Compliance Testing, LLC
Previously Flom Test Lab
EMI, EMC, RF Testing Experts Since 1963

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Test Report

Prepared for: CentraLite Systems

Models: 3200, 3201, 4257050-RZHAC

Description: 3-Series Smart Outlet

Serial Number: N/A

FCC ID: T3L-SS042
IC: 12192A-SS042

To

FCC Part 15.247
And
IC RSS-247 Issue 2

Date of Issue: January 29, 2018

On the behalf of the applicant:	**CentraLite Systems** **1000 Cody Road South** **Mobile, AL 36695**
Attention of:	**Adel A. Sakla, Senior Hardware Engineer** **Ph: (877)466-5483** **E-Mail: adel_sakla@centralite.com**

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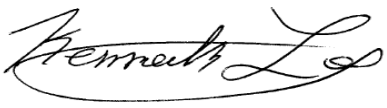
Project No: p17c0014



Kenneth Lee
Project Test Engineer

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	December 20, 2017	Kenneth Lee	Original Document
2.0	January 29, 2018	Kenneth Lee	Added explanations of Offsets into Output Power Section. Rephrased statement regarding power setting in additional information.

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ILAC / A2LA

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated January 2009).

The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to http://www.compliancetesting.com/labscope.html for current scope of accreditation.

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FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A

The applicant has been cautioned as to the following

15.21 - Information to User

The user's manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) - Special Accessories

Equipment marked to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer without an additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

Standard Test Conditions Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.10-2013 and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F) unless the particular equipment requirements specified testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Measurement results, unless otherwise noted, are worst-case measurements.

Environmental Conditions		
Temperature (ºC)	**Humidity (%)**	**Pressure (mbar)**
17-26	29-42	960-976

EUT Description
Models: 3200, 3201, 4257050-RZHAC
Description: 3-Series Smart Outlet
Firmware: N/A
Software: N/A
Serial Number: N/A
Additional Information: The EUT implements GFSK modulation**.** The EUT had a lower power setting for the high channel of operation.

EUT Operation during Tests
The EUT was set to transmit at the lowest, middle and highest channel of operation at the maximum available output power for each channel.

Accessories: None

Cables: None

Modifications: None

15.203: Antenna Requirement:

X	The antenna is permanently attached to the EUT
	The antenna uses a unique coupling
	The EUT must be professionally installed
	The antenna requirement does not apply

Test Summary

FCC 15.247 Specification	RSS-247 Specification	Test Name	Pass, Fail, N/A	Comments
15.247(b)	Section 5.4(d)	Output Power	Pass	
15.247(d)	Section 5.5	Conducted Spurious Emissions	N/A	EUT contains no Antenna Port
15.247(d), 15.209(a), 15.205	Section 5.5	Radiated Spurious Emissions	Pass	
15.247(d), 15.209(a), 15.205	Section 5.5	Emissions At Band Edges	Pass	
15.247(a)(2)	Sections 5.2(a)	Occupied Bandwidth	Pass	
15.247(e)	Section 5.2(b)	Transmitter Power Spectral Density	Pass	
15.207	RSS-GEN Section 8.8	A/C Powerline Conducted Emissions	Pass	

References	Description
CFR47, Part 15, Subpart B	Unintentional Radiators
CFR47, Part 15, Subpart C	Intentional Radiators
ANSI C63.10-2013	American National standard for testing Unlicensed Wireless Devices
ANSI C63.4-2014	Method and Measurements of Radio-Noise Emissions from low-Voltage Electrical and Electronic Equipment in the range 9kHz to 40GHz.
ISO/IEC 17025:2005	General requirements for the Competence of Testing and Calibrations Laboratories
KDB 558074 D01 v04	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating under §15.247

Output Power
Engineer: Kenneth Lee
Test Date: 12/20/2017

Test Procedure

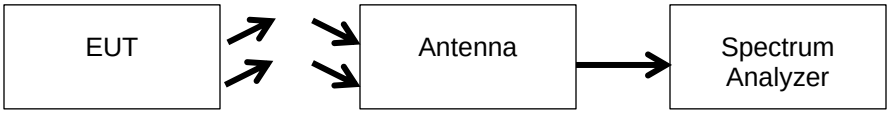
The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest, middle and highest frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the requirements for Output Power. Offsets were input into the analyzer the emulate antenna port measurements, 11.8 was added to the reference level offset for distance and 5 was added to the External Mixer Gain for antenna gain.

The Spectrum Analyzer was set to the following:

RBW ≥ DTS Bandwidth
VBW ≥ 3 x RBW
Span ≥ 3 x RBW
Sweep time = auto couple
Detector = peak
Trace Mode = max hold
Reference Level Offset = 11.8
External Mixer Gain = 5

The RF output power was measured using the spectrum analyzer's marker peak function

Test Setup



Transmitter Output Power Summary Table

Tuned Frequency (MHz)	Measured Value (dBm)	Specification Limit	Result
2405	4.5	1 W (30 dBm)	Pass
2445	4.28	1 W (30 dBm)	Pass
2475	-0.30	1 W (30 dBm)	Pass

Radiated Spurious Emissions
Engineer: Kenneth Lee
Test Date: 12/20/2017

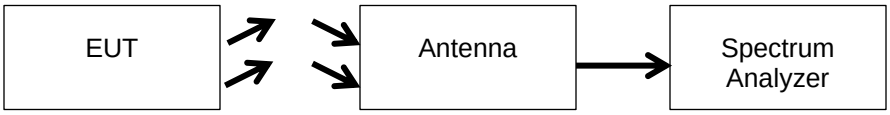
Test Procedure
Radiated Spurious Emissions: 30 – 1000 MHz

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest, middle and highest frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Spurious Emissions.

All emissions from 30 MHz to 1 GHz were examined.
Measured Level includes antenna and receiver cable correction factors.
Correction factors were input into the spectrum analyzer before recording “Measured Level”.

RBW = 100 KHz
VBW = 300 KHz
Detector – Quasi Peak

Test Setup

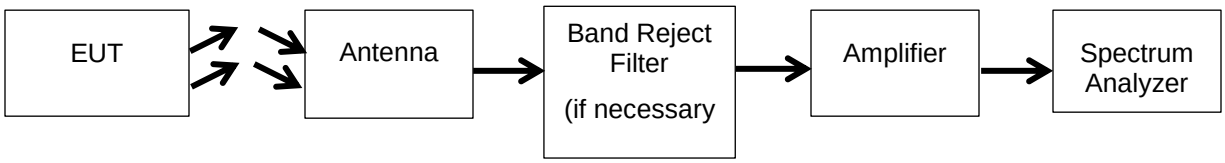


Test Procedure for
Radiated Spurious Emissions above 1 GHz

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest, middle and highest frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Spurious Emissions.

RBW = 100 KHz and 1 MHz
VBW = 300 KHz and 3 MHz
Detector – Peak

Test Setup



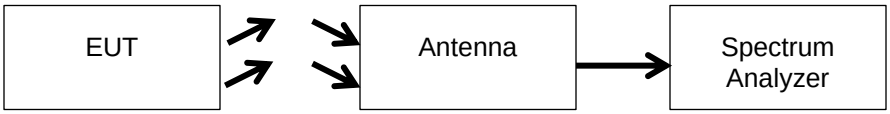
See Annex A for test data

Emissions at Band Edges
Engineer: Kenneth Lee
Test Date: 12/20/2017

Test Procedure

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest and highest frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the requirements for band edges.

Test Setup

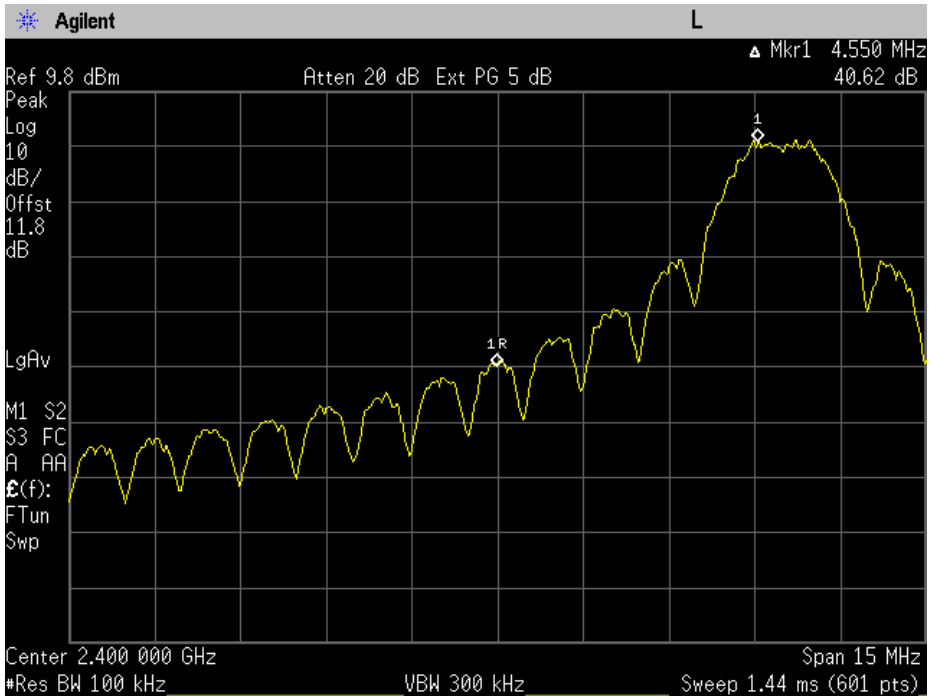


Band Edge Emissions Summary

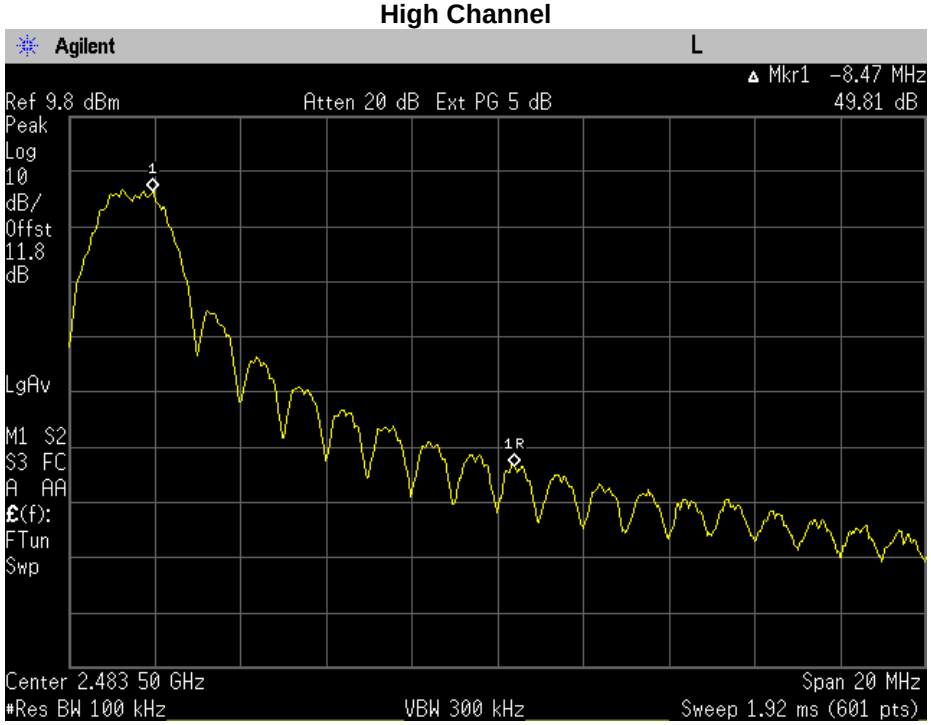
Tuned Frequency (MHz)	Emission Frequency (MHz)	Monitored Level	Detector	Limit	Result
2405	2400	-40.62	Peak	-20 dBc	Pass
2475	2483.5	-49.81	Peak	-20 dBc	Pass

Band Edge Plots

Low Channel



High Channel



DTS Bandwidth
Engineer: Kenneth Lee
Test Date: 12/20/2017

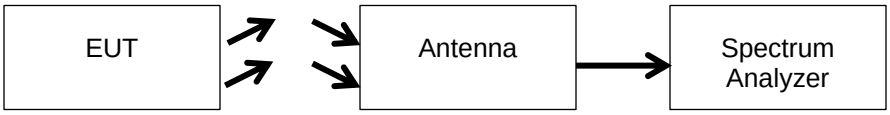
Test Procedure

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest, middle and highest frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the Bandwidth requirements.

The Spectrum Analyzer was set to the following:

RBW = 100 kHz
VBW ≥ 3 x RBW
Peak Detector
Trace mode = max hold
Sweep = auto couple
Span = 1.5 x EBW

Test Setup



6 dB Occupied Bandwidth Summary

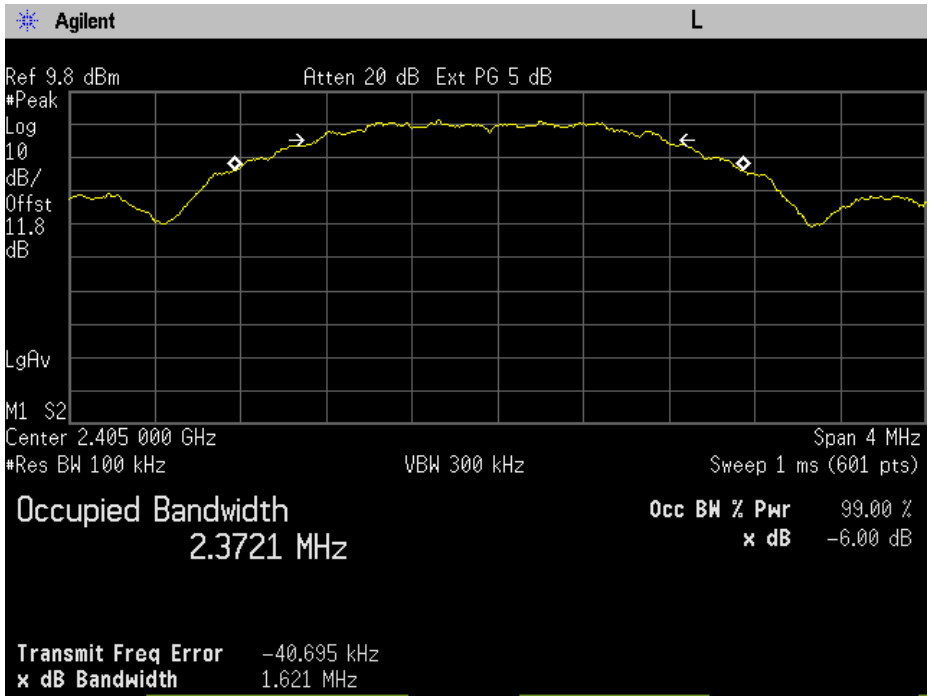
Frequency (MHz)	Measured Bandwidth (kHz)	Specification Limit (kHz)	Result
2405	1621	≥ 500	Pass
2445	1608	≥ 500	Pass
2475	1609	≥ 500	Pass

99% Bandwidth Summary

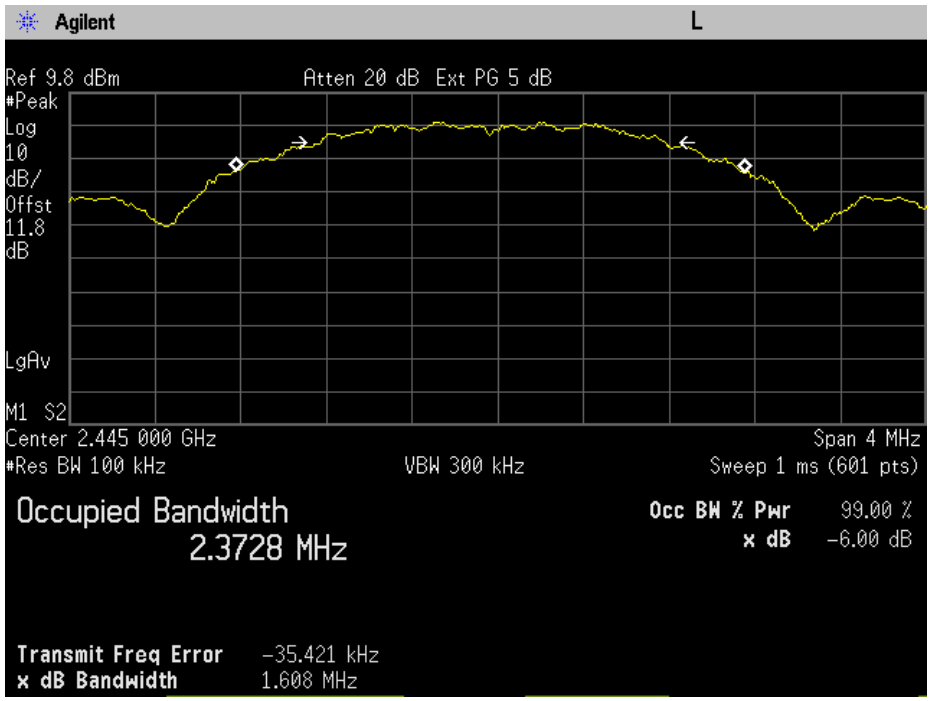
Frequency (MHz)	Measured Bandwidth (kHz)	Result
2405	2372	Pass
2445	2373	Pass
2475	2371	Pass

6 dB and 99% Bandwidth Plots

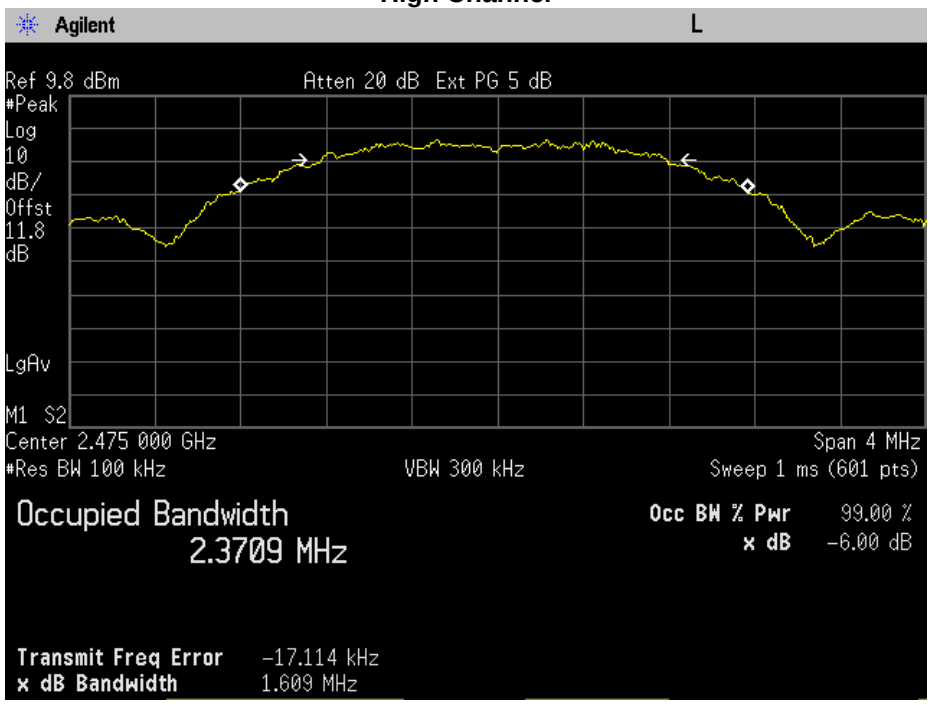
Low Channel



Mid Channel



High Channel



Transmitter Power Spectral Density (PSD)
Engineer: Kenneth Lee
Test Date: 12/20/2017

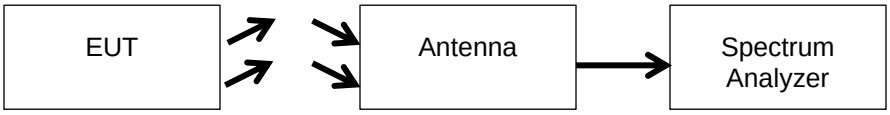
Test Procedure

The EUT was setup in a semi-anechoic test chamber set 3m from the receiving antenna. The EUT was set to transmit on the lowest, middle and highest frequency of operation at the maximum power level. The EUT was tested, in 3 orthogonal axis, by rotating it 360° with the receive antenna in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the TX signal levels were maximized. A spectrum analyzer was used to verify that the EUT met the requirements.
The Spectrum Analyzer was set to the following:

DTS channel center frequency
Span 1.5 x DTS bandwidth
RBW =3 kHz ≤ RBW ≤ 100 kHz
VBW ≥ 3 x RBW
Peak Detector
Sweep time = auto couple
Trace mode = max hold

Once the trace has stabilized the peak marker was used to determine the power spectral density.

Test Setup

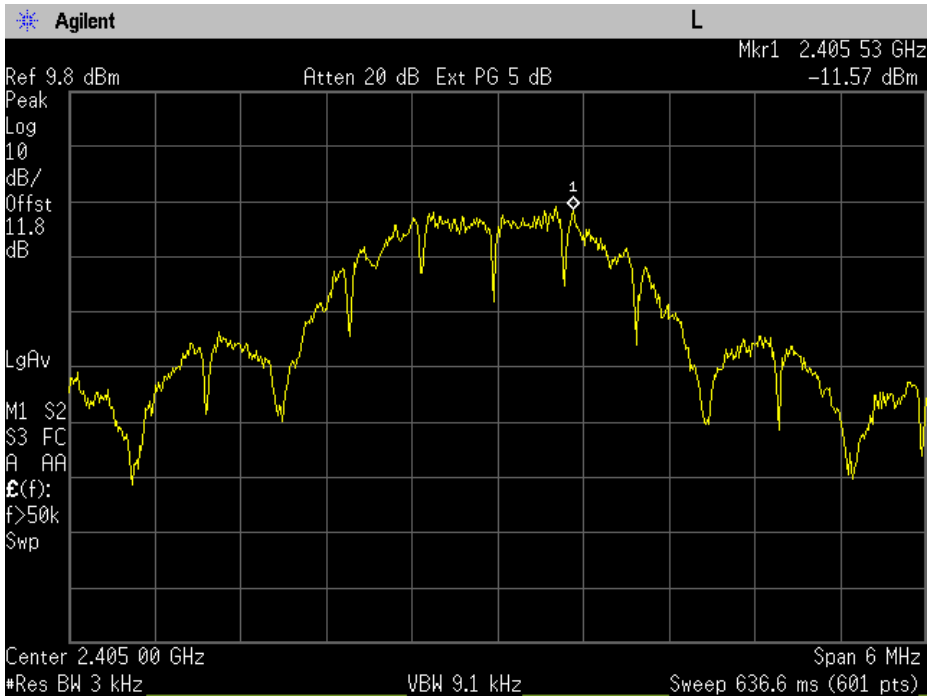


PSD Summary

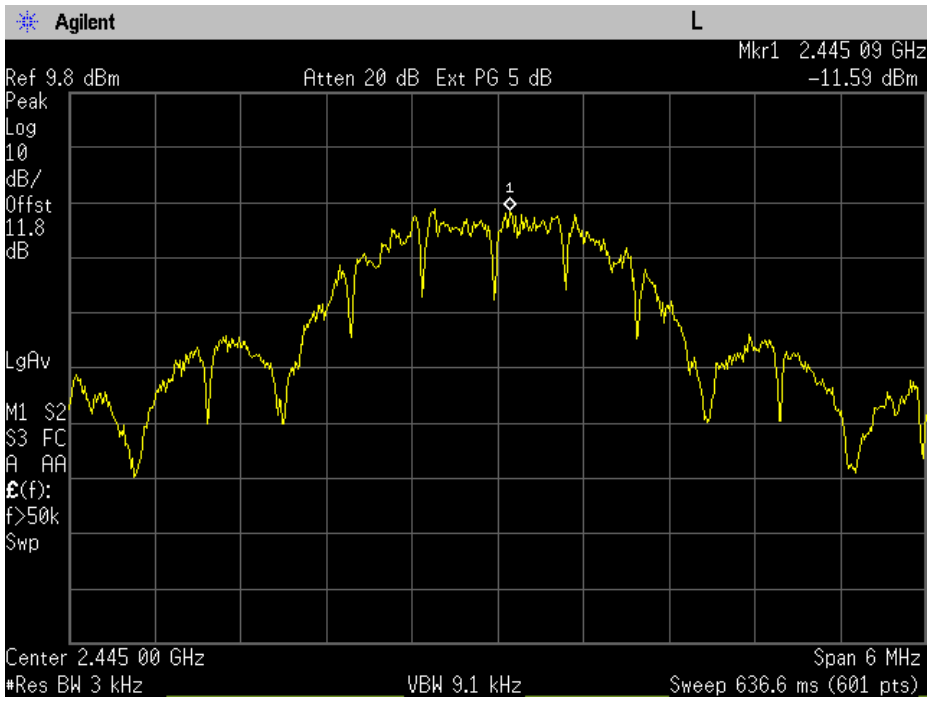
Frequency (MHz)	Measured Data (dBm)	Specification Limit (dBm)	Result
2405	-11.57	8	Pass
2445	-11.59	8	Pass
2475	-17.12	8	Pass

PSD Plots

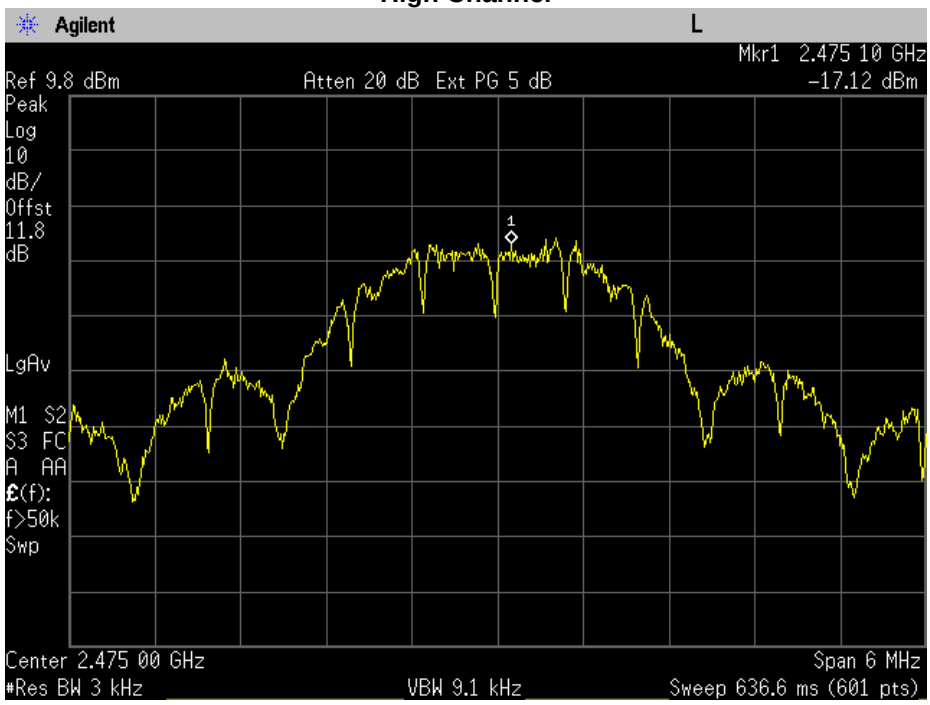
Low Channel



Mid Channel



High Channel

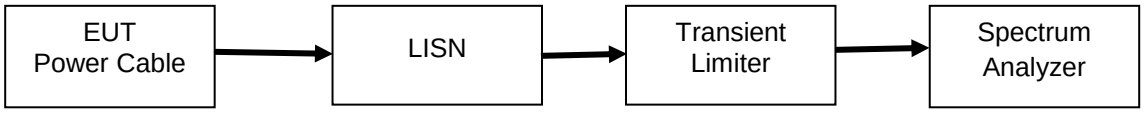


A/C Powerline Conducted Emission
Engineer: Kenneth Lee
Test Date: 12/20/2017

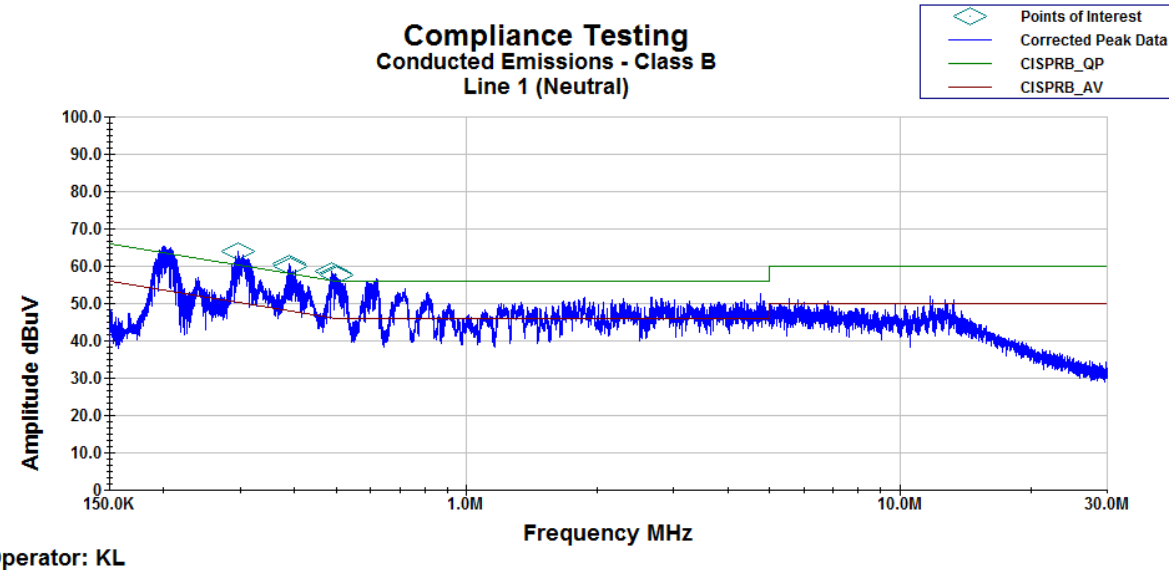
Test Procedure

The EUT power cable was connected to a LISN and the monitored output of the LISN was connected to a transient limiter, which then connected directly to a spectrum analyzer. The conducted emissions from 150 kHz to 30 MHz were measured and compared to the specification limits.

Test Setup



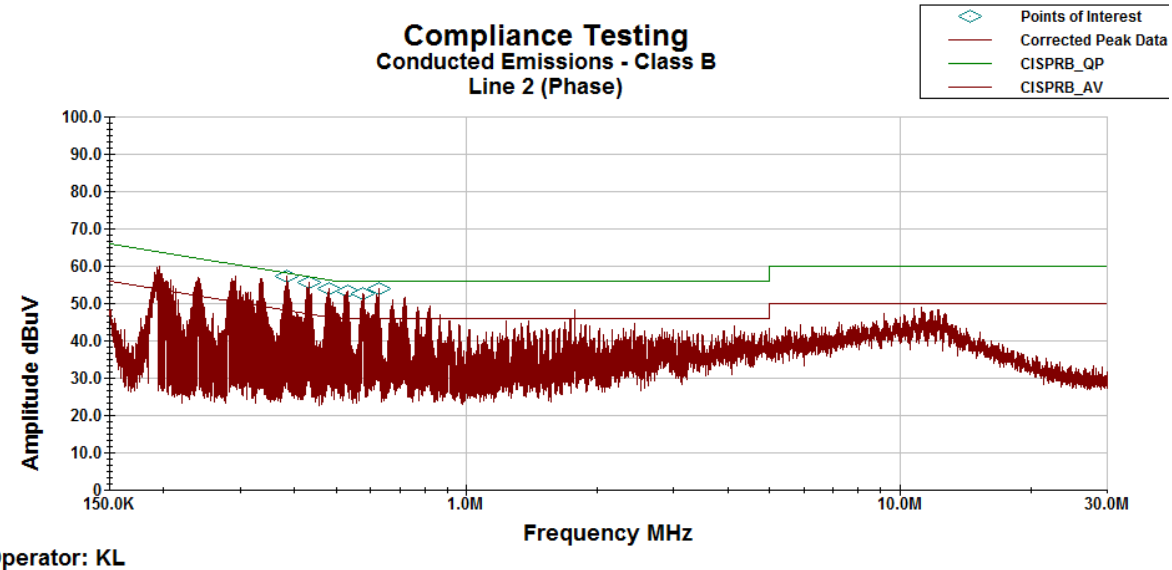
Peak Plot Line 1



Operator: KL

Conducted Emissions - 207.til **Job #: p17c0014**

Peak Plot Line 2



Operator: KL

Conducted Emissions - 207.til **Job #: p17c0014**

Line 1 Neutral Avg Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	Avg Margin (dB)
298.69 KHz	39.75	0.15	0.025	10.1	50.029	51.752	-1.723
388.95 KHz	33.7	0.11	0.029	10.1	43.938	49.173	-5.235
392.26 KHz	33.78	0.1	0.03	10.1	44.013	49.078	-5.065
490.18 KHz	31.16	0.1	0.03	10.1	41.387	46.281	-4.894
491.3 KHz	31.7	0.1	0.03	10.1	41.927	46.249	-4.322
495.82 KHz	33.24	0.1	0.03	10.1	43.467	46.119	-2.653

Line 2 Phase Avg Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	Avg Margin (dB)
388.0 KHz	19.6	0.11	0.029	10.1	29.835	49.2	-19.365
432.39 KHz	22.22	0.1	0.03	10.1	32.447	47.932	-15.485
483.52 KHz	16.77	0.1	0.03	10.1	27	46.471	-19.471
528.05 KHz	17.32	0.1	0.03	10.1	27.55	46	-18.45
567.14 KHz	15.95	0.1	0.03	10.1	26.183	46	-19.817
625.34 KHz	14.32	0.09	0.031	10.1	24.542	46	-21.458

Line 1 Neutral QP Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	QP Margin (dB)
298.69 KHz	48.05	0.151	0.025	10.1	58.326	61.752	-3.426
388.95 KHz	44.14	0.106	0.029	10.1	54.375	59.173	-4.798
392.26 KHz	44.45	0.104	0.03	10.1	54.683	59.078	-4.395
490.18 KHz	43.25	0.1	0.03	10.1	53.48	56.281	-2.801
491.3 KHz	43.37	0.1	0.03	10.1	53.6	56.249	-2.649
495.82 KHz	43.3	0.1	0.03	10.1	53.53	56.119	-2.589

Line 2 Phase QP Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	QP Margin (dB)
388.0 KHz	41.49	0.11	0.029	10.1	51.725	59.2	-7.475
432.39 KHz	42.91	0.1	0.03	10.1	53.14	57.932	-4.792
483.52 KHz	40	0.1	0.03	10.1	50.23	56.471	-6.241
528.05 KHz	40	0.1	0.03	10.1	50.23	56	-5.77
567.14 KHz	36.95	0.1	0.03	10.1	47.18	56	-8.82
625.34 KHz	36.42	0.09	0.031	10.1	46.639	56	-9.361

Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
EMI Receiver	HP	8546A	i00033	3/28/17	3/28/18
Transient Limiter	Com-Power	LIT-153	i00123	Verified on: 12/20/17	
Horn Antenna	ARA	DRG-118/A	i00271	6/16/16	6/16/18
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	6/9/17	6/9/18
Bi-Log Antenna	Schaffner	CBL 6111D	i00349	8/3/16	8/3/18
AC Power Source	Behlman	BL 6000	i00362	Verified on: 12/20/17	
EMI Analyzer	Agilent	E7405A	i00379	2/22/17	2/22/18
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	8/15/16	8/15/19
LISN	COM-Power	LI-125A	i00447	9/11/17	9/11/19
LISN	COM-Power	LI-125A	i00449	9/11/17	9/11/19
PSA Spectrum Analyzer	Agilent	E4445A	i00471	9/6/17	9/6/18
Preamplifier for 1-18GHz horn antenna	Miteq	AFS44 00101 400 23-10P-44	i00509	N/A	N/A

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT