



ELECTRO MAGNETIC TEST, INC.

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

*FCC PART 15.249, SUBPART C
IC RSS 210, ISSUE 8
TEST REPORT*

for

the

RANGE EXTENDER SMART PLUG

MODEL: 3210-L

Prepared for

CentraLite Systems, Inc.
1000 Cody Road South Ste-A
Mobile, Alabama, 36695

Prepared by: George Hsu
GEORGE HSU

Approved by: Kevin Bothmann
KEVIN BOTHMANN

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

DATE: June 25, 2015

	REPORT BODY	APPENDICES				TOTAL
		A	B	C	D	
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B	Test Setup Diagrams
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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.

The measurement data and conclusions contained in this test report are deemed satisfactory evidence of compliance with Industry Canada Interference-Causing Equipment Standard ICES-003, Issue 5, August 2012.

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-0118
	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.



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GENERAL REPORT SUMMARY (CONTINUED)

Device Tested: Range Extender Smart Plug
 Model: 3210-L
 S/N: N/A

Product Description: . The 3-Series Dual-Band Appliance Module introduces new functionality to existing appliances and lighting devices. By placing the Appliance Module between an outlet and any appliance in your home, you can instantly add advanced automation features. Not only can the Appliance Module be switched on and off remotely, but it also can be used with your existing ZigBee hub to respond to alerts, schedules, and scenes. The Appliance Module can also report its power usage for energy management and act as a repeater for both ZigBee and Z-Wave devices. The 3-Series Appliance Module is an affordable way to add automation and track the energy use of your home.

Modifications: The EUT was not modified during the testing.

Manufacturer: CentraLite Systems, inc.
 1000 Cody Road South, Ste A
 Mobile, Alabama, 36695

Test Date(s): June 16, 17, and July 13, 2015

Test Specifications: EMI requirements
 Limits: FCC Title 47, Part 15 Subpart C
 Test Procedure: ANSI C63.4: 2009

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 (General Requirements and Field Strength Requirements)	15.209, 15.249	RSS-GEN Issue 4, [8.9] RSS 210 Issue 8[A2.9(a)]	Radiated	PASS
7.2	Fundamental Field Strength	15.249(a)	IC RSS-210 A2.9(a)	Radiated	PASS
7.3	Conducted Emissions	15.207(a)	IC RSS-GEN Issue 4 [8.8]	Conducted	PASS
7.4	Antenna Requirement	15.203, 15.247(b)(4)		N/A	PASS
7.5	Occupied Bandwidth	N/A	RSS-GEN Issue 4, [6.6]	Conducted	PASS



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TECHNICAL DESCRIPTION OF THE EUT

Manufacturer:	CentraLite Systems, Inc.		
EUT Name:	Range Extender Smart Plug		
Model No:	3210-L		
Operating Frequency:	908.400 MHz and 916.000 MHz		
Channel Number:	2		
Modulation Technology:	DSSS		
Antenna Type:	PIFA		
Maximum Output Power:	93.8 dB μ V/m		
Description of Channel:			
Zigbee			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low	908.4	High	916

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1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Range Extender Smart Plug Model: 3210-L. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 2009. 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.

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 PersonnelCentralite Systems, Inc.

John Calagaz VP CTO

Electro Magnetic Test, Inc.

David Vivanco Test Technician
George Hsu Test Technician
Kevin Bothmann Lab Manager

2.4 Date Test Sample was Received

The test sample was received on June 16, 2015.

2.5 Disposition of the Test Sample

The test sample has not yet been returned to Centralite Systems, Inc..

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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

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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 8, December 2010	Licence-exempt Radio Apparatus (All Frequency Bands): Category 1 Equipment
RSS-Gen Issue 4, November 2014	General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.4 2009	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.

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4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – EMI

The range extender smart plug was connected to host PC through its communication pins. During testing the Z-Wave was continuously transmitting.

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.



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4.1.1 Cable Construction and Termination

Cable #1

This is a 6 ft. unshielded USB to Serial cable connecting the host PC to the EUT. It was hard wired on the EUT end and type A USB connector on the host PC end.


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

EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID
RANGE EXTENDER SMART PLUG (EUT)	CENTRALITE SYSTEMS, INC.	3210-L	N/A	T3L-SS007
THE FOLLOWING WERE LOCATED OUTSIDE THE TEST SITE:				
REMOTE LAPTOP COMPUTER	MARASST TECHNOLOGY	ATM2810	N/A	DoC
REMOTE LAPTOP POWER SUPPLY	ASIAN POWER DEVICES	NB-90B19	N/A	DoC


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5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	3013A07296	August 21, 2014	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	August 21, 2014	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00451	August 21, 2014	1 Year
Radiated EMI Software	Sector Design	N/A	Ver.1.4.6	N/A	N/A
Conducted EMI Software	Hewlett Packard	85869PC	Ver. A.02.03	N/A	N/A
Preamplifier	Com Power	PA-102	1482	March 4, 2015	1 Year
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	December 11, 2014	1 Year
LISN	Com Power	LI-200	12012	October 1, 2014	1 Year
LISN	Com Power	LI-200	12214	October 1, 2014	1 Year
LISN	Com Power	LI-200	1767	October 1, 2014	1 Year
LISN	Com Power	LI-200	1768	October 1, 2014	1 Year
Biconical Antenna	Com Power	AB-100	01557	July 9, 2014	1 Year
Log Periodic Antenna	Com Power	AL-100	16001	July 9, 2014	1 Year
Horn Antenna	Com Power	AHA-118	711054	N/A	N/A
Antenna Mast	Com Power	AM-400	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Dell, Inc.	DHS	DNSV641	N/A	N/A
Printer	Hewlett Packard	C8124A	CN39A220ZD	N/A	N/A


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5.2 EMI Test Equipment (Continued)

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
EMI Receiver	Rohde & Schwarz	ESU40	100127	January 16, 2015	1 Year
EMI Test Software	Rohde & Schwarz	EMC32	V8.40.0	N/A	N/A
MXA Signal Analyzer	Agilent	N9020A	MY53420778	July 1, 2015	1 Year
Passive Loop Antenna (9 KHz – 30 MHz)	ETS-Lindgren	6512	00128210	October, 28, 2014	4 Years
BiConiLog Antenna (30 MHz – 1 GHz)	ETS-Lindgren	3142D	00109337	July 24, 2014	1 Year
Horn Antenna (1 GHz – 18 GHz)	ETS-Lindgren	3117	00109294	July 24, 2014	1 Year
Preamplifier (1 GHz – 18 GHz)	Rohde & Schwarz	TS-PR18	100056	July 24, 2014	1 Year
Horn Antenna (18 GHz – 26.5 GHz)	ETS-Lindgren	3160-09	102646	June 18, 2015	1 Year
Preamplifier (18 GHz – 26.5 GHz)	Rohde & Schwarz	TS-PR26	100034	June 18, 2015	1 Year
Antenna Mast	ETS-Lindgren	2175	00095727	N/A	N/A
Turntable	ETS-Lindgren	2187-3.0	00118231	N/A	N/A
Computer	Dell, Inc.	OPTIPLEX 745	4T50WC1	N/A	N/A
Multi-Function Controller	ETS-Lindgren	2090	00102270	N/A	N/A



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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"
	Mains Conducted Emissions Test Site "A"
	Telecom Conducted Emissions Test Site "A"
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.

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 45%, and barometric pressure 102.6 kPa.



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7. TEST PROCEDURES

7.1 Radiated Emissions Test – Semi-Anechoic Chamber

7.1.1 General Requirements 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)
	µV/m	dBµV/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

Field Strength Requirements (FCC PART 15 Section 15.249(a), IC-RSS-210 Issue 8 [A2.9(a)])

Fundamental Frequency (MHz)	Field Strength of Fundamental (mV/m)	Field Strength of Harmonics (µV/m)	Field Strength of Fundamental (dBµV/m)	Field Strength of Harmonics (dBµV/m)
902-928	50	500	94	54
2400-2483.5	50	500	94	54
5725-5875	50	500	94	54
24000-24250	250	2500	108	68

Field Strength Requirements (FCC part 15.249(a))

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

Limit
See General Limits and Field Strength Requirement In Above Charts

7.1.2 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

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the instrument, the built in preamplifier was used from 9 KHz to 1 GHz and an external preamplifier was used from 1 GHz to 26.5 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 26.5 GHz.

The Loop Antenna, Broadband BiConiLog and horn antennas 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 and horn antennas were used from 1GHz – 26.5 GHz. 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, 1 GHz to 18 GHz and 18 GHz to 26.5 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 C63.4: 2009. 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 does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance from 9 kHz to 26.5 GHz. to obtain final test data.

Calculation Of Radiated Emission Test Data:

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

Corrected Amplitude - Limit = Margin


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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 (dB μ V)	
	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 C63.4: 2009. 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.



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7.3 Antenna Requirement

7.3.1 Requirement (FCC PART 15 SECTION 15.203 , IC RSS-GEN Issue 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.

7.3.2 Test Result

The antenna is integrated on the main PCB with no consideration for replacement on the Range Extender Smart Plug.

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7.4 Occupied Bandwidth

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

The emission bandwidth (x dB) is defined as the frequency range between two points, one above and one 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.

7.4.2 Test Procedure

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

RBW: 1% to 5% of Emission bandwidth

VBW: $\geq 3 \times$ RBW

Detector: Peak

Trace Mode: Max Hold

- (1) Use built in 99% occupied bandwidth measurement.



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8. CONCLUSIONS / COMPLIANCE STATEMENT

Based upon the results contained in this report, Electro Magnetic Test, Inc. has determined that the Range Extender Smart Plug, Model: 3210-L meets all of the specification limits defined in FCC Title 47, Part 15, Subpart C.



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APPENDIX A

RADIATED AND CONDUCTED DATA SHEETS

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Radiated Emissions

EUT:	Range Extender Smart Plug	Model Name:	3210-L
Test Mode:	Z-Wave	Test Date:	6/16/2015
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



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Radiated Emissions

EUT:	Range Extender Smart Plug	Model Name:	3210-L
Test Mode:	Z-Wave	Test Date:	6/17/15
Test Engineer:	George Hsu	Measurement:	30 MHz to 1 GHz

Peak Measurement:

Frequency (MHz)	MaxPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
63.990000	33.0	114.0	Vertical	136.0	8.1	7.00	40.00
86.940000	32.9	133.0	Vertical	243.0	8.1	7.10	40.00
124.500000	33.8	100.0	Vertical	102.0	11.6	9.70	43.50
527.850000	38.9	189.0	Horizontal	151.0	21.2	7.10	46.00
552.030000	36.4	178.0	Horizontal	0.0	21.1	9.60	46.00
599.670000	36.0	157.0	Vertical	91.0	22.1	10.00	46.00

Quasipeak Measurement:

Frequency (MHz)	QuasiPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
63.990000	30.5	114.0	Vertical	136.0	8.1	9.50	40.00
86.940000	21.6	133.0	Vertical	243.0	8.1	18.40	40.00
124.500000	23.5	100.0	Vertical	102.0	11.6	20.00	43.50
527.850000	34.0	189.0	Horizontal	151.0	21.2	12.00	46.00
552.030000	33.4	178.0	Horizontal	0.0	21.1	12.60	46.00
599.670000	31.7	157.0	Vertical	91.0	22.1	14.30	46.00



ELECTRO MAGNETIC TEST, INC.

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

Radiated Emissions

EUT:	Range Extender Smart Plug	Model Name:	3210-L
Test Mode:	Low and High Channel	Test Date:	6/17/15
Test Engineer:	George Hsu	Measurement:	Fundamental

Peak Measurement:

Frequency (MHz)	MaxPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
916.000	92.8	117.2	Vertical	141.5	26.7	1.2	94.0
916.026	92.3	100.0	Horizontal	335.2	26.7	1.8	94.0
908.377	93.3	100.0	Horizontal	275.2	26.7	0.7	94.0
908.374	93.8	123.7	Vertical	142.9	26.7	0.3	94.0

Quasipeak Measurement:

Frequency (MHz)	QuasiPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
916.000	93.3	117.2	Vertical	141.5	26.7	0.7	94.0
916.026	92.8	100.0	Horizontal	335.2	26.7	1.2	94.0
908.377	93.5	100.0	Horizontal	275.2	26.7	0.5	94.0
908.374	93.8	123.7	Vertical	142.9	26.7	0.2	94.0



ELECTRO MAGNETIC TEST, INC.

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

Radiated Emissions

EUT:	Range Extender Smart Plug	Model Name:	3210-L
Test Mode:	Z-Wave, Low Channel	Test Date:	6/16/15
Test Engineer:	George Hsu	Measurement:	1 GHz to 9.5 GHz

Peak Measurement:

Frequency (MHz)	MaxPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1244.800000	35.3	300.0	Vertical	222.0	-4.3	38.70	74.00
1332.350000	37.1	145.0	Vertical	348.0	-3.8	36.90	74.00
1816.850000	46.5	100.0	Vertical	195.0	-1.4	27.50	74.00
1816.850000	46.8	198.0	Horizontal	187.0	-1.4	27.20	74.00
1858.216667	46.8	100.0	Vertical	346.0	-1.1	27.20	74.00
2127.383333	38.6	107.0	Vertical	203.0	0.4	35.40	74.00
2725.288000	53.4	100.0	Horizontal	47.2	1.9	20.60	74.00
2725.288000	52.9	100.0	Vertical	198.8	1.9	21.10	74.00
4541.950000	50.9	100.0	Horizontal	51.0	4.8	23.10	74.00
4542.233333	52.1	100.0	Vertical	84.0	4.8	21.90	74.00
7267.050000	52.0	180.0	Horizontal	172.0	9.3	22.00	74.00
7267.050000	48.4	113.0	Vertical	218.0	9.3	25.60	74.00
8175.416667	55.0	131.0	Horizontal	160.0	10.5	19.00	74.00
8175.700000	51.8	107.0	Vertical	266.0	10.5	22.20	74.00

Average Measurement:

Frequency (MHz)	Average (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1244.800000	20.9	300.0	Vertical	222.0	-4.3	33.10	54.00
1332.350000	20.8	145.0	Vertical	348.0	-3.8	33.20	54.00
1816.850000	43.4	100.0	Vertical	195.0	-1.4	10.60	54.00
1816.850000	43.8	198.0	Horizontal	187.0	-1.4	10.20	54.00
1858.216667	24.0	100.0	Vertical	346.0	-1.1	30.00	54.00
2127.383333	25.2	107.0	Vertical	203.0	0.4	28.80	54.00
2725.288000	51.6	100.0	Horizontal	47.2	1.9	2.40	54.00
2725.288000	50.8	100.0	Vertical	198.8	1.9	3.20	54.00
4541.950000	48.0	100.0	Horizontal	51.0	4.8	6.00	54.00
4542.233333	48.5	100.0	Vertical	84.0	4.8	5.50	54.00
7267.050000	46.4	180.0	Horizontal	172.0	9.3	7.60	54.00
7267.050000	39.4	113.0	Vertical	218.0	9.3	14.60	54.00
8175.416667	51.4	131.0	Horizontal	160.0	10.5	2.60	54.00
8175.700000	47.0	107.0	Vertical	266.0	10.5	7.00	54.00



ELECTRO MAGNETIC TEST, INC.

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

Radiated Emissions

EUT:	Range Extender Smart Plug	Model Name:	3210-L
Test Mode:	Z-Wave, High Channel	Test Date:	6/16/15
Test Engineer:	George Hsu	Measurement:	1 GHz to 9.5 GHz

Peak Measurement:

Frequency (MHz)	MaxPeak (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1081.883333	39.0	140.0	Vertical	26.0	-6.3	35.00	74.00
1120.983333	32.2	107.0	Vertical	98.0	-6.0	41.80	74.00
1831.866667	42.4	153.0	Vertical	327.0	-1.2	31.60	74.00
1832.150000	43.7	143.0	Horizontal	-2.0	-1.2	30.30	74.00
2747.883333	53.0	241.0	Vertical	284.0	1.7	21.00	74.00
2747.883333	54.1	100.0	Horizontal	82.0	1.7	19.90	74.00
3361.300000	39.1	116.0	Horizontal	257.0	2.7	34.90	74.00
4579.633333	49.1	100.0	Vertical	83.0	4.9	24.90	74.00
4580.200000	47.6	200.0	Horizontal	186.0	4.9	26.40	74.00
6411.666667	46.4	186.0	Vertical	300.0	7.7	27.60	74.00
6412.516667	48.1	163.0	Horizontal	196.0	7.7	25.90	74.00
7327.966667	48.9	194.0	Horizontal	173.0	9.3	25.10	74.00
8243.983333	52.2	130.0	Horizontal	135.0	10.6	21.80	74.00
8244.266667	49.2	110.0	Vertical	157.0	10.6	24.80	74.00

Average Measurement:

Frequency (MHz)	Average (dB μ V/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1081.883333	18.6	140.0	Vertical	26.0	-6.3	35.40	54.00
1120.983333	18.8	107.0	Vertical	98.0	-6.0	35.20	54.00
1831.866667	36.6	153.0	Vertical	327.0	-1.2	17.40	54.00
1832.150000	39.1	143.0	Horizontal	-2.0	-1.2	14.90	54.00
2747.883333	51.0	241.0	Vertical	284.0	1.7	3.00	54.00
2747.883333	52.2	100.0	Horizontal	82.0	1.7	1.80	54.00
3361.300000	26.2	116.0	Horizontal	257.0	2.7	27.80	54.00
4579.633333	43.2	100.0	Vertical	83.0	4.9	10.80	54.00
4580.200000	41.7	200.0	Horizontal	186.0	4.9	12.30	54.00
6411.666667	37.4	186.0	Vertical	300.0	7.7	16.60	54.00
6412.516667	38.4	163.0	Horizontal	196.0	7.7	15.60	54.00
7327.966667	41.6	194.0	Horizontal	173.0	9.3	12.40	54.00
8243.983333	47.1	130.0	Horizontal	135.0	10.6	6.90	54.00


ELECTRO MAGNETIC TEST, INC.

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99% Occupied Bandwidth(Conducted)

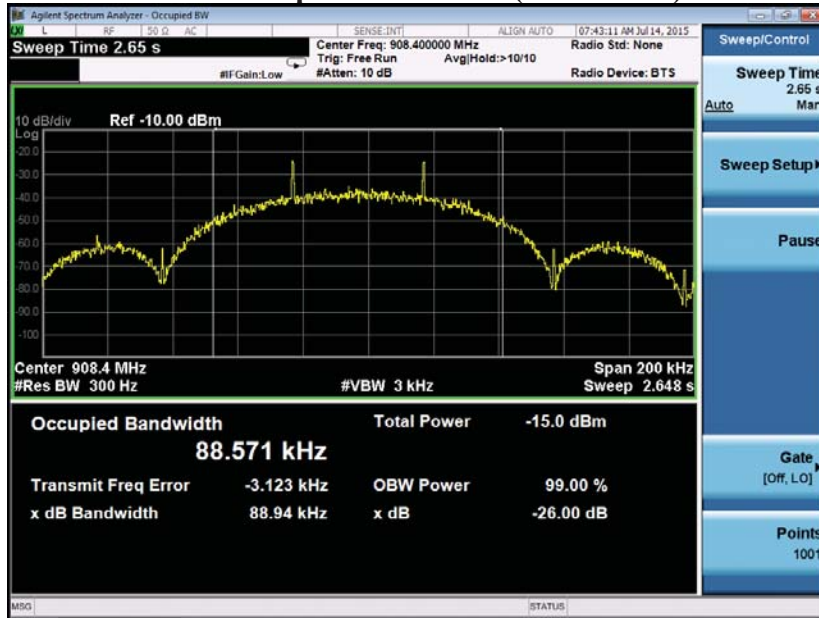
Company:	CentraLite Systems, Inc.	Test Date	7/13/15		
EUT Name	Range Extender Smart Plug	Test Engineer	George Hsu		
Model:	3210-L	Test Result	PASS		
Operating Mode	TX Mode				
	Test CH	Frequency (MHz)	99% Bandwidth (KHz)	Limit (KHz)	Conclusion
Z-Wave	1	908.4	88.571	N/A	PASS
	2	916.0	108.580	N/A	PASS
Test Equipment: Please refer to section 5.2					



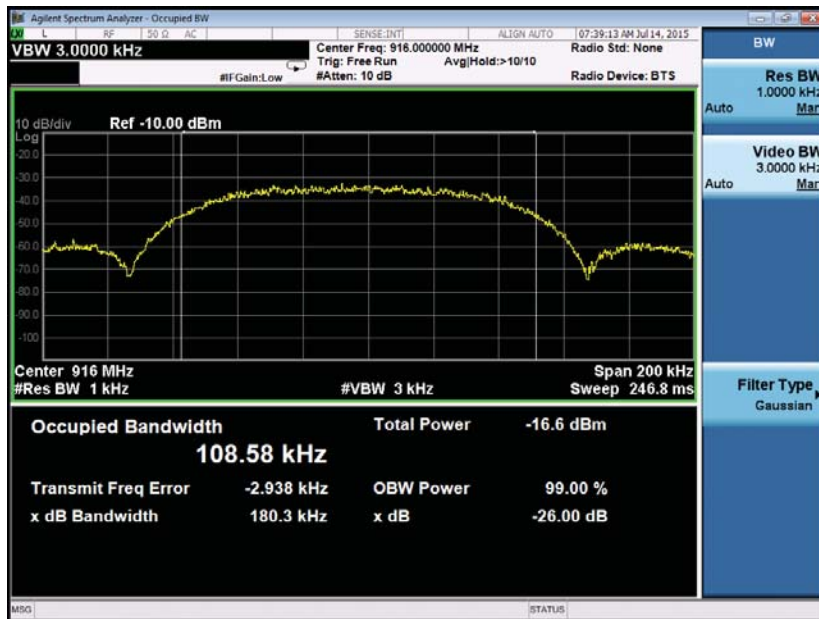
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99% Occupied Bandwidth(Conducted)



Low Channel



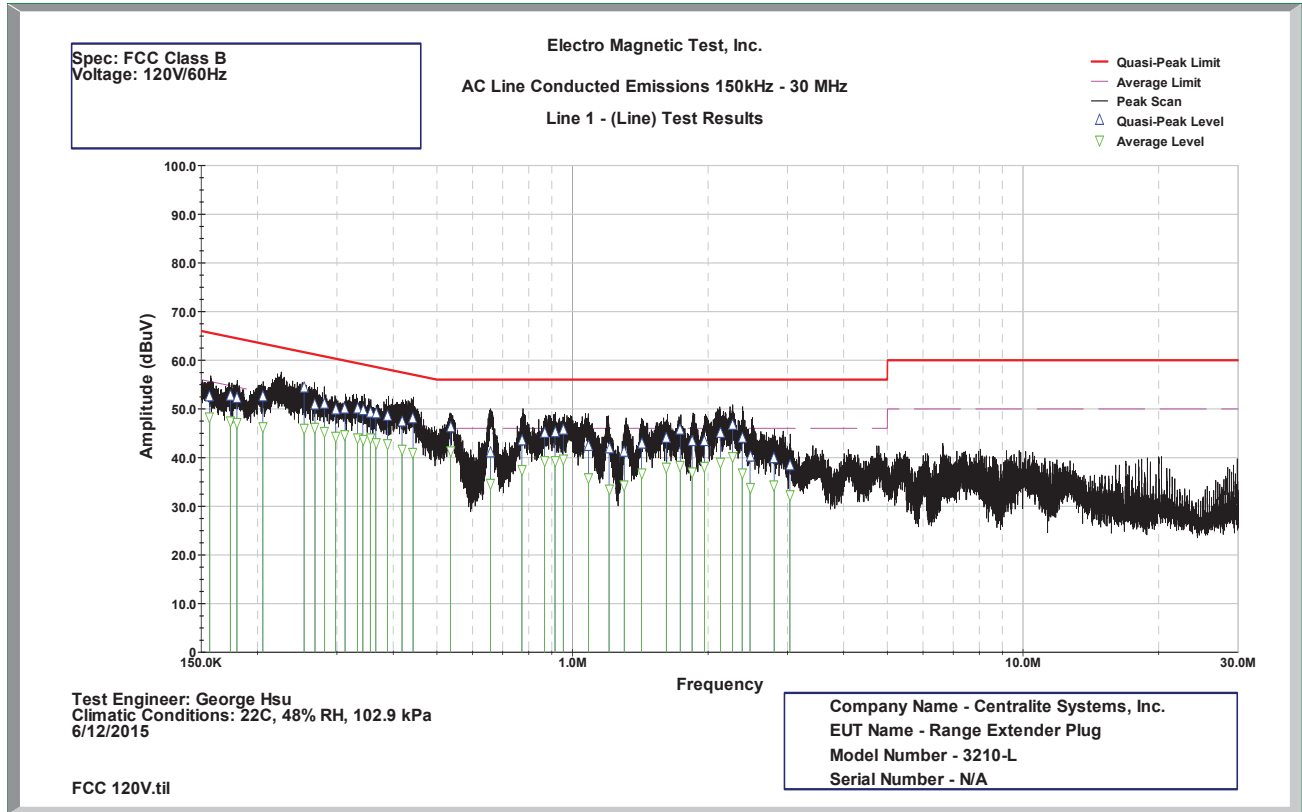
High Channel



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
0.157	57.737	52.487	48.305	12.137	65.810	-13.323	55.810	-7.505
0.174	56.332	52.622	47.552	11.632	65.311	-12.689	55.311	-7.759
0.180	55.820	52.210	47.080	11.520	65.143	-12.933	55.143	-8.063
0.206	55.918	52.448	46.365	11.118	64.413	-11.966	54.413	-8.048
0.254	59.128	54.328	46.018	10.928	63.038	-8.710	53.038	-7.020
0.268	57.178	50.778	46.073	10.878	62.620	-11.842	52.620	-6.547
0.281	55.433	50.983	45.333	10.833	62.245	-11.262	52.245	-6.912
0.298	55.276	49.816	44.266	10.776	61.768	-11.952	51.768	-7.502
0.313	54.916	49.946	44.676	10.716	61.347	-11.401	51.347	-6.671
0.334	54.366	50.026	43.981	10.666	60.755	-10.729	50.755	-6.774
0.343	53.684	49.604	43.579	10.684	60.494	-10.890	50.494	-6.915
0.356	53.593	49.083	43.953	10.593	60.116	-11.033	50.116	-6.163
0.366	53.170	48.900	42.905	10.570	59.827	-10.927	49.827	-6.922
0.388	52.833	48.453	42.840	10.633	59.186	-10.733	49.186	-6.346
0.419	52.642	47.362	41.607	10.542	58.323	-10.961	48.323	-6.716
0.443	51.752	47.942	41.000	10.552	57.635	-9.693	47.635	-6.636
0.536	50.075	46.145	41.385	10.475	56.000	-9.855	46.000	-4.615
0.658	45.596	40.966	34.588	10.496	56.000	-15.034	46.000	-11.412


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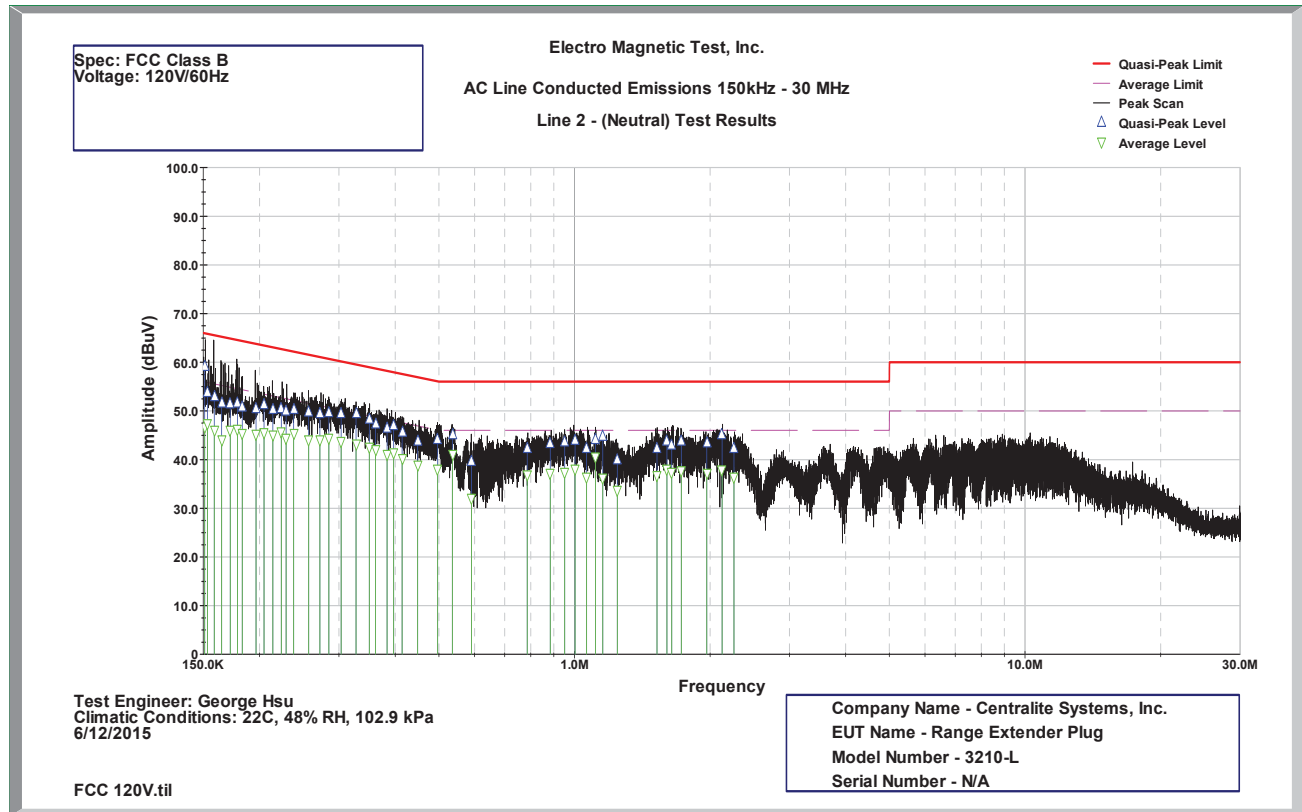
0.772	47.716	43.426	37.391	10.316	56.000	-12.574	46.000	-8.609
0.867	49.037	44.957	39.262	10.337	56.000	-11.043	46.000	-6.738
0.915	49.528	45.248	39.328	10.528	56.000	-10.752	46.000	-6.672
0.954	50.486	45.676	39.626	10.586	56.000	-10.324	46.000	-6.374
1.086	47.986	42.246	35.773	10.486	56.000	-13.754	46.000	-10.227
1.206	47.480	41.830	33.482	10.480	56.000	-14.170	46.000	-12.518
1.303	45.508	41.098	34.318	10.408	56.000	-14.902	46.000	-11.682
1.424	46.573	42.823	36.880	10.373	56.000	-13.177	46.000	-9.120
1.616	47.298	44.038	37.956	10.398	56.000	-11.962	46.000	-8.044
1.735	48.270	45.620	38.317	10.470	56.000	-10.380	46.000	-7.683
1.843	47.629	43.299	36.961	10.429	56.000	-12.701	46.000	-9.039
1.962	47.670	43.350	38.197	10.370	56.000	-12.650	46.000	-7.803
2.130	50.196	45.036	38.984	10.496	56.000	-10.964	46.000	-7.016
2.268	49.124	46.604	40.204	10.524	56.000	-9.396	46.000	-5.796
2.381	47.246	43.966	36.736	10.546	56.000	-12.034	46.000	-9.264
2.478	44.218	40.078	33.745	10.518	56.000	-15.922	46.000	-12.255
2.804	44.309	39.869	34.292	10.509	56.000	-16.131	46.000	-11.708
3.039	42.778	38.328	32.316	10.478	56.000	-17.672	46.000	-13.684



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
0.151	65.861	59.231	46.686	12.661	65.969	-6.738	55.969	-9.283
0.153	63.886	53.776	47.296	12.586	65.908	-12.132	55.908	-8.612
0.159	63.393	53.043	46.048	12.393	65.753	-12.710	55.753	-9.705
0.165	61.976	51.696	44.046	12.176	65.579	-13.882	55.579	-11.532
0.172	61.544	51.424	45.949	11.944	65.367	-13.944	55.367	-9.419
0.179	59.802	51.652	46.074	11.802	65.180	-13.529	55.180	-9.106
0.183	61.606	50.816	45.396	11.706	65.054	-14.238	55.054	-9.658
0.196	58.916	50.436	45.196	11.416	64.672	-14.236	54.672	-9.476
0.205	60.918	51.378	45.563	11.318	64.440	-13.062	54.440	-8.877
0.214	58.473	50.383	45.013	11.273	64.172	-13.789	54.172	-9.159
0.224	58.327	50.527	45.647	11.227	63.898	-13.371	53.898	-8.251
0.229	56.700	49.920	44.288	11.200	63.739	-13.819	53.739	-9.451
0.238	57.157	50.387	45.317	11.157	63.480	-13.094	53.480	-8.164
0.257	56.472	49.732	43.904	11.072	62.940	-13.209	52.940	-9.036
0.272	55.111	49.431	43.941	11.011	62.508	-13.077	52.508	-8.567
0.285	54.560	49.730	44.368	10.960	62.144	-12.414	52.144	-7.776
0.304	52.784	49.494	43.577	10.884	61.612	-12.118	51.612	-8.035
0.328	52.880	49.510	43.227	10.780	60.923	-11.413	50.923	-7.695



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0.351	52.240	48.240	42.423	10.740	60.268	-12.027	50.268	-7.845
0.362	51.582	47.272	41.942	10.682	59.949	-12.677	49.949	-8.007
0.384	50.511	46.431	41.021	10.711	59.324	-12.892	49.324	-8.302
0.397	50.984	46.934	41.316	10.784	58.944	-12.010	48.944	-7.627
0.414	50.364	45.664	40.094	10.664	58.443	-12.780	48.443	-8.350
0.449	47.998	43.778	38.828	10.598	57.461	-13.684	47.461	-8.634
0.497	48.193	44.093	37.958	10.493	56.084	-11.991	46.084	-8.126
0.536	49.249	45.159	41.044	10.549	56.000	-10.841	46.000	-4.956
0.591	45.335	39.655	31.985	10.535	56.000	-16.345	46.000	-14.015
0.785	46.573	42.393	36.870	10.373	56.000	-13.607	46.000	-9.130
0.884	47.656	43.276	37.104	10.456	56.000	-12.724	46.000	-8.896
0.952	47.441	43.591	37.299	10.641	56.000	-12.409	46.000	-8.701
1.003	47.540	43.940	37.975	10.540	56.000	-12.060	46.000	-8.025
1.065	48.334	42.404	36.314	10.534	56.000	-13.596	46.000	-9.686
1.113	47.229	44.169	40.466	10.529	56.000	-11.831	46.000	-5.534
1.156	46.924	44.874	36.132	10.524	56.000	-11.126	46.000	-9.868
1.244	47.482	40.042	33.665	10.482	56.000	-15.958	46.000	-12.335
1.524	46.762	42.352	36.579	10.462	56.000	-13.648	46.000	-9.421
1.604	48.054	43.814	38.014	10.454	56.000	-12.186	46.000	-7.986
1.644	48.617	43.007	37.332	10.417	56.000	-12.993	46.000	-8.668
1.727	47.210	43.880	37.632	10.510	56.000	-12.120	46.000	-8.368
1.967	46.710	43.440	37.233	10.410	56.000	-12.560	46.000	-8.767
2.126	47.333	45.213	37.768	10.533	56.000	-10.787	46.000	-8.232
2.260	46.457	42.377	36.392	10.557	56.000	-13.623	46.000	-9.608



ELECTRO MAGNETIC TEST, INC.

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APPENDIX B

TEST SETUP DIAGRAMS



ELECTRO MAGNETIC TEST, INC.

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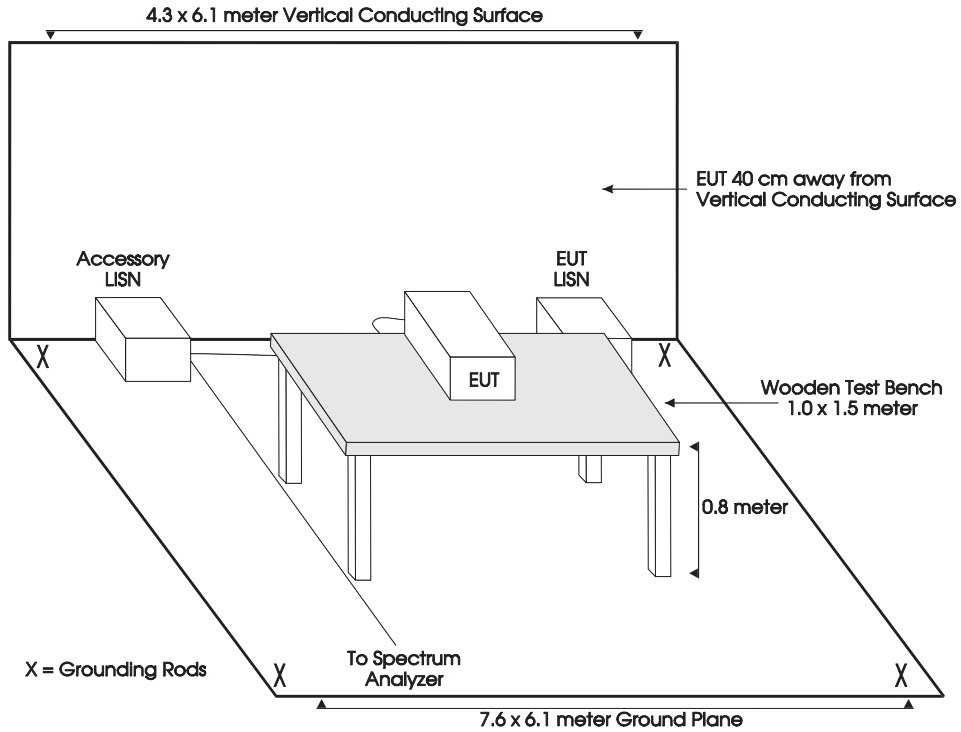


FIGURE 1 – TABLETOP CONDUCTED EMISSIONS TEST SETUP – SITE “A”

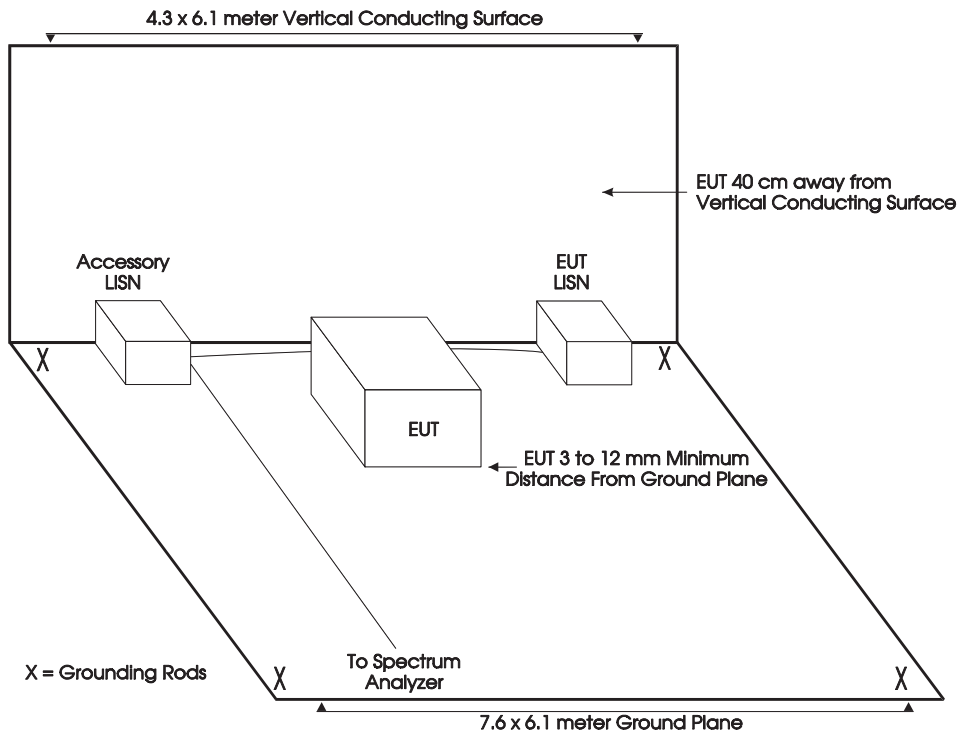


FIGURE 1a – FLOORSTANDING CONDUCTED EMISSIONS TEST SETUP – SITE “A”



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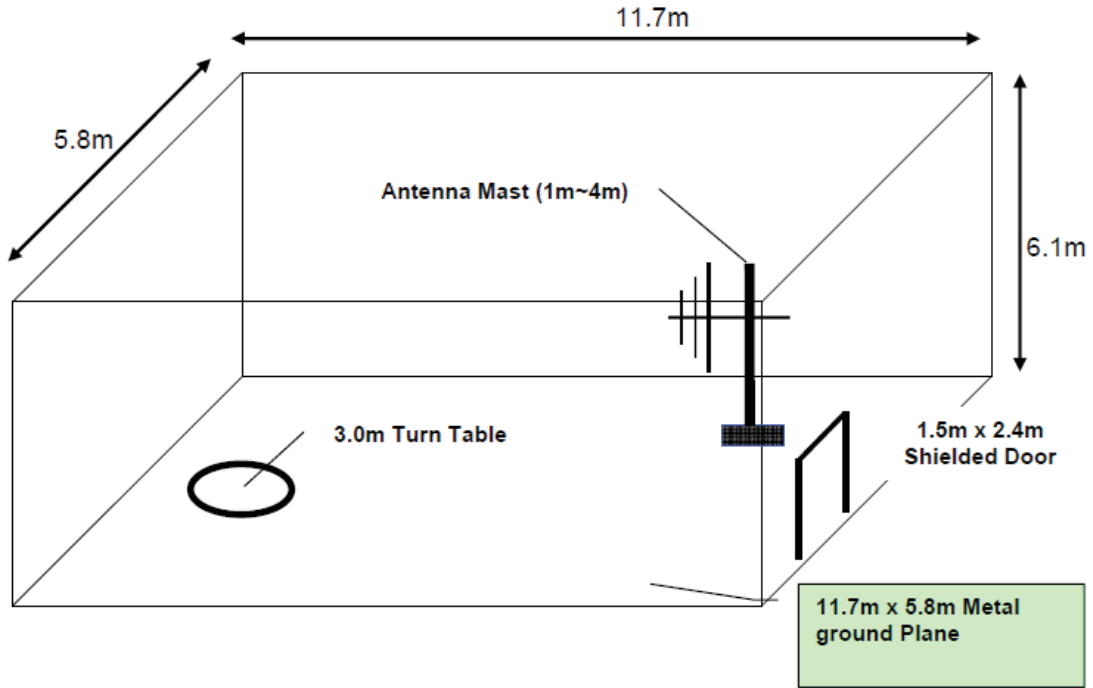


FIGURE 3 - LAYOUT OF 5 METER SEMI-ANECHOIC CHAMBER



ELECTRO MAGNETIC TEST, INC.

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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.