

Test Report # 3560 A

Equipment Under Test:	OD1025-01	
Requirement(s):	FCC 15.247 (DTS BLE), FCC 15.209, RSS-247, RSS-GEN	
Test Date(s):	March 9 th , 2022 to April 22 nd , 2022	
Prepared for:	Enovation Controls, LLC Attn: Jim Fox 5311 South 122 nd East Avenue Tulsa, OK 74146	

Report Issued by: Zach Wilson, EMC Engineer Signature: June Will	Date: 5/26/2022
Report Reviewed by: Adam Alger, Laboratory Manager Signature: Adam O Alger	Date: 4/28/2022
Report Constructed by: Zach Wilson, EMC Engineer II Signature:	Date: 4/22/2022

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Laird Connectivity Test Services in Review

The Laird Connectivity LLC laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:



A2LA – American Association for Laboratory Accreditation Accreditation based on ISO/IEC 17025:2017 with Electrical (EMC) Scope A2LA Certificate Number: 1255.01

Scope of accreditation includes all test methods listed herein unless otherwise noted



Federal Communications Commission (FCC) – USA Accredited Test Firm Registration Number: 953492 Recognition of two 3 meter Semi-Anechoic Chambers



Innovation, Science and Economic Development Canada

Accredited U.S. Identification Number: US0218 Recognition of two 3 meter Semi-Anechoic Chambers

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1 TEST REPORT SUMMARY

During March 9th, 2022, to April 22nd, 2022, the Equipment Under Test (EUT), OD1025-01, as provided by Enovation Controls, LLC was tested to the following requirements of the Federal Communications Commission and Innovation, Science and Economic Development Canada:

FCC 15.247 DTS (BLE)

Requirement	Description	Specification	Method	Result
FCC: 15.247 (a)(2) ISED: RSS-247: 5.2 a	Digital Modulation System 6 dB bandwidth	500 kHz	ANSI C63.10	Compliant
FCC: 2.1049 ISED: RSS-GEN 6.7	Occupied Bandwidth	Reported	ANSI C63.10	Compliant
FCC: 15.247 (b)(3) ISED: RSS-247: 5.4 d	Maximum Conducted Output Power	30 dBm	ANSI C63.10	Compliant
FCC: 15.247 (e) ISED: RSS-247: 5.2 b	Digital Modulation System Power Spectral Density	8 dBm / 3 kHz	ANSI C63.10	Compliant
FCC: 15.247 (d) ISED: RSS-247 5.5	RF Spurious Emissions	20 dBc	ANSI C63.10	Compliant
FCC: 15.247 (d) ISED: RSS-247 5.5	Spurious Radiated Emissions in Restricted Bands	FCC 15.209 RSS-GEN 8.10	ANSI C63.10	Compliant
FCC: 2.1055 (d) ISED: RSS-GEN 8.11	Frequency Stability	Reported	ANSI C63.10	Compliant
FCC 15.247 (d) ISED: RSS-247 5.5	Simultaneous Transmission	KDB 996369 D v02 Section C	ANSI C63.10	Compliant

Notice:

The results relate only to the item tested as configured and described in this report. Any additional configurations, modes of operation, or modifications made to the equipment under test after the specified test date(s) are at the decision of the client and may not apply to the data seen in this test report.

The decision rule for Pass / Fail assessment to the specification or standard listed in this test report has been agreed upon by the client and laboratory to be as follows:

Measurement Type	Rule
Emissions – Amplitude	1 dB below the specified limit
Emissions – Frequency	1% less than the specification

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2 CLIENT INFORMATION

Company Name	Enovation Controls, LLC	
Contact Person	Jim Fox	
Address		
Address	Tulsa, OK 74146	

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	OD1025-01	
Model Number	78350859	
Serial Number	Engineering Sample	
FCC ID	2A3FV-ECB01	
ISED ID	28102-ECB01	

2.2 Product Description

The EUT contains three Laird Connectivity BT850 BLE/BT modules. Each module contains a different trace layout. All modules use the chip antenna listed in section 2.5. Device powered at 14 VDC.

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

2.5 Antenna Information

Johanson Chip Antenna (3), P/N: 2450AT18D0100, with a peak gain of 1.5 dBi.

2.6 Programming Information

Programmed via CYbluetool v0.1.55.1. Radiated programming used host unit with selectable rates/channels/power via the front panel touch screen (code provided by client).

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2.7 Data Rates/Modulations and Channels

BLE Data Rate/Modulations: GFSK 1Mbps BLE Channels: 0 (2402 MHz), 19 (2440 MHz), 39 (2480 MHz)

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REFERENCES

Publication	Edition		Date		Amd. 1	Amd. 2
FCC eCFR	-		2022		-	-
ANSI C63.10	-		2013		-	-
KDB 996369 D	02	2015	-	-		
RSS-247	2	2017	-	-		
RSS-GEN	5	2018	2019	2021		

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4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k = 2.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty ±
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	urbance Power Emissions Absorbing Clamp	
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

Parameter	ETSI U.C. ±	U.C. ±
Radio Frequency, from F0	1x10 ⁻⁷	0.55x10 ⁻⁷
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

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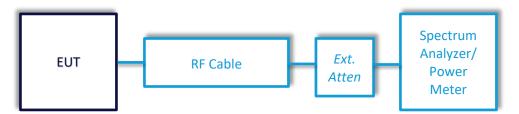


5 TEST DATA

5.1 Antenna Port Conducted Emissions

Description of	The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter.
Measurement	The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.
Example Calculations	Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm) Margin (dB) = Limit (dBm) – Corrected Reading (dBm)

Block Diagram



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5.1.1 DTS Bandwidth (6dB)

Operator	Zach Wilson	QA	Anthony Smith	
Temperature	20.5°C	R.H. % 25.4		
Test Date	3/9/2022	Location	Bench	
Requirement	FCC 15.247, RSS-247	Method	ANSI C63.10 §11.8.2	

Limits: DTS BW greater than or equal to 500kHz

Test Parameters

Frequency	Frequency 2402 MHz, 2440 MHz, 2480 MHz Setup		Conducted
RBW	100kHz	VBW	300kHz
Detector(s)	Max peak hold	Span	3 MHz

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	3/22/2021	3/22/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/12/2021	4/12/2022	Active Calibration

EUT Parameters

Input Power	14VDC via lab supply	Mode	BLE Modulated Transmit
Frequency	2402-2480 MHz	Channel	0, 19, 39

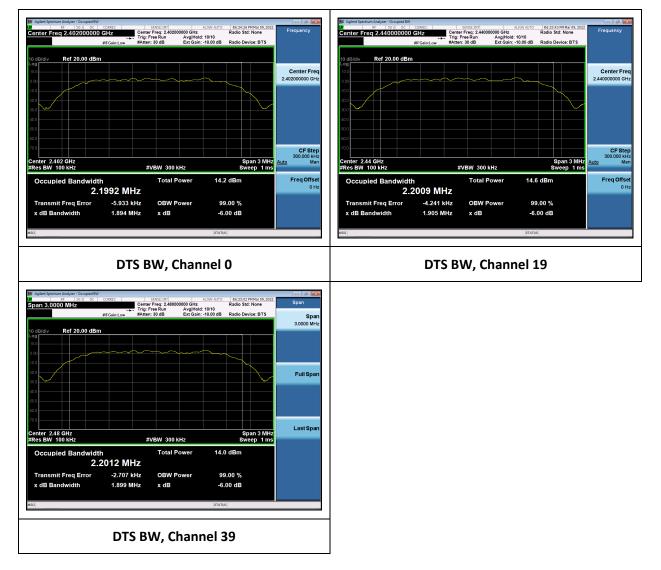
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Data Table

Frequency (MHz)	6 dB/DTS BW (kHz)	Limit (kHz)	Margin (kHz)
2402.0	1894.0	500.0	1394.0
2440.0	1905.0	500.0	1405.0
2480.0	1899.0	500.0	1399.0

Plots



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5.1.2 99% Occupied Bandwidth

Operator	Zach Wilson	QA	Anthony Smith
Temperature	20.5°C	R.H. %	25.4
Test Date	3/9/2022	Location	Bench
Requirement	FCC 15.247, RSS-247	Method	ANSI C63.10 §6.9.3

Limits: Reported

Test Parameters

Frequency	2402 MHz, 2440 MHz, 2480 MHz	Setup	Conducted
RBW	30 kHz	VBW	100 kHz
Detector(s)	Max peak hold	Span	3 MHz

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	3/22/2021	3/22/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/12/2021	4/12/2022	Active Calibration

EUT Parameters

Input Power	14VDC via lab supply	Mode	BLE Modulated Transmit
Frequency	2402-2480 MHz	Channel	0, 19, 39

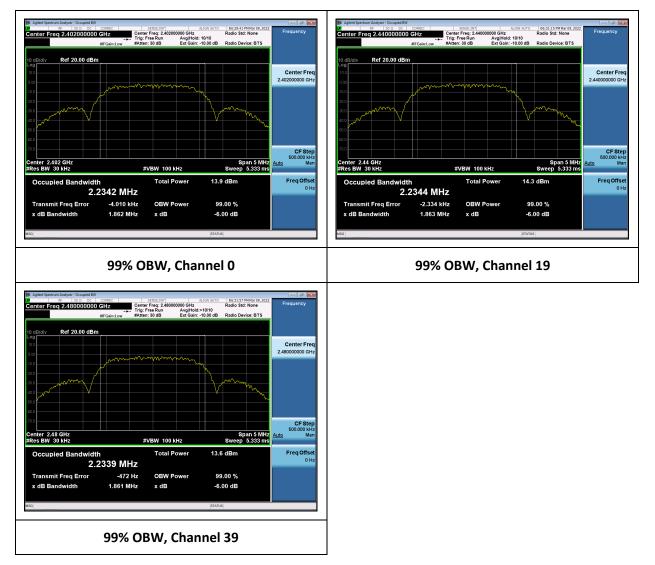
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Data Table

Frequency (MHz)	99% OBW (kHz)
2402.0	2234.2
2440.0	2234.4
2480.0	2233.9

Plots



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5.1.3 Peak Fundamental Emission Output Power

Operator	Zach Wilson	QA	Anthony Smith
Temperature	20.5°C	R.H. %	25.4
Test Date	3/9/2022	Location	Bench
Requirement	FCC 15.247, RSS-247	Method	ANSI C63.10 §11.9.1.1

Limits: 1W or 30dBm

Test Parameters

Frequency	2402 MHz, 2440 MHz, 2480 MHz	Setup	Conducted
RBW	3 MHz	VBW	50 MHz
Detector(s)	Max peak hold	Span	3 MHz

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	3/22/2021	3/22/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/12/2021	4/12/2022	Active Calibration

EUT Parameters

Input Power	14 VDC via lab supply	Mode	BLE Modulated Transmit
Frequency	2402-2480 MHz	Channel	0, 19, 39

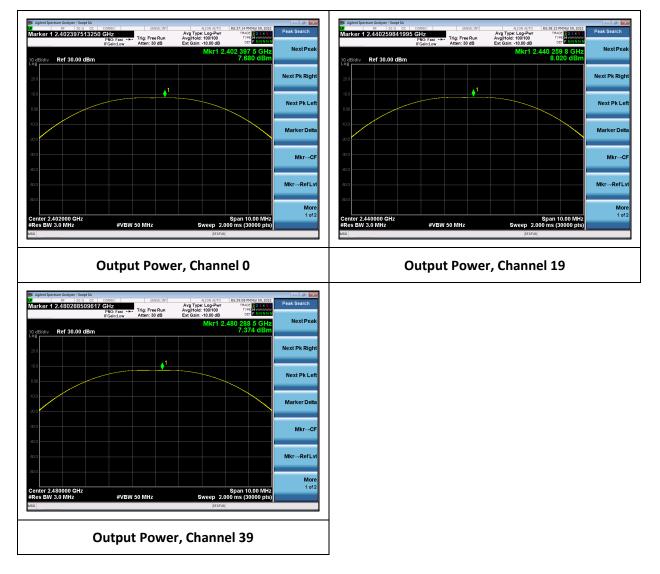
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Data Table

Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
2402.0	7.7	30.0	22.3
2440.0	8.0	30.0	22.0
2480.0	7.4	30.0	22.6

Plots



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5.1.4 Peak Power Spectral Density

Operator	Zach Wilson	QA Anthony Smith	
Temperature	20.5°C	R.H. % 25.4	
Test Date	3/9/2022	Location Bench	
Requirement	FCC 15.247, RSS-247	Method	ANSI C63.10 §11.10.2

Limits: 8dBm/3kHz

Test Parameters

Frequency	2402 MHz, 2440 MHz, 2480 MHz	Setup	Conducted
RBW	3 kHz	VBW	10 kHz
Detector(s)	Max peak hold	Span	3 MHz

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	3/22/2021	3/22/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/12/2021	4/12/2022	Active Calibration

EUT Parameters

Input Power	14VDC via lab supply	Mode	BLE Modulated Transmit
Frequency	2402-2480 MHz	Channel	0, 19, 39

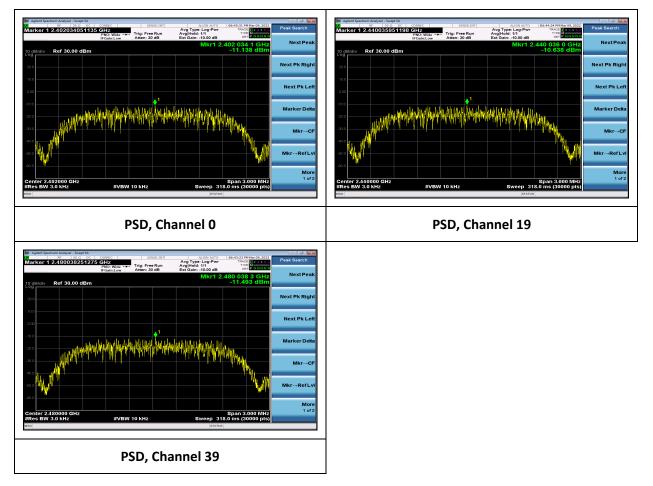
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Data Table

Frequency (MHz)	Peak Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dBm/3kHz)
2402.0	-11.1	8.0	19.1
2440.0	-10.6	8.0	18.6
2480.0	-11.5	8.0	19.5

Plots



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5.1.5 Conducted Spurious Emissions and Conducted Band Edge Measurements

Operator	Zach Wilson	QA	Anthony Smith
Temperature	20.5°C	R.H. %	25.4
Test Date	3/9/2022	Location	Bench
Requirement	FCC 15.247, RSS-247	Method	ANSI C63.10 §11.11, 11.12, 11.13

Limits: 20 dBc

Test Parameters

Frequency	30-25000 MHz	Setup	Conducted
RBW	100 kHz	VBW	300 kHz
Detector(s)	Max hold with peak detector for plots and data.		
Notes	Mid channel shown for spurious emissions		

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	3/22/2021	3/22/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/12/2021	4/12/2022	Active Calibration

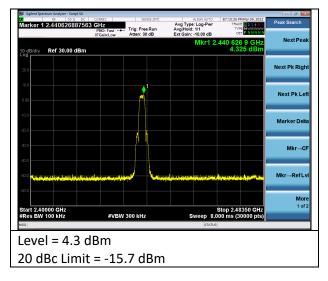
EUT Parameters

Input Power	14VDC via lab supply	Mode	BLE Transmit
Frequency	2402, 2440, 2480 MHz	Channel	0, 19, 39

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Reference Level Plot



Data Tables

Frequency (MHz)	Channel	Data Rate	Peak Reading (dBm)	Limit (dBm)	Margin (dB)
2400.0	0	BLE	-24.1	-15.7	8.4
2483.5	39	BLE	-32.8	-15.7	17.1

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Conducted Band Edge Plots

III Aglett Spectrum Anlyzer Swegt SA W So C CONSIC SINSEINT W So C CONSIC SINSEINT PNO: Fast →→ IFGaint_Low Atten: 24 dB	ALIGN AUTO 12:99:16 AM Nar 10, 2022 Avg Type: Log-Pwr TRACE 12:34:57 Avg[Hold: 111 Time 12:34:57 Ext Gain: -10:00 dB Det Det NNNNN	Marker Select Marker	III Agitet Spectrum Analyzer Swept SA SI SI SI Marker 1 2.950950951 MHz FNO: Fast	Avg Type: Log-Pwr TRACE 123456 n Avg Hold: 1/1 TYPE	Peak Search
10 dB/div Ref 24.00 dBm	ΔMkr1 -2.691 MHz -27.729 dB	1	10 dB/dfy Ref 24.00 dBm	ΔMkr1 2.951 MHz -36.984 dB	Next Peal
4.00	ensited the	Normal			Next Pk Righ
6 00	142	Deita	4.00 -160		Next Pk Lef
		Fixed⊳			Marker Delta
		no	-60 U	and the second se	Mkr→CF
Start 2.390000 GHz #Res BW 100 kHz #VBW 300 kHz	Stop 2.404000 GHz Sweep 1.399 ms (1000 pts)	Properties►	Start 2.47800 GHz #Res BW 100 kHz #VBW 300 kHz	Stop 2.50000 GHz Sweep 2.131 ms (1000 pts)	Mkr→RefLv
MMR MODEF TRC ScL X Y F I I 0.2 1.02 I 1.02 0.2 1.02 0.1 2.7.729 B 2 F 1 f 0.2 2.691 MHz 4.166 dBm 3 N 1 r 2.400 600 GHz -24.088 dBm 4 1 r 2.400 600 GHz -24.088 dBm	VICTION FUNCTION WOTH FUNCTION VALUE	More 1 of 2	MR MODE TRCI SCI. X Y 1 Δ2 1 f (Δ) 2.951 MHz (Δ) 3.954 dB 2 F 1 f 2.480 643 GHz 3.925 dBm 3 N 1 f 2.483 500 GHz -3.22760 dBm	FUNCTION FUNCTION WIDTH FUNCTION VALUE	More 1 of 2
MSG	STATUS		MSS	STATUS	
2390-2400 MHz	, Channel 0, BR		2483.5-2500 M	Hz, Channel 78, BR	

Conducted Spurious Plots

Marker 1 921.589052968 MHz	ALIGN AUTO 07:14:15 PMNar 09, 2022 Avg Type: Log-Pwr TRACE 12.3.4.5.0 Avg[Hold: 1/1 TVPF	Peak Search	Marker 1 2.3139644654	82 GHz	SENSE:INT	Avg Type: Log-Pu Avg Hold: 1/1	0 07:16:05 PH M	2 34 5 5 Peak Search
PNO: Fast +	Ext Gain: -10.00 dB DET				ree Run : 30 dB	Avg Hold: 1/1 Ext Gain: -10.00 dl		NNNNN
	Mkr1 921.59 MHz -50.151 dBm	Next Peak				M	kr1 2.313 9 -48.291	6 GHz Next Peak
10 dB/div Ref 30.00 dBm	-30:131 0811		10 dB/div Ref 30.00 dBm	1			-40.291	CIBII
20.0		Next Pk Right	20.0					Next Pk Right
10.0		Next Pk Left	10.0					Next Pk Left
0.00		Next PK Leit	0.00					Next PK Len
-10.0			-10.0					
	-1520.08%	Marker Delta						Marker Delta
-20.0			-20.0					
30.0		Mkr→CF	-30.0					Mkr→CF
			-40.0					
	_ 1							♦ ¹
and a second stress of second second second second second		Mkr→RefLvl	-50.0 Protonestel provident ford	and the second second				Mkr→RefLvi
			-60.0					
		More 1 of 2						More 1 of 2
Start 30.0 MHz #Res BW 100 kHz #VBW 300 kHz	Stop 1.0000 GHz Sweep 94.00 ms (30000 pts)		Start 1.0000 GHz #Res BW 100 kHz	#VBW 300 ki	Hz	Sweep	Stop 2.390 134.0 ms (300	00 GHz
N95	STATUS		MSG				trus	
30-1000 MHz	BLE Channel 19		10	00-2390 0	ЛН7 І	RIF Ch	annel 1	19
30-1000 MHz,	BLE, Channel 19		10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
30-1000 MHz,	BLE, Channel 19		10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
III Aglest Spectrum Analyzer - Swegt SA	M 10N M/TO 07-22:30 PM NW 09-2022	0 4	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglett Spectrum Analyzer - Swept SA RF 30.0 DC 00492 C StINSE.IV/ Mark er 1 24 - 8002 4961749892 CHz	ALIGN ALTO 07-22-30 PMN/# 69, 2022 Avg Type: Log-Pwr/ TRACE 02-26 TA	Pesk Search	10	000-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglient Spectrum Analyzer - Swept SA W INF 50.0 DC CORREC SERVICE SERVICENT	A 100 9/170 [072239 PMM# 69 2022 Avg Type: Log-Pwr Avg Hold: 11 TYPE [0.0 00] Ext Gain: 10.00 dB		10	000-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglett Spectrum Analyzer - Swept SA RF 30.0 DC 00492 C StINSE.IV/ Mark er 1 24 - 8002 4961749892 CHz	ALIGN ALTO 07-22-30 PMN/# 69, 2022 Avg Type: Log-Pwr/ TRACE 02-26 TA	Peak Search	10	000-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 2F Fidans.Low Fidans.Low Fidans.Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search Next Peak	10	000-2390 M	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 2F Fidans.Low Fidans.Low Fidans.Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search	10	000-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 2F Fidans.Low Fidans.Low Fidans.Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search Next Peak Next Pk Right	10	000-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 2F Fidans.Low Fidans.Low Fidans.Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search Next Peak	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 27 For Stan Fodes Low Fodes Low Fodes Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search Next Peak Next Pk Right	10	000-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 27 For Stan Fodes Low Fodes Low Fodes Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search Next Peak Next Pk Right	10	000-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 27 For Stan Fodes Low Fodes Low Fodes Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search Next Peak Next Pk Right Next Pk Left	10	000-2390 N	ИНz, I	BLE, Ch	annel 2	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 27 For Stan Fodes Low Fodes Low Fodes Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta	10	000-2390 N	ИНz, I	BLE, Ch	annel 2	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 27 For Stan Fodes Low Fodes Low Fodes Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search Next Peak Next Pk Right Next Pk Left	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 27 For Stan Fodes Low Fodes Low Fodes Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 27 For Stan Fodes Low Fodes Low Fodes Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 22 as a Ext Gain: -10.00 dB cr Carting Kirt 12.4, 2022 5 GHz 6	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 27 For Stan Fodes Low Fodes Low Fodes Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 23 as a Ext Gain: -10.00 dB cr Cartanata Mkr1 24.29.02 5 GHz	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta MkrCF	10	000-2390 N	ИНz, I	BLE, Ch	annel 1	19
Solet factore in a local of a lo	A 100 A010 67.20 MIRINE (0. 202) Avg Tote: In-prev Tote: 20-prev Mix:1 24.902.5 Mix:1 24.902.5	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta MkrRef MkrRef MkrRef	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
Solet factore in a local of a lo	A 100 A010 67.20 MIRINE (0. 202) Avg Tote: In-prev Tote: 20-prev Mix:1 24.902.5 Mix:1 24.902.5	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta MkrCF MkrRef Lvi	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
Aglent Spectrum Analyzer - Swigt SA Salace Tage Tage Mark Keyr 1 24, 902249074190992 CH 27 For Stan Fodes Low Fodes Low Fodes Low	ALION M/TO 07.22.30 PM Are 09, 2022 Avg Type: Log-Pwr TAGC [] 22 as a Avg Type: Log-Pwr TAGC [] 23 as a Ext Gain: -10.00 dB cr Cartanata Mkr1 24.29.02 5 GHz	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta MkrRef MkrRef MkrRef	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
Solet factore in a local of a lo	A 100 A010 67.20 MIRINE (0. 202) Avg Tote: In-prev Tote: 20-prev Mix:1 24.902.5 Mix:1 24.902.5	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta MkrRef MkrRef MkrRef	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
Solet factore in a local of a lo	A 100 A010 67.20 MIRINE (0. 202) Avg Tote: In-prev Tote: 20-prev Mix:1 24.902.5 Mix:1 24.902.5	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta MkrRef MkrRef MkrRef	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19
Agenticitation de de la gradia in a la gradia de la grad	A 100 A010 67.20 MIRINE (0. 202) Avg Tote: In-prev Tote: 20-prev Mix:1 24.902.5 Mix:1 24.902.5	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta MkrRef MkrRef MkrRef	10	00-2390 N	ИНz, I	BLE, Ch	annel 1	19

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5.2 Radiated Emissions

Description of Measurement	The frequency spectrum is investigated for intentional and / or unintentional signals emanating from the EUT by use of a standardized test site and measurement antenna. The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed allowing the data to be gathered and reported as corrected values.
	The maximum emissions from the EUT are determined by turn-table azimuth rotation (360°) and scanning of the measurement antenna. Maximized levels are noted at degree values of azimuth, measurement antenna height, and measurement antenna polarity.
Example Calculations	Measurement (dBµV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBµV/m) Margin (dB) = Limit (dBµV/m) - Corrected Reading (dBµV/m) Example at 4000 MHz: Reading = 40 dBµV + 3.4 dB + 0.9 dB + 6.5 dB/m = 50.8 dBµV/m Average Limit = 20 log (500) = 54 dBµV/m Margin = 54 dBµV/m - 50.8 dBµV/m = 3.2 dB

Block Diagram



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5.2.1 Frequency Stability

Operator	Anthony Smith	QA	Adam Alger
Temperature	24.3°C	R.H. %	31.60%
Test Date	4/22/2022	Location	Chamber 3
Requirement	FCC 2.1055, RSS-GEN	Method	ANSI C63.10 §6.8.2

Limits: Reported

Test Parameters

Frequency	2402, 2440, 2480 MHz	Setup	Radiated
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Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960081	Antenna - Double Ridge Horn	EMCO	3115	6907	9/7/2021	9/7/2022	Active Calibration
EE 960203	Analyzer - EMI Receiver	Keysight	N9038A	MY56400072	4/13/2022	4/13/2023	Active Calibration
LSC-300	Cable	Chamber 3 Emissions	-	-	4/15/2022	4/15/2023	Active Verification

EUT Parameters

Input Power	12.6, 14.0, 15.4 VDC via lab supply	Mode	BLE CW
Frequency	2402, 2440, 2480 MHz	Channel	0, 19, 39

Data Table

	Input Voltage			
	12.6 VDC	14.0 VDC	15.4 VDC	
Channel	Center Frequency (Hz)	Center Frequency (Hz)	Center Frequency (Hz)	
0	2401984605	2401984560	2401984477	
19	2439986605	2439986575	2439986580	
39	2479988725	2479988731	2479988787	

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5.2.2 Radiated Emissions

Operator	Jon Dilley; Braden Smith	QA	Anthony Smith; Alec Krabbe
Temperature	23.7°C	R.H. %	21.20%
Test Date	3/29/2022-4/1/2022	Location	Chamber 3
Requirement	FCC 15.209, FCC 15.247, RSS-247, RSS-GEN	Method	ANSI C63.10

Limits:

Frequency (MHz)	Quasi-Peak Limit (dBµV/m)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)
30-88	40.0	-	-
88-216	43.5	-	-
216-960	46.0	-	-
960-1000	54.0	-	-
1000-25000	-	54.0	74.0

Test Parameters

Frequency	30 MHz – 25 GHz	Distance	3m
Detector(s)	Quasi-peak detector for measurements under 1 GHz. Average measurements were made with a reduced VBW of 10Hz as the signal is 100% duty cycle. Max peak hold for plots.	Table height	80cm (below 1 GHz) 150cm (above 1 GHz)
RBW	Below 1 GHz: 120 kHz Above 1 GHz: 1 MHz	VBW	Below 1 GHz: 1.2 MHz Above 1 GHz, Peak: 3 MHz Above 1 GHz, Avg.: 10 Hz *30 kHz for emission identification
Plots	Worst case plots are shown.	EUT Orientations	Flat, Vertical, Horizontal
Notes	Significant host emissions not related to radio. Host emissions were found compliant with FCC 15.109 class A limits in host product report. Reference plots provided with radios disabled. Three BLE radios were tested.		

EUT Parameters

Input Power	14 VDC	Mode	BLE Transmit
Channel	0, 19, 39	Data Rate/Modulation	GFSK 1Mbps

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Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960005	Antenna - Biconical	EMCO	93110B	9601-2280	8/19/2021	8/19/2022	Active Calibration
AA 960154	Filter - High Pass 2.4 GHz	KWM	HPF-L-14186	7272-02	4/13/2022	4/13/2023	Active Calibration
AA 960158	Antenna - Double Ridge Horn	ETS Lindgren	3117	109300	9/27/2021	9/27/2022	Active Calibration
AA 960176	Cable	A.H. Systems, Inc.	SAC-26G-6	395	3/22/2022	3/22/2023	Active Verification
AA 960195	Antenna - Log Periodic	A.H. Systems, Inc.	SAS-512-2	557	8/17/2021	8/17/2022	Active Calibration
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/11/2022	4/11/2023	Active Calibration
EE 960196	Meter - Hygro-Thermometer	Control Company	90080-03	180045462	5/14/2021	5/14/2022	Active Calibration
LSC-300	Cable	Chamber 3 Emissions	-	-	4/15/2022	4/15/2023	Active Verification

Data Tables – Module 1

Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Quasi- Peak Reading (dBµV/m)	Quasi- Peak Limit (dBµV/m)	Quasi- Peak Margin (dB)	Note
70.7	Horizontal	Vertical	100	0	30.5	40.0	9.5	Emissions not a function of radio
153.0	Horizontal	Vertical	100	80	31.9	43.5	11.6	Emissions not a function of radio
153.0	Horizontal	Horizontal	195	261	32.7	43.5	10.8	Emissions not a function of radio
396.4	Horizontal	Vertical	146	178	41.5	46.0	4.5	Emissions not a function of radio

Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBµV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Channel
2362.0	Vertical	Vertical	176	119	40.0	54.0	14.0	0
2483.5	Vertical	Vertical	176	119	40.4	54.0	13.6	39

Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Channel
2331.9	Vertical	Vertical	176	119	52.9	74.0	21.1	0
2484.7	Vertical	Vertical	176	119	53.9	74.0	20.1	39

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Data Tables – Module 2

Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Quasi- Peak Reading (dBµV/m)	Quasi- Peak Limit (dBµV/m)	Quasi- Peak Margin (dB)	Note
70.7	Horizontal	Vertical	100	0	30.1	40.0	9.9	Emissions not a function of radio
153.3	Horizontal	Vertical	100	117	32.1	43.5	11.4	Emissions not a function of radio
153.3	Horizontal	Horizontal	100	100	29.8	43.5	13.7	Emissions not a function of radio
395.5	Horizontal	Vertical	135	185	43.4	46.0	2.6	Emissions not a function of radio
800.0	Horizontal	Vertical	160	248	39.4	46.0	6.6	Emissions not a function of radio

Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Channel
2362.1	Vertical	Vertical	183	100	40.0	54.0	14.0	0
2496.4	Vertical	Vertical	177	102	40.4	54.0	13.6	39

Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Channel
2384.3	Vertical	Vertical	183	100	52.4	74.0	21.6	0
2487.2	Vertical	Vertical	177	102	53.3	74.0	20.7	39

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Data Tables – Module 3

Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Quasi- Peak Reading (dBµV/m)	Quasi- Peak Limit (dBµV/m)	Quasi- Peak Margin (dB)	Note
129.8	Horizontal	Vertical	100	17	29.9	43.5	13.6	Emissions not a function of radio
153.3	Horizontal	Vertical	100	115	32.0	43.5	11.5	Emissions not a function of radio
153.4	Horizontal	Horizontal	223	111	30.7	43.5	12.8	Emissions not a function of radio
600.0	Horizontal	Horizontal	142	157	38.9	46.0	7.1	Emissions not a function of radio
383.3	Horizontal	Horizontal	110	319	38.4	46.0	7.6	Emissions not a function of radio
800.0	Horizontal	Vertical	200	94	41.8	46.0	4.2	Emissions not a function of radio

Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBμV/m)	Average Limit (dBµV/m)	Average Margin (dB)	Channel
2362.1	Vertical	Vertical	153	94	39.9	54.0	14.1	0
2493.3	Vertical	Vertical	153	94	40.4	54.0	13.6	39

Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Channel
2383.8	Vertical	Vertical	153	94	52.6	74.0	21.4	0
2495.1	Vertical	Vertical	153	94	52.9	74.0	21.1	39

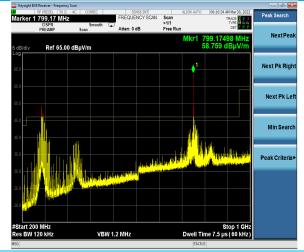
Report: TR3560 A Page 26 of 42 Model: 78350859	Company: Enovation Controls, LLC		Name: OD1025-01
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Quote: NBO-09-2021-004132-1 Serial: Engineering Sample	Quote: NBO-09-2021-004132-1		Serial: Engineering Sample



Plots - Reference, Radios Off



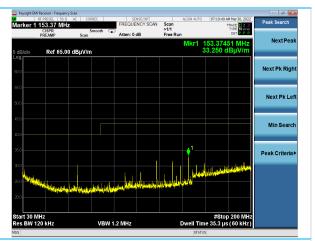
30-200 MHz, Horizontal Antenna All radios disabled, REFERENCE ONLY



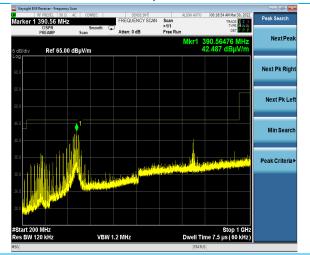
200-1000 MHz, Horizontal Antenna All radios disabled, REFERENCE ONLY



1000-2310 MHz, Horizontal Antenna All radios disabled, REFERENCE ONLY



30-200 MHz, Vertical Antenna All radios disabled, REFERENCE ONLY



200-1000 MHz, Vertical Antenna All radios disabled, REFERENCE ONLY

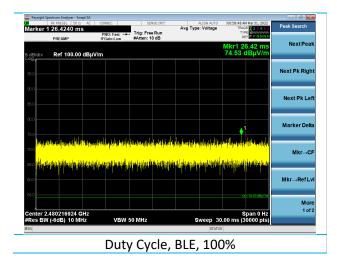


1000-2310 MHz, Vertical Antenna All radios disabled, REFERENCE ONLY

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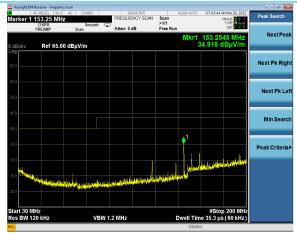
Plots – Duty Cycle



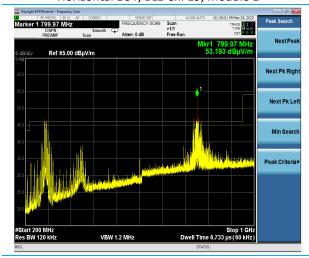
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Plots – Module 1



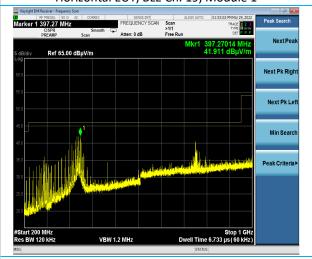
30-200 MHz, Horizontal Antenna Horizontal EUT, BLE Ch. 19, Module 1



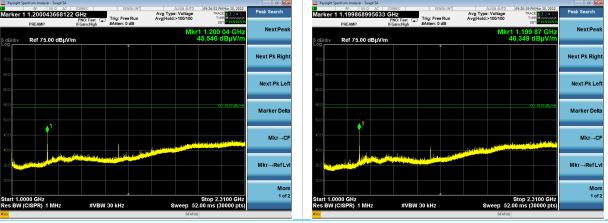
200-1000 MHz, Horizontal Antenna Horizontal EUT, BLE Ch. 19, Module 1



30-200 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 1



200-1000 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 1

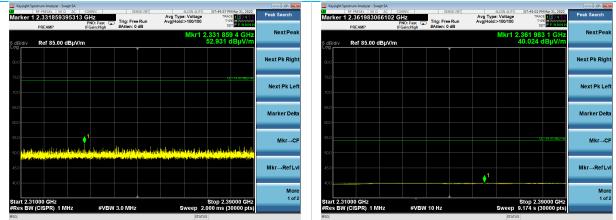


1000-2310 MHz, Horizontal Antenna Horizontal EUT, BLE Ch. 19, Module 1 1000-2310 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 1

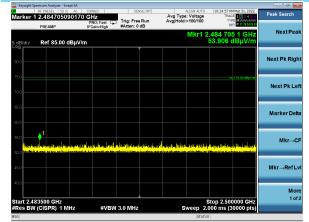
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CONNECTIVITY



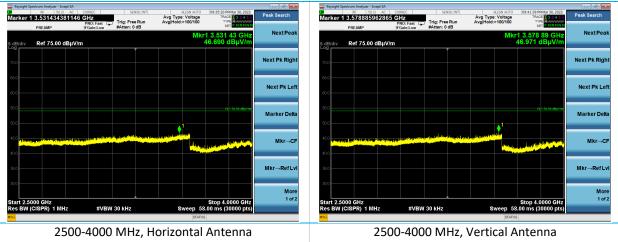
2310-2390 MHz, Peak Horizontal EUT, BLE Ch. 1, Module 1



2310-2390 MHz, Average Horizontal EUT, BLE Ch. 1, Module 1



2483.5-2500 MHz, Peak Horizontal EUT, BLE Ch. 39, Module 1 2483.5-2500 MHz, Average Horizontal EUT, BLE Ch. 39, Module 1



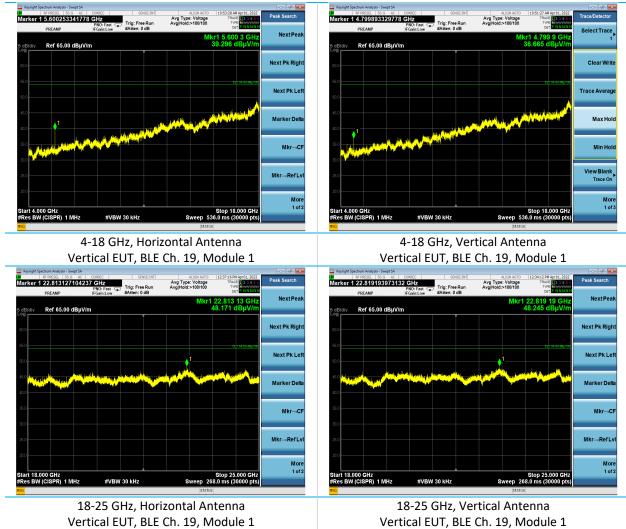
Horizontal EUT, BLE Ch. 19, Module 1

2500-4000 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 1

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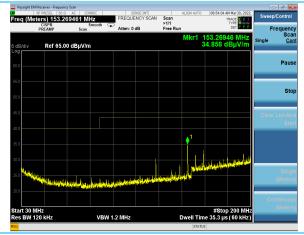
CONNECTIVITY



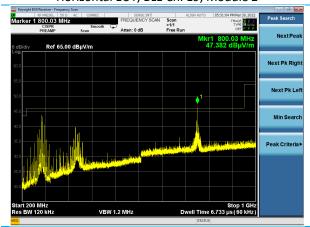
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Plots – Module 2



30-200 MHz, Horizontal Antenna Horizontal EUT, BLE Ch. 19, Module 2



200-1000 MHz, Horizontal Antenna Horizontal EUT, BLE Ch. 19, Module 2

> Avg Type: Voltage AvgHold:>100/100

> > 6 362

Stop 2.3100 GH Sweep 52.00 ms (30000 pt

Marker 1 1.2000000000000 GHz

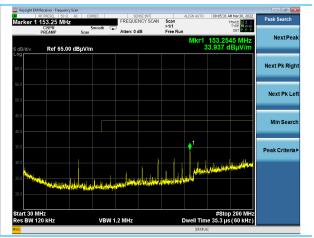
tart 1.0000 GHz es BW (CISPR) 1 MHz

#VBW 30 kHz

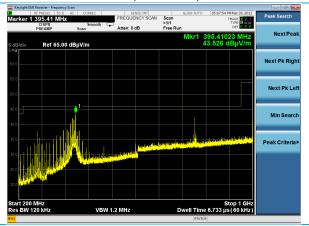
1000-2310 MHz, Horizontal Antenna

Horizontal EUT, BLE Ch. 19, Module 2

Ref 75.00 dBµV/m



30-200 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 2



200-1000 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 2

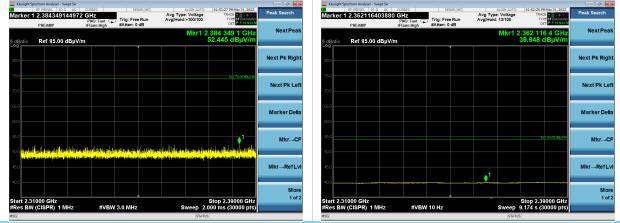


1000-2310 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 2

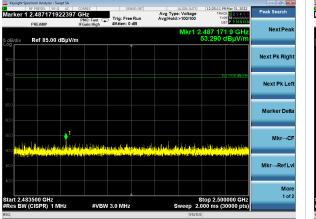
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CONNECTIVITY



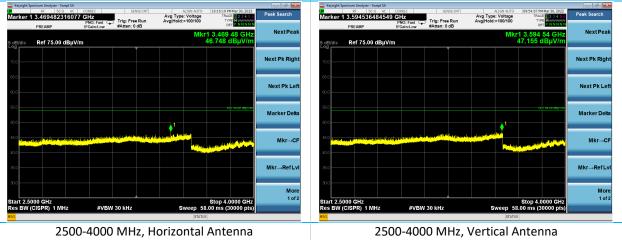
2310-2390 MHz, Peak Horizontal EUT, BLE Ch. 1, Module 2 2310-2390 MHz, Average Horizontal EUT, BLE Ch. 1, Module 2



 Operating Sectors Advances
 Control Legislation
 Control Legislatio

2483.5-2500 MHz, Peak Horizontal EUT, BLE Ch. 39, Module 2

2483.5-2500 MHz, Average Horizontal EUT, BLE Ch. 39, Module 2



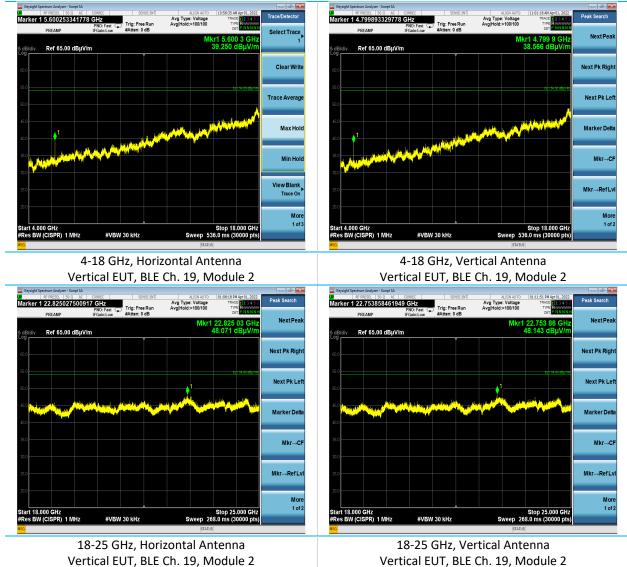
Horizontal EUT, BLE Ch. 19, Module 2

2500-4000 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 2

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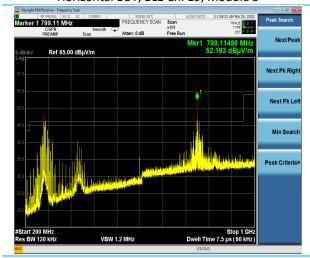
Company: Enovation Controls, LLC		Name: OD1025-01
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Plots – Module 3

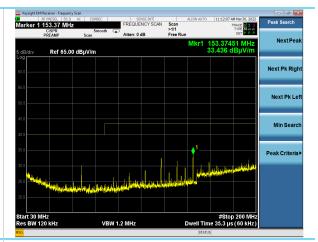


30-200 MHz, Horizontal Antenna Horizontal EUT, BLE Ch. 19, Module 3

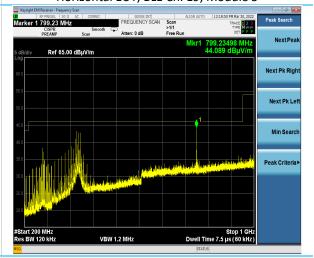


200-1000 MHz, Horizontal Antenna Horizontal EUT, BLE Ch. 19, Module 3

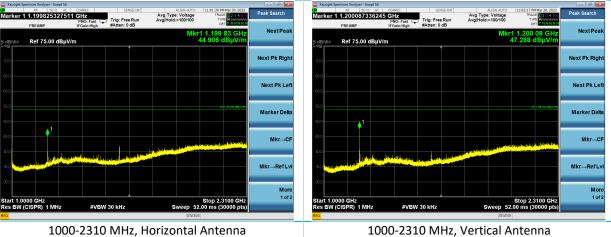
Horizontal EUT, BLE Ch. 19, Module 3



30-200 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 3



200-1000 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 3

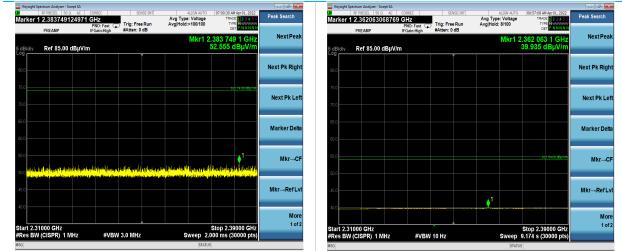


1000-2310 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 3

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Peak Searcl

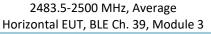
2310-2390 MHz, Peak Horizontal EUT, BLE Ch. 1, Module 3

2310-2390 MHz, Average Horizontal EUT, BLE Ch. 1, Module 3



Marker 1 2.495137287910 GHz Avg Type: Voltage Avg|Hold:>100/100 NextPe .495 137 (52.941 dE Ref 85.00 dBµV/m Next Pk Righ Next Pk Lef Marker Delt Mkr→C Mkr→RefLv More 1 of 2 Stop 2.500000 GH Sweep 2.000 ms (30000 pt art 2.483500 GHz Is BW (CISPR) 1 MHz #VBW 3.0 MHz

2483.5-2500 MHz, Peak Horizontal EUT, BLE Ch. 39, Module 3



NextPea

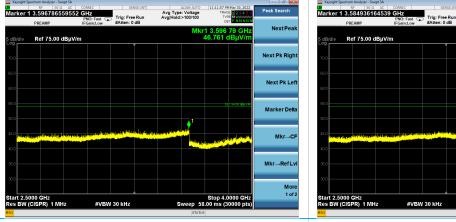
Next Pk Righ

Next Pk Lef Marker Del

Mkr→Ci

More 1 of 2

Mkr→RefLv



2500-4000 MHz, Horizontal Antenna Horizontal EUT, BLE Ch. 19, Module 3

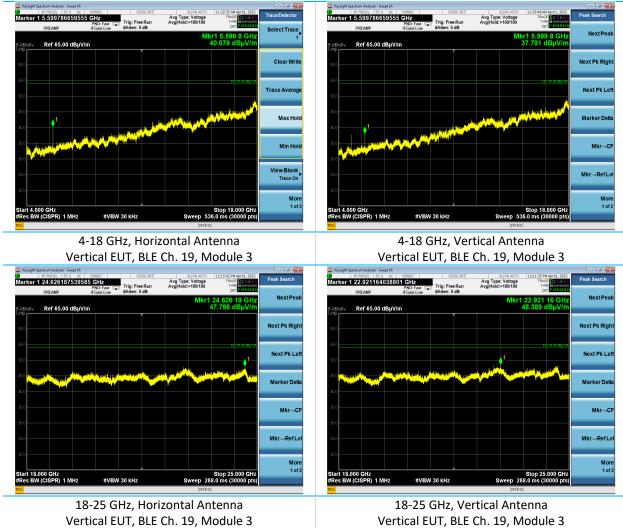
2500-4000 MHz, Vertical Antenna Horizontal EUT, BLE Ch. 19, Module 3

Stop 4.0000 GH Sweep 58.00 ms (30000 pts

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5.2.3 Simultaneous Transmit

Operator	Jon Dilley; Braden Smith	QA	Anthony Smith; Ivan Alvarez
Temperature	23.1°C	R.H. %	36.60%
Test Date	4/6/2022	Location	Chamber 3
Requirement	FCC 15.209, FCC 15.247	Method	ANSI C63.10

Limits:

Frequency	Average Limit	Peak Limit
(MHz)	(dBμV/m)	(dBµV/m)
1000-18000	54.0	74.0

Test Parameters

Frequency	2310-2390 MHz 2483.5-2500 MHz 4-18 GHz	Distance	3m	
Detector(s)	Average measurements were made with a reduced VBW of 10Hz as the signal is 100% duty cycle. Max peak hold for plots.	Table height	150cm (above 1 GHz)	
RBW	1 MHz	VBW	Peak: 3 MHz Average: 10 Hz *30 kHz for emission identification	
Plots	Worst case plots are shown.	EUT Orientations	Vertical shown as worst case	
Notes	No intermodulation effects were observed. No constructive interference was observed. No harmonics were observed in the 4-18 GHz range.			

EUT Parameters

Input Power	14 VDC	Mode	BLE (single channel) Bluetooth Classic (Hopping)
Channel	BLE: 0, 19, 39	Data	GFSK 1Mbps (BLE)
Channel	BTC: Hopping 0-78	Rate/Modulation	BR, EDR2, EDR3 (BTC)

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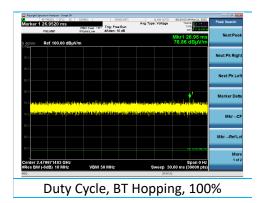
Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960154	Filter - High Pass 2.4 GHz	KWM	HPF-L-14186	7272-02	4/13/2022	4/13/2023	Active Calibration
AA 960158	Antenna - Double Ridge Horn	ETS Lindgren	3117	109300	9/27/2021	9/27/2022	Active Calibration
AA 960176	Cable	A.H. Systems, Inc.	SAC-26G-6	395	3/22/2022	3/22/2023	Active Verification
EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/11/2022	4/11/2023	Active Calibration
EE 960196	Meter - Hygro-Thermometer	Control Company	90080-03	180045462	5/14/2021	5/14/2022	Active Calibration
LSC-300	Cable	Chamber 3 Emissions	-	-	4/15/2022	4/15/2023	Active Verification

Data Tables

Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Module/Channel
2389.2	Vertical	Vertical	150	0	37.6	54.0	16.4	All BLE Ch. 0
2500.0	Vertical	Vertical	150	0	38.3	54.0	15.7	All BLE Ch. 39
2498.4	Vertical	Vertical	150	0	38.2	54.0	15.8	All BTC Hopping
2380.2	Vertical	Vertical	150	0	37.6	54.0	16.4	All BTC Hopping

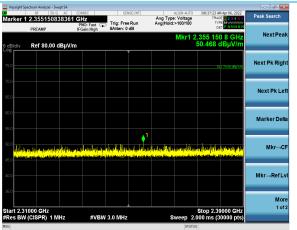
Frequency (MHz)	EUT Orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Module/Channel
2355.2	Vertical	Vertical	150	0	50.5	74.0	23.5	All BLE Ch. 0
2497.5	Vertical	Vertical	150	0	51.4	74.0	22.6	All BLE Ch. 39
2499.8	Vertical	Vertical	150	0	50.6	74.0	23.4	All BTC Hopping
2384.4	Vertical	Vertical	150	0	50.1	74.0	23.9	All BTC Hopping



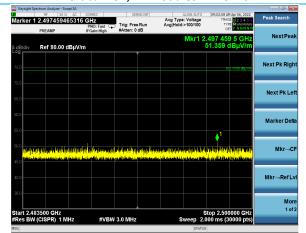
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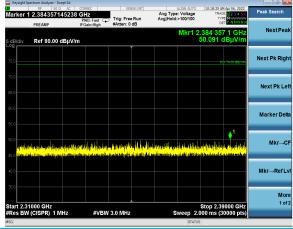




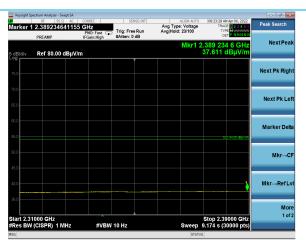
2310-2390 MHz, Peak Vertical EUT, All modules BLE Ch. 0



2483.5-2500 MHz, Peak Vertical EUT, All modules BLE Ch. 38



2310-2390 MHz, Peak Vertical EUT, All modules BT Hopping



2310-2390 MHz, Average Vertical EUT, All modules BLE Ch. 0



2483.5-2500 MHz, Average Vertical EUT, All modules BLE Ch. 38

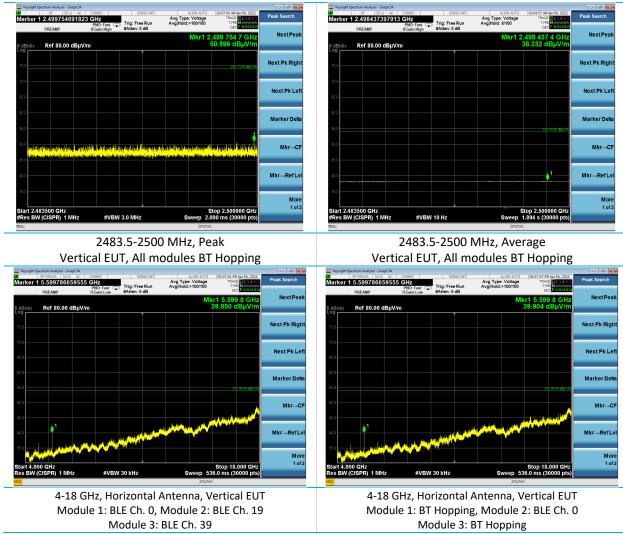


2310-2390 MHz, Average Vertical EUT, All modules BT Hopping

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6 **REVISION HISTORY**

Version	Date	Notes	Person
0	4/22/2022	Initial Draft	Zach Wilson
1	4/27/2022	Revised per internal review	Zach Wilson

END OF REPORT

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