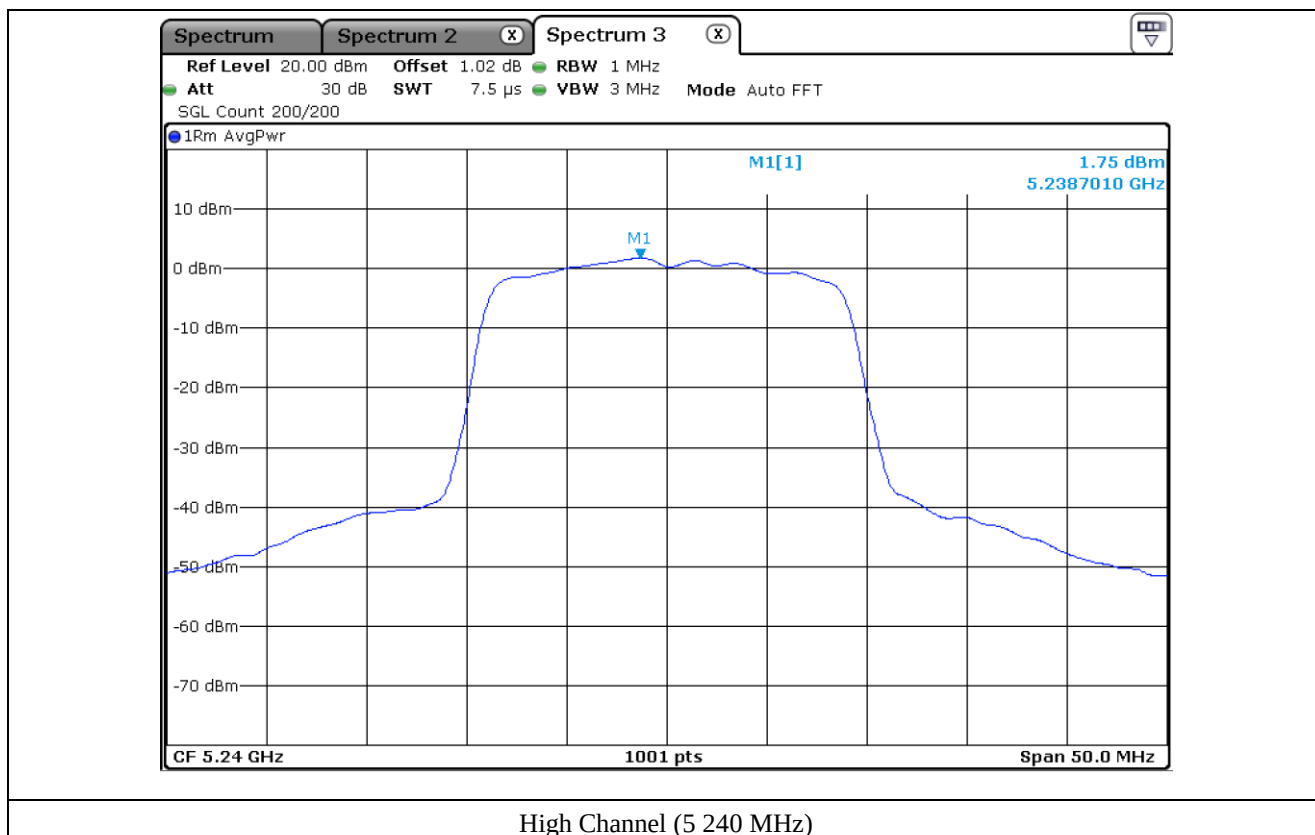
Tested by: Tae-Ho, Kim / Senior Manager

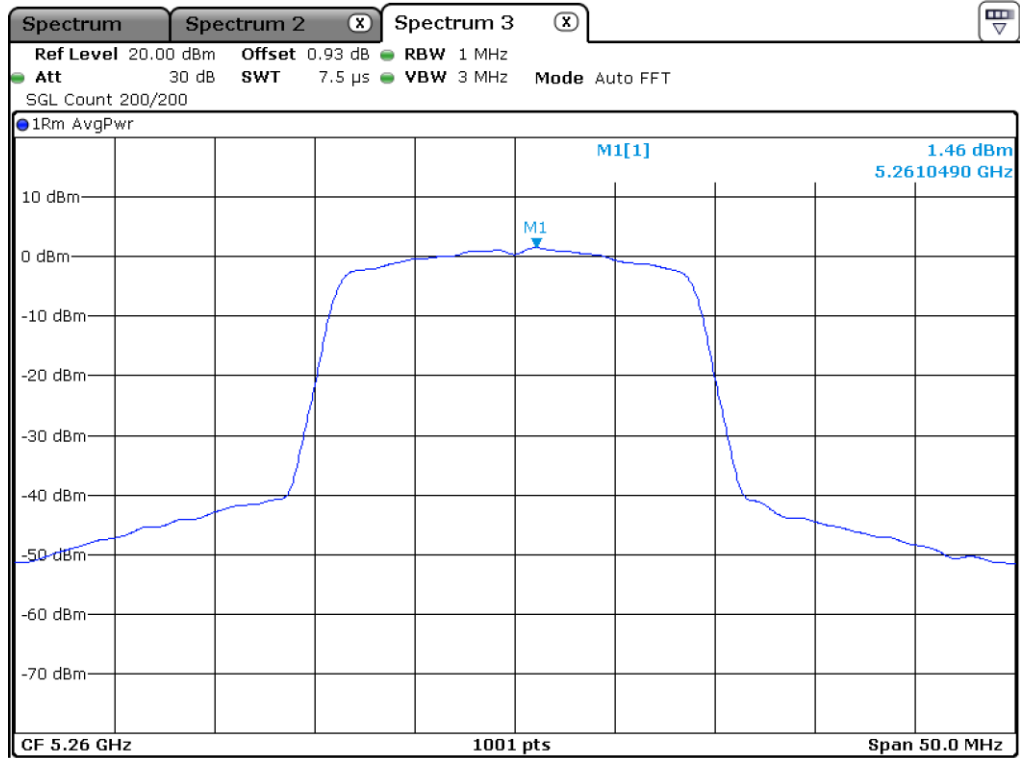


Low Channel (5 180 MHz)

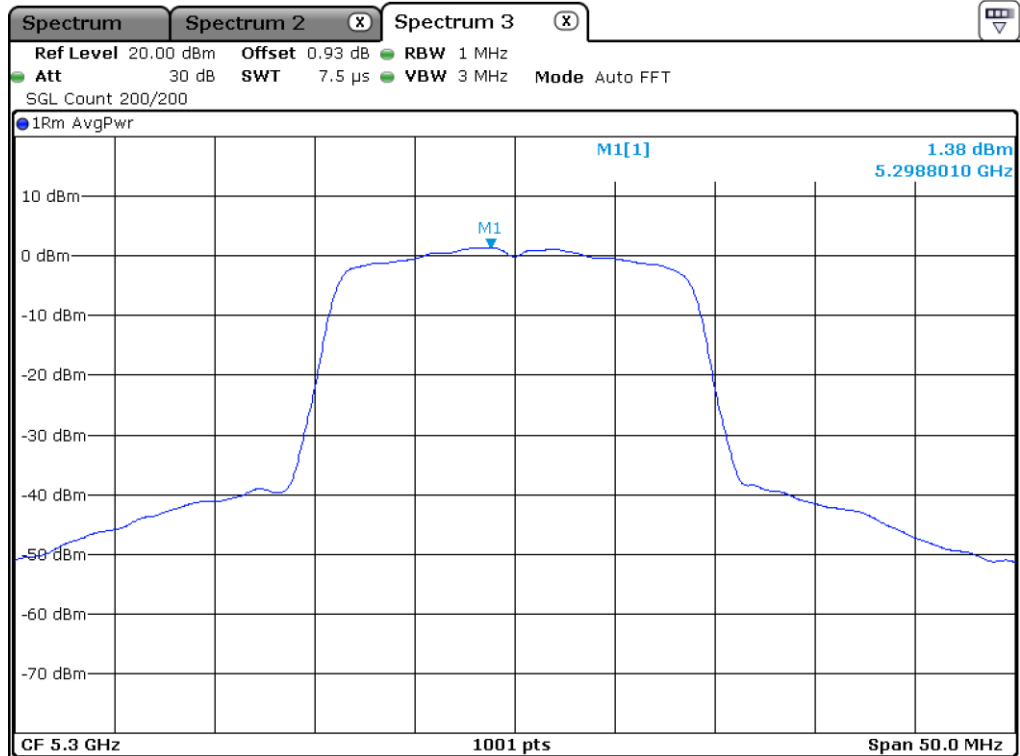


Middle Channel (5 220 MHz)

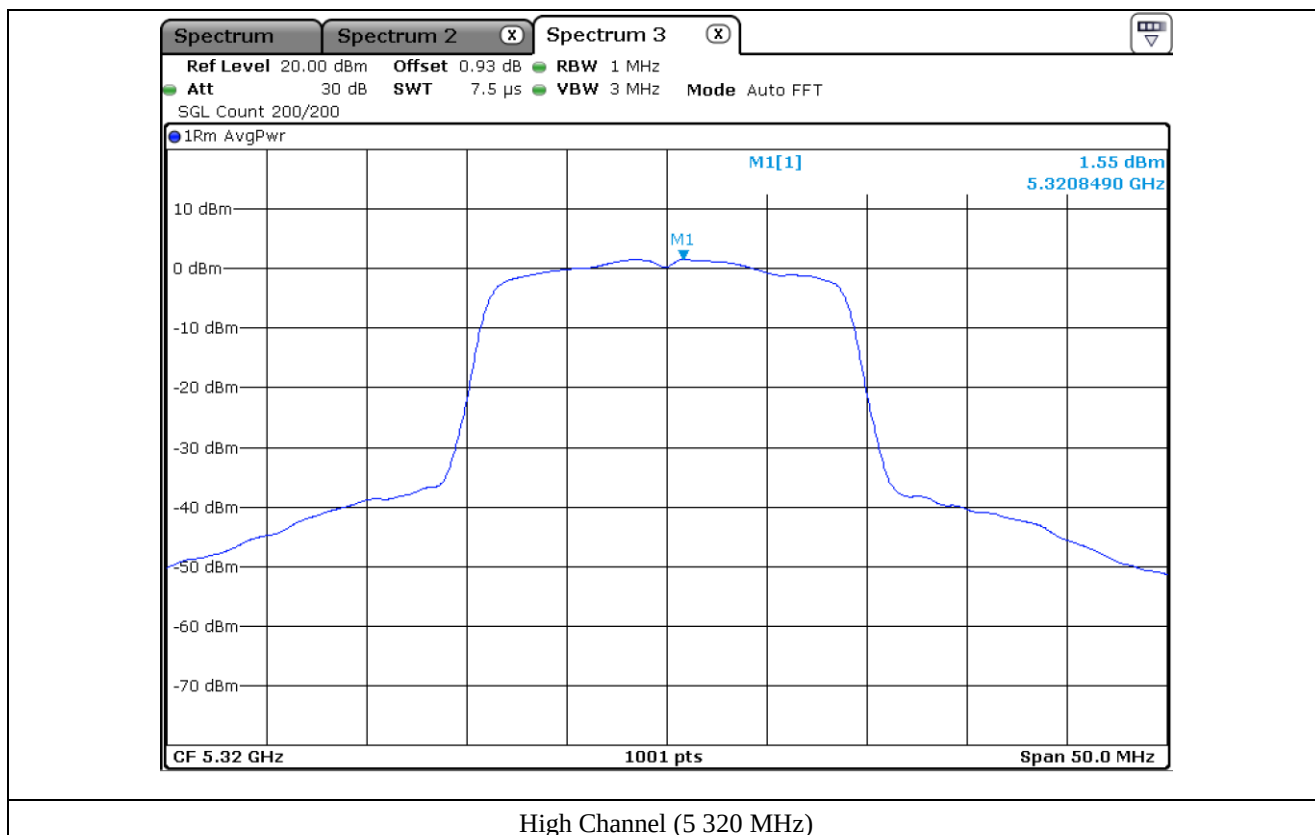


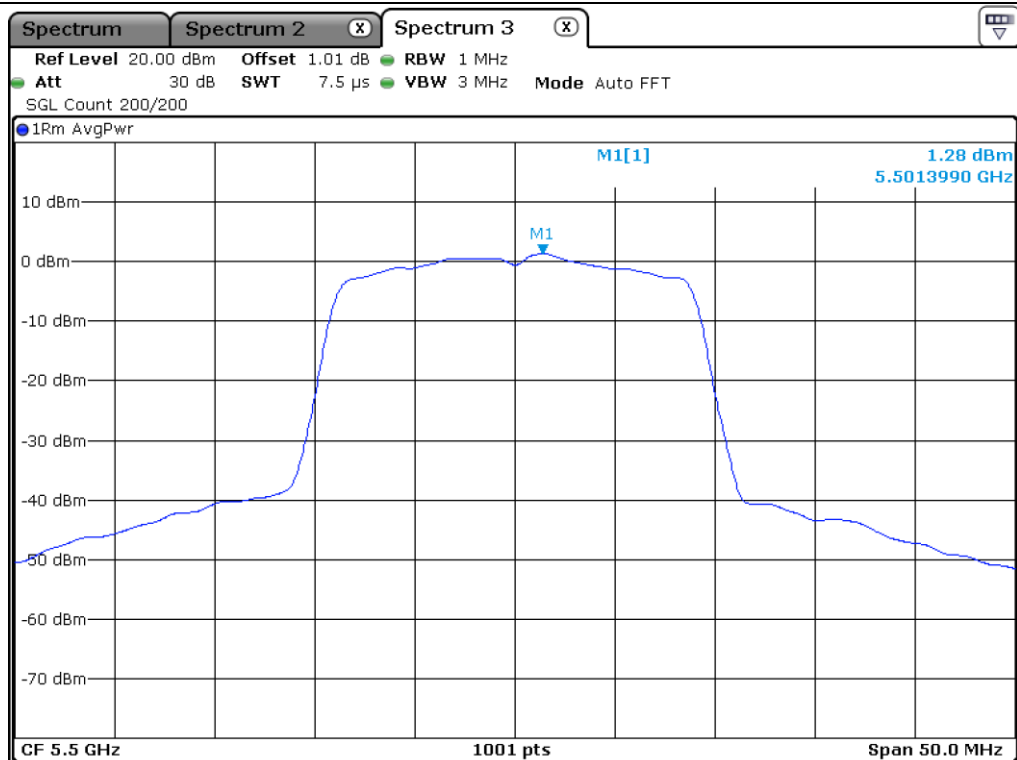


Low Channel (5 260 MHz)

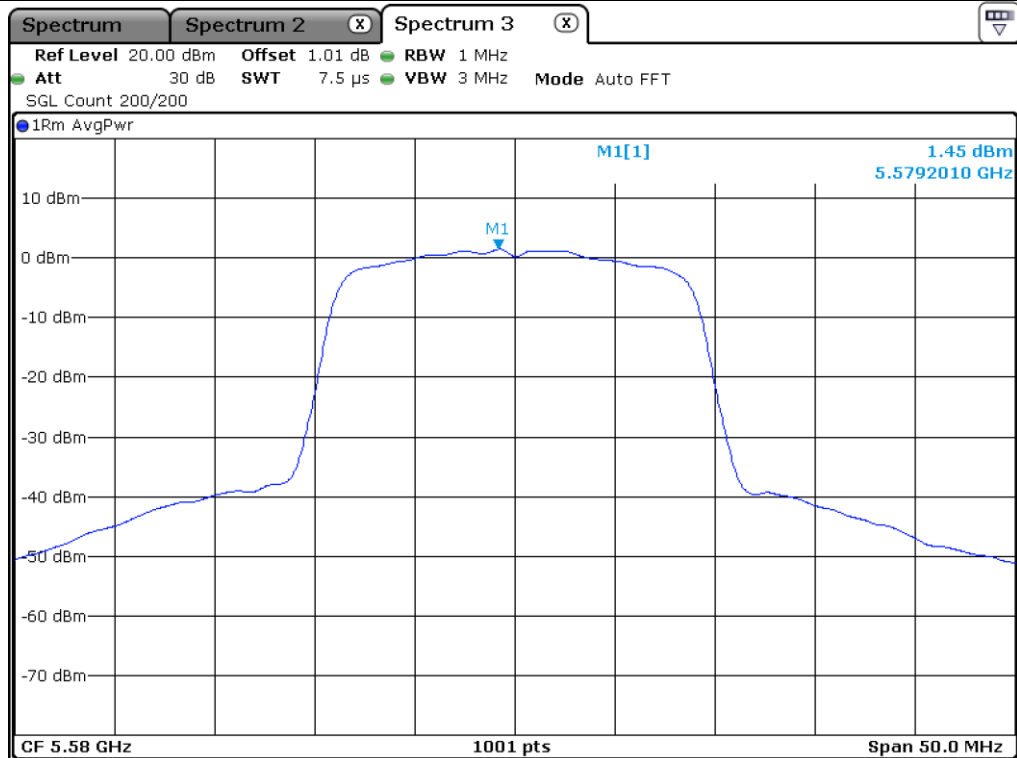


Middle Channel (5 300 MHz)

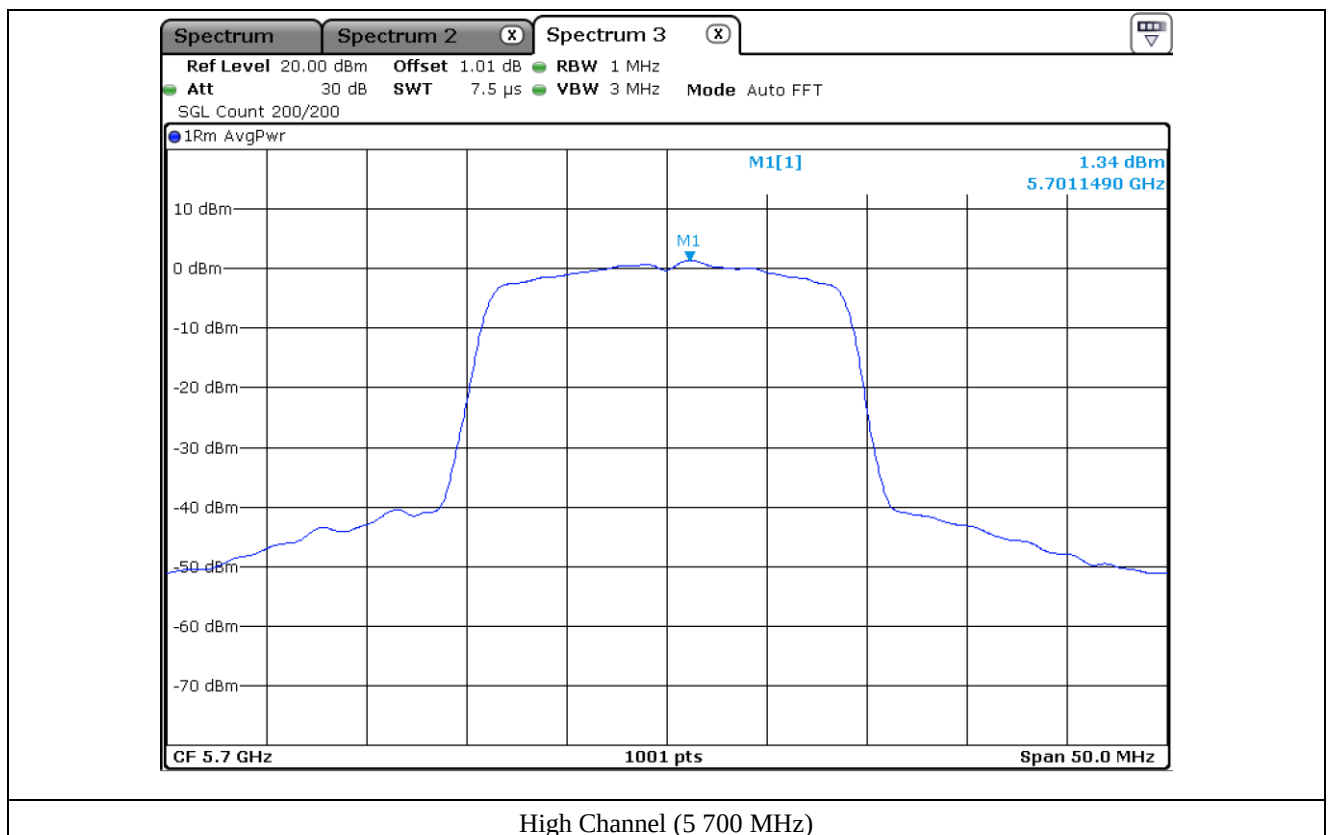


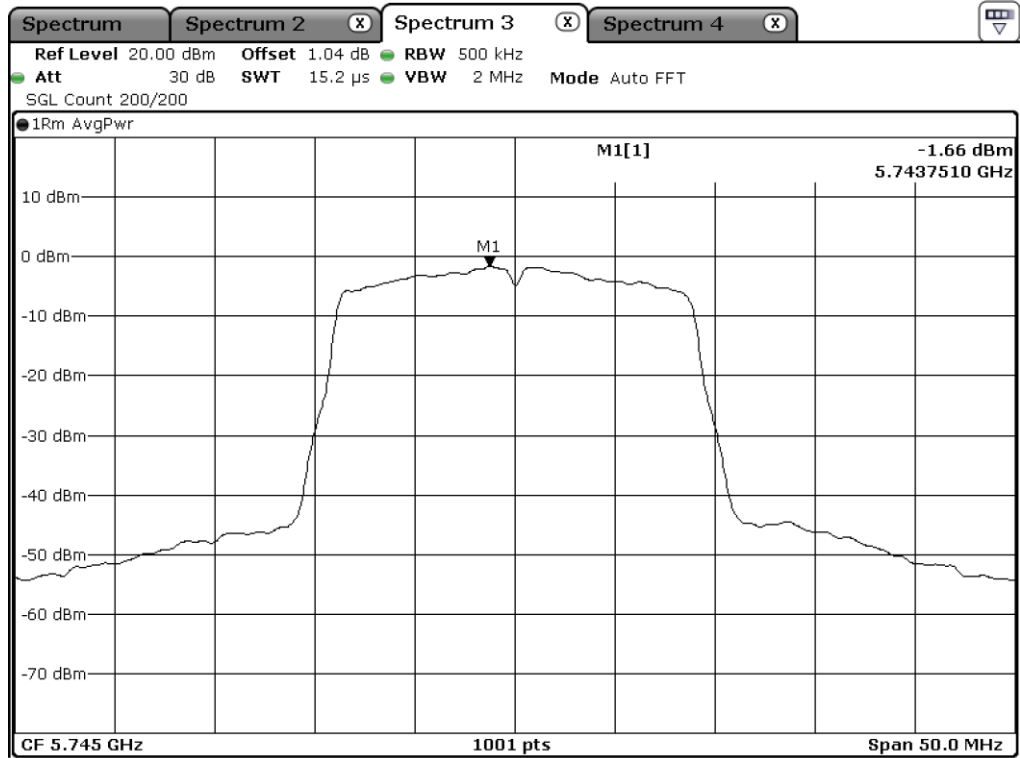


Low Channel (5 500 MHz)

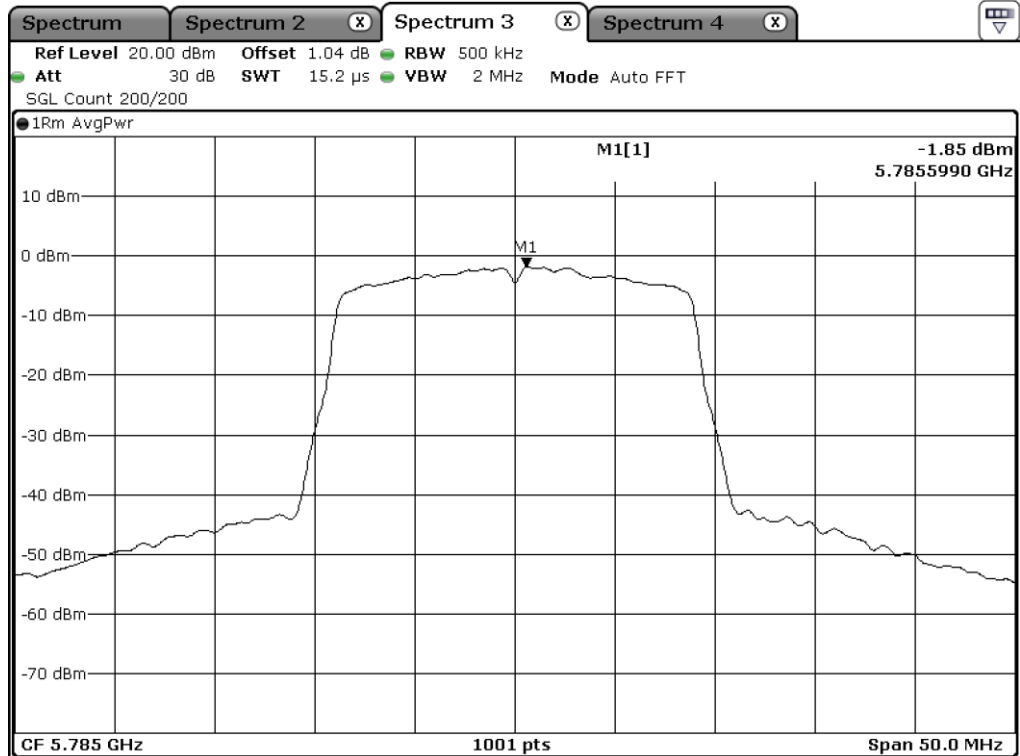


Middle Channel (5 580 MHz)

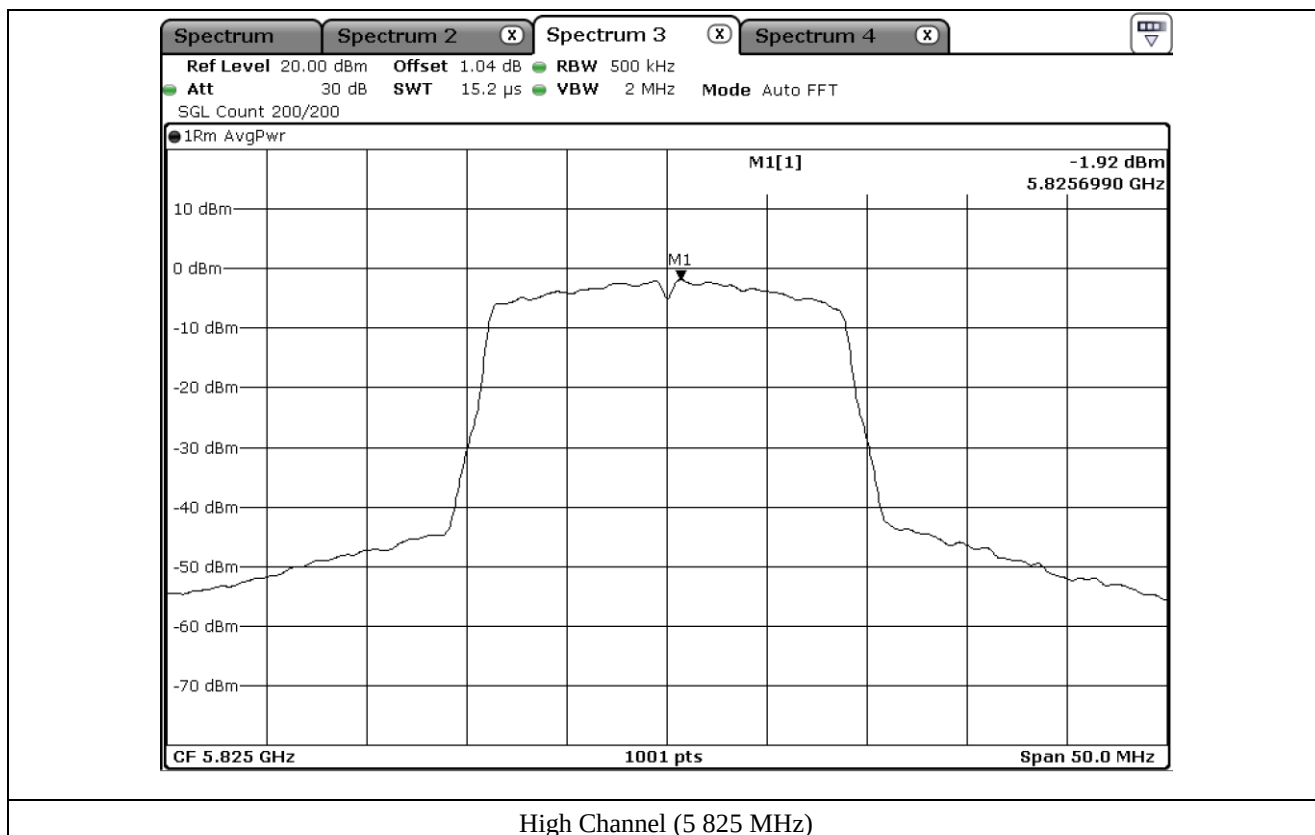




Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)



10.5.2 Test data for Antenna 1

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Operating condition : Highest Output Power Transmitting Mode

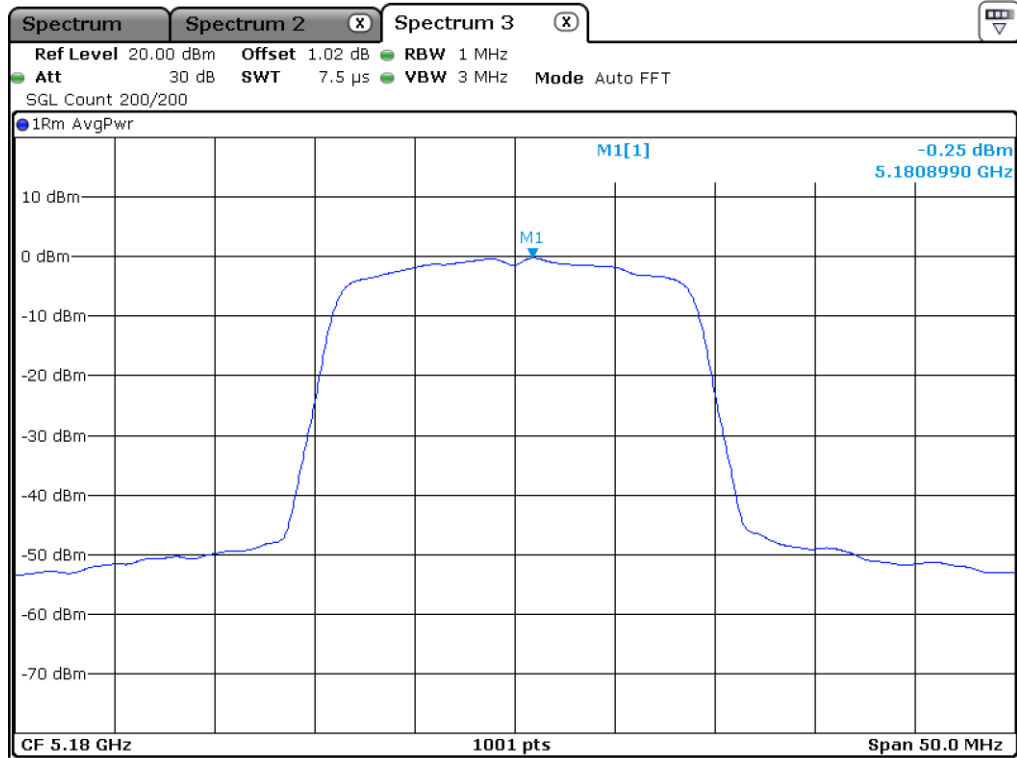
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	-0.25	11.00	11.25
	Middle	5 220.00	-0.20	11.00	11.20
	High	5 240.00	-0.21	11.00	11.21
5 250 ~ 5 350	Low	5 260.00	-0.15	11.00	11.15
	Middle	5 300.00	-0.18	11.00	11.18
	High	5 320.00	-0.12	11.00	11.12
5 470 ~ 5 725	Low	5 500.00	0.37	11.00	10.63
	Middle	5 580.00	0.40	11.00	10.60
	High	5 700.00	0.50	11.00	10.50
5 725 ~ 5 850	Low	5 745.00	-2.36	30.00	32.36
	Middle	5 785.00	-2.38	30.00	32.38
	High	5 825.00	-2.57	30.00	32.57

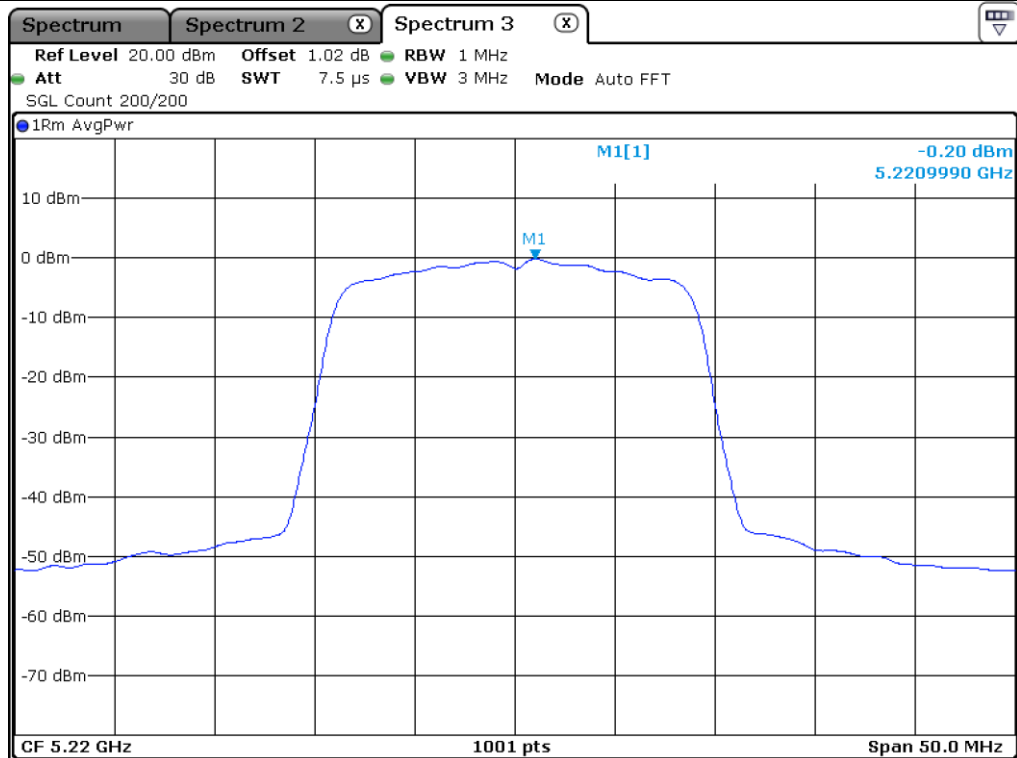
Remark: See next page for measurement data.



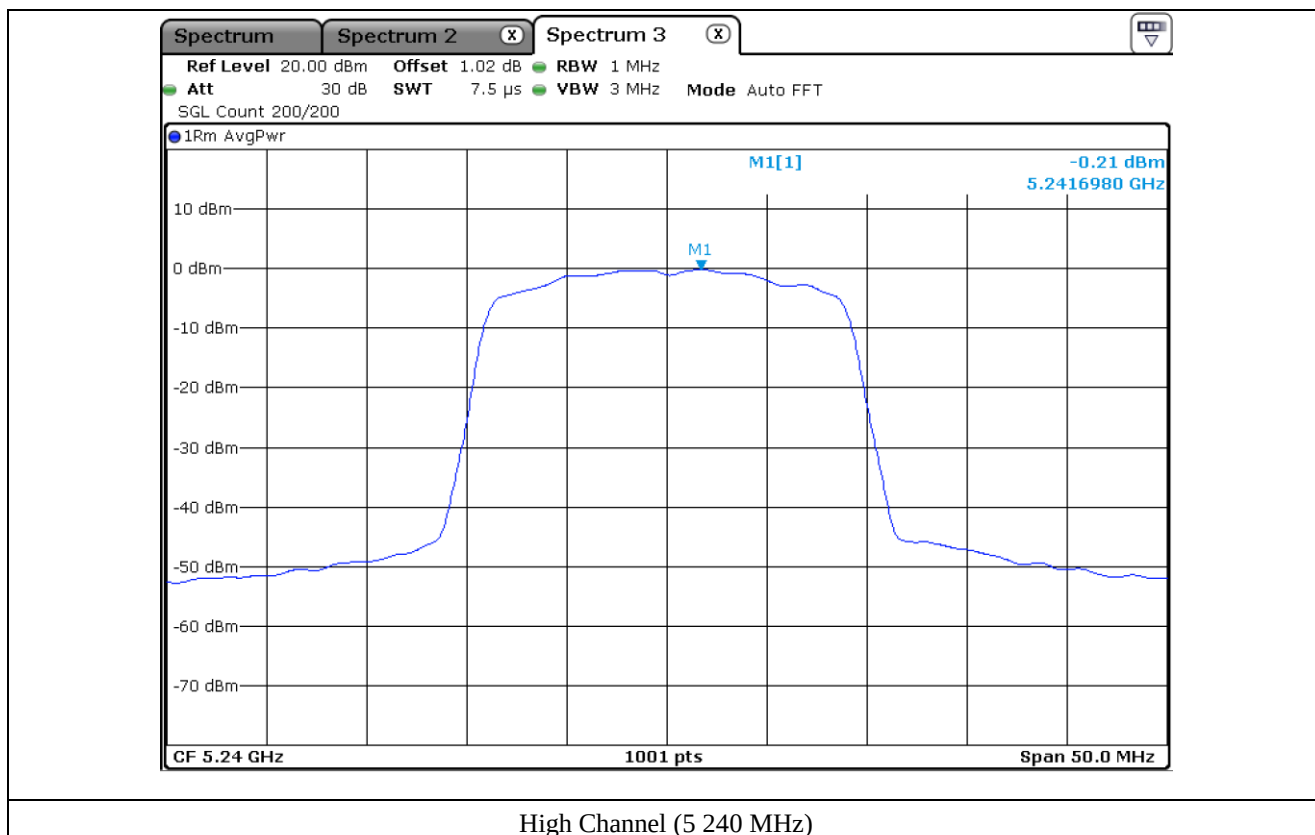
Tested by: Tae-Ho, Kim / Senior Manager

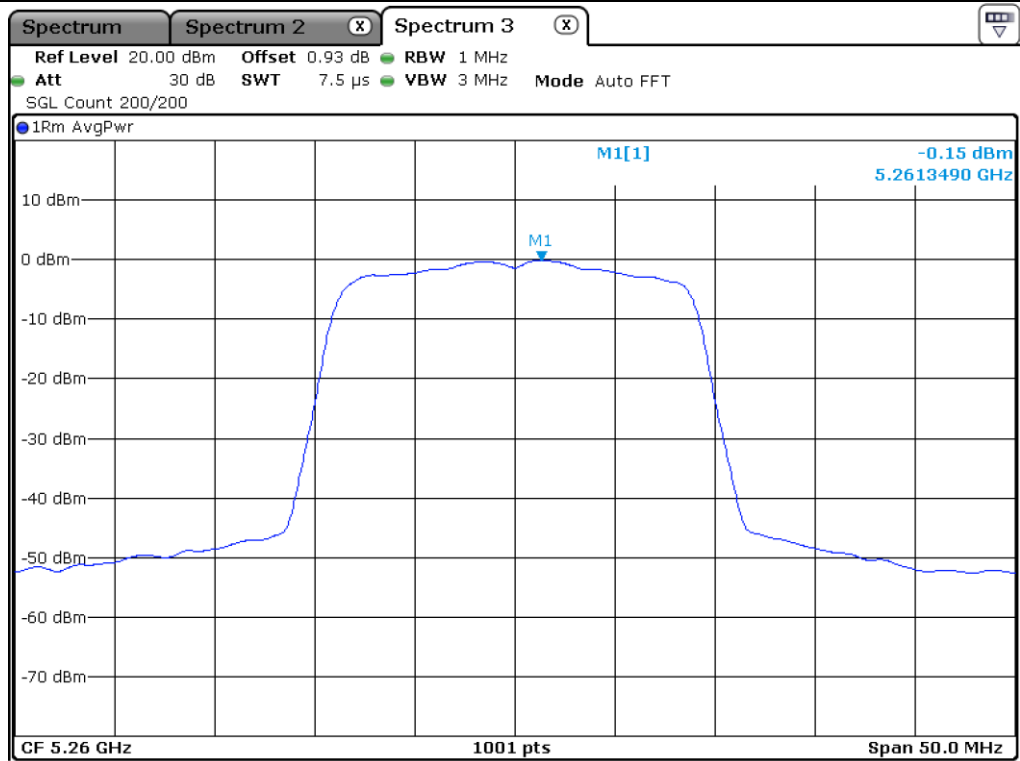


Low Channel (5 180 MHz)

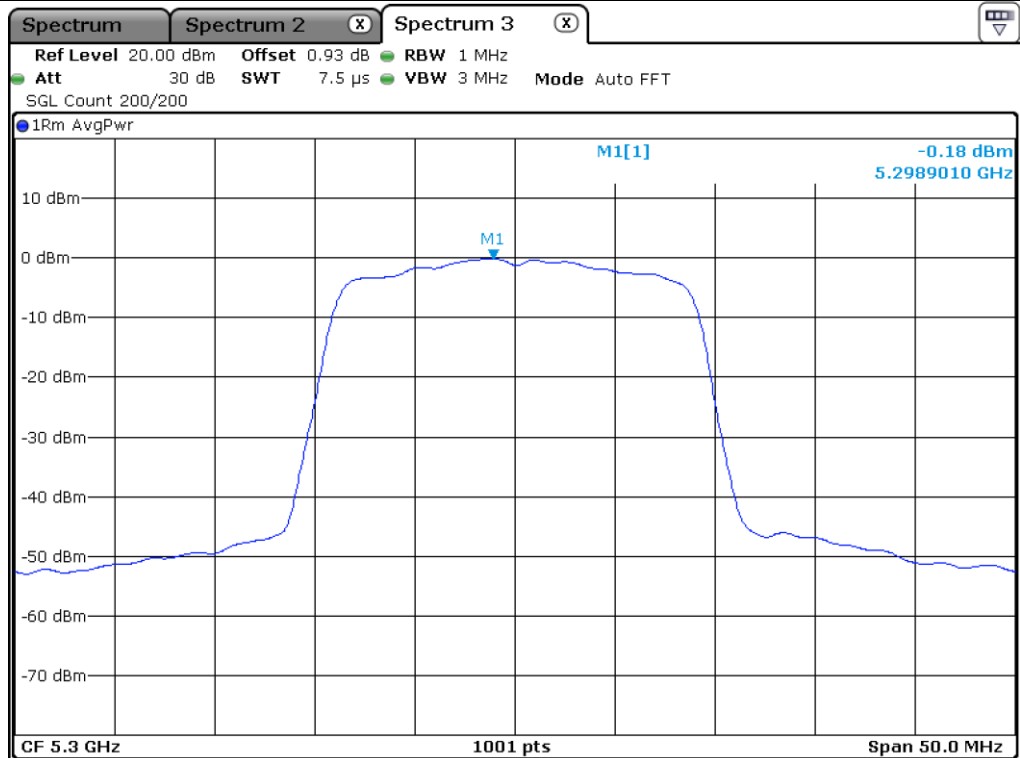


Middle Channel (5 220 MHz)

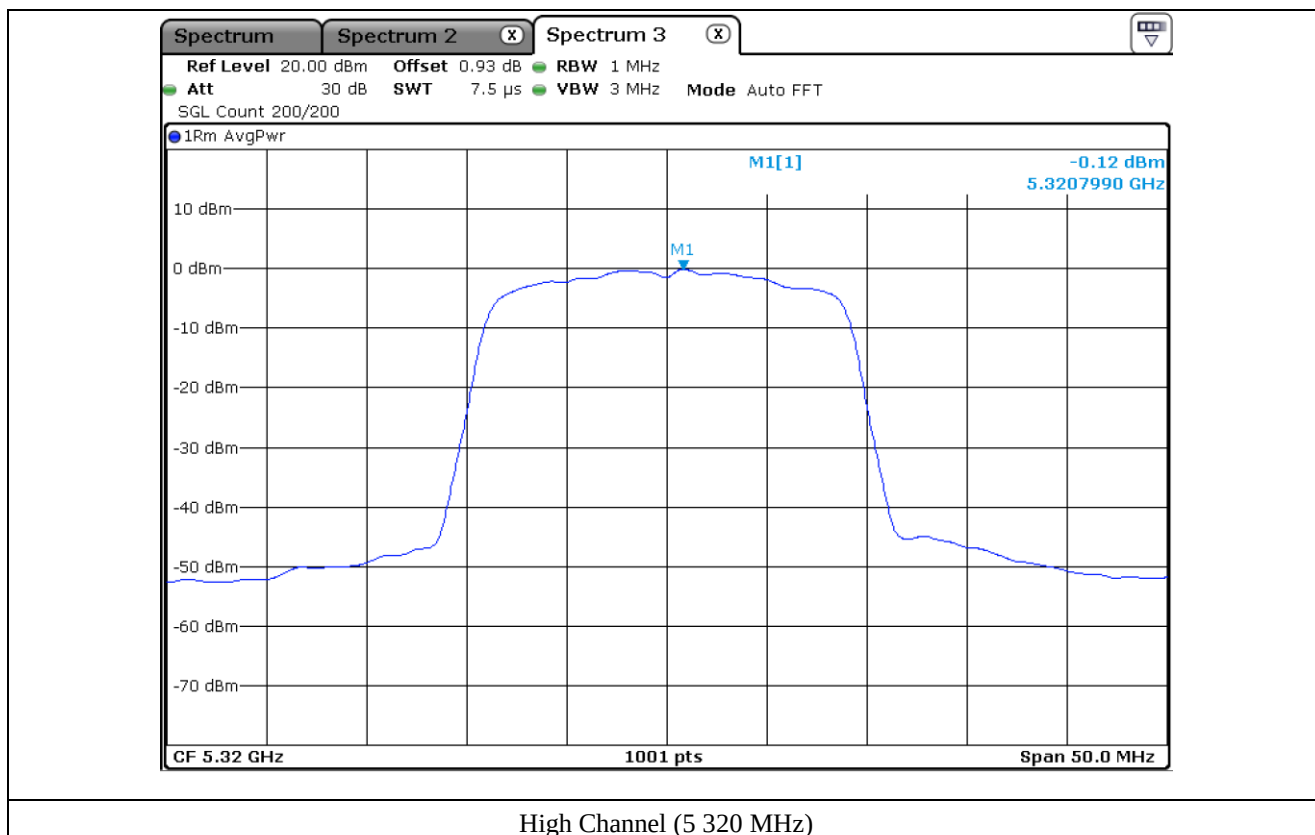


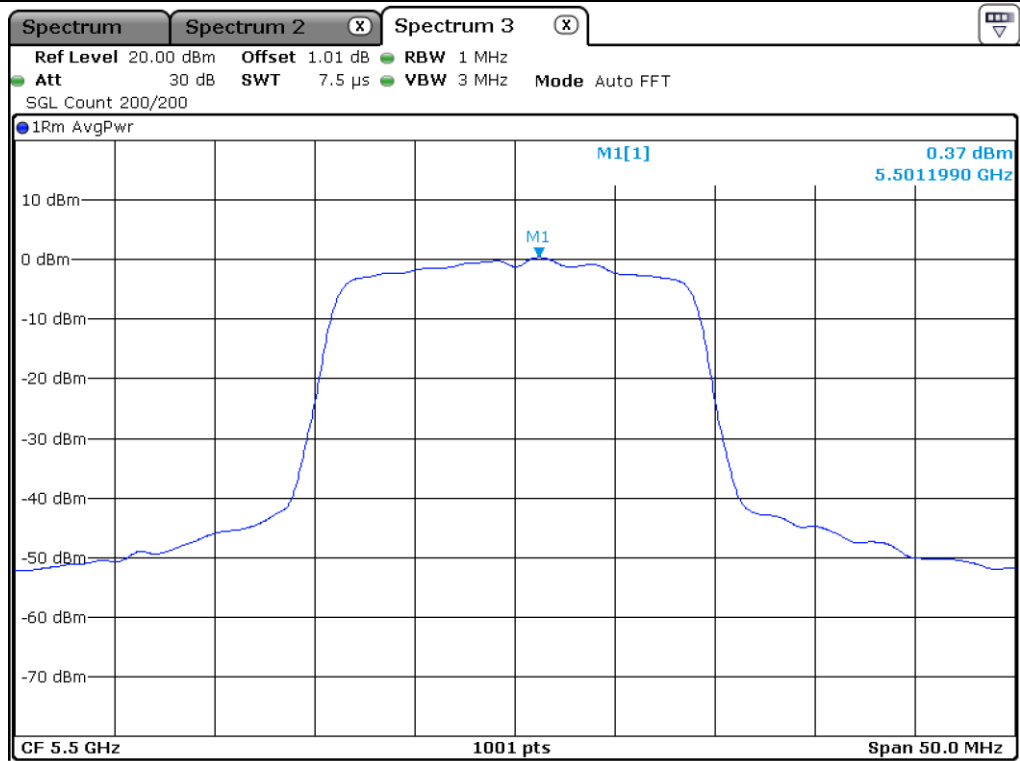


Low Channel (5 260 MHz)

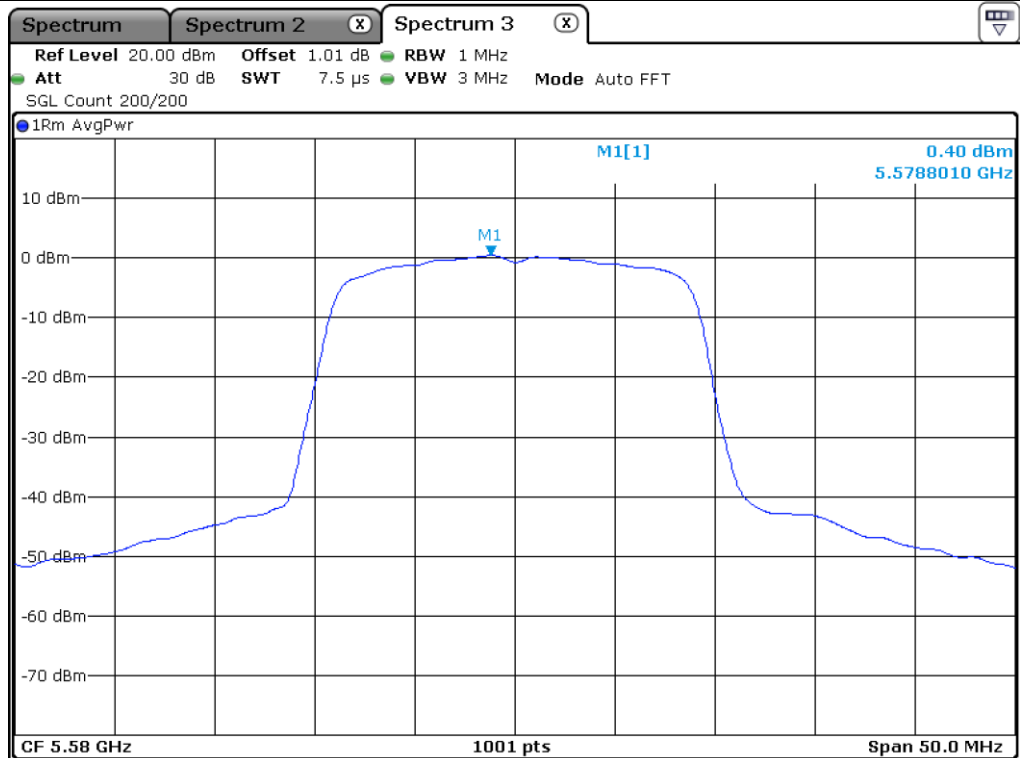


Middle Channel (5 300 MHz)

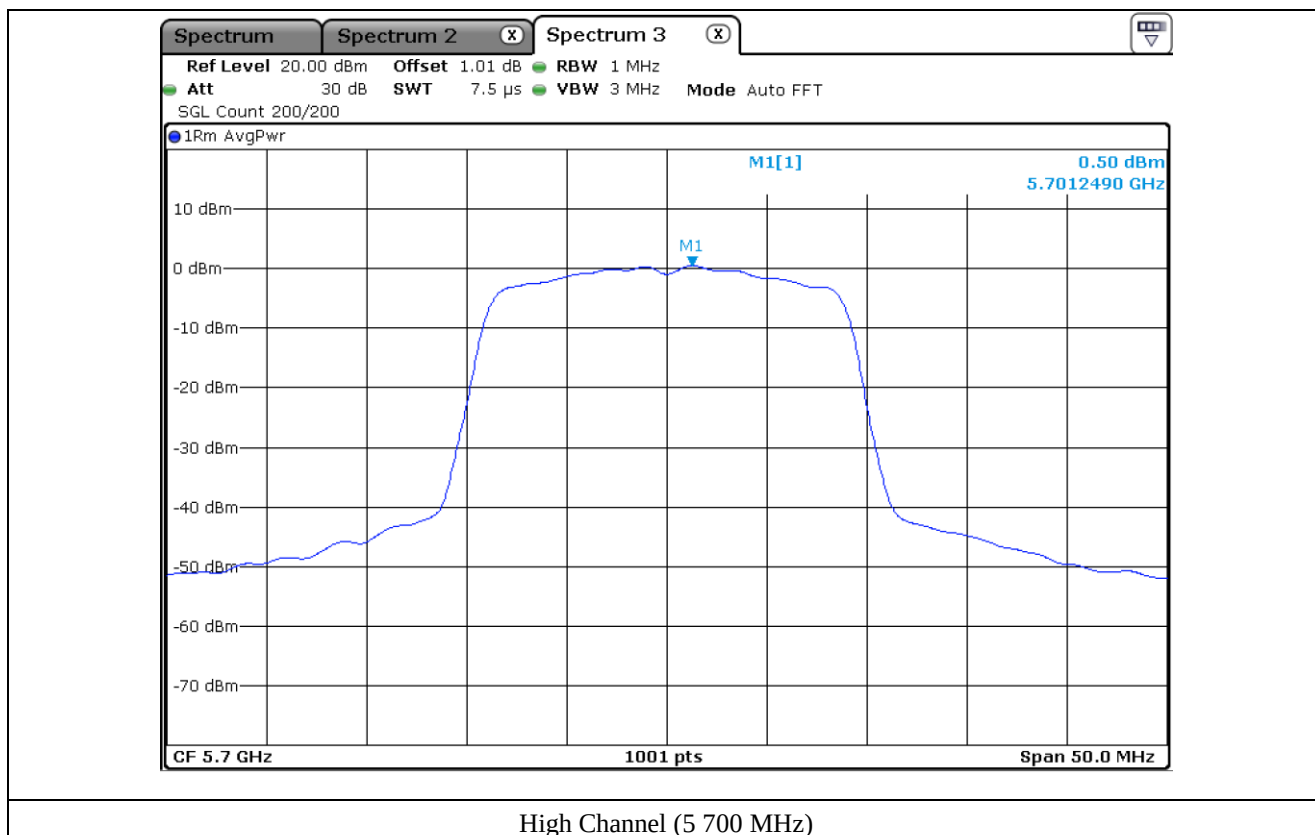


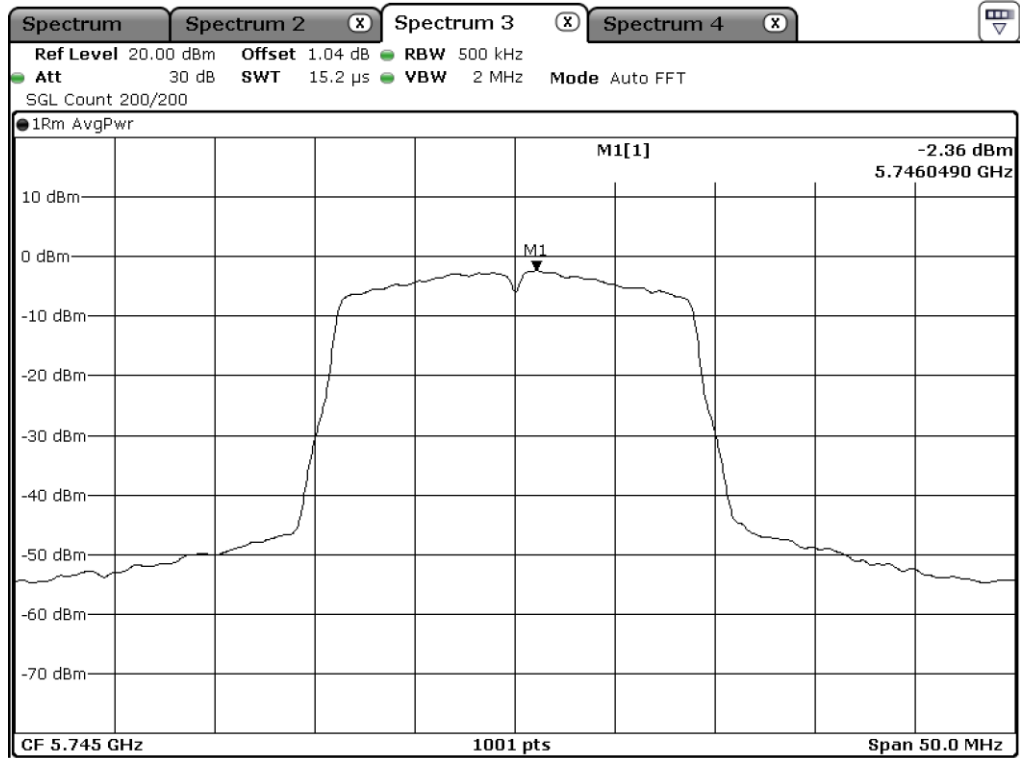


Low Channel (5 500 MHz)

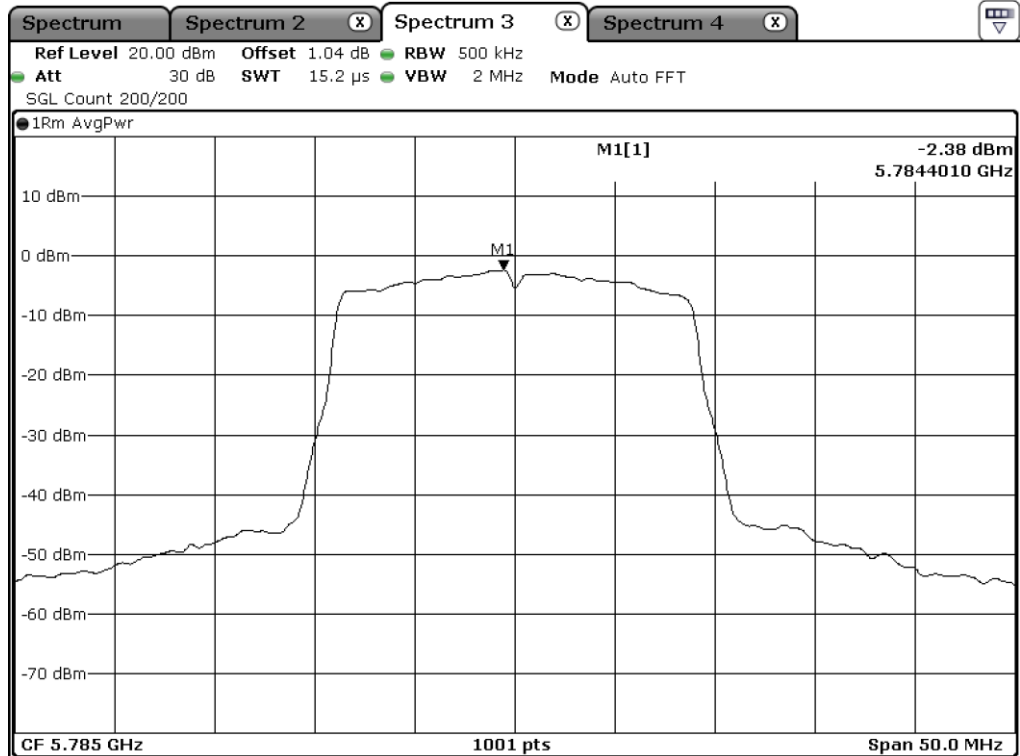


Middle Channel (5 580 MHz)

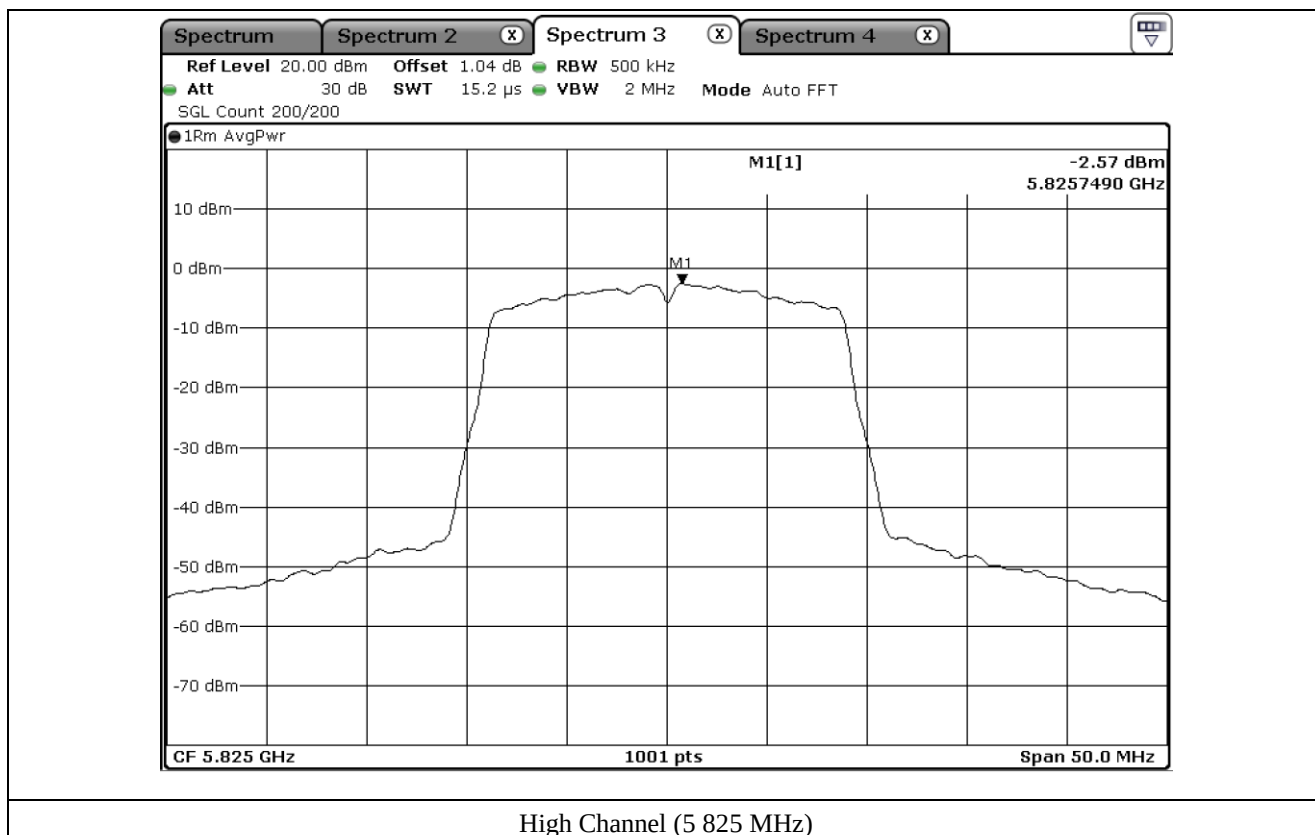




Low Channel (5 745 MHz)



Middle Channel (5 785 MHz)



10.5.3 Test data for Multiple Transmit

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Operating condition : Highest Output Power Transmitting Mode

-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 180.00	3.85	11.00	7.15
	Middle	5 220.00	3.91	11.00	7.09
	High	5 240.00	3.89	11.00	7.11
5 250 ~ 5 350	Low	5 260.00	3.74	11.00	7.26
	Middle	5 300.00	3.68	11.00	7.32
	High	5 320.00	3.81	11.00	7.19
5 470 ~ 5 725	Low	5 500.00	3.86	11.00	7.14
	Middle	5 580.00	3.97	11.00	7.03
	High	5 700.00	3.95	11.00	7.05
5 725 ~ 5 850	Low	5 745.00	1.01	30.00	28.99
	Middle	5 785.00	0.90	30.00	29.10
	High	5 825.00	0.78	30.00	29.22



Tested by: Tae-Ho, Kim / Senior Manager

10.5.4 Test data for Staddle Channel_Antenna 0

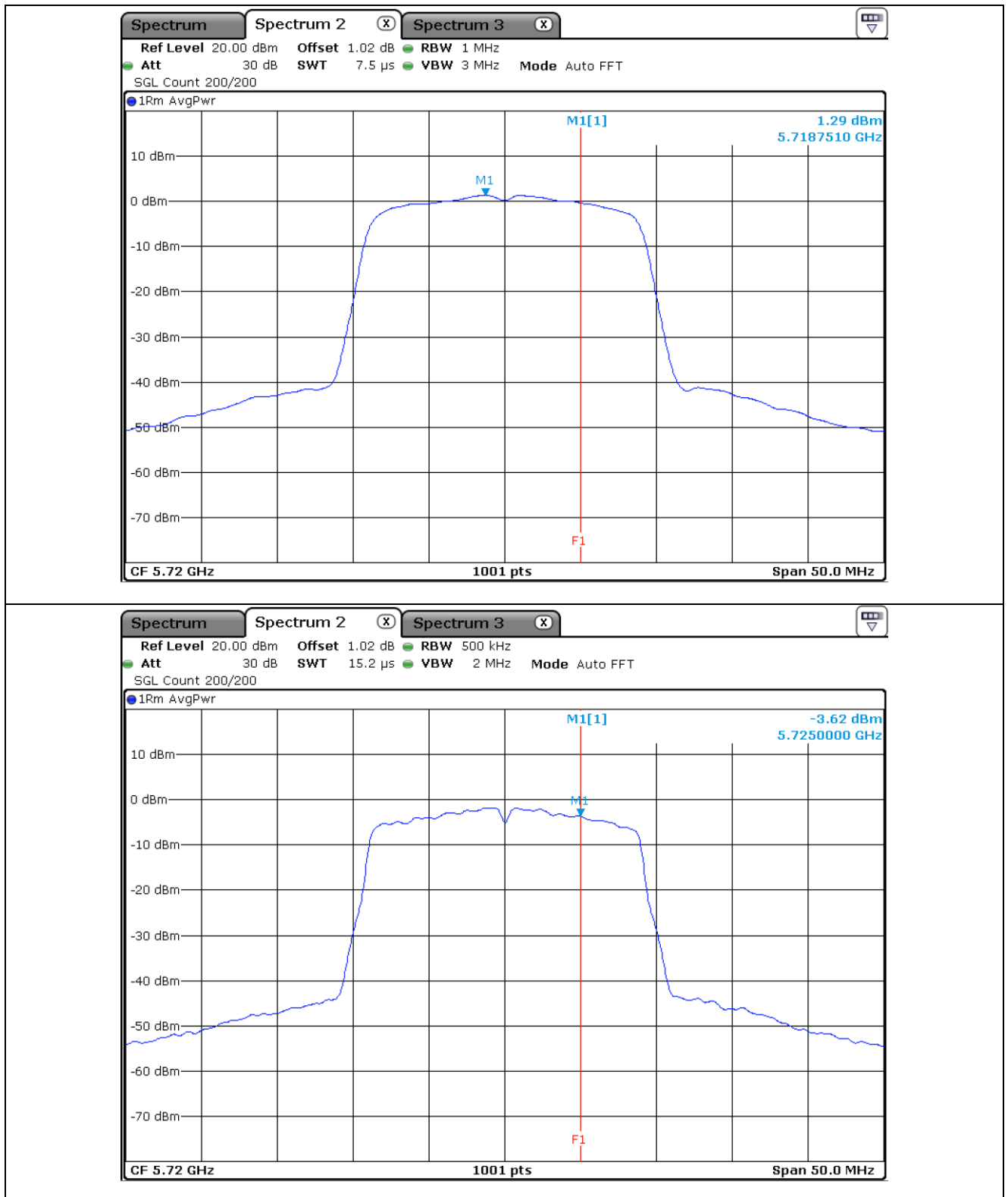
-. Test Date : November 20, 2019 ~ December 02, 2019
 -. Operating condition : Highest Output Power Transmitting Mode
 -. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	1.29	11.00	9.71
5 725 ~ 5 850	5 720.00	-3.62	30.00	33.62

Remark: See next page for measurement data.



Tested by: Tae-Ho, Kim / Senior Manager



10.5.5 Test data for Staddle Channel_Antenna 1

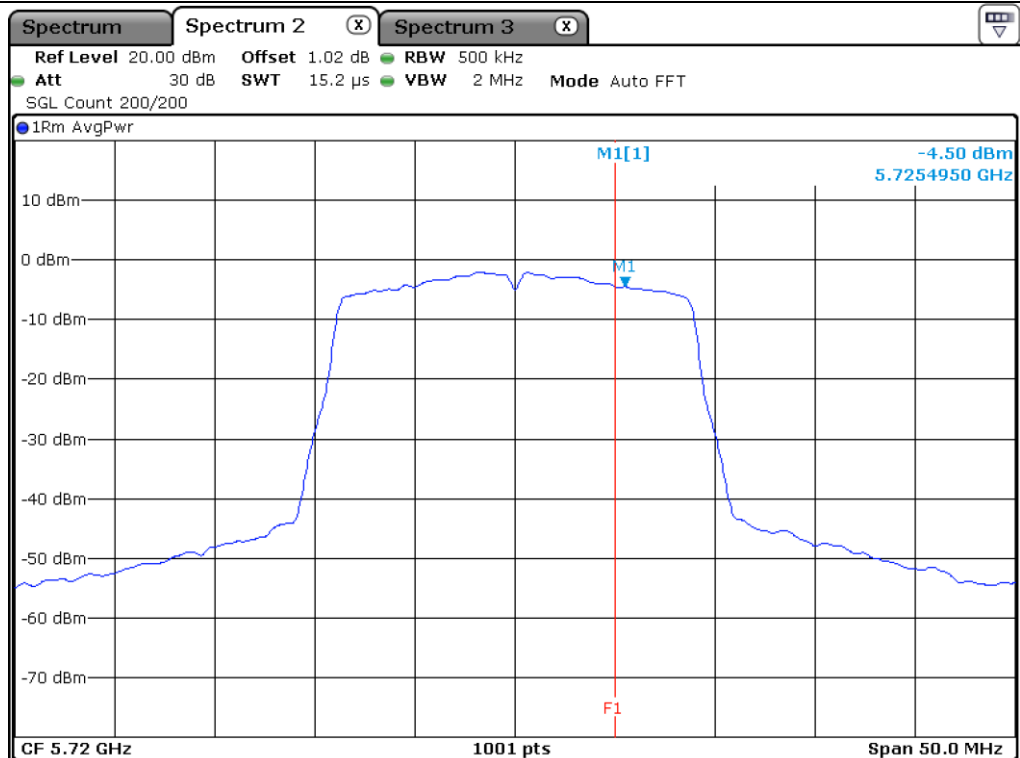
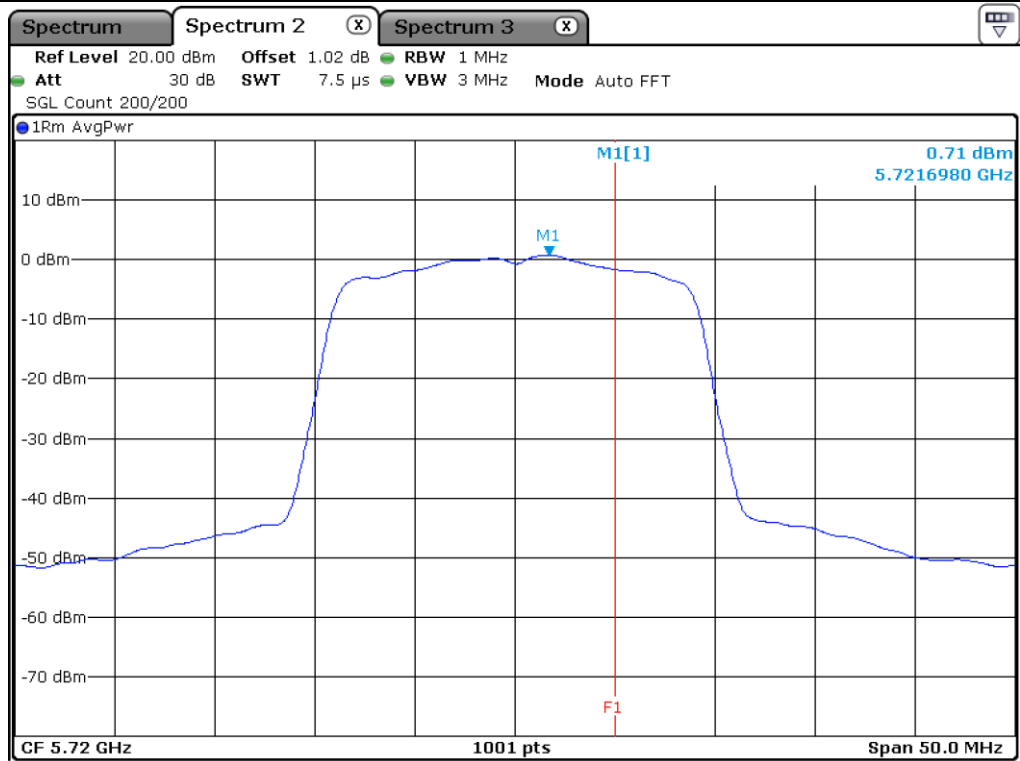
-. Test Date : November 20, 2019 ~ December 02, 2019
 -. Operating condition : Highest Output Power Transmitting Mode
 -. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	0.71	11.00	10.29
5 725 ~ 5 850	5 720.00	-4.50	30.00	34.50

Remark: See next page for measurement data.



Tested by: Tae-Ho, Kim / Senior Manager



10.5.6 Test data for Staddle Channel_Multiple Transmit

-. Test Date : November 20, 2019 ~ December 02, 2019
 -. Operating condition : Highest Output Power Transmitting Mode
 -. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 720.00	4.02	11.00	6.98
5 725 ~ 5 850	5 720.00	-1.03	30.00	31.03


 Tested by: Tae-Ho, Kim / Senior Manager

10.6 Test data for 802.11n_HT40 RLAN Mode

10.6.1 Test data for Antenna 0

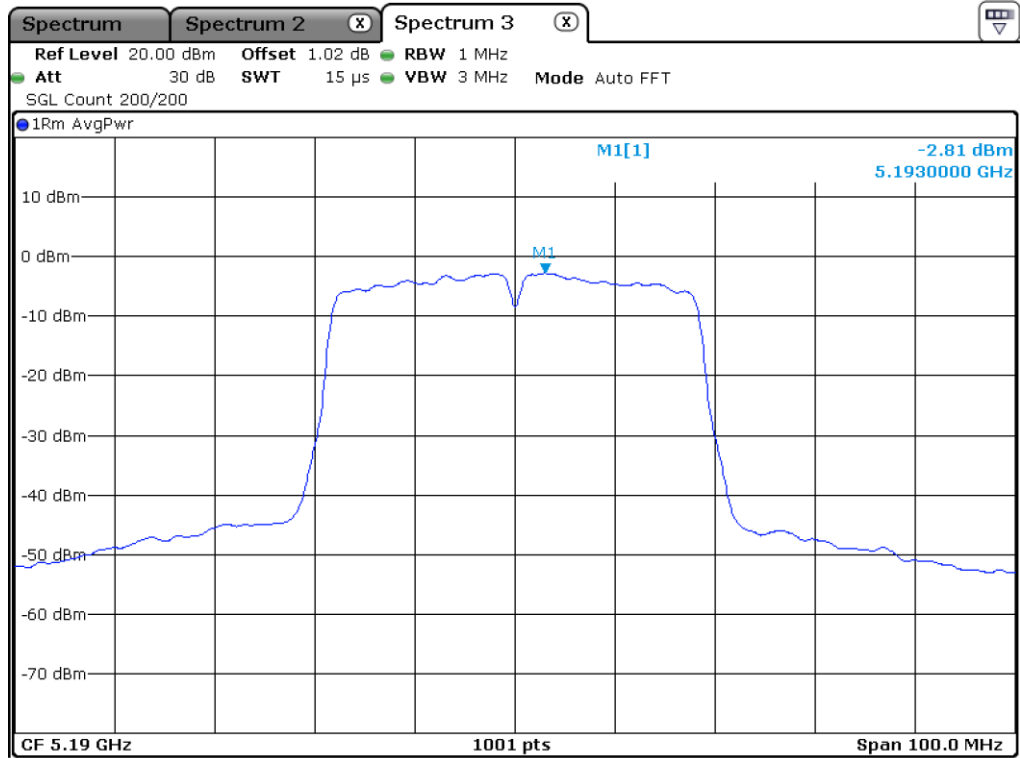
- . Test Date : November 20, 2019 ~ December 02, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190.00	-2.81	11.00	13.81
	High	5 230.00	-2.71	11.00	13.71
5 250 ~ 5 350	Low	5 270.00	-2.88	11.00	13.88
	High	5 310.00	-2.70	11.00	13.70
5 470 ~ 5 725	Low	5 510.00	-3.59	11.00	14.59
	Middle	5 550.00	-3.29	11.00	14.29
	High	5 670.00	-3.89	11.00	14.89
5 725 ~ 5 850	Low	5 755.00	-6.40	30.00	36.40
	High	5 795.00	-6.38	30.00	36.38

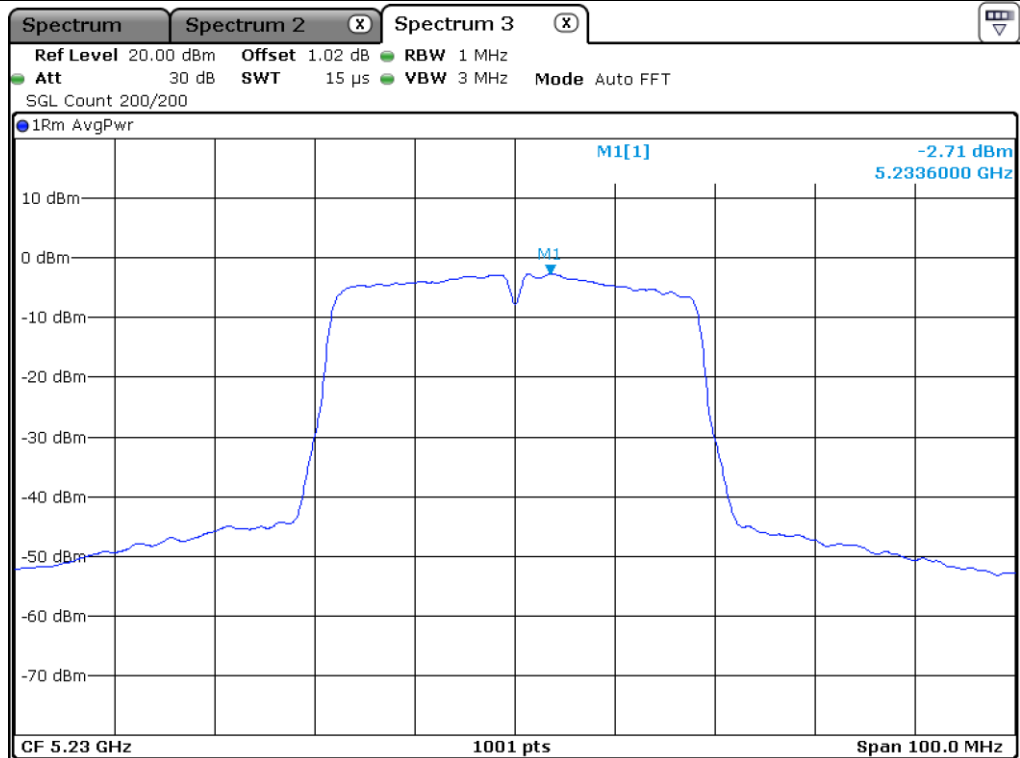
Remark: See next page for measurement data.



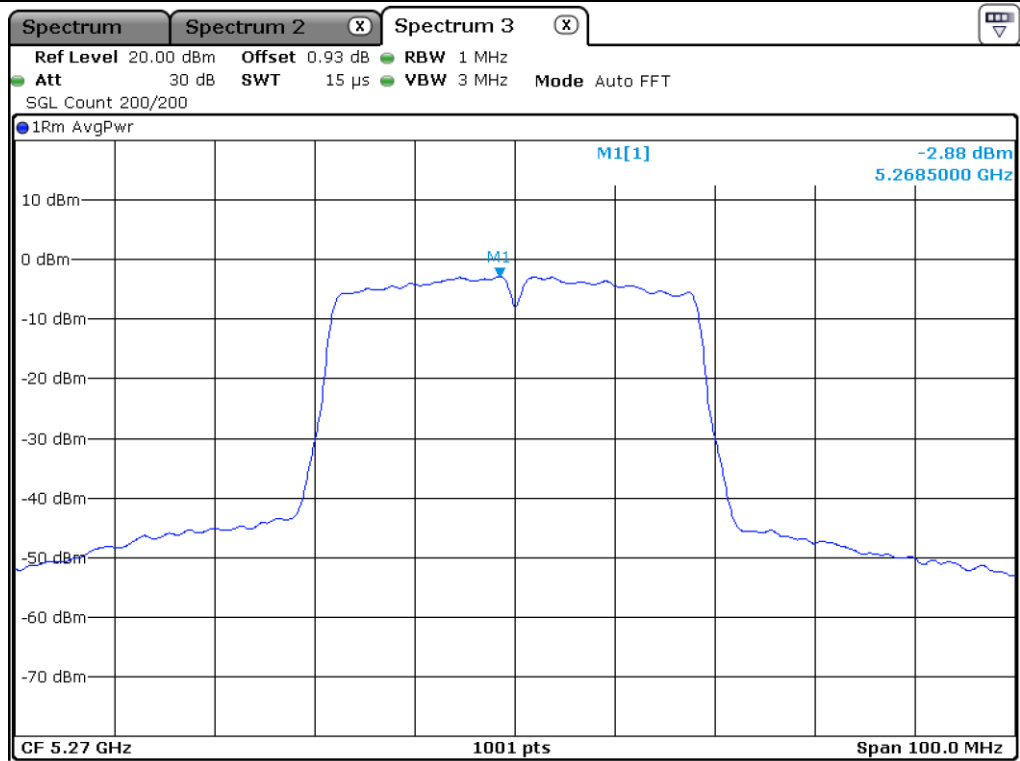
Tested by: Tae-Ho, Kim / Senior Manager



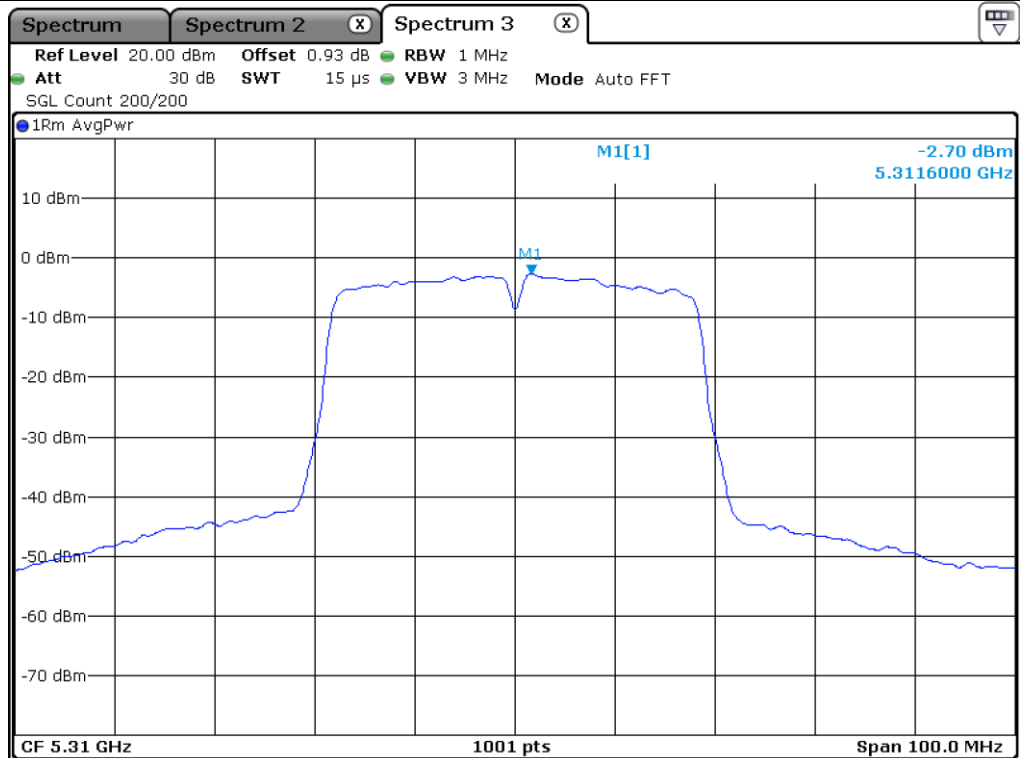
Low Channel (5 190 MHz)



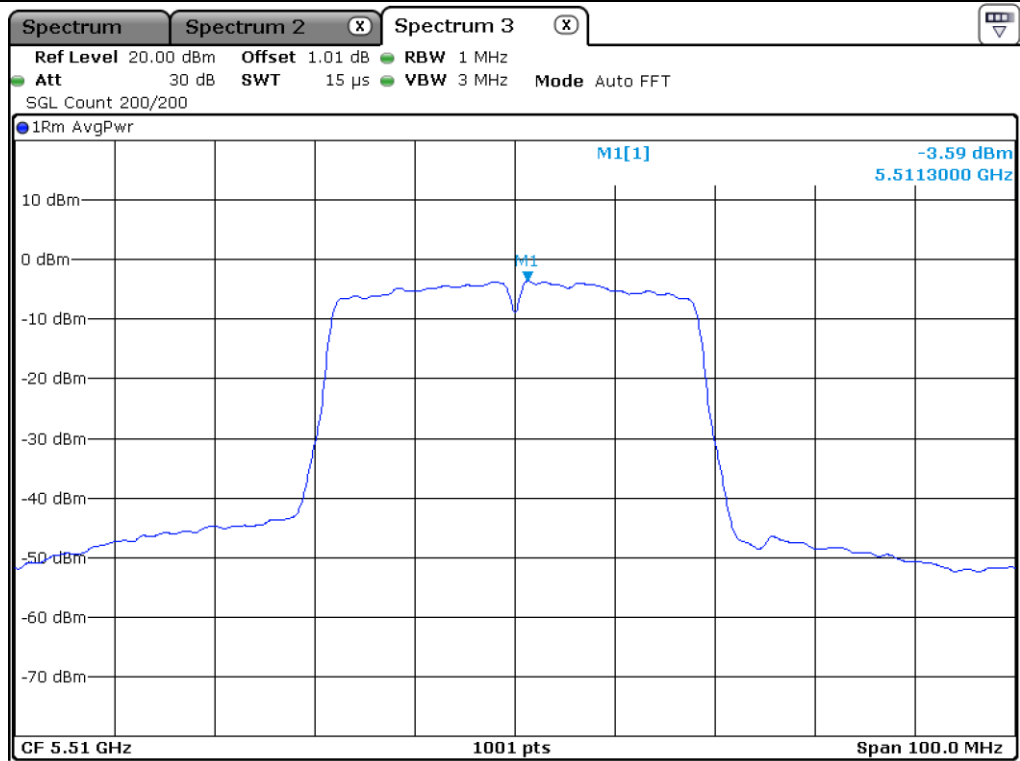
High Channel (5 230 MHz)



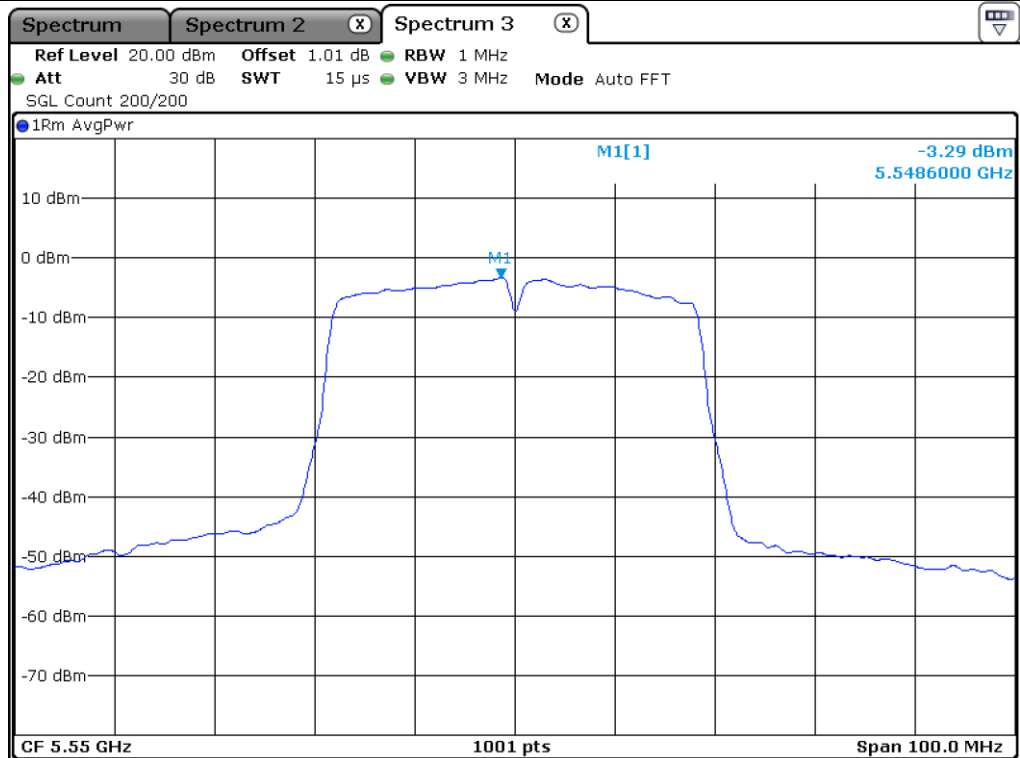
Low Channel (5 270 MHz)



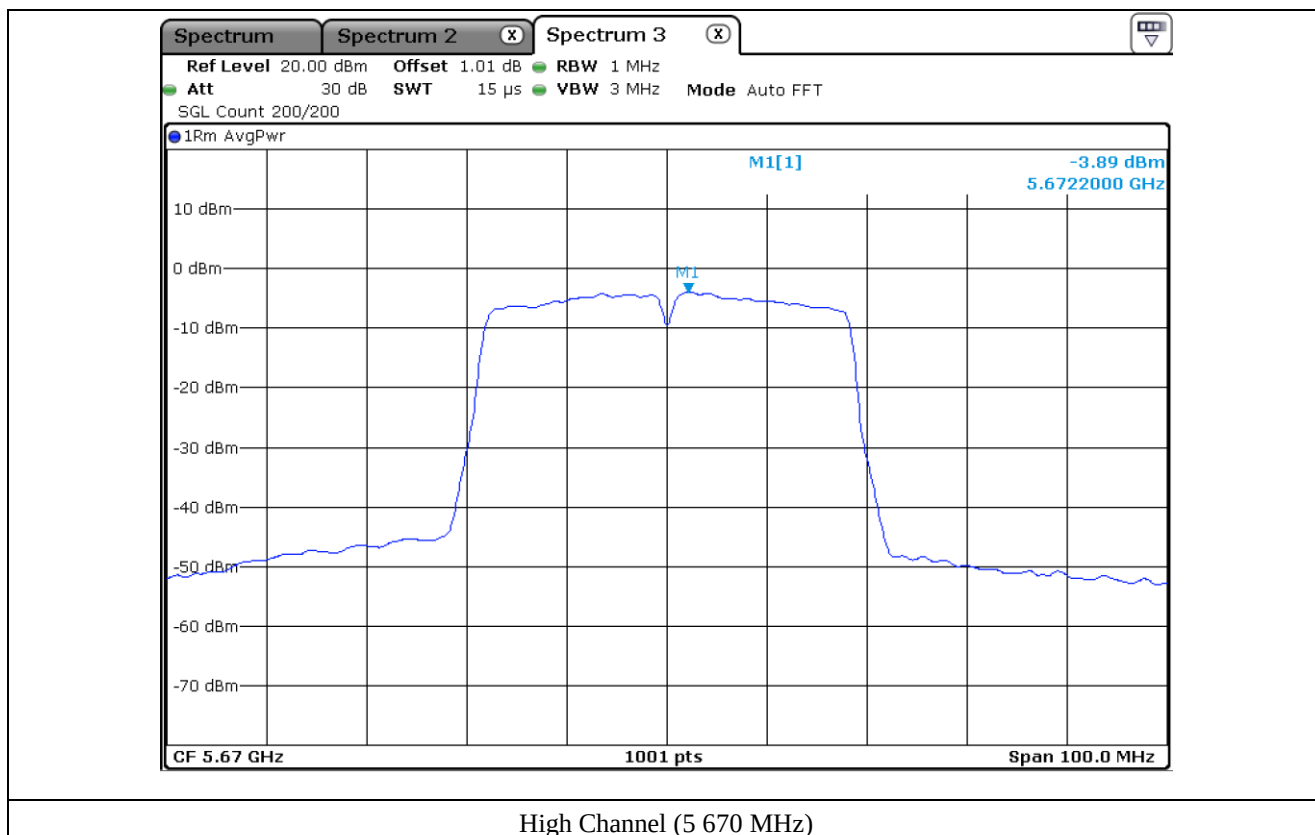
High Channel (5 310 MHz)

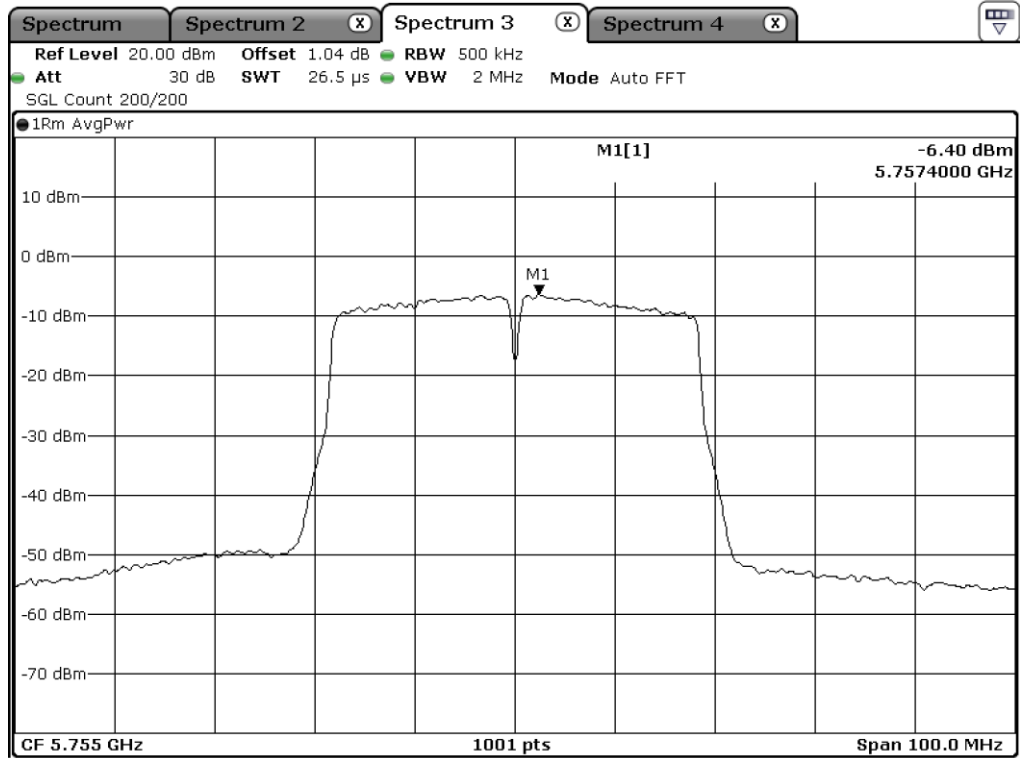


Low Channel (5 510 MHz)

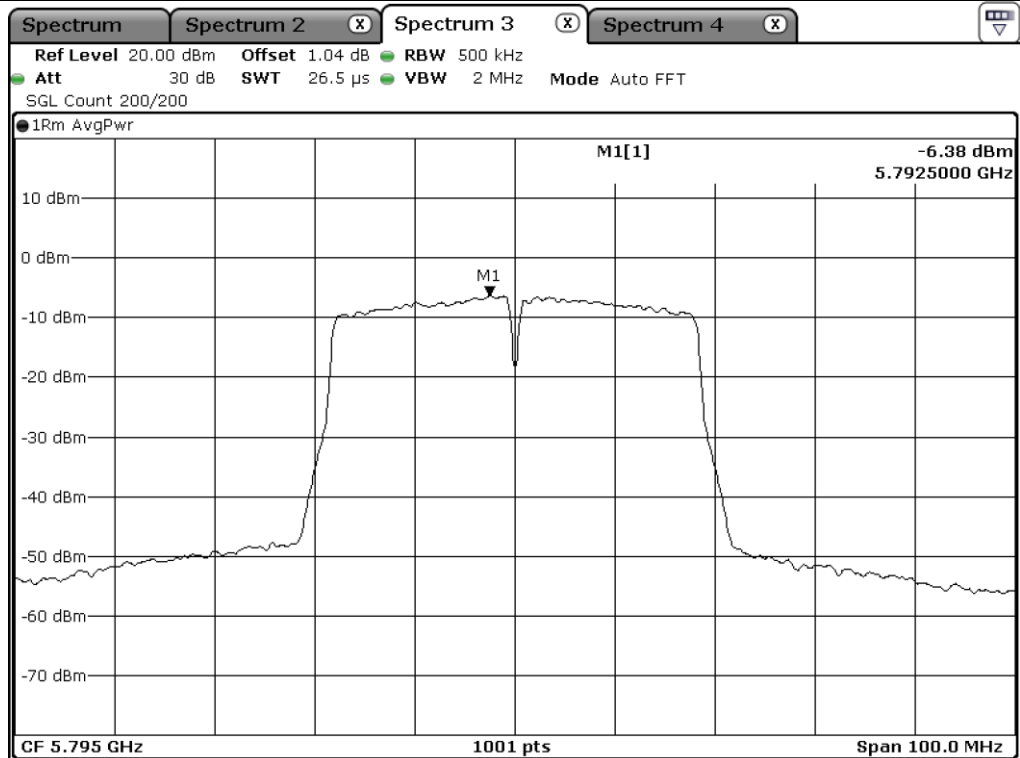


Middle Channel (5 550 MHz)





Low Channel (5 755 MHz)



High Channel (5 795 MHz)

10.6.2 Test data for Antenna 1

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Operating condition : Highest Output Power Transmitting Mode

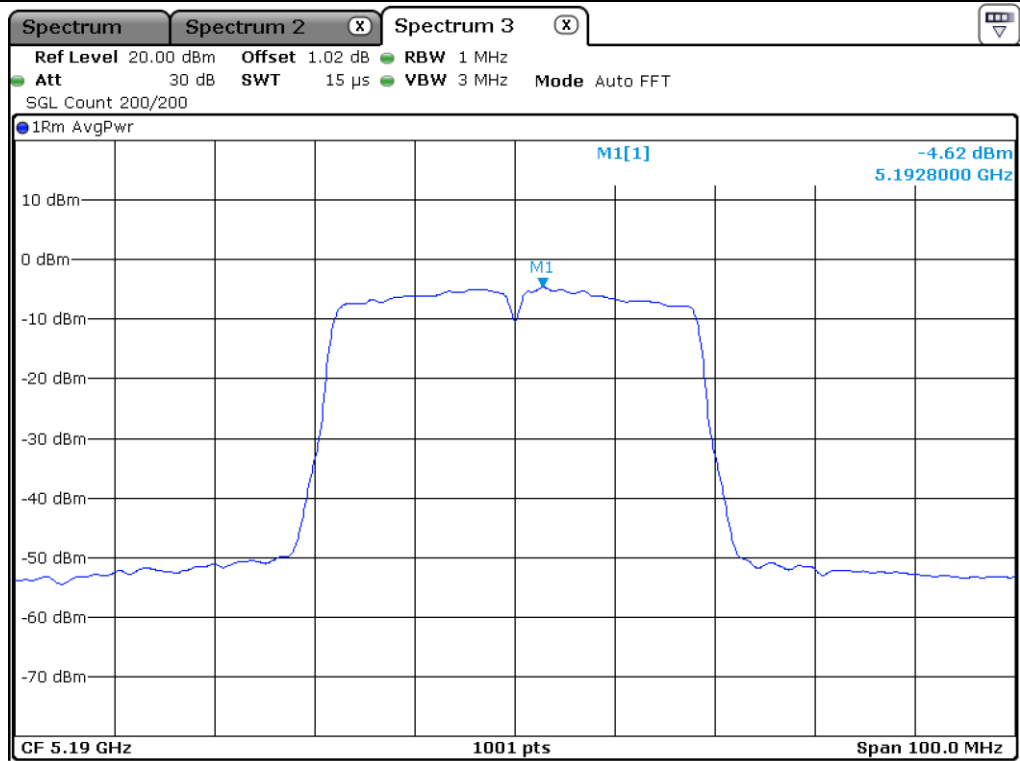
-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190.00	-4.62	11.00	15.62
	High	5 230.00	-4.65	11.00	15.65
5 250 ~ 5 350	Low	5 270.00	-5.15	11.00	16.15
	High	5 310.00	-5.03	11.00	16.03
5 470 ~ 5 725	Low	5 510.00	-4.07	11.00	15.07
	Middle	5 550.00	-3.97	11.00	14.97
	High	5 670.00	-3.94	11.00	14.94
5 725 ~ 5 850	Low	5 755.00	-6.83	30.00	36.83
	High	5 795.00	-6.39	30.00	36.39

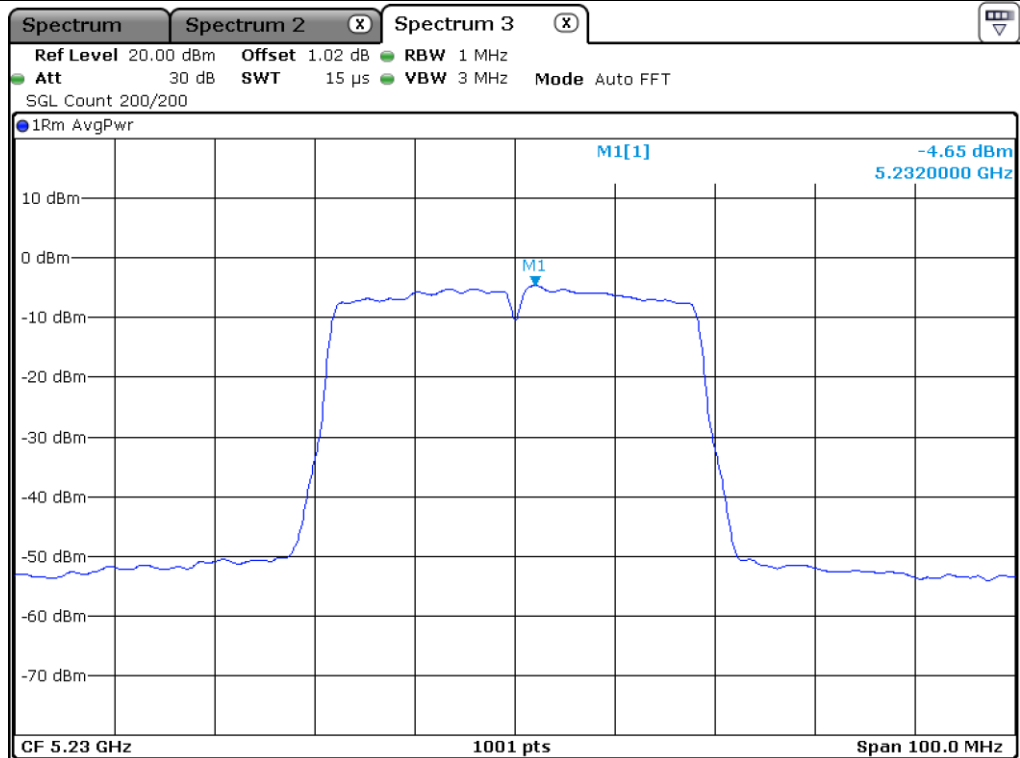
Remark: See next page for measurement data.



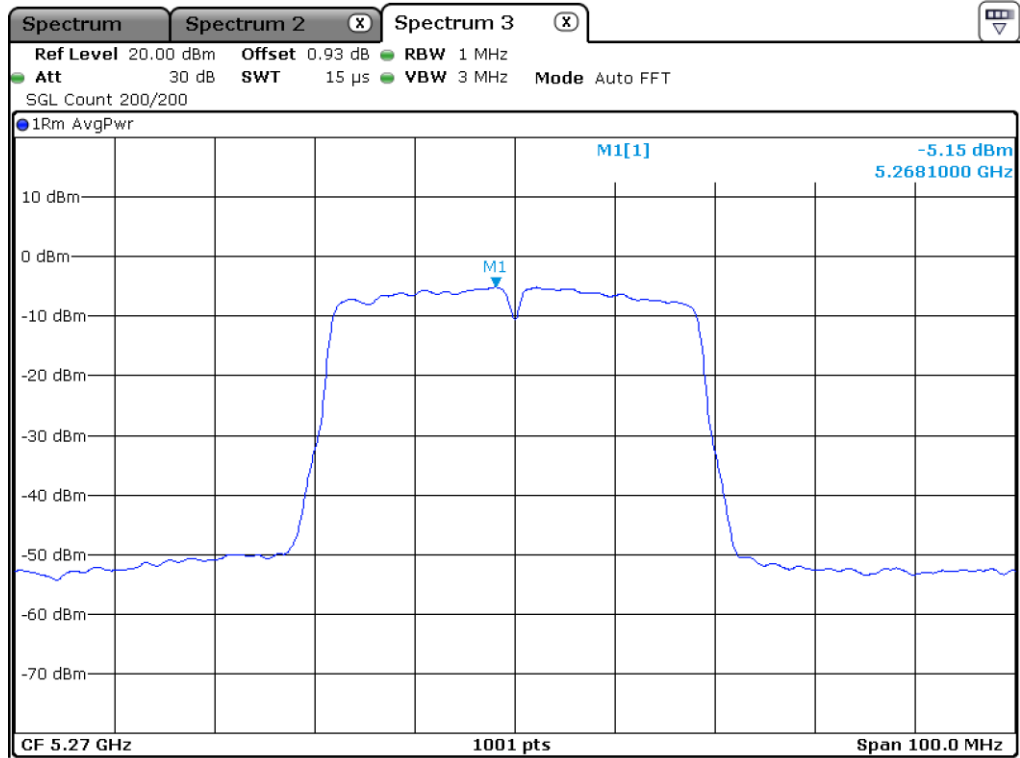
Tested by: Tae-Ho, Kim / Senior Manager



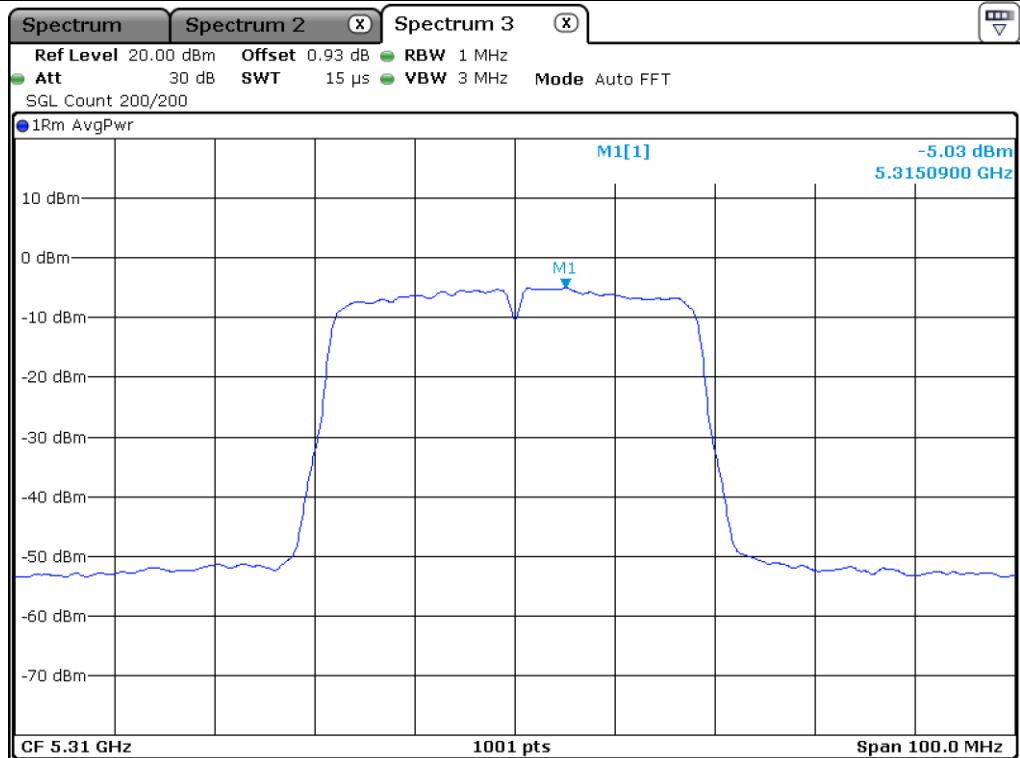
Low Channel (5 190 MHz)



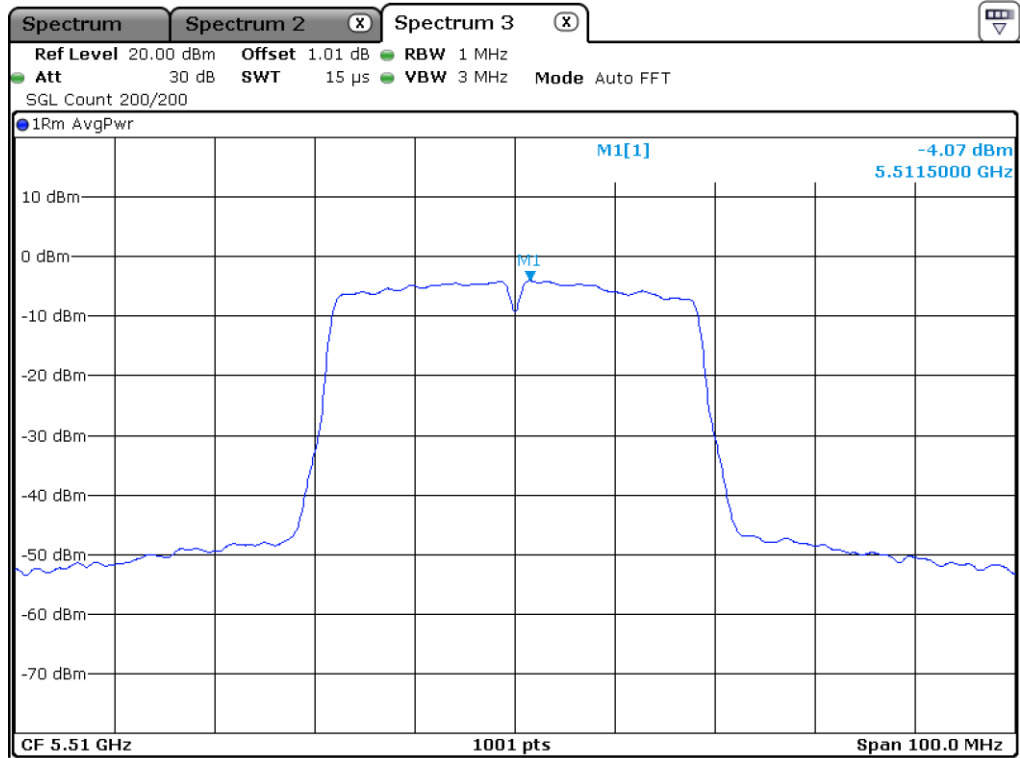
High Channel (5 230 MHz)



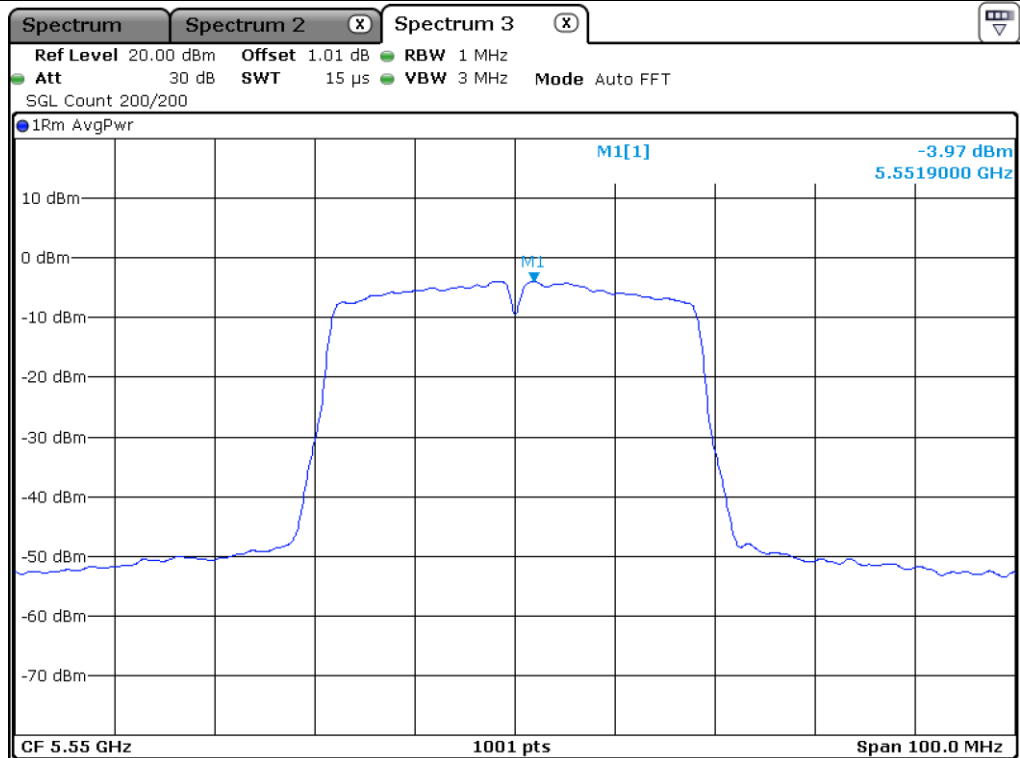
Low Channel (5 270 MHz)



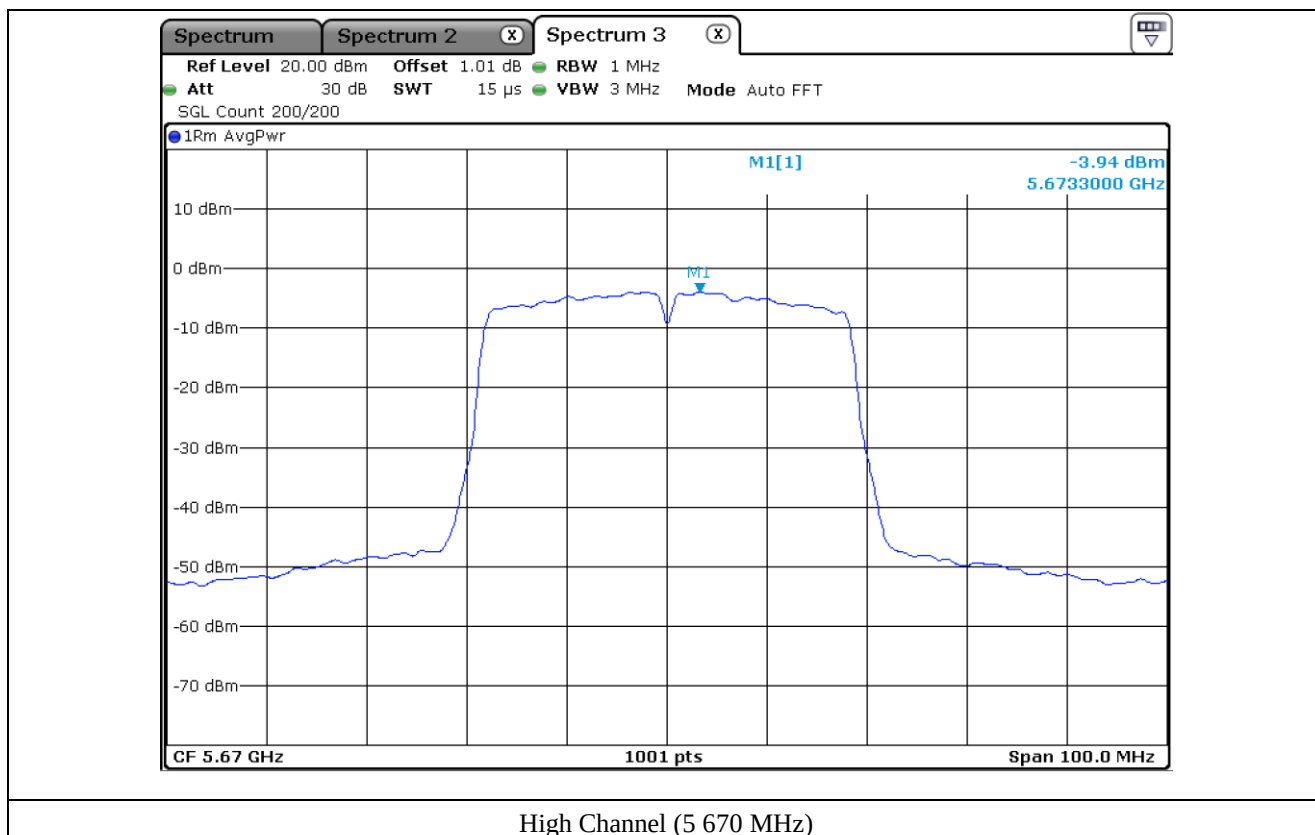
High Channel (5 310 MHz)

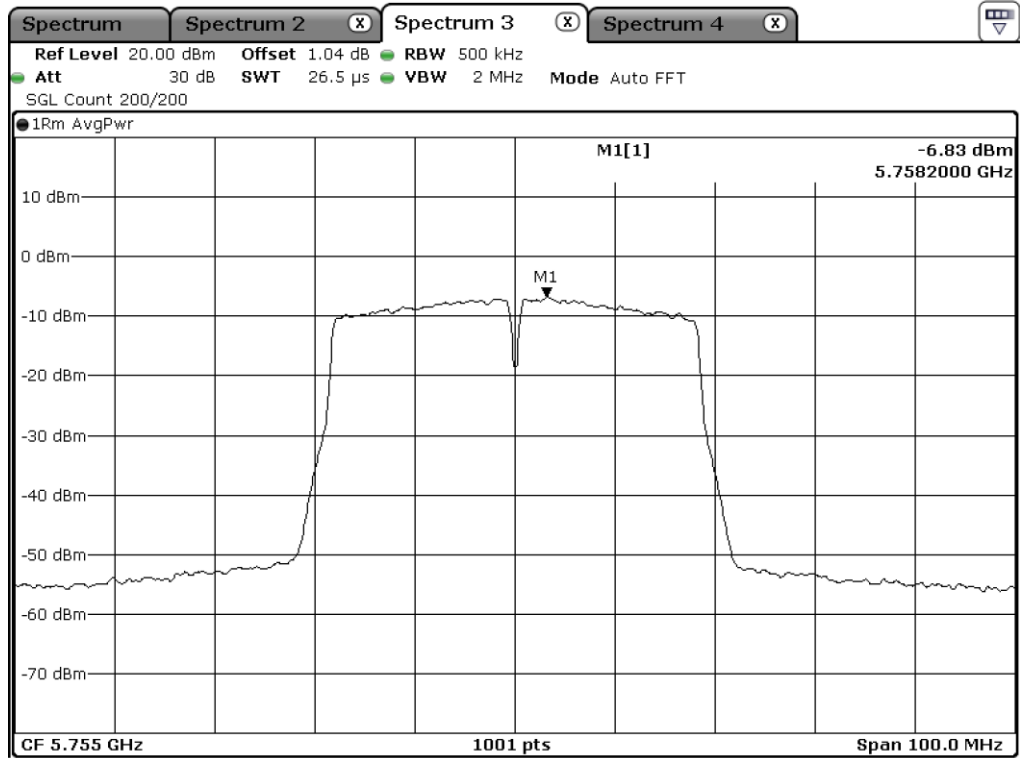


Low Channel (5 510 MHz)

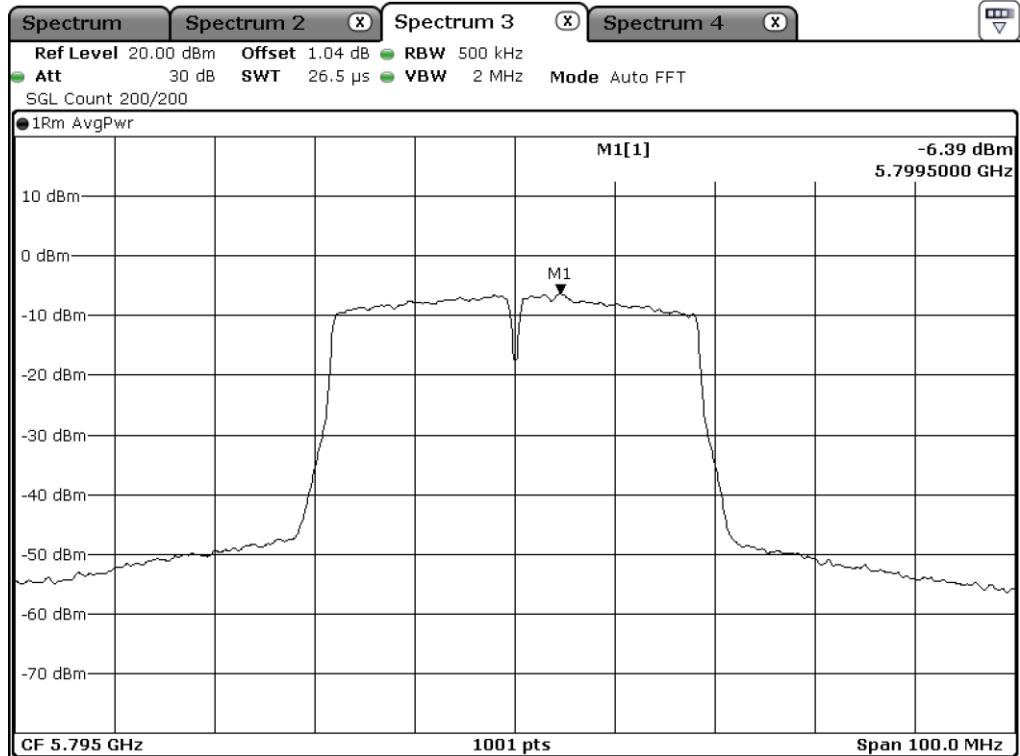


Middle Channel (5 550 MHz)





Low Channel (5 755 MHz)



High Channel (5 795 MHz)

10.6.3 Test data for Multiple Transmit

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190.00	-0.61	11.00	11.61
	High	5 230.00	-0.56	11.00	11.56
5 250 ~ 5 350	Low	5 270.00	-0.86	11.00	11.86
	High	5 310.00	-0.70	11.00	11.70
5 470 ~ 5 725	Low	5 510.00	-0.81	11.00	11.81
	Middle	5 550.00	-0.61	11.00	11.61
	High	5 670.00	-0.90	11.00	11.90
5 725 ~ 5 850	Low	5 755.00	-3.60	30.00	33.60
	High	5 795.00	-3.37	30.00	33.37



Tested by: Tae-Ho, Kim / Senior Manager

10.6.4 Test data for Staddle Channel_Antenna 0

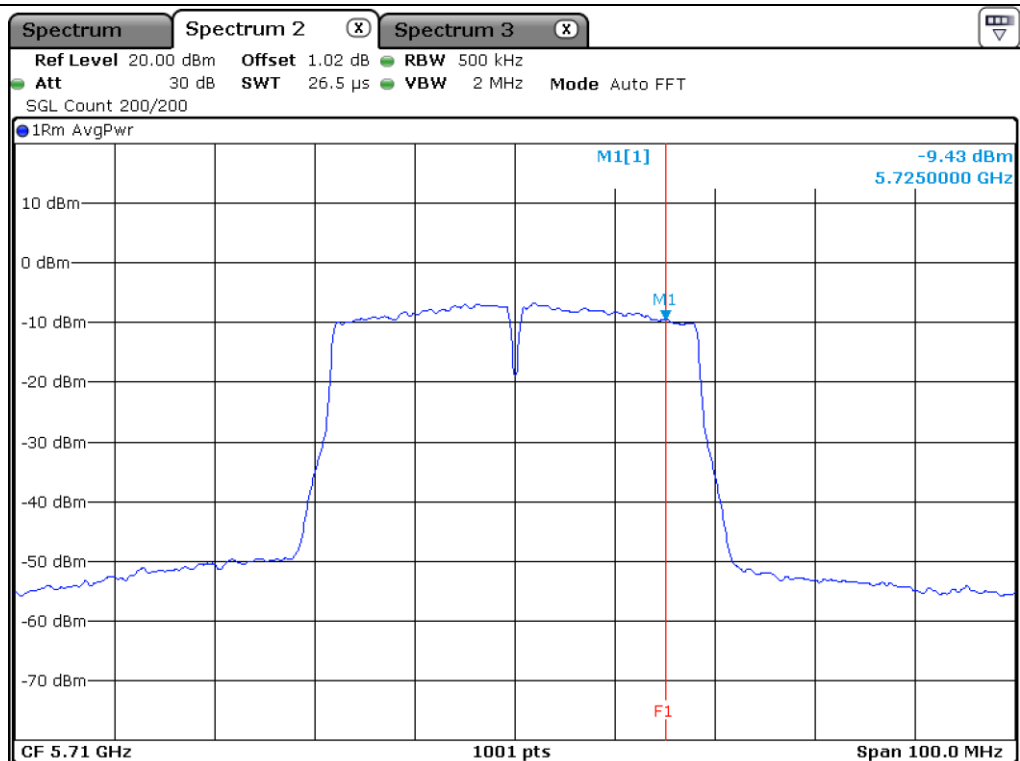
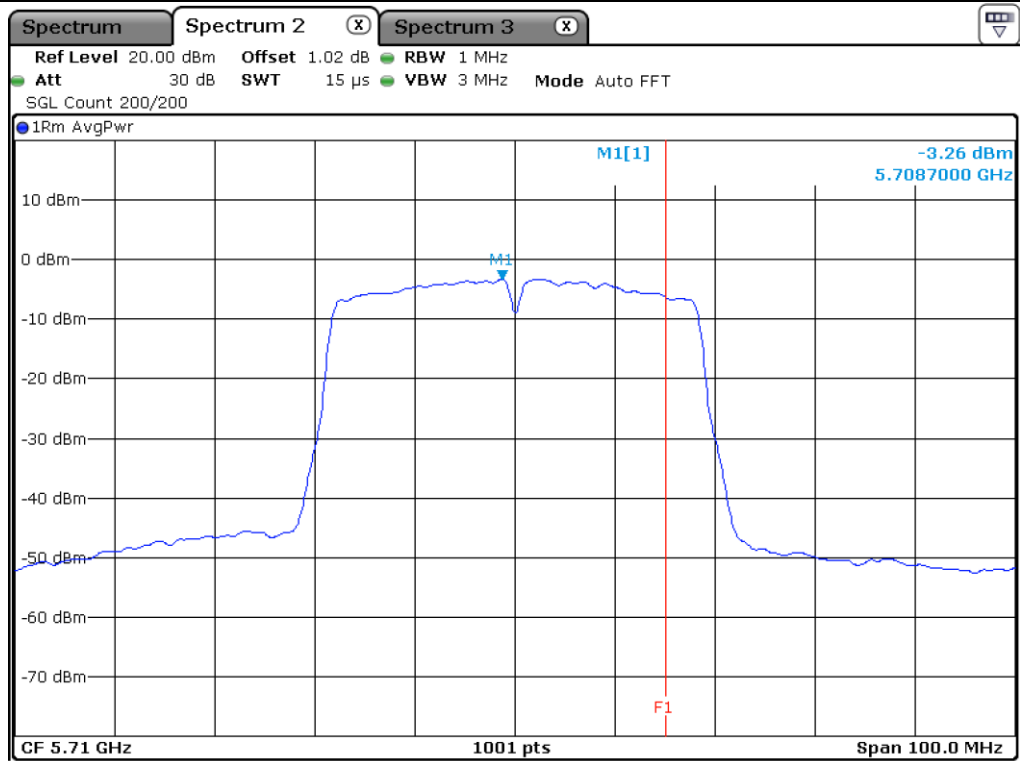
- . Test Date : November 20, 2019 ~ December 02, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710.00	-3.26	11.00	14.26
5 725 ~ 5 850	5 710.00	-9.43	30.00	39.43

Remark: See next page for measurement data.



Tested by: Tae-Ho, Kim / Senior Manager



10.6.5 Test data for Staddle Channel_Antenna 1

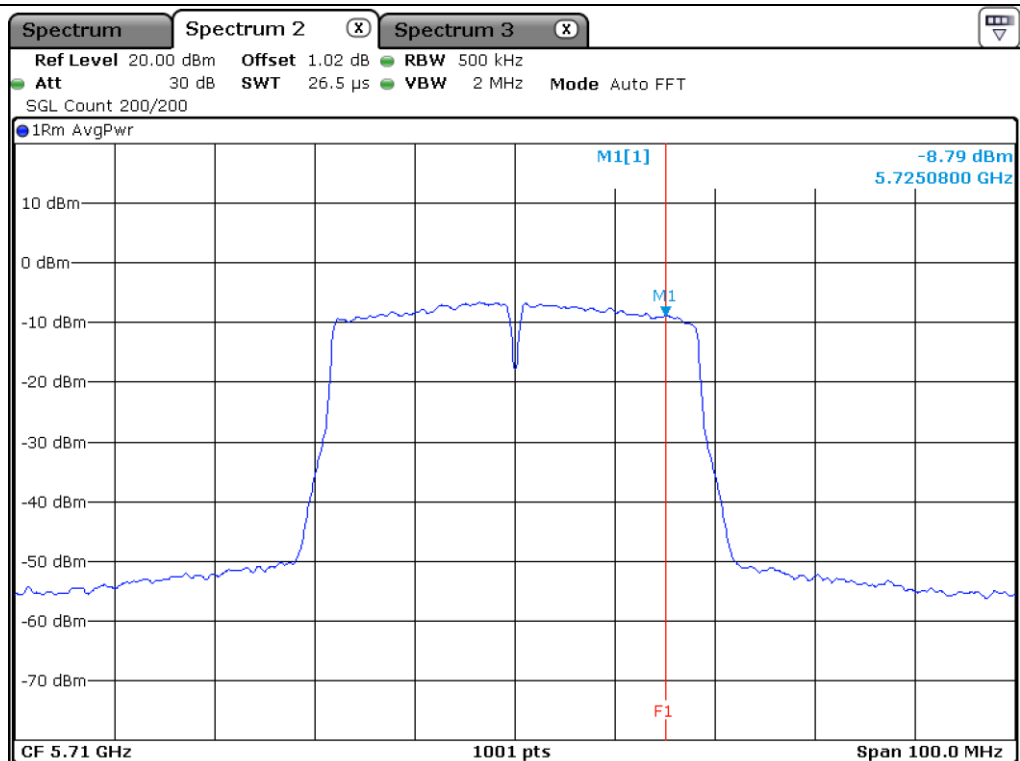
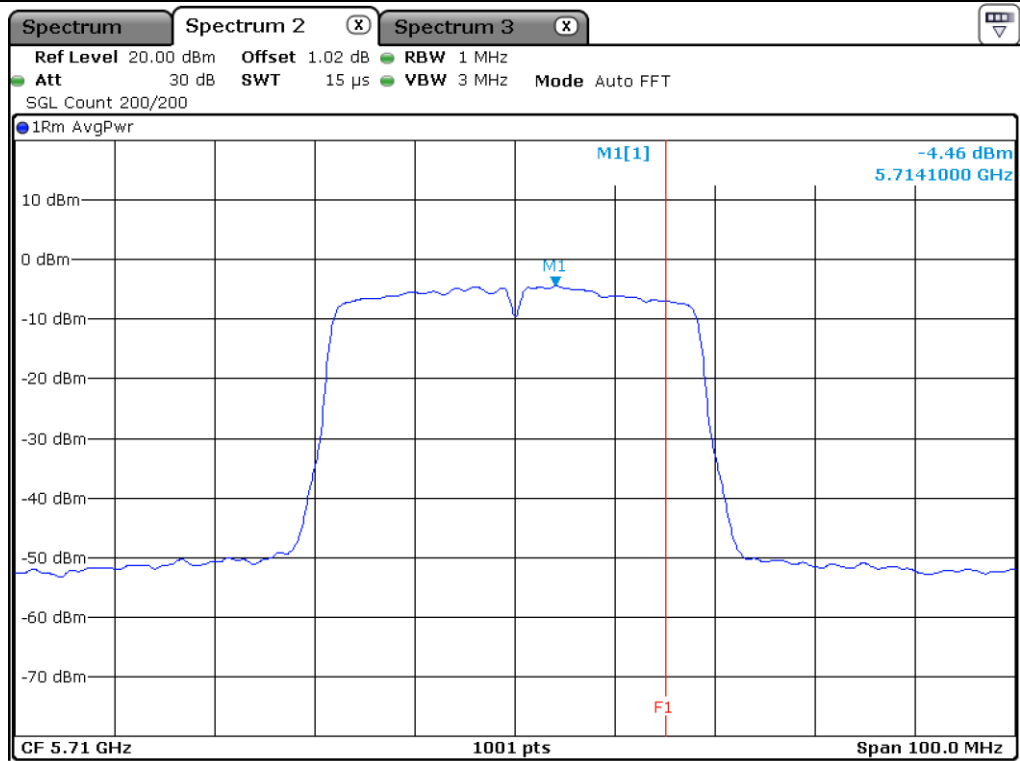
- . Test Date : November 20, 2019 ~ December 02, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710.00	-4.46	11.00	15.46
5 725 ~ 5 850	5 710.00	-8.79	30.00	38.79

Remark: See next page for measurement data.



Tested by: Tae-Ho, Kim / Senior Manager



10.6.6 Test data for Staddle Channel_Multiple Transmit

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710.00	-0.81	11.00	11.81
5 725 ~ 5 850	5 710.00	-6.09	30.00	36.09



Tested by: Tae-Ho, Kim / Senior Manager

10.7 Test data for 802.11ac_HT80 RLAN Mode

10.7.1 Test data for Antenna 0

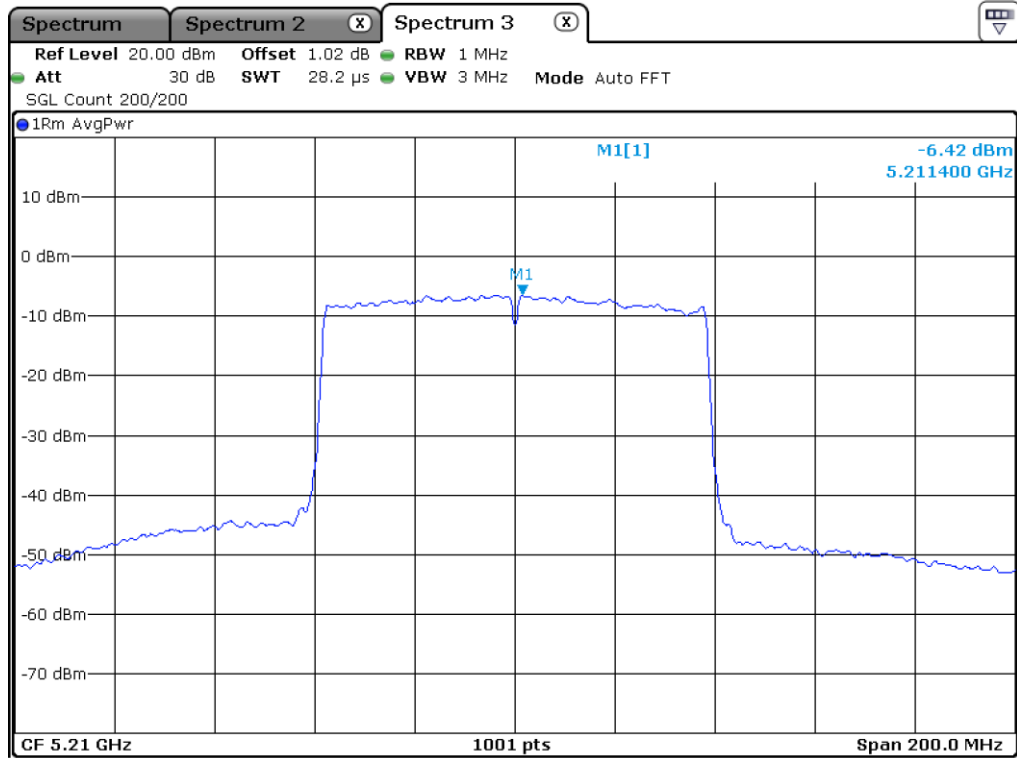
- . Test Date : November 20, 2019 ~ December 02, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 210.00	-6.42	11.00	17.42
5 250 ~ 5 350	Low	5 290.00	-6.32	11.00	17.32
5 470 ~ 5 725	Low	5 530.00	-6.59	11.00	17.59
5 725 ~ 5 850	Low	5 775.00	-10.95	30.00	40.95

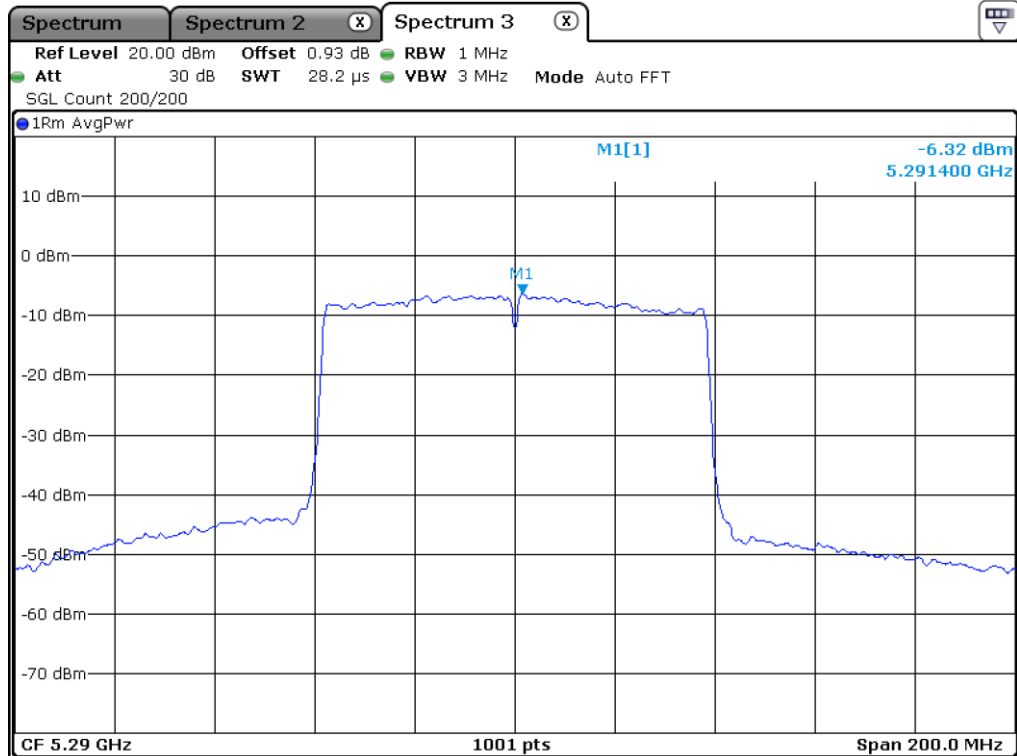
Remark: See next page for measurement data.



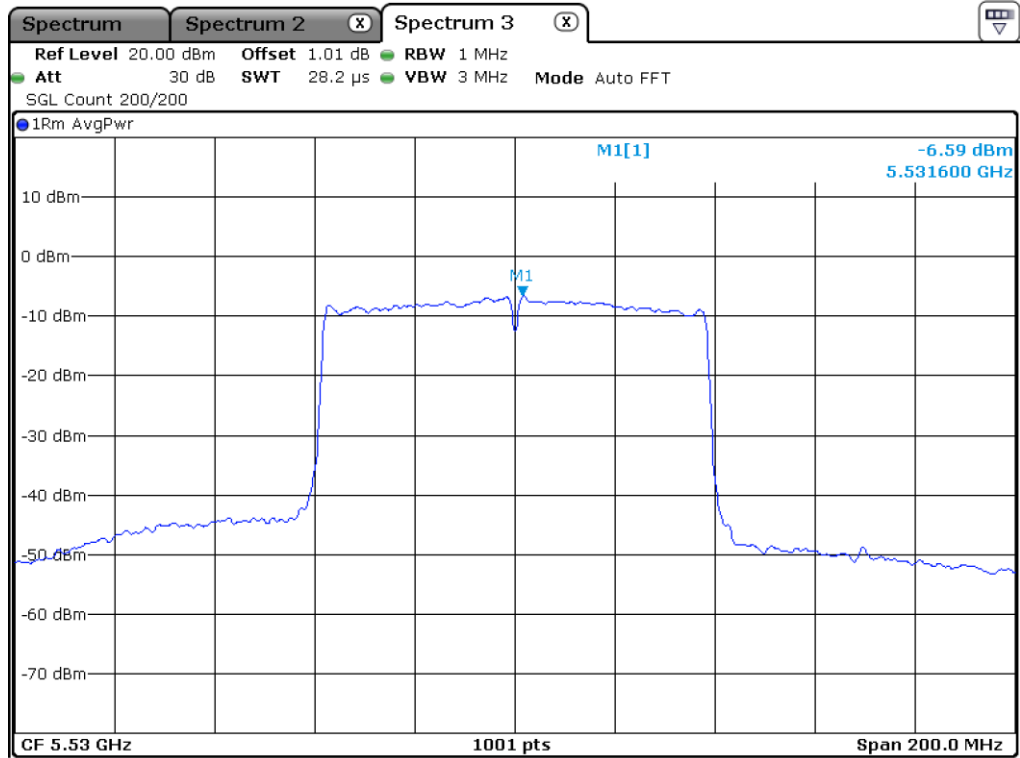
Tested by: Tae-Ho, Kim / Senior Manager



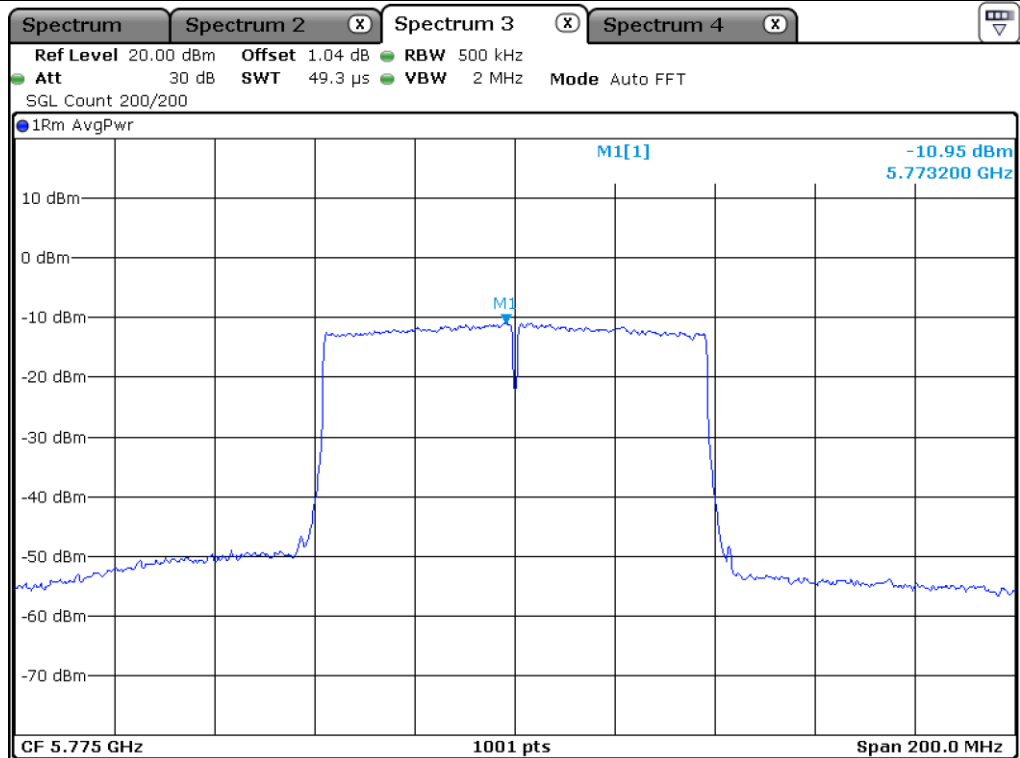
Middle Channel (5 210 MHz)



Middle Channel (5 290 MHz)



Middle Channel (5 530 MHz)



Middle Channel (5 775 MHz)

10.7.2 Test data for Antenna 1

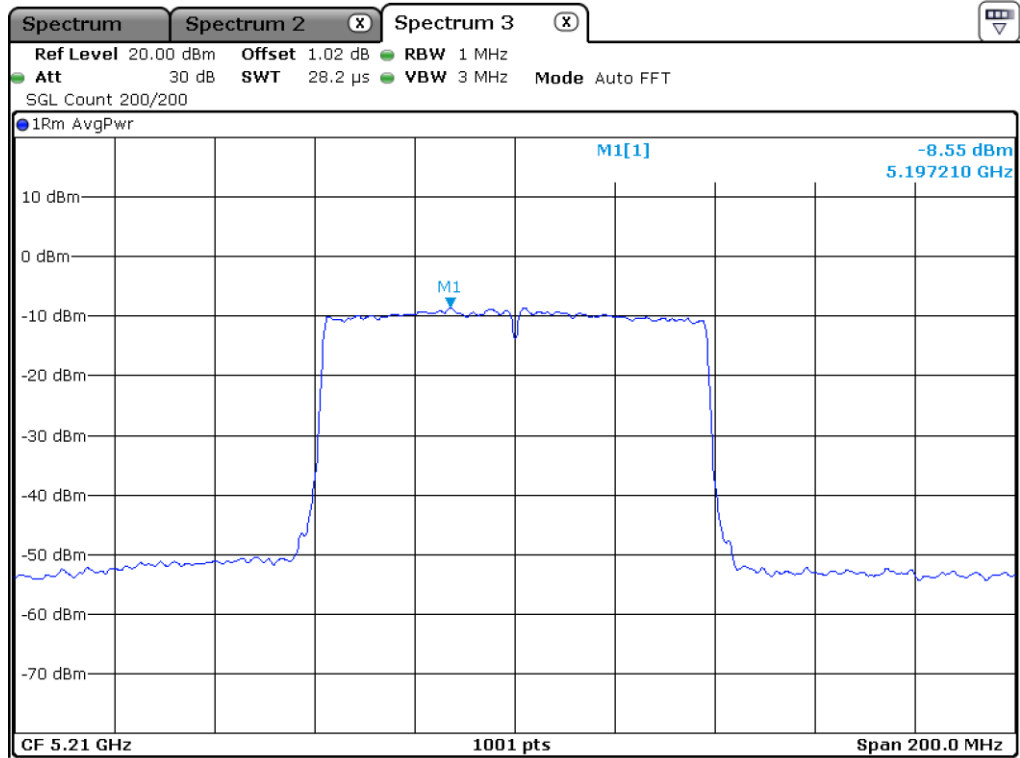
-. Test Date : November 20, 2019 ~ December 02, 2019
 -. Operating condition : Highest Output Power Transmitting Mode
 -. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 210.00	-8.55	11.00	19.55
5 250 ~ 5 350	Low	5 290.00	-8.99	11.00	19.99
5 470 ~ 5 725	Low	5 530.00	-7.82	11.00	18.82
5 725 ~ 5 850	Low	5 775.00	-11.18	30.00	41.18

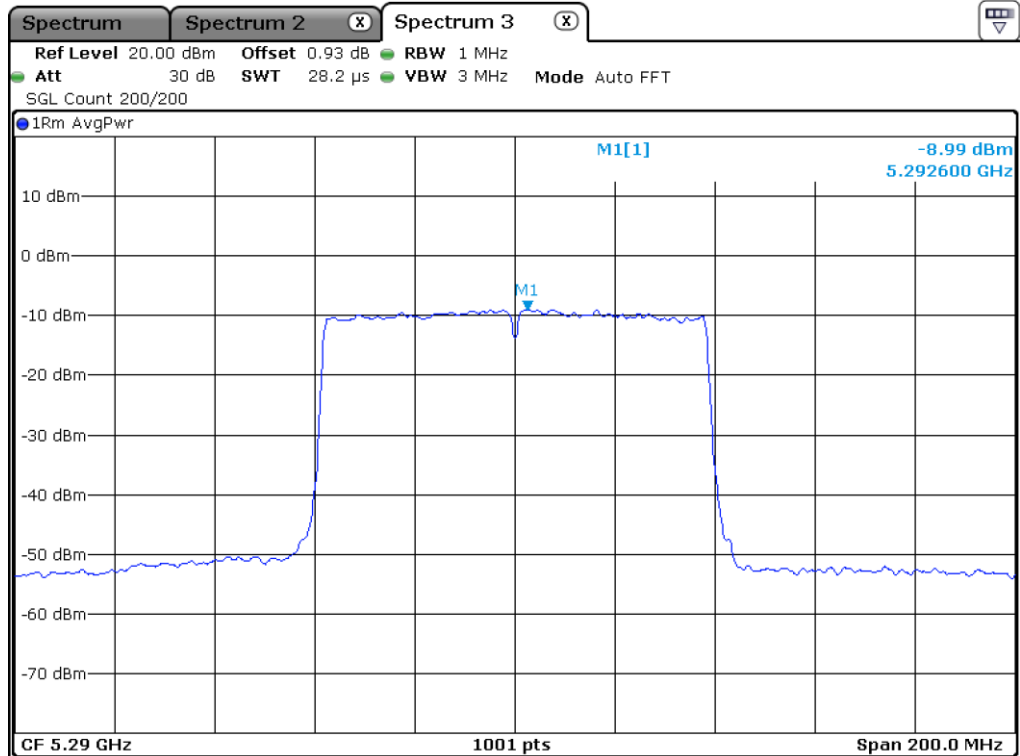
Remark: See next page for measurement data.



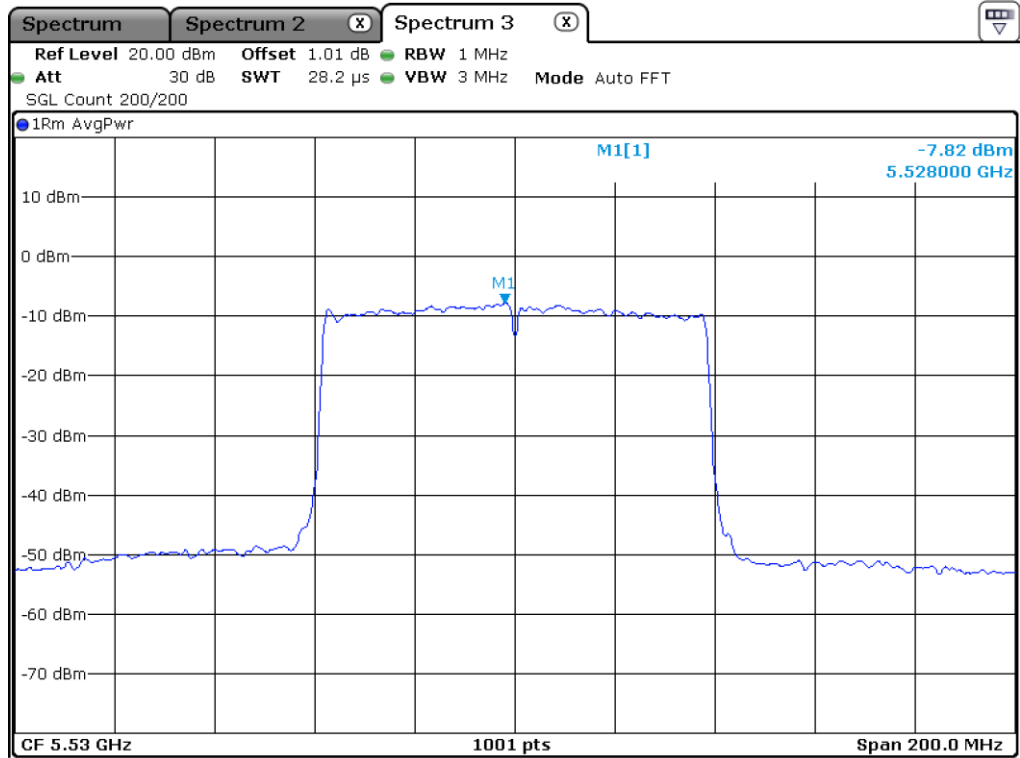
Tested by: Tae-Ho, Kim / Senior Manager



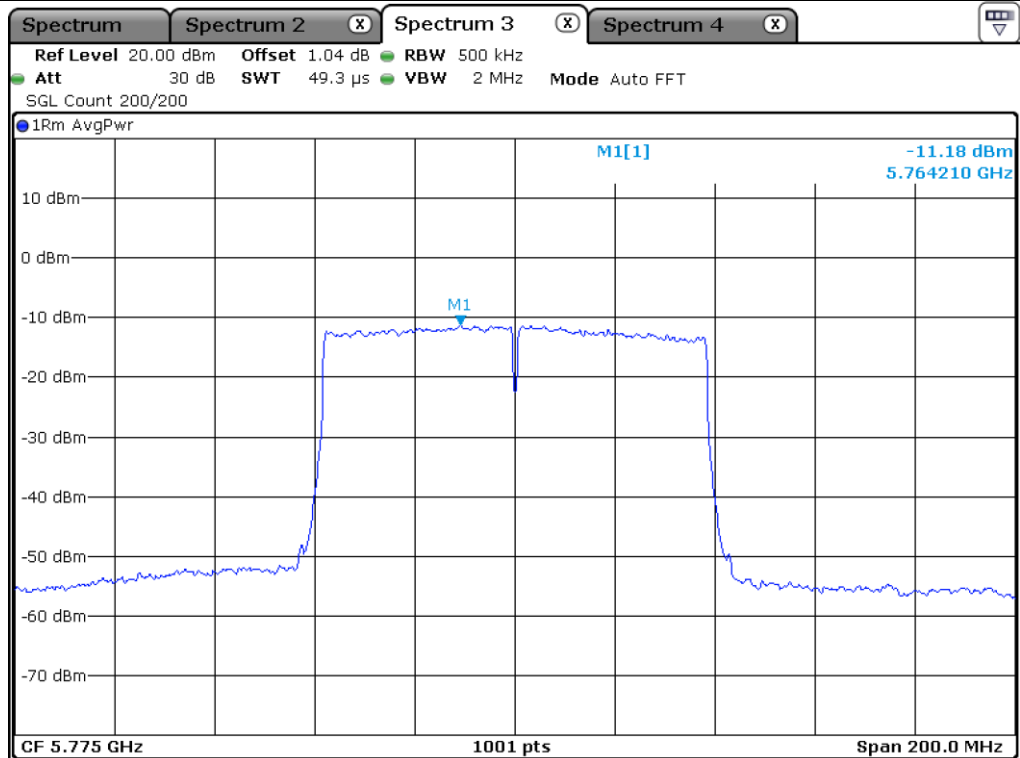
Middle Channel (5 210 MHz)



Middle Channel (5 290 MHz)



Middle Channel (5 530 MHz)



Middle Channel (5 775 MHz)

10.7.3 Test data for Multiple Transmit

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Operating condition : Highest Output Power Transmitting Mode

-. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 210.00	-4.35	11.00	15.35
5 250 ~ 5 350	Low	5 290.00	-4.44	11.00	15.44
5 470 ~ 5 725	Low	5 530.00	-4.15	11.00	15.15
5 725 ~ 5 850	Low	5 775.00	-8.05	30.00	38.05



Tested by: Tae-Ho, Kim / Senior Manager

10.7.4 Test data for Staddle Channel_Antenna 0

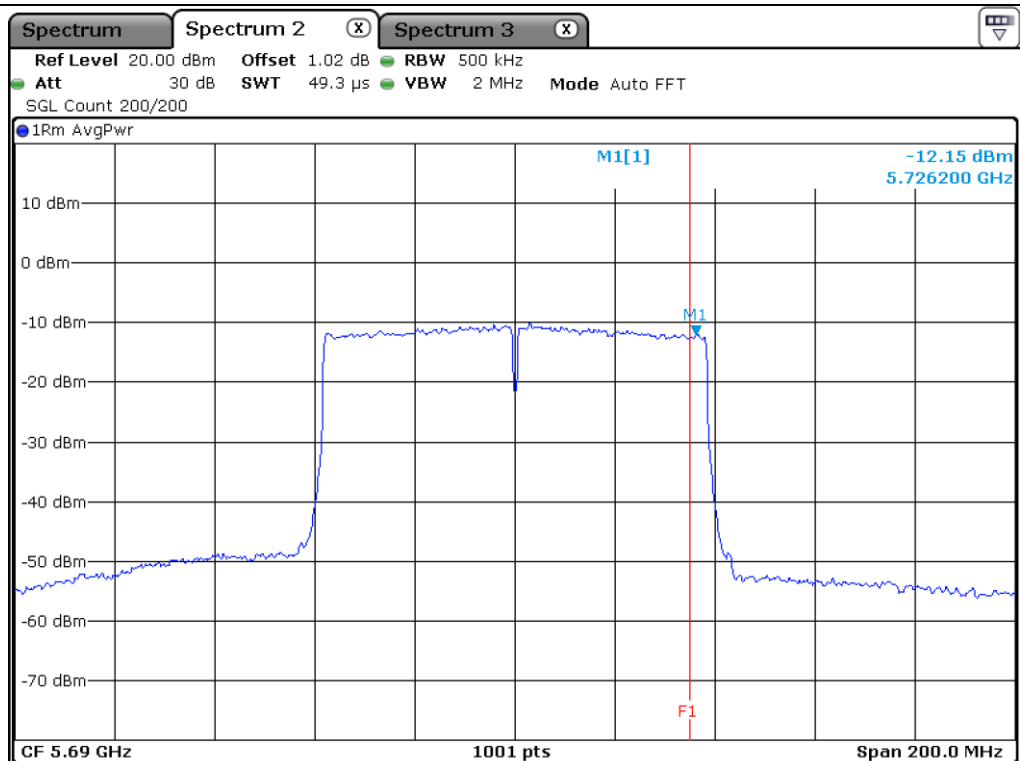
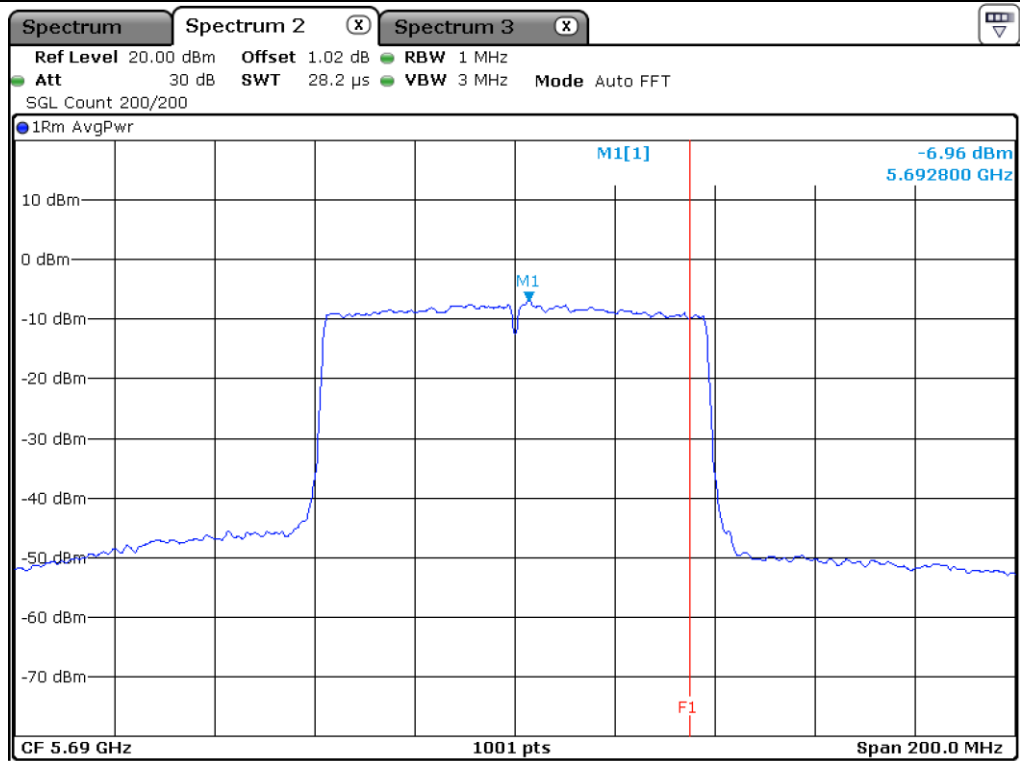
-. Test Date : November 20, 2019 ~ December 02, 2019
 -. Operating condition : Highest Output Power Transmitting Mode
 -. Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 690.00	-6.96	11.00	17.96
5 725 ~ 5 850	5 690.00	-12.15	30.00	42.15

Remark: See next page for measurement data.



Tested by: Tae-Ho, Kim / Senior Manager



10.7.5 Test data for Staddle Channel_Antenna 1

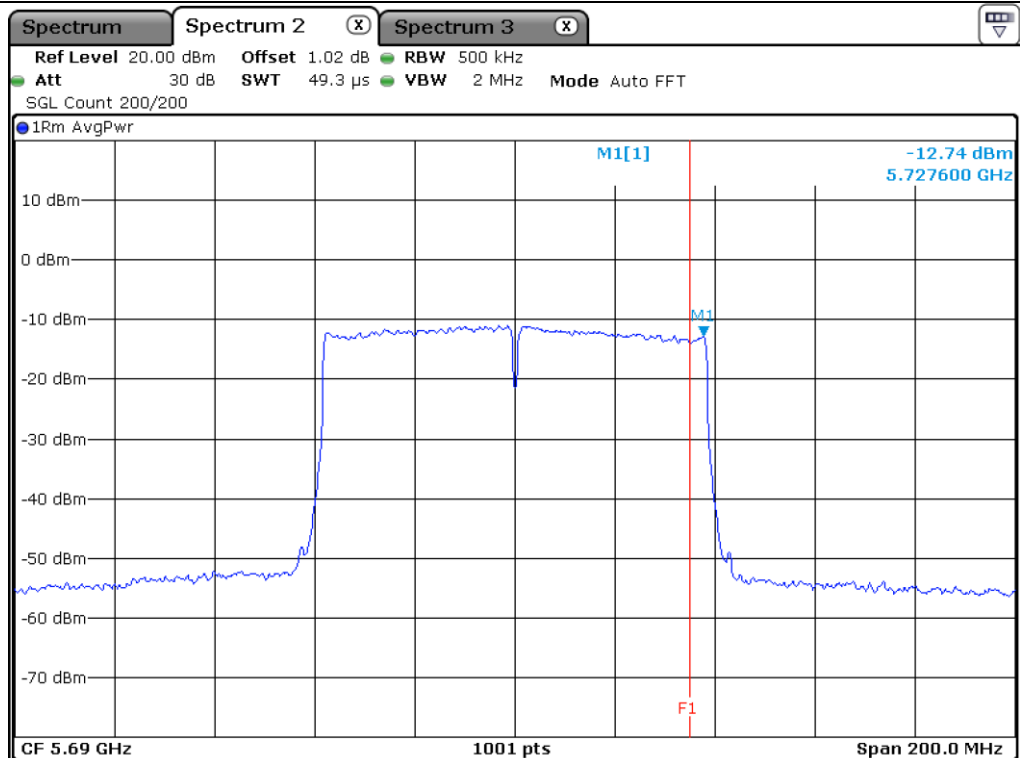
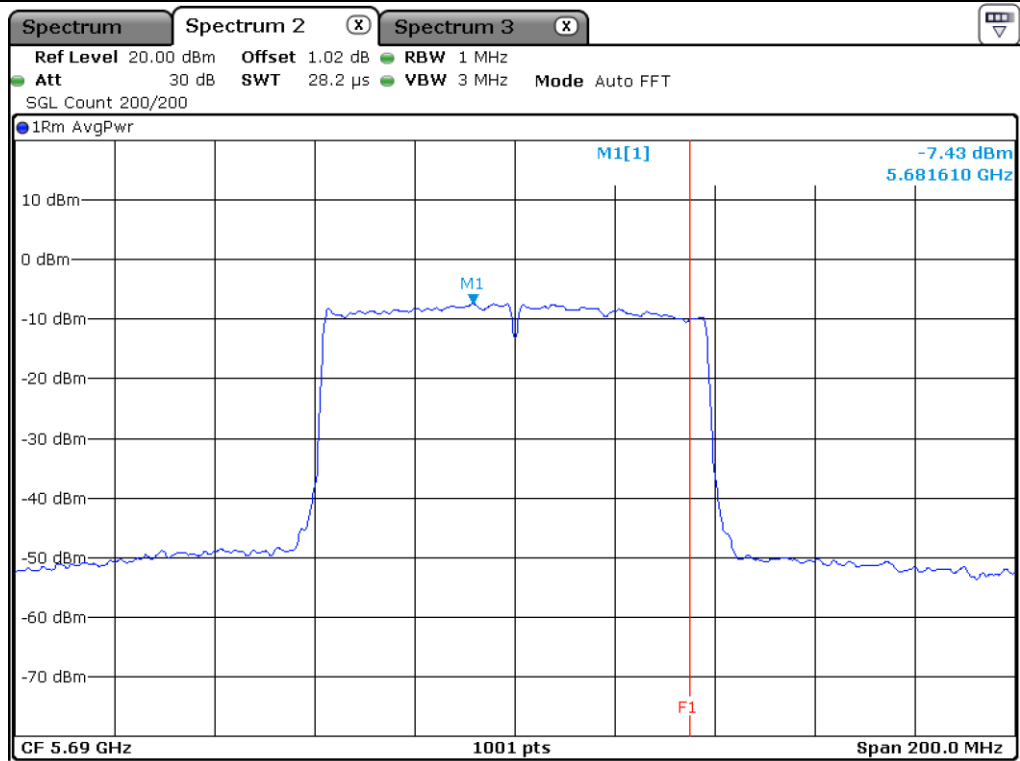
- . Test Date : November 20, 2019 ~ December 02, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 690.00	-7.43	11.00	18.43
5 725 ~ 5 850	5 690.00	-12.74	30.00	42.74

Remark: See next page for measurement data.



Tested by: Tae-Ho, Kim / Senior Manager



10.7.6 Test data for Staddle Channel_Multiple Transmit

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 690.00	-4.18	11.00	15.18
5 725 ~ 5 850	5 690.00	-9.42	30.00	39.42



Tested by: Tae-Ho, Kim / Senior Manager

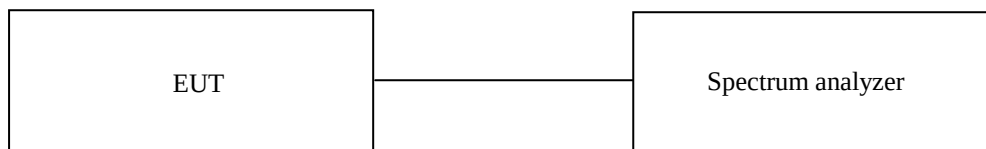
11. FREQUENCY STABILITY WITH TEMPERATURE VARIATION

11.1 Operating environment

Temperature : 23 °C
Relative humidity : 45 % R.H.

11.2 Test set-up

Turn EUT off and set chamber temperature to -20 °C and then allow sufficient time (approximately 20 min to 30 min after chamber reach the assigned temperature) for EUT to stabilize. Turn on the EUT and measure the EUT operating frequency and then turn off the EUT after the measurement. The temperature in the chamber was raised 10 °C step from -20 °C to +80 °C. Repeat above method for frequency measurements every 10 °C step and then record all measured frequencies on each temperature step.



11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)
■ -	SSE-43CI-A	Samkun Tech	Humidity Chamber	60712	Feb. 22, 2019 (1Y)
■ -	H-3005D	FinePower	DC Power supply	FP09092008	Mar. 13, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

11.4 Test Data for U-NII-1

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Result : Pass

Temperature (°C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
-20	5 180 000 000	5 180 039 816	39 816
-10		5 180 028 626	28 626
0		5 180 023 285	23 285
10		5 180 018 526	18 526
20		5 180 016 994	16 994
30		5 180 024 358	24 358
40		5 180 029 358	29 358
50		5 180 035 831	35 831
-20	5 220 000 000	5 220 039 428	39 428
-10		5 220 036 255	36 255
0		5 220 031 537	31 537
10		5 220 028 624	28 624
20		5 220 023 989	23 989
30		5 220 029 345	29 345
40		5 220 034 568	34 568
50		5 220 039 410	39 410
-20	5 240 000 000	5 240 034 301	34 301
-10		5 240 031 286	31 286
0		5 240 026 523	26 523
10		5 240 021 846	21 846
20		5 240 013 985	13 985
30		5 240 019 533	19 533
40		5 240 026 455	26 455
50		5 240 037 955	37 955

Note : While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized.

Four measurements in total are made.(ANSI C63.10-2013)



Tested by: Tae-Ho, Kim / Senior Manager

11.5 Test Data for U-NII-2A

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Result : Pass

Temperature (°C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
-20	5 260 000 000	5 260 039 875	39 875
-10		5 260 028 648	28 648
0		5 260 023 315	23 315
10		5 260 018 552	18 552
20		5 260 016 843	16 843
30		5 260 024 425	24 425
40		5 260 029 402	29 402
50		5 260 035 786	35 786
-20	5 300 000 000	5 300 039 515	39 515
-10		5 300 036 286	36 286
0		5 300 031 456	31 456
10		5 300 028 753	28 753
20		5 300 023 976	23 976
30		5 300 029 452	29 452
40		5 300 034 565	34 565
50		5 300 039 452	39 452
-20	5 320 000 000	5 320 034 315	34 315
-10		5 320 031 253	31 253
0		5 320 026 575	26 575
10		5 320 021 834	21 834
20		5 320 013 951	13 951
30		5 320 019 542	19 542
40		5 320 026 358	26 358
50		5 320 037 832	37 832

Note : While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized.

Four measurements in total are made.(ANSI C63.10-2013)


Tested by: Tae-Ho, Kim / Senior Manager

11.6 Test Data for U-NII-2C

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Result : Pass

Temperature (°C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
-20	5 500 000 000	5 500 039 824	39 824
-10		5 500 028 620	28 620
0		5 500 023 345	23 345
10		5 500 018 452	18 452
20		5 500 016 860	16 860
30		5 500 024 426	24 426
40		5 500 029 312	29 312
50		5 500 035 646	35 646
-20	5 580 000 000	5 580 039 315	39 315
-10		5 580 036 242	36 242
0		5 580 031 503	31 503
10		5 580 028 756	28 756
20		5 580 023 986	23 986
30		5 580 029 546	29 546
40		5 580 034 453	34 453
50		5 580 039 213	39 213
-20	5 700 000 000	5 700 034 345	34 345
-10		5 700 031 264	31 264
0		5 700 026 453	26 453
10		5 700 021 756	21 756
20		5 700 013 893	13 893
30		5 700 019 537	19 537
40		5 700 026 423	26 423
50		5 700 037 806	37 806

Note : While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized.

Four measurements in total are made.(ANSI C63.10-2013)


Tested by: Tae-Ho, Kim / Senior Manager

11.7 Test Data for U-NII-3

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Result : Pass

Temperature (°C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
-20	5 745 000 000	5 745 039 785	39 785
-10		5 745 028 605	28 605
0		5 745 023 526	23 526
10		5 745 018 452	18 452
20		5 745 016 845	16 845
30		5 745 024 563	24 563
40		5 745 029 540	29 540
50		5 745 035 865	35 865
-20	5 785 000 000	5 785 039 532	39 532
-10		5 785 036 315	36 315
0		5 785 031 453	31 453
10		5 785 028 532	28 532
20		5 785 023 983	23 983
30		5 785 029 386	29 386
40		5 785 034 453	34 453
50		5 785 039 365	39 365
-20	5 825 000 000	5 825 034 235	34 235
-10		5 825 031 440	31 440
0		5 825 026 452	26 452
10		5 825 021 756	21 756
20		5 825 013 863	13 863
30		5 825 019 453	19 453
40		5 825 026 538	26 538
50		5 825 037 868	37 868

Note : While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized.

Four measurements in total are made.(ANSI C63.10-2013)


Tested by: Tae-Ho, Kim / Senior Manager

12. FREQUENCY STABILITY WITH VOLTAGE VARIATION

12.1 Operating environment

Temperature : 23 °C
Relative humidity : 45 % R.H.

12.2 Test set-up

An external DC power supply was connected to the input of the EUT. The voltage of EUT set to 110.0 % of the nominal value and then was reduced to 90.0 % of nominal voltage. The output frequency was recorded at each step.



12.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)
■ -	H-3005D	FinePower	DC Power supply	FP09092008	Mar. 13, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

12.4 Test Data for U-NII-1

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Result : Pass

Voltage (VDC)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
5.0	5 180 000 000	5 180 039 553	39553
4.5		5 180 016 523	16523
5.5		5 180 034 686	34686
5.0	5 220 000 000	5 220 039 453	39453
4.5		5 220 016 453	16453
5.5		5 220 034 675	34675
5.0	5 240 000 000	5 240 039 315	39315
4.5		5 240 016 315	16315
5.5		5 240 034 745	34745

12.5 Test Data for U-NII-2A

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Result : Pass

Voltage (VDC)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
5.0	5 260 000 000	5 260 039 453	39 453
4.5		5 260 016 423	16 423
5.5		5 260 034 683	34 683
5.0	5 300 000 000	5 300 039 335	39 335
4.5		5 300 016 464	16 464
5.5		5 300 034 702	34 702
5.0	5 320 000 000	5 320 039 325	39 325
4.5		5 320 016 546	16 546
5.5		5 320 034 686	34 686


 Tested by: Tae-Ho, Kim / Senior Manager

12.6 Test Data for U-NII-2C

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Result : Pass

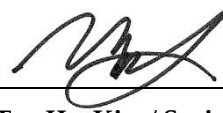
Voltage (VDC)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
5.0	5 500 000 000	5 500 039 297	39 297
4.5		5 500 016 425	16 425
5.5		5 500 034 658	34 658
5.0	5 580 000 000	5 580 039 329	39 329
4.5		5 580 016 483	16 483
5.5		5 580 034 625	34 625
5.0	5 700 000 000	5 700 039 315	39 315
4.5		5 700 016 521	16 521
5.5		5 700 034 698	34 698

12.7 Test Data for U-NII-3

-. Test Date : November 20, 2019 ~ December 02, 2019

-. Result : Pass

Voltage (VDC)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
5.0	5 745 000 000	5 745 039 345	39 345
4.5		5 745 016 525	16 525
5.5		5 745 034 698	34 698
5.0	5 785 000 000	5 785 039 358	39 358
4.5		5 785 016 425	16 425
5.5		5 785 034 684	34 684
5.0	5 825 000 000	5 825 039 289	39 289
4.5		5 825 016 483	16 483
5.5		5 825 034 752	34 752


 Tested by: Tae-Ho, Kim / Senior Manager

13. RADIATED SPURIOUS EMISSIONS

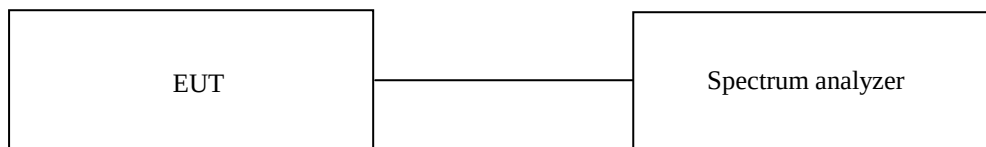
13.1 Operating environment

Temperature : 23 °C
Relative humidity : 45 % R.H.

13.2 Test set-up for conducted 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 40 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.



13.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ - FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)
■ - ESW	Rohde & Schwarz	EMI Test Receiver	101851	Aug. 07, 2019 (1Y)
■ - 310N	Sonoma Instrument	Pre-Amplifier	312544	Mar. 18, 2019 (1Y)
■ - BBV 9718B	Schwarzbeck	Amplifier	009	Mar. 20, 2019 (1Y)
■ - SCU40A	Rohde & Schwarz	Signal Conditioning unit	100436	Mar. 11, 2019 (1Y)
■ - SCU18	Rohde & Schwarz	Signal Conditioning unit	102266	Jul. 24, 2019(1Y)
■ - DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
■ - MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
■ - VULB9163	Schwarzbeck	TRILOG Broadband Antenna	777	Apr. 13, 2018 (2Y)
■ - BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1366	Jul. 16, 2019 (1Y)
■ - BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jan. 16, 2019(1Y)

All test equipment used is calibrated on a regular basis.

13.4 Test data for Below 30 MHz

- . Test Date : November 20, 2019 ~ December 02, 2019
- . 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
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
It was not observed any emissions from the EUT.									


 Tested by: Tae-Ho, Kim / Senior Manager

13.5 Test data for 30 MHz ~ 960 MHz

13.5.1 Test data for WLAN 5 GHz

Humidity Level : 45 % R.H.

Temperature: 23 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

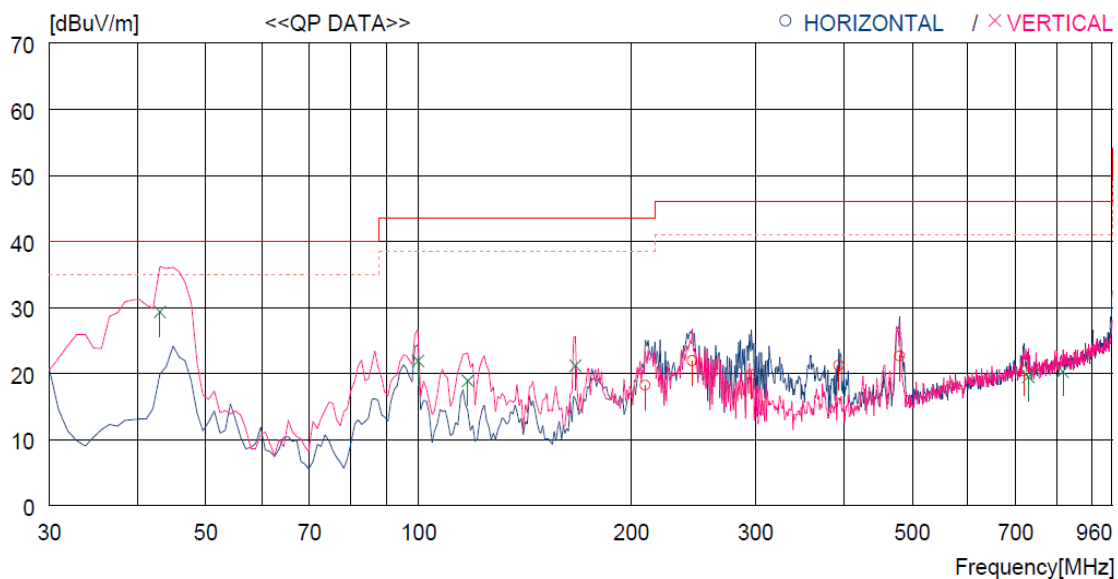
Result : PASSED

EUT : Wi-Fi/BT Transceiver

Date: November 20, 2019 ~ December 02, 2019

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

-.Antenna 0, Antenna 1 and Multiple transmit tested, but the worst data were recorded.



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	209.489	36.8	11.1	3.3	33.0	18.2	43.5	25.3	100	306
2	243.899	38.8	12.4	3.6	32.9	21.9	46.0	24.1	100	105
3	295.979	35.5	13.3	4.0	33.0	19.8	46.0	26.2	100	359
4	393.628	34.0	15.7	4.6	33.1	21.2	46.0	24.8	100	121
5	480.117	33.7	17.0	5.1	33.2	22.6	46.0	23.4	100	359
6	720.055	27.1	20.3	6.2	33.3	20.3	46.0	25.7	100	215
----- Vertical -----										
7	43.020	46.5	14.4	1.5	33.1	29.3	40.0	10.7	100	0
8	99.750	40.1	12.5	2.3	33.0	21.9	43.5	21.6	100	0
9	117.420	38.7	10.7	2.5	33.0	18.9	43.5	24.6	100	0
10	166.710	42.2	9.0	3.0	33.0	21.2	43.5	22.3	100	0
11	730.285	26.0	20.4	6.3	33.2	19.5	46.0	26.5	100	0
12	816.775	25.3	21.3	6.7	33.0	20.3	46.0	25.7	100	0


Tested by: Tae-Ho, Kim / Senior Manager

13.5.2 Test data for Intermodulation Mode(Bluetooth LE + WLAN 5 GHz)

Humidity Level : 45 % R.H.

Temperature: 23 °C

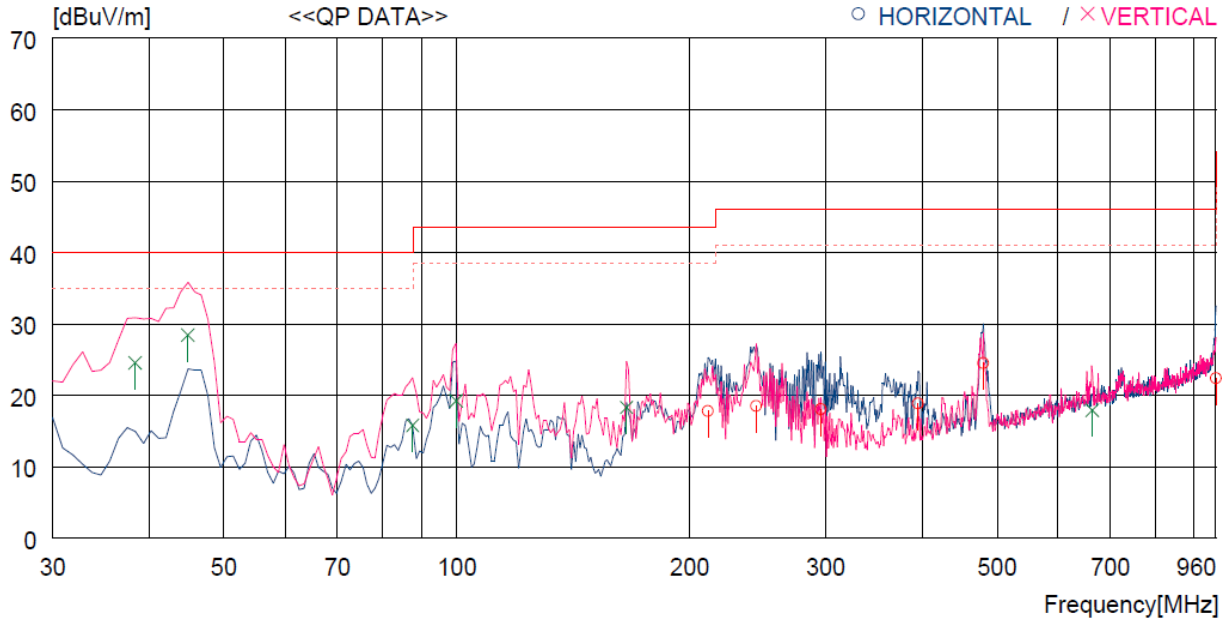
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wi-Fi/BT Transceiver

Date: November 20, 2019 ~ December 02, 2019

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
		[dBuV]	[dB]							
----- Horizontal -----										
1	211.349	37.0	11.1	2.8	33.1	17.8	43.5	25.7	100	278
2	243.899	36.1	12.4	3.0	33.0	18.5	46.0	27.5	100	1
3	295.979	34.4	13.3	3.3	33.0	18.0	46.0	28.0	100	1
4	395.488	32.5	15.8	3.7	33.2	18.8	46.0	27.2	100	1
5	480.117	36.6	17.0	4.2	33.3	24.5	46.0	21.5	100	204
6	960.000	24.6	23.3	6.4	31.9	22.4	46.0	23.6	100	278
----- Vertical -----										
7	38.370	42.3	13.9	1.4	33.1	24.5	40.0	15.5	100	7
8	44.880	45.5	14.5	1.5	33.1	28.4	40.0	11.6	100	7
9	87.660	36.6	10.3	2.0	33.1	15.8	40.0	24.2	100	177
10	99.750	37.8	12.5	2.0	33.1	19.2	43.5	24.3	100	337
11	165.780	39.9	8.9	2.5	33.0	18.3	43.5	25.2	100	359
12	663.326	26.4	19.8	5.1	33.4	17.9	46.0	28.1	100	359


Tested by: Tae-Ho, Kim / Senior Manager

13.5.3 Test data for Intermodulation Mode(Bluetooth + WLAN 5 GHz)

Humidity Level : 45 % R.H.

Temperature: 23 °C

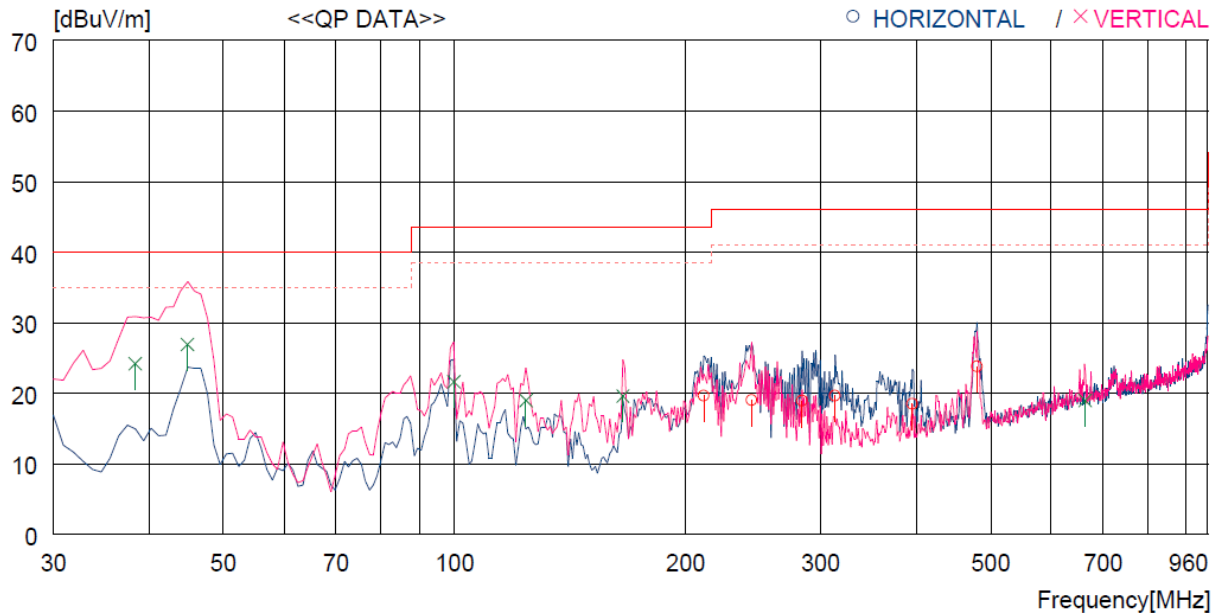
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wi-Fi/BT Transceiver

Date: November 20, 2019 ~ December 02, 2019

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	211.349	38.8	11.1	2.8	33.1	19.6	43.5	23.9	100	278
2	243.899	36.6	12.4	3.0	33.0	19.0	46.0	27.0	100	1
3	283.889	35.5	13.2	3.2	33.0	18.9	46.0	27.1	100	1
4	313.649	35.5	13.8	3.4	33.1	19.6	46.0	26.4	100	1
5	395.488	32.2	15.8	3.7	33.2	18.5	46.0	27.5	100	1
6	480.117	35.9	17.0	4.2	33.3	23.8	46.0	22.2	100	204
----- Vertical -----										
7	38.370	42.0	13.9	1.4	33.1	24.2	40.0	15.8	100	7
8	44.880	44.0	14.5	1.5	33.1	26.9	40.0	13.1	100	7
9	99.750	40.2	12.5	2.0	33.1	21.6	43.5	21.9	100	337
10	123.930	40.0	9.9	2.2	33.1	19.0	43.5	24.5	100	202
11	165.780	41.2	8.9	2.5	33.0	19.6	43.5	23.9	100	359
12	663.326	27.5	19.8	5.1	33.4	19.0	46.0	27.0	100	359


Tested by: Tae-Ho, Kim / Senior Manager

13.6 Test data for Above 1 GHz

13.6.1 Test data for Frequency UNII I

13.6.1.1 Test data for 802.11a RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
10 360.00	14.05	Peak	H	36.70	7.84	58.59	68.20	9.61
10 360.00	12.36	Peak	V	36.70	7.84	56.90	68.20	11.30
Middle Channel								
10 440.00	15.25	Peak	H	36.80	7.78	59.83	68.20	8.37
10 440.00	14.54	Peak	V	36.80	7.78	59.12	68.20	9.08
High Channel								
10 480.00	14.18	Peak	H	36.90	7.93	59.01	68.20	9.19
10 480.00	14.15	Peak	V	36.90	7.93	58.98	68.20	9.22

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

13.6.1.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
10 360.00	14.44	Peak	H	36.70	7.84	58.98	68.20	9.22
10 360.00	13.45	Peak	V	36.70	7.84	57.99	68.20	10.21
Middle Channel								
10 440.00	13.10	Peak	H	36.80	7.78	57.68	68.20	10.52
10 440.00	11.98	Peak	V	36.80	7.78	56.56	68.20	11.64
High Channel								
10 480.00	15.39	Peak	H	36.90	7.93	60.22	68.20	7.98
10 480.00	14.57	Peak	V	36.90	7.93	59.40	68.20	8.80

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

13.6.1.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
10 380.00	14.31	Peak	H	36.70	7.84	58.85	68.20	9.35
10 380.00	13.07	Peak	V	36.70	7.84	57.61	68.20	10.59
High Channel								
10 460.00	13.78	Peak	H	36.90	7.93	58.61	68.20	9.59
10 460.00	13.14	Peak	V	36.90	7.93	57.97	68.20	10.23

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

13.6.1.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Middle Channel								
10 420.00	14.35	Peak	H	36.80	7.87	59.02	68.20	9.18
10 420.00	13.10	Peak	V	36.80	7.87	57.77	68.20	10.43

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)


 Tested by: Tae-Ho, Kim / Senior Manager

13.6.2 Test data for Frequency UNII 2A

13.6.2.1 Test data for 802.11a RLAN Mode

- Test Date : November 20, 2019 ~ December 02, 2019
- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 40 GHz
- Measurement distance : 3 m
- Duty Cycle : > 98 %
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
10 520.00	14.52	Peak	H	36.90	7.93	59.35	68.20	8.85
10 520.00	13.68	Peak	V	36.90	7.93	58.51	68.20	9.69
Middle Channel								
10 600.00	14.81	Peak	H	36.90	7.75	59.46	74.00	14.54
10 600.00	3.21	Average	H	36.90	7.75	47.86	54.00	6.14
10 600.00	13.91	Peak	V	36.90	7.75	58.56	74.00	15.44
10 600.00	3.58	Average	V	36.90	7.75	48.23	54.00	5.77
High Channel								
10 640.00	14.01	Peak	H	36.90	7.77	58.68	74.00	15.32
10 640.00	3.67	Average	H	36.90	7.77	48.34	54.00	5.66
10 640.00	13.97	Peak	V	36.90	7.77	58.64	74.00	15.36
10 640.00	3.15	Average	V	36.90	7.77	47.82	54.00	6.18

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

13.6.2.2 Test data for 802.11n_HT20 RLAN Mode

- Test Date : November 20, 2019 ~ December 02, 2019
- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 40 GHz
- Measurement distance : 3 m
- Duty Cycle : > 98 %
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
10 520.00	15.45	Peak	H	36.90	7.93	60.28	68.20	7.92
10 520.00	14.04	Peak	V	36.90	7.93	58.87	68.20	9.33
Middle Channel								
10 600.00	14.39	Peak	H	36.90	7.75	59.04	74.00	14.96
10 600.00	2.83	Average	H	36.90	7.75	47.48	54.00	6.52
10 600.00	13.25	Peak	V	36.90	7.75	57.90	74.00	16.10
10 600.00	4.29	Average	V	36.90	7.75	48.94	54.00	5.06
High Channel								
10 640.00	13.97	Peak	H	36.90	7.77	58.64	74.00	15.36
10 640.00	4.56	Average	H	36.90	7.77	49.23	54.00	4.77
10 640.00	13.39	Peak	V	36.90	7.77	58.06	74.00	15.94
10 640.00	3.21	Average	V	36.90	7.77	47.88	54.00	6.12

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)


 Tested by: Tae-Ho, Kim / Senior Manager

13.6.2.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
10 540.00	14.02	Peak	H	36.90	7.97	58.89	68.20	9.31
10 540.00	12.68	Peak	V	36.90	7.97	57.55	68.20	10.65
High Channel								
10 620.00	14.69	Peak	H	36.90	7.77	59.36	74.00	14.64
10 620.00	3.83	Average	H	36.90	7.77	48.50	54.00	5.50
10 620.00	14.91	Peak	V	36.90	7.77	59.58	74.00	14.42
10 620.00	3.71	Average	V	36.90	7.77	48.38	54.00	5.62

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)


Tested by: Tae-Ho, Kim / Senior Manager

13.6.2.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Middle Channel								
10 580.00	13.87	Peak	H	36.90	7.84	58.61	68.20	9.59
10 580.00	14.39	Peak	V	36.90	7.84	59.13	68.20	9.07

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)


 Tested by: Tae-Ho, Kim / Senior Manager

13.6.3 Test data for Frequency UNII 2C

13.6.3.1 Test data for 802.11a RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
11 000.00	13.60	Peak	H	37.40	7.90	58.90	74.00	15.10
11 000.00	3.06	Average	H	37.40	7.90	48.36	54.00	5.64
11 000.00	14.86	Peak	V	37.40	7.90	60.16	74.00	13.84
11 000.00	3.14	Average	V	37.40	7.90	48.44	54.00	5.56
Middle Channel								
11 160.00	14.46	Peak	H	36.90	8.16	59.52	74.00	14.48
11 160.00	3.89	Average	H	36.90	8.16	48.95	54.00	5.05
11 160.00	14.56	Peak	V	36.90	8.16	59.62	74.00	14.38
11 160.00	3.92	Average	V	36.90	8.16	48.98	54.00	5.02
High Channel								
11 400.00	14.91	Peak	H	37.10	8.14	60.15	74.00	13.85
11 400.00	3.72	Average	H	37.10	8.14	48.96	54.00	5.04
11 400.00	13.27	Peak	V	37.10	8.14	58.51	74.00	15.49
11 400.00	3.54	Average	V	37.10	8.14	48.78	54.00	5.22

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

13.6.3.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
11 000.00	14.15	Peak	H	37.40	7.90	59.45	74.00	14.55
11 000.00	2.65	Average	H	37.40	7.90	47.95	54.00	6.05
11 000.00	14.04	Peak	V	37.40	7.90	59.34	74.00	14.66
11 000.00	3.81	Average	V	37.40	7.90	49.11	54.00	4.89
Middle Channel								
11 160.00	14.52	Peak	H	36.90	8.16	59.58	74.00	14.42
11 160.00	2.94	Average	H	36.90	8.16	48.00	54.00	6.00
11 160.00	14.74	Peak	V	36.90	8.16	59.80	74.00	14.20
11 160.00	4.49	Average	V	36.90	8.16	49.55	54.00	4.45
High Channel								
11 400.00	13.79	Peak	H	37.10	8.14	59.03	74.00	14.97
11 400.00	3.01	Average	H	37.10	8.14	48.25	54.00	5.75
11 400.00	14.40	Peak	V	37.10	8.14	59.64	74.00	14.36
11 400.00	3.60	Average	V	37.10	8.14	48.84	54.00	5.16

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

13.6.3.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
11 020.00	14.52	Peak	H	37.40	7.90	59.82	74.00	14.18
11 020.00	2.77	Average	H	37.40	7.90	48.07	54.00	5.93
11 020.00	14.76	Peak	V	37.40	7.90	60.06	74.00	13.94
11 020.00	2.58	Average	V	37.40	7.90	47.88	54.00	6.12
Middle Channel								
11 100.00	15.11	Peak	H	36.90	8.16	60.17	74.00	13.83
11 100.00	4.34	Average	H	36.90	8.16	49.40	54.00	4.60
11 100.00	14.32	Peak	V	36.90	8.16	59.38	74.00	14.62
11 100.00	3.35	Average	V	36.90	8.16	48.41	54.00	5.59
High Channel								
11 340.00	14.47	Peak	H	37.10	8.14	59.71	74.00	14.29
11 340.00	3.68	Average	H	37.10	8.14	48.92	54.00	5.08
11 340.00	13.03	Peak	V	37.10	8.14	58.27	74.00	15.73
11 340.00	3.50	Average	V	37.10	8.14	48.74	54.00	5.26

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

13.6.3.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Middle Channel								
11 060.00	14.60	Peak	H	36.90	8.16	59.66	68.20	8.54
11 060.00	14.54	Peak	V	36.90	8.16	59.60	68.20	8.60

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)


 Tested by: Tae-Ho, Kim / Senior Manager

13.6.4 Test data for Frequency UNII 3

13.6.4.1 Test data for 802.11a RLAN Mode

- Test Date : November 20, 2019 ~ December 02, 2019
- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 40 GHz
- Measurement distance : 3 m
- Duty Cycle : > 98 %
- Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
11 490.00	14.16	Peak	H	37.20	8.32	59.68	74.00	14.32
11 490.00	3.67	Average	H	37.20	8.32	49.19	54.00	4.81
11 490.00	13.84	Peak	V	37.20	8.32	59.36	74.00	14.64
11 490.00	2.62	Average	V	37.20	8.32	48.14	54.00	5.86
Middle Channel								
11 570.00	14.39	Peak	H	37.00	8.17	59.56	74.00	14.44
11 570.00	2.65	Average	H	37.00	8.17	47.82	54.00	6.18
11 570.00	14.11	Peak	V	37.00	8.17	59.28	74.00	14.72
11 570.00	2.49	Average	V	37.00	8.17	47.66	54.00	6.34
High Channel								
11 650.00	14.79	Peak	H	36.90	8.20	59.89	74.00	14.11
11 650.00	3.92	Average	H	36.90	8.20	49.02	54.00	4.98
11 650.00	13.47	Peak	V	36.90	8.20	58.57	74.00	15.43
11 650.00	3.41	Average	V	36.90	8.20	48.51	54.00	5.49

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)


Tested by: Tae-Ho, Kim / Senior Manager

13.6.4.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
11 490.00	14.75	Peak	H	37.20	8.32	60.27	74.00	13.73
11 490.00	3.19	Average	H	37.20	8.32	48.71	54.00	5.29
11 490.00	14.66	Peak	V	37.20	8.32	60.18	74.00	13.82
11 490.00	2.84	Average	V	37.20	8.32	48.36	54.00	5.64
Middle Channel								
11 570.00	13.93	Peak	H	37.00	8.17	59.10	74.00	14.90
11 570.00	3.78	Average	H	37.00	8.17	48.95	54.00	5.05
11 570.00	14.32	Peak	V	37.00	8.17	59.49	74.00	14.51
11 570.00	3.96	Average	V	37.00	8.17	49.13	54.00	4.87
High Channel								
11 650.00	13.18	Peak	H	36.90	8.20	58.28	74.00	15.72
11 650.00	2.65	Average	H	36.90	8.20	47.75	54.00	6.25
11 650.00	13.08	Peak	V	36.90	8.20	58.18	74.00	15.82
11 650.00	2.43	Average	V	36.90	8.20	47.53	54.00	6.47

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

13.6.4.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
11 510.00	13.98	Peak	H	37.20	8.32	59.50	74.00	14.50
11 510.00	3.48	Average	H	37.20	8.32	49.00	54.00	5.00
11 510.00	13.83	Peak	V	37.20	8.32	59.35	74.00	14.65
11 510.00	4.16	Average	V	37.20	8.32	49.68	54.00	4.32
High Channel								
11 590.00	15.19	Peak	H	36.60	8.20	59.99	74.00	14.01
11 590.00	3.87	Average	H	36.60	8.20	48.67	54.00	5.33
11 590.00	14.88	Peak	V	36.60	8.20	59.68	74.00	14.32
11 590.00	3.95	Average	V	36.60	8.20	48.75	54.00	5.25

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

13.6.4.4 Test data for 802.11ac_HT80 RLAN Mode

13.6.4.4.1 Test data for Multiple Transmit

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 40 GHz
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Middle Channel								
11 550.00	13.81	Peak	H	36.80	8.25	58.86	68.20	9.34
11 550.00	14.03	Peak	V	36.80	8.25	59.08	68.20	9.12

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)


Tested by: Tae-Ho, Kim / Senior Manager

14. RADIATED RESTRICTED BAND EDGE MEASUREMENTS

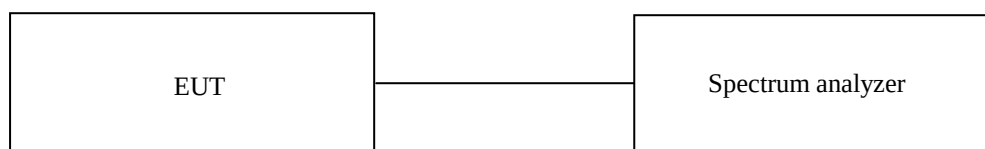
14.1 Operating environment

Temperature : 23 °C
Relative humidity : 45 % R.H.

14.2 Test set-up for conducted measurement

The radiated emissions measurements were performed on the 3 m, open-field test site. The EUT was placed on a non-conductive turntable above the ground plane.

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.



14.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)
■ -	ESW	Rohde & Schwarz	EMI Test Receiver	101851	Aug. 07, 2019 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Mar. 18, 2019 (1Y)
□ -	BBV9718	Schwarzbeck	Amplifier	310	Mar. 28, 2019 (1Y)
■ -	DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
■ -	MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	777	Apr. 13, 2018 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1366	Jul. 16, 2019 (1Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jan. 16, 2019(1Y)

All test equipment used is calibrated on a regular basis.

14.4 Test data for Frequency UNII I

14.4.1 Test data for 802.11a RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4 899.680	18.72	Peak	H	28.90	4.98	52.60	74.00	21.40
4 970.450	10.48	Average	H	28.90	4.98	44.36	54.00	9.64
5 054.220	19.17	Peak	V	28.90	4.98	53.05	74.00	20.95
4 743.180	10.15	Average	V	28.90	4.98	44.03	54.00	9.97

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

14.4.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4 896.430	18.83	Peak	H	28.90	4.98	52.71	74.00	21.29
4 896.430	10.53	Average	H	28.90	4.98	44.41	54.00	9.59
5 118.510	18.86	Peak	V	28.90	4.98	52.74	74.00	21.26
4 976.300	10.66	Average	V	28.90	4.98	44.54	54.00	9.46

Tabulated test data for Restricted Band

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

$$\text{Margin (dB)} = \text{Limits (dBμV/m)} - \text{Emission Level (dBμV/m)}$$


 Tested by: Tae-Ho, Kim / Senior Manager

14.4.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
5 025.650	18.83	Peak	H	28.90	4.98	52.71	74.00	21.29
5 081.490	9.92	Average	H	28.90	4.98	43.80	54.00	10.20
5 067.860	19.27	Peak	V	28.90	4.98	53.15	74.00	20.85
4 991.880	10.22	Average	V	28.90	4.98	44.10	54.00	9.90

Tabulated test data for Restricted Band

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

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


 Tested by: Tae-Ho, Kim / Senior Manager

14.4.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
4 902.270	19.24	Peak	H	28.90	4.98	53.12	74.00	20.88
4 973.050	10.05	Average	H	28.90	4.98	43.93	54.00	10.07
5 038.640	19.17	Peak	V	28.90	4.98	53.05	74.00	20.95
4 969.810	10.06	Average	V	28.90	4.98	43.94	54.00	10.06

Tabulated test data for Restricted Band

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

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


 Tested by: Tae-Ho, Kim / Senior Manager

14.5 Test data for Frequency UNII 2A

14.5.1 Test data for 802.11a RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
5 403.460	19.82	Peak	H	28.40	5.24	53.46	74.00	20.54
5 447.090	9.32	Average	H	28.40	5.24	42.96	54.00	11.04
5 454.890	19.46	Peak	V	28.40	5.24	53.10	74.00	20.90
5 449.180	9.19	Average	V	28.40	5.24	42.83	54.00	11.17

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

14.5.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
5 446.760	20.02	Peak	H	28.40	5.24	53.66	74.00	20.34
5 454.560	9.07	Average	H	28.40	5.24	42.71	54.00	11.29
5 453.350	20.62	Peak	V	28.40	5.24	54.26	74.00	19.74
5 449.840	9.08	Average	V	28.40	5.24	42.72	54.00	11.28

Tabulated test data for Restricted Band

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

$$\text{Margin (dB)} = \text{Limits (dBμV/m)} - \text{Emission Level (dBμV/m)}$$


 Tested by: Tae-Ho, Kim / Senior Manager

14.5.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
5 448.740	19.92	Peak	H	28.40	5.24	53.56	74.00	20.44
5 447.970	9.22	Average	H	28.40	5.24	42.86	54.00	11.14
5 365.770	19.57	Peak	V	28.40	5.24	53.21	74.00	20.79
5 450.600	9.10	Average	V	28.40	5.24	42.74	54.00	11.26

Tabulated test data for Restricted Band

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

$$\text{Margin (dB)} = \text{Limits (dBμV/m)} - \text{Emission Level (dBμV/m)}$$


 Tested by: Tae-Ho, Kim / Senior Manager

14.5.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
5 451.150	20.33	Peak	H	28.40	5.24	53.97	74.00	20.03
5 448.410	9.14	Average	H	28.40	5.24	42.78	54.00	11.22
5 452.580	19.62	Peak	V	28.40	5.24	53.26	74.00	20.74
5 448.520	9.15	Average	V	28.40	5.24	42.79	54.00	11.21

Tabulated test data for Restricted Band

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

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


 Tested by: Tae-Ho, Kim / Senior Manager

14.6 Test data for Frequency UNII 2C

14.6.1 Test data for 802.11a RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
5 447.310	20.05	Peak	H	28.40	5.24	53.69	74.00	20.31
5 447.750	9.33	Average	H	28.40	5.24	42.97	54.00	11.03
5 430.930	19.60	Peak	V	28.40	5.24	53.24	74.00	20.76
5 446.870	9.22	Average	V	28.40	5.24	42.86	54.00	11.14

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

14.6.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
5 451.810	19.60	Peak	H	28.40	5.24	53.24	74.00	20.76
5 450.710	9.13	Average	H	28.40	5.24	42.77	54.00	11.23
5 452.360	19.82	Peak	V	28.40	5.24	53.46	74.00	20.54
5 446.980	9.27	Average	V	28.40	5.24	42.91	54.00	11.09

Tabulated test data for Restricted Band

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

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


 Tested by: Tae-Ho, Kim / Senior Manager

14.6.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
5 447.530	20.34	Peak	H	28.40	5.24	53.98	74.00	20.02
5 453.350	9.13	Average	H	28.40	5.24	42.77	54.00	11.23
5 459.730	19.74	Peak	V	28.40	5.24	53.38	74.00	20.62
5 447.860	9.17	Average	V	28.40	5.24	42.81	54.00	11.19

Tabulated test data for Restricted Band

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

$$\text{Margin (dB)} = \text{Limits (dBμV/m)} - \text{Emission Level (dBμV/m)}$$


 Tested by: Tae-Ho, Kim / Senior Manager

14.6.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
5 452.800	19.46	Peak	H	28.40	5.24	53.10	74.00	20.90
5 447.640	9.18	Average	H	28.40	5.24	42.82	54.00	11.18
5 451.040	20.19	Peak	V	28.40	5.24	53.83	74.00	20.17
5 450.490	9.05	Average	V	28.40	5.24	42.69	54.00	11.31

Tabulated test data for Restricted Band

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

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


 Tested by: Tae-Ho, Kim / Senior Manager

14.7 Test data for Frequency U-NII-3

14.7.1 Test data for 802.11a RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
5 650.000	30.69	Peak	H	28.80	5.39	64.88	80.00	15.12
5 710.000	30.19	Peak	H	28.80	5.39	64.38	119.80	55.42
5 715.000	31.19	Peak	H	28.80	5.39	65.38	121.20	55.82
5 725.000	30.61	Peak	H	28.80	5.39	64.80	134.00	69.20
5 707.360	32.44	Peak	H	28.80	5.39	66.63	119.06	52.43
5 650.000	30.22	Peak	V	28.80	5.39	64.41	80.00	15.59
5 710.000	31.18	Peak	V	28.80	5.39	65.37	119.80	54.43
5 715.000	31.01	Peak	V	28.80	5.39	65.20	121.20	56.00
5 725.000	31.56	Peak	V	28.80	5.39	65.75	134.00	68.25
5 674.310	31.98	Peak	V	28.80	5.39	66.17	97.99	31.82

High Channel								
5 850.000	31.99	Peak	H	29.30	5.55	66.84	134.00	67.16
5 855.000	31.79	Peak	H	29.30	5.55	66.64	122.60	55.96
5 875.000	31.51	Peak	H	29.30	5.55	66.36	117.00	50.64
5 925.000	32.18	Peak	H	29.30	5.55	67.03	80.00	12.97
5 883.840	32.46	Peak	H	29.30	5.55	67.31	110.46	43.15
5 850.000	31.94	Peak	V	29.30	5.55	66.79	134.00	67.21
5 855.000	31.68	Peak	V	29.30	5.55	66.53	122.60	56.07
5 875.000	31.54	Peak	V	29.30	5.55	66.39	117.00	50.61
5 925.000	32.02	Peak	V	29.30	5.55	66.87	80.00	13.13
5 900.320	32.65	Peak	V	29.30	5.55	67.50	98.26	30.76

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

14.7.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
5 650.000	30.22	Peak	H	28.80	5.39	64.41	80.00	15.59
5 710.000	30.23	Peak	H	28.80	5.39	64.42	119.80	55.38
5 715.000	30.75	Peak	H	28.80	5.39	64.94	121.20	56.26
5 725.000	30.48	Peak	H	28.80	5.39	64.67	134.00	69.33
5 703.160	30.86	Peak	H	28.80	5.39	65.05	117.88	52.83
5 650.000	30.16	Peak	V	28.80	5.39	64.35	80.00	15.65
5 710.000	30.39	Peak	V	28.80	5.39	64.58	119.80	55.22
5 715.000	31.72	Peak	V	28.80	5.39	65.91	121.20	55.29
5 725.000	31.24	Peak	V	28.80	5.39	65.43	134.00	68.57
5 683.650	31.95	Peak	V	28.80	5.39	66.14	104.90	38.76

High Channel								
5 850.000	31.87	Peak	H	29.30	5.55	66.72	134.00	67.28
5 855.000	32.00	Peak	H	29.30	5.55	66.85	122.60	55.75
5 875.000	31.89	Peak	H	29.30	5.55	66.74	117.00	50.26
5 925.000	31.80	Peak	H	29.30	5.55	66.65	80.00	13.35
5 904.990	32.61	Peak	H	29.30	5.55	67.46	94.81	27.35
5 850.000	31.37	Peak	V	29.30	5.55	66.22	134.00	67.78
5 855.000	31.50	Peak	V	29.30	5.55	66.35	122.60	56.25
5 875.000	31.55	Peak	V	29.30	5.55	66.40	117.00	50.60
5 925.000	31.28	Peak	V	29.30	5.55	66.13	80.00	13.87
5 886.040	32.63	Peak	V	29.30	5.55	67.48	108.83	41.35

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

14.7.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel								
5 650.000	30.59	Peak	H	28.80	5.39	64.78	80.00	15.22
5 710.000	30.40	Peak	H	28.80	5.39	64.59	119.80	55.21
5 715.000	30.94	Peak	H	28.80	5.39	65.13	121.20	56.07
5 725.000	30.76	Peak	H	28.80	5.39	64.95	134.00	69.05
5 677.060	32.22	Peak	H	28.80	5.39	66.41	100.02	33.61
5 650.000	31.18	Peak	V	28.80	5.39	65.37	80.00	14.63
5 710.000	30.57	Peak	V	28.80	5.39	64.76	119.80	55.04
5 715.000	31.26	Peak	V	28.80	5.39	65.45	121.20	55.75
5 725.000	31.52	Peak	V	28.80	5.39	65.71	134.00	68.29
5 692.720	32.47	Peak	V	28.80	5.39	66.66	111.61	44.95

High Channel								
5 850.000	31.86	Peak	H	29.30	5.55	66.71	134.00	67.29
5 855.000	31.66	Peak	H	29.30	5.55	66.51	122.60	56.09
5 875.000	31.66	Peak	H	29.30	5.55	66.51	117.00	50.49
5 925.000	31.63	Peak	H	29.30	5.55	66.48	80.00	13.52
5 906.090	32.67	Peak	H	29.30	5.55	67.52	93.99	26.47
5 850.000	32.19	Peak	V	29.30	5.55	67.04	134.00	66.96
5 855.000	31.89	Peak	V	29.30	5.55	66.74	122.60	55.86
5 875.000	31.80	Peak	V	29.30	5.55	66.65	117.00	50.35
5 925.000	32.16	Peak	V	29.30	5.55	67.01	80.00	12.99
5 877.800	32.86	Peak	V	29.30	5.55	67.71	114.93	47.22

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)


Tested by: Tae-Ho, Kim / Senior Manager

14.7.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : > 98 %
- . Result : Pass

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Middle Channel								
5 650.000	30.72	Peak	H	28.80	5.39	64.91	80.00	15.09
5 710.000	30.39	Peak	H	28.80	5.39	64.58	119.80	55.22
5 715.000	30.32	Peak	H	28.80	5.39	64.51	121.20	56.69
5 725.000	30.72	Peak	H	28.80	5.39	64.91	134.00	69.09
5 689.230	32.02	Peak	H	28.80	5.39	66.21	109.03	42.82
5 650.000	30.70	Peak	V	28.80	5.39	64.89	80.00	15.11
5 710.000	30.41	Peak	V	28.80	5.39	64.60	119.80	55.20
5 715.000	31.36	Peak	V	28.80	5.39	65.55	121.20	55.65
5 725.000	31.47	Peak	V	28.80	5.39	65.66	134.00	68.34
5 707.360	32.86	Peak	V	28.80	5.39	67.05	119.06	52.01

Middle Channel								
5 850.000	31.77	Peak	H	29.30	5.55	66.62	134.00	67.38
5 855.000	32.30	Peak	H	29.30	5.55	67.15	122.60	55.45
5 875.000	32.07	Peak	H	29.30	5.55	66.92	117.00	50.08
5 925.000	31.77	Peak	H	29.30	5.55	66.62	80.00	13.38
5 906.090	32.53	Peak	H	29.30	5.55	67.38	93.99	26.61
5 850.000	31.83	Peak	V	29.30	5.55	66.68	134.00	67.32
5 855.000	31.74	Peak	V	29.30	5.55	66.59	122.60	56.01
5 875.000	32.36	Peak	V	29.30	5.55	67.21	117.00	49.79
5 925.000	31.42	Peak	V	29.30	5.55	66.27	80.00	13.73
5 901.700	32.90	Peak	V	29.30	5.55	67.75	97.24	29.49

Tabulated test data for Restricted Band

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

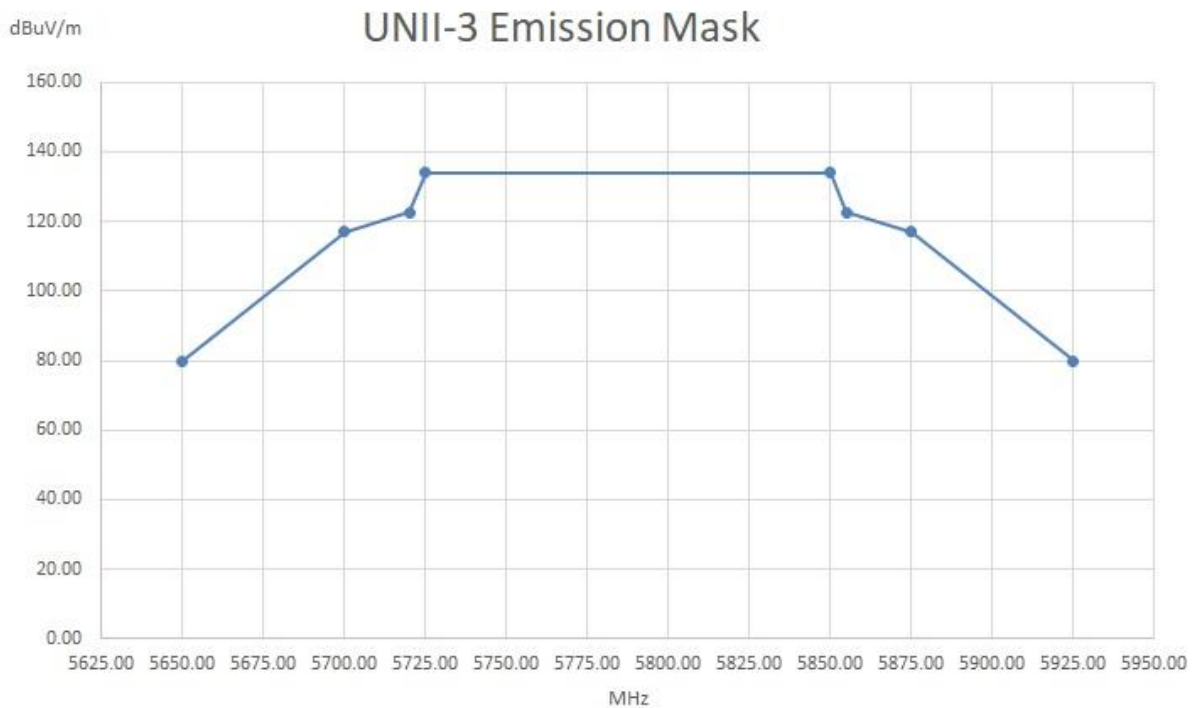
Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Tae-Ho, Kim / Senior Manager

14.7.5 U-NII-3 Emission Limits

14.7.5.1 Emission Mask Plots



Remark.

-. Title 47 → Part 15 → Subpart E—UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES

§ 15.407 General technical requirements.

(4) For transmitters operating in the 5.725-5.85 GHz band:

- (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Tested by: Tae-Ho, Kim / Senior Manager

15. CONDUCTED EMISSION TEST

15.1 Operating environment

Temperature : 23 °C
Relative humidity : 45 % R.H.

15.2 Test set-up

The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50 Ω / 50 μ H + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

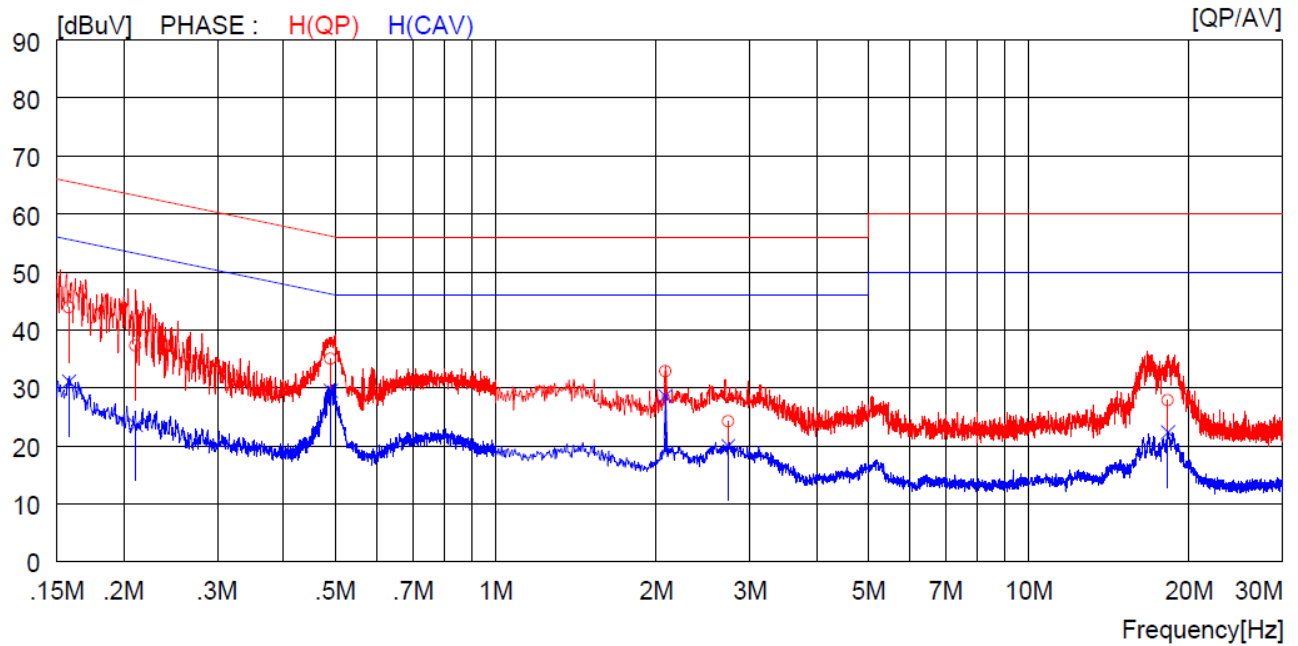
15.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESCI	Rohde & Schwarz	Test Receiver	101012	Oct. 22, 2019 (1Y)
□ -	ESU	Rohde & Schwarz	Test Receiver	100261	Mar. 28, 2019 (1Y)
□ -	NSLK8128	Schwarzbeck	AMN	8128-216	Mar. 20, 2019 (1Y)
■ -	NSLK8126	Schwarzbeck	AMN	8126-404	Mar. 19, 2019 (1Y)
□ -	3825/2	EMCO	AMN	9109-1869	Mar. 19, 2019 (1Y)
■ -	3825/2	EMCO	AMN	9109-1867	Mar. 27, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

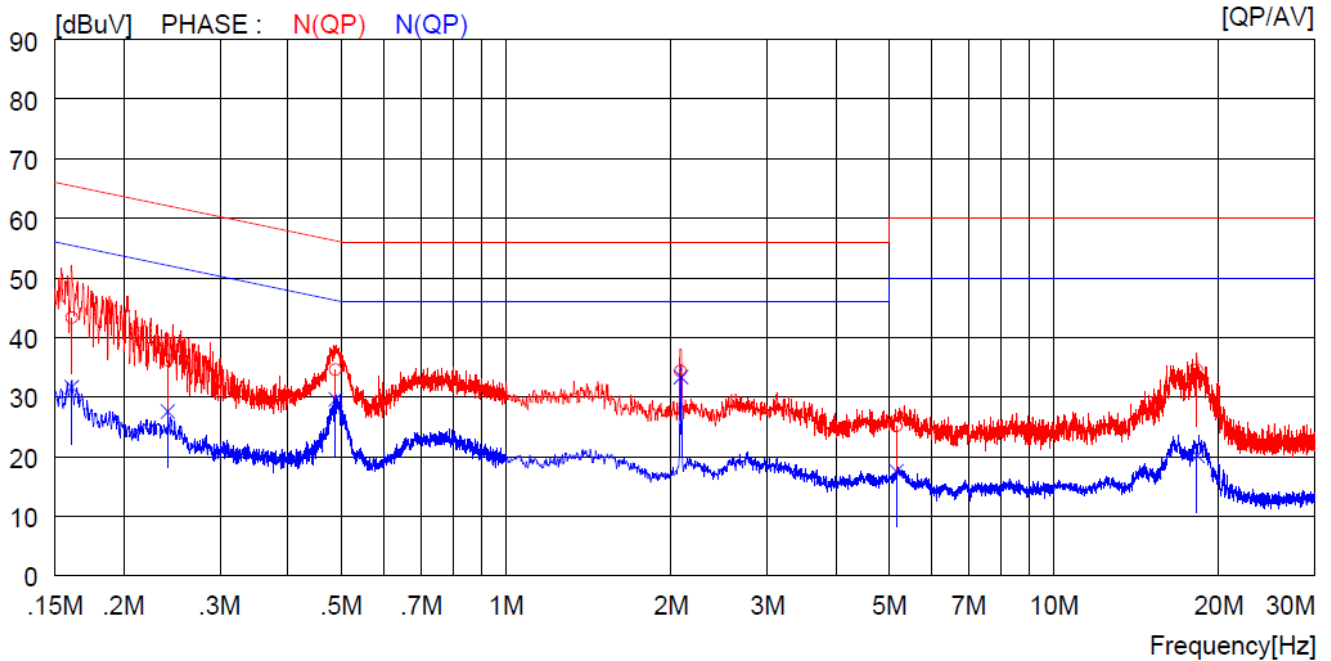
15.4 Test data

- . Test Date : November 20, 2019 ~ December 02, 2019
- . Resolution bandwidth : 9 kHz
- . Frequency range : 0.15 MHz ~ 30 MHz
- . Tested Line : HOT LINE
- . Antenna 0, Antenna 1 and Multiple transmit tested, but the worst data were recorded.



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15800	33.8	----	10.1	43.9	----	65.6	----	21.7	----	H (QP)
2	0.21100	27.2	----	10.1	37.3	----	63.2	----	25.9	----	H (QP)
3	0.49000	24.9	----	10.1	35.0	----	56.2	----	21.2	----	H (QP)
4	2.08000	22.8	----	10.1	32.9	----	56.0	----	23.1	----	H (QP)
5	2.73200	14.1	----	10.1	24.2	----	56.0	----	31.8	----	H (QP)
6	18.26000	17.5	----	10.3	27.8	----	60.0	----	32.2	----	H (QP)
7	0.15800	----	21.0	10.1	----	31.1	----	55.6	----	24.5	H (CAV)
8	0.21100	----	13.5	10.1	----	23.6	----	53.2	----	29.6	H (CAV)
9	0.49000	----	19.4	10.1	----	29.5	----	46.2	----	16.7	H (CAV)
10	2.08000	----	18.5	10.1	----	28.6	----	46.0	----	17.4	H (CAV)
11	2.73200	----	9.9	10.1	----	20.0	----	46.0	----	26.0	H (CAV)
12	18.26000	----	12.0	10.3	----	22.3	----	50.0	----	27.7	H (CAV)

-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.16100	33.2	----	10.1	43.3	----	65.4	----	22.1	----	N (QP)
2	0.24100	26.1	----	10.1	36.2	----	62.1	----	25.9	----	N (QP)
3	0.48800	24.4	----	10.1	34.5	----	56.2	----	21.7	----	N (QP)
4	2.08400	24.2	----	10.1	34.3	----	56.0	----	21.7	----	N (QP)
5	5.16000	15.0	----	10.1	25.1	----	60.0	----	34.9	----	N (QP)
6	18.26000	24.2	----	10.3	34.5	----	60.0	----	25.5	----	N (QP)
7	0.16100	----	21.6	10.1	----	31.7	----	55.4	----	23.7	N (CAV)
8	0.24100	----	17.5	10.1	----	27.6	----	52.1	----	24.5	N (CAV)
9	0.48800	----	19.5	10.1	----	29.6	----	46.2	----	16.6	N (CAV)
10	2.08400	----	23.3	10.1	----	33.4	----	46.0	----	12.6	N (CAV)
11	5.16000	----	7.5	10.1	----	17.6	----	50.0	----	32.4	N (CAV)
12	18.26000	----	9.8	10.3	----	20.1	----	50.0	----	29.9	N (CAV)

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

Tested by: Tae-Ho, Kim / Senior Manager

16. DYNAMIC FREQUENCY SELECTION (DFS)

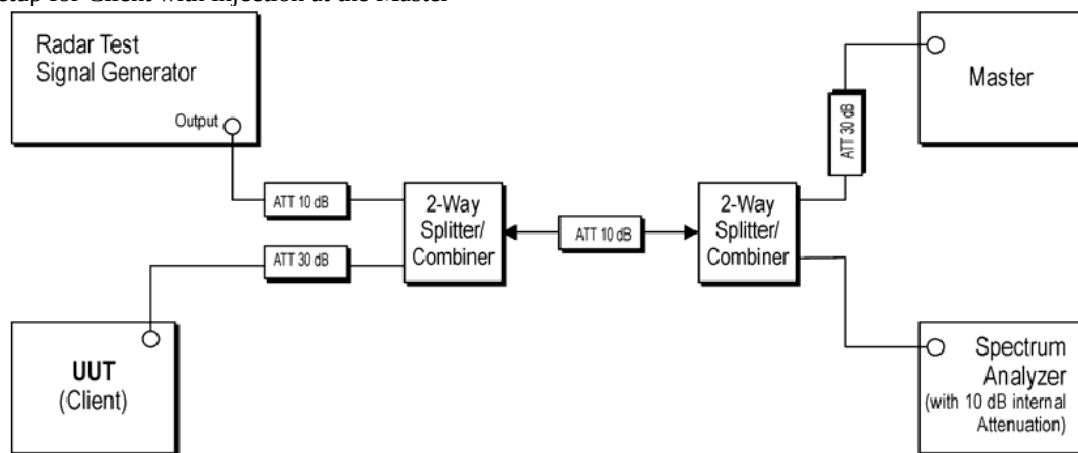
16.1 Operating environment

Temperature : 23 °C
Relative humidity : 45 % R.H.

16.2 Test set-ups

The FCC 06-96 and RSS-210 A9.3 describes a conducted test setup. A conducted test setup was user this testing. Figure 1 shows the typical test setup. Each one channel selected between 5 250 MHz and 5 350 MHz, 5 470 MHz and 5 725 MHz is chosen for the testing.

Figure 1. Setup for Client with injection at the Master



The operational behavior and individual DFS requirements that are associated with these modes are as follows:

<Master Devices>

- The Master Device will use DFS in order to detect Radar Waveforms with received signal strength above the DFS Detection Threshold in the 5 250 – 5 350 MHz and 5 470 – 5 725 MHz bands. DFS is not required in the 5 150 – 5 250 MHz or 5 725 – 5 825 MHz bands.
- Before initiating a network on a Channel, the Master Device will perform a Channel Availability Check for a specified time duration (Channel Availability Check Time) to ensure that there is no radar system operating on the Channel, using DFS described under subsection a) above.
- The Master Device initiates a U-NII network by transmitting control signals that will enable other U-NII devices to Associate with the Master Device.
- During normal operation, the Master Device will monitor the Channel (In-Service Monitoring) to ensure that there is no radar system operating on the Channel, using DFS described under a).
- If the Master Device has detected a Radar Waveform during In-Service Monitoring as described under d), the Operating Channel of the U-NII network is no longer an Available Channel. The Master Device will instruct all associated Client Device(s) to stop transmitting on this Channel within the Channel Move Time. The transmissions during the Channel Move Time will be limited to the Channel Closing Transmission Time.

f) Once the Master Device has detected a Radar Waveform it will not utilize the Channel for the duration of the Non-Occupancy Period. 3

g) If the Master Device delegates the In-Service Monitoring to a Client Device, then the combination will be tested to the requirements described under d) through f) above.

<Client Devices>

a) A Client Device will not transmit before having received appropriate control signals from a Master Device.

b) A Client Device will stop all its transmissions whenever instructed by a Master Device to which it is associated and will meet the Channel Move Time and Channel Closing Transmission Time requirements. The Client Device will not resume any transmissions until it has again received control signals from a Master Device.

c) If a Client Device is performing In-Service Monitoring and detects a Radar Waveform above the DFS Detection Threshold, it will inform the Master Device. This is equivalent to the Master Device detecting the Radar Waveform and d) through f) of section 5.1.1 apply.

d) Irrespective of Client Device or Master Device detection the Channel Move Time and Channel Closing Transmission Time requirements remain the same.

e) The client test frequency must be monitored to ensure no transmission of any type has occurred for 30 minutes. Note: If the client moves with the master, the device is considered compliant if nothing appears in the client non-occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear.

<Channel Connection Information>

a) Master Devices : RF-AX88U

b) Client(=EUT) Devices : WCT731

c) Connect to test channel : See next page for measurement data.

16.3 DFS Test Signals

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup $\left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Table 6 – Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

16.4 Technical Requirement Specification

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client (without DFS)	Client (with DFS)
<i>Non-Occupancy Period</i>	Yes	Not required	Yes
<i>DFS Detection Threshold</i>	Yes	Not required	Yes
<i>Channel Availability Check Time</i>	Yes	Not required	Not required
<i>Uniform Spreading</i>	Yes	Not required	Not required
<i>U-NII Detection Bandwidth</i>	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client (without DFS)	Client (with DFS)
<i>DFS Detection Threshold</i>	Yes	Not required	Yes
<i>Channel Closing Transmission Time</i>	Yes	Yes	Yes
<i>Channel Move Time</i>	Yes	Yes	Yes
<i>U-NII Detection Bandwidth</i>	Yes	Not required	Yes

16.5 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)
■ - D-05180-2	RLC Electronis Inc.	Combiner	0813	N/A
■ - 11636B	Hewlett Packard	Combiner	12268	N/A
■ - SMJ100A	R/S	Signal Generator	101038	Jul. 25, 2019 (1Y)
■ - H-3005D	FinePower	DC Power supply	FP09092008	Mar. 13, 2019 (1Y)
■ RF-AX88U	ASUS	Dual Band Gigabit Router	NA	N/A

Note. Dual Band Gigabit Router(Model : RF-AX88U) Information.

; FCC ID : MSQ-RTAXHP00, IC ID : 3568A-RTAXHP00

Note. This Device not support TPC Function.

All test equipment used is calibrated on a regular basis.

16.6 Test data

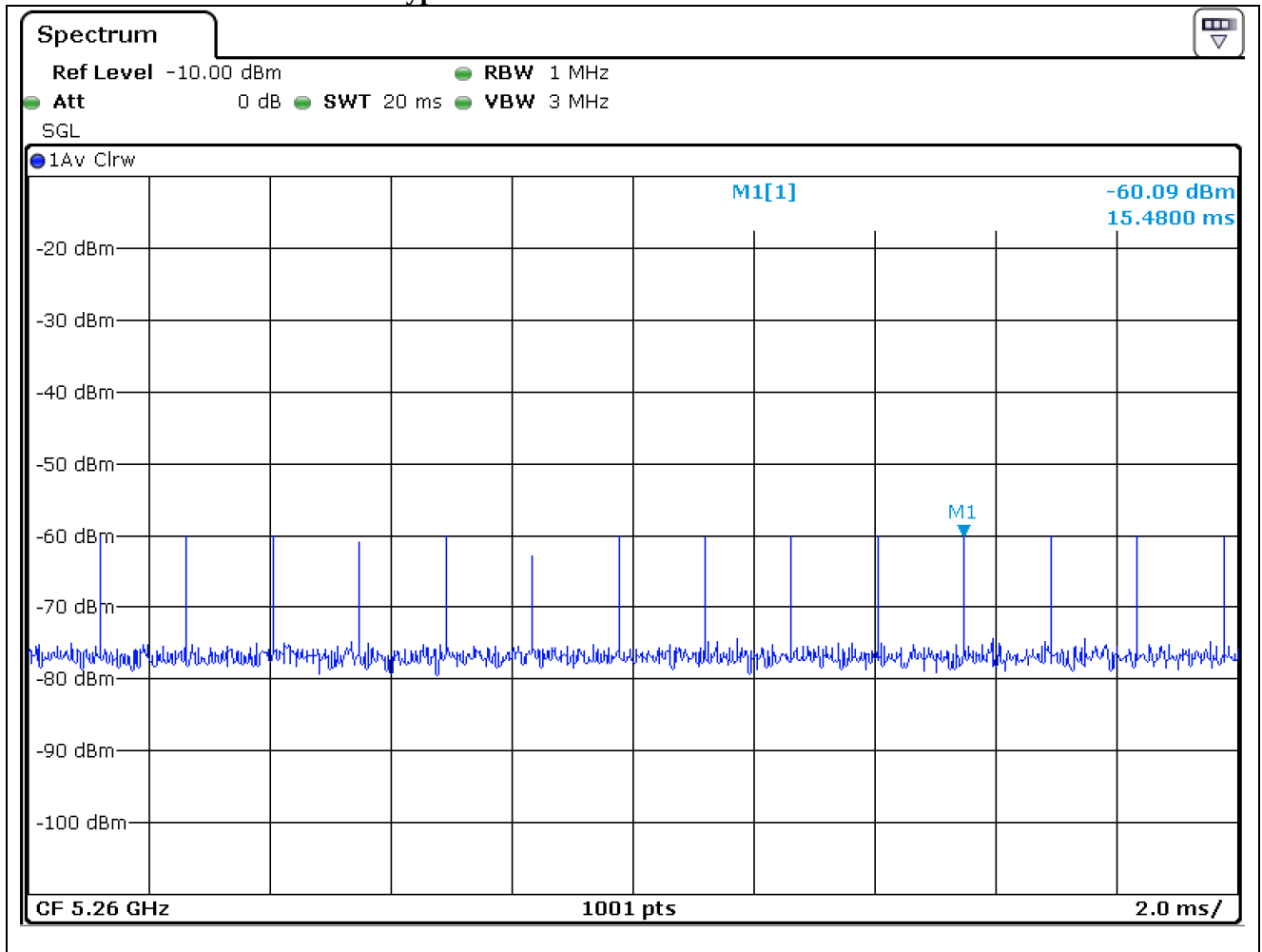
-. Test Date : November 20, 2019 ~ December 02, 2019

Band	Frequency (MHz)	Channel move time(s)		Channel closing transmission time(ms)	
		Measured	Limit	Measured	Limit
UNII 2A	5 260.00	0.260	10.00	0.20	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period.
UNII 2C	5 530.00	0.620		0.40	

Note. Channel closing transmission time: 1 * 0.2 ms = 0.2 ms, 2 * 0.2 ms = 0.4 ms

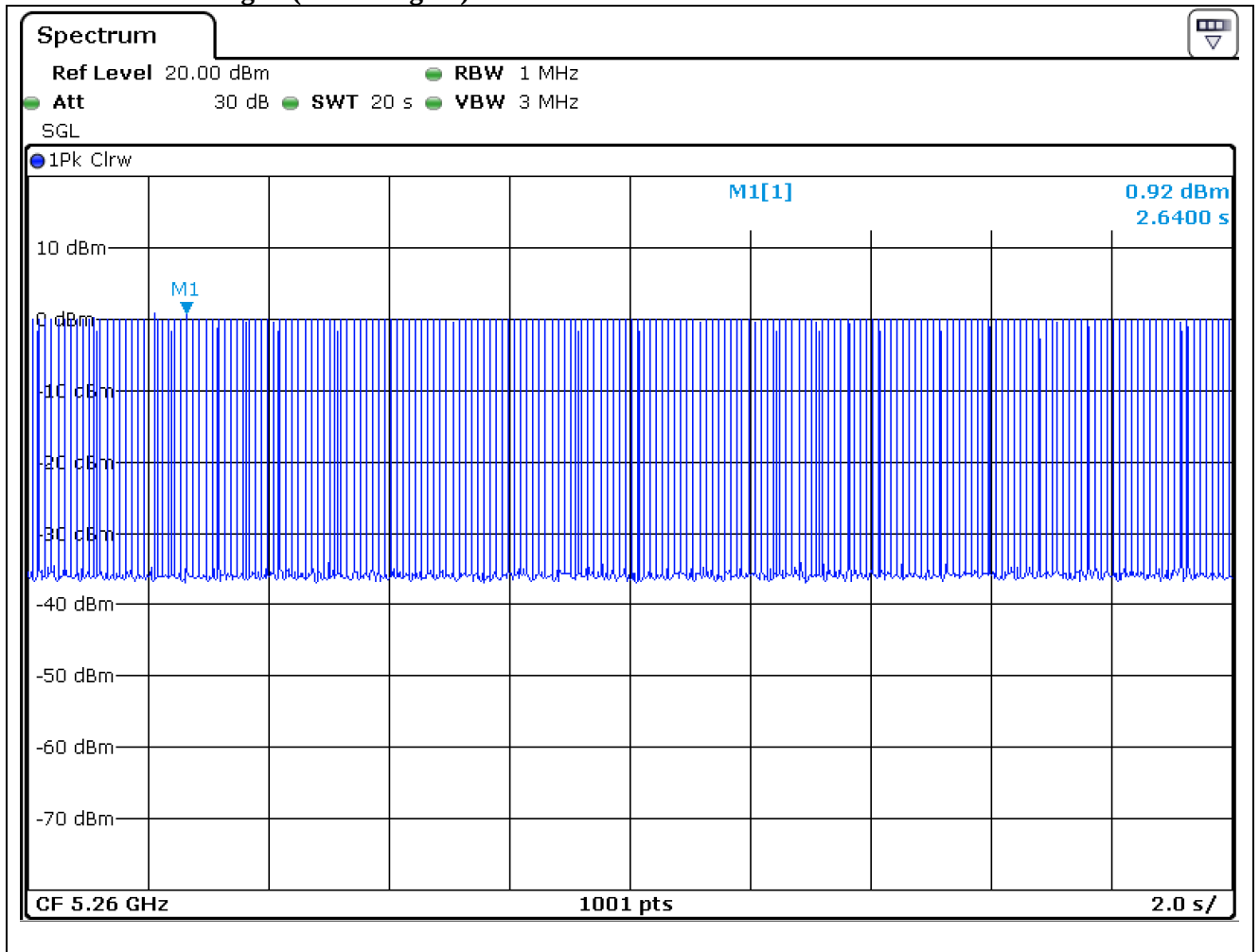
16.6.1 UNII 2A

16.6.1.1 Plot of Radar waveform type 0

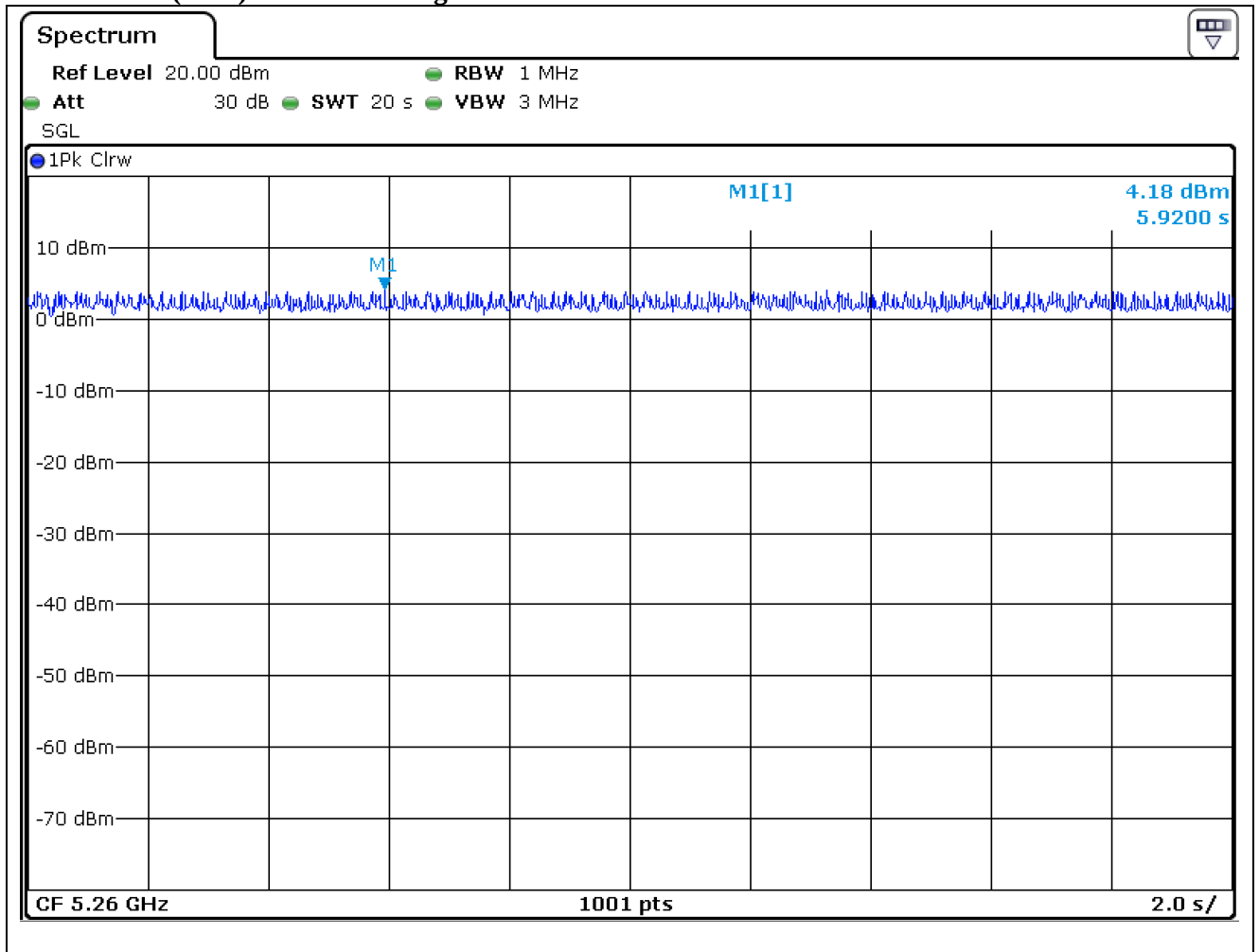


Note: The calibrated conducted DFS detection threshold level is set to -60.09 dBm (-62+1+2.48=-58.52 dBm)

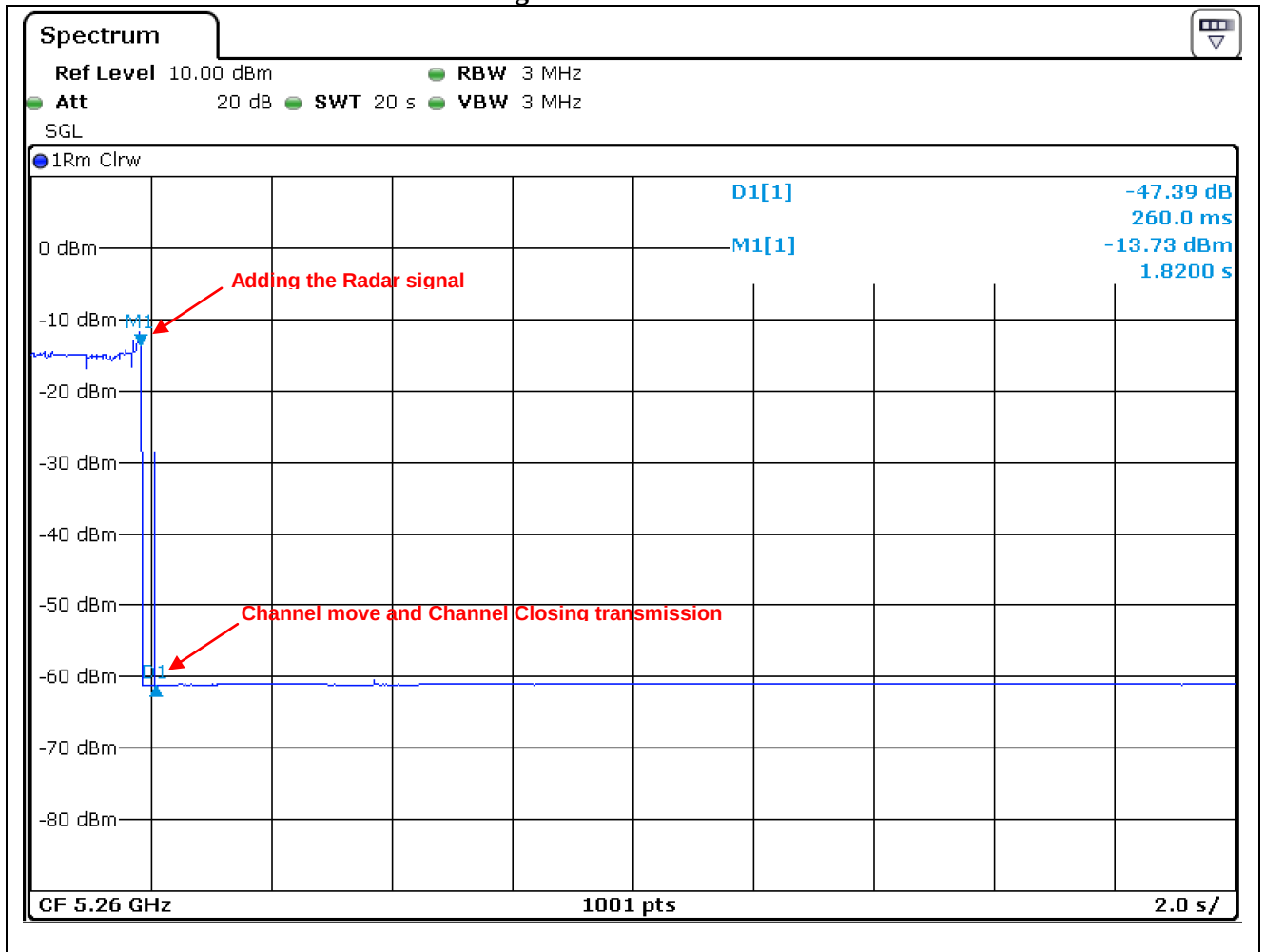
16.6.1.2 No traffic signal(master signal)



16.6.1.3 Client(EUT) Data Traffic Signal

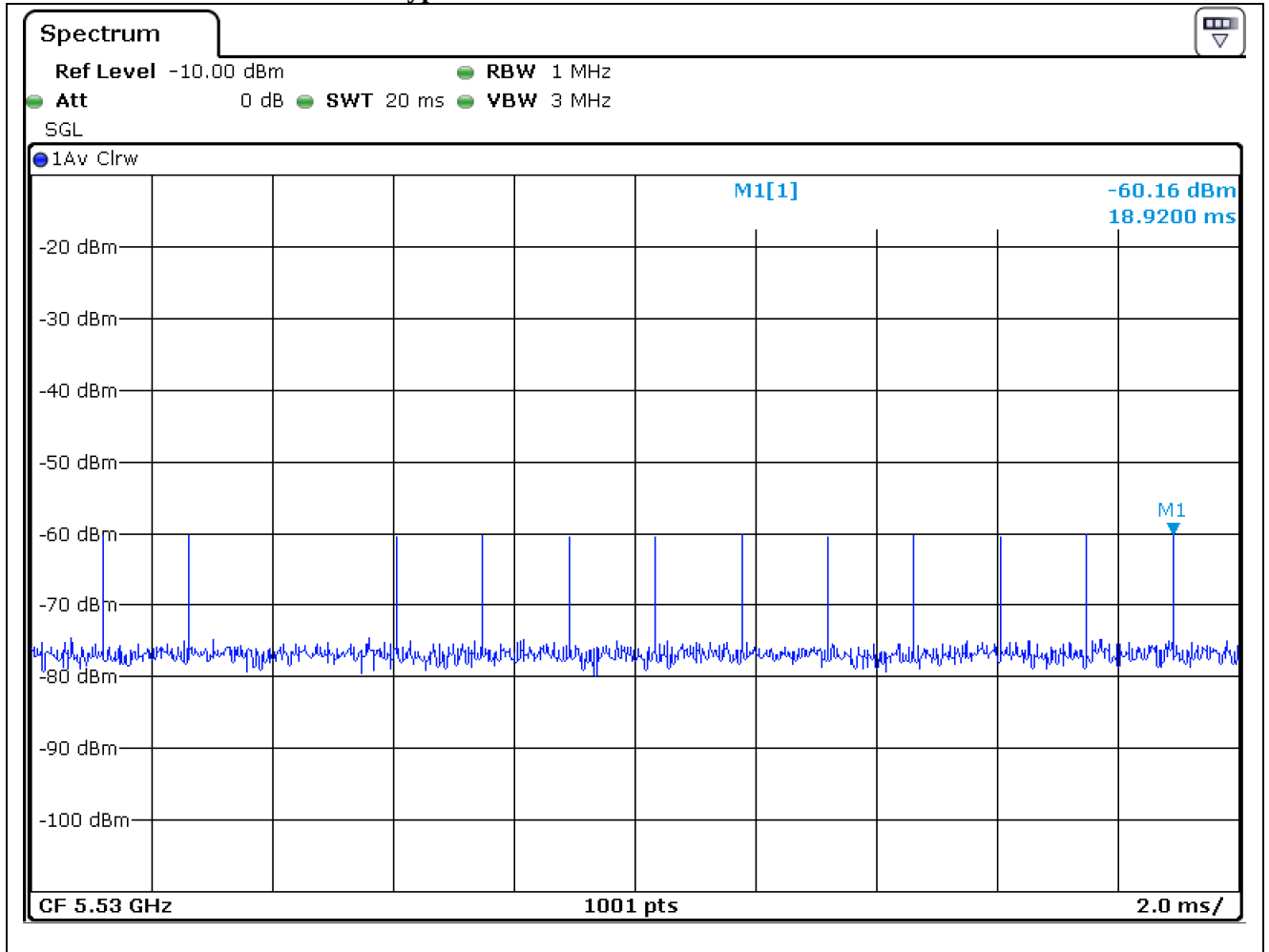


16.6.1.4 Channel move and Channel Closing transmission time



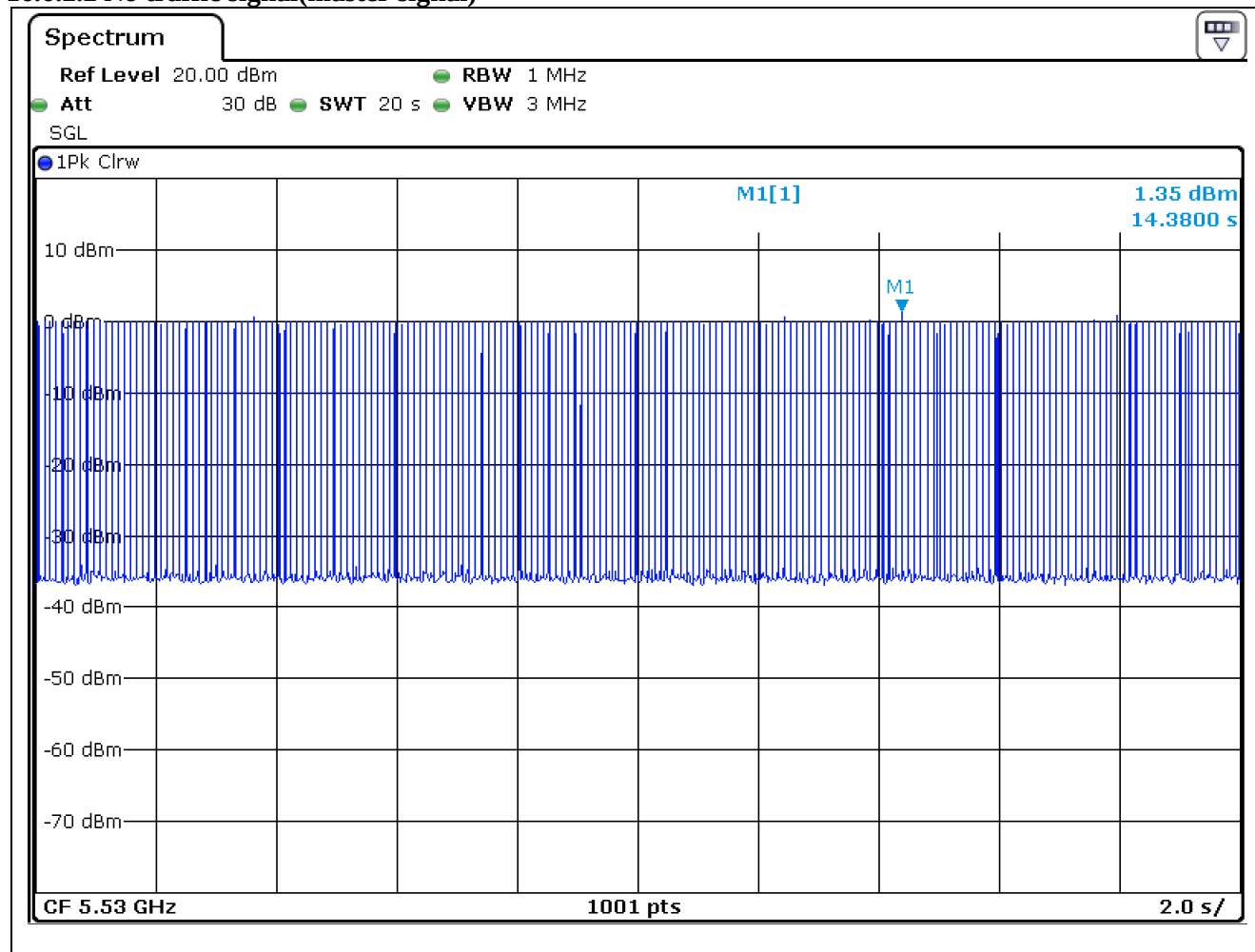
16.6.2 UNII 3

16.6.2.1 Plot of Radar waveform type 1

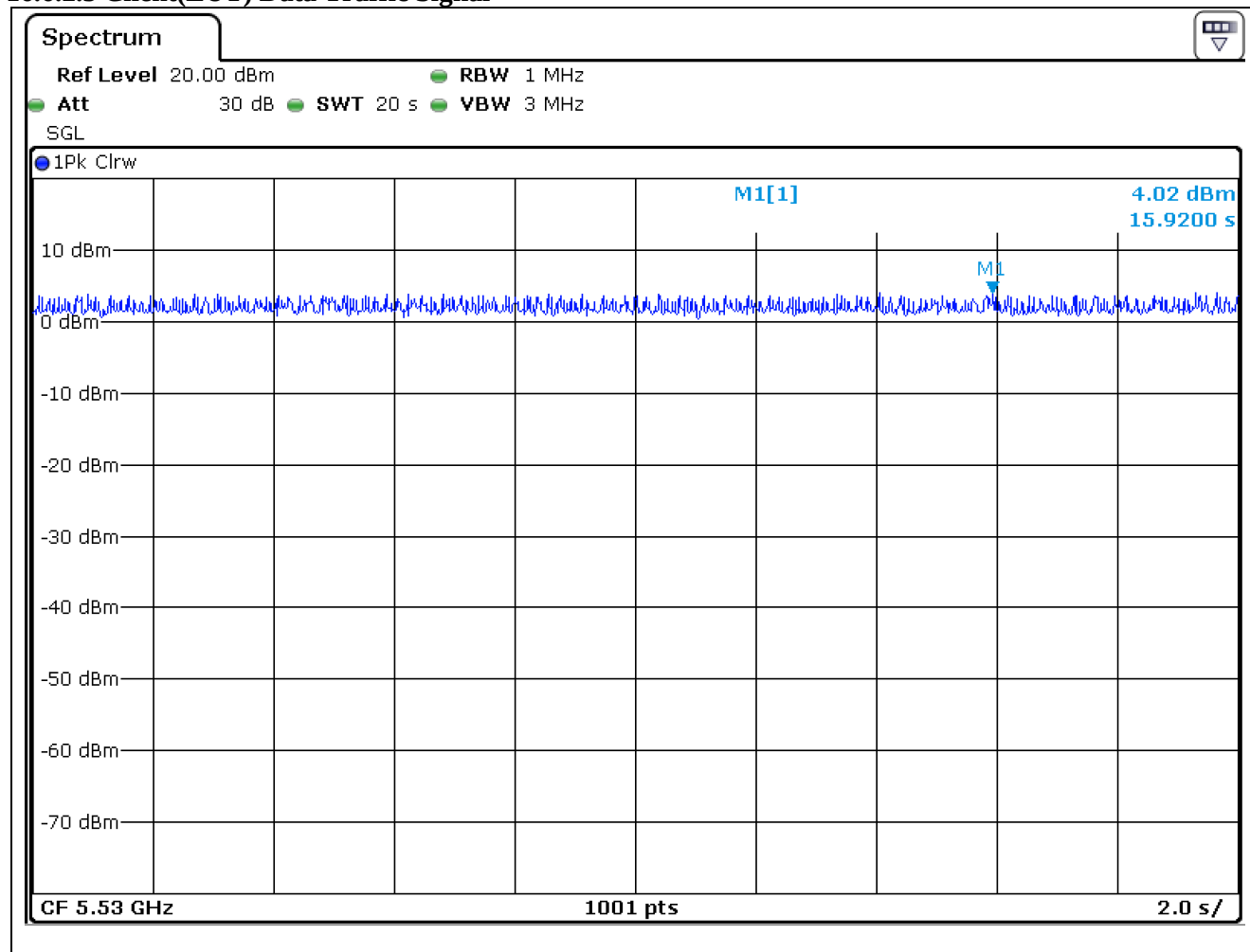


Note: The calibrated conducted DFS detection threshold level is set to -60.16 dBm ($-62+1+3.86=-57.14$ dBm)

16.6.2.2 No traffic signal(master signal)



16.6.2.3 Client(EUT) Data Traffic Signal



16.6.2.4 Channel move and Channel Closing transmission time

