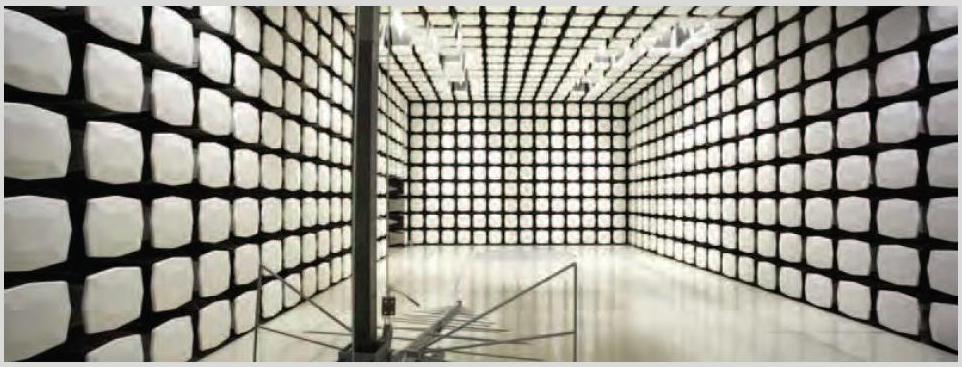
NORTHWEST EMC

WatchGuard Technologies, Inc.

Firebox T30-W (BS3AE5W)
Firebox T50-W (BS5AE7W)

FCC 15.207:2015
FCC 15.247:2015
802.11 bgn Radio

Report # VDEI0009



NVLAP Lab Code: 201049-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: October 27, 2015
WatchGuard Technologies, Inc.
Model: Firebox T30-W (BS3AE5W)
Firebox T50-W (BS5AE7W)

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2015	ANSI C63.10:2013
FCC 15.247:2015	ANSI C63.10:2013

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6, 11.12.1, 11.13.2	Spurious Radiated Emissions	Yes	Pass	
6.10.4	Band Edge Compliance	Yes	Pass	
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9	Output Power	Yes	Pass	
11.10	Power Spectral Density	Yes	Pass	
11.11	Spurious Conducted Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Jeremiah Darden, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.

REVISION HISTORY

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

NORTHWEST EMC
REV 2015.2.19

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIP / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

SCOPE

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/
http://gsi.nist.gov/global/docs/cabs/designations.html

MEASUREMENT UNCERTAINTY

NORTHWEST EMC
TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

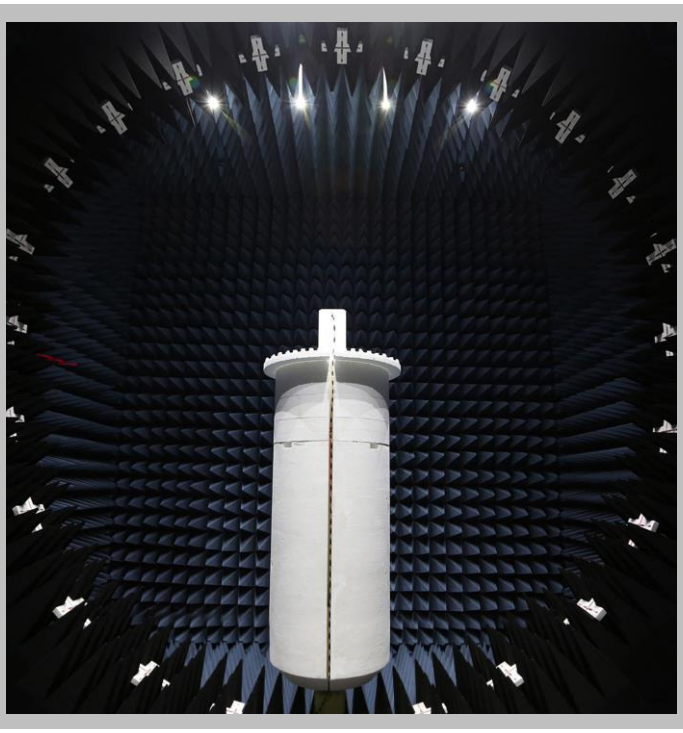
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

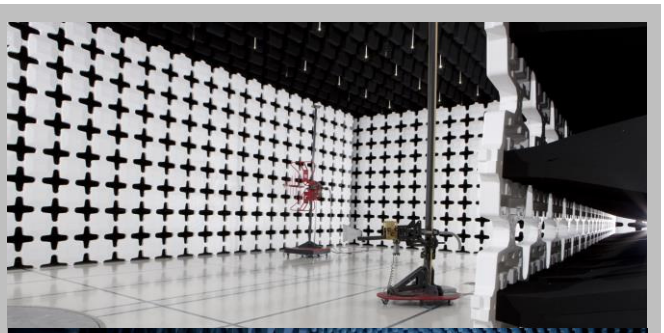
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	4.9 dB	-4.9 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

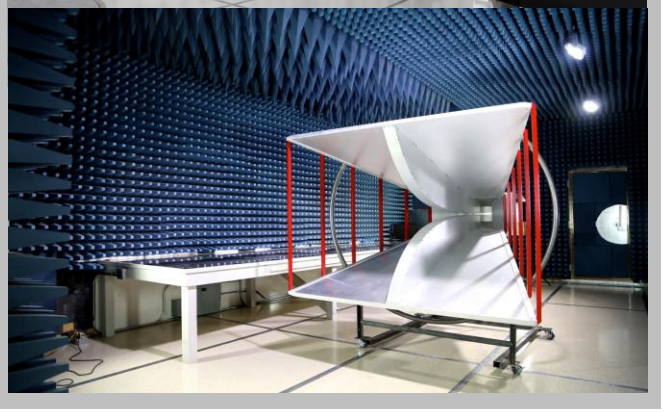
FACILITIES

REV 2015.2.19

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 9801 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Industry Canada					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-*2*	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157







PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Customer:	WatchGuard Technologies, Inc.
Address:	505 Fifth Avenue South Suite 500
City, State, Zip:	Seattle, WA 98104 United States
Test Requested By:	Brian Hudson
Model:	Firebox T30-W (BS3AE5W) Firebox T50-W (BS5AE7W)
Manufacturer:	Sercomm Corporation
First Date of Test:	July 28, 2015
Last Date of Test:	October 27, 2015
Receipt Date of Samples:	July 27, 2015
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The device is a wireless 802.11a/b/g/n/ac Access Point, which operates in 2.4GHz or 5Ghz band. It supports 20/40MHz channel on 2.4G, 20/40/80MHz channel on 5G and 256 QAM to maximize bandwidth efficiency. The single band WIFI module supports 3Tx/3Rx MIMO to enables antenna port data rate up to 1.3Gbps, while nearly tripling wireless performance of 802.11n 3x3. Three UFL antenna connectors enable design flexibility to utilize different transmit/receive chains to communicate with different users.

Statement of Similarity:
The model Firebox T30-W (BS3AE5W) and model Firebox T50-W (BS5AE7W) are wireless access points / hardware firewalls. Both use the same enclosure, power supply, and system / radio board; but the T30 has the digital portion slightly depopulated. The T30-W has 5 ethernet ports while the T50-W has 7.

Testing Objective:
To demonstrate compliance of the 802.11 bgn radio under FCC 15.247 for operation in the 2.4 GHz band.

RF Power Table – FCC 15.247

20 MHz Bandwidth Channels:

	2412 MHz	2437 MHz	2462 MHz
1 Mbps	20.0	20.0	20.0
11 Mbps	20.0	20.0	20.0
6 Mbps	19.0	20.0	18.5
36 Mbps	20.0	20.0	20.0
54 Mbps	18.0	18.0	18.0
MCS0	20.0	20.0	20.0
MCS7	18.0	18.0	18.0
MCS8	20.0	20.0	20.0
MCS15	18.0	18.0	18.0
MCS16	20.0	20.0	20.0
MCS23	18.0	18.0	18.0

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration VDEI0009- 1

Software/Firmware Running during test	
Description	**Version**
ART2-GUI	2.3
CART	4.9

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Firebox T50-W (BS5AE7W) (original unit)	Sercomm Corporation	T50-W	70AF00069-3EB6

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Supply	Leader Electronics Inc.	NU60-F480125-I1NN	11000811421520000079
Host Laptop	Lenovo	4180-65U	R8-V8DGE 11/07
AC/DC Power Supply (Laptop)	Lenovo	42T4438	11S42T4438Z1ZHY61677D8

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Ethernet Cable	No	1.8m	No	Firebox T50-W (BS5AE7W)	Host Laptop
AC Power	No	1.8m	No	AC Mains	AC/DC Power Supply
DC Power	No	1.8m	Yes	AC/DC Power Supply	Firebox T50-W (BS5AE7W)
AC Power	No	1.0m	No	AC Mains	AC/DC Power Supply (Laptop)
DC Power	No	1.8m	Yes	AC/DC Power Supply (Laptop)	Host Laptop

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration VDEI0009- 3

Software/Firmware Running during test	
Description	**Version**
ART2-GUI	2.3
CART	4.9

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Firebox T50-W (BS5AE7W) (new unit)	Sercomm Corporation	T50-W	70AF02717-B385

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Supply	Leader Electronics Inc.	NU60-F480125-I1NN	11000811421520000079
Host Laptop	Lenovo	4180-65U	R8-V8DGE 11/07
AC/DC Power Supply (Laptop)	Lenovo	42T4438	11S42T4438Z1ZHY61677D8

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.8m	No	AC Mains	AC/DC Power Supply
DC Power	No	1.8m	Yes	AC/DC Power Supply	Firebox T50-W (BS5AE7W)
AC Power	No	1.0m	No	AC Mains	AC/DC Power Supply (Laptop)
DC Power	No	1.8m	Yes	AC/DC Power Supply (Laptop)	Host Laptop
Ethernet Cable	No	7.6m	No	Firebox T50-W (BS5AE7W)	Host Laptop

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration VDEI0009- 4

Software/Firmware Running during test	
Description	**Version**
ART2-GUI	2.3
CART	4.9

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Firebox T30-W (BS3AE5W) (new unit)	Sercomm Corporation	T30-W	70AD00074-8977

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Supply	Leader Electronics Inc.	NU60-F480125-I1NN	11000811421520000079
Host Laptop	Lenovo	4180-65U	R8-V8DGE 11/07
AC/DC Power Supply (Laptop)	Lenovo	42T4438	11S42T4438Z1ZHY61677D8

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.8m	No	AC Mains	AC/DC Power Supply
DC Power	No	1.8m	Yes	AC/DC Power Supply	Firebox T30-W (BS3AE5W)
AC Power	No	1.0m	No	AC Mains	AC/DC Power Supply (Laptop)
DC Power	No	1.8m	Yes	AC/DC Power Supply (Laptop)	Host Laptop
Ethernet Cable	No	7.6m	No	Firebox T30-W (BS3AE5W)	Host Laptop

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration VDEI0009- 5

Software/Firmware Running during test	
Description	**Version**
ART2-GUI	2.3
CART	4.9

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Firebox T50-W (BS5AE7W) (new unit)	Sercomm Corporation	T50-W	70AF02717-B385

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Supply	Leader Electronics Inc.	NU60-F480125-I1NN	11000811421520000079
Host Laptop	Lenovo	4180-65U	R8-V8DGE 11/07
AC/DC Power Supply (Laptop)	Lenovo	42T4438	11S42T4438Z1ZHY61677D8

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Ethernet Cable	No	1.8m	No	Firebox T50-W (BS5AE7W)	Host Laptop
AC Power	No	1.8m	No	AC Mains	AC/DC Power Supply
DC Power	No	1.8m	Yes	AC/DC Power Supply (	Firebox T50-W (BS5AE7W)
AC Power	No	1.0m	No	AC Mains	AC/DC Power Supply (Laptop)
DC Power	No	1.8m	Yes	AC/DC Power Supply (Laptop)	Host Laptop

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration VDEI0009- 7

Software/Firmware Running during test	
Description	**Version**
ART2-GUI	2.3
CART	4.9

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Firebox T50-W (BS5AE7W) (new unit)	Sercomm Corporation	T50-W	70AF02717-B385

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Power Supply	Leader Electronics Inc.	NU60-U480125-I1	1517 000044
Host Laptop	Lenovo	4180-65U	R8-V8DGE 11/07
AC/DC Power Supply (Laptop)	Lenovo	42T4438	11S42T4438Z1ZHY61677D8

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.8m	No	AC Mains	AC/DC Power Supply
DC Power	No	1.8m	Yes	AC/DC Power Supply	Firebox T50-W (BS5AE7W)
AC Power	No	1.0m	No	AC Mains	AC/DC Power Supply (Laptop)
DC Power	No	1.8m	Yes	AC/DC Power Supply (Laptop)	Host Laptop
Ethernet Cable	No	7.6m	No	Firebox T50-W (BS5AE7W)	Host Laptop

MODIFICATIONS

NORTHWEST EMC 2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	7/28/2015	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	7/29/2015	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	7/29/2015	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	7/29/2015	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	9/08/2015	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	9/08/2015	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
7	9/22/2015	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
8	10/27/2015	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

TEST DESCRIPTION

The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable - Conducted Cable Assembly	Northwest EMC	TXA, HHZ, TQR	TXAA	5/27/2015	5/27/2016
Receiver	Rohde & Schwarz	ESCI	ARF	6/9/2015	6/9/2016
LISN	Solar Electronics	9252-50-R-24-BNC	LJK	9/23/2015	9/23/2016
LISN	Solar Electronics	9252-50-R-24-BNC	LJL	9/23/2015	9/23/2016

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

VDEI0009-3

MODES INVESTIGATED

Continuously Transmitting at Chain A High Channel @ 2462 MHz, 1Mbps
Continuously Transmitting at Chain A Low Channel @ 2412 MHz, 1Mbps
Continuously Transmitting at Chain A Mid Channel @ 2437 MHz, 1Mbps
Continuously Transmitting at Chain B High Channel @ 2462 MHz, 1Mbps
Continuously Transmitting at Chain B Low Channel @ 2412 MHz, 1Mbps
Continuously Transmitting at Chain B Mid Channel @ 2437 MHz, 1Mbps
Continuously Transmitting at Chain C High Channel @ 2462 MHz, 1Mbps
Continuously Transmitting at Chain C Low Channel @ 2412 MHz, 1Mbps
Continuously Transmitting at Chain C Mid Channel @ 2437 MHz, 1Mbps

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	3	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

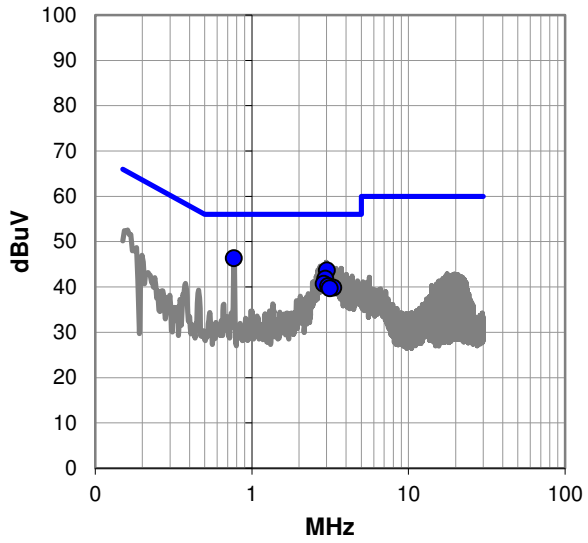
EUT OPERATING MODES

Continuously Transmitting at Chain A Low Channel @ 2412 MHz, 1Mbps

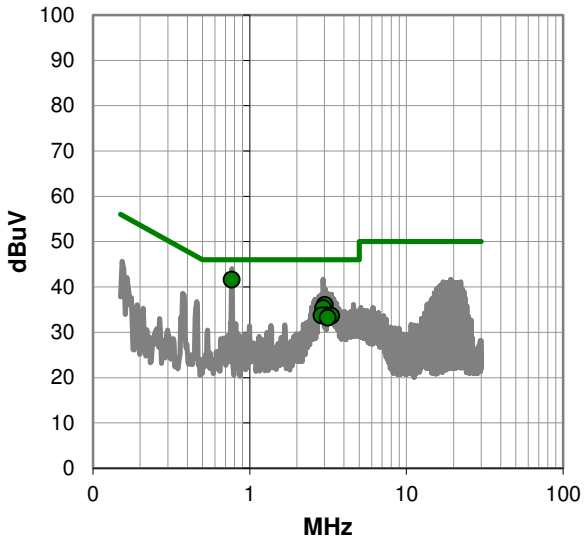
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.770	26.5	19.8	46.3	56.0	-9.7
3.025	23.7	19.9	43.6	56.0	-12.4
2.948	21.9	19.9	41.8	56.0	-14.2
2.875	20.8	19.9	40.7	56.0	-15.3
3.080	20.3	19.9	40.2	56.0	-15.8
3.320	19.9	19.9	39.8	56.0	-16.2
3.151	19.8	19.9	39.7	56.0	-16.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.770	21.8	19.8	41.6	46.0	-4.4
3.025	16.1	19.9	36.0	46.0	-10.0
2.948	15.4	19.9	35.3	46.0	-10.7
3.080	13.8	19.9	33.7	46.0	-12.3
2.875	13.8	19.9	33.7	46.0	-12.3
3.320	13.7	19.9	33.6	46.0	-12.4
3.151	13.3	19.9	33.2	46.0	-12.8

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	4	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

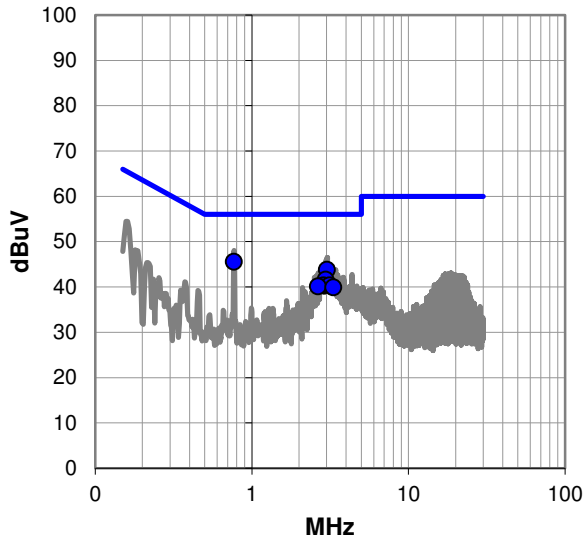
EUT OPERATING MODES

Continuously Transmitting at Chain A Low Channel @ 2412 MHz, 1Mbps

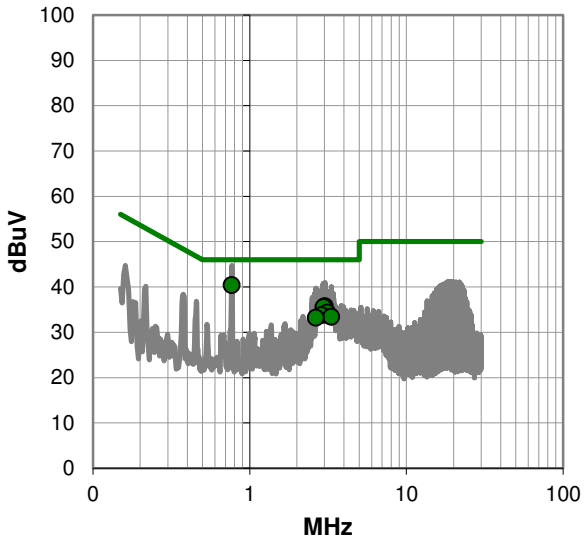
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.769	25.7	19.8	45.5	56.0	-10.5
3.018	23.9	19.9	43.8	56.0	-12.2
2.965	21.7	19.9	41.6	56.0	-14.4
2.861	20.5	19.9	40.4	56.0	-15.6
3.138	20.4	19.9	40.3	56.0	-15.7
2.650	20.3	19.8	40.1	56.0	-15.9
3.322	20.0	19.9	39.9	56.0	-16.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.769	20.6	19.8	40.4	46.0	-5.6
3.018	15.8	19.9	35.7	46.0	-10.3
2.965	15.6	19.9	35.5	46.0	-10.5
3.138	14.4	19.9	34.3	46.0	-11.7
2.861	13.9	19.9	33.8	46.0	-12.2
3.322	13.5	19.9	33.4	46.0	-12.6
2.650	13.4	19.8	33.2	46.0	-12.8

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	5	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

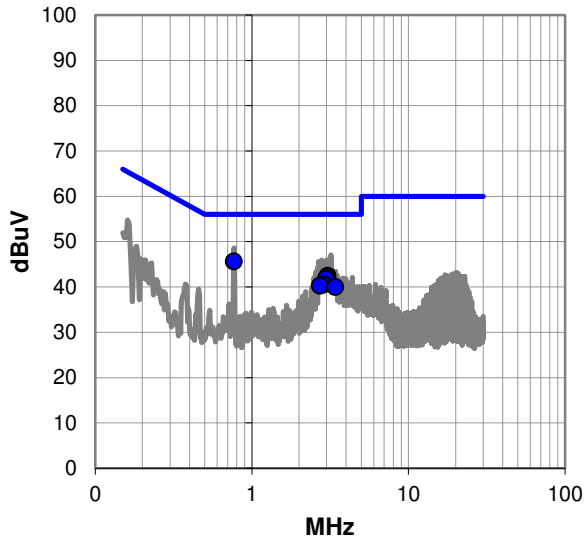
EUT OPERATING MODES

Continuously Transmitting at Chain A Mid Channel @ 2437 MHz, 1Mbps

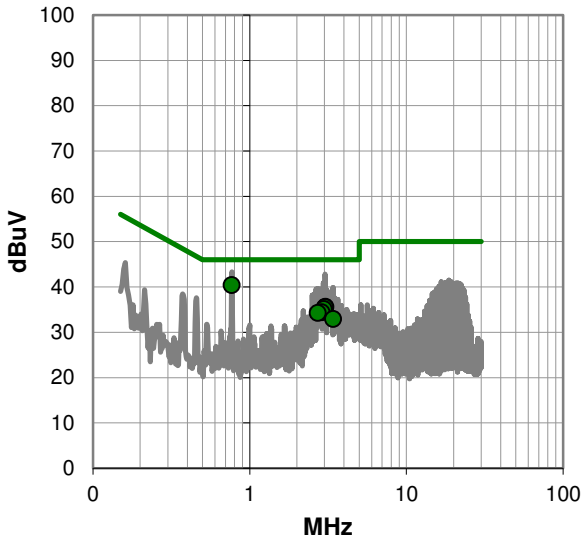
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.769	25.8	19.8	45.6	56.0	-10.4
3.047	22.5	19.9	42.4	56.0	-13.6
3.032	22.1	19.9	42.0	56.0	-14.0
2.971	21.9	19.9	41.8	56.0	-14.2
2.883	20.7	19.9	40.6	56.0	-15.4
2.727	20.4	19.8	40.2	56.0	-15.8
3.410	20.1	19.9	40.0	56.0	-16.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.769	20.6	19.8	40.4	46.0	-5.6
3.047	15.7	19.9	35.6	46.0	-10.4
3.032	15.6	19.9	35.5	46.0	-10.5
2.971	15.2	19.9	35.1	46.0	-10.9
2.883	14.5	19.9	34.4	46.0	-11.6
2.727	14.4	19.8	34.2	46.0	-11.8
3.410	13.0	19.9	32.9	46.0	-13.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	6	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

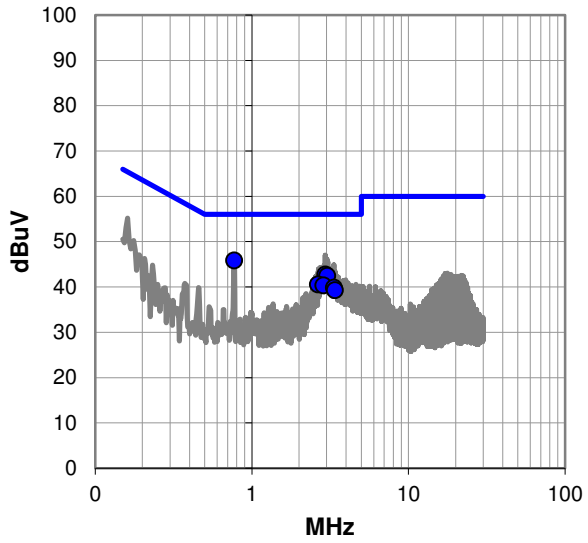
EUT OPERATING MODES

Continuously Transmitting at Chain A Mid Channel @ 2437 MHz, 1Mbps

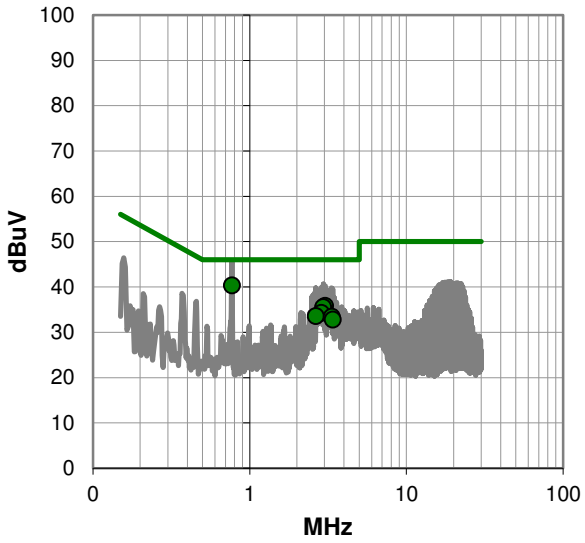
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.771	26.0	19.8	45.8	56.0	-10.2
2.946	22.8	19.9	42.7	56.0	-13.3
3.039	22.5	19.9	42.4	56.0	-13.6
2.647	20.7	19.8	40.5	56.0	-15.5
2.862	20.5	19.9	40.4	56.0	-15.6
3.342	19.9	19.9	39.8	56.0	-16.2
3.404	19.4	19.9	39.3	56.0	-16.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.771	20.5	19.8	40.3	46.0	-5.7
3.039	15.9	19.9	35.8	46.0	-10.2
2.946	15.6	19.9	35.5	46.0	-10.5
2.862	14.4	19.9	34.3	46.0	-11.7
2.647	13.7	19.8	33.5	46.0	-12.5
3.342	13.5	19.9	33.4	46.0	-12.6
3.404	12.9	19.9	32.8	46.0	-13.2

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	7	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

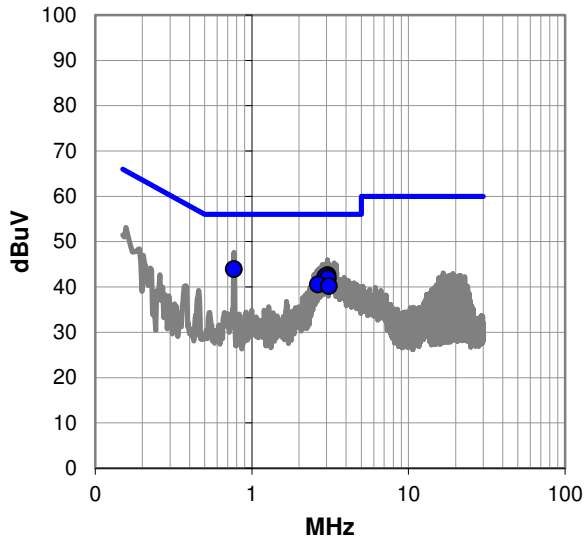
EUT OPERATING MODES

Continuously Transmitting at Chain A High Channel @ 2462 MHz, 1Mbps

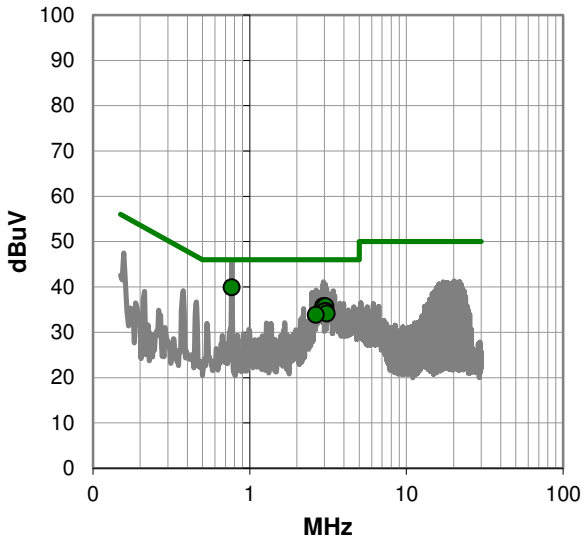
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #7

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.769	24.1	19.8	43.9	56.0	-12.1
3.048	22.7	19.9	42.6	56.0	-13.4
3.024	22.5	19.9	42.4	56.0	-13.6
2.950	22.3	19.9	42.2	56.0	-13.8
3.056	22.0	19.9	41.9	56.0	-14.1
2.652	20.7	19.8	40.5	56.0	-15.5
3.112	20.3	19.9	40.2	56.0	-15.8

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.769	20.1	19.8	39.9	46.0	-6.1
2.950	15.8	19.9	35.7	46.0	-10.3
3.048	15.8	19.9	35.7	46.0	-10.3
3.056	14.8	19.9	34.7	46.0	-11.3
3.024	14.7	19.9	34.6	46.0	-11.4
3.112	14.2	19.9	34.1	46.0	-11.9
2.652	14.0	19.8	33.8	46.0	-12.2

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	8	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

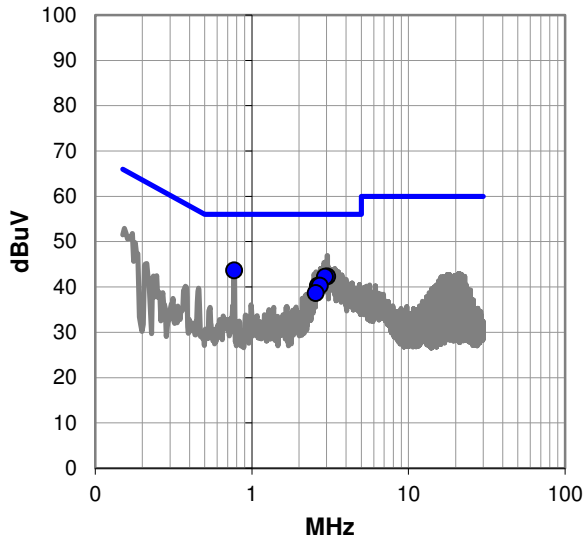
EUT OPERATING MODES

Continuously Transmitting at Chain A High Channel @ 2462 MHz, 1Mbps

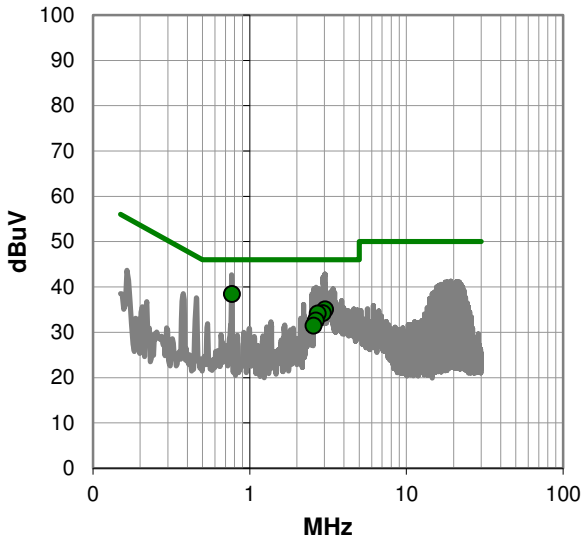
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #8

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.771	23.8	19.8	43.6	56.0	-12.4
3.028	22.4	19.9	42.3	56.0	-13.7
2.937	22.3	19.9	42.2	56.0	-13.8
2.644	20.4	19.8	40.2	56.0	-15.8
2.726	20.4	19.8	40.2	56.0	-15.8
2.566	18.8	19.8	38.6	56.0	-17.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.771	18.6	19.8	38.4	46.0	-7.6
3.028	15.1	19.9	35.0	46.0	-11.0
2.937	14.3	19.9	34.2	46.0	-11.8
2.726	14.3	19.8	34.1	46.0	-11.9
2.644	12.7	19.8	32.5	46.0	-13.5
2.566	11.6	19.8	31.4	46.0	-14.6

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	9	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

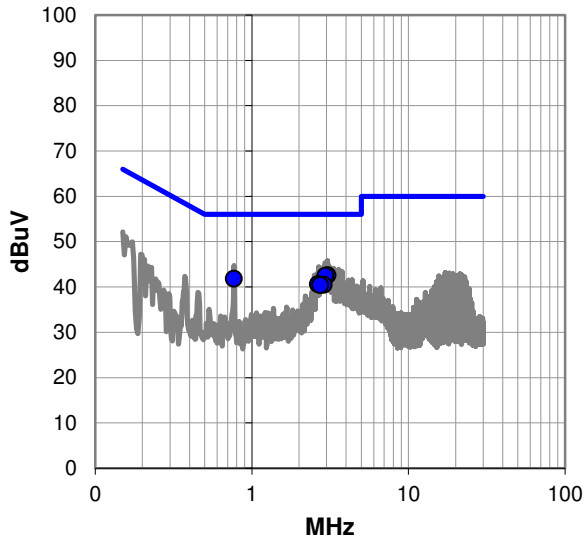
EUT OPERATING MODES

Continuously Transmitting at Chain B Low Channel @ 2412 MHz, 1Mbps

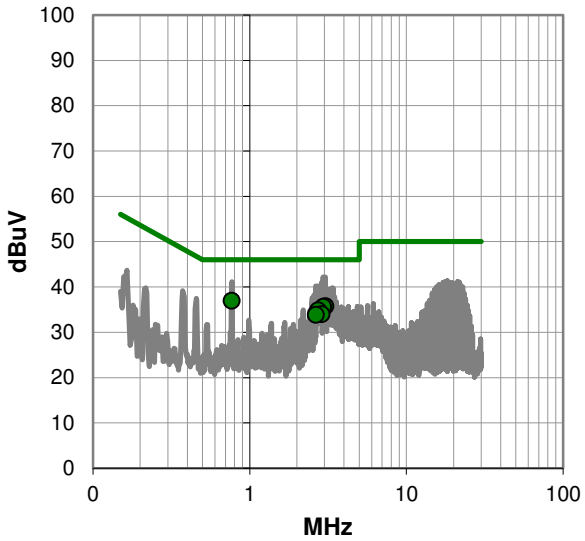
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #9

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.041	22.7	19.9	42.6	56.0	-13.4
2.946	22.5	19.9	42.4	56.0	-13.6
0.770	22.0	19.8	41.8	56.0	-14.2
2.648	20.8	19.8	40.6	56.0	-15.4
2.885	20.6	19.9	40.5	56.0	-15.5
2.733	20.6	19.8	40.4	56.0	-15.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.770	17.1	19.8	36.9	46.0	-9.1
3.041	15.8	19.9	35.7	46.0	-10.3
2.946	15.7	19.9	35.6	46.0	-10.4
2.733	15.0	19.8	34.8	46.0	-11.2
2.885	14.1	19.9	34.0	46.0	-12.0
2.648	14.0	19.8	33.8	46.0	-12.2

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	10	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

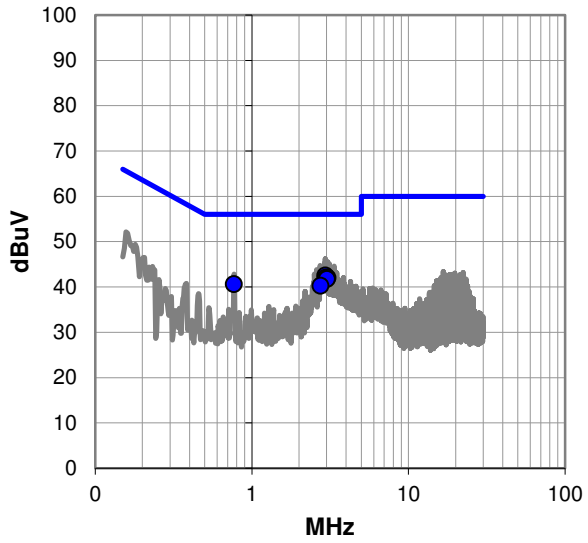
EUT OPERATING MODES

Continuously Transmitting at Chain B Low Channel @ 2412 MHz, 1Mbps

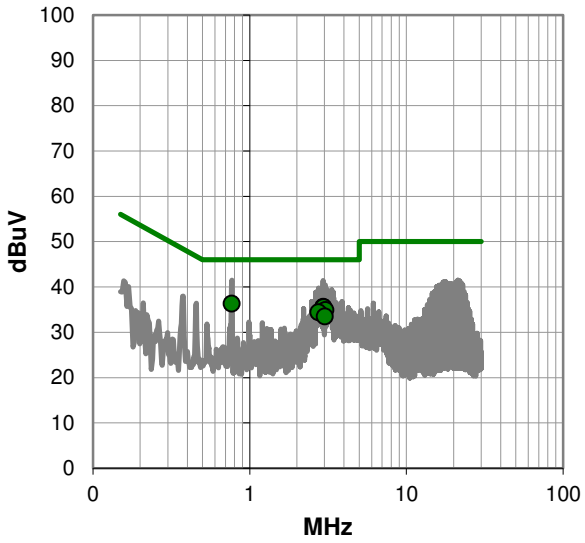
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #10

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.947	22.6	19.9	42.5	56.0	-13.5
2.964	22.1	19.9	42.0	56.0	-14.0
3.052	22.1	19.9	42.0	56.0	-14.0
3.017	21.8	19.9	41.7	56.0	-14.3
0.769	20.8	19.8	40.6	56.0	-15.4
2.753	20.4	19.8	40.2	56.0	-15.8

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.769	16.5	19.8	36.3	46.0	-9.7
2.947	15.7	19.9	35.6	46.0	-10.4
2.964	15.6	19.9	35.5	46.0	-10.5
3.052	15.0	19.9	34.9	46.0	-11.1
2.753	14.6	19.8	34.4	46.0	-11.6
3.017	13.6	19.9	33.5	46.0	-12.5

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	11	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

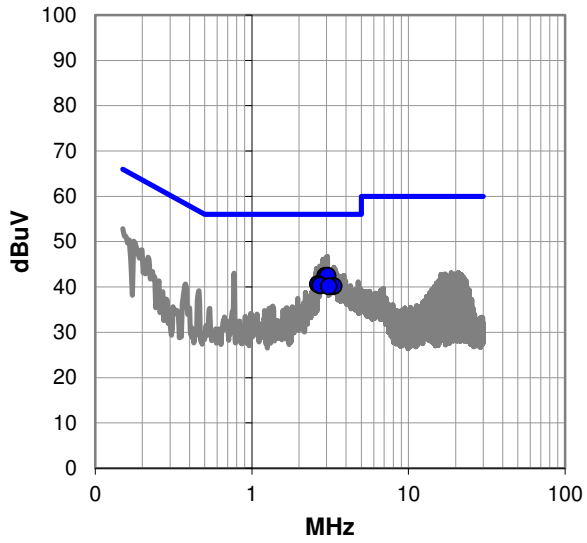
EUT OPERATING MODES

Continuously Transmitting at Chain B Mid Channel @ 2437 MHz, 1Mbps

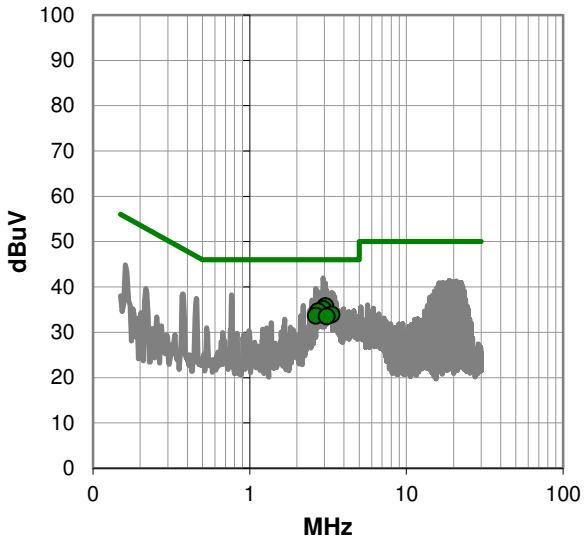
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #11

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.945	22.5	19.9	42.4	56.0	-13.6
3.046	22.5	19.9	42.4	56.0	-13.6
2.653	20.8	19.8	40.6	56.0	-15.4
2.732	20.5	19.8	40.3	56.0	-15.7
3.334	20.3	19.9	40.2	56.0	-15.8
3.105	20.2	19.9	40.1	56.0	-15.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.046	15.8	19.9	35.7	46.0	-10.3
2.945	15.2	19.9	35.1	46.0	-10.9
2.732	14.8	19.8	34.6	46.0	-11.4
3.334	14.0	19.9	33.9	46.0	-12.1
2.653	13.8	19.8	33.6	46.0	-12.4
3.105	13.6	19.9	33.5	46.0	-12.5

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	12	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

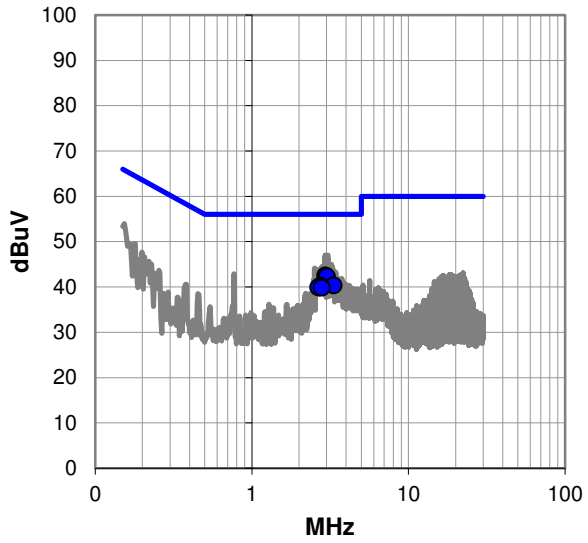
EUT OPERATING MODES

Continuously Transmitting at Chain B Mid Channel @ 2437 MHz, 1Mbps

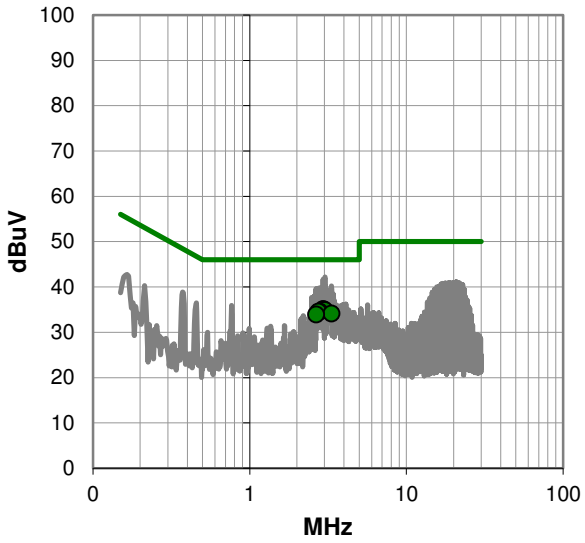
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #12

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.943	22.6	19.9	42.5	56.0	-13.5
3.026	22.4	19.9	42.3	56.0	-13.7
3.335	20.4	19.9	40.3	56.0	-15.7
2.750	20.4	19.8	40.2	56.0	-15.8
2.665	20.1	19.8	39.9	56.0	-16.1
2.806	20.0	19.8	39.8	56.0	-16.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.943	15.2	19.9	35.1	46.0	-10.9
3.026	15.0	19.9	34.9	46.0	-11.1
2.806	14.7	19.8	34.5	46.0	-11.5
2.750	14.7	19.8	34.5	46.0	-11.5
3.335	14.2	19.9	34.1	46.0	-11.9
2.665	14.1	19.8	33.9	46.0	-12.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	13	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

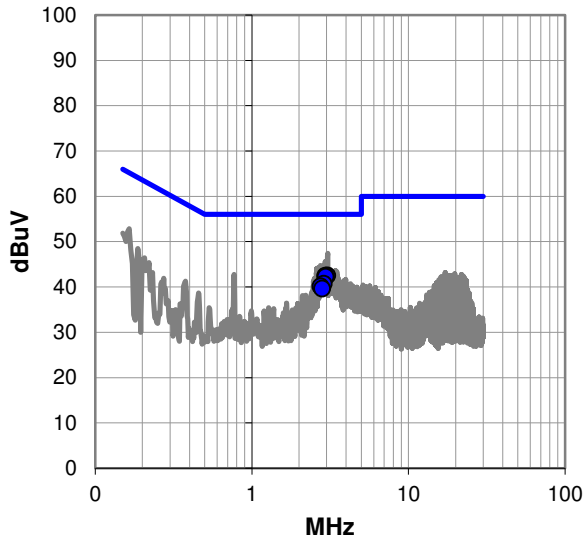
EUT OPERATING MODES

Continuously Transmitting at Chain B High Channel @ 2462 MHz, 1Mbps

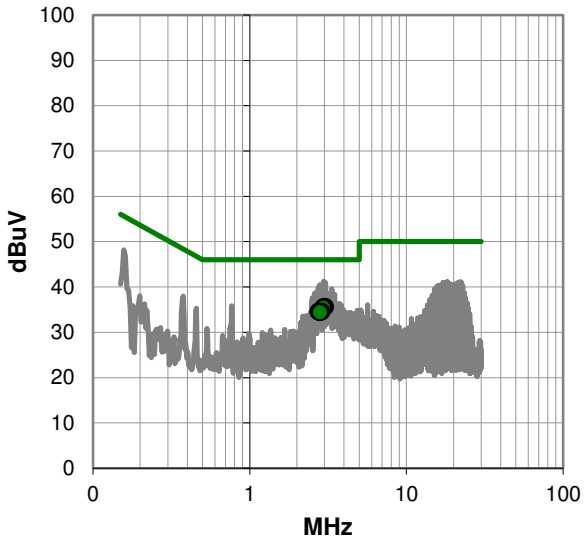
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #13

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.040	22.6	19.9	42.5	56.0	-13.5
2.944	22.5	19.9	42.4	56.0	-13.6
2.960	22.3	19.9	42.2	56.0	-13.8
2.883	20.8	19.9	40.7	56.0	-15.3
2.749	20.3	19.8	40.1	56.0	-15.9
2.809	19.8	19.8	39.6	56.0	-16.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.040	15.7	19.9	35.6	46.0	-10.4
2.960	15.6	19.9	35.5	46.0	-10.5
2.944	15.5	19.9	35.4	46.0	-10.6
2.883	14.7	19.9	34.6	46.0	-11.4
2.749	14.7	19.8	34.5	46.0	-11.5
2.809	14.6	19.8	34.4	46.0	-11.6

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	14	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

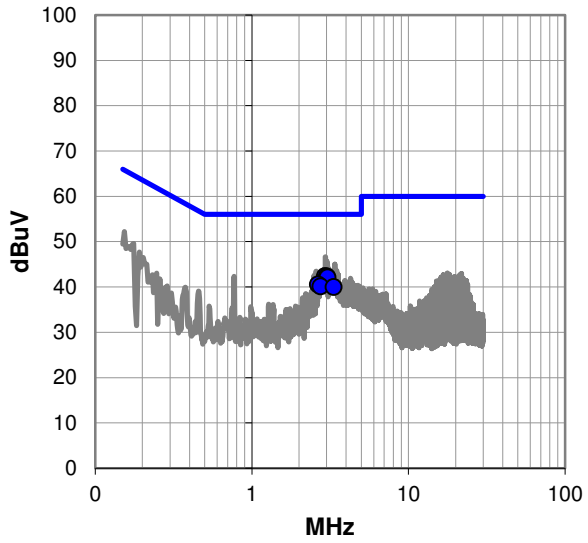
EUT OPERATING MODES

Continuously Transmitting at Chain B High Channel @ 2462 MHz, 1Mbps

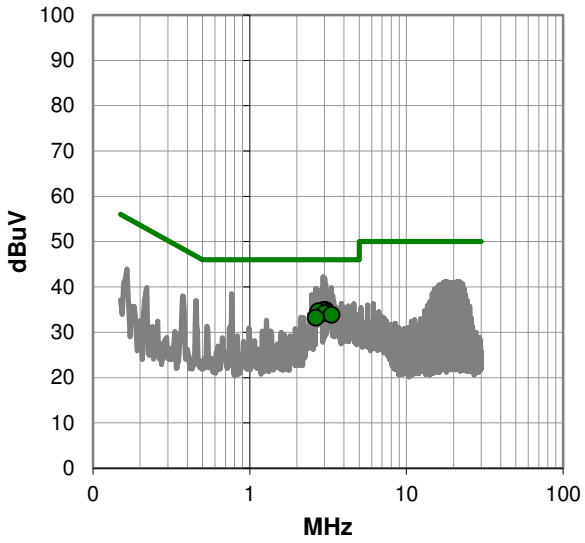
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #14

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.940	22.5	19.9	42.4	56.0	-13.6
3.021	22.4	19.9	42.3	56.0	-13.7
3.054	22.2	19.9	42.1	56.0	-13.9
2.648	20.7	19.8	40.5	56.0	-15.5
2.749	20.3	19.8	40.1	56.0	-15.9
3.326	20.1	19.9	40.0	56.0	-16.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.054	15.0	19.9	34.9	46.0	-11.1
2.940	14.9	19.9	34.8	46.0	-11.2
2.749	14.8	19.8	34.6	46.0	-11.4
3.021	14.3	19.9	34.2	46.0	-11.8
3.326	13.9	19.9	33.8	46.0	-12.2
2.648	13.4	19.8	33.2	46.0	-12.8

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	15	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

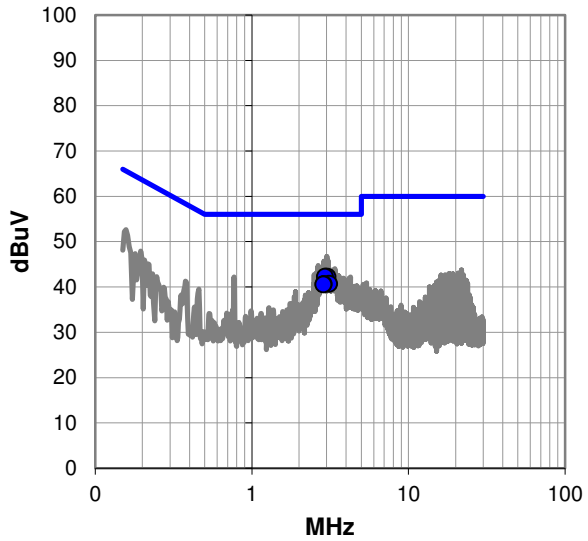
EUT OPERATING MODES

Continuously Transmitting at Chain C Low Channel @ 2412 MHz, 1Mbps

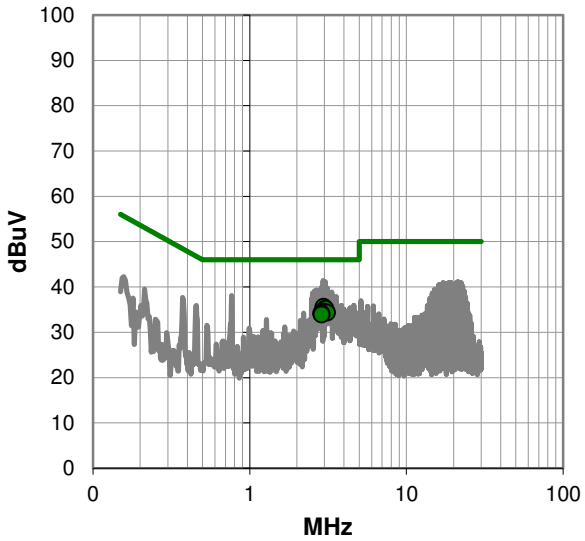
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #15

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.961	22.3	19.9	42.2	56.0	-13.8
3.051	22.3	19.9	42.2	56.0	-13.8
2.937	22.3	19.9	42.2	56.0	-13.8
3.126	20.8	19.9	40.7	56.0	-15.3
2.887	20.7	19.9	40.6	56.0	-15.4
2.862	20.7	19.9	40.6	56.0	-15.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.961	15.7	19.9	35.6	46.0	-10.4
3.051	15.3	19.9	35.2	46.0	-10.8
2.937	14.6	19.9	34.5	46.0	-11.5
3.126	14.4	19.9	34.3	46.0	-11.7
2.862	14.3	19.9	34.2	46.0	-11.8
2.887	14.0	19.9	33.9	46.0	-12.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	16	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

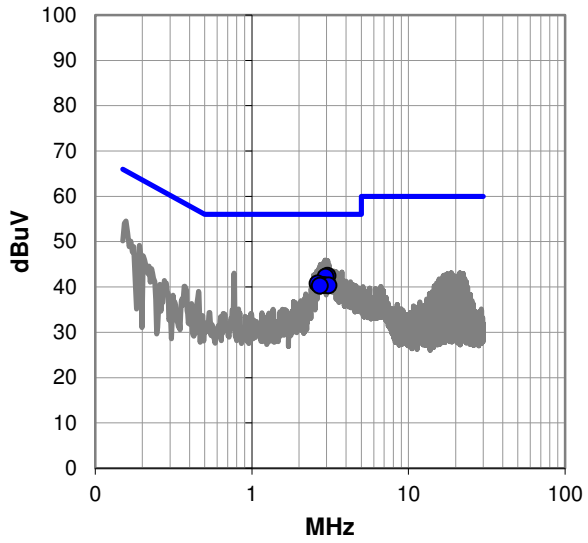
EUT OPERATING MODES

Continuously Transmitting at Chain C Low Channel @ 2412 MHz, 1Mbps

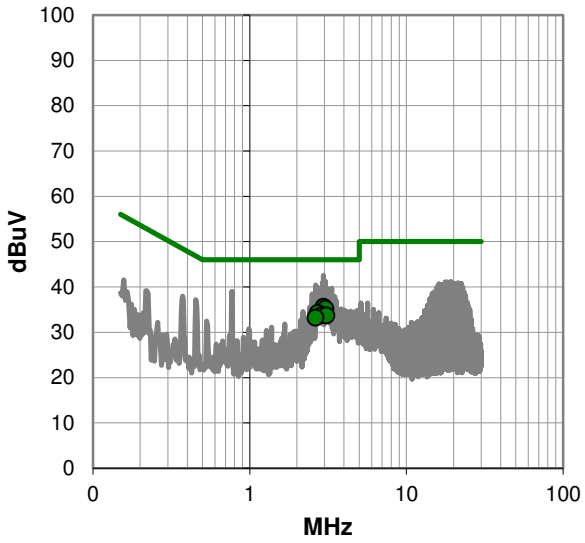
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #16

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.045	22.5	19.9	42.4	56.0	-13.6
2.957	22.3	19.9	42.2	56.0	-13.8
2.640	20.9	19.8	40.7	56.0	-15.3
2.885	20.5	19.9	40.4	56.0	-15.6
3.097	20.4	19.9	40.3	56.0	-15.7
2.720	20.4	19.8	40.2	56.0	-15.8

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.957	15.7	19.9	35.6	46.0	-10.4
3.045	15.3	19.9	35.2	46.0	-10.8
2.720	14.4	19.8	34.2	46.0	-11.8
2.885	13.9	19.9	33.8	46.0	-12.2
3.097	13.8	19.9	33.7	46.0	-12.3
2.640	13.4	19.8	33.2	46.0	-12.8

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	17	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

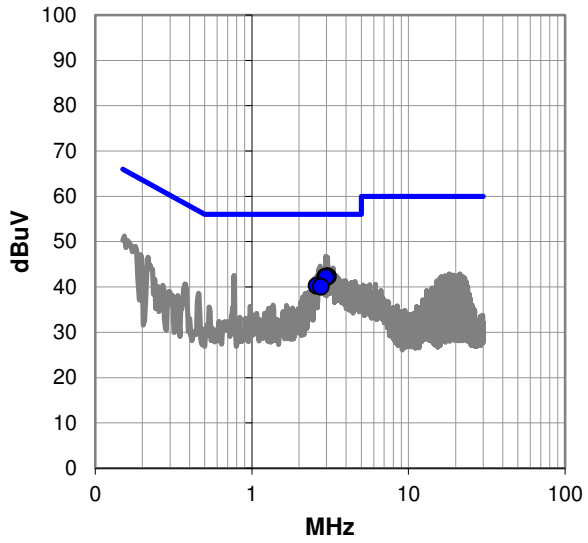
EUT OPERATING MODES

Continuously Transmitting at Chain C Mid Channel @ 2437 MHz, 1Mbps

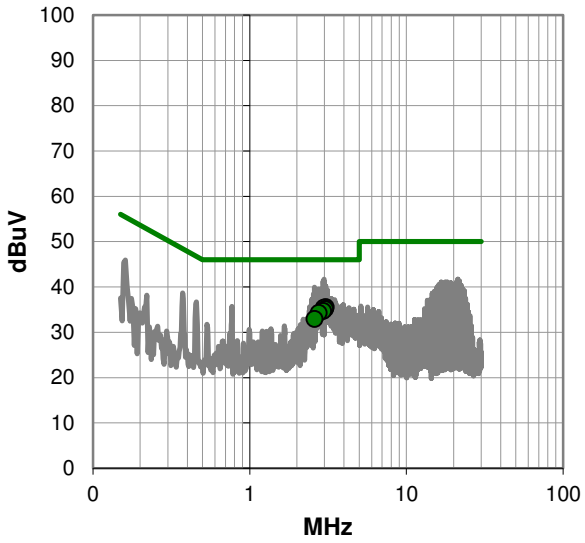
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #17

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.031	22.4	19.9	42.3	56.0	-13.7
3.058	22.4	19.9	42.3	56.0	-13.7
2.949	22.3	19.9	42.2	56.0	-13.8
2.973	22.2	19.9	42.1	56.0	-13.9
2.601	20.4	19.8	40.2	56.0	-15.8
2.758	20.2	19.8	40.0	56.0	-16.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.058	15.6	19.9	35.5	46.0	-10.5
2.973	15.5	19.9	35.4	46.0	-10.6
3.031	15.2	19.9	35.1	46.0	-10.9
2.949	14.8	19.9	34.7	46.0	-11.3
2.758	14.4	19.8	34.2	46.0	-11.8
2.601	13.1	19.8	32.9	46.0	-13.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	18	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

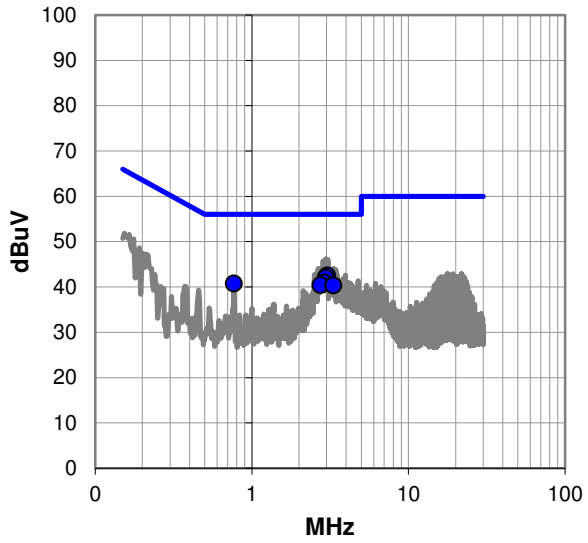
EUT OPERATING MODES

Continuously Transmitting at Chain C Mid Channel @ 2437 MHz, 1Mbps

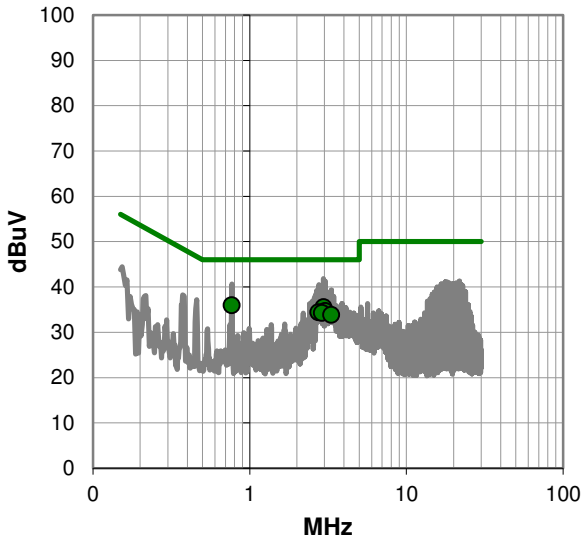
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #18

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.027	22.6	19.9	42.5	56.0	-13.5
2.967	22.1	19.9	42.0	56.0	-14.0
2.890	21.1	19.9	41.0	56.0	-15.0
0.769	20.9	19.8	40.7	56.0	-15.3
2.753	20.6	19.8	40.4	56.0	-15.6
3.325	20.4	19.9	40.3	56.0	-15.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.769	16.1	19.8	35.9	46.0	-10.1
2.967	15.6	19.9	35.5	46.0	-10.5
3.027	14.8	19.9	34.7	46.0	-11.3
2.753	14.6	19.8	34.4	46.0	-11.6
2.890	14.4	19.9	34.3	46.0	-11.7
3.325	13.9	19.9	33.8	46.0	-12.2

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	19	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

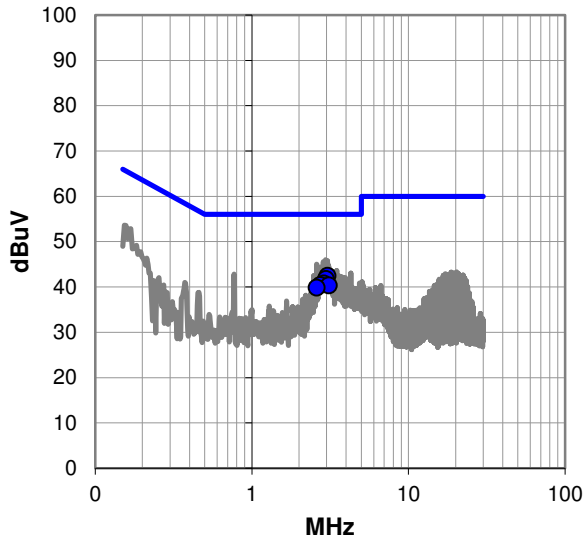
EUT OPERATING MODES

Continuously Transmitting at Chain C High Channel @ 2462 MHz, 1Mbps

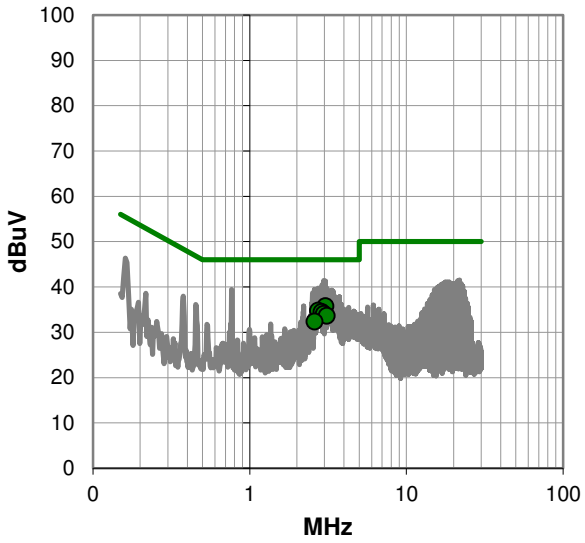
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #19

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.047	22.5	19.9	42.4	56.0	-13.6
2.977	21.8	19.9	41.7	56.0	-14.3
2.887	20.9	19.9	40.8	56.0	-15.2
2.734	20.6	19.8	40.4	56.0	-15.6
3.106	20.4	19.9	40.3	56.0	-15.7
2.596	20.0	19.8	39.8	56.0	-16.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.047	15.8	19.9	35.7	46.0	-10.3
2.734	14.9	19.8	34.7	46.0	-11.3
2.887	14.6	19.9	34.5	46.0	-11.5
2.977	14.1	19.9	34.0	46.0	-12.0
3.106	13.7	19.9	33.6	46.0	-12.4
2.596	12.5	19.8	32.3	46.0	-13.7

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF02717-B385	Date:	09/29/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	24.5°C
Attendees:	None	Relative Humidity:	44.3%
Customer Project:	None	Bar. Pressure:	1016 mb
Tested By:	Frank Sun	Job Site:	TX01
Power:	110VAC/60Hz	Configuration:	VDEI0009-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	20	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

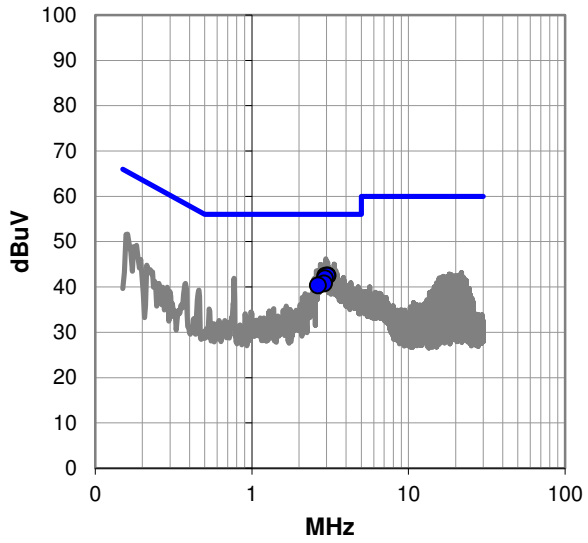
EUT OPERATING MODES

Continuously Transmitting at Chain C High Channel @ 2462 MHz, 1Mbps

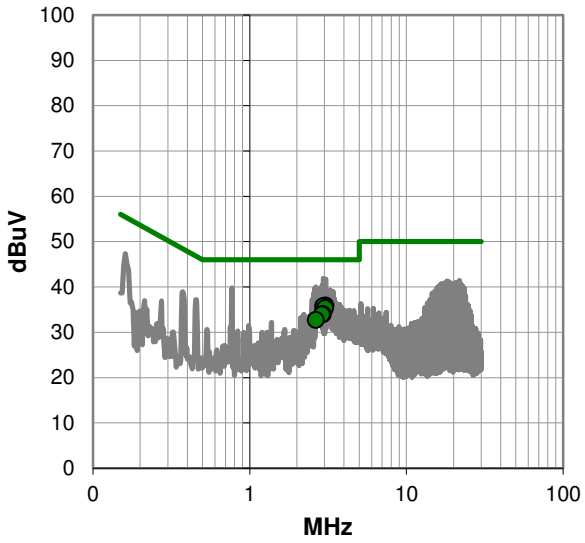
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.03.03, EmiR5 2015.08.28

RESULTS - Run #20

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.046	22.6	19.9	42.5	56.0	-13.5
2.952	22.5	19.9	42.4	56.0	-13.6
3.029	22.5	19.9	42.4	56.0	-13.6
2.939	22.0	19.9	41.9	56.0	-14.1
2.895	20.9	19.9	40.8	56.0	-15.2
2.648	20.5	19.8	40.3	56.0	-15.7

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
3.046	16.0	19.9	35.9	46.0	-10.1
2.952	15.8	19.9	35.7	46.0	-10.3
3.029	15.4	19.9	35.3	46.0	-10.7
2.939	14.1	19.9	34.0	46.0	-12.0
2.895	14.0	19.9	33.9	46.0	-12.1
2.648	12.9	19.8	32.7	46.0	-13.3

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

TEST DESCRIPTION

The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESCI	ARG	6/1/2015	6/1/2016
LISN	Solar Electronics	9252-50-24-BNC	LIA	3/4/2015	3/4/2016
LISN	Solar Electronics	9252-50-24-BNC	LIB	1/29/2015	1/29/2016
Cable - Conducted Cable Assembly	Northwest EMC	OCP, HFP, AWC	OCPA	4/10/2015	4/10/2016

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

VDEI0009-7

MODES INVESTIGATED

Continuous Transmit 802.11bg: High Channel 11 (2462MHz) Chain C
Continuous Transmit 802.11bg: Low Channel 1 (2412MHz) Chain A
Continuous Transmit 802.11bg: Mid Channel 6 (2437MHz) Chain B

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF00069-3EB6	Date:	10/27/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	44.4%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Mark Baytan	Job Site:	OC06
Power:	110VAC/60Hz	Configuration:	VDEI0009-7

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	1	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

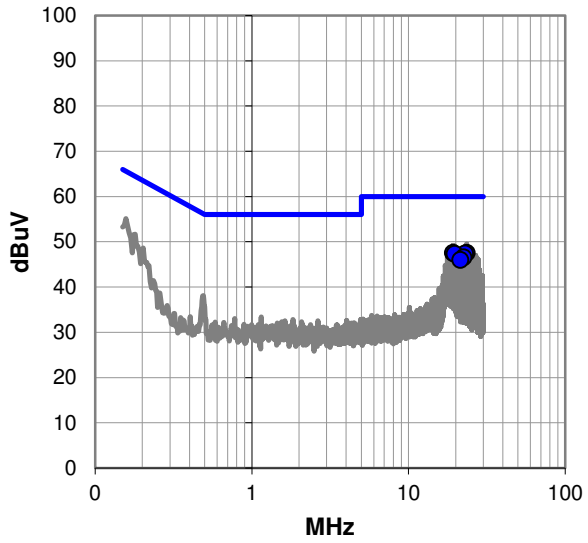
EUT OPERATING MODES

Continuous Transmit 802.11bg: Low Channel 1 (2412MHz) Chain A

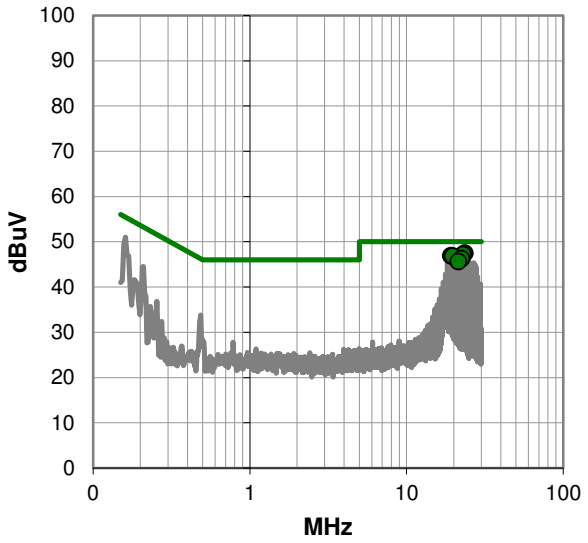
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

RESULTS - Run #1

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.532	26.2	21.3	47.5	60.0	-12.5
19.232	26.5	21.0	47.5	60.0	-12.5
23.026	26.1	21.3	47.4	60.0	-12.6
19.738	26.3	21.0	47.3	60.0	-12.7
22.521	25.3	21.2	46.5	60.0	-13.5
21.510	24.8	21.2	46.0	60.0	-14.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.532	26.1	21.3	47.4	50.0	-2.6
23.026	25.9	21.3	47.2	50.0	-2.8
19.232	25.9	21.0	46.9	50.0	-3.1
19.738	25.8	21.0	46.8	50.0	-3.2
22.521	25.0	21.2	46.2	50.0	-3.8
21.510	24.4	21.2	45.6	50.0	-4.4

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF00069-3EB6	Date:	10/27/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	44.4%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Mark Baytan	Job Site:	OC06
Power:	110VAC/60Hz	Configuration:	VDEI0009-7

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	2	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

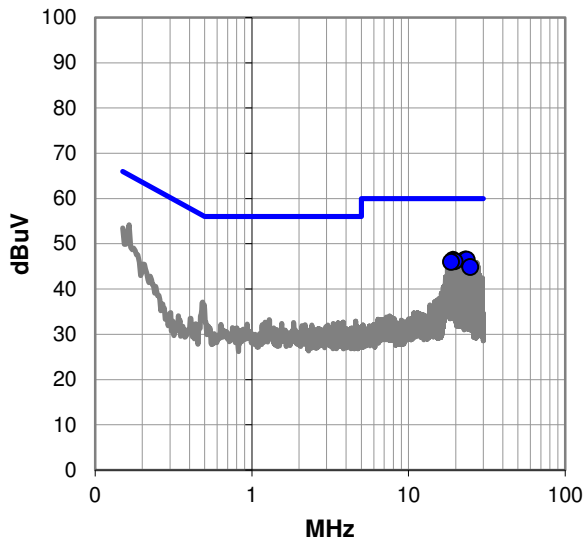
EUT OPERATING MODES

Continuous Transmit 802.11bg: Low Channel 1 (2412MHz) Chain A

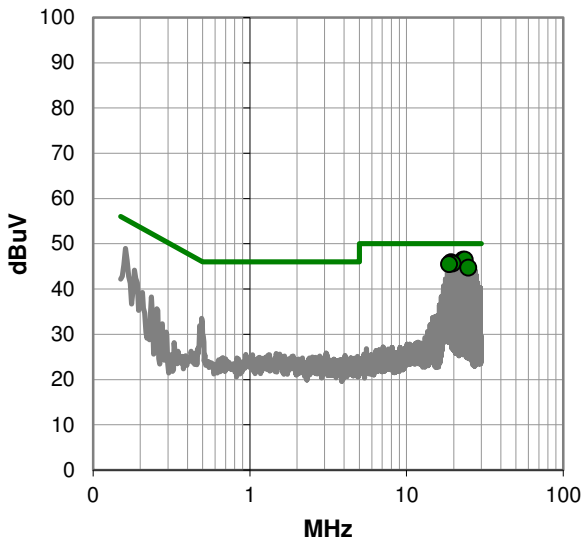
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

RESULTS - Run #2

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.035	25.2	21.3	46.5	60.0	-13.5
23.541	25.1	21.3	46.4	60.0	-13.6
19.239	25.4	21.0	46.4	60.0	-13.6
19.744	25.1	21.0	46.1	60.0	-13.9
18.732	25.0	21.0	46.0	60.0	-14.0
24.806	23.4	21.5	44.9	60.0	-15.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.035	25.2	21.3	46.5	50.0	-3.5
23.541	25.1	21.3	46.4	50.0	-3.6
19.239	24.9	21.0	45.9	50.0	-4.1
19.744	24.6	21.0	45.6	50.0	-4.4
18.732	24.5	21.0	45.5	50.0	-4.5
24.806	23.2	21.5	44.7	50.0	-5.3

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF00069-3EB6	Date:	10/27/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	44.4%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Mark Baytan	Job Site:	OC06
Power:	110VAC/60Hz	Configuration:	VDEI0009-7

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	3	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

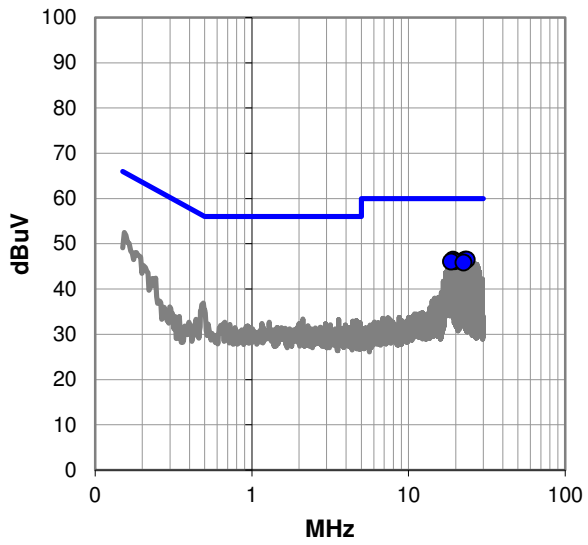
EUT OPERATING MODES

Continuous Transmit 802.11bg: Mid Channel 6 (2437MHz) Chain B

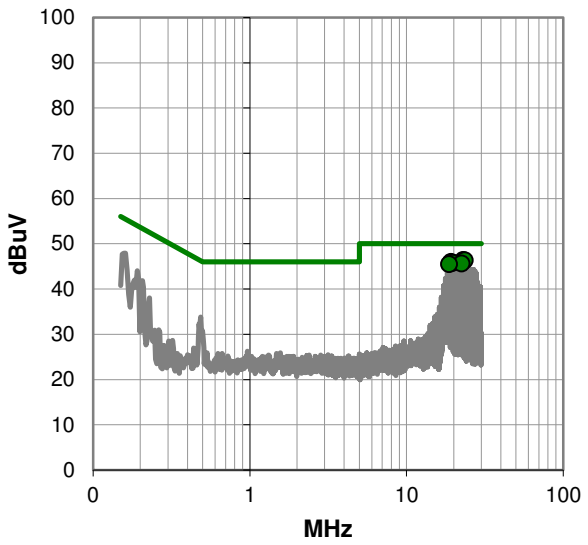
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
19.241	25.5	21.0	46.5	60.0	-13.5
23.037	25.2	21.3	46.5	60.0	-13.5
23.544	25.1	21.3	46.4	60.0	-13.6
19.747	25.1	21.0	46.1	60.0	-13.9
18.734	25.1	21.0	46.1	60.0	-13.9
22.532	24.6	21.3	45.9	60.0	-14.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.037	25.1	21.3	46.4	50.0	-3.6
23.544	25.0	21.3	46.3	50.0	-3.7
19.241	25.0	21.0	46.0	50.0	-4.0
19.747	24.7	21.0	45.7	50.0	-4.3
22.532	24.4	21.3	45.7	50.0	-4.3
18.734	24.5	21.0	45.5	50.0	-4.5

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF00069-3EB6	Date:	10/27/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	44.4%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Mark Baytan	Job Site:	OC06
Power:	110VAC/60Hz	Configuration:	VDEI0009-7

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	4	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

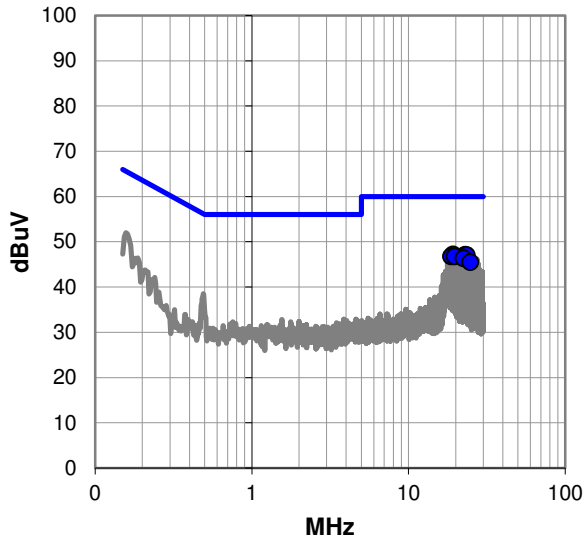
EUT OPERATING MODES

Continuous Transmit 802.11bg: Mid Channel 6 (2437MHz) Chain B

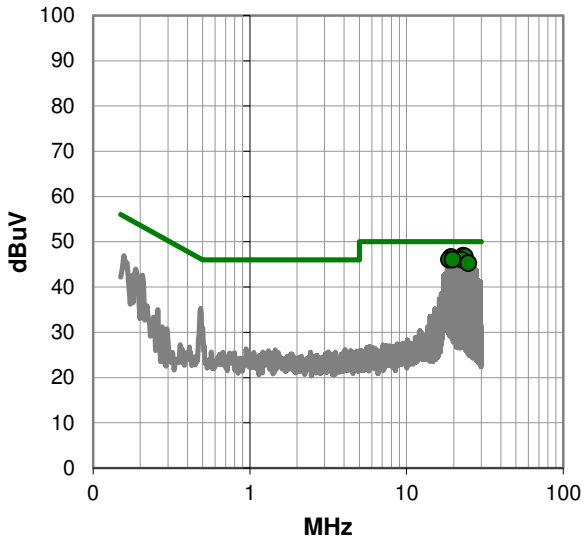
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
19.241	26.2	21.0	47.2	60.0	-12.8
23.038	25.8	21.3	47.1	60.0	-12.9
23.544	25.7	21.3	47.0	60.0	-13.0
18.734	25.8	21.0	46.8	60.0	-13.2
19.748	25.7	21.0	46.7	60.0	-13.3
22.531	25.1	21.3	46.4	60.0	-13.6
24.810	24.0	21.5	45.5	60.0	-14.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.038	25.6	21.3	46.9	50.0	-3.1
23.544	25.4	21.3	46.7	50.0	-3.3
19.241	25.6	21.0	46.6	50.0	-3.4
18.734	25.1	21.0	46.1	50.0	-3.9
22.531	24.8	21.3	46.1	50.0	-3.9
19.748	25.0	21.0	46.0	50.0	-4.0
24.810	23.8	21.5	45.3	50.0	-4.7

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF00069-3EB6	Date:	10/27/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	44.4%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Mark Baytan	Job Site:	OC06
Power:	110VAC/60Hz	Configuration:	VDEI0009-7

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	5	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

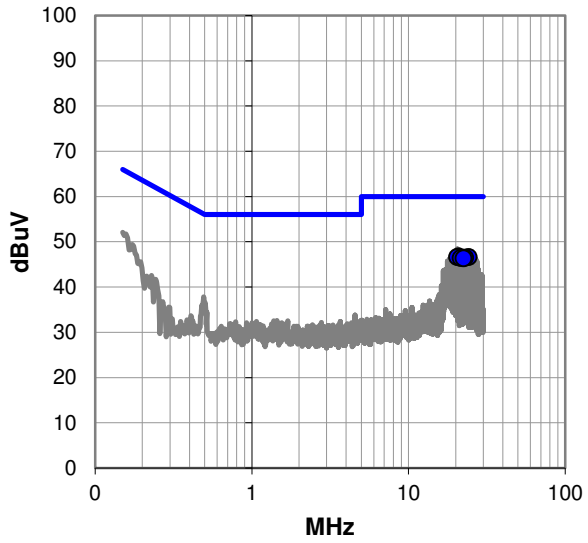
EUT OPERATING MODES

Continuous Transmit 802.11bg: High Channel 11 (2462MHz) Chain C

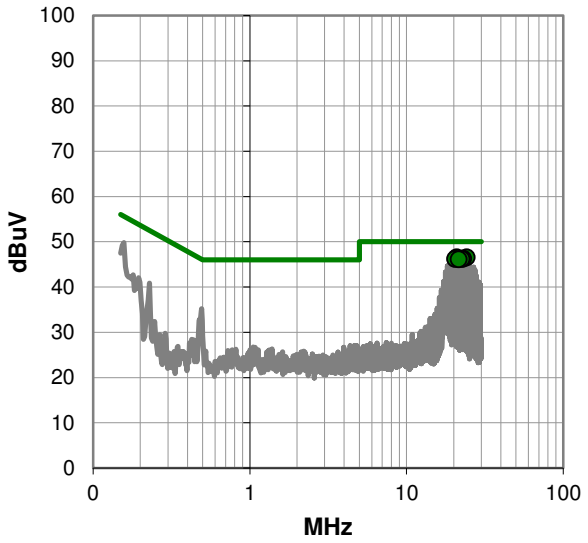
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
21.011	25.6	21.2	46.8	60.0	-13.2
24.303	25.2	21.4	46.6	60.0	-13.4
20.504	25.5	21.1	46.6	60.0	-13.4
23.037	25.2	21.3	46.5	60.0	-13.5
21.517	25.2	21.2	46.4	60.0	-13.6
22.531	25.1	21.3	46.4	60.0	-13.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
21.011	25.4	21.2	46.6	50.0	-3.4
24.303	25.1	21.4	46.5	50.0	-3.5
23.037	25.0	21.3	46.3	50.0	-3.7
20.504	25.1	21.1	46.2	50.0	-3.8
22.531	24.9	21.3	46.2	50.0	-3.8
21.517	24.9	21.2	46.1	50.0	-3.9

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

EUT:	Firebox T50-W (BS5AE7W)	Work Order:	VDEI0009
Serial Number:	70AF00069-3EB6	Date:	10/27/2015
Customer:	WatchGuard Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	44.4%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Mark Baytan	Job Site:	OC06
Power:	110VAC/60Hz	Configuration:	VDEI0009-7

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

TEST PARAMETERS

Run #:	6	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

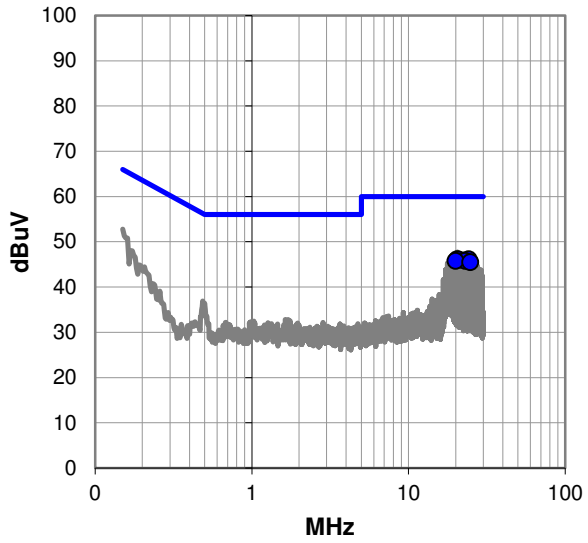
EUT OPERATING MODES

Continuous Transmit 802.11bg: High Channel 11 (2462MHz) Chain C

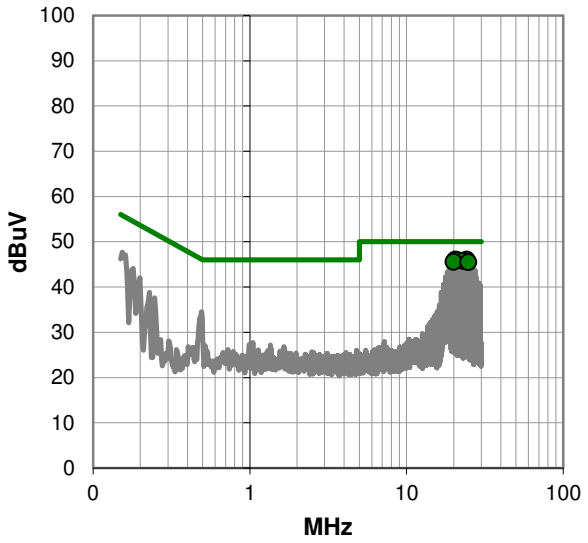
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.09.03
PSA-ESCI 2015.07.01, EmiR5 2015.08.28

RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
24.301	24.7	21.4	46.1	60.0	-13.9
20.503	25.0	21.1	46.1	60.0	-13.9
21.010	24.9	21.2	46.1	60.0	-13.9
23.035	24.5	21.3	45.8	60.0	-14.2
19.997	24.7	21.1	45.8	60.0	-14.2
24.807	24.0	21.5	45.5	60.0	-14.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
24.301	24.6	21.4	46.0	50.0	-4.0
20.503	24.9	21.1	46.0	50.0	-4.0
21.010	24.8	21.2	46.0	50.0	-4.0
23.035	24.5	21.3	45.8	50.0	-4.2
19.997	24.5	21.1	45.6	50.0	-4.4
24.807	24.0	21.5	45.5	50.0	-4.5

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Continuously Transmitting at Low, High Channel @ 2412, 2462 MHz

Continuously Transmitting at Low, Mid, High Channel @ 2412, 2437, 2462 MHz

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

VDEI0009 - 4

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna - Biconilog	ETS Lindgren	3143B	AYF	4/7/2014	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1551	PAH	9/18/2015	12 mo
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	9/18/2015	12 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	1/28/2015	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	HHV	8/11/2015	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJL	9/15/2014	24 mo
Cable	Northwest EMC	1-8.2 GHz	TXC	9/18/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAJ	9/18/2015	12 mo
Attenuator	Fairview Microwave	SA18H-20	TKQ	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHX	8/11/2015	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AJF	NCR	0 mo
Cable	Northwest EMC	8-18GHz	TXD	10/27/2014	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	PAK	10/27/2014	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AJG	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	PAL	10/27/2014	12 mo
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXW	4/23/2014	24 mo
Cable	Northwest EMC	18-40GHz	TXE	11/21/2014	12 mo
Amplifier - Pre-Amplifier	Miteq	JSDQK42-18004000-60-5P	PAM	11/21/2014	12 mo

TEST DESCRIPTION

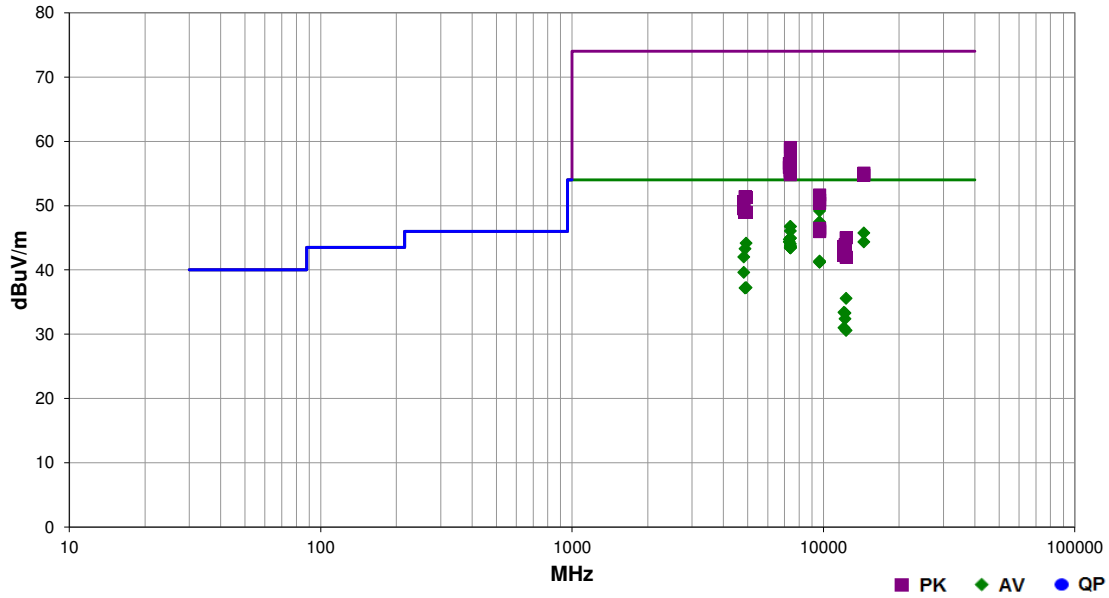
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS

Work Order:	VDEI0009	**Date:**	09/22/15	Jonathan Kiefer	
Project:	None	**Temperature:**	24.1 °C		
Job Site:	TX02	**Humidity:**	44.6% RH		
Serial Number:	70AD00074-8977	**Barometric Pres.:**	1016 mbar	**Tested by:**	Jonathan Kiefer
EUT:	Firebox T30-W (BS3AE5W)				
Configuration:	4				
Customer:	WatchGuard Technologies, Inc.				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Continuously Transmitting at Low, Mid, High Channel @ 2412, 2437, 2462 MHz				
Deviations:	None				
Comments:	PK and AVG(RMS) data. See comments for channel, EUT orientation, antenna and data rate.				

Test Specifications	**Test Method**
FCC 15.247:2015	ANSI C63.10:2013

Run #	142	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
9647.992	52.0	-2.8	2.4	298.9	3.0	0.0	Vert	AV	0.0	49.2	54.0	-4.8	Low Ch, EUT Horz, Chain B, 1 Mbps
9647.983	50.3	-2.8	1.0	154.9	3.0	0.0	Vert	AV	0.0	47.5	54.0	-6.5	Low Ch, EUT On Side, Chain B, 1 Mbps
9647.942	50.1	-2.8	1.0	93.9	3.0	0.0	Vert	AV	0.0	47.3	54.0	-6.7	Low Ch, EUT On Side, Chain B, 1 Mbps
7388.050	33.4	13.3	3.9	343.0	3.0	0.0	Vert	AV	0.0	46.7	54.0	-7.3	High Ch, EUT Horz, Chain B, 6 Mbps
7387.800	33.4	13.3	4.0	338.0	3.0	0.0	Vert	AV	0.0	46.7	54.0	-7.3	High Ch, EUT Horz, Chain B, MCS0
7386.908	32.7	13.3	2.8	114.0	3.0	0.0	Vert	AV	0.0	46.0	54.0	-8.0	High Ch, EUT Horz, Chain B, 1 Mbps
14471.970	35.1	10.6	3.8	45.9	3.0	0.0	Horz	AV	0.0	45.7	54.0	-8.3	Low Ch, EUT Horz, Chain B, 1 Mbps
7388.075	31.6	13.3	3.8	292.9	3.0	0.0	Vert	AV	0.0	44.9	54.0	-9.1	High Ch, EUT Horz, Chain B, MCS7
7387.683	31.6	13.3	1.9	294.0	3.0	0.0	Vert	AV	0.0	44.9	54.0	-9.1	High Ch, EUT Horz, Chain B, 11 Mbps
7313.192	31.5	13.2	1.9	34.9	3.0	0.0	Horz	AV	0.0	44.7	54.0	-9.3	Mid Ch, EUT Horz, Chain B, 1 Mbps
14471.820	33.7	10.6	1.0	26.0	3.0	0.0	Vert	AV	0.0	44.3	54.0	-9.7	Low Ch, EUT Horz, Chain B, 1 Mbps
7311.925	31.1	13.2	1.0	32.0	3.0	0.0	Vert	AV	0.0	44.3	54.0	-9.7	Mid Ch, EUT Horz, Chain B, 1 Mbps
4924.008	36.6	7.6	4.0	282.0	3.0	0.0	Vert	AV	0.0	44.2	54.0	-9.8	High Ch, EUT Horz, Chain B, 1 Mbps
7387.192	30.7	13.3	3.3	289.0	3.0	0.0	Horz	AV	0.0	44.0	54.0	-10.0	High Ch, EUT Horz, Chain B, 1 Mbps
7388.492	30.4	13.3	2.3	195.9	3.0	0.0	Vert	AV	0.0	43.7	54.0	-10.3	High Ch, EUT Horz, Chain A, MCS7
7388.450	30.3	13.3	1.0	127.0	3.0	0.0	Vert	AV	0.0	43.6	54.0	-10.4	High Ch, EUT Horz, Chain B, 36 Mbps
7388.017	30.2	13.3	1.0	195.0	3.0	0.0	Vert	AV	0.0	43.5	54.0	-10.5	High Ch, EUT Horz, Chain ABC, MCS23
7388.450	30.1	13.3	1.0	264.0	3.0	0.0	Vert	AV	0.0	43.4	54.0	-10.6	High Ch, EUT Horz, Chain BC, MCS15
7387.992	30.1	13.3	1.0	157.0	3.0	0.0	Vert	AV	0.0	43.4	54.0	-10.6	High Ch, EUT Horz, Chain B, 54 Mbps
7387.367	30.1	13.3	1.0	205.0	3.0	0.0	Vert	AV	0.0	43.4	54.0	-10.6	High Ch, EUT Horz, Chain AC, MCS15
7385.575	30.1	13.3	1.0	189.9	3.0	0.0	Vert	AV	0.0	43.4	54.0	-10.6	High Ch, EUT Horz Chain AB, MCS15
4873.992	35.9	7.4	3.9	282.0	3.0	0.0	Vert	AV	0.0	43.3	54.0	-10.7	Mid Ch, EUT Horz, Chain B, 1 Mbps
4823.975	34.8	7.2	4.0	268.9	3.0	0.0	Vert	AV	0.0	42.0	54.0	-12.0	Low Ch, EUT Horz, Chain B, 1 Mbps
9647.967	44.2	-2.8	3.5	44.0	3.0	0.0	Vert	AV	0.0	41.4	54.0	-12.6	Low Ch, EUT Vert, Chain B, 1 Mbps
9647.975	44.1	-2.8	1.0	343.0	3.0	0.0	Horz	AV	0.0	41.3	54.0	-12.7	Low Ch, EUT Horz, Chain B, 1 Mbps
9647.942	44.0	-2.8	2.1	50.0	3.0	0.0	Vert	AV	0.0	41.2	54.0	-12.8	Low Ch, EUT Vert, Chain B, 1 Mbps
4823.958	32.4	7.2	2.9	177.0	3.0	0.0	Horz	AV	0.0	39.6	54.0	-14.4	Low Ch, EUT Horz, Chain B, 1 Mbps
7387.933	45.7	13.3	4.0	338.0	3.0	0.0	Vert	PK	0.0	59.0	74.0	-15.0	High Ch, EUT Horz, Chain B, MCS0

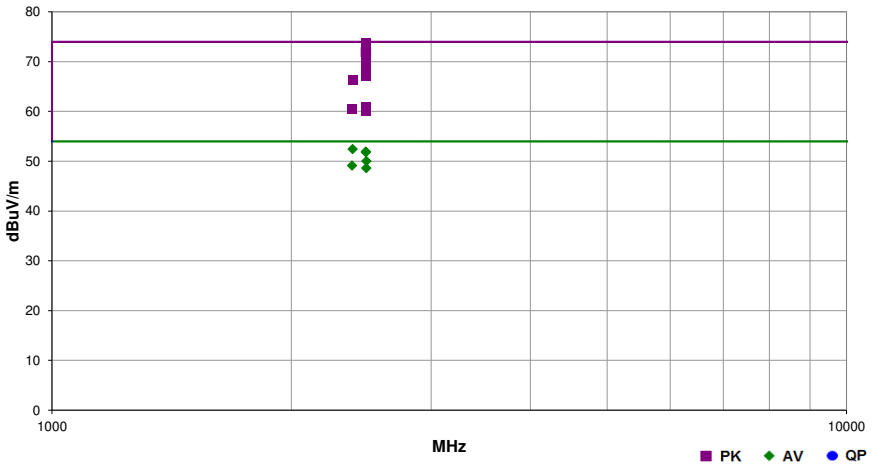
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7384.400	45.4	13.3	3.9	343.0	3.0	0.0	Vert	PK	0.0	58.7	74.0	-15.3	High Ch, EUT Horz, Chain B, 6 Mbps
4925.408	29.7	7.6	1.0	91.0	3.0	0.0	Horz	AV	0.0	37.3	54.0	-16.7	High Ch, EUT Horz, Chain B, 1 Mbps
4874.133	29.8	7.4	1.0	133.0	3.0	0.0	Horz	AV	0.0	37.2	54.0	-16.8	Mid Ch, EUT Horz, Chain B, 1 Mbps
7385.067	43.6	13.3	3.8	292.9	3.0	0.0	Vert	PK	0.0	56.9	74.0	-17.1	High Ch, EUT Horz, Chain B, MCS7
7312.450	43.3	13.2	1.9	34.9	3.0	0.0	Horz	PK	0.0	56.5	74.0	-17.5	Mid Ch, EUT Horz, Chain B, 1 Mbps
7387.100	43.2	13.3	2.8	114.0	3.0	0.0	Vert	PK	0.0	56.5	74.0	-17.5	High Ch, EUT Horz, Chain B, 1 Mbps
7387.117	43.0	13.3	1.9	294.0	3.0	0.0	Vert	PK	0.0	56.3	74.0	-17.7	High Ch, EUT Horz, Chain B, 11 Mbps
7310.192	42.7	13.2	1.0	32.0	3.0	0.0	Vert	PK	0.0	55.9	74.0	-18.1	Mid Ch, EUT Horz, Chain B, 1 Mbps
12308.770	36.2	-0.6	1.0	216.0	3.0	0.0	Vert	AV	0.0	35.6	54.0	-18.4	High Ch, EUT Horz, Chain B, 1 Mbps
7386.575	42.2	13.3	1.0	264.0	3.0	0.0	Vert	PK	0.0	55.5	74.0	-18.5	High Ch, EUT Horz, Chain BC, MCS15
7387.442	42.1	13.3	2.3	195.9	3.0	0.0	Vert	PK	0.0	55.4	74.0	-18.6	High Ch, EUT Horz, Chain A, MCS7
7384.942	42.0	13.3	3.3	289.0	3.0	0.0	Horz	PK	0.0	55.3	74.0	-18.7	High Ch, EUT Horz, Chain B, 1 Mbps
7383.917	42.0	13.3	1.0	195.0	3.0	0.0	Vert	PK	0.0	55.3	74.0	-18.7	High Ch, EUT Horz, Chain ABC, MCS23
7388.467	41.9	13.3	1.0	127.0	3.0	0.0	Vert	PK	0.0	55.2	74.0	-18.8	High Ch, EUT Horz, Chain B, 36 Mbps
7387.850	41.8	13.3	1.0	157.0	3.0	0.0	Vert	PK	0.0	55.1	74.0	-18.9	High Ch, EUT Horz, Chain B, 54 Mbps
14471.980	44.4	10.6	3.8	45.9	3.0	0.0	Horz	PK	0.0	55.0	74.0	-19.0	Low Ch, EUT Horz, Chain B, 1 Mbps
7385.433	41.5	13.3	1.0	205.0	3.0	0.0	Vert	PK	0.0	54.8	74.0	-19.2	High Ch, EUT Horz, Chain AC, MCS15
7384.458	41.5	13.3	1.0	189.9	3.0	0.0	Vert	PK	0.0	54.8	74.0	-19.2	High Ch, EUT Horz, Chain AB, MCS15
14472.430	44.1	10.6	1.0	26.0	3.0	0.0	Vert	PK	0.0	54.7	74.0	-19.3	Low Ch, EUT Horz, Chain B, 1 Mbps
12061.150	34.6	-1.2	1.0	356.0	3.0	0.0	Vert	AV	0.0	33.4	54.0	-20.6	Low Ch, EUT Horz, Chain B, 1 Mbps
12185.900	34.1	-0.8	3.9	156.0	3.0	0.0	Vert	AV	0.0	33.3	54.0	-20.7	Mid Ch, EUT Horz, Chain B, 1 Mbps
12186.750	33.2	-0.8	1.0	228.0	3.0	0.0	Vert	AV	0.0	32.4	54.0	-21.6	Mid Ch, EUT Horz, Chain B, 1 Mbps
9648.075	54.5	-2.8	2.4	298.9	3.0	0.0	Vert	PK	0.0	51.7	74.0	-22.3	Low Ch, EUT Horz, Chain B, 1 Mbps
4874.058	44.0	7.4	3.9	282.0	3.0	0.0	Vert	PK	0.0	51.4	74.0	-22.6	Mid Ch, EUT Horz, Chain B, 1 Mbps
4924.067	43.7	7.6	4.0	282.0	3.0	0.0	Vert	PK	0.0	51.3	74.0	-22.7	High Ch, EUT Horz, Chain B, 1 Mbps
12062.070	32.2	-1.2	1.0	214.9	3.0	0.0	Horz	AV	0.0	31.0	54.0	-23.0	Low Ch, EUT Horz, Chain B, 1 Mbps
9647.983	53.7	-2.8	1.0	154.9	3.0	0.0	Vert	PK	0.0	50.9	74.0	-23.1	Low Ch, EUT On Side, Chain B, 1 Mbps
4824.242	43.4	7.2	4.0	268.9	3.0	0.0	Vert	PK	0.0	50.6	74.0	-23.4	Low Ch, EUT Horz, Chain B, 1 Mbps
12311.610	31.2	-0.6	1.0	142.9	3.0	0.0	Horz	AV	0.0	30.6	54.0	-23.4	High Ch, EUT Horz, Chain B, 1 Mbps
9647.858	53.2	-2.8	1.0	93.9	3.0	0.0	Vert	PK	0.0	50.4	74.0	-23.6	Low Ch, EUT On Side, Chain B, 1 Mbps
4824.008	42.3	7.2	2.9	177.0	3.0	0.0	Horz	PK	0.0	49.5	74.0	-24.5	Low Ch, EUT Horz, Chain B, 1 Mbps
4873.533	41.6	7.4	1.0	133.0	3.0	0.0	Horz	PK	0.0	49.0	74.0	-25.0	Mid Ch, EUT Horz, Chain B, 1 Mbps
4922.342	41.4	7.5	1.0	91.0	3.0	0.0	Horz	PK	0.0	48.9	74.0	-25.1	High Ch, EUT Horz, Chain B, 1 Mbps
9647.950	49.3	-2.8	3.5	44.0	3.0	0.0	Vert	PK	0.0	46.5	74.0	-27.5	Low Ch, EUT Vert, Chain B, 1 Mbps
9648.033	49.0	-2.8	2.1	50.0	3.0	0.0	Vert	PK	0.0	46.2	74.0	-27.8	Low Ch, EUT Vert, Chain B, 1 Mbps
9647.975	48.8	-2.8	1.0	343.0	3.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	Low Ch, EUT Horz, Chain B, 1 Mbps
12309.920	45.6	-0.6	1.0	216.0	3.0	0.0	Vert	PK	0.0	45.0	74.0	-29.0	High Ch, EUT Horz, Chain B, 1 Mbps
12186.690	44.7	-0.8	3.9	156.0	3.0	0.0	Vert	PK	0.0	43.9	74.0	-30.1	Mid Ch, EUT Horz, Chain B, 1 Mbps
12058.380	44.8	-1.2	1.0	356.0	3.0	0.0	Vert	PK	0.0	43.6	74.0	-30.4	Low Ch, EUT Horz, Chain B, 1 Mbps
12187.230	43.9	-0.8	1.0	228.0	3.0	0.0	Vert	PK	0.0	43.1	74.0	-30.9	Mid Ch, EUT Horz, Chain B, 1 Mbps
12058.280	43.5	-1.2	1.0	214.9	3.0	0.0	Horz	PK	0.0	42.3	74.0	-31.7	Low Ch, EUT Horz, Chain B, 1 Mbps
12310.880	42.6	-0.6	1.0	142.9	3.0	0.0	Horz	PK	0.0	42.0	74.0	-32.0	High Ch, EUT Horz, Chain B, 1 Mbps

SPURIOUS RADIATED EMISSIONS

Work Order:	VDEI0009	**Date:**	09/22/15		
Project:	None	**Temperature:**	24.1 °C		
Job Site:	TX02	**Humidity:**	44.6% RH		
Serial Number:	70AD00074-8977	**Barometric Pres.:**	1016 mbar	**Tested by:**	Jonathan Kiefer
EUT:	Firebox T30-W				
Configuration:	4				
Customer:	WatchGuard Technologies, Inc.				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Continuously Transmitting at Low, High Channel @ 2412, 2462 MHz				
Deviations:	None				
Comments:	Low and High Band Edge. The Transmit Power setting had to be decreased to 19.0 at 2412 MHz, Chain B, 6 Mbps to meet the Low Band Edge limits. The Transmit Power setting had to be decreased to 18.5 at 2462 MHz, Chain B, 6 Mbps to meet the High Band Edge limits.				

Test Specifications	Test Method
FCC 15.247:2015	ANSI C63.10:2013

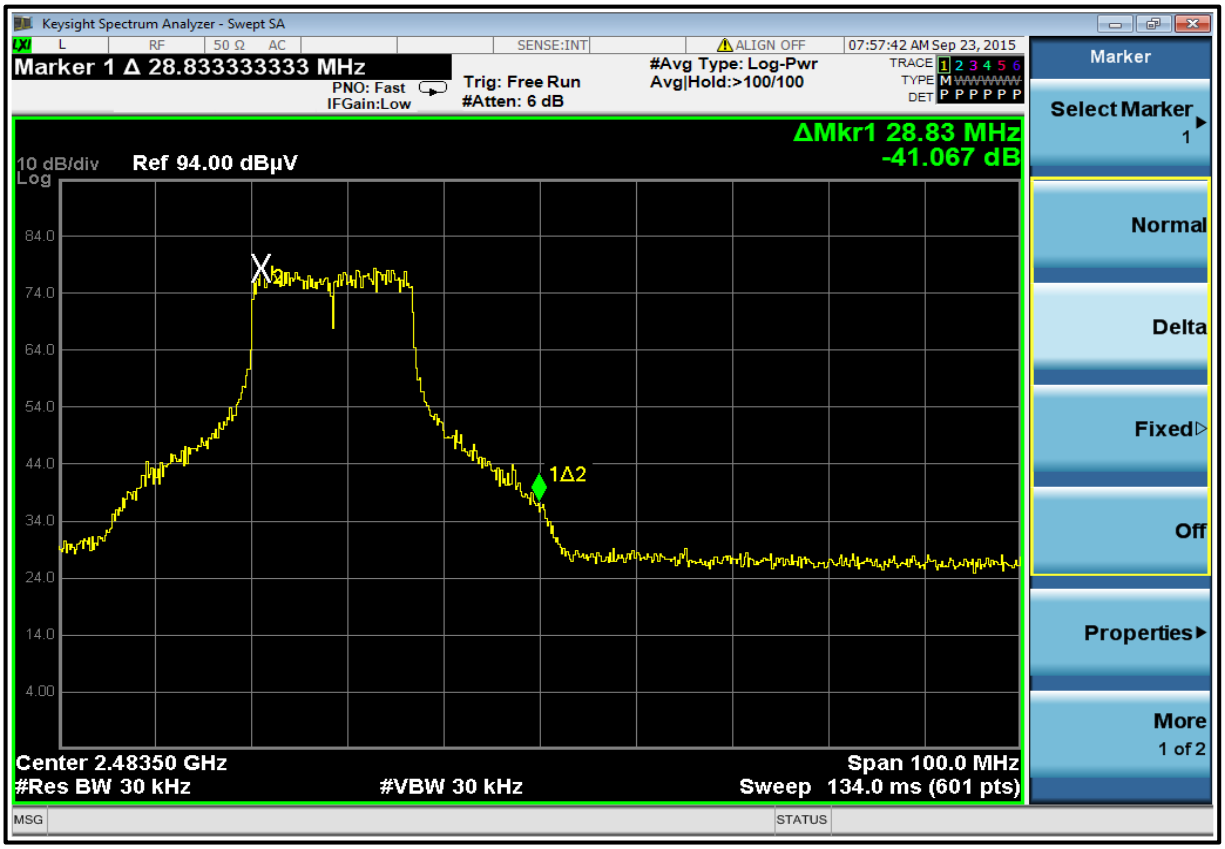
Run #	147	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2454.500	85.0	-6.8	3.8	170.0	3.0	20.0	Horz	AV	0.0	98.2			Fundamental, High Ch, EUT On Side, Chain B, 6 Mbps
2483.500				170.0	3.0	20.0	Horz	AV	0.0	52.8	54.0	-1.2	High Ch EUT On Side, Marker Delta Method: Peak 98.2 + -45.44 dBc = 52.76
2463.830	78.0	-4.4	1.0	190.9	3.0	20.0	Vert	AV	0.0	93.6			Fundamental, High Ch, EUT On Side, Chain B, MCS0
2483.500				190.9	3.0	20.0	Vert	AV	0.0	51.5	54.0	-2.5	High Ch EUT On Side, Marker Delta Method: Peak 93.6 + -42.086 dBc = 51.514
2455.170	82.0	-4.4	1.0	18.0	3.0	20.0	Horz	AV	0.0	97.6			Fundamental, High Ch, EUT Vert, Chain B, 6 Mbps
2483.500				18.0	3.0	20.0	Horz	AV	0.0	52.3	54.0	-1.7	High Ch EUT Vert, Marker Delta Method: Peak 97.6 + -45.344 dBc = 52.256
2465.500	94.5	-4.4	3.8	170.0	3.0	20.0	Horz	PK	0.0	110.1			Fundamental, High Ch, EUT On Side, Chain B, 6 Mbps
2483.500				170.0	3.0	20.0	Horz	PK	0.0	73.1	74.0	-0.9	High Ch EUT On Side, Marker Delta Method: Peak 110.1 + -34.303 dBc = 58.197
2457.000	79.0	-4.4	1.5	162.0	3.0	20.0	Vert	AV	0.0	94.6			Fundamental, High Ch, EUT Horz, Chain B, 6 Mbps
2483.500				162.0	3.0	20.0	Vert	AV	0.0	52.6	54.0	-1.4	High Ch EUT Horz, Marker Delta Method: Peak 94.6 + -41.999 dBc = 52.601
2467.000	80.0	-4.4	1.0	232.9	3.0	20.0	Vert	AV	0.0	95.6			Fundamental, High Ch, EUT On Side, Chain B, 6 Mbps
2483.500				232.9	3.0	20.0	Vert	AV	0.0	51.4	54.0	-2.6	High Ch EUT On Side, Marker Delta Method: Peak 95.6 + -44.24 dBc = 51.36
2467.170	77.0	-4.4	1.0	9.9	3.0	20.0	Vert	AV	0.0	92.6			Fundamental, High Ch, EUT On Side, Chain A, 6 Mbps
2483.500				9.9	3.0	20.0	Vert	AV	0.0	49.8	54.0	-4.2	High Ch EUT On Side, Marker Delta Method: Peak 92.6 + -42.773 dBc = 49.827
2454.670	78.0	-4.4	3.1	165.9	3.0	20.0	Horz	AV	0.0	93.6			Fundamental, High Ch, EUT Horz, Chain B, 6 Mbps
2483.500				165.9	3.0	20.0	Horz	AV	0.0	52.5	54.0	-1.5	High Ch EUT Horz, Marker Delta Method: Peak 93.6 + -41.067 = 52.533
2455.670	79.0	-4.4	1.0	188.0	3.0	20.0	Vert	AV	0.0	94.6			Fundamental, High Ch, EUT On Side, Chain B, 36 Mbps
2483.500				188.0	3.0	20.0	Vert	AV	0.0	51.5	54.0	-2.5	High Ch EUT On Side, Marker Delta Method: Peak 94.6 + -43.141 = 51.459
2462.330	76.0	-4.4	1.0	291.9	3.0	20.0	Vert	AV	0.0	91.6			Fundamental, High Ch, EUT Vert, Chain B, 6 Mbps
2483.500				291.9	3.0	20.0	Vert	AV	0.0	49.5	54.0	-4.5	High Ch EUT Vert, Marker Delta Method: Peak 91.6 + -42.095 =49.505
2457.330	89.3	-4.4	1.0	18.0	3.0	20.0	Horz	PK	0.0	105.0			Fundamental, High Ch, EUT Vert, Chain B, 6 Mbps
2483.500				18.0	3.0	20.0	Horz	PK	0.0	69.2	74.0	-4.8	High Ch EUT Vert, Marker Delta Method: Peak 105.0 + -35.766 dBc = 69.234
2457.170	89.7	-4.4	1.0	190.9	3.0	20.0	Vert	PK	0.0	105.3			Fundamental, High Ch, EUT On Side, Chain B, MCS0
2483.500				190.9	3.0	20.0	Vert	PK	0.0	68.9	74.0	-5.1	High Ch EUT On Side, Marker Delta Method: Peak 105.3 + -36.393 dBc = 68.907
2483.500	58.2	-4.4	1.0	232.9	3.0	20.0	Vert	PK	0.0	73.8	74.0	-0.2	High Ch, EUT On Side, Chain B, 6 Mbps
2483.547	58.0	-4.4	1.5	162.0	3.0	20.0	Vert	PK	0.0	73.6	74.0	-0.4	High Ch, EUT Horz, Chain B, 6 Mbps
2483.620	57.3	-4.4	3.1	165.9	3.0	20.0	Horz	PK	0.0	72.9	74.0	-1.1	High Ch, EUT Horz, Chain B, 6 Mbps
2483.500	57.2	-4.4	1.0	9.9	3.0	20.0	Vert	PK	0.0	72.8	74.0	-1.2	High Ch, EUT On Side, Chain A, 6 Mbps
2389.967	36.8	-4.4	1.0	201.0	3.0	20.0	Vert	AV	0.0	52.4	54.0	-1.6	Low Ch, EUT On Side, Chain B, 6 Mbps, TP 19
2483.587	56.5	-4.4	1.0	291.9	3.0	20.0	Vert	PK	0.0	72.1	74.0	-1.9	High Ch, EUT Vert, Chain B, 6 Mbps
2483.580	36.3	-4.4	1.0	235.0	3.0	20.0	Vert	AV	0.0	51.9	54.0	-2.1	High Ch, EUT On Side, Chain B, MCS7
2483.627	56.3	-4.4	1.0	188.0	3.0	20.0	Vert	PK	0.0	71.9	74.0	-2.1	High Ch, EUT On Side, Chain B, 36 Mbps
2483.507	36.3	-4.4	1.0	357.0	3.0	20.0	Vert	AV	0.0	51.9	54.0	-2.1	High Ch, EUT On Side, Chain C, 6 Mbps
2483.613	36.2	-4.4	1.0	261.0	3.0	20.0	Vert	AV	0.0	51.8	54.0	-2.2	High Ch, EUT On Side, Chain B, 54 Mbps
2483.513	54.8	-4.4	1.0	261.0	3.0	20.0	Vert	PK	0.0	70.4	74.0	-3.6	High Ch, EUT On Side, Chain B, 54 Mbps
2487.280	34.4	-4.4	1.0	124.9	3.0	20.0	Vert	AV	0.0	50.0	54.0	-4.0	High Ch, EUT On Side, Chain B, 1 Mbps
2386.827	33.5	-4.4	1.0	177.9	3.0	20.0	Vert	AV	0.0	49.1	54.0	-4.9	Low Ch, EUT On Side, Chain B, 1 Mbps, TP 19
2486.280	33.0	-4.4	2.2	262.9	3.0	20.0	Vert	AV	0.0	48.6	54.0	-5.4	High Ch, EUT On Side, Chain B, 11 Mbps
2483.613	52.8	-4.4	1.0	235.0	3.0	20.0	Vert	PK	0.0	68.4	74.0	-5.6	High Ch, EUT On Side, Chain B, MCS7
2483.993	51.4	-4.4	1.0	357.0	3.0	20.0	Vert	PK	0.0	67.0	74.0	-7.0	High Ch, EUT On Side, Chain C, 6 Mbps
2389.767	50.7	-4.4	1.0	201.0	3.0	20.0	Vert	PK	0.0	66.3	74.0	-7.7	Low Ch, EUT On Side, Chain B, 6 Mbps, TP 19
2486.640	45.2	-4.4	1.0	124.9	3.0	20.0	Vert	PK	0.0	60.8	74.0	-13.2	High Ch, EUT On Side, Chain B, 1 Mbps
2388.507	44.9	-4.4	1.0	177.9	3.0	20.0	Vert	PK	0.0	60.5	74.0	-13.5	Low Ch, EUT On Side, Chain B, 1 Mbps, TP 19
2484.053	44.5	-4.4	2.2	262.9	3.0	20.0	Vert	PK	0.0	60.1	74.0	-13.9	High Ch, EUT On Side, Chain B, 11 Mbps

SPURIOUS RADIATED EMISSIONS

Ant Horz, EUT Horz, Chain B, 6 Mbps, Marker Delta Method



Ant Horz, EUT On Side, Chain B, 6 Mbps, Marker Delta Method

SPURIOUS RADIATED EMISSIONS

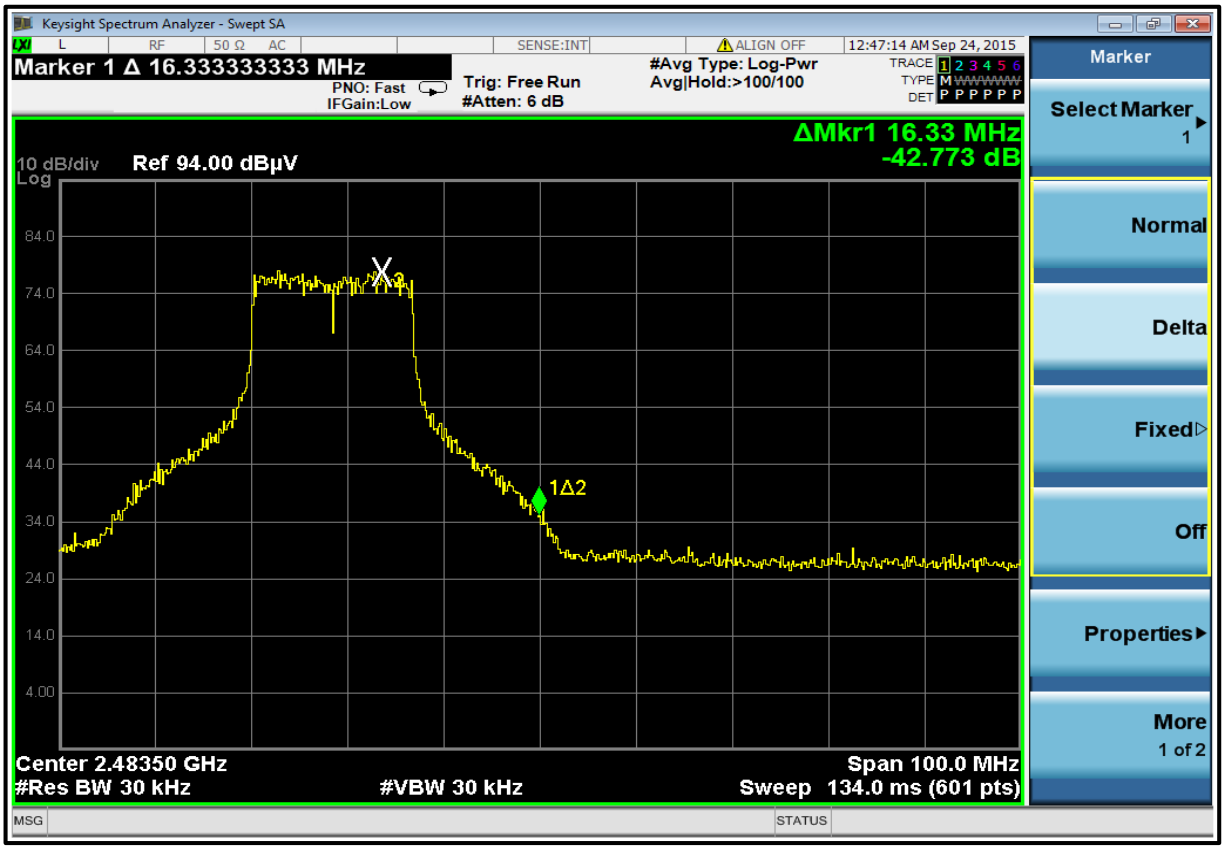
Ant Horz, EUT Vert, Chain B, 6 Mbps, Marker Delta Method

Ant Vert, EUT Horz, Chain B, 6 Mbps, Marker Delta Method

SPURIOUS RADIATED EMISSIONS

Ant Vert, EUT On Side, Chain B, 36 Mbps, Marker Delta Method

Ant Vert, EUT On Side, Chain A, 6 Mbps, Marker Delta Method



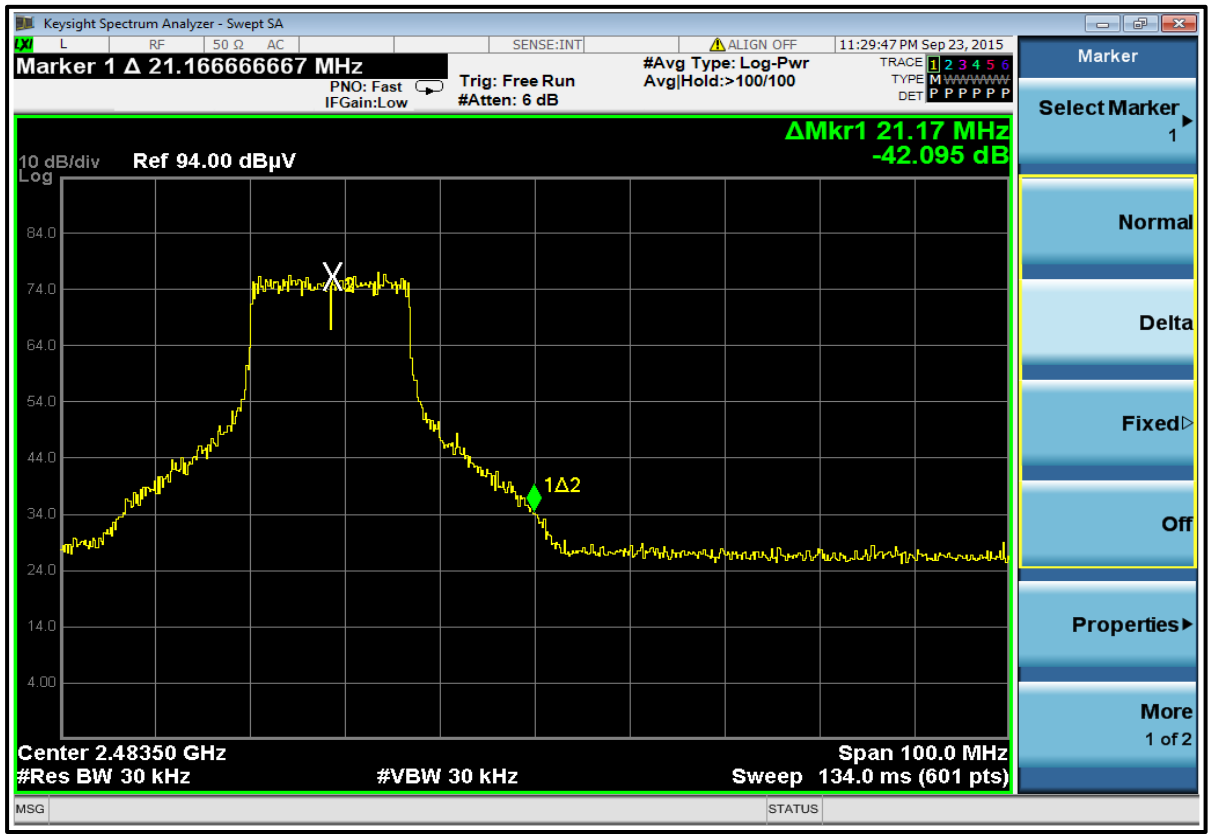
SPURIOUS RADIATED EMISSIONS

Ant Vert, EUT On Side, Chain B, 6 Mbps, Marker Delta Method

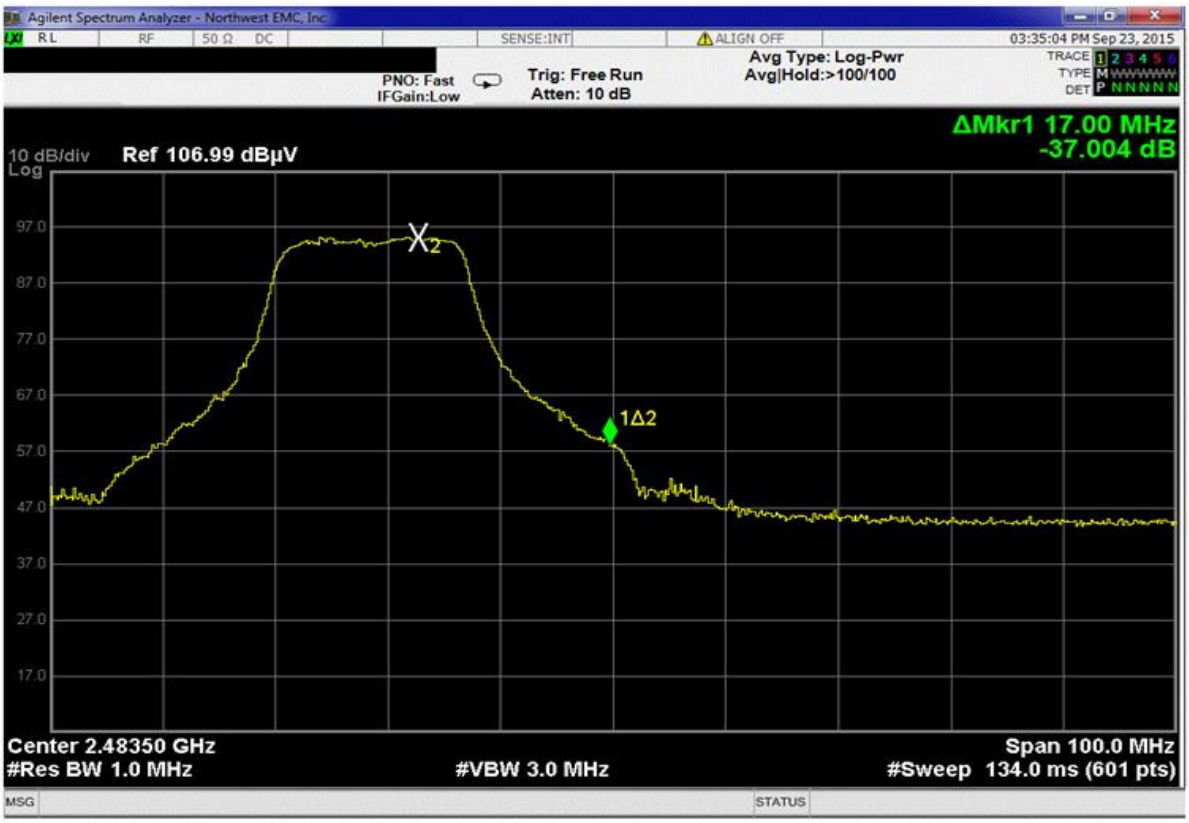
Ant Vert, EUT On Side, Chain B, MCS0, Marker Delta Method

SPURIOUS RADIATED EMISSIONS

Ant Vert, EUT Vert, Chain B, 6 Mbps, Marker Delta Method

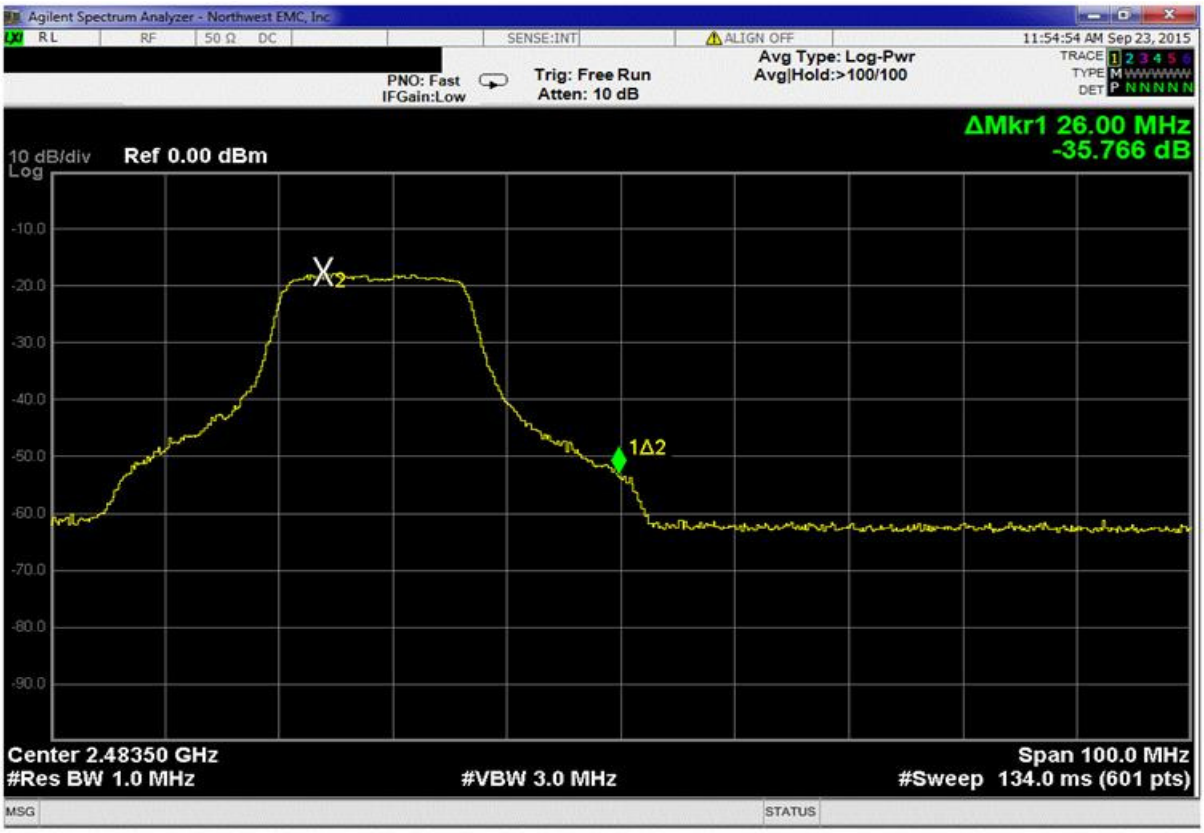


Ant Horz, EUT On Side, Chain B, 6 Mbps, Marker Delta Method (Peak)

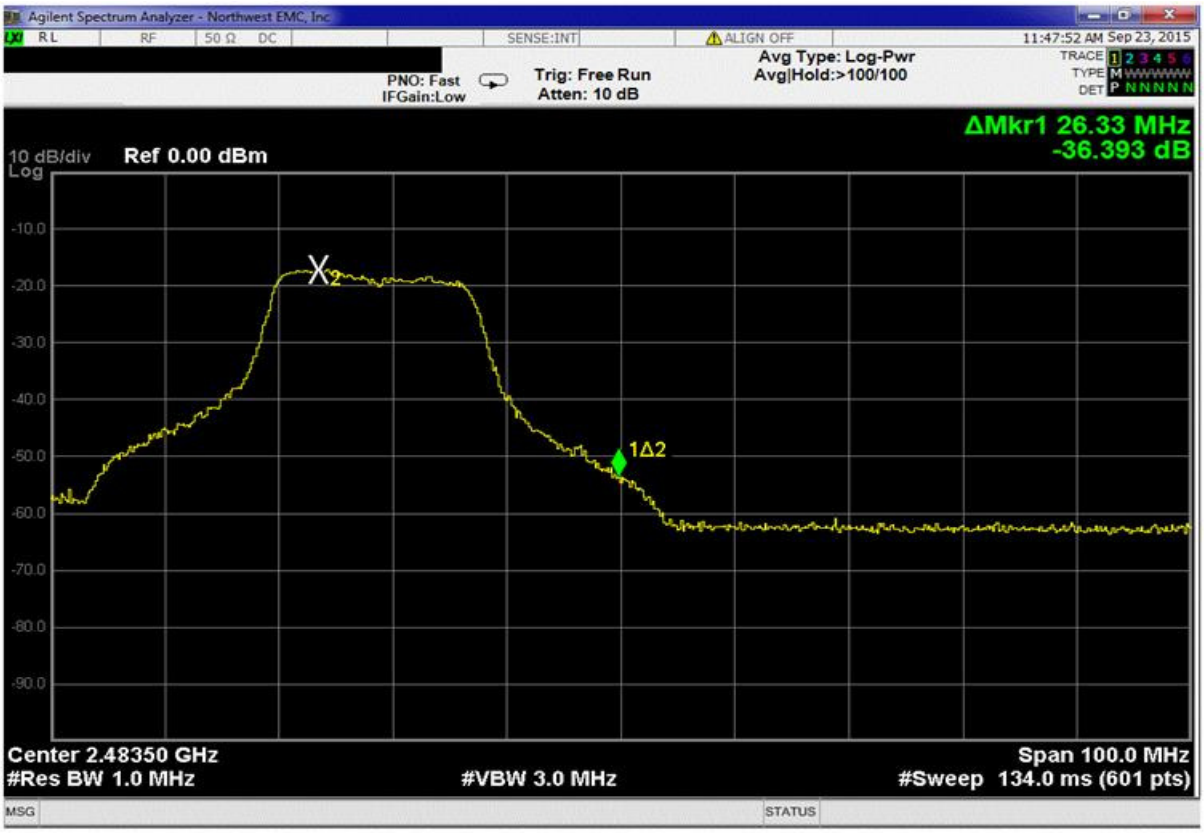


SPURIOUS RADIATED EMISSIONS

Ant Horz, EUT Vert, Chain B, 6 Mbps, Marker Delta Method (Peak)



Ant Vert, EUT On Side, Chain B, MCS0, Marker Delta Method (Peak)



SPURIOUS RADIATED EMISSIONS

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Continuously Transmitting at Low, High Ch @ 2412, 2462 MHz.
Continuously Transmitting at Low, Mid, High Channel @ 2412, 2437, 2462 MHz.

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

VDEI0009 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna - Biconilog	ETS Lindgren	3143B	AYF	4/7/2014	24 mo
Amplifier - Pre-Amplifier	Miteq	AM-1551	PAH	9/18/2015	12 mo
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	9/18/2015	12 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	1/28/2015	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	HHV	8/11/2015	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJL	9/15/2014	24 mo
Cable	Northwest EMC	1-8.2 GHz	TXC	9/18/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAJ	9/18/2015	12 mo
Attenuator	Fairview Microwave	SA18H-20	TKQ	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHX	8/11/2015	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AJF	NCR	0 mo
Cable	Northwest EMC	8-18GHz	TXD	10/27/2014	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	PAK	10/27/2014	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AJG	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	PAL	10/27/2014	12 mo
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXW	4/23/2014	24 mo
Cable	Northwest EMC	18-40GHz	TXE	11/21/2014	12 mo
Amplifier - Pre-Amplifier	Miteq	JSDQK42-18004000-60-5P	PAM	11/21/2014	12 mo

TEST DESCRIPTION

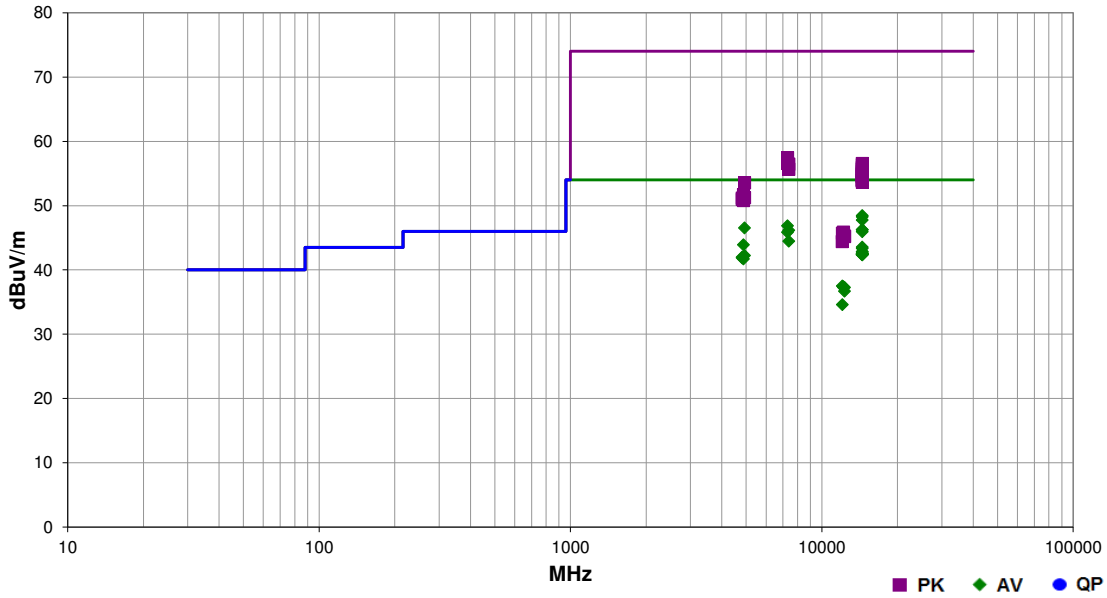
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS

Work Order:	VDEI0009	**Date:**	09/11/15	Jonathan Kiefer	
Project:	None	**Temperature:**	24.7 °C		
Job Site:	TX02	**Humidity:**	45.6% RH		
Serial Number:	70AF02717-B385	**Barometric Pres.:**	1019 mbar	**Tested by:**	Jonathan Kiefer
EUT:	Firebox T50-W (BS5AE7W)				
Configuration:	3				
Customer:	WatchGuard Technologies, Inc.				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Continuously Transmitting at Low, Mid, High Channel @ 2412, 2437, 2462 MHz.				
Deviations:	None				
Comments:	PK and AVG(RMS) data.				

Test Specifications	**Test Method**
FCC 15.247:2015	ANSI C63.10:2013

Run #	111	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
14471.860	37.8	10.6	1.2	339.9	3.0	0.0	Horz	AV	0.0	48.4	54.0	-5.6	Low Ch, EUT Vert, Chain B, 1 Mbps
14471.990	37.6	10.6	2.4	334.9	3.0	0.0	Vert	AV	0.0	48.2	54.0	-5.8	Low Ch, EUT On Side, Chain B, 1 Mbps
14471.970	37.1	10.6	1.0	332.0	3.0	0.0	Vert	AV	0.0	47.7	54.0	-6.3	Low Ch, EUT Horz, Chain B, 1 Mbps
7309.795	33.5	13.4	1.2	319.0	3.0	0.0	Vert	AV	0.0	46.9	54.0	-7.1	Mid Ch, EUT On Side, Chain B, 1 Mbps
4923.955	38.4	8.1	2.7	346.9	3.0	0.0	Vert	AV	0.0	46.5	54.0	-7.5	High Ch, EUT On Side, Chain B, 1 Mbps
14471.880	35.6	10.6	1.0	12.0	3.0	0.0	Horz	AV	0.0	46.2	54.0	-7.8	Low Ch, EUT On Side, Chain B, 1 Mbps
14471.900	35.6	10.6	1.0	19.0	3.0	0.0	Horz	AV	0.0	46.2	54.0	-7.8	Low Ch, EUT Horz, Chain B, 1 Mbps
7387.215	32.8	13.4	3.2	349.0	3.0	0.0	Vert	AV	0.0	46.2	54.0	-7.8	High Ch, EUT On Side, Chain B, 1 Mbps
14472.020	35.3	10.6	1.0	27.0	3.0	0.0	Vert	AV	0.0	45.9	54.0	-8.1	Low Ch, EUT Vert, Chain B, 1 Mbps
7309.730	32.5	13.4	2.8	7.0	3.0	0.0	Horz	AV	0.0	45.9	54.0	-8.1	Mid Ch, EUT Vert, Chain B, 1 Mbps
7387.165	31.1	13.4	1.0	2.0	3.0	0.0	Horz	AV	0.0	44.5	54.0	-9.5	High Ch, EUT Vert, Chain B, 1 Mbps
4874.035	35.9	8.0	3.9	27.9	3.0	0.0	Horz	AV	0.0	43.9	54.0	-10.1	Mid Ch, EUT Vert, Chain B, 1 Mbps
14471.980	32.9	10.6	1.0	39.0	3.0	0.0	Horz	AV	0.0	43.5	54.0	-10.5	Low Ch, EUT Vert, Chain B, 11 Mbps
14470.620	32.7	10.7	1.0	316.9	3.0	0.0	Horz	AV	0.0	43.4	54.0	-10.6	Low Ch, EUT Vert, Chain A, MCS7
14471.570	32.2	10.7	1.0	294.0	3.0	0.0	Horz	AV	0.0	42.9	54.0	-11.1	Low Ch, EUT Vert, Chain ABC, MCS23
14471.600	32.1	10.7	1.0	330.0	3.0	0.0	Horz	AV	0.0	42.8	54.0	-11.2	Low Ch, EUT Vert, Chain AC, MCS15
14470.760	31.9	10.7	1.0	360.0	3.0	0.0	Horz	AV	0.0	42.6	54.0	-11.4	Low Ch, EUT Vert, Chain C, MCS7
14472.430	31.9	10.6	1.0	328.9	3.0	0.0	Horz	AV	0.0	42.5	54.0	-11.5	Low Ch, EUT Vert, Chain B, MCS0
14471.540	31.8	10.7	1.0	351.0	3.0	0.0	Horz	AV	0.0	42.5	54.0	-11.5	Low Ch, EUT Vert, Chain B, 36 Mbps
14471.820	31.8	10.6	1.0	182.0	3.0	0.0	Horz	AV	0.0	42.4	54.0	-11.6	Low Ch, EUT Vert, Chain B, MCS7
14473.050	31.8	10.6	1.0	218.0	3.0	0.0	Horz	AV	0.0	42.4	54.0	-11.6	Low Ch, EUT Vert, Chain AB, MCS15
14473.340	31.8	10.6	1.0	24.0	3.0	0.0	Horz	AV	0.0	42.4	54.0	-11.6	Low Ch, EUT Vert, Chain B, 6 Mbps
14471.930	31.7	10.6	1.0	126.0	3.0	0.0	Horz	AV	0.0	42.3	54.0	-11.7	Low Ch, EUT Vert, Chain BC, MCS15
14473.420	31.7	10.6	1.2	140.0	3.0	0.0	Horz	AV	0.0	42.3	54.0	-11.7	Low Ch, EUT Vert, Chain B, 54 Mbps
4924.065	34.1	8.1	2.2	98.0	3.0	0.0	Horz	AV	0.0	42.2	54.0	-11.8	High Ch, EUT Vert, Chain B, 1 Mbps
4823.985	34.1	7.9	1.2	332.0	3.0	0.0	Vert	AV	0.0	42.0	54.0	-12.0	Low Ch, EUT On Side, Chain B, 1 Mbps
4824.030	34.0	7.9	1.0	68.0	3.0	0.0	Horz	AV	0.0	41.9	54.0	-12.1	Low Ch, EUT Vert, Chain B, 1 Mbps
4873.950	33.7	8.0	1.8	345.0	3.0	0.0	Vert	AV	0.0	41.7	54.0	-12.3	Mid Ch, EUT On Side, Chain B, 1 Mbps

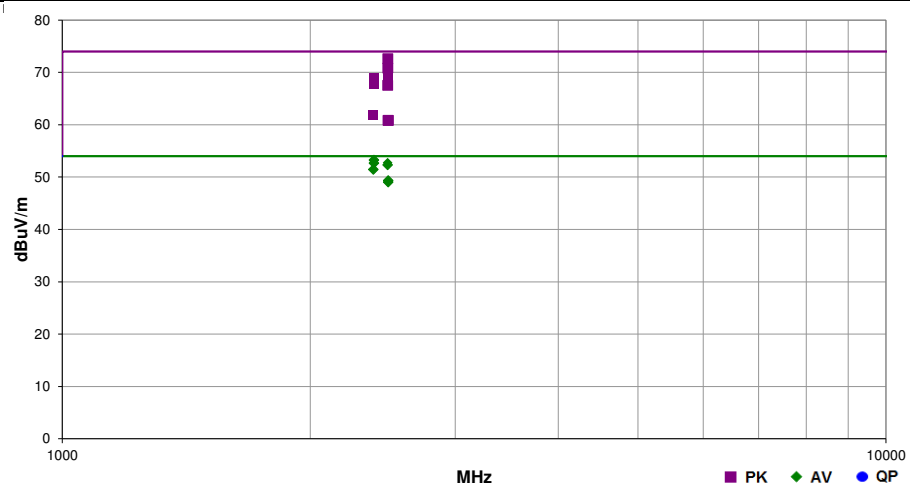
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12061.260	38.7	-1.2	1.0	337.0	3.0	0.0	Horz	AV	0.0	37.5	54.0	-16.5	Low Ch, EUT Vert, Chain B, 1 Mbps
7309.985	44.1	13.4	1.2	319.0	3.0	0.0	Vert	PK	0.0	57.5	74.0	-16.5	Mid Ch, EUT On Side, Chain B, 1 Mbps
12186.120	38.2	-0.8	1.3	328.9	3.0	0.0	Vert	AV	0.0	37.4	54.0	-16.6	Mid Ch, EUT On Side, Chain B, 1 Mbps
12186.410	38.1	-0.8	1.0	63.0	3.0	0.0	Horz	AV	0.0	37.3	54.0	-16.7	Mid Ch, EUT Vert, Chain B, 1 Mbps
12308.910	37.9	-0.6	1.0	63.9	3.0	0.0	Horz	AV	0.0	37.3	54.0	-16.7	High Ch, EUT Vert, Chain B, 1 Mbps
12310.900	37.3	-0.6	3.2	321.0	3.0	0.0	Vert	AV	0.0	36.7	54.0	-17.3	High Ch, EUT On Side, Chain B, 1 Mbps
7311.395	43.2	13.4	2.8	7.0	3.0	0.0	Horz	PK	0.0	56.6	74.0	-17.4	Mid Ch, EUT Vert, Chain B, 1 Mbps
14471.740	45.9	10.6	1.0	332.0	3.0	0.0	Vert	PK	0.0	56.5	74.0	-17.5	Low Ch, EUT Horz, Chain B, 1 Mbps
7384.605	43.1	13.4	3.2	349.0	3.0	0.0	Vert	PK	0.0	56.5	74.0	-17.5	High Ch, EUT On Side, Chain B, 1 Mbps
14471.890	45.7	10.6	1.2	339.9	3.0	0.0	Horz	PK	0.0	56.3	74.0	-17.7	Low Ch, EUT Vert, Chain B, 1 Mbps
14471.840	45.3	10.6	2.4	334.9	3.0	0.0	Vert	PK	0.0	55.9	74.0	-18.1	Low Ch, EUT On Side, Chain B, 1 Mbps
14471.070	45.1	10.7	1.0	316.9	3.0	0.0	Horz	PK	0.0	55.8	74.0	-18.2	Low Ch, EUT Vert, Chain A, MCS7
7387.415	42.3	13.4	1.0	2.0	3.0	0.0	Horz	PK	0.0	55.7	74.0	-18.3	High Ch, EUT Vert, Chain B, 1 Mbps
14471.980	45.0	10.6	1.0	27.0	3.0	0.0	Vert	PK	0.0	55.6	74.0	-18.4	Low Ch, EUT Vert, Chain B, 1 Mbps
14471.980	44.7	10.6	1.0	19.0	3.0	0.0	Horz	PK	0.0	55.3	74.0	-18.7	Low Ch, EUT Horz, Chain B, 1 Mbps
14472.060	44.5	10.6	1.0	12.0	3.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	Low Ch, EUT On Side, Chain B, 1 Mbps
14470.510	44.3	10.7	1.0	328.9	3.0	0.0	Horz	PK	0.0	55.0	74.0	-19.0	Low Ch, EUT Vert, Chain B, MCS0
14472.100	44.2	10.6	1.0	294.0	3.0	0.0	Horz	PK	0.0	54.8	74.0	-19.2	Low Ch, EUT Vert, Chain ABC, MCS23
14472.190	44.1	10.6	1.0	39.0	3.0	0.0	Horz	PK	0.0	54.7	74.0	-19.3	Low Ch, EUT Vert, Chain B, 11 Mbps
12061.010	35.8	-1.2	1.0	81.0	3.0	0.0	Vert	AV	0.0	34.6	54.0	-19.4	Low Ch, EUT On Side, Chain B, 1 Mbps
14471.920	43.9	10.6	1.0	360.0	3.0	0.0	Horz	PK	0.0	54.5	74.0	-19.5	Low Ch, EUT Vert, Chain C, MCS7
14472.820	43.9	10.6	1.2	140.0	3.0	0.0	Horz	PK	0.0	54.5	74.0	-19.5	Low Ch, EUT Vert, Chain B, 54 Mbps
14471.250	43.8	10.7	1.0	330.0	3.0	0.0	Horz	PK	0.0	54.5	74.0	-19.5	Low Ch, EUT Vert, Chain AC, MCS15
14471.190	43.3	10.7	1.0	351.0	3.0	0.0	Horz	PK	0.0	54.0	74.0	-20.0	Low Ch, EUT Vert, Chain B, 36 Mbps
14472.520	43.3	10.6	1.0	218.0	3.0	0.0	Horz	PK	0.0	53.9	74.0	-20.1	Low Ch, EUT Vert, Chain AB, MCS15
14472.680	43.3	10.6	1.0	24.0	3.0	0.0	Horz	PK	0.0	53.9	74.0	-20.1	Low Ch, EUT Vert, Chain B, 6 Mbps
14472.000	43.2	10.6	1.0	182.0	3.0	0.0	Horz	PK	0.0	53.8	74.0	-20.2	Low Ch, EUT Vert, Chain B, MCS7
14472.710	43.0	10.6	1.0	126.0	3.0	0.0	Horz	PK	0.0	53.6	74.0	-20.4	Low Ch, EUT Vert, Chain BC, MCS15
4924.200	45.4	8.1	2.7	346.9	3.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	High Ch, EUT On Side, Chain B, 1 Mbps
4874.110	43.7	8.0	3.9	27.9	3.0	0.0	Horz	PK	0.0	51.7	74.0	-22.3	Mid Ch, EUT Vert, Chain B, 1 Mbps
4923.475	43.1	8.1	2.2	98.0	3.0	0.0	Horz	PK	0.0	51.2	74.0	-22.8	High Ch, EUT Vert, Chain B, 1 Mbps
4823.680	43.3	7.9	1.2	332.0	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	Low Ch, EUT On Side,Chain B, 1 Mbps
4823.945	43.1	7.9	1.0	68.0	3.0	0.0	Horz	PK	0.0	51.0	74.0	-23.0	Low Ch, EUT Vert, Chain B, 1 Mbps
4873.740	42.8	8.0	1.8	345.0	3.0	0.0	Vert	PK	0.0	50.8	74.0	-23.2	Mid Ch, EUT On Side, Chain B, 1 Mbps
12185.900	46.7	-0.8	1.3	328.9	3.0	0.0	Vert	PK	0.0	45.9	74.0	-28.1	Mid Ch, EUT On Side, Chain B, 1 Mbps
12061.480	46.9	-1.2	1.0	337.0	3.0	0.0	Horz	PK	0.0	45.7	74.0	-28.3	Low Ch, EUT Vert, Chain B, 1 Mbps
12186.180	46.5	-0.8	1.0	63.0	3.0	0.0	Horz	PK	0.0	45.7	74.0	-28.3	Mid Ch, EUT Vert, Chain B, 1 Mbps
12309.950	45.9	-0.6	1.0	63.9	3.0	0.0	Horz	PK	0.0	45.3	74.0	-28.7	High Ch, EUT Vert, Chain B, 1 Mbps
12308.630	45.8	-0.6	3.2	321.0	3.0	0.0	Vert	PK	0.0	45.2	74.0	-28.8	High Ch, EUT On Side, Chain B, 1 Mbps
12058.680	45.6	-1.2	1.0	81.0	3.0	0.0	Vert	PK	0.0	44.4	74.0	-29.6	Low Ch, EUT On Side, Chain B, 1 Mbps

SPURIOUS RADIATED EMISSIONS

Work Order:	VDEI0009	**Date:**	09/14/15		
Project:	None	**Temperature:**	24.2 °C		
Job Site:	TX02	**Humidity:**	44.6% RH		
Serial Number:	70AF02717-B385	**Barometric Pres.:**	1017 mbar	**Tested by:**	Jonathan Kiefer
EUT:	Firebox T50-W (BS5AE7W)				
Configuration:	3				
Customer:	WatchGuard Technologies, Inc.				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Continuously Transmitting at Low, High Ch @ 2412, 2462 MHz.				
Deviations:	None				
Comments:	PK and AVG(RMS) data. Band Edge.				

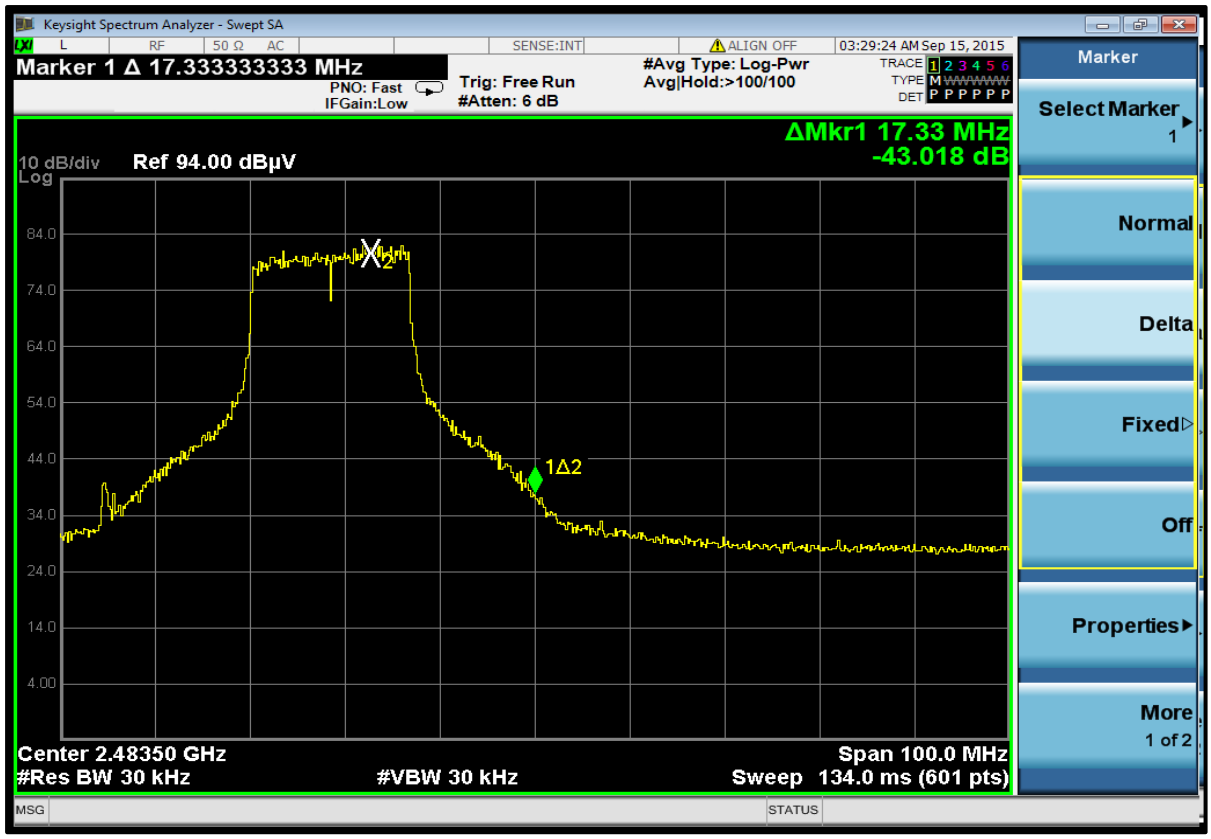
Test Specifications	**Test Method**
FCC 15.247:2015	ANSI C63.10:2013

Run #	121	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass

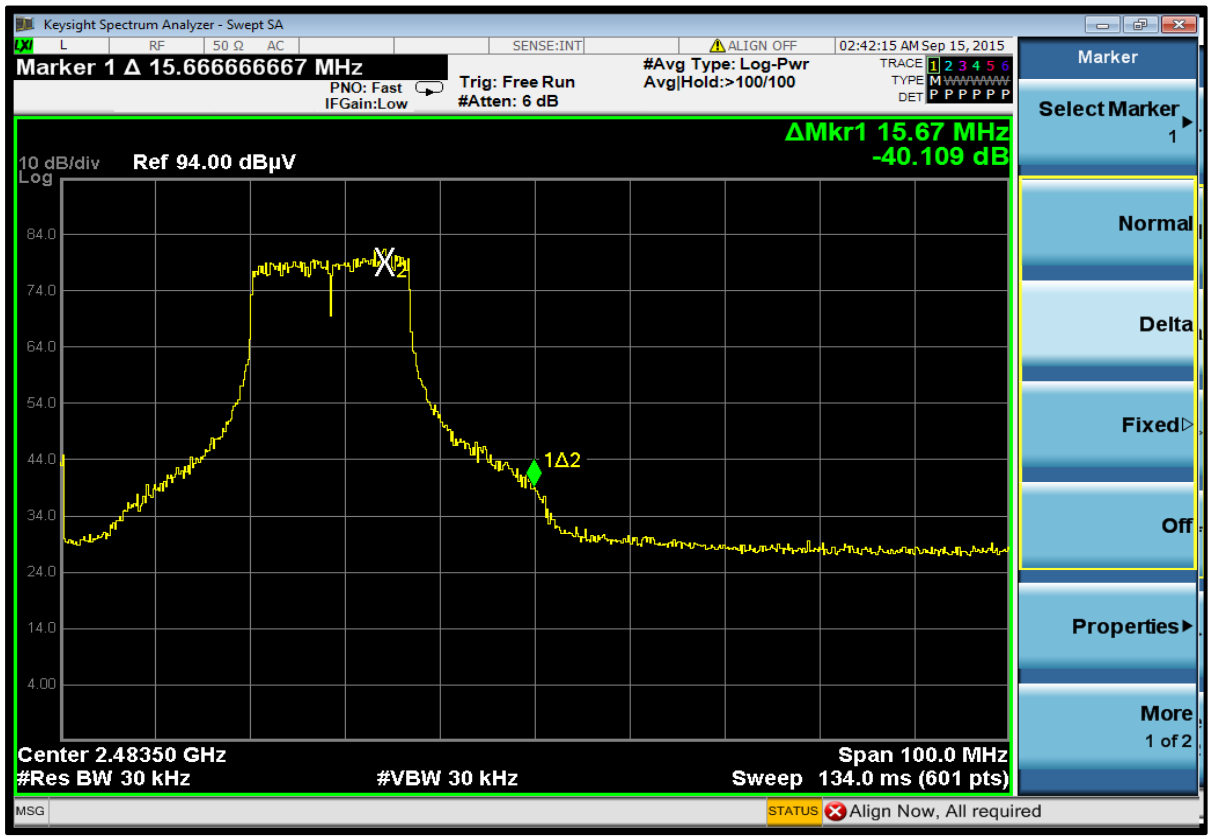


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2467.170	82.0	-9.8	2.5	103.0	3.0	20.0	Horz	AV	0.0	92.2			Fundamental, High Ch, EUT Vert, Chain B, MCS7
													High Ch EUT Vert, Marker Delta Method: Peak 92.2 + -
2483.500				103.0	3.0	20.0	Horz	AV	0.0	50.3	54.0	-3.7	41.899 dBc = 50.301
2455.500	96.3	-4.7	2.5	103.0	3.0	20.0	Horz	PK	0.0	111.7			Fundamental, High Ch, EUT Vert, Chain B, MCS7
													High Ch EUT Vert, Marker Delta Method: Peak 110.649 + -
2483.500				103.0	3.0	20.0	Horz	PK	0.0	73.2	74.0	-0.8	37.451 dBc = 73.198
2458.670	96.1	-4.7	2.7	90.0	3.0	20.0	Horz	PK	0.0	111.4			Fundamental, High Ch, EUT Vert, Chain B, 54 Mbps
													High Ch EUT Vert, Marker Delta Method: Peak 111.4 + -
2483.500				90.0	3.0	20.0	Horz	PK	0.0	73.8	74.0	-0.2	37.617 dBc = 73.783
2467.830	78.0	-4.7	2.7	90.0	3.0	20.0	Horz	AV	0.0	93.3			Fundamental, High Ch, EUT Vert, Chain B, 54 Mbps
													High Ch EUT Vert, Marker Delta Method: Peak 93.3 + -
2483.500				90.0	3.0	20.0	Horz	AV	0.0	53.2	54.0	-0.8	40.109 dBc = 53.191
2467.000	81.0	-4.7	3.8	319.0	3.0	20.0	Horz	AV	0.0	96.3			Fundamental, High Ch, EUT Vert, Chain C, 36 Mbps
													High Ch EUT Vert, Marker Delta Method: Peak 96.3 + -
2483.500				319.0	3.0	20.0	Horz	AV	0.0	52.2	54.0	-1.8	44.087 dBc = 52.213
2460.330	75.0	-4.7	2.0	300.0	3.0	20.0	Horz	AV	0.0	90.3			Fundamental, High Ch, EUT Vert, Chain B, MCS0
													High Ch EUT Vert, Marker Delta Method: Peak 90.3 + -
2483.500				300.0	3.0	20.0	Horz	AV	0.0	50.7	54.0	-3.3	39.603 dBc = 50.697
2467.170	77.0	-4.7	1.0	0.0	3.0	20.0	Vert	AV	0.0	92.3			Fundamental, High Ch, EUT On Side, Chain B, 6 Mbps
													High Ch EUT On Side, Marker Delta Method: Peak 92.3 + -
2483.500				0.0	3.0	20.0	Vert	AV	0.0	50.0	54.0	-4.0	42.262 dBc = 50.038
2464.670	75.0	-4.7	1.0	8.0	3.0	20.0	Vert	AV	0.0	90.3			Fundamental, High Ch, EUT Vert, Chain B, 6 Mbps
													High Ch EUT Vert, Marker Delta Method: Peak 90.3 + -
2483.500				8.0	3.0	20.0	Vert	AV	0.0	47.1	54.0	-6.9	43.196 dBc = 47.104
2463.330	77.0	-4.7	1.0	156.0	3.0	20.0	Horz	AV	0.0	92.3			Fundamental, High Ch, EUT On Side, Chain B, 6 Mbps
													High Ch EUT On Side, Marker Delta Method: Peak 92.3 + -
2483.500				156.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	43.508 dBc = 48.792
2466.170	81.0	-4.7	1.0	214.9	3.0	20.0	Horz	AV	0.0	96.3			Fundamental, High Ch, EUT Vert, Chain A, 36 Mbps
													High Ch EUT Vert, Marker Delta Method: Peak 96.3 + -
2483.500				214.9	3.0	20.0	Horz	AV	0.0	53.3	54.0	-0.7	43.018 dBc = 53.282
2389.960	38.0	-4.8	1.6	223.0	3.0	20.0	Horz	AV	0.0	53.2	54.0	-0.8	Low Ch, EUT Vert, Chain B, 36 Mbps
2483.507	37.4	-4.7	1.0	291.9	3.0	20.0	Horz	AV	0.0	52.7	54.0	-1.3	High Ch, EUT Vert, Chain B, 36 Mbps
2389.980	37.4	-4.8	1.0	225.0	3.0	20.0	Horz	AV	0.0	52.6	54.0	-1.4	Low Ch, EUT Vert, Chain B, 6 Mbps
2483.693	57.3	-4.7	1.0	0.0	3.0	20.0	Vert	PK	0.0	72.6	74.0	-1.4	High Ch, EUT On Side, Chain B, 6 Mbps
2483.553	37.0	-4.7	1.0	14.0	3.0	20.0	Horz	AV	0.0	52.3	54.0	-1.7	High Ch, EUT Vert, Chain B, 6 Mbps
2483.587	56.5	-4.7	3.8	319.0	3.0	20.0	Horz	PK	0.0	71.8	74.0	-2.2	High Ch, EUT Vert, Chain C, 36 Mbps
2483.527	56.5	-4.7	1.0	8.0	3.0	20.0	Vert	PK	0.0	71.8	74.0	-2.2	High Ch, EUT Vert, Chain B, 6 Mbps
2386.173	36.2	-4.8	2.3	99.0	3.0	20.0	Horz	AV	0.0	51.4	54.0	-2.6	Low Ch, EUT Vert, Chain B, 1 Mbps
2483.787	56.0	-4.7	1.0	156.0	3.0	20.0	Horz	PK	0.0	71.3	74.0	-2.7	High Ch, EUT On Side, Chain B, 6 Mbps
2483.653	55.5	-4.7	2.0	300.0	3.0	20.0	Horz	PK	0.0	70.8	74.0	-3.2	High Ch, EUT Vert, Chain B, MCS0
2483.600	54.4	-4.7	1.0	214.9	3.0	20.0	Horz	PK	0.0	69.7	74.0	-4.3	High Ch, EUT Vert, Chain A, 36 Mbps
2487.240	34.0	-4.7	1.5	304.9	3.0	20.0	Horz	AV	0.0	49.3	54.0	-4.7	High Ch, EUT Vert, Chain B, 1 Mbps
2487.393	33.7	-4.7	1.0	50.0	3.0	20.0	Horz	AV	0.0	49.0	54.0	-5.0	High Ch, EUT Vert, Chain B, 11 Mbps
2483.567	53.7	-4.7	1.0	14.0	3.0	20.0	Horz	PK	0.0	69.0	74.0	-5.0	High Ch, EUT Vert, Chain B, 6 Mbps
2389.887	53.6	-4.8	1.6	223.0	3.0	20.0	Horz	PK	0.0	68.8	74.0	-5.2	Low Ch, EUT Vert, Chain B, 36 Mbps
2389.707	52.6	-4.8	1.0	225.0	3.0	20.0	Horz	PK	0.0	67.8	74.0	-6.2	Low Ch, EUT Vert, Chain B, 6 Mbps
2483.533	52.2	-4.7	1.0	291.9	3.0	20.0	Horz	PK	0.0	67.5	74.0	-6.5	High Ch, EUT Vert, Chain B, 36 Mbps
2386.287	46.7	-4.8	2.3	99.0	3.0	20.0	Horz	PK	0.0	61.9	74.0	-12.1	Low Ch, EUT Vert, Chain B, 1 Mbps
2487.407	45.5	-4.7	1.5	304.9	3.0	20.0	Horz	PK	0.0	60.8	74.0	-13.2	High Ch, EUT Vert, Chain B, 1 Mbps
2486.567	45.5	-4.7	1.0	50.0	3.0	20.0	Horz	PK	0.0	60.8	74.0	-13.2	High Ch, EUT Vert, Chain B, 11 Mbps

Ant Horz, EUT Vert, Chain A, 36 Mbps, Marker Delta Method

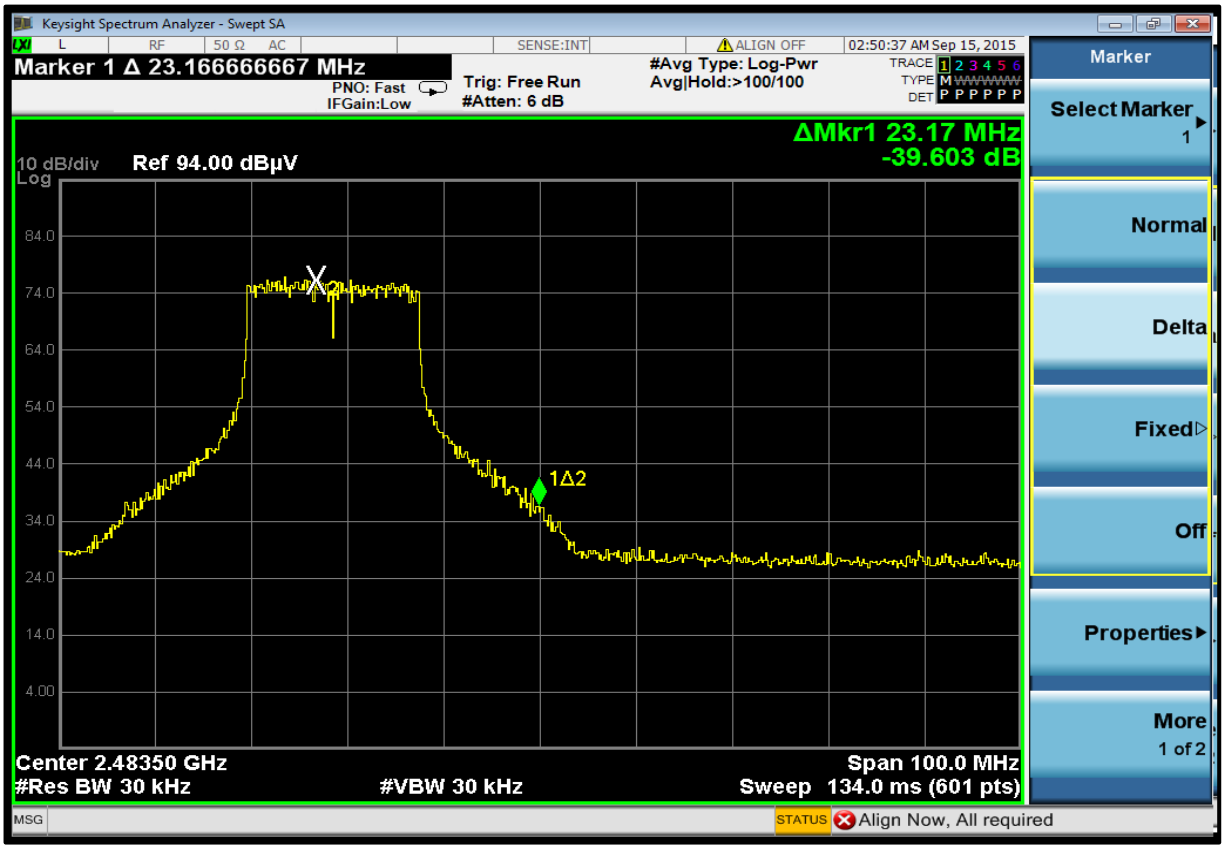


Ant Horz, EUT Vert, Chain B, 54 Mbps, Marker Delta Method

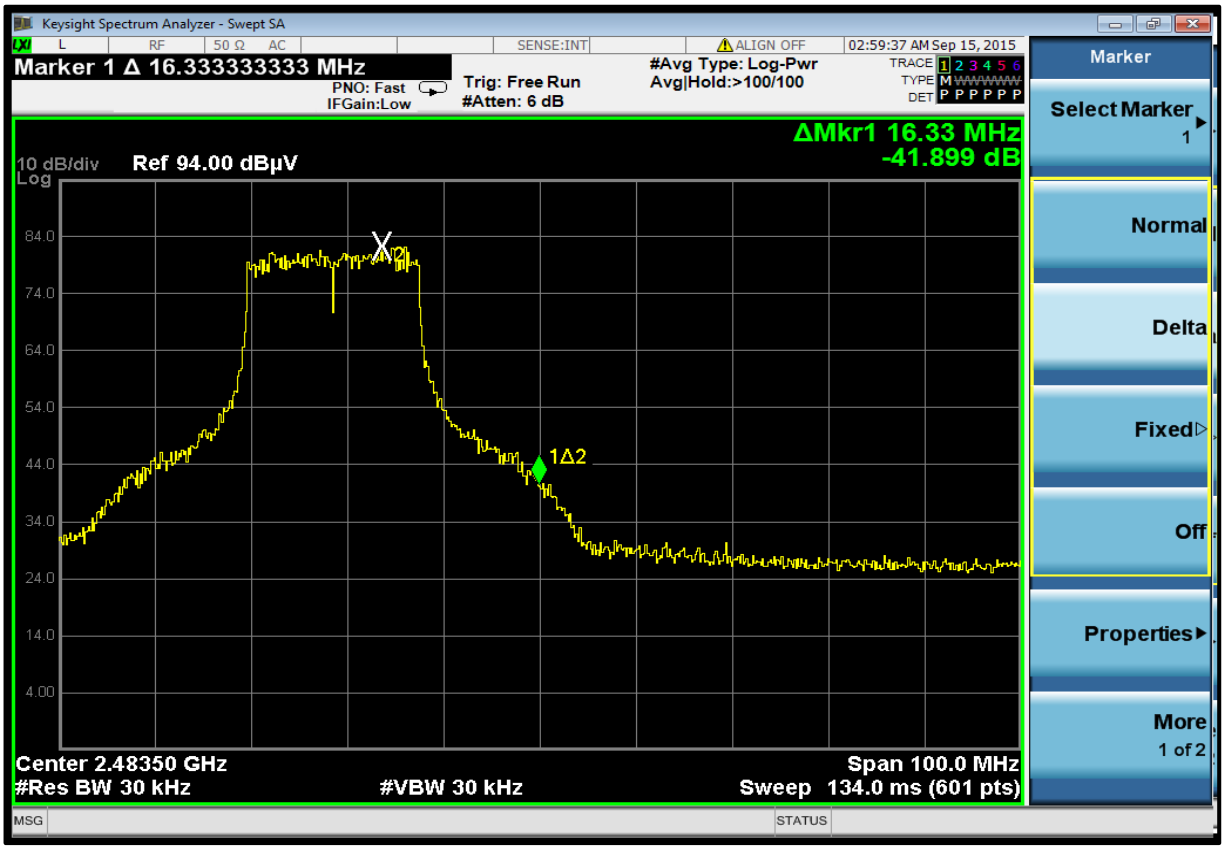


SPURIOUS RADIATED EMISSIONS

Ant Horz, EUT Vert, Chain B, MCS0, Marker Delta Method

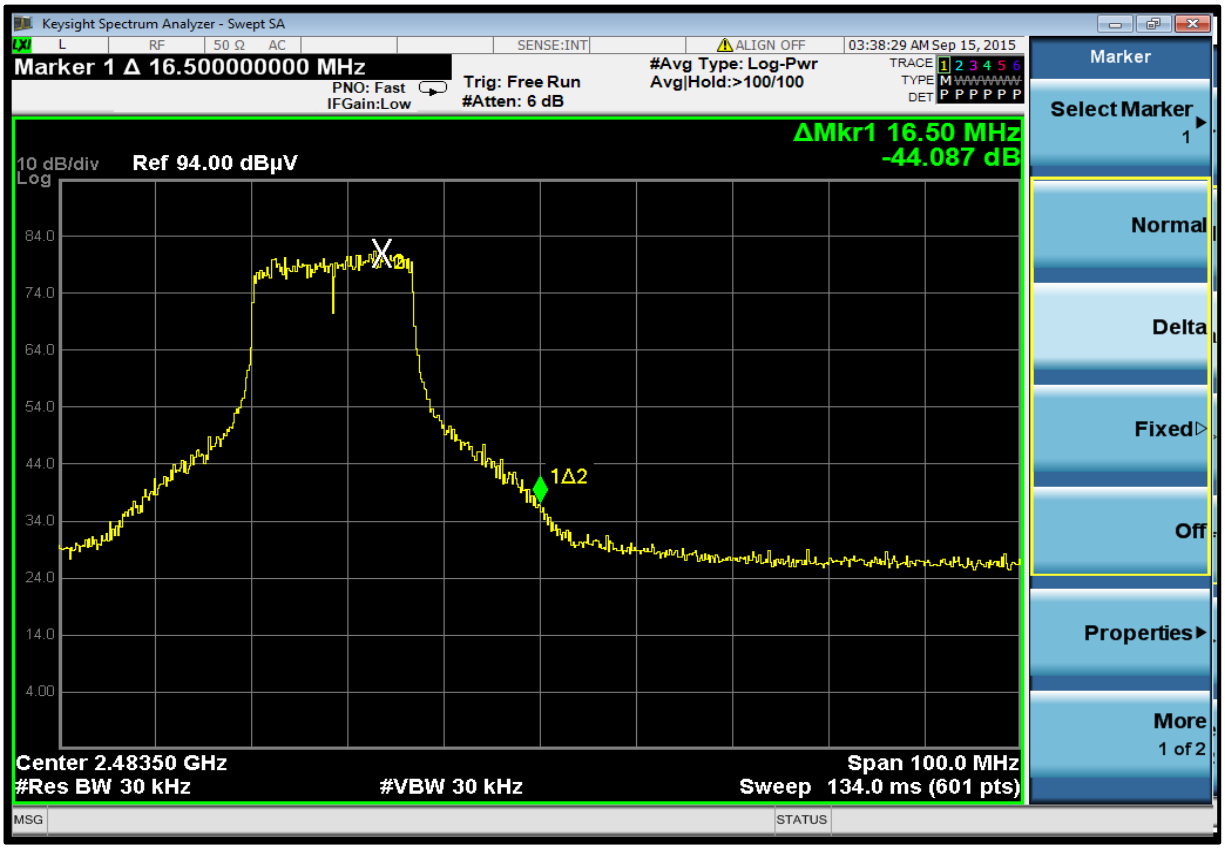


Ant Horz, EUT Vert, Chain B, MCS7, Marker Delta Method

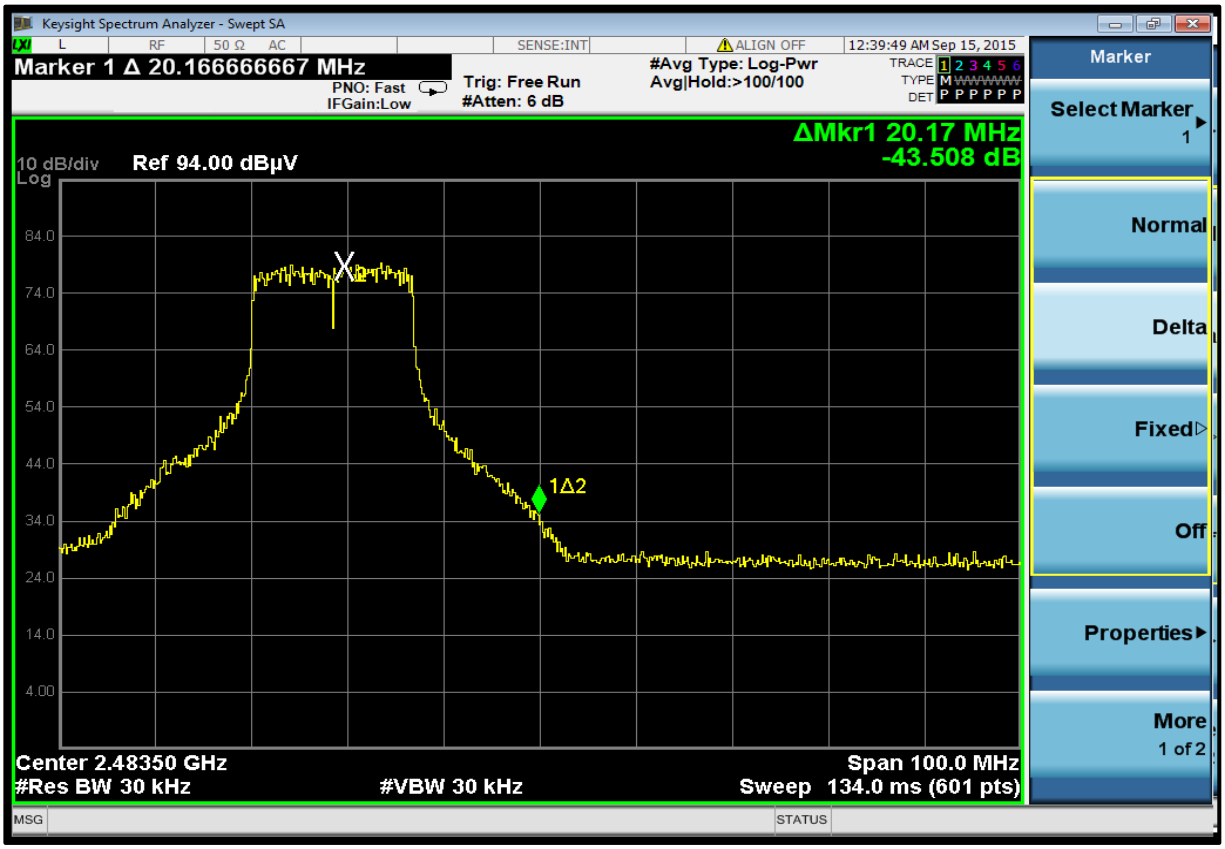


SPURIOUS RADIATED EMISSIONS

Ant Horz, EUT Vert, Chain C, 36 Mbps, Marker Delta Method

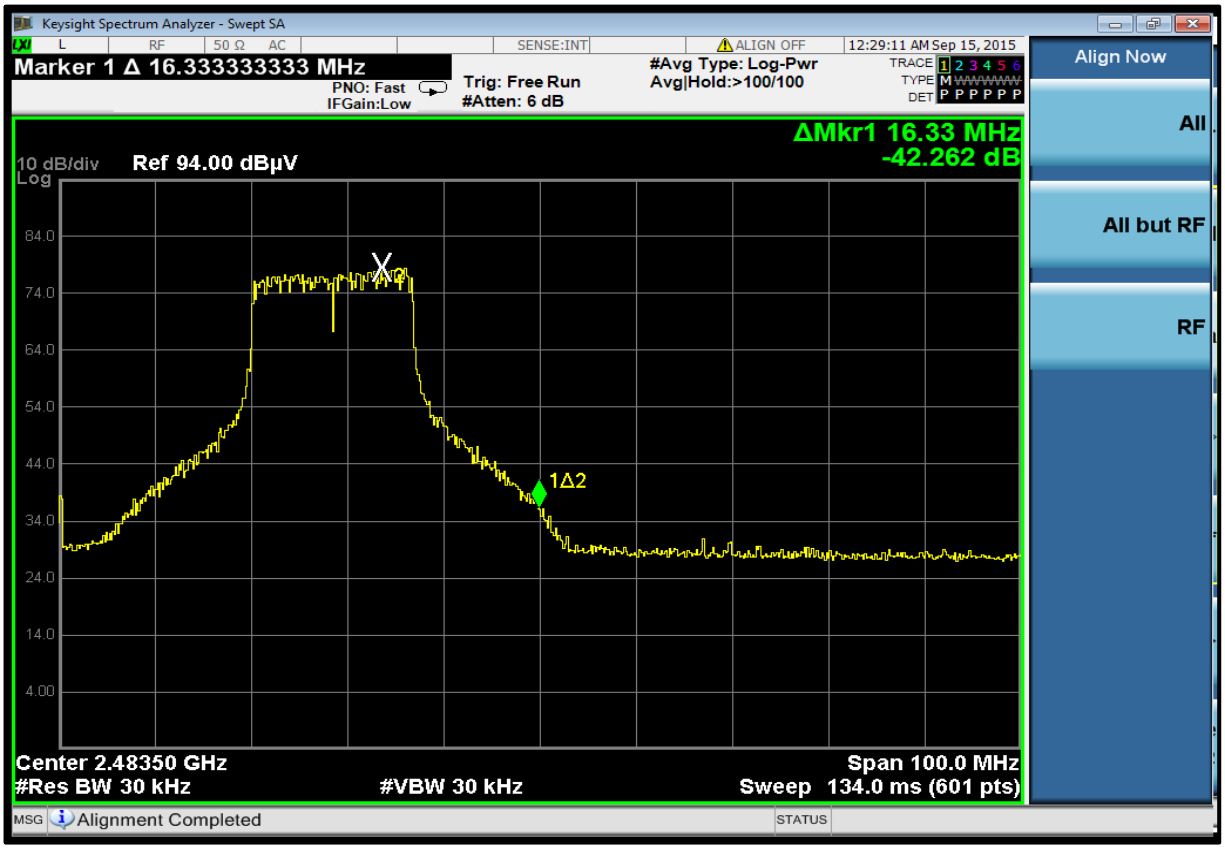


Ant Horz, EUT On Side, Chain B, 6 Mbps, Marker Delta Method

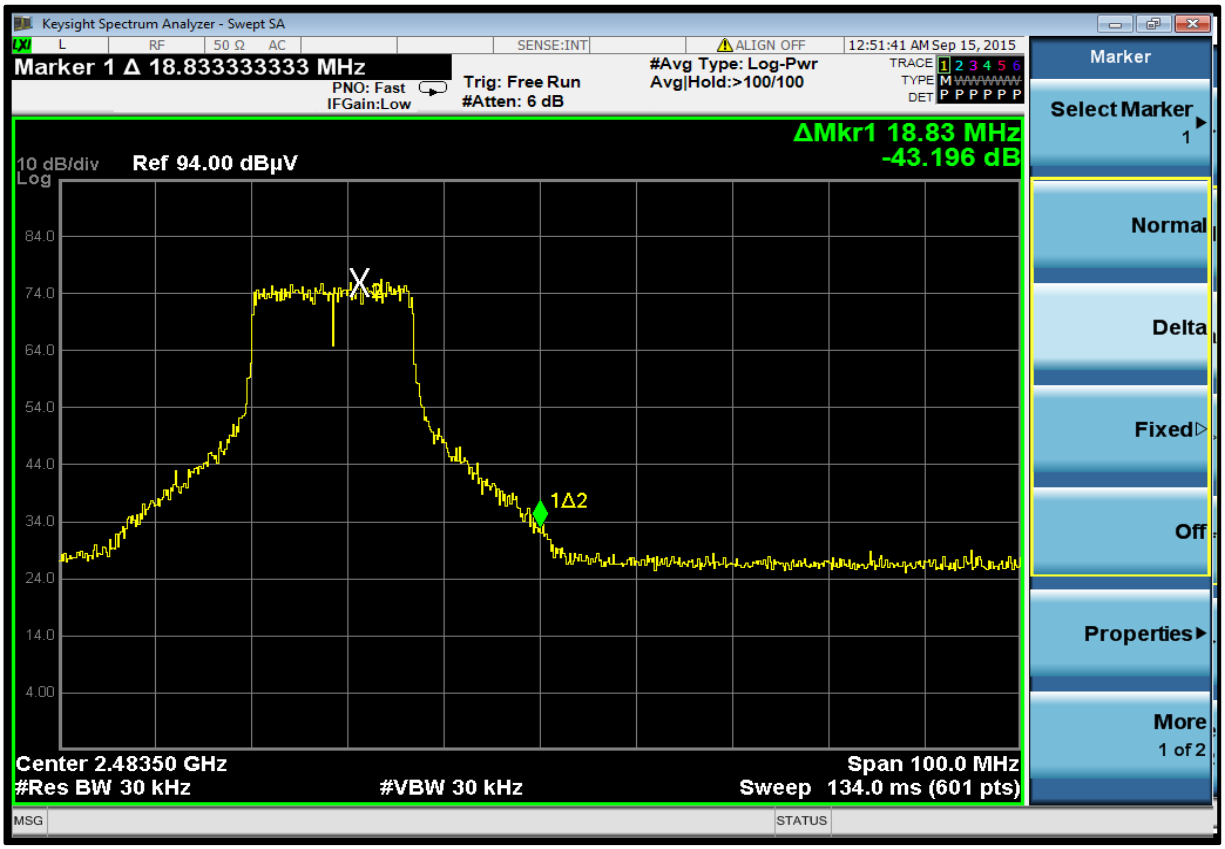


SPURIOUS RADIATED EMISSIONS

Ant Vert, EUT On Side, Chainn B, 6 Mbps, Marker Delta Method

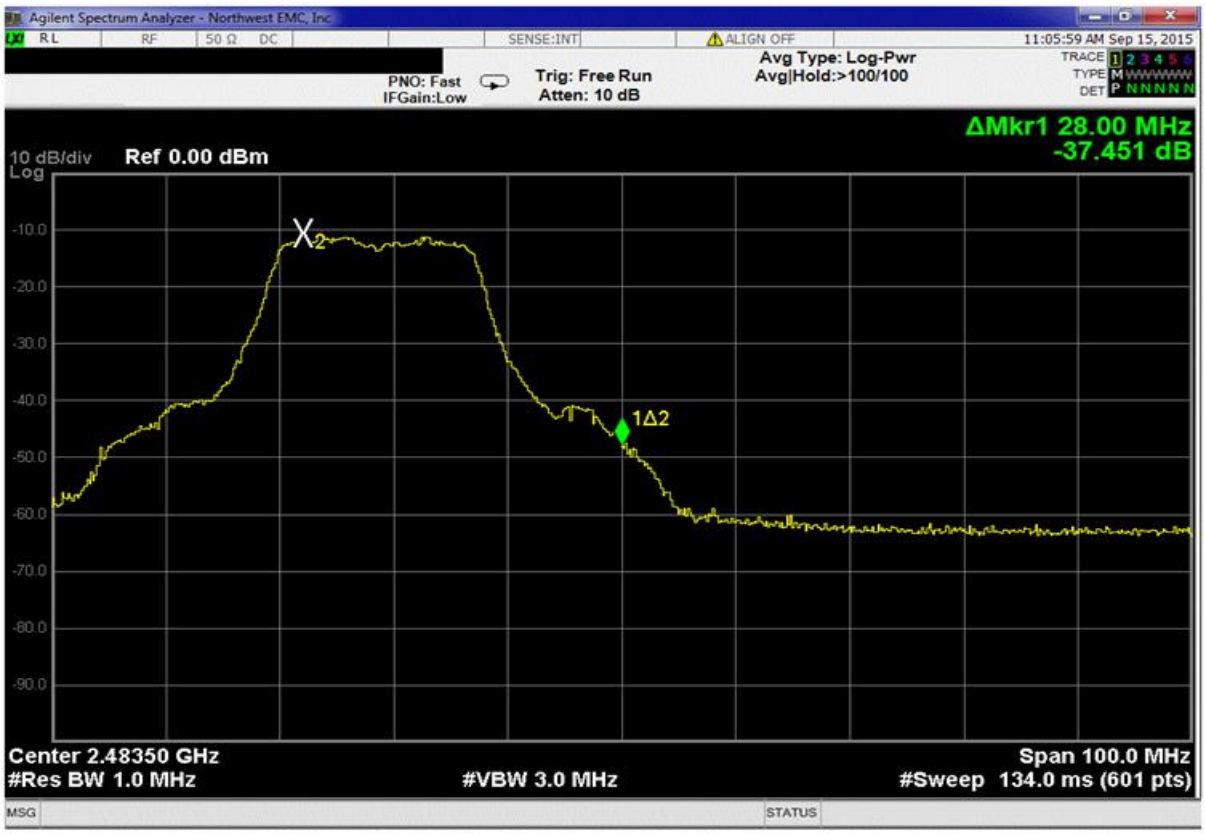


Ant Vert, EUT Vert, Chain B, 6 Mbps, Marker Delta Method

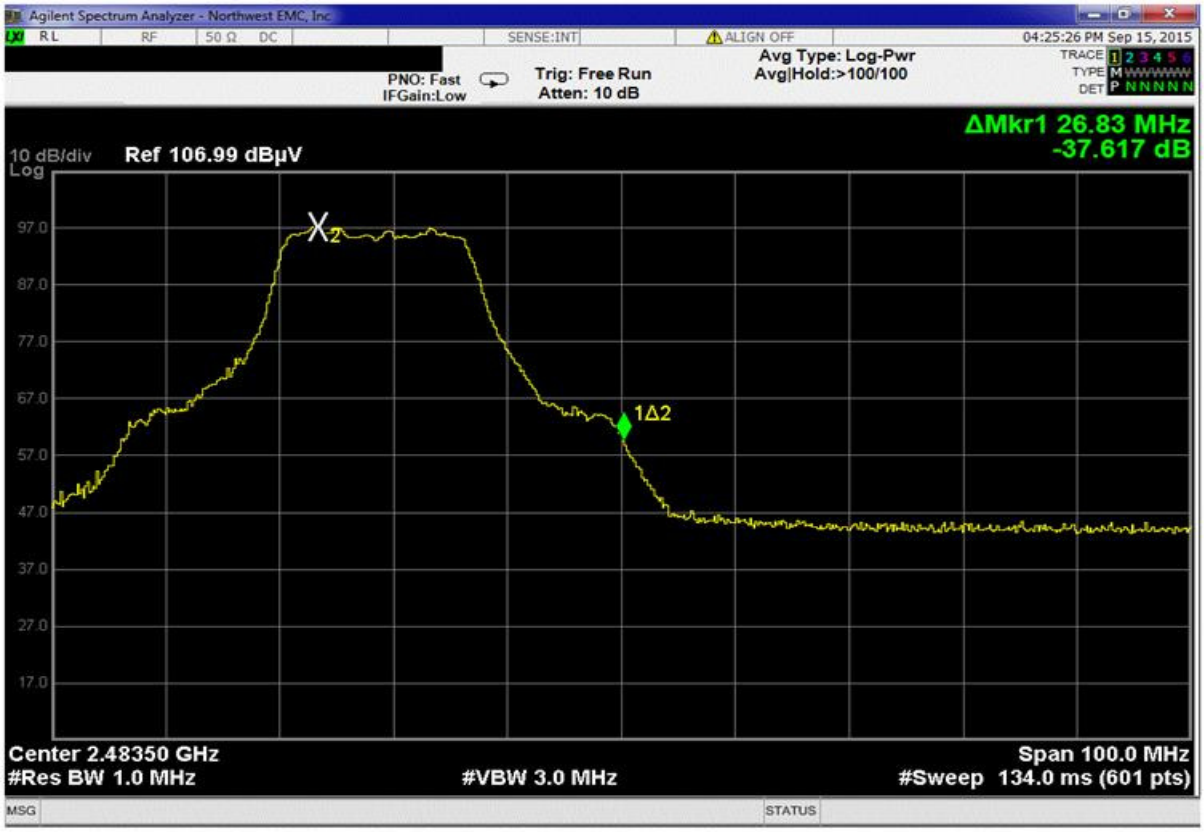


SPURIOUS RADIATED EMISSIONS

Ant Horz, EUT Vert, Chain B, MCS7, Marker Delta Method (Peak)



Ant Horz, EUT Vert, Chain B, 54 Mbps, Marker Delta Method (Peak)



BAND EDGE COMPLIANCE

NORTHWEST EMC

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mos)
Spectrum Analyzer	Agilent	N9010A	AFL	9/20/2014	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMM	2/27/2015	12
Attenuator, 20dB, 40 GHz	Fairview Microwave	SA4018-20	TQY	2/27/2015	12
Signal Generator, 40 GHz	Agilent	N5173B	TIW	7/15/2014	36

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

The spectrum was scanned below the lower band edge and above the higher band edge.

BAND EDGE COMPLIANCE

NORTHWEST EMC

XMit 2015.01.14

EUT:	Firebox T50-W (BS5AE7W)			**Work Order:**	VDEI0009
Serial Number:	70AF00069-3EB6			**Date:**	07/29/15
Customer:	WatchGuard Technologies, Inc.			**Temperature:**	24.9°C
Attendees:	None			**Humidity:**	47%
Project:	None			**Barometric Pres.:**	1014 mbar
Tested by:	Jonathan Kiefer	**Power:**	110VAC/60Hz	**Job Site:**	TX09

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2013

COMMENTS

2x2 MIMO mode, Chain AB (Chains 0 and 1). Tested the modulation that produced the highest conducted output power. Transmit power setting 17.0.

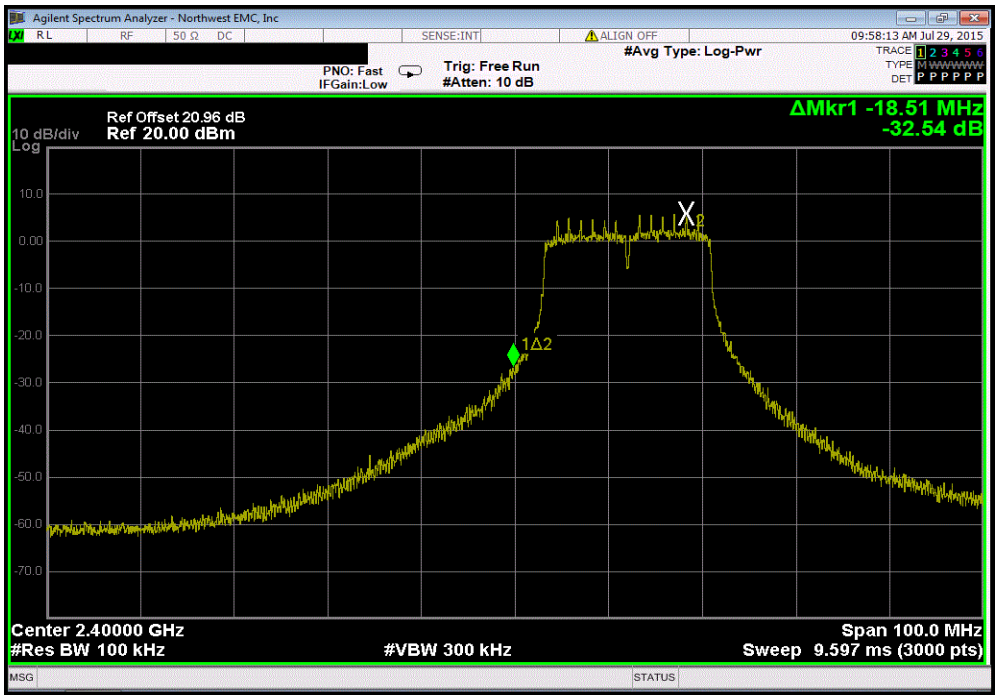
DEVIATIONS FROM TEST STANDARD

None

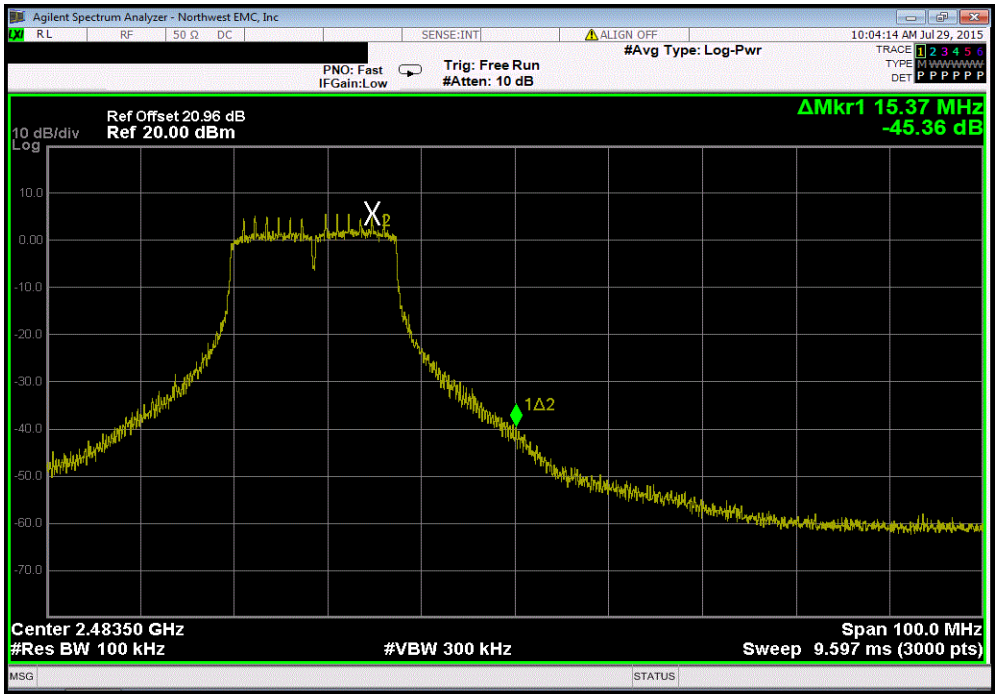
Configuration #	1	Signature Jonathan Kiefer

	Value (dBc)	Limit ≤ (dBc)	Result
Chain A			
20 MHz			
2400 MHz - 2483.5 MHz Band			
802.11(n) MCS8			
Low Channel 1, 2412 MHz	-32.54	-20	Pass
High Channel 11, 2462 MHz	-45.36	-20	Pass
Chain B			
20 MHz			
2400 MHz - 2483.5 MHz Band			
802.11(n) MCS8			
Low Channel 1, 2412 MHz	-33.33	-20	Pass
High Channel 11, 2462 MHz	-47.5	-20	Pass

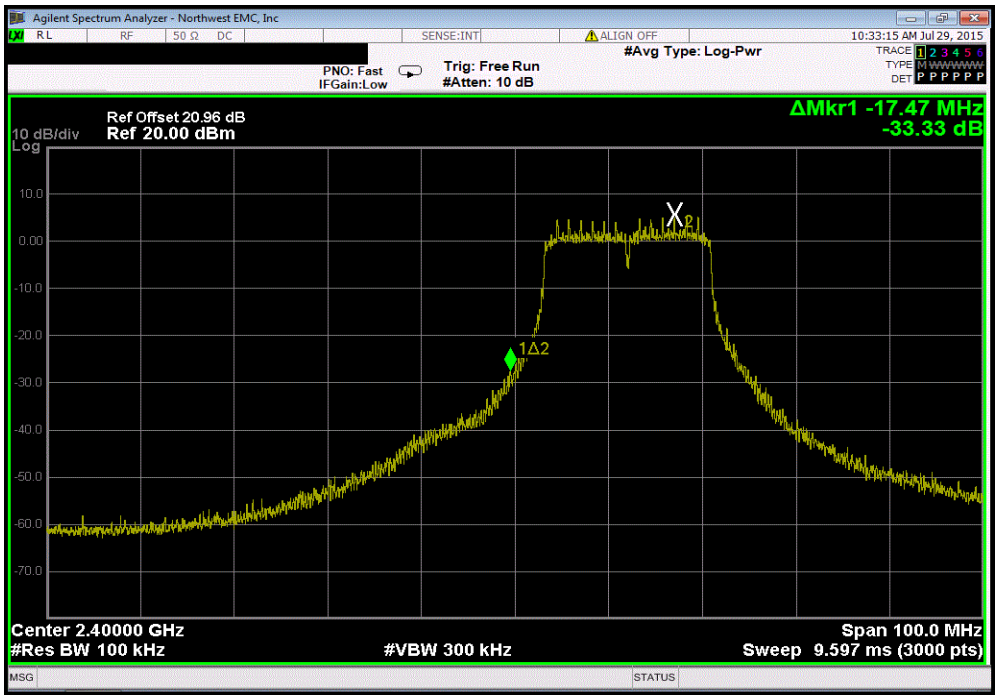
Chain A, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-32.54	-20	Pass



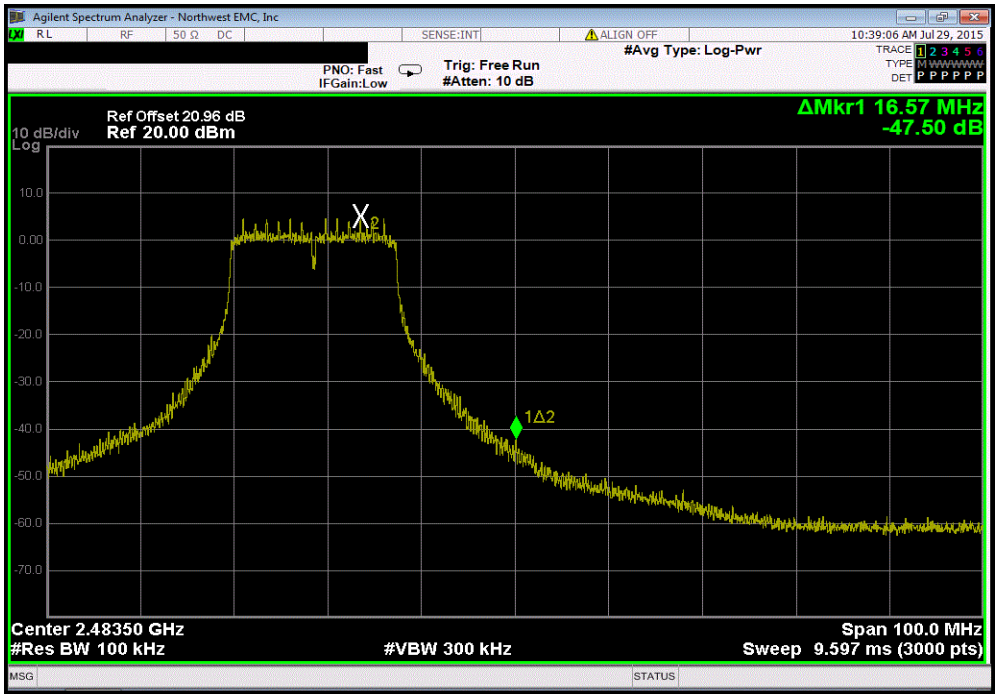
Chain A, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-45.36	-20	Pass



Chain B, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-33.33	-20	Pass



Chain B, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-47.5	-20	Pass



BAND EDGE COMPLIANCE

NORTHWEST EMC

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

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Description	Manufacturer	Model	ID	Last Cal.	Interval (mos)
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DC Block, 40 GHz	Fairview Microwave	SD3379	AMM	2/27/2015	12
Attenuator, 20dB, 40 GHz	Fairview Microwave	SA4018-20	TQY	2/27/2015	12
Signal Generator, 40 GHz	Agilent	N5173B	TIW	7/15/2014	36

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

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The spectrum was scanned below the lower band edge and above the higher band edge.

BAND EDGE COMPLIANCE

NORTHWEST EMC

XMit 2015.01.14

EUT:	Firebox T50-W (BS5AE7W)			**Work Order:**	VDEI0009
Serial Number:	70AF00069-3EB6			**Date:**	07/29/15
Customer:	WatchGuard Technologies, Inc.			**Temperature:**	24.9°C
Attendees:	None			**Humidity:**	47%
Project:	None			**Barometric Pres.:**	1014 mbar
Tested by:	Jonathan Kiefer	**Power:**	110VAC/60Hz	**Job Site:**	TX09

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2013

COMMENTS

2x2 MIMO mode, Chain AC (Chains 0 and 2). Tested the modulation that produced the highest conducted output power. Transmit power setting 17.0.

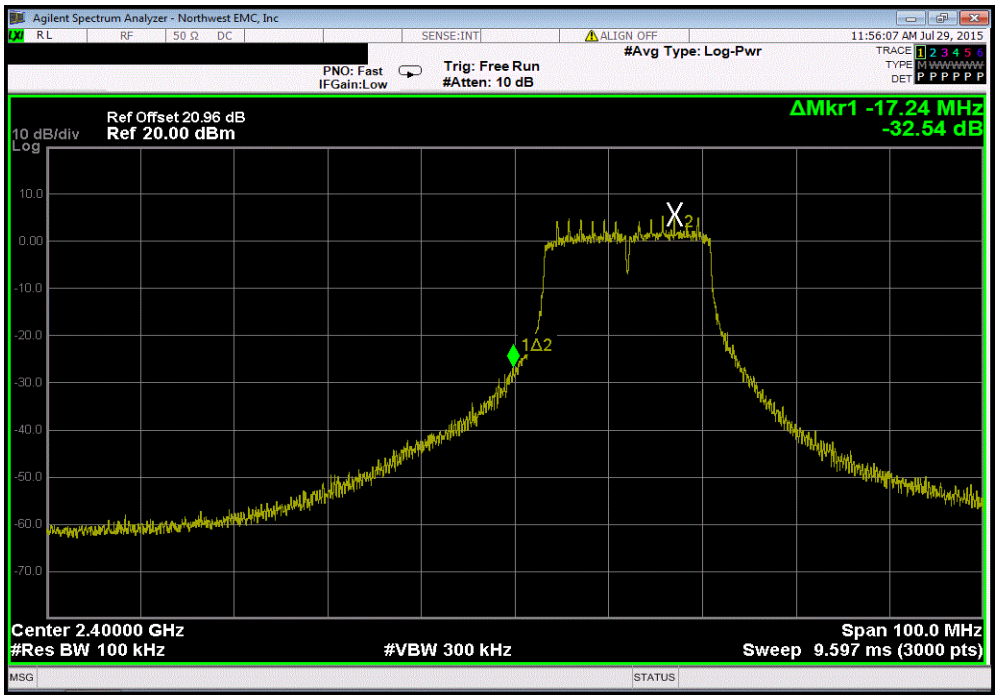
DEVIATIONS FROM TEST STANDARD

None

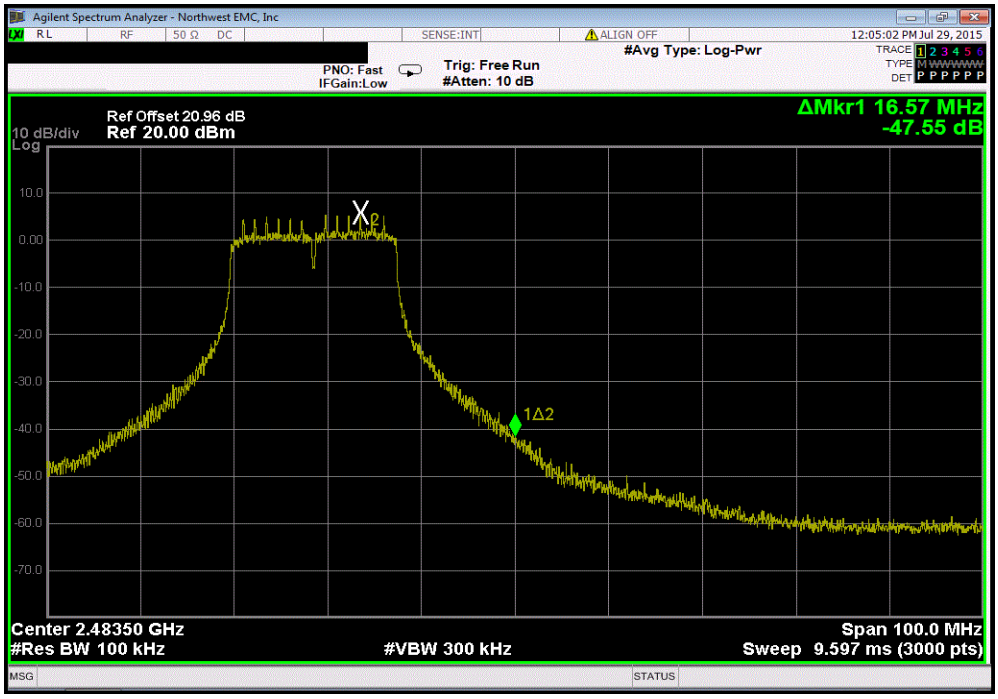
Configuration #	1	Signature Jonathan Kiefer

	Value (dBc)	Limit ≤ (dBc)	Result
Chain A			
20 MHz			
2400 MHz - 2483.5 MHz Band			
802.11(n) MCS8			
Low Channel 1, 2412 MHz	-32.54	-20	Pass
High Channel 11, 2462 MHz	-47.55	-20	Pass
Chain C			
20 MHz			
2400 MHz - 2483.5 MHz Band			
802.11(n) MCS8			
Low Channel 1, 2412 MHz	-30.24	-20	Pass
High Channel 11, 2462 MHz	-49.43	-20	Pass

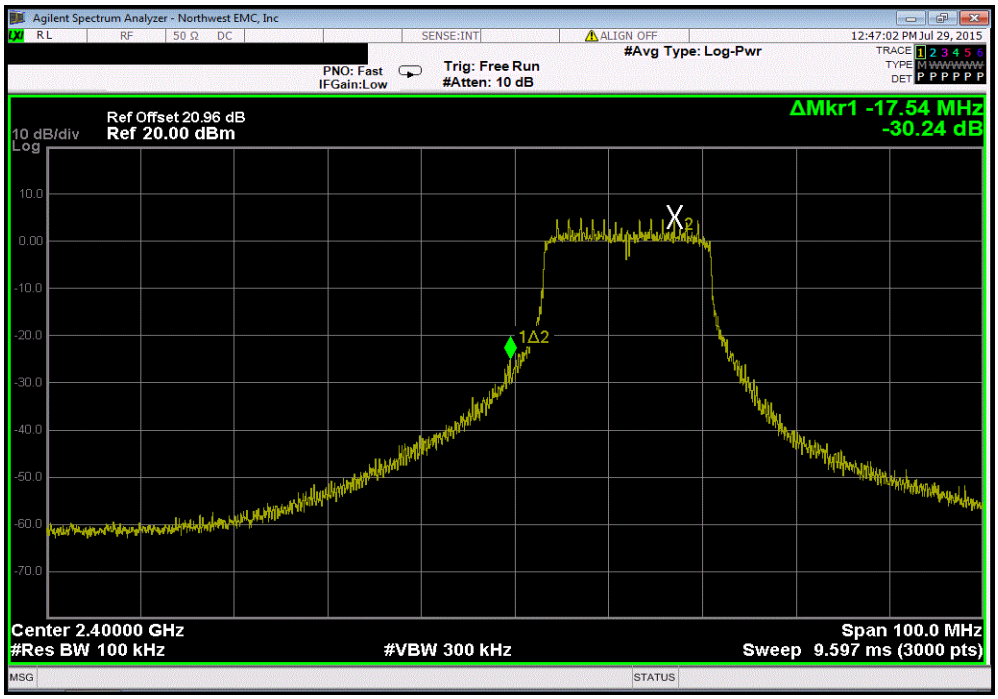
Chain A, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-32.54	-20	Pass



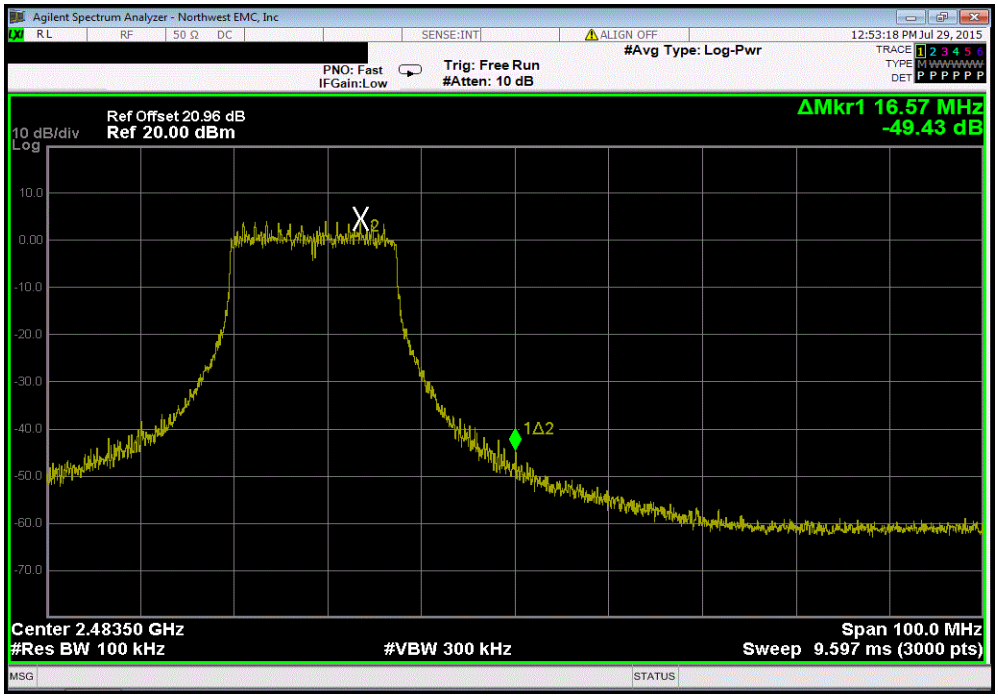
Chain A, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-47.55	-20	Pass



Chain C, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-30.24	-20	Pass



Chain C, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-49.43	-20	Pass



BAND EDGE COMPLIANCE

NORTHWEST EMC

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Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mos)
Spectrum Analyzer	Agilent	N9010A	AFL	9/20/2014	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMM	2/27/2015	12
Attenuator, 20dB, 40 GHz	Fairview Microwave	SA4018-20	TQY	2/27/2015	12
Signal Generator, 40 GHz	Agilent	N5173B	TIW	7/15/2014	36

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

The spectrum was scanned below the lower band edge and above the higher band edge.

BAND EDGE COMPLIANCE

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Customer:	WatchGuard Technologies, Inc.			**Temperature:**	24.9°C
Attendees:	None			**Humidity:**	47%
Project:	None			**Barometric Pres.:**	1014 mbar
Tested by:	Jonathan Kiefer	**Power:**	110VAC/60Hz	**Job Site:**	TX09

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2013

COMMENTS

2x2 MIMO mode, Chain BC (Chains 1 and 2). Tested the modulation that produced the highest conducted output power. Transmit power setting 17.0.

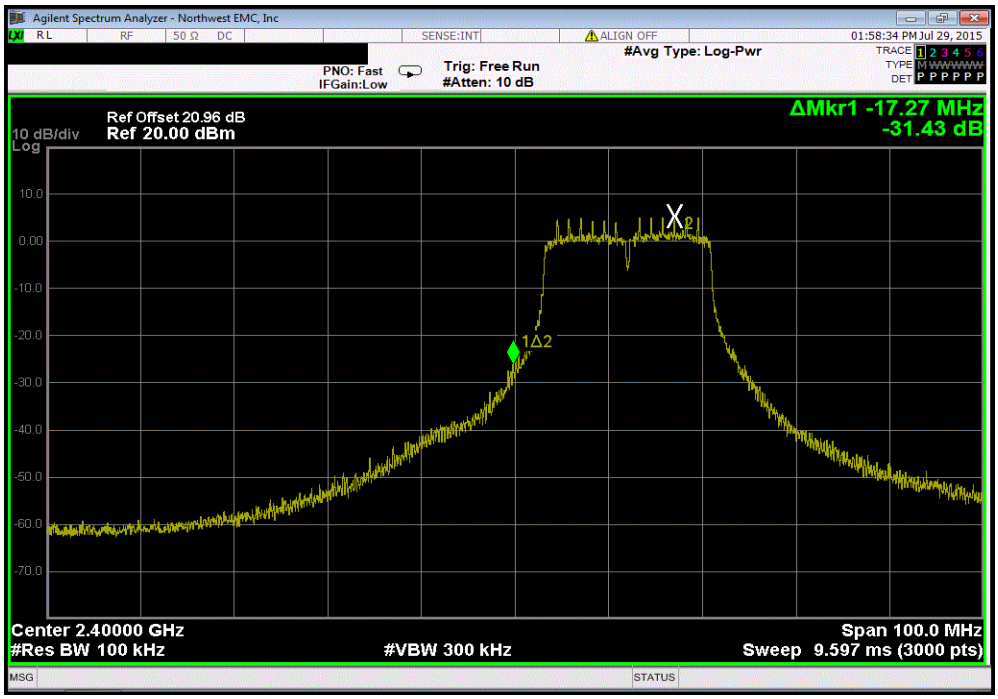
DEVIATIONS FROM TEST STANDARD

None

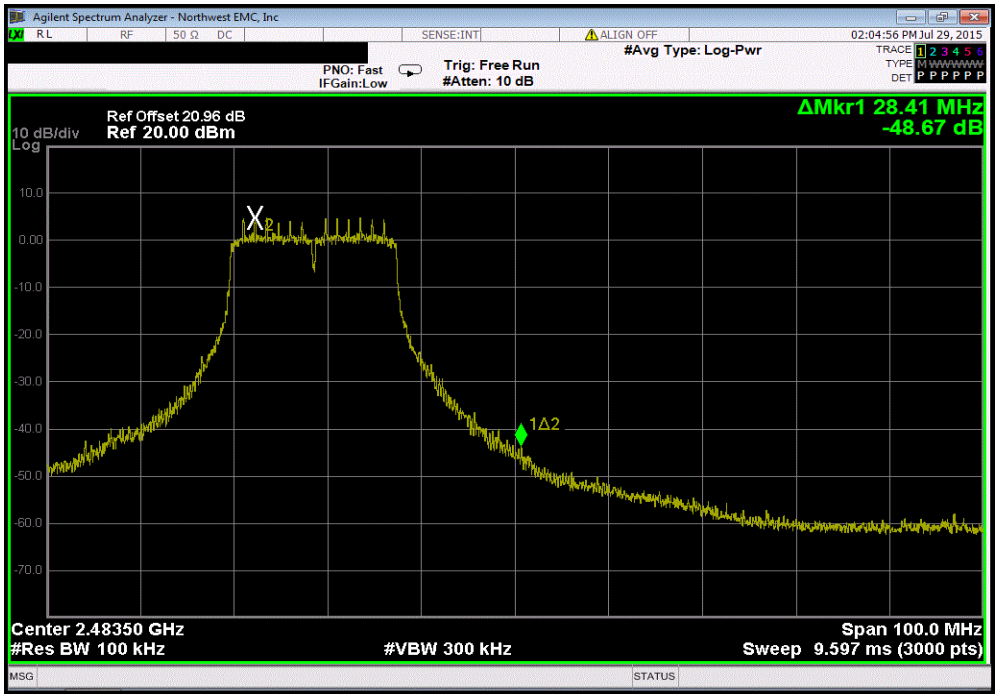
Configuration #	1	Signature Jonathan Kiefer

	Value (dBc)	Limit ≤ (dBc)	Result
Chain B			
20 MHz			
2400 MHz - 2483.5 MHz Band			
802.11(n) MCS8			
Low Channel 1, 2412 MHz	-31.44	-20	Pass
High Channel 11, 2462 MHz	-48.67	-20	Pass
Chain C			
20 MHz			
2400 MHz - 2483.5 MHz Band			
802.11(n) MCS8			
Low Channel 1, 2412 MHz	-31.56	-20	Pass
High Channel 11, 2462 MHz	-48.29	-20	Pass

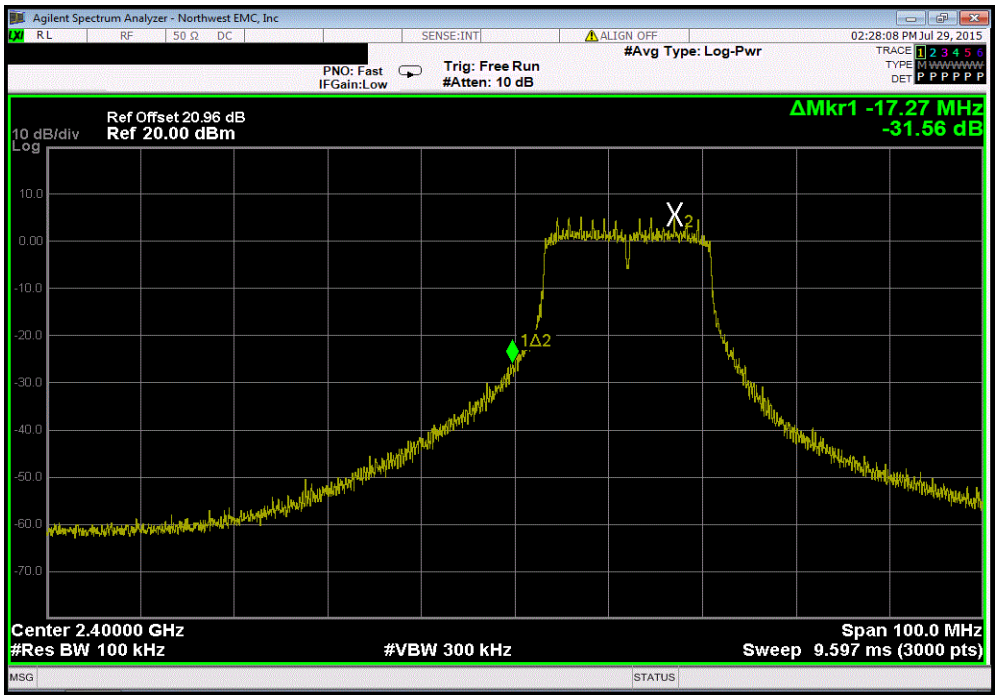
Chain B, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-31.44	-20	Pass



Chain B, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-48.67	-20	Pass



Chain C, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-31.56	-20	Pass



Chain C, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-48.29	-20	Pass