



**FCC CFR47 PART 15 SUBPART C
CERTIFICATION
TEST REPORT**

FOR

RF TRANSCEIVER

MODEL NUMBER: T-FH256MC

FCC ID: UY6-TFH256MC

REPORT NUMBER: 07J11197-1

ISSUE DATE: AUGUST 22, 2007

Prepared for

**TOHNICHI MFG CO., LTD
2-12, OMORI-KITA 2-CHOME, OTA-KU
TOKYO 143-0016, JAPAN**

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
<u>--</u>	<u>08/22/07</u>	<u>Initial Issue</u>	<u>T. Chan</u>

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: TOHNICHI MFG. CO., LTD
2-12, OMORI-KITA 2-CHOME
OTA-KU, TOKYO, 143-0016, JAPAN

EUT DESCRIPTION: RF TRANSCEIVER

MODEL: T-FH256MC

SERIAL NUMBER: 2002

DATE TESTED: AUGUST 13-17, 2007

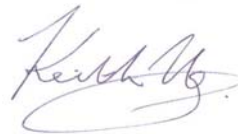
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

KEITH NG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Radiated Emission, Above 2000 MHz	+/- 4.3 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The T-FH256MC RF Transceiver operates in the 2402-2479MHz frequency range with 78 channels of GFSK modulation type in 1MHz spacing channels. It is installed onto TOHNICHI torque wrenches, and sends the tightening completion signal to the TOHNICHI R-FH256 RF Terminal far from the wrench using GFSK wave.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a permanently attached / Integral Antenna.

5.3. SOFTWARE AND FIRMWARE

EUT transmits continuously if the switches are set to low, mid or high channel.

5.4. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 2402MHz.

EUT has been evaluated at X, Y, and Z-axis. The highest measured output power was at Z-Axis

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

NA

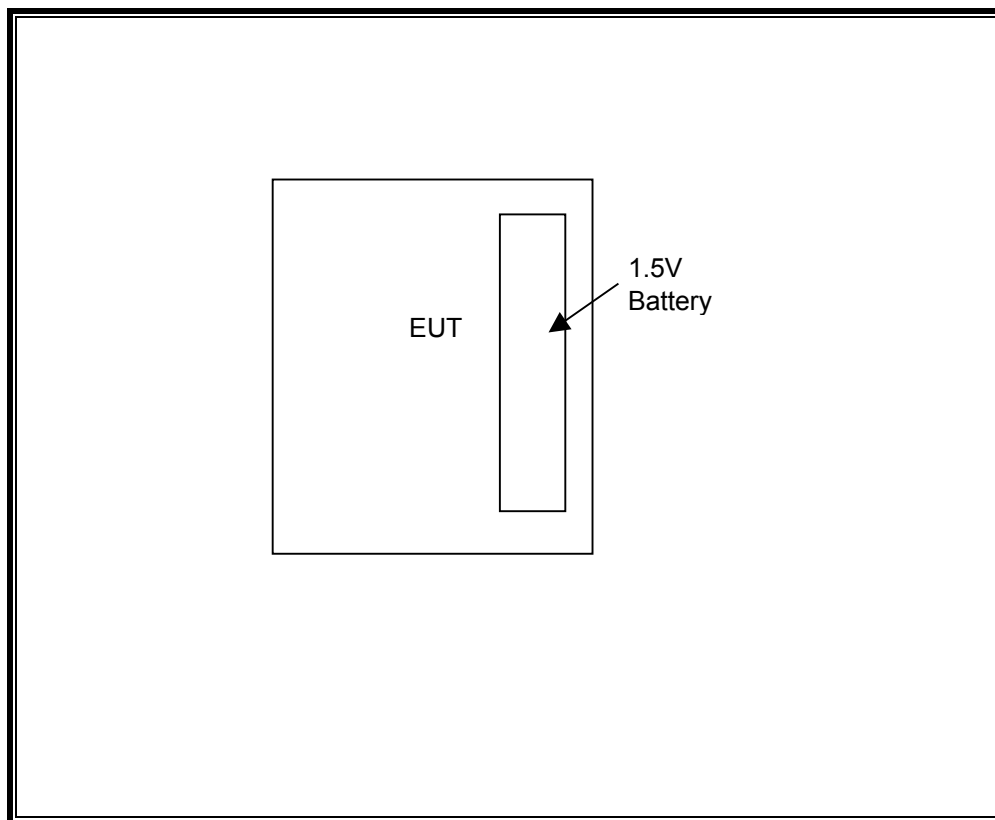
I/O CABLES

NA

TEST SETUP

The EUT is a standalone unit.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A121003	8/10/2008
Preamplifier, 1300 MHz	Agilent / HP	8447D	1937A02062	1/23/08
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY45300064	3/18/08
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00561	10/3/07
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	4/15/08
SA Display Section 2	Agilent / HP	85662A	2816A16696	4/7/08
SA RF Section, 1.5 GHz	Agilent / HP	85680B	2814A04227	1/7/08
Quasi-Peak Adaptor	Agilent / HP	85650A	3145A01654	1/21/08
2.4GHz Reject Filter	MicroTronic	BRM50702	2	CNR

7. LIMITS AND RESULTS

7.1. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4

LIMIT

§ 15.249 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz.

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/ meter)	Field strength of harmonics (microvolts/ meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(d) 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.

Frequency (MHz)	Field strength (microvolts/meter)	Measure- ment dis- tance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 ^{***}	3
88-216	150 ^{***}	3
216-960	200 ^{***}	3
Above 960	500	3

^{***} Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

RESULTS

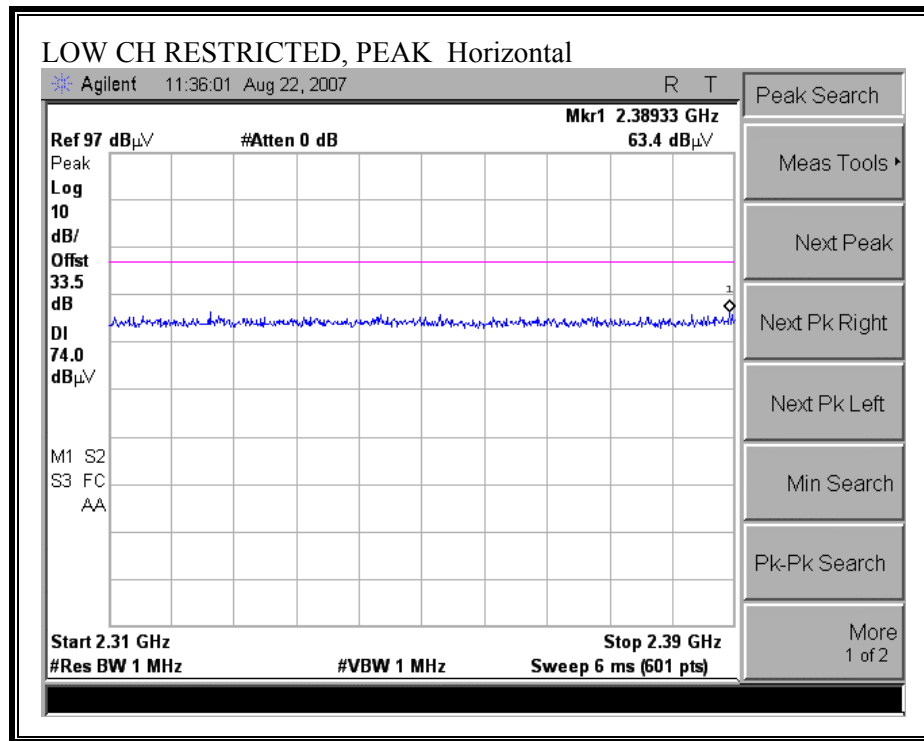
No non-compliance noted:

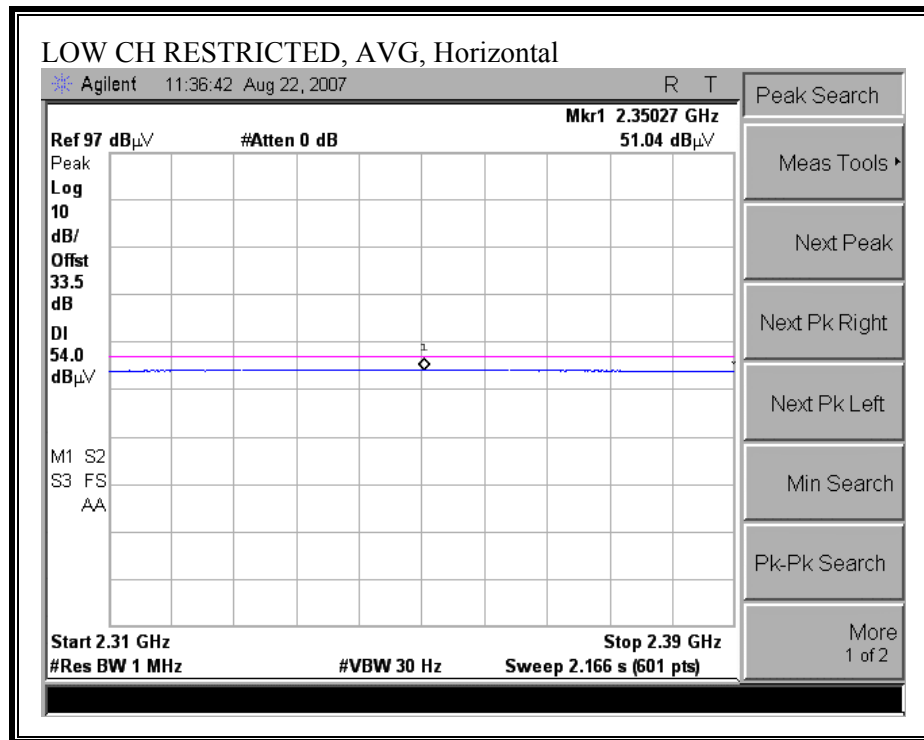
7.1.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

High Frequency Measurement															
Compliance Certification Services, Fremont 5m Chamber															
Company: Tohuchi Project #: 07J11197 Date: 08/13/07 Test Engineer: Keith Ng Configuration: EUT only Mode: Tx Model: T-FH256MC															
Test Equipment:															
Horn 1-18GHz		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit							
T73; S/N: 6717 @3m								FCC 15.209							
Hi Frequency Cables															
2 foot cable		3 foot cable		12 foot cable		HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz					
				B-5m Chamber											
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filt dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LO CH (2402MHz)															
2.402	3.0	63.8	43.8	29.5	4.0	0.0	0.0	0.0	97.3	77.3	114.0	94.0	-16.7	-16.7	H
2.402	3.0	75.0	55.0	29.5	4.0	0.0	0.0	0.0	108.5	88.5	114.0	94.0	-5.5	-5.5	V
MID CH (2440MHz)															
2.440	3.0	63.5	43.5	29.5	4.0	0.0	0.0	0.0	97.0	77.0	114.0	94.0	-17.0	-17.0	H
2.440	3.0	73.8	53.8	29.5	4.0	0.0	0.0	0.0	107.3	87.3	114.0	94.0	-6.7	-6.7	V
HI CH (2479MHz)															
2.479	3.0	63.3	43.3	29.5	4.0	0.0	0.0	0.0	96.8	76.8	114.0	94.0	-17.2	-17.2	H
2.479	3.0	72.7	52.7	29.5	4.0	0.0	0.0	0.0	106.2	86.2	114.0	94.0	-7.8	-7.8	V
Rev. 412.7															
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit								
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit								
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit								
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit								
CL	Cable Loss		HPF	High Pass Filter											

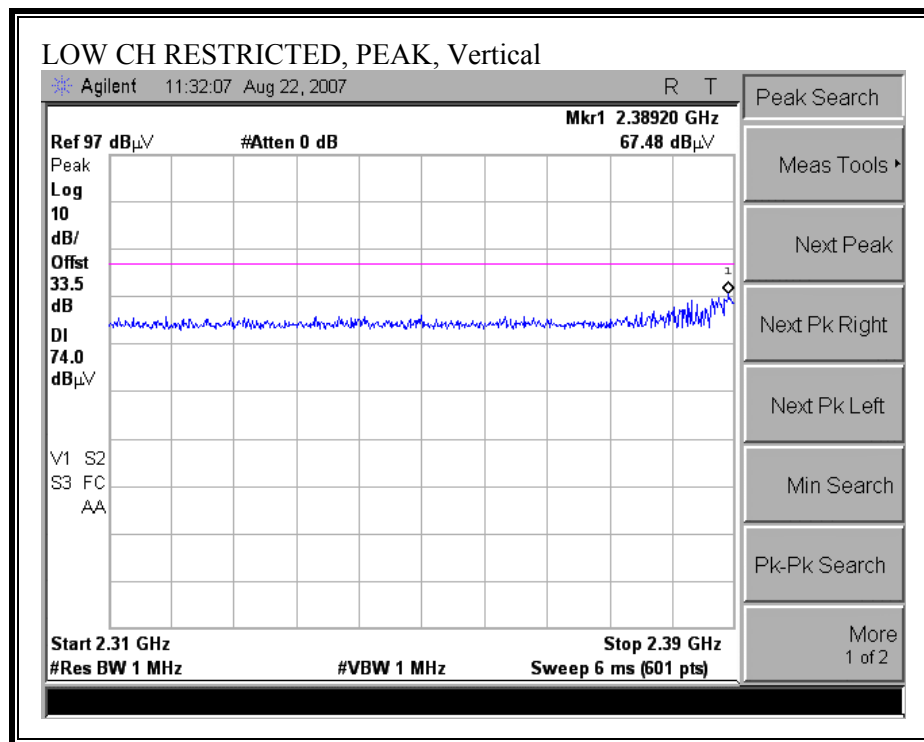
7.1.2. TRANSMITTER ABOVE 1 GHz FOR 2400 TO 2483.5 MHz BAND

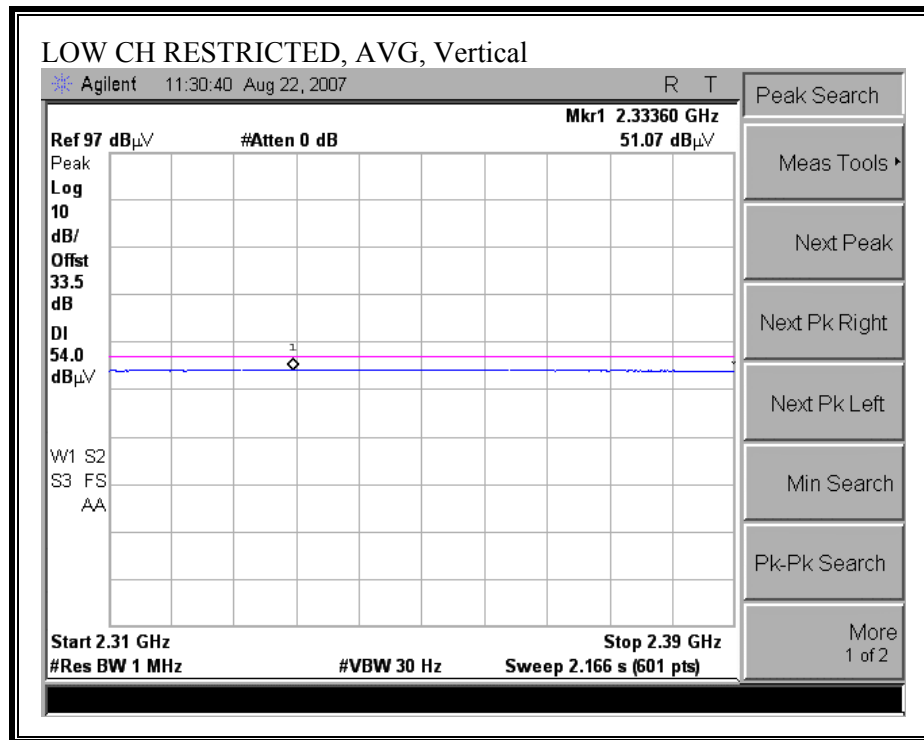
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



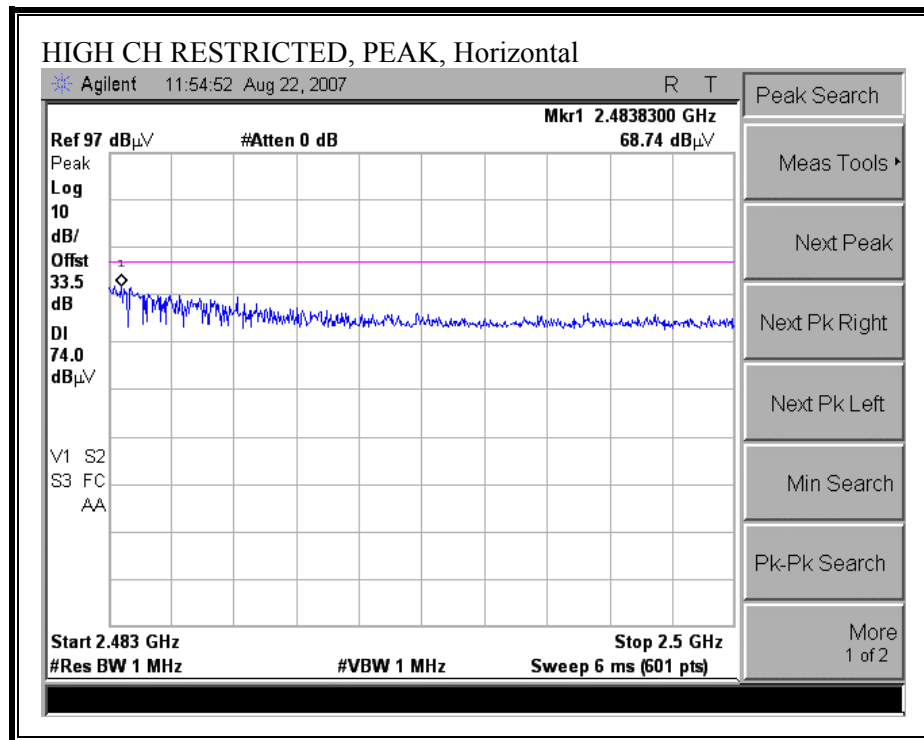


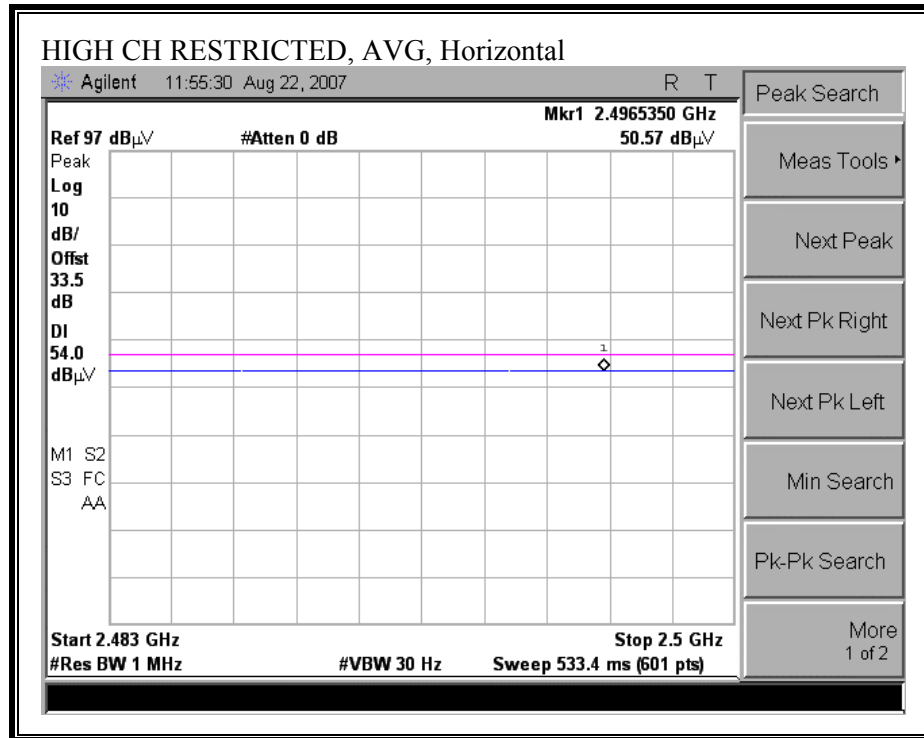
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



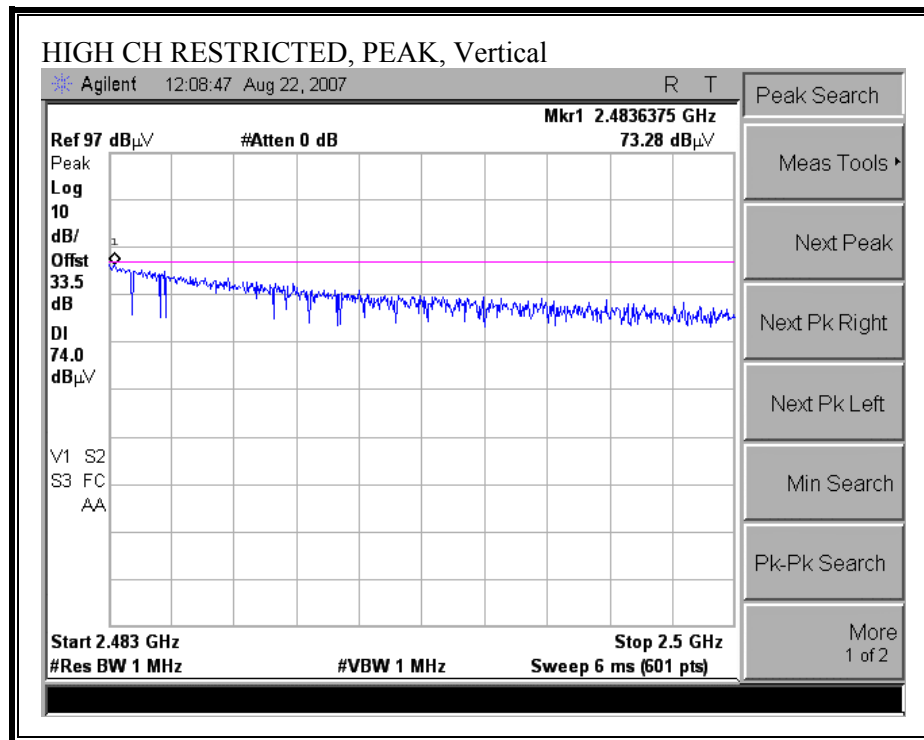


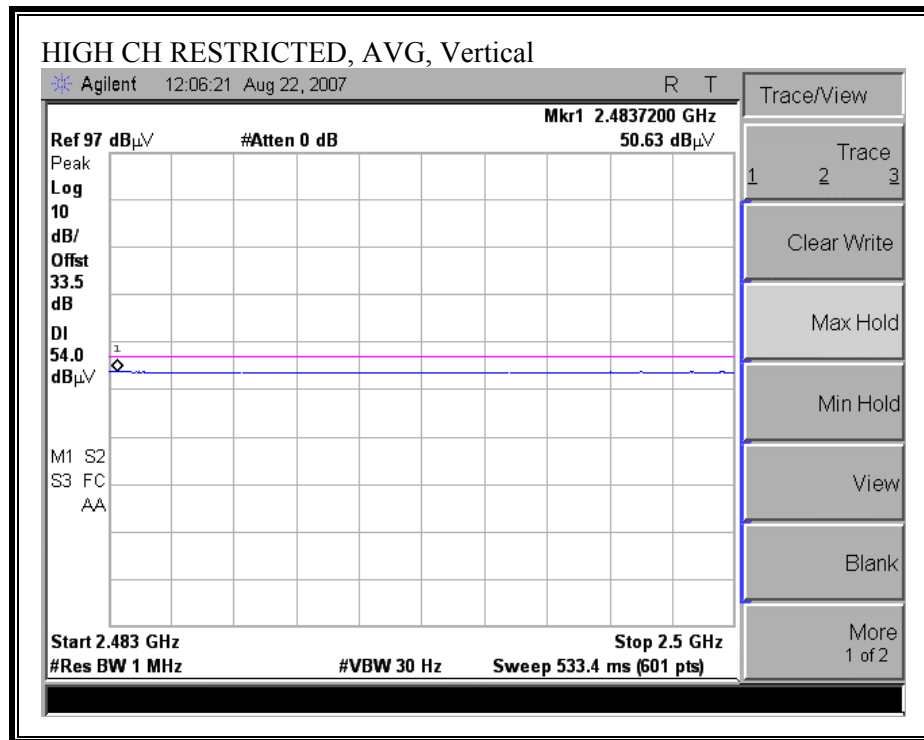
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





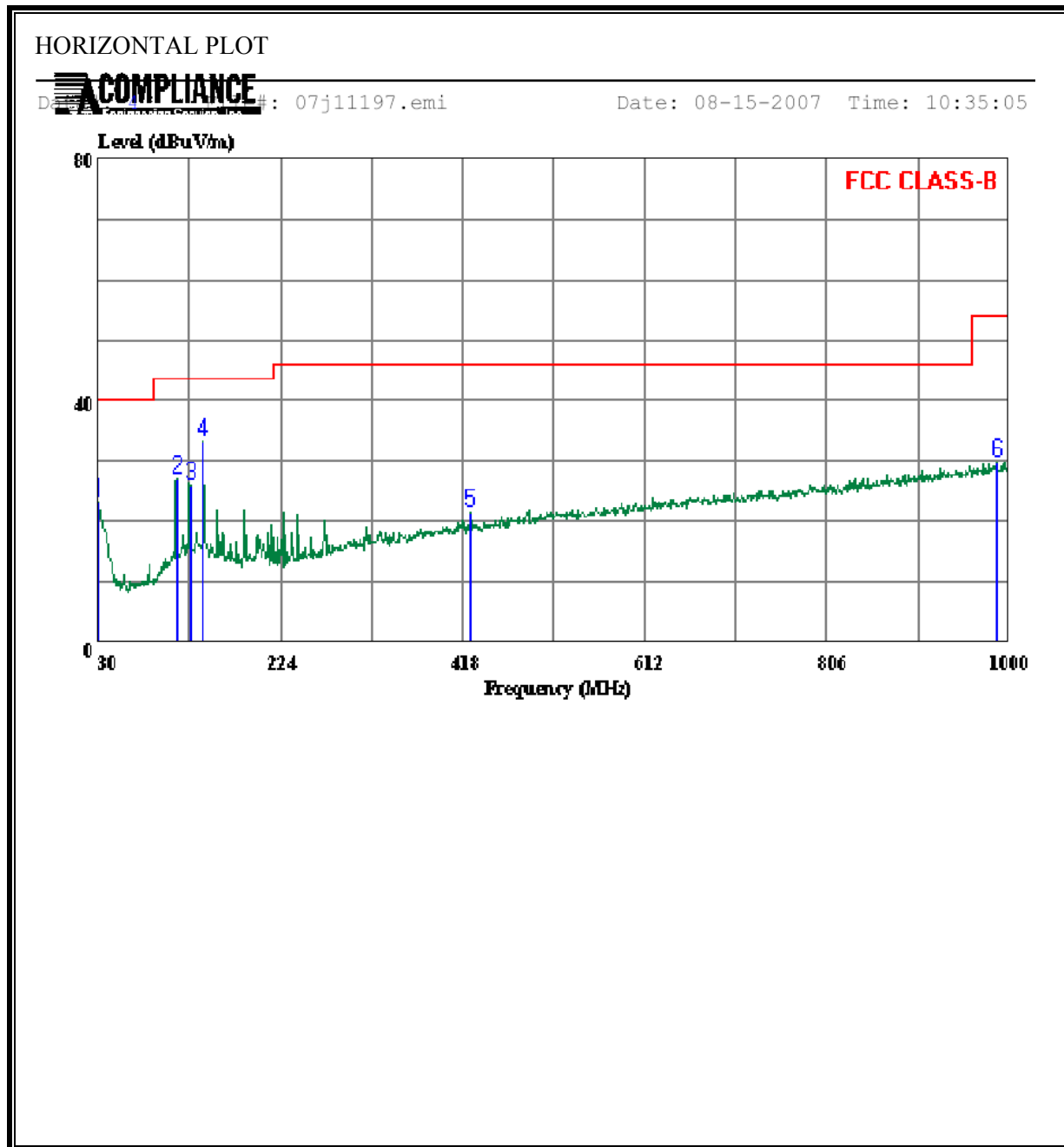
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





7.1.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (LOW CHANNEL 2402 MHz, HORIZONTAL)

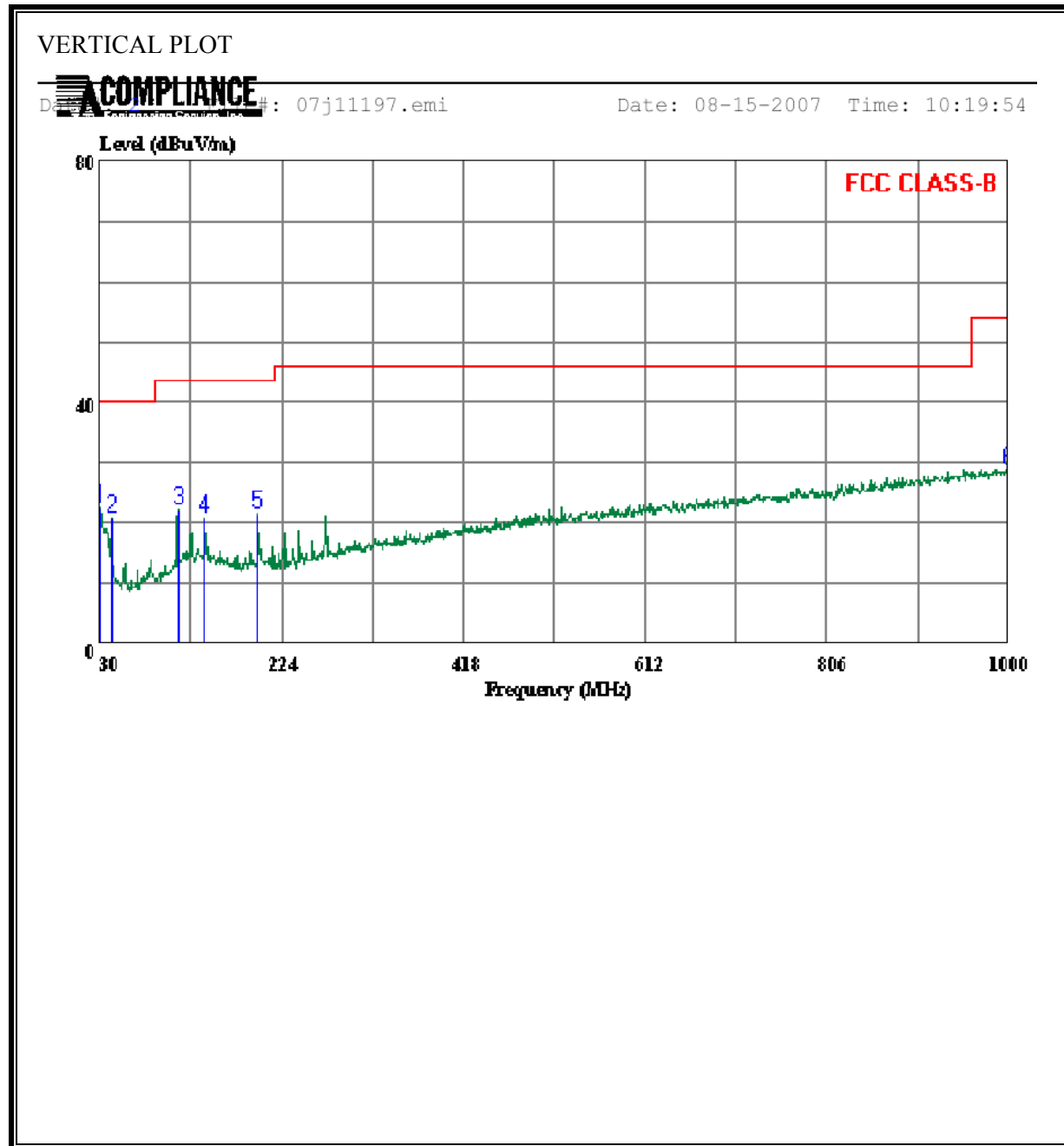


HORIZONTAL DATA

Condition: FCC CLASS-B HORIZONTAL
Engineer: : Keith Ng
Company: : Tohnichi
Project #: : 07J11197
Test Configuration:: EUT
Mode of operation: : 2.4GHz Tx @ 2402 MHz
Test Target: : FCC Class B

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	32.30	-9.13	23.17	40.00	-16.83	Peak
2	113.420	45.10	-17.99	27.11	43.50	-16.39	Peak
3	127.970	42.60	-16.52	26.08	43.50	-17.42	Peak
4	141.550	50.00	-16.84	33.16	43.50	-10.34	Peak
5	426.730	34.30	-12.71	21.59	46.00	-24.41	Peak
6	986.420	32.90	-3.22	29.68	54.00	-24.32	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (LOW CHANNEL 2402 MHz, VERTICAL)

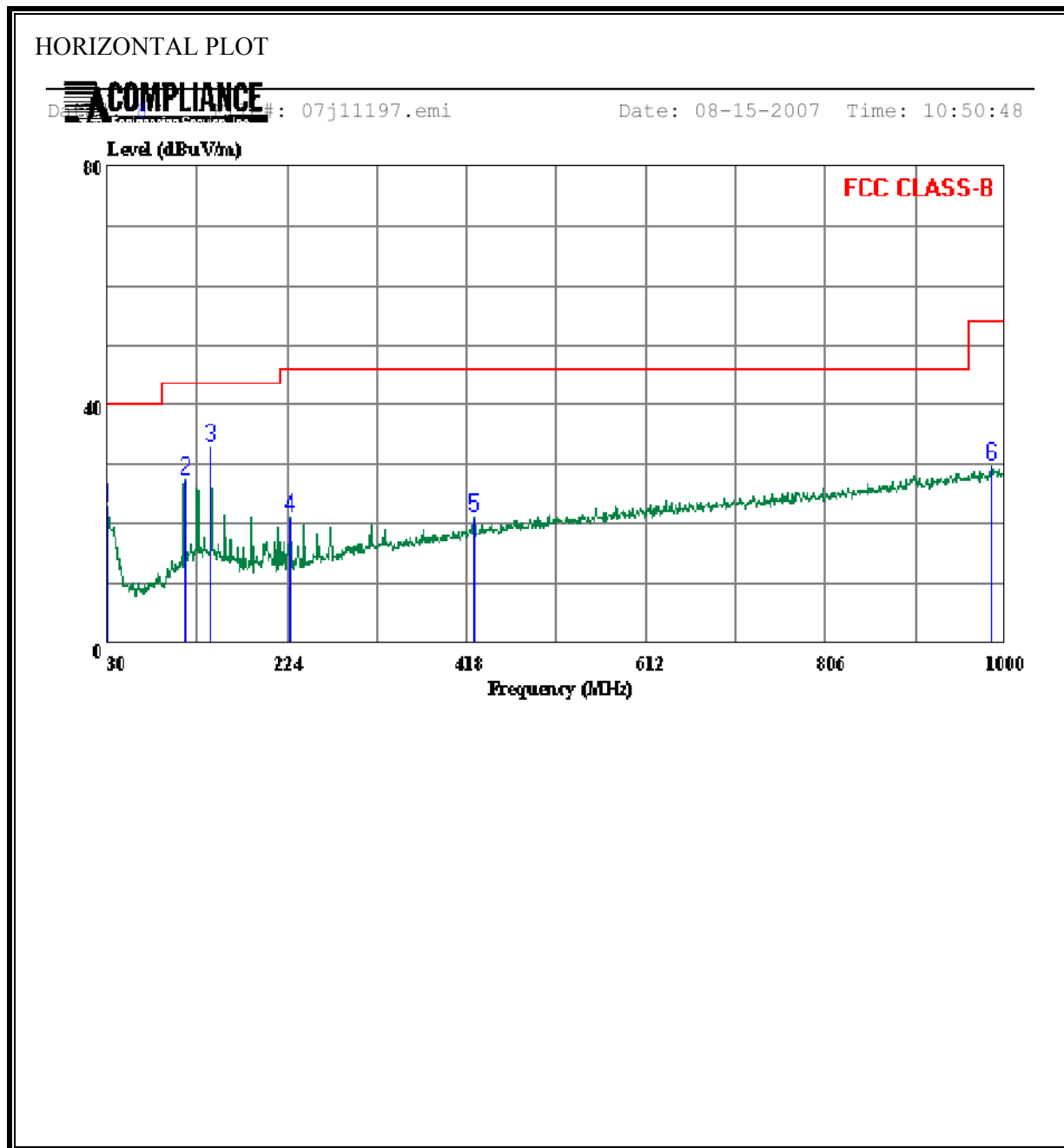


VERTICAL DATA

Condition: FCC CLASS-B VERTICAL
Engineer: : Keith Ng
Company: : Tohnichi
Project #: : 07J11197
Test Configuration: EUT
Mode of operation: : 2.4GHz Tx @ 2402 MHz
Test Target: : FCC Class B

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	31.70	-9.13	22.57	40.00	-17.43	Peak
2	41.640	36.78	-16.16	20.62	40.00	-19.38	Peak
3	113.420	40.00	-17.99	22.01	43.50	-21.49	Peak
4	141.550	37.50	-16.84	20.66	43.50	-22.84	Peak
5	197.810	38.60	-17.30	21.30	43.50	-22.20	Peak
6	999.030	31.80	-2.91	28.89	54.00	-25.11	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (MID CHANNEL 2440 MHz, HORIZONTAL)

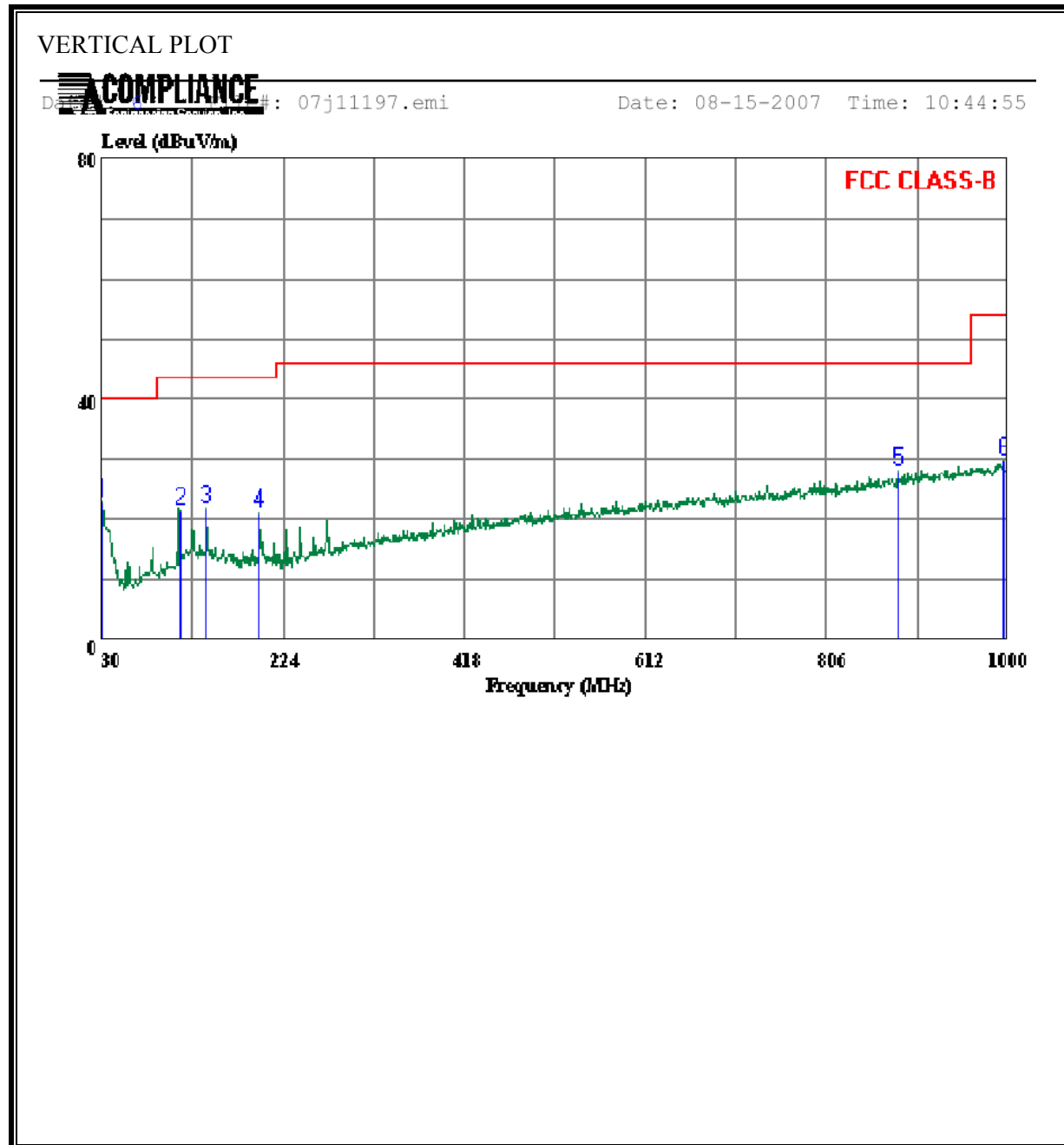


HORIZONTAL DATA

Condition: FCC CLASS-B HORIZONTAL
Engineer: : Keith Ng
Company: : Tohnichi
Project #: : 07J11197
Test Configuration:: EUT
Mode of operation: : 2.4GHz Tx @ 2440 MHz
Test Target: : FCC Class B

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	32.10	-9.13	22.97	40.00	-17.03	Peak
2	113.420	45.50	-17.99	27.51	43.50	-15.99	Peak
3	141.550	49.60	-16.84	32.76	43.50	-10.74	Peak
4	227.880	39.70	-18.57	21.13	46.00	-24.87	Peak
5	426.730	34.00	-12.71	21.29	46.00	-24.71	Peak
6	985.450	32.80	-3.16	29.64	54.00	-24.36	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (MID CHANNEL 2440 MHz, VERTICAL)

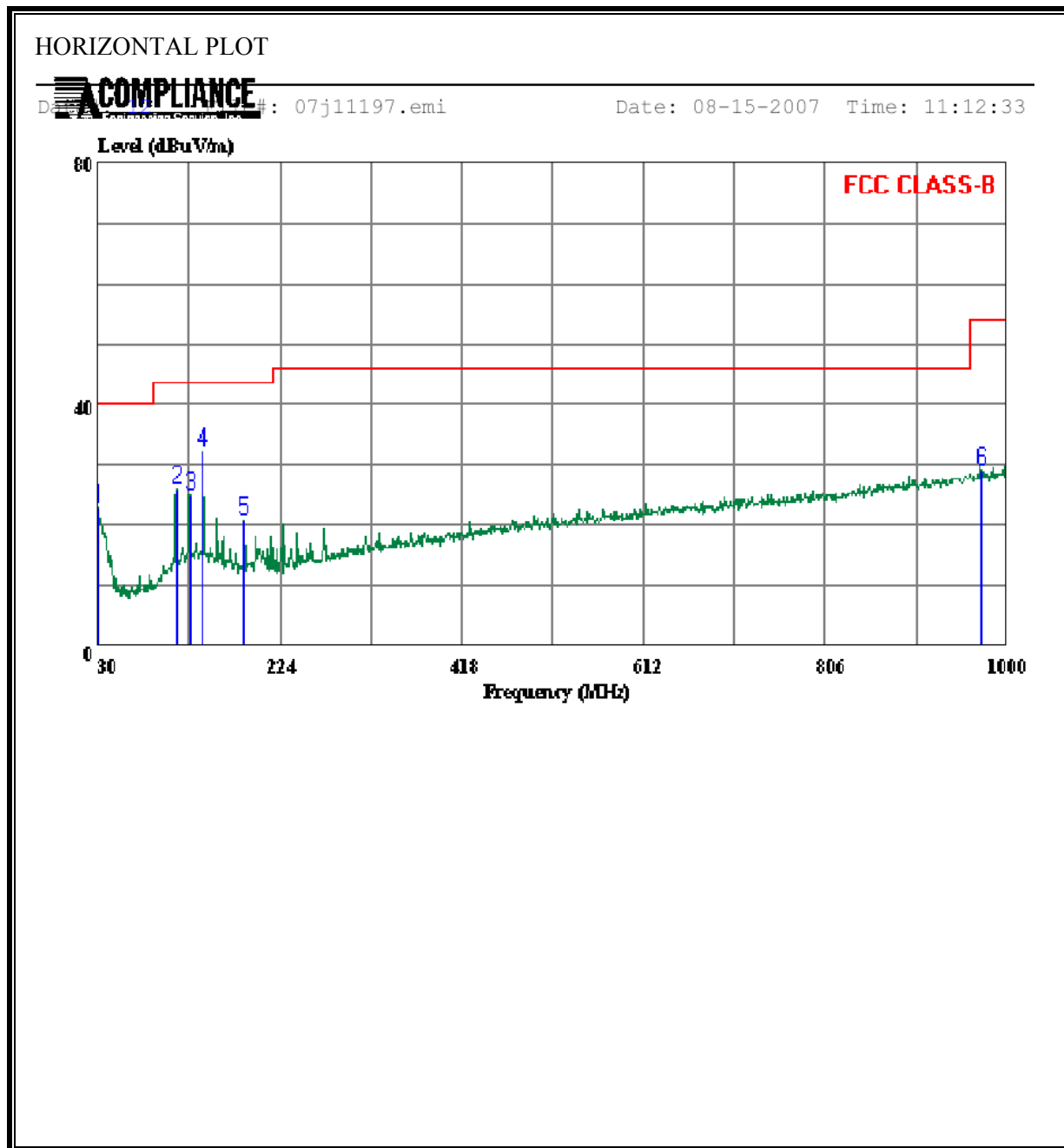


VERTICAL DATA

Condition: FCC CLASS-B VERTICAL
Engineer: : Keith Ng
Company: : Tohnichi
Project #: : 07J11197
Test Configuration: : EUT
Mode of operation: : 2.4GHz Tx @ 2440 MHz
Test Target: : FCC Class B

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	32.10	-9.13	22.97	40.00	-17.03	Peak
2	113.420	39.60	-17.99	21.61	43.50	-21.89	Peak
3	141.550	38.60	-16.84	21.76	43.50	-21.74	Peak
4	197.810	38.50	-17.30	21.20	43.50	-22.30	Peak
5	882.630	33.20	-5.29	27.91	46.00	-18.09	Peak
6	995.150	32.70	-2.96	29.74	54.00	-24.26	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (HIGH CHANNEL 2479 MHz, HORIZONTAL)

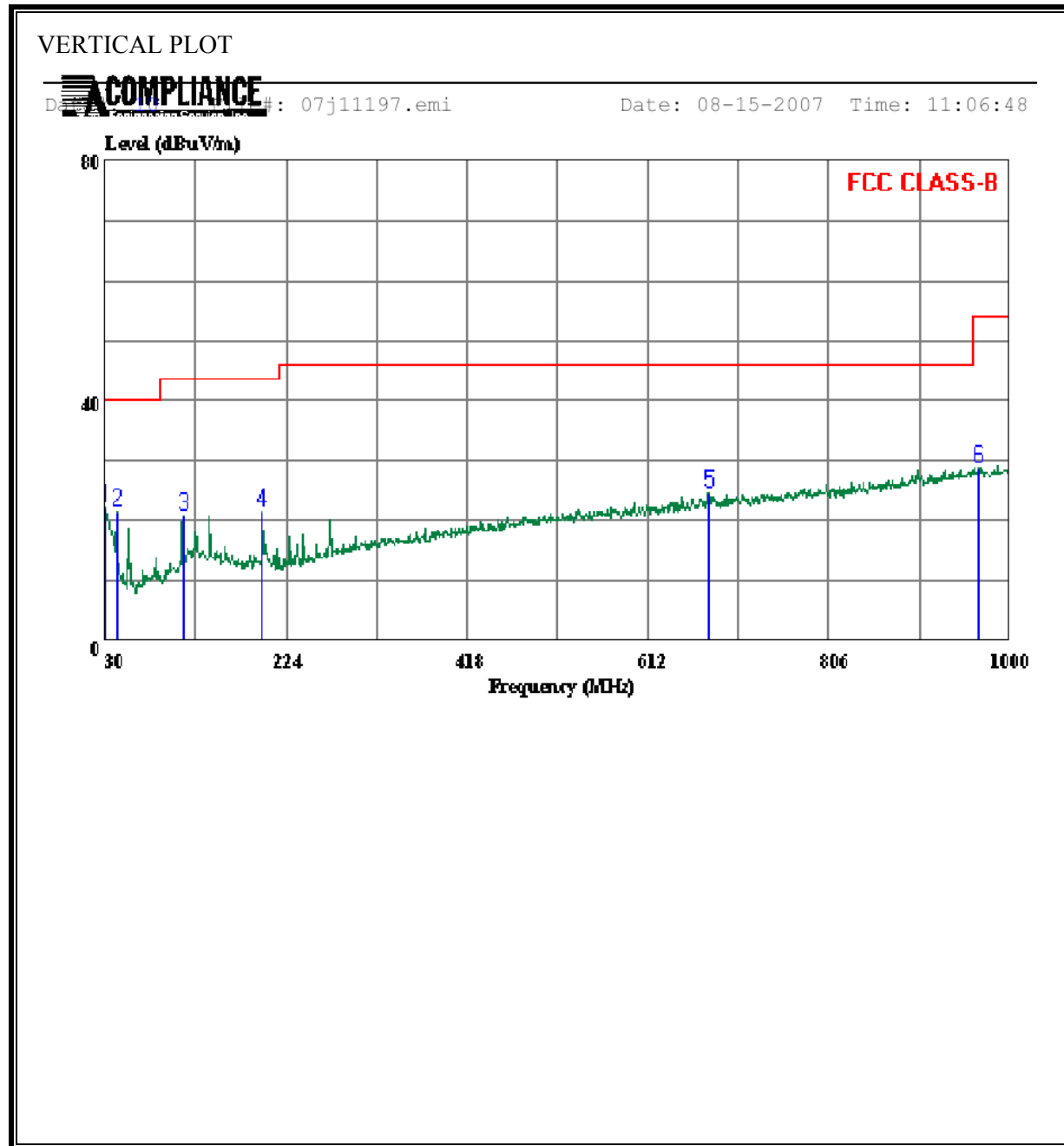


HORIZONTAL DATA

Condition: FCC CLASS-B HORIZONTAL
Engineer: : Keith Ng
Company: : Tohnichi
Project #: : 07J11197
Test Configuration:: EUT
Mode of operation: : 2.4GHz Tx @ 2479 MHz
Test Target: : FCC Class B

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	31.90	-9.13	22.77	40.00	-17.23	Peak
2	113.420	43.80	-17.99	25.81	43.50	-17.69	Peak
3	127.970	41.50	-16.52	24.98	43.50	-18.52	Peak
4	141.550	49.00	-16.84	32.16	43.50	-11.34	Peak
5	185.200	39.40	-18.54	20.86	43.50	-22.64	Peak
6	973.810	32.70	-3.62	29.08	54.00	-24.92	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (HIGH CHANNEL 2479 MHz, VERTICAL)



VERTICAL DATA

Condition: FCC CLASS-B VERTICAL
Engineer: : Keith Ng
Company: : Tohnichi
Project #: : 07J11197
Test Configuration: EUT
Mode of operation: : 2.4GHz Tx @ 2479 MHz
Test Target: : FCC Class B

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	31.30	-9.13	22.17	40.00	-17.83	Peak
2	41.640	37.48	-16.16	21.32	40.00	-18.68	Peak
3	113.420	38.70	-17.99	20.71	43.50	-22.79	Peak
4	197.810	38.70	-17.30	21.40	43.50	-22.10	Peak
5	677.960	33.20	-8.72	24.48	46.00	-21.52	Peak
6	966.050	32.30	-3.64	28.66	54.00	-25.34	Peak

7.1.4. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

High Frequency Measurement																
Compliance Certification Services, Fremont 5m Chamber																
Company: Tohnicli Project #: 07J11197 Date: 08/13/07 Test Engineer: Keith Ng Configuration: EUT only Mode: Tx Model: T-FH256MC																
Test Equipment:																
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit				
T73; S/N: 6717 @3m			T34 HP 8449B									FCC 15.209				
Hi Frequency Cables <div style="display: flex; justify-content: space-around;"> <div>2 foot cable</div> <div>3 foot cable</div> <div>12 foot cable</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div>B-5m Chamber</div> <div>HPF</div> <div>Reject Filter</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>Peak Measurements RBW=VBW=1MHz</div> <div>Average Measurements RBW=1MHz ; VBW=10Hz</div> </div>																
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filt dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)	
LO CH (2402MHz)																
4.804	3.0	48.2	28.2	33.3	7.1	-34.8	0.0	0.0	53.7	33.7	74	54	-20.3	-20.3	V	
7.206	3.0	49.9	29.9	34.9	8.6	-34.2	0.0	0.0	59.3	39.3	74	54	-14.7	-14.7	V	
4.804	3.0	45.9	25.9	33.3	7.1	-34.8	0.0	0.0	51.5	31.5	74	54	-22.5	-22.5	H	
7.206	3.0	48.9	28.9	34.9	8.6	-34.2	0.0	0.0	58.3	38.3	74	54	-15.7	-15.7	H	
MID CH (2440MHz)																
4.880	3.0	45.9	25.9	33.4	7.2	-34.8	0.0	0.0	51.6	31.6	74	54	-22.4	-22.4	V	
7.320	3.0	49.0	29.0	35.0	8.7	-34.1	0.0	0.0	58.5	38.5	74	54	-15.5	-15.5	V	
4.880	3.0	45.7	25.7	33.4	7.2	-34.8	0.0	0.0	51.4	31.4	74	54	-22.6	-22.6	H	
7.320	3.0	46.1	26.1	35.0	8.7	-34.1	0.0	0.0	55.6	35.6	74	54	-18.4	-18.4	H	
HI CH (2479MHz)																
4.958	3.0	53.6	33.6	33.4	7.2	-34.8	0.0	0.0	59.5	39.5	74	54	-14.5	-14.5	V	
7.437	3.0	50.5	30.5	35.1	8.7	-34.1	0.0	0.0	60.2	40.2	74	54	-13.8	-13.8	V	
4.958	3.0	52.1	32.1	33.4	7.2	-34.8	0.0	0.0	57.9	37.9	74	54	-16.1	-16.1	H	
7.437	3.0	47.9	27.9	35.1	8.7	-34.1	0.0	0.0	57.6	37.6	74	54	-16.4	-16.4	H	
Rev. 4.12.7																
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit									
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit									
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit									
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit									
CL	Cable Loss		HPF	High Pass Filter												

8. SETUP PHOTOS

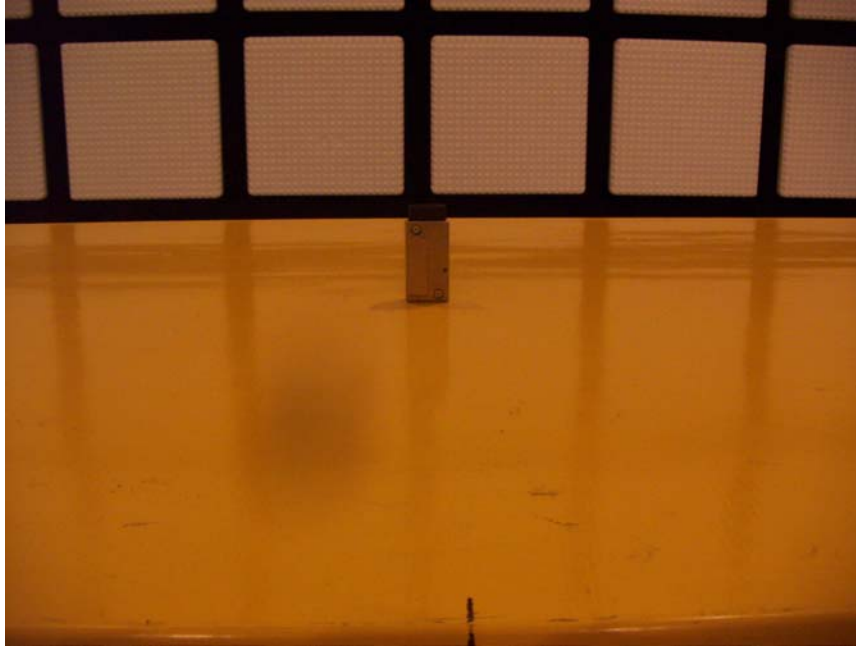
RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION



X-AXIS BACK PHOTO



Y-AXIS FRONT PHOTO



Y-AXIS BACK PHOTO



Z-AXIS FRONT PHOTO



Z-AXIS BACK PHOTO



END OF REPORT