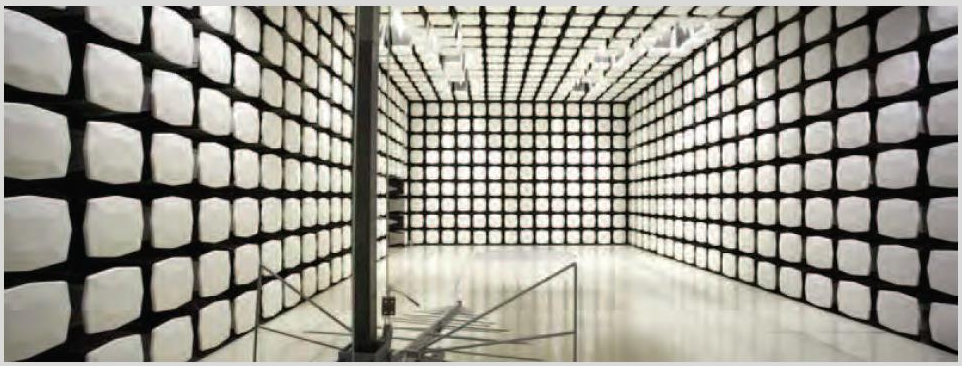
Finalmouse

Starlight-12 Dongle

FCC 15.247:2021

2400 - 2483.5 MHz DTS Transceiver

Report: FINA0003.6, Issue Date: July 28, 2021



NVLAP LAB CODE: 200676-0

CERTIFICATE OF TEST

Last Date of Test: July 22, 2021
Finalmouse
EUT: Starlight-12 Dongle

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2021	ANSI C63.10:2013, KDB 558074
FCC 15.247:2021	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6, 11.12.1, 11.13.2	Spurious Radiated Emissions	Yes	Pass	
11.6	Duty Cycle	No	N/A	Operating at 100% Duty Cycle
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:

James E Morris

James Morris, 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 – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

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

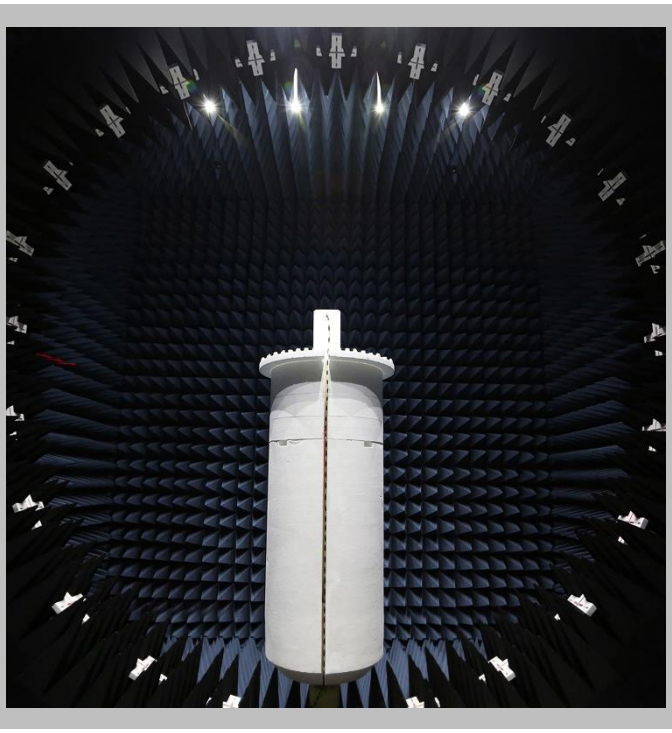
MIC – Recognized by MIC as a CAB for the acceptance of test data.

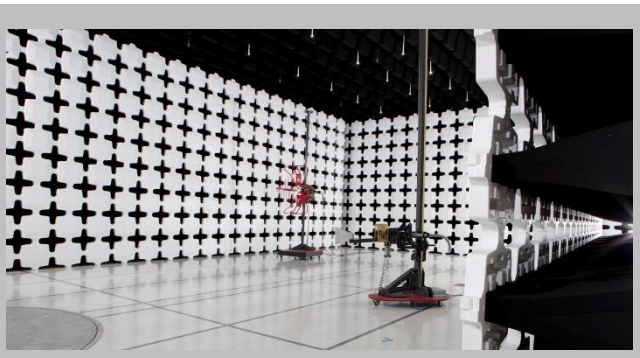
SCOPE

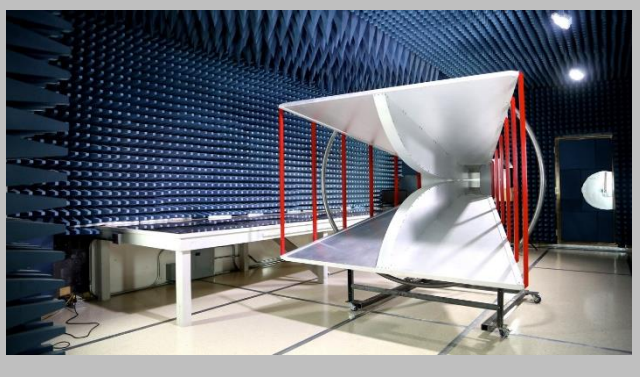
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

FACILITIES

California	Minnesota	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 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

element
TMU.2015.07.10

Measurement Uncertainty

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

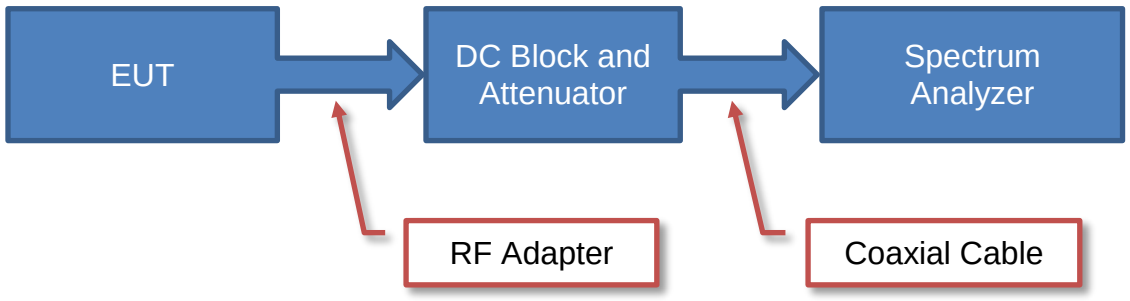
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. 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)	5.1 dB	-5.1 dB
AC Powerline Conducted Emissions (dB)	3.2 dB	-3.2 dB

TEST SETUP BLOCK DIAGRAMS

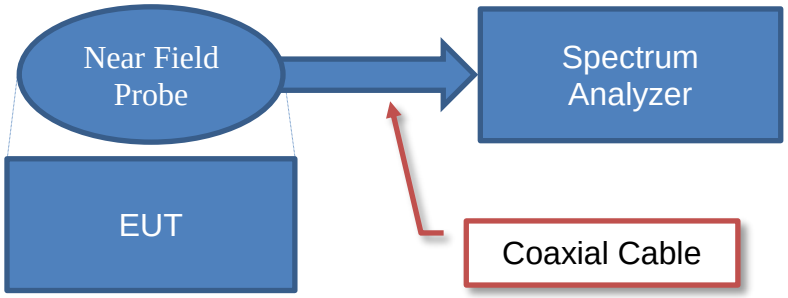
Antenna Port Conducted Measurements



Sample Calculation

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

Near Field Test Fixture Measurements

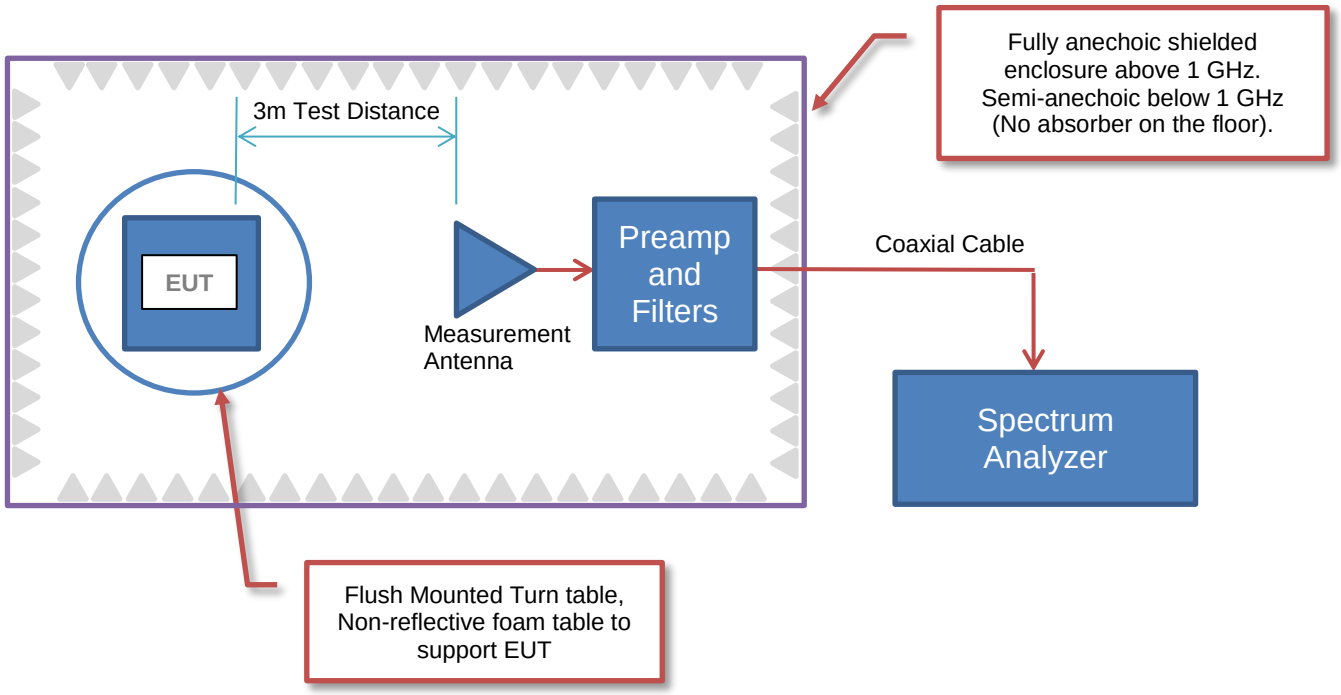


Sample Calculation

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

TEST SETUP BLOCK DIAGRAMS

Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Finalmouse
Address:	505 San Juan Ave 4
City, State, Zip:	Venice, CA 90291
Test Requested By:	Kevin Hung
EUT:	Starlight-12 Dongle
First Date of Test:	March 16, 2021
Last Date of Test:	July 22, 2021
Receipt Date of Samples:	March 16, 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:
USB Dongle for Wireless Mouse

Testing Objective:
Seeking to demonstrate compliance under FCC 15.247:2021 for operation in the 2400 - 2483.5 MHz Band.

CONFIGURATIONS

Configuration FINA0001- 3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Starlight-12 Small	Finalmouse	Starlight-12 Small	E
Starlight-12 Dongle	Finalmouse	Starlight-12 Dongle	E

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
HP Laptop	HP	14-dq0005cl	5CD05KR68
Laptop PS	HP	TPN-LA15	L25296-001

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Cable	No	1m	No	Laptop PS	AC Mains
DC Cable	Yes	1.5m	No	Laptop PS	HP Laptop
USB cable	Yes	.5m	No	Starlight-12 Dongle	HP Laptop

Configuration FINA0003- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Starlight-12 Dongle	Finalmouse	FM6D	E

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
HP Laptop	HP	14-dq0005cl	5CD05KR68
Laptop PS	HP	TPN-LA15	L25296-001

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Cable	No	1m	No	Laptop PS	AC Mains
DC Cable	Yes	1.5m	No	Laptop PS	HP Laptop
USB cable	Yes	.5m	No	FM6 Dongle	HP Laptop

CONFIGURATIONS

Configuration FINA0003- 3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Starlight-12 Dongle	Finalmouse	FM6D	F

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
HP Laptop	HP	14-dq0005cl	5CD05KR68
Laptop PS	HP	TPN-LA15	L25296-001

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Cable	No	1m	No	Laptop PS	AC Mains
DC Cable	Yes	1.5m	No	Laptop PS	HP Laptop
USB cable	Yes	.5m	No	FM6 Dongle	HP Laptop

Configuration FINA0003- 4

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Starlight-12 Dongle	Finalmouse	FM6D	G

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
HP Laptop	HP	14-dq0005cl	5CD05KR68
Laptop PS	HP	TPN-LA15	L25296-001

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Cable	No	1m	No	Laptop PS	AC Mains
DC Cable	Yes	1.5m	No	Laptop PS	HP Laptop
USB cable	Yes	.5m	No	FM6 Dongle	HP Laptop

CONFIGURATIONS

Configuration FINA0003- 6

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Starlight-12 Dongle	Finalmouse	FM6D	A

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Test Fixture	N/A	N/A	N/A

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB cable extension	Yes	3m	No	HP Laptop	USB cable
USB cable	Yes	.5m	No	USB cable extension	FM6 Dongle

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-03-16	Powerline Conducted Emissions (Transmitter)	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	2021-04-09	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.
3	2021-04-13	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.
4	2021-04-15	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.
5	2021-04-15	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.
6	2021-04-15	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	2021-04-15	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.
8	2021-07-22	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.
9	2021-07-22	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWER SETTINGS AND ANTENNA GAIN

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

SETTINGS FOR ALL TESTS IN THIS REPORT

Type	Frequency (MHz)	Power Setting
Other Wideband (DTS)	2402	-4 dBm
	2442	-4 dBm
	2480	-4 dBm

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency (MHz)	Gain (dBi)
Inverted-F Monopole	Manufacturer	2402	3.17
		2442	3.29
		2480	3.86

POWERLINE CONDUCTED EMISSIONS

element
WTD.2020.12.03.1
EmiR5 2021.01.08.0, PSA-ESCI 2021.01.22.0

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESCI	ARG	2020-08-07	2021-08-07
LISN	Solar Electronics	9252-50-24-BNC	LIA	2020-12-28	2021-12-28
LISN	Solar Electronics	9252-50-24-BNC	LIB	2020-12-28	2021-12-28
Cable - Conducted Cable Assembly	Northwest EMC	OCP, HFP, AWC	OCPA	2020-08-26	2021-08-26
Power Supply	Pacific Power	AFX 12KVA	SMT	NCR	NCR

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.6 dB	-2.6 dB

CONFIGURATIONS INVESTIGATED

FINA0001-3

MODES INVESTIGATED

USB Dongle connected to laptop.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2020.12.03.1
EmiR5 2021.01.08.0, PSA-ESCI 2021.01.22.0

EUT:	Starlight-12 Dongle	Work Order:	FINA0001
Serial Number:	F	Date:	2021-03-16
Customer:	Finalmouse	Temperature:	21.2°C
Attendees:	None	Relative Humidity:	39.4%
Customer Project:	None	Bar. Pressure:	1021 mb
Tested By:	Carlos Perez	Job Site:	OC06
Power:	5VDC USB via host laptop 110VAC/60Hz	Configuration:	FINA0001-3

TEST SPECIFICATIONS

Specification: Equipment Class B	Method:
FCC 15.207:2021	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

None

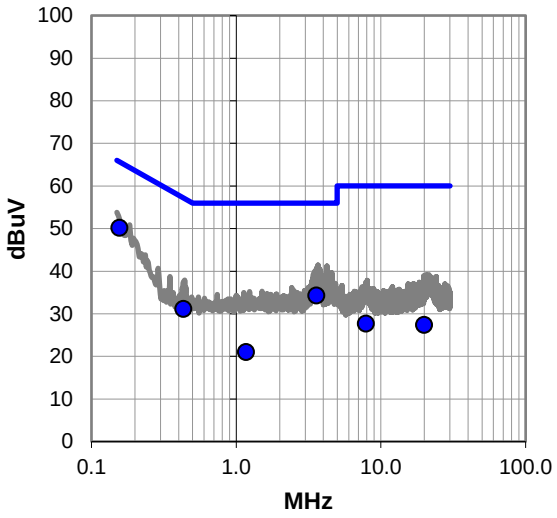
EUT OPERATING MODES

USB Dongle connected to laptop.

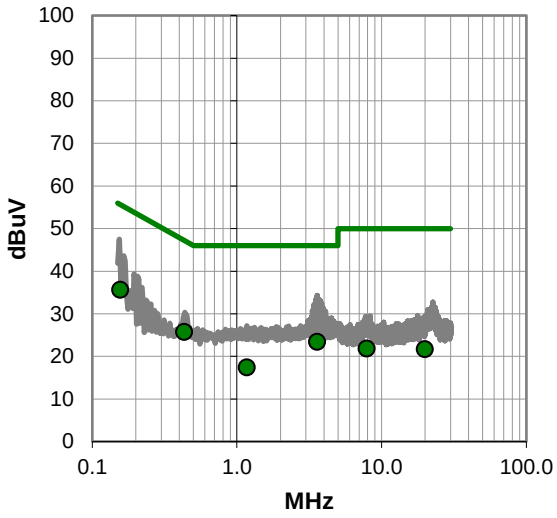
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2020.12.03.1
EmiR5 2021.01.08.0, PSA-ESCI 2021.01.22.0

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.155	30.0	20.2	50.2	65.7	-15.5
3.577	14.1	20.2	34.3	56.0	-21.7
0.431	11.0	20.1	31.1	57.2	-26.1
7.856	7.3	20.4	27.7	60.0	-32.3
19.848	6.4	21.0	27.4	60.0	-32.6
1.170	1.0	20.0	21.0	56.0	-35.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.155	15.4	20.2	35.6	55.7	-20.1
0.431	5.6	20.1	25.7	47.2	-21.5
3.577	3.2	20.2	23.4	46.0	-22.6
7.856	1.4	20.4	21.8	50.0	-28.2
19.848	0.7	21.0	21.7	50.0	-28.3
1.170	-2.6	20.0	17.4	46.0	-28.6

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2020.12.03.1
EmiR5 2021.01.08.0, PSA-ESCI 2021.01.22.0

EUT:	Starlight-12 Dongle	Work Order:	FINA0001
Serial Number:	F	Date:	2021-03-16
Customer:	Finalmouse	Temperature:	21.2°C
Attendees:	None	Relative Humidity:	39.4%
Customer Project:	None	Bar. Pressure:	1021 mb
Tested By:	Carlos Perez	Job Site:	OC06
Power:	5VDC USB via host laptop 110VAC/60Hz	Configuration:	FINA0001-3

TEST SPECIFICATIONS

Specification: Equipment Class B	Method:
FCC 15.207:2021	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

None

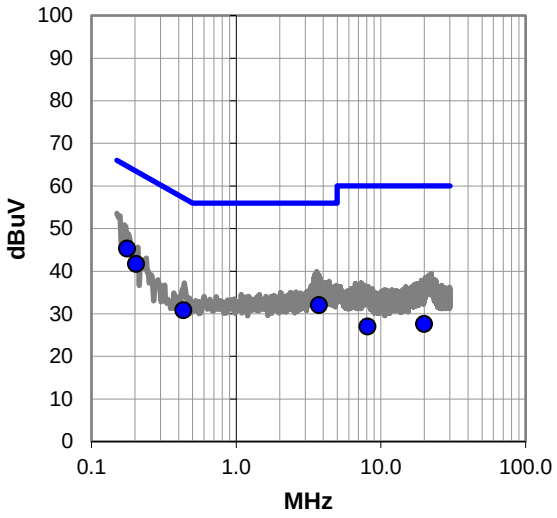
EUT OPERATING MODES

USB Dongle connected to laptop.

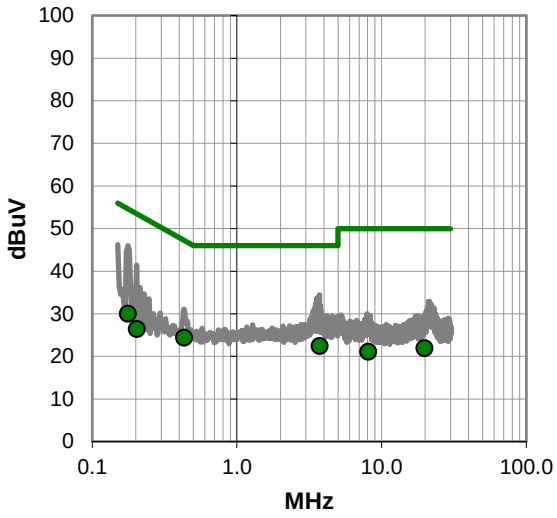
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2020.12.03.1
EmiR5 2021.01.08.0, PSA-ESCI
2021.01.22.0

RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.176	25.1	20.2	45.3	64.7	-19.4
0.203	21.5	20.2	41.7	63.5	-21.8
3.725	11.9	20.1	32.0	56.0	-24.0
0.431	10.7	20.1	30.8	57.2	-26.4
19.814	6.6	21.0	27.6	60.0	-32.4
8.060	6.6	20.4	27.0	60.0	-33.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.431	4.3	20.1	24.4	47.2	-22.8
3.725	2.3	20.1	22.4	46.0	-23.6
0.176	9.8	20.2	30.0	54.7	-24.7
0.203	6.2	20.2	26.4	53.5	-27.1
19.814	0.9	21.0	21.9	50.0	-28.1
8.060	0.7	20.4	21.1	50.0	-28.9

CONCLUSION

Pass

Tested By

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 Low Channel 2402 MHz and High Channel 2480 MHz
Transmitting Low Channel 2402 MHz, Mid Channel 2442 MHz and High Channel 2480 MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

FINA0003 - 2
FINA0003 - 3
FINA0003 - 4

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	S.M. Electronics	SA6-20	REO	2021-01-18	2022-01-18
Filter - Low Pass	Micro-Tronics	LPM50004	HGK	2021-01-15	2022-01-15
Filter - High Pass	Micro-Tronics	HPM50111	HGQ	2021-01-15	2022-01-15
Cable	D-Coax	None	OC4	2020-12-18	2021-12-18
Cable	ESM Cable Corp.	30-1GHz cables	OCW	2020-05-01	2021-05-01
Cable	ESM Cable Corp.	1-8GHz cables	OCX	2021-03-23	2022-03-23
Cable	ESM Cable Corp.	8-18GHz cables	OCY	2021-02-26	2022-02-26
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAN	2020-12-18	2021-12-18
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	2020-07-01	2021-07-01
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	2021-02-26	2022-02-26
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	2021-02-26	2022-02-26
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	2021-03-23	2022-03-23
Antenna - Double Ridge	ETS Lindgren	3115	AIR	2020-07-07	2022-07-07
Antenna - Standard Gain	ETS Lindgren	3160-07	AHX	NCR	NCR
Antenna - Standard Gain	EMCO	3160-08	AHK	NCR	NCR
Antenna - Double Ridge	AH Systems, Inc.	SAS-574	AXV	2020-06-03	2022-06-03
Antenna - Biconolog	EMCO	3142	AXB	2020-04-15	2022-04-15
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFJ	2021-01-06	2022-01-06

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*log(1/dc).

SPURIOUS RADIATED EMISSIONS

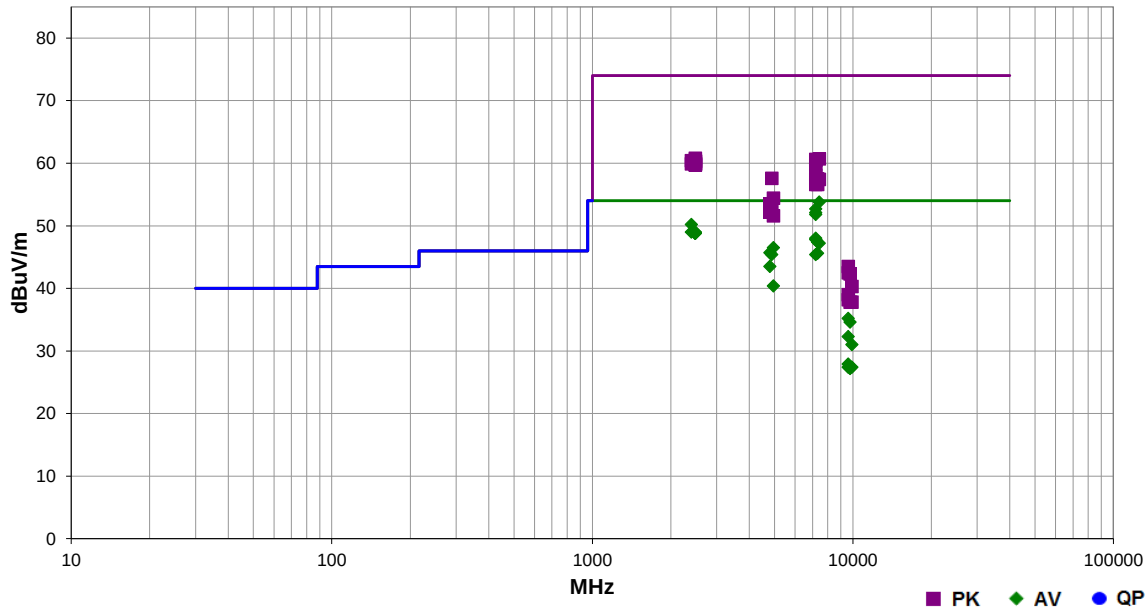
element

EmiR5 2021.01.08.0 PSA-ESCI 2021.03.17.0

Work Order:	FINA0003	**Date:**	2021-04-09		
Project:	None	**Temperature:**	22.4 °C		
Job Site:	OC07	**Humidity:**	49% RH		
Serial Number:	See Configurations	**Barometric Pres.:**	1018 mbar	**Tested by:**	Mauricio Joaquin
EUT:	Starlight-12 Dongle				
Configuration:	2,3,4				
Customer:	Finalmouse				
Attendees:	Kevin Hung				
EUT Power:	Battery				
Operating Mode:	Transmitting Low Channel 2402 MHz, Mid Channel 2442 MHz and High Channel 2480 MHz				
Deviations:	None				
Comments:	The test software provided for operation in a fixed, single channel mode allows the EUT to operate continuously at 100% Duty Cycle.				

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



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
7439.392	38.9	14.9	1.3	267.0	3.0	0.0	Vert	AV	0.0	53.8	54.0	-0.2	EUT Vert, High Ch. 2480 MHz
7205.325	39.2	13.5	2.2	329.0	3.0	0.0	Horz	AV	0.0	52.7	54.0	-1.3	EUT Horz, Low Ch. 2402 MHz
4883.800	45.5	7.0	1.1	270.0	3.0	0.0	Vert	AV	0.0	52.5	54.0	-1.5	EUT Vert, Mid Ch. 2442 MHz
7205.383	38.6	13.5	2.4	258.0	3.0	0.0	Horz	AV	0.0	52.1	54.0	-1.9	EUT on Side, Low Ch. 2402 MHz
7206.425	38.3	13.5	3.1	90.0	3.0	0.0	Vert	AV	0.0	51.8	54.0	-2.2	EUT Vert, Low Ch. 2402 MHz
2399.997	34.3	-4.1	1.5	142.0	3.0	20.0	Horz	AV	0.0	50.2	54.0	-3.8	EUT Horz, Low Ch. 2402 MHz
2399.983	33.1	-4.1	1.3	158.0	3.0	20.0	Vert	AV	0.0	49.0	54.0	-5.0	EUT Horz, Low Ch. 2402 MHz
2485.037	32.6	-3.7	1.5	163.0	3.0	20.0	Horz	AV	0.0	48.9	54.0	-5.1	EUT on Side, Mid Ch. 2442 MHz
2485.497	32.6	-3.7	1.5	216.0	3.0	20.0	Vert	AV	0.0	48.9	54.0	-5.1	EUT on Side, High Ch. 2480 MHz
2485.143	32.6	-3.7	2.7	194.0	3.0	20.0	Horz	AV	0.0	48.9	54.0	-5.1	EUT Horz, Mid Ch. 2442 MHz
2485.113	32.6	-3.7	1.5	143.0	3.0	20.0	Vert	AV	0.0	48.9	54.0	-5.1	EUT on Side, High Ch. 2480 MHz
2485.307	32.6	-3.7	1.5	115.0	3.0	20.0	Horz	AV	0.0	48.9	54.0	-5.1	EUT Vert, High Ch. 2480 MHz
2485.253	32.6	-3.7	1.5	212.0	3.0	20.0	Vert	AV	0.0	48.9	54.0	-5.1	EUT Vert, High Ch. 2480 MHz
2485.450	32.6	-3.7	3.7	167.0	3.0	20.0	Horz	AV	0.0	48.9	54.0	-5.1	EUT Horz, High Ch. 2480 MHz
2485.343	32.6	-3.7	1.5	99.0	3.0	20.0	Vert	AV	0.0	48.9	54.0	-5.1	EUT Horz, High Ch. 2480 MHz
2484.033	32.6	-3.8	3.0	8.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	EUT Vert, Mid Ch. 2442 MHz
2484.680	32.6	-3.8	1.7	24.0	3.0	20.0	Vert	AV	0.0	48.8	54.0	-5.2	EUT on Side, Mid Ch. 2442 MHz
2483.670	32.6	-3.8	1.5	179.0	3.0	20.0	Vert	AV	0.0	48.8	54.0	-5.2	EUT Horz, Mid Ch. 2442 MHz
2483.587	32.6	-3.8	1.5	32.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	EUT on Side, High Ch. 2480 MHz
7205.275	34.5	13.5	1.3	76.0	3.0	0.0	Vert	AV	0.0	48.0	54.0	-6.0	EUT on Side, Low Ch. 2402 MHz
7205.292	34.3	13.5	1.5	201.0	3.0	0.0	Vert	AV	0.0	47.8	54.0	-6.2	EUT Horz, Low Ch. 2402 MHz
7325.375	33.2	14.2	1.5	63.0	3.0	0.0	Vert	AV	0.0	47.4	54.0	-6.6	EUT Vert, Mid Ch. 2442 MHz

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
7439.408	32.3	14.9	2.2	342.0	3.0	0.0	Horz	AV	0.0	47.2	54.0	-6.8	EUT Horz, High Ch. 2480 MHz
4960.142	39.4	7.1	1.1	277.0	3.0	0.0	Vert	AV	0.0	46.5	54.0	-7.5	EUT Vert, High Ch. 2480 MHz
4804.092	39.0	6.7	1.2	265.0	3.0	0.0	Vert	AV	0.0	45.7	54.0	-8.3	EUT Vert, Low Ch. 2402 MHz
7325.517	31.4	14.2	1.5	213.0	3.0	0.0	Horz	AV	0.0	45.6	54.0	-8.4	EUT Horz, Mid Ch. 2442 MHz
7204.950	31.9	13.5	1.5	355.0	3.0	0.0	Horz	AV	0.0	45.4	54.0	-8.6	EUT Vert, Low Ch. 2402 MHz
4883.767	38.4	7.0	2.6	265.0	3.0	0.0	Horz	AV	0.0	45.4	54.0	-8.6	EUT Horz, Mid Ch. 2442 MHz
4804.192	36.8	6.7	1.7	260.0	3.0	0.0	Horz	AV	0.0	43.5	54.0	-10.5	EUT Horz, Low Ch. 2402 MHz
2484.757	44.6	-3.8	3.7	167.0	3.0	20.0	Horz	PK	0.0	60.8	74.0	-13.2	EUT Horz, High Ch. 2480 MHz
7440.800	45.8	14.9	1.3	267.0	3.0	0.0	Vert	PK	0.0	60.7	74.0	-13.3	EUT Vert, High Ch. 2480 MHz
7206.767	47.1	13.5	2.2	329.0	3.0	0.0	Horz	PK	0.0	60.6	74.0	-13.4	EUT Horz, Low Ch. 2402 MHz
2484.330	44.3	-3.8	1.5	179.0	3.0	20.0	Vert	PK	0.0	60.5	74.0	-13.5	EUT Horz, Mid Ch. 2442 MHz
7204.950	46.9	13.5	2.4	258.0	3.0	0.0	Horz	PK	0.0	60.4	74.0	-13.6	EUT on Side, Low Ch. 2402 MHz
4959.742	33.3	7.1	2.6	253.0	3.0	0.0	Horz	AV	0.0	40.4	54.0	-13.6	EUT Horz, High Ch. 2480 MHz
2399.977	44.5	-4.1	1.5	142.0	3.0	20.0	Horz	PK	0.0	60.4	74.0	-13.6	EUT Horz, Low Ch. 2402 MHz
2483.990	44.1	-3.8	1.7	24.0	3.0	20.0	Vert	PK	0.0	60.3	74.0	-13.7	EUT on Side, Mid Ch. 2442 MHz
2483.623	44.1	-3.8	1.5	163.0	3.0	20.0	Horz	PK	0.0	60.3	74.0	-13.7	EUT on Side, Mid Ch. 2442 MHz
2484.813	44.1	-3.8	1.5	143.0	3.0	20.0	Vert	PK	0.0	60.3	74.0	-13.7	EUT on Side, High Ch. 2480 MHz
2483.763	43.8	-3.8	3.0	8.0	3.0	20.0	Horz	PK	0.0	60.0	74.0	-14.0	EUT Vert, Mid Ch. 2442 MHz
2483.750	43.8	-3.8	1.5	216.0	3.0	20.0	Vert	PK	0.0	60.0	74.0	-14.0	EUT Horz, Mid Ch. 2442 MHz
2485.193	43.6	-3.7	2.7	194.0	3.0	20.0	Horz	PK	0.0	59.9	74.0	-14.1	EUT Horz, Mid Ch. 2442 MHz
2399.930	44.0	-4.1	1.3	158.0	3.0	20.0	Vert	PK	0.0	59.9	74.0	-14.1	EUT Horz, Low Ch. 2402 MHz
2484.503	43.6	-3.8	1.5	212.0	3.0	20.0	Vert	PK	0.0	59.8	74.0	-14.2	EUT Vert, High Ch. 2480 MHz
2485.090	43.5	-3.7	1.5	99.0	3.0	20.0	Vert	PK	0.0	59.8	74.0	-14.2	EUT Horz, High Ch. 2480 MHz
7205.700	46.2	13.5	3.1	90.0	3.0	0.0	Vert	PK	0.0	59.7	74.0	-14.3	EUT Vert, Low Ch. 2402 MHz
2483.787	43.5	-3.8	1.5	115.0	3.0	20.0	Horz	PK	0.0	59.7	74.0	-14.3	EUT Vert, High Ch. 2480 MHz
7206.958	44.6	13.5	1.3	76.0	3.0	0.0	Vert	PK	0.0	58.1	74.0	-15.9	EUT on Side, Low Ch. 2402 MHz
4883.425	50.6	7.0	1.1	270.0	3.0	0.0	Vert	PK	0.0	57.6	74.0	-16.4	EUT Vert, Mid Ch. 2442 MHz
7325.592	43.3	14.2	1.5	63.0	3.0	0.0	Vert	PK	0.0	57.5	74.0	-16.5	EUT Vert, Mid Ch. 2442 MHz
7205.367	43.9	13.5	1.5	201.0	3.0	0.0	Vert	PK	0.0	57.4	74.0	-16.6	EUT Horz, Low Ch. 2402 MHz
7441.758	42.5	14.9	2.2	342.0	3.0	0.0	Horz	PK	0.0	57.4	74.0	-16.6	EUT Horz, High Ch. 2480 MHz
7203.500	43.1	13.5	1.5	355.0	3.0	0.0	Horz	PK	0.0	56.6	74.0	-17.4	EUT Vert, Low Ch. 2402 MHz
7324.433	42.4	14.2	1.5	213.0	3.0	0.0	Horz	PK	0.0	56.6	74.0	-17.4	EUT Horz, Mid Ch. 2442 MHz
9608.825	41.8	-6.6	1.1	137.0	3.0	0.0	Horz	AV	0.0	35.2	54.0	-18.8	EUT Horz, Low Ch. 2402 MHz
9768.800	41.4	-6.8	1.3	293.0	3.0	0.0	Vert	AV	0.0	34.6	54.0	-19.4	EUT Vert, Mid Ch. 2442 MHz
4959.642	47.3	7.1	1.1	277.0	3.0	0.0	Vert	PK	0.0	54.4	74.0	-19.6	EUT Vert, High Ch. 2480 MHz
4803.383	46.8	6.7	1.2	265.0	3.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	EUT Vert, Low Ch. 2402 MHz
4883.208	46.2	7.0	2.6	265.0	3.0	0.0	Horz	PK	0.0	53.2	74.0	-20.8	EUT Horz, Mid Ch. 2442 MHz
9607.117	38.9	-6.6	2.1	59.0	3.0	0.0	Vert	AV	0.0	32.3	54.0	-21.7	EUT Vert, Low Ch. 2402 MHz
4804.408	45.5	6.7	1.7	260.0	3.0	0.0	Horz	PK	0.0	52.2	74.0	-21.8	EUT Horz, Low Ch. 2402 MHz
4960.058	44.5	7.1	2.6	253.0	3.0	0.0	Horz	PK	0.0	51.6	74.0	-22.4	EUT Horz, High Ch. 2480 MHz
9919.100	38.0	-7.0	1.4	290.0	3.0	0.0	Vert	AV	0.0	31.0	54.0	-23.0	EUT Vert, High Ch. 2480 MHz
9607.217	34.5	-6.6	1.0	86.0	3.0	0.0	Horz	AV	0.0	27.9	54.0	-26.1	EUT Horz, Mid Ch. 2442 MHz
9607.183	34.0	-6.6	1.5	0.0	3.0	0.0	Vert	AV	0.0	27.4	54.0	-26.6	EUT Vert, Mid Ch. 2442 MHz
9919.000	34.4	-7.0	3.3	18.0	3.0	0.0	Horz	AV	0.0	27.4	54.0	-26.6	EUT Horz, High Ch. 2480 MHz
9768.683	34.0	-6.8	1.4	303.0	3.0	0.0	Horz	AV	0.0	27.2	54.0	-26.8	EUT Horz, Mid Ch. 2442 MHz
9608.933	50.1	-6.6	1.1	137.0	3.0	0.0	Horz	PK	0.0	43.5	74.0	-30.5	EUT Horz, Low Ch. 2402 MHz
9607.158	49.1	-6.6	2.1	59.0	3.0	0.0	Vert	PK	0.0	42.5	74.0	-31.5	EUT Vert, Low Ch. 2402 MHz
9768.658	49.1	-6.8	1.3	293.0	3.0	0.0	Vert	PK	0.0	42.3	74.0	-31.7	EUT Vert, Mid Ch. 2442 MHz
9918.900	47.3	-7.0	1.4	290.0	3.0	0.0	Vert	PK	0.0	40.3	74.0	-33.7	EUT Vert, High Ch. 2480 MHz
9606.175	45.6	-6.6	1.0	86.0	3.0	0.0	Horz	PK	0.0	39.0	74.0	-35.0	EUT Horz, Mid Ch. 2442 MHz
9606.175	44.8	-6.6	1.5	0.0	3.0	0.0	Vert	PK	0.0	38.2	74.0	-35.8	EUT Vert, Mid Ch. 2442 MHz
9919.333	44.8	-7.0	3.3	18.0	3.0	0.0	Horz	PK	0.0	37.8	74.0	-36.2	EUT Horz, High Ch. 2480 MHz
9768.750	44.6	-6.8	1.4	303.0	3.0	0.0	Horz	PK	0.0	37.8	74.0	-36.2	EUT Horz, Mid Ch. 2442 MHz

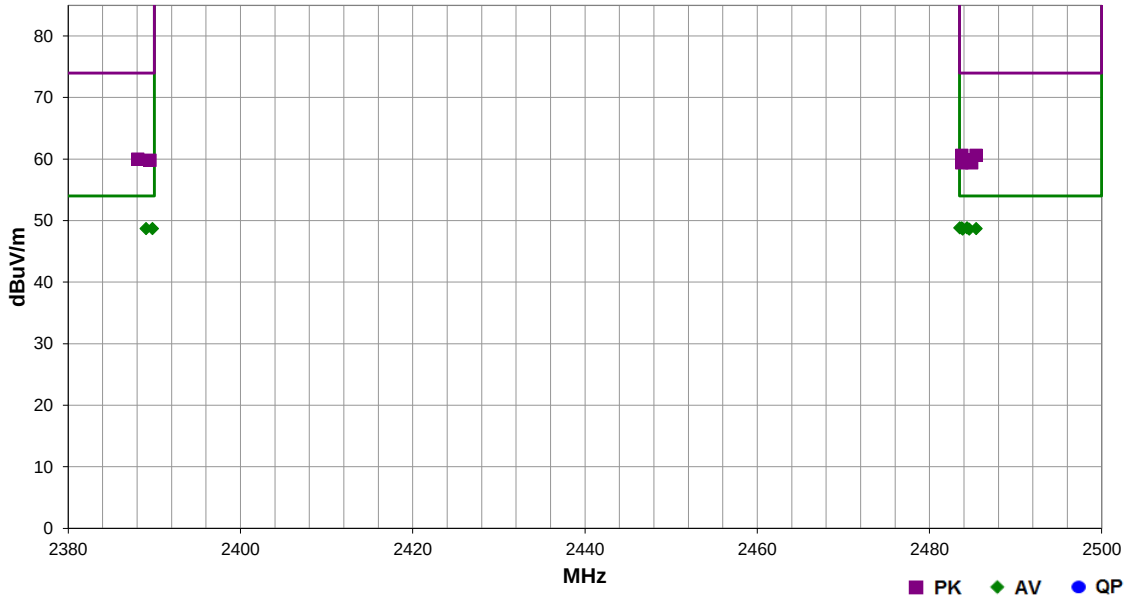
SPURIOUS RADIATED EMISSIONS

EmiR5 2021.01.08.0 PSA-ESCI 2021.03.17.0

Work Order:	FINA0003	**Date:**	2021-04-09		
Project:	None	**Temperature:**	21.3 °C		
Job Site:	OC07	**Humidity:**	48.5% RH		
Serial Number:	See Configurations	**Barometric Pres.:**	1013 mbar	**Tested by:**	Mauricio Joaquin
EUT:	Starlight-12 Dongle				
Configuration:	3,4				
Customer:	Finalmouse				
Attendees:	Kevin Hung				
EUT Power:	Battery				
Operating Mode:	Transmitting Low Channel 2402 MHz and High Channel 2480 MHz				
Deviations:	None				
Comments:	Band Edge				

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

Run #	17	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



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
2483.763	32.6	-3.8	1.5	296.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	EUT Horz, High Ch. 2480 MHz
2484.380	32.6	-3.8	1.5	94.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	EUT Vert, High Ch. 2480 MHz
2483.517	32.6	-3.8	2.5	189.0	3.0	20.0	Vert	AV	0.0	48.8	54.0	-5.2	EUT Vert, High Ch. 2480 MHz
2485.420	32.4	-3.7	1.63	323.0	3.0	20.0	Vert	AV	0.0	48.7	54.0	-5.3	EUT on Side, High Ch. 2480 MHz
2389.777	32.8	-4.1	1.5	326.0	3.0	20.0	Horz	AV	0.0	48.7	54.0	-5.3	EUT Horz, Low Ch. 2402 MHz
2389.047	32.8	-4.1	1.5	101.0	3.0	20.0	Vert	AV	0.0	48.7	54.0	-5.3	EUT Vert, Low Ch. 2402 MHz
2483.857	32.4	-3.8	1.5	183.0	3.0	20.0	Vert	AV	0.0	48.6	54.0	-5.4	EUT Horz, High Ch. 2480 MHz
2484.627	32.4	-3.8	1.5	151.0	3.0	20.0	Horz	AV	0.0	48.6	54.0	-5.4	EUT on Side, High Ch. 2480 MHz
2483.763	44.4	-3.8	1.5	296.0	3.0	20.0	Horz	PK	0.0	60.6	74.0	-13.4	EUT Horz, High Ch. 2480 MHz
2485.410	44.3	-3.7	1.5	94.0	3.0	20.0	Horz	PK	0.0	60.6	74.0	-13.4	EUT Vert, High Ch. 2480 MHz
2388.073	44.1	-4.1	1.5	101.0	3.0	20.0	Vert	PK	0.0	60.0	74.0	-14.0	EUT Vert, Low Ch. 2402 MHz
2484.677	43.7	-3.8	1.63	323.0	3.0	20.0	Vert	PK	0.0	59.9	74.0	-14.1	EUT on Side, High Ch. 2480 MHz
2389.493	43.9	-4.1	1.5	326.0	3.0	20.0	Horz	PK	0.0	59.8	74.0	-14.2	EUT Horz, Low Ch. 2402 MHz
2484.823	43.5	-3.8	1.5	183.0	3.0	20.0	Vert	PK	0.0	59.7	74.0	-14.3	EUT Horz, High Ch. 2480 MHz
2483.750	43.2	-3.8	1.5	151.0	3.0	20.0	Horz	PK	0.0	59.4	74.0	-14.6	EUT on Side, High Ch. 2480 MHz
2484.903	43.2	-3.8	2.5	189.0	3.0	20.0	Vert	PK	0.0	59.4	74.0	-14.6	EUT Vert, High Ch. 2480 MHz

DUTY CYCLE

XMit 2020.12.30.0

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.

OUTPUT POWER

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
Block - DC	Fairview Microwave	SD3379	AMV	2020-12-18	2021-12-18
Attenuator	Fairview Microwave	SA18H-20	TKR	2020-12-18	2021-12-18
Generator - Signal	Agilent	E8257D	TGU	2020-11-03	2023-11-03
Cable	Micro-Coax	UFD150A-1-0720-200200	OCA	2020-05-04	2021-05-04
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	2020-07-09	2021-07-09

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set according to the power settings table.

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

TbtTx 2019.08.30.0 XMit 2020.12.30.0

EUT:	**Starlight-12 Dongle**			**Work Order:**	**FINA0003**
Serial Number:	**A**			**Date:**	**15-Apr-21**
Customer:	**Finalmouse**			**Temperature:**	**20.1 °C**
Attendees:	**None**			**Humidity:**	**43.6% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Salvador Solorzano**	**Power:**	**Battery**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

COMMENTS

DC Block + 20 dB attenuator + Patch Cable + Test Cable = 21.62 dB Offset.

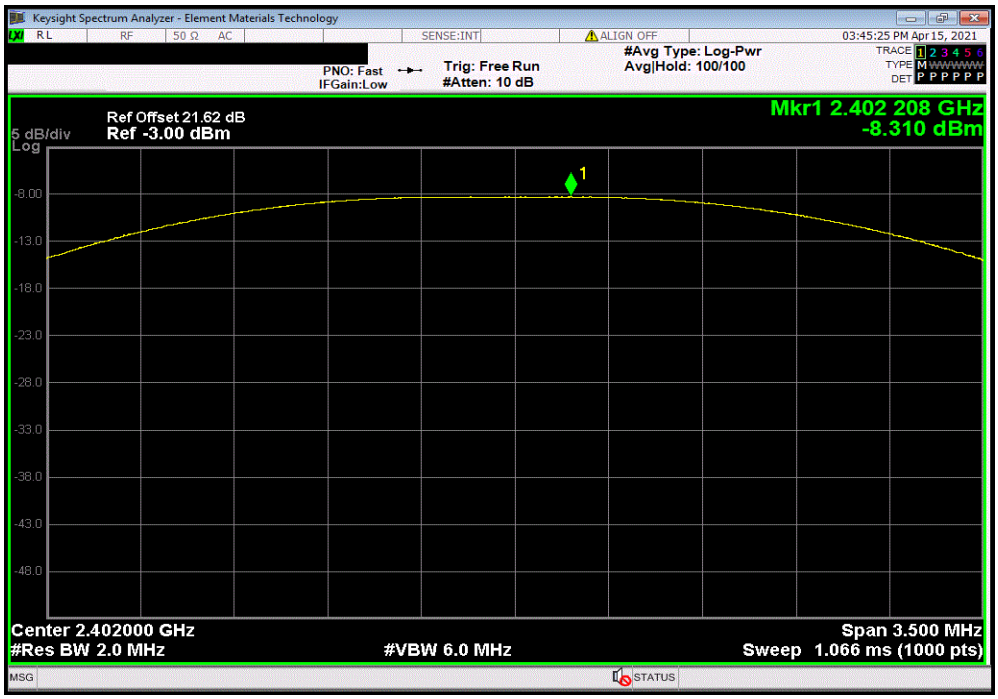
DEVIATIONS FROM TEST STANDARD

None

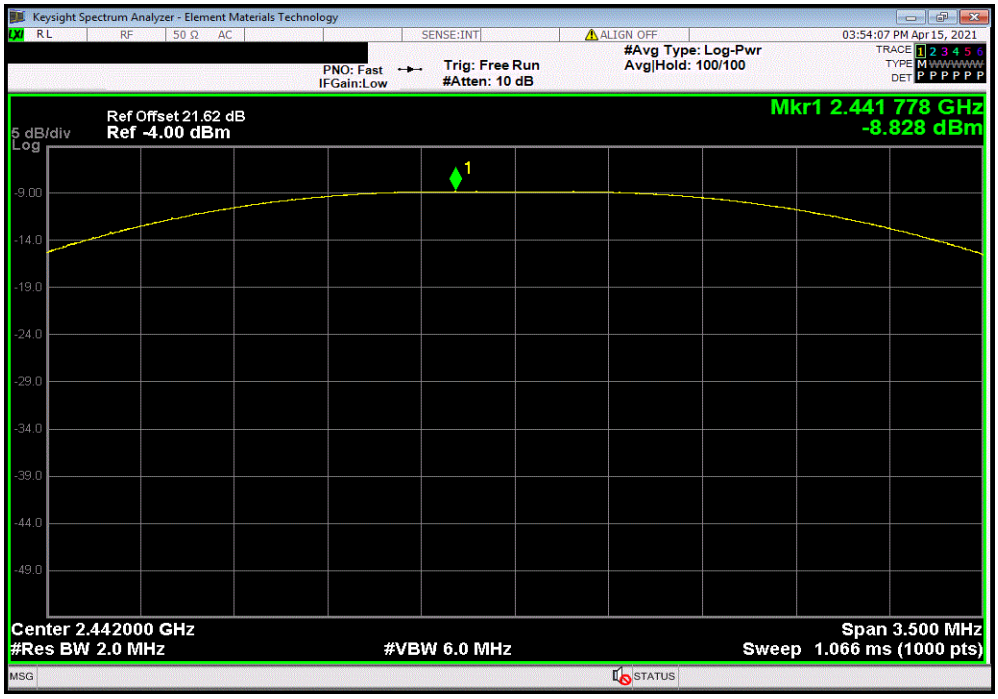
Configuration #	**6**	*Signature*

	Out Pwr (dBm)	**Limit (dBm)**	**Result**
2.4 GHz 1 Mbps			
Low Channel 2402 MHz	-8.310	30	Pass
Mid Channel 2442 MHz	-8.828	30	Pass
High Channel 2480 MHz	-8.266	30	Pass

2.4 GHz 1 Mbps, Low Channel 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-8.310	30	Pass

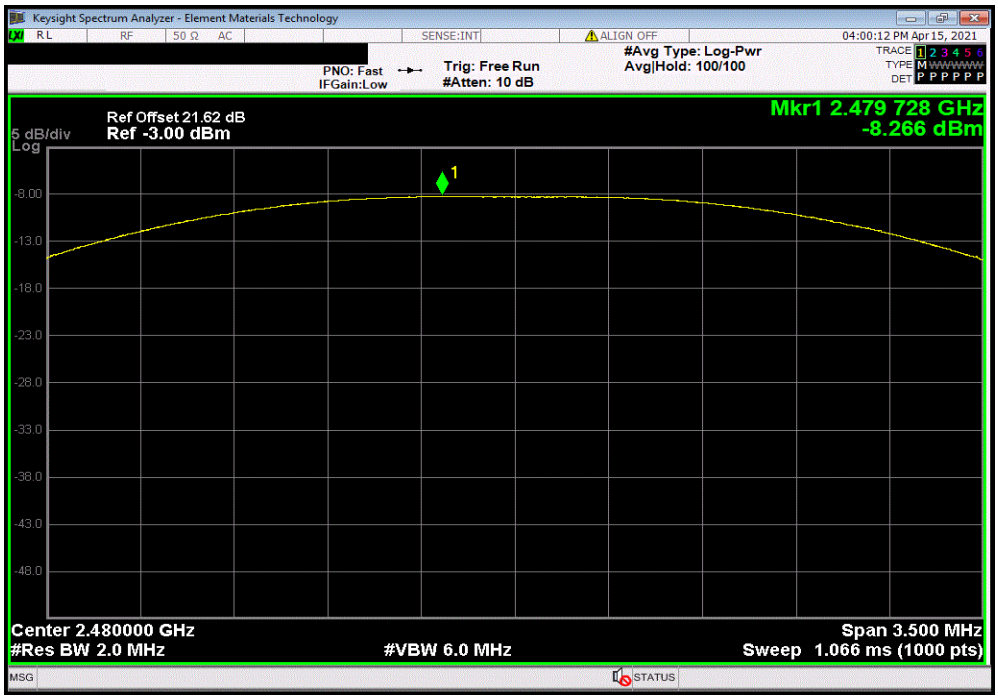


2.4 GHz 1 Mbps, Mid Channel 2442 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-8.828	30	Pass



OUTPUT POWER

2.4 GHz 1 Mbps, High Channel 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-8.266	30	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

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
Cable	Micro-Coax	UFD150A-1-0720-200200	OCA	2020-05-04	2021-05-04
Block - DC	Fairview Microwave	SD3379	AMV	2020-12-18	2021-12-18
Attenuator	Fairview Microwave	SA18H-20	TKR	2020-12-18	2021-12-18
Generator - Signal	Agilent	E8257D	TGU	2020-11-03	2023-11-03
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	2020-07-09	2021-07-09

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set according to power settings table.

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.

Equivalent Isotropic Radiated Power (EIRP) = Max Measured Power + Antenna gain (dBi)

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element

TbtTx 2019.08.30.0 XMit 2020.12.30.0

EUT:	**Starlight-12 Dongle**			**Work Order:**	**FINA0003**
Serial Number:	**A**			**Date:**	**15-Apr-21**
Customer:	**Finalmouse**			**Temperature:**	**20.1 °C**
Attendees:	**None**			**Humidity:**	**43.6% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Salvador Solorzano**	**Power:**	**Battery**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

COMMENTS

DC Block + 20 dB attenuator + Patch Cable + Test Cable = 21.62 dB Offset.

DEVIATIONS FROM TEST STANDARD

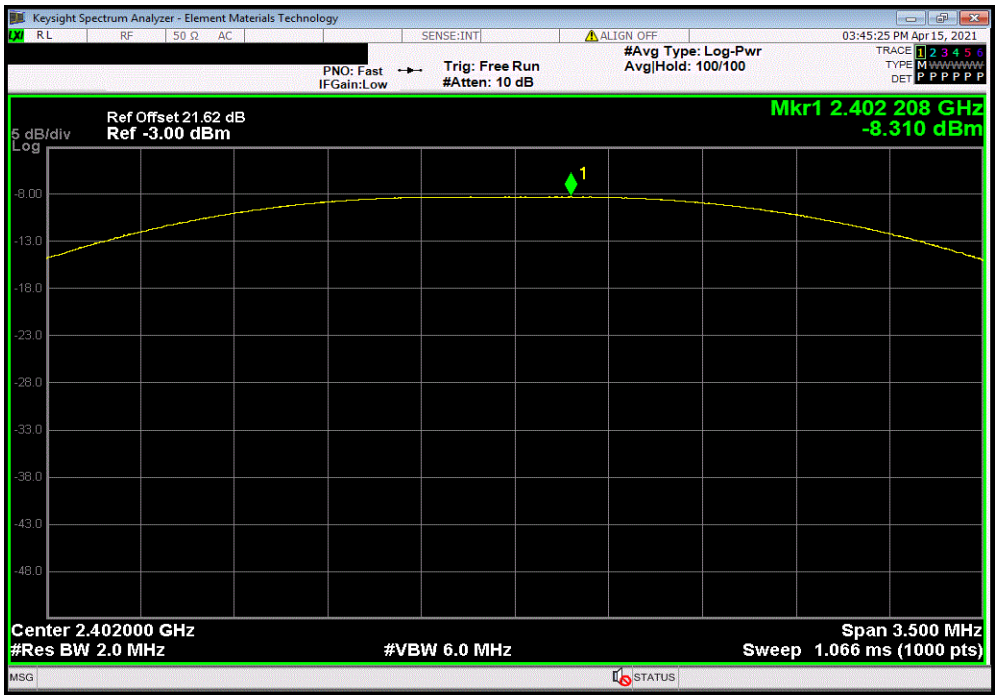
None

Configuration #	**6**	*Signature*

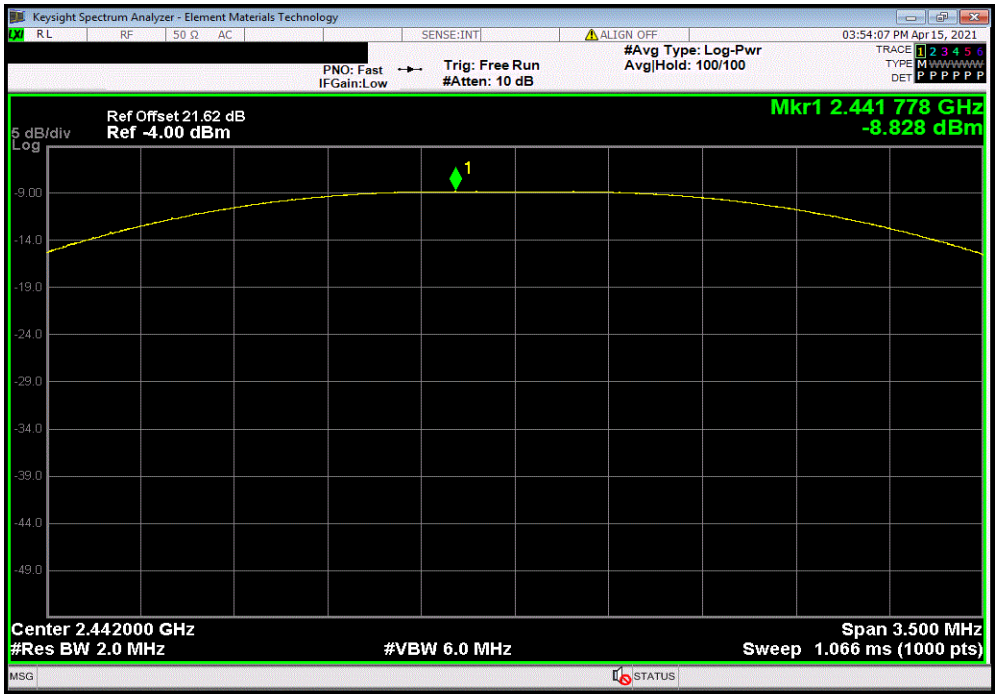
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
2.4 GHz 1 Mbps					
Low Channel 2402 MHz	-8.310	3.17	-5.140	36	Pass
Mid Channel 2442 MHz	-8.828	3.29	-5.538	36	Pass
High Channel 2480 MHz	-8.266	3.86	-4.406	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

2.4 GHz 1 Mbps, Low Channel 2402 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		-8.31	3.17	-5.14	36	Pass

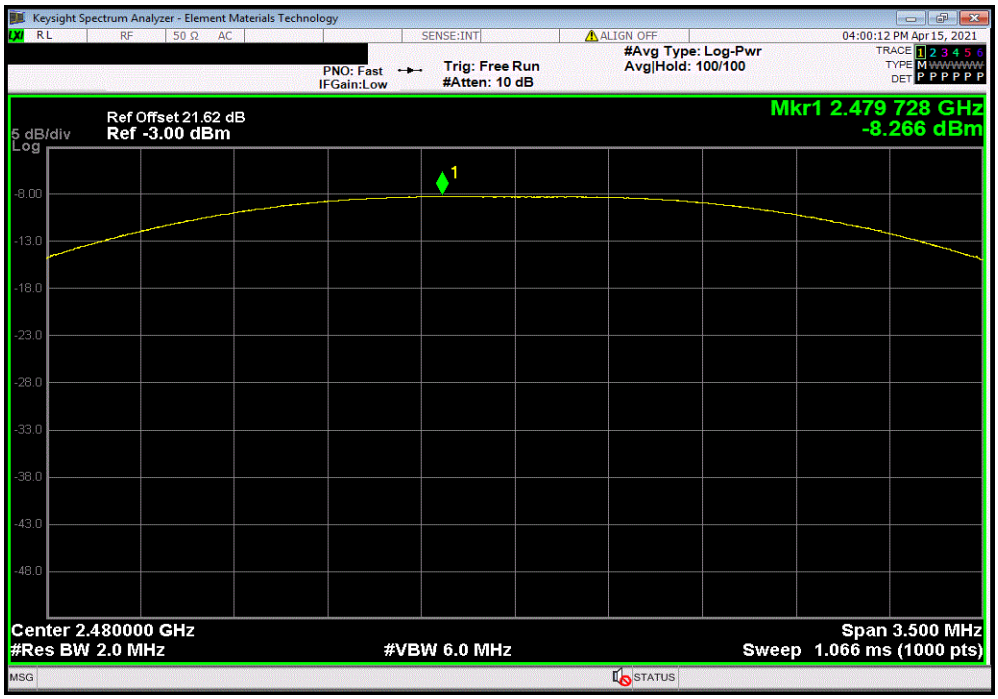


2.4 GHz 1 Mbps, Mid Channel 2442 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		-8.828	3.29	-5.538	36	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

2.4 GHz 1 Mbps, High Channel 2480 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		-8.266	3.86	-4.406	36	Pass



BAND EDGE COMPLIANCE

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
Block - DC	Fairview Microwave	SD3379	AMV	2020-12-18	2021-12-18
Attenuator	Fairview Microwave	SA18H-20	TKR	2020-12-18	2021-12-18
Generator - Signal	Agilent	E8257D	TGU	2020-11-03	2023-11-03
Cable	Micro-Coax	UFD150A-1-0720-200200	OCA	2020-05-04	2021-05-04
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	2020-07-09	2021-07-09

TEST DESCRIPTION

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

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

BAND EDGE COMPLIANCE

element

TbtTx 2019.08.30.0 XMit 2020.12.30.0

EUT:	**Starlight-12 Dongle**			**Work Order:**	**FINA0003**
Serial Number:	**A**			**Date:**	**15-Apr-21**
Customer:	**Finalmouse**			**Temperature:**	**20.1 °C**
Attendees:	**None**			**Humidity:**	**43.6% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Salvador Solorzano**	**Power:**	**Battery**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

COMMENTS

DC Block + 20 dB attenuator + Patch Cable + Test Cable = 21.62 dB Offset.

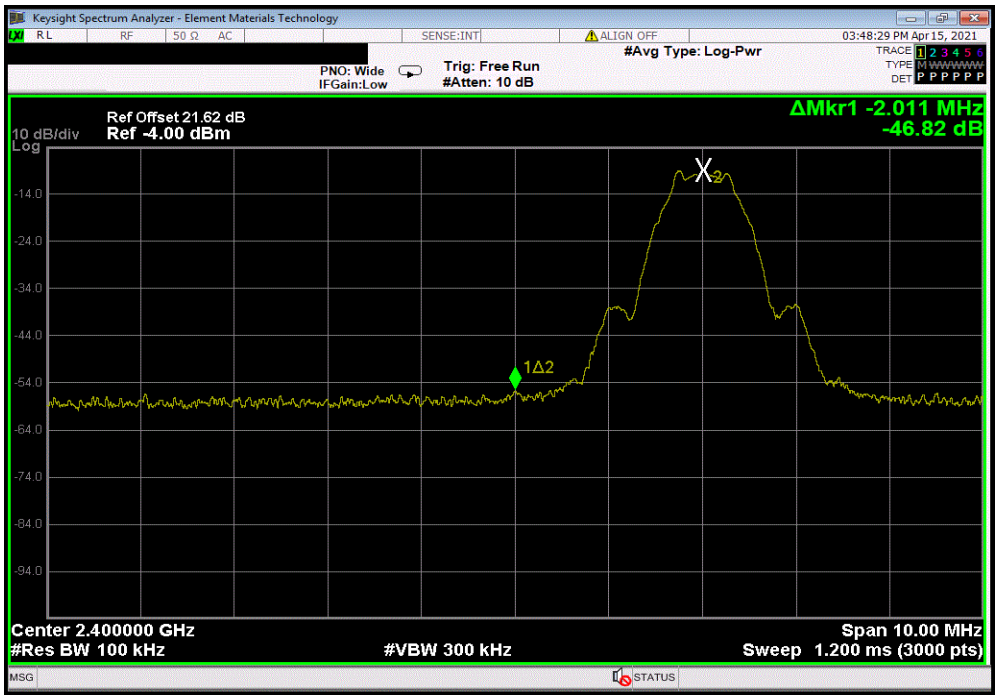
DEVIATIONS FROM TEST STANDARD

None

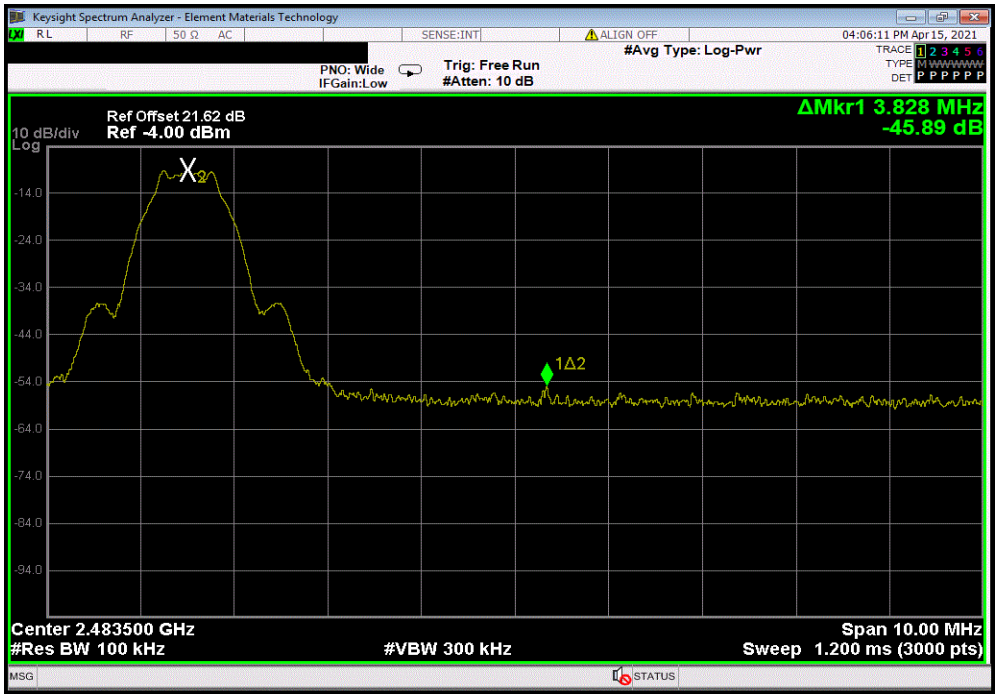
Configuration #	**6**	*Signature*

	Value (dBc)	**Limit ≤ (dBc)**	**Result**
2.4 GHz 1 Mbps			
Low Channel 2402 MHz	-46.82	-20	Pass
High Channel 2480 MHz	-45.90	-20	Pass

2.4 GHz 1 Mbps, Low Channel 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-46.82	-20	Pass



2.4 GHz 1 Mbps, High Channel 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-45.90	-20	Pass



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
Generator - Signal	Agilent	E8257D	TGU	2020-11-03	2023-11-03
Attenuator	Fairview Microwave	SA18H-20	TKR	2020-12-18	2021-12-18
Block - DC	Fairview Microwave	SD3379	AMV	2020-12-18	2021-12-18
Cable	Micro-Coax	UFD150A-1-0720-200200	OCA	2021-04-27	2022-04-27
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFJ	2021-01-06	2022-01-06

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

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	**Starlight-12 Dongle**			**Work Order:**	**FINA0003**
Serial Number:	**A**			**Date:**	**22-Jul-21**
Customer:	**Finalmouse**			**Temperature:**	**23.9 °C**
Attendees:	**Kevin Hung**			**Humidity:**	**48% RH**
Project:	**None**			**Barometric Pres.:**	**1017 mbar**
Tested by:	**Nolan De Ramos**	**Power:**	**via Laptop USB**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

COMMENTS

DC Block + 20 dB Attenuator + Cable + Patch Cable = 21.62 dB Ref Level Offset

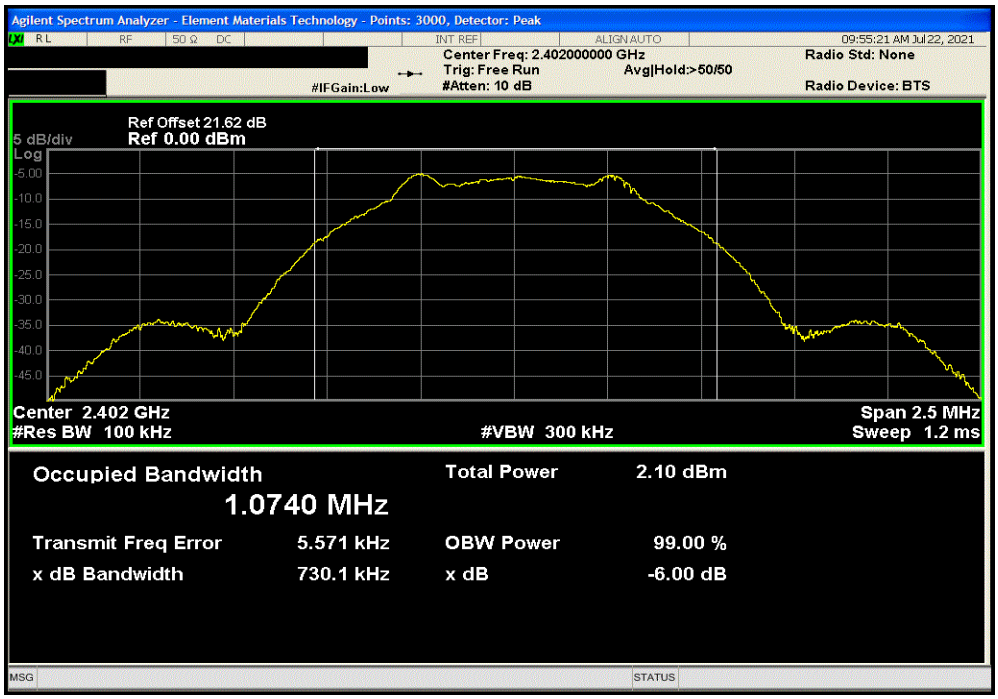
DEVIATIONS FROM TEST STANDARD

None

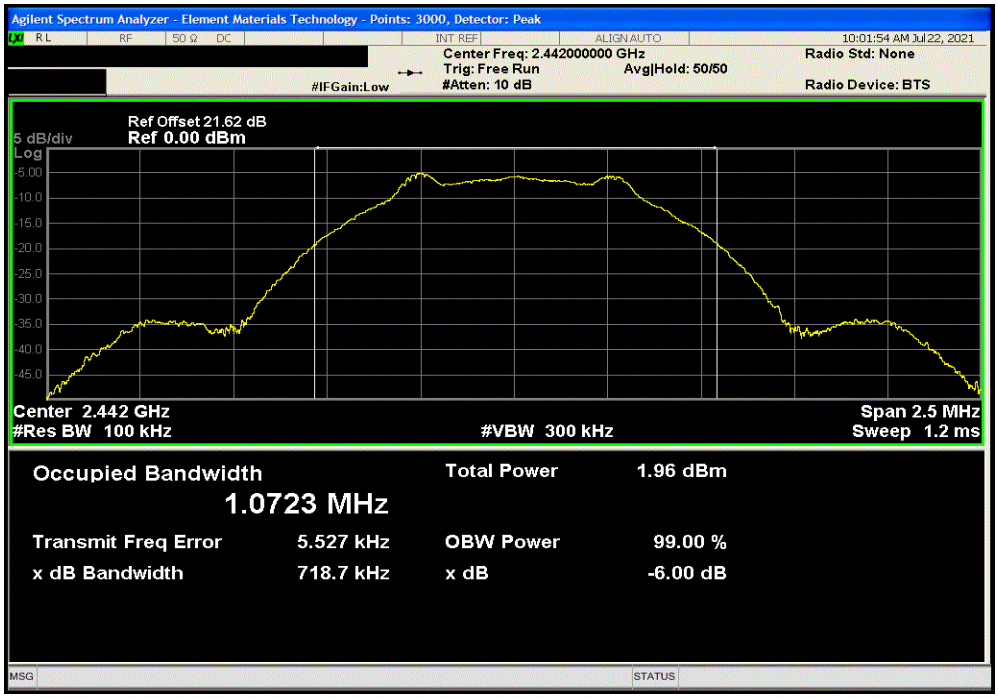
Configuration #	**6**	*Signature*

		Value	**Limit (≥)**	**Result**
2.4 GHz 1 Mbps				
	Low Channel 2402 MHz	730.055 kHz	500 kHz	Pass
	Mid Channel 2442 MHz	718.699 kHz	500 kHz	Pass
	High Channel 2480 MHz	717.163 kHz	500 kHz	Pass

2.4 GHz 1 Mbps, Low Channel 2402 MHz						
				Value	Limit (≥)	Result
				730.055 kHz	500 kHz	Pass



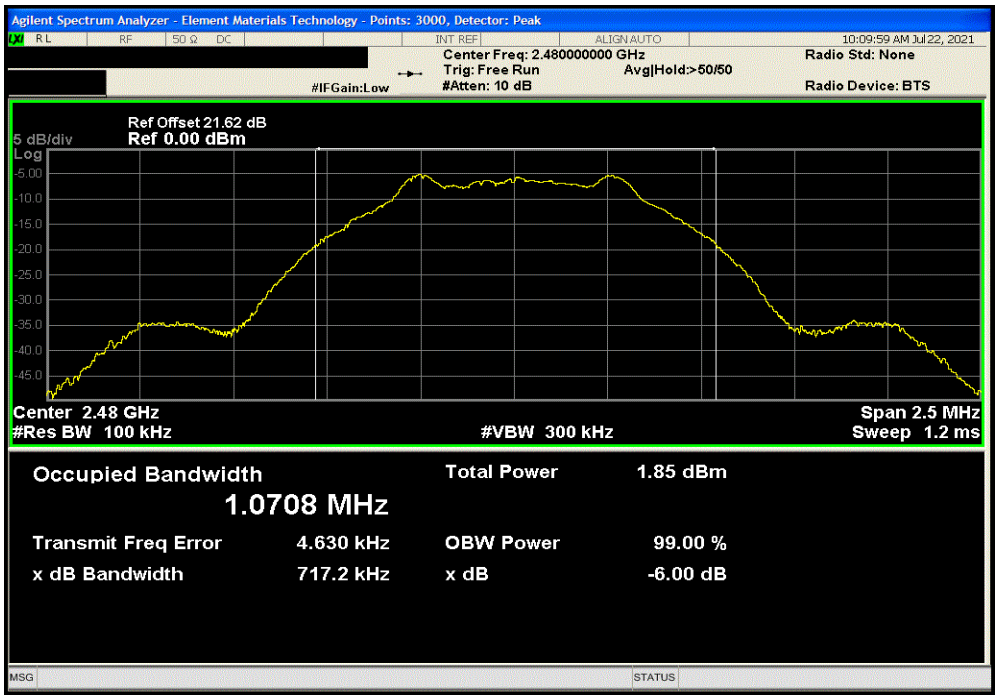
2.4 GHz 1 Mbps, Mid Channel 2442 MHz						
				Value	Limit (≥)	Result
				718.699 kHz	500 kHz	Pass



OCCUPIED BANDWIDTH

TbtTx 2021.03.19.1 XMit 2020.12.30.0

2.4 GHz 1 Mbps, High Channel 2480 MHz						
				Value	Limit (≥)	Result
				717.163 kHz	500 kHz	Pass



POWER SPECTRAL DENSITY

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
Generator - Signal	Agilent	E8257D	TGU	2020-11-03	2023-11-03
Attenuator	Fairview Microwave	SA18H-20	TKR	2020-12-18	2021-12-18
Block - DC	Fairview Microwave	SD3379	AMV	2020-12-18	2021-12-18
Cable	Micro-Coax	UFD150A-1-0720-200200	OCA	2021-04-27	2022-04-27
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFJ	2021-01-06	2022-01-06

TEST DESCRIPTION

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

TbtTx 2021.03.19.1 XMit 2020.12.30.0

EUT:	**Starlight-12 Dongle**			**Work Order:**	**FINA0003**
Serial Number:	**A**			**Date:**	**22-Jul-21**
Customer:	**Finalmouse**			**Temperature:**	**24 °C**
Attendees:	**Kevin Hung**			**Humidity:**	**47.9% RH**
Project:	**None**			**Barometric Pres.:**	**1017 mbar**
Tested by:	**Nolan De Ramos**	**Power:**	**via Laptop USB**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

COMMENTS

DC Block + 20 dB Attenuator + Cable + Patch Cable = 21.62 dB Ref Level Offset

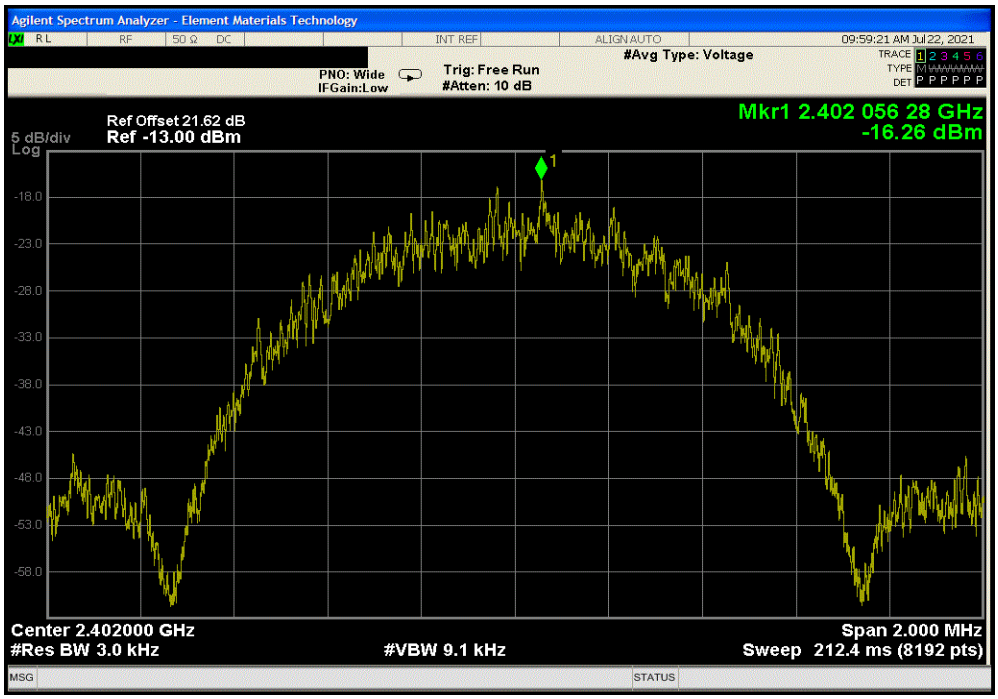
DEVIATIONS FROM TEST STANDARD

None

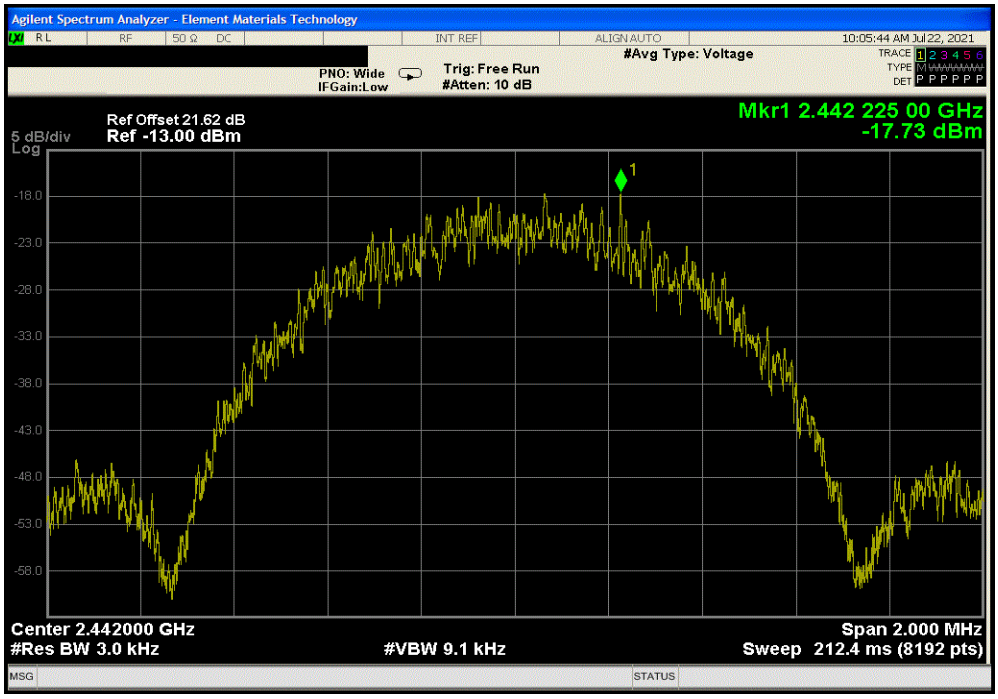
Configuration #	**6**	*Signature*

	Value dBm/3kHz	**Limit < dBm/3kHz**	**Results**
2.4 GHz 1 Mbps			
Low Channel 2402 MHz	-16.263	8	Pass
Mid Channel 2442 MHz	-17.730	8	Pass
High Channel 2480 MHz	-18.466	8	Pass

2.4 GHz 1 Mbps, Low Channel 2402 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-16.263	8	Pass



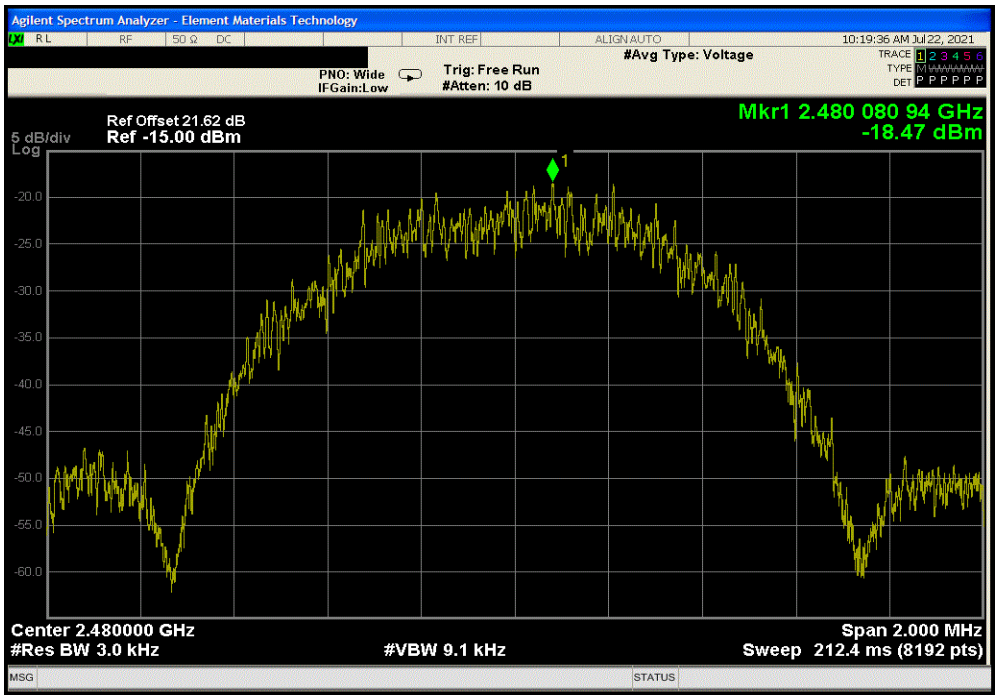
2.4 GHz 1 Mbps, Mid Channel 2442 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-17.730	8	Pass



POWER SPECTRAL DENSITY

TbtTx 2021.03.19.1 XMit 2020.12.30.0

2.4 GHz 1 Mbps, High Channel 2480 MHz							
					Value dBm/3kHz	Limit < dBm/3kHz	Results
					-18.466	8	Pass



SPURIOUS CONDUCTED EMISSIONS

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
Block - DC	Fairview Microwave	SD3379	AMV	2020-12-18	2021-12-18
Attenuator	Fairview Microwave	SA18H-20	TKR	2020-12-18	2021-12-18
Generator - Signal	Agilent	E8257D	TGU	2020-11-03	2023-11-03
Cable	Micro-Coax	UFD150A-1-0720-200200	OCA	2020-05-04	2021-05-04
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFP	2020-07-09	2021-07-09

TEST DESCRIPTION

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 fundamental was measured with a 100 kHz resolution bandwidth and the highest value was recorded. The rest of the spectrum was then measured with a 100 kHz resolution bandwidth and the highest value was found. The difference between the value found on the fundamental and the rest of the spectrum was compared against the limit to determine compliance.

SPURIOUS CONDUCTED EMISSIONS

TbtTx 2019.08.30.0 XMit 2020.12.30.0

EUT:	**Starlight-12 Dongle**			**Work Order:**	**FINA0003**
Serial Number:	**A**			**Date:**	**15-Apr-21**
Customer:	**Finalmouse**			**Temperature:**	**20.1 °C**
Attendees:	**None**			**Humidity:**	**43.6% RH**
Project:	**None**			**Barometric Pres.:**	**1019 mbar**
Tested by:	**Salvador Solorzano**	**Power:**	**Battery**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2021	ANSI C63.10:2013

COMMENTS

DC Block + 20 dB attenuator + Patch Cable + Test Cable = 21.62 dB Offset.

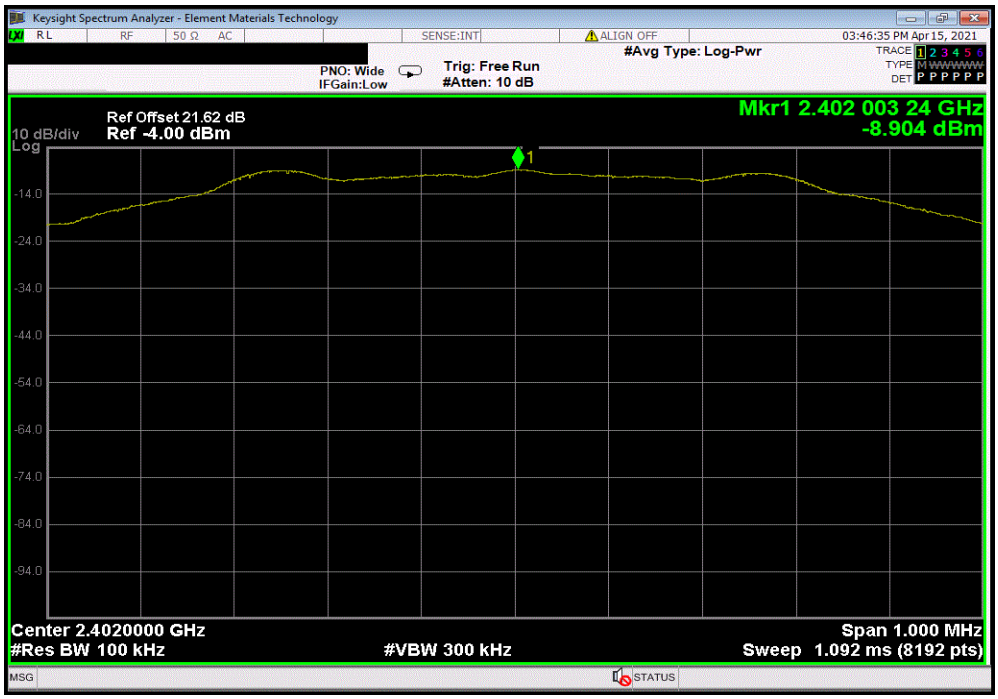
DEVIATIONS FROM TEST STANDARD

None

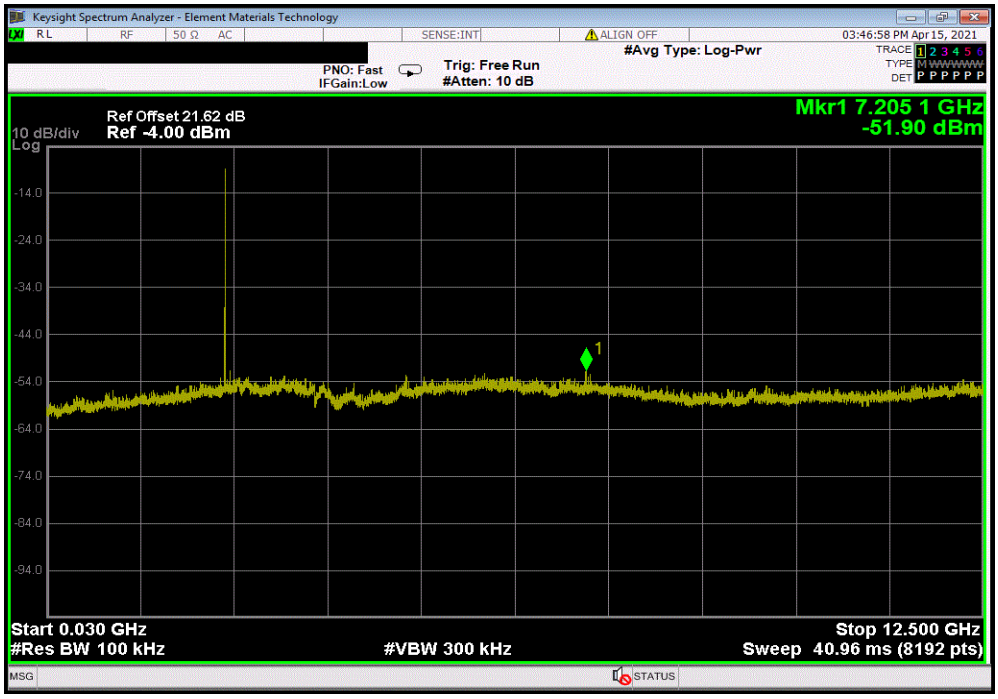
Configuration #	**6**	*Signature*

		Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
2.4 GHz 1 Mbps						
	Low Channel 2402 MHz	Fundamental	2402	N/A	N/A	N/A
	Low Channel 2402 MHz	30 MHz - 12.5 GHz	7205.08	-43.00	-20	Pass
	Low Channel 2402 MHz	12.5 GHz - 25 GHz	24948.11	-29.39	-20	Pass
	Mid Channel 2442 MHz	Fundamental	2441.75	N/A	N/A	N/A
	Mid Channel 2442 MHz	30 MHz - 12.5 GHz	7325.35	-41.59	-20	Pass
	Mid Channel 2442 MHz	12.5 GHz - 25 GHz	24977.11	-29.26	-20	Pass
	High Channel 2480 MHz	Fundamental	2480	N/A	N/A	N/A
	High Channel 2480 MHz	30 MHz - 12.5 GHz	7441.06	-41.88	-20	Pass
	High Channel 2480 MHz	12.5 GHz - 25 GHz	24911.49	-29.30	-20	Pass

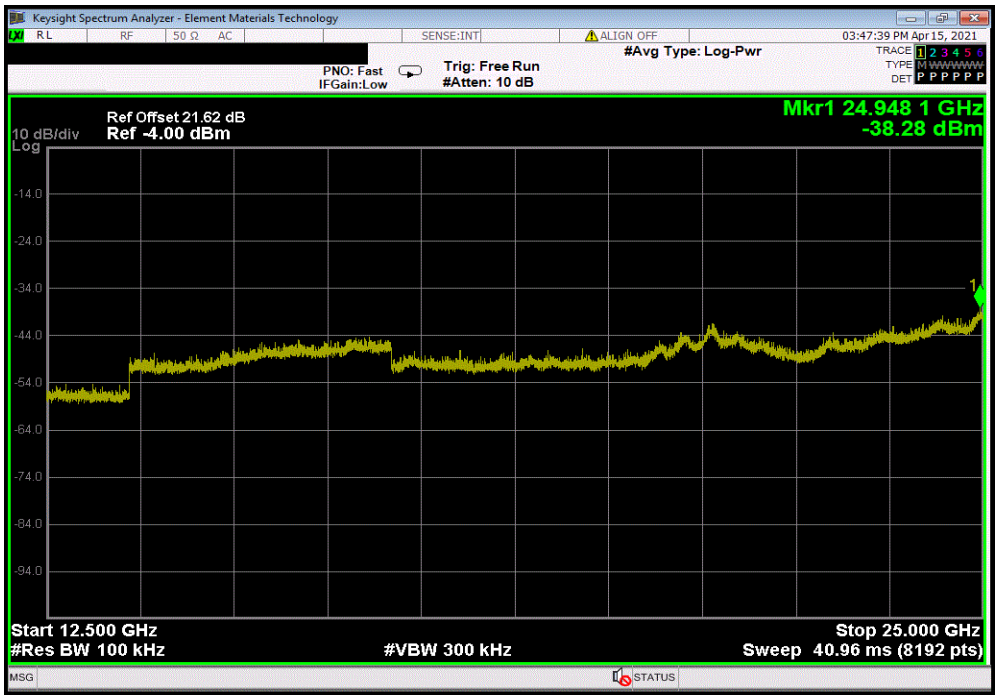
2.4 GHz 1 Mbps, Low Channel 2402 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	2402	N/A	N/A	N/A



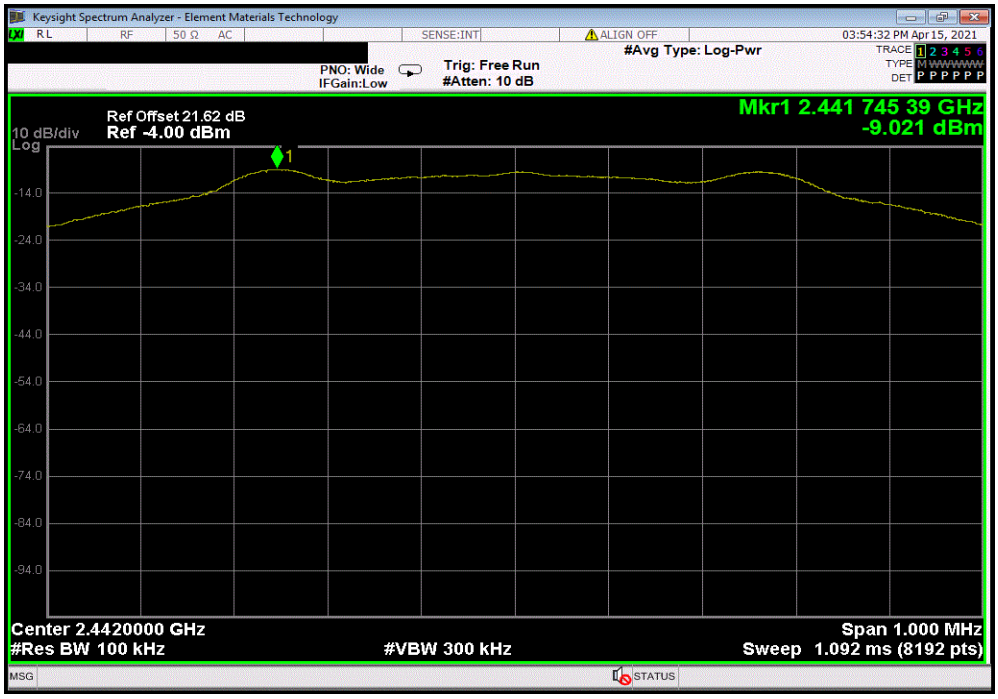
2.4 GHz 1 Mbps, Low Channel 2402 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	7205.08	-43.00	-20	Pass



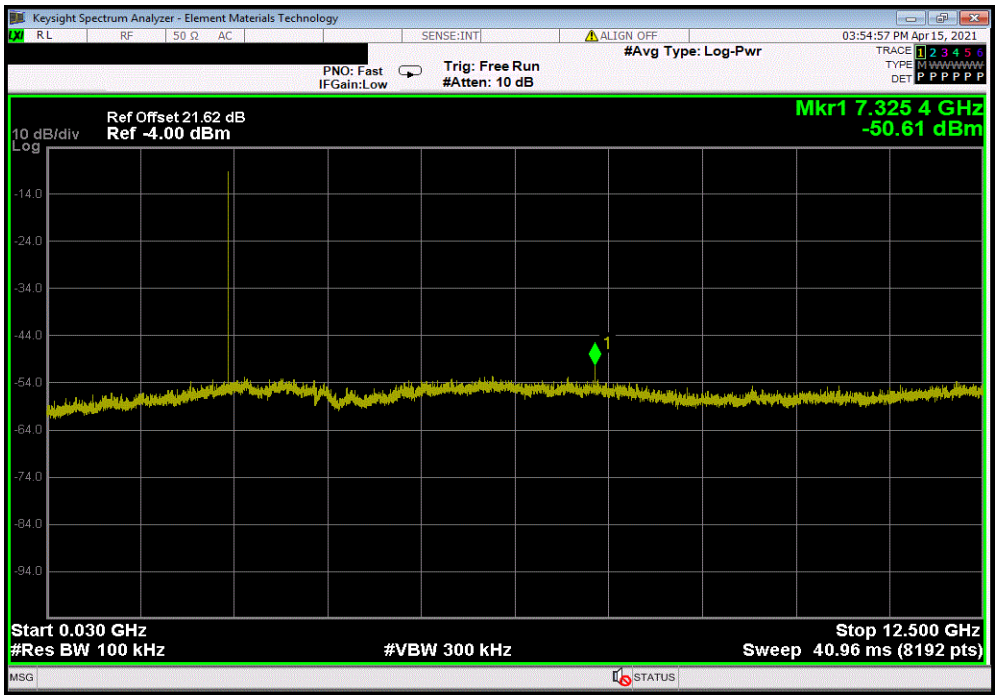
2.4 GHz 1 Mbps, Low Channel 2402 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24948.11	-29.39	-20	Pass



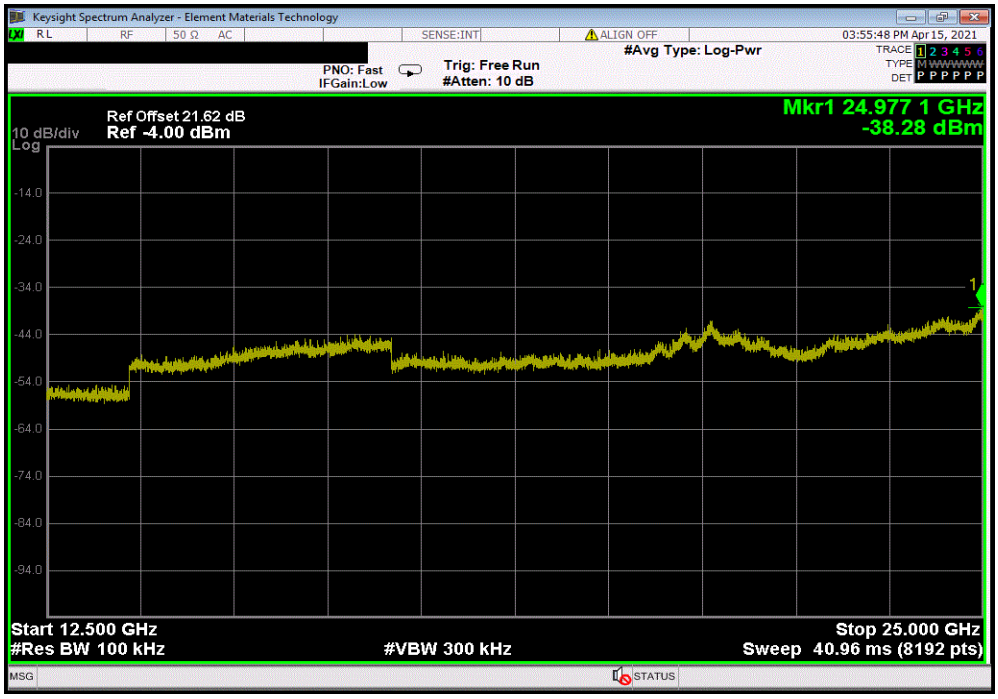
2.4 GHz 1 Mbps, Mid Channel 2442 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental	2441.75	N/A	N/A	N/A



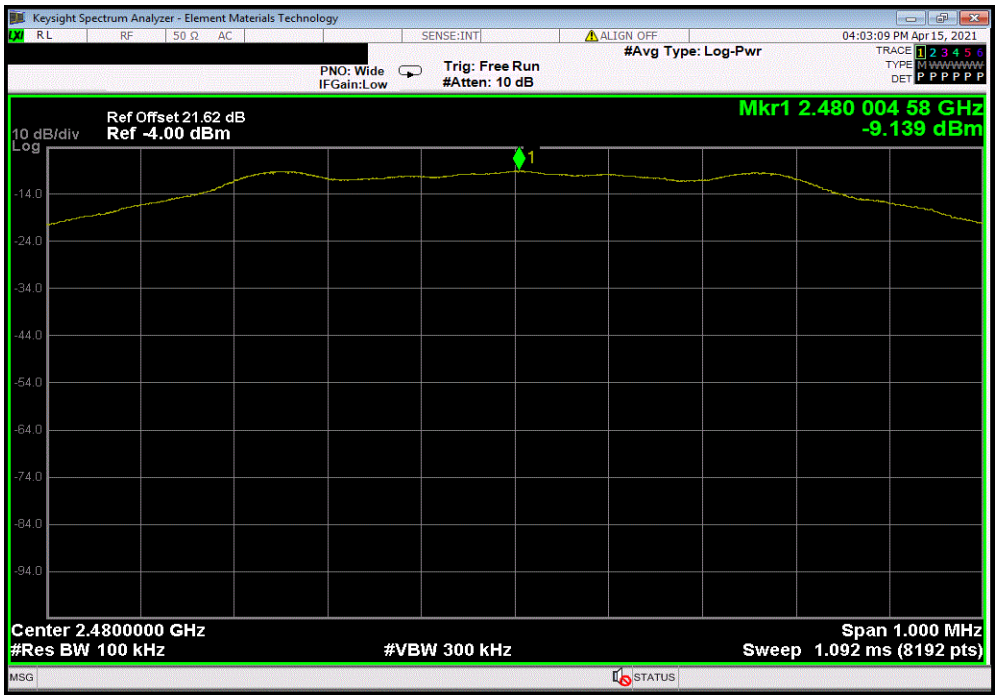
2.4 GHz 1 Mbps, Mid Channel 2442 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	7325.35	-41.59	-20	Pass



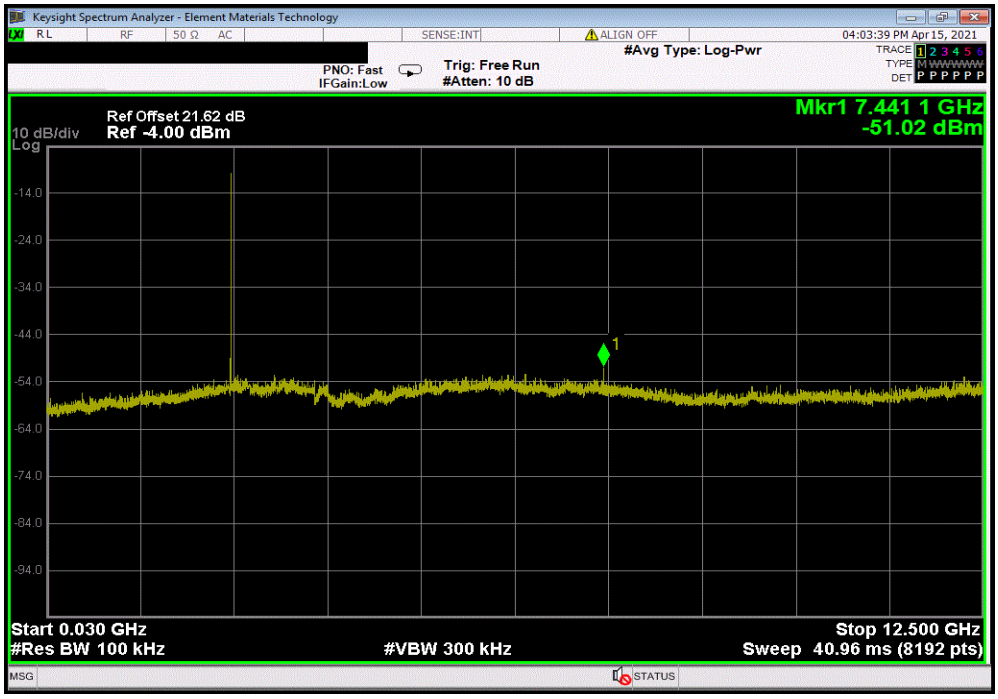
2.4 GHz 1 Mbps, Mid Channel 2442 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24977.11	-29.26	-20	Pass



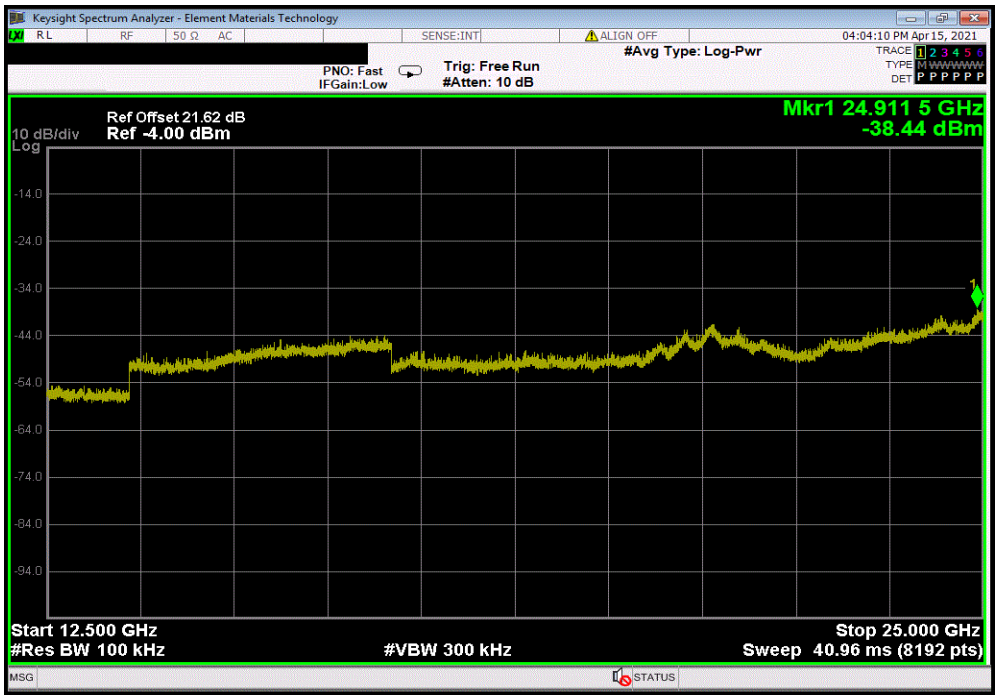
2.4 GHz 1 Mbps, High Channel 2480 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	2480	N/A	N/A	N/A



2.4 GHz 1 Mbps, High Channel 2480 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	7441.06	-41.88	-20	Pass



2.4 GHz 1 Mbps, High Channel 2480 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	24911.49	-29.30	-20	Pass



End of Test Report