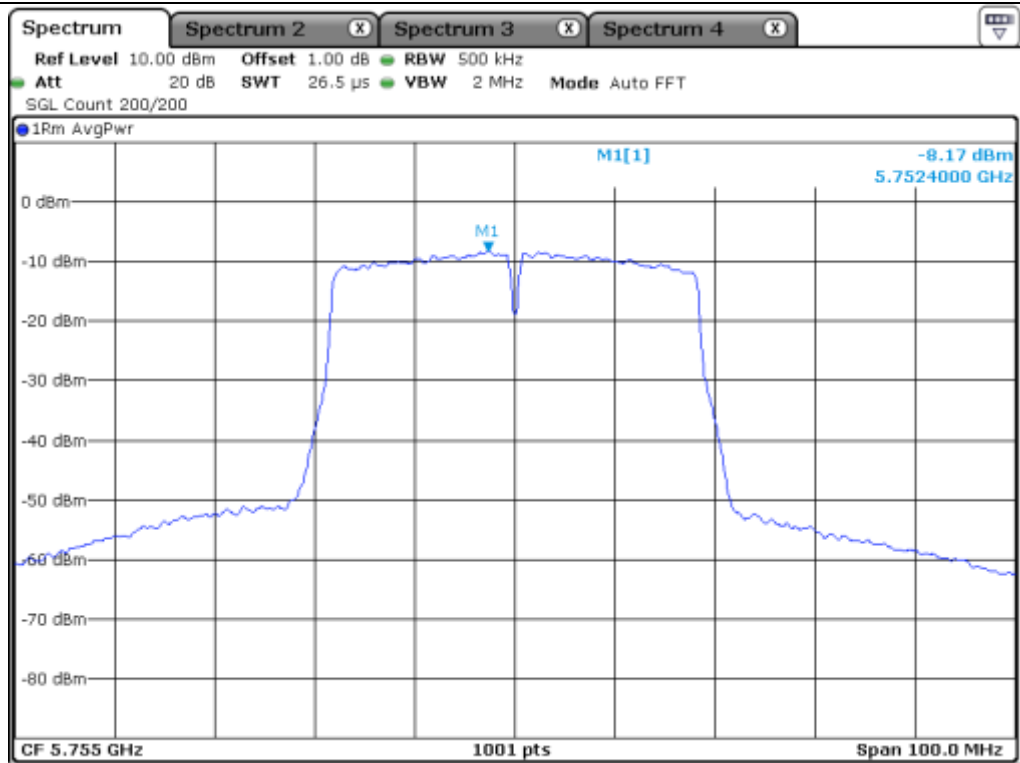
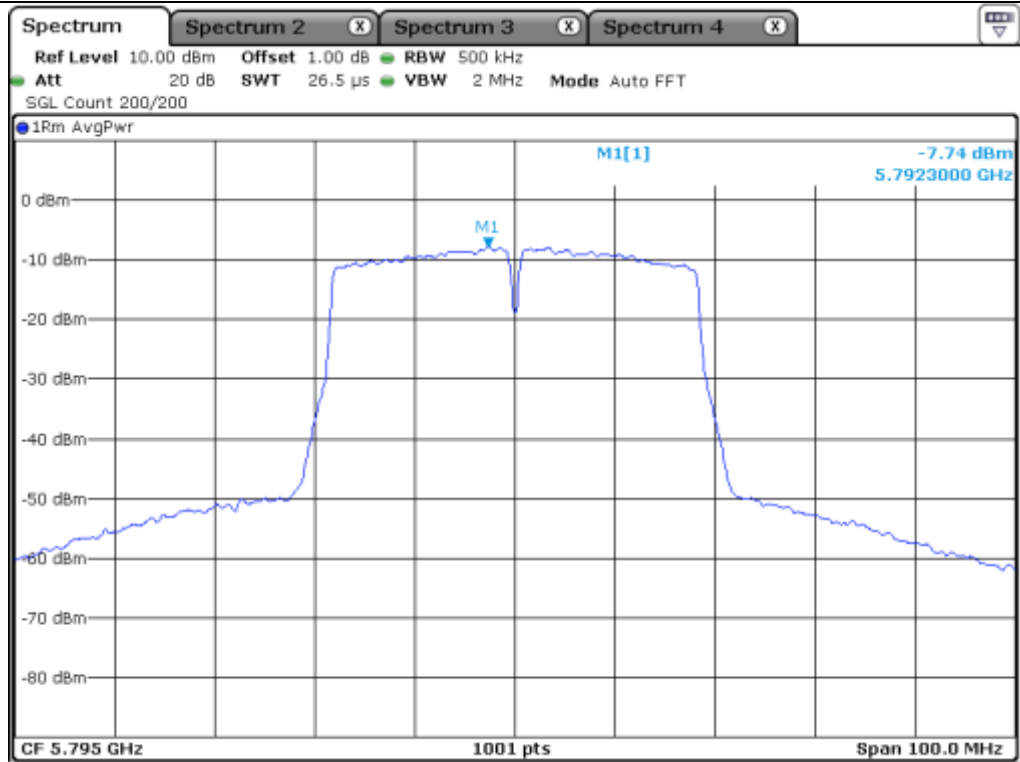




Low Channel (5 755 MHz)



High Channel (5 795 MHz)

10.6.2 Test data for Antenna 1

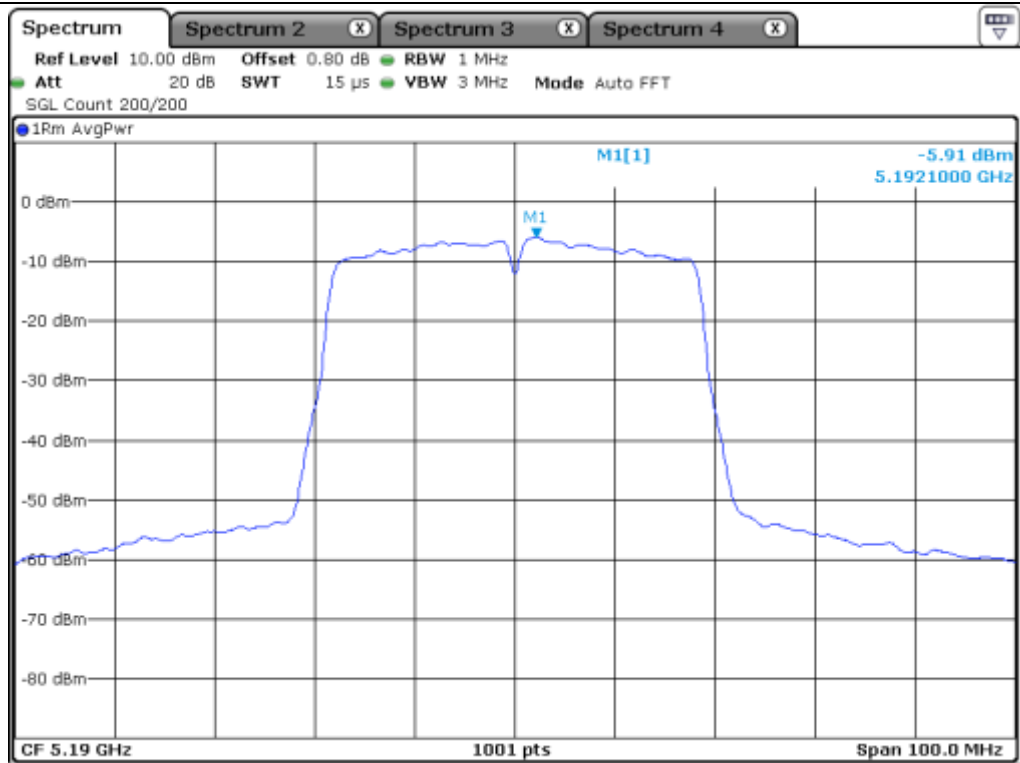
- . Test Date : December 02, 2019 ~ December 11, 2019
 -. Operating condition : Highest Output Power Transmitting Mode
 -. Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 190.00	-5.91	11.00	16.91
	High	5 230.00	-5.57	11.00	16.57
5 250 ~ 5 350	Low	5 270.00	-5.60	11.00	16.60
	High	5 310.00	-5.31	11.00	16.31
5 470 ~ 5 725	Low	5 510.00	-5.09	11.00	16.09
	Middle	5 550.00	-4.61	11.00	15.61
	High	5 670.00	-4.71	11.00	15.71
5 725 ~ 5 850	Low	5 755.00	-7.95	30.00	37.95
	High	5 795.00	-7.48	30.00	37.48

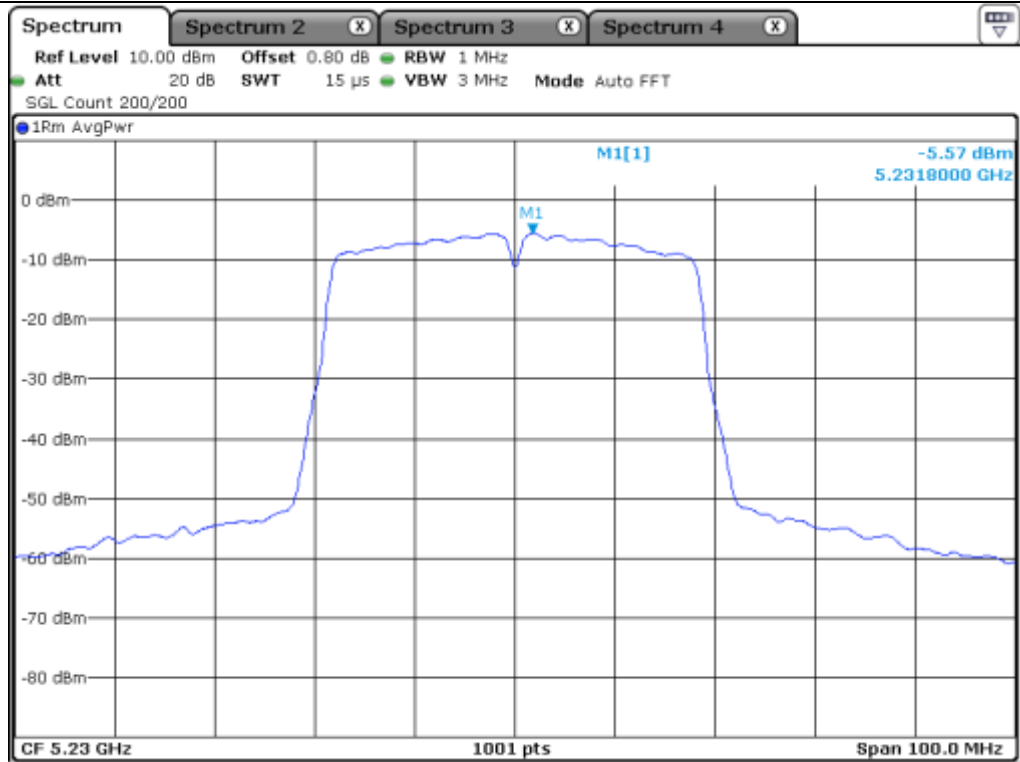
Remark: See next page for measurement data.



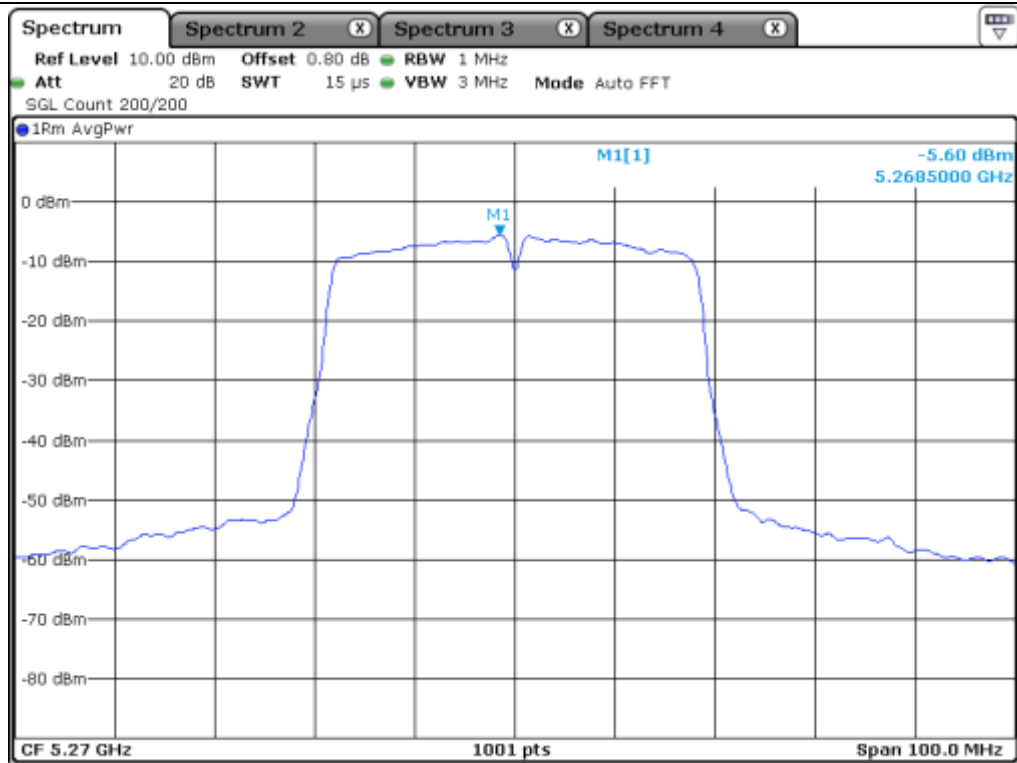
Tested by: Ha-Ram, Lee / Assistant Manager



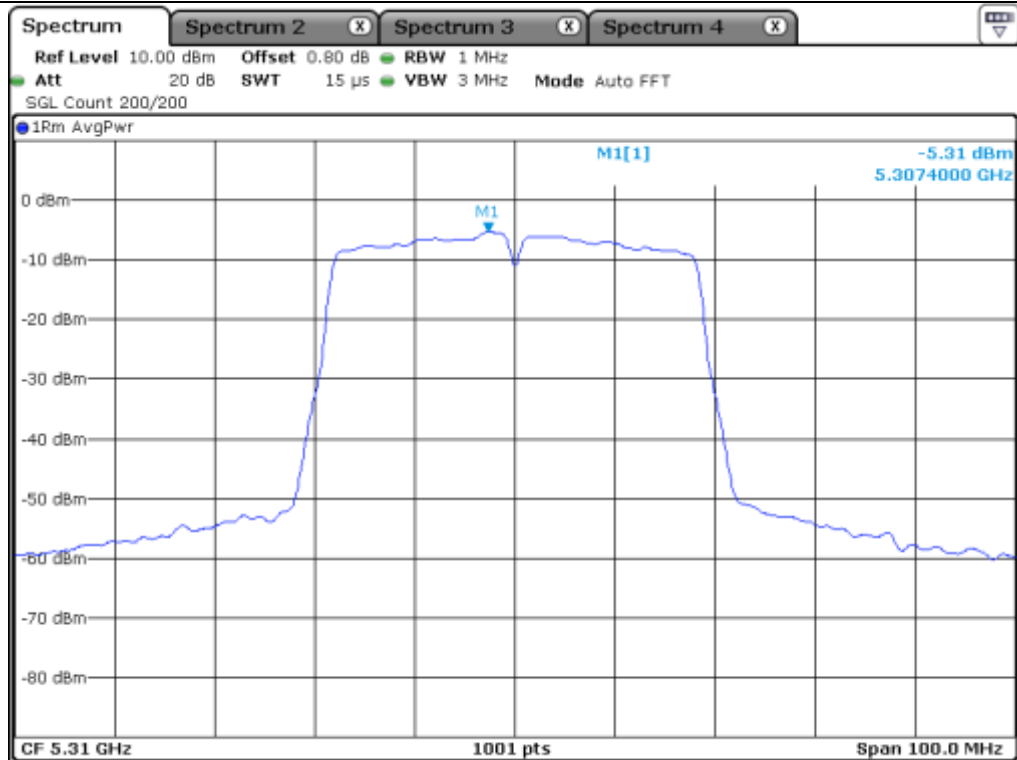
Low Channel (5 190 MHz)



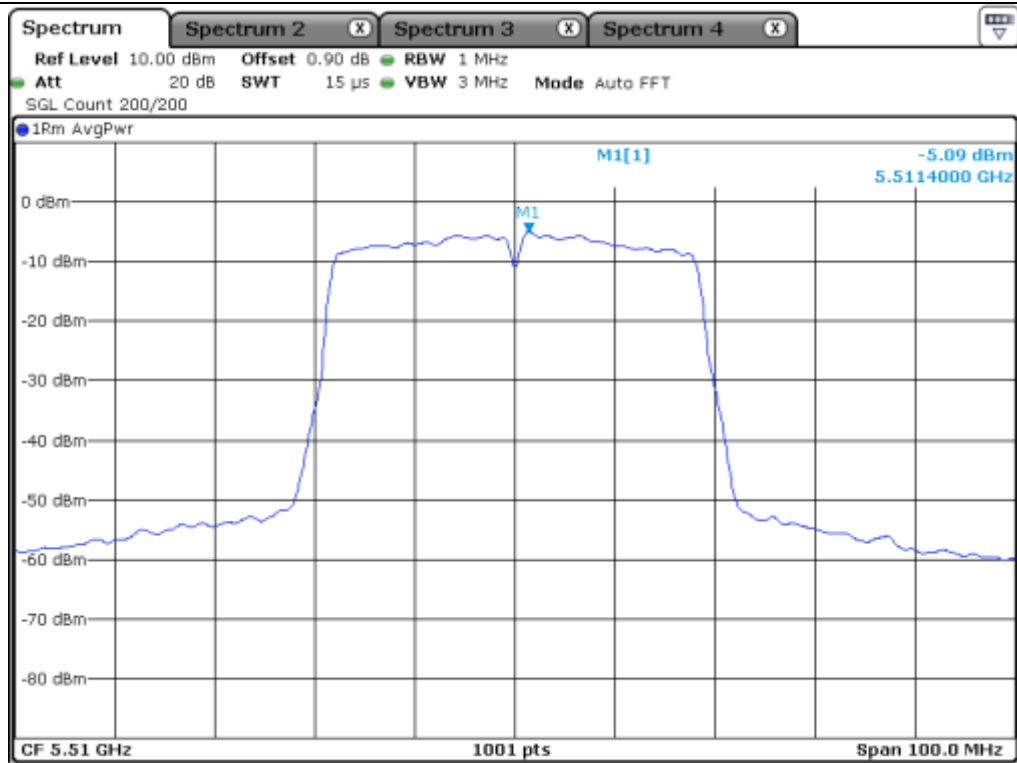
High Channel (5 230 MHz)



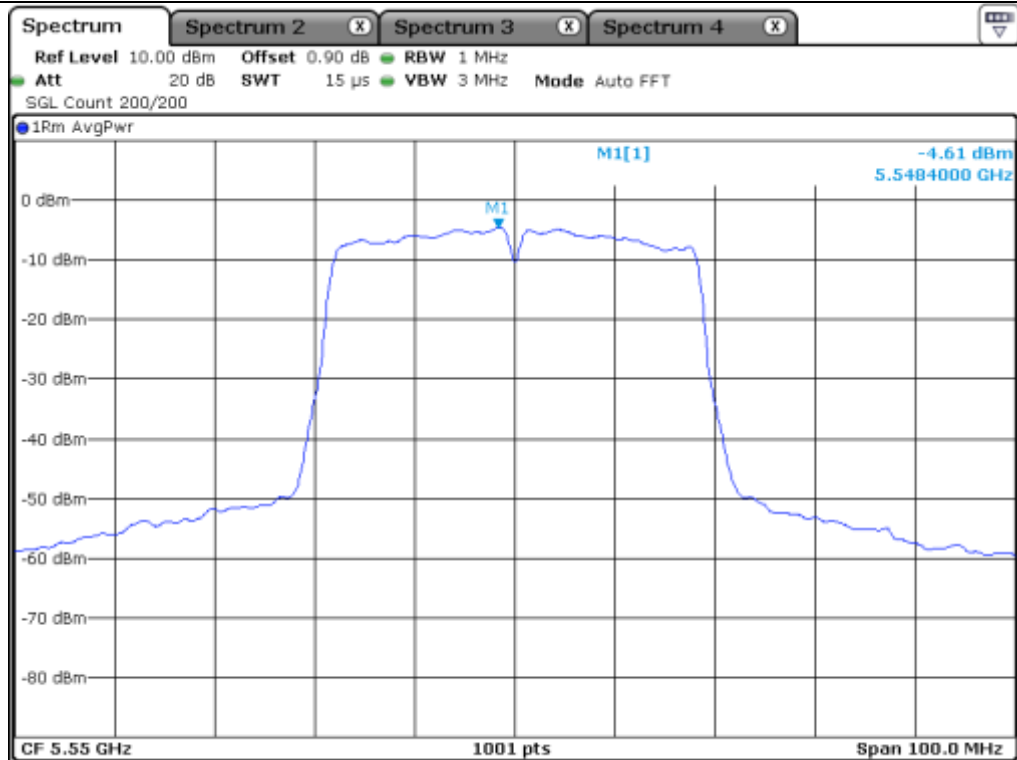
Low Channel (5 270 MHz)



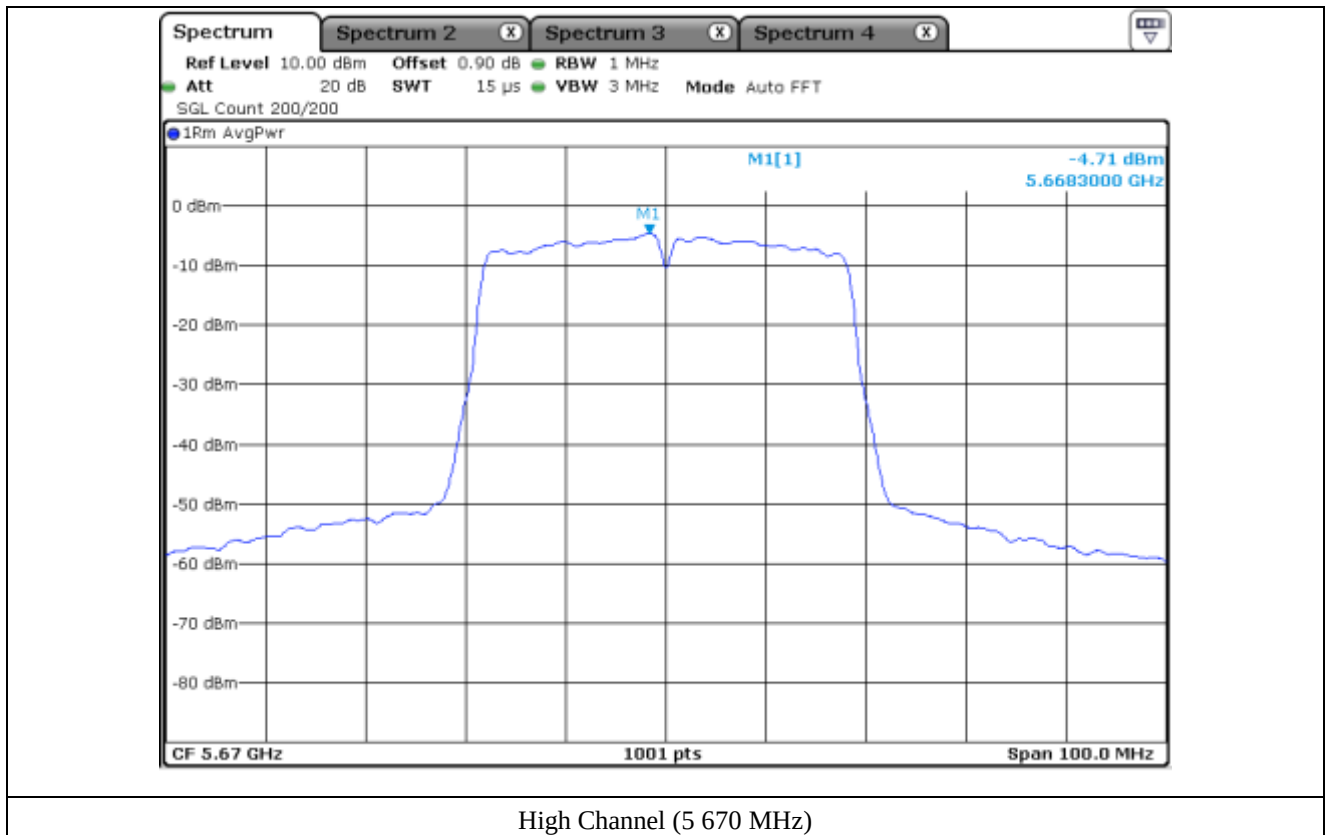
High Channel (5 310 MHz)

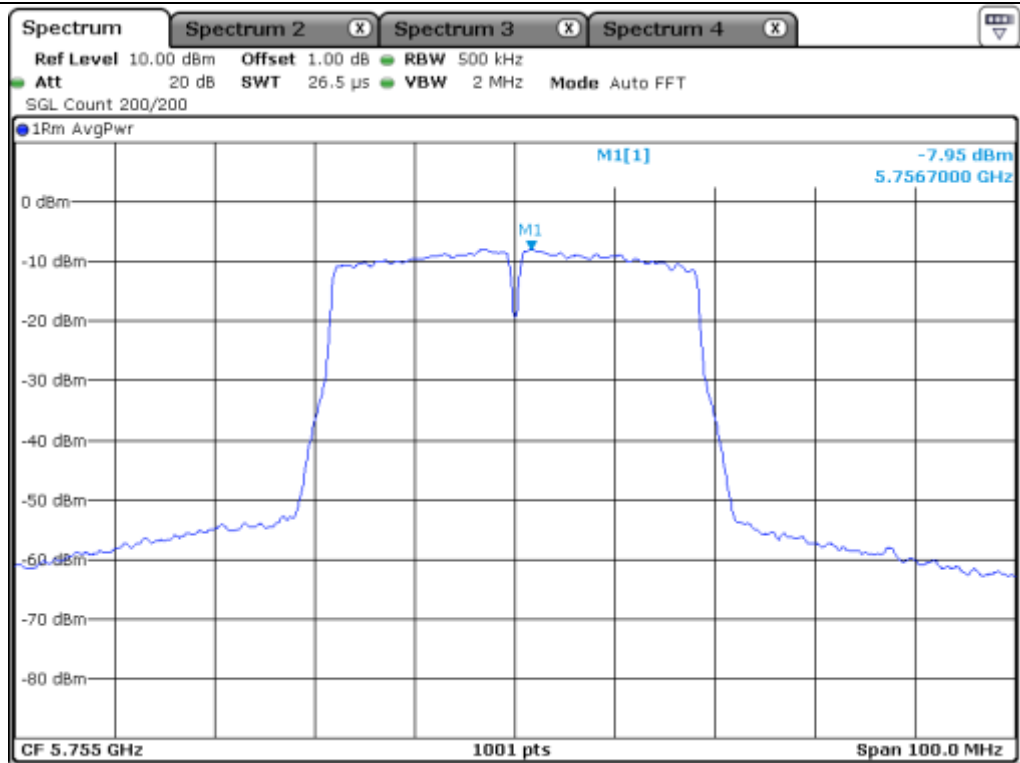


Low Channel (5 510 MHz)

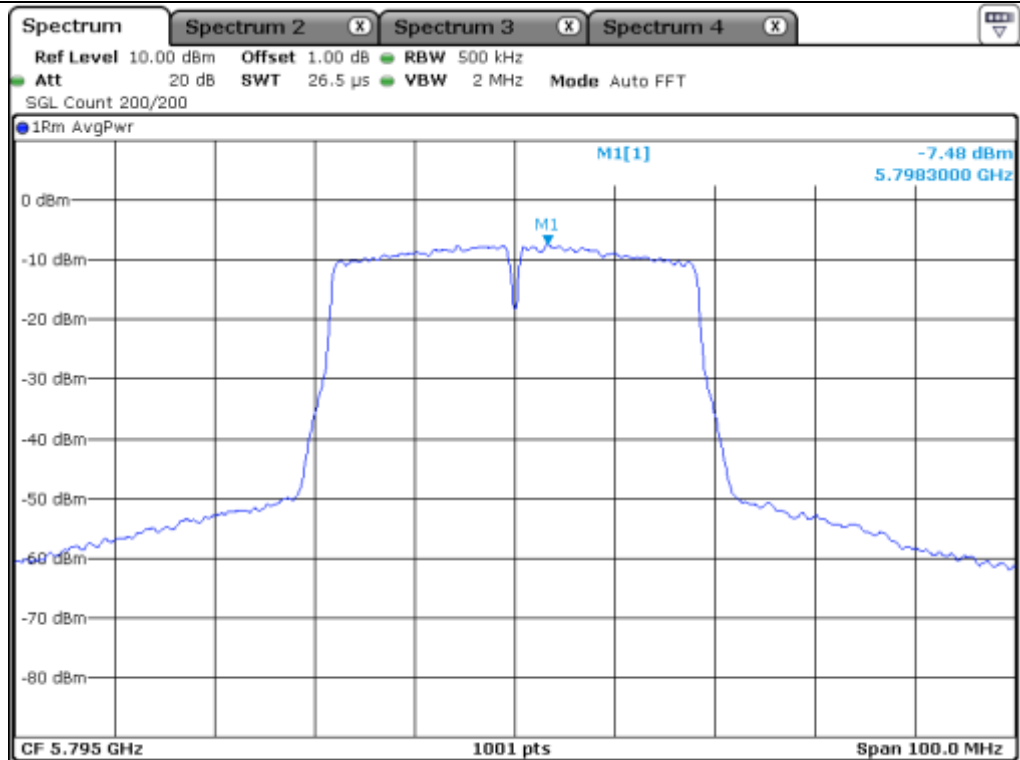


Middle Channel (5 550 MHz)





Low Channel (5.755 MHz)



High Channel (5.795 MHz)

10.6.3 Test data for Multiple Transmit

- . Test Date : December 02, 2019 ~ December 11, 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	-2.62	11.00	13.62
	High	5 230.00	-2.33	11.00	13.33
5 250 ~ 5 350	Low	5 270.00	-2.38	11.00	13.38
	High	5 310.00	-2.07	11.00	13.07
5 470 ~ 5 725	Low	5 510.00	-2.15	11.00	13.15
	Middle	5 550.00	-1.76	11.00	12.76
	High	5 670.00	-1.91	11.00	12.91
5 725 ~ 5 850	Low	5 755.00	-5.05	30.00	35.05
	High	5 795.00	-4.60	30.00	34.60



Tested by: Ha-Ram, Lee / Assistant Manager

10.6.4 Test data for Staddle Channel_Antenna 0

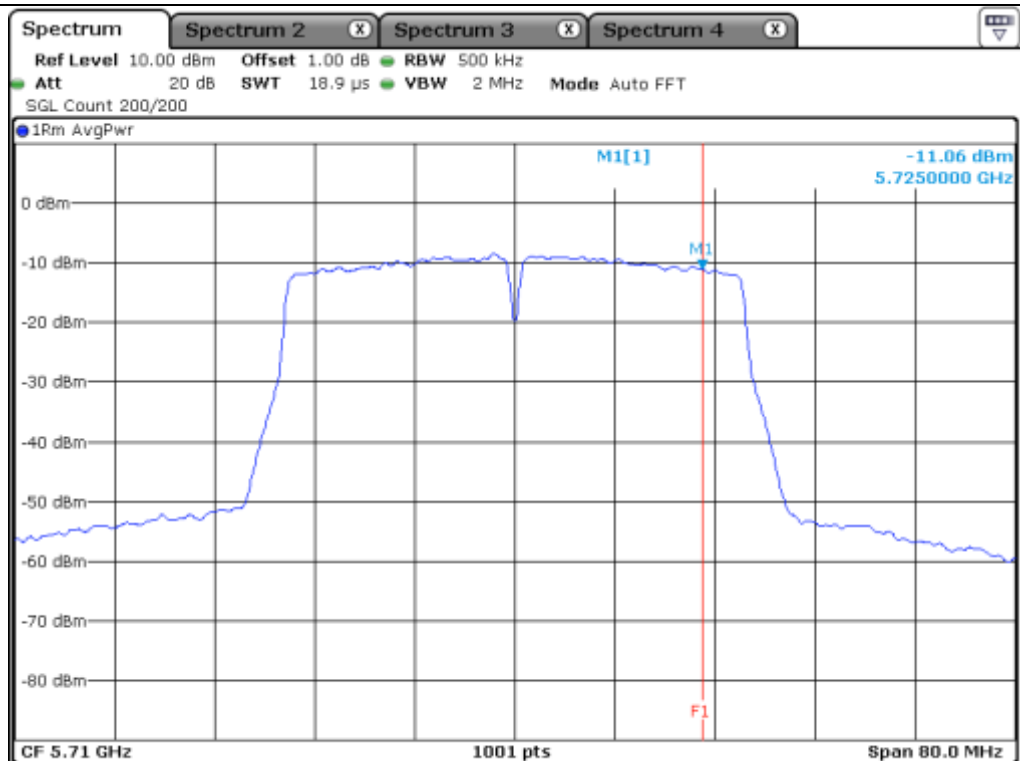
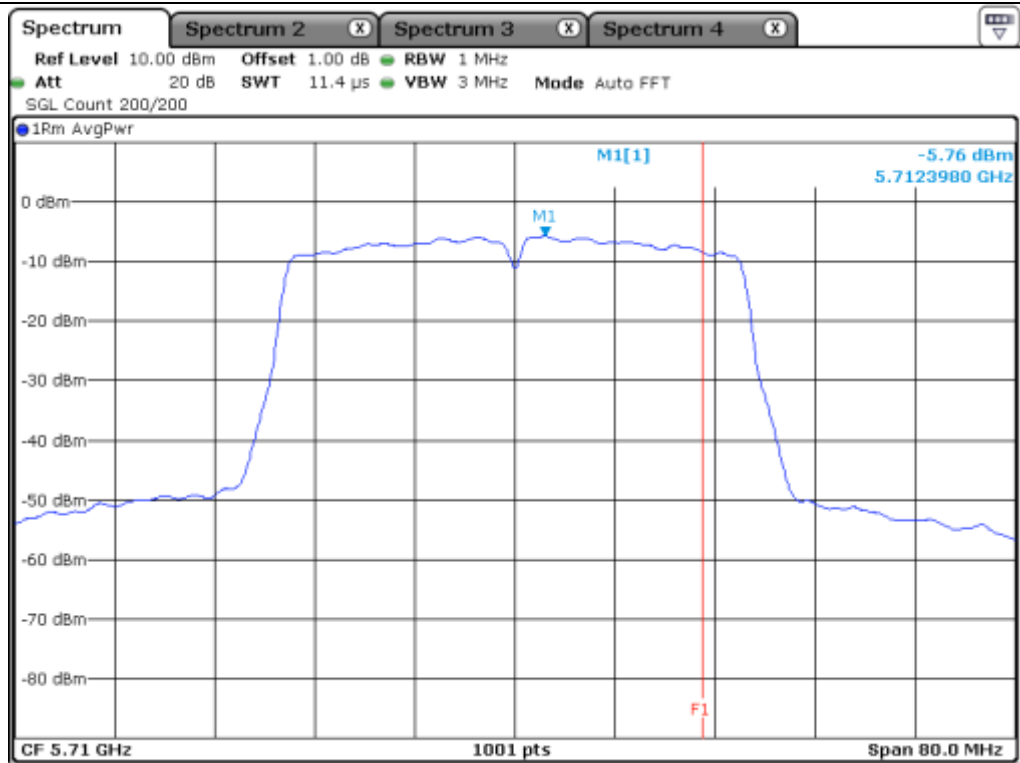
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710.00	-5.76	11.00	16.76
5 725 ~ 5 850	5 710.00	-11.06	30.00	41.06

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager



10.6.5 Test data for Staddle Channel_Antenna 1

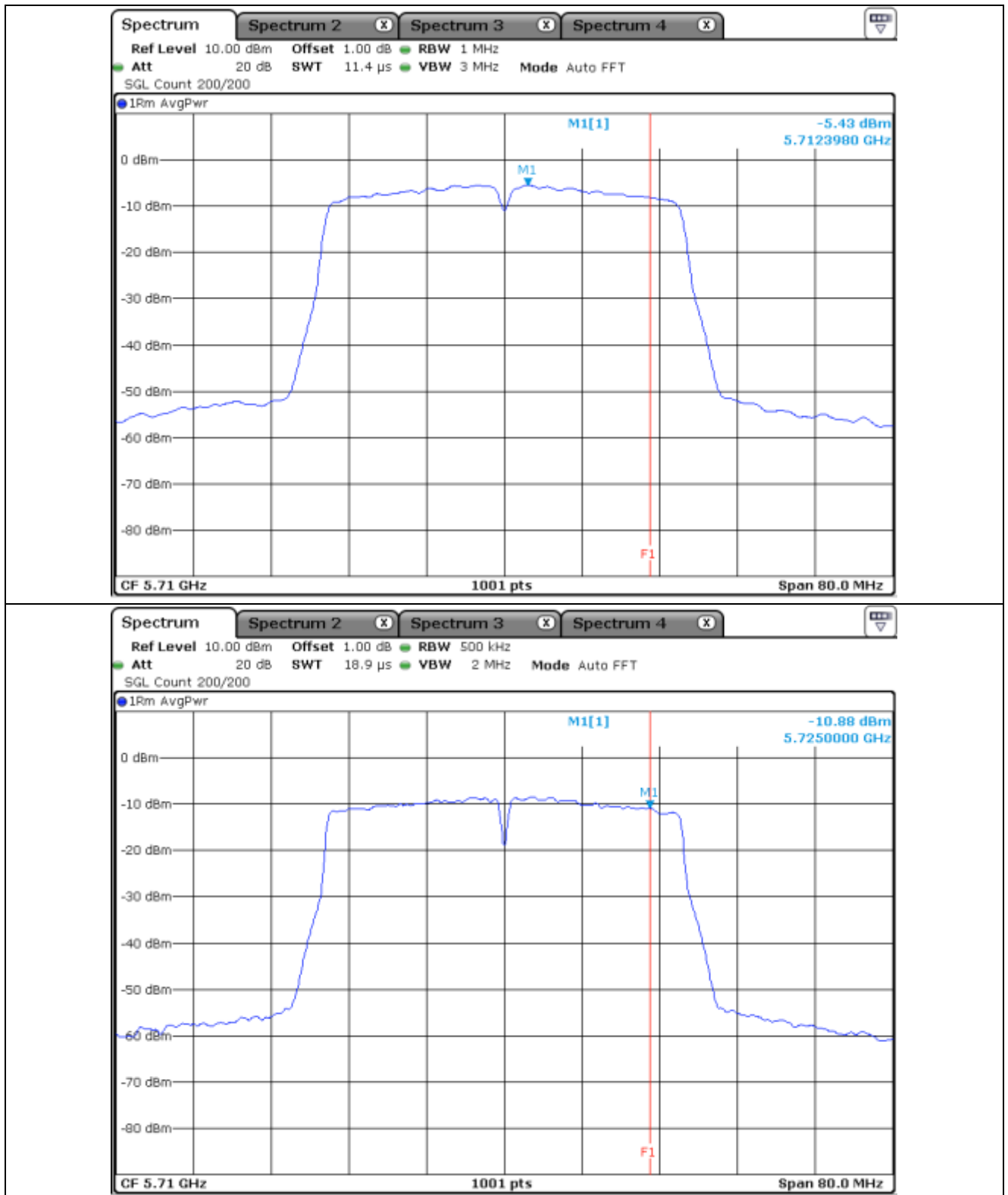
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 710.00	-5.43	11.00	16.43
5 725 ~ 5 850	5 710.00	-10.88	30.00	40.88

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager



10.6.6 Test data for Staddle Channel_Multiple Transmit

- . Test Date : December 02, 2019 ~ December 11, 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	-2.58	11.00	13.58
5 725 ~ 5 850	5 710.00	-7.96	30.00	37.96



Tested by: Ha-Ram, Lee / Assistant Manager

10.7 Test data for 802.11ac_HT80 RLAN Mode

10.7.1 Test data for Antenna 0

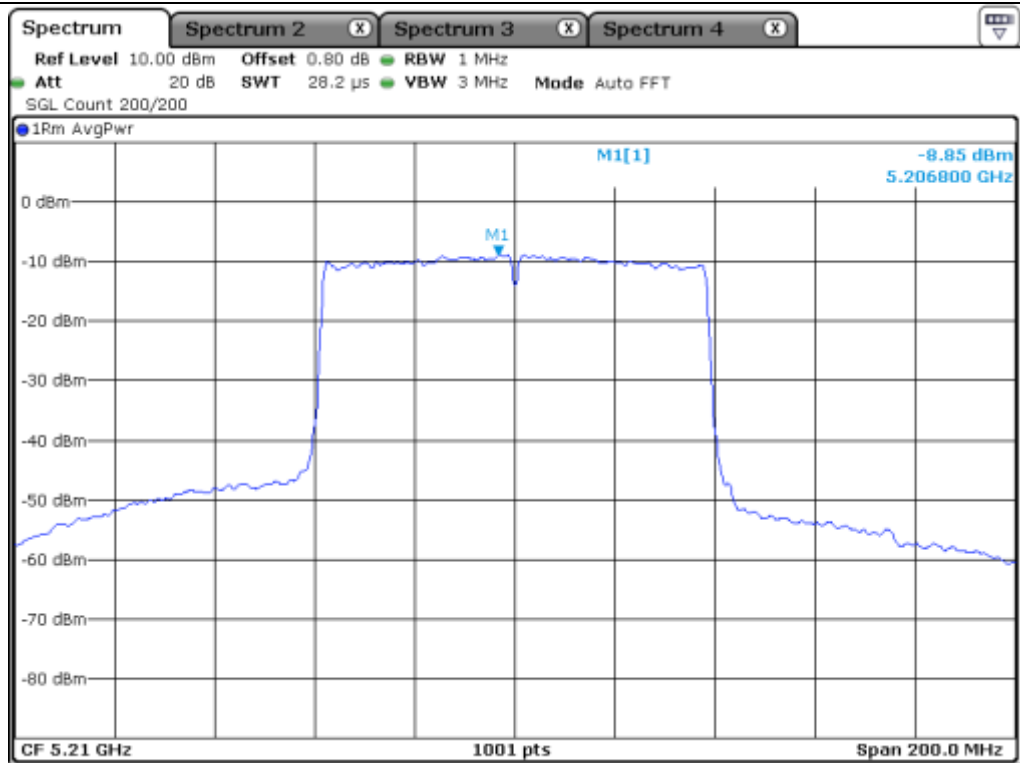
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 210.00	-8.85	11.00	19.85
5 250 ~ 5 350	Low	5 290.00	-9.21	11.00	20.21
5 470 ~ 5 725	Low	5 530.00	-8.49	11.00	19.49
5 725 ~ 5 850	Low	5 775.00	-12.09	30.00	42.09

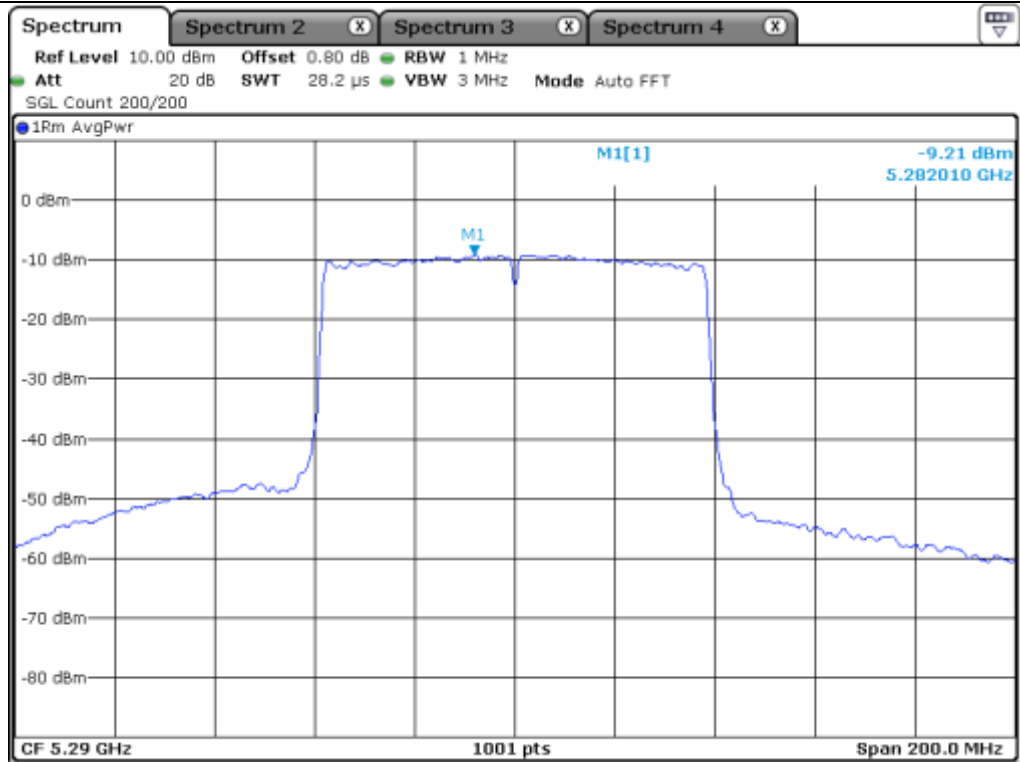
Remark: See next page for measurement data.



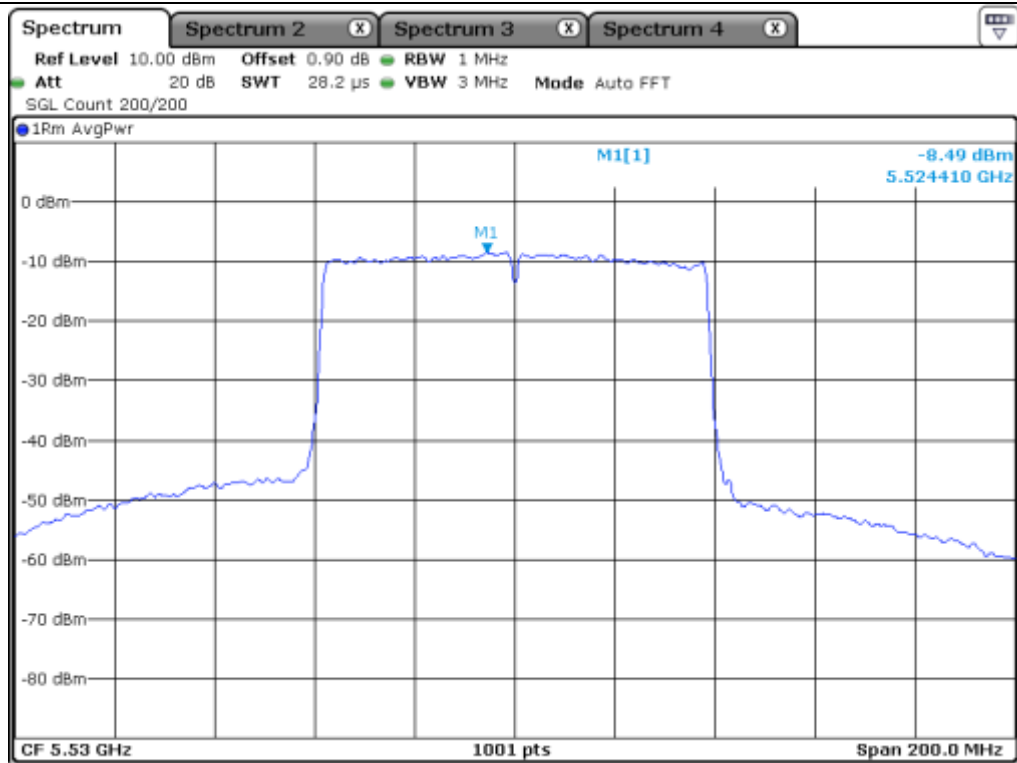
Tested by: Ha-Ram, Lee / Assistant Manager



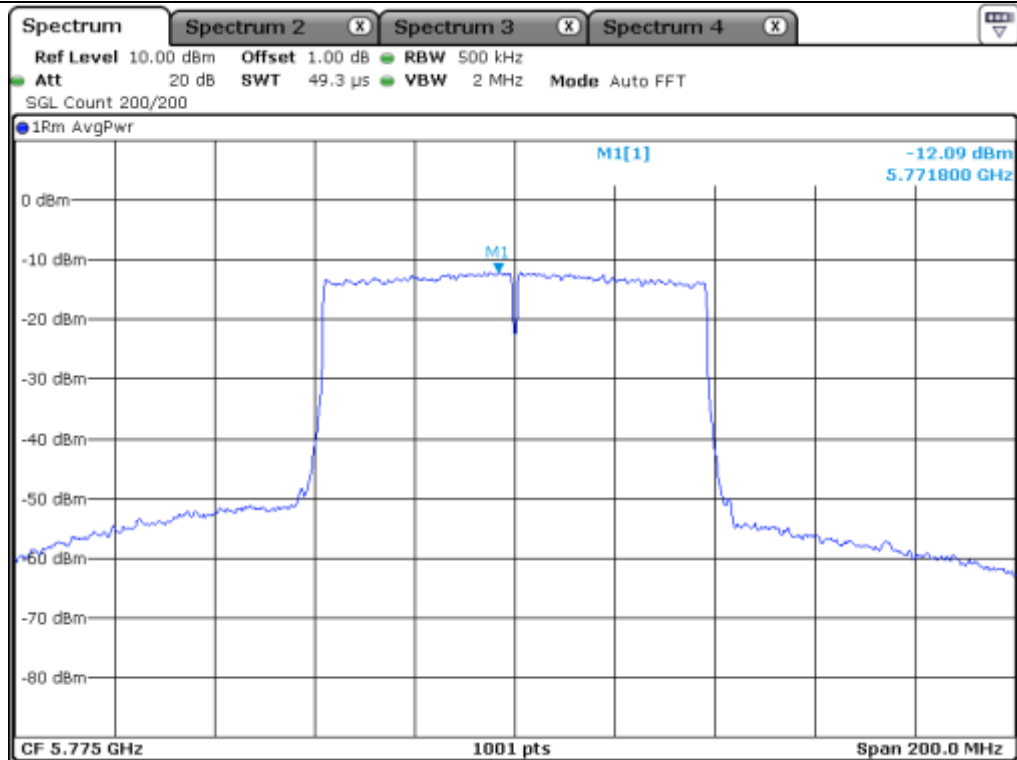
Low Channel (5 210 MHz)



Low Channel (5 290 MHz)



Low Channel (5 530 MHz)



Low Channel (5 775 MHz)

10.7.2 Test data for Antenna 1

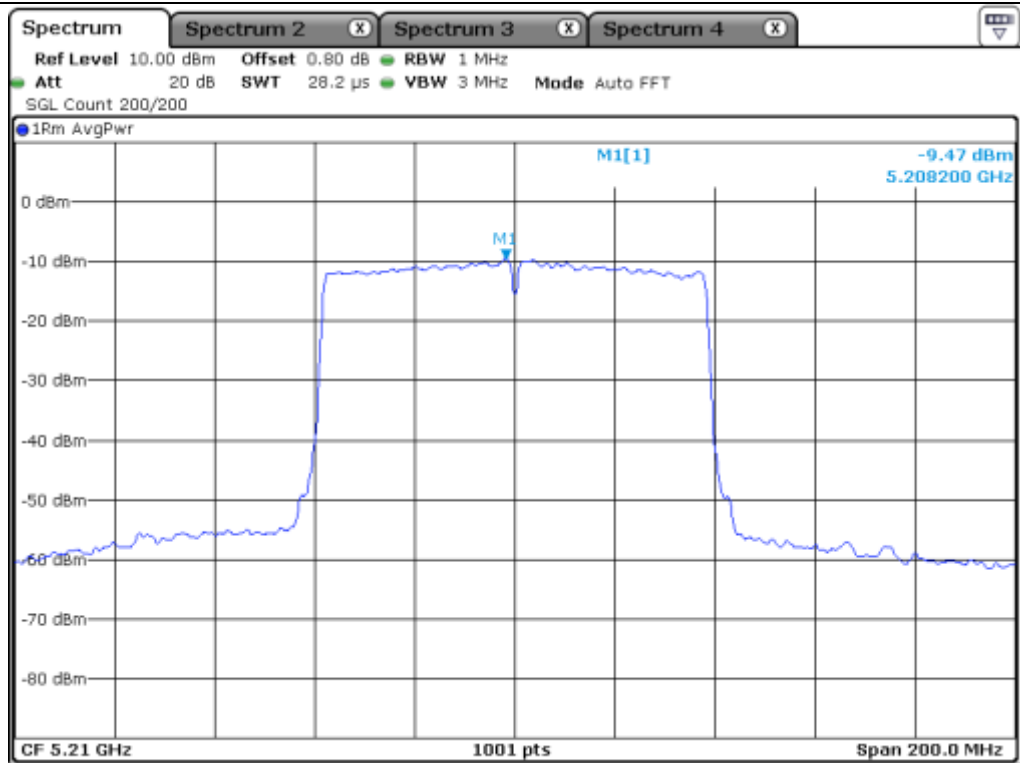
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 150 ~ 5 250	Low	5 210.00	-9.47	11.00	20.47
5 250 ~ 5 350	Low	5 290.00	-9.45	11.00	20.45
5 470 ~ 5 725	Low	5 530.00	-8.16	11.00	19.16
5 725 ~ 5 850	Low	5 775.00	-11.71	30.00	41.71

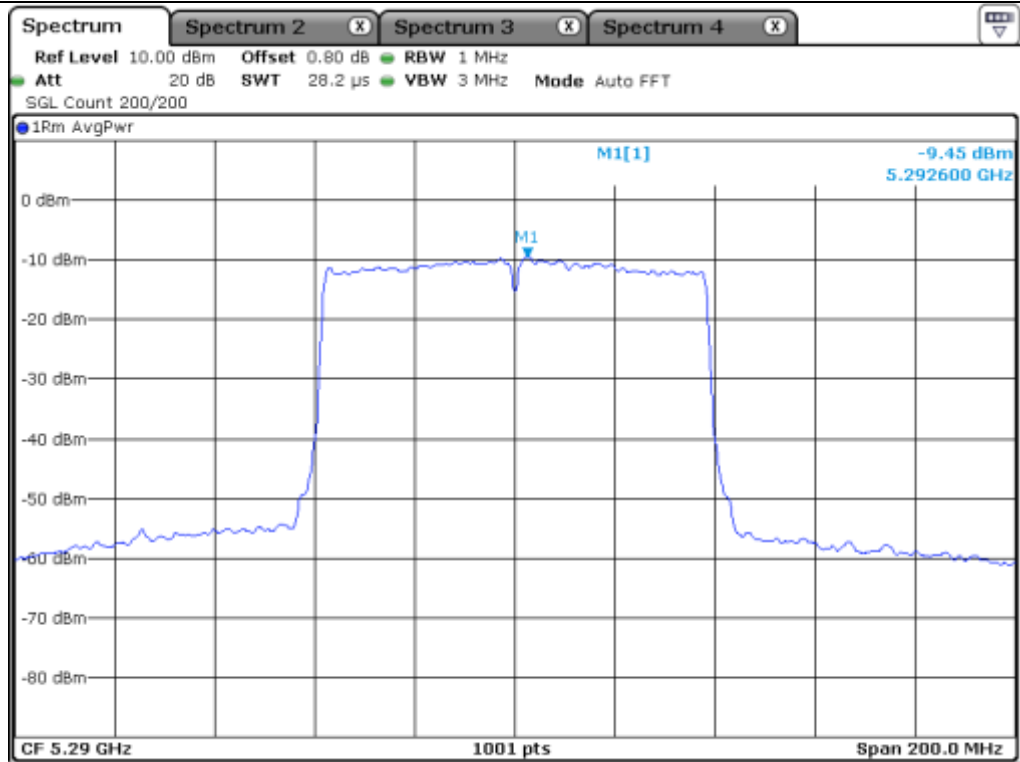
Remark: See next page for measurement data.



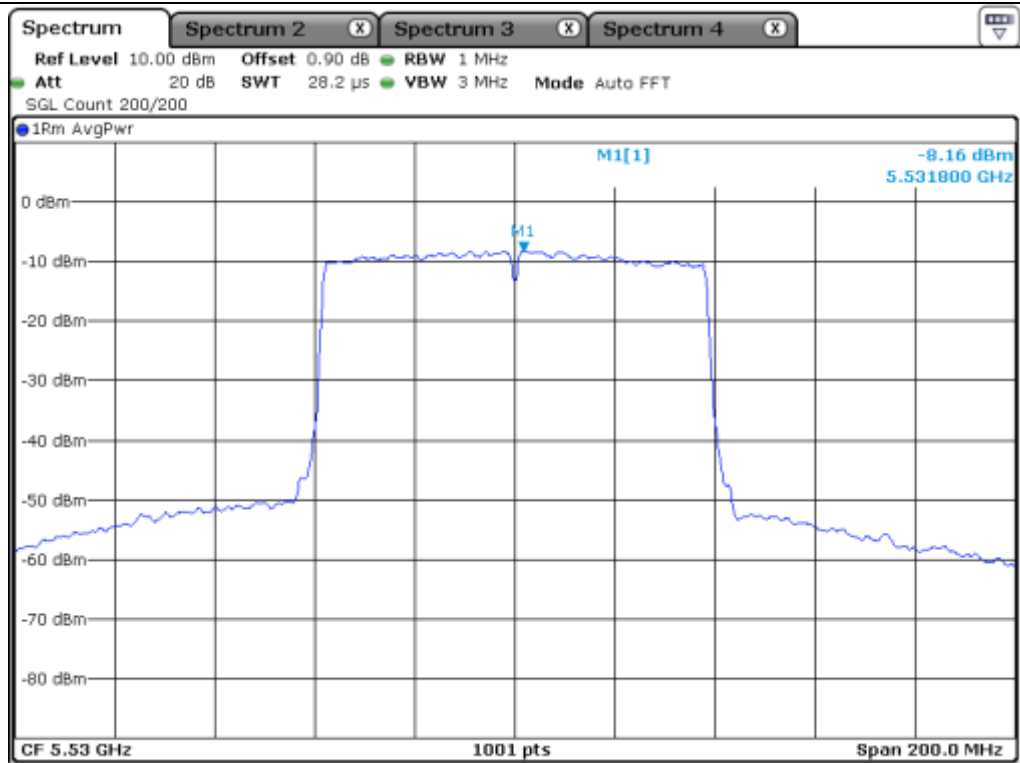
Tested by: Ha-Ram, Lee / Assistant Manager



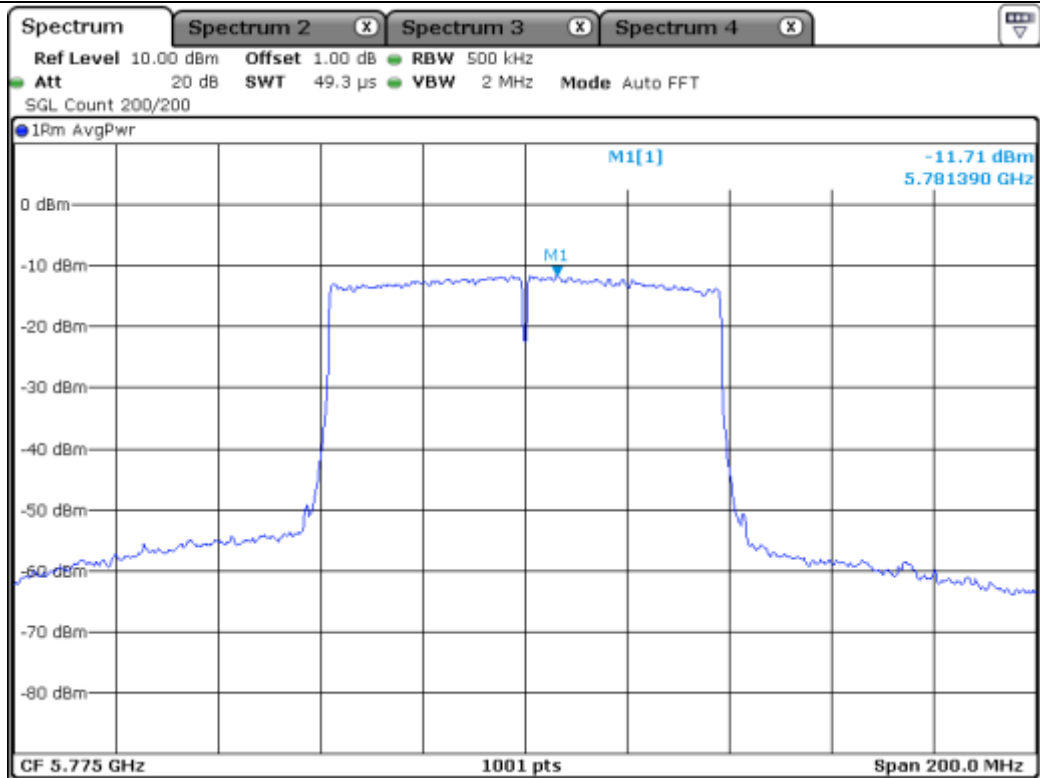
Low Channel (5 210 MHz)



Low Channel (5 290 MHz)



Low Channel (5 530 MHz)



Low Channel (5 775 MHz)

10.7.3 Test data for Multiple Transmit

- . Test Date : December 02, 2019 ~ December 11, 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	-6.14	11.00	17.14
5 250 ~ 5 350	Low	5 290.00	-6.32	11.00	17.32
5 470 ~ 5 725	Low	5 530.00	-5.31	11.00	16.31
5 725 ~ 5 850	Low	5 775.00	-8.89	30.00	38.89



Tested by: Ha-Ram, Lee / Assistant Manager

10.7.4 Test data for Staddle Channel_Antenna 0

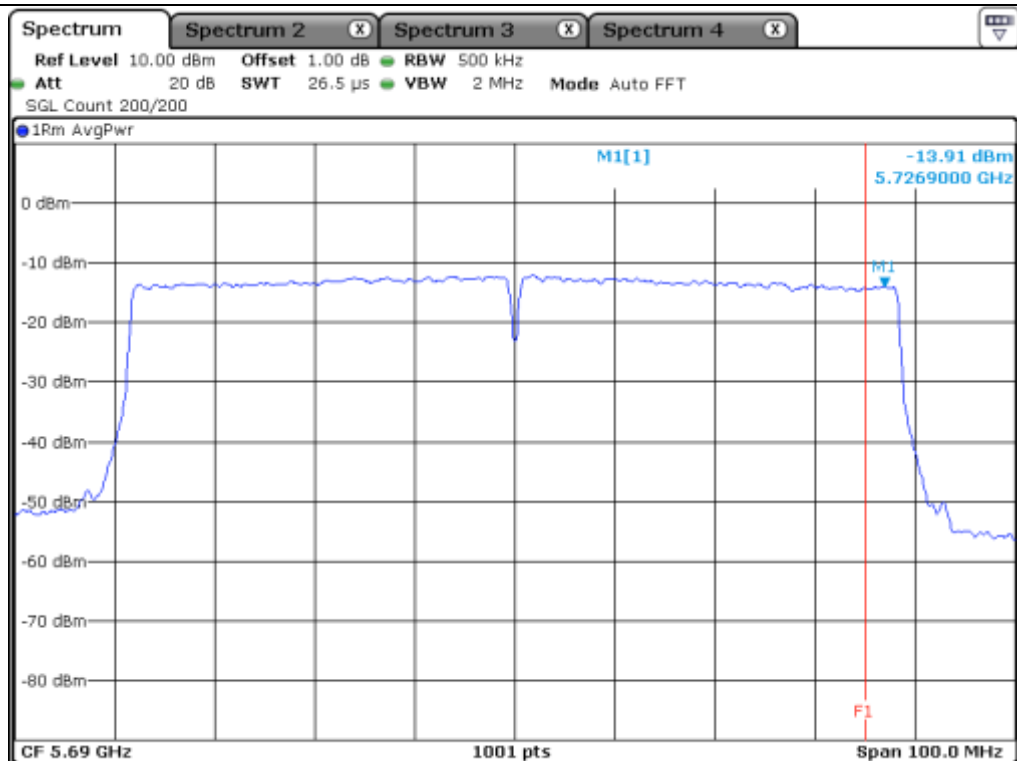
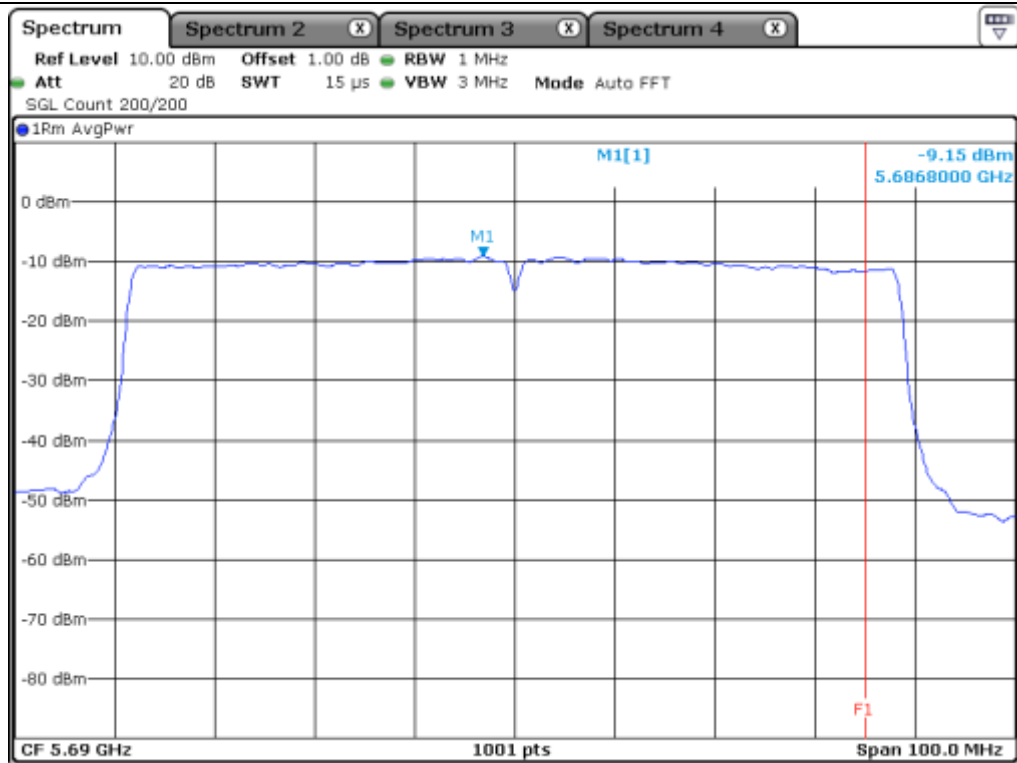
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 690.00	-9.15	11.00	20.15
5 725 ~ 5 850	5 690.00	-13.91	30.00	43.91

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager



10.7.5 Test data for Staddle Channel_Antenna 1

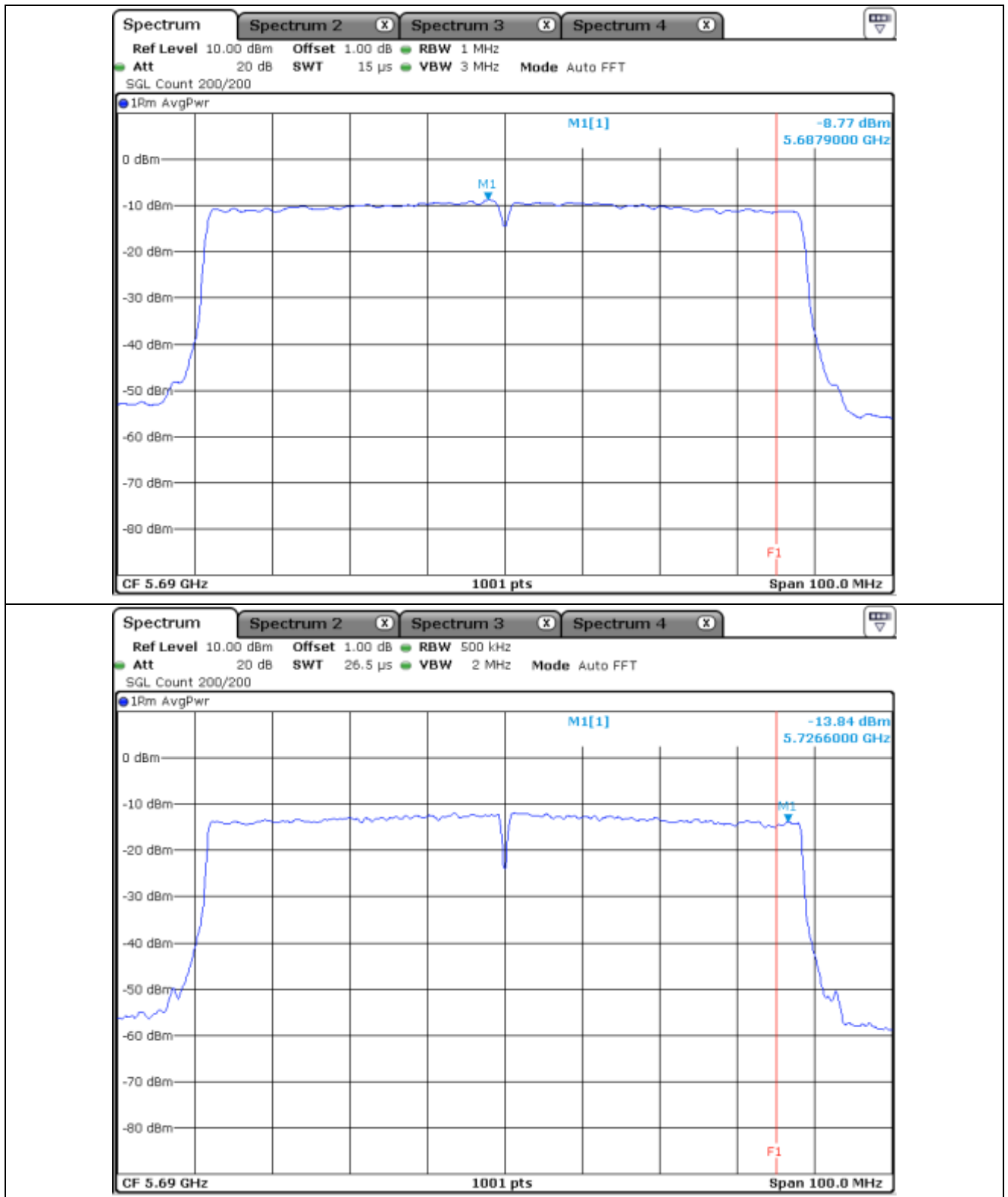
- . Test Date : December 02, 2019 ~ December 11, 2019
- . Operating condition : Highest Output Power Transmitting Mode
- . Test Result : Pass

FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
5 470 ~ 5 725	5 690.00	-8.77	11.00	19.77
5 725 ~ 5 850	5 690.00	-13.84	30.00	43.84

Remark: See next page for measurement data.



Tested by: Ha-Ram, Lee / Assistant Manager



10.7.6 Test data for Staddle Channel_Multiple Transmit

- . Test Date : December 02, 2019 ~ December 11, 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	-5.95	11.00	16.95
5 725 ~ 5 850	5 690.00	-10.86	30.00	40.86



Tested by: Ha-Ram, Lee / Assistant Manager

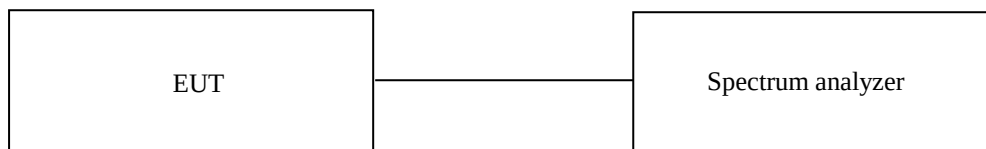
11. FREQUENCY STABILITY WITH TEMPERATURE VARIATION

11.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % 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)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101199	Mar. 11, 2019 (1Y)
■ -	PSL-2KP	ESPEC	Environmental Test Chamber	14009407	Feb. 22, 2019 (1Y)
■ -	PWS-3003D	Protek	DC Power supply	4020409	Jul. 24, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

11.4 Test Data for U-NII-1

-. Test Date : December 12, 2019

-. Result : Pass

Temperature (°C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
-20	5 180 000 000	5 180 079 022	79.022
-10		5 180 075 718	75.718
0		5 180 060 599	60.599
10		5 180 042 724	42.724
20		5 180 038 201	38.201
30		5 180 018 664	18.664
40		5 180 008 744	8.744
50		5 179 989 630	-10.370
-20	5 220 000 000	5 220 079 919	79.919
-10		5 220 075 364	75.364
0		5 220 059 222	59.222
10		5 220 043 214	43.214
20		5 220 038 407	38.407
30		5 220 019 942	19.942
40		5 220 007 899	7.899
50		5 219 990 012	-9.988
-20	5 240 000 000	5 240 079 795	79.795
-10		5 240 074 990	74.990
0		5 240 057 118	57.118
10		5 240 044 541	44.541
20		5 240 038 707	38.707
30		5 240 018 820	18.820
40		5 240 008 912	8.912
50		5 239 989 971	-10.029

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: Ha-Ram, Lee / Assistant Manager

11.5 Test Data for U-NII-2A

-. Test Date : December 12, 2019

-. Result : Pass

Temperature (°C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
-20	5 260 000 000	5 260 079 615	79.615
-10		5 260 074 855	74.855
0		5 260 056 538	56.538
10		5 260 043 055	43.055
20		5 260 037 654	37.654
30		5 260 017 745	17.745
40		5 260 007 701	7.701
50		5 259 990 071	-9.929
-20	5 300 000 000	5 300 079 029	79.029
-10		5 300 075 002	75.002
0		5 300 056 337	56.337
10		5 300 043 524	43.524
20		5 300 037 794	37.794
30		5 300 018 429	18.429
40		5 300 008 001	8.001
50		5 299 990 191	-9.809
-20	5 320 000 000	5 320 081 835	81.835
-10		5 320 073 467	73.467
0		5 320 056 841	56.841
10		5 320 044 092	44.092
20		5 320 038 401	38.401
30		5 320 016 774	16.774
40		5 320 008 513	8.513
50		5 319 990 016	-9.984

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: Ha-Ram, Lee / Assistant Manager

11.6 Test Data for U-NII-2C

-. Test Date : December 12, 2019

-. Result : Pass

Temperature (°C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
-20	5 500 000 000	5 500 084 085	84.085
-10		5 500 077 521	77.521
0		5 500 059 524	59.524
10		5 500 045 907	45.907
20		5 500 036 680	36.680
30		5 500 017 039	17.039
40		5 500 005 877	5.877
50		5 499 988 355	-11.645
-20	5 580 000 000	5 580 085 811	85.811
-10		5 580 077 905	77.905
0		5 580 058 292	58.292
10		5 580 043 621	43.621
20		5 580 037 201	37.201
30		5 580 019 901	19.901
40		5 580 006 033	6.033
50		5 579 987 067	-12.933
-20	5 700 000 000	5 700 083 065	83.065
-10		5 700 078 804	78.804
0		5 700 060 830	60.830
10		5 700 044 467	44.467
20		5 700 036 309	36.309
30		5 700 017 999	17.999
40		5 700 005 301	5.301
50		5 699 989 603	-10.397

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: Ha-Ram, Lee / Assistant Manager

11.7 Test Data for U-NII-3

-. Test Date : December 12, 2019

-. Result : Pass

Temperature (°C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
-20	5 745 000 000	5 745 085 406	85.406
-10		5 745 078 254	78.254
0		5 745 058 717	58.717
10		5 745 044 858	44.858
20		5 745 035 492	35.492
30		5 745 015 990	15.990
40		5 745 007 063	7.063
50		5 744 988 661	-11.339
-20	5 785 000 000	5 785 085 461	85.461
-10		5 785 076 895	76.895
0		5 785 060 799	60.799
10		5 785 045 071	45.071
20		5 785 036 633	36.633
30		5 785 016 008	16.008
40		5 785 006 742	6.742
50		5 784 989 007	-10.993
-20	5 825 000 000	5 825 085 026	85.026
-10		5 825 077 270	77.270
0		5 825 062 145	62.145
10		5 825 043 903	43.903
20		5 825 035 284	35.284
30		5 825 017 107	17.107
40		5 825 005 971	5.971
50		5 824 990 171	-9.829

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: Ha-Ram, Lee / Assistant Manager

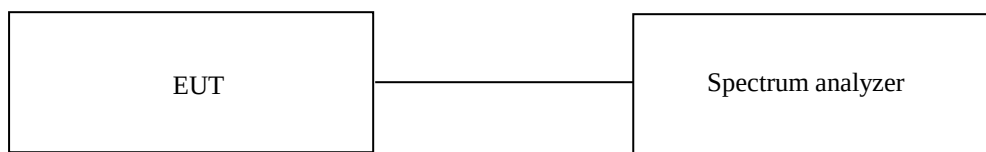
12. FREQUENCY STABILITY WITH VOLTAGE VARIATION

12.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % 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)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101199	Mar. 11, 2019 (1Y)
■ -	PWS-3003D	Protek	DC Power supply	4020409	Jul. 24, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

12.4 Test Data for U-NII-1

-. Test Date : December 12, 2019

-. Result : Pass

Voltage (VDC)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
5.0	5 180 000 000	5 180 041 694	41.694
4.5		5 180 039 640	39.640
5.5		5 180 037 598	37.598
5.0	5 220 000 000	5 220 041 062	41.062
4.5		5 220 038 109	38.109
5.5		5 220 035 851	35.851
5.0	5 240 000 000	5 240 040 823	40.823
4.5		5 240 037 900	37.900
5.5		5 240 035 598	35.598

12.5 Test Data for U-NII-2A

-. Test Date : December 12, 2019

-. Result : Pass

Voltage (VDC)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
5.0	5 260 000 000	5 260 040 009	40.009
4.5		5 260 037 401	37.401
5.5		5 260 035 112	35.112
5.0	5 300 000 000	5 300 040 332	40.332
4.5		5 300 038 112	38.112
5.5		5 300 035 784	35.784
5.0	5 320 000 000	5 320 039 450	39.450
4.5		5 320 036 697	36.697
5.5		5 320 034 474	34.474



Tested by: Ha-Ram, Lee / Assistant Manager

12.6 Test Data for U-NII-2C

-. Test Date : December 12, 2019

-. Result : Pass

Voltage (VDC)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
5.0	5 500 000 000	5 500 038 332	38.332
4.5		5 500 036 054	36.054
5.5		5 500 033 923	33.923
5.0	5 580 000 000	5 580 038 904	38.904
4.5		5 580 036 114	36.114
5.5		5 580 033 455	33.455
5.0	5 700 000 000	5 700 038 183	38.183
4.5		5 700 035 422	35.422
5.5		5 700 032 608	32.608

12.7 Test Data for U-NII-3

-. Test Date : December 12, 2019

-. Result : Pass

Voltage (VDC)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Frequency Error (kHz)
5.0	5 745 000 000	5 745 037 840	37.840
4.5		5 745 035 593	35.593
5.5		5 745 033 041	33.041
5.0	5 785 000 000	5 785 039 379	39.379
4.5		5 785 036 940	36.940
5.5		5 785 034 383	34.383
5.0	5 825 000 000	5 825 039 172	39.172
4.5		5 825 037 011	37.011
5.5		5 825 034 949	34.949



Tested by: Ha-Ram, Lee / Assistant Manager

13. RADIATED SPURIOUS EMISSIONS

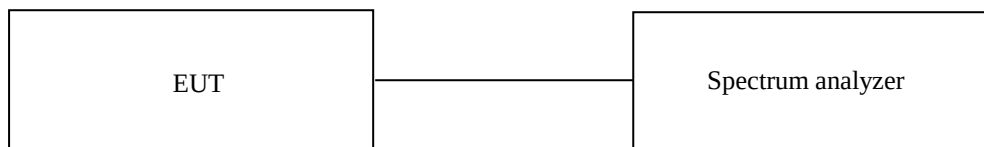
13.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % 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.
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101199	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)
■ -	DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
■ -	MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
■ -	Loop Antenna	Schwarzbeck	FMZB 1513	1513-235	May. 13, 2018 (2Y)
■ -	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	Jun. 10, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

13.4 Test data for Below 30 MHz

- . Test Date : December 03, 2019 ~ December 05, 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 (dB μ V)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
All emissions observed were 20 dB below the limit.									



Tested by: Ha-Ram, Lee / Assistant Manager

13.5 Test data for 30 MHz ~ 960 MHz

13.5.1 Test data for WLAN 5 GHz

Humidity Level : 48 % R.H.

Temperature: 24 °C

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

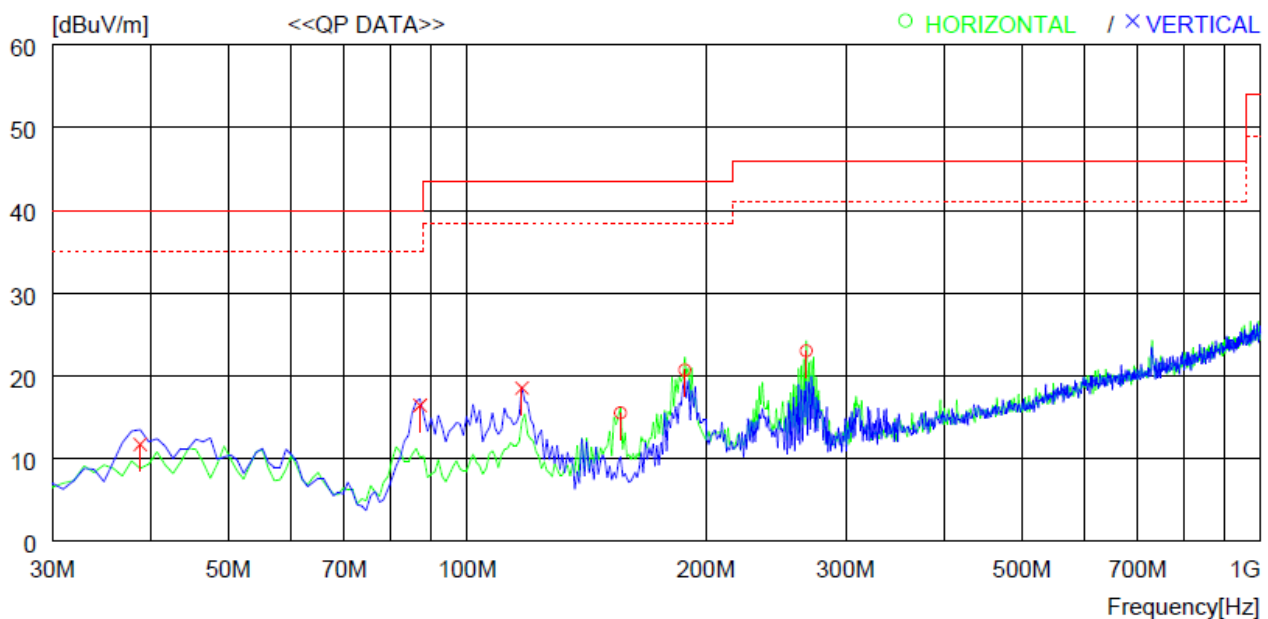
Result : PASSED

EUT : Wi-Fi/BT Transceiver

Date: December 03, 2019 ~ December 05, 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
		QP	FACTOR							
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	156.100	37.5	8.6	2.4	33.0	15.5	43.5	28.0	200	77
2	188.110	41.2	9.9	2.7	33.1	20.7	43.5	22.8	100	239
3	267.650	40.1	12.8	3.1	33.0	23.0	46.0	23.0	100	121
----- Vertical -----										
4	38.730	30.0	13.4	1.4	33.1	11.7	40.0	28.3	100	0
5	87.230	38.0	9.6	1.9	33.1	16.4	40.0	23.6	100	0
6	117.300	38.8	10.6	2.2	33.1	18.5	43.5	25.0	100	0



Tested by: Ha-Ram, Lee / Assistant Manager

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

Humidity Level : 48 % R.H.

Temperature: 24 °C

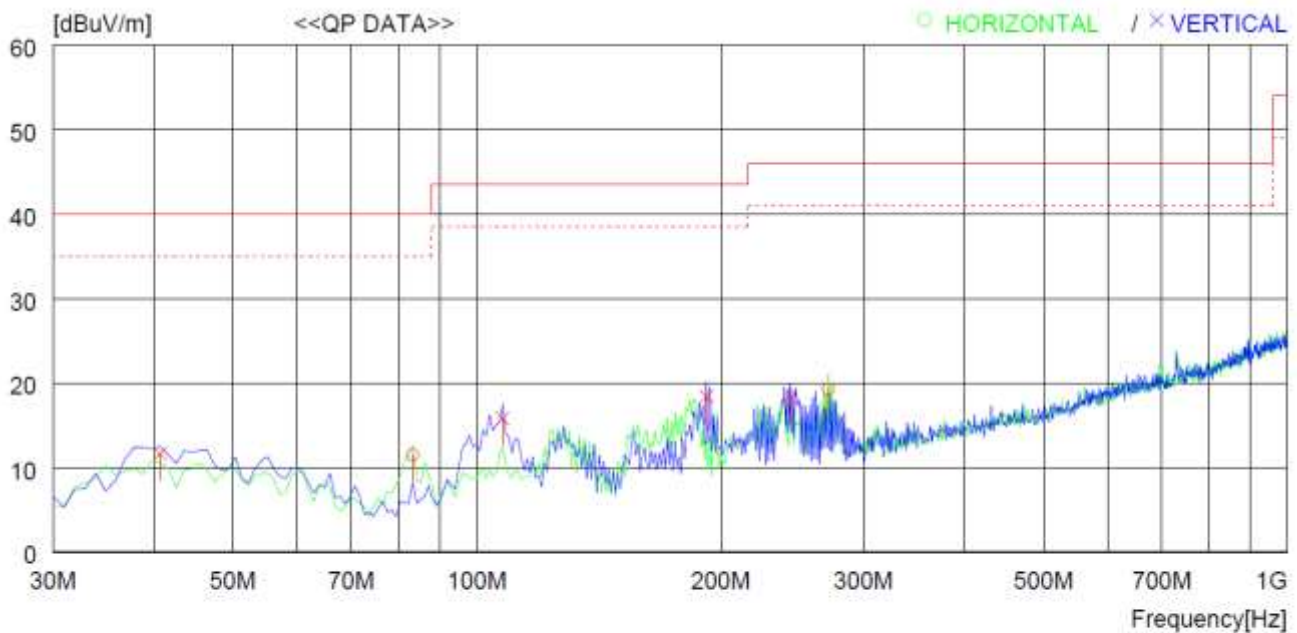
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wi-Fi/BT Transceiver

Date: December 03, 2019 ~ December 05, 2019

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



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
		QP	FACTOR							
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	83.350	34.2	8.5	1.9	33.1	11.5	40.0	28.5	100	197
2	271.530	36.2	12.9	3.2	33.0	19.3	46.0	26.7	100	359
----- Vertical -----										
3	40.670	29.5	13.8	1.4	33.1	11.6	40.0	28.4	300	299
4	107.600	35.2	11.5	2.2	33.1	15.8	43.5	27.7	100	69
5	191.990	38.7	10.1	2.7	33.1	18.4	43.5	25.1	100	229
6	243.400	36.2	12.1	3.0	33.0	18.3	46.0	27.7	100	0



Tested by: Ha-Ram, Lee / Assistant Manager

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

Humidity Level : 48 % R.H.

Temperature: 24 °C

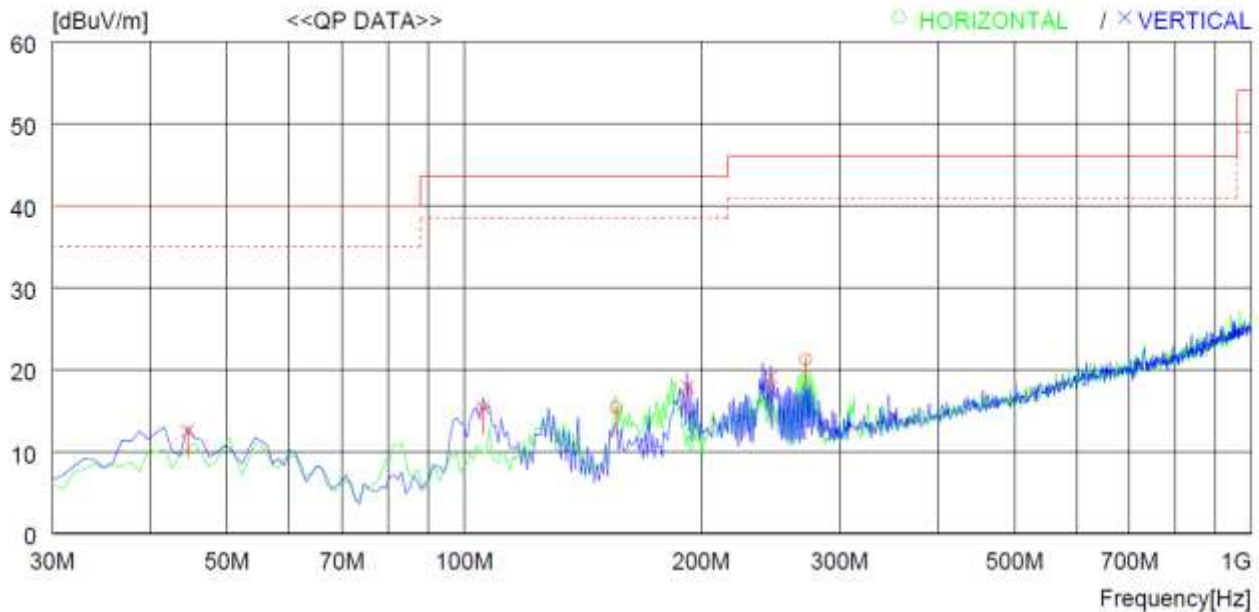
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Wi-Fi/BT Transceiver

Date: December 03, 2019 ~ December 05, 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	156.100	37.4	8.6	2.4	33.0	15.4	43.5	28.1	200	223
2	271.530	38.1	12.9	3.2	33.0	21.2	46.0	24.8	100	113
----- Vertical -----										
3	44.550	30.0	14.1	1.5	33.1	12.5	40.0	27.5	100	0
4	105.660	34.7	11.6	2.1	33.1	15.3	43.5	28.2	100	244
5	191.990	38.2	10.1	2.7	33.1	17.9	43.5	25.6	100	0
6	245.340	36.9	12.2	3.0	33.0	19.1	46.0	26.9	100	65



Tested by: Ha-Ram, Lee / Assistant 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 : December 03, 2019 ~ December 05, 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	14.63	Peak	H	39.70	7.60	61.93	68.20	6.27
10 360.00	14.02	Peak	V	39.70	7.60	61.32	68.20	6.88
Middle Channel								
10 440.00	14.37	Peak	H	39.90	7.70	61.97	68.20	6.23
10 440.00	12.90	Peak	V	39.90	7.70	60.50	68.20	7.70
High Channel								
10 480.00	13.44	Peak	H	39.90	7.72	61.06	68.20	7.14
10 480.00	15.11	Peak	V	39.90	7.72	62.73	68.20	5.47

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.1.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	13.84	Peak	H	39.70	7.60	61.14	68.20	7.06
10 360.00	13.71	Peak	V	39.70	7.60	61.01	68.20	7.19
Middle Channel								
10 440.00	12.84	Peak	H	39.90	7.70	60.44	68.20	7.76
10 440.00	13.29	Peak	V	39.90	7.70	60.89	68.20	7.31
High Channel								
10 480.00	13.46	Peak	H	39.90	7.72	61.08	68.20	7.12
10 480.00	12.84	Peak	V	39.90	7.72	60.46	68.20	7.74

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.1.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	13.75	Peak	H	39.70	7.60	61.05	68.20	7.15
10 380.00	13.01	Peak	V	39.70	7.60	60.31	68.20	7.89
High Channel								
10 460.00	13.99	Peak	H	39.90	7.71	61.60	68.20	6.60
10 460.00	13.29	Peak	V	39.90	7.71	60.90	68.20	7.30

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.1.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	15.05	Peak	H	39.80	7.66	62.51	68.20	5.69
10 420.00	13.31	Peak	V	39.80	7.66	60.77	68.20	7.43

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.2 Test data for Frequency UNII 2A

13.6.2.1 Test data for 802.11a RLAN Mode

- Test Date : December 03, 2019 ~ December 05, 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	12.95	Peak	H	39.90	7.75	60.60	68.20	7.60
10 520.00	14.79	Peak	V	39.90	7.75	62.44	68.20	5.76
Middle Channel								
10 600.00	12.92	Peak	H	39.90	7.77	60.59	74.00	13.41
10 600.00	3.49	Average	H	39.90	7.77	51.16	54.00	2.84
10 600.00	13.96	Peak	V	39.90	7.77	61.63	74.00	12.37
10 600.00	4.16	Average	V	39.90	7.77	51.83	54.00	2.17
High Channel								
10 640.00	13.76	Peak	H	39.90	7.80	61.46	74.00	12.54
10 640.00	4.03	Average	H	39.90	7.80	51.73	54.00	2.27
10 640.00	16.03	Peak	V	39.90	7.80	63.73	74.00	10.27
10 640.00	4.05	Average	V	39.90	7.80	51.75	54.00	2.25

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.2.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	12.21	Peak	H	39.90	7.75	59.86	68.20	8.34
10 520.00	14.09	Peak	V	39.90	7.75	61.74	68.20	6.46
Middle Channel								
10 600.00	12.99	Peak	H	39.90	7.77	60.66	74.00	13.34
10 600.00	3.82	Average	H	39.90	7.77	51.49	54.00	2.51
10 600.00	14.16	Peak	V	39.90	7.77	61.83	74.00	12.17
10 600.00	4.00	Average	V	39.90	7.77	51.67	54.00	2.33
High Channel								
10 640.00	14.05	Peak	H	39.90	7.80	61.75	74.00	12.25
10 640.00	3.53	Average	H	39.90	7.80	51.23	54.00	2.77
10 640.00	13.77	Peak	V	39.90	7.80	61.47	74.00	12.53
10 640.00	3.61	Average	V	39.90	7.80	51.31	54.00	2.69

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.2.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	13.64	Peak	H	39.90	7.75	61.29	68.20	6.91
10 540.00	12.68	Peak	V	39.90	7.75	60.33	68.20	7.87
High Channel								
10 620.00	13.75	Peak	H	39.90	7.78	61.43	74.00	12.57
10 620.00	4.09	Average	H	39.90	7.78	51.77	54.00	2.23
10 620.00	13.49	Peak	V	39.90	7.78	61.17	74.00	12.83
10 620.00	3.91	Average	V	39.90	7.78	51.59	54.00	2.41

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.2.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	12.71	Peak	H	39.90	7.76	60.37	68.20	7.83
10 580.00	13.27	Peak	V	39.90	7.76	60.93	68.20	7.27

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.3 Test data for Frequency UNII 2C

13.6.3.1 Test data for 802.11a RLAN Mode

- Test Date : December 03, 2019 ~ December 05, 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	12.33	Peak	H	40.40	8.23	60.96	74.00	13.04
11 000.00	3.27	Average	H	40.40	8.23	51.90	54.00	2.10
11 000.00	12.96	Peak	V	40.40	8.23	61.59	74.00	12.41
11 000.00	3.31	Average	V	40.40	8.23	51.94	54.00	2.06
Middle Channel								
11 160.00	13.34	Peak	H	39.90	8.43	61.67	74.00	12.33
11 160.00	3.44	Average	H	39.90	8.43	51.77	54.00	2.23
11 160.00	11.99	Peak	V	39.90	8.43	60.32	74.00	13.68
11 160.00	3.48	Average	V	39.90	8.43	51.81	54.00	2.19
High Channel								
11 400.00	13.65	Peak	H	40.10	8.81	62.56	74.00	11.44
11 400.00	3.56	Average	H	40.10	8.81	52.47	54.00	1.53
11 400.00	12.51	Peak	V	40.10	8.81	61.42	74.00	12.58
11 400.00	3.68	Average	V	40.10	8.81	52.59	54.00	1.41

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.3.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	12.04	Peak	H	40.40	8.23	60.67	74.00	13.33
11 000.00	3.34	Average	H	40.40	8.23	51.97	54.00	2.03
11 000.00	12.20	Peak	V	40.40	8.23	60.83	74.00	13.17
11 000.00	3.26	Average	V	40.40	8.23	51.89	54.00	2.11
Middle Channel								
11 160.00	13.20	Peak	H	39.90	8.43	61.53	74.00	12.47
11 160.00	3.32	Average	H	39.90	8.43	51.65	54.00	2.35
11 160.00	13.02	Peak	V	39.90	8.43	61.35	74.00	12.65
11 160.00	3.38	Average	V	39.90	8.43	51.71	54.00	2.29
High Channel								
11 400.00	12.56	Peak	H	40.10	8.81	61.47	74.00	12.53
11 400.00	3.61	Average	H	40.10	8.81	52.52	54.00	1.48
11 400.00	12.81	Peak	V	40.10	8.81	61.72	74.00	12.28
11 400.00	3.38	Average	V	40.10	8.81	52.29	54.00	1.71

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.3.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	12.37	Peak	H	40.40	8.26	61.03	74.00	12.97
11 020.00	3.34	Average	H	40.40	8.26	52.00	54.00	2.00
11 020.00	11.71	Peak	V	40.40	8.26	60.37	74.00	13.63
11 020.00	3.56	Average	V	40.40	8.26	52.22	54.00	1.78
Middle Channel								
11 100.00	11.78	Peak	H	40.10	8.39	60.27	74.00	13.73
11 100.00	3.19	Average	H	40.10	8.39	51.68	54.00	2.32
11 100.00	12.44	Peak	V	40.10	8.39	60.93	74.00	13.07
11 100.00	3.30	Average	V	40.10	8.39	51.79	54.00	2.21
High Channel								
11 340.00	12.06	Peak	H	40.00	8.75	60.81	74.00	13.19
11 340.00	3.71	Average	H	40.00	8.75	52.46	54.00	1.54
11 340.00	11.87	Peak	V	40.00	8.75	60.62	74.00	13.38
11 340.00	3.42	Average	V	40.00	8.75	52.17	54.00	1.83

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.3.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	14.00	Peak	H	40.40	8.26	62.66	74.00	11.34
11 060.00	3.77	Average	H	40.40	8.26	52.43	54.00	1.57
11 060.00	13.12	Peak	V	40.40	8.26	61.78	74.00	12.22
11 060.00	3.56	Average	V	40.40	8.26	52.22	54.00	1.78

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.4 Test data for Frequency UNII 3

13.6.4.1 Test data for 802.11a RLAN Mode

- Test Date : December 03, 2019 ~ December 05, 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	12.62	Peak	H	40.20	8.85	61.67	74.00	12.33
11 490.00	3.78	Average	H	40.20	8.85	52.83	54.00	1.17
11 490.00	12.62	Peak	V	40.20	8.85	61.67	74.00	12.33
11 490.00	3.81	Average	V	40.20	8.85	52.86	54.00	1.14
Middle Channel								
11 570.00	12.43	Peak	H	40.10	8.87	61.40	74.00	12.60
11 570.00	3.72	Average	H	40.10	8.87	52.69	54.00	1.31
11 570.00	12.56	Peak	V	40.10	8.87	61.53	74.00	12.47
11 570.00	3.41	Average	V	40.10	8.87	52.38	54.00	1.62
High Channel								
11 650.00	12.63	Peak	H	39.60	8.90	61.13	74.00	12.87
11 650.00	3.59	Average	H	39.60	8.90	52.09	54.00	1.91
11 650.00	13.37	Peak	V	39.60	8.90	61.87	74.00	12.13
11 650.00	3.72	Average	V	39.60	8.90	52.22	54.00	1.78

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.4.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	13.16	Peak	H	40.20	8.85	62.21	74.00	11.79
11 490.00	3.72	Average	H	40.20	8.85	52.77	54.00	1.23
11 490.00	12.27	Peak	V	40.20	8.85	61.32	74.00	12.68
11 490.00	3.73	Average	V	40.20	8.85	52.78	54.00	1.22
Middle Channel								
11 570.00	12.63	Peak	H	40.10	8.87	61.60	74.00	12.40
11 570.00	3.49	Average	H	40.10	8.87	52.46	54.00	1.54
11 570.00	12.83	Peak	V	40.10	8.87	61.80	74.00	12.20
11 570.00	3.54	Average	V	40.10	8.87	52.51	54.00	1.49
High Channel								
11 650.00	13.18	Peak	H	39.60	8.90	61.68	74.00	12.32
11 650.00	3.51	Average	H	39.60	8.90	52.01	54.00	1.99
11 650.00	12.91	Peak	V	39.60	8.90	61.41	74.00	12.59
11 650.00	3.53	Average	V	39.60	8.90	52.03	54.00	1.97

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

13.6.4.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	12.79	Peak	H	40.20	8.85	61.84	74.00	12.16
11 510.00	3.58	Average	H	40.20	8.85	52.63	54.00	1.37
11 510.00	12.90	Peak	V	40.20	8.85	61.95	74.00	12.05
11 510.00	3.86	Average	V	40.20	8.85	52.91	54.00	1.09
High Channel								
11 590.00	12.23	Peak	H	39.90	8.88	61.01	74.00	12.99
11 590.00	3.70	Average	H	39.90	8.88	52.48	54.00	1.52
11 590.00	12.75	Peak	V	39.90	8.88	61.53	74.00	12.47
11 590.00	3.64	Average	V	39.90	8.88	52.42	54.00	1.58

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

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



Tested by: Ha-Ram, Lee / Assistant 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 : December 03, 2019 ~ December 05, 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	12.98	Peak	H	40.10	8.86	61.94	74.00	12.06
11 550.00	3.99	Average	H	40.10	8.86	52.95	54.00	1.05
11 550.00	12.82	Peak	V	40.10	8.86	61.78	74.00	12.22
11 550.00	3.51	Average	V	40.10	8.86	52.47	54.00	1.53

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

14. RADIATED RESTRICTED BAND EDGE MEASUREMENTS

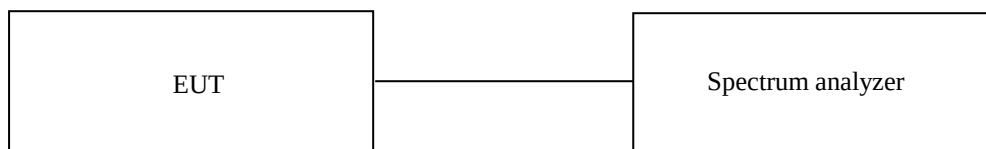
14.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % 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)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101199	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)
■ -	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	Jun. 10, 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 : December 03, 2019 ~ December 05, 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)
5 069.810	16.51	Peak	H	32.20	5.19	53.90	74.00	20.10
4 970.450	7.42	Average	H	32.20	5.19	44.81	54.00	9.19
4 975.000	16.93	Peak	V	32.20	5.19	54.32	74.00	19.68
4 972.100	7.62	Average	V	32.20	5.19	45.01	54.00	8.99

Tabulated test data for Restricted Band

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

14.4.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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)
5 141.800	17.12	Peak	H	32.20	5.19	54.51	74.00	19.49
4 967.100	7.17	Average	H	32.20	5.19	44.56	54.00	9.44
5 132.140	16.55	Peak	V	32.20	5.19	53.94	74.00	20.06
5 142.530	7.22	Average	V	32.20	5.19	44.61	54.00	9.39

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: Ha-Ram, Lee / Assistant Manager

14.4.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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)
4 975.000	16.37	Peak	H	32.20	5.19	53.76	74.00	20.24
4 899.030	7.34	Average	H	32.20	5.19	44.73	54.00	9.27
5 108.770	16.74	Peak	V	32.00	5.19	53.93	74.00	20.07
5 138.640	7.33	Average	V	32.20	5.19	44.72	54.00	9.28

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: Ha-Ram, Lee / Assistant Manager

14.4.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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)
5 017.210	17.54	Peak	H	32.20	5.19	54.93	74.00	19.07
5 102.270	7.10	Average	H	32.20	5.19	44.49	54.00	9.51
5 078.900	16.82	Peak	V	32.20	5.19	54.21	74.00	19.79
4 897.730	7.14	Average	V	32.00	5.19	44.33	54.00	9.67

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: Ha-Ram, Lee / Assistant Manager

14.5 Test data for Frequency UNII 2A

14.5.1 Test data for 802.11a RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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)
5 355.330	16.86	Peak	H	31.80	5.33	53.99	74.00	20.01
5 449.950	7.72	Average	H	31.80	5.33	44.85	54.00	9.15
5 358.300	17.94	Peak	V	31.80	5.33	55.07	74.00	18.93
5 354.120	7.93	Average	V	31.80	5.33	45.06	54.00	8.94

Tabulated test data for Restricted Band

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

14.5.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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)
5 393.900	17.61	Peak	H	31.80	5.33	54.74	74.00	19.26
5 454.780	7.23	Average	H	31.80	5.33	44.36	54.00	9.64
5 447.750	17.20	Peak	V	31.80	5.33	54.33	74.00	19.67
5 453.240	7.62	Average	V	31.80	5.33	44.75	54.00	9.25

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: Ha-Ram, Lee / Assistant Manager

14.5.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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)
5 366.430	17.15	Peak	H	31.80	5.33	54.28	74.00	19.72
5 450.270	7.72	Average	H	31.80	5.33	44.85	54.00	9.15
5 458.740	17.52	Peak	V	31.80	5.33	54.65	74.00	19.35
5 449.840	7.80	Average	V	31.80	5.33	44.93	54.00	9.07

Tabulated test data for Restricted Band

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

14.5.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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)
5 422.250	17.29	Peak	H	31.80	5.33	54.42	74.00	19.58
5 449.620	7.54	Average	H	31.80	5.33	44.67	54.00	9.33
5 361.700	17.45	Peak	V	31.80	5.33	54.58	74.00	19.42
5 449.720	7.48	Average	V	31.80	5.33	44.61	54.00	9.39

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: Ha-Ram, Lee / Assistant Manager

14.6 Test data for Frequency UNII 2C

14.6.1 Test data for 802.11a RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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)
5 395.440	17.21	Peak	H	31.80	5.33	54.34	74.00	19.66
5 456.870	7.69	Average	H	31.80	5.33	44.82	54.00	9.18
5 450.710	18.57	Peak	V	31.80	5.33	55.70	74.00	18.30
5 449.620	7.59	Average	V	31.80	5.33	44.72	54.00	9.28

Tabulated test data for Restricted Band

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

14.6.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	17.91	Peak	H	31.80	5.33	55.04	74.00	18.96
5 451.920	8.01	Average	H	31.80	5.33	45.14	54.00	8.86
5 414.010	18.38	Peak	V	31.80	5.33	55.51	74.00	18.49
5 449.620	8.33	Average	V	31.80	5.33	45.46	54.00	8.54

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: Ha-Ram, Lee / Assistant Manager

14.6.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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)
5 383.460	17.11	Peak	H	31.80	5.33	54.24	74.00	19.76
5 447.420	7.96	Average	H	31.80	5.33	45.09	54.00	8.91
5 421.700	17.81	Peak	V	31.80	5.33	54.94	74.00	19.06
5 455.330	8.21	Average	V	31.80	5.33	45.34	54.00	8.66

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: Ha-Ram, Lee / Assistant Manager

14.6.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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)
5 358.190	17.01	Peak	H	31.80	5.33	54.14	74.00	19.86
5 450.820	7.97	Average	H	31.80	5.33	45.10	54.00	8.90
5 447.090	17.44	Peak	V	31.80	5.33	54.57	74.00	19.43
5 454.780	7.67	Average	V	31.80	5.33	44.80	54.00	9.20

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: Ha-Ram, Lee / Assistant Manager

14.7 Test data for Frequency U-NII-3

14.7.1 Test data for 802.11a RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	27.14	Peak	H	31.70	5.41	64.25	80.00	15.75
5 700.000	28.09	Peak	H	31.80	5.41	65.30	119.80	54.50
5 715.000	27.34	Peak	H	31.80	5.41	64.55	121.20	56.65
5 725.000	28.66	Peak	H	31.80	5.41	65.87	134.00	68.13
5 722.940	30.37	Peak	H	31.80	5.41	67.58	133.68	66.10
5 650.000	26.20	Peak	V	31.70	5.41	63.31	80.00	16.69
5 700.000	26.39	Peak	V	31.80	5.41	63.60	119.80	56.20
5 715.000	26.18	Peak	V	31.80	5.41	63.39	121.20	57.81
5 725.000	28.66	Peak	V	31.80	5.41	65.87	134.00	68.13
5 722.120	28.78	Peak	V	31.80	5.41	65.99	132.43	66.44

High Channel								
5 850.000	26.59	Peak	H	32.20	5.41	64.20	134.00	69.80
5 860.000	27.28	Peak	H	32.20	5.41	64.89	122.60	57.71
5 875.000	28.06	Peak	H	32.20	5.41	65.67	117.00	51.33
5 925.000	27.94	Peak	H	32.30	5.41	65.65	80.00	14.35
5 907.280	29.98	Peak	H	32.30	5.41	67.69	97.65	29.96
5 850.000	28.16	Peak	V	32.20	5.41	65.77	134.00	68.23
5 860.000	26.74	Peak	V	32.20	5.41	64.35	122.60	58.25
5 875.000	26.50	Peak	V	32.20	5.41	64.11	117.00	52.89
5 925.000	27.68	Peak	V	32.30	5.41	65.39	80.00	14.61
5 855.360	28.58	Peak	V	32.20	5.41	66.19	119.52	53.33

Tabulated test data for Restricted Band

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

14.7.2 Test data for 802.11n_HT20 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	26.36	Peak	H	31.70	5.41	63.47	80.00	16.53
5 700.000	26.39	Peak	H	31.80	5.41	63.60	119.80	56.20
5 715.000	25.62	Peak	H	31.80	5.41	62.83	121.20	58.37
5 725.000	26.49	Peak	H	31.80	5.41	63.70	134.00	70.30
5 696.290	29.28	Peak	H	31.80	5.41	66.49	133.68	67.19
5 650.000	27.70	Peak	V	31.70	5.41	64.81	80.00	15.19
5 700.000	26.03	Peak	V	31.80	5.41	63.24	119.80	56.56
5 715.000	27.58	Peak	V	31.80	5.41	64.79	121.20	56.41
5 725.000	28.36	Peak	V	31.80	5.41	65.57	134.00	68.43
5 724.040	29.07	Peak	V	31.80	5.41	66.28	132.43	66.15

High Channel								
5 850.000	28.16	Peak	H	32.20	5.41	65.77	134.00	68.23
5 860.000	27.80	Peak	H	32.20	5.41	65.41	122.60	57.19
5 875.000	27.85	Peak	H	32.20	5.41	65.46	117.00	51.54
5 925.000	27.06	Peak	H	32.30	5.41	64.77	80.00	15.23
5 894.090	31.03	Peak	H	32.30	5.41	68.74	97.65	28.91
5 850.000	27.93	Peak	V	32.20	5.41	65.54	134.00	68.46
5 860.000	28.85	Peak	V	32.20	5.41	66.46	122.60	56.14
5 875.000	27.48	Peak	V	32.20	5.41	65.09	117.00	51.91
5 925.000	26.82	Peak	V	32.30	5.41	64.53	80.00	15.47
5 866.350	28.86	Peak	V	32.20	5.41	66.47	119.52	53.05

Tabulated test data for Restricted Band

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

14.7.3 Test data for 802.11n_HT40 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	27.33	Peak	H	31.70	5.41	64.44	80.00	15.56
5 700.000	29.24	Peak	H	31.80	5.41	66.45	119.80	53.35
5 715.000	27.68	Peak	H	31.80	5.41	64.89	121.20	56.31
5 725.000	27.11	Peak	H	31.80	5.41	64.32	134.00	69.68
5 691.900	30.23	Peak	H	31.80	5.41	67.44	133.68	66.24
5 650.000	26.29	Peak	V	31.70	5.41	63.40	80.00	16.60
5 700.000	24.92	Peak	V	31.80	5.41	62.13	119.80	57.67
5 715.000	27.13	Peak	V	31.80	5.41	64.34	121.20	56.86
5 725.000	26.21	Peak	V	31.80	5.41	63.42	134.00	70.58
5 719.920	28.12	Peak	V	31.80	5.41	65.33	132.43	67.10

High Channel								
5 850.000	27.56	Peak	H	32.20	5.41	65.17	134.00	68.83
5 860.000	25.75	Peak	H	32.20	5.41	63.36	122.60	59.24
5 875.000	27.20	Peak	H	32.20	5.41	64.81	117.00	52.19
5 925.000	28.27	Peak	H	32.30	5.41	65.98	80.00	14.02
5 855.630	28.17	Peak	H	32.20	5.41	65.78	97.65	31.87
5 850.000	27.16	Peak	V	32.20	5.41	64.77	134.00	69.23
5 860.000	26.56	Peak	V	32.20	5.41	64.17	122.60	58.43
5 875.000	26.21	Peak	V	32.20	5.41	63.82	117.00	53.18
5 925.000	27.07	Peak	V	32.30	5.41	64.78	80.00	15.22
5 865.520	28.61	Peak	V	32.20	5.41	66.22	119.52	53.30

Tabulated test data for Restricted Band

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

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



Tested by: Ha-Ram, Lee / Assistant Manager

14.7.4 Test data for 802.11ac_HT80 RLAN Mode

- . Test Date : December 03, 2019 ~ December 05, 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	27.16	Peak	H	31.70	5.41	64.27	80.00	15.73
5 700.000	26.85	Peak	H	31.80	5.41	64.06	119.80	55.74
5 715.000	28.12	Peak	H	31.80	5.41	65.33	121.20	55.87
5 725.000	26.10	Peak	H	31.80	5.41	63.31	134.00	70.69
5 716.620	29.47	Peak	H	31.80	5.41	66.68	133.68	67.00
5 650.000	25.96	Peak	V	31.70	5.41	63.07	80.00	16.93
5 700.000	27.33	Peak	V	31.80	5.41	64.54	119.80	55.26
5 715.000	29.03	Peak	V	31.80	5.41	66.24	121.20	54.96
5 725.000	26.94	Peak	V	31.80	5.41	64.15	134.00	69.85
5 710.300	30.01	Peak	V	31.80	5.41	67.22	132.43	65.21

Middle Channel								
5 850.000	27.56	Peak	H	32.20	5.41	65.17	134.00	68.83
5 860.000	27.43	Peak	H	32.20	5.41	65.04	122.60	57.56
5 875.000	28.52	Peak	H	32.20	5.41	66.13	117.00	50.87
5 925.000	27.61	Peak	H	32.30	5.41	65.32	80.00	14.68
5 858.100	29.65	Peak	H	32.20	5.41	67.26	97.65	30.39
5 850.000	28.00	Peak	V	32.20	5.41	65.61	134.00	68.39
5 860.000	27.34	Peak	V	32.20	5.41	64.95	122.60	57.65
5 875.000	28.23	Peak	V	32.20	5.41	65.84	117.00	51.16
5 925.000	28.29	Peak	V	32.30	5.41	66.00	80.00	14.00
5 861.130	29.10	Peak	V	32.20	5.41	66.71	119.52	52.81

Tabulated test data for Restricted Band

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

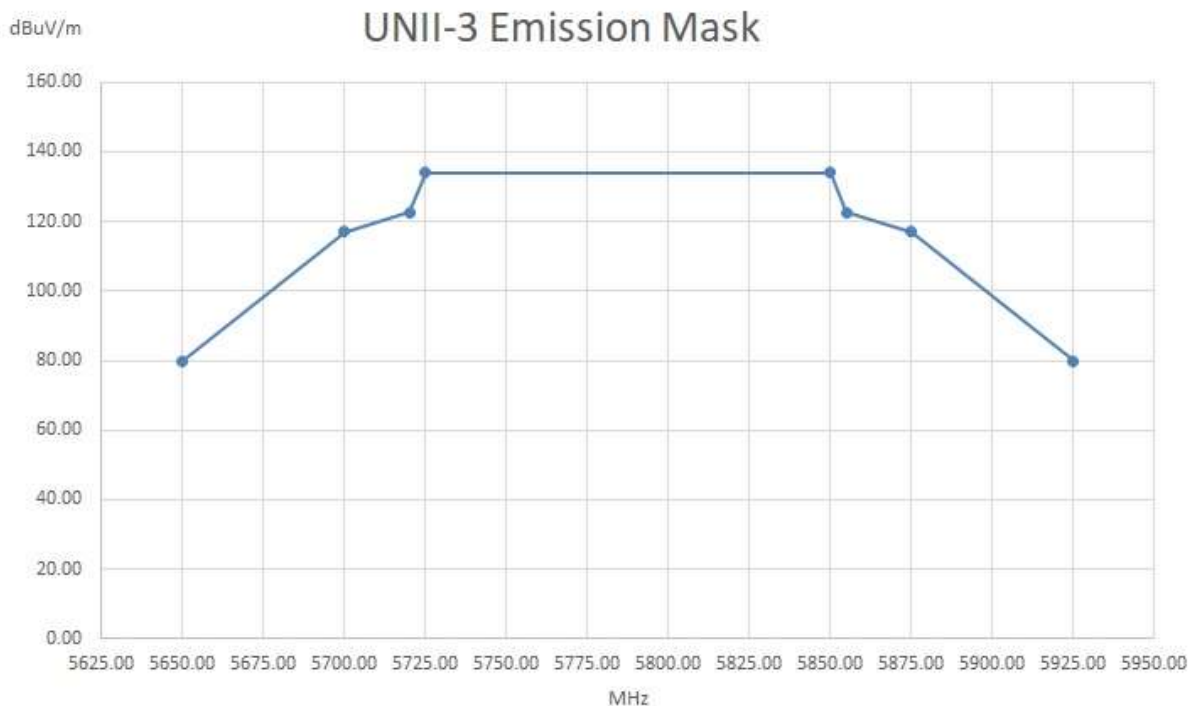
Margin (dB) = Limits (dBμV/m) - Emission Level (dBμV/m)



Tested by: Ha-Ram, Lee / Assistant 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: Ha-Ram, Lee / Assistant Manager

15. CONDUCTED EMISSION TEST

15.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % 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.

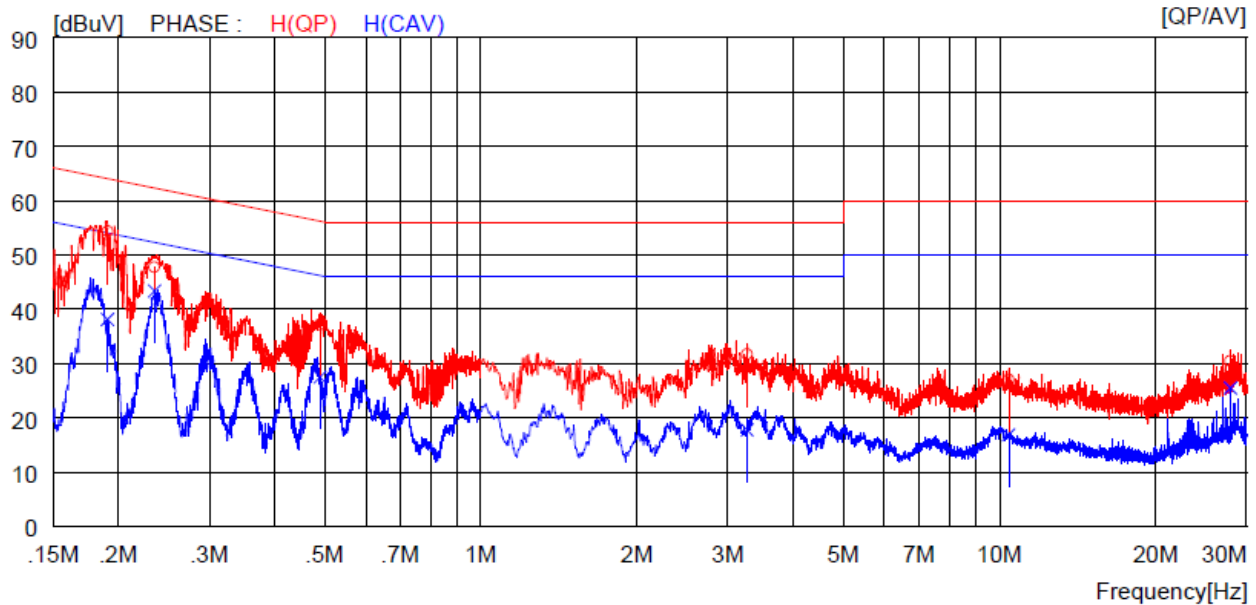
15.3 Test equipment used

	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.

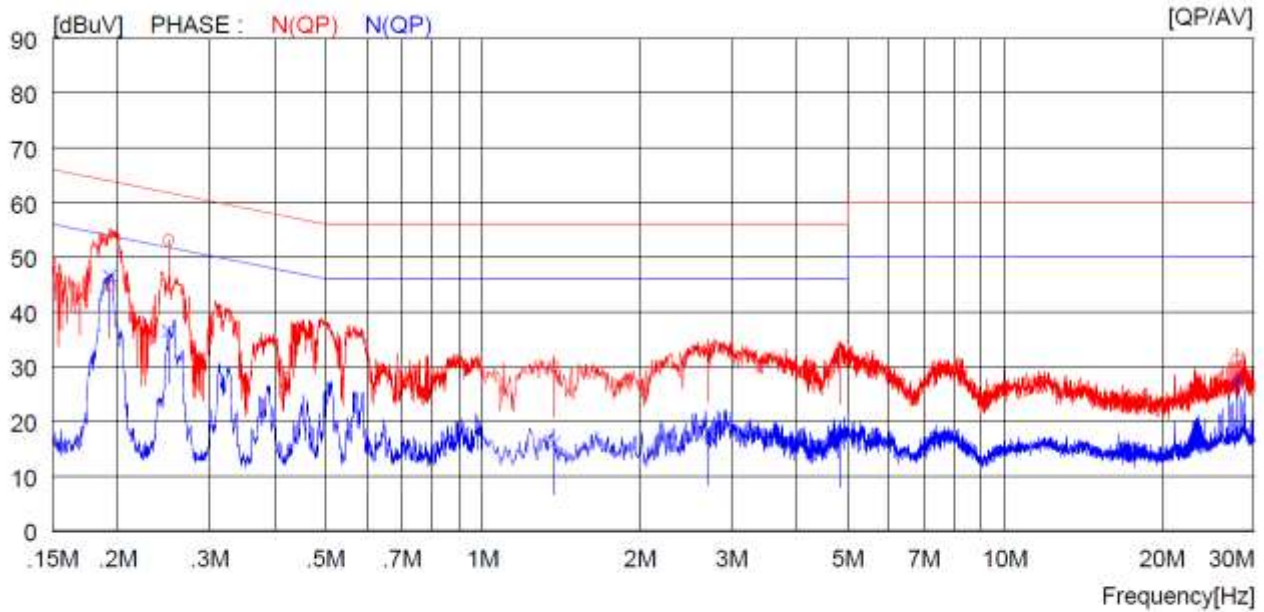
15.4 Test data

- Test Date : December 09, 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	0.19100	44.3	----	10.0	54.3	----	64.0	----	9.7	----	H (QP)
2	0.23500	37.7	----	10.0	47.7	----	62.3	----	14.6	----	H (QP)
3	0.49000	27.2	----	10.0	37.2	----	56.2	----	19.0	----	H (QP)
4	3.26400	21.6	----	10.1	31.7	----	56.0	----	24.3	----	H (QP)
5	10.42000	16.7	----	10.4	27.1	----	60.0	----	32.9	----	H (QP)
6	27.88000	19.6	----	10.8	30.4	----	60.0	----	29.6	----	H (QP)
7	0.19100	----	28.1	10.0	----	38.1	----	54.0	----	15.9	H (CAV)
8	0.23500	----	33.4	10.0	----	43.4	----	52.3	----	8.9	H (CAV)
9	0.49000	----	17.5	10.0	----	27.5	----	46.2	----	18.7	H (CAV)
10	3.26400	----	7.7	10.1	----	17.8	----	46.0	----	28.2	H (CAV)
11	10.42000	----	6.5	10.4	----	16.9	----	50.0	----	33.1	H (CAV)
12	27.88000	----	14.7	10.8	----	25.5	----	50.0	----	24.5	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	0.25000	43.1	----	10.0	53.1	----	61.8	----	8.7	----	N(QP)
2	0.19300	34.7	----	10.0	44.7	----	63.9	----	19.2	----	N(QP)
3	1.36800	20.0	----	10.1	30.1	----	56.0	----	25.9	----	N(QP)
4	2.70400	23.0	----	10.1	33.1	----	56.0	----	22.9	----	N(QP)
5	4.83200	22.4	----	10.1	32.5	----	56.0	----	23.5	----	N(QP)
6	27.87000	20.6	----	10.8	31.4	----	60.0	----	28.6	----	N(QP)
7	0.19300	----	36.6	10.0	----	46.6	----	53.9	----	7.3	N(CAV)
8	0.25000	----	26.5	10.0	----	36.5	----	51.8	----	15.3	N(CAV)
9	1.36800	----	6.0	10.1	----	16.1	----	46.0	----	29.9	N(CAV)
10	2.70400	----	7.7	10.1	----	17.8	----	46.0	----	28.2	N(CAV)
11	4.83200	----	7.3	10.1	----	17.4	----	46.0	----	28.6	N(CAV)
12	27.87000	----	16.7	10.8	----	27.5	----	50.0	----	22.5	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: Ha-Ram, Lee / Assistant Manager

16. DYNAMIC FREQUENCY SELECTION (DFS)

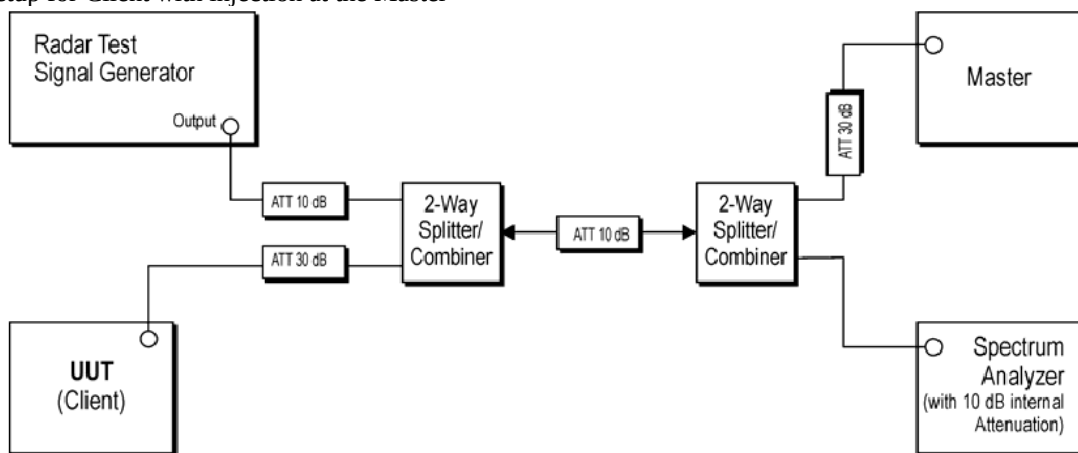
16.1 Operating environment

Temperature : 24 °C
Relative humidity : 48 % 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



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 Test B: 15 unique PRI values randomly selected within the range of 518-3066 μ sec, with a minimum increment of 1 μ sec, excluding PRI values selected in Test A	$\text{Roundup} \left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	60%	30
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)
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101199	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)
■ - PWS-3003D	Protek	DC Power supply	4020409	Jul. 24, 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

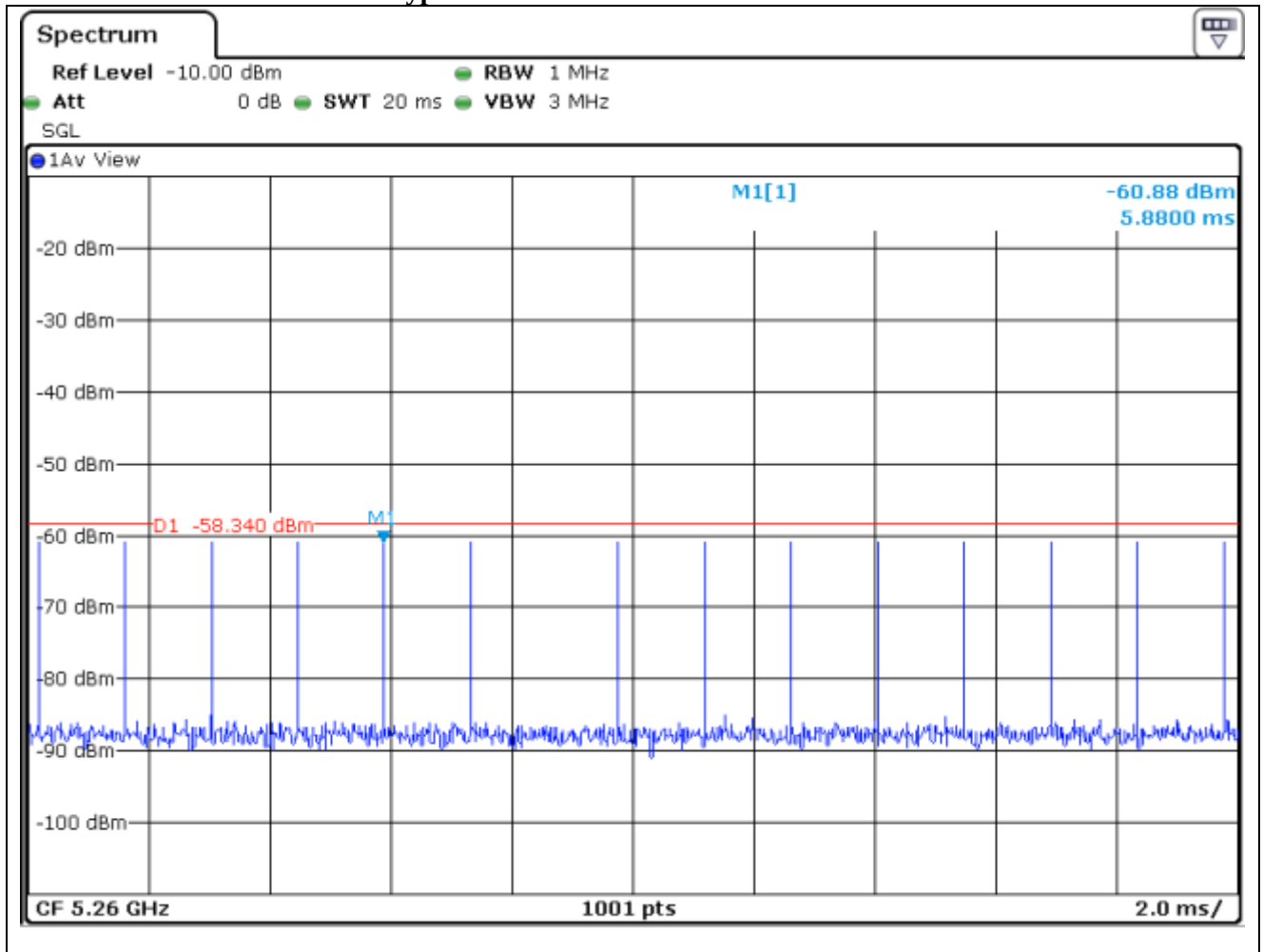
-. Test Date : December 13, 2019

Band	Frequency (MHz)	Channel move time(s)		Channel closing transmission time(ms)	
		Measured	Limit	Measured	Limit
UNII 2A	5 260.00	0.150	10.00	0.20	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period.
UNII 2C	5 530.00	0.190		0.20	

Note. Channel closing transmission time: $1 * 0.2 \text{ ms} = 0.2 \text{ ms}$

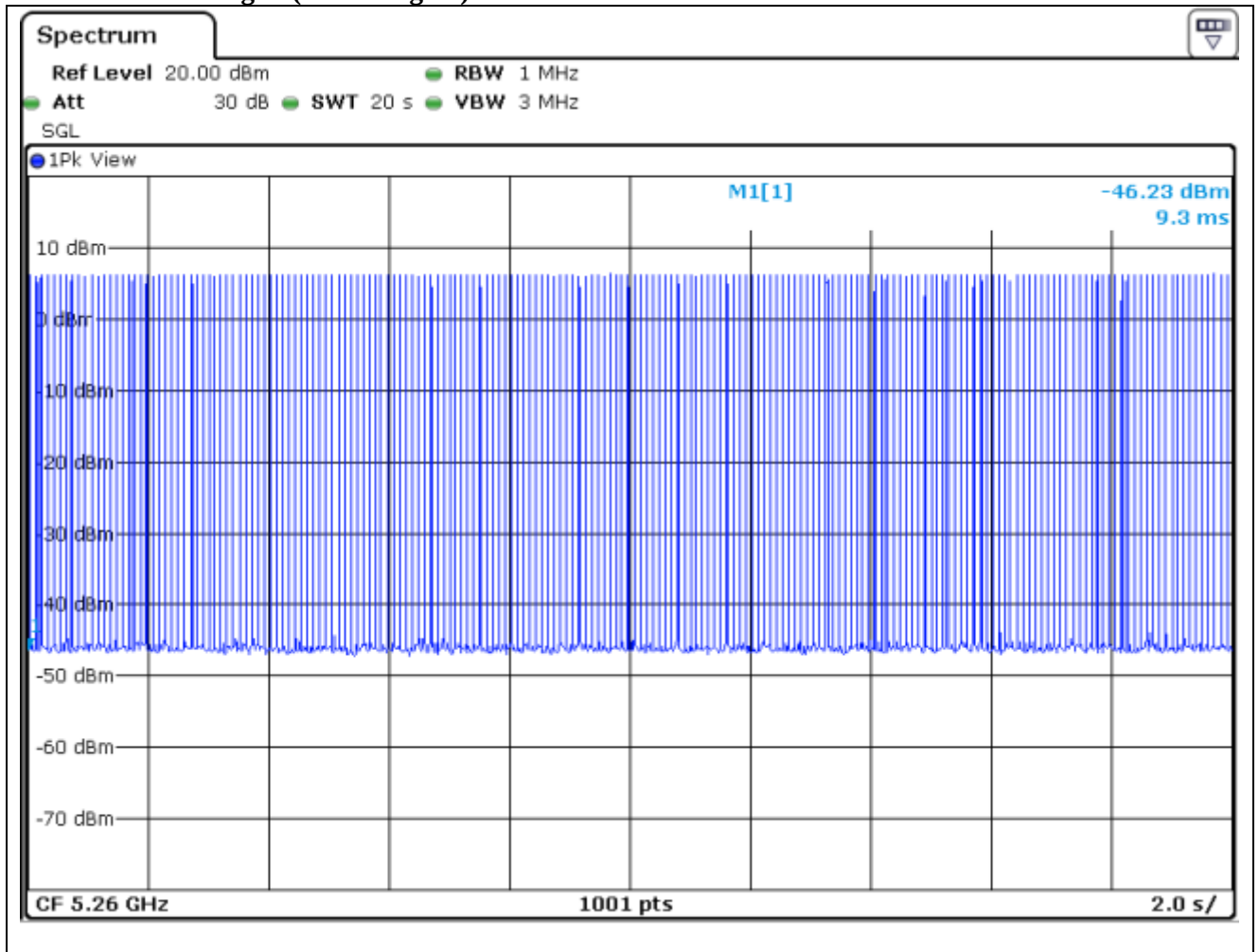
16.6.1 UNII 2A

16.6.1.1 Plot of Radar waveform type 0

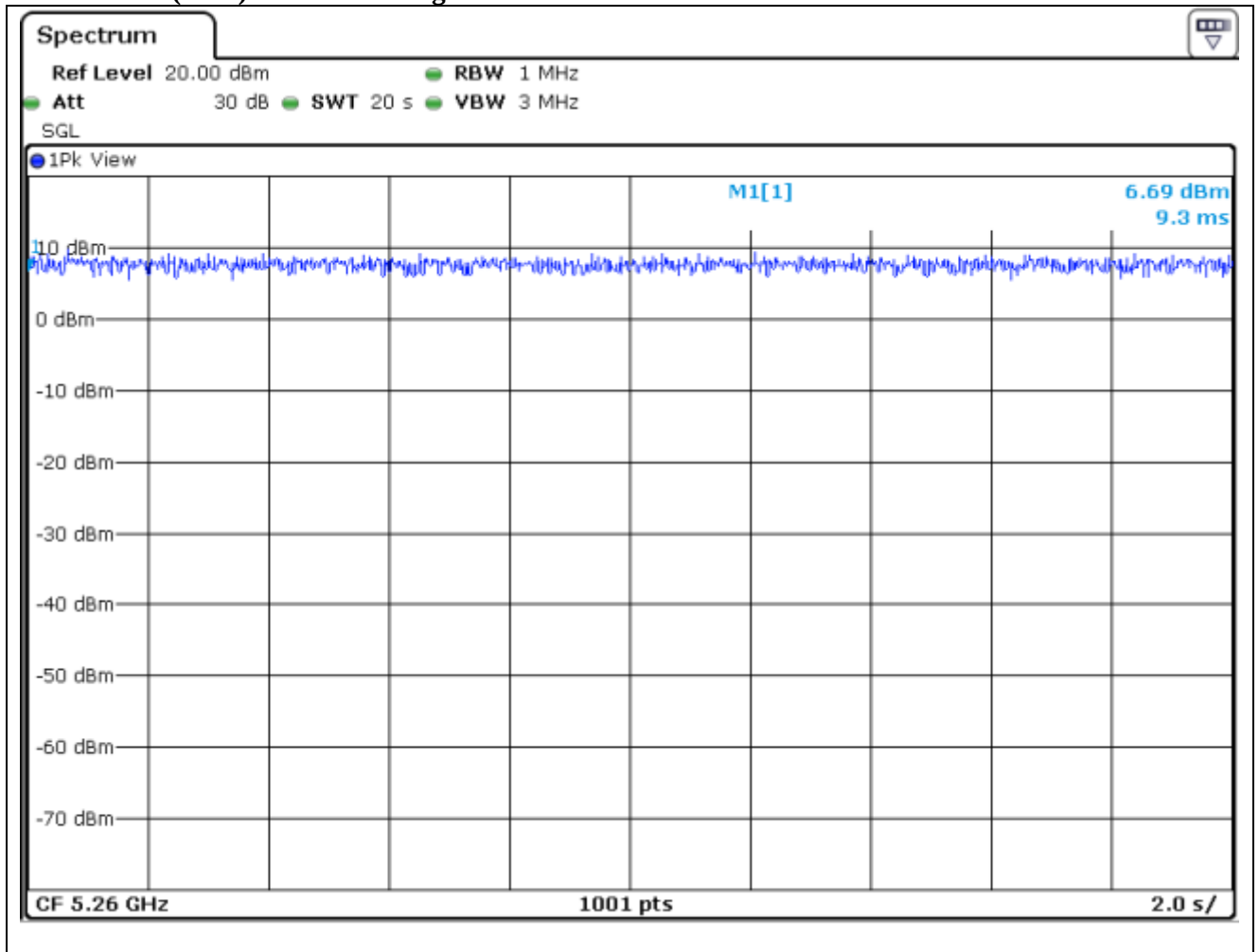


Note: The calibrated conducted DFS detection threshold level is set to -60.88 dBm ($-62+1+2.66=-58.34 \text{ dBm}$)

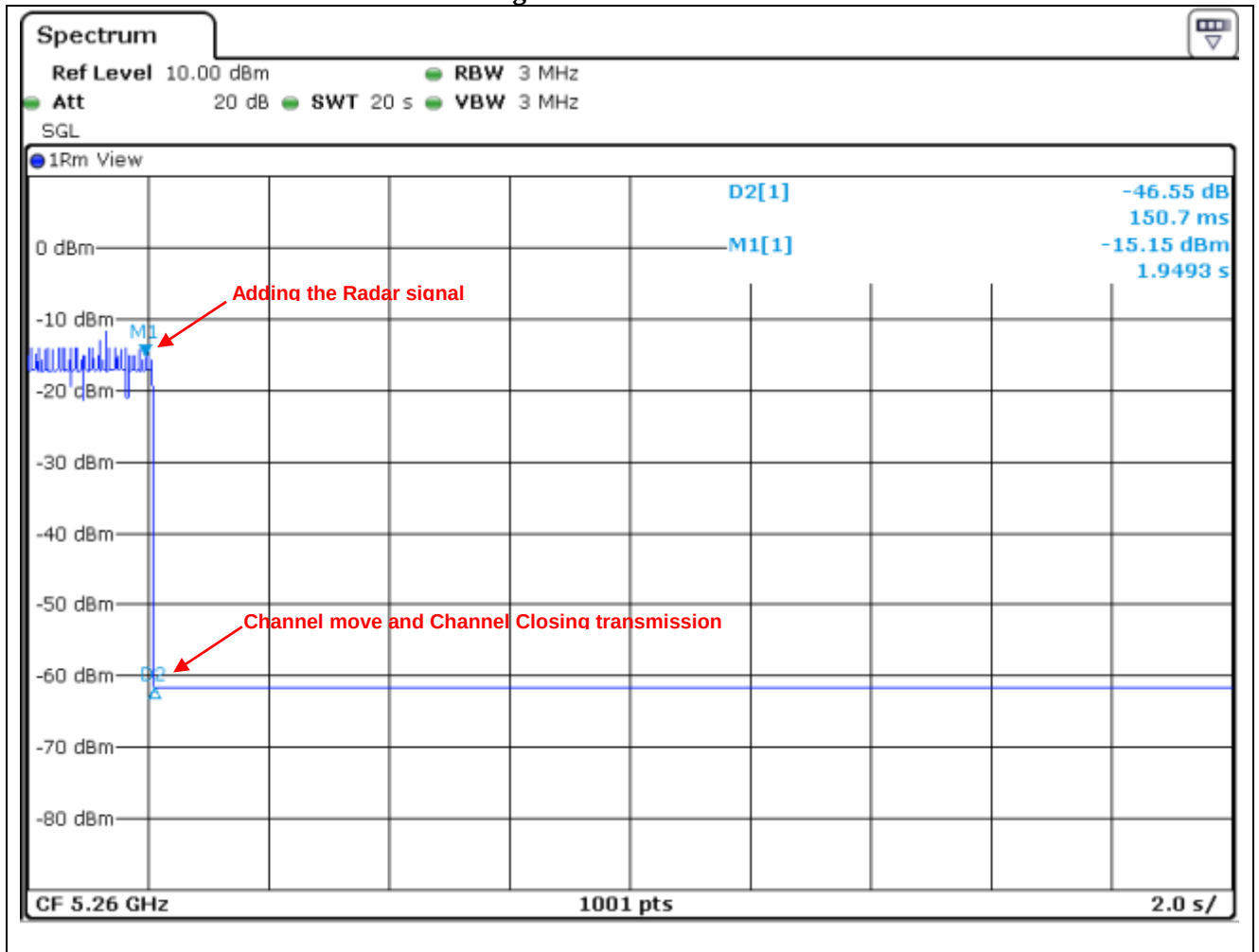
16.6.1.2 No traffic signal(master signal)



16.6.1.3 Client(EUT) Data Traiifc Signal

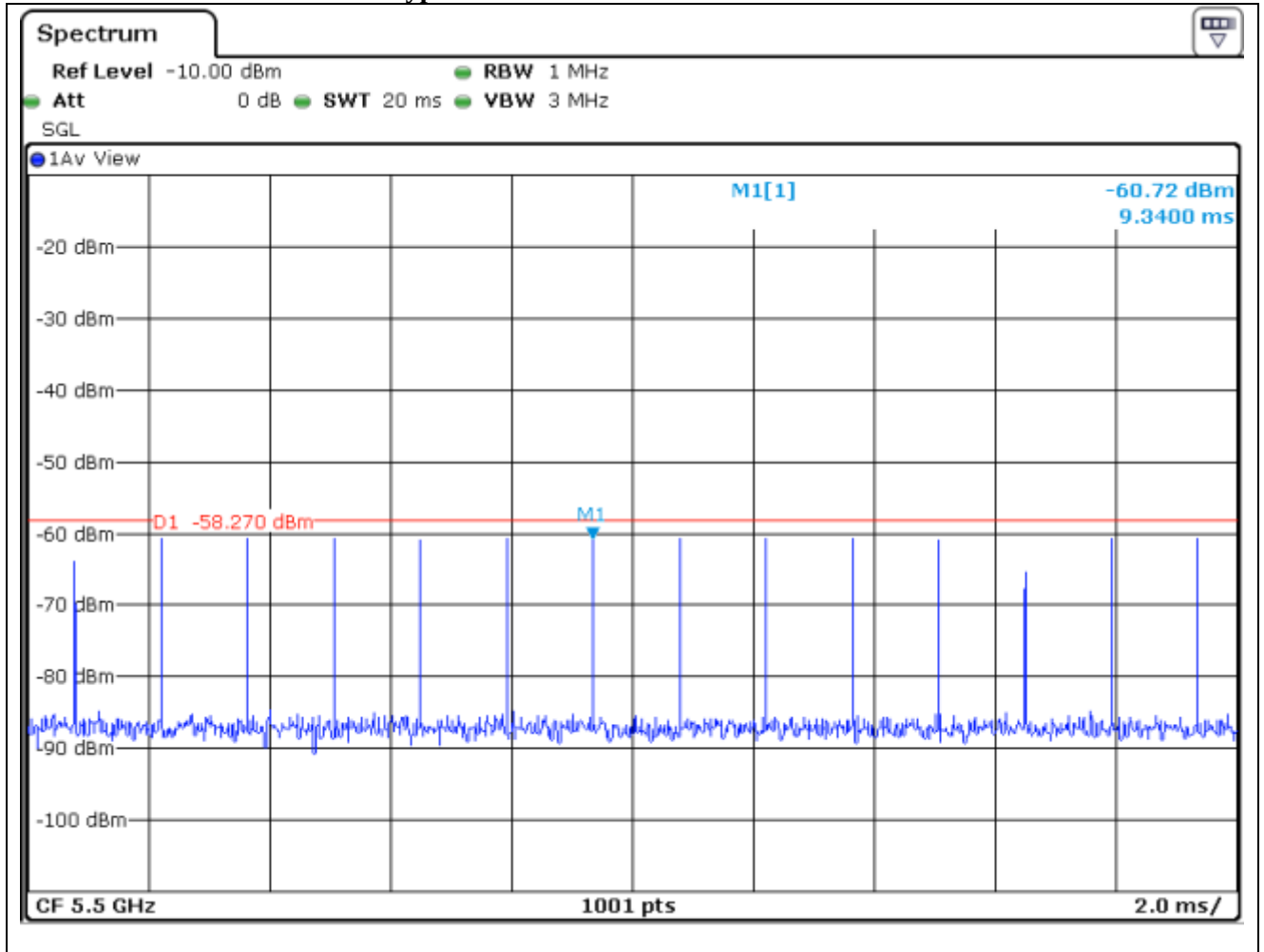


16.6.1.4 Channel move and Channel Closing transmission time



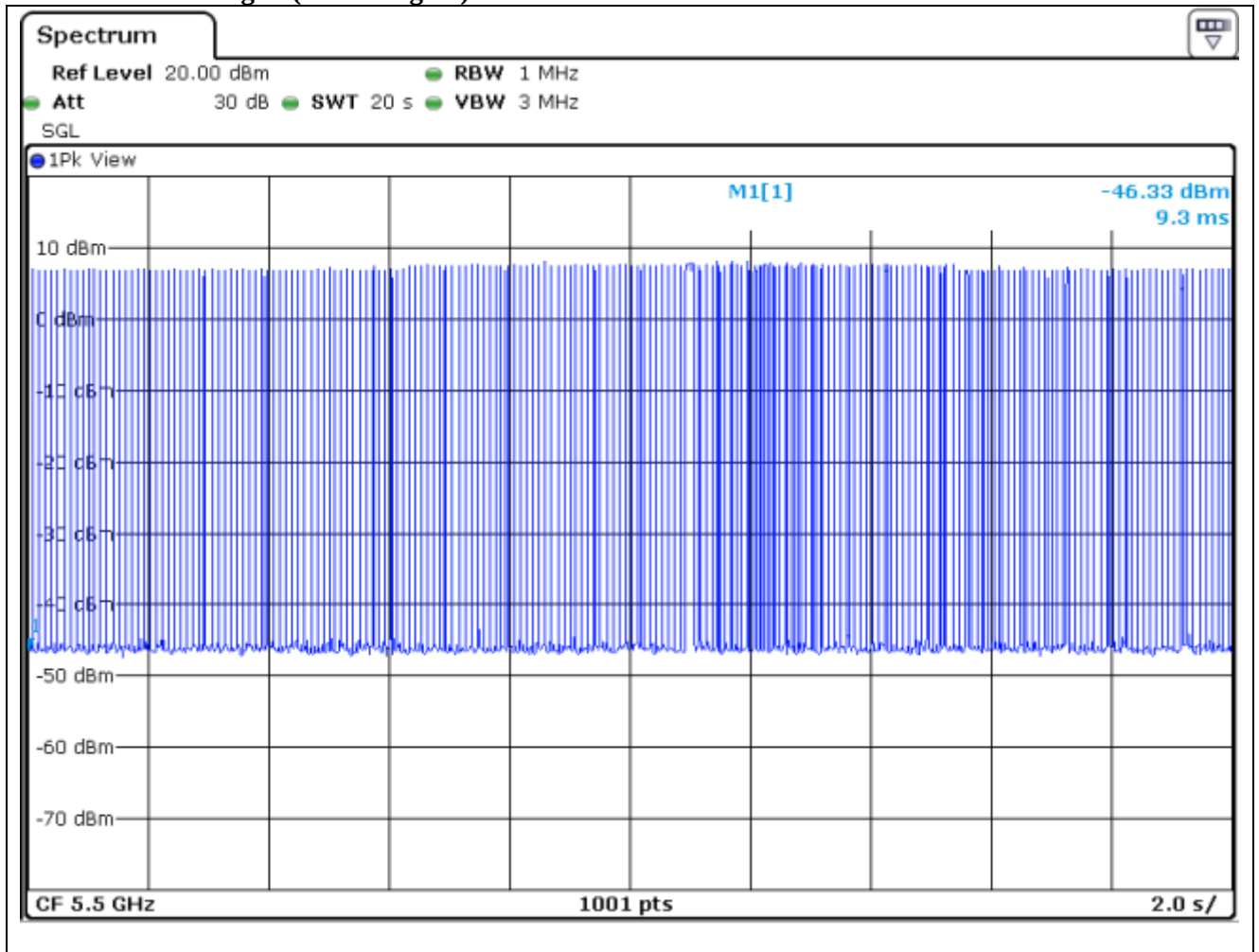
16.6.2 UNII 3

16.6.2.1 Plot of Radar waveform type 0

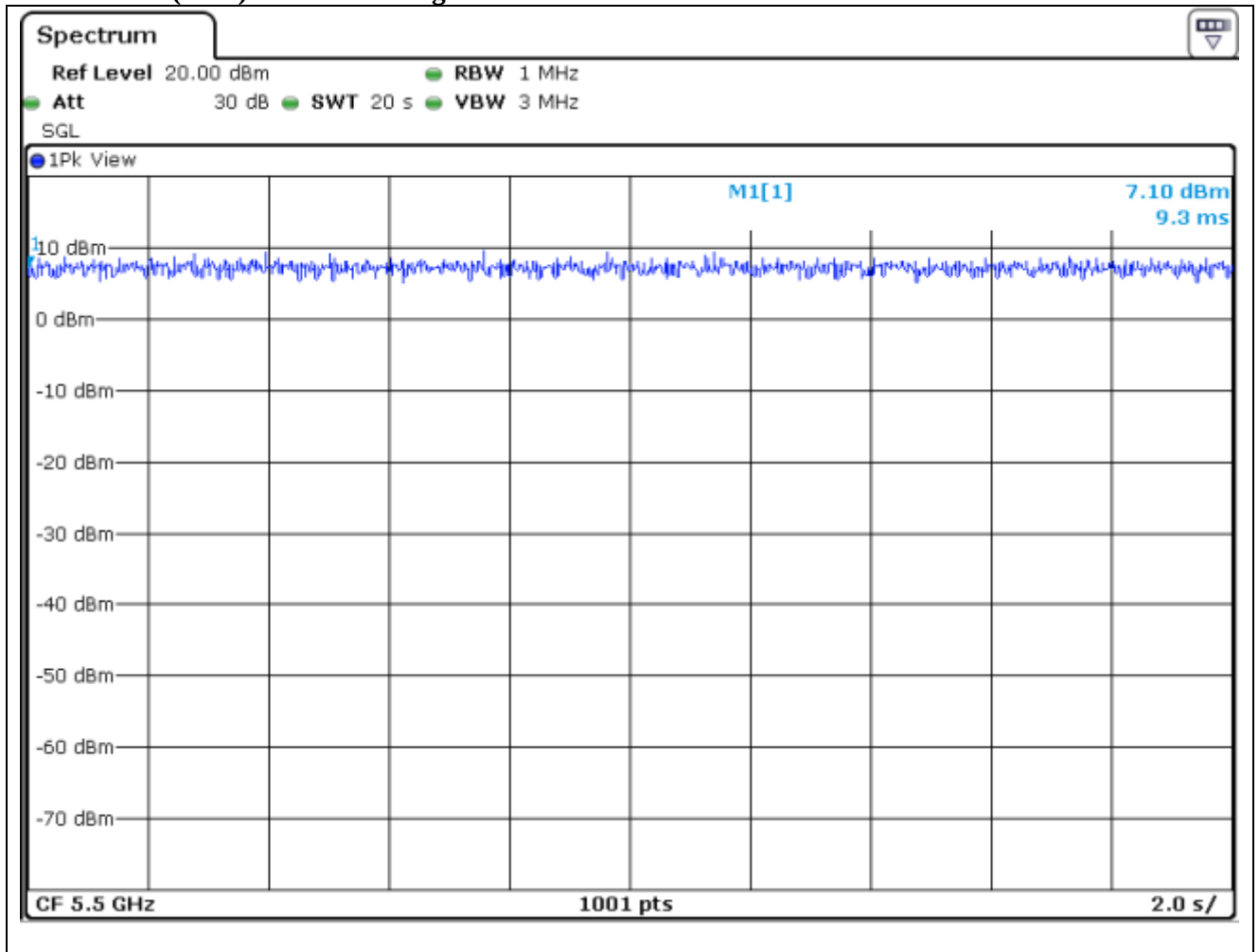


Note: The calibrated conducted DFS detection threshold level is set to -60.72 dBm ($-62+1+2.73=-58.27$ dBm)

16.6.2.2 No traffic signal(master signal)



16.6.2.3 Client(EUT) Data Traiifc Signal



16.6.2.4 Channel move and Channel Closing transmission time

