

Paragon Innovations, Inc.

Smart Tracking Collar

FCC 15.247:2021 Bluetooth

Report: PAON0005.1, Issue Date: June 24, 2021





NVLAP LAB CODE: 201049-0, 200881-0

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CERTIFICATE OF TEST



Last Date of Test: May 21, 2021 Paragon Innovations, Inc. EUT: Smart Tracking Collar

Radio Equipment Testing

Standards	
Specification	Method
FCC 15.207:2021	ANSI C63.10:2013
FCC 15.247:2021	ANSI C03. 10.2013

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.1.1	Output Power	Yes	Pass	
11.9.1.1	Equivalent Isotropic Radiated Power	Yes	Pass	
11.10.2	Power Spectral Density	Yes	Pass	
11.11	Band Edge Compliance	Yes	Pass	
11.11	Spurious Conducted Emissions	Yes	Pass	
11.12.1,				
11.13.2, 6.5,	Spurious Radiated Emissions	Yes	Pass	
6.6				

Deviations From Test Standards

None

Approved By:

Adam Bruno, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY



Revision Description		Date (yyyy-mm-dd)	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS



United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission - Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

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

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

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

Israel

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

Hong Kong

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

Vietnam

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

SCOPE

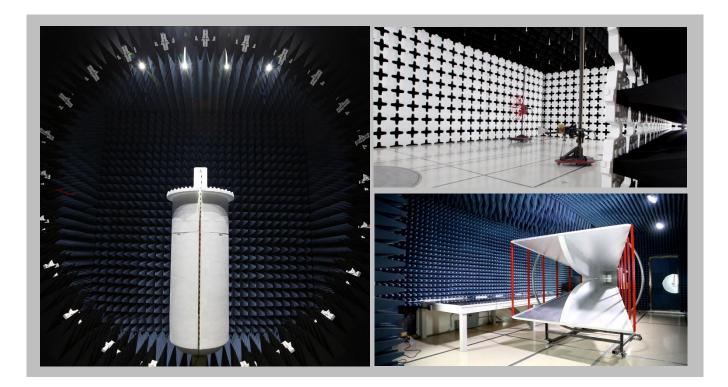
For details on the Scopes of our Accreditations, please visit: https://www.nwemc.com/emc-testing-accreditations

FACILITIES





California	Minnesota	Oregon	Texas	Washington	
Labs OC01-17	Labs MN01-10	Labs EV01-12	Labs TX01-09	Labs NC01-05	
41 Tesla	9349 W Broadway Ave.	6775 NE Evergreen Pkwy #400	3801 E Plano Pkwy	19201 120 th Ave NE	
Irvine, CA 92618	Brooklyn Park, MN 55445	Hillsboro, OR 97124	Plano, TX 75074	Bothell, WA 98011	
(949) 861-8918	(612)-638-5136	(503) 844-4066	(469) 304-5255	(425)984-6600	
		NVLAP			
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0	
Innovation, Science and Economic Development Canada					
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1	
		BSMI			
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R	
VCCI					
A-0029	A-0109	A-0108	A-0201	A-0110	
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	US0017	US0191	US0157	



MEASUREMENT UNCERTAINTY



Measurement Uncertainty

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

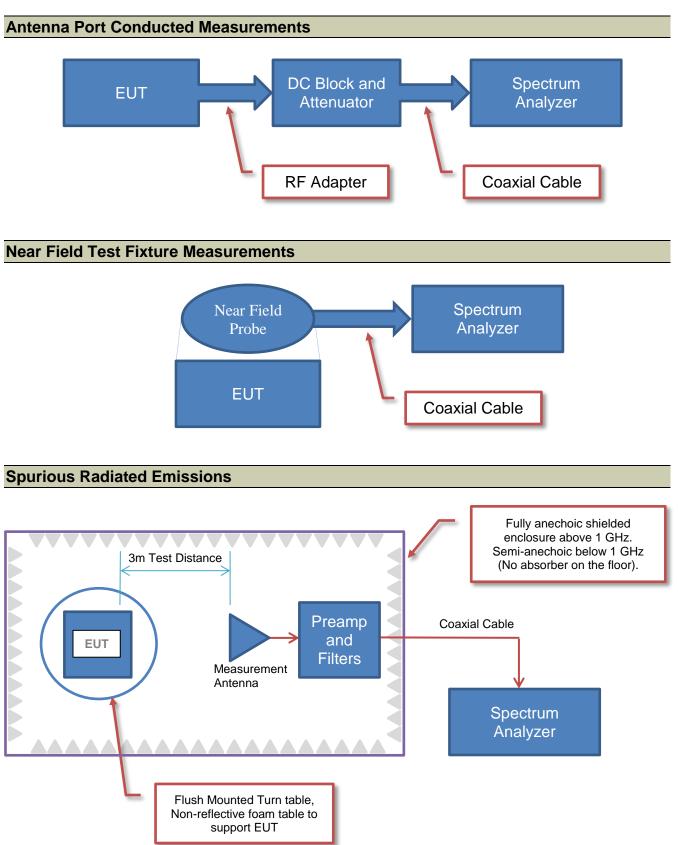
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable test description page. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

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

Test Setup Block Diagrams





PRODUCT DESCRIPTION



Client and Equipment Under Test (EUT) Information

Company Name:	Paragon Innovations, Inc.
Address:	3305 Matrix Drive
City, State, Zip:	Richardson, TX 75082
Test Requested By:	Alan Hasty
EUT:	Smart Tracking Collar
First Date of Test:	August 26, 2020
Last Date of Test:	May 21, 2021
Receipt Date of Samples:	August 26, 2020
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

Dog tracking collar

Testing Objective:

To demonstrate compliance of the Bluetooth radio to FCC 15.247 requirements.

CONFIGURATIONS



Configuration PAON0005-1

Software/Firmware Running during test			
Description	Version		
M1 Link Collar Sw	00.03.01-c3		
BT Link Collar Sw	00.03.01-c2		
M1 Modem Firmware	1.1.2		
BT Direct Test Mode Sw (fixed channels 0,19,39)	0.0.2		

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Smart Tracking Collar	Link	LT3A	0013

Peripherals in test setup boundary				
Description Manufacturer Model/Part Number Serial Number				
USB Charger	Link	S005BPU0500100	None	

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB Charging Cable	No	1m	No	Smart Tracking Collar	AC Main

Configuration PAON0005-2

Software/Firmware Running during test			
Description	Version		
M1 Link Collar Sw	00.03.01-c3		
BT Link Collar Sw	00.03.01-c2		
M1 modem firmware	1.1.2		
BT Direct Test Mode Sw (fixed channels 0,19,39)	0.0.2		

Description	Manufacturer	Model/Part Number	Serial Number		
Smart Tracking Collar Device	Link	LT3A	0013		

Peripherals in test setup boundary					
Description	Manufacturer	Model/Part Number	Serial Number		
USB Charger	Link	S005BPU0500100	None		

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB Charging Cable	No	1m	No	Smart Tracking Collar	AC Main

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2020-08-26	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was complete.
2	2020-11-13	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2020-11-13	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2020-11-13	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2021-04-15	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2021-04-15	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.
7	2021-04-15	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2021-04-15	Equivalent Isotropic Radiated Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
9	2021-05-21	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWER SETTINGS AND ANTENNAS



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

ANTENNA GAIN (dBi)

· · · · · ·			
Туре	Provided by	Frequency Range (MHz)	Gain (dBi)
Wideband SMD Chip Antenna	Customer	2300 - 2700	2.5

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types	Туре	Channel	Position	Frequency (MHz)	Power Setting
		0	Low Channel	2402	0 dBm
BLE	BLE DTS	20	Mid Channel	2440	0 dBm
	39	High Channel	2480	0 dBm	



TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 500hm measuring port is terminated by a 500hm EMI meter or a 500hm resistive load. All 500hm measuring ports of the LISN are terminated by 500hm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Gauss	TDEMI 30M	ARL	2021-03-23	2022-03-23
Cable - Conducted Cable Assembly	Northwest EMC	TXA, HFC, TQU	TXAA	2021-01-26	2022-01-26
LISN	Solar Electronics	9252-50-R-24-BNC	LJK	2020-08-25	2021-08-25
Power Source/Analyzer	Hewlett Packard	6841A	THC	NCR	NCR

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.6 dB	-2.6 dB

CONFIGURATIONS INVESTIGATED

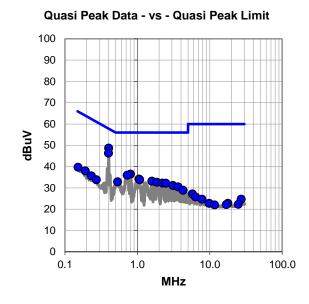
POAN0005-2

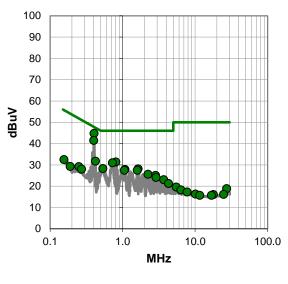
MODES INVESTIGATED

BT Mid Channel 2440 MHz Continuous Tx 1 Mbps



EUT:	Smart Tracking	n Collar			Work Order:	PAON0005	
Serial Number:	0013	y conar			Date:	2021-05-21	
Customer:		Paragon Innovations, Inc.			Temperature:	2021-03-21 22.4°C	
Attendees:	Alan Hasty				Relative Humidity:	53.7%	
Customer Project:	None				Bar. Pressure:	1022 mb	
Tested By:	Brandon Hobb	\$			Job Site:	TX01	
Power:	5 VDC	0			Configuration:	POAN0005-2	
TEST SPECIFIC	ATIONS			Method			
Specification:				Method:	Method:		
FCC 15.207:2021				ANSI C63.10:2013			
TEST PARAME	TERS						
Run #: 1		ine:	High Line		Add. Ext. Attenuation (dl	B): 0	
COMMENTS							
None							
EUT OPERATIN							
BT Mid Channel 24	40 MHz Continu	ous Tx 1	Mbps				
DEVIATIONS FR			N P D				
None							
NULLE							





Average Data - vs - Average Limit



Margin

(dB)

-3.0

-6.4

-14.6

-15.0

-15.6

-17.7

-17.8

-18.1 -18.5

-18.5

-20.4

-20.9

-21.9

-22.6

-22.9

-23.1

-23.3

-24.7

-24.8

-30.4

-31.1

-31.7

-32.7

-33.7

-33.8

Spec.

Limit

(dBuV)

47.8

47.9

46.0

46.0

47.4

46.0

46.0

46.0

46.0

46.0

46.0

46.0

46.0

51.8

46.0

51.1

55.8

46.0

54.1

50.0

50.0

50.0

50.0

50.0

50.0

RESULTS - Run #1

Amp.

(dBuV)

28.5

26.1

16.3

15.8

14.0

13.7

12.9

12.7

12.4

12.0

11.9

10.9

10.2

17.6

19.3

15.3

8.6

13.5

6.8

5.4

4.1

2.2

2.2

1.4

0.1

Freq

(MHz)

0.402

0.399

0.805

0.724

1.056

1.077

1.590

0.535

1.862

2.224

2.475

3.089

3.663

0.191

0.152

0.232

4.277

0.271

5.757

6.352

7.790

27.090

17.819

24.818

9.827

Quasi Peak Data -	vs - Quasi Peak Lim
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Factor

(dB)

20.2

20.2

20.2

20.2

20.2

20.2

20.3

20.2

20.3

20.3

20.3

20.3

20.3

20.4

20.4

20.4

20.3

20.4

20.4

20.4

20.6

22.5

20.6

21.4

22.2

Quasi P	eak Limit			Average	Data - vs	- Average
Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)
48.7	57.8	-9.1	0.404	24.6	20.2	44.8
46.3	57.9	-11.6	0.399	21.3	20.2	41.5
36.5	56.0	-19.5	0.807	11.2	20.2	31.4
36.0	56.0	-20.0	0.724	10.8	20.2	31.0
34.2	56.0	-21.8	0.422	11.6	20.2	31.8
33.9	56.0	-22.1	0.532	8.1	20.2	28.3
33.2	56.0	-22.8	1.633	7.9	20.3	28.2
32.9	56.0	-23.1	1.077	7.7	20.2	27.9
32.7	56.0	-23.3	1.056	7.3	20.2	27.5
32.3	56.0	-23.7	1.592	7.2	20.3	27.5
32.2	56.0	-23.8	2.244	5.3	20.3	25.6
31.2	56.0	-24.8	2.842	4.8	20.3	25.1
30.5	56.0	-25.5	2.883	3.8	20.3	24.1
38.0	64.0	-26.0	0.248	8.8	20.4	29.2
39.7	65.9	-26.2	3.688	2.8	20.3	23.1
35.7	62.4	-26.7	0.271	7.6	20.4	28.0
28.9	56.0	-27.1	0.155	12.1	20.4	32.5
33.9	61.1	-27.2	4.299	1.0	20.3	21.3
27.2	60.0	-32.8	0.189	8.9	20.4	29.3
25.8	60.0	-34.2	5.485	-0.8	20.4	19.6
24.7	60.0	-35.3	27.177	-3.6	22.5	18.9
24.7	60.0	-35.3	6.350	-2.1	20.4	18.3
22.8	60.0	-37.2	7.769	-3.3	20.6	17.3
22.8	60.0	-37.2	10.115	-4.4	20.7	16.3
22.3	60.0	-37.7	24.731	-6.0	22.2	16.2

Limit

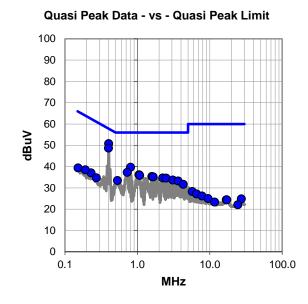
CONCLUSION

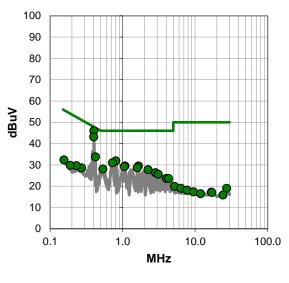
Pass

Tested By



EUT:	Smart Tracki	ng Collar			Work Order:	PAON0005
Serial Number:	0013	ig ooliai			Date:	2021-05-21
Customer:		Paragon Innovations, Inc.			Temperature:	22.4°C
Attendees:	Alan Hasty				Relative Humidity:	53.7%
Customer Project:	None				Bar. Pressure:	1022 mb
Tested By:	Brandon Hob	bs			Job Site:	TX01
Power:	5 VDC				Configuration:	POAN0005-2
TEST SPECIFIC	ATIONS					
Specification:				Method:		
FCC 15.207:2021				ANSI C63.10:2013		
EST PARAME	ERS					
Run #: 2		Line:	Neutral		Add. Ext. Attenuation (d	B): 0
COMMENTS						
None						
	G MODES					
BT Mid Channel 24		uous Tx 1	Mbps			
			•			
DEVIATIONS FR	OM TEST S	STANDA	RD			
None						





Average Data - vs - Average Limit



RESULTS - Run #2

Freq

(MHz)

0.402

0.399

0.805

0.724 1.056

1.077

1.590

1.649

2.244

2.494

3.086

0.532

3.661

4.293 0.230

0.191

0.271

0.152 5.732

6.556 7.783

9.490

27.340 16.947

17.151

Quasi Peak Data -	vs - Quasi	Peak Lim
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asi Peak	Data - vs	- Quasi P	eak Limit			Average I
Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)	Freq (MHz)	Amp. (dBuV)
30.6	20.2	50.8	57.8	-7.0	0.402	25.8
28.5	20.2	48.7	57.9	-9.2	0.399	23.0
19.5	20.2	39.7	56.0	-16.3	0.422	13.6
17.1	20.2	37.3	56.0	-18.7	0.805	11.7
16.0	20.2	36.2	56.0	-19.8	0.724	10.8
15.7	20.2	35.9	56.0	-20.1	1.651	9.2
15.1	20.3	35.4	56.0	-20.6	1.077	9.3
14.9	20.3	35.2	56.0	-20.8	1.056	9.0
14.4	20.3	34.7	56.0	-21.3	1.590	8.4
14.3	20.3	34.6	56.0	-21.4	0.532	7.9
13.4	20.3	33.7	56.0	-22.3	2.244	7.5
13.3	20.2	33.5	56.0	-22.5	2.839	6.1
13.0	20.3	33.3	56.0	-22.7	3.109	5.3
11.4	20.3	31.7	56.0	-24.3	4.025	3.4
16.7	20.4	37.1	62.4	-25.3	4.315	3.3
18.1	20.4	38.5	64.0	-25.5	0.271	8.2
14.4	20.4	34.8	61.1	-26.3	0.230	9.3
19.0	20.4	39.4	65.9	-26.5	0.155	12.0
7.9	20.4	28.3	60.0	-31.7	0.189	9.4
6.8	20.4	27.2	60.0	-32.8	5.203	-0.4
5.6	20.6	26.2	60.0	-33.8	6.348	-1.4
4.4	20.6	25.0	60.0	-35.0	27.232	-3.5
2.4	22.5	24.9	60.0	-35.1	7.765	-2.5
3.0	21.4	24.4	60.0	-35.6	9.490	-3.2
3.0	21.4	24.4	60.0	-35.6	16.805	-4.2

	Average	Data - vs	- Average	Limit	
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.402	25.8	20.2	46.0	47.8	-1.8
0.399	23.0	20.2	43.2	47.9	-4.7
0.422	13.6	20.2	33.8	47.4	-13.6
0.805	11.7	20.2	31.9	46.0	-14.1
0.724	10.8	20.2	31.0	46.0	-15.0
1.651	9.2	20.3	29.5	46.0	-16.5
1.077	9.3	20.2	29.5	46.0	-16.5
1.056	9.0	20.2	29.2	46.0	-16.8
1.590	8.4	20.3	28.7	46.0	-17.3
0.532	7.9	20.2	28.1	46.0	-17.9
2.244	7.5	20.3	27.8	46.0	-18.2
2.839	6.1	20.3	26.4	46.0	-19.6
3.109	5.3	20.3	25.6	46.0	-20.4
4.025	3.4	20.3	23.7	46.0	-22.3
4.315	3.3	20.3	23.6	46.0	-22.4
0.271	8.2	20.4	28.6	51.1	-22.5
0.230	9.3	20.4	29.7	52.4	-22.7
0.155	12.0	20.4	32.4	55.8	-23.4
0.189	9.4	20.4	29.8	54.1	-24.3
5.203	-0.4	20.3	19.9	50.0	-30.1
6.348	-1.4	20.4	19.0	50.0	-31.0
27.232	-3.5	22.5	19.0	50.0	-31.0
7.765	-2.5	20.6	18.1	50.0	-31.9
9.490	-3.2	20.6	17.4	50.0	-32.6
16.805	-4.2	21.4	17.2	50.0	-32.8

CONCLUSION

Pass

Tested By



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Attenuator	Fairview Microwave	SA4018-20	TYW	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMM	13-Mar-20	13-Mar-21
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	18-Sep-19	18-Sep-20

TEST DESCRIPTION

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

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

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

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

If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.



	Smart Tracking Collar						Work Order:		
Serial Number:	: 02						Date:	28-Aug-20	
Customer	Paragon Innovations, Inc.						Temperature:		
	Alan Hasty					Humidity: 53% RH			
Project:	None						Barometric Pres.:	1011 mbar	
	Brandon Hobbs			Power: 5 VDC			Job Site:	TX05	
EST SPECIFICAT	IONS			Test Method					
CC 15.247:2020				ANSI C63.10:2013					
COMMENTS									
	F measurement path were acco	unted for: DC block, at	ttenuator,	ble.					
	-	unted for: DC block, at	ttenuator, o	ble.	-				
DEVIATIONS FRO	-		ttenuator, d	ta Jan		Number of	Value	Limit	
DEVIATIONS FROM None	M TEST STANDARD		ttenuator, (Pulse Width	Period	Number of Pulses	(%)	(%)	Results
DEVIATIONS FROM Ione Configuration #	M TEST STANDARD		ttenuator,	Pulse Width 401.662 us	1.25 ms		(%) 32.1	(%) N/A	N/A
EVIATIONS FROM lone configuration # LE/GFSK 1 Mbps LE/GFSK 1 Mbps	M TEST STANDARD		ttenuator, (Pulse Width 401.662 us N/A	1.25 ms N/A		(%) 32.1 N/A	(%) N/A N/A	N/A N/A
EVIATIONS FROM Configuration # LE/GFSK 1 Mbps LE/GFSK 1 Mbps LE/GFSK 1 Mbps	M TEST STANDARD		ttenuator,	Pulse Width 401.662 us N/A 402.166 us	1.25 ms N/A 1.25 ms		(%) 32.1 N/A 32.2	(%) N/A N/A N/A	N/A N/A N/A
EVIATIONS FRO tone configuration # LE/GFSK 1 Mbps LE/GFSK 1 Mbps LE/GFSK 1 Mbps	M TEST STANDARD		ttenuator, (Pulse Width 401.662 us N/A 402.166 us N/A	1.25 ms N/A 1.25 ms N/A		(%) 32.1 N/A 32.2 N/A	(%) N/A N/A N/A N/A	N/A N/A N/A N/A
DEVIATIONS FROM Ione Configuration # BLE/GFSK 1 Mbps BLE/GFSK 1 Mbps BLE/GFSK 1 Mbps BLE/GFSK 1 Mbps	M TEST STANDARD		ttenuator, (Pulse Width 401.662 us N/A 402.166 us	1.25 ms N/A 1.25 ms		(%) 32.1 N/A 32.2	(%) N/A N/A N/A	N/A N/A N/A



			BLE/GFSK 1	Mbps Lo	w Chanr	el, 2402 MHz		
				Num	per of	Value	Limit	
		Pulse Width	Period	Pu	ses	(%)	(%)	Results
		401.662 us	1.25 ms		1	32.1	N/Á	N/A
								•
-								
Keysight Spec		r - Element Materials Technolo 50 Ω DC		ENSE:INT		ALIGN OFF		09:24:28 AM Aug 28, 2020
	N	30 32 DC		Trig Del	iy-1.000 m		e: Log-Pwr	TRACE 1 2 3 4 5 6
		I	NO: Fast 🔸	Trig: Vid				TRACE 1 2 3 4 5 6 TYPE WWWWWW DET PPPPP
		IF	Gain:Low	#Atten:	0 dB			
	Ref Offse	et 21.74 dB						Mkr1 998.2 µs
5 dB/div	Ref 5.0	0 dBm						-17.13 dBm
Log								
0.00								
-5.00								
-10.0								
-15.0			1				3	
-20.0				6 ²				
-25.0								
-30.0								TRIG LVL
-35.0								
-40.0								
10.0								
Center 2.4		00 GHz						Span 0 Hz
Res BW 3.	0 MHz		#VBV	V 100 kH	Z		Sweep	3.000 ms (8192 pts)
MKR MODE TRO	SCL	х	Y	FI	NCTION	FUNCTION WIDTH	FUNC	TION VALUE
1 N 1	t	998.2 µs	-17.13 c	Bm				
2 N 1 3 N 1		1.400 ms 2.248 ms	-26.64 c -15.32 c	Bm				
4		2.240 113	10.02 (
5								E
7								
8								
9								
11								-
•				Ш				•
MSG						STATUS		

BLE/GFSK 1 Mbps Low Channel, 2402 MHz										
		Number of	Value	Limit						
 Pulse Width	Period	Pulses	(%)	(%)	Results					
N/A	N/A	5	N/A	N/A	N/A					

RL RF 50 Ω DC	S	ENSE:INT	ALIGN OFF		09:24:33 AM Aug 28, 202	
	PNO: Fast ↔→ IFGain:Low	Trig: Video #Atten: 10 dB	#Avg Type: Log	g-Pwr	TRACE 1 2 3 4 5 TYPE WWWWW DET P P P P F	
Ref Offset 21.74 dB dB/div Ref 5.00 dBm						
.00				r		
.00						
0.0						
5.0						
5.0						
0.0					TRIG L	
5.0						
enter 2.402000000 GHz					Span 0 F	
es BW 3.0 MHz	#VBV	V 100 kHz		007 ms (8192 pt		



			Mbps Mid Chan Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
	402.166 us	1.25 ms	1	32.2	N/A	N/A
	102.100 00	1.20 110		02.2	10/74	10// (
	zer - Element Materials Technolo 50 Ω DC		ENSE:INT	ALIGN OFF		10:21:20 AM Aug 28, 2020
	50 S2 DC	50	Trig Delay-1.000 r		e: Log-Pwr	TRACE 1 2 3 4 5 6
		NO: Fast +++	Trig: Video			TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P P P P P
	II	Gain:Low	#Atten: 10 dB			
Ref Offs	set 21.74 dB					Mkr1 998.1 µs
5 dB/div Ref 2.0	00 dBm					-23.93 dBm
Log						
-3.00						
-8.00						
-13.0						
-18.0		<u> </u>			3	
-23.0		↓ ↓	2		Y	
			Ĭ			
-28.0						TRIG LVL
-33.0						
-38.0						
-43.0						
0						0
Center 2.4400000 Res BW 3.0 MHz	JUU GHZ	#\/B\A	/ 100 kHz		Sween	Span 0 Hz 3.000 ms (8192 pts)
					-	
MKR MODE TRC SCL	× 998.1 µs	-23.93 d	FUNCTION	FUNCTION WIDTH	FUNC	TION VALUE
2 N 1 t	1.400 ms	-24.39 d	Bm			
3 N 1 t	2.248 ms	-20.66 d	Bm			
5						E
6						
8						
9						
11						*
•			III			

BLE/GFSK 1 Mbps Mid Channel, 2440 MHz										
			Number of	Value	Limit					
	Pulse Width	Period	Pulses	(%)	(%)	Results				
	N/A	N/A	5	N/A	N/A	N/A				

RL RF 50 Ω DC	S	ENSE:INT	ALIGN OFF		10:21:28	3 AM Aug 28, 20
	PNO: Fast ↔→→ IFGain:Low	Trig: Video #Atten: 10 dB	#Avg Type:	Log-Pwr	TF	ACE 12345 TYPE WWWWW DET PPPPF
Ref Offset 21.74 dB dB/div Ref 2.00 dBm						1
00	-					
00						
3.0						
3.0						
.0						
.0						
.0						TRIGI
.0						
3.0						
enter 2.440000000 GHz es BW 3.0 MHz	#VBV	V 100 kHz		Sweep	6.007 ms	Span 0 F s (8192 pt



		DEL/OF OR T	Mbps High Char Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
	401.26 us	1.25 ms	1	32.1	N/A	N/A
	401.20 US	1.23 115	I	32.1	IN/A	IN/A
Keysight Spectrum Analyze						
LXIRL RF	50 Ω DC	SI	Trig Delay-1.000	ALIGN OFF	e: Log-Pwr	10:06:54 AM Aug 28, 2020
		PNO: Fast +++	Trig: Video			TRACE 1 2 3 4 5 6 TYPE WWWWWW DET PPPPP
		FGain:Low	#Atten: 10 dB			
Ref Offs	et 21.74 dB					Mkr1 998.9 µs
5 dB/div Ref 2.0						-15.17 dBm
Log						
-3.00						
-8.00		1				
-13.0		┼─∲'── ┼			3	
-18.0						
-23.0			<u>2</u>			
-28.0			Υ			
						TRIG LVL
-33.0						1100 EVE
-38.0						
-43.0						
						A
Center 2.4800000 Res BW 3.0 MHz	UU GHZ	#\(B)	V 100 kHz		Swoon	Span 0 Hz (3.000 ms (8192 pts)
					-	
MKR MODE TRC SCL	× 998.9 µs	Y -15.17 d	FUNCTION	FUNCTION WIDTH	FUNC	TION VALUE
2 N 1 t	1.400 ms	-26.26 d	Bm			
3 N 1 t	2.249 ms	-15.63 d	IBm			
5						E
6						
8						
9						
10						
•			m			•

BLE/GFSK 1 Mbps High Channel, 2480 MHz										
			Number of	Value	Limit					
	Pulse Width	Period	Pulses	(%)	(%)	Results				
	N/A	N/A	5	N/A	N/A	N/A				

RL RF 50 Ω DC	SENSE:INT	ALIGN OFF	10:07:03 AM Aug 28, 202
	PNO: Fast Trig: Video IFGain:Low #Atten: 10 dB	#Avg Type: Log-Pwr	TRACE 1 2 3 4 9 TYPE WWWW DET P P P P P
Ref Offset 21.74 dB B/div Ref 2.00 dBm			
00			
.0			
.0			
.0			
.0			
.0			TRIG I
.0			
.0			
enter 2.480000000 GHz es BW 3.0 MHz	#VBW 100 kHz	Swee	Span 0 F p 6.007 ms (8192 pt



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Attenuator	Fairview Microwave	SA4018-20	TYW	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMM	13-Mar-20	13-Mar-21
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	18-Sep-19	18-Sep-20

TEST DESCRIPTION

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

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.0% occupied bandwidth was also measured at the same time which can be needed during Output Power depending on the applicable method.

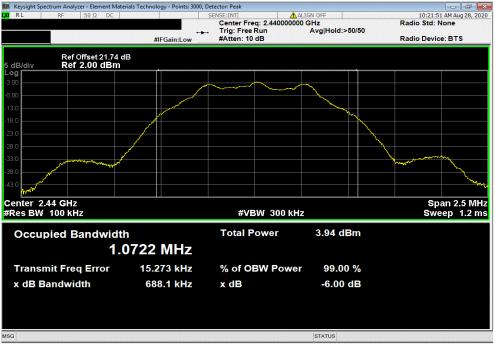


					TbtTx 2019.08.30.0	XMit 2020.03.25.0
EUT:	Smart Tracking Collar			Work Order:	PAON0005	
Serial Number:	02			Date:	28-Aug-20	
Customer:	Paragon Innovations, Inc.			Temperature:	22.6 °C	
Attendees:	Alan Hasty			Humidity:	54.1% RH	
Project:	None			Barometric Pres.:	1012 mbar	
Tested by:	Brandon Hobbs		Power: 5 VDC	Job Site:	TX05	
TEST SPECIFICATI	ONS		Test Method			
FCC 15.247:2020			ANSI C63.10:2013			
COMMENTS						
All losses in the RF	measurement path were account	ed for: DC block, attenuator, o	cable.			
DEVIATIONS FROM	I TEST STANDARD					
None						
Configuration #	1	Signature	2. Sal			
					Limit	
				Value	(≥)	Result
	ow Channel, 2402 MHz			687.724 kHz	500 kHz	Pass
BLE/GFSK 1 Mbps N	/lid Channel, 2440 MHz			688.103 kHz	500 kHz	Pass
BLE/GFSK 1 Mbps H	ligh Channel, 2480 MHz			709.839 kHz	500 kHz	Pass

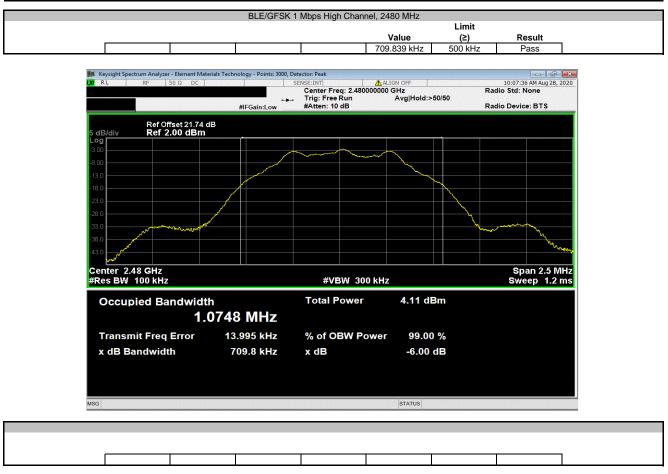
Report No. PAON0005.1













Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Attenuator	Fairview Microwave	SA4018-20	TYW	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMM	13-Mar-20	13-Mar-21
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	18-Sep-19	18-Sep-20

TEST DESCRIPTION

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.



					TbtTx 2019.08.30.0	XMit 2020.03.25
	mart Tracking Collar			Work Order:		
Serial Number: 02	2			Date:	28-Aug-20	
Customer: Pa	aragon Innovations, Inc.			Temperature:		
Attendees: Al					53.8% RH	
Project: No				Barometric Pres.:		
Tested by: Br	randon Hobbs		Power: 5 VDC	Job Site:	TX05	
TEST SPECIFICATION	NS		Test Method			
FCC 15.247:2020			ANSI C63.10:2013			
COMMENTS						
1						
DEVIATIONS FROM T	EST STANDARD					
	EST STANDARD					
None	TEST STANDARD	Signature	2 Sal			
None	EST STANDARD		2 Jan	Out Pwr	Limit	
None	EST STANDARD		Ja Jan	Out Pwr (dBm)	Limit (dBm)	Result
None Configuration #	1		2 Jan			Result Pass
DEVIATIONS FROM T None Configuration # BLE/GFSK 1 Mbps Low BLE/GFSK 1 Mbps Low	1 v Channel, 2402 MHz		2 Jan	(dBm)	(dBm)	



			Out Pwr (dBm)	Limit (dBm)	Result
			0.545	(dBll) 30	Pass
			01010	00	1 400
J Keysight Spectrum Analyzer - Element Mate	erials Technology	SENSE:INT	ALIGN OFF		09:27:11 AM Aug 28, 20
	PNO: Fast ↔ IFGain:Low		#Avg Type Avg Hold:	: Log-Pwr 100/100	TRACE 2 3 4 1 TYPE MWWW DET P P P P
Ref Offset 21.74 dB 5 dB/div Ref 6.00 dBm				Mkr1	2.402 222 GH 0.545 dB
			1		
1.00					
-4.00					
-9.00					
-14.0					
-19.0					
-24.0					
-29.0					
-34.0					
-39.0					
Center 2.402000 GHz #Res BW 2.0 MHz	 #VI	BW 6.0 MHz		Sween 1	Span 3.500 MH .066 ms (1000 pt
MSG			STATUS	anoch i	
	BLE/GFSI	K 1 Mbps Mid Chan	nel, 2440 MHz		
			Out Pwr (dBm)	Limit (dBm)	Result
			-2.738	30	Pass

		Materials Technology					
RL	RF 50 Ω DI	C	SI	ENSE:INT	ALIGN OFF		10:22:30 AM Aug 28, 20
			0: Fast ↔→ ain:Low	Trig: Free Run #Atten: 10 dB		pe: Log-Pwr d: 100/100	TRACE 1 2 3 4 TYPE MWWW DET P P P P
dB/div	Ref Offset 21.74 Ref 2.00 dBm	dB				Mk	r1 2.440 212 GF -2.738 dB
3.00					1		
3.00							
3.0							
3.0							
3.0							
.0							
.0							
.0							
3.0							
enter 2.44 Res BW 2	40000 GHz .0 MHz		#VBV	/ 6.0 MHz		Sweep	Span 3.500 Mi 1.066 ms (1000 pt
G					STATUS		



				Out Pwr (dBm)	Limit (dBm)	Result
				-2.531	30	Pass
Keysight Spectrum Anal	yzer - Element Materials T 50 Ω DC	echnology	SENSE:INT	ALIGN OFF		10:09:29 AM Aug 28, 202
		PNO: Fast ↔ IFGain:Low		#Avg Type: n Avg Hold: 1	Log-Pwr 100/100	TRACE 1 2 3 4 5 TYPE MWWW DET P P P P P
Ref Of 5 dB/div Ref 2 Log	fset 21.74 dB .00 dBm				Mkr1	2.479 739 GH: -2.531 dBn
209			▲1			
-3.00						
-8.00						
-13.0						
-18.0						
-23.0						
-23.0						
-28.0						
-33.0						
-38.0						
-43.0						
Center 2.480000 #Res BW 2.0 MH		#V	BW 6.0 MHz		Sweep 1	Span 3.500 MH .066 ms (1000 pts
MSG				STATUS		



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	SA4018-20	TYW	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMM	13-Mar-20	13-Mar-21
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	18-Sep-19	18-Sep-20

TEST DESCRIPTION

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)



						TbtTx 2019.08.30.0	XMit 2020.03.25
EUT: Sm	art Tracking Collar				Work Order:	PAON0005	
Serial Number: 02					Date:	28-Aug-20	
Customer: Par	ragon Innovations, Inc.				Temperature:	22.9 °C	
Attendees: Ala	an Hasty				Humidity:	55.7% RH	
Project: No	ne				Barometric Pres.:	1013 mbar	
Tested by: Bra	andon Hobbs	Power: 5 VDC			Job Site:	TX05	
TEST SPECIFICATIONS	S	Test Method					
FCC 15.247:2020		ANSI C63.10:2013					
COMMENTS							
	easurement path were accounted for: DC bloc	s, attenuator, cable.					
DEVIATIONS FROM TE None		ς, attenuator, cable.					
DEVIATIONS FROM TE None		s, attenuator, cable.					
DEVIATIONS FROM TE None	ST STANDARD	ç, attenuator, cable.	Out Pwr	Antenna	EIRP	EIRP Limit	
DEVIATIONS FROM TE None	ST STANDARD	c, attenuator, cable.	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
DEVIATIONS FROM TE None Configuration #	ST STANDARD	s, attenuator, cable.					Result Pass
DEVIATIONS FROM TE	1 Signature	c, attenuator, cable.	(dBm)	Gain (dBi)	(dBm)	(dBm)	



		Out Pwr	Mbps Low Chann Antenna		EIRP Limit		
		(dBm)	Gain (dBi)	(dBm)	(dBm)	Result	
		0.545	2.5	3.045	36	Pass	
		0.545	2.5	3.043		1 835	
	m Analyzer - Element Materials Te RF 50 Ω DC		ENSE:INT	ALIGN OFF		09:27:11 AM Aug 28, 20	
	KF 30 52 DC	3		#Avg Ty	/pe: Log-Pwr	TRACE 1 2 3 4 5 TYPE M WWW	6
		PNO: Fast 🔸	Trig: Free Run #Atten: 10 dB	Avg Ho	ld: 100/100	DET P P P P	₩
		IFGain:Low	#Atten: 10 dB		Nu		
R	ef Offset 21.74 dB				IVIKE'I	2.402 222 GH 0.545 dBr	
5 dB/div R Log	ef 6.00 dBm			1		0.545 0 61	
				. 1			
1.00				<mark>↓</mark> 1			
-4.00						and the second s	
							-
-9.00							
-14.0							
-19.0							
-24.0							
-29.0							
-34.0							
-39.0							
Center 2.402	000 GHz					Span 3.500 MF	z
#Res BW 2.0	MHz	#VBV	V 6.0 MHz		Sweep 1.	066 ms (1000 pt	9)
MSG				STATUS			
			Mbps Mid Chann				
		Out Pwr	Antenna	EIRP	EIRP Limit	Descrit	
		(dBm)	Gain (dBi)	(dBm)	(dBm)	Result	
		-2.738	2.5	-0.238	36	Pass	

RL RF 50 Ω DC	SENSE:INT	ALIGN OFF	10:22:30 AM Aug 28, 2
	PNO: Fast →→→ Trig: Free Run IFGain:Low #Atten: 10 dB	#Avg Type: Log-Pwr Avg Hold: 100/100	TRACE 1 2 3 4 TYPE M DET P P P P
Ref Offset 21.74 dB B/div Ref 2.00 dBm		MI	kr1 2.440 212 G -2.738 dE
		↓ 1	
0			
0			
o			
0			
nter 2.440000 GHz es BW 2.0 MHz	#VBW 6.0 MHz	Sweet	Span 3.500 M p 1.066 ms (1000 p



	Out Pwr	Antenna	EIRP	EIRP Limit	
	(dBm)	Gain (dBi)	(dBm)	(dBm)	Result
	-2.531	2.5	-0.031	36	Pass
Keysight Spectrum Analyzer - Element Materials T RL RF 50 Ω DC		NSE:INT	ALIGN OFF		10:09:29 AM Aug 28, 2020
KE RF 50 S2 DC	51		#Avg Type	e: Log-Pwr	TRACE 1 2 3 4 5
	PNO: Fast +++	Trig: Free Run #Atten: 10 dB	Avg Hold:	100/100	TRACE 1 2 3 4 5 TYPE M WWWW DET P P P P P
	IFGain:Low	#Atten: To dB		Mice4	2.479 739 GH
Ref Offset 21.74 dB 5 dB/div Ref 2.00 dBm Log					-2.531 dBn
		▲ 1			
-3.00		V			
-8.00					
-13.0					
-18.0					
-23.0					
-28.0					
-33.0					
-38.0					
12.0					
-43.0					
Center 2.480000 GHz #Res BW 2.0 MHz	#VBM	/ 6.0 MHz		Sweep 1.	Span 3.500 MH: 066 ms (1000 pts
MSG			STATUS		
			ora los		

POWER SPECTRAL DENSITY



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Attenuator	Fairview Microwave	SA4018-20	TYW	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMM	13-Mar-20	13-Mar-21
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	18-Sep-19	18-Sep-20

TEST DESCRIPTION

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

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

POWER SPECTRAL DENSITY

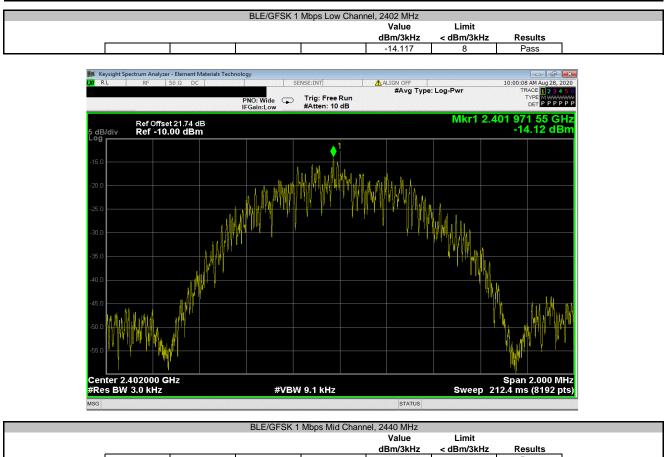


				TbtTx 2019.08.30.0	XMit 2020.03.
EUT: Smart Tracking Collar			Work Order:		
Serial Number: 02			Date:	28-Aug-20	
Customer: Paragon Innovations, Inc.			Temperature:	22.8 °C	
Attendees: Alan Hasty				53.2% RH	
Project: None			Barometric Pres.:		
Tested by: Brandon Hobbs		Power: 5 VDC	Job Site:	TX05	
TEST SPECIFICATIONS		Test Method			
FCC 15.247:2020		ANSI C63.10:2013			
COMMENTS					
DEVIATIONS FROM TEST STANDARD					
DEVIATIONS FROM TEST STANDARD None					
None	1	- Jan			
None Configuration # 1	4	- Jan	Value dBm/3kHz	Limit < dBm/3kHz	Results
None Configuration # 1	Ą	- A-A			Results Pass
None Configuration # 1 Signature	Ą	-J-1	dBm/3kHz	< dBm/3kHz	

Report No. PAON0005.1

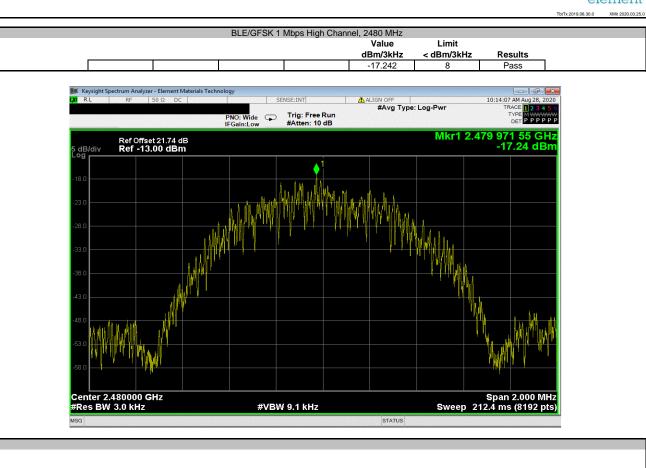
POWER SPECTRAL DENSITY







POWER SPECTRAL DENSITY





BAND EDGE COMPLIANCE



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Attenuator	Fairview Microwave	SA4018-20	TYW	13-Mar-20	13-Mar-21
Block - DC	Fairview Microwave	SD3379	AMM	13-Mar-20	13-Mar-21
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	18-Sep-19	18-Sep-20

TEST DESCRIPTION

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

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

BAND EDGE COMPLIANCE

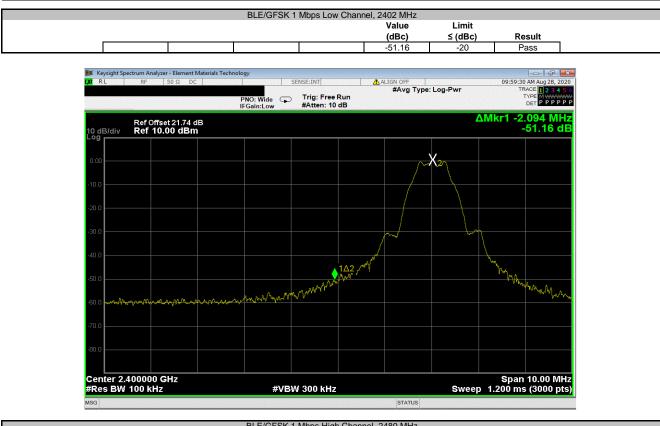


						TbtTx 2019.08.30.0	XMit 2020.03.25.0
EUT:	Smart Tracking Collar				Work Order:	PAON0005	
Serial Number:	02					28-Aug-20	
	Paragon Innovations, Inc				Temperature:	22.4 °C	
Attendees:	Alan Hasty				Humidity:	54.2% RH	
Project:	None				Barometric Pres.:	1012 mbar	
Tested by:	Brandon Hobbs		Power:	Battery	Job Site:	TX05	
TEST SPECIFICATI	IONS			Test Method			
FCC 15.247:2020				ANSI C63.10:2013			
COMMENTS				-			
All losses in the RF	measurement path were	accounted for: DC block, attenuator,	cable.				
DEVIATIONS FROM	I TEST STANDARD						
None							
Configuration #	1	Signature	2.A	-1			
					Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps L	ow Channel, 2402 MHz				-51.16	-20	Pass
BLE/GESK 1 Mbps H	High Channel 2480 MHz				-54 75	-20	Pass

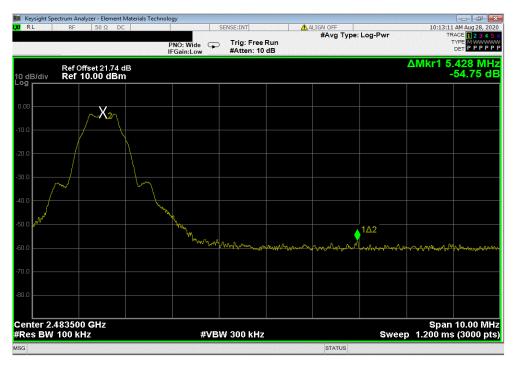
Mbps High Channel, 24

BAND EDGE COMPLIANCE











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	TXG	18-Sep-19	18-Sep-20
Block - DC	Fairview Microwave	SD3379	AMM	13-Mar-20	13-Mar-21
Attenuator	Fairview Microwave	SA4018-20	TYW	13-Mar-20	13-Mar-21
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21

TEST DESCRIPTION

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



	Smart Tracking Collar					Work Order:		
Serial Number:	: 02						28-Aug-20	
Customer:	Paragon Innovations, Inc.					Temperature:		
	Alan Hasty					Humidity:		
Project:						Barometric Pres.:		
	Brandon Hobbs		Powe	er: 5 VDC		Job Site:	TX05	
TEST SPECIFICAT	IONS			Test Method				
FCC 15.247:2020				ANSI C63.10:2013				
COMMENTS								
	F measurement path were acco							
DEVIATIONS FROM	M TEST STANDARD							
DEVIATIONS FROM	M TEST STANDARD							
	M TEST STANDARD	Signature	Ang	Jar				
None	M TEST STANDARD	Signature	Any	Frequency	Measured	Max Value	Limit	
None Configuration #	1	Signature	Ang	Frequency Range	Freq (MHz)	(dBc)	Limit ≤ (dBc)	Result
None Configuration #	M TEST STANDARD	Signature	Ang					Result N/A
None Configuration # BLE/GFSK 1 Mbps I	1	Signature	12-7	Range	Freq (MHz)	(dBc)	≤ (dBc)	
None Configuration # BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I	1 Low Channel, 2402 MHz Low Channel, 2402 MHz Low Channel, 2402 MHz	Signature	Pag	Range Fundamental	Freq (MHz) 2402.01	(dBc) N/A -51.15 -51.04	≤ (dBc) N/A	N/A
None Configuration # BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I	1 Low Channel, 2402 MHz Low Channel, 2402 MHz Low Channel, 2402 MHz Mid Channel, 2440 MHz	Signature	- Jang	Range Fundamental 30 MHz - 12.5 GHz	Freq (MHz) 2402.01 3787.29	(dBc) N/A -51.15	≤ (dBc) N/A -20	N/A Pass
None Configuration # BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I	1 Low Channel, 2402 MHz Low Channel, 2402 MHz Low Channel, 2402 MHz Mid Channel, 2440 MHz Mid Channel, 2440 MHz	Signature	- Jacq	Range Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	Freq (MHz) 2402.01 3787.29 23992.8	(dBc) N/A -51.15 -51.04	≤ (dBc) N/A -20 -20	N/A Pass Pass
None Configuration # BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I	1 Low Channel, 2402 MHz Low Channel, 2402 MHz Low Channel, 2402 MHz Mid Channel, 2440 MHz Mid Channel, 2440 MHz Mid Channel, 2440 MHz	Signature	Ang	Range Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental	Freq (MHz) 2402.01 3787.29 23992.8 2440.01	(dBc) N/A -51.15 -51.04 N/A -46.56 -48.57	≤ (dBc) N/A -20 -20 N/A	N/A Pass Pass N/A Pass Pass
None Configuration # BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I	1 Low Channel, 2402 MHz Low Channel, 2402 MHz Low Channel, 2402 MHz Mid Channel, 2440 MHz Mid Channel, 2440 MHz Mid Channel, 2440 MHz High Channel, 2480 MHz	Signature	- Jang	Range Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz	Freq (MHz) 2402.01 3787.29 23992.8 2440.01 5204.65 24145.4 2480.01	(dBc) N/A -51.15 -51.04 N/A -46.56	≤ (dBc) N/A -20 -20 N/A -20	N/A Pass Pass N/A Pass
None Configuration # BLE/GFSK 1 Mbps I BLE/GFSK 1 Mbps I	1 Low Channel, 2402 MHz Low Channel, 2402 MHz Low Channel, 2402 MHz Mid Channel, 2440 MHz Mid Channel, 2440 MHz Mid Channel, 2440 MHz	Signature	- Jacq	Range Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	Freq (MHz) 2402.01 3787.29 23992.8 2440.01 5204.65 24145.4	(dBc) N/A -51.15 -51.04 N/A -46.56 -48.57	≤ (dBc) N/A -20 -20 N/A -20 -20	N/A Pass Pass N/A Pass Pass



equency	Measured	Max Value	Limit		
				Result	
laanontai	2102101				
an Manadala Tanka ala ar					ĩ
	SENSE-INT	ALIGN OFF		09:55:38 AM Aug 28, 2020	1
		#Avg Type:	Log-Pwr	TRACE 1 2 3 4 5 6	
PNO: Wid IFGain:Lo		Avg Hold:>	100/100	DET PPPPP	
4 18			Mkr1 2.4	02 007 63 GHz	
				0.408 dBm	
	<u> </u>				
				Span 1.000 MHz	
	#VBW 300 kHz		Sweep 1	.092 ms (8192 pts)	
		STATUS			1
	Range Indamental Int Materials Technology DC PNO: Wid	Range Freq (MHz) Indamental 2402.01 ant Materials Technology SENSE:INT DC SENSE:INT PNO: Wide Trig: Free Run IFGain:Low #Atten: 10 dB 4 dB	Range Freq (MHz) (dBc) indamental 2402.01 N/A ant Materials Technology SENSE:INT Allow OFF DC SENSE:INT Allow OFF PNO: Wide Trig: Free Run IFGein:Low #Avg Type: Avg Hold> 4 dB 1 1 3m 1 1 4 dB 1 1 4 dB 1 1 4 dB 1 1 3m 1 1 4 dB 1 1 1	Range Freq (MHz) (dBc) ≤ (dBc) indamental 2402.01 N/A N/A int Materials Technology Image: Comparison of the sense intervence of the sense	Range Freq (MHz) (dBc) ≤ (dBc) Result Indamental 2402.01 N/A N/A N/A Indamental Sense:Int Interview 09:55:38 AM Aug 28, 2020 Indamental Trig: Free Run #Avg Type: Log-Pwr Trig: Free Run If Gain:Low Trig: Free Run #Avg Type: Log-Pwr Trig: Free Run If Gain:Low Trig: Free Run #Avg Type: Log-Pwr Trig: Free Run If Gain:Low Trig: Free Run Interview 0.408 dBm If Gain:Low If Gain:Low Interview 0.408 dBm If Gain:Low If Gain:Low Interview Interview If Gain:Low If Gain:Low Interview Interview If Gain:Low Interview Interview Interview If Gain:Low Interview Interview Interview </td

BLE/GFSK 1 Mbps Low Channel, 2402 MHz					
Frequency Measured Max Value Limit					
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result	
30 MHz - 12.5 GHz	3787.29	-51.15	-20	Pass	

RF 50 Ω	DC		SENSE:INT	A∧	LIGN OFF		09:58:0	2 AM Aug 28, 20
		PNO: Fast G			#Avg Type:	Log-Pwr		TYPE MWWW DET PPPP
Ref Offset 21.7 Ref 10.00 d	74 dB Bm							87 3 GH 1.15 dBi
		1						
	فيودون فستنجز والمتناز والمترود	A distant and a second de la construction de la construcción de la con	In the second	وللالا ويجازن والمحلو			James Marine	Jacobie Constants
Allfan at Daris the								
0 GHz			3W 300 kHz				Stop ep 1.192	12.500 GH
	Ref Offset 21. Ref 10.00 d	Ref Offset 21.74 dB Ref 10.00 dBm Image:	Ref Offset 21.74 dB Ref 10.00 dBm	PNO: Fast IFGain:Low Trig: Free #Atten: 10 Ref Offset21.74 dB Ref 10.00 dBm	PNO: Fast IFGain:Low Trig: Free Run #Atten: 10 dB Ref Offset 21.74 dB Ref 10.00 dBm	PNO: Fast IFGainLow Trig: Free Run #Atten: 10 dB Ref Offset21.74 dB Ref 10.00 dBm	PNO: Fast IFGsin:Low Trig: Free Run #Atten: 10 dB Ref Offset 21.74 dB Ref 10.00 dBm Image: Strategy and the strateg	#Avg Type: Log-Pwr TT PNO: Fast Trig: Free Run Ref Offset 21.74 dB Mkr1 3.7 Ref 10.00 dBm State Image: State Image: State Image: State State Image: State State Image: State State Image: State State State Image: State State <t< td=""></t<>



	Frequency		1 Mbps Low Ch Measured		ax Value	Limit		
	Range		Freq (MHz		(dBc)	≤ (dBc)	Res	sult
12	.5 GHz - 25 GHz		23992.8	/	-51.04	-20	Pa	
•								
Keysight Spectrum Analyzer - RL RF 50								
LXI R L RF 50	Ω DC		SENSE:INT		LIGN OFF #Avg Type	: Log-Pwr	TRA	AM Aug 28, 2020 CE <mark>1 2 3 4 5</mark> 6
		PNO: Fast G	Trig: Free Run #Atten: 10 dB		5).	-	T	
Ref Offset 2	21.74 dB					Mk	r1 23.99	2 8 GHz
10 dB/div Ref 10.00	dBm						-91	.04 dBm
0.00								
-10.0								
10.0								
-20.0								
2010								
-30.0								
-30.0								
-40.0								
-40.0								
-50.0								↓
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-60.0			the lot of	and the state of the state	A tradition of the second s		and the property of the later o	
-70.0								
-80.0								
Start 12.500 GHz #Res BW 100 kHz		#VB	W 300 kHz			Sweep	Stop 2: 0 1.195 s	5.000 GHz (8192 pts)
MSG					STATUS			

BLE/0	GFSK 1 Mbps Mid Chann	el, 2440 MHz			
Frequency	Measured	Max Value	Limit		
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result	_
Fundamental	2440.01	N/A	N/A	N/A]

RL RF 50 Ω DC	SENSE:INT	ALIGN OFF	10:23:24 AM Aug 28, 20
	PNO: Wide Trig: Free F IFGain:Low #Atten: 10	#Avg Type: Log-Pwr Run dB	TRACE 1 2 3 4 TYPE DET PPPP
Ref Offset 21.74 dB dB/div Ref 10.00 dBm		Mk	r1 2.440 013 25 GF -2.70 dBi
0.0			
0.0			
0.0			
).0			
.0			
.0			
enter 2.4400000 GHz Res BW 100 kHz	#VBW 300 kHz	Sw	Span 1.000 Mi eep 1.092 ms (8192 pi



Measured	Max Value	Limit	
Freq (MHz)	(dBc)	≤ (dBc)	Result
5204.65	-46.56	-20	Pass
3204.03	-40.00	-20	1 833
SENSEITINT	ALIGN OFF		10:24:32 AM Aug 28, 20
		: Log-Pwr	TRACE 1 2 3 4
			TRACE 1 2 3 4 TYPE M WWW DET P P P P
#Atten: To db			
		· · · · ·	Mkr1 5.204 6 GH -49.26 dB
		· · · · ·	-40.20 GD
1			
	NAME OF A DESCRIPTION OF A		لى يەرىلىكى يېڭى (بىللىكىتىكى ئىلىكى ي
			Stop 12.500 GI
300 KHZ		Swe	ep 1.192 s (8192 pi
	SENSE:INT	SENSE:INT ALIGN OFF Trig: Free Run #Avg Type #Avg Type	SENSE:INT ALIGN OFF Trig: Free Run #Atten: 10 dB

	BLE/GFSK 1 Mbps Mid Channel, 2440 MHz				
Frequency	Frequency Measured Max Value Limit				
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result	_
12.5 GHz - 25 GHz	24145.4	-48.57	-20	Pass	

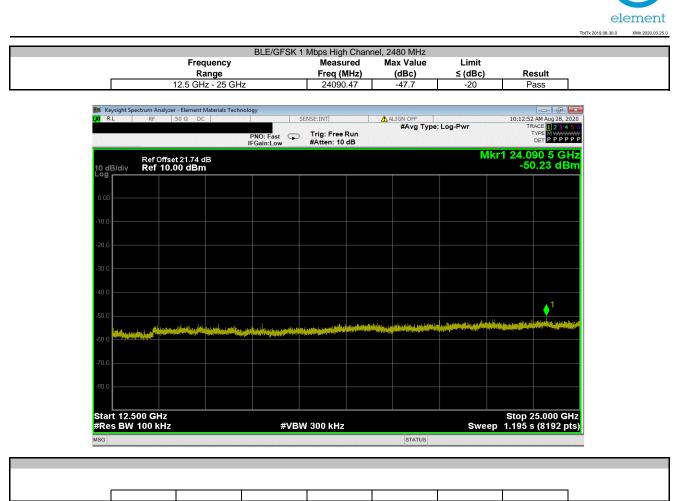
RL	t Spectrum Ana	50 Ω	DC	echnology		ENSE:INT		A ALTON OFF		10.05	
KL	KF	50 Ω	DC		5	ENSE:INT	4	ALIGN OFF			43 AM Aug 28, 20
				PNO: Fast IFGain:Low	Ģ	Trig: Free R #Atten: 10 c		#Avg Type	: Log-Pwr		TYPE MWWW DET P P P P F
dB/div	Ref Of Ref 1	fset 21.7 0.00 dl	4 dB 3m							Mkr1 24.1 -5	145 4 GH 51.27 dBi
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0.0											
art 1'	2.500 GH	7								Ston	25.000 GH
	2.500 GH. W 100 kH			#	VBV	V 300 kHz			Sw	eep 1.195	s (8192 pt
G	NATE AND A COMPANY	(1-7-1-1)(1-7-1-1)(1-7-1			Service and			STATUS			



	BLE/GFS	K 1 Mbps High Chanr	nel, 2480 MHz			
	Frequency	Measured	Max Value	Limit		
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result	
	Fundamental	2480.01	N/A	N/A	N/A	
	eectrum Analyzer - Element Materials Technology					
CX RL	RF 50 Ω DC	SENSE:INT	ALIGN OFF		10:10:03 AM Aug 28, 2020	
	PNO: Wide IFGain:Low	 Trig: Free Run #Atten: 10 dB 	#Avg Type:	: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P P P P P P	
	Ref Offset 21.74 dB			Mkr1 2.4	80 012 27 GHz -2.53 dBm	
10 dB/div Log	Ref 10.00 dBm			, , , , , , , , , , , , , , , , , , , ,	-2.55 dBm	
0.00		∮1				
-10.0					man man man and a start and a	
and the second se					and the second	
-20.0						
-30.0						
-40.0						
-50.0						
-60.0						
-70.0						
00.0						
-80.0						
	4800000 GHz				Span 1.000 MHz	
#Res BW	100 kHz #V	/BW 300 kHz		Sweep 1.	092 ms (8192 pts)	
MSG			STATUS			
	BLE/GES	K 1 Mbps High Chanr	el 2480 MHz			
	Frequency	Measured	Max Value	Limit		
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result	
	30 MHz - 12.5 GHz	3772.07	-48.57	-20	Pass	

BLE/GFSK 1 Mbps High Channel, 2480 MHz											
Frequency Measured Max Value Limit											
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result							
30 MHz - 12.5 GHz	3772.07	-48.57	-20	Pass							

RL	RF 50 Ω DC			SENSE:INT		ALIGN OFF		10:11:0	AM Aug 28, 20
		P	NO: Fast Gain:Low		Run	#Avg Type:	Log-Pwr	TF	TYPE MWWW DET PPPP
dB/div	Ref Offset 21.74 c Ref 10.00 dBm							Mkr1 3.7 -5	72 1 GF 1.10 dB
-									
o									
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art 0.03	0 GHz							Stop 7	12.500 GI
es BW	100 kHz		#V	BW 300 kHz			SWe	ep 1.192 s	s (8192 pi



SPURIOUS RADIATED EMISSIONS



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

BTLE continuous Tx, Low Channel 2402 MHz
BTLE continuous Tx, Mid Channel 2440 MHz
BTLE continuous Tx, High Channel 2480 MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

PAON0005 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz

Stop Frequency 26000 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna - Biconilog	Teseq	CBL 6141B	AYD	2020-02-05	24 mo
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2020-05-28	12 mo
Attenuator	Weinschel Corp	4H-20	AWB	2020-03-11	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AJG	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AJF	NCR	0 mo
Cable	Northwest EMC	18-40GHz	TXE	2019-09-20	12 mo
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAM	2019-09-20	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	PAL	2020-09-18	12 mo
Amplifier - Pre-Amplifier	Fairview Microwave	FMAM63001	PAS	2020-05-28	12 mo
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2020-05-07	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJL	2018-10-11	24 mo
Cable	Northwest EMC	1-8.2 GHz	TXC	2020-06-02	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAJ	2020-06-02	12 mo
Cable	Northwest EMC	8-18GHz	TXD	2020-05-14	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	PAK	2020-09-18	12 mo
Filter - high Pass	Micro-Tronics	HPM50108	HGD	2020-09-18	12 mo

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These "pre-scans" are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector PK = Peak Detector AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

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

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of $10*\log(1/dc)$.

SPURIOUS RADIATED EMISSIONS



1101	rk Order	: PAOI	10005		Date:	2020-08-26			/	0
	Project	: No	one	Tem	perature:	22.6 °C		1.	2/	Int
	Job Site	: T)	(02		Humidity:	52.6% RH	1		\sim	
Serial	Number	: 00)13	Barome	tric Pres.:	1016 mbar		Tested by:	Willie Love, E	Brandon Hobbs
	EUT	: Smart Tra	cking Colla	r					• · · ·	
Confic	guration									
		: Paragon Ir	novations	Inc						
		: Alan Hast								
		: Battery	/							
Operatin		BTI E cont	inuous Tx,	32% duty cy	ycle, please r	eference data o	comments for	EUT orientat	ion and chann	el.
De	viations	None								
Co	mments	formula is when oper downward	as describe ating in no DCCF cor	ed 10*Log(1 rmal DTS m rection appli	/.32) = 4.95 o ode, the wors	s to account for B added to the st-case duty cyc 20*log(On Tim nt = -39.6.	e measureme cle using a 10	nt values. Per 0 ms period i	the KDB 5580 s less than 1%	074 Guidance, 5. Therefore, t
st Specif	ications					Tost	Method			
C 15.247							C63.10:2013			
Run #	17	Test Dis	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
	17	Test Dis	stance (m)	3	Antenna H	leight(s)	1 to 4(r	m)	Results	Pass
Run #	17	Test Dis	stance (m)	3	Antenna H	leight(s)	1 to 4(r	m)	Results	Pass
	17	Test Dis	stance (m)	3	Antenna H	leight(s)	1 to 4(r	m)	Results	Pass
	17	Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(1	m)	Results	Pass
80	17	Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
	17	Test Dis	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80	17	Test Dis	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80	17	Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80	17	Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(1	n)	Results	Pass
80	17	Test Dis	stance (m)	3	Antenna H	leight(s)	1 to 4(1	n)	Results	Pass
80 - 60 -	17	Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80 - 60 -	17	Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80	17	Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80 - 60 -	17	Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80	17	Test Di	stance (m)	3	Antenna H	leight(s)		n)	Results	Pass
80	17	Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80 60 40 20	17	Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80 - 60 - 40 -	17		stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80 60 40 20			stance (m)	3	Antenna H	leight(s)		n)	Results	Pass
80 60 40 20	17	Test Di	stance (m)	3	Antenna H	leight(s)		n)	Results	Pass
80 60 40 20 0		Test Di	stance (m)	3	Antenna H	leight(s)	1 to 4(r	n)	Results	Pass
80 60 40 20			stance (m)	3			1 to 4(r	n)	Results	Pass
80 60 40 20 0			stance (m)	3	Antenna H			n)	Results	Pass
80 60 40 20 0			stance (m)	3	Antenna H			n)	Results	Pass
80 60 40 20 -20			stance (m)	3	Antenna H	leight(s)		n)	Results	Pass
80 60 40 20 -20 -40				3					Results	
8020			Stance (m)	3	Antenna H	leight(s)		n)	Results	Pass

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7440.945	48.7	9.9	1.3	337.0	0.0	0.0	Horz	PK	0.0	58.6	74.0	-15.4	EUT standing vertical, high Ch
7440.662	47.6	9.9	2.0	171.9	0.0	0.0	Vert	PK	0.0	57.5	74.0	-16.5	EUT Laying flat, high Ch
7439.278	46.8	9.9	2.5	360.0	0.0	0.0	Vert	PK	0.0	56.7	74.0	-17.3	EUT standing vertical, high Ch
7439.537	46.1	9.9	3.5	0.0	0.0	0.0	Vert	PK	0.0	56.0	74.0	-18.0	EUT on it's side, high Ch
7440.845	45.8	9.9	1.7	246.0	0.0	0.0	Horz	PK	0.0	55.7	74.0	-18.3	EUT Laying flat, high Ch
7440.587	45.7	9.9	1.6	249.9	0.0	0.0	Horz	PK	0.0	55.6	74.0	-18.4	EUT on it's side, high Ch
12011.450	54.0	-3.4	2.8	85.0	0.0	0.0	Horz	PK	0.0	50.6	74.0	-23.4	EUT standing vertical low ch
7327.708	40.2	9.9	1.5	261.9	0.0	0.0	Horz	PK	0.0	50.1	74.0	-23.9	EUT standing vertical mid ch
12011.250	53.4	-3.4	2.8	90.0	0.0	0.0	Horz	PK	0.0	50.0	74.0	-24.0	EUT standing vertical low ch
12011.270	53.3	-3.4	2.8	90.0	0.0	0.0	Horz	PK	0.0	49.9	74.0	-24.1	EUT standing vertical low ch
7328.117	39.7	9.9	1.5	45.0	0.0	0.0	Vert	PK	0.0	49.6	74.0	-24.4	EUT standing vertical mid ch
12011.410	50.4	-3.4	4.0	80.0	0.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	EUT standing vertical low ch
12398.660	48.6	-2.2	1.5	0.0	0.0	0.0	Horz	PK	0.0	46.4	74.0	-27.6	EUT standing vertical high ch.
12398.580	48.4	-2.2	1.5	360.0	0.0	0.0	Horz	PK	0.0	46.2	74.0	-27.8	EUT standing vertical high ch.
4803.742	42.6	3.6	2.0	270.0	0.0	0.0	Horz	PK	0.0	46.2	74.0	-27.8	EUT standing vertical low ch
4803.633	42.5	3.6	2.0	270.0	0.0	0.0	Horz	PK	0.0	46.1	74.0	-27.9	EUT standing vertical low ch
4805.067	41.7	3.6	3.0	225.0	0.0	0.0	Vert	PK	0.0	45.3	74.0	-28.7	EUT standing vertical low ch
12008.930	48.7	-3.4	2.0	157.0	0.0	0.0	Vert	PK	0.0	45.3	74.0	-28.7	EUT standing vertical low ch
4803.667	40.8	3.6	2.0	45.0	0.0	0.0	Vert	PK	0.0	44.4	74.0	-29.6	EUT standing vertical low ch
4881.508	40.1	3.7	1.5	225.0	0.0	0.0	Horz	PK	0.0	43.8	74.0	-30.2	EUT standing vertical mid ch
4958.708	39.6	3.9	3.0	270.0	0.0	0.0	Horz	PK	0.0	43.5	74.0	-30.5	EUT standing vertical, high Ch

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4881.625	39.5	3.7	1.5	90.0	0.0	0.0	Vert	PK	0.0	43.2	74.0	-30.8	EUT standing vertical mid ch
4961.750	39.1	3.9	2.5	0.0	0.0	0.0	Vert	PK	0.0	43.0	74.0	-31.0	EUT standing vertical, high Ch
12207.940	42.8	-3.0	1.5	225.0	0.0	0.0	Horz	PK	0.0	39.8	74.0	-34.2	EUT standing vertical mid ch
12212.180	42.0	-3.1	1.5	135.0	0.0	0.0	Vert	PK	0.0	38.9	74.0	-35.1	EUT standing vertical mid ch
7439.478	39.7	9.9	1.3	337.0	-39.6	0.0	Horz	AV	0.0	10.0	54.0	-44.0	EUT standing vertical, high Ch
7439.445	38.4	9.9	2.0	171.9	-39.6	0.0	Vert	AV	0.0	8.7	54.0	-45.3	EUT Laying flat, high Ch
7439.445	37.7	9.9	2.5	360.0	-39.6	0.0	Vert	AV	0.0	8.0	54.0	-46.0	EUT standing vertical, high Ch
7439.412	36.8	9.9	1.7	246.0	-39.6	0.0	Horz	AV	0.0	7.1	54.0	-46.9	EUT Laying flat, high Ch
7439.403	36.4	9.9	3.5	0.0	-39.6	0.0	Vert	AV	0.0	6.7	54.0	-47.3	EUT on it's side, high Ch
7439.445	36.2	9.9	1.6	249.9	-39.6	0.0	Horz	AV	0.0	6.5	54.0	-47.5	EUT on it's side, high Ch
12008.920	43.5	-3.4	2.8	90.0	-39.6	0.0	Horz	AV	0.0	0.5	54.0	-53.5	EUT standing vertical low ch
12008.910	43.5	-3.4	2.8	90.0	-39.6	0.0	Horz	AV	0.0	0.5	54.0	-53.5	EUT standing vertical low ch
7328.408	29.6	9.9	1.5	261.9	-39.6	0.0	Horz	AV	0.0	-0.1	54.0	-54.1	EUT standing vertical mid ch
7327.517	29.4	9.9	1.5	45.0	-39.6	0.0	Vert	AV	0.0	-0.3	54.0	-54.3	EUT standing vertical mid ch
4803.925	33.4	3.6	2.0	270.0	-39.6	0.0	Horz	AV	0.0	-2.6	54.0	-56.6	EUT standing vertical low ch
12398.880	39.1	-2.2	4.0	360.0	-39.6	0.0	Vert	AV	0.0	-2.7	54.0	-56.7	EUT standing vertical high ch.
12008.970	39.7	-3.4	4.0	80.0	-39.6	0.0	Vert	AV	0.0	-3.3	54.0	-57.3	EUT standing vertical low ch
12398.880	37.9	-2.2	1.5	360.0	-39.6	0.0	Horz	AV	0.0	-3.9	54.0	-57.9	EUT standing vertical high ch.
4803.833	31.0	3.6	2.0	45.0	-39.6	0.0	Vert	AV	0.0	-5.0	54.0	-59.0	EUT standing vertical low ch
4959.833	29.8	3.9	3.0	270.0	-39.6	0.0	Horz	AV	0.0	-5.9	54.0	-59.9	EUT standing vertical, high Ch
4883.467	29.2	3.8	1.5	225.0	-39.6	0.0	Horz	AV	0.0	-6.6	54.0	-60.6	EUT standing vertical mid ch
4959.683	29.0	3.9	2.5	0.0	-39.6	0.0	Vert	AV	0.0	-6.7	54.0	-60.7	EUT standing vertical, high Ch
4883.842	29.1	3.8	1.5	90.0	-39.6	0.0	Vert	AV	0.0	-6.7	54.0	-60.7	EUT standing vertical mid ch
12208.390	32.1	-3.0	1.5	225.0	-39.6	0.0	Horz	AV	0.0	-10.5	54.0	-64.5	EUT standing vertical mid ch
12208.480	32.1	-3.0	1.5	135.0	-39.6	0.0	Vert	AV	0.0	-10.5	54.0	-64.5	EUT standing vertical mid ch

SPURIOUS RADIATED EMISSIONS



	k Order:	PAON0005		Date:	2020-0	8-26		2	1
	Project:			perature:	22.6		1-1	a.t	Ial
	lob Site:			Humidity:	52.6%		1	\sim)
Serial N	Number:	0013		tric Pres.:	1016 ו	nbar	Test	ed by: Willie Love,	Brandon Hobb
		Smart Tracking C	ollar						
	uration:								
		Paragon Innovation	ons, Inc.						
		Alan Hasty							
EUT	Power:								
Operatin	g Mode:		Tx, 32% duty cy	/cle, please re	eference	lata comme	nts for EUT of	ientation and chanr	nel.
Dev	viations:	None							
Cor	nments:	formula is as deso when operating in	cribed 10*Log(1) normal DTS mo correction appli	/.32) = 4.95 d ode, the wors ed based on 2	B added t t-case du 20*log(Or	o the measu ty cycle usin Time(.592 r	irement value g a 100 ms pe	required 100% duty s. Per the KDB 558 eriod is less than 1% Pulse Period length	074 Guidance, 6. Therefore, the state of the
st Specifi	inations					Fest Method	4		
C 15.247:		1				ANSI C63.10			
Run #	23	Test Distance	(m) 3	Antenna H	eight(s)	1	to 4(m)	Results	Pass
Run #	23	Test Distance	(m) 3	Antenna H	eight(s)	1	to 4(m)	Results	Pass
	23	Test Distance	(m) 3	Antenna H	eight(s)	1	to 4(m)	Results	Pass
80 - 60 -	23	Test Distance	(m) 3	Antenna H	eight(s)		to 4(m)	Results	Pass
80	23	Test Distance	(m) 3	Antenna H	eight(s)		to 4(m)	Results Image: state	Pass
80 - 60 -	23	Test Distance	(m) 3	Antenna H	eight(s)		to 4(m)	Results	Pass
80	23	Test Distance	(m) 3	Antenna H	eight(s)		to 4(m)	Results Image: state	Pass
80		Test Distance	(m) 3	Antenna H	eight(s)		to 4(m)	Results Image: state	Pass
80	23	Test Distance	(m) 3	Antenna H	eight(s)		to 4(m)		Pass

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.513	44.0	-6.1	1.5	274.9	0.0	20.0	Vert	PK	0.0	57.9	74.0	-16.1	Band edge high ch EUT laying flat
2483.587	43.7	-6.1	2.4	75.0	0.0	20.0	Horz	PK	0.0	57.6	74.0	-16.4	Band edge high ch EUT standing vertical
2389.150	43.9	-6.4	1.5	280.9	0.0	20.0	Vert	PK	0.0	57.5	74.0	-16.5	Band edge low ch EUT on it's side
2388.350	43.9	-6.4	1.5	295.0	0.0	20.0	Horz	PK	0.0	57.5	74.0	-16.5	Band edge low ch EUT laying flat
2389.530	43.8	-6.4	3.3	290.0	0.0	20.0	Vert	PK	0.0	57.4	74.0	-16.6	Band edge low ch EUT standing vertical
2388.413	43.7	-6.4	1.5	337.0	0.0	20.0	Vert	PK	0.0	57.3	74.0	-16.7	Band edge low ch EUT laying flat
2388.417	43.6	-6.4	1.5	207.0	0.0	20.0	Horz	PK	0.0	57.2	74.0	-16.8	Band edge low ch EUT on it's side
2485.423	43.2	-6.1	1.5	51.9	0.0	20.0	Vert	PK	0.0	57.1	74.0	-16.9	Band edge high ch EUT standing vertical
2484.263	43.2	-6.1	1.5	204.0	0.0	20.0	Horz	PK	0.0	57.1	74.0	-16.9	Band edge high ch EUT on it's side
2484.293	43.2	-6.1	1.5	51.0	0.0	20.0	Vert	PK	0.0	57.1	74.0	-16.9	Band edge high ch EUT on it's side
2389.650	43.5	-6.4	3.5	225.0	0.0	20.0	Horz	PK	0.0	57.1	74.0	-16.9	Band edge low ch EUT standing vertical
2485.210	43.1	-6.1	2.9	105.9	0.0	20.0	Horz	PK	0.0	57.0	74.0	-17.0	Band edge high ch EUT laying flat
2484.847	36.8	-6.1	1.5	204.0	-39.6	20.0	Horz	AV	0.0	11.1	54.0	-42.9	Band edge high ch EUT on it's side
2485.417	32.6	-6.1	2.4	75.0	-39.6	20.0	Horz	AV	0.0	6.9	54.0	-47.1	Band edge high ch EUT standing vertical
2389.010	32.8	-6.4	1.5	295.0	-39.6	20.0	Horz	AV	0.0	6.8	54.0	-47.2	Band edge low ch EUT laying flat
2389.647	32.7	-6.4	1.5	207.0	-39.6	20.0	Horz	AV	0.0	6.7	54.0	-47.3	Band edge low ch EUT on it's side
2484.263	32.4	-6.1	2.9	105.9	-39.6	20.0	Horz	AV	0.0	6.7	54.0	-47.3	Band edge high ch EUT laying flat
2389.917	32.6	-6.4	1.5	280.9	-39.6	20.0	Vert	AV	0.0	6.6	54.0	-47.4	Band edge low ch EUT on it's side
2389.310	32.6	-6.4	1.5	337.0	-39.6	20.0	Vert	AV	0.0	6.6	54.0	-47.4	Band edge low ch EUT laying flat
2484.327	32.3	-6.1	1.5	51.9	-39.6	20.0	Vert	AV	0.0	6.6	54.0	-47.4	Band edge high ch EUT standing vertical
2485.467	32.3	-6.1	1.5	51.0	-39.6	20.0	Vert	AV	0.0	6.6	54.0	-47.4	Band edge high ch EUT on it's side
2484.747	32.3	-6.1	1.5	274.9	-39.6	20.0	Vert	AV	0.0	6.6	54.0	-47.4	Band edge high ch EUT laying flat
2389.767	32.5	-6.4	3.5	225.0	-39.6	20.0	Horz	AV	0.0	6.5	54.0	-47.5	Band edge low ch EUT standing vertical

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2389.627	32.5	-6.4	3.3	290.0	-39.6	20.0	Vert	AV	0.0	6.5	54.0	-47.5	Band edge low ch EUT standing vertical