ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No.	**: W163R-D031**
AGR No.	**: A163A-004**
Applicant	**: PROCHILD INC.**
Address	**: RM.806, 8FL, KURO ACE TECHNO TOWER #197-48, KURO, KURO-GU, SEOUL, 152-053, Korea**
Manufacturer	**: PROCHILD INC.**
Address	**: RM.806, 8FL, KURO ACE TECHNO TOWER #197-48, KURO, KURO-GU, SEOUL, 152-053, Korea**
Type of Equipment	**: Bluetooth Module**
FCC ID.	**: 2AEEY-PBLN51822**
Model Name	**: PBLN51822**
Serial number	**: N/A**
Total page of Report	**: 34 pages (including this page)**
Date of Incoming	**: March 02, 2016**
Date of issue	**: March 10, 2016**

SUMMARY

The equipment complies with the regulation; ***FCC PART 15 SUBPART C Section 15.247***

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by: Ki-Hong, Nam / Asst, Chief Engineer
ONETECH Corp.

Approved by: Sung-Ik, Han/ Managing Director
ONETECH Corp.

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

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
W163R-D031	March 10, 2016	Initial Issue	All

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1. VERIFICATION OF COMPLIANCE

Applicant : PROCHILD INC.

Address : RM.806, 8FL, KURO ACE TECHNO TOWER #197-48, KURO, KURO-GU, SEOUL, 152-053, Korea

Contact Person : Se-Wook Shin / Manager

Telephone No. : +82-2-2619-9662

FCC ID : 2AEEY-PBLN51822

Model Name : PBLN51822

Brand Name : Ubiquitous generation PROCHILD

Serial Number : N/A

Date : March 10, 2016

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
KIND OF EQUIPMENT	Modular Transmitter
E.U.T. DESCRIPTION	Bluetooth Module
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6 dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum Peak Conducted Output Power	Met the Limit / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (e)	Peak Power Spectral Density	Met the Limit / PASS
15.209	Radiated Emission Limits	Met the Limit / PASS
15.207	Conducted Limits	Met the Limit / PASS
15.203	Antenna Requirement	Met requirement / PASS

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.247.

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 301-14, Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862 Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-4617/ G-666/ T-1842 IC (Industry Canada) – Registration No. Site# 3736-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

3. GENERAL INFORMATION

3.1 Product Description

The PROCHILD INC., Model PBLN51822 (referred to as the EUT in this report) is a Bluetooth Module. The product specification described herein was obtained from product data sheet or user's manual.

Device Type	Bluetooth Module
Temperature Range	-25 ℃ ~ +75 ℃
Operating Frequency	2 402 MHz ~ 2 480 MHz
RF Output Power	-1.72 dBm
Number of Channel	40 Channel
Modulation Type	GFSK
Antenna Type	PCB Antenna
USED RF CHIP	Marker: Nordic Semiconductor Model Name: nRF51822
Antenna Gain	3.79 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32 kHz, 16 MHz

3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

4. EUT MODIFICATIONS

-. None

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5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	PROCHILD INC.	N/A	N/A

5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	Description	Connected to
PBLN51822	PROCHILD INC.	Bluetooth Module (EUT)	Jig Board
EK Extension Board	PROCHILD INC.	Jig Board	Notebook PC
R510	LG	Notebook PC	Jig Board
PA-1900-08	Dongguang Lite Power 2nd Plant	Adapter	-

5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting is programmed.

For final testing, the EUT was set at 2 402 MHz, 2 440 MHz, and 2 480 MHz to get a maximum emission levels from the EUT. The EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XZ” axis, but the worst data was recorded in this report.

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5.4 Configuration of Test System

Line Conducted Test: The DC Power Supply of the EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

5.5 Antenna Requirement

For intentional device, according to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

The antenna of the EUT is a PCB antenna on the main board in the EUT, so no consideration of replacement by the user.

6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

6.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

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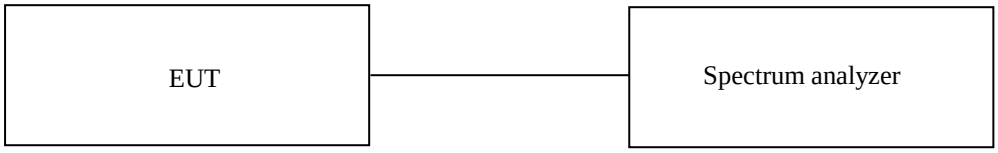
7. MIMIMUM 6 dB BANDWIDTH

7.1 Operating environment

Temperature	:	22.3 ℃
Relative humidity	:	44.8 % R.H.

7.2 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.



7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2015 (1Y)

All test equipment used is calibrated on a regular basis.

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7.4 Test data

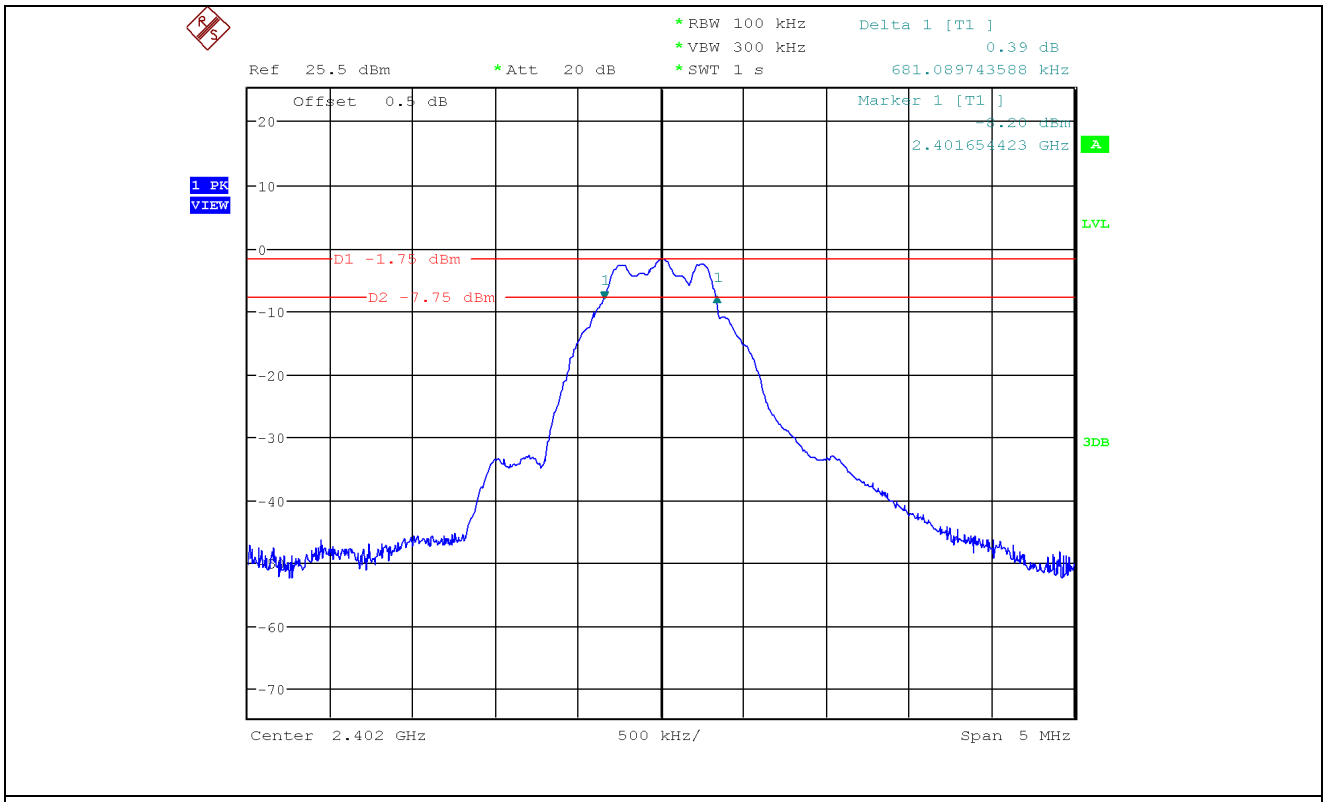
-. Test Date : March 07, 2016

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2 402	681.09	500	181.09
Middle	2 440	681.09	500	181.09
High	2 480	681.09	500	181.09

Remark. Margin = Measured Value - Limit

Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel

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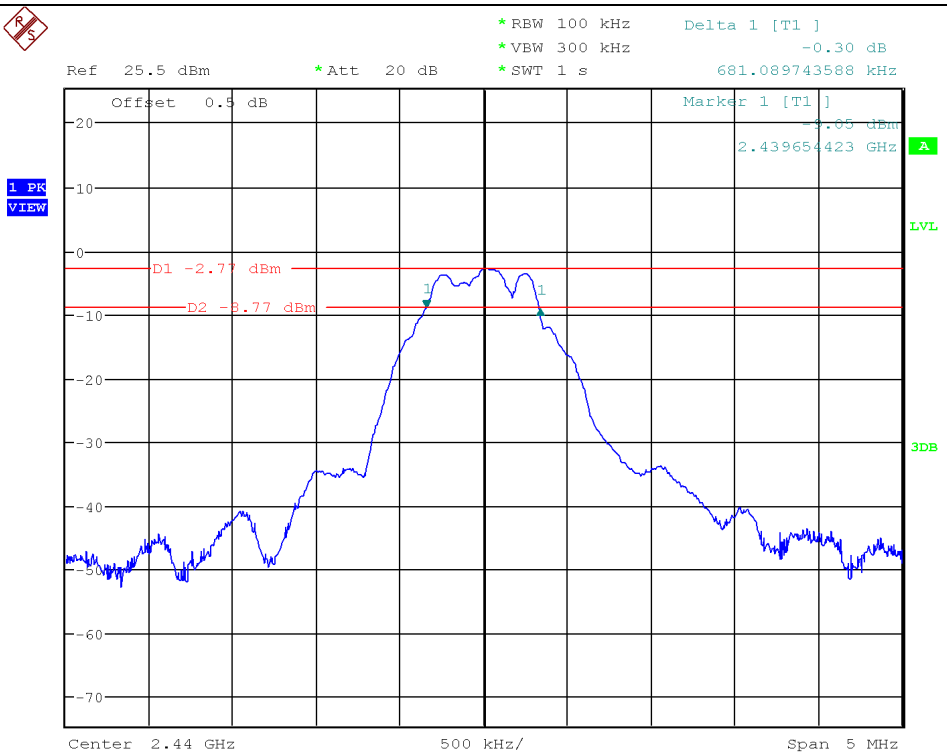
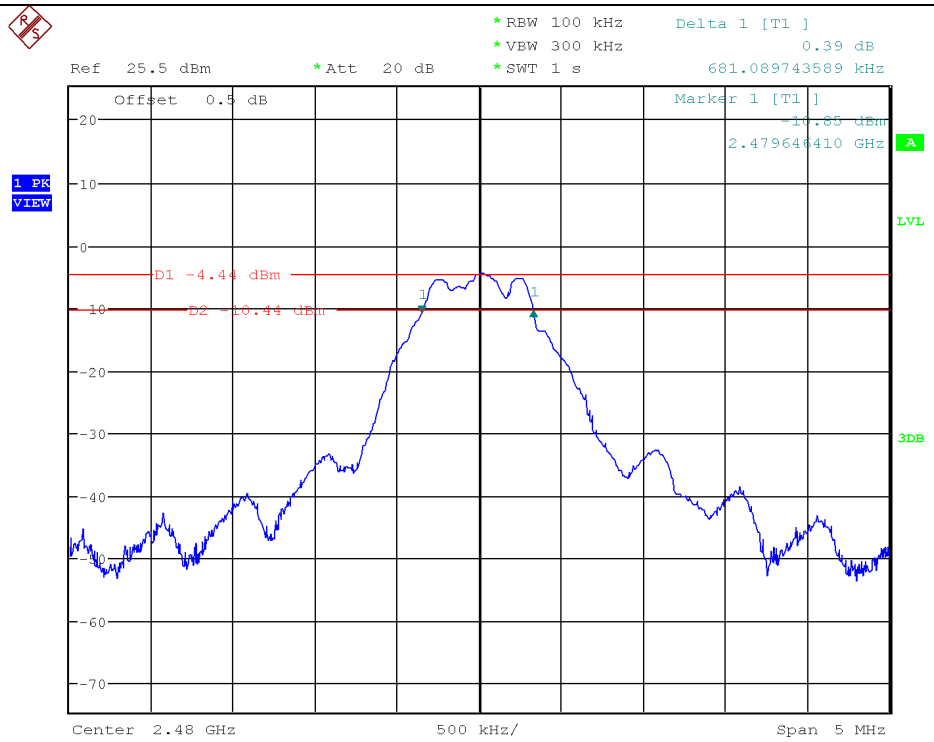


Middle Channel



High Channel

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8. MAXIMUM PEAK OUTPUT POWER

8.1 Operating environment

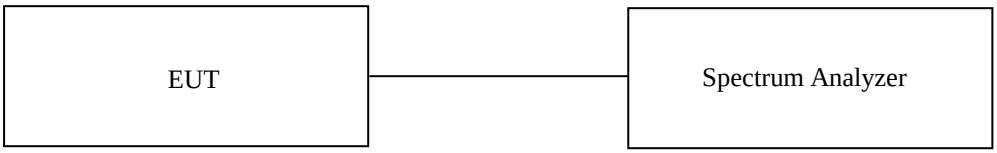
Temperature : 22.3 ℃

Relative humidity : 44.8 % R.H.

8.2 Test set-up

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

The resolution bandwidth is set to ≥DTS Bandwidth, the video bandwidth is set to 3 times the resolution bandwidth.



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2015 (1Y)

All test equipment used is calibrated on a regular basis.

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8.4 Test data

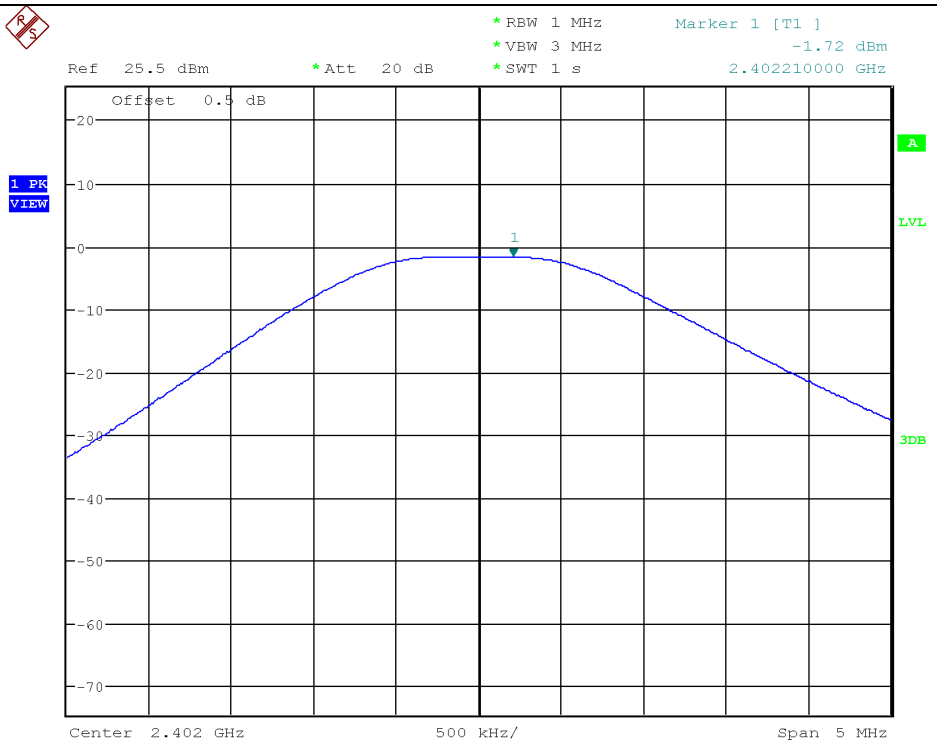
-. Test Date : March 07, 2016

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 402	-1.72	30	31.72
MIDDLE	2 440	-2.79	30	32.79
HIGH	2 480	-4.48	30	34.48

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

Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel

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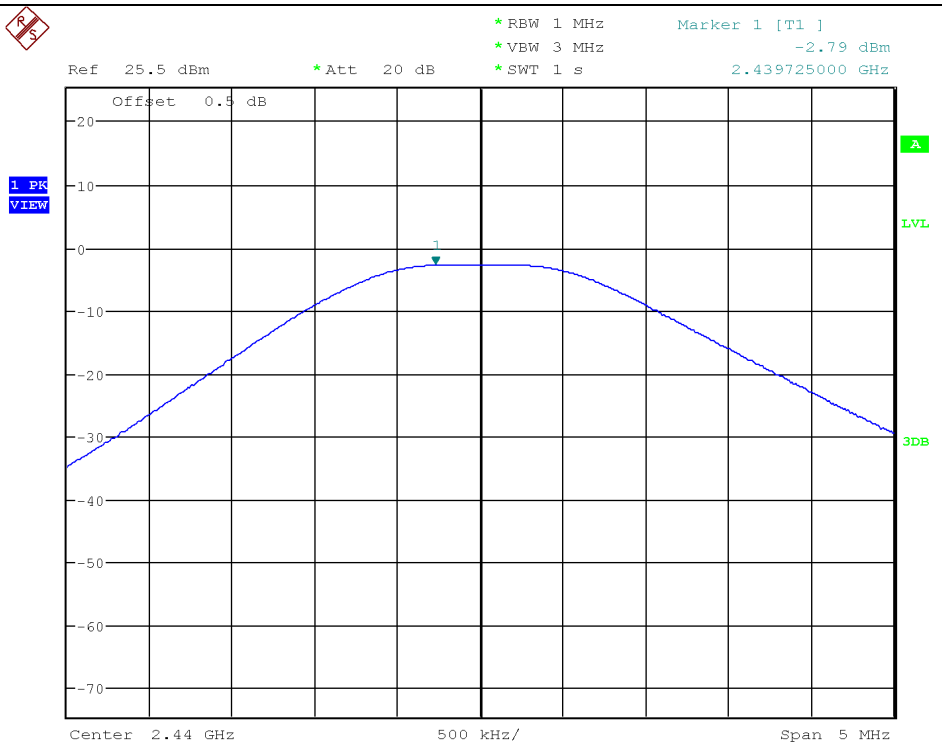
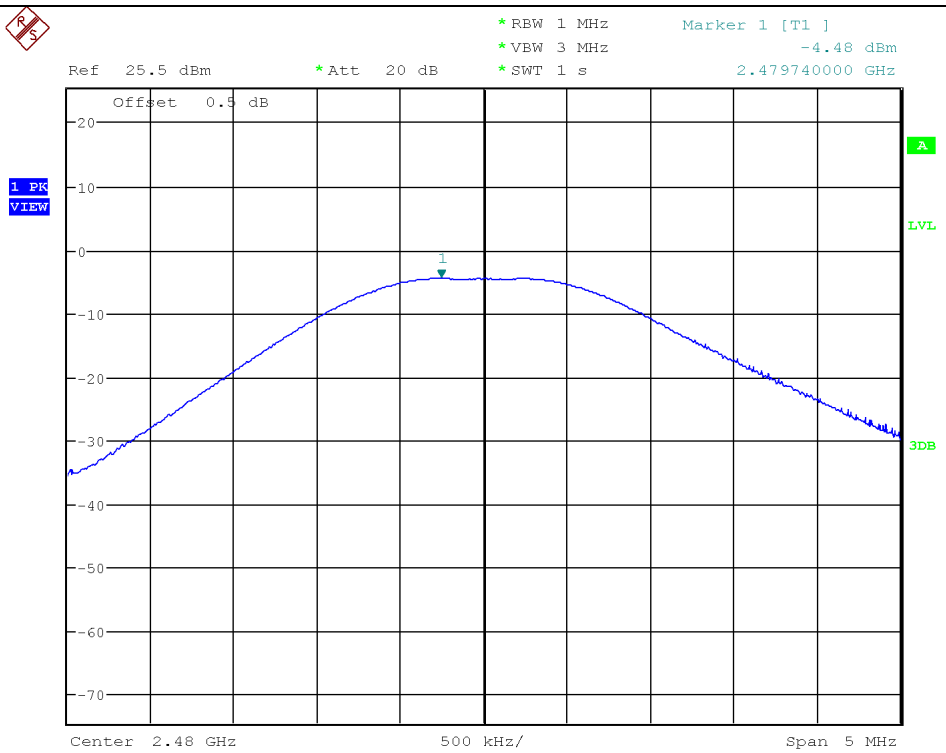


Middle Channel



High Channel

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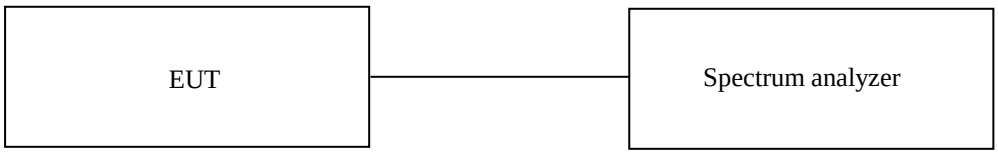
9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

9.1 Operating environment

Temperature	:	22.3 ℃
Relative humidity	:	44.8 % 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 semi anechoic chamber. The EUT was placed on turntable approximately 1.5 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.

9.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2015 (1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	Apr. 29, 2015 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 29, 2015 (1Y)
■ -	SCU-18	Rohde & Schwarz	Pre-Amplifier	10041	Nov. 23, 2015 (1Y)
■ -	DT3000	Innco System	Turn Table	930611	N/A
■ -	MA4000-EP	Innco System	Antenna Master	3320611	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Jul. 10, 2014 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Apr. 30, 2015 (2Y)

All test equipment used is calibrated on a regular basis.

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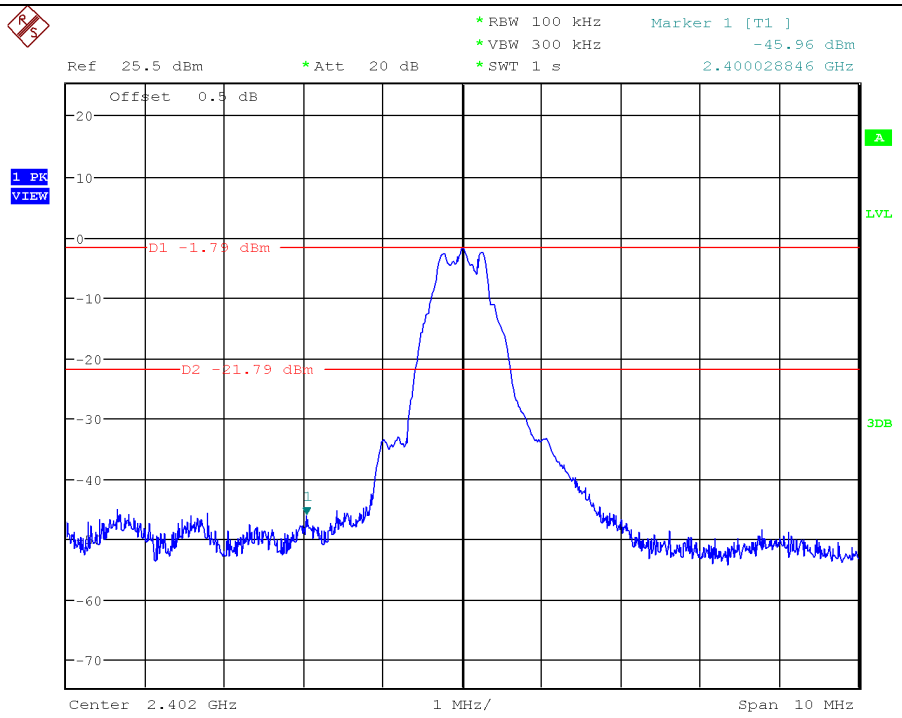
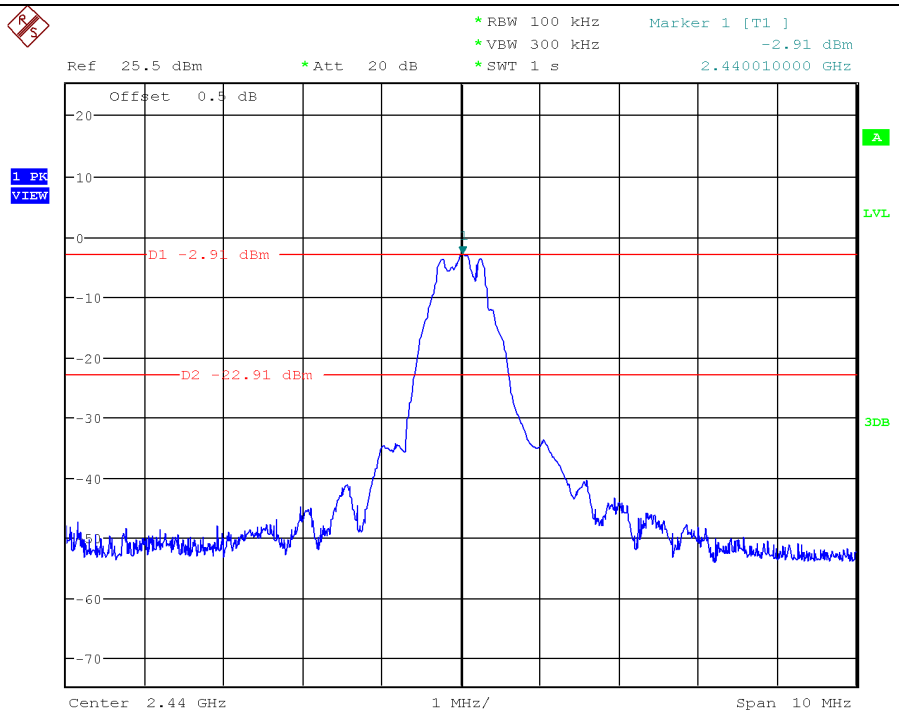
9.5 Test data for conducted emission



Low Channel



Middle Channel

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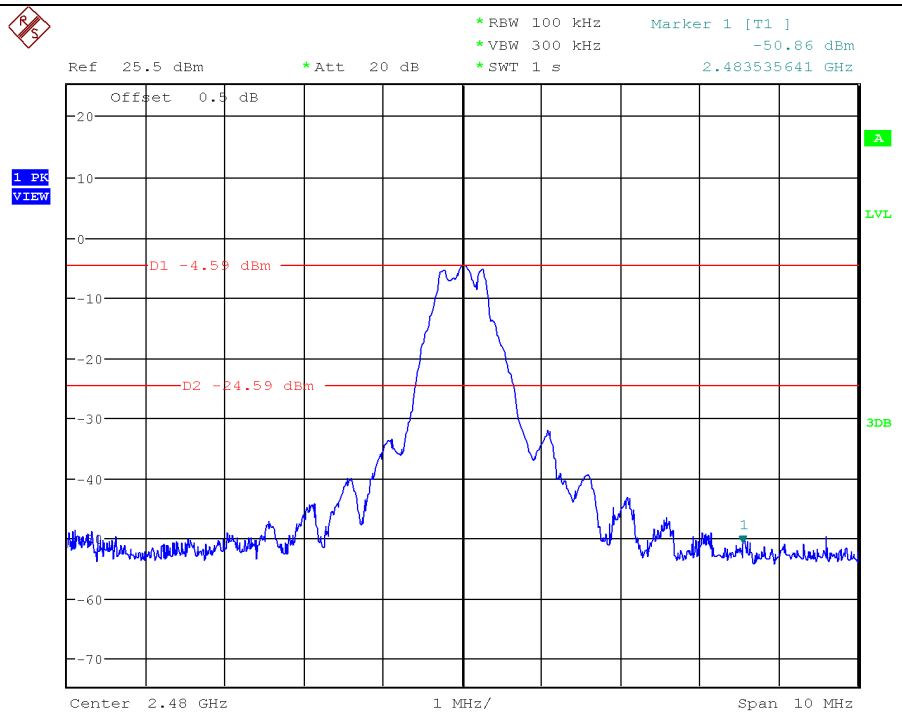

High Channel

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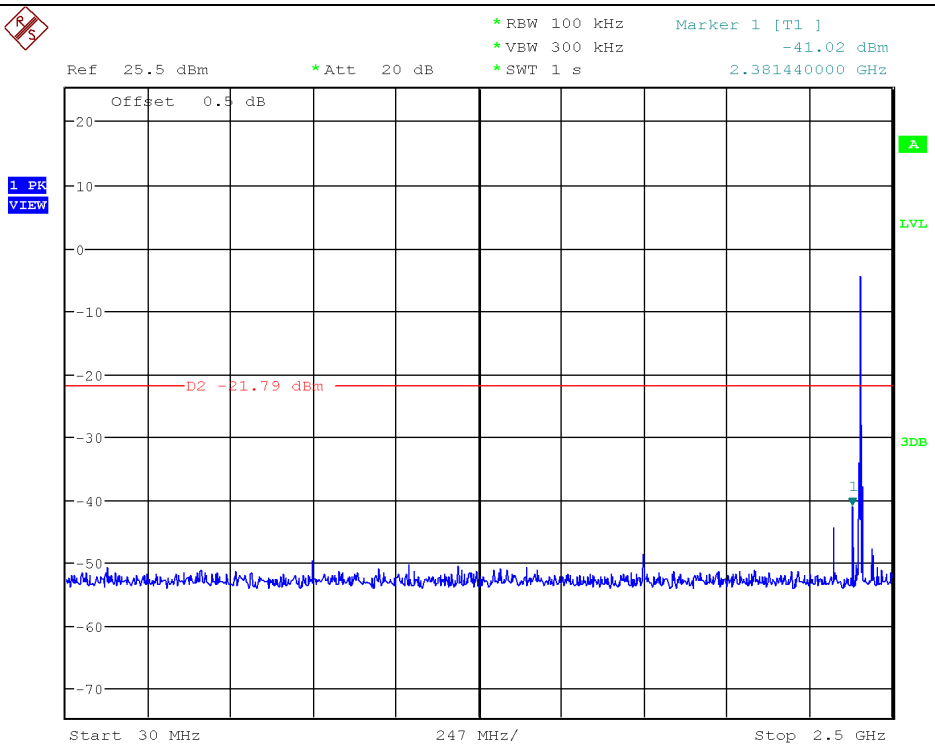
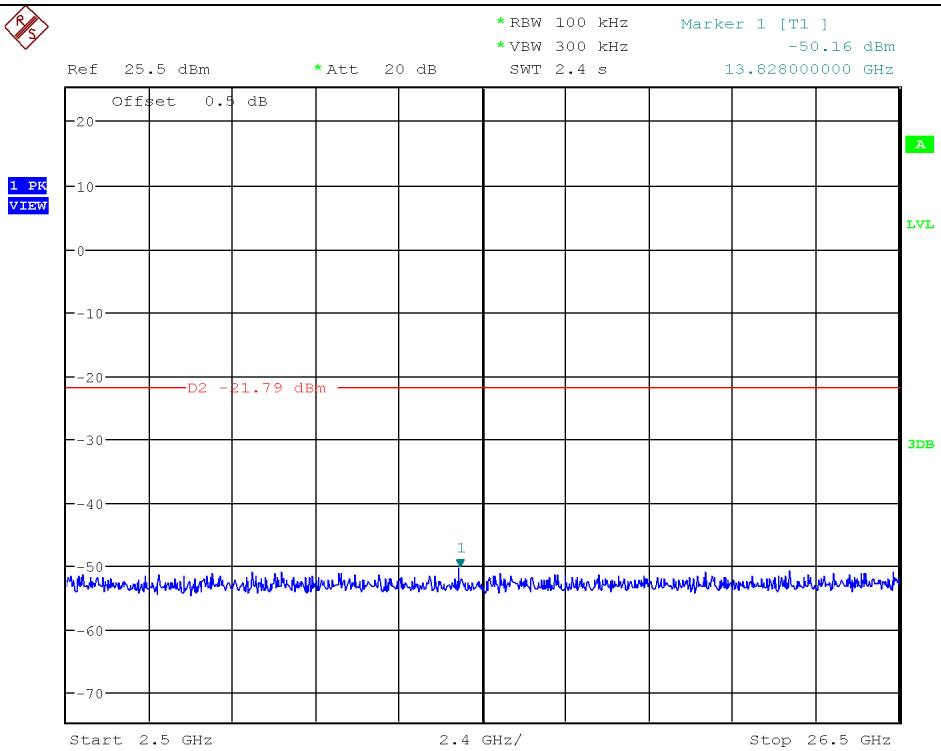


Low Channel



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)
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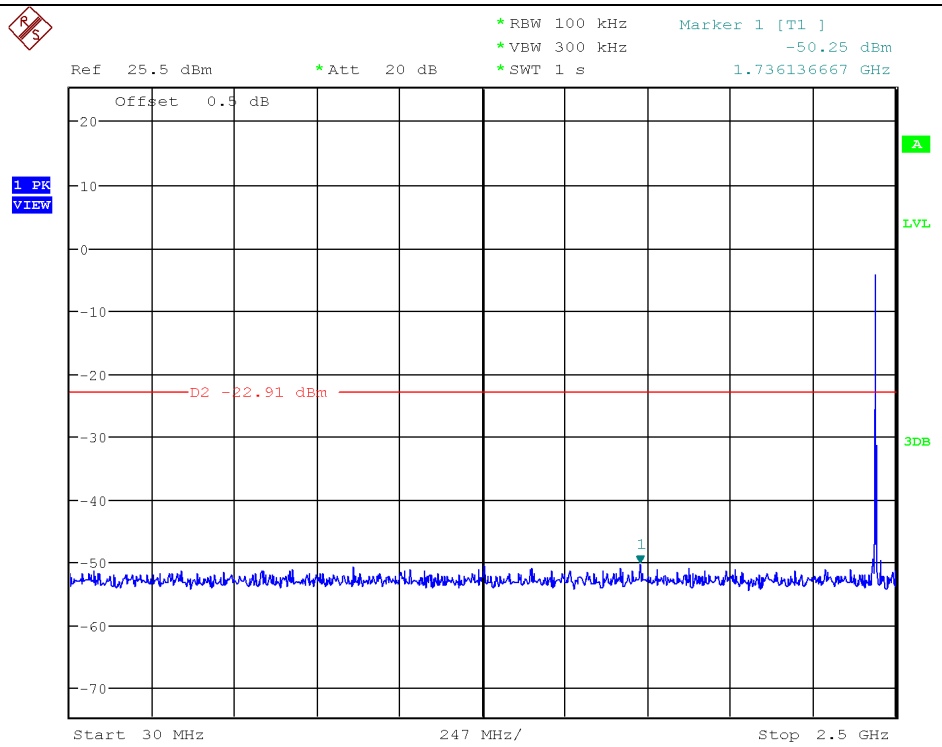
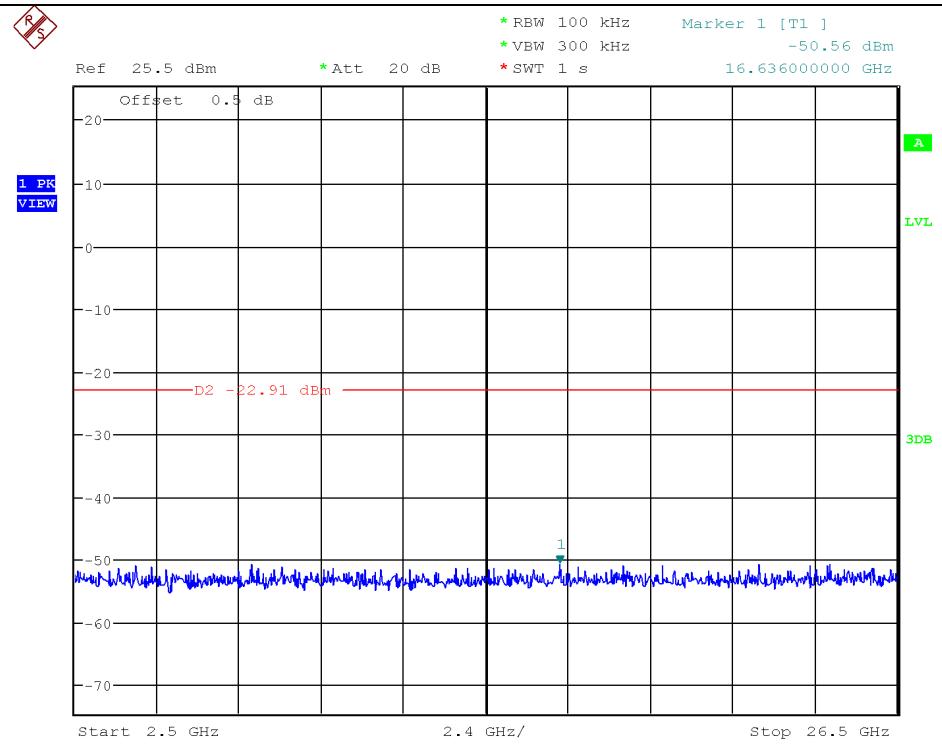


Middle Channel



Middle Channel

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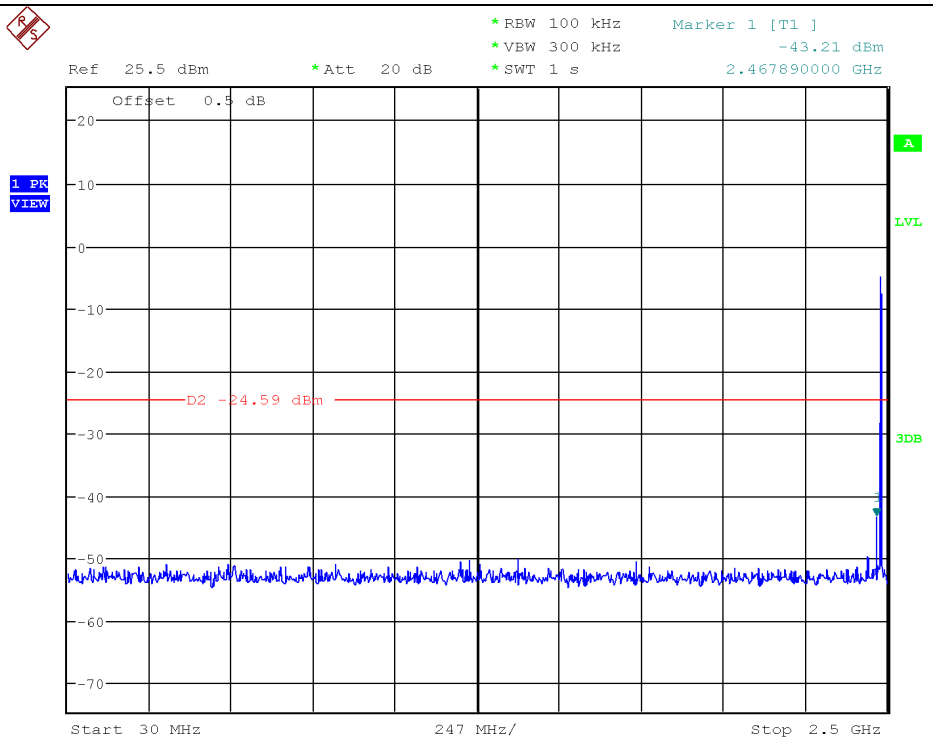
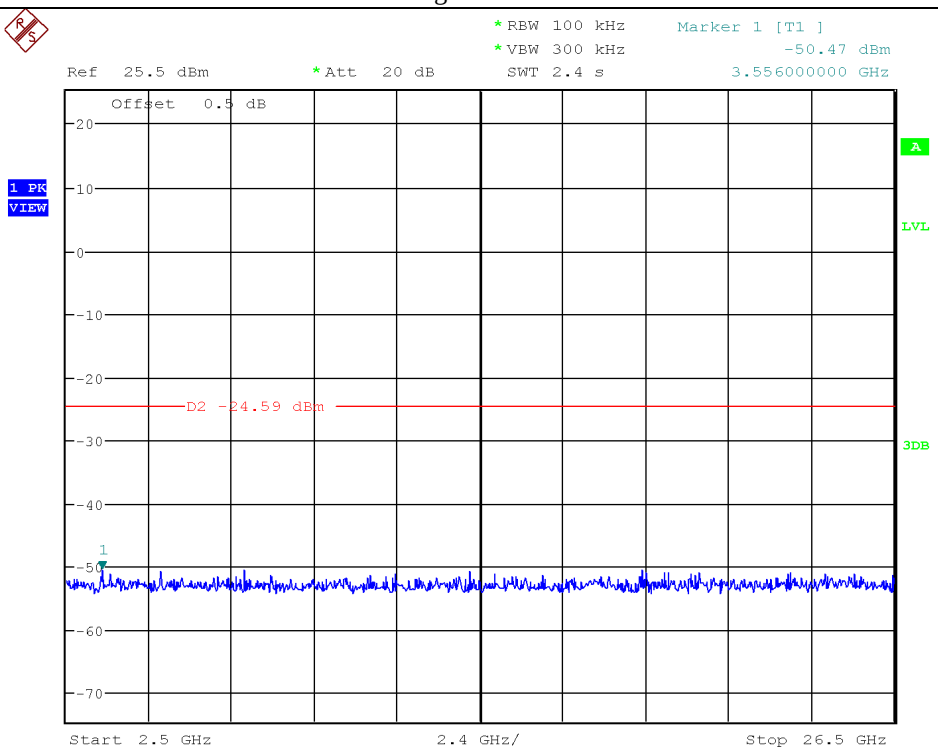


High Channel



High Channel

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9.6 Test data for radiated emission

9.6.1 Radiated Emission which fall in the Restricted Band

-. Test Date : March 03, 2016

-. 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

-. 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									
2 340.78	55.59	Peak	H	27.10	7.50	43.00	47.19	74.00	26.81
	24.80	Average	H				16.40	54.00	37.60
2 340.94	45.98	Peak	V				37.58	74.00	36.42
	23.26	Average	V				14.86	54.00	39.14
Test Data for Low Channel									
2 400.00	61.14	Peak	H	27.11	7.51	43.00	52.76	74.00	21.24
	31.99	Average	H				23.61	54.00	30.39
	54.00	Peak	V				45.62	74.00	28.38
	26.49	Average	V				18.11	54.00	35.89
Test Data for High Channel									
2 484.82	50.47	Peak	H	27.20	7.60	43.10	42.17	74.00	31.83
	25.54	Average	H				17.24	54.00	36.76
2 487.65	42.76	Peak	V				34.46	74.00	39.54
	24.32	Average	V				16.02	54.00	37.98

Tabulated test data for Restricted Band

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

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

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

Tested by: Tae-Ho, Kim / Senior Engineer

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9.6.2 Spurious & Harmonic Radiated Emission

-. Test Date : March 03, 2016

-. Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-. Result : PASSED

Frequency (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									
4 804.00	43.51	Peak	H	30.60	11.10	42.50	42.71	74.00	31.29
	31.58	Average	H				30.78	54.00	23.22
	44.67	Peak	V				43.87	74.00	30.13
	31.91	Average	V				31.11	54.00	22.89
Test Data for Middle Channel									
4 880.00	43.25	Peak	H	30.70	11.20	42.50	42.65	74.00	31.35
	31.22	Average	H				30.62	54.00	23.38
	43.58	Peak	V				42.98	74.00	31.02
	31.57	Average	V				30.97	54.00	23.03
Test Data for High Channel									
4 960.00	42.78	Peak	H	30.80	11.30	42.50	42.38	74.00	31.62
	31.04	Average	H				30.64	54.00	23.36
	43.05	Peak	V				42.65	74.00	31.35
	31.18	Average	V				30.78	54.00	23.22

Tabulated test data for Restricted Band

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

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

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

Tested by: Tae-Ho, Kim / Senior Engineer

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10. PEAK POWER SPECTRAL DENSITY

10.1 Operating environment

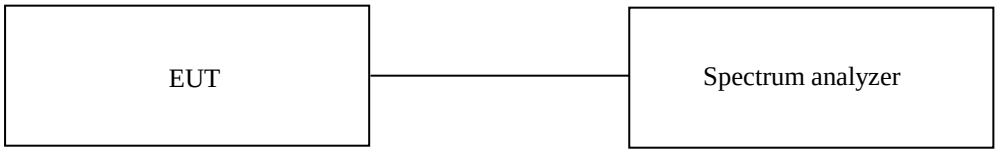
Temperature : 22.3 ℃

Relative humidity : 44.8 % R.H.

10.2 Test set-up

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

The resolution bandwidth is set to 3 kHz ≤ RBW ≤100 kHz , the video bandwidth is set to 3 times the resolution bandwidth.



10.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2015 (1Y)

All test equipment used is calibrated on a regular basis.

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10.4 Test data

-. Test Date : March 07, 2016

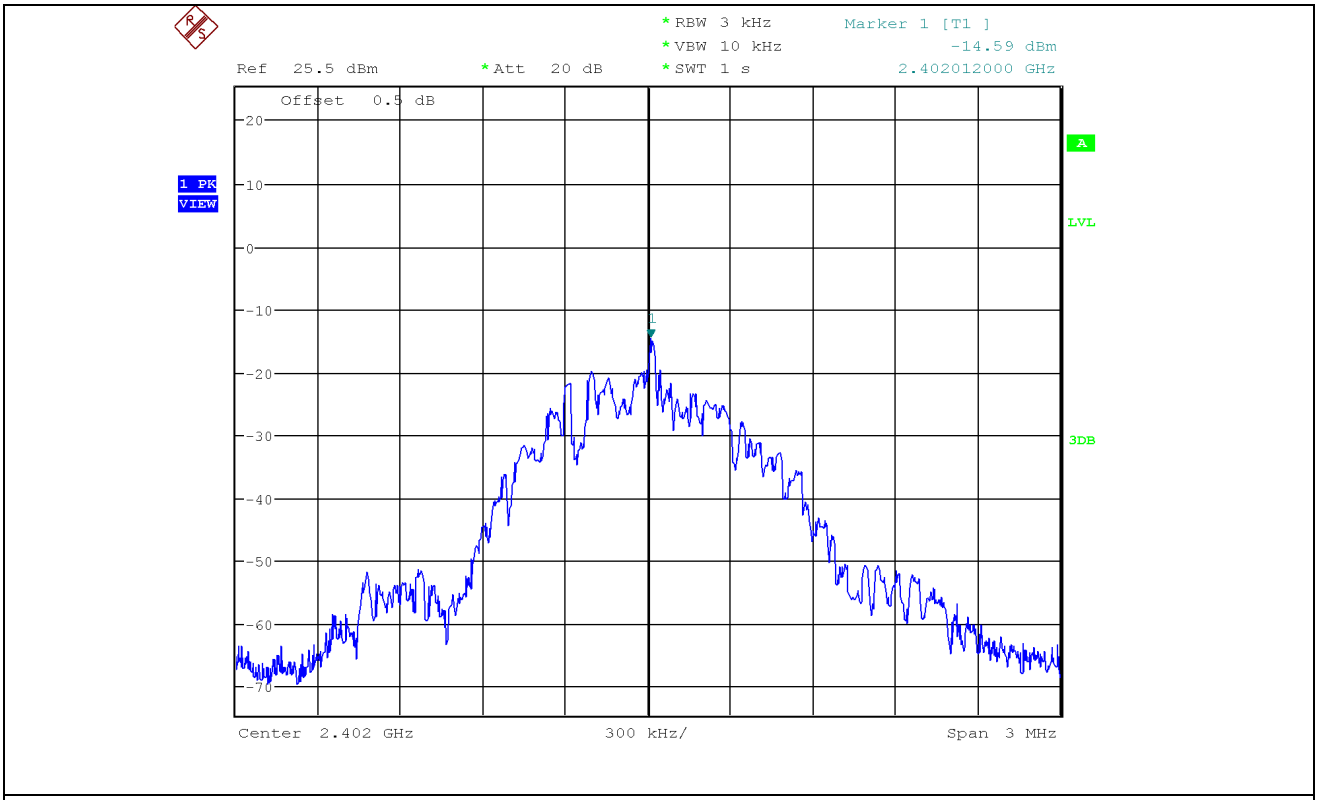
-. Test Result : Pass

-. Operating Condition : Continuous transmitting mode

CHANNEL	FREQUENCY(MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402	-14.59	8.00	22.59
Middle	2 440	-18.17	8.00	26.17
High	2 480	-18.22	8.00	26.22

Remark. Margin = Limit – Measured value

Tested by: Tae-Ho, Kim / Senior Engineer



Low Channel

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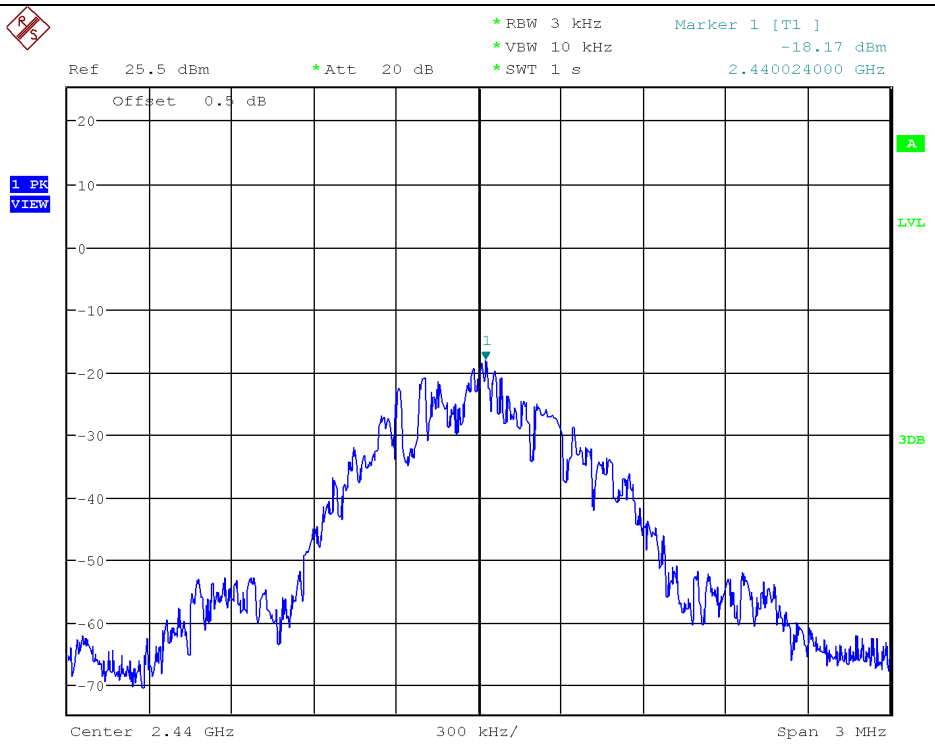
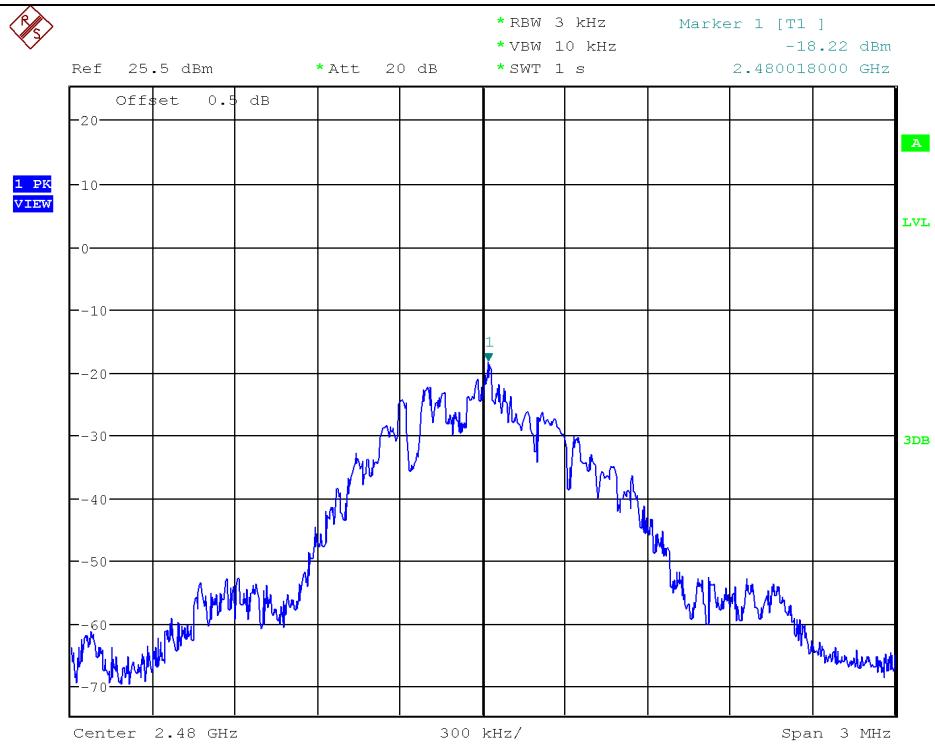


Middle Channel



High Channel

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11. RADIATED EMISSION TEST

11.1 Operating environment

Temperature : 22.3 ℃

Relative humidity : 44.8 % R.H.

11.2 Test set-up

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

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

11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	FSV40	Rohde & Schwarz	Signal Analyzer	101009	Jul. 22, 2015 (1Y)
■ -	ESCI	Rohde & Schwarz	Test Receiver	101012	Nov. 02, 2015 (1Y)
■ -	310N	Sonoma Instrument	Pre-Amplifier	312544	Apr. 29, 2015 (1Y)
■ -	SCU-18	Rohde & Schwarz	Pre-Amplifier	10041	Nov. 23, 2015 (1Y)
■ -	DT3000	Innco System	Turn Table	930611	N/A
■ -	MA4000-EP	Innco System	Antenna Master	3320611	N/A
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Jul. 10, 2014 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Apr. 30, 2015 (2Y)

All test equipment used is calibrated on a regular basis.

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11.4 Test data for Transmitting Mode

11.4.1 Test data for 30 MHz ~ 1 GHz

Humidity Level : 44.8 % R.H. Temperature: 22.3 ℃

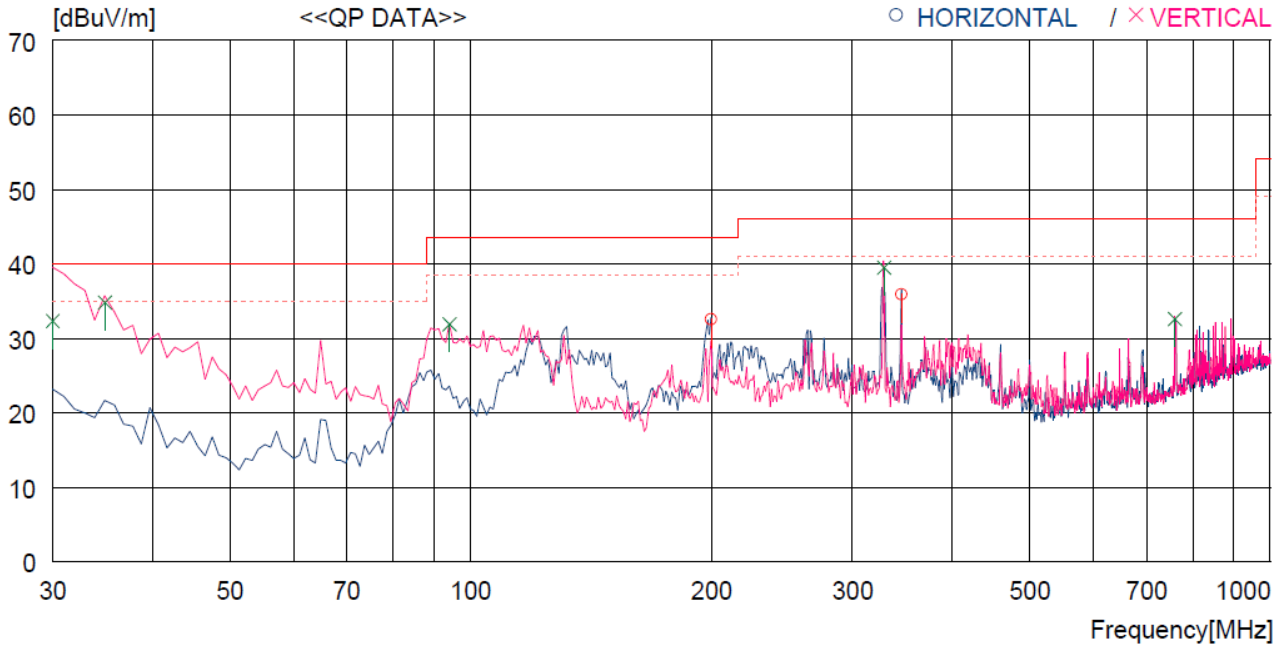
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Bluetooth Module Date: March 07, 2016

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

Operating condition : Low Channel



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	199.750	50.8	10.7	3.8	32.8	32.5	43.5	11.0	200	359
2	345.250	48.9	14.6	5.0	32.6	35.9	46.0	10.1	100	0
----- Vertical ------										
3	34.850	53.8	12.1	1.7	32.8	34.8	40.0	5.2	100	285
4	94.020	51.8	10.8	2.6	33.3	31.9	43.5	11.6	100	359
5	328.760	53.1	14.2	4.8	32.6	39.5	46.0	6.5	200	144
6	759.433	38.2	20.4	7.6	33.6	32.6	46.0	13.4	200	0
7	30.000	52.1	11.4	1.6	32.8	32.3	40.0	7.7	100	359

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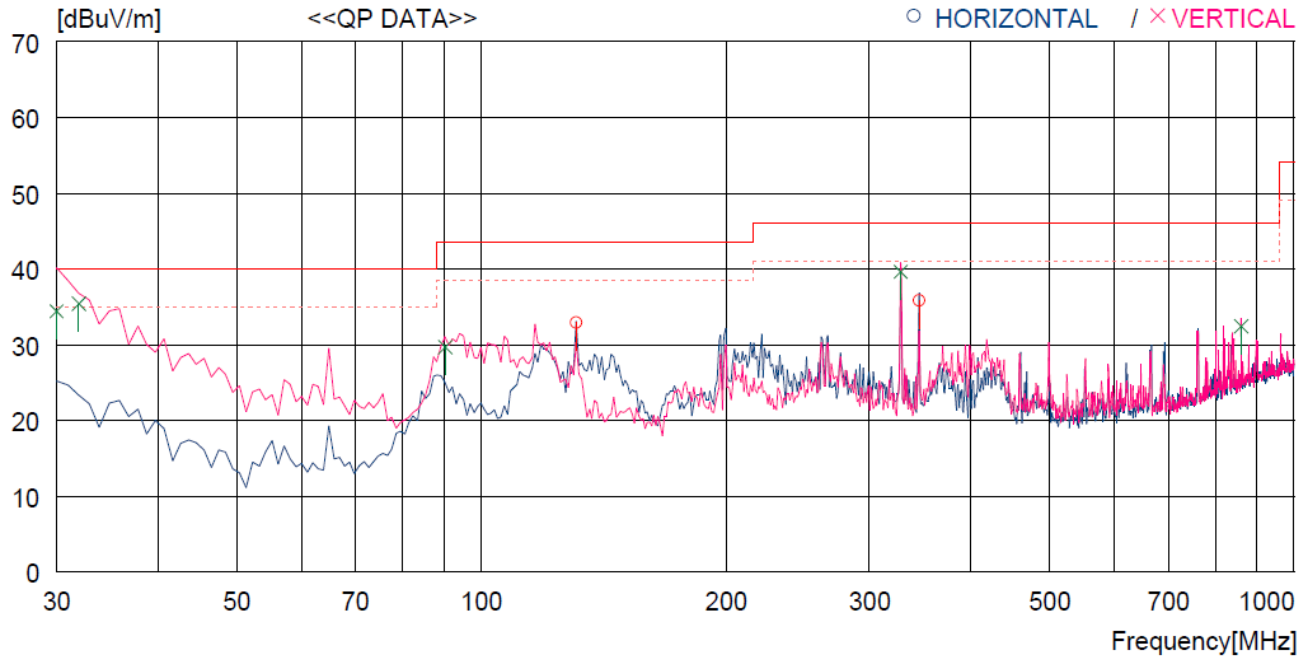
Operating condition : Middle Channel



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	130.880	53.8	9.1	3.1	33.1	32.9	43.5	10.6	200	359
2	345.250	48.8	14.6	5.0	32.6	35.8	46.0	10.2	100	174
----- Vertical ------										
3	31.940	54.8	11.7	1.7	32.8	35.4	40.0	4.6	100	174
4	90.140	50.3	10.1	2.6	33.3	29.7	43.5	13.8	100	359
5	327.790	53.2	14.2	4.8	32.6	39.6	46.0	6.4	200	151
6	860.310	35.8	21.7	8.2	33.3	32.4	46.0	13.6	100	359
7	30.000	54.2	11.4	1.6	32.8	34.4	40.0	5.6	100	359

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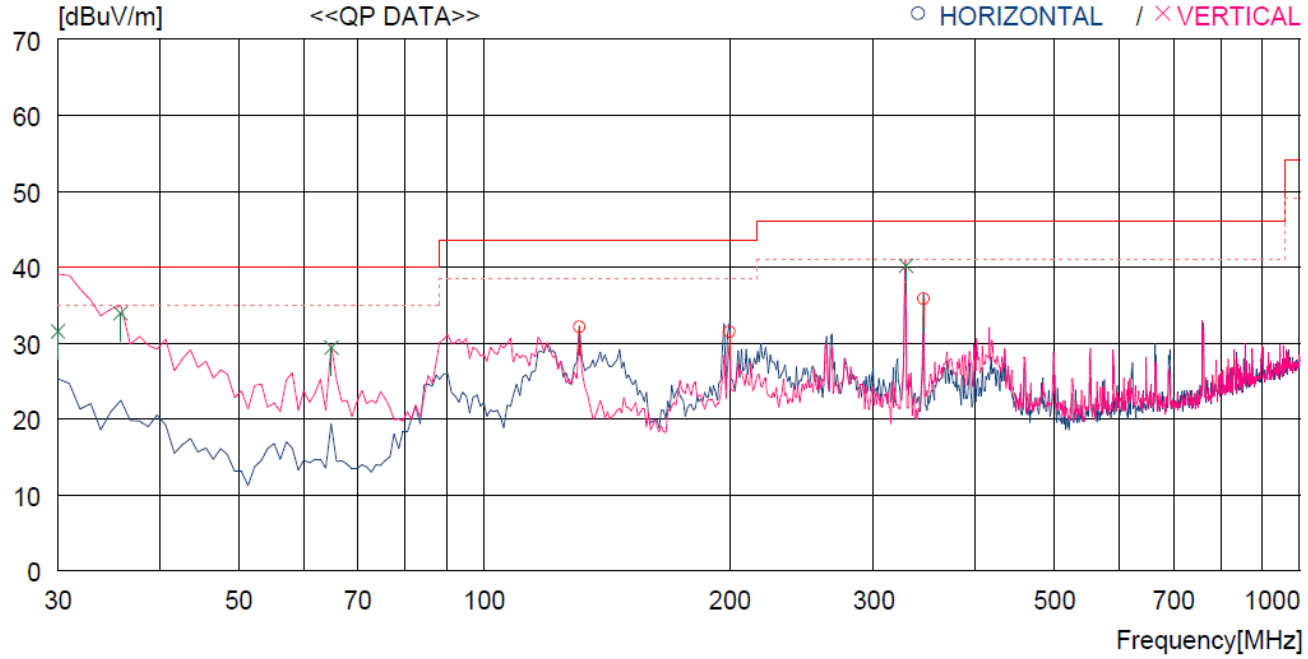
Operating condition : High Channel



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	130.880	53.0	9.1	3.1	33.1	32.1	43.5	11.4	200	159
2	199.750	49.8	10.7	3.8	32.8	31.5	43.5	12.0	100	229
3	345.250	48.8	14.6	5.0	32.6	35.8	46.0	10.2	100	0
----- Vertical ------										
4	35.820	52.6	12.3	1.8	32.8	33.9	40.0	6.1	100	359
5	64.920	48.8	11.5	2.2	33.1	29.4	40.0	10.6	100	359
6	328.760	53.8	14.2	4.8	32.6	40.2	46.0	5.8	200	0
7	30.000	51.3	11.4	1.6	32.8	31.5	40.0	8.5	100	359

Tested by: Tae-Ho, Kim / Senior Engineer

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11.4.2 Test data for Below 30 MHz

-. Test Date : March 07, 2016

-. Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)

-. Frequency range : 9 kHz ~ 30 MHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

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

11.4.3 Test data for above 1 GHz

-. Test Date : March 07, 2016

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

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

-. Frequency range : 1 GHz ~ 26.5 GHz

-. Measurement distance : 3 m

-.Operating mode : Transmitting mode

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

Tested by: Tae-Ho, Kim / Senior Engineer

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12. CONDUCTED EMISSION TEST

12.1 Operating environment

Temperature : 22.3 ℃

Relative humidity : 44.8 % R.H.

12.2 Test set-up

The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50 Ω / 50 μH + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

12.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESPI	Rohde & Schwarz	EMI Test Receiver	101278	Nov. 02, 2015 (1Y)
□ -	ESHS10	Rohde & Schwarz	EMI Test Receiver	834467/007	Apr. 29, 2015 (1Y)
□	NSLK8128	Schwarzbeck	AMN	8128-216	Apr. 06, 2015 (1Y)
■ -	NSLK8126	Schwarzbeck	AMN	8126-404	Apr. 29, 2015 (1Y)
□ -	3825/2	EMCO	AMN	9109-1869	Apr. 29, 2015 (1Y)
■ --	3825/2	EMCO	AMN	9109-1867	Apr. 29, 2015 (1Y)

All test equipment used is calibrated on a regular basis.

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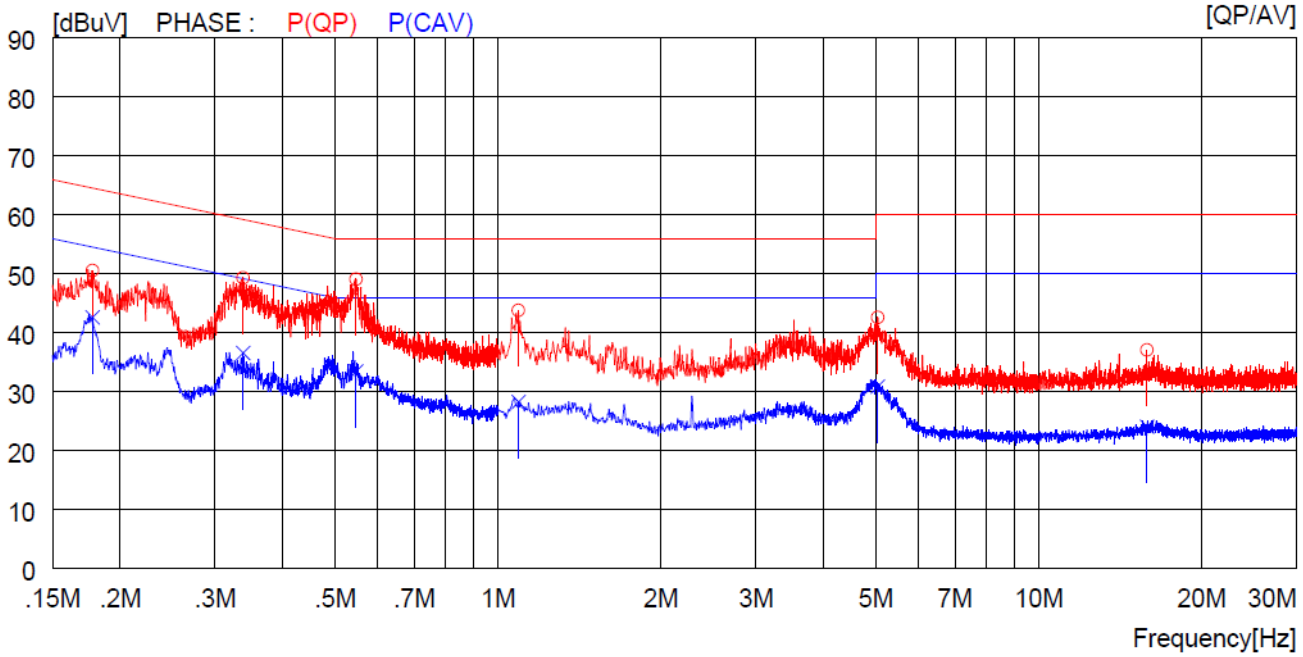
12.4 Test data

-. Test Date : March 07, 2016

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : POSITIVE LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.17800	30.3	----	20.3	50.6	----	64.6	----	14.0	----	P(QP)
2	0.33800	29.0	----	20.3	49.3	----	59.3	----	10.0	----	P(QP)
3	0.54700	28.8	----	20.3	49.1	----	56.0	----	6.9	----	P(QP)
4	1.09200	23.5	----	20.3	43.8	----	56.0	----	12.2	----	P(QP)
5	5.04000	22.2	----	20.4	42.6	----	60.0	----	17.4	----	P(QP)
6	15.87000	16.7	----	20.4	37.1	----	60.0	----	22.9	----	P(QP)
7	0.17800	----	22.3	20.3	----	42.6	----	54.6	----	12.0	P(CAV)
8	0.33800	----	16.3	20.3	----	36.6	----	49.3	----	12.7	P(CAV)
9	0.54700	----	13.2	20.3	----	33.5	----	46.0	----	12.5	P(CAV)
10	1.09200	----	8.0	20.3	----	28.3	----	46.0	----	17.7	P(CAV)
11	5.04000	----	10.5	20.4	----	30.9	----	50.0	----	19.1	P(CAV)
12	15.87000	----	3.7	20.4	----	24.1	----	50.0	----	25.9	P(CAV)

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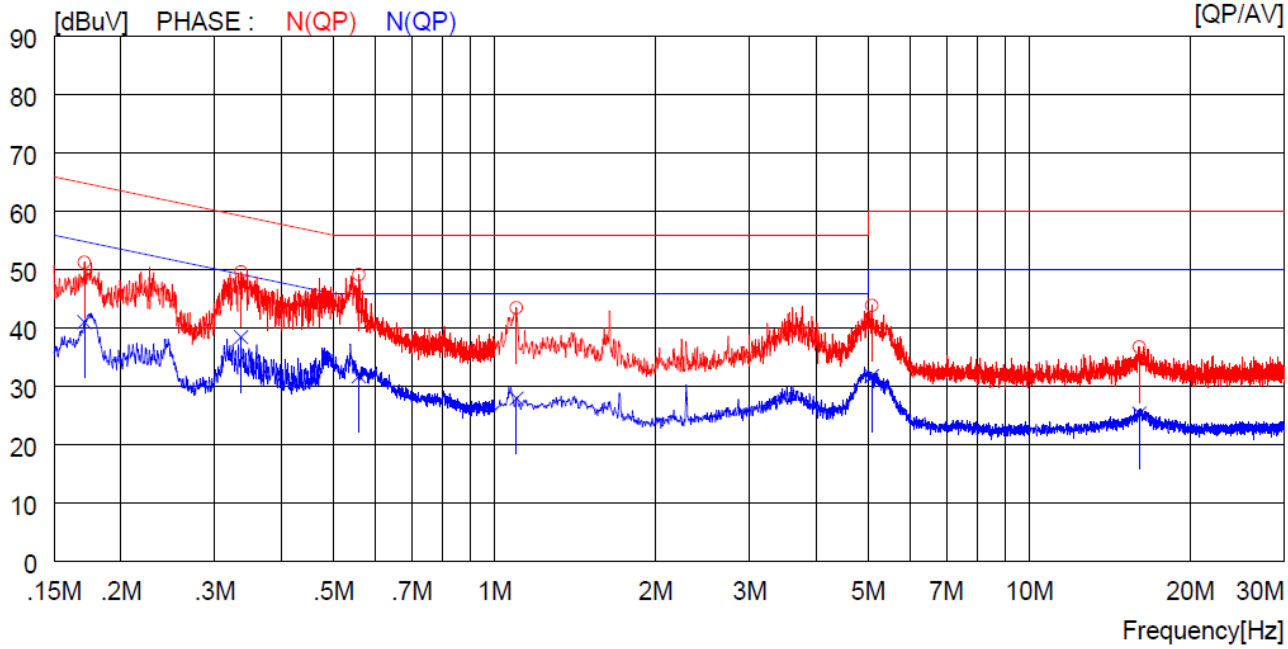
-. Tested Line : NEGATIVE LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.17100	31.0	----	20.3	51.3	----	64.9	----	13.6	----	N(QP)
2	0.33600	29.4	----	20.3	49.7	----	59.3	----	9.6	----	N(QP)
3	0.55800	28.9	----	20.3	49.2	----	56.0	----	6.8	----	N(QP)
4	1.10000	23.2	----	20.3	43.5	----	56.0	----	12.5	----	N(QP)
5	5.07500	23.5	----	20.4	43.9	----	60.0	----	16.1	----	N(QP)
6	16.07000	16.4	----	20.4	36.8	----	60.0	----	23.2	----	N(QP)
7	0.17100	----	20.8	20.3	----	41.1	----	54.9	----	13.8	N(CAV)
8	0.33600	----	18.2	20.3	----	38.5	----	49.3	----	10.8	N(CAV)
9	0.55800	----	11.5	20.3	----	31.8	----	46.0	----	14.2	N(CAV)
10	1.10000	----	7.7	20.3	----	28.0	----	46.0	----	18.0	N(CAV)
11	5.07500	----	11.4	20.4	----	31.8	----	50.0	----	18.2	N(CAV)
12	16.07000	----	5.0	20.4	----	25.4	----	50.0	----	24.6	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 / Senior Engineer

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