



element

WatchGuard Video

VISTA Wi-Fi Base

FCC 15.247:2019

802.11gn SISO Radio

Report # WTVD0015.1 Rev. 1



NVLAP[®]
TESTING

NVLAP LAB CODE: 201049-0



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CERTIFICATE OF TEST



Last Date of Test: June 10, 2019
WatchGuard Video
Model: VISTA Wi-Fi Base

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2019	ANSI C63.10:2013, KDB 558074

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for a battery powered EUT.
6.5, 6.6, 11.12.1, 11.13.3	Spurious Radiated Emissions	Yes	Pass	
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.1.1	Output Power	Yes	Pass	
11.9.1.1	Equivalent Isotropic Radiated Power	Yes	Pass	
11.10.2	Power Spectral Density	Yes	Pass	
11.11	Band Edge Compliance	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. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY



Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None		
01	Updated the Spurious Radiated Emissions graph y-axis to show all data points.	2019-07-31	14

ACCREDITATIONS AND AUTHORIZATIONS



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 Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

Australia/New Zealand

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

Korea

MSIT / 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

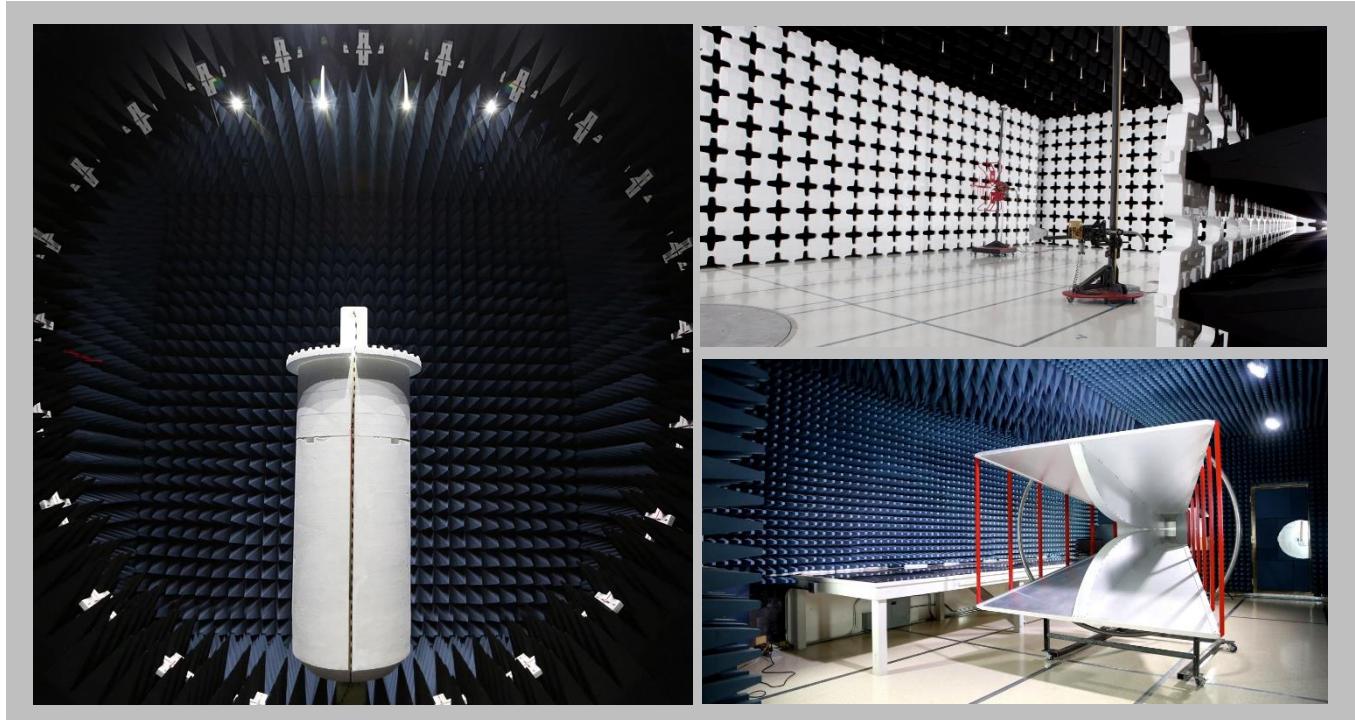
For details on the Scopes of our Accreditations, please visit:

<https://www.nwemc.com/emc-testing-accreditations>

FACILITIES



California Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425) 984-6600
NVLAP				
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code: 201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157



MEASUREMENT UNCERTAINTY



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.

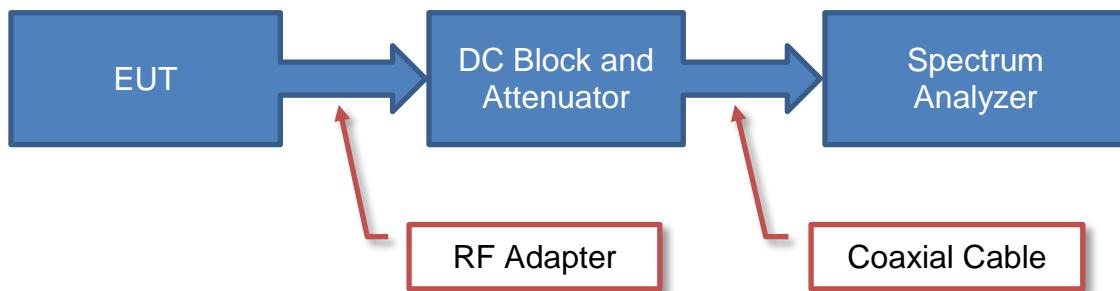
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. 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)	1.2 dB	-1.2 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)	5.1 dB	-5.1 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

Test Setup Block Diagrams

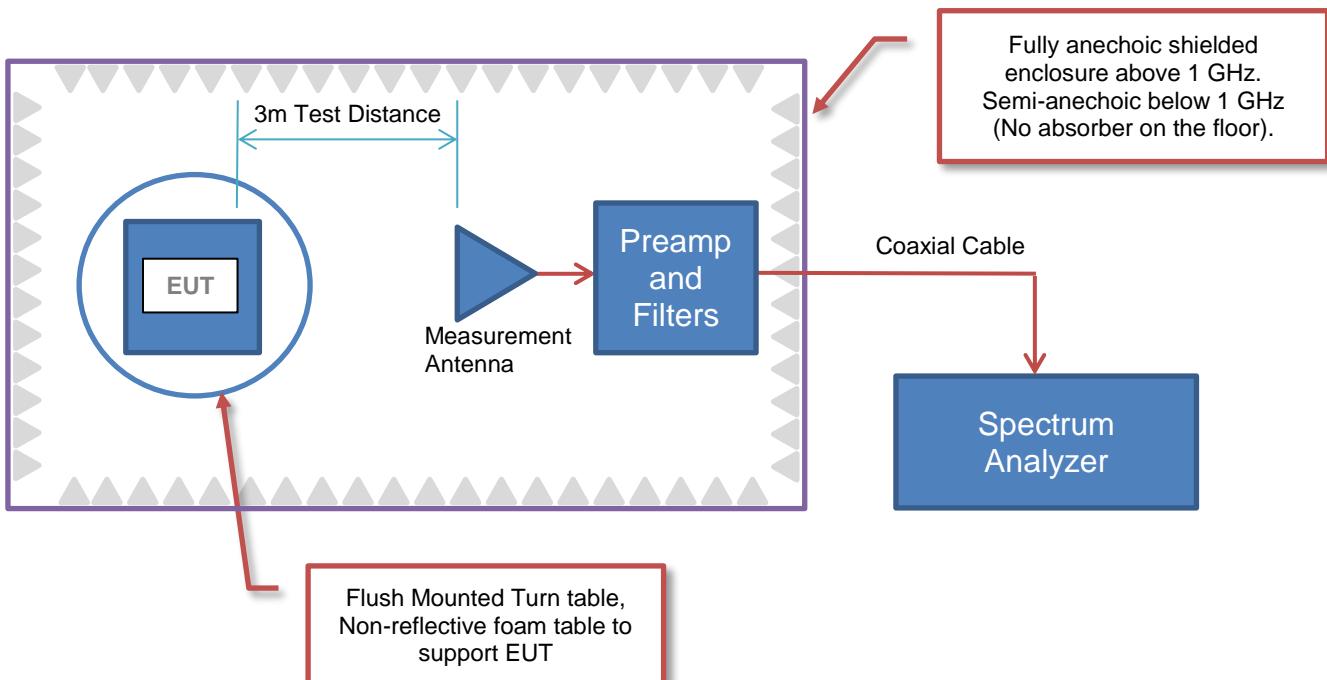
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	WatchGuard Video
Address:	415 Century Parkway
City, State, Zip:	Allen, TX 75013
Test Requested By:	Navaid Karimi
Model:	VISTA Wi-Fi Base
First Date of Test:	June 6, 2019
Last Date of Test:	June 10, 2019
Receipt Date of Samples:	June 6, 2019
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Charging and Data base for Vista and Vista XLT body cams using radio (TI WL1837MOD/WL1807MOD).
Testing Objective:
To demonstrate compliance of the 802.11 radio under FCC 15.247 for operation in the 2.4 GHz band.

CONFIGURATIONS



Configuration WTVD0015- 1

EUT					
Description	Manufacturer	Model/Part Number	Serial Number		
VISTA Wi-Fi Base	WatchGuard Video	WFB1	None		

Peripherals in test setup boundary					
Description	Manufacturer	Model/Part Number	Serial Number		
VISTA Body Camera	WatchGuard Video	WGA00600-100	WFC1-039187		
Dipole Antenna	WatchGuard Video	WG-3938D-24	None		

Remote Equipment Outside of Test Setup Boundary					
Description	Manufacturer	Model/Part Number	Serial Number		
Smart POE GigE Switch	WatchGuard Video	WGA00574	None		
Automotive Lead-Acid Battery	Superstart	24/24R48	None		

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
10-Pin RJ50 Cable	No	10m	No	VISTA Wi-Fi Base	Smart POE GigE Switch
DC Power Leads	No	2m	No	Automotive Lead-Acid Battery	Smart POE GigE Switch

Configuration WTVD0015- 4

EUT					
Description	Manufacturer	Model/Part Number	Serial Number		
VISTA Wi-Fi Base	WatchGuard Video	WFB1	None		

Peripherals in test setup boundary					
Description	Manufacturer	Model/Part Number	Serial Number		
Smart POE GigE Switch	WatchGuard Video	WGA00574	None		
AC Adapter (12VDC)	Unknown	AU-AC-90W	CP2015070912119		
AC Adapter (Ext Input)	Unknown	M120100A0	None		

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
10-Pin RJ50 Cable	No	10m	No	VISTA Wi-Fi Base	Smart POE GigE Switch
AC Power (12VDC Adapter)	No	1.8m	No	AC Mains	AC Adapter (12VDC)
DC Power (12VDC Adapter)	No	0.3m	No	AC Adapter (12VDC)	Smart POE GigE Switch
DC Power (Ext Input Adapter)	No	1.5m	No	AC Adapter (Ext Input)	Smart POE GigE Switch

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2019-06-06	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2019-06-10	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2019-06-10	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2019-06-10	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2019-06-10	Equivalent Isotropic Radiated Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2019-06-10	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2019-06-10	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2019-06-10	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.



POWER SETTINGS

The EUT was tested using the power settings provided by the manufacturer:

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types	Channel Bandwidths	Channel	Position	Frequency (MHz)	Power Setting
802.11(g) 6 Mbps	20	6	Single Channel	2437	20000 (Max)
802.11(g) 36 Mbps	20	6	Single Channel	2437	20000 (Max)
802.11(g) 54 Mbps	20	6	Single Channel	2437	20000 (Max)
802.11(n) MCS0	20	6	Single Channel	2437	20000 (Max)
802.11(n) MCS7	20	6	Single Channel	2437	20000 (Max)

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2019.05.10

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

Transmitting at Single Channel 2437 MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

WTVD0015 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz
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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
Attenuator	Weinschel Corp	4H-20	AWB	17-Mar-2019	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HGC	17-Mar-2019	12 mo
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAM	10-Oct-2018	12 mo
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXW	21-Aug-2018	24 mo
Cable	Northwest EMC	18-40GHz	TXE	10-Oct-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	PAL	9-Oct-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AJG	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	PAK	9-Oct-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AJF	NCR	0 mo
Cable	Northwest EMC	8-18GHz	TXD	14-May-2019	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAJ	17-Mar-2019	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJL	11-Oct-2018	24 mo
Cable	Northwest EMC	1-8.2 GHz	TXC	14-May-2019	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	HHV	3-Aug-2018	12 mo
Amplifier - Pre-Amplifier	Fairview Microwave	FMAM63001	PAS	24-Jan-2019	12 mo
Antenna - Biconilog	ETS Lindgren	3143B	AYF	10-May-2018	24 mo
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	22-Aug-2018	12 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	27-Feb-2019	12 mo

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These "pre-scans" are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector

PK = Peak Detector

AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of $10 \cdot \log(dc)$.

SPURIOUS RADIATED EMISSIONS



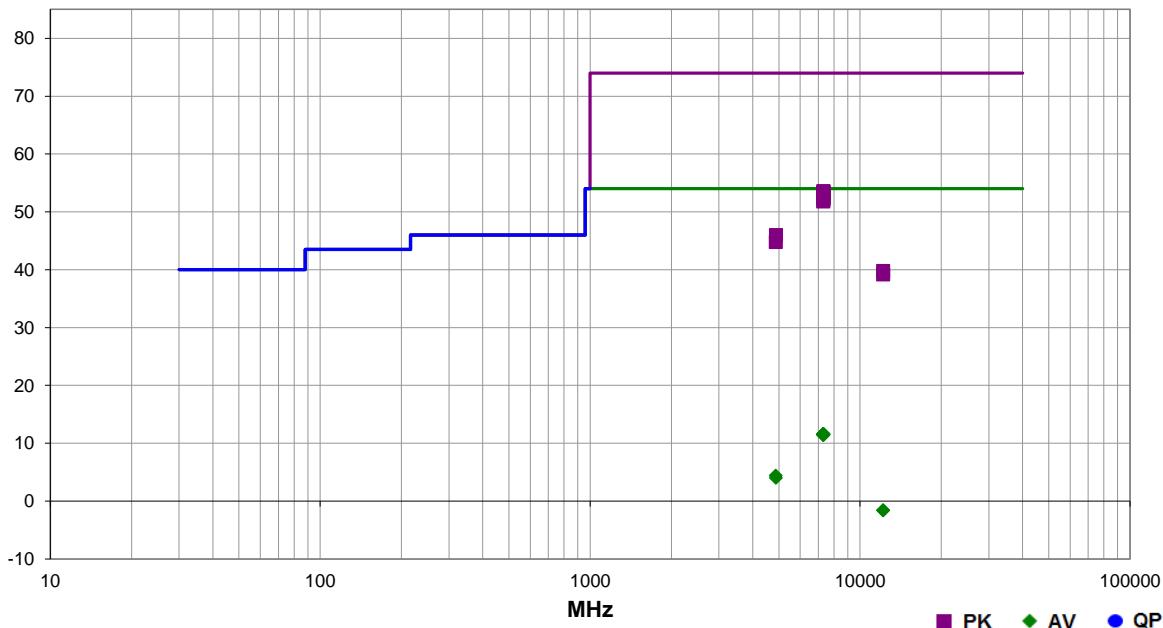
EmiR5 2019.05.20

PSA-ESCI 2019.05.10

Work Order:	WTVD0015	Date:	6-Jun-2019	
Project:	None	Temperature:	21.8 °C	
Job Site:	TX02	Humidity:	54.1% RH	
Serial Number:	None	Barometric Pres.:	1011 mbar	Tested by: Jonathan Kiefer
EUT:	VISTA Wi-Fi Base			
Configuration:	1			
Customer:	WatchGuard Video			
Attendees:	Navaid Karimi			
EUT Power:	Battery			
Operating Mode:	Transmitting at Single Channel 2437 MHz			
Deviations:	None			
Comments:	Harmonics data. EUT uses external dipole antenna with 4.6 dBi gain. EUT Duty Cycle < 98%, therefore upwardly corrected to 100% using 10*LOG(1/DC). Worst-case upward correction factor: 10*LOG(1/0.336) = 4.74 dB. Then downwardly corrected based on worse case duty cycle in normal use (1.75%), using 20*LOG(DC). Applied overall worst-case DCCF of -30.4 dB to average detector measurements.			

Test Specifications	Test Method
FCC 15.247:2019	ANSI C63.10:2013

Run #	5	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7311.650	41.9	11.7	1.5	97.0	0.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4	EUT Vertical, 6 Mbps
7310.583	41.8	11.7	1.5	75.0	0.0	0.0	Horz	PK	0.0	53.5	74.0	-20.5	EUT Vertical, 6 Mbps
7313.400	41.7	11.7	1.5	69.9	0.0	0.0	Horz	PK	0.0	53.4	74.0	-20.6	EUT Horizontal, 6 Mbps
7312.558	41.6	11.7	1.5	108.0	0.0	0.0	Vert	PK	0.0	53.3	74.0	-20.7	EUT Vertical, 6 Mbps
7311.758	41.5	11.7	1.8	36.0	0.0	0.0	Horz	PK	0.0	53.2	74.0	-20.8	EUT On Side, 6 Mbps
7312.750	41.4	11.7	3.9	153.9	0.0	0.0	Vert	PK	0.0	53.1	74.0	-20.9	EUT On Side, 6 Mbps
7312.292	40.7	11.7	1.5	342.0	0.0	0.0	Horz	PK	0.0	52.4	74.0	-21.6	EUT Horizontal, 36 Mbps
7320.750	40.7	11.7	1.5	255.0	0.0	0.0	Horz	PK	0.0	52.4	74.0	-21.6	EUT Horizontal, 54 Mbps
7312.042	40.3	11.7	1.5	79.0	0.0	0.0	Horz	PK	0.0	52.0	74.0	-22.0	EUT Horizontal, MCS7
7299.167	40.1	11.7	1.5	109.0	0.0	0.0	Horz	PK	0.0	51.8	74.0	-22.2	EUT Horizontal, MCS0
4876.708	41.7	4.3	3.8	116.0	0.0	0.0	Vert	PK	0.0	46.0	74.0	-28.0	EUT Horizontal, 6 Mbps
4870.292	40.5	4.3	1.5	31.0	0.0	0.0	Horz	PK	0.0	44.8	74.0	-29.2	EUT Horizontal, 6 Mbps
12173.210	43.7	-3.9	1.5	85.0	0.0	0.0	Horz	PK	0.0	39.8	74.0	-34.2	EUT Horizontal, 6 Mbps
12177.170	43.1	-3.9	1.5	162.0	0.0	0.0	Vert	PK	0.0	39.2	74.0	-34.8	EUT Horizontal, 6 Mbps
7310.375	30.3	11.7	1.5	69.9	-30.4	0.0	Horz	AV	0.0	11.6	54.0	-42.4	EUT Horizontal, 6 Mbps
7312.808	30.3	11.7	1.5	75.0	-30.4	0.0	Horz	AV	0.0	11.6	54.0	-42.4	EUT Vertical, 6 Mbps
7307.250	30.3	11.7	1.5	342.0	-30.4	0.0	Horz	AV	0.0	11.6	54.0	-42.4	EUT Horizontal, 36 Mbps

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7311.008	30.2	11.7	1.5	108.0	-30.4	0.0	Vert	AV	0.0	11.5	54.0	-42.5	EUT Horizontal, 6 Mbps
7310.317	30.2	11.7	1.8	36.0	-30.4	0.0	Horz	AV	0.0	11.5	54.0	-42.5	EUT On Side, 6 Mbps
7309.208	30.2	11.7	1.5	255.0	-30.4	0.0	Horz	AV	0.0	11.5	54.0	-42.5	EUT Horizontal, 54 Mbps
7298.083	30.2	11.7	1.5	109.0	-30.4	0.0	Horz	AV	0.0	11.5	54.0	-42.5	EUT Horizontal, MCS0
7320.042	30.2	11.7	1.5	79.0	-30.4	0.0	Horz	AV	0.0	11.5	54.0	-42.5	EUT Horizontal, MCS7
7312.142	30.1	11.7	1.5	97.0	-30.4	0.0	Vert	AV	0.0	11.4	54.0	-42.6	EUT Vertical, 6 Mbps
7310.667	30.1	11.7	3.9	153.9	-30.4	0.0	Vert	AV	0.0	11.4	54.0	-42.6	EUT On Side, 6 Mbps
4874.208	30.5	4.3	3.8	116.0	-30.4	0.0	Vert	AV	0.0	4.4	54.0	-49.6	EUT Horizontal, 6 Mbps
4883.208	30.1	4.3	1.5	31.0	-30.4	0.0	Horz	AV	0.0	4.0	54.0	-50.0	EUT Horizontal, 6 Mbps
12176.210	32.7	-3.9	1.5	85.0	-30.4	0.0	Horz	AV	0.0	-1.6	54.0	-55.6	EUT Horizontal, 6 Mbps
12188.380	32.7	-3.9	1.5	162.0	-30.4	0.0	Vert	AV	0.0	-1.6	54.0	-55.6	EUT Horizontal, 6 Mbps

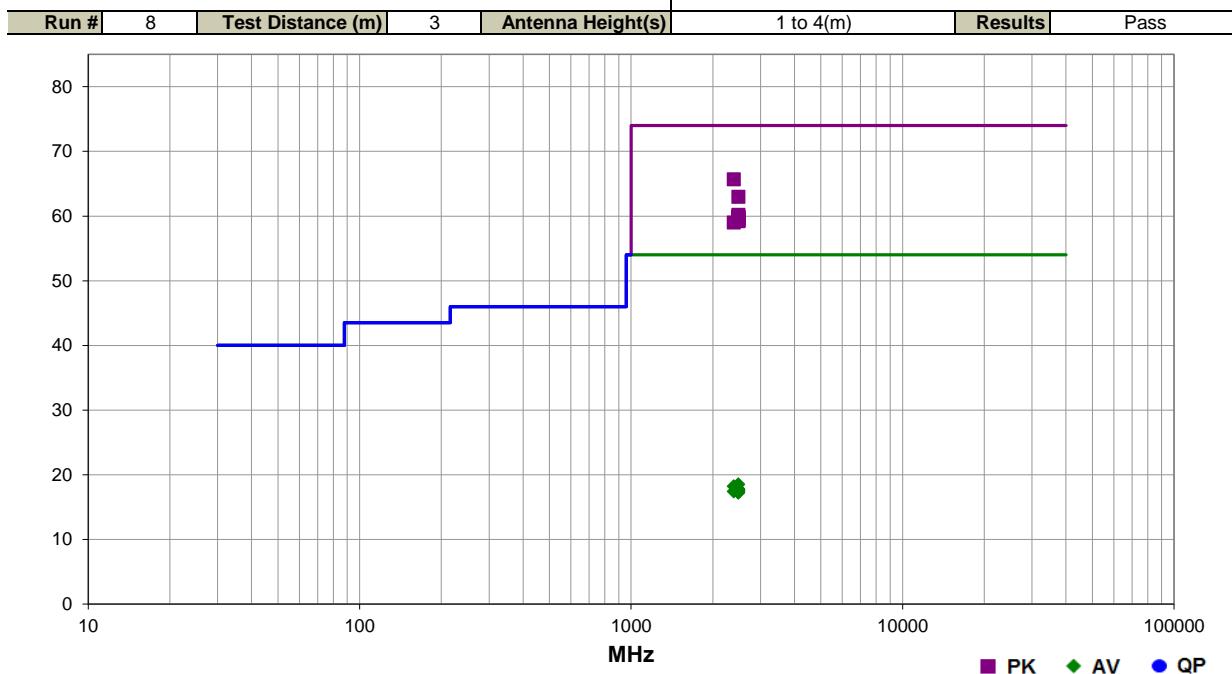
SPURIOUS RADIATED EMISSIONS



EmiR5 2019.05.20

PSA-ESCI 2019.05.10

Work Order:	WTVD0015	Date:	6-Jun-2019	
Project:	None	Temperature:	21.8 °C	
Job Site:	TX02	Humidity:	54.1% RH	
Serial Number:	None	Barometric Pres.:	1011 mbar	Tested by: Jonathan Kiefer
EUT:	VISTA Wi-Fi Base			
Configuration:	1			
Customer:	WatchGuard Video			
Attendees:	Navaid Karimi			
EUT Power:	Battery			
Operating Mode:	Transmitting at Single Channel 2437 MHz			
Deviations:	None			
Comments:	Band Edge data. EUT uses external dipole antenna with 4.6 dBi gain. EUT Duty Cycle < 98%, therefore upwardly corrected to 100% using 10*LOG(1/DC). Worst-case upward correction factor: 10*LOG(1/0.336) = 4.74 dB. Then downwardly corrected based on worse case duty cycle in normal use (1.75%), using 20*LOG(DC). Applied overall worst-case DCCF of -30.4 dB to average detector measurements.			
Test Specifications		Test Method		
FCC 15.247:2019		ANSI C63.10:2013		



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2389.993	51.1	-5.4	1.5	238.9	0.0	20.0	Vert	PK	0.0	65.7	74.0	-8.3	EUT On Side, 6 Mbps
2484.233	48.0	-5.0	1.5	52.9	0.0	20.0	Vert	PK	0.0	63.0	74.0	-11.0	EUT On Side, 6 Mbps
2483.513	45.2	-5.0	2.6	231.0	0.0	20.0	Horz	PK	0.0	60.2	74.0	-13.8	EUT Horizontal, 6 Mbps
2483.867	44.9	-5.0	1.5	184.9	0.0	20.0	Horz	PK	0.0	59.9	74.0	-14.1	EUT Vertical, 6 Mbps
2484.980	44.9	-5.0	1.5	240.0	0.0	20.0	Horz	PK	0.0	59.9	74.0	-14.1	EUT On Side, 6 Mbps
2485.057	44.9	-5.0	1.5	268.9	0.0	20.0	Vert	PK	0.0	59.9	74.0	-14.1	EUT On Side, MCS7
2484.157	44.5	-5.0	1.5	206.0	0.0	20.0	Vert	PK	0.0	59.5	74.0	-14.5	EUT On Side, 36 Mbps
2484.740	44.4	-5.0	2.5	70.9	0.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	EUT On Side, MCS0
2483.550	44.3	-5.0	2.2	260.0	0.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	EUT Horizontal, 6 Mbps
2485.017	44.3	-5.0	1.5	74.0	0.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	EUT Vertical, 6 Mbps
2484.153	44.2	-5.0	1.5	351.9	0.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	EUT On Side, 54 Mbps
2389.047	44.4	-5.4	1.5	171.0	0.0	20.0	Vert	PK	0.0	59.0	74.0	-15.0	EUT On Side, MCS0
2483.700	33.9	-5.0	1.5	52.9	-30.4	20.0	Vert	AV	0.0	18.5	54.0	-35.5	EUT On Side, 6 Mbps
2389.970	34.0	-5.4	1.5	238.9	-30.4	20.0	Vert	AV	0.0	18.2	54.0	-35.8	EUT On Side, 6 Mbps
2484.763	33.2	-5.0	2.6	231.0	-30.4	20.0	Horz	AV	0.0	17.8	54.0	-36.2	EUT Horizontal, 6 Mbps
2483.697	33.1	-5.0	2.5	70.9	-30.4	20.0	Vert	AV	0.0	17.7	54.0	-36.3	EUT On Side, MCS0
2483.980	33.0	-5.0	1.5	240.0	-30.4	20.0	Horz	AV	0.0	17.6	54.0	-36.4	EUT On Side, 6 Mbps

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2485.347	32.9	-5.0	1.5	184.9	-30.4	20.0	Horz	AV	0.0	17.5	54.0	-36.5	EUT Vertical, 6 Mbps
2484.267	32.9	-5.0	1.5	206.0	-30.4	20.0	Vert	AV	0.0	17.5	54.0	-36.5	EUT On Side, 36 Mbps
2484.760	32.9	-5.0	1.5	268.9	-30.4	20.0	Vert	AV	0.0	17.5	54.0	-36.5	EUT On Side, MCS7
2485.183	32.8	-5.0	1.5	351.9	-30.4	20.0	Vert	AV	0.0	17.4	54.0	-36.6	EUT On Side, 54 Mbps
2389.703	33.2	-5.4	1.5	171.0	-30.4	20.0	Vert	AV	0.0	17.4	54.0	-36.6	EUT On Side, MCS0
2485.130	32.7	-5.0	1.5	74.0	-30.4	20.0	Vert	AV	0.0	17.3	54.0	-36.7	EUT Vertical, 6 Mbps
2484.793	32.6	-5.0	2.2	260.0	-30.4	20.0	Vert	AV	0.0	17.2	54.0	-36.8	EUT Horizontal, 6 Mbps

DUTY CYCLE



XMIT 2019.05.15

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.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Attenuator	Fairview Microwave	SA4018-20	TYE	10-Oct-18	10-Oct-19
Block - DC	Fairview Microwave	SD3379	AMT	10-Oct-18	10-Oct-19
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	10-Oct-18	10-Oct-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum.

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time.

If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.

DUTY CYCLE



TbTx 2018.09.13 XMII 2019.05.15

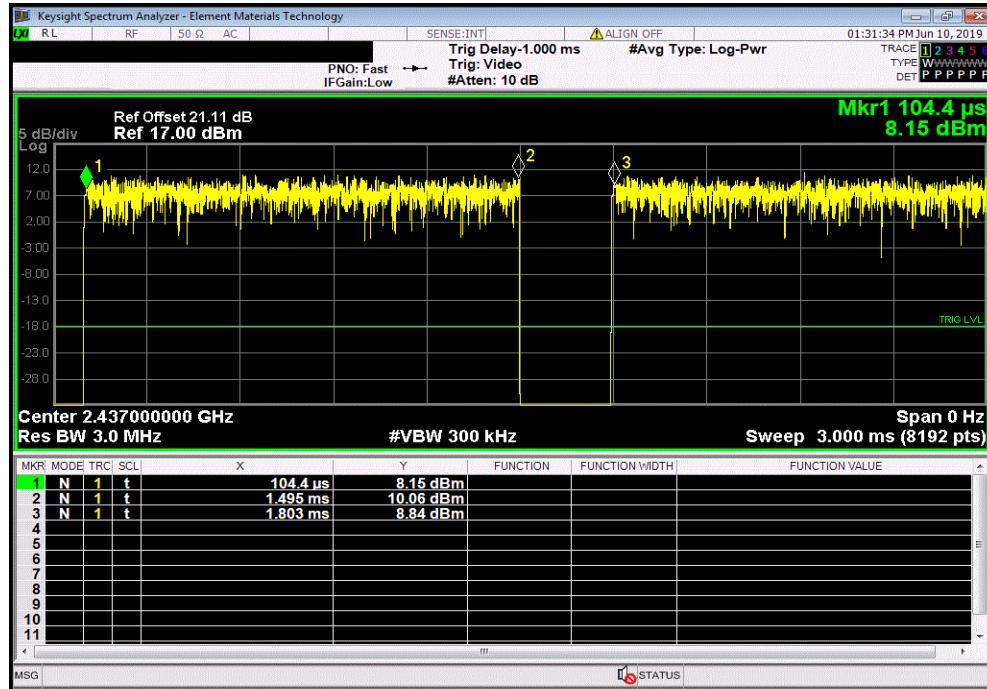
EUT:	VISTA Wi-Fi Base	Work Order:	WTVD0015				
Serial Number:	None	Date:	10-Jun-19				
Customer:	WatchGuard Video	Temperature:	21.9 °C				
Attendees:	Navaid Karimi	Humidity:	45.7% RH				
Project:	None	Barometric Pres.:	1029 mbar				
Tested by:	Jonathan Kiefer	Power:	Battery				
TEST SPECIFICATIONS		Test Method	ANSI C63.10:2013				
FCC 15.247:2019							
COMMENTS	Reference Level Offset of 21.11 dB (20dB Attenuator+DC Block+Cable).						
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	4	Signature	<i>Jonathan Kiefer</i>				
		Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
2400 MHz - 2483.5 MHz Band							
802.11(g) 6 Mbps							
Single Channel 6, 2437 MHz		1.391 ms	1.699 ms	1	81.9	N/A	N/A
Single Channel 6, 2437 MHz		N/A	N/A	6	N/A	N/A	N/A
802.11(g) 36 Mbps							
Single Channel 6, 2437 MHz		250.7 us	556.2 us	1	45.1	N/A	N/A
Single Channel 6, 2437 MHz		N/A	N/A	5	N/A	N/A	N/A
802.11(g) 54 Mbps							
Single Channel 6, 2437 MHz		174.7 us	471.1 us	1	37.1	N/A	N/A
Single Channel 6, 2437 MHz		N/A	N/A	5	N/A	N/A	N/A
802.11(n) MCS0							
Single Channel 6, 2437 MHz		1.179 ms	1.485 ms	1	79.4	N/A	N/A
Single Channel 6, 2437 MHz		N/A	N/A	5	N/A	N/A	N/A
802.11(n) MCS7							
Single Channel 6, 2437 MHz		149.9 us	446.3 us	1	33.6	N/A	N/A
Single Channel 6, 2437 MHz		N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE



TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz					
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
1.391 ms	1.699 ms	1	81.9	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz					
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
N/A	N/A	6	N/A	N/A	N/A

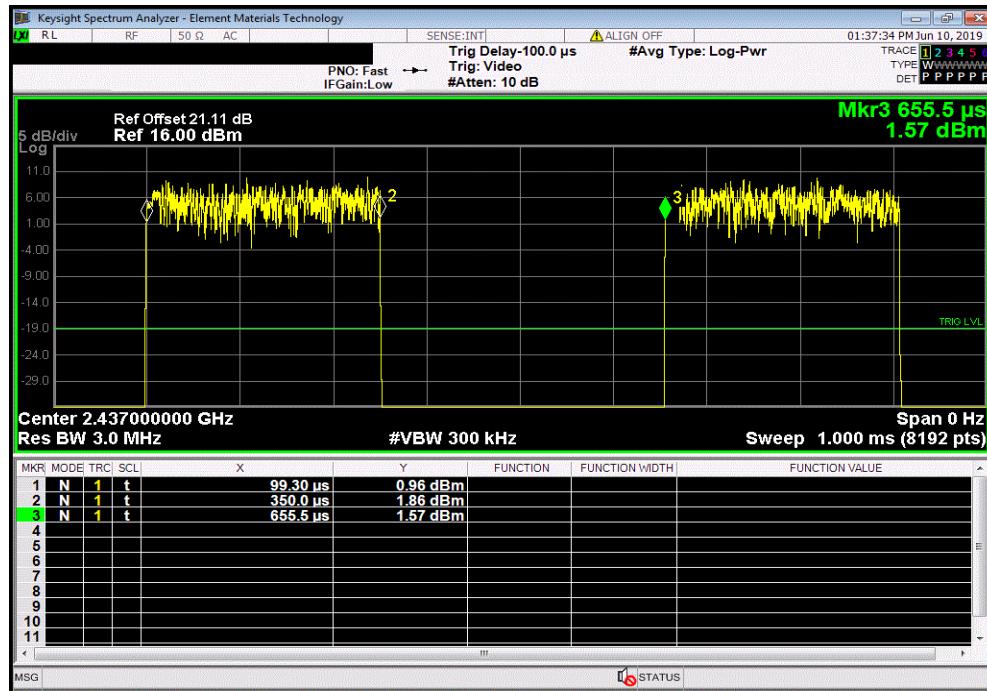


DUTY CYCLE

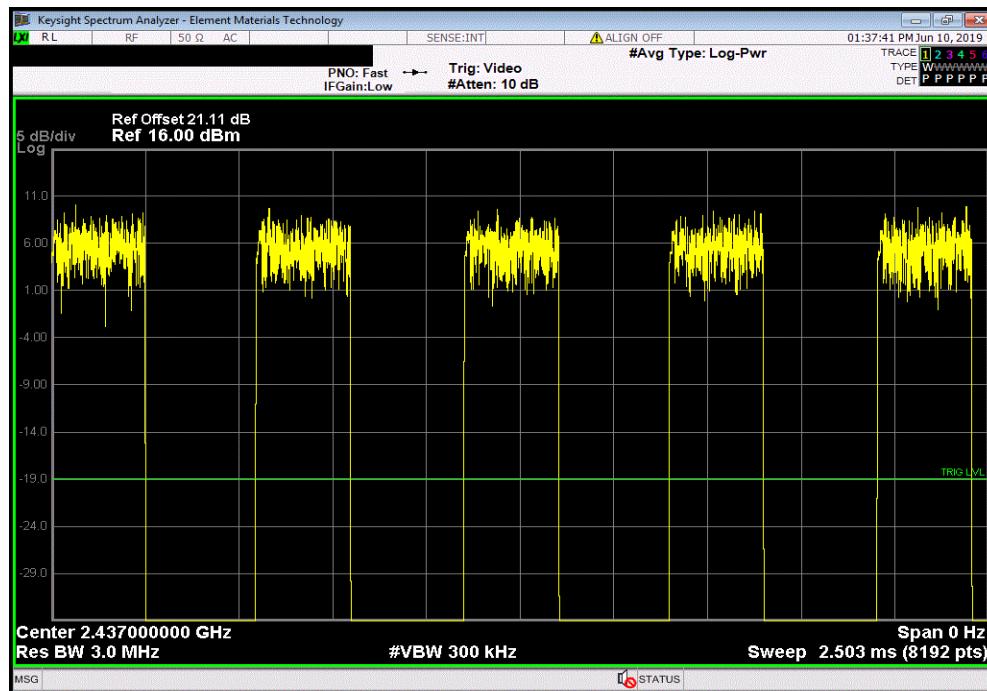


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz					
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
250.7 us	556.2 us	1	45.1	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz					
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
N/A	N/A	5	N/A	N/A	N/A

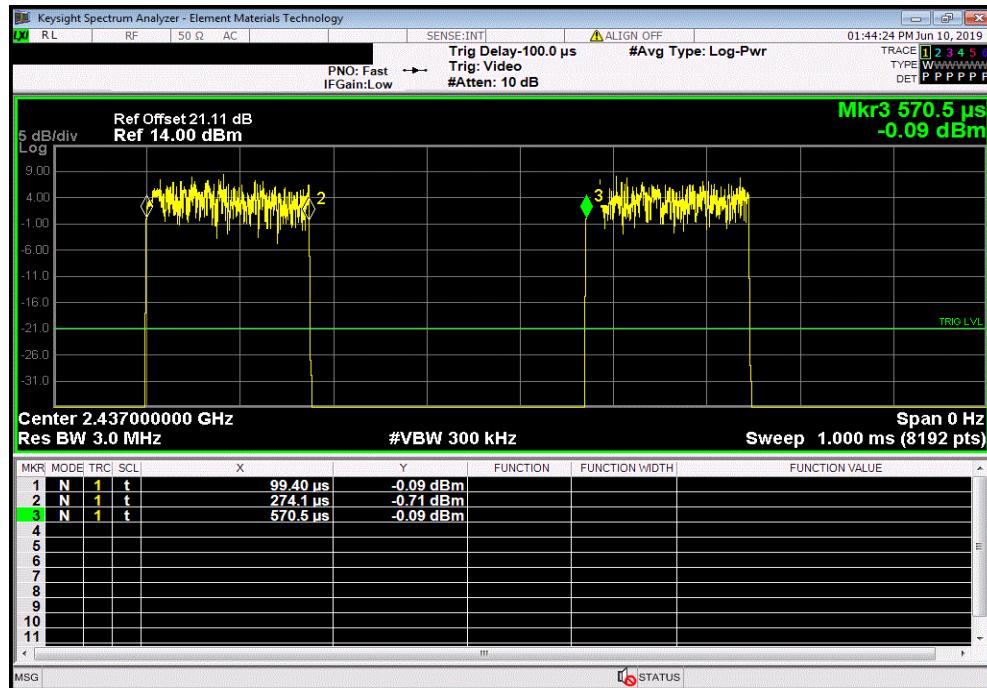


DUTY CYCLE

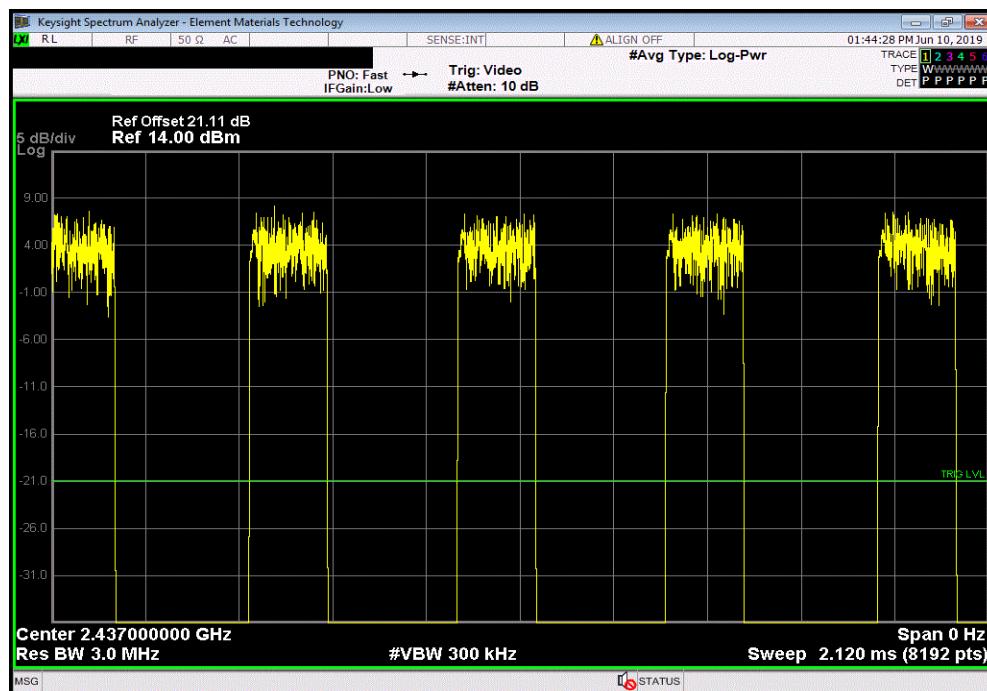


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Single Channel 6, 2437 MHz					
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
174.7 us	471.1 us	1	37.1	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Single Channel 6, 2437 MHz					
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
N/A	N/A	5	N/A	N/A	N/A

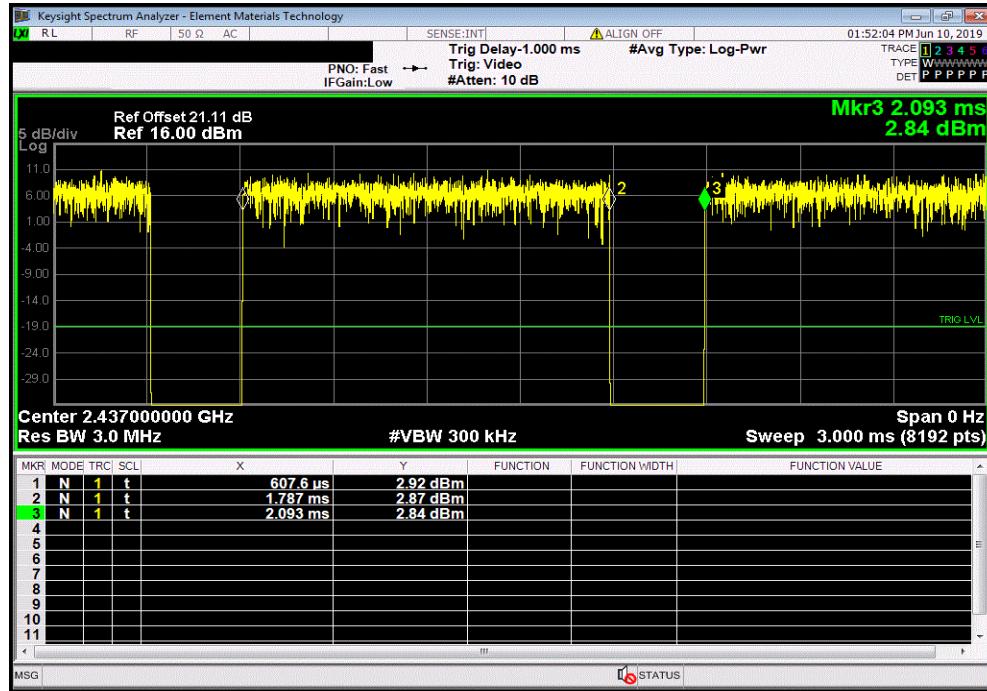


DUTY CYCLE

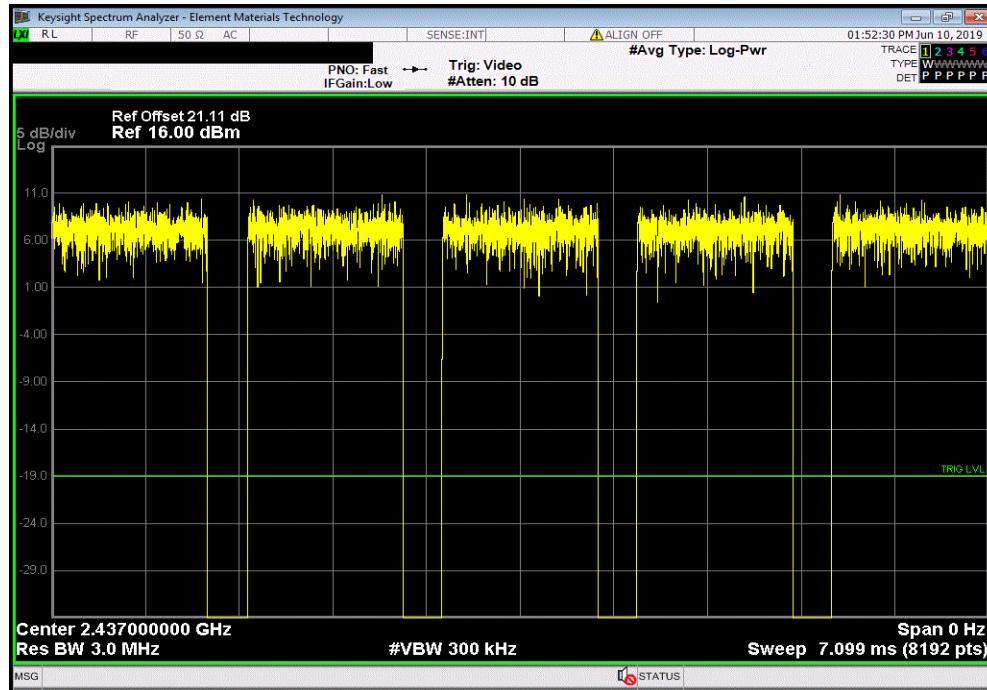


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz					
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
1.179 ms	1.485 ms	1	79.4	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz					
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
N/A	N/A	5	N/A	N/A	N/A

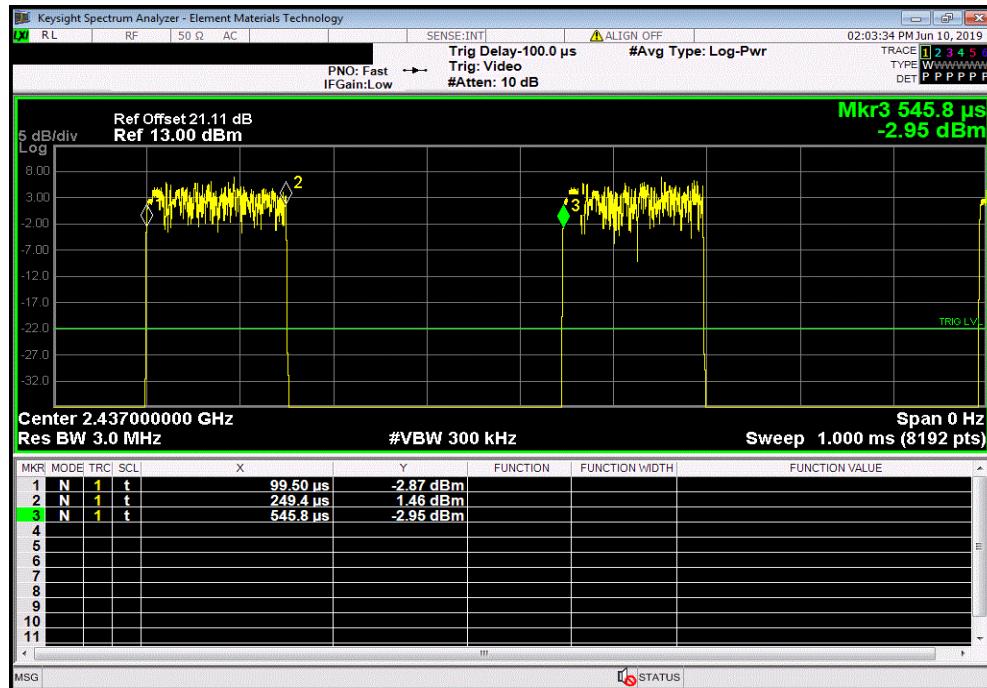


DUTY CYCLE

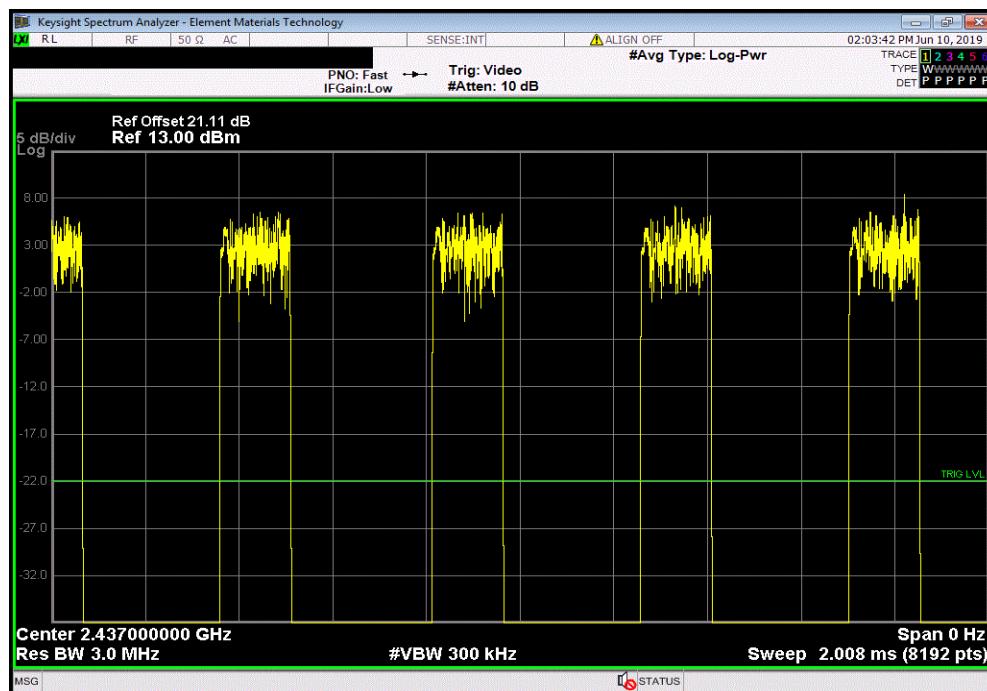


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Single Channel 6, 2437 MHz					
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
149.9 us	446.3 us	1	33.6	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Single Channel 6, 2437 MHz					
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
N/A	N/A	5	N/A	N/A	N/A



OCCUPIED BANDWIDTH



XMit 2019.05.15

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.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Attenuator	Fairview Microwave	SA4018-20	TYE	10-Oct-18	10-Oct-19
Block - DC	Fairview Microwave	SD3379	AMT	10-Oct-18	10-Oct-19
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	10-Oct-18	10-Oct-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The EUT was set to the channels and modes listed in the datasheet.

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.0% occupied bandwidth was also measured at the same time which can be needed during Output Power depending on the applicable method.

OCCUPIED BANDWIDTH



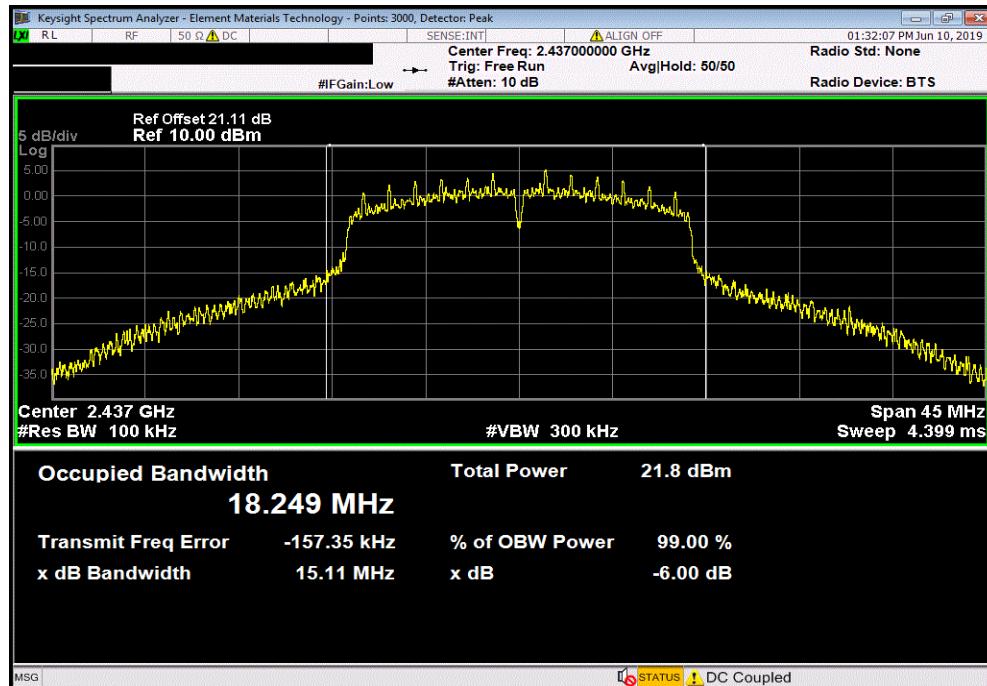
EUT: VISTA Wi-Fi Base			Work Order: WTVD0015
Serial Number:	None	Date:	10-Jun-19
Customer:	WatchGuard Video	Temperature:	21.9 °C
Attendees:	Navaid Karimi	Humidity:	46.9% RH
Project:	None	Barometric Pres.:	1029 mbar
Tested by:	Jonathan Kiefer	Power:	Battery
TEST SPECIFICATIONS		Test Method	ANSI C63.10:2013
FCC 15.247:2019			
COMMENTS			
Reference Level Offset of 21.11 dB (20dB Attenuator+DC Block+Cable).			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	4	Signature	<i>Jonathan Kiefer</i>
		Value	Limit (>)
2400 MHz - 2483.5 MHz Band			
802.11(g) 6 Mbps	Single Channel 6, 2437 MHz	15.105 MHz	500 kHz
802.11(g) 36 Mbps	Single Channel 6, 2437 MHz	15.109 MHz	500 kHz
802.11(g) 54 Mbps	Single Channel 6, 2437 MHz	15.111 MHz	500 kHz
802.11(n) MCS0	Single Channel 6, 2437 MHz	15.105 MHz	500 kHz
802.11(n) MCS7	Single Channel 6, 2437 MHz	15.107 MHz	500 kHz

OCCUPIED BANDWIDTH

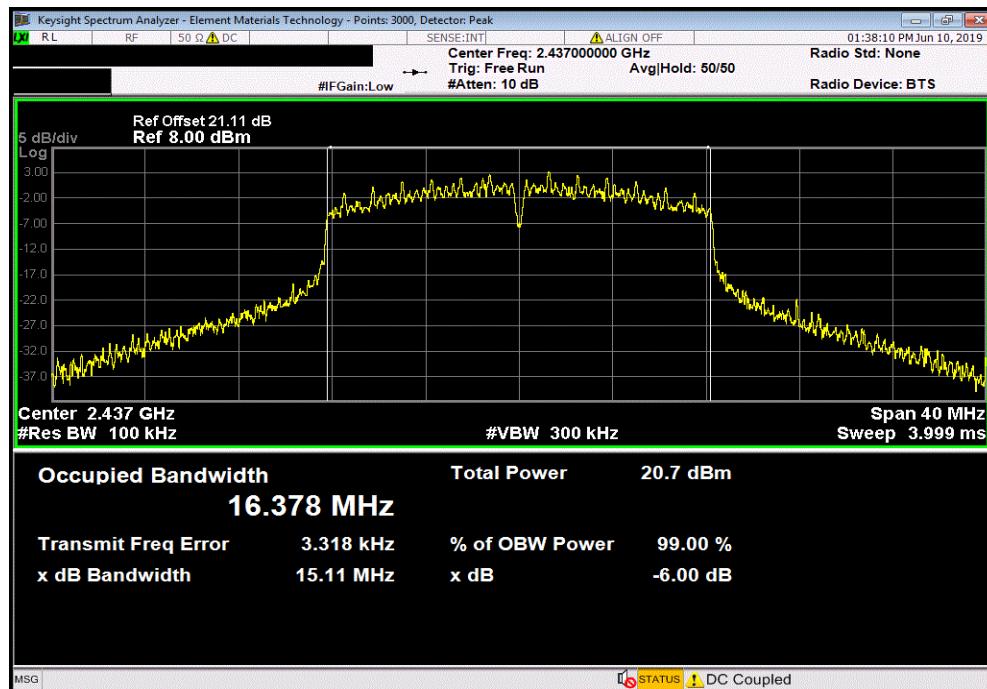


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz			Limit
Value	(>)	Result	
15.105 MHz	500 kHz	Pass	



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz			Limit
Value	(>)	Result	
15.109 MHz	500 kHz	Pass	

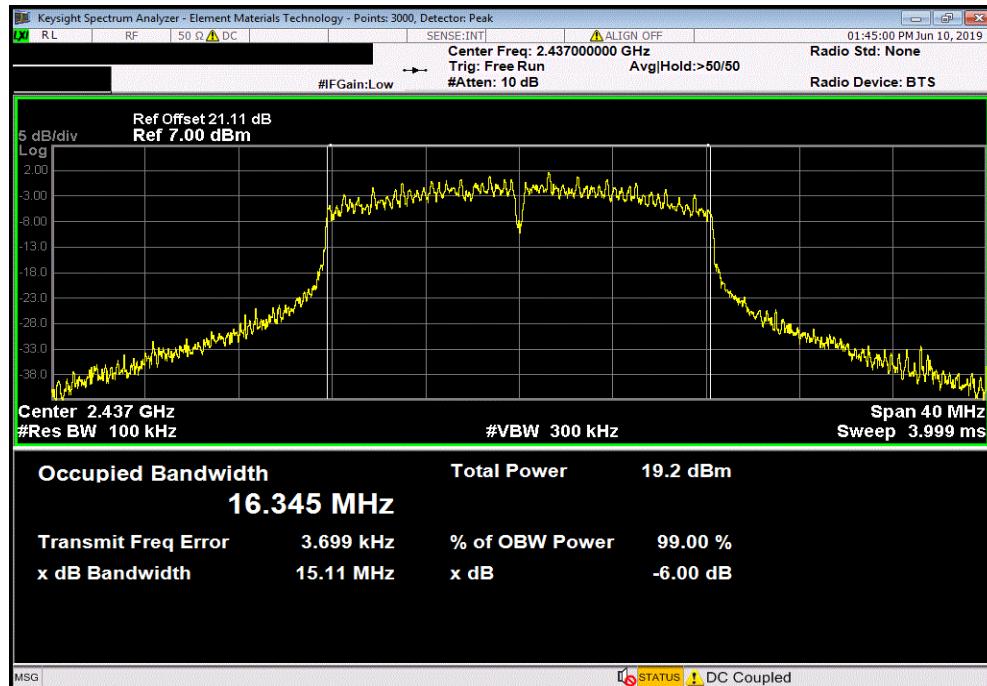


OCCUPIED BANDWIDTH

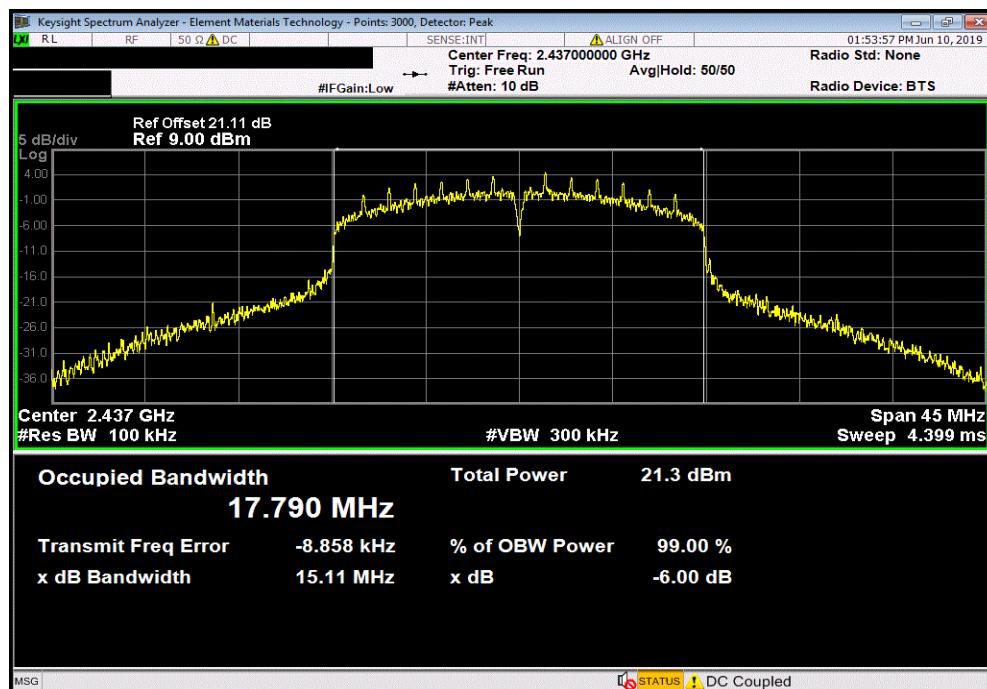


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Single Channel 6, 2437 MHz			Limit
Value	(>)	Result	
15.111 MHz	500 kHz	Pass	



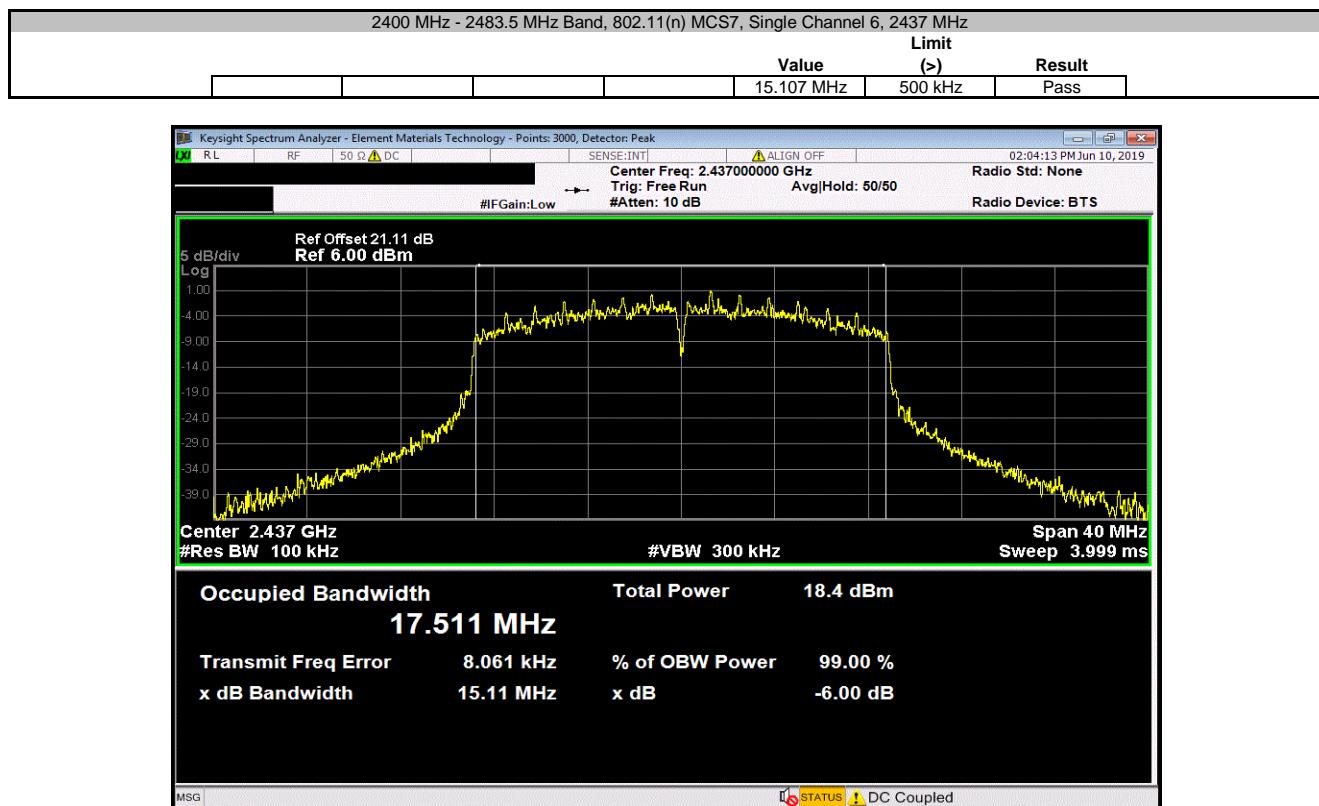
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz			Limit
Value	(>)	Result	
15.105 MHz	500 kHz	Pass	



OCCUPIED BANDWIDTH



TbTx 2018.09.13 XMI 2019.05.15



OUTPUT POWER



XMit 2019.05.15

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.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	10-Oct-18	10-Oct-19
Attenuator	Fairview Microwave	SA4018-20	TYE	10-Oct-18	10-Oct-19
Block - DC	Fairview Microwave	SD3379	AMT	10-Oct-18	10-Oct-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

Prior to measuring peak transmit power the DTS bandwidth (B) was measured.

The method found in ANSI C63.10:2013 Section 11.9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio.

OUTPUT POWER



TbTx 2018.09.13 XMII 2019.05.15

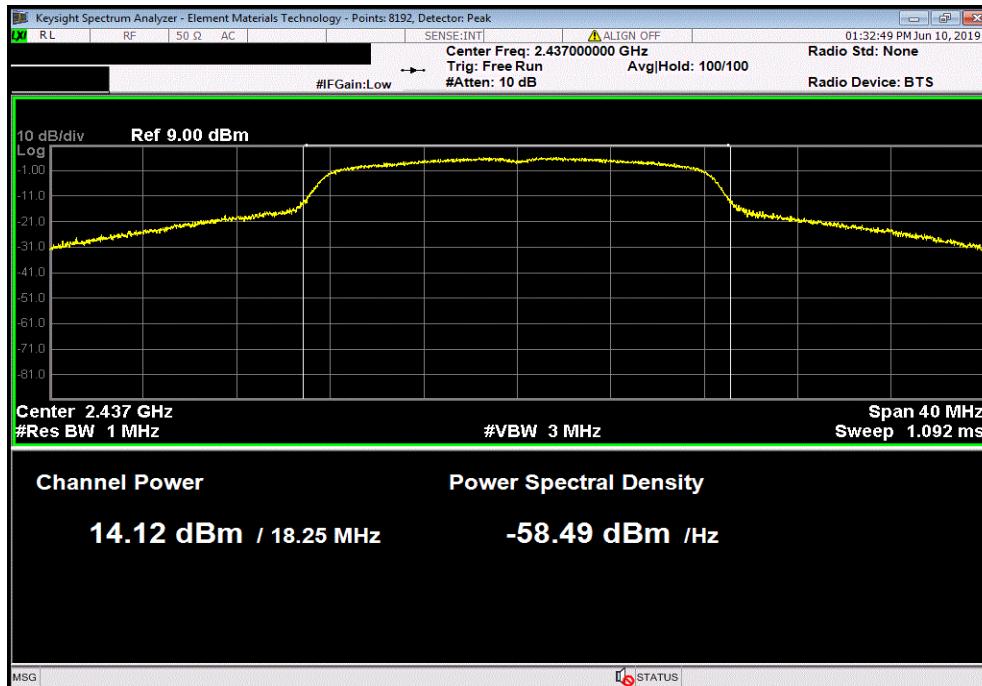
EUT:	VISTA Wi-Fi Base		Work Order:	WTVD0015				
Serial Number:	None		Date:	10-Jun-19				
Customer:	WatchGuard Video		Temperature:	22 °C				
Attendees:	Navaid Karimi		Humidity:	48.3% RH				
Project:	None		Barometric Pres.:	1028 mbar				
Tested by:	Jonathan Kiefer	Power:	Battery	Job Site: TX09				
TEST SPECIFICATIONS								
FCC 15.247:2019	Test Method							
	ANSI C63.10:2013							
COMMENTS								
Reference Level Offset of 21.11 dB (20dB Attenuator+DC Block+Cable).								
DEVIATIONS FROM TEST STANDARD								
None								
Configuration #	4	Signature	<i>Jonathan Kiefer</i>					
			Peak Cond Pwr (dBm)	Value (dBm)	Limit (dBm)	Results		
2400 MHz - 2483.5 MHz Band								
802.11(g) 6 Mbps								
Single Channel 6, 2437 MHz					14.124	Pass		
802.11(g) 36 Mbps					9.861	Pass		
Single Channel 6, 2437 MHz					7.518	Pass		
802.11(g) 54 Mbps					13.085	Pass		
Single Channel 6, 2437 MHz					6.311	Pass		
802.11(n) MCS0								
Single Channel 6, 2437 MHz								
802.11(n) MCS7								
Single Channel 6, 2437 MHz								

OUTPUT POWER

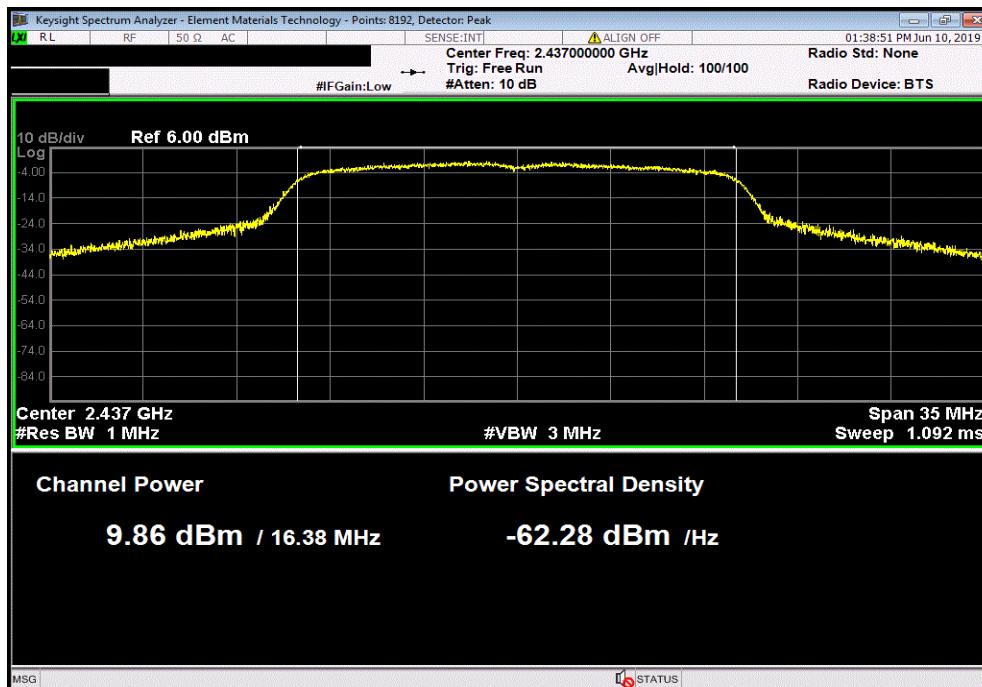


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz					
Peak Cond	Value	Limit			Results
Pwr (dBm)	(dBm)	(dBm)			
14.124	14.124	30			Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz					
Peak Cond	Value	Limit			Results
Pwr (dBm)	(dBm)	(dBm)			
9.861	9.861	30			Pass

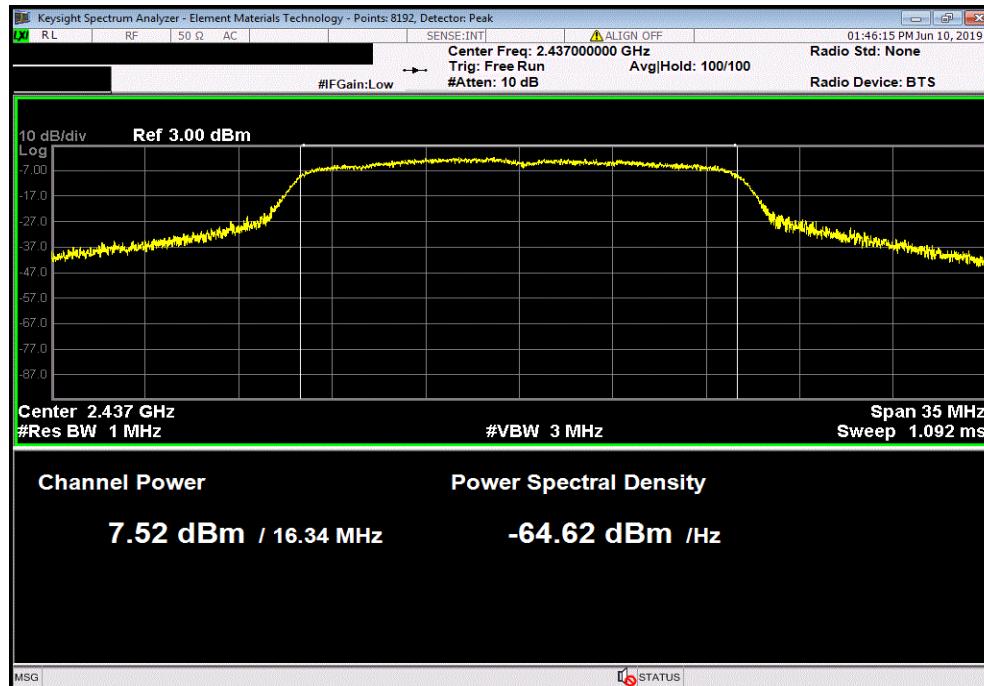


OUTPUT POWER

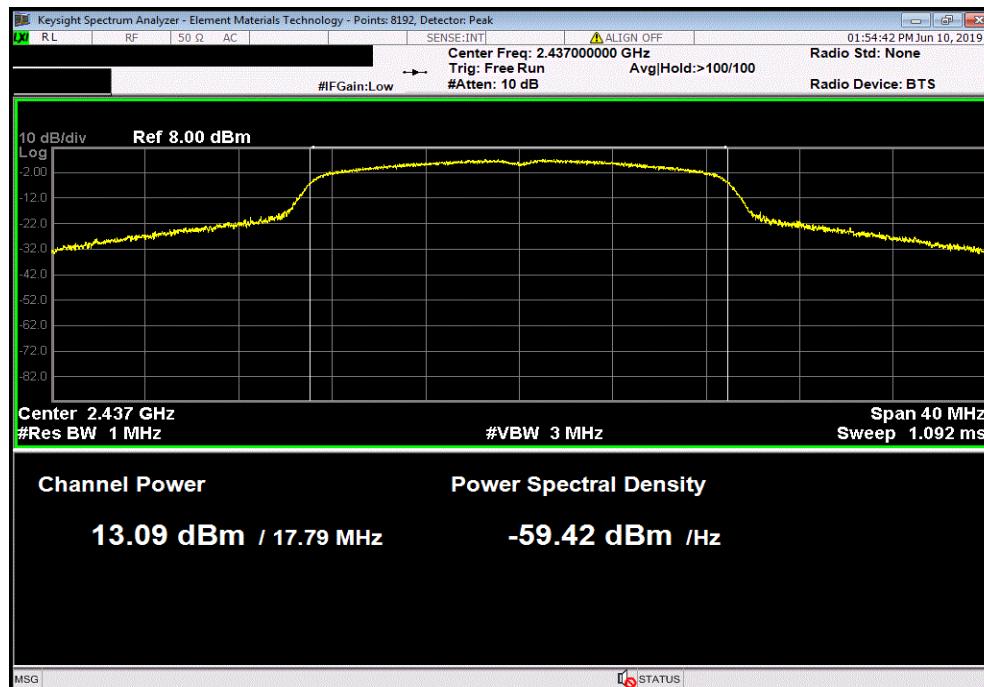


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Single Channel 6, 2437 MHz					
Peak Cond	Value	Limit			Results
Pwr (dBm)	(dBm)	(dBm)			
7.518	7.518	30			Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz					
Peak Cond	Value	Limit			Results
Pwr (dBm)	(dBm)	(dBm)			
13.085	13.085	30			Pass

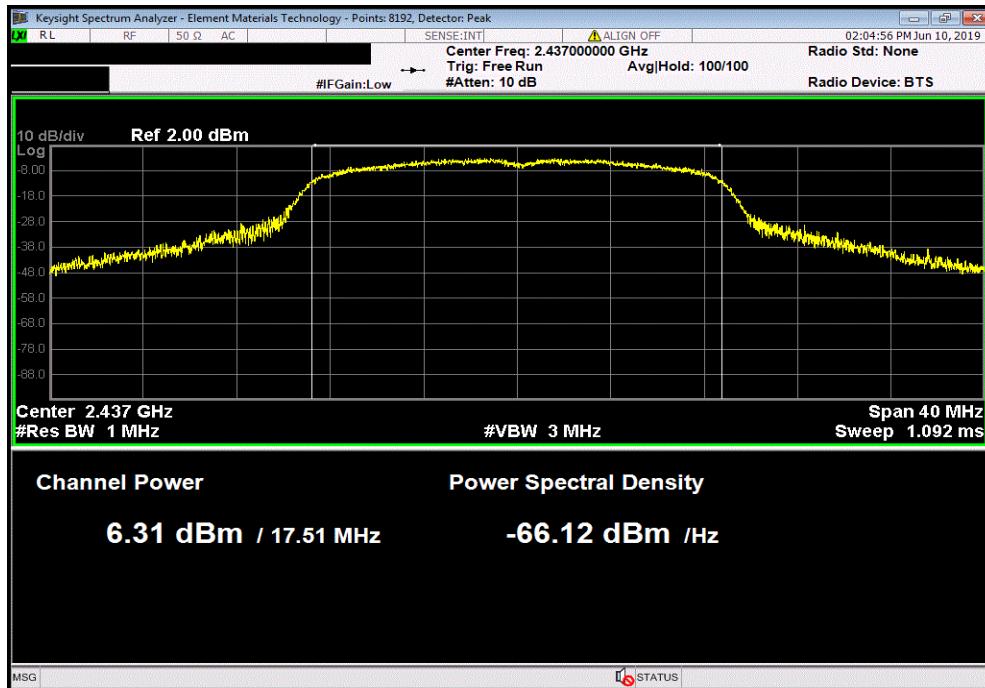


OUTPUT POWER



TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Single Channel 6, 2437 MHz					
Peak Cond	Value	Limit			
Pwr (dBm)	(dBm)	(dBm)			
6.311	6.311	30			Pass



EQUIVALENT ISOTROPIC RADIATED POWER



XMIT 2019.05.15

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.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	10-Oct-18	10-Oct-19
Attenuator	Fairview Microwave	SA4018-20	TYE	10-Oct-18	10-Oct-19
Block - DC	Fairview Microwave	SD3379	AMT	10-Oct-18	10-Oct-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

Prior to measuring peak transmit power the DTS bandwidth (B) was measured.

The method found in ANSI C63.10:2013 Section 11.9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio.

The gain of the antenna was added to the output power measurement. This value must not exceed 4 Watts, which is the same as 36 dBm.

EQUIVALENT ISOTROPIC RADIATED POWER



TbTx 2018.09.13 XMII 2019.05.15

EUT:	VISTA Wi-Fi Base	Work Order:	WTVD0015				
Serial Number:	None	Date:	10-Jun-19				
Customer:	WatchGuard Video	Temperature:	22 °C				
Attendees:	Navaid Karimi	Humidity:	48.3% RH				
Project:	None	Barometric Pres.:	1028 mbar				
Tested by:	Jonathan Kiefer	Power:	Battery				
TEST SPECIFICATIONS		Test Method	ANSI C63.10:2013				
FCC 15.247:2019							
COMMENTS							
Reference Level Offset of 21.11 dB (20dB Attenuator+DC Block+Cable).							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	4	Signature					
		Jonathan Kiefer					
		Peak Cond Pwr (dBm)	Value (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
2400 MHz - 2483.5 MHz Band							
802.11(g) 6 Mbps							
Single Channel 6, 2437 MHz							
14.124							
802.11(g) 36 Mbps							
Single Channel 6, 2437 MHz							
9.861							
802.11(g) 54 Mbps							
Single Channel 6, 2437 MHz							
7.518							
802.11(n) MCS0							
Single Channel 6, 2437 MHz							
13.085							
802.11(n) MCS7							
Single Channel 6, 2437 MHz							
6.311							

EQUIVALENT ISOTROPIC RADIATED POWER

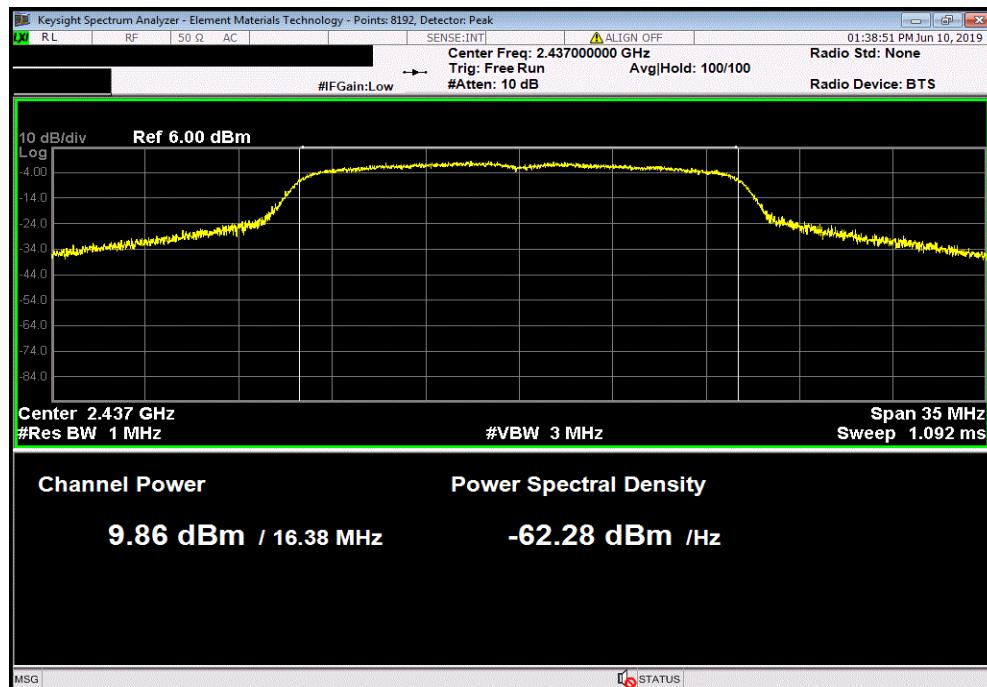


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz					
Peak Cond Pwr (dBm)	Value (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
14.124	14.124	4.6	18.724	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz					
Peak Cond Pwr (dBm)	Value (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
9.861	9.861	4.6	14.461	30	Pass

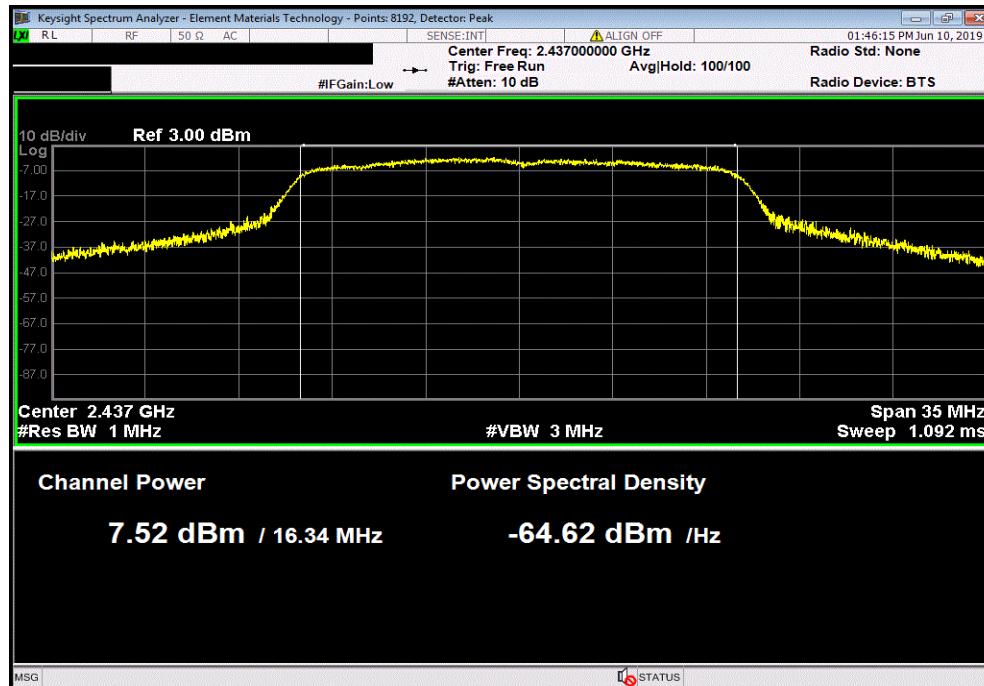


EQUIVALENT ISOTROPIC RADIATED POWER

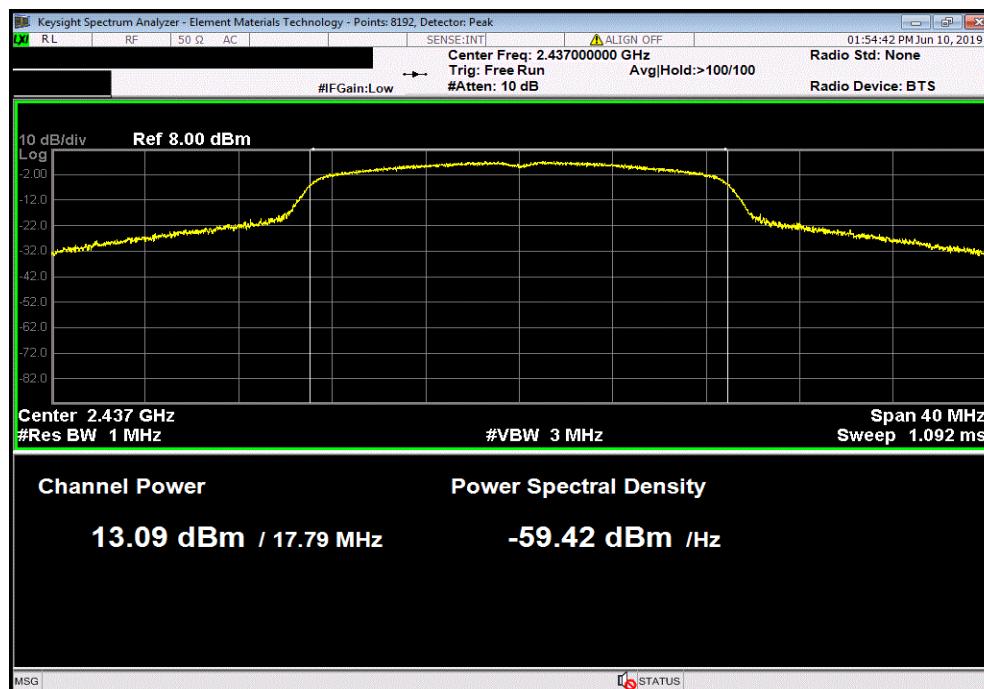


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Single Channel 6, 2437 MHz					
Peak Cond Pwr (dBm)	Value (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
7.518	7.518	4.6	12.118	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz					
Peak Cond Pwr (dBm)	Value (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
13.085	13.085	4.6	17.685	30	Pass

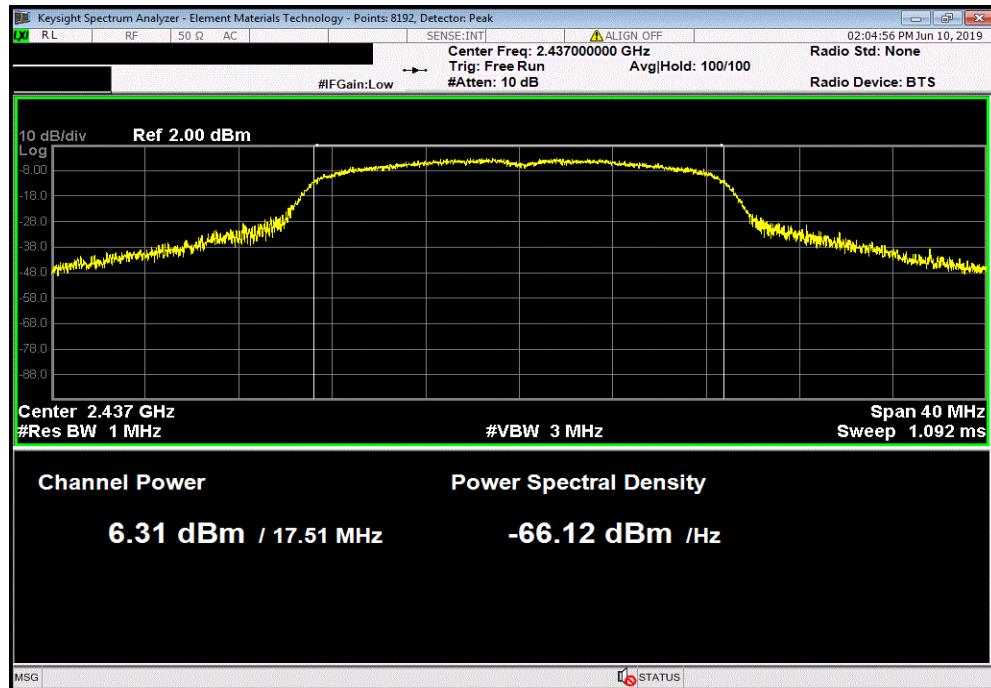


EQUIVALENT ISOTROPIC RADIATED POWER



TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Single Channel 6, 2437 MHz					
Peak Cond Pwr (dBm)	Value (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
6.311	6.311	4.6	10.911	30	Pass



POWER SPECTRAL DENSITY



XMit 2019.05.15

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.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Attenuator	Fairview Microwave	SA4018-20	TYE	10-Oct-18	10-Oct-19
Block - DC	Fairview Microwave	SD3379	AMT	10-Oct-18	10-Oct-19
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	10-Oct-18	10-Oct-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

Per the procedure outlined in ANSI C63.10 the peak power spectral density was measured in a 3 kHz RBW.

POWER SPECTRAL DENSITY



TbTx 2018.09.13 XMI 2019.05.15

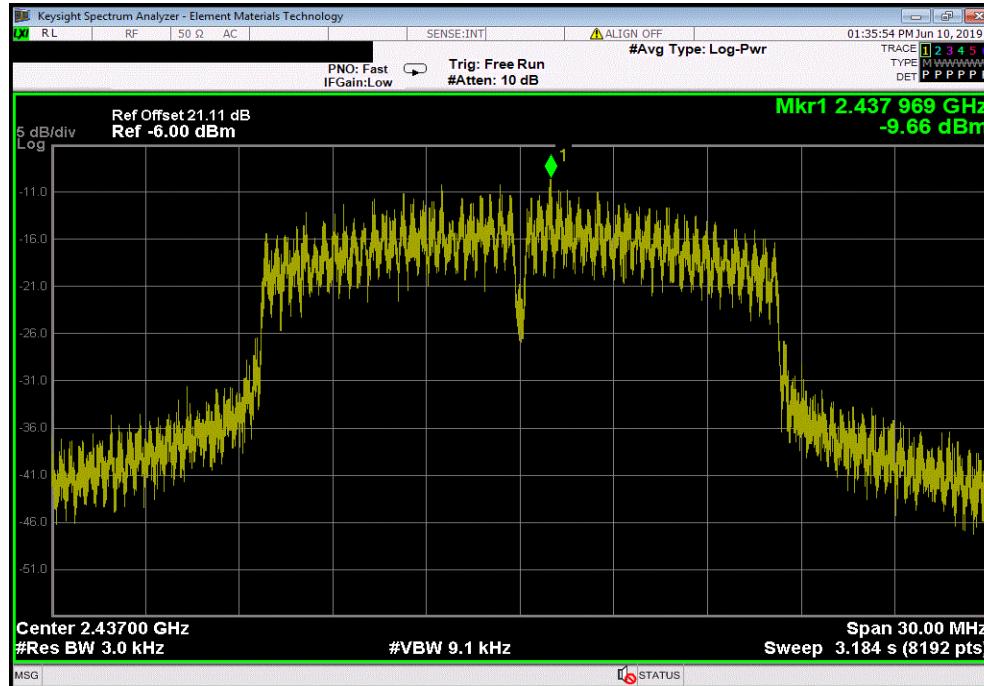
EUT:	VISTA Wi-Fi Base		Work Order:	WTVD0015
Serial Number:	None		Date:	10-Jun-19
Customer:	WatchGuard Video		Temperature:	21.9 °C
Attendees:	Navaid Karimi		Humidity:	46.4% RH
Project:	None		Barometric Pres.:	1029 mbar
Tested by:	Jonathan Kiefer	Power:	Battery	Job Site: TX09
TEST SPECIFICATIONS			Test Method	
FCC 15.247:2019			ANSI C63.10:2013	
COMMENTS	Reference Level Offset of 21.11 dB (20dB Attenuator+DC Block+Cable).			
DEVIATIONS FROM TEST STANDARD	None			
Configuration #	4	Signature	<i>Jonathan Kiefer</i>	
			Value dBm/3kHz	Limit < dBm/3kHz
2400 MHz - 2483.5 MHz Band				Results
802.11(g) 6 Mbps	Single Channel 6, 2437 MHz		-9.664	8
802.11(g) 36 Mbps	Single Channel 6, 2437 MHz		-11.952	8
802.11(g) 54 Mbps	Single Channel 6, 2437 MHz		-14.31	8
802.11(n) MCS0	Single Channel 6, 2437 MHz		-11.539	8
802.11(n) MCS7	Single Channel 6, 2437 MHz		-15.905	8

POWER SPECTRAL DENSITY

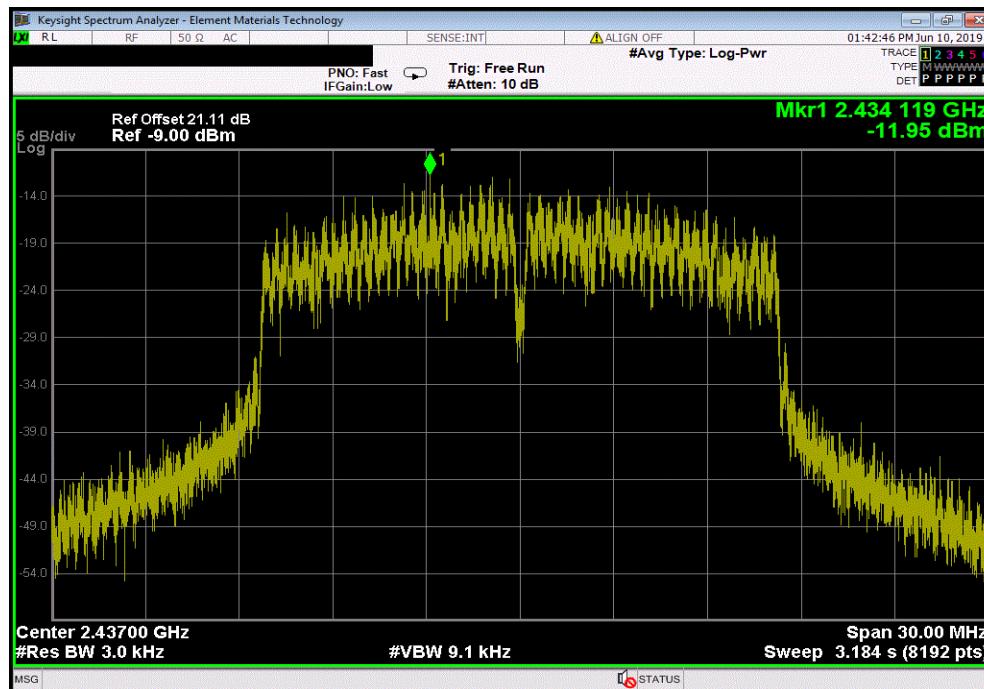


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz		
Value	Limit	Results
dBm/3kHz	< dBm/3kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz		
Value	Limit	Results
dBm/3kHz	< dBm/3kHz	Pass

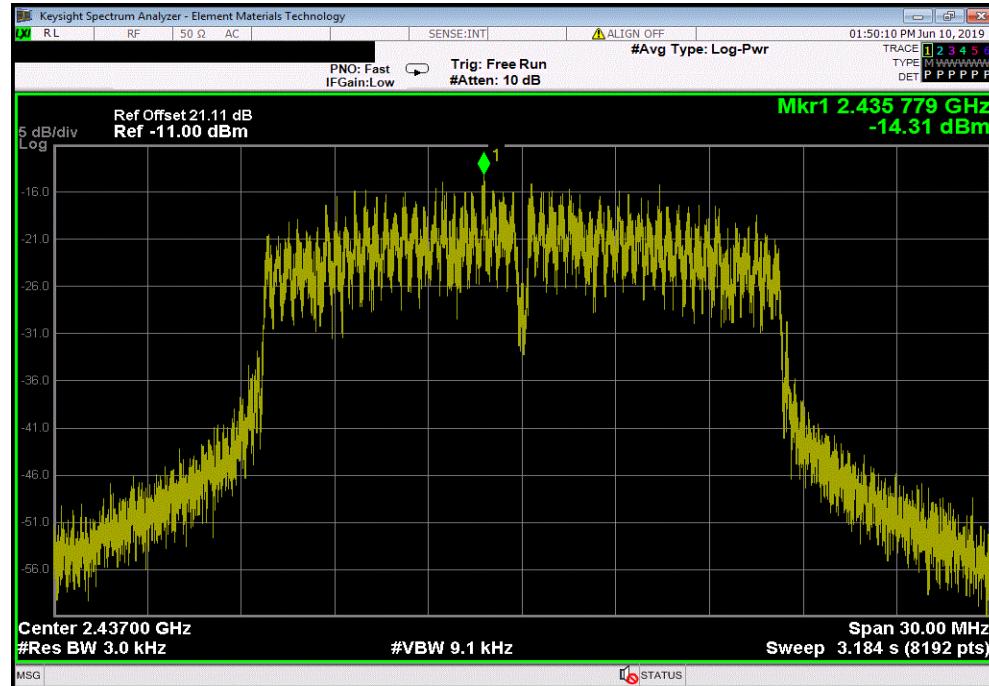


POWER SPECTRAL DENSITY

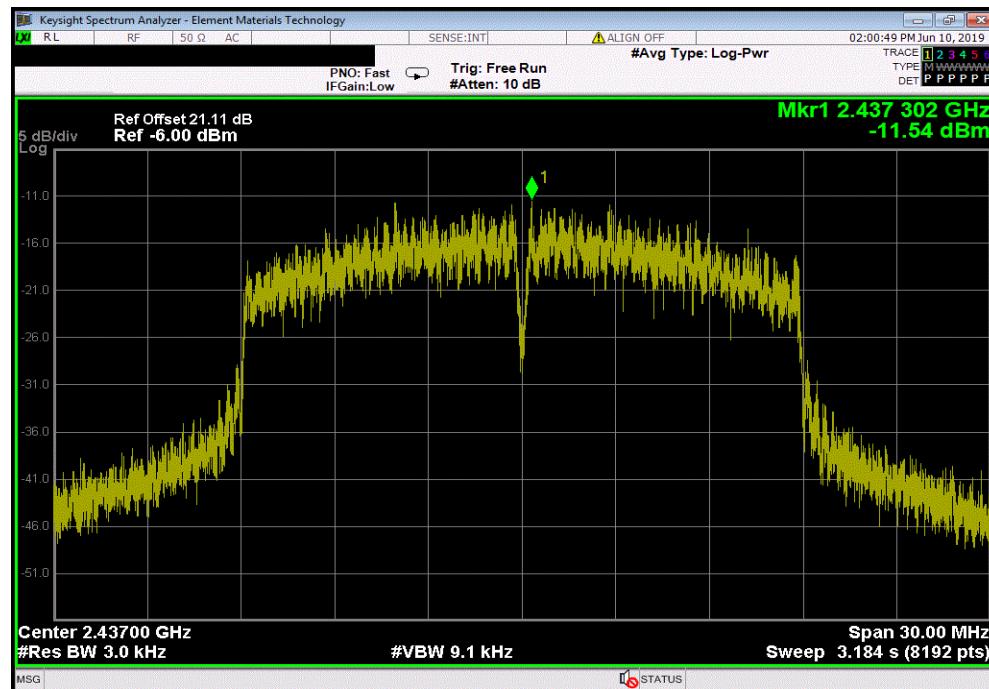


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Single Channel 6, 2437 MHz			
Value	Limit	Results	
dBm/3kHz	< dBm/3kHz		
-14.31	8	Pass	



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz			
Value	Limit	Results	
dBm/3kHz	< dBm/3kHz		
-11.539	8	Pass	

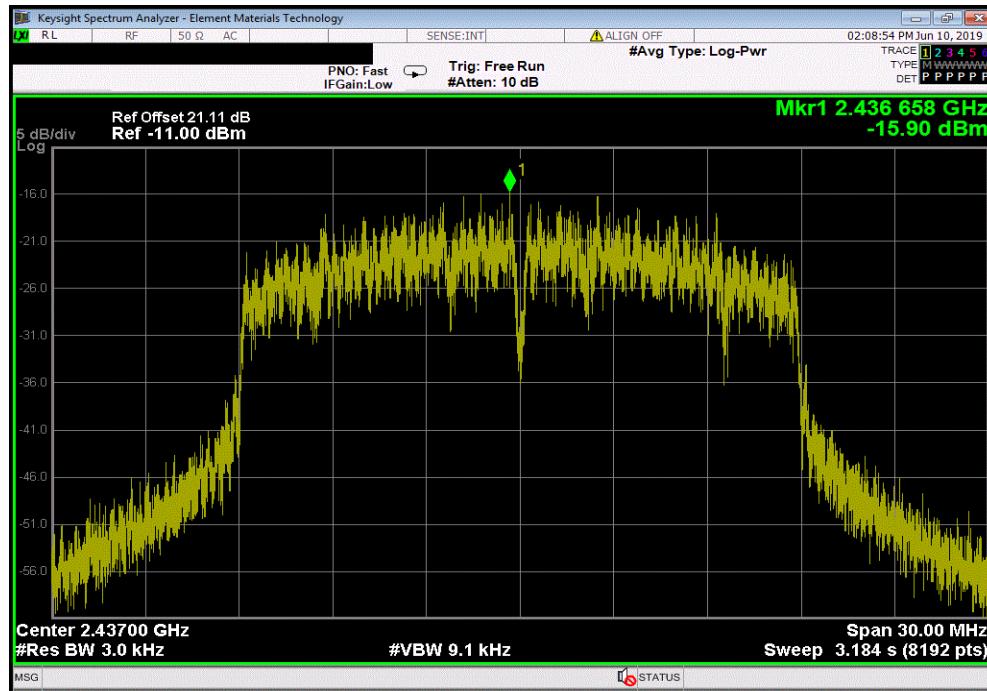


POWER SPECTRAL DENSITY



TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Single Channel 6, 2437 MHz		
Value	Limit	Results
dBm/3kHz	< dBm/3kHz	Pass



BAND EDGE COMPLIANCE



XMit 2019.05.15

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.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Attenuator	Fairview Microwave	SA4018-20	TYE	10-Oct-18	10-Oct-19
Block - DC	Fairview Microwave	SD3379	AMT	10-Oct-18	10-Oct-19
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	10-Oct-18	10-Oct-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. 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 spectrum was scanned below the lower band edge and above the higher band edge.

BAND EDGE COMPLIANCE



element

TxDx 2018.09.13

XMit 2019.05.15

EUT:	VISTA Wi-Fi Base		Work Order:	WTVD0015			
Serial Number:	None		Date:	10-Jun-19			
Customer:	WatchGuard Video		Temperature:	21.8 °C			
Attendees:	Navaid Karimi		Humidity:	47.6% RH			
Project:	None		Barometric Pres.:	1029 mbar			
Tested by:	Willie Love	Power:	Battery	Job Site: TX09			
TEST SPECIFICATIONS		Test Method					
FCC 15.247:2019		ANSI C63.10:2013					
COMMENTS							
Reference Level Offset of 21.11 dB (20dB Attenuator+DC Block+Cable).							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	4	Signature					
			Value (dBc)	Limit ≤ (dBc)	Result		
2400 MHz - 2483.5 MHz Band							
802.11(g) 6 Mbps							
Single Channel 6, 2437 MHz (Lower Band Edge)			-50.91	-20	Pass		
Single Channel 6, 2437 MHz (Upper Band Edge)			-55.96	-20	Pass		
802.11(g) 36 Mbps							
Single Channel 6, 2437 MHz (Lower Band Edge)			-55.05	-20	Pass		
Single Channel 6, 2437 MHz (Upper Band Edge)			-56.7	-20	Pass		
802.11(g) 54 Mbps							
Single Channel 6, 2437 MHz (Lower Band Edge)			-51.28	-20	Pass		
Single Channel 6, 2437 MHz (Upper Band Edge)			-55.32	-20	Pass		
802.11(n) MCS0							
Single Channel 6, 2437 MHz (Lower Band Edge)			-51.31	-20	Pass		
Single Channel 6, 2437 MHz (Upper Band Edge)			-56.63	-20	Pass		
802.11(n) MCS7							
Single Channel 6, 2437 MHz (Lower Band Edge)			-51.95	-20	Pass		
Single Channel 6, 2437 MHz (Upper Band Edge)			-54.26	-20	Pass		

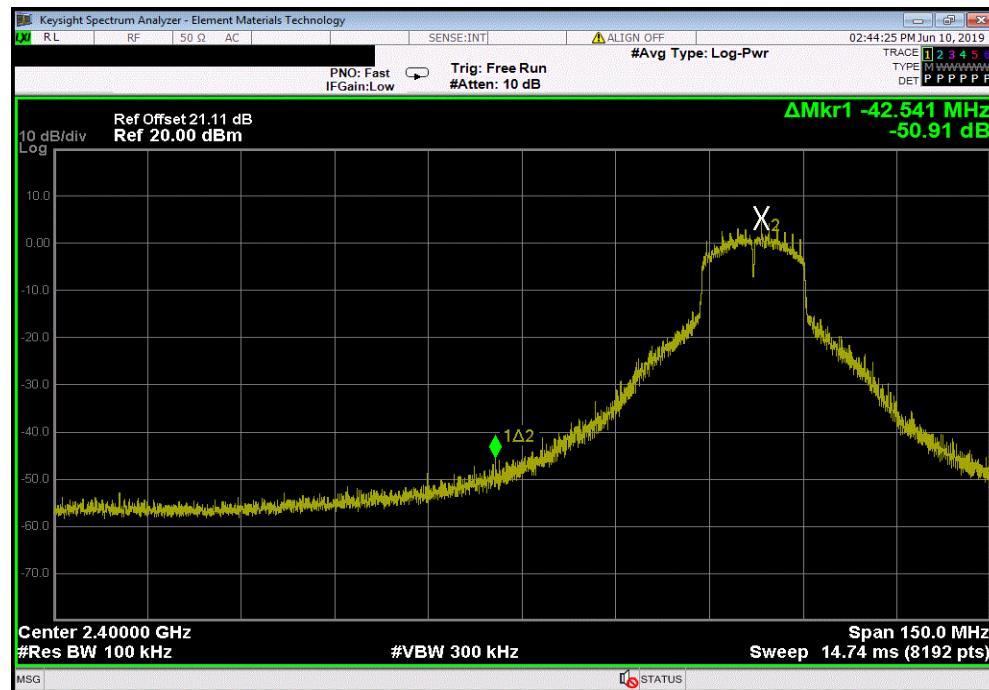
BAND EDGE COMPLIANCE



TbTx 2018.09.13 XMI 2019.05.15

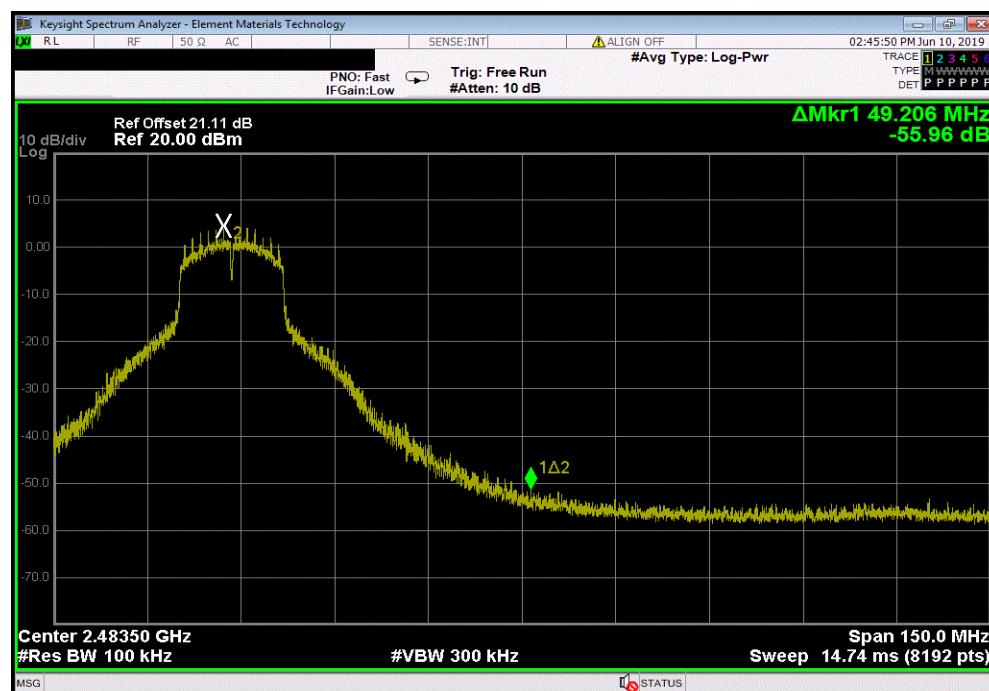
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz (Lower Band Edge)

Value (dBc)	Limit ≤ (dBc)	Result
-50.91	-20	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz (Upper Band Edge)

Value (dBc)	Limit ≤ (dBc)	Result
-55.96	-20	Pass



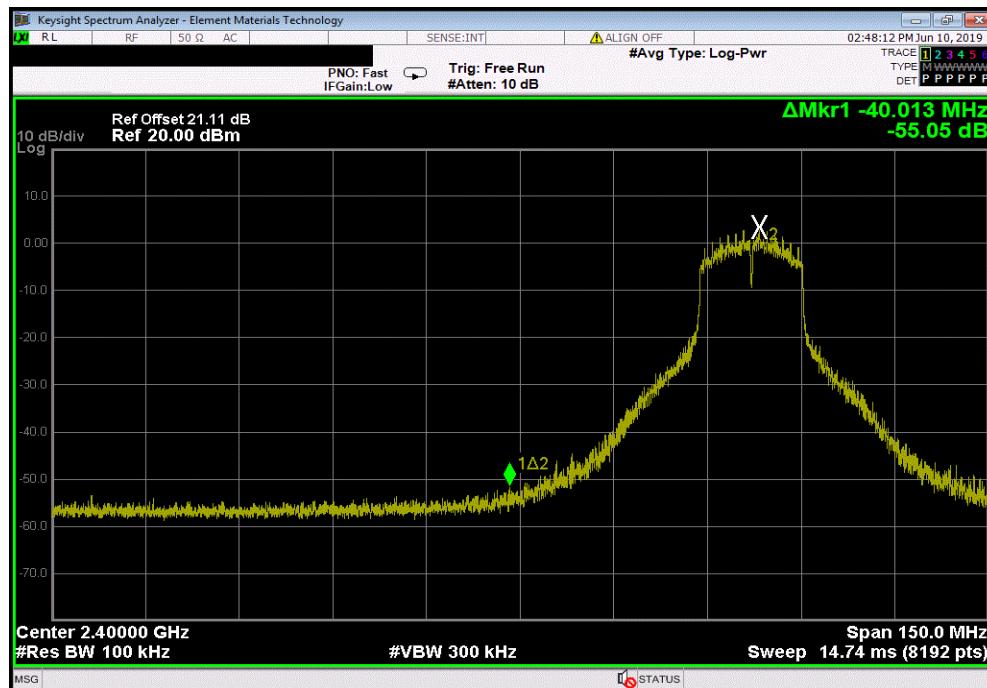
BAND EDGE COMPLIANCE



TbTx 2018.09.13 XMI 2019.05.15

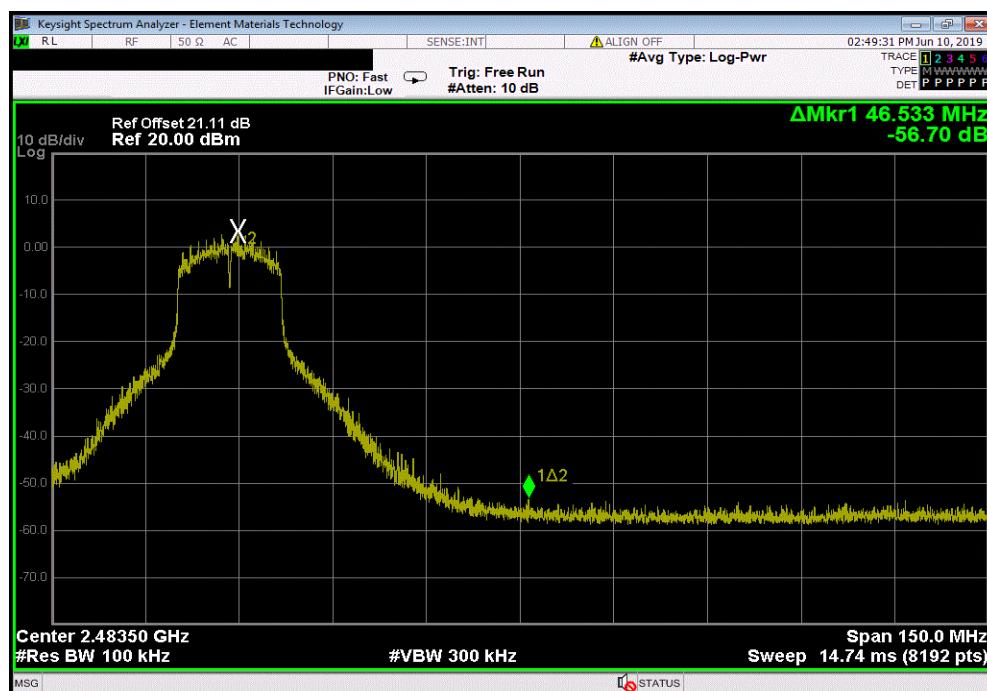
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz (Lower Band Edge)

	Value (dBc)	Limit ≤ (dBc)	Result
	-55.05	-20	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz (Upper Band Edge)

	Value (dBc)	Limit ≤ (dBc)	Result
	-56.7	-20	Pass



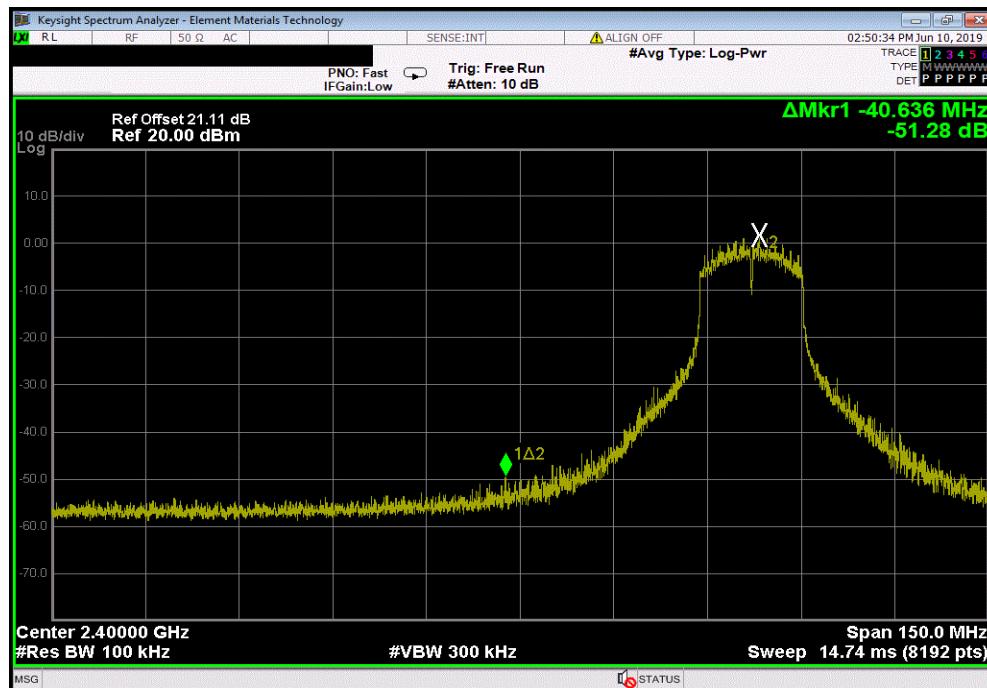
BAND EDGE COMPLIANCE



TbTx 2018.09.13 XMT 2019.05.15

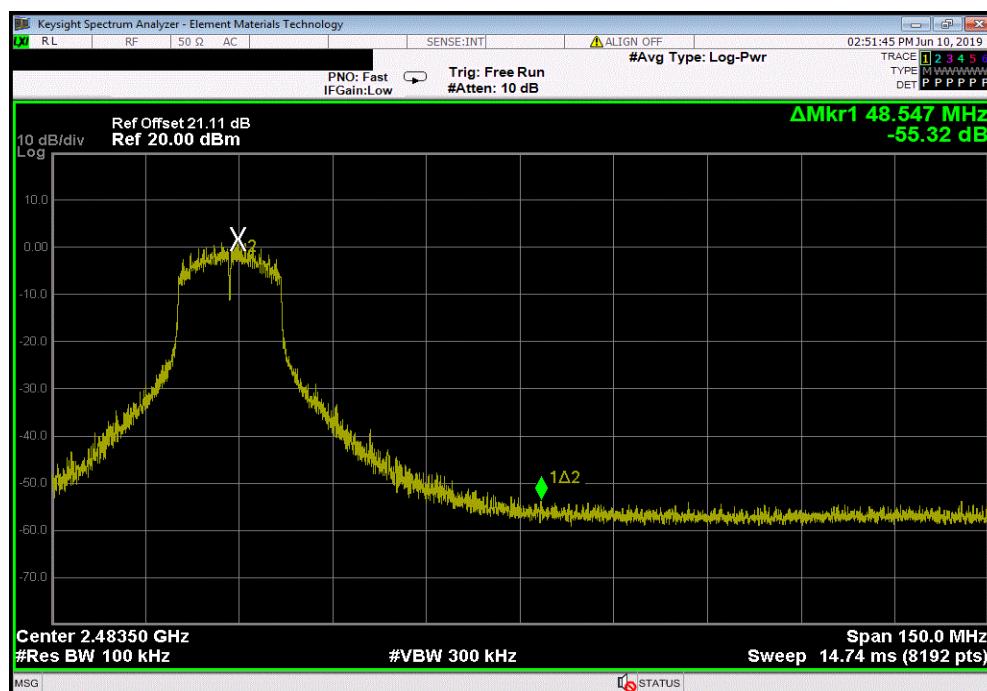
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Single Channel 6, 2437 MHz (Lower Band Edge)

Value (dBc)	Limit ≤ (dBc)	Result
-51.28	-20	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Single Channel 6, 2437 MHz (Upper Band Edge)

Value (dBc)	Limit ≤ (dBc)	Result
-55.32	-20	Pass



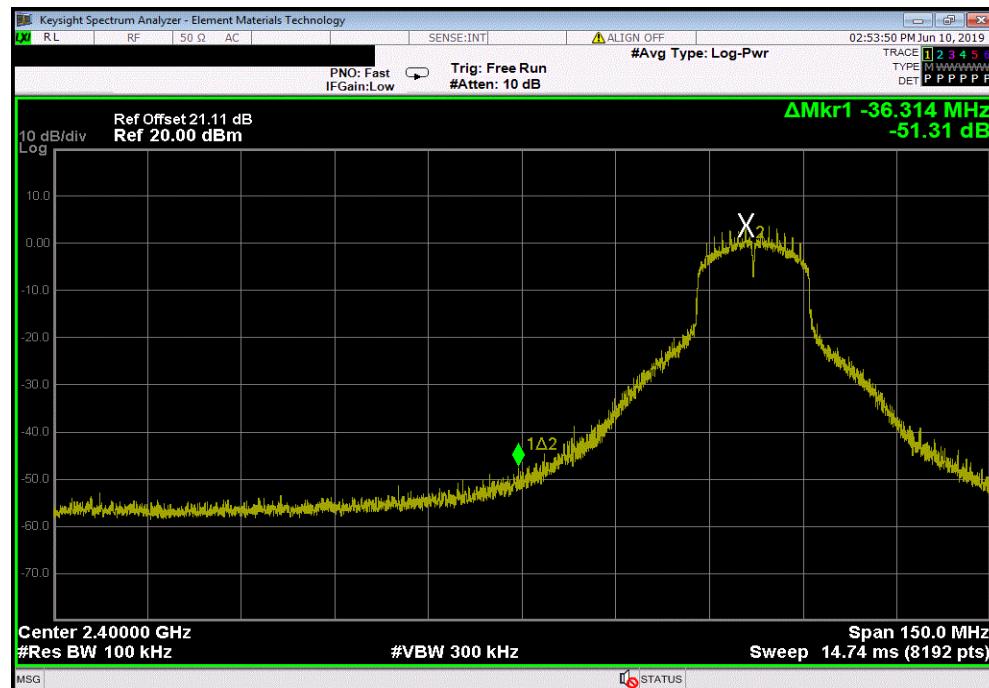
BAND EDGE COMPLIANCE



TbTx 2018.09.13 XMI 2019.05.15

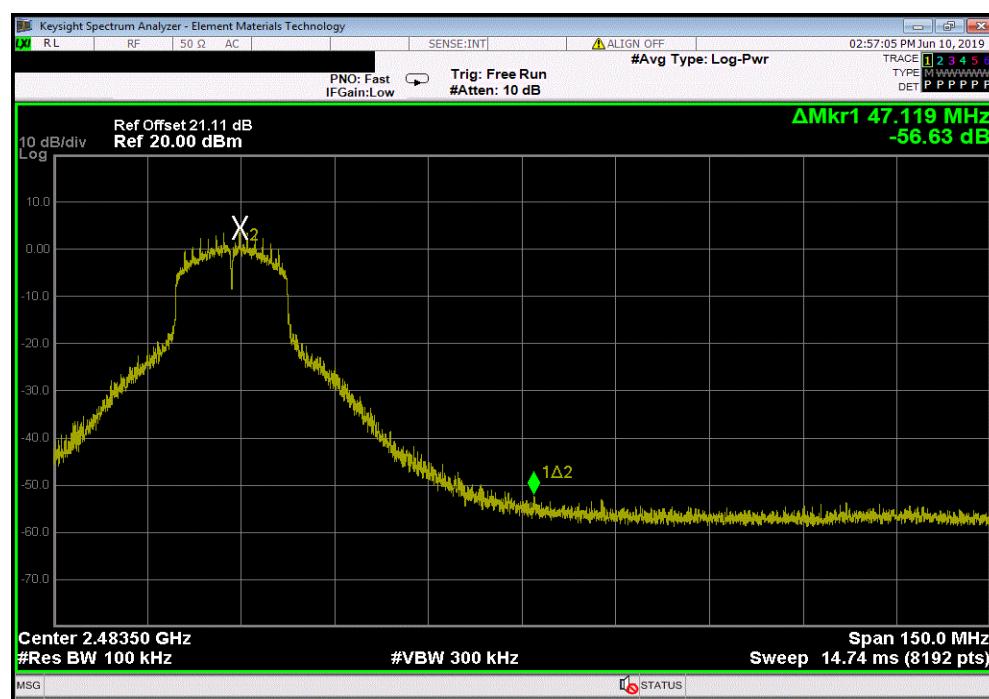
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz (Lower Band Edge)

Value (dBc)	Limit ≤ (dBc)	Result
-51.31	-20	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz (Upper Band Edge)

Value (dBc)	Limit ≤ (dBc)	Result
-56.63	-20	Pass



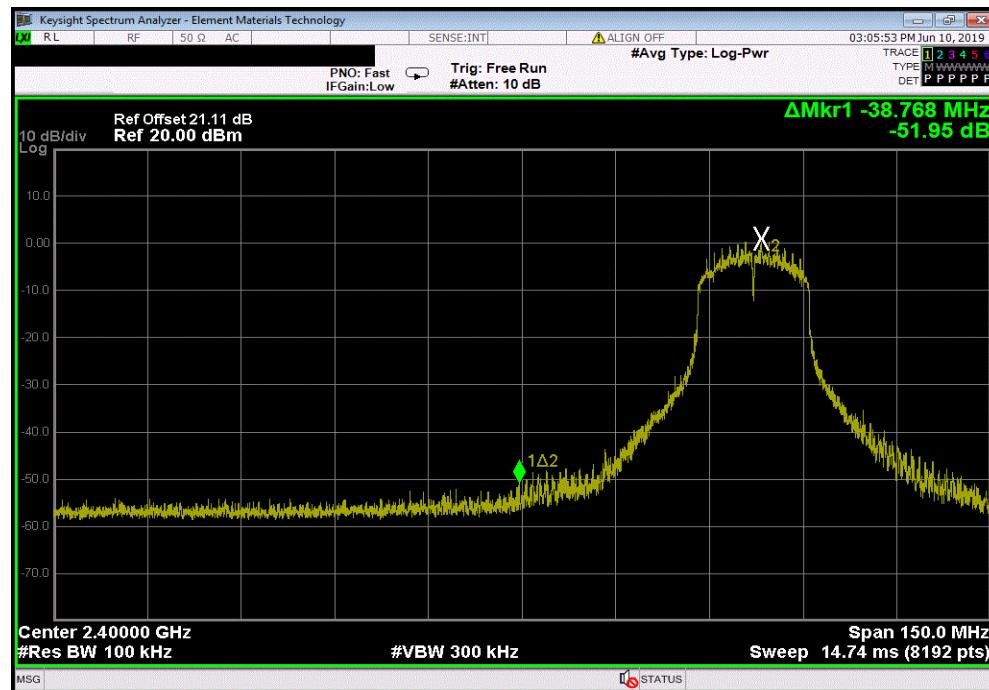
BAND EDGE COMPLIANCE



TbTx 2018.09.13 XMT 2019.05.15

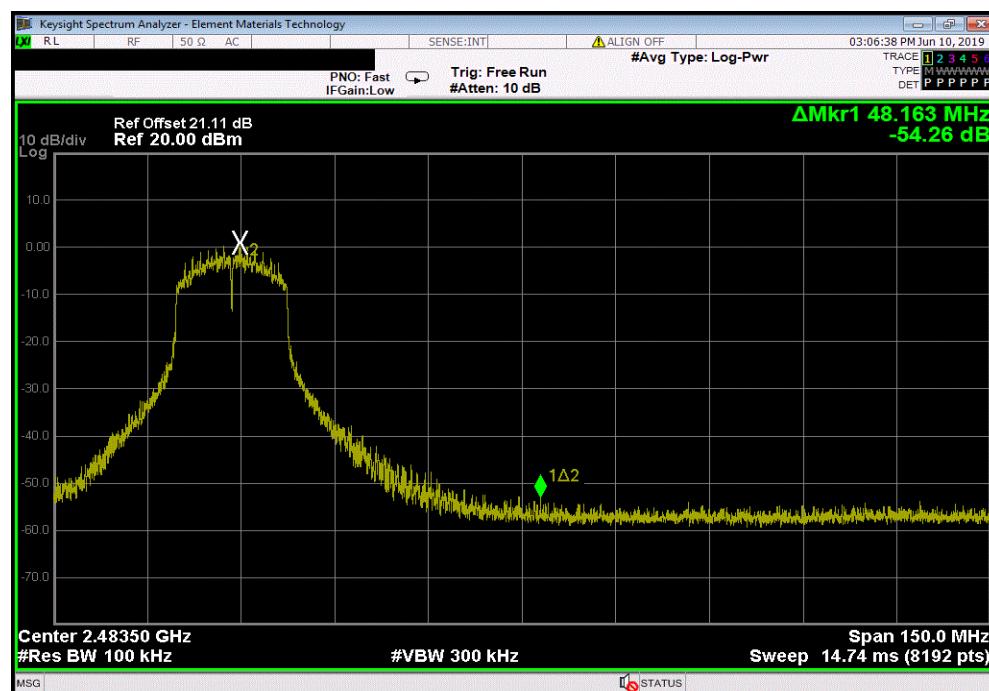
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Single Channel 6, 2437 MHz (Lower Band Edge)

Value (dBc)	Limit ≤ (dBc)	Result
-51.95	-20	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Single Channel 6, 2437 MHz (Upper Band Edge)

Value (dBc)	Limit ≤ (dBc)	Result
-54.26	-20	Pass



SPURIOUS CONDUCTED EMISSIONS



XMIT 2019.05.15

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.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Attenuator	Fairview Microwave	SA4018-20	TYE	10-Oct-18	10-Oct-19
Block - DC	Fairview Microwave	SD3379	AMT	10-Oct-18	10-Oct-19
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	10-Oct-18	10-Oct-19
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	19-Mar-19	19-Mar-20

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS



TbTx 2018.09.13 XMI 2019.05.15

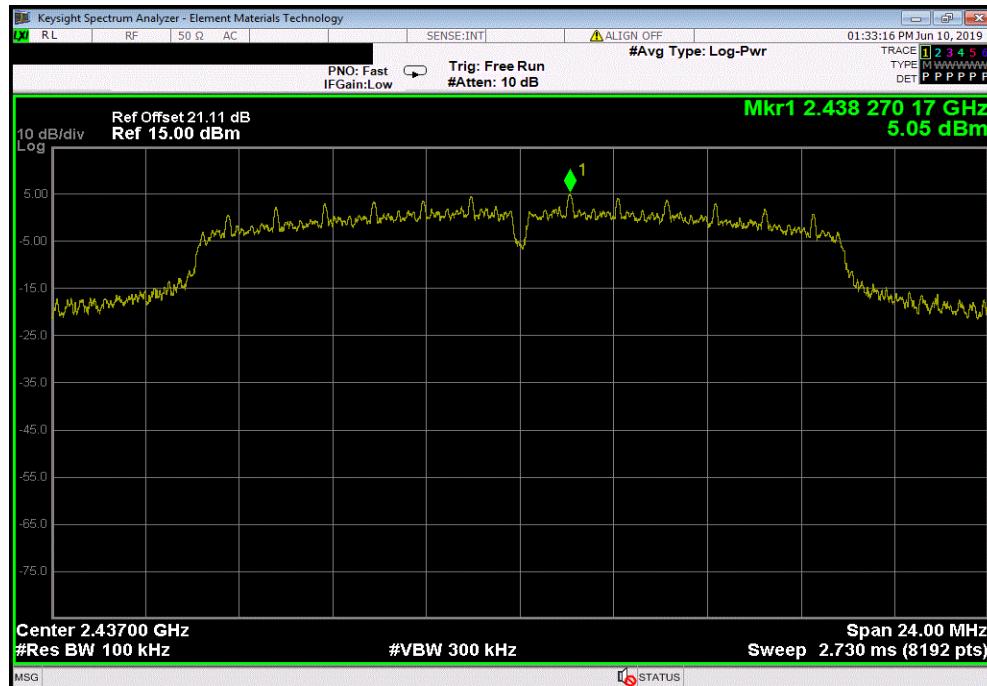
EUT:	VISTA Wi-Fi Base		Work Order:	WTVD0015						
Serial Number:	None		Date:	10-Jun-19						
Customer:	WatchGuard Video		Temperature:	22 °C						
Attendees:	Navaid Karimi		Humidity:	46.3% RH						
Project:	None		Barometric Pres.:	1028 mbar						
Tested by:	Jonathan Kiefer	Power:	Battery	Job Site: TX09						
TEST SPECIFICATIONS	Test Method									
FCC 15.247:2019	ANSI C63.10:2013									
COMMENTS	Reference Level Offset of 21.11 dB (20dB Attenuator+DC Block+Cable).									
DEVIATIONS FROM TEST STANDARD										
None										
Configuration #	4	Signature	<i>Jonathan Kiefer</i>							
		Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result				
2400 MHz - 2483.5 MHz Band										
802.11(g) 6 Mbps										
Single Channel 6, 2437 MHz	Fundamental	2438.27	N/A	N/A	N/A	N/A				
Single Channel 6, 2437 MHz	30 MHz - 12.5 GHz	2660.71	-54.83	-20	Pass					
Single Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24955.74	-44.65	-20	Pass					
802.11(g) 36 Mbps										
Single Channel 6, 2437 MHz	Fundamental	2438.27	N/A	N/A	N/A	N/A				
Single Channel 6, 2437 MHz	30 MHz - 12.5 GHz	5772.5	-52.89	-20	Pass					
Single Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24908.44	-43.07	-20	Pass					
802.11(g) 54 Mbps										
Single Channel 6, 2437 MHz	Fundamental	2438.27	N/A	N/A	N/A	N/A				
Single Channel 6, 2437 MHz	30 MHz - 12.5 GHz	12477.16	-51.59	-20	Pass					
Single Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24813.82	-41.22	-20	Pass					
802.11(n) MCS0										
Single Channel 6, 2437 MHz	Fundamental	2438.26	N/A	N/A	N/A	N/A				
Single Channel 6, 2437 MHz	30 MHz - 12.5 GHz	5868.41	-54	-20	Pass					
Single Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24971	-43.36	-20	Pass					
802.11(n) MCS7										
Single Channel 6, 2437 MHz	Fundamental	2438.27	N/A	N/A	N/A	N/A				
Single Channel 6, 2437 MHz	30 MHz - 12.5 GHz	5990.21	-50.21	-20	Pass					
Single Channel 6, 2437 MHz	12.5 GHz - 25 GHz	24900.81	-40.38	-20	Pass					

SPURIOUS CONDUCTED EMISSIONS

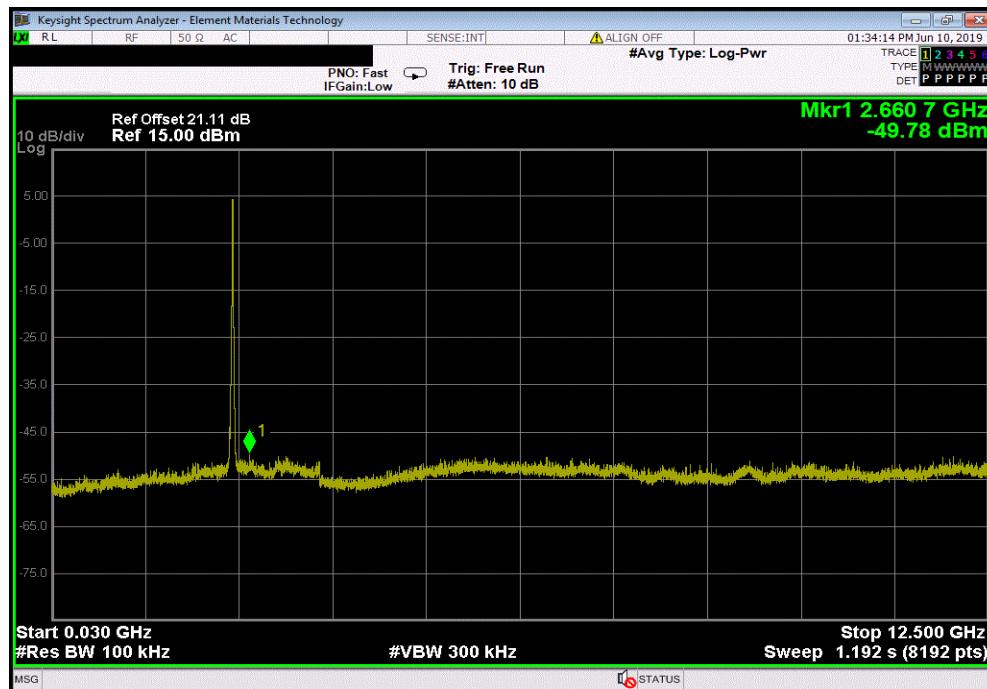


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2438.27	N/A	N/A	N/A	



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	2660.71	-54.83	-20	Pass	

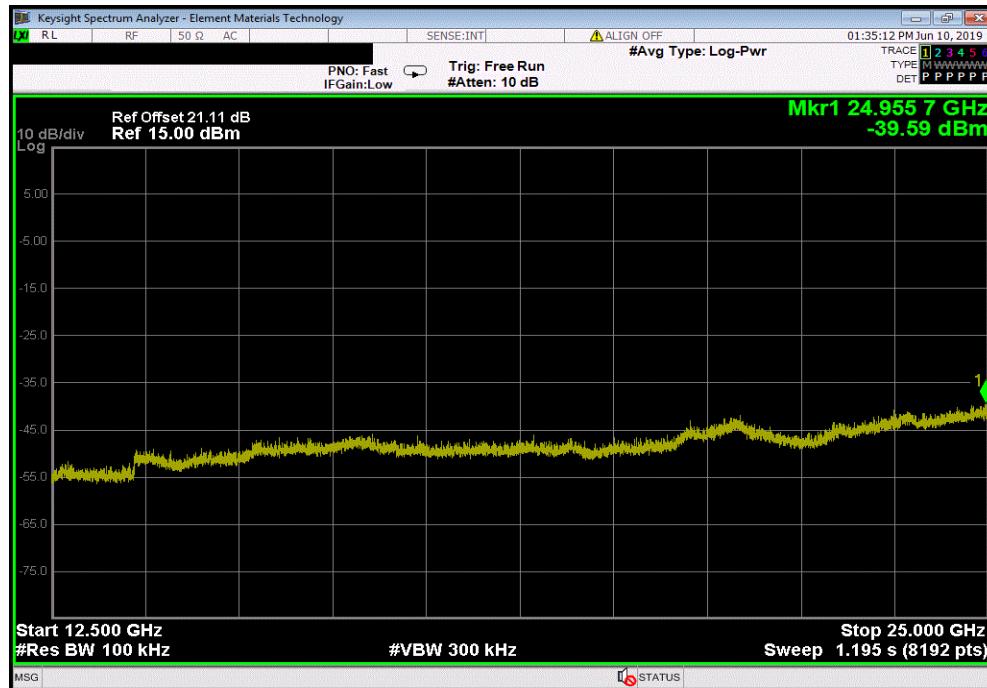


SPURIOUS CONDUCTED EMISSIONS

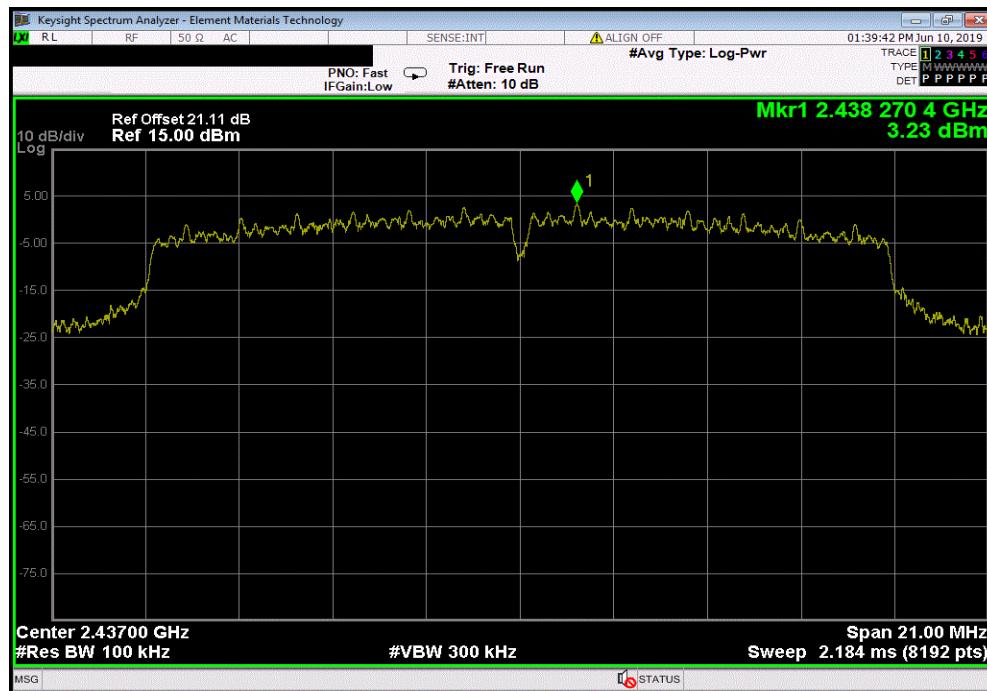


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Single Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24955.74	-44.65	-20	Pass	



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2438.27	N/A	N/A	N/A	

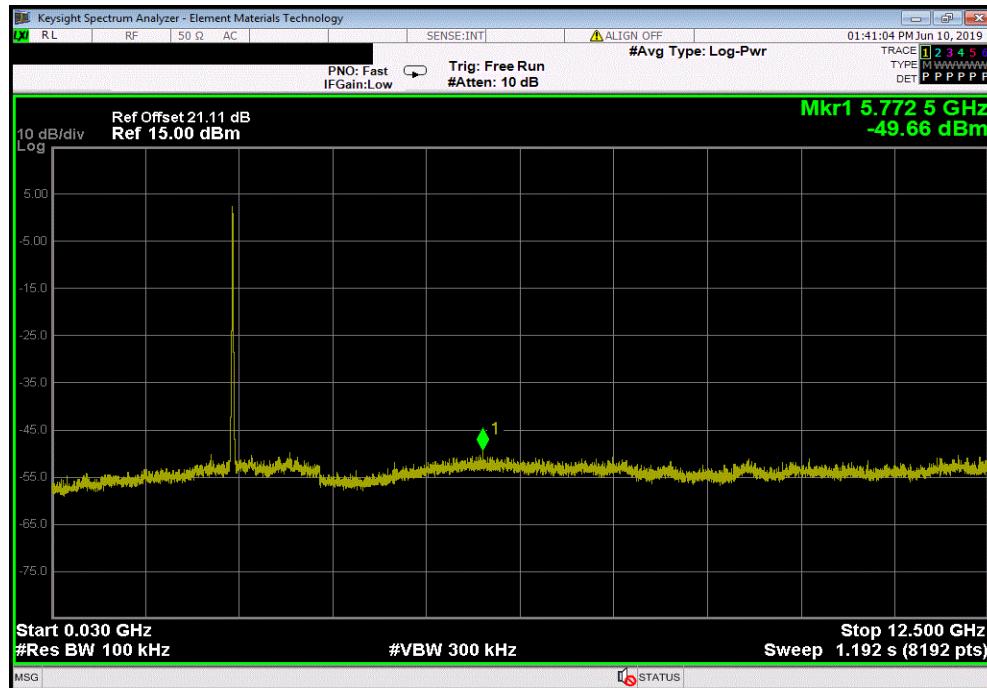


SPURIOUS CONDUCTED EMISSIONS

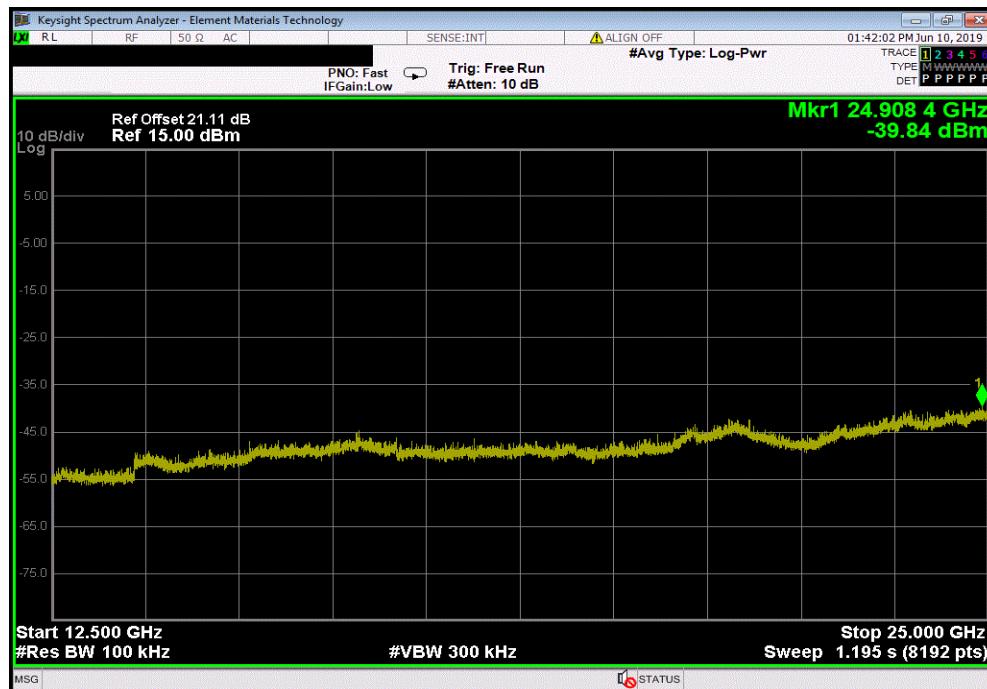


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit \leq (dBc)	Result
30 MHz - 12.5 GHz	5772.5	-52.89	-20	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Single Channel 6, 2437 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit \leq (dBc)	Result
12.5 GHz - 25 GHz	24908.44	-43.07	-20	Pass

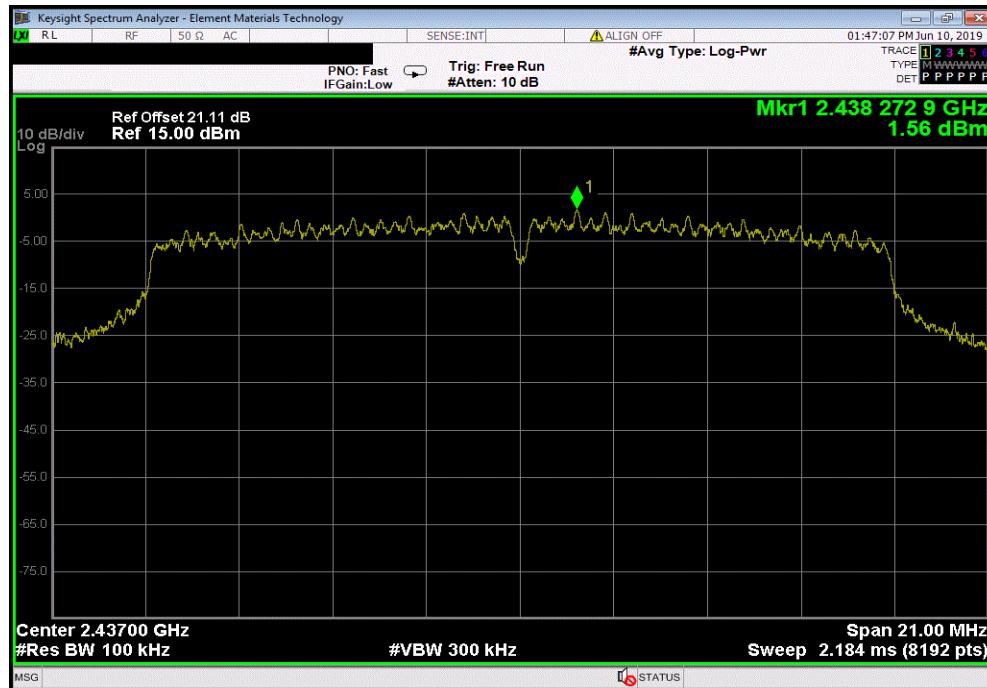


SPURIOUS CONDUCTED EMISSIONS

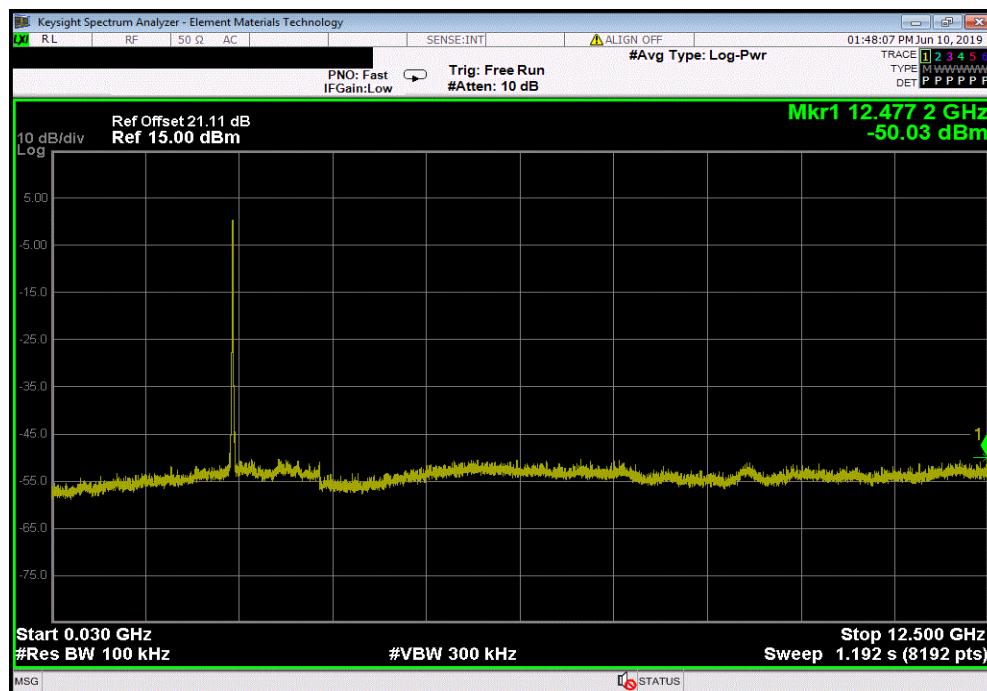


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Single Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2438.27	N/A	N/A	N/A	



Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	12477.16	-51.59	-20	Pass

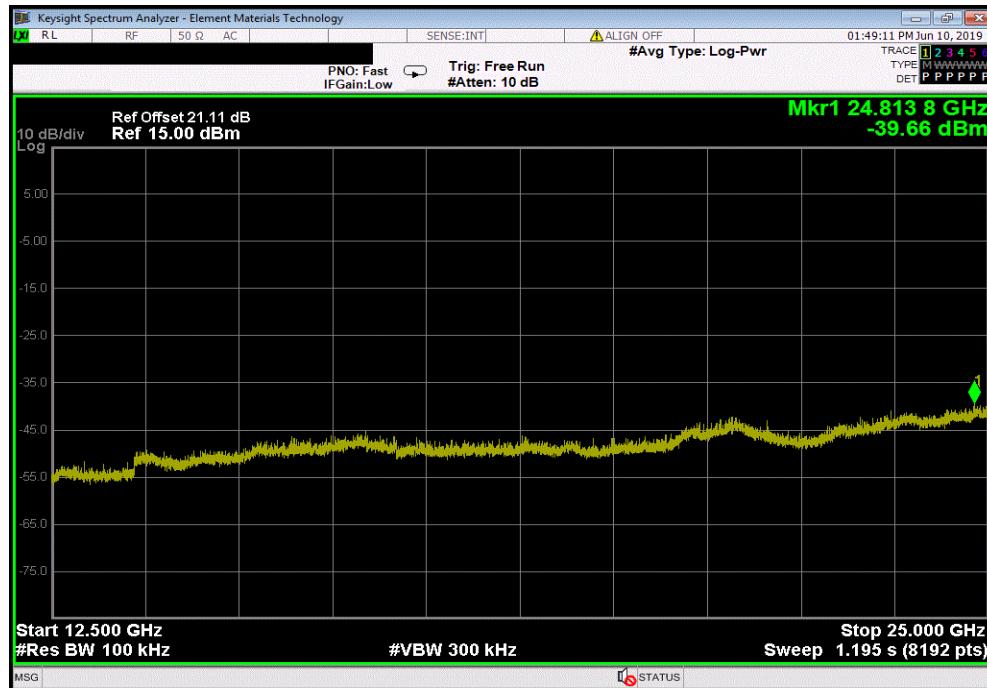


SPURIOUS CONDUCTED EMISSIONS

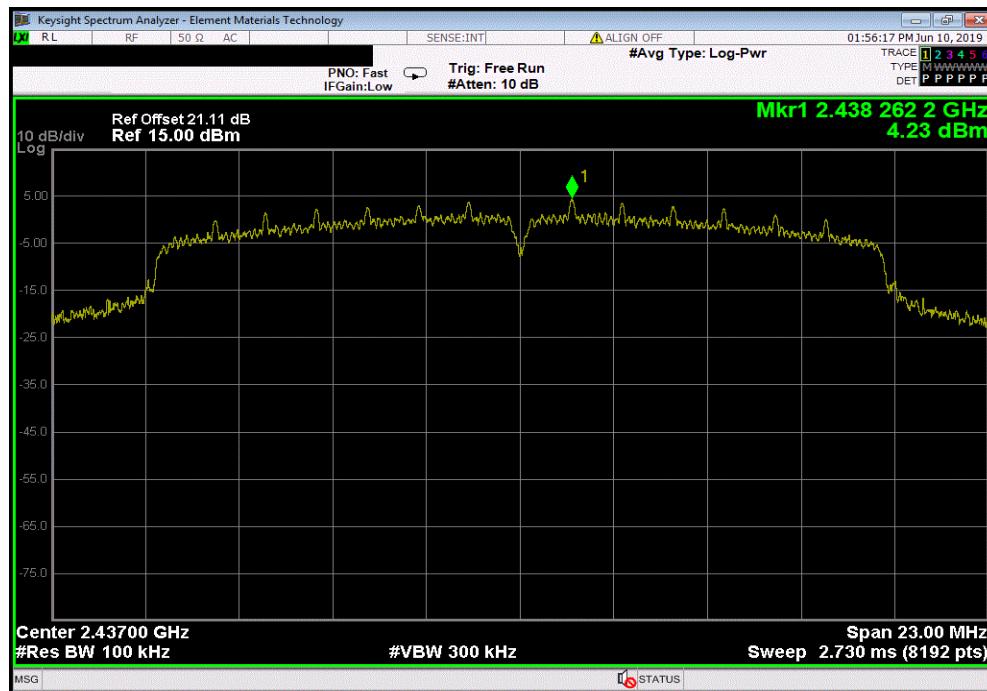


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Single Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24813.82	-41.22	-20	Pass	



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2438.26	N/A	N/A	N/A	N/A

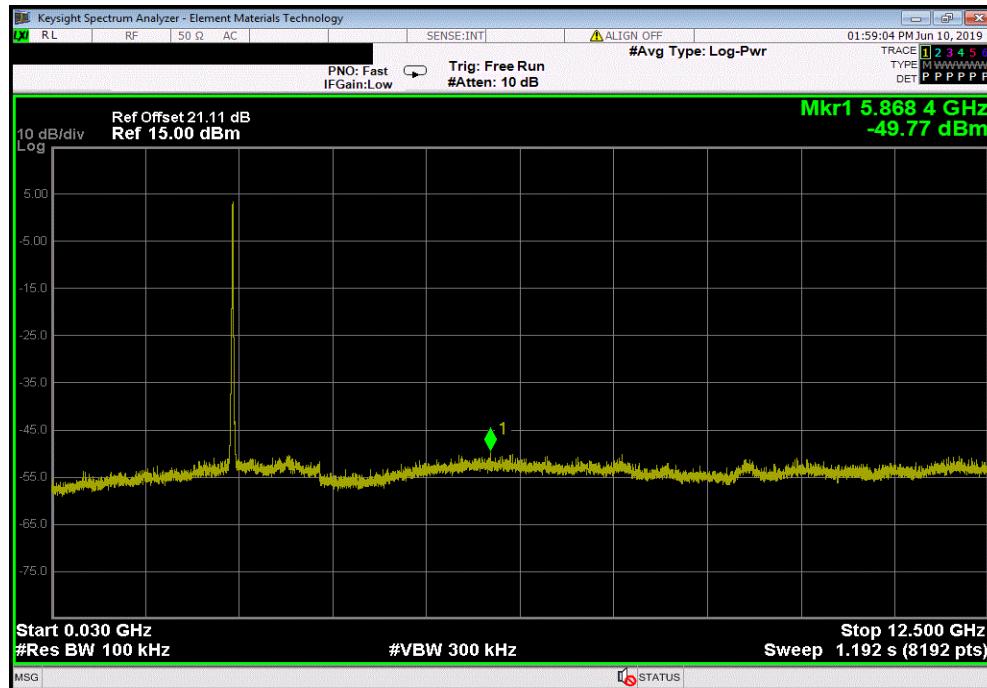


SPURIOUS CONDUCTED EMISSIONS

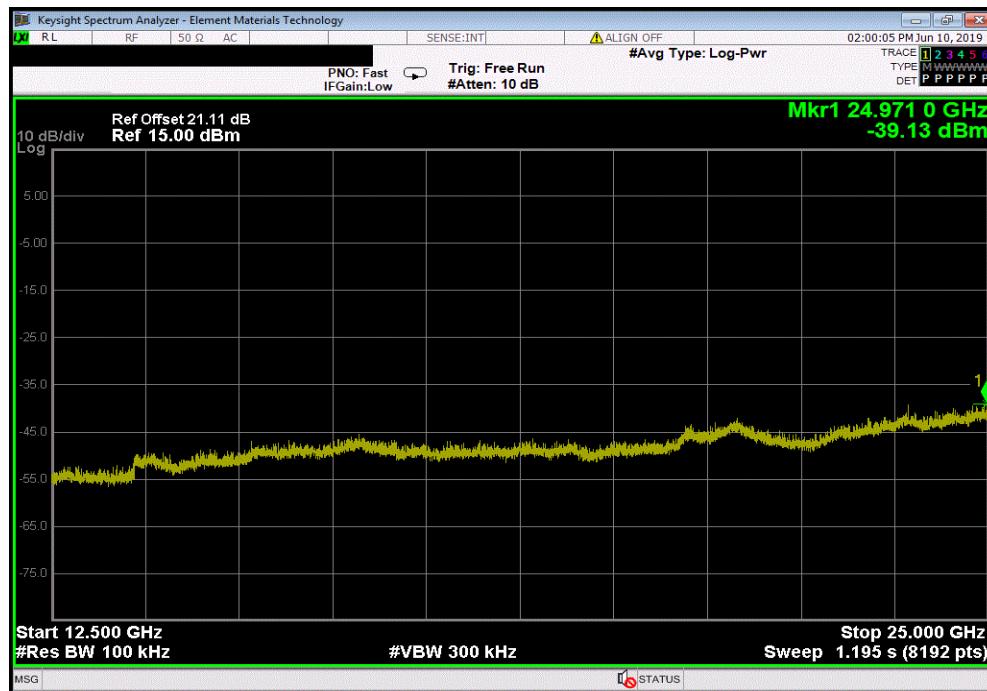


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit \leq (dBc)	Result
30 MHz - 12.5 GHz	5868.41	-54	-20	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Single Channel 6, 2437 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit \leq (dBc)	Result
12.5 GHz - 25 GHz	24971	-43.36	-20	Pass

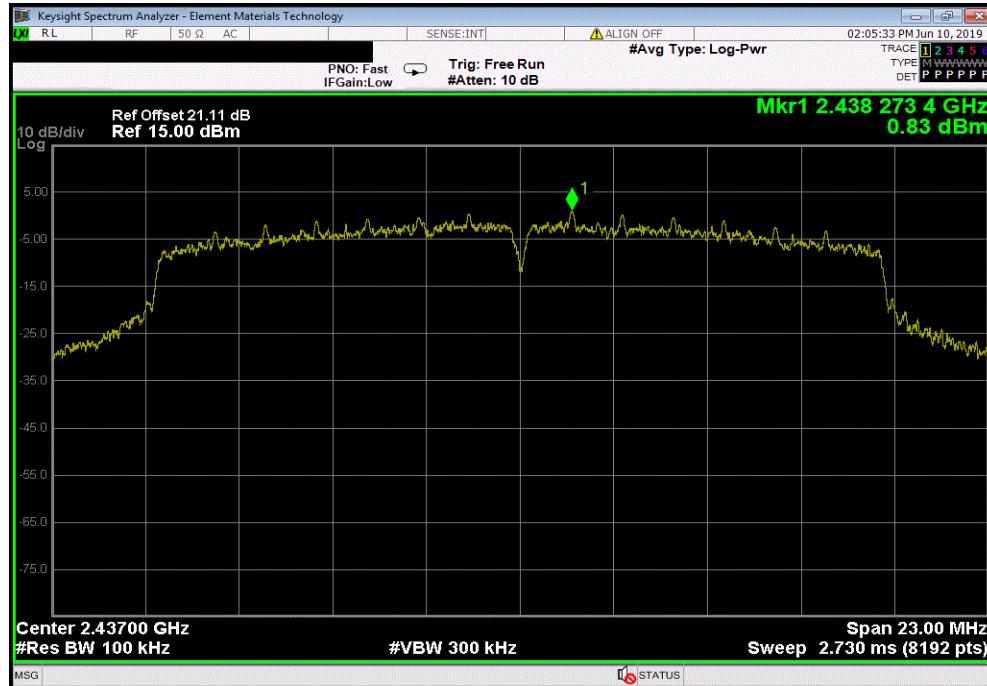


SPURIOUS CONDUCTED EMISSIONS

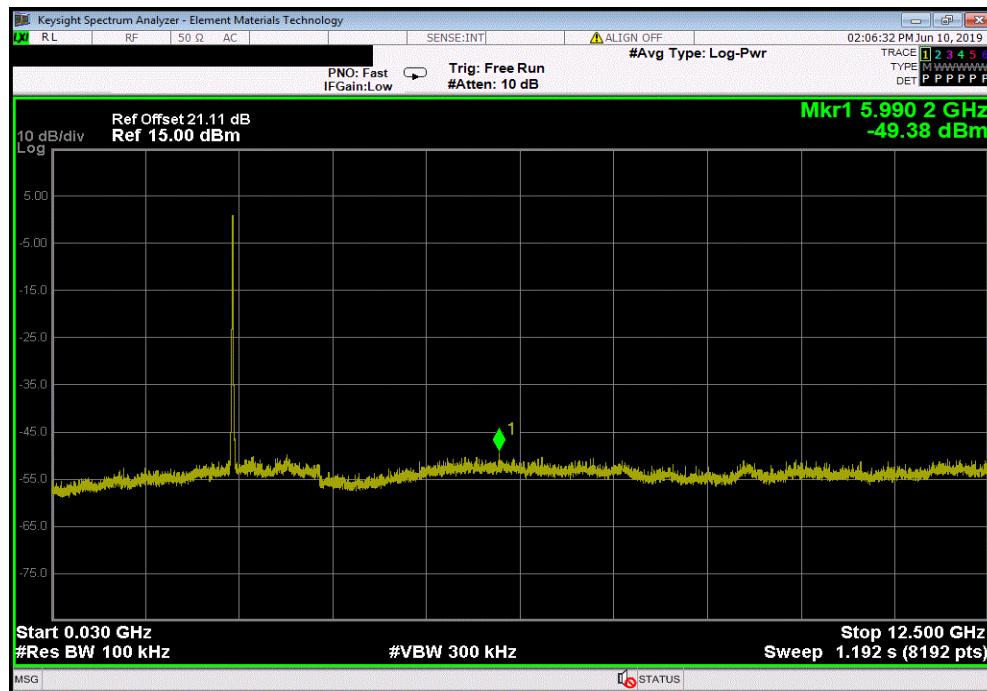


TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Single Channel 6, 2437 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2438.27	N/A	N/A	N/A	



Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	5990.21	-50.21	-20	Pass



SPURIOUS CONDUCTED EMISSIONS



TbTx 2018.09.13 XMI 2019.05.15

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Single Channel 6, 2437 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24900.81	-40.38	-20	Pass

