



RF TEST REPORT



Report No.: FCC_IC_SL17063001-RUC-018_DTS
Supersede Report No.:


Applicant	:	Ruckus Wireless, Inc.
Product Name	:	T310 (C/D) Access Point
Model No.	:	T310
Test Standard	:	47 CFR 15.247 RSS-247 Issue 2, February 2017
Test Method	:	ANSI C63.10: 2013 RSS Gen Iss 4: Nov 2014 558074 D01 DTS Meas Guidance v03r05
FCC ID	:	S9GT310
IC ID	:	5912A-T310
Dates of test	:	08/21/2017-10/05/2017
Issue Date	:	10/06/2017
Test Result	:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Equipment complied with the specification <input checked="" type="checkbox"/>		
Equipment did not comply with the specification <input type="checkbox"/>		

This Test Report is Issued Under the Authority of:	
	
Cipher	Chen Ge
Test Engineer	Engineer Reviewer

Issued By:
SIEMIC Laboratories
775 Montague Expressway, Milpitas, 95035 CA



775 Montague Expressway, Milpitas, CA 95035, USA • Phone: (+1) 408 526 1188 • Facsimile (+1) 408 526 1088

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Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/RRA, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELECOM, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC, RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom, Safety
Israel	MOC, NIST	EMC, RF, Telecom, Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB, NIST	EMC, RF, Telecom
Singapore	IDA, NIST	EMC, RF, Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_IC_SL17063001-RUC-018_DTS	None	Original	10/06/2017

2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: Ruckus Wireless, Inc.
Product: T310 (C/D) Access Point
Model: T310

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1st page.

3 Customer information

Applicant Name	:	Ruckus Wireless, Inc.
Applicant Address	:	350 West Java Drive, Sunnyvale, California 94089 U.S.A
Manufacturer Name	:	Ruckus Wireless, Inc.
Manufacturer Address	:	350 West Java Drive, Sunnyvale, California 94089 U.S.A

4 Test site information

Lab performing tests	SIEMIC Laboratories
Lab Address	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	881796
IC Test Site No.	4842D-2
VCCI Test Site No.	A0133

5 Modification

Index	Item	Description	Note
-	-	-	-

6 EUT Information

6.1 EUT Description

Product Name	T310 (C/D) Access Point
Model No.	T310
Trade Name	Ruckus
Serial No.	291706000098
Host Model No.	N/A
Input Power	100-240VAC 50/60Hz
Power Adapter Manu/Model	HK-AD-120A100-US
Power Adapter SN	N/A
Date of EUT received	08/20/2017
Equipment Class/ Category	DTS, UNII
Port/Connectors	PoE, Ethernet

6.2 Radio Description

Radio Type	802.11b	802.11g	802.11n-20M	802.11n-40M
Operating Frequency	2412-2462MHz	2412-2462MHz	2412-2462MHz	2422-2452MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	5MHz	5MHz	5MHz	5MHz
Number of Channels	11	11	11	7
Antenna Type	PCB Antenna			
Antenna Gain (Peak)	2.4G: 2.5dBi for Vertical 1dBi for Horizontal			
Antenna Connector Type	U.FL			
Note	Two PCB antenna's, One dual band horizontal, and One dual band vertical antenna.			

Note: The AP supports Beamforming mode and the power setting for Beamforming and Non-Beamforming modes are the same.

EUT Power level setting

Mode	Frequency (MHz)	Power setting
802.11-b	2412	43
802.11-b	2437	44
802.11-b	2462	42
802.11-g	2412	34
802.11-g	2437	42
802.11-g	2462	34
802.11-n-20	2412	33
802.11-n-20	2437	40
802.11-n-20	2462	34
802.11-n-40	2422	32
802.11-n-40	2437	40
802.11-n-40	2452	30

6.3 EUT Photos - External



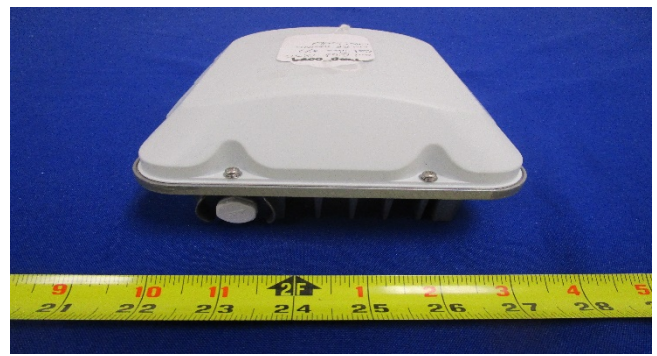
Top View



Bottom View



Front View



Rear View



Right Side View

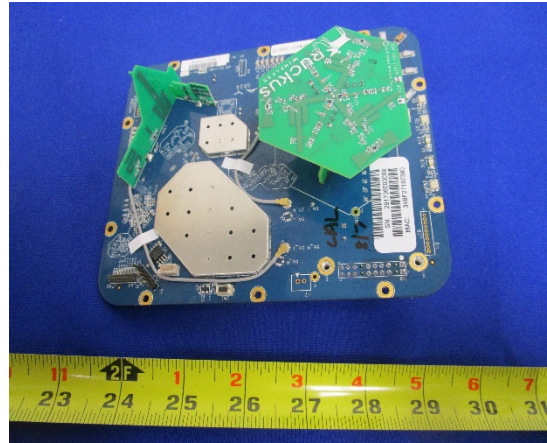


Left Side View

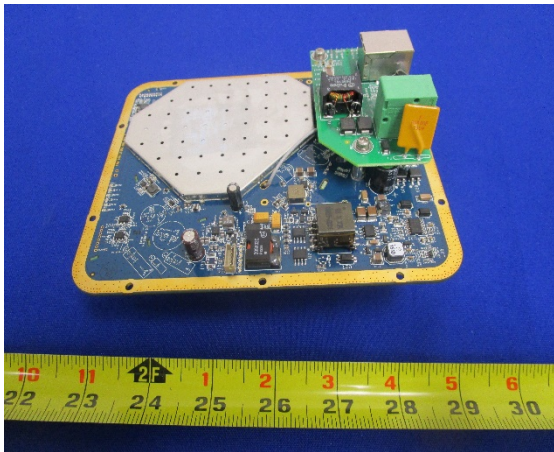
6.4 EUT Photos - Internal



EUT Case off View

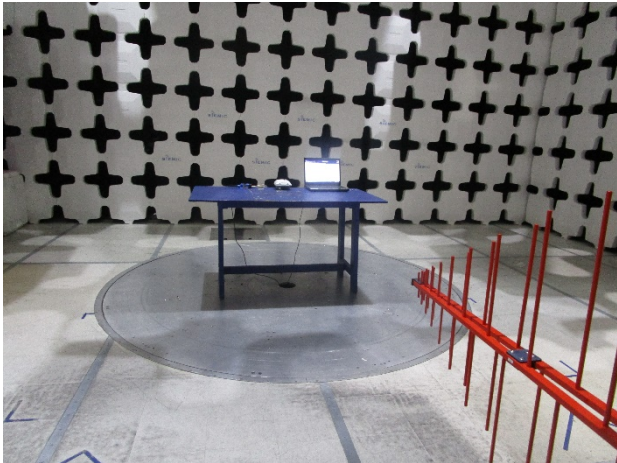


Modem Board Top View

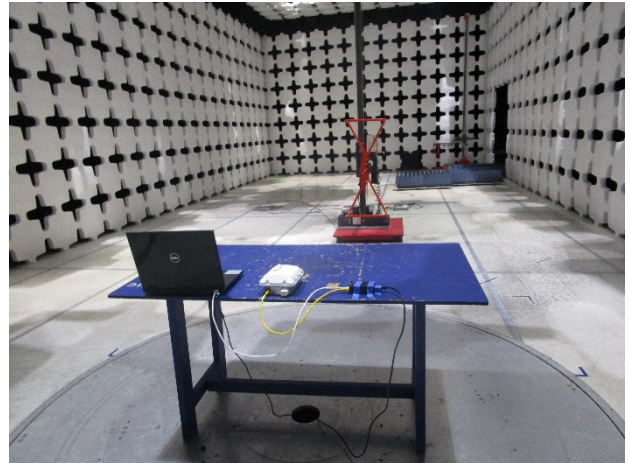


Modem Board Bottom View

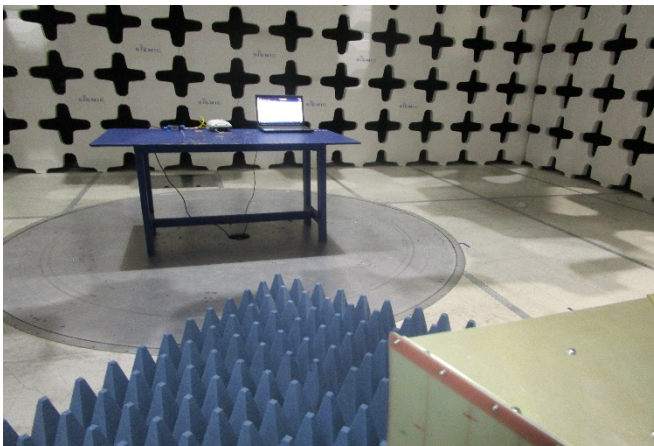
6.5 Test Setup Photos



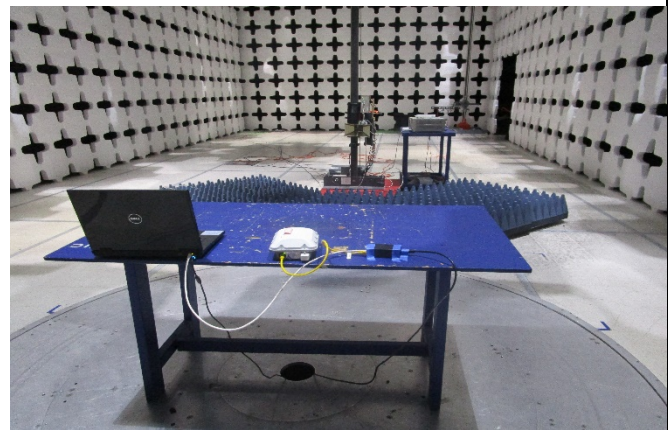
Radiated Emissions (<1GHz) – Front View



Radiated Emissions (<1GHz) – Rear View



Radiated Emissions (>1GHz) – Front View



Radiated Emissions (>1GHz) – Rear View



Conducted Emissions - P.O.E Mode – Front View



Conducted Emissions - P.O.E Mode – Rear View



Conducted Emissions - Power Supply Mode – Front View



Conducted Emissions - Power Supply Mode – Rear View

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Laptop	VOSTRO 1520	26543939185	Dell	-

7.2 Cabling Description

Item	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
1	EUT	RJ45	Power Over Ethernet Injector	RJ45	>3m	N/A	-
2	Laptop	RJ45	Power Over Ethernet Injector	RJ45	>3m	N/A	-

7.3 Test Software Description

Test Item	Software	Description
RF Testing	Command prompt	Set the EUT to transmit continuously in diferent test mode

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v03r05	<input checked="" type="checkbox"/> Pass
	IC	RSS Gen 8.10	IC		<input type="checkbox"/> N/A
AC Conducted Emissions	FCC	15.207(a)	FCC	ANSI C63.10:2013	<input checked="" type="checkbox"/> Pass
	IC	RSS Gen 8.8	IC	RSS Gen Issue 4: 2014	<input type="checkbox"/> N/A

DTS Band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
99% Occupied Bandwidth	-	-	-	-	<input checked="" type="checkbox"/> Pass
	IC	RSS Gen 6.6	IC	RSS Gen Issue 4: 2014 -	<input type="checkbox"/> N/A
6dB Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas Guidance v03r05	<input checked="" type="checkbox"/> Pass
	IC	RSS247 (5.2.1)	IC		<input type="checkbox"/> N/A
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.10:2013 558074 D01 DTS Meas Guidance v03r05	<input checked="" type="checkbox"/> Pass
	IC	RSS247 (5.5)	IC		<input type="checkbox"/> N/A
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas Guidance v03r05	<input checked="" type="checkbox"/> Pass
	IC	RSS247 (5.4.4)	IC		<input type="checkbox"/> N/A
Receiver Spurious Emissions	IC	RSS Gen (4.8)	IC	RSS Gen Issue 4: 2014	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	-	<input type="checkbox"/> Pass
	IC	-	IC	-	<input checked="" type="checkbox"/> N/A
Power Spectral Density	FCC	15.247(e)	FCC	558074 D01 DTS Meas Guidance v03r05	<input checked="" type="checkbox"/> Pass
	IC	RSS247 (5.2.2)	IC		<input type="checkbox"/> N/A
RF Exposure requirement	FCC	15.247(i)	FCC	-	<input type="checkbox"/> Pass
	IC	RSS Gen(5.5)	IC	RSS Gen Issue 4: 2014	<input checked="" type="checkbox"/> N/A
Remark	<ol style="list-style-type: none"> All measurement uncertainties do not take into consideration for all presented test results. The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual. 				

9 Measurement Uncertainty

9.1 Conducted Emissions

The test is to measure the conducted emissions to the mains port of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the LISN
- Uncertainty of cables
- Uncertainty due to the mismatches
- Etc, see the below table for details

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
LISN Insertion Loss	0.40	Normal	2	1	0.20
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch LISN - Receiver	0.25	U-Shape	1.414	1	0.1768033
LISN Impedance	2.5	Triangular	2.449	1	1.0208248
Combined Standard Uncertainty					1.928133
Expanded Uncertainty (K=2)					3.856266

The total derived measurement uncertainty is +/- 3.86 dB.

9.2 Radiated Emissions (30MHz to 1GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Filter Insertion Loss	0.25	Normal	2	1	0.125
Antenna Factor	0.65	Normal	2	1	0.325
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.86605081
PRF Response	1.5	Rectangular	1.732	1	0.86605081
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
NSA Calibration	4.0	U-Shape	1.414	1	2.8288543
Combined Standard Uncertainty					3.0059131
Expanded Uncertainty (K=2)					6.0118262

The total derived measurement uncertainty is +/- 6.00 dB.

9.3 Radiated Emissions (1GHz to 40GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- VSWR Calibration
- Etc., details see the below table

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Receiver Reading	0.12	Rectangular	1.732	1	0.0692840
Cable Insertion Loss	0.21	Normal	2	1	0.1050000
Filter Insertion Loss	0.25	Normal	2	1	0.1250000
Antenna Factor	0.65	Normal	2	1	0.3250000
Receiver CW accuracy	0.5	Rectangular	1.732	1	0.2886836
Pulse Amplitude Response	1.5	Rectangular	1.732	1	0.8660508
PRF Response	1.5	Rectangular	1.732	1	0.8660508
Mismatch Filter - Receiver	0.25	U-Shape	1.414	1	0.1768033
VSWR Calibration	2.0	U-Shape	1.414	1	1.4144272
Combined Standard Uncertainty					4.2363
Expanded Uncertainty (K=2)					8.4726

The total derived measurement uncertainty is +/- 8.47 dB.

9.4 RF conducted measurement

The test is to measure the RF output power from the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the Reference Level Uncertainty
- Uncertainty of variable attenuators
- Uncertainty of cables
- Uncertainty due to the mismatches

Source of Uncertainty	Value (dB)	Probability Distribution	Division	Sensitivity Coefficient	Expanded Uncertainty
Reference Level	0.12	Rectangular	1.732	1	0.069284
Cable Insertion Loss	0.21	Normal	2	1	0.105
Attenuator	0.25	Normal	2	1	0.125
Mismatch	0.25	U-Shape	1.414	1	0.1768033
Combined Standard Uncertainty					0.476087
Expanded Uncertainty (K=2)					0.952174

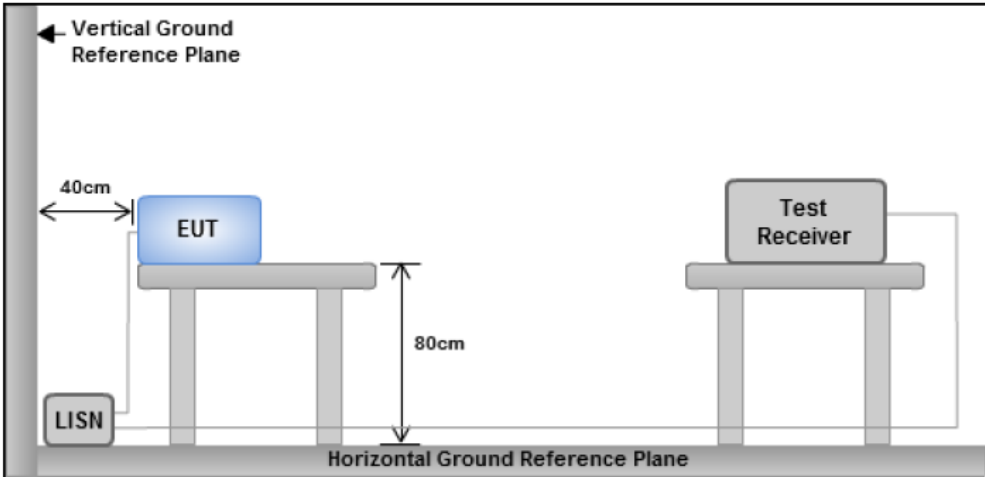
The total derived measurement uncertainty is +/- 0.95 dB.

10 Measurements, Examination and Derived Results

10.1 Conducted Emissions

Conducted Emission Limit

Frequency ranges (MHz)	Limit (dBuV)	
	QP	Average
0.15 ~ 0.5	66 - 56	56 - 46
0.5 ~ 5	56	46
5 ~ 30	60	50

Spec	Item	Requirement	Applicable
15.207(a) RSS247(A8.1)	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.	<input checked="" type="checkbox"/>
Test Setup	 <p>Note: 1. Support units were connected to second LISN. 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes</p>		
Procedure	<ul style="list-style-type: none"> - The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B. - The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains. - The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. - All other supporting equipment was powered separately from another main supply. 		
Remark	EUT was tested in two modes of operations: (1) P.O.E Mode; (2) Power Supply Mode		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

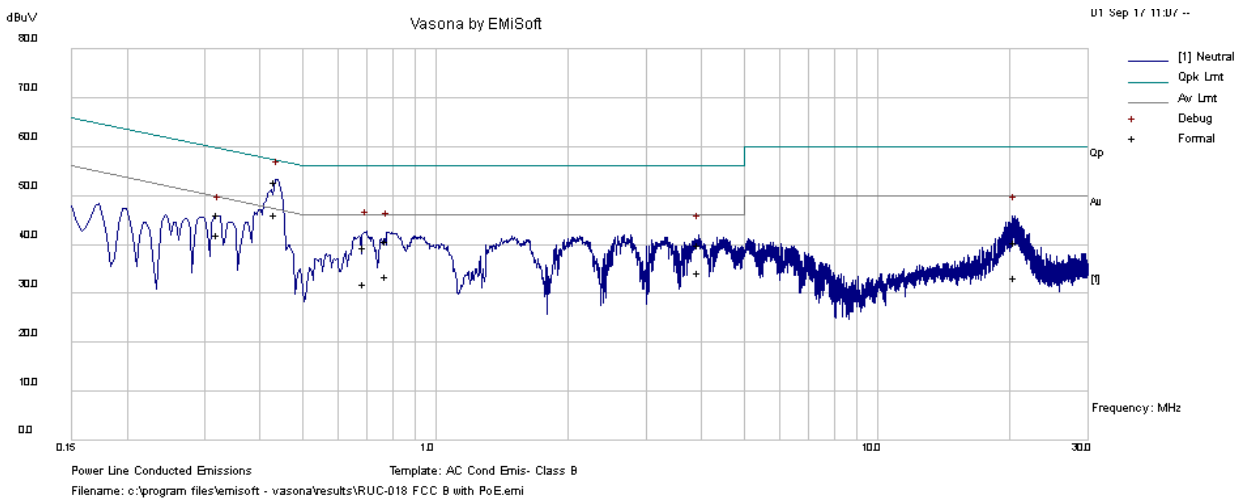
Test Data Yes N/A

Test Plot Yes (See below) N/A

Test was done by **Kushal Shastri** at Conducted Emission test site.

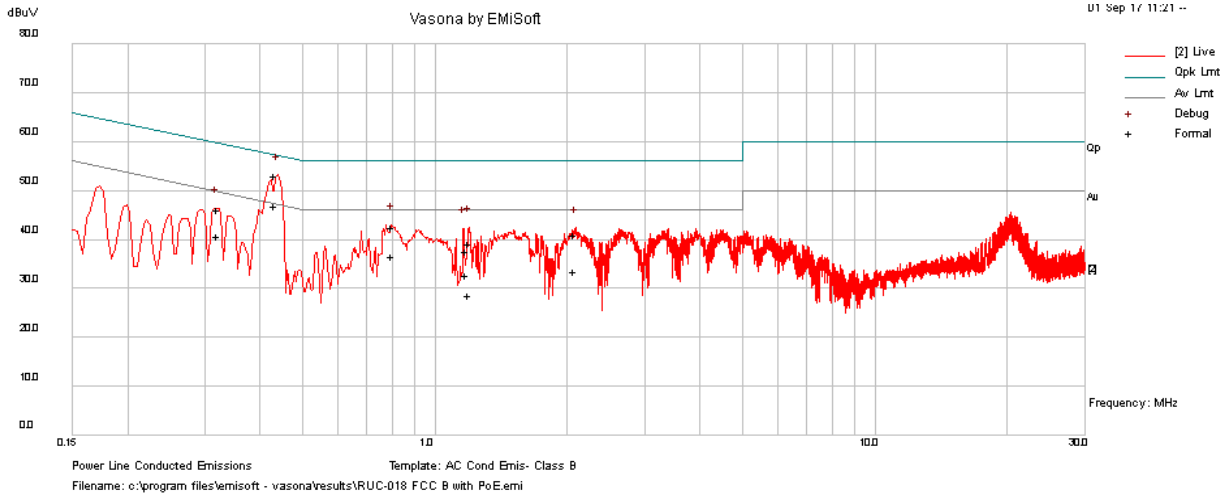
Conducted Emission Test Results

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	25.7	Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
	Humidity (%):	43.3		
	Atmospheric(mbar):	1014.9		
Mains Power:	120Vac, 60Hz			
Tested by:	Kushal Shastri			
Test Date:	08/21/2017-10/05/2017			
Remarks	Neutral- P.O.E Mode			



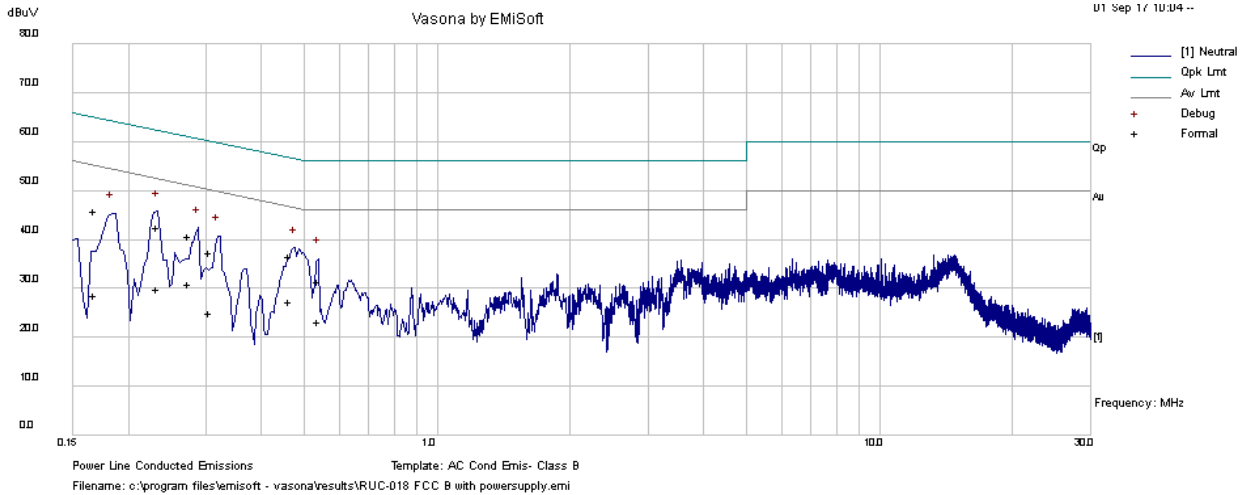
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.432421	42.16	10.01	0.68	52.84	Quasi Peak	Neutral	57.21	-4.36	Pass
0.686549	28.78	10.01	0.56	39.35	Quasi Peak	Neutral	56	-16.65	Pass
0.771415	30.22	10.01	0.55	40.78	Quasi Peak	Neutral	56	-15.22	Pass
0.319527	35.24	10	0.81	46.06	Quasi Peak	Neutral	59.72	-13.66	Pass
3.932571	29.4	10.03	0.5	39.93	Quasi Peak	Neutral	56	-16.07	Pass
20.48071	29.82	10.07	0.67	40.56	Quasi Peak	Neutral	60	-19.44	Pass
0.432421	35.47	10.01	0.68	46.15	Average	Neutral	47.21	-1.06	Pass
0.686549	21.35	10.01	0.56	31.92	Average	Neutral	46	-14.08	Pass
0.771415	23.03	10.01	0.55	33.6	Average	Neutral	46	-12.4	Pass
0.319527	31.06	10	0.81	41.88	Average	Neutral	49.72	-7.84	Pass
3.932571	23.65	10.03	0.5	34.18	Average	Neutral	46	-11.82	Pass
20.48071	22.54	10.07	0.67	33.28	Average	Neutral	50	-16.72	Pass

Test specification:	Conducted Emissions			
Environmental Conditions:	Temp(°C):	25.7	Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
	Humidity (%):	43.3		
	Atmospheric(mbar):	1014.9		
Mains Power:	120Vac, 60Hz			
Tested by:	Kushal Shastri			
Test Date:	08/21/2017-10/05/2017			
Remarks	Live - P.O.E Mode			



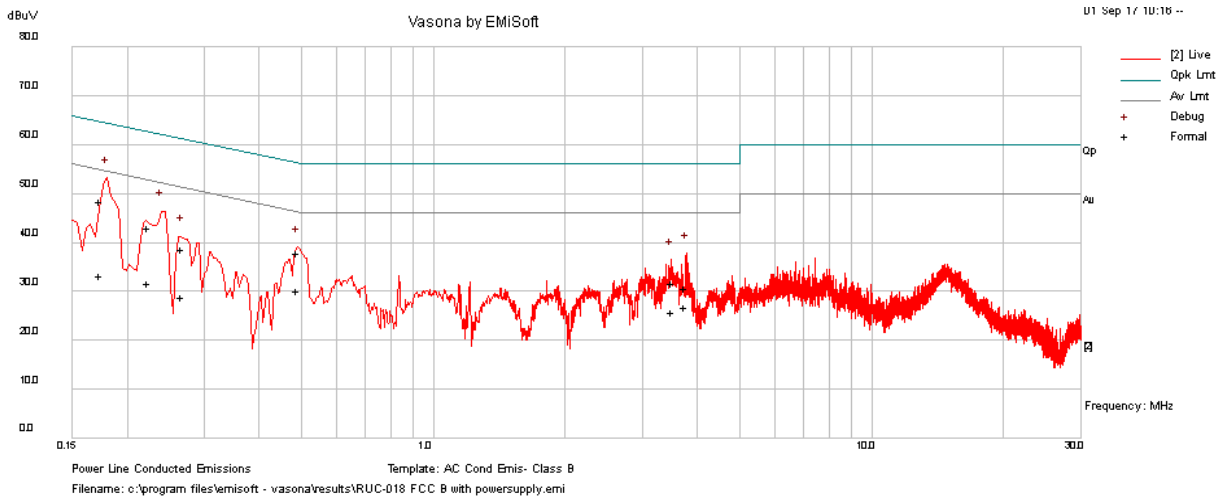
Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.432709	42.5	10.01	0.68	53.18	Quasi Peak	Live	57.2	-4.02	Pass
0.797327	32.02	10.01	0.55	42.58	Quasi Peak	Live	56	-13.42	Pass
0.320621	35.23	10	0.81	46.04	Quasi Peak	Live	59.69	-13.65	Pass
1.192701	28.73	10.02	0.52	39.27	Quasi Peak	Live	56	-16.73	Pass
2.080816	30.49	10.02	0.5	41.02	Quasi Peak	Live	56	-14.98	Pass
1.178802	27.07	10.02	0.52	37.6	Quasi Peak	Live	56	-18.4	Pass
0.432709	36.14	10.01	0.68	46.82	Average	Live	47.2	-0.38	Pass
0.797327	25.95	10.01	0.55	36.52	Average	Live	46	-9.48	Pass
0.320621	29.98	10	0.81	40.8	Average	Live	49.69	-8.89	Pass
1.192701	18.15	10.02	0.52	28.69	Average	Live	46	-17.31	Pass
2.080816	22.94	10.02	0.5	33.46	Average	Live	46	-12.54	Pass
1.178802	22.11	10.02	0.52	32.65	Average	Live	46	-13.35	Pass

Test specification:	Conducted Emissions				
Environmental Conditions:	Temp(°C):	25.7	Result:	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
	Humidity (%):	43.3			
	Atmospheric(mbar):	1014.9			
Mains Power:	120Vac, 60Hz				
Tested by:	Kushal Shastri				
Test Date:	08/21/2017-10/05/2017				
Remarks	Neutral- Power Supply				



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.23281	31.49	10	1.08	42.58	Quasi Peak	Neutral	62.35	-19.77	Pass
0.463756	25.99	10.01	0.65	36.65	Quasi Peak	Neutral	56.63	-19.97	Pass
0.273752	29.75	10	0.93	40.68	Quasi Peak	Neutral	61	-20.32	Pass
0.168108	34.22	10	1.52	45.75	Quasi Peak	Neutral	65.05	-19.3	Pass
0.305904	26.39	10	0.84	37.23	Quasi Peak	Neutral	60.08	-22.85	Pass
0.536705	20.9	10.01	0.61	31.52	Quasi Peak	Neutral	56	-24.48	Pass
0.23281	18.74	10	1.08	29.82	Average	Neutral	52.35	-22.52	Pass
0.463756	16.74	10.01	0.65	27.4	Average	Neutral	46.63	-19.22	Pass
0.273752	19.99	10	0.93	30.91	Average	Neutral	51	-20.09	Pass
0.168108	17.16	10	1.52	28.69	Average	Neutral	55.05	-26.37	Pass
0.305904	14.22	10	0.84	25.06	Average	Neutral	50.08	-25.02	Pass
0.536705	12.69	10.01	0.61	23.31	Average	Neutral	46	-22.69	Pass

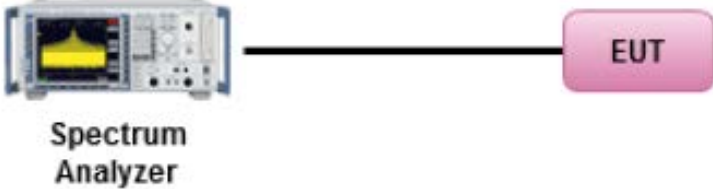
Test specification:	Conducted Emissions				
Environmental Conditions:	Temp(°C):	25.7	Result:	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
	Humidity (%):	43.3			
	Atmospheric(mbar):	1014.9			
Mains Power:	120Vac, 60Hz				
Tested by:	Kushal Shastri				
Test Date:	08/21/2017-10/05/2017				
Remarks	Live- Power Supply				



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV)	Measurement Type	Line / Neutral	Limit (dBuV)	Margin (dB)	Pass /Fail
0.173242	37.05	10	1.47	48.52	Quasi Peak	Live	64.8	-16.28	Pass
0.223118	31.77	10	1.13	42.9	Quasi Peak	Live	62.7	-19.8	Pass
0.48802	27.3	10.01	0.64	37.95	Quasi Peak	Live	56.2	-18.25	Pass
3.762982	20.11	10.03	0.5	30.65	Quasi Peak	Live	56	-25.35	Pass
3.501415	21.29	10.03	0.5	31.82	Quasi Peak	Live	56	-24.18	Pass
0.267331	27.61	10	0.94	38.56	Quasi Peak	Live	61.2	-22.64	Pass
0.173242	21.71	10	1.47	33.18	Average	Live	54.8	-21.62	Pass
0.223118	20.52	10	1.13	31.65	Average	Live	52.7	-21.05	Pass
0.48802	19.45	10.01	0.64	30.1	Average	Live	46.2	-16.1	Pass
3.762982	16.34	10.03	0.5	26.87	Average	Live	46	-19.13	Pass
3.501415	15.15	10.03	0.5	25.68	Average	Live	46	-20.32	Pass
0.267331	17.79	10	0.94	28.74	Average	Live	51.2	-22.46	Pass

10.2 6dB & 99% Bandwidth

Requirement(s):

Spec	Requirement	Applicable
§ 15.247 RSS247 (5.2.1)	6dB BW≥500KHz;	<input checked="" type="checkbox"/>
RSS Gen 4.6.1	The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual. The trace data points are recovered and directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>	
Test Procedure	558074 D01 DTS Meas Guidance v03r05, 8.1 DTS bandwidth <u>6dB Emission bandwidth measurement procedure</u> <ul style="list-style-type: none"> - Set RBW = 100 kHz. - Set the video bandwidth (VBW) ≥ 3 x RBW. - Detector = Peak. - Trace mode = max hold. - Sweep = auto couple. - Allow the trace to stabilize. - Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. 	
Test Date	08/21/2017-10/05/2017	Environmental condition Temperature 23°C Relative Humidity 42% Atmospheric Pressure 1021mbar
Remark	N/A	
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	

Test Data Yes N/A

Test Plot Yes N/A

Test was done by Cipher at RF test site.

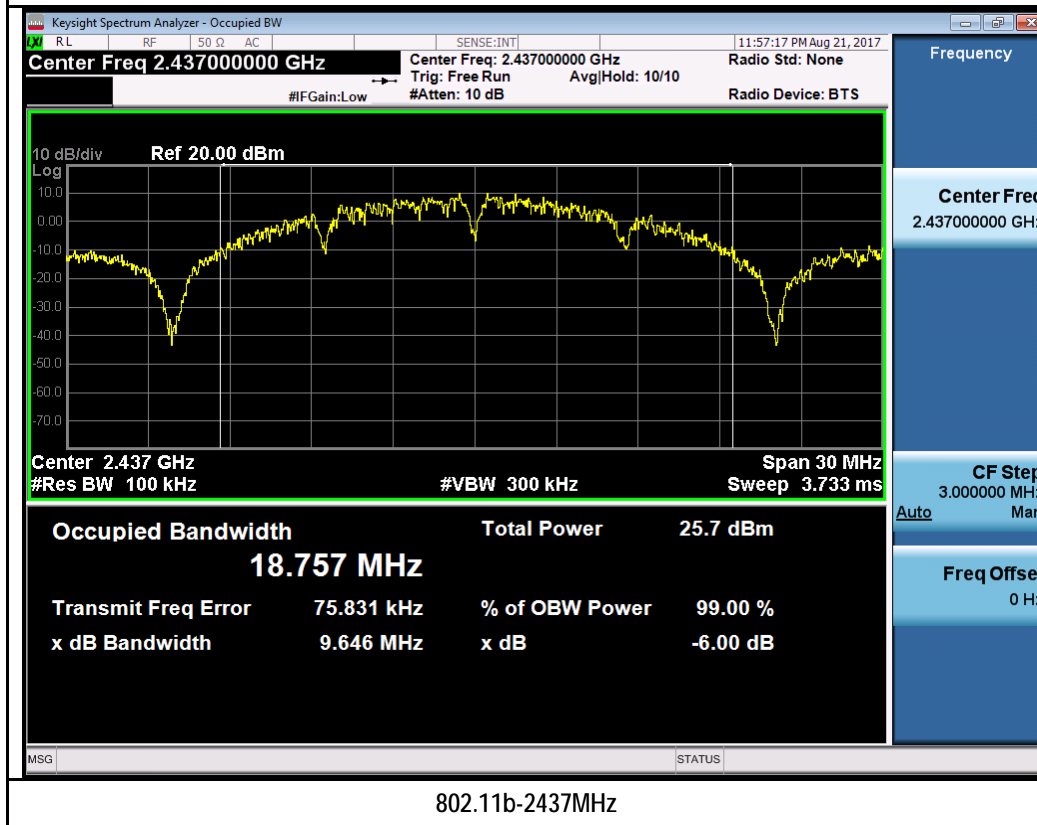
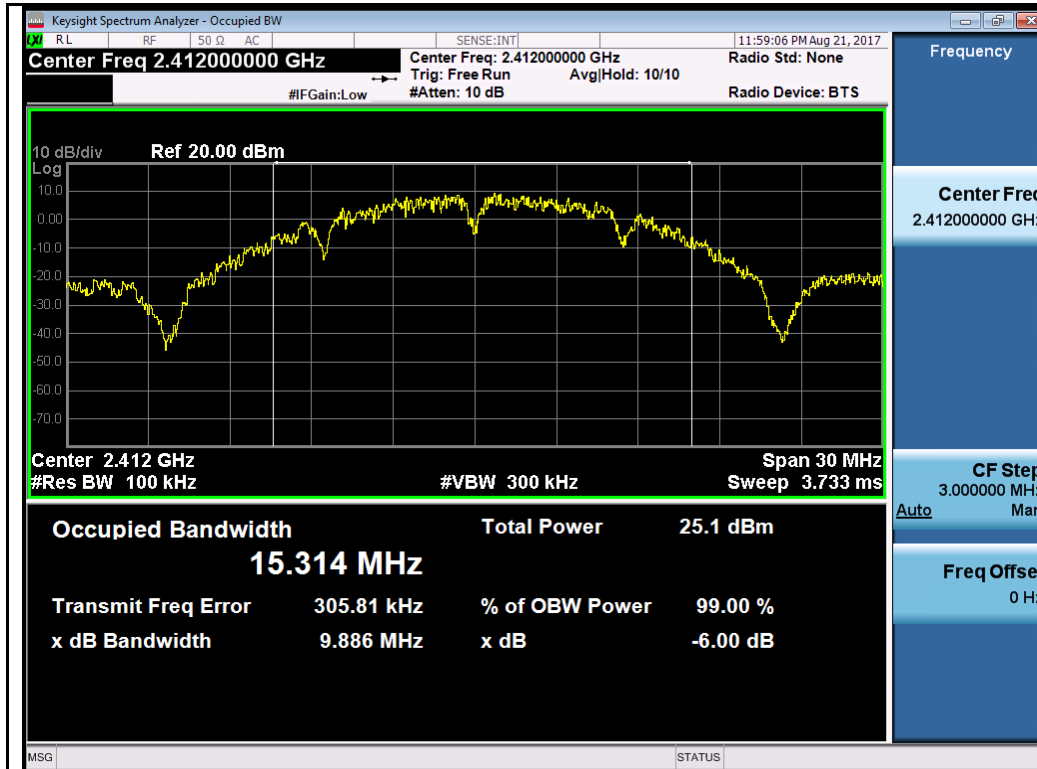
6dB Bandwidth measurement result for 2.4GHz

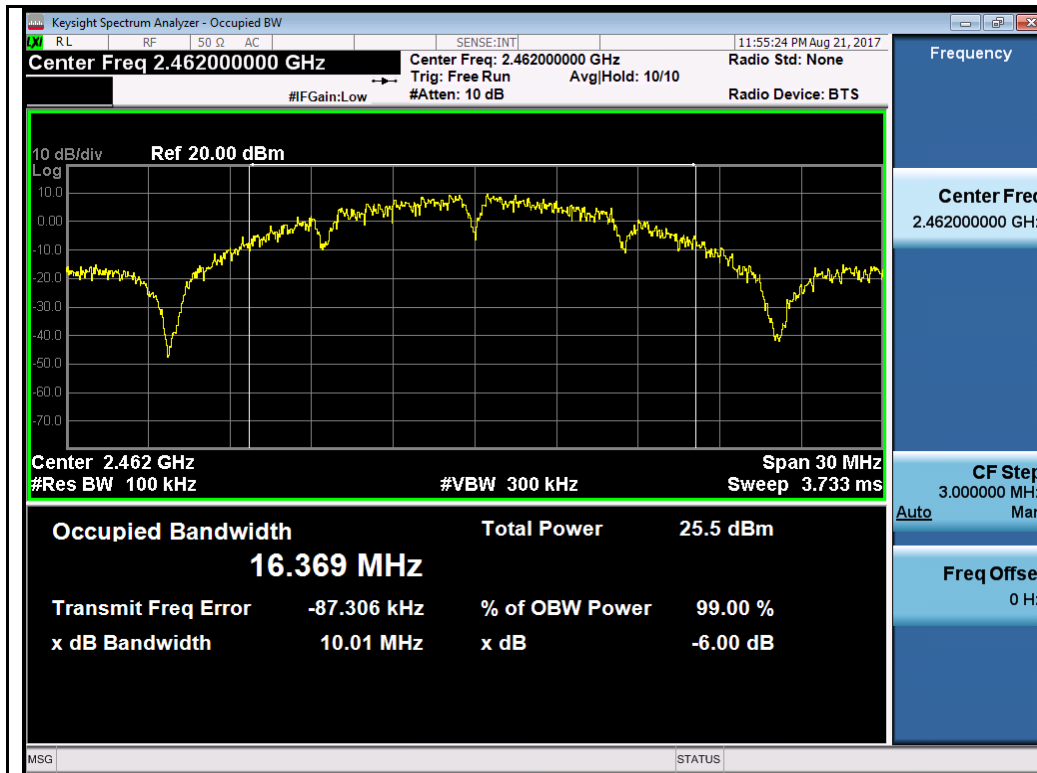
Type	Test mode	Freq (MHz)	CH	Result (MHz)	Limit (MHz)	Result
6dB BW	802.11b	2412	Low	9.886	≥0.5	Pass
		2437	Mid	9.646	≥0.5	Pass
		2462	High	10.008	≥0.5	Pass
	802.11g	2412	Low	16.332	≥0.5	Pass
		2437	Mid	15.270	≥0.5	Pass
		2462	High	15.677	≥0.5	Pass
	802.11n-20M	2412	Low	17.516	≥0.5	Pass
		2437	Mid	15.723	≥0.5	Pass
		2462	High	17.674	≥0.5	Pass
	802.11n-40M	2422	Low	30.431	≥0.5	Pass
		2437	Mid	33.860	≥0.5	Pass
		2452	High	34.210	≥0.5	Pass

99% OBW measurement result for 2.4GHz

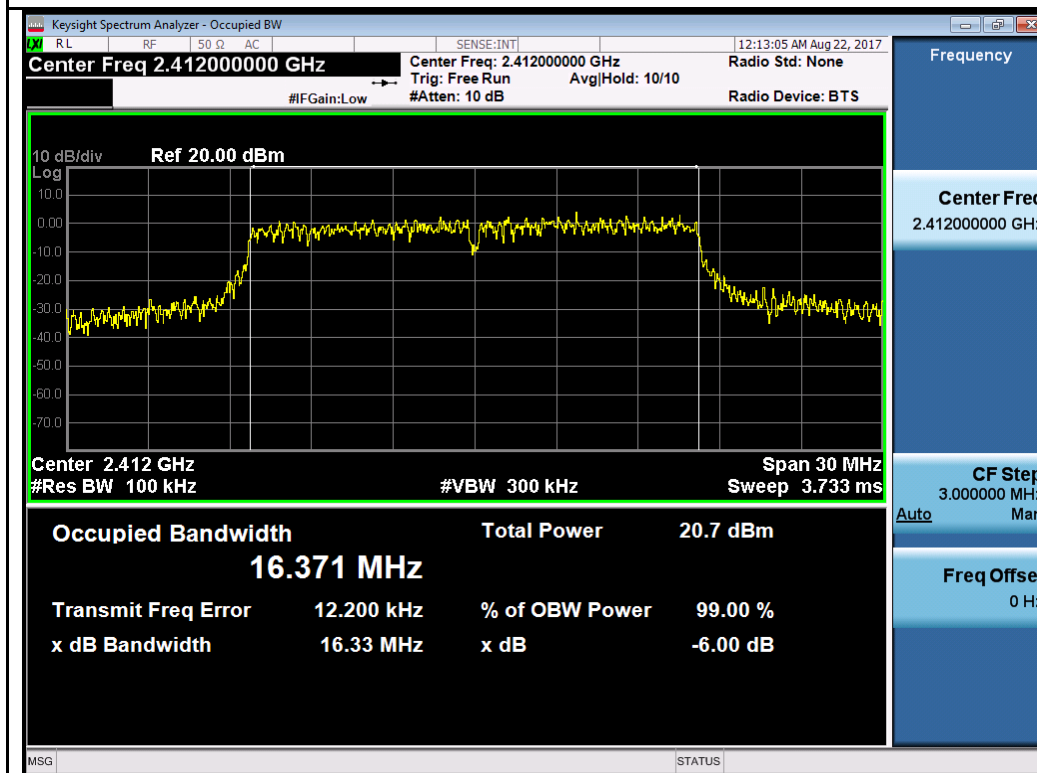
Type	Test mode	Freq (MHz)	CH	Result (MHz)
99% OBW	802.11b	2412	Low	15.314
		2437	Mid	18.757
		2462	High	16.369
	802.11g	2412	Low	16.371
		2437	Mid	16.448
		2462	High	16.391
	802.11n-20M	2412	Low	17.613
		2437	Mid	19.347
		2462	High	17.648
	802.11n-40M	2422	Low	35.878
		2437	Mid	36.113
		2452	High	36.049

6dB & 99% Bandwidth Test Plots





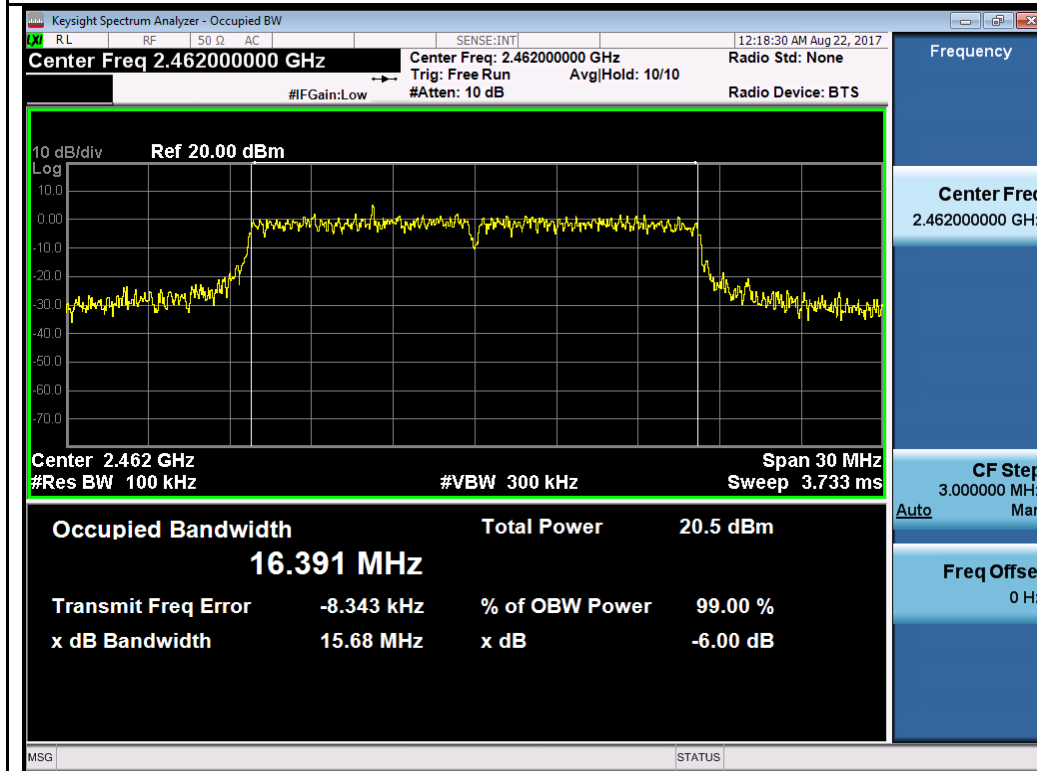
802.11b-2462MHz



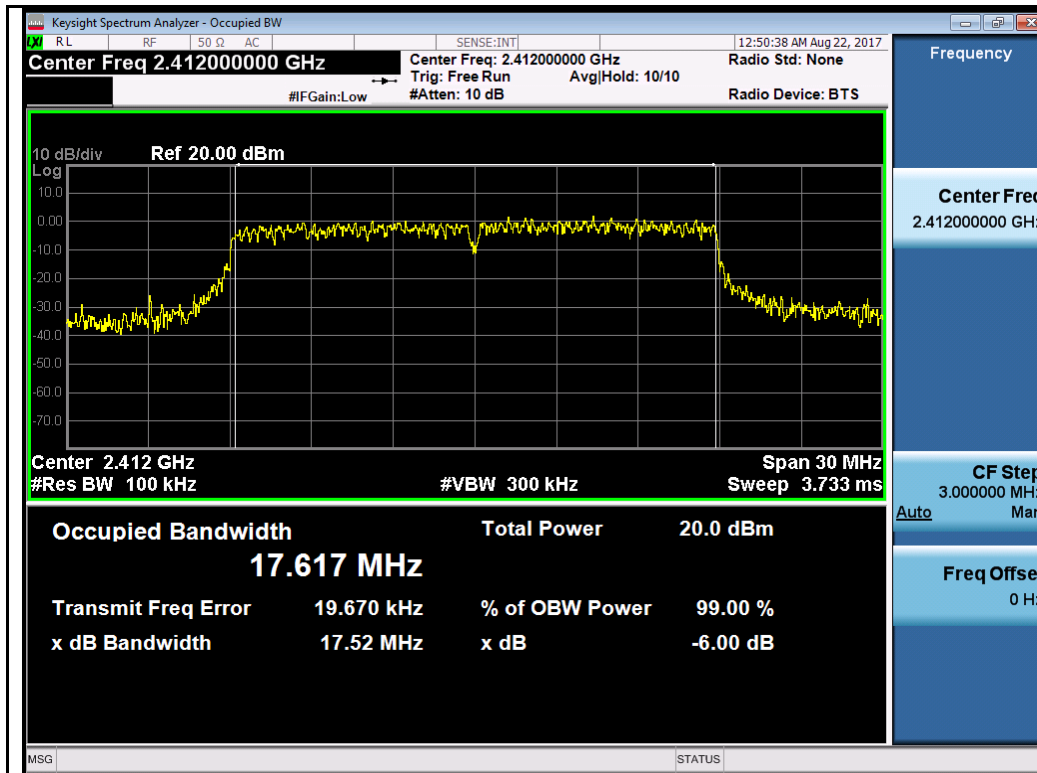
802.11g-2412MHz



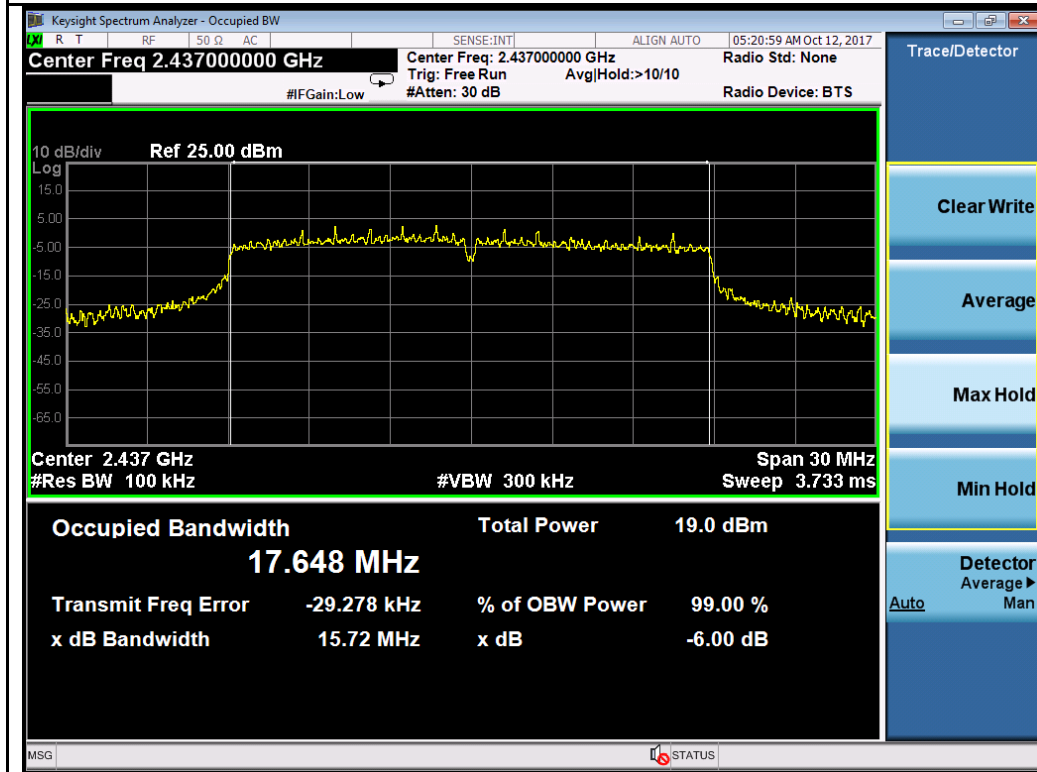
802.11g-2437MHz



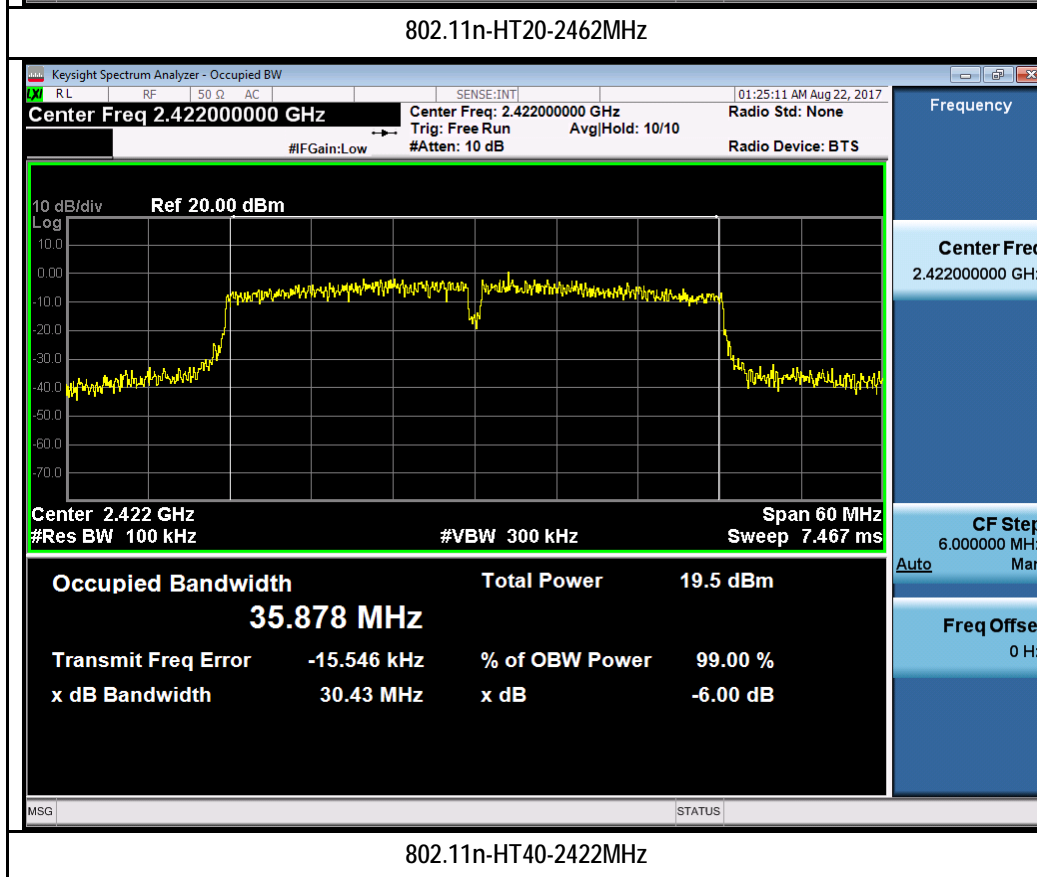
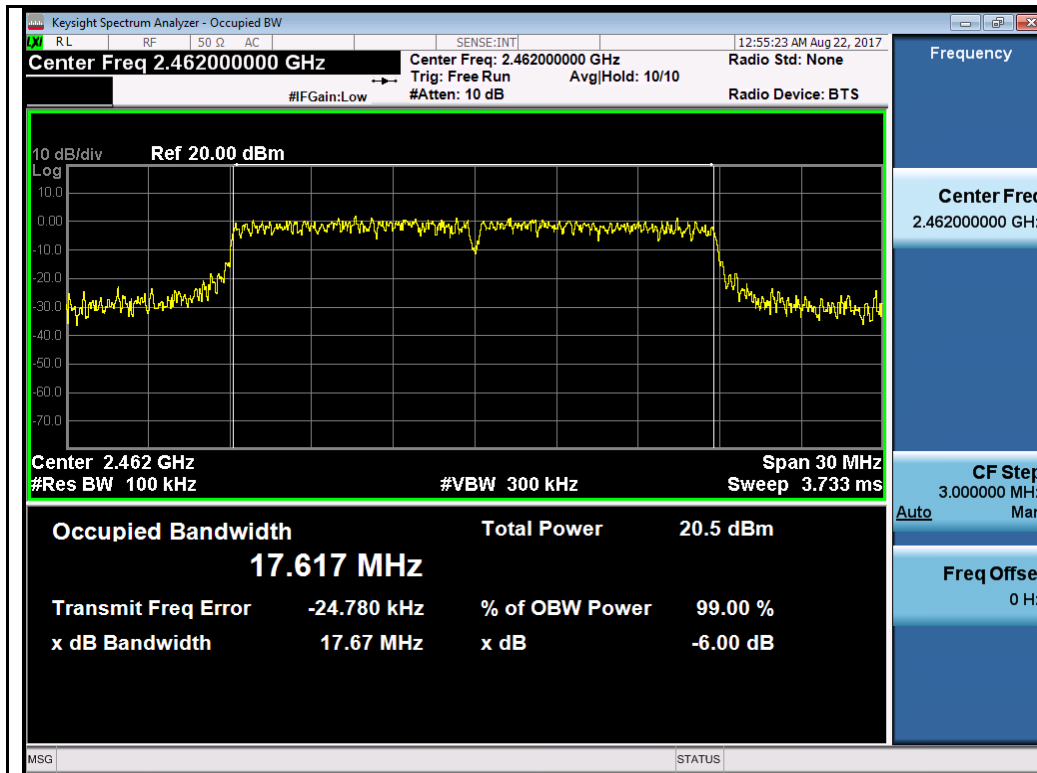
802.11g-2462MHz

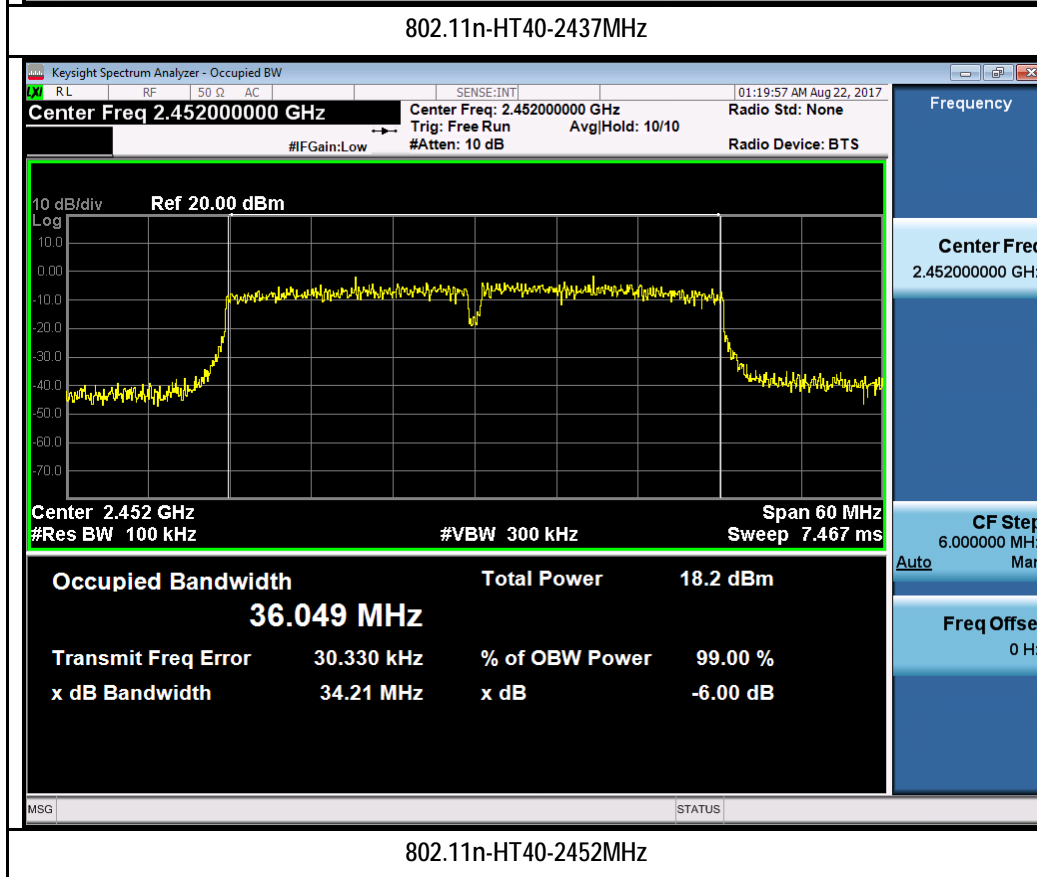


802.11n-HT20-2412MHz



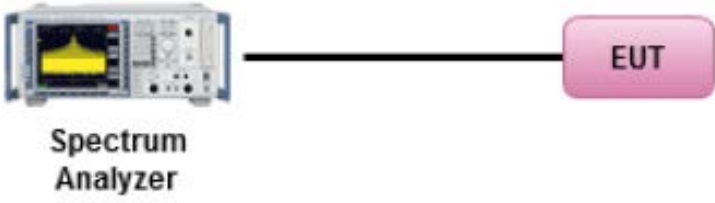
802.11n-HT20-2437MHz





10.3 Output Power

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247 RSS247 (5.4.4)	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: ≤1 Watt	<input checked="" type="checkbox"/>
Test Setup	 <p style="text-align: center;">Spectrum Analyzer EUT</p>		
Test Procedure	<p>558074 D01 DTS Meas Guidance v03r05, 9.2.2.2</p> <p><u>Measurement using a Spectrum Analyzer (SA)</u></p> <ul style="list-style-type: none"> (a) Set span to at least 1.5 times the OBW (b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz. (c) Set VBW ≥ 3 x RBW. (d) Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.) (e) Sweep time = auto. (f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode. (g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”. (h) Trace average at least 100 traces in power averaging (i.e., RMS) mode (i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum. 		
Test Date	08/21/2017-10/05/2017	Environmental condition	Temperature 23°C Relative Humidity 44% Atmospheric Pressure 1021mbar
Remark	N/A		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data Yes N/A

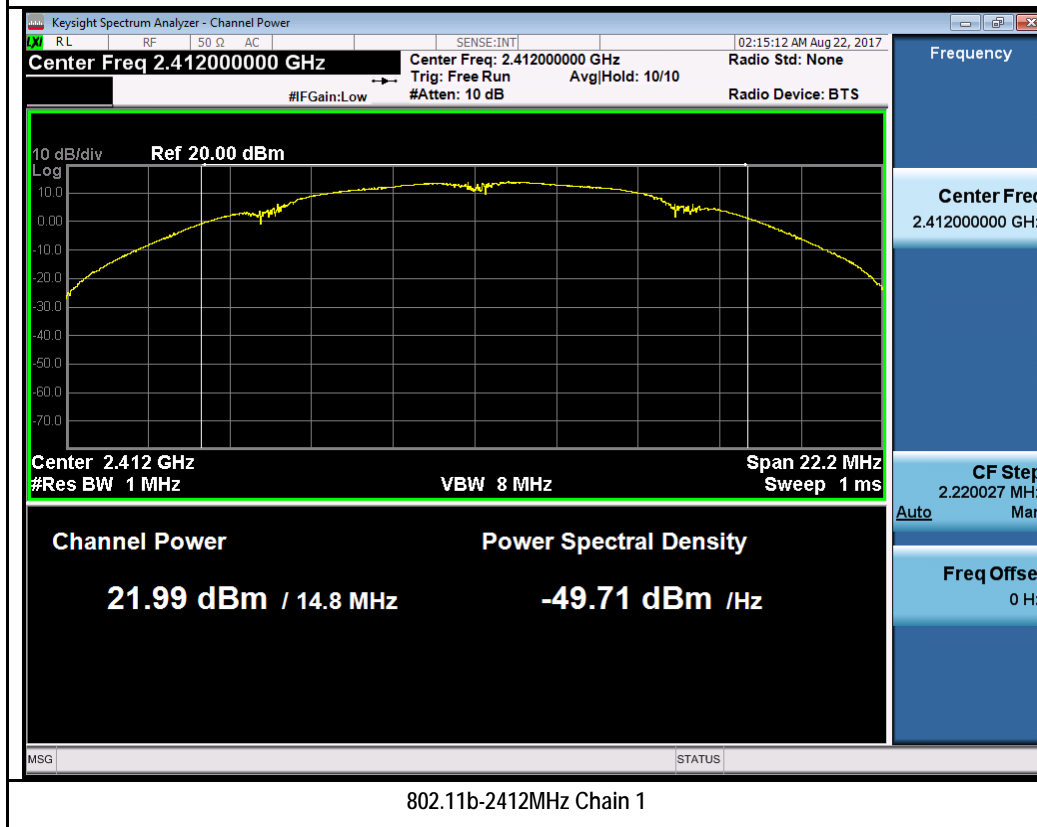
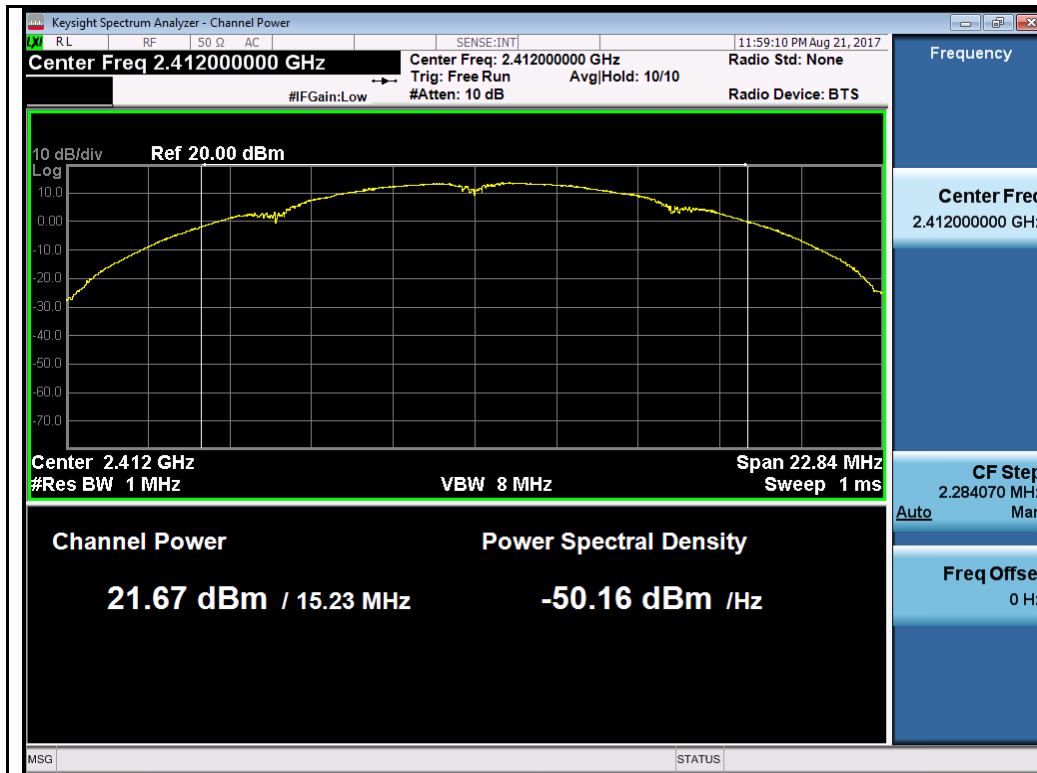
Test Plot Yes (See below) N/A

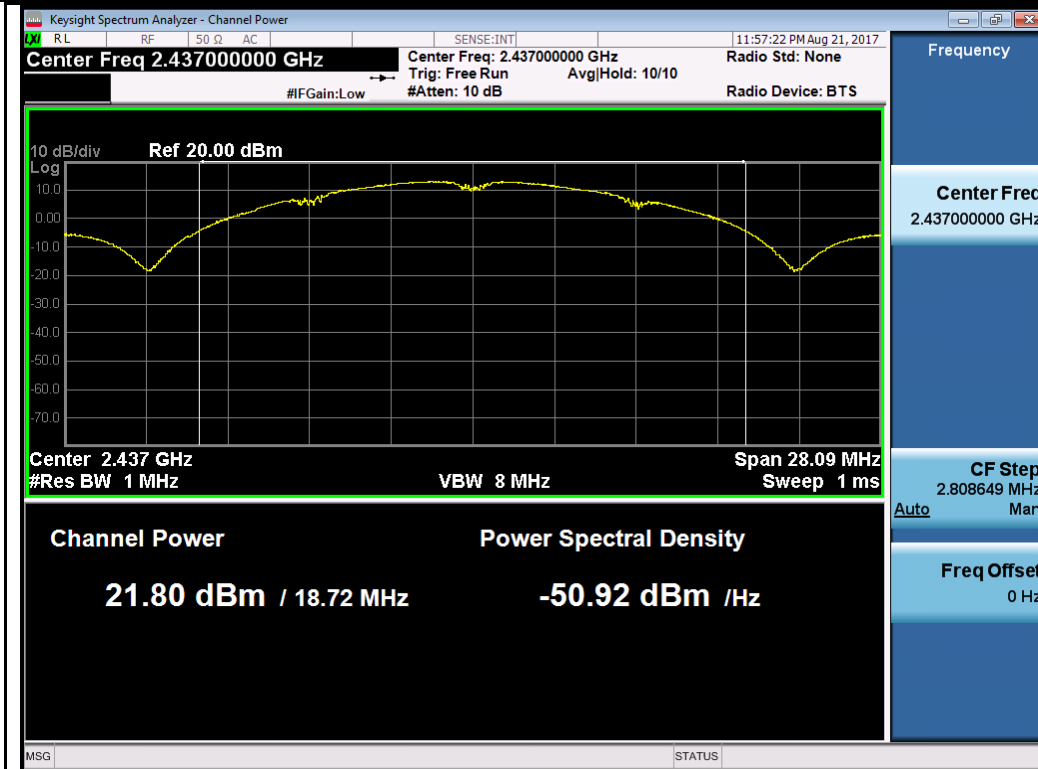
Test was done by CIPHER at RF test site.

Output Power measurement result

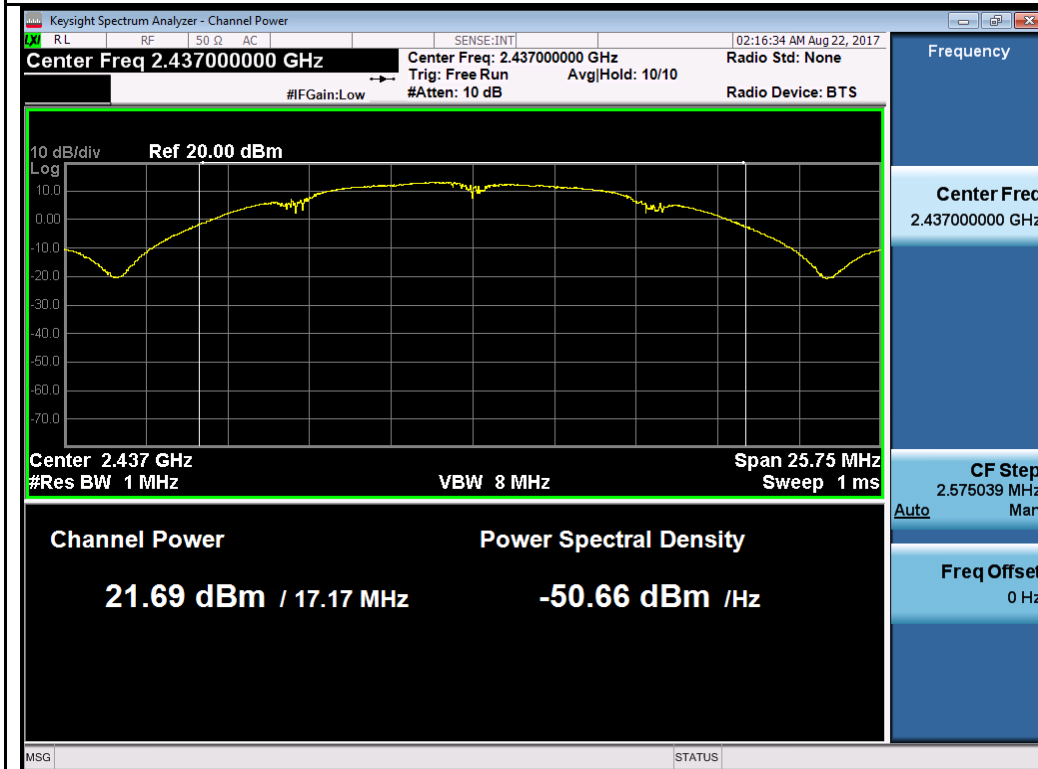
Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)			Limit (dBm)	Result
				Chain 0	Chain 1	Combined Power		
Output Power	802.11b	2412	Low	21.67	21.99	24.84	30	Pass
		2437	Mid	21.80	21.69	24.76	30	Pass
		2462	High	21.42	21.45	24.45	30	Pass
	802.11g	2412	Low	16.71	16.89	19.81	30	Pass
		2437	Mid	20.11	20.24	23.19	30	Pass
		2462	High	16.72	16.83	19.79	30	Pass
	802.11n-20M	2412	Low	16.50	16.35	19.44	30	Pass
		2437	Mid	19.69	19.51	22.61	30	Pass
		2462	High	16.43	16.87	19.67	30	Pass
	802.11n-40M	2422	Low	16.36	15.54	18.98	30	Pass
		2437	Mid	20.62	20.44	23.54	30	Pass
		2452	High	14.40	14.84	17.64	30	Pass
Note	Two chains are cross-polarized, additional gain is $10 \log_{10}(NANT)=0\text{dB}, N=1$, max directional gain of the EUT is 2.5dBi. No limit adjustment is needed. All the mode transmission is MIMO.							

Test Plots:

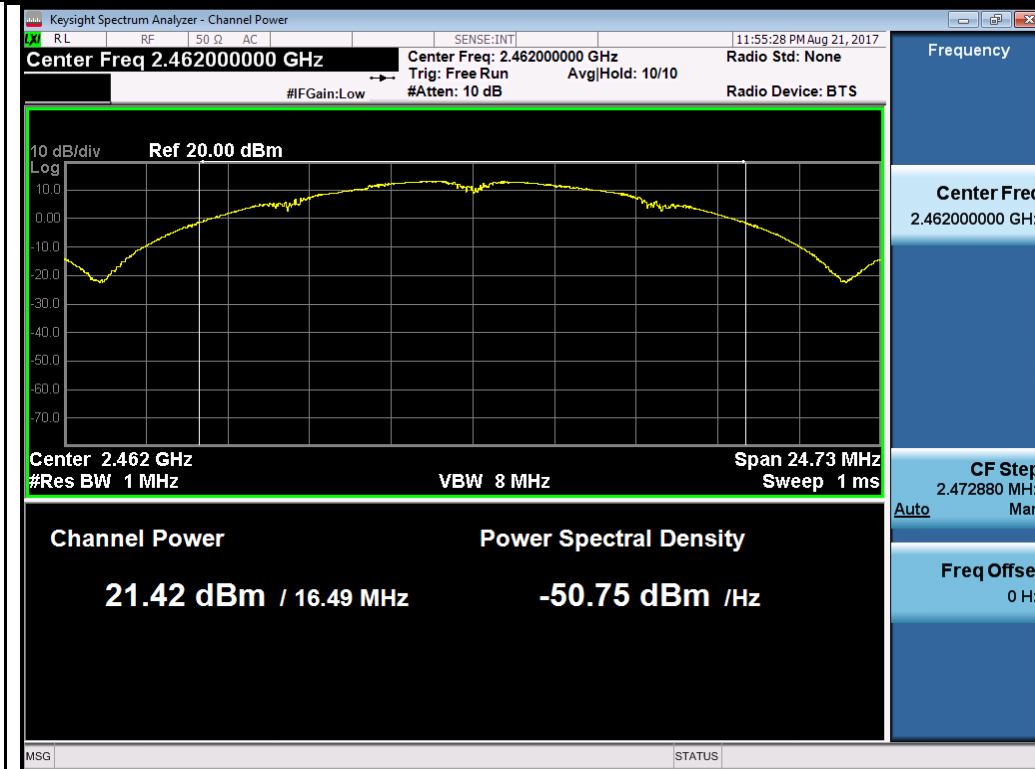




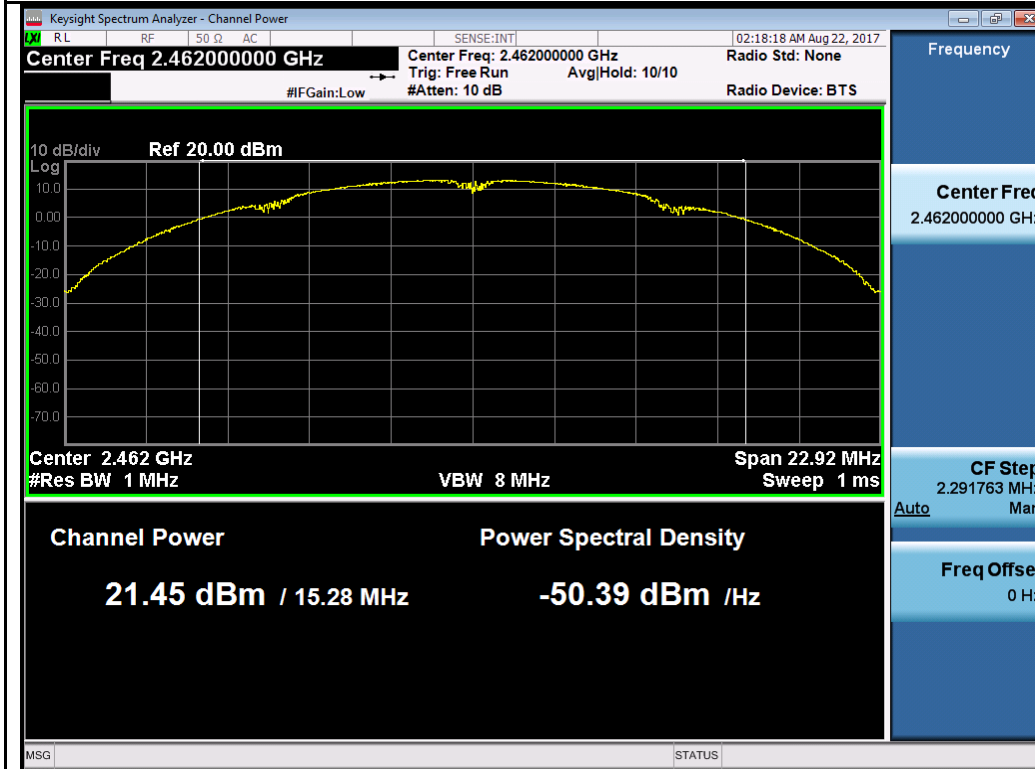
802.11b-2437MHz Chain 0



802.11b-2437MHz Chain 1



802.11b-2462MHz Chain 0



802.11b-2462MHz Chain 1