FCC TEST REPORT

CATEGORY	:	Module for Portable Host
PRODUCT NAME	:	802.11a/b/g RLAN module
FCC ID.	:	H9P2121160
FILING TYPE	:	Certification – Class II Permissive Change
BRAND NAME	:	SYMBOL
TYPE NO.	:	21-21160
MODEL OF HOST	:	MC3090 (with 11a/b/g module)
APPLICANT	:	**SYMBOL Technologies, Inc.** One Symbol Plaza Holtsville, New York, 11742-1300 U.S.A
MANUFACTURER	:	**Universal Scientific Industrial Co., Ltd.** 141, Lane 351, Taiping Road, Sec.1, Tsao Yuen, Nan-Tou, Taiwan, R.O.C.
ISSUED BY	:	**SPORTON INTERNATIONAL INC.** 6F, No. 106, Sec. 1, Hsin Tai Wu Rd., His Chih, Taipei Hsien, Taiwan, R.O.C.

Statements:

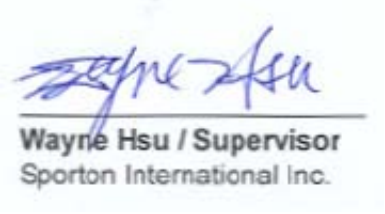
Only the test result of 802.11a part is shown in this test report, test result of 802.11b/g is in another separate test report.

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

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

Certificate or Test Report could not be used by the applicant to claim the product endorsement by CNLA, NVLAP or any agency of U.S. government.

The test equipment used to perform the test are calibrated and traceable to NML/ROC or NIST/USA.



NVLAP®

Lab Code: 200079-0

Table of Contents

History of this test report

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. General Description of Equipment under Test

1.1. Applicant

SYMBOL Technologies, Inc.

One Symbol Plaza Holtsville, New York, 11742-1300 U.S.A

1.2. Manufacturer

Universal Scientific Industrial Co., Ltd.

141, Lane 351, Taiping, Sec. 1, Tsao Yuen, Nan-Tou, Taiwan, R.O.C.

1.3. Basic Description of Equipment under Test

The device supplied for testing is a 21-21160 RF Module which offers 2.4GHz and 5GHz wireless local area network connectivity employing IEEE 802.11 a/b/g technologies intended to be installed in portable host such as Wireless LAN mobile Computer. The technical data has been listed on section " Features of Equipment under Test ".

1.4. Features of Equipment under Test (802.11a part)

ITEMS	DESCRIPTION
Type of Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Number of Channels	12
Frequency Band	5150 ~ 5250MHz, 5250 ~ 5350MHz 5725 ~ 5825MHz
Carrier Frequencies	Please reference section 1.5.
Channel Bandwidth	Normal Mode (20MHz)
RF Conducted Output Power	Band 1: 16.84 dBm Band 2: 18.94 dBm Band 3: 18.95 dBm
Antenna Type	PIFA Antenna / 4.9dBi
Function Type	Transceiver
Power Rating (DC/AC, Voltage)	3.3 VDC from host
Temperature Range (Operating)	-20 ~ +55 ℃

1.5. Table for Carrier Frequencies

Normal Mode

Channel	Frequency	Channel	Frequency
36	5180 MHz	149	5745 MHz
40	5200 MHz	153	5765 MHz
44	5220 MHz	157	5785 MHz
48	5240 MHz	161	5805 MHz
52	5260 MHz		
56	5280 MHz		
60	5300 MHz		
64	5320 MHz		

1.6. Information of EUT Slight Change

This product is an extension of original one reported under Sporton project number: 453101

Differences between the certified equipment and the application equipment:

Modifications	Description	Confirm Degrading Performance(s)
Relpace antennas	Old antenna : PIFA Antenna / 3.1dBi New antenna : PIFA Antenna / 4.9dBi	Band Edges of the Operation Frequency. AC Power Line Conducted Emission. Spurious Radiated Emission.

2. Test Configuration of the Equipment under Test

2.1. Description of the Test

a. The EUT has been programmed to continuously transmit or receive during testing. The used peripherals as well as the configuration fulfill the requirements of ANSI C63.4:2003.
b. The configuration is operated in a manner which tends to maximize its emission characteristics in a typical application.

2.2. Frequency Range Investigated

a. Conducted power line test: from 150 kHz to 30 MHz
b. Radiated emission test: from 30 MHz to 40,000 MHz

2.3. Test Modes

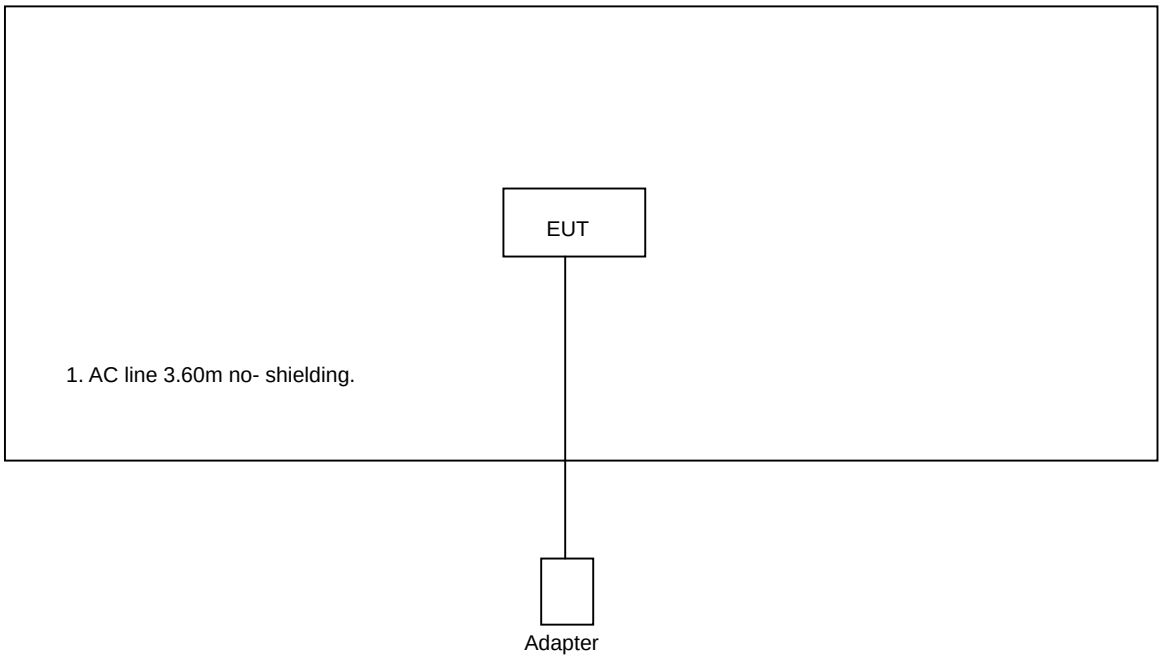
a. EUT was placed Inside the host and continuously transmitting RF modulated signal.
b. For OFDM modulation, BPSK (6Mbps) is the worst case on all test items.
c. Frequency range of EUT is more than 10 MHz, we have to test the lowest, middle and highest channels of EUT.
d. Spurious emission below 1GHz is independent of channel selection and modulation types, there will be no effect on test results. So only channel 161 with BPSK modulation was tested.
e. AC conduction emission is independent of channel selection and modulation types, there will be no effect on test results. So only channel 161 with BPSK modulation was tested.

2.4. Description of Test Supporting Units

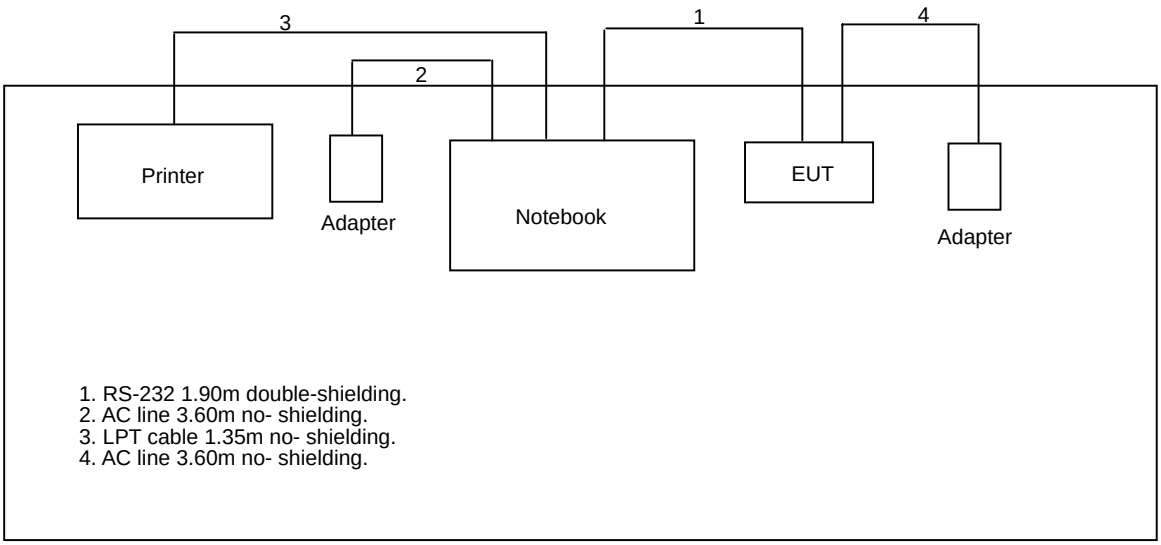
This test has not tested the perimeter.

2.5. Connection Diagram of Test System

Radiation



Conduction



2.6. Test Software

Channel & Power Controlling Software: This was provided by the manufacturer and is able to let the test engineer select the operating channel as well as the RF output power. The parameters for channel selection is trying to offer the test engineer the ability to fix the operating channel for testing, both normal data and continuously transmitting modes are allowed, and that for 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.

3. Test Location and Standards

3.1. Test Location

Test Location : Sporton Hwa Ya Testing Building

Address : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
Tel: +886 3 327 3456 Fax: +886 3 318 0055

Test Site No. : CO02-LK, 03CH03-HY

3.2. Test Conditions

Normal Voltage : 120V/60Hz (power adapter of host)

Normal Temperature : 20 ℃

3.3. Standards for Methods of Measurement

Here is the list of the standards followed in this test report.

ANSI C63.4-2003

47 CFR Part 15 Subpart E (Section 15.407)

4. List of Measurements

4.1. Summary of the Test Results

Applied Standard: 47 CFR Part 15 and Part 2			
Paragraph	**FCC Rule**	**Description of Test**	**Result**
5.1	15.407(b)	Band Edges of the Operation Frequency	Pass
5.2	15.209/15.407(b)	Spurious Radiated Emission	Pass
5.3	15.107/15.207	AC Power Line Conducted Emission	Pass
5.4	15.203/15.407(a)	Antenna Requirement	Pass
5.5	2.1091/2.1093	Maximum Permissible Exposure for the EUT	Pass

5. Test Result

5.1. Test of Band Edges of the Operating Frequency

5.1.1. Applicable Standard

47 CFR FCC Part 15 Subpart E, section 15.407(b): For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, radiated emissions that fall in the restricted bands, as defined in section 15.205, must also comply with the radiated emissions limits specified in section 15.209.

5.1.2. Measuring Instruments

Please refer to section 6 in this report.

5.1.3. Description of Major Test Instruments Setting

Restriction bandedge

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz / 1MHz for Peak
RB / VB	1 MHz / 10Hz for Average

EIRP bandedge

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz / 300kHz for Sample

5.1.4. Test Procedures and Test Instruments Setting

For EIPR bandedge delta method

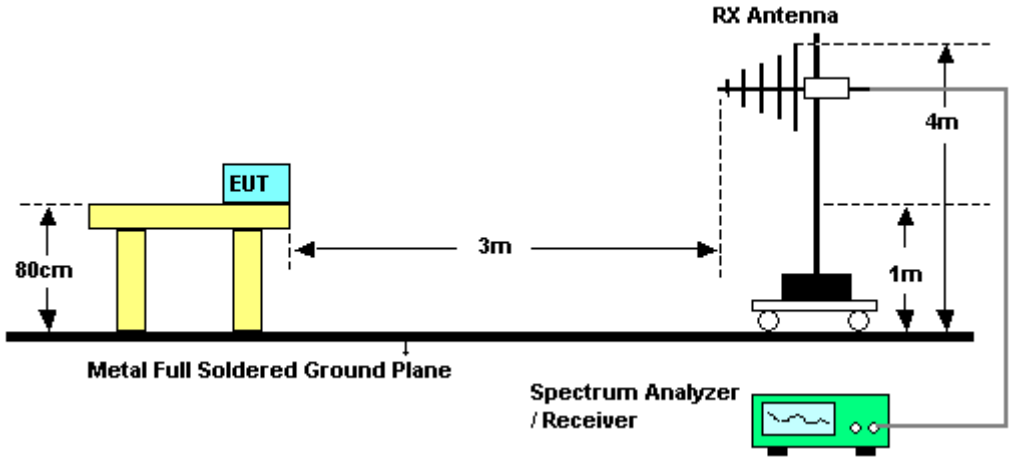
1. These limits are on the EIPR bandedge. The same measurement settings used to measure the transmit power of the fundamental emission may be used here.
   Conducted measurement, within the passband of the antenna an RF conducted measurement may be made. This level, added to the stated antenna gain for each proposed antenna, must comply with the limit.
   Radiated measurement, Outside of the passband of the antenna a radiated measurement must be made, as the gain of the antenna outside of its passband is uncertain, or, the emission may radiate from the case of the EUT. This measured field strength must then be converted to an equivalent EIRP for comparison to the limit.

For restriction bandedge method radiated measurement

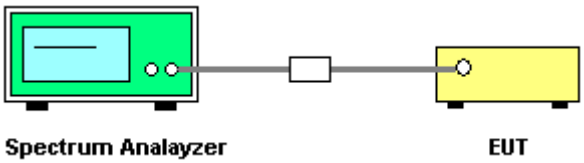
1. Configure the EUT according to ANSI C63.4.:2003
2. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
4. For band edge emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. For band edge emission in restriction bands, use 10Hz VBW and 1MHz RBW for reading under AV and use 1MHz VBW and 1 MHz RBW for reading under PK.

5.1.5. Test Setup

Radiated Method



Conducted Method

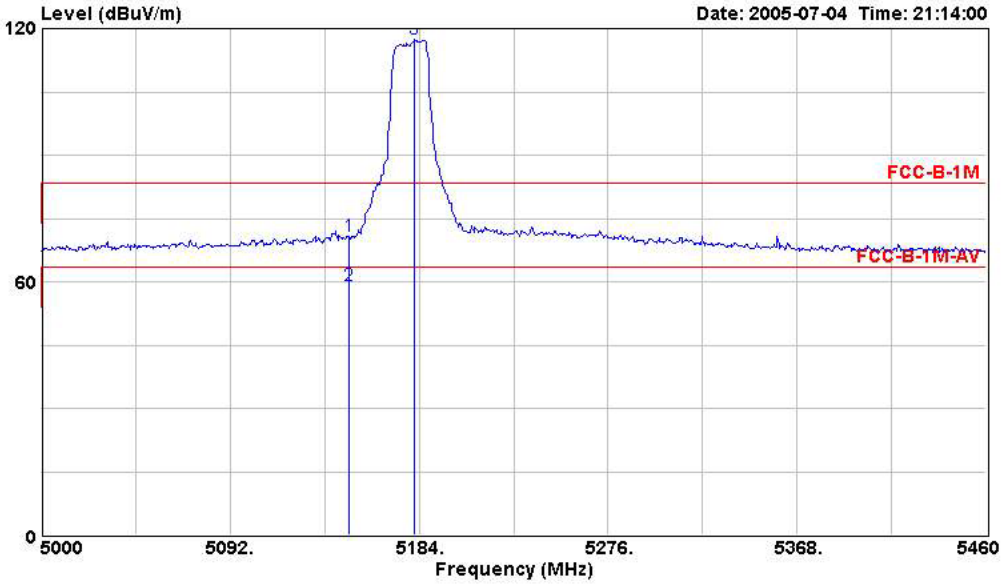


5.1.6. Test Criteria

All test results complied with the requirements of 15.407(b). Measurement Uncertainty is $1x10^{-5}$.

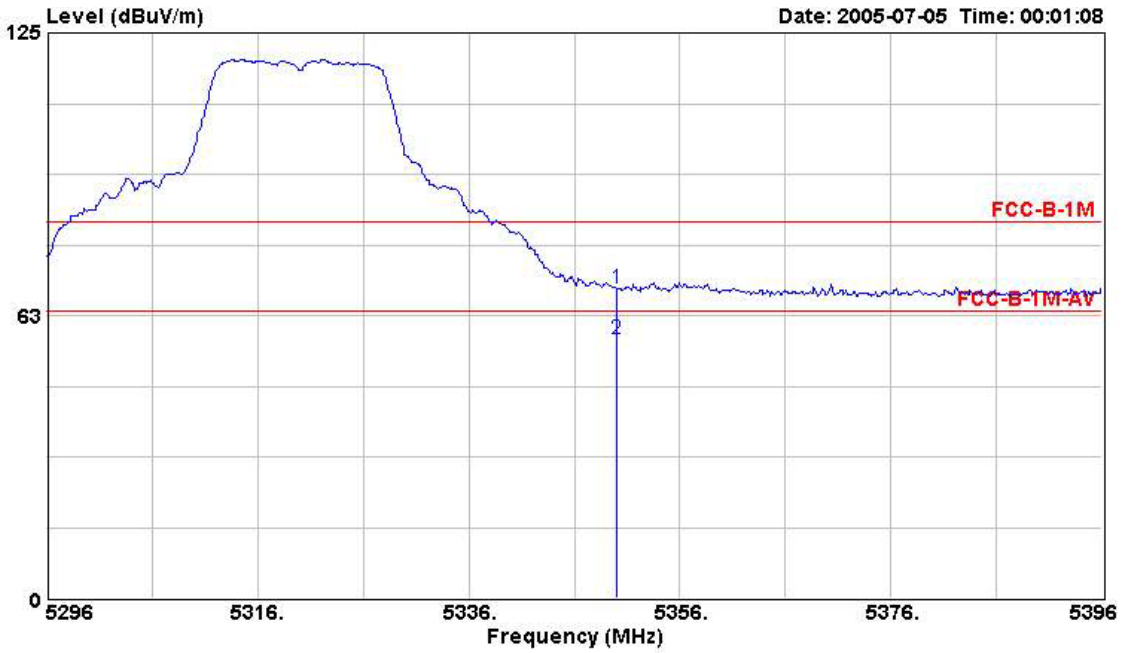
5.1.7. Note on Band Edge Emission

Test Mode : 5180MHz



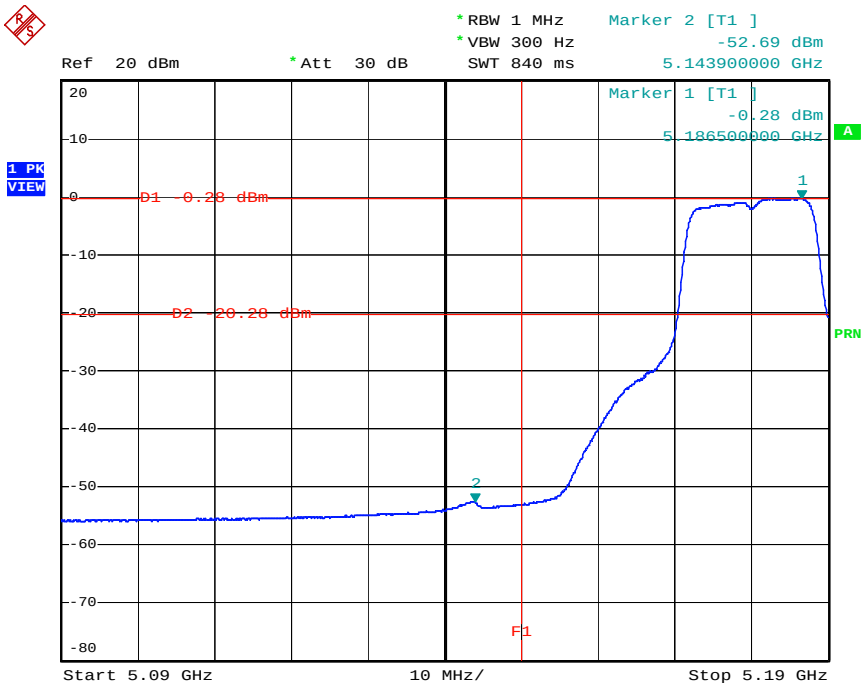
	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	5150.000	70.69	-12.71	34.08	83.40	36.61	2.97	0.00	Peak	---	---
2	5150.000	58.95	-4.45	22.34	63.40	36.61	2.97	0.00	Average	---	---

Test Mode : 5320MHz



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	5350.000	68.54	-14.86	31.54	83.40	37.00	3.04	0.00	Peak	---	---
2	5350.000	57.36	-6.04	20.36	63.40	37.00	3.04	0.00	Average	---	---

(CH 36)：5180MHz



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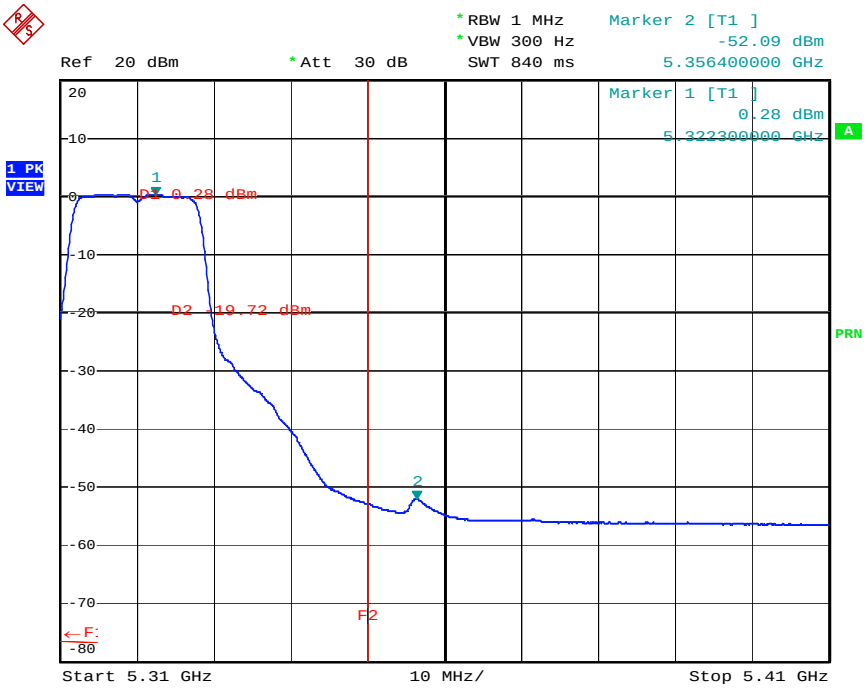
(CH 64)：5320MHz



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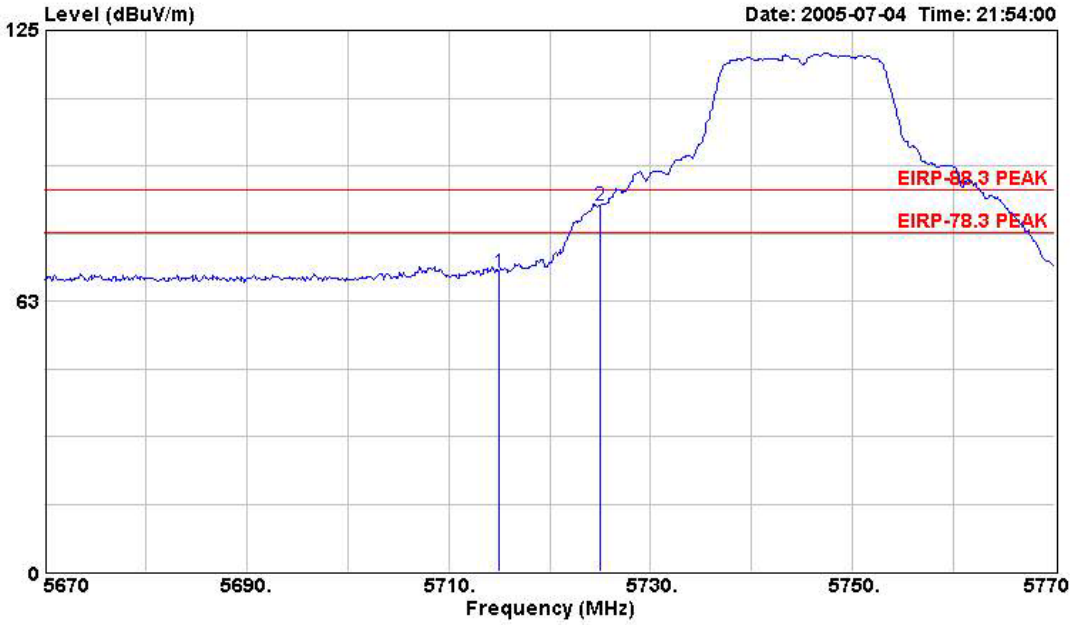
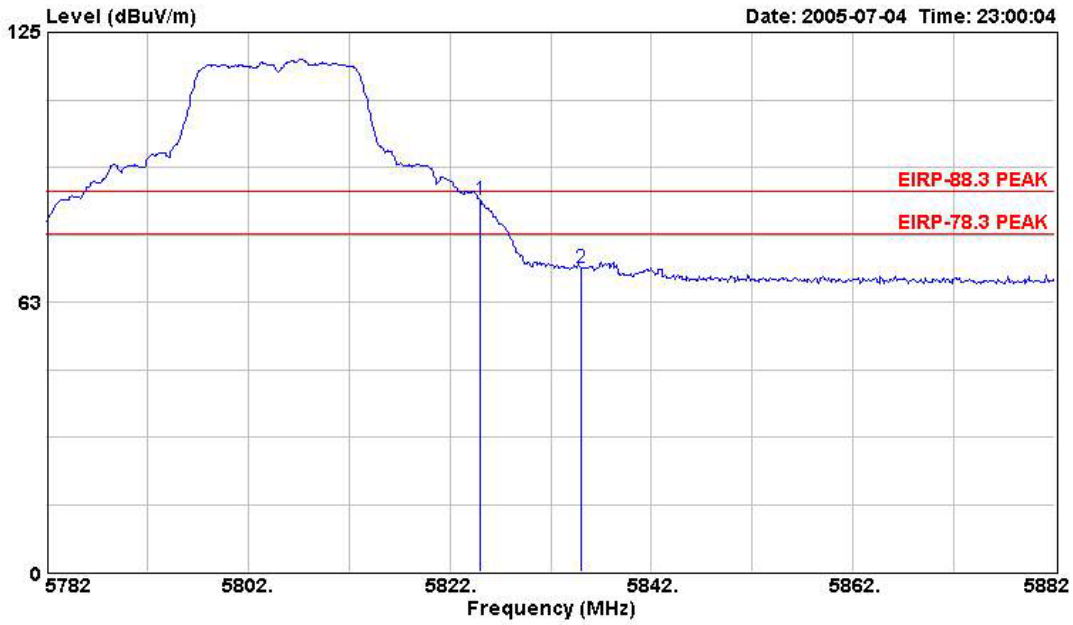
Test Mode : 5745MHz



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	5715.000	69.16	-19.14	31.76	88.30	37.40	3.16	0.00	Peak	---	---
2	5725.000	84.62	-3.68	47.20	88.30	37.42	3.17	0.00	Peak	---	---

Test Mode : 5805MHz



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	5825.000	86.08	-2.22	48.62	88.30	37.46	3.20	0.00	Peak	---	---
2	5835.000	70.48	-17.82	33.01	88.30	37.47	3.21	0.00	Peak	---	---

5.2. Test of Spurious Radiated Emission

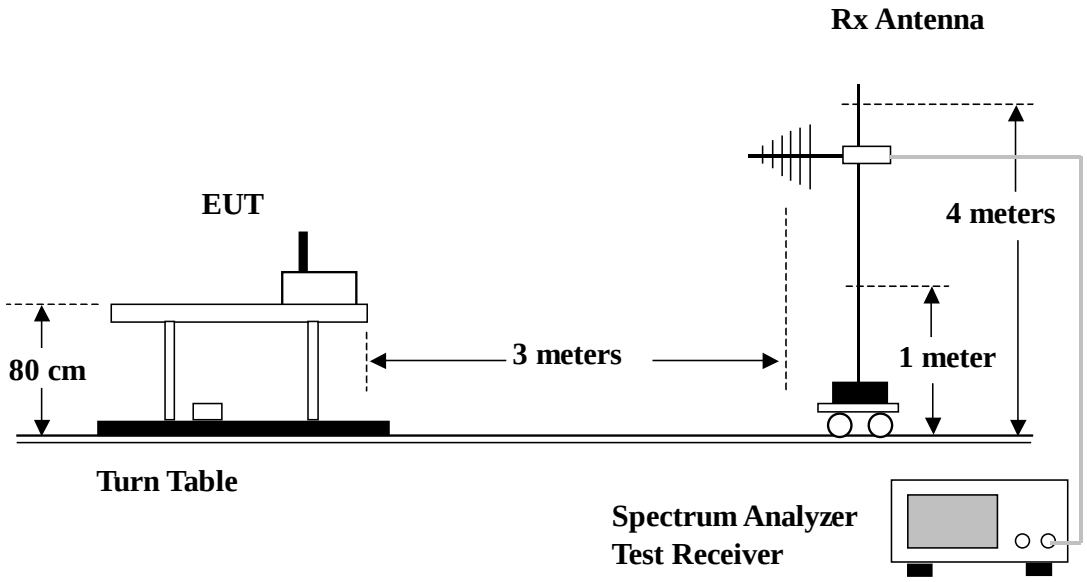
5.2.1. Measuring Instruments

Please reference item 5~19 in chapter 6 for the instruments used for testing.

5.2.2. Test Procedures

1. Configure the EUT according to ANSI C63.4.:2003
2. The EUT was placed on the top of the turn table 0.8 meter above ground.
3. 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 turn table.
4. Power on the EUT and all the supporting units.
5. The turn table was rotated by 360 degrees to determine the position of the highest radiation.
6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
7. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
8. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
9. For emission above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 300Hz VBW for average reading in spectrum analyzer.
10. If the emission 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 and average method for above the 1GHz. the reported.
11. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB higher than average limit (that means the emission 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.

5.2.3. Test Setup Layout

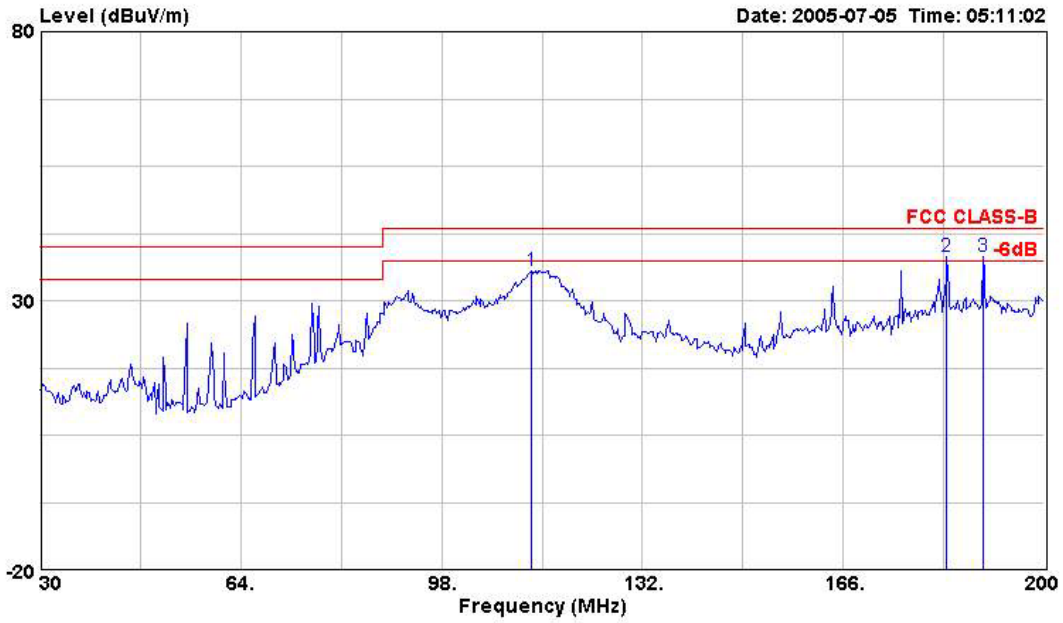


5.2.4. Test Results and Limit

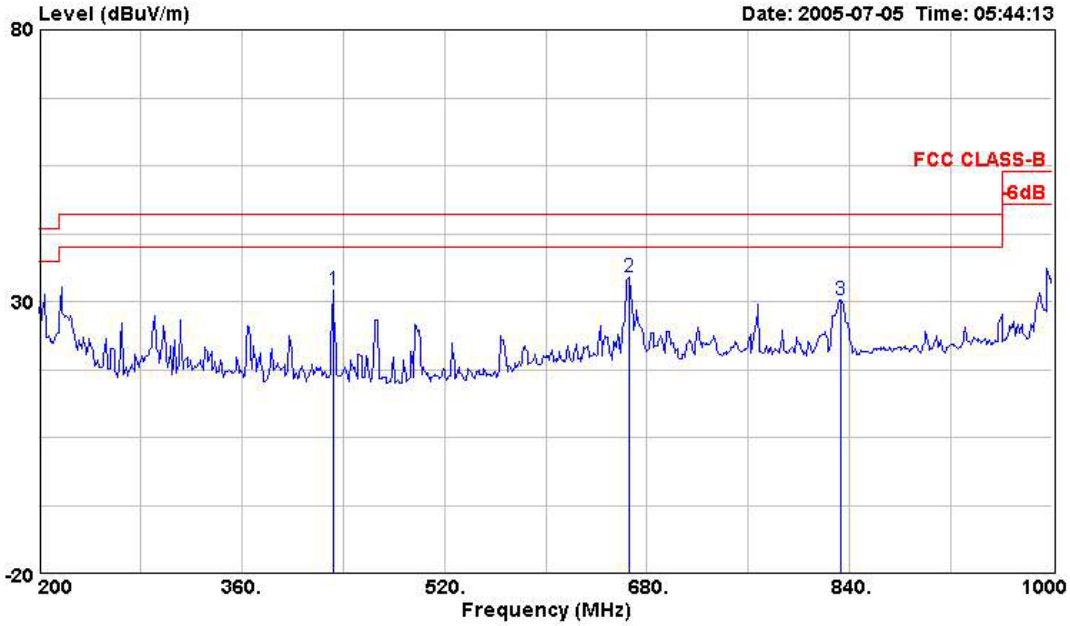
Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Test Mode	5805MHz	**Temperature**	26.5 deg. C	**Tested By**	Ted Chiu
Freq. Range	30MHz~1GHz	**Humidity**	51%		

(A) Polarization: Horizontal

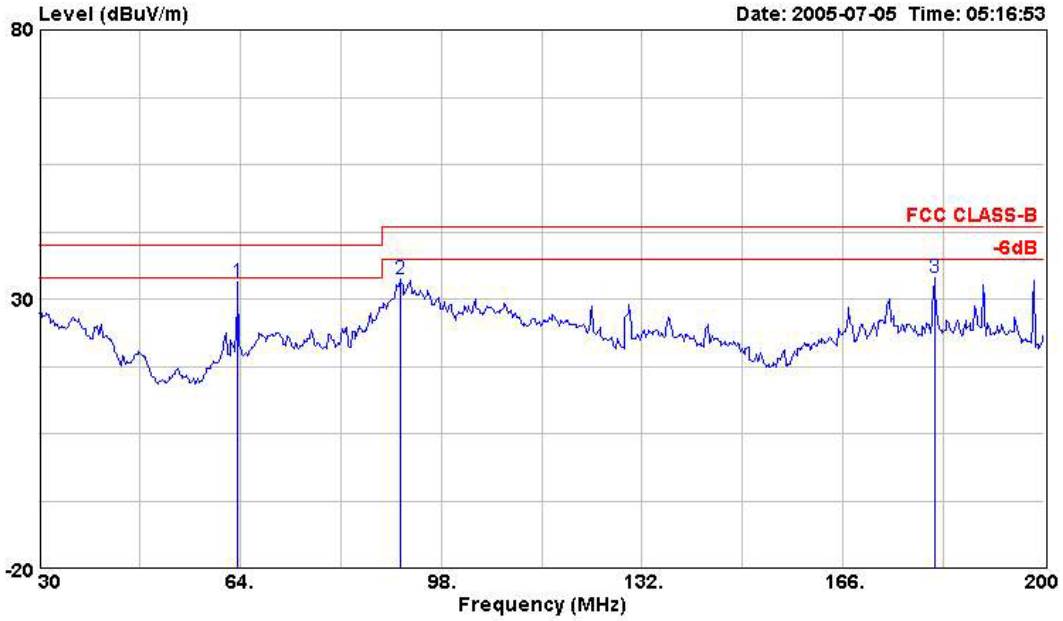


		Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
		MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1		113.300	35.63	-7.87	53.93	43.50	-18.30	1.05	30.29	Peak	---	---
2	!	183.510	38.16	-5.34	52.46	43.50	-14.30	1.27	30.05	Peak	---	---
3	!	189.630	38.13	-5.37	51.99	43.50	-13.86	1.27	30.10	Peak	---	---

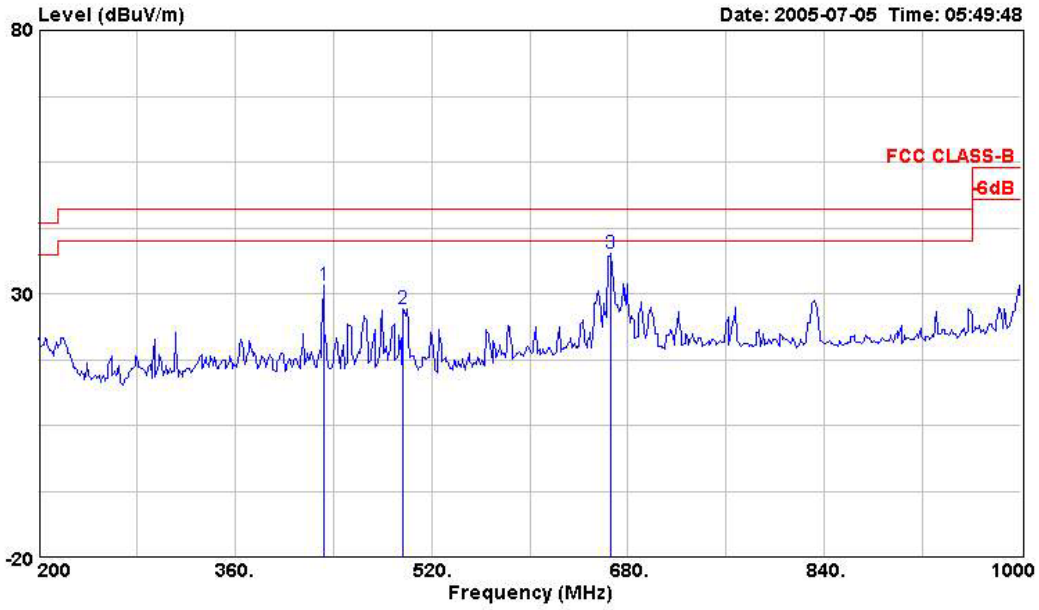


	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	432.000	32.19	-13.81	44.27	46.00	-12.08	2.04	30.66	Peak	---	---
2	665.600	34.47	-11.53	41.90	46.00	-7.43	2.52	30.54	Peak	---	---
3	832.800	30.35	-15.65	36.05	46.00	-5.70	2.88	30.41	Peak	---	---

(B) Polarization: Vertical



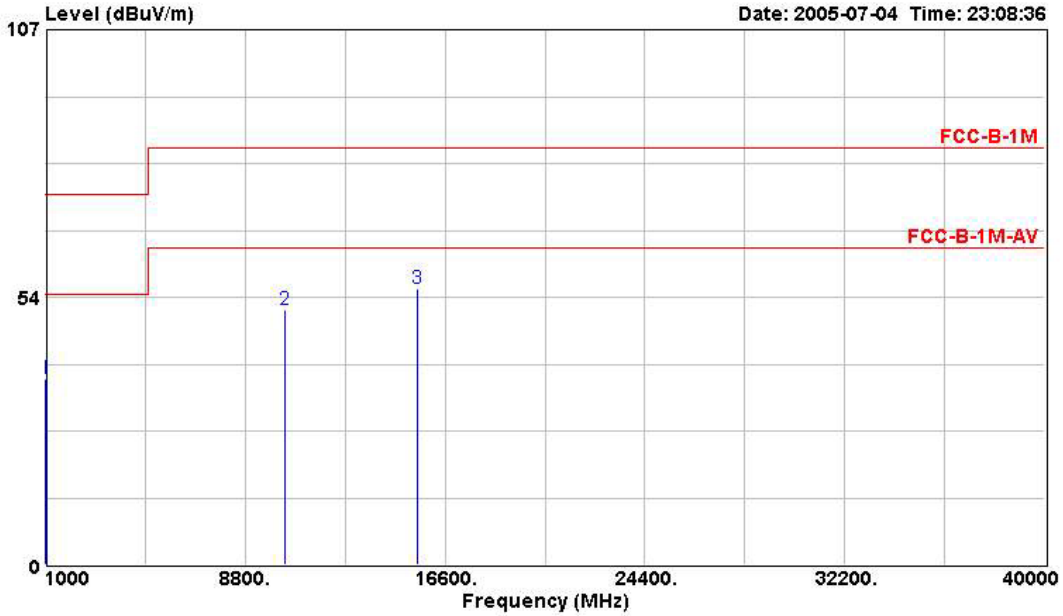
	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	63.660	33.16	-6.84	52.65	40.00	-19.49	0.81	30.54	Peak	---	---
2	91.030	33.59	-9.91	53.62	43.50	-20.03	0.91	29.49	Peak	---	---
3	181.470	33.96	-9.54	48.41	43.50	-14.45	1.27	30.03	Peak	---	---



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	432.000	31.52	-14.48	43.60	46.00	-12.08	2.04	30.66	Peak	---	---
2	496.800	27.24	-18.76	39.82	46.00	-12.58	2.17	30.78	Peak	---	---
3	666.400	37.65	-8.35	45.08	46.00	-7.43	2.52	30.54	Peak	---	---

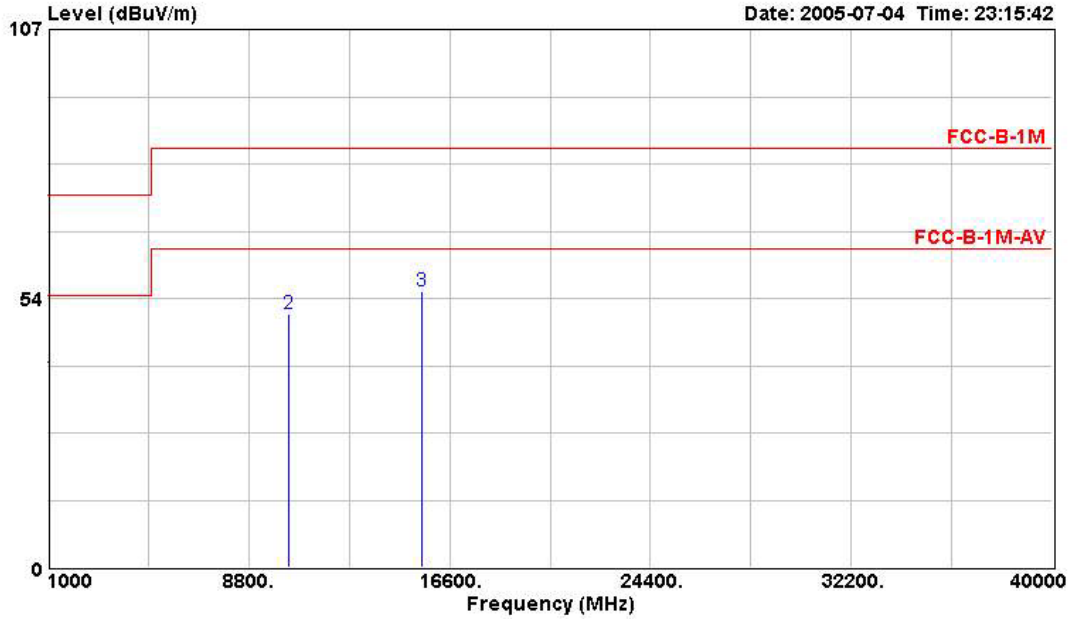
Test Mode	5180MHz	Temperature	26.5 deg. C	Tested By	Ted Chiu
Freq. Range	1GHz~40GHz	Humidity	51%		

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1020.000	37.28	-36.72	45.77	74.00	-8.49	1.24	34.07	PEAK	---	---
2	10360.000	51.06	-32.34	41.01	83.40	10.05	4.27	33.15	PEAK	---	---
3	15540.000	55.15	-28.25	44.92	83.40	10.23	5.18	32.79	PEAK	---	---

(B) Polarization: Vertical

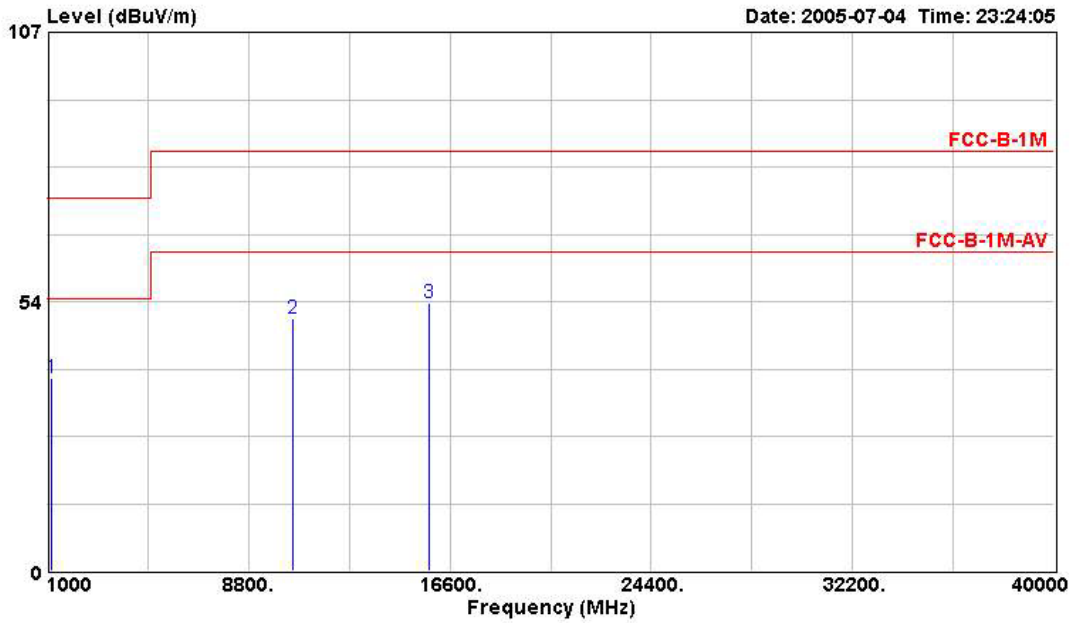


	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1076.000	37.35	-36.65	45.61	74.00	-8.26	1.26	33.96	PEAK	---	---
2	10360.000	50.54	-32.86	40.49	83.40	10.05	4.27	33.15	PEAK	---	---
3	15540.000	54.84	-28.56	44.61	83.40	10.23	5.18	32.79	PEAK	---	---

Remark: Spurious on higher frequency band, the emission emitted by the EUT is too low to be measured.

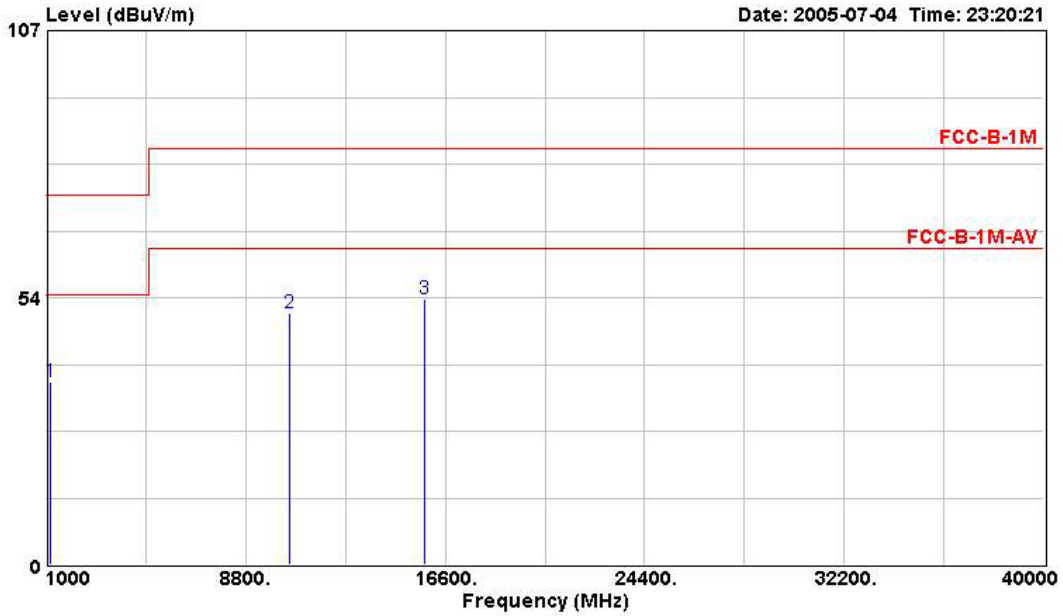
Test Mode	5260MHz	Temperature	26.5 deg. C	Tested By	Ted Chiu
Freq. Range	1GHz~40GHz	Humidity	51%		

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1160.000	38.28	-35.72	46.17	74.00	-7.89	1.30	33.80	PEAK	---	---
2	10520.000	50.17	-33.23	39.88	83.40	10.29	4.41	33.01	PEAK	---	---
3	15780.000	53.20	-30.20	43.50	83.40	9.70	5.17	32.87	PEAK	---	---

(B) Polarization: Vertical

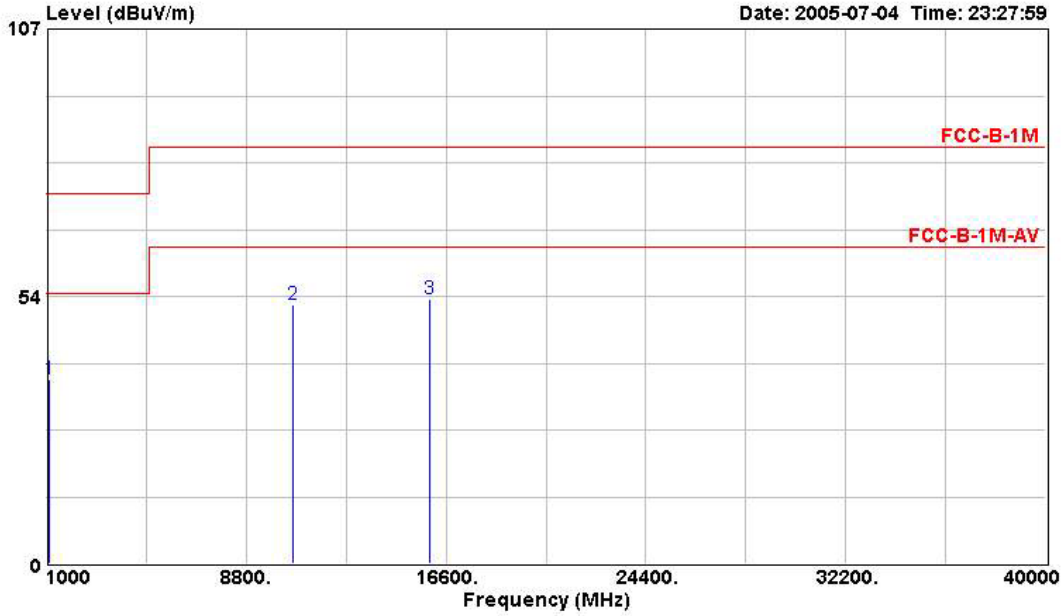


	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1160.000	36.58	-37.42	44.47	74.00	-7.89	1.30	33.80	PEAK	---	---
2	10520.000	50.48	-32.92	40.20	83.40	10.29	4.41	33.01	PEAK	---	---
3	15780.000	53.35	-30.05	43.65	83.40	9.70	5.17	32.87	PEAK	---	---

Remark: Spurious on higher frequency band, the emission emitted by the EUT is too low to be measured.

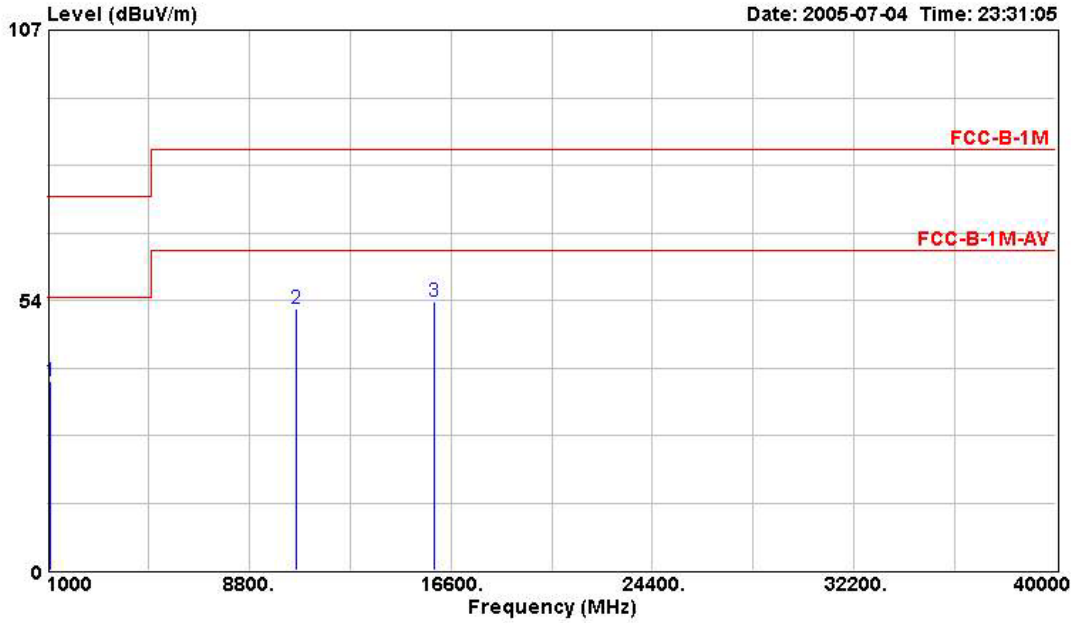
Test Mode	5320MHz	Temperature	26.5 deg. C	Tested By	Ted Chiu
Freq. Range	1GHz~40GHz	Humidity	51%		

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1132.000	36.93	-37.07	44.92	74.00	-8.00	1.28	33.85	PEAK	---	---
2	10640.000	51.81	-31.59	41.31	83.40	10.51	4.51	32.82	PEAK	---	---
3	15960.000	52.90	-30.50	43.60	83.40	9.30	5.17	32.93	PEAK	---	---

(B) Polarization: Vertical

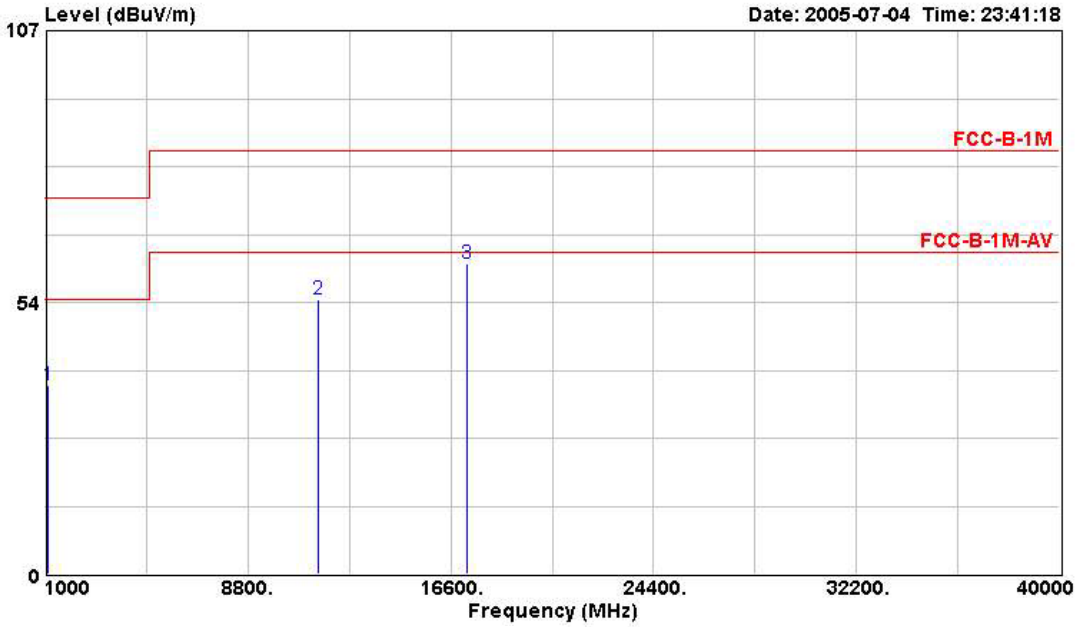


	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1132.000	37.55	-36.45	45.55	74.00	-8.00	1.28	33.85	PEAK	---	---
2	10640.000	51.92	-31.48	41.41	83.40	10.51	4.51	32.82	PEAK	---	---
3	15960.000	53.33	-30.07	44.03	83.40	9.30	5.17	32.93	PEAK	---	---

Remark: Spurious on higher frequency band, the emission emitted by the EUT is too low to be measured.

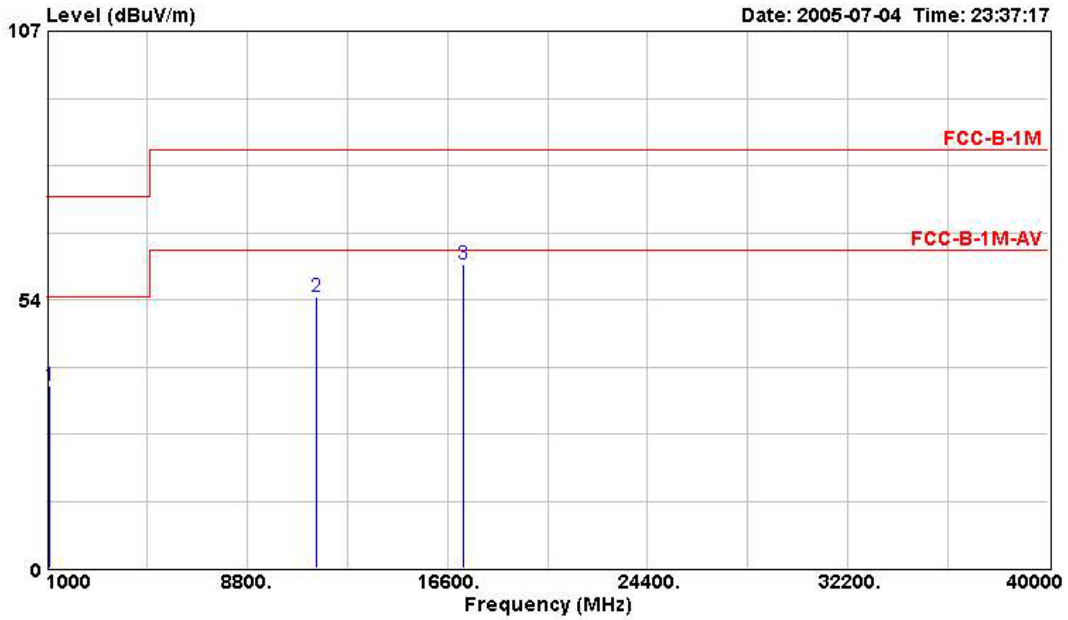
Test Mode	5745MHz	Temperature	26.5 deg. C	Tested By	Ted Chiu
Freq. Range	1GHz~40GHz	Humidity	51%		

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1132.000	37.11	-36.89	45.10	74.00	-8.00	1.28	33.85	PEAK	---	---
2	11488.000	54.01	-29.39	42.37	83.40	11.64	4.74	32.38	PEAK	---	---
3	17235.000	61.08	-22.32	44.54	83.40	16.54	6.62	32.01	PEAK	---	---

(B) Polarization: Vertical

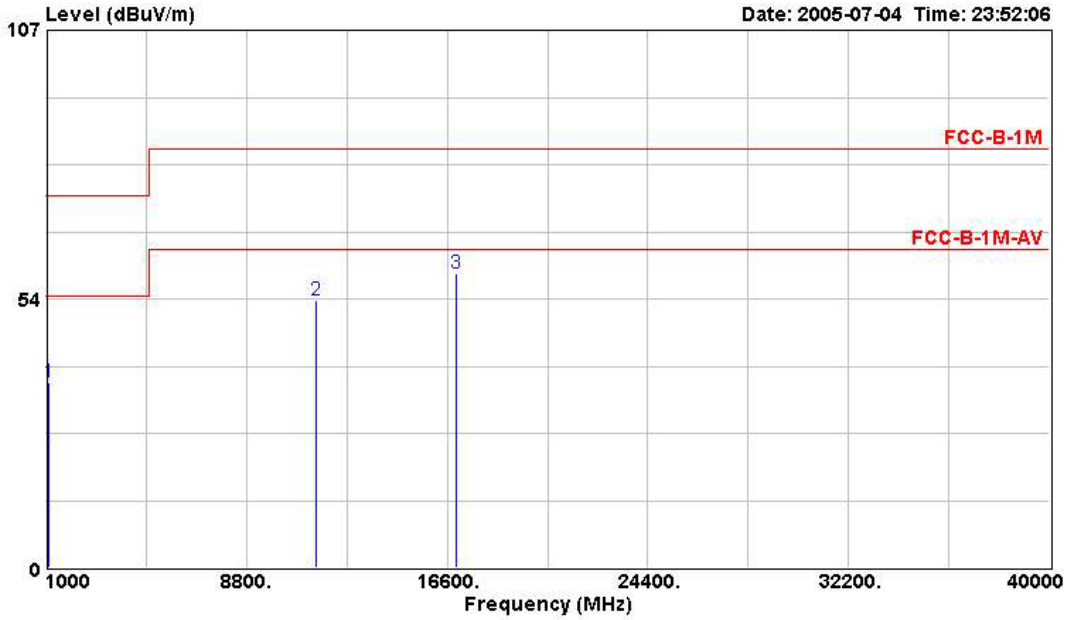


	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1132.000	36.47	-37.53	44.47	74.00	-8.00	1.28	33.85	PEAK	---	---
2	11488.000	54.17	-29.23	42.53	83.40	11.64	4.74	32.38	PEAK	---	---
3	17235.000	60.57	-22.83	44.03	83.40	16.54	6.62	32.01	PEAK	---	---

Remark: Spurious on higher frequency band, the emission emitted by the EUT is too low to be measured.

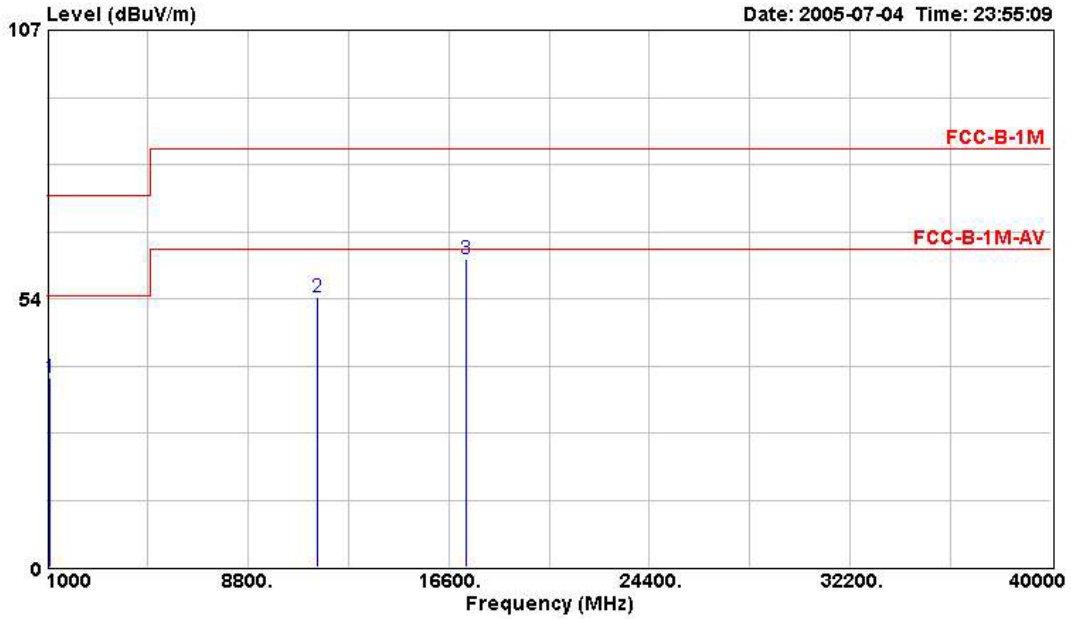
Test Mode	5765MHz	Temperature	26.5 deg. C	Tested By	Ted Chiu
Freq. Range	1GHz~40GHz	Humidity	51%		

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1132.000	36.86	-37.14	44.85	74.00	-8.00	1.28	33.85	PEAK	---	---
2	11528.000	53.27	-30.13	41.62	83.40	11.64	4.73	32.39	PEAK	---	---
3	16964.000	58.56	-24.84	45.59	83.40	12.97	5.05	32.13	PEAK	---	---

(B) Polarization: Vertical

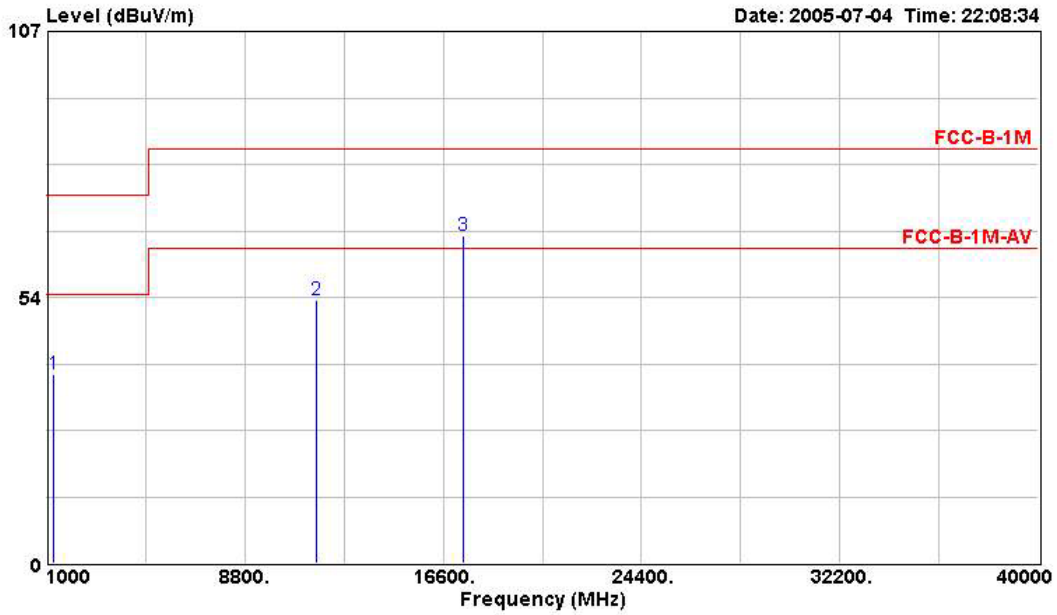


	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1132.000	37.77	-36.23	45.76	74.00	-8.00	1.28	33.85	PEAK	---	---
2	11528.000	53.82	-29.58	42.17	83.40	11.64	4.73	32.39	PEAK	---	---
3	17295.000	61.44	-21.96	44.12	83.40	17.31	6.88	31.98	PEAK	---	---

Remark: Spurious on higher frequency band, the emission emitted by the EUT is too low to be measured.

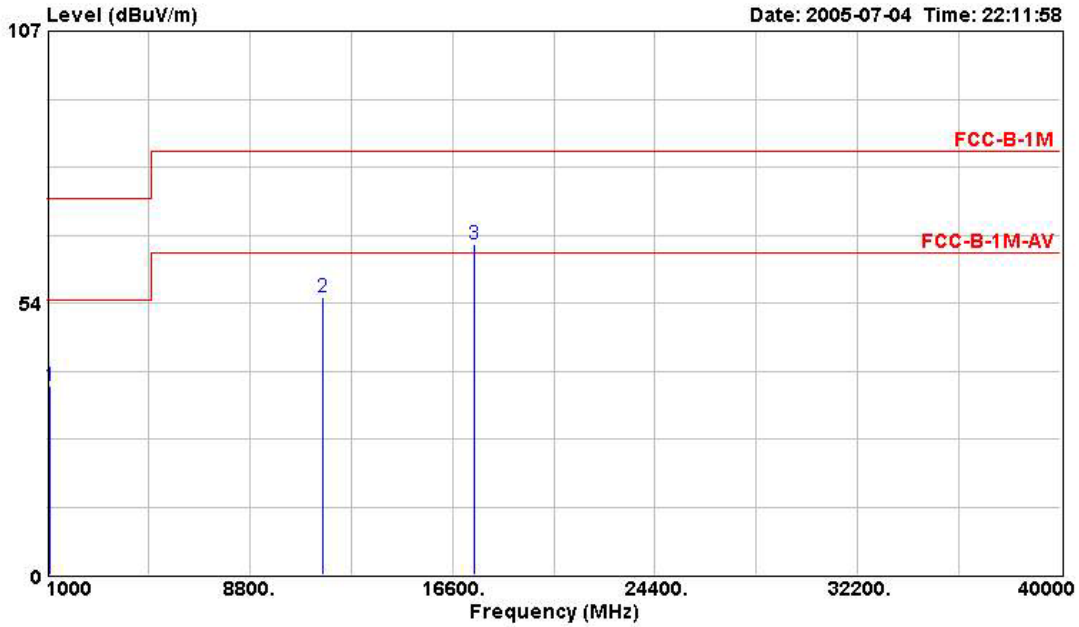
Test Mode	5805MHz	Temperature	26.5 deg. C	Tested By	Ted Chiu
Freq. Range	1GHz~40GHz	Humidity	51%		

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1296.000	38.11	-35.89	45.33	74.00	-7.21	1.37	33.47	PEAK	---	---
2	11610.000	52.84	-30.56	41.24	83.40	11.60	4.70	32.40	PEAK	---	---
3	17412.000	65.95	-17.45	47.06	83.40	18.89	7.66	31.93	PEAK	---	---

(B) Polarization: Vertical



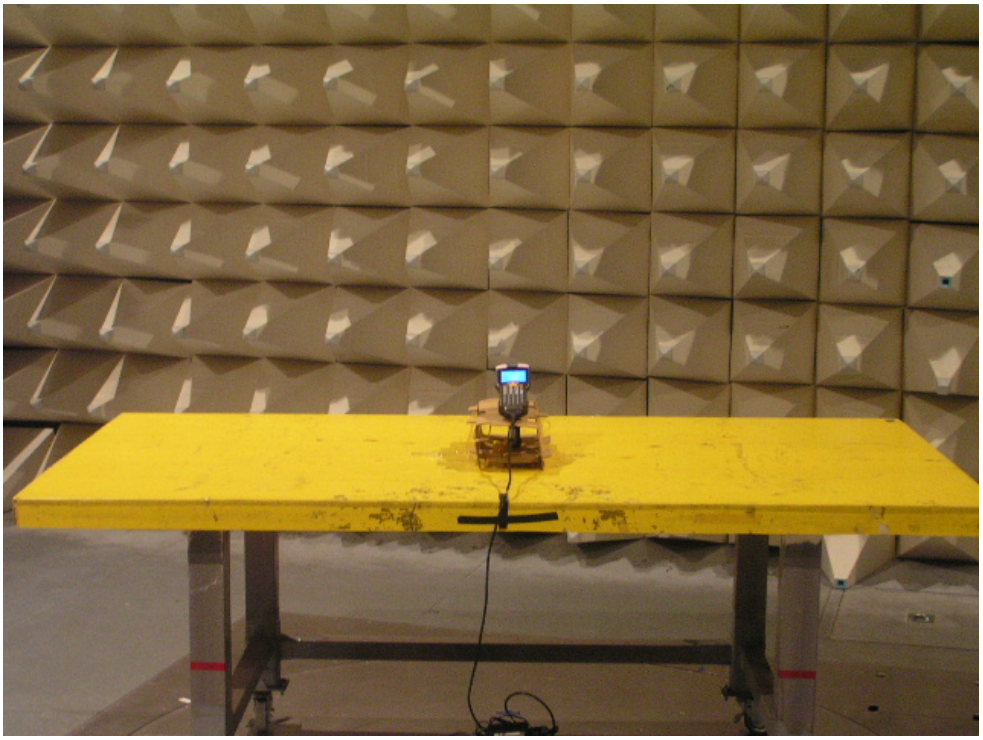
	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB		cm	deg
1	1128.000	37.16	-36.84	45.16	74.00	-8.00	1.28	33.85	PEAK	---	---
2	11608.000	54.64	-28.76	43.04	83.40	11.60	4.70	32.40	PEAK	---	---
3	17424.000	64.99	-18.41	45.71	83.40	19.27	7.92	31.93	PEAK	---	---

Remark: Spurious on higher frequency band, the emission emitted by the EUT is too low to be measured.

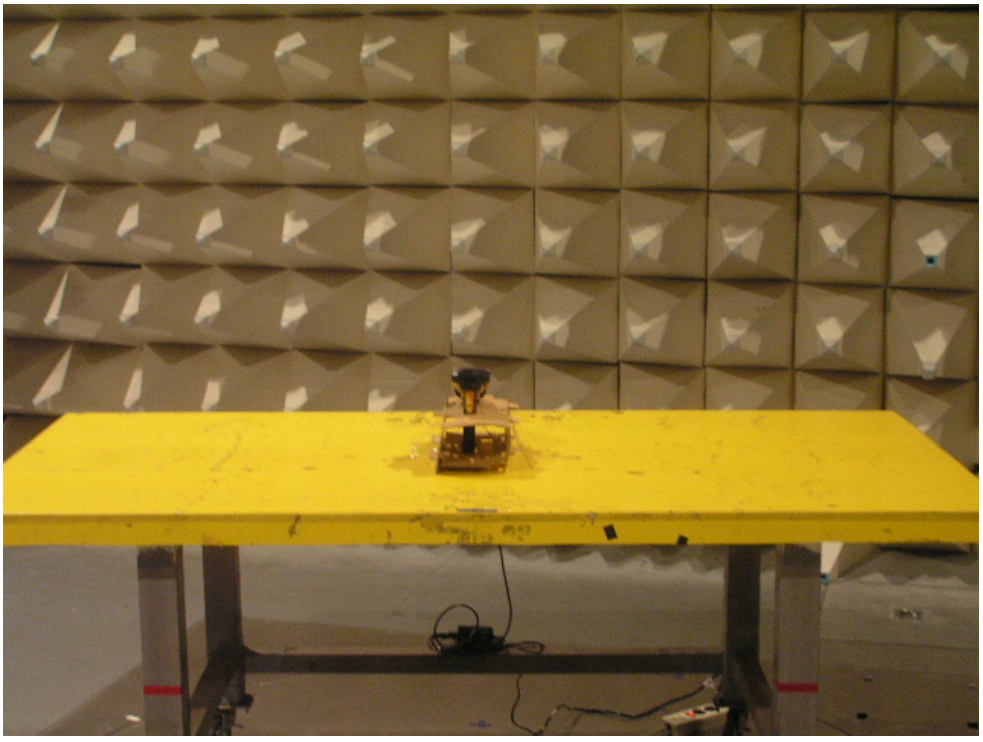
5.2.5. Photographs of Radiated Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW



5.3. Test of AC Power Line Conducted Emission

5.3.1. Measuring Instruments

Please reference item 1~4 in chapter 6 for the instruments used for testing.

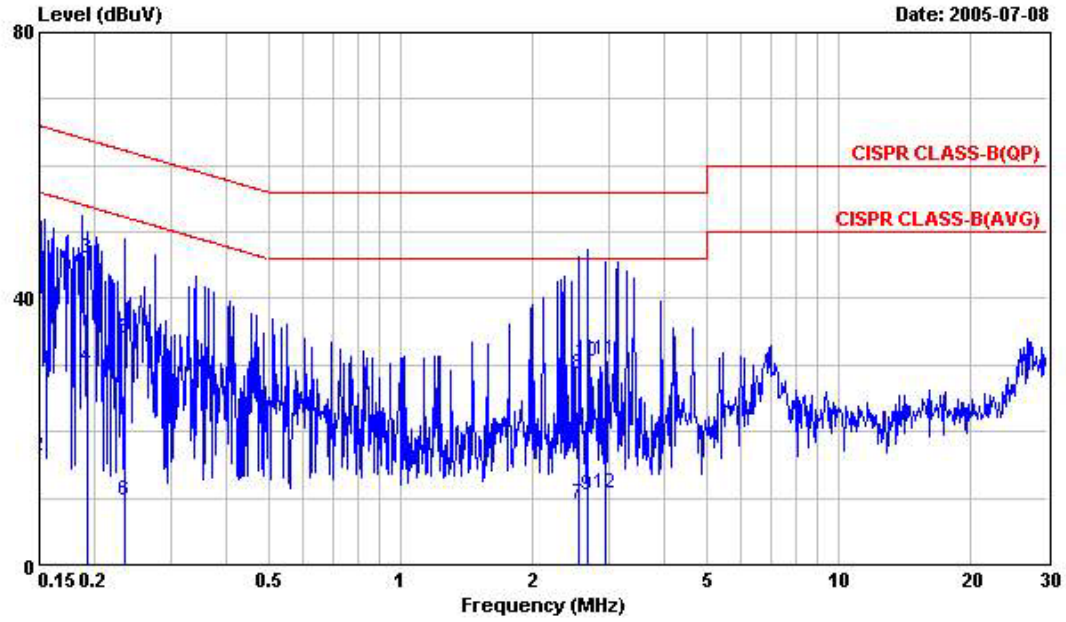
5.3.2. Test Procedures

1. Configure the EUT according to ANSI C63.4.:2003
2. The EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provides 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Use the Channel & Power Controlling software to make the EUT working on selected channel and expected output power, then use the “H” Patter Generator software to make the supporting equipments stay on working condition.
7. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
8. The measurement has to be done between each power line and ground at the power terminal for each RF channel. Only one RF channel has to be investigated since this test is independent with the RF channel selection.

5.3.3. Test Result of Conducted Emission

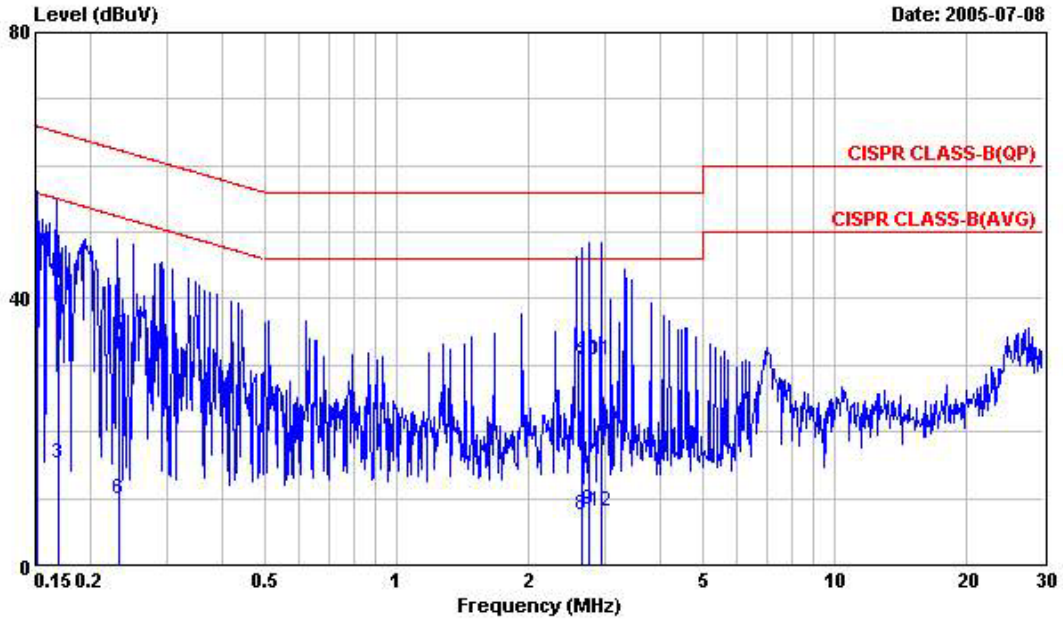
Test Mode	RF Link	Tested By	Sky Wu
Temperature / Humidity	28 deg. C / 40%		

Line to Ground



	Freq	Level	Over Limit	Limit Line	Read Level	Factor	Cable Loss	LISN Factor	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.150	43.16	-22.84	66.00	43.06	0.10	0.00	0.10	QP
2	0.150	16.19	-39.81	56.00	16.09	0.10	0.00	0.10	Average
3 @	0.193	46.10	-17.79	63.89	46.00	0.10	0.00	0.10	QP
4	0.193	29.63	-24.26	53.89	29.53	0.10	0.00	0.10	Average
5	0.235	33.85	-28.42	62.27	33.74	0.11	0.01	0.10	QP
6	0.235	9.74	-42.53	52.27	9.63	0.11	0.01	0.10	Average
7	2.570	9.10	-36.90	46.00	8.88	0.22	0.08	0.14	Average
8	2.570	28.76	-27.24	56.00	28.54	0.22	0.08	0.14	QP
9	2.690	10.38	-35.62	46.00	10.17	0.21	0.07	0.14	Average
10	2.690	30.63	-25.37	56.00	30.42	0.21	0.07	0.14	QP
11	2.950	30.77	-25.23	56.00	30.55	0.22	0.06	0.16	QP
12	2.950	10.62	-35.38	46.00	10.40	0.22	0.06	0.16	Average

Neutral to Ground

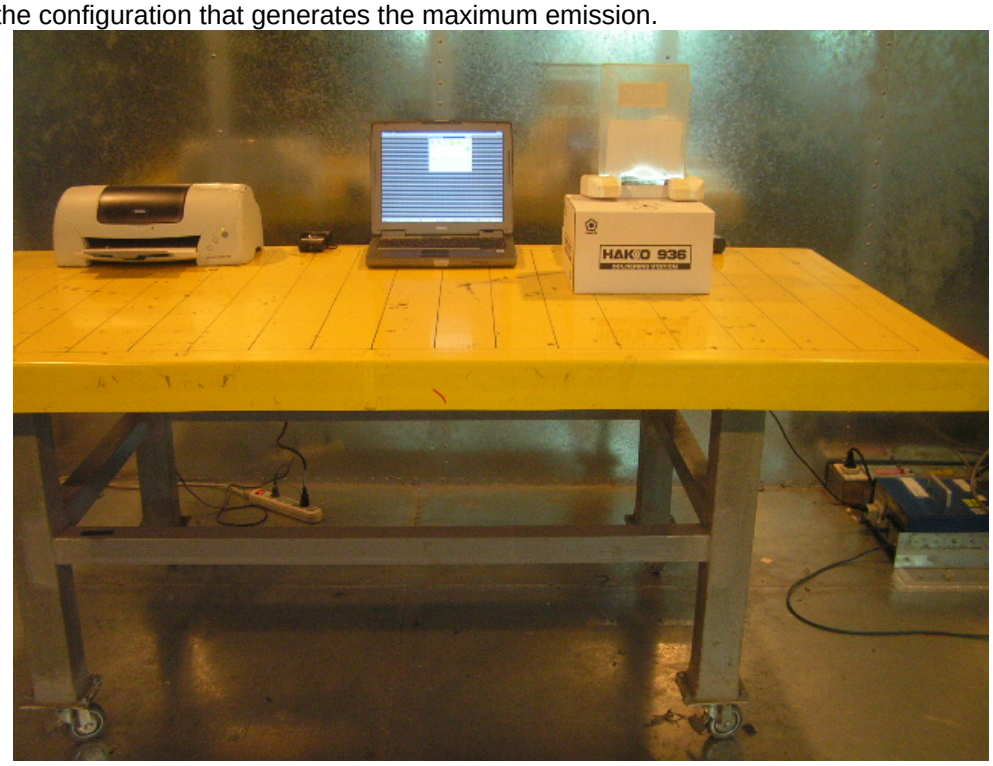


	Freq	Level	Over Limit	Limit Line	Read Level	Factor	Cable Loss	LISN Factor	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	dB	
1	0.152	16.36	-39.53	55.89	16.26	0.10	0.00	0.10	Average
2	0.152	43.76	-22.13	65.89	43.66	0.10	0.00	0.10	QP
3	0.169	15.18	-39.83	55.01	15.08	0.10	0.00	0.10	Average
4	0.169	42.37	-22.64	65.01	42.27	0.10	0.00	0.10	QP
5	0.232	34.48	-27.90	62.38	34.37	0.11	0.01	0.10	QP
6	0.232	9.78	-42.60	52.38	9.67	0.11	0.01	0.10	Average
7	2.660	29.95	-26.05	56.00	29.74	0.21	0.07	0.14	QP
8	2.660	7.53	-38.47	46.00	7.32	0.21	0.07	0.14	Average
9	2.760	8.17	-37.83	46.00	7.95	0.22	0.07	0.15	Average
10	2.760	30.86	-25.14	56.00	30.64	0.22	0.07	0.15	QP
11	2.930	30.68	-25.32	56.00	30.47	0.21	0.06	0.15	QP
12	2.930	7.99	-38.01	46.00	7.78	0.21	0.06	0.15	Average

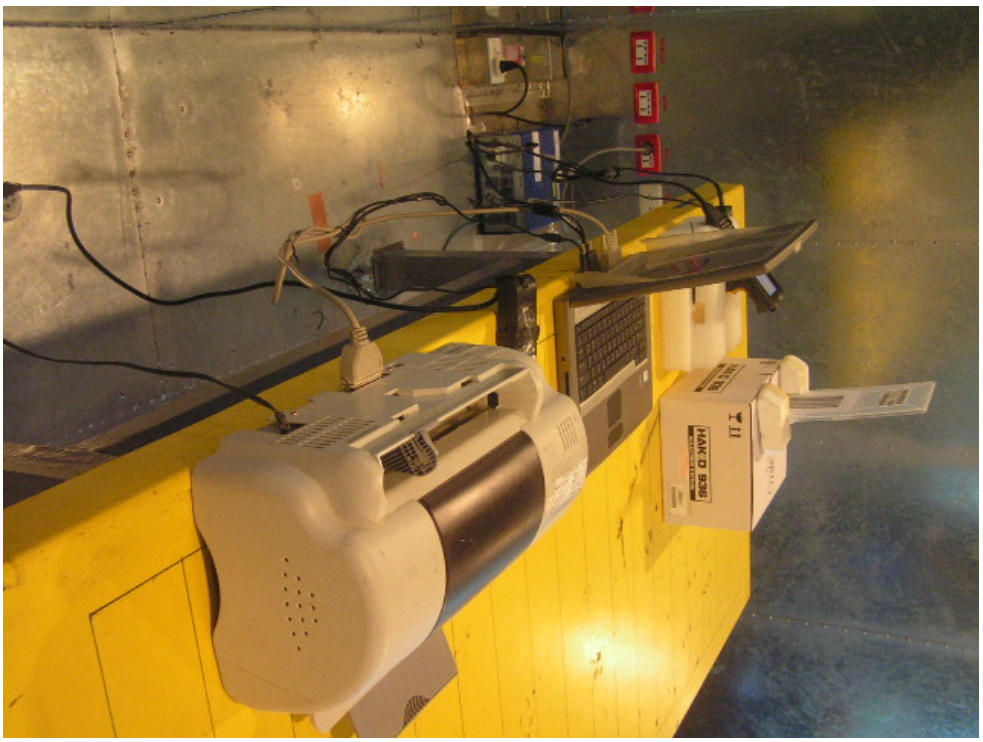
5.3.4. Photographs of Conduction Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW



5.4. Antenna Requirements

5.4.1. Standard Applicable

47 CFR Part15 Section 15.203:

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.

47 CFR Part15 Section 15.407 (a):

For 5150MHz~5250MHz : If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Device shall use a transmitting antenna that is an integral part of the device.

For 5250MHz~5350MHz / 5470MHz~5725MHz : If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For 5725MHz~5825MHz : If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing

high gain directional antennas are used exclusively for fixed, point-to-point operations.

5.4.2. Antenna Connected Construction

The antenna connector is U.FL.

6. List of Measuring Equipments Used

Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
1	Receiver	R&S	ESCS 30	100168	9kHz – 2.75GHz	Dec. 09, 2004	Conduction (CO02-LK)
2	LISN	Rolf Heine	NNB-2/16Z	98087	9kHz – 30MHz	Aug. 30, 2004	Conduction (CO02-LK)
3	LISN	Rolf Heine	NNB-2/16Z	98009	9kHz – 30MHz	Aug. 30, 2004	Conduction (CO02-LK)
4	RF Cable-CON	Suhner Switzerland	RG223/U	CB018	9kHz – 30MHz	Feb. 04, 2005	Conduction (CO02-LK)
5	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Jun. 16, 2005	Radiation (03CH03-HY)
6	Spectrum analyzer	R&S	FSP40	100004	9KHZ ~ 40GHz	Aug. 31, 2004	Radiation (03CH03-HY)
7	Amplifier	SCHAFFNER	CPA9231A	18667	9KHz ~ 2GHz	Jan. 10, 2005	Radiation (03CH03-HY)
8	Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	May 31, 2005	Radiation (03CH03-HY)
9	Amplifier	MITEQ	AMF-6F-260400	923364	26.5GHz ~ 40GHz	Jan. 05, 2004*	Radiation (03CH03-HY)
10	Loop Antenna	R&S	HFH2-Z2	860004/001	9kHz ~ 30MHz	May 24, 2004*	Radiation (03CH03-HY)
11	Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz ~ 200MHz	Jul. 28, 2004	Radiation (03CH03-HY)
12	Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz ~ 1GHz	Jul. 28, 2004	Radiation (03CH03-HY)
13	Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Apr. 22, 2005	Radiation (03CH03-HY)
14	Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jun. 09, 2004*	Radiation (03CH03-HY)
15	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Feb. 22, 2005	Radiation (03CH03-HY)
16	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Dec.01, 2004	Radiation (03CH03-HY)
17	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
18	Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
19	Spectrum analyzer	R&S	FSP30	100023	9kHz ~ 30GHx	Aug. 02, 2004	Conducted (TH01-HY)

※ Calibration Interval of instruments listed above is one year.

※ *Calibration Interval of instruments listed above is two year.