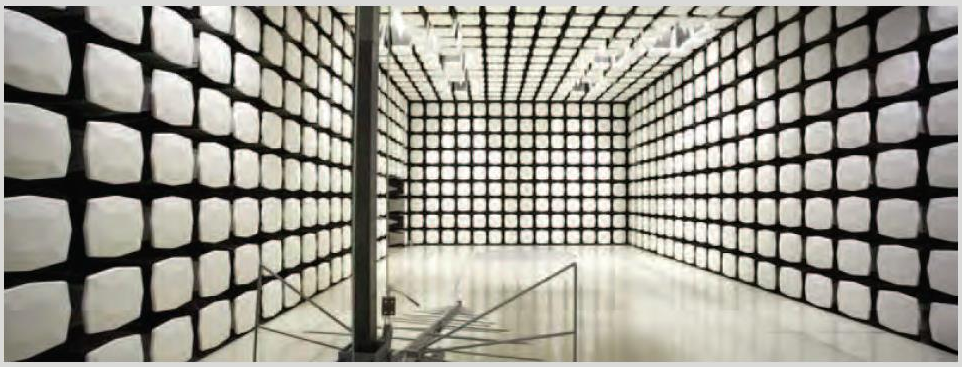
Onity Inc.

Passport

FCC 15.247:2022

Bluetooth Low Energy (DTS)

Report: ONIT0101.2, Issue Date: June 15, 2023



CERTIFICATE OF TEST

Last Date of Test: September 8, 2022
Onity Inc.
EUT: Passport

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2022	ANSI C63.10:2013

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not Required for a battery powered EUT.
6.9.3	Occupied Bandwidth	Yes	Pass	
11.6	Duty Cycle	Yes	N/A	Operates at 100%.
11.8.2	DTS 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:

Cole Ghizzone, 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
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

element
2021.09.01

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

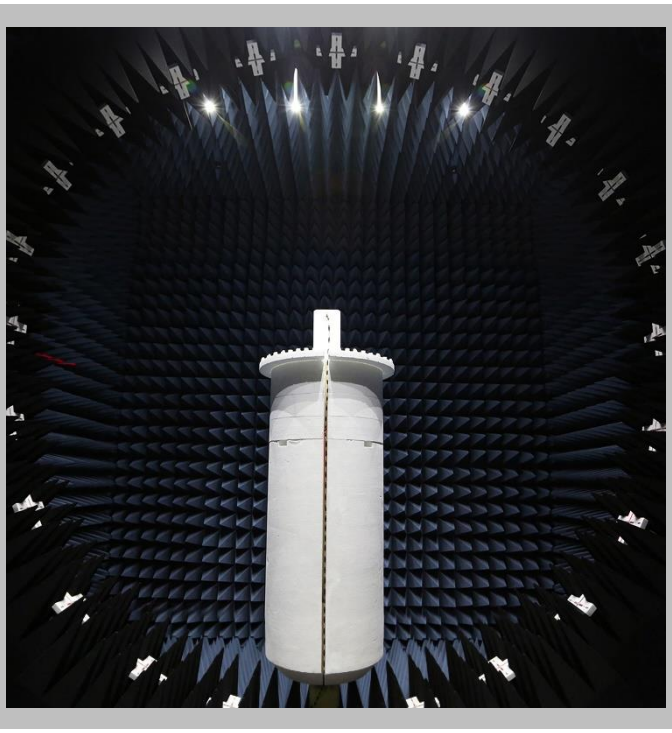
For details on the Scopes of our Accreditations, please visit:

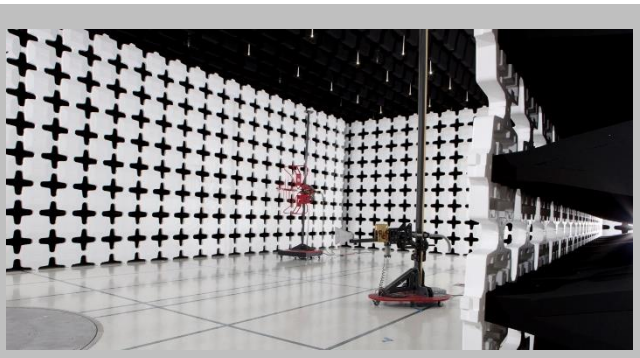
California Minnesota Oregon Texas Washington

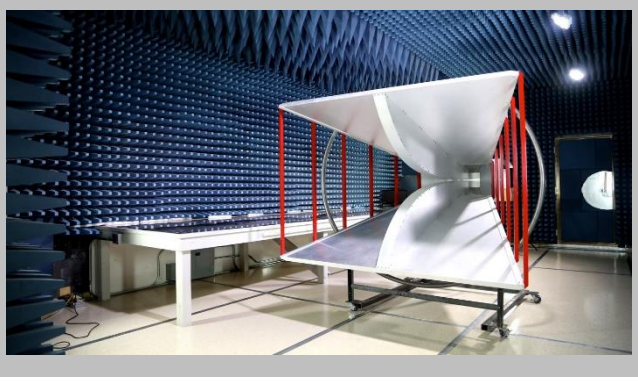
FACILITIES

element
2020.12.15

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
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

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)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	3.2 dB	-3.2 dB

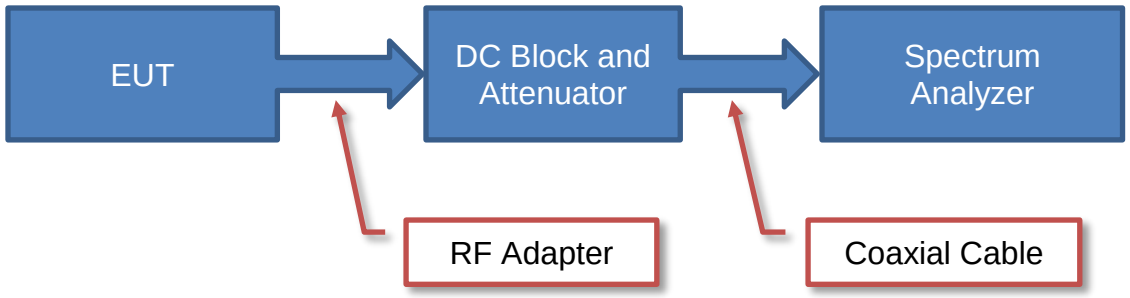
TEST SETUP BLOCK DIAGRAMS

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.

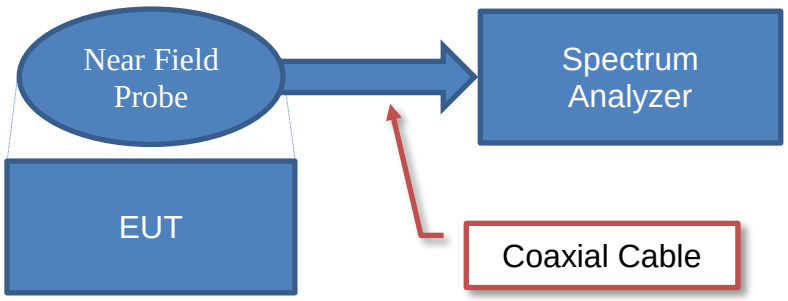
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

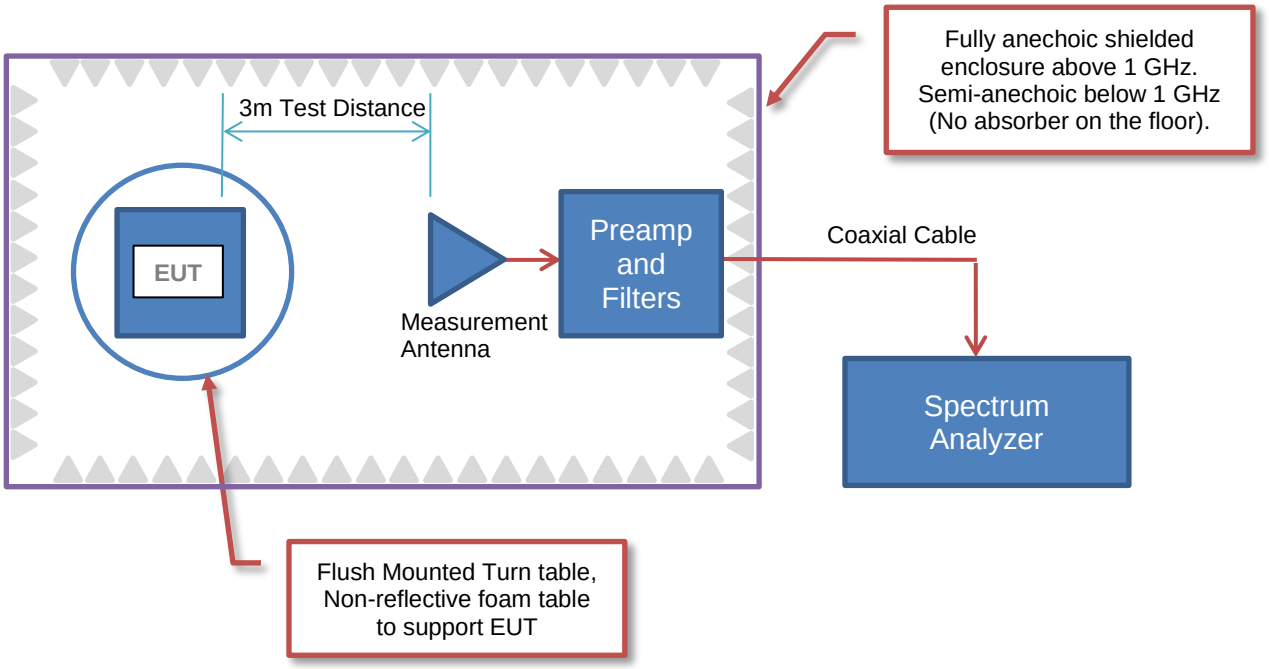


Sample Calculation (logarithmic units)

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:

Measured Level (Amplitude)		Factor: Antenna Factor		Factor: Cable Factor		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:

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

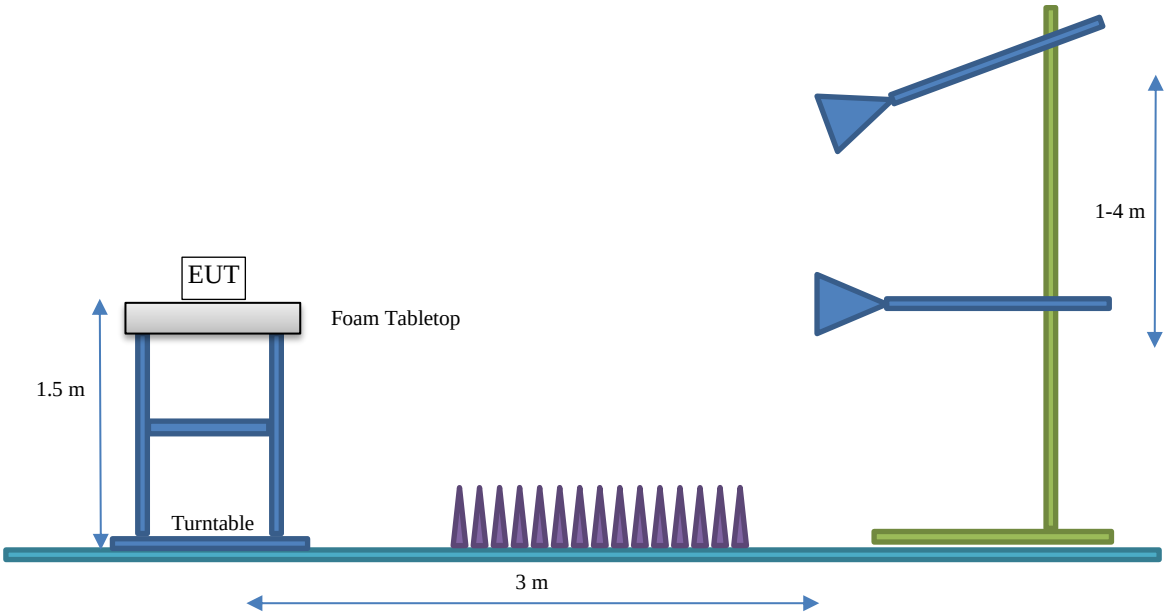
Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)		Substitution Antenna Factor (dBi)		EIRP to ERP (if applicable)		Measured power (dBm ERP/EIRP)
10.0	+	6.0	-	2.15	=	**13.9/16.0**

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:	Onity Inc.
Address:	4001 Fairview Industrial Drive
City, State, Zip:	Salem, OR 97302
Test Requested By:	Ali Elmi
EUT:	Passport
First Date of Test:	September 7, 2022
Last Date of Test:	September 8, 2022
Receipt Date of Samples:	September 7, 2022
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Electronic door lock - it can be operated by Bluetooth (2.4 GHz) or by LoRaWAN (868 MHz / 915 MHz), which is a Low Power Wide Area (LPWA), long ranging networking protocol designed to wirelessly connect battery operated devices to the internet in regional, national, or global networks.

Testing Objective:
To demonstrate compliance of the Bluetooth 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. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
Ceramic Chip	Johanson Technology	2400 - 2500	0.5

The EUT was tested using the power settings provided by the manufacturer which were based upon:

☒ Test software settings Test software/firmware installed on EUT: 10.0.23
☐ Rated power settings

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting (dBm)
BLE 1 Mbps	DTS	Low (37)	2402	2
		Mid (18)	2442	
		High (39)	2480	

CONFIGURATIONS

Configuration ONIT0091- 1

Software/Firmware Running During Test	
Description	**Version**
BLE Fimware	10.0.23
TRFW Tester	None

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Electronic door lock with BLE and LoRaWAN	Onity Inc.	Passport	44594549

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
iPad mini	Apple	MUQW2LL/A	DMPZKMCHLM93

CONFIGURATIONS

Configuration ONIT0091- 2

Software/Firmware Running During Test	
Description	**Version**
BLE Fimware	10.0.23
TRFW Tester	None

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Electronic door lock with BLE and LoRaWAN	Onity Inc.	Passport	47155986

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
iPad mini	Apple	MUQW2LL/A	DMPZKMCHLM93

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2022-09-07	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
2	2022-09-07	DTS 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.
3	2022-09-07	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.
4	2022-09-07	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2022-09-07	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	2022-09-07	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2022-09-07	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.
8	2022-09-08	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE

TEST DESCRIPTION

The Duty Cycle (x) were measured for each of the EUT operating modes. 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.

The EUT operates at 100% Duty Cycle.

OCCUPIED BANDWIDTH

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
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2021-12-05	2022-12-05
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2022-01-26	2023-01-26

TEST DESCRIPTION

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

The 99% occupied bandwidth was measured with the EUT configured for continuous modulated operation.

Per ANSI C63.10:2013, 6.9.3, the spectrum analyzer was configured as follows:

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto to prevent video filtering or averaging. A sample detector was used unless the device was not able to be operated in a continuous transmit mode, in which case a peak detector was used.

The spectrum analyzer occupied bandwidth measurement function was used to sum the power of the transmission in linear terms to obtain the 99% bandwidth.

OCCUPIED BANDWIDTH

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**Passport**			**Work Order:**	**ONIT0091**
Serial Number:	**44594549**			**Date:**	**7-Sep-22**
Customer:	**Supra, A Division of UTCFS**			**Temperature:**	**22.7 °C**
Attendees:	**Ali Elmi**			**Humidity:**	**43.6% RH**
Project:	**None**			**Barometric Pres.:**	**1022 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable and manufacturers provided SMA patch cable.

DEVIATIONS FROM TEST STANDARD

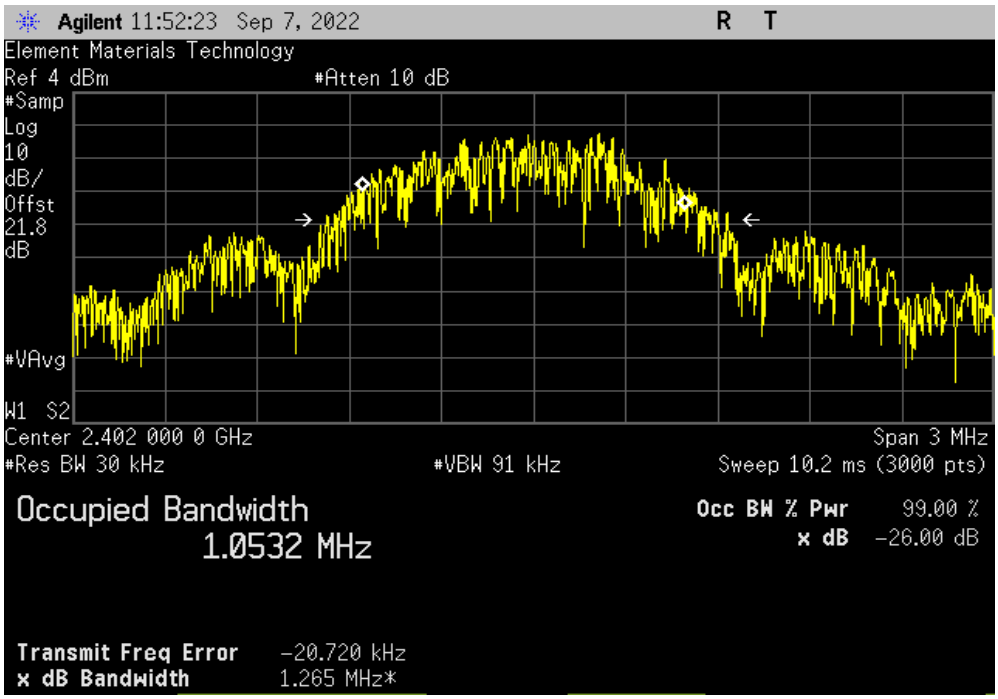
None

Configuration #	**1**	*Signature*

	Value	**Limit**	**Result**
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	1.053 MHz	N/A	N/A
Mid Channel, 2442 MHz	1.058 MHz	N/A	N/A
High Channel, 2480 MHz	1.056 MHz	N/A	N/A

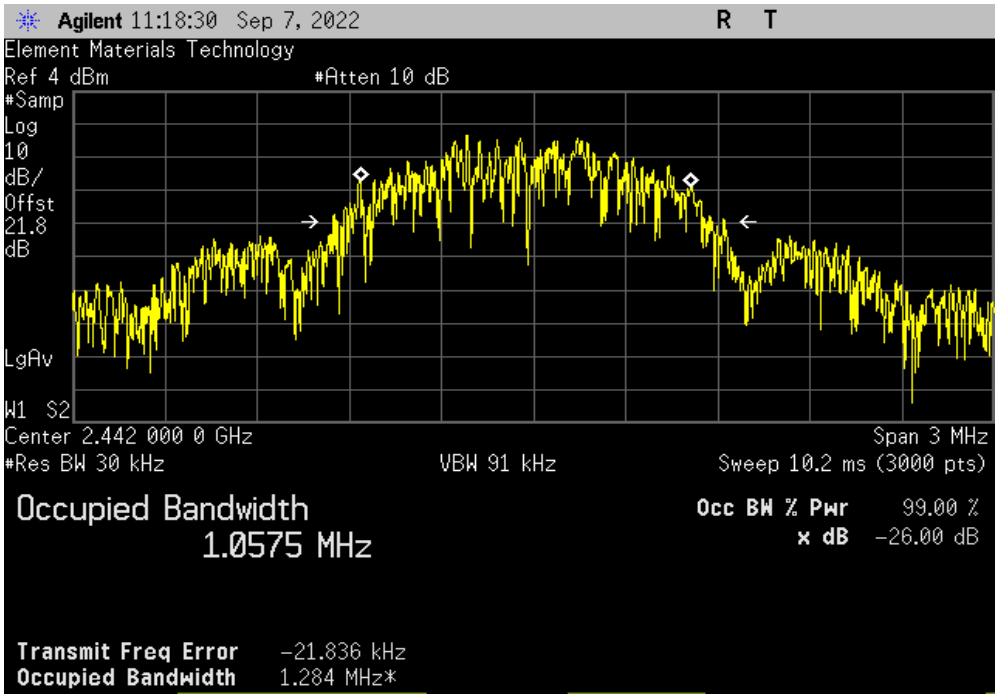
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz

				Value	Limit	Result
				1.053 MHz	N/A	N/A



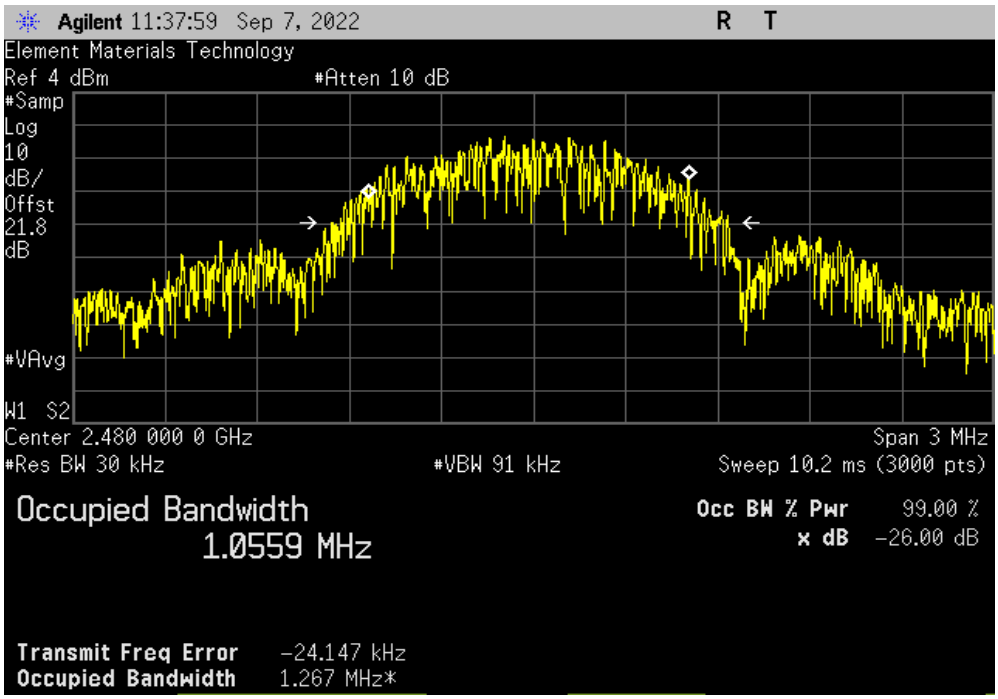
BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz

				Value	Limit	Result
				1.058 MHz	N/A	N/A



BLE/GFSK 1 Mbps, High Channel, 2480 MHz

				Value	Limit	Result
				1.056 MHz	N/A	N/A



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
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2021-12-05	2022-12-05
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2022-01-26	2023-01-26

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

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**Passport**			**Work Order:**	**ONIT0091**
Serial Number:	**44594549**			**Date:**	**7-Sep-22**
Customer:	**Supra, A Division of UTCFS**			**Temperature:**	**22.7 °C**
Attendees:	**Ali Elmi**			**Humidity:**	**43.6% RH**
Project:	**None**			**Barometric Pres.:**	**1022 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable and manufacturers provided SMA patch cable.

DEVIATIONS FROM TEST STANDARD

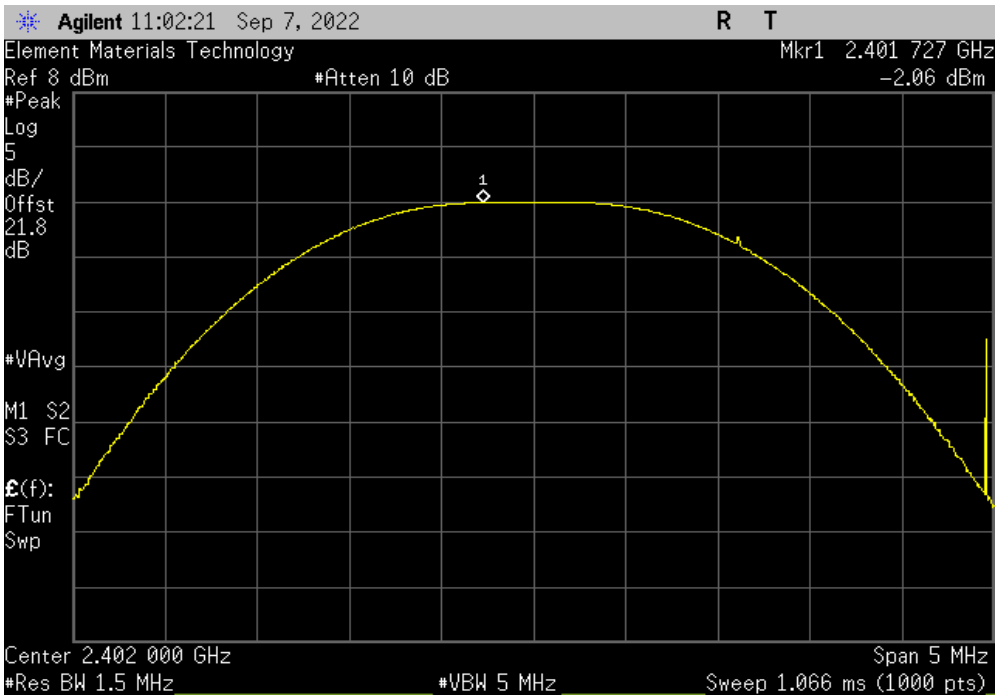
None

Configuration #	**1**	*Signature*

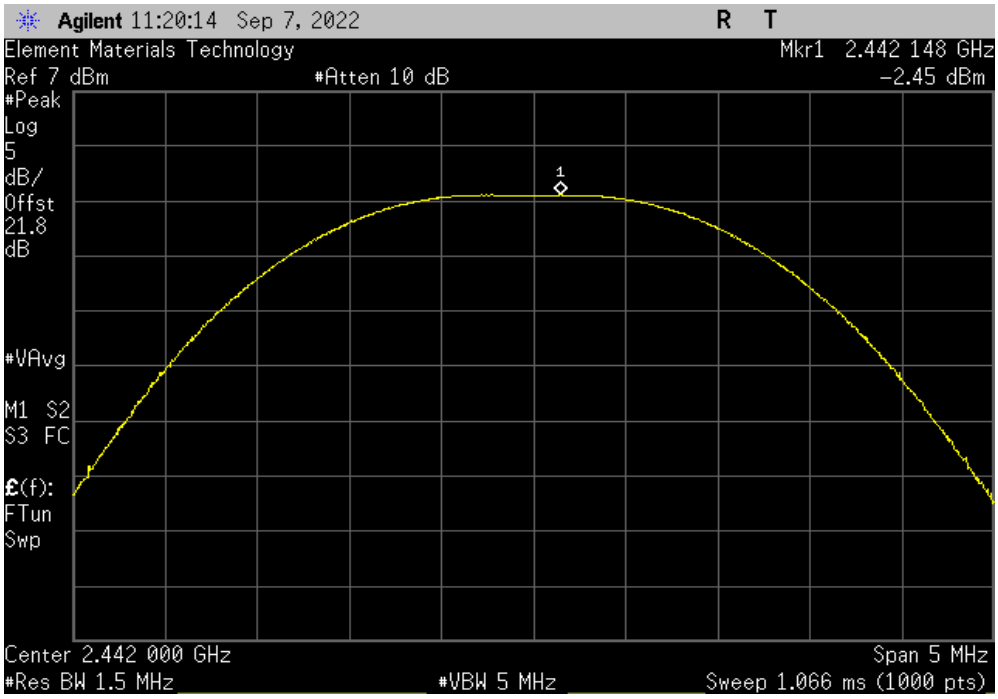
	Out Pwr (dBm)	**Limit (dBm)**	**Result**
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-2.059	30	Pass
Mid Channel, 2442 MHz	-2.447	30	Pass
High Channel, 2480 MHz	-2.138	30	Pass

OUTPUT POWER

BLE/GFSK 1 Mbps, Low Channel, 2402 MHz							
					Out Pwr (dBm)	Limit (dBm)	Result
					-2.059	30	Pass

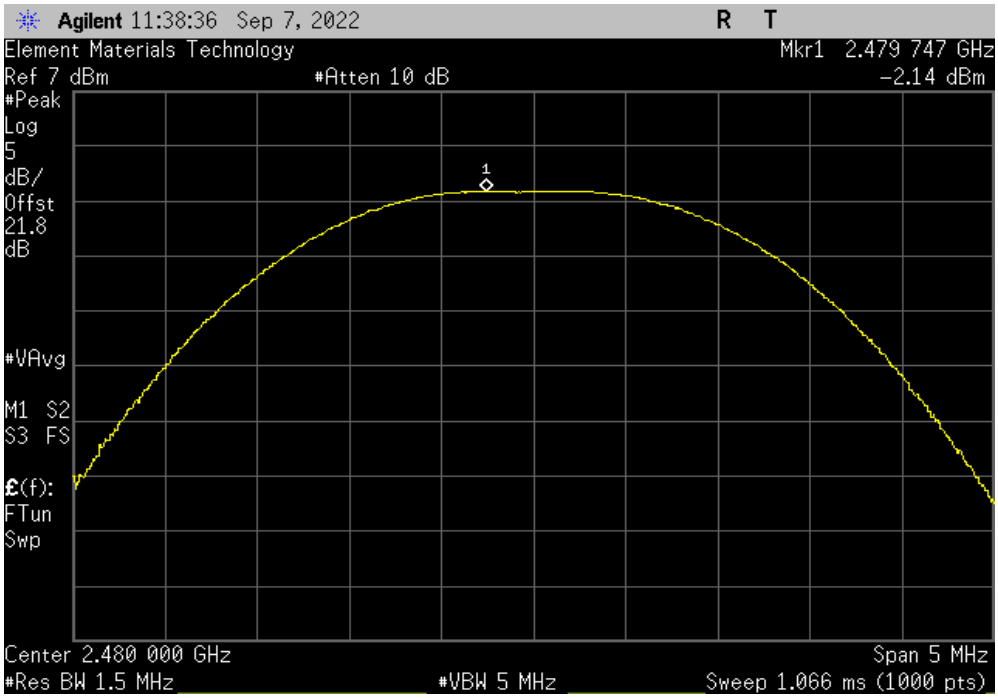


BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz							
					Out Pwr (dBm)	Limit (dBm)	Result
					-2.447	30	Pass



OUTPUT POWER

BLE/GFSK 1 Mbps, High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				-2.138	30	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

XMit 2022.02.07.0

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TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2021-12-05	2022-12-05
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2022-01-26	2023-01-26

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)

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**Passport**			**Work Order:**	**ONIT0091**
Serial Number:	**44594549**			**Date:**	**7-Sep-22**
Customer:	**Supra, A Division of UTCFS**			**Temperature:**	**22.7 °C**
Attendees:	**Ali Elmi**			**Humidity:**	**43.6% RH**
Project:	**None**			**Barometric Pres.:**	**1022 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable and manufacturers provided SMA patch cable.

DEVIATIONS FROM TEST STANDARD

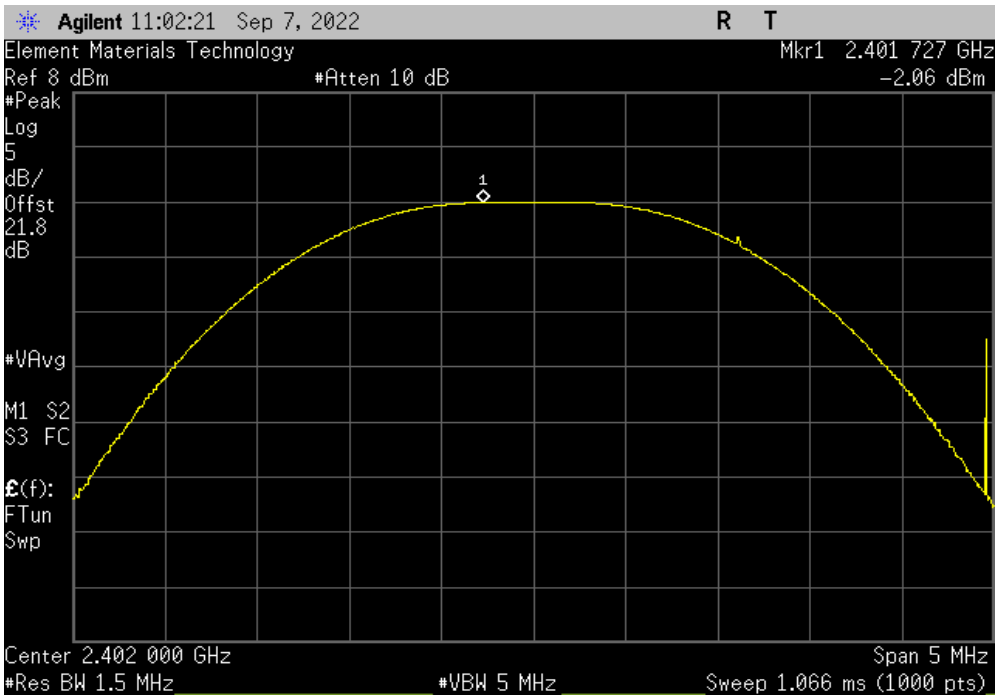
None

Configuration #	**1**	*Signature*

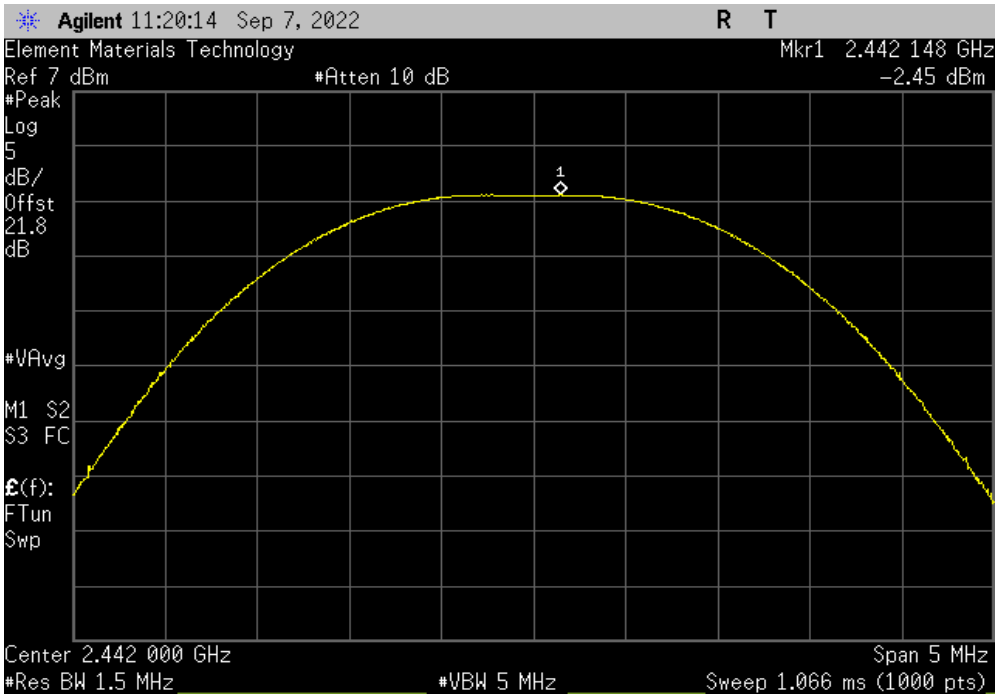
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
BLE/GFSK 1 Mbps					
Low Channel, 2402 MHz	-2.059	0.5	-1.6	36	Pass
Mid Channel, 2442 MHz	-2.447	0.5	-1.9	36	Pass
High Channel, 2480 MHz	-2.138	0.5	-1.6	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

BLE/GFSK 1 Mbps, Low Channel, 2402 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		-2.059	0.5	-1.6	36	Pass



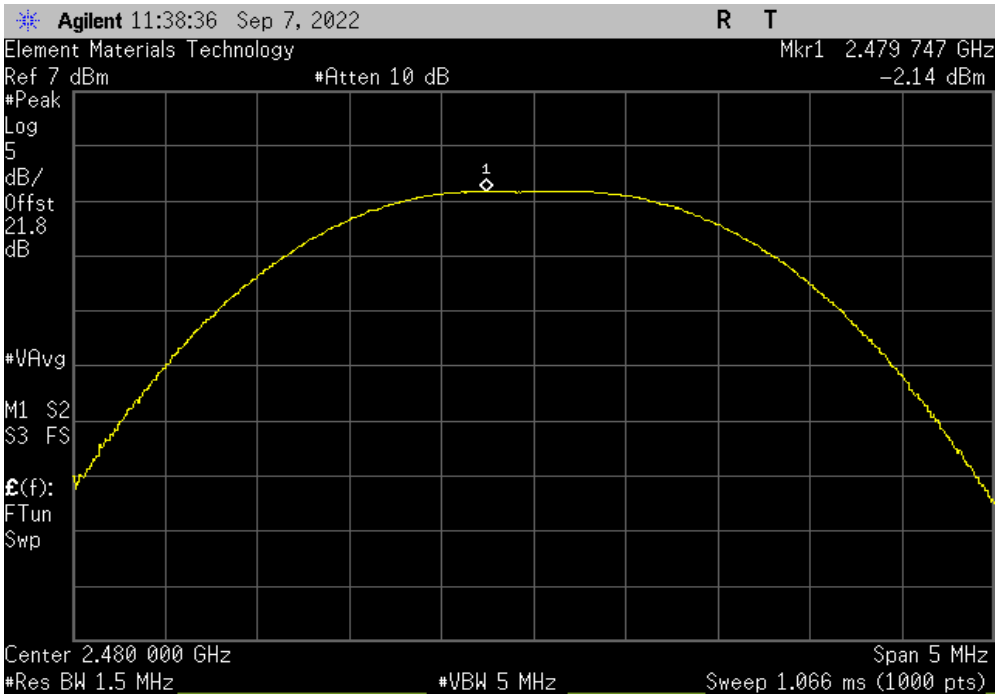
BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		-2.447	0.5	-1.947	36	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

TbtTx 2022.06.03.0 XMit 2022.02.07.0

BLE/GFSK 1 Mbps, High Channel, 2480 MHz						
		Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
		-2.138	0.5	-1.6	36	Pass



POWER SPECTRAL DENSITY

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
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2021-12-05	2022-12-05
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2022-01-26	2023-01-26

TEST DESCRIPTION

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

The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

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

POWER SPECTRAL DENSITY

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**Passport**			**Work Order:**	**ONIT0091**
Serial Number:	**44594549**			**Date:**	**7-Sep-22**
Customer:	**Supra, A Division of UTCFS**			**Temperature:**	**22.9 °C**
Attendees:	**Ali Elmi**			**Humidity:**	**43.9% RH**
Project:	**None**			**Barometric Pres.:**	**1022 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable and manufacturers provided SMA patch cable.

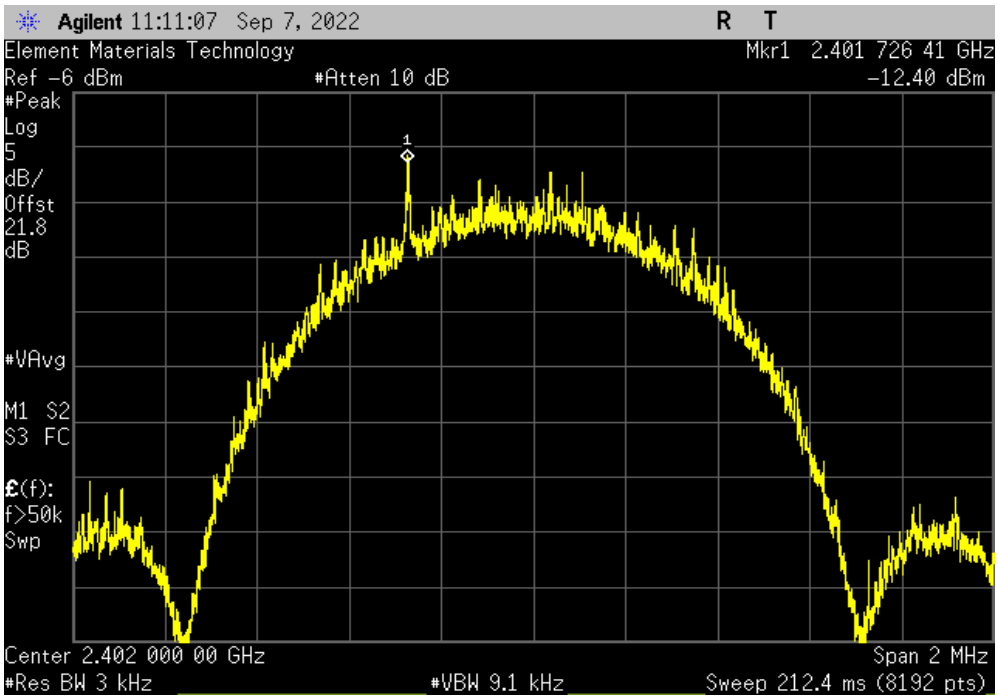
DEVIATIONS FROM TEST STANDARD

None

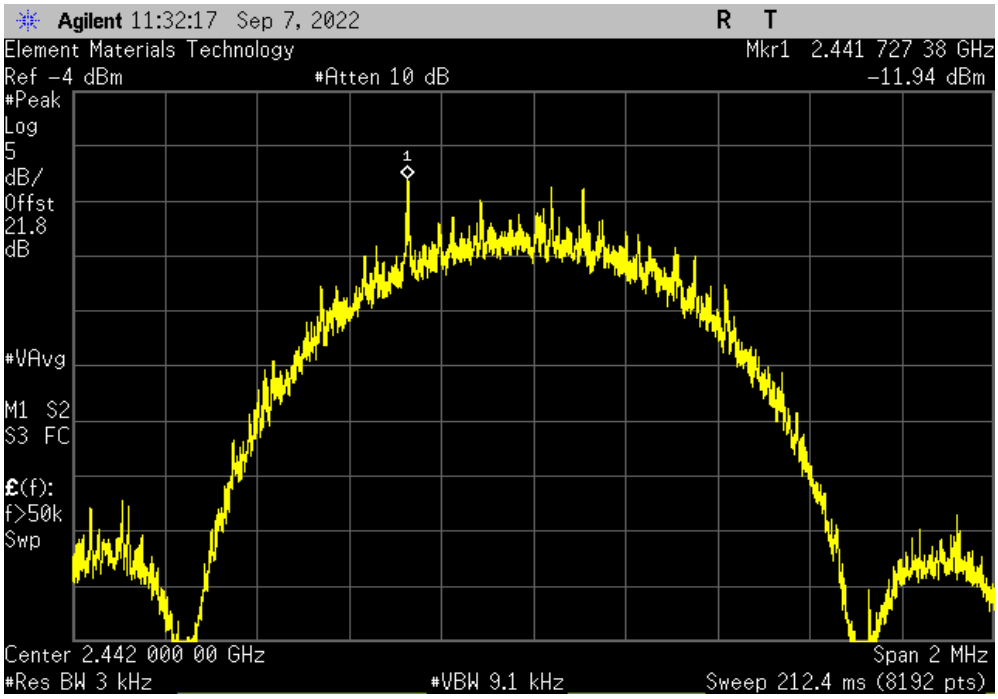
Configuration #	**1**	*Signature*

		Value dBm/3kHz	**Limit < dBm/3kHz**	**Results**
BLE/GFSK 1 Mbps				
	Low Channel, 2402 MHz	-12.4	8	Pass
	Mid Channel, 2442 MHz	-11.944	8	Pass
	High Channel, 2480 MHz	-13.519	8	Pass

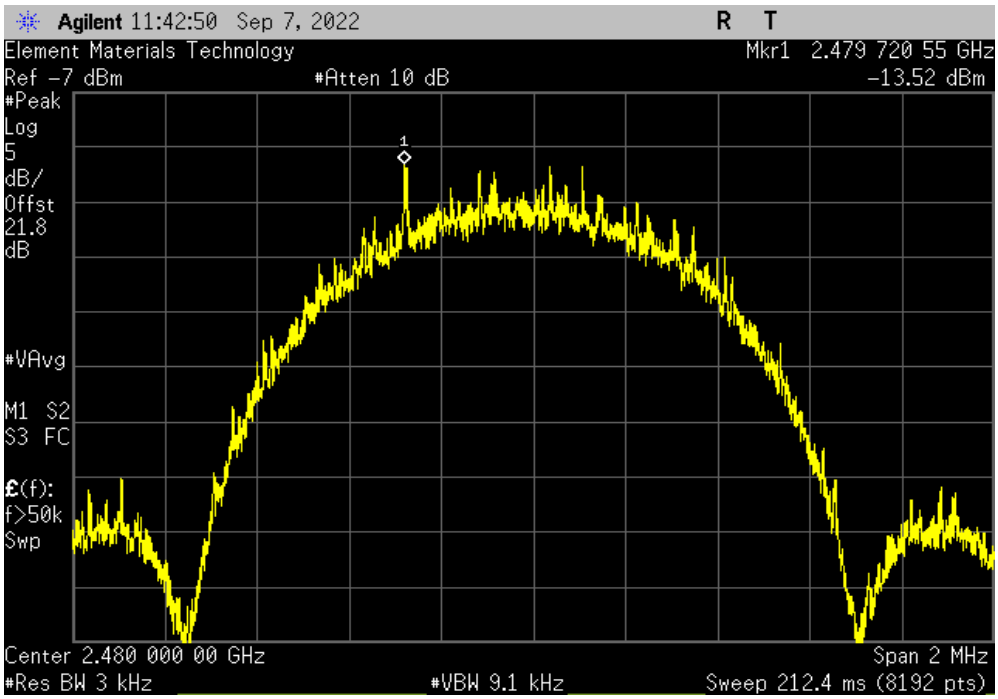
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-12.4	8	Pass



BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-11.944	8	Pass



BLE/GFSK 1 Mbps, High Channel, 2480 MHz							
					Value dBm/3kHz	Limit < dBm/3kHz	Results
					-13.519	8	Pass



BAND EDGE COMPLIANCE

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
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2021-12-05	2022-12-05
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2022-01-26	2023-01-26

TEST DESCRIPTION

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

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

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

BAND EDGE COMPLIANCE

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**Passport**			**Work Order:**	**ONIT0091**
Serial Number:	**44594549**			**Date:**	**7-Sep-22**
Customer:	**Supra, A Division of UTCFS**			**Temperature:**	**22.9 °C**
Attendees:	**Ali Elmi**			**Humidity:**	**43.6% RH**
Project:	**None**			**Barometric Pres.:**	**1023 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable and manufacturers provided SMA patch cable.

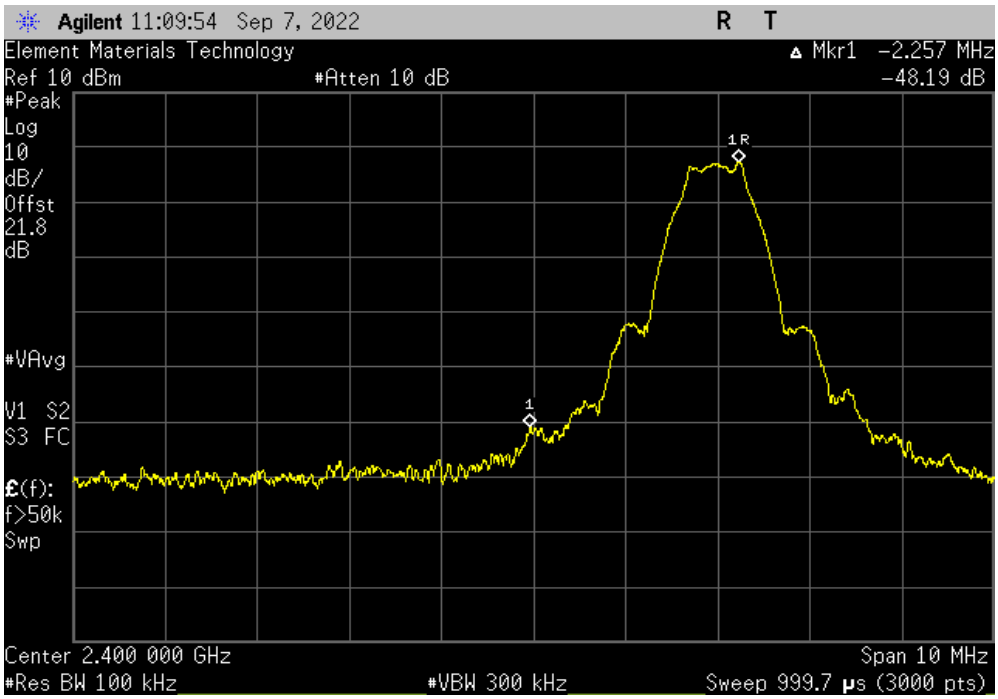
DEVIATIONS FROM TEST STANDARD

None

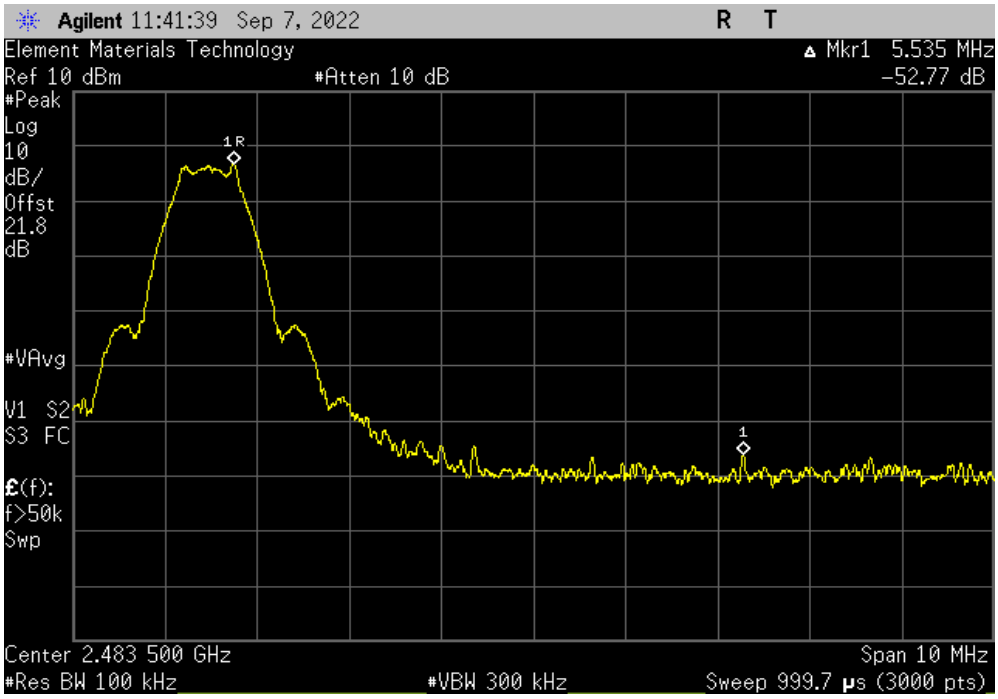
Configuration #	**1**	*Signature*

	Value (dBc)	**Limit ≤ (dBc)**	**Result**
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-48.19	-20	Pass
High Channel, 2480 MHz	-52.77	-20	Pass

BLE/GFSK 1 Mbps, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-48.19	-20	Pass



BLE/GFSK 1 Mbps, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-52.77	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

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
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2021-12-05	2022-12-05
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2022-01-26	2023-01-26

TEST DESCRIPTION

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

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the 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.

The reference level offset for the fundamental screen capture was based on a measured value of the loss between the spectrum analyzer and the EUT which was verified at the time of test. The remaining screen capture(s) use an internal transducer factor on the analyzer to correct the displayed trace based on the cable loss over frequency. The reference level offset for the additional screen capture(s) is then based on the expected attenuator value and any other losses.

Fundamental Offset = Ref Lvl Offset showing measured composite factor of all losses

Remaining Screen capture(s) Offset = “Internal” cable loss factor not shown on screen capture + Ref Lvl Offset showing expected attenuator value and any other losses

SPURIOUS CONDUCTED EMISSIONS

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**Passport**			**Work Order:**	**ONIT0091**
Serial Number:	**44594549**			**Date:**	**7-Sep-22**
Customer:	**Supra, A Division of UTCFS**			**Temperature:**	**22.9 °C**
Attendees:	**Ali Elmi**			**Humidity:**	**43.9% RH**
Project:	**None**			**Barometric Pres.:**	**1022 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes: 20 dB attenuator and manufacturers provided SMA patch cable.

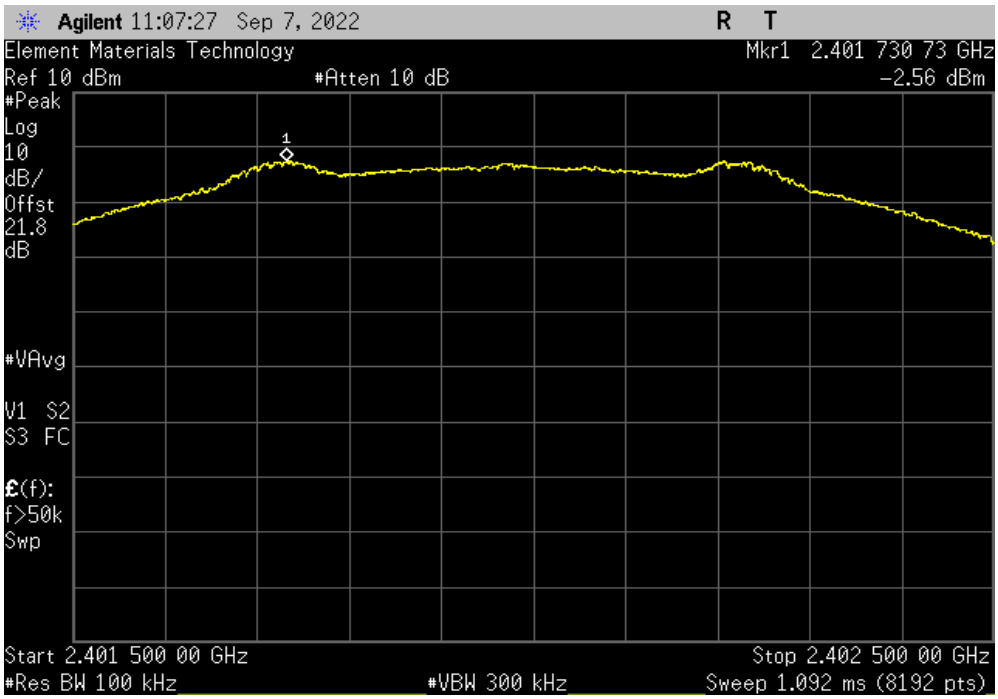
DEVIATIONS FROM TEST STANDARD

None

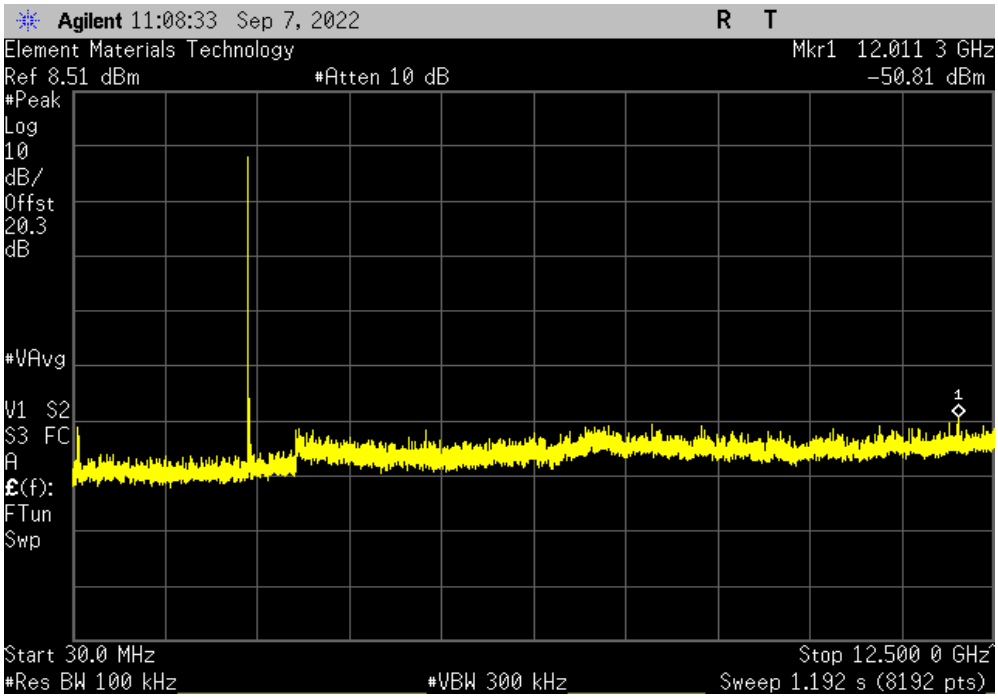
Configuration #	**1**	*Signature*

		Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps						
	Low Channel, 2402 MHz	Fundamental	2401.73	N/A	N/A	N/A
	Low Channel, 2402 MHz	30 MHz - 12.5 GHz	12011.3	-48.26	-20	Pass
	Low Channel, 2402 MHz	12.5 GHz - 25 GHz	24291.9	-44.24	-20	Pass
	Mid Channel, 2442 MHz	Fundamental	2441.72	N/A	N/A	N/A
	Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	7093.9	-49.13	-20	Pass
	Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	24728.4	-44.54	-20	Pass
	High Channel, 2480 MHz	Fundamental	2480.24	N/A	N/A	N/A
	High Channel, 2480 MHz	30 MHz - 12.5 GHz	9919.5	-45.94	-20	Pass
	High Channel, 2480 MHz	12.5 GHz - 25 GHz	24404.8	-44.51	-20	Pass

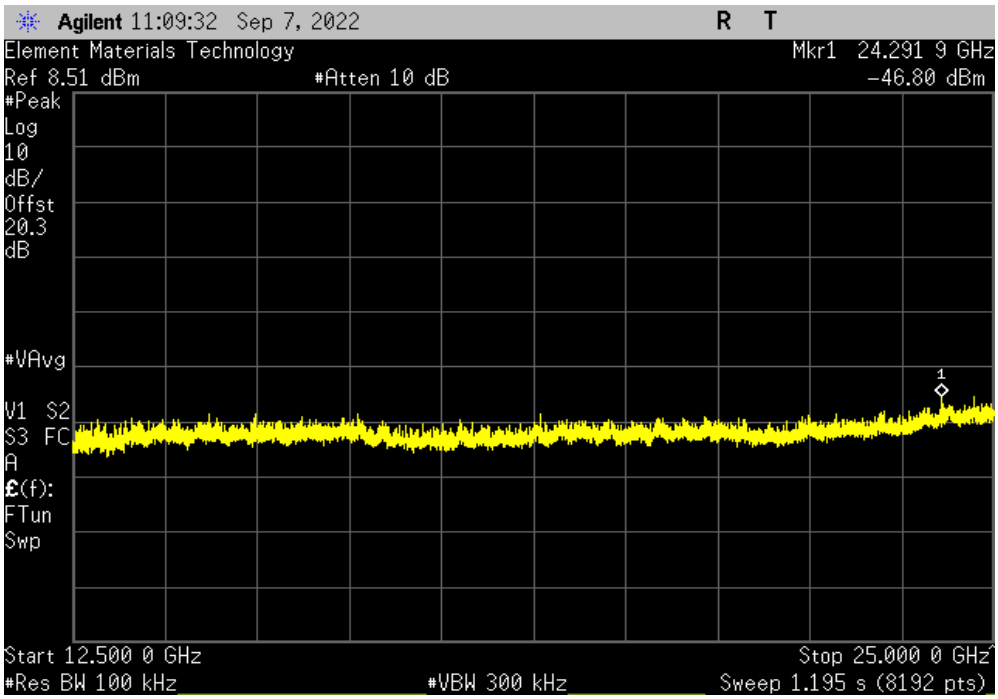
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental		2401.73	N/A	N/A	N/A



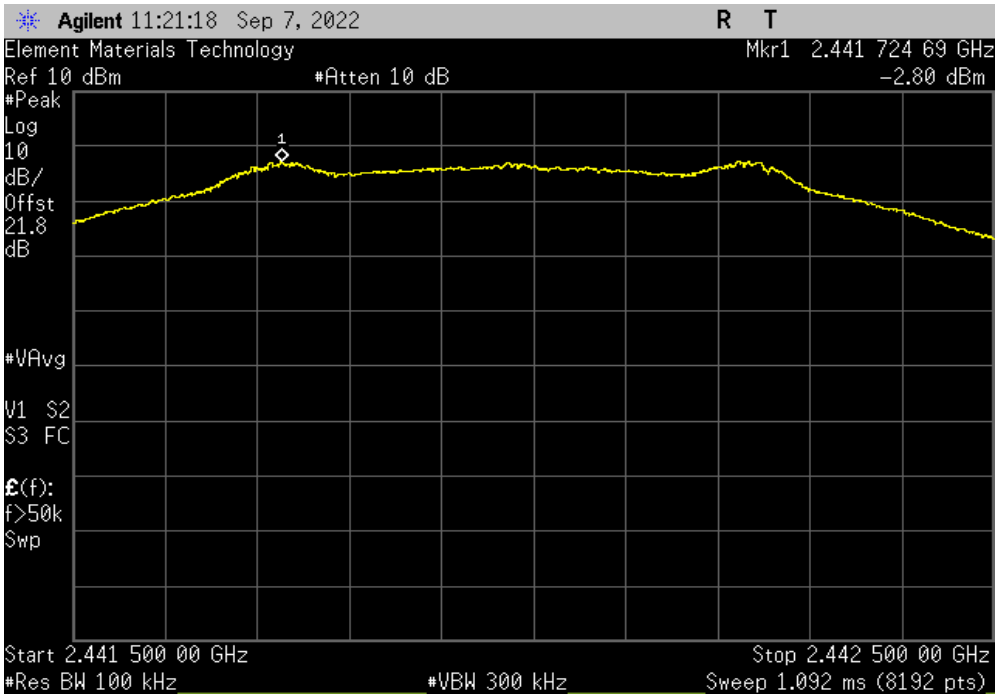
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	12011.3	-48.26	-20	Pass



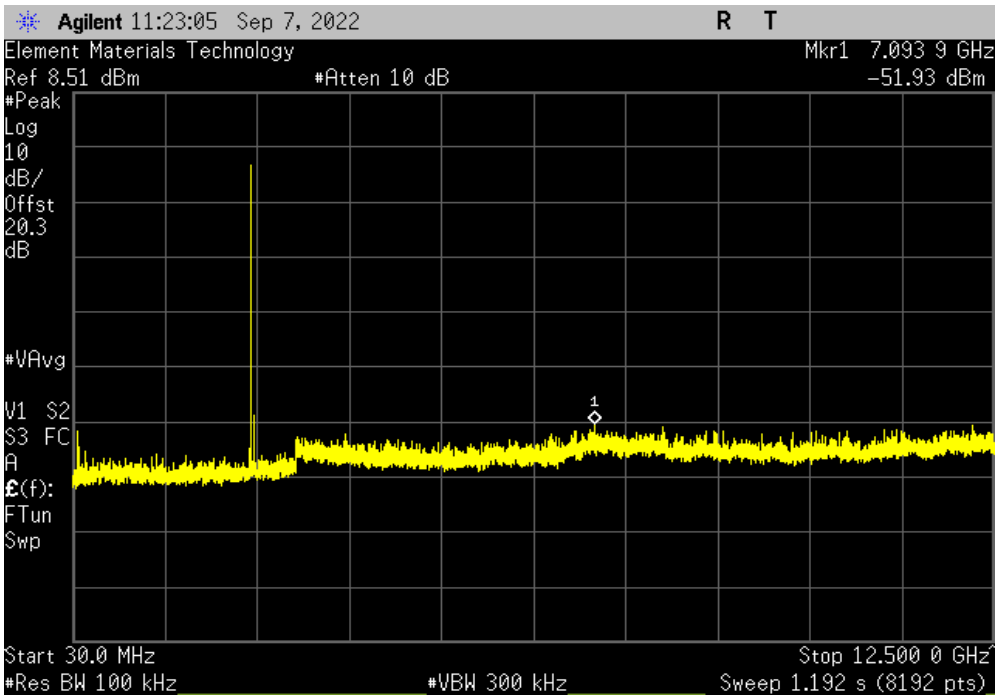
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24291.9	-44.24	-20	Pass



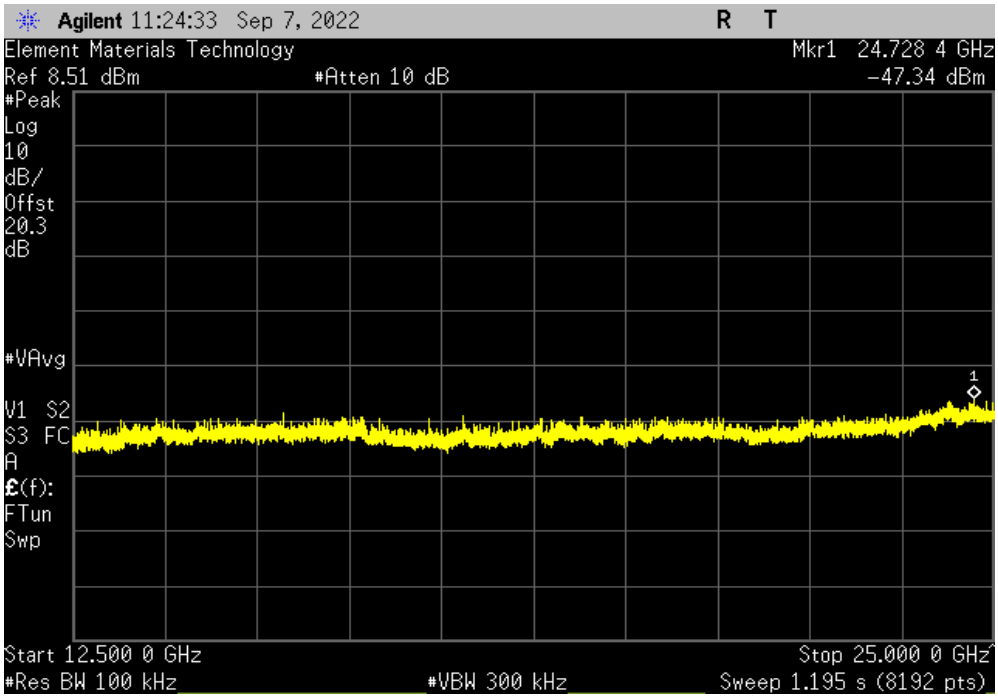
BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	2441.72	N/A	N/A	N/A



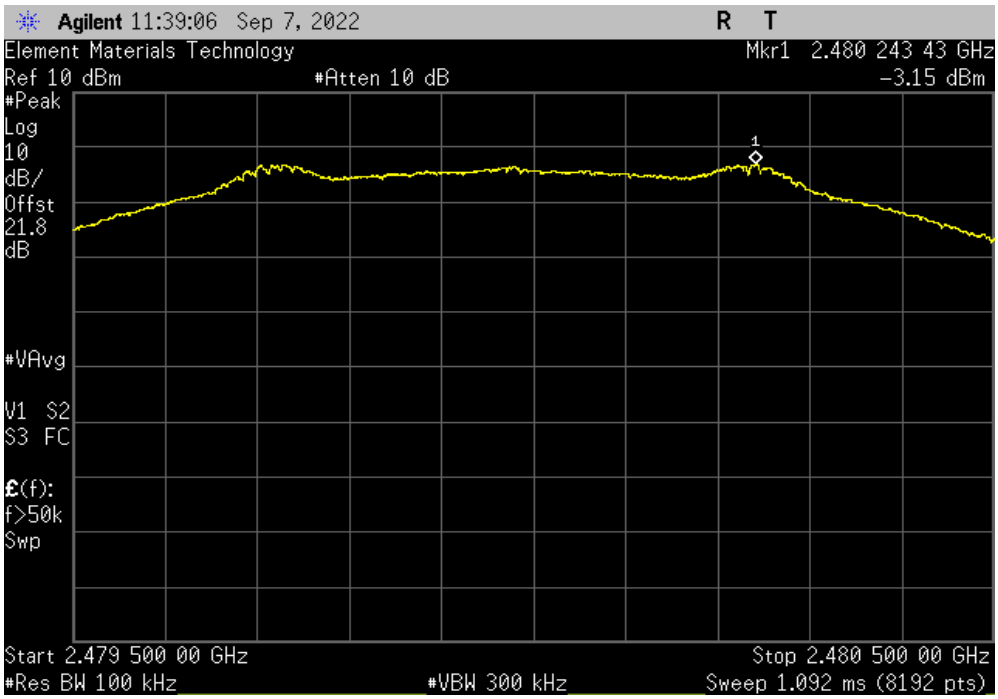
BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz	7093.9	-49.13	-20	Pass



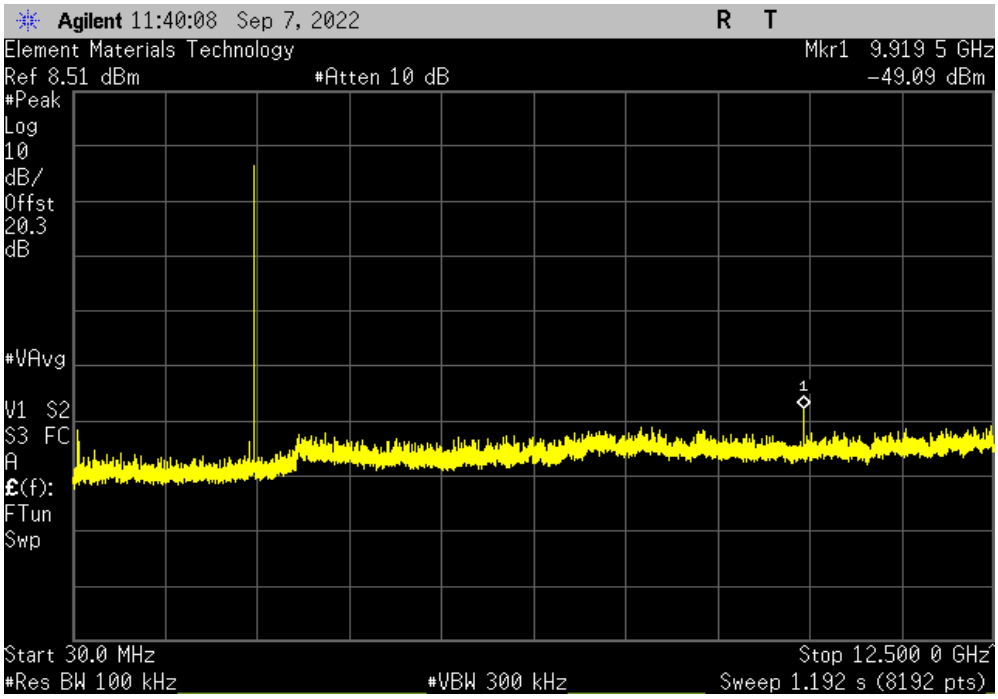
BLE/GFSK 1 Mbps, Mid Channel, 2442 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	24728.4	-44.54	-20	Pass



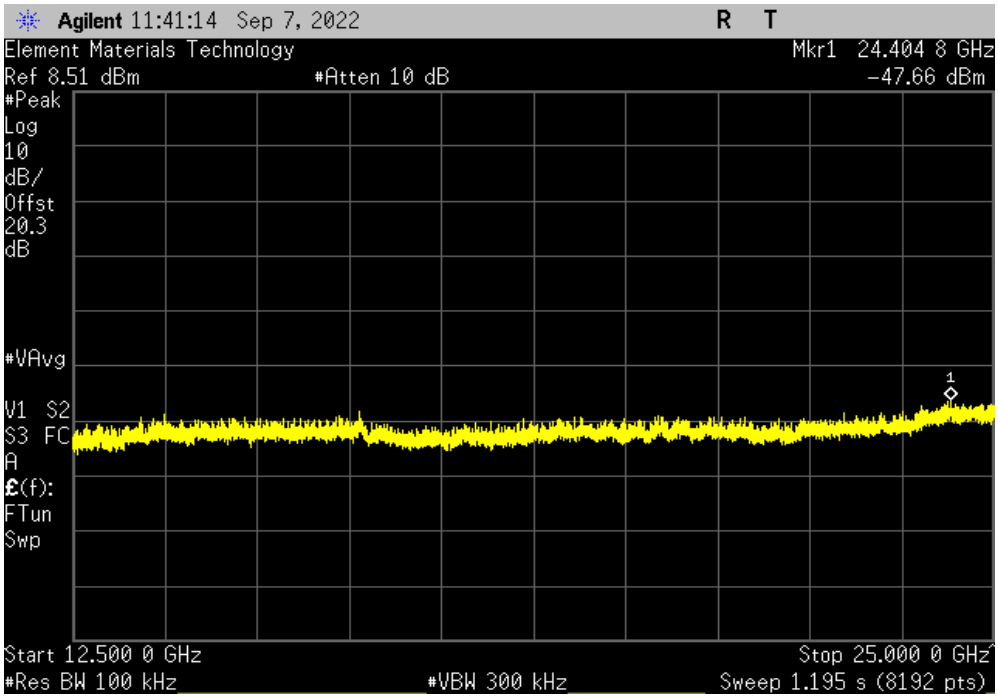
BLE/GFSK 1 Mbps, High Channel, 2480 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	2480.24	N/A	N/A	N/A



BLE/GFSK 1 Mbps, High Channel, 2480 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	9919.5	-45.94	-20	Pass



BLE/GFSK 1 Mbps, High Channel, 2480 MHz				
Frequency Range	**Measured Freq (MHz)**	**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz	24404.8	-44.51	-20	Pass



SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	2021-12-09	2022-12-09
Antenna - Biconilog	EMCO	3142B	AXJ	2021-03-03	2023-03-03
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2022-03-02	2024-03-02
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	NCR
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	NCR
Antenna - Standard Gain	ETS Lindgren	3160-09	AIV	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	2021-11-17	2022-11-17
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	2022-05-03	2023-05-03
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	2021-11-17	2022-11-17
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2021-11-17	2022-11-17
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	2022-07-08	2023-07-08
Cable	N/A	Bilog Cables	EVA	2021-11-17	2022-11-17
Cable	N/A	Double Ridge Horn Cables	EVB	2022-05-03	2023-05-03
Cable	None	Standard Gain Horn Cables	EVF	2021-11-17	2022-11-17
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	EVY	2022-07-08	2023-07-08

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.2 dB	-5.2 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 26.5 GHz

POWER INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

ONIT0091-2

MODES INVESTIGATED

Continuous Tx - BLE, GFSK, 1 Mbps, Low Ch = 2402 MHz, Mid Ch = 2442 MHz, High Ch = 2480 MHz
Continuous Tx - BLE, GFSK, 1 Mbps, Low Ch = 2402 MHz, High Ch = 2480 MHz

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

EUT:	Passport	Work Order:	ONIT0091
Serial Number:	47155986	Date:	2022-09-08
Customer:	Supra, A Division of UTCFS	Temperature:	22.6°C
Attendees:	Ali Elmi	Relative Humidity:	40.3%
Customer Project:	None	Bar. Pressure (PMSL):	1027 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	ONIT0091-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	12	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

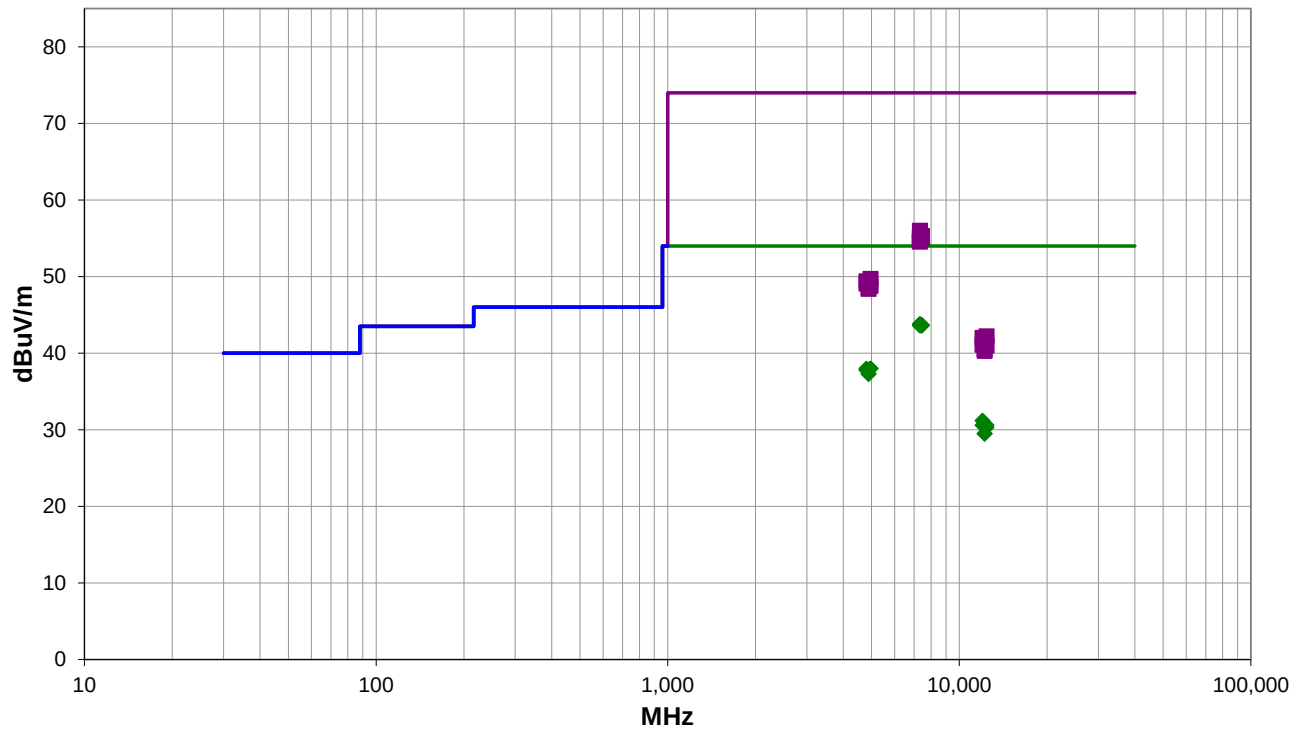
None

EUT OPERATING MODES

Continuous Tx - BLE, GFSK, 1 Mbps, Low Ch = 2402 MHz, Mid Ch = 2442 MHz, High Ch = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 12 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

RESULTS - Run #12

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
7326.017	28.1	15.7	1.0	116.0	3.0	0.0	Horz	AV	0.0	43.8	54.0	-10.2	Mid Ch, EUT Horz
7324.075	28.1	15.7	1.4	149.0	3.0	0.0	Vert	AV	0.0	43.8	54.0	-10.2	Mid Ch, EUT Horz
7325.000	28.0	15.7	2.6	48.0	3.0	0.0	Horz	AV	0.0	43.7	54.0	-10.3	Mid Ch, EUT on Side
7324.658	28.0	15.7	3.2	37.0	3.0	0.0	Horz	AV	0.0	43.7	54.0	-10.3	Mid Ch, EUT Vert
7323.858	28.0	15.7	1.0	229.0	3.0	0.0	Vert	AV	0.0	43.7	54.0	-10.3	Mid Ch, EUT Vert
7437.508	27.7	16.0	1.0	302.0	3.0	0.0	Horz	AV	0.0	43.7	54.0	-10.3	High Ch, EUT Horz
7327.267	27.9	15.7	1.0	117.0	3.0	0.0	Vert	AV	0.0	43.6	54.0	-10.4	Mid Ch, EUT on Side
7438.833	27.6	16.0	2.8	279.0	3.0	0.0	Vert	AV	0.0	43.6	54.0	-10.4	High Ch, EUT Horz
4961.817	29.5	8.5	1.0	31.0	3.0	0.0	Horz	AV	0.0	38.0	54.0	-16.0	High Ch, EUT Horz
4962.358	29.5	8.5	1.0	63.0	3.0	0.0	Vert	AV	0.0	38.0	54.0	-16.0	High Ch, EUT Horz
4801.783	29.7	8.3	1.0	40.0	3.0	0.0	Vert	AV	0.0	38.0	54.0	-16.0	Low Ch, EUT Horz
4801.533	29.5	8.3	1.0	306.0	3.0	0.0	Horz	AV	0.0	37.8	54.0	-16.2	Low Ch, EUT Horz
4883.608	29.0	8.3	1.0	1.0	3.0	0.0	Horz	AV	0.0	37.3	54.0	-16.7	Mid Ch, EUT Horz
4882.475	29.0	8.3	1.0	178.0	3.0	0.0	Vert	AV	0.0	37.3	54.0	-16.7	Mid Ch, EUT Horz
7323.558	40.3	15.7	1.0	116.0	3.0	0.0	Horz	PK	0.0	56.0	74.0	-18.0	Mid Ch, EUT Horz
7441.908	39.3	16.0	1.0	302.0	3.0	0.0	Horz	PK	0.0	55.3	74.0	-18.7	High Ch, EUT Horz
7323.917	39.4	15.7	1.0	229.0	3.0	0.0	Vert	PK	0.0	55.1	74.0	-18.9	Mid Ch, EUT Vert
7324.175	39.3	15.7	1.0	117.0	3.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	Mid Ch, EUT on Side
7441.567	39.0	16.0	2.8	279.0	3.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	High Ch, EUT Horz
7328.467	38.9	15.7	1.4	149.0	3.0	0.0	Vert	PK	0.0	54.6	74.0	-19.4	Mid Ch, EUT Horz
7324.900	38.9	15.7	2.6	48.0	3.0	0.0	Horz	PK	0.0	54.6	74.0	-19.4	Mid Ch, EUT on Side
7324.325	38.9	15.7	3.2	37.0	3.0	0.0	Horz	PK	0.0	54.6	74.0	-19.4	Mid Ch, EUT Vert
12008.780	31.4	-0.2	1.0	337.0	3.0	0.0	Vert	AV	0.0	31.2	54.0	-22.8	Low Ch, EUT Horz
12398.620	30.1	0.5	1.0	84.0	3.0	0.0	Vert	AV	0.0	30.6	54.0	-23.4	High Ch, EUT Horz
12008.880	30.8	-0.2	1.5	100.0	3.0	0.0	Horz	AV	0.0	30.6	54.0	-23.4	Low Ch, EUT Horz
12398.700	29.8	0.5	1.1	66.0	3.0	0.0	Horz	AV	0.0	30.3	54.0	-23.7	High Ch, EUT Horz
4961.567	41.2	8.5	1.0	63.0	3.0	0.0	Vert	PK	0.0	49.7	74.0	-24.3	High Ch, EUT Horz
12208.870	29.5	0.0	1.6	279.0	3.0	0.0	Horz	AV	0.0	29.5	54.0	-24.5	Mid Ch, EUT Horz
12209.140	29.5	0.0	2.0	128.0	3.0	0.0	Vert	AV	0.0	29.5	54.0	-24.5	Mid Ch, EUT Horz
4803.342	41.1	8.3	1.0	306.0	3.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	Low Ch, EUT Horz
4801.517	40.8	8.3	1.0	40.0	3.0	0.0	Vert	PK	0.0	49.1	74.0	-24.9	Low Ch, EUT Horz
4960.425	40.3	8.5	1.0	31.0	3.0	0.0	Horz	PK	0.0	48.8	74.0	-25.2	High Ch, EUT Horz
4886.142	40.4	8.3	1.0	178.0	3.0	0.0	Vert	PK	0.0	48.7	74.0	-25.3	Mid Ch, EUT Horz
4885.733	40.1	8.3	1.0	1.0	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	Mid Ch, EUT Horz
12399.040	41.7	0.5	1.0	84.0	3.0	0.0	Vert	PK	0.0	42.2	74.0	-31.8	High Ch, EUT Horz
12008.610	42.2	-0.2	1.0	337.0	3.0	0.0	Vert	PK	0.0	42.0	74.0	-32.0	Low Ch, EUT Horz
12009.300	41.3	-0.2	1.5	100.0	3.0	0.0	Horz	PK	0.0	41.1	74.0	-32.9	Low Ch, EUT Horz
12399.180	40.5	0.5	1.1	66.0	3.0	0.0	Horz	PK	0.0	41.0	74.0	-33.0	High Ch, EUT Horz
12208.180	40.5	0.0	2.0	128.0	3.0	0.0	Vert	PK	0.0	40.5	74.0	-33.5	Mid Ch, EUT Horz
12210.880	40.3	0.0	1.6	279.0	3.0	0.0	Horz	PK	0.0	40.3	74.0	-33.7	Mid Ch, EUT Horz

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

CONCLUSION
Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

EUT:	Passport	Work Order:	ONIT0091
Serial Number:	47155986	Date:	2022-09-08
Customer:	Supra, A Division of UTCFS	Temperature:	22.6°C
Attendees:	Ali Elmi	Relative Humidity:	40.3%
Customer Project:	None	Bar. Pressure (PMSL):	1027 mb
Tested By:	Jeff Alcoke	Job Site:	EV01
Power:	Battery	Configuration:	ONIT0091-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2022	ANSI C63.10:2013

TEST PARAMETERS

Run #:	16	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

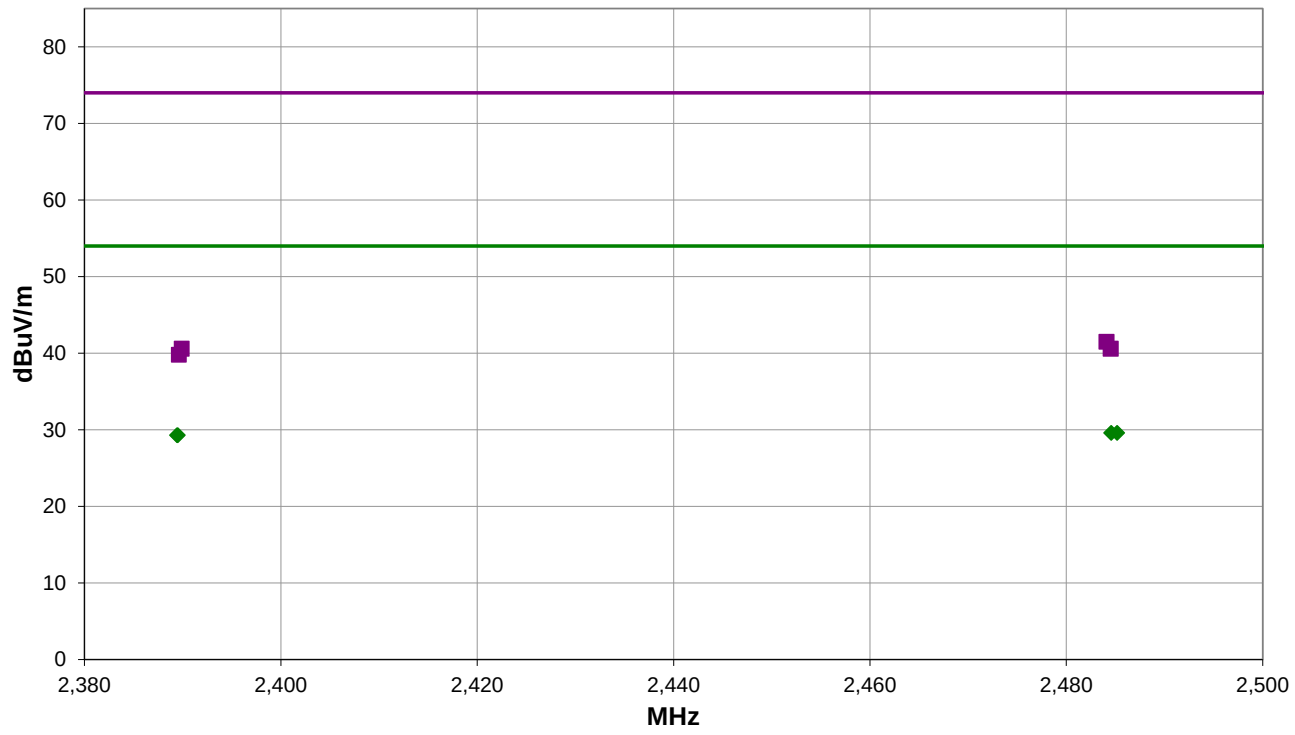
None

EUT OPERATING MODES

Continuous Tx - BLE, GFSK, 1 Mbps, Low Ch = 2402 MHz, High Ch = 2480 MHz

DEVIATIONS FROM TEST STANDARD

None



Run #: 16 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2022.02.22.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.1.12.0

RESULTS

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
2484.570	30.9	-1.3	1.0	287.0	3.0	0.0	Horz	AV	0.0	29.6	54.0	-24.4	High Ch, EUT Horz
2485.173	30.9	-1.3	1.0	338.0	3.0	0.0	Vert	AV	0.0	29.6	54.0	-24.4	High Ch, EUT Vert
2389.427	31.1	-1.8	1.0	5.0	3.0	0.0	Vert	AV	0.0	29.3	54.0	-24.7	Low Ch, EUT Vert
2389.497	31.1	-1.8	1.0	47.0	3.0	0.0	Horz	AV	0.0	29.3	54.0	-24.7	Low Ch, EUT Horz
2484.100	42.8	-1.3	1.0	338.0	3.0	0.0	Vert	PK	0.0	41.5	74.0	-32.5	High Ch, EUT Vert
2484.520	41.9	-1.3	1.0	287.0	3.0	0.0	Horz	PK	0.0	40.6	74.0	-33.4	High Ch, EUT Horz
2389.897	42.4	-1.8	1.0	5.0	3.0	0.0	Vert	PK	0.0	40.6	74.0	-33.4	Low Ch, EUT Vert
2389.603	41.6	-1.8	1.0	47.0	3.0	0.0	Horz	PK	0.0	39.8	74.0	-34.2	Low Ch, EUT Horz

CONCLUSION

Pass

Tested By

DTS BANDWIDTH

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
Cable	Micro-Coax	UFD150A-1-0720-200200	EVI	2021-12-05	2022-12-05
Block - DC	Fairview Microwave	SD3379	AMW	2022-03-14	2023-03-14
Attenuator	S.M. Electronics	SA26B-20	AUY	2022-03-15	2023-03-15
Generator - Signal	Keysight	N5182B	TFU	2020-11-20	2022-11-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	2022-01-26	2023-01-26

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.

DTS BANDWIDTH

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**Passport**			**Work Order:**	**ONIT0091**
Serial Number:	**44594549**			**Date:**	**7-Sep-22**
Customer:	**Supra, A Division of UTCFS**			**Temperature:**	**22.8 °C**
Attendees:	**Ali Elmi**			**Humidity:**	**43.5% RH**
Project:	**None**			**Barometric Pres.:**	**1022 mbar**
Tested by:	**Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2022	ANSI C63.10:2013

COMMENTS

Reference level offset includes: DC Block, 20 dB attenuator, measurement cable and manufacturers provided SMA patch cable.

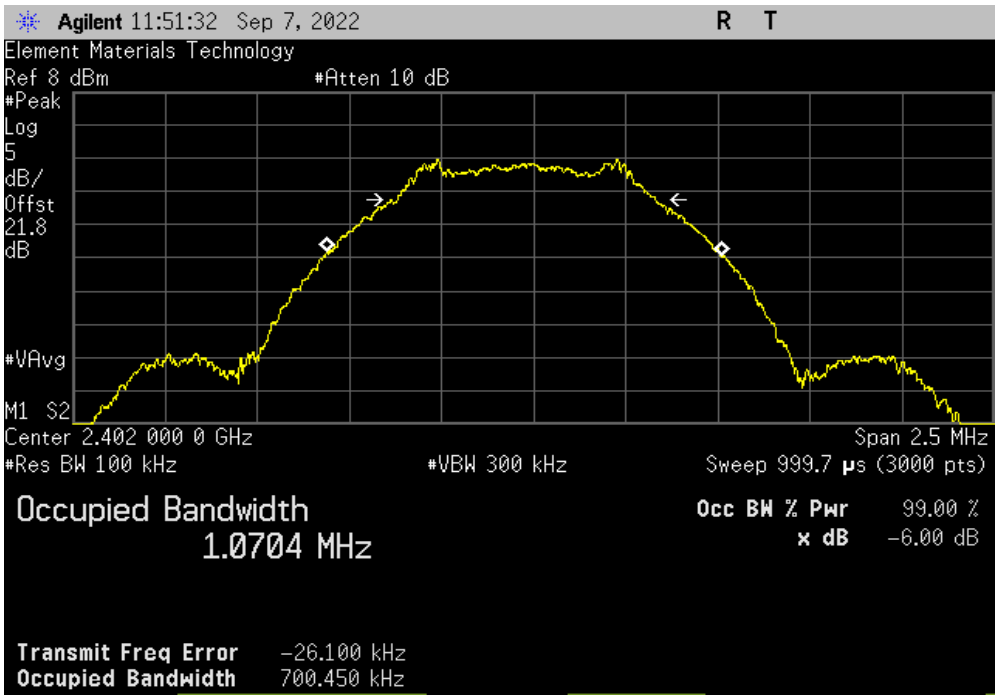
DEVIATIONS FROM TEST STANDARD

None

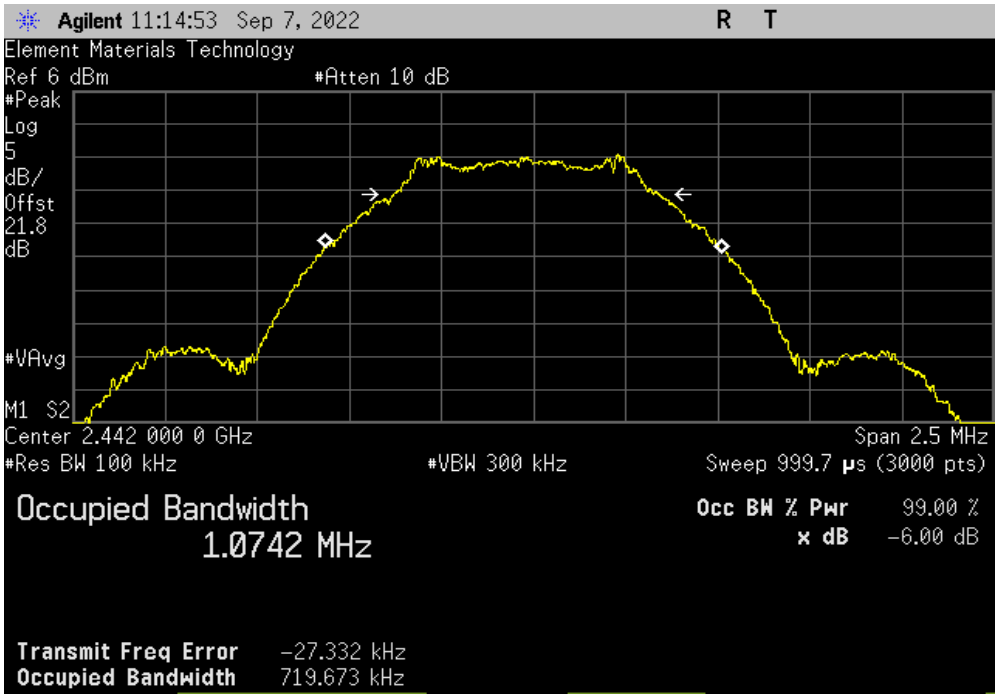
Configuration #	**1**	*Signature*

	Value	**Limit (≥)**	**Result**
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	700.45 kHz	500 kHz	Pass
Mid Channel, 2442 MHz	719.673 kHz	500 kHz	Pass
High Channel, 2480 MHz	698.397 kHz	500 kHz	Pass

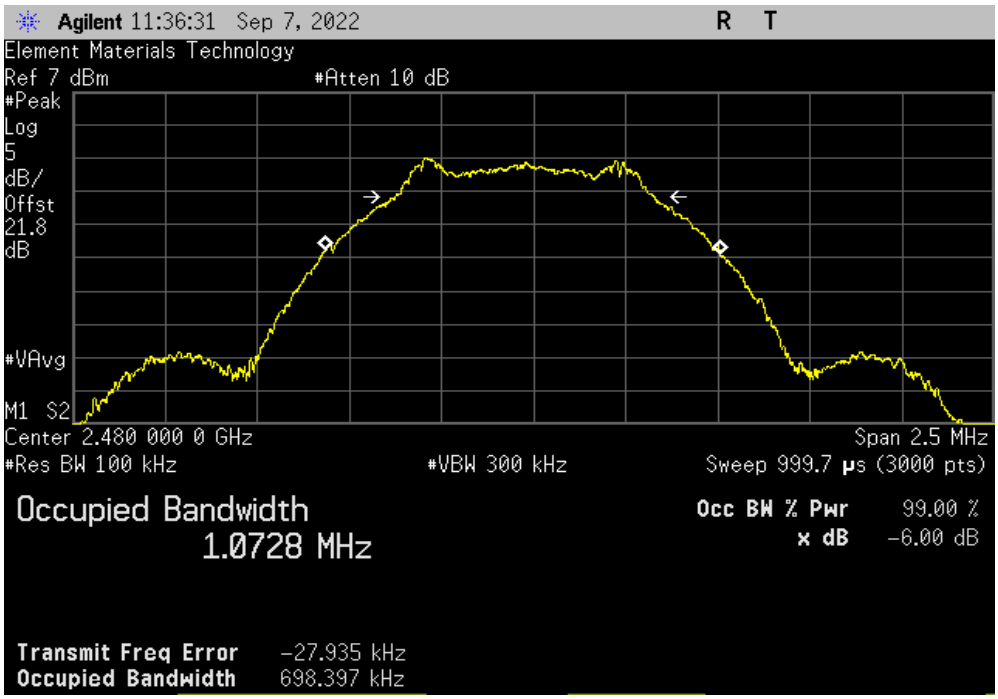
BLE/GFSK 1 Mbps, Low Channel, 2402 MHz						
				Value	Limit (≥)	Result
				700.45 kHz	500 kHz	Pass



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



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



End of Test Report