FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment	:	**2.4GHz Wireless USB Transmitter**
Model No.	:	**RF-2600 Transmitter**
Filing Type	:	**New Application**
Applicant	:	**Gstar industrial Co., Ltd.** 3F, No.646, Sec 5, Chung-Hsin Rd, Sang-Chung City, Taipei, Taiwan
FCC ID	:	**UDQ-RF2600TX**
Manufacturer	:	**He Guang Electronic Co., Ltd.** Shan Xia Industrial District. HenLi Town, DongGuan City, Guang Dong Province, China
Received Date	:	Jan. 27, 2010
Final Test Date	:	Jun. 21, 2010

Statement

Test result included is only for the wireless 2.4GHz part of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart C**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

SPORTON International Inc.

No. 52 Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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History of This Test Report

Original Issue Date: Aug. 04, 2010

Report No.: FR012031-01

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment : 2.4GHz Wireless USB Transmitter

Model No. : RF-2600 Transmitter

Applicant : Gstar industrial Co., Ltd.
3F, No.646, Sec 5, Chung-Hsin Rd,
Sang-Chung City, Taipei, Taiwan

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jan. 27, 2010 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Wayne Hsu 2010.8.9

Wayne Hsu ViceManager

SPORTON International Inc.

No. 52 Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

1. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
3.1	15.207	AC Power Line Conducted Emissions	Complies	8.99 dB
3.2	15.247(b)(3)	Maximum Peak Conducted Output Power	Complies	19.65 dB
3.3	15.247(e)	Power Spectral Density	Complies	6.38 dB
3.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
3.5	15.247(d)	Radiated Emissions	Complies	2.80 dB
3.6	15.247(d)	Band Edge Emissions	Complies	1.00 dB
3.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Peak Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	$\pm 8.5\times10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

2. GENERAL INFORMATION

2.1. Product Details

Only the radio detail of wireless is shown in this report.

For more detailed features description, please refer to the manufacturer's specifications or user's manual.

Items	Description
Power Type	From host
Modulation	FHSS (GFSK)
Data Rate (Mbps)	GFSK: 1
Frequency Range	2400 ~ 2483.5MHz
Channel Number	4
Channel Band Width (99%)	2.44 MHz
Conducted Output Power	10.35 dBm

2.2. Table for Filed Antenna

Ant.	Antenna Type	Connector	Gain (dBi)
1	Printed Antenna	Fix on board	1.00

2.3. Table for Carrier Frequencies

Frequency Band	Channel No.	Frequency
2400~2483.5MHz	1	2406 MHz
	2	2416 MHz
	3	2464 MHz
	4	2472 MHz

2.4. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Channel
AC Power Line Conducted Emissions	Normal Mode	-
Maximum Peak Conducted Output Power Power Spectral Density 6dB Spectrum Bandwidth	GFSK	1/3/4
Radiated Emissions 9kHz~1GHz	Normal Mode	-
Radiated Emissions 1GHz~10th Harmonic	GFSK	1/3/4
Band Edge Emissions	GFSK	1/4

2.5. Table for Testing Locations

Test Site No.	Site Category	Location
CO01-HY	Conduction	Hwa Ya
TH01-HY	OVEN Room	Hwa Ya
03CH03-HY	SAC	Hwa Ya

Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

2.6. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D505	N/A
Test Fixture	-	-	-

2.7. Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters of wireless

Test Software Version	Hyper Terminal		
Frequency	2406 MHz	2464 MHz	2472 MHz
GFSK	default	default	default

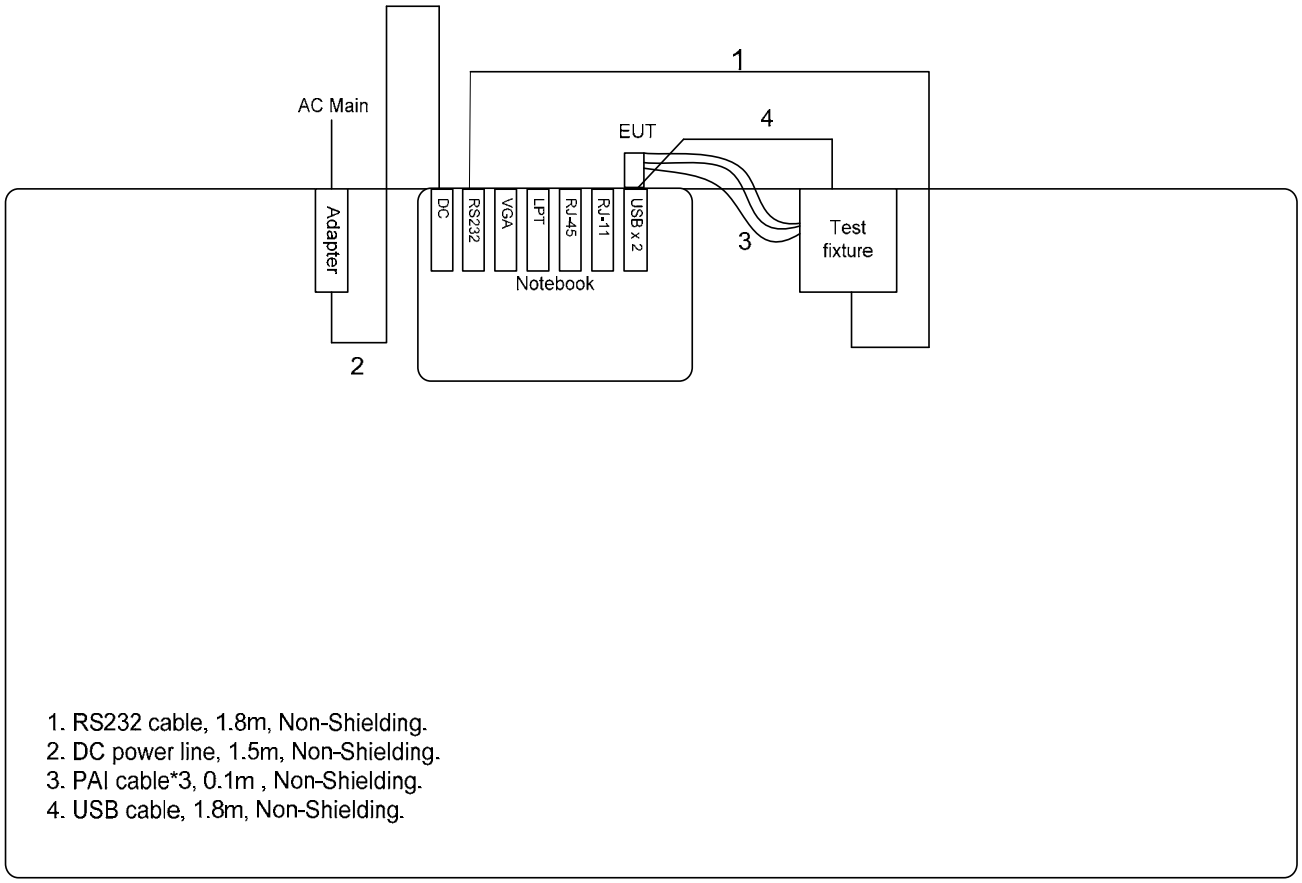
2.8. EUT Operation during Test

-Executed “Hyper Terminal” to keep transmitting signals at fixed frequency.

2.9. Test Configurations

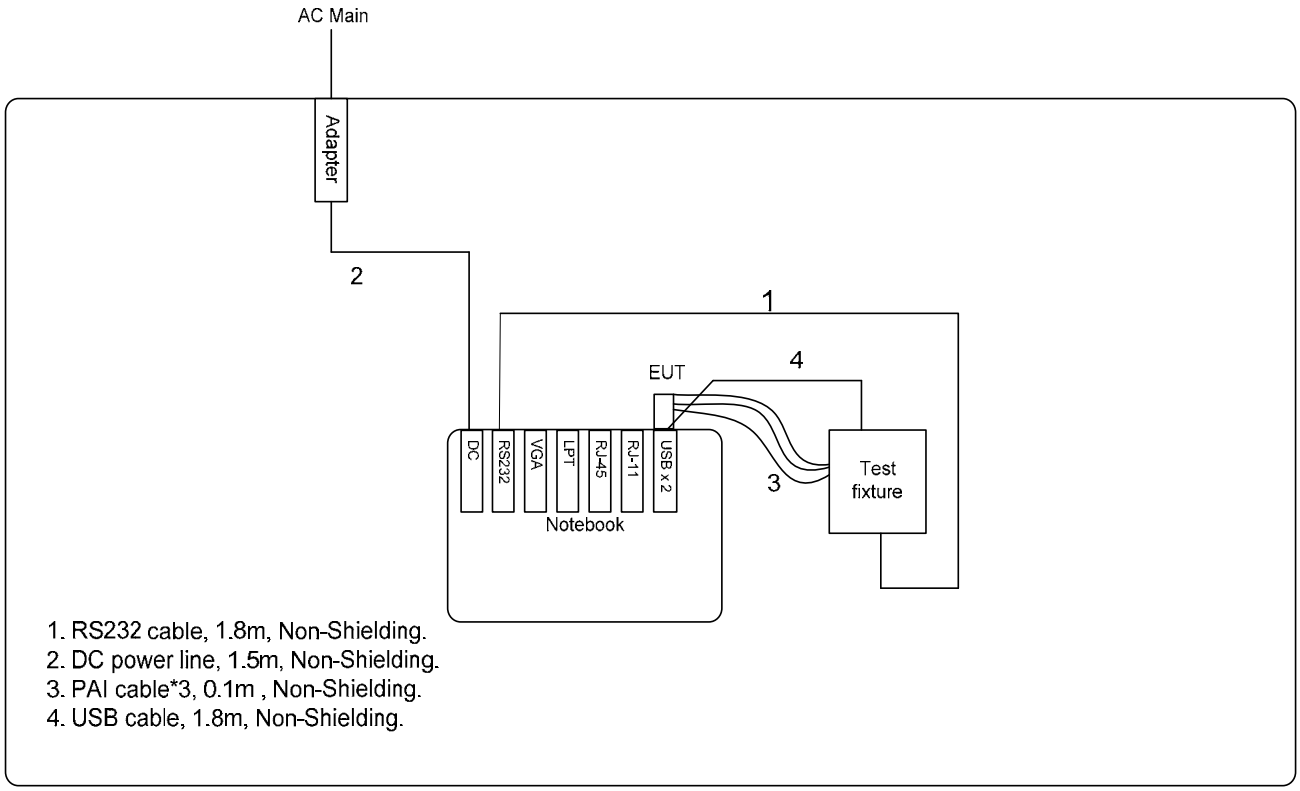
2.9.1. Radiation Emissions Test Configuration

Below 9kHz~1GHz



1. RS232 cable, 1.8m, Non-Shielding.
2. DC power line, 1.5m, Non-Shielding.
3. PAI cable*3, 0.1m , Non-Shielding.
4. USB cable, 1.8m, Non-Shielding.

Above 1GHz


AC Main
Adapter
2
1
4
EUT
DC
RS232
VGA
LPT
RJ-45
RJ-11
USB x2
Notebook
3
Test fixture
1. RS232 cable, 1.8m, Non-Shielding.
2. DC power line, 1.5m, Non-Shielding.
3. PAI cable*3, 0.1m , Non-Shielding.
4. USB cable, 1.8m, Non-Shielding.

3. TEST RESULT

3.1. AC Power Line Conducted Emissions Measurement

3.1.1. Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

CLASS B

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

3.1.2. Measuring Instruments and Setting

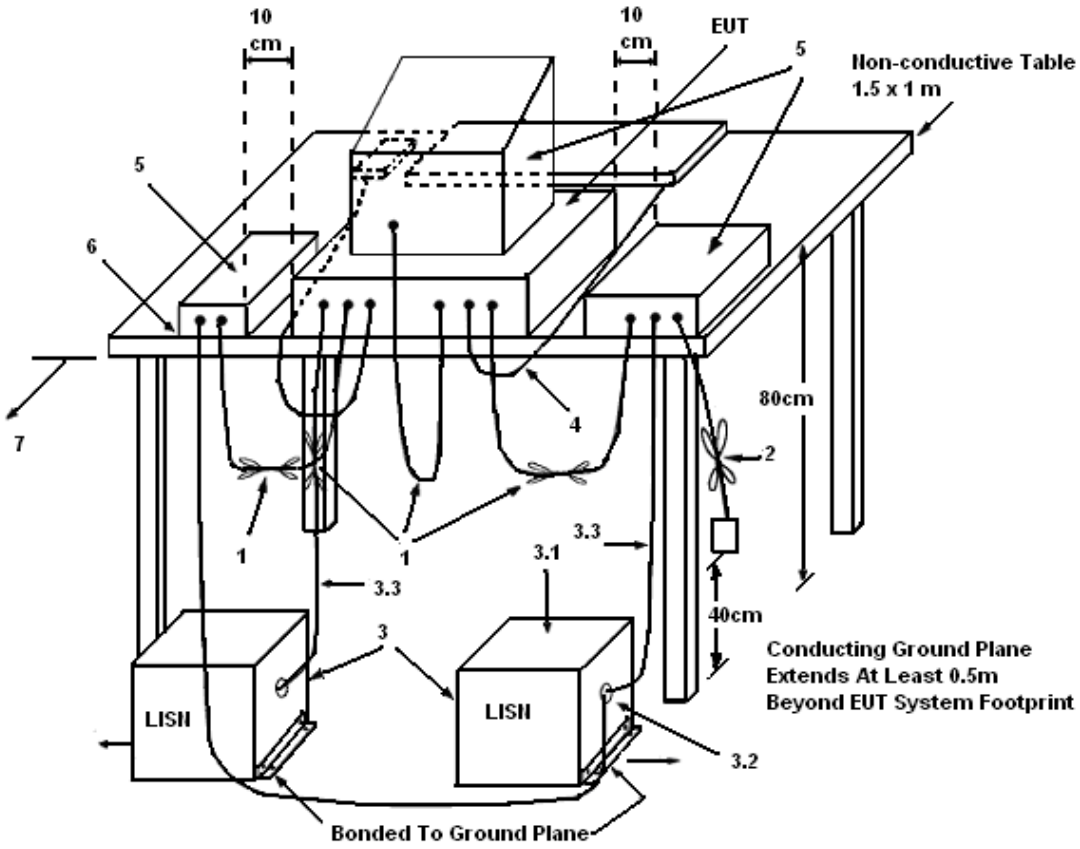
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.1.3. Test Procedures

1. The EUT warm up about 15 minutes then start test.
2. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. The measurement has to be done between each power line and ground at the power terminal.

3.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

3.1.5. Test Deviation

There is no deviation with the original standard.

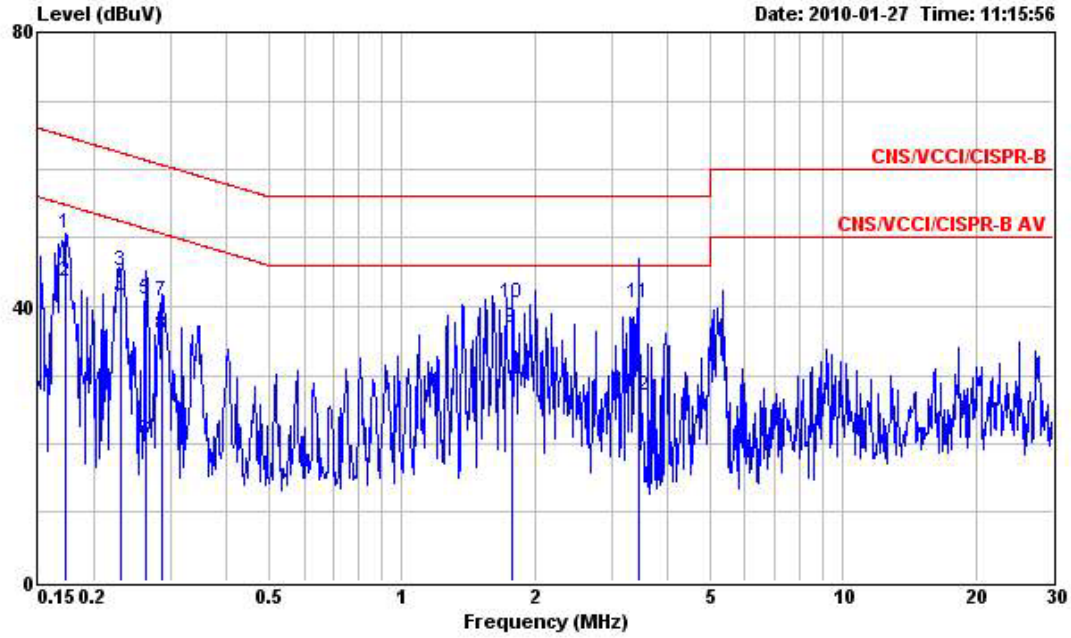
3.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

3.1.7. Results of AC Power Line Conducted Emissions Measurement

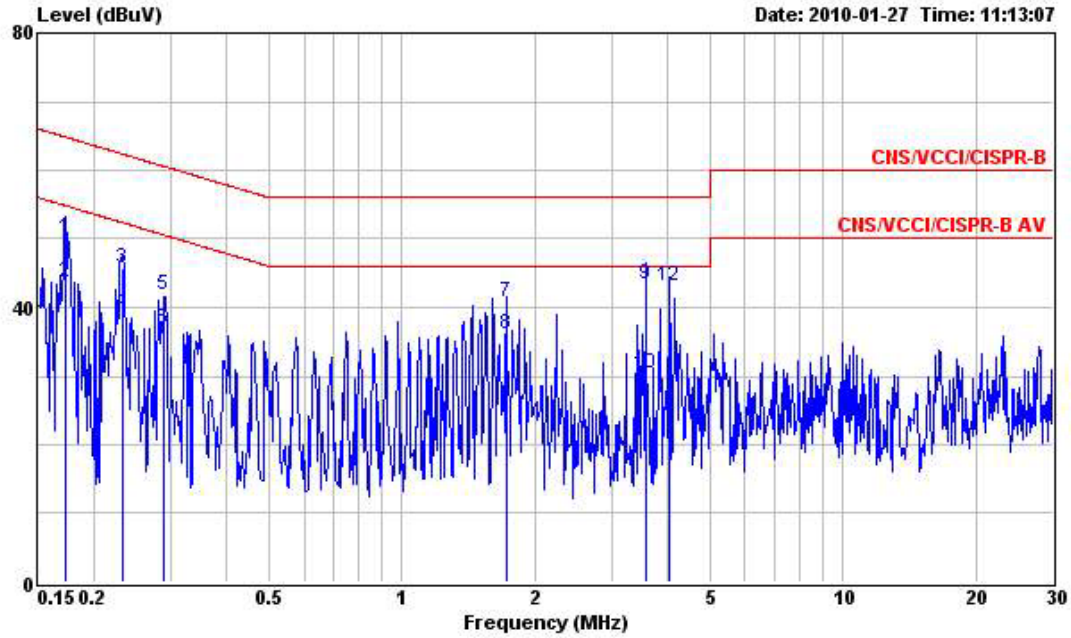
Final Test Date	Jan. 27, 2010	**Test Site No.**	CO01-HY
Temperature	24℃	**Humidity**	49.8%
Test Engineer	David	**Configuration**	Normal Mode

Line



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.173	50.65	-14.17	64.82	50.50	0.08	0.07	QP
2	0.173	43.66	-11.16	54.82	43.51	0.08	0.07	Average
3	0.231	45.10	-17.32	62.42	44.96	0.08	0.06	QP
4	0.231	40.96	-11.46	52.42	40.82	0.08	0.06	Average
5	0.263	41.09	-20.25	61.34	40.95	0.08	0.06	QP
6	0.263	20.39	-30.95	51.34	20.25	0.08	0.06	Average
7	0.286	40.81	-19.83	60.64	40.65	0.09	0.07	QP
8	0.286	35.78	-14.86	50.64	35.62	0.09	0.07	Average
9	1.780	37.01	-8.99	46.00	36.76	0.13	0.12	Average
10	1.780	40.41	-15.59	56.00	40.16	0.13	0.12	QP
11	3.450	40.56	-15.44	56.00	40.26	0.16	0.14	QP
12	3.450	27.11	-18.89	46.00	26.81	0.16	0.14	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.173	50.03	-14.79	64.82	49.90	0.06	0.07	QP
2	0.173	43.53	-11.29	54.82	43.40	0.06	0.07	Average
3	0.232	45.74	-16.64	62.38	45.62	0.06	0.06	QP
4	0.232	39.15	-13.23	52.38	39.03	0.06	0.06	Average
5	0.288	41.90	-18.68	60.58	41.76	0.07	0.07	QP
6	0.288	36.87	-13.71	50.58	36.73	0.07	0.07	Average
7	1.723	40.70	-15.30	56.00	40.47	0.11	0.12	QP
8	1.723	36.05	-9.95	46.00	35.82	0.11	0.12	Average
9	3.564	43.32	-12.68	56.00	43.05	0.13	0.14	QP
10	3.564	30.43	-15.57	46.00	30.16	0.13	0.14	Average
11	4.023	26.79	-19.21	46.00	26.51	0.14	0.14	Average
12	4.023	43.06	-12.94	56.00	42.78	0.14	0.14	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

3.2. Maximum Peak Output Power Measurement

3.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

3.2.2. Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of the power meter.

3.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with Measurement of Digital Transmission Systems Operating under Section 15.247.

3.2.4. Test Setup Layout

3.2.5. Test Deviation

There is no deviation with the original standard.

3.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.2.7. Test Result of Maximum Peak Output Power Measurement

Final Test Date	Jun. 18, 2010	**Test Site No.**	TH01-HY
Temperature	24℃	**Humidity**	60%
Test Engineer	Ian	**Configuration**	GFSK

Channel	**Frequency**	**Conducted Power (dBm)**	**Max. Limit (dBm)**	**Result**
1	2406 MHz	10.35	30.00	**Complies**
3	2464 MHz	9.61	30.00	**Complies**
4	2472 MHz	9.49	30.00	**Complies**

3.3. Power Spectral Density Measurement

3.3.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

3.3.2. Measuring Instruments and Setting

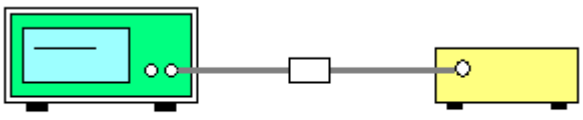
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	1.5MHz
RB	3 kHz
VB	30 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	500s

3.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 3kHz and VBW to 30kHz. Set Detector to Peak, Trace to Max Hold.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum.
4. Set the span to 1.5MHz and the sweep time to 500s and record the maximum peak value.

3.3.4. Test Setup Layout



3.3.5. Test Deviation

There is no deviation with the original standard.

3.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.3.7. Test Result of Power Spectral Density Measurement

Final Test Date	Jun. 18, 2010	**Test Site No.**	TH01-HY
Temperature	24℃	**Humidity**	60%
Test Engineer	Ian	**Configuration**	GFSK

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2406 MHz	-0.35	8.00	**Complies**
3	2464 MHz	1.08	8.00	**Complies**
4	2472 MHz	1.62	8.00	**Complies**

Power Density Plot on Configuration / 2406 MHz

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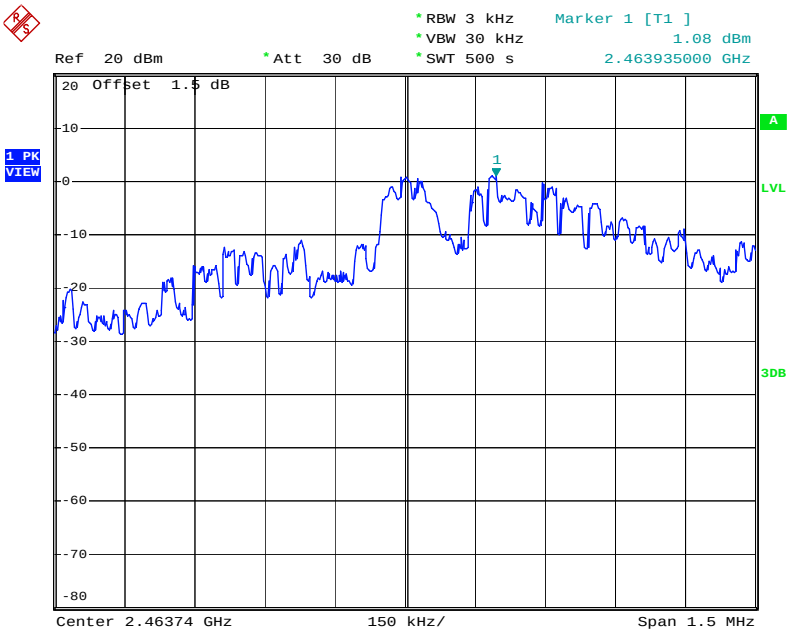
Power Density Plot on Configuration / 2464 MHz



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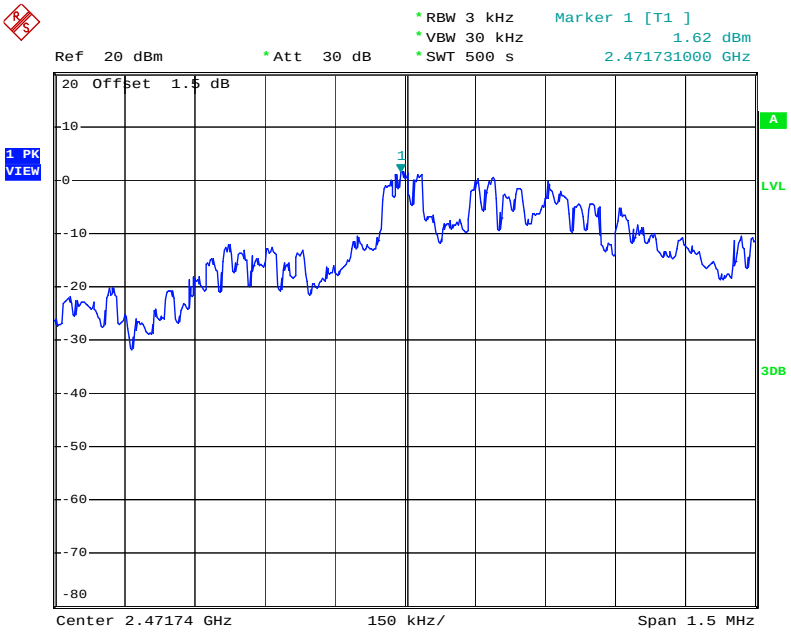
Power Density Plot on Configuration / 2472 MHz



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3.4. 6dB Spectrum Bandwidth Measurement

3.4.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

3.4.2. Measuring Instruments and Setting

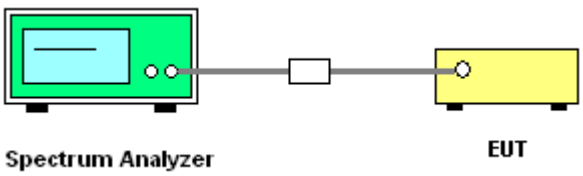
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
3. Measured the spectrum width with power higher than 6dB below carrier.

3.4.4. Test Setup Layout



3.4.5. Test Deviation

There is no deviation with the original standard.

3.4.6. EUT Operation during Test

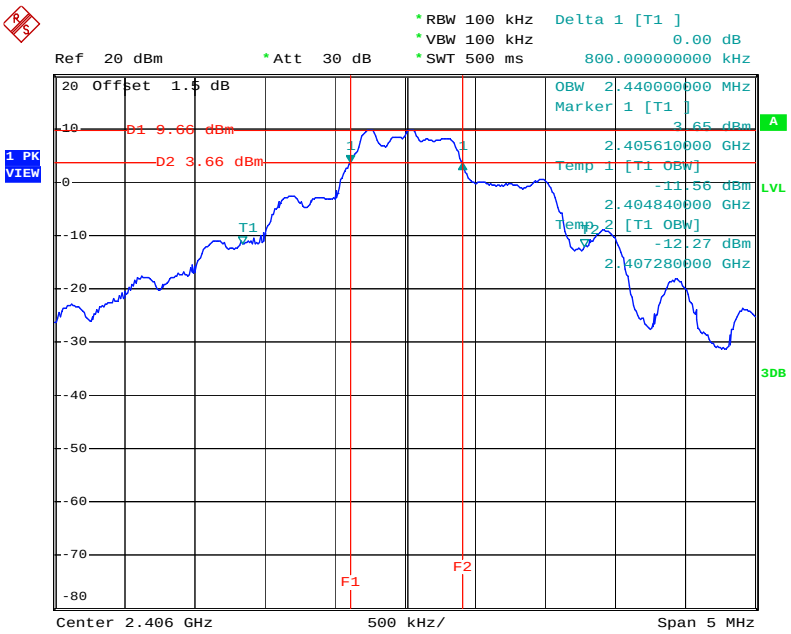
The EUT was programmed to be in continuously transmitting mode.

3.4.7. Test Result of 6dB Spectrum Bandwidth

Final Test Date	Jun. 18, 2010	**Test Site No.**	TH01-HY
Temperature	24℃	**Humidity**	60%
Test Engineer	Ian	**Configuration**	GFSK

Channel	**Frequency**	**6dB Bandwidth (kHz)**	**99% Occupied Bandwidth (MHz)**	**Min. Limit (kHz)**	**Test Result**
1	2406 MHz	800.00	2.44	500	**Complies**
3	2464 MHz	810.00	1.92	500	**Complies**
4	2472 MHz	820.00	1.91	500	**Complies**

6 dB Bandwidth Plot on Configuration / 2406 MHz



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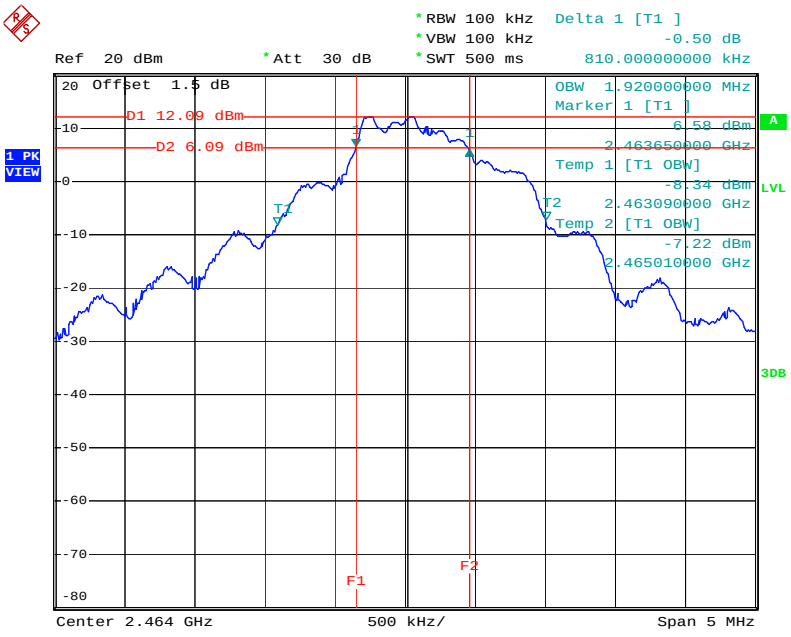
6 dB Bandwidth Plot on Configuration / 2464 MHz



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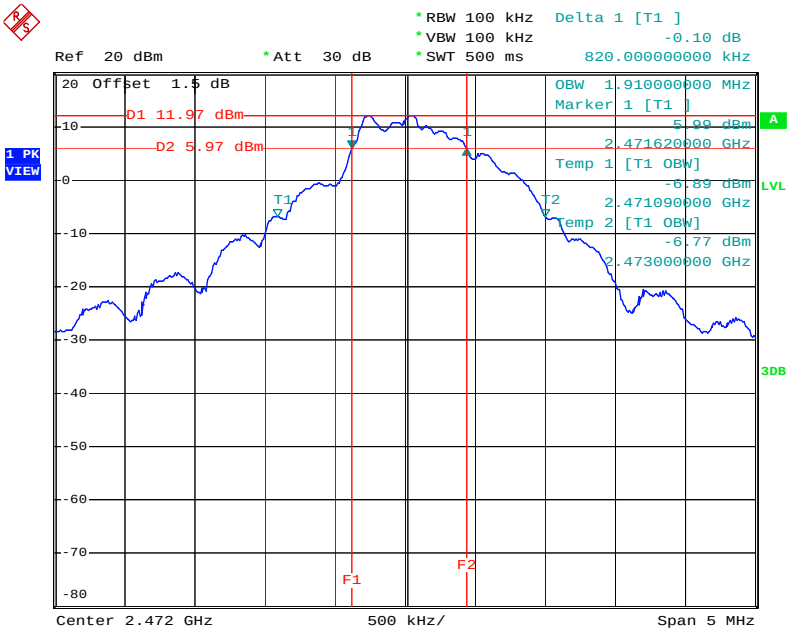
6 dB Bandwidth Plot on Configuration / 2472 MHz



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3.5. Radiated Emissions Measurement

3.5.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.5.2. Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for peak

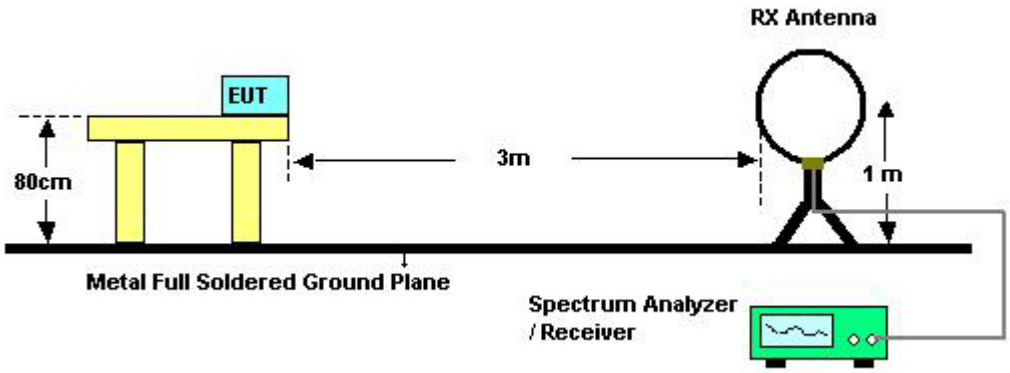
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.5.3. Test Procedures

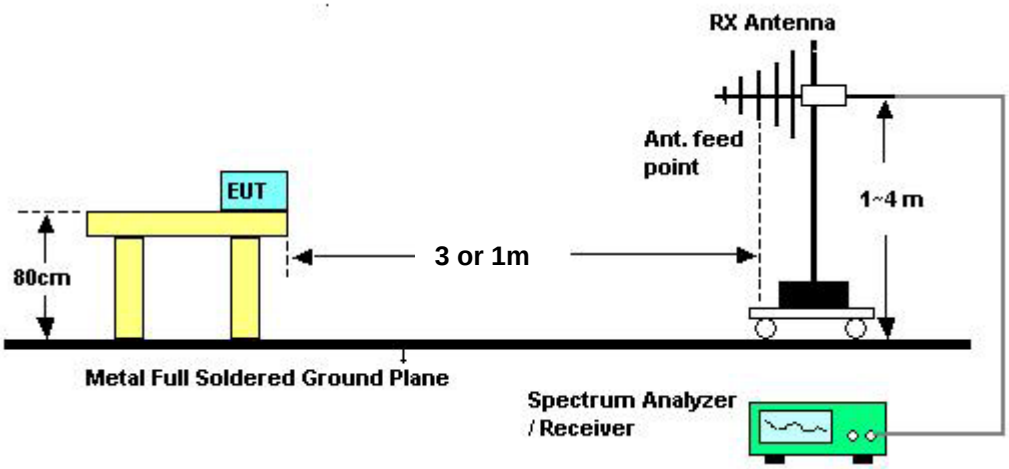
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

3.5.4. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.5.5. Test Deviation

There is no deviation with the original standard.

3.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.5.7. Results of Radiated Emissions (9kHz~30MHz)

Final Test Date	Jun. 21, 2010	**Test Site No.**	03CH03-HY
Temperature	25.9℃	**Humidity**	53%
Test Engineer	Eddie		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

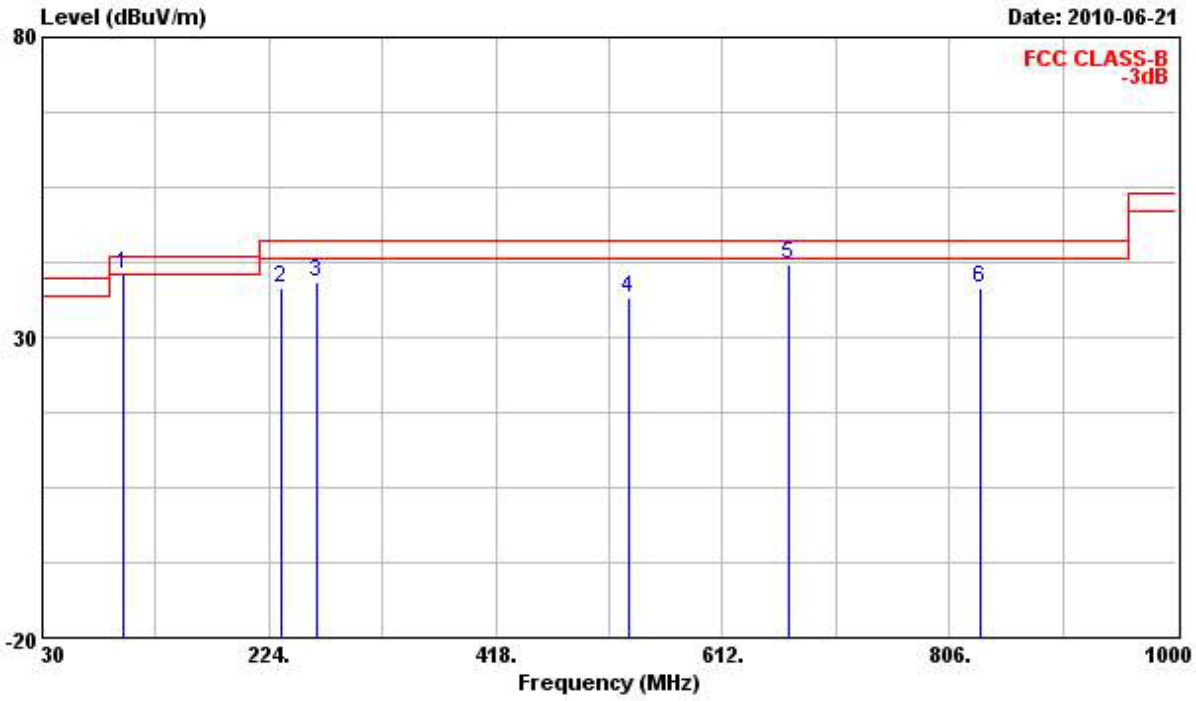
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

3.5.8. Results of Radiated Emissions (30MHz~1GHz)

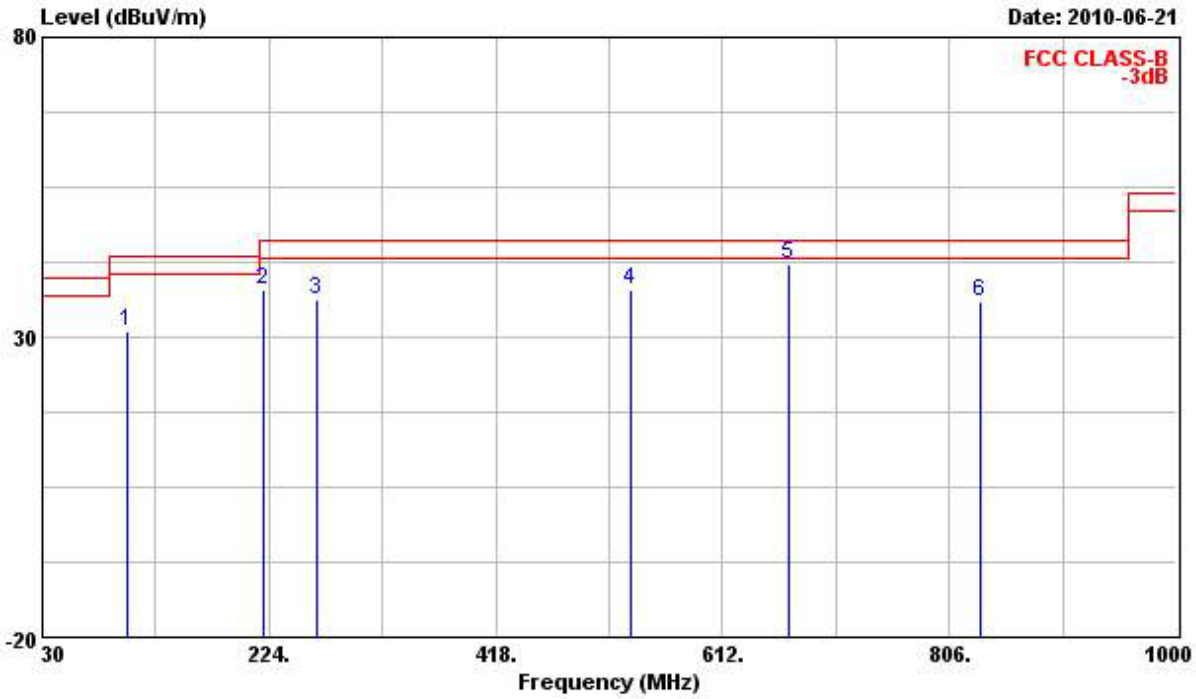
Final Test Date	Jun. 21, 2010	**Test Site No.**	03CH03-HY
Temperature	25.9℃	**Humidity**	53%
Test Engineer	Eddie	**Configurations**	Normal Mode

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	99.840	40.43	-3.07	43.50	55.21	11.20	1.65	27.64	---	---	Peak
2	233.700	38.24	-7.76	46.00	52.68	10.84	2.63	27.90	---	---	Peak
3	264.740	39.24	-6.76	46.00	50.81	13.57	2.84	27.99	---	---	Peak
4	532.460	36.43	-9.57	46.00	42.84	18.88	4.04	29.33	---	---	Peak
5	668.260	42.30	-3.70	46.00	47.19	19.75	4.62	29.26	---	---	QP
6	832.190	38.11	-7.89	46.00	41.28	20.81	5.24	29.22	---	---	Peak

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	102.750	31.06	-12.44	43.50	45.46	11.56	1.69	27.65	---	---	QP
2	219.150	37.81	-8.19	46.00	54.16	9.17	2.52	28.04	---	---	Peak
3	265.710	36.15	-9.85	46.00	47.75	13.55	2.85	28.00	---	---	Peak
4	533.430	38.05	-7.95	46.00	44.44	18.90	4.05	29.34	---	---	Peak
5	668.260	42.33	-3.67	46.00	47.22	19.75	4.62	29.26	---	---	Peak
6	832.190	36.00	-10.00	46.00	39.17	20.81	5.24	29.22	---	---	Peak

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

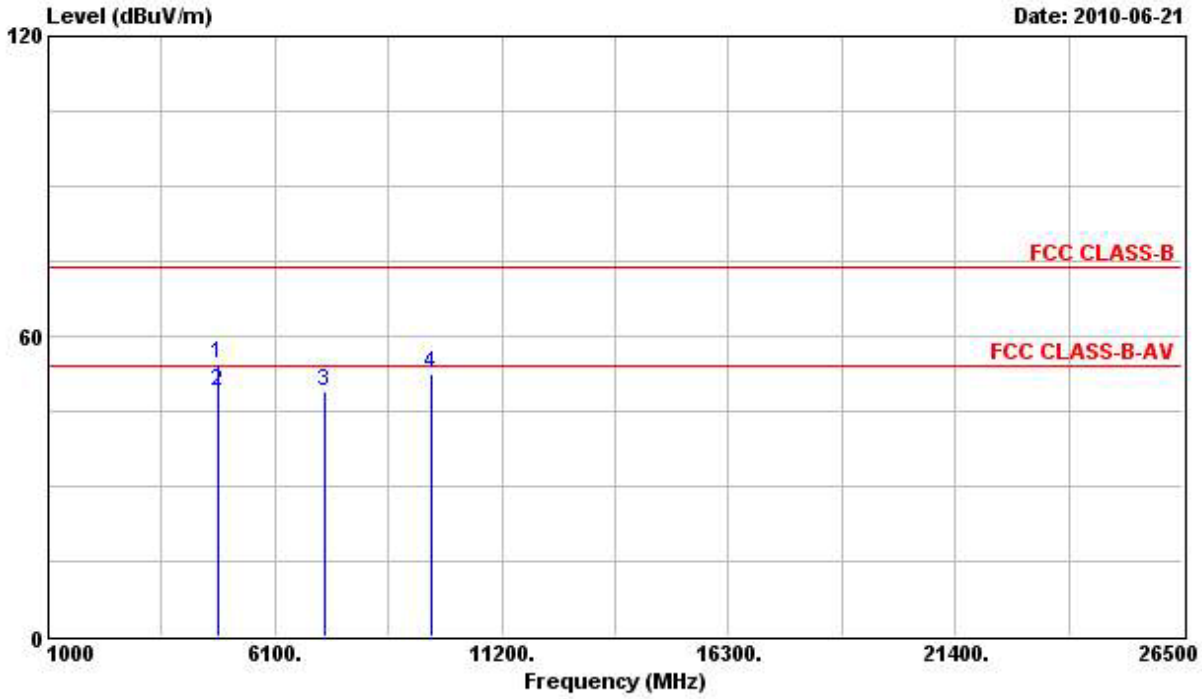
Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

3.5.9. Results for Radiated Emissions (1GHz~10th Harmonic)

Final Test Date	Jun. 21, 2010	Test Site No.	03CH03-HY
Temperature	25.9℃	Humidity	53%
Test Engineer	Eddie	Configurations	2406 MHz

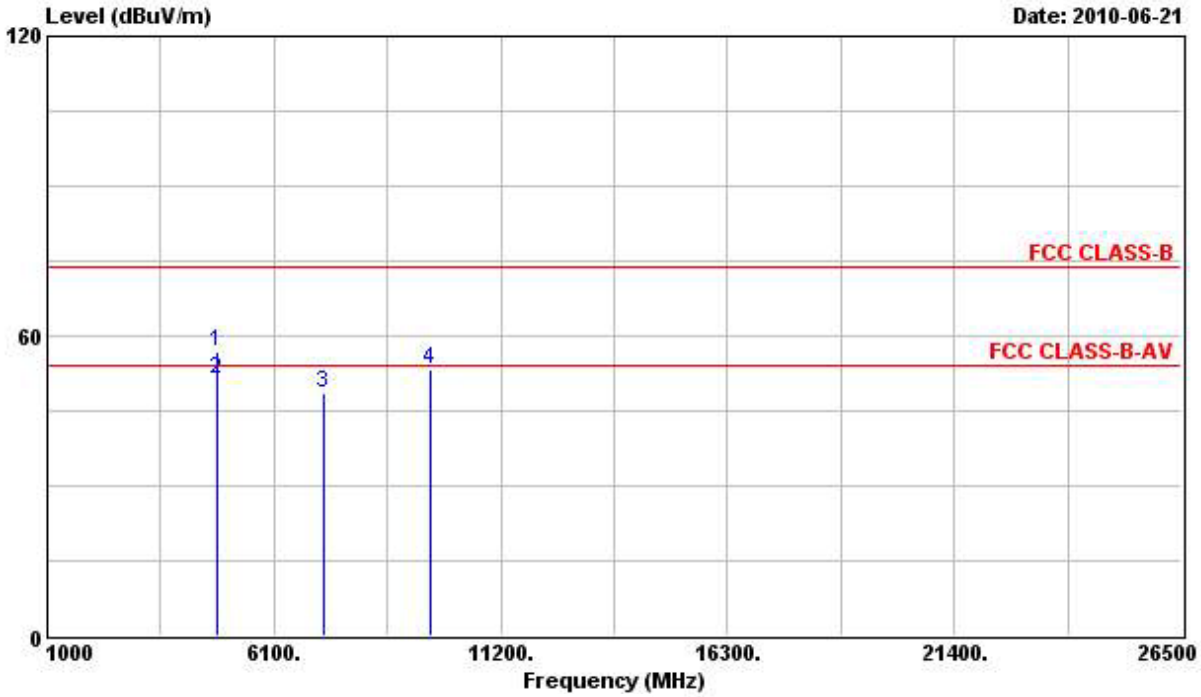
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4816.000	54.34	-19.66	74.00	50.91	33.02	2.70	32.28	---	---	PEAK
2 @	4816.000	48.88	-5.12	54.00	45.44	33.02	2.70	32.28	---	---	Average
3	7222.000	48.79			41.42	35.49	4.55	32.67	---	---	Peak
4	9620.000	52.66			41.30	38.34	5.29	32.27	---	---	PEAK

Note: The item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

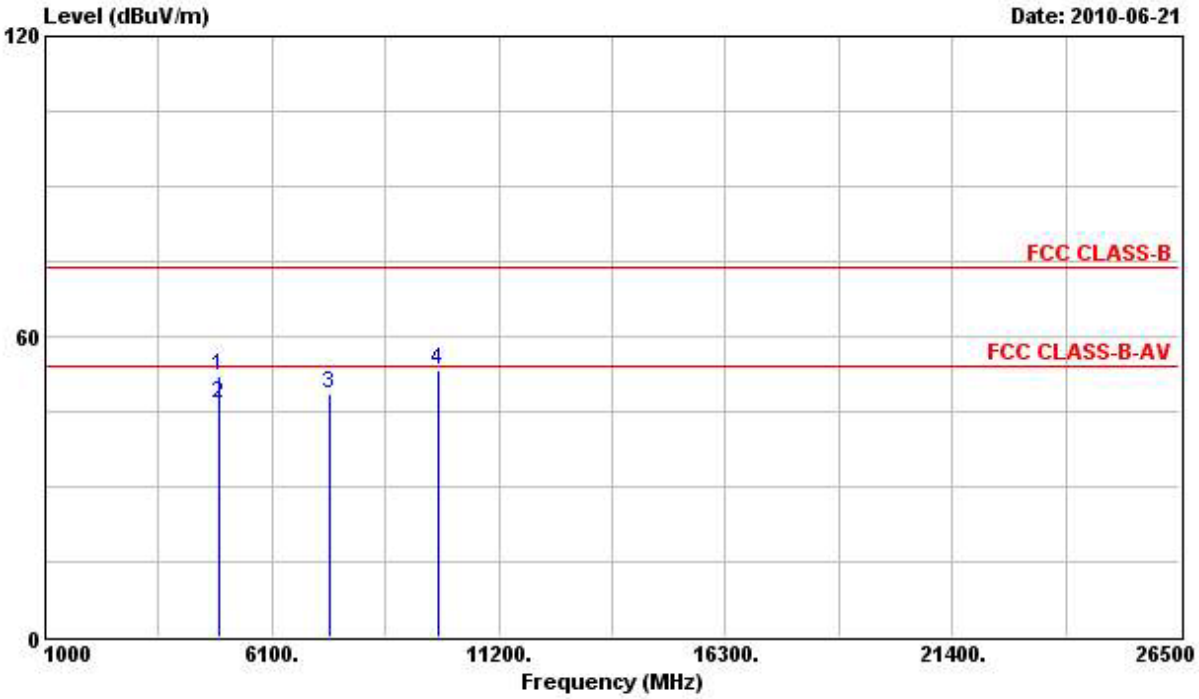


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4812.000	56.66	-17.34	74.00	53.20	33.02	2.70	32.25	---	---	PEAK
2 @	4812.000	51.20	-2.80	54.00	47.74	33.02	2.70	32.25	---	---	Average
3	7222.000	48.48			41.10	35.49	4.55	32.67	---	---	PEAK
4	9628.000	53.17			41.77	38.38	5.29	32.27	---	---	PEAK

Note: The item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Jun. 21, 2010	**Test Site No.**	03CH03-HY
Temperature	25.9℃	**Humidity**	53%
Test Engineer	Eddie	**Configurations**	2464 MHz

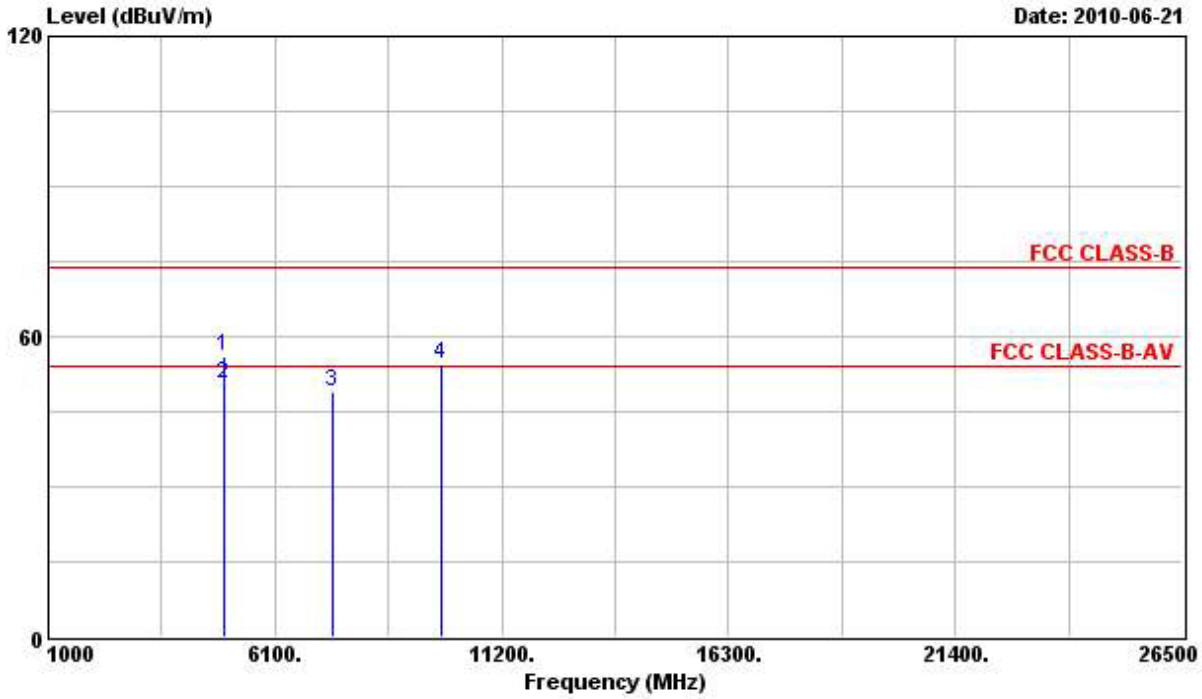
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4928.000	52.04	-21.96	74.00	48.60	33.26	2.56	32.38	---	---	PEAK
2	4928.000	46.58	-7.42	54.00	43.14	33.26	2.56	32.38	---	---	Average
3	7388.000	48.39	-5.61	54.00	40.01	35.87	4.75	32.24	---	---	PK
4	9856.000	53.31			41.39	38.82	5.49	32.38	---	---	PEAK

Note: The item 4 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

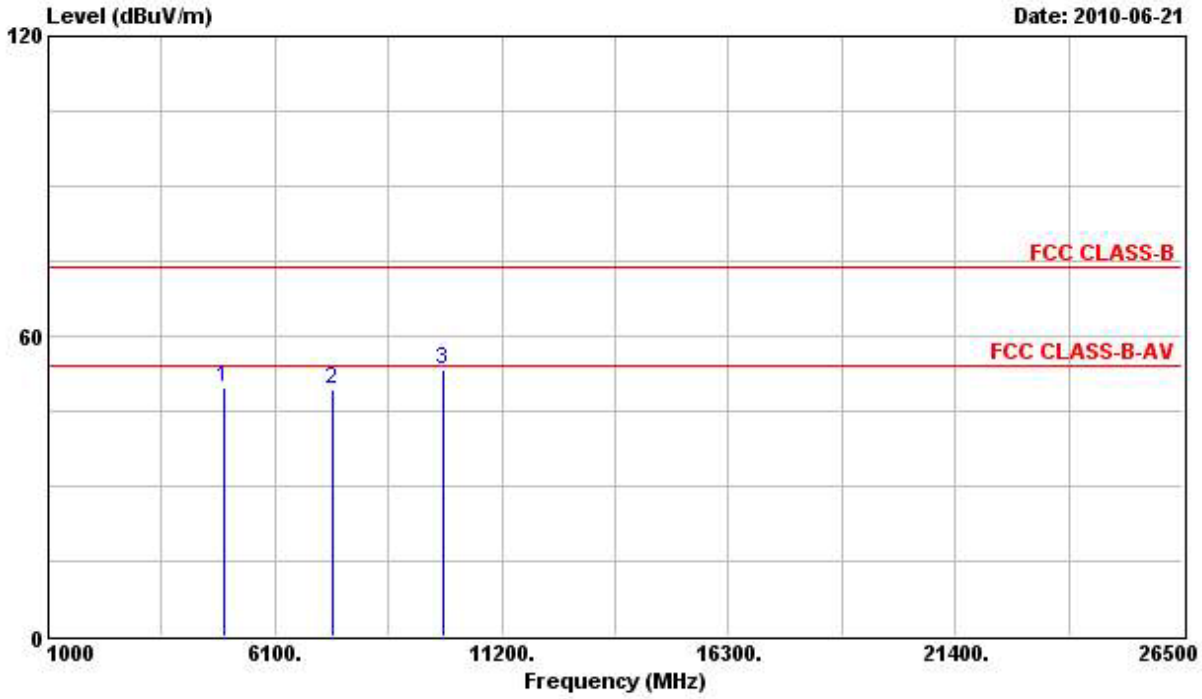


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4932.000	55.96	-18.04	74.00	52.52	33.26	2.56	32.38	---	---	PEAK
2	4932.000	50.50	-3.50	54.00	47.06	33.26	2.56	32.38	---	---	Average
3	7392.000	48.79	-5.21	54.00	40.41	35.87	4.75	32.24	---	---	PK
4	9852.000	54.42			42.49	38.82	5.49	32.38	---	---	PEAK

Note: The item 4 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Jun. 21, 2010	**Test Site No.**	03CH03-HY
Temperature	25.9℃	**Humidity**	53%
Test Engineer	Eddie	**Configurations**	2472 MHz

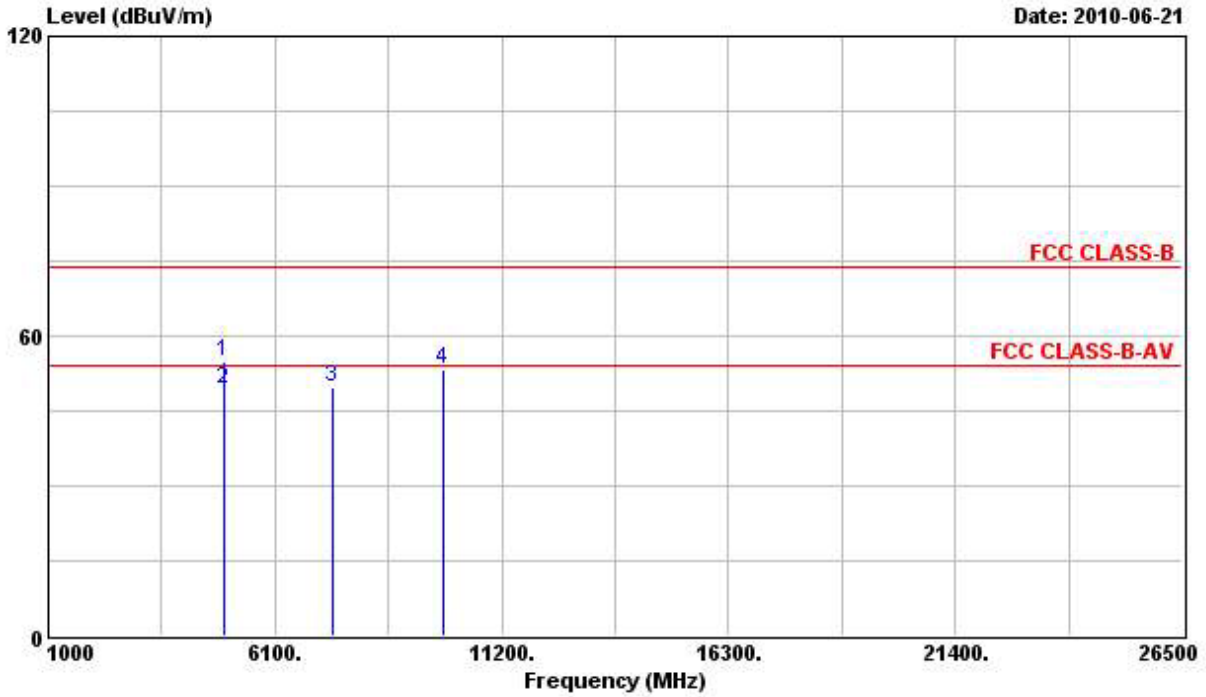
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4948.000	49.73	-4.27	54.00	46.28	33.30	2.56	32.40	---	---	PK
2	7416.000	49.39	-4.61	54.00	40.86	35.91	4.80	32.18	---	---	PK
3	9888.000	53.46			41.46	38.89	5.52	32.41	---	---	PEAK

Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4944.000	54.93	-19.07	74.00	51.48	33.30	2.56	32.40	---	---	PEAK
2	4944.000	49.47	-4.53	54.00	46.02	33.30	2.56	32.40	---	---	Average
3	7416.000	49.88	-4.12	54.00	41.35	35.91	4.80	32.18	---	---	PK
4	9884.000	53.48			41.46	38.89	5.52	32.40	---	---	PEAK

Note:

1. The item 4 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).
2. The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

   Emission level (dBuV/m) = 20 log Emission level (uV/m).

   Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

3.6. Band Edge Emissions Measurement

3.6.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.6.2. Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak

3.6.3. Test Procedures

1. The test procedure is the same as section 3.5.3, only the frequency range investigated is limited to 100MHz around band edges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

3.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 3.5.4.

3.6.5. Test Deviation

There is no deviation with the original standard.

3.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.6.7. Test Result of Band Edge

Final Test Date	Jun. 21, 2010	Test Site No.	03CH03-HY
Temperature	25.9℃	Humidity	53%
Test Engineer	Eddie	Configurations	GFSK

2406MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2390.000	73.00	-1.00	74.00	42.28	28.13	2.58	0.00	---	---	Peak
2 @	2406.330	109.93			79.18	28.16	2.58	0.00	---	---	Peak
1	2389.610	47.42	-6.58	54.00	16.70	28.13	2.58	0.00	---	---	Average
2 @	2406.140	108.93			78.18	28.16	2.58	0.00	---	---	Average

The item 2 is Fundamental Emissions.

2464MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2463.900	104.74			73.87	28.24	2.63	0.00	---	---	Peak
1 @	2464.090	103.78			72.91	28.24	2.63	0.00	---	---	Average

The item 1 is Fundamental Emissions.

***2472MHz* 1**

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2471.690	104.62			73.72	28.27	2.63	0.00	---	---	Peak
2	2483.660	70.43	-3.57	74.00	39.53	28.27	2.63	0.00	---	---	Peak
1 @	2472.260	103.58			72.68	28.27	2.63	0.00	---	---	Average
2	2488.220	43.57	-10.43	54.00	12.64	28.30	2.63	0.00	---	---	Average

The item 1 is Fundamental Emissions.

Note:

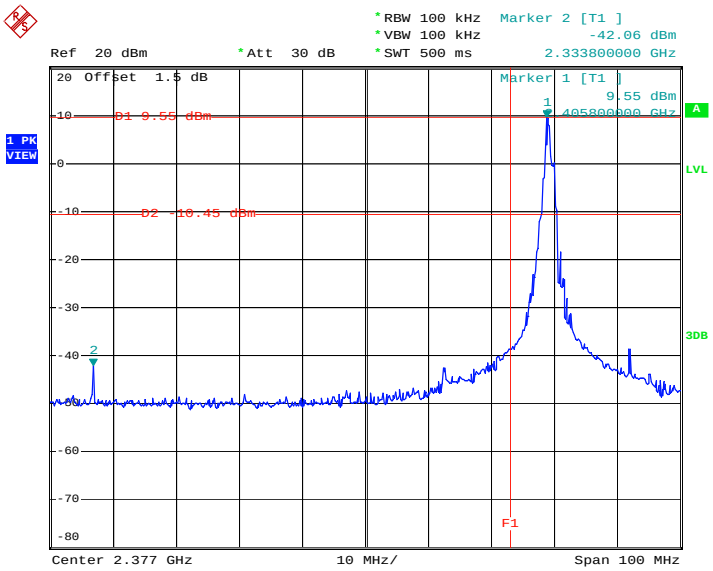
Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

For Emission not in Restricted Band

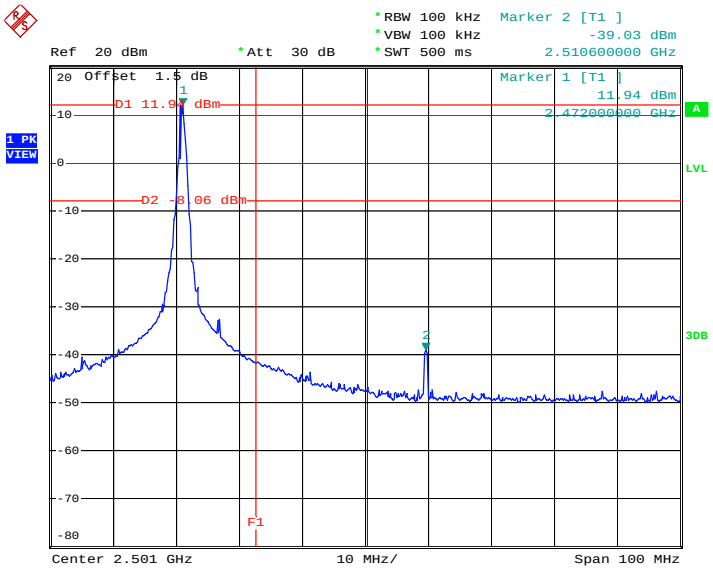
Final Test Date	Jun. 18, 2010	**Test Site No.**	TH01-HY
Temperature	24℃	**Humidity**	60%
Test Engineer	Ian	**Configuration**	GFSK

Low Band Edge Plot on Configuration / 2406 MHz



Date: 18.JUN.2010 21:19:31

High Band Edge Plot on Configuration / 2472 MHz



Date: 18.JUN.2010 21:02:05

3.7. Antenna Requirements

3.7.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.7.2. Antenna Connector Construction

Please refer to section 2.2 in this test report; antenna connector complied with the requirements.

4. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9kHz – 2.75GHz	Sep. 01, 2009	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Mar. 18, 2009	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz – 30MHz	Feb. 24, 2009	Conduction (CO01-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832010001	9kHz – 30MHz	May 05, 2009	Conduction (CO01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSU26.5	100015	20Hz ~ 26.5GHz	Oct. 29, 2009	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	0917017	300MHz~40GHz	Dec. 03, 2009	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300MHz~40GHz	Dec. 03, 2009	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jul. 31, 2009	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Apr. 16, 2010	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Aug. 06, 2009	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 02, 2009	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 02, 2009	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jul. 12, 2010*	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is two year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100305/040	9 kHz - 40GHz	Feb. 02, 2010	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30 MHz - 1 GHz 3m	May 01, 2010	Radiation (03CH02-HY)
Amplifier	SCHAFFNER	COA9231A	18667	9 kHz - 2 GHz	Jan. 24, 2010	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Jul. 20, 2010	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz~18GHz	Oct. 22, 2009	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Feb. 26, 2010	Radiation (03CH02-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX106	03CH02-HY	1GHz~40GHz	Feb. 26, 2010	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30 MHz - 2 GHz	Nov. 30, 2009	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0 - 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 m - 4 m	N/A	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 28, 2008*	Radiation (03CH02-HY)

Note: Calibration Interval of instruments listed above is two year.

5. TEST LOCATION

SHIJR	ADD	: 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL	: 886-2-2696-2468
	FAX	: 886-2-2696-2255
HWA YA	ADD	: No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL	: 886-3-327-3456
	FAX	: 886-3-318-0055
LINKOU	ADD	: No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL	: 886-2-2601-1640
	FAX	: 886-2-2601-1695
DUNGHU	ADD	: No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL	: 886-2-2631-4739
	FAX	: 886-2-2631-9740
JUNGHE	ADD	: 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL	: 886-2-8227-2020
	FAX	: 886-2-8227-2626
NEIHU	ADD	: 4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	: 886-2-2794-8886
	FAX	: 886-2-2794-9777
JHUBEI	ADD	: No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL	: 886-3-656-9065
	FAX	: 886-3-656-9085

6. TAF CERTIFICATE OF ACCREDITATION

Certificate No. : L1190-100529

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	:	ISO/IEC 17025:2005
Accreditation Number	:	1190
Originally Accredited	:	December 15, 2003
Effective Period	:	January 10, 2010 to January 09, 2013
Accredited Scope	:	Testing Field, see described in the Appendix
Specific Accreditation Program	:	Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangment with Foreign Authorities

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : May 29, 2010

P1, total 23 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix