

FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : Security Camera

Model No. : CMS

FCC ID : Q77CMS

Filing Type : Certification

Applicant : **BEYOND BROADBAND NETWORK, INC.**
7F-3, No. 186, Jian Yi Rd., Chung Ho City,
Taipei County, Taiwan, R.O.C.

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SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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History of this test report

Original Report Issue Date: May 30, 2003

- ☒ No additional attachment.
☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

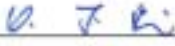
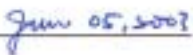
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Equipment : Security Camera
Model No. : CMS
FCC ID : Q77CMS
Filing Type : Certification
Applicant : **BEYOND BROADBAND NETWORK, INC.**
7F-3, No. 186, Jian Yi Rd., Chung Ho City,
Taipei County, Taiwan, R.O.C.

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 1992** and the energy emitted by this equipment was ***passed*** both radiated and conducted emission limits. Testing was carried out on May 23, 2003 at **SPORTON International Inc. LAB.**

 
K. J. Lin
Manager

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

BEYOND BROADBAND NETWORK, INC.
7F-3, No. 186, Jian Yi Rd., Chung Ho City, Taipei County, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

Equipment	: Security Camera
Model No.	: CMS
FCC ID	: Q77CMS
Trade Name	: BEYOND
Power Supply Type	: Linear
AC Power Input	: Wall-mount, 2pin
DC Power Cable	: Non-Shielded, 1.8m

1.4. Feature of Equipment under Test

- Frequency: 2400MHz~2483MHz
- Rx Sensibility: 0dBm
- Modulation Type: FM
- Channel Number: 4
- Frequency stability: +100KHz
- Supply voltage: 6V with camera
- Current consumption: 50mA under 10dBm
- Adapter: JNELEC / YAD-0600300CR

2. Test Configuration of Equipment under Test

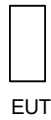
2.1. Test Manner

- a. The EUT has been associated with peripherals pursuant to ANSI C63.4-1992 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.
- b. The following test modes were performed:
 - Mode 1: CH01 (2412MHz)
 - Mode 2: CH03 (2452MHz)
 - Mode 3: CH04 (2472MHz)
- c. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 24830MHz.
- d. The radiated emissions testing was made by rotating three orthogonal axes.

2.2. Description of Test System

The EUT was tested alone. No support devices is needed for testing.

2.3. Connection Diagram of Test System



3. Test Software

No test software was used during testing.

4. General Information of Test

4.1. Test Facility

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,
Kwei-Shan Hsiag, Tao Yuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-318-0055
Test Site No. : CO01-HY, 03CH03-HY

4.2. Test Voltage

115V/60Hz

4.3. Standard for Methods of Measurement

ANSI C63.4-1992

4.4. Test in Compliance with

FCC Part 15, Subpart C 15.249

4.5. Frequency Range Investigated

- a. Conduction: from 150 KHz to 30 MHz
- b. Radiation: from 30 MHz to 24830 MHz

4.6. Test Distance

The test distance of radiated emission from antenna to EUT is 3 M.

5. Test of Conducted Powerline

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz and return leads of the EUT according to the methods defined in ANSI C63.4-1992 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

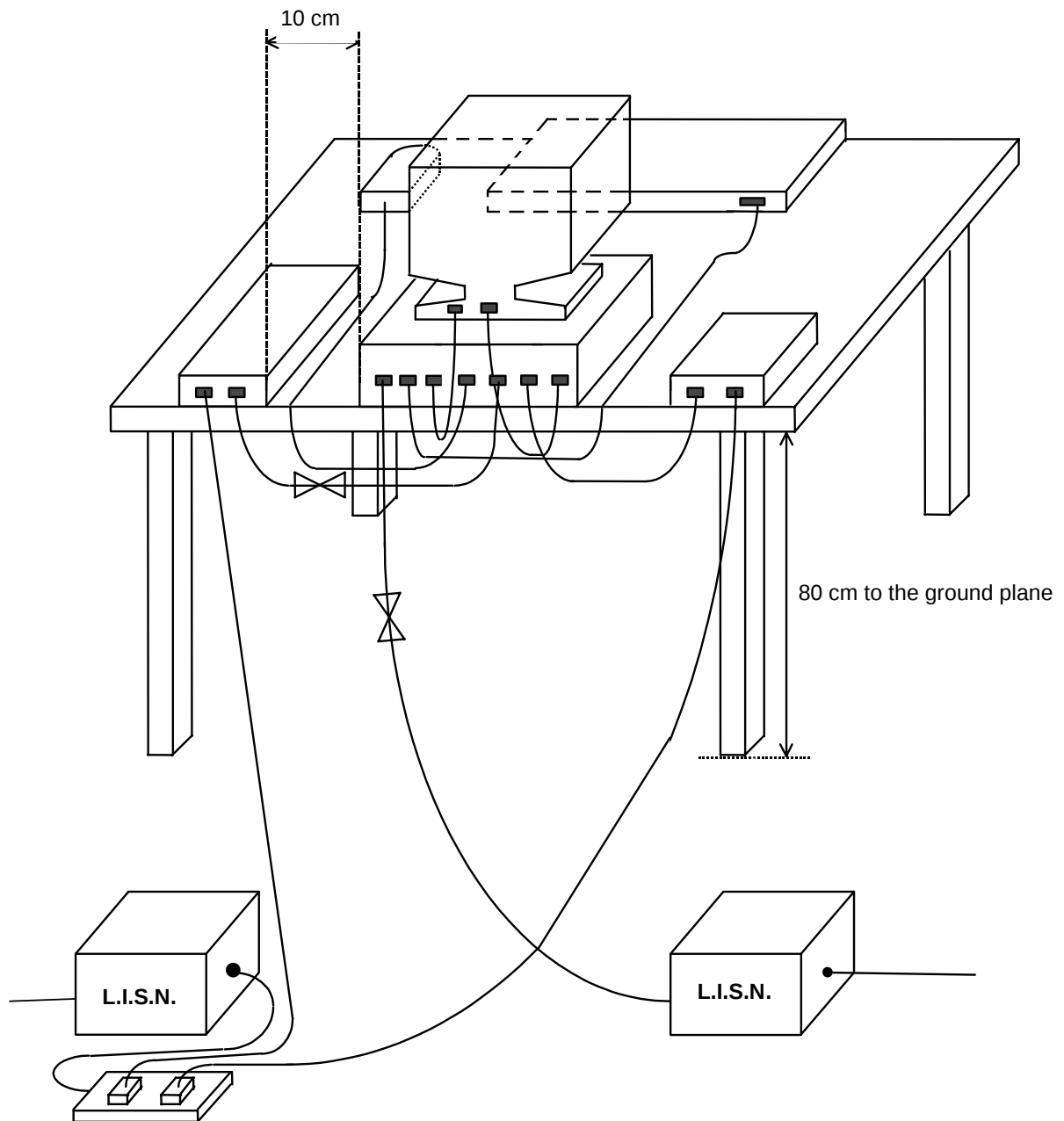
5.1. Major Measuring Instruments

- Test Receiver (R&S ESCS 30)
 - Attenuation 10 dB
 - Start Frequency 0.15 MHz
 - Stop Frequency 30 MHz
 - IF Bandwidth 9 KHz

5.2. Test Procedures

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connect to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5.3. Typical Test Setup Layout of Conducted Powerline

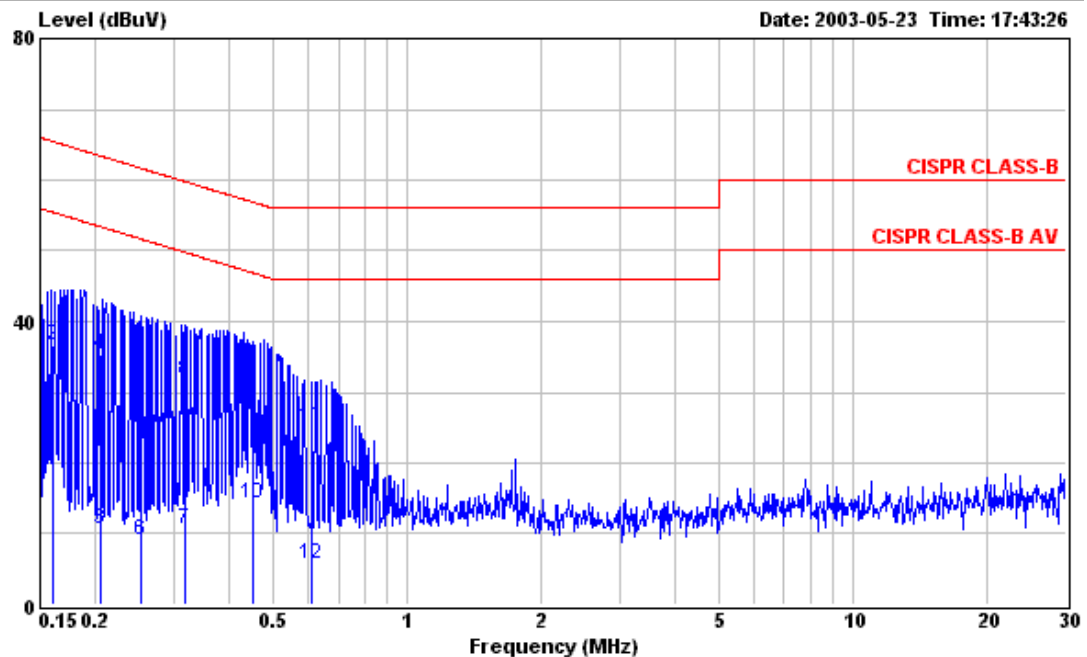


5.4. Test Result of AC Powerline Conducted Emission

5.4.1. Test Mode: Mode 1

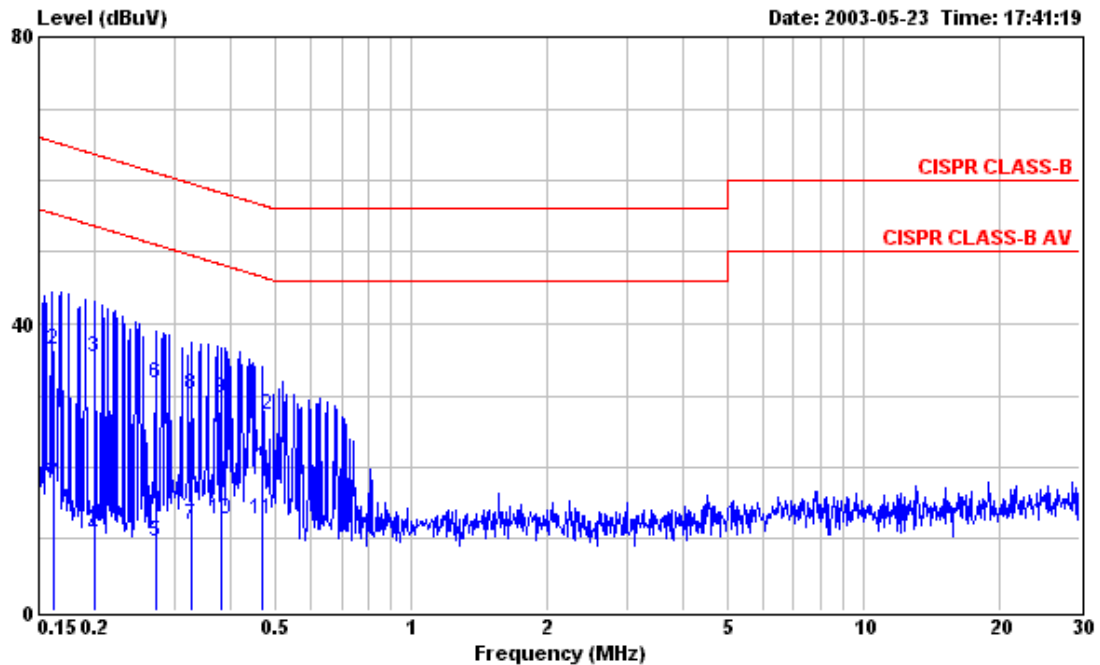
- Frequency Range of Test: from 0.15 MHz to 30 MHz
- Temperature: 24.7 °C
- Relative Humidity: 57 %
- All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked by a frame in the following data



Site : C001-HY
 Condition : CISPR CLASS-B 2003 2001/008 LINE
 EUT : 2.4G AV SENDER(ANTENNA)
 Power : 110V/60Hz
 Memo : CCD TX and RX
 : TX CH01 2412Mz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.161	18.93	-36.50	55.43	18.78	0.10	0.05	Average
2	0.161	36.64	-28.79	65.43	36.49	0.10	0.05	QP
3	0.206	10.62	-42.75	53.37	10.48	0.10	0.04	Average
4	0.206	35.45	-27.92	63.37	35.31	0.10	0.04	QP
5	0.252	33.21	-28.48	61.69	33.06	0.10	0.05	QP
6	0.252	9.06	-42.63	51.69	8.91	0.10	0.05	Average
7	0.317	10.53	-39.26	49.79	10.38	0.10	0.05	Average
8	0.317	31.80	-27.99	59.79	31.65	0.10	0.05	QP
9	0.452	30.38	-26.46	56.84	30.21	0.10	0.07	QP
10	0.452	14.36	-32.48	46.84	14.19	0.10	0.07	Average
11	0.611	25.14	-30.86	56.00	24.96	0.10	0.08	QP
12	0.611	5.79	-40.21	46.00	5.61	0.10	0.08	Average



Site : C001-HY
 Condition : CISPR CLASS-B 2003 2001/008 NEUTRAL
 EUT : 2.4G AV SENDER(ANTENNA)
 Power : 110V/60Hz
 Memo : CCD TX and RX
 : TX CH01 2412Mz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.161	18.17	-37.22	55.39	18.02	0.10	0.05	Average
2	0.161	36.34	-29.05	65.39	36.19	0.10	0.05	QP
3	0.200	35.29	-28.32	63.61	35.15	0.10	0.04	QP
4	0.200	10.38	-43.23	53.61	10.24	0.10	0.04	Average
5	0.272	9.66	-41.40	51.06	9.51	0.10	0.05	Average
6	0.272	31.72	-29.34	61.06	31.57	0.10	0.05	QP
7	0.325	12.06	-37.52	49.58	11.91	0.10	0.05	Average
8	0.325	30.05	-29.53	59.58	29.90	0.10	0.05	QP
9	0.379	29.51	-28.79	58.30	29.35	0.10	0.06	QP
10	0.379	12.60	-35.70	48.30	12.44	0.10	0.06	Average
11	0.469	12.82	-33.71	46.53	12.65	0.10	0.07	Average
12	0.469	27.26	-29.27	56.53	27.09	0.10	0.07	QP

Test Engineer:

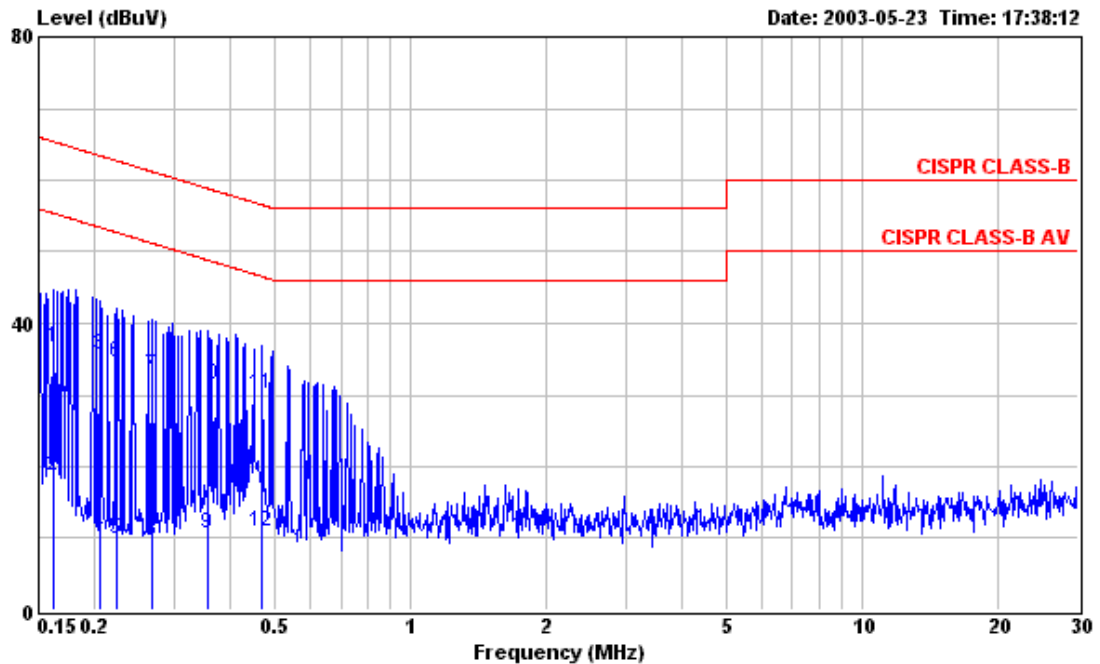
John

John Huang

5.4.2. Test Mode: Mode 2

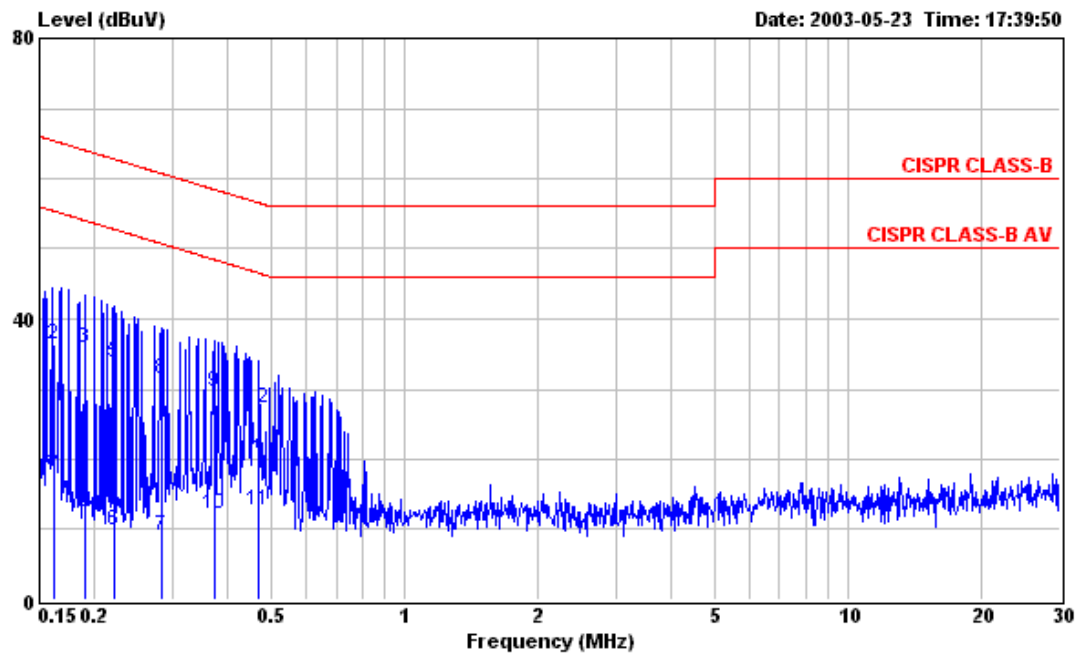
- Frequency Range of Test: from 0.15 MHz to 30 MHz
- Temperature: 24.7 °C
- Relative Humidity: 57 %
- All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked by a frame in the following data



Site : C001-HY
 Condition : CISPR CLASS-B 2003 2001/008 LINE
 EUT : 2.4G AV SENDER(ANTENNA)
 Power : 110V/60Hz
 Memo : CCD TX and RX
 : TX CH03 2452Mz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.162	36.61	-28.75	65.36	36.46	0.10	0.05	QP
2	0.162	18.80	-36.56	55.36	18.65	0.10	0.05	Average
3	0.205	35.49	-27.92	63.41	35.35	0.10	0.04	QP
4	0.205	10.62	-42.79	53.41	10.48	0.10	0.04	Average
5	0.223	9.83	-42.88	52.71	9.69	0.10	0.04	Average
6	0.223	34.46	-28.25	62.71	34.32	0.10	0.04	QP
7	0.267	32.73	-28.48	61.21	32.58	0.10	0.05	QP
8	0.267	9.51	-41.70	51.21	9.36	0.10	0.05	Average
9	0.356	10.78	-38.04	48.82	10.62	0.10	0.06	Average
10	0.356	31.43	-27.39	58.82	31.27	0.10	0.06	QP
11	0.469	30.09	-26.44	56.53	29.92	0.10	0.07	
12	0.469	10.97	-35.56	46.53	10.80	0.10	0.07	Average



Site : C001-HY
 Condition : CISPR CLASS-B 2003 2001/008 NEUTRAL
 EUT : 2.4G AV SENDER(ANTENNA)
 Power : 110V/60Hz
 Memo : CCD TX and RX
 : TX CH03 2452Mz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV		dBuV	dBuV	dB	dB	
1	0.161	18.17	-37.22	55.39	18.02	0.10	0.05	Average
2	0.161	36.34	-29.05	65.39	36.19	0.10	0.05	QP
3	0.190	35.88	-28.16	64.04	35.74	0.10	0.04	QP
4	0.190	11.88	-42.16	54.04	11.74	0.10	0.04	Average
5	0.222	33.86	-28.88	62.74	33.72	0.10	0.04	QP
6	0.222	9.83	-42.91	52.74	9.69	0.10	0.04	Average
7	0.282	9.04	-41.72	50.76	8.89	0.10	0.05	Average
8	0.282	31.37	-29.39	60.76	31.22	0.10	0.05	QP
9	0.373	29.68	-28.75	58.43	29.52	0.10	0.06	QP
10	0.373	12.21	-36.22	48.43	12.05	0.10	0.06	Average
11	0.469	12.70	-33.83	46.53	12.53	0.10	0.06	Average
12	0.469	27.20	-29.33	56.53	27.03	0.10	0.07	QP

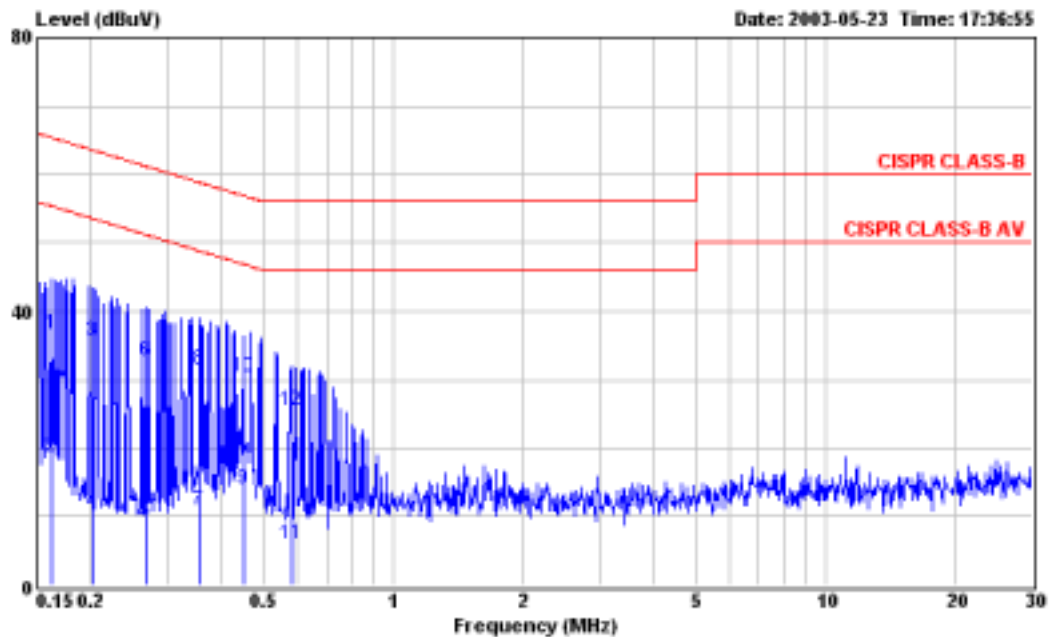
Test Engineer:

John Huang

5.4.3. Test Mode: Mode 3

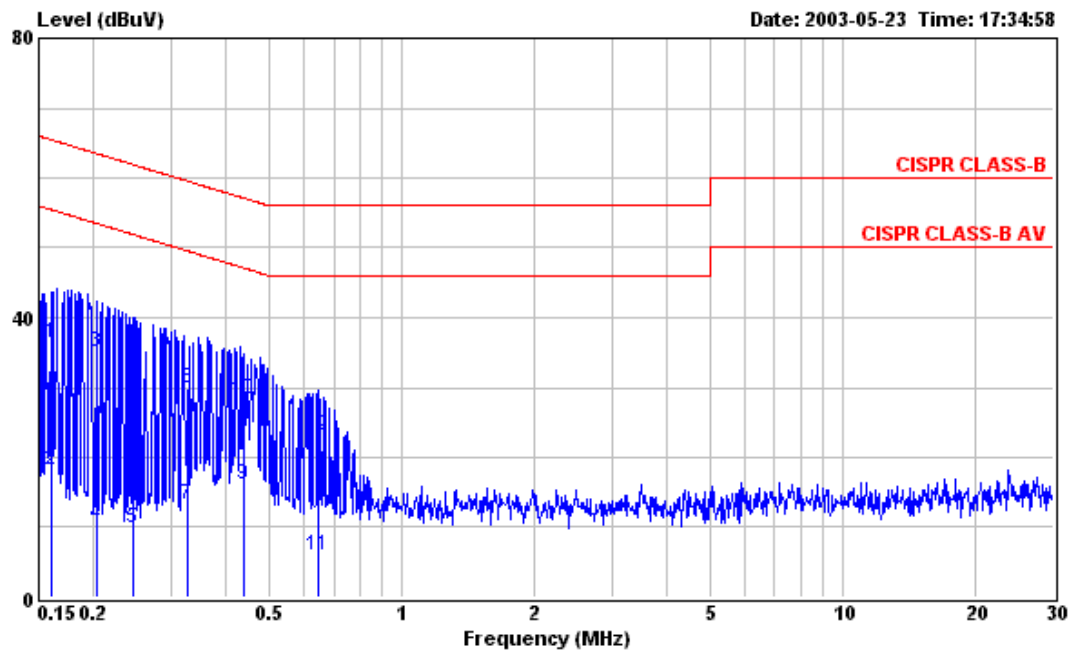
- Frequency Range of Test: from 0.15 MHz to 30 MHz
- Temperature: 24.7 °C
- Relative Humidity: 57 %
- All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked by a frame in the following data



Site : C001-HY
 Condition : CISPR CLASS-B 2003 2001/008 LINE
 EUT : 2.4G AV SENDER(ANTENNA)
 Power : 110V/60Hz
 Memo : CCD TX and RX
 : TX CH04 2472MHz

			Over	Limit	Read	Probe	Cable	
	Freq	Level	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.162	36.59	-28.77	65.36	36.44	0.10	0.05	QP
2	0.162	18.80	-36.56	55.36	18.65	0.10	0.05	Average
3	0.202	35.65	-27.88	63.53	35.51	0.10	0.04	QP
4	0.202	10.70	-42.83	53.53	10.56	0.10	0.04	Average
5	0.267	9.47	-41.74	51.21	9.32	0.10	0.05	Average
6	0.267	32.78	-28.43	61.21	32.63	0.10	0.05	QP
7	0.356	10.86	-37.96	48.82	10.70	0.10	0.06	Average
8	0.356	31.37	-27.45	58.82	31.21	0.10	0.06	QP
9	0.449	14.01	-32.88	46.89	13.84	0.10	0.07	Average
10	0.449	30.47	-26.42	56.89	30.30	0.10	0.07	QP
11	0.582	5.99	-40.01	46.00	5.81	0.10	0.08	Average
12	0.582	25.42	-30.58	56.00	25.24	0.10	0.08	QP



Site : C001-HY
 Condition : CISPR CLASS-B 2003 2001/008 NEUTRAL
 EUT : 2.4G AV SENDER(ANTENNA)
 Power : 110V/60Hz
 Memo : CCD TX and RX
 : TX CH04 2472Mz

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.161	36.27	-29.16	65.43	36.12	0.10	0.05	QP
2	0.161	18.18	-37.25	55.43	18.03	0.10	0.05	Average
3	0.204	34.97	-28.48	63.45	34.83	0.10	0.04	QP
4	0.204	10.38	-43.07	53.45	10.24	0.10	0.04	Average
5	0.246	9.87	-42.02	51.89	9.72	0.10	0.05	Average
6	0.246	32.63	-29.26	61.89	32.48	0.10	0.05	QP
7	0.328	13.36	-36.15	49.51	13.21	0.10	0.05	Average
8	0.328	29.97	-29.54	59.51	29.82	0.10	0.05	QP
9	0.438	16.01	-31.08	47.09	15.85	0.10	0.06	Average
10	0.438	28.22	-28.87	57.09	28.06	0.10	0.06	QP
11	0.644	5.99	-40.01	46.00	5.81	0.10	0.08	Average
12	0.644	23.18	-32.82	56.00	23.00	0.10	0.08	QP

Test Engineer:

John Huang

6. Test of Radiated Emission

Radiated emissions from 30 MHz to 24830 MHz were measured with a bandwidth of 120 kHz for 30MHz to 1 GHz and 1MHz for above 1GHz according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

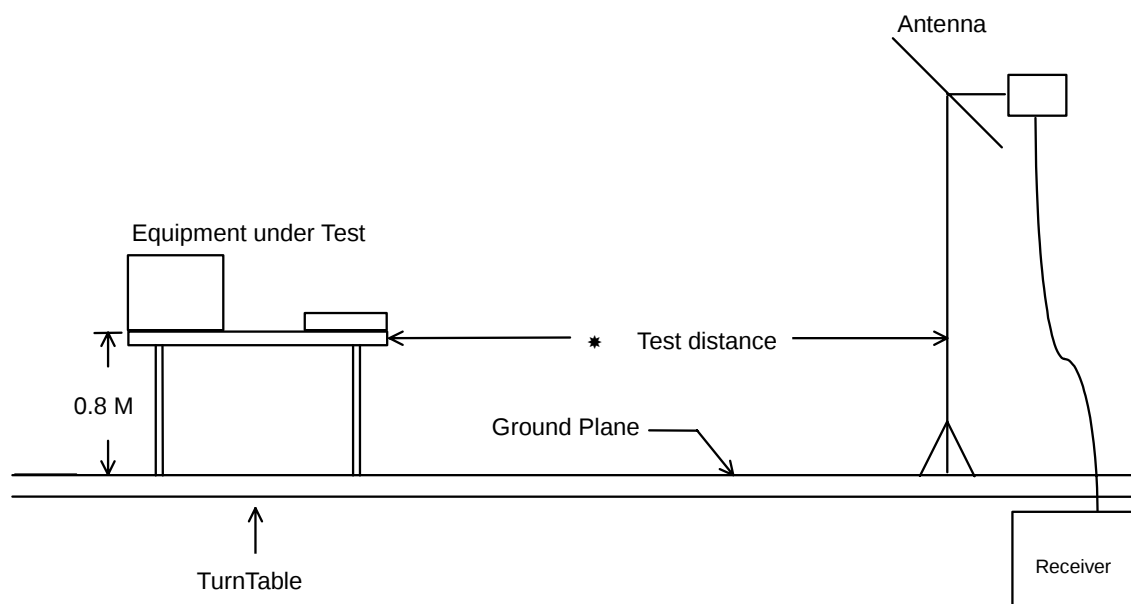
6.1. Major Measuring Instruments

- Amplifier (MITEQ AFS44)
 - RF Gain 40 dB
 - Signal Input 100 MHz to 26.5 GHz
- Amplifier (HP 8447D)
 - RF Gain 30 dB
 - Signal Input 100 KHz to 1.3 GHz
- Spectrum analyzer (R&S FSP40)
 - Attenuation 10 dB
 - Start Frequency 1 GHz
 - Stop Frequency 24 GHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 9 KHz to 40 GHz
- Test Receiver (SCHAFFNER SCR3501)
 - Resolution Bandwidth 120 KHz
 - Frequency Band 9 K – 1 GHz
 - Quasi-Peak Detector ON for Quasi-Peak Mode
OFF for Peak Mode

6.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the 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 and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was more 20dB lower 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.

6.3. Typical Test Setup Layout of Radiated Emission



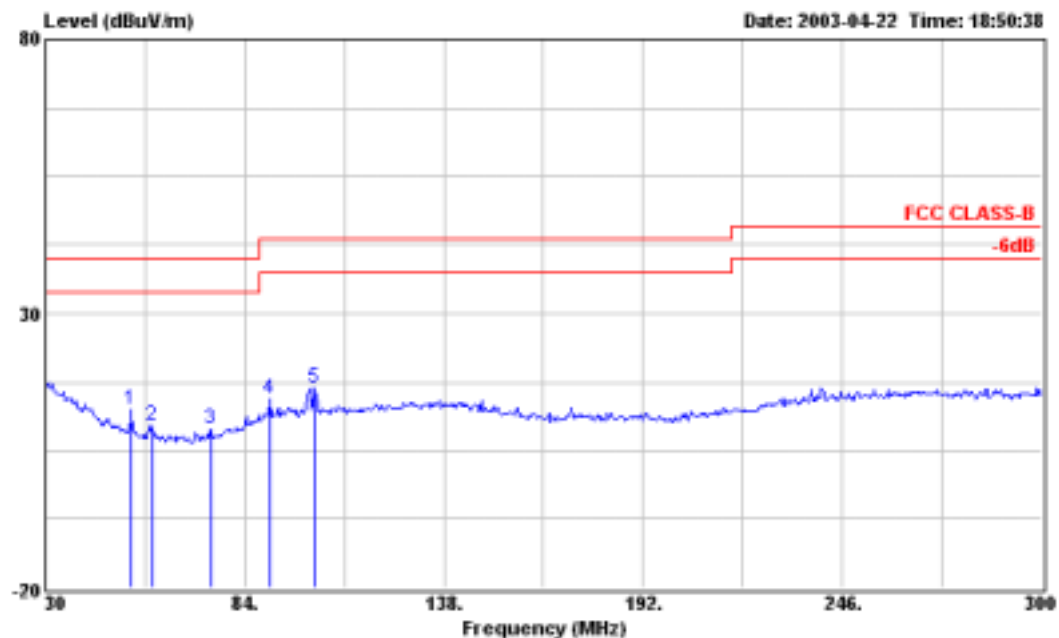
6.4. Test Result of Radiated Emission

6.4.1. Test Mode: Mode 1

- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 65 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

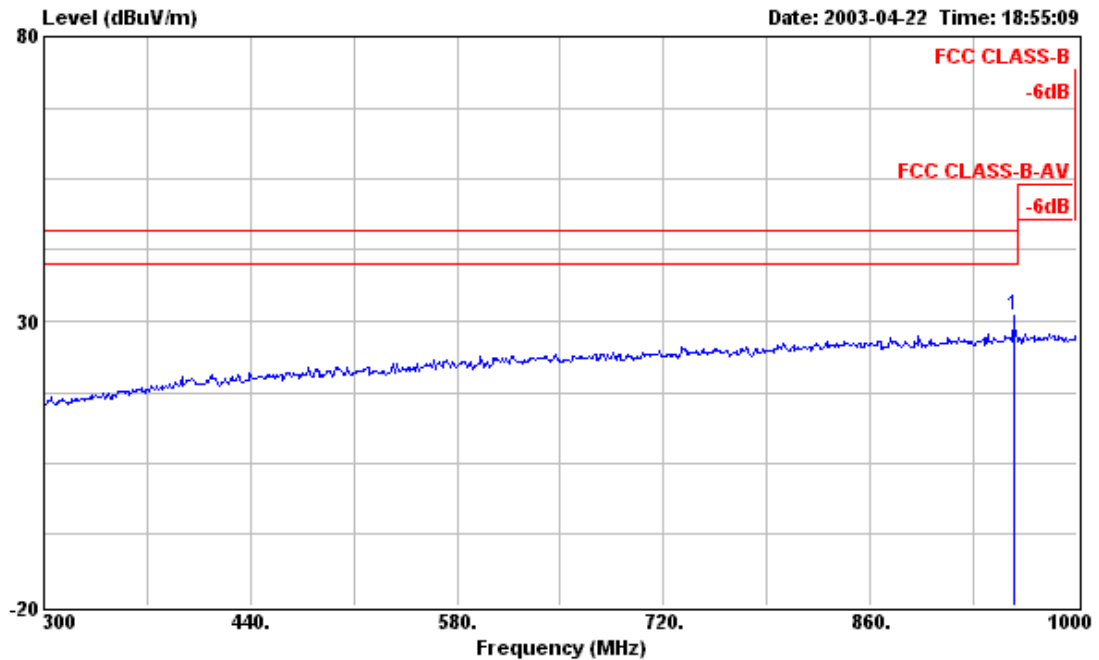
■ The test was passed at the minimum margin that marked under gray area in the following table, and its antenna height is 2 m, turn table degree is 90°

■ Spurious Emission



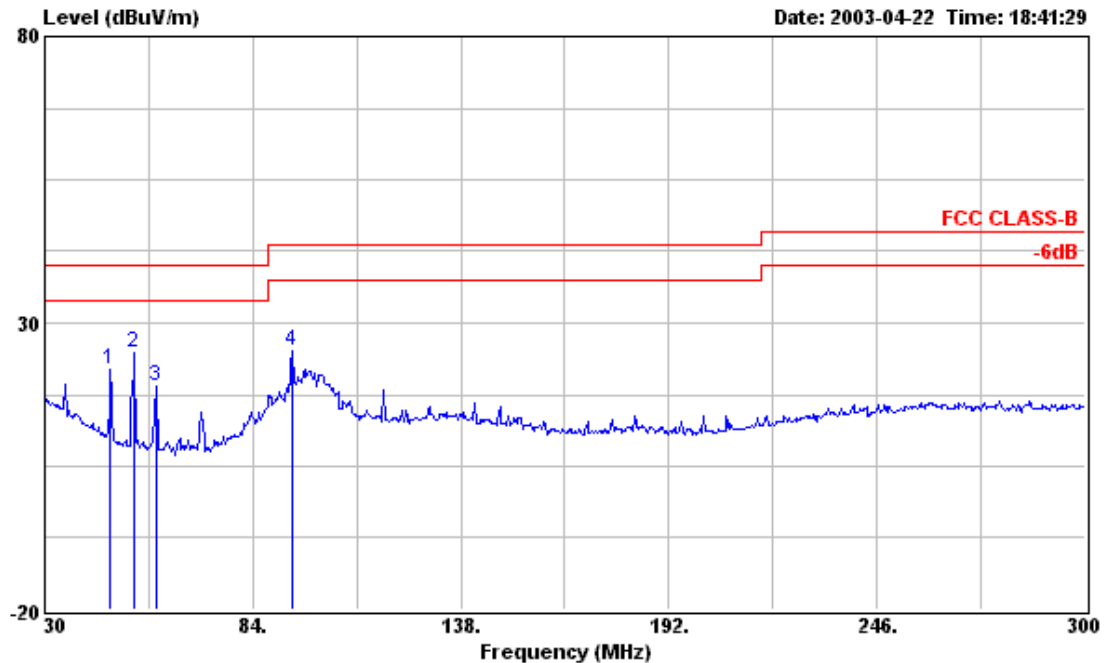
Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH01 2412MHz
 : F332802

	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	53.220	12.35	-27.65	40.00	32.04	6.05	1.35	27.09	Peak	---	---
2	58.890	9.67	-30.33	40.00	30.01	5.31	1.43	27.08	Peak	---	---
3	74.020	0.97	-31.03	40.00	29.12	5.21	1.69	27.05	Peak	---	---
4	91.020	14.50	-29.00	43.50	30.85	8.84	1.83	27.02	Peak	---	---
5	103.170	16.24	-27.26	43.50	31.85	9.45	1.93	26.99	Peak	---	---



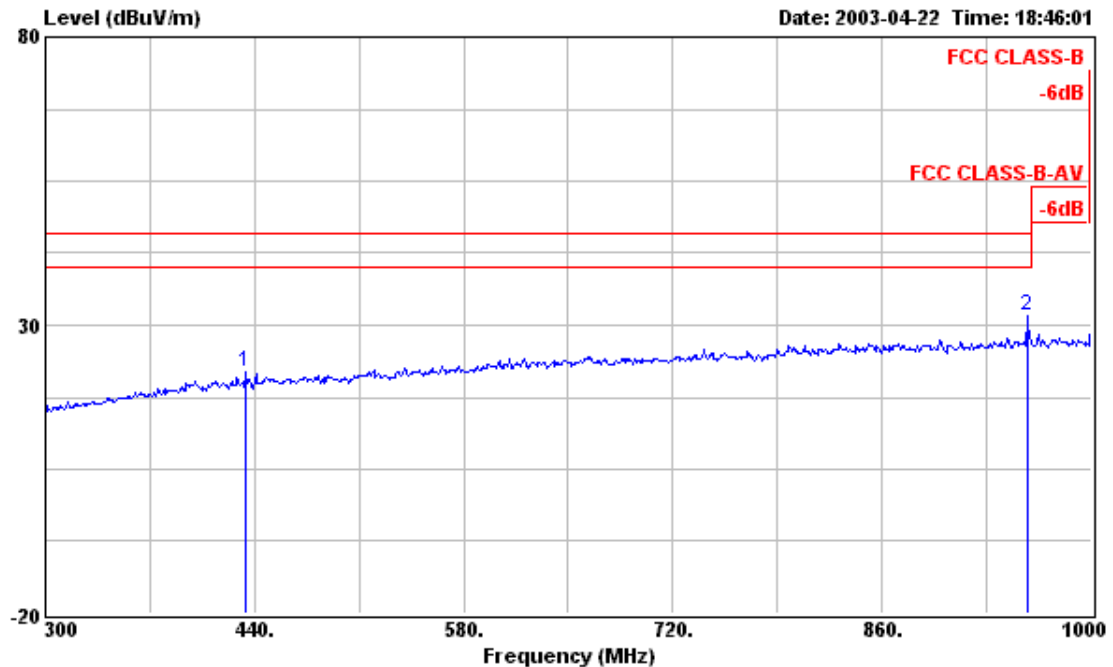
Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH01 2412MHz
 : F332802

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	957.300	31.04	-14.96	46.00	31.95	19.61	7.11	27.63	Peak	---	---



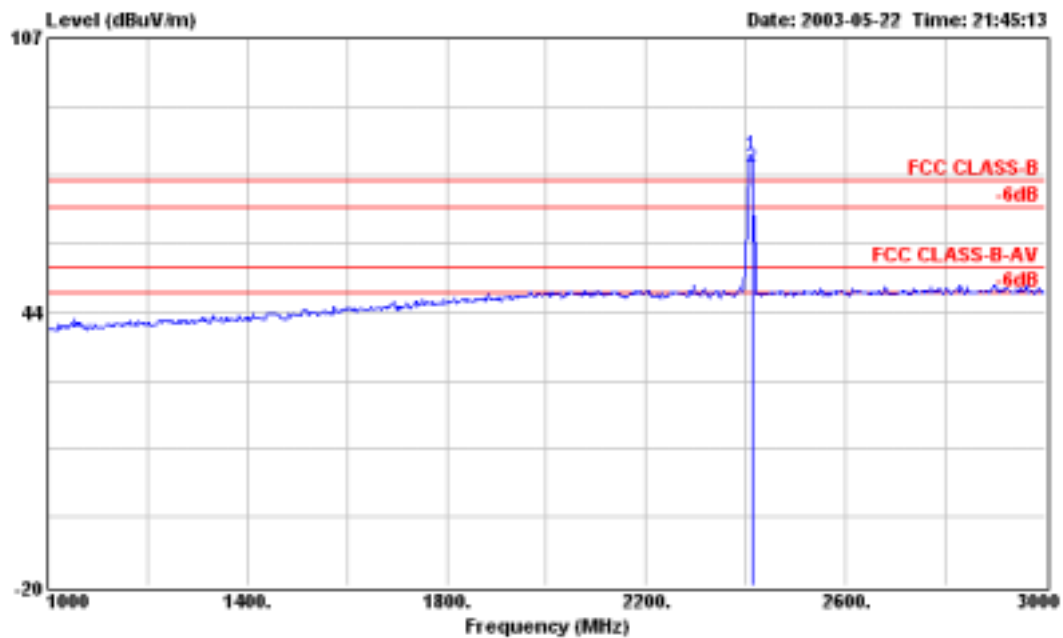
Site : 03CH03-HY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH01 2412MHz
 : F332802

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	47.010	21.99	-18.01	40.00	40.09	7.74	1.26	27.10	Peak	---	---
2	53.220	24.85	-15.15	40.00	44.54	6.05	1.35	27.09	Peak	---	---
3	58.890	19.01	-20.99	40.00	39.35	5.31	1.43	27.08	Peak	---	---
4	94.260	25.20	-18.30	43.50	41.32	9.04	1.85	27.01	Peak	---	---

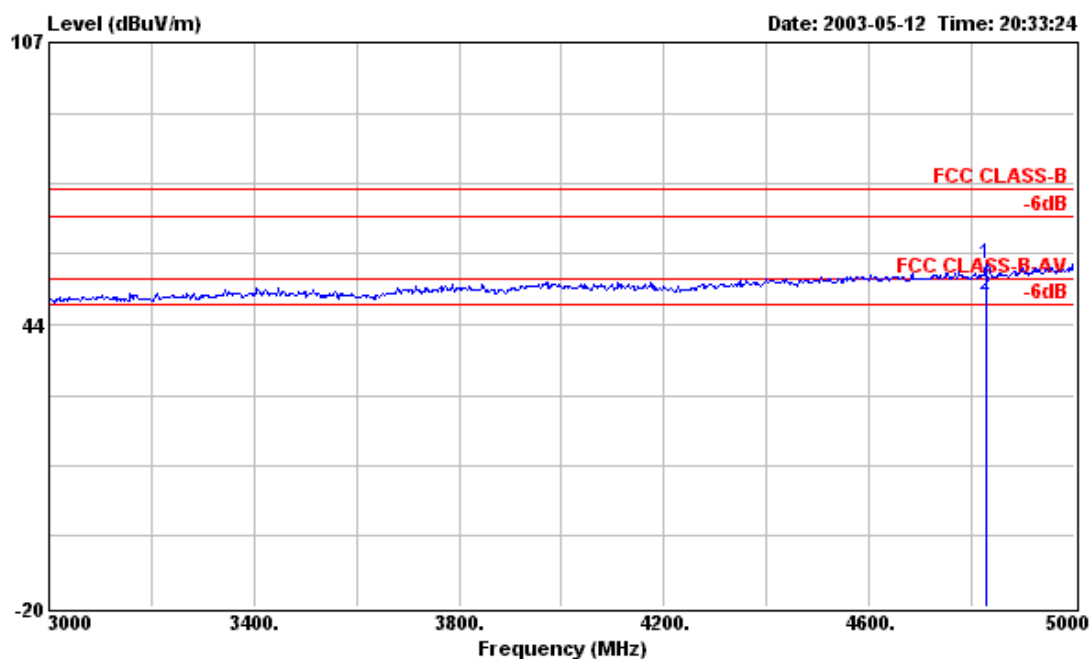


Site : 03CH03-HY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH01 2412MHz
 : F332802

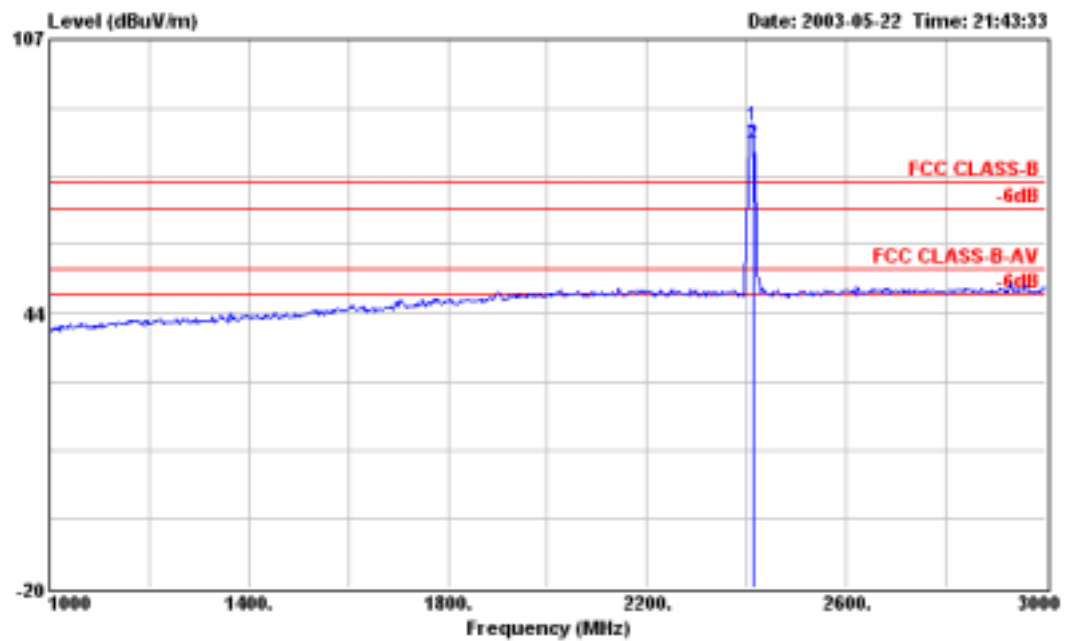
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	433.700	21.85	-24.15	46.00	29.87	15.10	4.25	27.37	Peak	---	---
2	957.300	31.65	-14.35	46.00	32.56	19.61	7.11	27.63	Peak	100	157



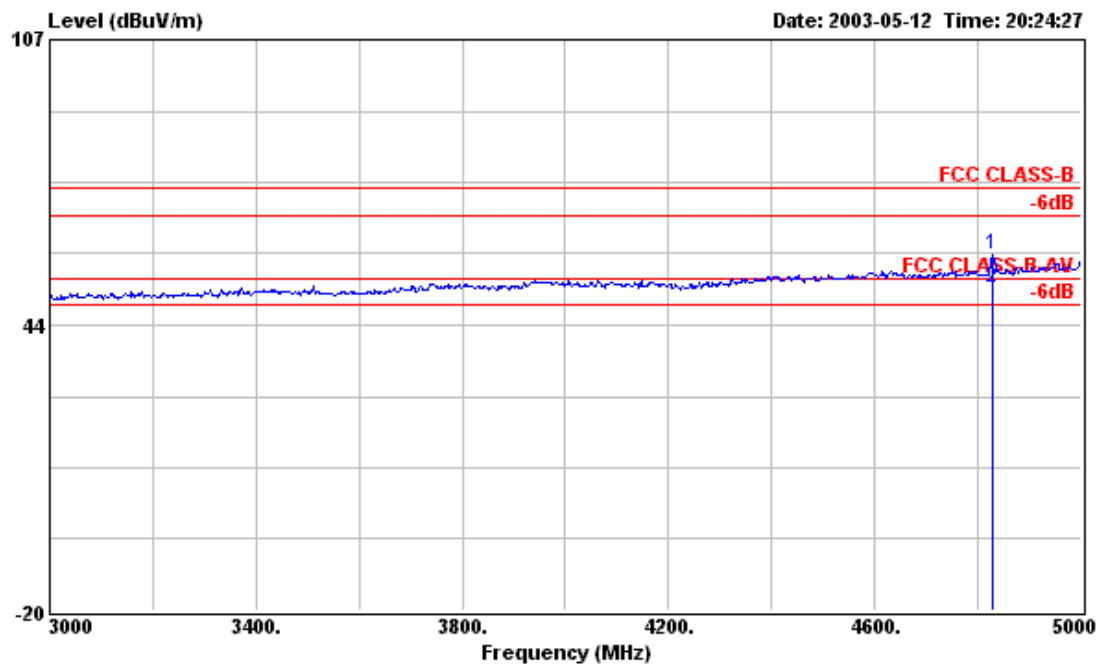
Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH01 2412MHz
: F332802



Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH01 2412MHz
: F332802



Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH01 2412MHz
: F332802



Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH01 2412MHz
: F332802

■ Field strength of fundamental and harmonics

Frequency	Antenna	Cable	Reading	Limits		Emission	Level	Margin	Detect	
	Polarity	Factor	Loss							
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2412.000	H	30.18	5.98	43.70	-	-	79.86	9840.11		Peak
2412.000	H	30.18	5.98	40.58	-	-	76.74	6870.68		A.V.
2412.000	V	30.18	5.98	50.81	-	-	86.97	22310.02		Peak
2412.000	V	30.18	5.98	46.69	-	-	82.85	13883.53		A.V.
4830.000	H	33.29	9.16	14.82	74.00	5011.87	57.27	730.30	-16.73	Peak
4830.000	H	33.29	9.16	7.76	54.00	501.19	50.21	323.97	-3.79	A.V.
4828.000	V	33.28	9.16	16.91	74.00	5011.87	59.35	927.90	-14.65	Peak
4828.000	V	33.28	9.16	9.31	54.00	501.19	51.75	386.81	-2.25	A.V.
7236.000	V/H						-			Peak, A.V.
9648.000	V/H						-			Peak, A.V.
12060.000	V/H						-			Peak, A.V.
14472.000	V/H						-			Peak, A.V.
16884.000	V/H						-			Peak, A.V.
19296.000	V/H						-			Peak, A.V.
21708.000	V/H						-			Peak, A.V.
24120.000	V/H						-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer: 

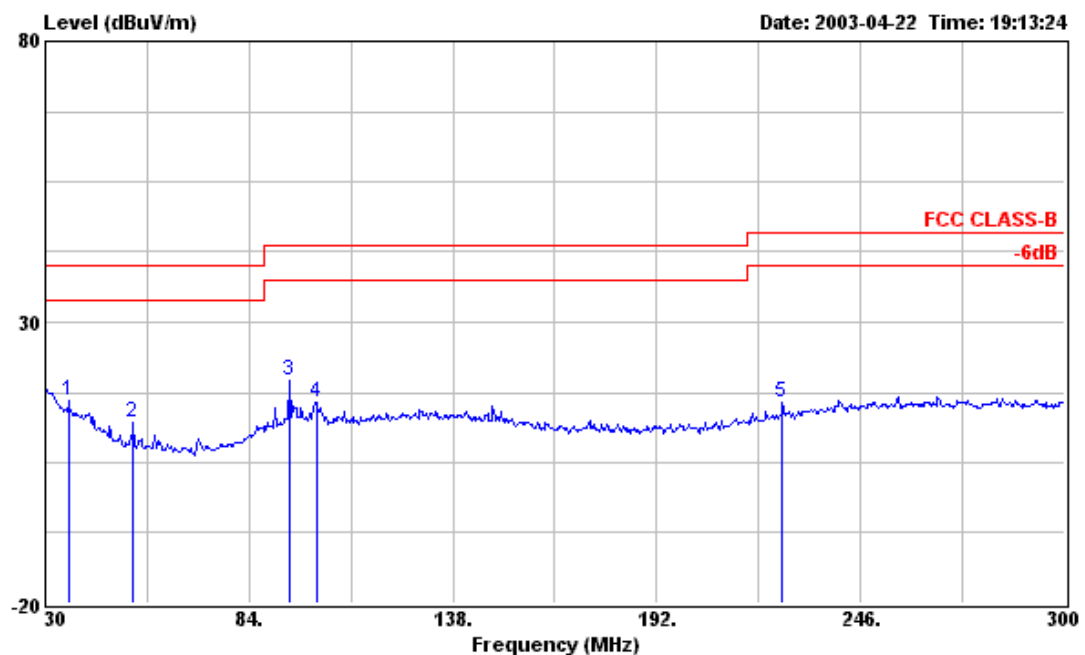
Jay Zhong

6.4.2. Test Mode: Mode 2

- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 65 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

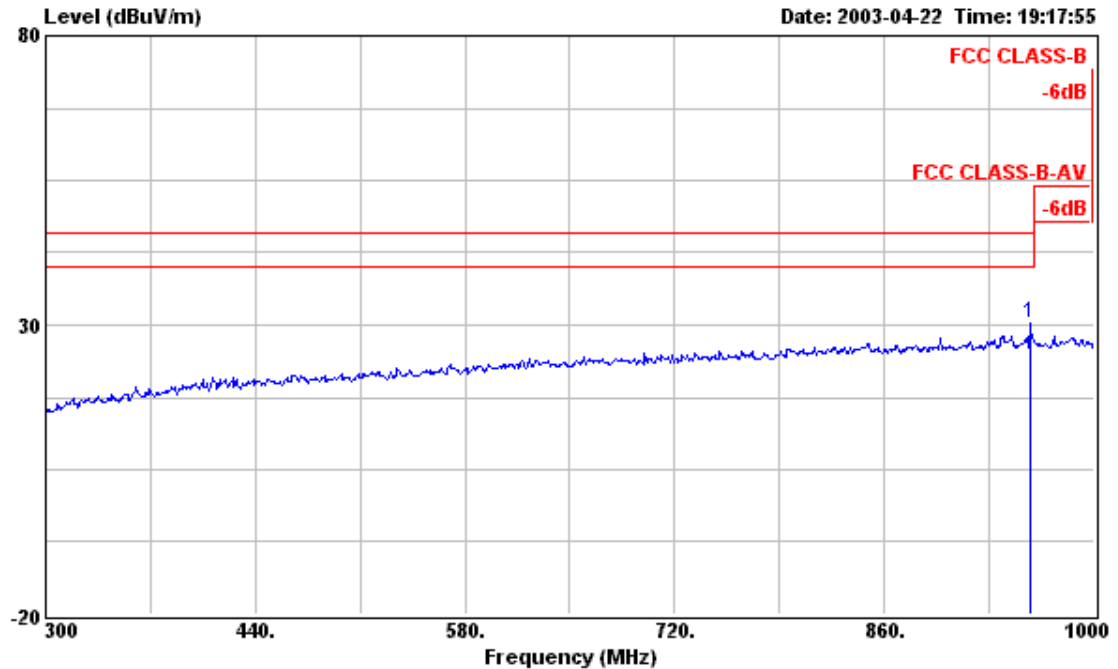
■ The test was passed at the minimum margin that marked under gray area in the following table, and its antenna height is 2 m, turn table degree is 89^o

■ Spurious Emission



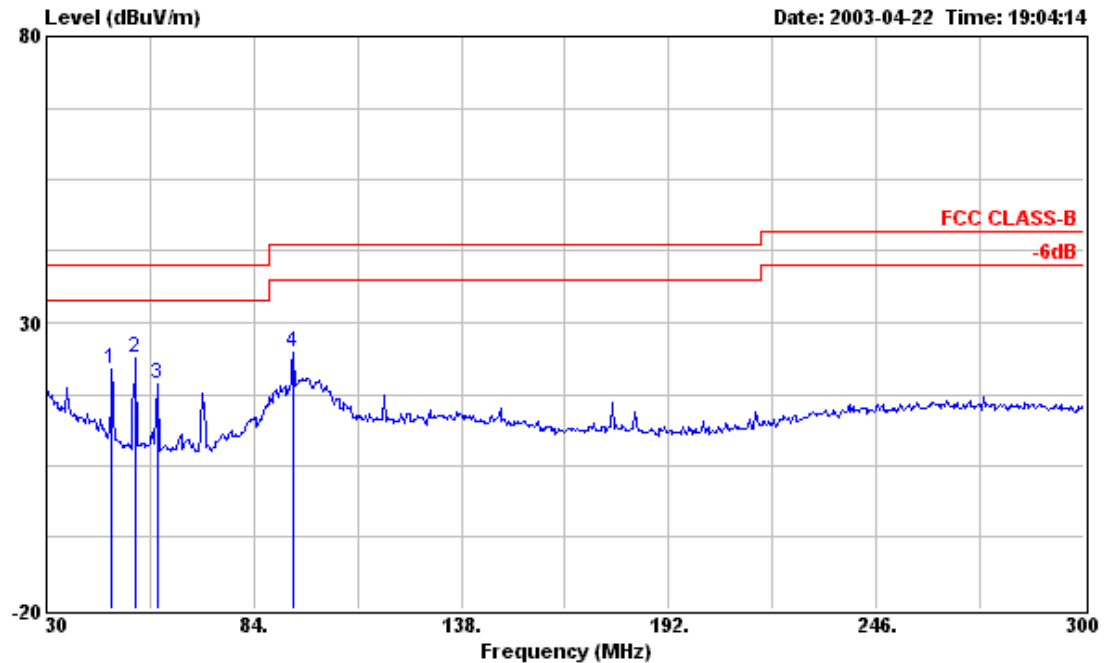
Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH03 2452MHz
 : F332802

	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	36.210	15.89	-24.11	40.00	29.49	12.38	1.12	27.10	Peak	---	---
2	53.220	12.01	-27.99	40.00	31.70	6.05	1.35	27.09	Peak	---	---
3	94.530	19.48	-24.02	43.50	35.59	9.05	1.85	27.01	Peak	---	---
4	101.820	15.78	-27.72	43.50	31.44	9.41	1.92	26.99	Peak	---	---
5	225.210	15.75	-30.25	46.00	29.74	9.62	2.99	26.60	Peak	---	---



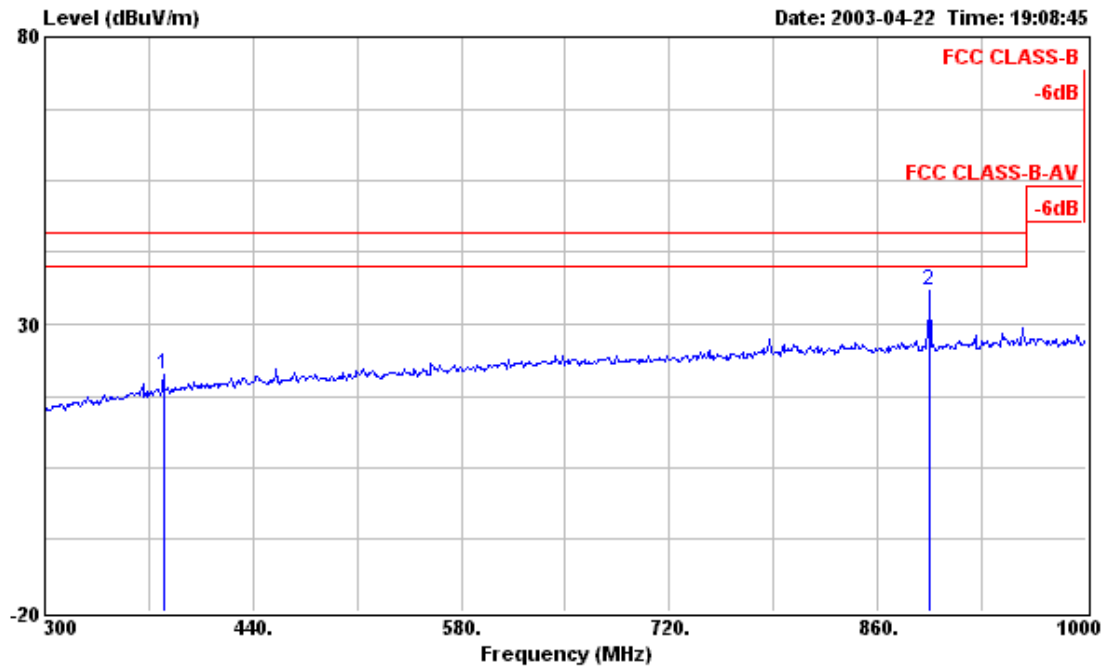
Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH03 2452MHz
 : F332802

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	957.300	30.41	-15.59	46.00	31.32	19.61	7.11	27.63	Peak	---	---



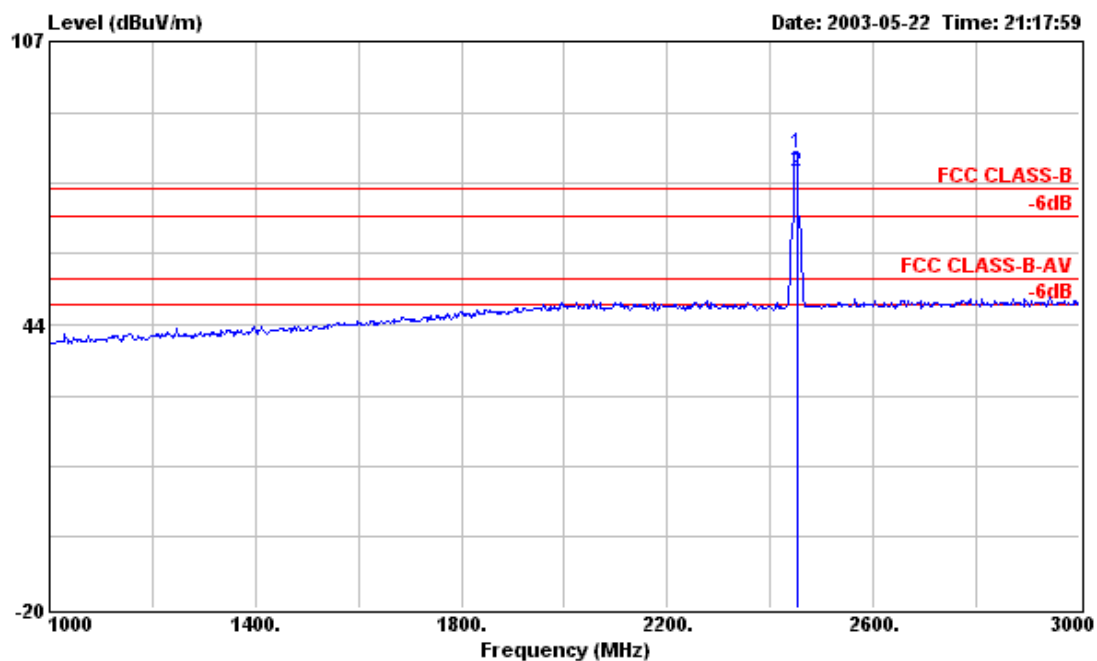
Site : 03CH03-HY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH03 2452MHz
 : F332802

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	47.010	21.73	-18.27	40.00	39.83	7.74	1.26	27.10	Peak	---	---
2	53.220	23.73	-16.27	40.00	43.42	6.05	1.35	27.09	Peak	---	---
3	58.890	19.28	-20.72	40.00	39.62	5.31	1.43	27.08	Peak	---	---
4	94.260	24.67	-18.83	43.50	40.79	9.04	1.85	27.01	Peak	---	---

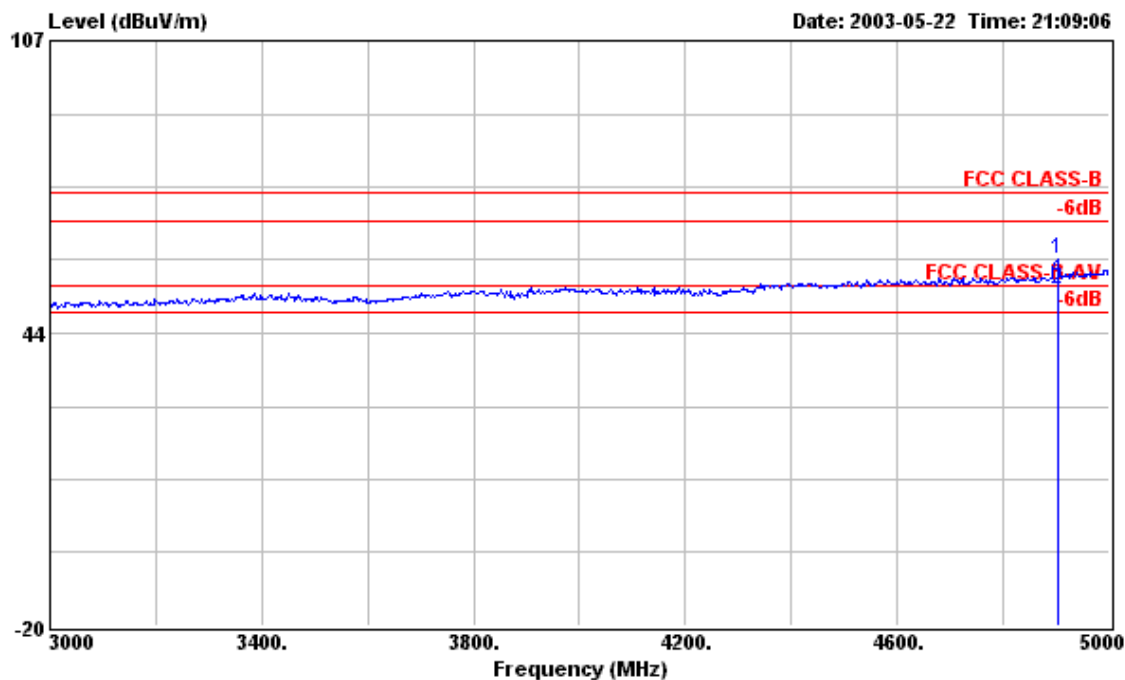


Site : 03CH03-HY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH03 2452MHz
 : F332802

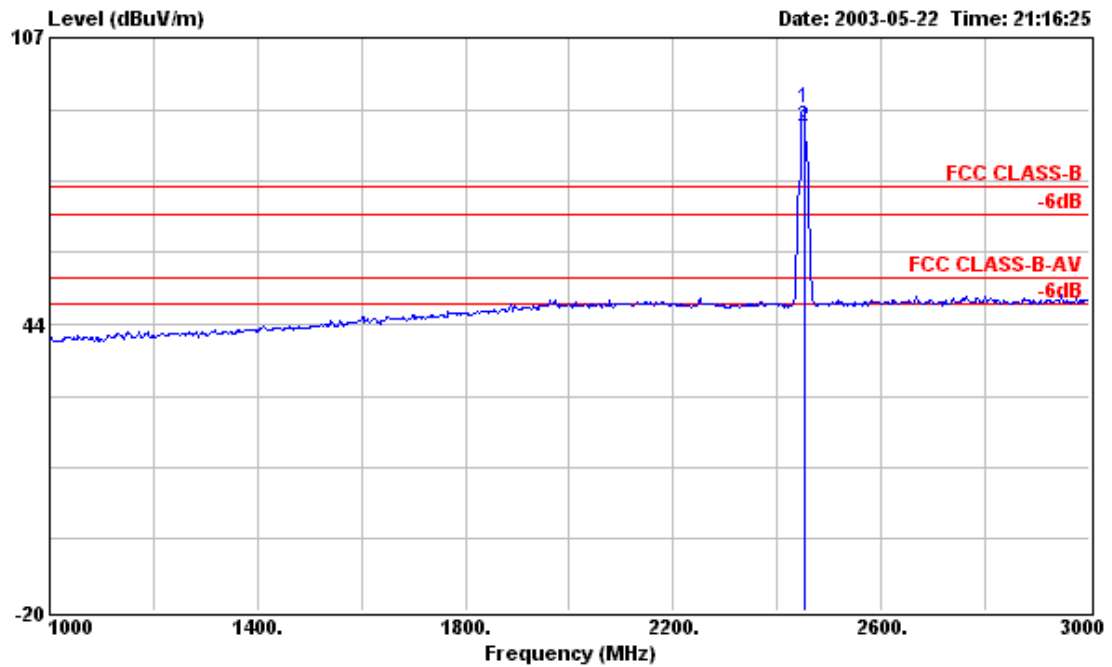
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	379.800	21.13	-24.87	46.00	30.21	14.00	4.00	27.08	Peak	---	---
2	895.000	35.95	-10.05	46.00	37.56	19.39	6.81	27.81	Peak	100	76



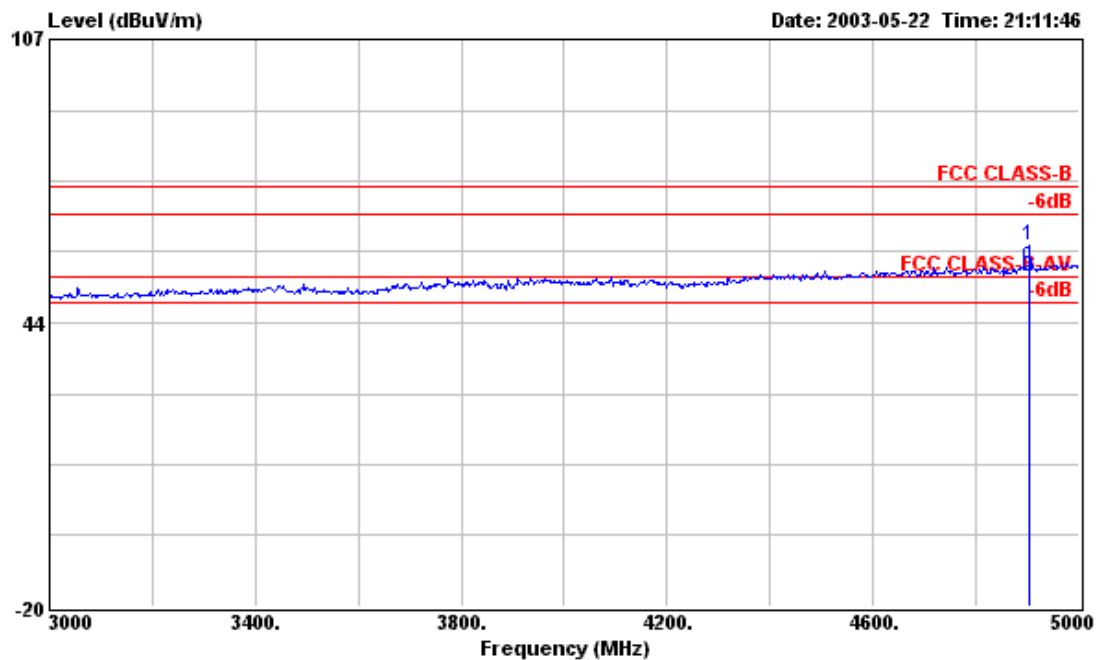
Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH03 2452MHz
: F332802



Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT : 2.4G AV Sender (Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH03 2452MHz
: F332802



Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH03 2452MHz
: F332802



Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH03 2452MHz
: F332802

■ Field strength of fundamental and harmonics

Frequency	Antenna	Cable	Reading	Limits		Emission	Level	Margin	Detect	
	Polarity	Factor	Loss							
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2452.000	H	30.14	6.03	45.83	-	-	82.00	12589.25		Peak
2452.000	H	30.14	6.03	41.75	-	-	77.92	7870.46		A.V.
2452.000	V	30.14	6.03	54.98	-	-	91.15	36099.40		Peak
2452.000	V	30.14	6.03	51.19	-	-	87.36	23334.58		A.V.
4902.00	H	33.52	9.19	16.80	74.00	5011.87	59.51	945.15	-14.49	Peak
4902.00	H	33.52	9.19	10.43	54.00	501.19	53.14	453.94	-0.86	A.V.
4902.00	V	33.52	9.19	17.94	74.00	5011.87	60.65	1077.71	-13.35	Peak
4902.00	V	33.52	9.19	11.08	54.00	501.19	53.79	489.22	-0.21	A.V.
7356.000	V/H						-			Peak, A.V.
9808.000	V/H						-			Peak, A.V.
12260.000	V/H						-			Peak, A.V.
14712.000	V/H						-			Peak, A.V.
17164.000	V/H						-			Peak, A.V.
19616.000	V/H						-			Peak, A.V.
22068.000	V/H						-			Peak, A.V.
24520.000	V/H						-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer:

Jay

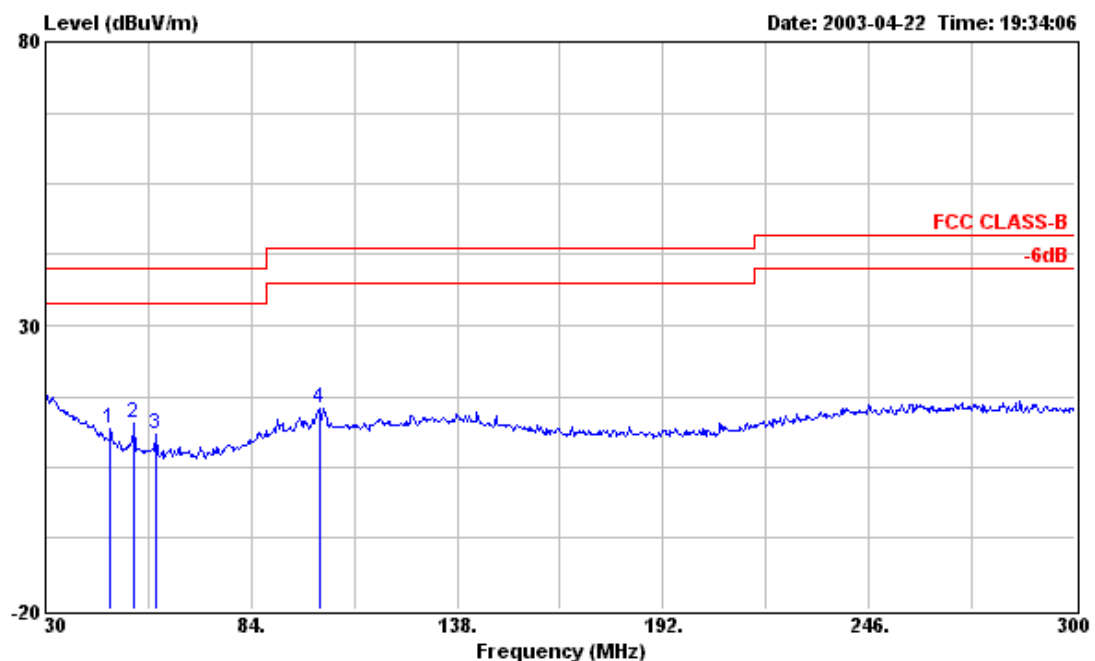
Jay Zhong

6.4.3. Test Mode: Mode 3

- Test Distance: 3 M
- Temperature: 26 °C
- Relative Humidity: 65 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

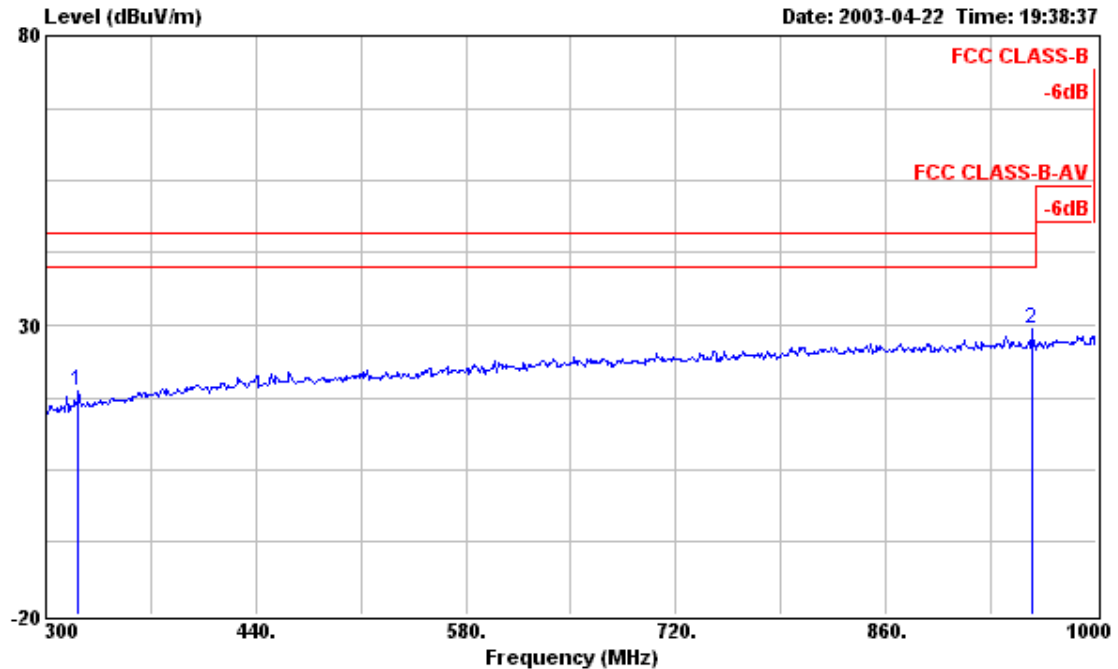
■ The test was passed at the minimum margin that marked under gray area in the following table, and its antenna height is 2 m, turn table degree is 74°

■ Spurious Emission



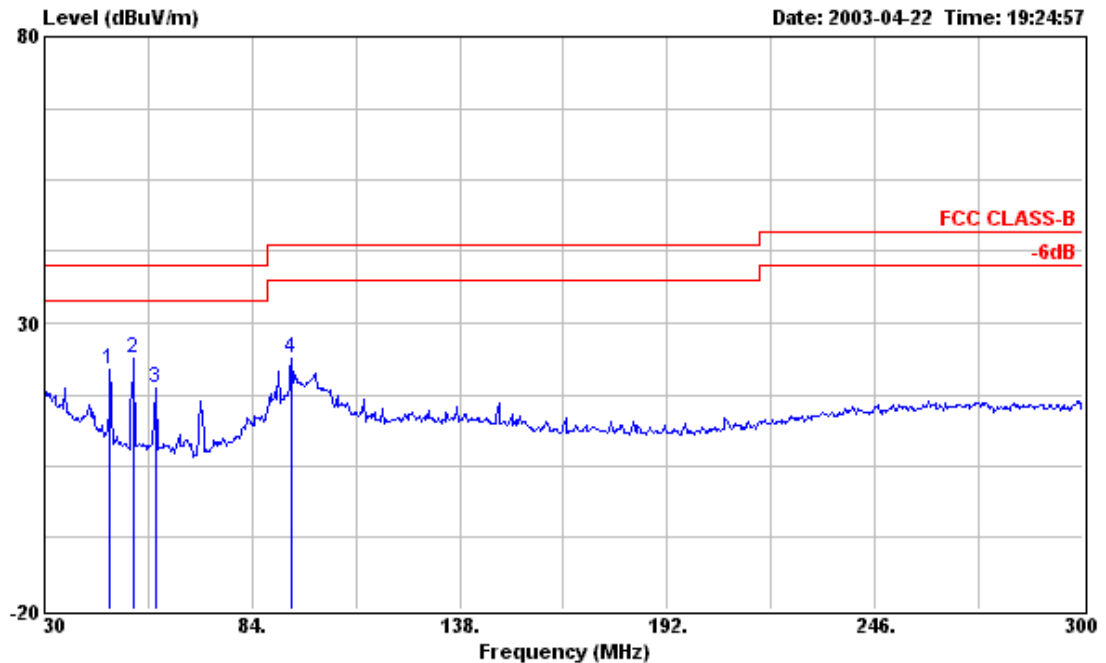
Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH04 2470MHz
 : F332802

	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	47.010	11.70	-28.30	40.00	29.80	7.74	1.26	27.10	Peak	---	---
2	53.220	12.88	-27.12	40.00	32.57	6.05	1.35	27.09	Peak	---	---
3	58.890	10.80	-29.20	40.00	31.14	5.31	1.43	27.08	Peak	---	---
4	101.820	15.46	-28.04	43.50	31.12	9.41	1.92	26.99	Peak	---	---



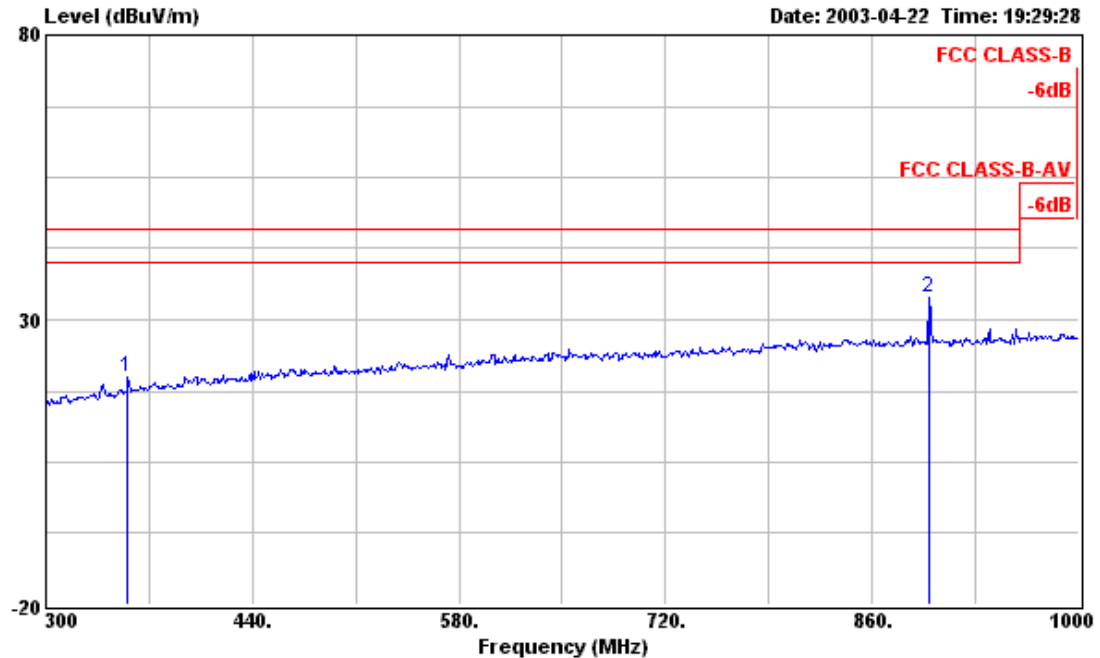
Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : 2.4G AV Sender (Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH04 2470MHz
 : F332802

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	321.700	18.69	-27.31	46.00	29.69	12.09	3.64	26.73	Peak	---	---
2	957.300	29.46	-16.54	46.00	30.37	19.61	7.11	27.63	Peak	---	---



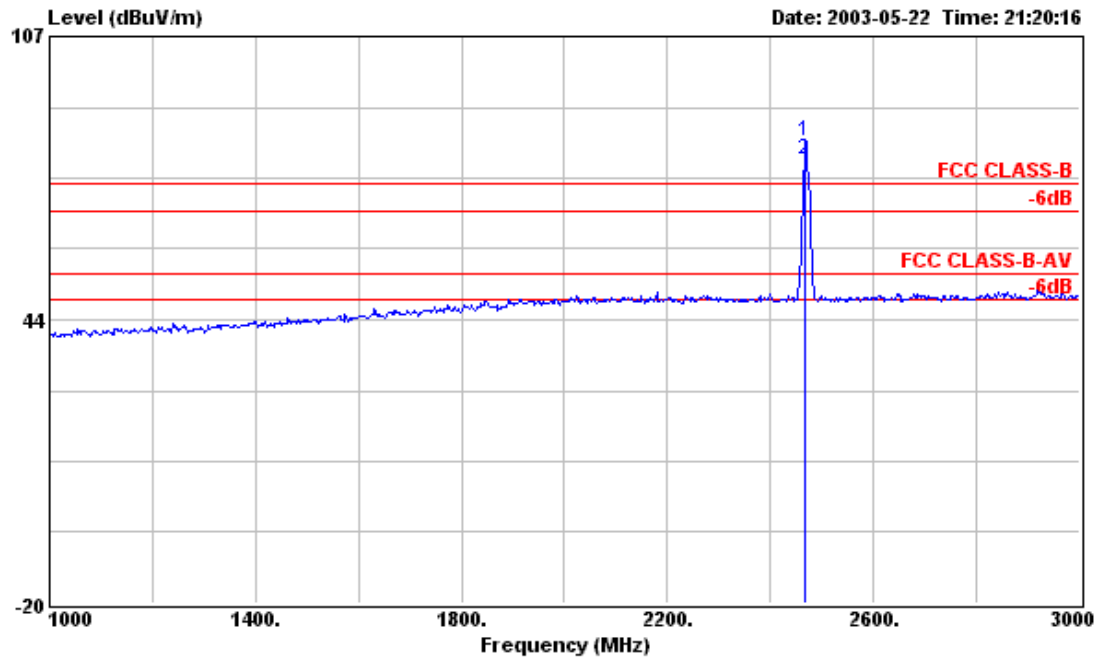
Site : 03CH03-HY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH04 2470MHz
 : F332802

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamplifier	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	47.010	21.81	-18.19	40.00	39.91	7.74	1.26	27.10	Peak	---	---
2	53.220	23.91	-16.09	40.00	43.60	6.05	1.35	27.09	Peak	---	---
3	58.890	18.79	-21.21	40.00	39.13	5.31	1.43	27.08	Peak	---	---
4	94.260	23.77	-19.73	43.50	39.89	9.04	1.85	27.01	Peak	---	---

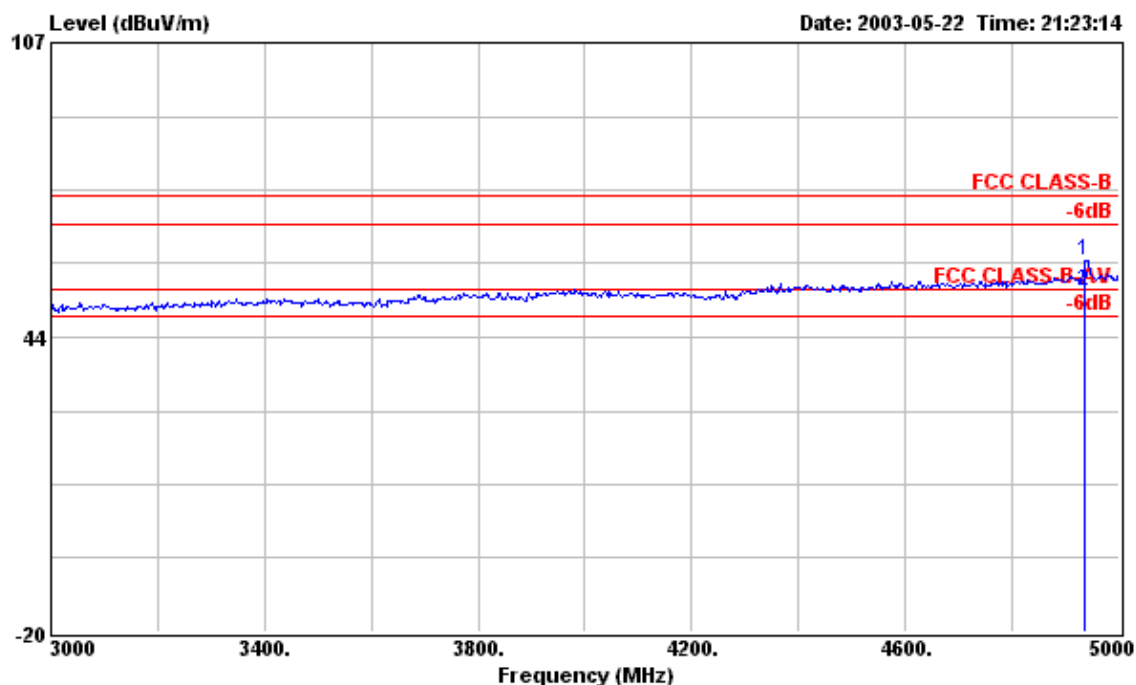


Site : 03CH03-HY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : 2.4G AV Sender(Antenna)
 Power : 110V/60Hz
 MODEL : CCD TX and RX
 MEMO : TX CH04 2470MHz
 : F332802

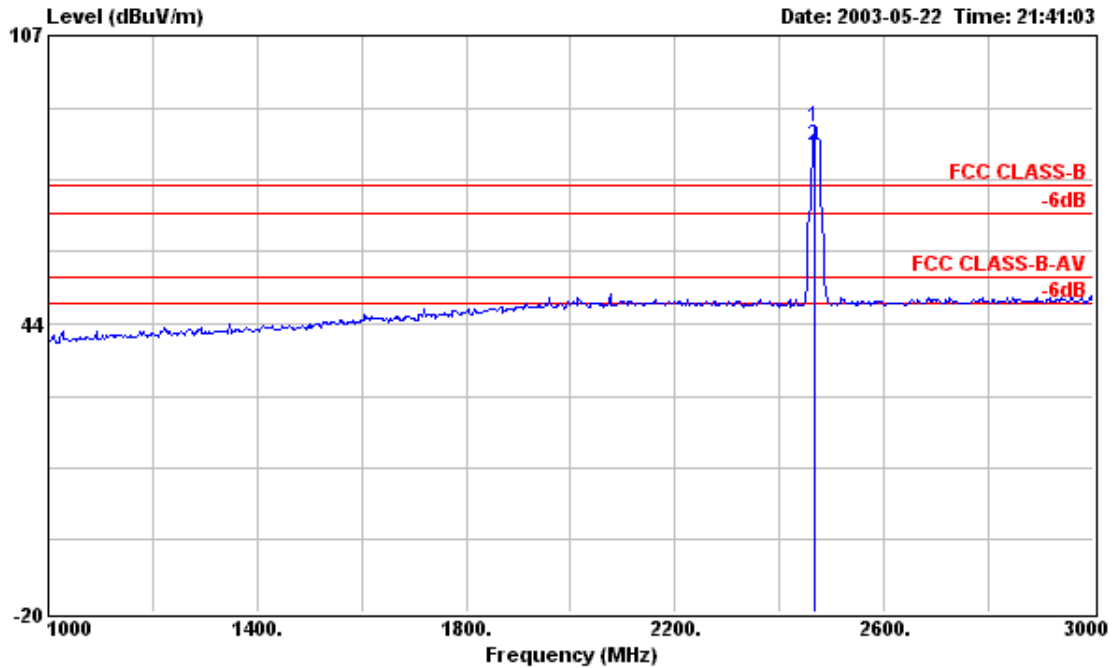
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	355.300	19.79	-26.21	46.00	29.61	13.17	3.94	26.93	Peak	---	---
2	898.500	33.91	-12.09	46.00	35.49	19.41	6.81	27.80	Peak	100	76



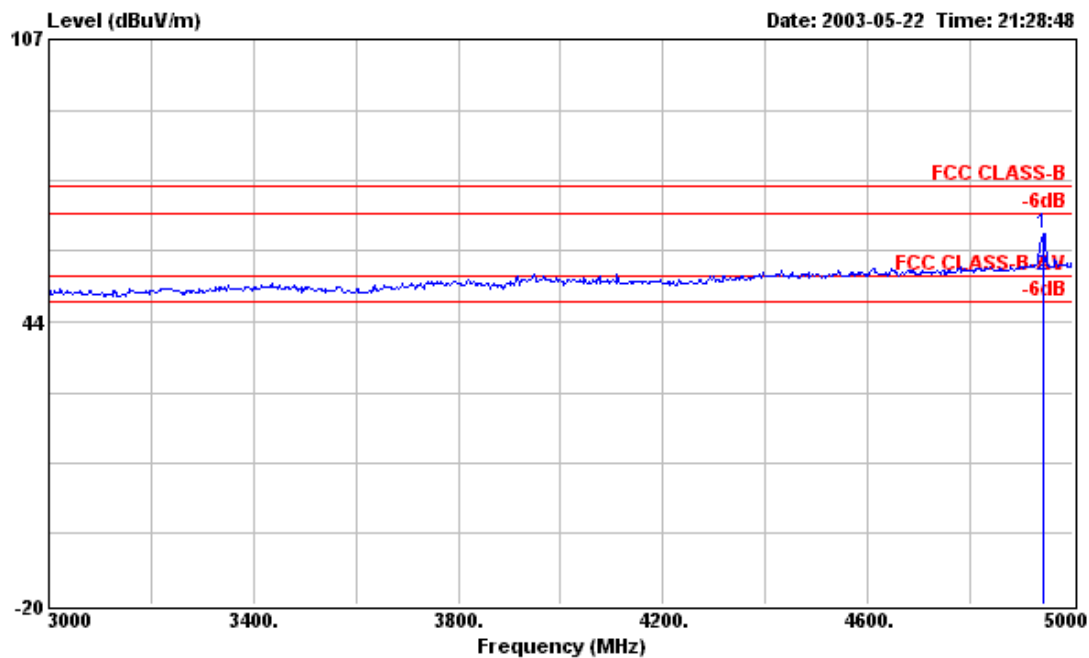
Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH04 2472MHz
: F332802



Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 HORIZONTAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH04 2472MHz
: F332802



Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH04 2472MHz
: F332802



Site : 03CH03-HY
Condition : 3m HORN-ANT-10094-0417 VERTICAL
EUT : 2.4G AV Sender(Antenna)
Power : 110V/60Hz
MODEL : CCD TX and RX
MEMO : TX CH04 2472MHz
: F332802

■ Field strength of fundamental and harmonics

Frequency	Antenna	Cable	Reading	Limits		Emission	Level	Margin	Detect	
	Polarity	Factor	Loss							
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2468.000	H	30.12	6.05	47.17	-	-	83.34	14689.26		Peak
2468.000	H	30.12	6.05	43.08	-	-	79.25	9172.76		A.V.
2468.000	V	30.12	6.05	50.65	-	-	86.82	21928.05		Peak
2468.000	V	30.12	6.05	46.50	-	-	82.67	13598.78		A.V.
4934.000	H	33.63	9.20	17.32	74.00	5011.87	60.15	1017.42	-13.85	Peak
4934.000	H	33.63	9.20	10.55	54.00	501.19	53.38	466.66	-0.62	A.V.
4942.000	V	33.65	9.21	20.59	74.00	5011.87	63.45	1487.65	-10.55	Peak
4942.000	V	33.65	9.21	10.76	54.00	501.19	53.62	479.73	-0.38	A.V.
7416.000	V/H						-			Peak, A.V.
9888.000	V/H						-			Peak, A.V.
12360.000	V/H						-			Peak, A.V.
14832.000	V/H						-			Peak, A.V.
17304.000	V/H						-			Peak, A.V.
19776.000	V/H						-			Peak, A.V.
22248.000	V/H						-			Peak, A.V.
24720.000	V/H						-			Peak, A.V.

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above

Test Engineer:

Jay

Jay Zhong

7. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	15.35	1.00	1000	24.30	3.89
35	13.63	1.08	2000	31.10	5.41
40	11.11	1.18	3000	29.60	6.92
45	10.59	1.24	4000	30.80	8.24
50	6.47	1.30	5000	34.20	9.22
55	5.83	1.38	6000	33.30	10.25
60	5.18	1.44	7000	37.80	11.61
65	4.81	1.52	8000	39.40	11.78
70	4.43	1.59	9000	38.40	12.59
75	5.10	1.68	10000	38.90	13.84
80	5.91	1.75	11000	41.10	14.64
85	7.33	1.77	12000	42.70	14.12
90	8.74	1.83	13000	43.90	16.01
95	9.05	1.85	14000	43.70	13.76
100	9.36	1.90	15000	43.40	14.30
110	9.65	2.01	16000	40.90	15.16
120	9.97	2.06	17000	44.40	15.88
130	10.51	2.16	18000	47.10	16.09
140	10.32	2.24	19000	37.60	16.98
150	9.42	2.34	20000	37.30	16.21
160	8.09	2.42	21000	37.00	20.13
170	7.43	2.56	22000	38.00	19.24
180	7.60	2.62	23000	38.70	19.64
190	7.43	2.67	24000	38.60	20.54
200	7.26	2.76	25000	38.90	20.14
220	9.11	2.92	14000	43.70	13.76
240	10.88	3.09	15000	43.40	14.30
260	11.75	3.23	16000	40.90	15.16
280	11.55	3.38	17000	44.40	15.88
300	11.36	3.51	18000	47.10	16.09
320	12.03	3.63	19000	37.60	16.98
340	12.69	3.73	20000	37.30	16.21
360	13.33	4.03	21000	37.00	20.13
380	14.00	4.00	22000	38.00	19.24
400	14.63	4.09	23000	38.70	19.64
450	15.33	4.31	24000	38.60	20.54
500	16.03	4.64	25000	38.90	20.14
550	16.65	5.09			
600	17.29	5.49			
650	17.64	5.82			
700	18.00	5.94			
750	18.39	6.16			
800	18.79	6.58			
850	19.10	6.72			
900	19.42	6.81			
950	19.58	7.10			
1000	19.75	7.41			

8. EMI Suppression Component List

1. To add copper foil on main board.
(As the Internal photo No.6)

9. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9 KHz – 2.75 GHz	Jun. 03, 2002	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001-008	9 KHz – 30 MHz	Apr. 29, 2003	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001-009	9 KHz – 30 MHz	Apr. 29, 2003	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450 Hz	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 ~ 60 Hz	N/A	Conduction (CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9KHz~30MHz	Jan. 07, 2003	Conduction (CO01-HY)
50 ohm BNC type Terminal	NOBLE	50ohm	TM009	50 ohm	Apr. 24, 2003	Conduction (CO01-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 22, 2002	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004/040	9KHz~40GHz	Aug. 07, 2002	Radiation (03CH03-HY)
Receiver	SCHAFFNER	SCR 3501	417	9 KHz –1GHz	Feb. 20, 2003	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Oct. 21, 2002	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2687	30MHz –2GHz	Dec. 21, 2002	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Jan. 02, 2003	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Aug. 12, 2002	Radiation (03CH03-HY)
Horn Antenna	COM-POWER	AH-118	10094	1GHz – 18GHz	Apr. 10, 2003	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)
Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170154	15GHz~40GHz	Apr. 03, 2003	Radiation (03CH03-HY)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Mar. 14, 2003	Radiation (03CH03-HY)

Calibration Interval of instruments listed above is one year.

10. Uncertainty of Test Site

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	3m
Antenna factor calibration	normal(k=2)	±1
cable loss calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
Antenna Directivity	rectangular	±3
Antenna Factor V.S. Height	rectangular	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25
site imperfection	rectangular	±2
Mismatch Receiver VSWR $\Gamma_1=0.09$ Antenna VSWR $\Gamma_2=0.67$ Uncertainty= $20\log(1-\Gamma_1\Gamma_2)$	U-shaped	±0.54
combined standard uncertainty $U_e(y)$	normal	±2.7
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±5.4

$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 0.5^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.2$ for 10m test distance

$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.7$ for 3m test distance

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
LISN coupling specification	rectangular	±1.5
Transducer factor frequency interpolation	rectangular	±0.2
Mismatch Receiver VSWR $\Gamma_1=0.09$ LISN VSWR $\Gamma_2=0.33$ Uncertainty= $20\log(1-\Gamma_1\Gamma_2)$	U-shaped	0.2
combined standard uncertainty $U_e(y)$	normal	±1.66
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±3.32

$U = \sqrt{\{(0.3/2)^2 + (2^2 + 1.5^2 + 0.2^2)/3 + (0.2)^2/2\}} = 1.66$