

FCC PART 15.249
MEASUREMENT AND TEST REPORT
FOR
SHANGHAI MULTAK TECHNOLOGY CO., LTD.

4/F, No.71, 1066 North Qin Zhou Road, Shanghai, China

FCC ID: URRMD-1001

Report Concerns: Original Report	Equipment Type: Wireless MIDI Transceiver
Model:	<u>WIDI-X8</u>
Report No.:	<u>STR061080027I</u>
Test/Witness Engineer:	<u>Innaz Lee</u>
Test Date:	<u>2006-11-11</u>
Prepared By:	Shenzhen SEM.Test Compliance Service Co., Ltd Room 609-610, Baotong Building, Baomin 1 st Road, Baoan District, Shenzhen, Guangdong, P.R.C. (518133)
Approved & Authorized By:	 _____ PSQ Manager / Jandy So

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Shanghai Multak Technology Co., LTD.
Address of applicant: 4/F, No.71, 1066 North Qin Zhou Road, Shanghai, China

Manufacturer: Shanghai Multak Technology Co., LTD.
Address of manufacturer: 4/F, No.71, 1066 North Qin Zhou Road, Shanghai, China

General Description of E.U.T

Items	Description
EUT Description:	Wireless MIDI Transceiver
Trade Name:	CME
Model No.:	WIDI-X8
Rated Voltage:	DC 5V
Output Power:	<10 dBm
Frequency Range:	2401-2464 MHz
No. of Channel:	64
Antenna Type:	Integral Antenna
Size:	9.3X6.2X2.8 cm
For more information refer to the circuit diagram form and the user's manual.	

The test data gathered are from a production sample, provided by the manufacturer.

1.2 Test Standards

The following report of is prepared on behalf of Shanghai Multak Technology Co., LTD. in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted with Low Channel, Middle Channel and High Channel, accordingly in reference to the Operating Instructions.

1.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

United States of American Federal Communications Commission (**FCC**), and the registration number is **274801**(semi anechoic chamber).

Voluntary Control Council for Interference by Information Technology Equipment (**VCCI**), and the registration number is **R-1966** (semi anechoic chamber).

Industry Canada (**IC**), and the registration number is **IC4174**.

All measurement required was performed at laboratory of Shenzhen Academy of Metrology and Quality Inspection, Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China.

1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components. The test software, is started while the whole system is on.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
TPI	DC Adaptor	TPCA-050050U	0516

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Cord/Without Cord
MIDI Cable	0.5	Shielded	Without Cord
DC Power Cable	1.2	Shielded	With Cord

2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.207	Conducted Emission	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.209	Radiated Emission	Compliant
§15.249(a)	Field Strength	Compliant
§15.249(d)	Out of Band Emission	Compliant

3. §15.203 - ANTENNA REQUIREMENT

3.1 Standard Applicable

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Test Result

This product has a permanent antenna, fulfill the requirement of this section.

4. §15.207 (a)- CONDUCTED EMISSION

4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 4.0 dB.

4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	830245/009	2006-1-26	2007-1-25
AMN	Rohde & Schwarz	ESH2-Z5	100002	2006-1-26	2007-1-25
Limiter	Rohde & Schwarz	ESH3-Z2	357.8810.52	2006-1-26	2007-1-25
AMN	Rohde & Schwarz	ESH3-Z5	828304/014	2006-1-26	2007-1-25

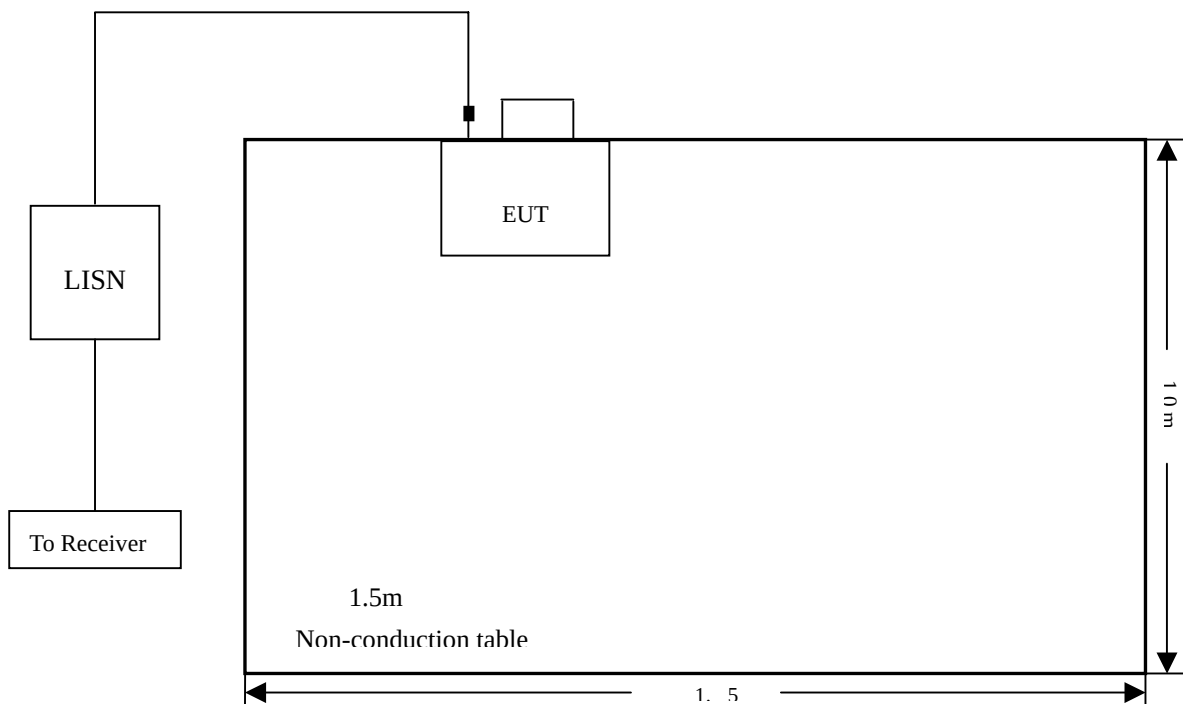
Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

4.3 Test Procedure

The setup of EUT is according with ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

4.4 Basic Test Setup Block Diagram



4.5 Environmental Conditions

Temperature:	26° C
Relative Humidity:	52%
ATM Pressure:	1018 mbar

4.6 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 150 kHz
 Stop Frequency..... 30 MHz
 Sweep Speed Auto
 IF Bandwidth..... 10 kHz
 Quasi-Peak Adapter Bandwidth 9 kHz
 Quasi-Peak Adapter Mode Normal

4.7 Summary of Test Results/Plots

According to the data in section 4.8, the EUT complied with the FCC 15.207 Conducted margin for a the device, with the *worst* case reading of:

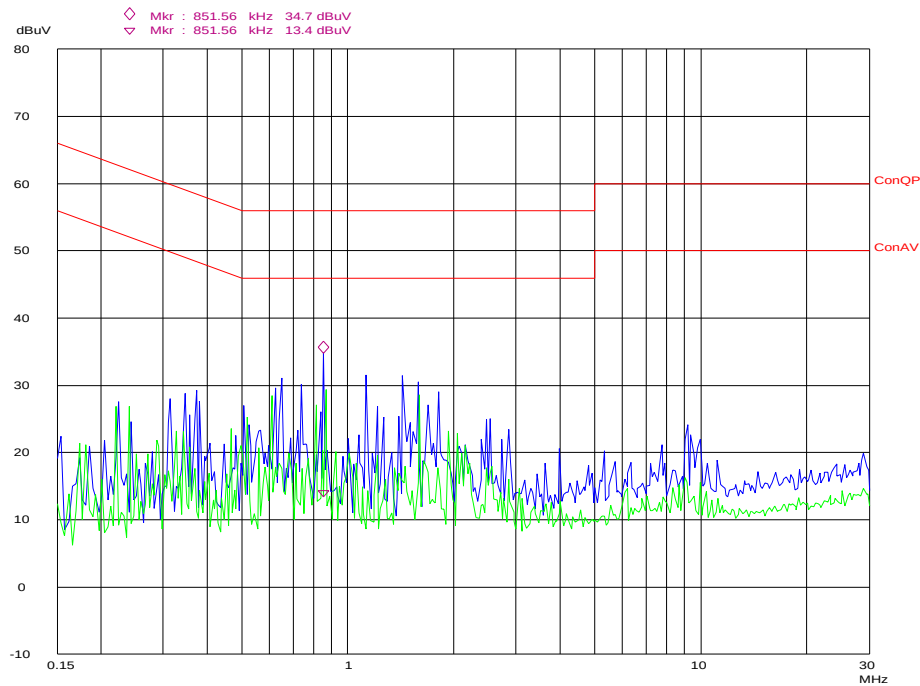
-14.5 dB μ V at 1.59 MHz in the Middle Channel Transmitting, Line mode, 0.15-30MHz

4.8 Conducted Emissions Test Data

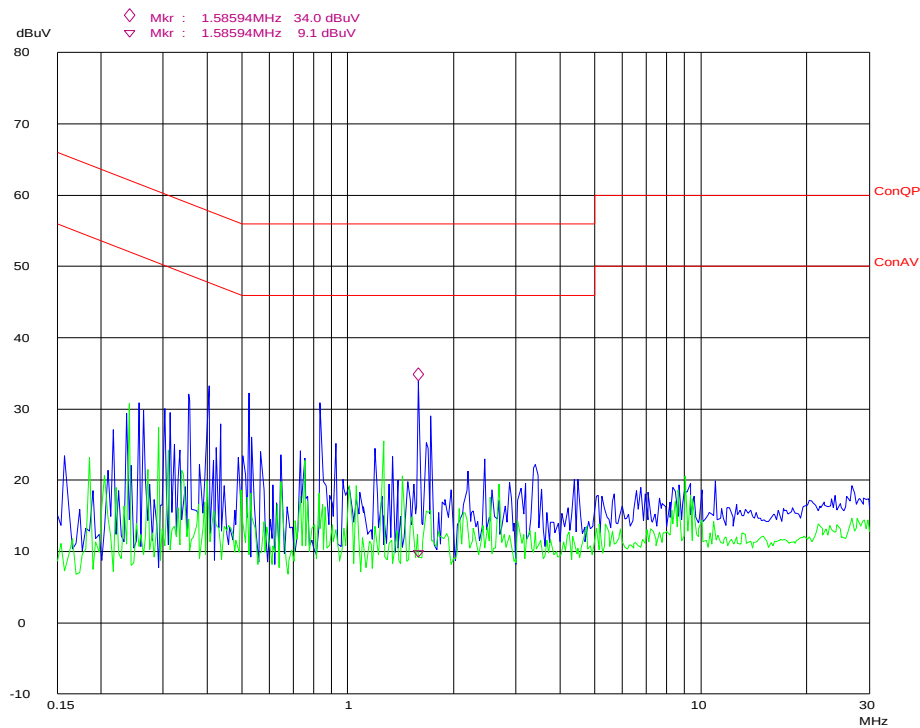
LINE CONDUCTED EMISSIONS				FCC 15.207	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB μ V	QP/Ave/Pk	Line/Neutral	dB μ V	dB
1.59	31.5	AV	Line	46	-14.5
0.85	29.3	AV	Neutral	46	-16.7
1.62	28.1	AV	Neutral	46	-17.9
0.40	29.1	AV	Line	47.85	-18.8
0.85	25.6	AV	Line	46	-20.4
0.50	25.5	AV	Neutral	46	-20.5
0.85	34.7	Pk	Neutral	56	-21.3
1.59	34.0	Pk	Line	56	-22.0
0.85	31.7	Pk	Line	56	-24.3
1.62	31.4	Pk	Neutral	56	-24.6
0.40	33.2	Pk	Line	57.85	-24.7
0.50	27.8	Pk	Neutral	56	-28.2

Plot of Conducted Emissions Test Data

Plot of Neutral:



Plot of Line:



5. §15.205, §15.209, §15.249 (a)- RADIATED EMISSION

5.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 4.0 dB.

5.2 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of fundamental (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

According to §15.205 and §15.209 the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

FIELD STRENGTH of Fundamental:	FIELD STRENGTH of Harmonics:	Section 15.209:
902-928MHz		30 - 88 MHz 40 dBuV/m @3M
2.4-2.4835GHz	127.37dBuV/m @3m	88 -216 MHz 43.5 dBuV/m @3M
127.38dBuV/m @3m	54 dBuV/m @3m	216 -960 MHz 46 dBuV/m @3M
		Above 960 MHz 54dBuV/m @3M

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209,WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Rohde & Schwarz	EMI Test Receiver	ES126	830245/009	2006-1-26	2007-1-25
ETS	Multi_Device Controller	2090	57230	2006-1-26	2007-1-25
ETS	Receiver Antenna	2175	57337	2006-1-26	2007-1-25
ETS	50 ohm Coaxial Cable	SUCOFLEX 104	25498514	2006-1-26	2007-1-25
Rohde & Schwarz	Horn Antenna	HF906	100014	2006-1-26	2007-1-25

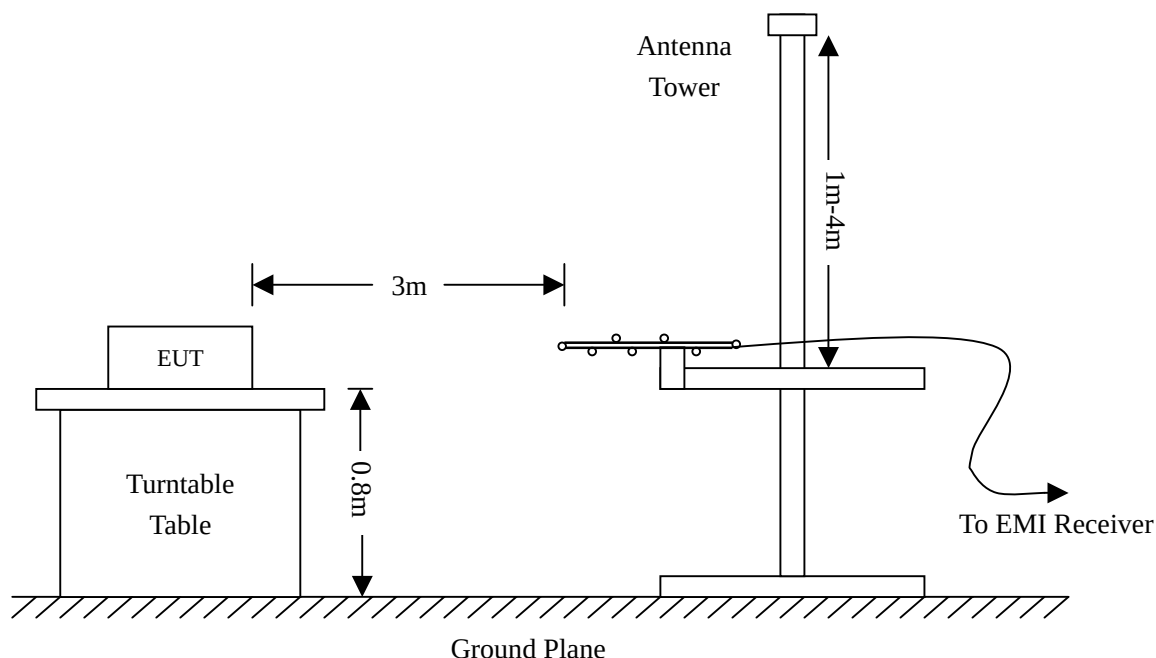
Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



5.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

5.6 Environmental Conditions

Temperature:	26° C
Relative Humidity:	52%
ATM Pressure:	1022 mbar

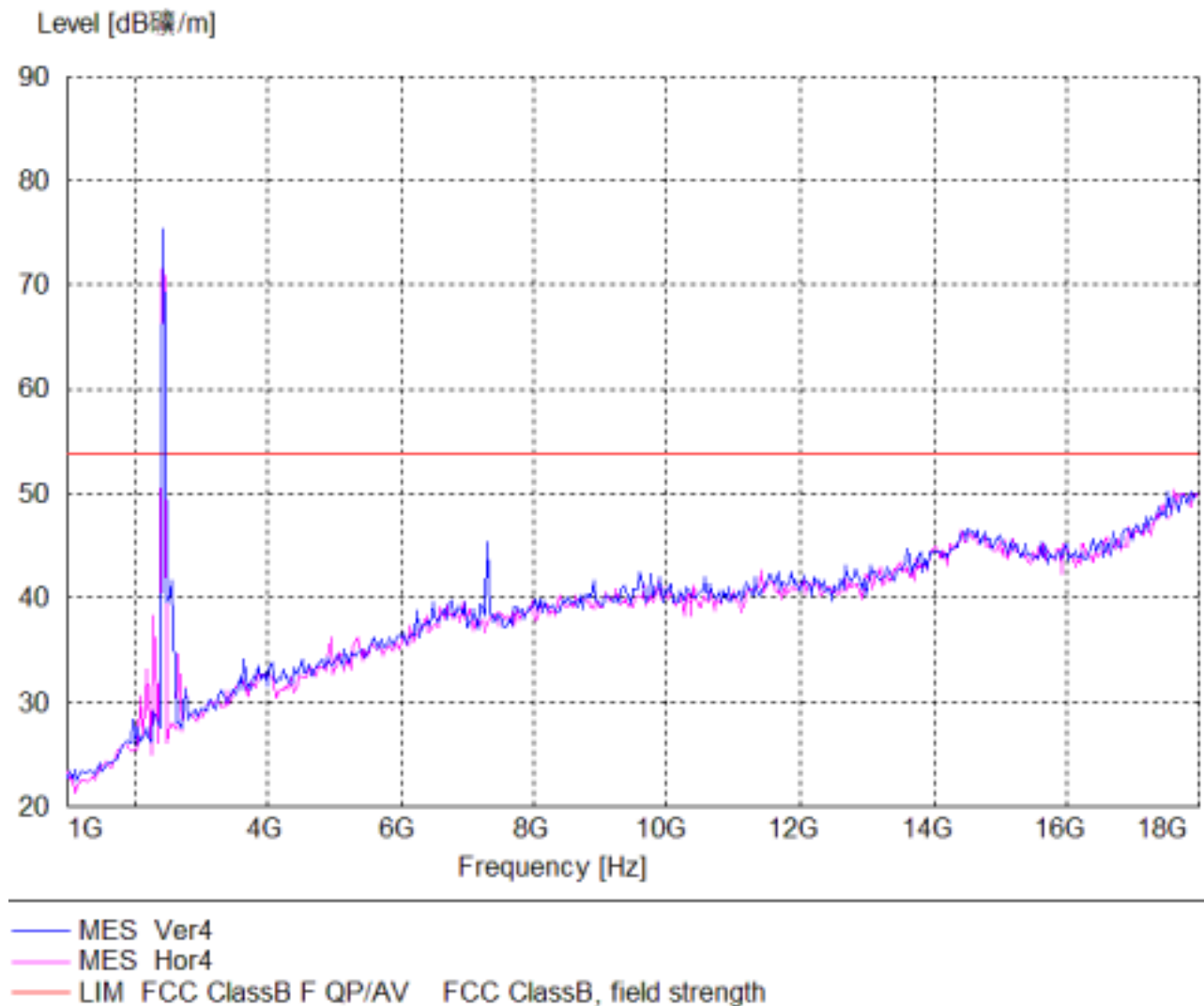
5.7 Summary of Test Results/Plots

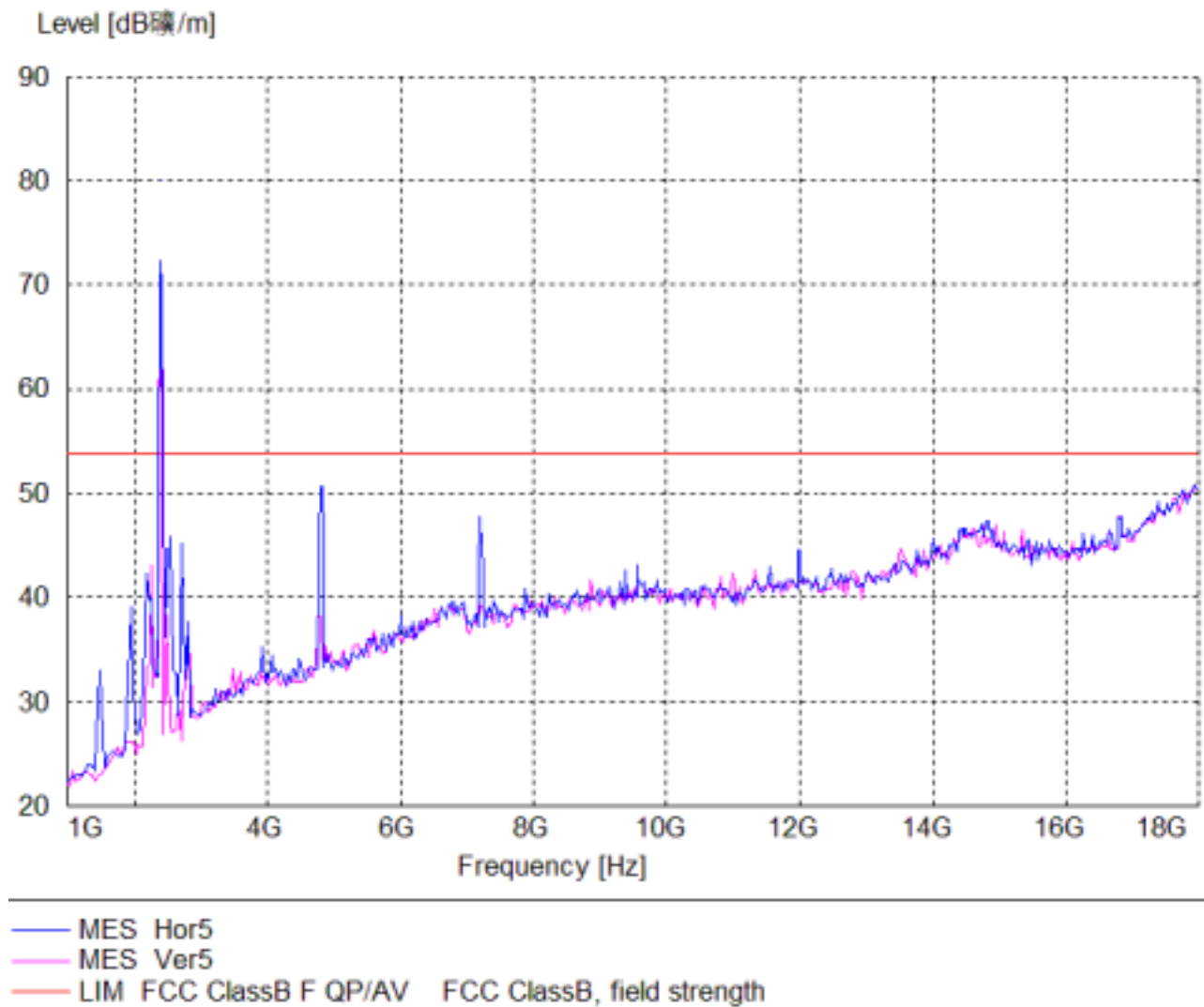
According to the data below, the FCC Part 15.205, 15.209 and 15.249 standards, and had the worst margin of:

-2.80 dB μ V at 4864.00 MHz in the Horizontal polarization, 30 MHz to 25 GHz, 3Meters

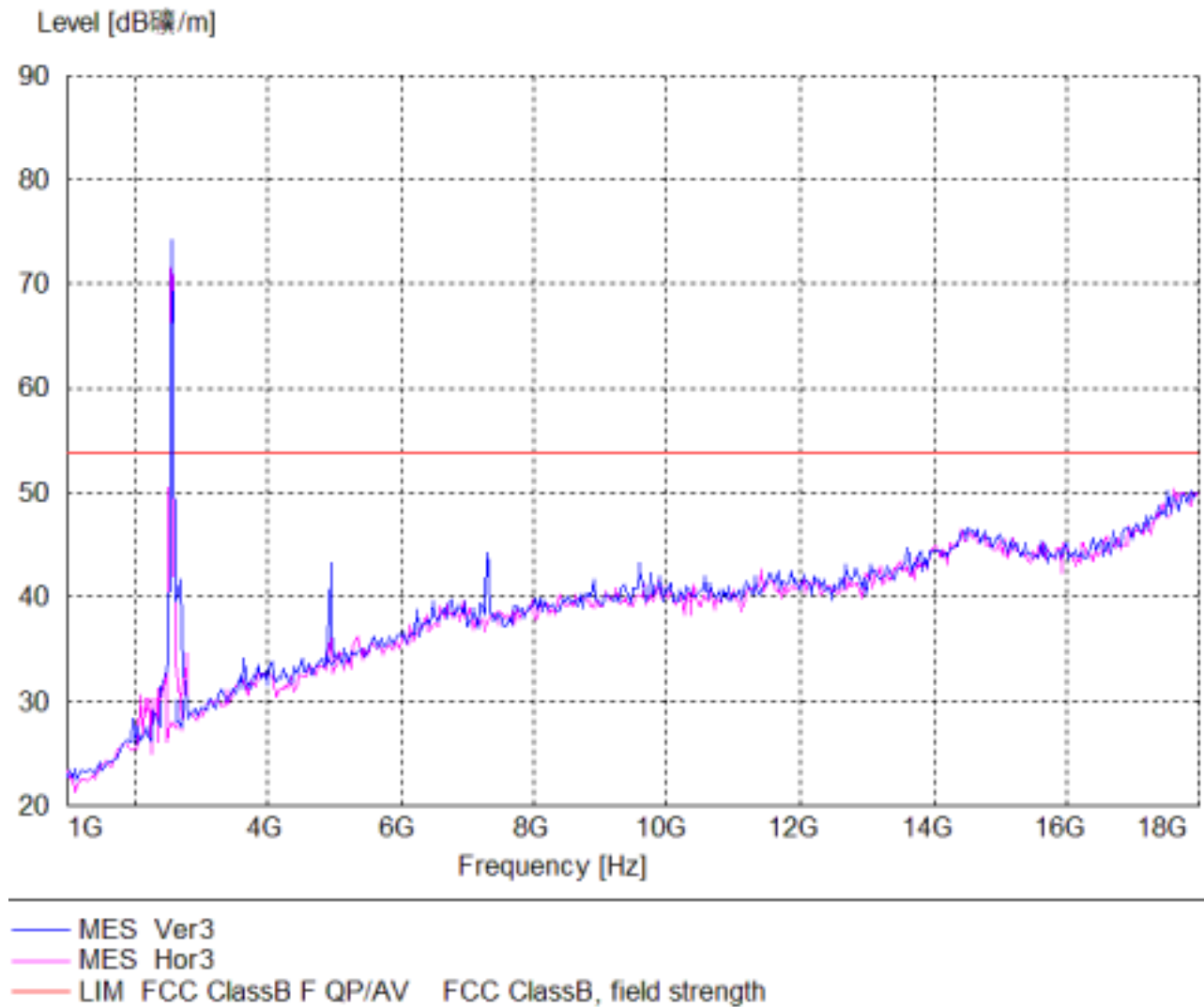
Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier Gain	Corr. Ampl.	FCC Part 15.249 & 15.209	
MHz	dBuV	PK/QP/AV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB
Transmitting Low CH (2401MHz)											
7203.0	36.4	AV	180	1.2	V	37.4	6.1	33.5	46.4	54	-7.6
7203.0	28.2	AV	45	1.0	H	37.4	6.1	33.5	38.2	54	-15.8
4802.0	30.5	AV	180	1.2	H	34.1	5.2	33	36.8	54	-17.2
2401.0	77.4	AV	60	1.0	V	29.1	3.7	34	76.2	94	-17.8
4802.0	28.8	AV	45	1.2	V	34.1	5.2	33	35.1	54	-18.9
2401.0	75.8	AV	45	1.0	H	29.1	3.7	34	74.6	94	-19.4
Transmitting Middle CH (2432MHz)											
4864.0	44.9	AV	60	1.0	H	34.1	5.2	33	51.2	54	-2.8
7296.0	38.4	AV	270	1.2	H	37.4	6.1	33.5	48.4	54	-5.6
7296.0	29.7	AV	45	1.2	V	37.4	6.1	33.5	39.7	54	-14.3
4864.0	32.1	AV	90	1.2	V	34.1	5.2	33	38.4	54	-15.6
2432.0	74.5	AV	45	1.2	H	29.1	3.7	34	73.3	94	-20.7
2432.0	65.7	AV	45	1.0	V	29.1	3.7	34	64.5	94	-29.5
Transmitting High CH (2464MHz)											
7392.0	34.7	AV	270	1.0	V	37.4	6.2	33.5	44.8	54	-9.2
4928.0	37.6	AV	60	1.2	V	34.1	5.2	33	43.9	54	-10.1
4928.0	29.9	AV	45	1.2	H	34.1	5.2	33	36.2	54	-17.8
2464.0	76.1	AV	45	1.0	V	29.1	3.8	34	75.0	94	-19.0
7392.0	24.7	AV	180	1.2	H	37.4	6.2	33.5	34.8	54	-19.2
2464.0	73.6	AV	60	1.0	H	29.1	3.8	34	72.5	94	-21.5
Receiving Mode											
144.0	37.5	QP	45	1.0	H	13.8	1.1	25.58	26.8	43.5	-16.7
192.2	37.2	QP	45	1.0	H	11.8	1.3	25.23	25.1	43.5	-18.4
288.3	33.1	QP	60	1.0	H	13.8	1.5	24.58	23.8	46	-22.2
168.2	31.8	QP	180	1.2	H	12.5	1.2	25.45	20.0	43.5	-23.5
120.1	30.5	QP	180	1.2	V	14.0	1.1	25.64	20.0	43.5	-23.5
420.0	29.0	QP	60	1.2	V	16.8	2.1	25.42	22.5	46	-23.5
168.2	31.0	QP	45	1.2	V	12.5	1.2	25.45	19.2	43.5	-24.3
144.0	29.8	QP	45	1.0	V	13.8	1.1	25.58	19.1	43.5	-24.4

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

Plot of Radiation Emissions Test*Radiated Disturbance**EUT: Wireless MIDI Transceiver M/N: WIDI-X8**Operating Condition: Transmitting (Low Channel)**Test Site: SMQ EMC Lab.SAC**Test Specification: Vertical & Horizontal**Comment: DC 5V Adaptor*

*Radiated Disturbance**EUT: Wireless MIDI Transceiver M/N: WIDI-X8**Operating Condition: Transmitting (Middle Channel)**Test Site: SMQ EMC Lab.SAC**Test Specification: Vertical & Horizontal**Comment: DC 5V Adaptor*

EUT: Wireless MIDI Transceiver M/N: WIDI-X8
Operating Condition: Transmitting (High Channel)
Test Site: SMQ EMC Lab.SAC
Test Specification: Vertical & Horizontal
Comment: DC 5V Adaptor



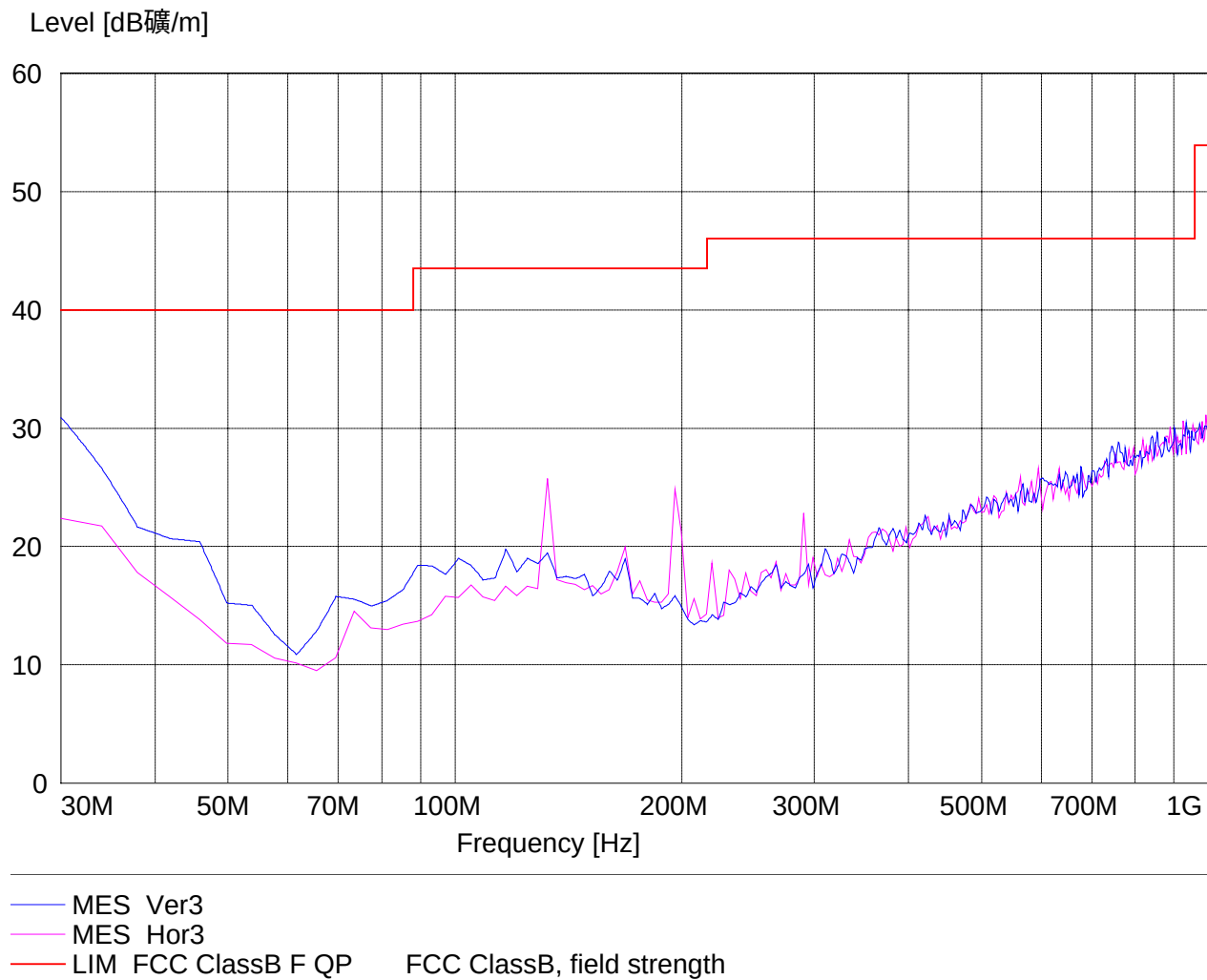
EUT: Wireless MIDI Transceiver M/N: WIDI-X8

Operating Condition: Receiving Mode

Test Site: SMQ EMC Lab.SAC

Test Specification: Vertical & Horizontal

Comment: DC 5V Adaptor



6. §15.249(b) OUT OF BAND EMISSIONS

6.1 Standard Applicable

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

6.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2006-06-30	2007-06-29
ETS	Receiver Antenna	2175	57337	2006-1-26	2007-1-25
ETS	50 ohm Coaxial Cable	SUCOFLEX 104	25498514	2006-1-26	2007-1-25
Rohde & Schwarz	Horn Antenna	HF906	100014	2006-1-26	2007-1-25

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2438.5MHz, than mark the higher-level emission for comparing with the FCC rules.

6.4 Environmental Conditions

Temperature:	28° C
Relative Humidity:	54%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

Frequency MHz	Emission dBμV/m	Limit dBμV/m
2400	30.94	54
2438.5	29.30	54

Note: The corrected factor is under considering and the reading is using AV detector.

Test Result Pass

Refer to the attached plots.

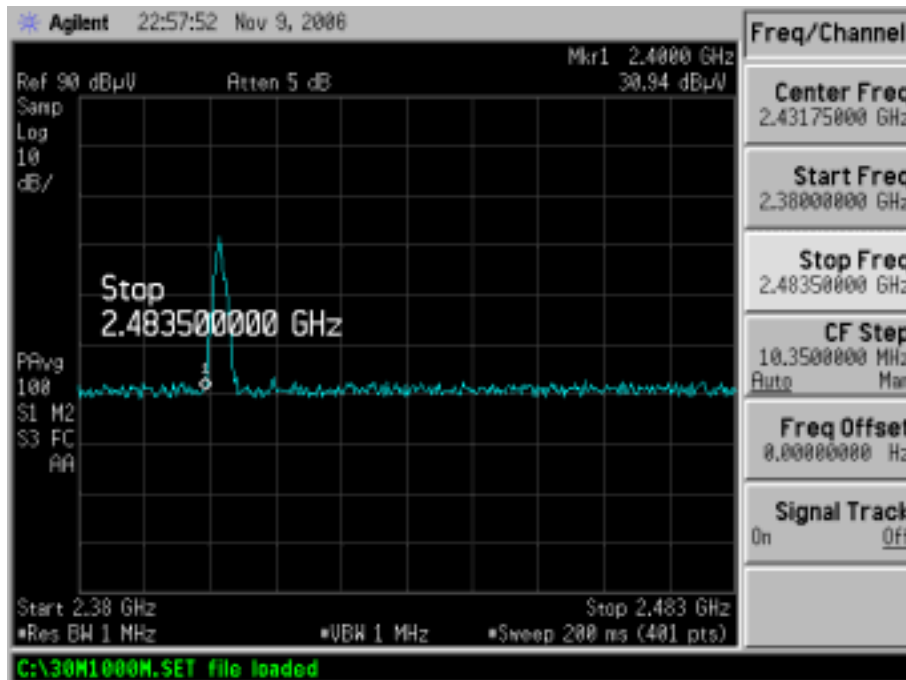
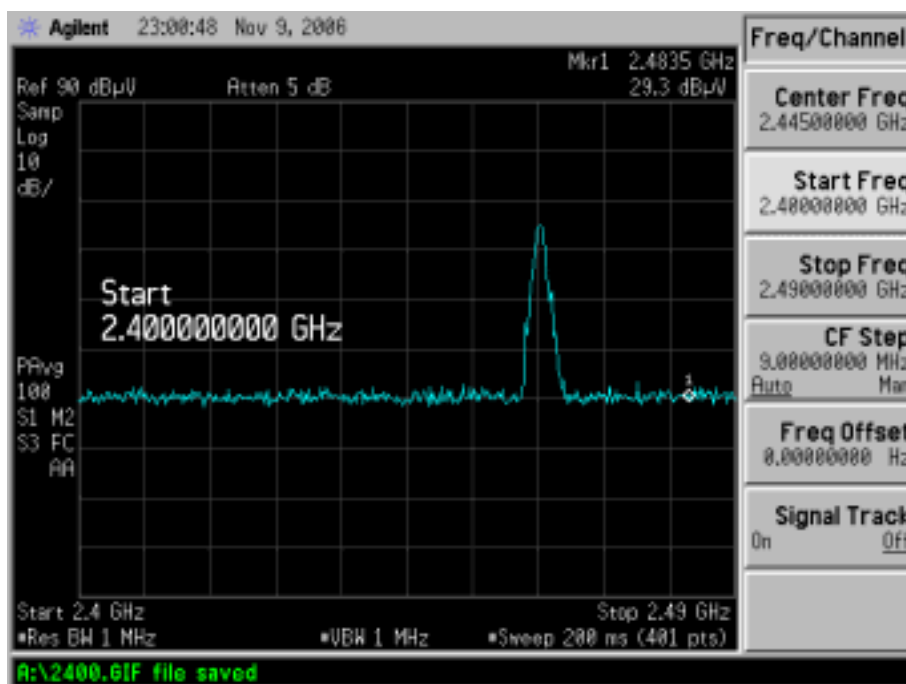
Lowest Bandedge**Highest Bandedge**

EXHIBIT 1- PRODUCT LABELING

Proposed FCC ID Label Format

FCC ID: URRMD-1001

Specifications: Text is Black in color and is left justified. Labels are printed in indelible ink on permanent adhesive silk-screened onto the EUT or shall be affixed at a conspicuous location on the EUT.

Proposed Label Location on EUT

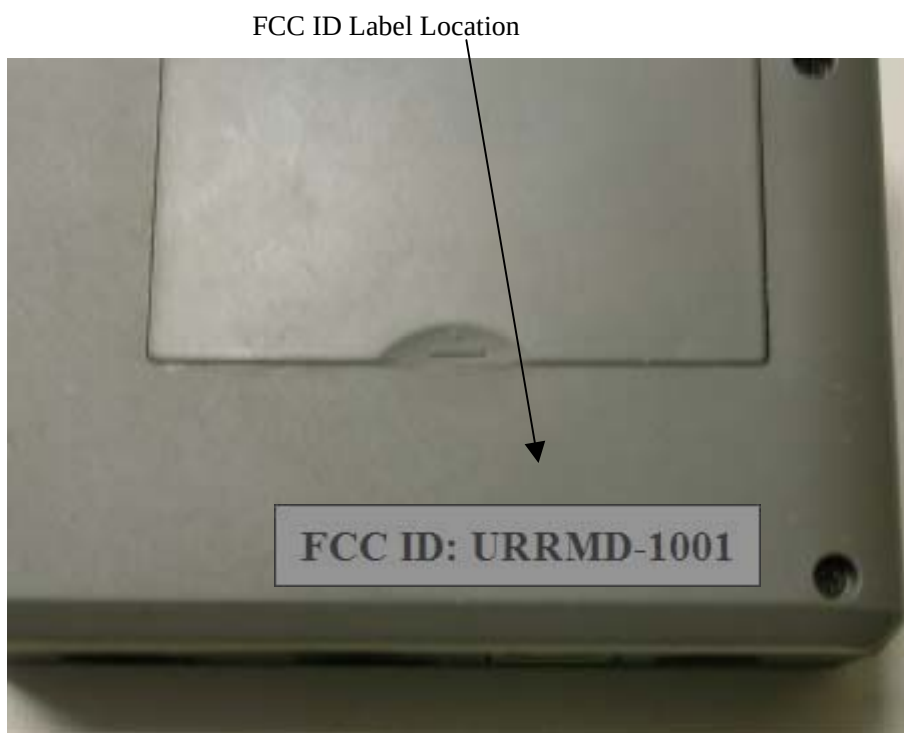


EXHIBIT 2 - EUT EXTERNAL PHOTOGRAPHS

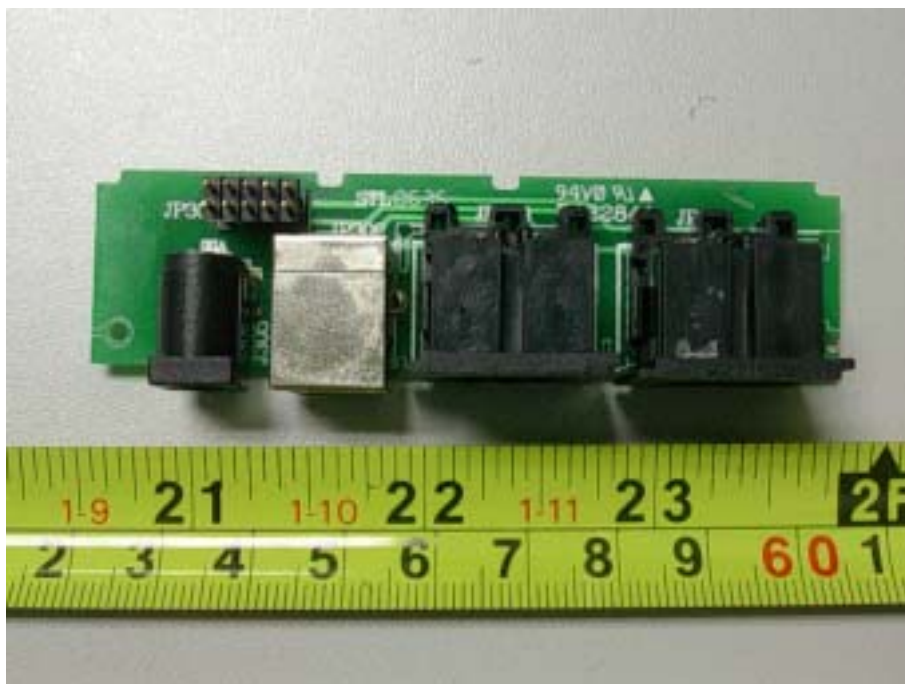
EUT View 1**EUT View 2**

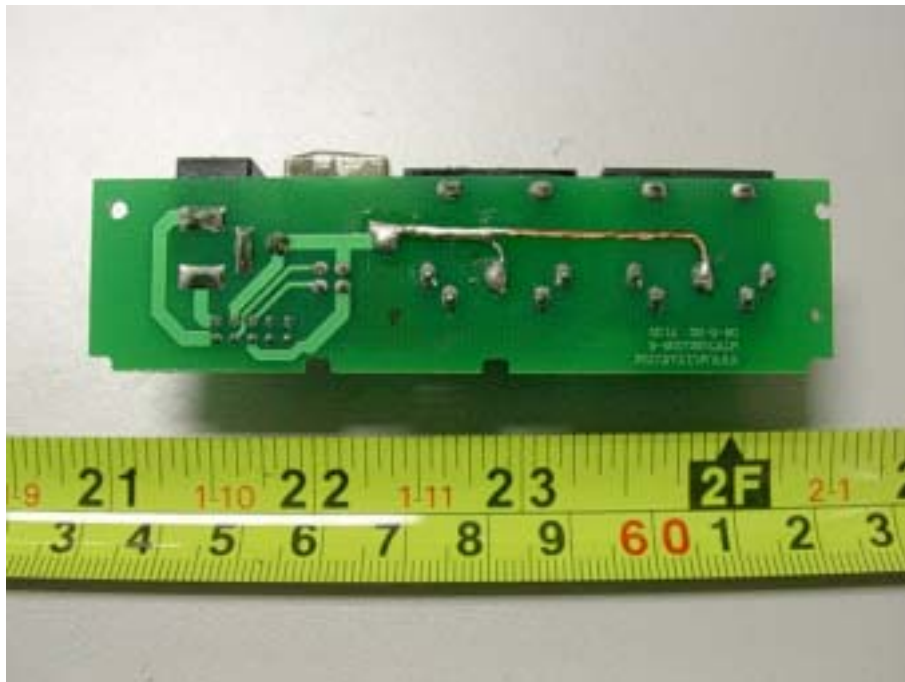
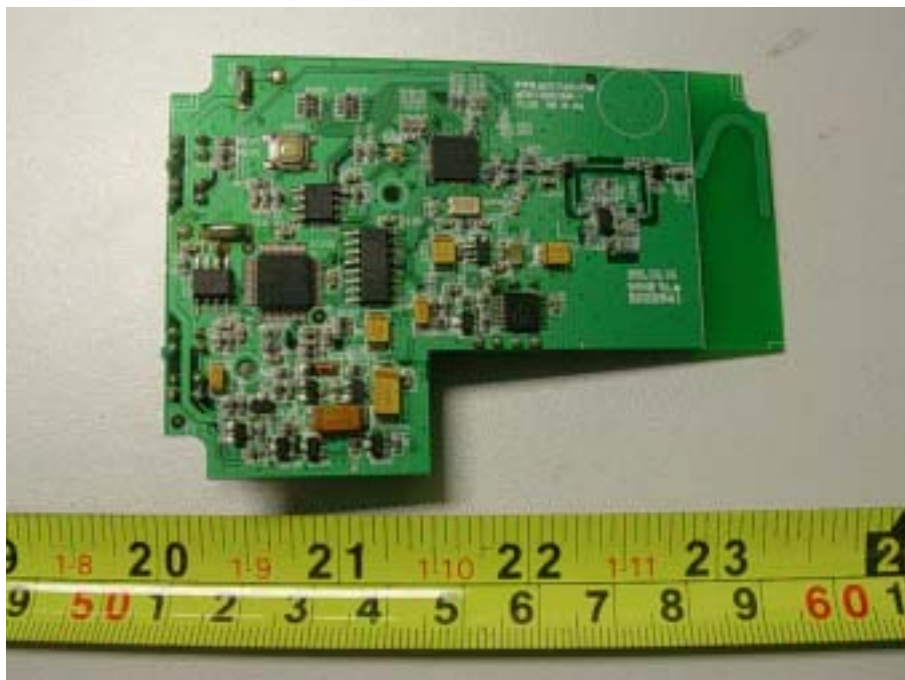
EXHIBIT 3 - EUT INTERNAL PHOTOGRAPHS

EUT Housing and Board View



Solder Board-Component View 1



Solder Board-Component View 2**Solder Board-Component View 3**

Solder Board-Component View 4

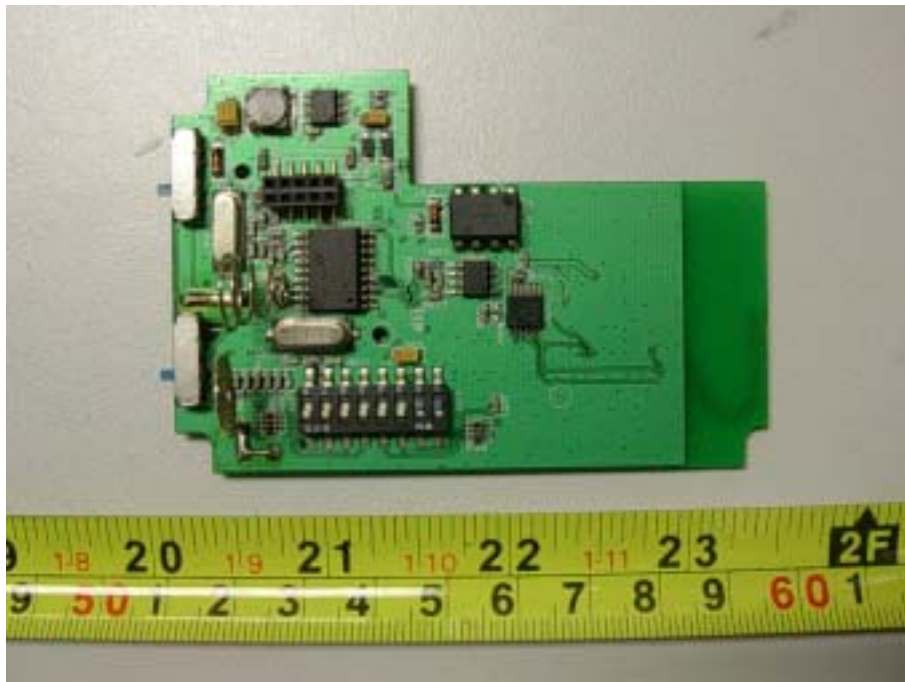
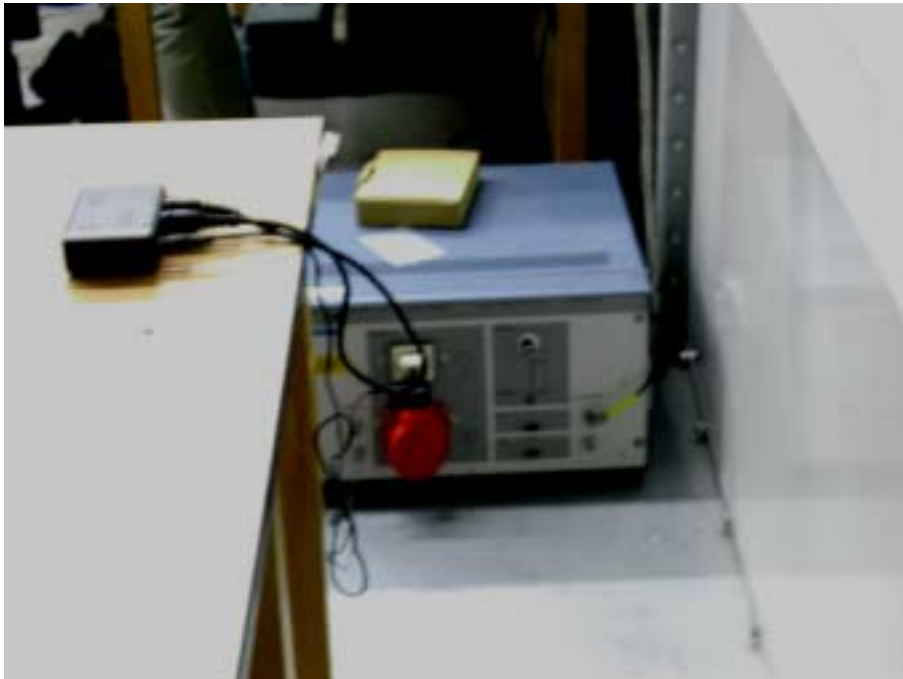


EXHIBIT 4 - TEST SETUP PHOTOGRAPHS

Conducted Emission Test Setup 1



Conducted Emission Test Setup 1



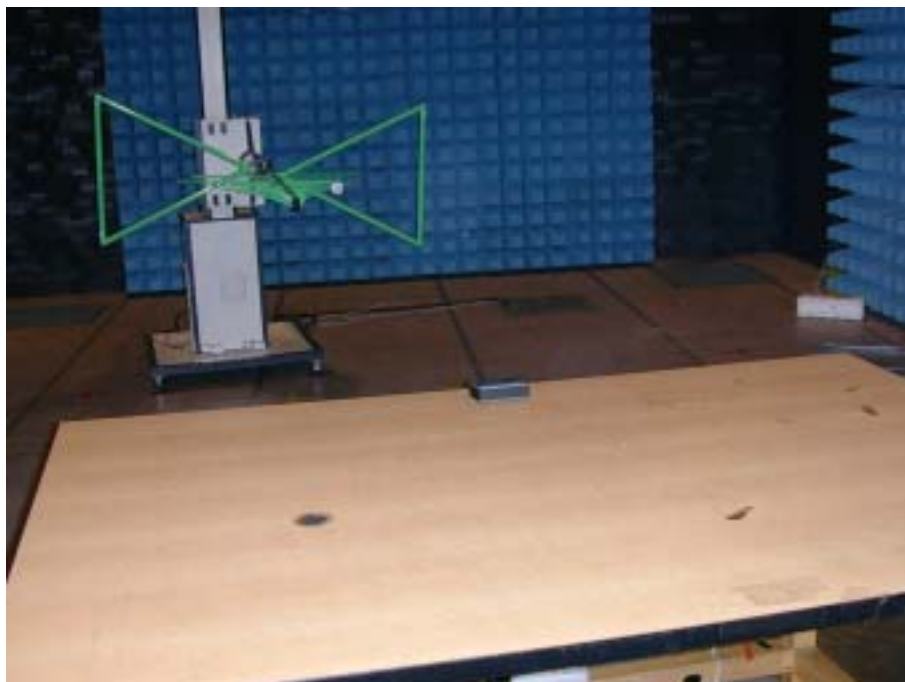
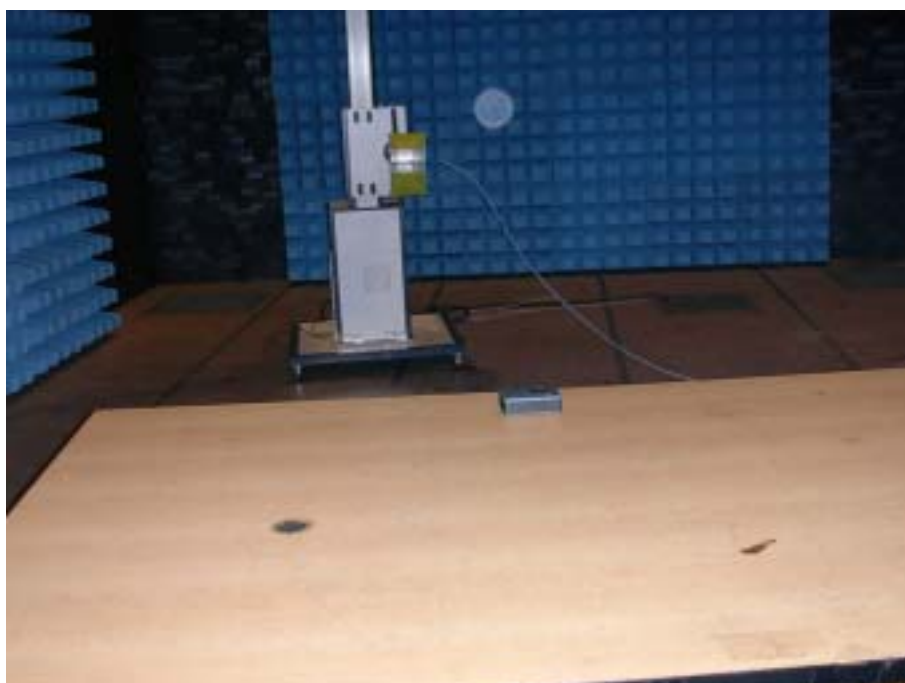
Radiation Emission Test Setup (30MHz to 1GHz)**Radiation Emission Test Setup (Above 1GHz)**

EXHIBIT 5 - BLOCK DIARGRAM

EXHIBIT 6 - OPERATION DESCRIPTIONS

EXHIBIT 7 - USERS MANUAL