

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

Test Report No. : E12OR-037

AGR No. : A128A-050

Applicant : GAON-INT CO., LTD.

Address : Incheon IT Tower Suite1501, 592-5, Dohwa1-Dong, Nam-Gu, Incheon, Korea
402-711

Manufacturer : Jenny Electronics Factory

Address : 5 floor, B tower, No.8 , North District, Shangxue Technology Park, Bantian Town,
Long gang District, Shenzhen City, China

Type of Equipment : Bluetooth Remote Control

FCC ID. : UP4-GBR-100

Model Name : GBR-100

Serial number : N/A

Total page of Report : 43 pages (including this page)

Date of Incoming : August 13, 2012

Date of issue : October 12, 2012

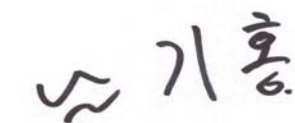
SUMMARY

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.

Prepared by:



Ki-Hong, Nam / Senior Engineer
ONETECH Corp.

Approved by:



Y. K. Kwon / Exe. Managing Director
ONETECH Corp.

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
E12OR-037	October 12, 2012	Initial Issue	All

1. VERIFICATION OF COMPLIANCE

APPLICANT : GAON-INT CO., LTD.
 ADDRESS : Incheon IT Tower Suite1501, 592-5, Dohwa1-Dong, Nam-Gu, Incheon, Korea 402-711
 CONTACT PERSON : Dae-sung, Ha / General Manager
 TELEPHONE NO : +82-32-246-1800
 FCC ID : UP4-GBR-100
 MODEL NAME : GBR-100
 BRAND NAME : N/A
 SERIAL NUMBER : N/A
 DATE : October 12, 2012

EQUIPMENT CLASS	<i>DSS – PART 15 SPREAD SPECTRUM TRANSMITTER</i>
KIND OF EQUIPMENT	Bluetooth Remote Control
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.4: 2009
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	10 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.

2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (1)	Carrier Frequency Separation	Met the Limit / PASS
15.247 (a) (1) (iii)	Minimum Number of Hopping Channels	Met the Limit / PASS
15.247 (a) (1) (iii)	Average Time of Occupancy	Met the Limit / PASS
15.247 (b) (1)	Maximum Peak Conducted Output Power	Met the Limit / PASS
15.247 (b) (4)	Antenna Gain	Met requirement / 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 (i)	Radio Frequency Exposure Level	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 section 2.1.

2.5 Test Methodology

The radiated testing was performed according to the procedures in ANSI C63.4: 2009 at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 301-14, Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. The Onetech Corp. has been accredited as a Conformity Assessment Body (CAB) with designation number KR0013.

3. GENERAL INFORMATION

3.1 Product Description

The GAON-INT CO.,LTD. Model GBR-100 (referred to as the EUT in this report) is a Bluetooth Remote Control. The EUT has a function of Bluetooth. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Bluetooth Remote Control
OPERATING FREQUENCY	2 402 MHz ~ 2 480 MHz
RF OUTPUT POWER	-2.20 dBm
NUMBER OF CHANNEL	79 Channels
MODULATION TYPE	GFSK
ANTENNA	PCB Pattern Antenna
ANTENNA GAIN	1.87 dBi
LIST OF EACH OSC. OR CRYSTAL. FREQ.(FREQ.>=1 MHz)	24 MHz
RATED SUPPLY VOLTAGE	DC 3.7 V (Li-polymer Battery)
EXTERNAL CONNECTOR	USB

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

-. None

4. EUT MODIFICATIONS

-. None

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	N/A	GBR-100_Rev_A	N/A
Li-polymer Battery	N/A	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	FCC ID	Description	Connected to
GBR-100	Jenny Electronics Factory	UP4-GBR-100	Bluetooth Remote Control (EUT)	-
PP10L	DELL	N/A	Notebook PC	EUT & JIG
JIG	N/A	N/A	N/A	EUT

5.3 Mode of operation during the test

The EUT was set at Low Channel (2 402 MHz), Middle Channel (2 441 MHz), and High Channel (2 480 MHz). To get a maximum radiated emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and worst case is “XY”

5.4 Configuration of Test System

Line Conducted Test: The EUT was connected to notebook PC and power of notebook PC was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission tests were performed by using the procedure in ANSI C63.4: 2009 7.3.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2009 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m open area test site.

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 transmitter antenna of the EUT is a PCB Pattern Antenna, so no consideration of replacement by the user.

6. PRELIMINARY TEST

6.1 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
Charging and Transmitter Mode	X

6.2 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)
Charging and Transmitter Mode	X

7. CARRIER FREQUENCY SEPARATION

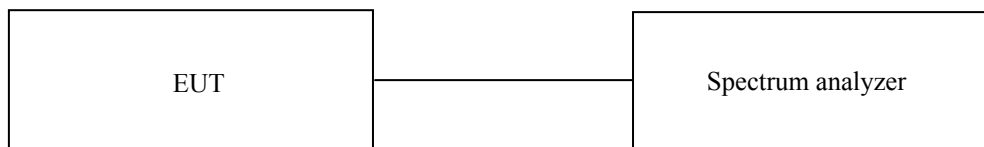
7.1 20 dB BANDWIDTH

7.1.1 Operating environment

Temperature : 25 °C
Relative humidity : 43 % R.H.

7.1.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 10 kHz, and peak detection was used. The 20 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.



7.1.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)

All test equipment used is calibrated on a regular basis.

7.1.4 Test data

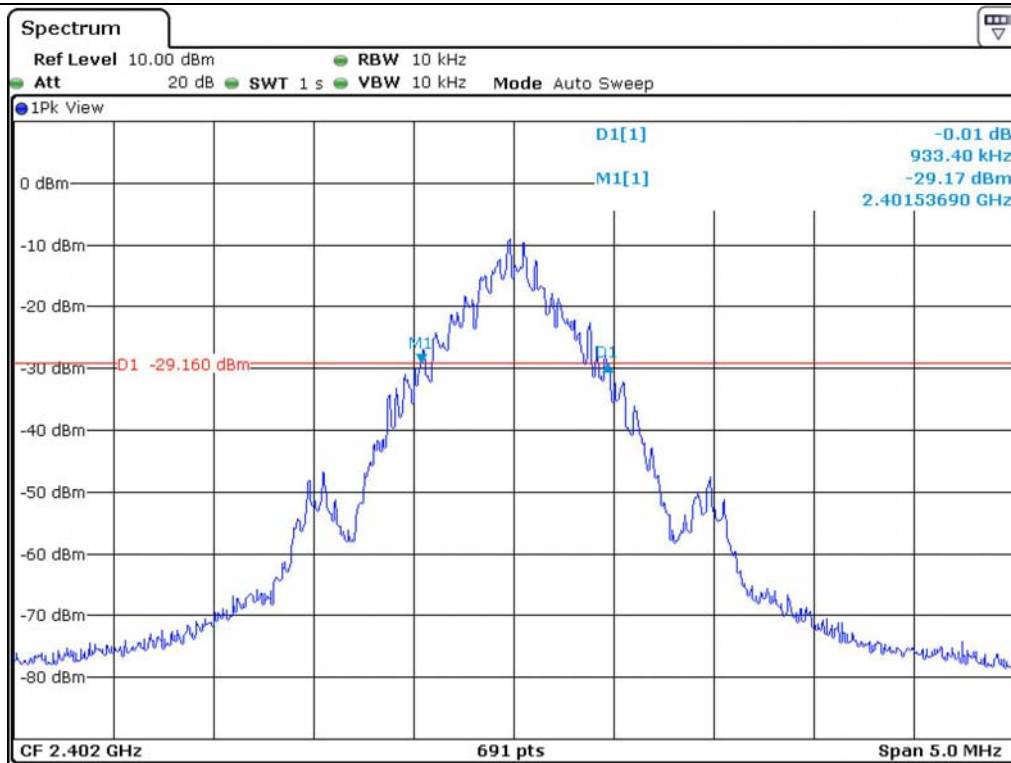
-. Test Date : October 12, 2012

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (kHz)
Low	2 402	933.4
Middle	2 441	940.7
High	2 480	940.7

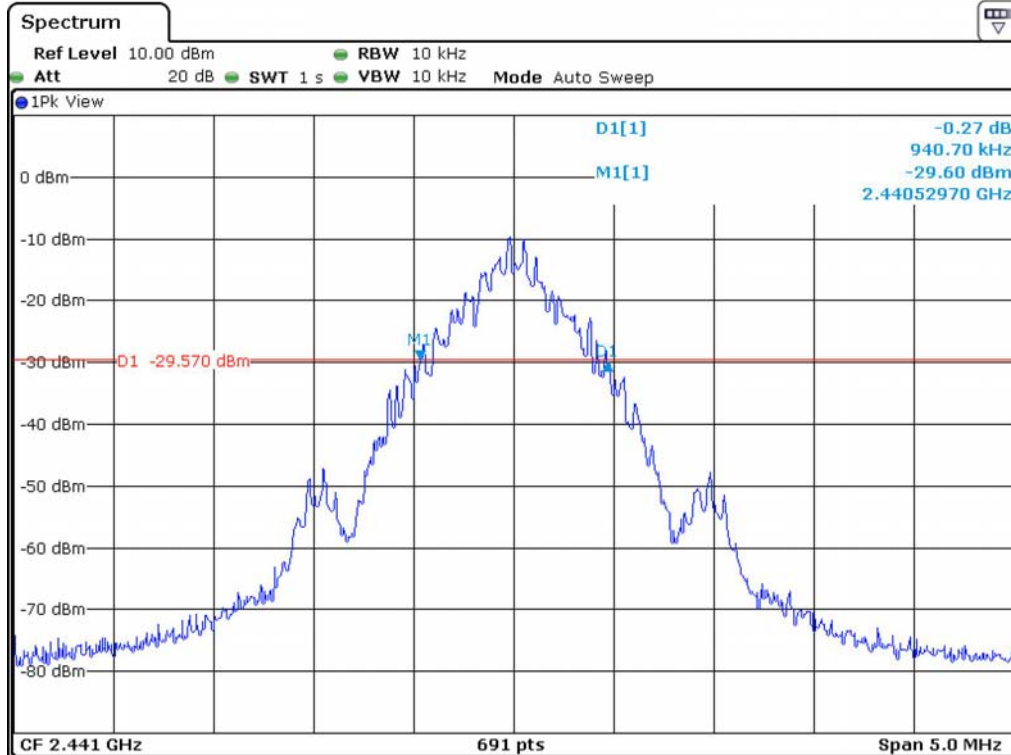
Remark: See next page for an overview sweep performed with peak detector.

Tested by:  Hong-Kyu, Lee/

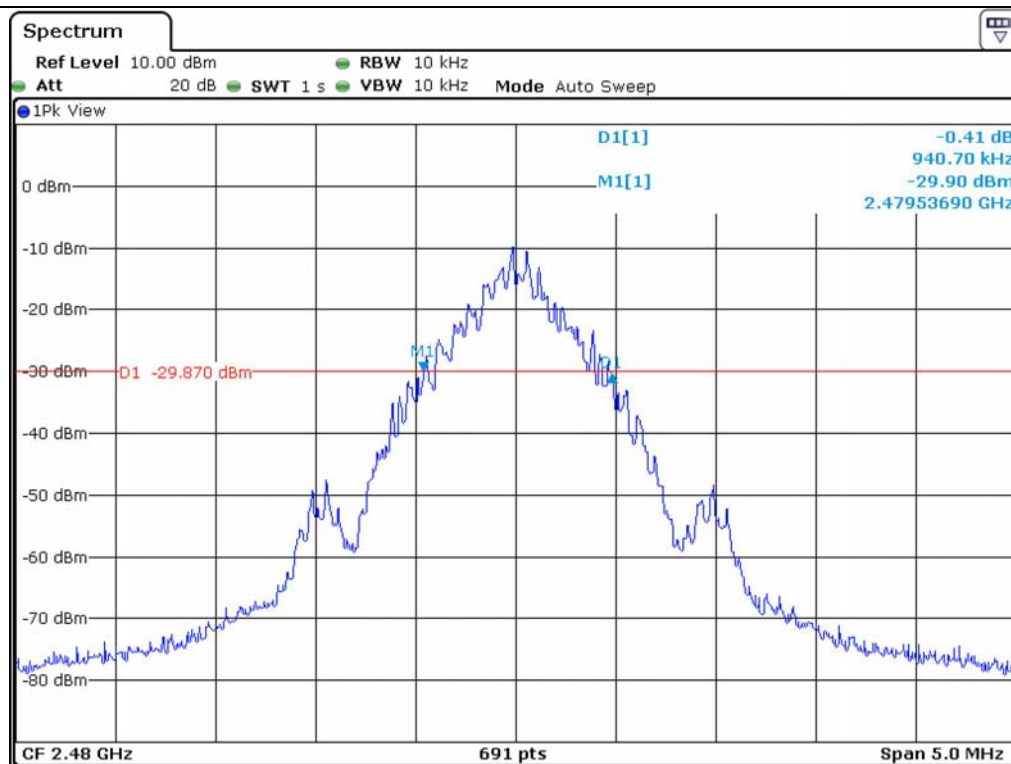
Engineer



Low Channel



Middle Channel



High Channel

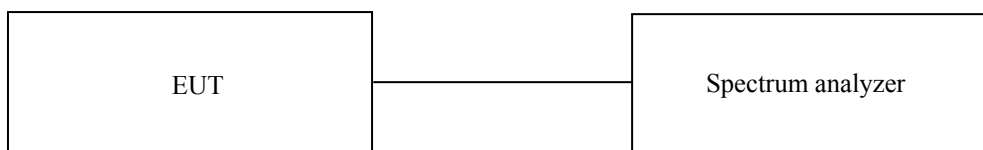
7.2 HOPPING FREQUENCY SEPARATION

7.2.1 Operating environment

Temperature : 25 °C
Relative humidity : 43 % R.H.

7.2.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The frequency span is set to 10 MHz. The analyzer is set to peak hold then a pseudo-random hopping sequence of the transmitter is captured. The mark delta function was used to measure the frequency separation between two adjacent hopping channels.



7.2.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)

All test equipment used is calibrated on a regular basis.


7.2.4 Test dataz

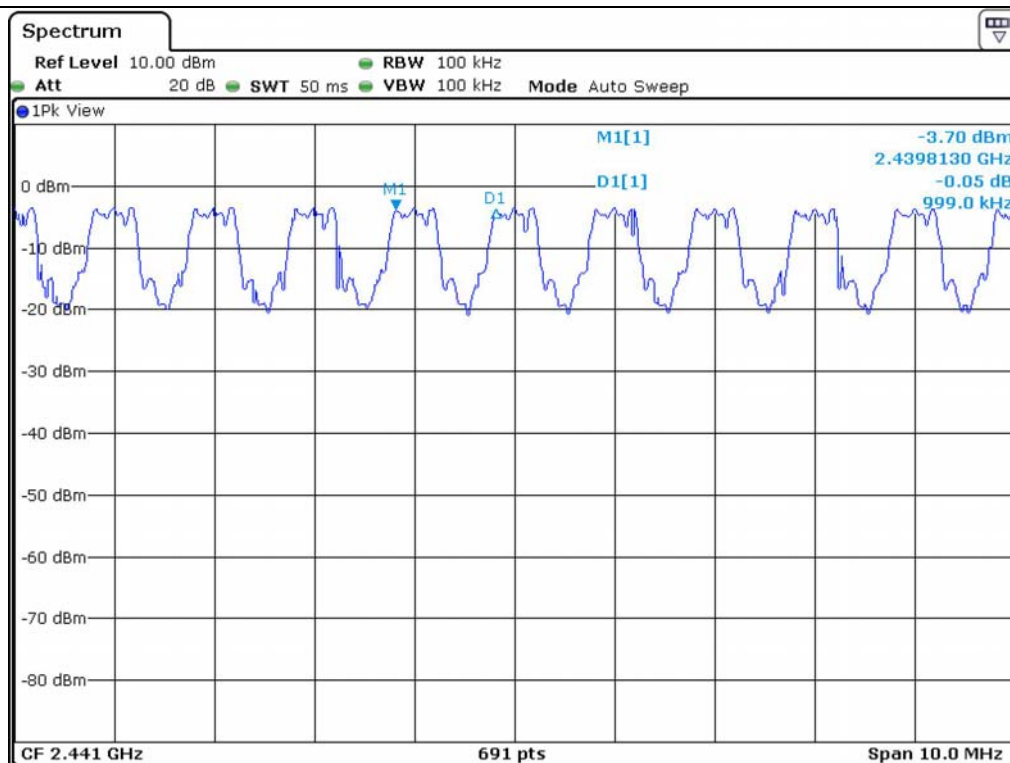
-. Test Date : October 12, 2012
-. Test Result : Pass

MEASURED VLAUE (kHz)	LIMIT, 20 dB Bandwidth (kHz)	MARGIN (kHz)
999	940.7	58.3

Remark: See next page for an overview sweep performed with peak detector

Margin = Limit – Measured value


 Tested by: Hong-Kyu, Lee/ Engineer



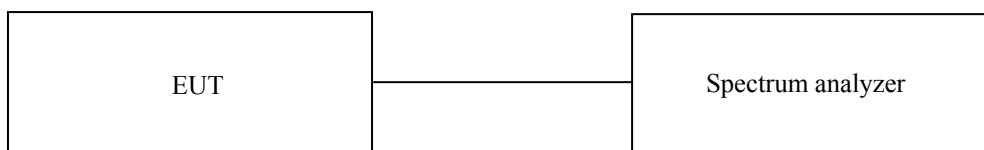
7.3. NUMBER OF HOPPING CHANNELS

7.3.1 Operating environment

Temperature : 25 °C
Relative humidity : 43 % R.H.

7.3.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The frequency span is set to 100 MHz and the resolution bandwidth is set to 100 kHz. The analyzer is set to peak hold and then complete pseudo-random hopping sequence of the transmitter is captured.



7.3.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSP	R/S	Spectrum Analyzer	100017	Mar. 12, 2012(1Y)

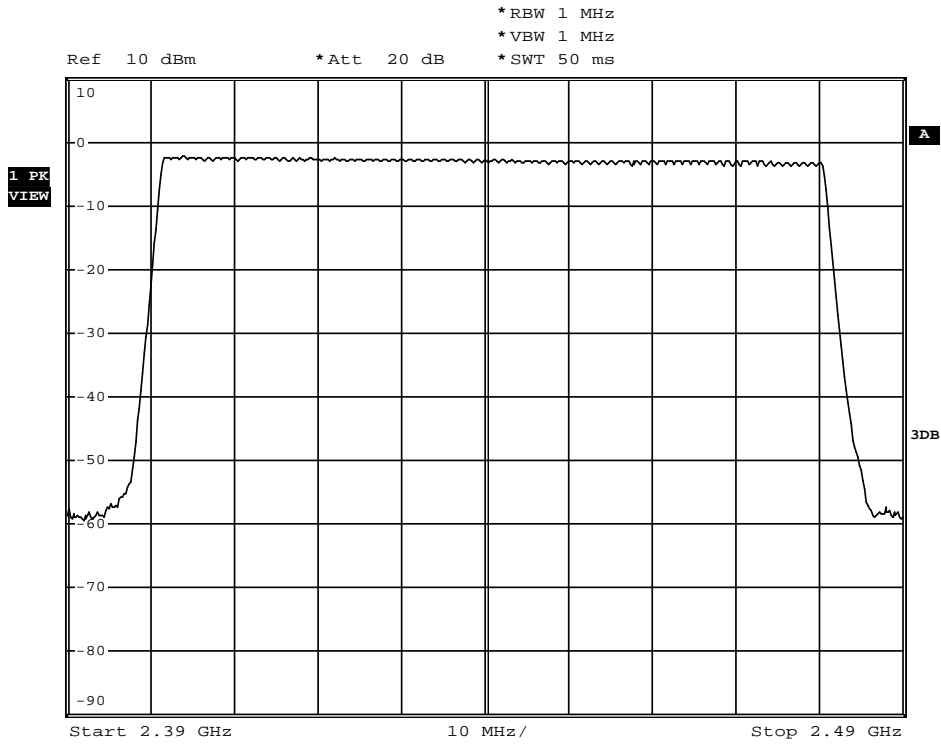
All test equipment used is calibrated on a regular basis.

7.3.4 Test data

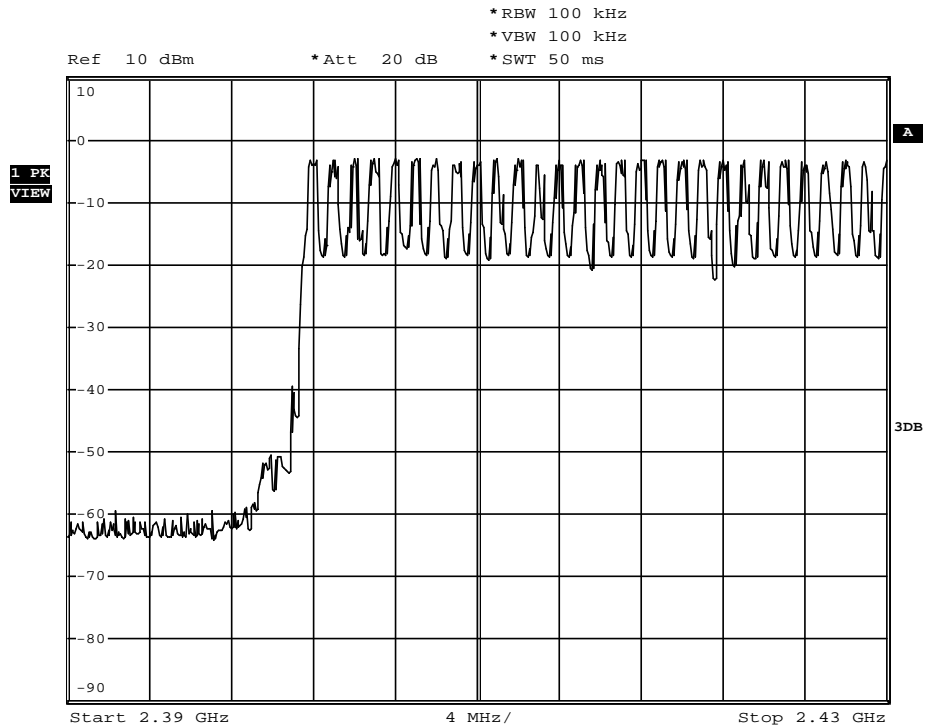
- Test Date : October 12, 2012
- Test Result : Pass

MEASURED VLAUE (Number)	LIMIT (Number)	MARGIN (Number)
79	Minimum of 15	64

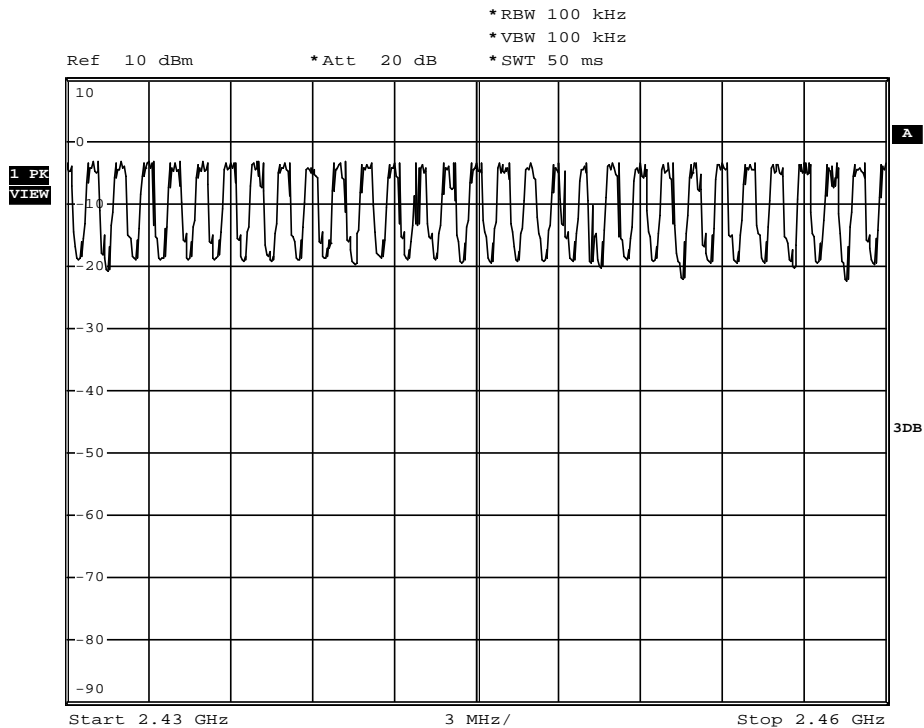
Tested by: Hong-Kyu, Lee/ Engineer



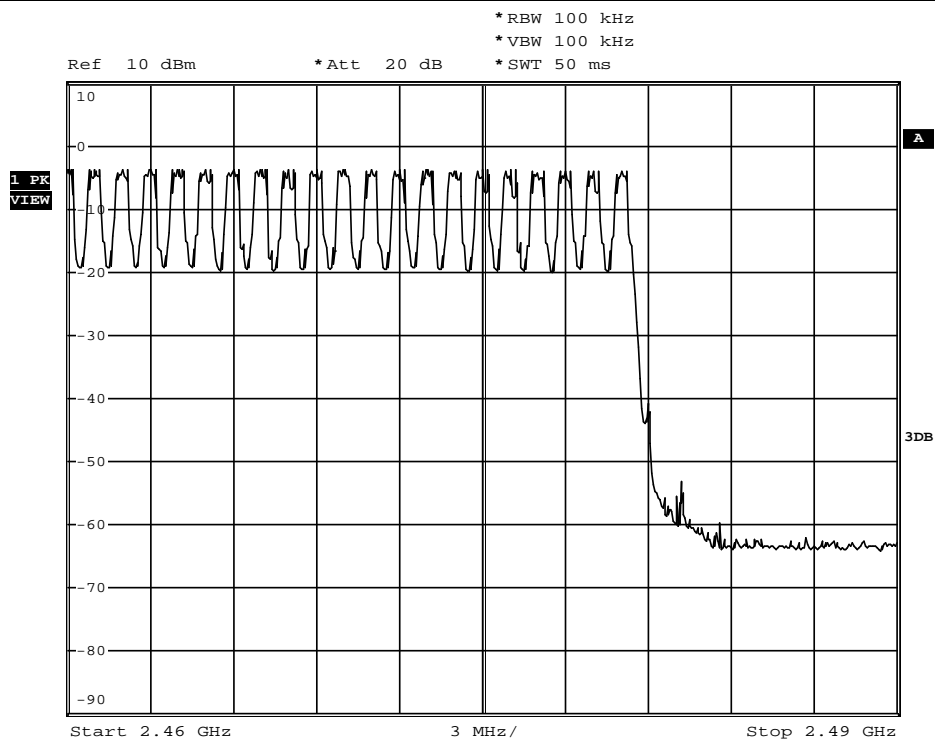
Total number of hopping channel: $28+30+21 = 79$



Number of hopping channel: 28



Number of hopping channel: 30



Number of hopping channel: 21

7.4 TIME OF OCCUPANCY

7.4.1 Operating environment

Temperature : 25 °C
Relative humidity : 43 % R.H.

7.4.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The transmitter is set to operate in its normal frequency hopping mode. The center frequency of the spectrum analyzer is set to one of hopping channels near the center of the operating band and span is set to zero Hz. The sweep time is set to display one complete pulse. The mark delta function is used to measure the duration of the pulses.



7.4.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)

All test equipment used is calibrated on a regular basis.

7.4.4 Test data

- Test Date : October 12, 2012


The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μ s with 79 channels.

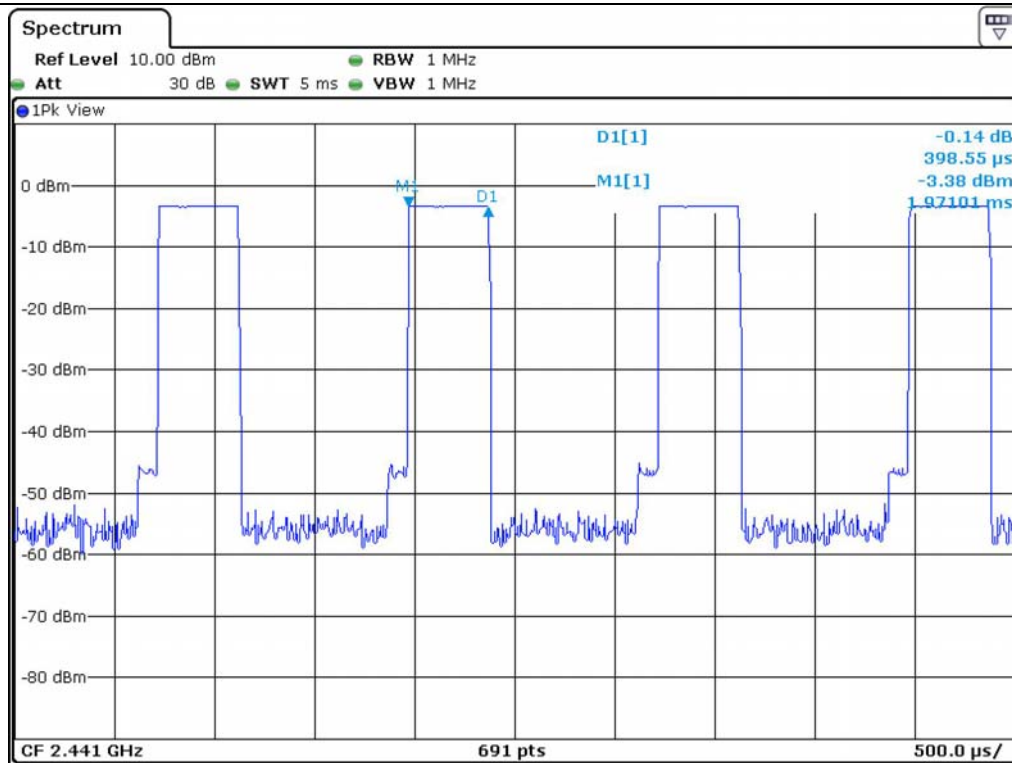
For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (= 1 600/2/79) for DH1, and 5.06 times (= 1 600/4/79) for DH3, and 3.38 times (= 1 600/6/79) for DH5.

Packet Type	Pulse Time (ms)	Hops per second with channels	Period Time (ms)	Total Dwell Time (ms)	Limit (ms)	Test Result
DH1	0.3986	10.13	31.6	127.60	400	PASS
DH3	1.6304	5.06	31.6	260.69	400	PASS
DH5	2.8986	3.38	31.6	309.59	400	PASS

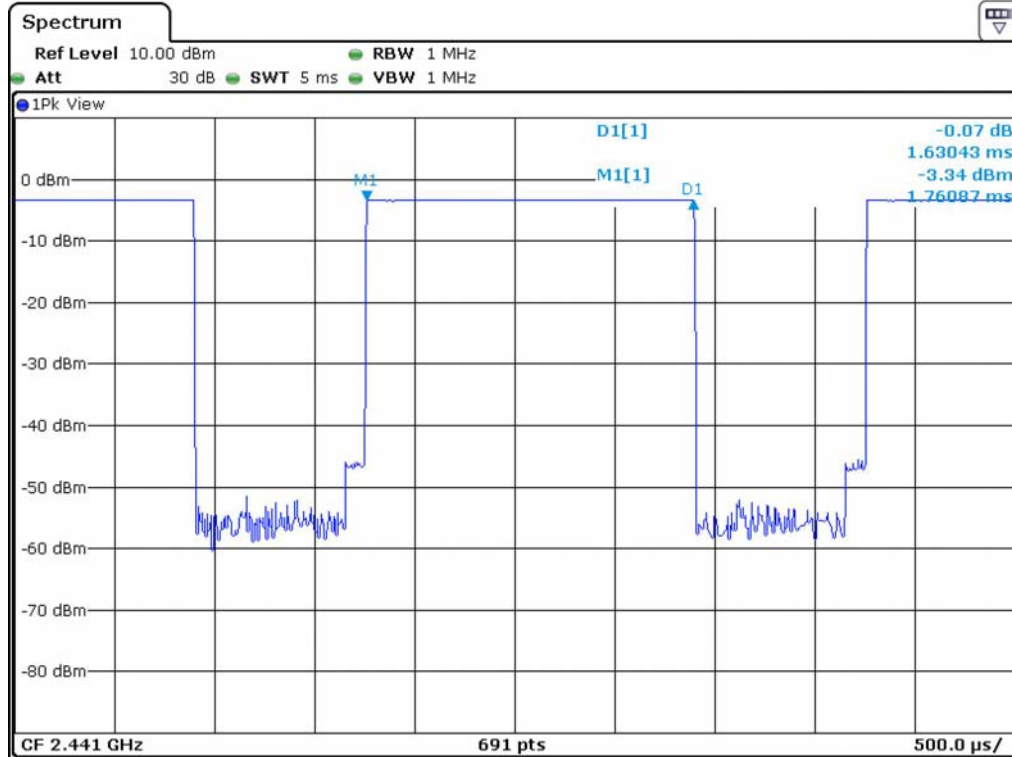
Total dwell time is calculated as following.

Total Dwell Time = Pulse time * Hops per second with channels * period time

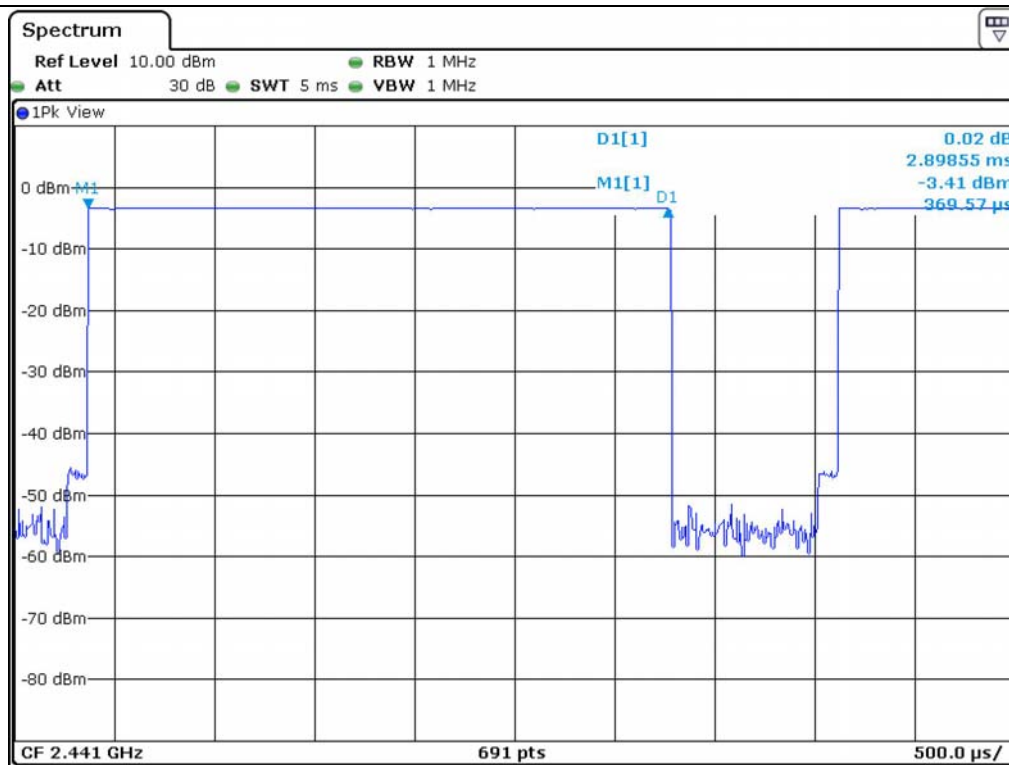

 Tested by: Hong-Kyu, Lee/ Engineer



DH1



DH3



DH5

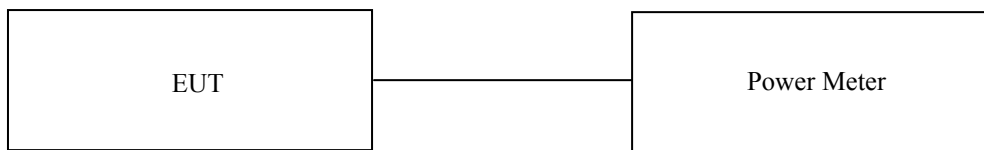
7.5 MAXIMUM PEAK OUTPUT POWER

7.5.1 Operating environment

Temperature : 25 °C
Relative humidity : 43 % R.H.

7.5.2 Test set-up

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



7.5.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ - FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)

All test equipment used is calibrated on a regular basis.

7.5.4 Test data

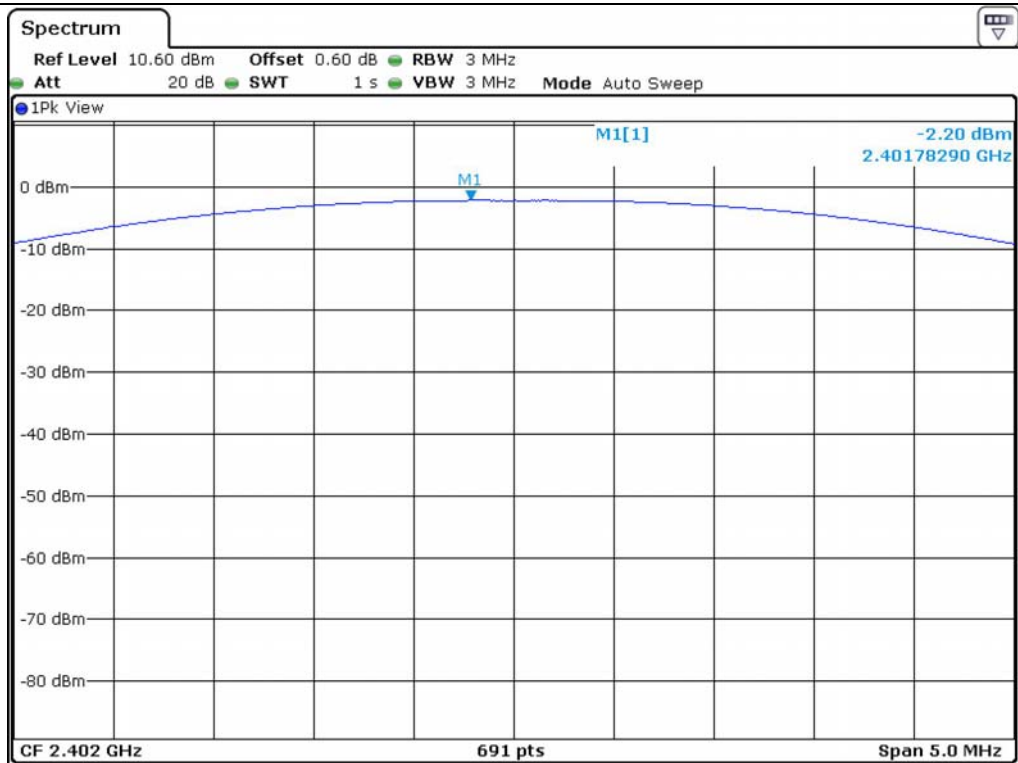
- Test Date : October 12, 2012
- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 402	-2.20	30	32.20
Middle	2 441	-2.61	30	32.61
High	2 480	-3.07	30	33.07

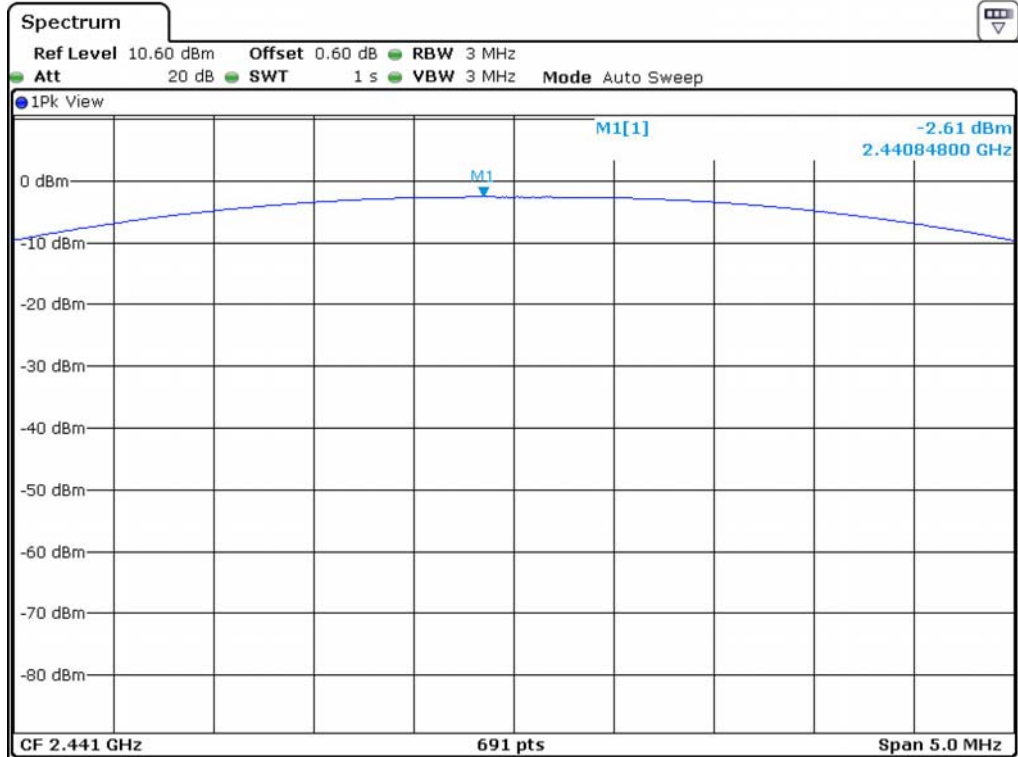
Remark. Margin = Limit – Measured value

01 30 21

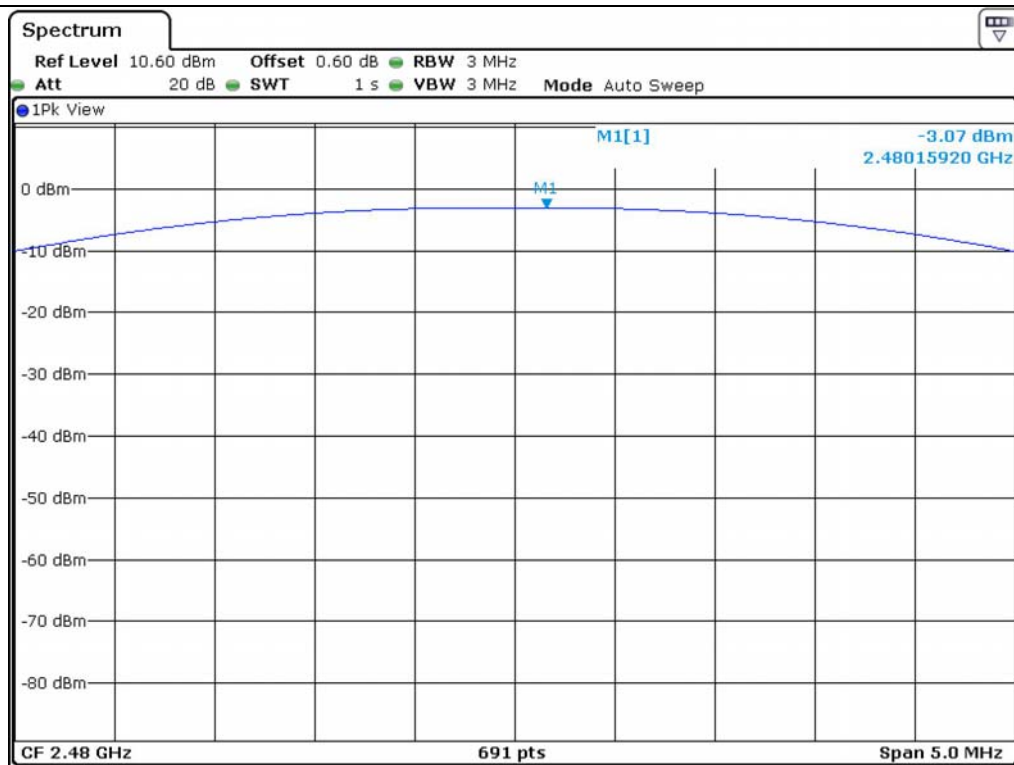
Tested by: Hong-Kyu, Lee/ Engineer



Low Channel



Middle Channel



High Channel

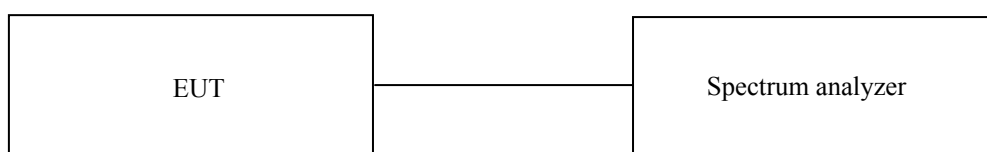
7.6 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

7.6.1 Operating environment

Temperature : 25 °C
Relative humidity : 43 % R.H.

7.6.2 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.



7.6.3 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 9 KHz to 25 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.

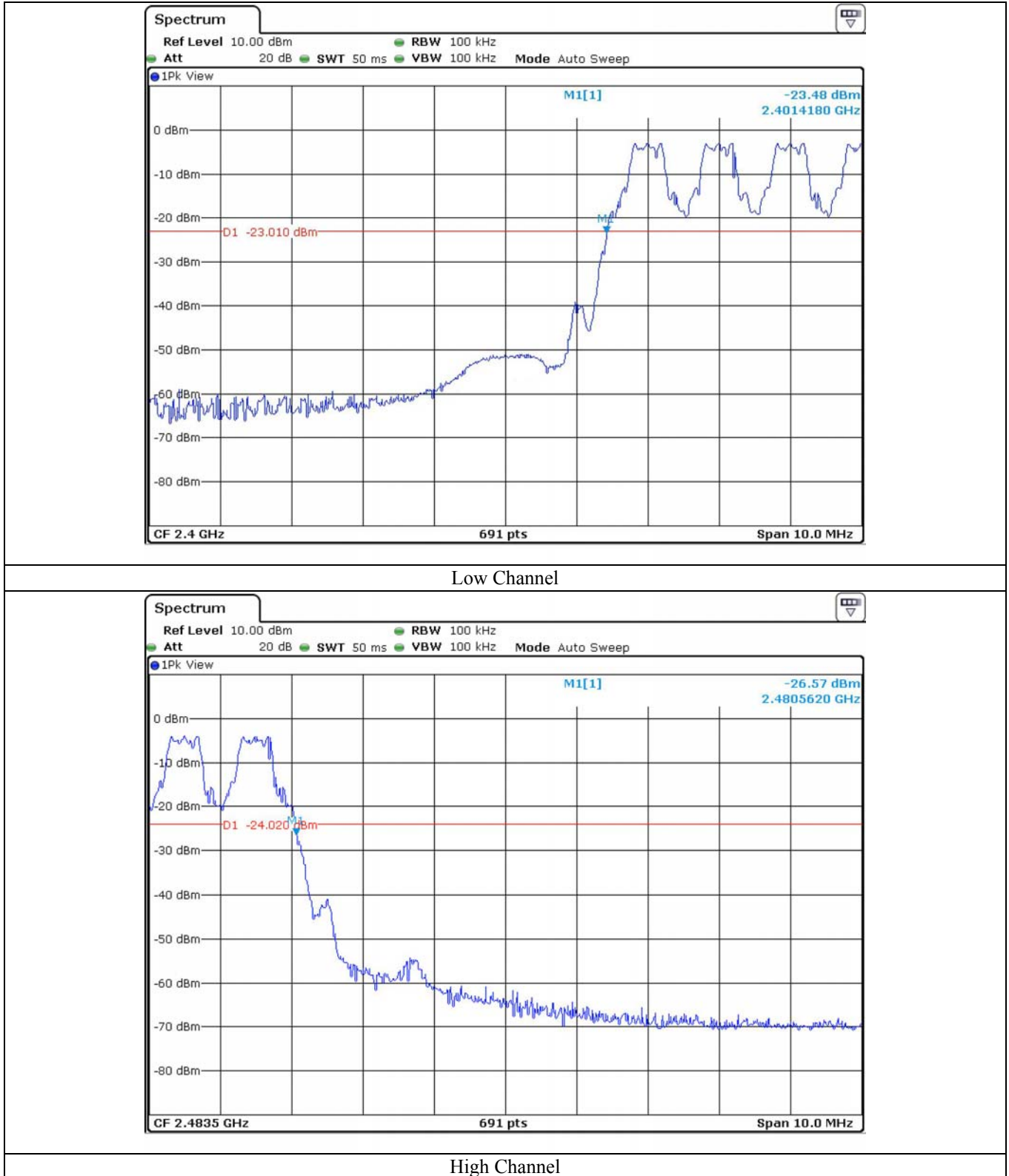
7.6.4 Test equipment used

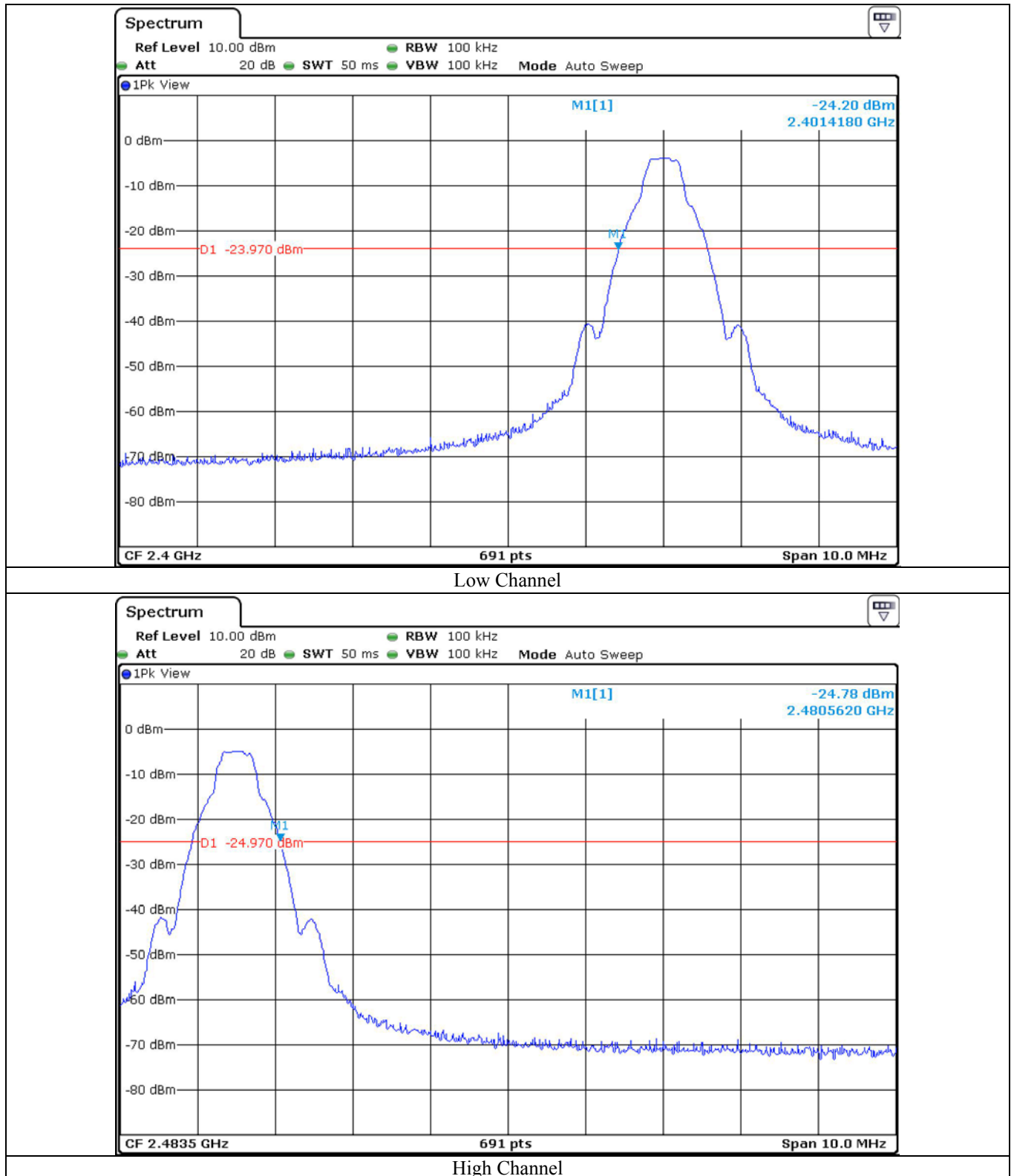
	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
□ -	ESCI	Rohde & Schwarz	EMI Test Receiver	101012	Feb. 06, 2012 (1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	Sep.11, 2012 (1Y)
■ -	310N	Sonoma Instrument	AMPLIFIER	312544	Oct 11, 2012(1Y)
■ -	FSV30	Rohde & Schwarz	Signal Analyzer	101372	May 31, 2012(1Y)
■ -	SCU-18	Rohde & Schwarz	PRE-AMPLIFIER	10041	Dec 15, 2011 (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
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	VULB9163-255	Apr. 24, 2012(2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	Jun. 17, 2011 (2Y)
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jun. 17, 2011 (2Y)
■ -	HFH2-Z2	Rohde & Schwarz	Loop Antenna	889 285 / 26	Nov. 08, 2010(2Y)

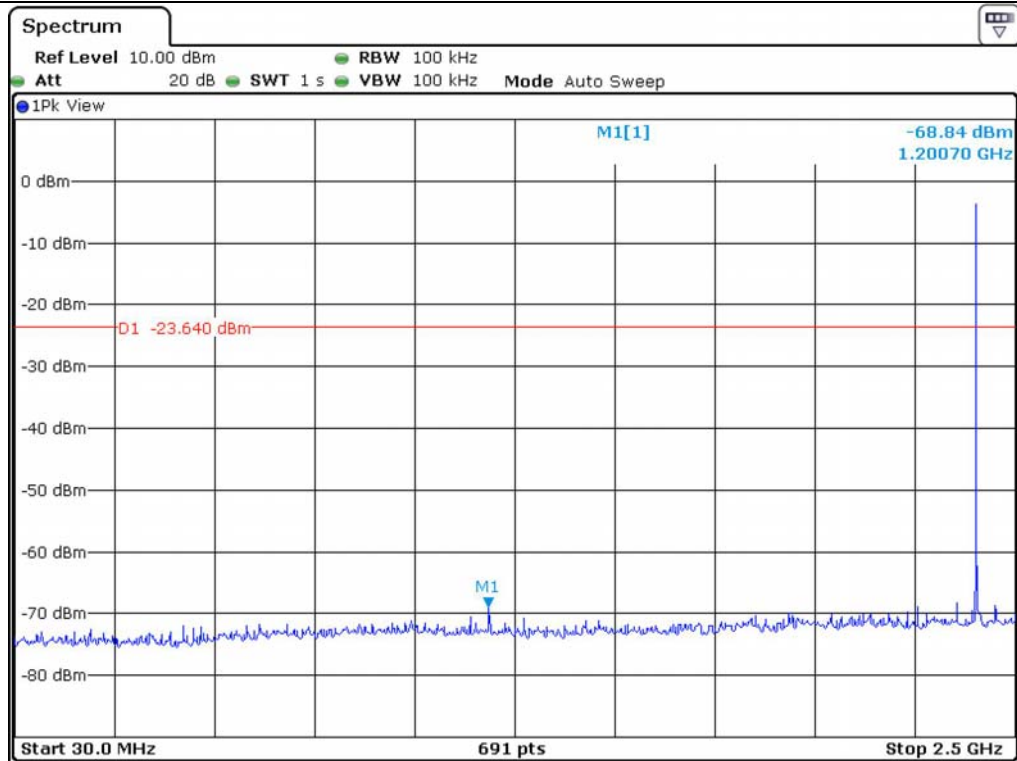
All test equipment used is calibrated on a regular basis.

7.6.5. Test data

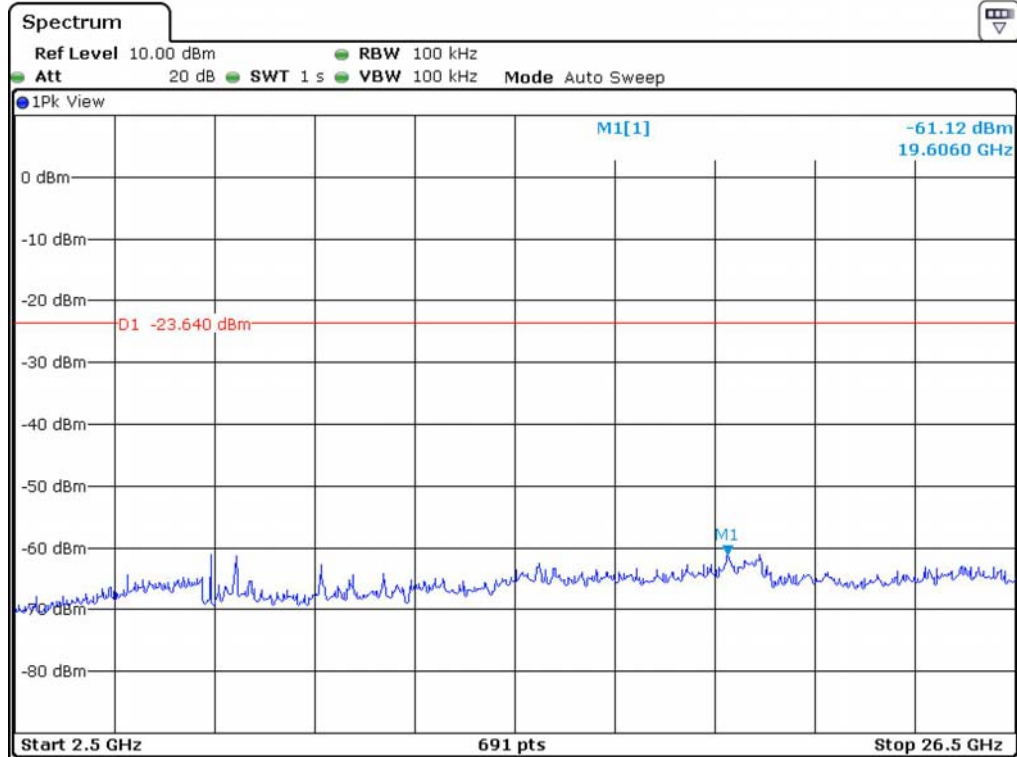
7.6.5.1. Test data for conducted emission



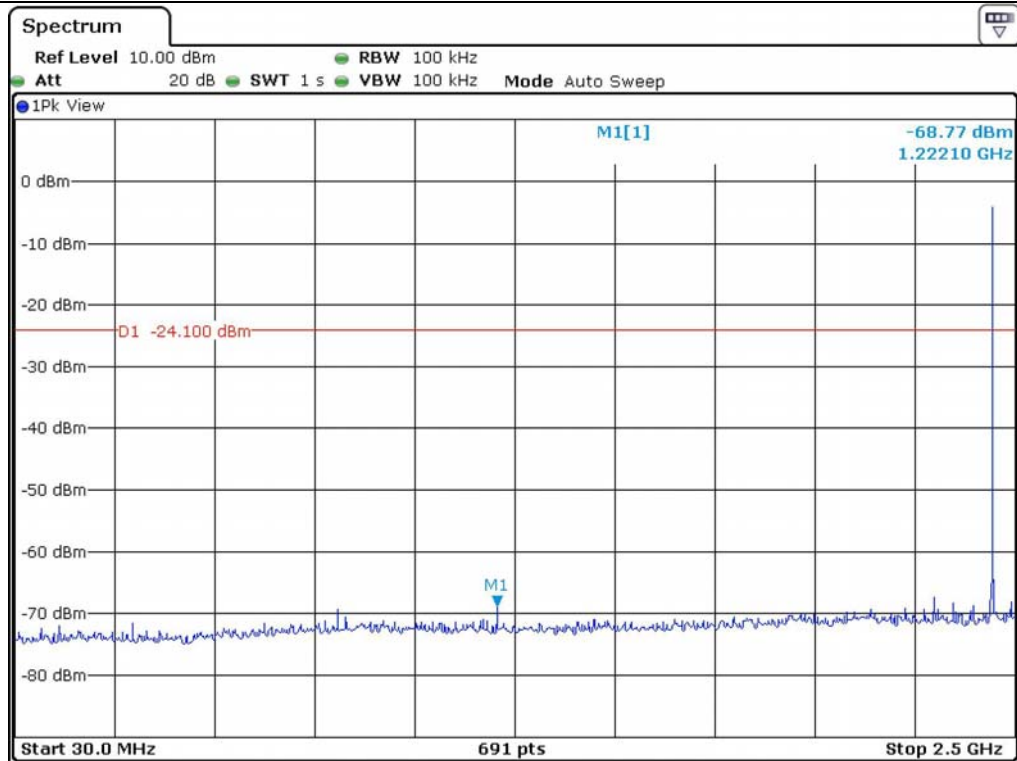




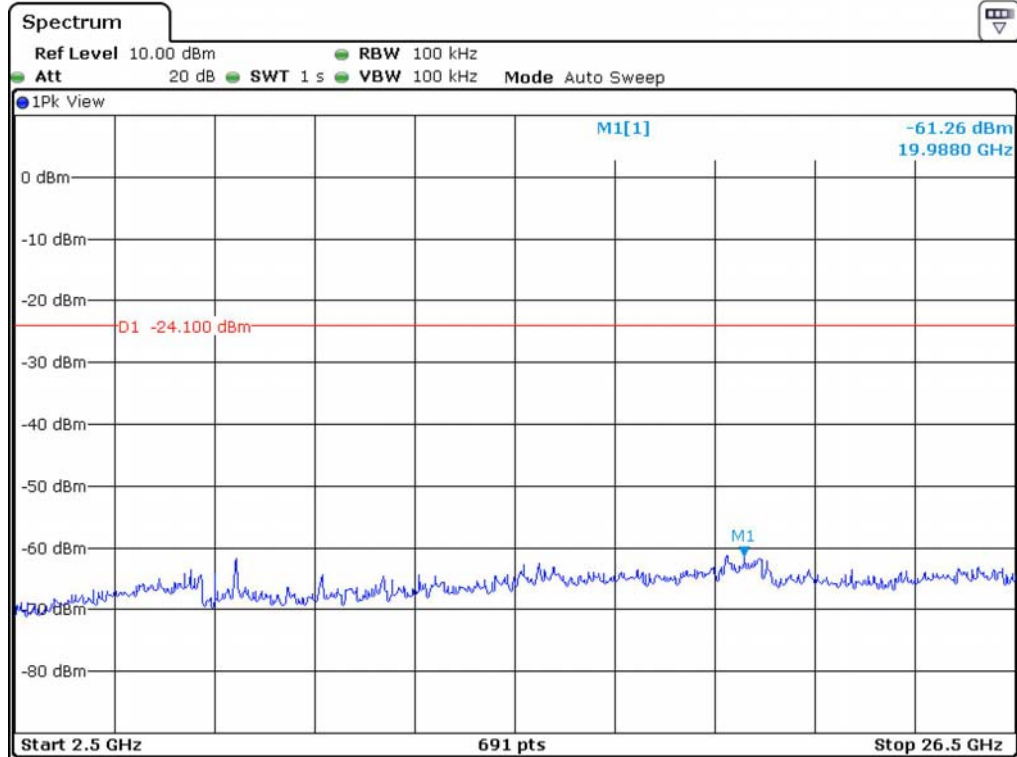
Low Channel



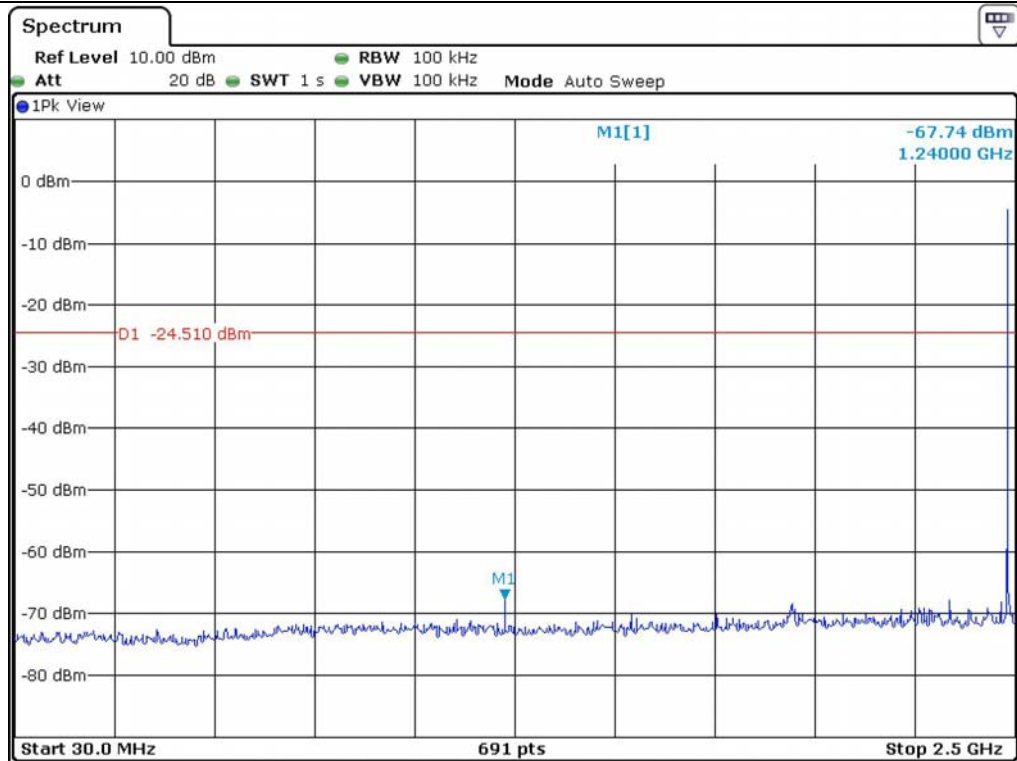
Low Channel



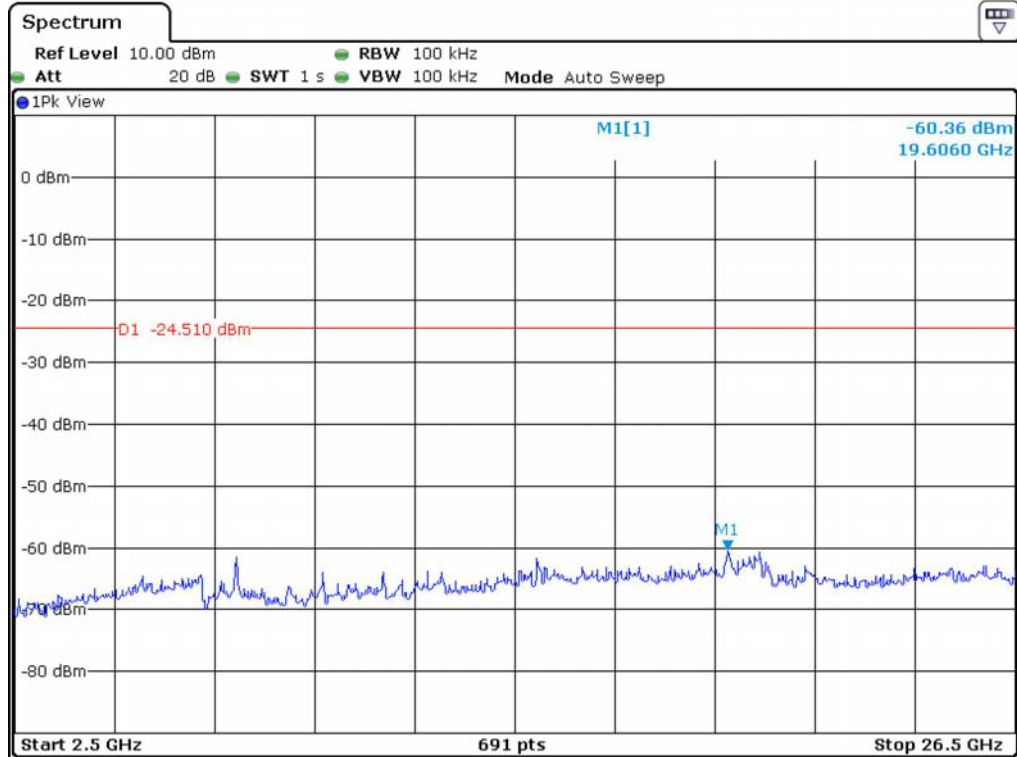
Middle Channel



Middle Channel



High Channel



High Channel

7.6.5.2. Test data for radiated emission

7.6.5.2.1. Radiated Emission which fall in the Restricted Band

- . Test Date : October 12, 2012
- . 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 : Low / 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									
2353.84	44.71	Peak	H	27.05	3.13	43.10	31.79	74.00	42.21
	37.09	Average	H				24.17	54.00	29.83
2317.76	46.67	Peak	V				33.75	74.00	40.25
	39.03	Average	V				26.11	54.00	27.89
Test Data for High Channel									
2498.69	43.12	Peak	H	27.31	3.17	43.10	30.50	74.00	43.50
	38.06	Average	H				25.44	54.00	28.56
2497.36	43.38	Peak	V				30.76	74.00	43.24
	38.19	Average	V				25.57	54.00	28.43

Tabulated test data for Restricted Band

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

$$\text{Margin} = \text{Limit} - \text{Total}$$

$$\text{Total} = \text{Reading} + \text{Antenna Factor} + \text{Cable loss} - \text{Pre-amplifier Gain}$$



Tested by: Hong-Kyu, Lee/ Engineer

7.6.5.2.2. Spurious & Harmonic Radiated Emission above 1 GHz

- Test Date : October 17, 2012
- 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 ~ 25 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									
2 402.00	95.51	Peak	H	27.09	3.16	43.10	82.66		82.66
	89.18	Peak	V				76.33		76.33
4 804.00*	52.64	Peak	H	31.07	4.10	42.80	45.01	74.00	28.99
	49.70	Average	H				42.07	54.00	11.93
	47.01	Peak	V				39.38	74.00	34.62
	41.68	Average	V				34.05	54.00	19.95
Test Data for Middle Channel									
2 441.00	93.56	Peak	H	27.19	3.16	43.10	81.97		80.81
	85.06	Peak	V				81.20		72.31
4 882.00*	51.30	Peak	H	31.19	4.12	42.80	43.81	74.00	30.19
	47.84	Average	H				40.35	54.00	13.65
	45.79	Peak	V				38.30	74.00	35.70
	40.56	Average	V				33.07	54.00	20.93

Tabulated test data for Restricted Band

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

Margin = Limit – Total

Total = Reading + Antenna Factor + Cable loss – Pre-amplifier Gain

-Continued

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 High Channel									
2 480.00	93.22	Peak	H	27.30	3.16	43.10	80.58		80.58
	86.44	Peak	V				73.53		73.53
4 960.00*	49.24	Peak	H	31.32	4.15	42.80	41.91	74.00	32.09
	46.40	Average	H				39.07	54.00	14.93
	44.24	Peak	V				36.91	74.00	37.09
	39.99	Average	V				32.66	54.00	21.34

Tabulated test data for Restricted Band

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

Margin = Limit – Total

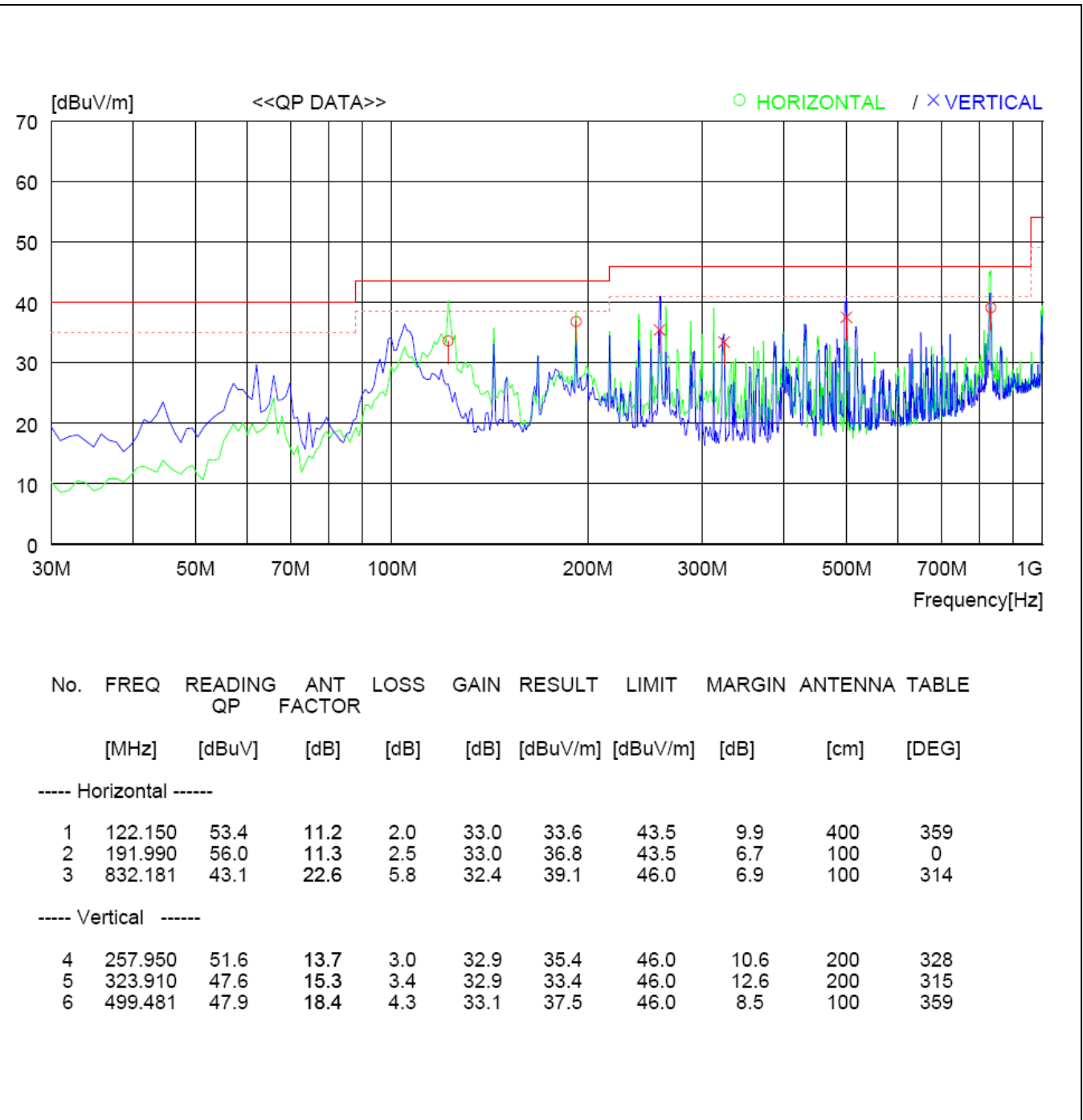
Total = Reading + Antenna Factor + Cable loss – Pre-amplifier Gain



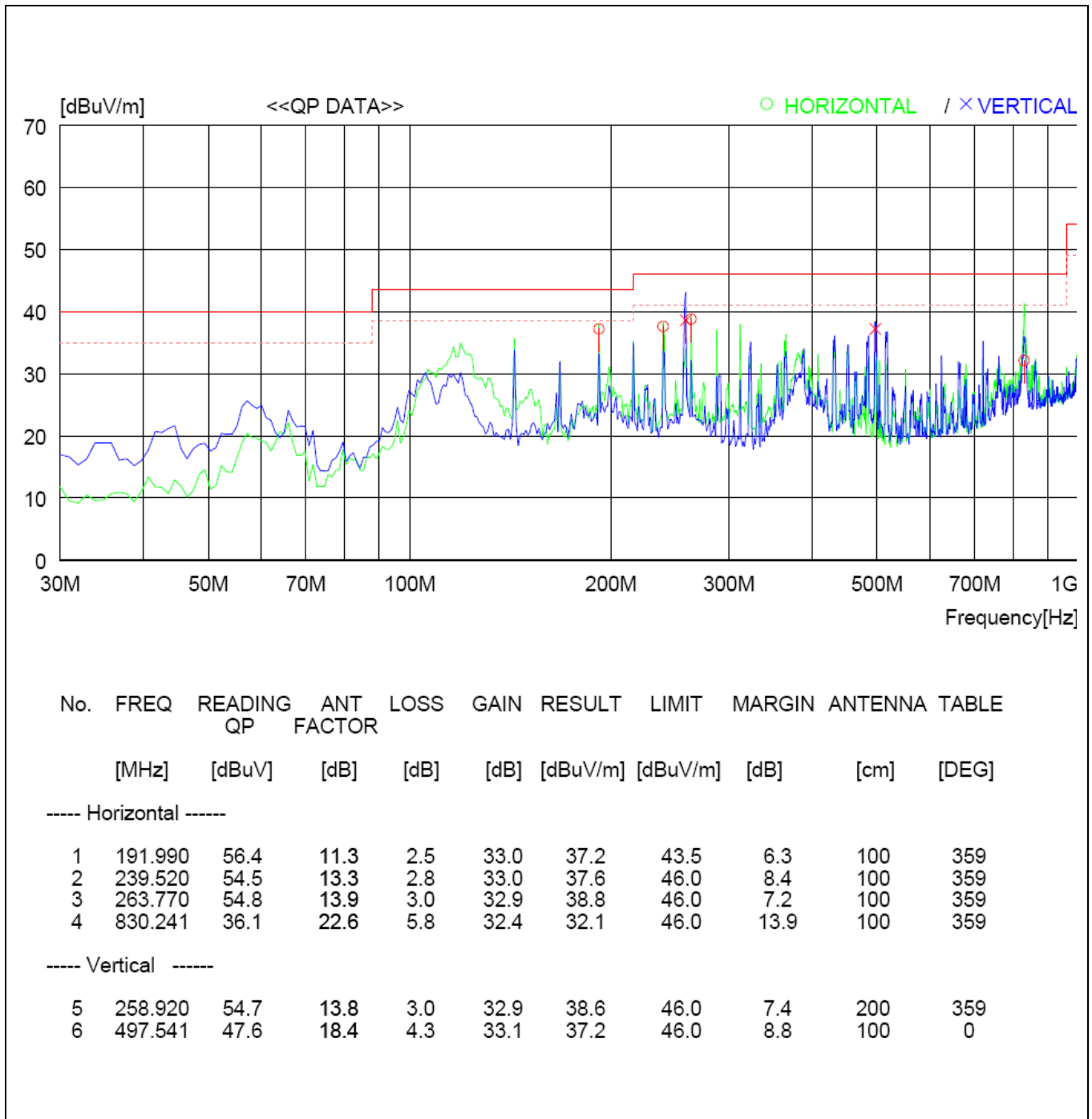
Tested by: Hong-Kyu, Lee/ Engineer

7.6.5.2.3. Spurious Radiated Emission below 1 GHz

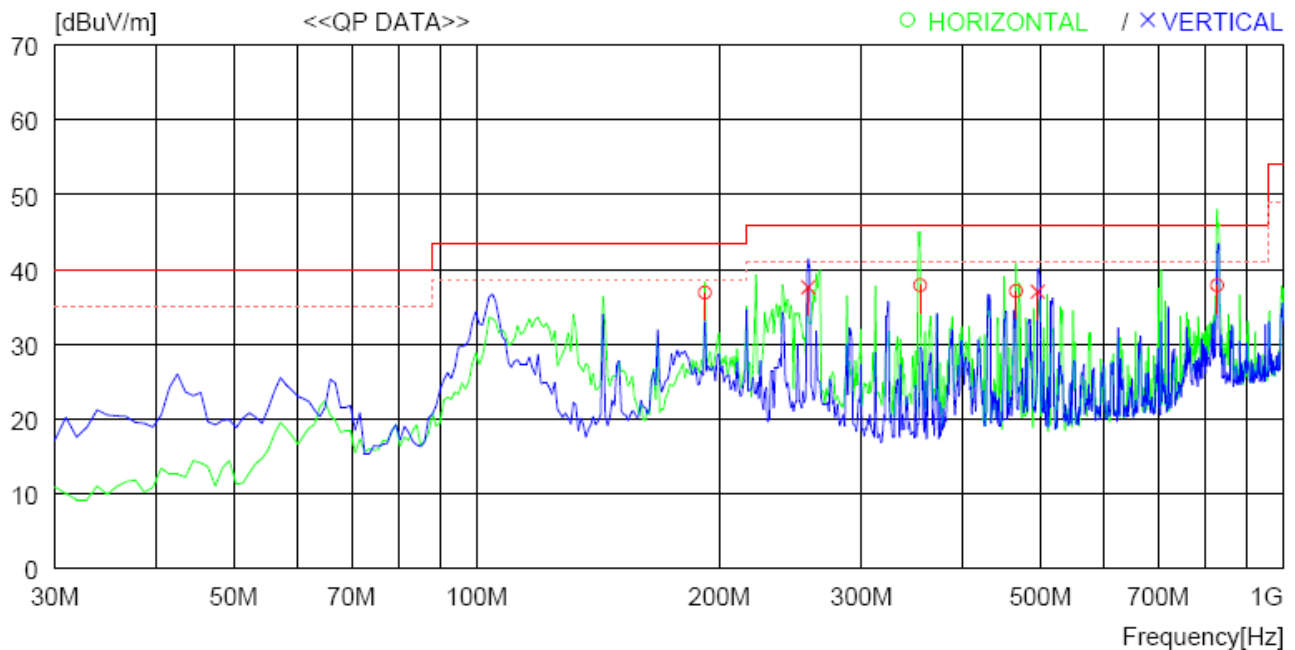
- Test Date : October 17, 2012
- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m
- Channel : Low



-. Channel : Middle



-. Channel : High



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	191.990	56.1	11.3	2.5	33.0	36.9	43.5	6.6	100	359
2	354.950	51.4	15.9	3.6	33.0	37.9	46.0	8.1	100	359
3	466.501	48.1	17.9	4.2	33.1	37.1	46.0	8.9	100	341
4	828.301	41.9	22.6	5.8	32.4	37.9	46.0	8.1	100	359
----- Vertical -----										
5	257.950	53.8	13.7	3.0	32.9	37.6	46.0	8.4	200	359
6	496.571	47.4	18.4	4.3	33.1	37.0	46.0	9.0	100	0

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

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

0 | 30 21

Tested by: Hong-Kyu, Lee/ Engineer

7.7 Conducted Emission Test

Humidity Level : 43 % R.H.

Temperature: 21 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107(a)

Type of Test : CLASS B

Result : PASSED BY 10.09 dB at 3.38 MHz under quasi-peak detector mode

EUT : Bluetooth Remote Control

Date: October 17, 2012

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Quasi-Peak (dBμV)		Margin (dB)
		Emission level	Limits	
0.15	N	53.22	66.00	12.78
0.16	H	51.66	65.73	14.07
0.31	H	39.44	60.11	20.67
1.61	H	37.12	56.00	18.88
1.62	N	36.36	56.00	19.64
3.38	H	45.91	56.00	10.09
Frequency (MHz)	Line	Average (dBμV)		Margin (dB)
		Emission level	Limits	
0.15	N	35.03	56.00	20.97
0.16	H	40.31	55.73	15.42
1.61	H	23.77	46.00	22.23
3.38	H	24.71	46.00	21.29

Line Conducted Emissions Tabulated Data

Remark: "H": Hot Line, "N": Neutral Line.

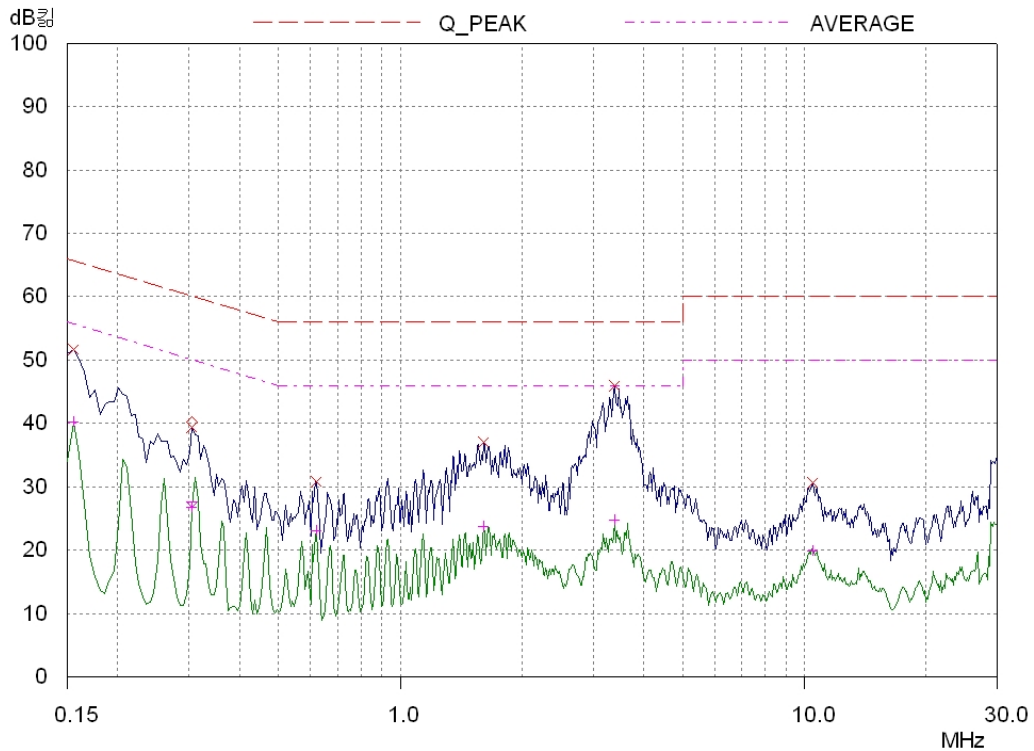
$$\text{Margin} = \text{Limit} - \text{Emission level}$$

$$\text{Emission level} = \text{Receiver reading} + \text{Cable Loss} + \text{Insertion loss of LISN}$$

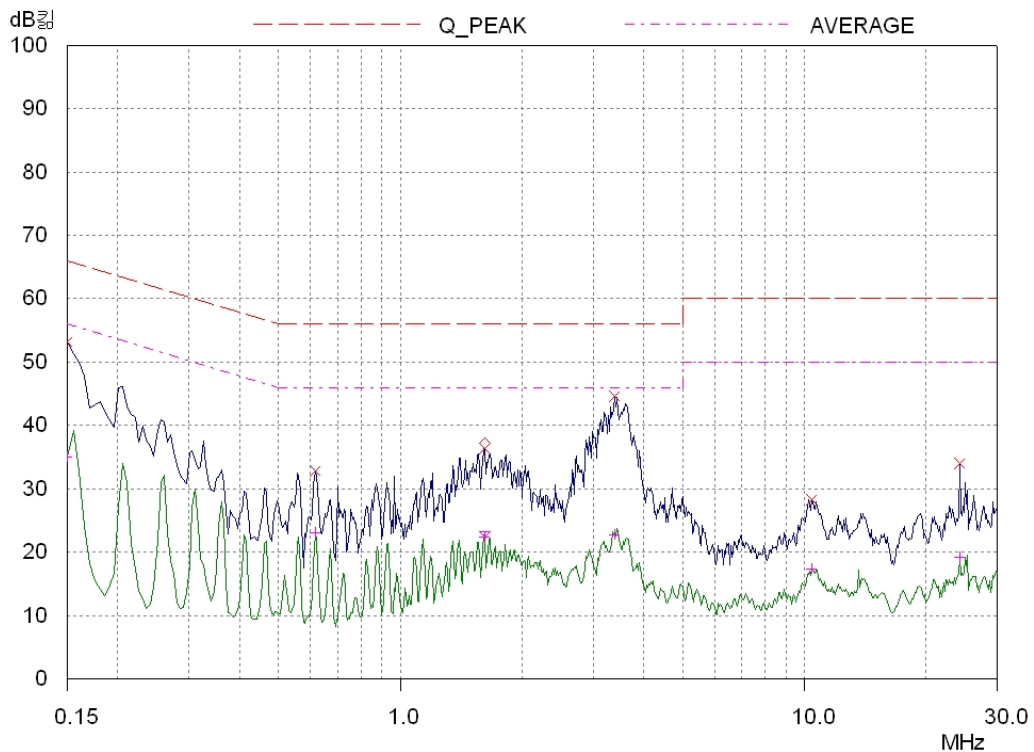
See next page for an overview sweep performed with quasi-peak and average detector.



Tested by: Hong-Kyu, Lee/ Engineer



HOT LINE



NEUTRAL LINE

8. RADIO FREQUENCY EXPOSURE

8.1 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.

8.2 EUT Description

Kind of EUT	Bluetooth Remote Control
Operating Frequency Band	<input type="checkbox"/> Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz <input type="checkbox"/> WLAN: 2 412 MHz ~ 2 462 MHz <input type="checkbox"/> WLAN: 5 180 MHz ~ 5 320 MHz / 5 500 MHz ~ 5 700 MHz <input type="checkbox"/> WLAN: 5 745 MHz ~ 5 825 MHz <input checked="" type="checkbox"/> Bluetooth: 2 402 MHz ~ 2 480 MHz
Device Category	<input checked="" type="checkbox"/> Portable (< 20 cm separation) <input type="checkbox"/> Mobile (> 20 cm separation) <input type="checkbox"/> Others
Max. Output Power	-2.20 dBm (0.60 mW)
Used Antenna	PCB Pattern Antenna
Used Antenna Gain	1.87 dBi
Exposure Evaluation Applied	<input type="checkbox"/> MPE <input type="checkbox"/> SAR <input checked="" type="checkbox"/> N/A

8.3 Test Result

According to the rule, §1.1307(b) (1) and §2.1093, portable devices using Bluetooth technology according to §15.247 are exempt from the regulation.

Also, SAR evaluation is not required for the PORTABLE Device while its maximum output power is lower than threshold:
 $60/f(\text{GHz}) = 60/2.480 = 24.19 \text{ mW}$.

So, the device meets the RF exposure requirement.