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	**U-MEDIA Communications, Inc.**
Applicant Address	9F, No. 1, Jin-Shan 7th St., Hsinchu 300, Taiwan, R.O.C.
FCC ID	**SI5SA10HRC100**
Manufacturer's company	**U-MEDIA Communications, Inc.**
Manufacturer Address	9F, No. 1, Jin-Shan 7th St., Hsinchu 300, Taiwan, R.O.C.

Product Name	Bidirectional Remote Control
Brand Name	U-MEDiA
Model Name	HRC-100
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.249
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Feb. 07, 2007
Final Test Date	Apr. 02, 2007
Submission Type	Original Equipment

Statement

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.

Testing Laboratory
1190

Table of Contents

History of This Test Report

Original Issue Date: Apr. 23, 2007

Report No.: FR720718

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Bidirectional Remote Control
Brand Name	:	U-MEDiA
Model Name	:	HRC-100
Applicant	:	U-MEDIA Communications, Inc.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.249

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Feb. 07, 2007 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

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	10.76 dB
4.2	15.249(a)	Field Strength of Fundamental Emissions	Complies	13.05 dB
4.3	15.215(c)	20dB Spectrum Bandwidth	Complies	-
4.4	15.249(a)/(d)	Radiated Emissions	Complies	7.64 dB
4.5	15.249(d)	Band Edge Emissions	Complies	2.39 dB
4.6	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Field Strength of Fundamental Emissions	±0.8dB	Confidence levels of 95%
20dB Spectrum Bandwidth	$\pm 8.5 \times 10^{-8}$	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%

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Power Type	Li-ion Battery / Charger
Modulation	FSK
Frequency Range	2400 ~ 2483.5MHz
Channel Number	252
Channel Band Width (99%)	0.314 MHz
Max. Field Strength	67.10 dBuV/m at 3m (Average)
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

3.2. Accessories

Power	Brand	Model	Rating
Li-ion Battery	SENAO	MOT-V170	Output: 3.7V, 700mAh

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	WANSHIH	T2W1508A1	PIFA Antenna	NA	2.59

3.4. Table for Carrier Frequencies

Frequency Band	Channel No.	Frequency
2400 ~ 2483.5MHz	1	2403.0 MHz
	2	2403.2 MHz
	:	:
	127	2427.8 MHz
	128	2428.0 MHz
	129	2428.2 MHz
	:	:
	251	2452.8 MHz
	252	2453.0 MHz

3.5. Table for Test Modes

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 Link / Charger Mode	128	1
Field Strength of Fundamental Emissions 20dB Spectrum Bandwidth	CTX	1/128/252	1
Radiated Emissions 9kHz~1GHz	CTX	128	1
Radiated Emissions 1GHz~10th Harmonic	CTX	1/128/252	1
Band Edge Emissions	CTX	1/252	1

Radiated emission and Band-edge tests were performed at its 3-axis and the worst-case was found at x-axis. All the results have been recorded in this report.

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
Notebook	DELL	D520	E2KWM3945ABG
Printer	EPSON	LQ-300+	N/A
Modem	ACEEX	DM1414	IFAXDM1414
iPod	Apple	A1136	DoC
Speaker	DELL	A215	DoC
Monitor	SAMSUNG	SAM-14MV	N/A
Wireless Music Receiver	U-MEDiA	ACR-100	SI5SA10ACR100

3.8. EUT Operation during Test

An executive program, EMCTEST.EXE under WIN XP, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows:

a. Turn on the power of all equipment.

b. The NB sends " H" messages to the panel, and the panel displays " H " patterns on the screen.

c. The NB sends " H " messages to the printer, then the printer prints them on the paper.

d. The NB sends " H " messages to the modem.

e. Repeat the steps from b to d.

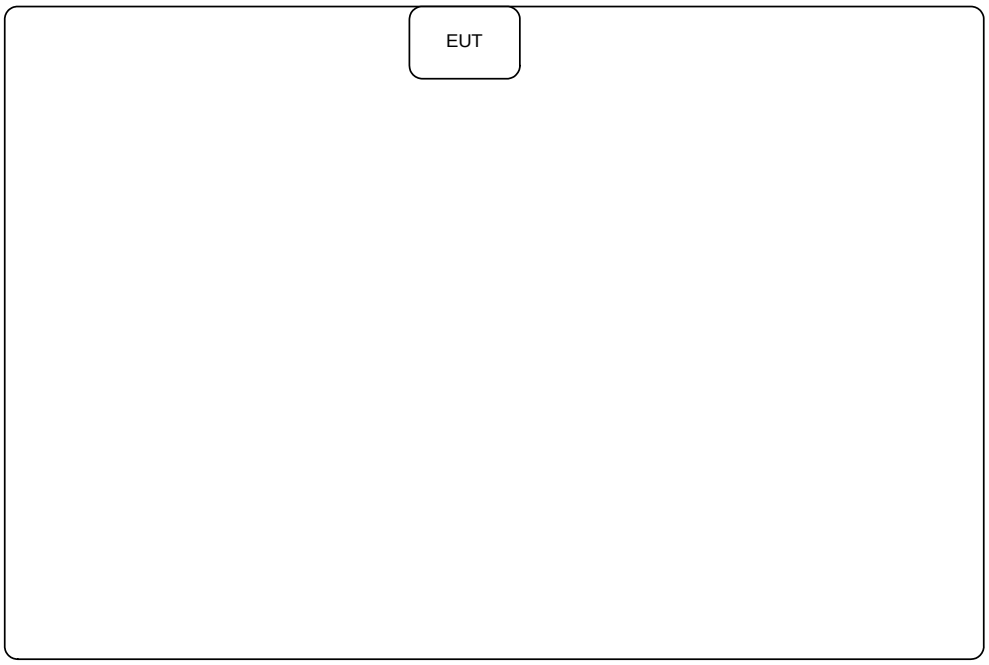
At the same time, the following programs were executed:

Executed to control the EUT continuously transmit RF signal.

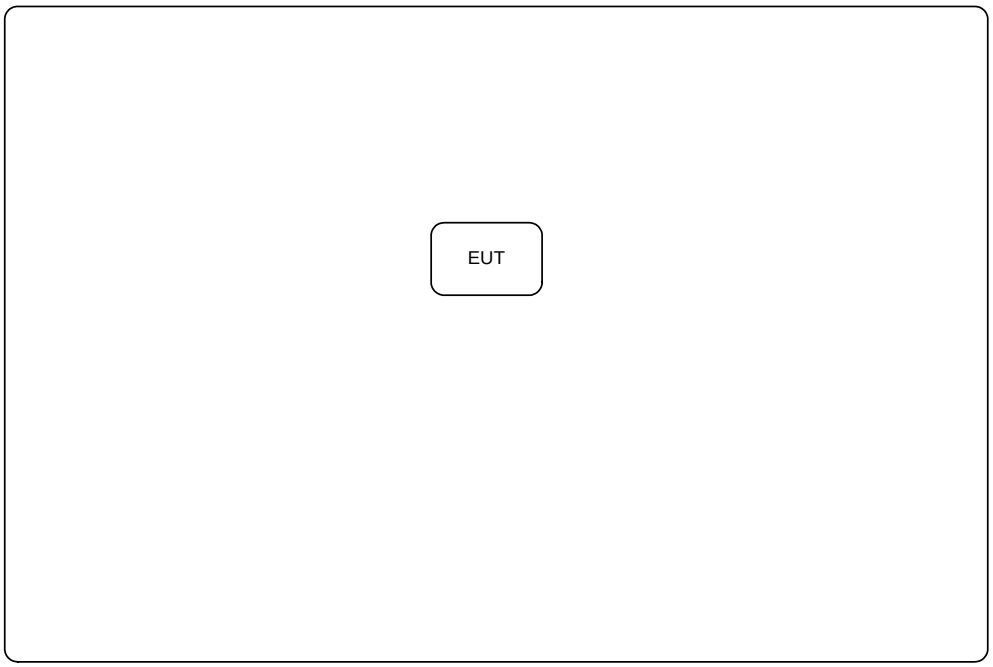
3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration

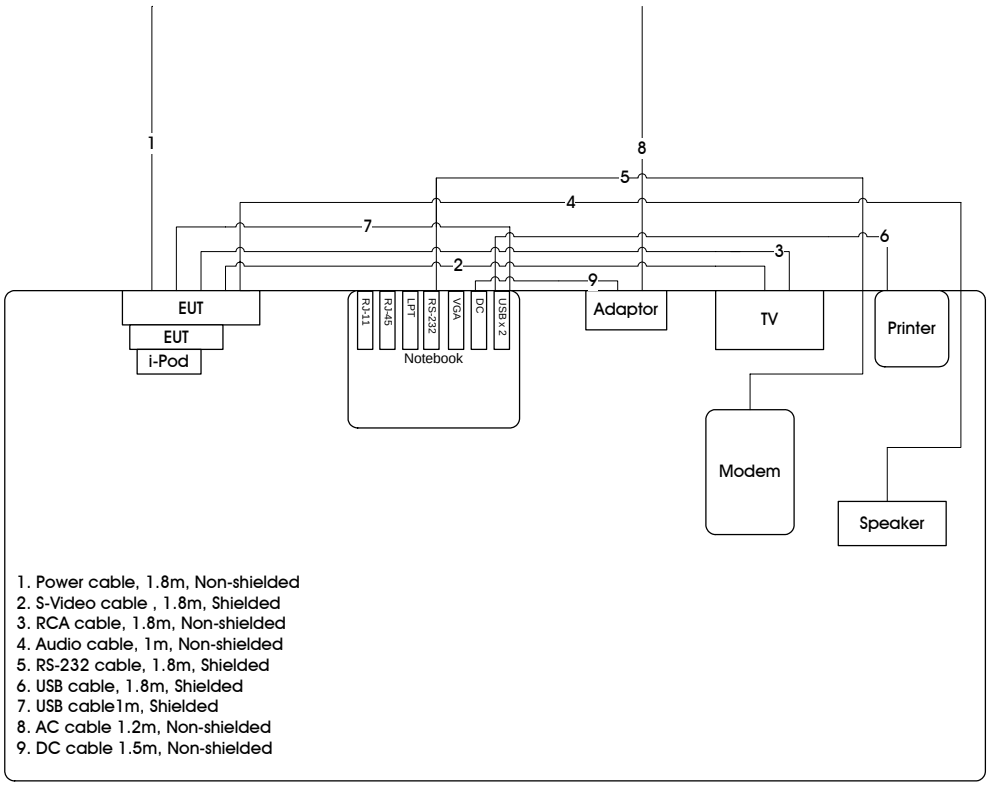
9kHz~1GHz



Above 1GHz



3.9.2. AC Power Line Conduction Emissions Test Configuration



1. Power cable, 1.8m, Non-shielded
2. S-Video cable , 1.8m, Shielded
3. RCA cable, 1.8m, Non-shielded
4. Audio cable, 1m, Non-shielded
5. RS-232 cable, 1.8m, Shielded
6. USB cable, 1.8m, Shielded
7. USB cable1m, Shielded
8. AC cable 1.2m, Non-shielded
9. DC cable 1.5m, Non-shielded

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. 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.

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

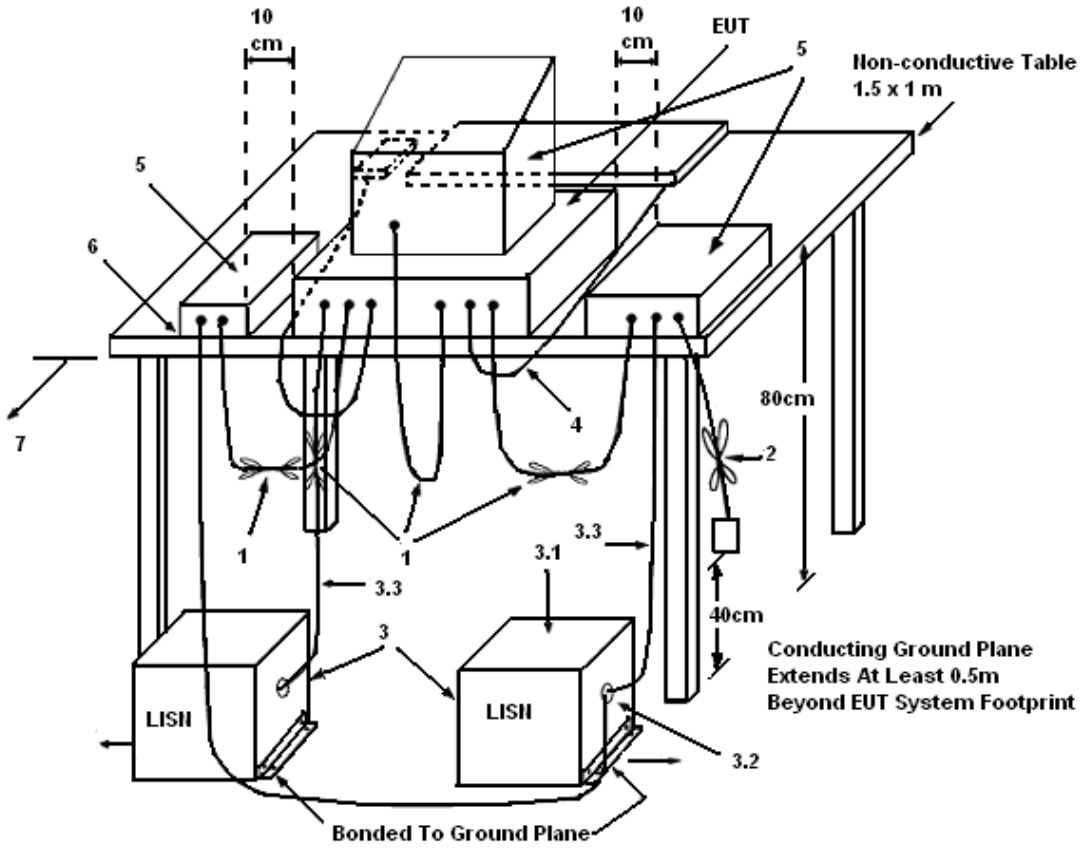
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

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



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.

4.1.5. Test Deviation

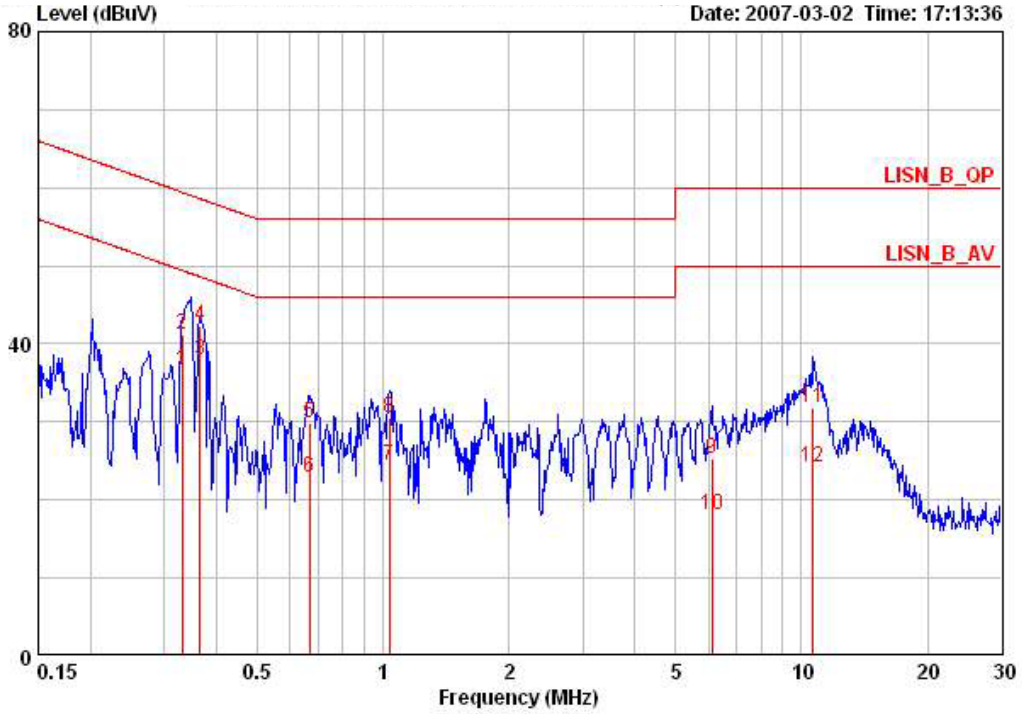
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

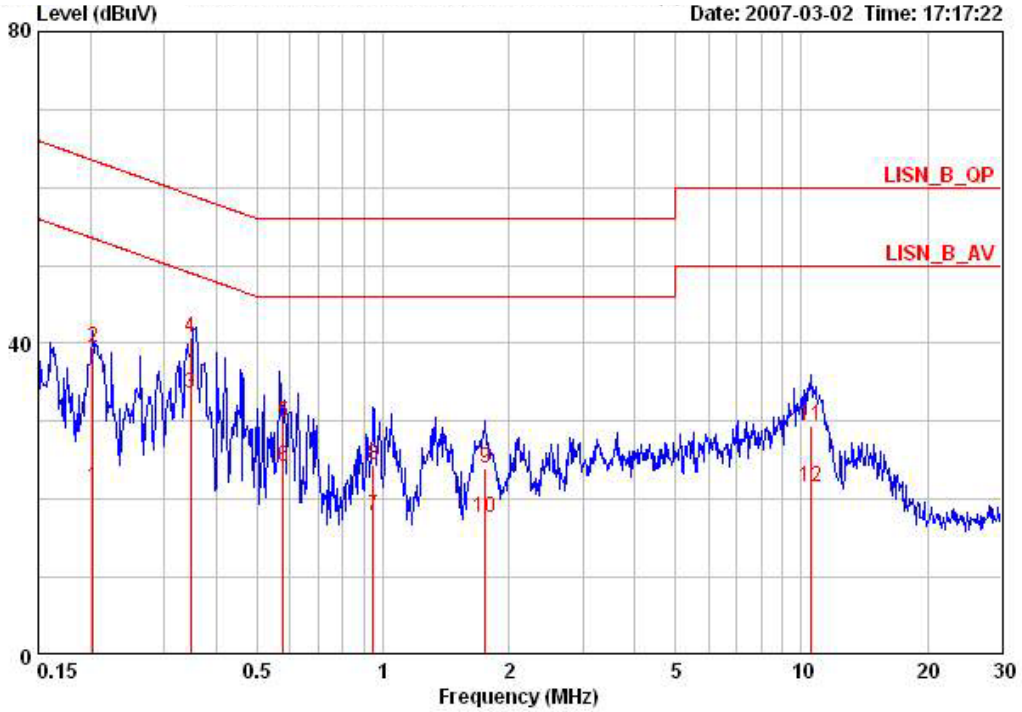
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	20℃	Humidity	59%
Test Engineer	Barry Chen	Phase	Line
Configuration	Normal Link / Charger Mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.33046	36.52	-12.92	49.44	36.29	0.03	0.20	AVERAGE	LINE
2	0.33046	41.27	-18.17	59.44	41.04	0.03	0.20	QP	LINE
3 @	0.36446	37.86	-10.76	48.63	37.65	0.01	0.20	AVERAGE	LINE
4	0.36446	42.25	-16.37	58.63	42.04	0.01	0.20	QP	LINE
5	0.66832	29.97	-26.03	56.00	29.77	0.00	0.20	QP	LINE
6	0.66832	22.91	-23.09	46.00	22.71	0.00	0.20	AVERAGE	LINE
7	1.037	24.33	-21.67	46.00	24.14	0.00	0.19	AVERAGE	LINE
8	1.037	30.44	-25.56	56.00	30.25	0.00	0.19	QP	LINE
9	6.121	25.38	-34.62	60.00	25.01	0.05	0.33	QP	LINE
10	6.121	18.12	-31.88	50.00	17.75	0.05	0.33	AVERAGE	LINE
11	10.676	31.91	-28.09	60.00	31.41	0.10	0.40	QP	LINE
12	10.676	24.13	-25.87	50.00	23.63	0.10	0.40	AVERAGE	LINE

Temperature	20℃	Humidity	59%
Test Engineer	Barry Chen	Phase	Neutral
Configuration	Normal Link / Charger Mode		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.20289	21.54	-31.95	53.49	21.24	0.10	0.20	AVERAGE	NEUTRAL
2	0.20289	39.37	-24.12	63.49	39.07	0.10	0.20	QP	NEUTRAL
3	0.34765	33.56	-15.46	49.02	33.34	0.02	0.20	AVERAGE	NEUTRAL
4	0.34765	40.79	-18.23	59.02	40.57	0.02	0.20	QP	NEUTRAL
5	0.57709	29.93	-26.07	56.00	29.73	0.00	0.20	QP	NEUTRAL
6	0.57709	24.22	-21.78	46.00	24.02	0.00	0.20	AVERAGE	NEUTRAL
7	0.94809	17.94	-28.06	46.00	17.74	0.00	0.20	AVERAGE	NEUTRAL
8	0.94809	24.49	-31.51	56.00	24.29	0.00	0.20	QP	NEUTRAL
9	1.753	23.90	-32.10	56.00	23.75	0.00	0.15	QP	NEUTRAL
10	1.753	17.61	-28.39	46.00	17.46	0.00	0.15	AVERAGE	NEUTRAL
11	10.564	29.40	-30.60	60.00	28.90	0.10	0.40	QP	NEUTRAL
12	10.564	21.53	-28.47	50.00	21.03	0.10	0.40	AVERAGE	NEUTRAL

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. Field Strength of Fundamental Emissions Measurement

4.2.1. Limit

The field strength of fundamental 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

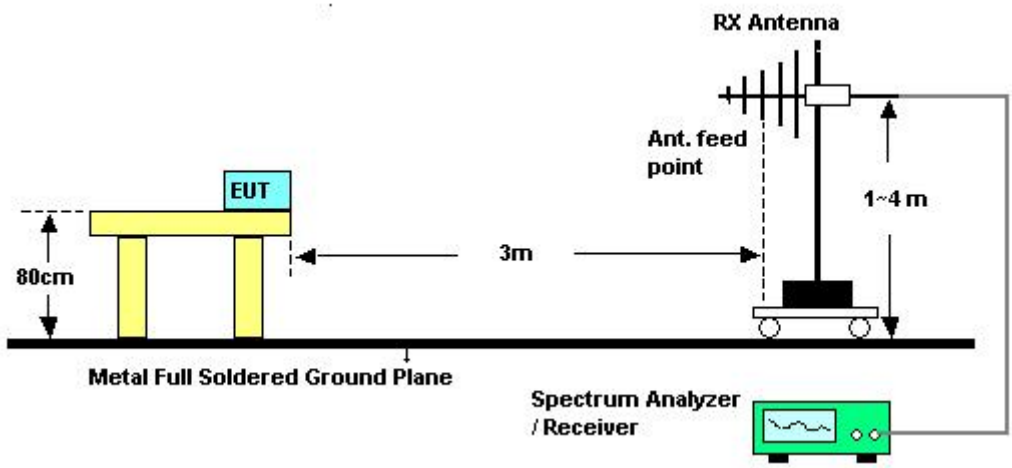
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Power Meter Parameter	Setting
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 is no deviation with the original standard.

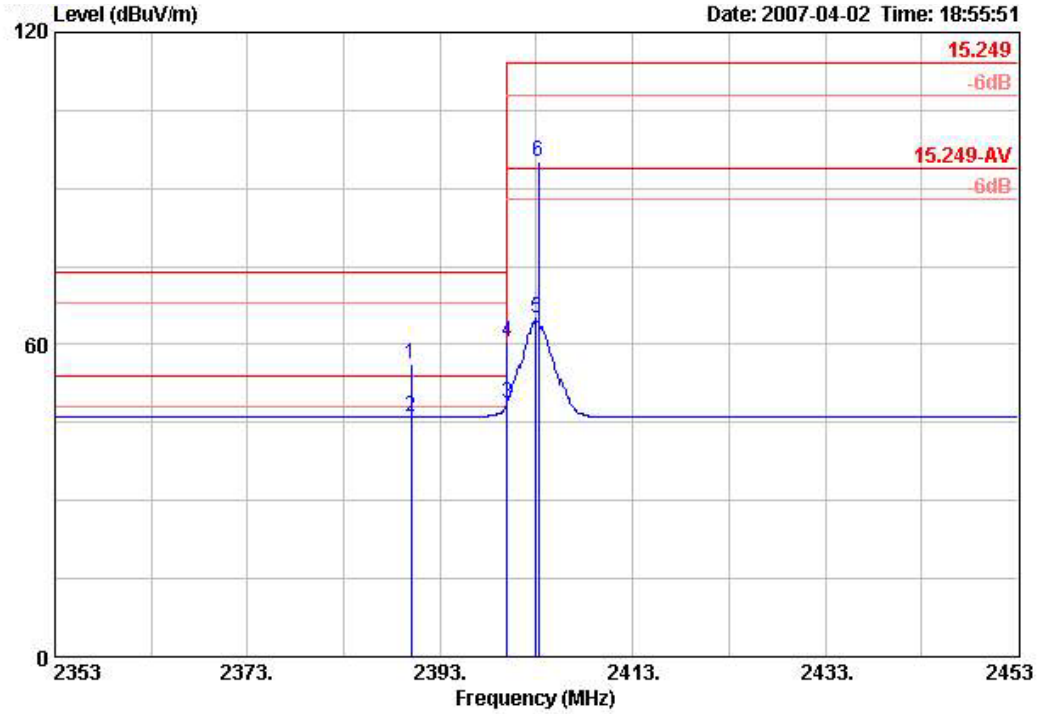
4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Field Strength of Fundamental Emissions

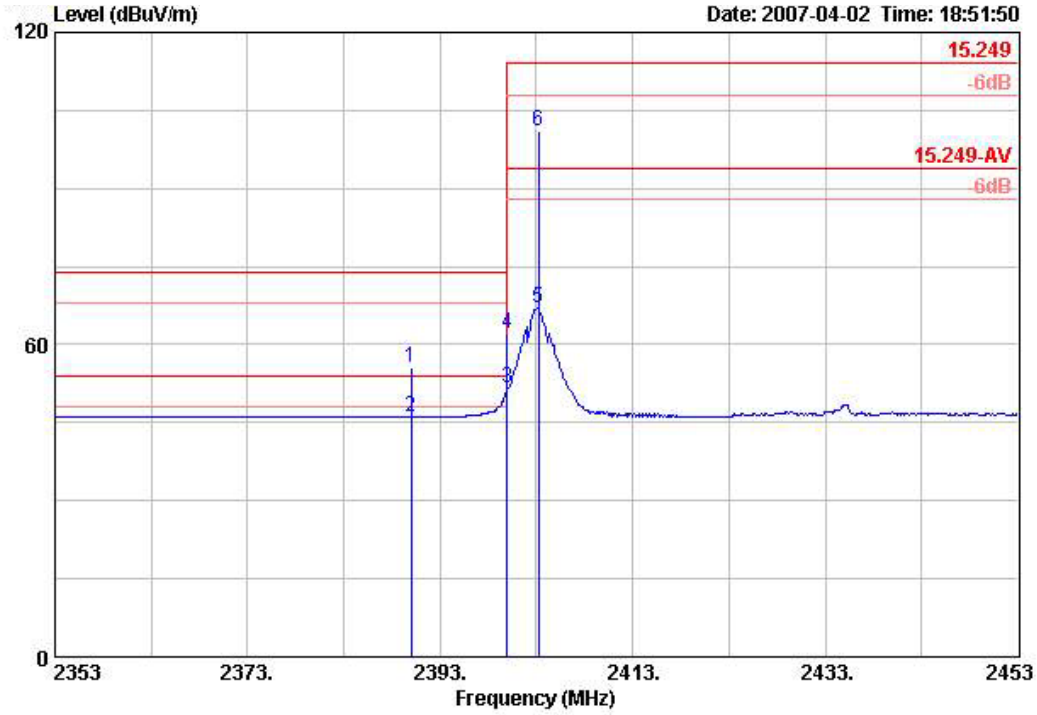
Temperature	23℃	Humidity	62%
Test Engineer	Jordan Hsiao	Configurations	Channel 1

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
5	2403.000	64.92	-29.08	94.00	31.84	28.09	4.98	0.00	AVERAGE	108	340
6	2403.200	95.04	-18.96	114.00	61.96	28.09	4.98	0.00	PEAK	108	340

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
5	2403.200	67.10	-26.90	94.00	34.03	28.09	4.98	0.00	AVERAGE	100	29
6	2403.200	100.95	-13.05	114.00	67.88	28.09	4.98	0.00	PEAK	100	29

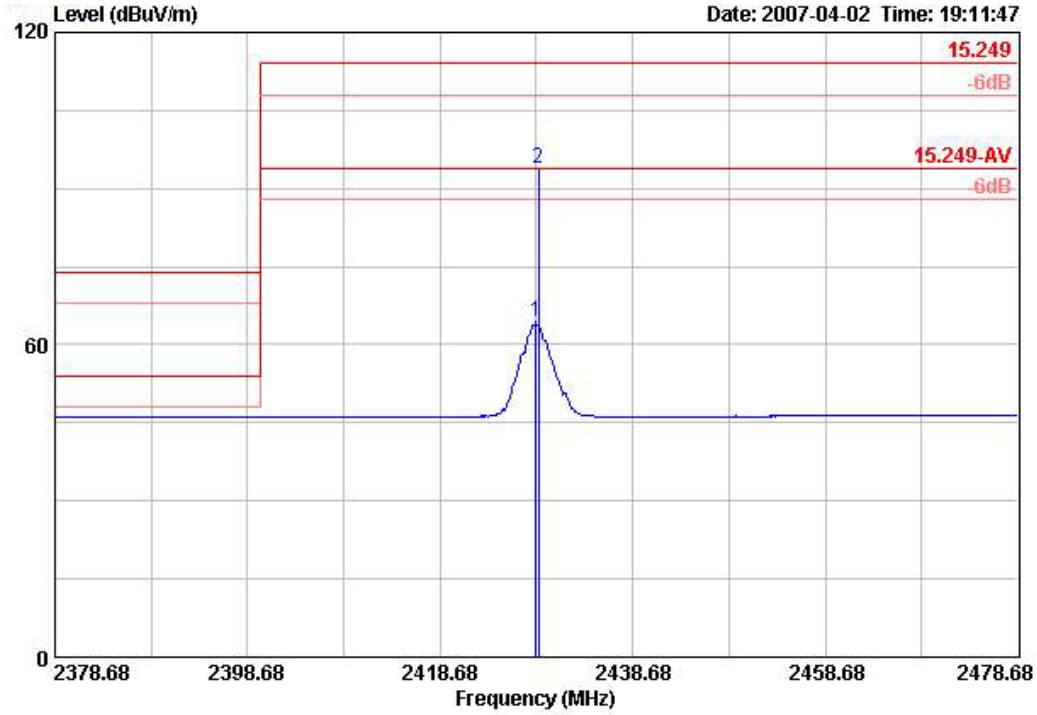
Note:

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

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

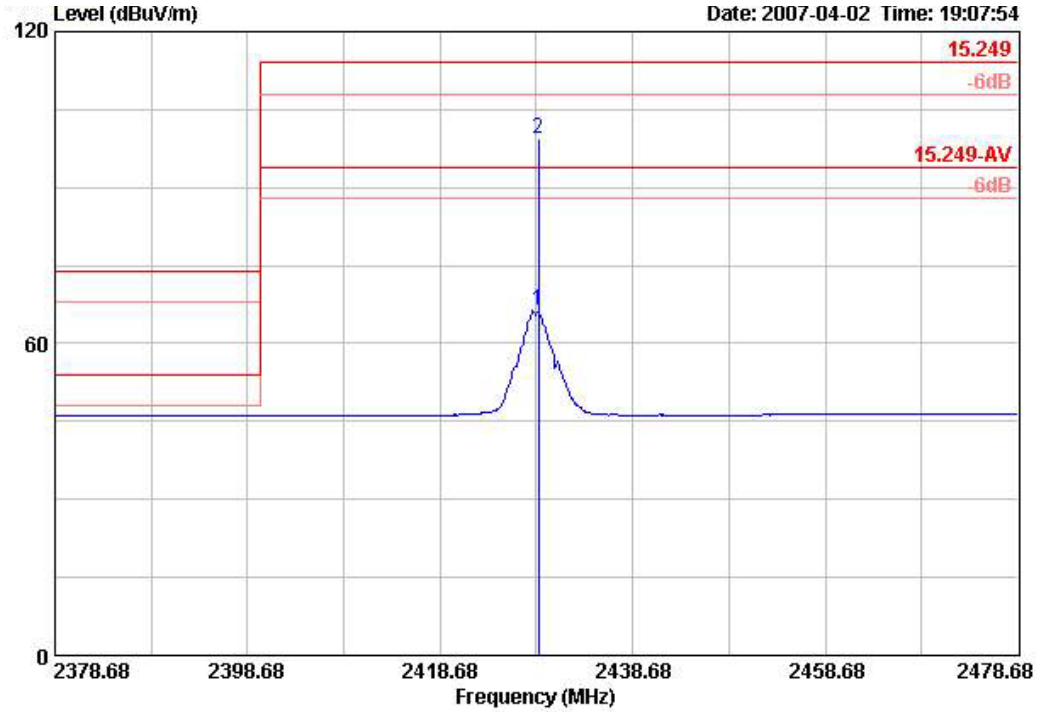
Temperature	23℃	Humidity	62%
Test Engineer	Jordan Hsiao	Configurations	Channel 128

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2428.680	64.29	-29.71	94.00	31.13	28.13	5.02	0.00	AVERAGE	100	340
2	2428.880	93.68	-20.32	114.00	60.53	28.13	5.02	0.00	PEAK	100	340

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2428.880	66.50	-27.50	94.00	33.34	28.13	5.02	0.00	AVERAGE	123	27
2	2428.880	99.34	-14.66	114.00	66.18	28.13	5.02	0.00	PEAK	123	27

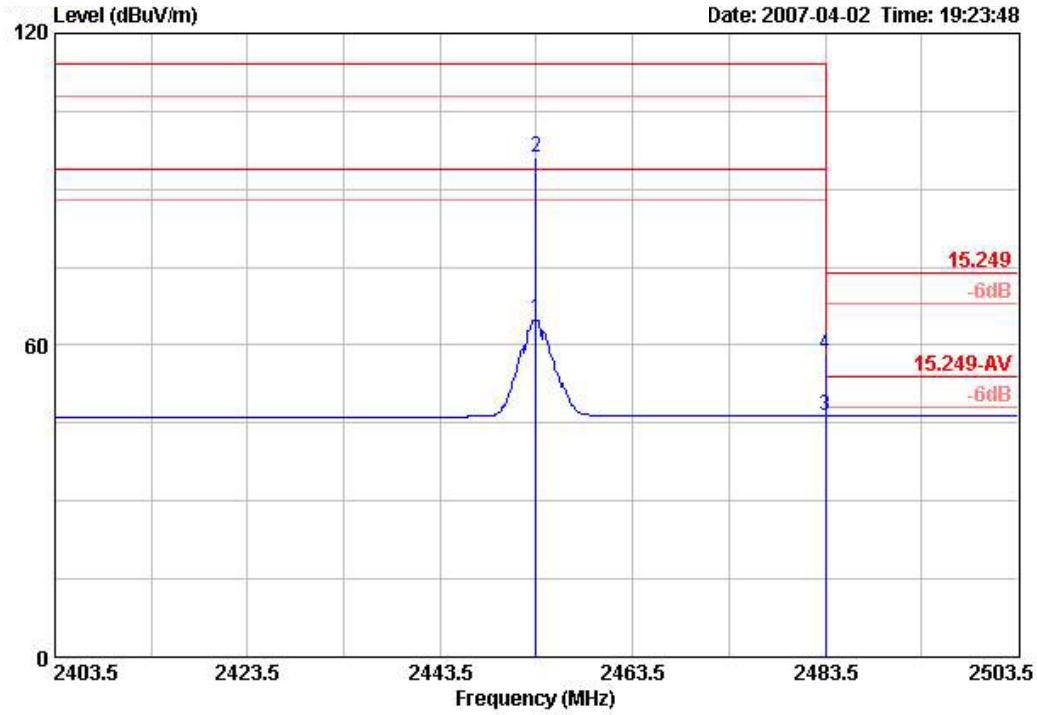
Note:

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

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

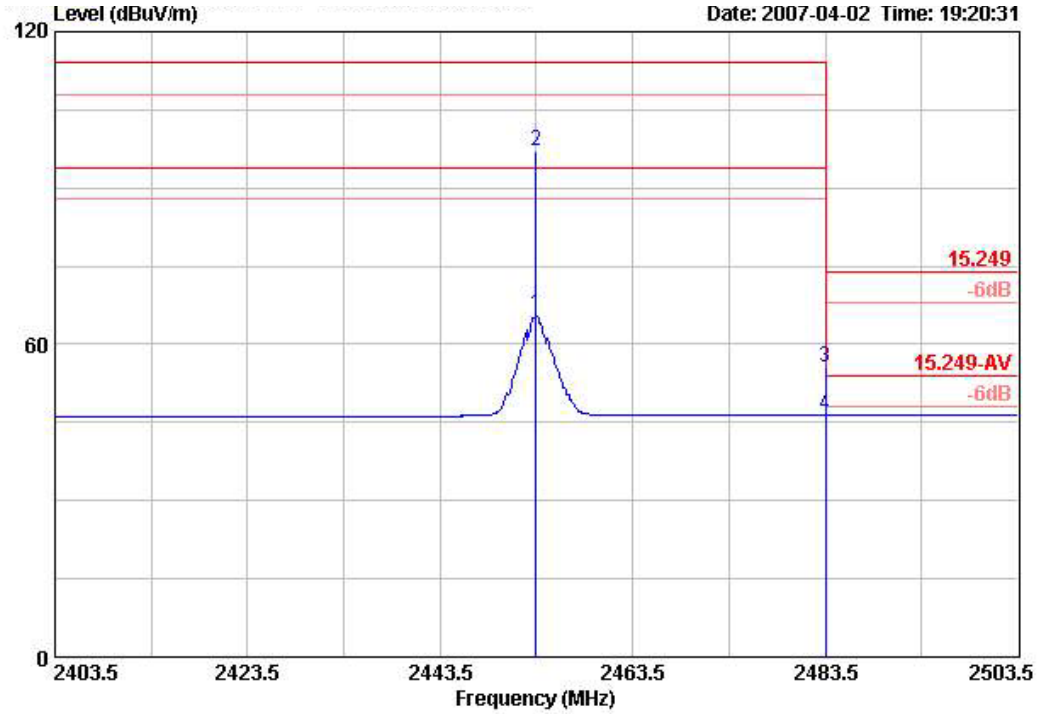
Temperature	23℃	Humidity	62%
Test Engineer	Jordan Hsiao	Configurations	Channel 252

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2453.500	65.12	-28.88	94.00	31.83	28.22	5.07	0.00	AVERAGE	105	100
2	2453.500	95.98	-18.02	114.00	62.70	28.22	5.07	0.00	PEAK	105	100

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2453.500	65.67	-28.33	94.00	32.38	28.22	5.07	0.00	AVERAGE	121	31
2	2453.500	97.04	-16.96	114.00	63.75	28.22	5.07	0.00	PEAK	121	31

Note:

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

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

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 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

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 is no deviation with the original standard.

4.3.6. EUT Operation during Test

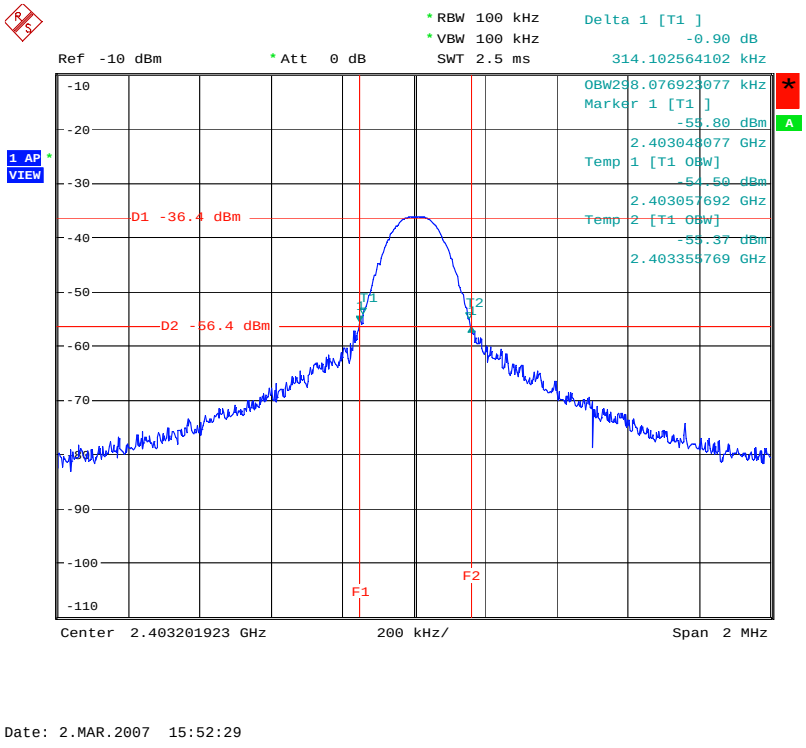
The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 20dB Spectrum Bandwidth

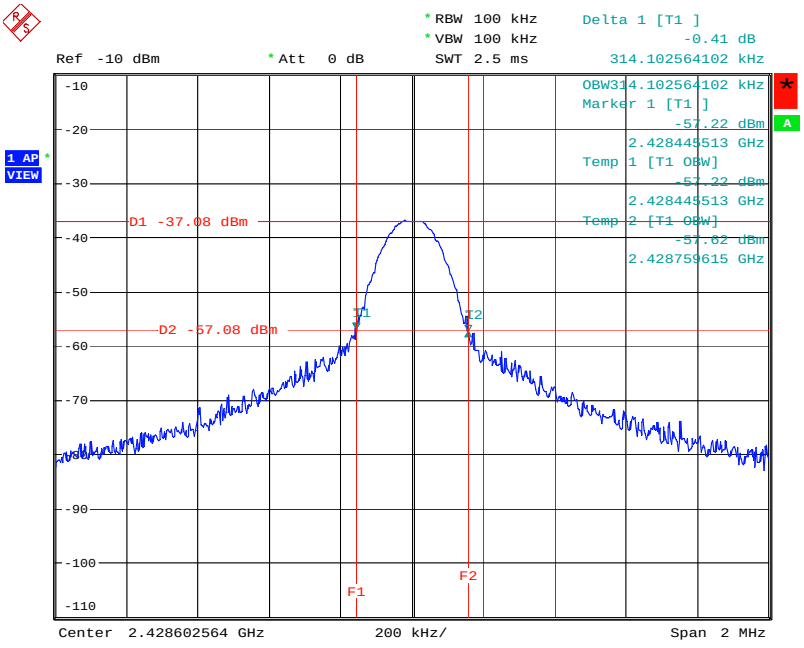
Temperature	23℃	Humidity	62%
Test Engineer	Leo Hung	Configurations	Channel 1/128/252

Frequency	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) $f_L > 2400MHz$	Frequency range (MHz) $f_H < 2483.5MHz$	Test Result
2403.0 MHz	0.314	0.298	2403.0480	-	Complies
2428.0 MHz	0.314	0.314	-	-	Complies
2453.0 MHz	0.310	0.307	-	2453.5500	Complies

20 dB/99% Bandwidth Plot on 2403.0 MHz



20 dB/99% Bandwidth Plot on 2428.0 MHz



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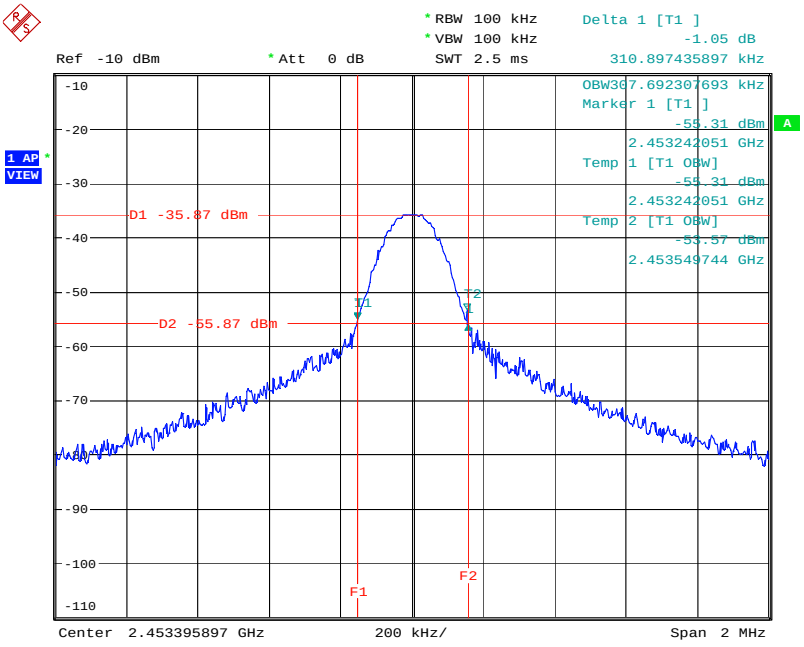
20 dB/99% Bandwidth Plot on 2453.0 MHz



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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 of equipments list in this report. The following table is the setting of the spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

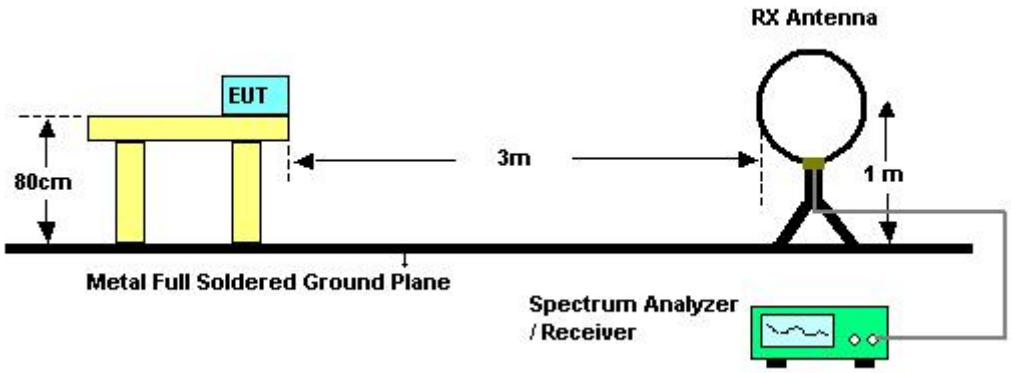
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.4.3. Test Procedures

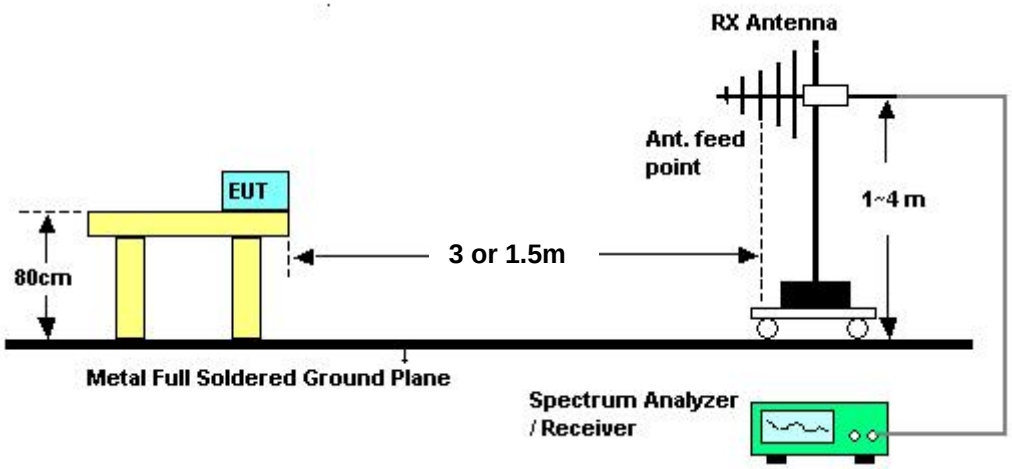
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

4.4.5. Test Deviation

There is no deviation 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	23℃	Humidity	62%
Test Engineer	Jordan Hsiao	Configurations	Channel 128

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 20dB below the permissible value has no need to be reported.

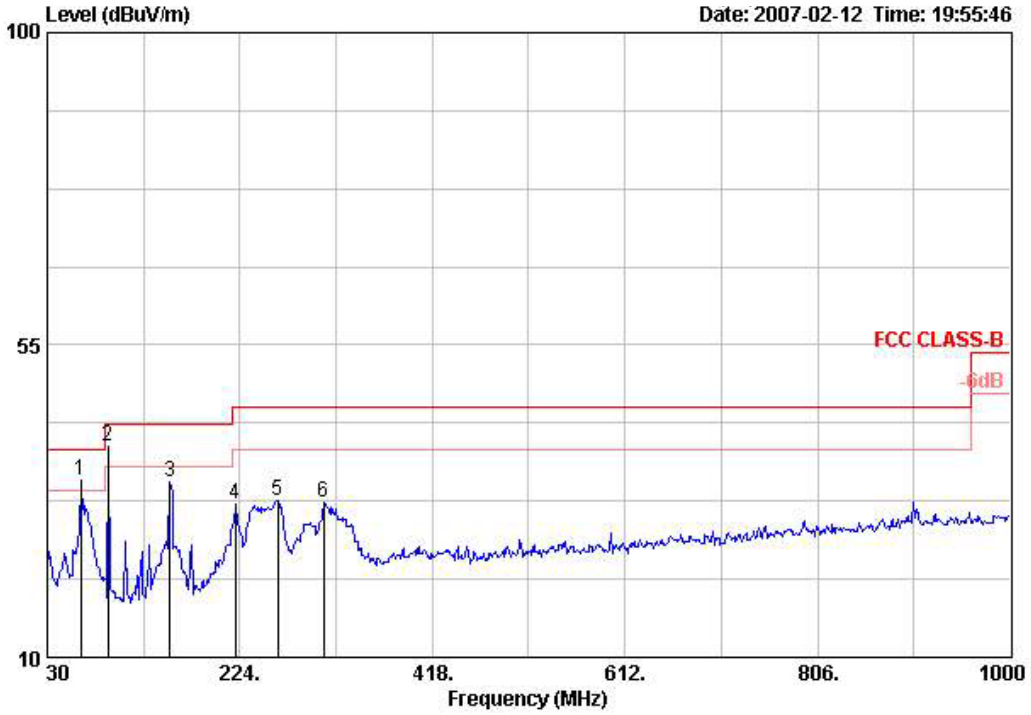
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

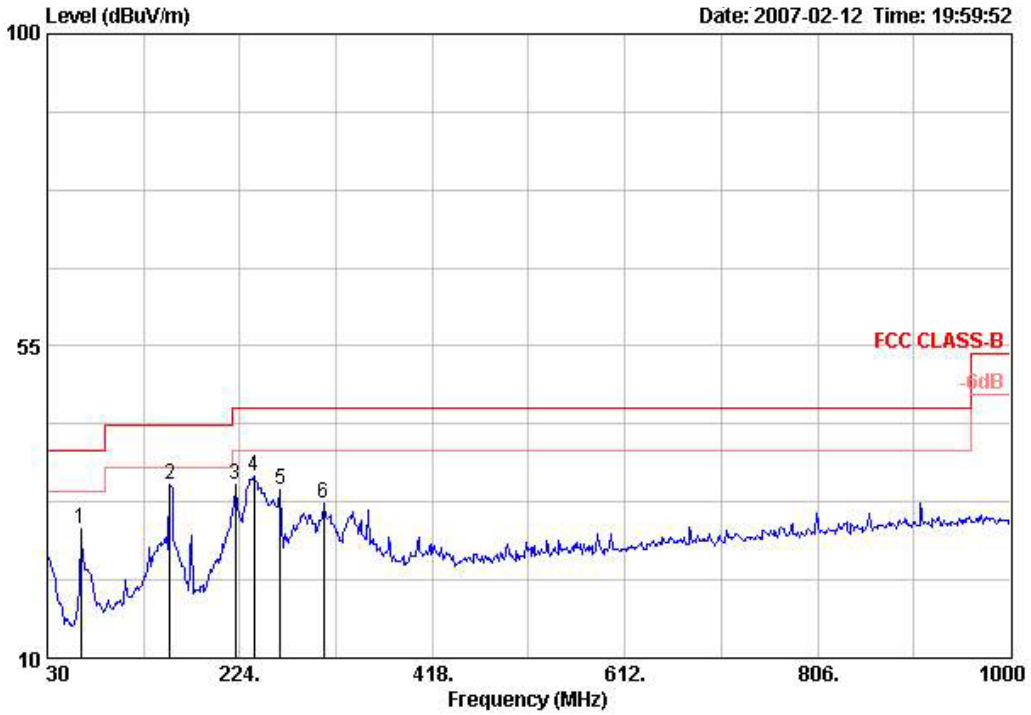
Temperature	23℃	Humidity	62%
Test Engineer	Jordan Hsiao	Configurations	Channel 128

Vertical



	Freq	Read Level	Level	Limit Line	Over Limit	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV	dBuV/m	dBuV/m	dB	dB/m	dB	dB		cm	deg	
1 *	63.950	59.35	35.46	40.00	-4.54	6.60	31.82	1.33	Peak	---	---	VERTICAL
2 *	91.110	61.02	40.44	43.50	-3.06	9.58	31.59	1.43	Peak	100	93	VERTICAL
3 *	153.190	53.83	35.22	43.50	-8.28	11.02	31.53	1.90	Peak	---	---	VERTICAL
4	219.150	50.90	32.10	46.00	-13.90	10.51	31.41	2.10	Peak	---	---	VERTICAL
5	261.830	47.60	32.64	46.00	-13.36	13.88	31.34	2.50	Peak	---	---	VERTICAL
6	308.390	47.10	32.27	46.00	-13.73	14.24	31.31	2.23	Peak	---	---	VERTICAL

Horizontal



	Freq	Read Level	Level	Limit Line	Over Limit	Antenna Factor	Preamp Factor	Cable Loss	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV	dBuV/m	dBuV/m	dB	dB/m	dB	dB		cm	deg	
1 *	63.950	52.50	28.61	40.00	-11.39	6.60	31.82	1.33	Peak	---	---	HORIZONTAL
2 *	153.190	53.57	34.96	43.50	-8.54	11.02	31.53	1.90	Peak	---	---	HORIZONTAL
3 *	219.150	53.76	34.96	46.00	-11.04	10.51	31.41	2.10	Peak	---	---	HORIZONTAL
4 *	238.550	53.32	36.24	46.00	-9.76	12.00	31.37	2.28	Peak	---	---	HORIZONTAL
5	264.740	49.47	34.33	46.00	-11.67	13.70	31.34	2.50	Peak	---	---	HORIZONTAL
6	308.390	47.03	32.20	46.00	-13.80	14.24	31.31	2.23	Peak	---	---	HORIZONTAL

Note:

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

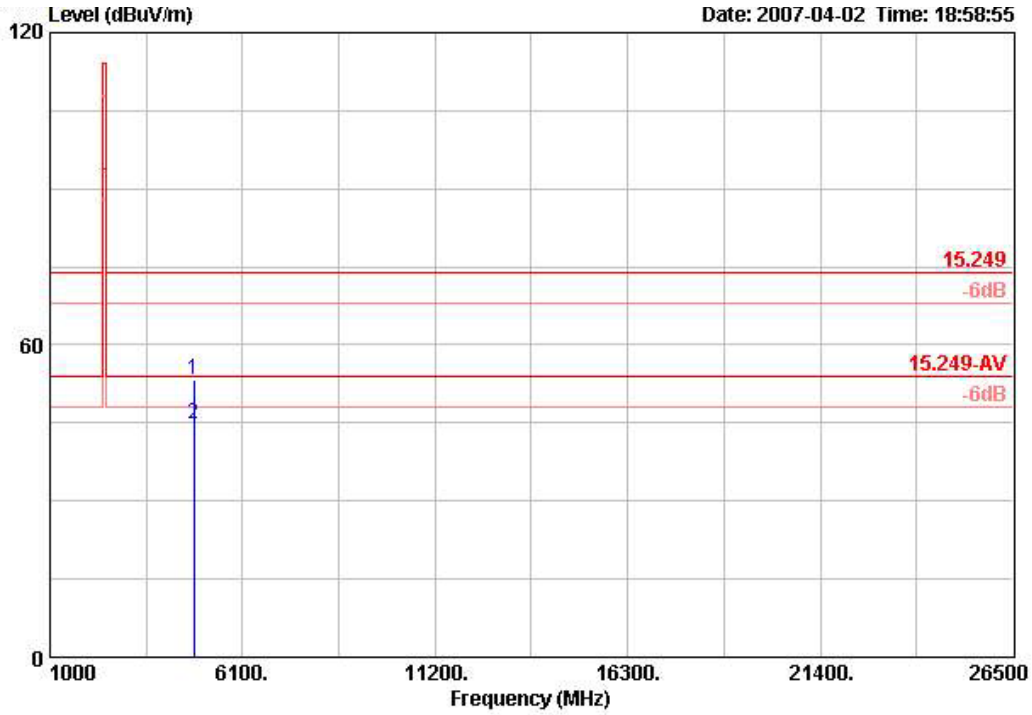
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

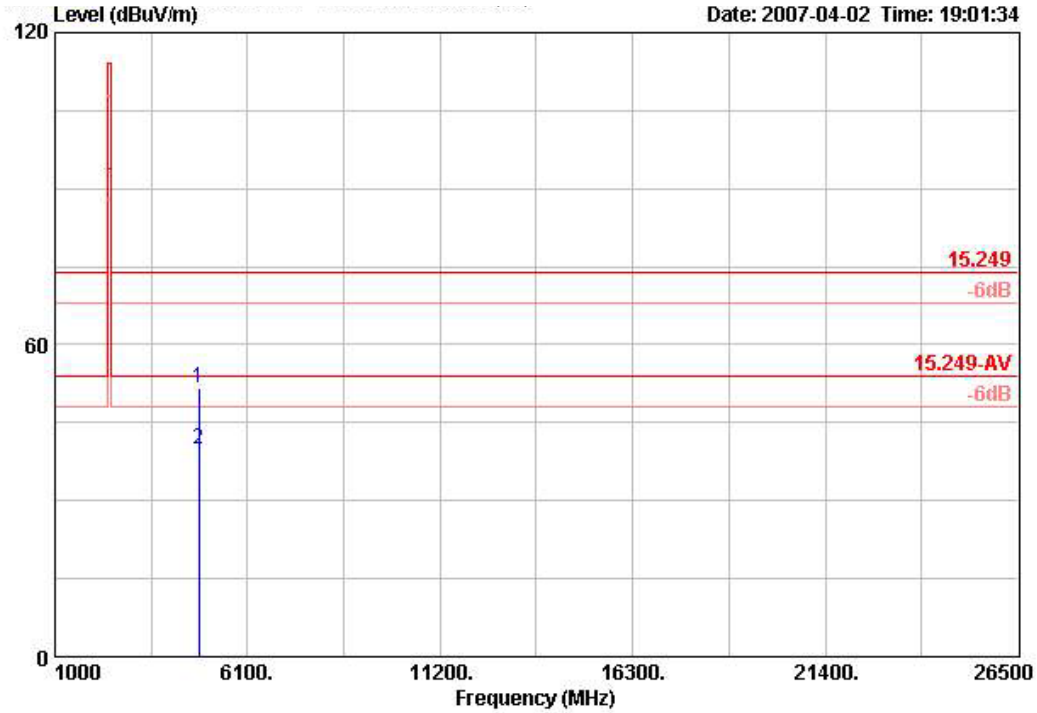
Temperature	23℃	Humidity	62%
Test Engineer	Jordan Hsiao	Configurations	Channel 1

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4805.540	53.19	-20.81	74.00	45.87	33.36	7.20	33.24	PEAK	100	152
2 @	4806.160	44.64	-9.36	54.00	37.32	33.36	7.20	33.24	AVERAGE	100	152

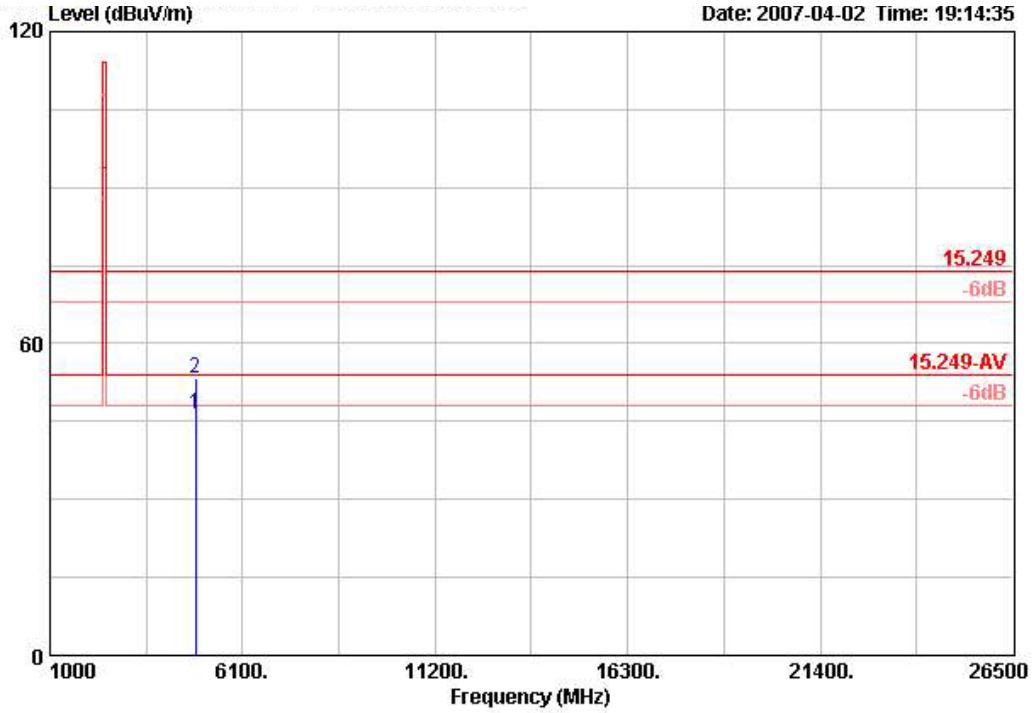
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4805.050	51.65	-22.35	74.00	44.33	33.36	7.20	33.24	PEAK	100	349
2	4805.280	40.00	-14.00	54.00	32.68	33.36	7.20	33.24	AVERAGE	100	349

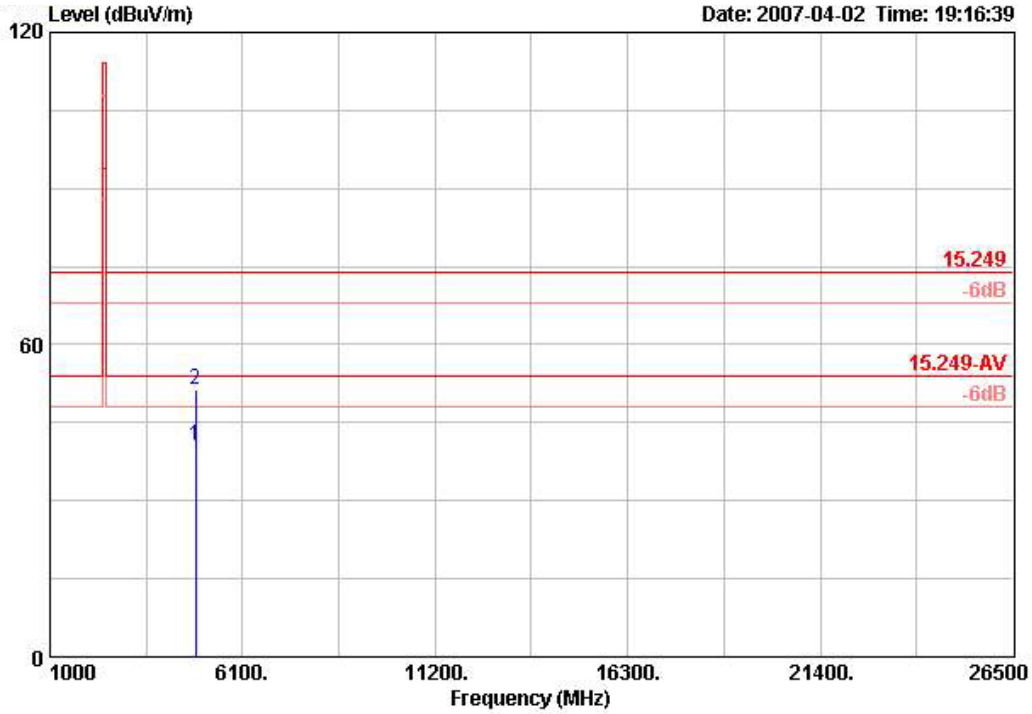
Temperature	23℃	Humidity	62%
Test Engineer	Jordan Hsiao	Configurations	Channel 128

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	4856.540	46.36	-7.64	54.00	38.92	33.45	7.22	33.23	AVERAGE	112	94
2	4856.820	53.38	-20.62	74.00	45.93	33.45	7.22	33.23	PEAK	112	94

Horizontal



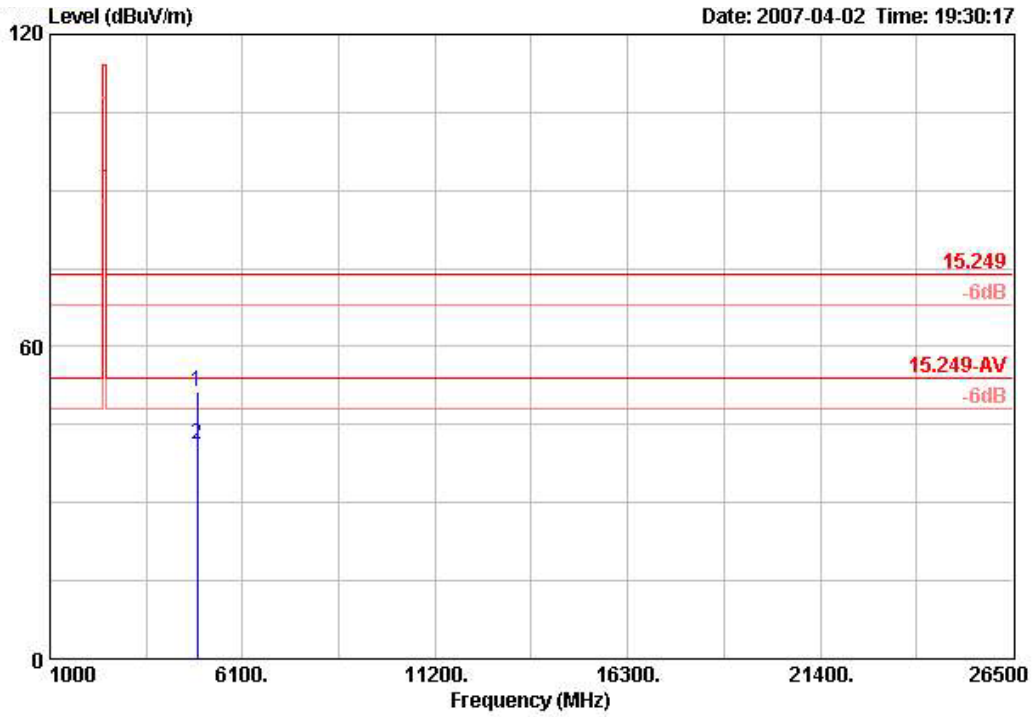
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4856.540	40.43	-13.57	54.00	32.98	33.45	7.22	33.23	AVERAGE	100	360
2	4857.220	51.20	-22.80	74.00	43.75	33.45	7.22	33.23	PEAK	100	360

Temperature	23℃	Humidity	62%
Test Engineer	Jordan Hsiao	Configurations	Channel 252

Vertical

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	4906.180	44.34	-9.66	54.00	36.77	33.54	7.25	33.22	AVERAGE	105	258
2	4906.280	52.96	-21.04	74.00	45.39	33.54	7.25	33.22	PEAK	105	258

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4905.960	51.28	-22.72	74.00	43.71	33.54	7.25	33.22	PEAK	100	57
2 @	4906.060	41.08	-12.92	54.00	33.51	33.54	7.25	33.22	AVERAGE	100	57

Note:

The amplitude of spurious emissions which 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.

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 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	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

4.5.3. Test Procedures

1. The test procedure is the same as section 4.2.3, only the frequency 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.

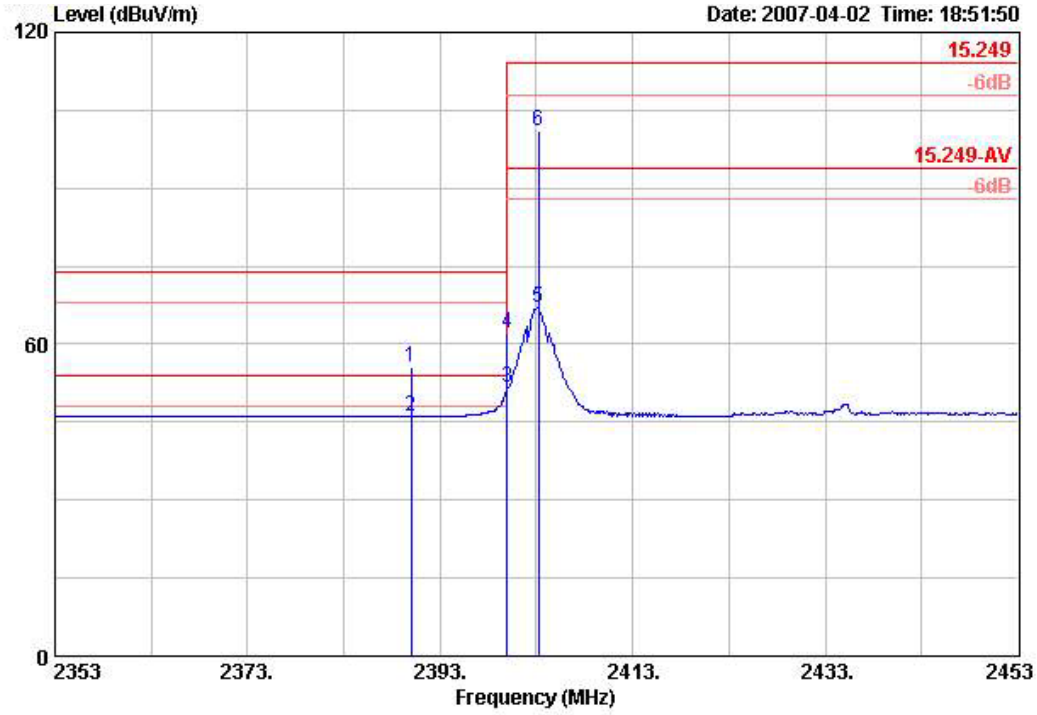
4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Band Edge and Fundamental Emissions

Temperature	23℃	Humidity	62%
Test Engineer	Jordan Hsiao	Configurations	Channel 1, 252

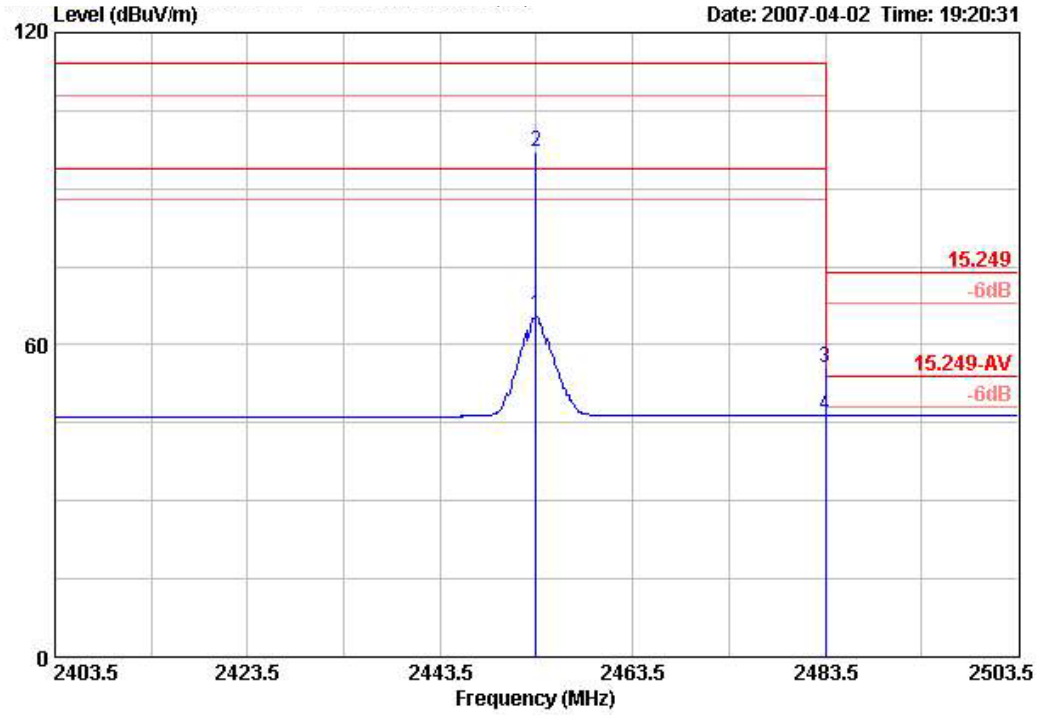
Channel 1



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2390.000	55.47	-18.53	74.00	22.43	28.05	4.98	0.00	PEAK	100	29
2 @	2390.000	46.19	-7.81	54.00	13.16	28.05	4.98	0.00	AVERAGE	100	29
3 @	2400.000	51.61	-2.39	54.00	18.58	28.05	4.98	0.00	AVERAGE	100	29
4 @	2400.000	62.07	-11.93	74.00	29.04	28.05	4.98	0.00	PEAK	100	29
5	2403.200	67.10			34.03	28.09	4.98	0.00	AVERAGE	100	29
6	2403.200	100.95			67.88	28.09	4.98	0.00	PEAK	100	29

Item 5, 6 are fundamental frequency at 2403 MHz.

Channel 252



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2453.500	65.67			32.38	28.22	5.07	0.00	AVERAGE	121	31
2	2453.500	97.04			63.75	28.22	5.07	0.00	PEAK	121	31
3	2483.500	55.52	-18.48	74.00	22.15	28.26	5.11	0.00	PEAK	121	31
4 @	2483.500	46.47	-7.53	54.00	13.10	28.26	5.11	0.00	AVERAGE	121	31

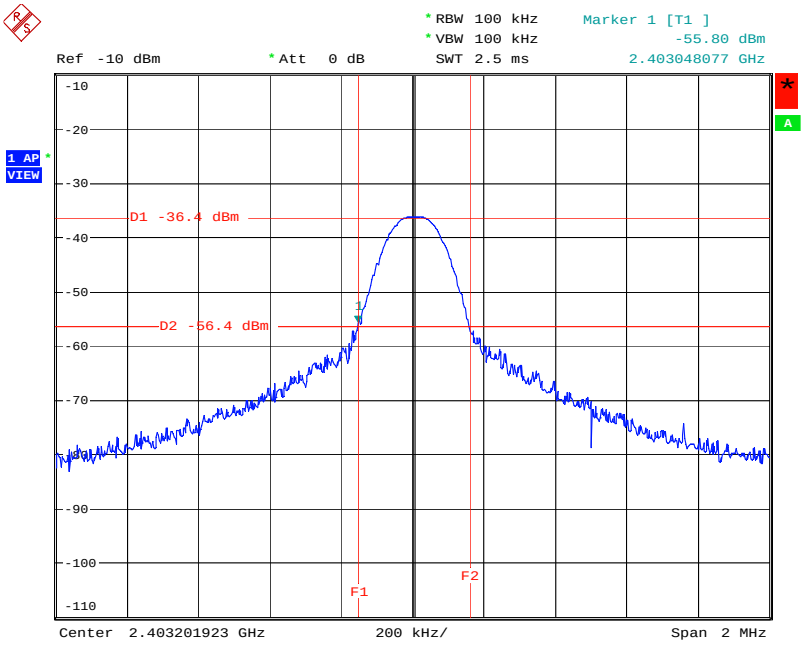
Item 1, 2 are fundamental frequency at 2453 MHz.

Note:

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

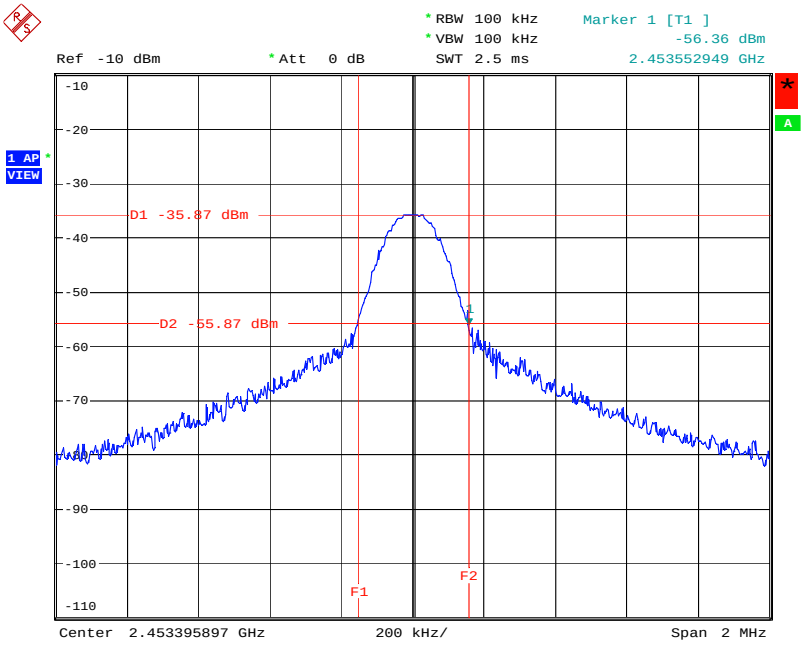
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Low Band Edge Plot on 2403.0 MHz



Date: 2.MAR.2007 15:53:04

High Band Edge Plot on 2453.0 MHz



Date: 2.MAR.2007 15:51:11

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; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 15, 2006	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	CPA9231A	1886	9 kHz - 2 GHz	Jan. 22, 2007	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	May 29, 2006	Radiation (03CH03-HY)
Amplifier	MITEQ	AMF-6F-260400	923364	26.5 GHz - 40 GHz	Jan. 22, 2007*	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100004/040	9 kHz - 40 GHz	Sep. 21, 2006	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	May 23, 2006*	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Jul. 24, 2006	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Apr. 27, 2006	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	NCR	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Dec. 02, 2006	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Dec. 02, 2006	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)
EMC Receiver	R&S	ESCS 30	100359	9kHz – 2.75GHz	Sep. 21, 2006	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 28, 2007	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 17, 2007	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2006	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz –30MHz	Mar. 27, 2007	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
Spectrum Analyzer	R&S	FSP30	100023	9kHz ~ 30GHz	Dec. 17, 2006	Conducted (TH01-HY)
Power Meter	R&S	NRVS	100764	DC ~ 40GHz	Jul. 20, 2006	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z51	100666	DC ~ 40GHz	Jul. 20, 2006	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jun. 10, 2006	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	Dec. 28, 2006	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 02, 2006	Conducted (TH01-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 01, 2006	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 01, 2006	Conducted (TH01-HY)
Oscilloscope	Tektronix	TDS1012	CO38515	100MHz / 1GS/s	Jun. 20, 2006	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Dec. 30, 2006	Conducted (TH01-HY)
Data Generator	Tektronix	DG2030	063-2920-50	0.1Hz~400MHz	Jun. 16, 2006	Conducted (TH01-HY)

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

*Calibration Interval of instruments listed above is two year.

NCR means Non-Calibration required.

6. 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

7. TAF CERTIFICATE OF ACCREDITATION

Certificate No. : L1190-070110

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, 2007 to January 09, 2010
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

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

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