7.3.7.3 Test data for 802.11n_HT20 Mode

-. Test Date : January 28, 2014

-. Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode
1 GHz above 1MHz for Peak and Average Mode

-. Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode
1 GHz above 1MHz for Peak and 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Result : PASSED

Frequency (GHz)	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									
2 412.00	98.12	Peak	H	27.10	7.90	43.00	90.12	113.98	23.86
	89.36	Average	H				81.36	93.98	12.62
	96.12	Peak	V				88.12	113.98	25.86
	87.32	Average	V				79.32	93.98	14.66
4 824.00	48.25	Peak	H	30.70	11.90	42.50	48.35	73.98	25.63
	37.01	Average	H				37.11	53.98	16.87
	46.25	Peak	V				46.35	73.98	27.63
	32.42	Average	V				32.52	53.98	21.46
Test Data for Middle Channel									
2 442.00	98.98	Peak	H	27.20	7.90	43.00	91.08	113.98	22.90
	90.74	Average	H				82.84	93.98	11.14
	97.04	Peak	V				89.14	113.98	24.84
	88.21	Average	V				80.31	93.98	13.67
4 884.00	48.36	Peak	H	30.70	12.00	42.40	48.66	73.98	25.32
	37.63	Average	H				37.93	53.98	16.05
	46.93	Peak	V				47.23	73.98	26.75
	33.21	Average	V				33.51	53.98	20.47

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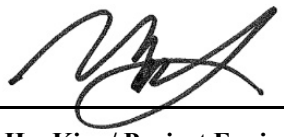
Test Data for High Channel									
2 462.00	99.26	Peak	H	27.30	8.00	43.00	91.56	113.98	22.42
	90.57	Average	H				82.87	93.98	11.11
	97.11	Peak	V				89.41	113.98	24.57
	88.80	Average	V				81.10	93.98	12.88
4 924.00	48.96	Peak	H	30.80	12.00	42.30	49.46	73.98	24.52
	38.04	Average	H				38.54	53.98	15.44
	47.94	Peak	V				48.44	73.98	25.54
	33.84	Average	V				34.34	53.98	19.64

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 / Project Engineer

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7.3.7.4 Test data for 802.11n_HT40 Mode

-. Test Date : January 28, 2014

-. Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode
1 GHz above 1MHz for Peak and Average Mode

-. Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode
1 GHz above 1MHz for Peak and 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Result : PASSED

Frequency (GHz)	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									
2 422.00	99.03	Peak	H	27.10	7.90	43.00	91.03	113.98	22.95
	90.21	Average	H				82.21	93.98	11.77
	96.87	Peak	V				88.87	113.98	25.11
	87.04	Average	V				79.04	93.98	14.94
4 844.00	48.87	Peak	H	30.70	12.00	42.40	49.17	73.98	24.81
	37.74	Average	H				38.04	53.98	15.94
	47.14	Peak	V				47.44	73.98	26.54
	32.64	Average	V				32.94	53.98	21.04
Test Data for Middle Channel									
2 442.00	99.97	Peak	H	27.20	7.90	43.00	92.07	113.98	21.91
	91.63	Average	H				83.73	93.98	10.25
	97.92	Peak	V				90.02	113.98	23.96
	89.12	Average	V				81.22	93.98	12.76
4 884.00	48.83	Peak	H	30.70	12.00	42.40	49.13	73.98	24.85
	38.11	Average	H				38.41	53.98	15.57
	47.48	Peak	V				47.78	73.98	26.20
	33.79	Average	V				34.09	53.98	19.89

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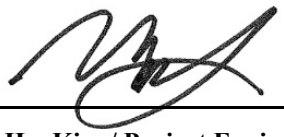
Test Data for High Channel									
2 452.00	100.12	Peak	H	27.50	8.10	43.00	92.72	113.98	21.26
	90.86	Average	H				83.46	93.98	10.52
	97.42	Peak	V				90.02	113.98	23.96
	89.14	Average	V				81.74	93.98	12.24
4 904.00	49.42	Peak	H	30.80	12.00	42.30	49.92	73.98	24.06
	38.63	Average	H				39.13	53.98	14.85
	48.42	Peak	V				48.92	73.98	25.06
	34.38	Average	V				34.88	53.98	19.10

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 / Project Engineer

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7.4 PEAK POWER SPECTRUL DENSITY

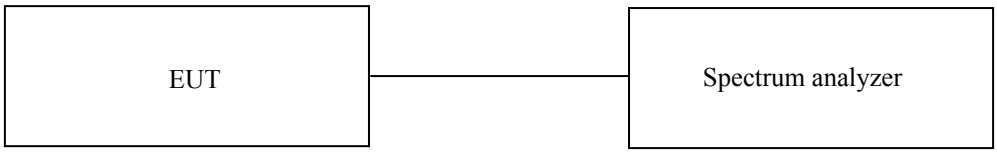
7.4.1 Operating environment

Temperature : 20 °C

Relative humidity : 40 % R.H.

7.4.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 3 kHz, the video bandwidth is set to 3 times the resolution bandwidth. The maximum level form the EUT in 100 kHz bandwidth was measured with above condition.



7.4.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV30	R/S	Spectrum Analyzer	101372	May 20, 2013

All test equipment used is calibrated on a regular basis.

7.4.4 Test data for 802.11b Mode

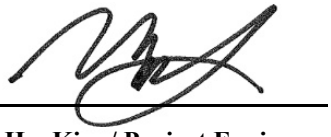
-. Test Date : January 28, 2014

-. Test Result : Pass

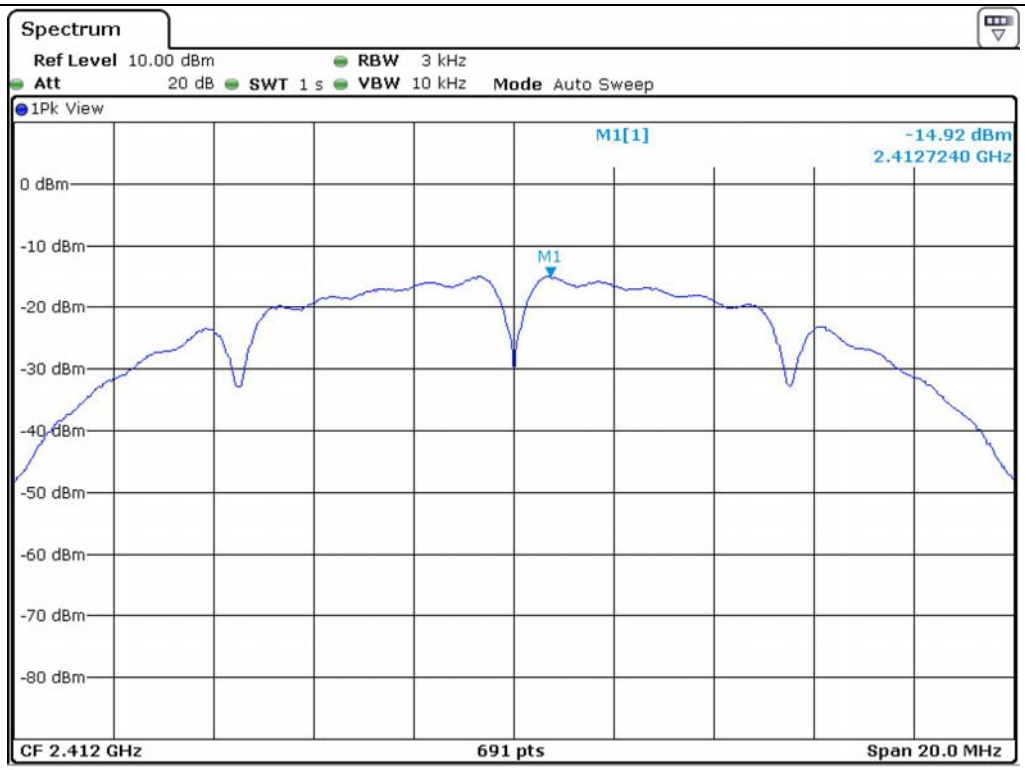
-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-14.92	8.00	22.92
Middle	2 442	-14.77	8.00	22.77
High	2 462	-14.78	8.00	22.78

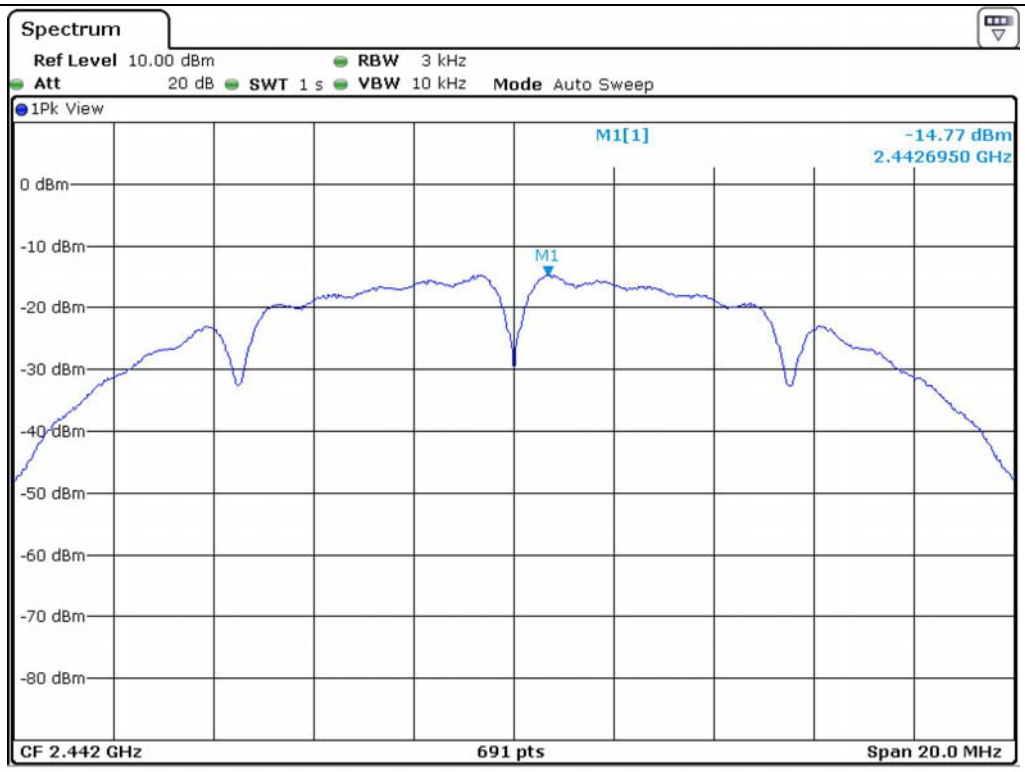
Remark. Margin = Limit – Measured value



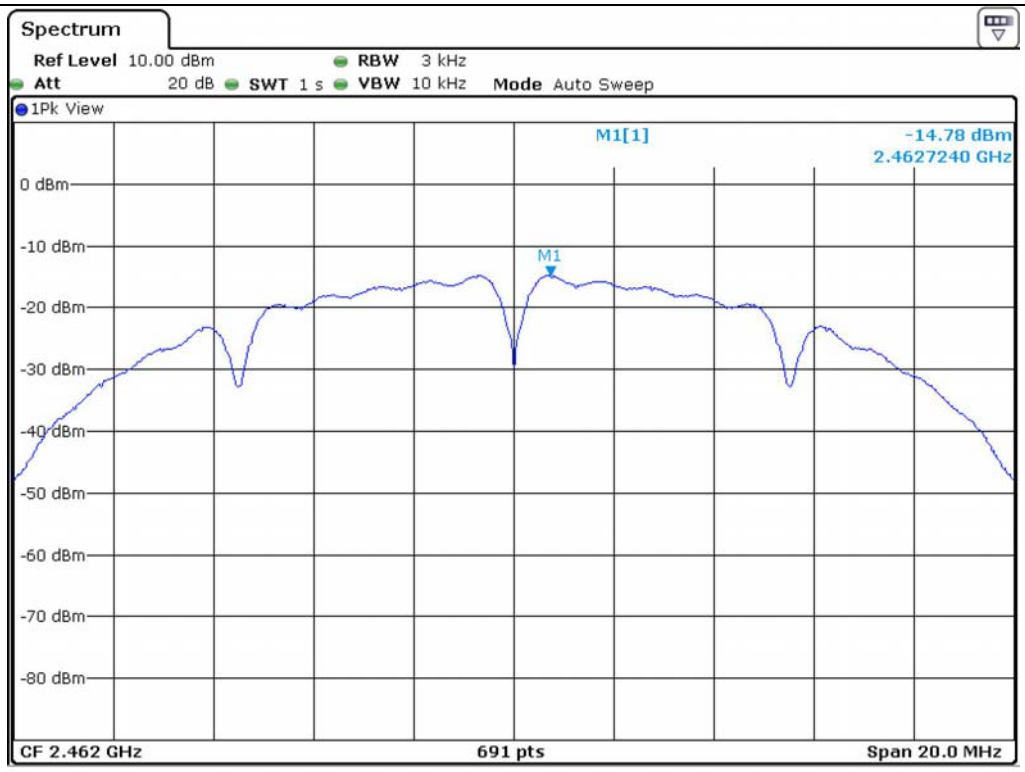
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

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7.4.5 Test data for 802.11g Mode

-. Test Date : January 28, 2014

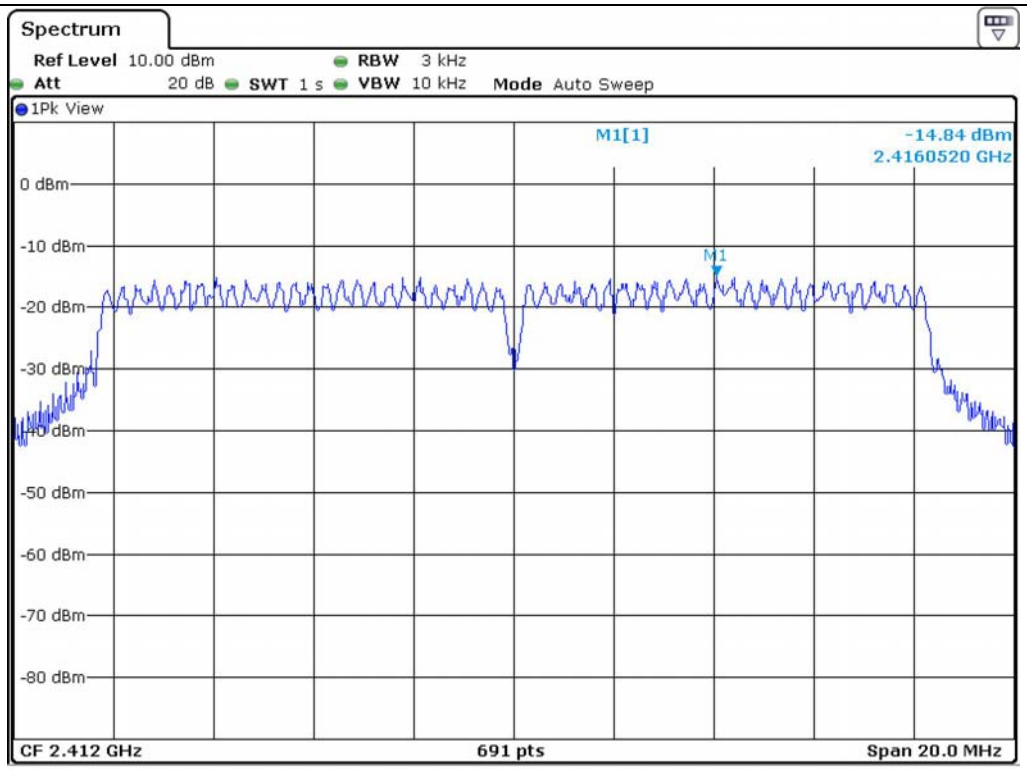
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

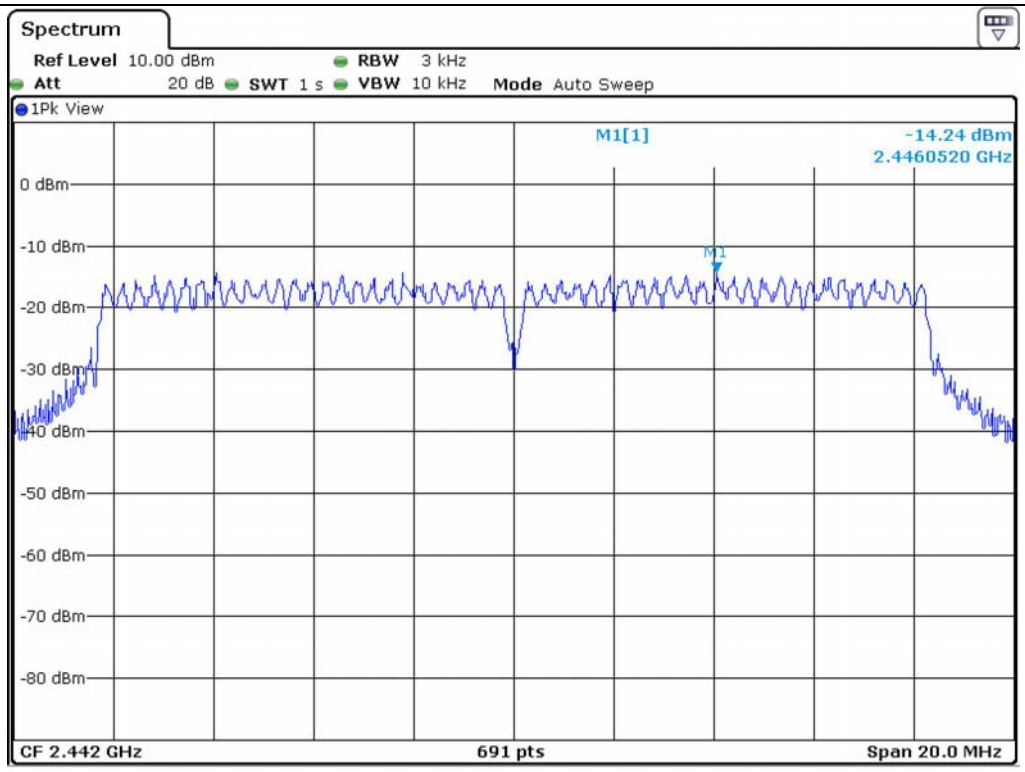
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-14.84	8.00	22.84
Middle	2 442	-14.24	8.00	22.24
High	2 462	-14.30	8.00	22.30

Remark. Margin = Limit – Measured value

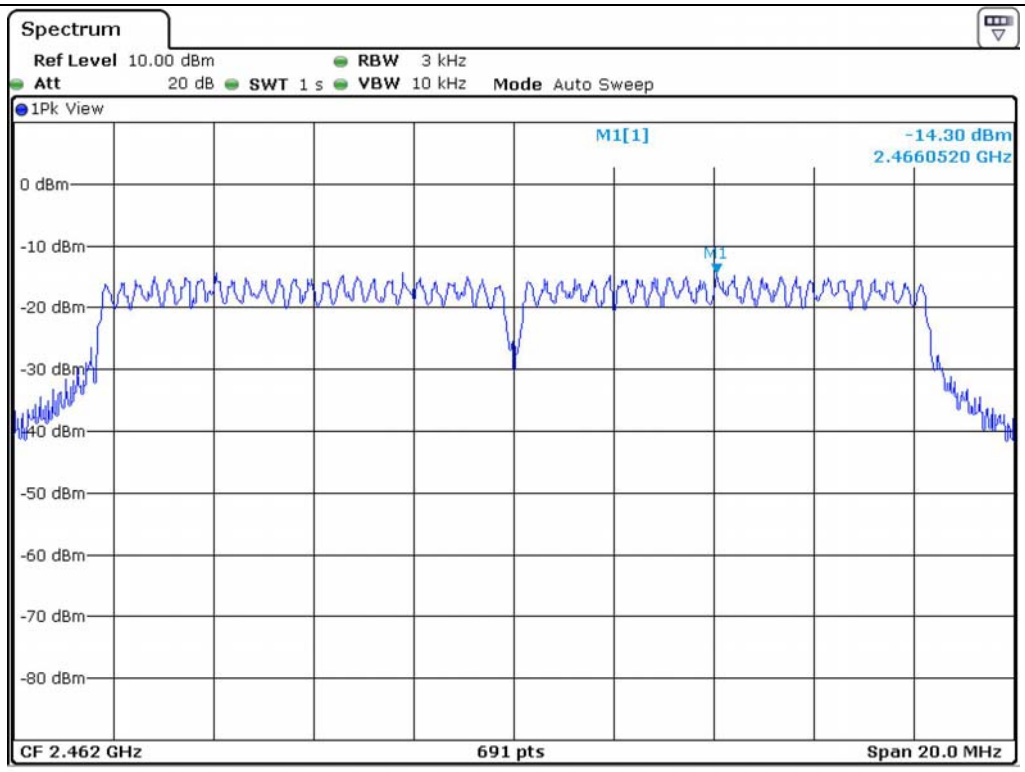
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

7.4.6 Test data for 802.11n_HT20 Mode

-. Test Date : January 28, 2014

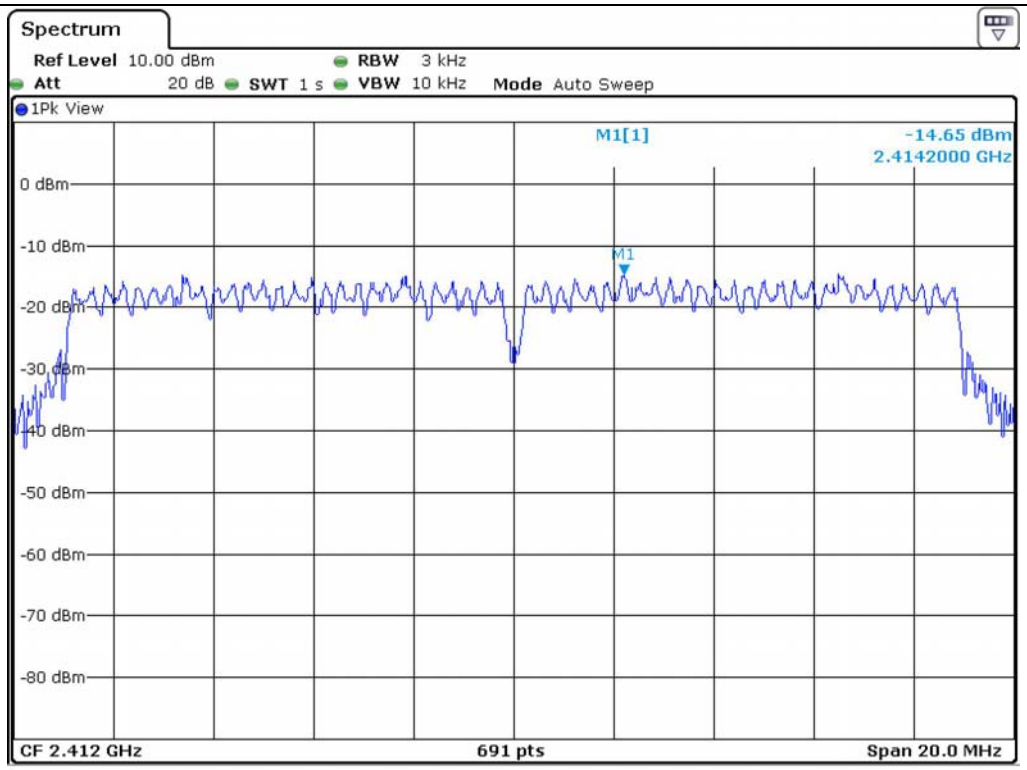
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

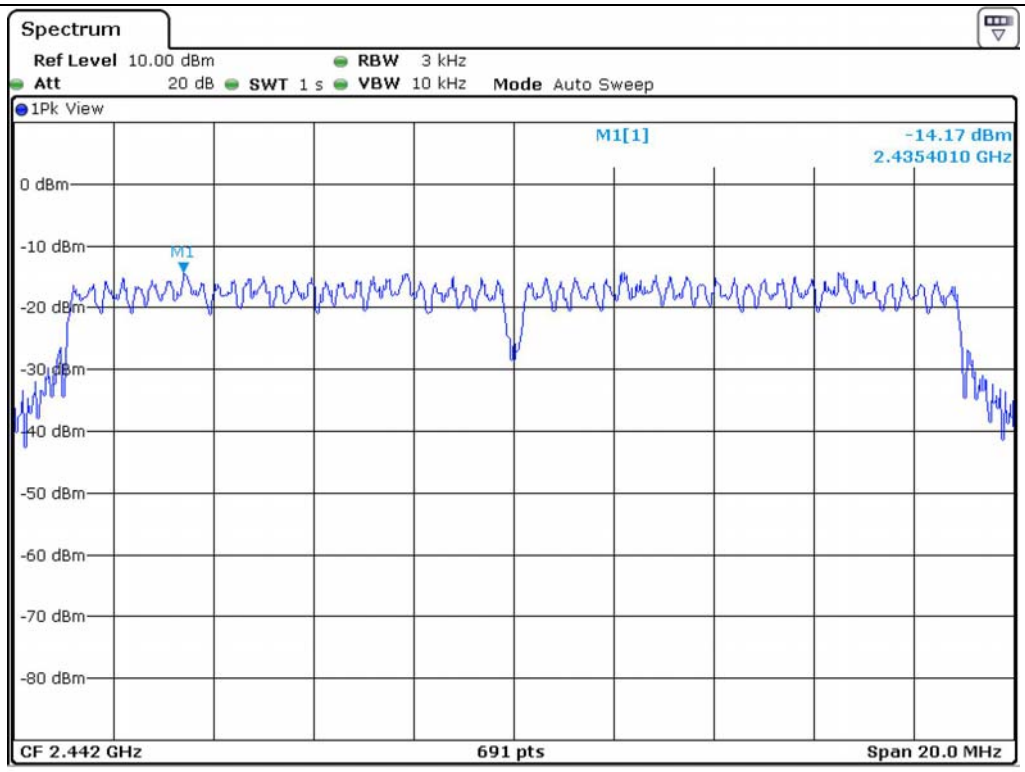
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412	-14.65	8.00	22.65
Middle	2 442	-14.17	8.00	22.17
High	2 462	-13.82	8.00	21.82

Remark. Margin = Limit – Measured value

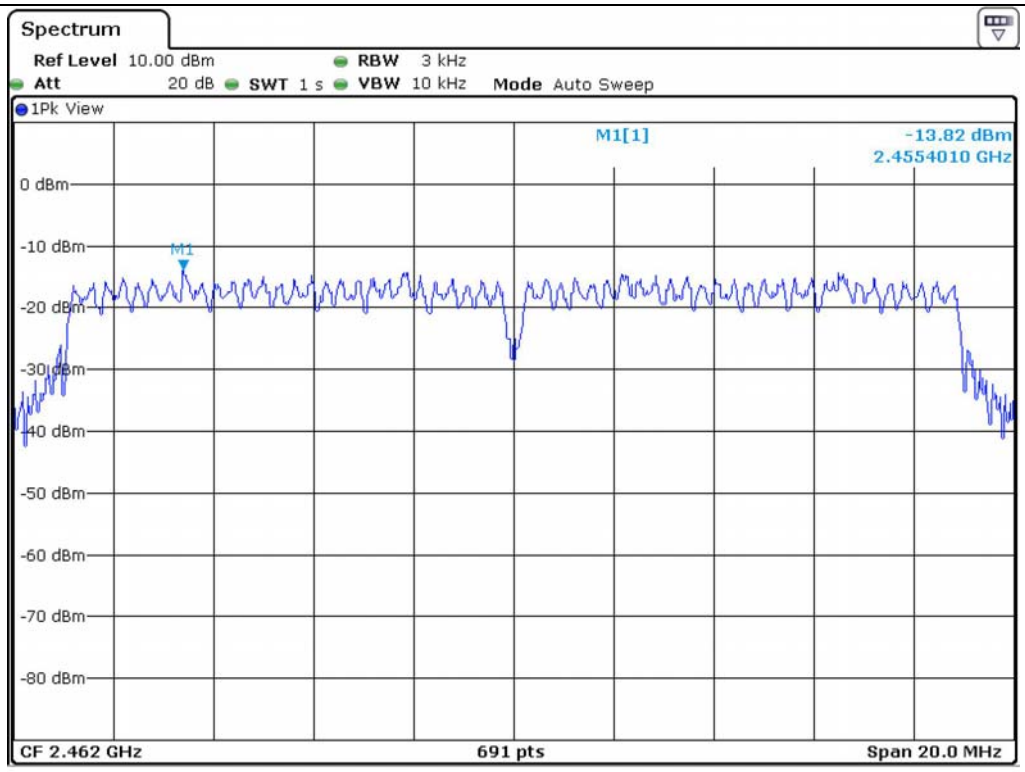
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

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7.4.7 Test data for 802.11n_HT40 Mode

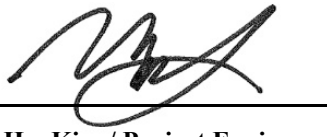
-. Test Date : January 28, 2014

-. Test Result : Pass

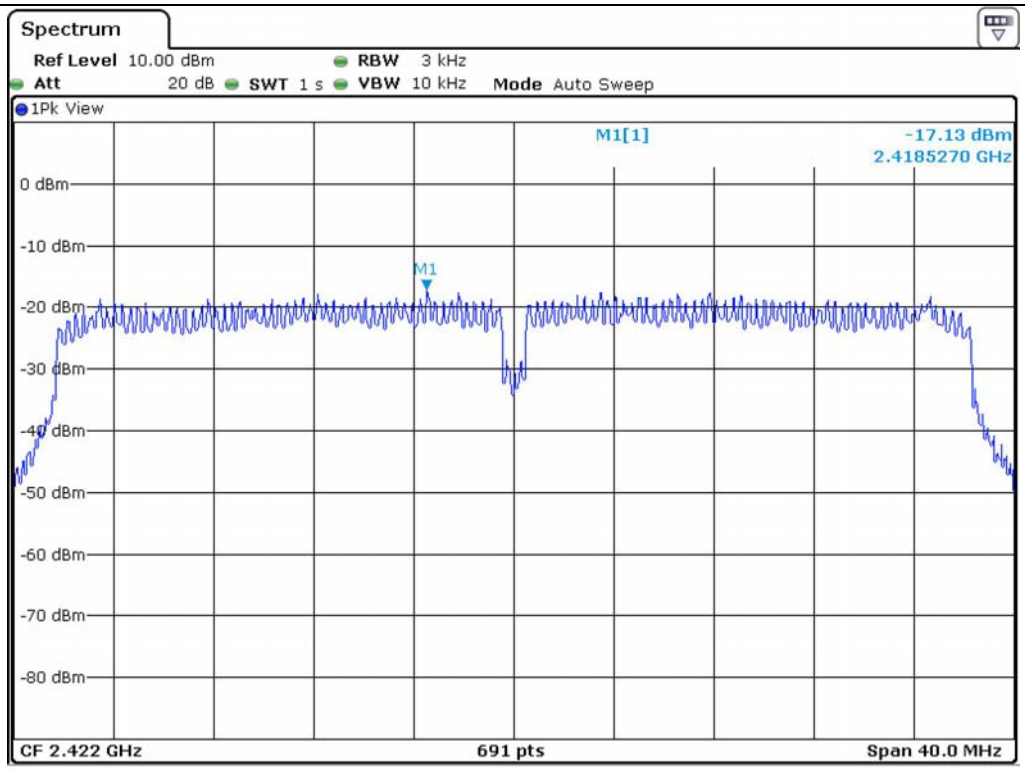
-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422	-17.13	8.00	25.13
Middle	2 442	-17.10	8.00	25.10
High	2 452	-16.71	8.00	24.71

Remark. Margin = Limit – Measured value



Tested by: Tae-Ho, Kim / Project Engineer



Low Channel

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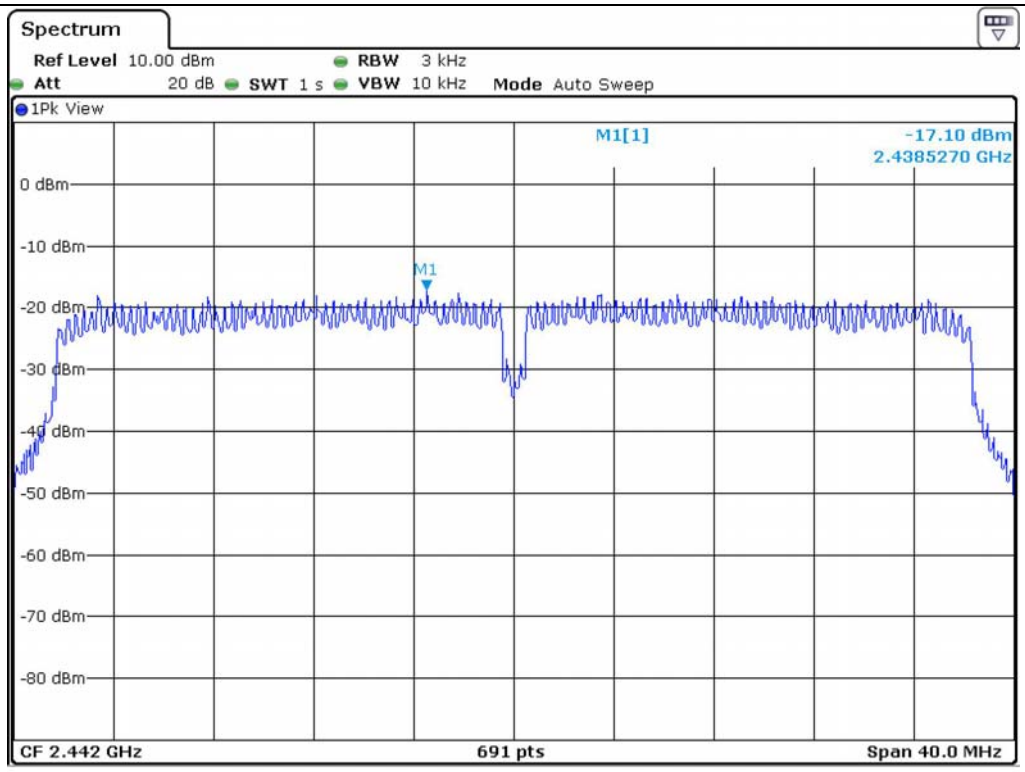
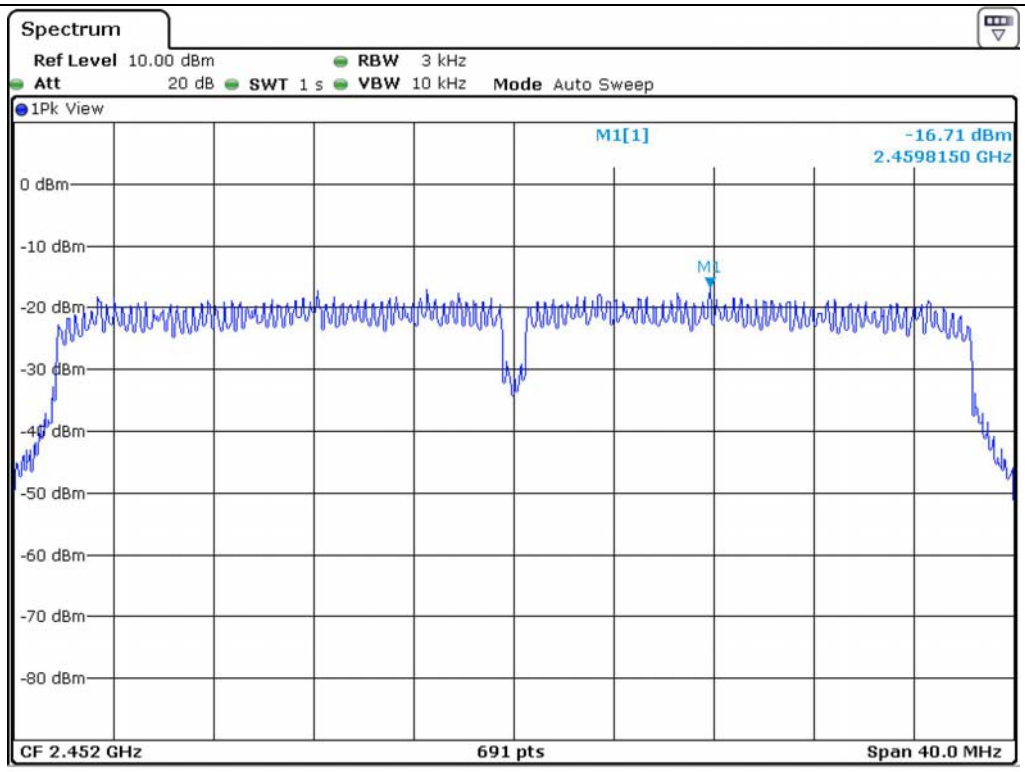


Middle Channel



High Channel

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7.5 RADIATED EMISSION TEST

7.5.1 Operating environment

Temperature : (21 ~ 22) °C

Relative humidity : (43 ~ 44) % R.H.

7.5.2 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 up to 25 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.

7.5.3 Measurement uncertainty

Radiated emission electric field intensity, 0.15 MHz ~ 30 MHz : ± 2.61 dB

Radiated emission electric field intensity, 30 MHz ~ 300 MHz : ± 4.43 dB

Radiated emission electric field intensity, 300 MHz ~ 1 000 MHz : ± 3.80 dB

Radiated emission electric field intensity, 1 000 MHz ~ 3 000 MHz: ± 4.40 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2. The measurement uncertainty is given with a confidence of 95 % with the coverage factor, $k = 2$.

7.5.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
☐ -	ESCI	Rohde & Schwarz	EMI Test Receiver	101012	Nov. 18, 2013(1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	May 27, 2013(1Y)
☐ -	8564E	HP	Spectrum Analyzer	3650A00756	May 03, 2013(1Y)
☐ -	FSP	Rohde & Schwarz	Spectrum Analyzer	100017	Nov. 05, 2013(1Y)
■ -	310N	Sonoma Instrument	AMPLIFIER	312544	May 21, 2013(1Y)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 20, 2013(1Y)
■ -	SCU-18	Rohde & Schwarz	PRE-AMPLIFIER	10041	Jan. 20, 2014(1Y)
■ -	MA240	HD GmbH	Antenna Master	N/A	N/A
■ -	HD100	HD GmbH	Position Controller	N/A	N/A
■ -	DS420S	HD GmbH	Turn Table	N/A	N/A
■ -	HFH2-Z2	Rohde & Schwarz	Loop Antenna	879 285/26	Dec. 11, 2012(2Y)
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-255	Apr. 24, 2012(2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Sep. 05, 2013(2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jun. 17, 2013(2Y)
■ -	83051A	Agilent	Microwave System Preamplifer	3950M00201	May 22, 2013(1Y)

All test equipment used is calibrated on a regular basis.

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7.5.5 Test data for 802.11b Mode

7.5.5.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (43 ~ 44) % R.H. Temperature: (21 ~ 22) °C

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

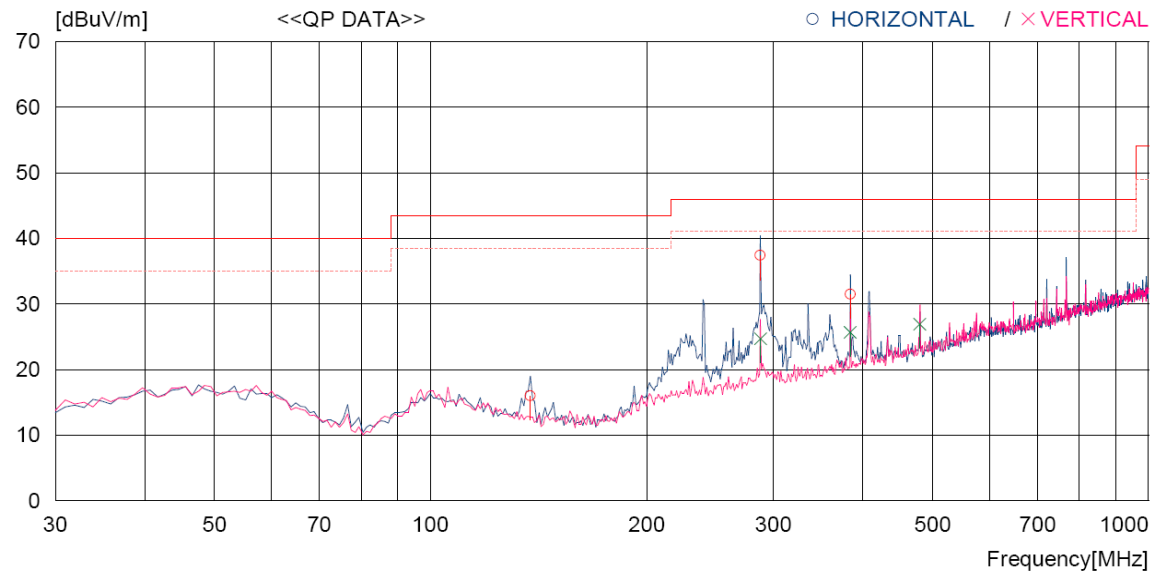
Result : PASSED

EUT : Remote Control Date: January 27, 2014

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

Operating condition : Low Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

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	137.670	31.4	9.4	8.3	33.1	16.0	43.5	27.5	100	359
2	288.020	46.5	14.5	9.4	33.0	37.4	46.0	8.6	100	219
3	384.050	38.0	16.6	9.9	33.0	31.5	46.0	14.5	100	342
----- Vertical ------										
4	288.020	33.8	14.5	9.4	33.0	24.7	46.0	21.3	100	0
5	384.050	32.2	16.6	9.9	33.0	25.7	46.0	20.3	100	169
6	480.081	31.4	18.1	10.5	33.1	26.9	46.0	19.1	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

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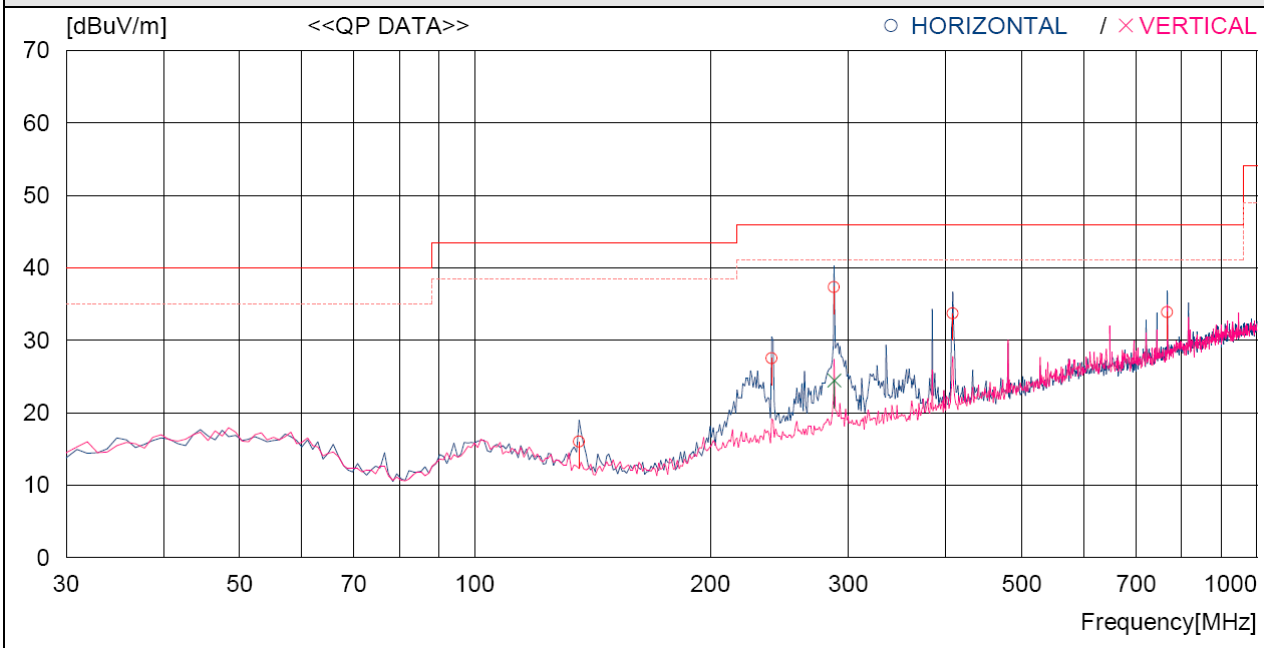
Operating condition : Middle Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	135.730	31.2	9.6	8.3	33.1	16.0	43.5	27.5	100	359
2	239.520	38.1	13.3	9.1	33.0	27.5	46.0	18.5	100	359
3	288.020	46.4	14.5	9.4	33.0	37.3	46.0	8.7	100	40
4	408.300	39.6	17.0	10.1	33.0	33.7	46.0	12.3	100	74
5	768.163	33.4	21.8	11.9	33.2	33.9	46.0	12.1	100	274
----- Vertical ------										
6	288.020	33.5	14.5	9.4	33.0	24.4	46.0	21.6	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

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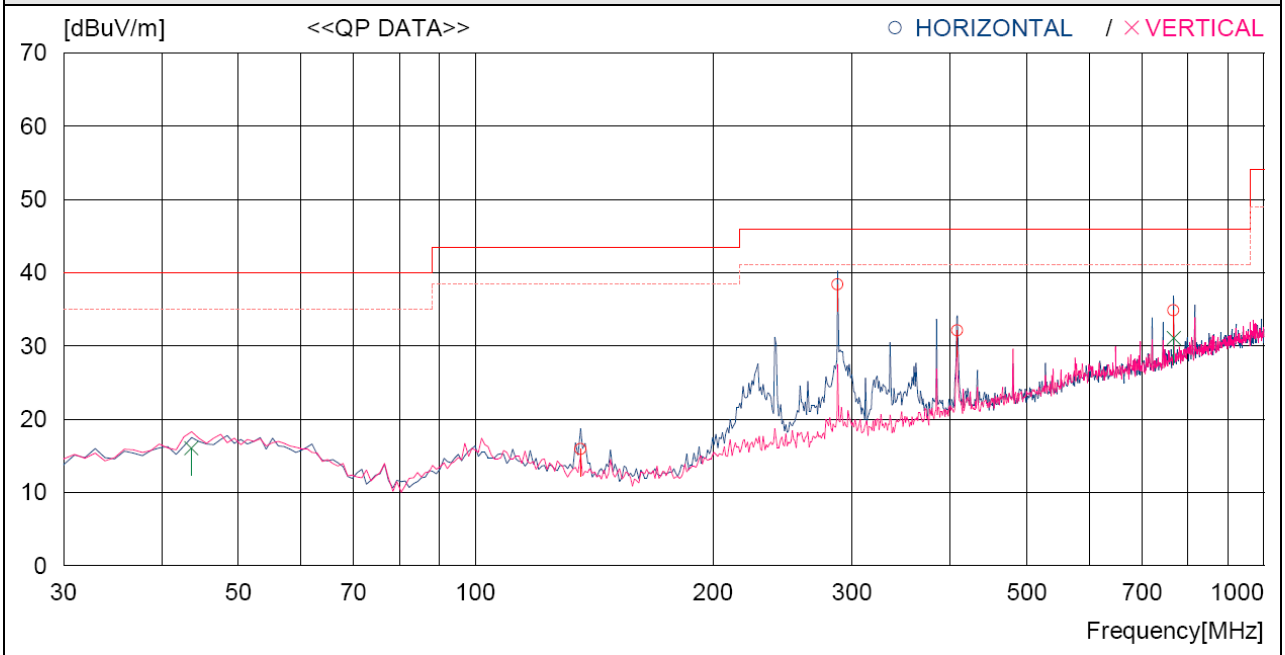
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

Operating condition : High Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	135.730	31.1	9.6	8.3	33.1	15.9	43.5	27.6	100	359
2	288.020	47.5	14.5	9.4	33.0	38.4	46.0	7.6	100	359
3	408.300	38.0	17.0	10.1	33.0	32.1	46.0	13.9	100	359
4	768.163	34.3	21.8	11.9	33.2	34.8	46.0	11.2	100	359
----- Vertical ------										
5	43.580	26.8	15.1	7.3	33.2	16.0	40.0	24.0	100	0
6	768.163	30.6	21.8	11.9	33.2	31.1	46.0	14.9	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Tested by: Tae-Ho, Kim / Project Engineer

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

7.5.5.2 Test data for Below 30 MHz

-. Test Date : January 27, 2014

-. 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

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.									

7.5.5.3 Test data for above 1 GHz

-. Test Date : January 27, 2014

-. 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

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

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

7.5.6 Test data for 802.11g Mode

7.5.6.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (43 ~ 44) % R.H. Temperature: (21 ~ 22) °C

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

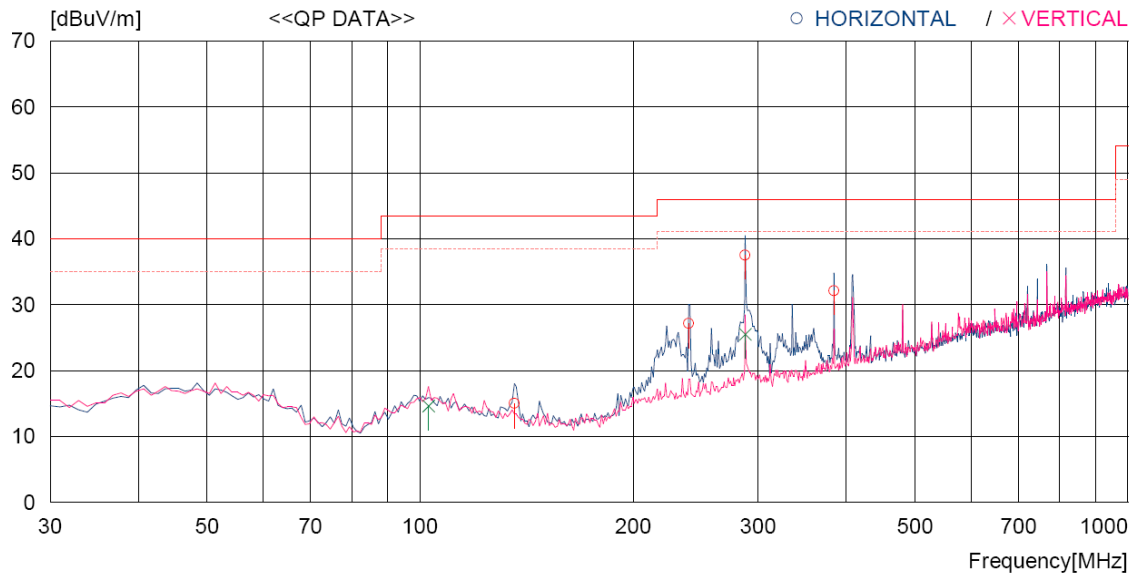
Result : PASSED

EUT : Remote Control Date: January 27, 2014

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

Operating condition : Low Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

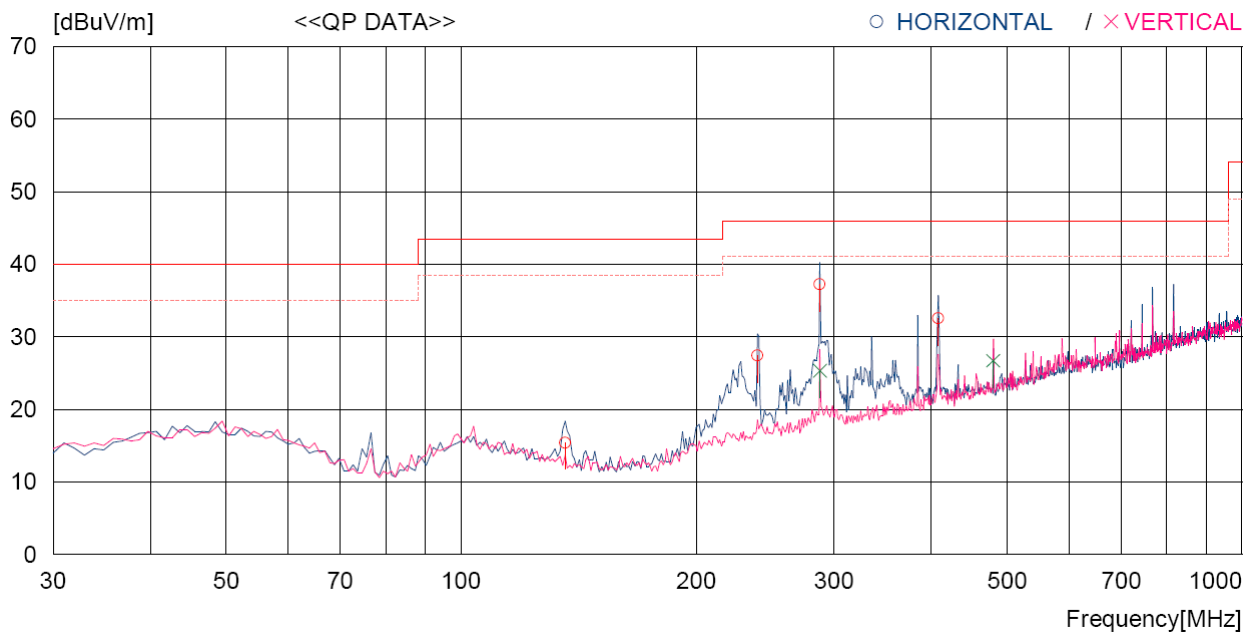
No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	135.730	30.2	9.6	8.3	33.1	15.0	43.5	28.5	100	191
2	239.520	37.7	13.3	9.1	33.0	27.1	46.0	18.9	100	359
3	288.020	46.6	14.5	9.4	33.0	37.5	46.0	8.5	100	212
4	384.050	38.6	16.6	9.9	33.0	32.1	46.0	13.9	100	149
----- Vertical ------										
5	102.750	26.3	13.4	8.0	33.1	14.6	43.5	28.9	100	0
6	288.020	34.6	14.5	9.4	33.0	25.5	46.0	20.5	100	320

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

Operating condition : Middle Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	135.730	30.6	9.6	8.3	33.1	15.4	43.5	28.1	100	359
2	239.520	38.0	13.3	9.1	33.0	27.4	46.0	18.6	100	204
3	288.020	46.3	14.5	9.4	33.0	37.2	46.0	8.8	100	359
4	408.300	38.4	17.0	10.1	33.0	32.5	46.0	13.5	100	108
----- Vertical ------										
5	288.020	34.4	14.5	9.4	33.0	25.3	46.0	20.7	100	0
6	480.081	31.2	18.1	10.5	33.1	26.7	46.0	19.3	100	321

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

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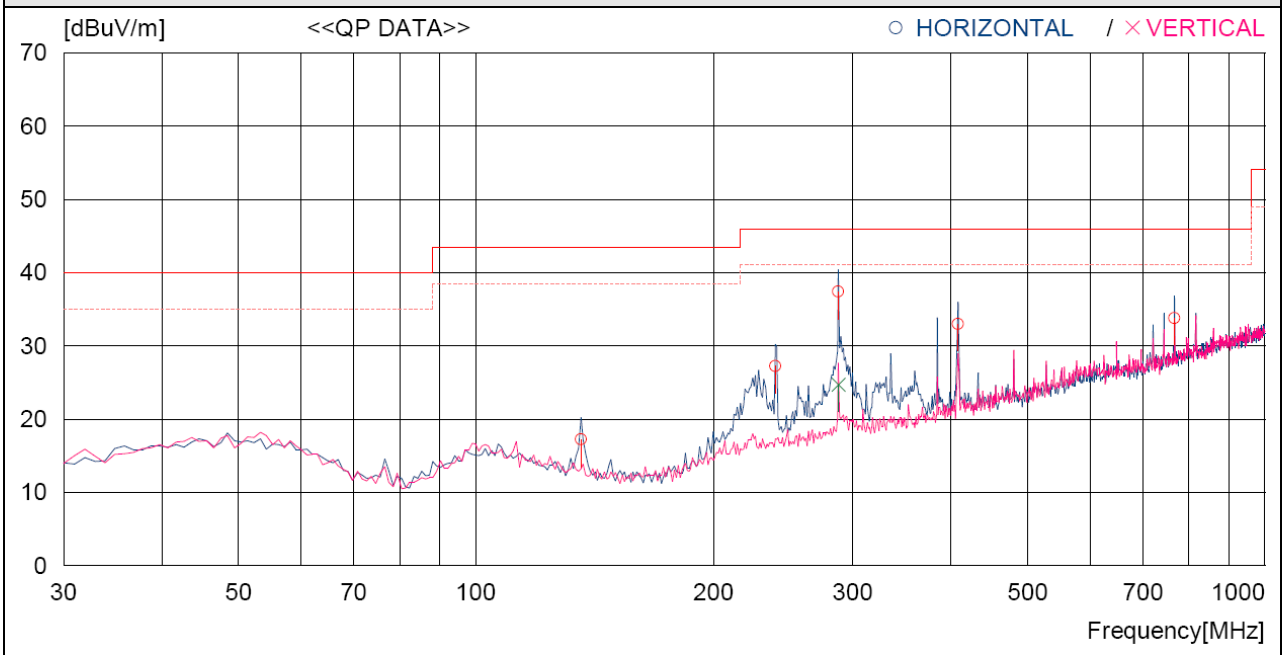
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

Operating condition : High Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	135.730	32.4	9.6	8.3	33.1	17.2	43.5	26.3	100	2
2	239.520	37.8	13.3	9.1	33.0	27.2	46.0	18.8	100	211
3	288.020	46.5	14.5	9.4	33.0	37.4	46.0	8.6	100	359
4	408.300	38.9	17.0	10.1	33.0	33.0	46.0	13.0	100	87
5	768.163	33.3	21.8	11.9	33.2	33.8	46.0	12.2	100	266
----- Vertical ------										
6	288.020	33.8	14.5	9.4	33.0	24.7	46.0	21.3	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Tested by: Tae-Ho, Kim / Project Engineer

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

7.5.6.2 Test data for Below 30 MHz

-. Test Date : January 27, 2014

-. 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

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.									

7.5.6.3 Test data for above 1 GHz

-. Test Date : January 27, 2014

-. 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

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

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

7.5.7 Test data for 802.11n_HT20 Mode

7.5.7.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (43 ~ 44) % R.H. Temperature: (21 ~ 22) °C

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

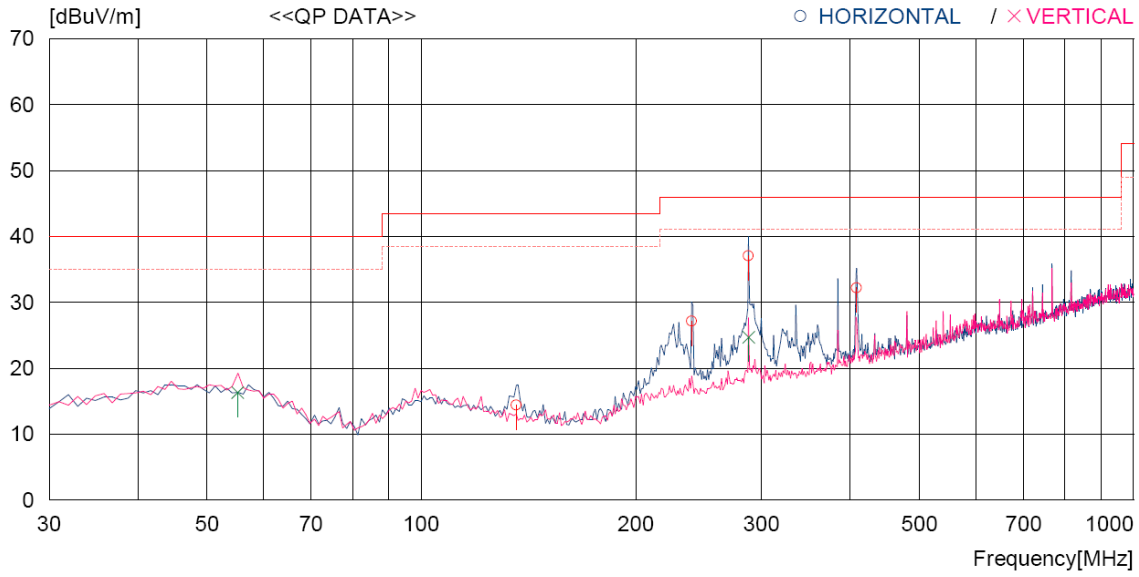
Result : PASSED

EUT : Remote Control Date: January 27, 2014

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

Operating condition : Low Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

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	135.730	29.6	9.6	8.3	33.1	14.4	43.5	29.1	100	170
2	239.520	37.7	13.3	9.1	33.0	27.1	46.0	18.9	100	359
3	288.020	46.1	14.5	9.4	33.0	37.0	46.0	9.0	100	359
4	408.300	38.1	17.0	10.1	33.0	32.2	46.0	13.8	100	359
----- Vertical ------										
5	55.220	27.4	14.6	7.4	33.1	16.3	40.0	23.7	100	280
6	288.020	33.8	14.5	9.4	33.0	24.7	46.0	21.3	100	114

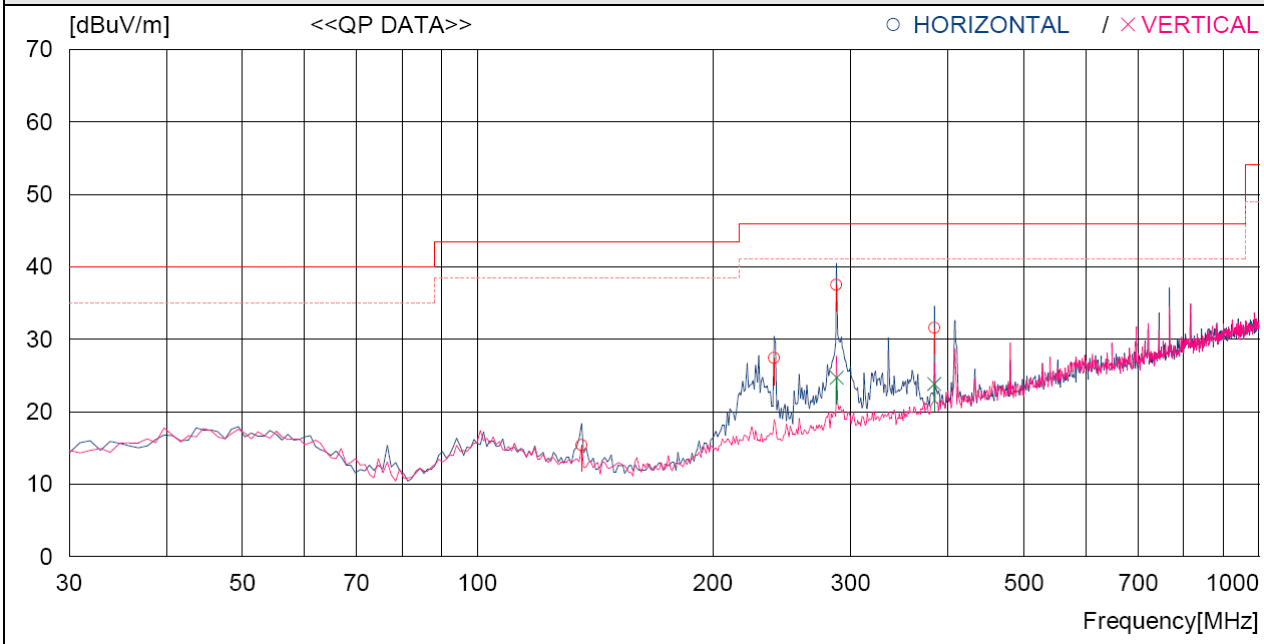
Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

Operating condition : Middle Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

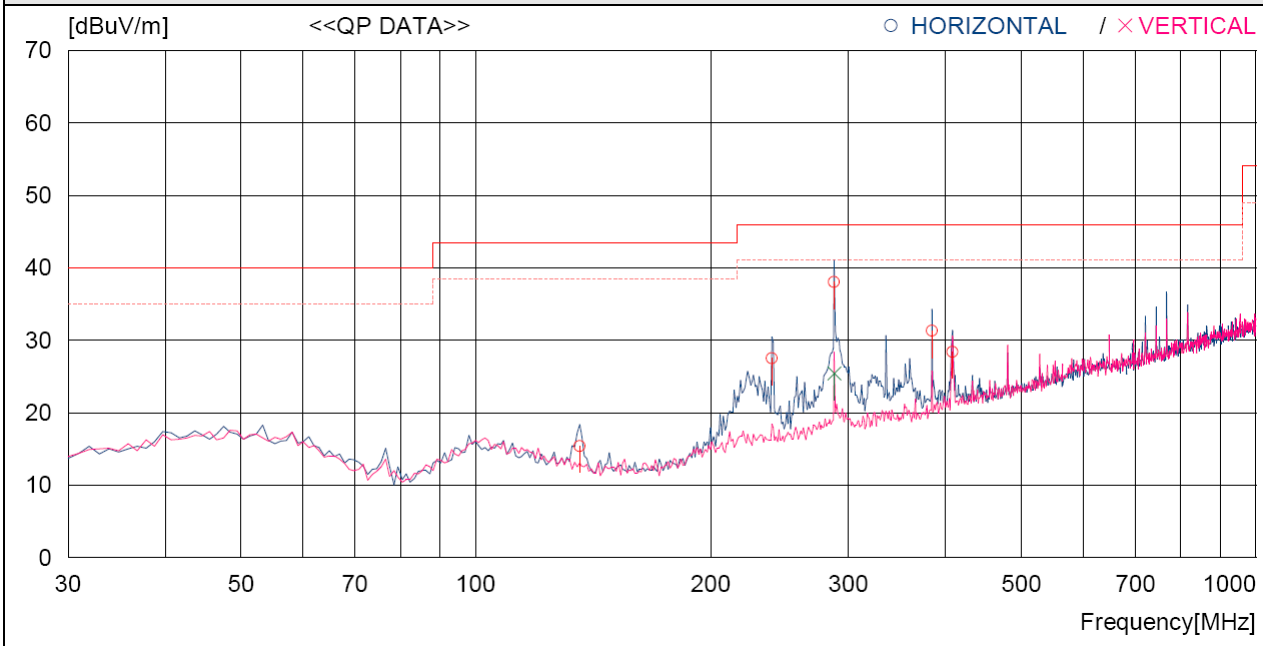
No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	135.730	30.6	9.6	8.3	33.1	15.4	43.5	28.1	100	359
2	239.520	38.0	13.3	9.1	33.0	27.4	46.0	18.6	100	359
3	288.020	46.6	14.5	9.4	33.0	37.5	46.0	8.5	100	40
4	384.050	38.1	16.6	9.9	33.0	31.6	46.0	14.4	100	359
----- Vertical ------										
5	288.020	33.8	14.5	9.4	33.0	24.7	46.0	21.3	100	334
6	384.050	30.3	16.6	9.9	33.0	23.8	46.0	22.2	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

Operating condition : High Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	135.730	30.6	9.6	8.3	33.1	15.4	43.5	28.1	100	358
2	239.520	38.1	13.3	9.1	33.0	27.5	46.0	18.5	100	211
3	288.020	47.1	14.5	9.4	33.0	38.0	46.0	8.0	100	45
4	384.050	37.8	16.6	9.9	33.0	31.3	46.0	14.7	100	359
5	408.300	34.3	17.0	10.1	33.0	28.4	46.0	17.6	100	87
----- Vertical ------										
6	288.020	34.5	14.5	9.4	33.0	25.4	46.0	20.6	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Tested by: Tae-Ho, Kim / Project Engineer

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

7.5.7.2 Test data for Below 30 MHz

-. Test Date : January 27, 2014

-. 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

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.									

7.5.7.3 Test data for above 1 GHz

-. Test Date : January 27, 2014

-. 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

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

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

7.5.8 Test data for 802.11n_HT40 Mode

7.5.8.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (43 ~ 44) % R.H. Temperature: (21 ~ 22) °C

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

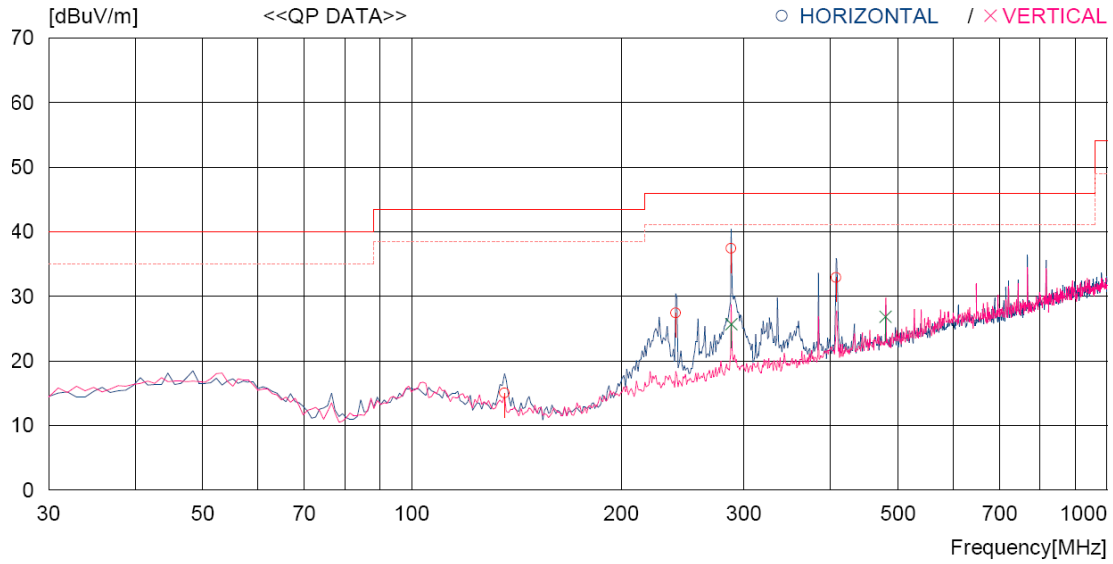
Result : PASSED

EUT : Remote Control Date: January 27, 2014

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

Operating condition : Low Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

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	135.730	30.2	9.6	8.3	33.1	15.0	43.5	28.5	100	359
2	239.520	38.0	13.3	9.1	33.0	27.4	46.0	18.6	100	359
3	288.020	46.5	14.5	9.4	33.0	37.4	46.0	8.6	100	53
4	407.330	38.8	17.0	10.1	33.0	32.9	46.0	13.1	100	359
----- Vertical ------										
5	288.020	34.8	14.5	9.4	33.0	25.7	46.0	20.3	100	280
6	480.081	31.3	18.1	10.5	33.1	26.8	46.0	19.2	100	348

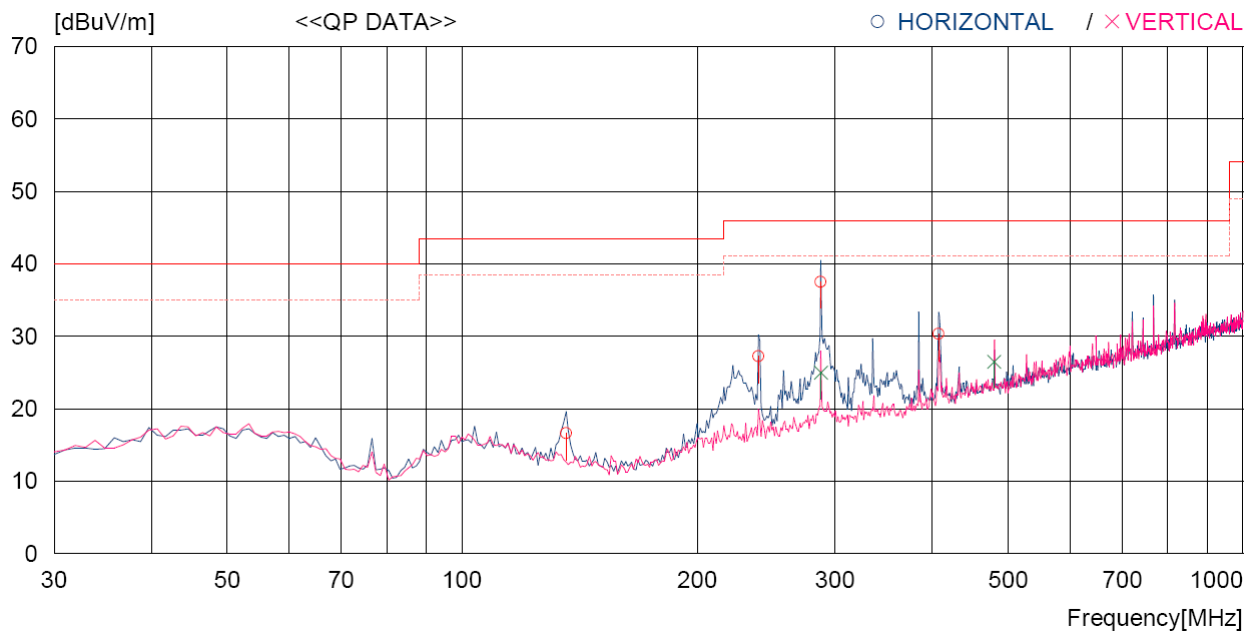
Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

Operating condition : Middle Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	135.730	31.8	9.6	8.3	33.1	16.6	43.5	26.9	100	204
2	239.520	37.8	13.3	9.1	33.0	27.2	46.0	18.8	100	190
3	288.020	46.6	14.5	9.4	33.0	37.5	46.0	8.5	100	39
4	407.330	36.2	17.0	10.1	33.0	30.3	46.0	15.7	100	114
----- Vertical ------										
5	288.020	34.1	14.5	9.4	33.0	25.0	46.0	21.0	100	0
6	480.081	31.0	18.1	10.5	33.1	26.5	46.0	19.5	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

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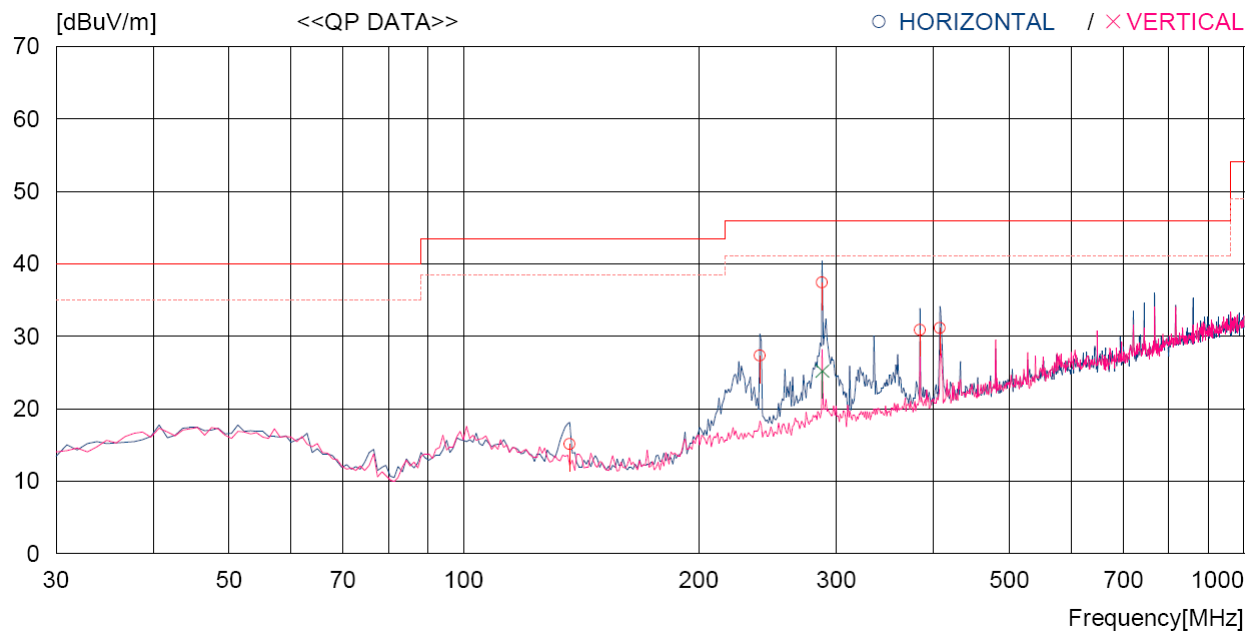
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

Operating condition : High Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	136.700	30.4	9.5	8.3	33.1	15.1	43.5	28.4	100	359
2	239.520	37.9	13.3	9.1	33.0	27.3	46.0	18.7	100	359
3	288.020	46.5	14.5	9.4	33.0	37.4	46.0	8.6	100	25
4	384.050	37.4	16.6	9.9	33.0	30.9	46.0	15.1	100	336
5	407.330	37.0	17.0	10.1	33.0	31.1	46.0	14.9	100	359
----- Vertical ------										
6	288.020	34.3	14.5	9.4	33.0	25.2	46.0	20.8	100	286

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Tested by: Tae-Ho, Kim / Project Engineer

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7.5.8 2 Test data for Below 30 MHz

-. Test Date : January 27, 2014

-. 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

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.									

7.5.8.3 Test data for above 1 GHz

-. Test Date : January 27, 2014

-. 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

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

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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8. Test Data for Zigbee

8.1 MIMIMUM 6 dB BANDWIDTH

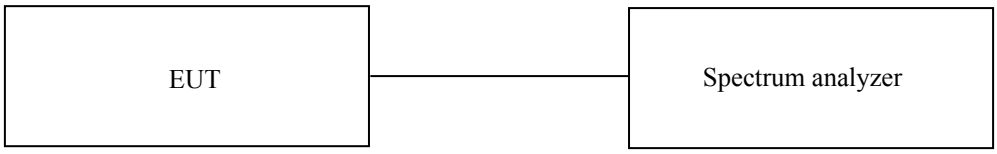
8.1.1 Operating environment

Temperature : 21 °C

Relative humidity : 42 % R.H.

8.1.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



8.1.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV30	R/S	Spectrum Analyzer	101372	May 20, 2013

All test equipment used is calibrated on a regular basis.

8.1.4 Test data for Antenna 0

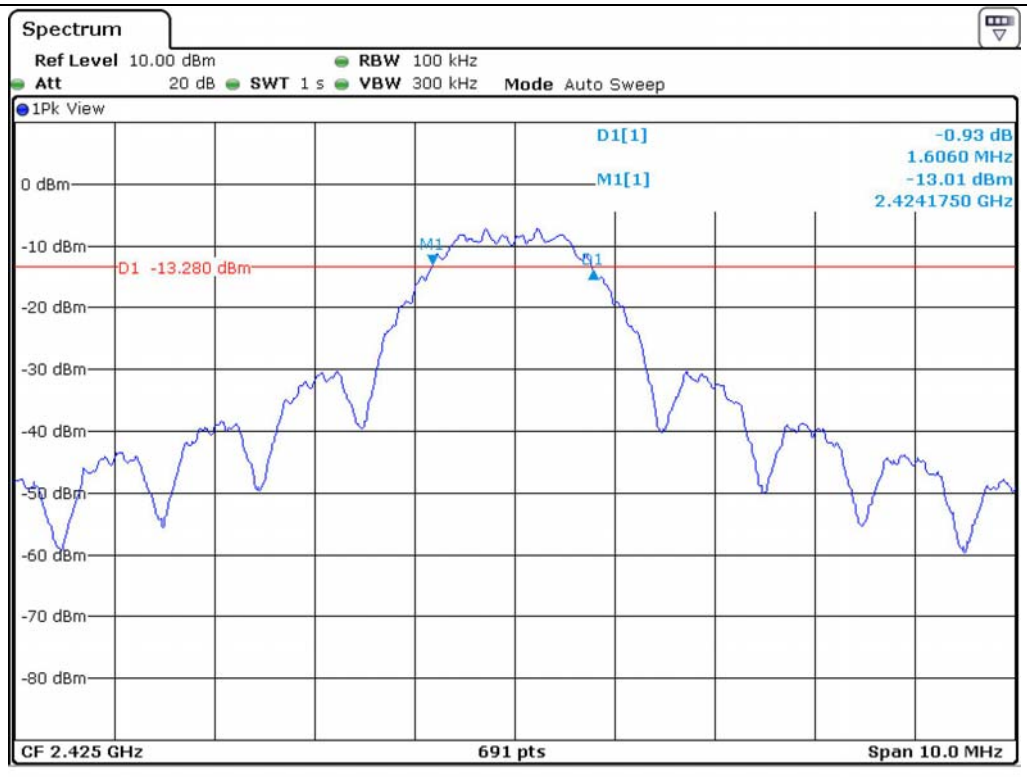
-. Test Date : January 24, 2014

-. Test Result : Pass

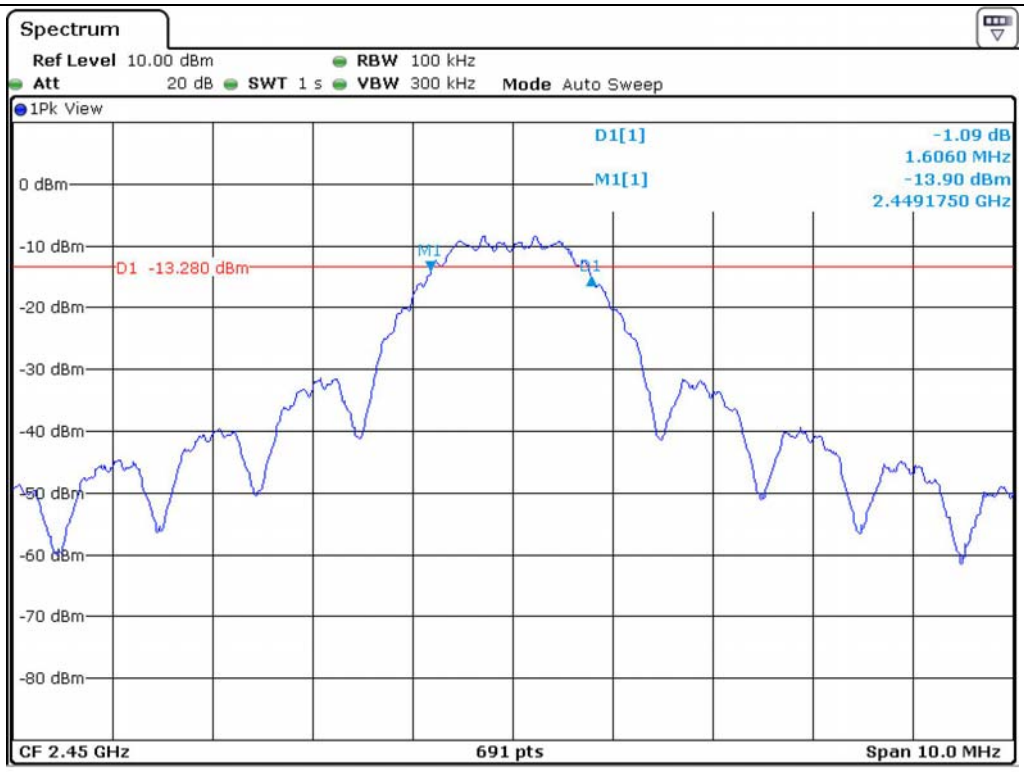
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 425	1.60	0.5	1.10
Middle	2 450	1.60	0.5	1.10
High	2 475	1.60	0.5	1.10

Remark. Margin = Measured Value - Limit

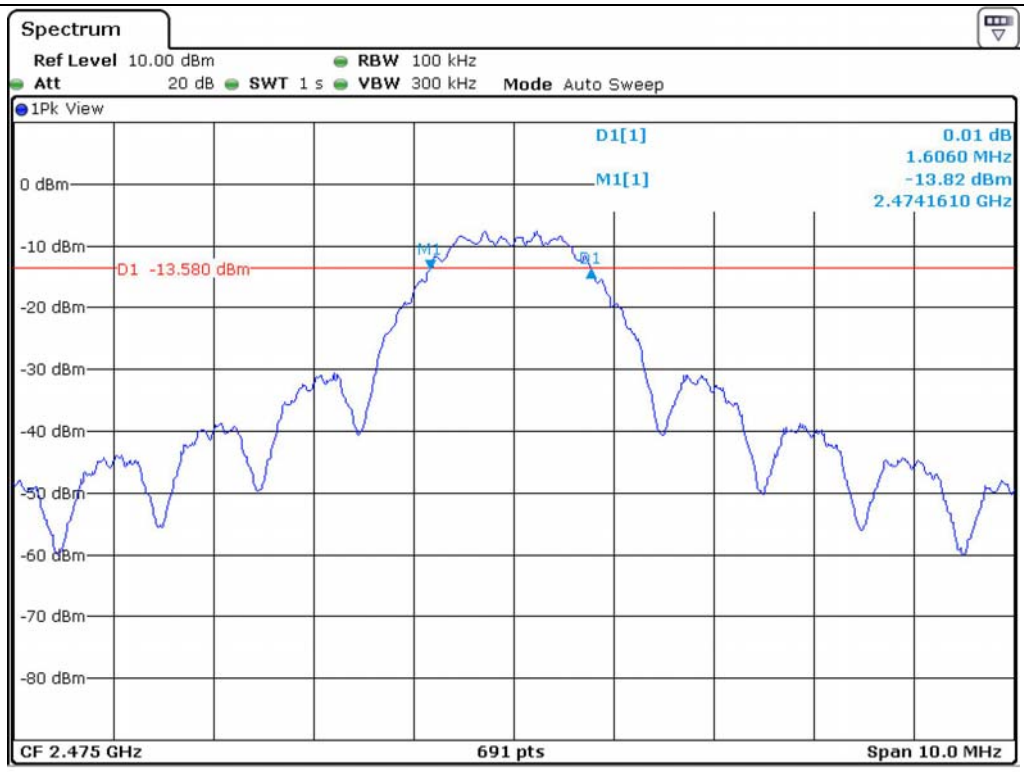
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

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8.1.5 Test data for Antenna 1

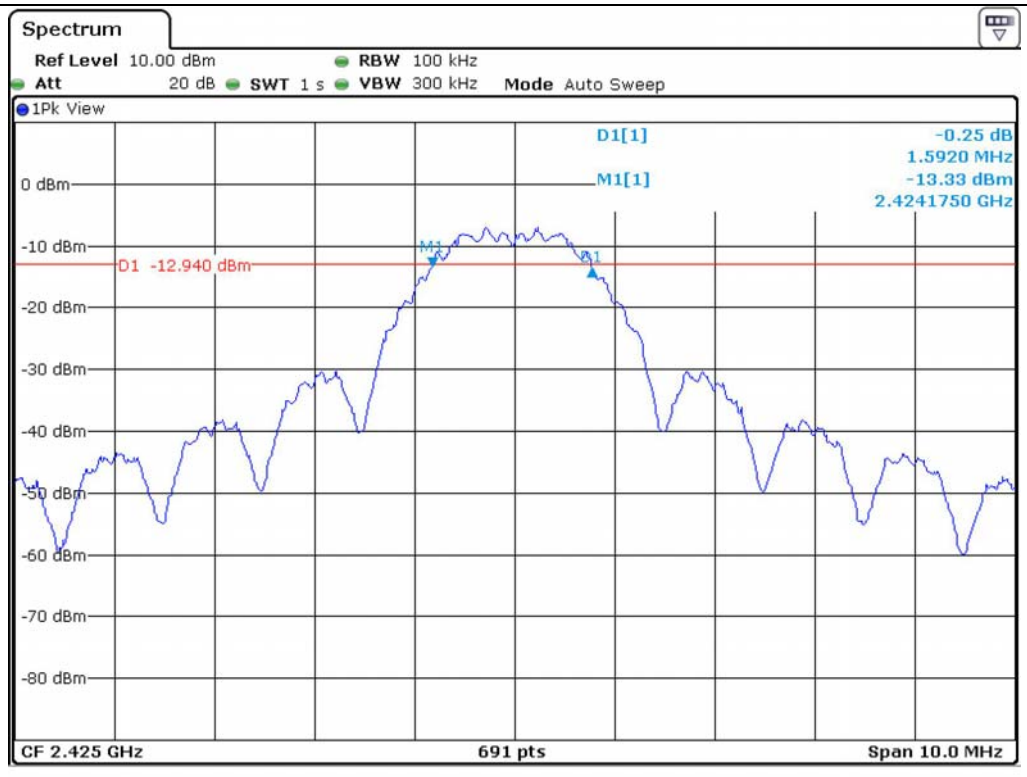
-. Test Date : January 24, 2014

-. Test Result : Pass

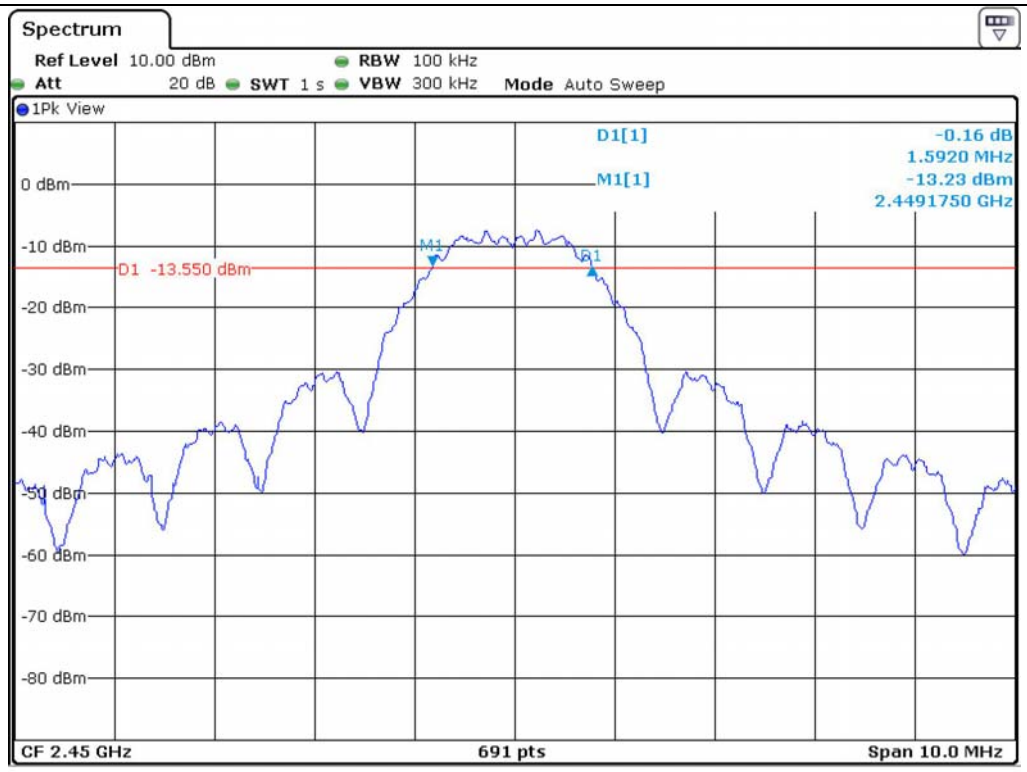
CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (MHz)	LIMIT (MHz)	MARGIN (MHz)
Low	2 425	1.59	0.5	1.09
Middle	2 450	1.59	0.5	1.09
High	2 475	1.59	0.5	1.09

Remark. Margin = Measured Value - Limit

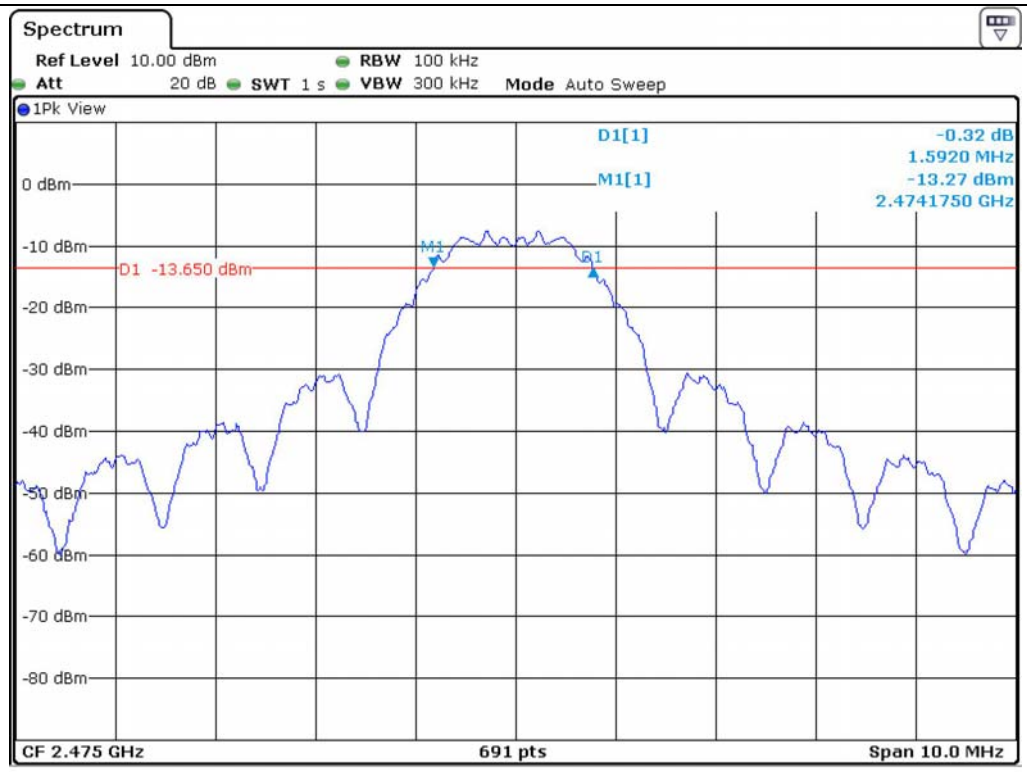
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

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8.2 MAXIMUM PEAK OUTPUT POWER

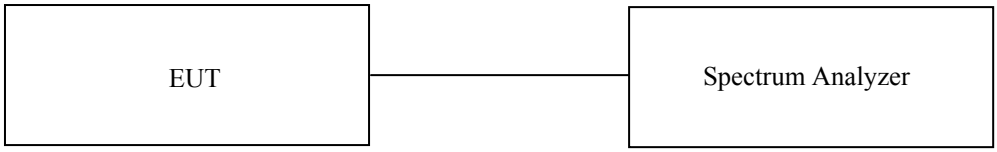
8.2.1 Operating environment

Temperature : 21 °C

Relative humidity : 42 % R.H.

8.2.2 Test set-up

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The EUT was operating in transmit mode at the appropriate center frequency.



8.2.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV30	R/S	Spectrum Analyzer	101372	May 30, 2013

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

8.2.4 Test data for Antenna 0

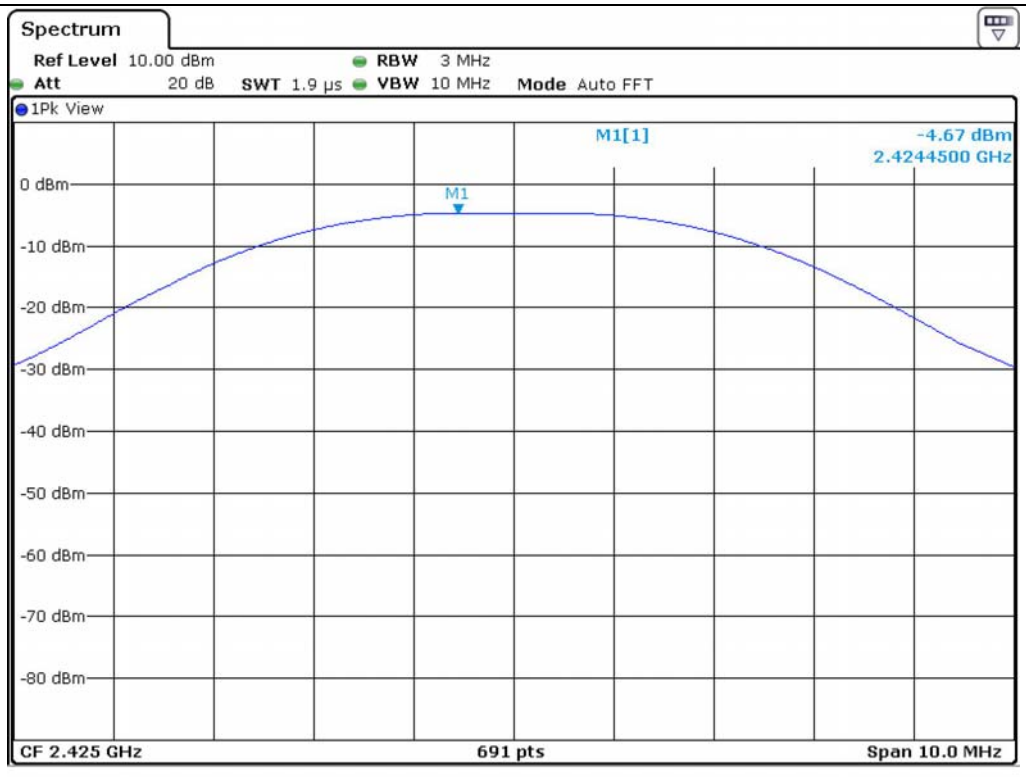
-. Test Date : January 24, 2014

-. Test Result : Pass

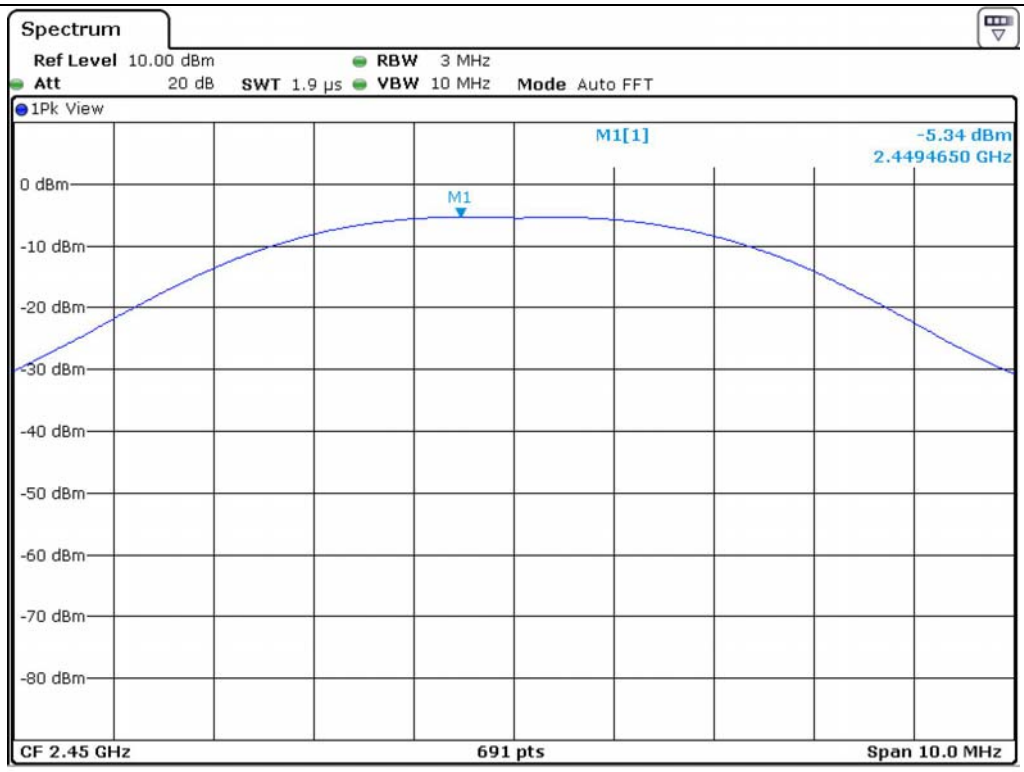
CHANNEL	FREQUENCY (MHz)	Emission Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 425	1.60	-4.67	30.00	34.67
MIDDLE	2 450	1.60	-5.34	30.00	35.34
HIGH	2 475	1.60	-6.06	30.00	36.06

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

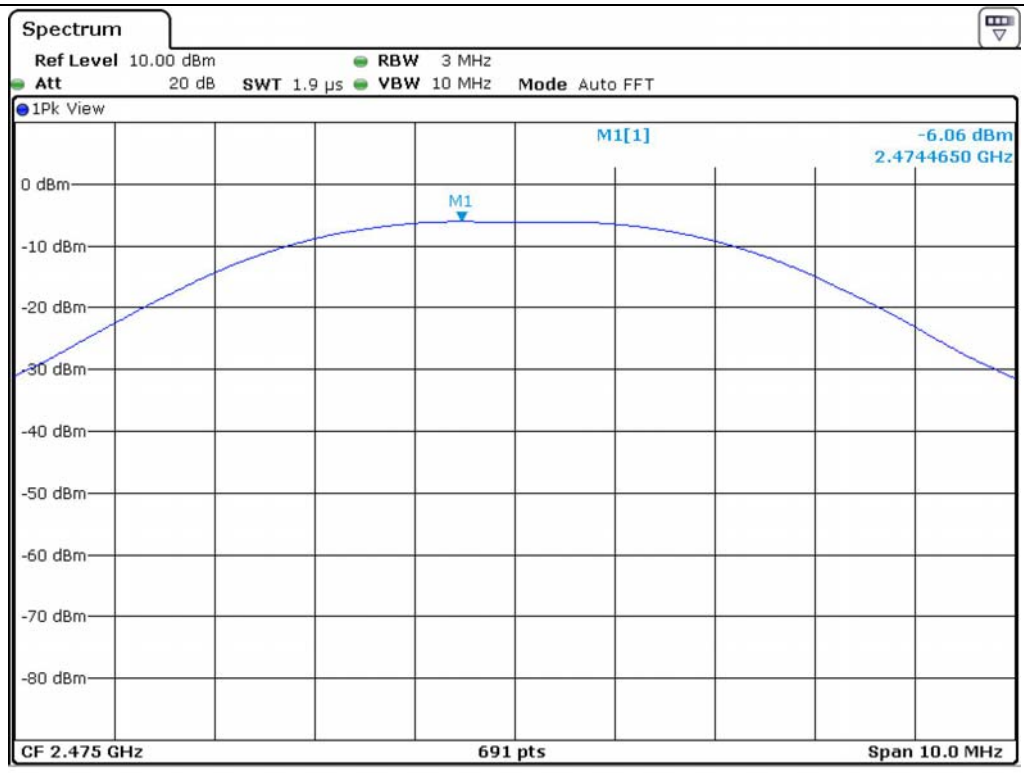
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

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8.2.5 Test data for Antenna 1

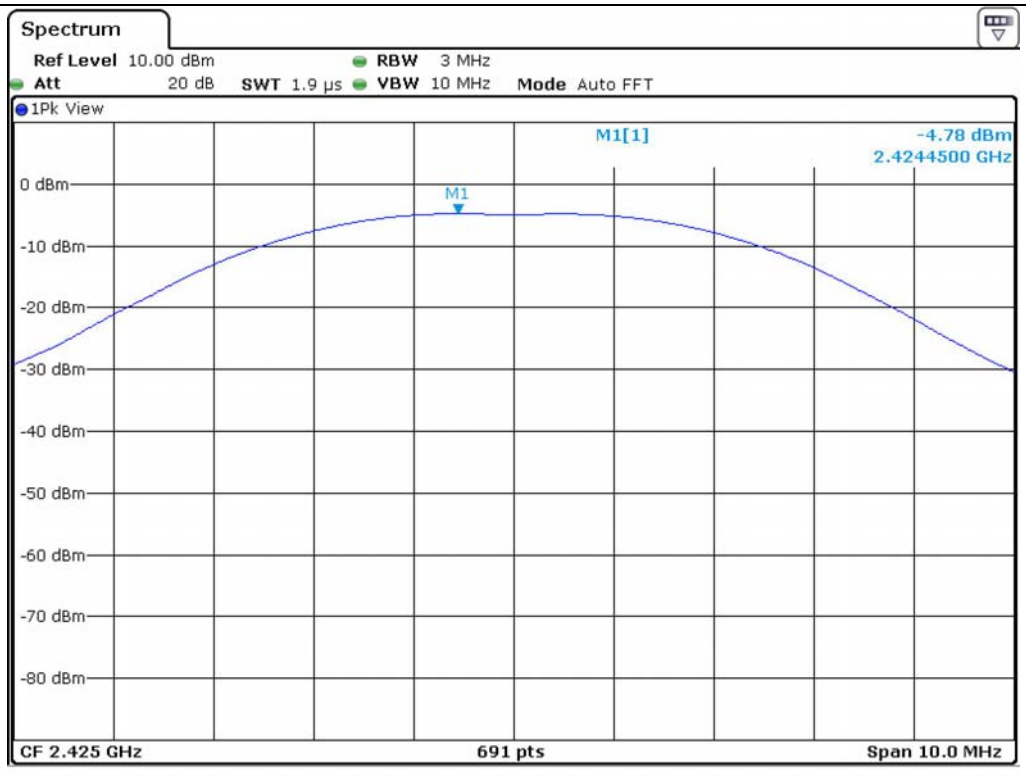
-. Test Date : January 24, 2014

-. Test Result : Pass

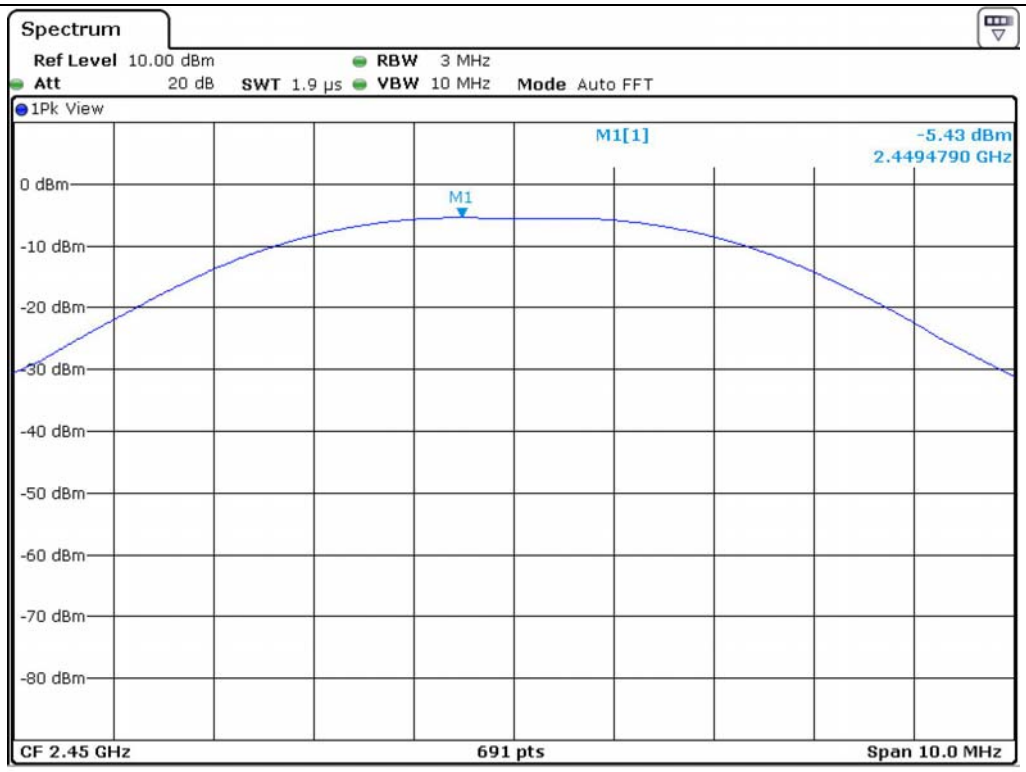
CHANNEL	FREQUENCY (MHz)	Emission Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 425	1.59	-4.78	30.00	34.78
MIDDLE	2 450	1.59	-5.43	30.00	35.43
HIGH	2 475	1.59	-6.16	30.00	36.16

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

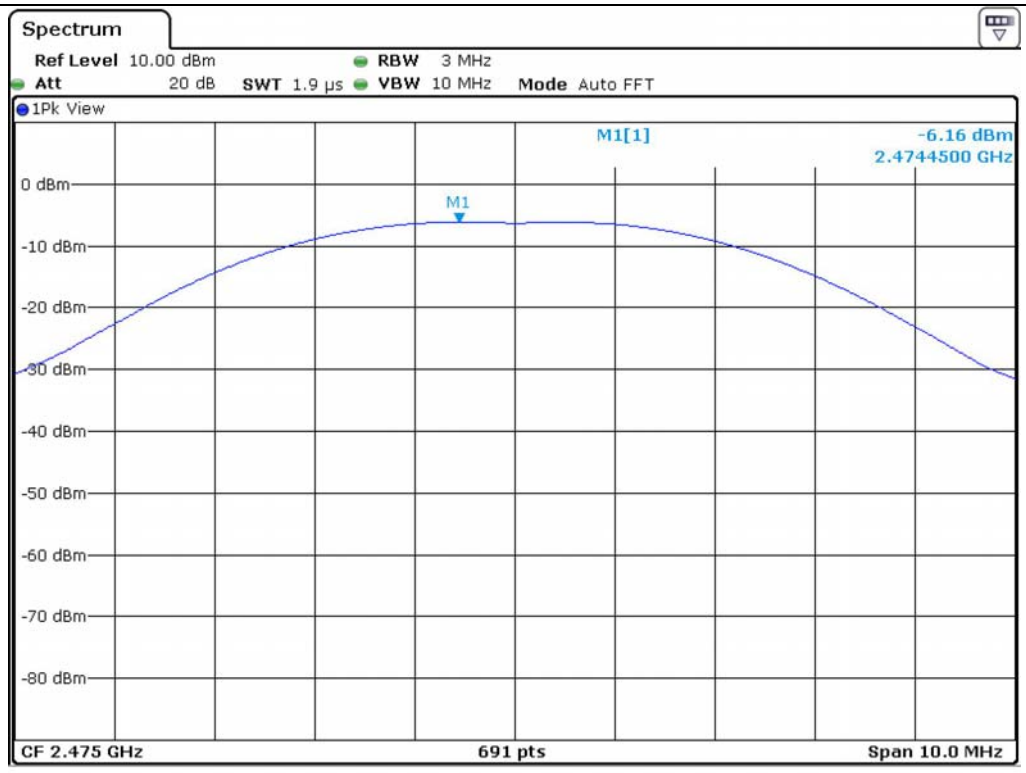
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

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8.3 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

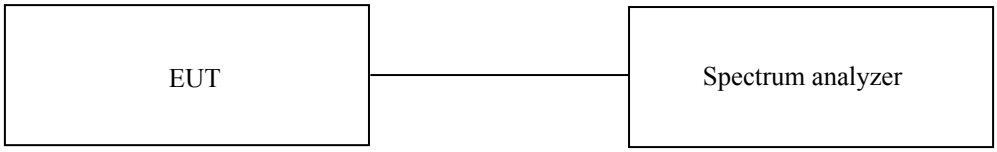
8.3.1 Operating environment

Temperature : 28 °C

Relative humidity : 45 % R.H.

8.3.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



8.3.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m, open-field test site. The EUT was placed on a non-conductive turntable approximately 0.8 m above the ground plane.

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

8.3.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	8564E	HP	Spectrum Analyzer	3650A00756	May 03, 2013(1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	May 27, 2013(1Y)
■-	310N	Sonoma Instrument	AMPLIFIER	312544	May 21, 2013(1Y)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 20, 2013(1Y)
■ -	SCU-18	Rohde & Schwarz	PRE-AMPLIFIER	10041	Jan. 25, 2013(1Y)
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	VULB9163-255	Apr. 24, 2012(2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	Jun. 17, 2013 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jun. 17, 2013 (2Y)
■ -	83051A	Agilent	Microwave System Preamplifer	3950M00201	May 22, 2013(1Y)

All test equipment used is calibrated on a regular basis.

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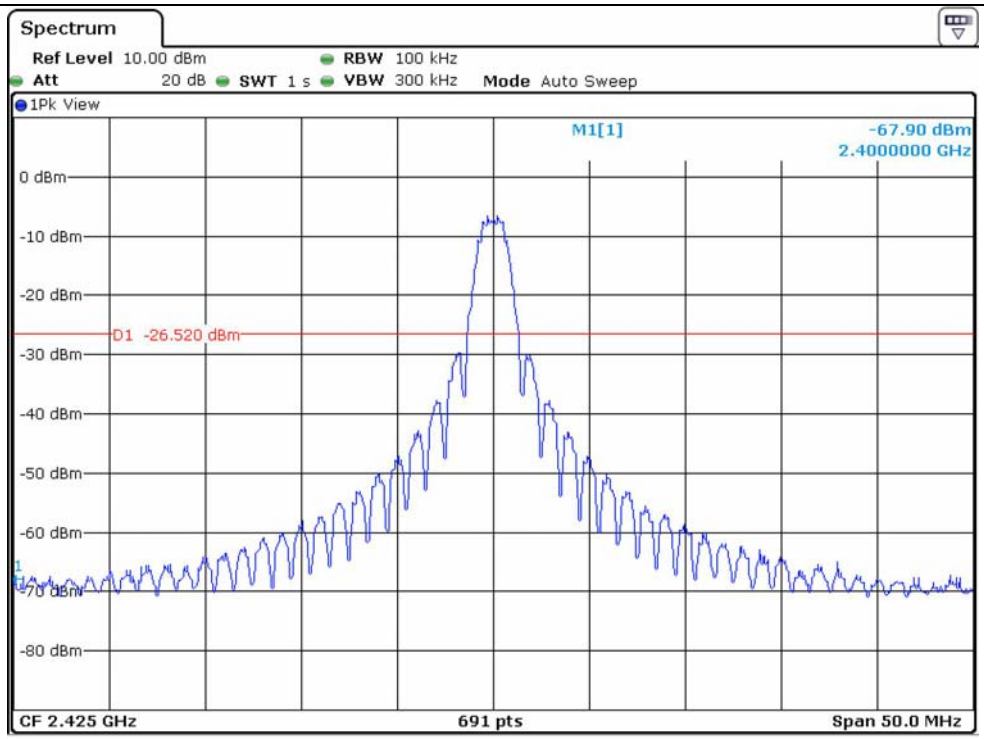
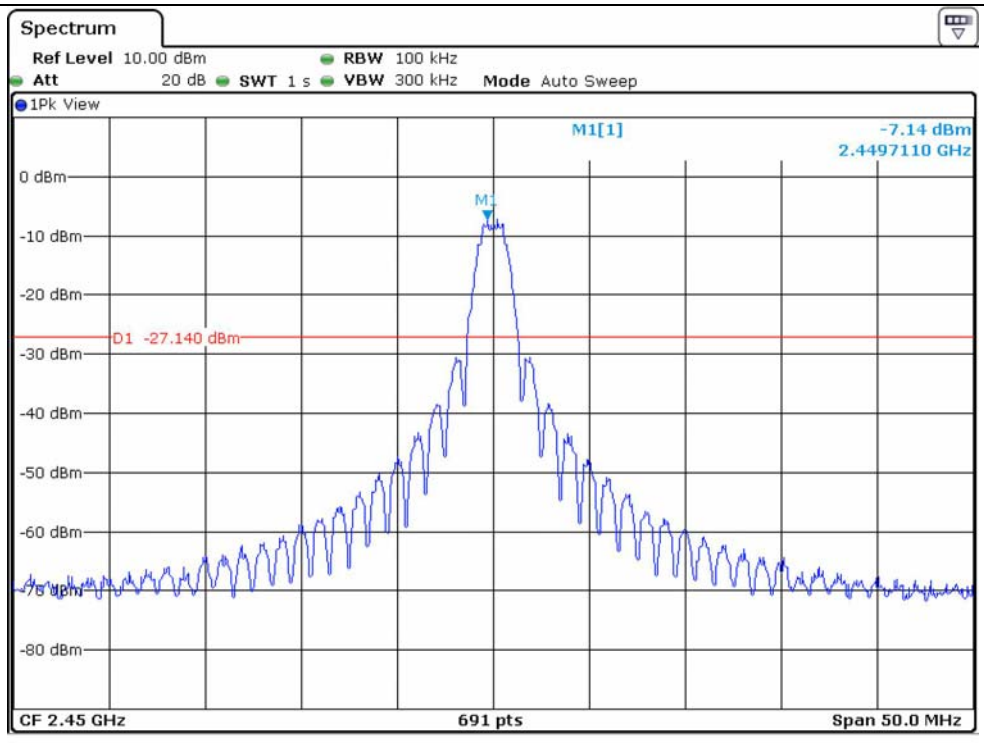
8.3.5 Test data for conducted emission

8.3.5.1 Test data for Antenna 0



Low Channel



Middle Channel

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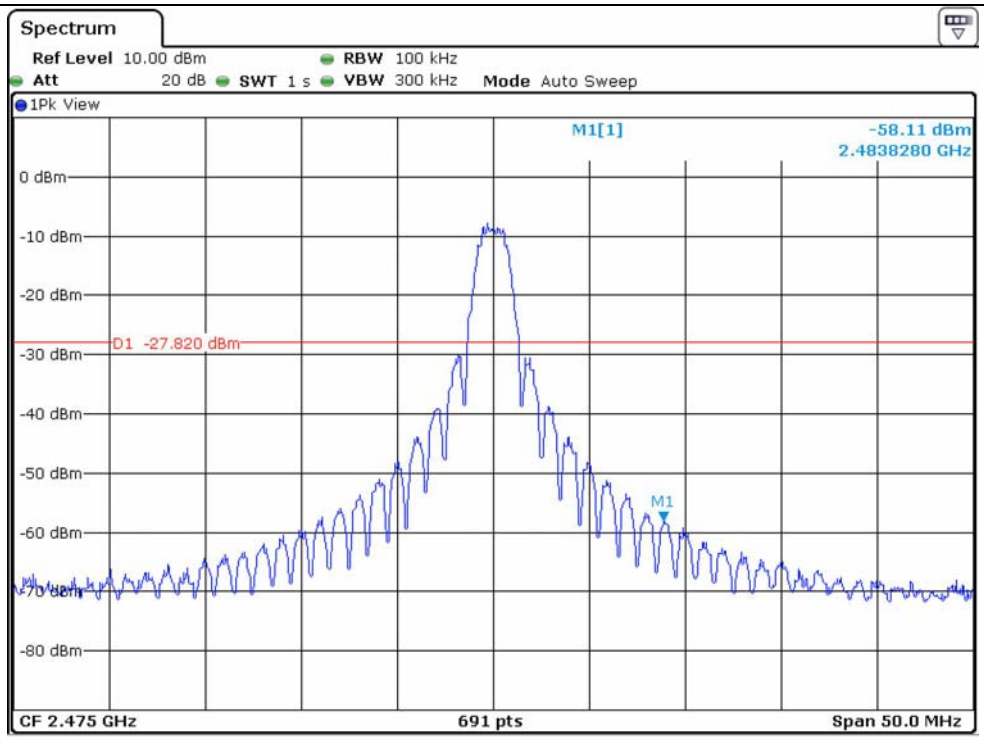
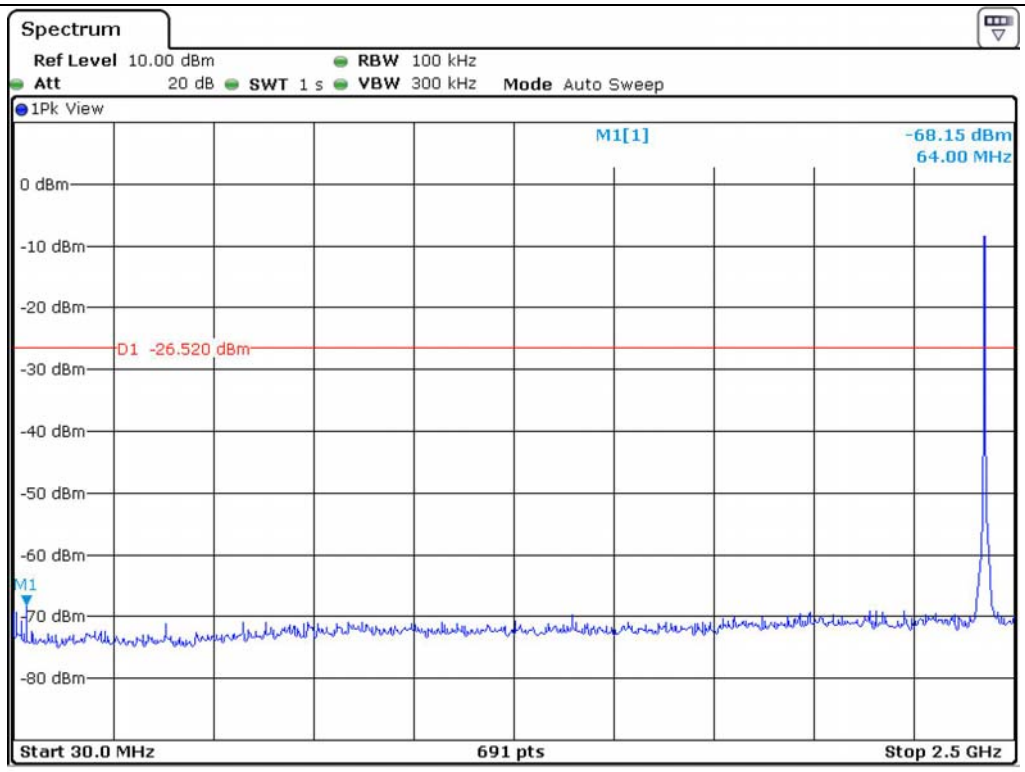
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

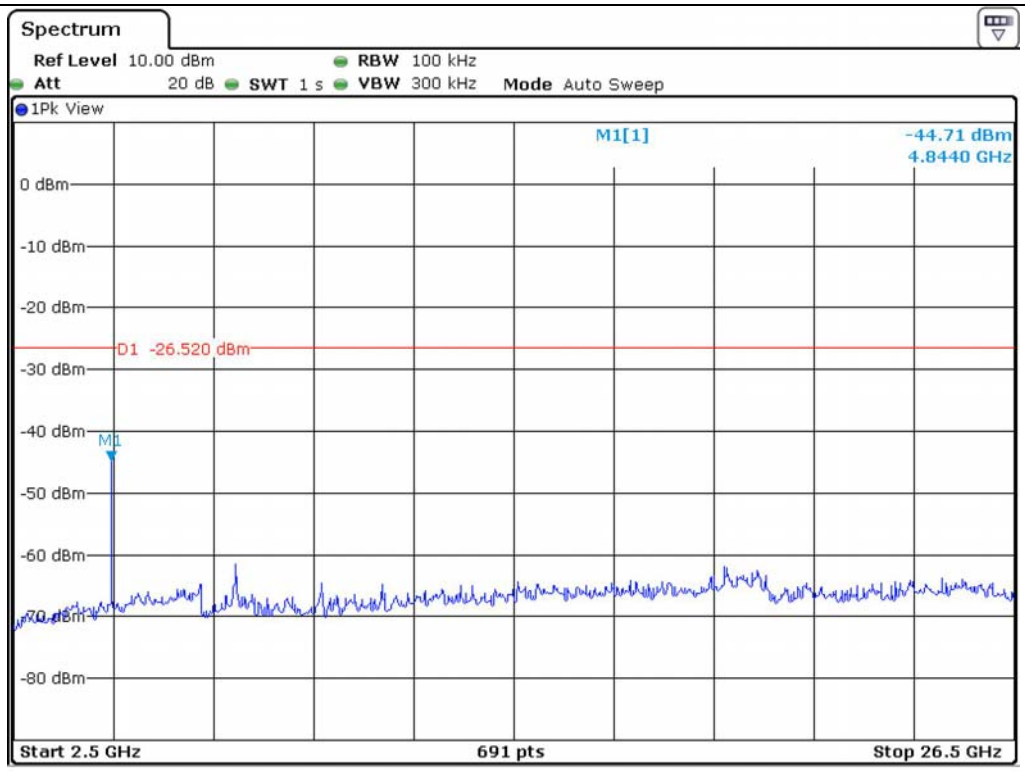


High Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

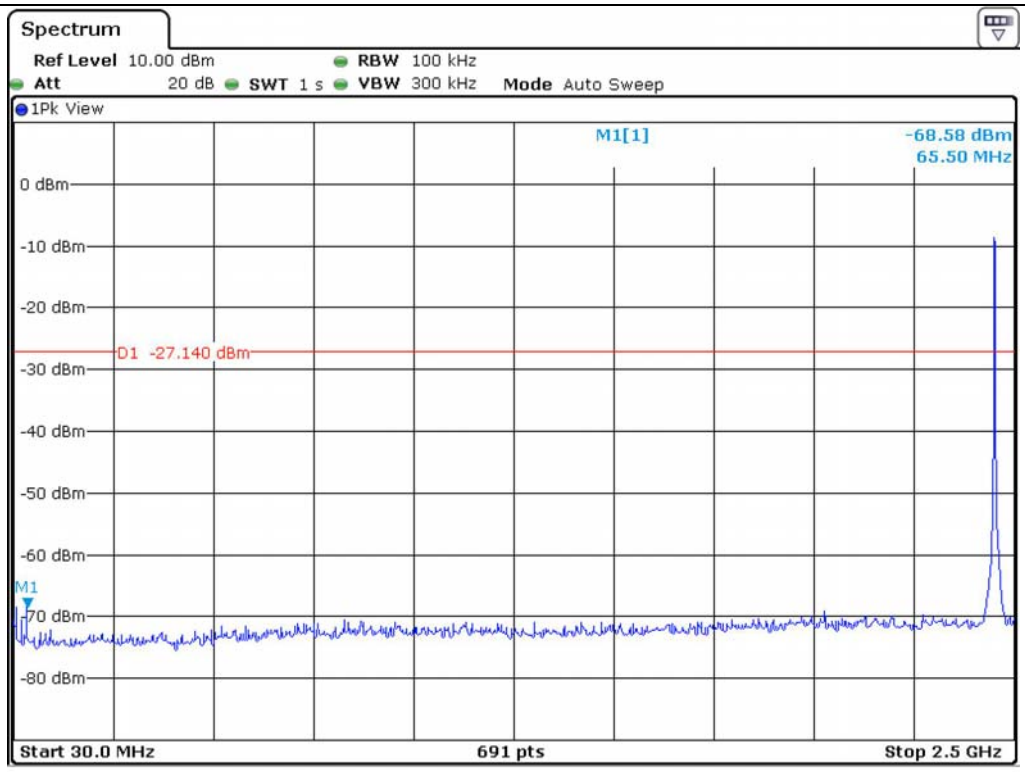


Low Channel

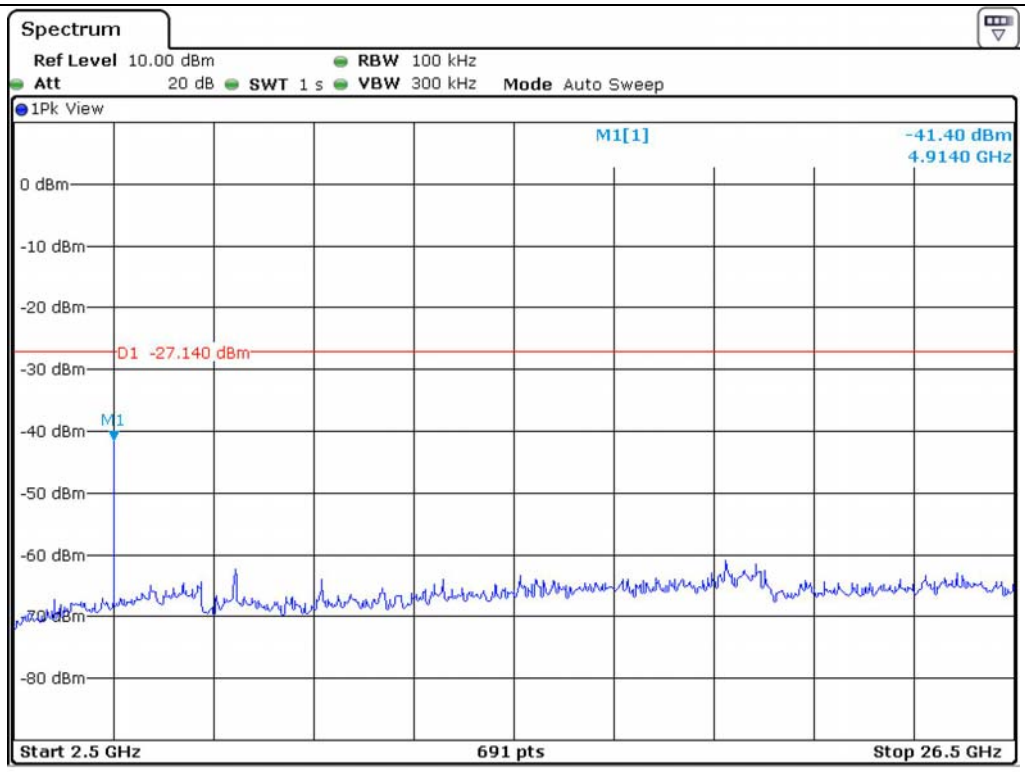


Low Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

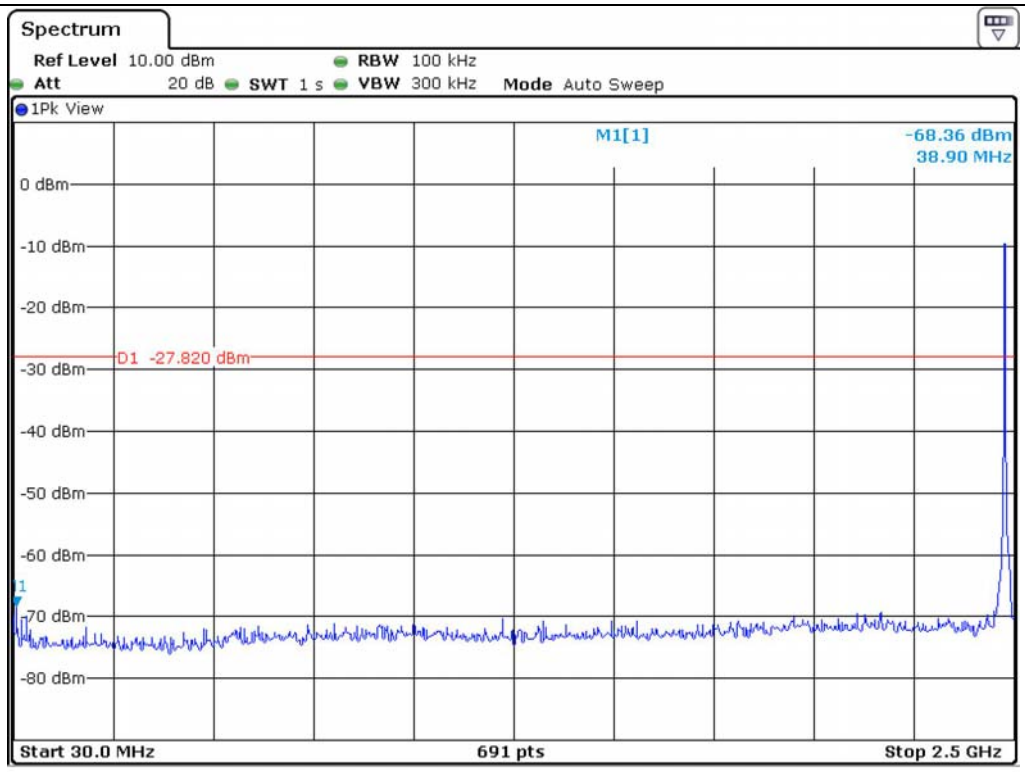


Middle Channel

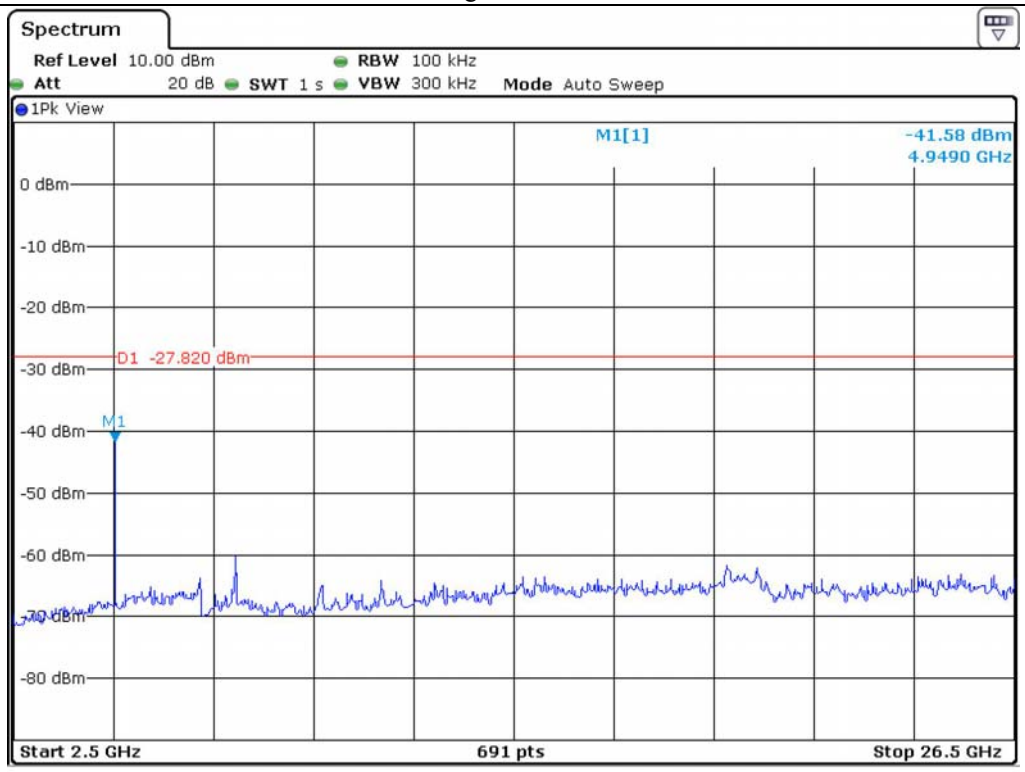


Middle Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



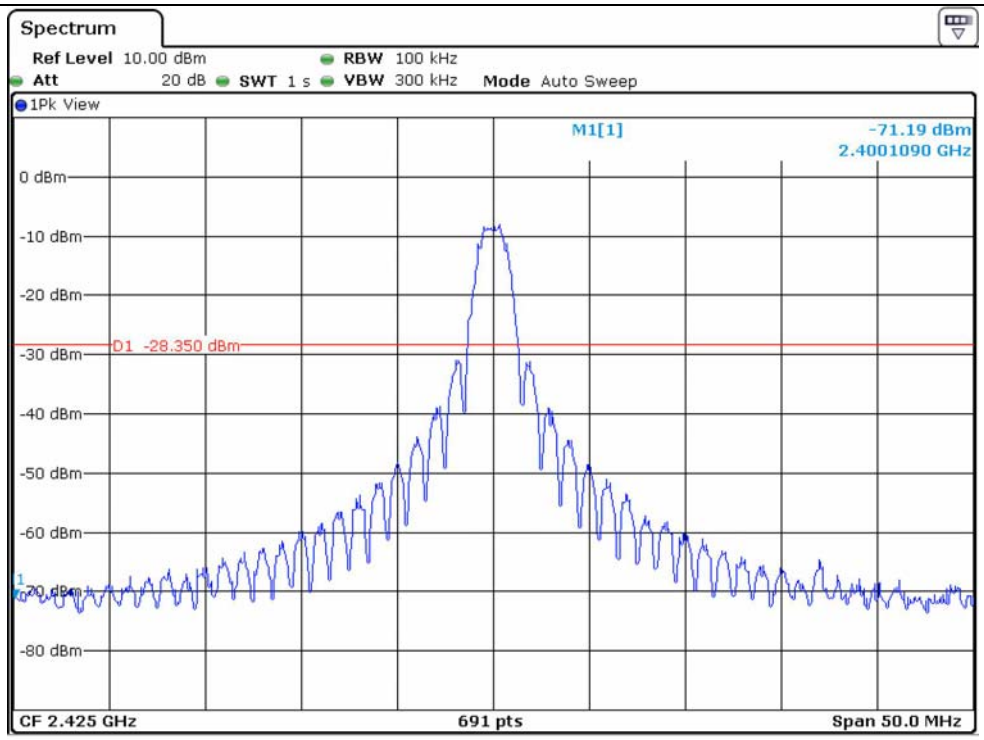
High Channel



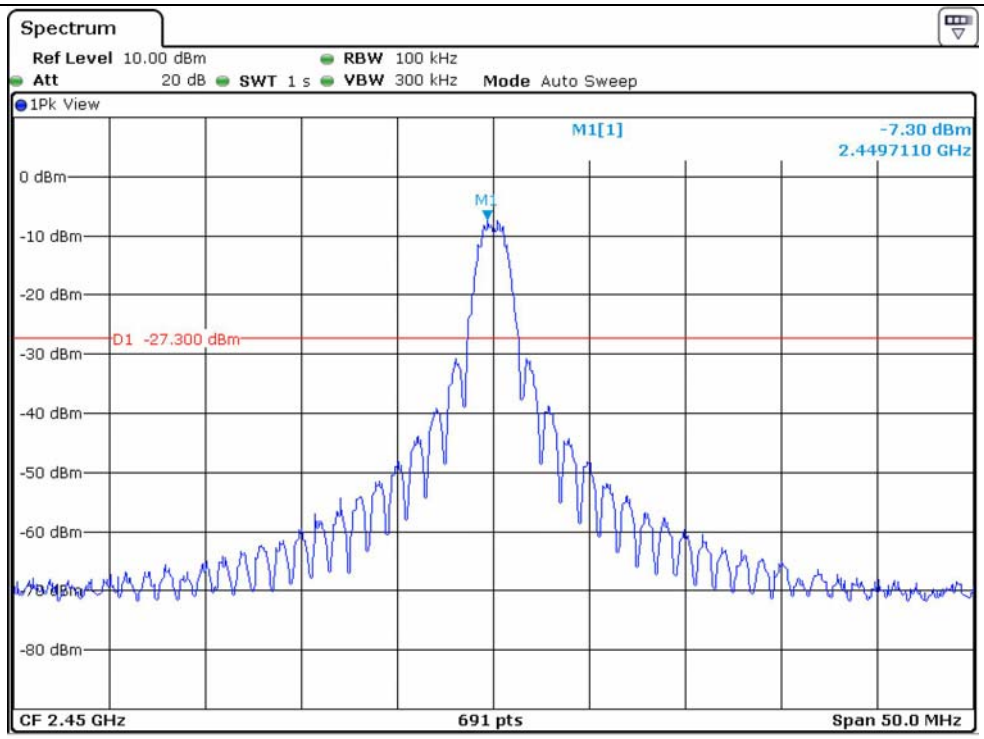
High Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

8.3.5.2 Test data for Antenna 1



Low Channel



Middle Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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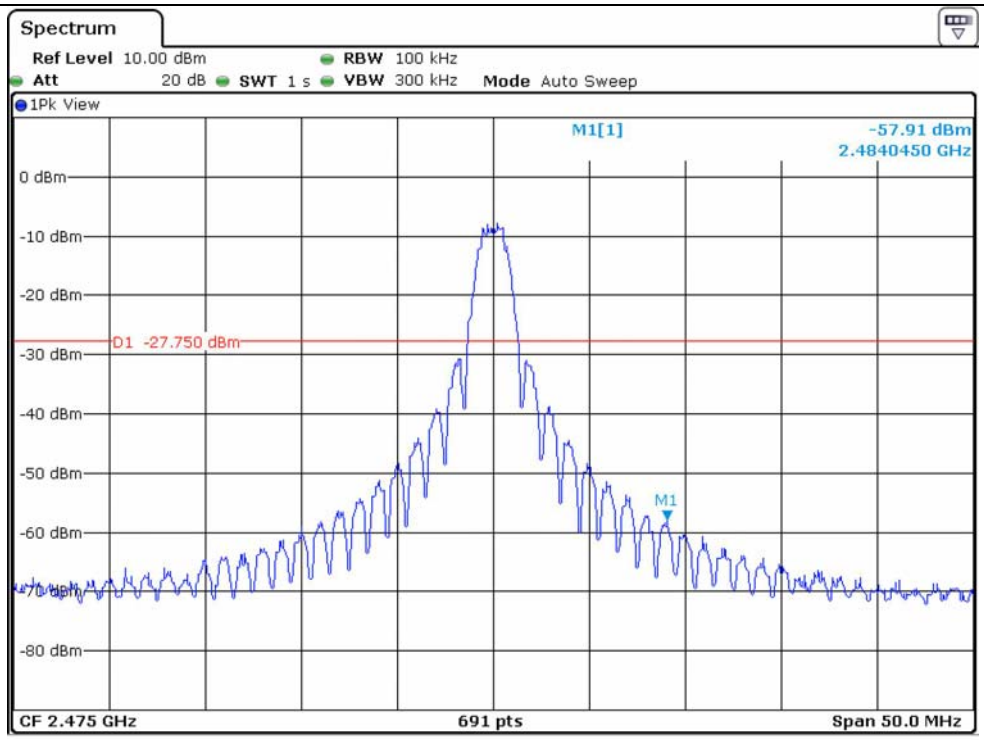

High Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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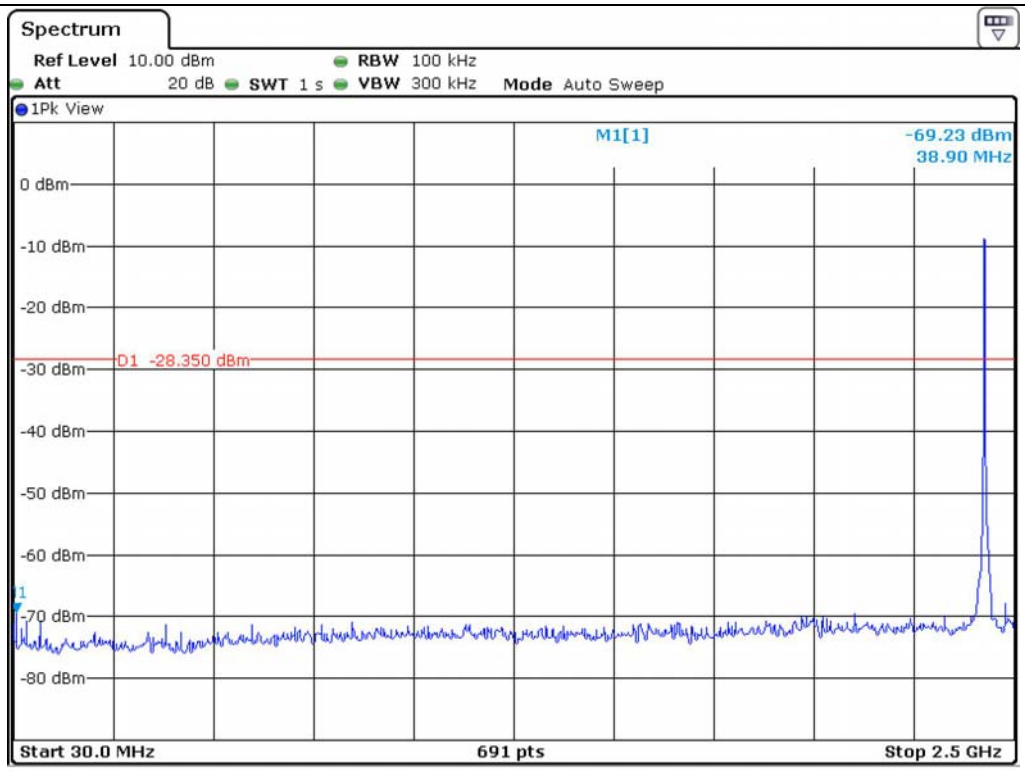
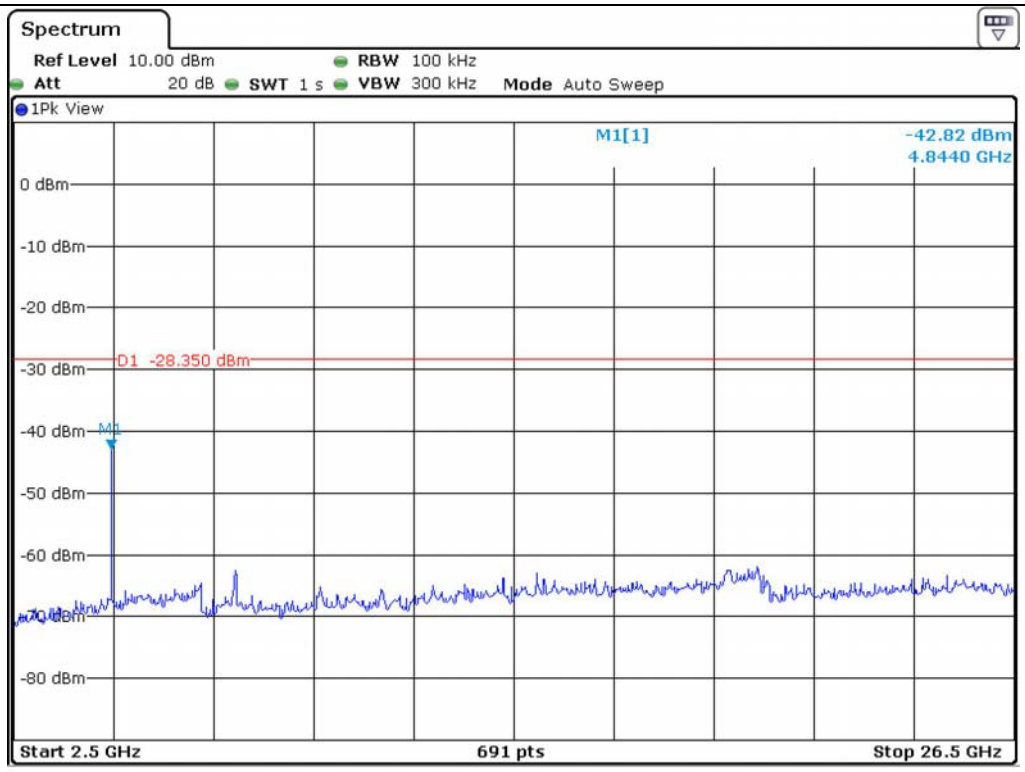


Low Channel



Low Channel

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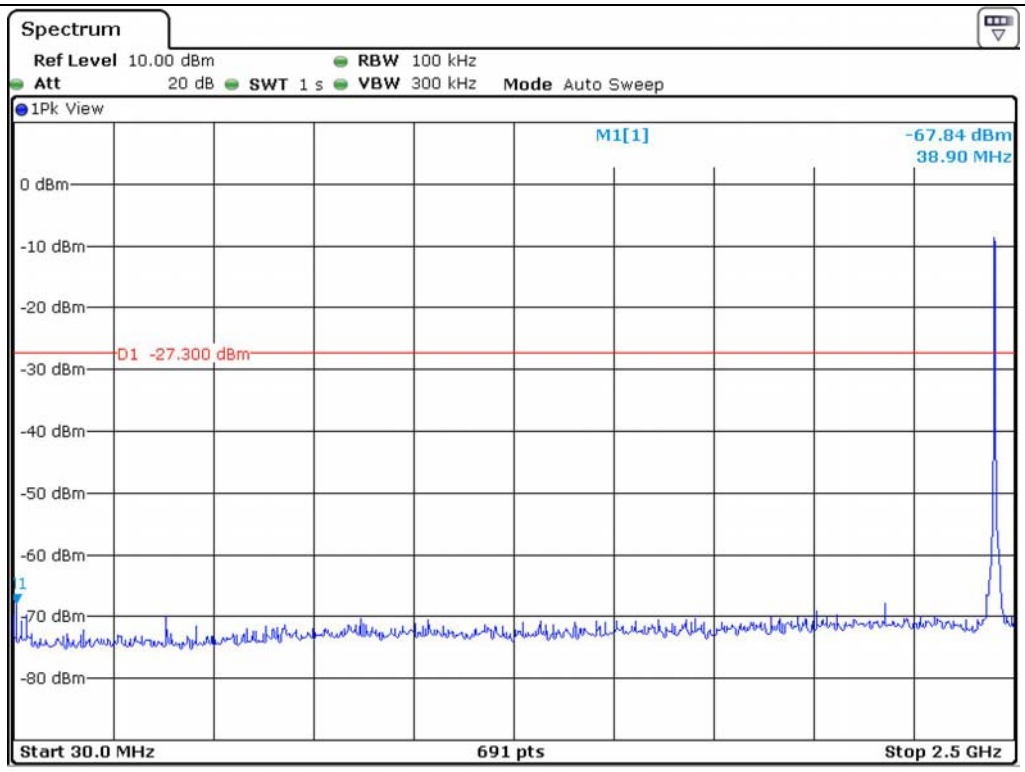
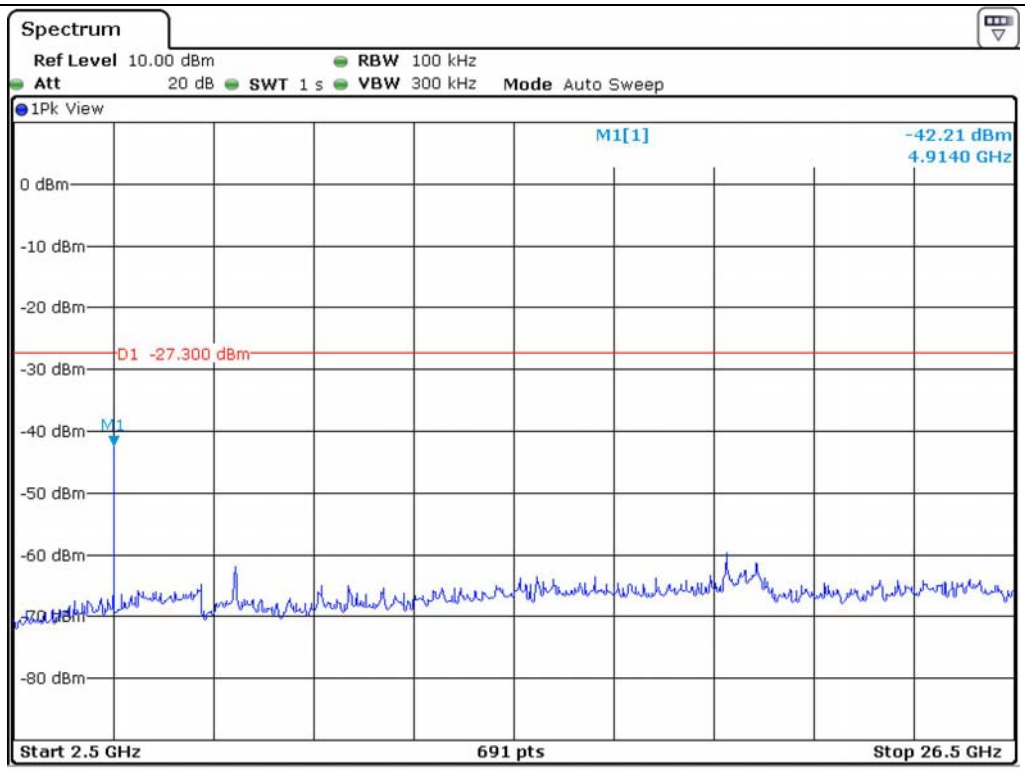


Middle Channel



Middle Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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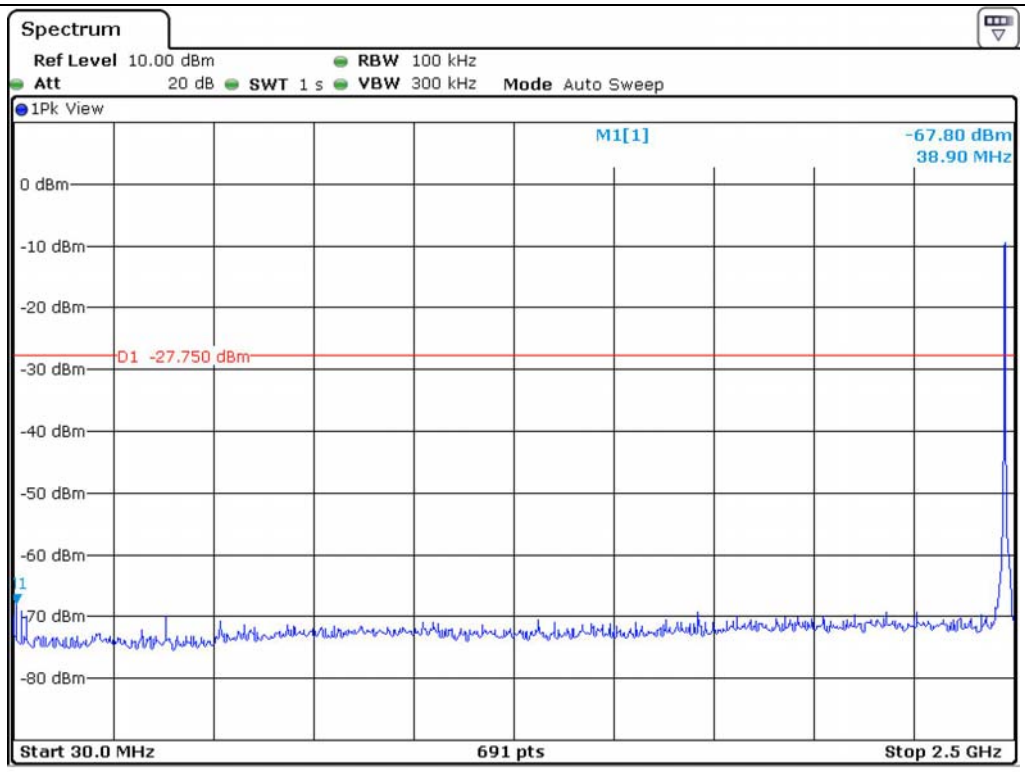
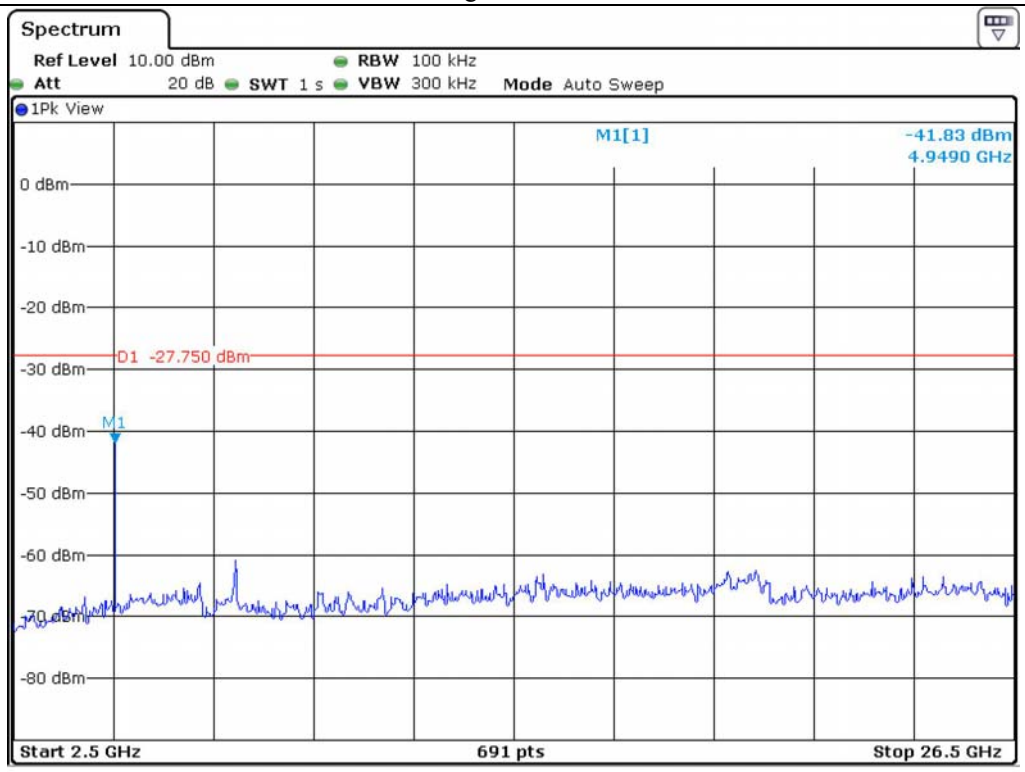


High Channel



High Channel

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8.3.6 Test data for radiated emission

8.3.6.1 Radiated Emission which fall in the Restricted Band

8.3.6.1.1 Test data for Antenna 0

-. Test Date : January 28, 2014

-. Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode
1 GHz above 1MHz for Peak and Average Mode

-. Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode
1 GHz above 1MHz for Peak and 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	51.33	Peak	H	27.00	7.80	43.00	43.13	74.00	30.87
	38.13	Average	H				29.93	54.00	24.07
	52.28	Peak	V				44.08	74.00	29.92
	39.32	Average	V				31.12	54.00	22.88
Test Data for High Channel									
2 483.50	51.47	Peak	H	27.40	8.00	43.00	43.87	74.00	30.13
	38.25	Average	H				30.65	54.00	23.35
	52.38	Peak	V				44.78	74.00	29.22
	39.14	Average	V				31.54	54.00	22.46

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 / Project Engineer

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

8.3.6.1.2 Test data for Antenna 1

-. Test Date : January 28, 2014

-. Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode
1 GHz above 1MHz for Peak and Average Mode

-. Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode
1 GHz above 1MHz for Peak and 10 Hz for Average Mode

-. Frequency range : 30 MHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Result : PASSED

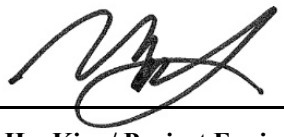
Frequency (MHz)	Reading (dBµV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBµV/m)	Limits (dBµV/m)	Margin (dB)
Test Data for Low Channel									
2 390.00	51.01	Peak	H	27.00	7.80	43.00	42.81	74.00	31.19
	38.04	Average	H				29.84	54.00	24.16
	52.14	Peak	V				43.94	74.00	30.06
	39.25	Average	V				31.05	54.00	22.95
Test Data for High Channel									
2 483.50	51.21	Peak	H	27.40	8.00	43.00	43.61	74.00	30.39
	38.14	Average	H				30.54	54.00	23.46
	52.04	Peak	V				44.44	74.00	29.56
	39.09	Average	V				31.49	54.00	22.51

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 / Project Engineer

8.3.7 Spurious & Harmonic Radiated Emission

8.3.7.1 Test data for Antenna 0

-. Test Date : January 28, 2014

-. Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode

1 GHz above 1MHz for Peak and Average Mode

-. Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode

1 GHz above 1MHz for Peak and 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Result : PASSED

Frequency (GHz)	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									
2 425.00	91.53	Peak	H	27.10	7.90	43.00	83.53	113.98	30.45
	87.25	Average	H				79.25	93.98	14.73
	87.79	Peak	V				79.79	113.98	34.19
	83.88	Average	V				75.88	93.98	18.10
4 850.00	56.94	Peak	H	30.70	12.00	42.40	57.24	73.98	16.74
	47.58	Average	H				47.88	53.98	6.10
	50.12	Peak	V				50.42	73.98	23.56
	39.28	Average	V				39.58	53.98	14.40
Test Data for Middle Channel									
2 450.00	91.83	Peak	H	27.20	7.90	43.00	83.93	113.98	30.05
	87.52	Average	H				79.62	93.98	14.36
	88.04	Peak	V				80.14	113.98	33.84
	84.31	Average	V				76.41	93.98	17.57
4 900.00	57.12	Peak	H	30.80	12.00	42.40	57.52	73.98	16.46
	47.74	Average	H				48.14	53.98	5.84
	50.38	Peak	V				50.78	73.98	23.20
	39.44	Average	V				39.84	53.98	14.14

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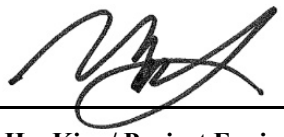
Test Data for High Channel									
2 475.00	92.10	Peak	H	27.30	8.00	43.00	84.40	113.98	29.58
	87.86	Average	H				80.16	93.98	13.82
	87.42	Peak	V				79.72	113.98	34.26
	84.47	Average	V				76.77	93.98	17.21
4 950.00	56.70	Peak	H	30.80	12.10	42.30	57.30	73.98	16.68
	47.36	Average	H				47.96	53.98	6.02
	49.95	Peak	V				50.55	73.98	23.43
	39.01	Average	V				39.61	53.98	14.37

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 / Project Engineer

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8.3.7.2 Test data for Antenna 1

-. Test Date : January 28, 2014

-. Resolution bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode
1 GHz above 1MHz for Peak and Average Mode

-. Video bandwidth : 30 MHz~1 GHz 100 kHz for Peak and Average Mode
1 GHz above 1MHz for Peak and 10 Hz for Average Mode

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Result : PASSED

Frequency (GHz)	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									
2 425.00	91.06	Peak	H	27.10	7.90	43.00	83.06	113.98	30.92
	87.18	Average	H				79.18	93.98	14.80
	87.40	Peak	V				79.40	113.98	34.58
	82.96	Average	V				74.96	93.98	19.02
4 850.00	56.23	Peak	H	30.70	12.00	42.40	56.53	73.98	17.45
	46.78	Average	H				47.08	53.98	6.90
	49.97	Peak	V				50.27	73.98	23.71
	38.94	Average	V				39.24	53.98	14.74
Test Data for Middle Channel									
2 450.00	91.43	Peak	H	27.20	7.90	43.00	83.53	113.98	30.45
	87.12	Average	H				79.22	93.98	14.76
	87.45	Peak	V				79.55	113.98	34.43
	83.69	Average	V				75.79	93.98	18.19
4 900.00	56.76	Peak	H	30.70	12.00	42.40	57.06	73.98	16.92
	47.23	Average	H				47.53	53.98	6.45
	50.04	Peak	V				50.34	73.98	23.64
	39.04	Average	V				39.34	53.98	14.64

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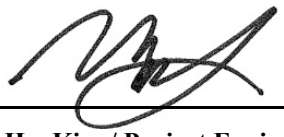
Test Data for High Channel									
2 475.00	91.36	Peak	H	27.30	8.00	43.00	83.66	113.98	30.32
	87.16	Average	H				79.46	93.98	14.52
	86.51	Peak	V				78.81	113.98	35.17
	84.39	Average	V				76.69	93.98	17.29
4 950.00	56.02	Peak	H	30.80	12.10	42.30	56.62	73.98	17.36
	46.56	Average	H				47.16	53.98	6.82
	49.46	Peak	V				50.06	73.98	23.92
	38.12	Average	V				38.72	53.98	15.26

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 / Project Engineer

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8.4 PEAK POWER SPECTRUL DENSITY

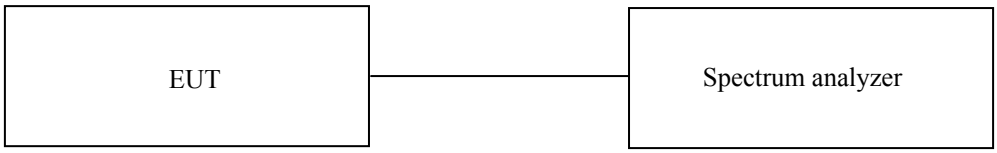
8.4.1 Operating environment

Temperature : 20 °C

Relative humidity : 40 % R.H.

8.4.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 3 kHz, the video bandwidth is set to 3 times the resolution bandwidth. The maximum level form the EUT in 100 kHz bandwidth was measured with above condition.



8.4.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV30	R/S	Spectrum Analyzer	101372	May 20, 2013

All test equipment used is calibrated on a regular basis.

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8.4.4 Test data for Antenna 0

-. Test Date : January 28, 2014

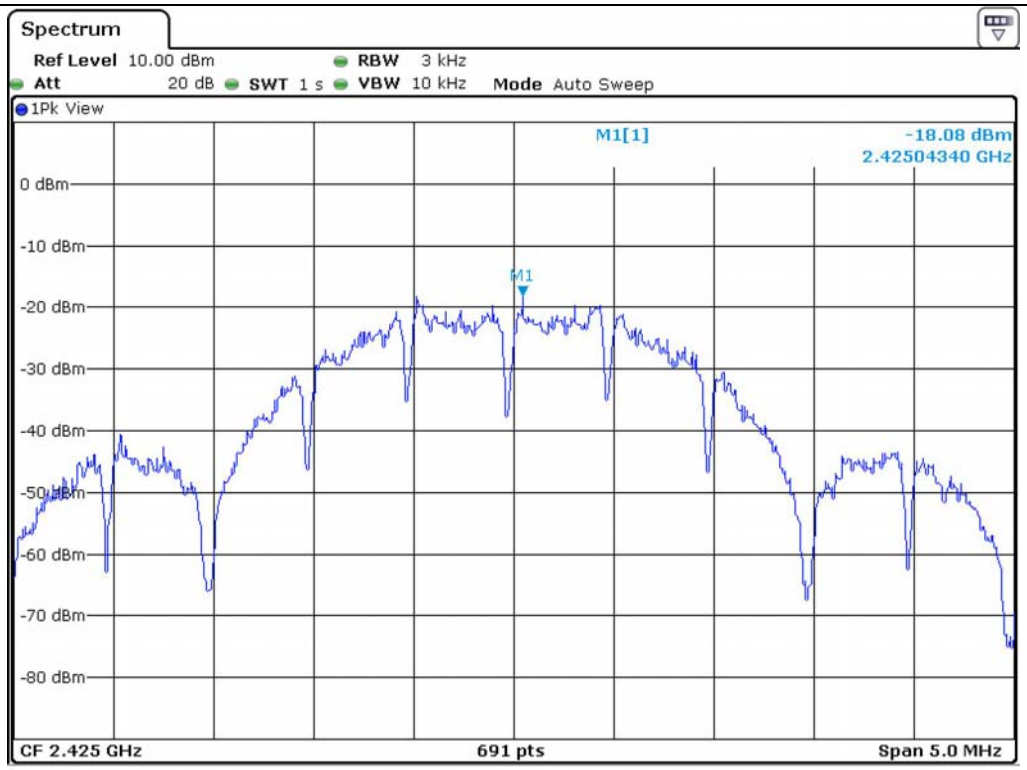
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 425	-18.08	8.00	26.08
Middle	2 450	-19.81	8.00	27.81
High	2 475	-20.37	8.00	28.37

Remark. Margin = Limit – Measured value

Tested by: Tae-Ho, Kim / Project Engineer



Low Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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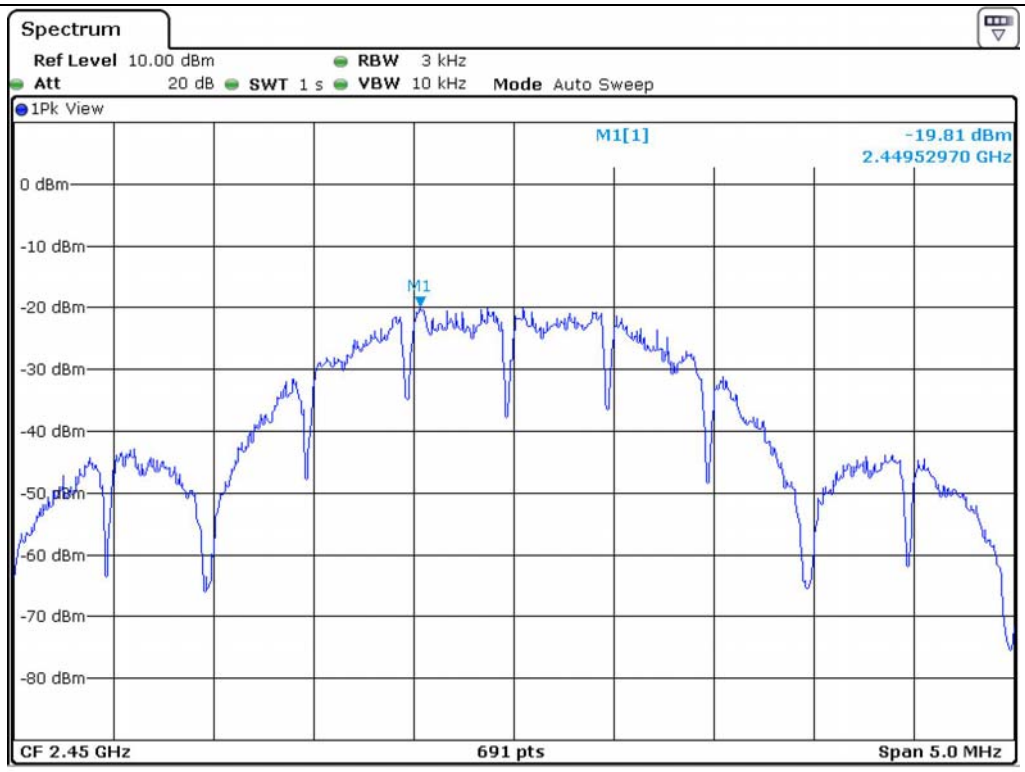
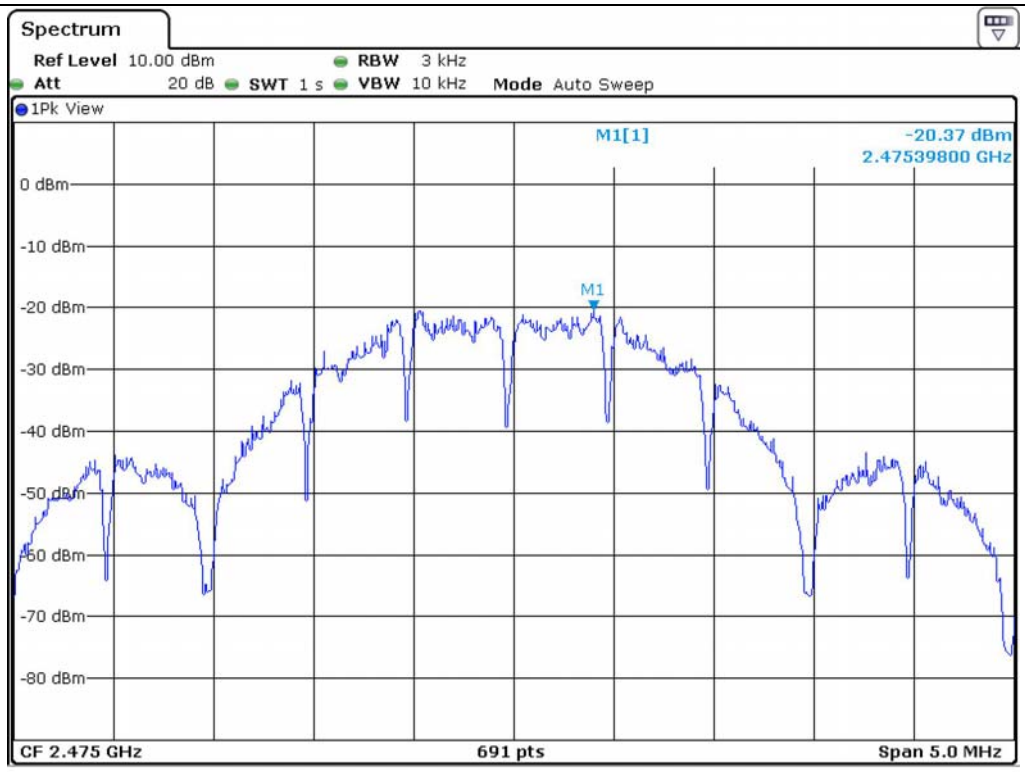


Middle Channel



High Channel

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8.4.5 Test data for Antenna 1

-. Test Date : January 28, 2014

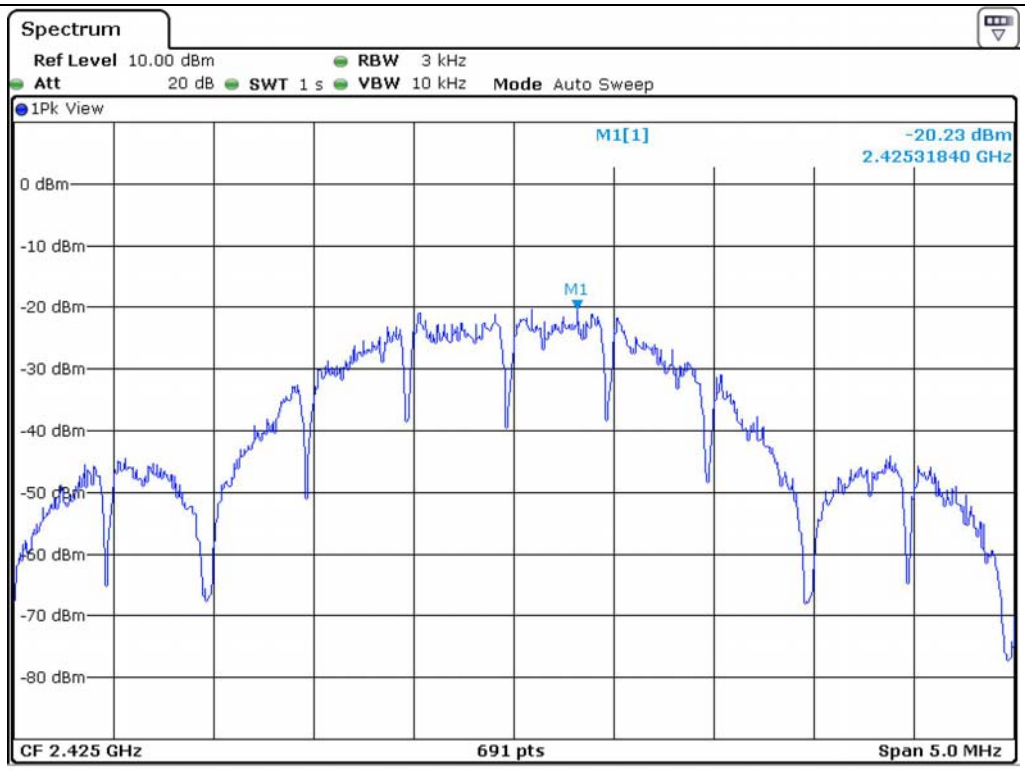
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

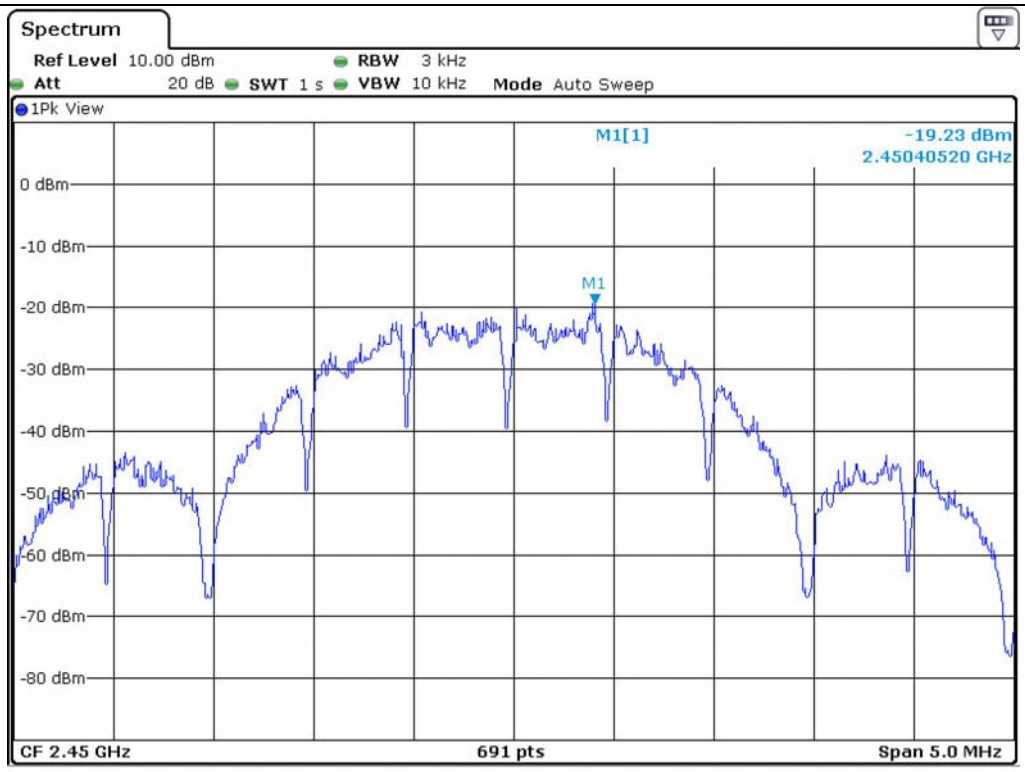
CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 425	-20.23	8.00	28.23
Middle	2 450	-19.23	8.00	27.23
High	2 475	-20.26	8.00	28.26

Remark. Margin = Limit – Measured value

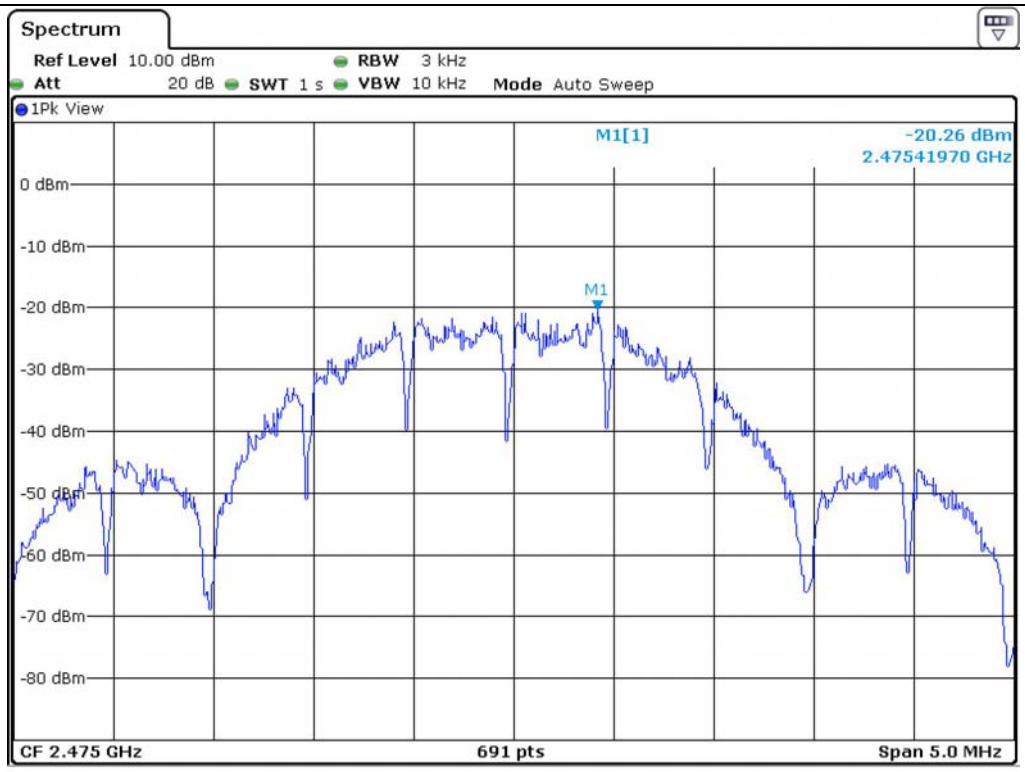
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

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EMC Testing Div. : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

8.5 RADIATED EMISSION TEST

8.5.1 Operating environment

Temperature : (21 ~ 22) °C

Relative humidity : (43 ~ 44) % R.H.

8.5.2 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 up to 25 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.

8.5.3 Measurement uncertainty

Radiated emission electric field intensity, 0.15 MHz ~ 30 MHz : ± 2.61 dB

Radiated emission electric field intensity, 30 MHz ~ 300 MHz : ± 4.43 dB

Radiated emission electric field intensity, 300 MHz ~ 1 000 MHz : ± 3.80 dB

Radiated emission electric field intensity, 1 000 MHz ~ 3 000 MHz: ± 4.40 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2. The measurement uncertainty is given with a confidence of 95 % with the coverage factor, $k = 2$.

8.5.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
☐ -	ESCI	Rohde & Schwarz	EMI Test Receiver	101012	Nov. 18, 2013(1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	May 27, 2013(1Y)
☐ -	8564E	HP	Spectrum Analyzer	3650A00756	May 03, 2013(1Y)
☐ -	FSP	Rohde & Schwarz	Spectrum Analyzer	100017	Nov. 05, 2013(1Y)
■ -	310N	Sonoma Instrument	AMPLIFIER	312544	May 21, 2013(1Y)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 20, 2013(1Y)
■ -	SCU-18	Rohde & Schwarz	PRE-AMPLIFIER	10041	Jan. 20, 2014(1Y)
■ -	MA240	HD GmbH	Antenna Master	N/A	N/A
■ -	HD100	HD GmbH	Position Controller	N/A	N/A
■ -	DS420S	HD GmbH	Turn Table	N/A	N/A
■ -	HFH2-Z2	Rohde & Schwarz	Loop Antenna	879 285/26	Dec. 11, 2012(2Y)
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-255	Apr. 24, 2012(2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Sep. 05, 2013(2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jun. 17, 2013(2Y)
■ -	83051A	Agilent	Microwave System Preamplifer	3950M00201	May 22, 2013(1Y)

All test equipment used is calibrated on a regular basis.

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8.5.4 Test data for Antenna 0

8.5.4.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (43 ~ 44) % R.H. Temperature: (21 ~ 22) °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.249 (d)

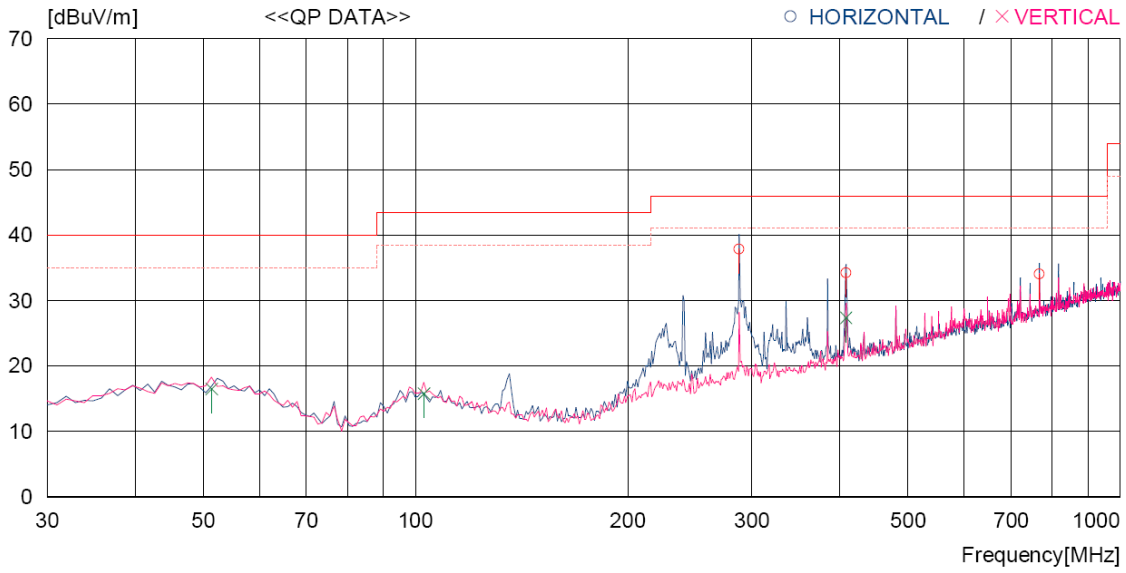
Result : PASSED

EUT : Remote Control Date: January 27, 2014

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

Operating condition : Low Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	288.020	46.9	14.5	9.4	33.0	37.8	46.0	8.2	100	32
2	408.300	40.1	17.0	10.1	33.0	34.2	46.0	11.8	100	95
3	768.163	33.5	21.8	11.9	33.2	34.0	46.0	12.0	100	359
----- Vertical ------										
4	51.340	27.3	15.0	7.4	33.2	16.5	40.0	23.5	100	3
5	102.750	27.5	13.4	8.0	33.1	15.8	43.5	27.7	100	327
6	408.300	33.3	17.0	10.1	33.0	27.4	46.0	18.6	100	94

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

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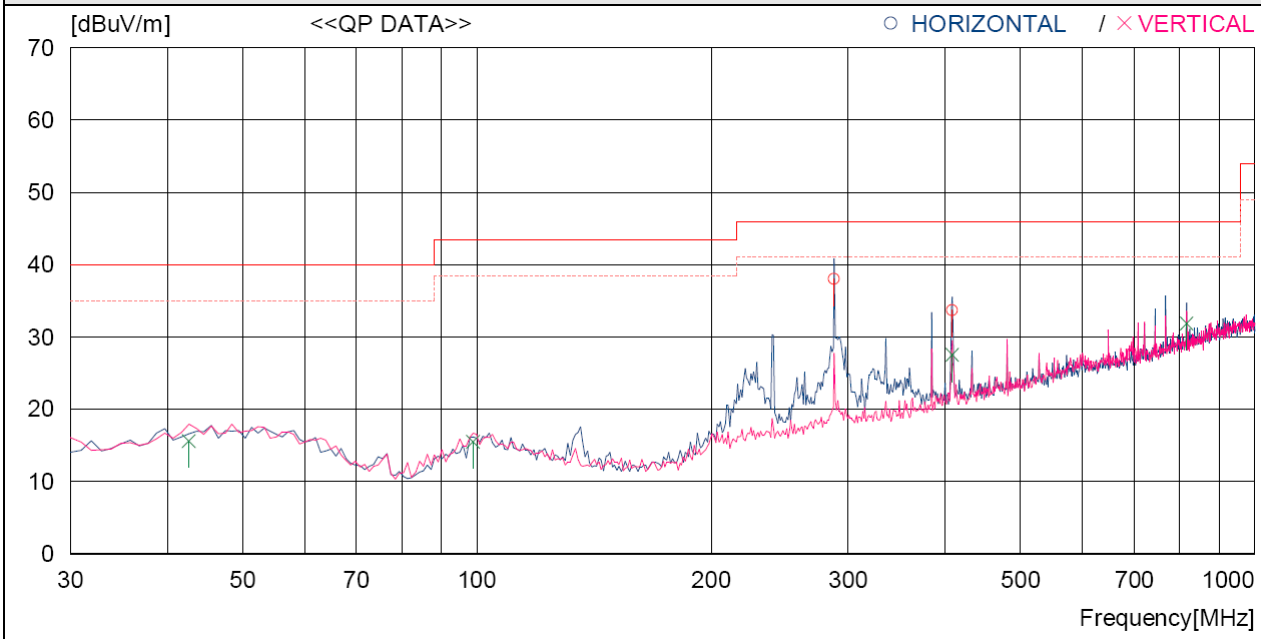
Operating condition : Middle Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

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	288.020	47.1	14.5	9.4	33.0	38.0	46.0	8.0	100	225
2	408.300	39.6	17.0	10.1	33.0	33.7	46.0	12.3	100	101
----- Vertical ------										
3	42.610	26.5	15.0	7.3	33.2	15.6	40.0	24.4	100	0
4	98.870	27.2	13.4	8.0	33.1	15.5	43.5	28.0	100	60
5	408.300	33.4	17.0	10.1	33.0	27.5	46.0	18.5	100	142
6	816.661	30.4	22.4	12.1	33.0	31.9	46.0	14.1	100	149

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

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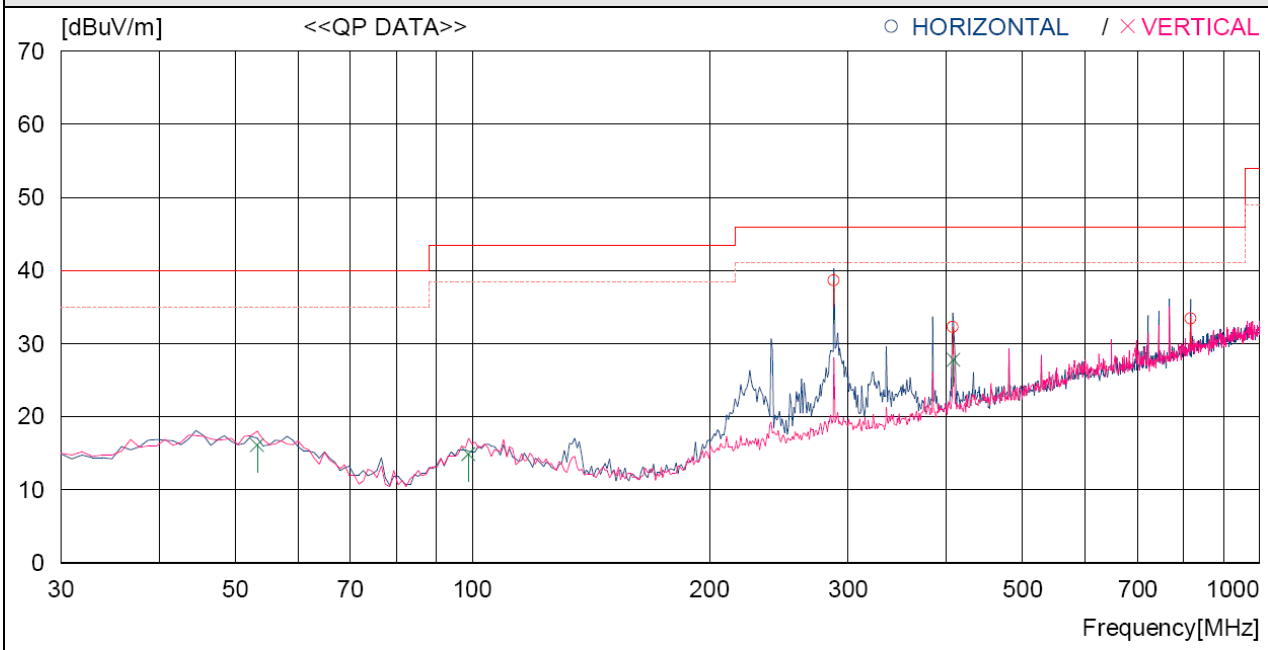
Operating condition : High Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	288.020	47.7	14.5	9.4	33.0	38.6	46.0	7.4	100	359
2	407.330	38.2	17.0	10.1	33.0	32.3	46.0	13.7	100	359
3	816.661	31.9	22.4	12.1	33.0	33.4	46.0	12.6	100	211
----- Vertical ------										
4	53.280	27.1	14.8	7.4	33.2	16.1	40.0	23.9	100	252
5	98.870	26.6	13.4	8.0	33.1	14.9	43.5	28.6	100	265
6	408.300	33.7	17.0	10.1	33.0	27.8	46.0	18.2	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Tested by: Tae-Ho, Kim / Project Engineer

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8.5.4.2 Test data for Below 30 MHz

-. Test Date : January 27, 2014

-. 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

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.									

8.5.4.3 Test data for above 1 GHz

-. Test Date : January 27, 2014

-. 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

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

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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8.5.5 Test data for Antenna 1

8.5.5.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (43 ~ 44) % R.H. Temperature: (21 ~ 22) °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.249 (d)

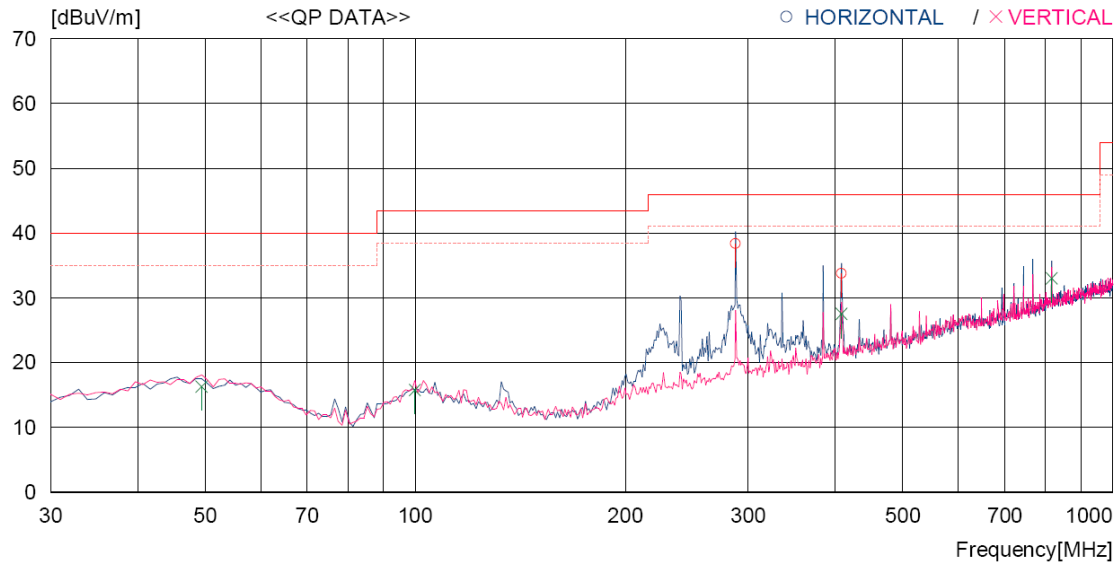
Result : PASSED

EUT : Remote Control Date: January 27, 2014

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

Operating condition : Low Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

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	288.020	47.5	14.5	9.4	33.0	38.4	46.0	7.6	100	359
2	408.300	39.7	17.0	10.1	33.0	33.8	46.0	12.2	100	108
----- Vertical ------										
3	49.400	27.0	15.1	7.4	33.2	16.3	40.0	23.7	100	0
4	99.840	27.3	13.6	8.0	33.1	15.8	43.5	27.7	100	190
5	408.300	33.4	17.0	10.1	33.0	27.5	46.0	18.5	100	134
6	816.661	31.5	22.4	12.1	33.0	33.0	46.0	13.0	100	121

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

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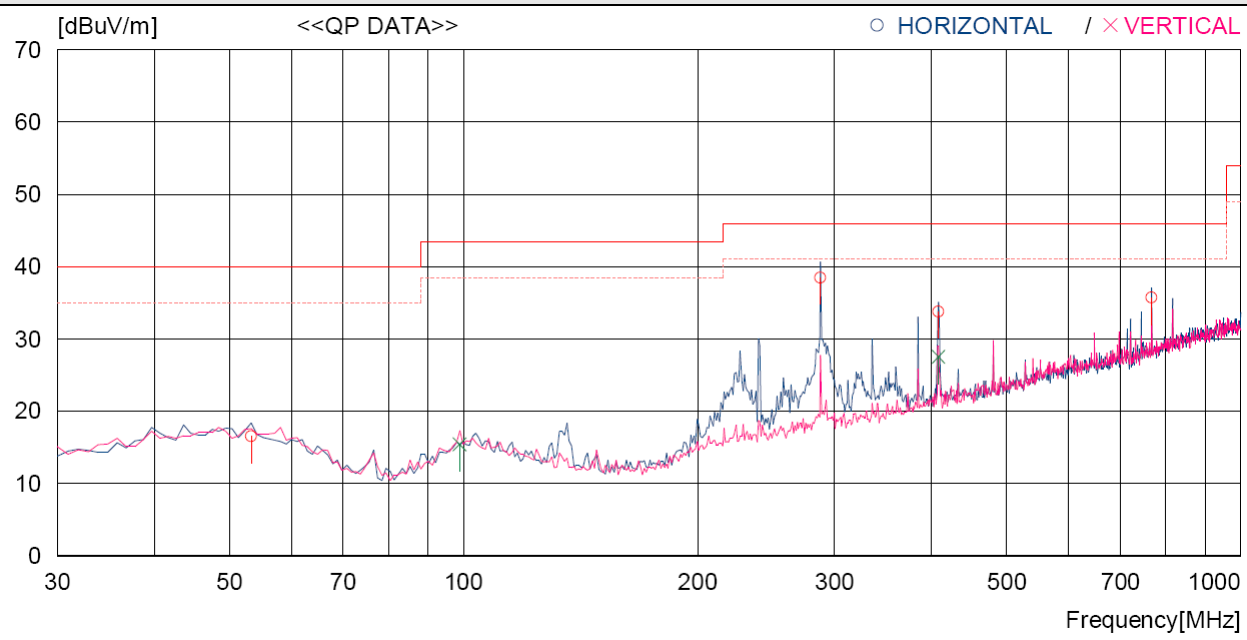
Operating condition : Middle Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	53.280	27.5	14.8	7.4	33.2	16.5	40.0	23.5	100	157
2	288.020	47.6	14.5	9.4	33.0	38.5	46.0	7.5	100	40
3	408.300	39.7	17.0	10.1	33.0	33.8	46.0	12.2	100	109
4	768.163	35.2	21.8	11.9	33.2	35.7	46.0	10.3	100	260
----- Vertical ------										
5	98.870	27.1	13.4	8.0	33.1	15.4	43.5	28.1	100	0
6	408.300	33.4	17.0	10.1	33.0	27.5	46.0	18.5	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

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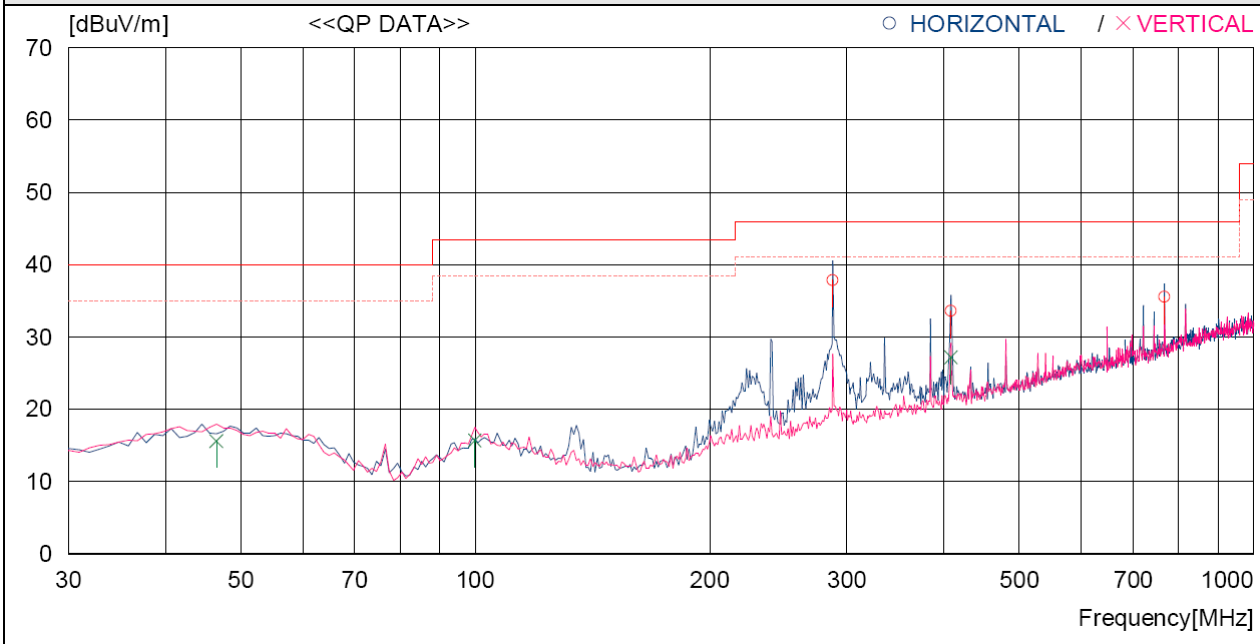
Operating condition : High Channel

Graphical representation of Radiated Emission



Tabulated Results for Radiated Emission

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	288.020	46.9	14.5	9.4	33.0	37.8	46.0	8.2	100	40
2	408.300	39.5	17.0	10.1	33.0	33.6	46.0	12.4	100	80
3	768.163	35.0	21.8	11.9	33.2	35.5	46.0	10.5	100	281
----- Vertical ------										
4	46.490	26.3	15.2	7.3	33.2	15.6	40.0	24.4	100	99
5	99.840	27.2	13.6	8.0	33.1	15.7	43.5	27.8	100	0
6	408.300	33.1	17.0	10.1	33.0	27.2	46.0	18.8	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Peak + Antenna Factor + Loss – Gain
Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Tested by: Tae-Ho, Kim / Project Engineer

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8.5.5.2 Test data for Below 30 MHz

-. Test Date : January 27, 2014

-. 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

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.									

8.5.5.3 Test data for above 1 GHz

-. Test Date : January 27, 2014

-. 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

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

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9. RADIO FREQUENCY EXPOSURE

9.1 RF Exposure Limit

According to the FCC rule §1.1310, the limit for General Population/Uncontrolled exposure is 1 mW/cm² for the device operating 1 500 ~ 100 000 MHz.

9.1 RF Exposure consideration

This equipment should be operated with a minimum distance of 2 cm between the radiator and front of face. This equipment should not be placed directly on the ear when the speaker is active

9.3 EUT Description

Kind of EUT	Remote Control		
Operating Frequency Band	☐ Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz ■ WLAN(802.11b/g/n(HT20)): 2 412 MHz ~ 2 462 MHz ■ WLAN(802.11n(HT40)): 2 422 MHz ~ 2 452 MHz ☐ WLAN: 5 180 MHz ~ 5 320 MHz / 5 500 MHz ~ 5 700 MHz ☐ WLAN: 5 745 MHz ~ 5 825 MHz ☐ Bluetooth: 2 402 MHz ~ 2 480 MHz ■ Zigbee:2 425 MHz, 2 450 MHz, 2 475 MHz		
Device Category	☐ Portable (< 20 cm separation) ☐ Mobile (> 20 cm separation) ■ Others		
Max. Output Power	WLAN	802.11b	14.80 dBm
		802.11g	13.97 dBm
		802.11n (HT20)	14.05 dBm
		802.11n (HT40)	13.39 dBm
	Zigbee	Antenna 0	-4.67 dBm
		Antenna 1	-4.78 dBm
Used Antenna	WLAN	Inserted into the main board (Chip Antenna)	
	Zigbee	Inserted into the main board (PCB Antenna)	
Used Antenna Gain	WLAN	3.3 dBi	
	Zigbee	Antenna0	-0.61 dBi
		Antenna1	1.73 dBi
Exposure Evaluation Applied	■ MPE ☐ SAR ☐ N/A		

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9.4 Test Result for WLAN

According to the procedure, KDB 447498 D01, the standalone SAR test exclusion threshold is

[(Max. Power of channel, including tune-up tolerance, mW)/(Mim. test separation distance, mm)] X [√ f(GHz)] < 3

= [30.2/20)] X √ 2.462 = 2.37

Conclusion: The SAR test exclusion threshold is less than 3, so the device meets the RF Exposure Requirement and excluded SAR Test.

9.5 Test Result for Zigbee

According to the procedure, KDB 447498 D01, the standalone SAR test exclusion threshold is

[(Max. Power of channel, including tune-up tolerance, mW)/(Mim. test separation distance, mm)] X [√ f(GHz)] < 3

= [0.34/20)] X √ 2.425 = 0.026

Conclusion: The SAR test exclusion threshold is less than 3, so the device meets the RF Exposure Requirement and excluded SAR Test.

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