

9.6 Test data for radiated emission

9.6.1 Radiated Emission which fall in the Restricted Band

9.6.1.1 Test data for 802.11b WLAN Mode

- Test Date : June 20, 2019 ~ June 26, 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 : 99.08 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Correction Factor	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 341.933	28.21	Peak	H	25.94	2.75	-	56.90	74.00	17.10
2 336.243	16.38	Average	H	25.94	2.75	0.04	45.11	54.00	8.89
2 340.054	27.70	Peak	V	25.94	2.75	-	56.39	74.00	17.61
2 337.867	16.90	Average	V	25.94	2.75	0.04	45.63	54.00	8.37
Test Data for High Channel									
2 489.484	28.89	Peak	H	26.47	2.39	-	57.75	74.00	16.25
2 488.645	17.88	Average	H	26.47	2.39	0.04	46.78	54.00	7.22
2 491.626	28.09	Peak	V	26.47	2.39	-	56.95	74.00	17.05
2 488.929	16.57	Average	V	26.47	2.39	0.04	45.47	54.00	8.53

Tabulated test data for Restricted Band

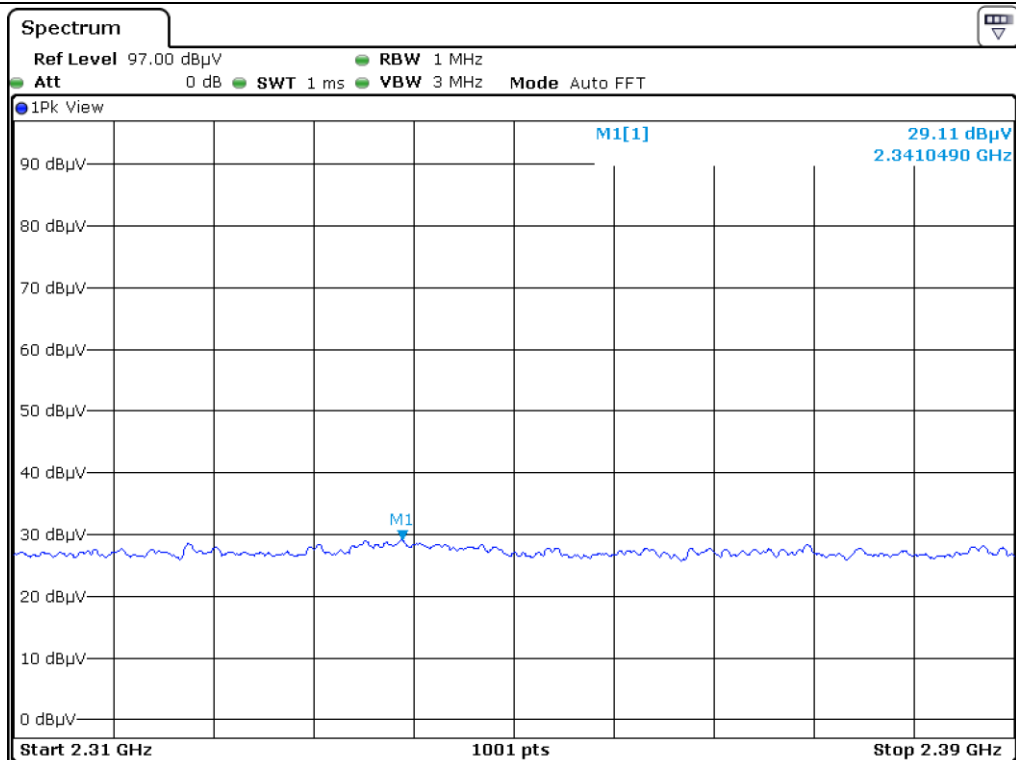
Remark: "H": Horizontal, "V": Vertical

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

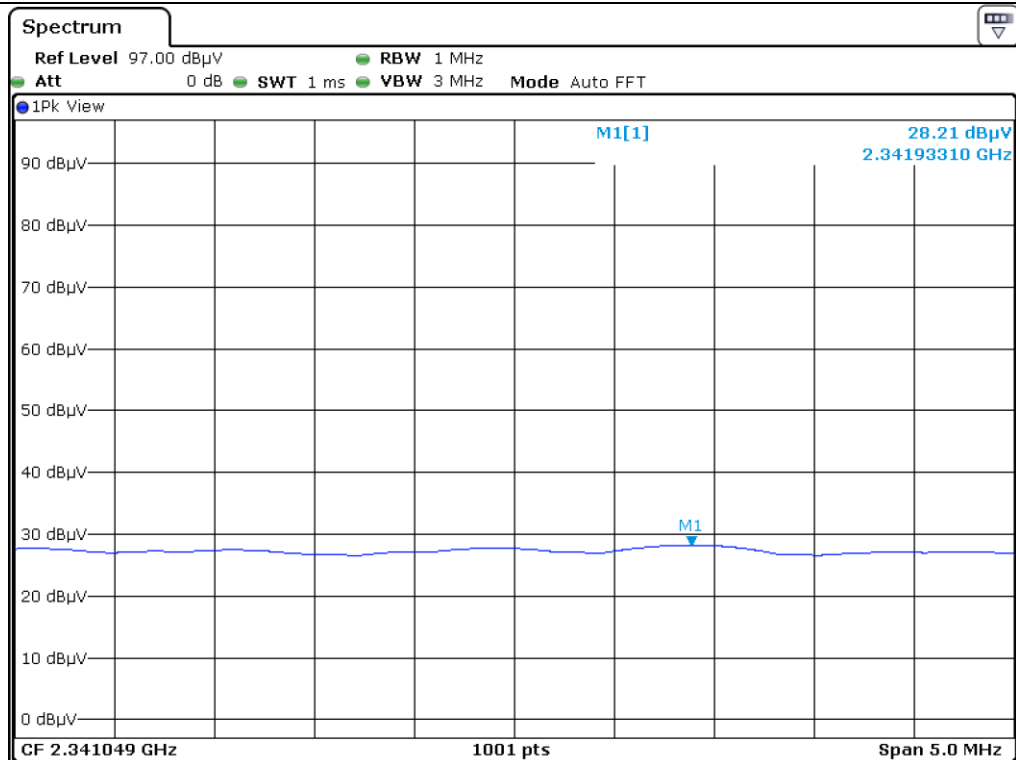
$$\text{Total} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Correction Factor}$$



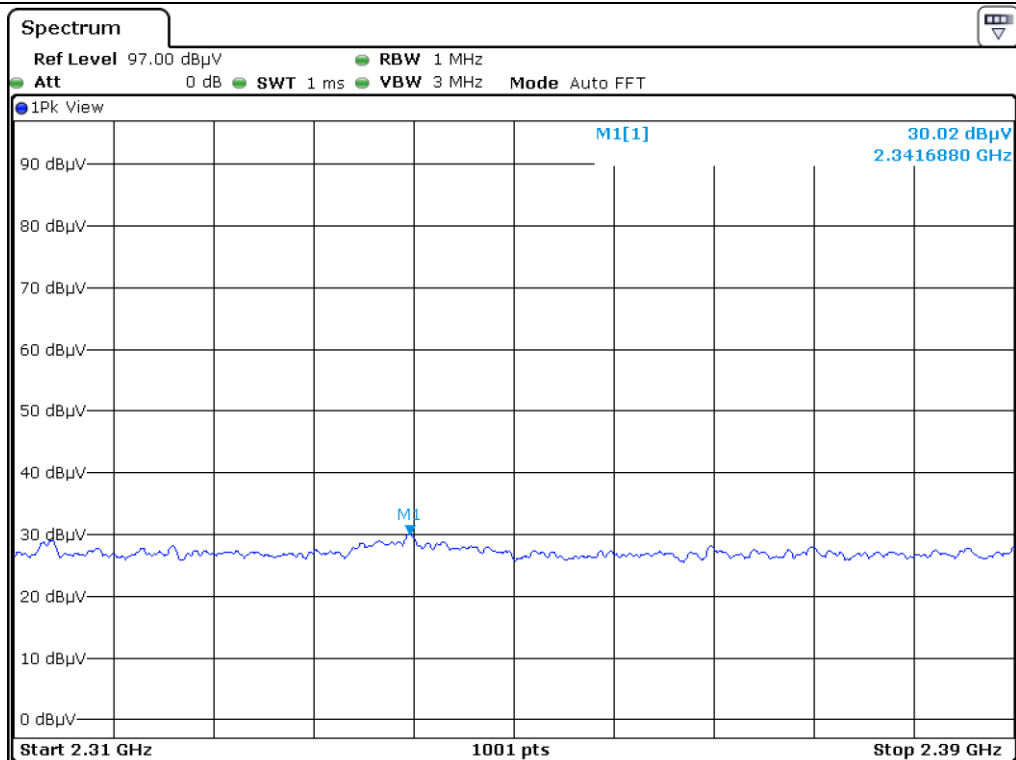
Tested by: Hyung-Kwon, Oh / Assistant Manager



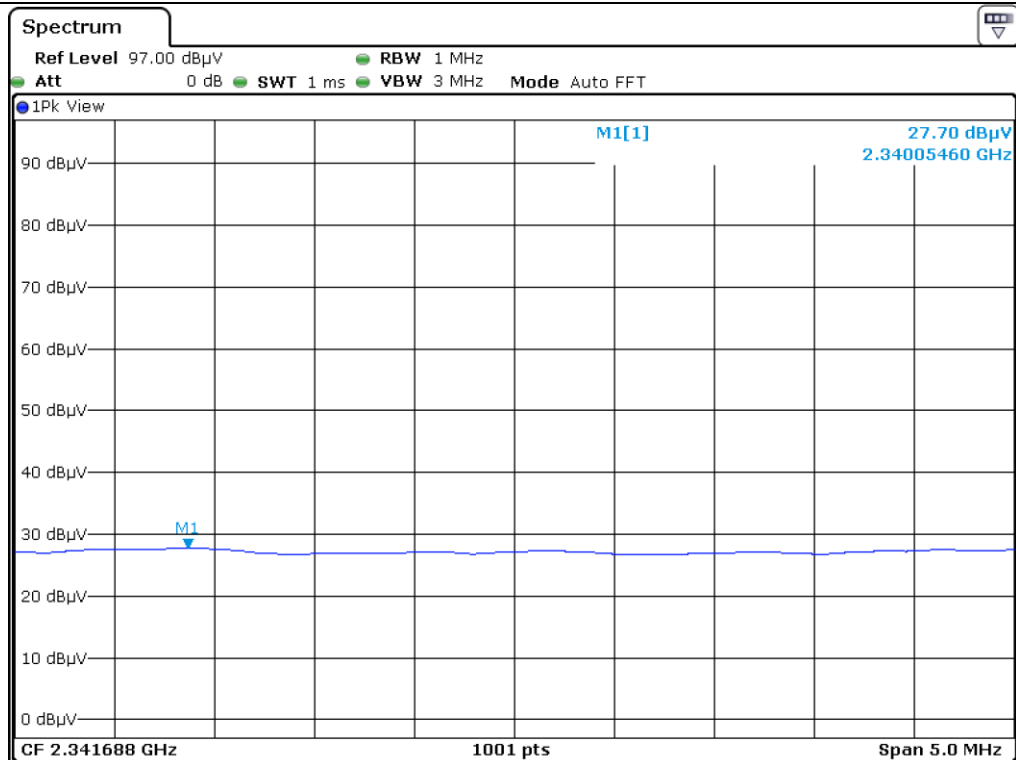
Low Channel_H_Peak



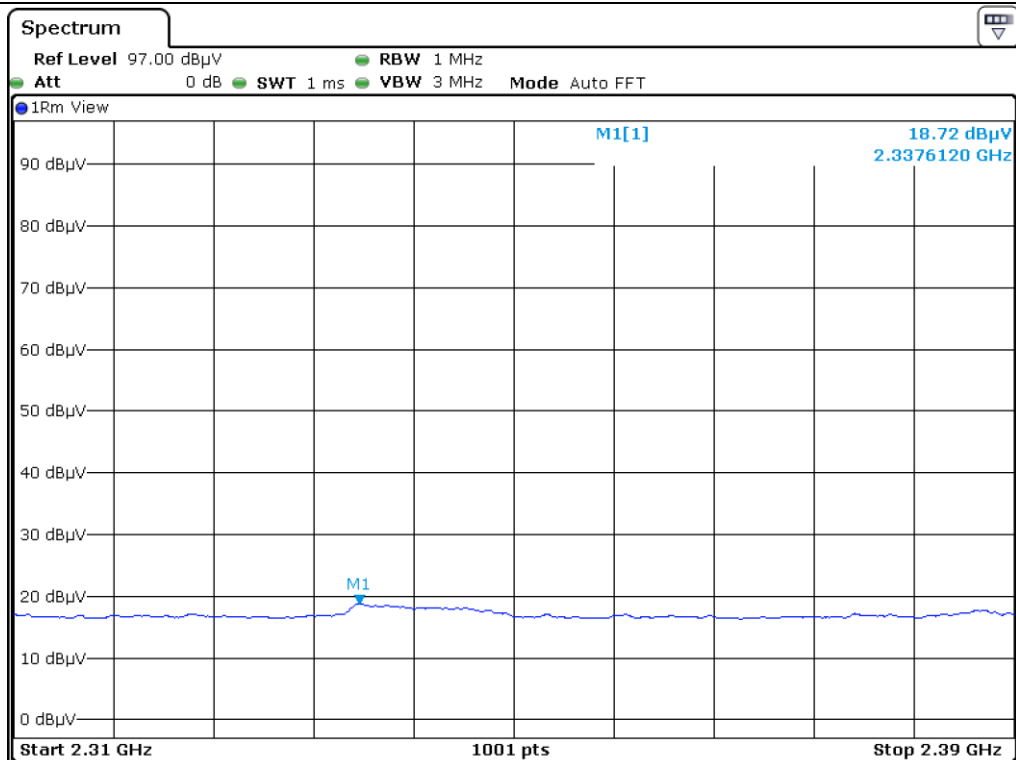
Low Channel_H_Peak_Focus



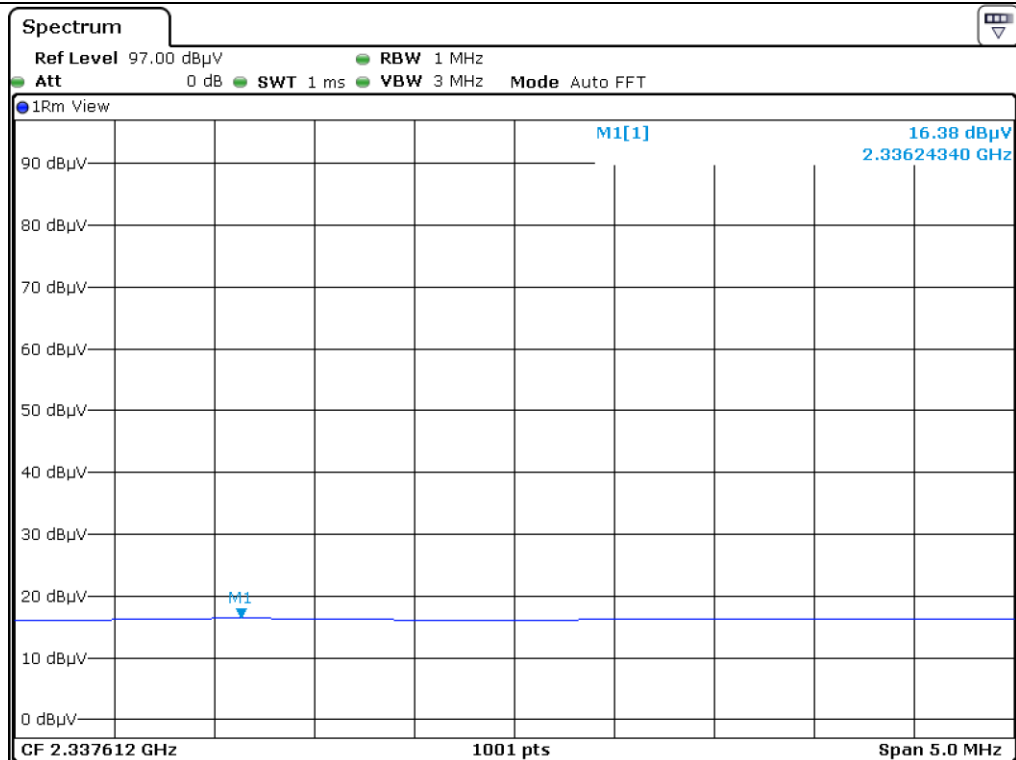
Low Channel_V_Peak



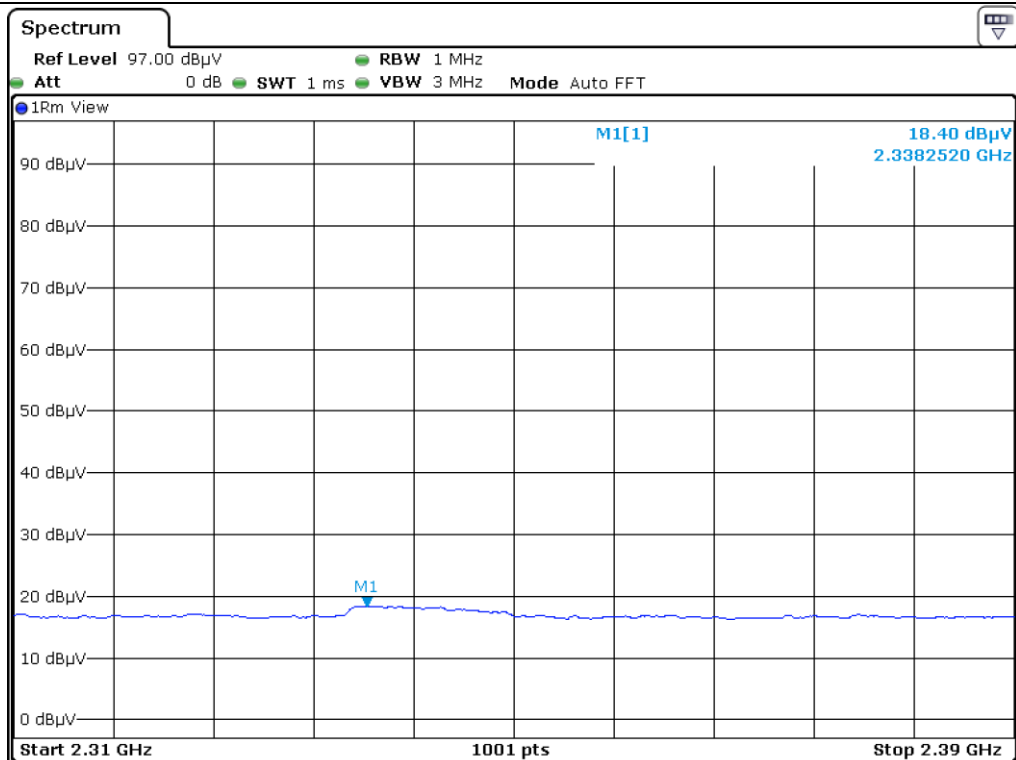
Low Channel_V_Peak_Focus



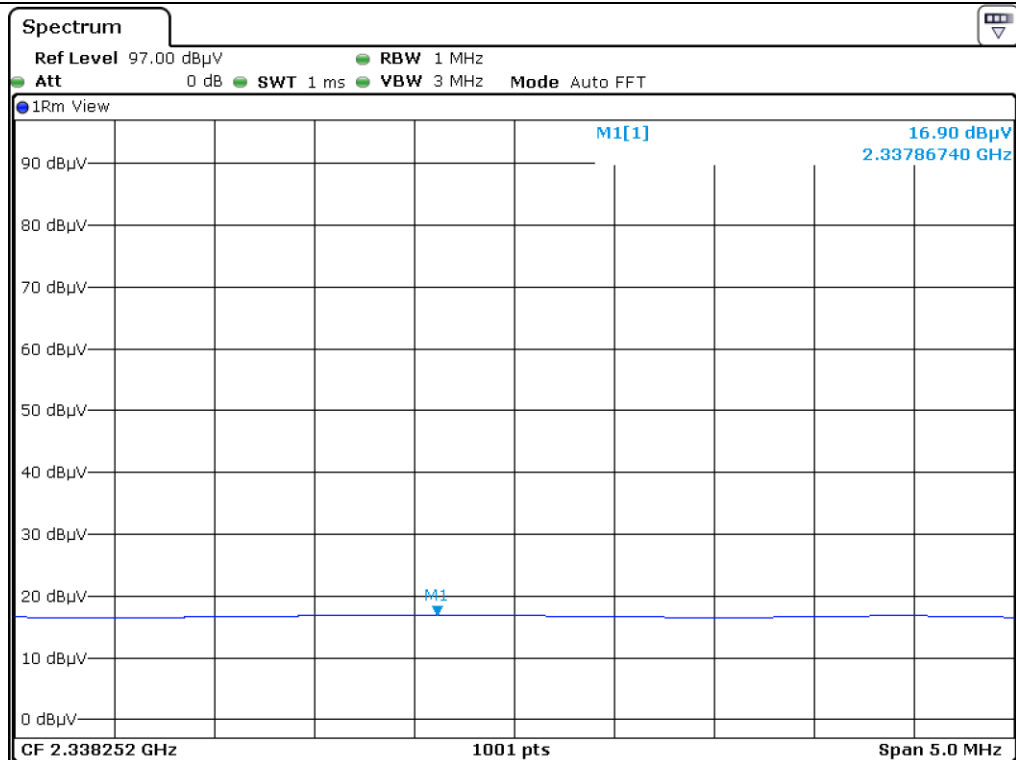
Low Channel_H_Average



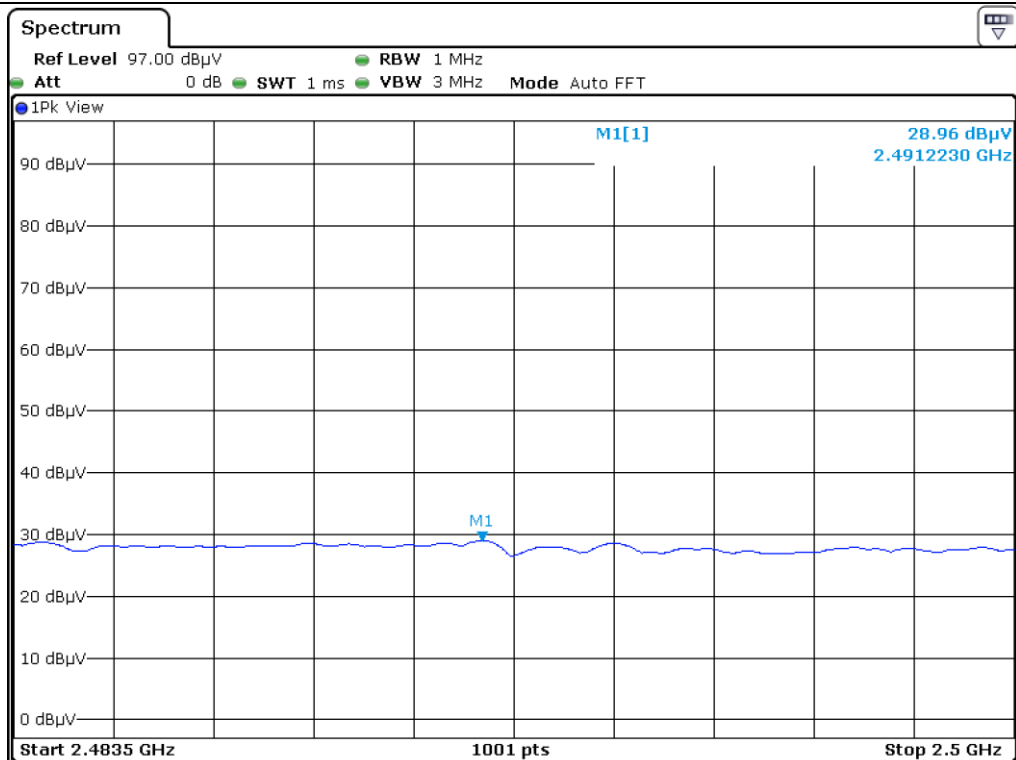
Low Channel_H_Average_Focus



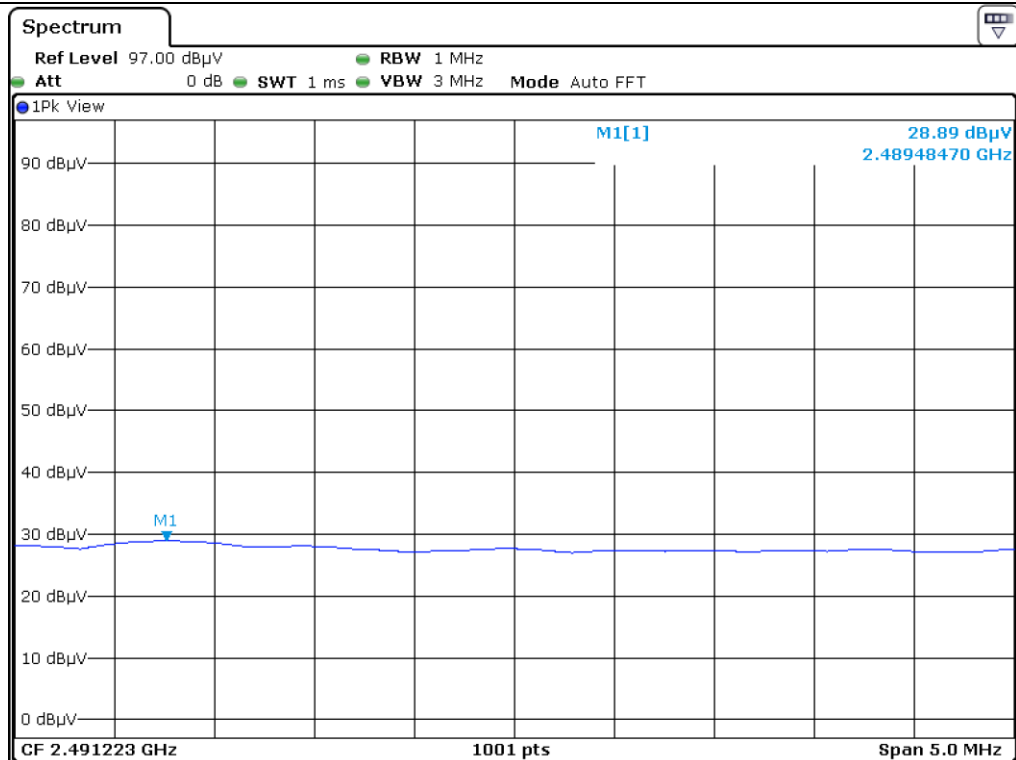
Low Channel_V_Average



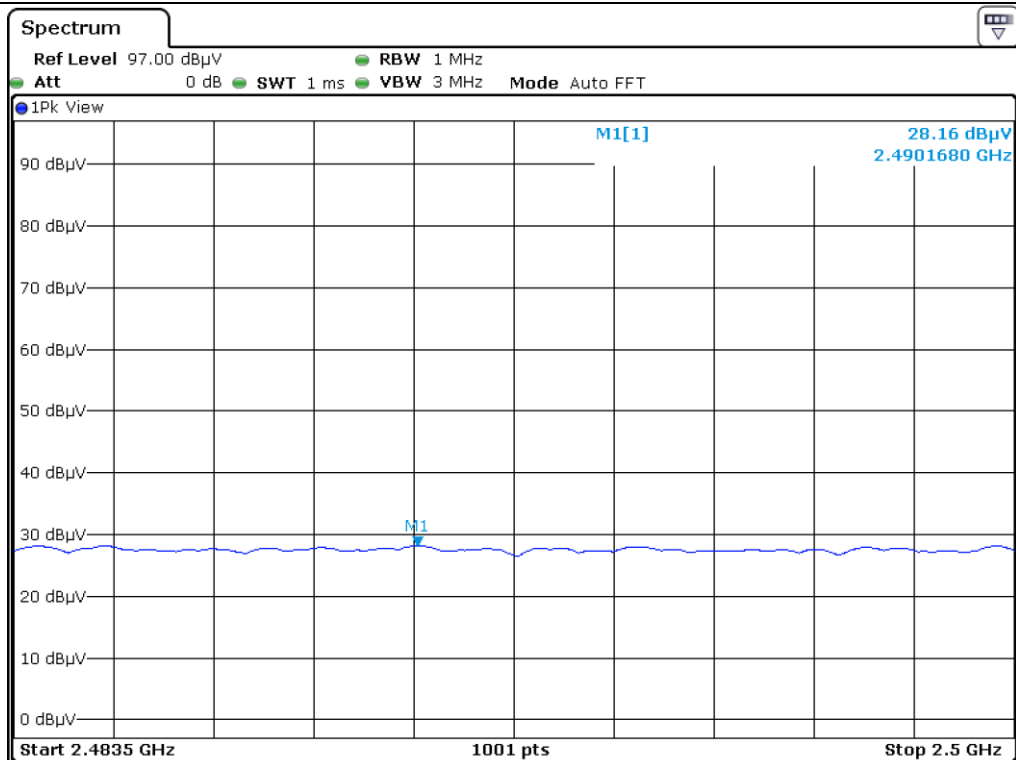
Low Channel_V_Average_Focus



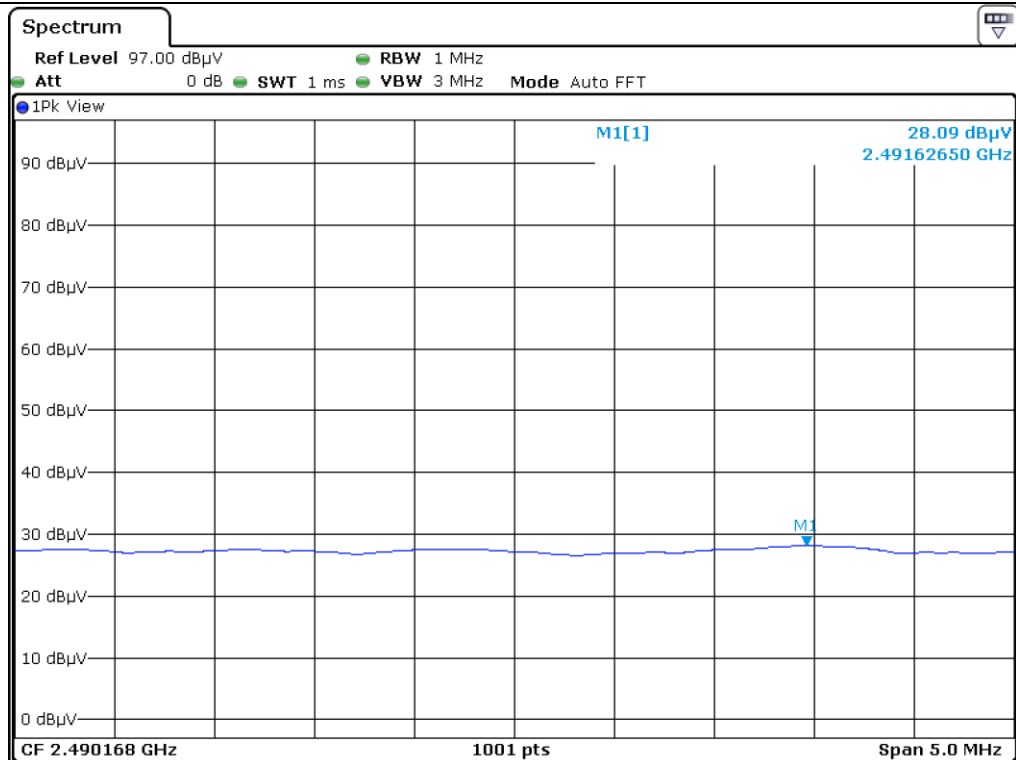
High Channel_H_Peak



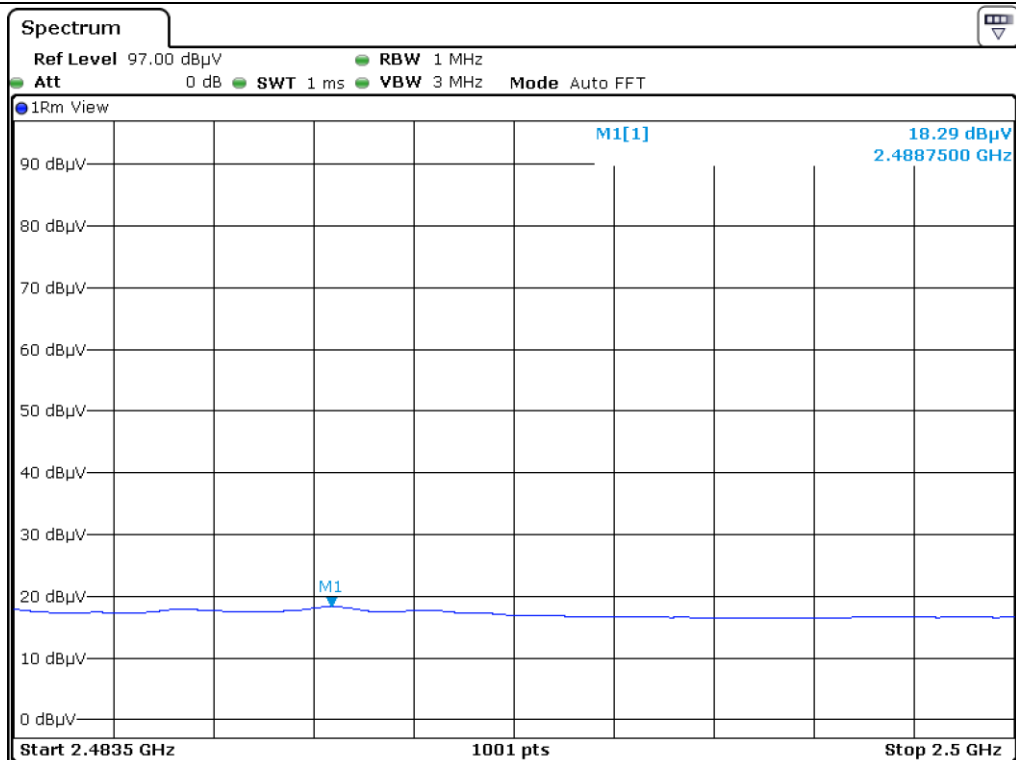
High Channel_H_Peak_Focus



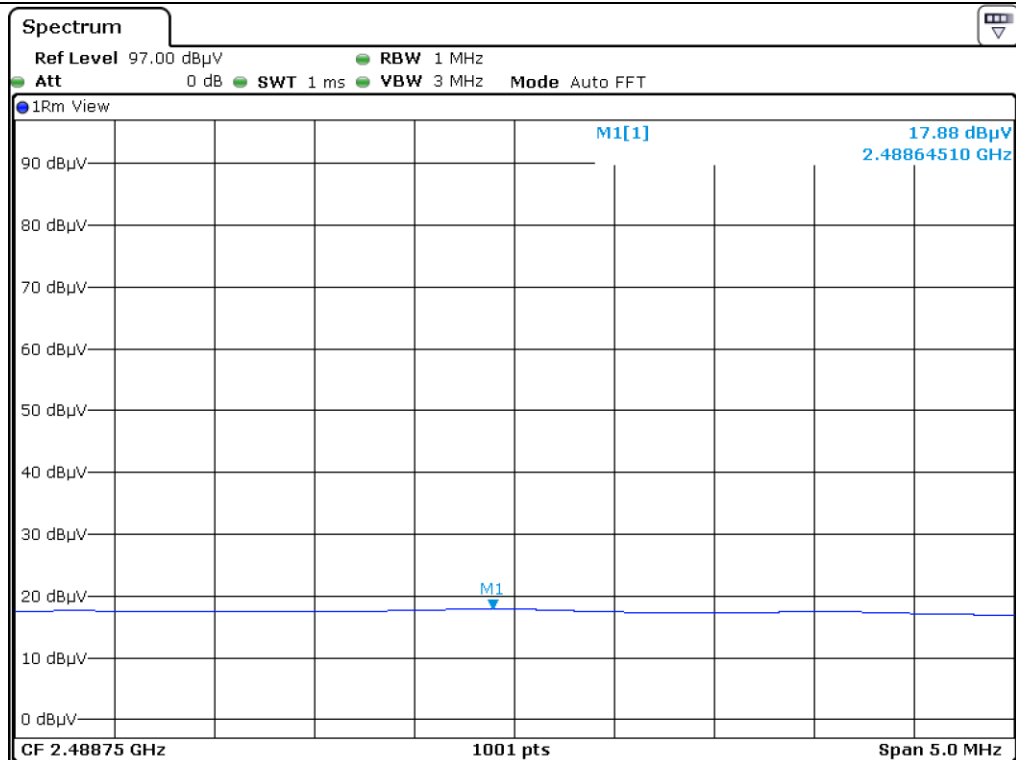
High Channel_V_Peak



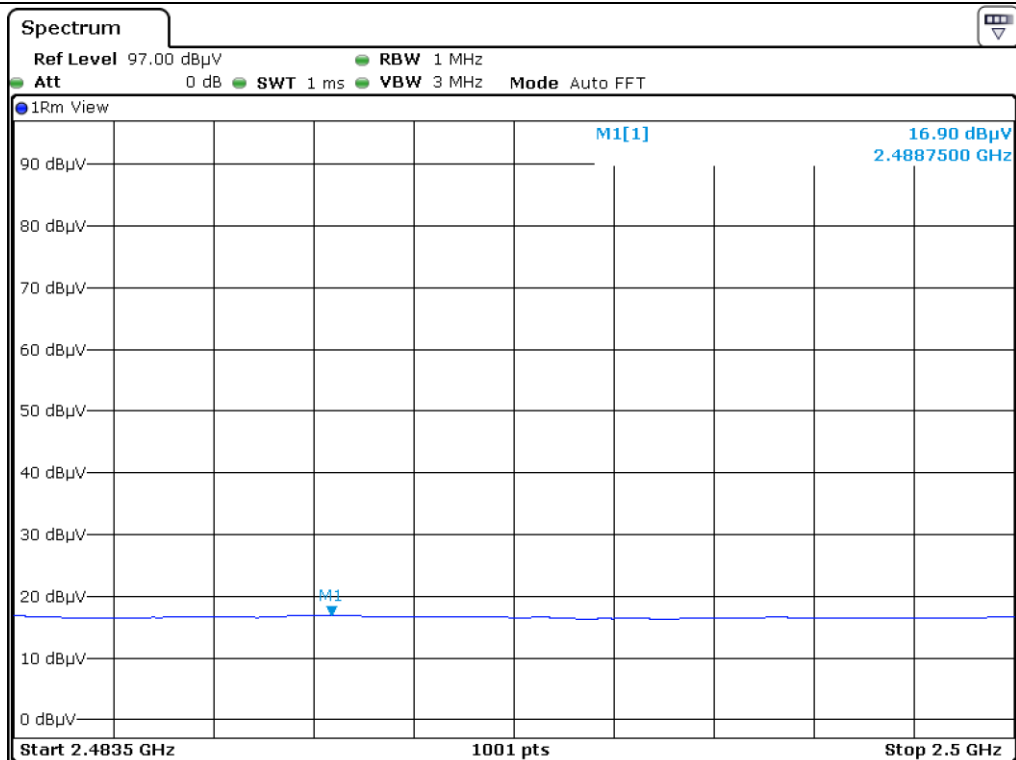
High Channel_V_Peak_Focus



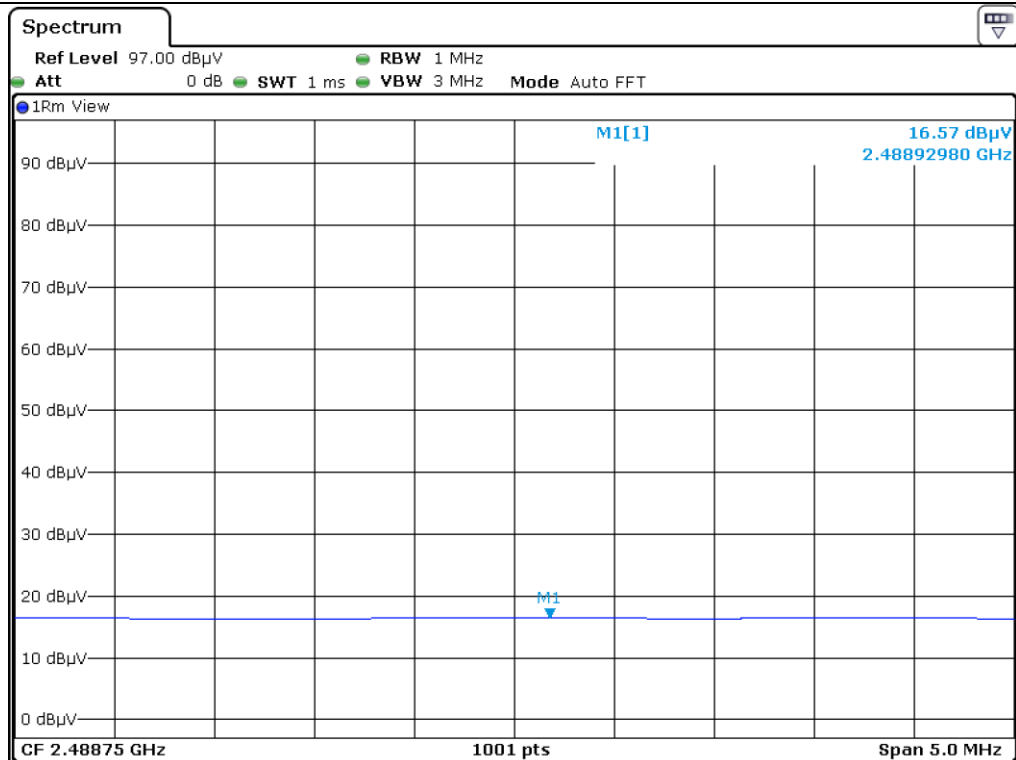
High Channel_H_Average



High Channel_H_Average_Focus



High Channel_V_Average



High Channel_V_Average_Focus

9.6.1.2 Test data for 802.11g WLAN Mode

- . Test Date : June 20, 2019 ~ June 26, 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 : 91.80 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Correction Factor	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 341.887	27.22	Peak	H	25.94	2.75	-	55.91	74.00	18.09
2 336.246	15.41	Average	H	25.94	2.75	0.37	44.47	54.00	9.53
2 340.077	27.33	Peak	V	25.94	2.75	-	56.02	74.00	17.98
2 337.853	16.90	Average	V	25.94	2.75	0.37	45.96	54.00	8.04
Test Data for High Channel									
2 489.480	29.85	Peak	H	26.47	2.39	-	58.71	74.00	15.29
2 488.644	17.40	Average	H	26.47	2.39	0.37	46.63	54.00	7.37
2 491.625	27.52	Peak	V	26.47	2.39	-	56.38	74.00	17.62
2 488.991	16.26	Average	V	26.47	2.39	0.37	45.49	54.00	8.51

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Total (dBμV/m)

Total = Reading + Antenna Factor + Cable Loss + Correction Factor



Tested by: Hyung-Kwon, Oh / Assistant Manager

9.6.1.3 Test data for 802.11n_HT20 WLAN Mode

- . Test Date : June 20, 2019 ~ June 26, 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 : 91.64 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Correction Factor	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 341.776	28.58	Peak	H	25.94	2.75	-	57.27	74.00	16.73
2 336.250	17.34	Average	H	25.94	2.75	0.38	46.41	54.00	7.59
2 340.077	27.25	Peak	V	25.94	2.75	-	55.94	74.00	18.06
2 337.856	16.01	Average	V	25.94	2.75	0.38	45.08	54.00	8.92
Test Data for High Channel									
2 489.481	29.36	Peak	H	26.47	2.39	-	58.22	74.00	15.78
2 488.661	17.77	Average	H	26.47	2.39	0.38	47.01	54.00	6.99
2 491.635	28.70	Peak	V	26.47	2.39	-	57.56	74.00	16.44
2 488.917	17.35	Average	V	26.47	2.39	0.38	46.59	54.00	7.41

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Total (dBμV/m)

Total = Reading + Antenna Factor + Cable Loss + Correction Factor



Tested by: Hyung-Kwon, Oh / Assistant Manager

9.6.2 Spurious & Harmonic Radiated Emission

9.6.2.1 Test data for 802.11b WLAN Mode

- . Test Date : June 20, 2019 ~ June 26, 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 ~ 26.5 GHz
- . Measurement distance : 3 m
- . Duty Cycle : 99.08 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Correction Factor	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	22.81	Peak	H	27.84	5.28	-	55.93	74.00	18.07
4 824.00	16.77	Average	H	27.84	5.28	0.04	49.93	54.00	4.07
4 824.00	18.52	Peak	V	27.84	5.28	-	51.64	74.00	22.36
4 824.00	14.22	Average	V	24.84	5.28	0.04	44.38	54.00	9.62
Test Data for Middle Channel									
4 884.00	22.75	Peak	H	27.01	5.42	-	55.18	74.00	18.82
4 884.00	15.81	Average	H	27.01	5.42	0.04	48.28	54.00	5.72
4 884.00	20.80	Peak	V	27.01	5.42	-	53.23	74.00	20.77
4 884.00	14.04	Average	V	27.01	5.42	0.04	46.51	54.00	7.49
Test Data for High Channel									
4 924.00	21.35	Peak	H	28.15	5.40	-	54.90	74.00	19.10
4 924.00	16.68	Average	H	28.15	5.40	0.04	50.27	54.00	3.73
4 924.00	20.76	Peak	V	28.15	5.40	-	54.31	74.00	19.69
4 924.00	14.11	Average	V	28.15	5.40	0.04	47.70	54.00	6.30

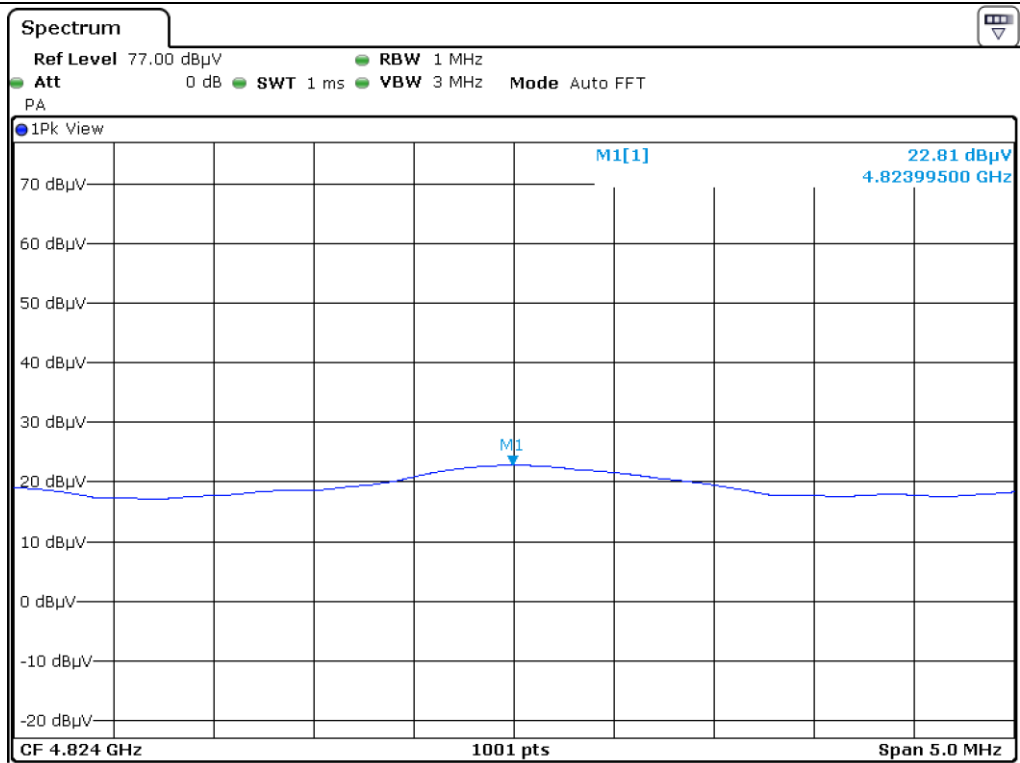
Tabulated test data for Restricted Band

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

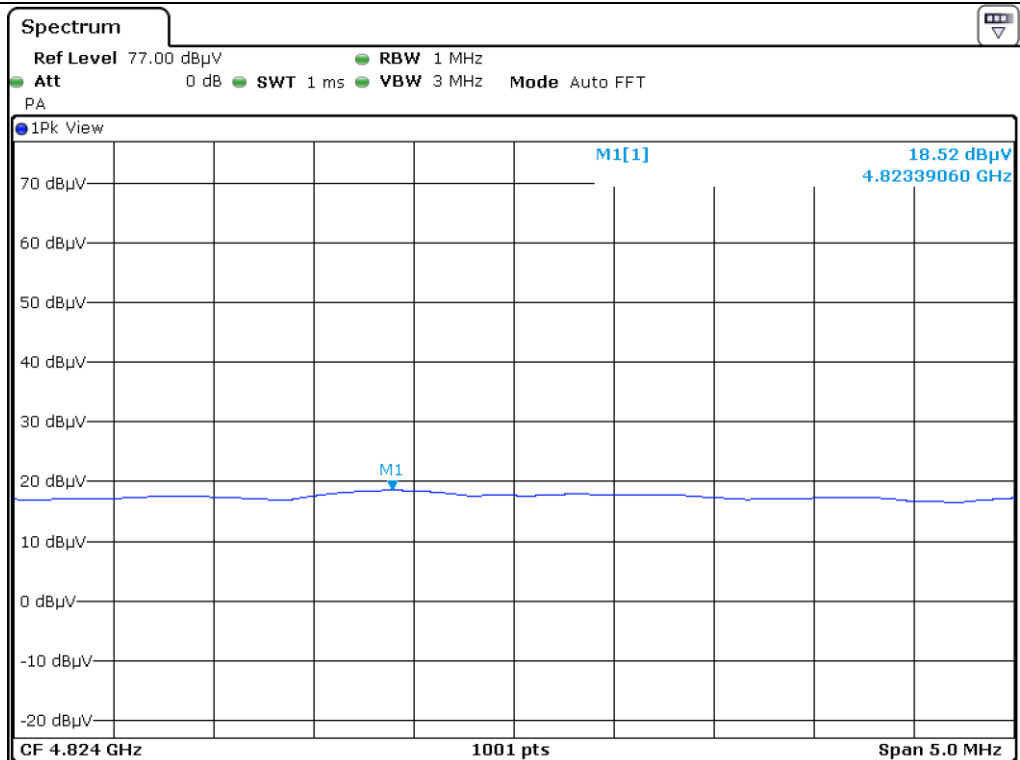
Margin (dB) = Limits (dBμV/m) - Total (dBμV/m)

Total = Reading + Antenna Factor + Cable Loss + Correction Factor

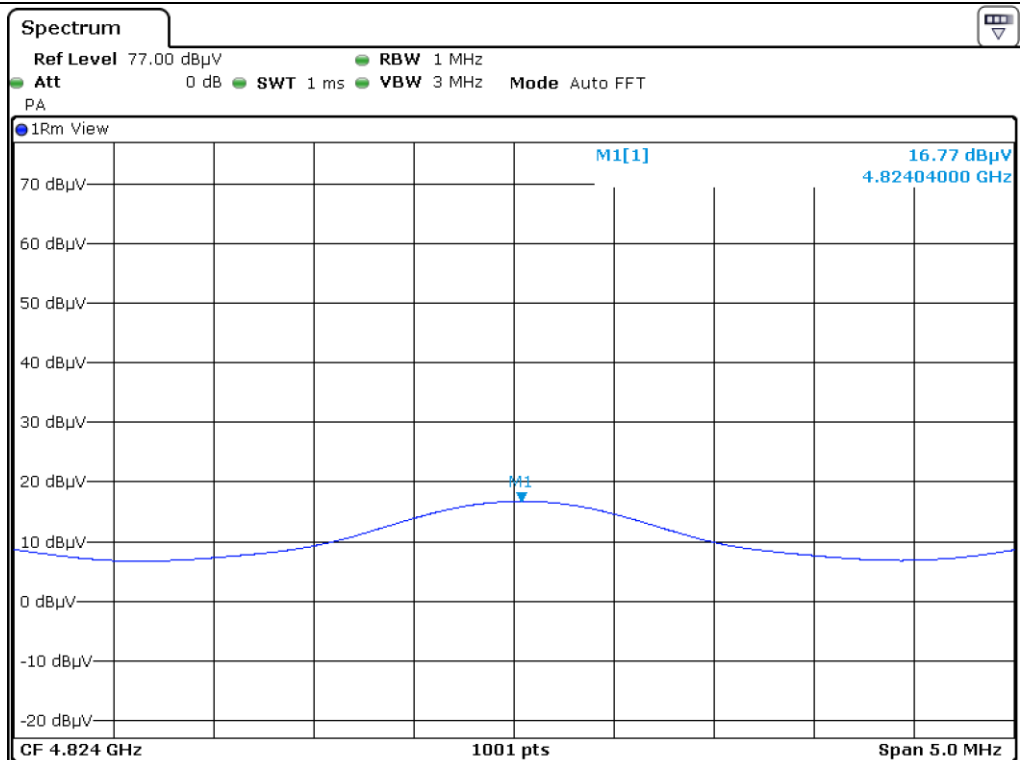
Tested by: Hyung-Kwon, Oh / Assistant Manager



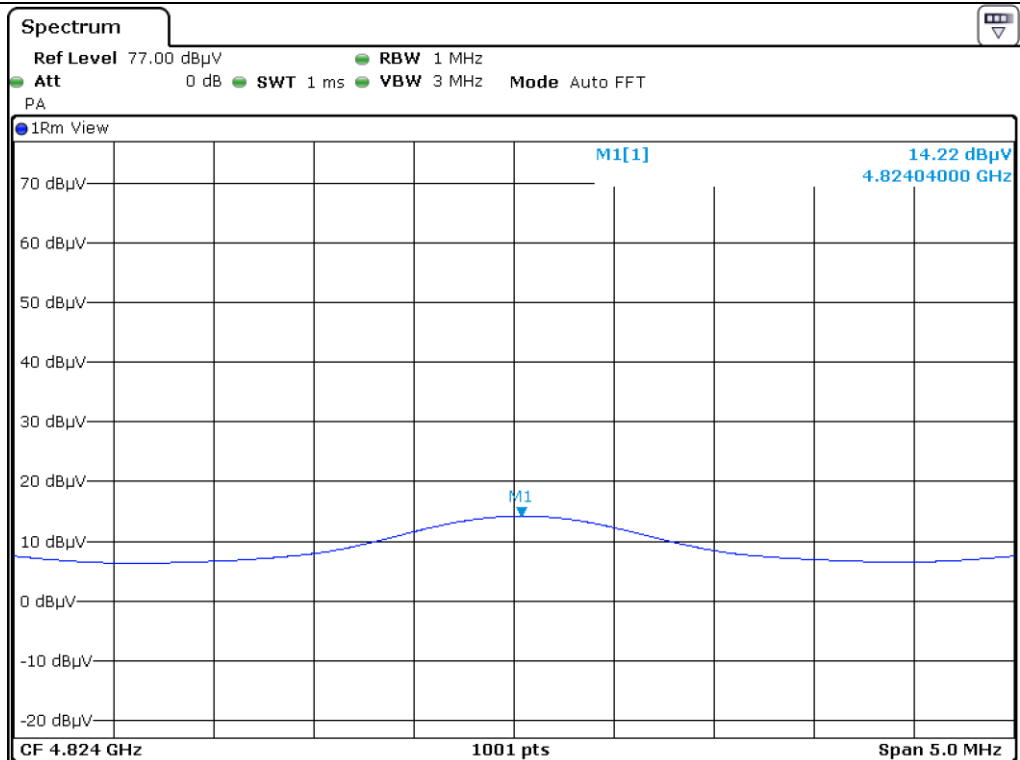
Low Channel_H_Peak



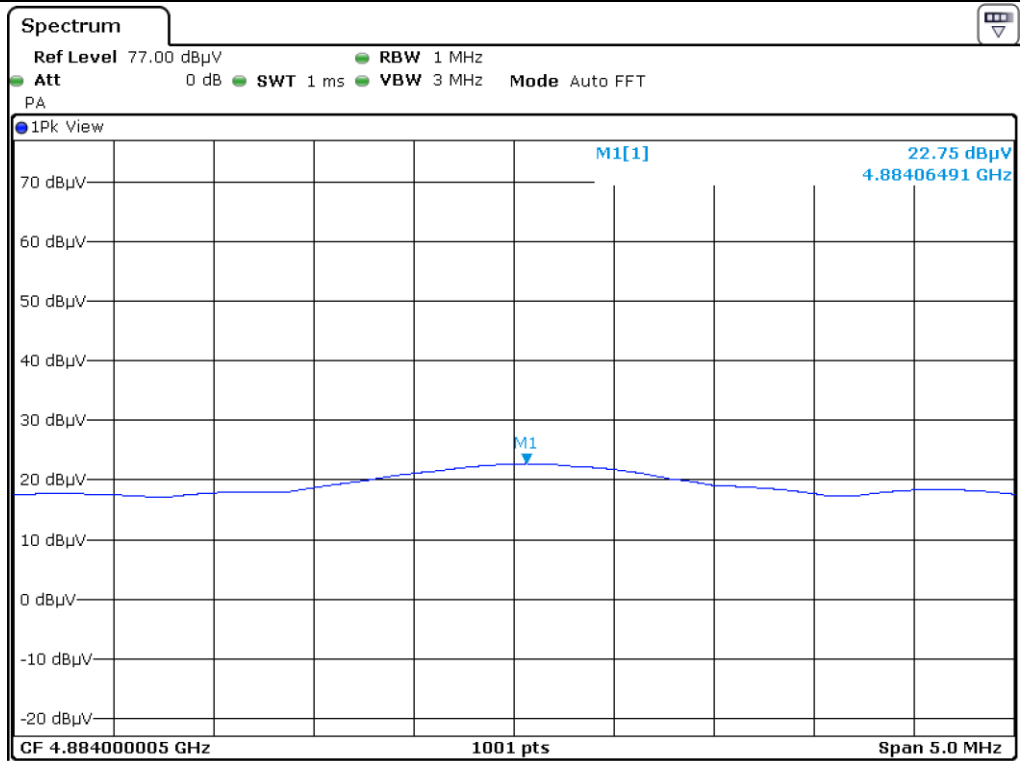
Low Channel_V_Peak



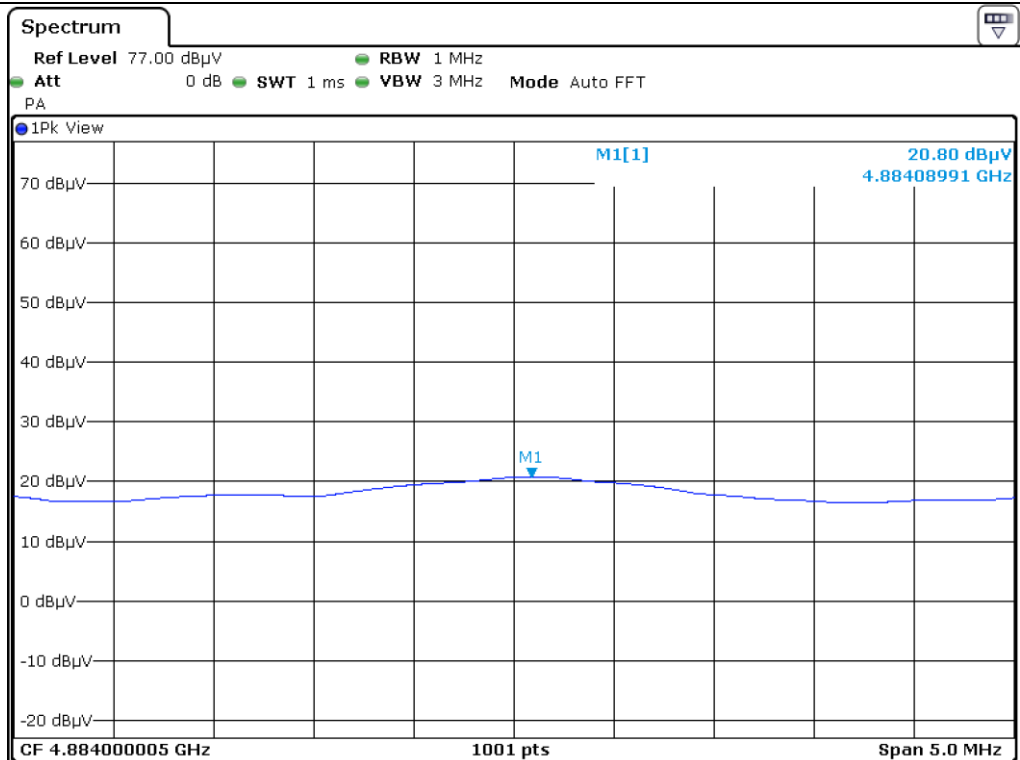
Low Channel_H_Average



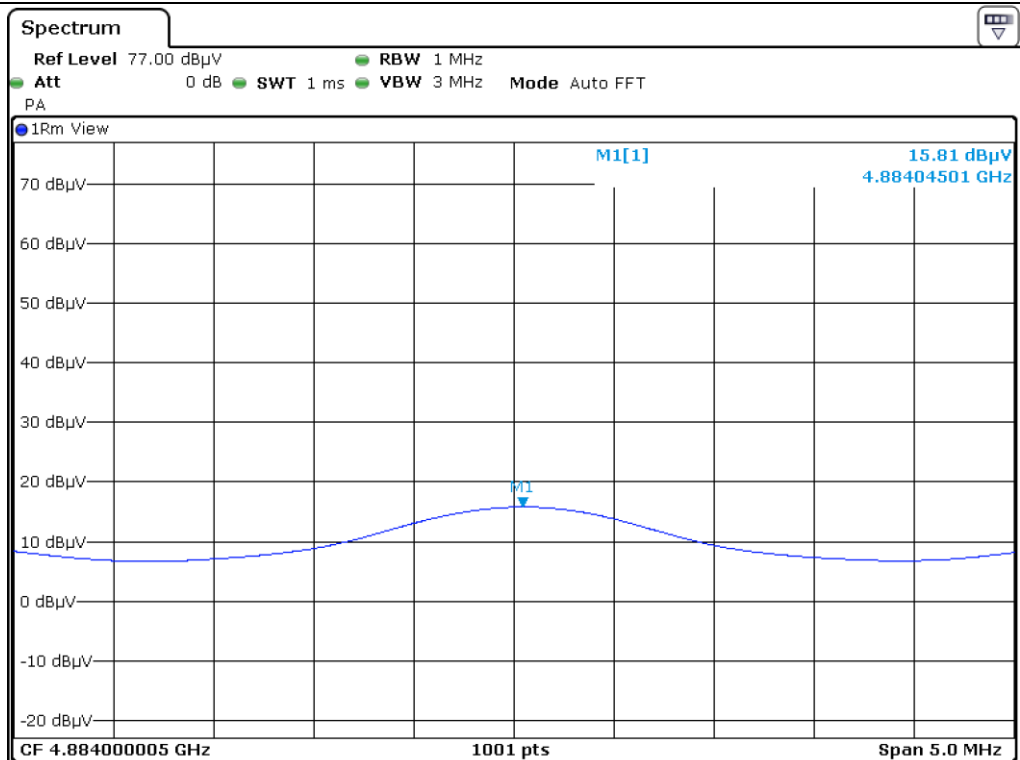
Low Channel_V_Average



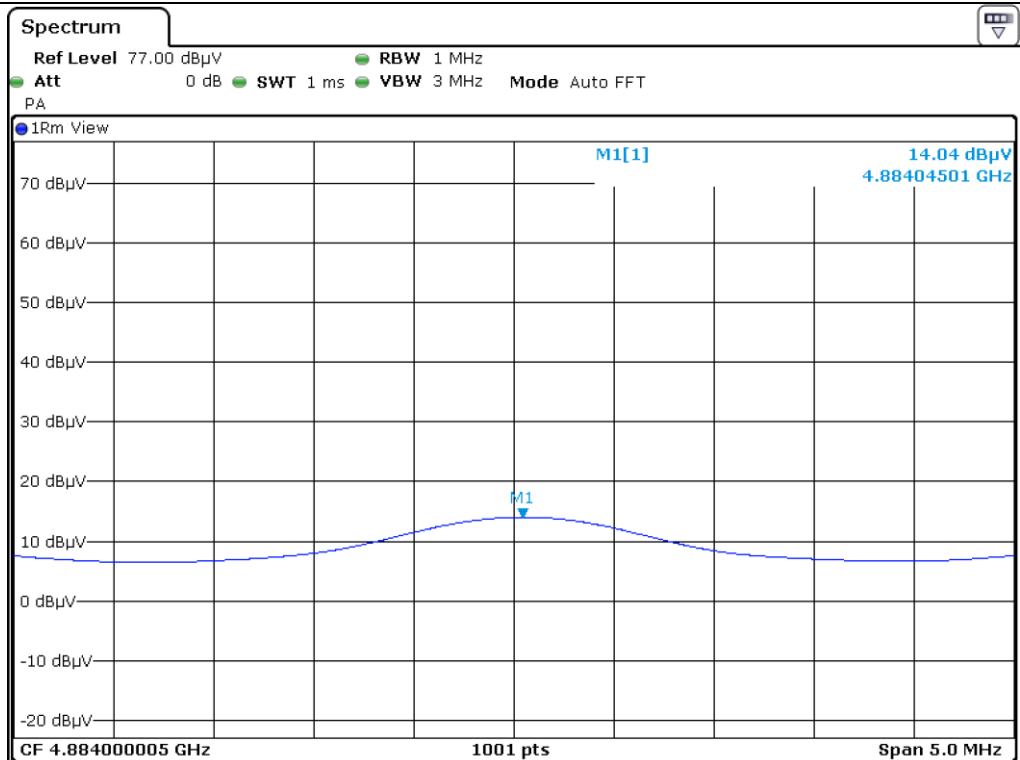
Middle Channel_H_Peak



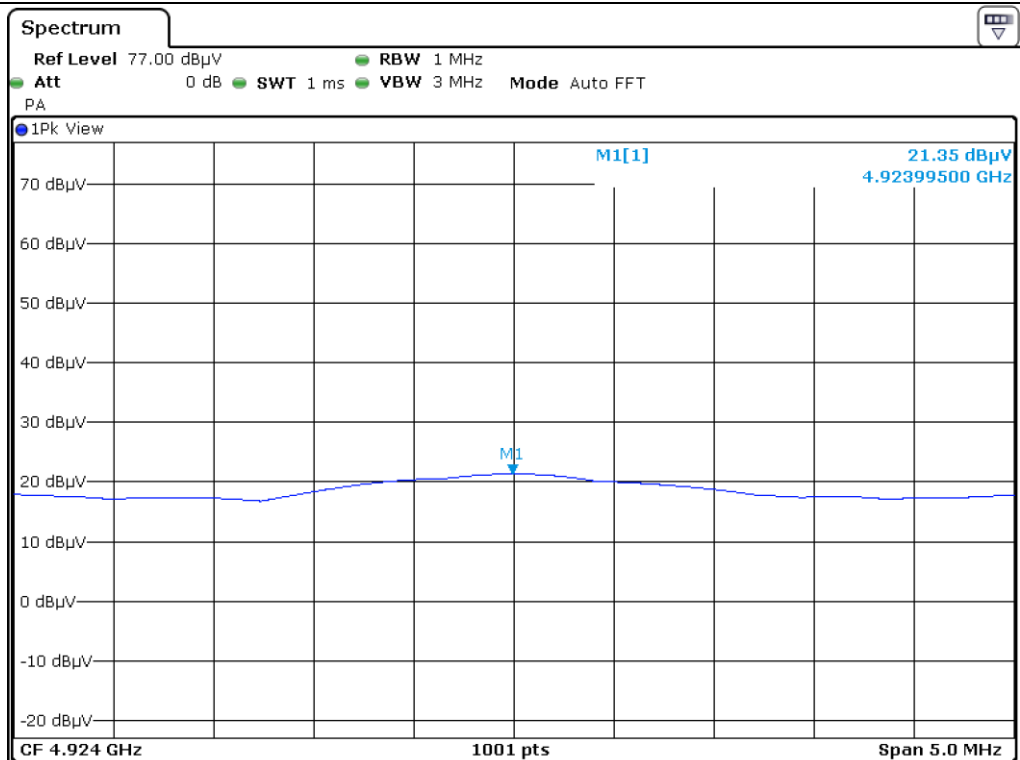
Middle Channel_V_Peak



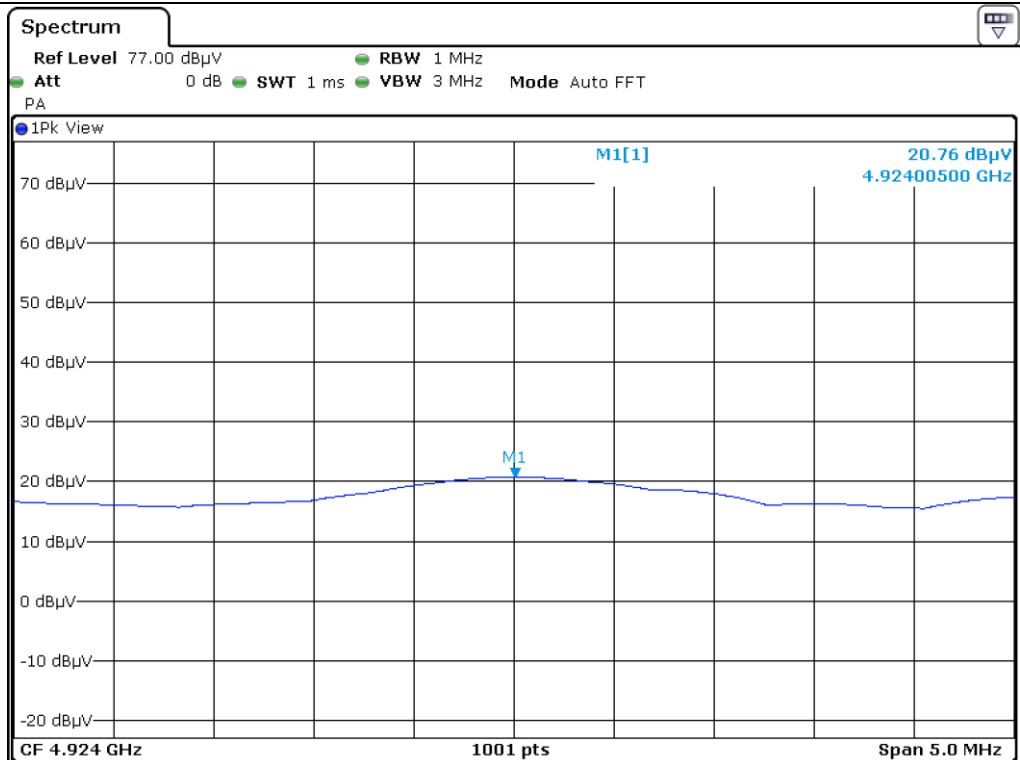
Middle Channel_H_Average



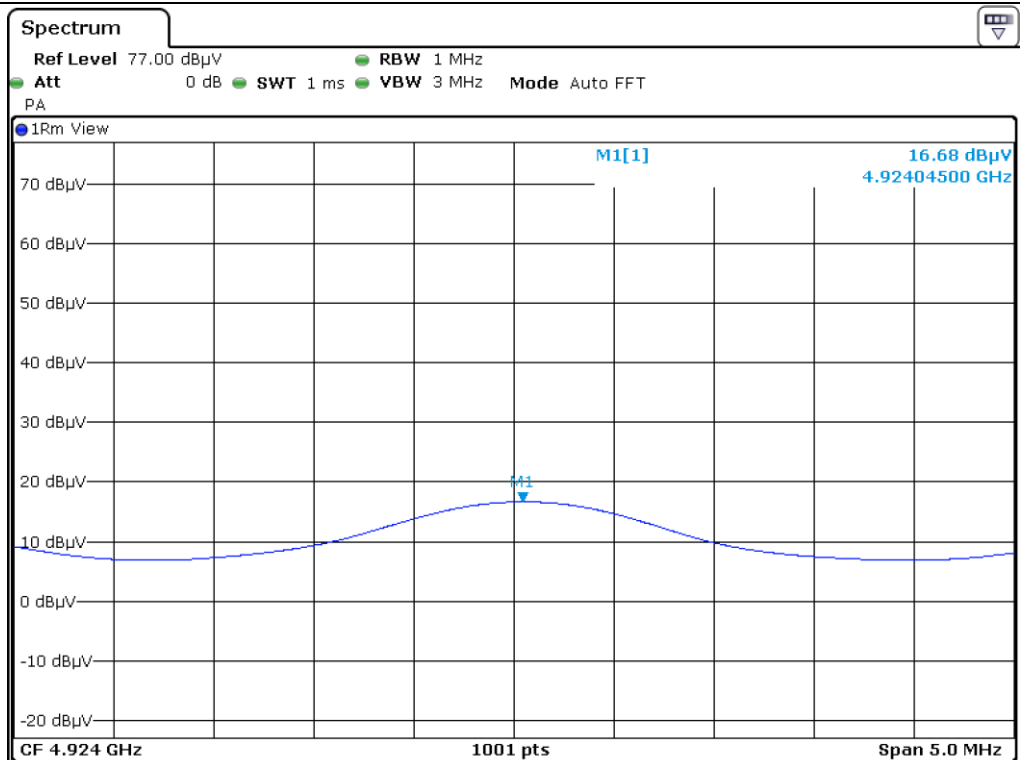
Middle Channel_V_Average



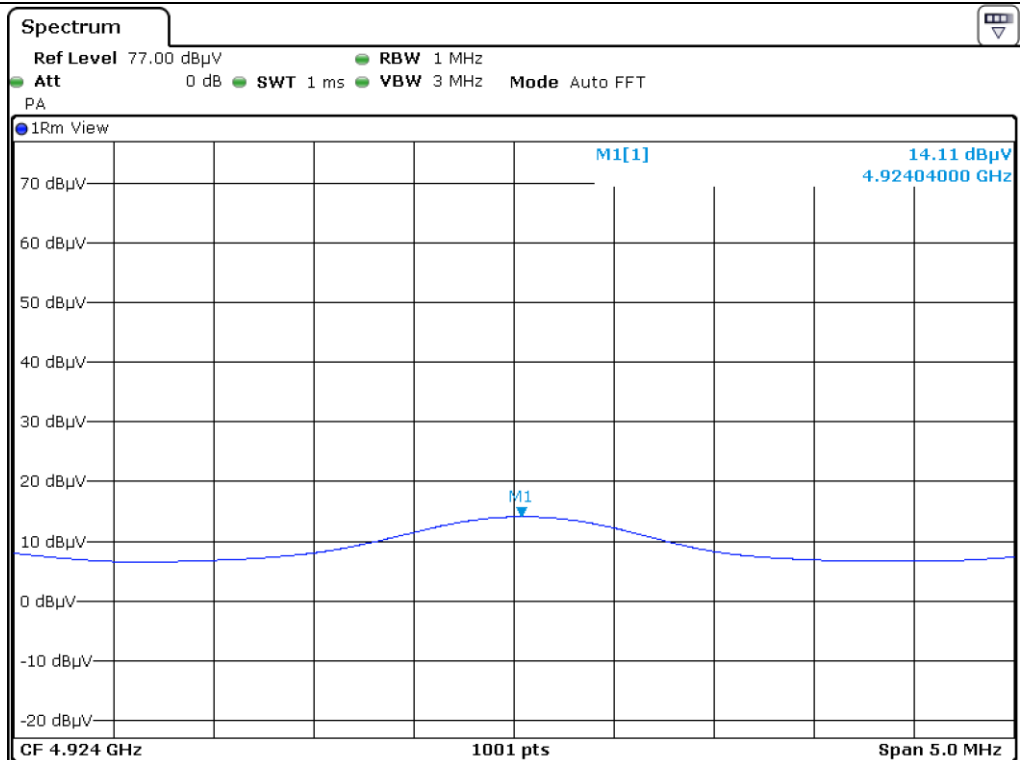
High Channel_H_Peak



High Channel_V_Peak



High Channel_H_Average



High Channel_V_Average

9.6.2.2 Test data for 802.11g WLAN Mode

- . Test Date : June 20, 2019 ~ June 26, 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 ~ 26.5 GHz
- . Measurement distance : 3 m
- . Duty Cycle : 91.80 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Correction Factor	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	23.01	Peak	H	27.84	5.28	-	56.13	74.00	17.87
4 824.00	17.06	Average	H	27.84	5.28	0.37	50.55	54.00	3.45
4 824.00	18.19	Peak	V	27.84	5.28	-	51.31	74.00	22.69
4 824.00	14.18	Average	V	24.84	5.28	0.37	44.67	54.00	9.33
Test Data for Middle Channel									
4 884.00	22.39	Peak	H	27.01	5.42	-	54.82	74.00	19.18
4 884.00	14.86	Average	H	27.01	5.42	0.37	47.66	54.00	6.34
4 884.00	21.66	Peak	V	27.01	5.42	-	54.09	74.00	19.91
4 884.00	14.75	Average	V	27.01	5.42	0.37	47.55	54.00	6.45
Test Data for High Channel									
4 924.00	21.80	Peak	H	28.15	5.40	-	55.35	74.00	18.65
4 924.00	16.40	Average	H	28.15	5.40	0.37	50.32	54.00	3.68
4 924.00	20.88	Peak	V	28.15	5.40	-	54.43	74.00	19.57
4 924.00	13.99	Average	V	28.15	5.40	0.37	47.91	54.00	6.09

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Total (dBμV/m)

Total = Reading + Antenna Factor + Cable Loss + Correction Factor

Tested by: Hyung-Kwon, Oh / Assistant Manager

9.6.2.3 Test data for 802.11n_HT20 WLAN Mode

- . Test Date : June 20, 2019 ~ June 26, 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 ~ 26.5 GHz
- . Measurement distance : 3 m
- . Duty Cycle : 91.64 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Correction Factor	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	22.21	Peak	H	27.84	5.28	-	55.33	74.00	18.67
4 824.00	16.25	Average	H	27.84	5.28	0.38	49.75	54.00	4.25
4 824.00	18.19	Peak	V	27.84	5.28	-	51.31	74.00	22.69
4 824.00	13.67	Average	V	24.84	5.28	0.38	44.17	54.00	9.83
Test Data for Middle Channel									
4 884.00	23.03	Peak	H	27.01	5.42	-	55.46	74.00	18.54
4 884.00	16.28	Average	H	27.01	5.42	0.38	49.09	54.00	4.91
4 884.00	20.36	Peak	V	27.01	5.42	-	52.79	74.00	21.21
4 884.00	14.65	Average	V	27.01	5.42	0.38	47.46	54.00	6.54
Test Data for High Channel									
4 924.00	21.28	Peak	H	28.15	5.40	-	54.83	74.00	19.17
4 924.00	16.40	Average	H	28.15	5.40	0.38	50.33	54.00	3.67
4 924.00	21.17	Peak	V	28.15	5.40	-	54.72	74.00	19.28
4 924.00	13.96	Average	V	28.15	5.40	0.38	47.89	54.00	6.11

Tabulated test data for Restricted Band

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

Margin (dB) = Limits (dBμV/m) - Total (dBμV/m)

Total = Reading + Antenna Factor + Cable Loss + Correction Factor

Tested by: Hyung-Kwon, Oh / Assistant Manager

10. PEAK POWER SPECTRUL DENSITY

10.1 Operating environment

Temperature : 23 °C
Relative humidity : 41 % R.H.

10.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$, the video bandwidth is set to 3 times the resolution bandwidth.



10.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

10.4 Test data for 802.11b WLAN Mode

-. Test Date : June 20, 2019 ~ June 26, 2019

-. Test Result : Pass

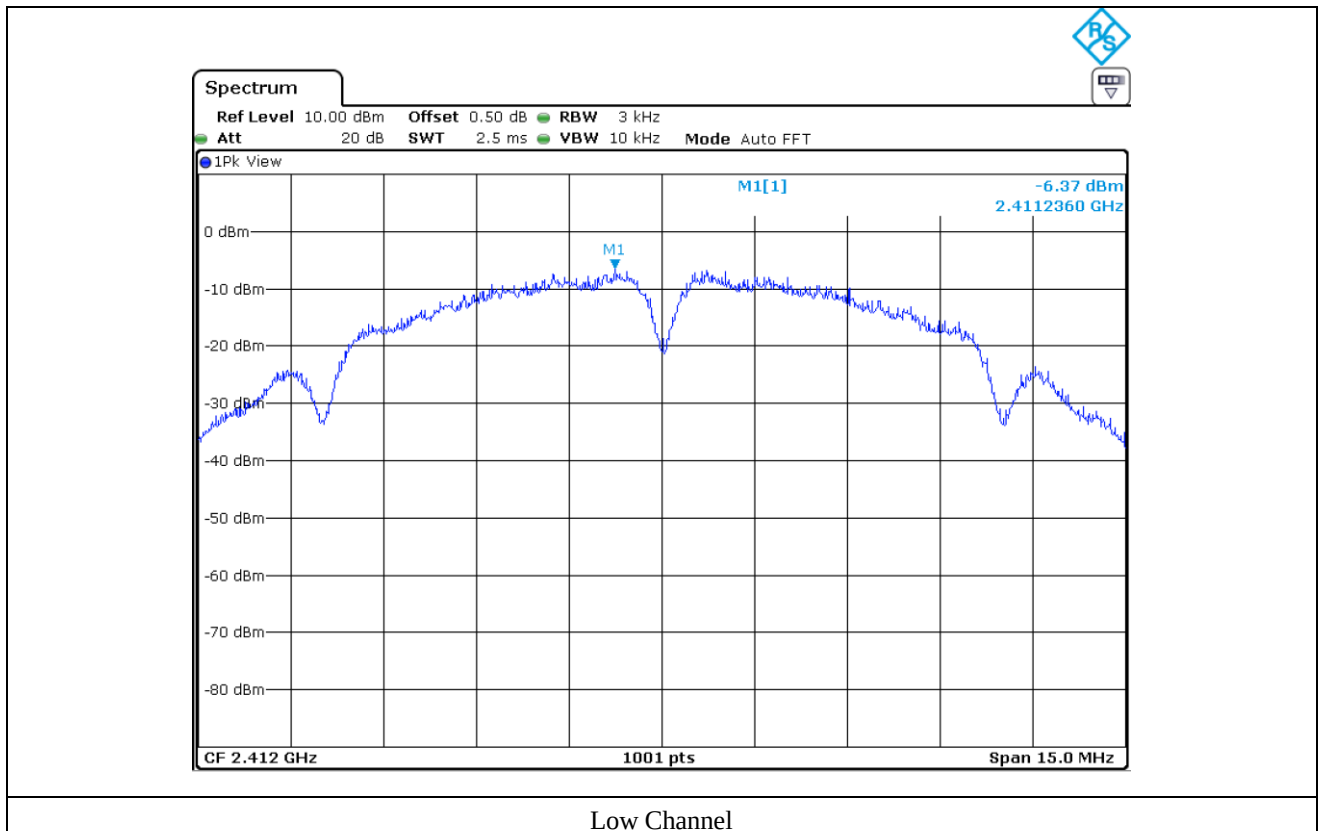
-. Operating Condition : Continuous transmitting mode

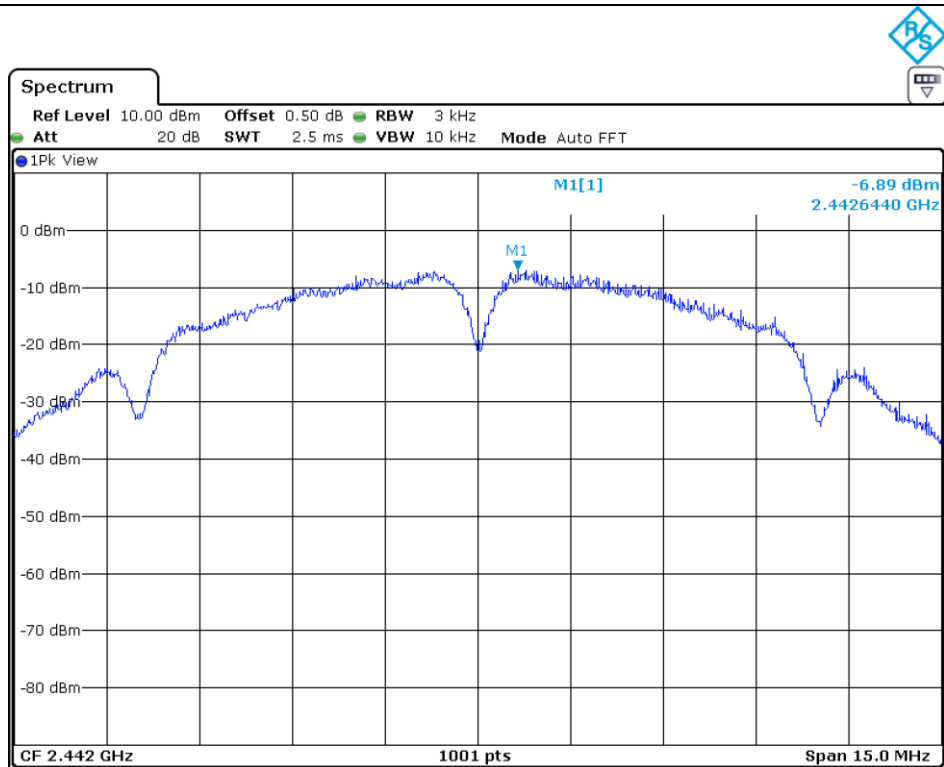
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-6.37	8.00	14.37
Middle	2 442.00	-6.89	8.00	14.89
High	2 462.00	-6.47	8.00	14.47

Remark. Margin = Limit – Measured value

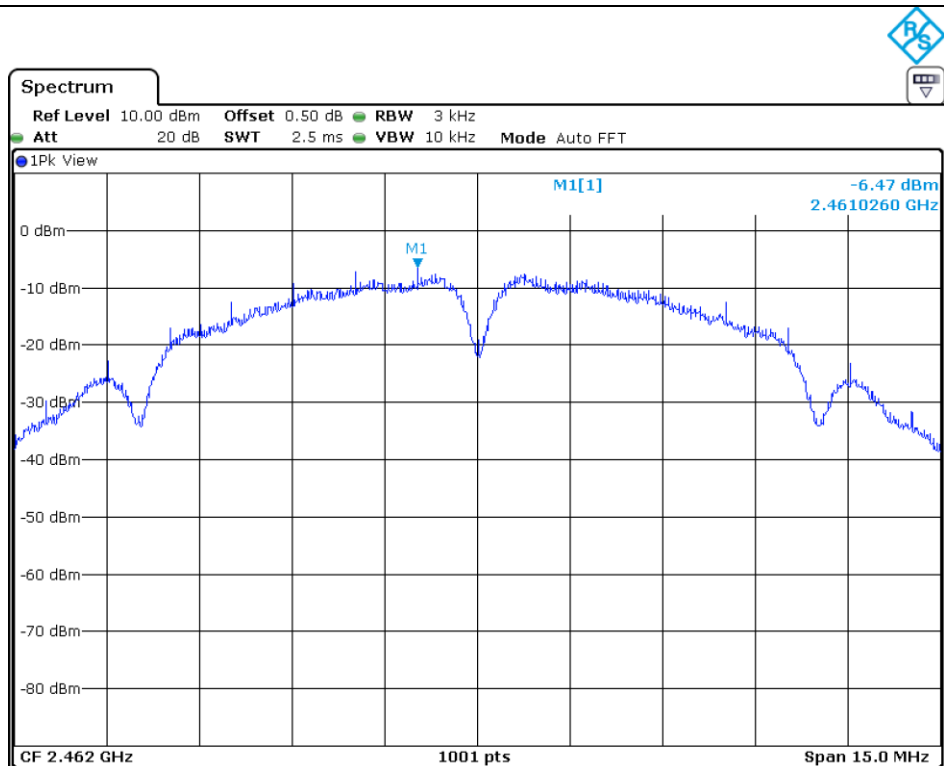


Tested by: Hyung-Kwon, Oh / Assistant Manager





Middle Channel



High Channel

10.5 Test data for 802.11g WLAN Mode

-. Test Date : June 20, 2019 ~ June 26, 2019

-. Test Result : Pass

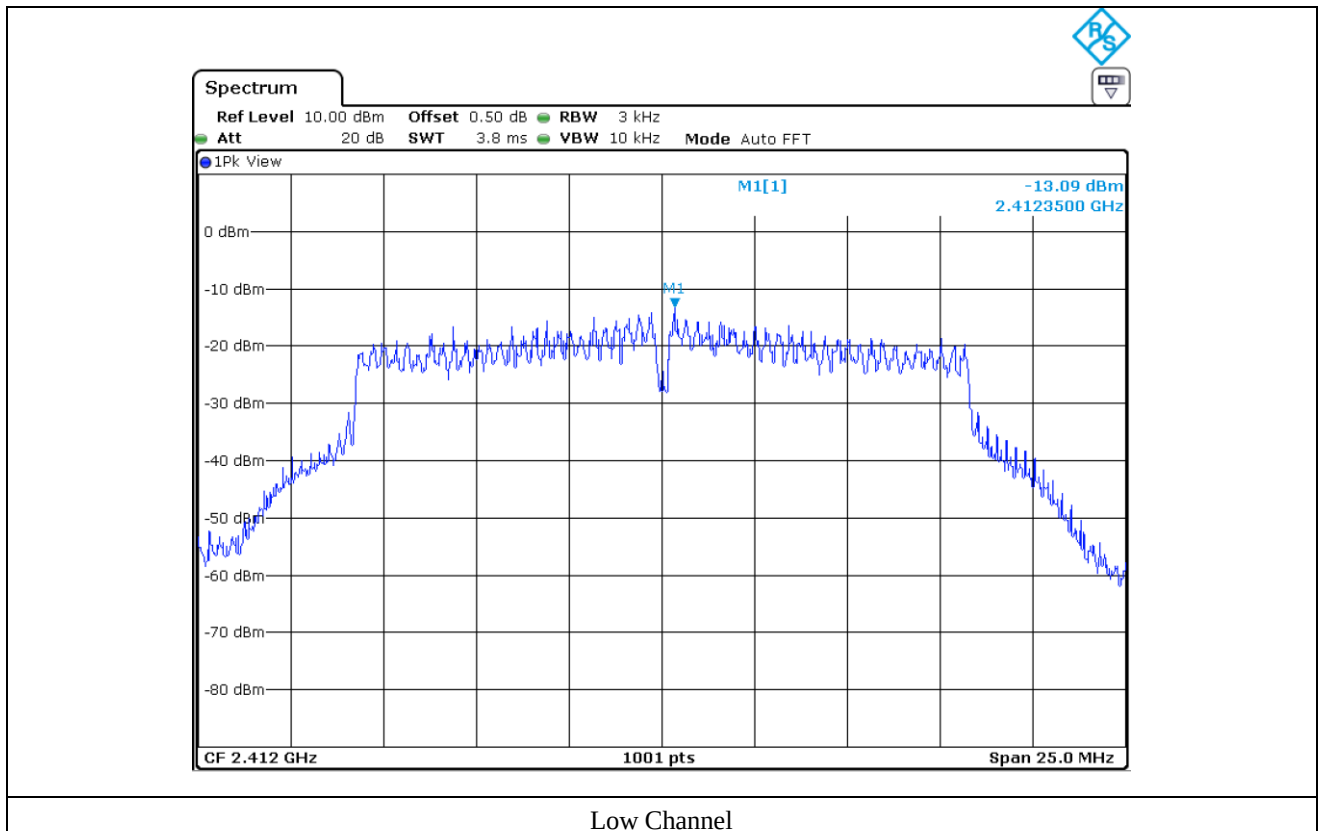
-. Operating Condition : Continuous transmitting mode

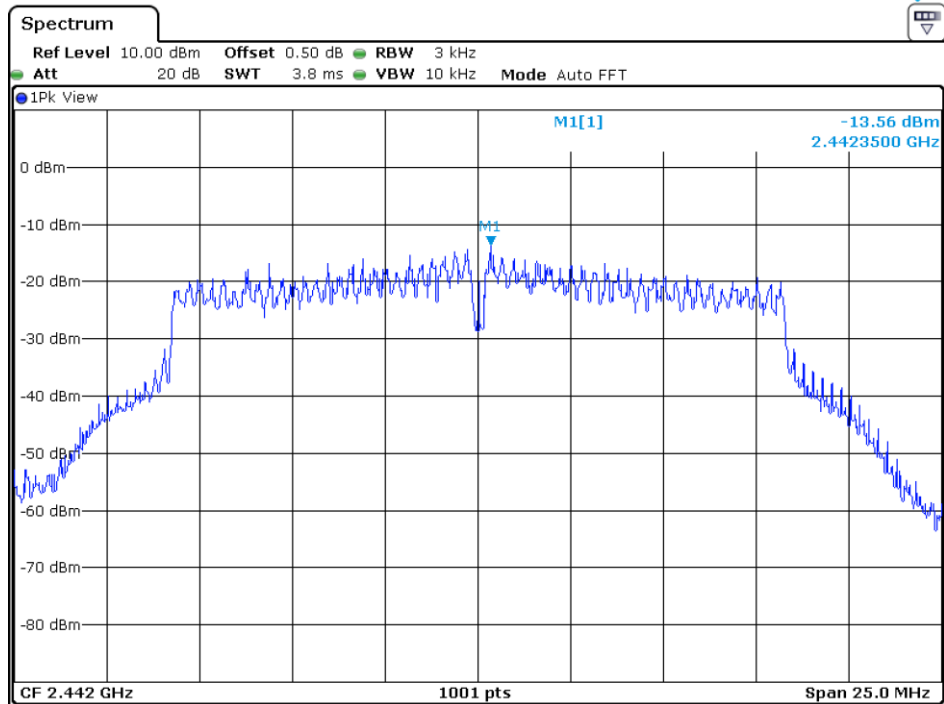
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-13.09	8.00	21.09
Middle	2 442.00	-13.56	8.00	21.56
High	2 462.00	-14.04	8.00	22.04

Remark. Margin = Limit – Measured value

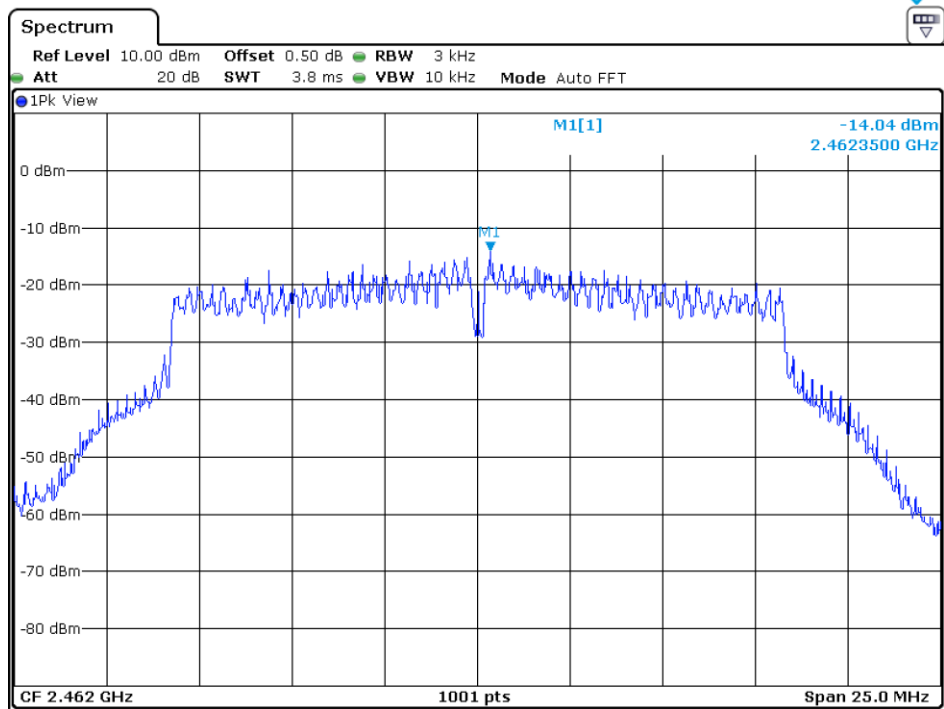


Tested by: Hyung-Kwon, Oh / Assistant Manager





Middle Channel



High Channel

10.6 Test data for 802.11n_HT20 WLAN Mode

-. Test Date : June 20, 2019 ~ June 26, 2019

-. Test Result : Pass

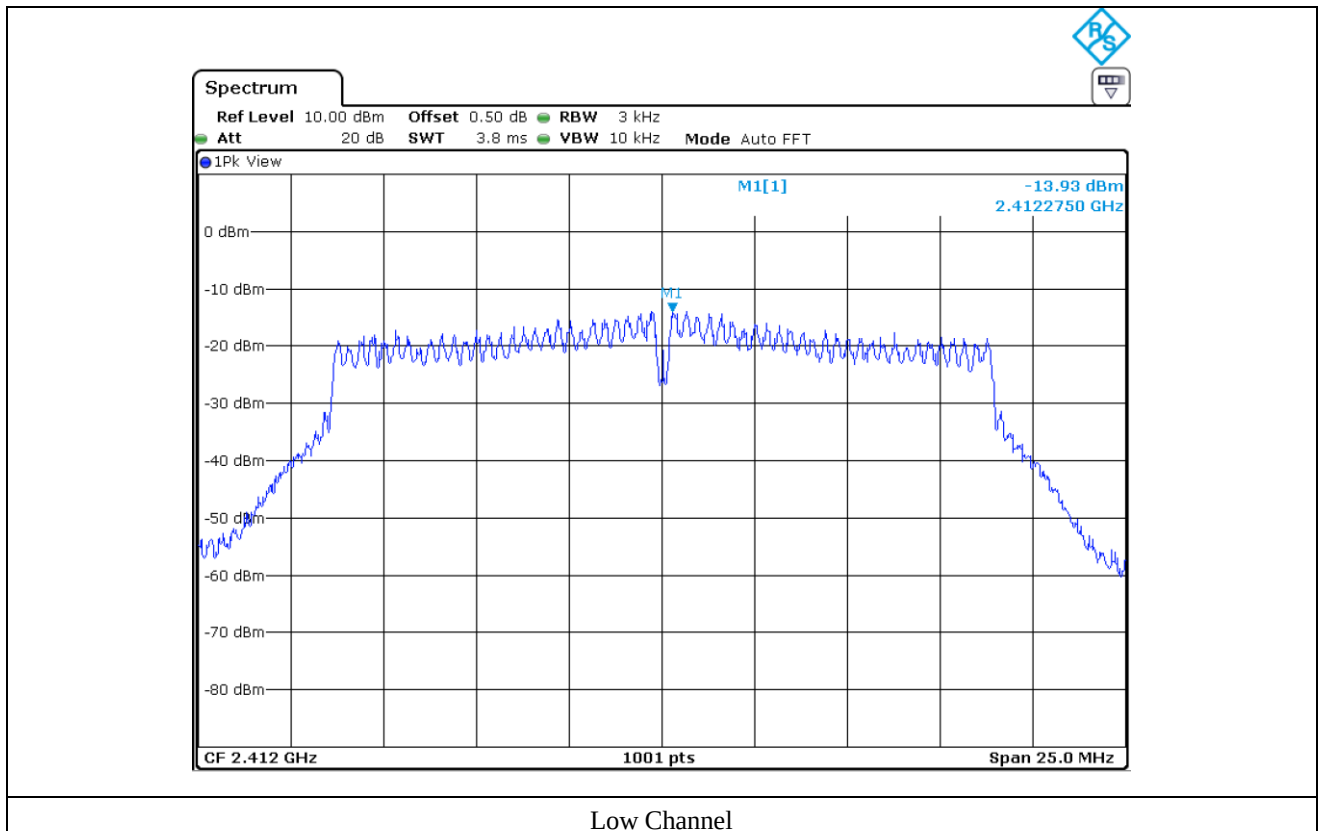
-. Operating Condition : Continuous transmitting mode

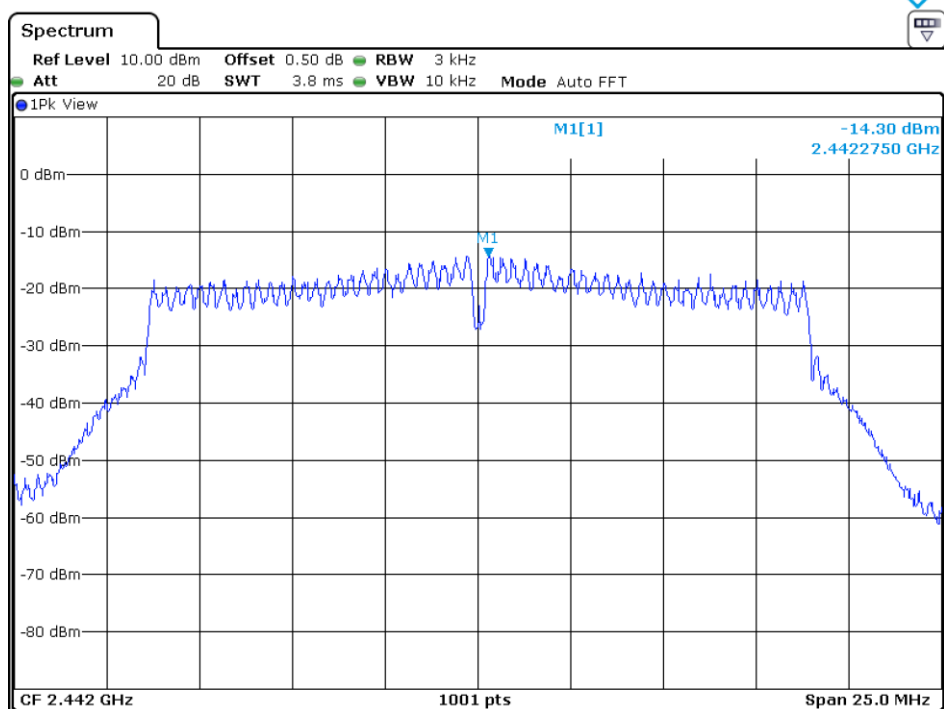
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-13.93	8.00	21.93
Middle	2 442.00	-14.30	8.00	22.30
High	2 462.00	-14.77	8.00	22.77

Remark. Margin = Limit – Measured value

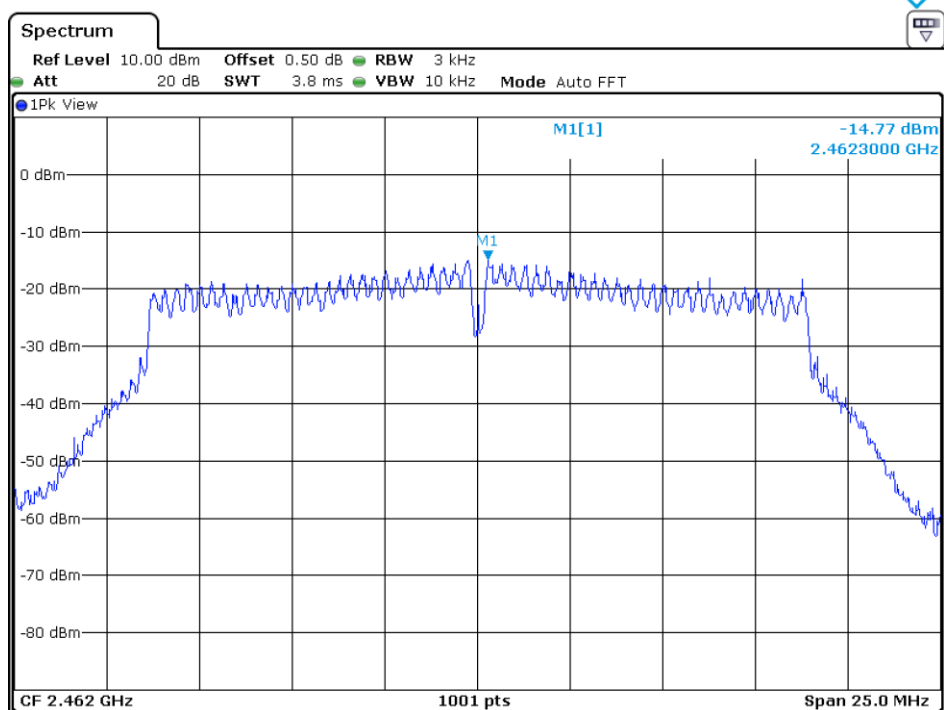


Tested by: Hyung-Kwon, Oh / Assistant Manager





Middle Channel



High Channel

11. RADIATED EMISSION TEST

11.1 Operating environment

Temperature : 25 °C
Relative humidity : 44 % R.H.

11.2 Test set-up

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

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

11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Mar. 11, 2019 (1Y)
■ -	ESR	Rohde & Schwarz	EMI Test Receiver	101470	Oct. 22, 2018 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312545	Mar. 18, 2019 (1Y)
■ -	BBV9718B	Schwarzbeck	Amplifier	310	Mar. 20, 2019 (1Y)
■	SCU40A	Rohde & Schwarz	Signal Conditioning unit	100436	Mar. 11, 2019 (1Y)
■ -	DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
■ -	MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
■	HLA 6121	TESEQ GmbH	Loop Antenna	50841	Aug. 29, 2019 (1Y)
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-419	Aug. 09, 2018 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 16, 2017 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170179	Jan. 16, 2019 (1Y)

All test equipment used is calibrated on a regular basis.

11.4 Test data for WLAN 2.4 GHz

11.4.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : 44 % R.H.

Temperature: 25 °C

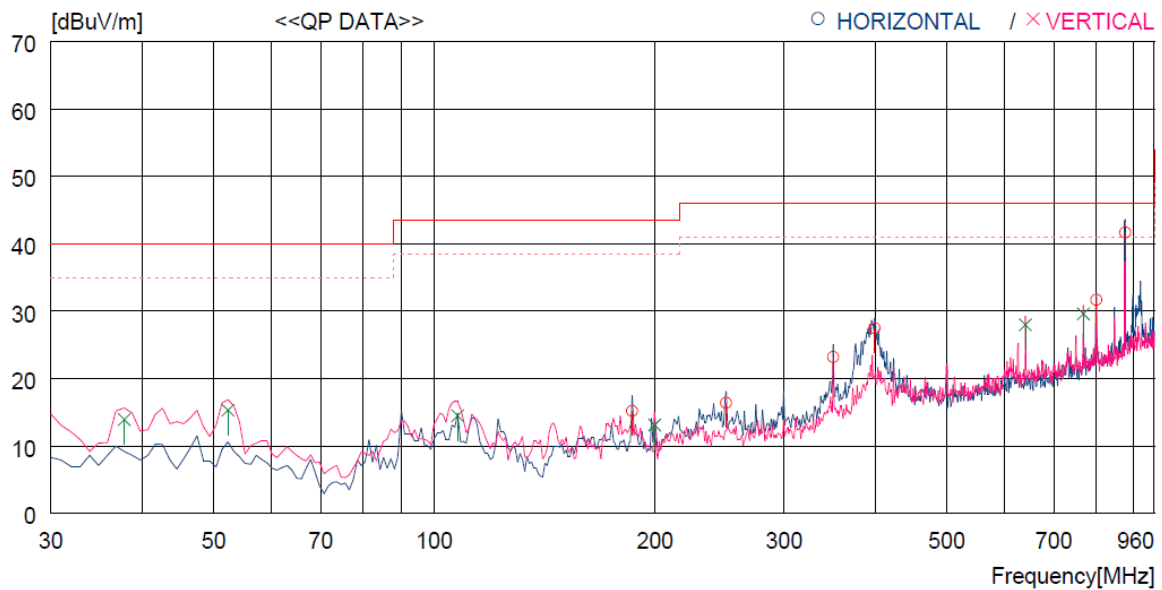
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT EUT : Wireless module

Date: June 20, 2019 ~ June 26, 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	186.170	34.5	10.5	3.2	33.0	15.2	43.5	28.3	100	0
2	250.190	32.9	12.7	3.7	32.9	16.4	46.0	29.6	100	28
3	350.100	37.0	14.8	4.4	33.0	23.2	46.0	22.8	100	12
4	398.600	40.2	15.8	4.6	33.1	27.5	46.0	18.5	100	117
5	800.172	36.8	21.3	6.6	33.0	31.7	46.0	14.3	100	68
6	875.830	45.2	22.1	7.0	32.6	41.7	46.0	4.3	100	0
----- Vertical -----										
7	37.760	31.7	13.8	1.5	33.1	13.9	40.0	26.1	100	359
8	52.310	32.8	13.9	1.7	33.1	15.3	40.0	24.7	100	359
9	107.600	33.4	11.7	2.4	33.0	14.5	43.5	29.0	100	219
10	199.750	32.1	10.7	3.3	33.0	13.1	43.5	30.4	100	359
11	640.127	35.8	19.7	5.8	33.3	28.0	46.0	18.0	100	84
12	768.163	35.4	20.9	6.4	33.1	29.6	46.0	16.4	100	359

Tested by: Hyung-Kwon, Oh / Assistant Manager

11.4.2 Test data for Below 30 MHz

- . Test Date : June 20, 2019 ~ June 26, 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.									

11.4.3 Test data for above 1 GHz

- . Test Date : June 20, 2019 ~ June 26, 2019
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . 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: Hyung-Kwon, Oh / Assistant Manager

11.5 Test data for WLAN 2.4 GHz + Bluetooth

11.5.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : 44 % R.H.

Temperature: 25 °C

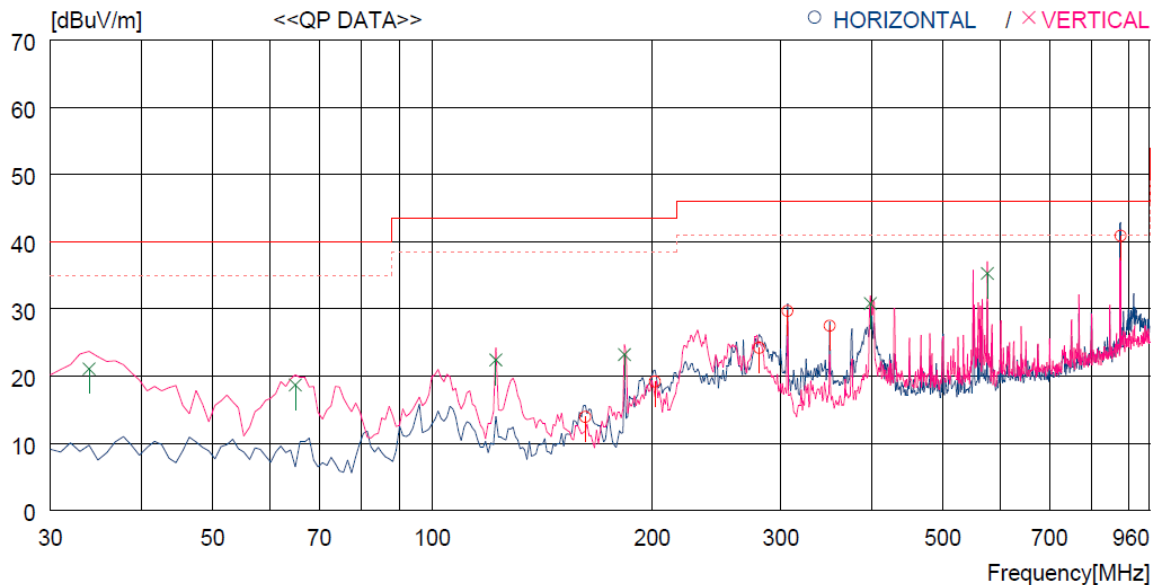
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT EUT : Wireless module

Date: June 20, 2019 ~ June 26, 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]
----- Horizontal -----										
1	161.920	35.1	8.5	3.3	33.0	13.9	43.5	29.6	100	248
2	201.690	38.2	10.5	3.7	33.2	19.2	43.5	24.3	100	192
3	280.260	40.9	12.0	4.3	33.0	24.2	46.0	21.8	100	248
4	306.450	44.7	13.4	4.6	33.0	29.7	46.0	16.3	100	223
5	350.100	40.5	15.2	4.9	33.1	27.5	46.0	18.5	100	331
6	875.830	44.3	21.5	7.9	32.8	40.9	46.0	5.1	100	192
----- Vertical -----										
7	33.880	40.6	12.1	1.5	33.1	21.1	40.0	18.9	100	0
8	64.920	38.2	11.5	2.1	33.1	18.7	40.0	21.3	100	0
9	122.150	42.7	9.8	2.9	33.0	22.4	43.5	21.1	100	0
10	183.260	43.0	9.8	3.5	33.1	23.2	43.5	20.3	100	0
11	397.630	42.8	16.0	5.2	33.2	30.8	46.0	15.2	100	0
12	575.139	44.2	18.1	6.3	33.3	35.3	46.0	10.7	100	0

Tested by: Hyung-Kwon, Oh / Assistant Manager

11.5.2 Test data for Below 30 MHz

- . Test Date : June 20, 2019 ~ June 26, 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.									

11.5.3 Test data for above 1 GHz

- . Test Date : June 20, 2019 ~ June 26, 2019
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . 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: Hyung-Kwon, Oh / Assistant Manager

12. CONDUCTED EMISSION TEST

12.1 Operating environment

Temperature : 25 °C
Relative humidity : 44 % R.H.

12.2 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.

12.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESCI	Rohde & Schwarz	Test Receiver	101012	Oct. 22, 2018 (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.

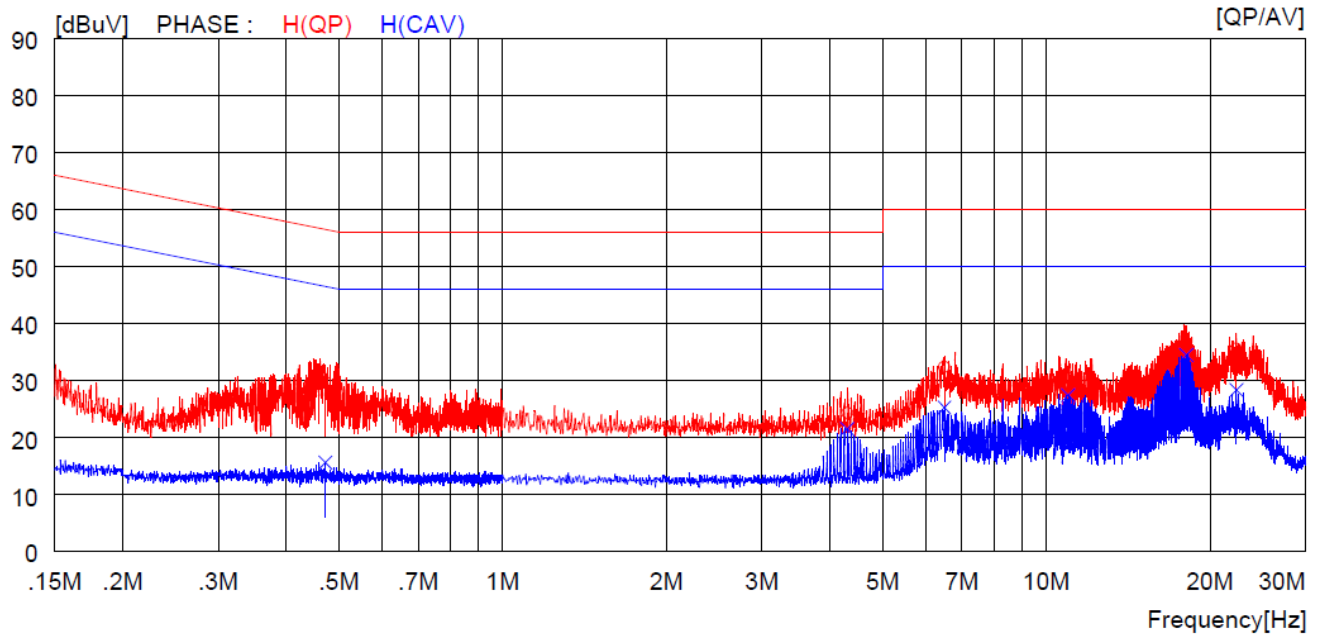
12.4 Test data

-. Test Date : June 20, 2019 ~ June 26, 2019

-. Resolution bandwidth : 9 kHz

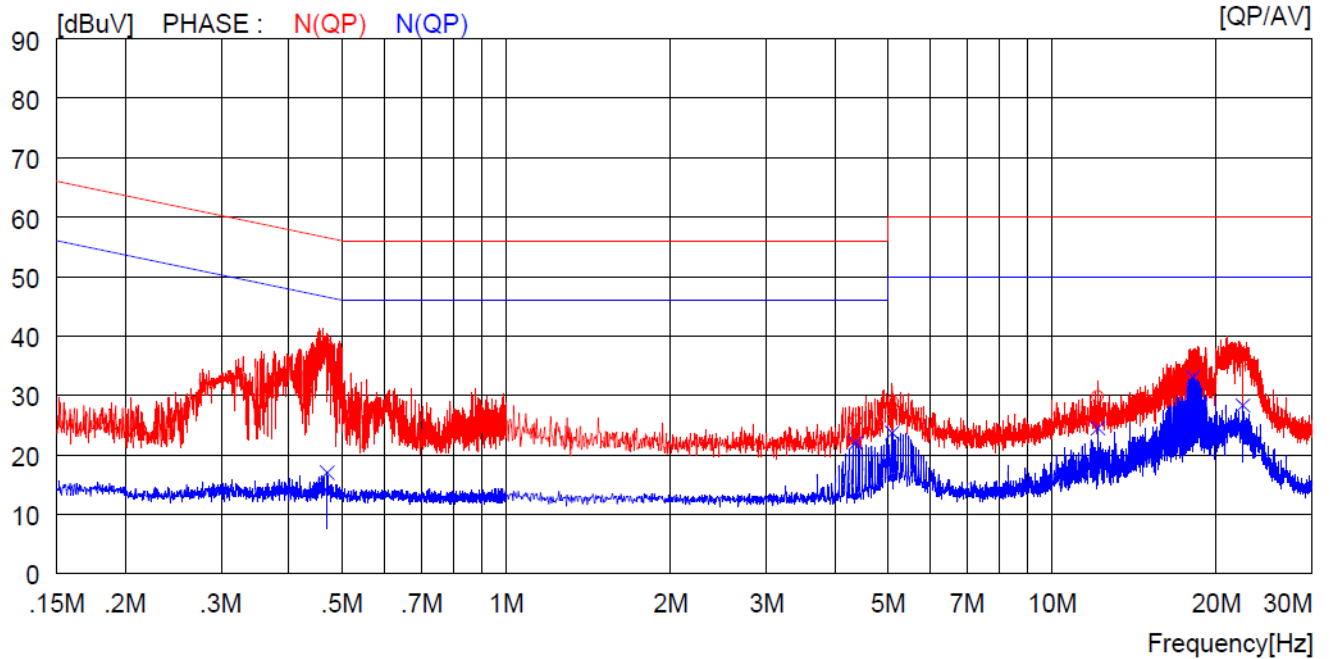
-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT 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	0.47200	19.8	----	10.0	29.8	----	56.5	----	26.7	----	H (QP)
2	4.30800	14.2	----	10.1	24.3	----	56.0	----	31.7	----	H (QP)
3	6.49500	22.2	----	10.2	32.4	----	60.0	----	27.6	----	H (QP)
4	10.98000	20.0	----	10.4	30.4	----	60.0	----	29.6	----	H (QP)
5	18.09000	25.7	----	10.6	36.3	----	60.0	----	23.7	----	H (QP)
6	22.37000	24.9	----	10.7	35.6	----	60.0	----	24.4	----	H (QP)
7	0.47200	----	5.6	10.0	----	15.6	----	46.5	----	30.9	H (CAV)
8	4.30800	----	11.4	10.1	----	21.5	----	46.0	----	24.5	H (CAV)
9	6.49500	----	15.1	10.2	----	25.3	----	50.0	----	24.7	H (CAV)
10	10.98000	----	17.0	10.4	----	27.4	----	50.0	----	22.6	H (CAV)
11	18.09000	----	23.9	10.6	----	34.5	----	50.0	----	15.5	H (CAV)
12	22.37000	----	17.7	10.7	----	28.4	----	50.0	----	21.6	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	0.46900	28.4	----	10.0	38.4	----	56.5	----	18.1	----	N (QP)
2	4.37200	15.6	----	10.1	25.7	----	56.0	----	30.3	----	N (QP)
3	5.10000	18.7	----	10.2	28.9	----	60.0	----	31.1	----	N (QP)
4	12.14000	19.3	----	10.5	29.8	----	60.0	----	30.2	----	N (QP)
5	18.15000	23.5	----	10.6	34.1	----	60.0	----	25.9	----	N (QP)
6	22.37000	25.1	----	10.7	35.8	----	60.0	----	24.2	----	N (QP)
7	0.46900	----	7.0	10.0	----	17.0	----	46.5	----	29.5	N (CAV)
8	4.37200	----	11.9	10.1	----	22.0	----	46.0	----	24.0	N (CAV)
9	5.10000	----	13.5	10.2	----	23.7	----	50.0	----	26.3	N (CAV)
10	12.14000	----	14.0	10.5	----	24.5	----	50.0	----	25.5	N (CAV)
11	18.15000	----	22.4	10.6	----	33.0	----	50.0	----	17.0	N (CAV)
12	22.37000	----	17.6	10.7	----	28.3	----	50.0	----	21.7	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: Hyung-Kwon, Oh / Assistant Manager