



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

FOR

RF TERMINAL

MODEL NUMBER: R-FH256

FCC ID: UY6-RFH256

REPORT NUMBER: 07J11198-1

ISSUE DATE: SEPTEMBER 05, 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>09/05/07</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 TERMINAL

MODEL: R-FH256

SERIAL NUMBER: 02007

DATE TESTED: AUGUST 13-AND AUGUST 29-30, 2007

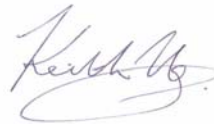
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

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 R-FH256 RF Terminal operates in the 2402-2479MHz frequency range with 78 channels of GFSK modulation type in 1MHz spacing channels, which is far from TOHNICHI torque wrenches, receives the tightening completion using GFSK wave from the TOHNICHI T-FH256MC RF Transceiver installed on the wrench.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes Dipole antenna with a maximum peak antenna gain of 2dBi.

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 2479MHz.

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	AK II	A10P1-05MP	1222	NA

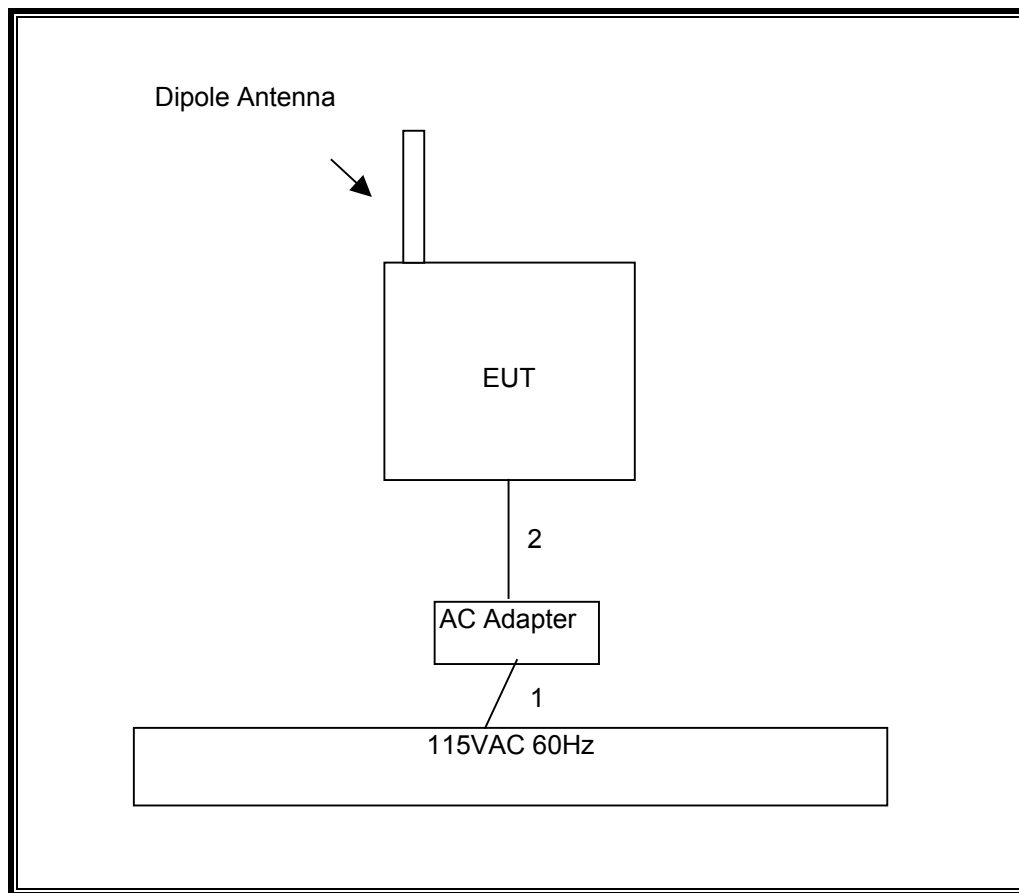
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	115VAC	Un-Shielded	2m	NO
2	DC	1	DC	Un-Shielded	1m	NO

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	1/23/2008
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY45300064	3/18/2008
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00561	10/3/2007
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	4/15/2008
SA Display Section 2	Agilent / HP	85662A	2816A16696	4/7/2008
SA RF Section, 1.5 GHz	Agilent / HP	85680B	2814A04227	1/7/2008
Quasi-Peak Adaptor	Agilent / HP	85650A	3145A01654	1/21/2008
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

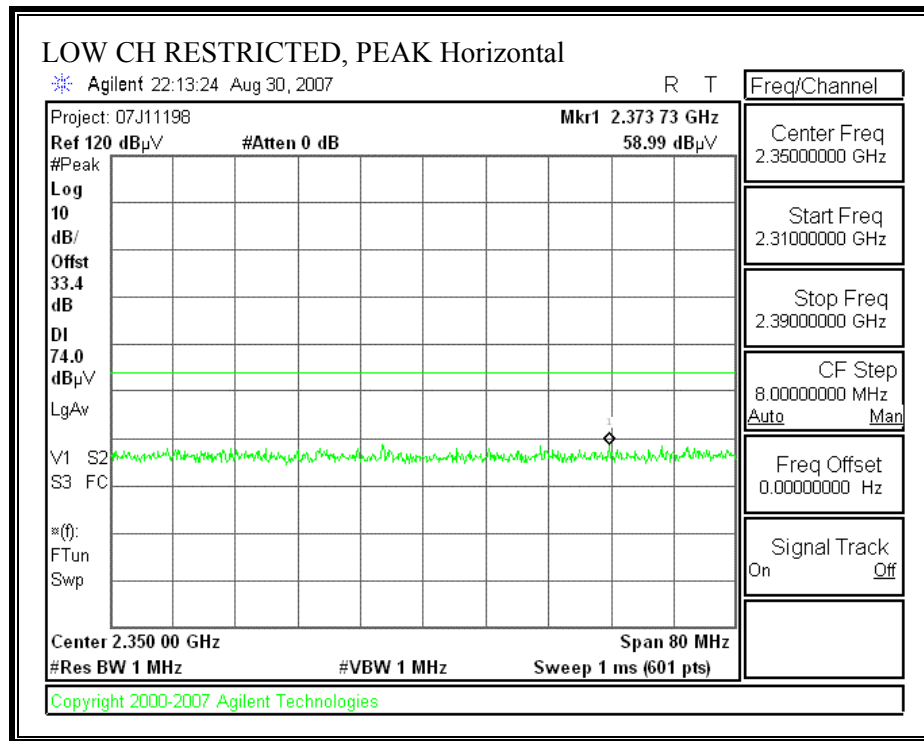
No non-compliance noted:

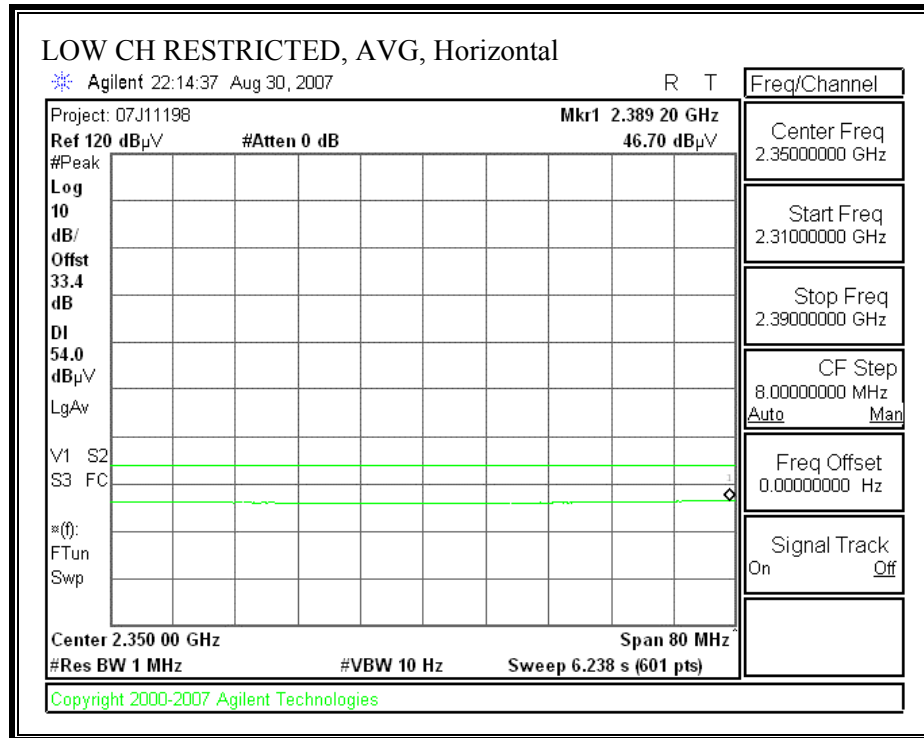
7.1.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

High Frequency Measurement																
Compliance Certification Services, Fremont 5m Chamber																
Company: Tolmichi																
Project #: 07J11198																
Date: 08/28/07																
Test Engineer: Ninous Davoudi																
Configuration: EUT Only																
Mode: Tx (Worst Case)																
Test Equipment:																
Horn 1-18GHz			Pre-amplifer 1-26GHz			Pre-amplifer 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 A-5m Chamber HPF Reject Filter Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz																
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fldr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)	
Low Ch																
2.402	3.0	63.3	45.5	29.5	4.0	0.0	0.0	0.0	96.8	79.0	114.0	94.0	-17.2	-15.0	V	
2.402	3.0	69.8	52.0	29.5	4.0	0.0	0.0	0.0	103.3	85.5	114.0	94.0	-10.8	-8.5	H	
Mid Ch																
2.440	3.0	64.5	46.8	29.5	4.0	0.0	0.0	0.0	98.0	80.3	114.0	94.0	-16.0	-13.7	V	
2.440	3.0	71.8	54.1	29.5	4.0	0.0	0.0	0.0	105.3	87.6	114.0	94.0	-8.7	-6.4	H	
High ch																
2.479	3.0	68.7	51.0	29.5	4.0	0.0	0.0	0.0	102.2	84.5	114.0	94.0	-11.8	-9.5	V	
2.479	3.0	74.5	56.7	29.5	4.0	0.0	0.0	0.0	108.0	90.2	114.0	94.0	-6.0	-3.8	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											

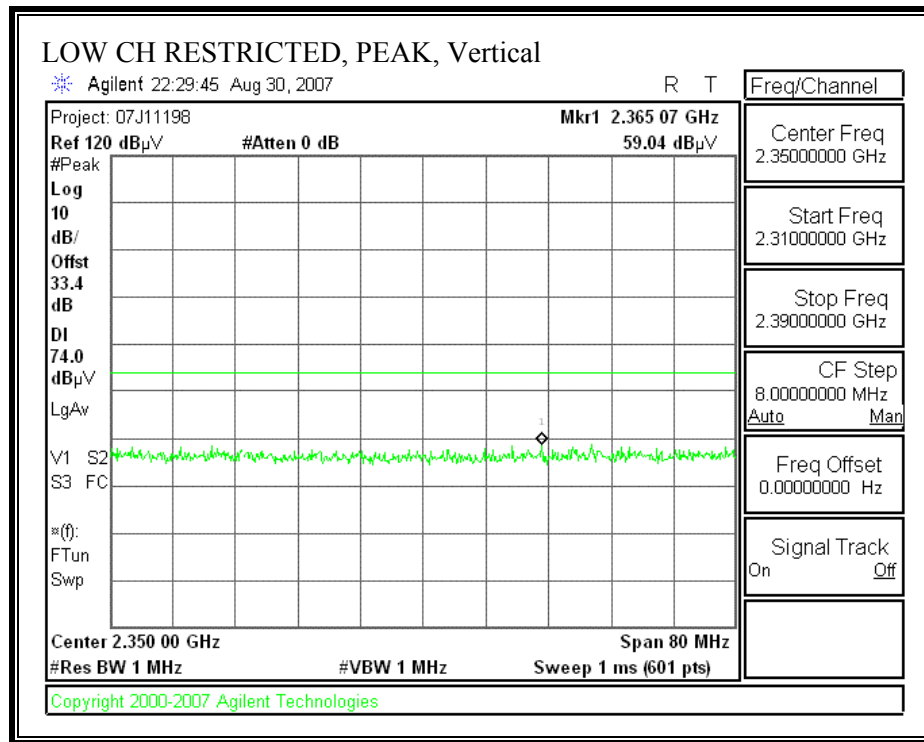
7.1.2. TRANSMITTER ABOVE 1 GHz FOR 2400 TO 2483.5 MHz BAND

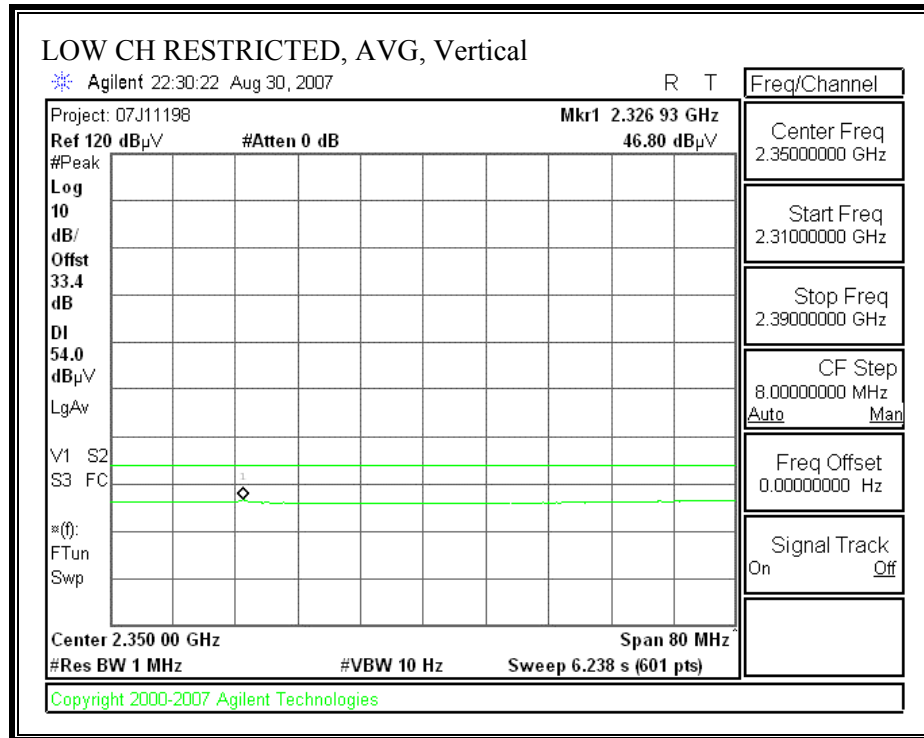
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



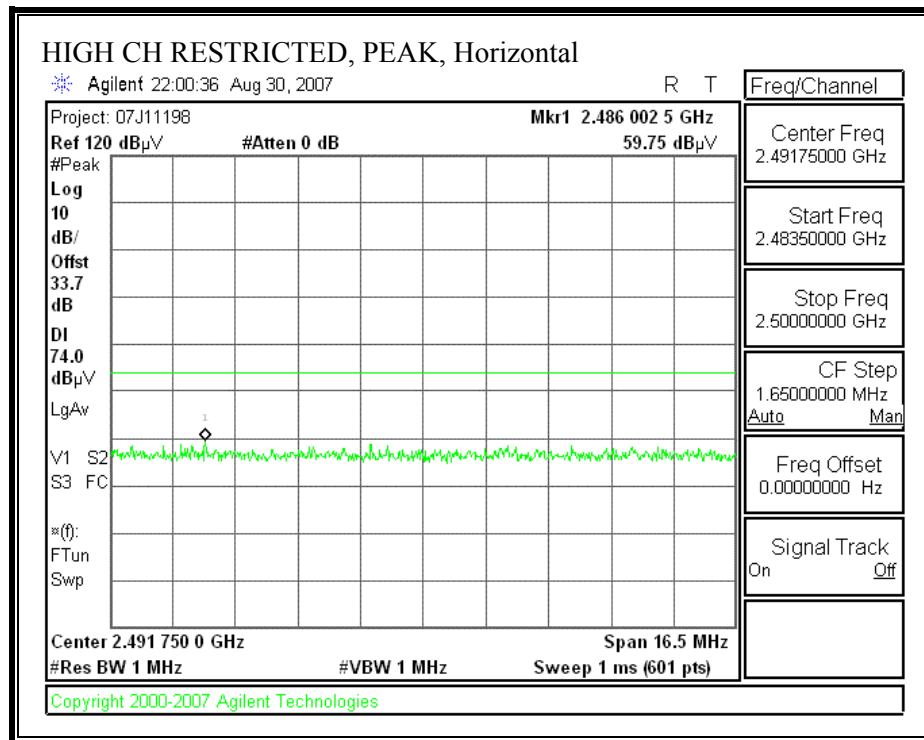


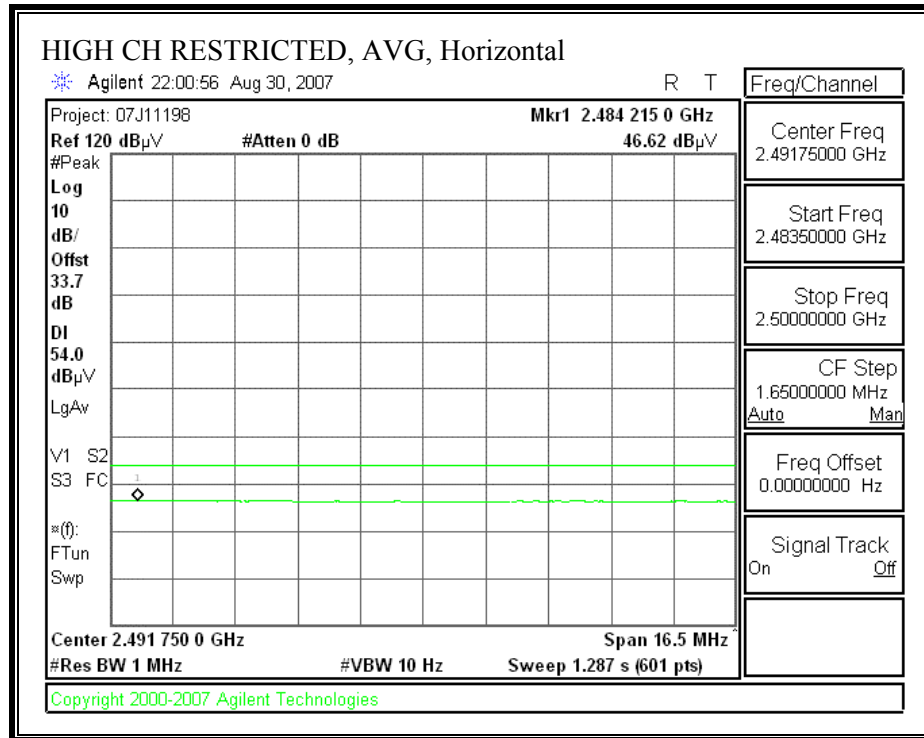
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



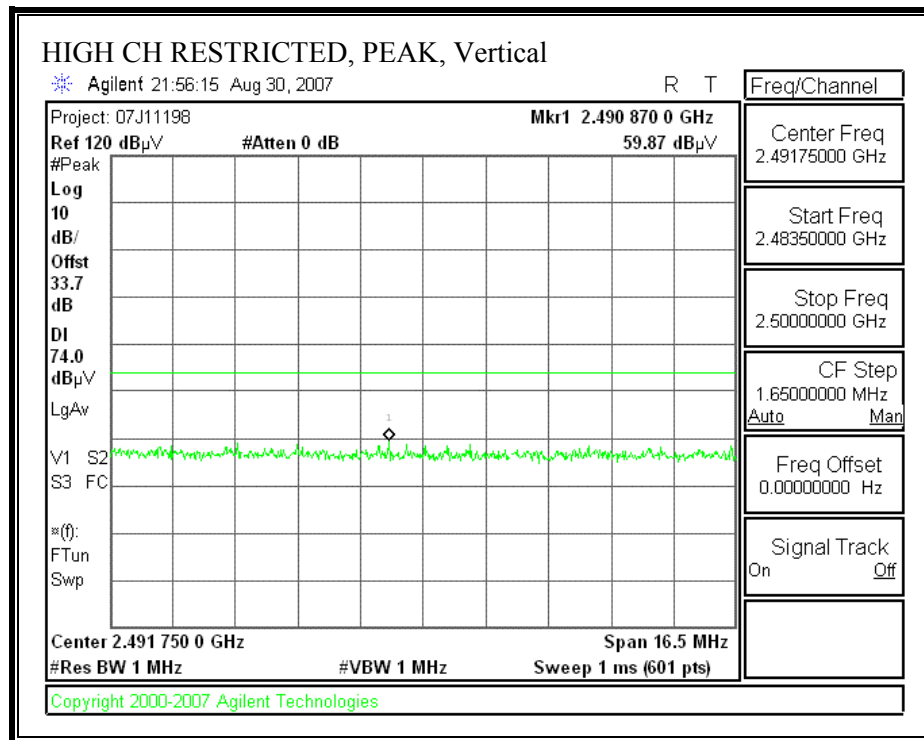


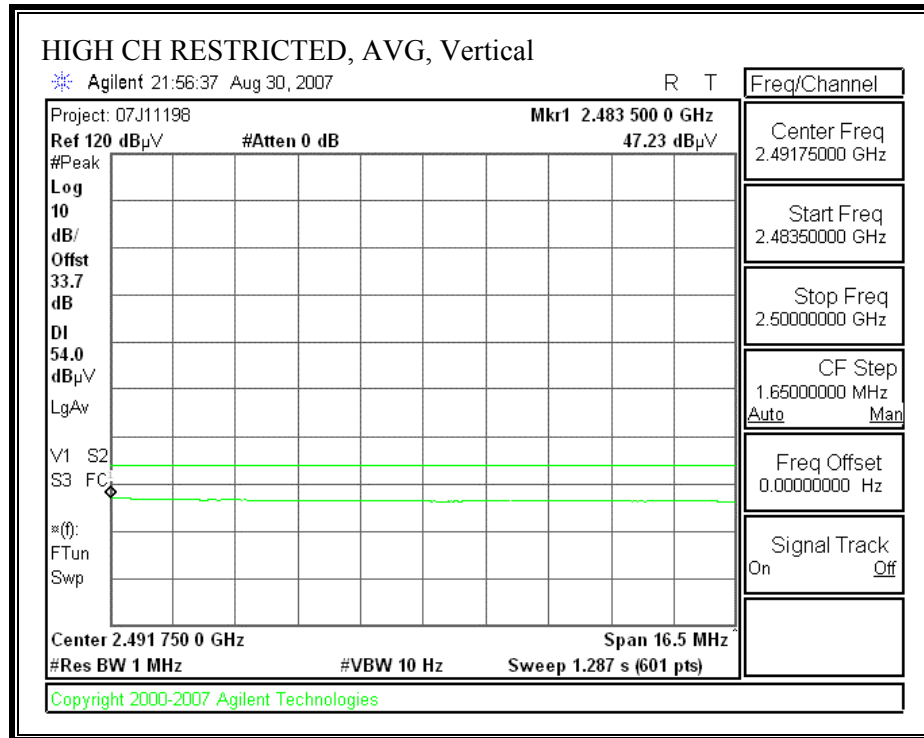
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





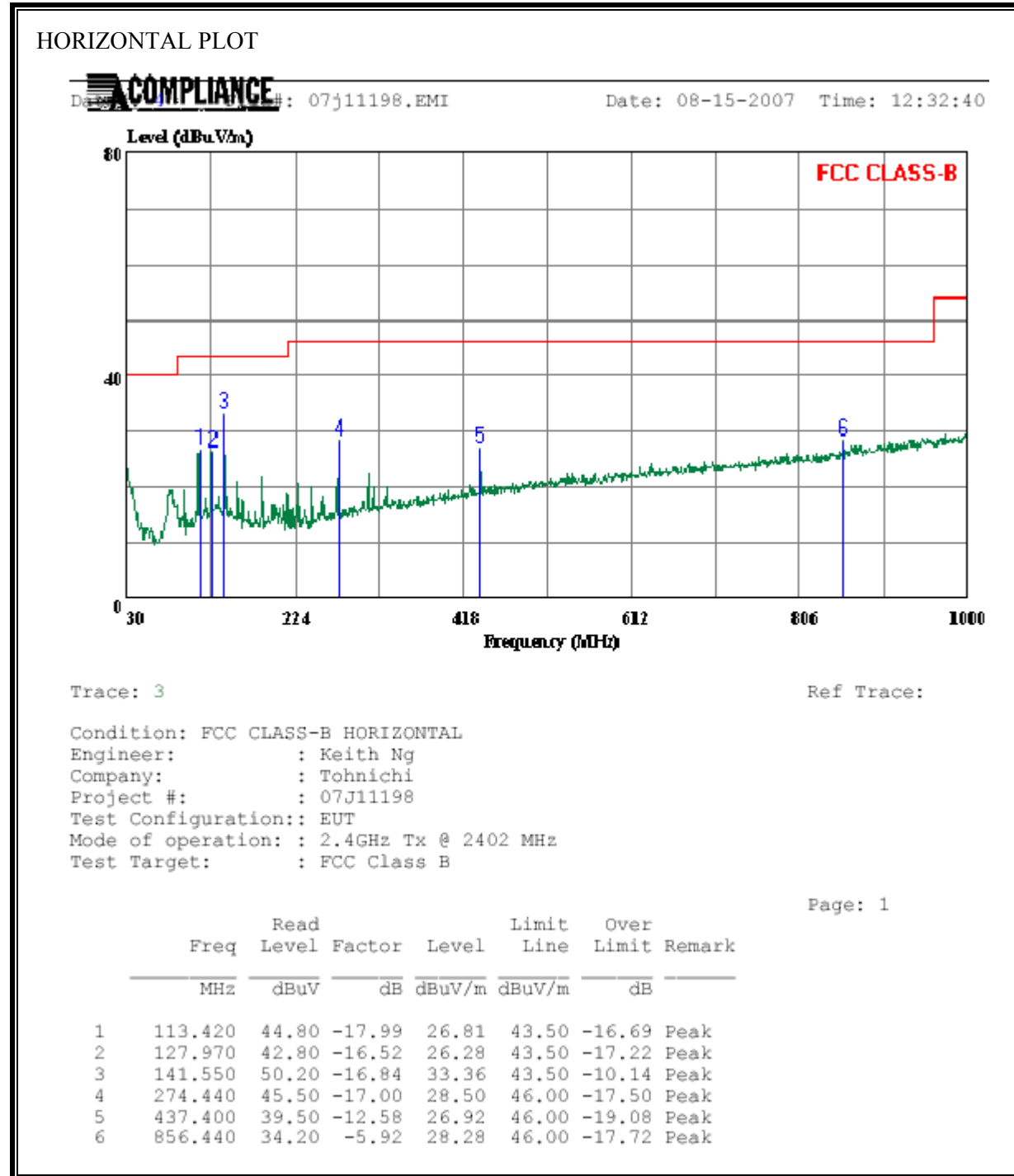
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



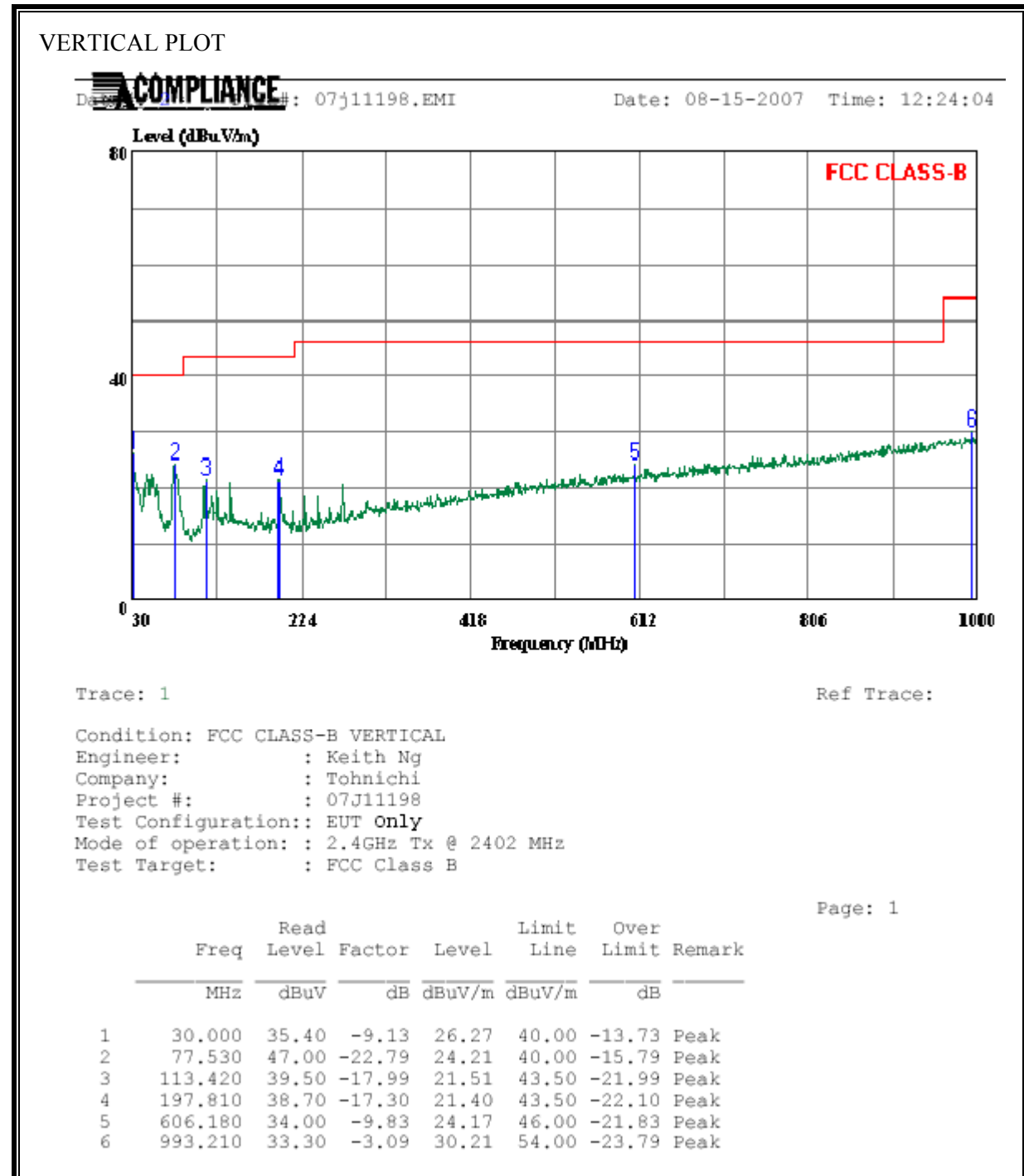


7.1.3. WORST-CASE BELOW 1 GHz

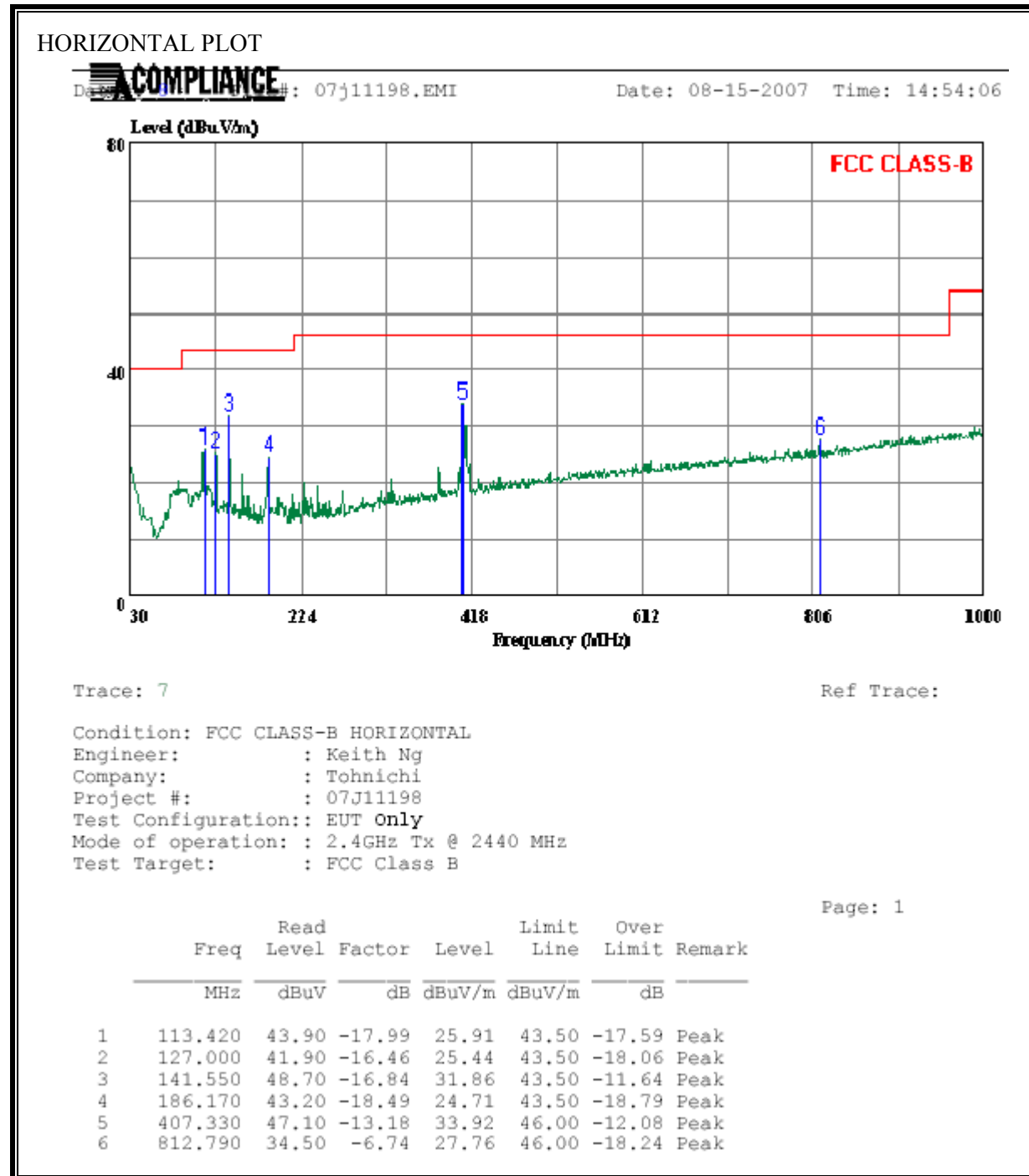
SPURIOUS EMISSIONS 30 TO 1000 MHz (LOW CHANNEL 2402 MHz, HORIZONTAL)



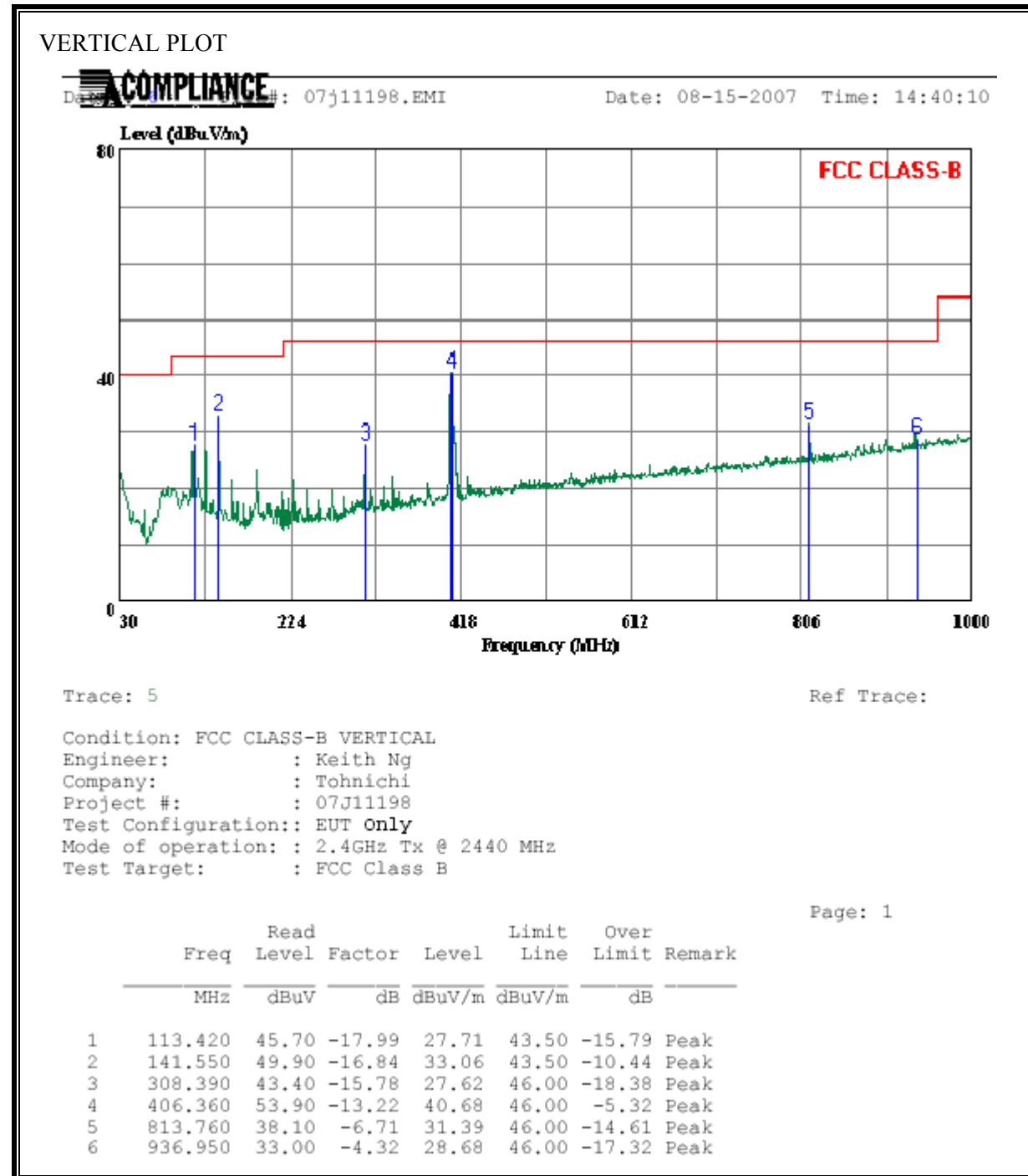
SPURIOUS EMISSIONS 30 TO 1000 MHz (LOW CHANNEL 2402 MHz, VERTICAL)



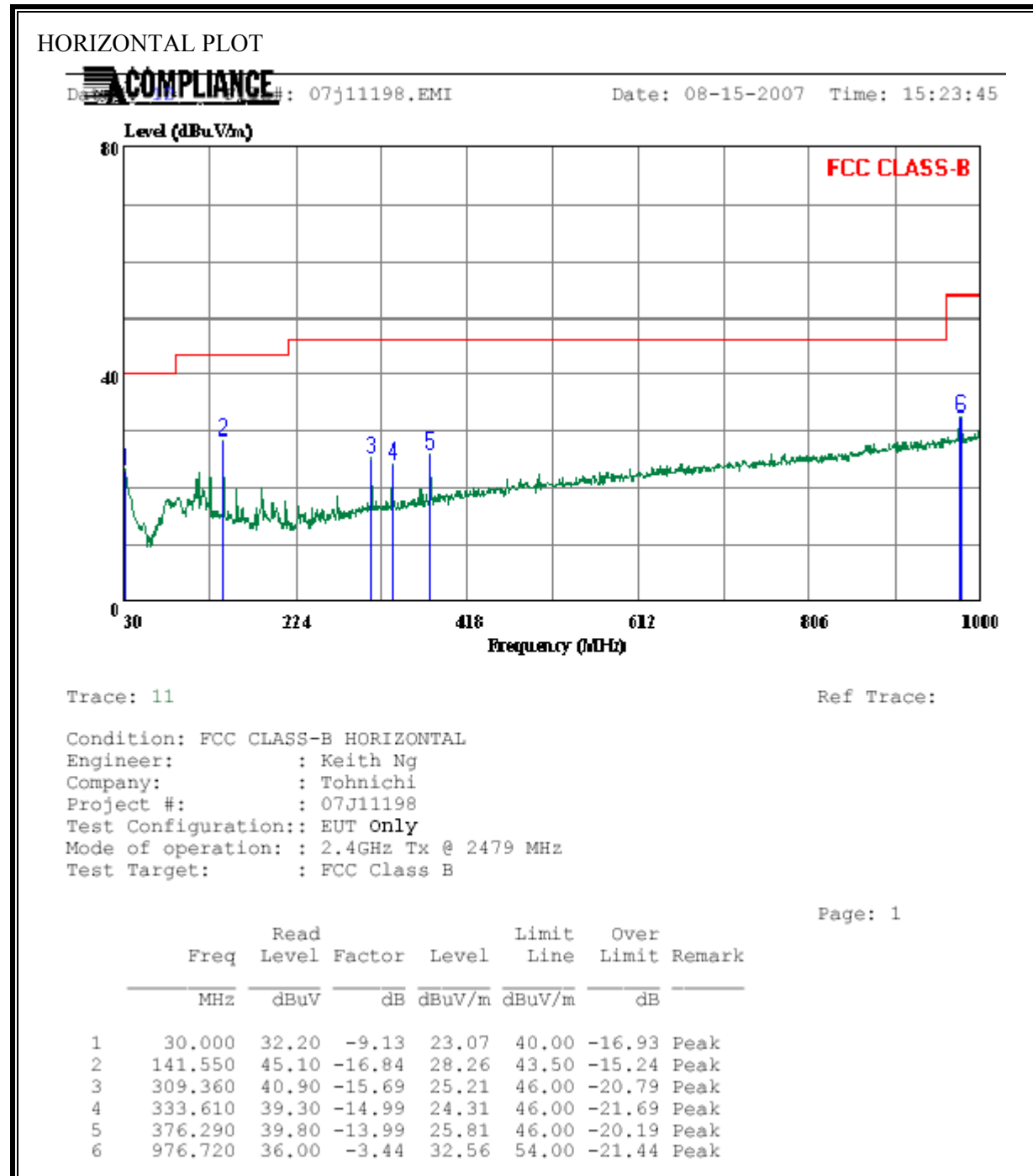
SPURIOUS EMISSIONS 30 TO 1000 MHz (MID CHANNEL 2440 MHz, HORIZONTAL)



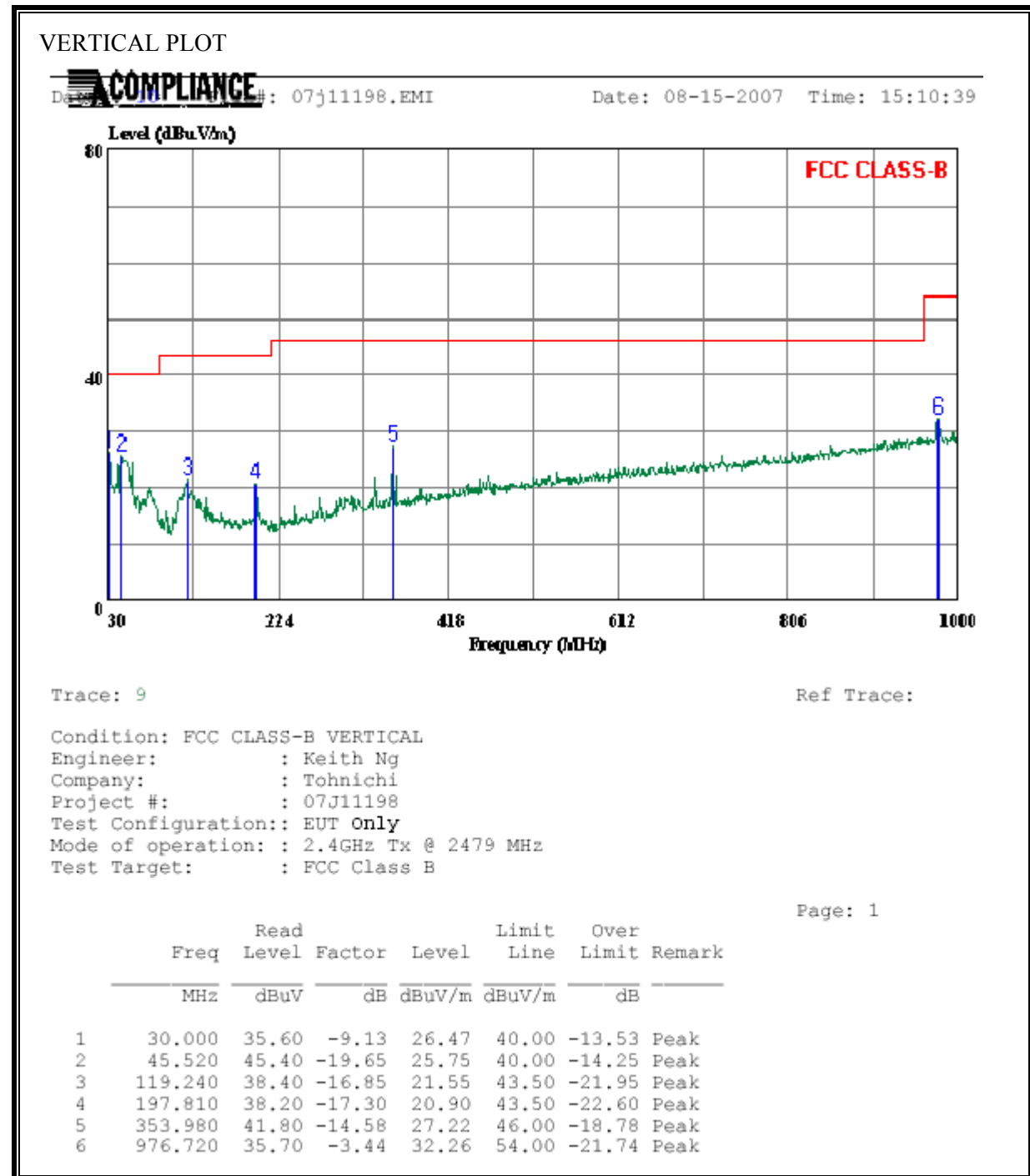
SPURIOUS EMISSIONS 30 TO 1000 MHz (MID CHANNEL 2440 MHz, VERTICAL)



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



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



7.1.4. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

High Frequency Measurement																
Compliance Certification Services, Fremont 5m Chamber																
Company: Tohnicli Project #: 07J11198 Date: 08/28/07 Test Engineer: Nimous Davoudi Configuration: EUT Only Mode: Tx (Worst Case)																
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																
2 foot cable			3 foot cable			12 foot cable			HPF			Reject Filter			Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz	
						A-5m Chamber			HPF_4.0GHz							
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)	
Low Ch																
4.802	3.0	50.5	32.7	33.3	6.9	-34.8	0.0	0.6	56.4	38.7	74	54	-17.6	-15.3	V	
7.206	3.0	45.2	27.4	34.9	8.4	-34.2	0.0	0.6	55.0	37.2	74	54	-19.0	-16.8	V	
9.608	3.0	40.6	22.9	36.7	9.6	-33.7	0.0	0.8	54.1	36.4	74	54	-19.9	-17.6	V	
4.802	3.0	51.9	34.1	33.3	6.9	-34.8	0.0	0.6	57.8	40.1	74	54	-16.2	-13.9	H	
7.206	3.0	45.4	27.6	34.9	8.4	-34.2	0.0	0.6	55.1	37.4	74	54	-18.9	-16.6	H	
9.608	3.0	40.2	22.4	36.7	9.6	-33.7	0.0	0.8	53.7	35.9	74	54	-20.3	-18.1	H	
Mid Ch																
4.880	3.0	49.0	31.2	33.4	6.9	-34.8	0.0	0.6	55.0	37.3	74	54	-19.0	-16.7	V	
7.320	3.0	43.8	26.0	35.0	8.4	-34.1	0.0	0.6	53.7	35.9	74	54	-20.3	-18.1	V	
9.760	3.0	39.6	21.8	36.8	9.8	-33.3	0.0	0.8	53.7	35.9	74	54	-20.3	-18.1	V	
4.880	3.0	49.2	31.5	33.4	6.9	-34.8	0.0	0.6	55.3	37.5	74	54	-18.7	-16.5	H	
7.320	3.0	42.5	24.7	35.0	8.4	-34.1	0.0	0.6	52.4	34.7	74	54	-21.6	-19.3	H	
9.760	3.0	41.2	23.4	36.8	9.8	-33.3	0.0	0.8	55.3	37.5	74	54	-18.7	-16.5	H	
High Ch																
4.958	3.0	51.9	34.2	33.4	7.0	-34.8	0.0	0.6	58.2	40.4	74	54	-15.8	-13.6	V	
7.437	3.0	42.5	24.7	35.1	8.5	-34.1	0.0	0.6	52.6	34.8	74	54	-21.4	-19.2	V	
9.916	3.0	41.9	24.2	36.8	10.0	-32.9	0.0	0.8	56.7	38.9	74	54	-17.3	-15.1	V	
4.958	3.0	57.6	39.9	33.4	7.0	-34.8	0.0	0.6	63.9	46.1	74	54	-10.1	-7.9	H	
7.437	3.0	43.6	25.8	35.1	8.5	-34.1	0.0	0.6	53.7	35.9	74	54	-20.3	-18.1	H	
9.916	3.0	40.9	23.1	36.8	10.0	-32.9	0.0	0.8	55.6	37.9	74	54	-18.4	-16.1	H	
Rev. 4127																
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									

7.2. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

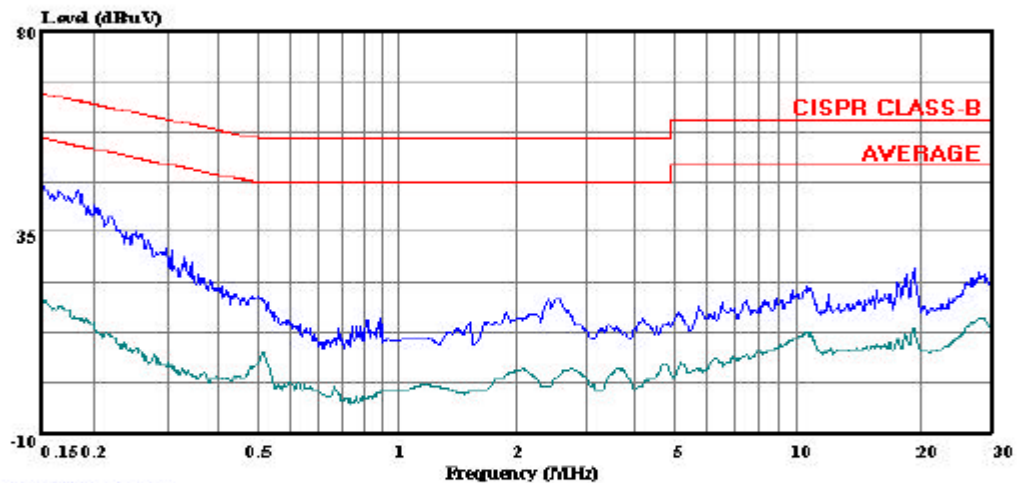
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	47.40	--	19.94	0.00	66.00	56.00	-18.60	-36.06	L1
0.18	44.60	--	15.57	0.00	64.39	54.39	-19.79	-38.82	L1
19.43	26.98	--	13.54	0.00	60.00	50.00	-33.02	-36.46	L1
0.15	49.06	--	19.55	0.00	66.00	56.00	-16.94	-36.45	L2
0.18	47.40	--	17.42	0.00	64.39	54.39	-16.99	-36.97	L2
19.43	27.75	--	14.09	0.00	60.00	50.00	-32.25	-35.91	L2
6 Worst Data									

LINE 1 RESULTS



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 14 File#: 07j11198.emi Date: 08-13-2007 Time: 17:12:22



(Line Conduction)
Trace: 12

Ref Trace:

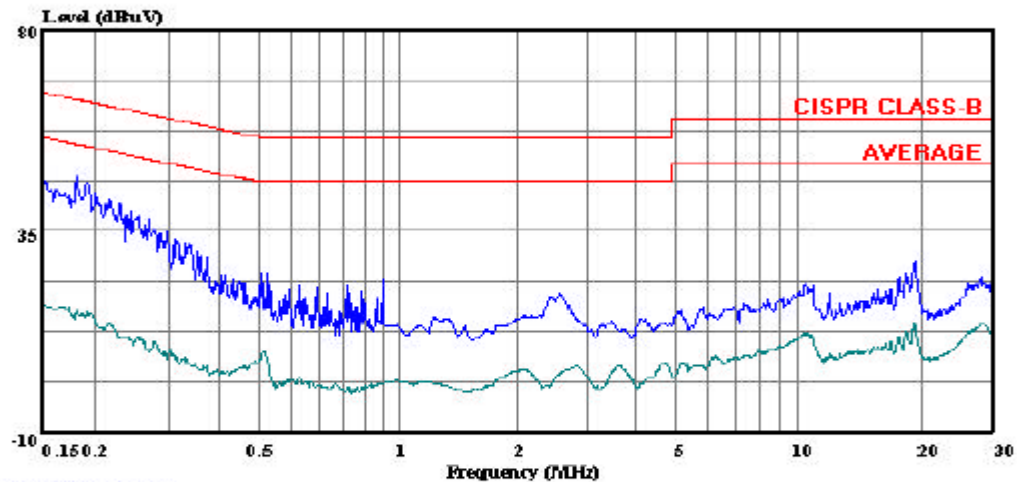
Condition: CISPR CLASS-B
Test Operator:: Keith Ng
Project #: : 07J11198
Company: : Tohnichi
Configuration:: BUT only
Mode: : Tx
Target: : FCC Class B
Voltage: : L1: Peak(Blue), Avg(Green)
: 115VAC 60Hz

LINE 2 RESULTS



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 7 File#: 07j11198.emi Date: 08-13-2007 Time: 17:06:53



(Line Conduction)

Trace: 5

Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Keith Ng
Project #: 07J11198
Company: Tohnichi
Configuration:: EUT only
Mode: Tx
Target: FCC Class B
Voltage: L2: Peak(Blue), Avg(Green)
: 115VAC 60Hz