SPORTON International Inc.
No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.
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FCC RADIO TEST REPORT

Applicant's company	**TwinMOS Technologies Inc.**
Applicant Address	No.3, Tzu Chiang Rd., Hu Kou Xiang, Hsin Chu, Taiwan, R.O.C.
FCC ID	**QS3-BTTA01**
Manufacturer's company	**TwinMOS Technologies Inc.**
Manufacturer Address	No.3, Tzu Chiang Rd., Hu Kou Xiang, Hsin Chu, Taiwan, R.O.C.

Product Name	Bluetooth 2.1ch Audio System for iPod
Brand Name	TwinMOS
Model Name	BTTA01
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Jun. 5, 2006
Final Test Date	Sep. 4, 2006
Submission Type	Original Equipment

Statement

Test result included is only for the Bluetooth part of the product.

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

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

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

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

Table of Contents

History of This Test Report

Original Issue Date: Sep. 7, 2006

Report No.: FR683006

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Bluetooth 2.1ch Audio System for iPod
Brand Name	:	TwinMOS
Model Name	:	BTTA01
Applicant	:	TwinMOS Technologies Inc.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jun. 5, 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.

Sharon Jiang 18.9.06	Steven Lu 18.9.06	Wayne Hsu 18.9.06
Prepared By:	Tested By:	Reviewed By:
Sharon Jiang / Specialist	Steven Lu / 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	11.60 dB
4.2	15.247(b)(1)	Maximum Peak Conducted Output Power	Complies	31.23 dB
4.3	15.247(a)(1)	Hopping Channel Separation	Complies	-
4.4	15.247(b)(1)	Number of Hopping Frequency	Complies	-
4.5	15.247(a)(1)	Dwell Time	Complies	-
4.6	15.247(d)	Radiated Emissions	Complies	0.14 dB
4.7	15.247(d)	Band Edge Emissions	Complies	0.40 dB
4.8	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.26dB	Confidence levels of 95%
Maximum Peak Conducted Output Power	±0.776dB	Confidence levels of 95%
Hopping Channel Separation	$\pm 1.64 \times 10^{-6}$	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	Power Adapter
Modulation	FHSS (GFSK)
Data Rate (Mbps)	1
Frequency Range	2400 ~ 2483.5MHz
Channel Number	79
Channel Band Width (99%)	741.00 kHz
Conducted Output Power	-1.23 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

3.2. Accessories

Power	Case Color	Brand	Model	Rating
Adapter 1	Black	Touch	SA07H1217	Input: 100~240 V, 0.8A, 50-60Hz Output: 12V, 24W
Adapter 2	White	Touch	SA07H1217	Input: 100~240 V, 0.8A, 50-60Hz Output: 12V, 24W
Others				
Remote control / Audio cable / Video cable				

Due to Adapter 1 & Adapter 2 are only different colors, so Adapter 1 tested and recorded in this report.

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	-	-	Printed Antenna	NA	1.00

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

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

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Conducted Emissions	Bluetooth Link/ iPod AUDIO/ iPod NANO AUDIO/ iPod NANO VIDEO/ iPod Shuffle AUDIO	1 Mbps	Hopping 0~78	1
Max. Conducted Output Power	GFSK	1 Mbps	0/39/78	NA
Hopping Channel Separation	GFSK	1 Mbps	0~1/39~40/77~78	NA
Number of Hopping Frequency	GFSK	1 Mbps	0~78	NA
Dwell Time	DH1/DH3/DH5	1 Mbps	0/39/78	NA
Radiated Emissions Below 1GHz	GFSK	1 Mbps	39	1
Radiated Emissions Above 1GHz	GFSK	1 Mbps	0/39/78	1
Band Edge Emissions	GFSK	1 Mbps	0/78	1

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	D505	DoC
Printer	EPSON	LQ-300	DOC
TV	SAMSUNG	SAM-14MV	DOC
NANO	MAC	MA350TA/A	DOC
Woofer	OZAKI	CM699	DoC
SHUFFLE	MAC	M9724PA/A	DoC
Dongle	Motorola	890-57-280	DOC

3.8. Table for Parameters of Test Software Setting

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

Power Parameters of Bluetooth

Test Software Version	HCICONTROLSOFT		
Frequency	2402 MHz	2441 MHz	2480 MHz
Power Parameters	F3	F3	F3

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.

At the same time, the following programs were executed:

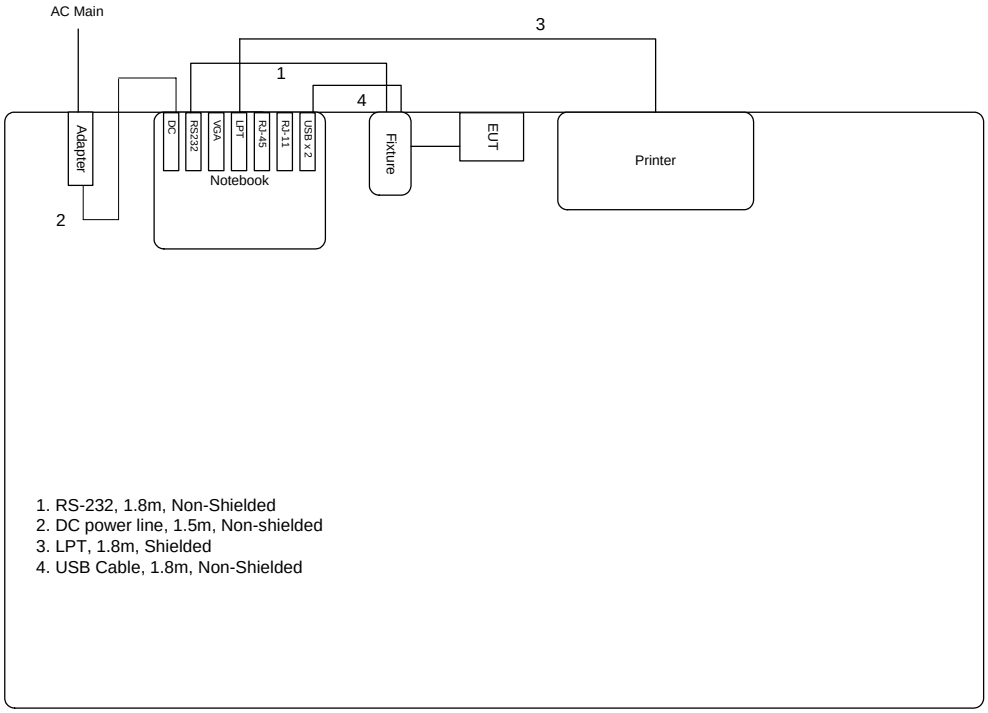
Executed "HCICONTROLSOFT " to control the EUT continuously transmitter RF signal.

Executed "Media player" to play audio and video.

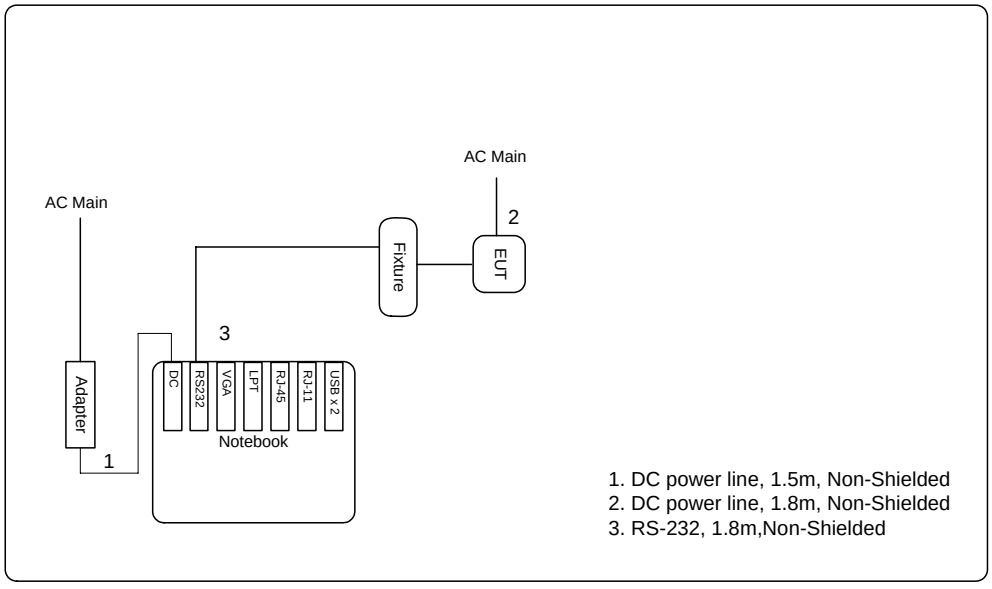
3.9. Test Configurations

3.9.1. Radiation Emissions Test Configuration

9kHz~1GHz



Above 1GHz

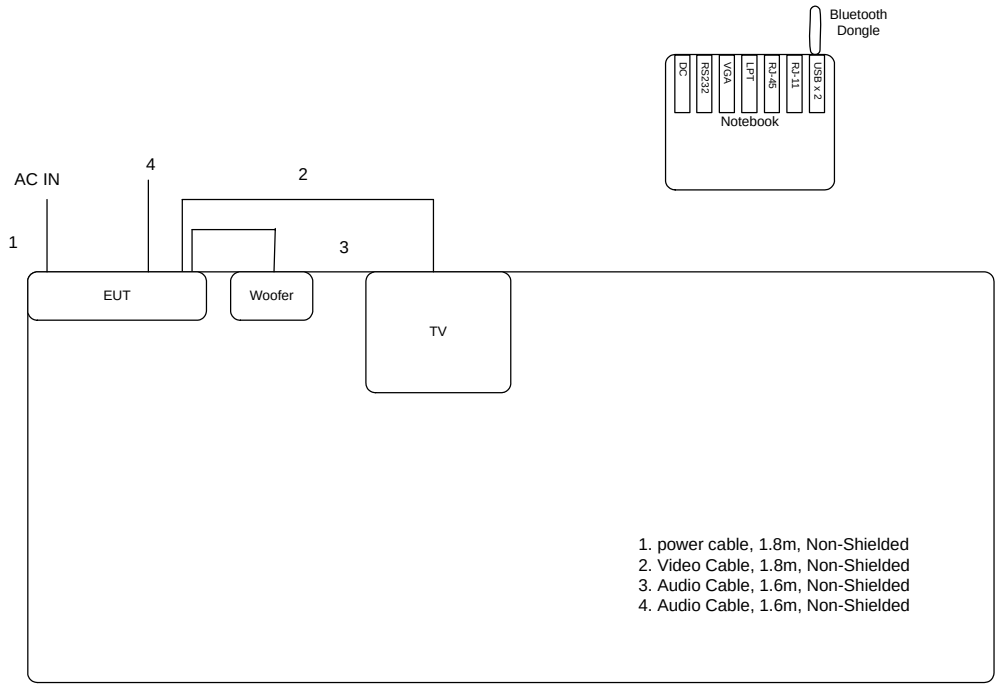


Note: The EUT must be operated by a fixture for continue TX function.

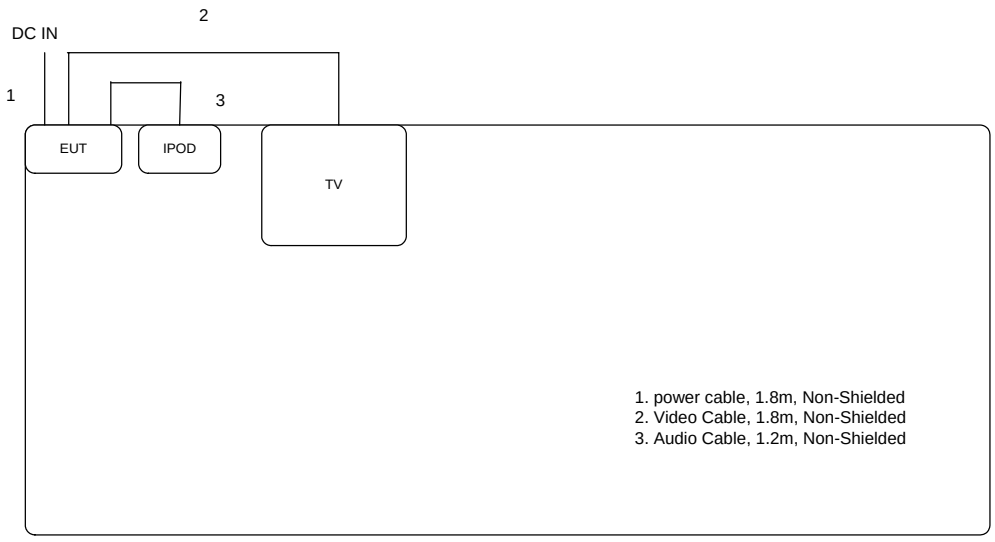
The material of the housing of this EUT is plastic, no metal part. Test configuration without the housing was taken as the worse emission case.

3.9.2. AC Power Line Conduction Emissions Test Configuration

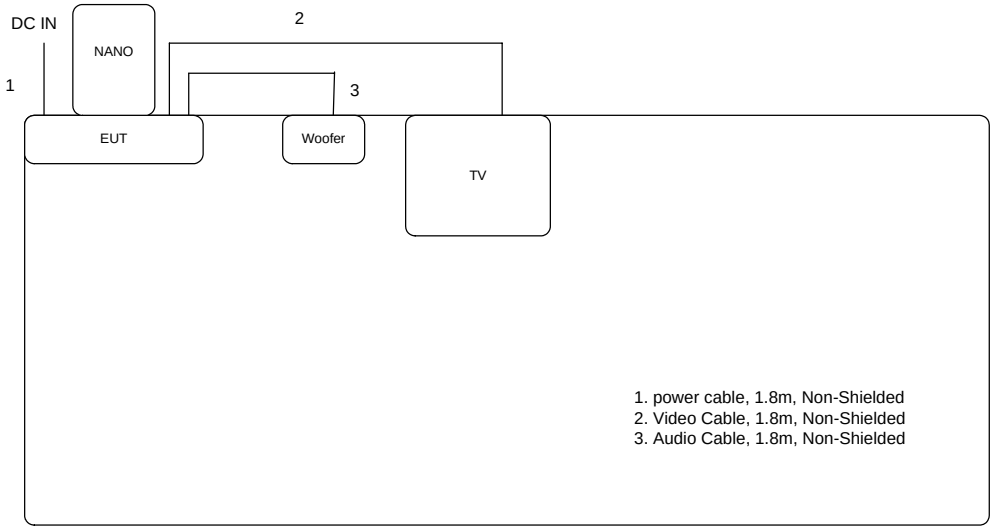
Bluetooth Link



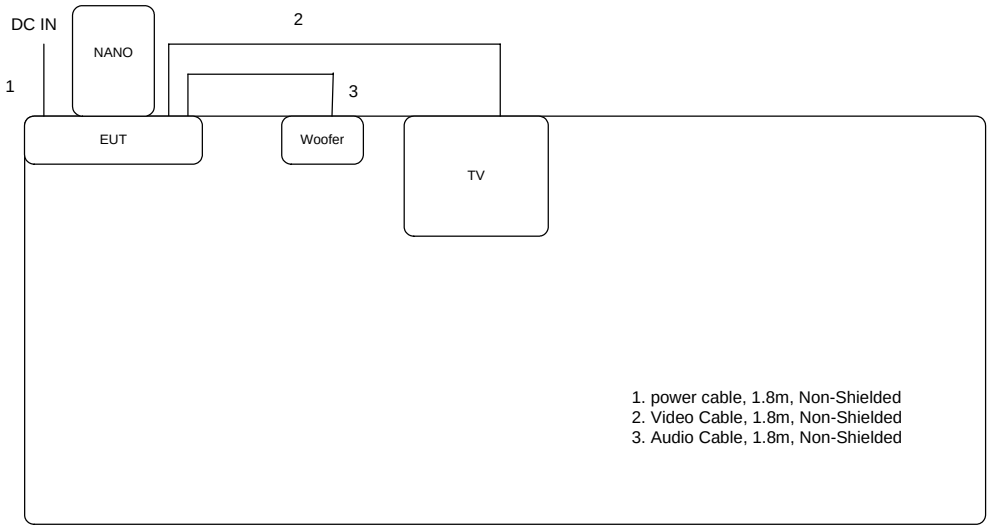
iPod AUDIO



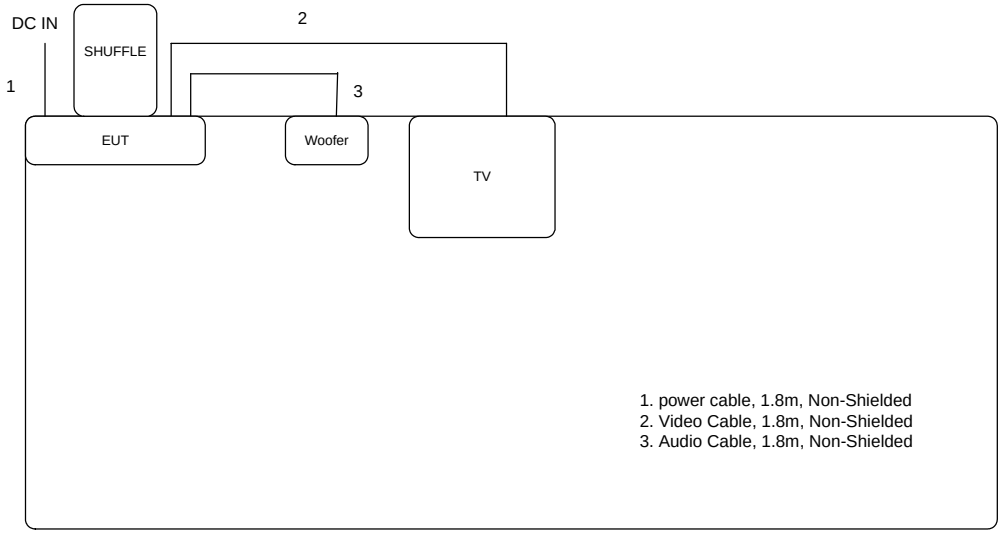
iPod NANO AUDIO



iPod NANO VIDEO



iPod Shuffle AUDIO



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

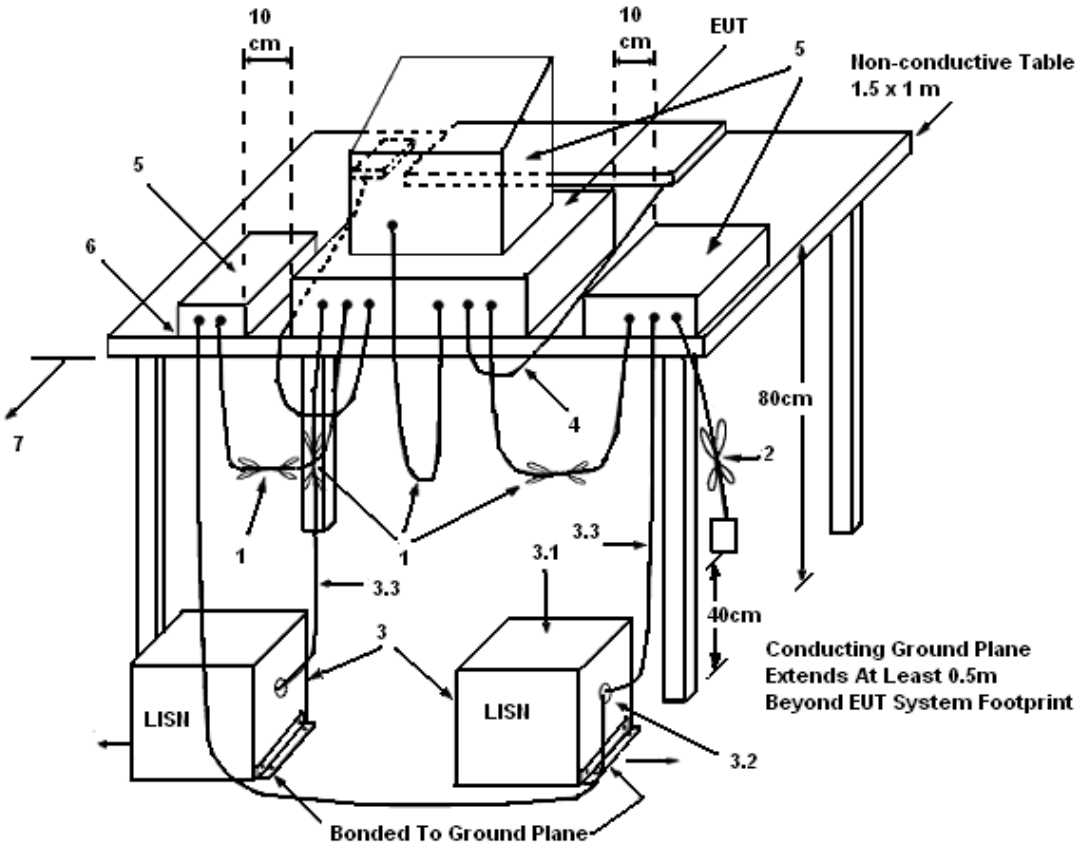
Please refer to section 5 in this report. The following table is the setting of the receiver.

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



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

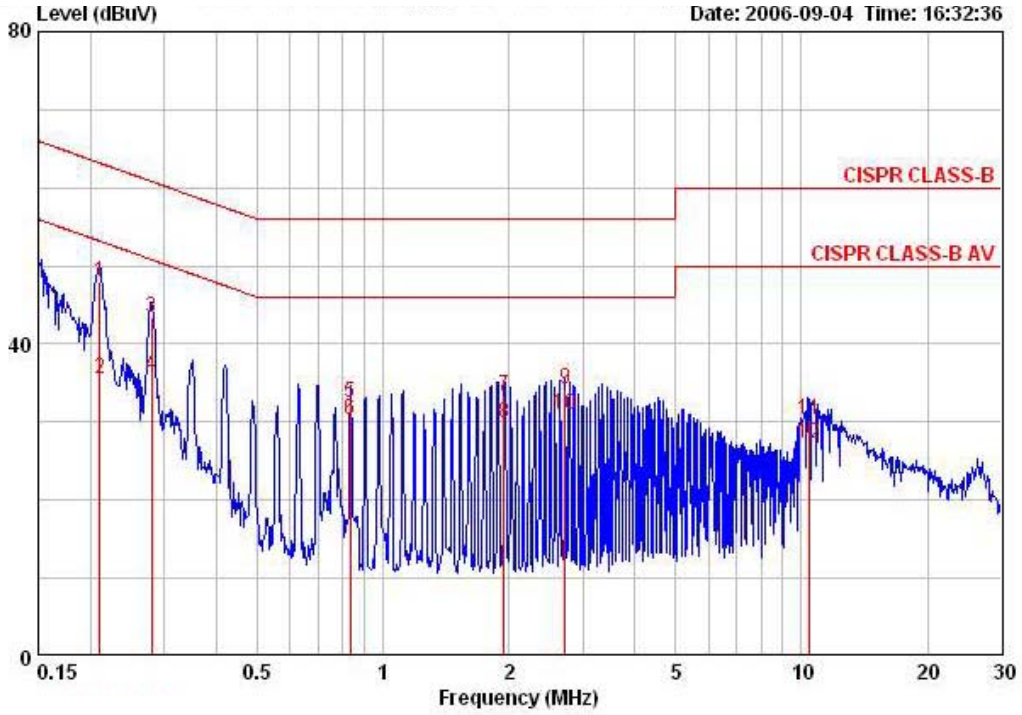
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

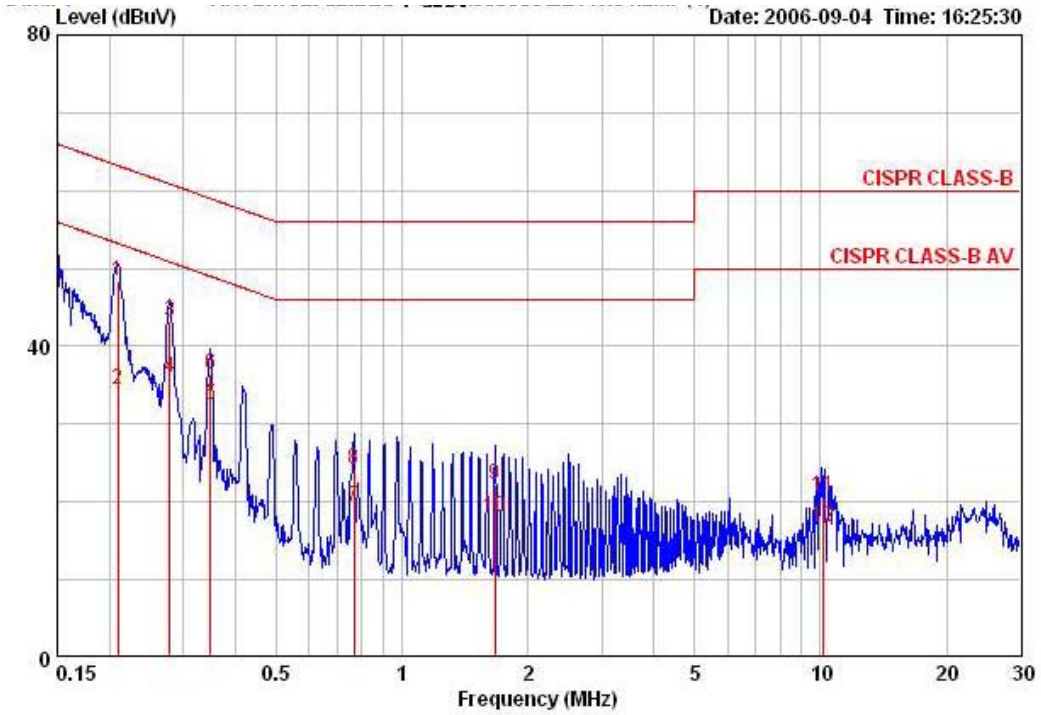
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24℃	Humidity	64%
Test Engineer	Johnson Chang	Phase	Line
Configuration	Bluetooth Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.21055	48.03	-15.15	63.18	46.63	1.20	0.20	QP
2	0.21055	35.56	-17.62	53.18	34.16	1.20	0.20	AVERAGE
3	0.28029	43.45	-17.36	60.81	42.45	0.80	0.20	QP
4	0.28029	35.96	-14.85	50.81	34.96	0.80	0.20	AVERAGE
5	0.83488	32.42	-23.58	56.00	31.92	0.30	0.20	QP
6	0.83488	30.39	-15.61	46.00	29.89	0.30	0.20	AVERAGE
7	1.949	33.44	-22.56	56.00	32.95	0.30	0.19	QP
8	1.949	29.96	-16.04	46.00	29.47	0.30	0.19	AVERAGE
9	2.718	34.20	-21.80	56.00	33.70	0.30	0.20	QP
10	2.718	30.88	-15.12	46.00	30.38	0.30	0.20	AVERAGE
11	10.448	30.33	-29.67	60.00	29.64	0.30	0.39	QP
12	10.448	27.27	-22.73	50.00	26.58	0.30	0.39	AVERAGE

Temperature	24℃	Humidity	64%
Test Engineer	Johnson Chang	Phase	Neutral
Configuration	Bluetooth Link		

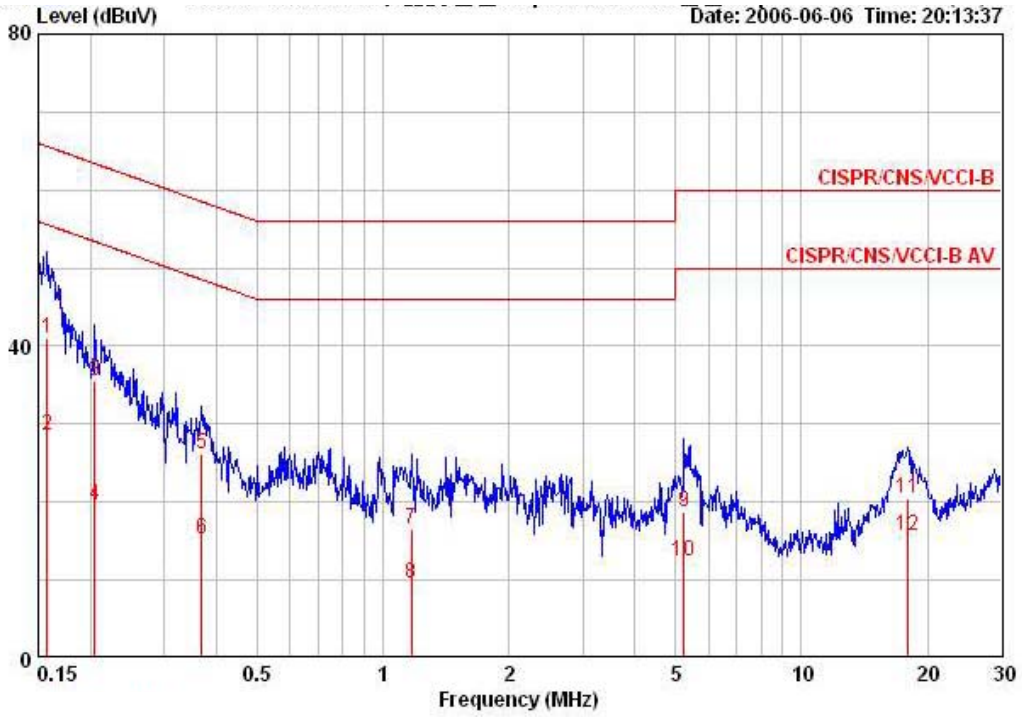


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 @	0.20944	48.49	-14.74	63.23	47.18	1.11	0.20	QP
2	0.20944	34.44	-18.79	53.23	33.13	1.11	0.20	AVERAGE
3	0.27881	43.13	-17.72	60.85	42.23	0.70	0.20	QP
4	0.27881	35.86	-14.99	50.85	34.96	0.70	0.20	AVERAGE
5	0.34830	32.53	-16.47	49.00	31.73	0.60	0.20	AVERAGE
6	0.34830	36.49	-22.51	59.00	35.69	0.60	0.20	QP
7	0.76702	19.48	-26.52	46.00	18.98	0.30	0.20	AVERAGE
8	0.76702	24.22	-31.78	56.00	23.72	0.30	0.20	QP
9	1.671	22.23	-33.77	56.00	21.83	0.26	0.14	QP
10	1.671	18.00	-28.00	46.00	17.60	0.26	0.14	AVERAGE
11	10.156	20.77	-39.23	60.00	20.14	0.30	0.33	QP
12	10.156	16.84	-33.16	50.00	16.21	0.30	0.33	AVERAGE

Note:

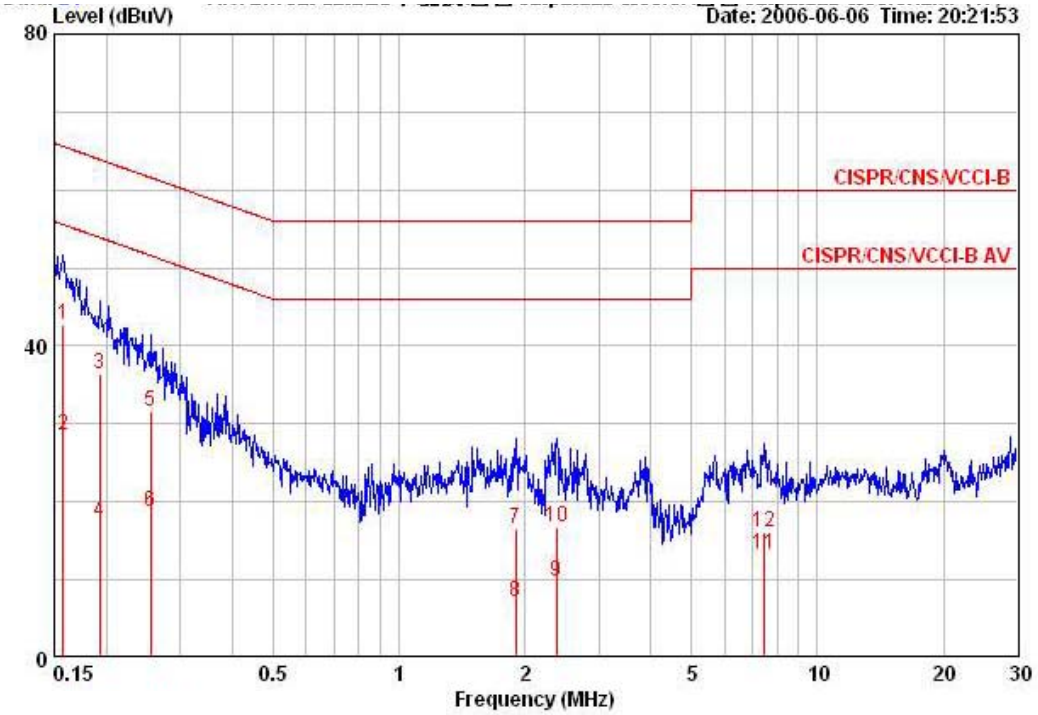
Level = Read Level + LISN Factor + Cable Loss.

Temperature	24℃	Humidity	64%
Test Engineer	Johnson Chang	Phase	Line
Configuration	iPod AUDIO		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15733	40.94	-24.67	65.60	38.66	2.08	0.20	QP
2	0.15733	28.57	-27.04	55.60	26.29	2.08	0.20	AVERAGE
3	0.20505	35.45	-27.95	63.40	34.00	1.25	0.20	QP
4	0.20505	19.58	-33.82	53.40	18.13	1.25	0.20	AVERAGE
5	0.36920	26.24	-32.28	58.52	25.44	0.60	0.20	QP
6	0.36920	15.26	-33.26	48.52	14.46	0.60	0.20	AVERAGE
7	1.172	16.63	-39.37	56.00	16.17	0.30	0.16	QP
8	1.172	9.65	-36.35	46.00	9.19	0.30	0.16	AVERAGE
9	5.249	18.65	-41.35	60.00	18.05	0.30	0.30	QP
10	5.249	12.43	-37.57	50.00	11.83	0.30	0.30	AVERAGE
11	17.944	20.49	-39.51	60.00	19.69	0.30	0.50	QP
12	17.944	15.77	-34.23	50.00	14.97	0.30	0.50	AVERAGE

Temperature	24℃	Humidity	64%
Test Engineer	Johnson Chang	Phase	Neutral
Configuration	iPod AUDIO		

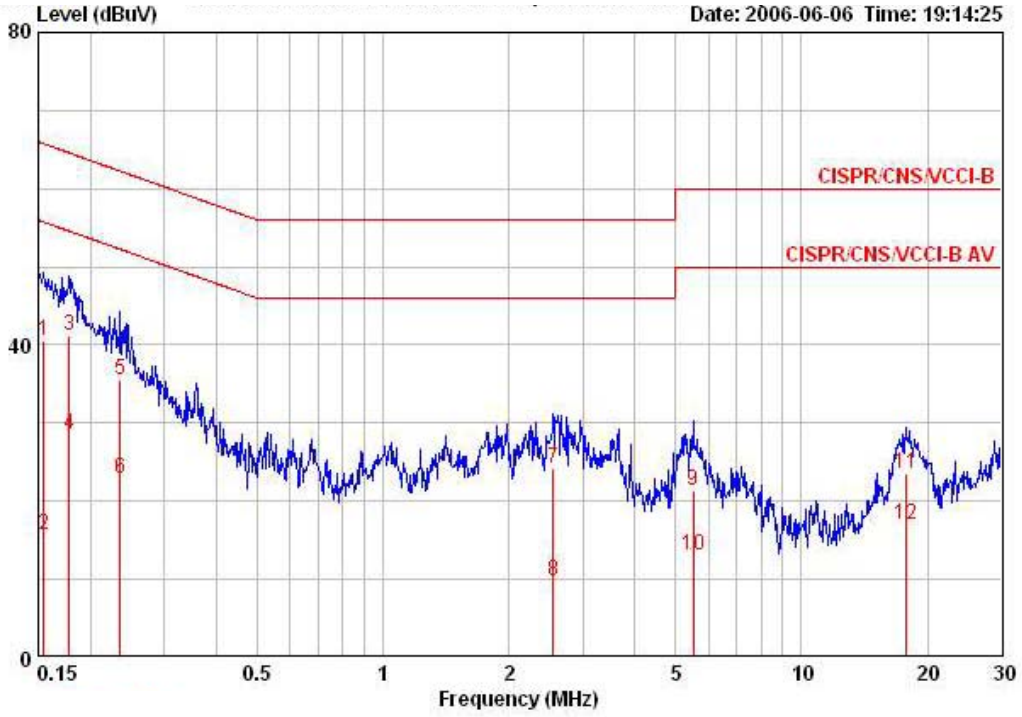


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15733	42.81	-22.79	65.60	40.71	1.90	0.20	QP
2	0.15733	28.50	-27.10	55.60	26.40	1.90	0.20	AVERAGE
3	0.19242	36.41	-27.52	63.93	35.17	1.04	0.20	QP
4	0.19242	17.50	-36.43	53.93	16.26	1.04	0.20	AVERAGE
5	0.25480	31.52	-30.08	61.60	30.52	0.80	0.20	QP
6	0.25480	18.78	-32.82	51.60	17.78	0.80	0.20	AVERAGE
7	1.898	16.47	-39.53	56.00	16.07	0.22	0.18	QP
8	1.898	7.28	-38.72	46.00	6.88	0.22	0.18	AVERAGE
9	2.384	9.72	-36.28	46.00	9.24	0.28	0.20	AVERAGE
10	2.384	16.71	-39.29	56.00	16.23	0.28	0.20	QP
11	7.486	13.28	-36.72	50.00	12.58	0.30	0.40	AVERAGE
12	7.486	16.06	-43.94	60.00	15.36	0.30	0.40	QP

Note:

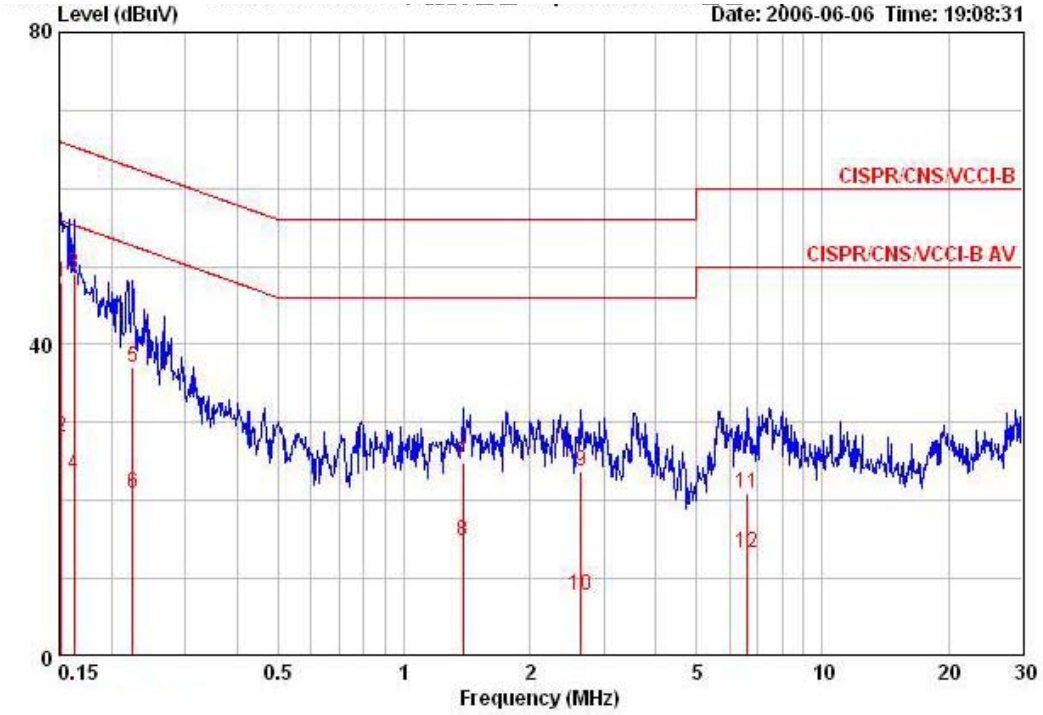
Level = Read Level + LISN Factor + Cable Loss.

Temperature	24℃	Humidity	64%
Test Engineer	Johnson Chang	Phase	Line
Configuration	iPod NANO AUDIO		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15485	40.52	-25.22	65.74	38.27	2.05	0.20	QP
2	0.15485	15.64	-40.10	55.74	13.39	2.05	0.20	AVERAGE
3	0.17772	41.24	-23.35	64.59	39.30	1.74	0.20	QP
4	0.17772	28.61	-25.98	54.59	26.67	1.74	0.20	AVERAGE
5	0.23533	35.50	-26.76	62.26	34.30	1.00	0.20	QP
6	0.23533	22.95	-29.31	52.26	21.75	1.00	0.20	AVERAGE
7	2.554	24.18	-31.82	56.00	23.68	0.30	0.20	QP
8	2.554	9.83	-36.17	46.00	9.33	0.30	0.20	AVERAGE
9	5.505	21.31	-38.69	60.00	20.71	0.30	0.30	QP
10	5.505	13.18	-36.82	50.00	12.58	0.30	0.30	AVERAGE
11	17.755	23.64	-36.36	60.00	22.84	0.30	0.50	QP
12	17.755	16.98	-33.02	50.00	16.18	0.30	0.50	AVERAGE

Temperature	24℃	Humidity	64%
Test Engineer	Johnson Chang	Phase	Neutral
Configuration	iPod NANO AUDIO		

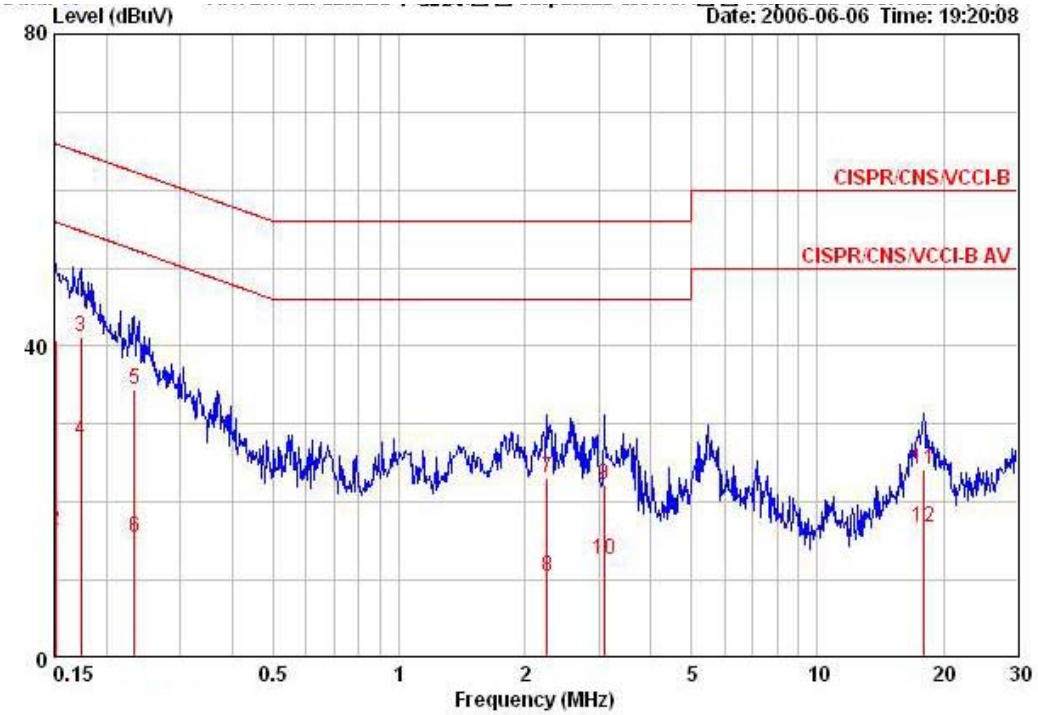


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15160	47.88	-18.03	65.91	45.78	1.90	0.20	QP
2	0.15160	28.17	-27.74	55.91	26.07	1.90	0.20	AVERAGE
3 @	0.16241	49.06	-16.28	65.34	47.01	1.85	0.20	QP
4	0.16241	23.22	-32.12	55.34	21.17	1.85	0.20	AVERAGE
5	0.22437	36.99	-25.67	62.66	35.83	0.96	0.20	QP
6	0.22437	20.88	-31.78	52.66	19.72	0.96	0.20	AVERAGE
7	1.381	24.93	-31.07	56.00	24.51	0.30	0.12	QP
8	1.381	14.93	-31.07	46.00	14.51	0.30	0.12	AVERAGE
9	2.650	23.77	-32.23	56.00	23.27	0.30	0.20	QP
10	2.650	7.81	-38.19	46.00	7.31	0.30	0.20	AVERAGE
11	6.627	20.84	-39.16	60.00	20.20	0.27	0.37	QP
12	6.627	13.35	-36.65	50.00	12.71	0.27	0.37	AVERAGE

Note:

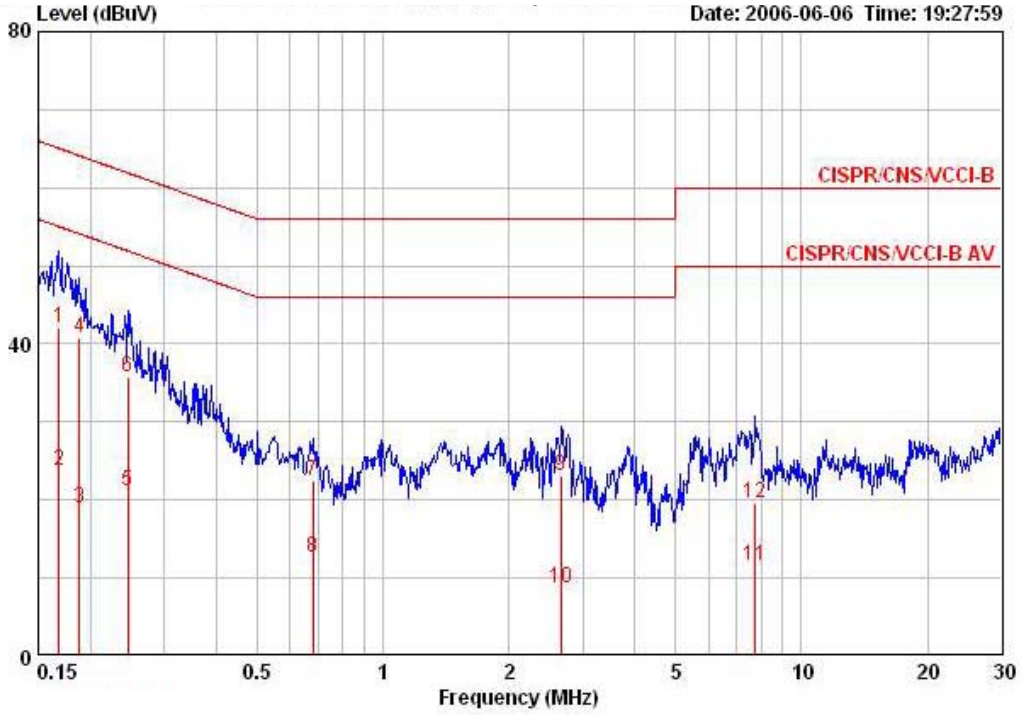
Level = Read Level + LISN Factor + Cable Loss.

Temperature	24℃	Humidity	64%
Test Engineer	Johnson Chang	Phase	Line
Configuration	iPod NANO VIDEO		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15080	40.73	-25.23	65.96	38.52	2.01	0.20	QP
2	0.15080	16.29	-39.67	55.96	14.08	2.01	0.20	AVERAGE
3	0.17399	41.22	-23.55	64.77	39.20	1.82	0.20	QP
4	0.17399	27.85	-26.92	54.77	25.83	1.82	0.20	AVERAGE
5	0.23285	34.47	-27.88	62.35	33.27	1.00	0.20	QP
6	0.23285	15.49	-36.86	52.35	14.29	1.00	0.20	AVERAGE
7	2.261	23.16	-32.84	56.00	22.66	0.30	0.20	QP
8	2.261	10.38	-35.62	46.00	9.88	0.30	0.20	AVERAGE
9	3.090	22.31	-33.69	56.00	21.79	0.30	0.22	QP
10	3.090	12.69	-33.31	46.00	12.17	0.30	0.22	AVERAGE
11	17.944	24.17	-35.83	60.00	23.37	0.30	0.50	QP
12	17.944	16.76	-33.24	50.00	15.96	0.30	0.50	AVERAGE

Temperature	24℃	Humidity	64%
Test Engineer	Johnson Chang	Phase	Neutral
Configuration	iPod NANO VIDEO		

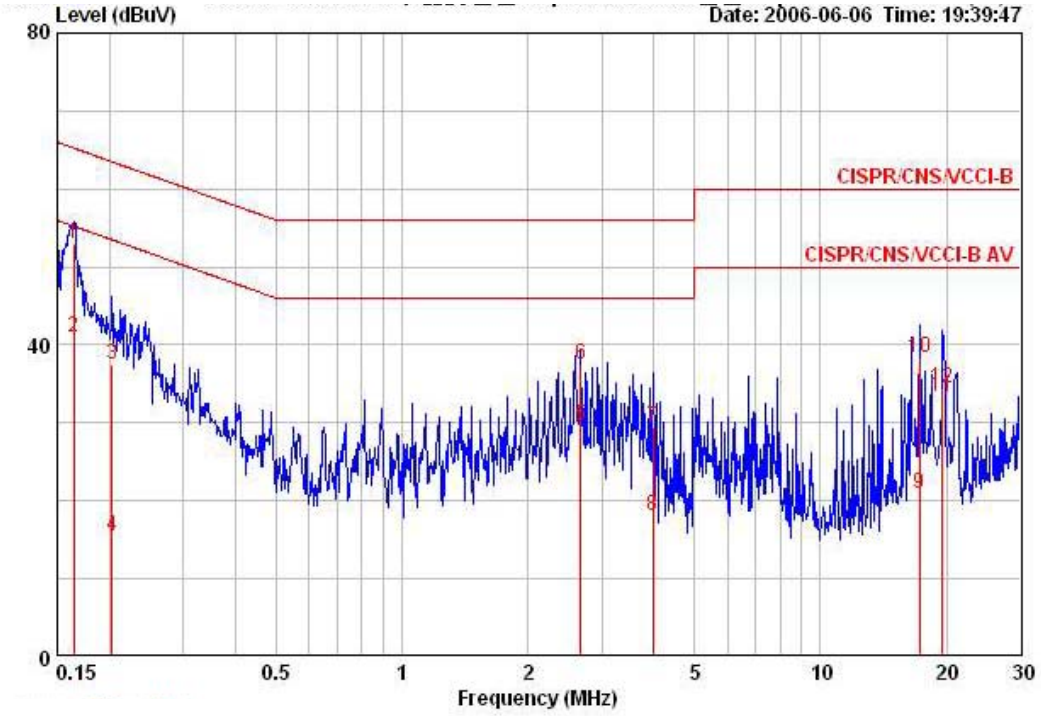


	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16854	42.10	-22.93	65.03	40.17	1.73	0.20	QP
2	0.16854	23.72	-31.31	55.03	21.79	1.73	0.20	AVERAGE
3	0.18838	18.99	-35.12	54.11	17.70	1.09	0.20	AVERAGE
4	0.18838	40.67	-23.44	64.11	39.38	1.09	0.20	QP
5	0.24552	21.22	-30.68	51.91	20.18	0.84	0.20	AVERAGE
6	0.24552	35.75	-26.15	61.91	34.71	0.84	0.20	QP
7	0.67902	22.49	-33.51	56.00	21.99	0.30	0.20	QP
8	0.67902	12.54	-33.46	46.00	12.04	0.30	0.20	AVERAGE
9	2.664	23.02	-32.98	56.00	22.52	0.30	0.20	QP
10	2.664	8.77	-37.23	46.00	8.27	0.30	0.20	AVERAGE
11	7.769	11.62	-38.38	50.00	10.92	0.30	0.40	AVERAGE
12	7.769	19.64	-40.36	60.00	18.94	0.30	0.40	QP

Note:

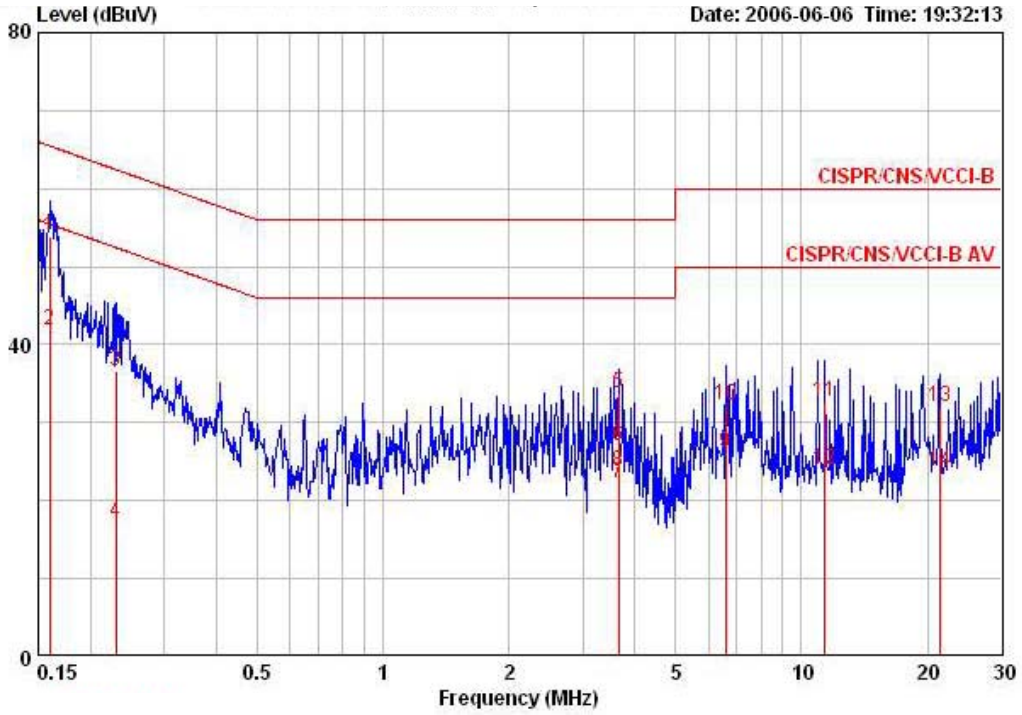
Level = Read Level + LISN Factor + Cable Loss.

Temperature	24℃	Humidity	64%
Test Engineer	Johnson Chang	Phase	Line
Configuration	iPod Shuffle AUDIO		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 @	0.16414	52.89	-12.37	65.25	50.67	2.02	0.20	QP
2 @	0.16414	40.99	-14.27	55.25	38.77	2.02	0.20	AVERAGE
3	0.20289	37.51	-25.98	63.49	36.04	1.27	0.20	QP
4	0.20289	15.55	-37.94	53.49	14.08	1.27	0.20	AVERAGE
5 @	2.678	29.57	-16.43	46.00	29.07	0.30	0.20	AVERAGE
6	2.678	37.52	-18.48	56.00	37.02	0.30	0.20	QP
7	3.975	29.49	-26.51	56.00	28.79	0.40	0.30	QP
8	3.975	18.17	-27.83	46.00	17.47	0.40	0.30	AVERAGE
9	17.280	20.91	-29.09	50.00	20.11	0.30	0.50	AVERAGE
10	17.280	38.47	-21.53	60.00	37.67	0.30	0.50	QP
11 @	19.552	33.33	-16.67	50.00	32.53	0.30	0.50	AVERAGE
12	19.552	34.50	-25.50	60.00	33.70	0.30	0.50	QP

Temperature	24℃	Humidity	64%
Test Engineer	Johnson Chang	Phase	Neutral
Configuration	iPod Shuffle AUDIO		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 @	0.15985	53.87	-11.60	65.47	51.77	1.90	0.20	QP
2 @	0.15985	41.75	-13.72	55.47	39.65	1.90	0.20	AVERAGE
3	0.23040	36.61	-25.83	62.44	35.51	0.90	0.20	QP
4	0.23040	17.28	-35.16	52.44	16.18	0.90	0.20	AVERAGE
5	3.652	33.69	-22.31	56.00	33.09	0.30	0.30	QP
6	3.652	26.94	-19.06	46.00	26.34	0.30	0.30	AVERAGE
7	3.652	22.30	-33.70	56.00	21.70	0.30	0.30	QP
8	3.652	23.79	-22.21	46.00	23.19	0.30	0.30	AVERAGE
9	6.574	26.15	-23.85	50.00	25.48	0.29	0.39	AVERAGE
10	6.574	32.17	-27.83	60.00	31.50	0.29	0.39	QP
11	11.361	32.70	-27.30	60.00	32.00	0.30	0.40	QP
12	11.361	23.97	-26.03	50.00	23.27	0.30	0.40	AVERAGE
13	21.419	32.06	-27.95	60.00	31.18	0.38	0.50	QP
14	21.419	23.84	-26.17	50.00	22.96	0.38	0.50	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. Maximum Peak Output Power Measurement

4.2.1. Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

4.2.2. Measuring Instruments and Setting

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

Power Meter Parameter	Setting
Filter No.	Auto
Measurement time	0.135 s ~ 26 s
Used Peak Sensor	NRV-Z32 (model 04)

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Turn on the EUT and power meter and then record the peak power value.
3. Repeat above procedures on all channels needed to be tested.

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 Maximum Peak Output Power

Temperature	24℃	Humidity	64%
Test Engineer	Beck Wu	Configurations	FHSS (GFSK)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
0	2402 MHz	-1.51	30.00	Complies
39	2441 MHz	-1.23	30.00	Complies
78	2480 MHz	-1.93	30.00	Complies

4.3. Hopping Channel Separation Measurement

4.3.1. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

4.3.2. Measuring Instruments and Setting

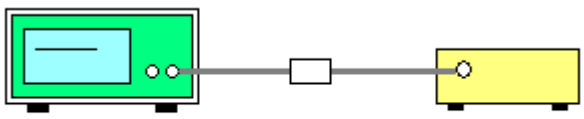
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 300 kHz (Channel Separation)
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 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
3. The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

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.

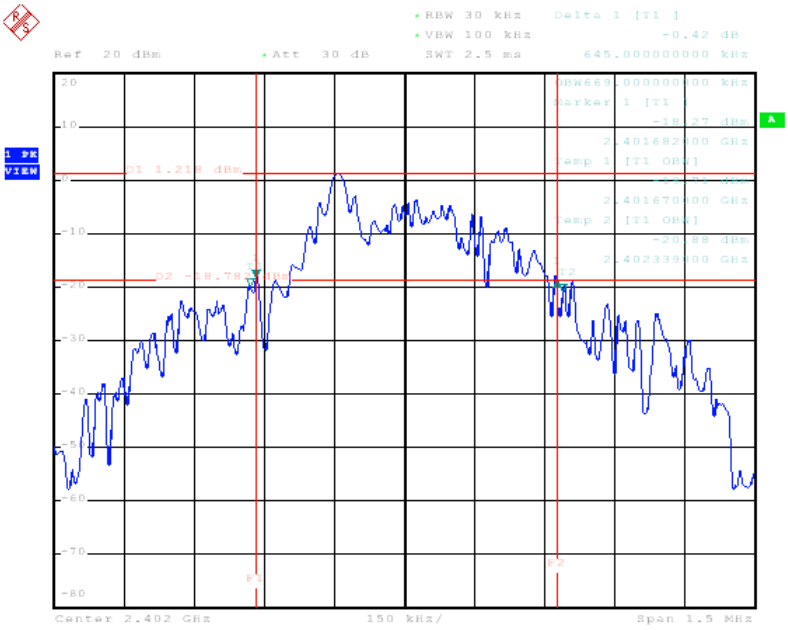
4.3.7. Test Result of Hopping Channel Separation

Temperature	24℃	Humidity	64%
Test Engineer	Beck Wu	Configurations	FHSS (GFSK)

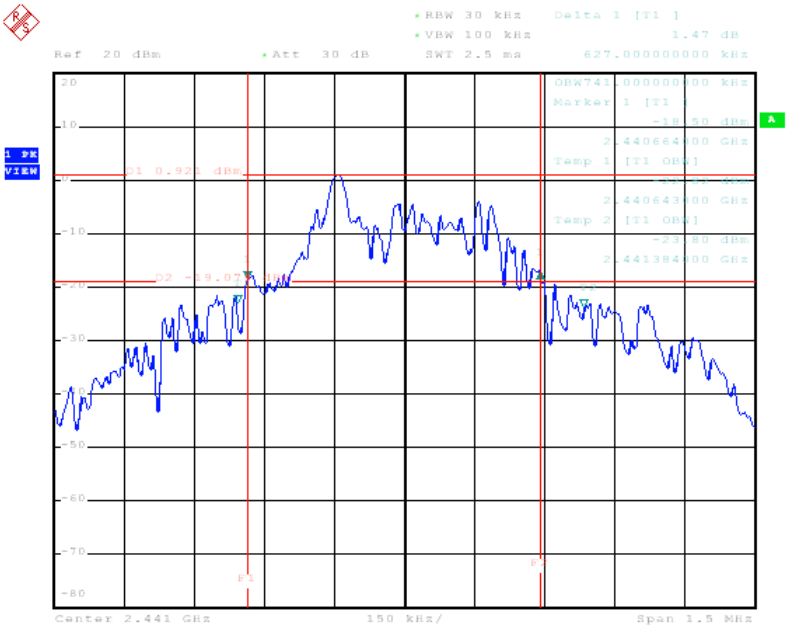
Frequency	Ch. Separation (MHz)	20dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)	Result
2402 MHz	1.00	645.00	669.00	Complies
2441 MHz	1.00	627.00	741.00	Complies
2480 MHz	1.00	657.00	741.00	Complies

Ch. Separation Limits: >20dB bandwidth or >2/3 of 20dB bandwidth

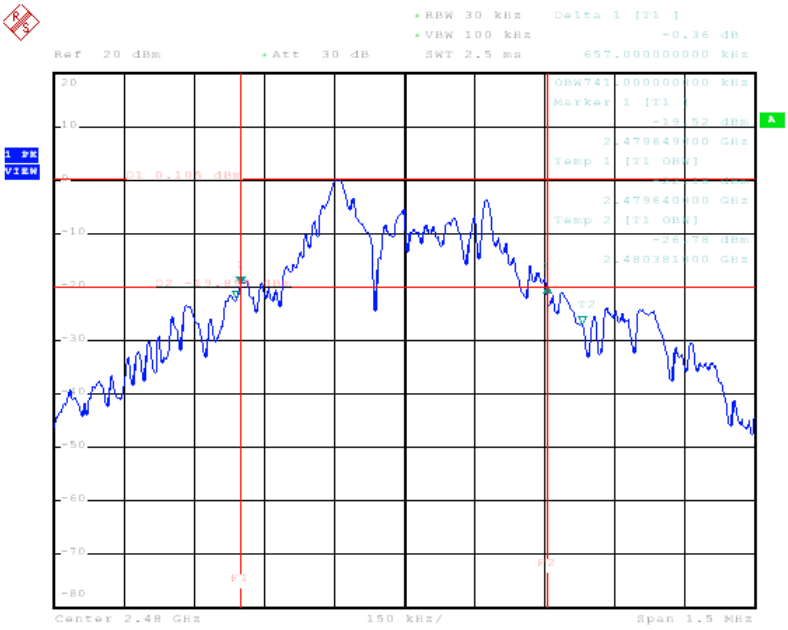
20 dB Bandwidth Plot on Channel 0 / 2402 MHz



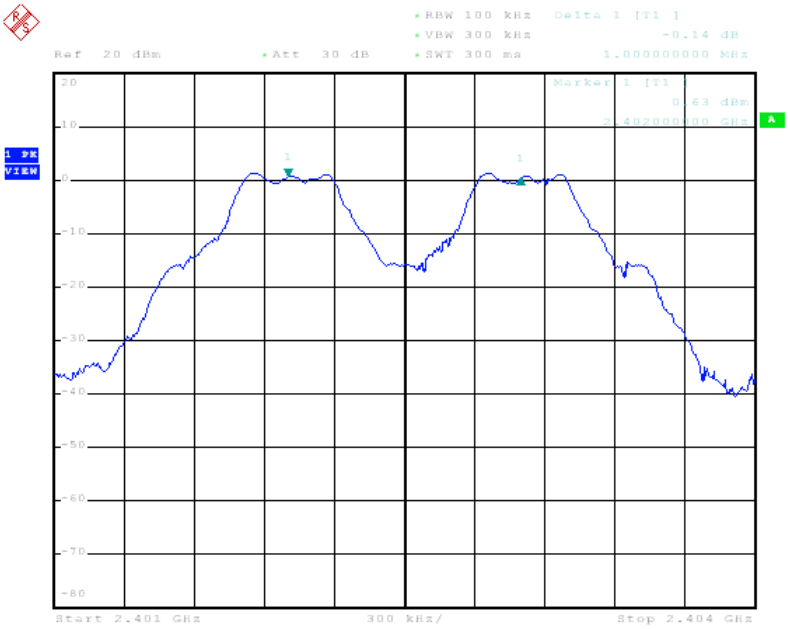
20 dB Bandwidth Plot on Channel 39 / 2441 MHz



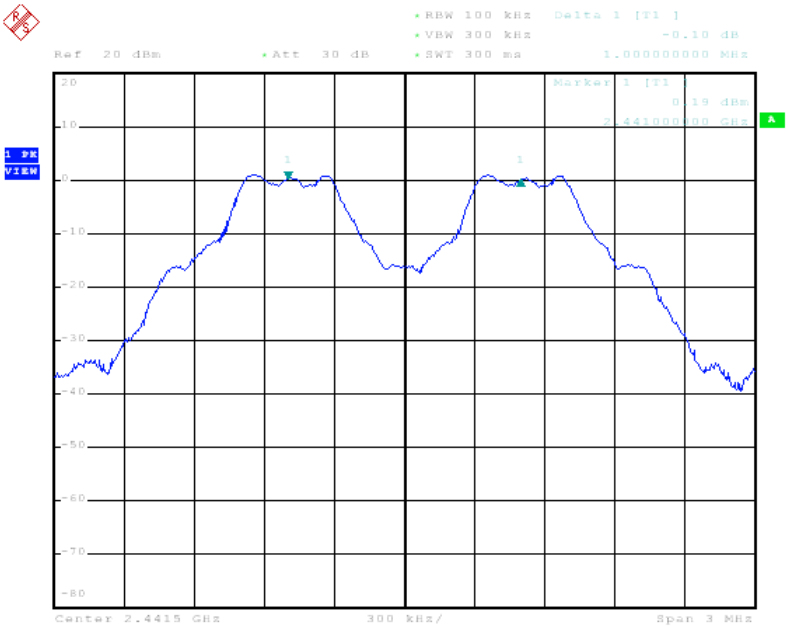
20 dB Bandwidth Plot on Channel 78 / 2480 MHz



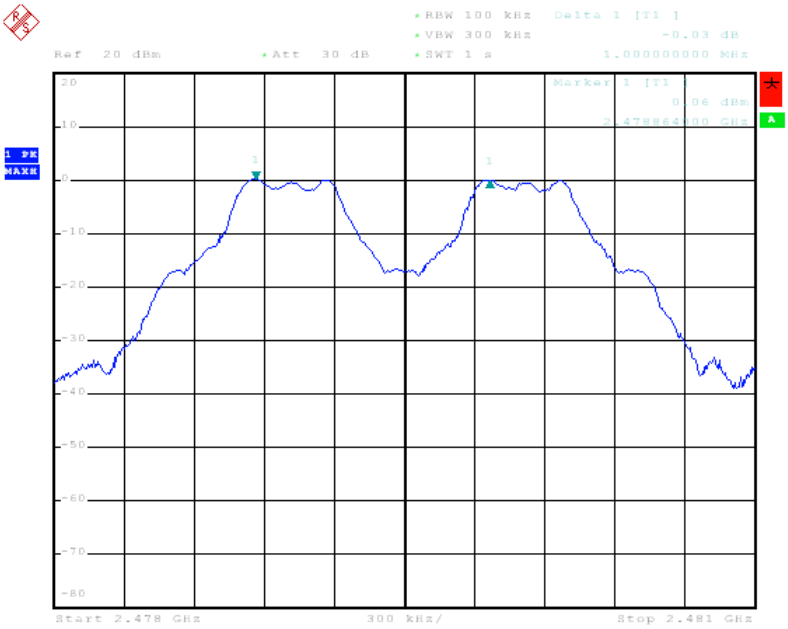
Channel Separation Plot on Channel 0~1 / 2402 MHz ~ 2403 MHz



Channel Separation Plot on Channel 39~40 / 2441 MHz ~ 2442 MHz



Channel Separation Plot on Channel 77~78 / 2479 MHz ~ 2480 MHz



4.4. Number of Hopping Frequency Measurement

4.4.1. Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels.

4.4.2. 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	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. 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 utilised.
3. Observe frequency hopping in 2400MHz~2483.5MHz, there are at least 75 non-overlapping channels.

4.4.4. Test Setup Layout

4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

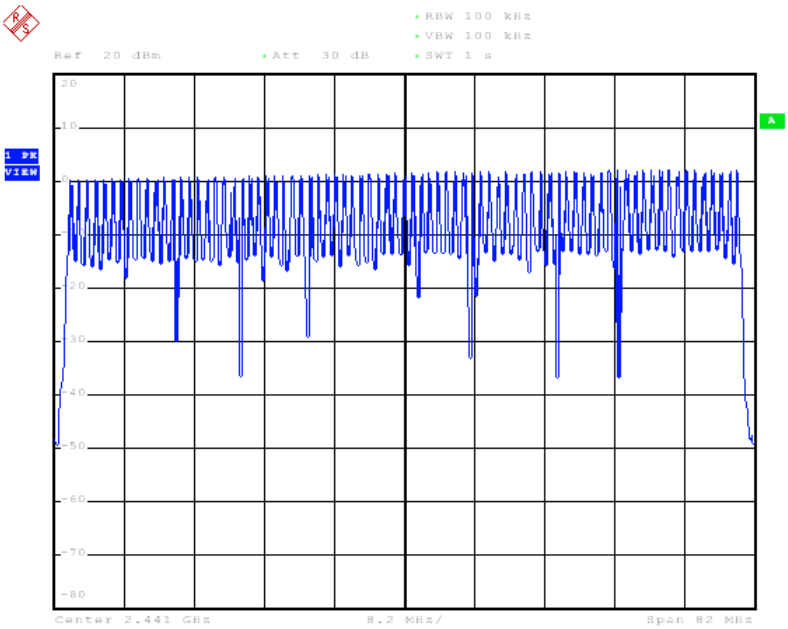
The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Number of Hopping Frequency

Temperature	24℃	Humidity	64%
Test Engineer	Beck Wu	Configurations	FHSS (GFSK)

Modulation Type	Channel No.	Frequency (MHz)	Hopping Ch. (Channels)	Min. Limit (Channels)	Test Result
GFSK	0 ~ 78	2402 ~ 2480	79	75	Complies

Number of Hopping Channel Plot on Channel 0~78 / 2402 MHz ~ 2480 MHz



4.5. Dwell Time Measurement

4.5.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

4.5.2. Measuring Instruments and Setting

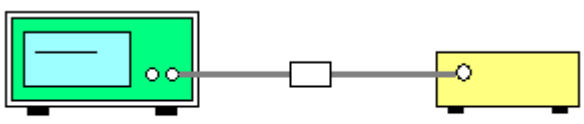
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	1000 kHz
VB	1000 kHz
Detector	Peak
Trace	Single Trigger

4.5.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser
2. Set RBW of spectrum analyzer to 1000kHz and VBW to 1000kHz.
3. Use a video trigger with the trigger level set to enable triggering only on full pulses.
4. Sweep Time is more than once pulse time.
5. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
6. Measure the maximum time duration of one single pulse.
7. Set the EUT for DH1 packet transmitting.
8. Measure the maximum time duration of one single pulse.
9. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 10.12 x 31.6 = 320 within 31.6 seconds.

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

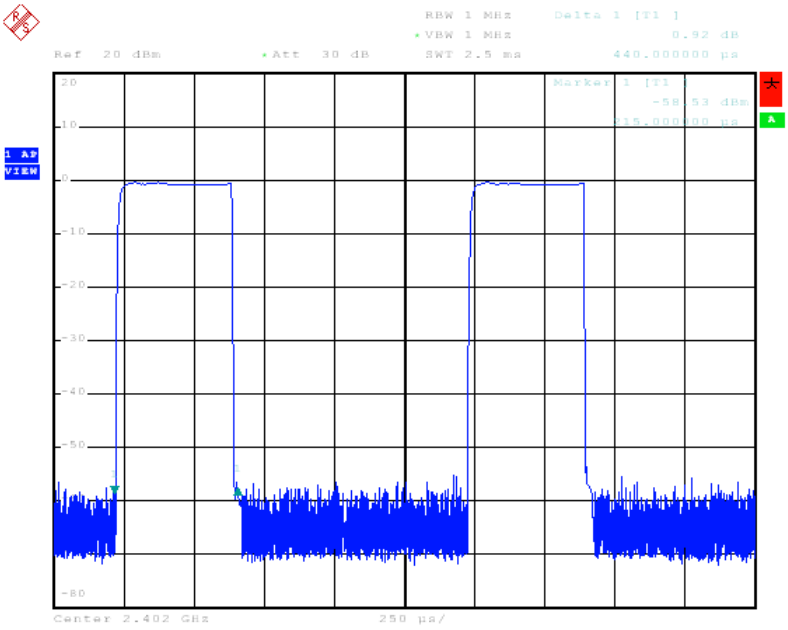
The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Dwell Time

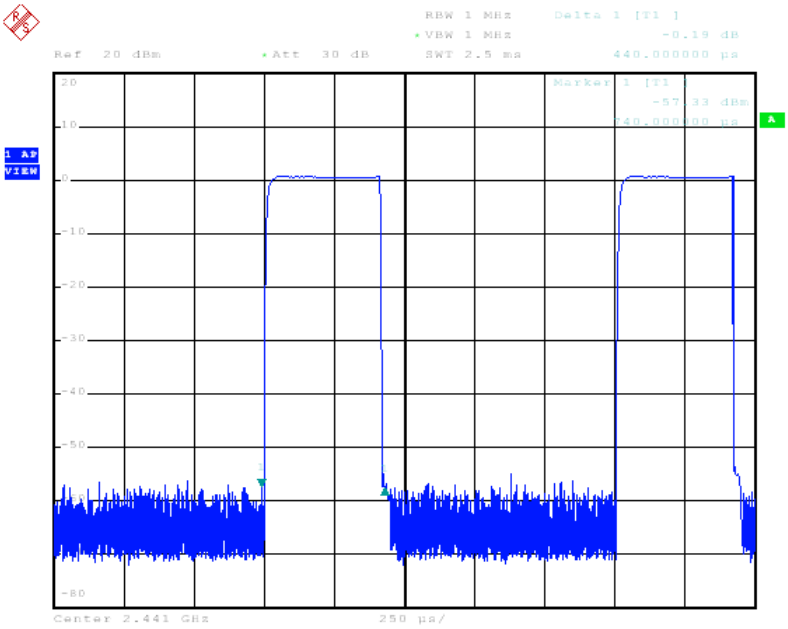
Temperature	24℃	Humidity	64%
Test Engineer	Beck Wu	Configurations	FHSS (GFSK)

Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits (s)	Test Result
DH1	2402 MHz	0.4400	0.1408	0.4000	Complies
DH1	2441 MHz	0.4400	0.1408	0.4000	Complies
DH1	2480 MHz	0.4550	0.1456	0.4000	Complies

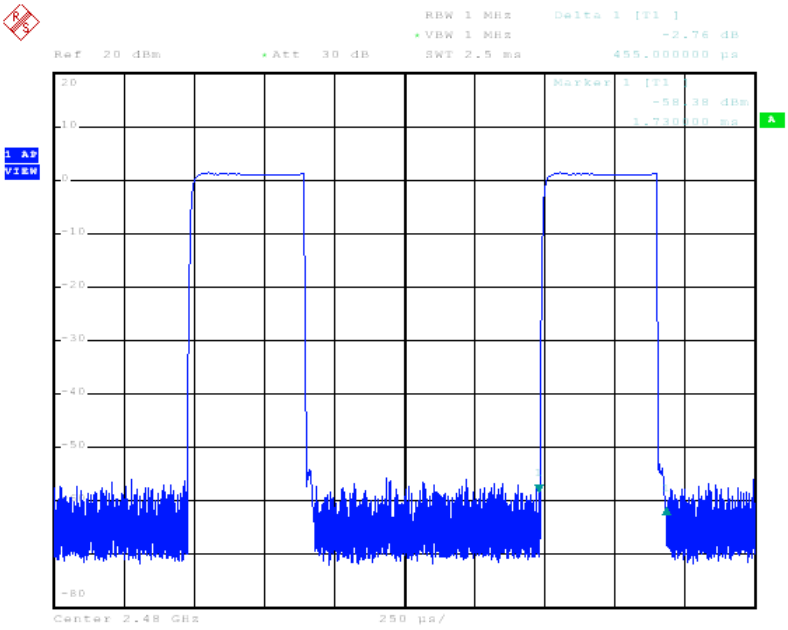
DH1 Dwell Time Plot on Channel 0 / 2402 MHz



DH1 Dwell Time Plot on Channel 39 / 2441 MHz



DH1 Dwell Time Plot on Channel 78 / 2480 MHz



Note: The EUT had been disabled DH5 and DH3 function during normal use and test.

4.6. Radiated Emissions Measurement

4.6.1. Limit

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

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

4.6.2. 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 (Emission in non-restricted band)	1000KHz / 1000KHz for peak

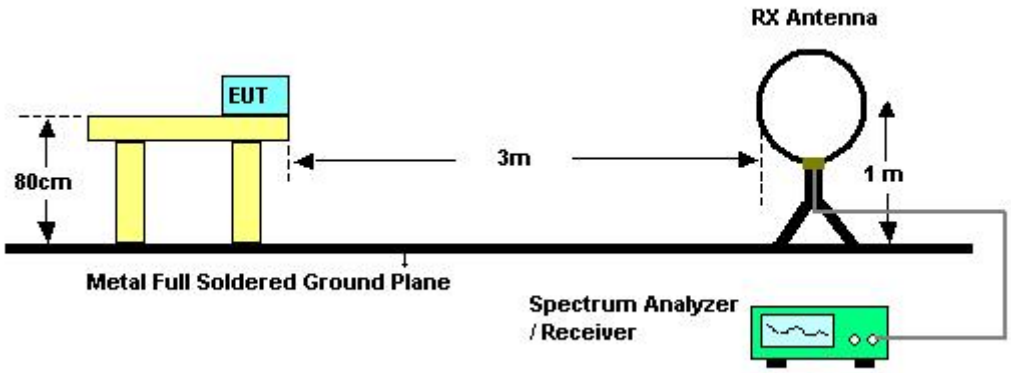
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.6.3. Test Procedures

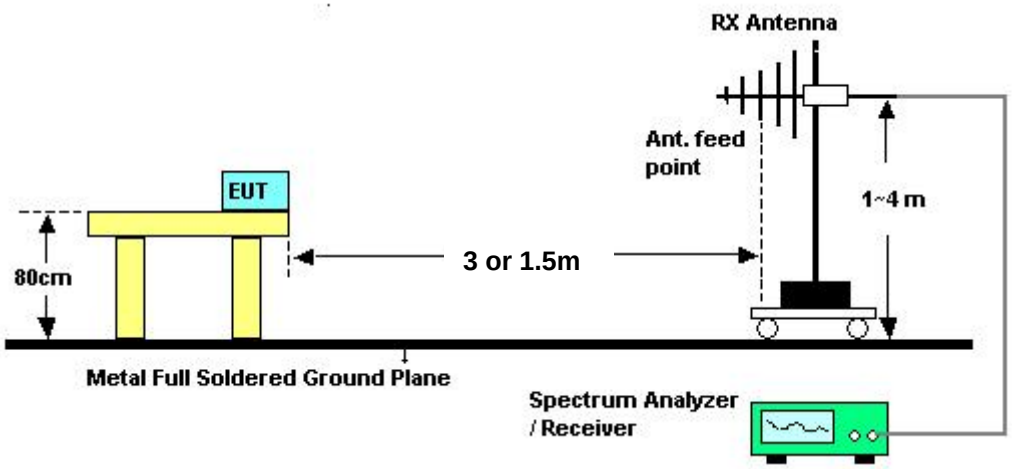
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

4.6.4. 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 distanc [3m] / test distance [1.5m]) (dB);

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	24℃	Humidity	64%
Test Engineer	Jordan Hsiao	Configurations	Channel 39

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.

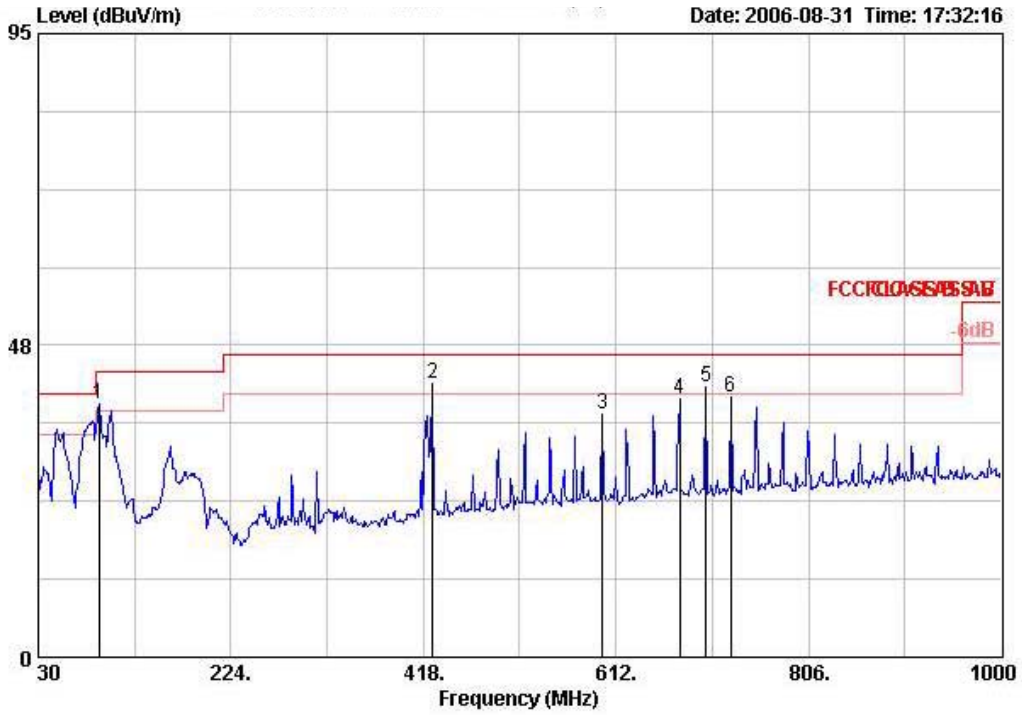
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

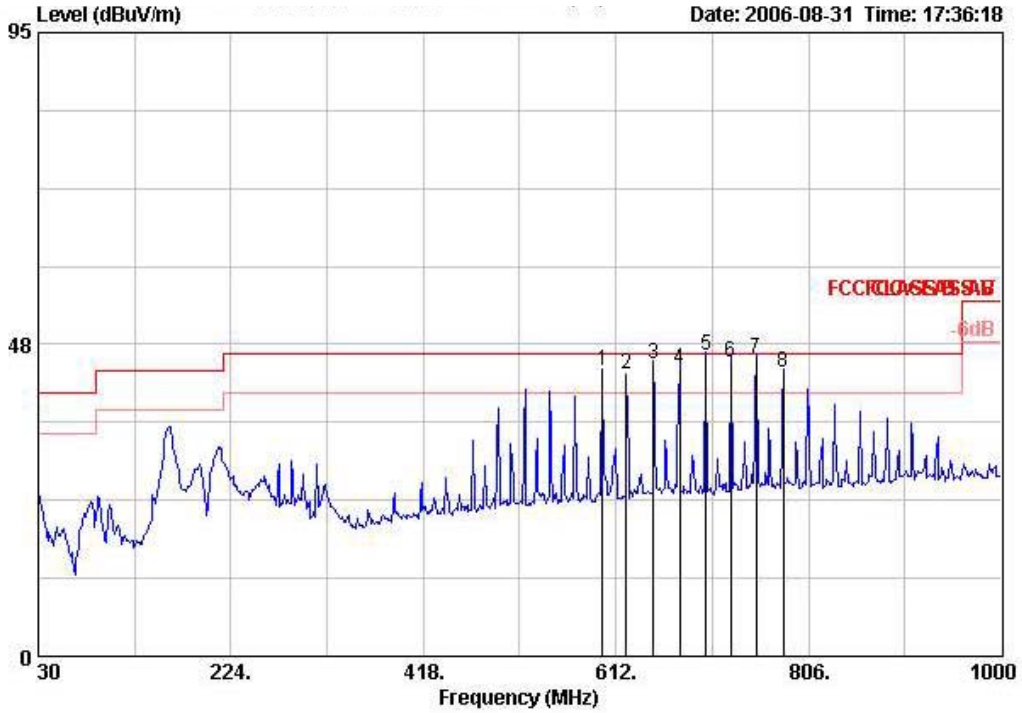
Temperature	24℃	Humidity	64%
Test Engineer	Jordan Hsiao	Configurations	Channel 39

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Antenna Factor
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg	dB/m
1 @	91.110	38.61	-4.89	43.50	59.19	1.43	31.59	Peak	---	---	9.58
2 @	427.700	41.73	-4.27	46.00	52.95	2.81	30.97	Peak	---	---	16.93
3 @	598.420	37.10	-8.90	46.00	45.66	3.10	30.75	Peak	---	---	19.09
4 @	676.020	39.25	-6.75	46.00	46.41	3.55	30.41	Peak	---	---	19.70
5 @	703.180	41.07	-4.93	46.00	48.12	3.62	30.51	Peak	---	---	19.83
6 @	727.430	39.72	-6.28	46.00	46.26	3.77	30.38	Peak	---	---	20.07

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Antenna Factor
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg	dB/m
1 @	598.420	43.40	-2.60	46.00	51.96	3.10	30.75	QP	145	245	19.09
2 @	622.670	42.86	-3.14	46.00	50.79	3.28	30.55	Peak	---	---	19.33
3 @	649.830	44.56	-1.44	46.00	51.76	3.50	30.30	QP	144	249	19.60
4 @	676.020	43.67	-2.33	46.00	50.83	3.55	30.41	QP	145	246	19.70
5 @	703.180	45.86	-0.14	46.00	52.91	3.62	30.51	QP	145	243	19.83
6 @	727.430	44.78	-1.22	46.00	51.32	3.77	30.38	QP	140	250	20.07
7 @	753.620	45.22	-0.78	46.00	51.26	3.89	30.26	QP	142	250	20.33
8 @	780.780	43.32	-2.68	46.00	49.15	3.84	30.21	QP	142	242	20.55

Note:

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

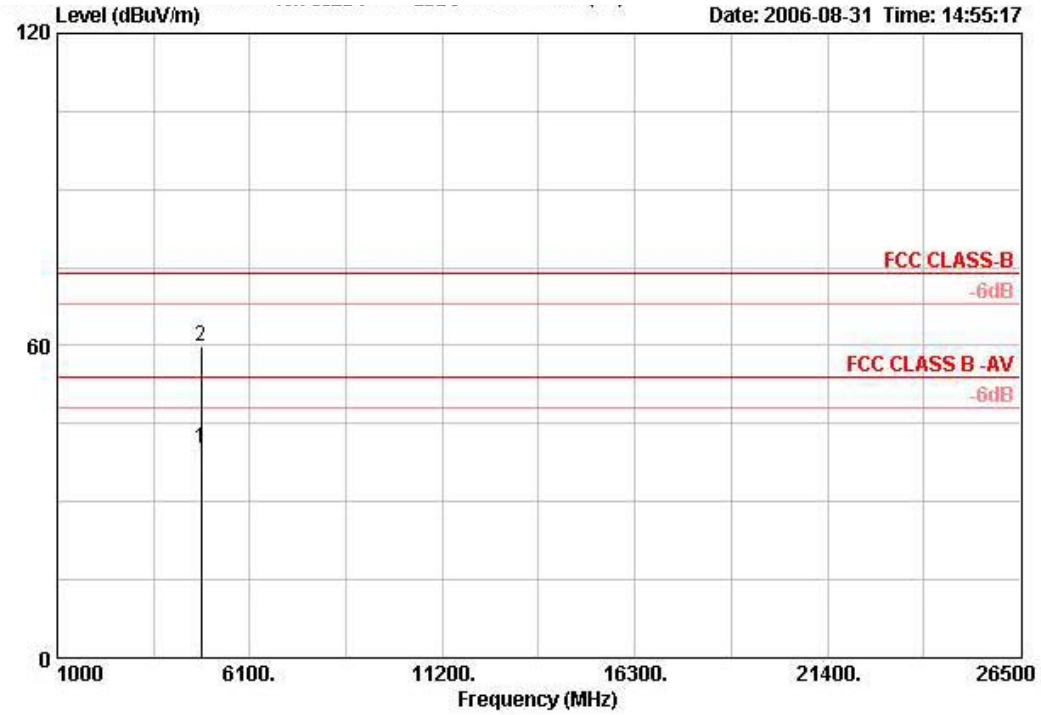
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

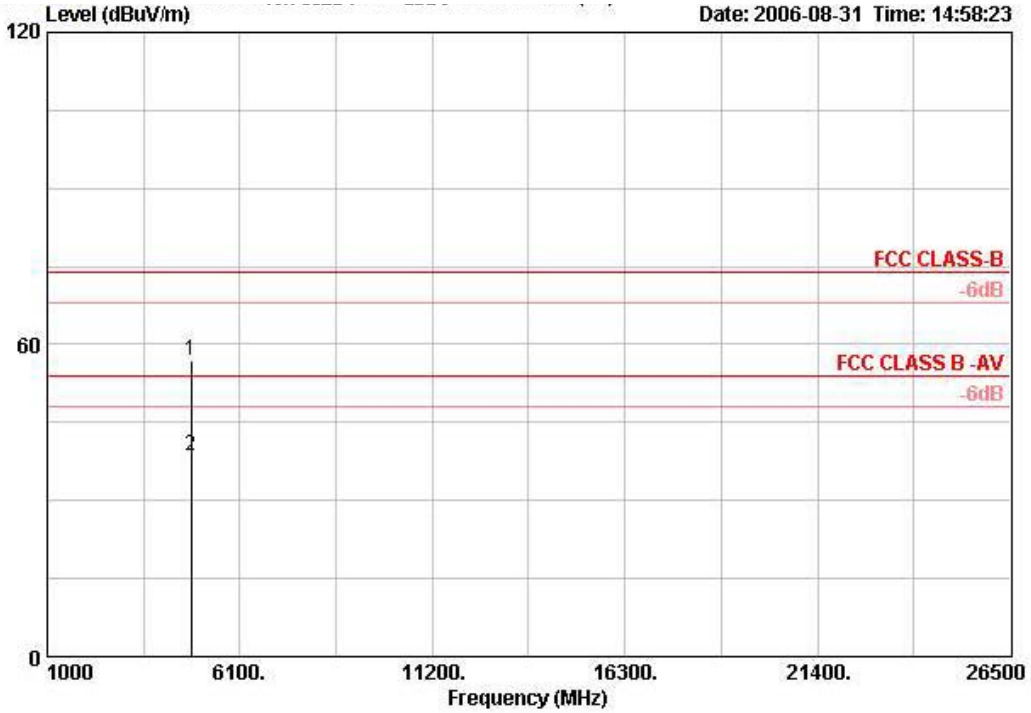
Temperature	24℃	Humidity	64%
Test Engineer	Jordan Hsiao	Configurations	Channel 0

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Antenna Factor
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg	dB/m
1 @	4803.840	40.13	-13.87	54.00	37.83	4.30	35.17	AVERAGE	100	39	33.17
2 @	4804.280	59.97	-14.03	74.00	57.68	4.30	35.17	PEAK	100	39	33.17

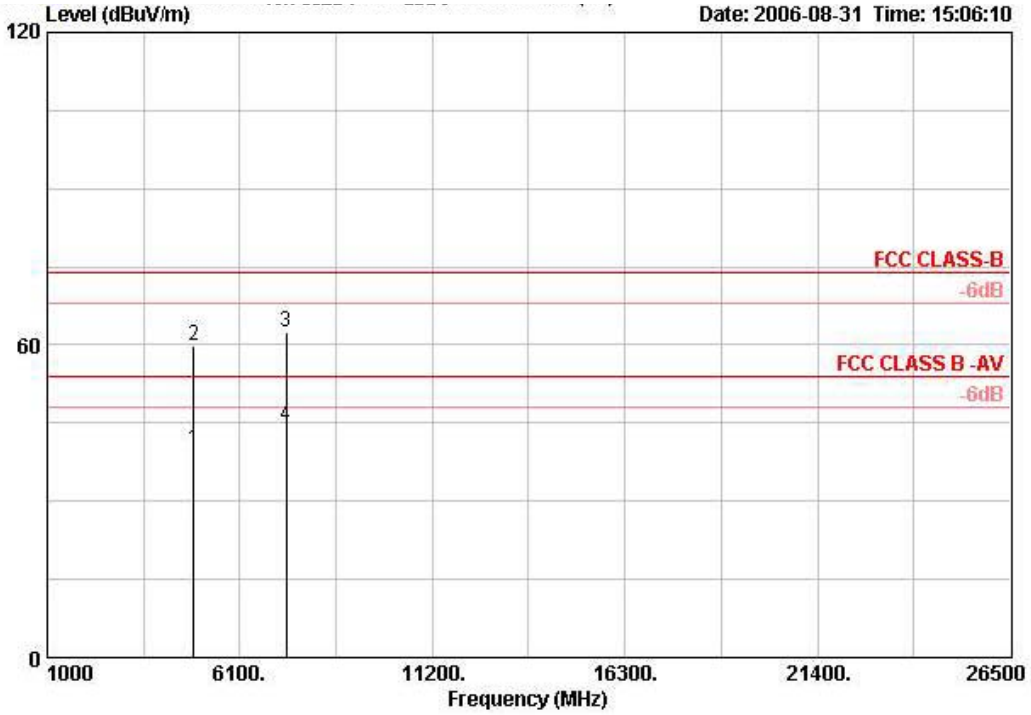
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Antenna Factor
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg	dB/m
1 @	4803.680	56.86	-17.14	74.00	54.56	4.30	35.17	PEAK	185	290	33.17
2 @	4803.840	38.52	-15.48	54.00	36.22	4.30	35.17	AVERAGE	185	290	33.17

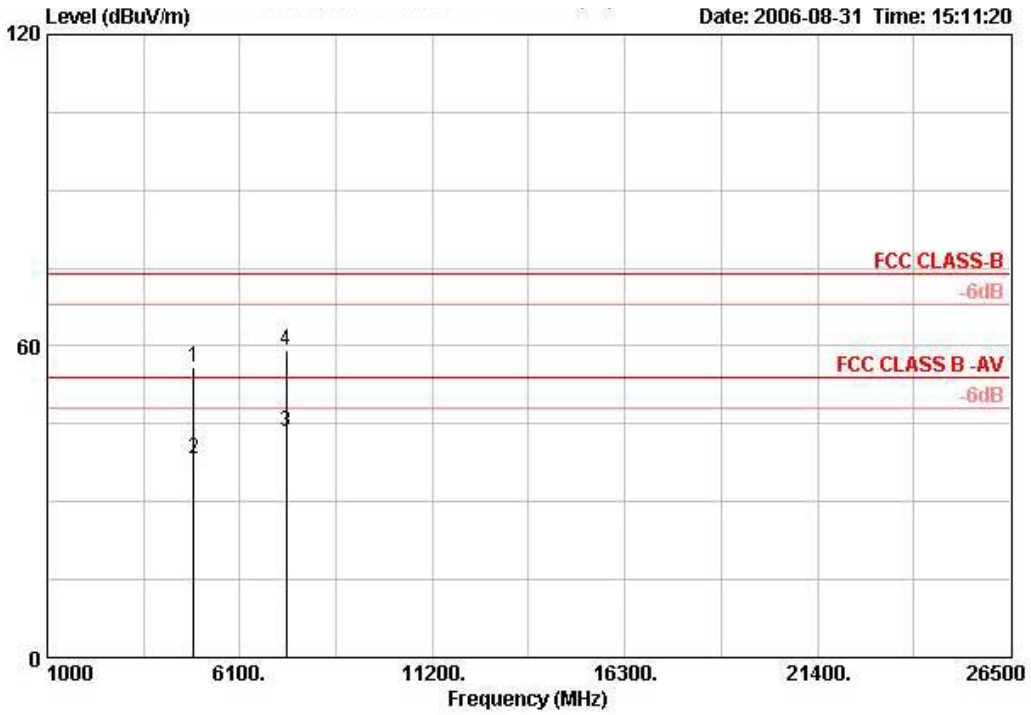
Temperature	24℃	Humidity	64%
Test Engineer	Jordan Hsiao	Configurations	Channel 39

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Antenna Factor
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg	dB/m
1 @	4881.810	39.94	-14.06	54.00	37.43	4.30	35.15	AVERAGE	100	96	33.36
2 @	4881.820	59.77	-14.23	74.00	57.26	4.30	35.15	PEAK	100	96	33.36
3 @	7322.550	62.43	-11.57	74.00	53.07	5.56	35.18	PEAK	100	284	38.98
4 @	7322.630	44.61	-9.39	54.00	35.25	5.56	35.18	AVERAGE	100	284	38.98

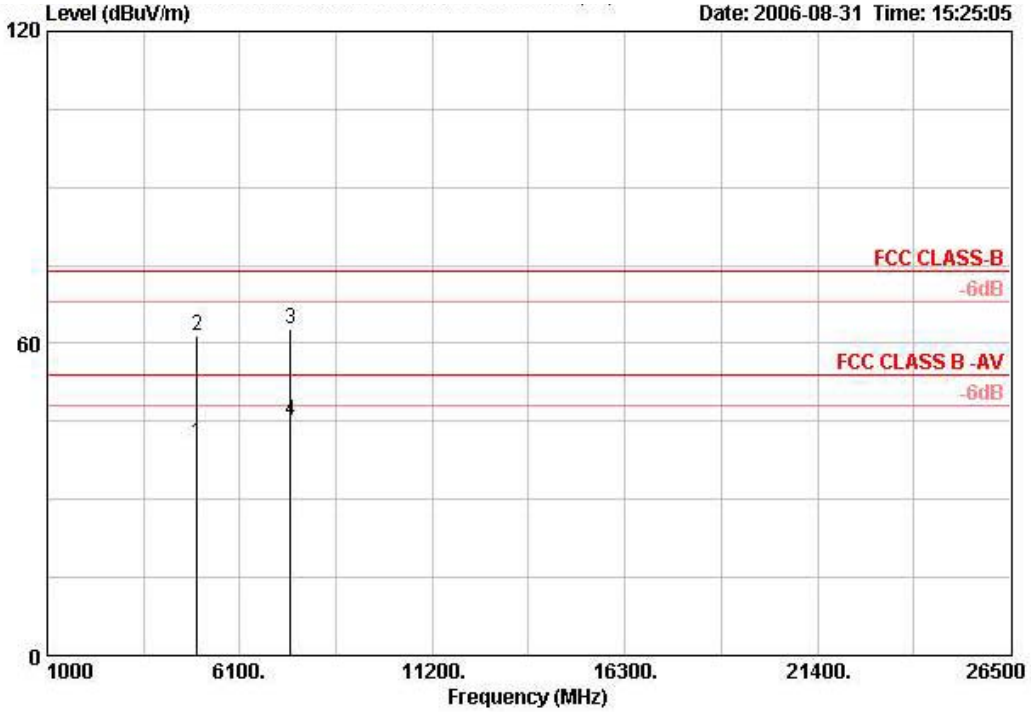
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Antenna Factor
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg	dB/m
1 @	4881.760	55.78	-18.22	74.00	53.28	4.30	35.15	PEAK	217	310	33.36
2 @	4881.810	38.20	-15.80	54.00	35.69	4.30	35.15	AVERAGE	217	310	33.36
3 @	7322.670	43.34	-10.66	54.00	33.98	5.56	35.18	AVERAGE	154	135	38.98
4 @	7322.680	59.34	-14.66	74.00	49.98	5.56	35.18	PEAK	154	135	38.98

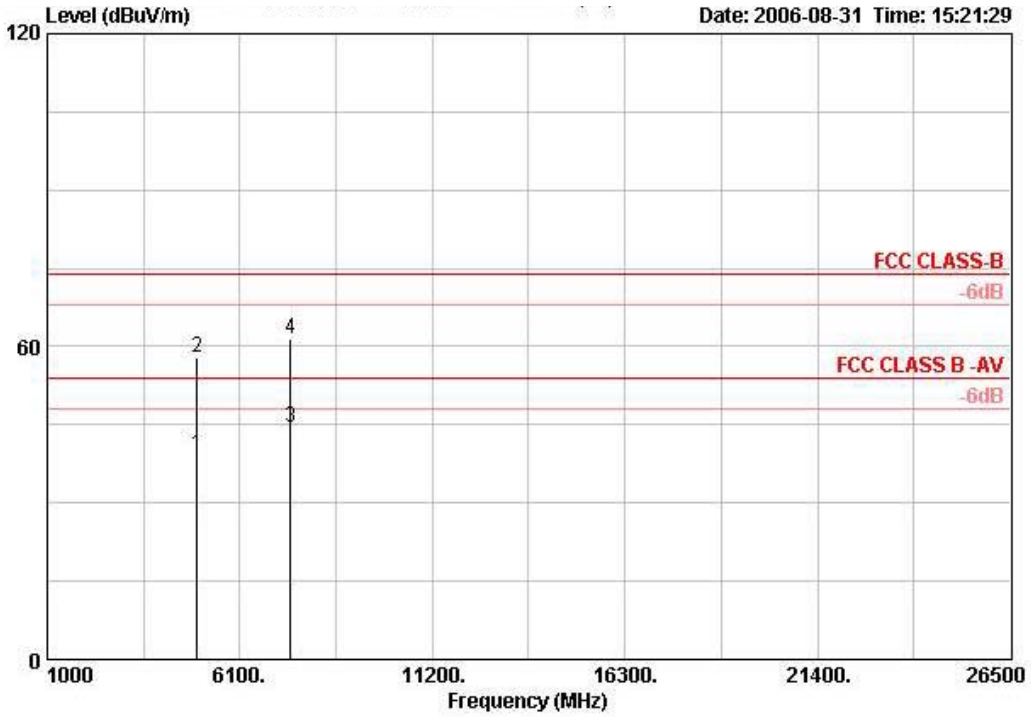
Temperature	24℃	Humidity	64%
Test Engineer	Jordan Hsiao	Configurations	Channel 78

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Antenna Factor
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg	dB/m
1 @	4959.750	40.78	-13.22	54.00	38.02	4.30	35.14	AVERAGE	127	250	33.60
2 @	4959.780	61.55	-12.45	74.00	58.79	4.30	35.14	PEAK	127	250	33.60
3 @	7439.400	62.73	-11.27	74.00	52.90	5.63	35.15	PEAK	100	249	39.34
4 @	7439.610	45.11	-8.89	54.00	35.28	5.63	35.15	AVERAGE	100	249	39.34

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Antenna Factor
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg	dB/m
1 @	4959.830	39.39	-14.61	54.00	36.62	4.30	35.14	AVERAGE	172	189	33.60
2 @	4960.260	57.93	-16.07	74.00	55.17	4.30	35.14	PEAK	172	189	33.60
3 @	7439.610	44.53	-9.47	54.00	34.70	5.63	35.15	AVERAGE	162	304	39.34
4 @	7439.650	61.44	-12.56	74.00	51.62	5.63	35.15	PEAK	162	304	39.34

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.

4.7. Band Edge Emissions Measurement

4.7.1. Limit

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

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

4.7.2. 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 (Emission in non-restricted band)	100 KHz /100 KHz for Peak

4.7.3. Test Procedures

1. The test procedure is the same as section 4.5.3, only the freqeuncy range investigated is limited to 100MHz 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.

4.7.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.6.4.

4.7.5. Test Deviation

There is no deviation with the original standard.

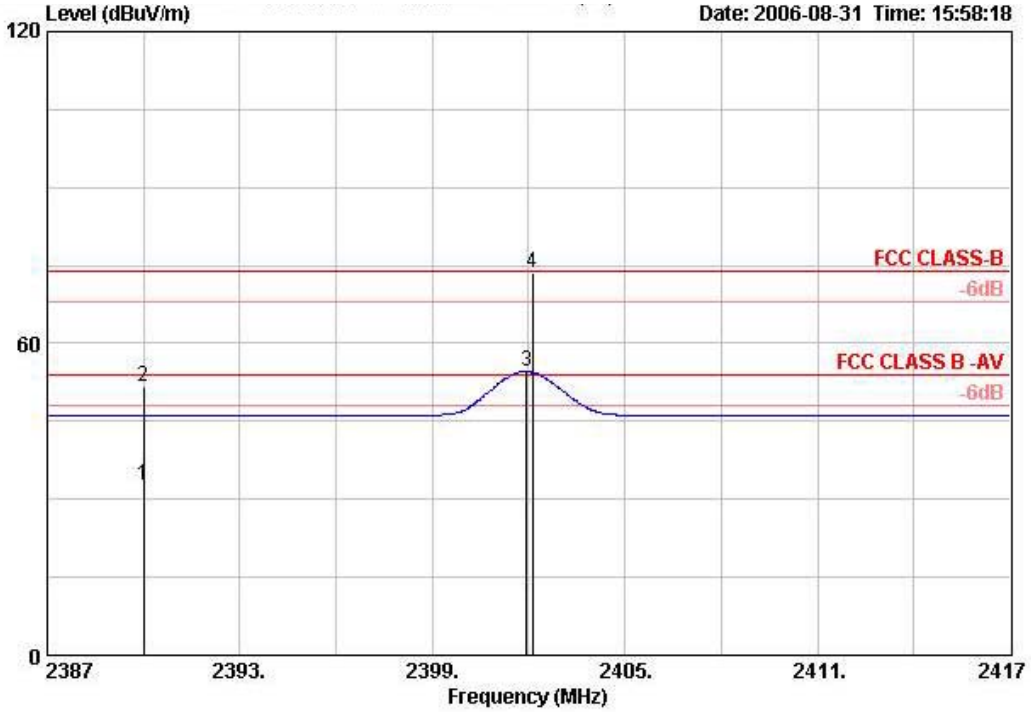
4.7.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.7.7. Test Result of Band Edge and Fundamental Emissions

Temperature	24℃	Humidity	64%
Test Engineer	Jordan Hsiao	Configurations	Channel 0, 78

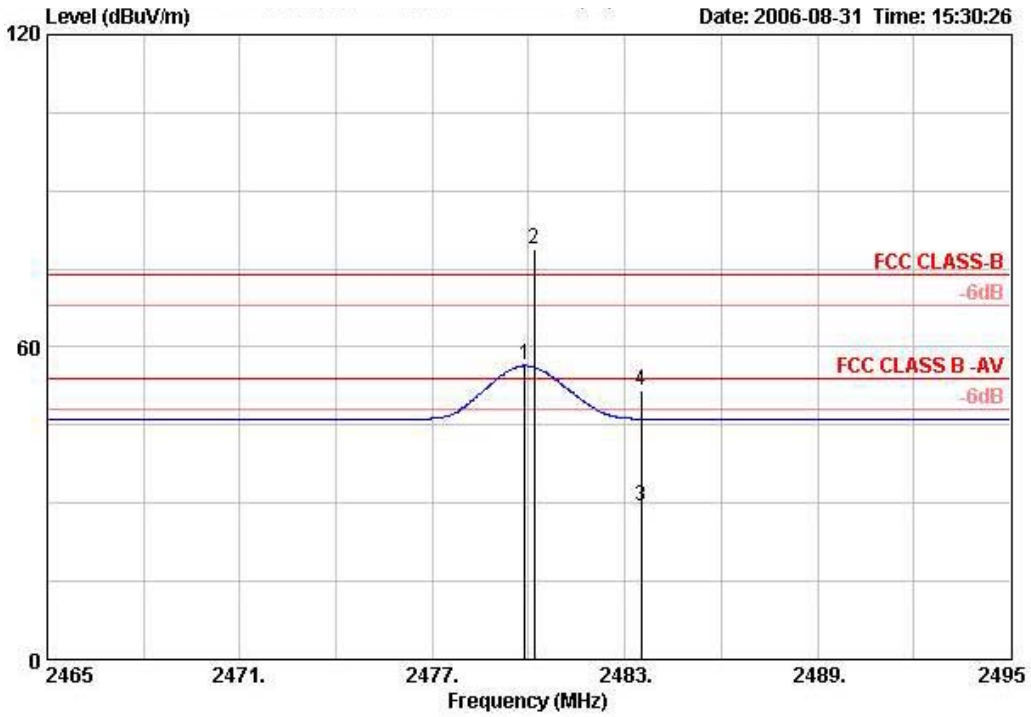
Channel 0



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Antenna Factor
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg	dB/m
1 @	2390.000	32.64	-21.36	54.00	-0.57	2.76	0.00	AVERAGE	100	185	30.44
2	2390.000	51.66	-22.34	74.00	18.45	2.76	0.00	Peak	100	185	30.44
3 @	2401.940	54.58			21.38	2.76	0.00	AVERAGE	100	185	30.44
4 @	2402.120	73.60			40.40	2.76	0.00	PEAK	100	185	30.44

Item 3, 4 are the fundamental frequency at 2402 MHz.

Channel 78



	Freq	Level	Over Limit	Limit Line	Read Level	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Antenna Factor
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg	dB/m
1 @	2479.880	56.43			23.21	2.81	0.00	AVERAGE	100	198	30.41
2 @	2480.180	78.83			45.60	2.81	0.00	PEAK	100	198	30.41
3	2483.500	29.42	-24.58	54.00	-3.83	2.84	0.00	AVERAGE	100	198	30.41
4	2483.500	51.81	-22.19	74.00	18.56	2.84	0.00	Peak	100	198	30.41

Item 1, 2 are the fundamental frequency at 2480 MHz.

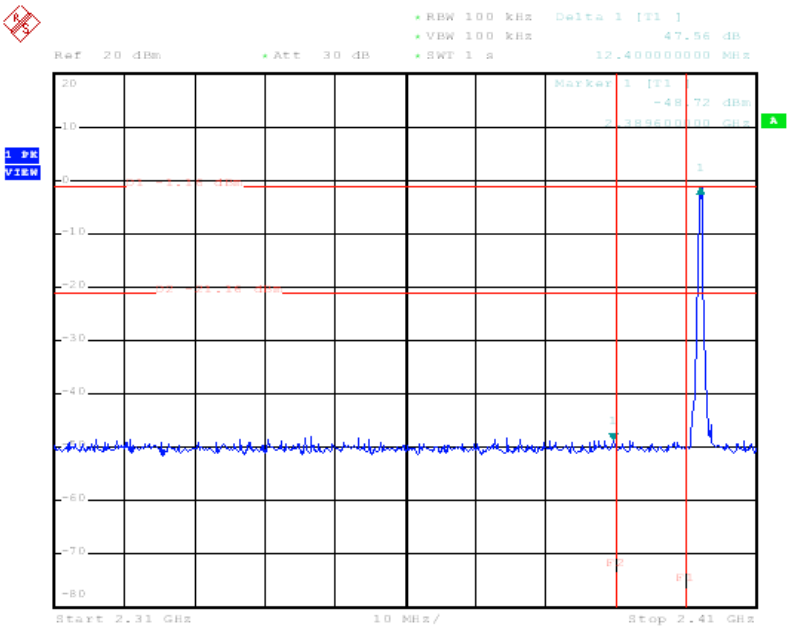
Note:

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

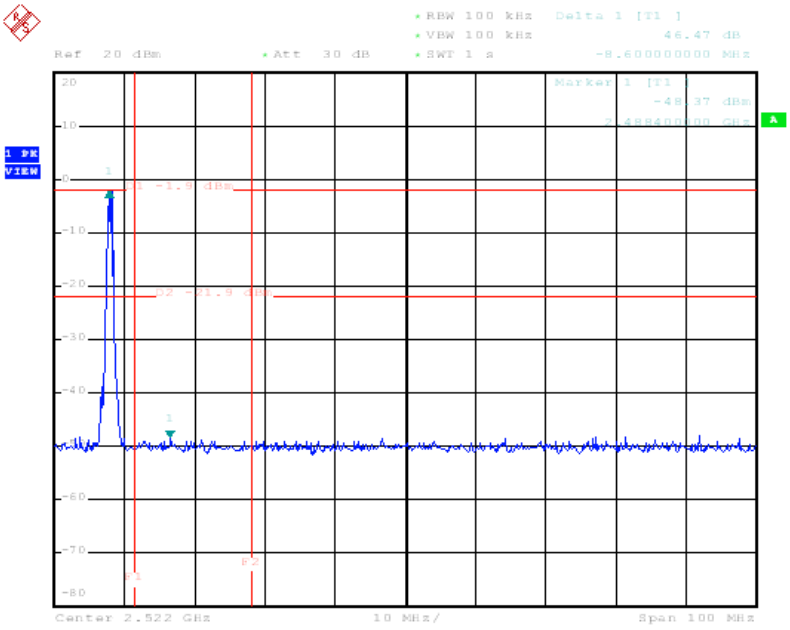
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

For Emission not in Restricted Band

Low Band Edge Plot on Channel 0 / 2402 MHz



High Band Edge Plot on Channel 78 / 2480 MHz



4.8. Antenna Requirements

4.8.1. 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.

4.8.2. 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	3565	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)
Amplifier	MITEQ	AMF-6F-260400	923364	26.5 GHz - 40 GHz	Jan. 24, 2006*	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100004/040	9 kHZ - 40 GHz	Sep. 30, 2005	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	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)
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)
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-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, 2005	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	Dec. 30, 2005	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 30, 2005	Conducted (TH01-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
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.

*Calibration Interval of instruments listed above is one year.

NCR means Non-Calibration required.

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