

FCC TEST REPORT

according to

47 CFR Part 15 Subpart B

Equipment : Bluetooth Dongle

Trade Name : MOTOROLA

Model No. : D200

FCC ID : OHH-D200

IC ID : 109O-D200

Filing Type : Declaration of Conformity

Applicant : **MOTOROLA INC.**
600 North US Highway 45, Libertyville, Illinois 60048, USA

- The test result refers exclusively to the test presented test model / sample.
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- Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.
- Report Version: Rev. 01.

SPORTON International Inc.

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

SPORTON International Inc.

TEL : 886-2-2696-2468

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Report Version: Rev. 01

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History of this test report

Report Issue Date: Jan. 23, 2007

Report No.	Description

CERTIFICATE OF COMPLIANCE

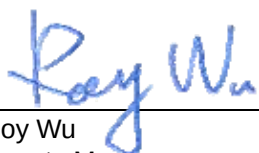
according to

47 CFR Part 15 Subpart B

Equipment : Bluetooth Dongle
Trade Name : MOTOROLA
Model No. : D200
FCC ID : OHH-D200
IC ID : 109O-D200
Filing Type : Declaration of Conformity
Applicant : MOTOROLA INC.
600 North US Highway 45, Libertyville, Illinois 60048, USA

I **HEREBY** CERTIFY THAT:

The measurements shown in this test report were made in accordance with the procedures given in ANSI C63.4 - 2003 and the energy emitted by this equipment was *passed* FCC Part 15 B in both radiated and conducted emission class B limits. Testing was carried out on Dec. 22, 2006 at SPORTON International Inc. LAB.



Roy Wu
Deputy Manager

SPORTON International Inc.

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

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FCC ID : OHH-D200

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Page No. : 1 of 30

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1. General Description of Equipment under Test

1.1 Applicant

MOTOROLA INC.

600 North US Highway 45, Libertyville, Illinois 60048, USA

1.2 Manufacturer

Cal-Comp Electronics & Communications Company Limited

191/54, 57, 18th FL., Rachadapisek Rd., Klongtoey, Bangkok, Thailand

1.3 Basic Description of Equipment under Test

Equipment	: Bluetooth Dongle
Trade Name	: MOTOROLA
Model No.	: D200
FCC ID	: OHH-D200
IC ID	: 109O-D200
Power Supply Type	: DC source 3.7V
DC Power Cable	: DC 3.7V, 0.1 m, 2 pin

1.4 Feature of Equipment under Test

Product Feature & Specification	
1. DUT Type :	Bluetooth Dongle
2. Trade Name :	MOTOROLA
3. Model No. :	D200
4. FCC ID :	OHH-D200
5. IC ID :	109O-D200
6. Type of Modulation :	GFSK
7. HW Version	BT-1947-03
8. SW Version	RC2.4
9. Tx Frequency :	2400-2483.5 MHz
10. Rx Frequency :	2400-2483.5 MHz
11. Number of Channels :	79
12. Carrier Frequency of Each Channel :	$2402+n*1$ MHz; $n=0\sim78$
13. Maximum Output Power to Antenna :	8.15 dBm
14. Type of Antenna Connector :	N/A
15. Antenna Type :	PIFA Antenna
16. Antenna Gain :	3 dBi
17. Duty Stage	Production Unit

2. Test Configuration of Equipment under Test

2.1 Test Manner

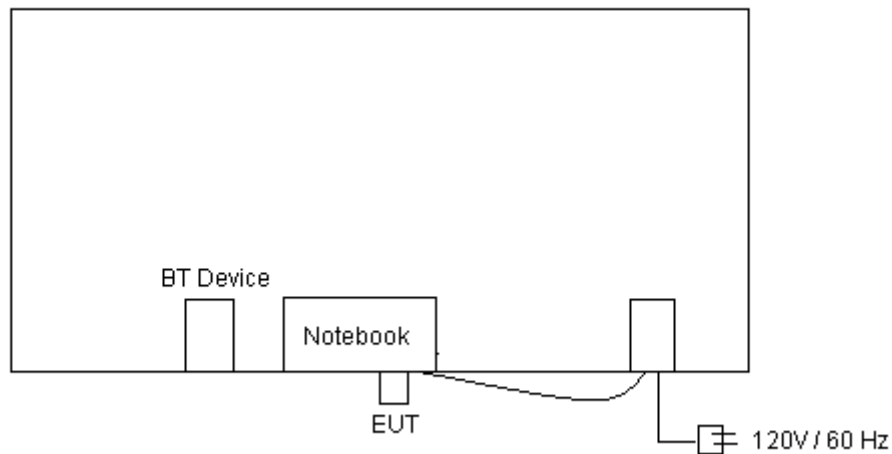
- a. The EUT has been setup pursuant to ANSI C63.4-2003 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.
- b. The complete test system refers to 2.2 for EMI test.
- c. The following test mode were tested for conduction:
Mode 1: BT Rx Mode
- d. The following test mode were tested for radiation test:
Mode 1: BT Rx Mode
- e. Frequency range investigated: conduction 150 kHz to 30 MHz, radiation 30 MHz to 13 GHz.

2.2 Description of Test System

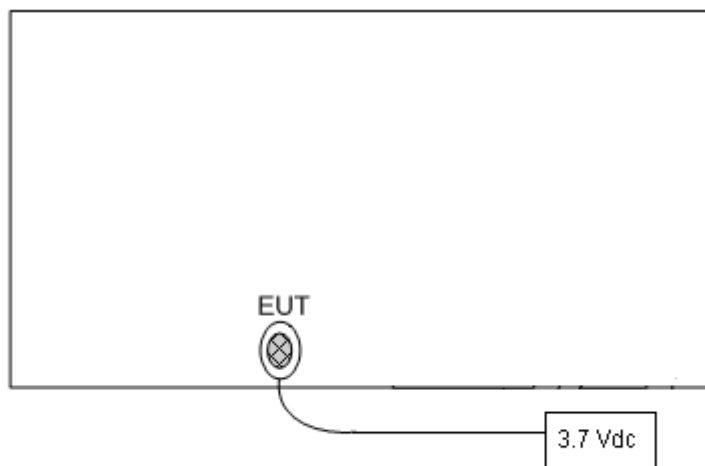
Item	Asset	Trade Name	Model Name	Power Cord
1.	NOTE BOOK	DELL	D400	N/A
2.	DC Power Supply	GW	GPC-60300	3.7V
3.	BT Device	Sony	K750	N/A

2.3 Connection Diagram of Test System

<Conducted Emission>



<Radiated Emission>



3. Test Software

The executive program, EMCTEST.EXE under WIN XP installed in notebook, which generates a complete line of continuously repeating "H" pattern were used as the test software.

Programmed RF utility installed in notebook provides function for continuous receiving signal.

4. General Information of Test

4.1 Test Facility

Test Site Location : 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. : CO01-HY, 03CH06-HY

4.2 Test Voltage

AC 120V/60Hz

4.3 Standard for Methods of Measurement

ANSI C63.4-2003

4.4 Test in Compliance with

FCC Part 15 Subpart B

4.5 Frequency Range Investigated

- a. Conduction: from 150 kHz to 30 MHz
- b. Radiation: from 30 MHz to 13000MHz

4.6 Test Distance

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

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 C63.4-2003 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.

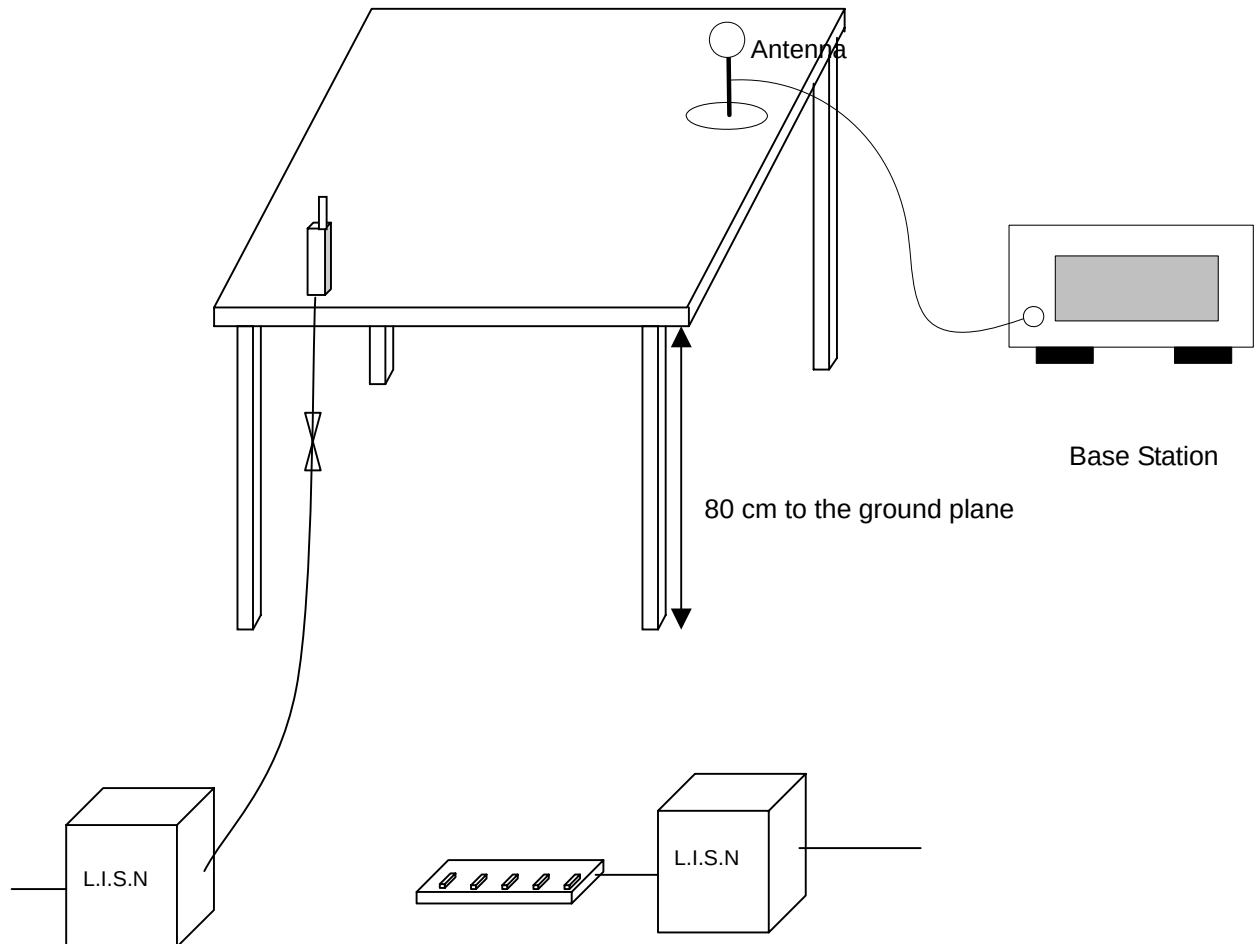
5.1 Major Measuring Instruments

As described in Chapter 7.

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

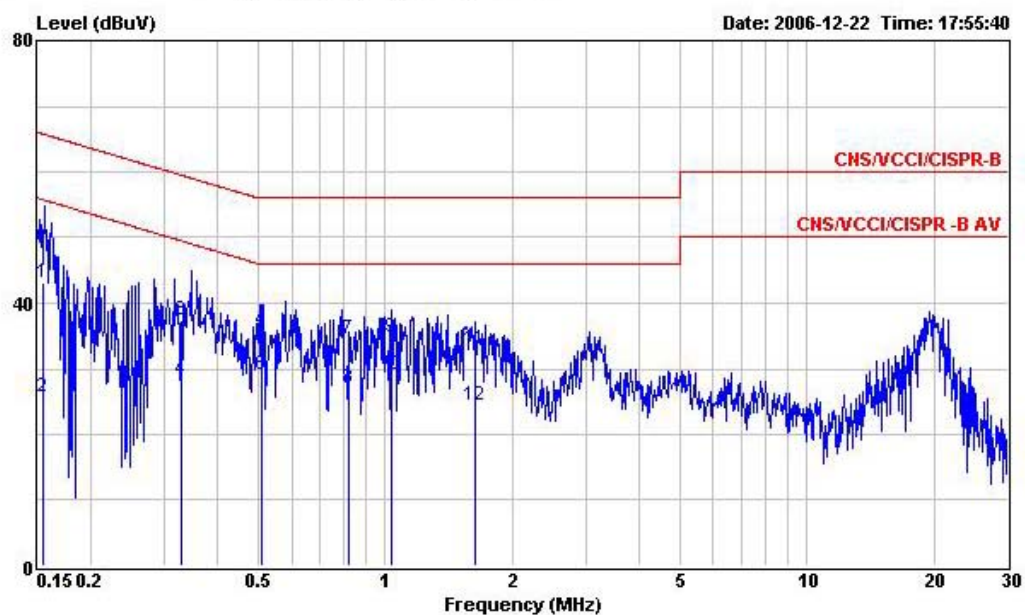


5.4 Test Result of AC Powerline Conducted Emission

5.4.1 Test Mode: Mode 1

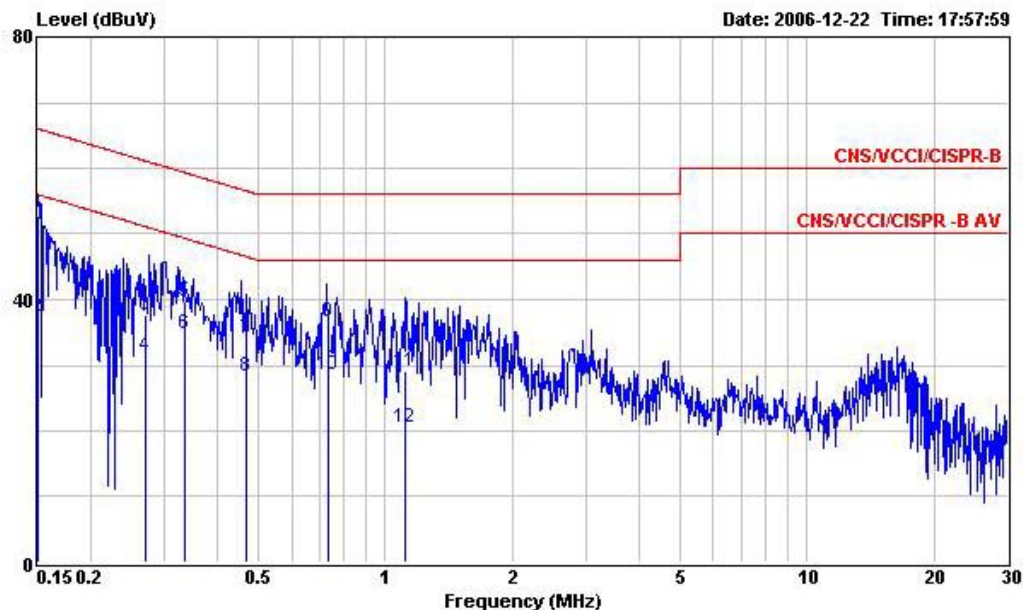
- Frequency Range of Test: from 0.15 MHz to 30 MHz
- Temperature: 25°C
- Relative Humidity: 60%
- Test Engineer: James
- All emissions not reported here are more than 10 dB below the prescribed limit.

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



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2001/004 200604 LINE
EUT : Bluetooth Dongle (Class I)
Power : 120V/60Hz
Model : FD6D1421
Memo : BT Rx
Memo :
Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.155	43.19	-22.55	65.74	43.04	0.10	0.05	QP
2	0.155	25.75	-29.99	55.74	25.60	0.10	0.05	Average
3	0.329	37.46	-22.00	59.46	37.31	0.10	0.05	QP
4	0.329	28.25	-21.21	49.46	28.10	0.10	0.05	Average
5	0.511	35.24	-20.76	56.00	35.07	0.10	0.07	QP
6	0.511	29.01	-16.99	46.00	28.84	0.10	0.07	Average
7	0.821	34.51	-21.49	56.00	34.32	0.10	0.09	QP
8	0.821	27.03	-18.97	46.00	26.84	0.10	0.09	Average
9	1.031	34.87	-21.13	56.00	34.67	0.10	0.10	QP
10	1.031	29.07	-16.93	46.00	28.87	0.10	0.10	Average
11	1.630	32.96	-23.04	56.00	32.77	0.10	0.09	QP
12	1.630	24.43	-21.57	46.00	24.24	0.10	0.09	Average



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2001/004 200604 NEUTRAL
EUT : Bluetooth Dongle (Class I)
Power : 120V/60Hz
Model : FD6D1421
Memo : BT Rx
Memo :
Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	52.79	-13.21	66.00	52.64	0.10	0.05	QP
2	0.150	37.40	-18.60	56.00	37.25	0.10	0.05	Average
3	0.271	37.78	-23.31	61.09	37.63	0.10	0.05	QP
4	0.271	31.39	-19.70	51.09	31.24	0.10	0.05	Average
5	0.336	39.86	-19.45	59.31	39.71	0.10	0.05	QP
6	0.336	34.69	-14.62	49.31	34.54	0.10	0.05	Average
7	0.468	34.07	-22.48	56.55	33.90	0.10	0.07	QP
8	0.468	28.40	-18.15	46.55	28.23	0.10	0.07	Average
9	0.735	36.61	-19.39	56.00	36.42	0.10	0.09	QP
10	0.735	28.49	-17.51	46.00	28.30	0.10	0.09	Average
11	1.116	29.02	-26.98	56.00	28.82	0.10	0.10	QP
12	1.116	20.40	-25.60	46.00	20.20	0.10	0.10	Average

5.5 Photographs of Conducted Powerline Test Configuration

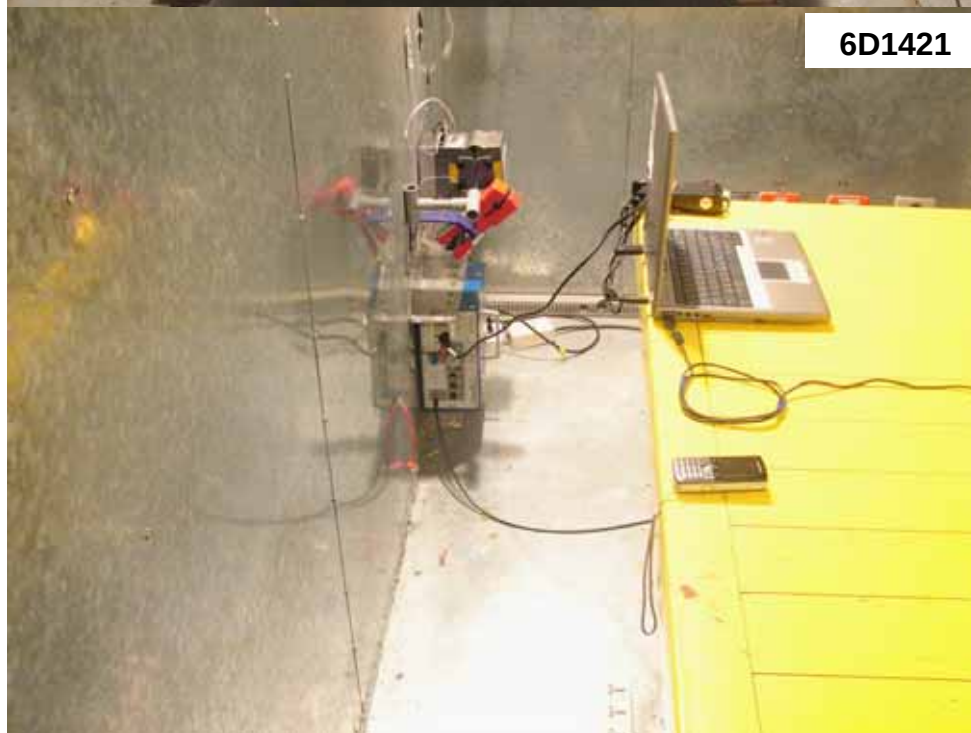
Mode 1

Front View



6D1421

Rear View



6D1421

6D1421

Side View



6. Test of Radiated Emission

Radiated emissions from 30 MHz to 13 GHz were measured with a bandwidth of 120 kHz and 1MHz according to the methods defines in ANSI C63.4-2003. The EUT was placed on a nonmetallic stand, 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.

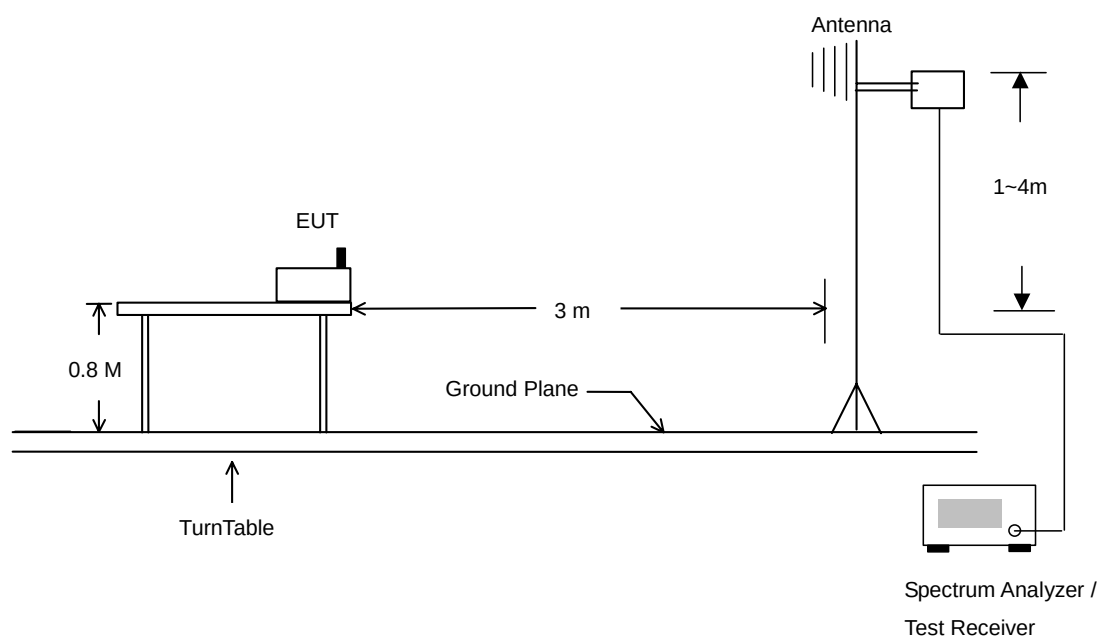
6.1 Major Measuring Instruments

As described in Chapter 7.

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 Bi-Log antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both for horizontal polarization and vertical polarization of the antenna.
- 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 turntable (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 will be repeated one by one using the quasi-peak method and reported.

6.3 Typical Test Setup Layout of Radiated Emission

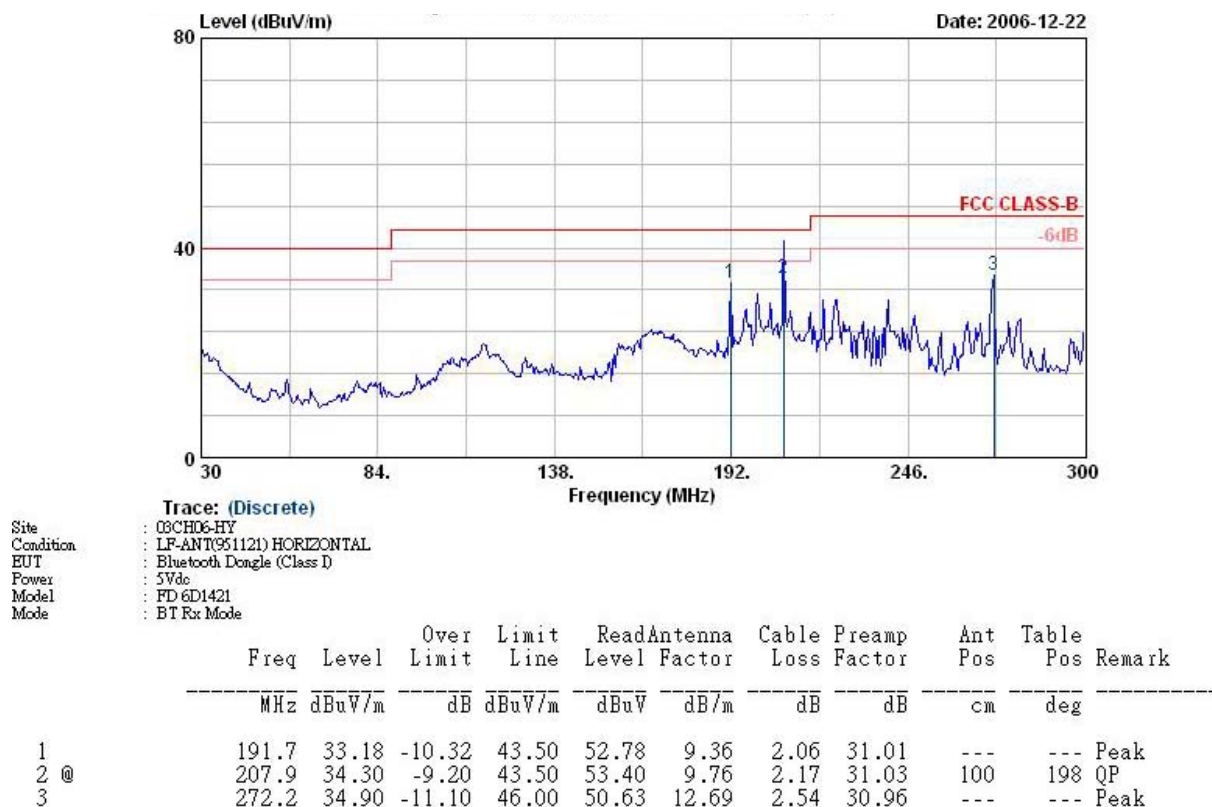


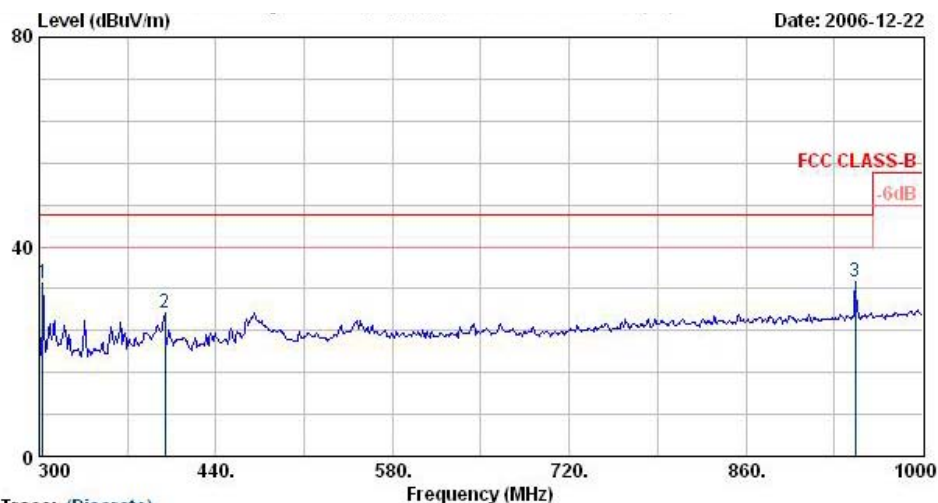
6.4 Test Result of Radiated Emission

6.4.1 Test Mode: Mode 1

- Test Distance: 3m
- Temperature: 26°C
- Relative Humidity: 52%
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Test Engineer: Andrew
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

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

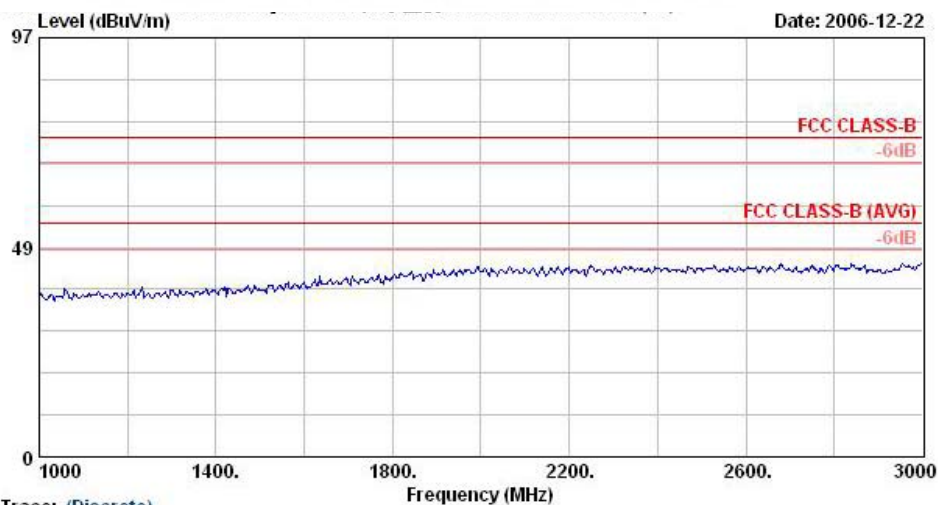




Trace: (Discrete)

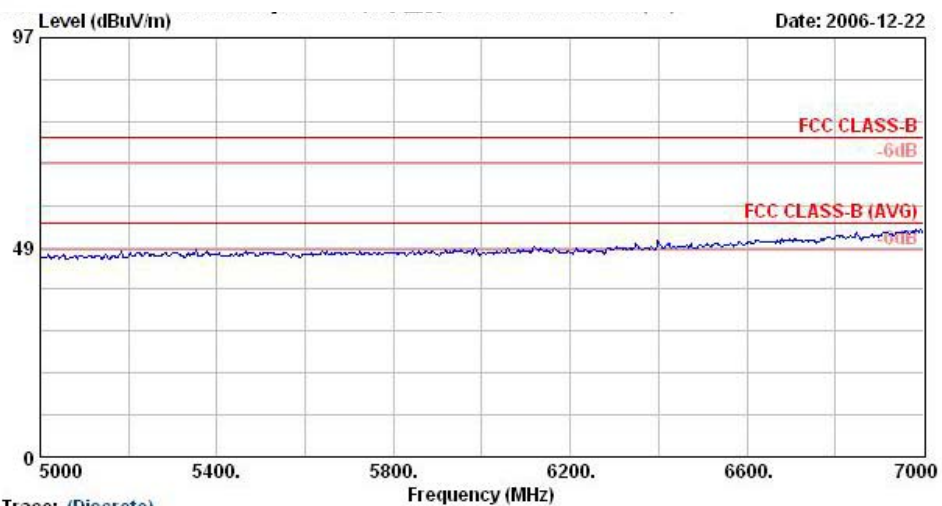
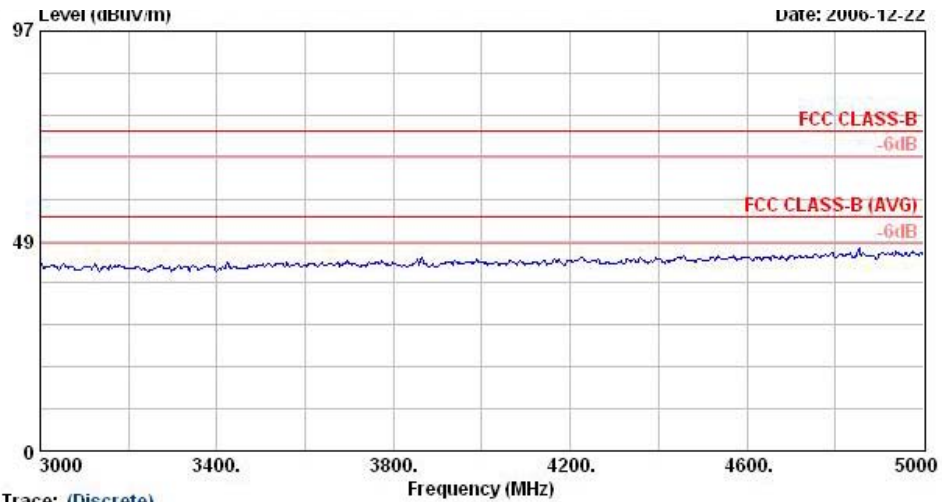
Site : 03CH06-HY
Condition : LF-ANT(951121) HORIZONTAL
EUT : Bluetooth Dongle (Class D)
Power : 5Vdc
Model : FD 6D1421
Mode : BT Rxt Mode

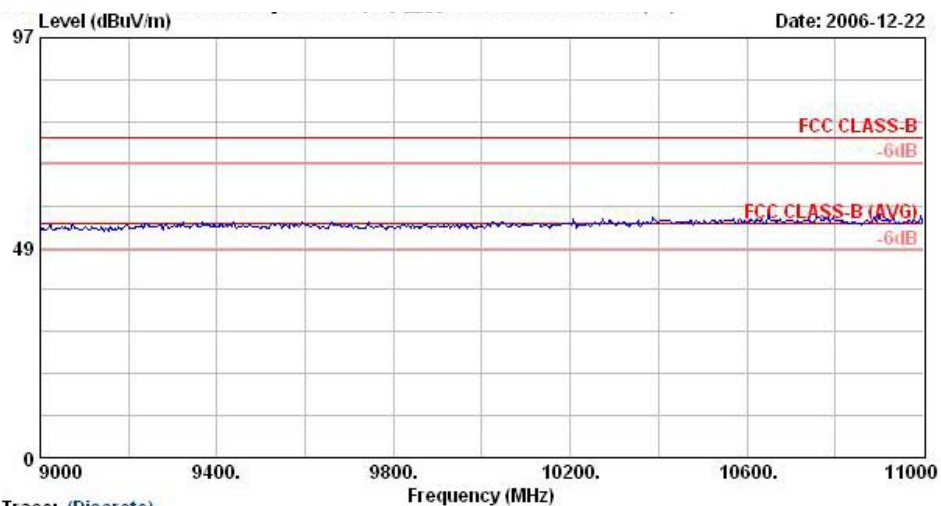
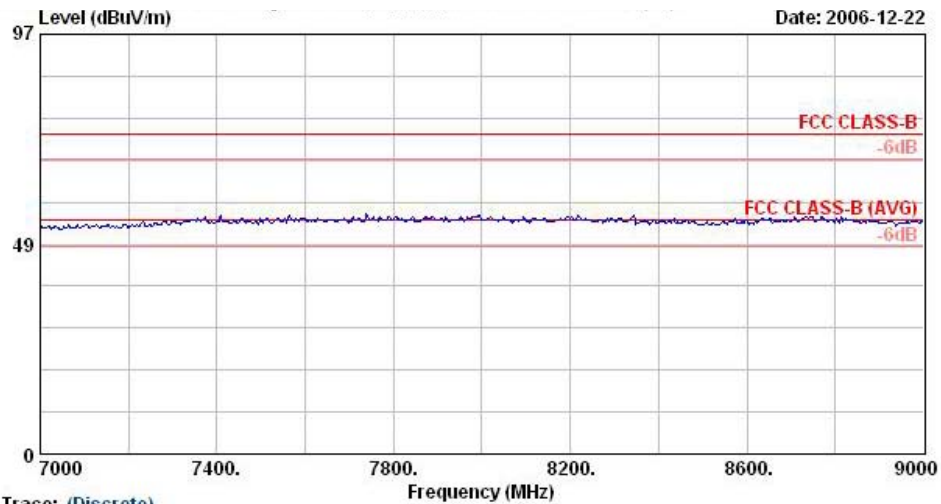
: B1 for mode											
	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	Ant	Table		
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	Remark
1	302.8	32.89	-13.11	46.00	47.89	13.28	2.65	30.93	---	---	Peak
2	399.4	27.31	-18.69	46.00	39.32	15.76	3.09	30.86	---	---	Peak
3	946.8	33.33	-12.67	46.00	37.80	20.86	4.95	30.29	---	---	Peak

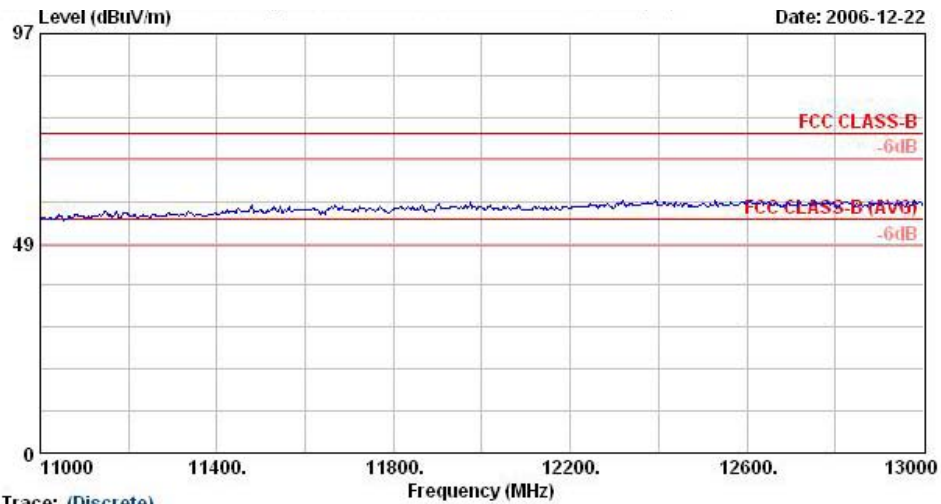


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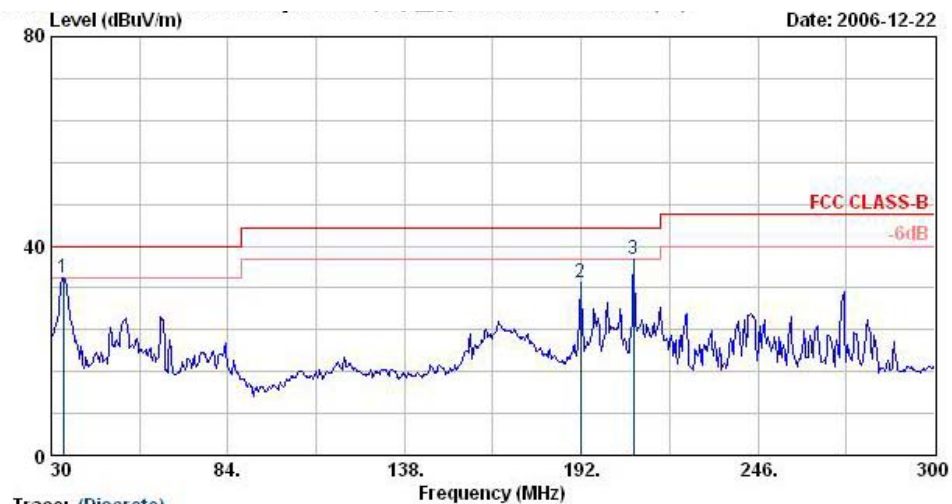
Site : 03CH06-HY
Condition : HF-ANT-060410 HORIZONTAL
EUT : Bluetooth Dongle (Class D)
Power : 5Vdc
Model : FD 6D1421
Mode : BT Rxt Mode





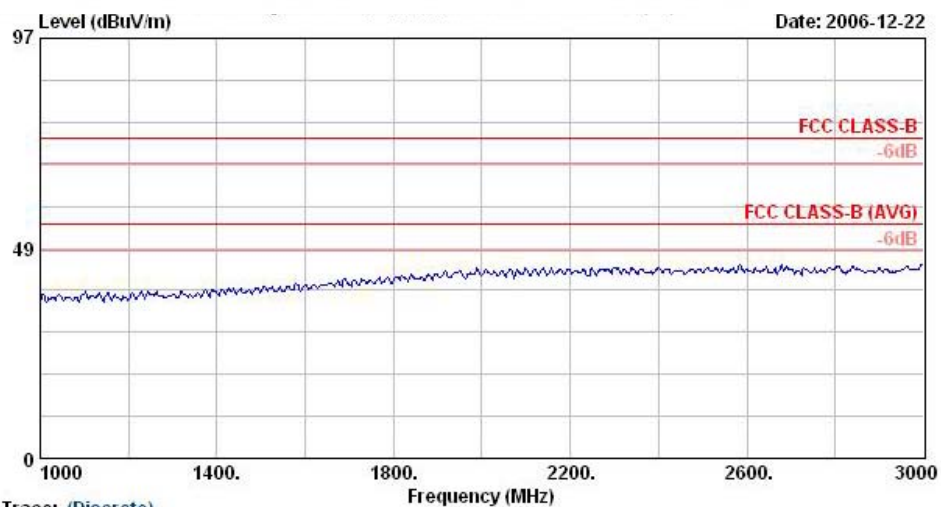
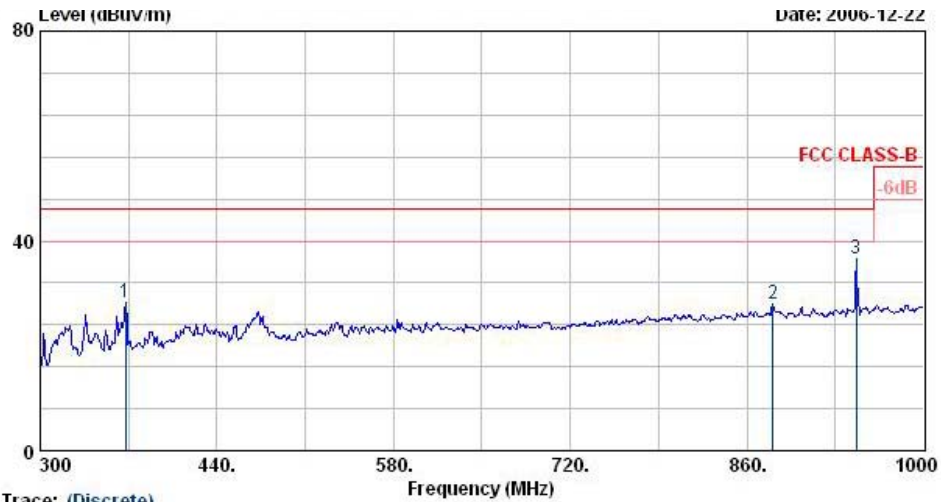


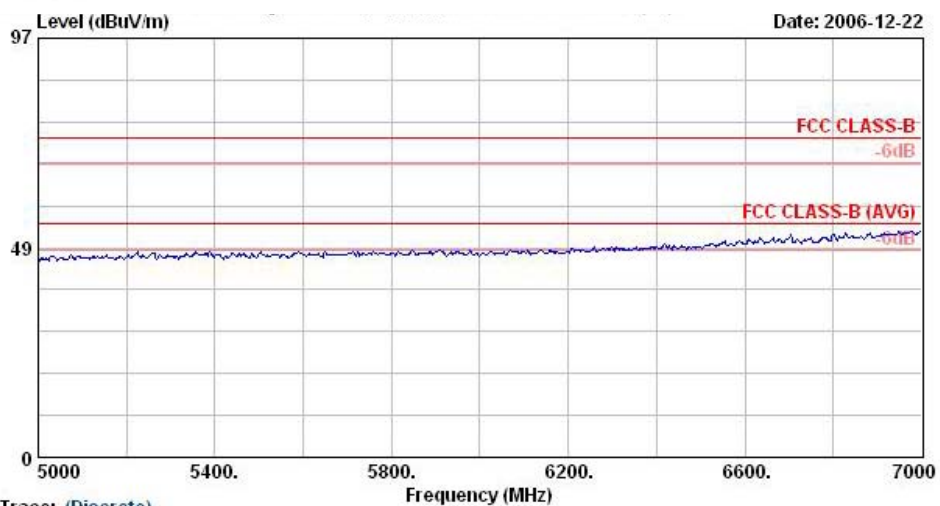
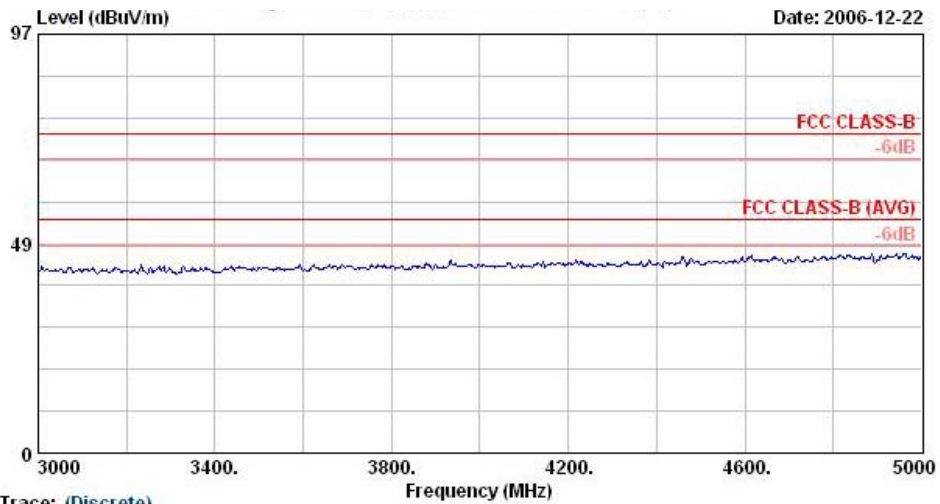
Trace: (Discrete)
 Site : 03CH06-HY
 Condition : HF-ANT-060410 HORIZONTAL
 EUT : Bluetooth Dongle (Class D)
 Power : 5Vdc
 Model : FD 6D1421
 Mode : BT Rx Mode

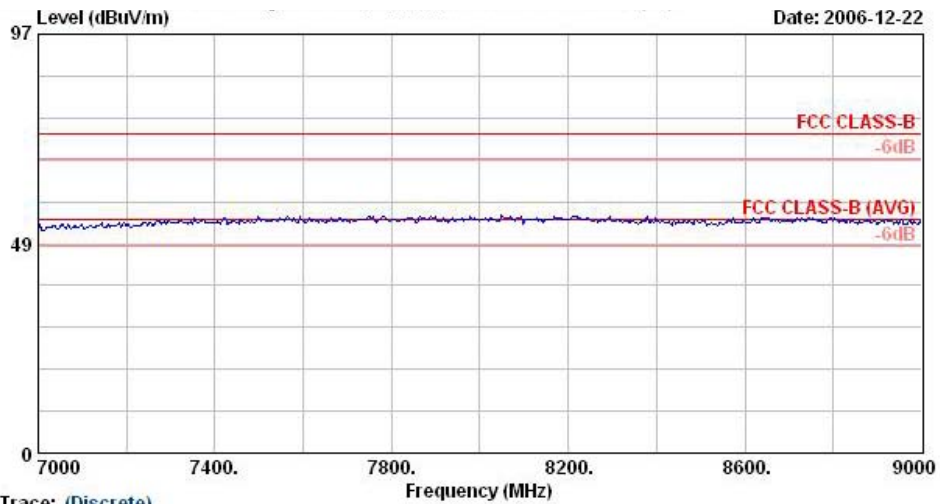


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : LF-ANT(951121) VERTICAL
 EUT : Bluetooth Dongle (Class D)
 Power : 5Vdc
 Model : FD 6D1421
 Mode : BT Rx Mode

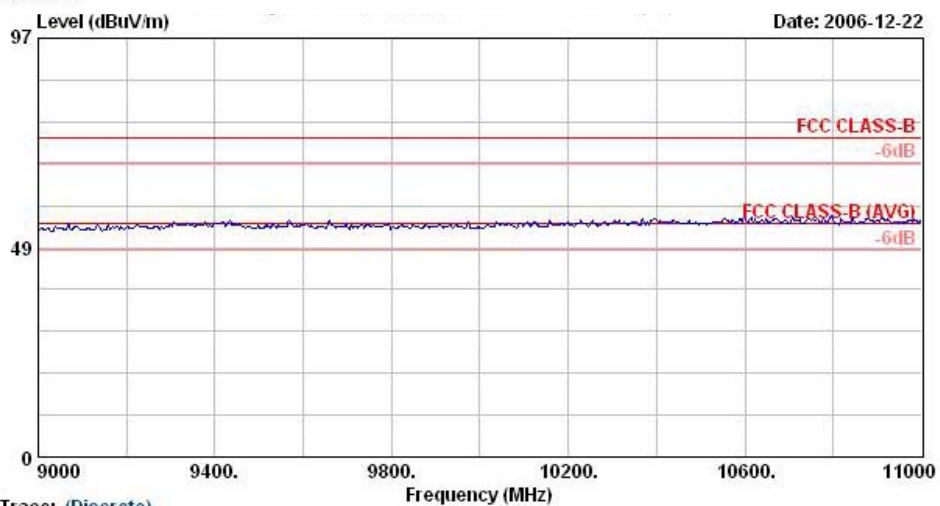
	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 @	33.8	33.97	-6.03	40.00	47.58	16.84	0.87	31.32	---	---
2	191.7	32.98	-10.52	43.50	52.58	9.36	2.06	31.01	---	---
3 @	207.9	37.59	-5.91	43.50	56.68	9.76	2.17	31.03	100	225



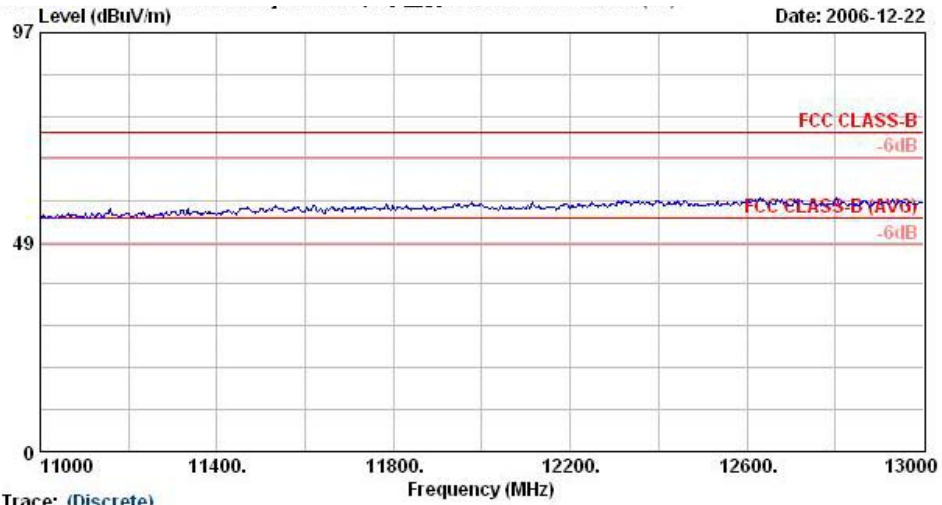




Trace: (Discrete)
 Site : 08CH06-HY
 Condition : HF-ANT-060410 VERTICAL
 EUT : Bluetooth Dongle (Class I)
 Power : 5Vdc
 Model : FD 6D1421
 Mode : BT Rx Mode



Trace: (Discrete)
 Site : 08CH06-HY
 Condition : HF-ANT-060410 VERTICAL
 EUT : Bluetooth Dongle (Class I)
 Power : 5Vdc
 Model : FD 6D1421
 Mode : BT Rx Mode

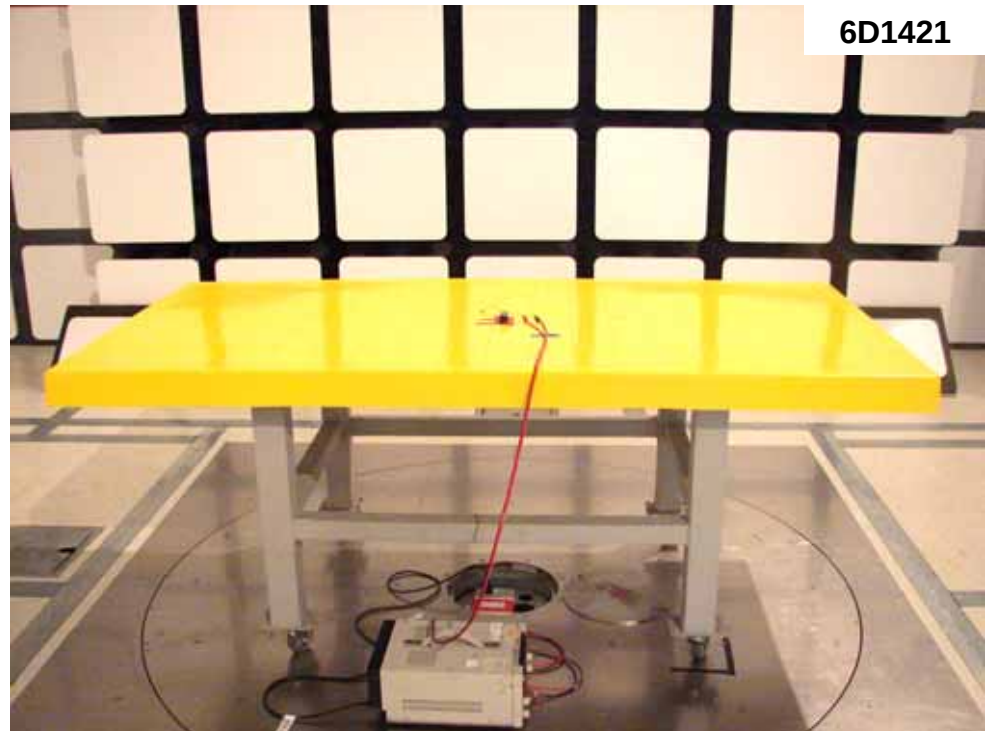


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : HF-ANT-060410 VERTICAL
 EUT : Bluetooth Dongle (Class I)
 Power : 5Vdc
 Model : FD6D1421
 Mode : BT Rx Mode

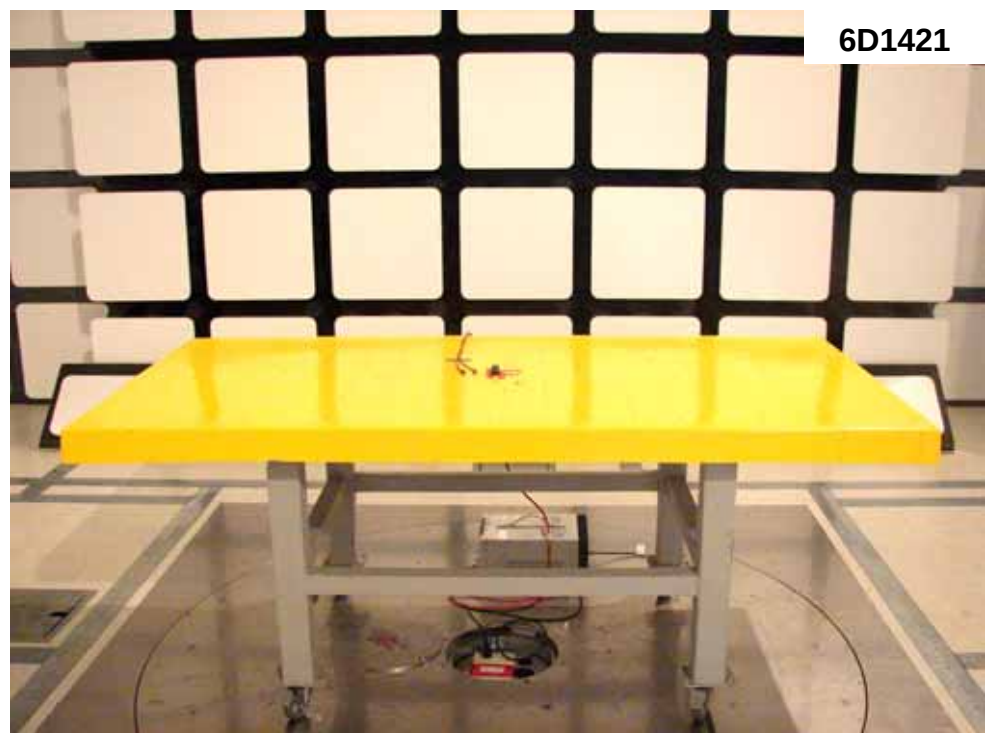
6.5 Photographs of Radiated Emission Test Configuration

Mode 1

FRONT VIEW



REAR VIEW



7. List of Measuring Equipment Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Feb. 22, 2006	Feb. 22, 2007	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Apr. 28, 2006	Apr. 28, 2007	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz – 30MHz	Apr. 19, 2006	Apr. 19, 2007	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450Hz	N/A	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 – 60Hz	N/A	N/A	Conduction (CO01-HY)
Spectrum analyzer	Agilent	E4408B	MY44211030	9KHz-26.5GHz	Jul. 25, 2006	Jul. 24, 2007	Radiation (03CH06-HY)
Receiver	R&S	ESCS30	100356	9KHz-2.75GHz	Jun. 28, 2006	Jun. 27, 2007	Radiation (03CH06-HY)
Controller	CT	SC100	N/A	N/A	N/A	N/A	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Nov. 20, 2006	Nov. 19, 2007	Radiation (03CH06-HY)
Horn Antenna	Com-Power	AH118	071025	1G-18G	Feb. 1, 2005	Feb. 1, 2007	Radiation (03CH06-HY)
SHF-EHF Horn	SCHWARZBECK	BBHA 9170	9170-249	14G - 40G	Jul. 21, 2006	Jul. 20, 2007	Radiation (03CH06-HY)
Amplifier	MITEQ	AMF-6F	997165	26G - 40G	Jul. 21, 2006	Jul. 20, 2007	Radiation (03CH06-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	N/A	Radiation (03CH06-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	N/A	Radiation (03CH06-HY)

8. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.10	Normal(k=2)	0.05
Cable loss	0.10	Normal(k=2)	0.05
AMN insertion loss	2.50	Rectangular	0.63
Receiver Spec	1.50	Rectangular	0.43
Site imperfection	1.39	Rectangular	0.80
Mismatch	+0.34/-0.35	U-shape	0.24
combined standard uncertainty Uc(y)	1.13		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	2.26		

Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

Contribution	Uncertainty of x_i		$u(x_i)$
	dB	Probability Distribution	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch	+0.39/-0.41	U-shaped	0.28
combined standard uncertainty Uc(y)	1.27		
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)	2.54		

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	± 0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	± 1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	± 0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20 \log(1 - \Gamma_1 * \Gamma_2 * \Gamma_3)$	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty $U_c(y)$	2.36				
Measuring uncertainty for a level of confidence of 95% $U = 2U_c(y)$	4.72				

9. Certificate of NVLAP Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP[®]

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200079-0

Sporton International, Inc. Hwa Ya EMC Laboratory
Tao Yuan Hsien 333
TAIWAN

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communiqué dated 18 June 2005).*

2007-01-01 through 2007-12-31
Effective dates



Sally A. Bruce
For the National Institute of Standards and Technology

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