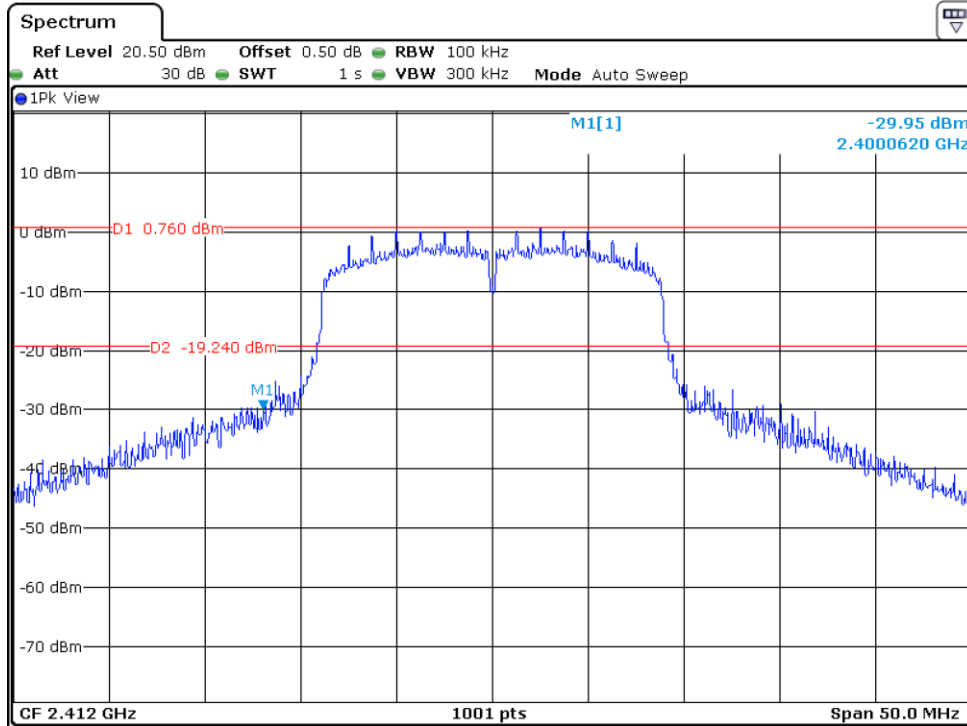
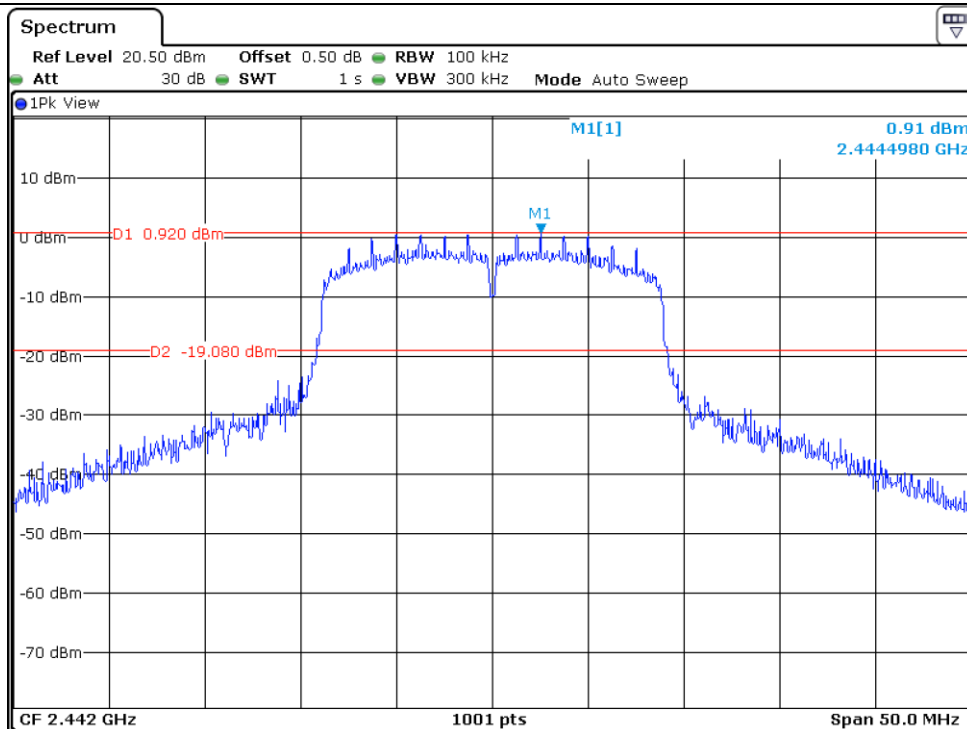


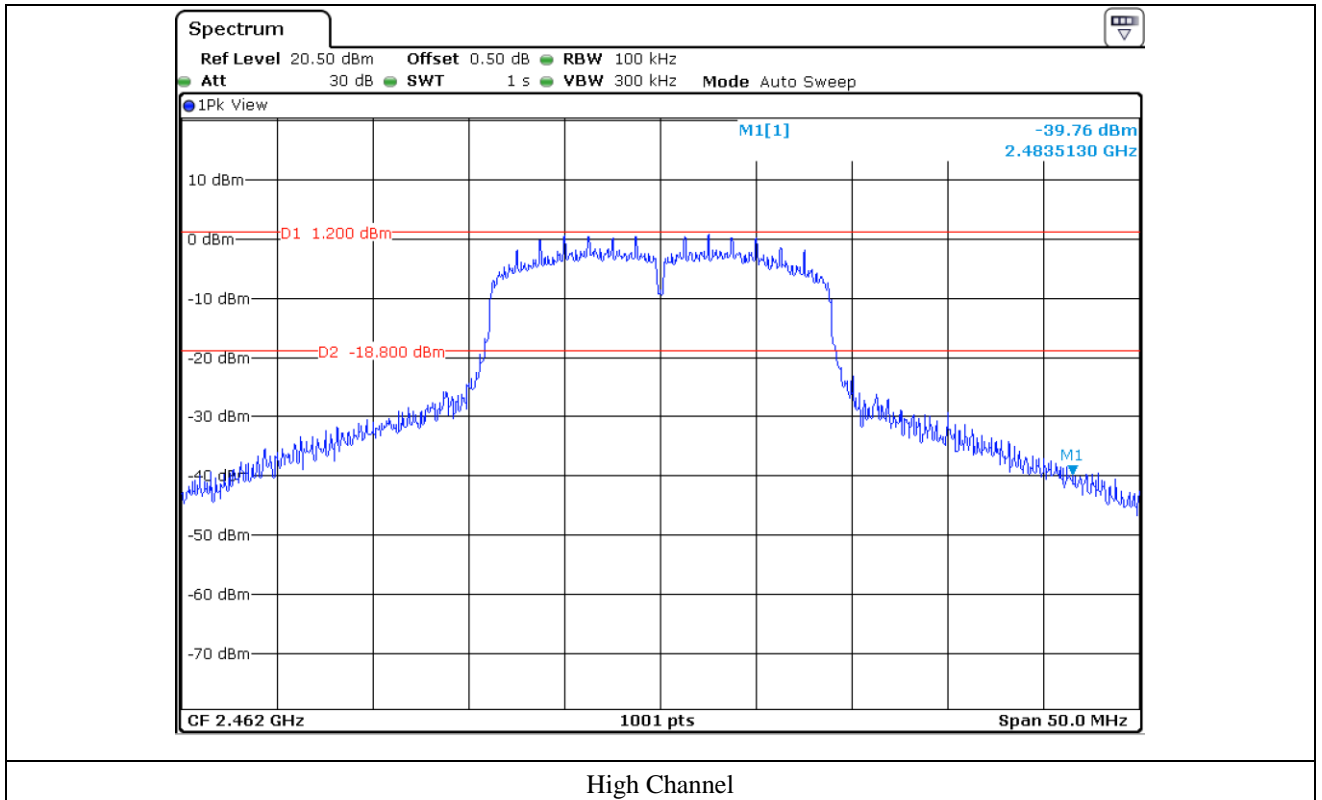
9.5.2.2.3 Test data for 802.11n_HT20 WLAN Mode

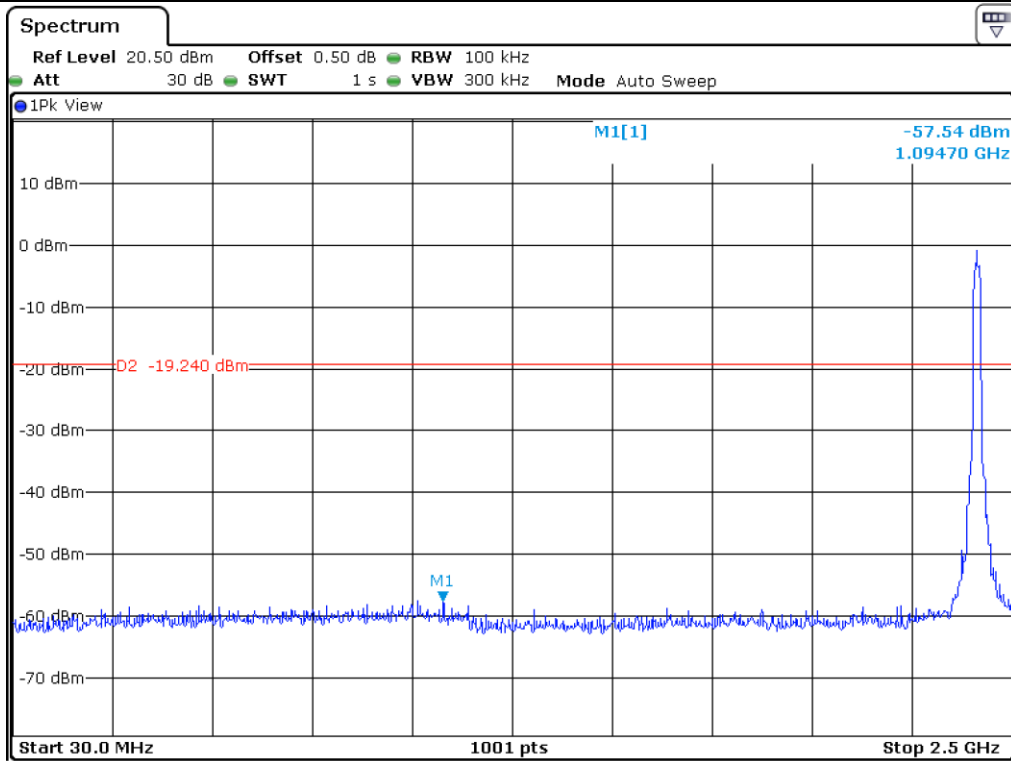


Low Channel

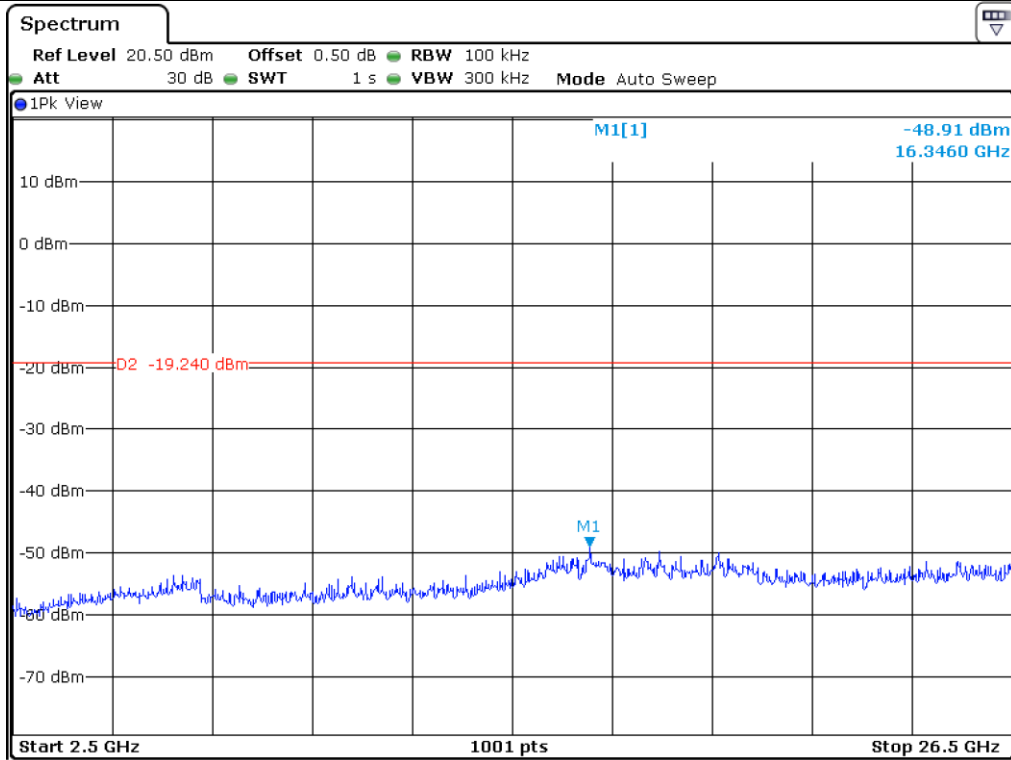


Middle Channel

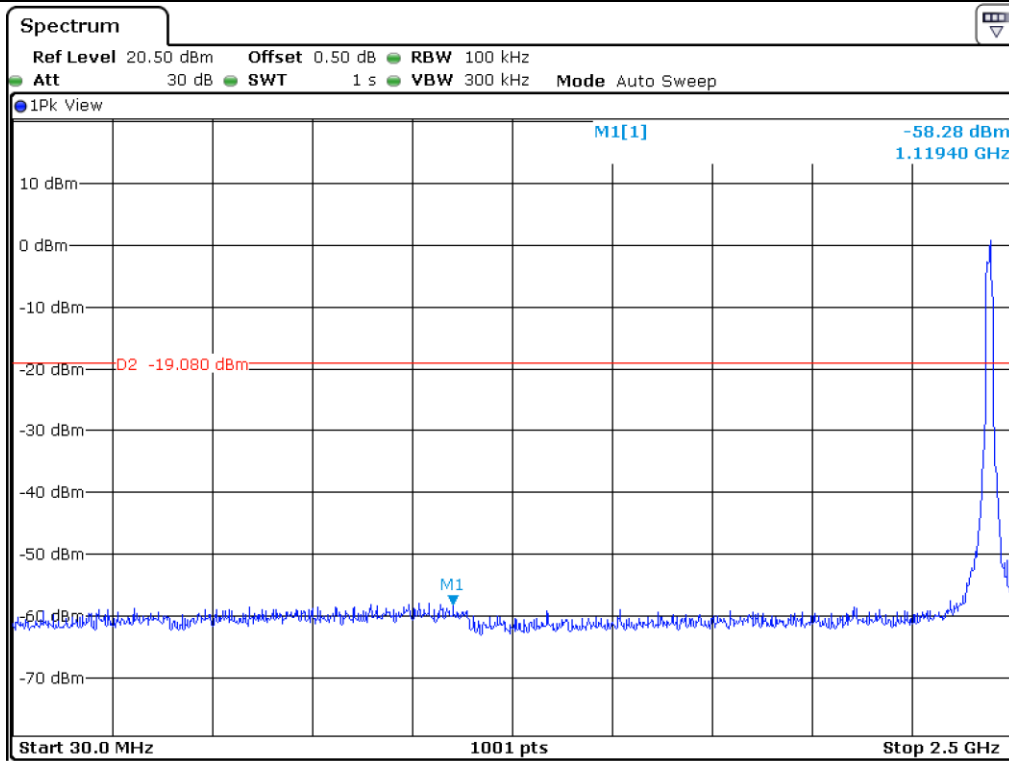




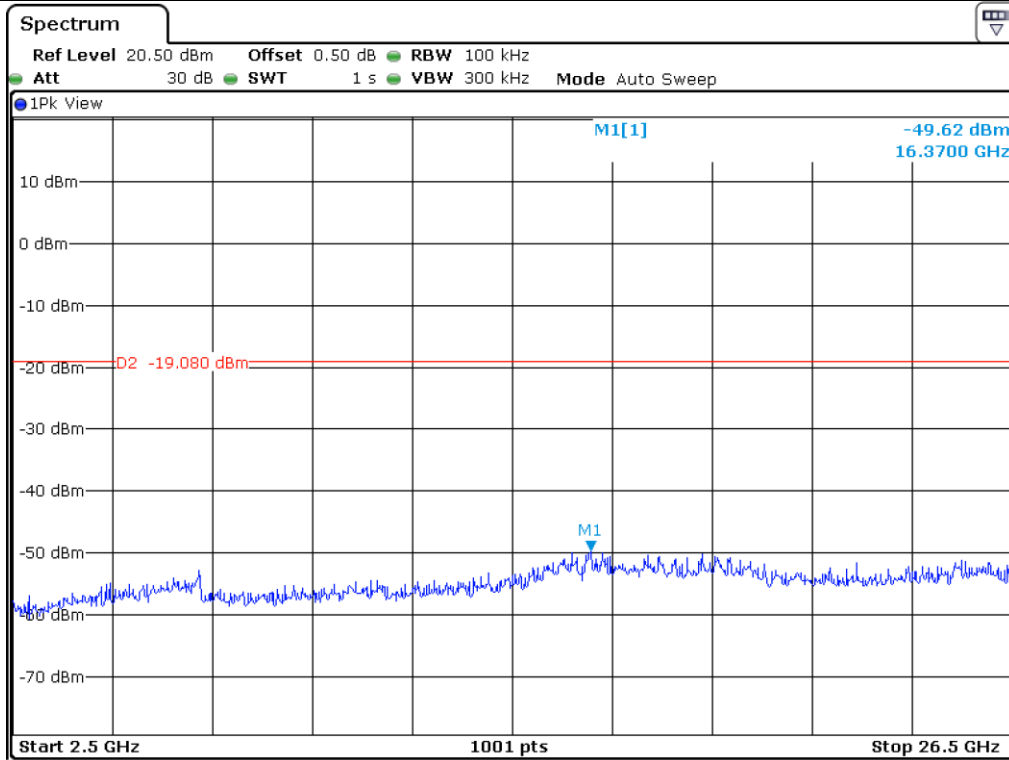
Low Channel



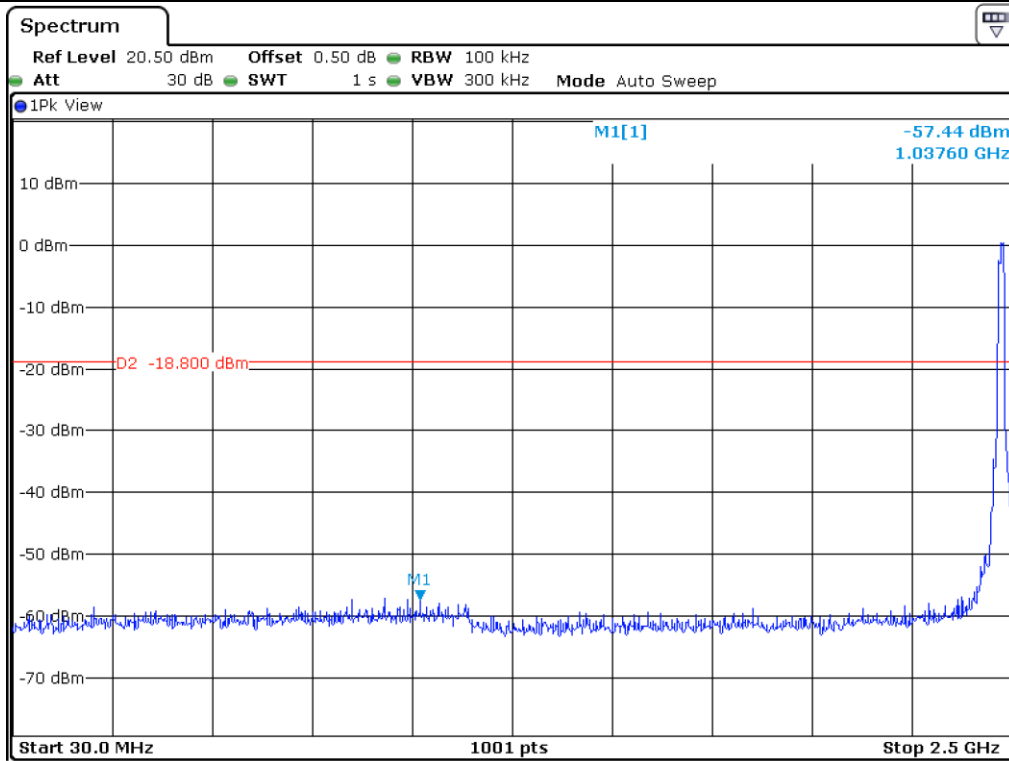
Low Channel



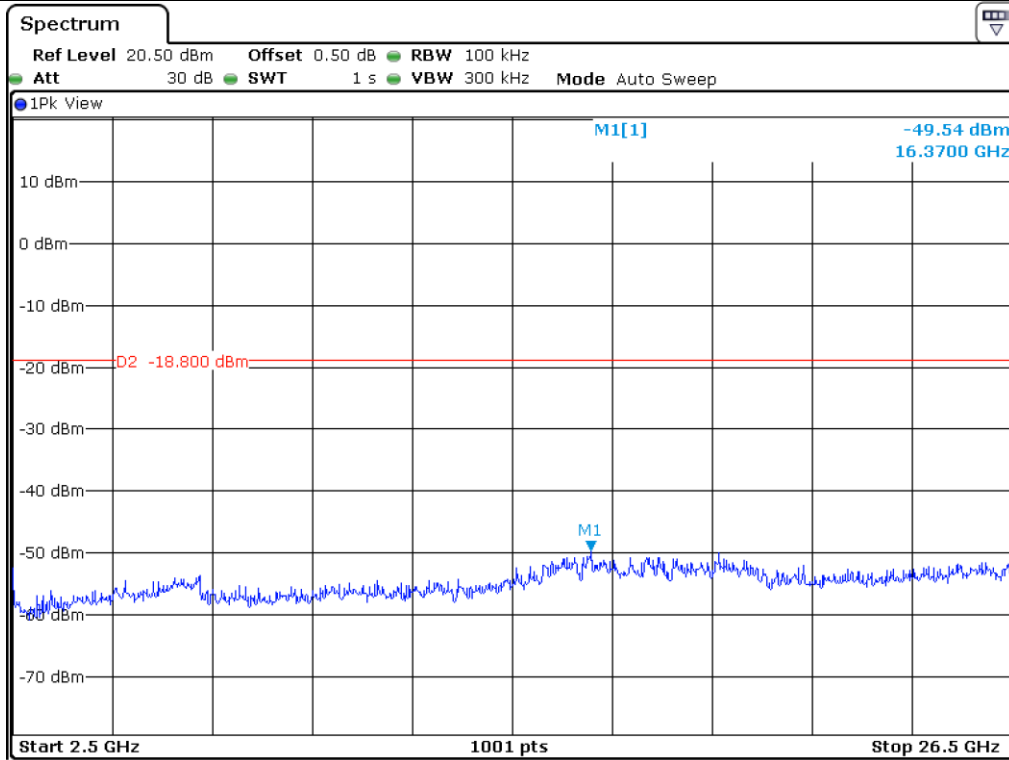
Middle Channel



Middle Channel



High Channel



High Channel

9.6 Test data for radiated emission

9.6.1 Radiated Emission which fall in the Restricted Band

9.6.1.1 Test data for AC 12 V

9.6.1.1.1 Test data for Antenna 0

9.6.1.1.1.1 Test data for 802.11b WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	50.14	Peak	H	27.10	7.50	43.00	41.74	74.00	32.26
	41.34	Average	H				32.94	54.00	21.06
	45.38	Peak	V				36.98	74.00	37.02
	37.70	Average	V				29.30	54.00	24.70
Test Data for Low Channel									
2 400.00	61.34	Peak	H	27.10	7.50	43.00	52.94	74.00	21.06
	56.78	Average	H				48.38	54.00	5.62
	45.45	Peak	V				37.05	74.00	36.95
	37.85	Average	V				29.45	54.00	24.55
Test Data for High Channel									
2 483.50	50.25	Peak	H	27.10	7.50	43.00	41.85	74.00	32.15
	41.78	Average	H				33.38	54.00	20.62
	47.49	Peak	V				39.09	74.00	34.91
	39.74	Average	V				31.34	54.00	22.66

Tabulated test data for Restricted Band

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

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

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.1.1.2 Test data for 802.11g WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	66.87	Peak	H	27.10	7.50	43.00	58.47	74.00	15.53
	50.32	Average	H				41.92	54.00	12.08
	53.25	Peak	V				44.85	74.00	29.15
	45.22	Average	V				36.82	54.00	17.18
Test Data for Low Channel									
2 400.00	71.37	Peak	H	27.10	7.50	43.00	62.97	74.00	11.03
	58.74	Average	H				50.34	54.00	3.66
	61.26	Peak	V				52.86	74.00	21.14
	52.11	Average	V				43.71	54.00	10.29
Test Data for High Channel									
2 483.50	67.62	Peak	H	27.10	7.50	43.00	59.22	74.00	14.78
	58.74	Average	H				50.34	54.00	3.66
	57.31	Peak	V				48.91	74.00	25.09
	48.41	Average	V				40.01	54.00	13.99

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.1.1.3 Test data for 802.11n_HT20 WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	63.84	Peak	H	27.10	7.50	43.00	55.44	74.00	18.56
	55.15	Average	H				46.75	54.00	7.25
	51.64	Peak	V				43.24	74.00	30.76
	42.15	Average	V				33.75	54.00	20.25
Test Data for Low Channel									
2 400.00	70.68	Peak	H	27.10	7.50	43.00	62.28	74.00	11.72
	59.24	Average	H				50.84	54.00	3.16
	61.61	Peak	V				53.21	74.00	20.79
	52.48	Average	V				44.08	54.00	9.92
Test Data for High Channel									
2 483.50	68.32	Peak	H	27.10	7.50	43.00	59.92	74.00	14.08
	58.67	Average	H				50.27	54.00	3.73
	57.56	Peak	V				49.16	74.00	24.84
	41.48	Average	V				33.08	54.00	20.92

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.1.2 Test data for Antenna 1

9.6.1.1.2.1 Test data for 802.11b WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	50.06	Peak	H	27.10	7.50	43.00	41.66	74.00	32.34
	40.86	Average	H				32.46	54.00	21.54
	46.15	Peak	V				37.75	74.00	36.25
	38.94	Average	V				30.54	54.00	23.46
Test Data for Low Channel									
2 400.00	60.26	Peak	H	27.10	7.50	43.00	51.86	74.00	22.14
	55.86	Average	H				47.46	54.00	6.54
	46.21	Peak	V				37.81	74.00	36.19
	38.94	Average	V				30.54	54.00	23.46
Test Data for High Channel									
2 483.50	50.64	Peak	H	27.10	7.50	43.00	42.24	74.00	31.76
	42.26	Average	H				33.86	54.00	20.14
	47.39	Peak	V				38.99	74.00	35.01
	39.44	Average	V				31.04	54.00	22.96

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.1.2.2 Test data for 802.11g WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	65.94	Peak	H	27.10	7.50	43.00	57.54	74.00	16.46
	50.08	Average	H				41.68	54.00	12.32
	52.99	Peak	V				44.59	74.00	29.41
	45.31	Average	V				36.91	54.00	17.09
Test Data for Low Channel									
2 400.00	70.94	Peak	H	27.10	7.50	43.00	62.54	74.00	11.46
	58.31	Average	H				49.91	54.00	4.09
	61.22	Peak	V				52.82	74.00	21.18
	52.09	Average	V				43.69	54.00	10.31
Test Data for High Channel									
2 483.50	67.55	Peak	H	27.10	7.50	43.00	59.15	74.00	14.85
	58.37	Average	H				49.97	54.00	4.03
	57.87	Peak	V				49.47	74.00	24.53
	48.30	Average	V				39.90	54.00	14.10

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.1.2.3 Test data for 802.11n_HT20 WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	63.27	Peak	H	27.10	7.50	43.00	54.87	74.00	19.13
	54.61	Average	H				46.21	54.00	7.79
	52.09	Peak	V				43.69	74.00	30.31
	42.60	Average	V				34.20	54.00	19.80
Test Data for Low Channel									
2 400.00	69.88	Peak	H	27.10	7.50	43.00	61.48	74.00	12.52
	58.74	Average	H				50.34	54.00	3.66
	61.20	Peak	V				52.80	74.00	21.20
	51.88	Average	V				43.48	54.00	10.52
Test Data for High Channel									
2 483.50	67.59	Peak	H	27.10	7.50	43.00	59.19	74.00	14.81
	58.03	Average	H				49.63	54.00	4.37
	58.11	Peak	V				49.71	74.00	24.29
	50.94	Average	V				42.54	54.00	11.46

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.1.3 Test data for Multiple Antenna

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	64.31	Peak	H	27.10	7.50	43.00	55.91	74.00	18.09
	55.67	Average	H				47.27	54.00	6.73
	53.14	Peak	V				44.74	74.00	29.26
	42.94	Average	V				34.54	54.00	19.46
Test Data for Low Channel									
2 400.00	70.68	Peak	H	27.10	7.50	43.00	62.28	74.00	11.72
	59.26	Average	H				50.86	54.00	3.14
	62.09	Peak	V				53.69	74.00	20.31
	51.39	Average	V				42.99	54.00	11.01
Test Data for High Channel									
2 483.50	68.42	Peak	H	27.10	7.50	43.00	60.02	74.00	13.98
	59.30	Average	H				50.90	54.00	3.10
	58.21	Peak	V				49.81	74.00	24.19
	51.03	Average	V				42.63	54.00	11.37

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.2 Test data for AC 24 V

9.6.1.2.1 Test data for Antenna 0

9.6.1.2.1.1 Test data for 802.11b WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	50.09	Peak	H	27.10	7.50	43.00	41.69	74.00	32.31
	41.40	Average	H				33.00	54.00	21.00
	45.41	Peak	V				37.01	74.00	36.99
	37.22	Average	V				28.82	54.00	25.18
Test Data for Low Channel									
2 400.00	61.42	Peak	H	27.10	7.50	43.00	53.02	74.00	20.98
	56.74	Average	H				48.34	54.00	5.66
	45.52	Peak	V				37.12	74.00	36.88
	38.15	Average	V				29.75	54.00	24.25
Test Data for High Channel									
2 483.50	50.42	Peak	H	27.10	7.50	43.00	42.02	74.00	31.98
	41.84	Average	H				33.44	54.00	20.56
	47.60	Peak	V				39.20	74.00	34.80
	40.11	Average	V				31.71	54.00	22.29

Tabulated test data for Restricted Band

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

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

Total Level = Reading + Antenna Factor + Cable Loss – Pre-Amplifier Gain



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.2.1.2 Test data for 802.11g WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	66.90	Peak	H	27.10	7.50	43.00	58.50	74.00	15.50
	50.72	Average	H				42.32	54.00	11.68
	52.99	Peak	V				44.59	74.00	29.41
	45.36	Average	V				36.96	54.00	17.04
Test Data for Low Channel									
2 400.00	71.28	Peak	H	27.10	7.50	43.00	62.88	74.00	11.12
	58.61	Average	H				50.21	54.00	3.79
	62.23	Peak	V				53.83	74.00	20.17
	52.46	Average	V				44.06	54.00	9.94
Test Data for High Channel									
2 483.50	67.84	Peak	H	27.10	7.50	43.00	59.44	74.00	14.56
	58.71	Average	H				50.31	54.00	3.69
	57.49	Peak	V				49.09	74.00	24.91
	48.60	Average	V				40.20	54.00	13.80

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.2.1.3 Test data for 802.11n_HT20 WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	63.97	Peak	H	27.10	7.50	43.00	55.57	74.00	18.43
	55.15	Average	H				46.75	54.00	7.25
	52.76	Peak	V				44.36	74.00	29.64
	43.09	Average	V				34.69	54.00	19.31
Test Data for Low Channel									
2 400.00	70.85	Peak	H	27.10	7.50	43.00	62.45	74.00	11.55
	59.30	Average	H				50.90	54.00	3.10
	61.78	Peak	V				53.38	74.00	20.62
	52.77	Average	V				44.37	54.00	9.63
Test Data for High Channel									
2 483.50	68.19	Peak	H	27.10	7.50	43.00	59.79	74.00	14.21
	58.64	Average	H				50.24	54.00	3.76
	57.80	Peak	V				49.40	74.00	24.60
	41.62	Average	V				33.22	54.00	20.78

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.2.2 Test data for Antenna 1

9.6.1.2.2.1 Test data for 802.11b WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	50.90	Peak	H	27.10	7.50	43.00	42.50	74.00	31.50
	40.91	Average	H				32.51	54.00	21.49
	46.84	Peak	V				38.44	74.00	35.56
	38.74	Average	V				30.34	54.00	23.66
Test Data for Low Channel									
2 400.00	60.44	Peak	H	27.10	7.50	43.00	52.04	74.00	21.96
	55.91	Average	H				47.51	54.00	6.49
	46.29	Peak	V				37.89	74.00	36.11
	38.84	Average	V				30.44	54.00	23.56
Test Data for High Channel									
2 483.50	50.62	Peak	H	27.10	7.50	43.00	42.22	74.00	31.78
	42.39	Average	H				33.99	54.00	20.01
	47.49	Peak	V				39.09	74.00	34.91
	39.62	Average	V				31.22	54.00	22.78

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.2.2.2 Test data for 802.11g WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	65.77	Peak	H	27.10	7.50	43.00	57.37	74.00	16.63
	49.68	Average	H				41.28	54.00	12.72
	52.84	Peak	V				44.44	74.00	29.56
	45.29	Average	V				36.89	54.00	17.11
Test Data for Low Channel									
2 400.00	70.68	Peak	H	27.10	7.50	43.00	62.28	74.00	11.72
	58.39	Average	H				49.99	54.00	4.01
	61.77	Peak	V				53.37	74.00	20.63
	52.69	Average	V				44.29	54.00	9.71
Test Data for High Channel									
2 483.50	67.84	Peak	H	27.10	7.50	43.00	59.44	74.00	14.56
	58.69	Average	H				50.29	54.00	3.71
	58.03	Peak	V				49.63	74.00	24.37
	48.64	Average	V				40.24	54.00	13.76

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.2.2.3 Test data for 802.11n_HT20 WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	63.38	Peak	H	27.10	7.50	43.00	54.98	74.00	19.02
	54.74	Average	H				46.34	54.00	7.66
	52.23	Peak	V				43.83	74.00	30.17
	42.31	Average	V				33.91	54.00	20.09
Test Data for Low Channel									
2 400.00	69.71	Peak	H	27.10	7.50	43.00	61.31	74.00	12.69
	58.34	Average	H				49.94	54.00	4.06
	61.61	Peak	V				53.21	74.00	20.79
	51.70	Average	V				43.30	54.00	10.70
Test Data for High Channel									
2 483.50	67.23	Peak	H	27.10	7.50	43.00	58.83	74.00	15.17
	58.36	Average	H				49.96	54.00	4.04
	58.22	Peak	V				49.82	74.00	24.18
	50.39	Average	V				41.99	54.00	12.01

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.1.2.3 Test data for Multiple Antenna

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 30 MHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	64.49	Peak	H	27.10	7.50	43.00	56.09	74.00	17.91
	55.86	Average	H				47.46	54.00	6.54
	53.36	Peak	V				44.96	74.00	29.04
	42.68	Average	V				34.28	54.00	19.72
Test Data for Low Channel									
2 400.00	70.61	Peak	H	27.10	7.50	43.00	62.21	74.00	11.79
	59.26	Average	H				50.86	54.00	3.14
	62.33	Peak	V				53.93	74.00	20.07
	51.41	Average	V				43.01	54.00	10.99
Test Data for High Channel									
2 483.50	68.50	Peak	H	27.10	7.50	43.00	60.10	74.00	13.90
	59.17	Average	H				50.77	54.00	3.23
	59.74	Peak	V				51.34	74.00	22.66
	51.34	Average	V				42.94	54.00	11.06

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2 Spurious & Harmonic Radiated Emission

9.6.2.1 Test data for AC 12 V

9.6.2.1.1 Test data for Antenna 0

9.6.2.1.1.1 Test data for 802.11b WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4824.00	59.33	Peak	H	30.60	11.10	42.50	58.53	73.98	15.45
	48.66	Average	H				47.86	53.98	6.12
	44.38	Peak	V				43.58	73.98	30.40
	36.38	Average	V				35.58	53.98	18.40
Test Data for Middle Channel									
4 882.00	58.57	Peak	H	30.70	11.20	42.50	57.97	73.98	16.01
	49.44	Average	H				48.84	53.98	5.14
	45.75	Peak	V				45.15	73.98	28.83
	36.69	Average	V				36.09	53.98	17.89
Test Data for High Channel									
4 960.00	59.13	Peak	H	30.80	11.30	42.50	58.73	73.98	15.25
	50.59	Average	H				50.19	53.98	3.79
	45.32	Peak	V				44.92	73.98	29.06
	36.69	Average	V				36.29	53.98	17.69

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.1.1.2 Test data for 802.11g WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	52.35	Peak	H	30.60	11.10	42.50	51.55	73.98	22.43
	43.89	Average	H				43.09	53.98	10.89
	44.27	Peak	V				43.47	73.98	30.51
	36.97	Average	V				36.17	53.98	17.81
Test Data for Middle Channel									
4 882.00	51.07	Peak	H	30.70	11.20	42.50	50.47	73.98	23.51
	42.59	Average	H				41.99	53.98	11.99
	43.93	Peak	V				43.33	73.98	30.65
	37.63	Average	V				37.03	53.98	16.95
Test Data for High Channel									
4 960.00	51.26	Peak	H	30.80	11.30	42.50	50.86	73.98	23.12
	41.76	Average	H				41.36	53.98	12.62
	44.85	Peak	V				44.45	73.98	29.53
	37.63	Average	V				37.23	53.98	16.75

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.1.1.3 Test data for 802.11n_HT20 WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	51.75	Peak	H	30.60	11.10	42.50	50.95	73.98	23.03
	41.96	Average	H				41.16	53.98	12.82
	45.40	Peak	V				44.60	73.98	29.38
	37.49	Average	V				36.69	53.98	17.29
Test Data for Middle Channel									
4 882.00	51.06	Peak	H	30.70	11.20	42.50	50.46	73.98	23.52
	42.18	Average	H				41.58	53.98	12.40
	44.29	Peak	V				43.69	73.98	30.29
	37.62	Average	V				37.02	53.98	16.96
Test Data for High Channel									
4 960.00	51.68	Peak	H	30.80	11.30	42.50	51.28	73.98	22.70
	43.35	Average	H				42.95	53.98	11.03
	45.68	Peak	V				45.28	73.98	28.70
	37.62	Average	V				37.22	53.98	16.76

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.1.2 Test data for Antenna 1

9.6.2.1.2.1 Test data for 802.11b WLAN Mode

- . Test Date : May 03, 2016
- . Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	58.29	Peak	H	30.60	11.10	42.50	57.49	73.98	16.49
	49.30	Average	H				48.50	53.98	5.48
	45.82	Peak	V				45.02	73.98	28.96
	37.04	Average	V				36.24	53.98	17.74
Test Data for Middle Channel									
4 882.00	58.15	Peak	H	30.70	11.20	42.50	57.55	73.98	16.43
	49.86	Average	H				49.26	53.98	4.72
	45.56	Peak	V				44.96	73.98	29.02
	36.78	Average	V				36.18	53.98	17.80
Test Data for High Channel									
4 960.00	60.18	Peak	H	30.80	11.30	42.50	59.78	73.98	14.20
	50.47	Average	H				50.07	53.98	3.91
	44.37	Peak	V				43.97	73.98	30.01
	36.78	Average	V				36.38	53.98	17.60

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.1.2.2 Test data for 802.11g WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	52.29	Peak	H	30.60	11.10	42.50	51.49	73.98	22.49
	43.32	Average	H				42.52	53.98	11.46
	45.12	Peak	V				44.32	73.98	29.66
	37.66	Average	V				36.86	53.98	17.12
Test Data for Middle Channel									
4 882.00	50.96	Peak	H	30.70	11.20	42.50	50.36	73.98	23.62
	41.90	Average	H				41.30	53.98	12.68
	45.06	Peak	V				44.46	73.98	29.52
	37.68	Average	V				37.08	53.98	16.90
Test Data for High Channel									
4 960.00	51.64	Peak	H	30.80	11.30	42.50	51.24	73.98	22.74
	42.56	Average	H				42.16	53.98	11.82
	45.89	Peak	V				45.49	73.98	28.49
	37.68	Average	V				37.28	53.98	16.70

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.1.2.3 Test data for 802.11n_HT20 WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	51.73	Peak	H	30.60	11.10	42.50	50.93	73.98	34.28
	43.06	Average	H				42.26	53.98	23.52
	44.92	Peak	V				44.12	73.98	32.74
	37.52	Average	V				36.72	53.98	23.01
Test Data for Middle Channel									
4 882.00	52.33	Peak	H	30.70	11.20	42.50	51.73	73.98	33.32
	42.81	Average	H				42.21	53.98	23.02
	44.52	Peak	V				43.92	73.98	33.61
	38.21	Average	V				37.61	53.98	22.55
Test Data for High Channel									
4 960.00	50.97	Peak	H	30.80	11.30	42.50	50.57	73.98	33.50
	41.90	Average	H				41.50	53.98	23.02
	44.52	Peak	V				44.12	73.98	33.12
	38.21	Average	V				37.81	53.98	22.61

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.1.3 Test data for Multiple Antenna

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	50.89	Peak	H	30.60	11.10	42.50	50.09	73.98	33.81
	43.43	Average	H				42.63	53.98	23.01
	45.23	Peak	V				44.43	73.98	32.42
	37.88	Average	V				37.08	53.98	22.66
Test Data for Middle Channel									
4 882.00	51.25	Peak	H	30.70	11.20	42.50	50.65	73.98	33.02
	43.44	Average	H				42.84	53.98	22.79
	44.98	Peak	V				44.38	73.98	33.33
	37.97	Average	V				37.37	53.98	22.10
Test Data for High Channel									
4 960.00	51.43	Peak	H	30.80	11.30	42.50	51.03	73.98	33.33
	43.14	Average	H				42.74	53.98	22.72
	44.69	Peak	V				44.29	73.98	32.86
	37.97	Average	V				37.57	53.98	22.41

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.2 Test data for AC 24 V

9.6.2.2.1 Test data for Antenna 0

9.6.2.2.1.1 Test data for 802.11b WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	58.71	Peak	H	30.60	11.10	42.50	57.91	73.98	16.07
	48.72	Average	H				47.92	53.98	6.06
	44.16	Peak	V				43.36	73.98	30.62
	36.70	Average	V				35.90	53.98	18.08
Test Data for Middle Channel									
4 882.00	59.04	Peak	H	30.70	11.20	42.50	58.44	73.98	15.54
	48.74	Average	H				48.14	53.98	5.84
	44.56	Peak	V				43.96	73.98	30.02
	36.65	Average	V				36.05	53.98	17.93
Test Data for High Channel									
4 960.00	59.60	Peak	H	30.80	11.30	42.50	59.20	73.98	14.78
	49.04	Average	H				48.64	53.98	5.34
	45.02	Peak	V				44.62	73.98	29.36
	36.65	Average	V				36.25	53.98	17.73

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.2.1.2 Test data for 802.11g WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	52.53	Peak	H	30.60	11.10	42.50	51.73	73.98	22.25
	43.37	Average	H				42.57	53.98	11.41
	44.06	Peak	V				43.26	73.98	30.72
	37.88	Average	V				37.08	53.98	16.90
Test Data for Middle Channel									
4 882.00	51.51	Peak	H	30.70	11.20	42.50	50.91	73.98	23.07
	43.41	Average	H				42.81	53.98	11.17
	45.44	Peak	V				44.84	73.98	29.14
	37.84	Average	V				37.24	53.98	16.74
Test Data for High Channel									
4 960.00	51.60	Peak	H	30.80	11.30	42.50	51.20	73.98	22.78
	43.17	Average	H				42.77	53.98	11.21
	44.24	Peak	V				43.84	73.98	30.14
	37.84	Average	V				37.44	53.98	16.54

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.2.1.3 Test data for 802.11n_HT20 WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	51.78	Peak	H	30.60	11.10	42.50	50.98	73.98	23.00
	43.87	Average	H				43.07	53.98	10.91
	44.66	Peak	V				43.86	73.98	30.12
	37.98	Average	V				37.18	53.98	16.80
Test Data for Middle Channel									
4 882.00	52.15	Peak	H	30.70	11.20	42.50	51.55	73.98	22.43
	41.96	Average	H				41.36	53.98	12.62
	45.60	Peak	V				45.00	73.98	28.98
	36.66	Average	V				36.06	53.98	17.92
Test Data for High Channel									
4 960.00	51.28	Peak	H	30.80	11.30	42.50	50.88	73.98	23.10
	42.47	Average	H				42.07	53.98	11.91
	44.14	Peak	V				43.74	73.98	30.24
	36.66	Average	V				36.26	53.98	17.72

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.2.2 Test data for Antenna 1

9.6.2.2.2.1 Test data for 802.11b WLAN Mode

- . Test Date : May 03, 2016
- . Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	58.64	Peak	H	30.60	11.10	42.50	57.84	73.98	16.14
	50.09	Average	H				49.29	53.98	4.69
	45.90	Peak	V				45.10	73.98	28.88
	37.58	Average	V				36.78	53.98	17.20
Test Data for Middle Channel									
4 882.00	58.06	Peak	H	30.70	11.20	42.50	57.46	73.98	16.52
	50.22	Average	H				49.62	53.98	4.36
	45.13	Peak	V				44.53	73.98	29.45
	37.48	Average	V				36.88	53.98	17.10
Test Data for High Channel									
4 960.00	58.55	Peak	H	30.80	11.30	42.50	58.15	73.98	15.83
	49.07	Average	H				48.67	53.98	5.31
	45.32	Peak	V				44.92	73.98	29.06
	37.48	Average	V				37.08	53.98	16.90

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.2.2.2 Test data for 802.11g WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	51.74	Peak	H	30.60	11.10	42.50	50.94	73.98	23.04
	42.24	Average	H				41.44	53.98	12.54
	43.83	Peak	V				43.03	73.98	30.95
	37.97	Average	V				37.17	53.98	16.81
Test Data for Middle Channel									
4 882.00	52.42	Peak	H	30.70	11.20	42.50	51.82	73.98	22.16
	42.73	Average	H				42.13	53.98	11.85
	44.88	Peak	V				44.28	73.98	29.70
	38.18	Average	V				37.58	53.98	16.40
Test Data for High Channel									
4 960.00	51.96	Peak	H	30.80	11.30	42.50	51.56	73.98	22.42
	42.80	Average	H				42.40	53.98	11.58
	44.89	Peak	V				44.49	73.98	29.49
	38.18	Average	V				37.78	53.98	16.20

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.2.2.3 Test data for 802.11n_HT20 WLAN Mode

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	51.05	Peak	H	30.60	11.10	42.50	50.25	73.98	34.28
	43.38	Average	H				42.58	53.98	23.52
	45.05	Peak	V				44.25	73.98	32.74
	37.54	Average	V				36.74	53.98	23.01
Test Data for Middle Channel									
4 882.00	51.28	Peak	H	30.70	11.20	42.50	50.68	73.98	33.32
	42.63	Average	H				42.03	53.98	23.02
	44.30	Peak	V				43.70	73.98	33.61
	36.44	Average	V				35.84	53.98	22.55
Test Data for High Channel									
4 960.00	51.05	Peak	H	30.80	11.30	42.50	50.65	73.98	33.50
	42.98	Average	H				42.58	53.98	23.02
	44.86	Peak	V				44.46	73.98	33.12
	36.44	Average	V				36.04	53.98	22.61

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

9.6.2.2.3 Test data for Multiple Antenna

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel									
4 824.00	51.36	Peak	H	30.60	11.10	42.50	50.56	73.98	33.81
	43.23	Average	H				42.43	53.98	23.01
	45.04	Peak	V				44.24	73.98	32.42
	37.81	Average	V				37.01	53.98	22.66
Test Data for Middle Channel									
4 882.00	51.78	Peak	H	30.70	11.20	42.50	51.18	73.98	33.02
	43.47	Average	H				42.87	53.98	22.79
	44.54	Peak	V				43.94	73.98	33.33
	37.35	Average	V				36.75	53.98	22.10
Test Data for High Channel									
4 960.00	51.17	Peak	H	30.80	11.30	42.50	50.77	73.98	33.33
	41.93	Average	H				41.53	53.98	22.72
	44.46	Peak	V				44.06	73.98	32.86
	37.35	Average	V				36.95	53.98	22.41

Tabulated test data for Restricted Band

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

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

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



Tested by: Tae-Ho, Kim / Senior Engineer

10. PEAK POWER SPECTRUL DENSITY

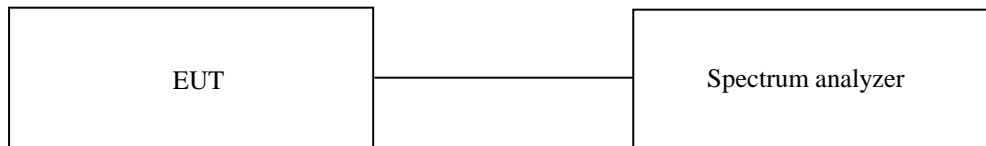
10.1 Operating environment

Temperature : 21.4 °C
 Relative humidity : 45.1 % 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	Jul. 22, 2015 (1Y)

All test equipment used is calibrated on a regular basis.

10.4 Test data for AC 12 V

10.4.1 Test data for Antenna 0

10.4.1.1 Test data for 802.11b WLAN Mode

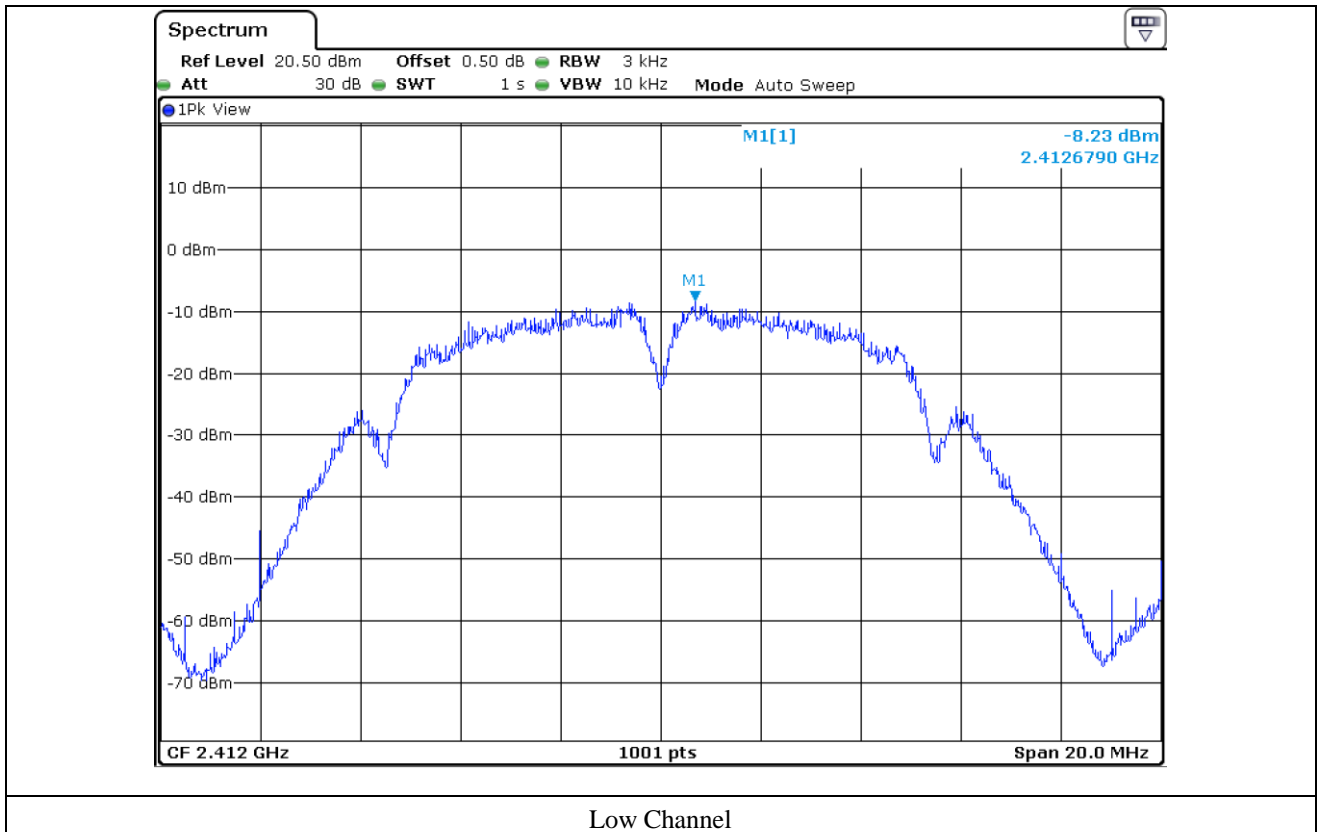
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

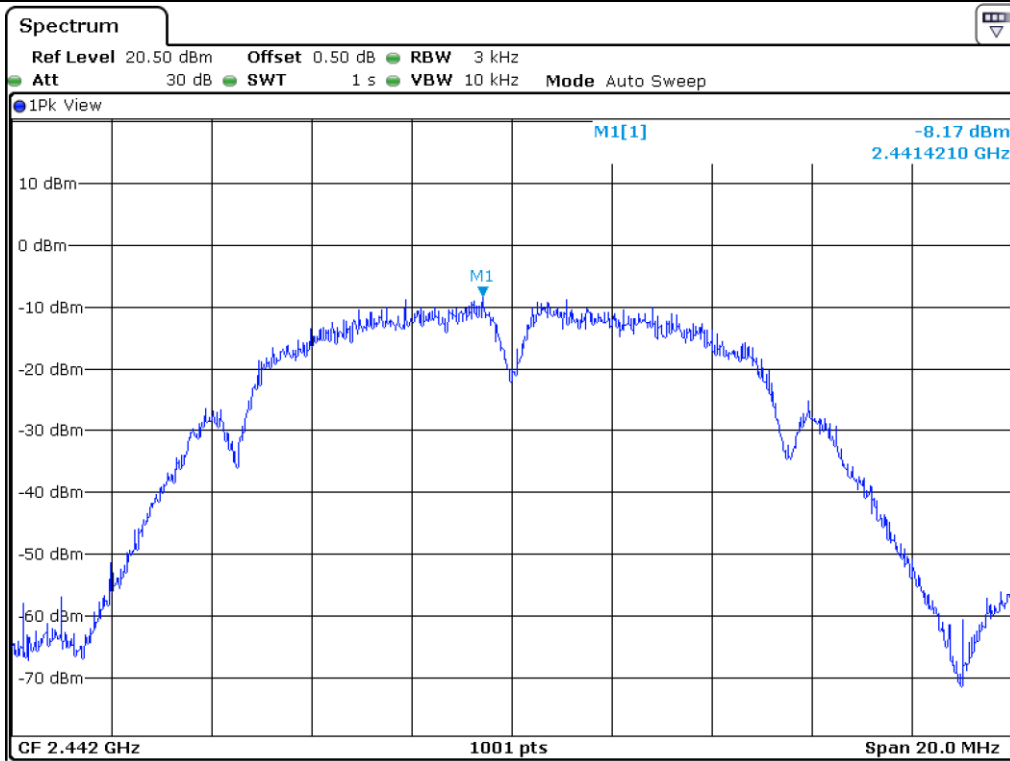
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-8.23	8.00	16.23
Middle	2 442	-8.17	8.00	16.17
High	2 462	-8.50	8.00	16.50

Remark. Margin = Limit – Measured value

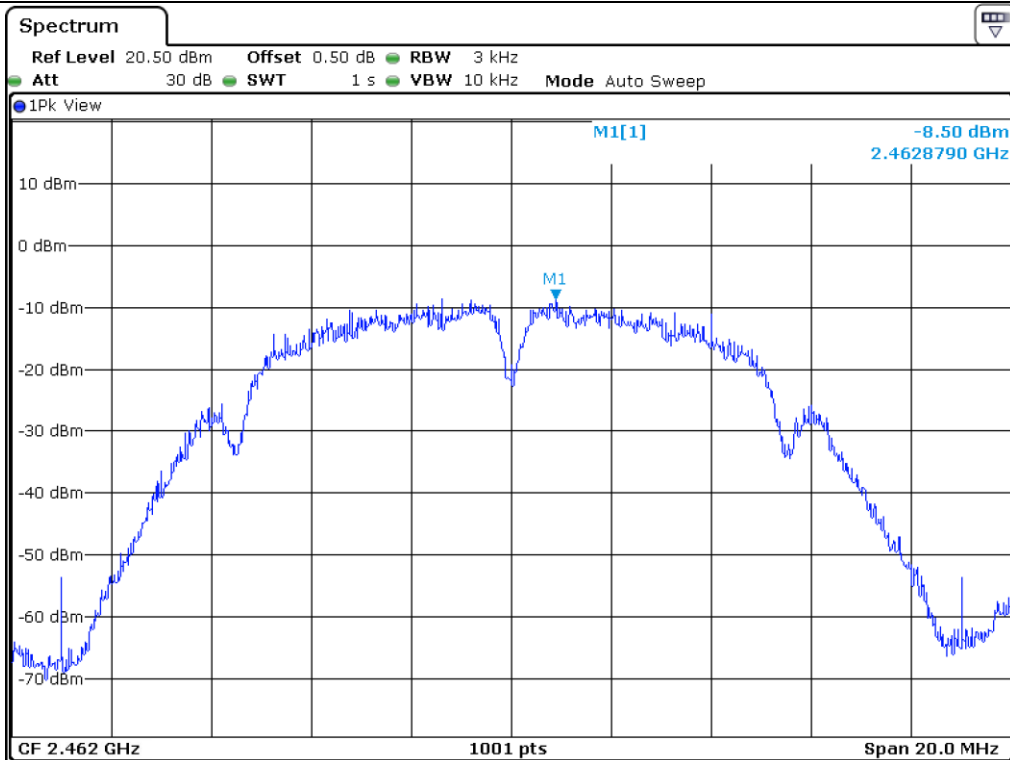


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.4.1.2 Test data for 802.11g WLAN Mode

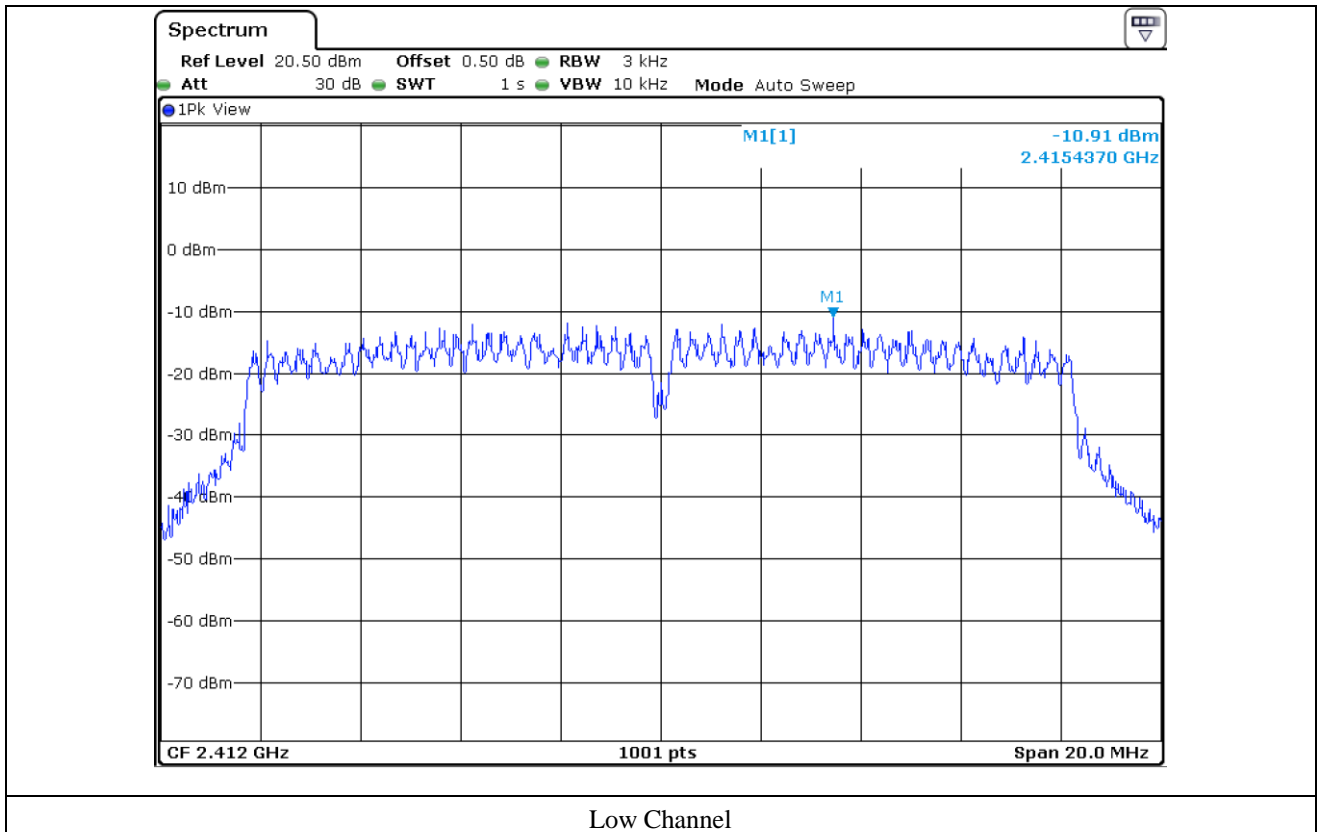
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-10.91	8.00	18.91
Middle	2 442	-12.36	8.00	20.36
High	2 462	-11.04	8.00	19.04

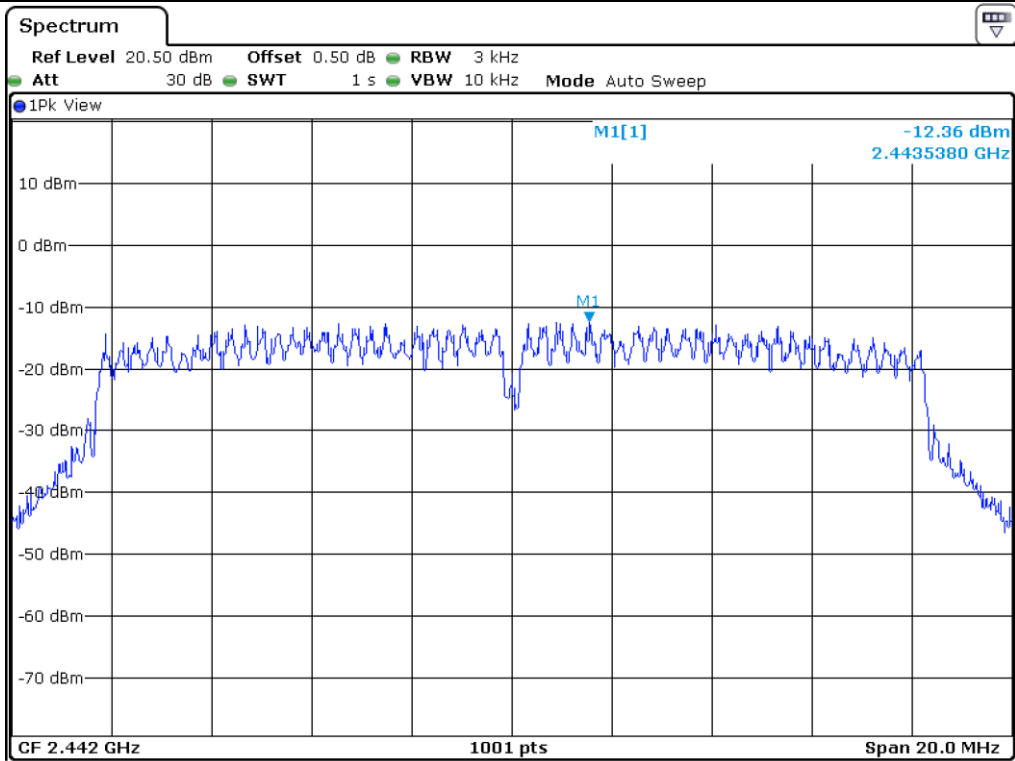
Remark. Margin = Limit – Measured value



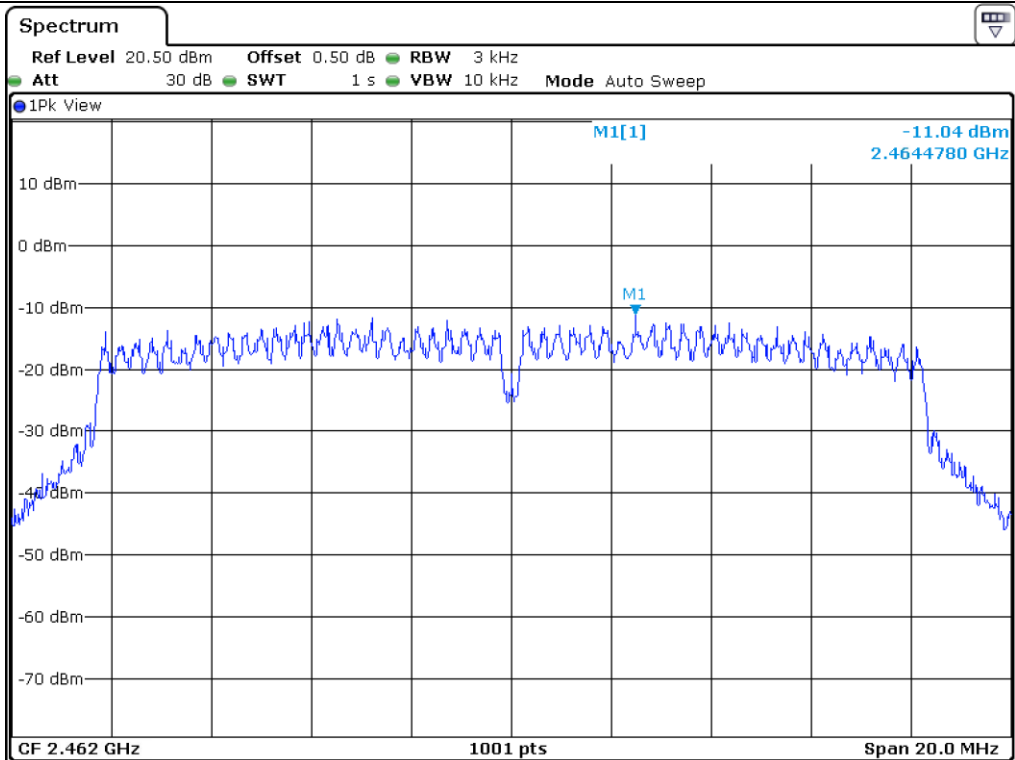
Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel



Middle Channel



High Channel

10.4.1.3 Test data for 802.11n_HT20 WLAN Mode

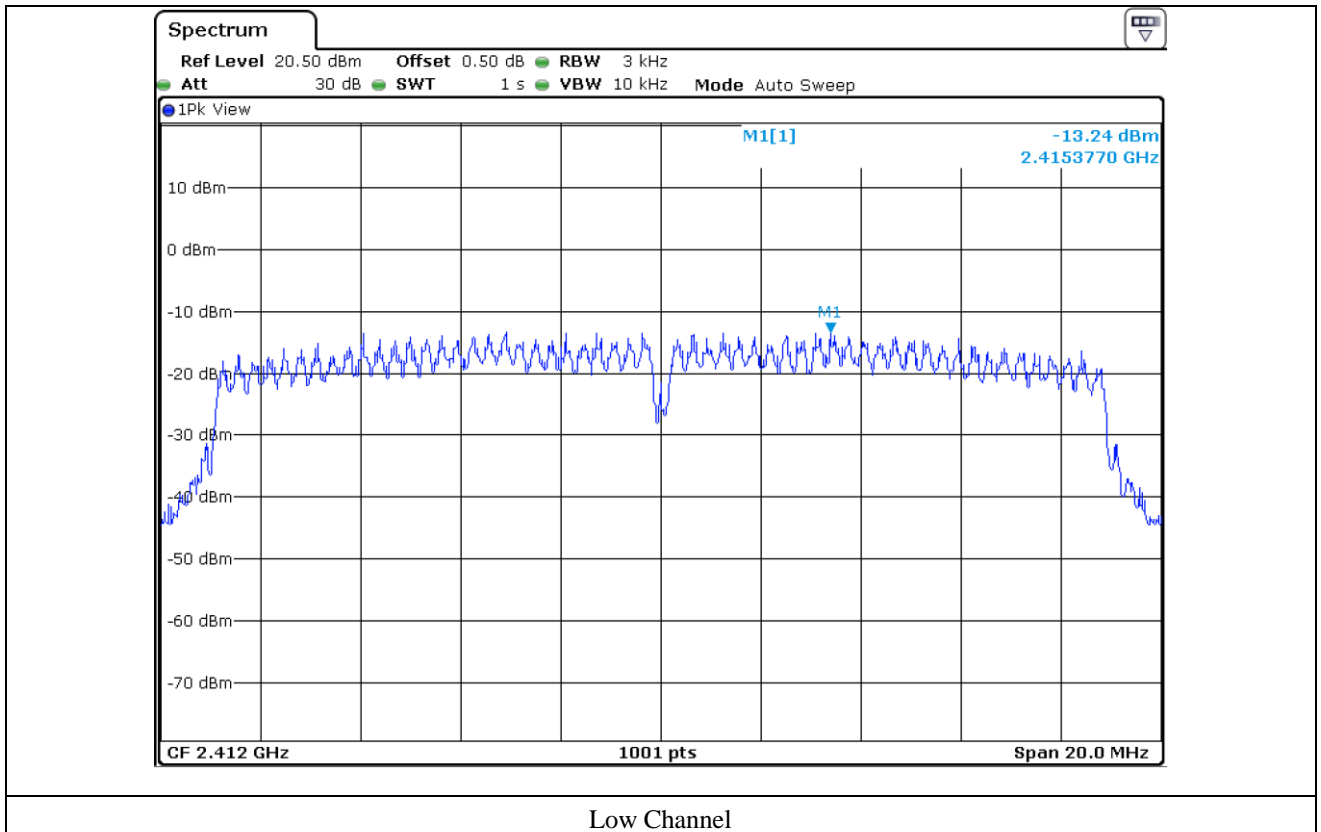
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

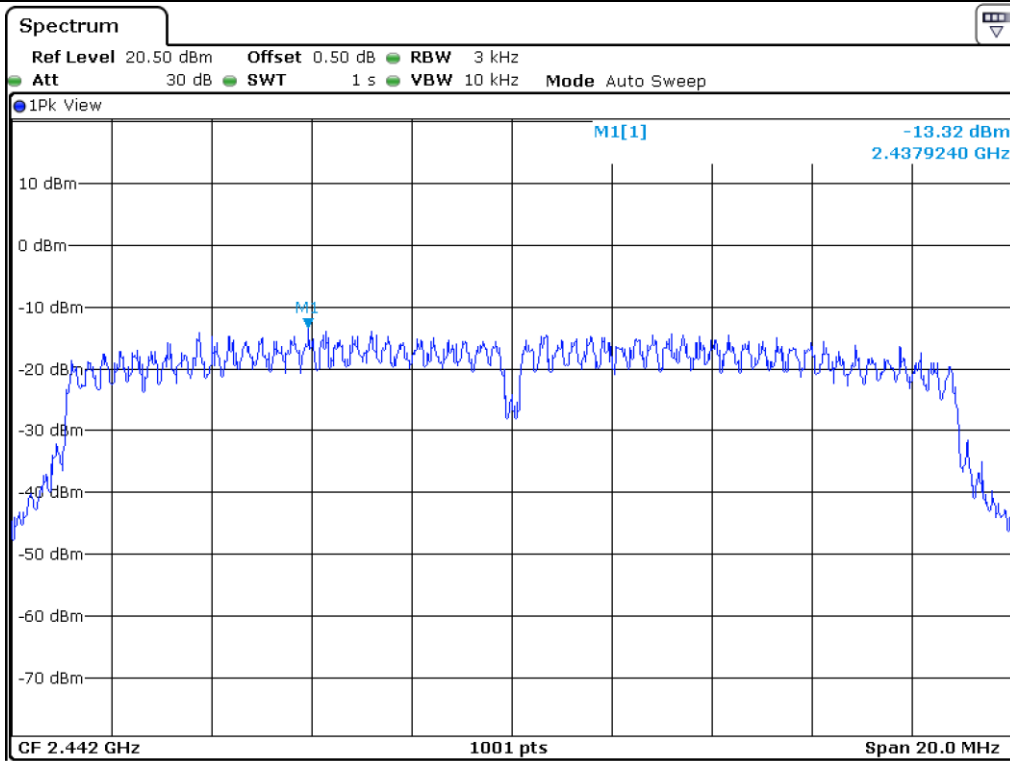
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-13.24	8.00	21.24
Middle	2 442	-13.32	8.00	21.32
High	2 462	-12.45	8.00	20.45

Remark. Margin = Limit – Measured value

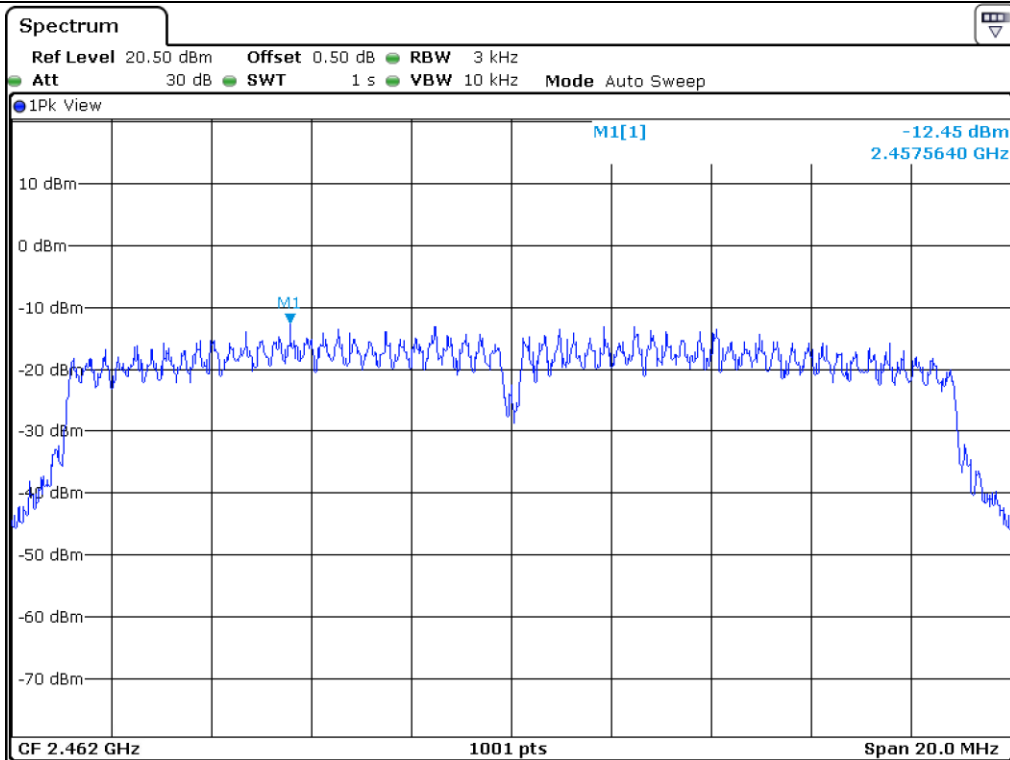


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.4.2 Test data for Antenna 1

10.4.2.1 Test data for 802.11b WLAN Mode

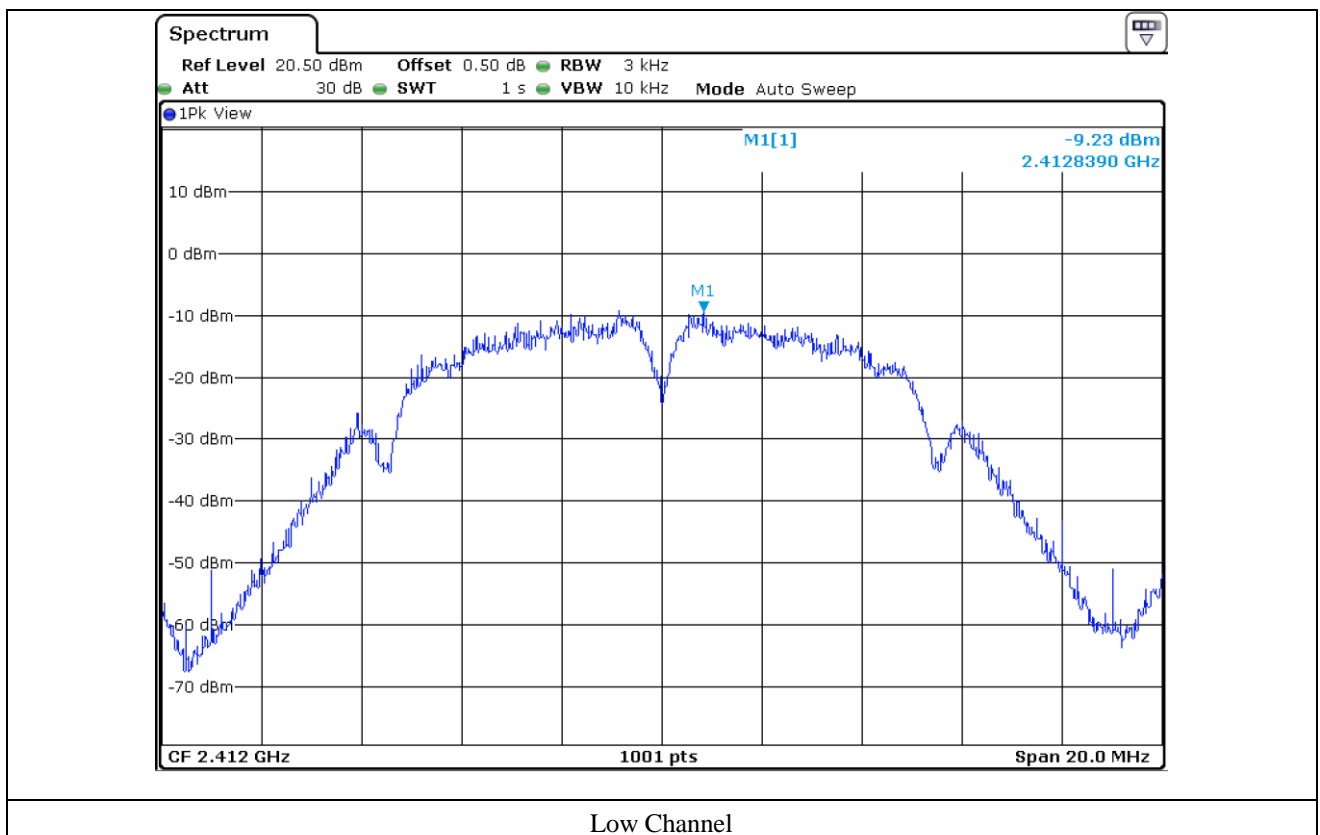
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

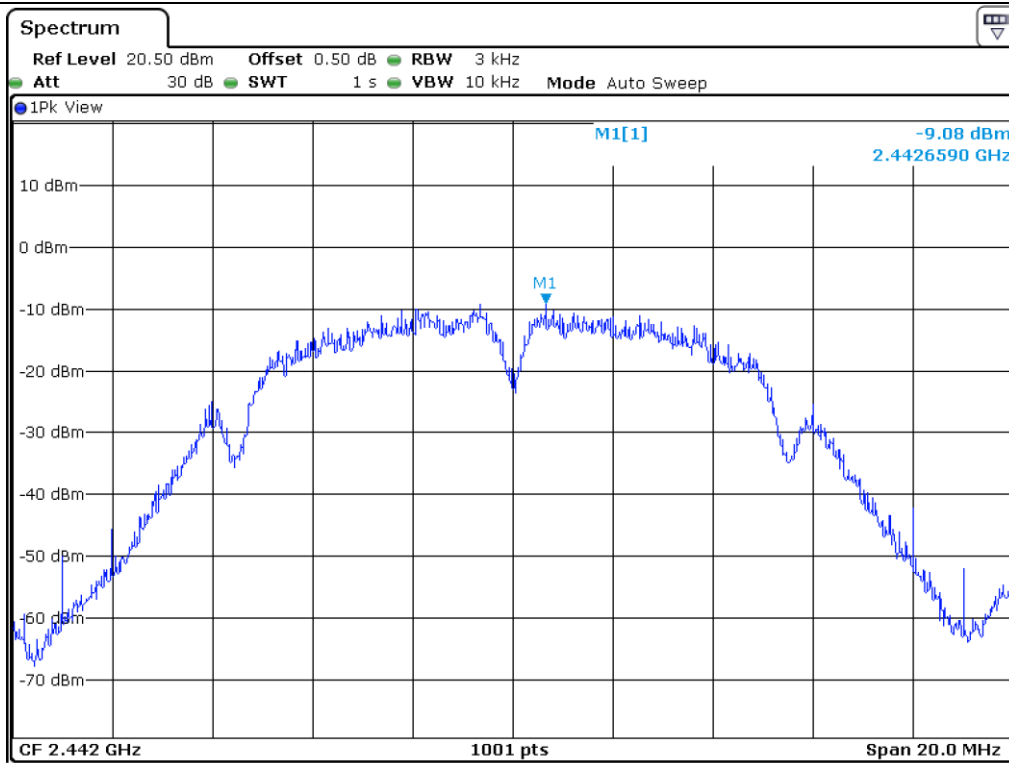
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-9.23	8.00	17.23
Middle	2 442	-9.08	8.00	17.08
High	2 462	-7.73	8.00	15.73

Remark. Margin = Limit – Measured value

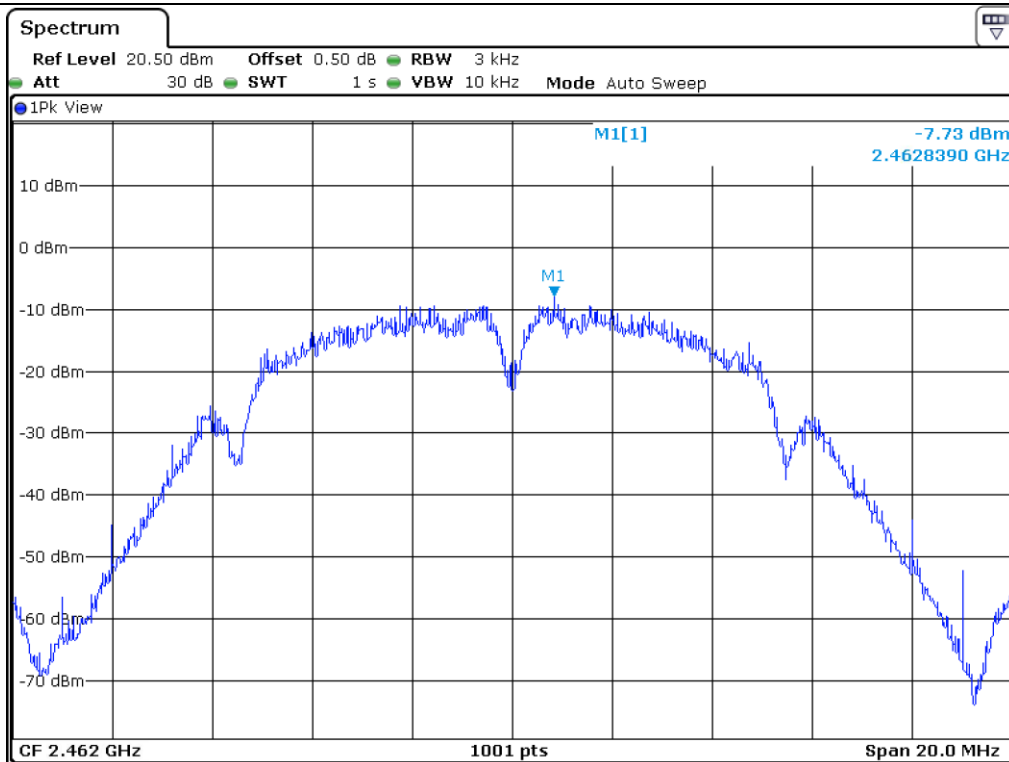


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.4.2.2 Test data for 802.11g WLAN Mode

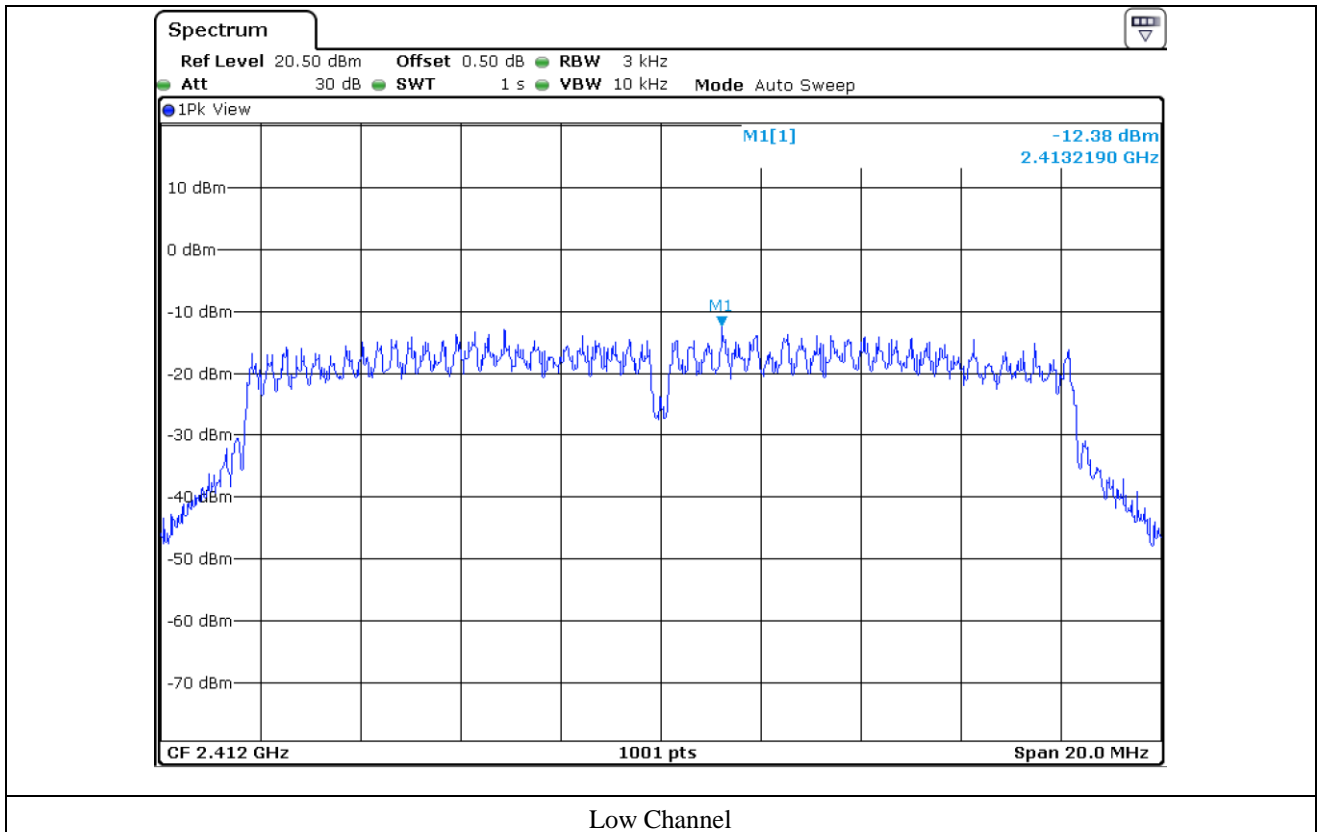
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

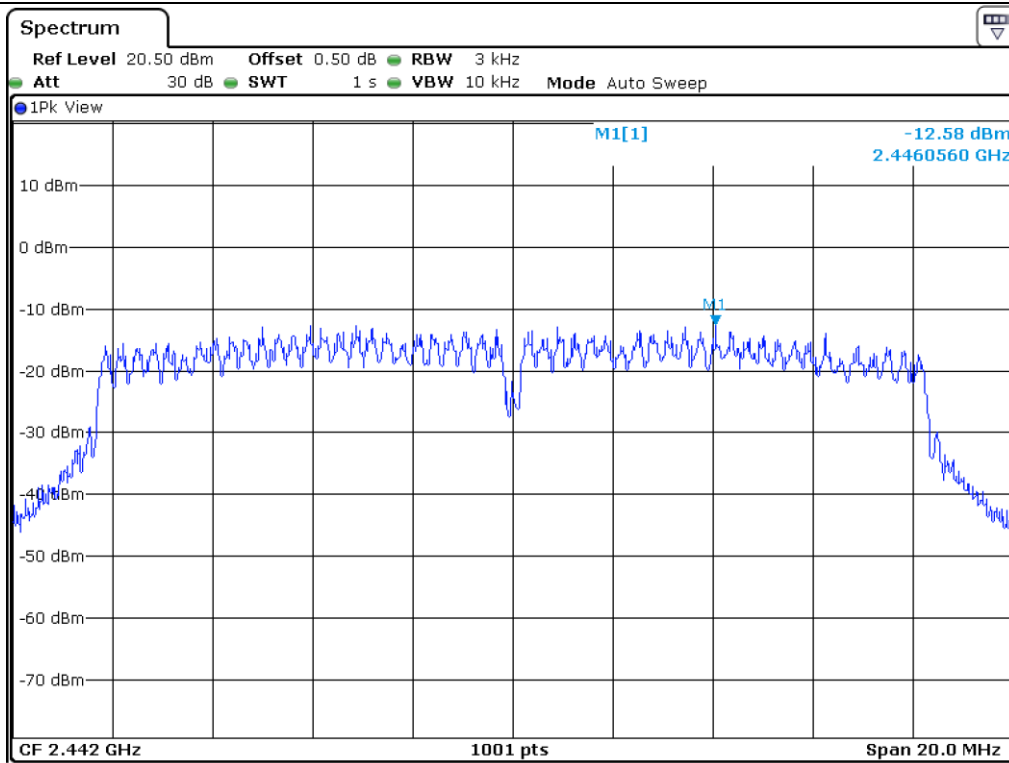
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-12.38	8.00	20.38
Middle	2 442	-12.58	8.00	20.58
High	2 462	-12.31	8.00	20.31

Remark. Margin = Limit – Measured value

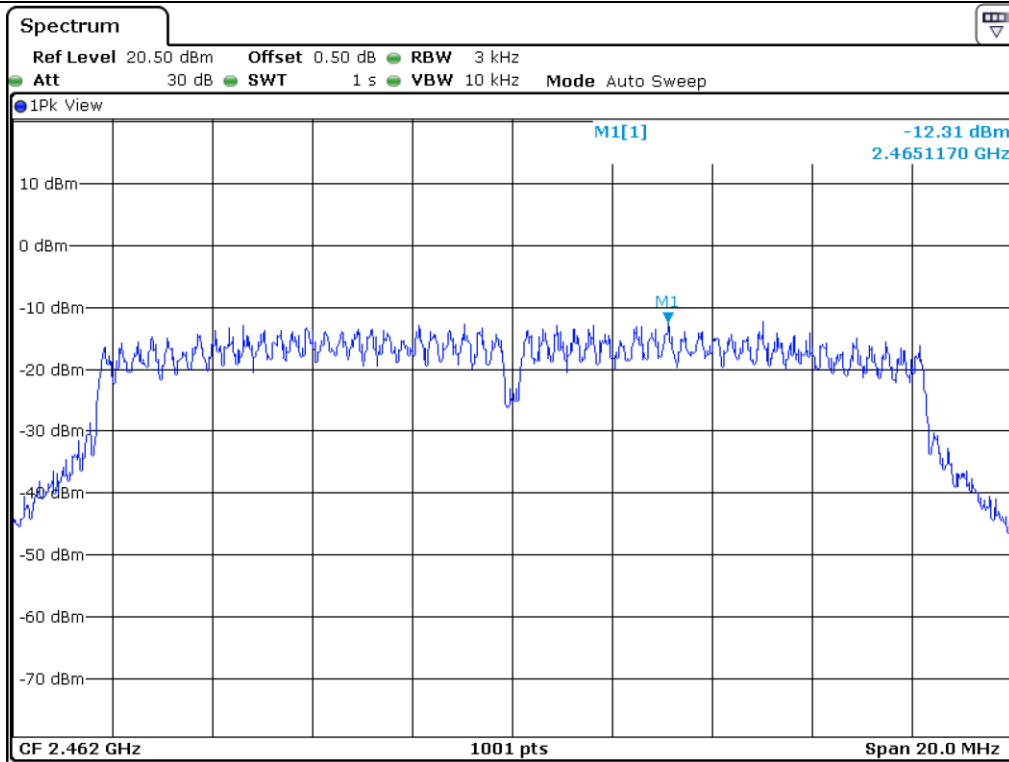


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.4.2.3 Test data for 802.11n_HT20 WLAN Mode

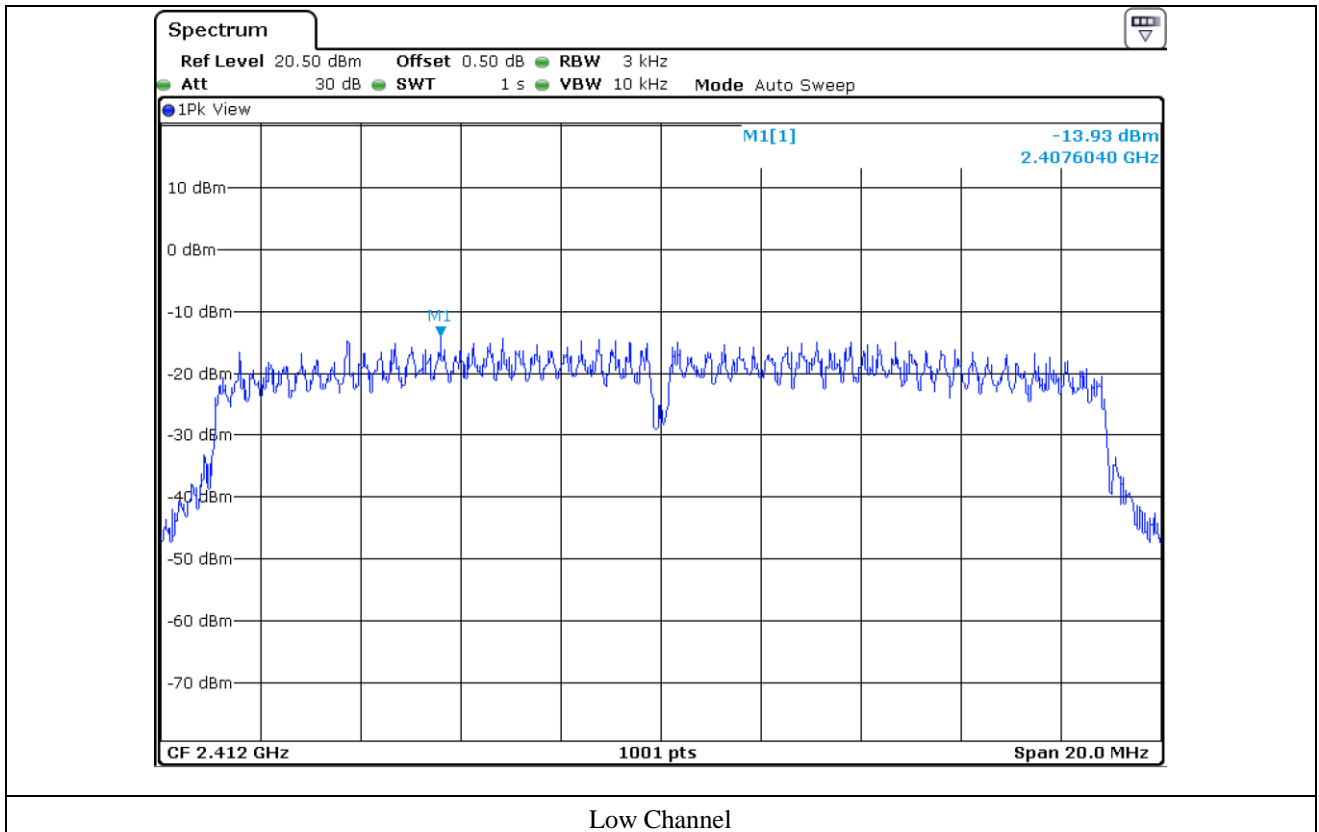
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

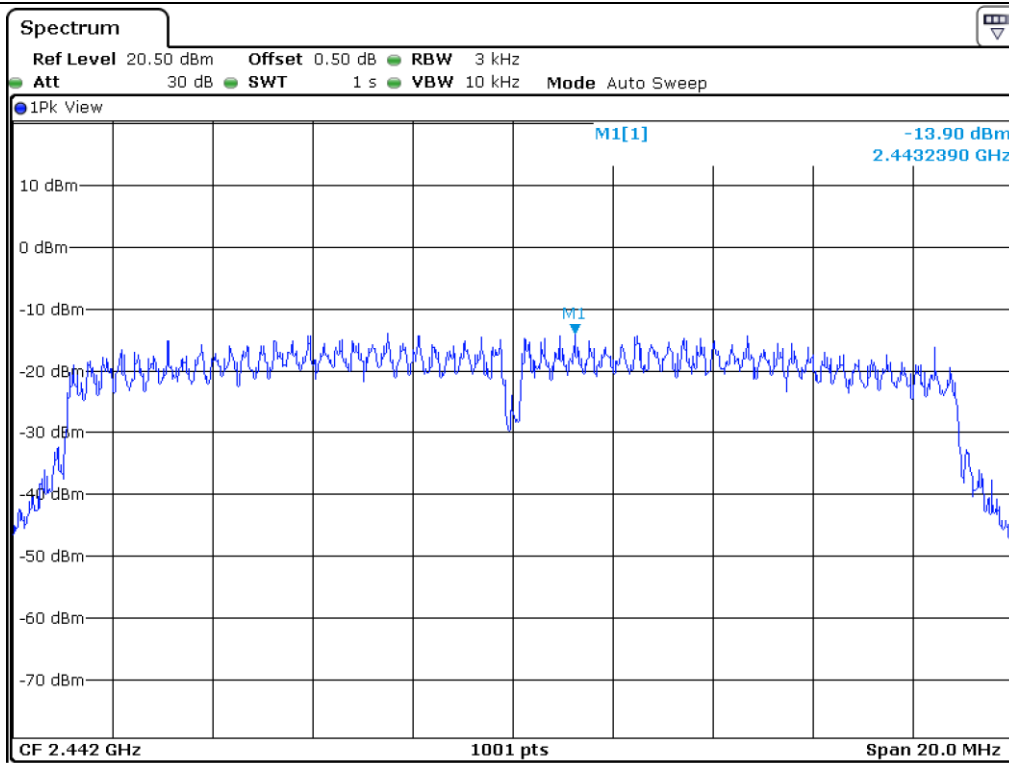
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-13.93	8.00	21.93
Middle	2 442	-13.90	8.00	21.90
High	2 462	-12.50	8.00	20.50

Remark. Margin = Limit – Measured value

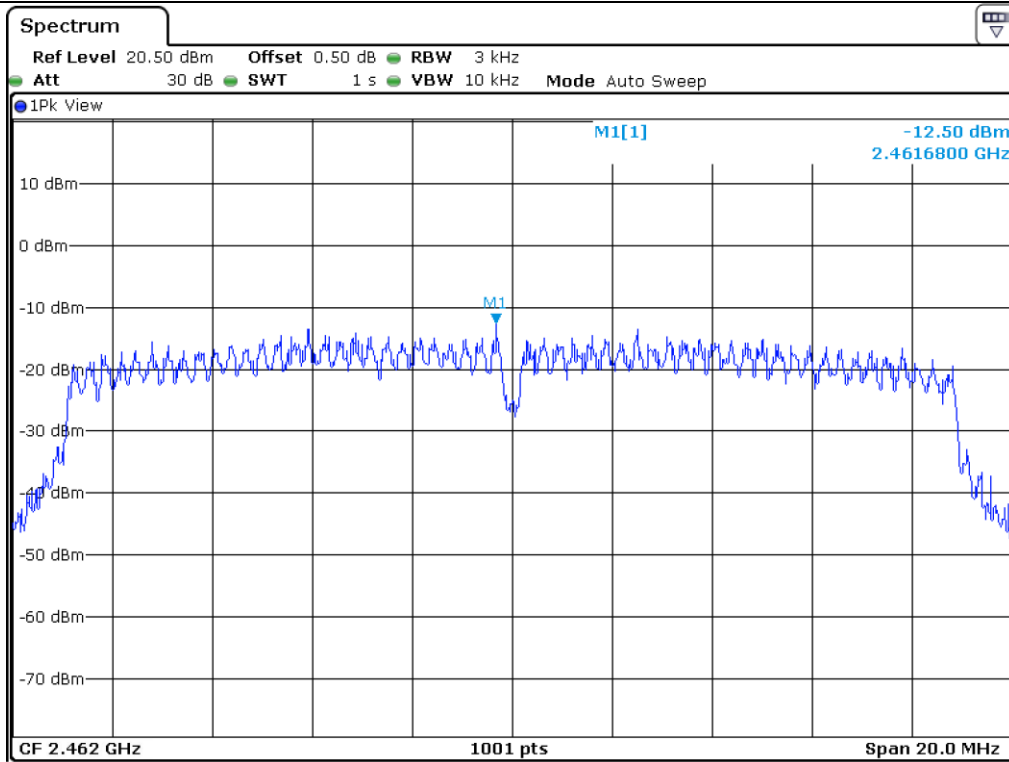


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.4.3 Test data for Multiple Antenna

- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-10.56	6.77	17.33
Middle	2 442	-10.59	6.77	17.36
High	2 462	-9.46	6.77	16.23

Remark. Margin = Limit – Measured value



Tested by: Tae-Ho, Kim / Senior Engineer

10.5 Test data for AC 24 V

10.5.1 Test data for Antenna 0

10.5.1.1 Test data for 802.11b WLAN Mode

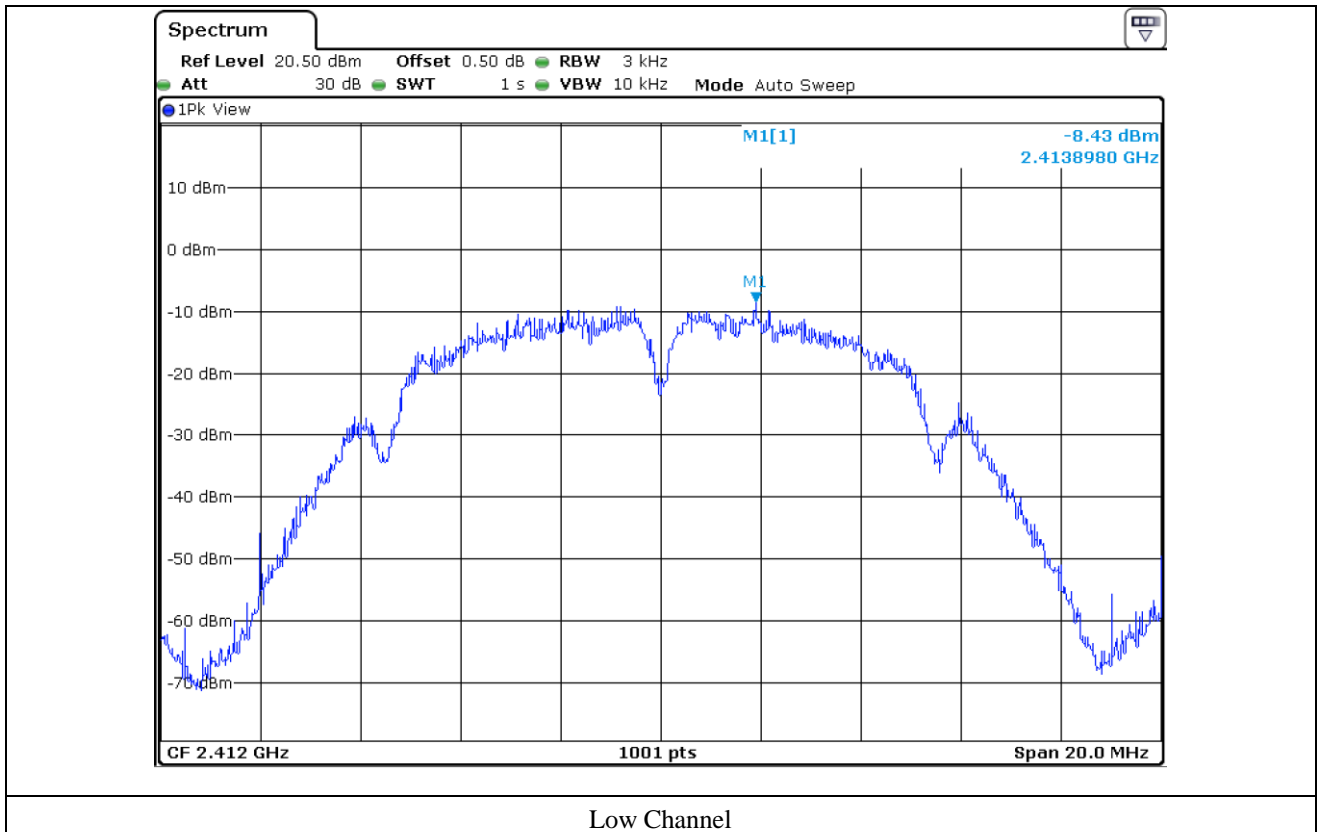
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

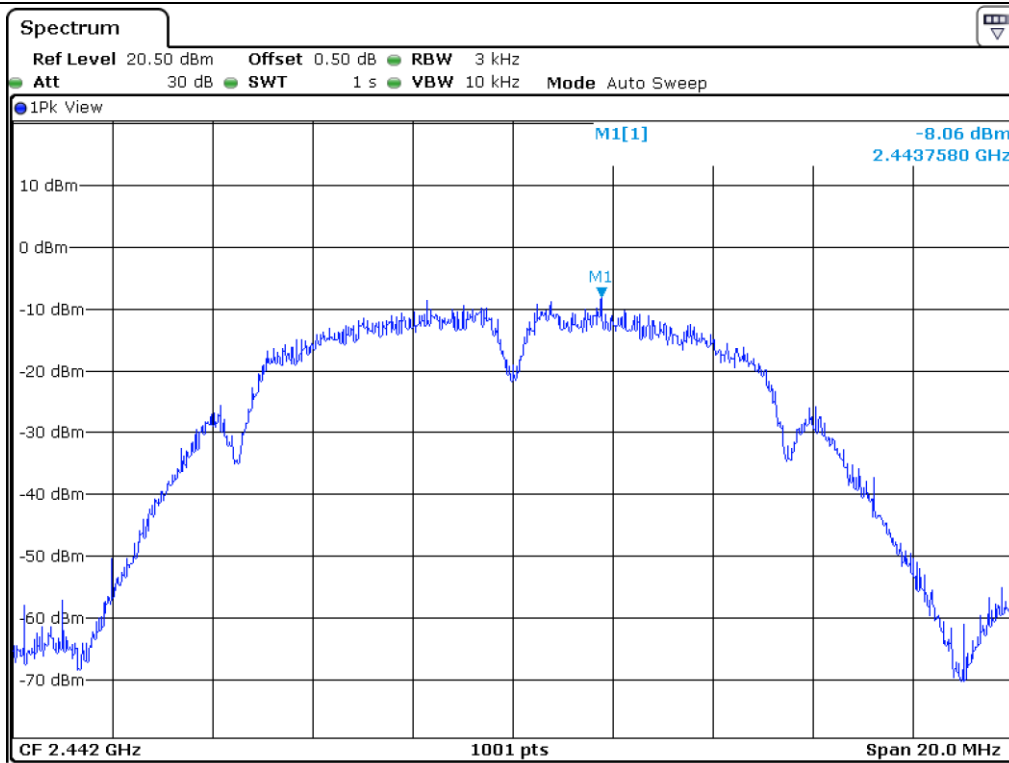
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-8.43	8.00	16.43
Middle	2 442	-8.06	8.00	16.06
High	2 462	-8.53	8.00	16.53

Remark. Margin = Limit – Measured value

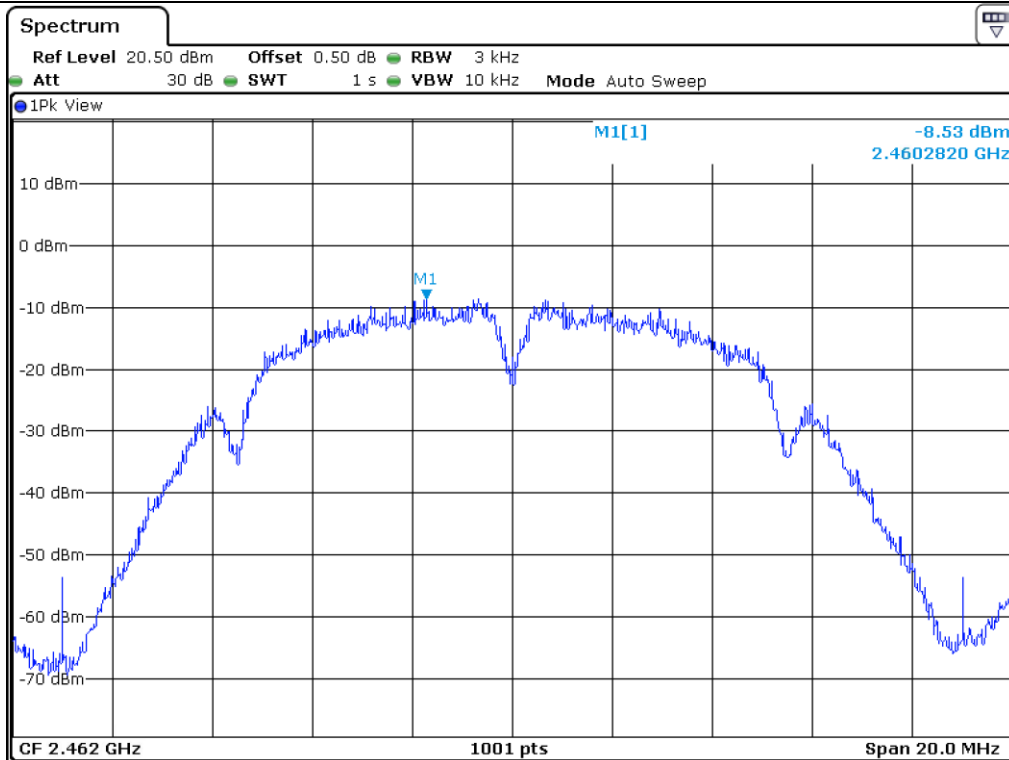


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.5.1.2 Test data for 802.11g WLAN Mode

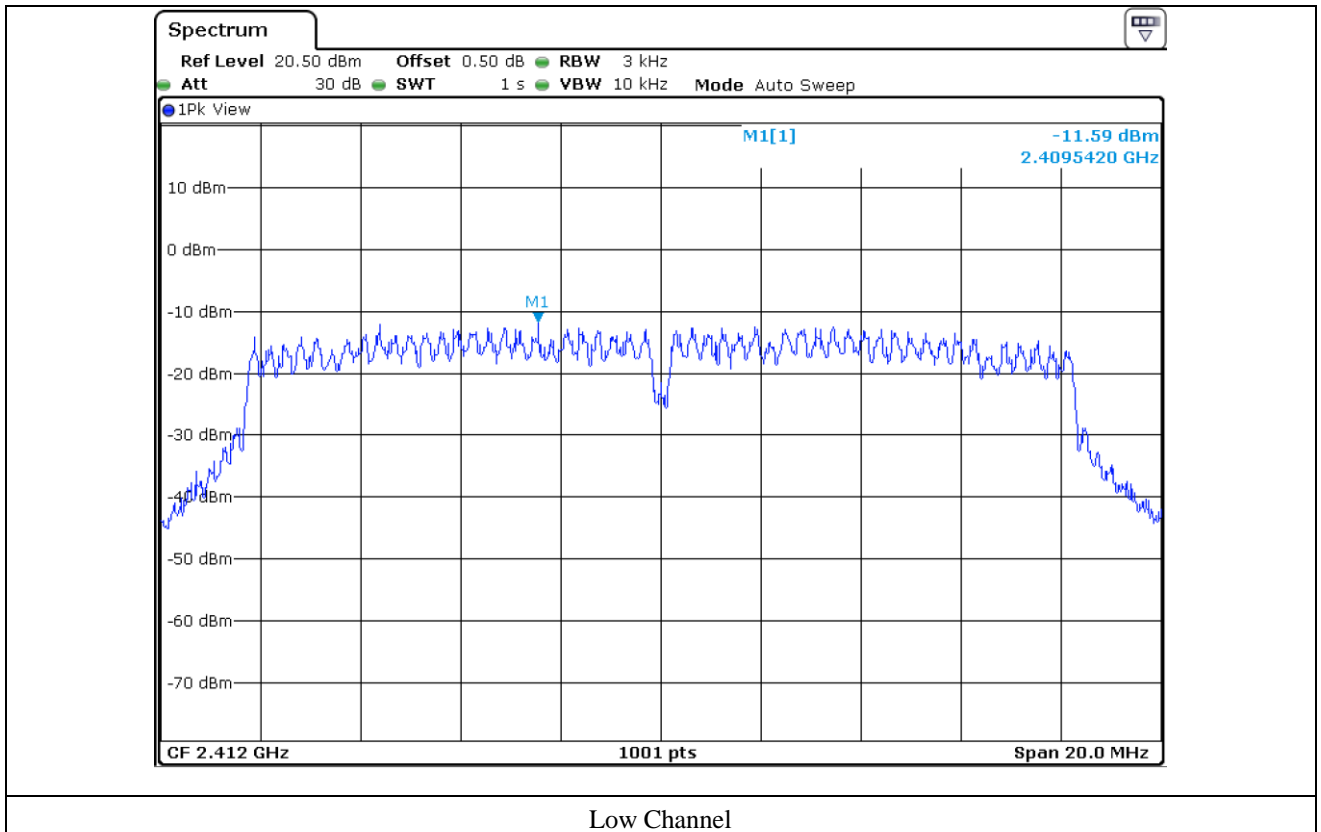
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

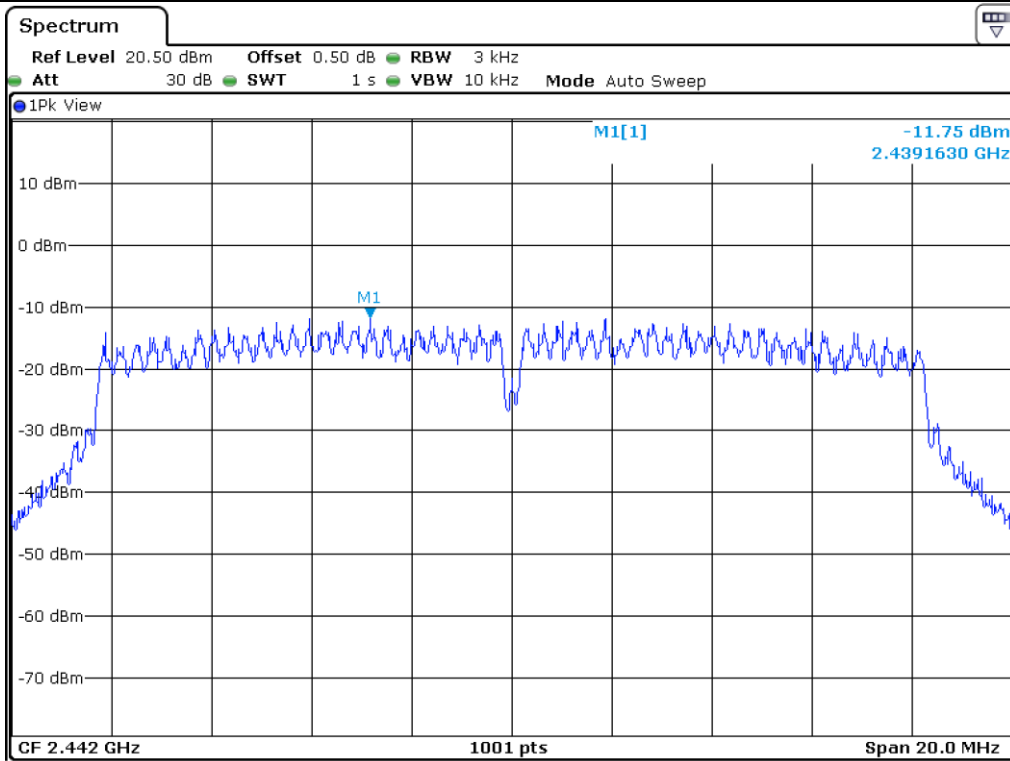
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-11.59	8.00	19.59
Middle	2 442	-11.75	8.00	19.75
High	2 462	-11.73	8.00	19.73

Remark. Margin = Limit – Measured value

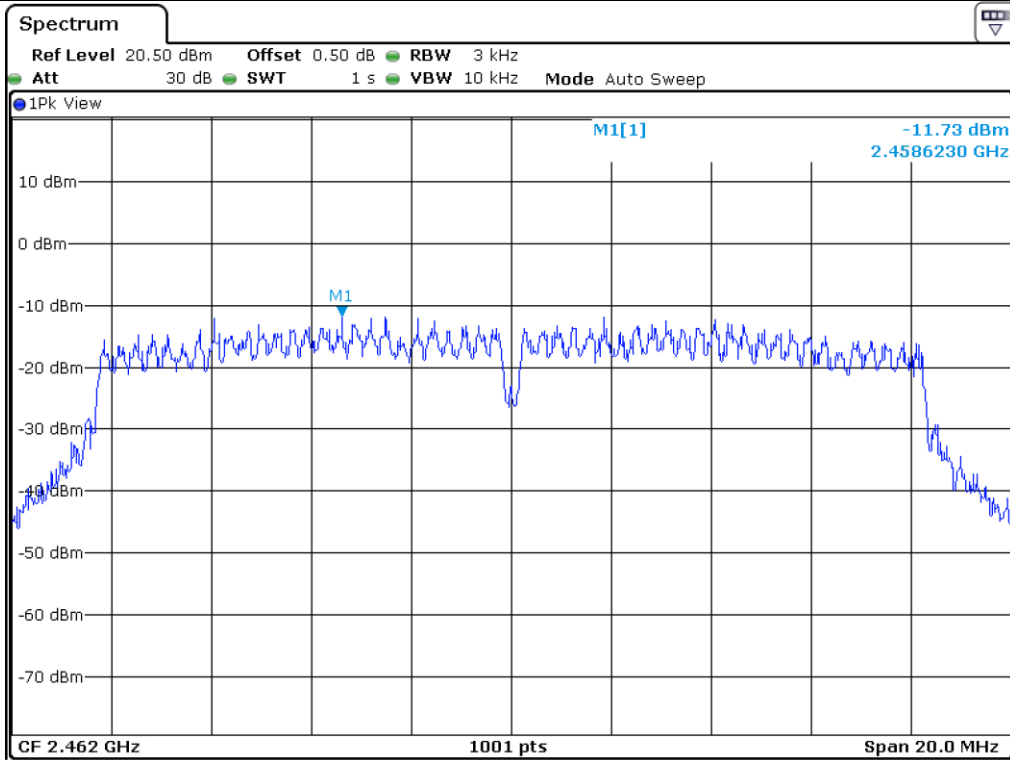


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.5.1.3 Test data for 802.11n_HT20 WLAN Mode

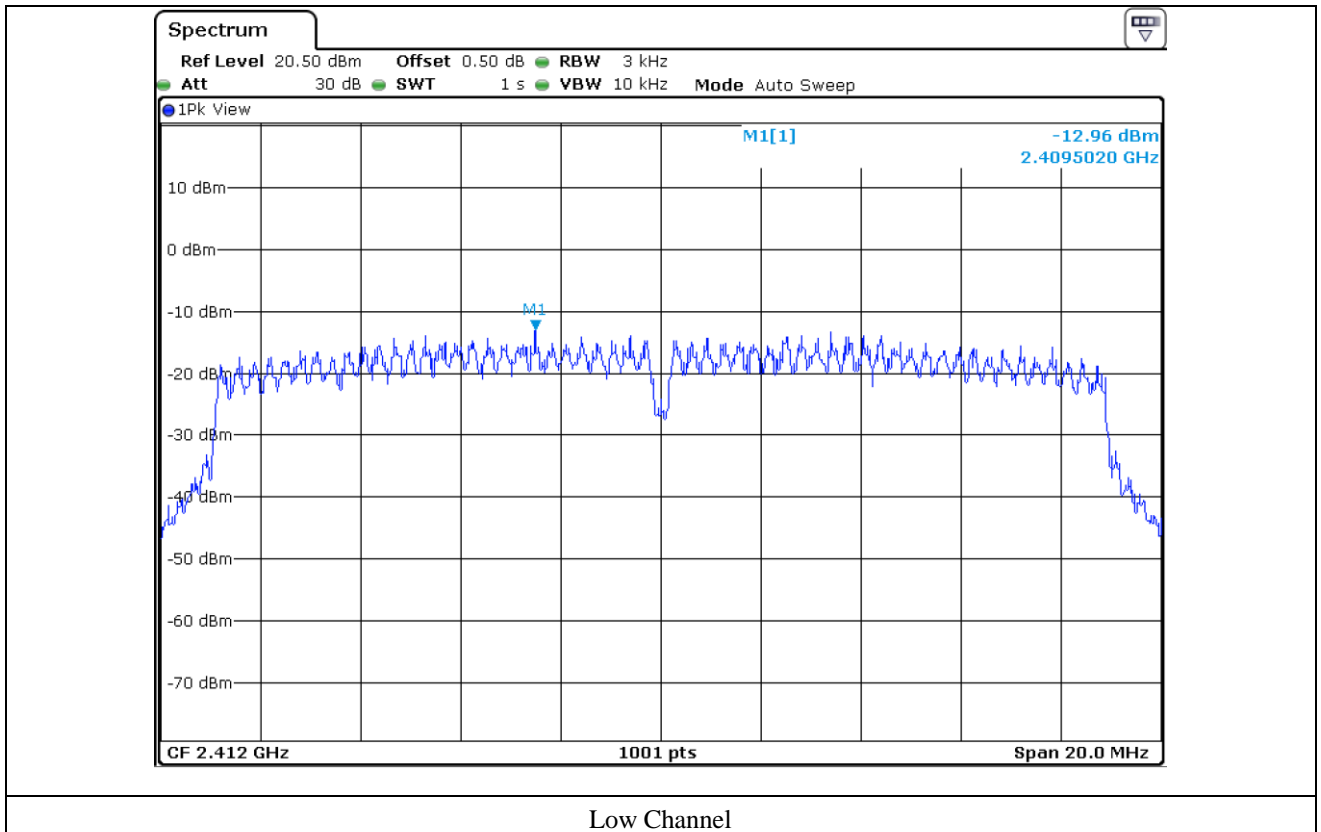
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

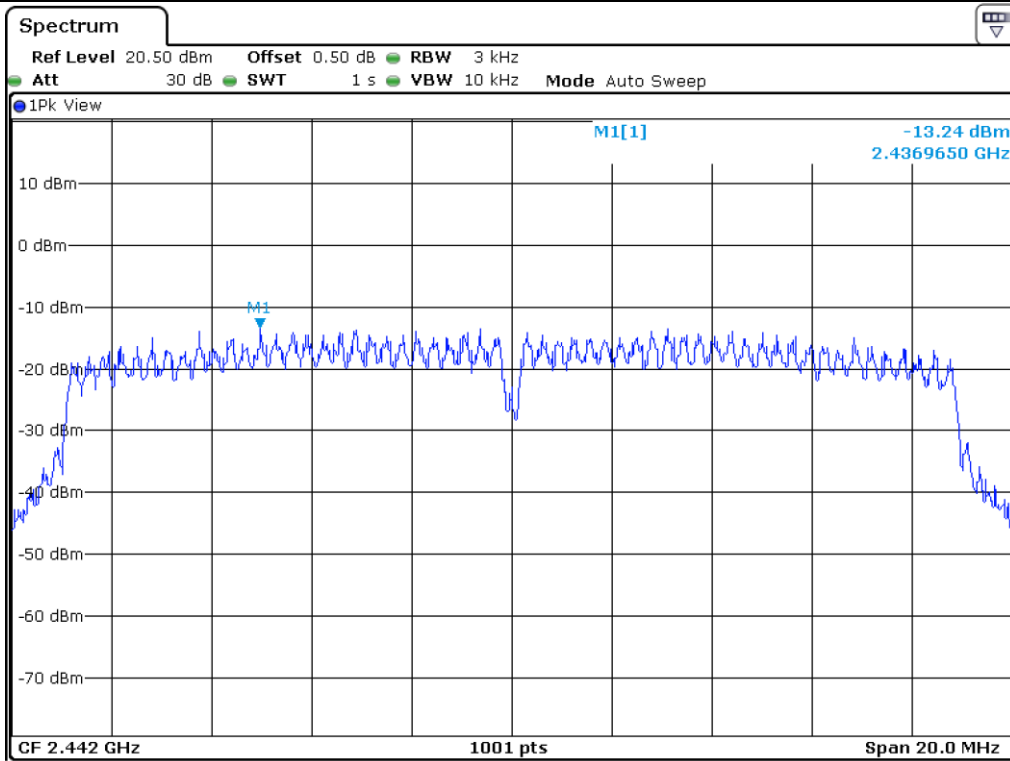
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-12.96	8.00	20.96
Middle	2 442	-13.24	8.00	21.24
High	2 462	-12.16	8.00	20.16

Remark. Margin = Limit – Measured value

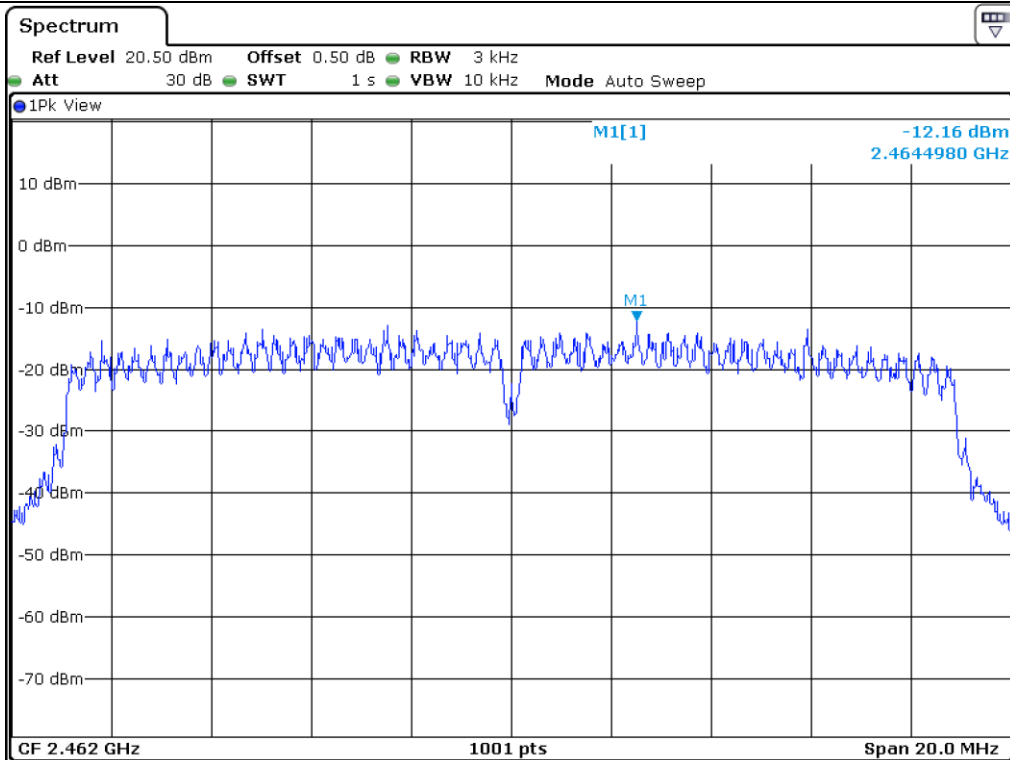


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.5.2 Test data for Antenna 1

10.5.2.1 Test data for 802.11b WLAN Mode

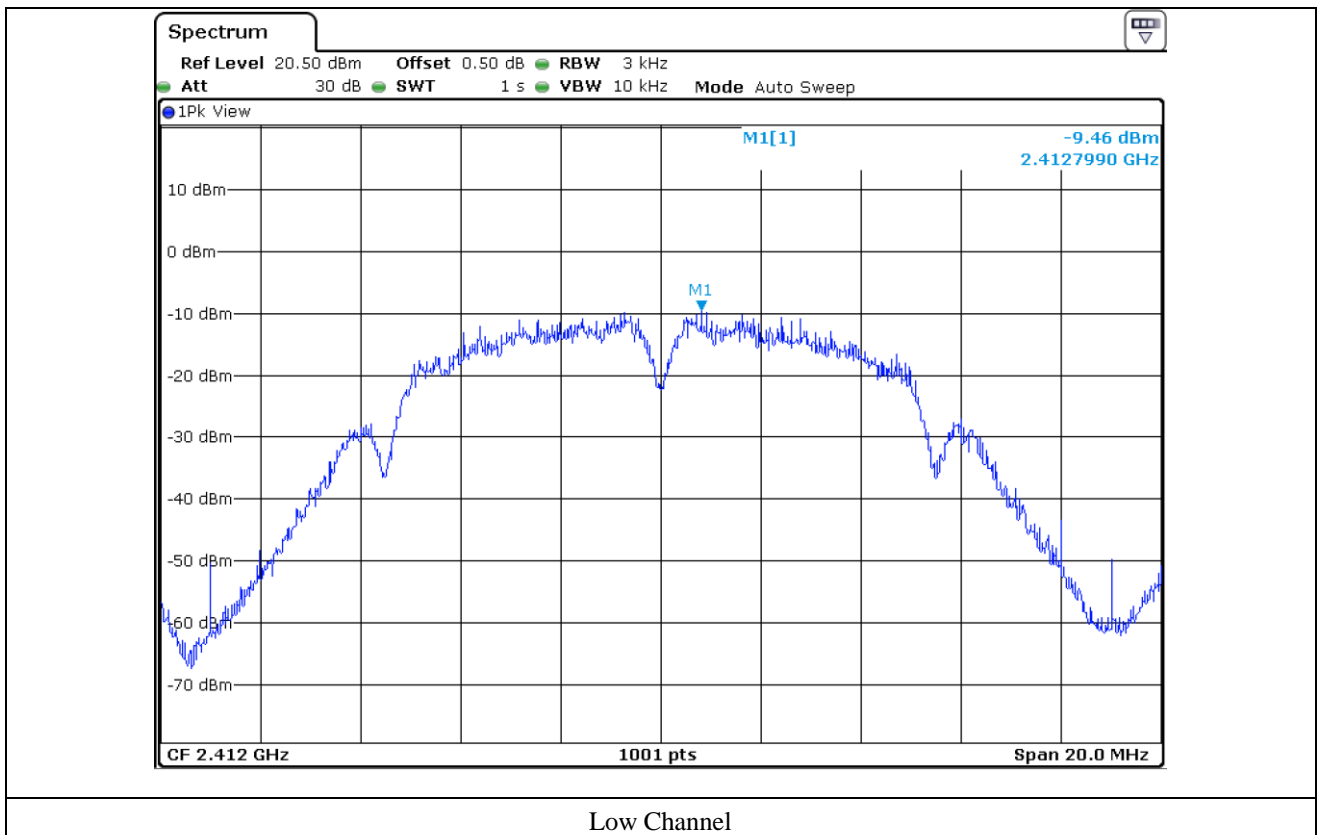
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

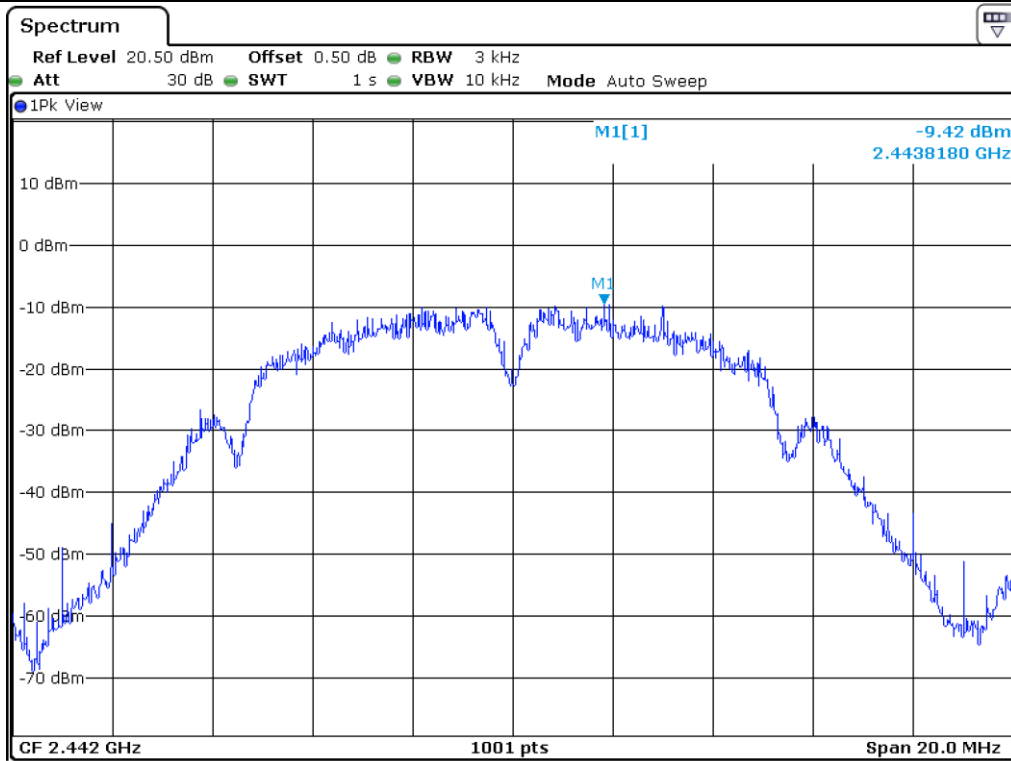
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-9.46	8.00	17.46
Middle	2 442	-9.42	8.00	17.42
High	2 462	-8.12	8.00	16.12

Remark. Margin = Limit – Measured value

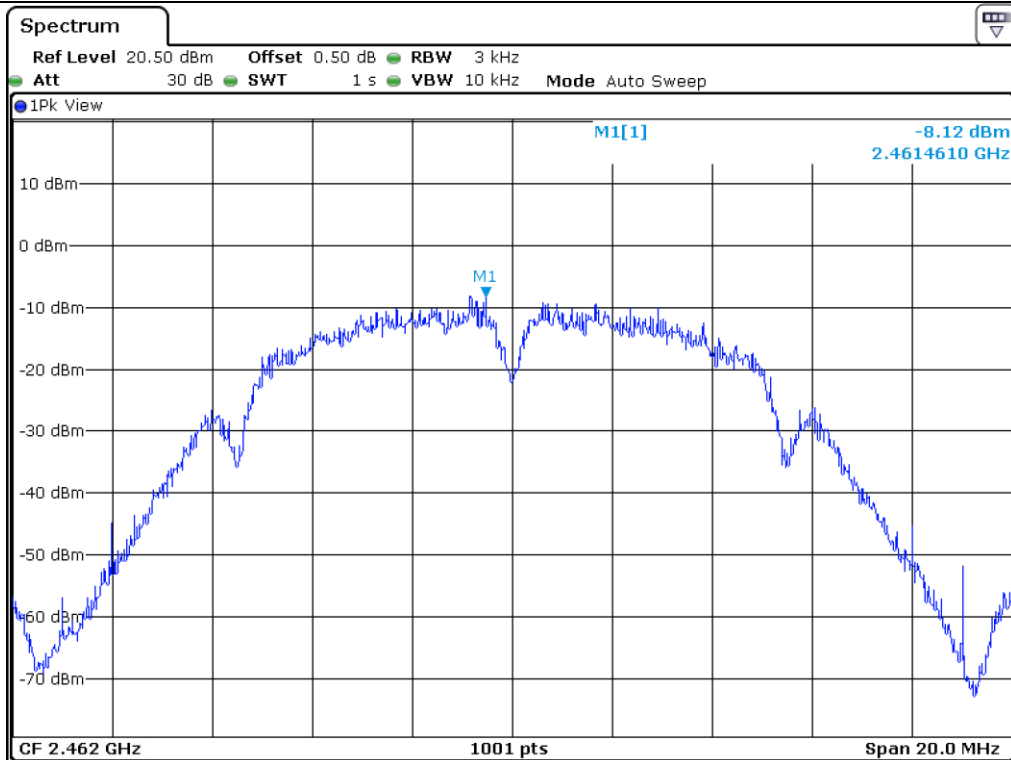


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.5.2.2 Test data for 802.11g WLAN Mode

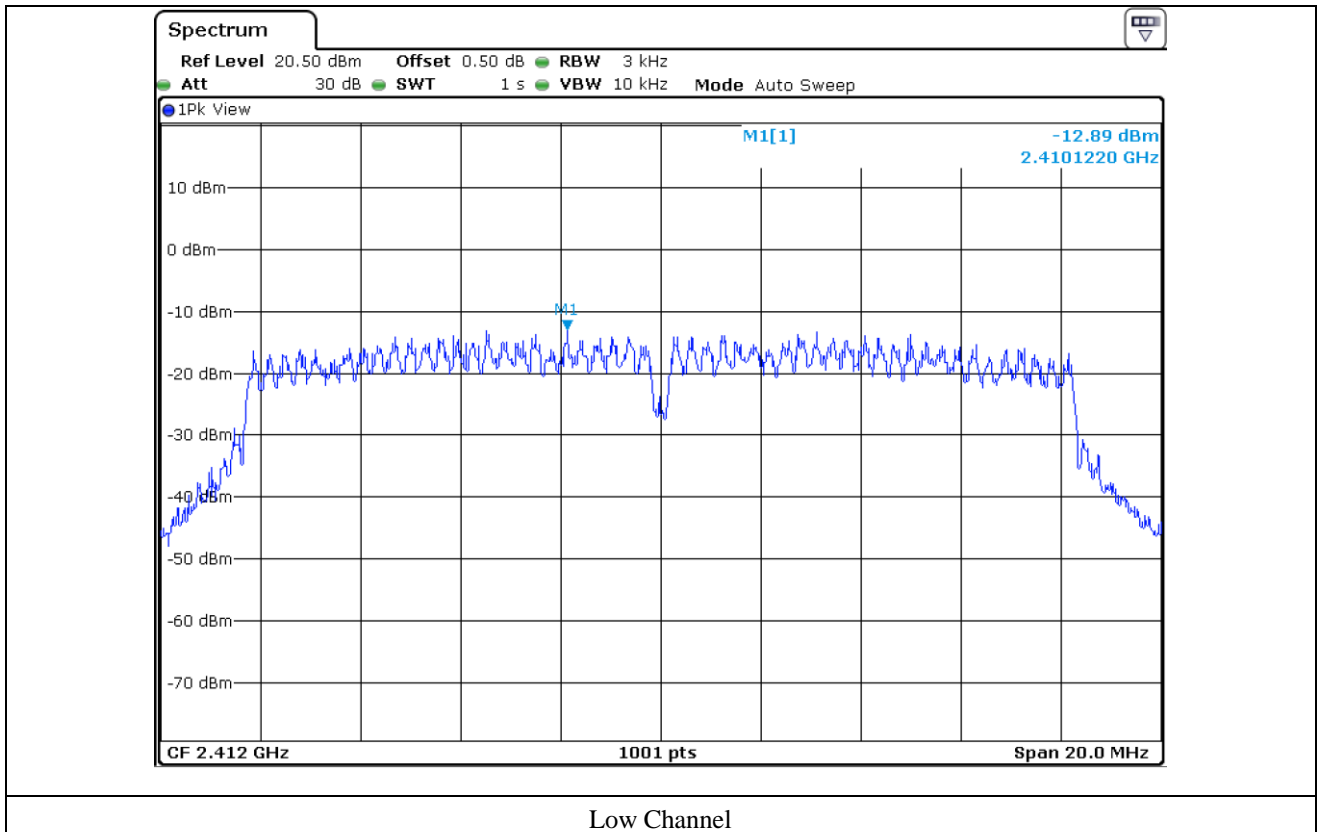
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

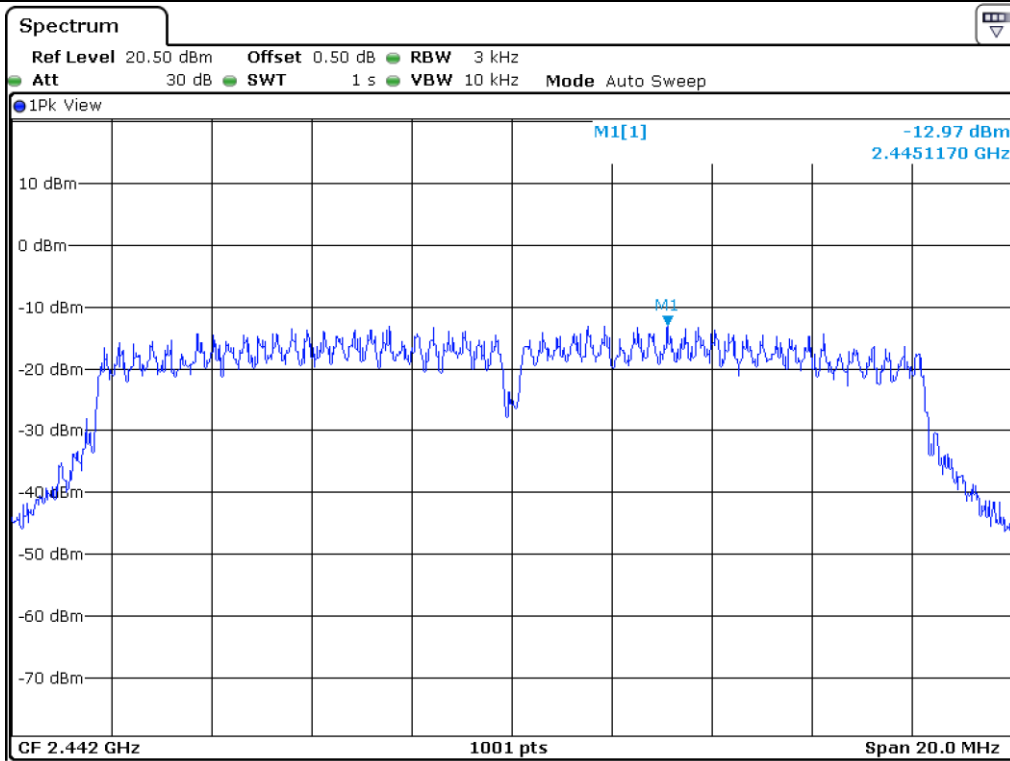
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-12.89	8.00	20.89
Middle	2 442	-12.97	8.00	20.97
High	2 462	-11.91	8.00	19.91

Remark. Margin = Limit – Measured value

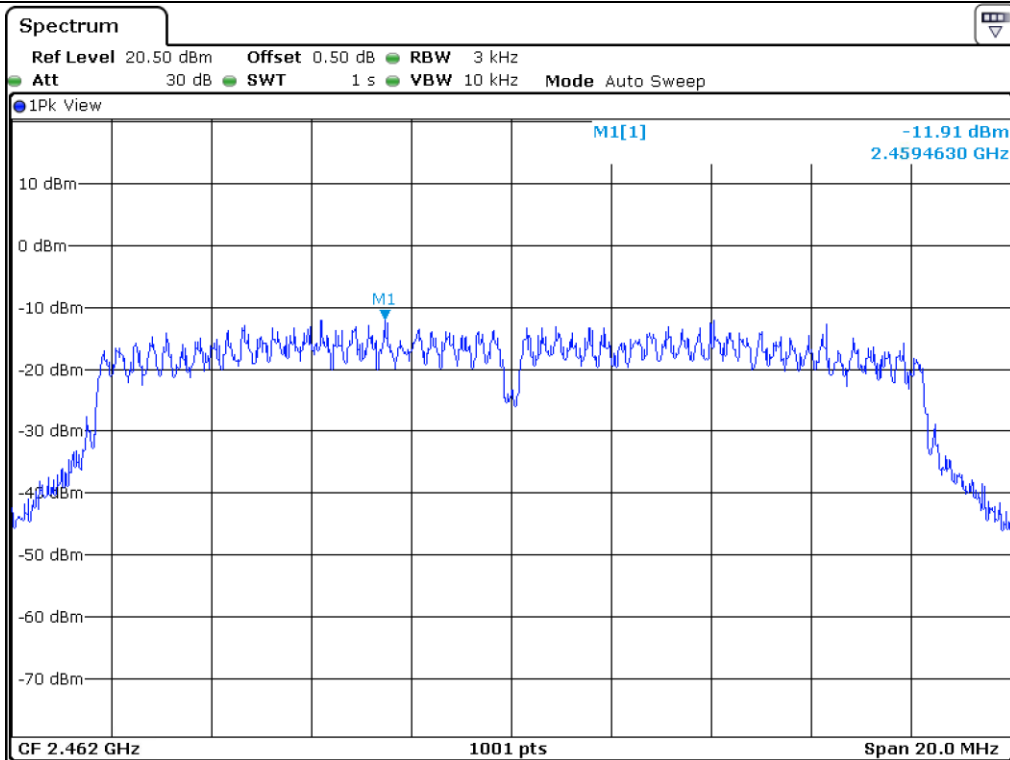


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.5.2.3 Test data for 802.11n_HT20 WLAN Mode

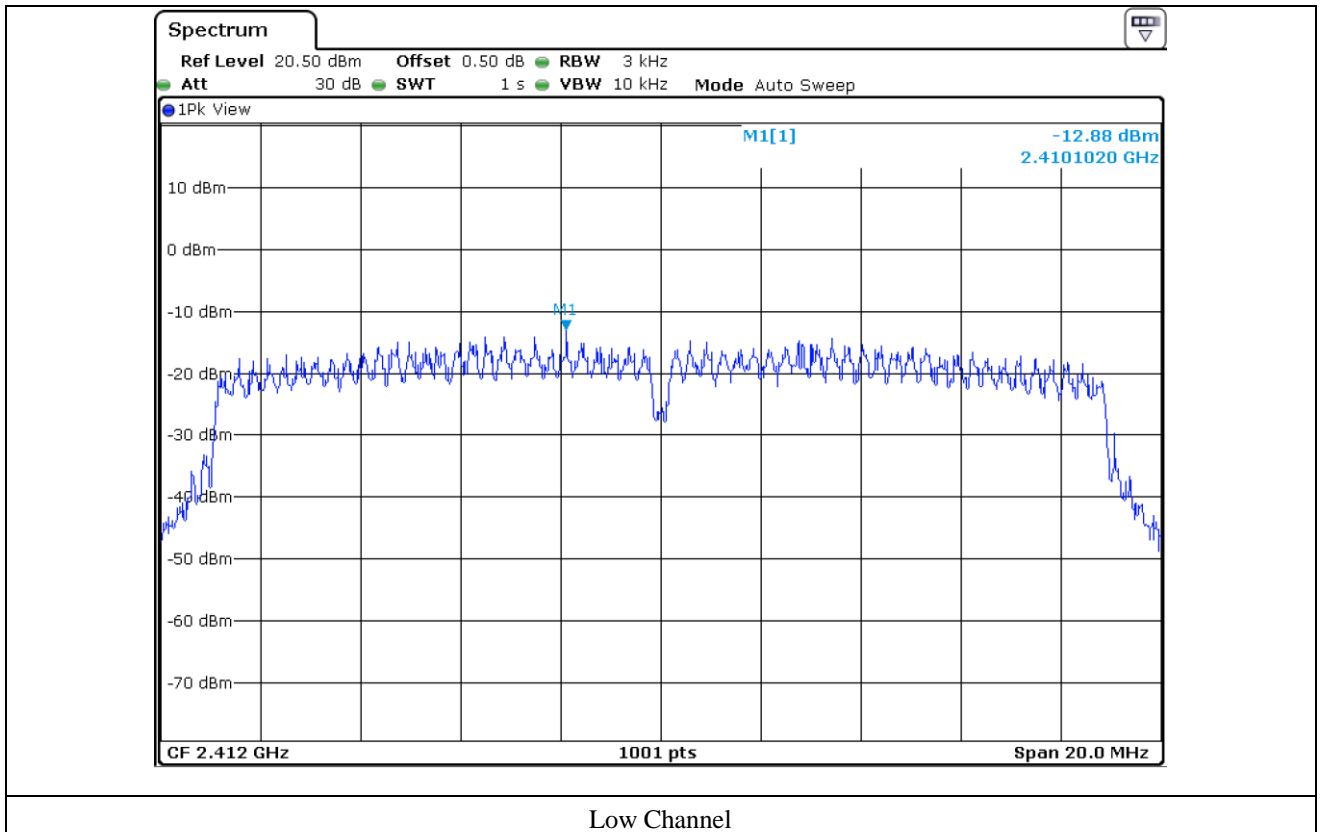
- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

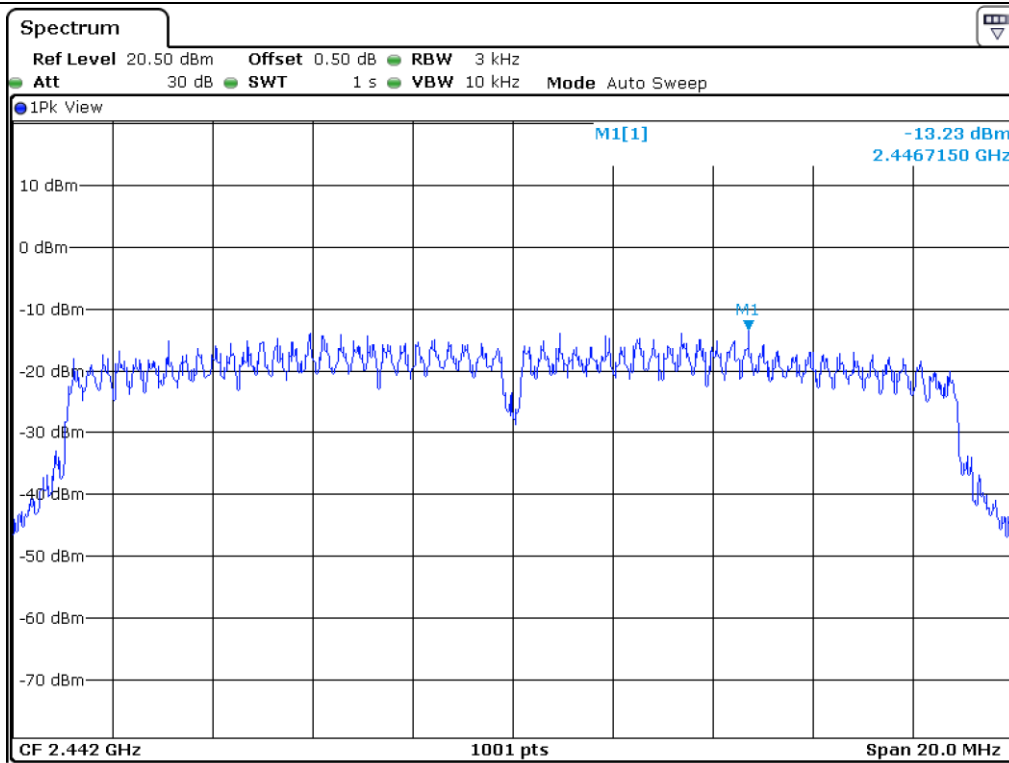
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-12.88	8.00	20.88
Middle	2 442	-13.23	8.00	21.23
High	2 462	-12.99	8.00	20.99

Remark. Margin = Limit – Measured value

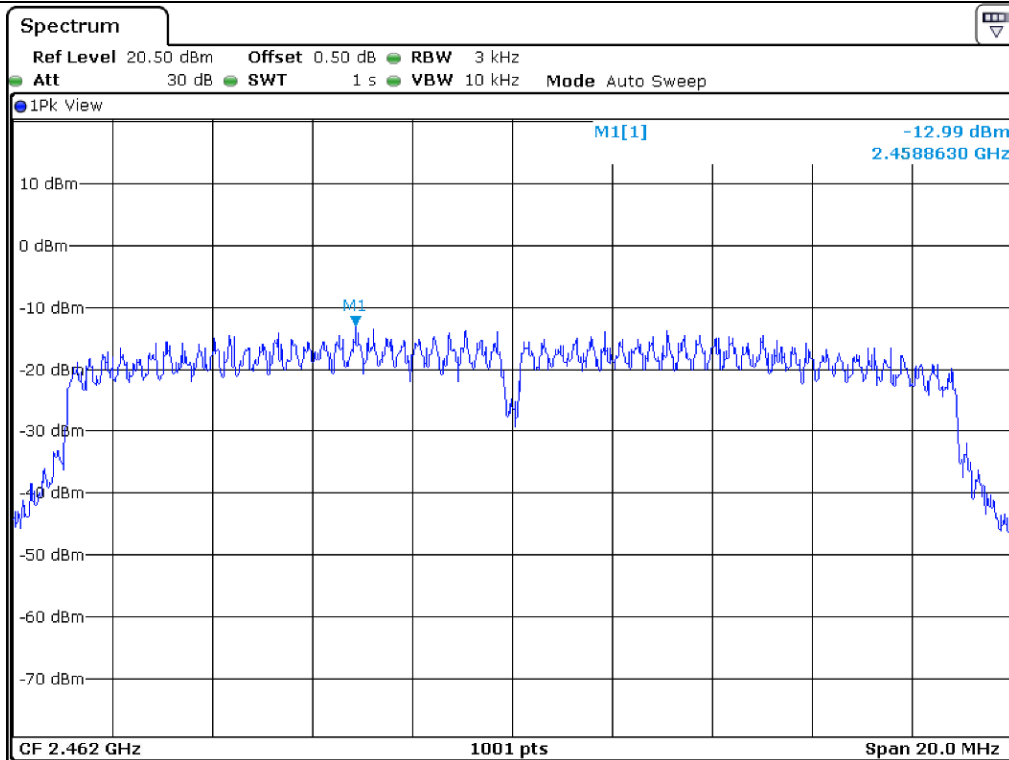


Tested by: Tae-Ho, Kim / Senior Engineer





Middle Channel



High Channel

10.5.3 Test data for Multiple Antenna

- Test Date : May 03, 2016
- Test Result : Pass
- Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-9.91	6.77	16.68
Middle	2 442	-10.22	6.77	16.99
High	2 462	-9.54	6.77	16.31

Remark. Margin = Limit – Measured value



Tested by: Tae-Ho, Kim / Senior Engineer

11. RADIATED EMISSION TEST

11.1 Operating environment

Temperature : (21 ~ 22) °C
 Relative humidity : (42 ~ 43) % 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 a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and 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.(Interval)
■ - FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2015 (1Y)
■ - ESU	Rohde & Schwarz	EMI Test Receiver	100261	Apr. 29, 2016 (1Y)
■ - 310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 05, 2016 (1Y)
■ - SCU-18	Rohde & Schwarz	Pre-Amplifier	10041	Nov. 23, 2015 (1Y)
■ - DT3000	Innco System	Turn Table	930611	N/A
■ - MA4000-EP	Innco System	Antenna Master	3320611	N/A
■ - VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Jul. 10, 2014 (2Y)
■ - BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ - BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Apr. 31, 2015 (2Y)

All test equipment used is calibrated on a regular basis.

11.4 Test data for AC 12 V

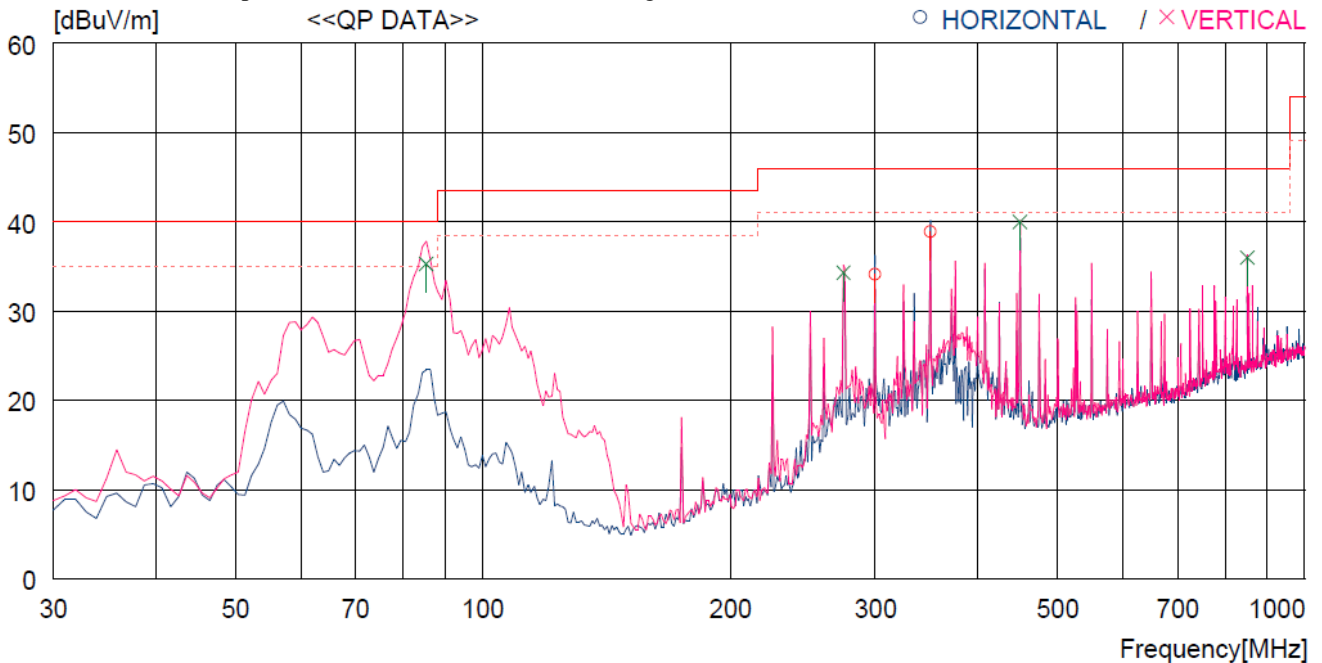
11.4.1 Test data for 802.11b WLAN Mode

11.4.1.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (42 ~ 43) % R.H. Temperature: (21 ~ 22) °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247
 Result : PASSED

EUT : Video Doorbell Date: May 03, 2016
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

-Ant0, Ant1 and Multiple transmit with Low, Middle and High Channels were tested, but the worst data were recorded.



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	299.660	48.6	13.6	4.6	32.7	34.1	46.0	11.9	100	292
2	350.100	51.8	14.7	5.0	32.6	38.9	46.0	7.1	100	292
----- Vertical -----										
3	85.290	57.2	8.8	2.5	33.2	35.3	40.0	4.7	100	0
4	274.440	49.7	13.0	4.4	32.8	34.3	46.0	11.7	100	0
5	450.011	50.5	16.6	5.7	32.8	40.0	46.0	6.0	100	0
6	850.610	39.8	21.6	8.1	33.5	36.0	46.0	10.0	100	0

11.4.1.2 Test data for Below 30 MHz

- . Test Date : May 03, 2016
- . Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- . Frequency range : 9 kHz ~ 30 MHz
- . Measurement distance : 3 m
- . 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.									

11.4.1.3 Test data for above 1 GHz

- . Test Date : May 03, 2016
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

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



Tested by: Tae-Ho, Kim / Project Engineer

11.4.2 Test data for 802.11g WLAN Mode

11.4.2.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (42 ~ 43) % R.H.

Temperature: (21 ~ 22) °C

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

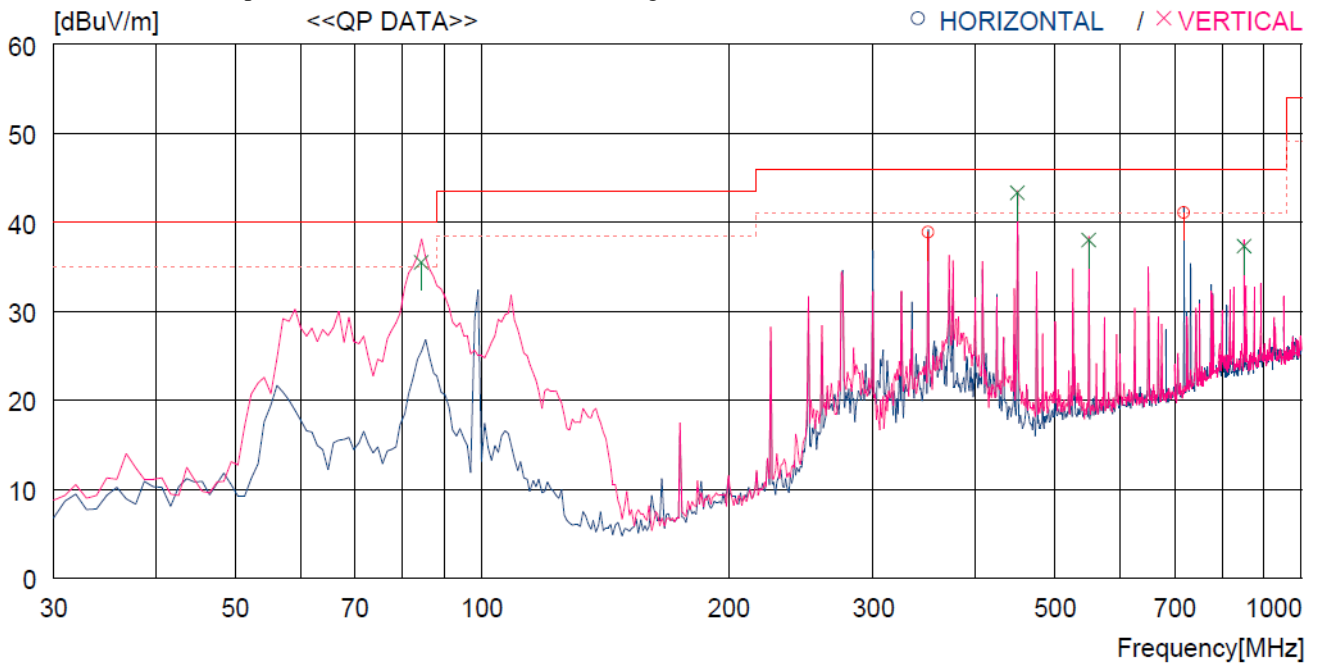
Result : PASSED

EUT : Video Doorbell

Date: May 03, 2016

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

-Ant0, Ant1 and Multiple transmit with Low, Middle and High Channels were tested, but the worst data were recorded.



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	350.100	51.8	14.7	5.0	32.6	38.9	46.0	7.1	100	359
2	718.694	47.5	19.9	7.4	33.7	41.1	46.0	4.9	200	359
----- Vertical -----										
3	84.320	57.6	8.6	2.5	33.2	35.5	40.0	4.5	100	12
4	450.011	53.8	16.6	5.7	32.8	43.3	46.0	2.7	100	0
5	549.919	46.5	18.2	6.3	33.0	38.0	46.0	8.0	100	0
6	850.610	41.1	21.6	8.1	33.5	37.3	46.0	8.7	100	0

11.4.2.2 Test data for Below 30 MHz

- . Test Date : May 03, 2016
- . Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- . Frequency range : 9 kHz ~ 30 MHz
- . Measurement distance : 3 m
- . 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.									

11.4.2.3 Test data for above 1 GHz

- . Test Date : May 03, 2016
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

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



Tested by: Tae-Ho, Kim / Project Engineer

11.4.3 Test data for 802.11n_HT20 WLAN Mode

11.4.3.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (42 ~ 43) % R.H.

Temperature: (21 ~ 22) °C

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

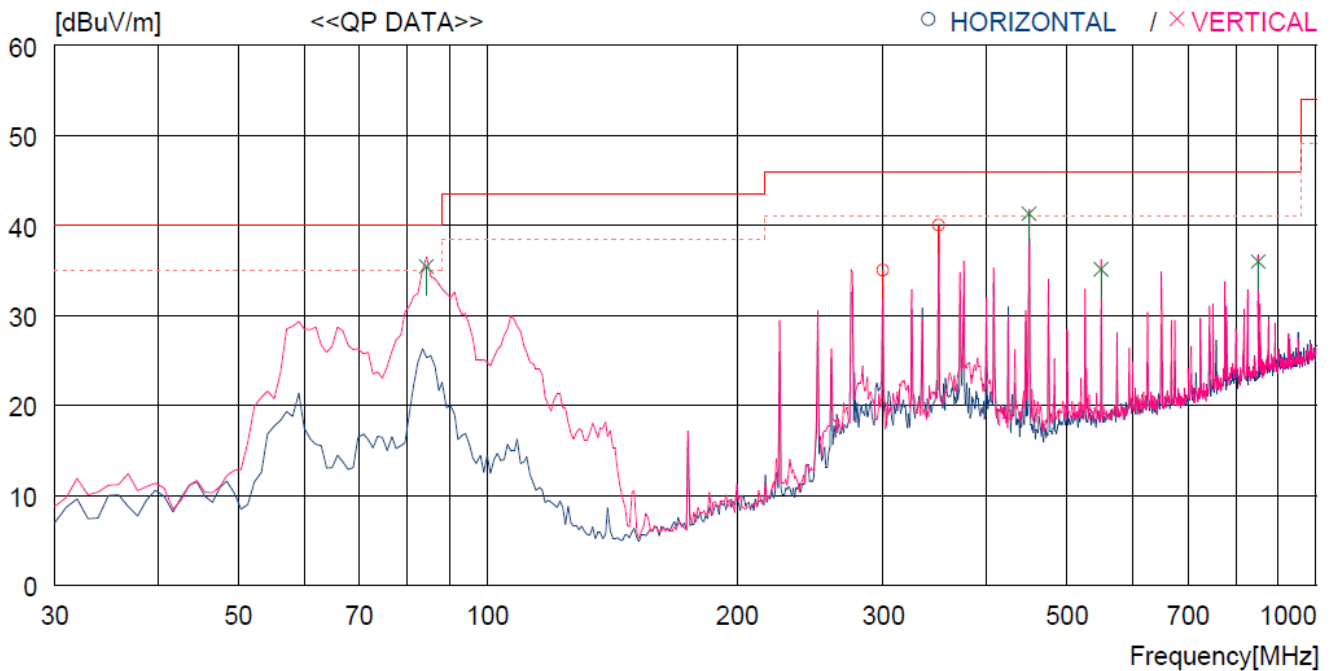
Result : PASSED

EUT : Video Doorbell

Date: May 03, 2016

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

-Ant0, Ant1 and Multiple transmit with Low, Middle and High Channels were tested, but the worst data were recorded.



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	299.660	49.5	13.6	4.6	32.7	35.0	46.0	11.0	100	308
2	350.100	52.9	14.7	5.0	32.6	40.0	46.0	6.0	100	359
----- Vertical -----										
3	84.320	57.5	8.6	2.5	33.2	35.4	40.0	4.6	100	359
4	450.011	51.8	16.6	5.7	32.8	41.3	46.0	4.7	100	40
5	549.919	43.6	18.2	6.3	33.0	35.1	46.0	10.9	100	0
6	850.610	39.8	21.6	8.1	33.5	36.0	46.0	10.0	100	199

11.4.3.2 Test data for Below 30 MHz

- . Test Date : May 03, 2016
- . Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- . Frequency range : 9 kHz ~ 30 MHz
- . Measurement distance : 3 m
- . 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.									

11.4.3.3 Test data for above 1 GHz

- . Test Date : May 03, 2016
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

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



Tested by: Tae-Ho, Kim / Project Engineer

11.5 Test data for AC 24 V

11.5.1 Test data for 802.11b WLAN Mode

11.5.1.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (42 ~ 43) % R.H.

Temperature: (21 ~ 22) °C

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

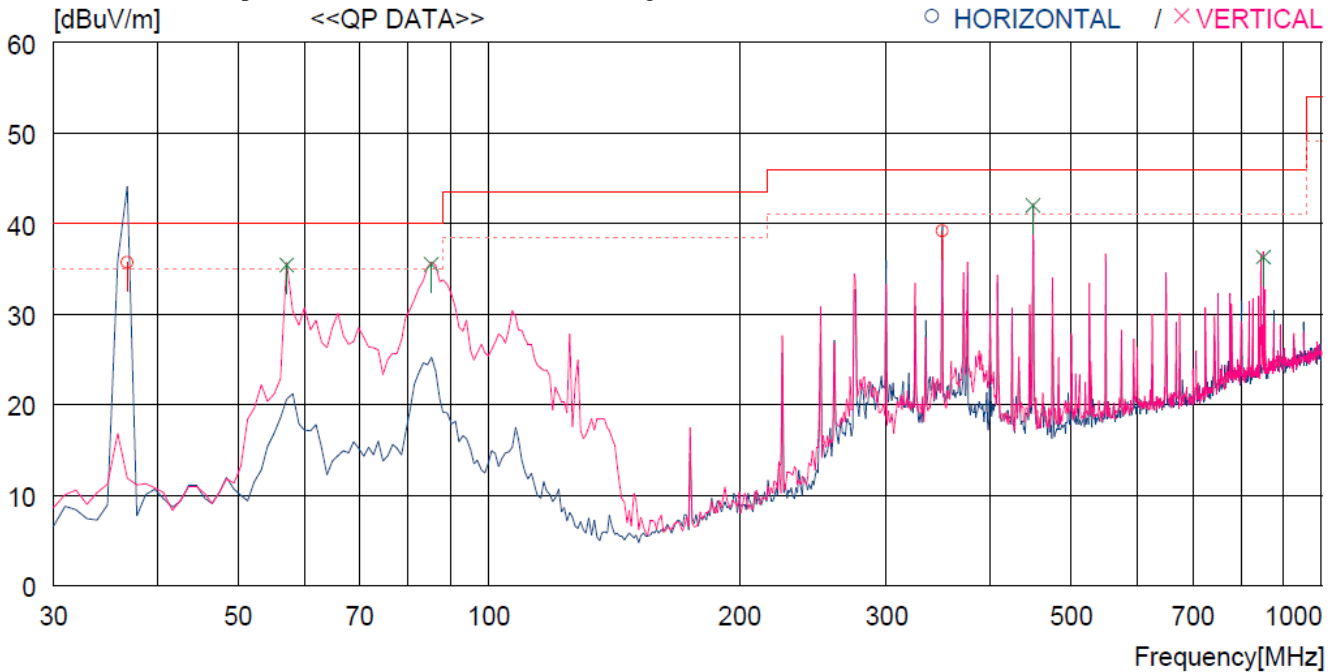
Result : PASSED

EUT : Video Doorbell

Date: May 03, 2016

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

-Ant0, Ant1 and Multiple transmit with Low, Middle and High Channels were tested, but the worst data were recorded.



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	36.790	54.3	12.5	1.8	32.9	35.7	40.0	4.3	100	19
2	350.100	52.1	14.7	5.0	32.6	39.2	46.0	6.8	100	359
----- Vertical -----										
3	57.160	52.9	13.4	2.1	33.0	35.4	40.0	4.6	100	0
4	85.290	57.4	8.8	2.5	33.2	35.5	40.0	4.5	100	6
5	450.011	52.5	16.6	5.7	32.8	42.0	46.0	4.0	100	29
6	850.610	40.1	21.6	8.1	33.5	36.3	46.0	9.7	100	197

11.5.1.2 Test data for Below 30 MHz

- Test Date : May 03, 2016
- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m
- 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.									

11.5.1.3 Test data for above 1 GHz

- Test Date : May 03, 2016
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Operating mode : Transmitting mode

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



Tested by: Tae-Ho, Kim / Project Engineer

11.5.2 Test data for 802.11g WLAN Mode

11.5.2.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (42 ~ 43) % R.H.

Temperature: (21 ~ 22) °C

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

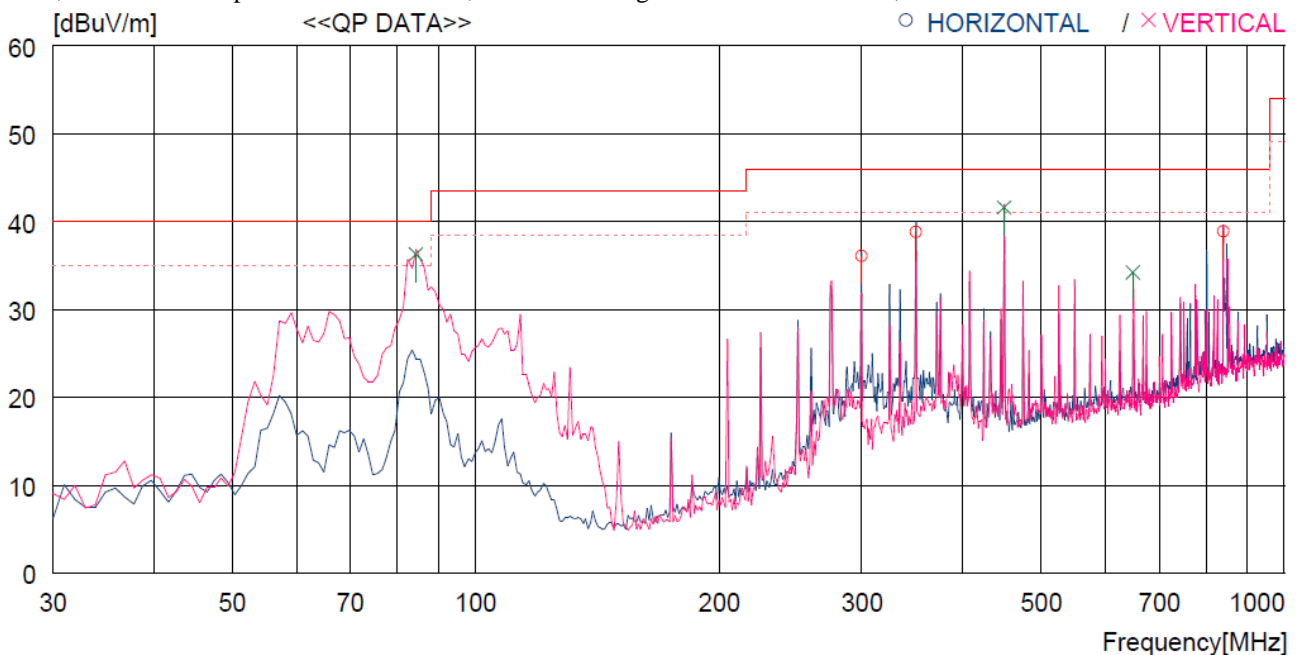
Result : PASSED

EUT : Video Doorbell

Date: May 03, 2016

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

-Ant0, Ant1 and Multiple transmit with Low, Middle and High Channels were tested, but the worst data were recorded.



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	299.660	50.6	13.6	4.6	32.7	36.1	46.0	9.9	100	288
2	350.100	51.7	14.7	5.0	32.6	38.8	46.0	7.2	100	288
3	839.941	42.8	21.4	8.1	33.4	38.9	46.0	7.1	100	359
----- Vertical -----										
4	84.320	58.4	8.6	2.5	33.2	36.3	40.0	3.7	100	158
5	450.011	52.1	16.6	5.7	32.8	41.6	46.0	4.4	100	24
6	649.826	41.3	19.4	6.9	33.4	34.2	46.0	11.8	100	158

11.5.2.2 Test data for Below 30 MHz

- . Test Date : May 03, 2016
- . Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- . Frequency range : 9 kHz ~ 30 MHz
- . Measurement distance : 3 m
- . 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.									

11.5.2.3 Test data for above 1 GHz

- . Test Date : May 03, 2016
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

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



Tested by: Tae-Ho, Kim / Project Engineer

11.5.3 Test data for 802.11n_HT20 WLAN Mode

11.5.3.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (42 ~ 43) % R.H.

Temperature: (21 ~ 22) °C

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

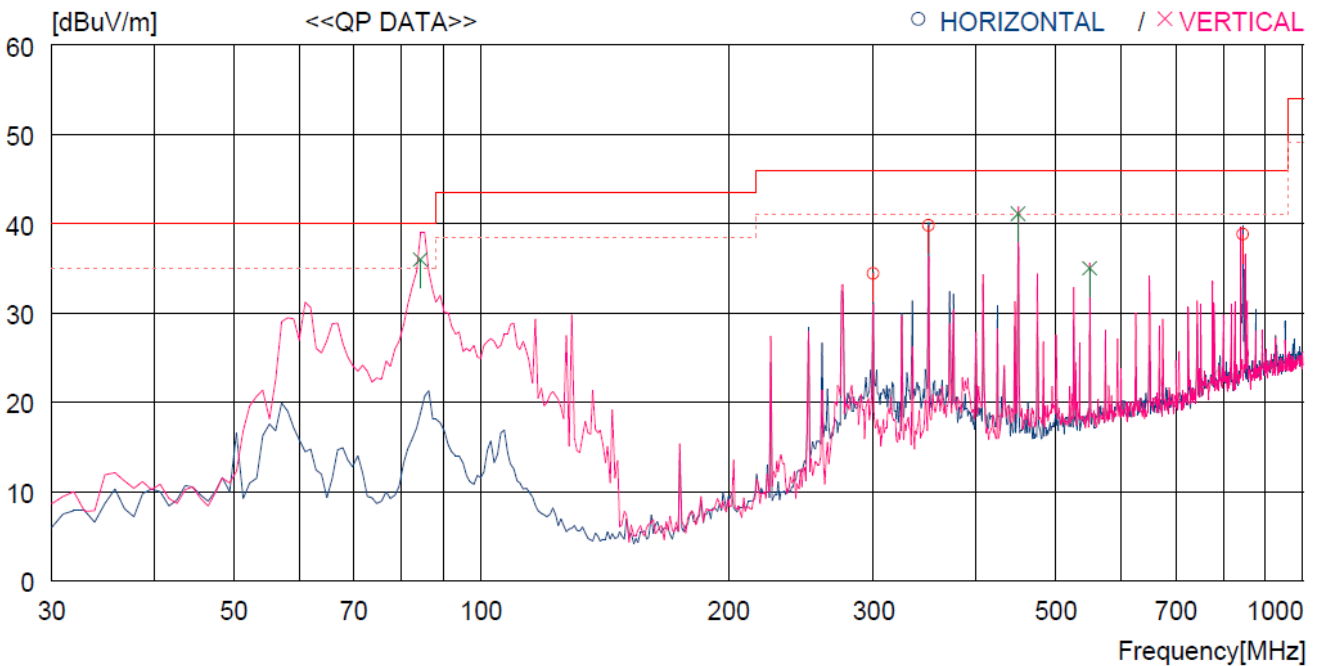
Result : PASSED

EUT : Video Doorbell

Date: May 03, 2016

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

-Ant0, Ant1 and Multiple transmit with Low, Middle and High Channels were tested, but the worst data were recorded.



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal -----										
1	299.660	48.9	13.6	4.6	32.7	34.4	46.0	11.6	100	356
2	350.100	52.7	14.7	5.0	32.6	39.8	46.0	6.2	100	300
3	844.791	42.7	21.5	8.1	33.5	38.8	46.0	7.2	100	356
----- Vertical -----										
4	84.320	58.1	8.6	2.5	33.2	36.0	40.0	4.0	100	5
5	450.011	51.6	16.6	5.7	32.8	41.1	46.0	4.9	100	25
6	549.919	43.5	18.2	6.3	33.0	35.0	46.0	11.0	100	12

11.5.3.2 Test data for Below 30 MHz

- . Test Date : May 03, 2016
- . Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- . Frequency range : 9 kHz ~ 30 MHz
- . Measurement distance : 3 m
- . 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.									

11.5.3.3 Test data for above 1 GHz

- . Test Date : May 03, 2016
- . Resolution bandwidth : 1 MHz for Peak and Average Mode
- . Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

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



Tested by: Tae-Ho, Kim / Project Engineer

12. CONDUCTED EMISSION TEST

12.1 Operating environment

Temperature : (21 ~ 22) °C
 Relative humidity : (42 ~ 43) % 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 μH + 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.

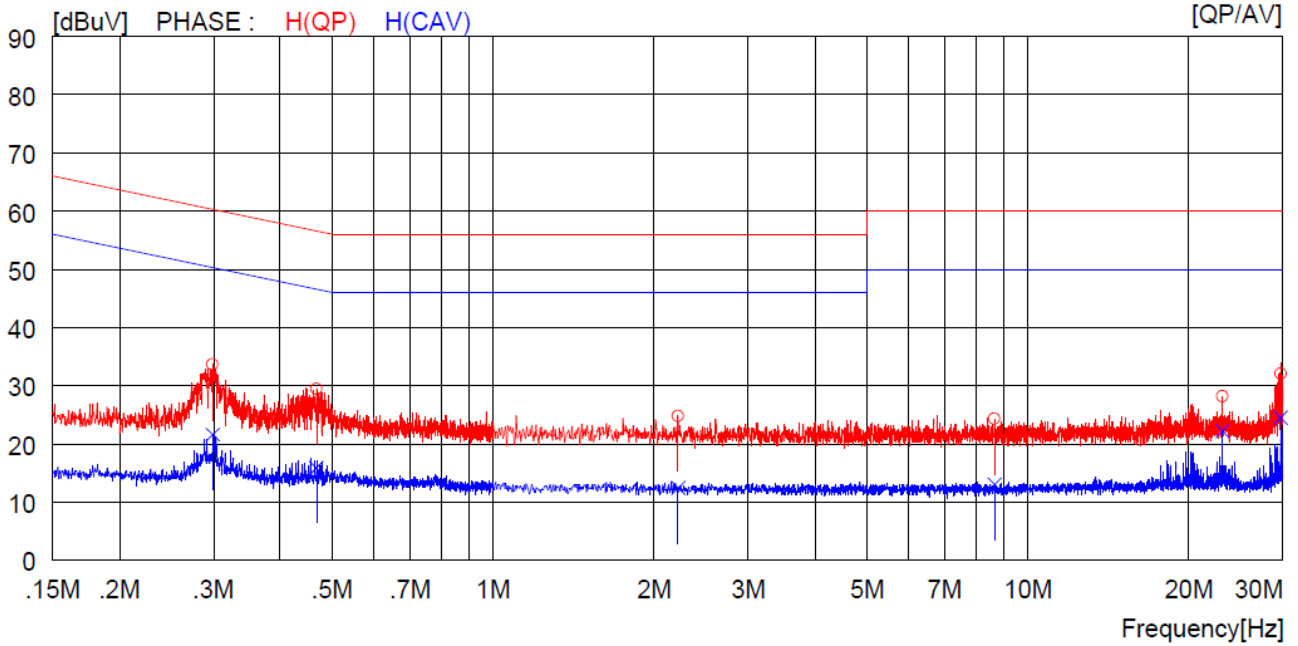
12.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - ESPI	Rohde & Schwarz	Test Receiver	101012	Nov. 02, 2015 (1Y)
□ - ESHS10	Rohde & Schwarz	Test Receiver	834467/007	Apr. 29, 2015 (1Y)
□ - NSLK8128	Schwarzbeck	AMN	8128-216	Apr. 06, 2015 (1Y)
■ - NSLK8126	Schwarzbeck	AMN	8126-404	Apr. 29, 2015 (1Y)
□ - 3825/2	EMCO	AMN	9109-1869	Apr. 29, 2015 (1Y)
■ - 3825/2	EMCO	AMN	9109-1867	Apr. 29, 2015 (1Y)

All test equipment used is calibrated on a regular basis.

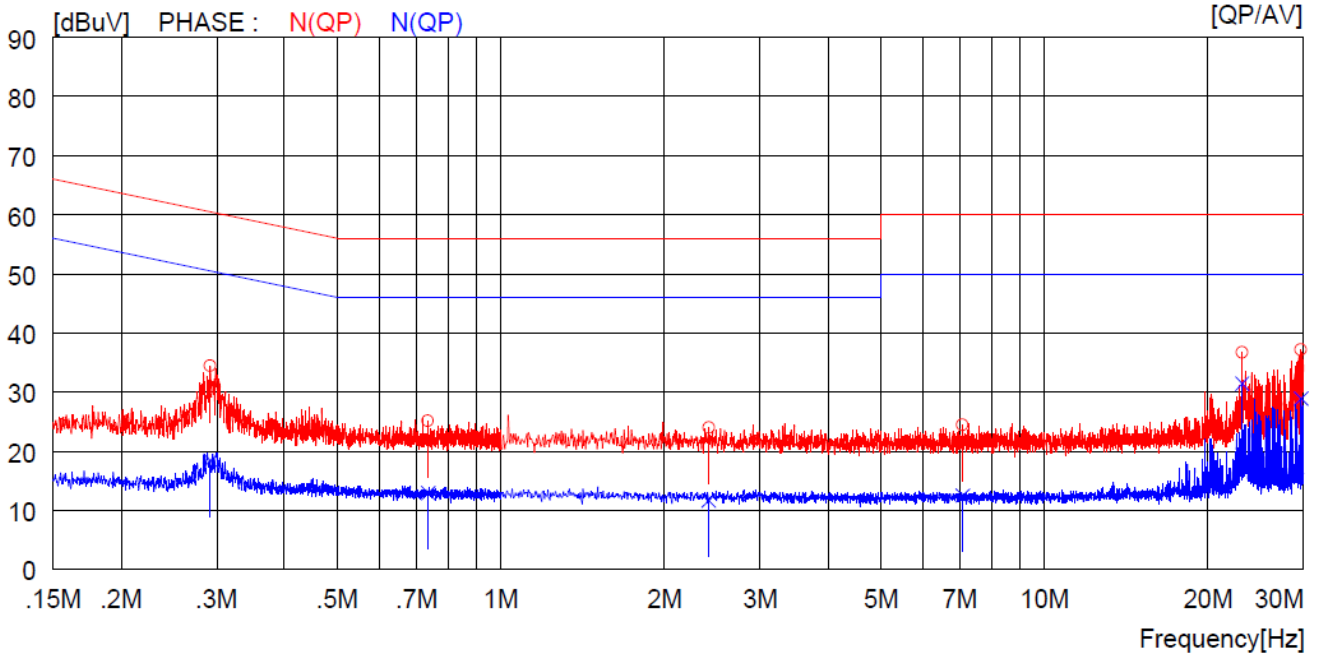
12.4 Test data for AC 12 V

- Test Date : May 03, 2016
- 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	0.29900	23.5	----	10.1	33.6	----	60.3	----	26.7	----	H (QP)
2	0.46700	19.3	----	10.1	29.4	----	56.6	----	27.2	----	H (QP)
3	2.22000	14.7	----	10.1	24.8	----	56.0	----	31.2	----	H (QP)
4	8.66500	14.1	----	10.2	24.3	----	60.0	----	35.7	----	H (QP)
5	23.13000	17.6	----	10.6	28.2	----	60.0	----	31.8	----	H (QP)
6	29.72000	21.3	----	10.7	32.0	----	60.0	----	28.0	----	H (QP)
7	0.29900	----	11.5	10.1	----	21.6	----	50.3	----	28.7	H (CAV)
8	0.46700	----	5.8	10.1	----	15.9	----	46.6	----	30.7	H (CAV)
9	2.22000	----	2.3	10.1	----	12.4	----	46.0	----	33.6	H (CAV)
10	8.66500	----	2.8	10.2	----	13.0	----	50.0	----	37.0	H (CAV)
11	23.13000	----	11.6	10.6	----	22.2	----	50.0	----	27.8	H (CAV)
12	29.72000	----	13.8	10.7	----	24.5	----	50.0	----	25.5	H (CAV)

- Test 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	0.29200	24.3	----	10.1	34.4	----	60.5	----	26.1	----	N (QP)
2	0.73500	15.0	----	10.1	25.1	----	56.0	----	30.9	----	N (QP)
3	2.41200	13.9	----	10.1	24.0	----	56.0	----	32.0	----	N (QP)
4	7.08000	14.3	----	10.2	24.5	----	60.0	----	35.5	----	N (QP)
5	23.13000	26.1	----	10.6	36.7	----	60.0	----	23.3	----	N (QP)
6	29.70000	26.5	----	10.7	37.2	----	60.0	----	22.8	----	N (QP)
7	0.29200	----	8.3	10.1	----	18.4	----	50.5	----	32.1	N (CAV)
8	0.73500	----	2.8	10.1	----	12.9	----	46.0	----	33.1	N (CAV)
9	2.41200	----	1.5	10.1	----	11.6	----	46.0	----	34.4	N (CAV)
10	7.08000	----	2.3	10.2	----	12.5	----	50.0	----	37.5	N (CAV)
11	23.13000	----	20.8	10.6	----	31.4	----	50.0	----	18.6	N (CAV)
12	29.70000	----	18.2	10.7	----	28.9	----	50.0	----	21.1	N (CAV)

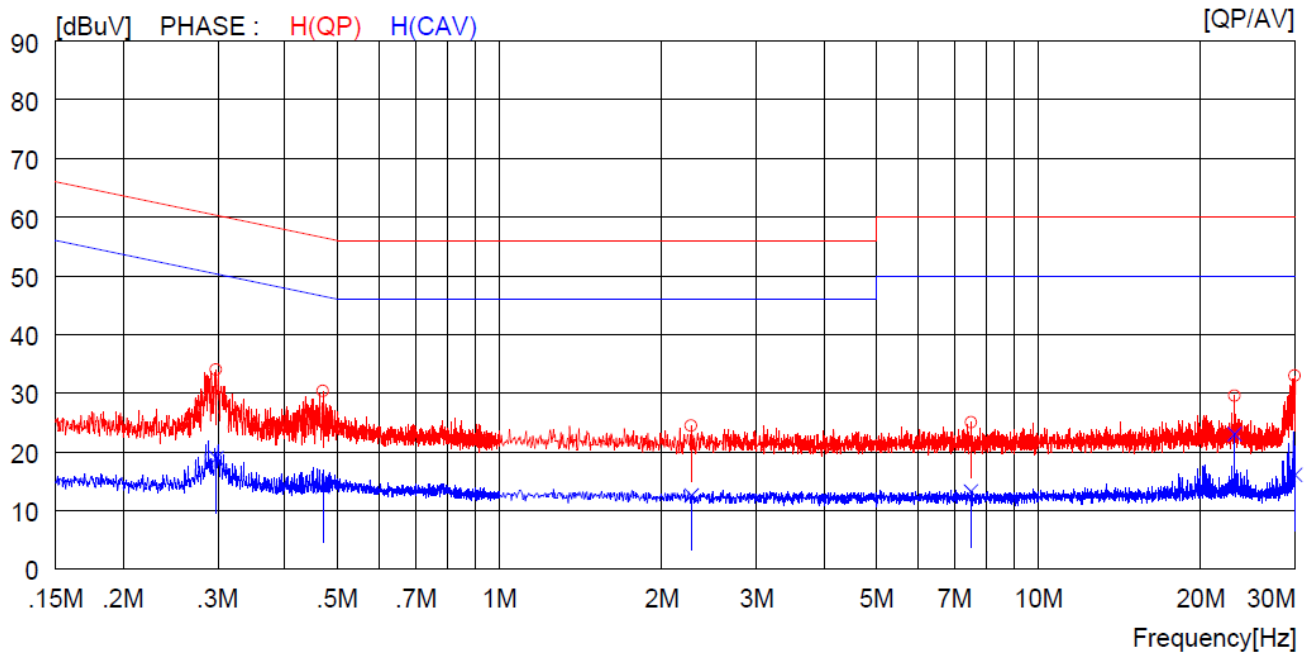
Remark: Margin (dB) = Limit – Level (Result)

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

Tested by: Tae-Ho, Kim / Project Engineer

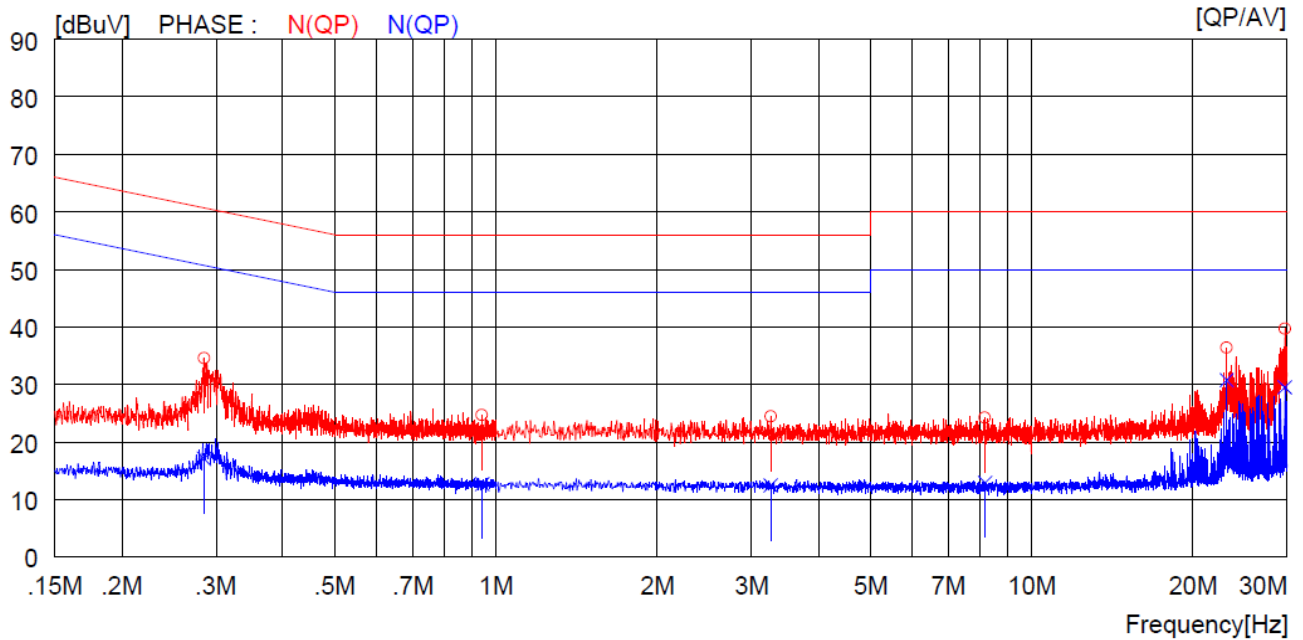
12.5 Test data for AC 24 V

- Test Date : May 03, 2016
- 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	0.29800	23.9	----	10.1	34.0	----	60.3	----	26.3	----	H (QP)
2	0.47000	20.2	----	10.1	30.3	----	56.5	----	26.2	----	H (QP)
3	2.27200	14.3	----	10.1	24.4	----	56.0	----	31.6	----	H (QP)
4	7.50500	14.8	----	10.2	25.0	----	60.0	----	35.0	----	H (QP)
5	23.13000	19.0	----	10.6	29.6	----	60.0	----	30.4	----	H (QP)
6	29.92000	22.3	----	10.7	33.0	----	60.0	----	27.0	----	H (QP)
7	0.29800	----	8.8	10.1	----	18.9	----	50.3	----	31.4	H (CAV)
8	0.47000	----	3.9	10.1	----	14.0	----	46.5	----	32.5	H (CAV)
9	2.27200	----	2.5	10.1	----	12.6	----	46.0	----	33.4	H (CAV)
10	7.50500	----	3.0	10.2	----	13.2	----	50.0	----	36.8	H (CAV)
11	23.13000	----	12.4	10.6	----	23.0	----	50.0	----	27.0	H (CAV)
12	29.92000	----	5.4	10.7	----	16.1	----	50.0	----	33.9	H (CAV)

- Test 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	0.28500	24.4	----	10.1	34.5	----	60.7	----	26.2	----	N (QP)
2	0.94200	14.6	----	10.1	24.7	----	56.0	----	31.3	----	N (QP)
3	3.25600	14.3	----	10.1	24.4	----	56.0	----	31.6	----	N (QP)
4	8.19000	14.0	----	10.2	24.2	----	60.0	----	35.8	----	N (QP)
5	23.13000	25.8	----	10.6	36.4	----	60.0	----	23.6	----	N (QP)
6	29.71000	29.0	----	10.7	39.7	----	60.0	----	20.3	----	N (QP)
7	0.28500	----	7.0	10.1	----	17.1	----	50.7	----	33.6	N (CAV)
8	0.94200	----	2.6	10.1	----	12.7	----	46.0	----	33.3	N (CAV)
9	3.25600	----	2.3	10.1	----	12.4	----	46.0	----	33.6	N (CAV)
10	8.19000	----	2.7	10.2	----	12.9	----	50.0	----	37.1	N (CAV)
11	23.13000	----	20.2	10.6	----	30.8	----	50.0	----	19.2	N (CAV)
12	29.71000	----	18.8	10.7	----	29.5	----	50.0	----	20.5	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: Tae-Ho, Kim / Project Engineer