



element

Starkey Laboratories, Inc.

Genesis macro RIC (BLE and NFMI)

FCC 15.247:2021

FCC 15.247:2022

Bluetooth Low Energy (DTS) Radio

Report: STAK0251.1 Rev. 2, Issue Date: April 8, 2022



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CERTIFICATE OF TEST

Last Date of Test: March 28, 2022
Starkey Laboratories, Inc.
EUT: Genesis macro RIC (BLE and NFMI)

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2021	ANSI C63.10:2013, KDB 558074
FCC 15.247:2022	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for a battery powered EUT.
11.6	Duty Cycle	Yes	N/A	
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	
11.12.1, 11.13.2, 6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:



Eric Brandon, Department 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
01	Updated Antenna Gains type and frequency range	2022-04-06	11
	Updated Test Description	2022-04-06	14, 63
	Retested DTS Bandwidth, Output Power	2022-04-06	28-38
02	Updated block diagrams	2022-04-07	7-9
	Expanded the SRE comments to clarify how the applied DCCF was calculated.	2022-04-08	65-69

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 - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

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

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FACILITIES



California Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-11 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
A2LA				
Lab Code: 3310.04	Lab Code: 3310.05	Lab Code: 3310.02	Lab Code: 3310.03	Lab Code: 3310.06
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157



MEASUREMENT UNCERTAINTY



Measurement Uncertainty

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

A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found 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)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	3.2 dB	-3.2 dB

TEST SETUP BLOCK DIAGRAMS

Measurement Bandwidths

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.

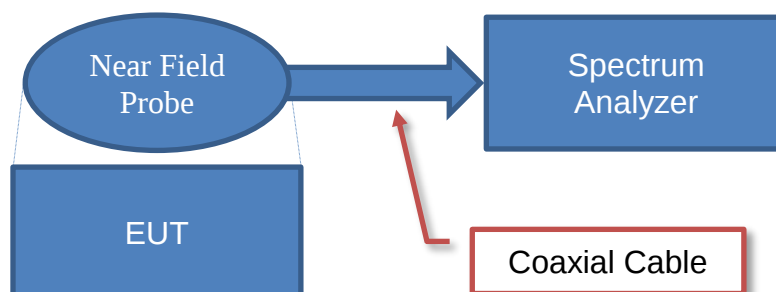
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

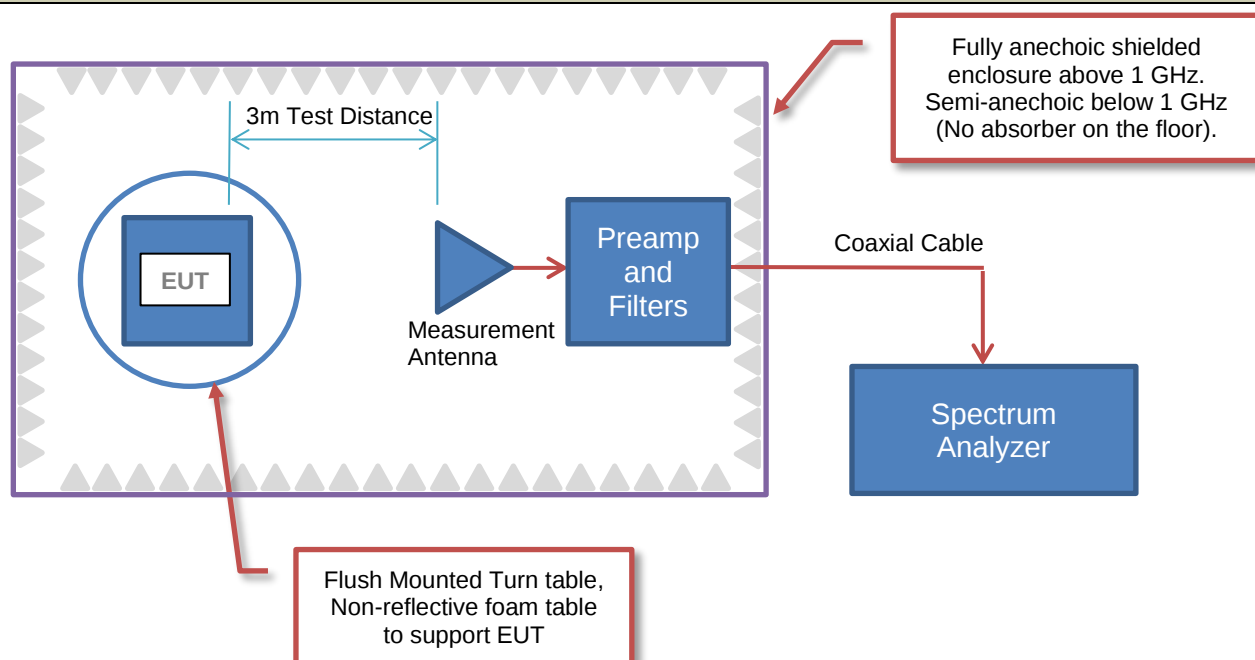


Sample Calculation (logarithmic units)

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

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

Factor												
Measured Level (Amplitude)		Antenna Factor		Cable Factor		Amplifier Gain		Distance Adjustment Factor		External Attenuation		Field Strength
42.6	+	28.6	+	3.1	-	40.8	+	0.0	+	0.0	=	33.5

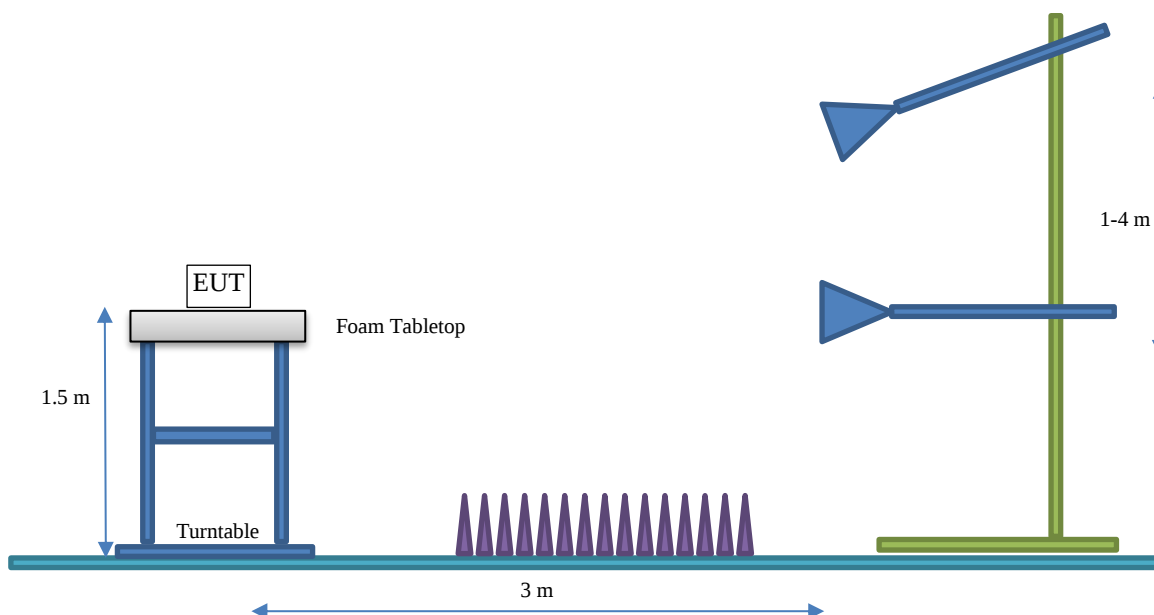
Conducted Emissions:

Factor							
Measured Level (Amplitude)		Transducer Factor		Cable Factor		External Attenuation	Adjusted Level
26.7	+	0.3	+	0.1	+	20.0	= 47.1

TEST SETUP BLOCK DIAGRAMS

Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



PRODUCT DESCRIPTION



Client and Equipment Under Test (EUT) Information

Company Name:	Starkey Laboratories, Inc.
Address:	6600 Washington Ave S
City, State, Zip:	Eden Prairie, MN 55344-3404
Test Requested By:	Bill Mitchell
EUT:	Genesis macro RIC (BLE and NFMI)
First Date of Test:	October 13, 2021
Last Date of Test:	March 28, 2022
Receipt Date of Samples:	October 12, 2021
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Hearing aid with 10.281 MHz NFMI radio and BLE supporting 1 and 2 Mbps data rates.
Testing Objective:
To demonstrate compliance of the Bluetooth Low Energy (DTS) radio to FCC 15.247 requirements.

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)
Bowtie	Starkey Laboratories, Inc.	2400-2485	-5.9

POWER SETTINGS

Radio	Modulation	Channel	Power Setting
BLE	1 Mbps, 2 Mbps	Low, Mid, and High Ch. (2402, 2442, and 2480 MHz)	+2 dBm

CONFIGURATIONS



Configuration STAK0251- 1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Hearing Aid	Starkey Laboratories, Inc.	63191-040	211728202

Configuration STAK0251- 2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Hearing Aid	Starkey Laboratories, Inc.	63191-040	211717179

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-10-13	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.
2	2021-10-13	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	2021-10-13	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.
4	2021-10-13	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.
5	2021-10-13	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.
6	2021-10-14	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.
7	2022-28-3	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.
8	2022-28-3	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE



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	N5183A	TIK	2019-04-30	2022-04-30
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2021-05-18	2022-05-18
Block - DC	Fairview Microwave	SD3379	AMZ	2020-11-04	2021-11-04
Attenuator	S.M. Electronics	SA26B-20	RFW	2021-02-05	2022-02-05
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2021-09-12	2022-09-12

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

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

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

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

DUTY CYCLE



XMH 2020.12.30.0

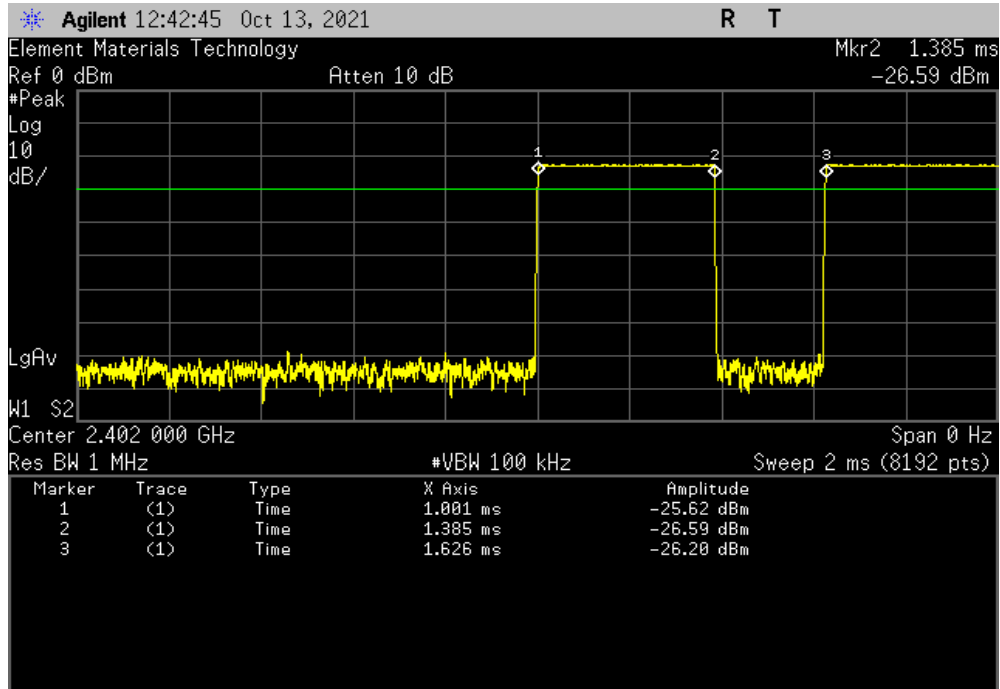
EUT: Genesis macro RIC (BLE and NFMI)		Work Order: STAK0251					
Serial Number: 211717179		Date: 13-Oct-21					
Customer: Starkey Laboratories, Inc.		Temperature: 22.7 °C					
Attendees: John Quach		Humidity: 48.7% RH					
Project: None		Barometric Pres.: 1004 mbar					
Tested by: Andrew Rogstad		Power: Battery					
Job Site: MN08							
TEST SPECIFICATIONS		Test Method					
FCC 15.247:2021		ANSI C63.10:2013					
COMMENTS							
None							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	2	Signature <i>Andrew Rogstad</i>					
	Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz							
Pulse Length	0.38	N/A	N/A	N/A	N/A	N/A	N/A
Pulse Count	N/A	14	5.38	N/A	N/A	N/A	N/A
Overall Period	N/A	N/A	N/A	40.01	13.44	N/A	N/A
Repeatability	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz							
Pulse Length	0.38	N/A	N/A	N/A	N/A	N/A	N/A
Pulse Count	N/A	14	5.35	N/A	N/A	N/A	N/A
Overall Period	N/A	N/A	N/A	40.00	13.37	N/A	N/A
Repeatability	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BLE/GFSK 1 Mbps High Channel, 2480 MHz							
Pulse Length	0.38	N/A	N/A	N/A	N/A	N/A	N/A
Pulse Count	N/A	14	5.38	N/A	N/A	N/A	N/A
Overall Period	N/A	N/A	N/A	40.01	13.44	N/A	N/A
Repeatability	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BLE/GFSK 2 Mbps Low Channel, 2402 MHz							
Pulse Length	0.20	N/A	N/A	N/A	N/A	N/A	N/A
Pulse Count	N/A	14	2.74	N/A	N/A	N/A	N/A
Overall Period	N/A	N/A	N/A	40.01	6.86	N/A	N/A
Repeatability	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz							
Pulse Length	0.20	N/A	N/A	N/A	N/A	N/A	N/A
Pulse Count	N/A	14	2.74	N/A	N/A	N/A	N/A
Overall Period	N/A	N/A	N/A	40.00	6.86	N/A	N/A
Repeatability	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BLE/GFSK 2 Mbps High Channel, 2480 MHz							
Pulse Length	0.20	N/A	N/A	N/A	N/A	N/A	N/A
Pulse Count	N/A	14	2.74	N/A	N/A	N/A	N/A
Overall Period	N/A	N/A	N/A	40.00	6.86	N/A	N/A
Repeatability	N/A	N/A	N/A	N/A	N/A	N/A	N/A

DUTY CYCLE

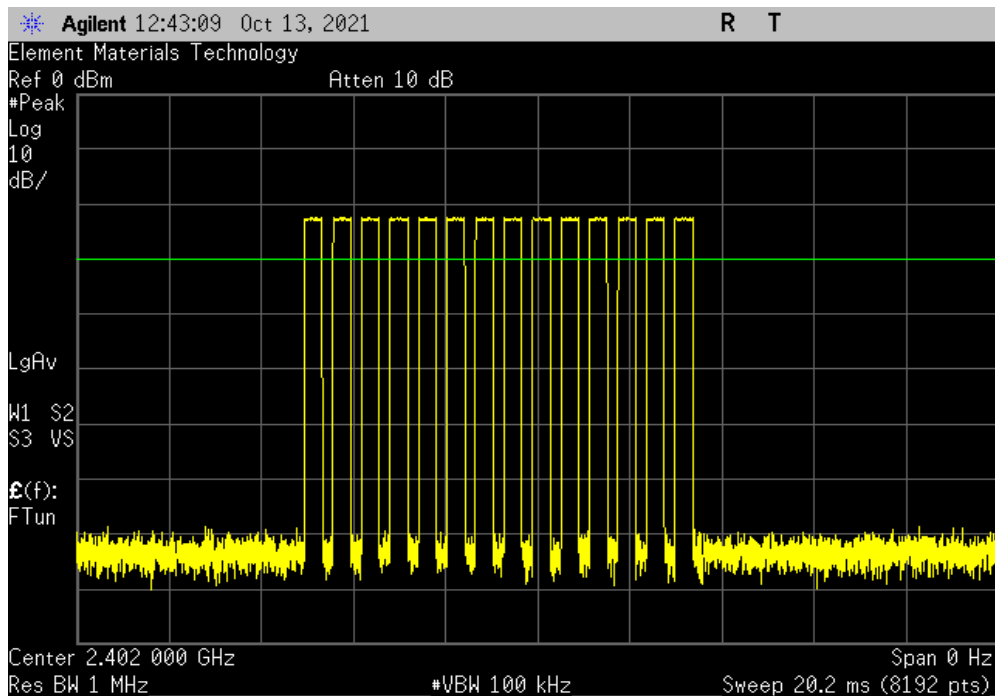


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BLE/GFSK 1 Mbps Low Channel, 2402 MHz, Pulse Length						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
0.38	N/A	N/A	N/A	N/A	N/A	N/A



BLE/GFSK 1 Mbps Low Channel, 2402 MHz, Pulse Count						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	14	5.38	N/A	N/A	N/A	N/A

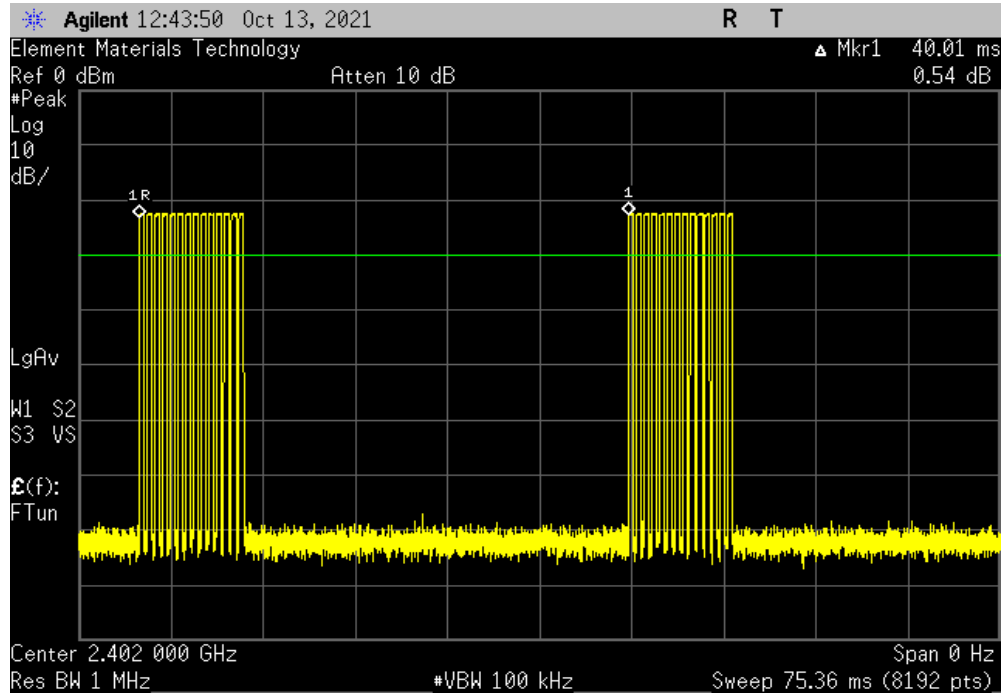


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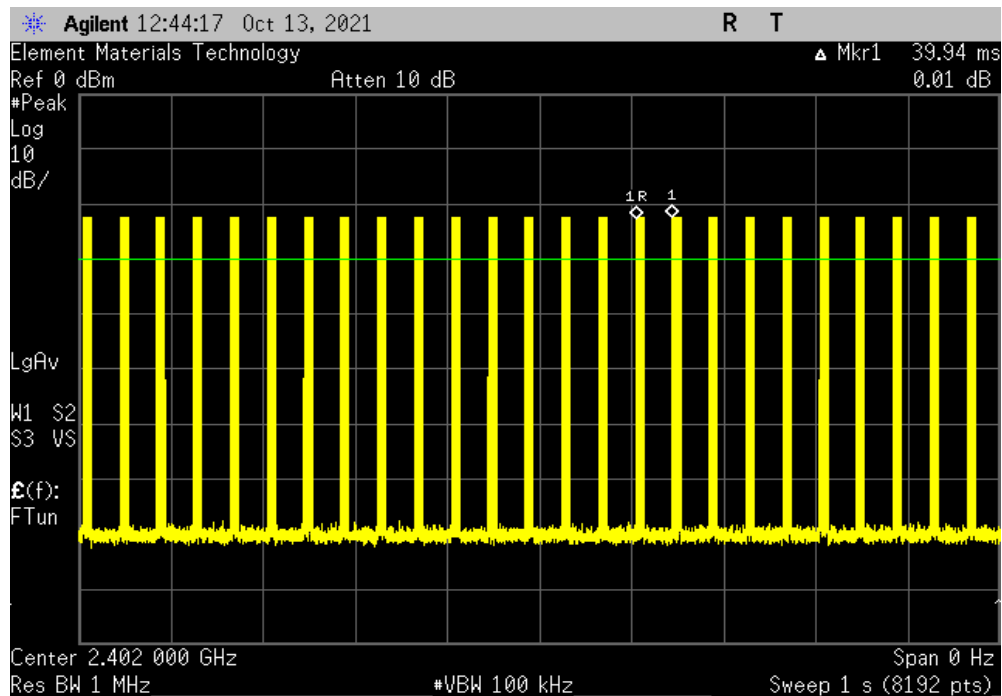


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BLE/GFSK 1 Mbps Low Channel, 2402 MHz, Overall Period						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	40.01	13.44	N/A	N/A

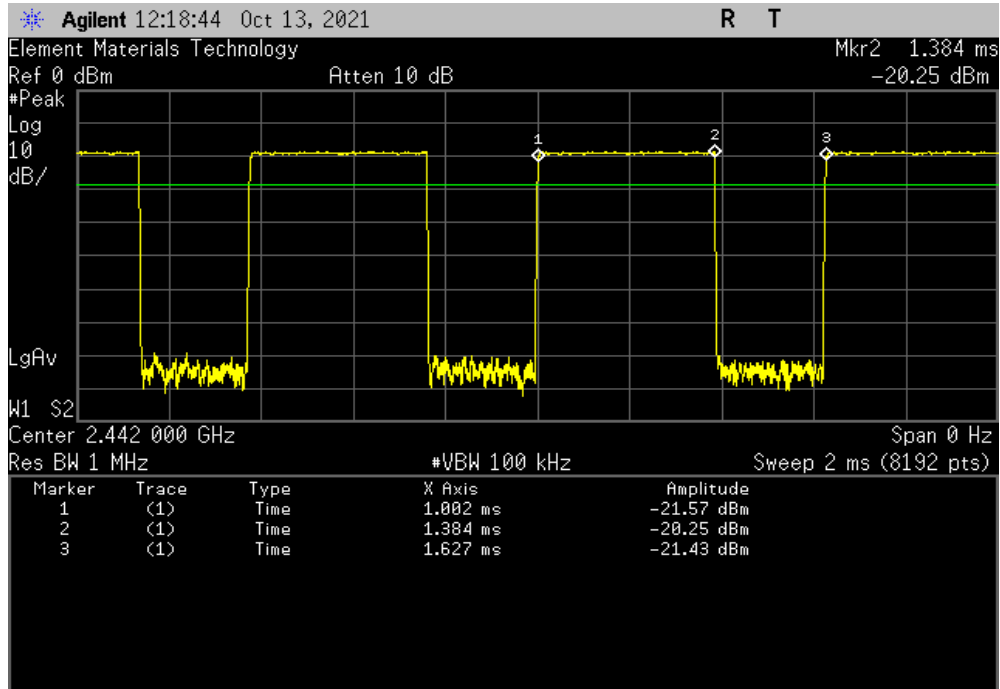


BLE/GFSK 1 Mbps Low Channel, 2402 MHz, Repeatability						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A

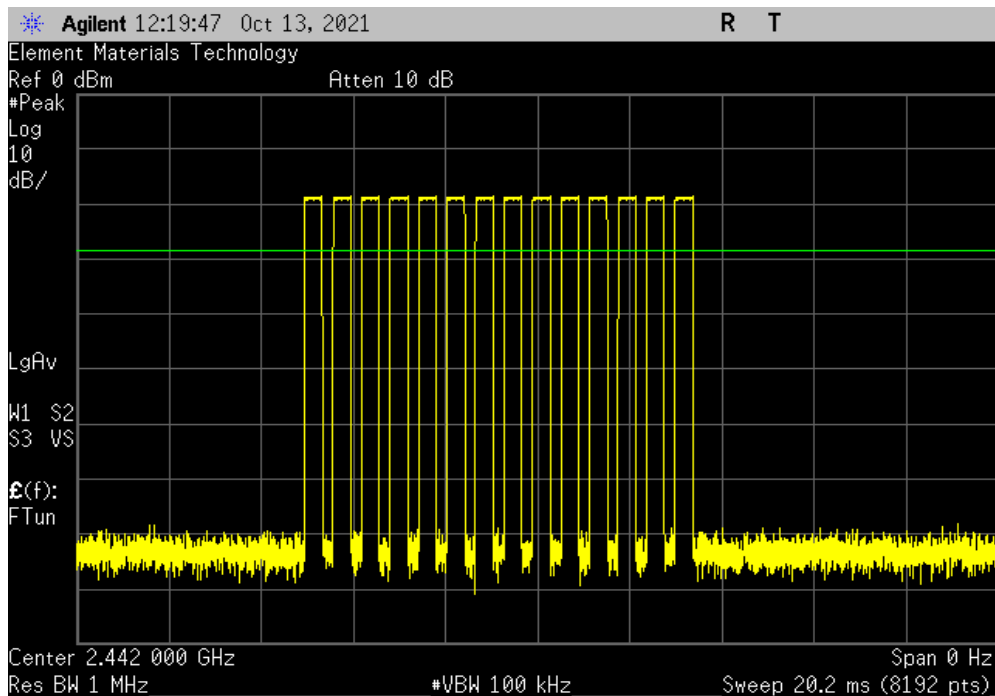


DUTY CYCLE

BLE/GFSK 1 Mbps Mid Channel, 2442 MHz, Pulse Length						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
0.38	N/A	N/A	N/A	N/A	N/A	N/A



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz, Pulse Count						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	14	5.35	N/A	N/A	N/A	N/A

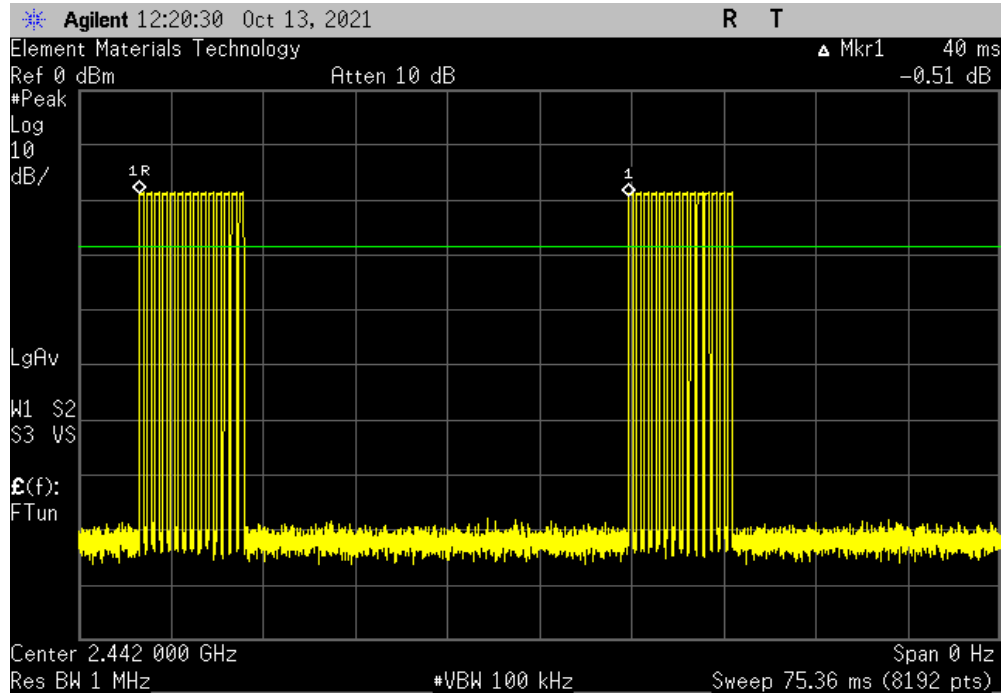


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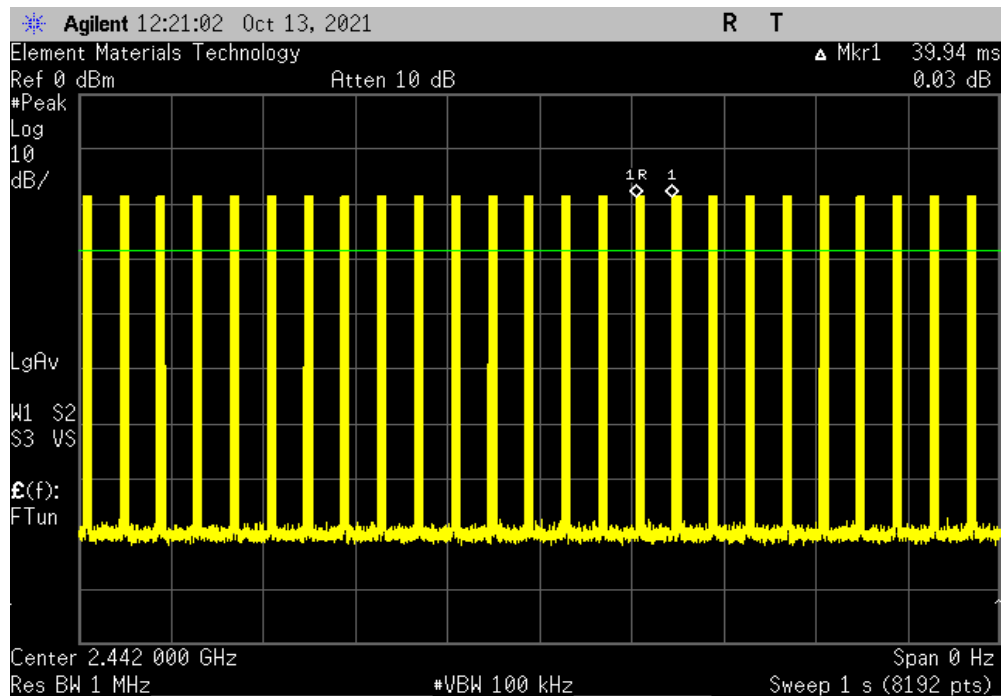


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BLE/GFSK 1 Mbps Mid Channel, 2442 MHz, Overall Period						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	40.00	13.37	N/A	N/A



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz, Repeatability						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A

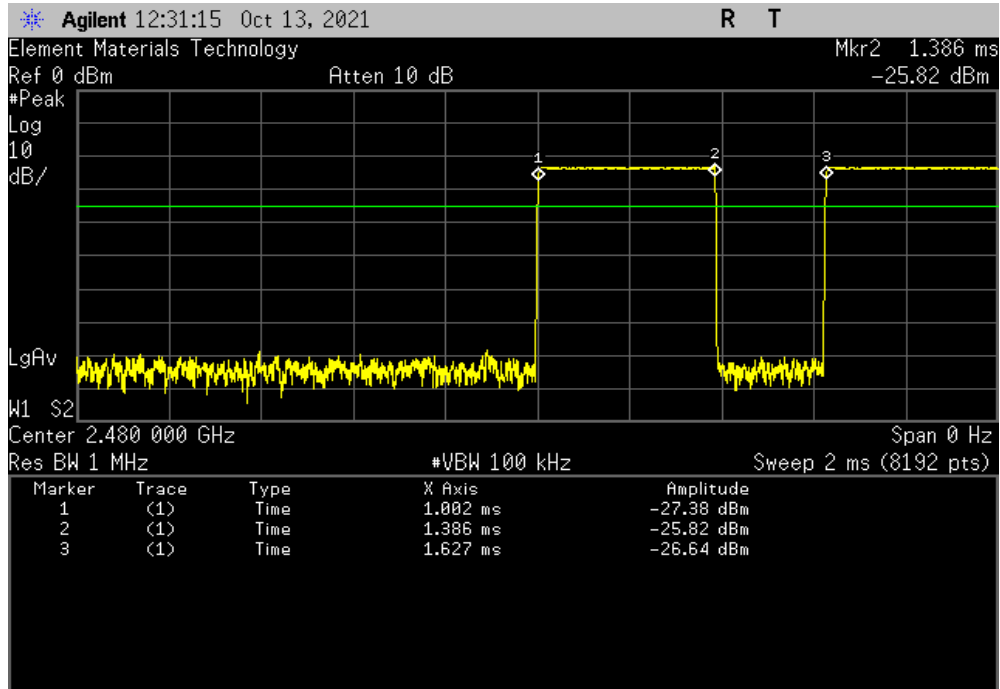


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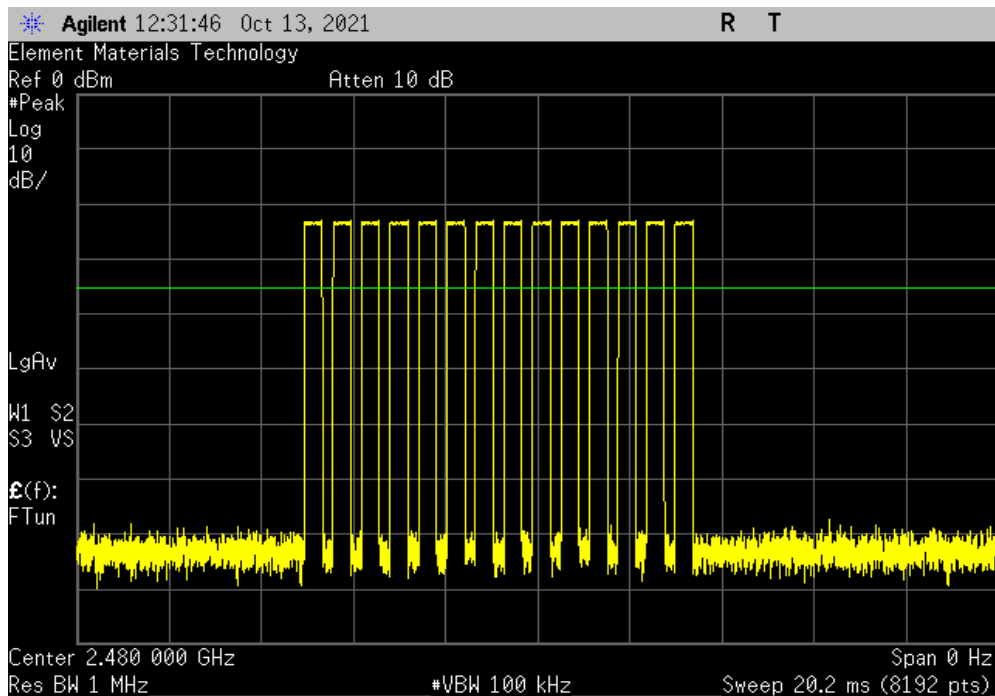


XMR 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz, Pulse Length						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
0.38	N/A	N/A	N/A	N/A	N/A	N/A



BLE/GFSK 1 Mbps High Channel, 2480 MHz, Pulse Count						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	14	5.38	N/A	N/A	N/A	N/A

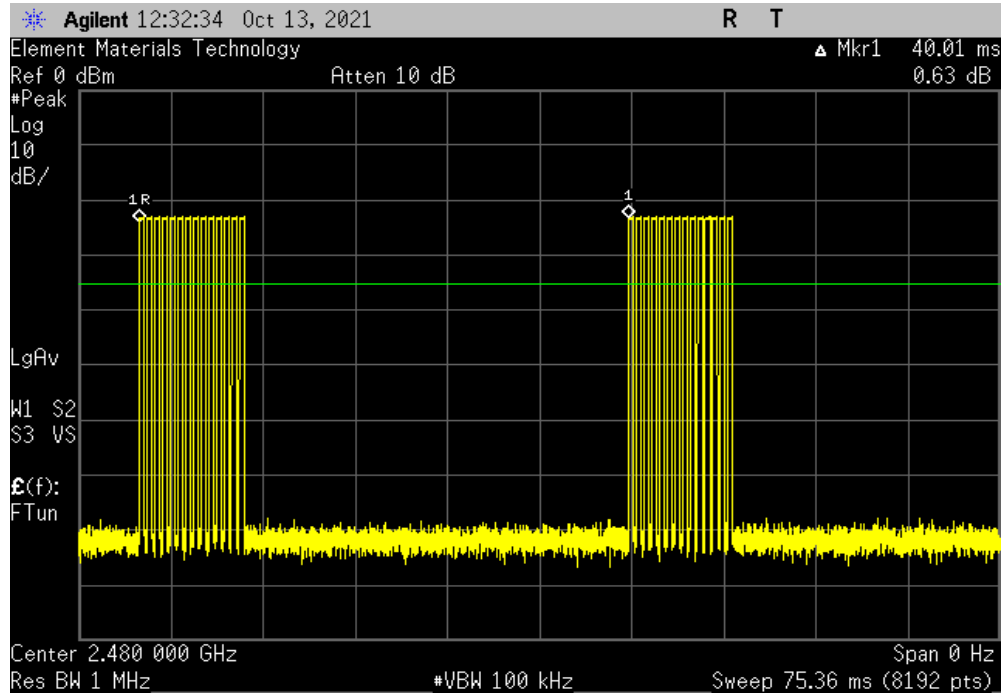


DUTY CYCLE

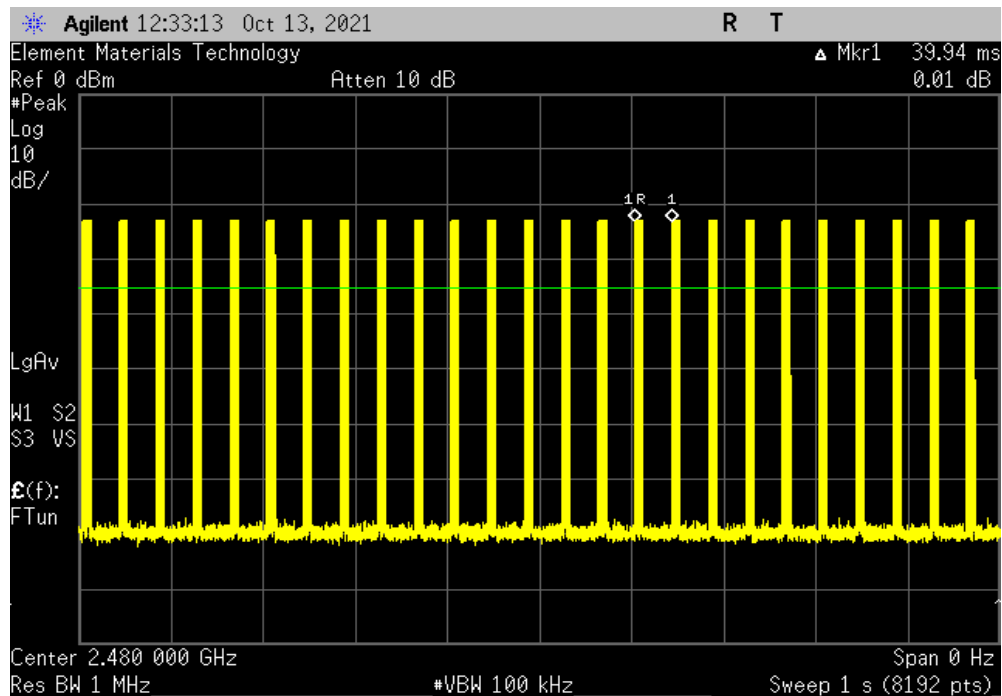


XMR 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz, Overall Period						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	40.01	13.44	N/A	N/A



BLE/GFSK 1 Mbps High Channel, 2480 MHz, Repeatability						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A

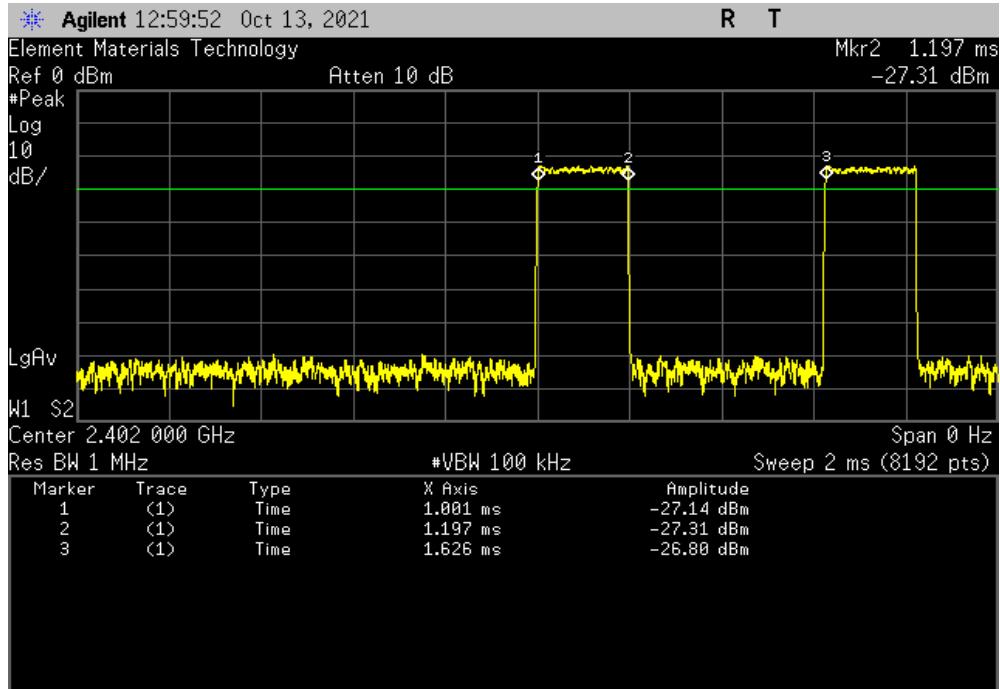


DUTY CYCLE

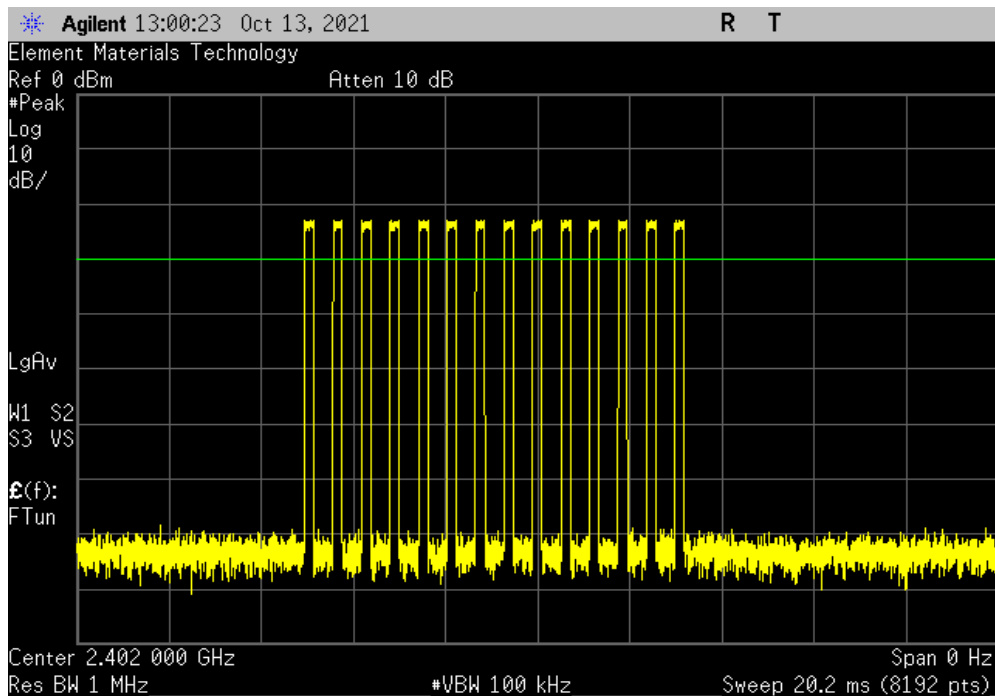


XMR 2020.12.30.0

BLE/GFSK 2 Mbps Low Channel, 2402 MHz, Pulse Length						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
0.20	N/A	N/A	N/A	N/A	N/A	N/A



BLE/GFSK 2 Mbps Low Channel, 2402 MHz, Pulse Count						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	14	2.74	N/A	N/A	N/A	N/A

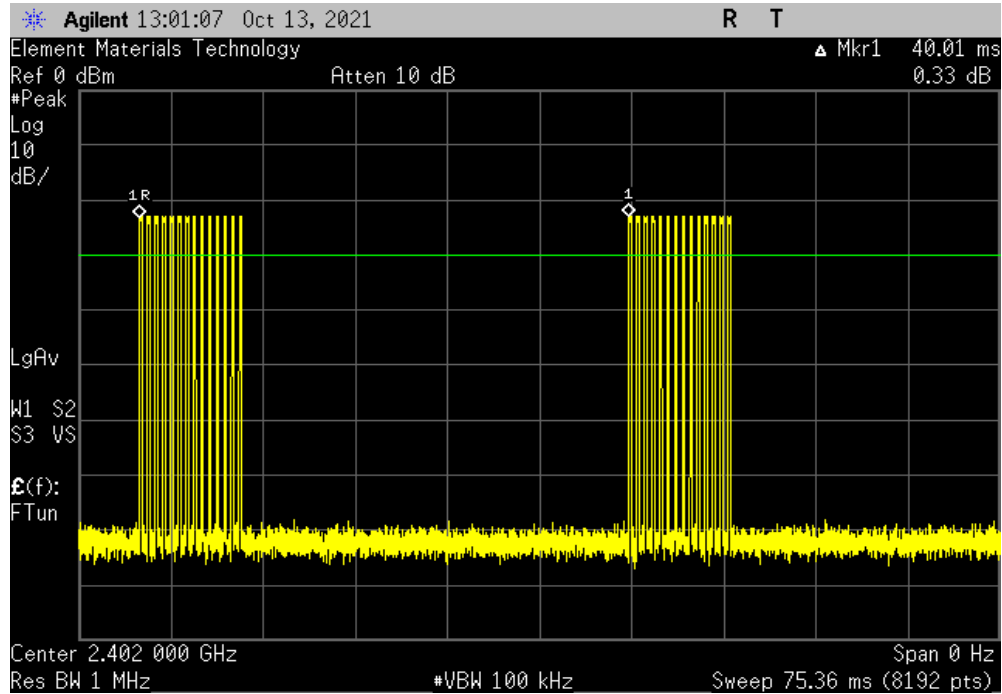


DUTY CYCLE

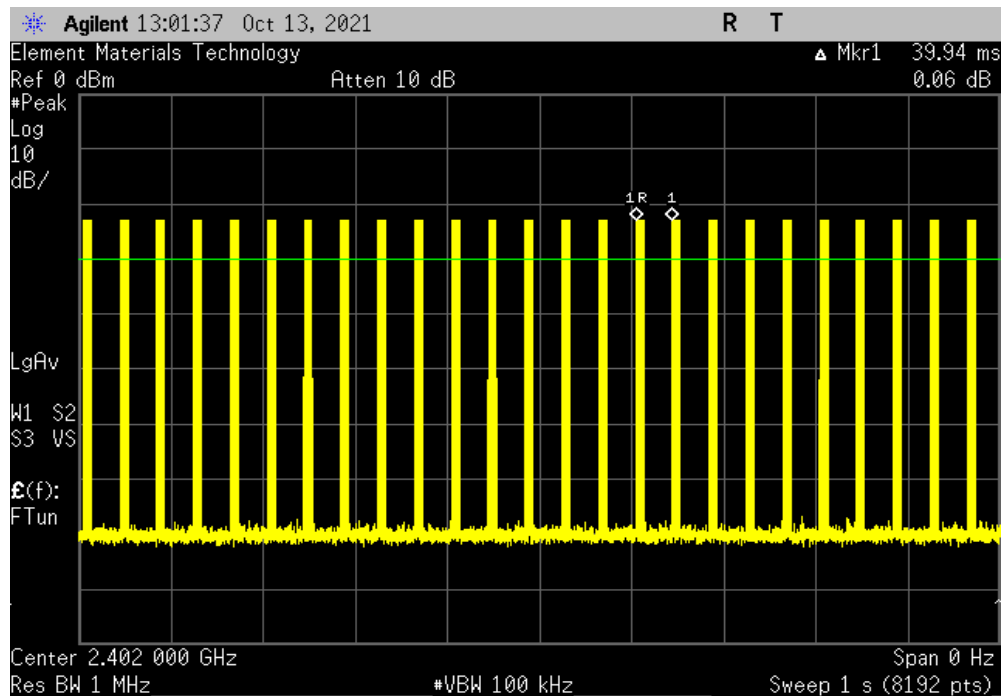


XMR 2020.12.30.0

BLE/GFSK 2 Mbps Low Channel, 2402 MHz, Overall Period						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	40.01	6.86	N/A	N/A



BLE/GFSK 2 Mbps Low Channel, 2402 MHz, Repeatability						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A

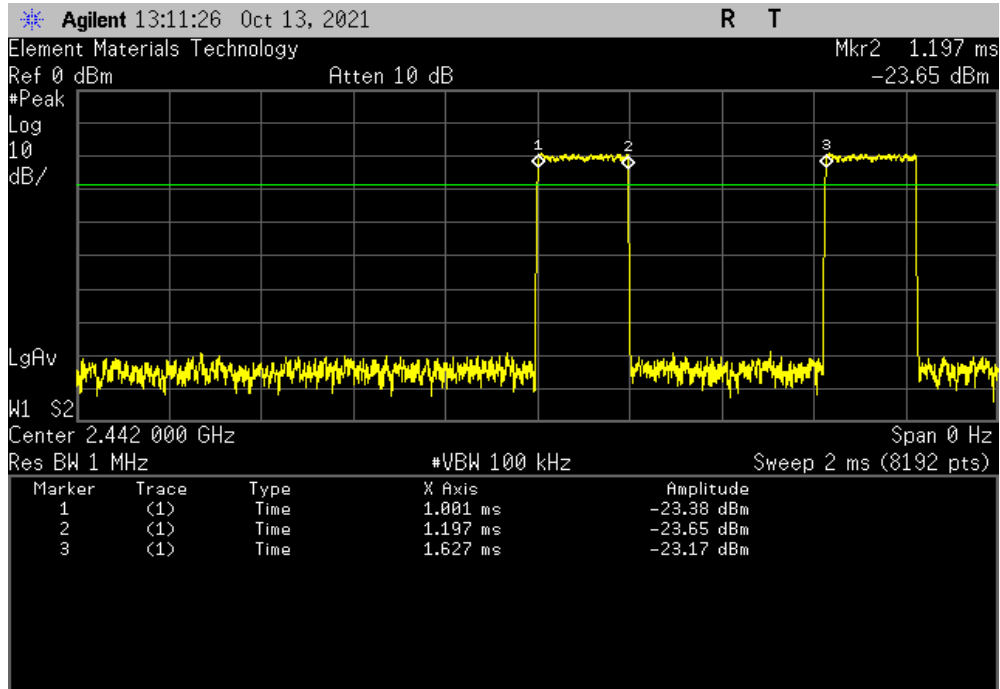


DUTY CYCLE

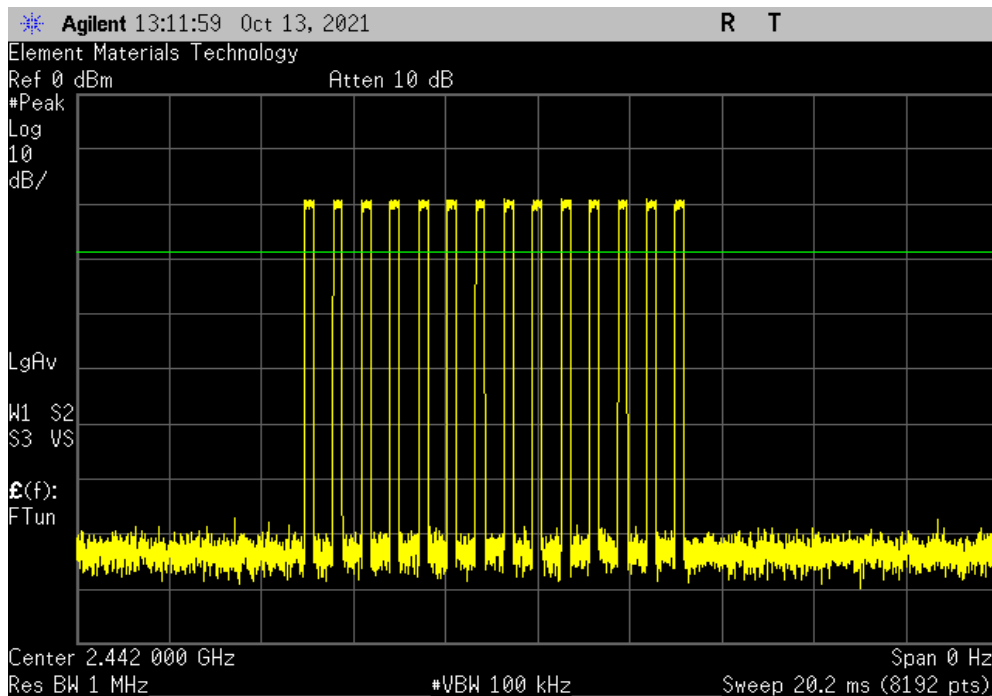


XMR 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz, Pulse Length						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
0.20	N/A	N/A	N/A	N/A	N/A	N/A



BLE/GFSK 2 Mbps Mid Channel, 2442 MHz, Pulse Count						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	14	2.74	N/A	N/A	N/A	N/A

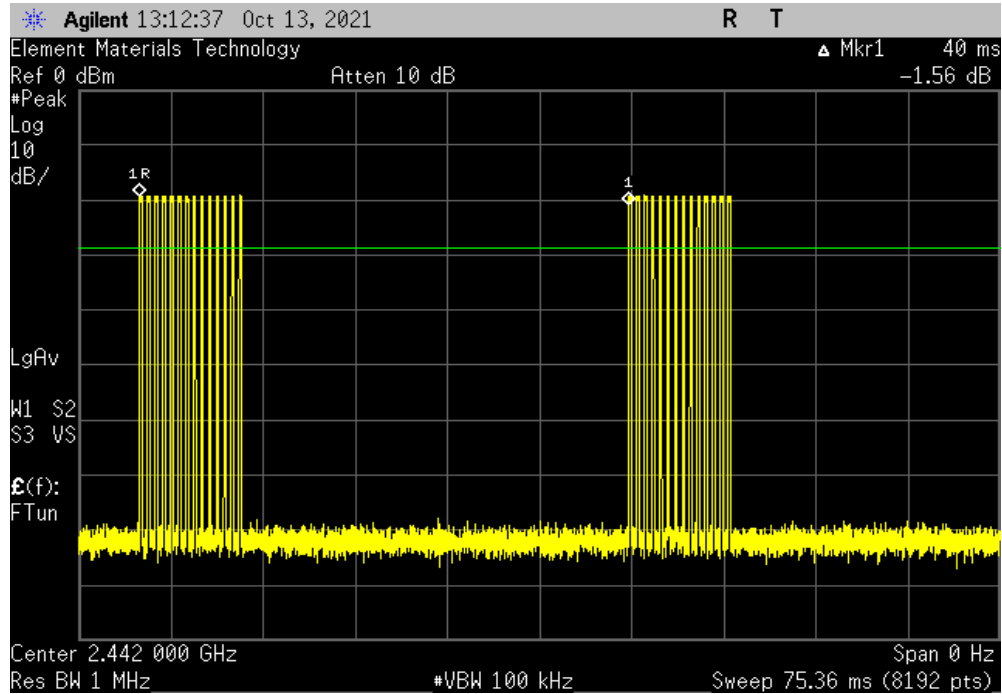


DUTY CYCLE

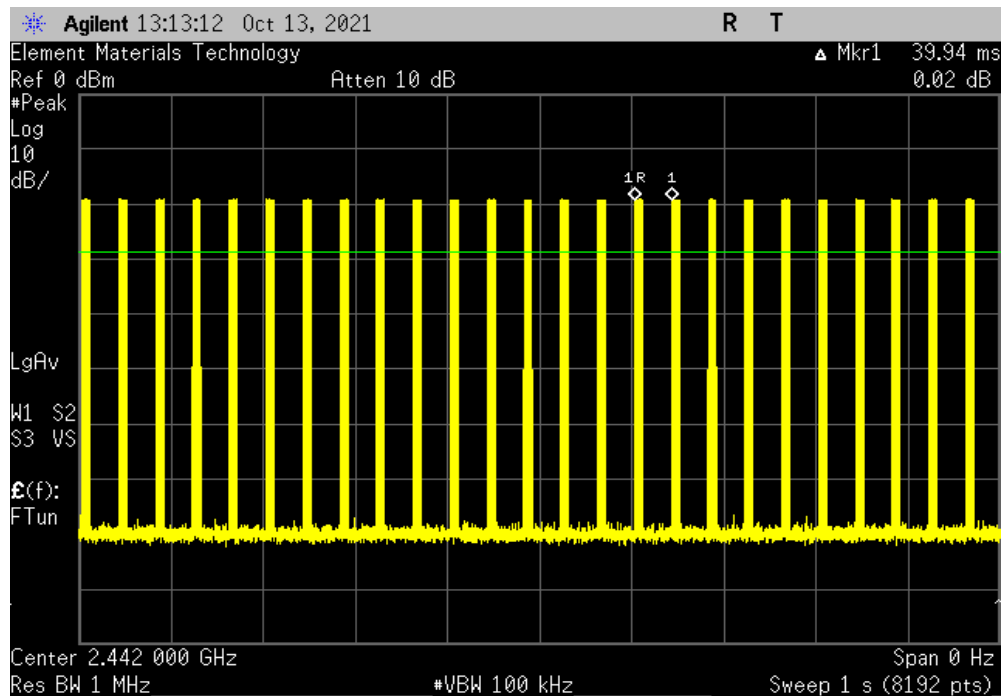


XMR 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz, Overall Period						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	40.00	6.86	N/A	N/A



BLE/GFSK 2 Mbps Mid Channel, 2442 MHz, Repeatability						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A

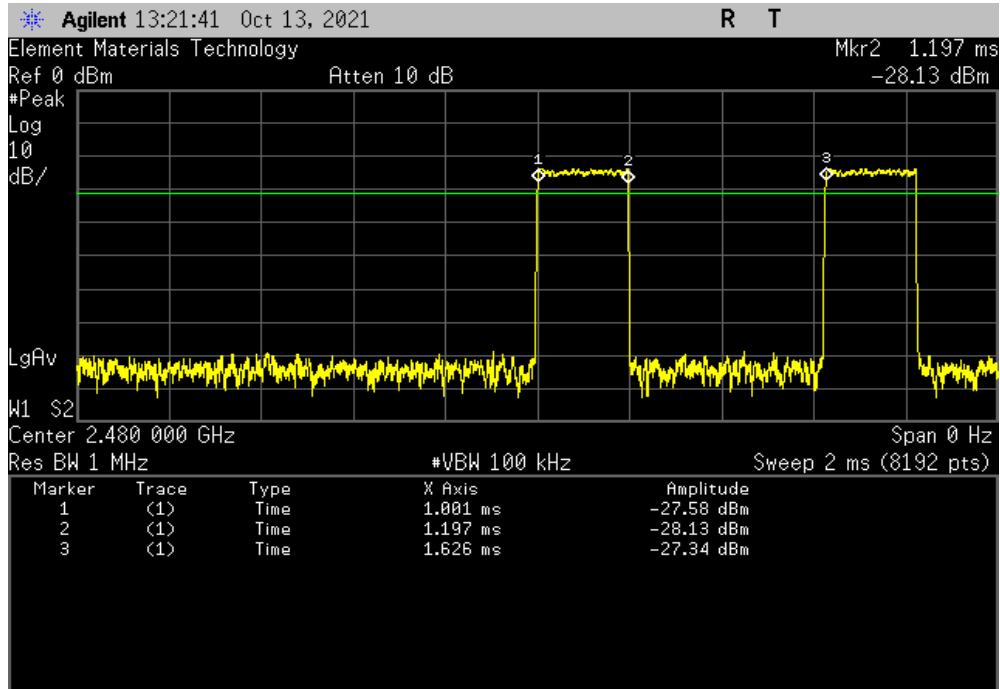


DUTY CYCLE

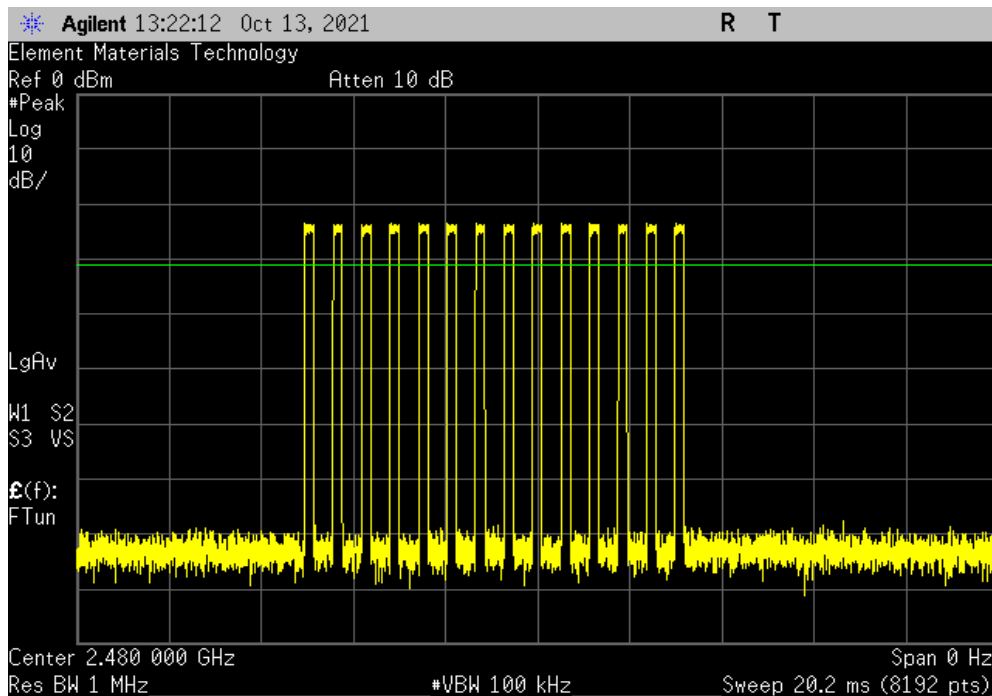


XMR 2020.12.30.0

BLE/GFSK 2 Mbps High Channel, 2480 MHz, Pulse Length						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
0.20	N/A	N/A	N/A	N/A	N/A	N/A



BLE/GFSK 2 Mbps High Channel, 2480 MHz, Pulse Count						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	14	2.74	N/A	N/A	N/A	N/A

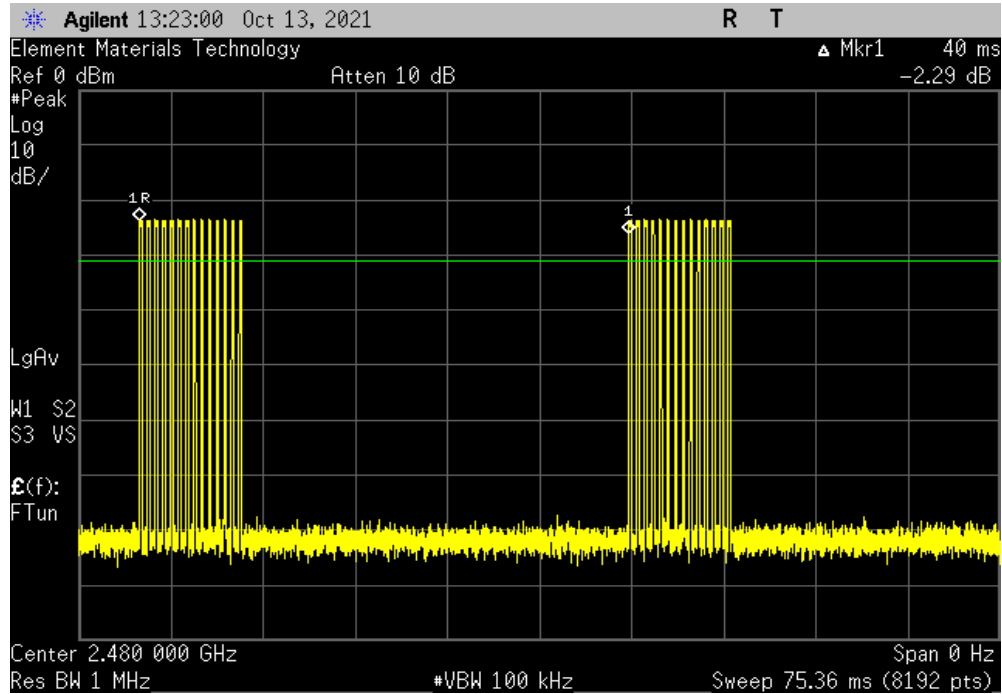


DUTY CYCLE

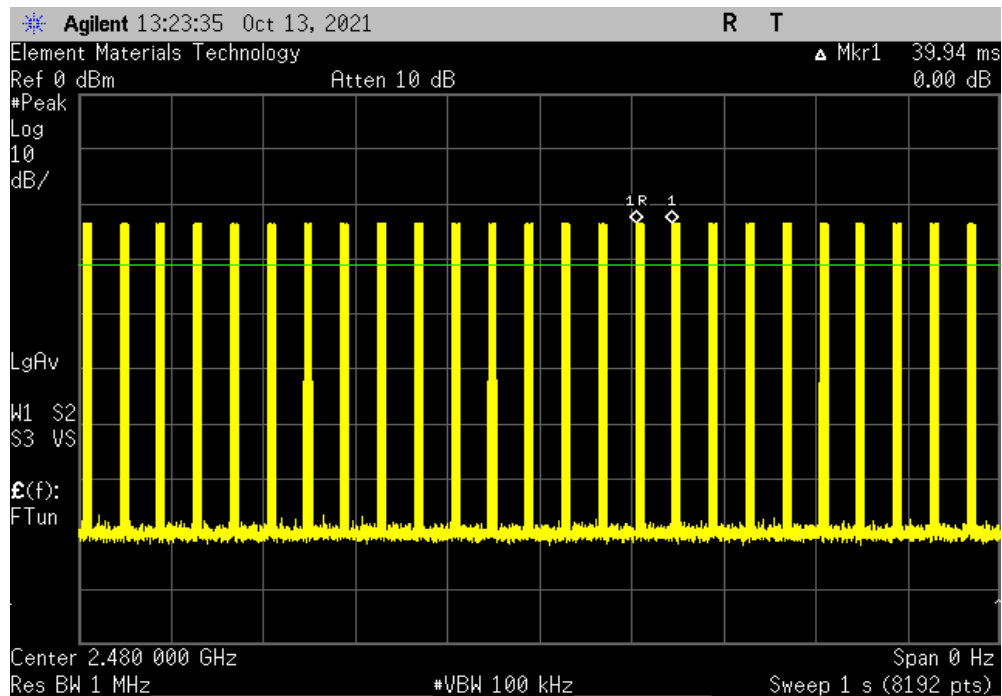


XMR 2020.12.30.0

BLE/GFSK 2 Mbps High Channel, 2480 MHz, Overall Period						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	40.00	6.86	N/A	N/A



BLE/GFSK 2 Mbps High Channel, 2480 MHz, Repeatability						
Pulse Width (ms)	Number of Pulses	Total On-Time (ms)	Period (ms)	Value (%)	Limit (%)	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A



DTS BANDWIDTH



element

XMIT 2022.02.07.0

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	Keysight	N5171B (EXG)	TEY	2019-12-31	2022-12-31
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2021-04-16	2022-04-16
Block - DC	Fairview Microwave	SD3379	AMI	2021-08-13	2022-08-13
Attenuator	Fairview Microwave	SA18S5W-20	RFX	2021-06-02	2022-06-02
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2021-09-12	2022-09-12

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

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

The 6dB DTS bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The procedure outlined in ANSI C63.10 Section 11.8.2 was used for testing.

DTS BANDWIDTH



TSTx 2021.12.14.1 XMR 2022.02.07.0

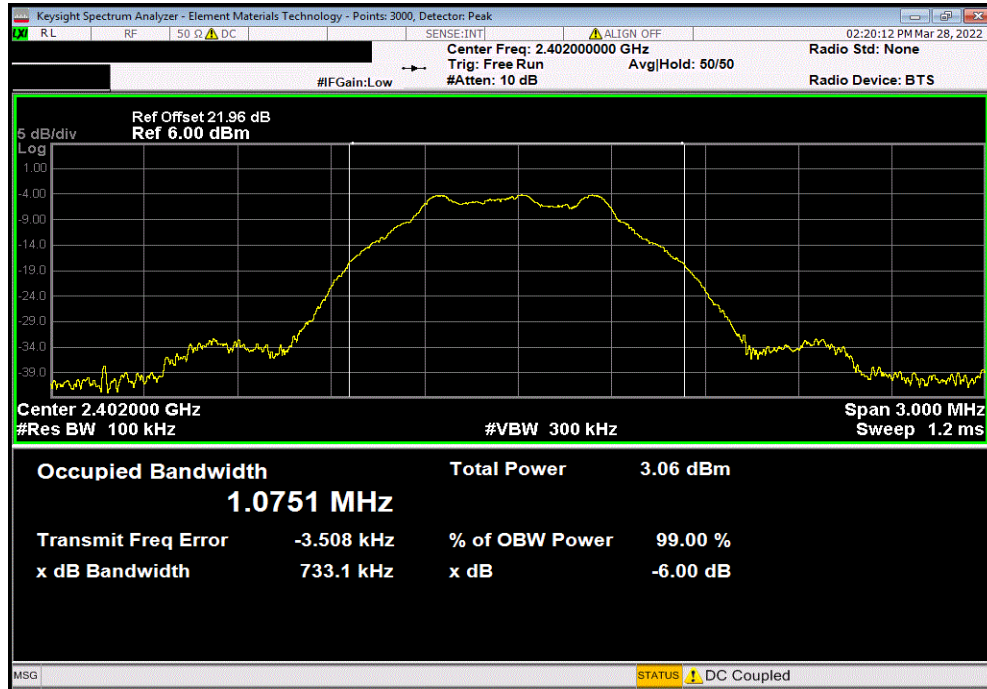
EUT: Genesis macro RIC (BLE and NFMI)		Work Order: STAK0251	
Serial Number: 211717179		Date: 28-Mar-22	
Customer: Starkey Laboratories, Inc.		Temperature: 24.2 °C	
Attendees: John Quach		Humidity: 18.3% RH	
Project: None		Barometric Pres.: 1027 mbar	
Tested by: Andrew Rogstad		Power: Battery	
		Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2022		Test Method	
		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature <i>Andrew Rogstad</i>	
		Value	Limit (±) Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		733.118 kHz	500 kHz Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		732.514 kHz	500 kHz Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		742.496 kHz	500 kHz Pass
BLE/GFSK 2 Mbps Low Channel, 2402 MHz		1.27 MHz	500 kHz Pass
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz		1.273 MHz	500 kHz Pass
BLE/GFSK 2 Mbps High Channel, 2480 MHz		1.27 MHz	500 kHz Pass

DTS BANDWIDTH

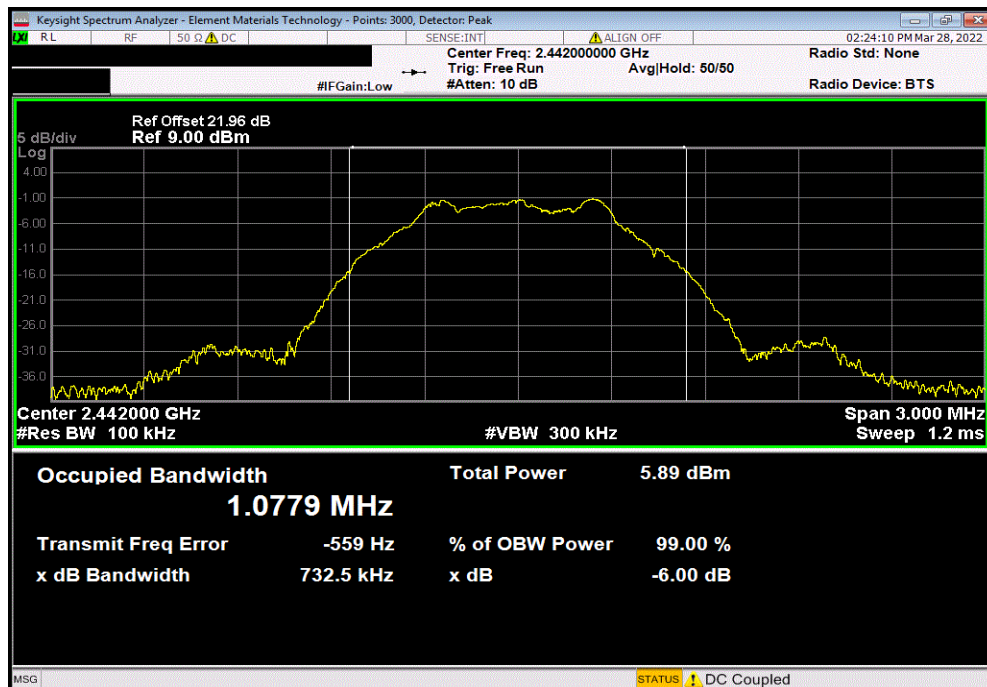


TbTx 2021.12.14.1 XMt 2022.02.07.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
				Value	Limit (≥)	Result
				733.118 kHz	500 kHz	Pass



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz						
				Value	Limit (≥)	Result
				732.514 kHz	500 kHz	Pass

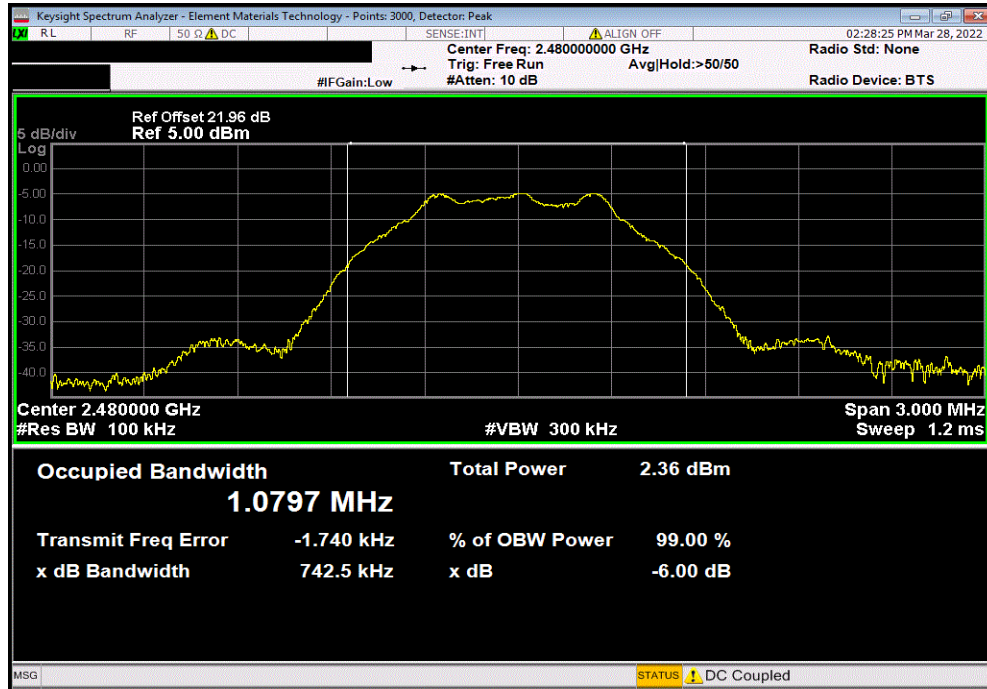


DTS BANDWIDTH

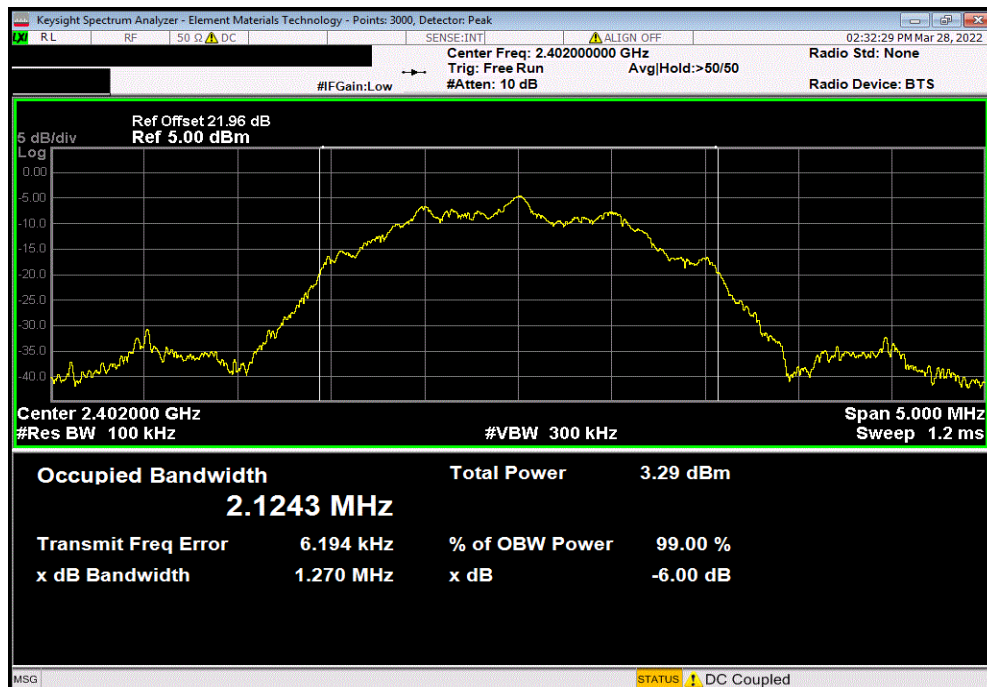


TbTx 2021.12.14.1 XMt 2022.02.07.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
	Value	Limit (≥)	Result			
	742.496 kHz	500 kHz	Pass			



BLE/GFSK 2 Mbps Low Channel, 2402 MHz						
	Value	Limit (≥)	Result			
	1.27 MHz	500 kHz	Pass			

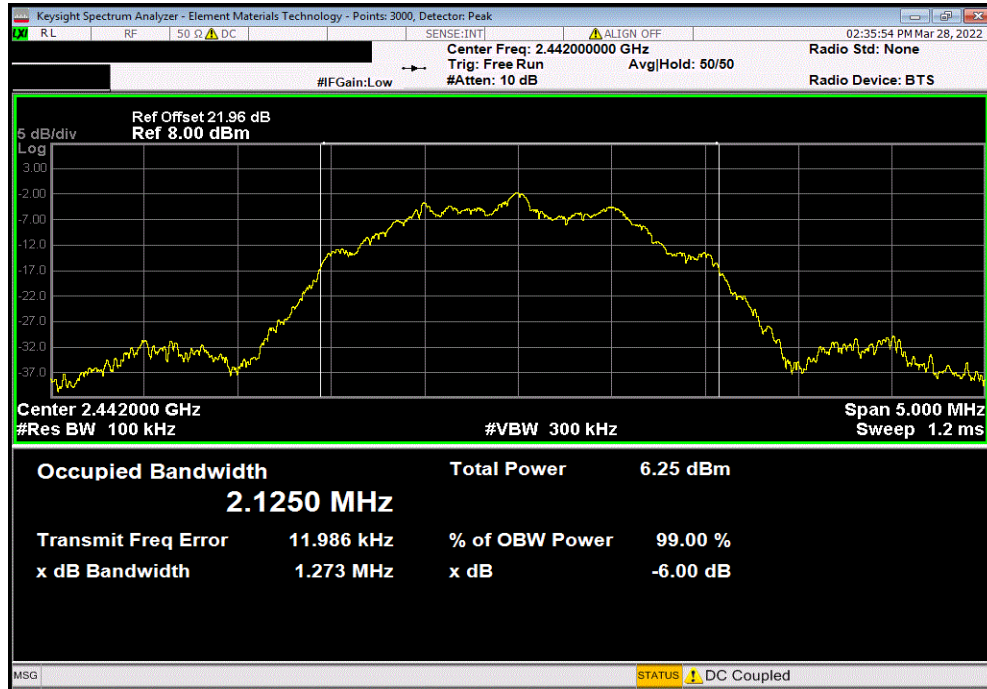


DTS BANDWIDTH

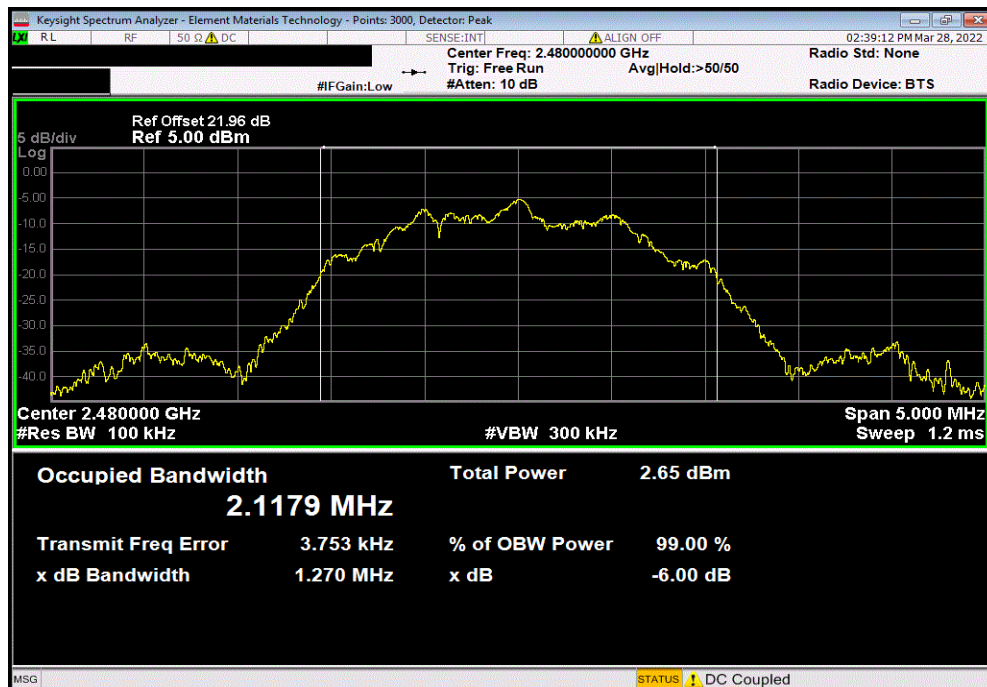


TbTtx 2021.12.14.1 XMt 2022.02.07.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
				Value	Limit (≥)	Result
				1.273 MHz	500 kHz	Pass



BLE/GFSK 2 Mbps High Channel, 2480 MHz						
				Value	Limit (≥)	Result
				1.27 MHz	500 kHz	Pass



OUTPUT POWER



XMIT 2022.02.07.0

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	Keysight	N5171B (EXG)	TEY	2019-12-31	2022-12-31
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2021-04-16	2022-04-16
Block - DC	Fairview Microwave	SD3379	AMI	2021-08-13	2022-08-13
Attenuator	Fairview Microwave	SA18S5W-20	RFX	2021-06-02	2022-06-02
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2021-09-12	2022-09-12

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

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

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

OUTPUT POWER



TSTx 2021.12.14.1 XMR 2022.02.07.0

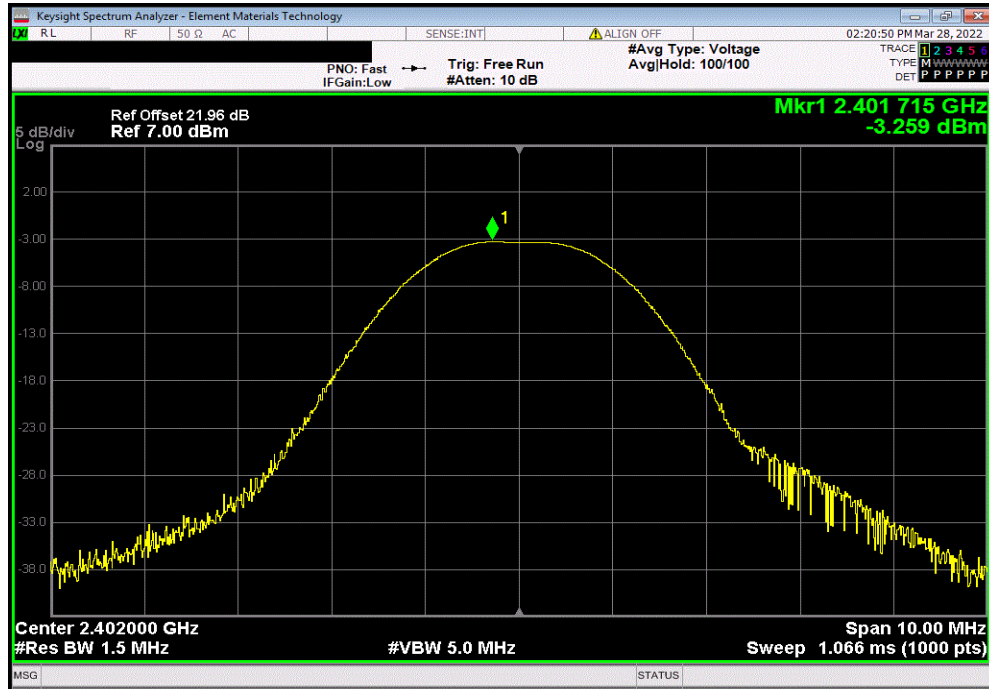
EUT: Genesis macro RIC (BLE and NFMI)		Work Order: STAK0251	
Serial Number: 211717179		Date: 28-Mar-22	
Customer: Starkey Laboratories, Inc.		Temperature: 24.1 °C	
Attendees: John Quach		Humidity: 18.5% RH	
Project: None		Barometric Pres.: 1027 mbar	
Tested by: Andrew Rogstad		Power: Battery	
Job Site: MN08			
TEST SPECIFICATIONS			
FCC 15.247:2022		Test Method	
		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature <i>Andrew Rogstad</i>	
		Out Pwr (dBm)	Limit (dBm)
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-3.259	30
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		-0.373	30
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-3.97	30
BLE/GFSK 2 Mbps Low Channel, 2402 MHz		-3.307	30
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz		-0.332	30
BLE/GFSK 2 Mbps High Channel, 2480 MHz		-3.965	30
			Result
			Pass
			Pass
			Pass
			Pass
			Pass

OUTPUT POWER

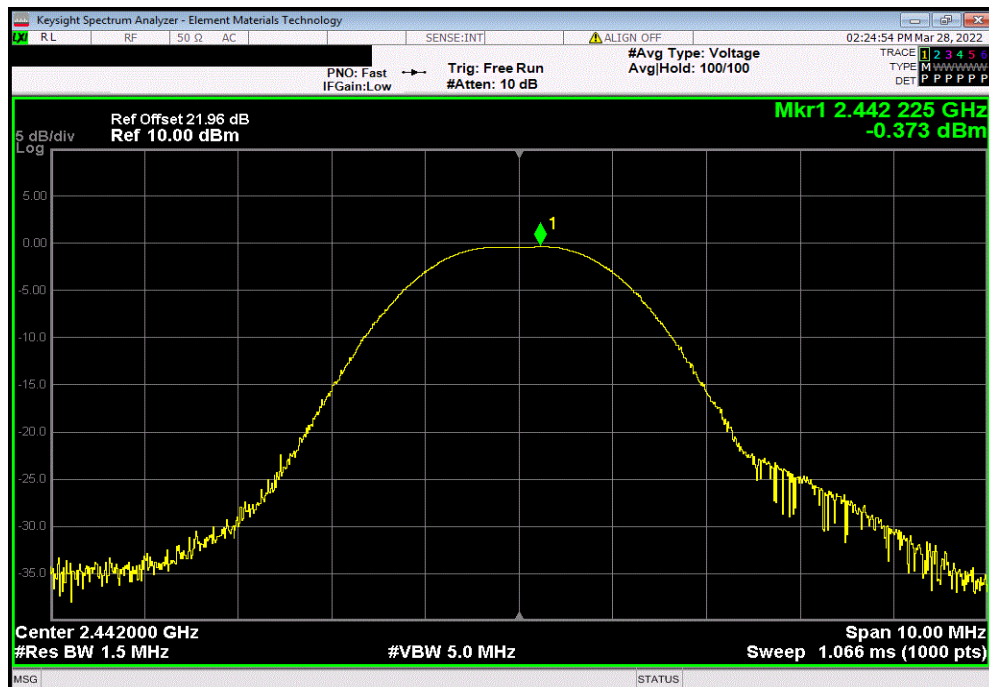


TMTx 2021.12.14.1 XMt 2022.02.07.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-3.259	30	Pass



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.373	30	Pass

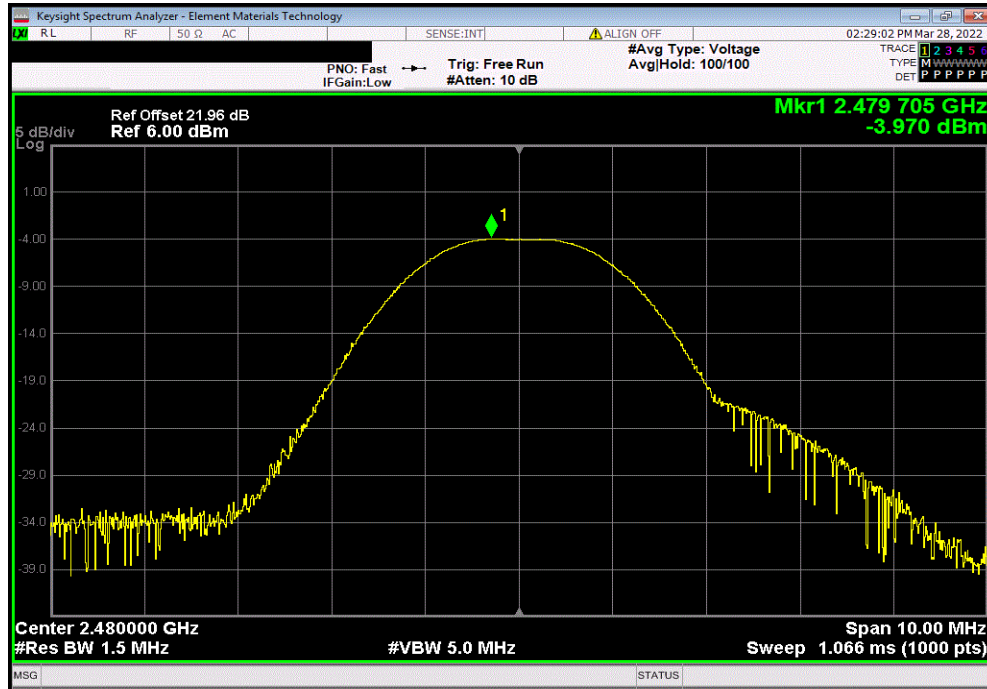


OUTPUT POWER

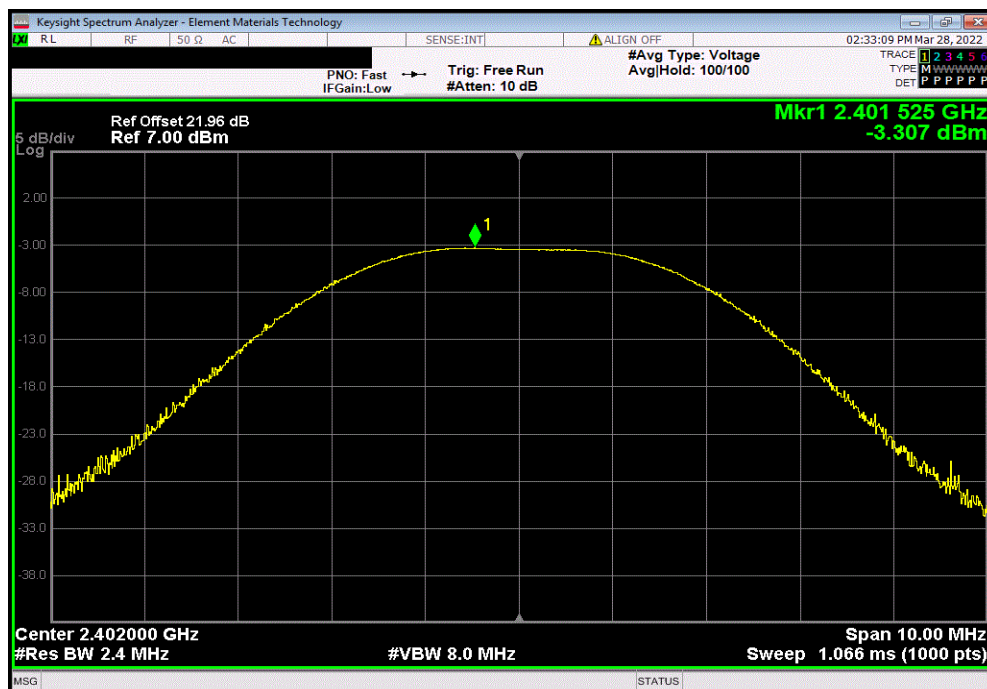


TbTtx 2021.12.14.1 XMt 2022.02.07.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-3.97	30	Pass



BLE/GFSK 2 Mbps Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-3.307	30	Pass

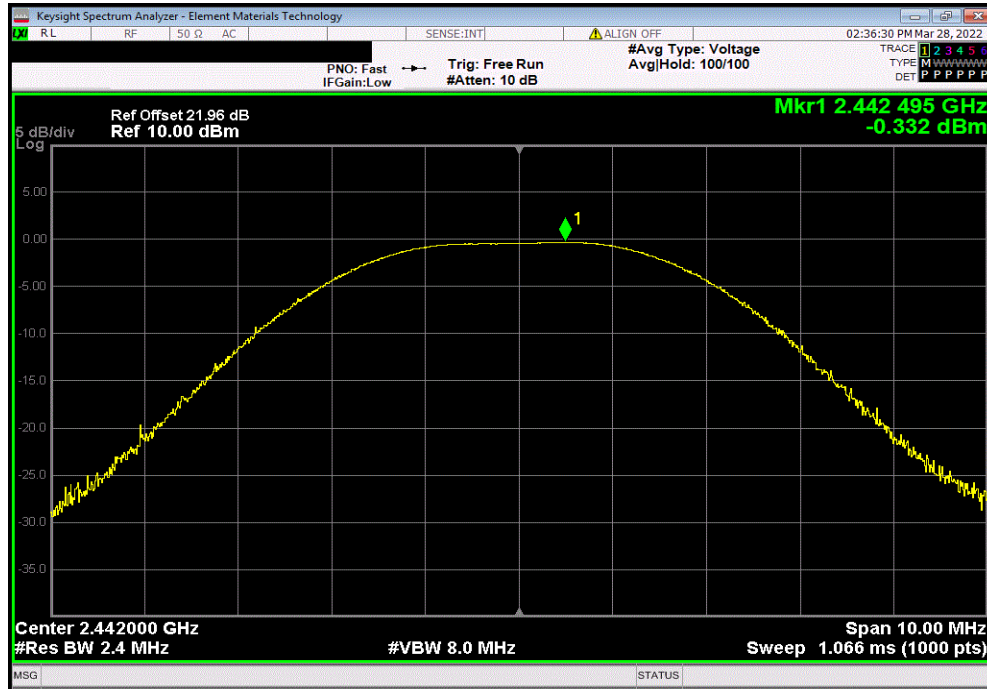


OUTPUT POWER

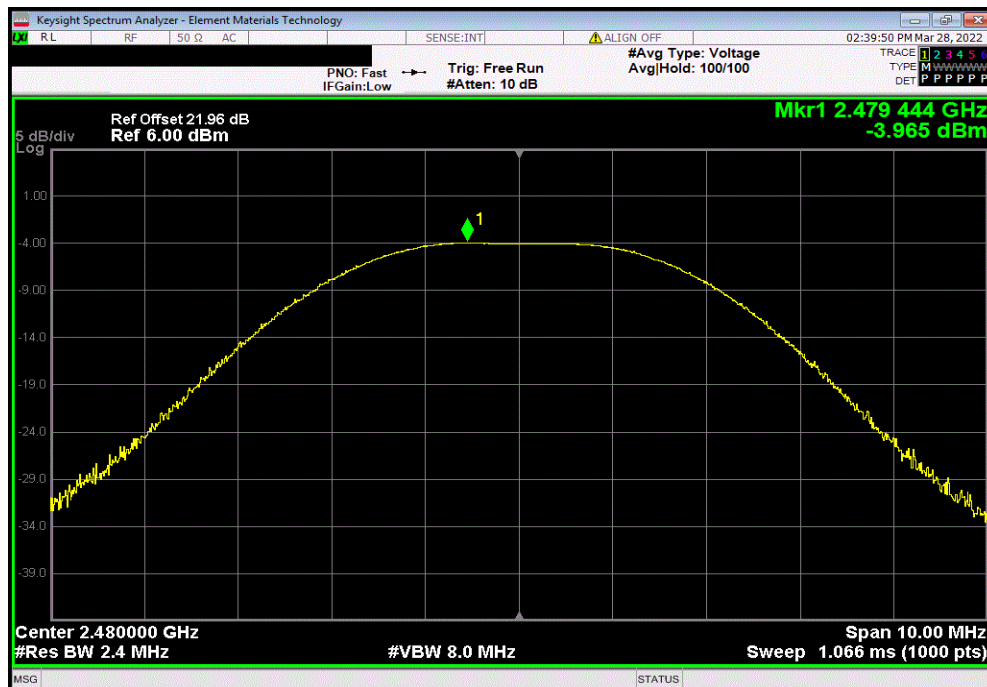


TbTtx 2021.12.14.1 XMt 2022.02.07.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-0.332	30	Pass



BLE/GFSK 2 Mbps High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-3.965	30	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



XMIT 2022.02.07.0

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	Keysight	N5171B (EXG)	TEY	2019-12-31	2022-12-31
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2021-04-16	2022-04-16
Block - DC	Fairview Microwave	SD3379	AMI	2021-08-13	2022-08-13
Attenuator	Fairview Microwave	SA18S5W-20	RFX	2021-06-02	2022-06-02
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2021-09-12	2022-09-12

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

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

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

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

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



TSTx 2021.12.14.1 XMR 2022.02.07.0

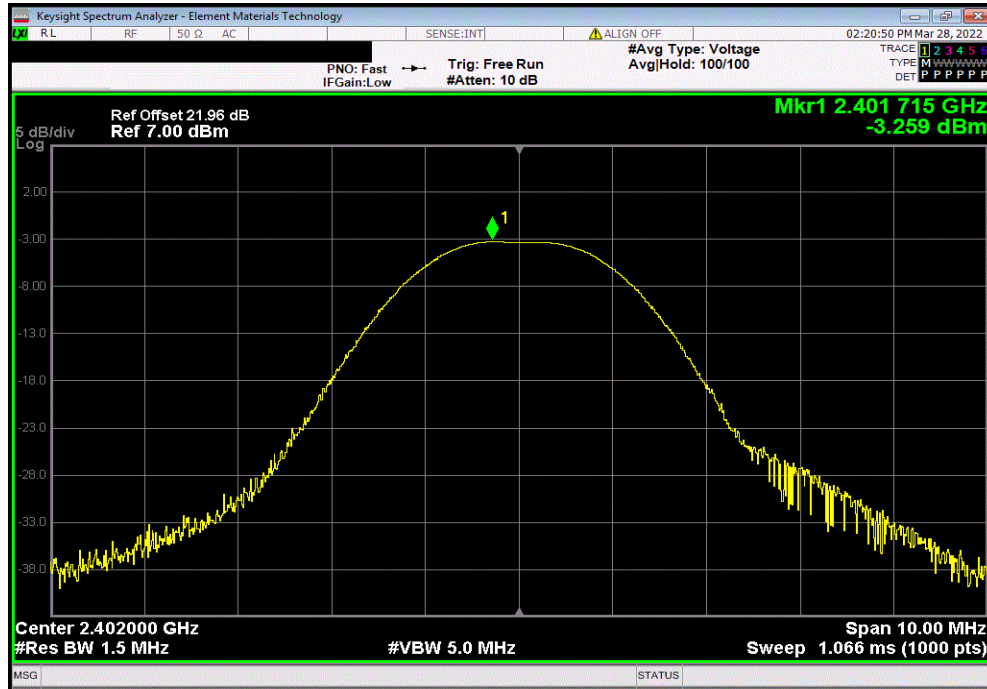
EUT: Genesis macro RIC (BLE and NFMI)		Work Order: STAK0251	
Serial Number: 211717179		Date: 28-Mar-22	
Customer: Starkey Laboratories, Inc.		Temperature: 24.1 °C	
Attendees: John Quach		Humidity: 18.4% RH	
Project: None		Barometric Pres.: 1027 mbar	
Tested by: Andrew Rogstad		Power: Battery	
Job Site: MN08			
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2022		ANSI C63.10:2013	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature <i>Andrew Rogstad</i>	
		Out Pwr (dBm)	Antenna Gain (dBi)
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-3.259	-5.9
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		-0.373	-5.9
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-3.97	-5.9
BLE/GFSK 2 Mbps Low Channel, 2402 MHz		-3.307	-5.9
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz		-0.332	-5.9
BLE/GFSK 2 Mbps High Channel, 2480 MHz		-3.965	-5.9
		EIRP (dBm)	EIRP Limit (dBm)
		-9.159	36
		-6.273	36
		-9.87	36
		-9.207	36
		-6.232	36
		-9.865	36
			Result
			Pass
			Pass
			Pass
			Pass
			Pass
			Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

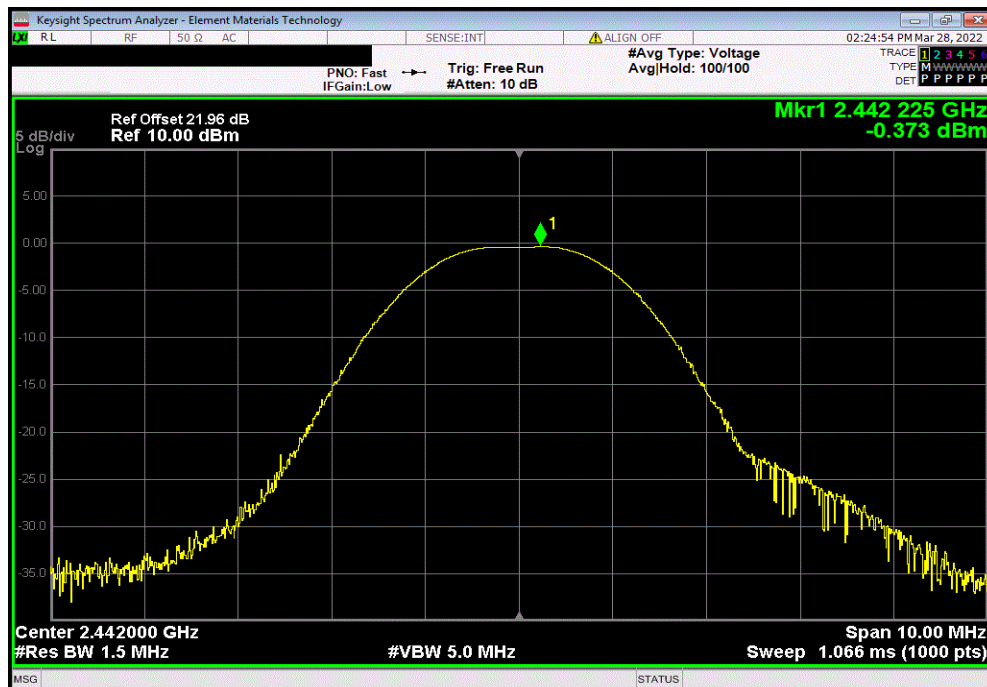


TbTx 2021.12.14.1 XMt 2022.02.07.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-3.259	-5.9	-9.159	36	Pass		



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.373	-5.9	-6.273	36	Pass		

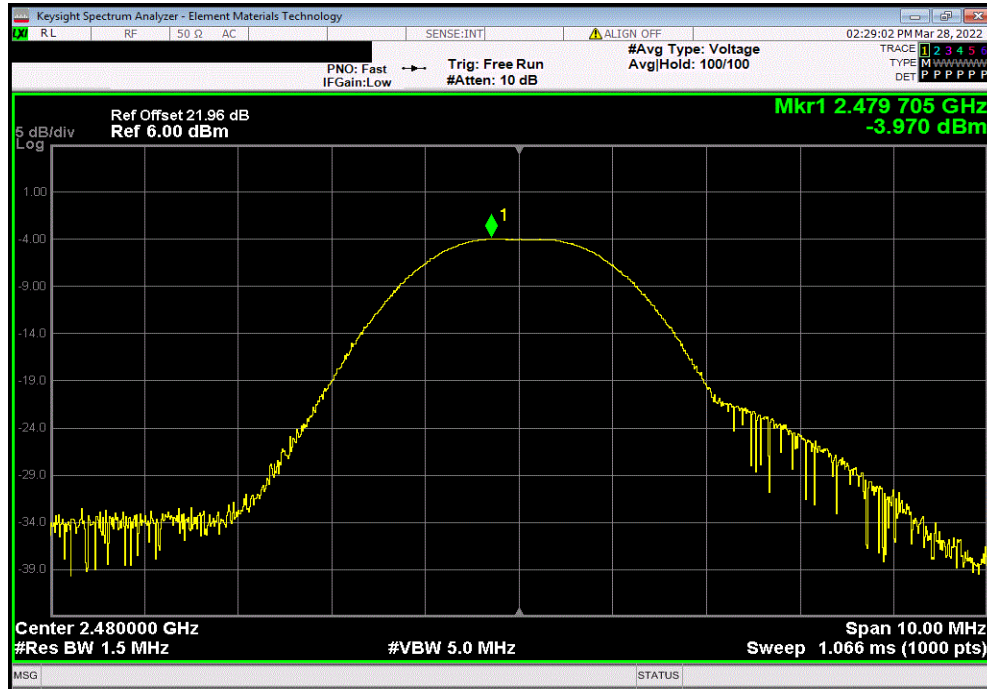


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

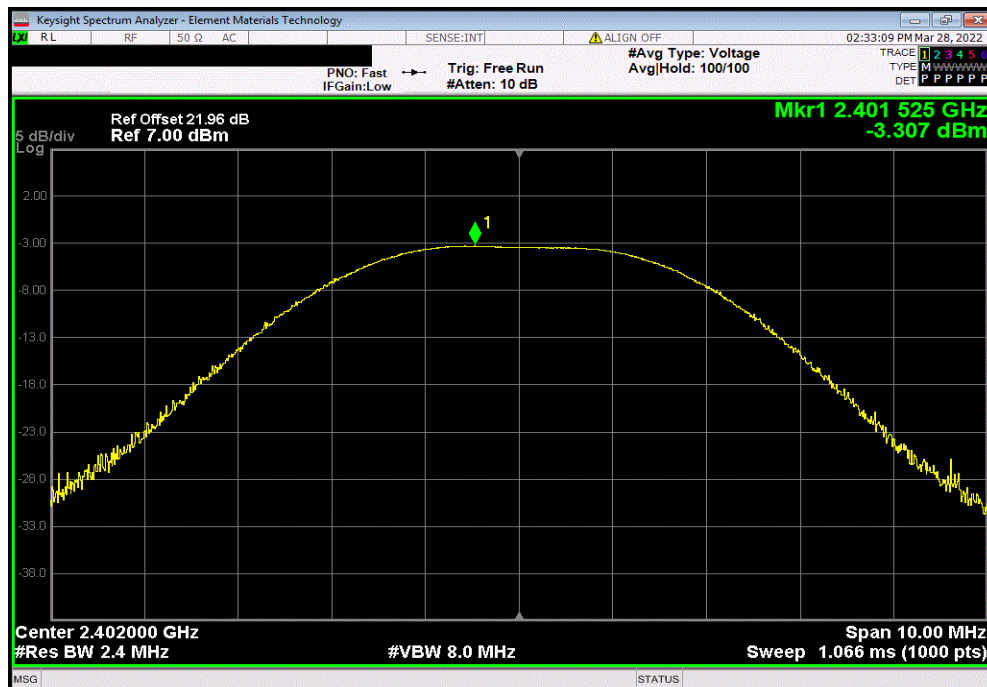


TbTx 2021.12.14.1 XMt 2022.02.07.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	-3.97	-5.9	-9.87	36	Pass	



BLE/GFSK 2 Mbps Low Channel, 2402 MHz						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	-3.307	-5.9	-9.207	36	Pass	

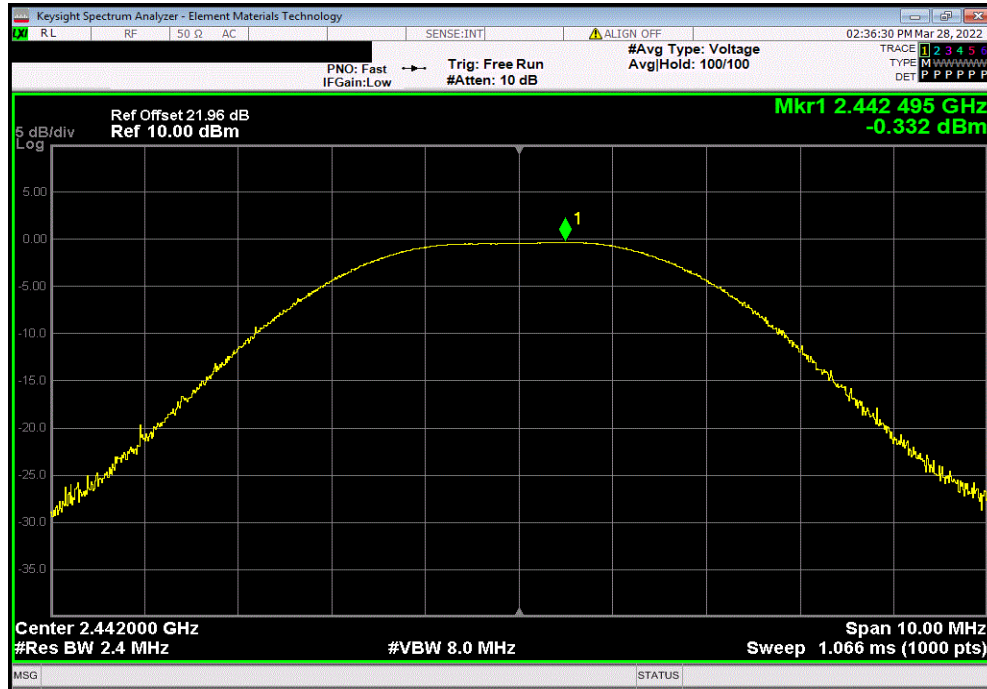


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

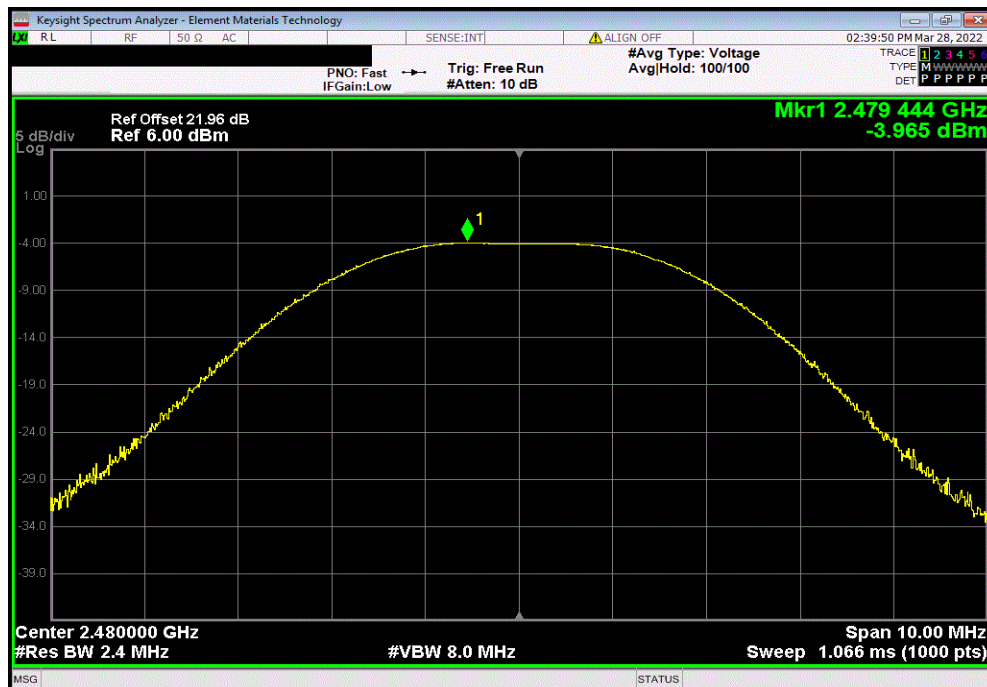


TbTx 2021.12.14.1 XMt 2022.02.07.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-0.332	-5.9	-6.232	36	Pass		



BLE/GFSK 2 Mbps High Channel, 2480 MHz						
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result		
-3.965	-5.9	-9.865	36	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	N5183A	TIK	2019-04-30	2022-04-30
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2021-05-18	2022-05-18
Block - DC	Fairview Microwave	SD3379	AMZ	2020-11-04	2021-11-04
Attenuator	S.M. Electronics	SA26B-20	RFW	2021-02-05	2022-02-05
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2021-09-12	2022-09-12

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The maximum power spectral density measurements were measured using the channels and modes as called out on the following data sheets with the radio transmitting at its maximum output power.

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

POWER SPECTRAL DENSITY



TSMTx 2021.03.19.1 XMR 2020.12.30.0

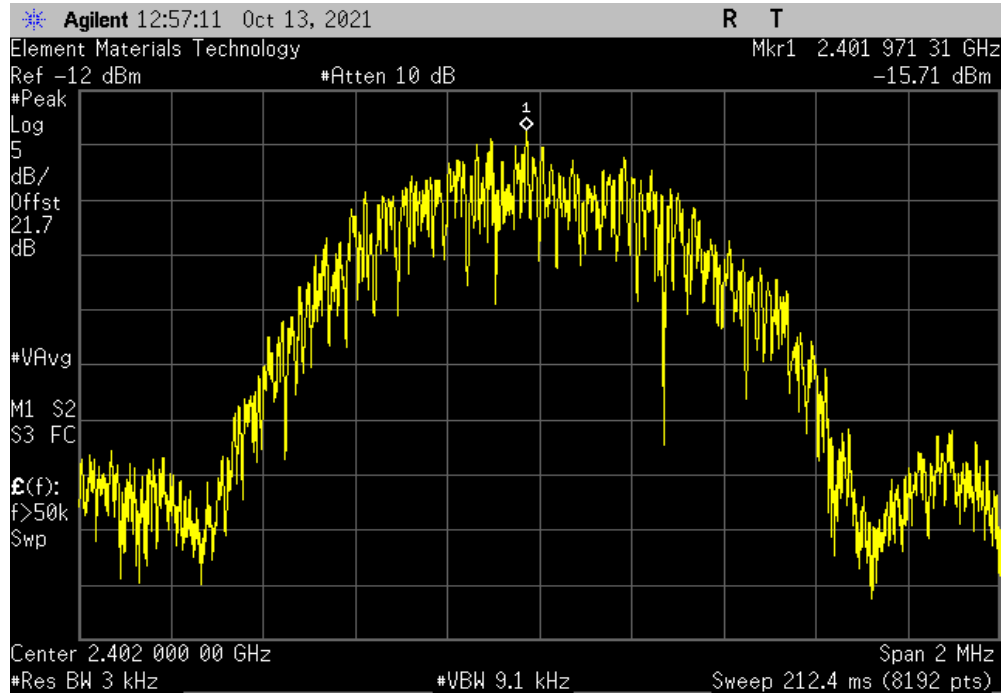
EUT: Genesis macro RIC (BLE and NFMI)		Work Order: STAK0251	
Serial Number: 211717179		Date: 13-Oct-21	
Customer: Starkey Laboratories, Inc.		Temperature: 22.7 °C	
Attendees: John Quach		Humidity: 48.5% RH	
Project: None		Barometric Pres.: 1004 mbar	
Tested by: Andrew Rogstad		Power: Battery	
Job Site: MN08			
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
Reference level offset includes measurement cable, attenuator, DC block, and customer's patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature <i>Andrew Rogstad</i>	
		Value dBm/3kHz	Limit < dBm/3kHz
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-15.714	8
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz		-11.885	8
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-16.344	8
BLE/GFSK 2 Mbps Low Channel, 2402 MHz		-18.311	8
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz		-14.638	8
BLE/GFSK 2 Mbps High Channel, 2480 MHz		-19.01	8
			Results
			Pass
			Pass
			Pass
			Pass
			Pass
			Pass

POWER SPECTRAL DENSITY

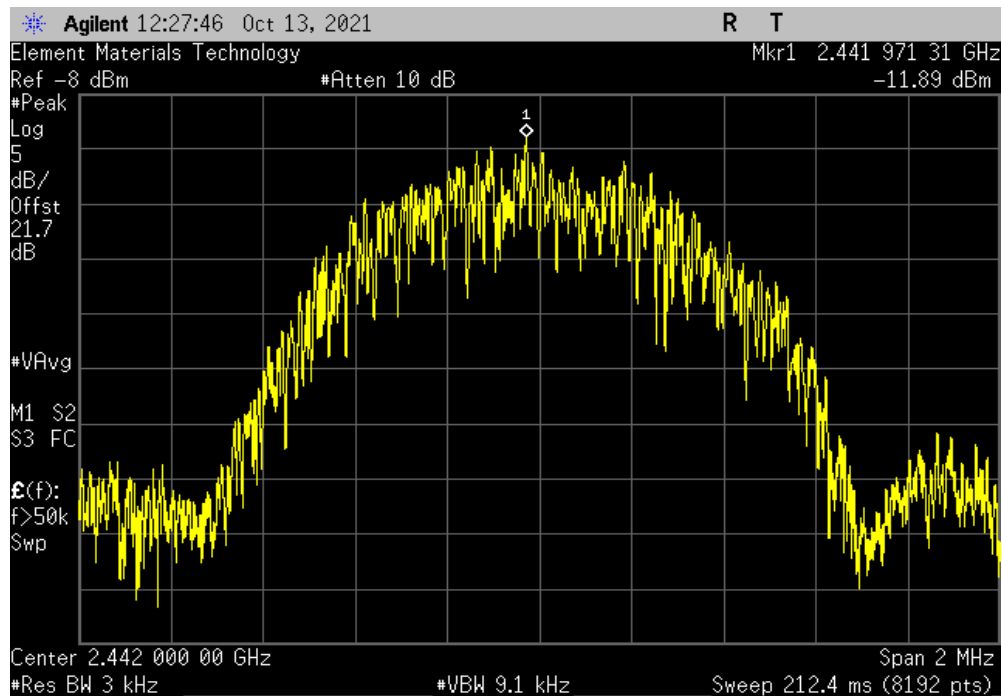


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-15.714	8	Pass			



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-11.885	8	Pass			

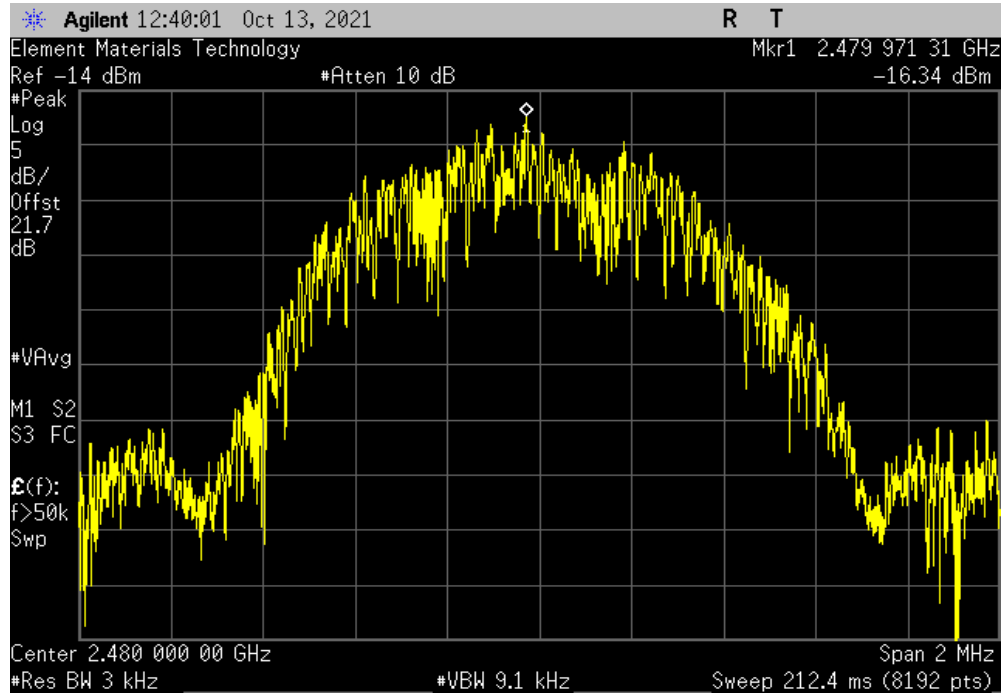


POWER SPECTRAL DENSITY

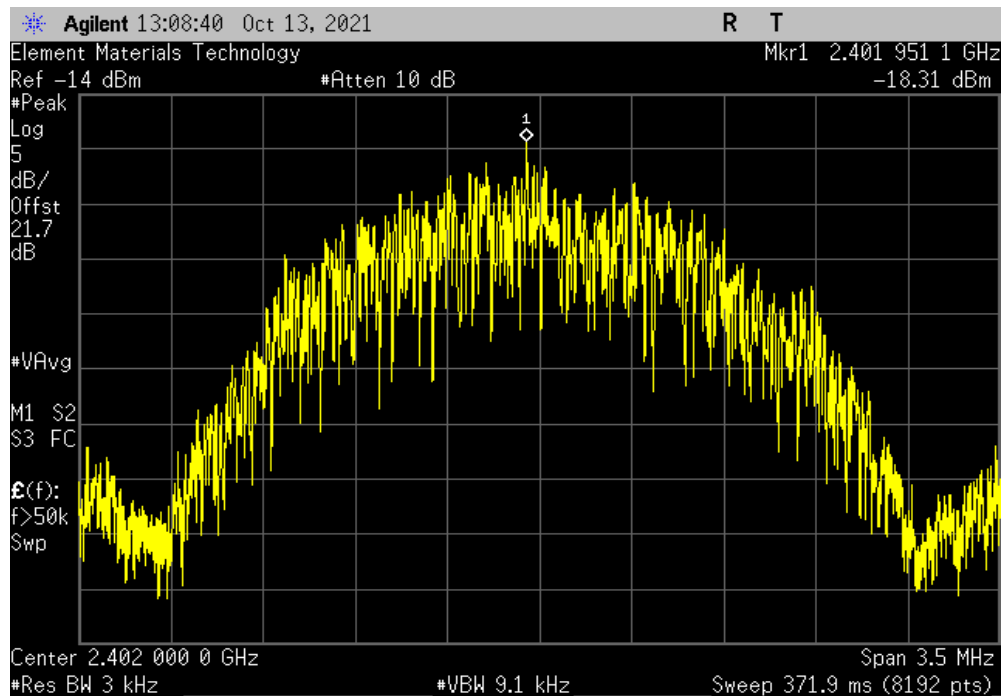


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-16.344	8	Pass			



BLE/GFSK 2 Mbps Low Channel, 2402 MHz						
	Value	Limit	Results			
	dBm/3kHz	< dBm/3kHz				
	-18.311	8	Pass			

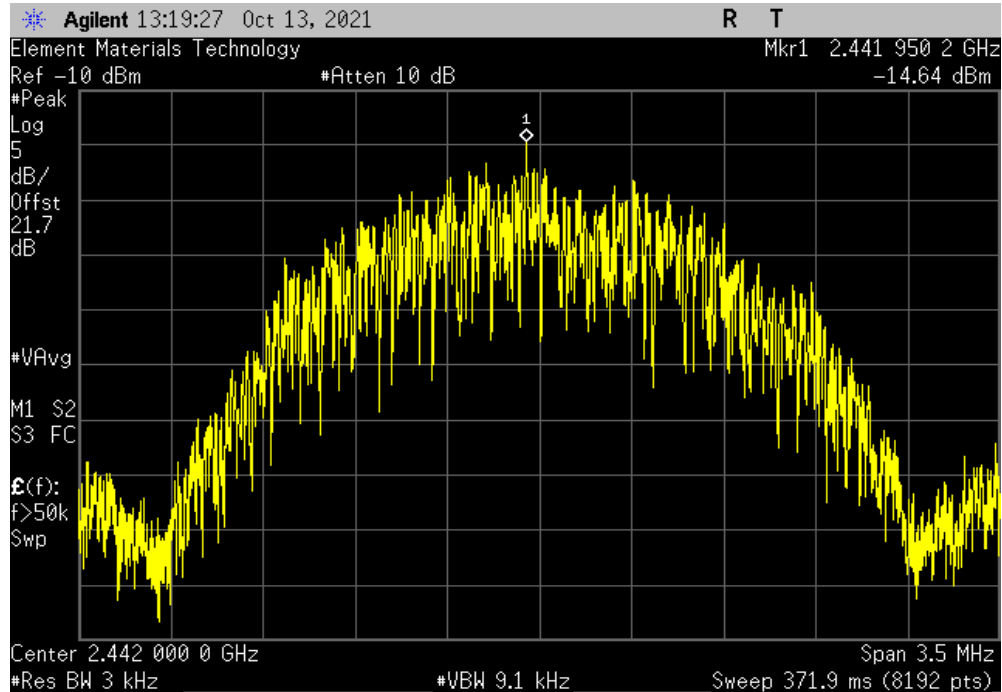


POWER SPECTRAL DENSITY

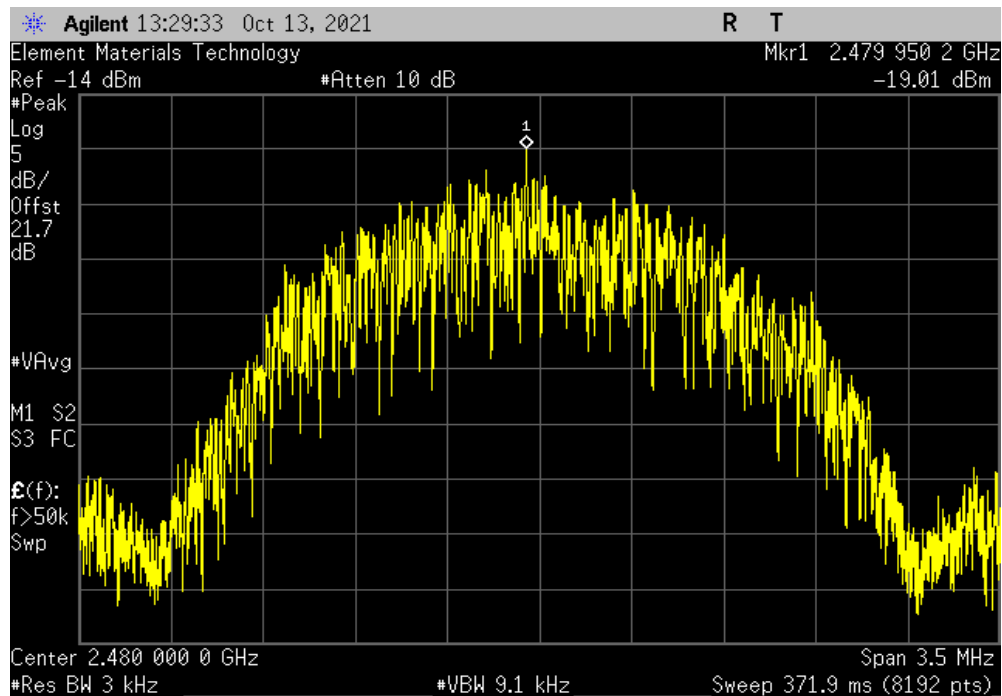


TUTx 2021.03.19.1 XM8 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
	Value	Limit				
	dBm/3kHz	< dBm/3kHz	Results			
	-14.638	8	Pass			



BLE/GFSK 2 Mbps High Channel, 2480 MHz						
	Value	Limit				
	dBm/3kHz	< dBm/3kHz	Results			
	-19.01	8	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
Generator - Signal	Agilent	N5183A	TIK	2019-04-30	2022-04-30
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2021-05-18	2022-05-18
Block - DC	Fairview Microwave	SD3379	AMZ	2020-11-04	2021-11-04
Attenuator	S.M. Electronics	SA26B-20	RFW	2021-02-05	2022-02-05
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2021-09-12	2022-09-12

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

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

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

BAND EDGE COMPLIANCE



TSTx 2021.03.19.1 XMR 2020.12.30.0

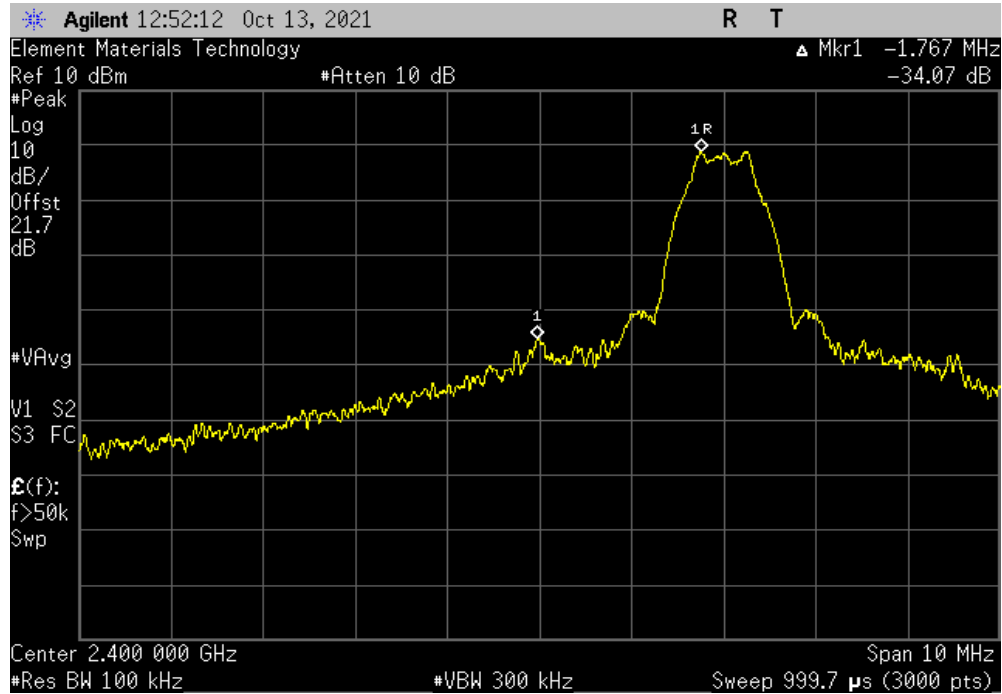
EUT: Genesis macro RIC (BLE and NFMI)		Work Order: STAK0251	
Serial Number: 211717179		Date: 13-Oct-21	
Customer: Starkey Laboratories, Inc.		Temperature: 22.6 °C	
Attendees: John Quach		Humidity: 48.9% RH	
Project: None		Barometric Pres.: 1004 mbar	
Tested by: Andrew Rogstad		Power: Battery	
Job Site: MN08			
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
Reference level offset includes measurement cable, attenuator, DC block, and customer's patch cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature <i>Andrew Rogstad</i>	
		Value (dBc)	Limit ≤ (dBc) Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz		-34.07	-20 Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz		-45.06	-20 Pass
BLE/GFSK 2 Mbps Low Channel, 2402 MHz		-26.76	-20 Pass
BLE/GFSK 2 Mbps High Channel, 2480 MHz		-39.36	-20 Pass

BAND EDGE COMPLIANCE

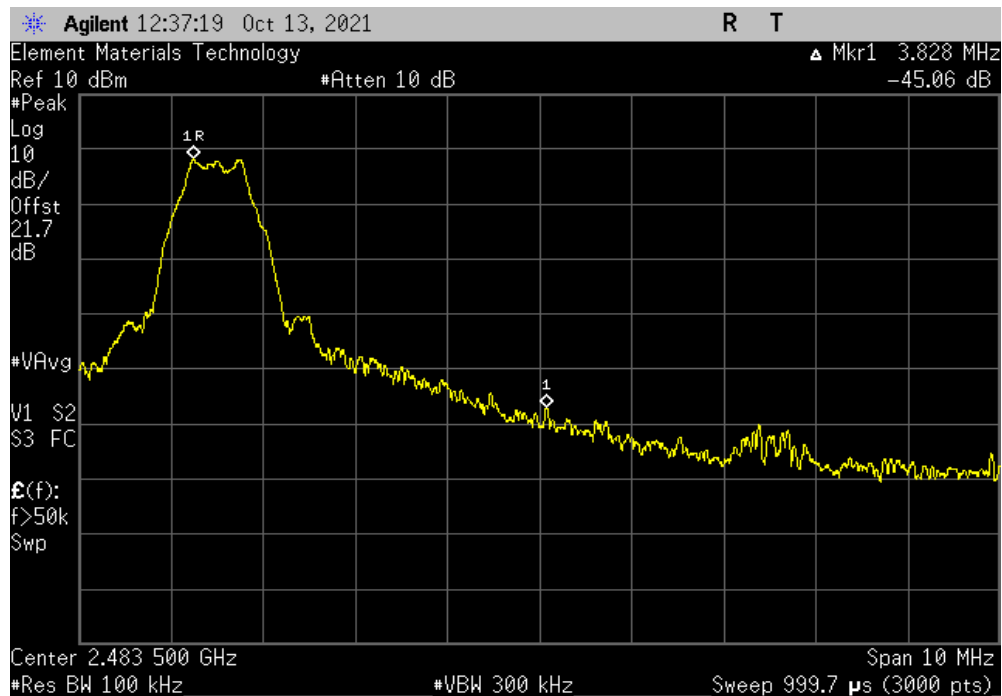


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-34.07	-20	Pass



BLE/GFSK 1 Mbps High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-45.06	-20	Pass

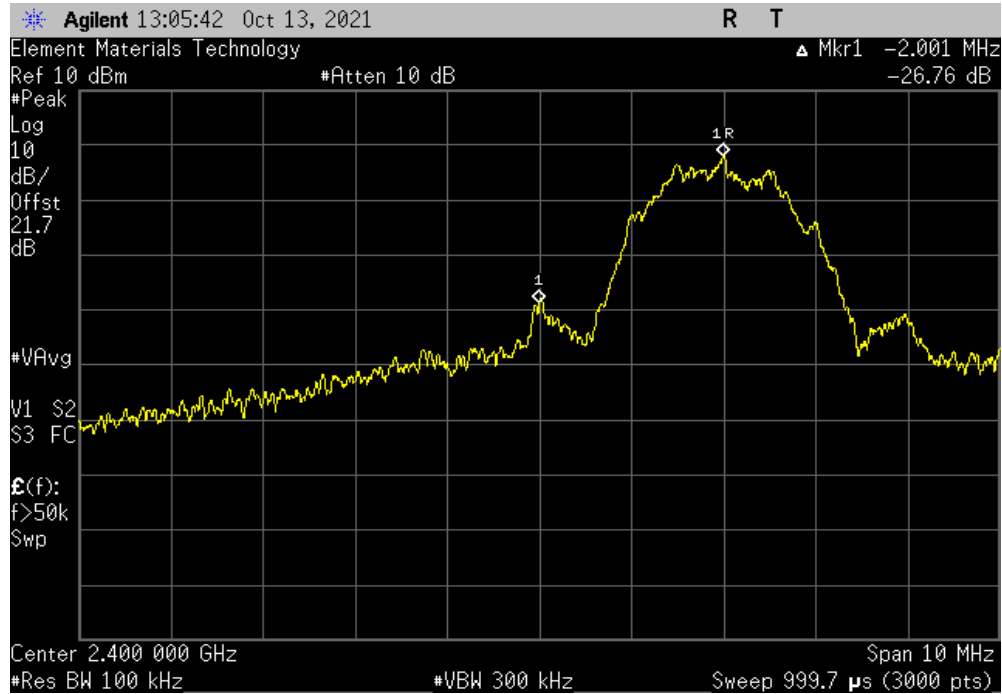


BAND EDGE COMPLIANCE

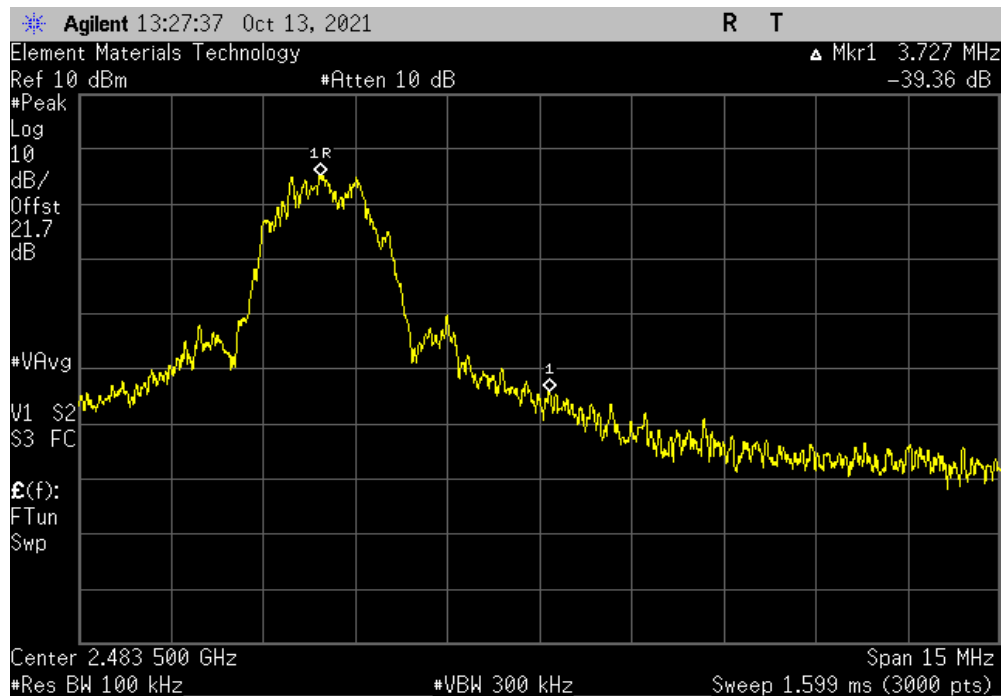


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 2 Mbps Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-26.76	-20	Pass



BLE/GFSK 2 Mbps High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-39.36	-20	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
Generator - Signal	Agilent	N5183A	TIK	2019-04-30	2022-04-30
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	2021-05-18	2022-05-18
Block - DC	Fairview Microwave	SD3379	AMZ	2020-11-04	2021-11-04
Attenuator	S.M. Electronics	SA26B-20	RFW	2021-02-05	2022-02-05
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2021-09-12	2022-09-12

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies at its maximum output power. 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



TestTx 2021.03.19.1 XMR 2020.12.30.0

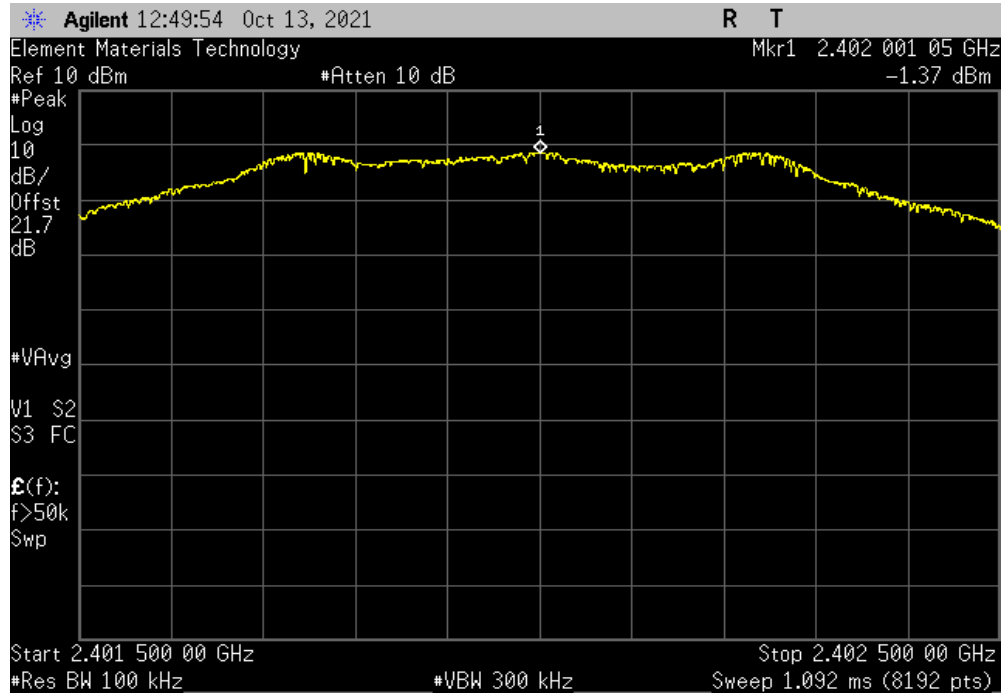
EUT: Genesis macro RIC (BLE and NFMI)		Work Order: STAK0251			
Serial Number: 211717179		Date: 13-Oct-21			
Customer: Starkey Laboratories, Inc.		Temperature: 22.7 °C			
Attendees: John Quach		Humidity: 48.4% RH			
Project: None		Barometric Pres.: 1004 mbar			
Tested by: Andrew Rogstad		Power: Battery			
Job Site: MN08					
TEST SPECIFICATIONS		Test Method			
FCC 15.247:2021		ANSI C63.10:2013			
COMMENTS					
Reference level offset includes measurement cable, attenuator, DC block, and customer's patch cable.					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	2	Signature <i>Andrew Rogstad</i>			
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	Fundamental	2402	N/A	N/A	N/A
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	30 MHz - 12.5 GHz	7205.1	-44.47	-20	Pass
BLE/GFSK 1 Mbps Low Channel, 2402 MHz	12.5 GHz - 25 GHz	24879.4	-48.68	-20	Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	Fundamental	2442.24	N/A	N/A	N/A
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	6623.5	-57.72	-20	Pass
BLE/GFSK 1 Mbps Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	24905.4	-51.33	-20	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz	Fundamental	2480	N/A	N/A	N/A
BLE/GFSK 1 Mbps High Channel, 2480 MHz	30 MHz - 12.5 GHz	7439.5	-45.54	-20	Pass
BLE/GFSK 1 Mbps High Channel, 2480 MHz	12.5 GHz - 25 GHz	24716.2	-47.42	-20	Pass
BLE/GFSK 2 Mbps Low Channel, 2402 MHz	Fundamental	2401.99	N/A	N/A	N/A
BLE/GFSK 2 Mbps Low Channel, 2402 MHz	30 MHz - 12.5 GHz	2397.3	-41.34	-20	Pass
BLE/GFSK 2 Mbps Low Channel, 2402 MHz	12.5 GHz - 25 GHz	24848.9	-48.03	-20	Pass
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz	Fundamental	2441.99	N/A	N/A	N/A
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	7323.8	-50.28	-20	Pass
BLE/GFSK 2 Mbps Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	24897.8	-50.74	-20	Pass
BLE/GFSK 2 Mbps High Channel, 2480 MHz	Fundamental	2480	N/A	N/A	N/A
BLE/GFSK 2 Mbps High Channel, 2480 MHz	30 MHz - 12.5 GHz	7438	-44.39	-20	Pass
BLE/GFSK 2 Mbps High Channel, 2480 MHz	12.5 GHz - 25 GHz	24940.5	-47.53	-20	Pass

SPURIOUS CONDUCTED EMISSIONS

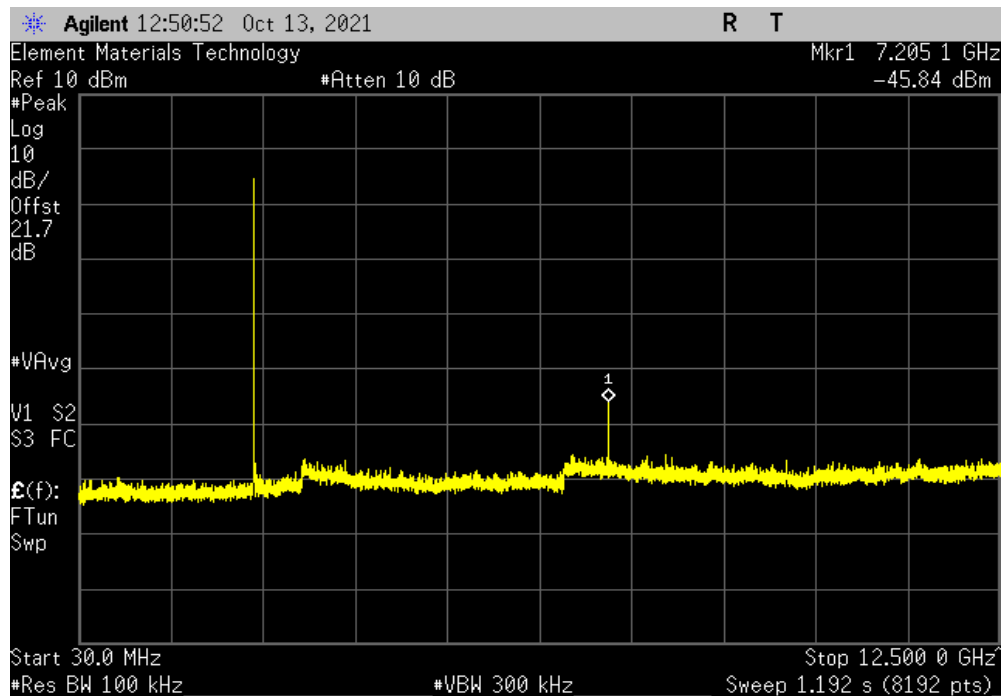


TbTx 2021.03.19.1 XMt 2020.12.30.0

BLE/GFSK 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	



BLE/GFSK 1 Mbps Low Channel, 2402 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		7205.1	-44.47	-20	Pass	

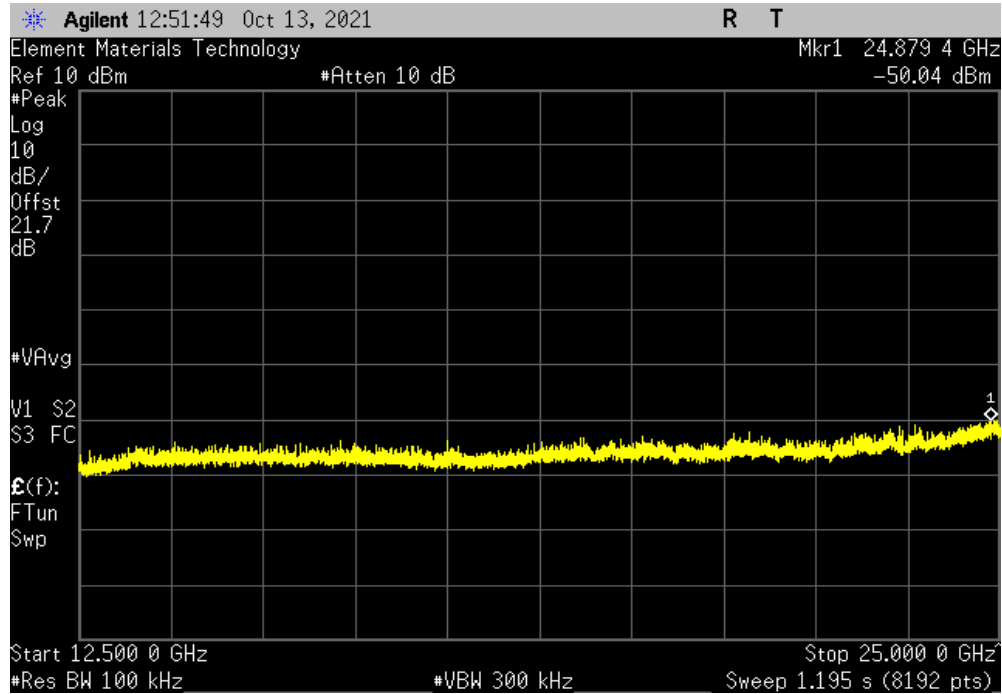


SPURIOUS CONDUCTED EMISSIONS

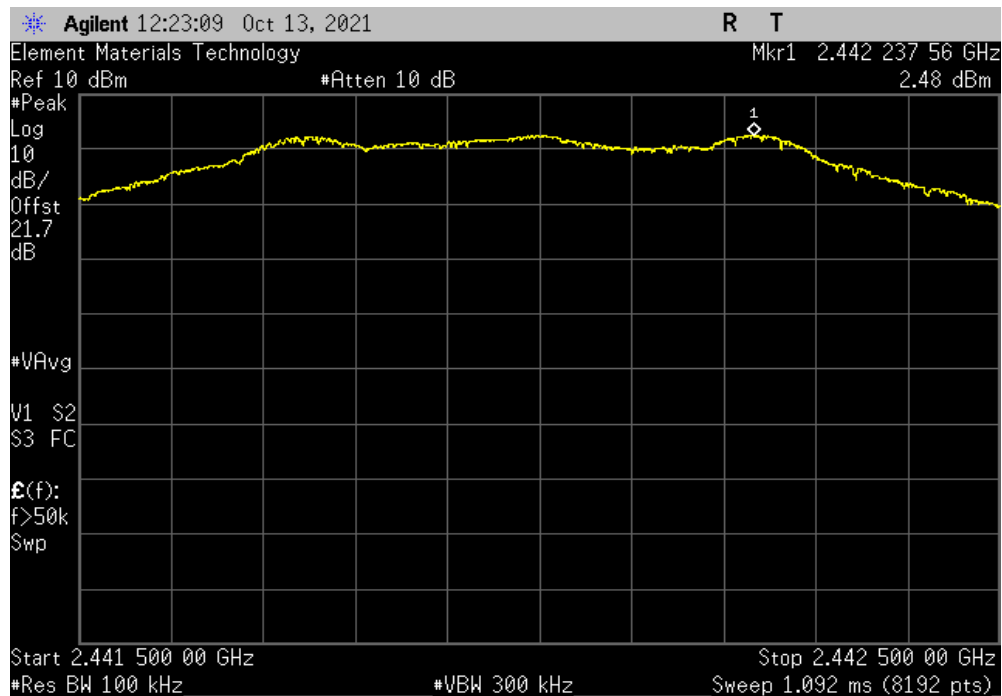


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 1 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24879.4	-48.68	-20	Pass	



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2442.24	N/A	N/A	N/A	

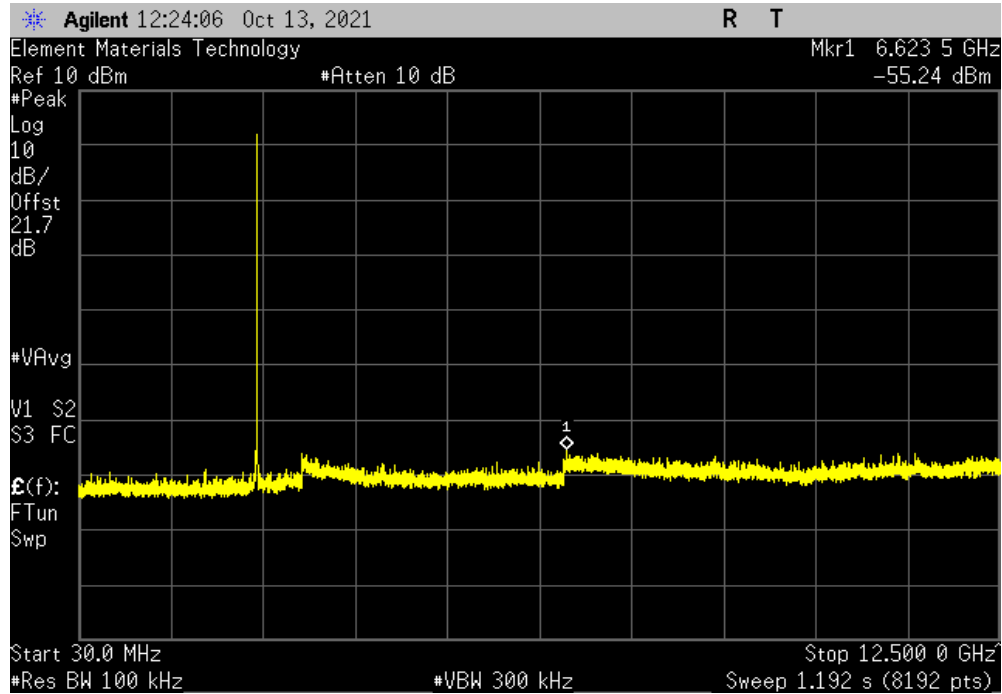


SPURIOUS CONDUCTED EMISSIONS

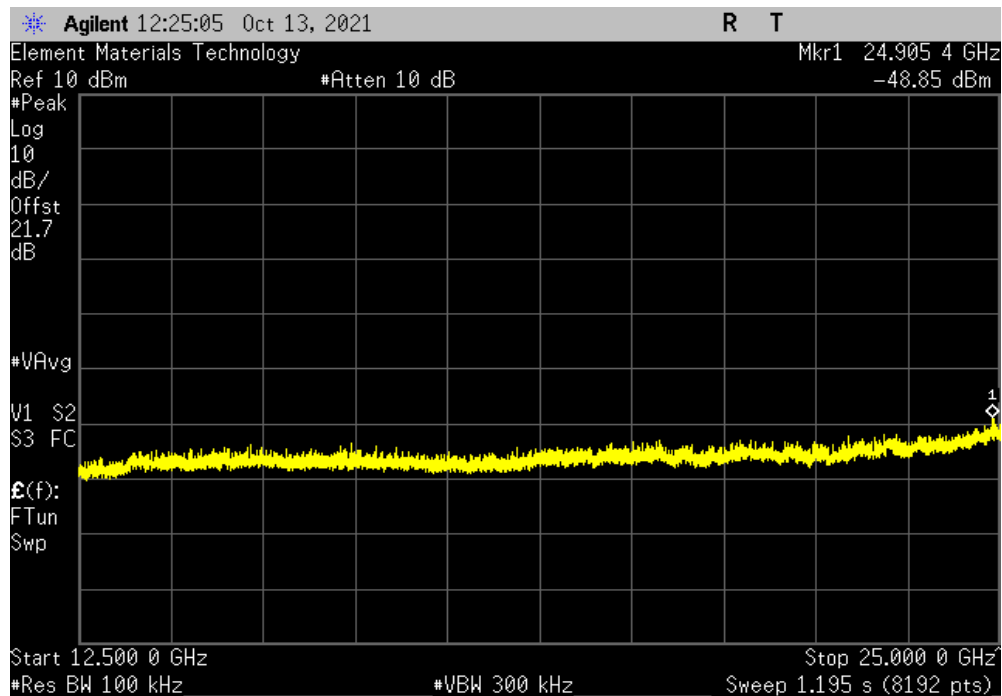


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 1 Mbps Mid Channel, 2442 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	6623.5	-57.72	-20	Pass	



BLE/GFSK 1 Mbps Mid Channel, 2442 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24905.4	-51.33	-20	Pass	

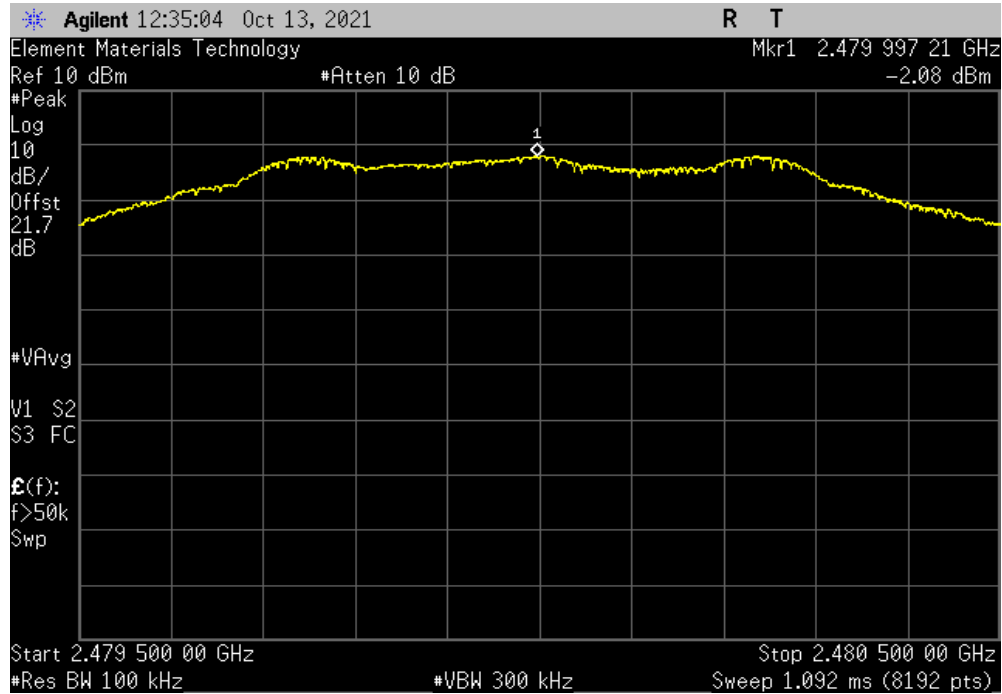


SPURIOUS CONDUCTED EMISSIONS

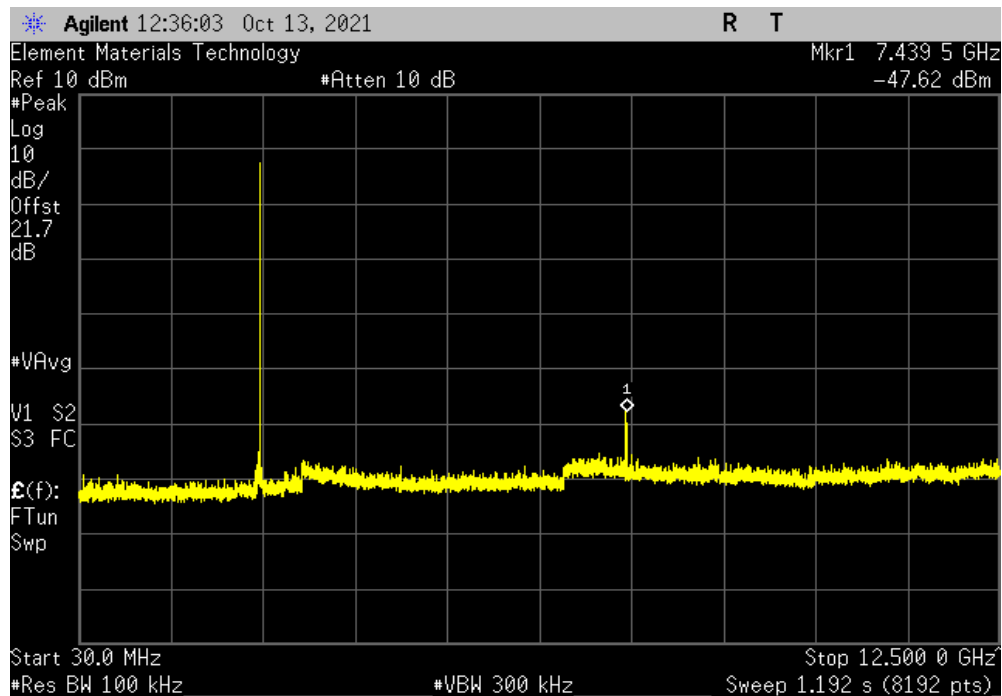


TbTx 2021.03.19.1 XM8 2020.12.30.0

BLE/GFSK 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	



BLE/GFSK 1 Mbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7439.5	-45.54	-20	Pass	

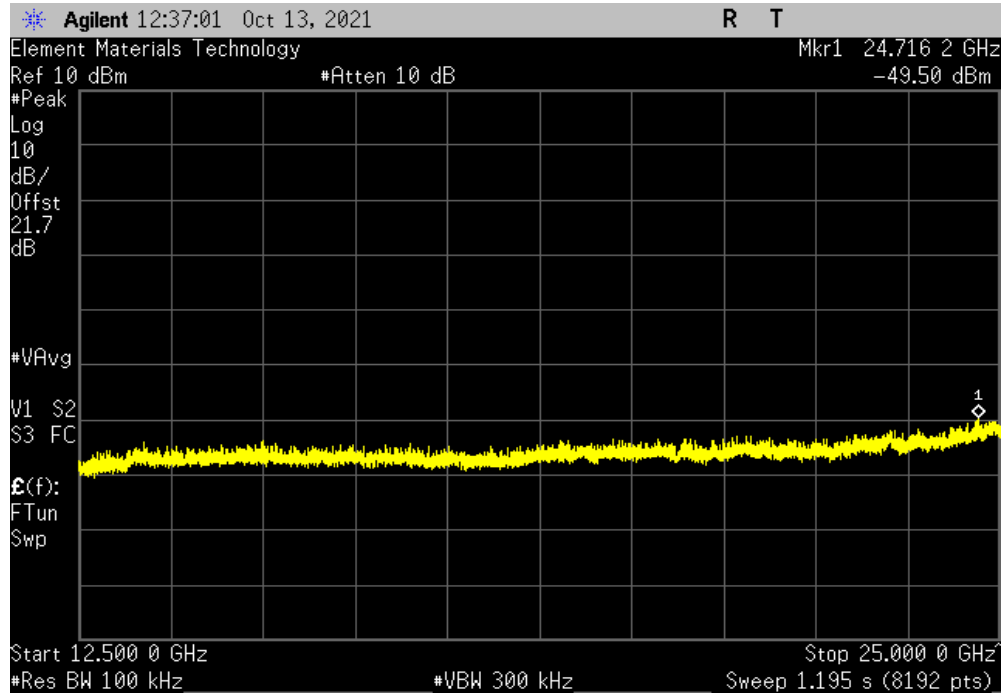


SPURIOUS CONDUCTED EMISSIONS

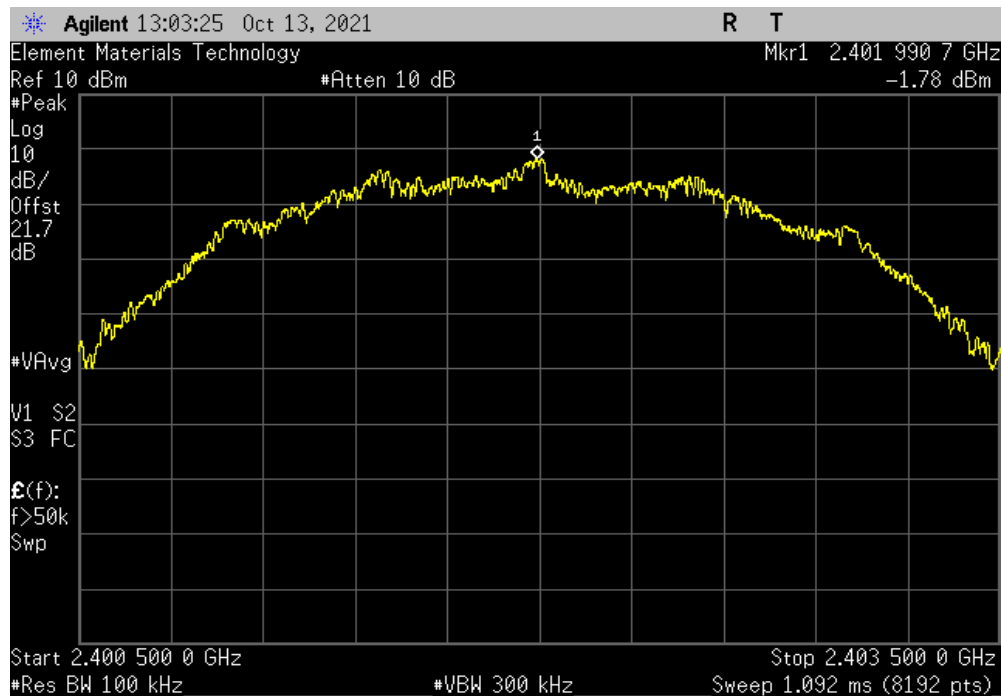


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 1 Mbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24716.2	-47.42	-20	Pass	



BLE/GFSK 2 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2401.99	N/A	N/A	N/A	

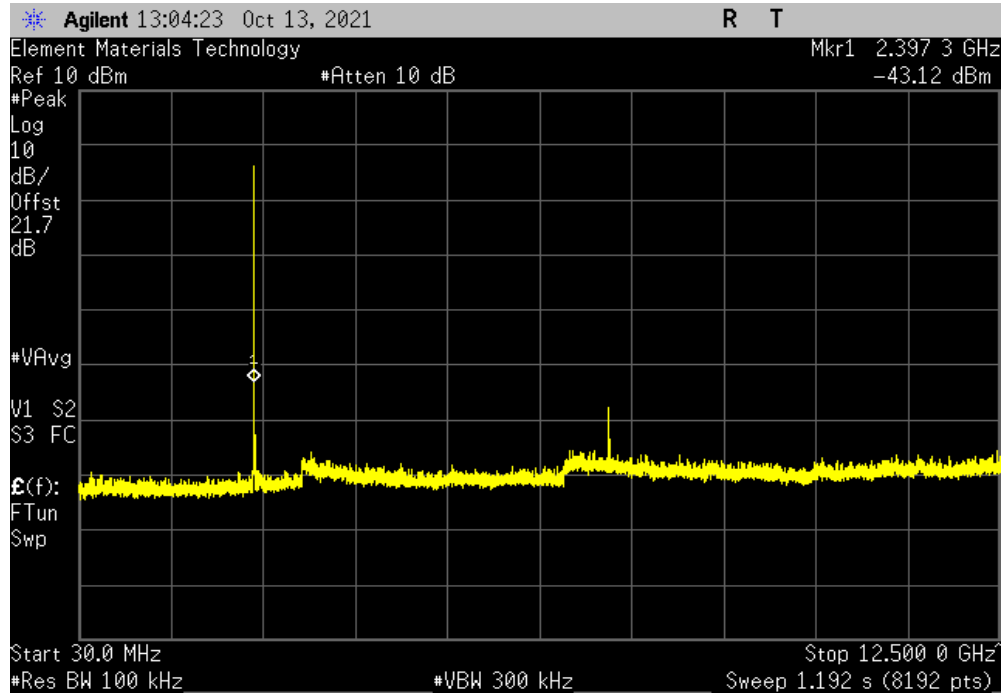


SPURIOUS CONDUCTED EMISSIONS

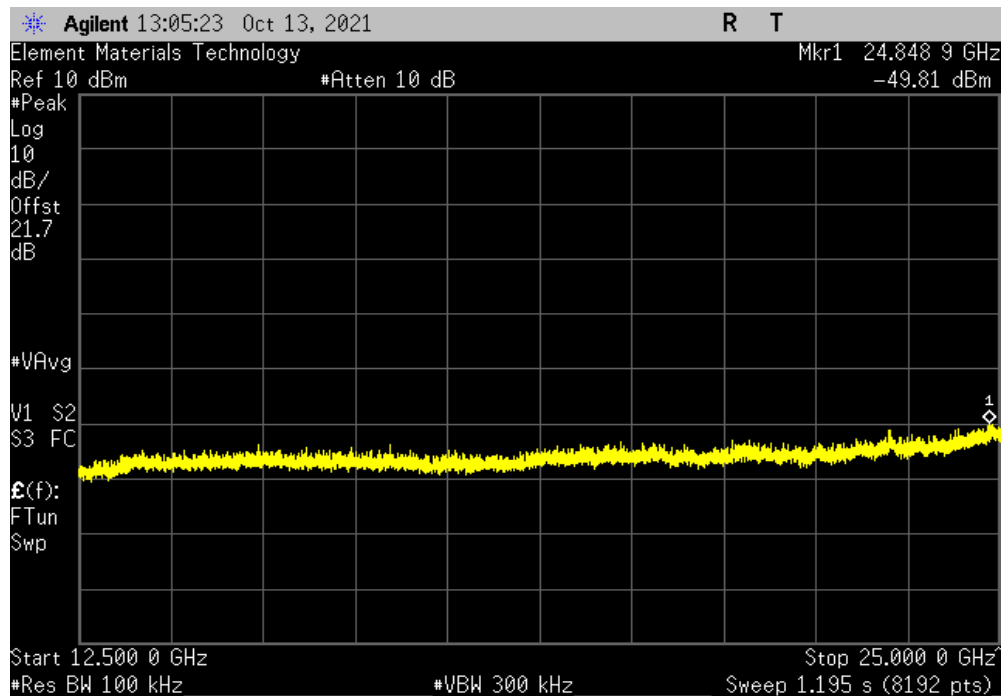


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 2 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	2397.3	-41.34	-20	Pass	



BLE/GFSK 2 Mbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24848.9	-48.03	-20	Pass	

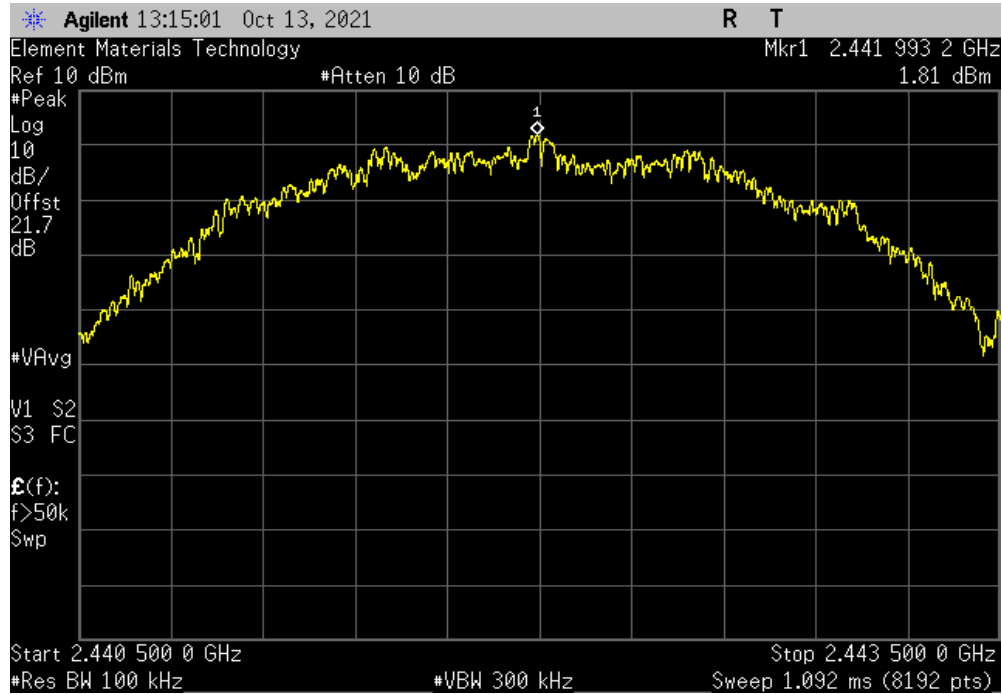


SPURIOUS CONDUCTED EMISSIONS

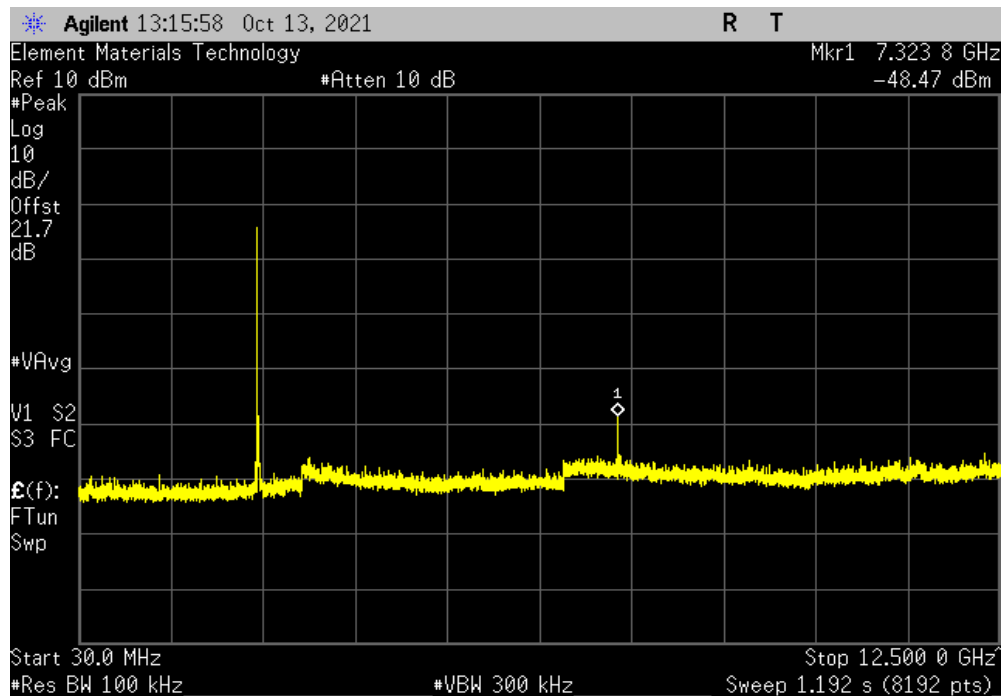


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental		2441.99	N/A	N/A	N/A	



BLE/GFSK 2 Mbps Mid Channel, 2442 MHz						
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		7323.8	-50.28	-20	Pass	

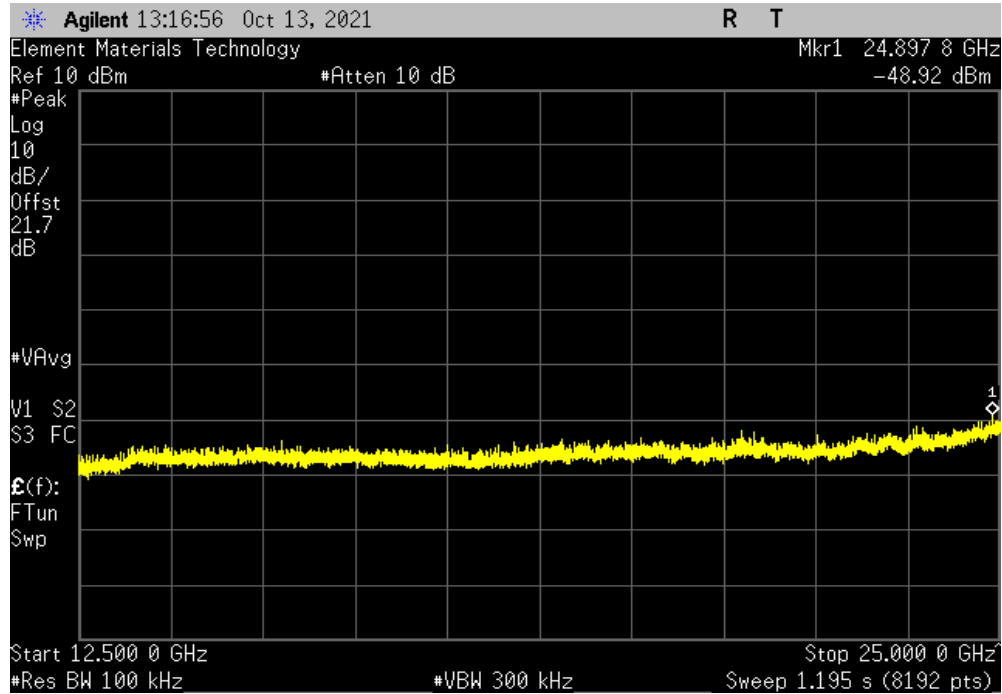


SPURIOUS CONDUCTED EMISSIONS

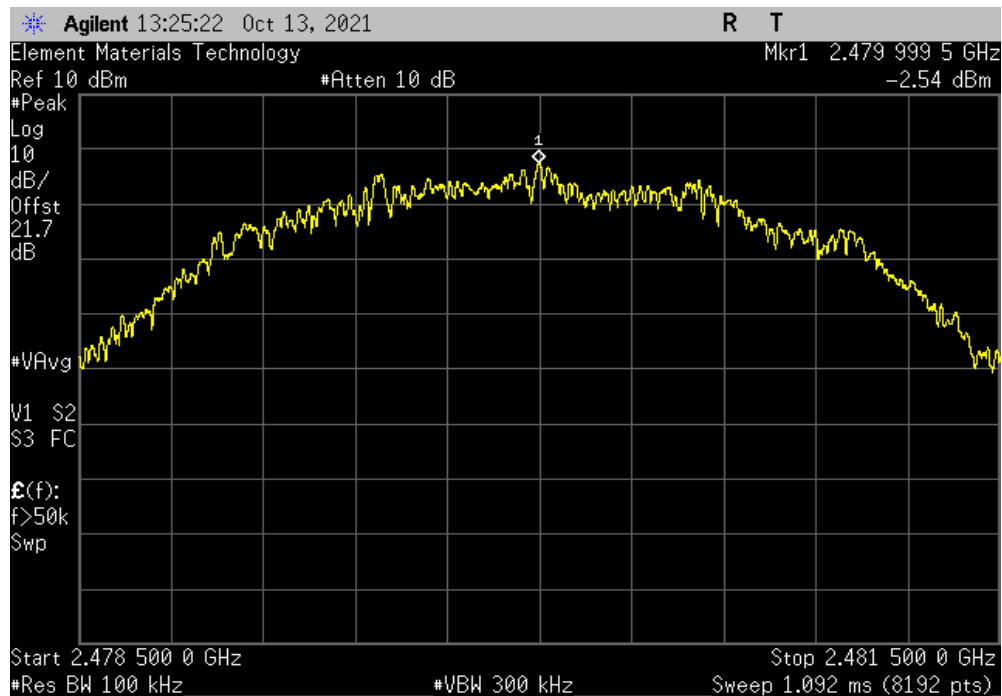


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 2 Mbps Mid Channel, 2442 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24897.8	-50.74	-20	Pass	



BLE/GFSK 2 Mbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2480	N/A	N/A	N/A	

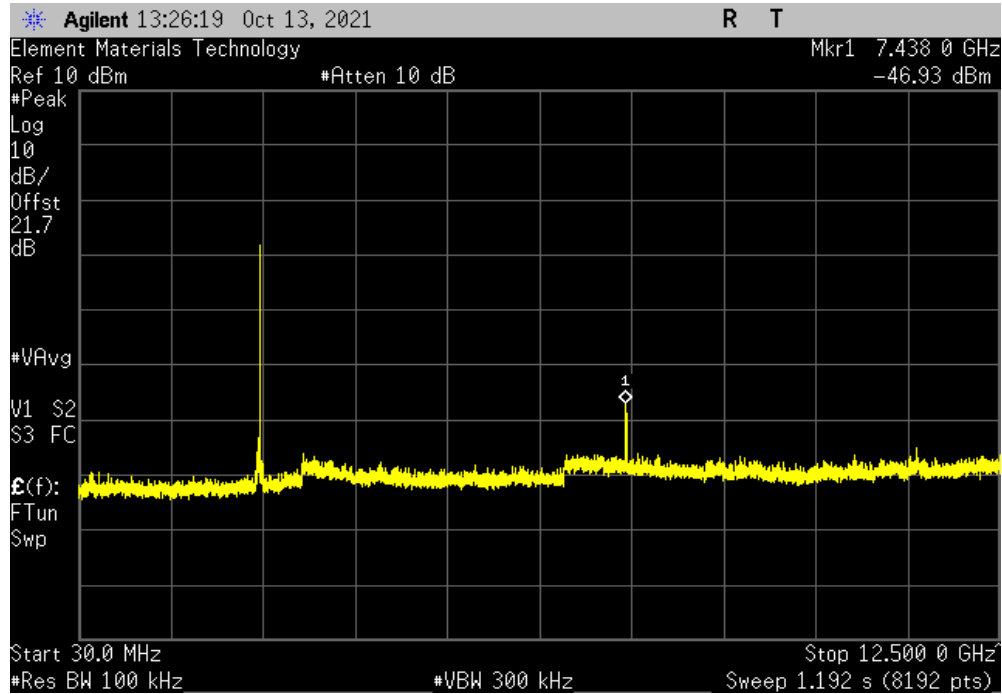


SPURIOUS CONDUCTED EMISSIONS

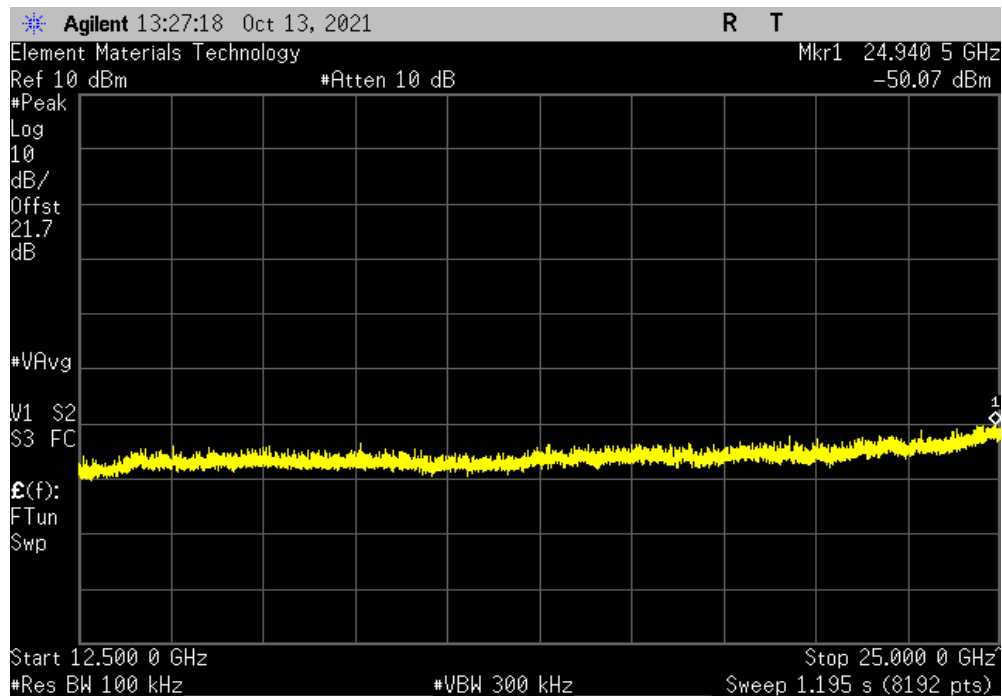


TUTx 2021.03.19.1 XMR 2020.12.30.0

BLE/GFSK 2 Mbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	7438	-44.39	-20	Pass	



BLE/GFSK 2 Mbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24940.5	-47.53	-20	Pass	



SPURIOUS RADIATED EMISSIONS

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 using its maximum output power.

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 C63.10:2013). 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.

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	2021-09-09	2022-09-09
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNP	2021-09-09	2022-09-09
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2020-12-27	2021-12-27
Cable	ESM Cable Corp.	Bilog Cables	MNH	2021-10-13	2022-10-13
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	NCR
Antenna - Double Ridge	ETS Lindgren	3115	AJQ	2021-01-25	2023-01-25
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2021-01-15	2022-01-15
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	2021-01-15	2022-01-15
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2021-01-15	2022-01-15
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	NCR
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	2021-01-15	2022-01-15
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	2021-03-07	2022-03-07
Filter - High Pass	Micro-Tronics	HPM50111	LFN	2021-09-09	2022-09-09
Attenuator	Fairview Microwave	SA18E-20	TWZ	2021-09-09	2022-09-09
Antenna - Biconilog	ETS Lindgren	3142D	AXO	2021-09-14	2023-09-14

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

SPURIOUS RADIATED EMISSIONS

FREQUENCY RANGE INVESTIGATED

30 MHz TO 26500 MHz

POWER INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

STAK0251-1

MODES INVESTIGATED

Transmitting BLE Low, Mid, and High Chs (2402, 2442, and 2480 MHz), 1 Mbps and 2 Mbps

Transmitting BLE on Low and High Chs (2402 and 2480 MHz), 1 Mbps and 2 Mbps

SPURIOUS RADIATED EMISSIONS

EUT:	Genesis macro RIC (BLE and NFMI)	Work Order:	STAK0251
Serial Number:	211728202	Date:	2021-10-14
Customer:	Starkey Laboratories, Inc.	Temperature:	22.9°C
Attendees:	John Quach	Relative Humidity:	41.1%
Customer Project:	None	Bar. Pressure (PMSL):	1013 mb
Tested By:	Christopher Heintzelman	Job Site:	MN05
Power:	Battery	Configuration:	STAK0251-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	14	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

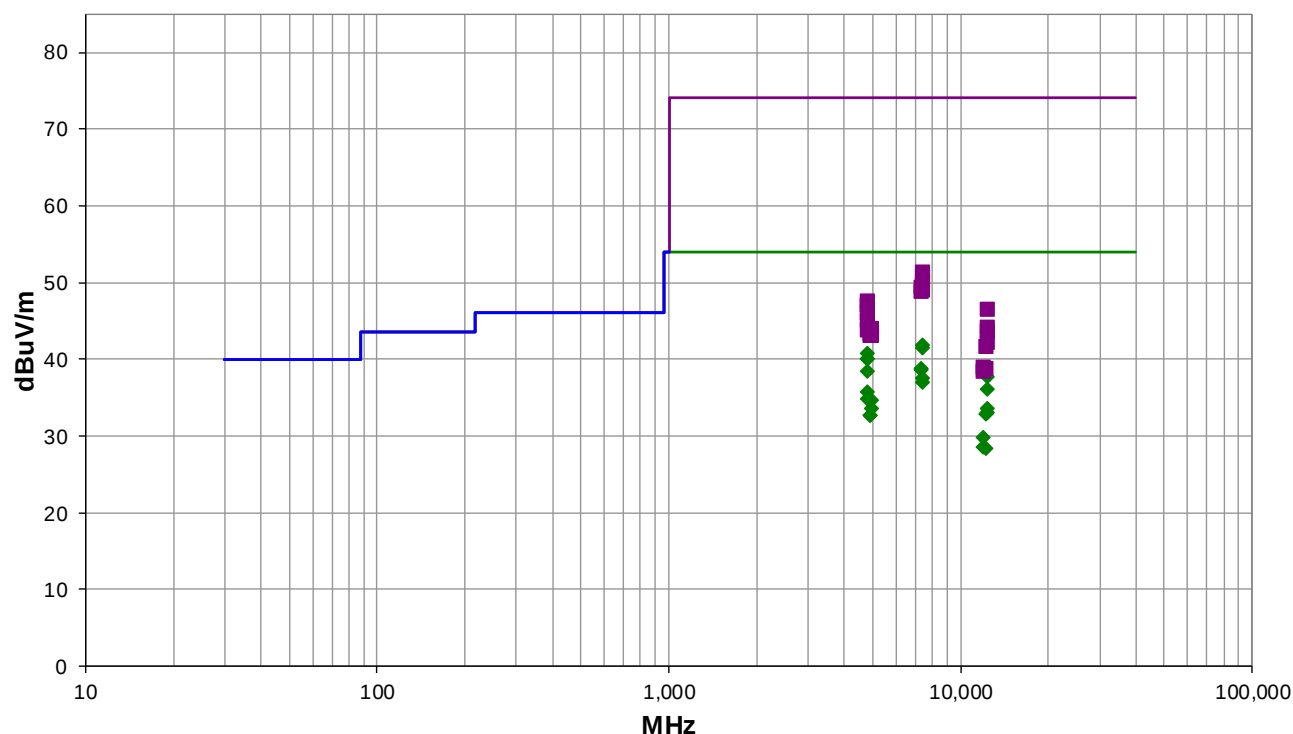
Test mode (measured) duty cycle is 13.4% (1 Mbps) and 6.9% (2 Mbps), therefore an upward duty cycle correction factor (DCCF) was applied using the formula $10 \cdot \log(\text{duty cycle})$, giving a +8.7dB on 1 Mbps and +11.6 on 2 Mbps. The operational duty cycle is limited to 16.8% (1 Mbps) and 5.28% (2 Mbps), therefore a downward duty cycle correction factor (DCCF) was applied using the formula $10 \cdot \log(\text{duty cycle})$, giving a -7.75dB correction (1 Mbps) and a -12.77 dB correction (2 Mbps).
Applied duty cycle correction = Upward DCCF + Downward DCCF = +0.95dB (1 Mbps) and -1.17dB (2 Mbps).

EUT OPERATING MODES

Transmitting BLE Low, Mid, and High Chs (2402, 2442, and 2480 MHz), 1 Mbps and 2 Mbps; Output power set to +2 dBm

DEVIATIONS FROM TEST STANDARD

None



Run #: 14

PK AV QP

SPURIOUS RADIATED EMISSIONS

RESULTS - Run #14

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7439.350	31.7	9.2	1.2	231.0	1.0	0.0	Horz	AV	0.0	41.9	54.0	-12.2	EUT Horz, High Ch, 1 Mbps
7439.275	31.3	9.2	1.8	238.0	1.0	0.0	Vert	AV	0.0	41.5	54.0	-12.6	EUT Vert, High Ch, 1 Mbps
4803.592	37.6	2.3	1.5	228.0	1.0	0.0	Horz	AV	0.0	40.9	54.0	-13.2	EUT Horz, Low Ch, 1 Mbps
4803.625	36.8	2.3	1.1	88.0	1.0	0.0	Vert	AV	0.0	40.1	54.0	-14.0	EUT Vert, Low Ch, 1 Mbps
4803.567	36.8	2.3	2.1	360.0	1.0	0.0	Horz	AV	0.0	40.1	54.0	-14.0	EUT On Side, Low Ch, 1 Mbps
7326.717	28.6	9.2	1.5	200.9	1.0	0.0	Horz	AV	0.0	38.8	54.0	-15.3	EUT Horz, Mid Ch, 1 Mbps
7328.100	28.4	9.2	1.6	95.9	1.0	0.0	Vert	AV	0.0	38.6	54.0	-15.5	EUT Vert, Mid Ch, 1 Mbps
4803.608	35.2	2.3	3.4	276.9	1.0	0.0	Vert	AV	0.0	38.5	54.0	-15.6	EUT Horz, Low Ch, 1 Mbps
12401.070	30.7	6.0	1.9	264.9	1.0	0.0	Horz	AV	0.0	37.7	54.0	-16.4	EUT Horz, High Ch, 1 Mbps
7438.567	29.5	9.2	2.1	150.9	-1.2	0.0	Vert	AV	0.0	37.5	54.0	-16.5	EUT Vert, High Ch, 2 Mbps
7438.492	28.9	9.2	1.5	47.0	-1.2	0.0	Horz	AV	0.0	36.9	54.0	-17.1	EUT Horz, High Ch, 2 Mbps
12398.730	34.2	1.0	1.7	271.0	1.0	0.0	Horz	AV	0.0	36.2	54.0	-17.9	EUT Horz, High Ch, 1 Mbps
4803.650	32.5	2.3	3.0	162.0	1.0	0.0	Vert	AV	0.0	35.8	54.0	-18.3	EUT On Side, Low Ch, 1 Mbps
4803.558	31.6	2.3	1.5	1.0	1.0	0.0	Horz	AV	0.0	34.9	54.0	-19.2	EUT Vert, Low Ch, 1 Mbps
4959.500	31.1	2.6	1.5	178.9	1.0	0.0	Vert	AV	0.0	34.7	54.0	-19.4	EUT Vert, High Ch, 1 Mbps
12400.140	26.7	6.0	1.5	346.0	1.0	0.0	Vert	AV	0.0	33.7	54.0	-20.4	EUT Vert, High Ch, 1 Mbps
4959.558	30.0	2.6	1.5	67.9	1.0	0.0	Horz	AV	0.0	33.6	54.0	-20.5	EUT Horz, High Ch, 1 Mbps
12398.840	31.1	1.0	1.9	264.9	1.0	0.0	Vert	AV	0.0	33.1	54.0	-21.0	EUT Vert, High Ch, 1 Mbps
12208.780	31.9	0.1	2.3	329.9	1.0	0.0	Horz	AV	0.0	33.0	54.0	-21.1	EUT Horz, Mid Ch, 1 Mbps
4886.467	29.3	2.5	1.5	238.0	1.0	0.0	Horz	AV	0.0	32.8	54.0	-21.3	EUT Horz, Mid Ch, 1 Mbps
4884.608	29.3	2.5	1.5	108.0	1.0	0.0	Vert	AV	0.0	32.8	54.0	-21.3	EUT Vert, Mid Ch, 1 Mbps
7440.658	42.2	9.2	1.2	231.0	0.0	0.0	Horz	PK	0.0	51.4	74.0	-22.6	EUT Horz, High Ch, 1 Mbps
7439.242	41.7	9.2	1.8	238.0	0.0	0.0	Vert	PK	0.0	50.9	74.0	-23.1	EUT Vert, High Ch, 1 Mbps
7438.525	40.9	9.2	2.1	150.9	0.0	0.0	Vert	PK	0.0	50.1	74.0	-23.9	EUT Vert, High Ch, 2 Mbps
12008.860	28.9	-0.1	1.5	308.9	1.0	0.0	Vert	AV	0.0	29.8	54.0	-24.3	EUT Vert, Low Ch, 1 Mbps
7324.558	40.2	9.2	1.5	200.9	0.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	EUT Horz, Mid Ch, 1 Mbps
7441.175	39.9	9.2	1.5	47.0	0.0	0.0	Horz	PK	0.0	49.1	74.0	-24.9	EUT Horz, High Ch, 2 Mbps
7328.225	39.7	9.2	1.6	95.9	0.0	0.0	Vert	PK	0.0	48.9	74.0	-25.1	EUT Vert, Mid Ch, 1 Mbps
12011.110	27.7	-0.1	1.5	294.9	1.0	0.0	Horz	AV	0.0	28.6	54.0	-25.5	EUT Horz, Low Ch, 1 Mbps
12209.550	27.4	0.1	1.5	347.0	1.0	0.0	Vert	AV	0.0	28.5	54.0	-25.6	EUT Vert, Mid Ch, 1 Mbps
4803.408	45.3	2.3	1.5	228.0	0.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	EUT Horz, Low Ch, 1 Mbps
4803.492	44.8	2.3	1.1	88.0	0.0	0.0	Vert	PK	0.0	47.1	74.0	-26.9	EUT Vert, Low Ch, 1 Mbps
4803.400	44.7	2.3	2.1	360.0	0.0	0.0	Horz	PK	0.0	47.0	74.0	-27.0	EUT On Side, Low Ch, 1 Mbps
12400.090	40.5	6.0	1.9	264.9	0.0	0.0	Horz	PK	0.0	46.5	74.0	-27.5	EUT Horz, High Ch, 1 Mbps
4803.508	43.7	2.3	3.4	276.9	0.0	0.0	Vert	PK	0.0	46.0	74.0	-28.0	EUT Horz, Low Ch, 1 Mbps
4803.725	42.7	2.3	3.0	162.0	0.0	0.0	Vert	PK	0.0	45.0	74.0	-29.0	EUT On Side, Low Ch, 1 Mbps
12398.810	43.2	1.0	1.7	271.0	0.0	0.0	Horz	PK	0.0	44.2	74.0	-29.8	EUT Horz, High Ch, 1 Mbps
4960.592	41.4	2.6	1.5	178.9	0.0	0.0	Vert	PK	0.0	44.0	74.0	-30.0	EUT Vert, High Ch, 1 Mbps
4803.550	41.5	2.3	1.5	1.0	0.0	0.0	Horz	PK	0.0	43.8	74.0	-30.2	EUT Vert, Low Ch, 1 Mbps
12401.850	37.6	6.0	1.5	346.0	0.0	0.0	Vert	PK	0.0	43.6	74.0	-30.4	EUT Vert, High Ch, 1 Mbps

SPURIOUS RADIATED EMISSIONS

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4885.933	40.8	2.5	1.5	108.0	0.0	0.0	Vert	PK	0.0	43.3	74.0	-30.7	EUT Vert, Mid Ch, 1 Mbps
4885.758	40.6	2.5	1.5	238.0	0.0	0.0	Horz	PK	0.0	43.1	74.0	-30.9	EUT Horz, Mid Ch, 1 Mbps
4959.450	40.5	2.6	1.5	67.9	0.0	0.0	Horz	PK	0.0	43.1	74.0	-30.9	EUT Horz, High Ch, 1 Mbps
12398.430	41.2	1.0	1.9	264.9	0.0	0.0	Vert	PK	0.0	42.2	74.0	-31.8	EUT Vert, High Ch, 1 Mbps
12208.750	41.6	0.1	2.3	329.9	0.0	0.0	Horz	PK	0.0	41.7	74.0	-32.3	EUT Horz, Mid Ch, 1 Mbps
12011.020	39.1	-0.1	1.5	308.9	0.0	0.0	Vert	PK	0.0	39.0	74.0	-35.0	EUT Vert, Low Ch, 1 Mbps
12212.080	38.7	0.1	1.5	347.0	0.0	0.0	Vert	PK	0.0	38.8	74.0	-35.2	EUT Vert, Mid Ch, 1 Mbps
12009.930	38.5	-0.1	1.5	294.9	0.0	0.0	Horz	PK	0.0	38.4	74.0	-35.6	EUT Horz, Low Ch, 1 Mbps

CONCLUSION

Pass



Tested By

SPURIOUS RADIATED EMISSIONS

EUT:	Genesis macro RIC (BLE and NFMI)	Work Order:	STAK0251
Serial Number:	211728202	Date:	2021-10-14
Customer:	Starkey Laboratories, Inc.	Temperature:	22.9°C
Attendees:	John Quach	Relative Humidity:	41.1%
Customer Project:	None	Bar. Pressure (PMSL):	1013 mb
Tested By:	Christopher Heintzelman	Job Site:	MN05
Power:	Battery	Configuration:	STAK0251-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	20	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

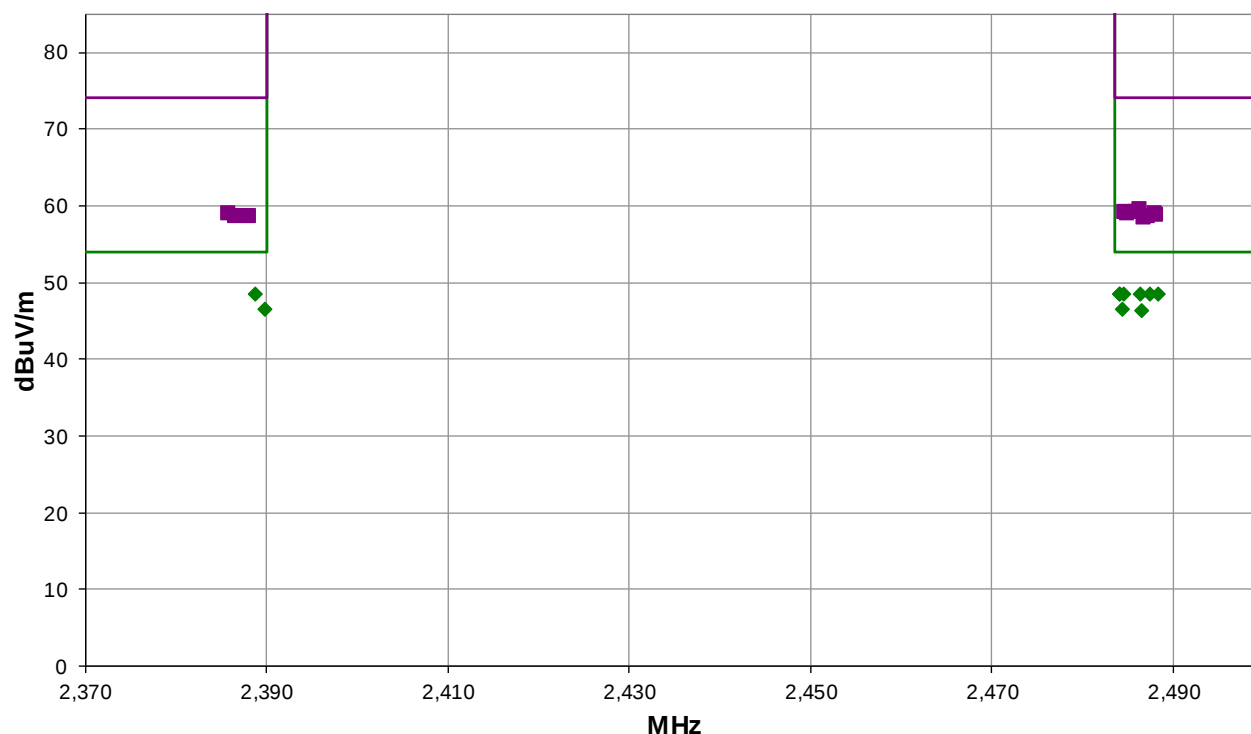
Test mode (measured) duty cycle is 13.4% (1 Mbps) and 6.9% (2 Mbps), therefore an upward duty cycle correction factor (DCCF) was applied using the formula $10 \cdot \log(\text{duty cycle})$, giving a +8.7dB on 1 Mbps and +11.6 on 2 Mbps. The operational duty cycle is limited to 16.8% (1 Mbps) and 5.28% (2 Mbps), therefore a downward duty cycle correction factor (DCCF) was applied using the formula $10 \cdot \log(\text{duty cycle})$, giving a -7.75dB correction (1 Mbps) and a -12.77 dB correction (2 Mbps).
Applied duty cycle correction = Upward DCCF + Downward DCCF = +0.95dB (1 Mbps) and -1.17dB (2 Mbps).

EUT OPERATING MODES

Transmitting BLE on Low and High Chs (2402 and 2480 MHz), 1 Mbps and 2 Mbps; Output power set to +2 dBm

DEVIATIONS FROM TEST STANDARD

None



Run #: 20

PK AV QP

SPURIOUS RADIATED EMISSIONS

RESULTS - Run #20

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2484.150	32.4	-4.8	1.5	156.0	1.0	20.0	Horz	AV	0.0	48.6	54.0	-5.5	EUT On Side, High Ch, 1 Mbps
2486.333	32.4	-4.8	1.5	340.9	1.0	20.0	Vert	AV	0.0	48.6	54.0	-5.5	EUT On Side, High Ch, 1 Mbps
2484.508	32.3	-4.8	3.14	250.9	1.0	20.0	Horz	AV	0.0	48.5	54.0	-5.6	EUT Vert, High Ch, 1 Mbps
2484.017	32.3	-4.8	1.5	344.9	1.0	20.0	Vert	AV	0.0	48.5	54.0	-5.6	EUT Vert, High Ch, 1 Mbps
2488.342	32.4	-4.9	1.5	329.0	1.0	20.0	Horz	AV	0.0	48.5	54.0	-5.6	EUT Horz, High Ch, 1 Mbps
2487.392	32.3	-4.8	2.9	275.0	1.0	20.0	Vert	AV	0.0	48.5	54.0	-5.6	EUT Horz, High Ch, 1 Mbps
2388.658	32.1	-4.6	2.68	145.0	1.0	20.0	Horz	AV	0.0	48.5	54.0	-5.6	EUT On Side, Low Ch, 1 Mbps
2484.425	32.4	-4.8	1.5	117.0	-1.2	20.0	Vert	AV	0.0	46.4	54.0	-7.6	EUT On Side, High Ch, 2 Mbps
2389.775	32.2	-4.6	1.28	354.0	-1.2	20.0	Horz	AV	0.0	46.4	54.0	-7.6	EUT On Side, Low Ch, 2 Mbps
2486.450	32.3	-4.8	1.5	105.0	-1.2	20.0	Horz	AV	0.0	46.3	54.0	-7.7	EUT On Side, High Ch, 2 Mbps
2486.200	44.4	-4.8	1.5	340.9	0.0	20.0	Vert	PK	0.0	59.6	74.0	-14.4	EUT On Side, High Ch, 1 Mbps
2484.575	44.0	-4.8	3.14	250.9	0.0	20.0	Horz	PK	0.0	59.2	74.0	-14.8	EUT Vert, High Ch, 1 Mbps
2485.767	44.0	-4.8	1.5	344.9	0.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	EUT Vert, High Ch, 1 Mbps
2385.608	43.7	-4.6	2.68	145.0	0.0	20.0	Horz	PK	0.0	59.1	74.0	-14.9	EUT On Side, Low Ch, 1 Mbps
2487.867	43.8	-4.8	2.9	275.0	0.0	20.0	Vert	PK	0.0	59.0	74.0	-15.0	EUT Horz, High Ch, 1 Mbps
2484.842	43.8	-4.8	1.5	105.0	0.0	20.0	Horz	PK	0.0	59.0	74.0	-15.0	EUT On Side, High Ch, 2 Mbps
2487.975	43.8	-4.9	1.5	329.0	0.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	EUT Horz, High Ch, 1 Mbps
2487.200	43.6	-4.8	1.5	156.0	0.0	20.0	Horz	PK	0.0	58.8	74.0	-15.2	EUT On Side, High Ch, 1 Mbps
2386.467	43.4	-4.6	1.28	354.0	0.0	20.0	Horz	PK	0.0	58.8	74.0	-15.2	EUT On Side, Low Ch, 2 Mbps
2388.000	43.3	-4.6	1.28	354.0	0.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	EUT On Side, Low Ch, 2 Mbps
2486.708	43.4	-4.8	1.5	117.0	0.0	20.0	Vert	PK	0.0	58.6	74.0	-15.4	EUT On Side, High Ch, 2 Mbps

CONCLUSION

Pass



Tested By

End of Test Report