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

toll-free: (866) 311-3268
fax: (480) 926-3598
http://www.ComplianceTesting.com
info@ComplianceTesting.com

Test Report

Prepared for: Ubiquiti Networks, Inc

Model: B-DB-AC, Bullet

Description: Dual Band Networking Device

Serial Number: N/A

FCC ID: SWX-BDBAC
IC: 6545A-BDBAC

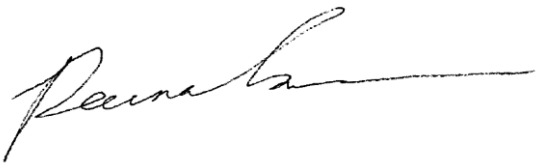
To

FCC Part 15.247
RSS 247, Issue 2

Date of Issue: February 1, 2018

On the behalf of the applicant:	**Ubiquiti Networks, Inc** **2580 Orchard Parkway** **San Jose, CA 95131**
Attention of:	**Mark Feil** **Ph: 801-898-1911** **E-mail: mark.feil@ubnt.com**

Prepared By
Compliance Testing, LLC
1724 S. Nevada Way
Mesa, AZ 85204
(480) 926-3100 phone / (480) 926-3598 fax
www.compliancetesting.com
Project No: p1790008



Poona Saber
Project Test Engineer

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	Dec 6, 2017	Poona Saber	Original Document
2.0	January 30,2017	Poona Saber	-Added annex D for DTS bandwidth plots -Added tables for different antennas for 2.4 GHz Radio on Power and power spectral density -Updated Annex A -Updated Annex B
3.0	January 31, 2017	Poona Saber	Updated Annex A, B and Annex C
4.0	February 1, 2017	Poona Saber	Updated Annex C

Table of Contents

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.

Testing Certificate Number: **2152.01**

ACCREDITED
TESTING CERT
#2152.01

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)**
25.4 – 26.6	21.4 – 22.5	976.7 – 980.9

EUT Operation during Tests
EUT is powered by POE (Power over Ethernet) Ethernet cable.

EUT Description
Model: B-DB-AC, Bullet
Description: Dual Band Networking Device
Firmware: NA
Software: NA
Serial Number: NA
Additional Information: The Bullet AC (Model: B-DB-AC) is a dual band networking device that is powered over Ethernet (passive POE, 24V) and provides an N-type antenna connection. It features dual-band AC mode operation in 5GHz and 2.4GHz bands, and a dedicated 2.4 GHz WiFi management radio for convenient device setup.
Through this report for the 2.4GHz radio mode AC, Channels 10,20 and 40 MHz has been tested and for the 2.4 GHz Management unit mode N, 20 MHz bandwidth has been tested

EUT Operation during Tests
Radio testing has been done conducted and radiated with controlling the device for continuous modulation transmission on low, middle and high channels with client's provided commands through telnet.

Antenna List

No.	Model	Antenna Type	Peak Gain
1	UniFi Omni	Omni	4
1	AMO-2G13	Omni	13
1	AM-V2G-Ti	Sector	17
1	RD-2G24	Dish	24

Note: Management Radio only uses the Omni 4 dBi gain Antenna.

Accessories:

Qty	Description	Manufacturer	Model	S/N
1	Switching mode power supply/ POE	Ubiquiti	GP-A240-050	N/A

Cables:

Qty	Description	Length (M)	Shielding Y/N	Shielded Hood Y/N	Ferrite Y/N
2	Ethernet cable	<3 meters	N	N	N

Modifications: None

15.203: Antenna Requirement:

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

Test Results Summary

FCC 15.247 Specification	Test Name	Pass, Fail, N/A	Comments
15.247(b)	Peak Output Power	Pass	
15.247(d)	Conducted Spurious Emissions	Pass	
15.247(d), 15.209(a), 15.205	Radiated Spurious Emissions	Pass	
15.247(d), 15.209(a), 15.205	Emissions At Band Edges	Pass	
15.247(a)(2)	Occupied Bandwidth	Pass	
15.247(e)	Transmitter Power Spectral Density	Pass	
15.207	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

Peak Conducted Output Power

Engineer: Poona Saber

Test Date: 12/4/2017

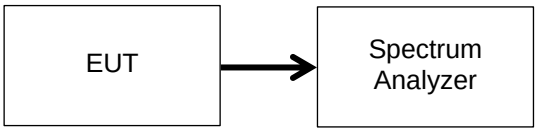
Test Procedure

The EUT was connected directly to a spectrum analyzer. The Spectrum Analyzer was set to the following:

RBW = 1MHz
VBW ≥ 3 x RBW
Detector= Peak
Trace = Max hold
Sweep = auto
The band/channel power measurement function of the device was used with band limits set equal to DTS bandwidth edges to measure the peak power.

The EUT was set to transmit on the lowest, middle and highest frequencies at the maximum power level.

Test Setup



Transmitter Output Power (Management Radio)

Tuned Frequency (MHz)	Mode	Bandwidth	Measured Value (dBm)	Specification Limit	Result
2412	N	20	6.7	1 W (30 dBm)	Pass
2437	N	20	18.71	1 W (30 dBm)	Pass
2462	N	20	12.66	1 W (30 dBm)	Pass

Transmitter Output Power (2.4 GHz Radio)

Omni 4 dBi
ptmp

Conducted Power for 2.4 GHz

Band Width	Mode	Frequency	Data Rate	TP	Port 1	Limit	Margin
MHz	ac	MHz			dBm	dBm	dB
10	ac	2412	MCS0	11	16.1	30	-14.0
10	ac	2437	MCS0	18	23.4	30	-6.6
10	ac	2462	MCS0	10	14.8	30	-15.2
20	ac	2412	MCS0	12	16.9	30	-13.2
20	ac	2437	MCS0	19	24.5	30	-5.5
20	ac	2462	MCS0	13	17.5	30	-12.5
40	ac	2422	MCS0	11	15.6	30	-14.4
40	ac	2437	MCS0	16	20.2	30	-9.8
40	ac	2452	MCS0	14	18.5	30	-11.5

Omni 13 dBi
ptmp

Band Width	Mode	Frequency	Data Rate	TP	Port 1	Limit	Margin
MHz	ac	MHz			dBm	dBm	dB
10	ac	2412	MCS0	11	9.05	23	-14.0
10	ac	2437	MCS0	18	16.36	23	-6.6
10	ac	2462	MCS0	10	7.79	23	-15.2
20	ac	2412	MCS0	12	9.85	23	-13.2
20	ac	2437	MCS0	19	17.48	23	-5.5
20	ac	2462	MCS0	13	10.49	23	-12.5
40	ac	2422	MCS0	11	8.64	23	-14.4
40	ac	2437	MCS0	16	13.21	23	-9.8
40	ac	2452	MCS0	14	11.49	23	-11.5

Sector 17 dBi
ptmp

Band Width	Mode	Frequency	Data Rate	TP	Port 1	Limit	Margin
MHz	ac	MHz			dBm	dBm	dB
10	ac	2412	MCS0	9	3.05	17	-14.0
10	ac	2437	MCS0	19	10.36	17	-6.6
10	ac	2462	MCS0	19	1.79	17	-15.2
20	ac	2412	MCS0	7	3.85	17	-13.2
20	ac	2437	MCS0	19	11.48	17	-5.5
20	ac	2462	MCS0	20	4.49	17	-12.5
40	ac	2422	MCS0	5	2.64	17	-14.4
40	ac	2437	MCS0	20	7.21	17	-9.8
40	ac	2452	MCS0	20	5.49	17	-11.5

Dish 24 dBi
ptp

Band Width	Mode	Frequency	Data Rate	TP	Port 1	Limit	Margin
MHz	ac	MHz			dBm	dBm	dB
10	ac	2412	MCS0	11	11.05	25	-14.0
10	ac	2437	MCS0	18	18.36	25	-6.6
10	ac	2462	MCS0	10	9.79	25	-15.2
20	ac	2412	MCS0	12	11.85	25	-13.2
20	ac	2437	MCS0	19	19.48	25	-5.5
20	ac	2462	MCS0	13	12.49	25	-12.5
40	ac	2422	MCS0	11	10.64	25	-14.4
40	ac	2437	MCS0	16	15.21	25	-9.8
40	ac	2452	MCS0	14	13.49	25	-11.5

Conducted RF Measurements (15.209)

Engineer: Poona Saber

Test Date: 12/5/2017

Test Procedure

Antenna-port conducted measurements were performed as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands for 15.209.

The following offsets were added to the measurements:
The maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level
A maximum ground reflection factor to the EIRP level, 6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000MHz.

The following equations were used to determine the field strength from the conducted values.
E[dBµV/m] = EIRP[dBm] - 20 log(d[meters]) + 104.77, where E = field strength and d = 3m
E[dBµV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

The Spectrum Analyzer was set to the following:

The Spectrum Analyzer was set to the following for emissions > 1000MHz:

a. RBW = 1 MHz
b. VBW ≥ 3 MHz
c. Detector = Peak.
d. Sweep time = auto
e. Trace mode = max hold
    1. Note: For emissions where the peak exceeded that of the average 15.209 emission limit the following was performed.
f. RBW = 1 MHz
g. VBW ≤ RBW/100 (i.e., 10 kHz) but not less than 10 Hz

For emissions below 1000MHz the Spectrum Analyzer settings were as follows:

a. RBW = 100 kHz
b. VBW ≥ 300 kHz
c. Detector = Peak
d. Sweep time = auto
e. Trace mode = max hold

The EUT was connected to a spectrum analyzer to verify that the EUT met the requirements for spurious emissions. The EUT was set to transmit on the lowest, middle and highest frequencies at the maximum power level. The frequency range from 30 MHz to the 10th harmonic of the fundamental transmitter was investigated.

Test Setup

See Annex A for test data

Radiated Spurious Emissions

Engineer: Poona Saber

Test Date: 12/6/2017

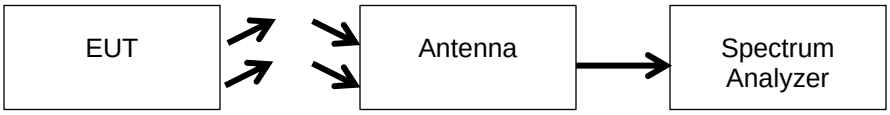
Test Procedure
Radiated Spurious Emissions: 30 – 1000 MHz

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

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

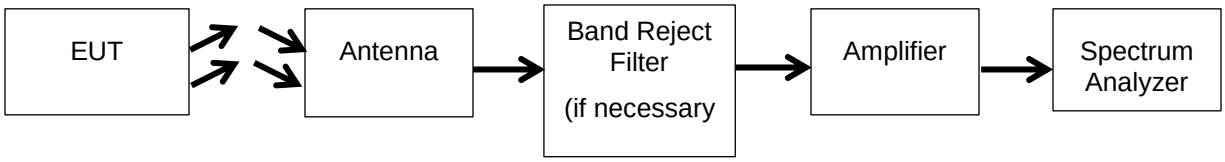
Test Setup



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 output of the transmitter was connected to a non-radiating balance load. The EUT was set to transmit on the lowest, middle and highest frequencies at the maximum power level. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360° with the antennas in both the vertical and horizontal orientation and was raised from 1 to 4 meters to ensure the TX signal levels were maximized.

Test Setup



See Annex B for Test Data

Conducted Spurious Emissions

Engineer: Poona Saber

Test Date: 12/5/2017

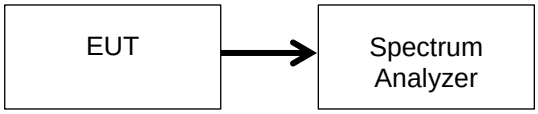
Test Procedure

The EUT was connected directly to a spectrum analyzer. The Spectrum Analyzer was set to the following:

RBW = 100 kHz
VBW ≥ 3 x RBW
Peak Detector
Trace mode = max hold
Sweep = auto couple
Frequency Range = 30MHz – 10th Harmonic of the fundamental

The EUT was set to transmit on the lowest, middle and highest frequencies at the maximum power level. The trace was allowed to stabilize. All emission were investigated to insure they were attenuated from the peak fundamental by at least 20dB. If the average power levels were measured then the out-of-band emissions needed to be attenuated by 30dB. In addition emissions were investigated at the band edges to insure all out-of-band emissions were attenuated 20 or 30dB as necessary.

Test Setup



See Annex C for Test Data

DTS Bandwidth

Engineer: Poona Saber
Test Date: 12/5/2017

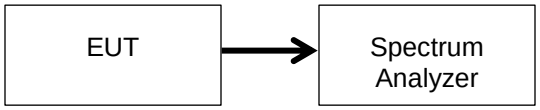
Test Procedure

The EUT was connected directly to a spectrum analyzer. 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

The EUT was set to transmit at the lowest, middle and highest channels of the band at the maximum power levels. The maximum width of the emission that was determined by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that were attenuated by 6db and this value was used to determine the width of the carrier. Alternatively the spectrum analyzer's automatic bandwidth capability was used.

Test Setup



6 dB Occupied Bandwidth Summary

Frequency (MHz)	Mode	Bandwidth	Measured Bandwidth (MHz)	Specification Limit (kHz)	Result
2412	N	20	17.837	≥ 500	Pass
2437	N	20	17.851	≥ 500	Pass
2462	N	20	17.807	≥ 500	Pass
2412	AC	10	8.861	≥ 500	Pass
2437	AC	10	8.838	≥ 500	Pass
2462	AC	10	8.851	≥ 500	Pass
2412	AC	20	17.586	≥ 500	Pass
2437	AC	20	17.531	≥ 500	Pass
2462	AC	20	17.173	≥ 500	Pass
2422	AC	40	35.745	≥ 500	Pass
2437	AC	40	35.198	≥ 500	Pass
2452	AC	40	35.388	≥ 500	Pass

99% Bandwidth Summary

Frequency (MHz)	Mode	Bandwidth	Measured Bandwidth (MHz)	Specification Limit (kHz)	Result
2412	N	20	20.138	≥ 500	Pass
2437	N	20	18.2586	≥ 500	Pass
2462	N	20	18.804	≥ 500	Pass
2412	AC	10	8.958	≥ 500	Pass
2437	AC	10	8.916	≥ 500	Pass
2462	AC	10	8.938	≥ 500	Pass
2412	AC	20	17.638	≥ 500	Pass
2437	AC	20	17.567	≥ 500	Pass
2462	AC	20	17.603	≥ 500	Pass
2422	AC	40	36.059	≥ 500	Pass
2437	AC	40	35.754	≥ 500	Pass
2452	AC	40	35.832	≥ 500	Pass

See Annex D for Test Plots

Transmitter Power Spectral Density (PSD)

Engineer: Poona Saber

Test Date: 12/5/2017

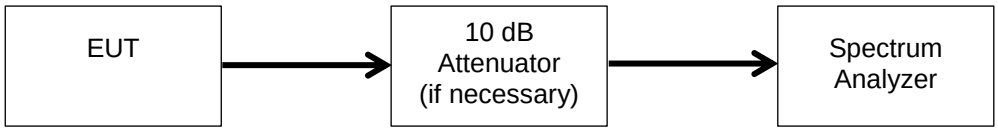
Test Procedure

The EUT was connected directly to a spectrum analyzer. 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

The EUT was set to transmit at the lowest, middle and highest channels of the band at the maximum power levels. Once the trace has stabilize the peak marker was used to determine the peak power spectral density.

Test Setup



PSD Summary

Management Radio

Frequency (MHz)	Mode	Bandwidth	Measured Data (dBm)	Specification Limit (dBm)	Result
2412	N	20	-21.88	8	Pass
2437	N	20	-10.81	8	Pass
2462	N	20	-18.33	8	Pass

2.4 GHz Radio

Omni 4 dBi
ptmp

Conducted Power Spectral Density for 2.4 GHz

Band Width	Mode	Frequency	Data Rate	TP	Port 1	Limit	Margin
MHz	ac	MHz			dBm	dBm	dB
10	ac	2412	MCS0	11	-10.5	8	-18.5
10	ac	2437	MCS0	18	-10.5	8	-18.5
10	ac	2462	MCS0	10	-12.3	8	-20.3
20	ac	2412	MCS0	12	-13.1	8	-21.1
20	ac	2437	MCS0	19	-12.4	8	-20.4
20	ac	2462	MCS0	13	-12.4	8	-20.4
40	ac	2422	MCS0	11	-7.5	8	-15.5
40	ac	2437	MCS0	16	-11.6	8	-19.6
40	ac	2452	MCS0	14	-13.8	8	-21.8

Omni 13
dBi ptmp

Band Width	Mode	Frequency	Data Rate	TP	Port 1	Limit	Margin
MHz	ac	MHz			dBm	dBm	dB
10	ac	5160	MCS0	9	-17.47	1	-18.5
10	ac	5200	MCS0	19	-17.45	1	-18.5
10	ac	5245	MCS0	19	-19.28	1	-20.3
20	ac	5165	MCS0	7	-20.11	1	-21.1
20	ac	5200	MCS0	19	-19.37	1	-20.4
20	ac	5240	MCS0	20	-19.4	1	-20.4
40	ac	5175	MCS0	5	-14.47	1	-15.5
40	ac	5200	MCS0	20	-18.62	1	-19.6
40	ac	5230	MCS0	20	-20.8	1	-21.8

Sector 17
dBi ptmp

Band Width	Mode	Frequency	Data Rate	TP	Port 1	Limit	Margin
MHz	ac	MHz			dBm	dBm	dB
10	ac	5160	MCS0	9	-23.47	-5	-18.5
10	ac	5200	MCS0	19	-23.45	-5	-18.5
10	ac	5245	MCS0	19	-25.28	-5	-20.3
20	ac	5165	MCS0	7	-26.11	-5	-21.1
20	ac	5200	MCS0	19	-25.37	-5	-20.4
20	ac	5240	MCS0	20	-25.4	-5	-20.4
40	ac	5175	MCS0	5	-20.47	-5	-15.5
40	ac	5200	MCS0	20	-24.62	-5	-19.6
40	ac	5230	MCS0	20	-26.8	-5	-21.8

Dish 24 dBi
ptp

Band Width	Mode	Frequency	Data Rate	TP	Port 1	Limit	Margin
MHz	ac	MHz			dBm	dBm	dB
10	ac	5160	MCS0	11	-15.47	3	-18.5
10	ac	5200	MCS0	18	-15.45	3	-18.5
10	ac	5245	MCS0	10	-17.28	3	-20.3
20	ac	5165	MCS0	12	-18.11	3	-21.1
20	ac	5200	MCS0	19	-17.37	3	-20.4
20	ac	5240	MCS0	13	-17.4	3	-20.4
40	ac	5175	MCS0	11	-12.47	3	-15.5
40	ac	5200	MCS0	16	-16.62	3	-19.6
40	ac	5230	MCS0	14	-18.8	3	-21.8

A/C Powerline Conducted Emission

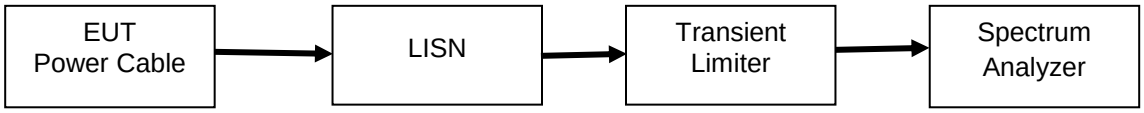
Engineer: Poona Saber

Test Date: 12/12/17

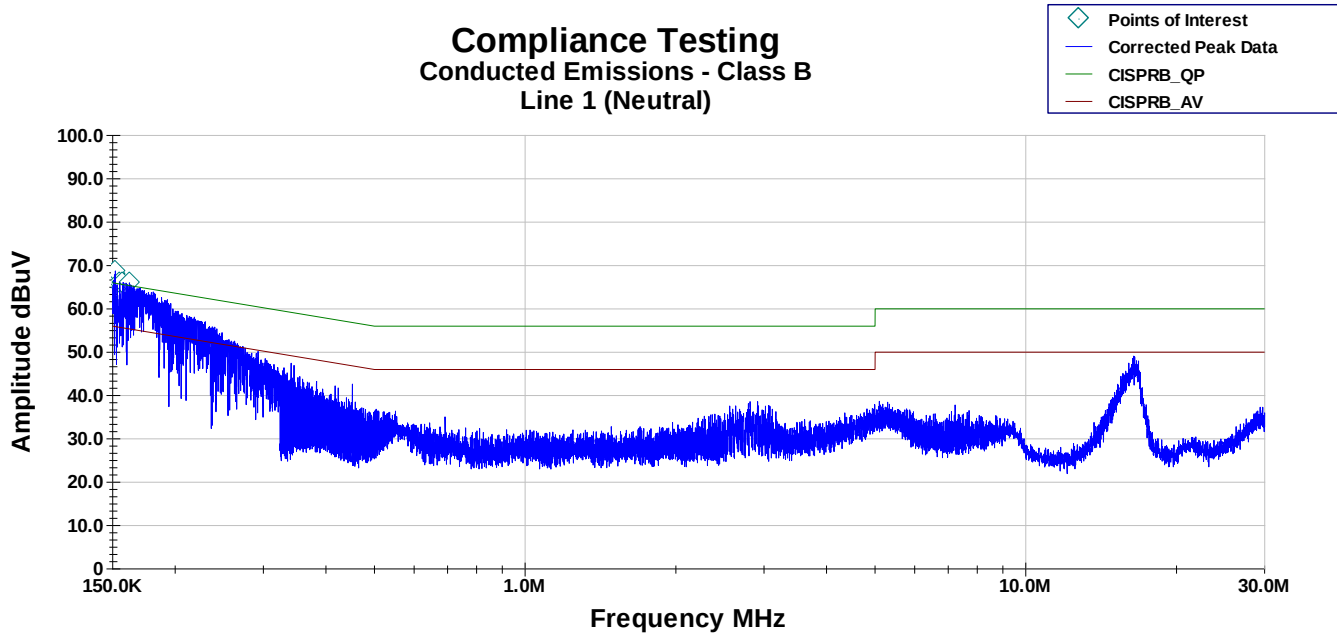
Test Procedure

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



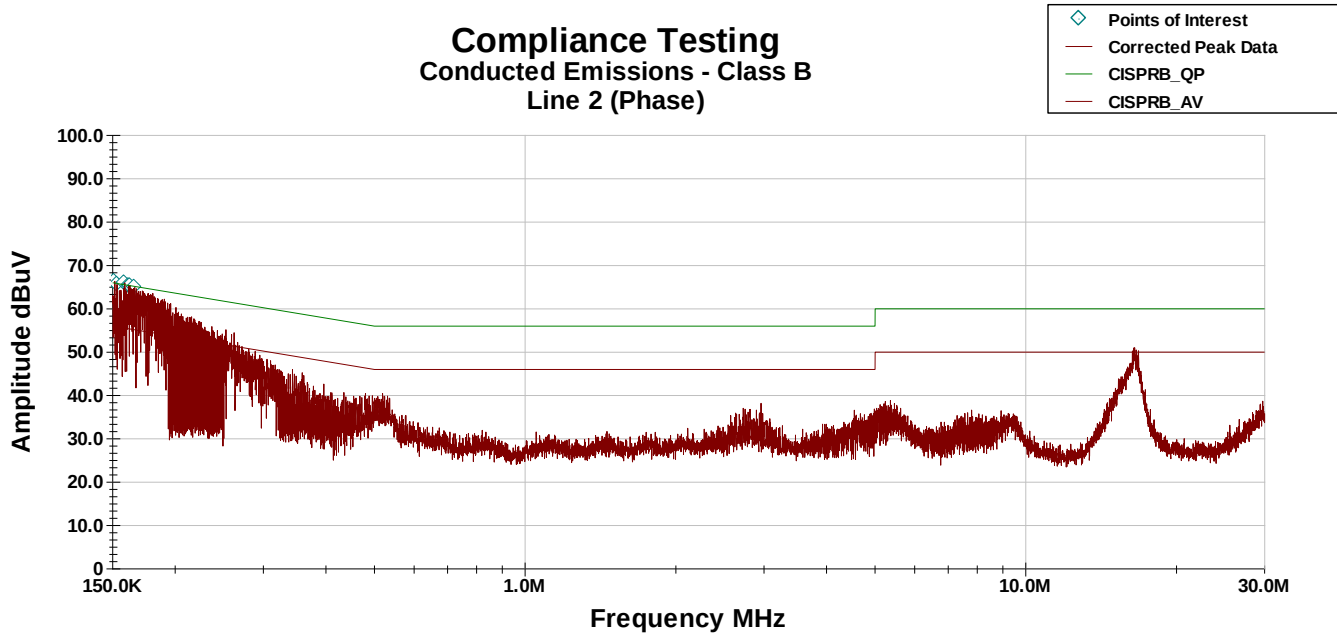
Line 1 Peak results



Operator: PS

EN55032 Class B_85462 EMI Rec_15.til **Job #:**

Line 2 Peak Results



Operator: PS

EN55032 Class B_85462 EMI Rec_15.til **Job #:**

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)
153.2 KHz	25.63	0.27	0.02	10.2	36.121	55.909	-19.787
154.33 KHz	25.4	0.26	0.02	10.2	35.877	55.876	-20
155.15 KHz	26.55	0.25	0.02	10.2	37.018	55.853	-18.834
158.93 KHz	26.23	0.21	0.02	10.2	36.661	55.745	-19.084
159.05 KHz	25.85	0.21	0.02	10.2	36.283	55.741	-19.459
157.2 KHz	26.45	0.23	0.02	10.2	36.898	55.794	-18.896

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)
154.35 KHz	25.58	0.26	0.02	10.2	36.06	55.876	-19.816
156.73 KHz	26.39	0.23	0.02	10.2	36.843	55.808	-18.965
156.98 KHz	26.38	0.23	0.02	10.2	36.834	55.801	-18.967
158.83 KHz	25.4	0.21	0.02	10.2	35.832	55.748	-19.916
159.0 KHz	26.05	0.21	0.02	10.2	36.48	55.743	-19.263
163.82 KHz	28.61	0.2	0.02	10.162	38.992	55.605	-16.613

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)
153.2 KHz	47.9	0.268	0.02	10.2	58.388	65.909	-7.521
154.33 KHz	48.21	0.257	0.02	10.2	58.687	65.876	-7.19
155.15 KHz	48.64	0.249	0.02	10.2	59.108	65.853	-6.744
158.93 KHz	48.67	0.211	0.02	10.2	59.101	65.745	-6.644
159.05 KHz	48.85	0.21	0.02	10.2	59.279	65.741	-6.462
157.2 KHz	48.2	0.228	0.02	10.2	58.648	65.794	-7.146

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)
154.35 KHz	47.75	0.26	0.02	10.2	58.226	65.876	-7.649
156.73 KHz	48.53	0.23	0.02	10.2	58.983	65.808	-6.825
156.98 KHz	48.5	0.23	0.02	10.2	58.95	65.801	-6.85
158.83 KHz	48.48	0.21	0.02	10.2	58.912	65.748	-6.836
159.0 KHz	47.65	0.21	0.02	10.2	58.08	65.743	-7.663
163.82 KHz	50.96	0.2	0.02	10.162	61.342	65.605	-4.263

Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Horn Antenna	ARA	DRG-118/A	i00271	6/16/16	6/16/18
Horn Antenna, Amplified	ARA	MWH-1826/B	i00273	4/22/15	4/22/18
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	6/9/17	6/9/18
Spectrum Analyzer	Agilent	E4407B	i00331	11/21/2017	11/21/2018
Bi-Log Antenna	Schaffner	CBL 6111D	i00349	8/3/16	8/3/18
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
Preamplifier	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