



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

HANDHELD TERMINAL

MODEL NUMBER: IT- 800A-35U

**FCC ID: BBQIT800A
IC: 2388F-IT800A**

REPORT NUMBER: 11J13697-4

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Prepared for
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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>
--	06/22/11	Initial Issue, updated to the latest RSS-210 and RSS-GEN from 09J12750-7 and changed EUT model number and FCC ID/IC ID	T. Chan

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: CASIO COMPUTER CO., LTD
6-2 HON-MACHI 1-CHOME
SHIBUYA-KU
TOKYO, 151-8543, JAPAN

EUT DESCRIPTION: HANDHELD TERMINAL

MODEL: IT-800A-35U (HANDHELD) & HA-H62IO (ETHERNET CRADLE)

SERIAL NUMBER: 73 (CONDUCTED) & 02121 (RADIATED)

DATE TESTED: OCTOBER 21 TO 29, 2009

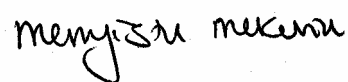
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Pass
INDUSTRY CANADA RSS-210 Issue 8, Annex 2	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

Compliance Certification Services (UL CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report. All Data are complied with the latest RSS-210 Issue 8 Standard.

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 UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL CCS By:

Tested By:



THU CHAN
EMC MANAGER
UL CCS

MENGISTU MEKURIA
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL 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. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11abg, Bluetooth and RFID equipped Handheld Terminal

The RFID module is manufactured by NXP Semiconductors.

5.2. MAXIMUM TRANSMITTER FIELD STRENGTH

The field strength of the transmitter is as follows:

Frequency Range (MHz)	Mode	Output Power (dBuV/m @ 30m)
13.56	Normal Mode	29.54

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a loop antenna.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was NFCTest Ver 0.19.00.

5.5. WORST-CASE CONFIGURATION AND MODE

Emission with highest power is considered to be the worst-case. To determine the worst case configuration the EUT investigate in X, Y, Z-Positions, and EUT with the Ethernet cradle. The highest power is turned out for the EUT with Y-Position. As a result, all the necessary harmonics tests have done with this EUT orientation.

5.6. MODIFICATIONS

No modifications were made during testing.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST			
Description	Manufacturer	Model	Serial Number
AC/DC Adapter	Casio	AD-S42120B	N/A
Ethernet Cradle	Casio	HA-H62IO	N/A
Micro SD	San Disk	09228042950J1	N/A
ACCESSS CARD	N/A	N/A	N/A

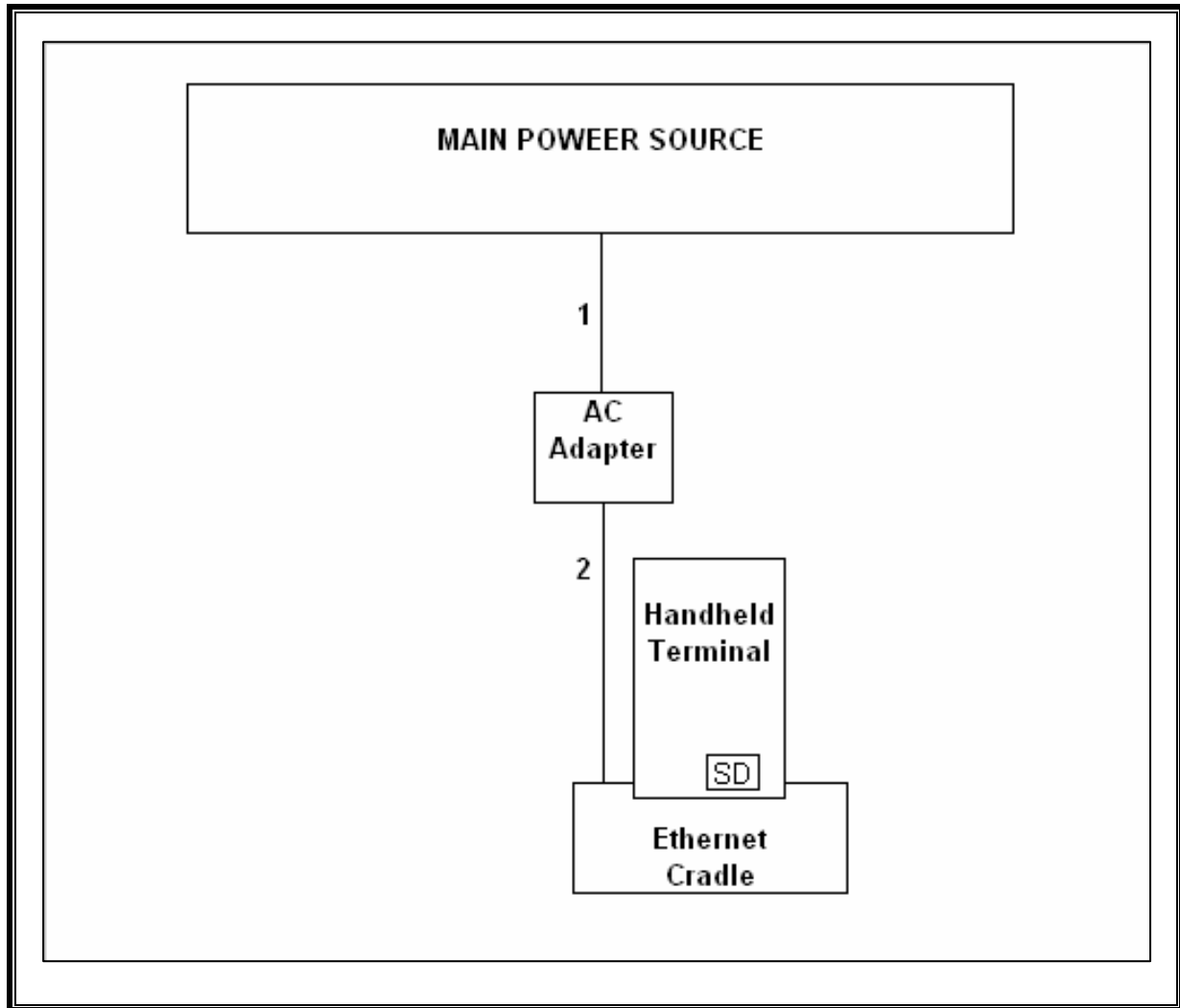
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identica Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	2m	one ferrite at Cradle end.

TEST SETUP

The EUT is sited on the cradle that connects to AC Adapter.

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	Asset No.	Cal Due
RF Filter Section	HP	85420E	C00958	03/24/11
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	C00957	03/24/11
Antenna, Loop, 30 MHz	EMCO	6502	C00593	09/16/10
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	1/14/2010
Antenna, Horn, 18 GHz	EMCO	3115	C00945	1/29/2010
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	12/16/2009
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	2/4/2010
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	8/24/2010
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	1/5/2010
Spectrum Analyzer, 40 GHz	Agilent / HP	8564E	C00951	6/12/2010
Power Meter	Agilent / HP	437B	N02785	12/2/2009
Power Sensor, 18 GHz	Agilent / HP	8481A	N02783	11/2/2009
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	4/6/2010

7. RADIATED EMISSION TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMIT

§15.225

IC RSS-210, Section 2.5 (Transmitter)

IC RSS-GEN, Section 6 (Receiver)

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
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.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:

Limit (dBuV/m) = 20 log limit (uV/m)

In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

TEST PROCEDURE

ANSI C63.4

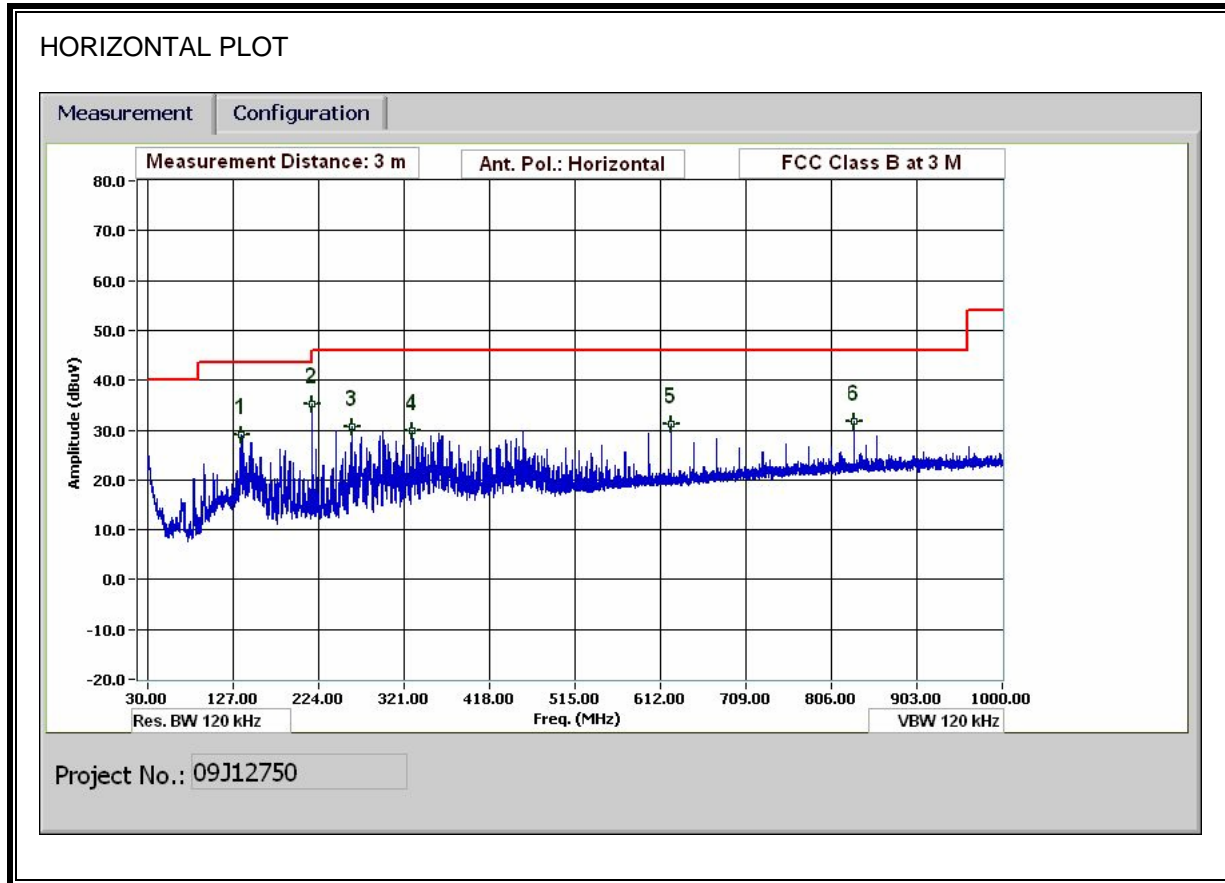
The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 624 MHz; therefore, the frequency range was investigated from 30 MHz to the 10th harmonic of the highest fundamental frequency.

RESULTS

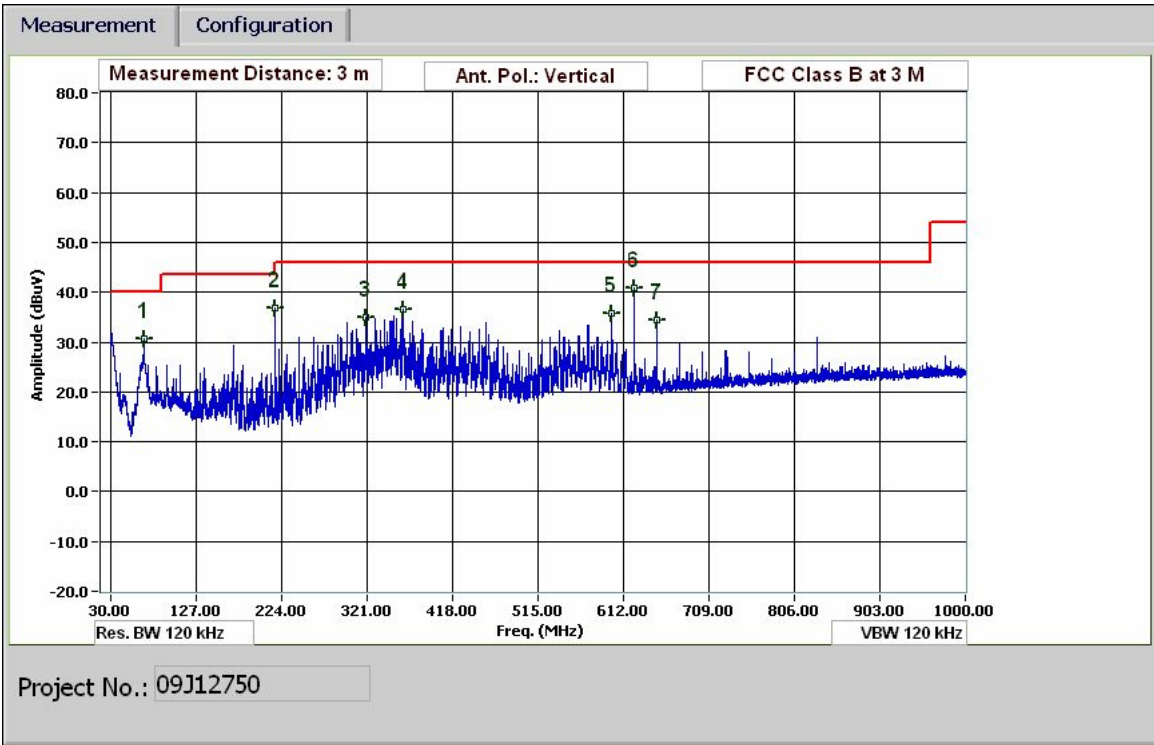
7.1.1. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)

FCC Part 15, Subpart B & C 10 Meter Distance Measurement At Open Field												
Company: CASIO COMPUTER CO., LTD. Project #: 09712750 Model #: IT-800A-35U Tester: MENGISTU MEKURIA Date: 10/21/2009												
Frequency (MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	AF (dB/m)	Distance Correction (dB)	PK Corrected Reading (dBuV/m)	AV Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	PK Margin (dB)	AV Margin (dB)	Notes
Loop Antenna Face On:												
13.56	58.98		N/A	10.56	-40.00	29.54	N/A	84.00	N/A	-54.5	N/A	Fundamental Measured @ 3m Dist
Loop Antenna Face Off:												
13.56	53.41		N/A	10.56	-40.00	23.97	N/A	84.00	N/A	-60.0	N/A	Fundamental Measured @ 3m Dist
* No other emissions were found of 20dB below the system noise up to 30MHz Note: The emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 10000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. P.K. = Peak Q.P. = Quasi Peak Readings A.F. = Antenna factor												

7.1.2. TX SPURIOUS EMISSION 30 TO 1000 MHz



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

50-1000MHz Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		MENGISTU MEKURIA											
Date:		10/21/2009											
Project #:		09J12752											
Company:		CASIO COMPUTER CO., LTD											
EUT Description:		HANDHELD TERMINAL WITH ETHERNET CRADLE											
EUT M/N:		IT-800A-35U											
Test Target:		FCC CLASS B											
Mode Oper:		TX 13.56 MHz											
f	Measurement Frequency	Amp	Preamp Gain	Margin	Margin vs. Limit								
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters										
Read	Analyzer Reading	Filter	Filter Insert Loss										
AF	Antenna Factor	Corr.	Calculated Field Strength										
CL	Cable Loss	Limit	Field Strength Limit										
f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QZ	Notes
135.604	3.0	42.9	13.4	1.1	28.3	0.0	0.0	29.1	43.5	-14.4	H	P	
216.948	3.0	50.3	11.9	1.3	28.2	0.0	0.0	35.3	46.0	-10.7	H	P	
261.730	3.0	45.2	12.2	1.4	28.2	0.0	0.0	30.5	46.0	-15.5	H	P	
329.652	3.0	42.5	13.9	1.6	28.1	0.0	0.0	29.9	46.0	-16.1	H	P	
624.024	3.0	37.6	18.7	2.3	27.4	0.0	0.0	31.1	46.0	-14.9	H	P	
831.993	3.0	35.4	21.3	2.7	27.6	0.0	0.0	31.3	46.0	-14.2	H	P	
67.802	3.0	50.2	8.0	0.7	28.4	0.0	0.0	30.6	46.0	-9.4	V	P	
216.948	3.0	52.0	11.9	1.3	28.2	0.0	0.0	37.0	46.0	-9.0	V	P	
319.452	3.0	47.7	13.7	1.6	28.1	0.0	0.0	34.9	46.0	-11.1	V	P	
362.534	3.0	48.5	14.4	1.7	28.1	0.0	0.0	36.4	46.0	-9.6	V	P	
597.983	3.0	42.7	18.4	2.2	27.5	0.0	0.0	35.3	46.0	-10.2	V	P	
624.024	3.0	47.2	18.7	2.3	27.4	0.0	0.0	40.3	46.0	-5.2	V	P	
650.066	3.0	40.4	19.0	2.3	27.4	0.0	0.0	34.4	46.0	-11.7	V	P	
Rev. 1.27.09													
Note: No other emissions were detected above the system noise floor.													

7.1.3. TX SPURIOUS EMISSIONS ABOVE 1 GHz

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Company: CASIO COMPUTER CO., LTD.
 Project #: 09J12752
 Date: 10/29/2009
 Test Engineer: MENGISTU MEKURIA
 Configuration: HANDHELD TERMNA, ETHERNET CRADLE, AND AC ADAPTER
 Mode: TX MODE

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz
3' cable 22807700	12' cable 22807600	20' cable 22807500			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	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)
1.064	3.0	51.7	36.0	24.1	2.4	-39.4	0.0	0.0	38.8	23.1	70.0	50.0	-31.2	-26.9	H
1.209	3.0	52.7	45.1	24.6	2.6	-39.2	0.0	0.0	40.7	33.1	70.0	50.0	-29.3	-16.9	H
1.067	3.0	61.5	39.2	24.1	2.4	-39.4	0.0	0.0	48.6	26.3	70.0	50.0	-21.4	-23.7	V
1.200	3.0	50.6	45.2	24.5	2.6	-39.2	0.0	0.0	38.5	33.1	70.0	50.0	-31.5	-16.9	V
4.874	3.0	54.6	32.7	33.1	5.8	-36.5	0.0	0.0	57.1	35.2	70.0	50.0	-12.9	-14.8	V

Rev. 11.10.08

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		

7.1.4. RX SPURIOUS EMISSIONS ABOVE 1 GHz

These requirements do not apply to receivers used in combination with permanently co-located transmitters continuously transmitting

8. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207
IC RSS-GEN, Section 7.2.4

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Notes:
1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

TEST PROCEDURE

ANSI C63.4

RESULTS

No non-compliance noted:

6 WORST EMISSIONS

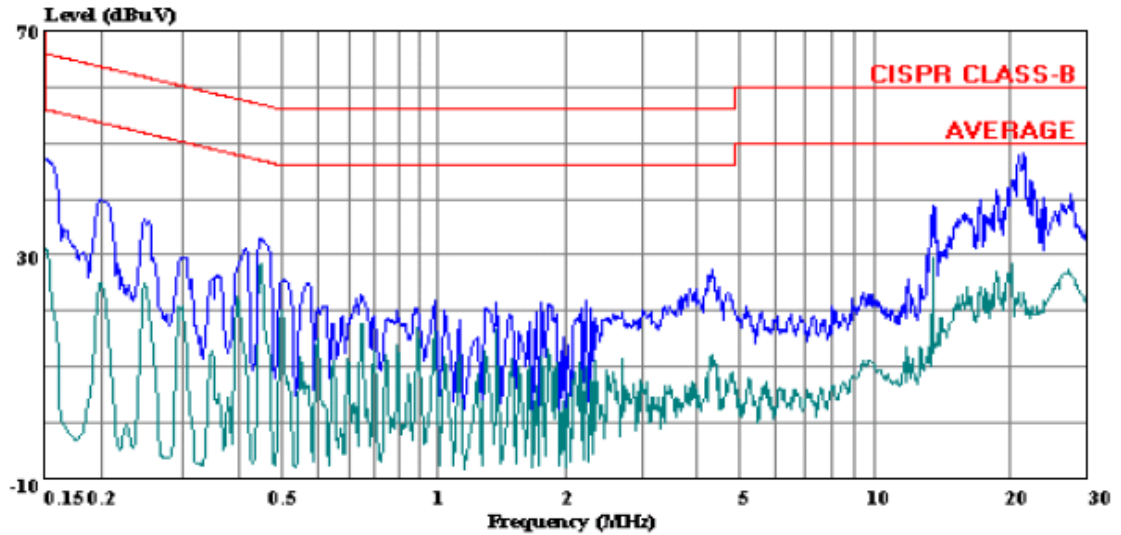
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.15	47.25	--	31.04	0.00	66.00	56.00	-18.75	-24.96	L1
0.45	32.83	--	28.42	0.00	56.89	46.89	-24.06	-18.47	L1
20.92	47.90	--	28.35	0.00	60.00	50.00	-12.10	-21.65	L1
0.15	47.71	--	33.45	0.00	66.00	56.00	-18.29	-22.55	L2
0.42	38.77	--	30.19	0.00	57.55	47.55	-18.78	-17.36	L2
0.45	39.29	--	34.08	0.00	56.93	46.93	-17.64	-12.85	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#: 175 File#: 09J12750LC.EMI Date: 10-22-2009 Time: 19:55:18



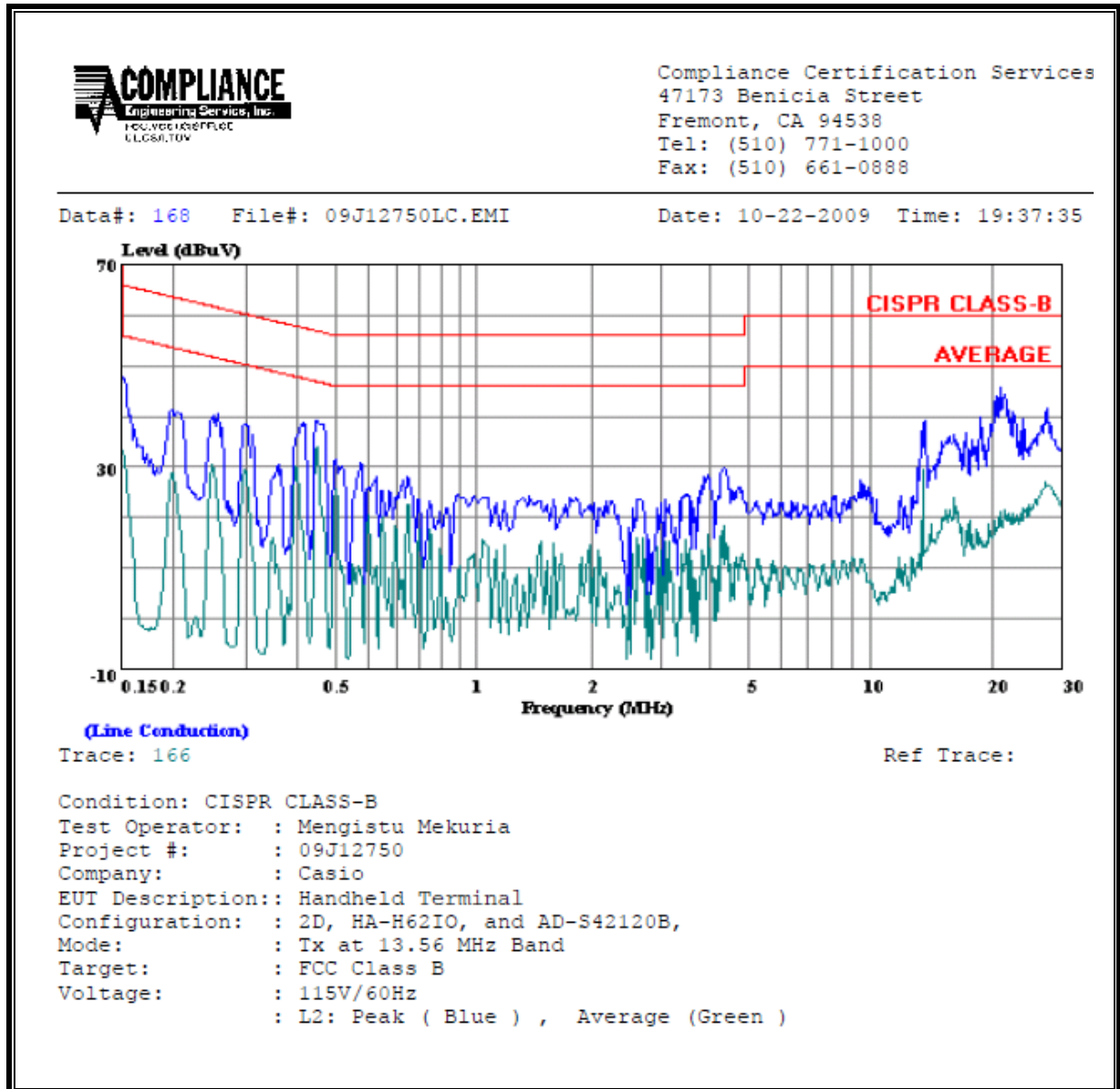
(Line Conduction)

Trace: 173

Ref Trace:

Condition: CISPR CLASS-B
Test Operator: : Mengistu Mekuria
Project #: : 09J12750
Company: : Casio
EUT Description: : Handheld Terminal
Configuration: : 2D, HA-H62IO, and AD-S42120B,
Mode: : Tx at 13.56 MHz Band
Target: : FCC Class B
Voltage: : 115V/60Hz
: L1: Peak (Blue) , Average (Green)

LINE 2 RESULTS



9. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clause 2.3.1 and 2.3.2

RESULTS

Reference Frequency: EUT Channel 13.56 MHz @ 20°C					
Limit: ± 100 ppm = 1.356 kHz					
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse			
		(MHz)	Delta (ppm)	Limit (ppm)	Minutes
115.00	50	13.5599835	1.278	± 100	10
115.00	40	13.5599843	1.214	± 100	10
115.00	30	13.5599971	0.273	± 100	10
115.00	20	13.5600008	0.000	± 100	10
115.00	10	13.5600208	-1.477	± 100	10
115.00	0	13.5600287	-2.055	± 100	10
115.00	-10	13.5600217	-1.539	± 100	10
115.00	-20	13.5599933	0.552	± 100	10
97.15	20	13.5600005	0.023	± 100	10
132.25	20	13.5600007	0.008	± 100	10

Note: While maintaining a constant temperature inside the environmental chamber, the EUT has been recorded at operating frequency at startup and two, five, and ten minutes, but only the worst case readings of minutes was reporting.

10. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Frequency (MHz)	99% Bandwidth (KHz)
13.65	6.4974

99% BANDWIDTH

