8 MAXIMUM PEAK OUTPUT POWER

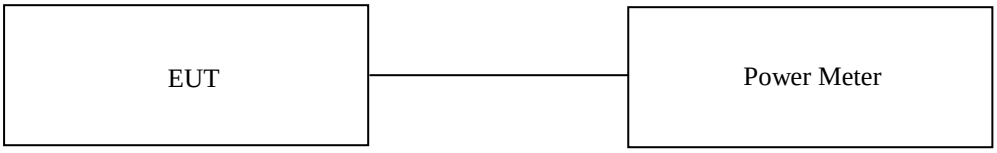
8.1 Operating environment

Temperature : 26 ℃

Relative humidity : 48 % R.H

8.2 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.



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	Apr. 28, 2014(1Y)

All test equipment used is calibrated on a regular basis.

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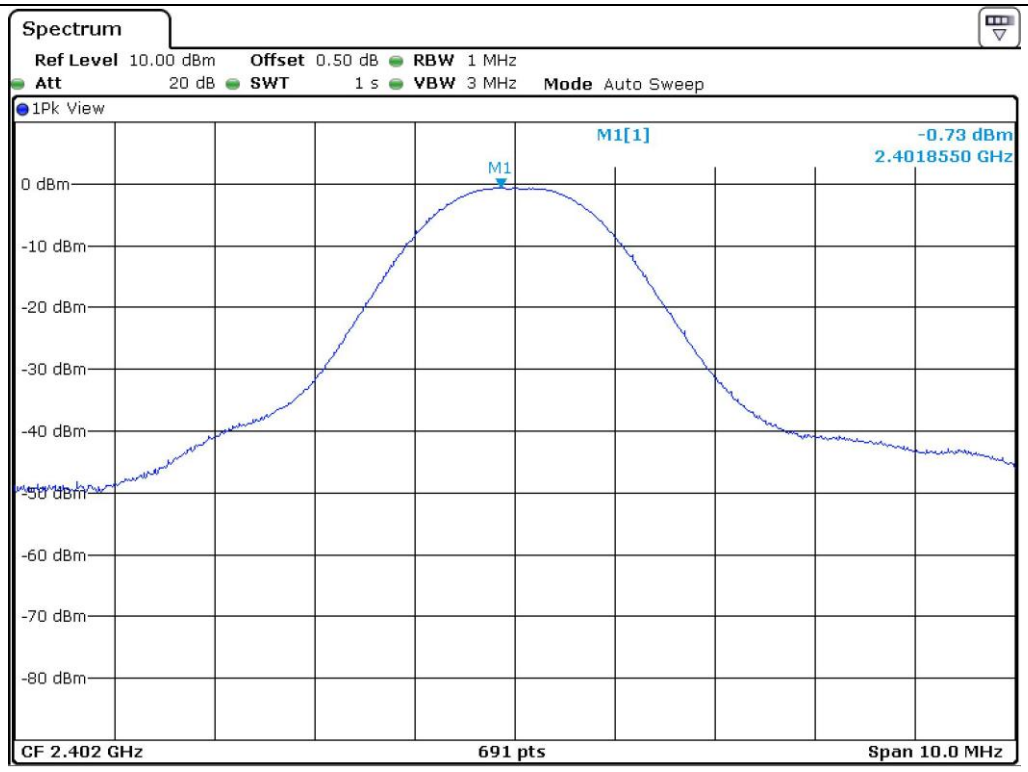
8.4 Test data for 1 Mbps

-. Test Date : September 17, 2014

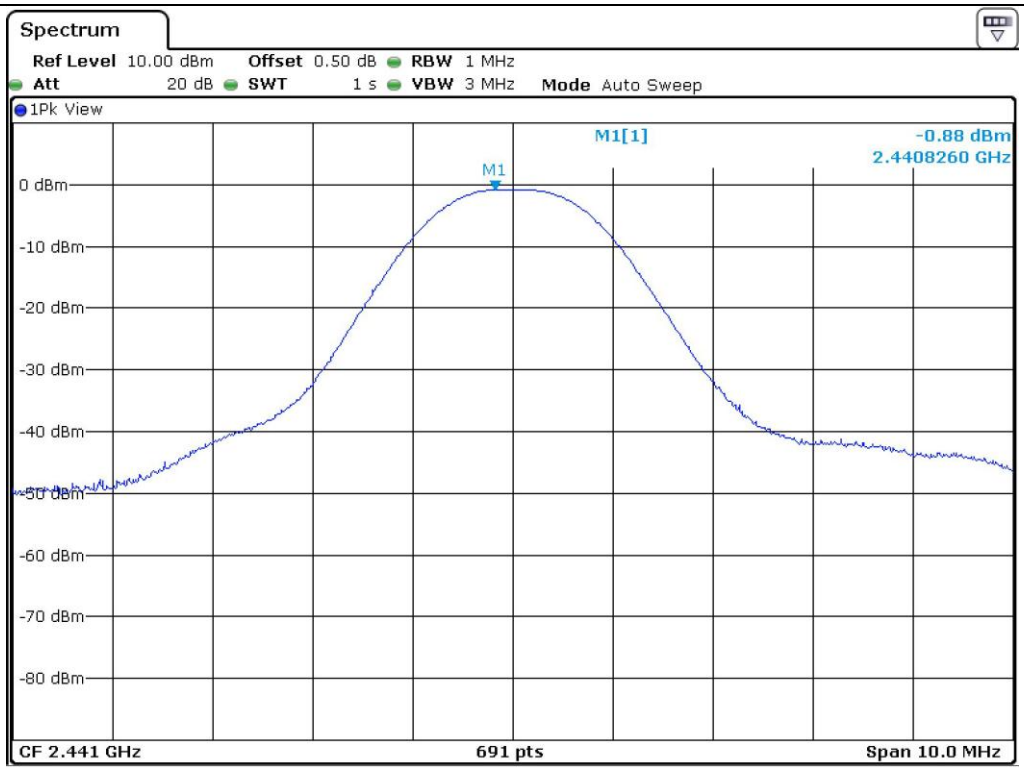
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402	-0.73	30.00	30.73
Middle	2 441	-0.88	30.00	30.88
High	2 480	-1.39	30.00	31.39

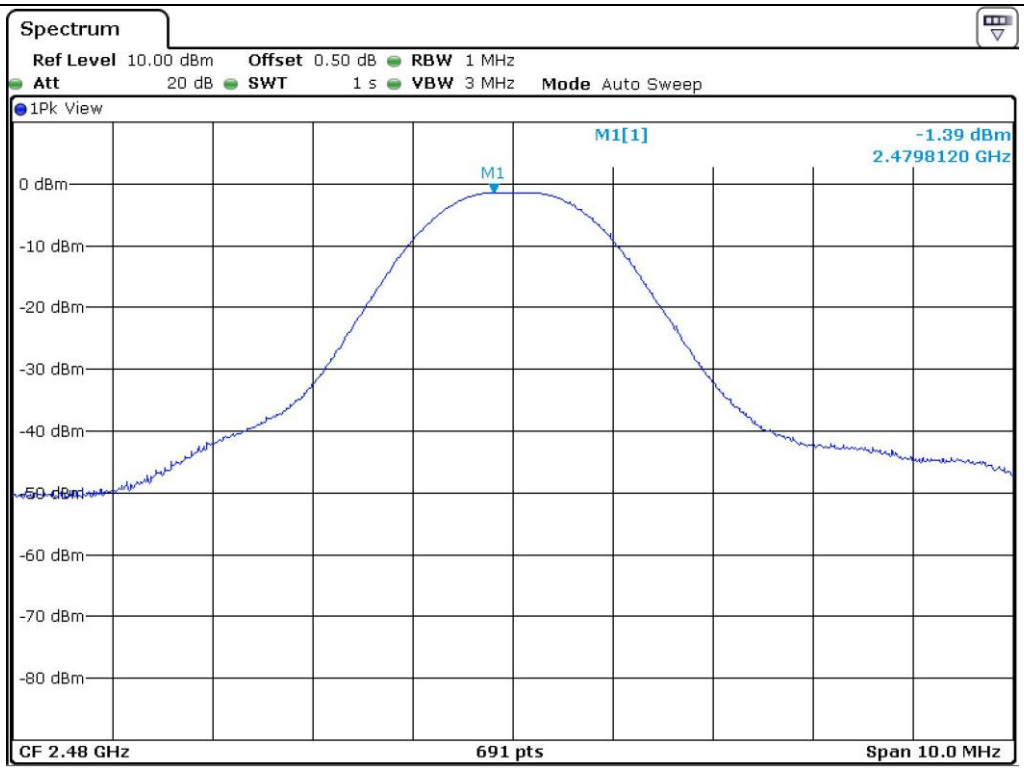
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

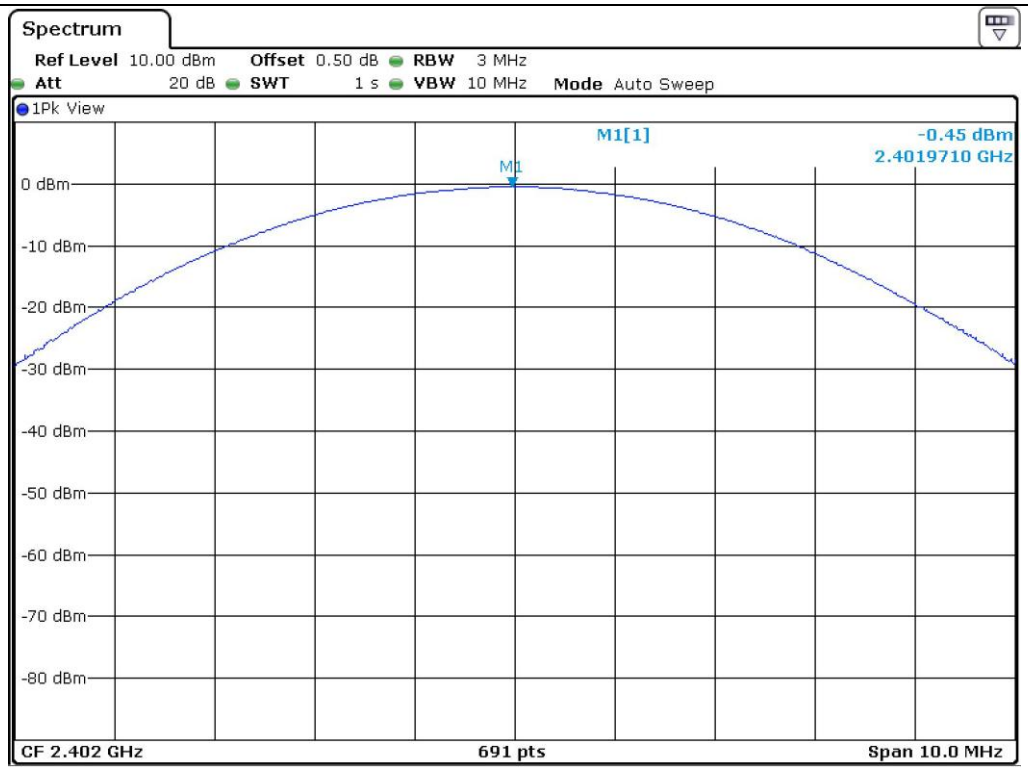
8.5 Test data for 2 Mbps

-. Test Date : September 17, 2014

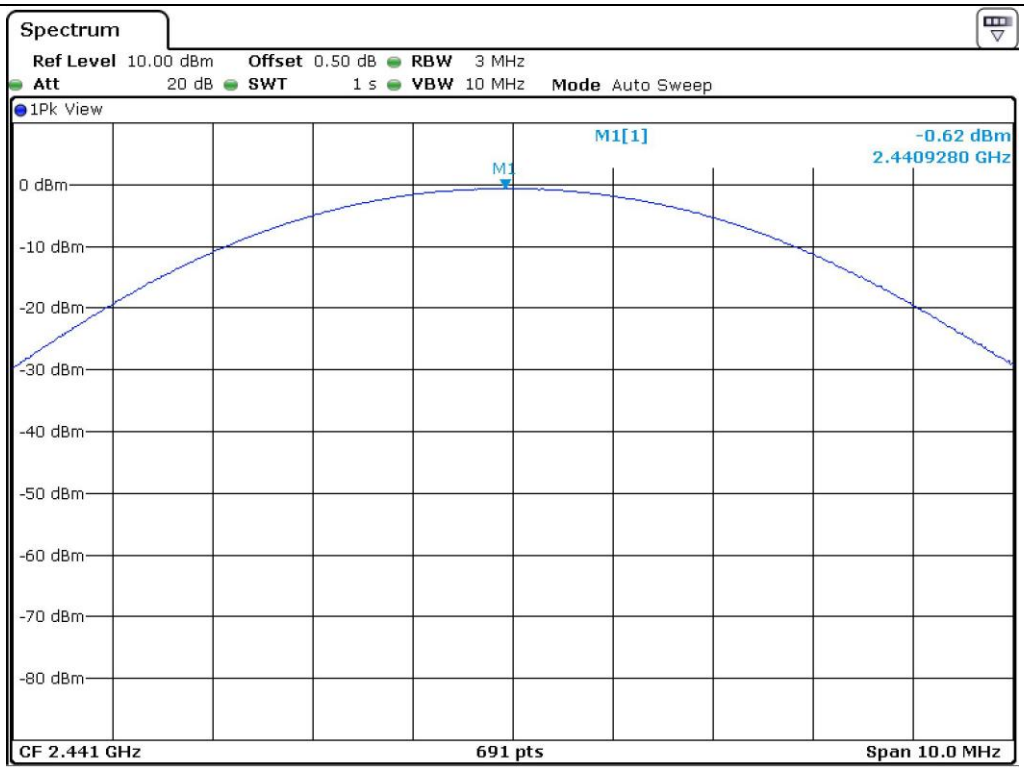
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402	-0.45	30.00	30.45
Middle	2 441	-0.62	30.00	30.62
High	2 480	-0.96	30.00	30.96

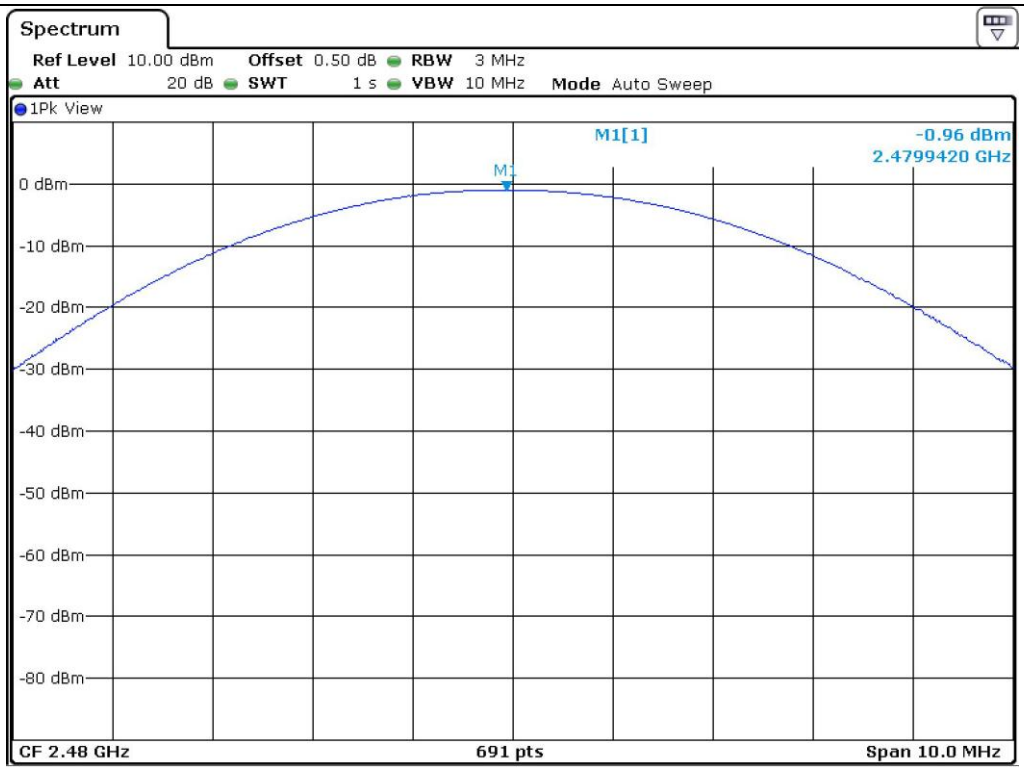
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

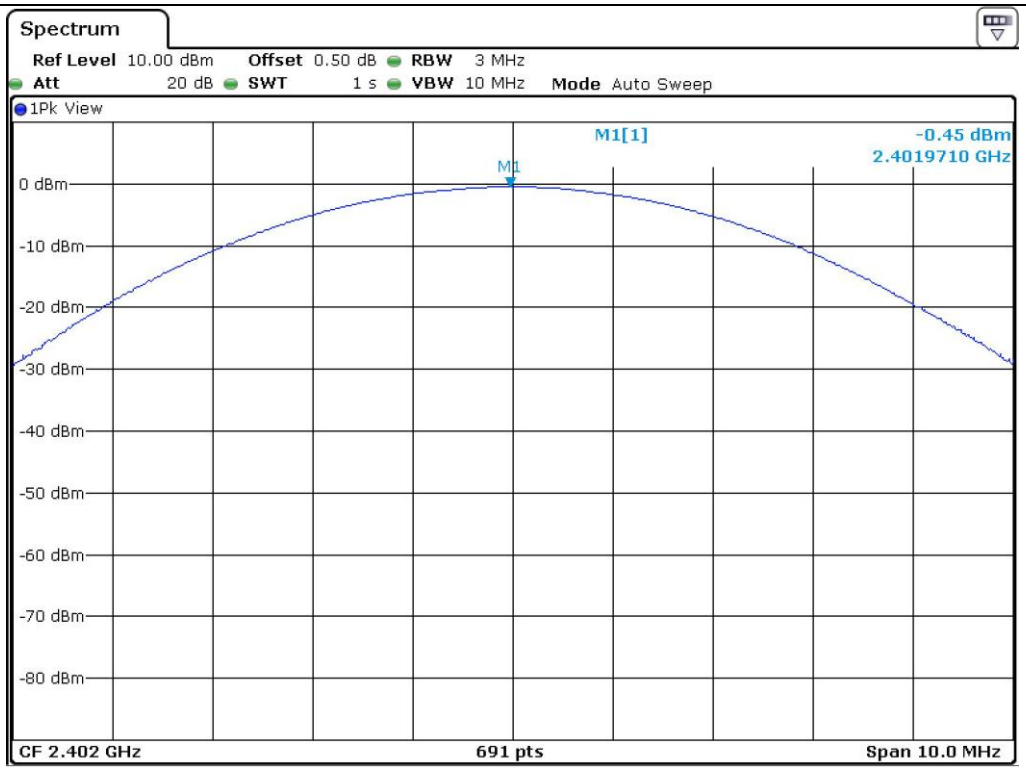
8.6 Test data for 3 Mbps

-. Test Date : September 17, 2014

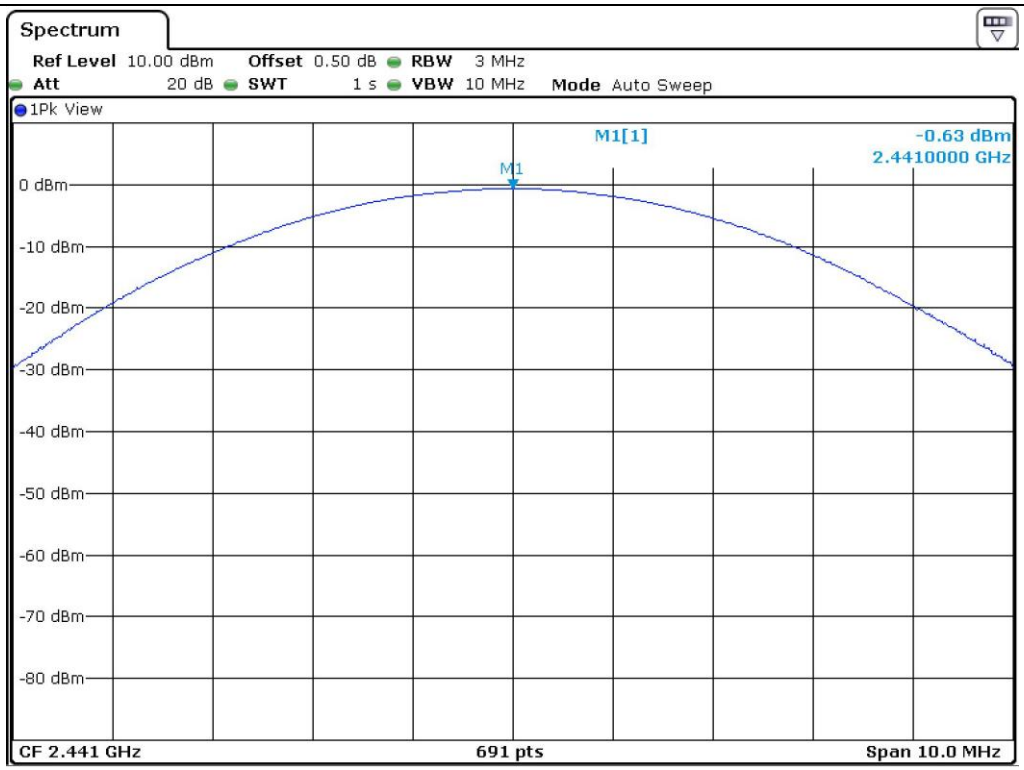
-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402	-0.45	30.00	30.45
Middle	2 441	-0.63	30.00	30.63
High	2 480	-0.91	30.00	30.91

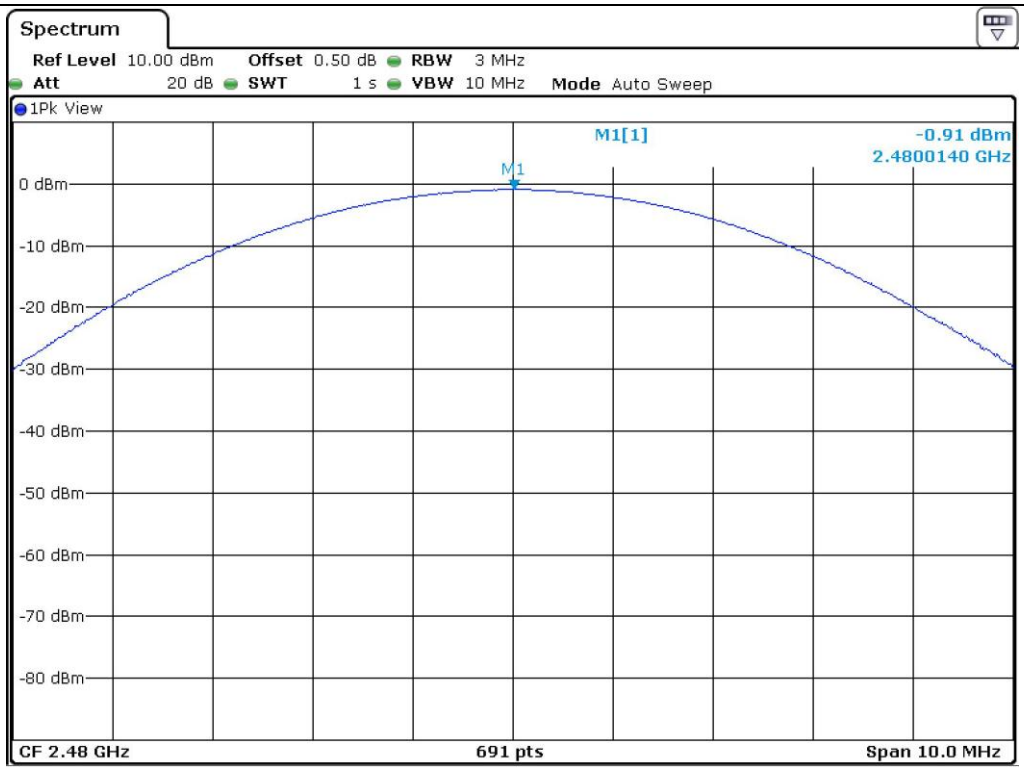
Tested by: Tae-Ho, Kim / Project Engineer



Low Channel



Middle Channel



High Channel

9 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

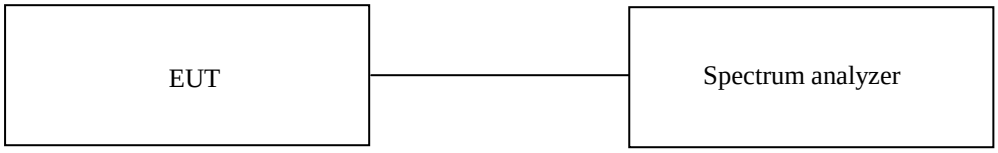
9.1 Operating environment

Temperature : 26 ℃

Relative humidity : 48 % R.H

9.2 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.



9.3 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 kHz 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 ms in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

9.4 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	Apr. 29, 2014(1Y)
☐ -	8564E	HP	Spectrum Analyzer	3650A00756	Apr. 28, 2014(1Y)
☐ -	FSP	Rohde & Schwarz	Spectrum Analyzer	100017	Nov. 05, 2013(1Y)
■ -	310N	Sonoma Instrument	AMPLIFIER	312544	Apr. 28, 2014(1Y)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	Apr. 28, 2014(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	May 05, 2014(2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Sep. 05, 2013(2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	N/A
■ -	83051A	Agilent	Microwave System Preamplifer	3950M00201	Apr. 30, 2014(1Y)

All test equipment used is calibrated on a regular basis.

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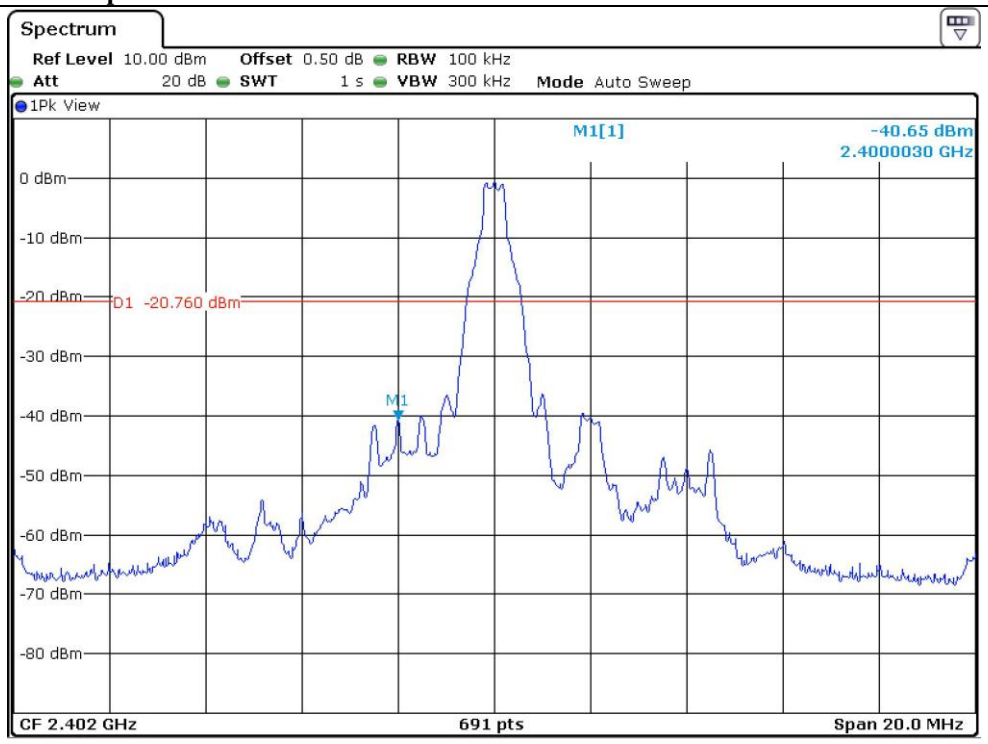
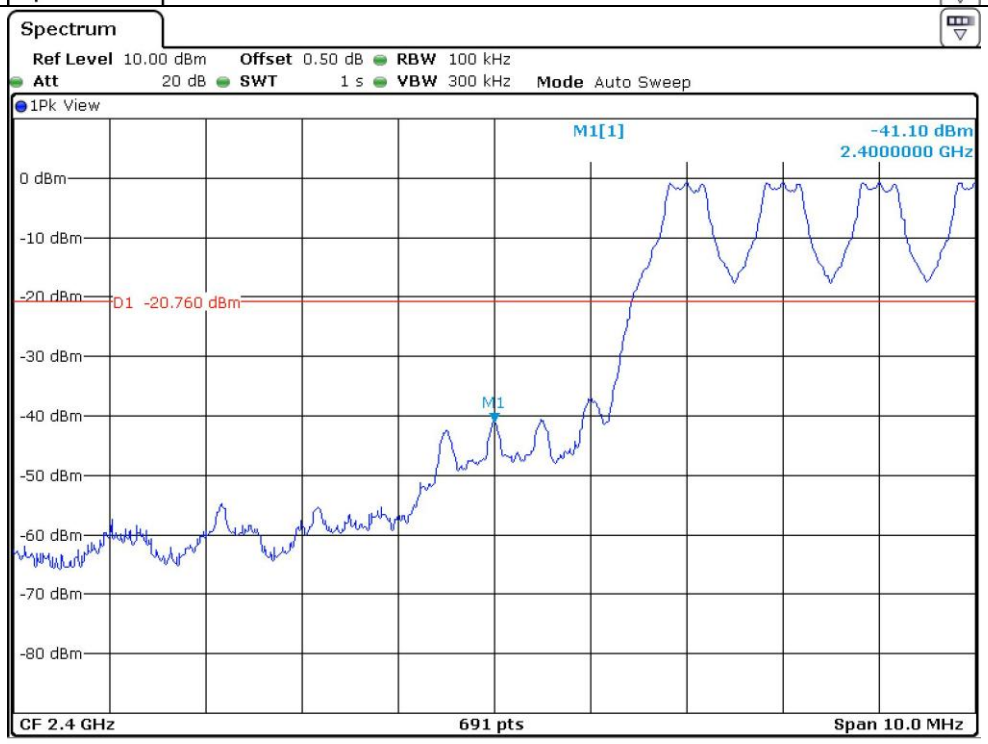
9.5 Test data for conducted emission

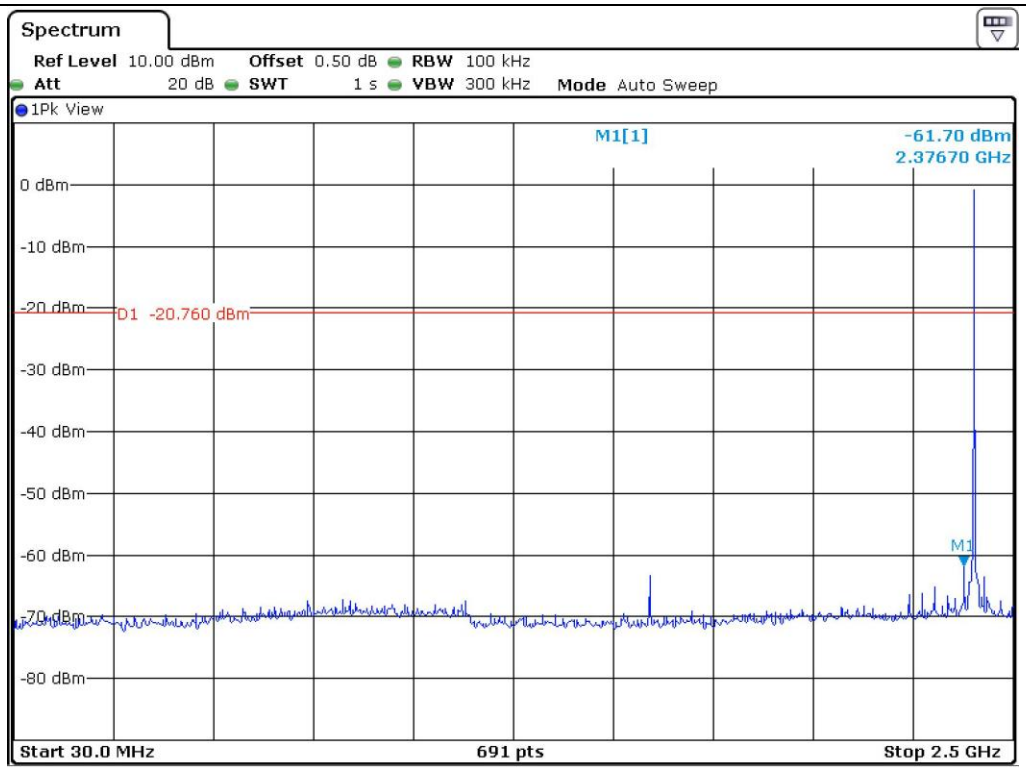
9.5.1 Test data for 1 Mbps



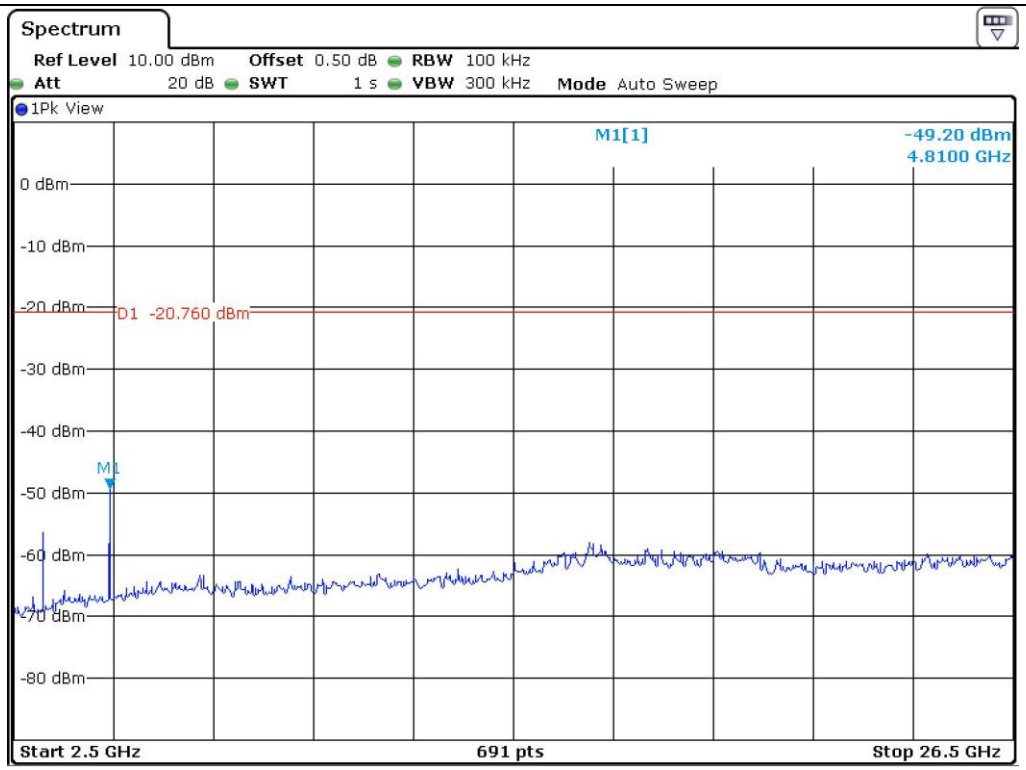
Low Channel



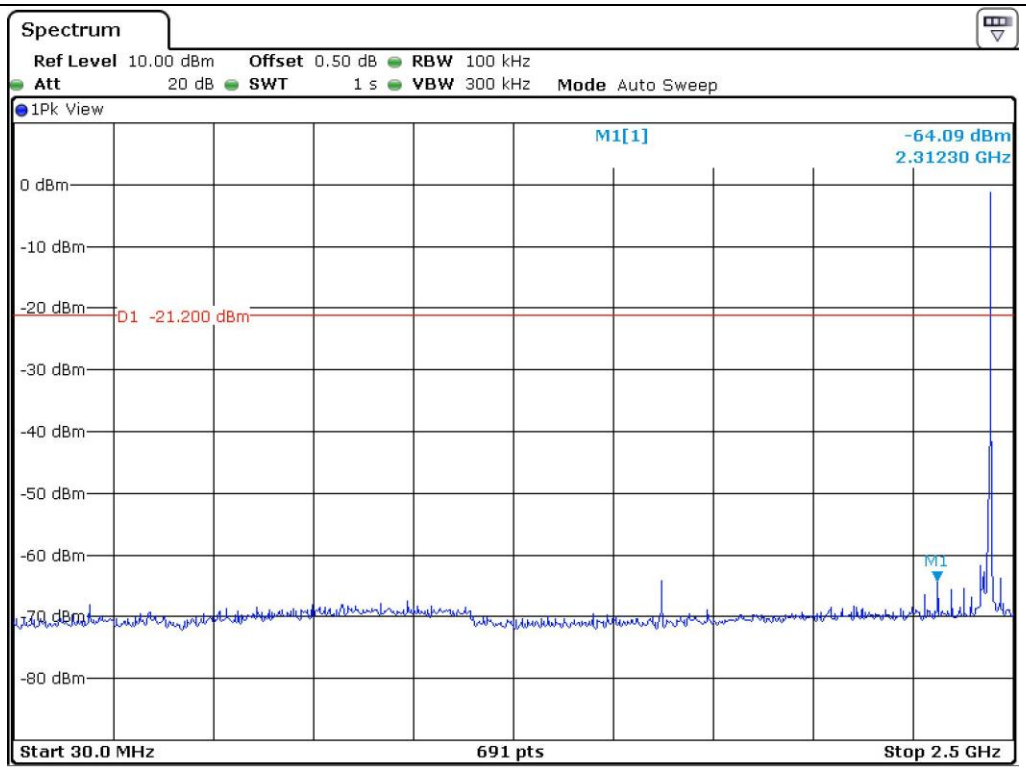
Low Channel



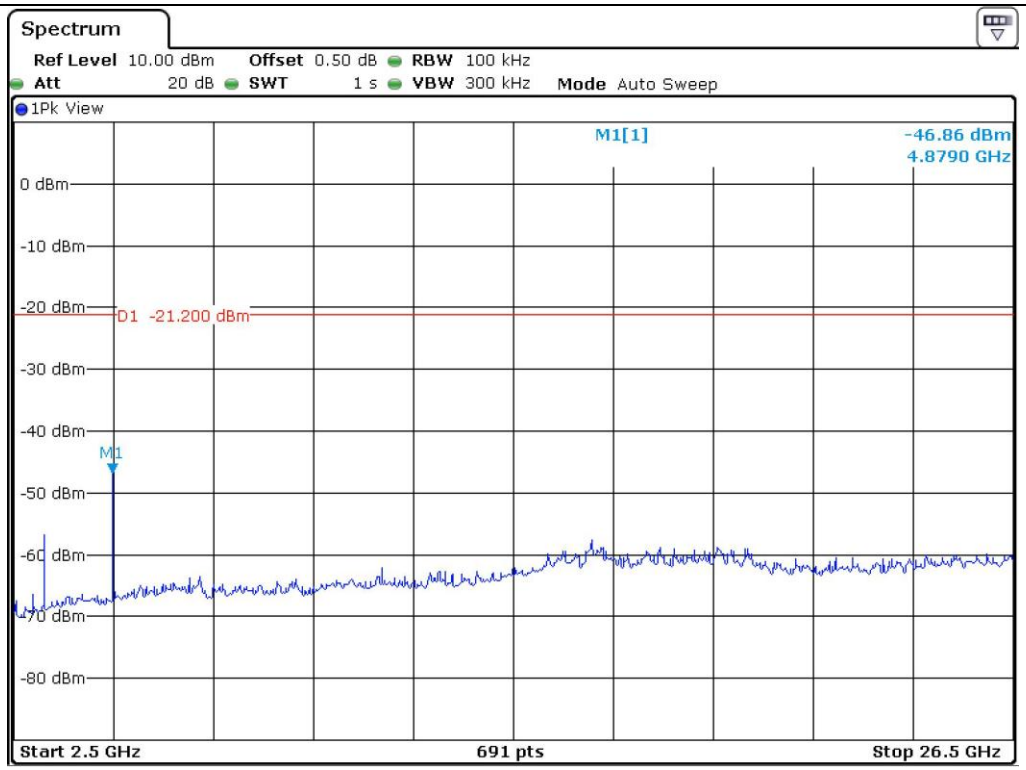
Low Channel



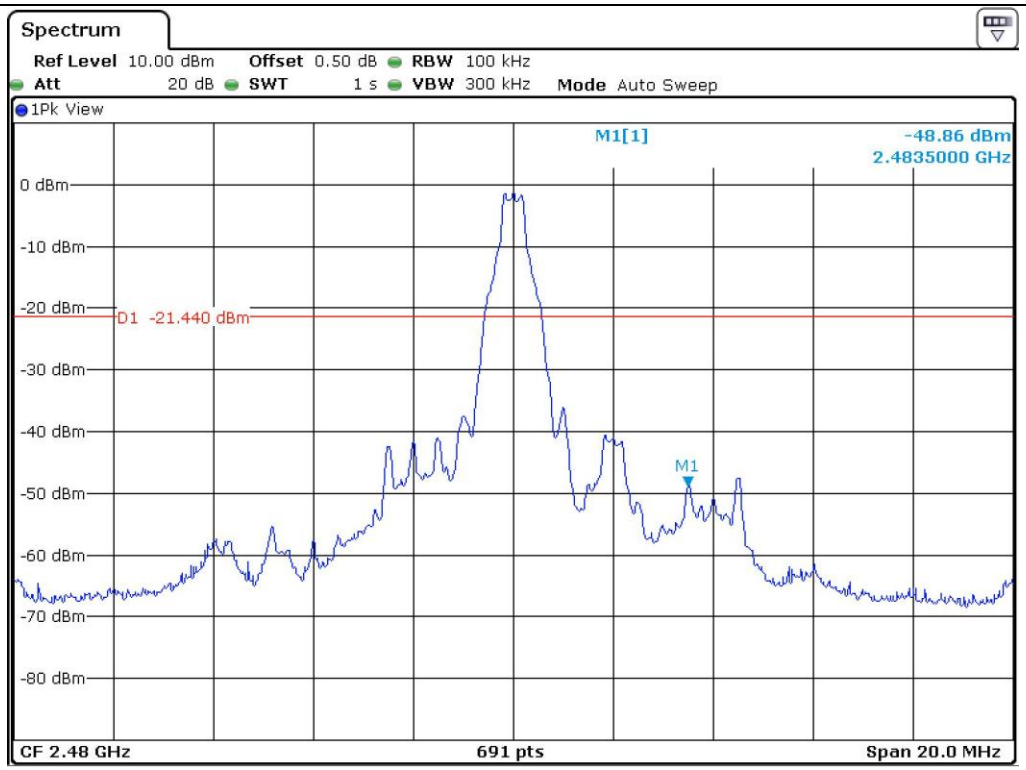
Low Channel



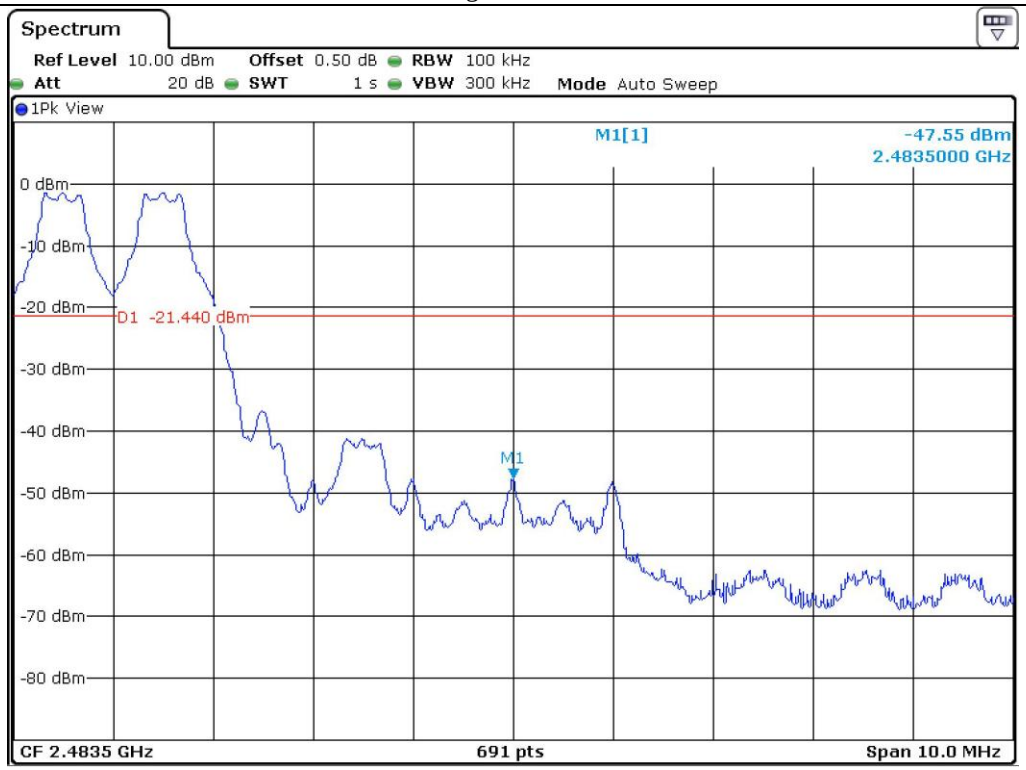
Middle Channel



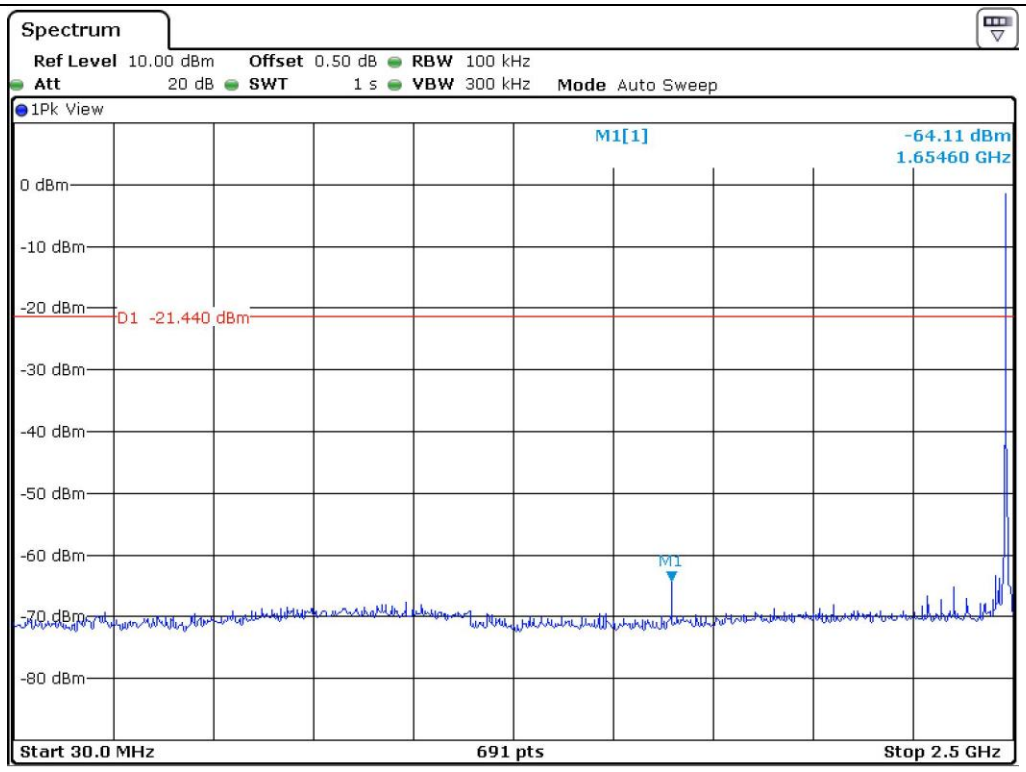
Middle Channel



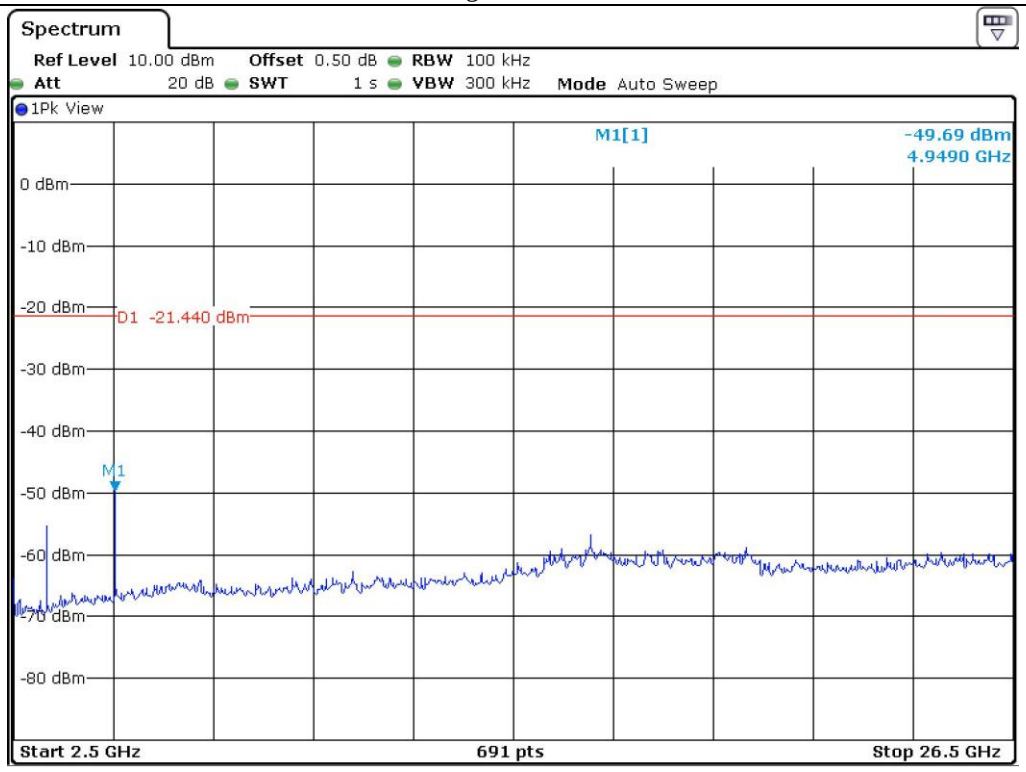
High Channel



High Channel

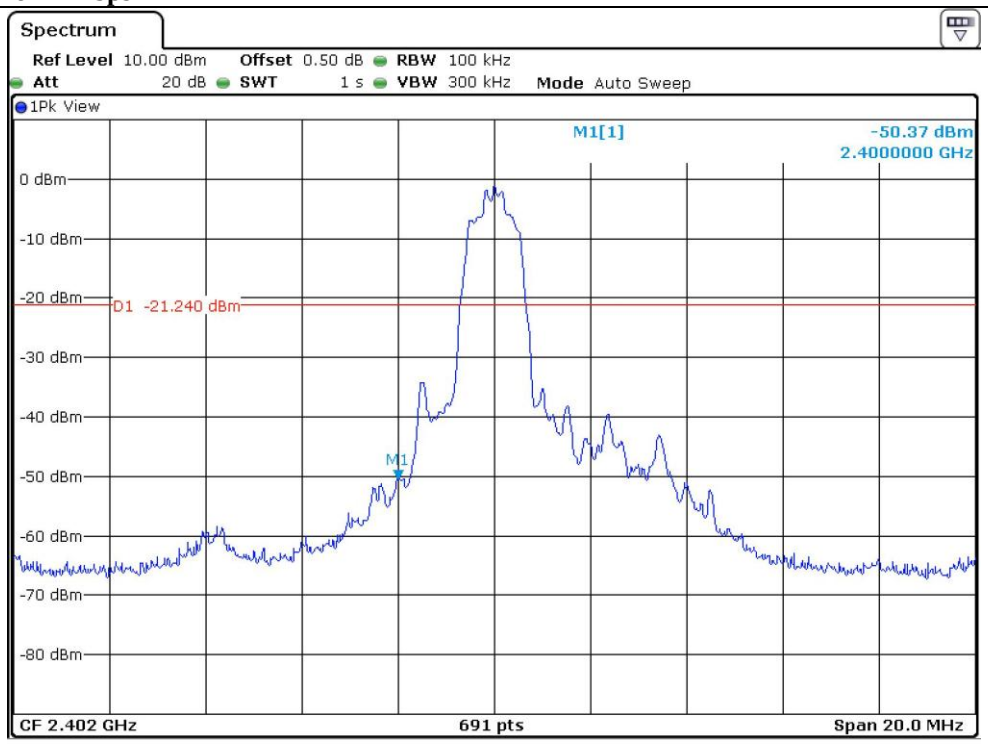


High Channel

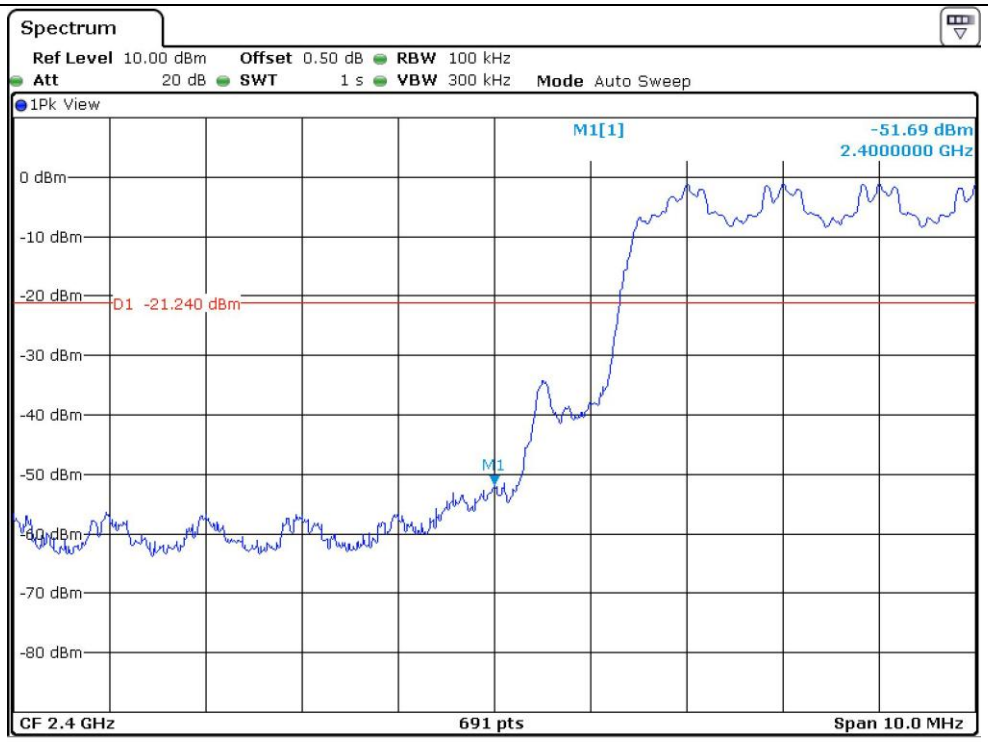


High Channel

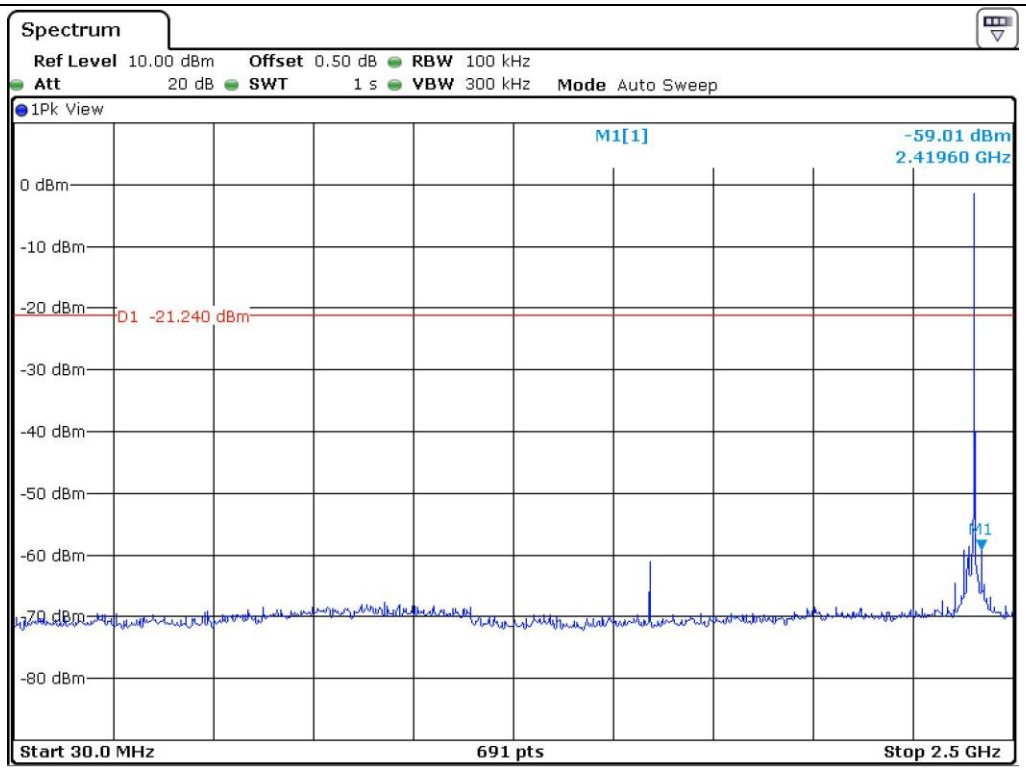
9.5.2 Test data for 2 Mbps



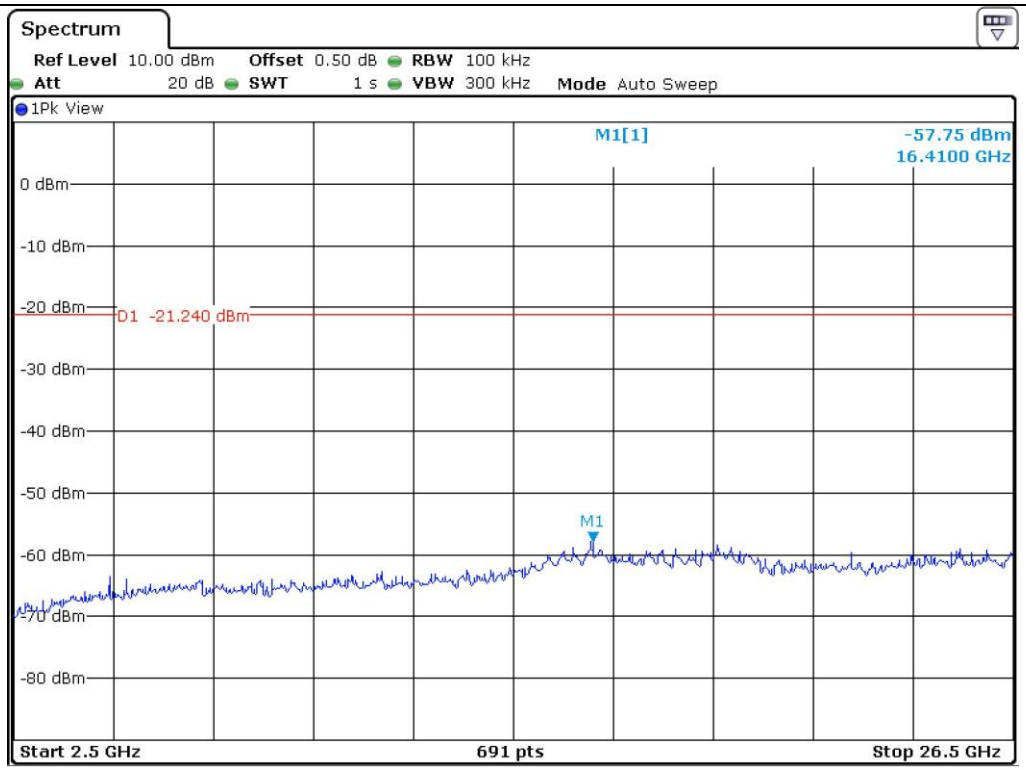
Low Channel



Low Channel



Low Channel



Low Channel

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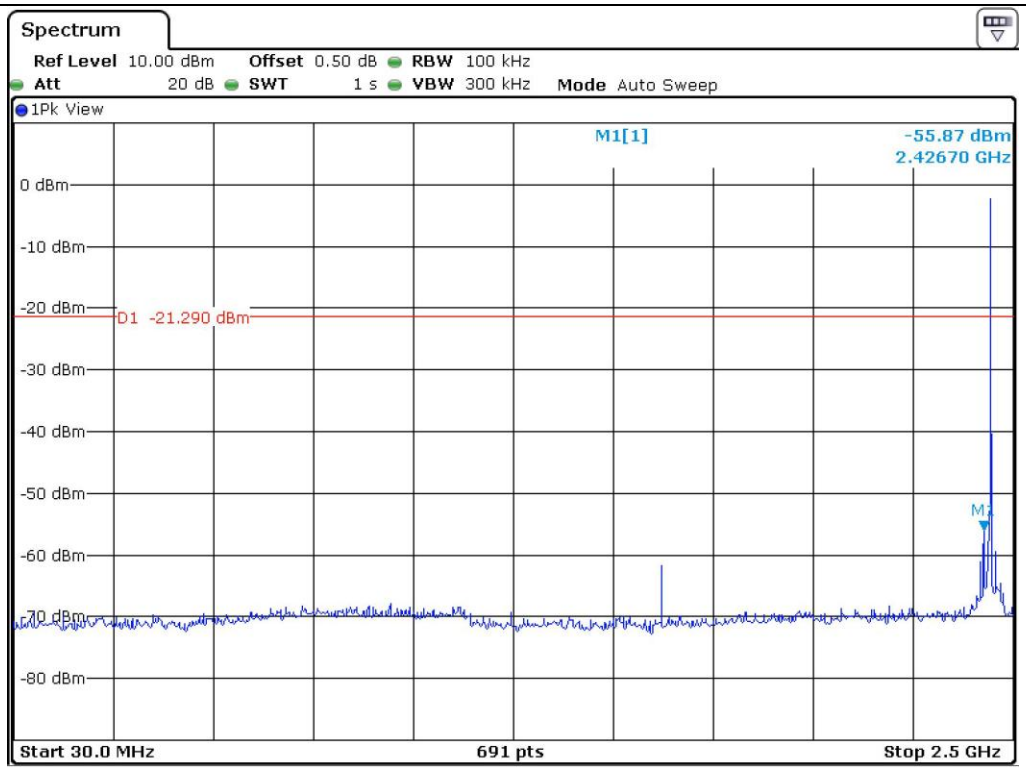
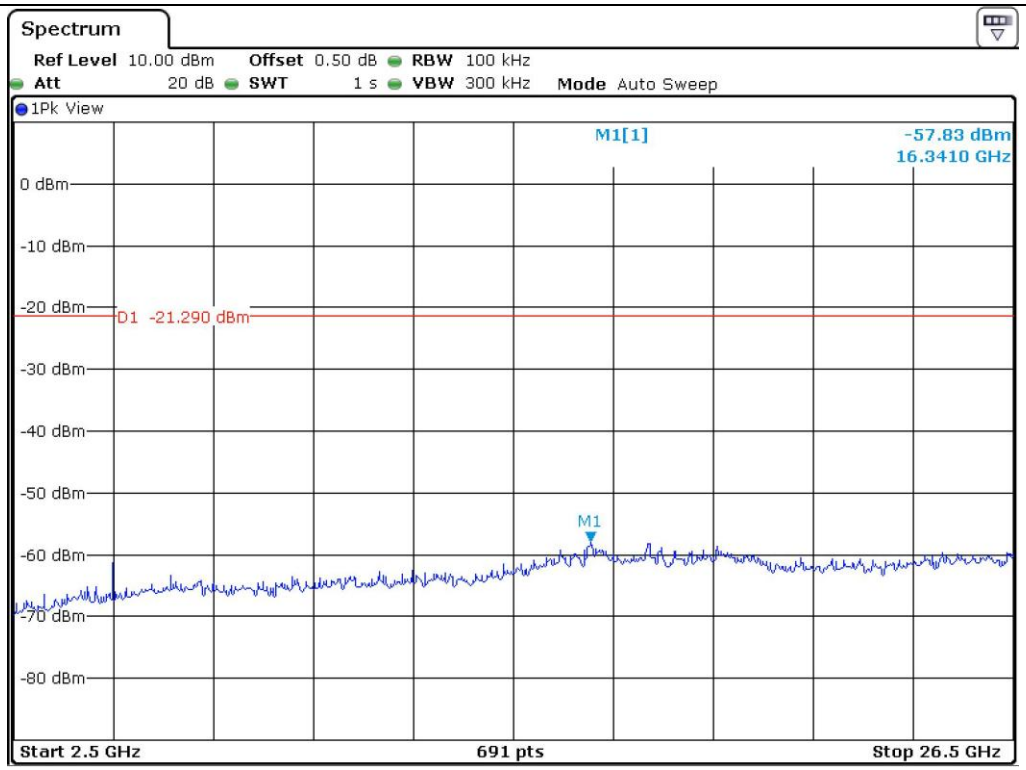
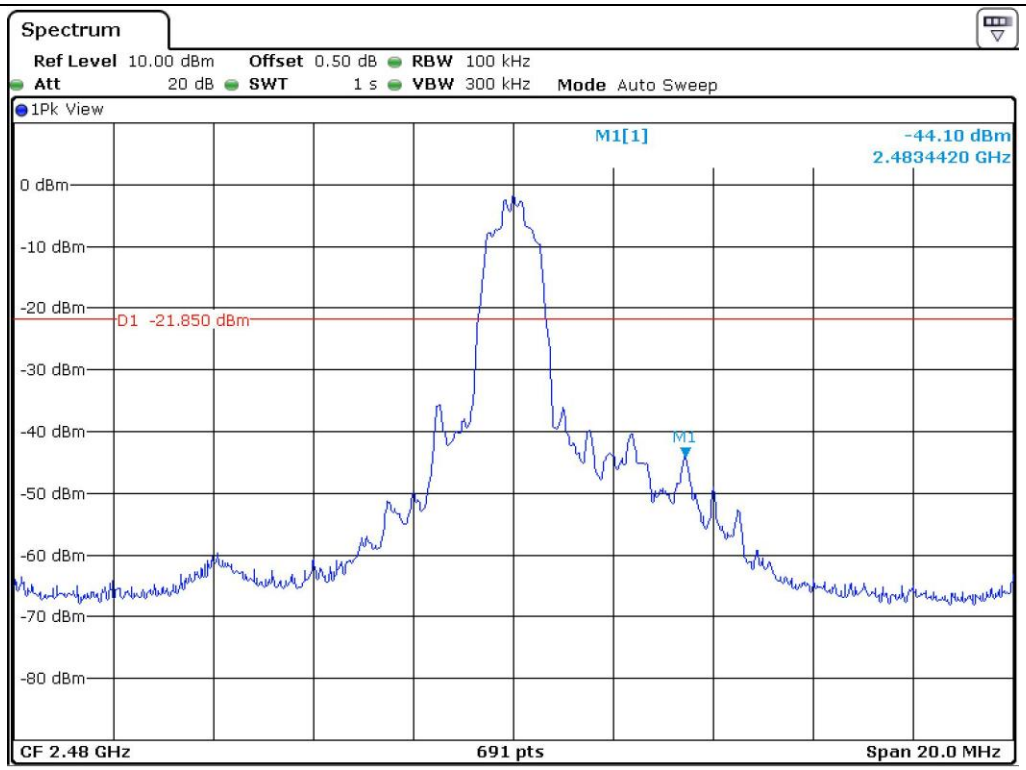


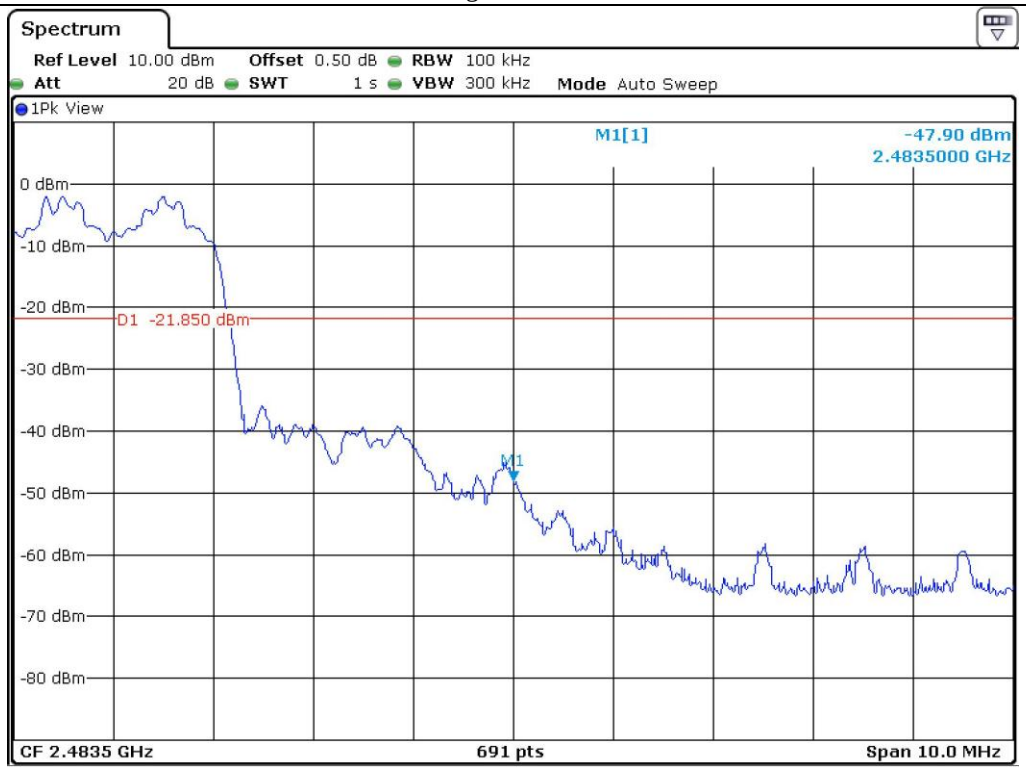
Middle Channel



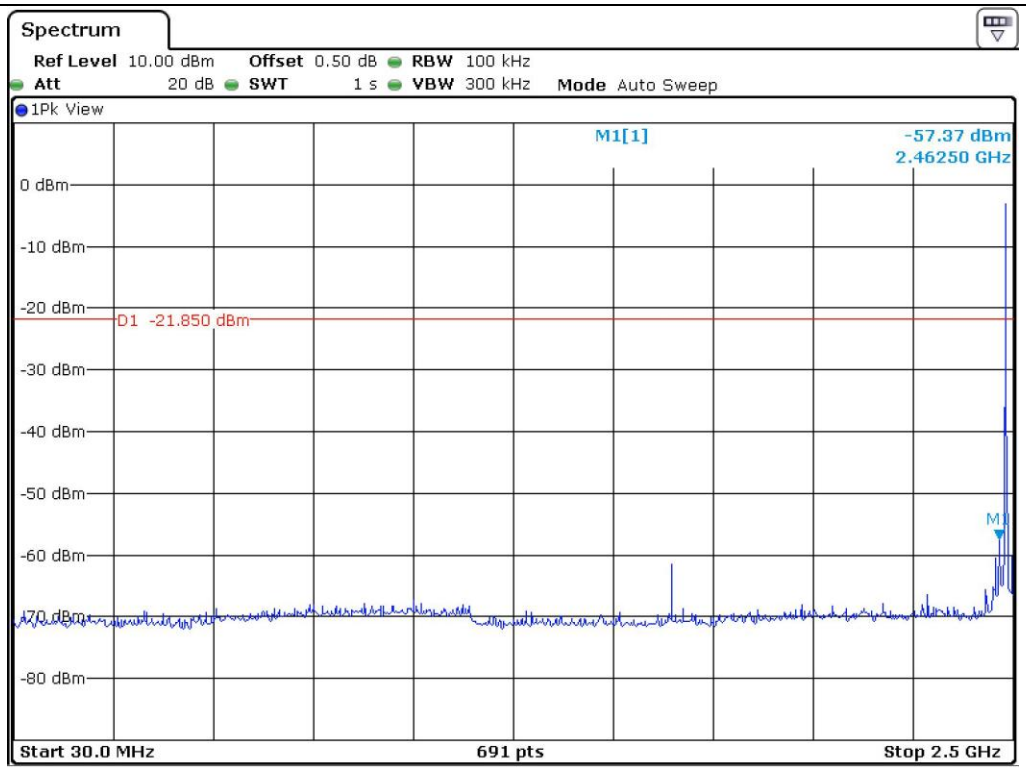
Middle Channel



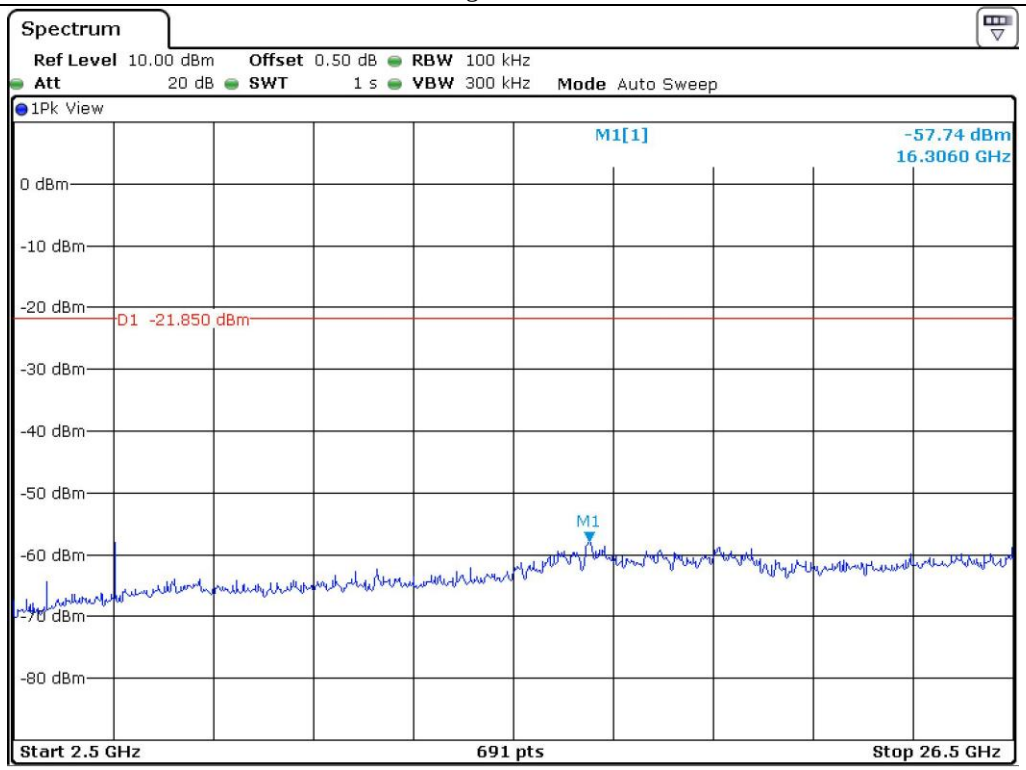
High Channel



High Channel



High Channel



High Channel

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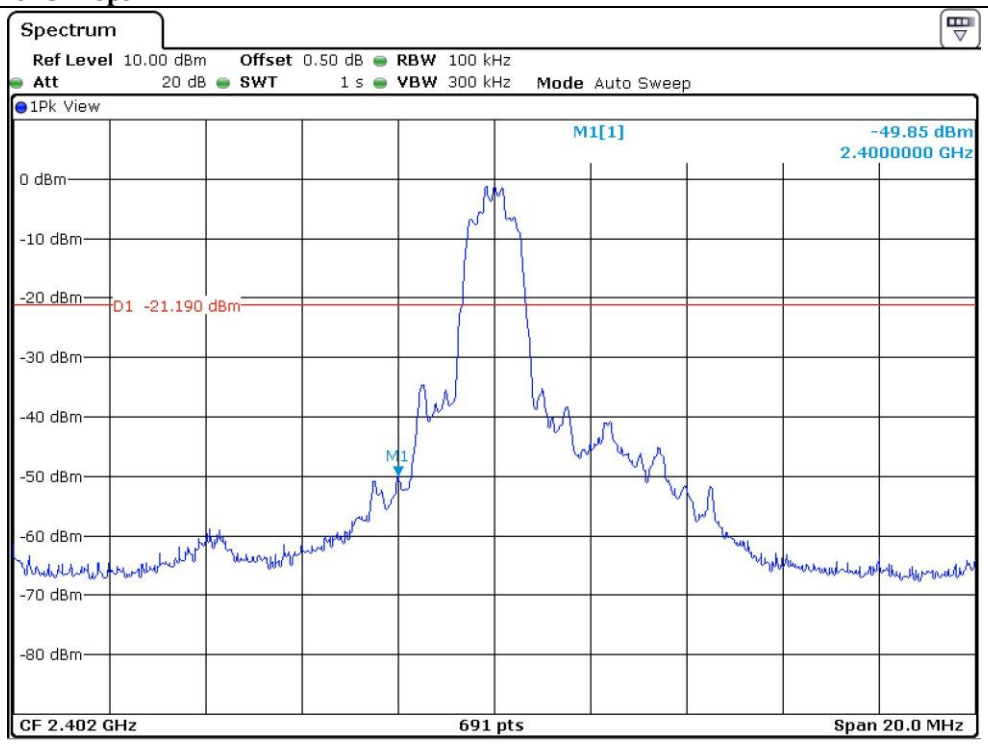
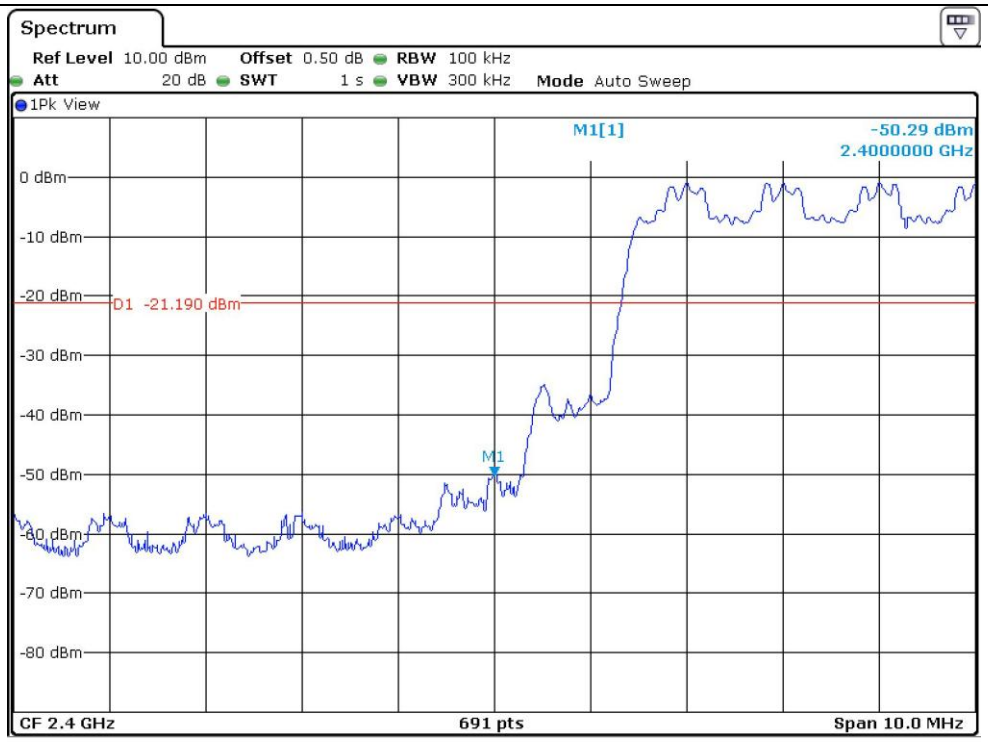
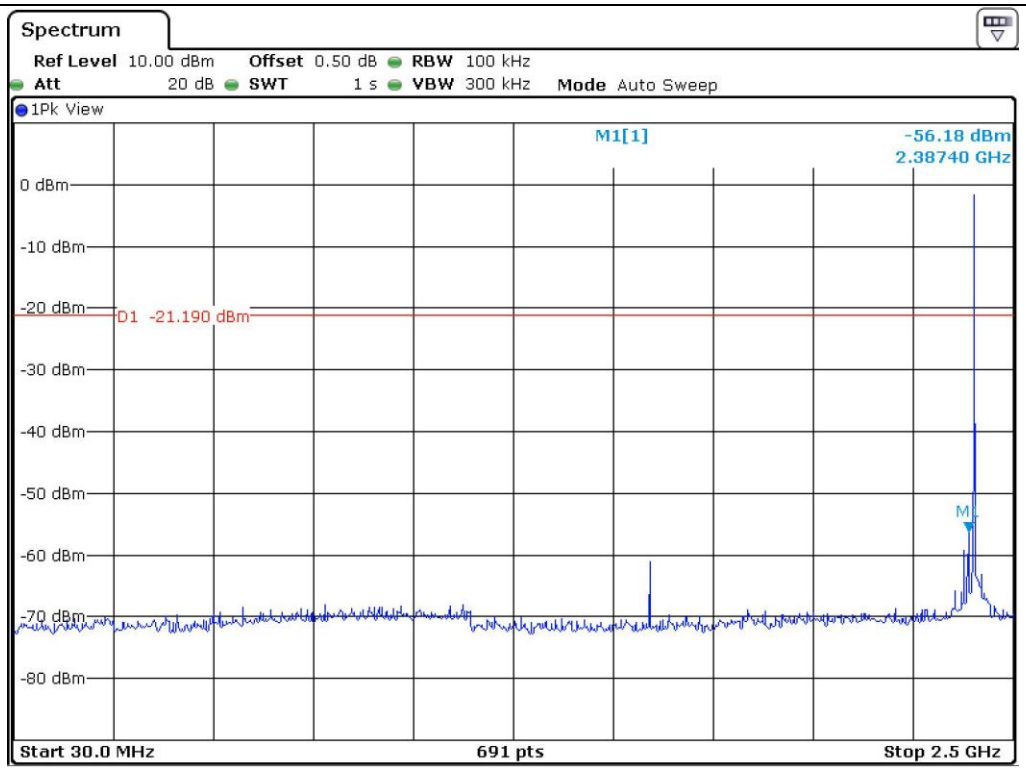
9.5.3 Test data for 3 Mbps



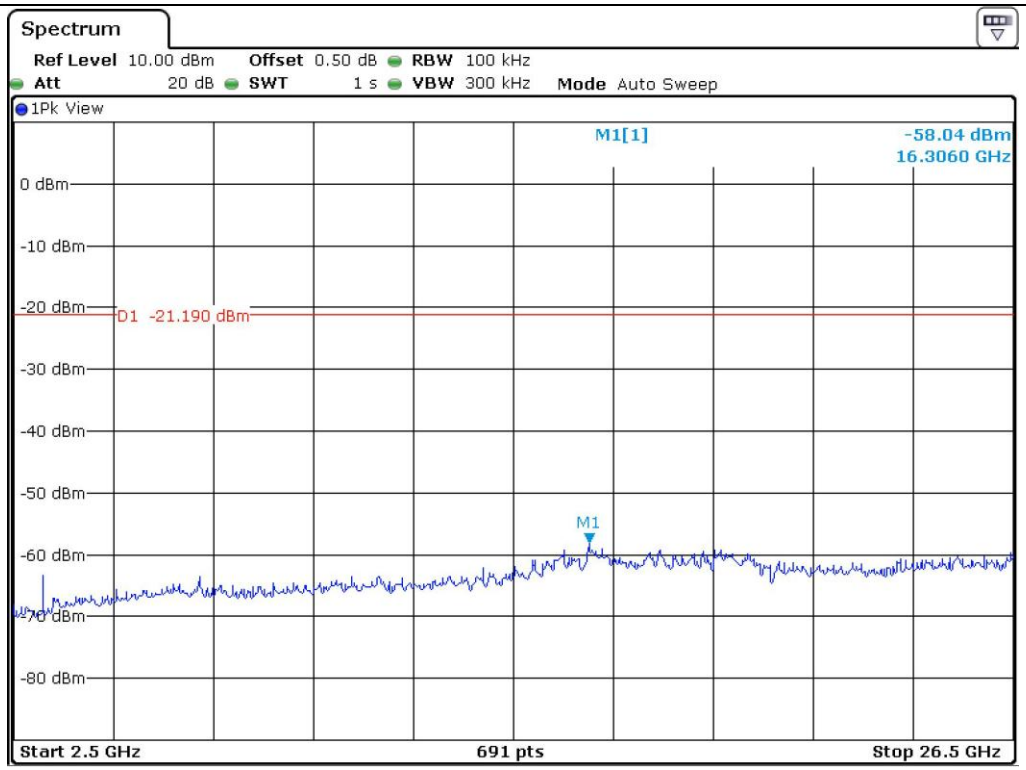
Low Channel



Low Channel



Low Channel



Low Channel

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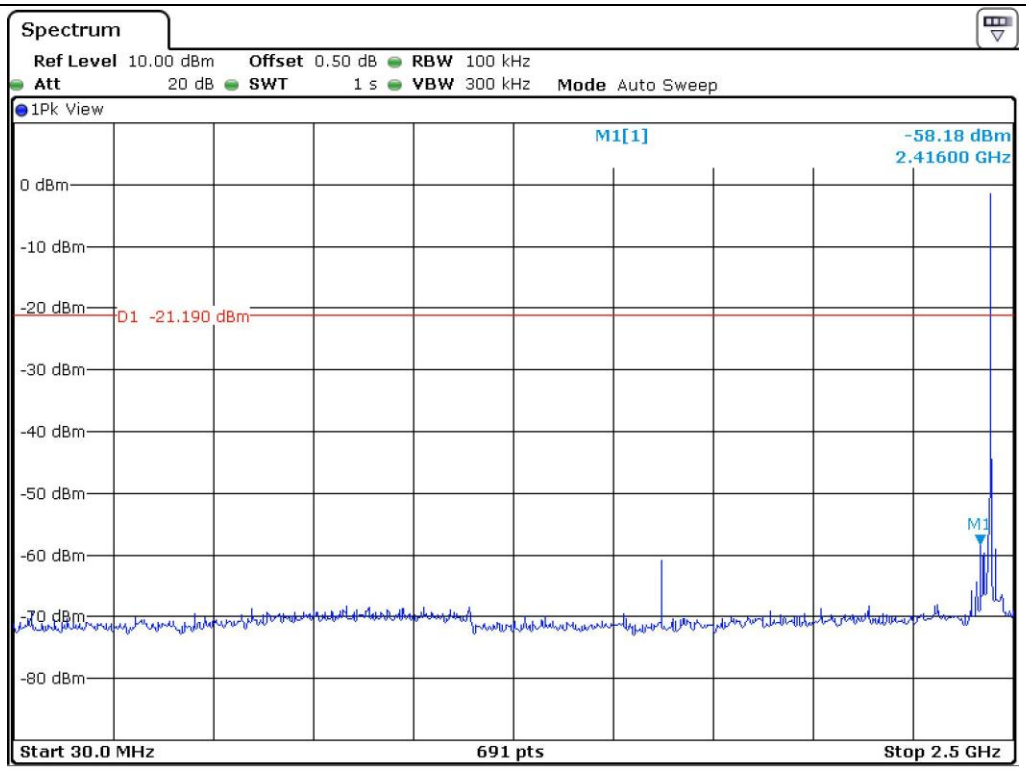
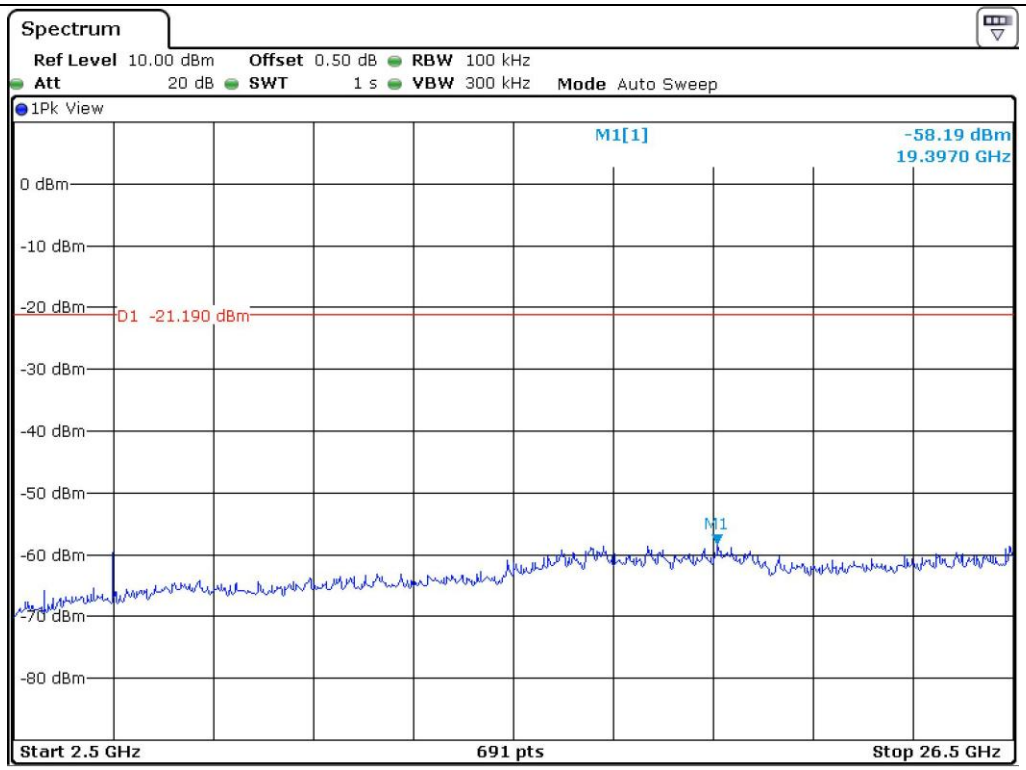


Middle Channel



Middle Channel

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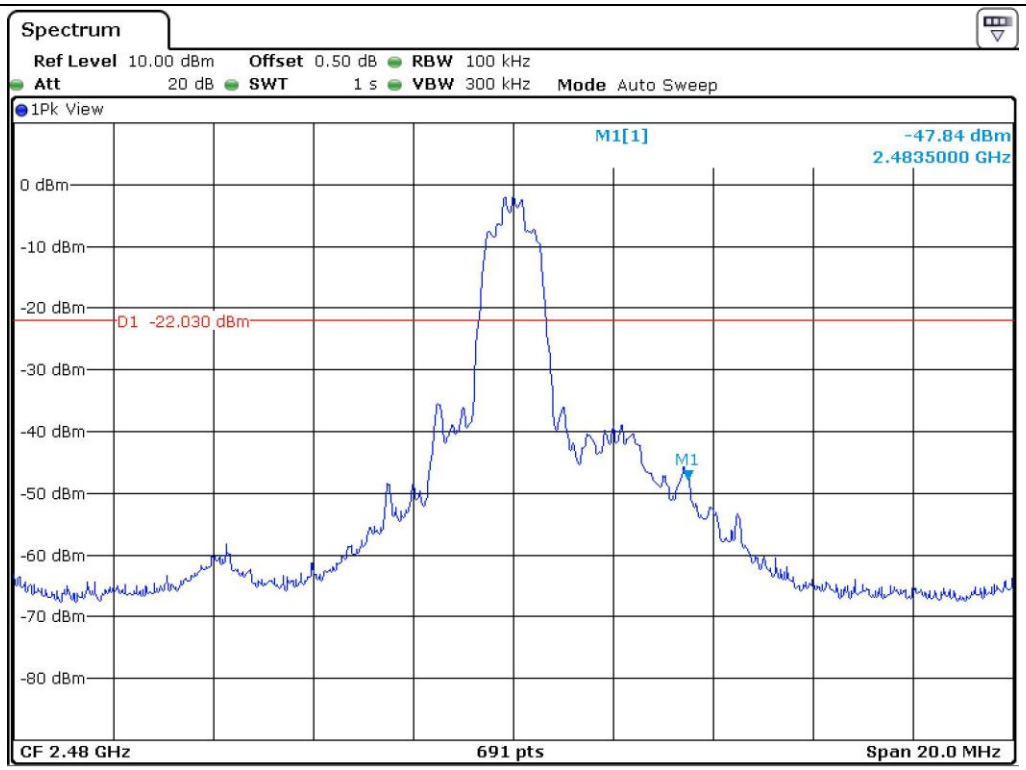
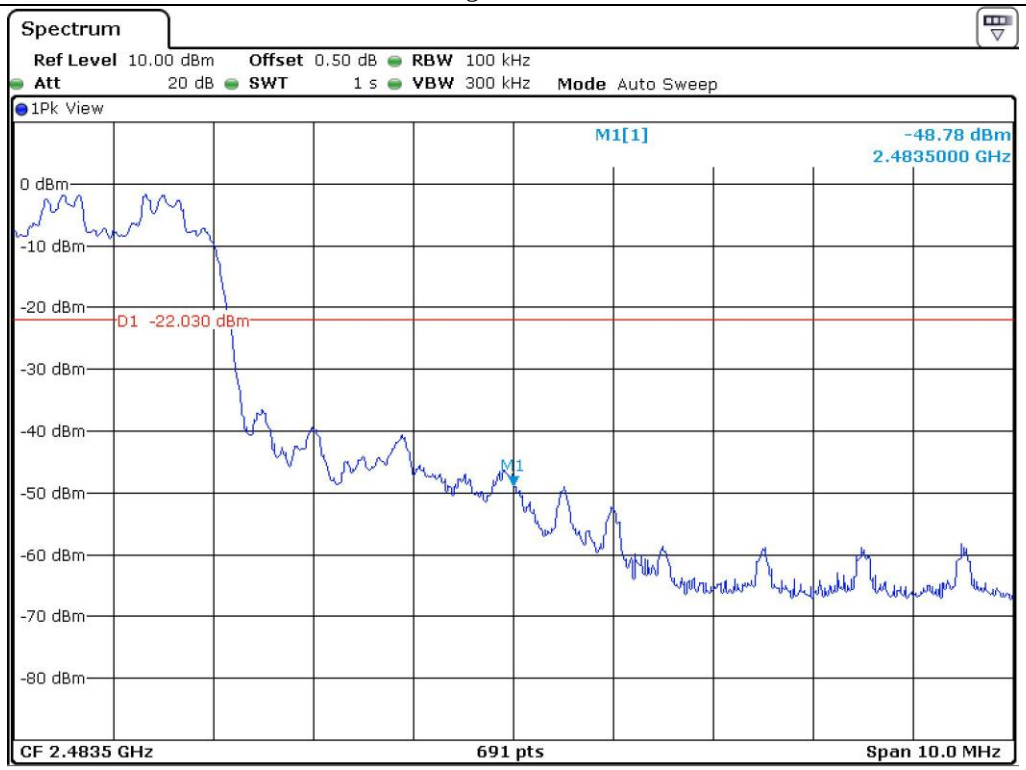
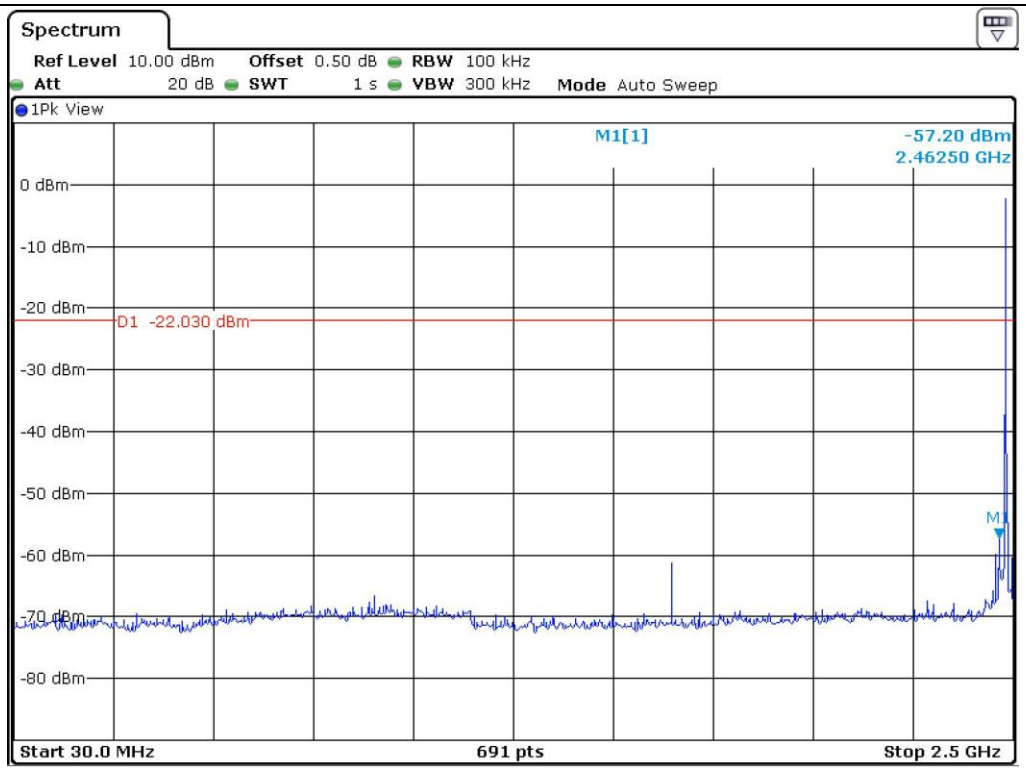


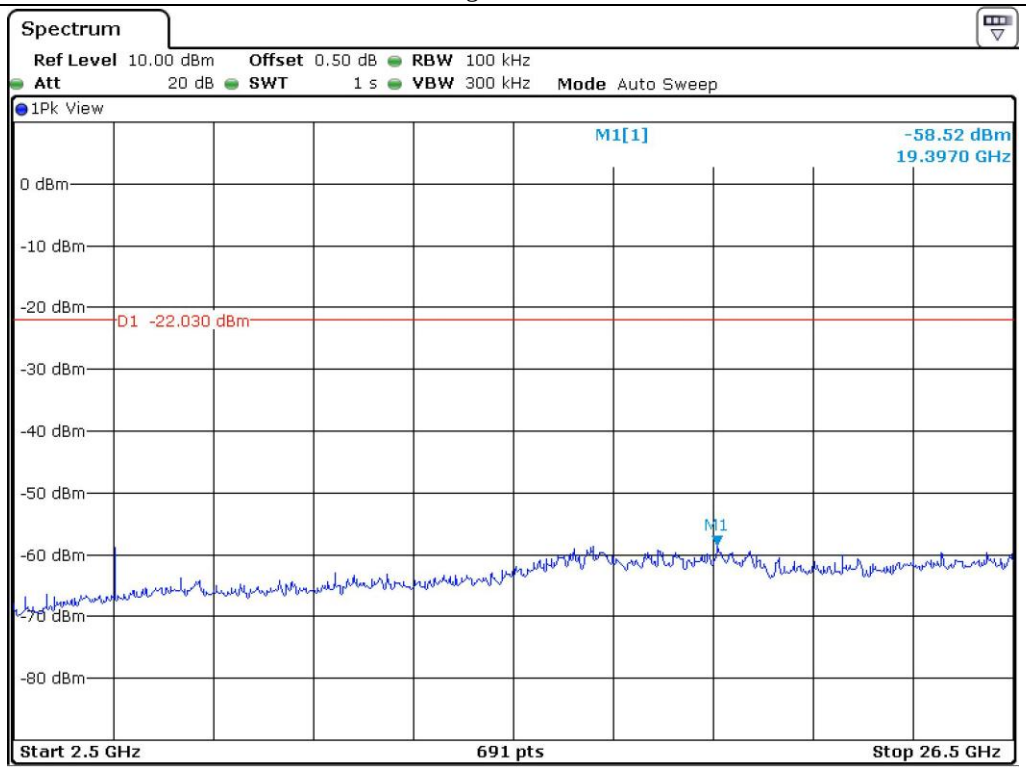
High Channel



High 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 1 Mbps

-. Test Date : September 17, 2014

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Measurement distance : 3 m

-. Operating Condition : Highest Output Power Transmitting Mode(Low Channel and High Channel)

-. 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									
2 389.88	38.71	Peak	H	27.10	7.50	43.00	30.31	74.00	43.69
	25.20	Average	H				16.80	54.00	37.20
2 389.62	38.54	Peak	V				30.14	74.00	43.86
	25.42	Average	V				17.02	54.00	36.98
Test Data for High Channel									
2 483.86	37.89	Peak	H	27.10	7.50	43.00	29.49	74.00	44.51
	25.31	Average	H				16.91	54.00	37.09
2 484.35	38.06	Peak	V				29.66	74.00	44.34
	25.22	Average	V				16.82	54.00	37.18

Tabulated test data for Restricted Band

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

Tested by: Tae-Ho, Kim / Project Engineer

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9.6.1.2 Test data for 2 Mbps

-. Test Date : September 17, 2014

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Measurement distance : 3 m

-. Operating Condition : Highest Output Power Transmitting Mode(Low Channel and High Channel)

-. 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									
2 389.84	38.68	Peak	H	27.10	7.50	43.00	30.28	74.00	43.72
	25.22	Average	H				16.82	54.00	37.18
2 389.60	38.51	Peak	V				30.11	74.00	43.89
	25.43	Average	V				17.03	54.00	36.97
Test Data for High Channel									
2 483.88	37.86	Peak	H	27.10	7.50	43.00	29.46	74.00	44.54
	25.33	Average	H				16.93	54.00	37.07
2 484.37	38.08	Peak	V				29.68	74.00	44.32
	25.20	Average	V				16.80	54.00	37.20

Tabulated test data for Restricted Band

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

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)

9.6.1.3 Test data for 3 Mbps

-. Test Date : September 17, 2014

-. Resolution bandwidth : 1 MHz for Peak and Average Mode

-. Video bandwidth : 1 MHz for Peak Mode, 10 Hz for Average Mode

-. Measurement distance : 3 m

-. Operating Condition : Highest Output Power Transmitting Mode(Low Channel and High Channel)

-. 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									
2 389.85	38.69	Peak	H	27.10	7.50	43.00	30.29	74.00	43.71
	25.24	Average	H				16.84	54.00	37.16
2 389.63	38.51	Peak	V				30.11	74.00	43.89
	25.44	Average	V				17.04	54.00	36.96
Test Data for High Channel									
2 483.84	37.88	Peak	H	27.10	7.50	43.00	29.48	74.00	44.52
	25.34	Average	H				16.94	54.00	37.06
2 484.32	38.04	Peak	V				29.64	74.00	44.36
	25.23	Average	V				16.83	54.00	37.17

Tabulated test data for Restricted Band

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

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)

9.6.2 Spurious & Harmonic Radiated Emission above 1 GHz

9.6.2.1 Test data for 1 Mbps

-. Test Date : September 17, 2014

-. 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

-. Operating Condition : Highest Output Power Transmitting Mode

-. 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									
2 402.00	94.54	Peak	H	27.00	7.50	42.80	86.24	-	86.24
	91.04	Peak	V				82.74	-	82.74
4 804.00	57.84	Peak	H	30.60	11.10	42.50	57.04	74.00	16.96
	44.87	Average	H				44.07	54.00	9.93
	52.42	Peak	V				51.62	74.00	22.38
	40.74	Average	V				39.94	54.00	14.06
Test Data for Middle Channel									
2 441.00	93.55	Peak	H	27.20	7.60	42.80	85.55	-	85.55
	90.19	Peak	V				82.19	-	82.19
4 882.00	56.24	Peak	H	30.70	11.20	42.50	55.64	74.00	18.36
	43.84	Average	H				43.24	54.00	10.76
	51.76	Peak	V				51.16	74.00	22.84
	39.71	Average	V				39.11	54.00	14.89

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)

Test Data for High Channel									
2 480.00	93.67	Peak	H	27.40	7.70	42.90	85.87	-	85.87
	89.84	Peak	V				82.04	-	82.04
4 960.00	56.86	Peak	H	30.80	11.30	42.50	56.46	74.00	17.54
	43.35	Average	H				42.95	54.00	11.05
	50.98	Peak	V				50.58	74.00	23.42
	39.14	Average	V				38.74	54.00	15.26

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical, “*” Frequency fall in restricted band

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)

9.6.2.2 Test data for 2 Mbps

-. Test Date : September 17, 2014

-. 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

-. Operating Condition : Highest Output Power Transmitting Mode

-. 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									
2 402.00	94.50	Peak	H	27.00	7.50	42.80	86.20	-	86.20
	91.08	Peak	V				82.78	-	82.78
4 804.00	57.82	Peak	H	30.60	11.10	42.50	57.02	74.00	16.98
	44.83	Average	H				44.03	54.00	9.97
	52.41	Peak	V				51.61	74.00	22.39
	40.76	Average	V				39.96	54.00	14.04
Test Data for Middle Channel									
2 441.00	93.52	Peak	H	27.20	7.60	42.80	85.52	-	85.52
	90.21	Peak	V				82.21	-	82.21
4 882.00	56.28	Peak	H	30.70	11.20	42.50	55.68	74.00	18.32
	43.89	Average	H				43.29	54.00	10.71
	51.73	Peak	V				51.13	74.00	22.87
	39.77	Average	V				39.17	54.00	14.83

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)

Test Data for High Channel									
2 480.00	93.64	Peak	H	27.40	7.70	42.90	85.84	-	85.84
	89.81	Peak	V				82.01	-	82.01
4 960.00	56.84	Peak	H	30.80	11.30	42.50	56.44	74.00	17.56
	43.38	Average	H				42.98	54.00	11.02
	50.92	Peak	V				50.52	74.00	23.48
	39.16	Average	V				38.76	54.00	15.24

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical, “*” Frequency fall in restricted band

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)

9.6.2.3 Test data for 3 Mbps

-. Test Date : September 17, 2014

-. 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

-. Operating Condition : Highest Output Power Transmitting Mode

-. 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									
2 402.00	94.49	Peak	H	27.00	7.50	42.80	86.19	-	86.19
	91.11	Peak	V				82.81	-	82.81
4 804.00	57.83	Peak	H	30.60	11.10	42.50	57.03	74.00	16.97
	44.88	Average	H				44.08	54.00	9.92
	52.39	Peak	V				51.59	74.00	22.41
	40.71	Average	V				39.91	54.00	14.09
Test Data for Middle Channel									
2 441.00	93.57	Peak	H	27.20	7.60	42.80	85.57	-	85.57
	90.21	Peak	V				82.21	-	82.21
4 882.00	56.28	Peak	H	30.70	11.20	42.50	55.68	74.00	18.32
	43.86	Average	H				43.26	54.00	10.74
	51.73	Peak	V				51.13	74.00	22.87
	39.67	Average	V				39.07	54.00	14.93

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)

Test Data for High Channel									
2 480.00	93.62	Peak	H	27.40	7.70	42.90	85.82	-	85.82
	89.78	Peak	V				81.98	-	81.98
4 960.00	56.90	Peak	H	30.80	11.30	42.50	56.50	74.00	17.50
	43.38	Average	H				42.98	54.00	11.02
	51.02	Peak	V				50.62	74.00	23.38
	39.10	Average	V				38.70	54.00	15.30

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical, “*” Frequency fall in restricted band

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)

9.6.3 Spurious Radiated Emission

9.6.3.1 Test Data for 1 Mbps

9.6.3.1.1 Test Data for 30 MHz ~ 1 000 MHz

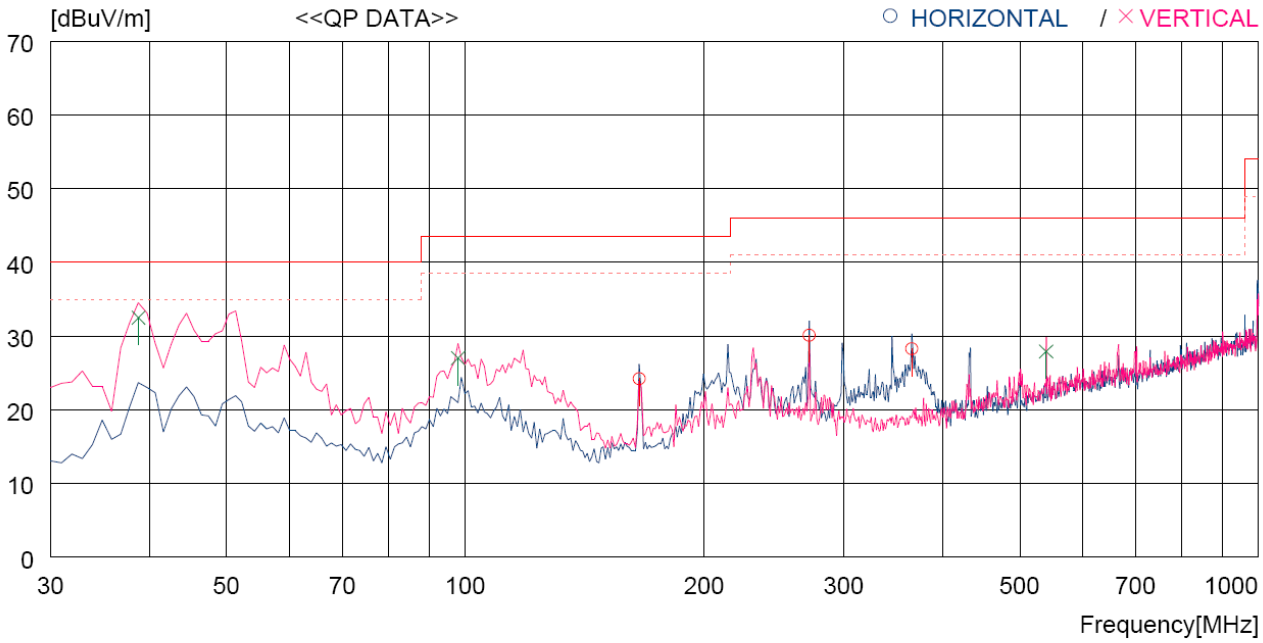
Humidity Level : (42 ~ 43) % R.H. Temperature: (22 ~ 23) ℃

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

Result : PASSED

EUT : Personal Swing analyzer Date: September 17, 2014

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



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	165.800	39.1	9.5	8.6	33.0	24.2	43.5	19.3	100	349
2	271.530	39.7	14.1	9.3	33.0	30.1	46.0	15.9	100	272
3	365.620	35.3	16.2	9.8	33.0	28.3	46.0	17.7	100	300
----- Vertical ------										
4	38.730	44.1	14.4	7.2	33.2	32.5	40.0	7.5	100	264
5	97.900	38.9	13.2	8.0	33.1	27.0	43.5	16.5	100	348
6	540.220	31.1	19.2	10.8	33.2	27.9	46.0	18.1	100	264

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)

9.6.3.1.2 Test Data for Below 30 MHz

-. Test Date : September 17, 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

-. Operating Condition : Highest Output Power Transmitting Mode

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	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)

9.6.3.2 Test Data for 2 Mbps

9.6.3.2.1 Test Data for 30 MHz ~ 1 000 MHz

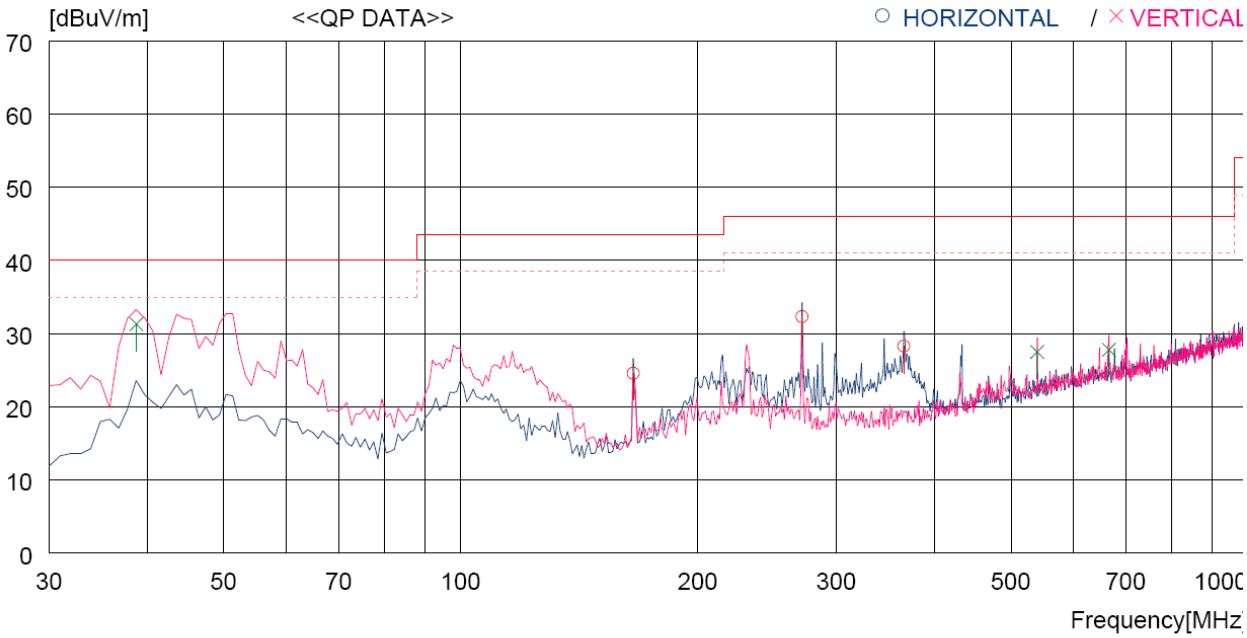
Humidity Level : (42 ~ 43) % R.H. Temperature: (22 ~ 23) ℃

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

Result : PASSED

EUT : Personal Swing analyzer Date: September 17, 2014

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



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	165.800	39.5	9.5	8.6	33.0	24.6	43.5	18.9	100	236
2	271.530	41.9	14.1	9.3	33.0	32.3	46.0	13.7	100	236
3	365.620	35.3	16.2	9.8	33.0	28.3	46.0	17.7	100	278
----- Vertical ------										
4	38.730	42.9	14.4	7.2	33.2	31.3	40.0	8.7	100	272
5	540.220	30.7	19.2	10.8	33.2	27.5	46.0	18.5	100	354
6	666.316	29.1	20.6	11.4	33.3	27.8	46.0	18.2	100	278

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)

9.6.3.2.2 Test Data for Below 30 MHz

-. Test Date : September 17, 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

-. Operating Condition : Highest Output Power Transmitting Mode

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	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)

9.6.3.3 Test Data for 3 Mbps

9.6.3.3.1 Test Data for 30 MHz ~ 1 000 MHz

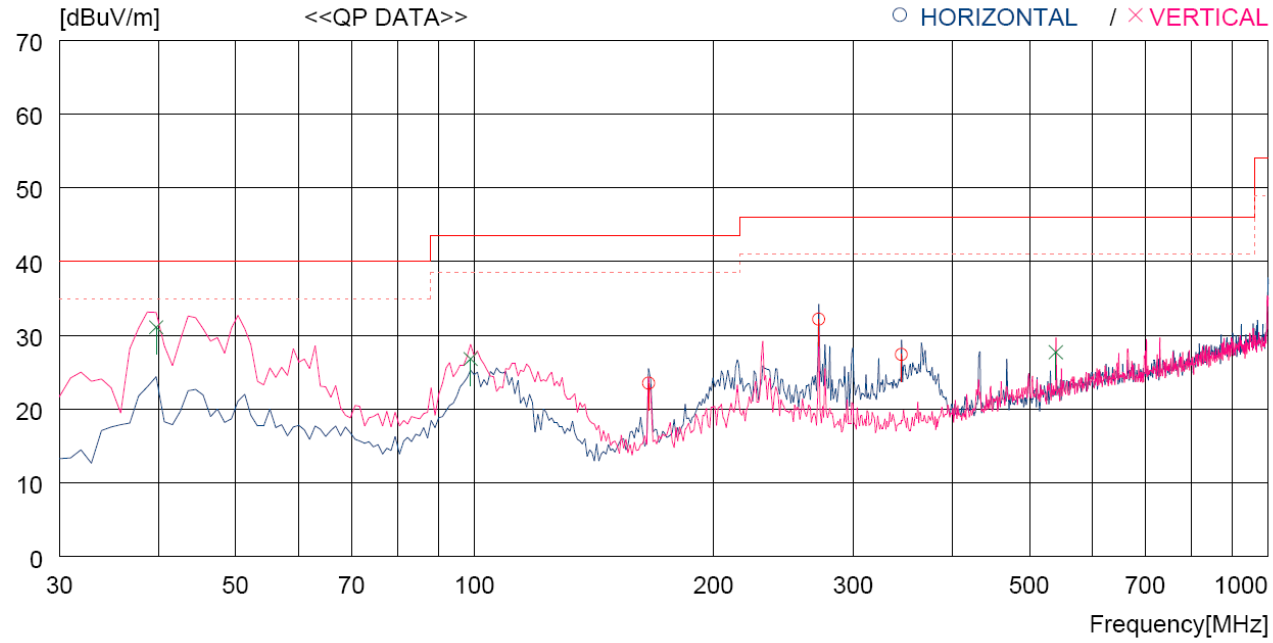
Humidity Level : (42 ~ 43) % R.H. Temperature: (22 ~ 23) ℃

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

Result : PASSED

EUT : Personal Swing analyzer Date: September 17, 2014

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



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	165.800	38.4	9.5	8.6	33.0	23.5	43.5	20.0	100	214
2	271.530	41.8	14.1	9.3	33.0	32.2	46.0	13.8	100	214
3	345.250	35.0	15.7	9.7	33.0	27.4	46.0	18.6	100	214
----- Vertical ------										
4	39.700	42.4	14.7	7.2	33.2	31.1	40.0	8.9	100	284
5	98.870	38.5	13.4	8.0	33.1	26.8	43.5	16.7	100	299
6	540.220	30.9	19.2	10.8	33.2	27.7	46.0	18.3	100	358

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)

9.6.3.3.2 Test Data for Below 30 MHz

-. Test Date : September 17, 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

-. Operating Condition : Highest Output Power Transmitting Mode

-. Result : PASSED

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	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)

10 RADIATED EMISSION TEST

10.1 Operating environment

Temperature : (22 ~ 23) ℃

Relative humidity : (42 ~ 43) % R.H.

10.2 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 1 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.

10.3 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.

10.4 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	Apr. 29, 2014(1Y)
☐ -	8564E	HP	Spectrum Analyzer	3650A00756	Apr. 28, 2014(1Y)
☐ -	FSP	Rohde & Schwarz	Spectrum Analyzer	100017	Nov. 05, 2013(1Y)
■ -	310N	Sonoma Instrument	AMPLIFIER	312544	Apr. 28, 2014(1Y)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	Apr. 28, 2014(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	May 05, 2014(2Y)
☐ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Sep. 05, 2013(2Y)
☐ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	N/A
■ -	83051A	Agilent	Microwave System Preamplifer	3950M00201	Apr. 30, 2014(1Y)

All test equipment used is calibrated on a regular basis.

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10.5 Test data for Charging mode

10.5.1 Test data for 30 MHz ~ 1 000 MHz

Humidity Level : (42 ~ 43) % R.H. Temperature: (22 ~ 23) ℃

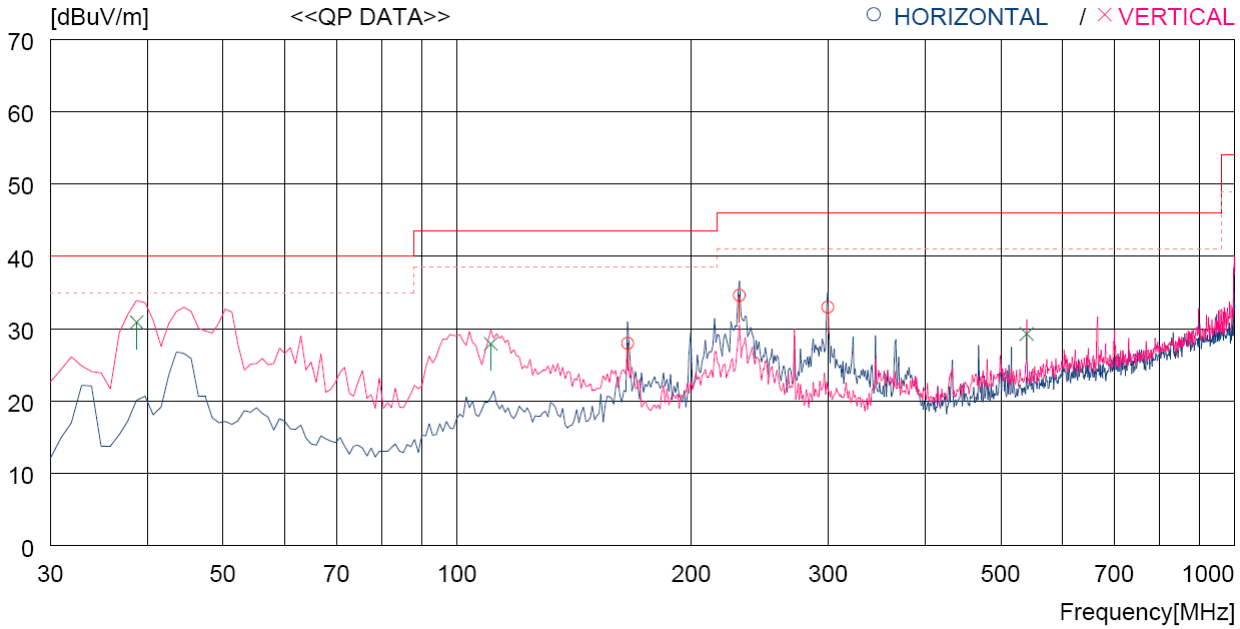
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Personal Swing analyzer Date: September 17, 2014

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

Operating condition : Charging Mode



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	165.800	42.9	9.5	8.6	33.0	28.0	43.5	15.5	100	89
2	230.790	45.4	13.1	9.1	33.0	34.6	46.0	11.4	100	89
3	299.660	41.7	14.8	9.5	33.0	33.0	46.0	13.0	100	19
----- Vertical ------										
4	38.730	42.5	14.4	7.2	33.2	30.9	40.0	9.1	100	272
5	110.510	40.4	12.5	8.1	33.1	27.9	43.5	15.6	100	230
6	540.220	32.5	19.2	10.8	33.2	29.3	46.0	16.7	111	359

Tested by: Tae-Ho, Kim / Project Engineer

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10.5.2 Test data for Below 30 MHz

-. Test Date : September 17, 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

-. Operating condition : Charging 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

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11 CONDUCTED EMISSION TEST

11.1 Operating environment

Temperature : (22 ~ 23) ℃

Relative humidity : (42 ~ 43) % R.H.

11.2 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.

11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESHS10	Rohde & Schwarz	EMI Test Receiver	834467/007	Jul. 15, 2014 (1Y)
■ -	NSLK 8128	Schwarzbeck	LISN	8128-216	Apr. 11, 2014 (1Y)
☐ -	3825/2	EMCO	LISN	9109-1867	Apr. 29, 2014 (1Y)

All test equipment used is calibrated on a regular basis.

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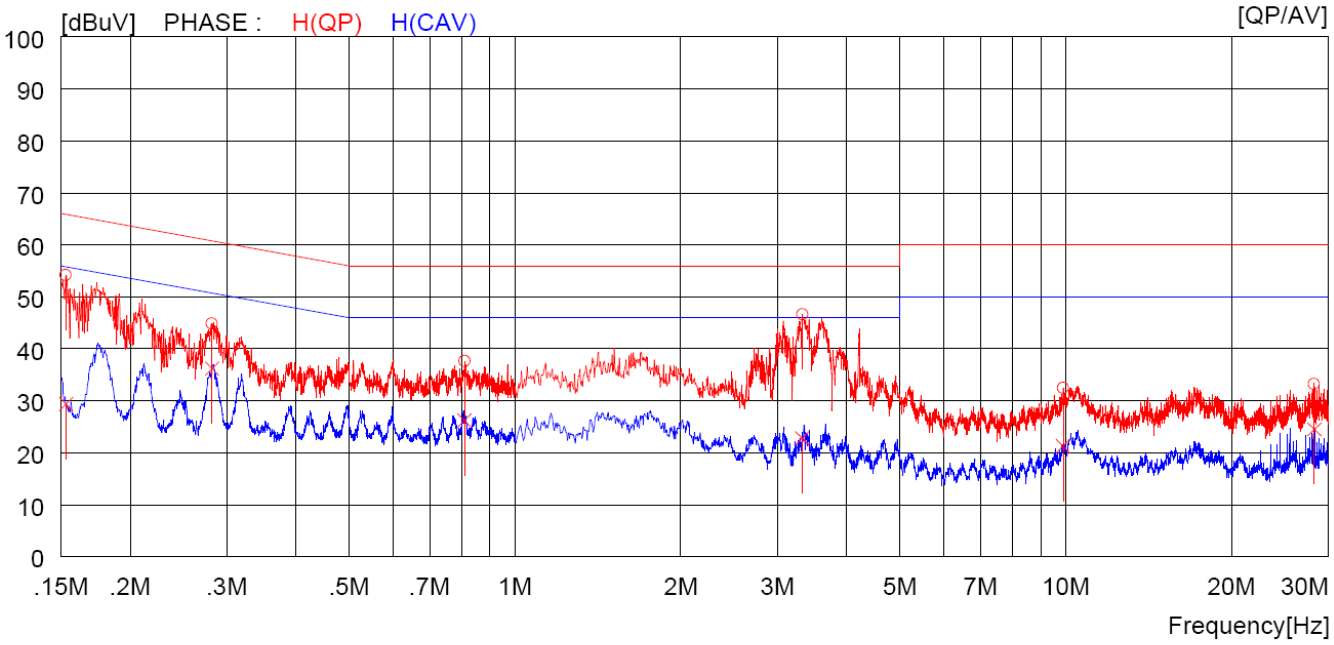
11.4 Test data for Charging mode

-. Test Date : September 17, 2014

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR QP [dB]	C.FACTOR AV [dBuV]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP	MARGIN AV	PHASE
1	0.15300	44.2	----	10.0		54.2	----	65.8	----	11.6	----	H(QP)
2	0.28200	34.9	----	10.0		44.9	----	60.8	----	15.9	----	H(QP)
3	0.81000	27.6	----	10.0		37.6	----	56.0	----	18.4	----	H(QP)
4	3.32400	36.6	----	10.0		46.6	----	56.0	----	9.4	----	H(QP)
5	9.88500	22.2	----	10.2		32.4	----	60.0	----	27.6	----	H(QP)
6	28.24000	22.5	----	10.7		33.2	----	60.0	----	26.8	----	H(QP)
7	0.15300	----	19.4	10.0		----	29.4	----	55.8	----	26.4	H(CAV)
8	0.28200	----	26.2	10.0		----	36.2	----	50.8	----	14.6	H(CAV)
9	0.81000	----	16.2	10.0		----	26.2	----	46.0	----	19.8	H(CAV)
10	3.32400	----	12.8	10.0		----	22.8	----	46.0	----	23.2	H(CAV)
11	9.88500	----	11.1	10.2		----	21.3	----	50.0	----	28.7	H(CAV)
12	28.24000	----	13.8	10.7		----	24.5	----	50.0	----	25.5	H(CAV)

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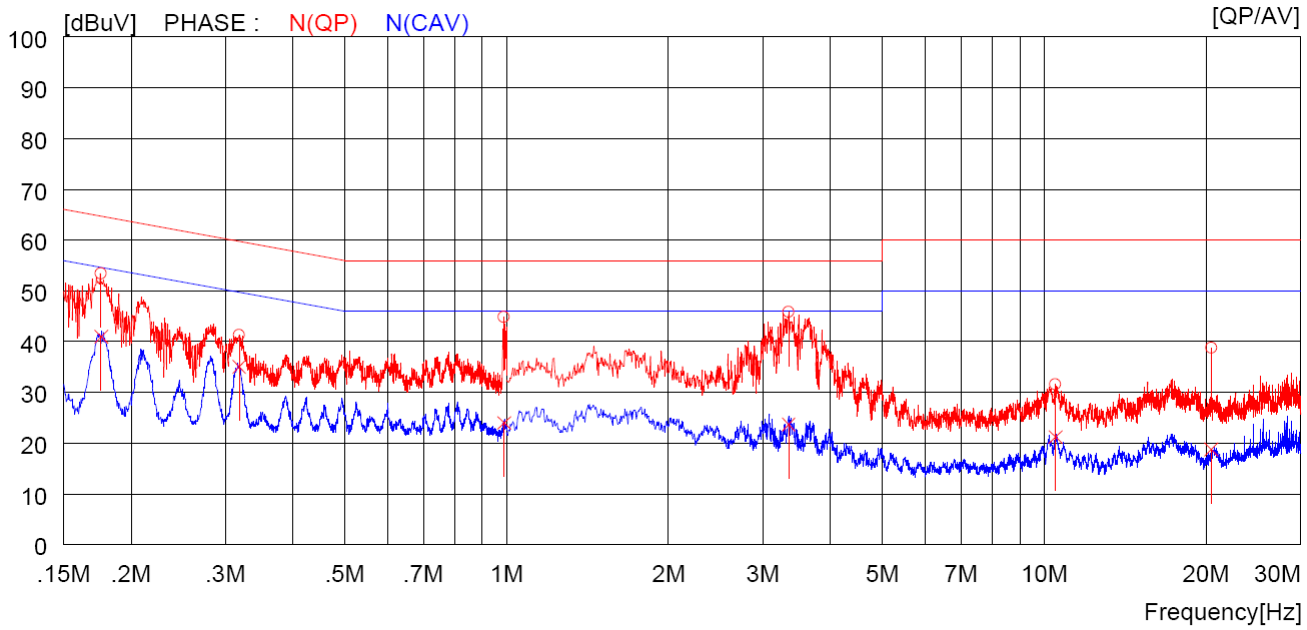
-. Tested Line : NEUTRAL LINE



NO	FREQ	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR QP [dB]	C.FACTOR AV [dBuV]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP	MARGIN AV	PHASE
	[MHz]											
1	0.17600	43.4	----	10.0		53.4	----	64.7	----	11.3	----	N(QP)
2	0.31800	31.3	----	10.0		41.3	----	59.8	----	18.5	----	N(QP)
3	0.98900	34.9	----	10.0		44.9	----	56.0	----	11.1	----	N(QP)
4	3.34400	35.8	----	10.0		45.8	----	56.0	----	10.2	----	N(QP)
5	10.49000	21.4	----	10.2		31.6	----	60.0	----	28.4	----	N(QP)
6	20.45000	28.0	----	10.7		38.7	----	60.0	----	21.3	----	N(QP)
7	0.17600	----	31.0	10.0		----	41.0	----	54.7	----	13.7	N(CAV)
8	0.31800	----	25.0	10.0		----	35.0	----	49.8	----	14.8	N(CAV)
9	0.98900	----	14.0	10.0		----	24.0	----	46.0	----	22.0	N(CAV)
10	3.34400	----	13.7	10.0		----	23.7	----	46.0	----	22.3	N(CAV)
11	10.49000	----	11.0	10.2		----	21.2	----	50.0	----	28.8	N(CAV)
12	20.45000	----	8.0	10.7		----	18.7	----	50.0	----	31.3	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

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