SPORTON International Inc.
No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / www.sporton.com.tw

FCC RADIO TEST REPORT

Applicant's company	**PChome Online, Inc.**
Applicant Address	12F, 105, Sec. 2, Tun-Hua S. Rd., Taipei, 106, Taiwan
FCC ID	**TN6VP630**
Manufacturer's company	**Cal-Comp Electronics & Communication Company Limited**
Manufacturer Address	191/54, 191/57 18FL., CTI Tower, Rachadapisek Road, Klongtoey, Bangkok, Thailand

Product Name	USB 2.4GHz PHONE
Brand Name	PChome
Model Name	fly-1
Test Rule Part(s)	47 CFR Part 15 Subpart C15.249
Test Freq. Range	2400 ~ 2483.5MHz
Receive Date	Aug. 17, 2005
Test Date	Oct. 05, 2005
Submission Type	Original Equipment

Statement

Test result included in this report is only for the phone 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.

Lab Code: 200079-0

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History of This Test Report

Original Issue Date: Oct. 13, 2005

Report No.: FR581721

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name	:	USB 2.4GHZ PHONE
Brand Name	:	PChome
Model Name	:	fly-1
Applicant	:	PChome Online, Inc.
Test Rule Part(s)	:	47 CFR Part 15 Subpart C15.249

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Aug. 17, 2005 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 / Supervisor
Sporton International Inc.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	26.38 dB
4.2	15.249(a)	Field Strength of Fundamental Emissions	Complies	16.87 dB
4.3	15.215(c)	20dB Spectrum Bandwidth	Complies	-
4.4	15.249(a)/(d)	Radiated Emissions	Complies	1.15 dB
4.5	15.249(d)	Band Edge Emissions	Complies	7.17 dB
4.6	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.26dB	Confidence levels of 95%
Field Strength of Fundamental Emissions	±3.72dB	Confidence levels of 95%
20dB Spectrum Bandwidth	±6.25×10-7	Confidence levels of 95%
Radiated Emissions/ Band Edge Emissions	±3.72dB	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	USB 2.4GHZ PHONE
Radio Type	Intentional Transceiver
Power Type	Base & Battery
Interface Type	NA
Modulation	GFSK
Frequency Range	2400 ~ 2483.5MHz
Channel Number	12
Channel Band Width (99%)	1.00 MHz
Max. Field Strength	77.13 dBuV/m at 3m (Average)
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

3.2. Accessories

Device	Brand	Model	Rating
Battery	GP	GP70AAAH2BMY	2.4 VDC 700mAh
Adapter	SPEC LIN	L4D-060050R	Input: 120V~,60HZ Output: 6VDC
Others			
Base			
Audio Cable			
Antenna			

3.3. Table for Filed Antenna

Ant.	Antenna Type	Connector	Gain (dBi)
1	PCB Antenna	-	1.94

3.4. Table for Carrier Frequencies

Freqeuncy Band	Channel No.	Frequency
2400 ~ 2483.5MHz	1	2402 MHz
	2	2405 MHz
	:	:
	5	2432 MHz
	6	2435 MHz
	7	2439 MHz
	:	:
	11	2468 MHz
	12	2470 MHz

3.5. Table for Test Modes

The test result in the test report is only for the phone part. 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	Antenna
AC Power Line Conducted Emissions	Normal Use	6	1
Radiated Emissions 9kHz~1GHz	CTX	6	1
Field Strength of Fundamental Emissions Radiated Emissions 1GHz~10th Harmonic	CTX	1/6/12	1
Band Edge Emissions	CTX	1/12	1
20dB Spectrum Bandwidth	CTX	1/6/12	NA

Note: CTX=continuously transmitting

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH03-HY	SAC	Hwa Ya	101377	IC 4088	-
CO04-HY	Conduction	Hwa Ya	101377	IC 4088	-
TH01-HY	OVEN Room	Hwa Ya	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

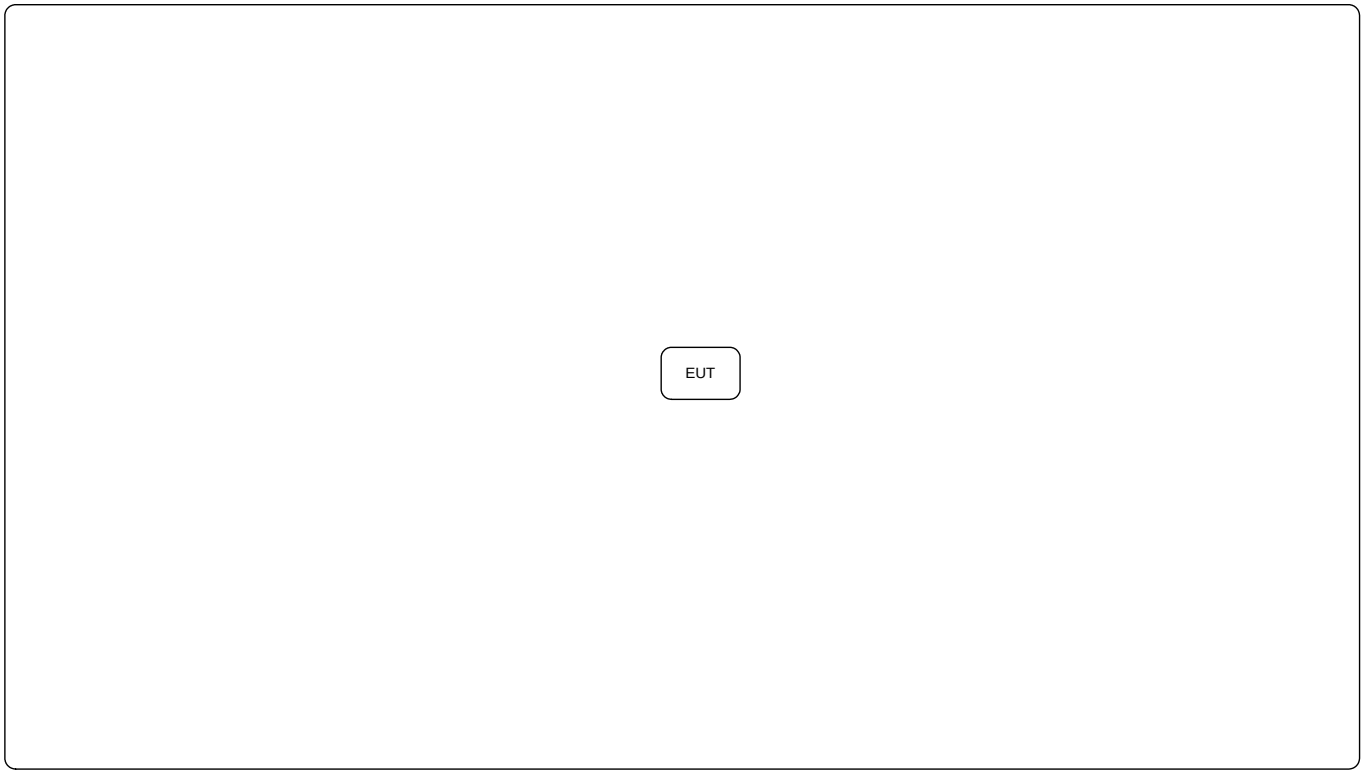
Please refer section 6 for Test Site Address.

3.7. Table for Supporting Units

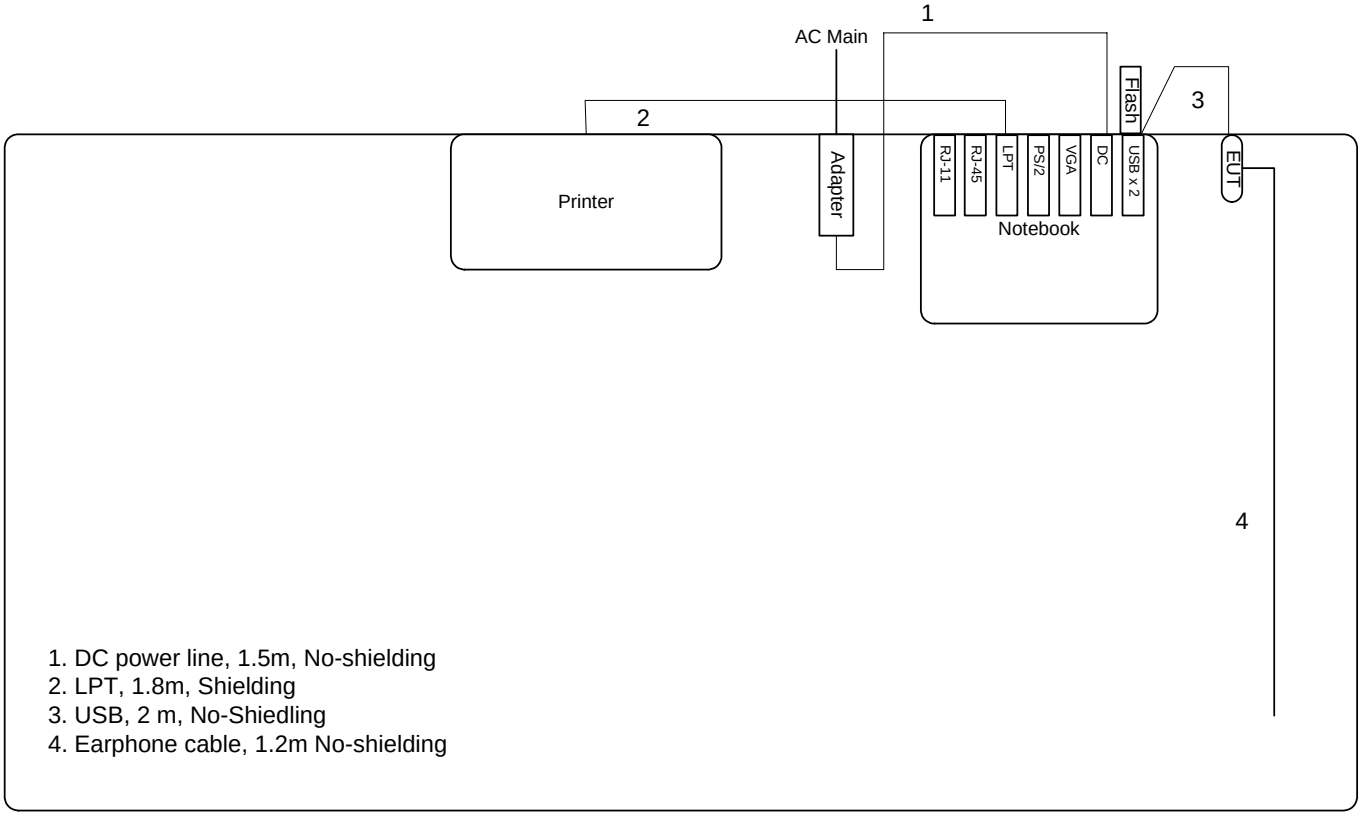
Support Unit	Brand	Model	FCC ID
Printer	EPSON	LQ-680	DoC
TV	SV	PMH-215C	DoC
Earphone	-	-	DoC

3.8. Test Configurations

3.8.1. Radiation Emissions Test Configuration



3.8.2. AC Power Line Conduction Emissions Test Configuration



4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For a Low-power Radio-frequency Device 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.

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

4.1.2. Measuring Instruments and Setting

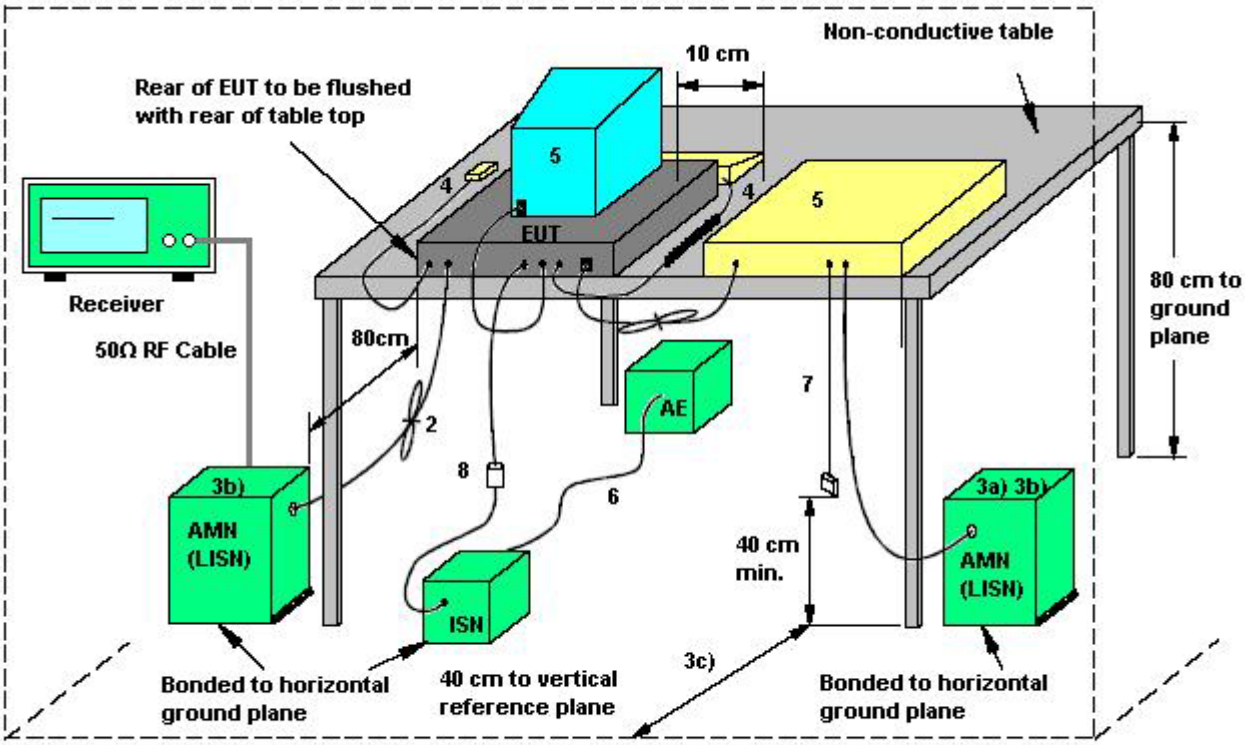
Please refer to section 5 in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

1. 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.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

1. If cables, which hang closer than 40 cm to the horizontal metal groundplane, cannot be shortened to appropriate length, the excess shall be folded back and forth forming a bundle 30 cm to 40 cm long.
2. Excess mains cord shall be bundled in the centre or shortened to appropriate length.
3. EUT is connected to one artificial mains network (AMN). All AMNs and ISNs may alternatively be connected to a vertical reference plane or metal wall.
4. All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
5. AMN and ISN are 80 cm from the EUT and at least 80 cm from other units and other metal planes.
6. Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
7. Cables of hand operated devices, such as keyboards, mouses, etc. shall be placed as for normal usage.
8. Peripherals shall be placed at a distance of 10 cm from each other and from the controller, except for the monitor which, if this is an acceptable installation practice, shall be placed directly on the top of the controller.
9. I/O signal cable intended for external connection.
10. The end of the I/O signal cables which are not connected to an AE may be terminated, if required, using correct terminating impedance.
11. If used, the current probe shall be placed at 0,1 m from the ISN.

4.1.5. Test Deviation

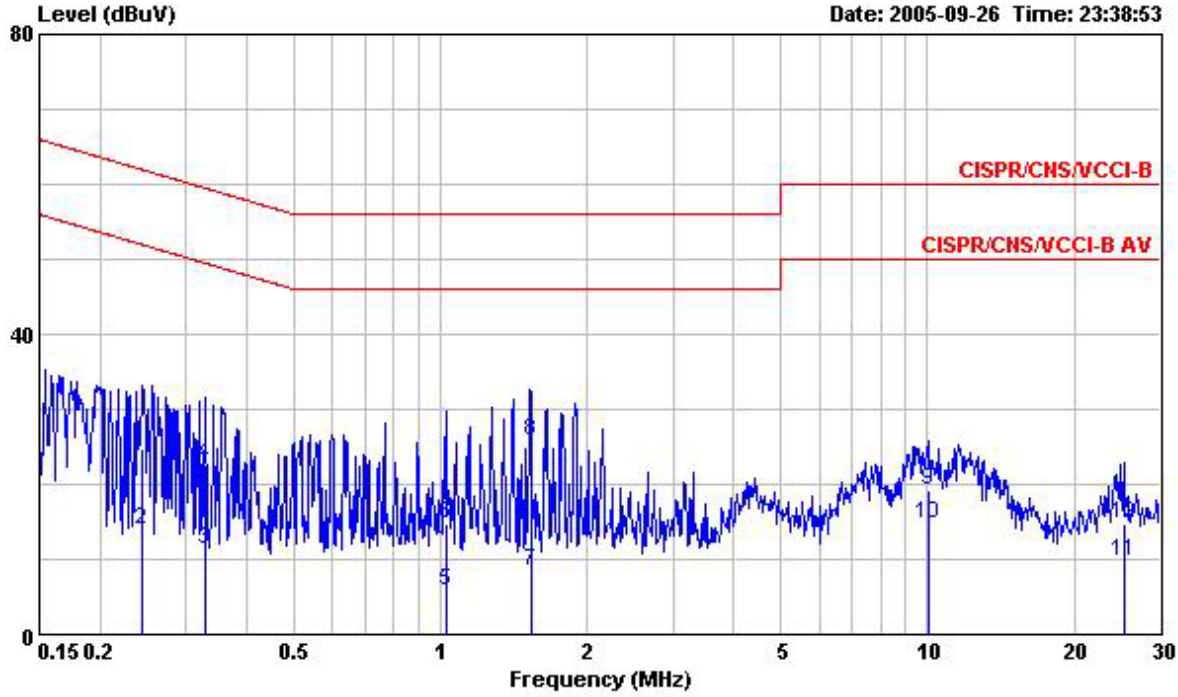
There are no deviations with the original standard.

4.1.6. EUT Operation during Test

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

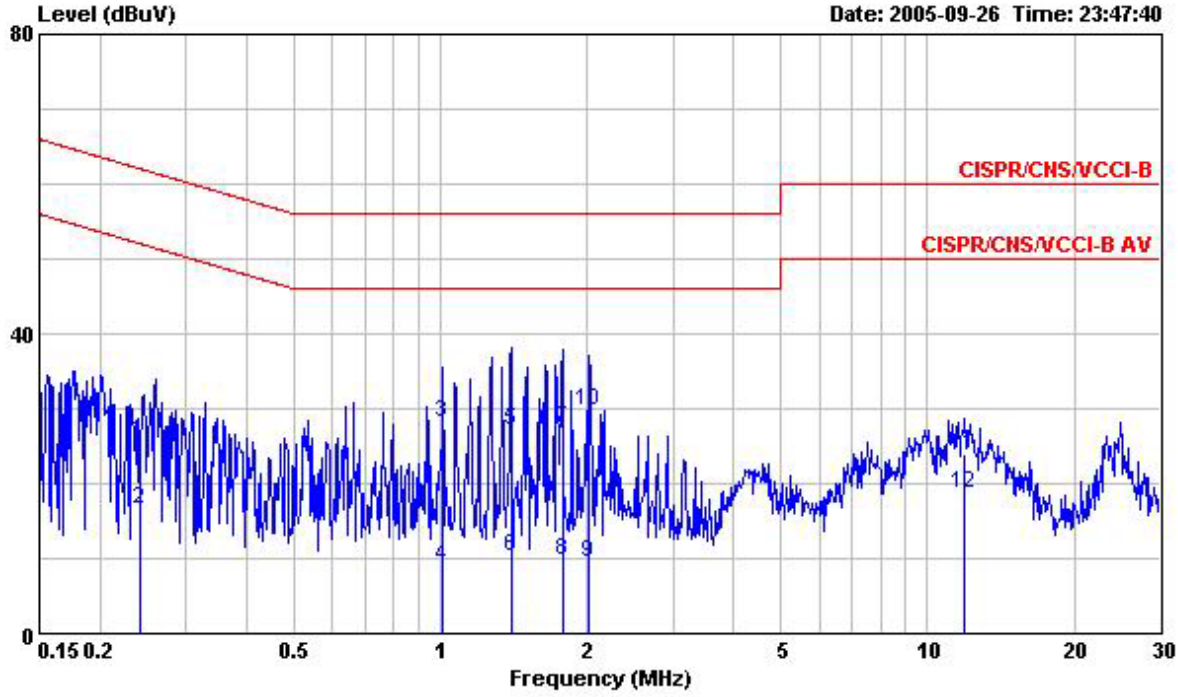
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	20℃	Humidity	70%
Test Engineer	Sky Wu	Phase	Line
Configuration	Charger Mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.2429320	24.64	-37.36	62.00	24.28	0.10	0.26	QP
2	0.2429320	13.98	-38.02	52.00	13.62	0.10	0.26	Average
3	0.3303280	11.28	-38.16	49.44	10.87	0.10	0.31	Average
4	0.3303280	22.73	-36.71	59.44	22.32	0.10	0.31	QP
5	1.030	5.79	-40.21	46.00	5.07	0.10	0.62	Average
6	1.030	14.81	-41.19	56.00	14.09	0.10	0.62	QP
7	1.530	8.48	-37.52	46.00	8.00	0.10	0.38	Average
8	1.530	25.82	-30.18	56.00	25.34	0.10	0.38	QP
9	10.020	19.34	-40.66	60.00	18.68	0.10	0.56	QP
10	10.020	14.79	-35.21	50.00	14.13	0.10	0.56	Average
11	25.320	9.82	-40.18	50.00	9.33	0.10	0.39	Average
12	25.320	14.70	-45.30	60.00	14.21	0.10	0.39	QP

Temperature	20℃	Humidity	70%
Test Engineer	Sky Wu	Phase	Neutral
Configuration	Charger Mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.2415050	25.82	-36.22	62.04	25.46	0.10	0.26	QP
2	0.2415050	16.64	-35.40	52.04	16.28	0.10	0.26	Average
3	1.010	28.24	-27.76	56.00	27.51	0.10	0.63	QP
4	1.010	8.92	-37.08	46.00	8.19	0.10	0.63	Average
5	1.400	27.21	-28.79	56.00	26.68	0.10	0.43	QP
6	1.400	10.37	-35.63	46.00	9.84	0.10	0.43	Average
7	1.780	27.25	-28.75	56.00	26.86	0.10	0.29	QP
8	1.780	9.78	-36.22	46.00	9.39	0.10	0.29	Average
9	2.020	9.51	-36.49	46.00	9.19	0.10	0.22	Average
10	2.020	29.62	-26.38	56.00	29.30	0.10	0.22	QP
11	11.930	23.91	-36.09	60.00	22.80	0.20	0.91	QP
12	11.930	18.56	-31.44	50.00	17.45	0.20	0.91	Average

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. Field Strength of Fundamental Emissions Measurement

4.2.1. Limit

The field strength of emissions within these bands specified at a distance of 3 meters (measurement instrumentation employing an average detector) shall comply with the following table.

Frequency Band (MHz)	Fundamental Emissions Limit (dBuV/m) at 3m
2400-2483.5	94
5725-5875	94

4.2.2. Measuring Instruments and Setting

Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

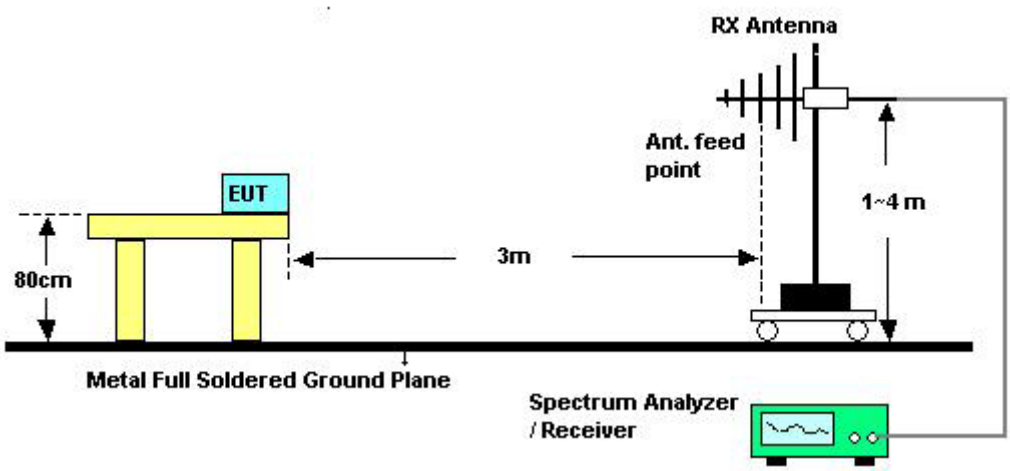
Power Meter Parameter	Setting
Attenuation	Auto
RB	1 MHz Peak / 1MHz Average
VB	1 MHz Peak / 10Hz Average
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3. 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. For Fundamental emissions, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
6. 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.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There are no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Field Strength of Fundamental Emissions

Temperature	20℃	Humidity	70%
Test Engineer	Ted Chiu	Configurations	Channel 1/6/12

Ch.	Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-amp Factor (dB)	Remark	Pol.
1	2402.340	91.46	-22.54	114.00	60.97	28.21	2.28	0.00	Peak	V
1	2401.770	76.05	-17.95	94.00	45.56	28.21	2.28	0.00	Average	V
6	2435.210	91.52	-22.48	114.00	60.95	28.28	2.30	0.00	Peak	V
6	2435.210	76.11	-17.89	94.00	45.54	28.28	2.30	0.00	Average	V
12	2470.170	92.54	-21.46	114.00	61.88	28.34	2.32	0.00	Peak	V
12	2470.170	77.13	-16.87	94.00	46.47	28.34	2.32	0.00	Average	V

Note:

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

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

Receiving maximum fundamental emissions are Vertical Polarization.

4.3. 20dB Spectrum Bandwidth Measurement

4.3.1. Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (2400 ~ 2483.5MHz).

4.3.2. Measuring Instruments and Setting

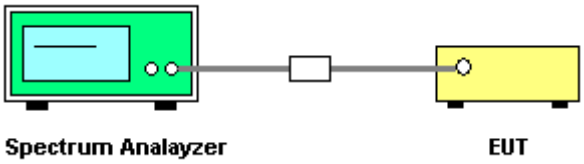
Please refer to section 5 in this report. The following table is the setting of the Spectrum Analyzer.

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

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser 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.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There are no deviations with the original standard.

4.3.6. EUT Operation during Test

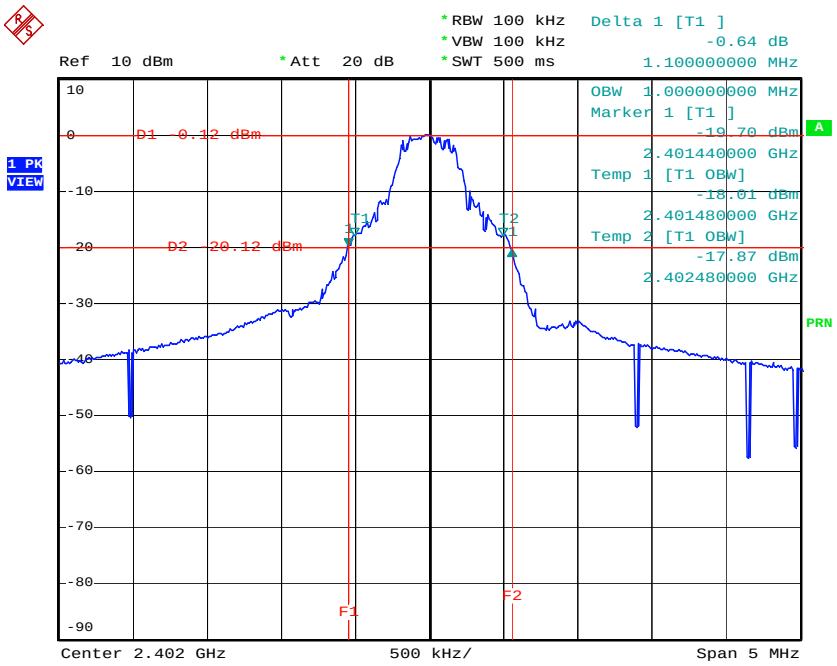
The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 20dB Spectrum Bandwidth

Temperature	20℃	Humidity	70%
Test Engineer	Eason Lu	Configurations	Channel 1/6/12

Frequency	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) $f_L > 2400MHz$	Frequency range (MHz) $f_H < 2483.5MHz$	Test Result
2402 MHz	1.10	1.00	2401.4400	-	Complies
2435 MHz	1.10	0.98	-	-	Complies
2470 MHz	1.12	0.99	-	2470.5500	Complies

20 dB/99% Bandwidth Plot on 2402 MHz



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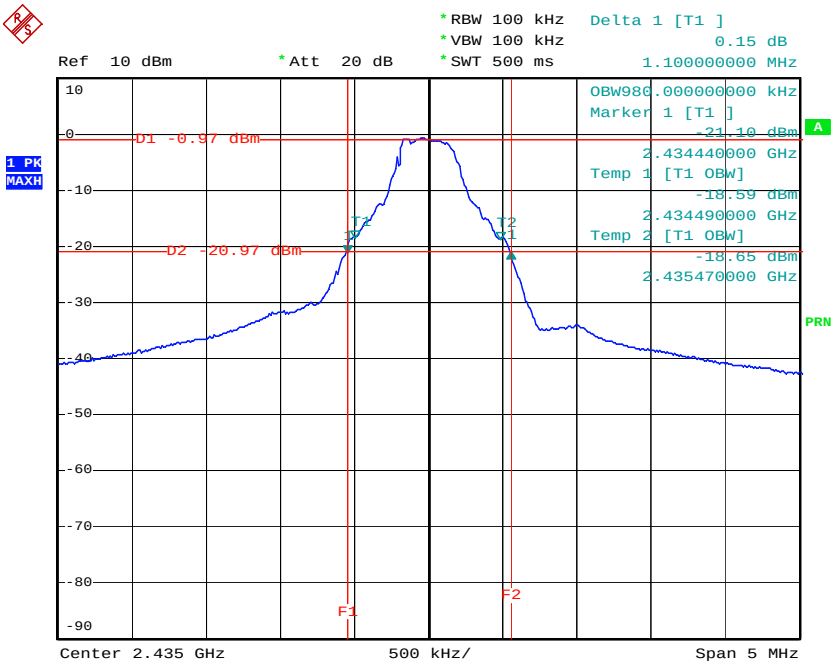
20 dB/99% Bandwidth Plot on 2435 MHz



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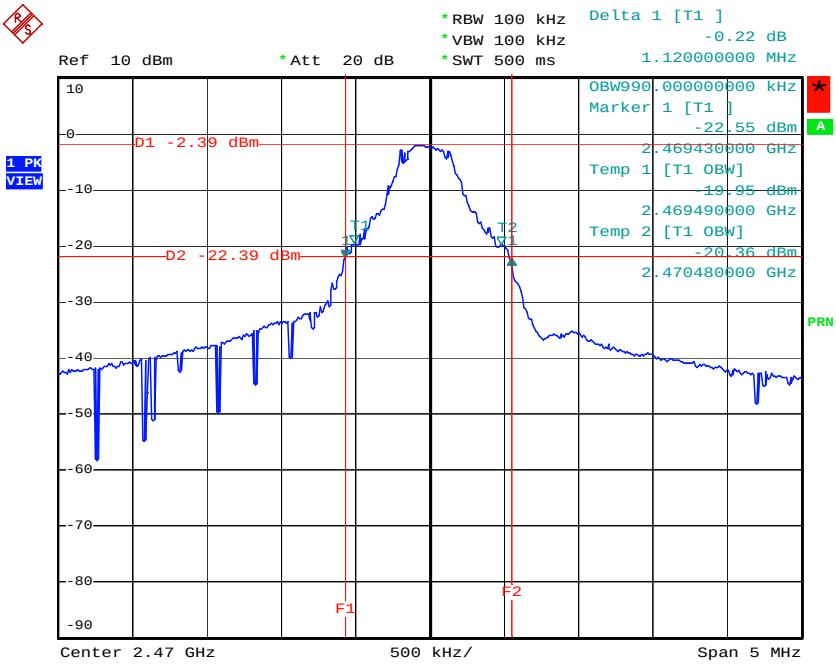
20 dB/99% Bandwidth Plot on 2470 MHz



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4.4. Radiated Emissions Measurement

4.4.1. Limit

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 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

4.4.2. Measuring Instruments and Setting

Please refer to section 5 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 (other emission)	100KHz / 100KHz for peak

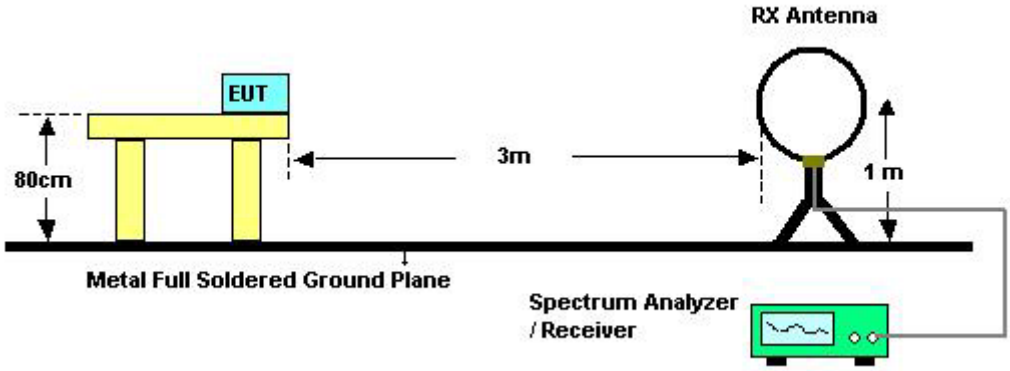
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.4.3. Test Procedures

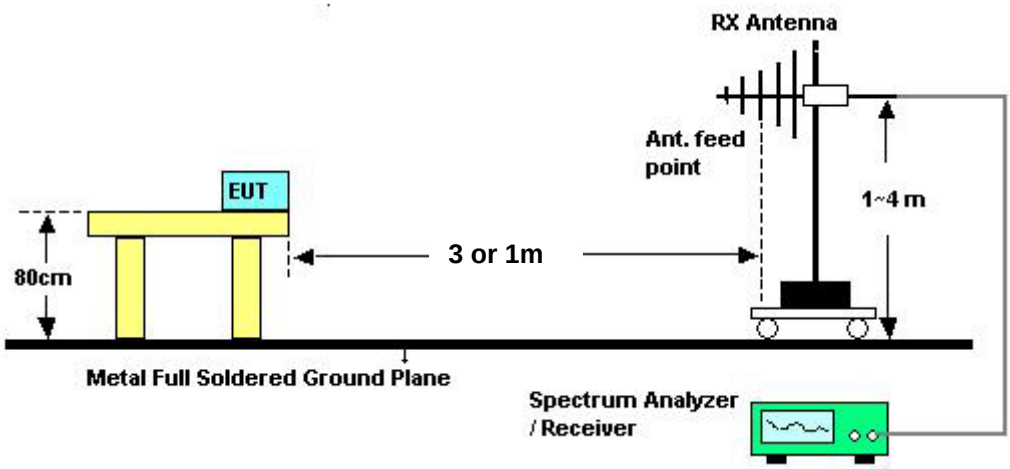
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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.

4.4.4. 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 distanc [3m] / test distance [1m]) (dB);

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

4.4.5. Test Deviation

There are no deviations with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	20°C	Humidity	70%
Test Engineer	Ted Chiu	Configurations	channel 6

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

Note:

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

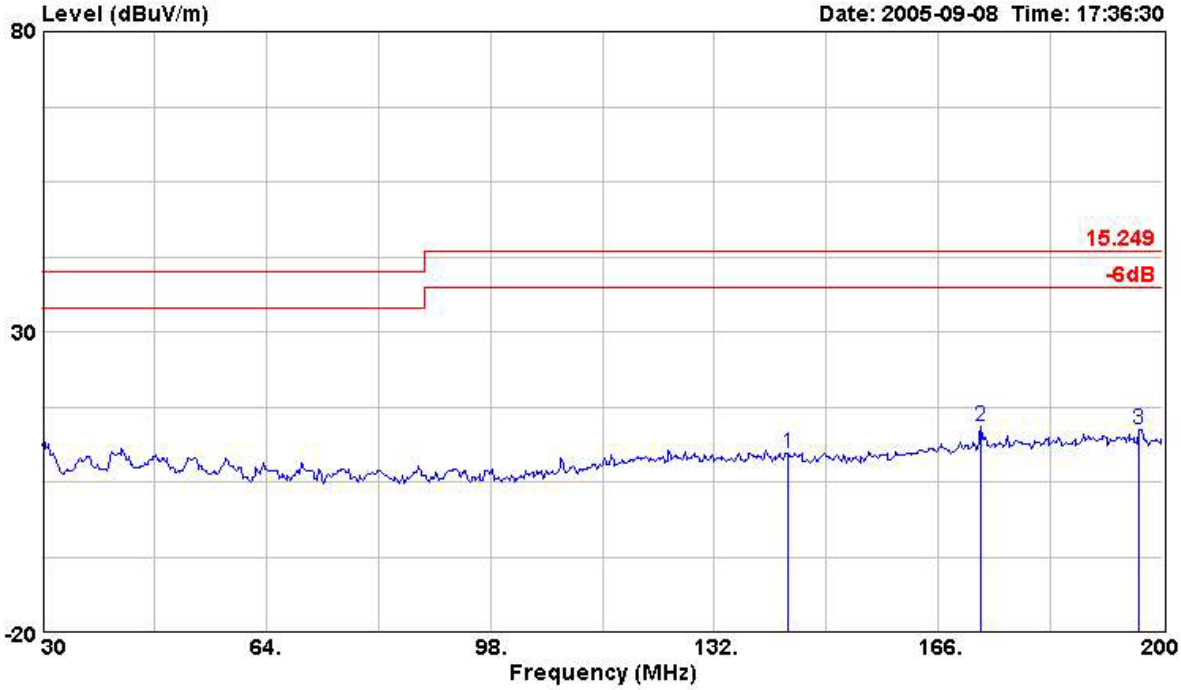
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

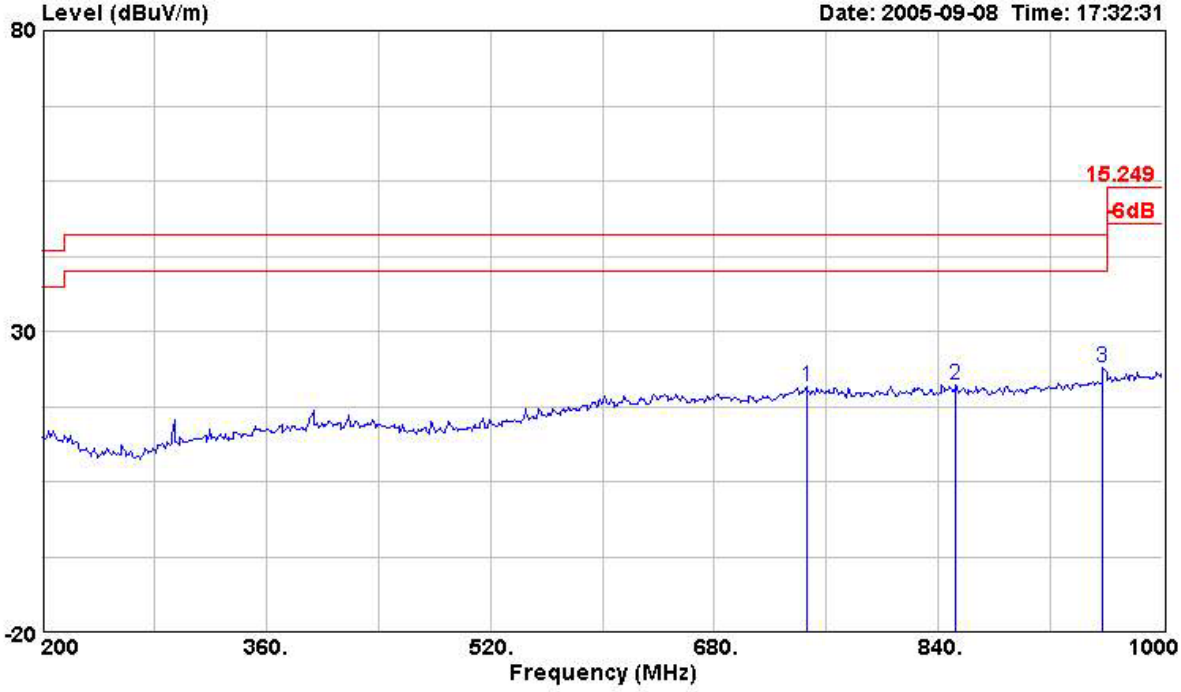
4.4.8. Results of Radiated Emissions (30MHz~1GHz)

Temperature	20℃	Humidity	70%
Test Engineer	Ted Chiu	Configurations	channel 6

Horizontal

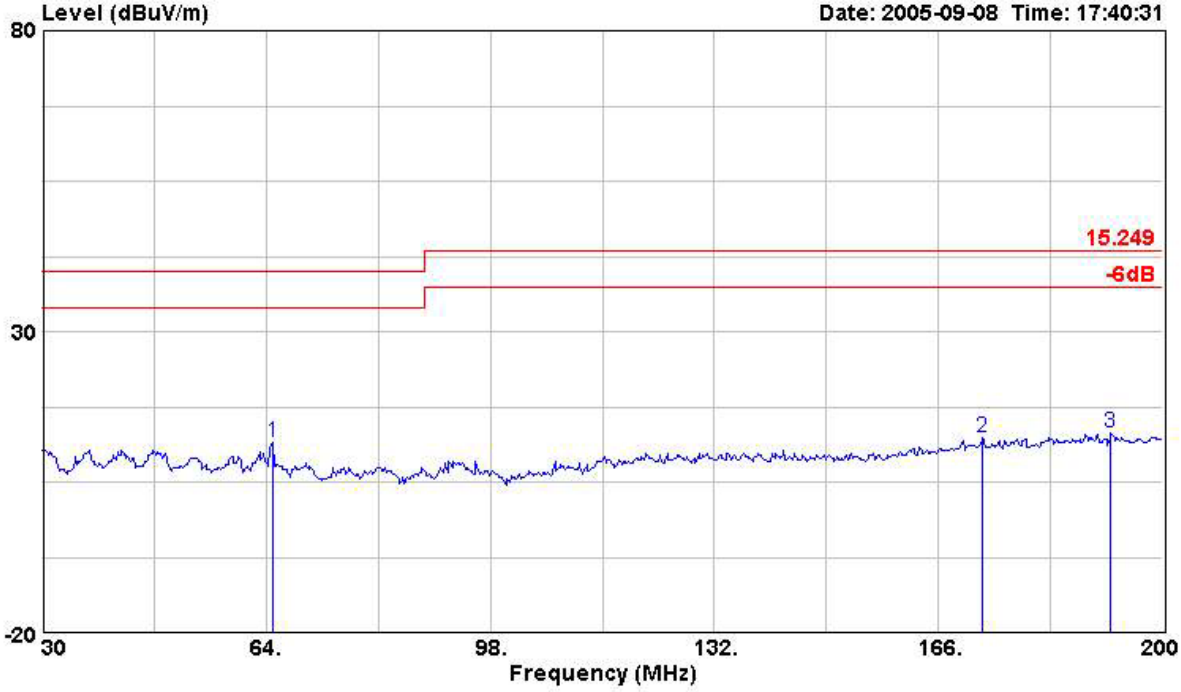


	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	143.220	9.87	-33.63	27.00	43.50	1.18	12.36	30.68	Peak	---	---
2	172.460	14.30	-29.20	29.01	43.50	1.28	13.94	29.92	Peak	---	---
3	196.430	13.82	-29.68	27.73	43.50	1.31	15.52	30.74	Peak	---	---

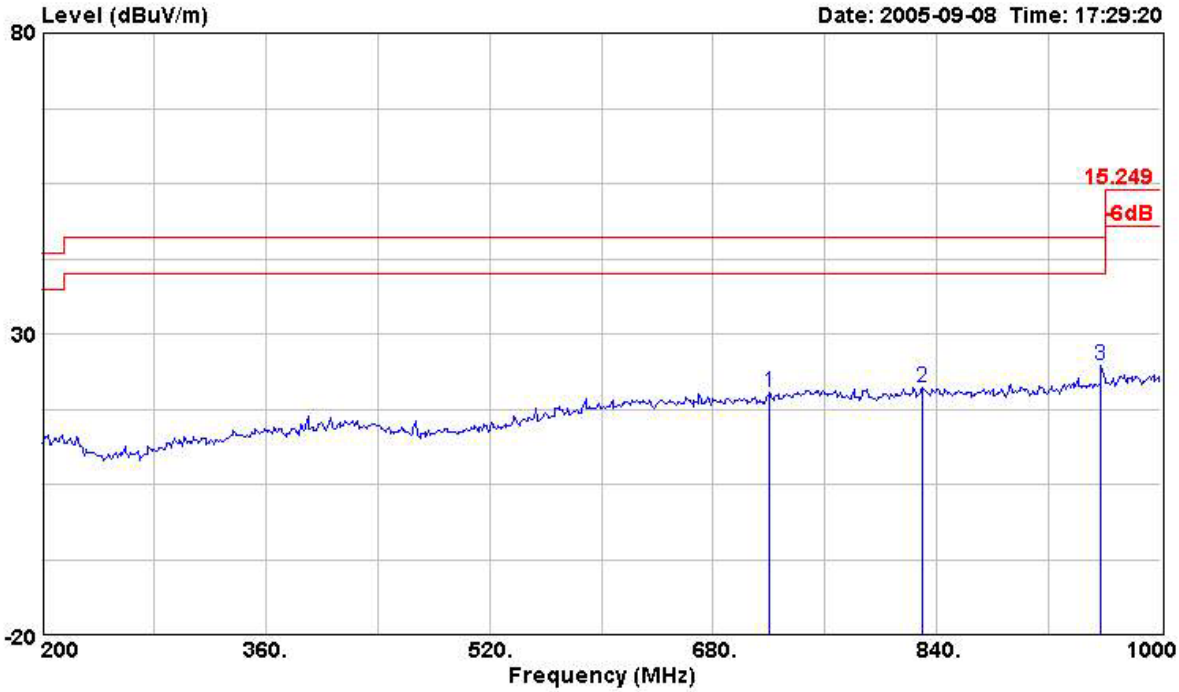


	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	745.600	20.78	-25.22	27.21	46.00	2.77	21.25	30.45	Peak	---	---
2	852.000	21.18	-24.82	26.71	46.00	2.93	21.80	30.26	Peak	---	---
3	957.600	23.95	-22.05	27.28	46.00	3.01	22.96	29.30	Peak	---	---

Vertical



	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	65.020	11.53	-28.47	31.15	40.00	0.82	10.14	30.58	Peak	---	---
2	172.630	12.39	-31.11	27.08	43.50	1.28	13.96	29.92	Peak	---	---
3	192.180	13.07	-30.43	26.90	43.50	1.28	15.17	30.28	Peak	---	---



	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	720.000	20.18	-25.82	27.14	46.00	2.66	20.95	30.56	Peak	---	---
2	829.600	21.04	-24.96	26.78	46.00	2.87	21.84	30.45	Peak	---	---
3	957.600	24.74	-21.26	28.07	46.00	3.01	22.96	29.30	Peak	---	---

Note:

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

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

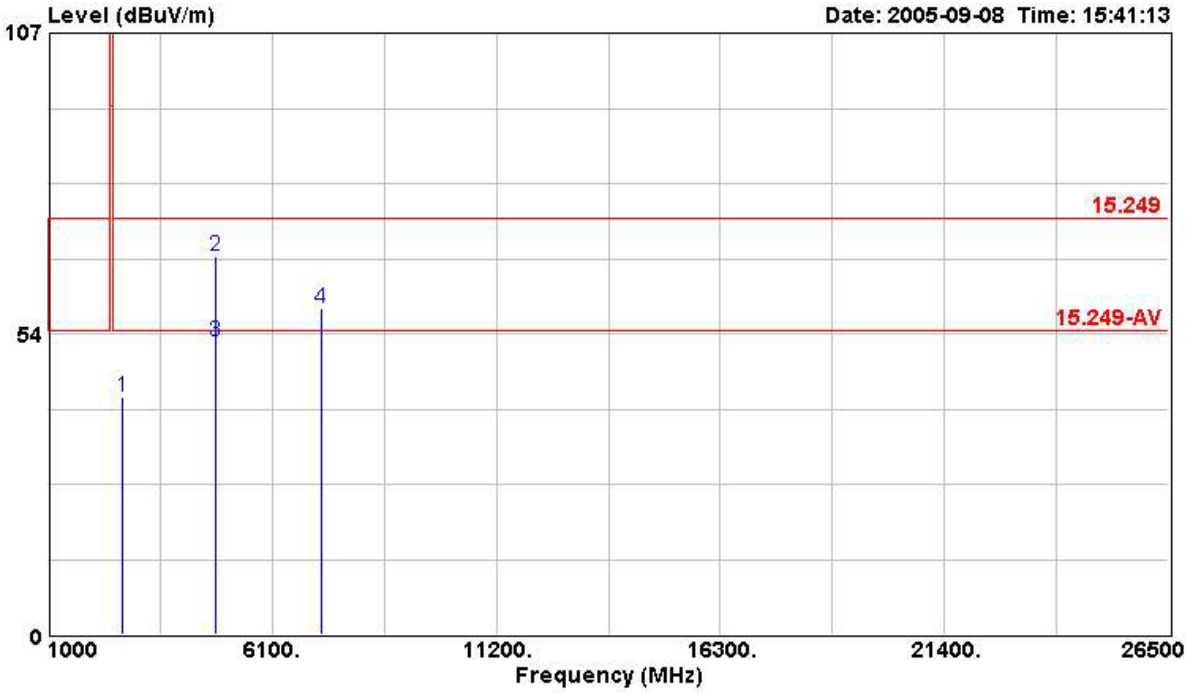
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Pol. : V is Vertical Polarization ; H is Horizontal Polarization.

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

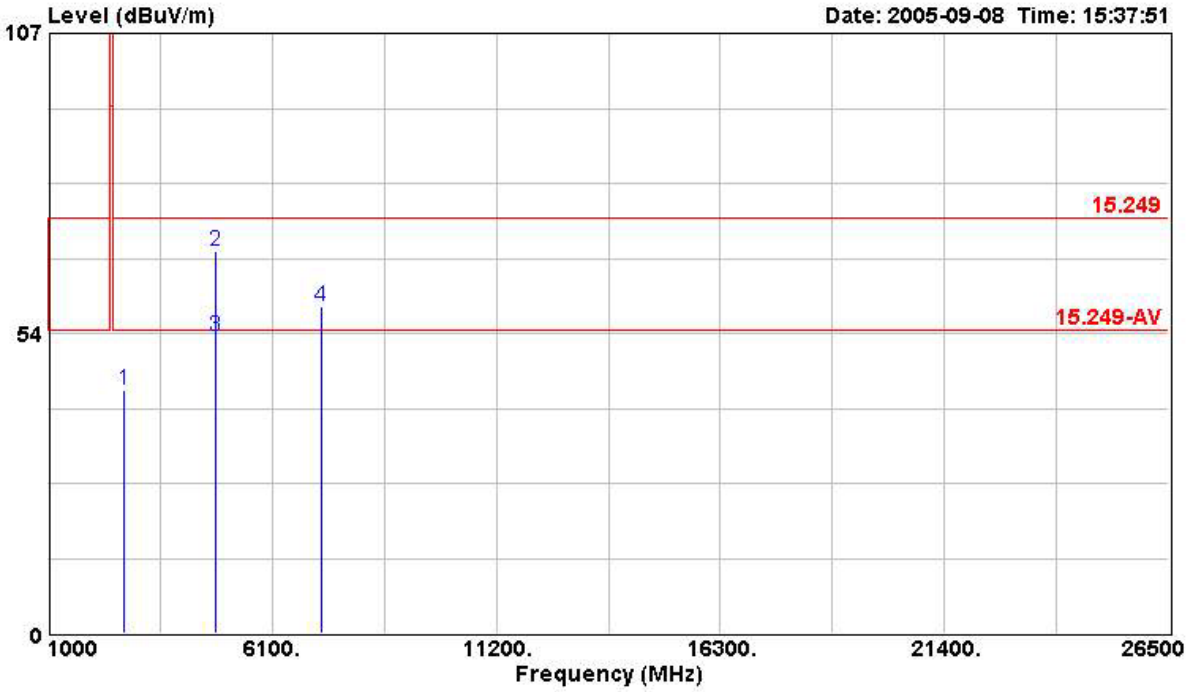
Temperature	20℃	Humidity	70%
Test Engineer	Ted Chiu	Configurations	Channel 1

Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	2676.000	42.18	-31.82	43.70	74.00	2.47	29.02	33.01	Peak	---	---
2	4804.000	67.41	-6.59	63.76	74.00	3.10	33.10	32.54	Peak	---	---
3 @	4804.000	52.00	-2.00	48.35	54.00	3.10	33.10	32.54	Average	---	---
4	7204.000	57.96	-16.04	50.32	74.00	4.10	35.90	32.35	Peak	---	---

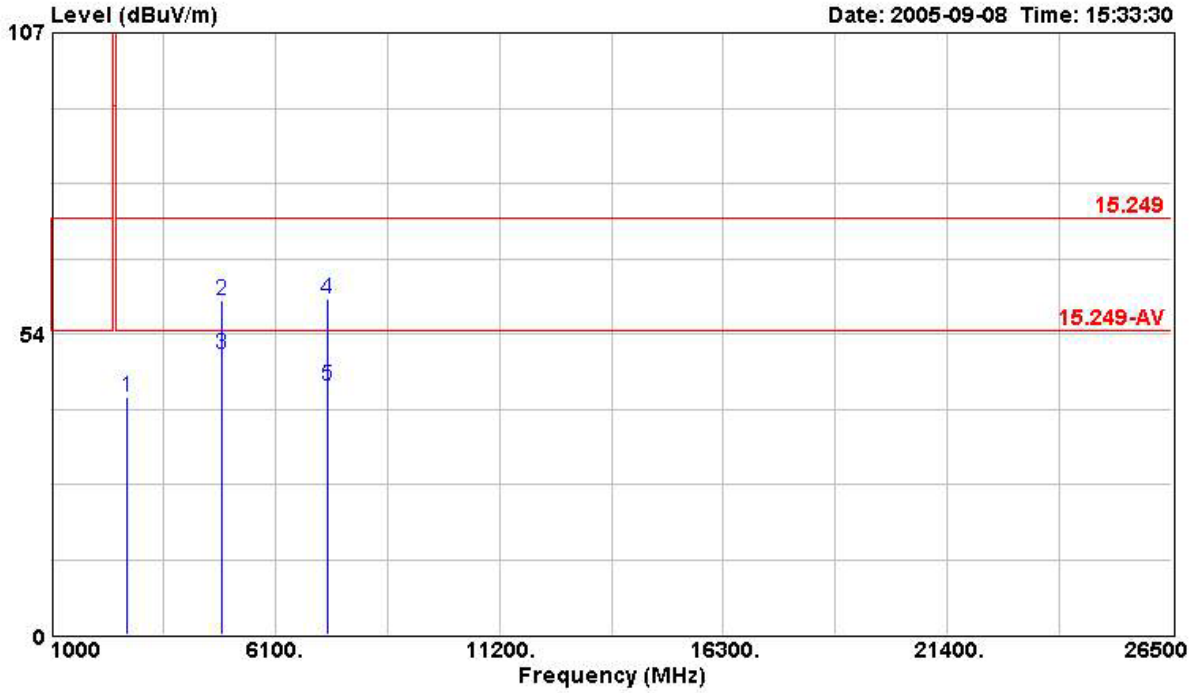
Vertical



	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	2708.000	43.45	-30.55	44.89	74.00	2.47	29.08	32.99	Peak	---	---
2	4804.000	68.26	-5.74	64.60	74.00	3.10	33.10	32.54	PEAK	---	---
3 @	4804.000	52.85	-1.15	49.20	54.00	3.10	33.10	32.54	Average	---	---
4	7204.000	58.39	-15.61	50.75	74.00	4.10	35.90	32.35	PEAK	---	---

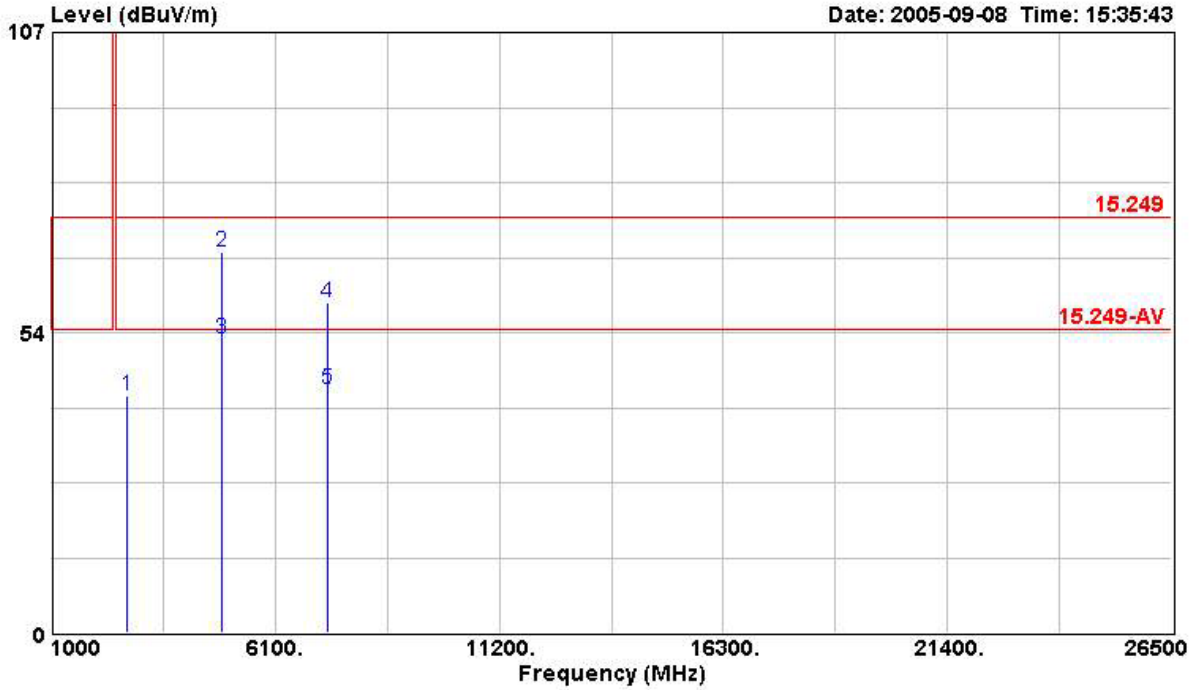
Temperature	20℃	Humidity	70%
Test Engineer	Ted Chiu	Configurations	Channel 6

Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	2708.000	42.18	-31.82	43.62	74.00	2.47	29.08	32.99	Peak	---	---
2	4872.000	59.32	-14.68	55.54	74.00	3.11	33.21	32.55	PEAK	---	---
3 @	4872.000	49.91	-4.09	46.14	54.00	3.11	33.21	32.55	Average	---	---
4	7304.000	59.73	-14.27	52.09	74.00	4.06	36.14	32.56	PEAK	---	---
5	7304.000	44.32	-9.68	36.67	54.00	4.06	36.14	32.56	Average	---	---

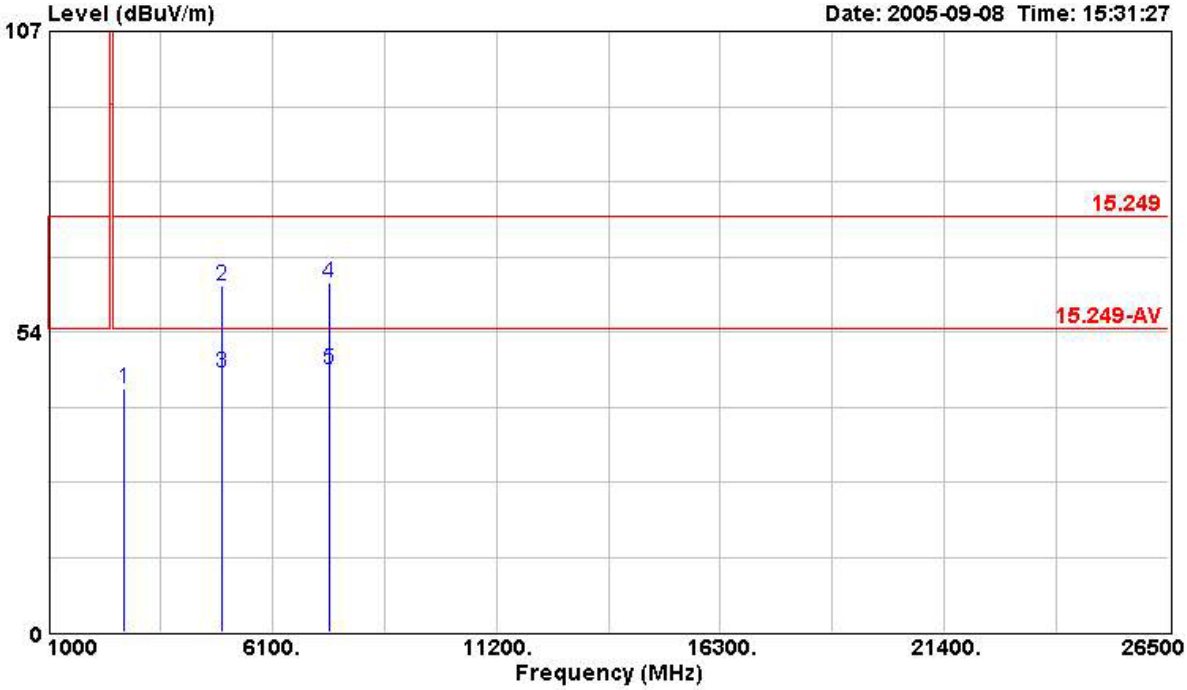
Vertical



	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	2708.000	42.21	-31.79	43.65	74.00	2.47	29.08	32.99	Peak	---	---
2	4872.000	67.75	-6.25	63.98	74.00	3.11	33.21	32.55	PEAK	---	---
3 @	4872.000	52.34	-1.66	48.57	54.00	3.11	33.21	32.55	Average	---	---
4	7304.000	58.89	-15.11	51.25	74.00	4.06	36.14	32.56	PEAK	---	---
5	7304.000	43.48	-10.52	35.83	54.00	4.06	36.14	32.56	Average	---	---

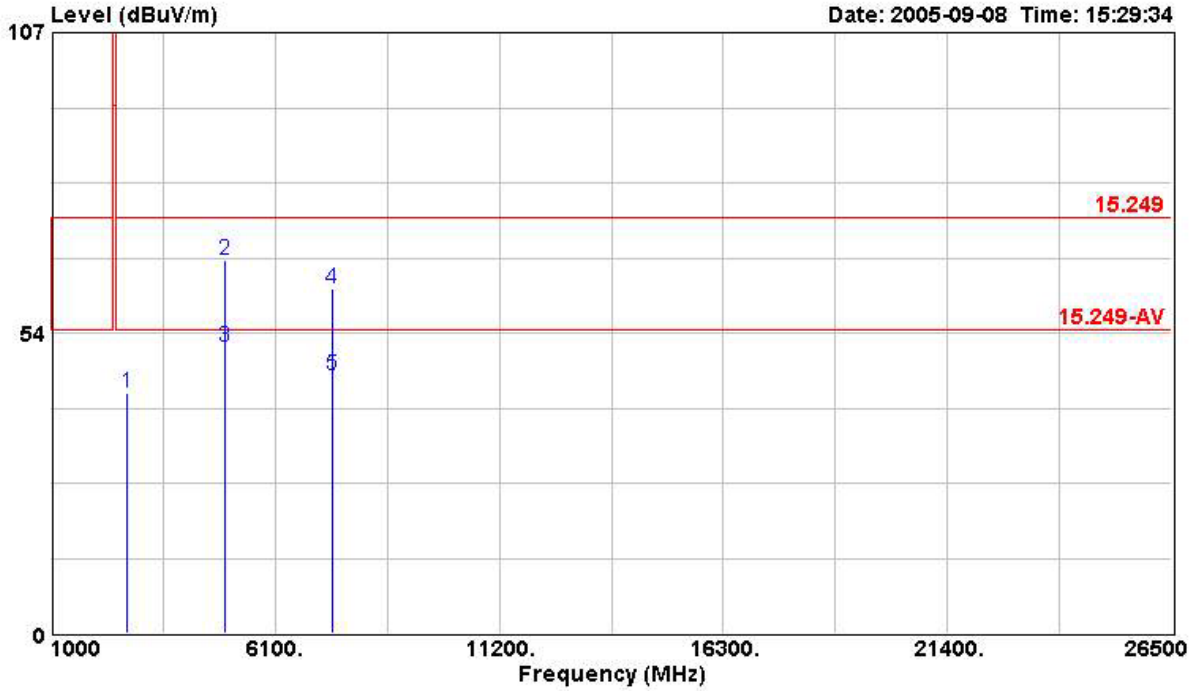
Temperature	20℃	Humidity	70%
Test Engineer	Ted Chiu	Configurations	Channel 12

Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	2708.000	43.32	-30.68	44.76	74.00	2.47	29.08	32.99	Peak	---	---
2	4944.000	61.57	-12.43	57.69	74.00	3.12	33.32	32.56	PEAK	---	---
3	4944.000	46.16	-7.84	42.27	54.00	3.12	33.32	32.56	Average	---	---
4	7408.000	62.12	-11.88	54.46	74.00	4.03	36.39	32.76	PEAK	---	---
5	7408.000	46.71	-7.29	39.05	54.00	4.03	36.39	32.76	Average	---	---

Vertical



	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB		cm	deg
1	2708.000	42.86	-31.14	44.30	74.00	2.47	29.08	32.99	Peak	---	---
2	4944.000	66.33	-7.67	62.44	74.00	3.12	33.32	32.56	PEAK	---	---
3 @	4944.000	50.92	-3.08	47.03	54.00	3.12	33.32	32.56	Average	---	---
4	7408.000	61.30	-12.70	53.64	74.00	4.03	36.39	32.76	PEAK	---	---
5	7408.000	45.89	-8.11	38.23	54.00	4.03	36.39	32.76	Average	---	---

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB 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.

Pol.: V is Vertical Polarization ; H is Horizontal Polarization.

4.5. Band Edge Emissions Measurement

4.5.1. Limit

Band edge emissions radiated outside of the specified frequency bands shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 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

4.5.2. Measuring Instruments and Setting

Please refer to section 5 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 (other emission)	100 KHz /100 KHz for Peak

4.5.3. Test Procedures

1. The test procedure is the same as section 4.2.3, only the freqeuncy range investigated is limited to 2MHz around bandedges.
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.

4.5.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.2.4.

4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Band Edge Emissions

Temperature	20°C	Humidity	70%
Test Engineer	Ted Chiu	Configurations	Channel 1, 12

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-amp Factor (dB)	Remark
2400.00	62.24	-11.76	74.00	31.75	28.21	2.28	0.00	Peak
2400.00	46.83	-7.17	54.00	16.34	28.21	2.28	0.00	Average
2483.50	56.01	-17.99	74.00	25.30	28.37	2.34	0.00	Peak
2483.50	40.60	-13.40	54.00	9.89	28.37	2.34	0.00	Average

Note:

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

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

Receiving maximum band edge emissions are Vertical Polarization.

4.6. Antenna Requirements

4.6.1. 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. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.6.2. Antenna Connector Construction

Please refer to section 3.3 in this test report, all antenna connectors comply with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Feb. 16, 2005	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Apr. 20, 2005	Conduction (CO04-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9kHz – 30MHz	May. 05, 2005	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2005	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 16, 2005	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	CPA9231A	18667	9 kHz - 2 GHz	Jan. 10, 2005	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	May 31, 2005	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100019	9 kHZ - 40 GHz	Jul. 21, 2005	Radiation (03CH03-HY)
Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30 MHz - 200 MHz	Jul. 22, 2005	Radiation (03CH03-HY)
Log Antenna	SCHWARZBECK	VUSLP 9111	221	200 MHz - 1 GHz	Jul. 22, 2005	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1 GHz - 18 GHz	Apr. 22, 2005	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Feb. 22, 2005	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Dec.01, 2004	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 - 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100116	9kHz ~ 40GHx	Jan. 28, 2005	Conducted (TH01-HY)
Power meter	R&S	NRVS	100444	DC ~ 40GHz	Jul. 06, 2005	Conducted (TH01-HY)
Power sensor	R&S	NRV-Z55	100049	DC ~ 40GHz	Jul. 06, 2005	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Apr. 28, 2005	Conducted (TH01-HY)
AC power source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Apr. 21, 2005	Conducted (TH01-HY)
DC power source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Nov. 28, 2004	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2005	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Jan. 01, 2005	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Jan. 01, 2005	Conducted (TH01-HY)
Oscilloscope	Tektronix	TDS1012	CO38515	100MHz / 1GS/s	Apr. 15, 2005	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Dec. 31, 2004	Conducted (TH01-HY)
Data Generator	Tektronix	DG2030	063-2920-50	0.1Hz~400MHz	Jun. 02, 2005	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	MITEQ	AMF-6F-260400	923364	26.5 GHz - 40 GHz	Jan. 05, 2004*	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	May 24, 2004*	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	Jun. 09, 2004*	Radiation (03CH03-HY)

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

6. SPORTON COMPANY PROFILE

SPORTON Lab. was established in 1986 with one shielded room: the first private EMI test facility, offering local manufacturers an alternative EMI test familial apart from ERSO. In 1988, one 3M and 10M/3M open area test site were setup and also obtained official accreditation from FCC, VCCI and NEMKO. In 1993, a Safety laboratory was founded and obtained accreditation from UL of USA, CSA of Canada and TUV (Rhineland & PS) of Germany. In 1995, one EMC lab, including EMI and EMS test facilities was setup. In 1997, SPORTON Group has provided financial expense to relocate the headquarter to Orient Scientific Park in Taipei Hsien to offer more comprehensive, more qualified and better service to local suppliers and manufactures. In 1999, Safety Group and Component Group were setup. In 2001, SPORTON has established 3M/10M chamber in Hwa Ya Technology Park.

6.1. Test Location

SHIJR	ADD	:	6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL	:	02-2696-2468
	FAX	:	02-2696-2255
HWA YA	ADD	:	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL	:	03-327-3456
	FAX	:	03-318-0055
LINKOU	ADD	:	No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL	:	02-2601-1640
	FAX	:	02-2601-1695
DUNGHU	ADD	:	No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL	:	02-2631-4739
	FAX	:	02-2631-9740
JUNGHE	ADD	:	7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL	:	02-8227-2020
	FAX	:	02-8227-2626
NEIHU	ADD	:	4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	:	02-2794-8886
	FAX	:	02-2794-9777
JHUBEI	ADD	:	No.8, Lane 728, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.
	TEL	:	03-656-9065
	FAX	:	03-656-9085

7. CERTIFICATE OF NVLAP ACCREDITATION

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC 17025:1999
ISO 9002:1994

Certificate of Accreditation

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

SPORTON INTERNATIONAL, INC.
TAIPEI HSIEN 221
TAIWAN

is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

December 31, 2005
Effective through

For the National Institute of Standards and Technology
NVLAP Lab Code: 200079-0

NVLAP-01C (06-01)