



element

Paragon Innovations, Inc.

Smart Tracking Collar

**FCC 15.247:2021
802.11bgn SISO Radio**

Report: PAON0005.3, Issue Date: July 1, 2021



NVLAP LAB CODE: 201049-0, 200881-0

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CERTIFICATE OF TEST

Last Date of Test: June 23, 2021
 Paragon Innovations, Inc.
 EUT: Smart Tracking Collar

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2021	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, 11.13.2,	Spurious Radiated Emissions	Yes	Pass	
11.6	Duty Cycle	Yes	N/A	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.2.2.4	Output Power	Yes	Pass	
11.9.2.2.4	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:



Adam Bruno, 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		

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

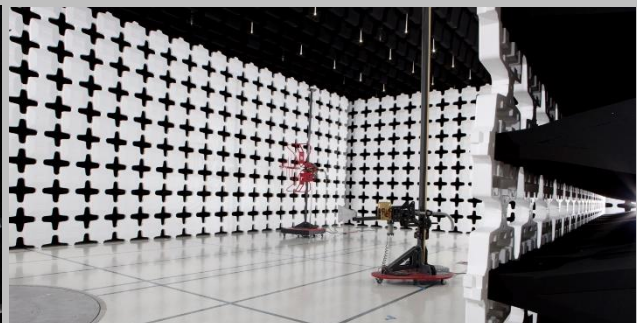
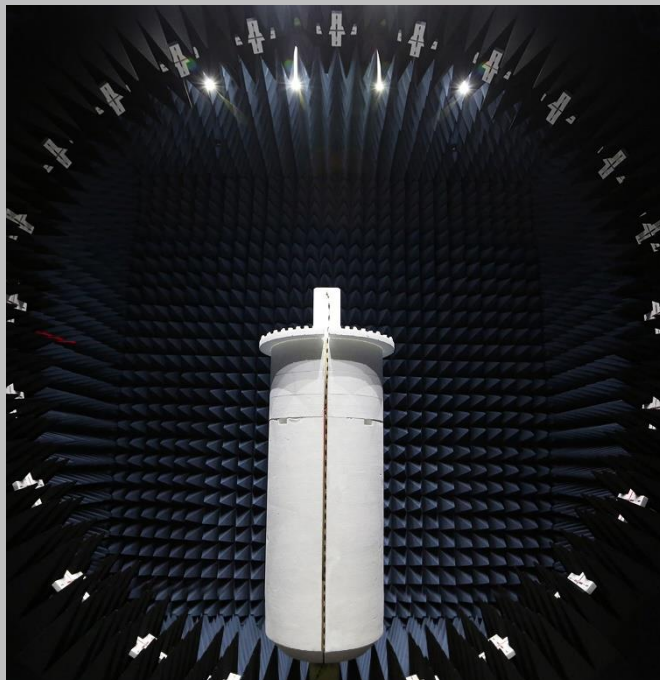
For details on the Scopes of our Accreditations, please visit:

<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 120 th 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/RRR, 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.

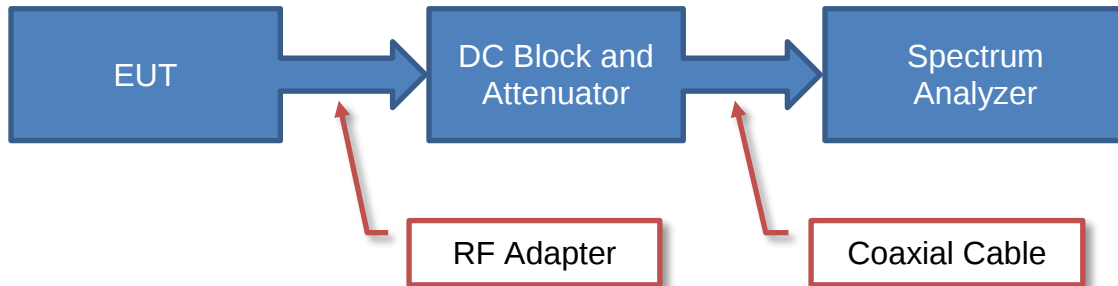
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable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

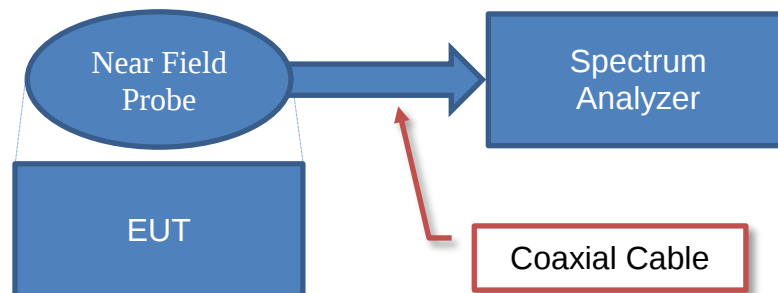
Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.6 dB	-2.6 dB

Test Setup Block Diagrams

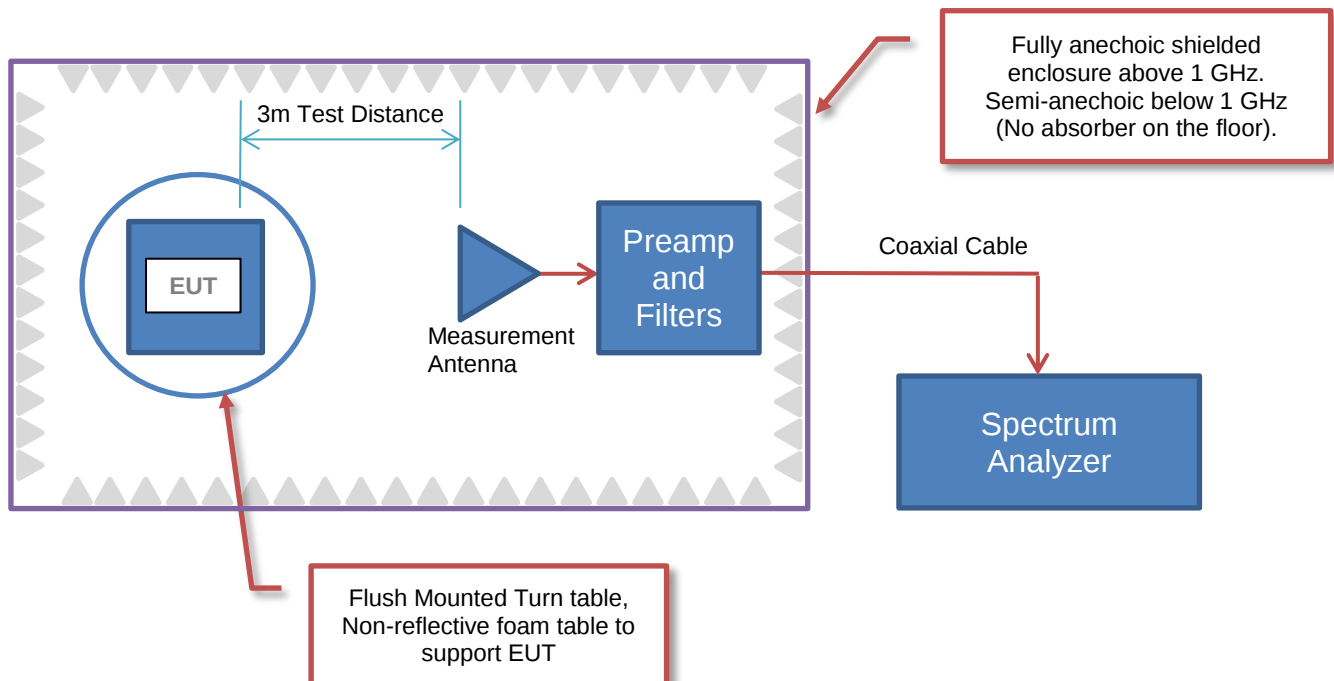
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION



Client and Equipment Under Test (EUT) Information

Company Name:	Paragon Innovations, Inc.
Address:	3305 Matrix Drive
City, State, Zip:	Richardson, TX 75082
Test Requested By:	Alan Hasty
EUT:	Smart Tracking Collar
First Date of Test:	April 15, 2021
Last Date of Test:	June 23, 2021
Receipt Date of Samples:	April 15, 2021
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Dog tracking collar
Testing Objective:
To demonstrate compliance of the 802.11 radio under FCC 15.247 for operation in the 2.4 GHz band.

CONFIGURATIONS



Configuration PAON0011- 1

Software/Firmware Running during test	
Description	Version
M1 Link Collar SW	00.03.03-u11_reg

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Link Device	Link	LT3A	6797400036

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Zentri Wi-Fi Debug board	Zentri	ATG002	None
Surface Tablet PC	Microsoft	SurfacePro4	CCC1D0FC-4F05-461F-A0E9-27E832BD716F

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB Cable	Yes	1.0m	No	Surface Tablet PC	Wi-Fi Debug Board
Custom Programming Cable	No	0.13m	No	Wi-Fi Debug Board	Link Device

CONFIGURATIONS



Configuration PAON0011- 6

Software/Firmware Running during test	
Description	Version
M1 Link Collar SW	00.03.03-u11_reg

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Link Device	Link	LT3A	6797400036

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Zentri Wi-Fi Debug board	Zentri	ATG002	None

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Surface Tablet PC	Microsoft	SurfacePro4	CCC1D0FC-4F05-461F-A0E9-27E832BD716F
Power Supply	Microsoft	1625	N/A

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB Cable	Yes	1.0m	No	Surface Tablet PC	Wi-Fi Debug board
Custom Programming Cable	No	0.13m	No	Wi-Fi Debug board	Link Device
AC Cable	No	0.5 m	No	AC Mains	Power Supply
DC Cable	No	1.7 m	No	Power Supply	Surface Tablet PC

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-04-15	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was complete.
2	2021-06-23	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.
3	2021-06-23	Spurious Conducted 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.
4	2021-06-23	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.
5	2021-06-23	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.
6	2021-06-23	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.
7	2021-06-23	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWER SETTINGS AND ANTENNAS



The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
Wideband SMD Chip	Client	2400-2483.5	2.5

No adjustable power settings were provided. The EUT was tested using power settings pre-defined by the manufacturer.

SETTINGS FOR ALL TESTS IN THIS REPORT

Frequency Range	Power Setting
2412-2462 MHz	+14 dBm

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2021.03.17.0

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 802.11bg: Low Channel 1 (2412 MHz), High Channel 11 (2462 MHz)

Transmitting 802.11bgn: Low Channel 1 (2412 MHz), Mid Channel 6 (2437 MHz), High Channel 11 (2462 MHz)

POWER SETTINGS INVESTIGATED

3.3V via USB

CONFIGURATIONS INVESTIGATED

PAON0011 - 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.	Cal. Due
Attenuator	Weinschel Corp	4H-10	AWA	2021-03-09	2022-03-09
Filter - High Pass	Micro-Tronics	HPM50111	HGC	2021-03-09	2022-03-09
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAM	2020-09-18	2021-09-18
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	PAL	2020-09-17	2021-09-17
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	PAK	2020-09-17	2021-09-17
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAJ	2020-06-02	2021-06-02
Cable	Northwest EMC	18GHz - 40GHz	TXE	2020-09-18	2021-09-18
Cable	Northwest EMC	8GHz - 18GHz	TXD	2020-05-14	2021-05-14
Cable	Northwest EMC	1GHz - 8.2GHz	TXC	2020-06-02	2021-06-02
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXW	2020-09-02	2022-09-02
Antenna - Double Ridge	ETS Lindgren	3117	AJK	NCR	NCR
Antenna - Standard Gain	ETS Lindgren	3160-08	AJG	NCR	NCR
Antenna - Standard Gain	ETS Lindgren	3160-07	AJF	NCR	NCR
Amplifier - Pre-Amplifier	Fairview Microwave	FMAM63001	PAS	2020-05-28	2021-05-28
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2020-05-28	2021-05-28
Filter - Low Pass	Micro-Tronics	LPM50004	HHV	2020-08-04	2021-08-04
Antenna - Biconilog	ETS Lindgren	3143B	AYF	2020-06-25	2022-06-25
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	2020-07-30	2021-07-30

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 within 2 MHz of the allowable band may have been taken using the integration method from ANSI C63.10 clause 11.13.3. This procedure uses the channel power feature of the spectrum analyzer to integrate the power of the emission within a 1 MHz bandwidth.

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 $10 \cdot \log(1/dc)$.

SPURIOUS RADIATED EMISSIONS

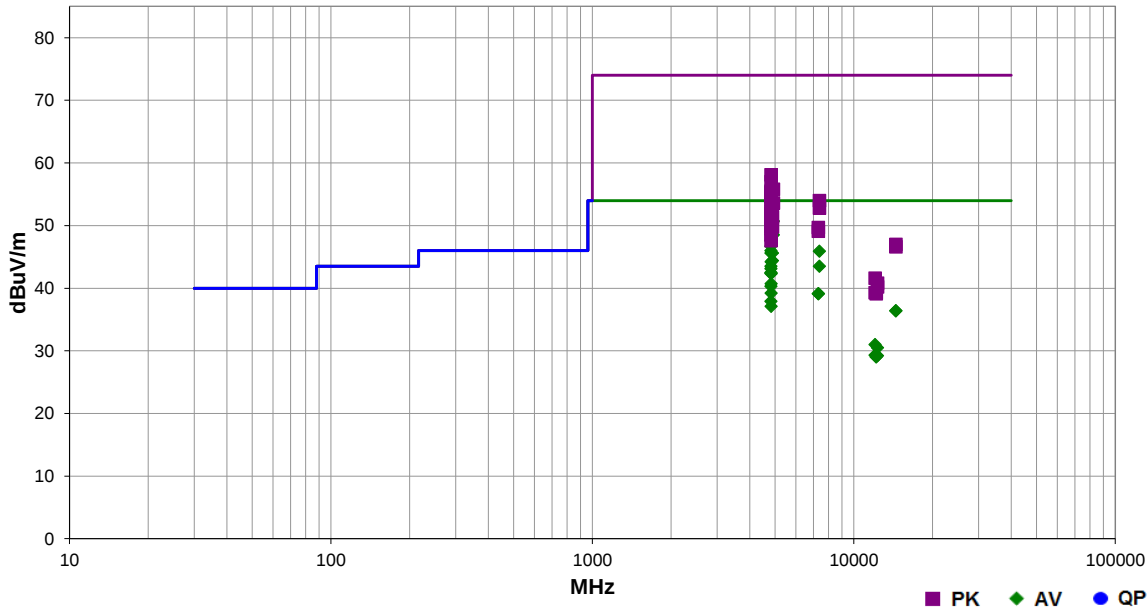


EmiRS 2021.01.08.0 PSA-ESCI 2021.03.17.0

Work Order:	PAON0011	Date:	2021-04-15	
Project:	None	Temperature:	21.7 °C	
Job Site:	TX02	Humidity:	43.7% RH	
Serial Number:	6797400036	Barometric Pres.:	1021 mbar	
EUT: Smart Tracking Collar				Tested by: Mark Baytan
Configuration:	1			
Customer:	Paragon Innovations, Inc.			
Attendees:	Alan Hasty			
EUT Power:	3.3V via USB			
Operating Mode:	Transmitting 802.11bgn: Low Channel 1 (2412 MHz), Mid Channel 6 (2437 MHz), High Channel 11 (2462 MHz)			
Deviations:	None			
Comments:	Please see comments for channel, data rate, and EUT position.			

Test Specifications	Test Method
FCC 15.247:2021	ANSI C63.10:2013

Run #	8	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4818.758	49.5	3.7	2.5	252.0	3.0	0.0	Horz	AV	0.0	53.2	54.0	-0.8	Low Ch 1, EUT Horz, 1 Mbps
4918.600	46.8	3.9	1.5	160.9	3.0	0.0	Horz	AV	0.0	50.7	54.0	-3.3	High Ch 11, EUT Horz, 1 Mbps
4818.717	46.4	3.7	3.9	267.9	3.0	0.0	Vert	AV	0.0	50.1	54.0	-3.9	Low Ch 1, EUT Horz, 1 Mbps
4818.675	45.4	3.7	3.8	236.0	3.0	0.0	Vert	AV	0.0	49.1	54.0	-4.9	Low Ch 1, EUT on Side, 1 Mbps
4918.670	44.6	3.9	2.0	189.9	3.0	0.0	Vert	AV	0.0	48.5	54.0	-5.5	High Ch 11, EUT Horz, 1 Mbps
4818.675	43.9	3.7	1.5	144.0	3.0	0.0	Horz	AV	0.0	47.6	54.0	-6.4	Low Ch 1, EUT on Side, 1 Mbps
4820.383	43.0	3.7	2.5	252.0	3.0	0.0	Horz	AV	0.0	46.7	54.0	-7.3	Low Ch 1, EUT Horz, 11 Mbps
4818.650	42.3	3.7	1.9	159.0	3.0	0.0	Horz	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Vert, 1 Mbps
7378.170	36.1	9.8	3.2	141.0	3.0	0.0	Vert	AV	0.0	45.9	54.0	-8.1	High Ch 11, EUT Horz, 1 Mbps
4822.583	41.9	3.7	2.5	252.0	3.0	0.0	Horz	AV	0.0	45.6	54.0	-8.4	Low Ch 1, EUT Horz, MCS0
4879.500	41.9	3.7	2.0	319.9	3.0	0.0	Horz	AV	0.0	45.6	54.0	-8.4	Mid Ch 6, EUT Horz, 1 Mbps
4879.430	40.7	3.7	2.5	318.0	3.0	0.0	Vert	AV	0.0	44.4	54.0	-9.6	Mid Ch 6, EUT Horz, 1 Mbps
4822.817	40.5	3.7	2.5	252.0	3.0	0.0	Horz	AV	0.0	44.2	54.0	-9.8	Low Ch 1, EUT Horz, 36 Mbps
4818.658	39.8	3.7	1.7	330.0	3.0	0.0	Vert	AV	0.0	43.5	54.0	-10.5	Low Ch 1, EUT Vert, 1 Mbps
7377.970	33.7	9.8	1.5	166.9	3.0	0.0	Horz	AV	0.0	43.5	54.0	-10.5	High Ch 11, EUT Horz, 1 Mbps
4819.775	39.4	3.7	2.5	252.0	3.0	0.0	Horz	AV	0.0	43.1	54.0	-10.9	Low Ch 1, EUT Horz, 6 Mbps
4821.467	38.8	3.7	3.9	267.9	3.0	0.0	Vert	AV	0.0	42.5	54.0	-11.5	Low Ch 1, EUT Horz, 11 Mbps
4822.617	38.7	3.7	2.5	252.0	3.0	0.0	Horz	AV	0.0	42.4	54.0	-11.6	Low Ch 1, EUT Horz, 54 Mbps
4822.917	38.6	3.7	3.9	267.9	3.0	0.0	Vert	AV	0.0	42.3	54.0	-11.7	Low Ch 1, EUT Horz, MCS0
4822.917	37.0	3.7	3.9	267.9	3.0	0.0	Vert	AV	0.0	40.7	54.0	-13.3	Low Ch 1, EUT Horz, 36 Mbps
4821.292	36.6	3.7	3.9	267.9	3.0	0.0	Vert	AV	0.0	40.3	54.0	-13.7	Low Ch 1, EUT Horz, 6 Mbps
4822.933	35.5	3.7	3.9	267.9	3.0	0.0	Vert	AV	0.0	39.2	54.0	-14.8	Low Ch 1, EUT Horz, 54 Mbps

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7316.170	29.3	9.8	1.5	210.0	3.0	0.0	Horz	AV	0.0	39.1	54.0	-14.9	Mid Ch 6, EUT Horz, 1 Mbps
7318.770	29.3	9.8	1.5	285.0	3.0	0.0	Vert	AV	0.0	39.1	54.0	-14.9	Mid Ch 6, EUT Horz, 1 Mbps
4818.608	54.4	3.7	2.5	252.0	3.0	0.0	Horz	PK	0.0	58.1	74.0	-15.9	Low Ch 1, EUT Horz, 1 Mbps
4822.583	34.2	3.7	2.5	252.0	3.0	0.0	Horz	AV	0.0	37.9	54.0	-16.1	Low Ch 1, EUT Horz, MCS7
4822.933	33.4	3.7	3.9	267.9	3.0	0.0	Vert	AV	0.0	37.1	54.0	-16.9	Low Ch 1, EUT Horz, MCS7
4821.083	53.3	3.7	2.5	252.0	3.0	0.0	Horz	PK	0.0	57.0	74.0	-17.0	Low Ch 1, EUT Horz, MCS0
14471.590	28.6	7.8	1.5	355.0	3.0	0.0	Horz	AV	0.0	36.4	54.0	-17.6	Low Ch 1, EUT Horz, 1 Mbps
14472.850	28.6	7.8	1.5	282.0	3.0	0.0	Vert	AV	0.0	36.4	54.0	-17.6	Low Ch 1, EUT Horz, 1 Mbps
4918.600	51.9	3.9	1.5	160.9	3.0	0.0	Horz	PK	0.0	55.8	74.0	-18.2	High Ch 11, EUT Horz, 1 Mbps
4818.775	51.8	3.7	2.5	252.0	3.0	0.0	Horz	PK	0.0	55.5	74.0	-18.5	Low Ch 1, EUT Horz, 11 Mbps
4818.600	51.6	3.7	3.9	267.9	3.0	0.0	Vert	PK	0.0	55.3	74.0	-18.7	Low Ch 1, EUT Horz, 1 Mbps
4820.200	51.4	3.7	2.5	252.0	3.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	Low Ch 1, EUT Horz, 6 Mbps
4818.667	50.9	3.7	3.8	236.0	3.0	0.0	Vert	PK	0.0	54.6	74.0	-19.4	Low Ch 1, EUT on Side, 1 Mbps
4817.000	50.9	3.7	2.5	252.0	3.0	0.0	Horz	PK	0.0	54.6	74.0	-19.4	Low Ch 1, EUT Horz, 36 Mbps
7378.030	44.2	9.8	3.2	141.0	3.0	0.0	Vert	PK	0.0	54.0	74.0	-20.0	High Ch 11, EUT Horz, 1 Mbps
4918.530	49.7	3.9	2.0	189.9	3.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4	High Ch 11, EUT Horz, 1 Mbps
4818.617	49.5	3.7	1.5	144.0	3.0	0.0	Horz	PK	0.0	53.2	74.0	-20.8	Low Ch 1, EUT on Side, 1 Mbps
4818.633	49.3	3.7	3.9	267.9	3.0	0.0	Vert	PK	0.0	53.0	74.0	-21.0	Low Ch 1, EUT Horz, MCS0
7377.830	43.0	9.8	1.5	166.9	3.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2	High Ch 11, EUT Horz, 1 Mbps
4820.017	48.3	3.7	2.5	252.0	3.0	0.0	Horz	PK	0.0	52.0	74.0	-22.0	Low Ch 1, EUT Horz, 54 Mbps
4818.733	48.2	3.7	1.9	159.0	3.0	0.0	Horz	PK	0.0	51.9	74.0	-22.1	Low Ch 1, EUT Vert, 1 Mbps
4879.630	47.7	3.7	2.0	319.9	3.0	0.0	Horz	PK	0.0	51.4	74.0	-22.6	Mid Ch 6, EUT Horz, 1 Mbps
4820.758	47.5	3.7	3.9	267.9	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	Low Ch 1, EUT Horz, 6 Mbps
4819.967	47.4	3.7	3.9	267.9	3.0	0.0	Vert	PK	0.0	51.1	74.0	-22.9	Low Ch 1, EUT Horz, 36 Mbps
12059.990	35.0	-4.0	1.5	145.0	3.0	0.0	Horz	AV	0.0	31.0	54.0	-23.0	Low Ch 1, EUT Horz, 1 Mbps
12310.190	34.0	-3.5	1.5	141.9	3.0	0.0	Horz	AV	0.0	30.5	54.0	-23.5	High Ch 11, EUT Horz, 1 Mbps
4821.500	46.7	3.7	3.9	267.9	3.0	0.0	Vert	PK	0.0	50.4	74.0	-23.6	Low Ch 1, EUT Horz, 11 Mbps
4818.675	46.1	3.7	1.7	330.0	3.0	0.0	Vert	PK	0.0	49.8	74.0	-24.2	Low Ch 1, EUT Vert, 1 Mbps
4879.630	46.1	3.7	2.5	318.0	3.0	0.0	Vert	PK	0.0	49.8	74.0	-24.2	Mid Ch 6, EUT Horz, 1 Mbps
7310.070	39.9	9.8	1.5	210.0	3.0	0.0	Horz	PK	0.0	49.7	74.0	-24.3	Mid Ch 6, EUT Horz, 1 Mbps
4820.400	45.8	3.7	3.9	267.9	3.0	0.0	Vert	PK	0.0	49.5	74.0	-24.5	Low Ch 1, EUT Horz, 54 Mbps
12058.470	33.3	-4.0	1.5	204.0	3.0	0.0	Vert	AV	0.0	29.3	54.0	-24.7	Low Ch 1, EUT Horz, 1 Mbps
12185.440	32.5	-3.2	1.5	230.0	3.0	0.0	Horz	AV	0.0	29.3	54.0	-24.7	Mid Ch 6, EUT Horz, 1 Mbps
12310.260	32.7	-3.5	1.5	180.0	3.0	0.0	Vert	AV	0.0	29.2	54.0	-24.8	High Ch 11, EUT Horz, 1 Mbps
7311.830	39.3	9.8	1.5	285.0	3.0	0.0	Vert	PK	0.0	49.1	74.0	-24.9	Mid Ch 6, EUT Horz, 1 Mbps
12183.780	32.2	-3.2	1.5	289.0	3.0	0.0	Vert	AV	0.0	29.0	54.0	-25.0	Mid Ch 6, EUT Horz, 1 Mbps
4819.617	44.8	3.7	2.5	252.0	3.0	0.0	Horz	PK	0.0	48.5	74.0	-25.5	Low Ch 1, EUT Horz, MCS7
4820.217	43.9	3.7	3.9	267.9	3.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4	Low Ch 1, EUT Horz, MCS7
14472.290	39.2	7.8	1.5	282.0	3.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	Low Ch 1, EUT Horz, 1 Mbps
14471.610	38.8	7.8	1.5	355.0	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	Low Ch 1, EUT Horz, 1 Mbps
12060.320	45.6	-4.0	1.5	145.0	3.0	0.0	Horz	PK	0.0	41.6	74.0	-32.4	Low Ch 1, EUT Horz, 1 Mbps
12307.890	44.4	-3.6	1.5	180.0	3.0	0.0	Vert	PK	0.0	40.8	74.0	-33.2	High Ch 11, EUT Horz, 1 Mbps
12310.270	43.7	-3.5	1.5	141.9	3.0	0.0	Horz	PK	0.0	40.2	74.0	-33.8	High Ch 11, EUT Horz, 1 Mbps
12061.620	43.3	-4.0	1.5	204.0	3.0	0.0	Vert	PK	0.0	39.3	74.0	-34.7	Low Ch 1, EUT Horz, 1 Mbps
12183.410	42.5	-3.2	1.5	230.0	3.0	0.0	Horz	PK	0.0	39.3	74.0	-34.7	Mid Ch 6, EUT Horz, 1 Mbps
12182.930	42.3	-3.2	1.5	289.0	3.0	0.0	Vert	PK	0.0	39.1	74.0	-34.9	Mid Ch 6, EUT Horz, 1 Mbps

SPURIOUS RADIATED EMISSIONS

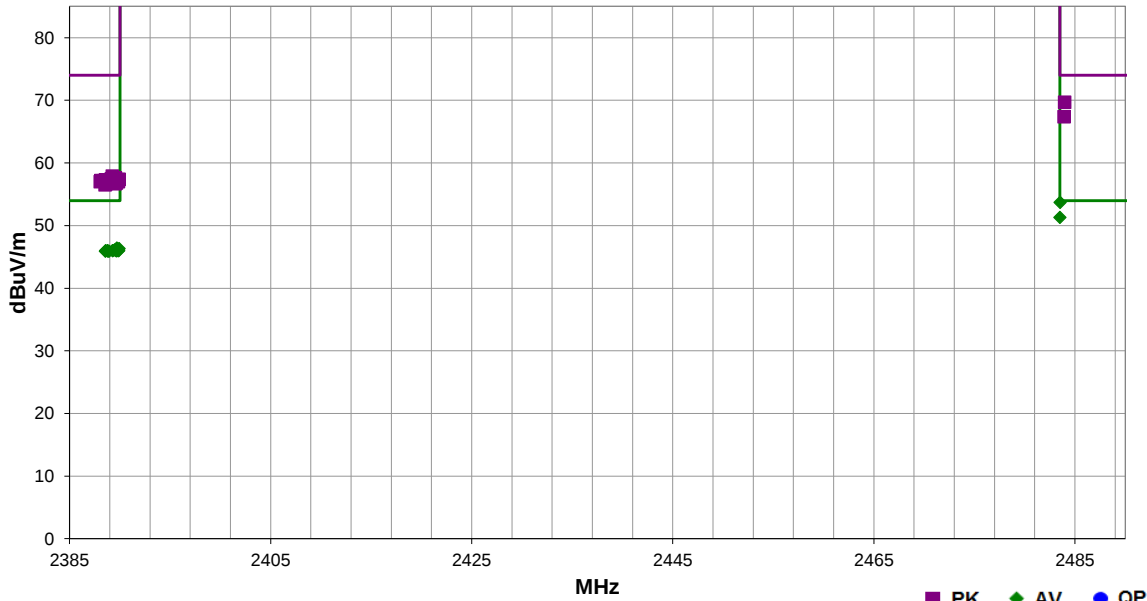


EmiRS 2021.01.08.0 PSA-ESCI 2021.03.17.0

Work Order:	PAON0011	Date:	2021-04-15	
Project:	None	Temperature:	21.7 °C	
Job Site:	TX02	Humidity:	43.7% RH	
Serial Number:	6797400036	Barometric Pres.:	1021 mbar	
EUT: Smart Tracking Collar				Tested by: Mark Baytan
Configuration:	1			
Customer:	Paragon Innovations, Inc.			
Attendees:	Alan Hasty			
EUT Power:	3.3V via USB			
Operating Mode:	Transmitting 802.11bg: Low Channel 1 (2412 MHz), High Channel 11 (2462 MHz)			
Deviations:	None			
Comments:	Please see comments for channel, data rate, and EUT position.			

Test Specifications	Test Method
FCC 15.247:2021	ANSI C63.10:2013

Run #	12	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.523	39.8	-6.1	3.91	48.0	3.0	20.0	Horz	AV	0.0	53.7	54.0	-0.3	High Ch 11, EUT Horz, 6 Mbps
2483.513	37.4	-6.1	3.38	351.0	3.0	20.0	Vert	AV	0.0	51.3	54.0	-2.7	High Ch 11, EUT Horz, 6 Mbps
2483.977	55.8	-6.1	3.91	48.0	3.0	20.0	Horz	PK	0.0	69.7	74.0	-4.3	High Ch 11, EUT Horz, 6 Mbps
2483.913	53.5	-6.1	3.38	351.0	3.0	20.0	Vert	PK	0.0	67.4	74.0	-6.6	High Ch 11, EUT Horz, 6 Mbps
2389.707	32.8	-6.4	1.5	49.0	3.0	20.0	Vert	AV	0.0	46.4	54.0	-7.6	Low Ch 1, EUT Horz, 6 Mbps
2389.930	32.7	-6.4	1.5	49.0	3.0	20.0	Vert	AV	0.0	46.3	54.0	-7.7	Low Ch 1, EUT Horz, MCS0
2389.837	32.6	-6.4	1.5	92.0	3.0	20.0	Horz	AV	0.0	46.2	54.0	-7.8	Low Ch 1, EUT Horz, 6 Mbps
2389.853	32.5	-6.4	1.5	49.0	3.0	20.0	Vert	AV	0.0	46.1	54.0	-7.9	Low Ch 1, EUT Horz, 36 Mbps
2389.493	32.5	-6.4	1.5	92.0	3.0	20.0	Horz	AV	0.0	46.1	54.0	-7.9	Low Ch 1, EUT Horz, MCS0
2389.643	32.4	-6.4	1.5	92.0	3.0	20.0	Horz	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Horz, 11 Mbps
2389.293	32.4	-6.4	1.5	49.0	3.0	20.0	Vert	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Horz, 1 Mbps
2389.897	32.4	-6.4	1.5	21.9	3.0	20.0	Horz	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Vert, 1 Mbps
2389.303	32.4	-6.4	1.5	181.0	3.0	20.0	Vert	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Vert, 1 Mbps
2388.603	32.4	-6.4	1.5	49.0	3.0	20.0	Vert	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Horz, 11 Mbps
2389.630	32.4	-6.4	1.5	92.0	3.0	20.0	Vert	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Horz, 11 Mbps
2389.863	32.4	-6.4	1.5	92.0	3.0	20.0	Horz	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Horz, 36 Mbps
2389.737	32.4	-6.4	1.5	49.0	3.0	20.0	Vert	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Horz, 54 Mbps
2389.670	32.4	-6.4	1.5	92.0	3.0	20.0	Horz	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Horz, 54 Mbps
2388.780	32.4	-6.4	1.5	92.0	3.0	20.0	Horz	AV	0.0	46.0	54.0	-8.0	Low Ch 1, EUT Horz, MCS7
2388.833	32.3	-6.4	1.89	90.0	3.0	20.0	Horz	AV	0.0	45.9	54.0	-8.1	Low Ch 1, EUT on Side, 1 Mbps
2388.930	32.3	-6.4	1.5	121.0	3.0	20.0	Vert	AV	0.0	45.9	54.0	-8.1	Low Ch 1, EUT on Side, 1 Mbps
2388.573	32.3	-6.4	1.5	49.0	3.0	20.0	Vert	AV	0.0	45.9	54.0	-8.1	Low Ch 1, EUT Horz, MCS7

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2389.250	44.3	-6.4	1.5	121.0	3.0	20.0	Vert	PK	0.0	57.9	74.0	-16.1	Low Ch 1, EUT on Side, 1 Mbps
2389.563	44.0	-6.4	1.5	49.0	3.0	20.0	Vert	PK	0.0	57.6	74.0	-16.4	Low Ch 1, EUT Horz, 6 Mbps
2389.163	43.9	-6.4	1.89	90.0	3.0	20.0	Horz	PK	0.0	57.5	74.0	-16.5	Low Ch 1, EUT on Side, 1 Mbps
2389.913	43.8	-6.4	1.5	92.0	3.0	20.0	Horz	PK	0.0	57.4	74.0	-16.6	Low Ch 1, EUT Horz, 6 Mbps
2388.603	43.7	-6.4	1.5	92.0	3.0	20.0	Horz	PK	0.0	57.3	74.0	-16.7	Low Ch 1, EUT Horz, 54 Mbps
2389.387	43.7	-6.4	1.5	49.0	3.0	20.0	Vert	PK	0.0	57.3	74.0	-16.7	Low Ch 1, EUT Horz, MCS0
2388.437	43.6	-6.4	1.5	92.0	3.0	20.0	Horz	PK	0.0	57.2	74.0	-16.8	Low Ch 1, EUT Horz, 36 Mbps
2388.107	43.6	-6.4	1.5	49.0	3.0	20.0	Vert	PK	0.0	57.2	74.0	-16.8	Low Ch 1, EUT Horz, 36 Mbps
2388.573	43.5	-6.4	1.5	49.0	3.0	20.0	Vert	PK	0.0	57.1	74.0	-16.9	Low Ch 1, EUT Horz, 1 Mbps
2389.127	43.5	-6.4	1.5	181.0	3.0	20.0	Vert	PK	0.0	57.1	74.0	-16.9	Low Ch 1, EUT Vert, 1 Mbps
2389.860	43.5	-6.4	1.5	49.0	3.0	20.0	Vert	PK	0.0	57.1	74.0	-16.9	Low Ch 1, EUT Horz, 54 Mbps
2389.277	43.4	-6.4	1.5	92.0	3.0	20.0	Horz	PK	0.0	57.0	74.0	-17.0	Low Ch 1, EUT Horz, 1 Mbps
2388.040	43.4	-6.4	1.5	21.9	3.0	20.0	Horz	PK	0.0	57.0	74.0	-17.0	Low Ch 1, EUT Vert, 1 Mbps
2389.847	43.4	-6.4	1.5	49.0	3.0	20.0	Vert	PK	0.0	57.0	74.0	-17.0	Low Ch 1, EUT Horz, 11 Mbps
2389.653	43.2	-6.4	1.5	92.0	3.0	20.0	Vert	PK	0.0	56.8	74.0	-17.2	Low Ch 1, EUT Horz, 11 Mbps
2389.553	43.1	-6.4	1.5	92.0	3.0	20.0	Horz	PK	0.0	56.7	74.0	-17.3	Low Ch 1, EUT Horz, MCS0
2388.630	43.1	-6.4	1.5	92.0	3.0	20.0	Horz	PK	0.0	56.7	74.0	-17.3	Low Ch 1, EUT Horz, MCS7
2388.530	42.9	-6.4	1.5	49.0	3.0	20.0	Vert	PK	0.0	56.5	74.0	-17.5	Low Ch 1, EUT Horz, MCS7

DUTY CYCLE



XMH 2020.12.30.0

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 DESCRIPTION

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 test software provided for operation in a fixed, single channel mode allows the EUT to operate continuously at 100% Duty Cycle.

OCCUPIED BANDWIDTH



XMIT 2020.12.30.0

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
Attenuator	Coaxicom	3910-20	AXY	2020-09-14	2021-09-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2021-04-16	2022-04-16
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	2021-02-01	2022-02-01
Cable	Element	Double Ridge Guide Horn Cables	MNV	2021-02-01	2022-02-01
Antenna - Double Ridge	ETS Lindgren	3115	AIB	2020-09-03	2022-09-03

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



TSTx 2021.03.19.1 XMR 2020.12.30.0

EUT: Smart Tracking Collar		Work Order: PAON0011	
Serial Number: 6797400036		Date: 23-Jun-21	
Customer: Paragon Innovations, Inc.		Temperature: 22.2 °C	
Attendees: None		Humidity: 44.1% RH	
Project: None		Barometric Pres.: 1012 mbar	
Tested by: Andrew Rogstad		Power: 3.3 VDC via USB Cable	
		Job Site: MN09	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
Tested in a radiated configuration with the EUT maximized in the single worst-case EUT orientation/receive antenna polarity combination. Reference level offset accounts for cables, transducer, preamp, and 20 dB attenuator.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature <i>Andrew Rogstad</i>	
		Value	Limit (>) Result
2400 MHz - 2483.5 MHz Band			
802.11(b) 1 Mbps			
	Low Channel 1, 2412 MHz	7.709 MHz	500 kHz Pass
	Mid Channel 6, 2437 MHz	7.74 MHz	500 kHz Pass
	High Channel 11, 2462 MHz	7.405 MHz	500 kHz Pass
802.11(b) 11 Mbps			
	Low Channel 1, 2412 MHz	8.237 MHz	500 kHz Pass
	Mid Channel 6, 2437 MHz	7.721 MHz	500 kHz Pass
	High Channel 11, 2462 MHz	7.804 MHz	500 kHz Pass
802.11(g) 6 Mbps			
	Low Channel 1, 2412 MHz	9.49 MHz	500 kHz Pass
	Mid Channel 6, 2437 MHz	15.756 MHz	500 kHz Pass
	High Channel 11, 2462 MHz	13.171 MHz	500 kHz Pass
802.11(g) 36 Mbps			
	Low Channel 1, 2412 MHz	10.748 MHz	500 kHz Pass
	Mid Channel 6, 2437 MHz	15.801 MHz	500 kHz Pass
	High Channel 11, 2462 MHz	12.005 MHz	500 kHz Pass
802.11(g) 54 Mbps			
	Low Channel 1, 2412 MHz	10.752 MHz	500 kHz Pass
	Mid Channel 6, 2437 MHz	15.808 MHz	500 kHz Pass
	High Channel 11, 2462 MHz	12.005 MHz	500 kHz Pass
802.11(n) MCS0			
	Low Channel 1, 2412 MHz	11.014 MHz	500 kHz Pass
	Mid Channel 6, 2437 MHz	14.875 MHz	500 kHz Pass
	High Channel 11, 2462 MHz	13.407 MHz	500 kHz Pass
802.11(n) MCS7			
	Low Channel 1, 2412 MHz	11.305 MHz	500 kHz Pass
	Mid Channel 6, 2437 MHz	16.34 MHz	500 kHz Pass
	High Channel 11, 2462 MHz	12.242 MHz	500 kHz Pass

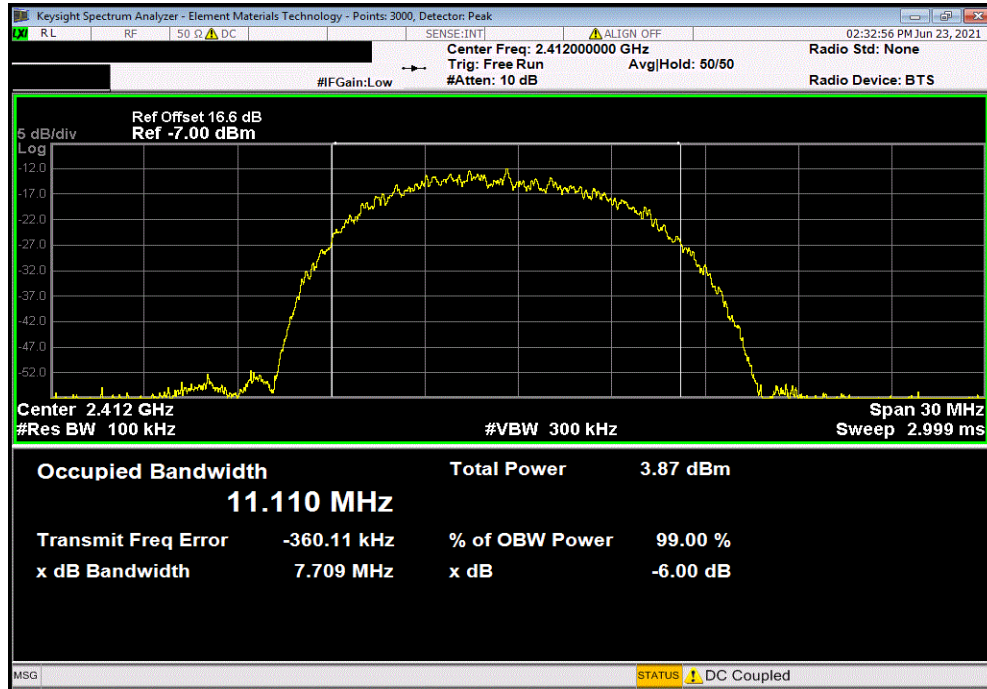
OCCUPIED BANDWIDTH



TbTx 2021.03.19.1 XMt 2020.12.30.0

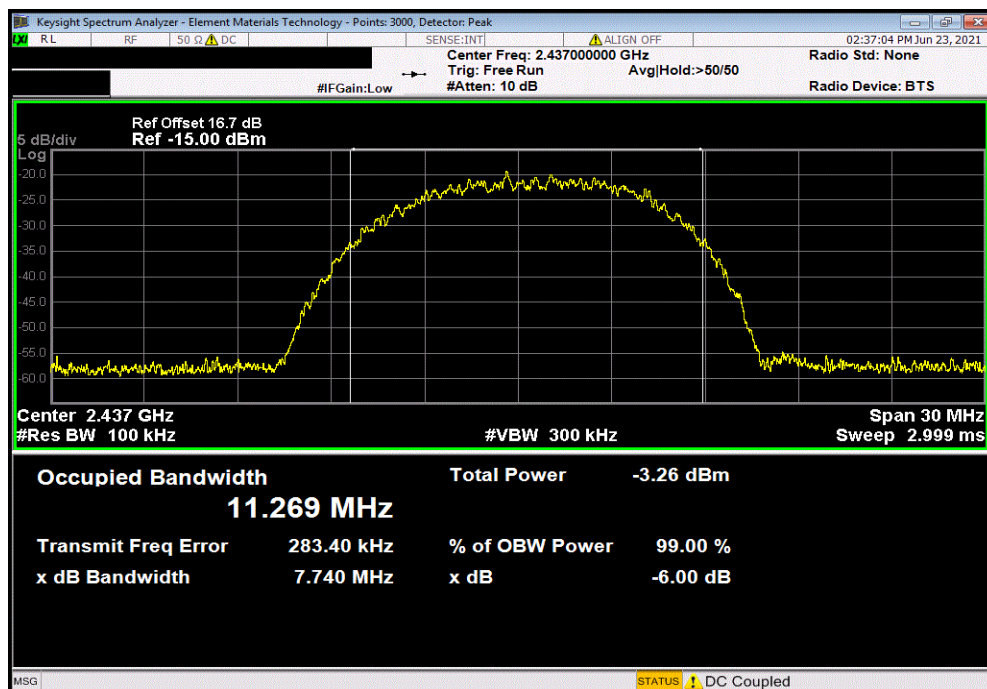
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				7.709 MHz	(>) 500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz

				Value	Limit	Result
				7.74 MHz	(>) 500 kHz	Pass

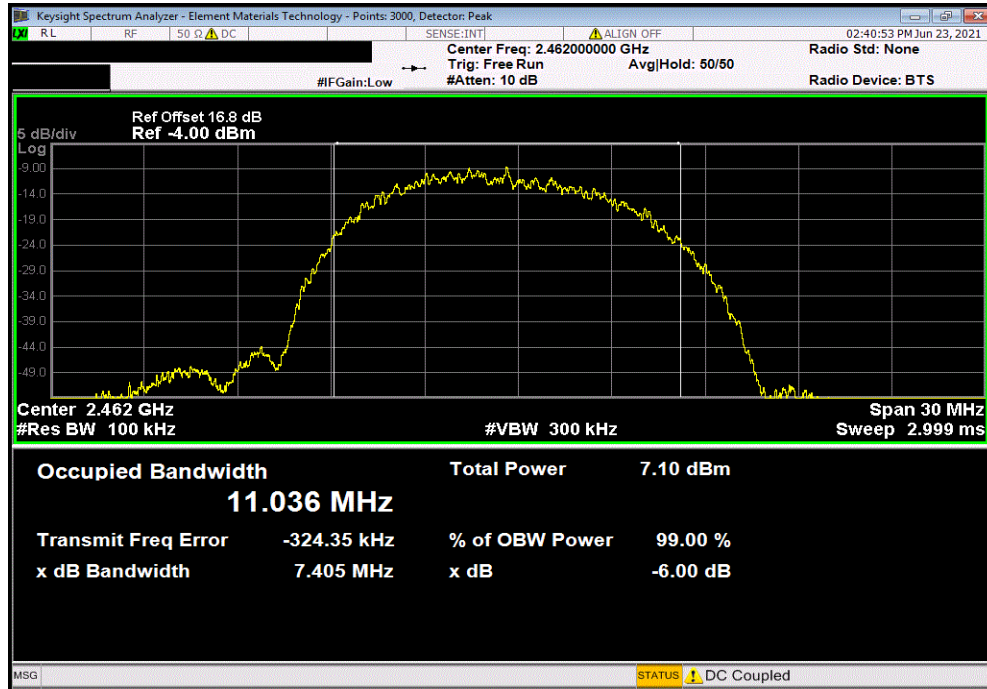


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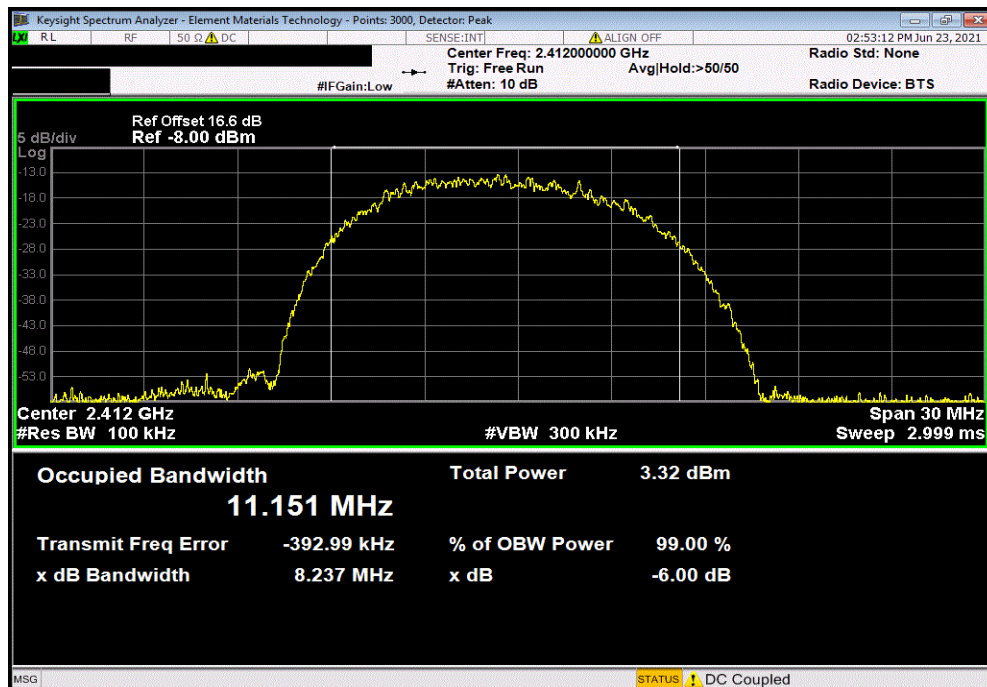


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
				Value	Limit	Result
				7.405 MHz	500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				8.237 MHz	500 kHz	Pass

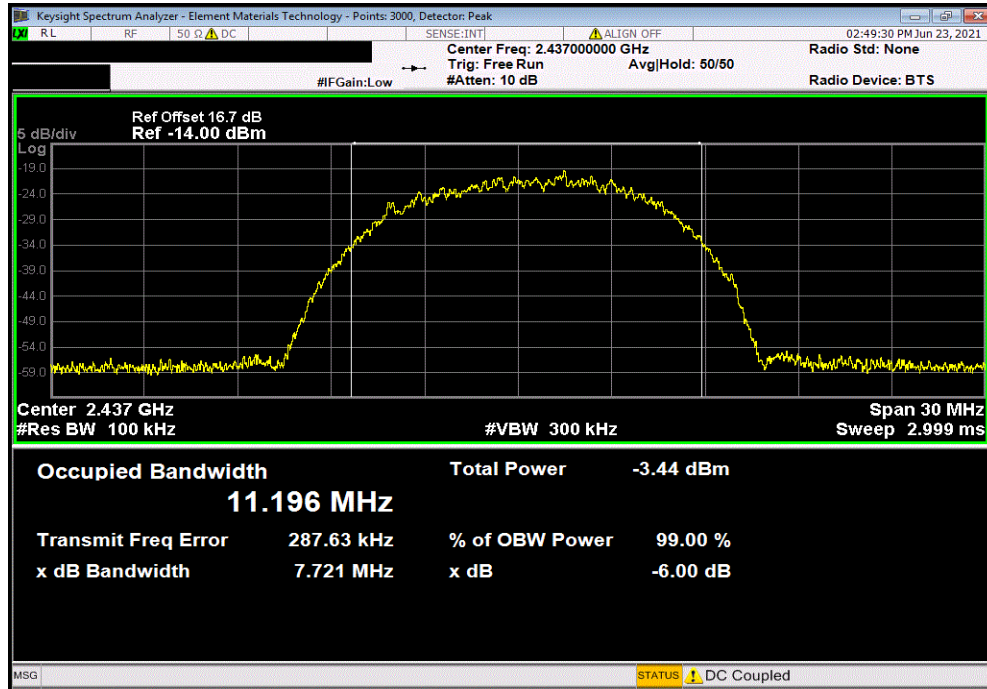


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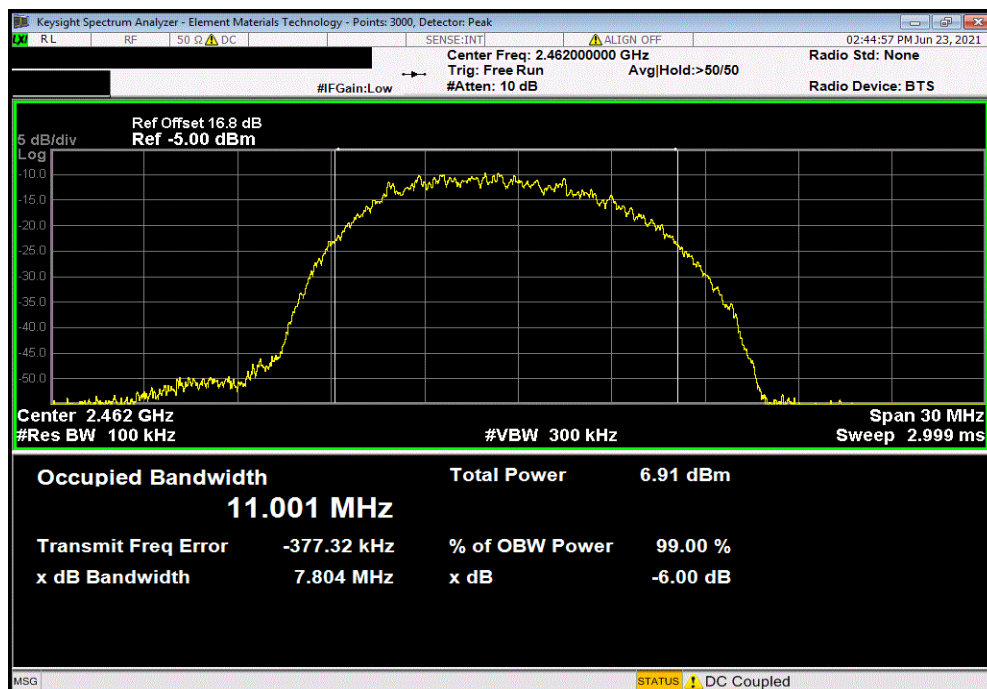


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				7.721 MHz	500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				7.804 MHz	500 kHz	Pass

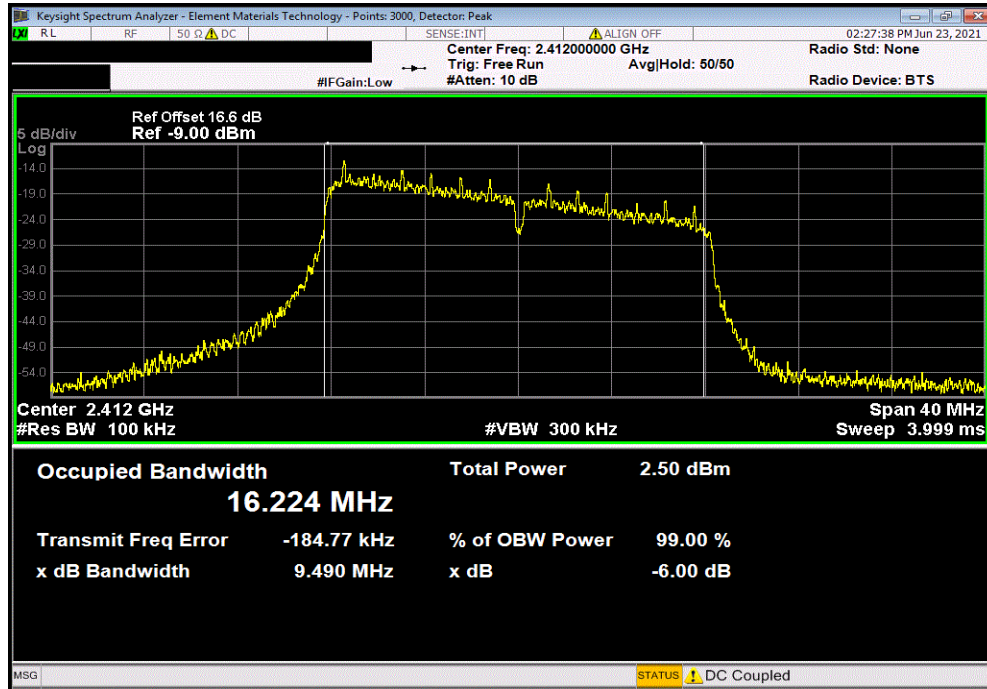


OCCUPIED BANDWIDTH

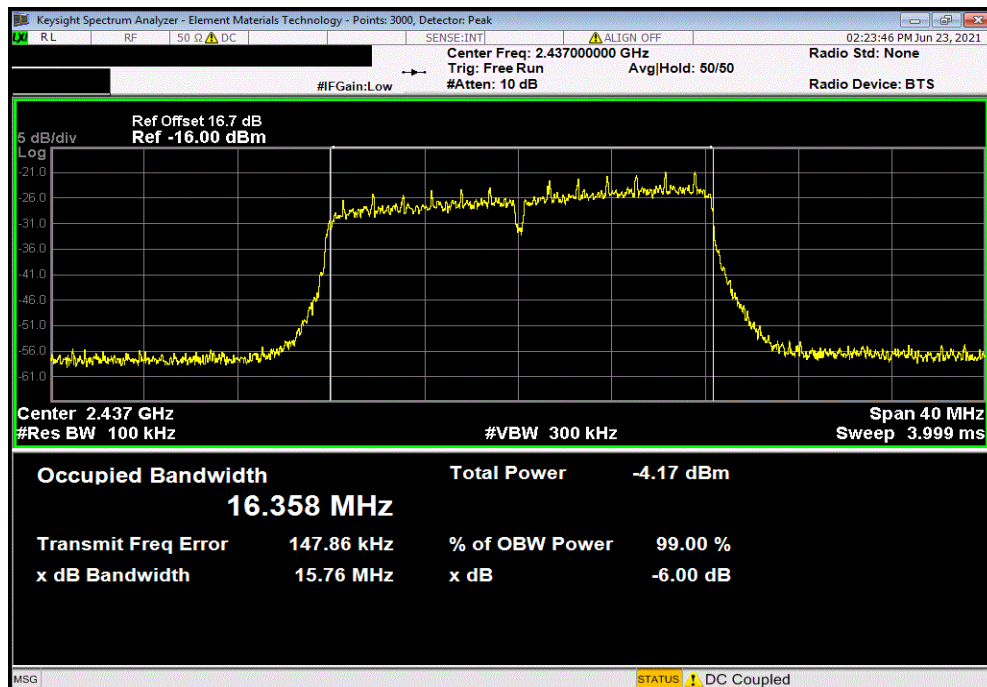


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				9.49 MHz	(>) 500 kHz	Pass



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

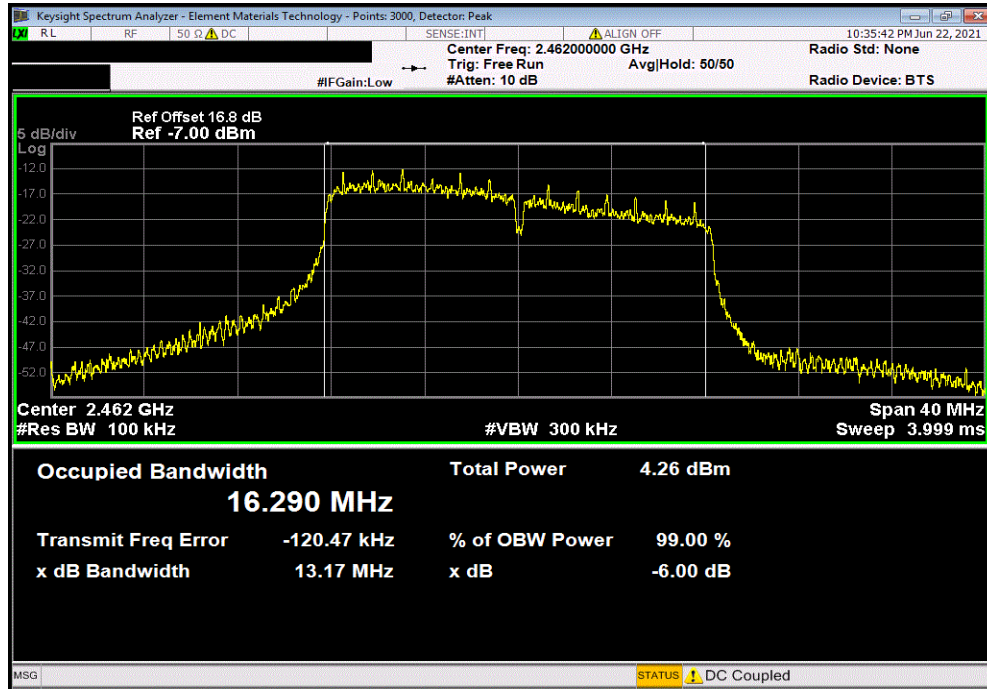


OCCUPIED BANDWIDTH

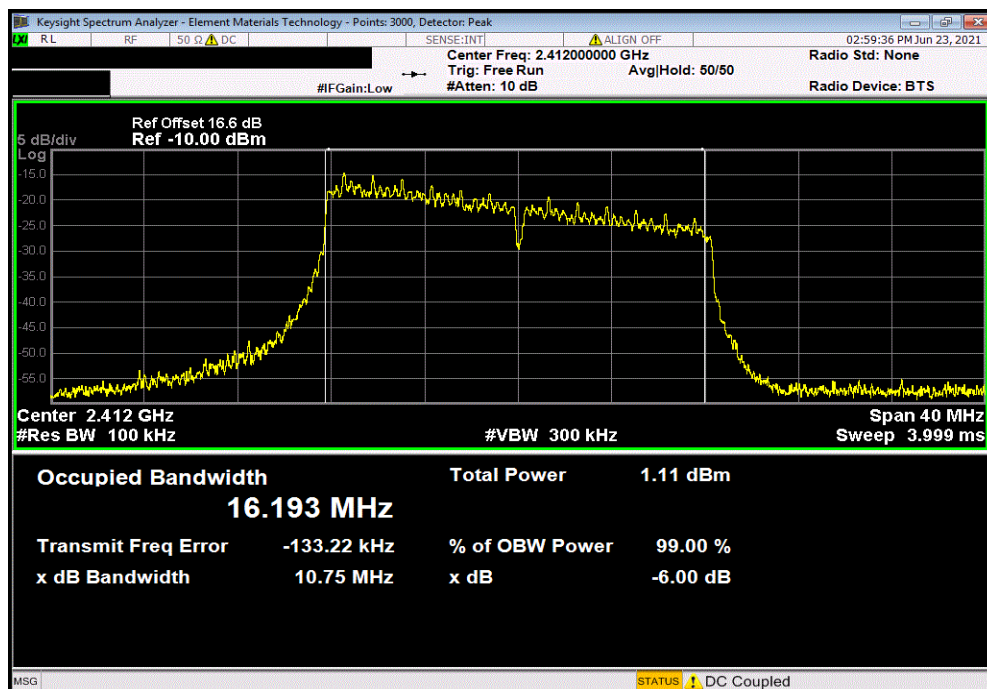


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
				Value	Limit	Result
				13.171 MHz	500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				10.748 MHz	500 kHz	Pass

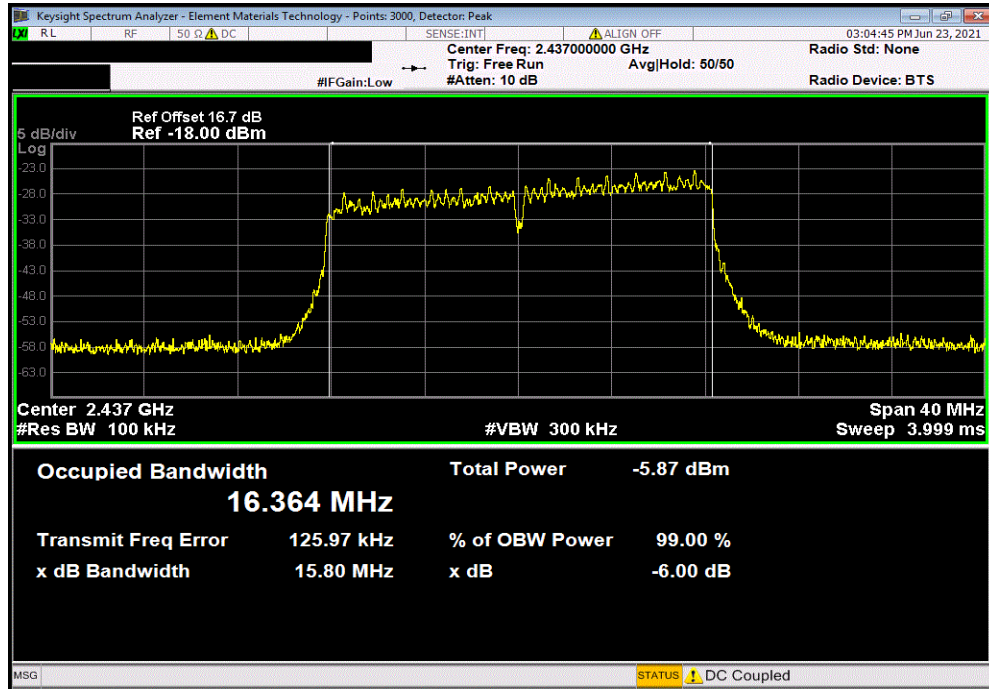


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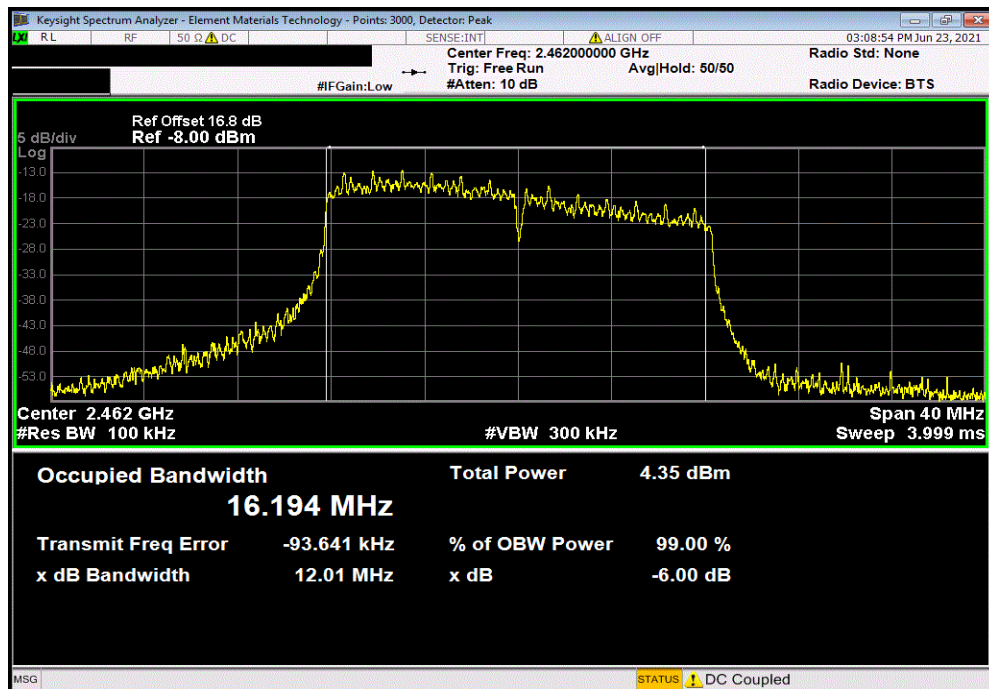


TbTx 2021.03.19.1 XMt 2020.12.30.0

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



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
				Value	Limit	Result
				12.005 MHz	(>) 500 kHz	Pass

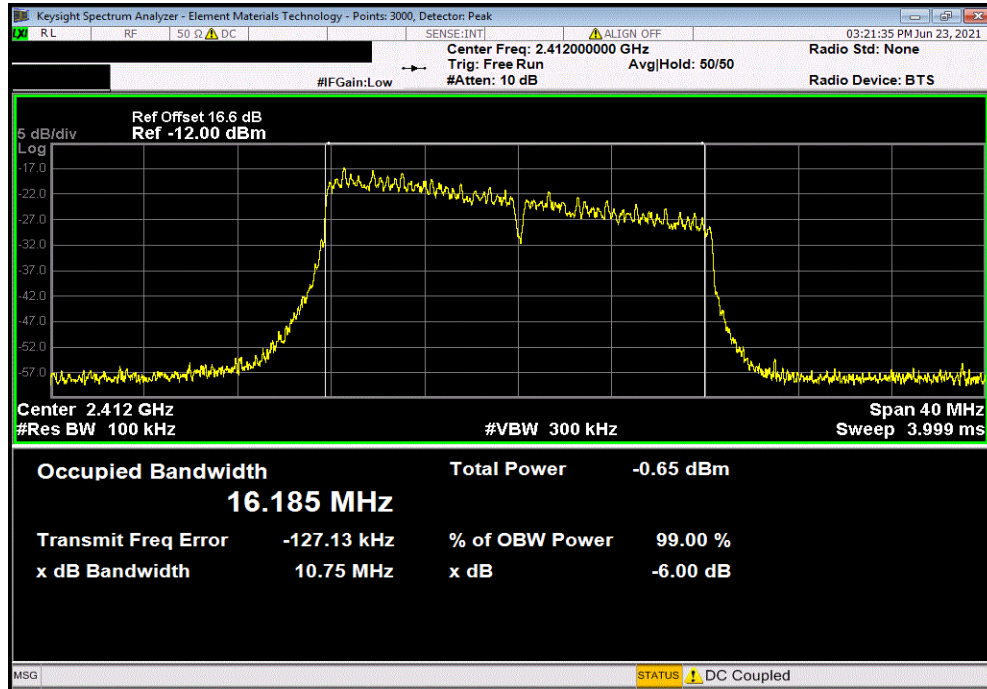


OCCUPIED BANDWIDTH

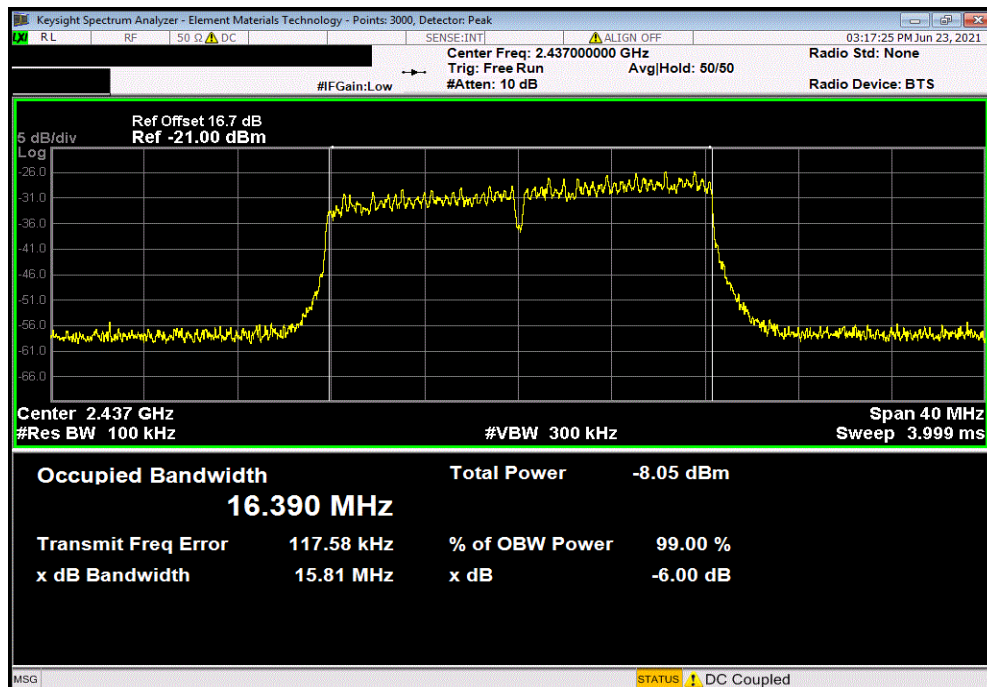


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				(>)		
				10.752 MHz	500 kHz	Pass



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

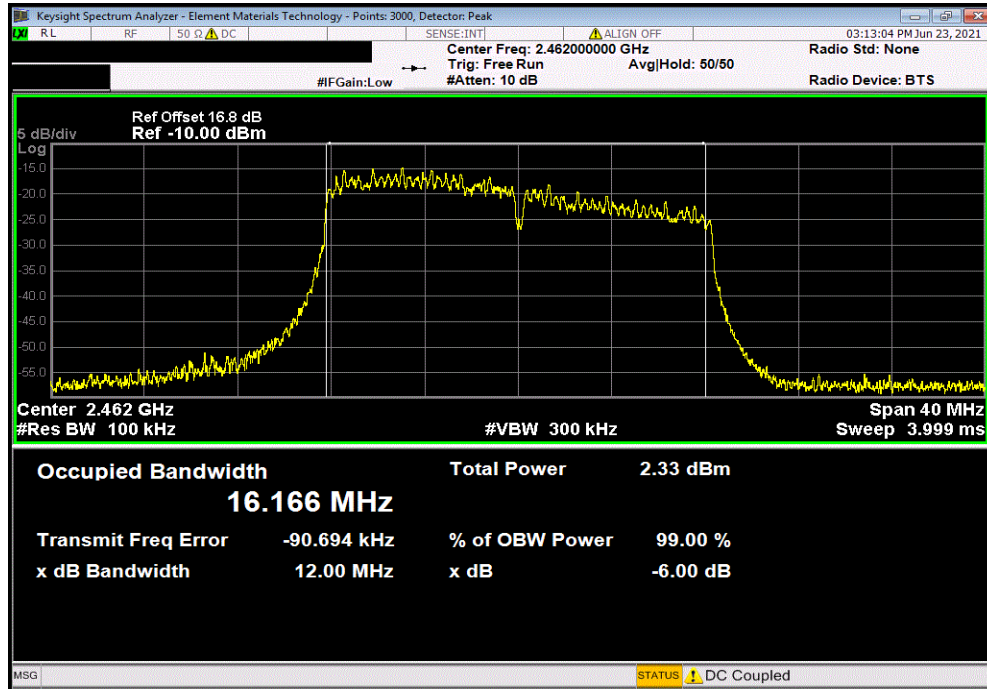


OCCUPIED BANDWIDTH

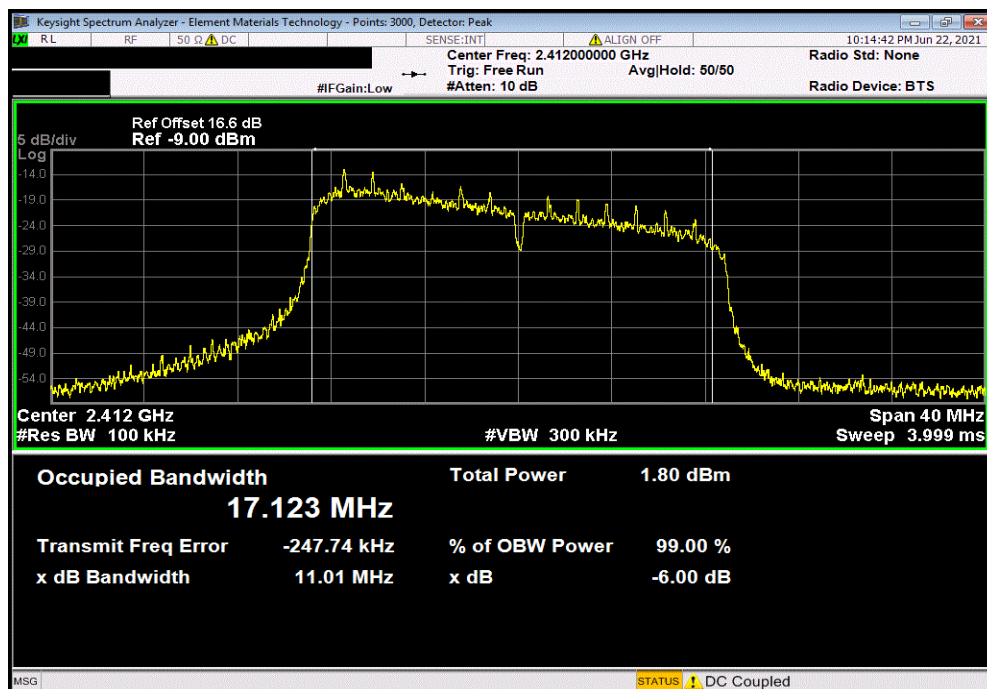


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
				Value	Limit	Result
					(>)	
				12.005 MHz	500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
				Value	Limit	Result
					(>)	
				11.014 MHz	500 kHz	Pass

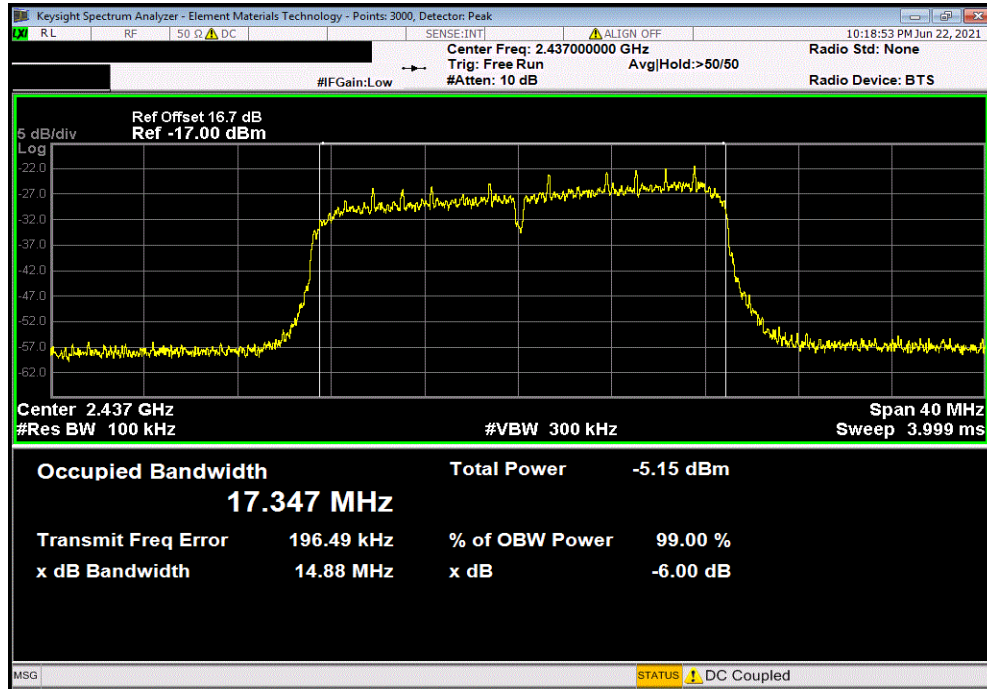


OCCUPIED BANDWIDTH

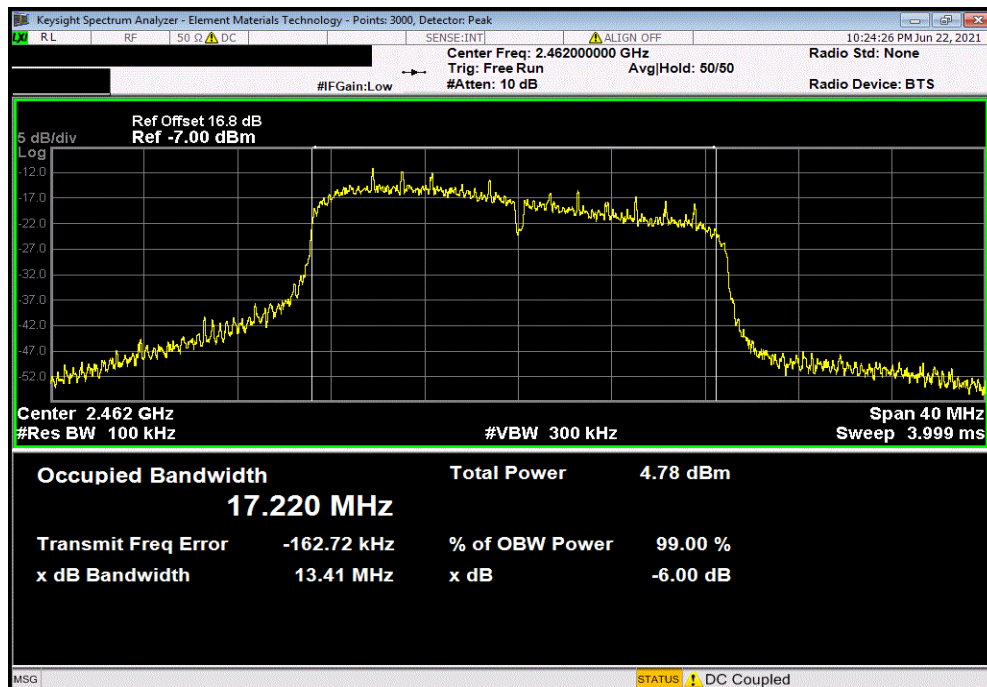


TbTx 2021.03.19.1 XMt 2020.12.30.0

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



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
				Value	Limit	Result
				13.407 MHz	(>) 500 kHz	Pass

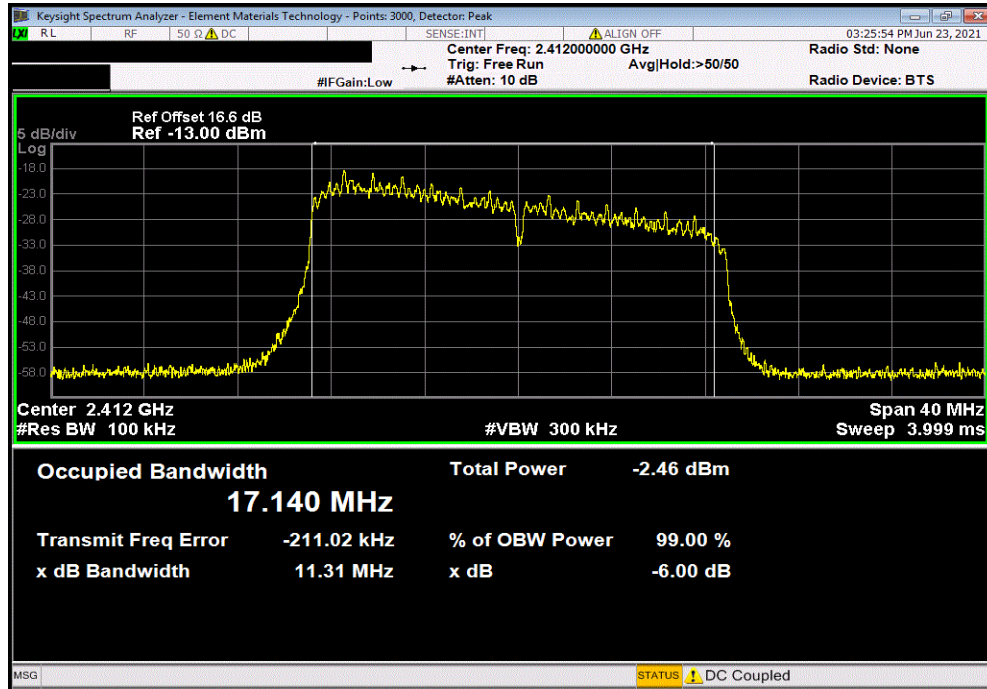


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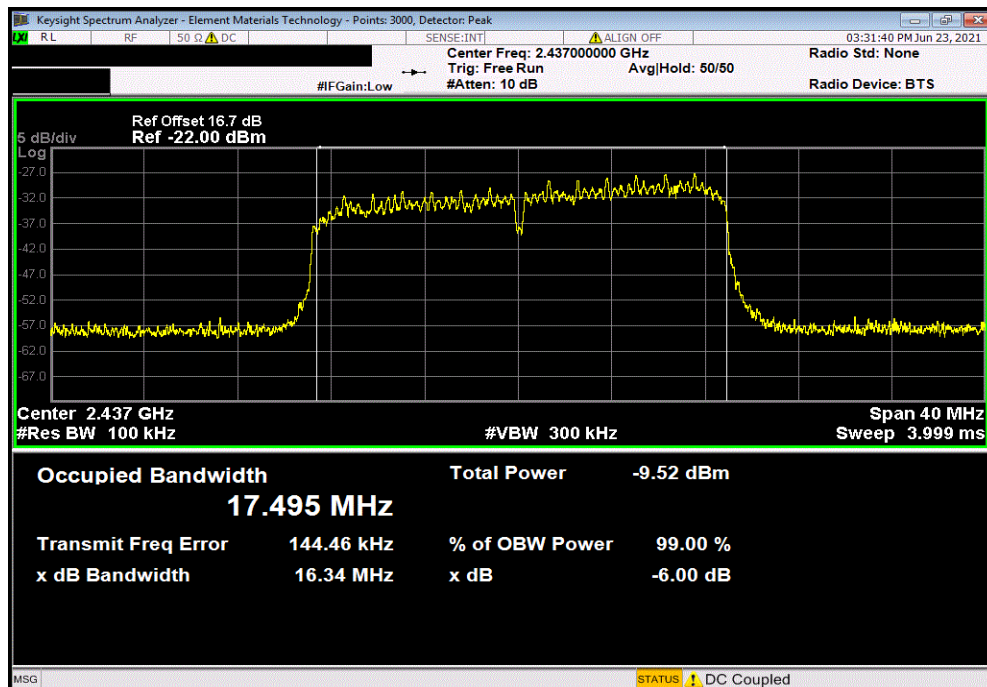


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				11.305 MHz	500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
				Value	Limit	Result
				16.34 MHz	500 kHz	Pass

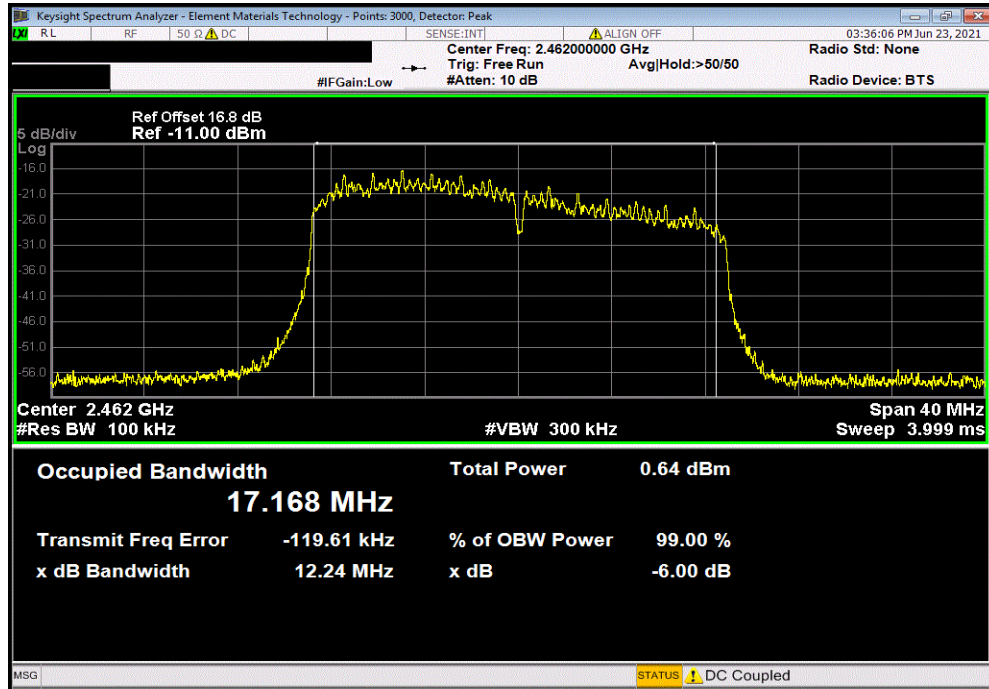


OCCUPIED BANDWIDTH



TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
Value				Limit	Result	
12.242 MHz				(> 500 kHz	Pass	



OUTPUT POWER

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
Attenuator	Coaxicom	3910-20	AXY	2020-09-14	2021-09-14
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2021-04-16	2022-04-16
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	2021-02-01	2022-02-01
Cable	Element	Double Ridge Guide Horn Cables	MNV	2021-02-01	2022-02-01
Antenna - Double Ridge	ETS Lindgren	3115	AIB	2020-09-03	2022-09-03

TEST DESCRIPTION

The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

Prior to measuring output power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method AVGSA-2 in section 11.9.2.2.4 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding $[10 \log (1 / D)]$, where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

OUTPUT POWER



TSTx 2021.03.19.1 XMR 2020.12.30.0

EUT: Smart Tracking Collar

Serial Number: 6797400036

Customer: Paragon Innovations, Inc.

Attendees: None

Project: None

Tested by: Andrew Rogstad

Power: 3.3 VDC via USB Cable

Work Order: PAON0011

Date: 23-Jun-21

Temperature: 22.2 °C

Humidity: 44.2% RH

Barometric Pres.: 1012 mbar

Job Site: MN09

TEST SPECIFICATIONS

FCC 15.247:2021

Test Method

ANSI C63.10:2013

COMMENTS

Tested in a radiated configuration with the EUT maximized in the single worst-case EUT orientation/receive antenna polarity combination. Reference level offset accounts for cables, transducer, preamp, and 20 dB attenuator.

DEVIATIONS FROM TEST STANDARD

None

Configuration #

6

Signature



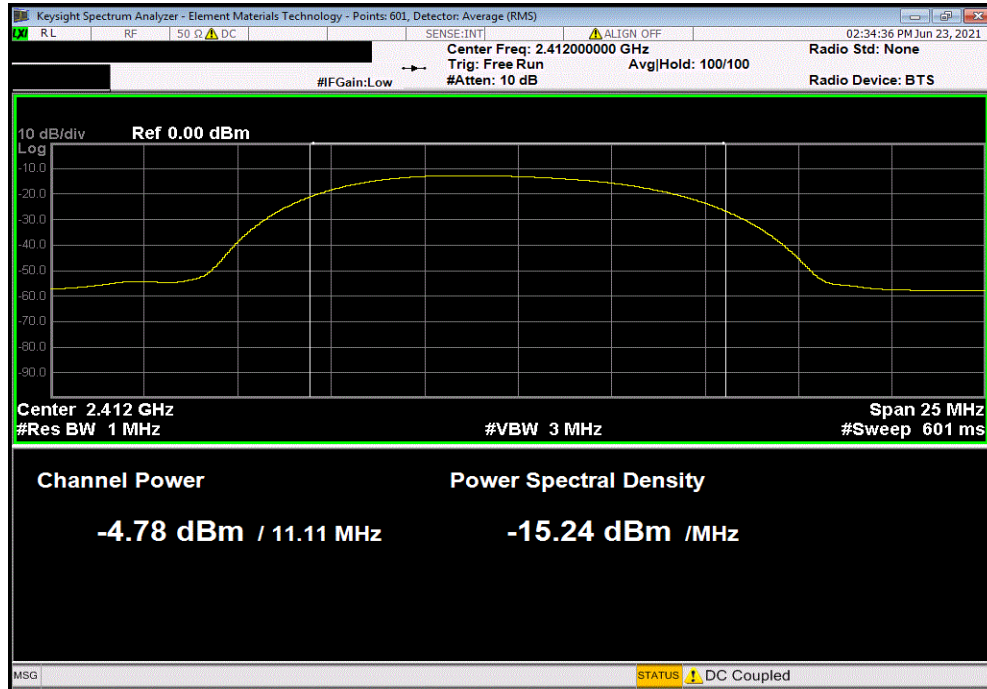
	Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
2400 MHz - 2483.5 MHz Band							
802.11(b) 1 Mbps							
Low Channel 1, 2412 MHz	-4.784	11.77	0	2.5	4.5	30	Pass
Mid Channel 6, 2437 MHz	-11.738	11.77	0	2.5	-2.5	30	Pass
High Channel 11, 2462 MHz	-1.499	11.77	0	2.5	7.8	30	Pass
802.11(b) 11 Mbps							
Low Channel 1, 2412 MHz	-5.243	11.77	0	2.5	4.0	30	Pass
Mid Channel 6, 2437 MHz	-11.872	11.77	0	2.5	-2.6	30	Pass
High Channel 11, 2462 MHz	-1.596	11.77	0	2.5	7.7	30	Pass
802.11(g) 6 Mbps							
Low Channel 1, 2412 MHz	-4.84	11.77	0	2.5	4.4	30	Pass
Mid Channel 6, 2437 MHz	-11.324	11.77	0	2.5	-2.1	30	Pass
High Channel 11, 2462 MHz	-2.931	11.77	0	2.5	6.3	30	Pass
802.11(g) 36 Mbps							
Low Channel 1, 2412 MHz	-7.039	11.77	0	2.5	2.2	30	Pass
Mid Channel 6, 2437 MHz	-13.953	11.77	0	2.5	-4.7	30	Pass
High Channel 11, 2462 MHz	-3.838	11.77	0	2.5	5.4	30	Pass
802.11(g) 54 Mbps							
Low Channel 1, 2412 MHz	-9.132	11.77	0	2.5	0.1	30	Pass
Mid Channel 6, 2437 MHz	-16.351	11.77	0	2.5	-7.1	30	Pass
High Channel 11, 2462 MHz	-5.993	11.77	0	2.5	3.3	30	Pass
802.11(n) MCS0							
Low Channel 1, 2412 MHz	-5.585	11.77	0	2.5	3.7	30	Pass
Mid Channel 6, 2437 MHz	-12.326	11.77	0	2.5	-3.1	30	Pass
High Channel 11, 2462 MHz	-2.548	11.77	0	2.5	6.7	30	Pass
802.11(n) MCS7							
Low Channel 1, 2412 MHz	-10.786	11.77	0	2.5	-1.5	30	Pass
Mid Channel 6, 2437 MHz	-17.809	11.77	0	2.5	-8.5	30	Pass
High Channel 11, 2462 MHz	-7.729	11.77	0	2.5	1.5	30	Pass

OUTPUT POWER

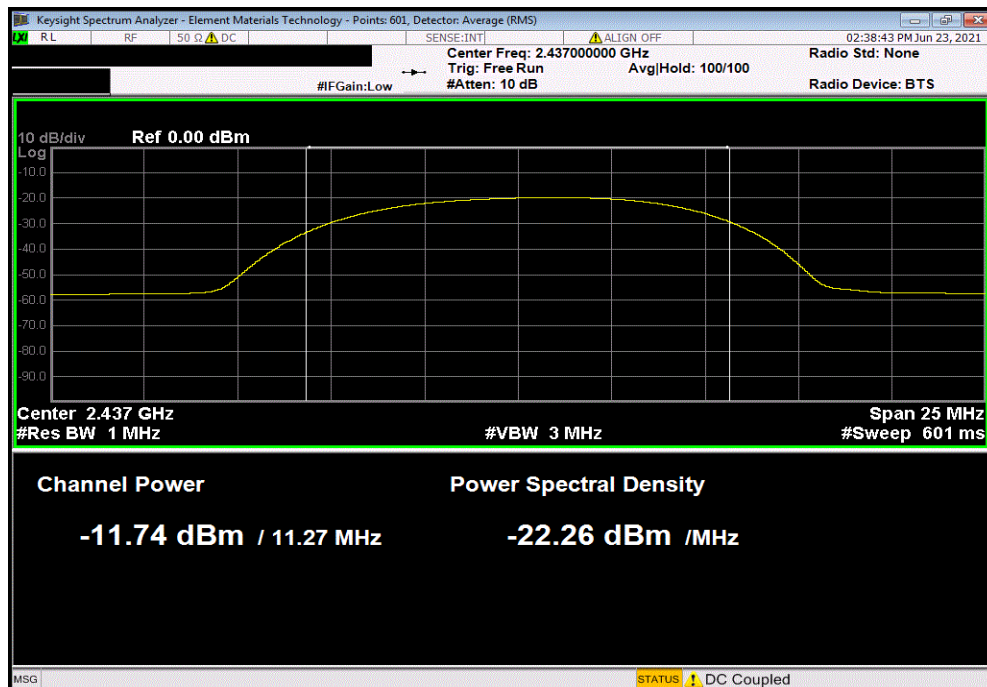


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-4.784	11.77	0	2.5	4.5	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-11.738	11.77	0	2.5	-2.5	30	Pass

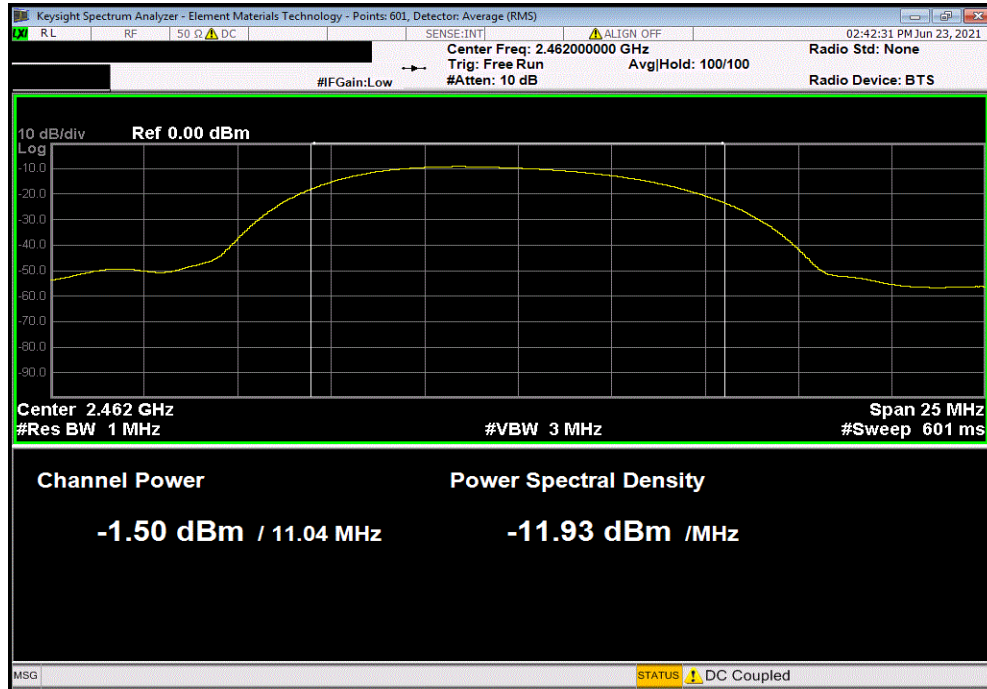


OUTPUT POWER

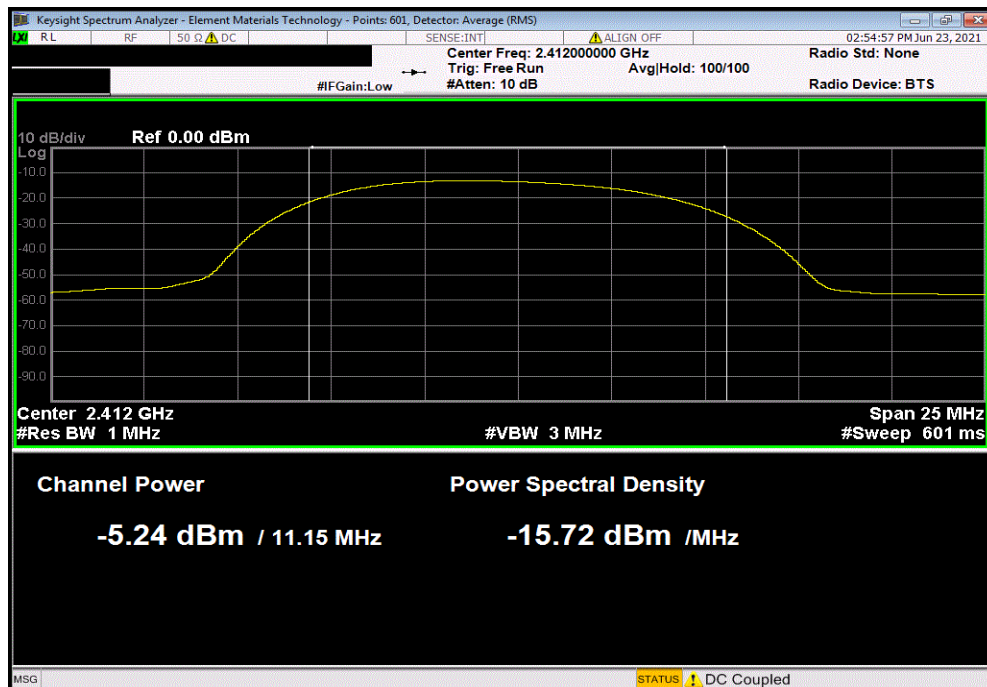


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-1.499	11.77	0	2.5	7.8	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-5.243	11.77	0	2.5	4.0	30	Pass

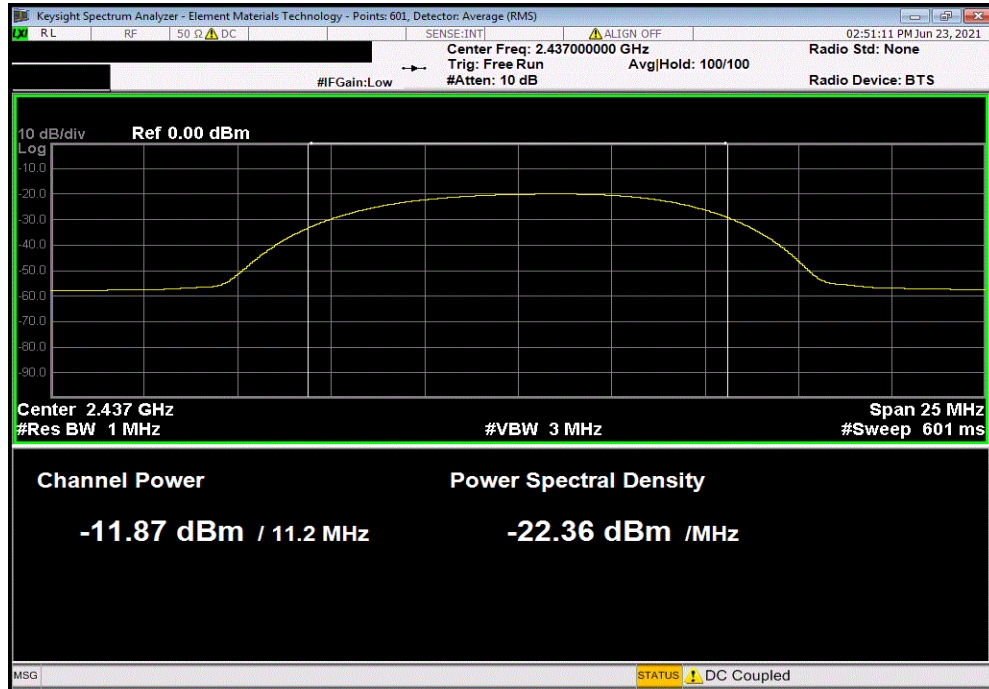


OUTPUT POWER

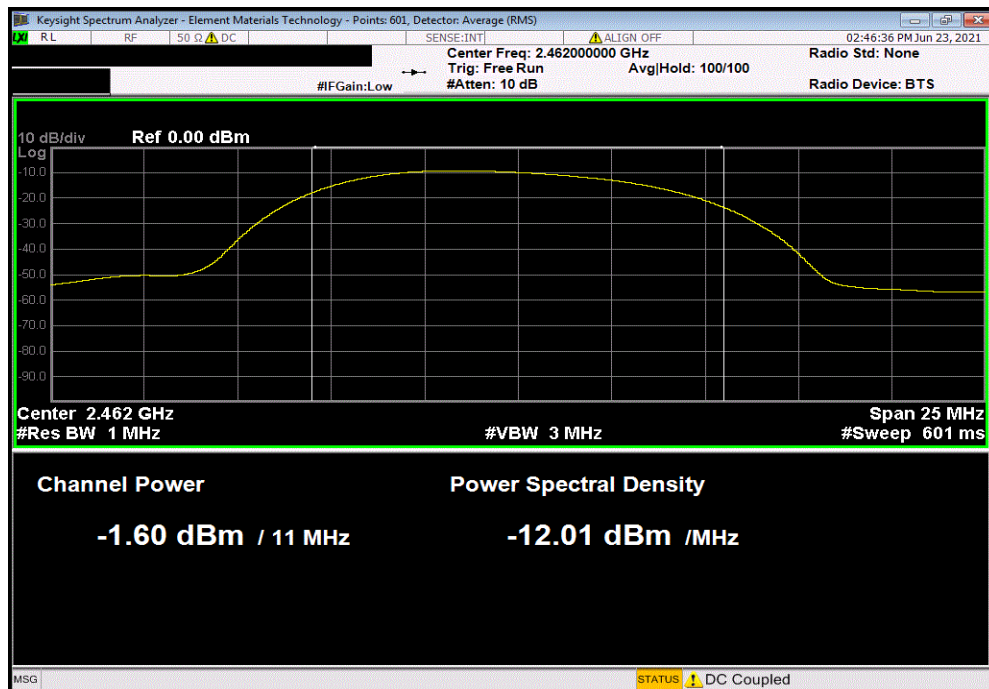


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-11.872	11.77	0	2.5	-2.6	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-1.596	11.77	0	2.5	7.7	30	Pass

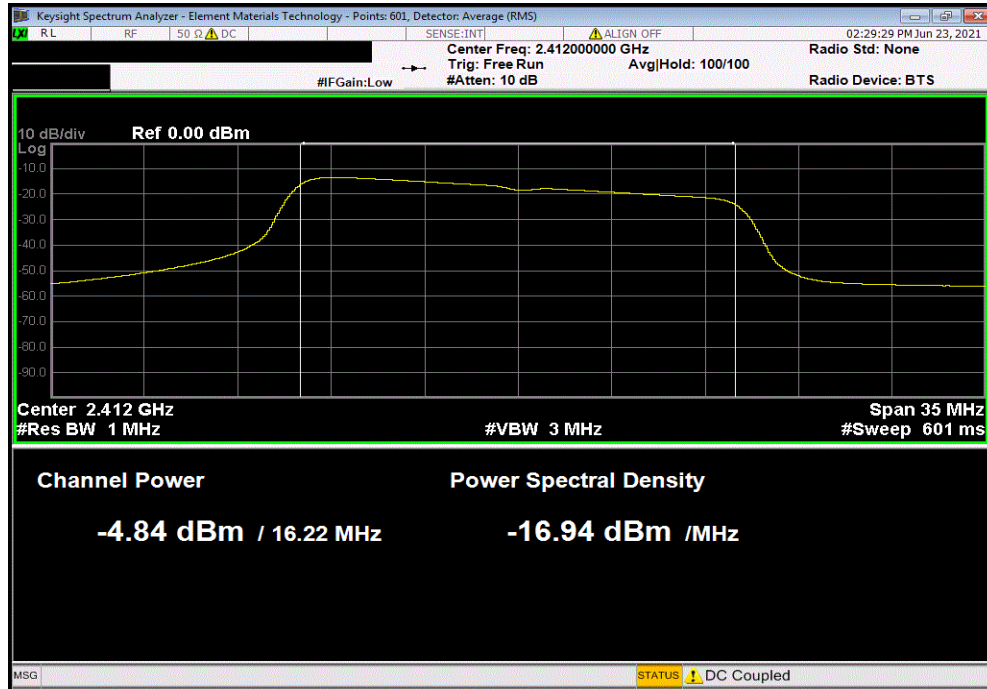


OUTPUT POWER

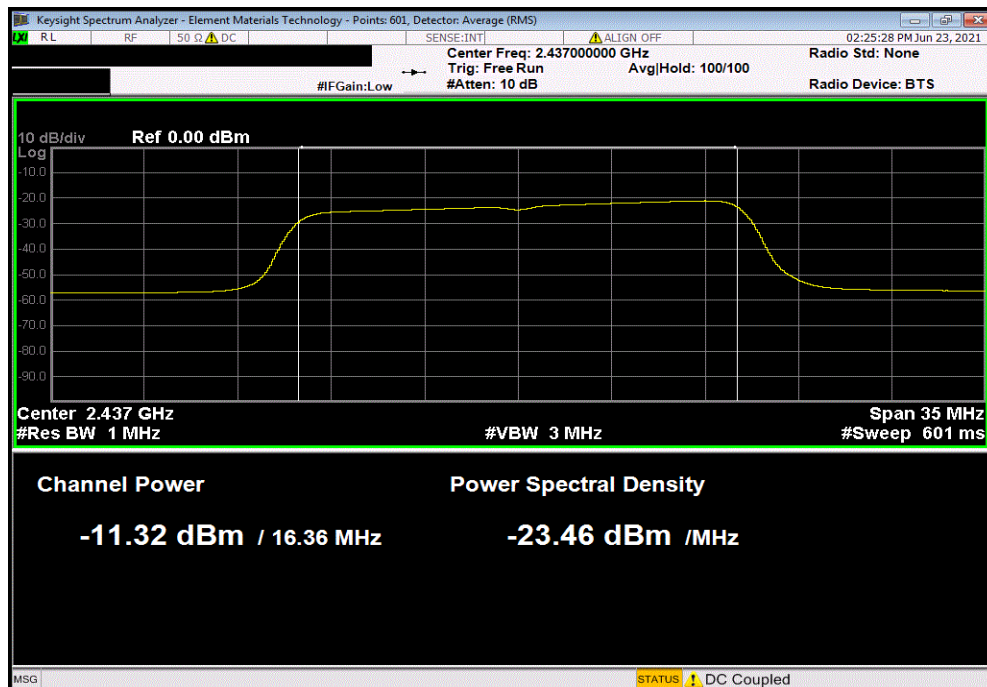


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-4.84	11.77	0	2.5	4.4	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-11.324	11.77	0	2.5	-2.1	30	Pass

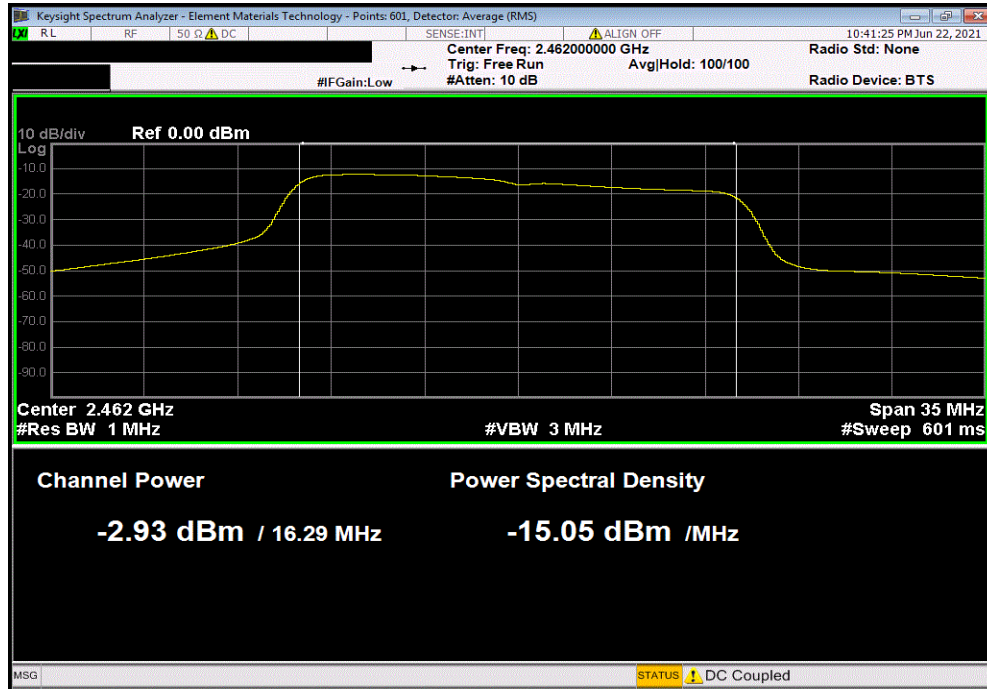


OUTPUT POWER

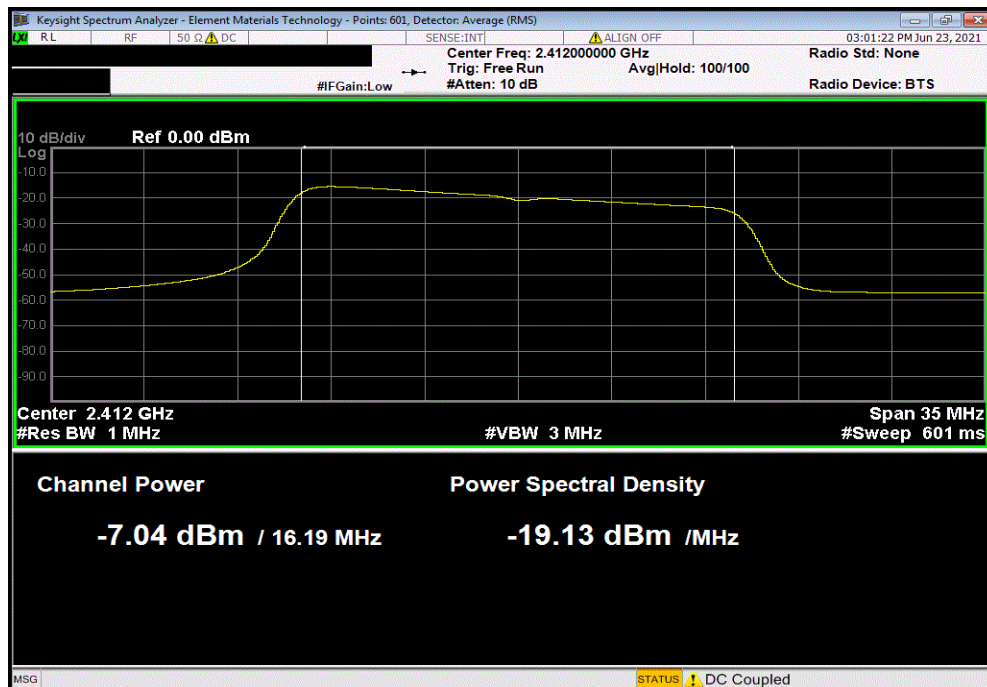


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-2.931	11.77	0	2.5	6.3	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-7.039	11.77	0	2.5	2.2	30	Pass

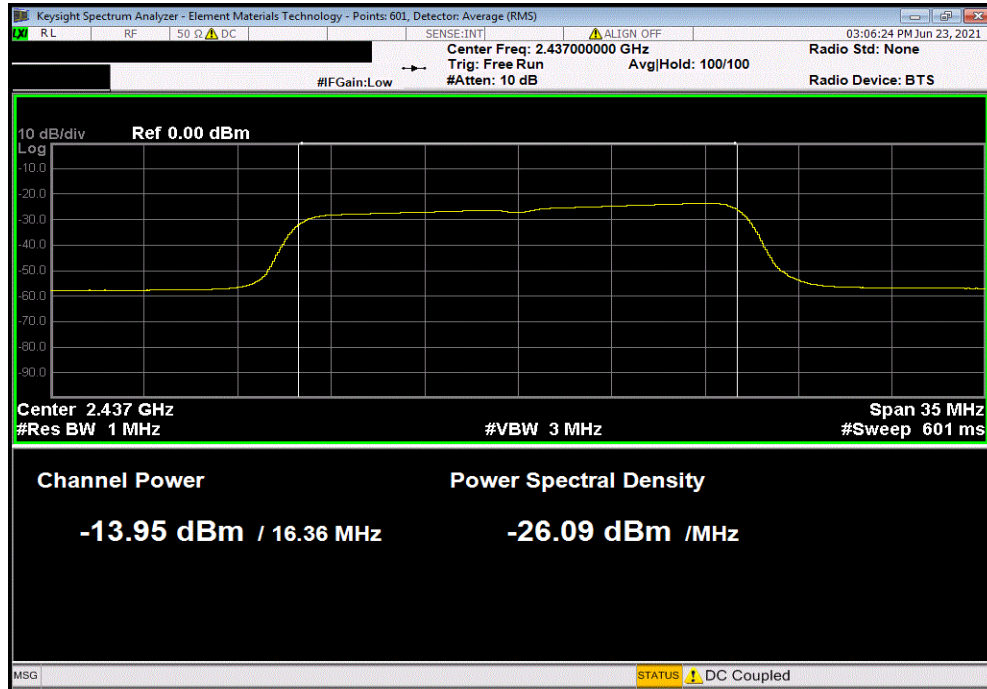


OUTPUT POWER

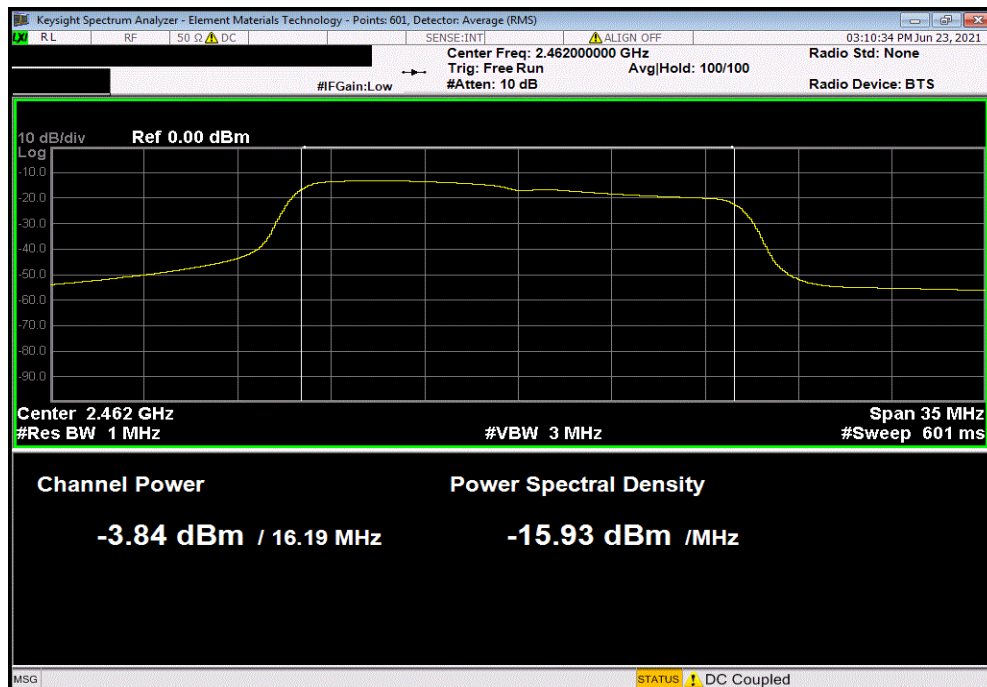


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-13.953	11.77	0	2.5	-4.7	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-3.838	11.77	0	2.5	5.4	30	Pass

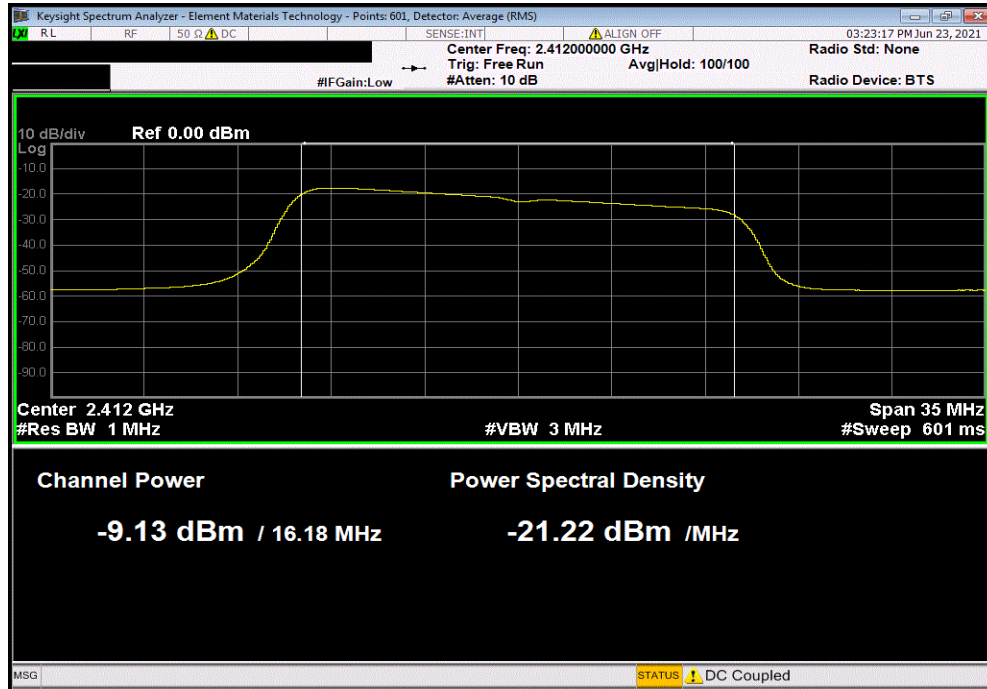


OUTPUT POWER

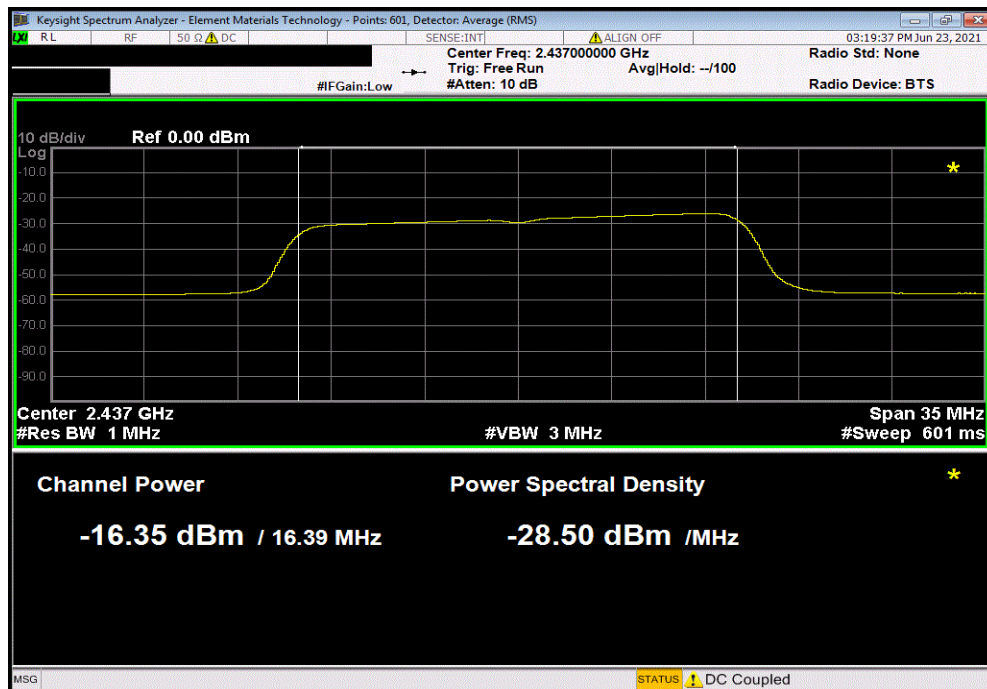


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-9.132	11.77	0	2.5	0.1	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-16.351	11.77	0	2.5	-7.1	30	Pass

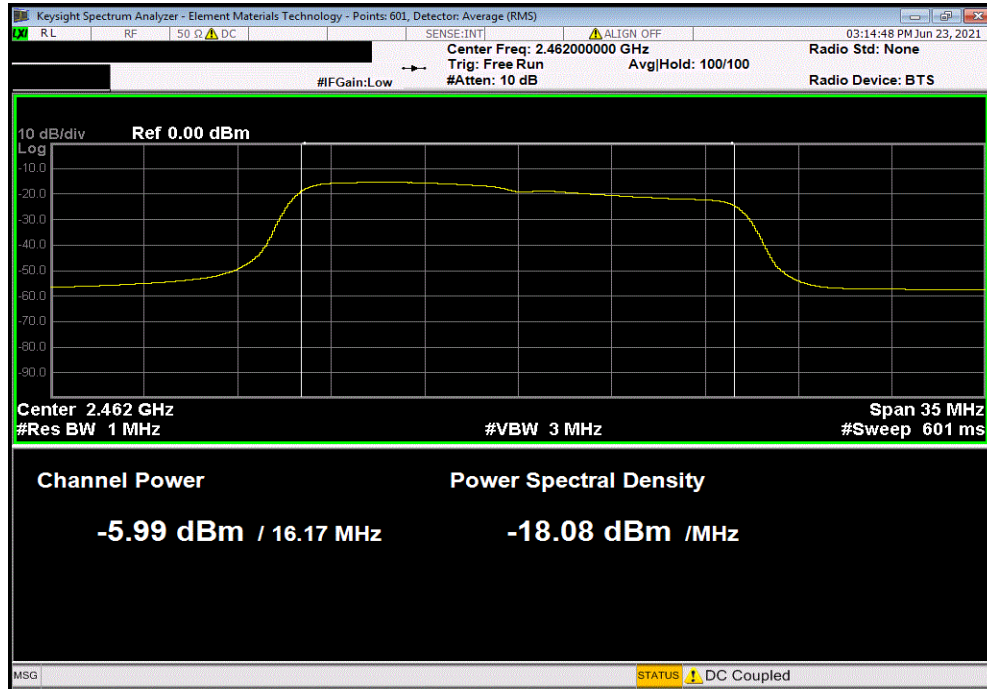


OUTPUT POWER

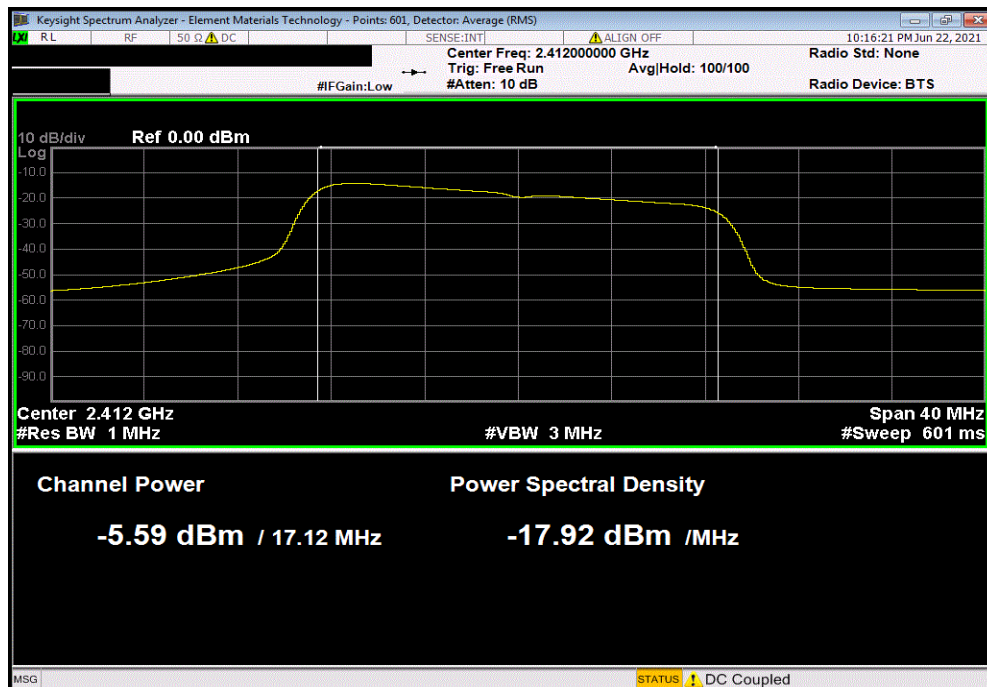


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-5.993	11.77	0	2.5	3.3	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-5.585	11.77	0	2.5	3.7	30	Pass

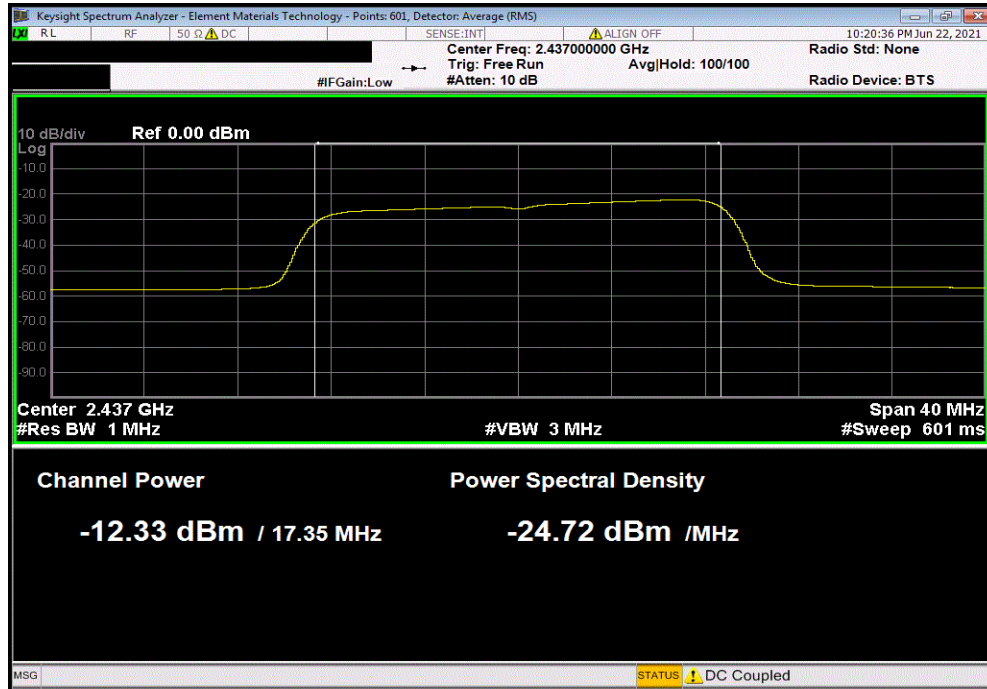


OUTPUT POWER

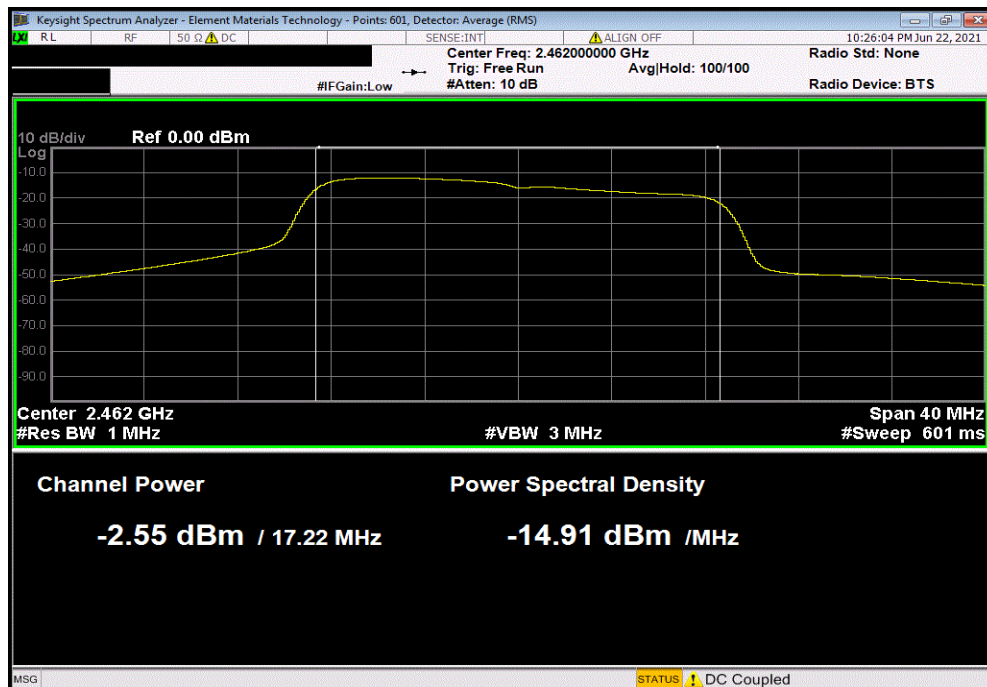


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-12.326	11.77	0	2.5	-3.1	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-2.548	11.77	0	2.5	6.7	30	Pass

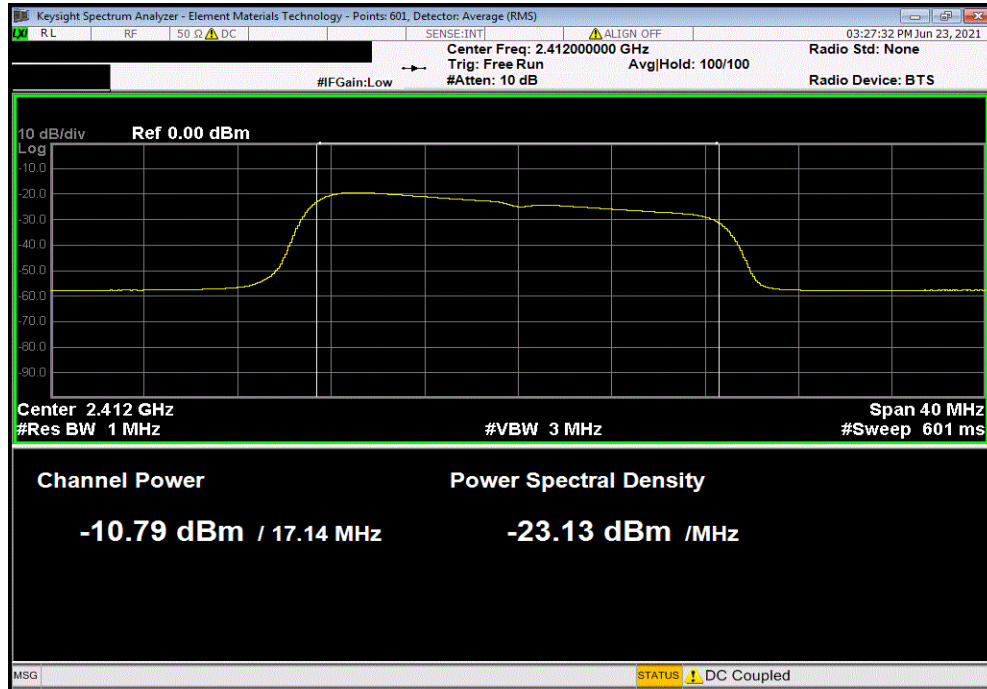


OUTPUT POWER

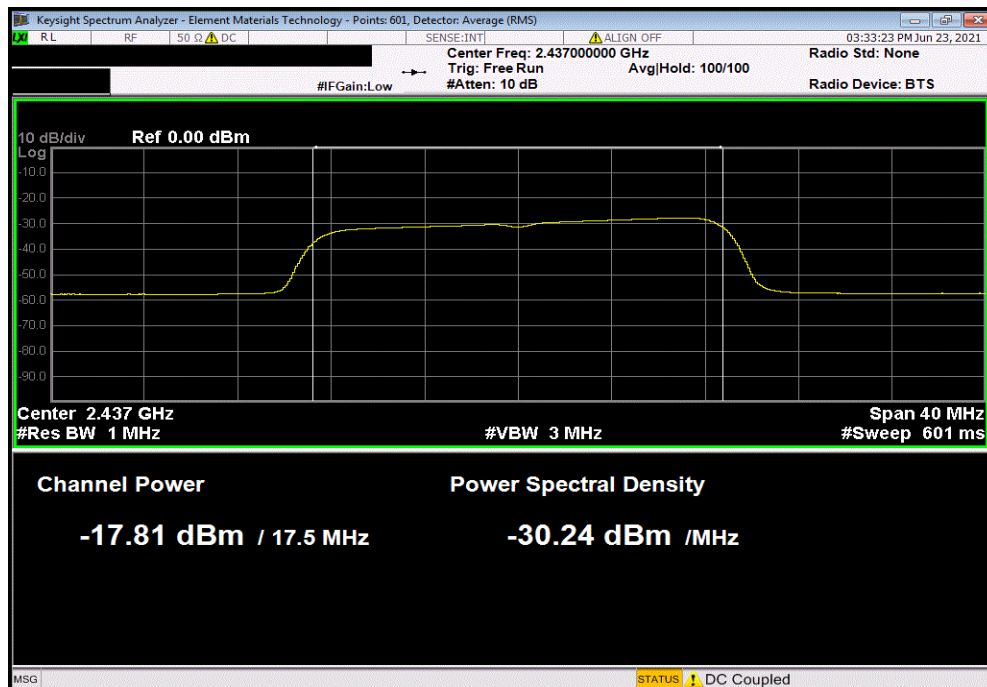


TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-10.786	11.77	0	2.5	-1.5	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-17.809	11.77	0	2.5	-8.5	30	Pass

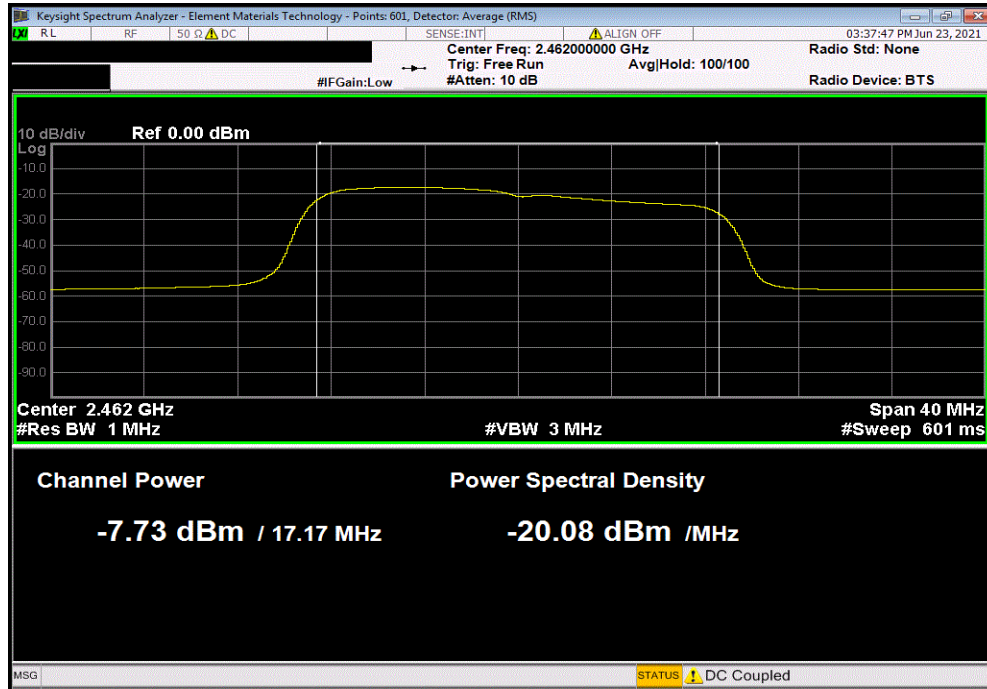


OUTPUT POWER



TbTx 2021.03.19.1 XMt 2020.12.30.0

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
Avg Cond Pwr (dBm)	Correction Factor	Duty Cycle Factor (dB)	Antenna Gain (dBi)	Out Pwr (dBm)	Limit (dBm)	Result
-7.729	11.77	0	2.5	1.5	30	Pass



11.77

2.5

9.3