

**ELECTRO MAGNETIC TEST, INC.**1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

*FCC PART 15, SUBPART C
IC RSS 210, ISSUE 9
TEST REPORT*

*for**the*

RFID SCANNER

MODEL: CENTAURI V2

Prepared for

Eventbrite, Inc.
155 5th Street, Floor 7
San Francisco, CA 94103

Prepared by:

A handwritten signature in blue ink that reads 'George Hsu'.

GEORGE HSU

Approved by:

A handwritten signature in blue ink that reads 'Kevin Bothmann'.

KEVIN BOTHMANN

ELECTRO MAGNETIC TEST, INC.
1547 PLYMOUTH STREET
MOUNTAIN VIEW, CALIFORNIA 94043
(650) 965-4000

DATE: May 1, 2017

	REPORT BODY	APPENDICES				TOTAL
		A	C	D	E	
PAGES	22	8	3	2	2	37

This report shall not be reproduced except in full, without the written approval of Electro Magnetic Test, Inc.

**ELECTRO MAGNETIC TEST, INC.**

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

TABLE OF CONTENTS

GENERAL REPORT SUMMARY	4
SUMMARY OF TEST RESULTS.....	5
TECHNICAL DESCRIPTION OF THE EUT	6
1. PURPOSE	7
2. ADMINISTRATIVE DATA.....	7
2.1 LOCATION OF TESTING	7
2.2 TRACEABILITY STATEMENT.....	7
2.3 COGNIZANT PERSONNEL.....	7
2.4 DATE TEST SAMPLE WAS RECEIVED.....	7
2.5 DISPOSITION OF THE TEST SAMPLE.....	7
2.6 ABBREVIATIONS AND ACRONYMS	8
3. APPLICABLE DOCUMENTS.....	9
4. DESCRIPTION OF TEST CONFIGURATION.....	10
4.1 DESCRIPTION OF TEST CONFIGURATION - EMI.....	11
4.1.1 Cable Construction and Termination	11
5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT.....	12
5.1 EUT AND ACCESSORY LIST	12
5.2 EMI TEST EQUIPMENT	13
6. TEST SITE DESCRIPTION	15
6.1 TEST FACILITY DESCRIPTION	15
6.2 EUT MOUNTING, BONDING AND GROUNDING.....	15
6.3 FACILITY ENVIRONMENTAL CHARACTERISTICS	15
7. TEST PROCEDURES	16
7.1 RADIATED EMISSIONS	16
7.1.1 Limit (FCC PART 15 SECTION 15.225(a,b,c,d), IC RSS 210 Issue 9[B.6])	16
7.1.2 Limit (FCC PART 15 SECTION 15.209(a)(1), IC RSS-GEN Issue 4 [8.9]).....	16
7.1.3 Test Procedure.....	17
7.2 Conducted Emissions	18
7.2.1 Limit (FCC PART 15 SECTION 15.207(a), IC RSS-GEN Issue 4 [8.8]).....	18
7.2.2 Test Procedure.....	18
7.3 FREQUENCY STABILITY	19
7.3.1 Limit (FCC PART 15 SECTION 15.225(e), IC RSS 210 Issue 9 [B.6]).....	19
7.3.2 Test Procedure.....	19
7.4 OCCUPIED BANDWIDTH	19
7.4.1 Limit (RSS-GEN Issue 4, [6.6])	20
7.4.2 Test Procedure.....	20
7.5 ANTENNA REQUIREMENT	21
7.5.1 Requirement (FCC PART 15 SECTION 15.203).....	21
7.5.2 Result	21
8. CONCLUSIONS / COMPLIANCE STATEMENT	22

**ELECTRO MAGNETIC TEST, INC.**1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

LIST OF APPENDICES

APPENDIX	TITLE
A	Radiated and Conduction Data Sheets <ul style="list-style-type: none">• Radiated Emissions Test Data• Conducted Emissions Test Data• Frequency Stability Test Data• Occupied Bandwidth Test Data
B	Test Setup Diagrams
C	Modifications To The EUT
D	Additional Models Covered Under This Report

LIST OF FIGURES

FIGURE	TITLE
1	Conducted Emissions Test Setup
2	Plot Map And Layout of Test Site
3	Layout of 5 Meter Semi-Anechoic Chamber


ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Electro Magnetic Test, Inc., which is an independent testing and consulting firm. The test report is based on testing performed Electro Magnetic Test, Inc. personnel according to the measurement procedure described in the test specification given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government.

Electro Magnetic Test, Inc. is recognized by the following agencies for performing EMI/EMC testing:

COUNTRY	AGENCY	IDENTIFYING #
USA	Federal Communications Commission (FCC) (EMT's test site is recognized by the FCC)	Registration Number: 90576
USA, Canada, Taiwan, Australia/New Zealand, European Community	National Voluntary Lab Accreditation Program (NVLAP) (EMT is accredited by NVLAP. A copy of the NVLAP Scope Of Accreditation is available upon request.)	Lab Code: 200147-0
Canada	Industry Canada	File No.: IC 2804
Japan	Voluntary Control Council For Interference (VCCI)	A-0018
	Open Field Test Site "A"	-
	Mains Conducted Emissions Test Site "A"	-
	Telecom Conducted Emissions Test Site "A"	-
	3 Meter Semi-Anechoic Chamber Site "E"	-
	3 Meter Semi-Anechoic Chamber Site "E" (1GHz – 6GHz)	-
	Mains Conducted Emissions Test Site "E"	-
	Telecom Conducted Emissions Test Site "E"	-
Korea	Ministry of Information and Communication's Radio Research Laboratory (RRL) under the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (A copy of the Scope Of Accreditation is available upon request)	US0036
Taiwan	Bureau Of Standards, Metrology and Inspection (BSMI)	Reference Number: SL2-IN-E-1024
Australia / New Zealand	Australian Communications Authority (AUSTEL)	*

*These agencies do not issue an identifying number to test labs.

**ELECTRO MAGNETIC TEST, INC.**

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

GENERAL REPORT SUMMARY (CONTINUED)

Device Tested: RFID Scanner
Model: CENTAURI V2
S/N: N/A

Product Description: The EUT is an HF RFID (13.56MHz) scanner made for commercial access control applications. It scans for NFC tags present within its field, verifies if the tag has access to the configured zone by looking up online data (through wifi or Ethernet) and it emits a red light pattern if the access is granted or a green one if the access is denied. The device can run on its internal battery and also while it's being charged through the USB or Ethernet(POE) port.

Modifications: The EUT was not modified during the testing.

Manufacturer: Eventbrite, Inc.
155 5th Street, Floor 7
San Francisco, California 94103

Test Date(s): January 10, 14, 15, 16, 21, 22, 2014

Test Specifications: EMI requirements
Limits: FCC Title 47, Part 15 Subpart C
IC RSS 210, Issue 9
IC RSS-GEN Issue 4
Test Procedure: ANSI C63.10: 2013

Test Deviations: The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	FCC STANDARD	IC STANDARD	REMARKS	RESULTS
7.1	Radiated Emissions	FCC, 15.209, 15.225	RSS-GEN Issue 4, [8.9] RSS 210 Issue 9, [B.6]	Radiated	PASS
7.2	Conducted Emissions	FCC 15.207	RSS-GEN Issue 4, [8.8]	Conducted	PASS
7.3	Frequency Tolerance	FCC 15.225(e)	RSS 210 Issue 9, [B.6]	Conducted	PASS
7.4	Occupied Bandwidth	N/A	RSS-GEN Issue 4, [6.6]	Conducted	PASS
7.5	Antenna Requirement	FCC 15.203	N/A	N/A	PASS

**ELECTRO MAGNETIC TEST, INC.**

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

TECHNICAL DESCRIPTION OF THE EUT

EUT Name:	RFID Scanner		
Model No:	CENTAURI V2		
Operation frequency:	13.56 MHz		
Channel Number:	1		
Serial No:	N/A		
Power Supply:	Rechargeable Battery with, 48Vdc POE power for charging or USB power for charging		
Description of Channel:			
RFID			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	13.56		

**ELECTRO MAGNETIC TEST, INC.**1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Equip. Under Test Model: REV. E4. The EMI measurements were performed according to the measurement procedure described in ANSI C63.10: 2013. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the specification limits defined in FCC Title 47 Part 15 Subpart C, IC RSS 210 Issue 9, and IC RSS-GEN Issue 3.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Electro Magnetic Test, Inc., 1547 Plymouth Street, Mountain View, California, 94043.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The measurement results in this report and the calibration of the test equipment are traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Eventbrite, Inc.

Samantha Harnett

General Counsel

Electro Magnetic Test, Inc.

David Flores	Test Technician
David Vivanco	Test Technician
George Hsu	Test Technician
Simeet Gandhi	Test Technician
Manan Modi	Test Technician
Sagar Bombaywala	Test Technician
Kevin Bothmann	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on March 28, 2017.

2.5 Disposition of the Test Sample

The test sample was returned to Eventbrite, Inc on April 1, 2017.

***ELECTRO MAGNETIC TEST, INC.***1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

2. ADMINISTRATIVE DATA(Continued)

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
CISPR	International Special Committee On Radio Interference
FCC	Federal Communications Commission

**ELECTRO MAGNETIC TEST, INC.**1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
FCC Title 47, Part 15, Subpart C	FCC Rules - Radio frequency devices (including digital devices).
RSS 210, Issue 9, August 2016	Licence-exempt Radio Apparatus Category I Equipment
RSS-Gen Issue 4, November 2014	General Requirements for Compliance of Radio Apparatus
ANSI C63.10 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

***ELECTRO MAGNETIC TEST, INC.***1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – EMI

The EUT was connected to a POE network switch and USB power supply, via its Ethernet port and mini-USB port respectively. During testing the EUT is being charged by the POE network switch while the EUT was transmitting the RFID signal.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration. The cables were moved to maximize the emissions. The final conducted as well as radiated data was taken in this mode of operation. All initial investigations were performed with the EMI receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix B.

***ELECTRO MAGNETIC TEST, INC.***1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

4.1.1 Cable Construction and Termination

Cables #1

This is a 50 foot unshielded Ethernet cable connecting the EUT to the remote Ethernet Switch. It has plastic RJ45 connectors at both ends of the cable.

Cables #2

This is a 8 foot braid and foil shielded USB cable connecting the EUT to the USB power adapter. It has a metallic mini USB connector at the EUT end and a metallic USB “Type A” metallic connector at the USB power supply end..

**ELECTRO MAGNETIC TEST, INC.**

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUT and Accessory List**

EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID
RFID Scanner (EUT)	Eventbrite	Centauri V2	N/A	N/A
USB power supply	Apple	A1385	N/A	N/A
THE FOLLOWING WERE LOCATED OUTSIDE THE TEST SITE:				
POE Ethernet Switch	Netgear	ProSAFE GS108PE	N/A	N/A


ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	3024A20115	September 30, 2016	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	September 30, 2016	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00451	September 30, 2016	1 Year
Conducted EMI Software	ETS-Lindgren	Tile!	Rev. 7.0.12.697	N/A	N/A
RF Attenuator	Com-Power	LIT-153A	531175	March 17, 2017	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150701	August 3, 2016	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150702	August 3, 2016	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150703	August 3, 2016	1 Year
LISN	Solar Electronics	Type 21107-50-TS-50-N	21107150704	August 3, 2016	1 Year
Computer	Dell, Inc.	DHS	DNSV641	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESU40	100127	March 11, 2017	1 Year
EMI Test Software	Rohde & Schwarz	EMC32	V8.40.0	N/A	N/A
Active Loop Antenna (9 KHz – 30 MHz)	ETS-Lindgren	6502	00206773	May 31, 2016	2 Years
BiConiLog Antenna (30 MHz – 1 GHz)	ETS-Lindgren	3143B	00206757	April 5, 2017	1 Year
MXA Signal Analyzer	Agilent	N9020A	MY53420778	September 21, 2016	1 Year
Antenna Mast	ETS-Lindgren	2171B	00150364	N/A	N/A
Turntable	ETS-Lindgren	2187-3.0	00118231	N/A	N/A
Multi-Function Controller	ETS-Lindgren	2090	00102270	N/A	N/A
Computer	Dell, Inc.	OPTIPLEX 745	4T50WC1	N/A	N/A

**ELECTRO MAGNETIC TEST, INC.**

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to the table below and section 7 of this report for the details of which sites were used for testing. All sites are located at 1547 Plymouth Street, Mountain View, California 94043.

Site Used For Test	Site Description
	Open Field Test Site "A"
X	Mains Conducted Emissions Test Site "D"
	Telecom Conducted Emissions Test Site "D"
X	3 Meter Semi-Anechoic Chamber Site "E"
	Mains Conducted Emissions Test Site "E"
	Telecom Conducted Emissions Test Site "E"

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane for measurements below 1 GHz. For measurement above 1 GHz the EUT was raised to a height of 1.5 meters.

The EUT was not grounded

6.3 Facility Environmental Characteristics

All tests were performed in a climate controlled building. The temperature was 22° C, humidity 52%, and barometric pressure 102.8 kPa.


ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

7. TEST PROCEDURES
7.1 Radiated Emissions Test – Semi-Anechoic Chamber
7.1.1 Limit (FCC PART 15 Section 15.225(a,b,c,d), IC RSS 210 Issue 9 [B.6])

Frequency of Emission (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (Meters)
13.553-13.567	15,484	30
13.410-13.533	334	30
13.567-13.710	334	30
13.110-13.410	106	30
13.710-14.010	106	30

The following chart is the 3 meter measurement in dB $\mu\text{V/m}$ using extrapolation of 40 dB/decade as outlined in FCC part 15.31

Frequency of Emission (MHz)	Field Strength (dB $\mu\text{V/m}$)	Measurement Distance (Meters)
13.553-13.567	123.8	3
13.410-13.533	90.5	3
13.567-13.710	90.5	3
13.110-13.410	80.5	3
13.710-14.010	80.5	3

For FCC 15.225:

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

For RSS 210:

RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

7.1.2 Limit (FCC PART 15 Section 15.209(a)(1), IC RSS-GEN Issue 4 [8.9])

Frequency of Emission (MHz)	Field Strength		Measurement Distance (Meters)
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
0.009-0.49	2400/F(kHz)		300
0.49-1.705	24000/F(kHz)		30
1.705-30	30		30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

7.1.3 Test Procedure

The Rohde & Schwarz ESU40 EMI receiver was used as a measuring meter while under software control by the Rohde & Schwarz EMC32 software. To increase the sensitivity of the instrument, the built in preamplifier was used from 9 KHz to 1 GHz. The EMI receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the EMI receiver records the highest measured reading over all the sweeps. The built in quasi-peak or average detector was used only for those readings which are marked accordingly on the data sheets. The effective measurement bandwidth used for the radiated emissions test was 100 kHz from 9 kHz to to 1 GHz.

The Loop Antenna and Broadband BiConiLog were used as transducers during the measurement. The Loop antenna was used from 9 KHz to 30 MHz, the BiConiLog antenna was used from 30 MHz to 1000 MHz. The frequency spans were wide (9 kHz to 150 kHz, 150 kHz to 30 MHz, 30 MHz to 88 MHz, 88 MHz to 216 MHz, 216 to 300 MHz, 300 MHz to 1 GHz) during preliminary investigations. The final data was taken with a frequency span of 1 MHz. Furthermore, the frequency span was reduced during the preliminary investigations as deemed necessary.

The 5 meter semi-anechoic chamber of Electro Magnetic Test, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.10: 2013. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. The EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength).

The presence of non EUT signals was verified by turning the EUT off. In case a non EUT signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the other signal

***ELECTRO MAGNETIC TEST, INC.***1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

7.1.3**Test Procedure (Continued)**

does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance from 9 kHz to 1 GHz. to obtain final test data..

Calculation Of Radiated Emission Test Data:

Amplitude - Gain + Antenna Factor + Cable Loss = Corrected Amplitude

Corrected Amplitude - Limit = Margin


ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

7.2 Conducted Emissions Test – Mains Ports

7.2.1 Limit (FCC PART 15 Section 15.207(a), IC RSS-GEN Issue 4 [8.8])

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

*Note: Decreases with the logarithm of the frequency

7.2.2 Test Procedure

The HP 8566B spectrum analyzer was used as a measuring meter along with the HP 85650A quasi-peak adapter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak detector was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the spectrum analyzer offset was adjusted accordingly to read the actual data measured. The LISN output was read by the HP 8566B spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for the conducted emissions test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.10: 2013. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequency ranges of 0.15 MHz to 1.6 MHz, 1.6 MHz to 5 MHz and 5 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable and peripheral placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the HP 85869PC software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave.

**ELECTRO MAGNETIC TEST, INC.**1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

7.3 Frequency Tolerance

7.3.1 Limit (FCC PART 15 Section 15.225(e), IC RSS-210 Issue 9 [B.6(e)])

FCC 15.225:

(e) The frequency tolerance of the carrier signal shall be maintained within +/- 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.

IC RSS-210:

Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm)

7.3.2 Test Procedure

The EUT was placed in the temperature chamber and set to transmit. For each temperature, the carrier frequency was recorded.

**ELECTRO MAGNETIC TEST, INC.**1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

7.4 Occupied Bandwidth

7.4.1 Requirement (IC RSS-GEN Issue 4, [6.6])

The emission bandwidth (x dB) is defined as the frequency range between two points, one above and below the carrier frequency, at which the spectral density of the emission is attenuated x dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth and video bandwidth (VBW) shall be approximately 3x RBW.

7.4.2 Test Procedure

Connect the antenna port of the EUT to the spectrum analyzer via an Attenuator and set the Spectrum Analyzer as below

RBW: 1% - 5% of the emission bandwidth

VBW: 3 x RBW

Detector: Peak

Trace Mode: Max Hold

**ELECTRO MAGNETIC TEST, INC.**1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

7.5 Antenna Requirement**7.5.1 Requirement (FCC PART 15 SECTION 15.203,15.247(b)(4))**

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.

7.5.2 Result

The antenna is integrated on the main PCB with no consideration for replacement on the PCB

***ELECTRO MAGNETIC TEST, INC.***1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

8. CONCLUSIONS / COMPLIANCE STATEMENT

Based upon the results contained in this report, Electro Magnetic Test, Inc. has determined that the RFID Scanner, Model: CENTAURI V2 meets all of the specification limits defined in FCC Title 47 Part 15 Subpart C, IC RSS 210 Issue 9, and IC RSS-GEN Issue 4.



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

APPENDIX A

RADIATED AND CONDUCTION DATA SHEETS

***ELECTRO MAGNETIC TEST, INC.***1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

Radiated Emissions

EUT:	RFID Scanner	Model Name:	CENTAURI V2
Test Mode:	13.56 MHz RFID	Test Date:	3/21/2017
Test Engineer:	George Hsu	Measurement:	9 KHz to 30 MHz

The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators were attenuated more than 20 dB below the permissible value



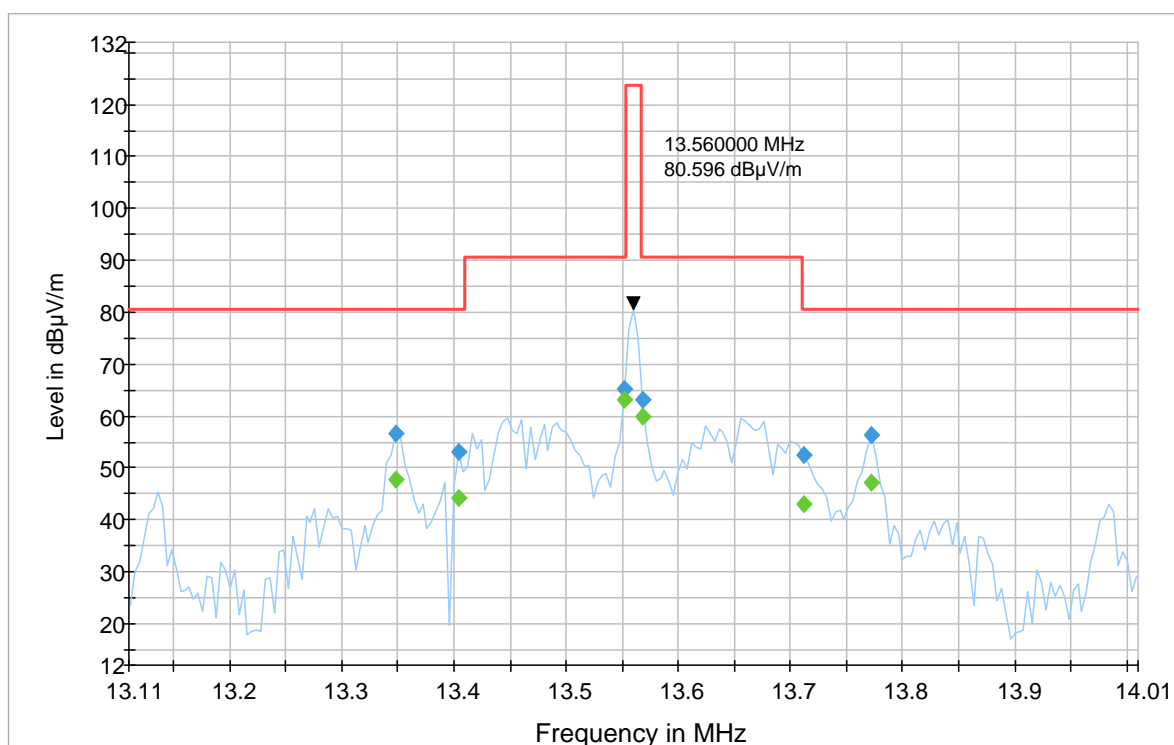
ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

Radiated Emissions

EUT:	RFID Scanner	Model Name:	CENTAURI V2
Test Mode:	13.56 MHz RFID	Test Date:	3/21/2017
Test Engineer:	George Hsu	Measurement:	13.56 Carrier Frequency

FCC Radiated Fundamental 3m 13.110MHz-14.010MHz E Field



◆ Preview Result 1H-PK+ — FCC 15.225 Fundamental
◆ Final Result 1-PK+ ◆ Final Result 2-QPK

Frequency (MHz)	MaxPeak (dBμV/m)	QuasiPeak (dBμV/m)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
13.348	56.8	47.6	2.0	10.3	32.9	80.50
13.404	53.0	44.1	174.0	10.3	36.4	80.50
13.552	65.3	63.2	1.0	10.3	27.3	90.50
13.568	63.1	59.8	174.0	10.2	30.7	90.50
13.712	52.4	43.0	0.0	10.2	37.5	80.50
13.772	56.2	47.1	174.0	10.2	33.4	80.50


ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

Radiated Emissions

EUT:	RFID Scanner	Model Name:	CENTAURI V2
Test Mode:	13.56 MHz	Test Date:	3/28/ 2017
Test Engineer:	George Hsu	Measurement:	30-1000 Mhz

Frequency (MHz)	MaxPeak (dBμV/m)	QuasiPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
40.680	35.3	33.7	100.0	Vertical	104.0	14.7	6.30	40.00
67.800	24.8	23.0	119.0	Vertical	100.0	11.7	17.0	40.00
149.160	27.4	24.9	114.0	Vertical	36.0	14.4	18.6	43.50
162.720	25.8	23.2	100.0	Vertical	29.0	15.5	20.3	43.50
176.280	29.0	26.4	271.0	Vertical	0.0	15.4	17.1	43.50
189.840	25.9	22.3	158.0	Vertical	155.0	14.9	21.2	43.50
203.400	30.8	28.9	142.0	Vertical	176.0	15.5	14.6	43.50
216.960	40.2	36.6	143.0	Vertical	344.0	16.0	9.40	46.00


ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

Frequency Stability

EUT:	RFID Scanner	Model Name:	CENTAURI V2
Test Engineer:	George Hsu	Test Date:	3/29/2017

Temperature (°C)	Measured Frequency (MHz)	Measured % Difference	Limit (%)	Measured PPM	Limit (PPM)	Result
50	13.5597075	0.00026%	± 0.01%	2.581	100	Pass
40	13.55971	0.00028%	± 0.01%	2.766	100	Pass
30	13.5596612	-0.00008%	± 0.01%	0.833	100	Pass
20	13.5596725	0	± 0.01%	0	100	Pass
10	13.55973745	0.00048%	± 0.01%	4.790	100	Pass
0	13.5597612	0.00065%	± 0.01%	6.541	100	Pass
-10	13.55978	0.00079%	± 0.01%	7.928	100	Pass
-20	13.5598075	0.00100%	± 0.01%	9.956	100	Pass
20*	13.55976125	0.00065%	± 0.01%	6.545	100	Pass
20**	13.55973125	0.00043%	± 0.01%	4.333	100	Pass

* Testing done at 115% of Rated Supply Voltage

** Testing done at 85% of Rated Supply Voltage

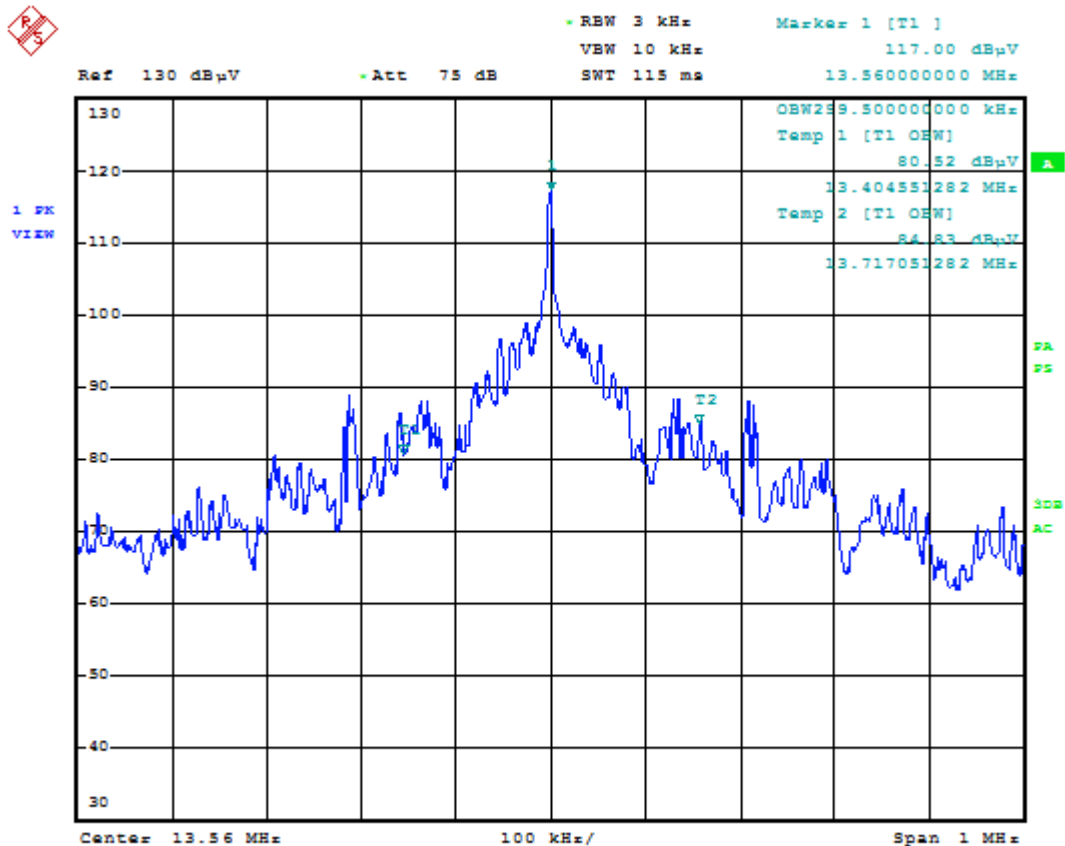


ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

Occupied Bandwidth

EUT:	RFID Scanner	Model Name:	CENTAURI V2
Test Engineer:	George Hsu	Test Date:	3/29/17



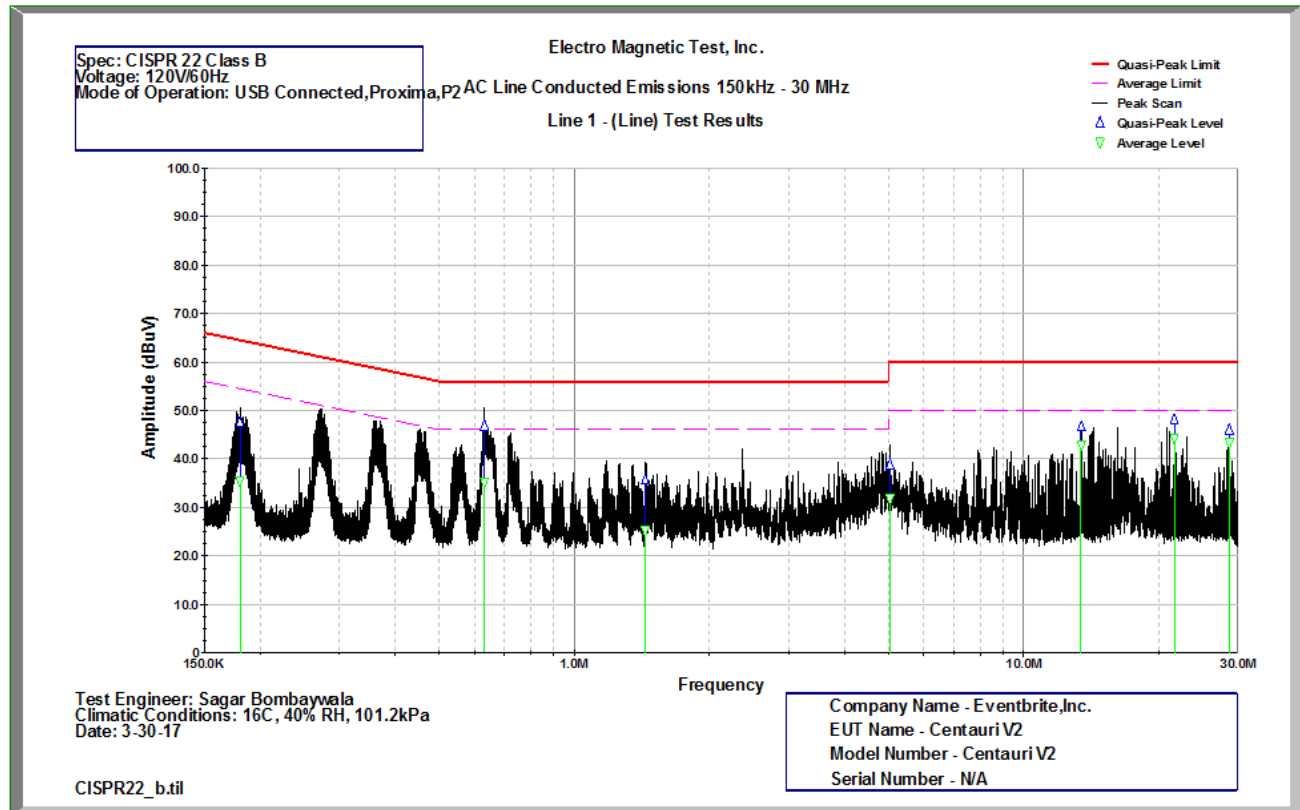
Frequency (Mhz)	Occupied Bandwidth (KHz)
13.56	299.50



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

AC Line Conducted Emissions Test Data



Line 1 - (Line) Test Results

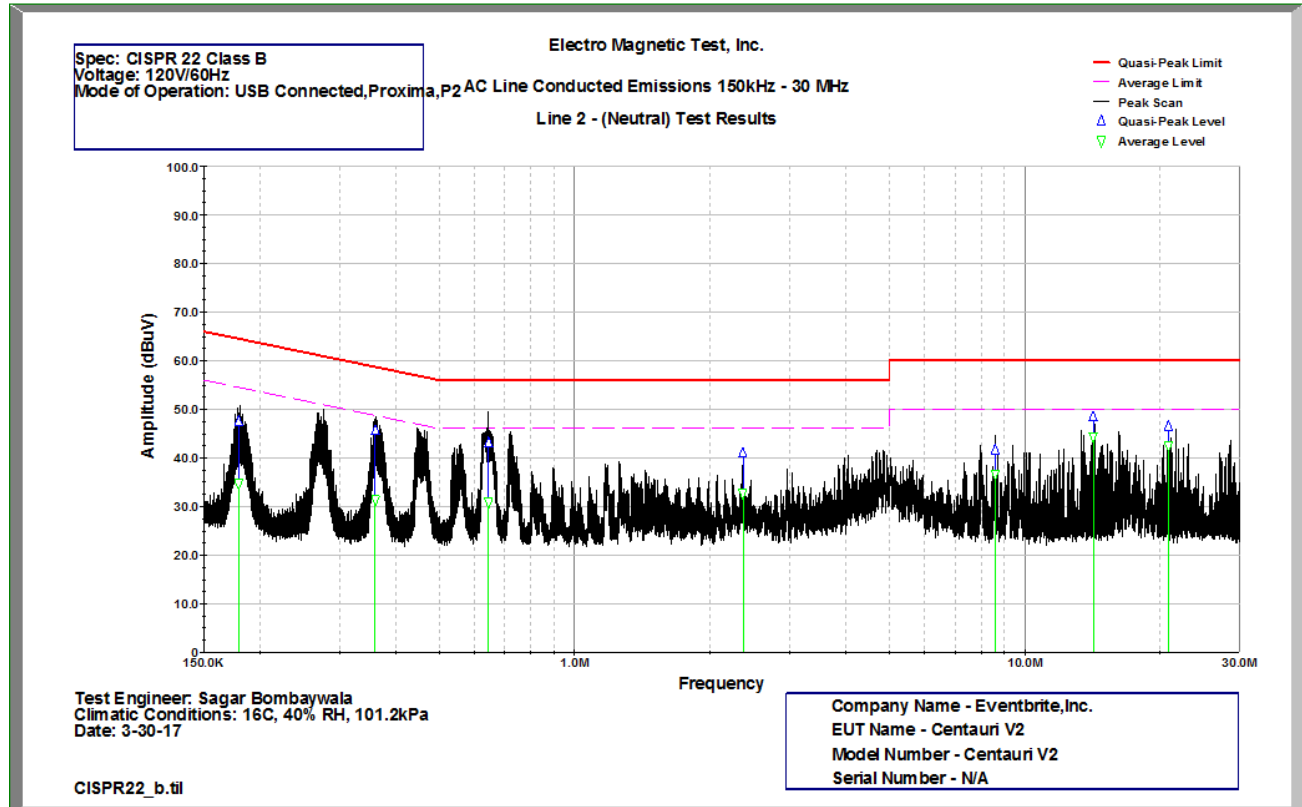
Frequency (MHz)	Peak (dBuV)	Quasi-Peak (dBuV)	Average (dBuV)	Corr. Factor (dB)	Quasi-Peak Limit	QP Margin	Average Limit	Average Margin
0.180	52.527	47.577	35.447	11.227	65.137	-31.423	55.137	-30.553
0.630	53.592	46.882	35.175	10.592	56.000	-26.118	46.000	-24.825
1.440	41.752	35.682	25.299	10.452	56.000	-37.318	46.000	-34.701
5.035	44.584	38.864	31.819	10.784	60.000	-34.136	50.000	-28.181
13.418	47.629	46.569	42.746	11.029	60.000	-26.431	50.000	-17.254
21.663	49.299	48.159	44.371	11.099	60.000	-24.841	50.000	-15.629
28.685	47.345	46.015	43.282	11.345	60.000	-26.985	50.000	-16.718



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

AC Line Conducted Emissions Test Data



Line 2 - (Neutral) Test Results

Frequency (MHz)	Peak (dBuV)	Quasi-Peak (dBuV)	Average (dBuV)	Corr. Factor (dB)	Quasi-Peak Limit	QP Margin	Average Limit	Average Margin
0.179	52.235	47.405	34.652	11.235	65.166	-31.595	55.166	-31.348
0.361	51.523	45.663	31.358	10.823	59.981	-33.337	49.981	-34.642
0.643	50.699	43.079	30.734	10.599	56.000	-29.921	46.000	-29.266
2.367	45.054	40.964	32.634	10.554	56.000	-32.036	46.000	-27.366
8.593	45.056	41.716	36.708	10.856	60.000	-31.284	50.000	-23.292
14.214	49.389	48.429	44.304	10.989	60.000	-24.571	50.000	-15.696
20.810	47.804	46.434	42.547	11.104	60.000	-26.566	50.000	-17.453



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

APPENDIX B

TEST SETUP DIAGRAMS



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

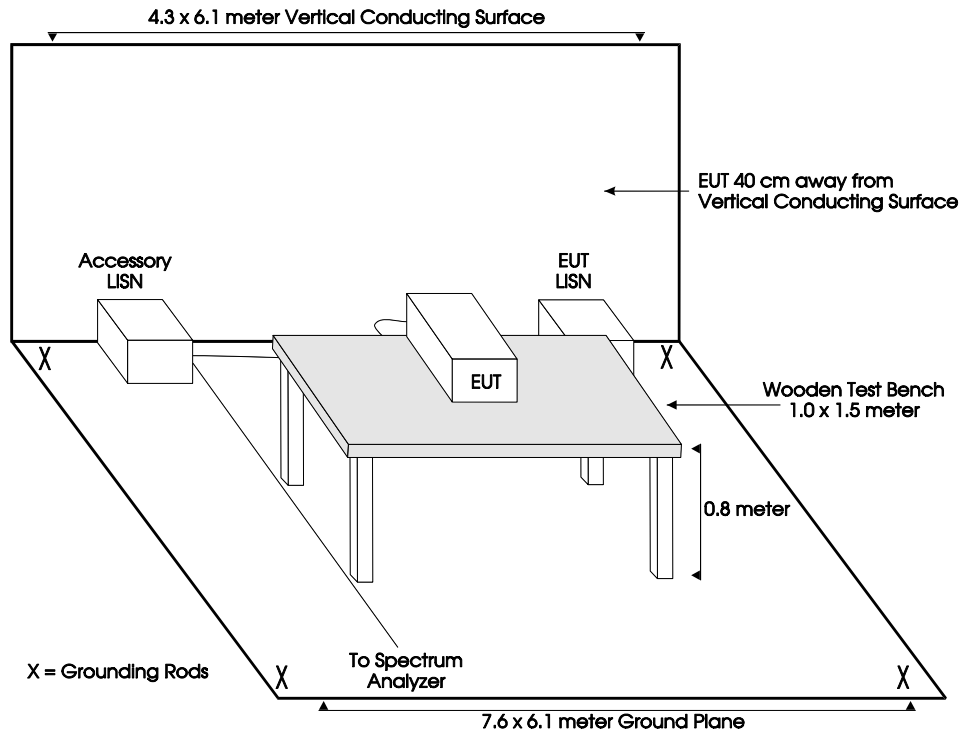


FIGURE 1 – TABLETOP CONDUCTED EMISSIONS TEST SETUP – SITE ‘A’

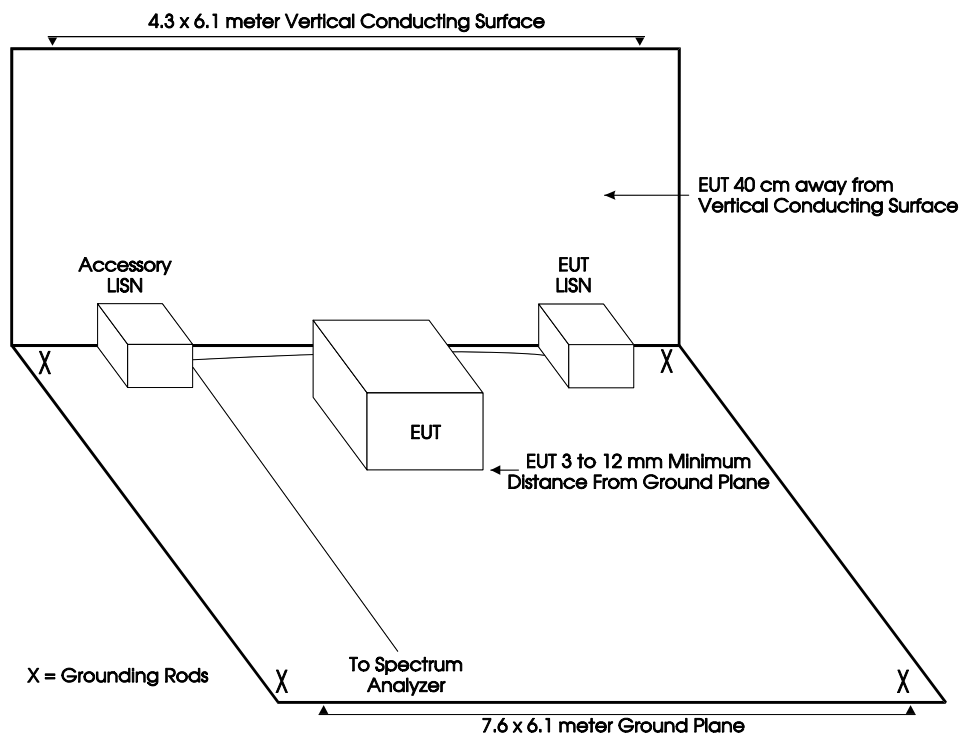
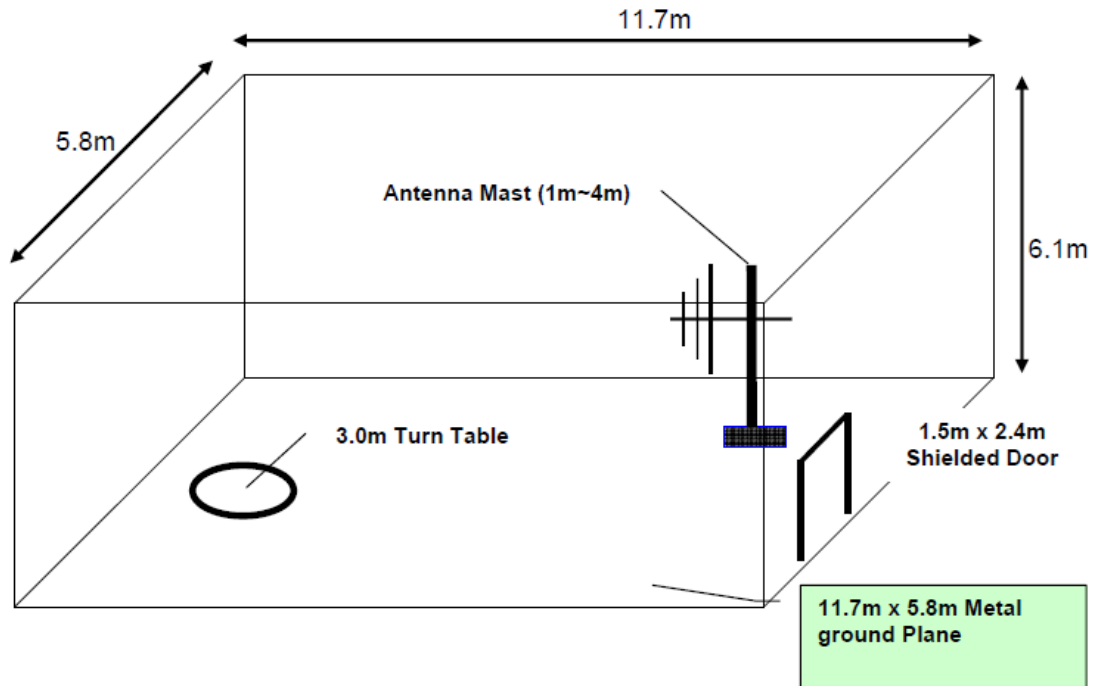


FIGURE 1a – FLOORSTANDING CONDUCTED EMISSIONS TEST SETUP – SITE ‘A’

**ELECTRO MAGNETIC TEST, INC.**

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

**FIGURE 3 - LAYOUT OF 5 METER SEMI-ANECHOIC CHAMBER**



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

APPENDIX C

MODIFICATIONS TO THE EUT



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

MODIFICATIONS TO THE EUT

No modifications were made to the EUT by Electro Magnetic Test, Inc. personnel during the testing.



ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

APPENDIX D

ADDITIONAL MODELS COVERED UNDER THIS REPORT

***ELECTRO MAGNETIC TEST, INC.***1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

ADDITIONAL MODELS COVERED UNDER THIS REPORT

There are no additional models to be covered under this report.