SPORTON International Inc.
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FCC RADIO TEST REPORT

Applicant's company	**CIPHERLAB CO.,LTD**
Applicant Address	12 F,333,Dunhua S.Rd.,Sec.2,Taipei,Taiwan
FCC ID	**Q3N-8360BL**
Manufacturer's company	**CIPHERLAB CO.,LTD**
Manufacturer Address	12 F,333,Dunhua S.Rd.,Sec.2,Taipei,Taiwan

Product Name	Terminal
Brand Name	CIPHERLAB
Model Name	8360
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.249
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Sep. 29, 2006
Final Test Date	Nov. 07, 2006
Submission Type	Class II Change

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.

Lab Code: 200079-0

Table of Contents

History of This Test Report

Original Issue Date: Nov. 10, 2006

Report No.: FR692813

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Terminal
Brand Name	:	CIPHERLAB
Model Name	:	8360
Applicant	:	CIPHERLAB CO.,LTD
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 Sep. 29, 2006 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.

Prepared By:	Tested By:	Reviewed By:
Tina Jao / Specialist	Sam Lee / Engineer	Wayne Hsu

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	9.86 dB
4.2	15.249(a)	Field Strength of Fundamental Emissions	Complies	5.21 dB
4.3	15.215(c)	20dB Spectrum Bandwidth	Complies	-
4.4	15.249(a)/(d)	Radiated Emissions	Complies	3.56 dB
4.5	15.249(d)	Band Edge Emissions	Complies	3.91 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	±1.89dB	Confidence levels of 95%
20dB Spectrum Bandwidth	$\pm 1.64 \times 10^{-6}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.754dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.89dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.89dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.86dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±0.04%	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Power Type	5V DC from adapter ; 3.7V DC from battery
Modulation	GFSK
Frequency Range	2400 ~ 2483.5MHz
Channel Number	79
Channel Band Width (99%)	980 kHz
Max. Field Strength	84.92 dBuV/m at 3m (Average)

3.2. Accessories

Power	Brand	Model	Rating
Adapter 1	BALANCE	GPSA-0500255	INPUT: 100-240V AC OUTPUT: 5V DC
Li-ion Battery	-	-	3.7V DC
Others			
Cradle / RS-232 cable / Power cord			

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	ACX	AT9520 Series	Chip Antenna	NA	3.0

3.4. Table for Carrier Frequencies

Frequency Band	Channel No.	Frequency
2400~2483.5MHz	0	2402 MHz
	1	2403 MHz
	:	:
	38	2440 MHz
	39	2441 MHz
	40	2442 MHz
	:	:
	77	2479 MHz
	78	2480 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	39	1
Field Strength of Fundamental Emissions 20dB Spectrum Bandwidth	CTX	0/39/78	1
Radiated Emissions 9kHz~1GHz	CTX	39	1
Radiated Emissions 1GHz~10th Harmonic	CTX	0/39/78	1
Band Edge Emissions	CTX	0/78	1

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).

3.7. Please refer section 6 for Test Site Address. Table for Existing Change

Modified with following changes:

1.) Change antenna of Bluetooth from Wire antenna to AT9520-B2R4HAAT

2.) Change PCB to model 8300.

Change AC/DC adapter from SA10-0515U (SINO-AMERICAN) to GPSA-0500255 (BALANCE ELECTRONICS) for charging.

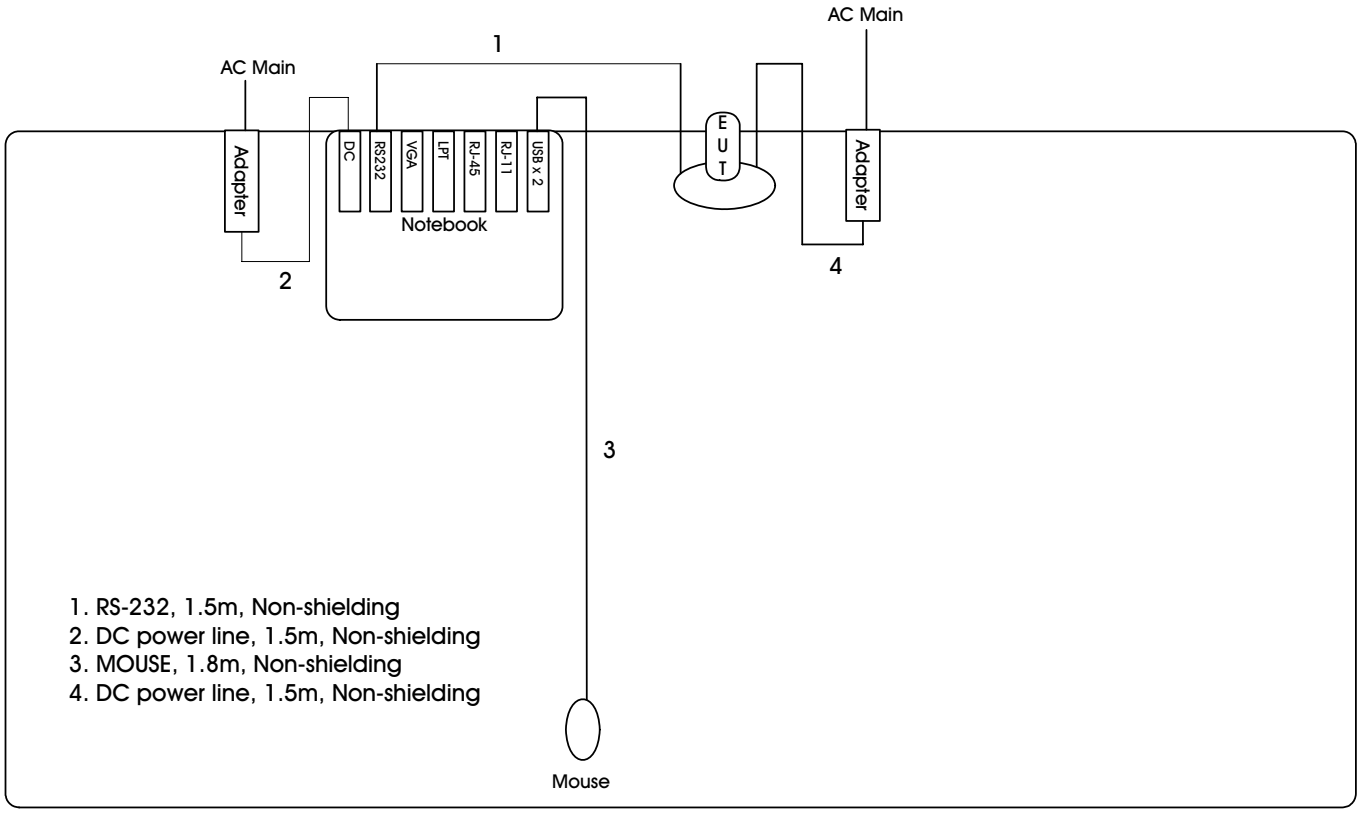
3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D400	DoC
Mouse	Microsoft	1004	DoC
Notebook	DELL	PP01L	DoC

3.9. Test Configurations

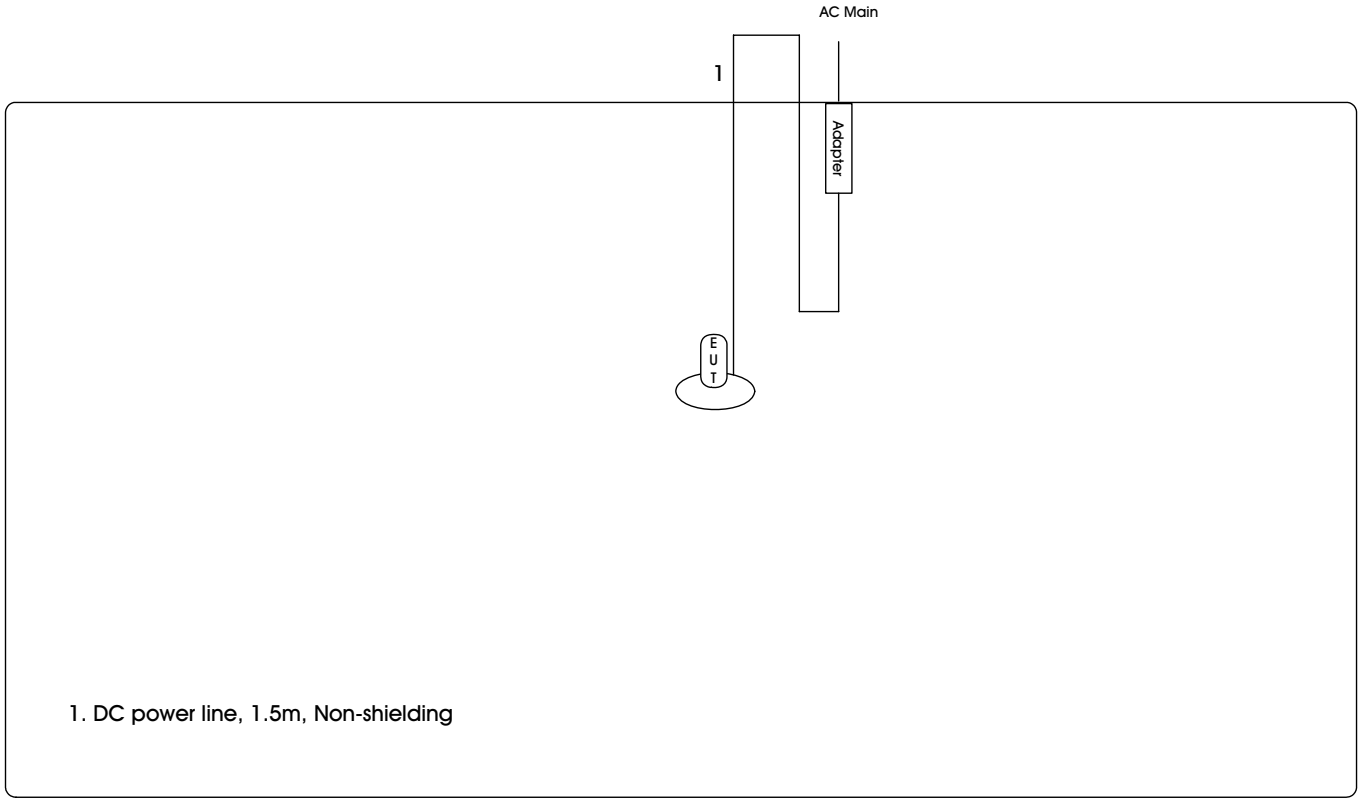
3.9.1. Radiation Emissions Test Configuration

Below 1GHz



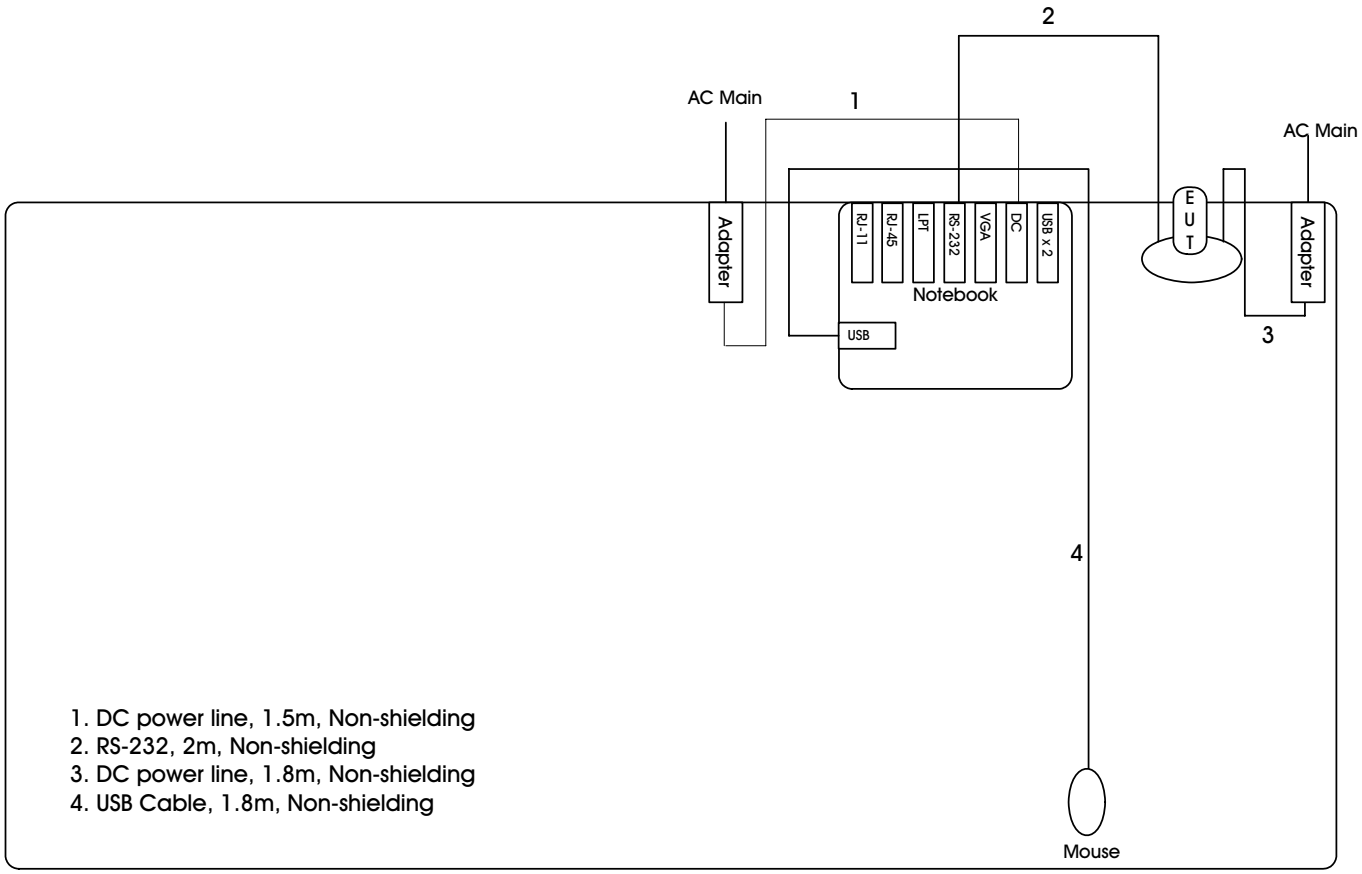
1. RS-232, 1.5m, Non-shielding
2. DC power line, 1.5m, Non-shielding
3. MOUSE, 1.8m, Non-shielding
4. DC power line, 1.5m, Non-shielding

Above 1GHz



1. DC power line, 1.5m, Non-shielding

3.9.2. AC Power Line Conduction Emissions Test Configuration



1. DC power line, 1.5m, Non-shielding
2. RS-232, 2m, Non-shielding
3. DC power line, 1.8m, Non-shielding
4. USB Cable, 1.8m, Non-shielding

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

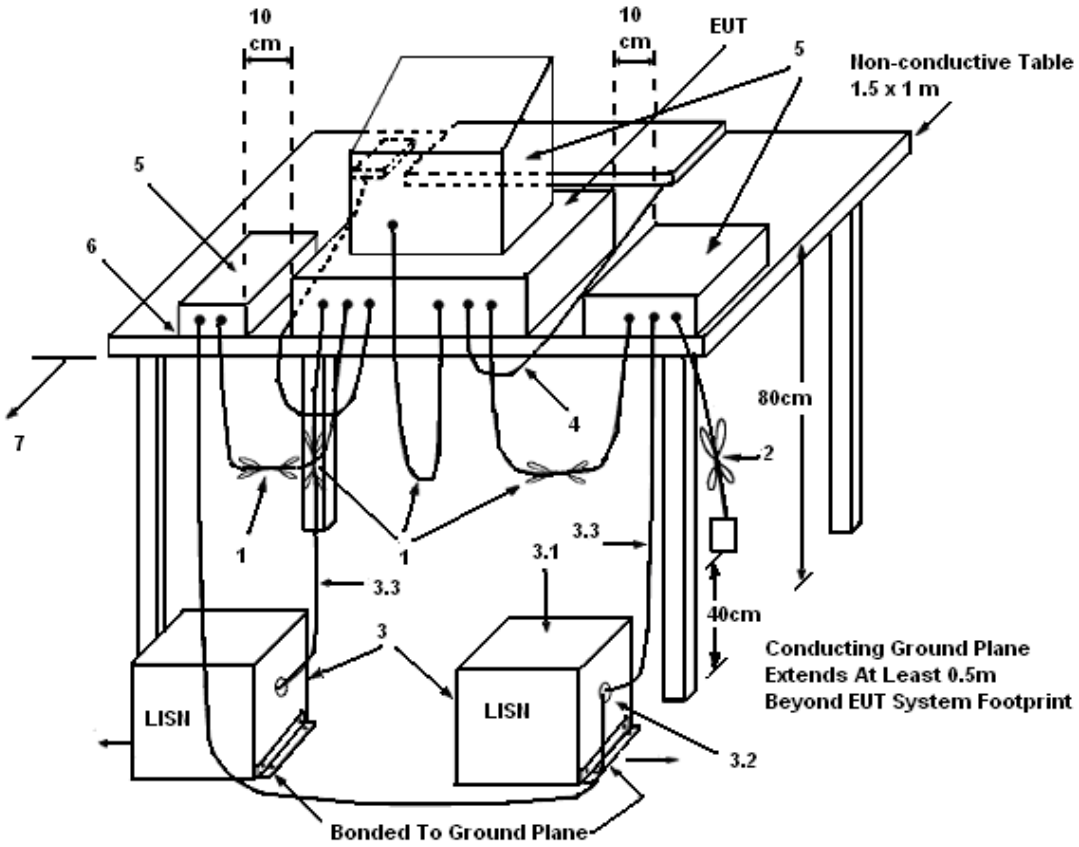
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

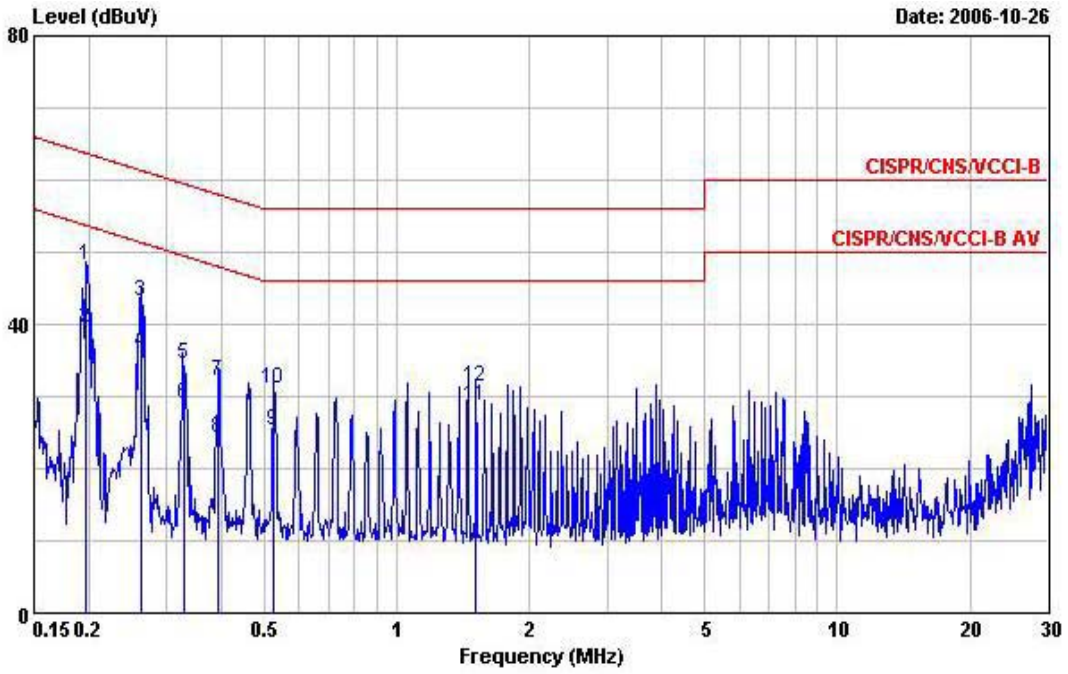
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

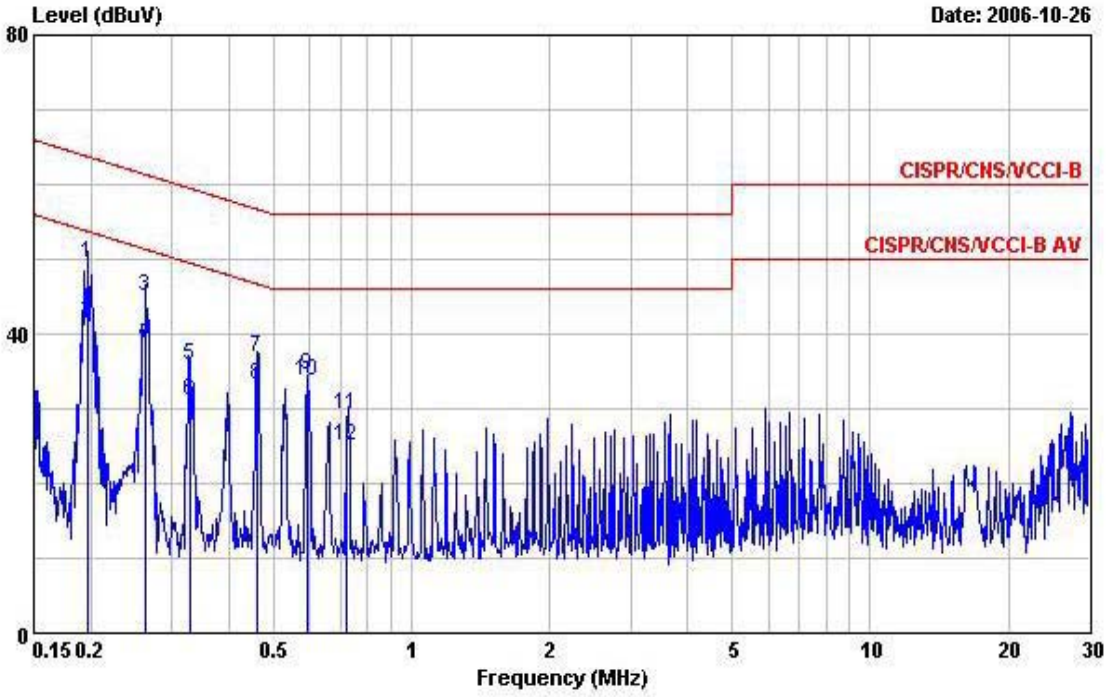
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	26℃	Humidity	49%
Test Engineer	Ted Chiu	Phase	Line
Configuration	Adapter+EUT Mode (24 Key)		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1965370	48.05	-15.71	63.76	47.94	0.10	0.01	QP
2	0.1965370	39.53	-14.23	53.76	39.42	0.10	0.01	Average
3	0.2630270	43.18	-18.16	61.34	43.06	0.10	0.02	QP
4	0.2630270	36.12	-15.22	51.34	36.00	0.10	0.02	Average
5	0.3293860	34.58	-24.89	59.47	34.44	0.10	0.04	QP
6	0.3293860	28.91	-20.56	49.47	28.77	0.10	0.04	Average
7	0.3934400	32.02	-25.97	57.99	31.87	0.10	0.05	QP
8	0.3934400	24.34	-23.65	47.99	24.19	0.10	0.05	Average
9	0.5265450	25.34	-20.66	46.00	25.18	0.10	0.06	Average
10	0.5265450	31.14	-24.86	56.00	30.98	0.10	0.06	QP
11	1.513	28.60	-17.40	46.00	28.34	0.10	0.16	Average
12	1.513	31.35	-24.65	56.00	31.09	0.10	0.16	QP

Temperature	26℃	Humidity	49%
Test Engineer	Ted Chiu	Phase	Neutral
Configuration	Adapter+EUT Mode (24 Key)		

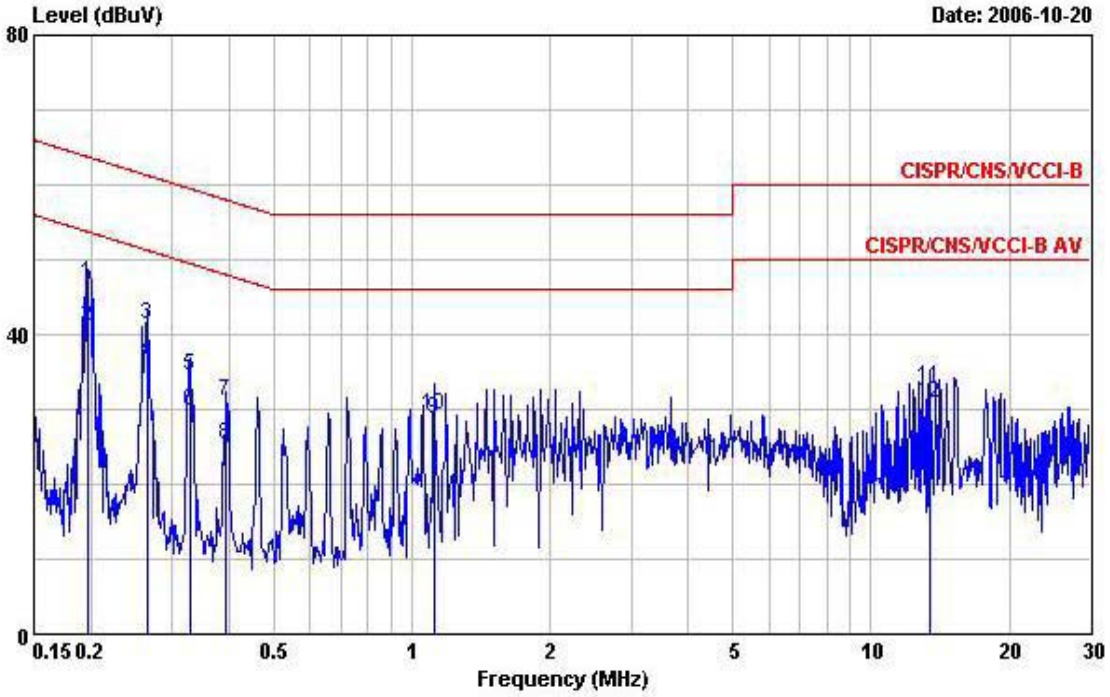


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1975810	49.53	-14.18	63.71	49.43	0.10	0.00	QP
2	@0.1975810	41.56	-12.15	53.71	41.46	0.10	0.00	Average
3	0.2630270	45.03	-16.31	61.34	44.91	0.10	0.02	QP
4	@0.2630270	38.74	-12.60	51.34	38.62	0.10	0.02	Average
5	0.3298960	35.68	-23.77	59.45	35.54	0.10	0.04	QP
6	0.3298960	31.06	-18.39	49.45	30.92	0.10	0.04	Average
7	0.4612220	36.85	-19.82	56.67	36.70	0.10	0.05	QP
8	@0.4612220	33.14	-13.53	46.67	32.99	0.10	0.05	Average
9	0.5916410	34.56	-21.44	56.00	34.36	0.10	0.10	QP
10	@0.5916410	33.60	-12.40	46.00	33.40	0.10	0.10	Average
11	0.7237920	29.32	-26.68	56.00	29.12	0.10	0.10	QP
12	0.7237920	25.12	-20.88	46.00	24.92	0.10	0.10	Average

Note:

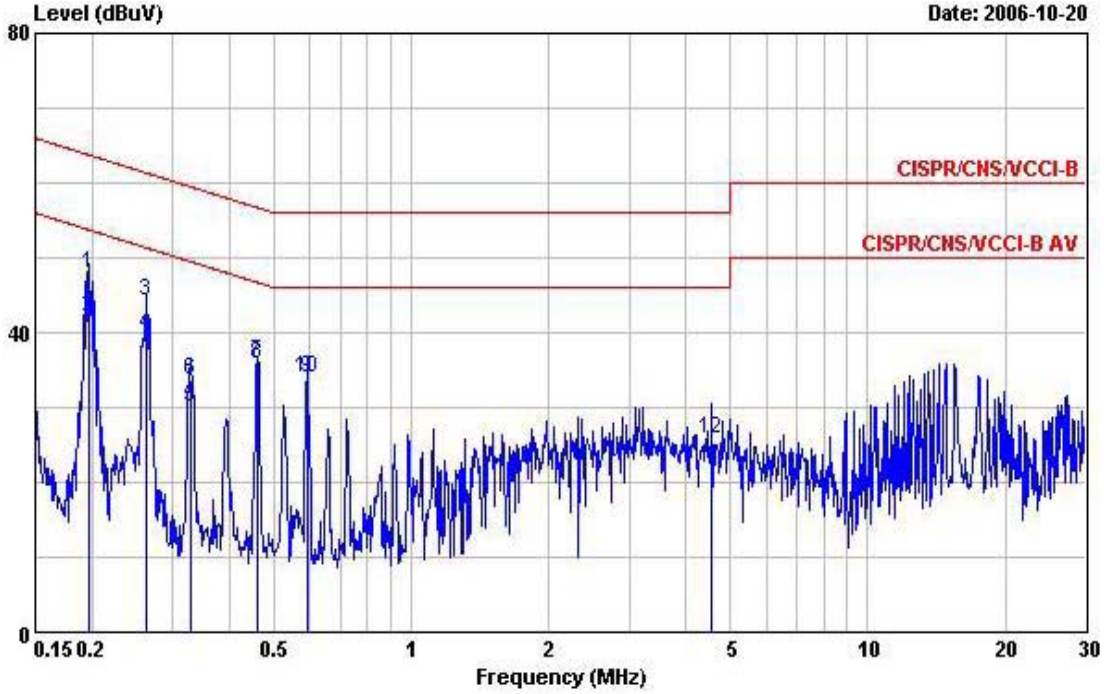
Level = Read Level + LISN Factor + Cable Loss.

Temperature	26℃	Humidity	49%
Test Engineer	Ted Chiu	Phase	Line
Configuration	RS232+Charging Mode (24Key)		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1975810	46.89	-16.82	63.71	46.79	0.10	0.00	QP
2	@0.1975810	40.95	-12.76	53.71	40.85	0.10	0.00	Average
3	0.2644240	41.22	-20.07	61.29	41.10	0.10	0.02	QP
4	0.2644240	36.34	-14.95	51.29	36.22	0.10	0.02	Average
5	0.3303280	34.51	-24.93	59.44	34.37	0.10	0.04	QP
6	0.3303280	29.82	-19.62	49.44	29.68	0.10	0.04	Average
7	0.3934400	30.98	-27.01	57.99	30.83	0.10	0.05	QP
8	0.3934400	25.26	-22.73	47.99	25.11	0.10	0.05	Average
9	1.120	28.63	-17.37	46.00	28.41	0.10	0.12	Average
10	1.120	29.30	-26.70	56.00	29.08	0.10	0.12	QP
11	13.480	32.97	-27.03	60.00	32.07	0.50	0.40	QP
12	13.480	30.91	-19.09	50.00	30.01	0.50	0.40	Average

Temperature	26℃	Humidity	49%
Test Engineer	Ted Chiu	Phase	Neutral
Configuration	RS232+Charging Mode (24Key)		

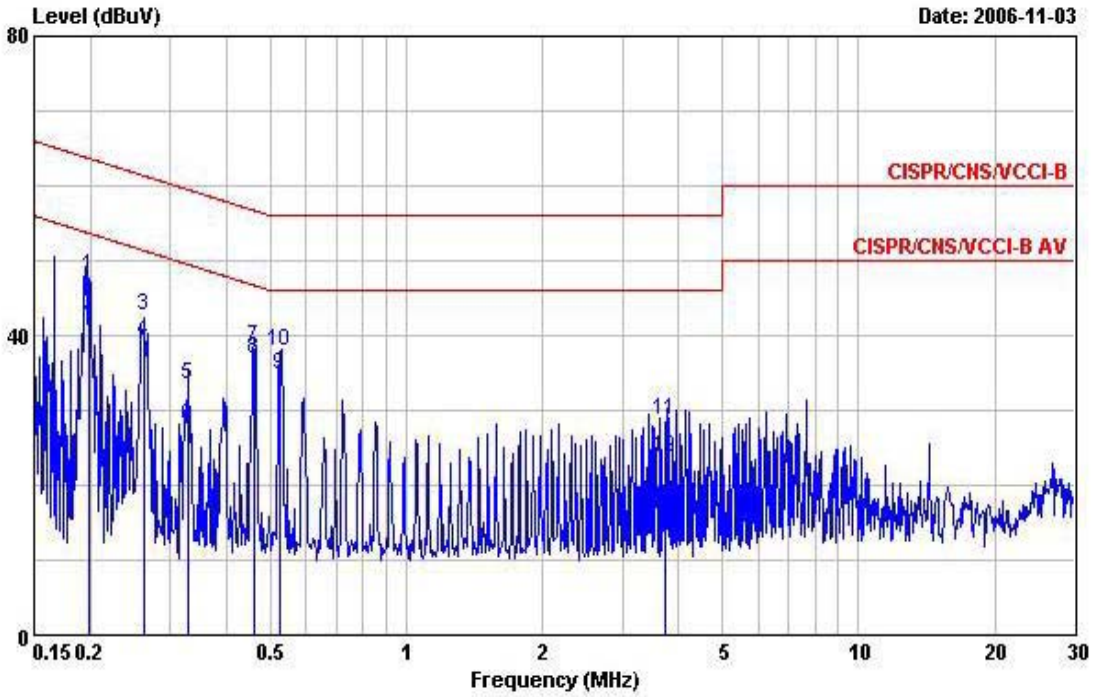


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1965370	47.91	-15.85	63.76	47.80	0.10	0.01	QP
2	@0.1965370	42.20	-11.56	53.76	42.09	0.10	0.01	Average
3	0.2616370	44.19	-17.19	61.38	44.07	0.10	0.02	QP
4	@0.2616370	39.75	-11.63	51.38	39.63	0.10	0.02	Average
5	0.3303280	29.97	-19.47	49.44	29.83	0.10	0.04	Average
6	0.3303280	33.64	-25.80	59.44	33.50	0.10	0.04	QP
7	@0.4612220	35.94	-10.73	46.67	35.79	0.10	0.05	Average
8	0.4612220	35.81	-20.86	56.67	35.66	0.10	0.05	QP
9	@0.5916410	34.07	-11.93	46.00	33.87	0.10	0.10	Average
10	0.5916410	34.02	-21.98	56.00	33.82	0.10	0.10	QP
11	4.533	21.94	-24.06	46.00	21.47	0.21	0.26	Average
12	4.533	25.83	-30.17	56.00	25.36	0.21	0.26	QP

Note:

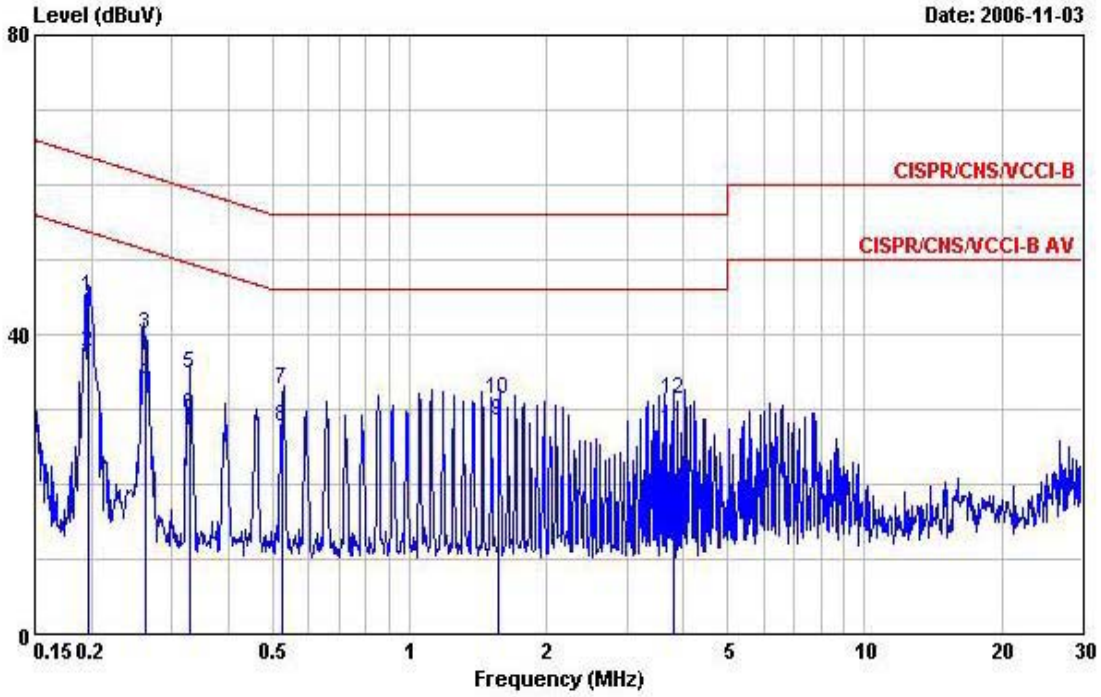
Level = Read Level + LISN Factor + Cable Loss.

Temperature	26℃	Humidity	49%
Test Engineer	Ted Chiu	Phase	Line
Configuration	Adapter+EUT Mode (39 Key)		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1979380	48.02	-15.68	63.70	47.81	0.10	0.11	QP
2	@0.1979380	42.50	-11.20	53.70	42.29	0.10	0.11	Average
3	0.2627390	42.74	-18.60	61.34	42.55	0.10	0.09	QP
4	0.2627390	39.27	-12.07	51.34	39.08	0.10	0.09	Average
5	0.3290380	33.50	-25.98	59.48	33.32	0.10	0.08	QP
6	0.3290380	27.90	-21.58	49.48	27.72	0.10	0.08	Average
7	0.4599420	38.32	-18.37	56.69	38.14	0.10	0.08	QP
8	@0.4599420	36.83	-9.86	46.69	36.65	0.10	0.08	Average
9	0.5253920	34.61	-11.39	46.00	34.43	0.10	0.08	Average
10	0.5253920	37.86	-18.14	56.00	37.68	0.10	0.08	QP
11	3.740	28.69	-27.31	56.00	28.42	0.19	0.08	QP
12	3.740	23.76	-22.24	46.00	23.49	0.19	0.08	Average

Temperature	26℃	Humidity	49%
Test Engineer	Ted Chiu	Phase	Neutral
Configuration	Adapter+EUT Mode (39 Key)		

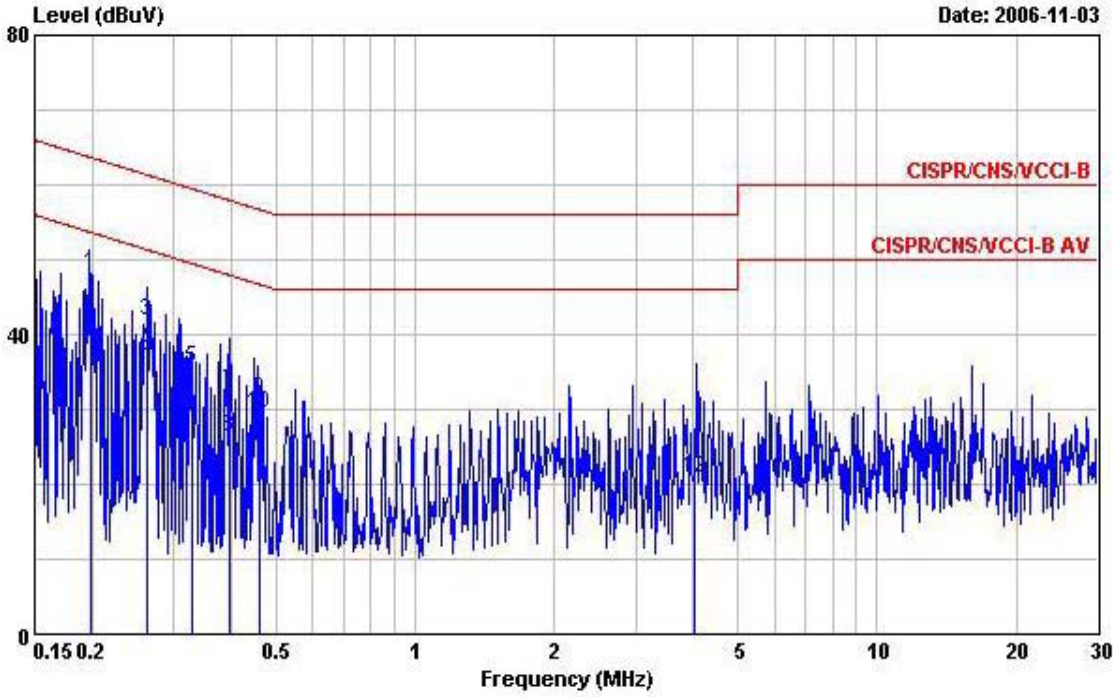


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1975810	45.04	-18.67	63.71	44.83	0.10	0.11	QP
2	0.1975810	37.69	-16.02	53.71	37.48	0.10	0.11	Average
3	0.2628150	40.10	-21.24	61.34	39.91	0.10	0.09	QP
4	0.2628150	33.36	-17.98	51.34	33.17	0.10	0.09	Average
5	0.3287980	34.68	-24.80	59.48	34.50	0.10	0.08	QP
6	0.3287980	29.20	-20.28	49.48	29.02	0.10	0.08	Average
7	0.5242620	32.74	-23.26	56.00	32.56	0.10	0.08	QP
8	0.5242620	27.76	-18.24	46.00	27.58	0.10	0.08	Average
9	1.570	28.45	-17.55	46.00	28.26	0.10	0.09	Average
10	1.570	31.31	-24.69	56.00	31.12	0.10	0.09	QP
11	3.810	27.47	-18.53	46.00	27.29	0.10	0.08	Average
12	3.810	31.42	-24.58	56.00	31.24	0.10	0.08	QP

Note:

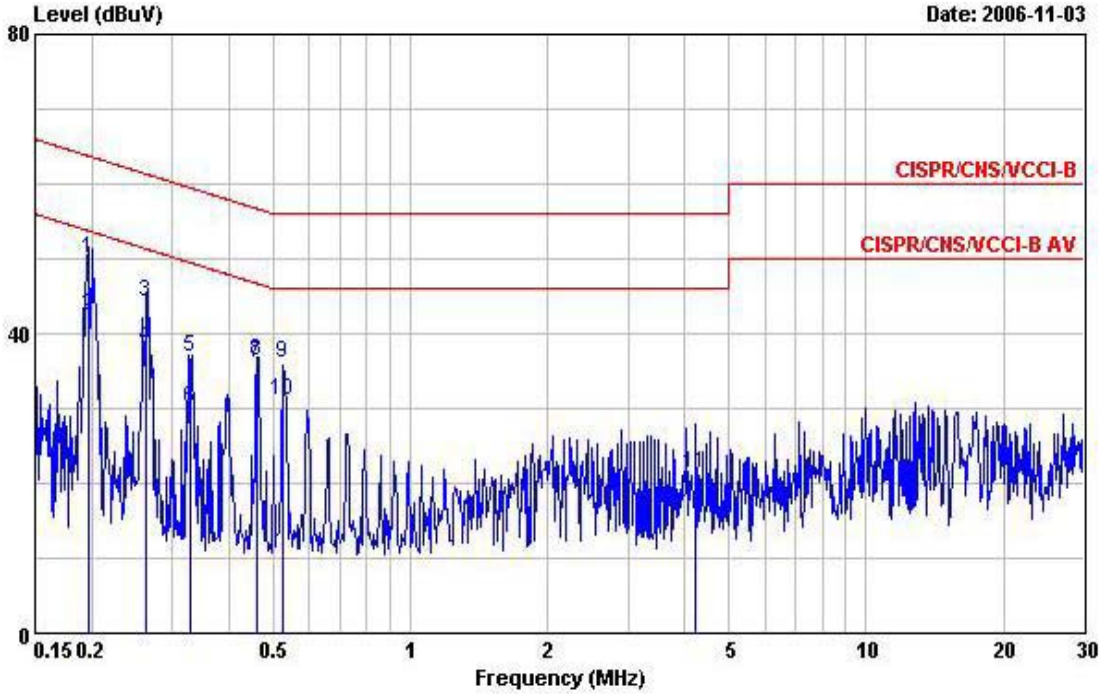
Level = Read Level + LISN Factor + Cable Loss.

Temperature	26℃	Humidity	49%
Test Engineer	Ted Chiu	Phase	Line
Configuration	RS232+Charging Mode (39Key)		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1979270	48.10	-15.60	63.70	47.89	0.10	0.11	QP
2	0.1979270	41.04	-12.66	53.70	40.83	0.10	0.11	Average
3	0.2630270	41.89	-19.45	61.34	41.70	0.10	0.09	QP
4	0.2630270	36.65	-14.69	51.34	36.46	0.10	0.09	Average
5	0.3296310	35.56	-23.90	59.46	35.38	0.10	0.08	QP
6	0.3296310	28.96	-20.50	49.46	28.78	0.10	0.08	Average
7	0.3954100	32.31	-25.64	57.95	32.14	0.10	0.07	QP
8	0.3954100	26.19	-21.76	47.95	26.02	0.10	0.07	Average
9	0.4606040	31.44	-25.24	56.68	31.26	0.10	0.08	QP
10	0.4606040	29.39	-17.29	46.68	29.21	0.10	0.08	Average
11	4.010	24.53	-31.47	56.00	24.25	0.20	0.08	QP
12	4.010	20.69	-25.31	46.00	20.41	0.20	0.08	Average

Temperature	26℃	Humidity	49%
Test Engineer	Ted Chiu	Phase	Neutral
Configuration	RS232+Charging Mode (39Key)		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1975810	49.99	-13.72	63.71	49.78	0.10	0.11	QP
2	0.1975810	42.29	-11.42	53.71	42.08	0.10	0.11	Average
3	0.2630270	44.25	-17.09	61.34	44.06	0.10	0.09	QP
4	0.2630270	38.23	-13.11	51.34	38.04	0.10	0.09	Average
5	0.3298260	36.82	-22.64	59.46	36.64	0.10	0.08	QP
6	0.3298260	29.95	-19.51	49.46	29.77	0.10	0.08	Average
7	0.4609820	36.10	-20.57	56.67	35.92	0.10	0.08	QP
8	@0.4609820	36.29	-10.38	46.67	36.11	0.10	0.08	Average
9	0.5267820	36.01	-19.99	56.00	35.82	0.10	0.09	QP
10	0.5267820	30.95	-15.05	46.00	30.76	0.10	0.09	Average
11	4.220	21.19	-34.81	56.00	21.00	0.11	0.08	QP
12	4.220	16.03	-29.97	46.00	15.84	0.11	0.08	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 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

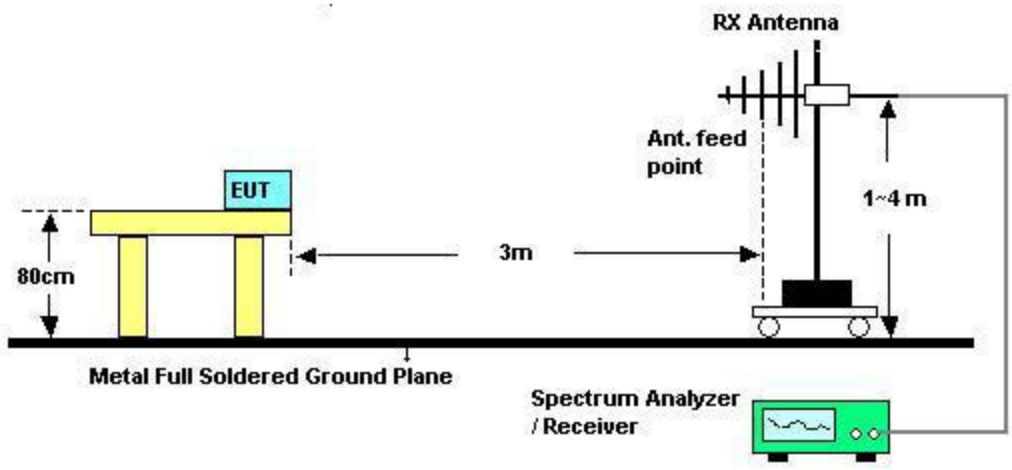
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	26.8℃	Humidity	54%
Test Engineer	Vic Hsiao	Configurations	Channel 0/39/78

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.
0	2401.77	108.79	-5.21	114.00	78.61	28.29	1.88	0.00	Peak	H
0	2401.77	84.86	-9.14	94.00	54.68	28.29	1.88	0.00	Average	H
39	2441.10	108.97	-5.03	114.00	78.66	28.40	1.91	0.00	Peak	H
39	2441.10	84.92	-9.08	94.00	54.61	28.40	1.91	0.00	Average	H
78	2479.86	107.82	-6.18	114.00	77.42	28.47	1.94	0.00	Peak	H
78	2479.86	83.75	-10.25	94.00	53.35	28.47	1.94	0.00	Average	H

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

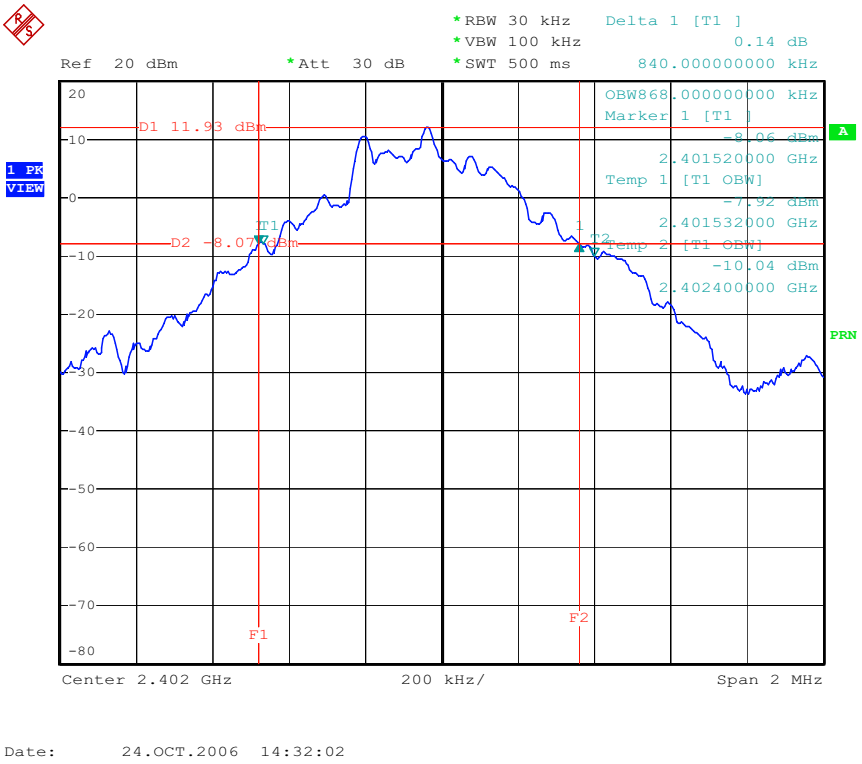
The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 20dB Spectrum Bandwidth

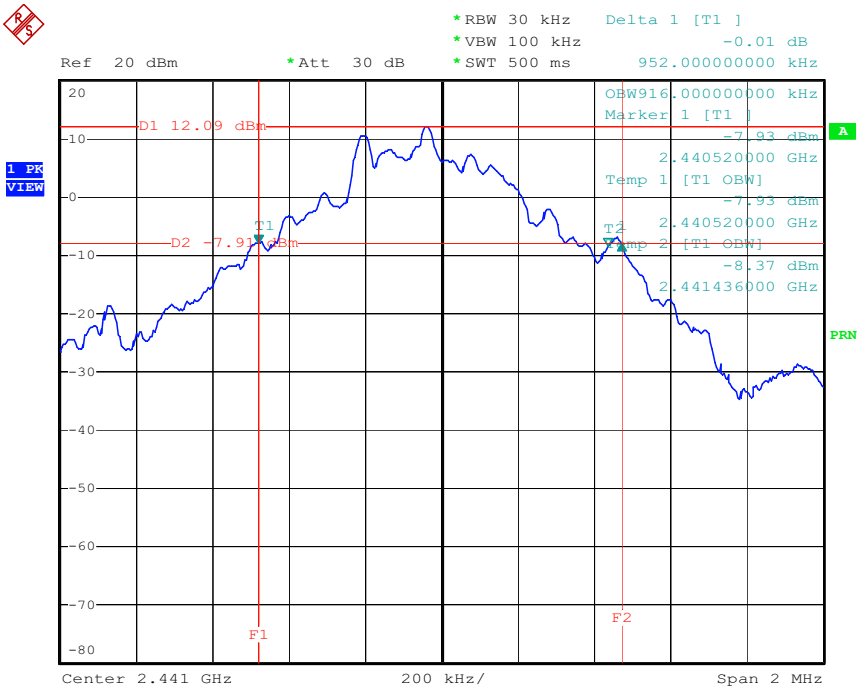
Temperature	20℃	Humidity	70%
Test Engineer	Sam Lee	Configurations	Channel 0/39/78

Frequency	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) $f_L > 2400MHz$	Frequency range (MHz) $f_H < 2483.5MHz$	Test Result
2402 MHz	840.00	868.00	2401.52	-	Complies
2441 MHz	952.00	916.00	-	-	Complies
2480 MHz	984.00	980.00	-	2480.48	Complies

20 dB/99% Bandwidth Plot on 2402 MHz

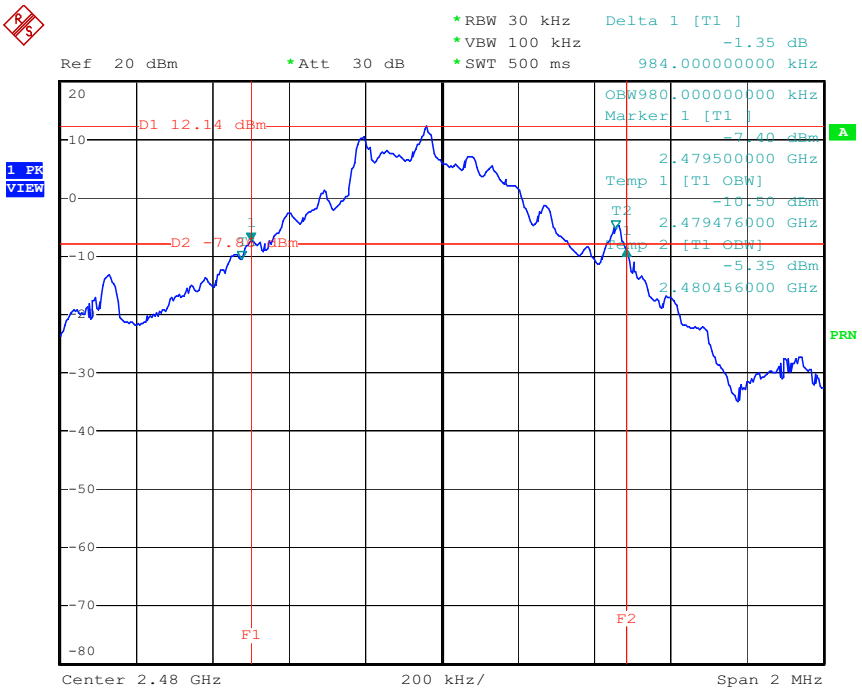


20 dB/99% Bandwidth Plot on 2441 MHz



Date: 24.OCT.2006 14:34:16

20 dB/99% Bandwidth Plot on 2480 MHz



Date: 24.OCT.2006 14:35:54

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

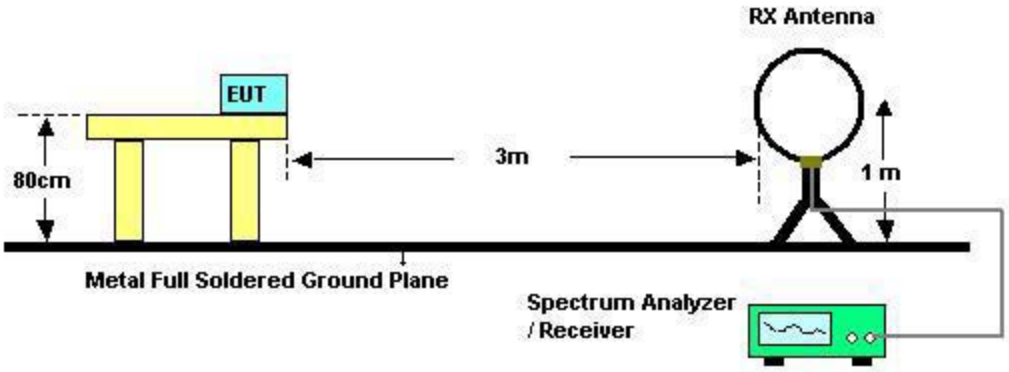
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.4.3. Test Procedures

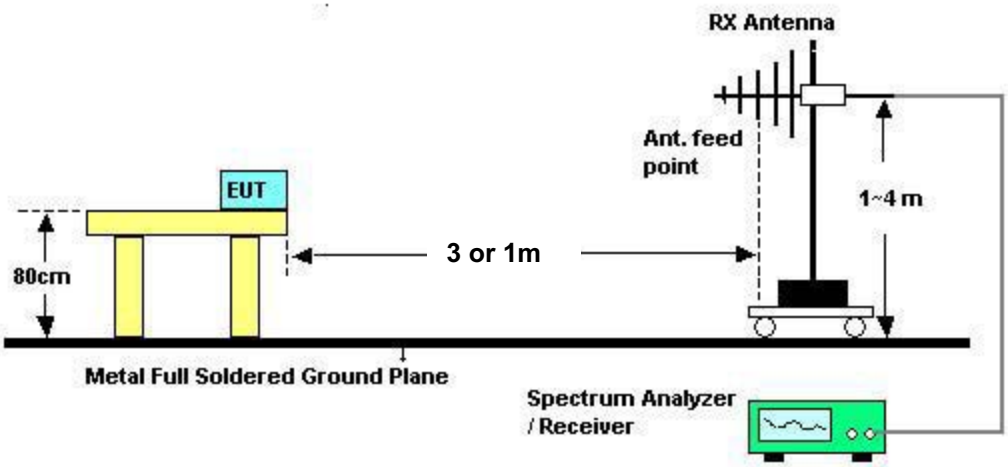
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

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

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 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	20℃	Humidity	70%
Test Engineer	Vic Hsiao		

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.

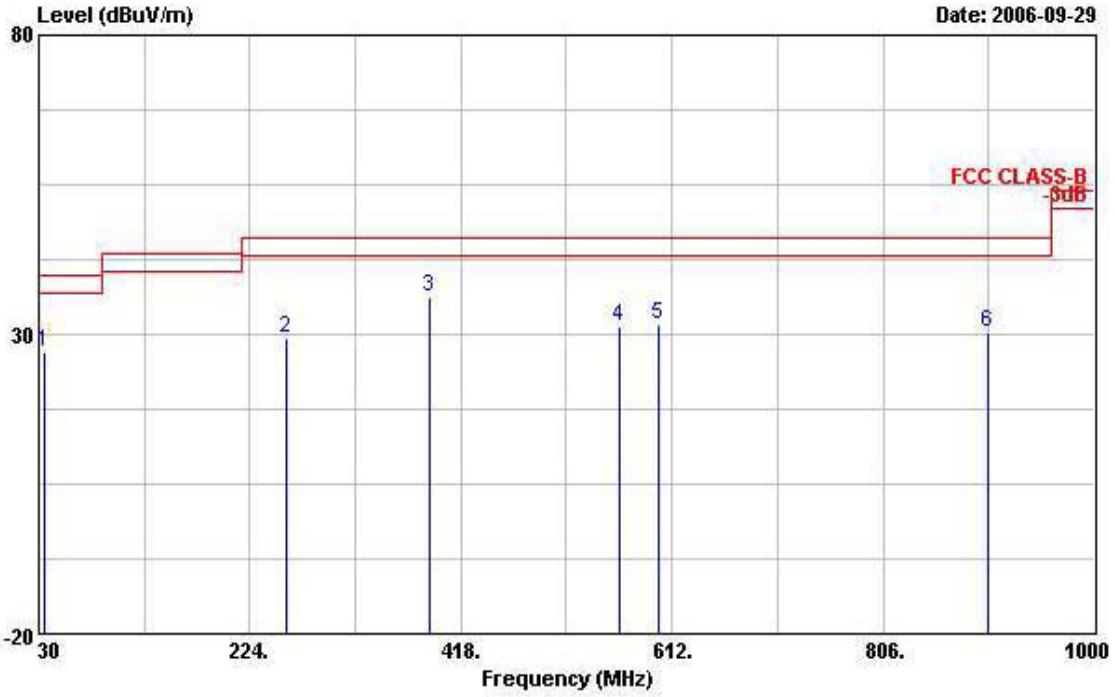
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

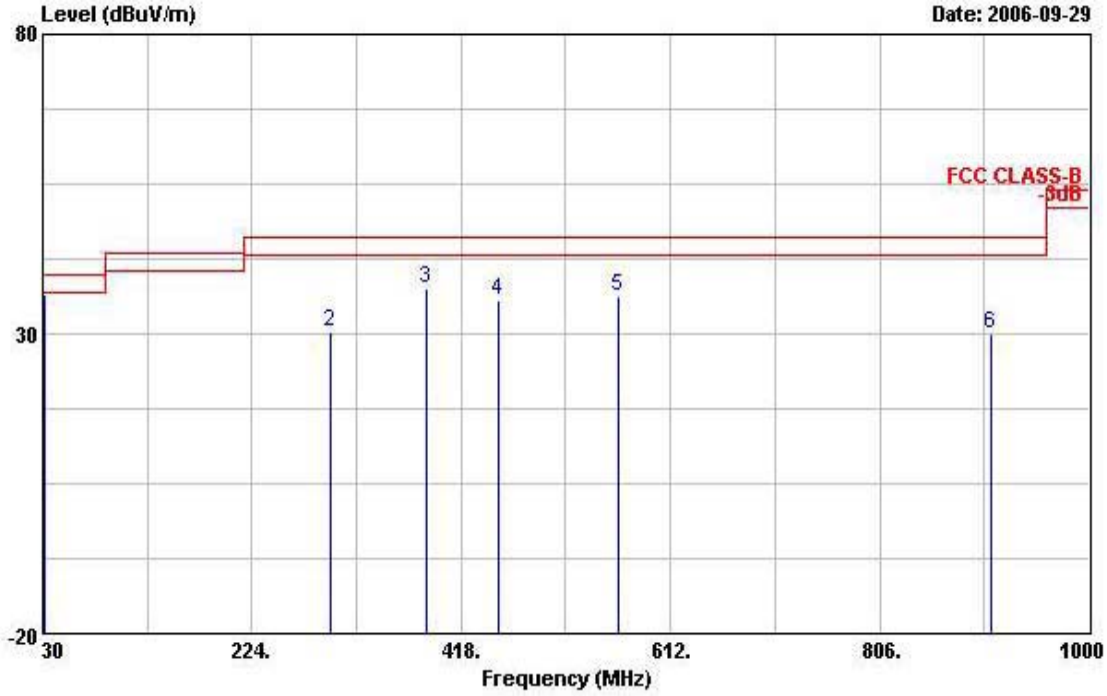
Temperature	26℃	Humidity	54%
Test Engineer	Vic Hsiao	Configurations	Channel 39

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	35.820	27.19	-12.81	40.00	39.55	14.94	0.50	27.80	Peak
2	257.950	29.38	-16.62	46.00	41.95	13.48	2.33	28.38	Peak
3 @	388.900	36.18	-9.82	46.00	45.83	16.08	3.35	29.08	Peak
4	564.470	31.48	-14.52	46.00	37.64	19.30	4.22	29.69	Peak
5	599.390	31.49	-14.51	46.00	37.40	19.30	4.47	29.68	Peak
6	902.030	30.43	-15.57	46.00	33.92	21.05	5.49	30.02	Peak

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	31.940	36.44	-3.56	40.00	46.58	17.30	0.33	27.77	Peak
2	296.750	30.17	-15.83	46.00	42.42	13.53	2.81	28.59	Peak
3 @	385.990	37.72	-8.28	46.00	47.45	15.98	3.35	29.06	Peak
4	451.950	35.72	-10.28	46.00	44.21	17.15	3.67	29.30	Peak
5 @	564.470	36.26	-9.74	46.00	42.42	19.30	4.22	29.69	Peak
6	908.820	29.96	-16.04	46.00	33.44	21.08	5.41	29.97	Peak

Note:

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

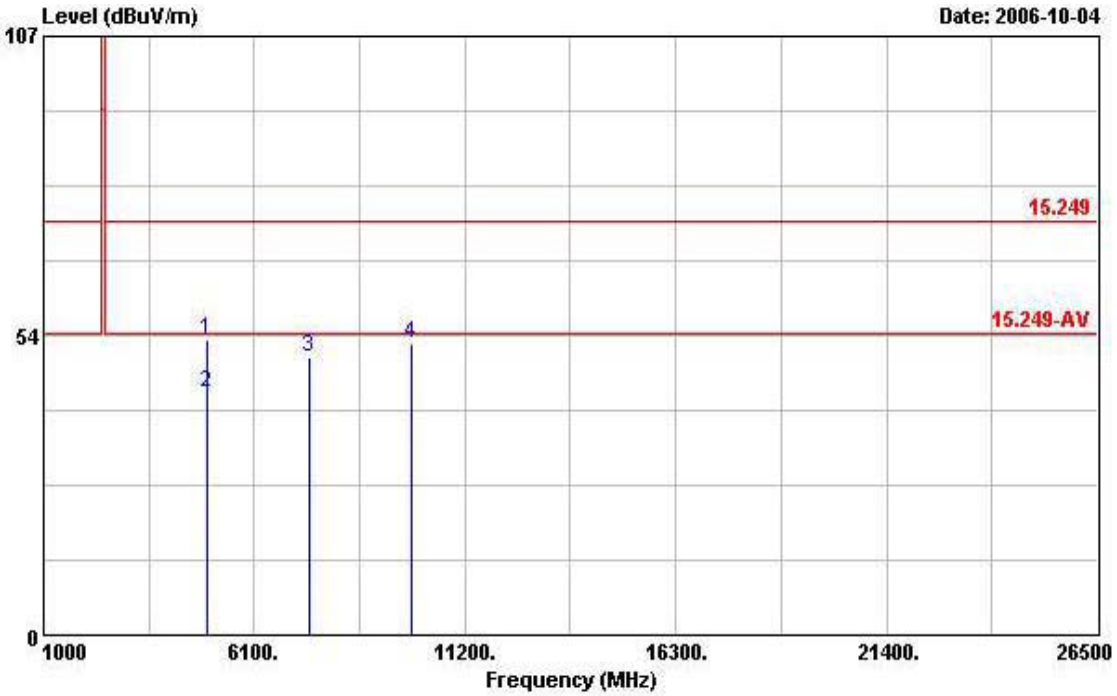
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

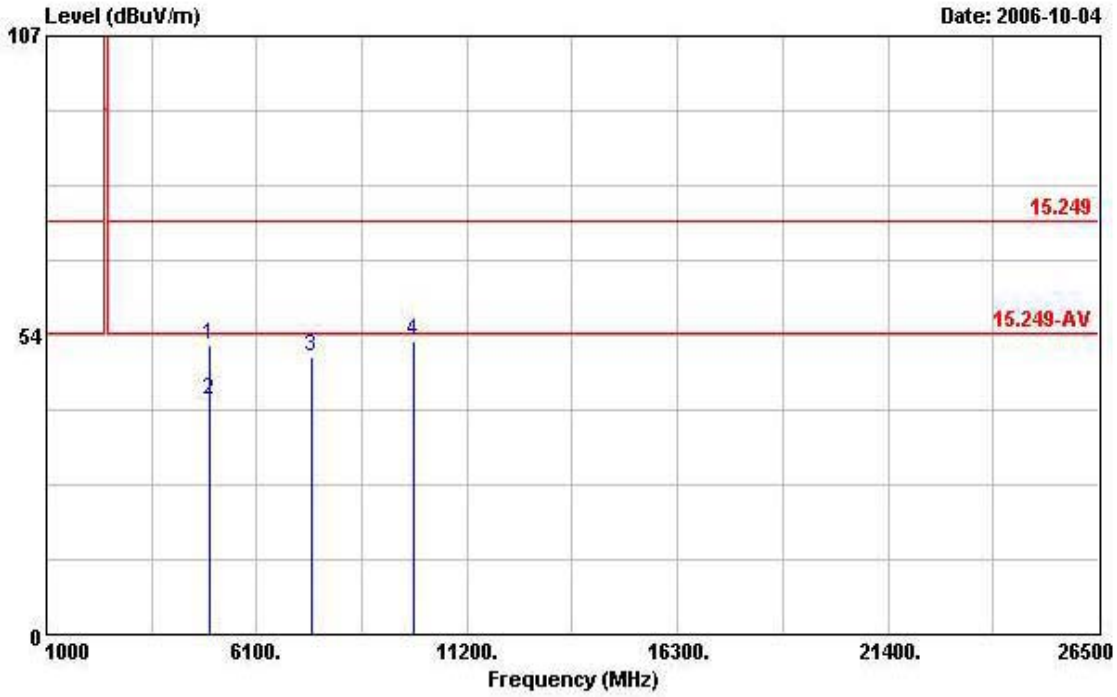
Temperature	26℃	Humidity	54%
Test Engineer	Vic Hsiao	Configurations	Channel 0

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4960.000	52.88	-21.12	74.00	48.60	33.34	3.20	32.26	PEAK
2	4960.000	43.18	-10.82	54.00	38.91	33.34	3.20	32.26	Average
3	7440.000	49.74	-24.26	74.00	41.71	36.48	4.23	32.67	PEAK
4	9920.000	52.10	-21.90	74.00	41.30	39.08	4.51	32.79	PEAK

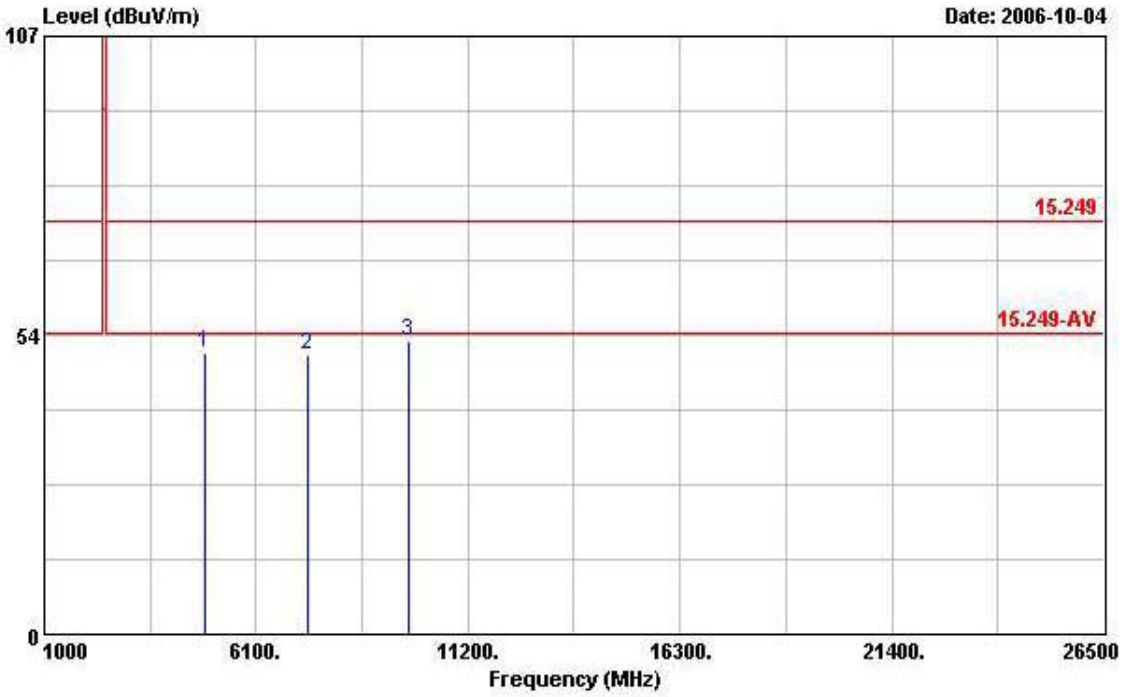
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4960.000	51.64	-22.36	74.00	47.37	33.34	3.20	32.26	PEAK
2	4960.000	41.81	-12.19	54.00	37.54	33.34	3.20	32.26	Average
3	7440.000	49.67	-24.33	74.00	41.64	36.48	4.23	32.67	PEAK
4	9920.000	52.39	-21.61	74.00	41.59	39.08	4.51	32.79	PEAK

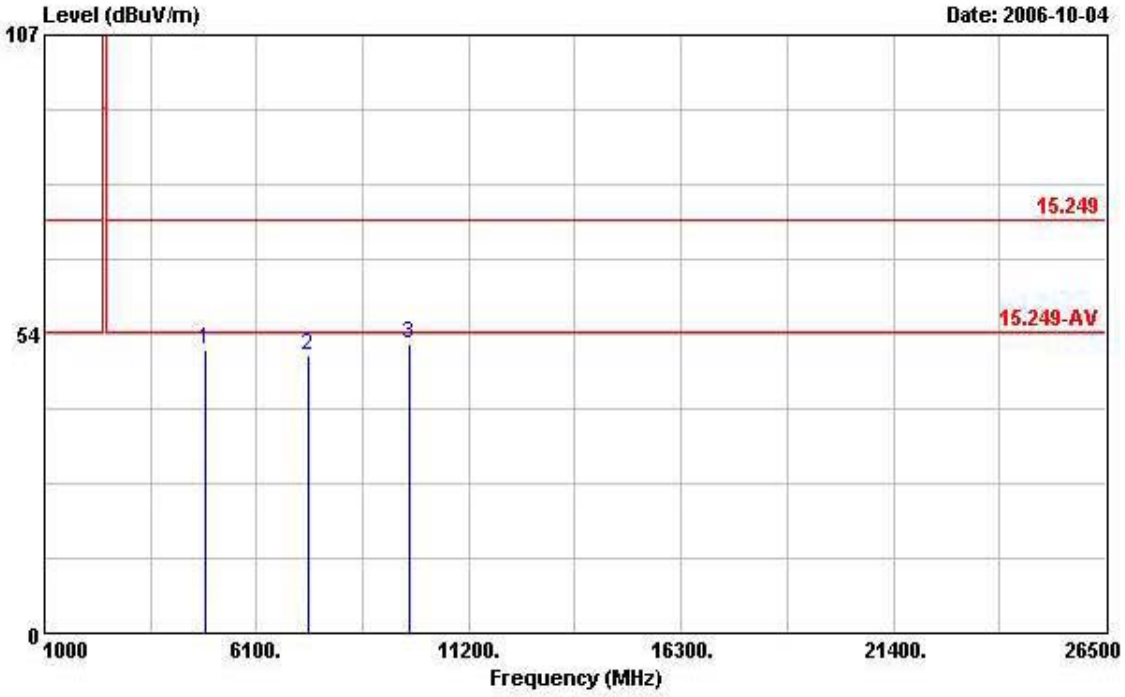
Temperature	26℃	Humidity	54%
Test Engineer	Vic Hsiao	Configurations	Channel 39

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4884.000	50.22	-23.78	74.00	46.16	33.18	3.17	32.30	PEAK
2	7323.000	49.94	-24.06	74.00	42.18	36.19	4.18	32.61	PEAK
3	9764.000	52.47	-21.53	74.00	42.01	38.80	4.46	32.79	PEAK

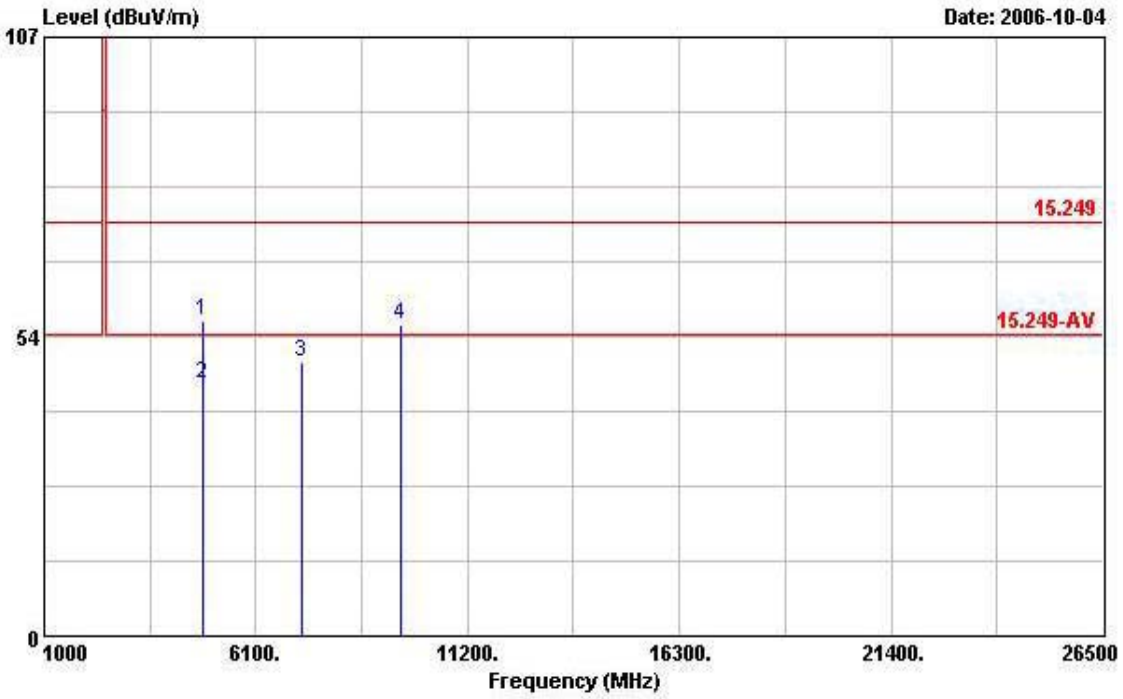
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4882.000	50.68	-23.32	74.00	46.63	33.18	3.17	32.30	PEAK
2	7323.000	49.79	-24.21	74.00	42.03	36.19	4.18	32.61	PEAK
3	9764.000	51.84	-22.16	74.00	41.38	38.80	4.46	32.79	PEAK

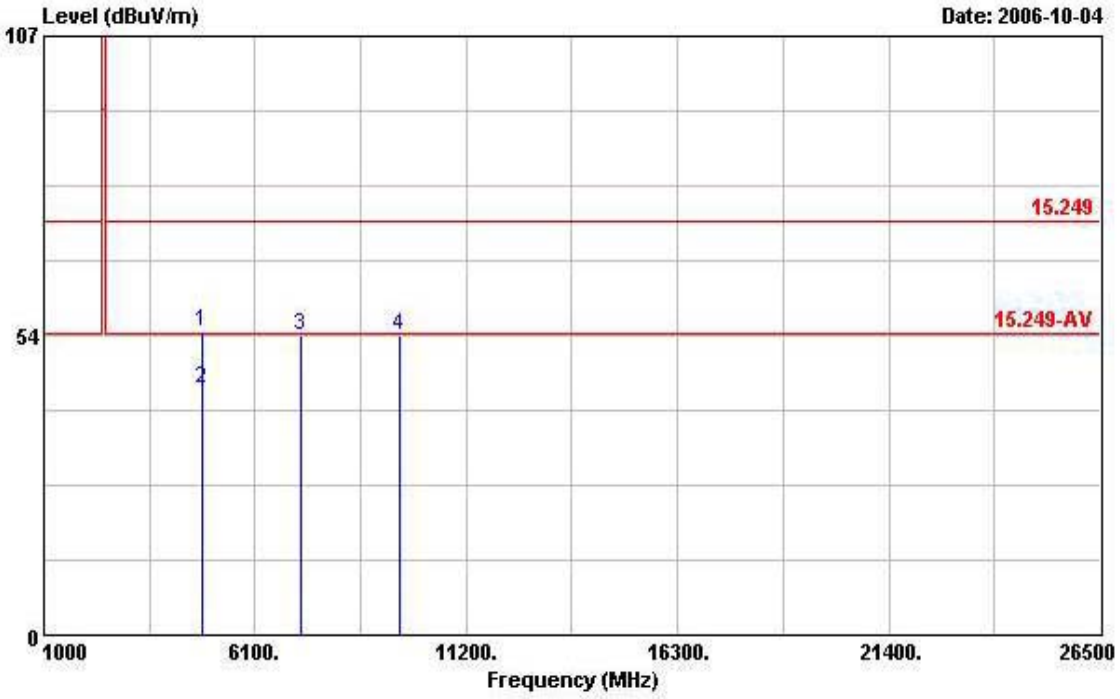
Temperature	26℃	Humidity	54%
Test Engineer	Vic Hsiao	Configurations	Channel 78

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4808.000	56.22	-17.78	74.00	52.34	33.06	3.15	32.34	PEAK
2 @	4808.000	44.95	-9.05	54.00	41.08	33.06	3.15	32.34	Average
3	7206.000	48.99	-25.01	74.00	41.49	35.90	4.14	32.54	PEAK
4	9608.000	55.54	-18.46	74.00	45.45	38.49	4.40	32.80	PEAK

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4808.000	54.05	-19.95	74.00	50.17	33.06	3.15	32.34	PEAK
2	4808.000	43.99	-10.01	54.00	40.12	33.06	3.15	32.34	Average
3	7204.000	53.36	-20.64	74.00	45.87	35.90	4.14	32.54	PEAK
4	9608.000	53.48	-20.52	74.00	43.39	38.49	4.40	32.80	PEAK

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	26℃	Humidity	54%
Test Engineer	Vic Hsiao	Configurations	Channel 0, 78

Channel 0

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2369.660	59.92	-14.08	74.00	29.81	28.26	1.85	0.00	Peak
2	2400.000	61.96				28.29	1.88	0.00	Peak
3 @	2401.770	108.79				28.29	1.88	0.00	Peak
1 @	2369.660	50.09	-3.91	54.00	19.98	28.26	1.85	0.00	Average
2	2400.000	38.03				28.29	1.88	0.00	Average
3 @	2401.770	84.86				28.29	1.88	0.00	Average

Item 3 are the Fundamental emission at ch00 2402MHz.

Channel 78

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2479.860	107.82				28.47	1.94	0.00	Peak
2	2483.500	53.55	-20.45	74.00	23.15	28.47	1.94	0.00	Peak
1	2479.860	83.75				28.47	1.94	0.00	Average
2	2483.500	29.48	-24.52	54.00	-0.92	28.47	1.94	0.00	Average

Item 1 are the Fundamental emission at ch78 2480MHz.

Note:

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

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

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
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Feb. 22, 2006	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Dec. 19, 2005	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9708-1839	9kHz – 30MHz	Mar. 18, 2006	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2006	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. 15, 2006	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	CPA9231A	18667	9 kHz - 2 GHz	Jan. 18, 2006	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	May 29, 2006	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100004/040	9 kHZ - 40 GHz	Sep. 21, 2006	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Jul. 24, 2006	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6903	1GHz ~ 18GHz	Mar. 15, 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, 2005	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Dec.02, 2005	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	FSP30	100023	9kHz ~ 30GHz	Nov. 26, 2005	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)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Dec. 28, 2005	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 02, 2006	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 30, 2005	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 30, 2005	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, 2005	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. NCR: Non-Calibration required.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	MITEQ	AMF-6F-260400	923364	26.5 GHz - 40 GHz	Jan. 24, 2006*	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	May 23, 2006*	Radiation (03CH03-HY)
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Apr. 21, 2005*	Conducted (TH01-HY)

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

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 728, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL	:	886-3-656-9065
	FAX	:	886-3-656-9085

7. NVLAP CERTIFICATE OF ACCREDITATION

United States Department of Commerce
National Institute of Standards and Technology

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Accreditation is granted for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

2006-01-01 through 2006-12-31
Effective dates

For the National Institute of Standards and Technology

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