



NVLAP LAB CODE 200707-0



FCC PART 15 B

MEASUREMENT AND TEST REPORT

For

Tobii Technology AB

Karlsrovägen 2D, 18256 Danderyd, Sweden

FCC ID: W5MT0BIIC8
Model: T-C84-R1.0A-V0

Report Type: Original Report	Product Type: A Laptop Computer with Bluetooth, WiFi and GSM Modules
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Report Number: <u>RSZ08122303</u>	
Report Date: <u>2009-03-13</u>	
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “*” (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Tobii Technology AB*'s product, model *T-C84-R1.0A-V0* or the "EUT" as referred to in this report is a *Tobii C8* (A Laptop Computer with Bluetooth, WiFi and GSM Modules), the EUT is measured approximately 23.2 cm L x 20.6 cm W x 3.9 cm H, rated input voltage: DC 24V adapter or DC 11.1V battery.

Adapter Information:

Model: EXM 80 5121;

Input: AC 100-240V 50/60Hz Max 1.7A;

Output: DC 24V -- 2.9A

** All measurement and test data in this report was gathered from production sample serial number: 0812062 (Assigned by BACL, Shenzhen). The EUT was received on 2008-12-23.*

Objective

The following test report is prepared on behalf of *Tobii Technology AB* in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine compliance with FCC Part 15.109, 15.121.

Related Submittal(s)/Grant(s)

FCC Part 24E and Part 15.247 submission with FCC ID: W5MTOBIIC8.

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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at
<http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

Equipment Modifications

No modifications were made to the EUT.

Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Motherboard	OWC297	CN-OWC297-70821-566-02BR	DoC
DELL	Power	NPS-250KB D	CN-0H2678-17972-56E8NBM	DoC
Seagate	Hard Disk	ST340014A	5JXK3NAD	DoC
DELL	3.5' Floppy	N/A	CN-0N8893-69802-54Q-02OZ	DoC
Lite-ON	CD-Rom	LTN-489S	N/A	DoC
Intel	CPU	Celeron D-2533	N/A	N/A
ProMOS	Memory	V826632K24SATG-C0	0525-K1933700	N/A
Intel	Ethernet	PRO 10/100 VE	N/A	DoC

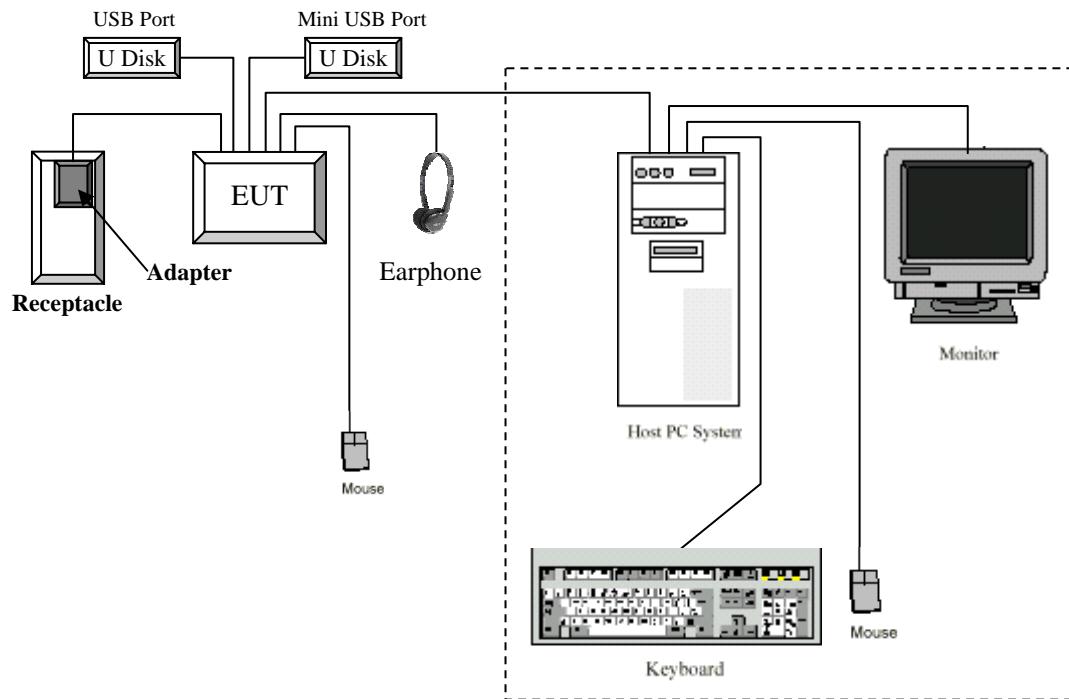
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	PC	DELL 170L	CN-0TC670-70821-560-F4WQ	DoC
DELL	Keyboard	SK-8110	CN07N244-71616-56I-1I0O	DoC
DELL	Mouse	M071KC	519046820	DoC
DELL	Mouse	MUC5UO	N/A	DoC
DELL	LCD Monitor	1505FP	Y4287-7168-574-GBSH	DoC
SOMIC	Earphone	ST-818	N/A	DOC
Kingston	U-Disk	Data Traveler	N/A	DOC
HuaPu	Mini U-Disk	DPF-802	N/A	DOC

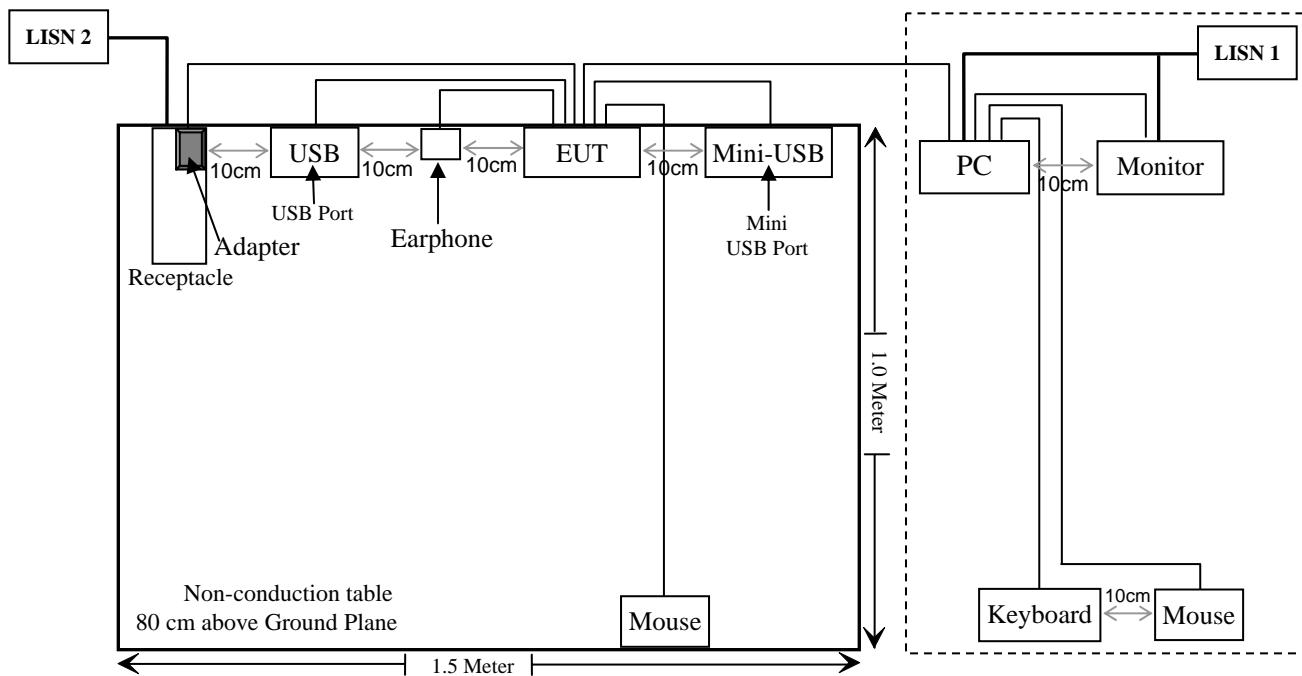
External Cable List and Details

Cable Description	Length (m)	From/Port	To
Shielded Detachable Keyboard Cable	1.50	Keyboard Port / Host	Keyboard
Shielded Detachable Mouse Cable	1.50	Mouse Port / Host	Mouse
Shielded Detachable VGA Cable	1.50	VGA Port / Host	Monitor
Shielded Detachable Power Cable	1.96	EUT	Adapter

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliant
§15.109	Radiated Emissions	Compliant
§15.33	Frequency of Investigation	N/A
§15.27	Special Accessories	Compliant

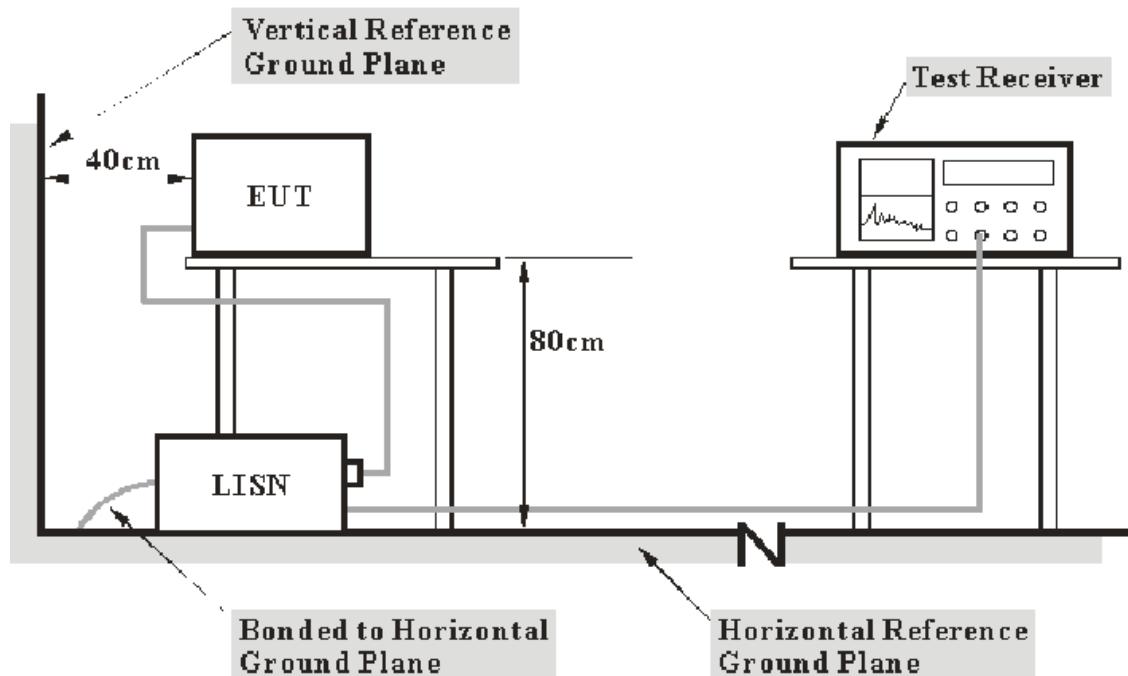
CFR47 §15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ± 2.4 dB.

EUT Setup



Note:

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.107 limits.

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

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

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

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12208	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCS30	DE25330	2008-03-25	2009-03-25
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2008-03-25	2009-03-25

* Com-Power's LISN were used as the supporting equipment.

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN, and the host PC was connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the [FCC Part 15.107](#), with the worst margin reading of:

2.50 dB at 0.1500 MHz in the Neutral conductor mode

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Bruce Zhang on 2009-03-02.

Test Mode: Operating

Line Conducted Emissions				FCC PART 15.107	
Frequency (MHz)	Amplitude (dB μ V)	Detector (QP/AV)	Conductor (Line/Neutral)	Limit (dB μ V)	Margin (dB)
0.1500	63.50	QP	Neutral	66.00	2.50
0.1500	61.30	QP	Line	66.00	4.70
12.3050	44.70	AV	Neutral	50.00	5.30
23.4200	44.60	AV	Line	50.00	5.40
12.0600	44.30	AV	Line	50.00	5.70
24.0300	43.70	AV	Neutral	50.00	6.30
22.0150	43.00	AV	Line	50.00	7.00
23.4150	49.80	QP	Line	60.00	10.20
22.1200	48.60	QP	Line	60.00	11.40
12.0600	48.50	QP	Line	60.00	11.50
12.2450	48.40	QP	Neutral	60.00	11.60
7.7850	47.70	QP	Line	60.00	12.30
7.6650	47.40	QP	Neutral	60.00	12.60
7.6650	36.40	AV	Neutral	50.00	13.60
0.5900	42.30	QP	Neutral	56.00	13.70
23.9700	45.80	QP	Neutral	60.00	14.20
7.7850	35.70	AV	Line	50.00	14.30
0.7050	40.30	QP	Line	56.00	15.70
1.1050	39.00	QP	Neutral	56.00	17.00
0.5900	28.40	AV	Neutral	46.00	17.60
0.7000	25.90	AV	Line	46.00	20.10
1.1000	24.90	AV	Neutral	46.00	21.10
0.1500	29.70	AV	Neutral	56.00	26.30
0.1500	26.50	AV	Line	56.00	29.50

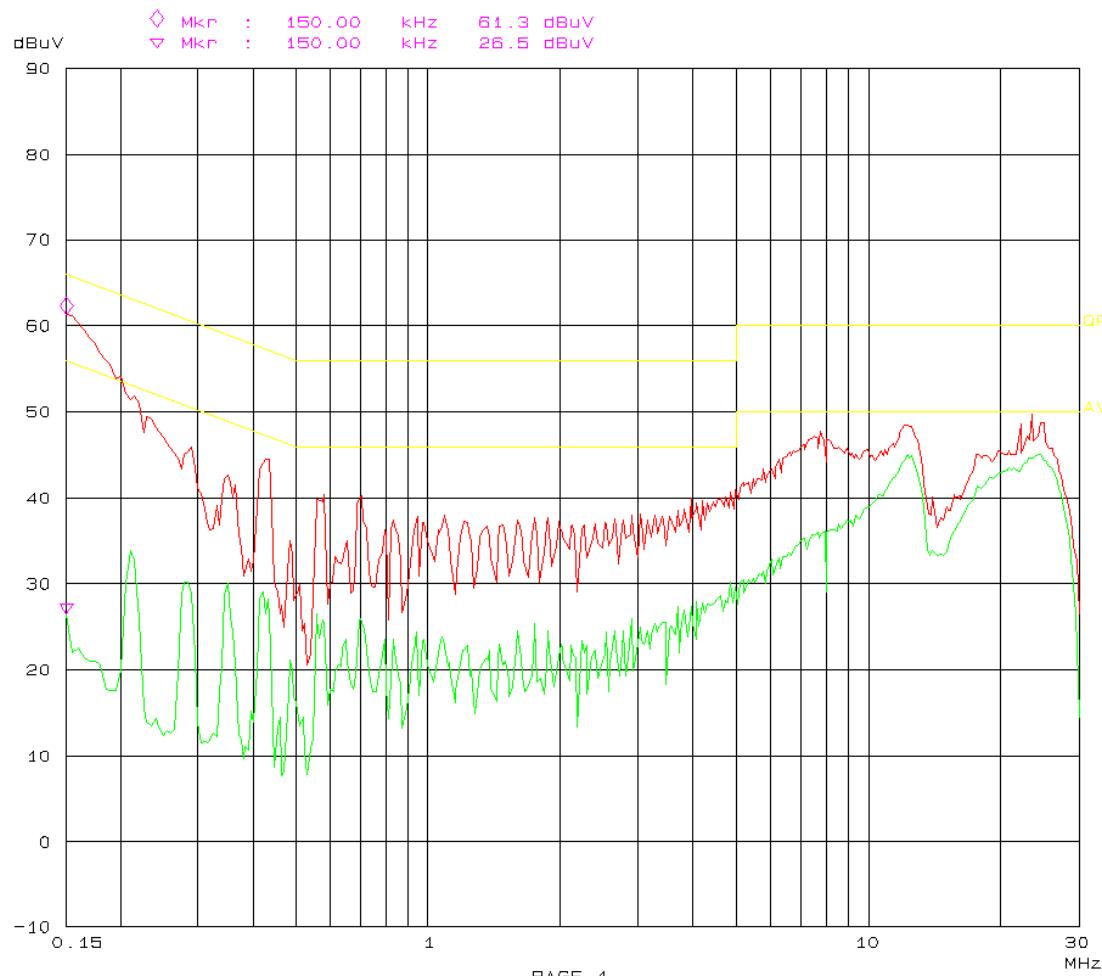
Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.

Conducted emission
FCC part15

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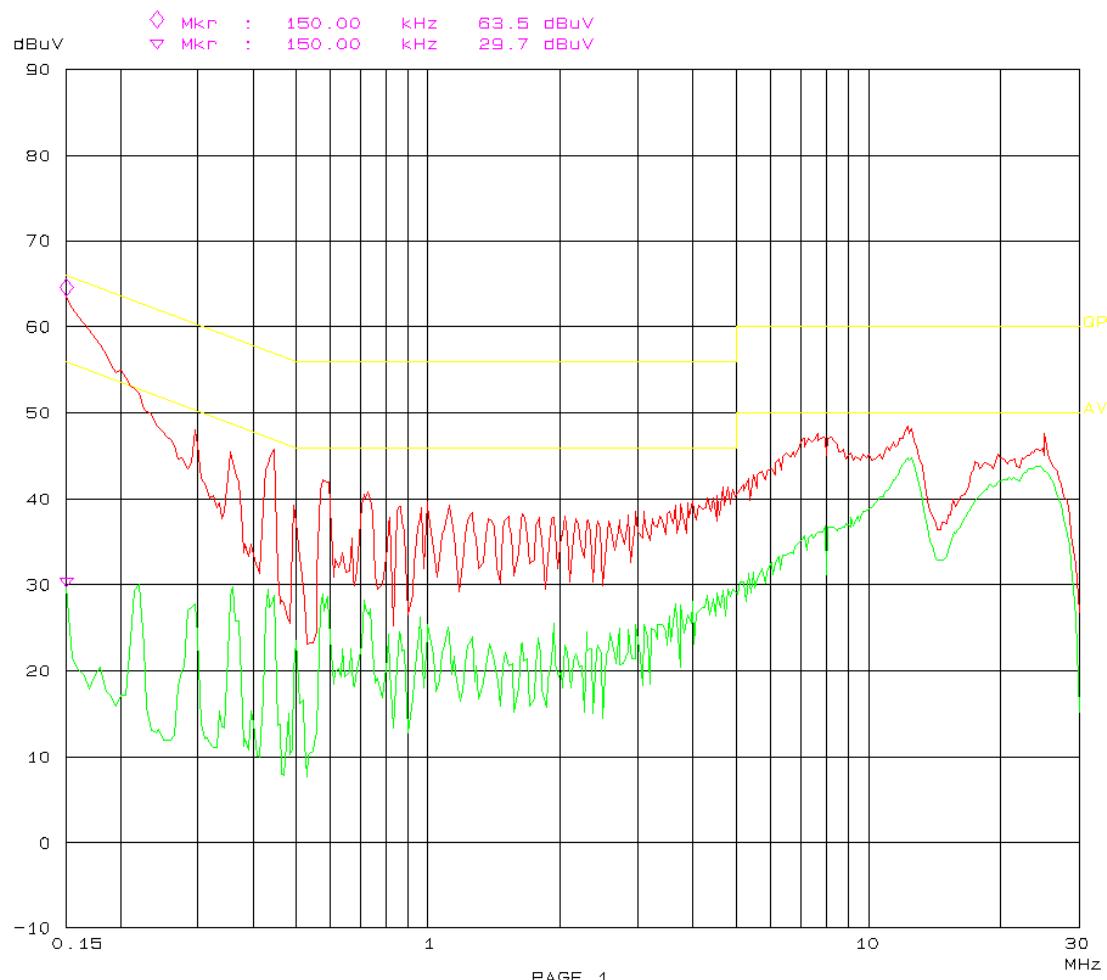
EUT: Tobii C8 M/N: T-C84-R1.0A-VO
Manuf: Tobii
Op Cond: Operating
Operator: Bruce
Test Spec: AC 120V/60Hz L
Comment: Temp: 25 Hum: 56%
BACL



Conducted emission
FCC part15

02. Mar 09 13:13

EUT: Tobii C8 M/N: T-C84-R1.0A-VO
Manuf: Tobii
Op Cond: Operating
Operator: Bruce
Test Spec: AC 120V/60Hz N
Comment: Temp: 25 Hum: 56%
BACL



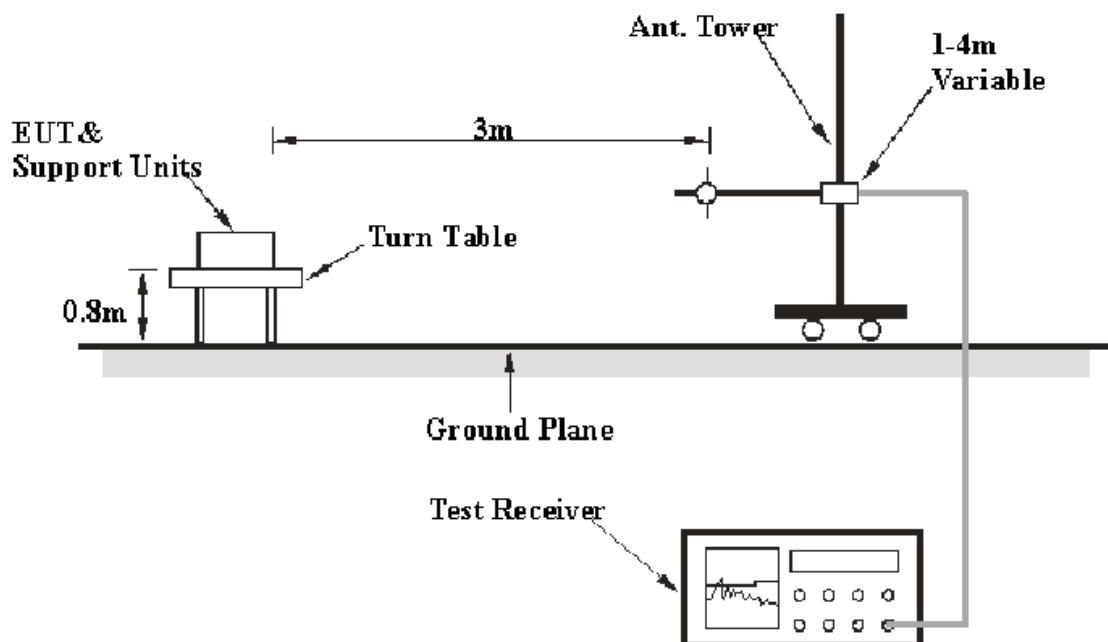
CFR47 §15.109 - RADIATED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part 15.109 limits.

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

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 1000 MHz.

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

Frequency	RB/W	VB/W	IF B/W
30 MHz-1 GHz	100 kHz	300 kHz	120 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06
HP	Amplifier	HP8447E	1937A01046	2008-11-15	2009-11-15
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2008-08-14	2009-08-14

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, the adapter and the host PC were connected to AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode.

Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.109, with the worst margin reading of:

5.3 dB at 30.626500 MHz in the Vertical polarization

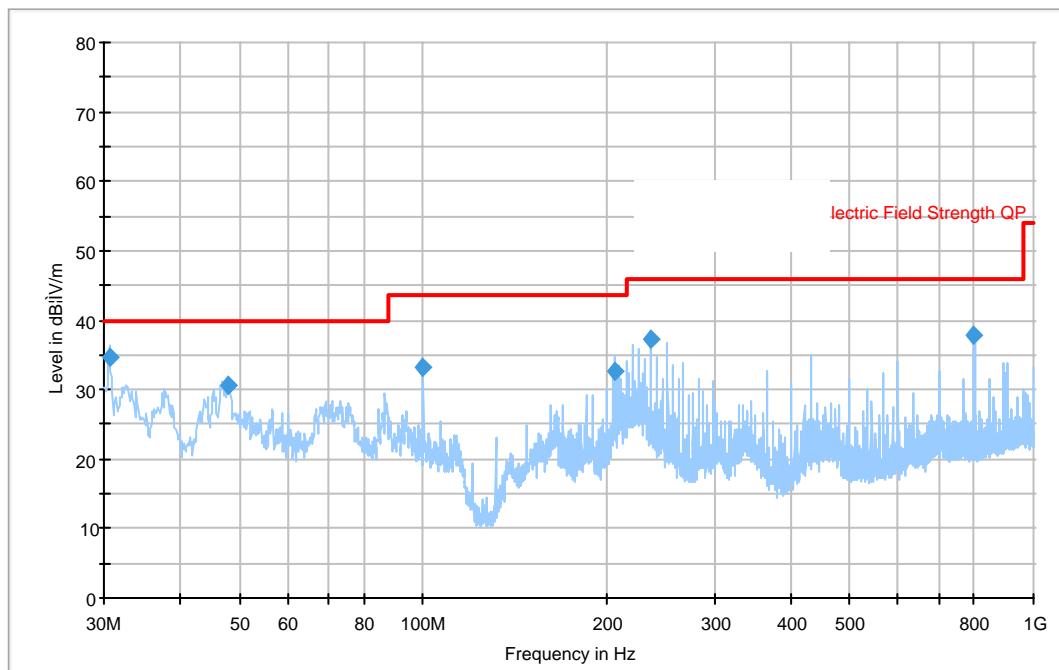
Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Bruce Zhang on 2009-03-02.

Test mode: Operating



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Ant. Polarity	Turntable position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
30.626500	34.7	105.0	V	88.0	-9.0	40.0	5.3
800.114675	37.9	105.0	V	65.0	-5.4	46.0	8.1
236.102475	37.4	138.0	H	256.0	-16.3	46.0	8.6
47.809325	30.7	105.0	V	128.0	-19.3	40.0	9.3
99.999050	33.2	200.0	H	35.0	-20.2	43.5	10.3
205.321625	32.6	128.0	V	0.0	-17.1	43.5	10.9

***** END OF REPORT *****