CONFORMANCE TEST REPORT
FOR
FCC 47 CFR, Part 15 Subpart C
and
Canada RSS-210

Report No.: 08-10-MAS-254-01

Client:	Ezurio Limited.
Product:	Bluetooth Intelligent Serial Module Version II, 3.3V
Model:	BTM403
FCC ID:	PI407B
IC ID:	1931B-BISM33
Manufacturer/supplier:	Sanmina-SCI (Thailand) Ltd
Date test item received:	2008/10/25
Date test campaign completed:	2008/10/29
Date of issue:	2008/11/11

Total number of pages of this test report: 17 pages
Total number of pages of photos: External photos 2 pages
Setup photos 2 pages

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Manufacturer	: Sanmina-SCI (Thailand) Ltd
Address	: 90 Moo 1 Tiwanon Road, Banmai Muang, Pathumthani 12000, Thailand
EUT	: Bluetooth Intelligent Serial Module Version II, 3.3V
Trade name	: EZURiO
Model No.	: BTM403
Power Source	: DC 5V (From DC Power Supply to Test Jig)
Regulations applied	: FCC 47 CFR, Part 15 Subpart C (2007)
	Canada RSS-210 Issue 7 (2007) / RSS-Gen Issue 2 (2007)

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④ MRA: Australia, Hong Kong, New Zealand, Singapore, USA, Japan, Korea, China, APLAC through CNLA

⑤ FCC Registration Number: 90588, 91094, 91095

NVLAP Lab Code 200133-0

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1 GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : Bluetooth Intelligent Serial Module Version II, 3.3V
b) Trade Name : EZURiO
c) Model No. : BTM403

※ The EUT changes PCB technology and add two SMD ferrites. This test report pretest some items to check the new EUT is still conform to the rule of FCC.

1.2 Characteristics of Device

The EUT is a Bluetooth Intelligent Serial Module Version II, based on the Bluetooth technology. Bluetooth is a short-range radio link intended to be a cable replacement between portable or fixed electronic devices. Bluetooth operates in the unlicensed ISM Band at 2.4GHz.

1.3 Test Methodology

All testing were performed according to the procedures in ANSI C63.4 (2003) an FCC CFR 47 Part 2 and Part 15.

1.4 Modifiction List of EUT

N/A

1.5 Test Facility

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kweishan Hsiang, Taoyuan, Taiwan, R.O.C.
This site has been accreditation as a FCC filing site.

1.6 Test Summary

Requirement	FCC Paragraph #	IC Paragraph #	Test Pass
Spurious Emissions	15.247 (d)	RSS-210_A8.5	☒
Radiated Emission	15.247 (d)	RSS-210_2.2	☒

2 PROVISIONS APPLICABLE

2.1 Definition

Unintentional radiator:

A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:

A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device :

A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

Intentional radiator:

A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Requirement for Compliance

(1) Radiated Emission Requirement

For unintentional device, according to §15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated dB μV/m	Radiated μV/m
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
above 960	3	54.0	500

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

According to 15.247 (d), radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

2.3 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.25
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio / TV technician for help.

To comply with the FCC RF exposure compliance requirement, this device and its antenna must not be co-located or operating to conjunction with any other antenna or transmitter.

3. SYSTEM TEST CONFIGURATION

3.1 Justification

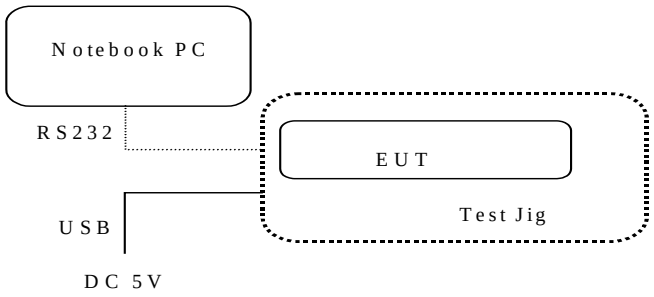
For the purposes of this test report ancillary equipment is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT during the test. Notebook PC was used to control the RF channel under the hightest, middle and lowest frequency and transmit the maximun RF power. Customer would not use it. But never the less ancillary equipment can influence the test results.

3.2 Devices for Tested System

Device	Manufacture	Model	Cable Description
* Bluetooth Intelligent Serial Module Version II, 3.3V	Sanmina-SCI (Thailand) Ltd	BTM403	1.0m*1, Unshielded Power Line 0.7m*1, Unshielded Signal Line
Test Jig	Ezurio	N/A	1.5m Unshielded Signal Line/USB 1.2m Unshielded Signal Line/RS232
Notebook PC	HP	nx6320	3.3m*1, Unshielded Power Line/Adaptor 1.7m Unshielded Signal Line

Remark

1. "*" means equipment under test.



Note: A HP notebook performs the control test mode. The notebook removes away after the control command is ready.

2. Software setting: Bluetest.exe
   Power setting (Ext, Int): (255, 58)

4 RADIATED EMISSION MEASUREMENT

4.1 Applicable Standard

For unintentional radiator, the radiated emission shall comply with §15.109(a).

For intentional radiators, according to §15.247 (a), operation under this provision is limited to frequency hopping and digitally modulated, and the out band emission shall be comply with § 15.247 (c)

4.2 Measurement Procedure

A.Preliminary Measurement For Portable Devices.

For movable devices, the following procedure was performed to determine the maximum emission axis of EUT (X,Y and Z axis):

1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
2. With the receiving antennna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
3. Compare the results derived from above two steps. The axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.
4. The position in which the maximum noise occurred was “Y axis”. (Please see the test setup photos)

B. Final Measurement

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively. Turn on EUT and make sure that it is in continuous operating function.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a semi-anechoic chamber to determine the accurate frequencies of higher emissions and then each selected frequency is precisely measured. As the same purpose, for emission measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission measured below and above 1 GHz, set the spectrum analyzer on a 120 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.

Figure 1 : Frequencies measured below 1 GHz configuration

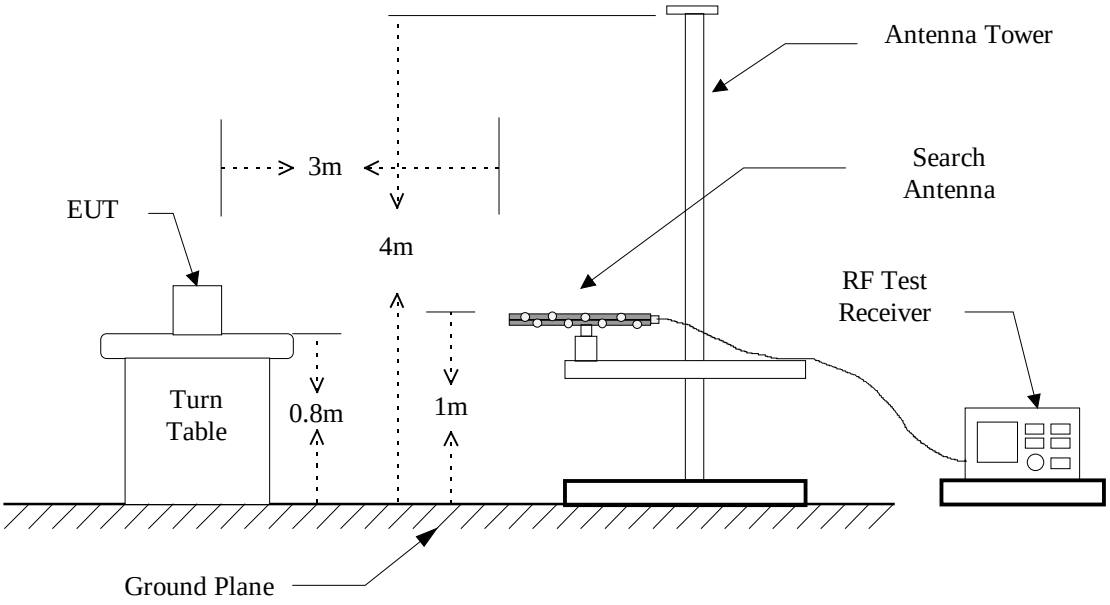
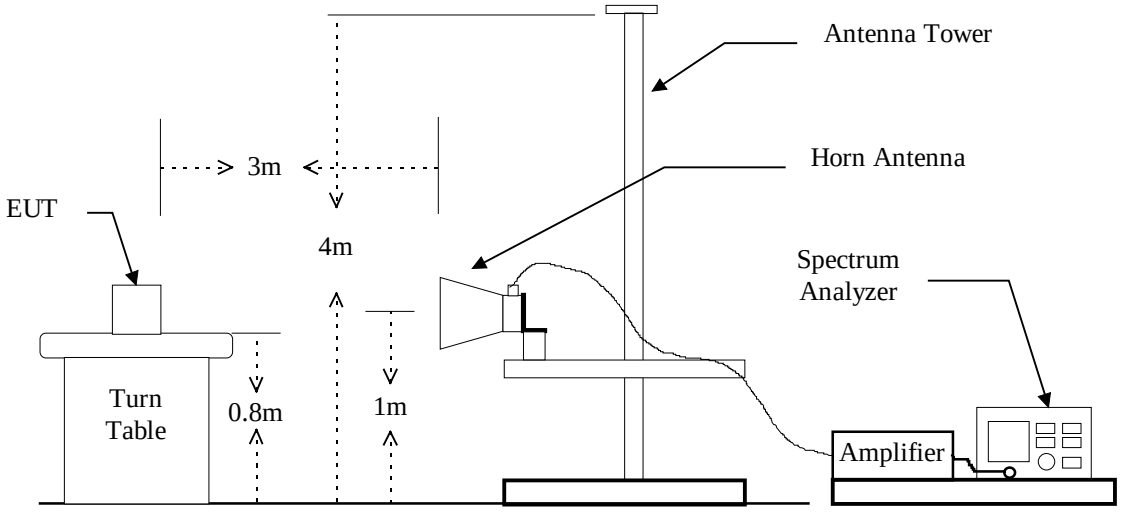


Figure 2 : Frequencies measured above 1 GHz configuration



4.3 Measuring Instrument

The following instrument are used for radiated emissions measurement :

Equipment	Manufacturer	Model No.	Next Cal. Due
EMI Test Receiver	R&S	ESIB7	07/17/2009
Spectrum Analyzer	Rohde & Schwarz	FSU46	11/23/2008
Horn Antenna	EMCO	3115	06/12/2009
BiLog Antenna	Schaffner	CBL 6112B	07/03/2009
Horn Antenna	COM-POWER	AH-118	04/20/2009
Preamplifier	Hewlett-Packard	8449B	09/21/2009
SYNESIZED SWEEPER	AGILENT	83640B	09/21/2009

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	300 kHz
	RF Test Receiver	Peak	120 kHz	300 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz

4.4 Radiated Emission Data

4.4.1 RF Portion

a) Channel 0

Operation Mode : Transmitting
Fundamental Frequency : 2402 MHz
Test Date : Oct. 25, 2008 Temperature : 23℃ Humidity : 67%

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
1201.000	---	---	---	---	-15.0	---	---	74.0	54.0
4804.000	57.4	38.9	56.6	38.9	0.6	58.0	39.5	74.0	54.0
12010.000	---	---	---	---	1.1	---	---	74.0	54.0
16216.000	---	---	---	---	11.2	---	---	74.0	54.0

b) Channel 39

Fundamental Frequency : 2441 MHz

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
1220.500	---	---	---	---	-15.0	---	---	74.0	54.0
4882.000	57.5	45.8	58.3	46.0	0.5	58.8	46.5	74.0	54.0
7323.000	---	---	---	---	2.9	---	---	74.0	54.0
12205.000	---	---	---	---	1.1	---	---	74.0	54.0
19528.000	---	---	---	---	10.7	---	---	74.0	54.0

c) Channel 78

Fundamental Frequency : 2480 MHz

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
1240.000	---	---	---	---	-15.0	---	---	74.0	54.0
4960.000	56.6	42.9	57.3	43.4	0.5	57.8	43.9	74.0	54.0
7440.000	---	---	---	---	2.9	---	---	74.0	54.0
12400.000	---	---	---	---	4.2	---	---	74.0	54.0
19840.000	---	---	---	---	10.7	---	---	74.0	54.0
22320.000	---	---	---	---	10.5	---	---	74.0	54.0

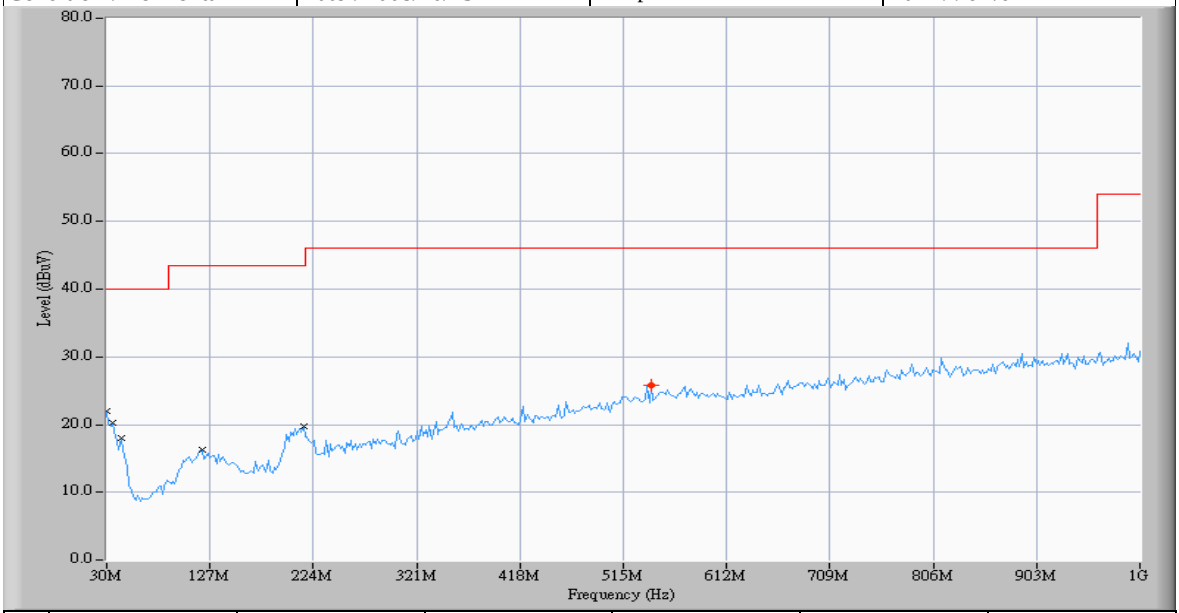
Note :

1. Item of margin shown in above table refer to average limit.
2. Remark "---" means that the emissions level is too low to be measured.
3. Item "Margin" referred to Average limit while there is only peak result.
4. The radiation emissions have been measured to beyond the tenth harmonic of the fundamental frequency and show the significant frequencies, other means the value is too low to be detected.

4.4.2 Other Emission

4.4.2.1 below 1GHz

EUT :	Model : BTM403	Status : TX-H	
Condition : Horizontal	Date : 2008/10/25	Temp. : 23℃	Humi. : 67%



	Freq (MHz)	QP Level (dBuV)	Factor (dB/m)	QP Result (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dB)
1	30.000	2.2	19.7	21.9	40.0	-18.1
2	35.832	3.3	17.0	20.3	40.0	-19.7
3	43.607	4.8	13.1	17.9	40.0	-22.1
4	119.419	1.7	14.6	16.3	43.5	-27.2
5	214.669	6.7	13.1	19.8	43.5	-23.7
6	541.242	2.6	23.1	25.7	46.0	-20.3

EUT :	Model : BTM403	Status : TX-V	
Condition : Vertical	Date : 2008/10/25	Temp. : 23℃	Humi. : 67%

	Freq (MHz)	QP Level (dBuV)	Factor (dB/m)	QP Result (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dB)
1	30.000	5.6	19.7	25.3	40.0	-14.7
2	39.719	10.7	15.1	25.8	40.0	-14.2
3	47.495	21.4	11.1	32.5	40.0	-7.5
4	113.587	11.2	14.2	25.4	43.5	-18.1
5	117.475	12.7	14.4	27.1	43.5	-16.4
6	138.858	15.1	13.9	29.0	43.5	-14.5

4.4.2.2 above 1GHz (TX Mode)

4.4.2.2.1 Fundamental Frequency: 2402 MHz

Frequency (MHz)	Reading (dBuV)				Correct Factor (dB/m)	Result @3m (dBuV/m)		Limit @3m (dBuV/m)	
	Horizontal		Vertical						
	Peak	AVG	Peak	AVG		Peak	AVG	Peak	AVG
1601.960	54.8	50.9	57.7	55.4	-11.0	46.7	44.4	74.0	54.0

4.4.2.2.2 Fundamental Frequency: 2441 MHz

Frequency (MHz)	Reading (dBuV)				Correct Factor (dB/m)	Result @3m (dBuV/m)		Limit @3m (dBuV/m)	
	Horizontal		Vertical						
	Peak	AVG	Peak	AVG		Peak	AVG	Peak	AVG
1440.739	52.2	47.3	52.4	47.6	-12.3	40.1	35.3	74.0	54.0
1628.008	56.4	53.4	57.2	54.8	-11.0	46.2	43.8	74.0	54.0

4.4.2.2.3 Fundamental Frequency: 2480 MHz

Frequency (MHz)	Reading (dBuV)				Correct Factor (dB/m)	Result @3m (dBuV/m)		Limit @3m (dBuV/m)	
	Horizontal		Vertical						
	Peak	AVG	Peak	AVG		Peak	AVG	Peak	AVG
1441.987	52.6	47.0	51.7	48.1	-12.3	40.3	35.8	74.0	54.0
1654.008	56.2	53.5	56.9	54.9	-11.0	45.9	43.9	74.0	54.0

4.4.2.3 above 1GHz (RX Mode)

No emission found.

Note:
1. Place of Measurement: Measuring site of the ETC.
2. If the data table appeared symbol of "***" means the value was too low to be measured.
3. The estimated measurement uncertainty of the result measurement is
   ±4.6dB (30MHz≦f<300MHz).
   ±4.4dB (300MHz≦f<1000MHz).
   ±4.1dB (1GHz≦f≦18GHz).
4. Remark “---” means that the emissions level is too low to be measured.

4.4.3 Radiated Measurement at Bandedge with Fundamental Frequencies

(A)

Channel 0

Operation Mode : Transmitting

Fundamental Frequency : 2402 MHz

Test Date : Oct. 25, 2008 Temperature : 23℃ Humidity : 67%

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
2331.923	26.9	15.5	27.6	15.6	30.3	57.9	45.9	74.0	54.0

Note:

The result is the highest value of radiated emission from restrict band of 2310 ~2390 MHz.

(B)

Channel 78

Operation Mode : Transmitting

Fundamental Frequency : 2480 MHz

Test Date : Oct. 25, 2008 Temperature : 23℃ Humidity : 67%

Frequency (MHz)	Reading (dBuV) H Peak	H Ave	V Peak	V Ave	Factor (dB) Corr.	Result @3m (dBuV/m) Peak (H/V Max.)	Result @3m (dBuV/m) Ave (H/V Max.)	Limit @3m (dBuV/m) Peak	Limit @3m (dBuV/m) Ave.
2483.500	30.6	20.5	32.7	22.7	30.3	63.0	53.0	74.0	54.0

Note:

The result is the highest value of radiated emission from restrict band of 2483.5 ~2500 MHz.

4.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss(if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

where

Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Amplifier Gain