

PayRange Inc. BluKey Pro

FCC 15.247:2019 Bluetooth Low Energy DTS Radio

Report # PAYR0015.1





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CERTIFICATE OF TEST



Last Date of Test: March 23, 2019 PayRange Inc. Model: BluKey Pro

Radio Equipment Testing

Standards	
Specification	Method
FCC 15.207:2019	ANSI C63.10:2013, KDB 558074
FCC 15.247:2019	ANSI C03.10.2013, RDB 330074

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
11.12.1, 11.13.2, 6.5, 6.6	Spurious Radiated 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	1 Band Edge Compliance		Pass	
11.11	Spurious Conducted Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Kyle Holgate, 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



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

ACCREDITATIONS AND AUTHORIZATIONS



United States

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

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

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

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

European Union

European Commission – 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

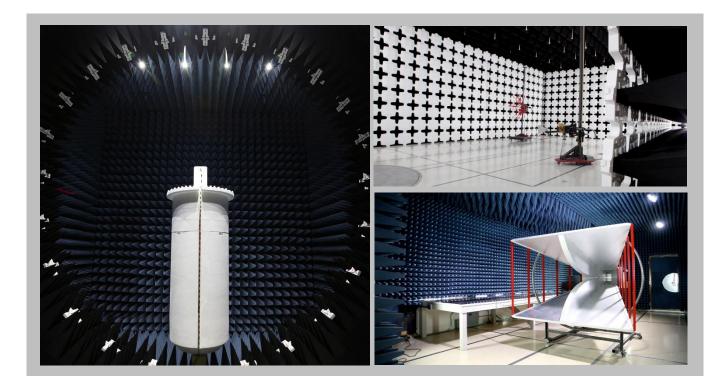
For details on the Scopes of our Accreditations, please visit: https://www.nwemc.com/emc-testing-accreditations

FACILITIES





California Minnesota Labs OC01-17 Labs MN01-10 41 Tesla 9349 W Broadway Ave. Irvine, CA 92618 Brooklyn Park, MN 55445 (949) 861-8918 (612)-638-5136		Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th Ave NE Bothell, WA 98011 (425)984-6600		
		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.

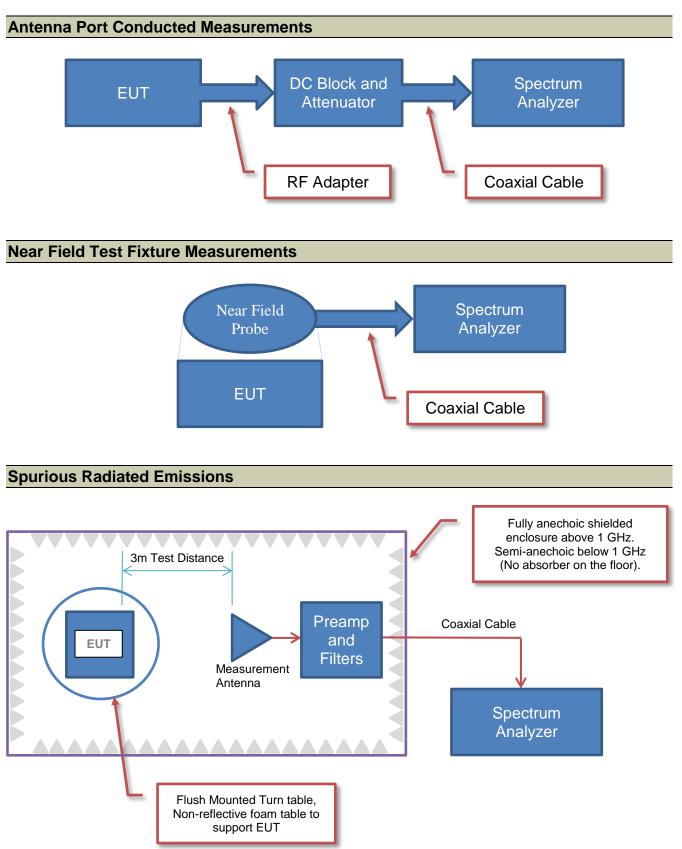
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable 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 (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 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)	2.4 dB	-2.4 dB

Test Setup Block Diagrams





PRODUCT DESCRIPTION



Client and Equipment Under Test (EUT) Information

Company Name:	PayRange Inc.
Address:	9600 NE Cascades Pkwy, Suite 280
City, State, Zip:	Portland, OR 97220
Test Requested By:	Mike Mitchell
Model:	BluKey Pro
First Date of Test:	March 12, 2019
Last Date of Test:	March 23, 2019
Receipt Date of Samples:	March 12, 2019
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

Payrange devices allow wireless payment from smartphones to vending machines, in this case laundry devices.

Testing Objective:

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





Configuration PAYR0015-1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
BLE device	PayRange, Inc.	BluKey Pro	1

Peripherals in test setup boundary						
Description Manufacturer Model/Part Number Serial Number						
Transformer	Basier	BE34406001 G19 1520	None			
Battery	PayRange, Inc.	11.01201	None			

Cables						
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2	
Extension	No	1 m	No	BLE device	Power Cable	
Extension	No	1 m	No	BLE device	Power Cable	
Power Cable	No	1 m	No	Extension	Transformer	
AC Power Cable	No	1 m	No	Transformer	AC Mains	
Battery cable	No	0.1 m	No	BLE Device	Battery	

Configuration PAYR0015-2

EUT						
Description	Manufacturer	Model/Part Number	Serial Number			
BLE device	PayRange, Inc.	BluKey Pro	2			

Peripherals in test setup boundary						
Description	Manufacturer	Model/Part Number	Serial Number			
Transformer	Basier	BE34406001 G19 1520	None			
Battery	PayRange, Inc.	11.01201	None			
Laptop	HP	15BS115DX	CND8076QJL			
BK Module Programmer	PayRange, Inc.	None	None			

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Extension	No	1 m	No	BLE device	Power Cable
Extension	No	1 m	No	BLE device	Power Cable
Power Cable	No	1 m	No	Extension	Transformer
AC Power Cable	No	1 m	No	Transformer	AC Mains
Battery cable	No	0.1 m	No	BLE Device	Battery
SMA Cable	Yes	0.1 m	No	BLE Device	SMA Connector
USB Cable	Yes	0.5 m	No	Laptop	BK Module Programmer
Serial Cable	No	0.05 m	No	BK Module Programmer	BLE Device





Configuration PAYR0015-3

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
BLE device	PayRange, Inc.	BluKey Pro	1

Peripherals in test setup boundary						
Description Manufacturer Model/Part Number Serial Number						
Transformer	Basier	BE34406001 G19 1520	None			
Battery	PayRange, Inc.	11.01201	None			
Laptop	HP	15BS115DX	CND8076QJL			

Cables								
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2			
Extension	No	1 m	No	BLE device	Power Cable			
Extension	No	1 m	No	BLE device	Power Cable			
Power Cable	No	1 m	No	Extension	Transformer			
AC Power Cable	No	1 m	No	Transformer	AC Mains			
Battery cable	No	0.1 m	No	BLE Device	Battery			

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
		Powerline	Tested as	No EMI suppression	EUT remained at
1	2019-03-12	Conducted	delivered to	devices were added or	Element following the
		Emissions	Test Station.	modified during this test.	test.
2	2019-03-13	Spurious Radiated Emissions	Modified from delivered configuration.	Client shorted the cavity on a PCB level antenna that had no EUT function. Modification authorized by Mike Mitchell.	EUT remained at Element following the test.
3	2019-03-19	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2019-03-22	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.
5	2019-03-22	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.
6	2019-03-23	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.
7	2019-03-23	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2019-03-23	Power Spectra 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.
9	2019-03-23	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.
10	2019-03-23	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.



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	Rohde & Schwarz	ESCI	ARH	2018-04-11	2019-04-11
LISN	Solar Electronics	9252-50-R-24-BNC	LIP	2018-09-11	2020-09-11
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKA	EVGA	2019-01-07	2020-01-07

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

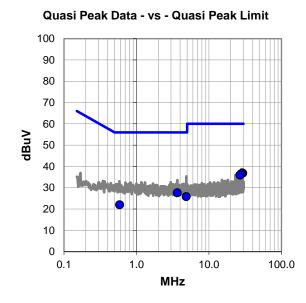
PAYR0015-1

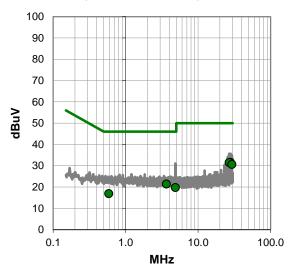
MODES INVESTIGATED

BLE radio continuous transmission. Mid channel = 2442 MHz. Maximum power setting.



EUT:	BluKey Pro				Work Order:	PAYR0015
Serial Number:	1				Date:	2019-03-12
Customer:	PayRange Ir	IC.			Temperature:	20.4°C
Attendees:	Michael Mitc	hell			Relative Humidity:	36%
Customer Project:	None				Bar. Pressure:	1016 mb
Tested By:	Jody House				Job Site:	EV07
Power:	24 VAC via 1	110VAC/60	Hz		Configuration:	PAYR0015-1
TEST SPECIFIC	CATIONS					
Specification:				Method:		
FCC 15.207:2019				ANSI C63.1	0:2013	
TEST PARAME	TERS					
Run #: 5		Line:	High Line	A	Add. Ext. Attenuation (dB	b): 0
COMMENTS						
None						
EUT OPERATING MODES						
BLE radio continuous transmission. Mid channel = 2442 MHz. Maximum power setting.						
DEVIATIONS FROM TEST STANDARD						





Average Data - vs - Average Limit



RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit							
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)		
29.282	14.6	22.2	36.8	60.0	-23.2		
28.065	14.6	22.0	36.6	60.0	-23.4		
26.842	14.0	21.9	35.9	60.0	-24.1		
3.660	7.4	20.2	27.6	56.0	-28.4		
4.875	5.6	20.2	25.8	56.0	-30.2		
0.587	2.0	20.0	22.0	56.0	-34.0		

Average Data - vs - Average Limit							
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)		
28.065	9.6	22.0	31.6	50.0	-18.4		
26.842	9.6	21.9	31.5	50.0	-18.5		
29.282	8.4	22.2	30.6	50.0	-19.4		
3.660	1.2	20.2	21.4	46.0	-24.6		
4.875	-0.5	20.2	19.7	46.0	-26.3		
0.587	-3.1	20.0	16.9	46.0	-29.1		

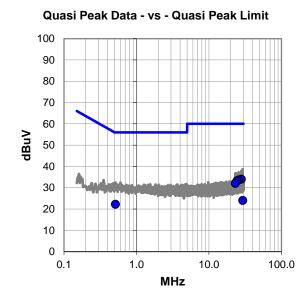
CONCLUSION

Pass

Tested By



EUT:	BluKey Pro				Work Order:	PAYR0015	
Serial Number:	1				Date:	2019-03-12	
Customer:	PayRange Ir	IC.			Temperature:	20.4°C	
Attendees:	Michael Mitc	hell			Relative Humidity:	36%	
Customer Project:	None				Bar. Pressure:	1016 mb	
Tested By:	Jody House				Job Site:	EV07	
Power:	24 VAC via 1	110VAC/60	Hz		Configuration:	PAYR0015-1	
TEST SPECIFIC	CATIONS						
Specification:				Method:			
FCC 15.207:2019				ANSI C63.10):2013		
TEST PARAME	TERS						
Run #: 6		Line:	Neutral	А	dd. Ext. Attenuation (dB): 0	
COMMENTS							
None							
EUT OPERATING MODES							
BLE radio continuous transmission. Mid channel = 2442 MHz. Maximum power setting.							
DEVIATIONS FROM TEST STANDARD							
None							



100 90 80 70 60 dBuV 50 40 30 W_n 20 10 0 0.1 1.0 10.0 100.0 MHz

Average Data - vs - Average Limit



RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit							
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)		
28.058	12.0	22.0	34.0	60.0	-26.0		
25.620	11.8	21.8	33.6	60.0	-26.4		
24.400	11.6	21.6	33.2	60.0	-26.8		
23.180	10.5	21.5	32.0	60.0	-28.0		
0.515	2.3	19.9	22.2	56.0	-33.8		
29.267	1.8	22.2	24.0	60.0	-36.0		

Average Data - vs - Average Limit							
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)		
25.620	7.4	21.8	29.2	50.0	-20.8		
28.058	7.1	22.0	29.1	50.0	-20.9		
24.400	6.4	21.6	28.0	50.0	-22.0		
23.180	5.1	21.5	26.6	50.0	-23.4		
0.515	-3.2	19.9	16.7	46.0	-29.3		
29.267	-3.3	22.2	18.9	50.0	-31.1		

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

BLE Tx, GFSK, Low Ch. = 2402 MHz, Mid Ch. = 2442 MHz, High Ch. = 2480 MHz, Maximum power setting, Duty cycle during test: 62.2%. Protocol limited duty cycle: 5.7%.

POWER SETTINGS INVESTIGATED

24 VAC via 110VAC/60Hz

CONFIGURATIONS INVESTIGATED

PAYR0015 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz

Stop Frequency 26500 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	18-Mar-2018	12 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1-Feb-2019	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFD	15-Feb-2019	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HFO	11-Dec-2018	12 mo
Attenuator	Coaxicom	3910-20	AXZ	15-Feb-2019	12 mo
Cable	ESM Cable Corp.	KMKM-72	EVY	24-Aug-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	24-Aug-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIV	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	24-Nov-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	0 mo
Cable - Conducted Cable	None	Conducted Cable	EVG	NCR	0 mo
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	24-Nov-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0 mo
Cable	N/A	Double Ridge Horn Cables	EVB	24-Nov-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	24-Nov-2018	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	7-Feb-2018	24 mo
Cable	N/A	Bilog Cables	EVA	24-Nov-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	24-Nov-2018	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AXR	2-Oct-2018	24 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 at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

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(dc). For an EUT with a protocol limited duty cycle, a 20*LOG(dc) correction is subtracted from the average measurements.

During testing, the EUT operated at a 62.2% duty cycle. In the field, the EUT has a 5.7% protocol limited duty cycle. The total duty cycle correction factor applied was thus: 20*LOG(0.057)-10*LOG(0.622) = -22.8 dB.



									EmiR5 2018.09.26		PSA-ESCI 2019.02.26
Wor	k Order:			Date:		r-2019	12	e	4 3	DI	2
	Project:		Ter	nperature:		5°C	100	my "	en 1	ence	500
	Job Site:			Humidity:		% RH		5		V	
Serial	Number:		Barome	etric Pres.:	1028	mbar		Fested by:	Jody House	e & Rod P	eloquin
		BluKey Pro									
Config	juration:	3									
		PayRange Inc.									
		Michael Mitchell									
EU	Power:	24 VAC via 110VAC/	60Hz								
Operatin	g Mode:	BLE Tx, GFSK, Low during test: 62.2%. P				/IHZ, HIGN C	Jn. = 2480	vihz, Maxir	num power :	setting, Di	uty cycle
De	viations:	None									
Co	mments:	See comments for El	JT channel	and orientat	ion.						
Test Specifi	ications					Test Meth	od				
FCC 15.247						ANSI C63.					
Run #	29	Test Distance (m)	3	Antenna	Height(s)		1 to 4(m)		Results	P	ass
80 -											
										-	
70 —											
60 -											
00											
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									PK	◆ AV	QP
				Duty Cycle		Polarity/					

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
42.3	2.0	1.0	113.0	0.0	0.0	Vert	PK	0.0	44.3	74.0		High Ch, EUT On Side
												Mid Ch. EUT On Side
41.2	2.0	1.0	317.0	0.0	0.0	Horz	PK	0.0	43.2	74.0	-30.8	High Ch, EUT Vert
40.8	1.7	1.0	166.0	0.0	0.0	Horz	PK	0.0	42.5	74.0	-31.5	Mid Ch, EUT Vert
41.5	0.8	1.0	335.0	0.0	0.0	Vert	PK	0.0	42.3	74.0	-31.7	Low Ch, EUT On side
40.5	0.8	1.0	218.0	0.0	0.0	Horz	PK	0.0	41.3	74.0	-32.7	Low Ch, EUT Vert
32.1	1.7	1.0	334.0	-22.8	0.0	Vert	AV	0.0	11.0	54.0	-43.0	Mid Ch, EUT On Side
31.1	2.0	1.0	113.0	-22.8	0.0	Vert	AV	0.0	10.3	54.0	-43.7	High Ch, EUT On Side
31.3	1.7	1.0	166.0	-22.8	0.0	Horz	AV	0.0	10.2	54.0	-43.8	Mid Ch, EUT Vert
31.1	0.8	1.0	335.0	-22.8	0.0	Vert	AV	0.0	9.1	54.0	-44.9	Low Ch, EUT On side
29.8	2.0	1.0	317.0	-22.8	0.0	Horz	AV	0.0	9.0	54.0	-45.0	High Ch, EUT Vert
29.7	0.8	1.0	218.0	-22.8	0.0	Horz	AV	0.0	7.7	54.0	-46.3	Low Ch, EUT Vert
)))	(dBuV) 42.3 42.0 41.2 40.8 41.5 40.5 32.1 31.1 31.3 31.1 29.8	(dBuV) (dB) 42.3 2.0 42.0 1.7 41.2 2.0 40.8 1.7 41.5 0.8 32.1 1.7 31.1 2.0 31.3 1.7 31.1 0.8 29.8 2.0	(dBuV) (dB) (meters) 42.3 2.0 1.0 42.0 1.7 1.0 41.2 2.0 1.0 40.8 1.7 1.0 40.5 0.8 1.0 32.1 1.7 1.0 31.1 2.0 1.0 31.1 0.8 1.0 32.8 2.0 1.0	(dBuV) (dB) (meters) (degrees) 42.3 2.0 1.0 113.0 42.0 1.7 1.0 334.0 41.2 2.0 1.0 317.0 40.8 1.7 1.0 166.0 41.5 0.8 1.0 218.0 32.1 1.7 1.0 334.0 31.1 2.0 1.0 113.0 31.3 1.7 1.0 334.0 31.1 2.0 1.0 113.0 31.3 1.7 1.0 335.0 32.1 1.7 1.0 335.0 32.1 1.7 1.0 335.0 31.3 1.0 335.0 335.0 29.8 2.0 1.0 317.0	Amplitude (dBW) Factor (dB) Antenna Height (meters) Azimuth (degrees) Correction Factor (dB) 42.3 2.0 1.0 113.0 0.0 42.0 1.7 1.0 334.0 0.0 41.2 2.0 1.0 317.0 0.0 41.5 0.8 1.0 317.0 0.0 40.8 1.7 1.0 335.0 0.0 40.5 0.8 1.0 218.0 0.0 32.1 1.7 1.0 334.0 -22.8 31.1 2.0 1.0 113.0 -22.8 31.3 1.7 1.0 166.0 -22.8 31.3 1.7 1.0 166.0 -22.8 31.3 0.8 1.0 335.0 -22.8 31.1 0.8 1.0 335.0 -22.8 29.8 2.0 1.0 317.0 -22.8	Amplitude (dBuV) Factor (dB) Antenna Height (meters) Azimuth (degrees) Correction Factor (dB) External Attenuation (dB) 42.3 2.0 1.0 113.0 0.0 0.0 42.0 1.7 1.0 334.0 0.0 0.0 41.2 2.0 1.0 317.0 0.0 0.0 40.8 1.7 1.0 166.0 0.0 0.0 40.5 0.8 1.0 218.0 0.0 0.0 32.1 1.7 1.0 334.0 -22.8 0.0 31.1 2.0 1.0 113.0 -22.8 0.0 31.1 0.0 1.0 335.0 -22.8 0.0 31.3 1.7 1.0 166.0 -22.8 0.0 31.3 1.7 1.0 335.0 -22.8 0.0 31.3 1.7 1.0 335.0 -22.8 0.0 32.3 2.0 1.0 317.0 -22.8 0.0	Amplitude (dBvV) Factor (dB) Antenna Height (meters) Azimuth (degrees) Correction (dB) External Attenuation (dB) Transducer Type 42.3 2.0 1.0 113.0 0.0 0.0 Vert 42.0 1.7 1.0 334.0 0.0 0.0 Vert 41.2 2.0 1.0 317.0 0.0 0.0 Horz 40.8 1.7 1.0 166.0 0.0 0.0 Horz 40.5 0.8 1.0 218.0 0.0 0.0 Horz 40.5 0.8 1.0 218.0 0.0 0.0 Horz 31.1 2.0 1.0 113.0 -22.8 0.0 Vert 31.3 1.7 1.0 335.0 -22.8 0.0 Vert 31.1 0.8 1.0 335.0 -22.8 0.0 Horz 31.1 0.8 1.0 335.0 -22.8 0.0 Horz 29.8 2.0 1.0 </td <td>Amplitude (dBv/) Factor (dB) Antenna Height (meters) Azimuth (degrees) Correction (dB) External Attenuation (dB) Transducer Type Detector 42.3 2.0 1.0 113.0 0.0 0.0 Vert PK 42.0 1.7 1.0 334.0 0.0 0.0 Vert PK 41.2 2.0 1.0 317.0 0.0 0.0 Horz PK 40.8 1.7 1.0 166.0 0.0 0.0 Horz PK 41.5 0.8 1.0 218.0 0.0 0.0 Horz PK 40.5 0.8 1.0 218.0 0.0 0.0 Horz PK 31.1 2.0 1.0 113.0 -22.8 0.0 Vert AV 31.3 1.7 1.0 136.0 -22.8 0.0 Vert AV 31.3 1.7 1.0 335.0 -22.8 0.0 Horz AV 31.3</td> <td>Amplitude (dBvV) Factor (dB) Antenna Height (meters) Azimuth (degrees) Correction (dB) External Attenuation (dB) Transducer Type Detector Distance Adjustment (dB) 42.3 2.0 1.0 113.0 0.0 0.0 Vert PK 0.0 42.0 1.7 1.0 334.0 0.0 0.0 Vert PK 0.0 41.2 2.0 1.0 317.0 0.0 0.0 Horz PK 0.0 40.8 1.7 1.0 166.0 0.0 0.0 Horz PK 0.0 41.5 0.8 1.0 218.0 0.0 0.0 Horz PK 0.0 40.5 0.8 1.0 218.0 0.0 0.0 Horz PK 0.0 31.1 2.0 1.0 113.0 -22.8 0.0 Vert AV 0.0 31.3 1.7 1.0 166.0 -22.8 0.0 Vert AV 0.0</td> <td>Amplitude (dBv/) Factor (dB) Antenna Height (meters) Azimuth (degrees) Correction (dB) Extenuation (dB) Transducer (dB) Detector Distance Adjustment (dB) Adjusted (dBuV/m) 42.3 2.0 1.0 113.0 0.0 0.0 Vert PK 0.0 44.3 42.0 1.7 1.0 334.0 0.0 0.0 Vert PK 0.0 43.7 41.2 2.0 1.0 317.0 0.0 0.0 Horz PK 0.0 43.2 40.8 1.7 1.0 166.0 0.0 0.0 Horz PK 0.0 42.5 41.5 0.8 1.0 218.0 0.0 0.0 Horz PK 0.0 41.3 32.1 1.7 1.0 334.0 -22.8 0.0 Vert AV 0.0 11.0 31.1 2.0 1.0 113.0 -22.8 0.0 Vert AV 0.0 10.3 31.3 1.7<!--</td--><td>Amplitude (dBu/) Factor (dB) Antenna Height (meters) Azimuth (degrees) Correction (dB) Extensition (dB) Transducer (dB) Detector Distance Adjustment (dB) Adjusted (dBu//m) Spec. Limit (dB) 42.3 2.0 1.0 113.0 0.0 0.0 Vert PK 0.0 44.3 74.0 42.0 1.7 1.0 334.0 0.0 0.0 Vert PK 0.0 43.7 74.0 41.2 2.0 1.0 317.0 0.0 0.0 Horz PK 0.0 43.2 74.0 40.8 1.7 1.0 36.0 0.0 0.0 Horz PK 0.0 43.2 74.0 40.5 0.8 1.0 335.0 0.0 0.0 Horz PK 0.0 42.3 74.0 40.5 0.8 1.0 218.0 0.0 0.0 Horz PK 0.0 41.3 74.0 31.1 2.0 1.0 113.0 -22.8</td><td>Amplitude (dBuV) Factor (dB) Antenna Height (meters) Azimuth (degrees) Correction (dB) External Attenuation (dB) Transducer Type Detector Distance Adjustment (dB) Adjusted (dBuV/m) Spec. Limit (dBuV/m) Compared to Spec. 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	Proj				one					nperat			18				/	Con	-	>	le	-	1	e	y	27	>	
	Job S	ite:		E١	V01					Humio	dity:		37.6	5%	RH				C					6				
Seria	al Numb	per:			2			Bare	ome	etric Pr	es.:		1028	8 n	nbar				Test	ed by:	Jody	γ Ηοι	lse	& Ro	od P	eloq	luin	_
	E	UT:	BluK	ev Pr	0																							-
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	Custon			Range	e Inc.																							-
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			BIE		FOR			$\frac{1}{h} = 2/$	102	MHz, N	Aid C	`h –	2112	M	-17 H	liah (`h - '	2/180	MH-	Mavi	mum	now	or co	atting		ity c	vclo	-
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			None		1. 02.	Z /0.	FIU		minic	eu uuty	Cyci	ie. J.	1 /0.															_
C	Deviatio	ns:	NONE																									
с	Commei	nts:	See	comn	nents	for	EUT	ſ chan	nel a	and ori	enta	tion.																-
Test Spec	ificatio	ns												Т	est l	Meth	od		1									-
FCC 15.24																	10:20	13	-									-
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Run #	33		Ie	st Di	stand	ce (I	m)	3		Ante	enna	a Hei	ght(s)			1 to	4(m)			R	esult	S		Р	ass		-
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Freq (MHz)	Amplitu (dBu\			ctor IB)	Anten (m	na He neters)		Azimul (degree	es)	Duty C Correc Fact (dB	tion or	Atte	tternal inuation (dB)		Polar Transc Typ	ducer be		ector	Ad	istance justment (dB)		justed luV/m)		Spec. (dBu\	//m)	Co	ompared to Spec. (dB)	Comments
2389.720	34.9		-5			1.0		357.		-22			20.0		Ve			V		0.0		27.0		54			-27.0	Low Ch, EUT Vert
2389.707	42.9			5.1		1.0		277.		0.0			20.0		Ho			ĸ		0.0		57.8		74			-16.2	Low Ch, EUT Horz
2388.580	31.5			5.1 5.1		1.0		277. 357.		-22			20.0 20.0		Ho			V		0.0		23.6 58.0		54 74			-30.4	Low Ch, EUT Horz Low Ch, EUT Vert
2388.120	43.1					1.0			1	0.0	•				Ve			ΥK		0.0					0		-16.0	Low Ch ELIT Vort



	k Order:	PAYR0015		Date:	19-Mar	-2019					
	Project:		Tem	perature:	22.1	°C	, /	1	_ /	//	
	Job Site:			Humidity:	35.6%	NRH	00	-	19/10	4	
Serial N	Number:	2		tric Pres.:	1017		Т	ested by: Jef	f Alcoke		
		BluKey Pro									
Config	uration:										
Cu	stomer:	PayRange Inc.									
		Michael Mitchell									
EUT	- Bower:	24 V/AC via 110V	AC/60Hz								
Operatin	g Mode:	BLE Tx, GFSK, L during test: 62.29	ow Ch. = 2402 I	MHz, Mid Ch.	. = 2442 N	Hz, High C	h. = 2480 N	IHz, Maximun	n power set	ting, Duty	у сус
Dev	viations:	None			. 0.1 /0.						
Cor	nments:	See comments be pF at C11 does n				Spot check	measurem	ents taken to	show that ir	stallation	n of (
t Specifi	cations					Fest Metho	bd				
C 15.247:						ANSI C63.1					
Run #	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)	F	Results	Pase	S
Run #	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)	F	Results	Pass	s
	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)	F	Results	Pass	s
80 -	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)	F	Results	Pass	s
	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)	F	Results	Pass	s
	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)	F	Results	Pase	s
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)	F	Results	Pas	S
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)		Results		S
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)		Results		S
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)				S
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)				S
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)				s
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)				S
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)				S
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)				S
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)				S
80 70 60 50 40	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)				S
80	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)				S
80 70 60 50 40	39	Test Distance	(m) 3				1 to 4(m)				S
80 70 60 50 40	39	Test Distance	(m) 3	Antenna H	leight(s)		1 to 4(m)				S
80 70 60 50 40 30	39	Test Distance					1 to 4(m)				S
80 70 60 50 40 30	39	Test Distance	(m) 3				1 to 4(m)				S
80 70 60 50 40 30	39	Test Distance	(m) 3				1 to 4(m)				S
80 70 60 50 40 30 20	39	Test Distance	(m) 3				1 to 4(m)				S
80 70 60 50 40 30 20	39	Test Distance	(m) 3				1 to 4(m)				S
80 70 60 50 40 30 20	39						1 to 4(m)				S
80 70 60 50 40 30 20 10	39		(m) 3				1 to 4(m)	10000			s

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
7000 750		10.0						DI/		01.0	71.0		
7326.750	51.7	13.2	2.6	144.0	0.0	0.0	Horz	PK	0.0	64.9	74.0	-9.1	Mid Ch, EUT Vert
7439.317	50.6	14.2	1.0	221.0	0.0	0.0	Horz	PK	0.0	64.8	74.0	-9.2	High Ch, EUT Vert
4804.542	58.9	4.6	2.6	24.0	0.0	0.0	Horz	PK	0.0	63.5	74.0	-10.5	Low Ch, EUT Vert
4884.533	58.0	5.4	1.1	166.0	0.0	0.0	Vert	PK	0.0	63.4	74.0	-10.6	Mid Ch, EUT on Side
4804.442	58.6	4.6	1.0	188.0	0.0	0.0	Vert	PK	0.0	63.2	74.0	-10.8	Low Ch, EUT on Side
4884.533	57.8	5.4	2.3	154.0	0.0	0.0	Horz	PK	0.0	63.2	74.0	-10.8	Mid Ch, EUT Vert
7439.350	48.7	14.2	2.8	116.0	0.0	0.0	Horz	PK	0.0	62.9	74.0	-11.1	High Ch, EUT Horz
7439.033	48.0	14.2	3.7	10.0	0.0	0.0	Vert	PK	0.0	62.2	74.0	-11.8	High Ch, EUT on Side
7439.342	47.7	14.2	1.0	17.0	0.0	0.0	Vert	PK	0.0	61.9	74.0	-12.1	High Ch, EUT Vert
7326.558	48.7	13.2	2.6	230.0	0.0	0.0	Vert	PK	0.0	61.9	74.0	-12.1	Mid Ch, EUT on Side
4959.483	56.3	5.6	2.4	167.0	0.0	0.0	Horz	PK	0.0	61.9	74.0	-12.1	High Ch, EUT Vert
4959.467	55.6	5.6	3.1	193.0	0.0	0.0	Vert	PK	0.0	61.2	74.0	-12.8	High Ch, EUT on Side
7439.375	46.0	14.2	1.7	52.0	0.0	0.0	Horz	PK	0.0	60.2	74.0	-13.8	High Ch, EUT on Side
7439.058	45.7	14.2	1.0	337.0	0.0	0.0	Vert	PK	0.0	59.9	74.0	-14.1	High Ch, EUT Horz
4803.967	54.8	4.5	2.6	24.0	-22.8	0.0	Horz	AV	0.0	36.5	54.0	-17.5	Low Ch, EUT Vert
4883.883	53.8	5.4	1.1	166.0	-22.8	0.0	Vert	AV	0.0	36.4	54.0	-17.6	Mid Ch, EUT on Side
4884.017	53.8	5.4	2.3	154.0	-22.8	0.0	Horz	AV	0.0	36.4	54.0	-17.6	Mid Ch, EUT Vert

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
7439.500	44.5	14.2	1.0	221.0	-22.8	0.0	Horz	AV	0.0	35.9	54.0	-18.1	High Ch, EUT Vert
4804.008	54.2	4.5	1.0	188.0	-22.8	0.0	Vert	AV	0.0	35.9	54.0	-18.1	Low Ch, EUT on Side
7326.442	45.2	13.2	2.6	144.0	-22.8	0.0	Horz	AV	0.0	35.6	54.0	-18.4	Mid Ch, EUT Vert
7439.417	42.0	14.2	2.8	116.0	-22.8	0.0	Horz	AV	0.0	33.4	54.0	-20.6	High Ch, EUT Horz
7439.525	41.1	14.2	3.7	10.0	-22.8	0.0	Vert	AV	0.0	32.5	54.0	-21.5	High Ch, EUT on Side
7326.417	41.2	13.2	2.6	230.0	-22.8	0.0	Vert	AV	0.0	31.6	54.0	-22.4	Mid Ch, EUT on Side
7439.492	39.7	14.2	1.0	17.0	-22.8	0.0	Vert	AV	0.0	31.1	54.0	-22.9	High Ch, EUT Vert
4959.933	47.6	5.6	2.4	167.0	-22.8	0.0	Horz	AV	0.0	30.4	54.0	-23.6	High Ch, EUT Vert
4959.933	47.3	5.6	3.1	193.0	-22.8	0.0	Vert	AV	0.0	30.1	54.0	-23.9	High Ch, EUT on Side
7439.483	38.3	14.2	1.7	52.0	-22.8	0.0	Horz	AV	0.0	29.7	54.0	-24.3	High Ch, EUT on Side
7439.467	37.8	14.2	1.0	337.0	-22.8	0.0	Vert	AV	0.0	29.2	54.0	-24.8	High Ch, EUT Horz



Wo	rk Order:	PAYR0015		Date	10-Ma	ar-2019			EmiR5 2018.09.26	-	PSA-ESCI 2019.02.2
110	Project:	None		emperature		1 °C		1	//		1
	Job Site:	EV01	•	Humidity	42.20.	% RH	\sim	A	-0	1/2-	
	Number:	2	Baro	metric Pres.:		mbar		Tested by:	loff Alcoke	`	
Serial			Daro	metric Pres.	1016	mbar		Tested by:	Jell Alcoke	3	
Canfi		BluKey Pro									
Confi	guration:	3 Dev Deves las									
		PayRange Inc.									
		Michael Mitchell									
EU	T Power:	24 VAC via 110V									
Operati	ng Mode:	BLE Tx, GFSK, Lo during test: 62.2%				MHz, High (Ch. = 2480	MHz, Maxin	num power	setting, Du	ity cycle
De	eviations:	None									
Co	omments:	See comments be pF at C11 does no				Spot chec	k measurer	nents taken	to show that	at installatio	on of 0.5
Test Specif	fications					Test Meth	od				
FCC 15.247						ANSI C63	.10:2013				
Run #	52	Test Distance	(m) 3	Antonn	a Height(s)		1 to 4(m)		Results		
Kun #	52	Test Distance	(m) 3	Antenn	a neight(s)		1 to 4(m)		Results	Pi	ass
Г											
80 -											
											+
70 -											
60 -											
- ⁵⁰ +											
W/\ng											
3									- I - T		
n 40 +											
0											
20											
30 -											
20 -											
20											
10 -											
o 🕂											
2380	C	2400	24	20	2440		2460		2480		2500
					MHz				PK	◆ AV	• QP
						Dolarity					<u>_</u>
Freq (MHz)	Amplitude (dBuV)	Factor Antenna H (dB) (meter		Test Distance) (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)

(dBuV)	(dB)	(meters)	(degrees)	(meters)	(dB)			(dB)	(dBuv/m)	(dBuv/m)	(dB)	
												Comments
29.1	-4.9	1.0	320.0	3.0	20.0	Vert	AV	0.0	44.2	54.0	-9.8	High Ch, EUT Horz
28.9	-4.9	4.0	250.0	3.0	20.0	Horz	AV	0.0	44.0	54.0	-10.0	High Ch, EUT on Side
28.7	-4.9	1.0	235.0	3.0	20.0	Horz	AV	0.0	43.8	54.0	-10.2	High Ch, EUT Vert
28.6	-4.9	1.0	98.0	3.0	20.0	Horz	AV	0.0	43.7	54.0	-10.3	High Ch, EUT Horz
28.5	-4.9	1.0	50.0	3.0	20.0	Vert	AV	0.0	43.6	54.0	-10.4	High Ch, EUT Vert
28.4	-4.9	1.9	170.0	3.0	20.0	Vert	AV	0.0	43.5	54.0	-10.5	High Ch, EUT on Side
41.8	-4.8	1.0	50.0	3.0	20.0	Vert	PK	0.0	57.0	74.0	-17.0	High Ch, EUT Vert
41.9	-4.9	4.0	250.0	3.0	20.0	Horz	PK	0.0	57.0	74.0	-17.0	High Ch, EUT on Side
41.8	-4.9	1.0	320.0	3.0	20.0	Vert	PK	0.0	56.9	74.0	-17.1	High Ch, EUT Horz
41.5	-4.8	1.0	235.0	3.0	20.0	Horz	PK	0.0	56.7	74.0	-17.3	High Ch, EUT Vert
40.8	-4.8	1.9	170.0	3.0	20.0	Vert	PK	0.0	56.0	74.0	-18.0	High Ch, EUT on Side
40.7	-4.9	1.0	98.0	3.0	20.0	Horz	PK	0.0	55.8	74.0	-18.2	High Ch, EUT Horz
	29.1 28.9 28.7 28.6 28.5 28.4 41.8 41.9 41.8 41.5 40.8	29.1 -4.9 28.9 -4.9 28.7 -4.9 28.6 -4.9 28.5 -4.9 28.4 -4.9 41.8 -4.8 41.9 -4.9 41.8 -4.8 41.9 -4.9 41.8 -4.8 40.8 -4.8	29.1 -4.9 1.0 28.9 -4.9 4.0 28.7 -4.9 1.0 28.6 -4.9 1.0 28.5 -4.9 1.0 28.4 -4.9 1.9 41.8 -4.8 1.0 41.8 -4.9 1.0 41.8 -4.8 1.0 41.8 -4.8 1.0 41.8 -4.8 1.0 40.8 -4.8 1.9	29.1 -4.9 1.0 320.0 28.9 -4.9 4.0 250.0 28.7 -4.9 1.0 235.0 28.6 -4.9 1.0 235.0 28.5 -4.9 1.0 98.0 28.5 -4.9 1.0 50.0 28.4 -4.9 1.9 170.0 41.8 -4.8 1.0 50.0 41.8 -4.9 1.0 320.0 41.8 -4.8 1.0 250.0 41.8 -4.8 1.0 220.0 41.8 -4.8 1.0 235.0 40.8 -4.8 1.9 170.0	29.1 -4.9 1.0 320.0 3.0 28.9 -4.9 4.0 250.0 3.0 28.7 -4.9 1.0 235.0 3.0 28.6 -4.9 1.0 235.0 3.0 28.5 -4.9 1.0 98.0 3.0 28.4 -4.9 1.9 170.0 3.0 41.8 -4.8 1.0 50.0 3.0 41.8 -4.9 1.0 250.0 3.0 41.8 -4.8 1.0 250.0 3.0 41.8 -4.8 1.0 250.0 3.0 41.8 -4.8 1.0 235.0 3.0 41.5 -4.8 1.9 170.0 3.0	29.1 -4.9 1.0 320.0 3.0 20.0 28.9 -4.9 4.0 250.0 3.0 20.0 28.7 -4.9 1.0 235.0 3.0 20.0 28.6 -4.9 1.0 235.0 3.0 20.0 28.5 -4.9 1.0 98.0 3.0 20.0 28.4 -4.9 1.9 170.0 3.0 20.0 41.8 -4.8 1.0 50.0 3.0 20.0 41.8 -4.8 1.0 50.0 3.0 20.0 41.8 -4.8 1.0 320.0 3.0 20.0 41.5 -4.8 1.0 235.0 3.0 20.0 41.8 -4.8 1.0 235.0 3.0 20.0 41.8 -4.8 1.9 170.0 3.0 20.0	29.1 -4.9 1.0 320.0 3.0 20.0 Vert 28.9 -4.9 4.0 250.0 3.0 20.0 Horz 28.7 -4.9 1.0 235.0 3.0 20.0 Horz 28.6 -4.9 1.0 98.0 3.0 20.0 Horz 28.5 -4.9 1.0 50.0 3.0 20.0 Horz 28.4 -4.9 1.9 170.0 3.0 20.0 Vert 41.8 -4.8 1.0 50.0 3.0 20.0 Vert 41.8 -4.8 1.0 320.0 3.0 20.0 Vert 41.8 -4.8 1.0 320.0 3.0 20.0 Vert 41.8 -4.8 1.0 235.0 3.0 20.0 Vert 41.5 -4.8 1.9 170.0 3.0 20.0 Vert	29.1 -4.9 1.0 320.0 3.0 20.0 Vert AV 28.9 -4.9 4.0 250.0 3.0 20.0 Horz AV 28.7 -4.9 1.0 235.0 3.0 20.0 Horz AV 28.7 -4.9 1.0 235.0 3.0 20.0 Horz AV 28.6 -4.9 1.0 98.0 3.0 20.0 Horz AV 28.5 -4.9 1.0 50.0 3.0 20.0 Vert AV 28.4 -4.9 1.9 170.0 3.0 20.0 Vert AV 41.8 -4.8 1.0 50.0 3.0 20.0 Vert PK 41.8 -4.9 1.0 320.0 3.0 20.0 Vert PK 41.8 -4.8 1.0 320.0 3.0 20.0 Horz PK 41.5 -4.8 1.0 235.0 3.0 <	29.1 -4.9 1.0 320.0 3.0 20.0 Vert AV 0.0 28.9 -4.9 4.0 250.0 3.0 20.0 Horz AV 0.0 28.7 -4.9 1.0 235.0 3.0 20.0 Horz AV 0.0 28.6 -4.9 1.0 235.0 3.0 20.0 Horz AV 0.0 28.5 -4.9 1.0 98.0 3.0 20.0 Horz AV 0.0 28.4 -4.9 1.9 170.0 3.0 20.0 Vert AV 0.0 41.8 -4.8 1.0 50.0 3.0 20.0 Vert AV 0.0 41.8 -4.8 1.0 50.0 3.0 20.0 Vert PK 0.0 41.8 -4.8 1.0 320.0 3.0 20.0 Horz PK 0.0 41.5 -4.8 1.0 235.0 3.0	29.1 -4.9 1.0 320.0 3.0 20.0 Vert AV 0.0 44.2 28.9 -4.9 4.0 250.0 3.0 20.0 Horz AV 0.0 44.2 28.7 -4.9 1.0 235.0 3.0 20.0 Horz AV 0.0 44.0 28.7 -4.9 1.0 235.0 3.0 20.0 Horz AV 0.0 43.8 28.6 -4.9 1.0 98.0 3.0 20.0 Horz AV 0.0 43.6 28.5 -4.9 1.0 50.0 3.0 20.0 Vert AV 0.0 43.6 28.4 -4.9 1.9 170.0 3.0 20.0 Vert AV 0.0 43.6 28.4 -4.9 1.9 170.0 3.0 20.0 Vert AV 0.0 57.0 41.8 -4.8 1.0 250.0 3.0 20.0 Horz	29.1 -4.9 1.0 320.0 3.0 20.0 Vert AV 0.0 44.2 54.0 28.9 -4.9 4.0 250.0 3.0 20.0 Horz AV 0.0 44.2 54.0 28.9 -4.9 1.0 235.0 3.0 20.0 Horz AV 0.0 43.8 54.0 28.7 -4.9 1.0 235.0 3.0 20.0 Horz AV 0.0 43.8 54.0 28.6 -4.9 1.0 98.0 3.0 20.0 Horz AV 0.0 43.6 54.0 28.5 -4.9 1.0 50.0 3.0 20.0 Vert AV 0.0 43.6 54.0 28.4 -4.9 1.9 170.0 3.0 20.0 Vert AV 0.0 43.5 54.0 41.8 -4.8 1.0 50.0 3.0 20.0 Vert PK 0.0 57.0 74.0	28.1 -4.9 1.0 320.0 3.0 20.0 Vert AV 0.0 44.2 54.0 -9.8 28.9 -4.9 4.0 250.0 3.0 20.0 Horz AV 0.0 44.2 54.0 -9.8 28.9 -4.9 1.0 235.0 3.0 20.0 Horz AV 0.0 44.0 54.0 -10.0 28.7 -4.9 1.0 235.0 3.0 20.0 Horz AV 0.0 43.8 54.0 -10.2 28.6 -4.9 1.0 98.0 3.0 20.0 Horz AV 0.0 43.6 54.0 -10.3 28.5 -4.9 1.0 50.0 3.0 20.0 Vert AV 0.0 43.6 54.0 -10.4 28.4 -4.9 1.9 170.0 3.0 20.0 Vert AV 0.0 57.0 74.0 -17.0 41.8 -4.8 1.0 50



XMit 2019.02.26

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TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	27-Jul-18	27-Jul-19

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

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

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

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

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.

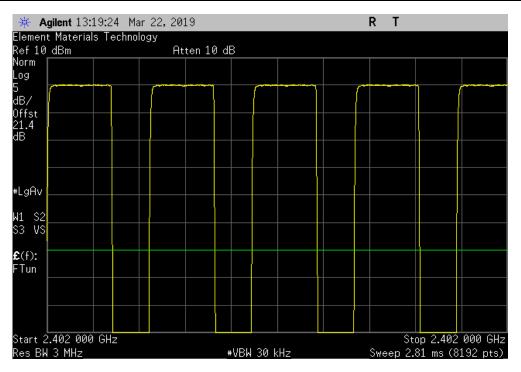


EUT:	BluKey Pro								Work Order:	PAYR0015	
Serial Number:	: 2									23-Mar-19	
Customer:	: PayRange Inc.								Temperature:	21.4 °C	
Attendees:	: Michael Mitchell								Humidity:		
Project:								I	Barometric Pres.:		
Tested by:	: Jeff Alcoke				Power	: 24 VAC via 110VA	C/60Hz		Job Site:	EV06	
TEST SPECIFICAT	TIONS					Test Method					
FCC 15.247:2019						ANSI C63.10:2013					
COMMENTS											
		ble loss and inli	le attenuation.								
DEVIATIONS FROM None Configuration #				Ū	TA .						
DEVIATIONS FROM	M TEST STANDAR		Signature	C	1A.			Number of	Value	Limit	
DEVIATIONS FROM	M TEST STANDAR			Ċ	1A	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
DEVIATIONS FROM None Configuration #	M TEST STANDAR			C	TAF	Pulse Width 389.03 us	Period 624.513 us				Results N/A
DEVIATIONS FROM None Configuration # BLE/GFSK Low Cha	M TEST STANDAR 2 annel, 2402 MHz			C	1AL.				(%)	(%)	
DEVIATIONS FROM None Configuration # BLE/GFSK Low Cha BLE/GFSK Low Cha	M TEST STANDAR 2 annel, 2402 MHz annel, 2402 MHz			C	1A.	389.03 us	624.513 us		(%) 62.3	(%) N/A	N/A
DEVIATIONS FROM None Configuration # BLE/GFSK Low Cha BLE/GFSK Low Cha BLE/GFSK Mid Cha	M TEST STANDAR 2 annel, 2402 MHz annel, 2402 MHz annel, 2402 MHz			C	TAF ,	389.03 us N/A	624.513 us N/A		(%) 62.3 N/A	(%) N/A N/A	N/A N/A
DEVIATIONS FROM	A TEST STANDAR 2 annel, 2402 MHz annel, 2402 MHz annel, 2424 MHz annel, 2424 MHz			C	1A.	389.03 us N/A 389.604 us	624.513 us N/A 624.681 us		(%) 62.3 N/A 62.4	(%) N/A N/A N/A	N/A N/A N/A

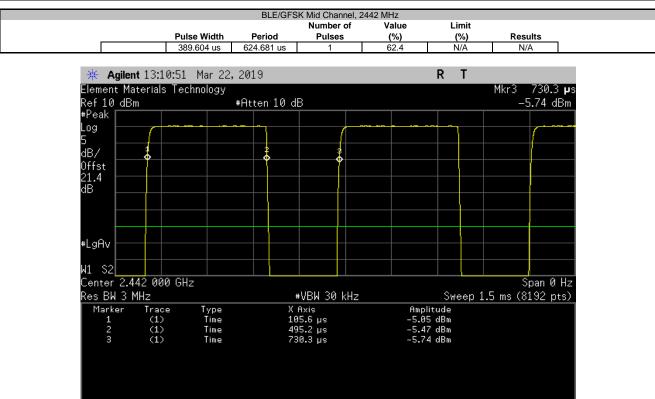


				N/ Law Obaras L.O.				_
			BLE/GFS	SK Low Channel, 24 Number of	Value	Limit		
	Pulse \	Vidth I	Period	Pulses	(%)	(%)	Results	
	389.0		4.513 us	1	62.3	N/A	N/A	
	1							
	3:19:17 M		19			RT		
Element Mater	rials Techno	ology					Mkr3 730	.1 µs
Ref 10 dBm		At	ten 10 d	IB			-6.06	dBm
Norm 🛛								
Log 🕂 🔤			<u> </u>					
5							/	
dB/ 📔 🧯			1	3				
Offst 📃 🗌				*				
21.4 dB				<u> </u>				
dB				<u> </u>				
	_			<u> </u>				
#LgAv								
~ L 911 V								
W1 S2								
Start 2.402 0	00 GHz					Sti	op 2.402 000	GHz
Res BW 3 MHz				#VBW 30 kHz		Sweep 1	.5 ms (8192	pts)
		Гуре	Х	Axis	Ampli	tude		
1		Time		05.5 μs	-5.40			
		Time Time		94.6 µs 30.1 µs	-4.96 -6.06			
3	(1)	lime		30.1 μs	-6.06	abm		

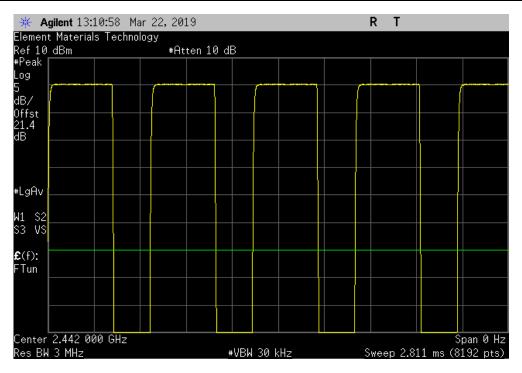
BLE/GFSK Low Channel, 2402 MHz								
			Number of	Value	Limit			
	Pulse Width	Period	Pulses	(%)	(%)	Results		
	N/A	N/A	5	N/A	N/A	N/A		



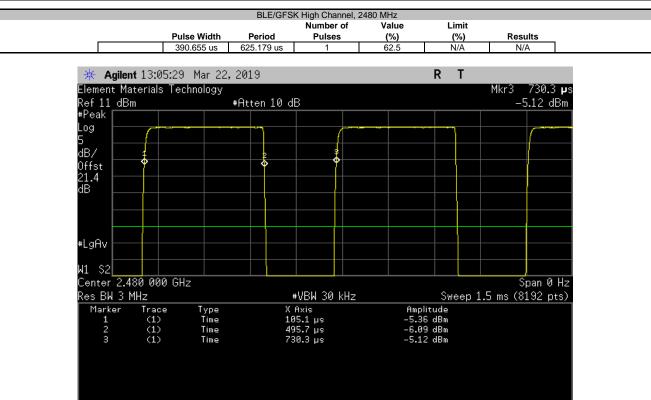




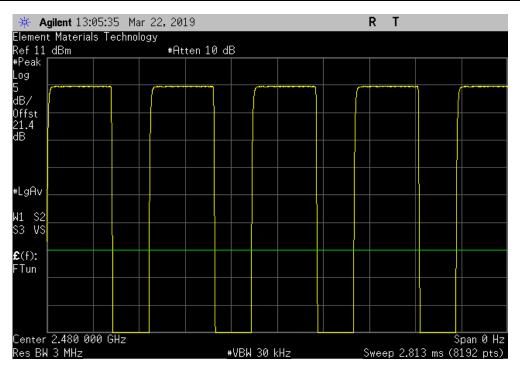
BLE/GFSK Mid Channel, 2442 MHz								
			Number of	Value	Limit			
	Pulse Width	Period	Pulses	(%)	(%)	Results		
	N/A	N/A	5	N/A	N/A	N/A		







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





744AC 2010.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	27-Jul-18	27-Jul-19

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was set to the channels and modes listed in the datasheet.

The 6dB 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.



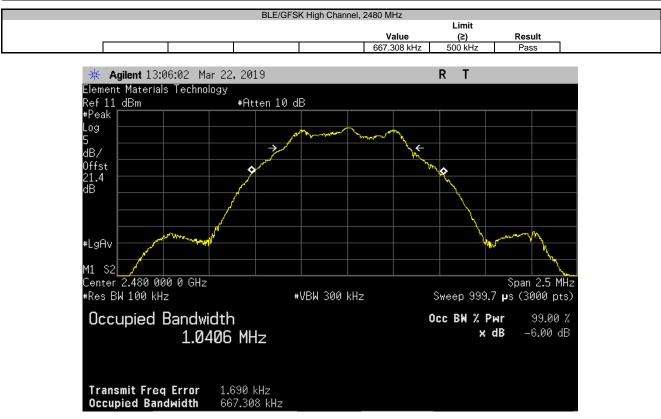
						TbtTx 2018.09.13	XMit 2019.0
EUT: BI	luKey Pro				Work Order	: PAYR0015	
Serial Number: 2					Date	: 23-Mar-19	
Customer: Pa	ayRange Inc.				Temperature	: 21.3 °C	
Attendees: Mi	ichael Mitchell				Humidity	: 39.2% RH	
Project: No	one				Barometric Pres.	: 1014 mbar	
Tested by: Je	eff Alcoke		Power:	24 VAC via 110VAC/60Hz	Job Site	: EV06	
TEST SPECIFICATION	NS			Test Method			
FCC 15.247:2019				ANSI C63.10:2013			
COMMENTS							
DEVIATIONS FROM T	EST STANDARD						
None							
Configuration #	2	Signature	Tett				
						Limit	
					Value	(≥)	Result
BLE/GFSK Low Channe	el, 2402 MHz				666.782 kHz	500 kHz	Pass
BLE/GFSK Mid Channe	el, 2442 MHz				670.783 kHz	500 kHz	Pass
BLE/GFSK High Chann	nel, 2480 MHz				667.308 kHz	500 kHz	Pass

Report No. PAYR0015.1











XMit 2019.02.26

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TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

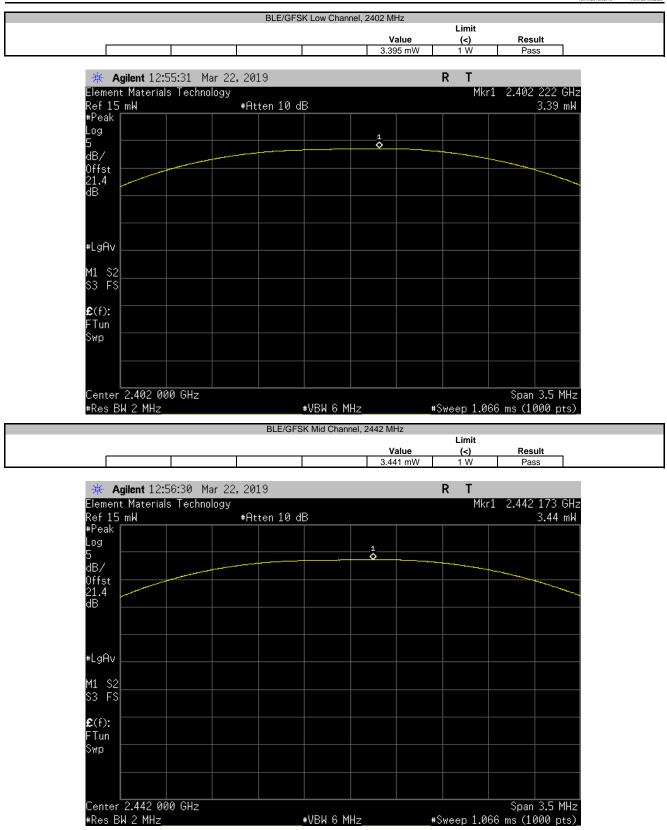
Prior to measuring peak transmit power the DTS bandwidth (B) was measured.

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



EUT: BI	uKey Pro				Work Ore	er: PAYR0015	
Serial Number: 2						te: 22-Mar-19	
Customer: Pa	ayRange Inc.				Temperate	re: 20.1 °C	
Attendees: Mi	ichael Mitchell				Humid	ty: 43% RH	
Project: No					Barometric Pr	s.: 1017 mbar	
Tested by: Je				Power: 24 VAC via 110VAC/60Hz	Job S	te: EV06	
EST SPECIFICATION	15			Test Method			
CC 15.247:2019				ANSI C63.10:2013			
OMMENTS referenece level offse	et includes Cable loss and	l inline attenuation. Measu	urements v	were taken to show the effects of adding 0.5 pF ca	pacitor to C11.		
eferenece level offse EVIATIONS FROM T		l inline attenuation. Measu	urements v	were taken to show the effects of adding 0.5 pF ca	pacitor to C11.		
		l inline attenuation. Measu	urements v	were taken to show the effects of adding 0.5 pF ca	apacitor to C11.		
eferenece level offse		inline attenuation. Measu	urements v	were taken to show the effects of adding 0.5 pF ca	pacitor to C11.		
eferenece level offse EVIATIONS FROM T Ione	EST STANDARD			were taken to show the effects of adding 0.5 pF ca	pacitor to C11.	Limit	
eferenece level offse EVIATIONS FROM T	EST STANDARD			were taken to show the effects of adding 0.5 pF ca	pacitor to C11.	Limit (<)	Result
eferenece level offse EVIATIONS FROM T one onfiguration #	EST STANDARD			were taken to show the effects of adding 0.5 pF ca			Result Pass
eferenece level offse EVIATIONS FROM T Ione	2 el, 2402 MHz			were taken to show the effects of adding 0.5 pF ca	Value	(<)	







			BLE/GFS	K High Chai	nnel, 2480	MHz		Limit		
				r	0	Value 920 mW		(<) 1 W	Resu Pass	
					3.	.920 mvv		1 VV	Pass	5
🔆 Agilent 12	2:59:02 M	ar 22, 20	19				R	Т		
Element Materi	ials Techno	ology						Mkr1	2.479	
Ref 15 mW		#At	ten 10 c	IB						3.92 mW
#Peak Log										
5										
dB/										
Offst 21.4 dB										
21.4 dB										
#LgAv										
M1 52										
M1 S2 S3 FS										
£ (f):										
FTun										
Swp										
Center 2.480	000 GHz								Span	3.5 MHz
#Res BW 2 MH;				#VBW 6 N	1Hz		#Swee	ep 1.06	6 ms (10	00 pts)



XMit 2019.02.26

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	N5182B	TFU	5-Nov-18	5-Nov-21
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

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

The method found in ANSI C63.10:2013 Section 11.9.1.1 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio. The actual antenna gain of the EUT was added to the conducted output power to derive the EIRP values.



								TbtTx 2018.09.13	XMit 2019.02.
EUT: BI	uKey Pro						Work Order:	PAYR0015	
Serial Number: 2							Date:	22-Mar-19	
Customer: Pa	yRange Inc.						Temperature:	20.1 °C	
Attendees: Mi	chael Mitchell						Humidity:	43% RH	
Project: No	one						Barometric Pres.:	1017 mbar	
Tested by: Je	ff Alcoke		Power: 2	4 VAC via 110VAC	60Hz		Job Site:	EV06	
TEST SPECIFICATION	IS		T	est Method					
FCC 15.247:2019			A	NSI C63.10:2013					
COMMENTS									
DEVIATIONS FROM TI	EST STANDARD								
None									
Configuration #	2	Signature	Tett						
				Value	Value	Antenna	EIRP	Limit	
				(mW)	(dBm)	Gain (dBi)	(dBm)	(< dBm)	Result
BLE/GFSK Low Channe	el, 2402 MHz			3.395	5.31	3	8.31	36	Pass
BLE/GFSK Mid Channe	I, 2442 MHz			3.441	5.37	3	8.37	36	
BLE/GFSK High Chann									Pass



			-				
	Value		SK Low Channel,		l imit		
	Value (mW)	Value (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit (< dBm)	Result	
	3.395	5.31	3	8.31	36	Pass	
					D T		
🔆 Agilent 12:5		2019			RT		
Element Materials Ref 15 mW		Atten 10 (NR.		PIK	1 2.402 222 GHz 3.39 mW	
#Peak						5.55 IIM	
Log				1			
5				1 \$			
dB/ Offst							
21.4 dB							
dB							
#LgAv							
M1 S2 S3 FS							
53 FS							
£ (f):							
FTun							
Swp							Í
Center 2.402 000	0 GHz					Span 3.5 MHz	
#Res BW 2 MHz_			#VBW 6 MHz		_#Sweep 1.0	66 ms (1000 pts)	
			SK Mid Channel,				
	Value (mW)	Value	Antenna	EIRP	Limit (< dBm)	Result	
	Value (mW) 3.441				Limit (< dBm) 36	Result Pass	
	(mW) 3.441	Value (dBm) 5.37	Antenna Gain (dBi)	EIRP (dBm)	(< dBm) 36		_
* Agilent 12:5	(mW) 3.441 6:30 Mar 22, 2	Value (dBm) 5.37	Antenna Gain (dBi)	EIRP (dBm)	(< dBm) 36 R T	Pass	
Element Materials Ref 15 mW	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm)	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW #Peak	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm)	(< dBm) 36 R T	Pass	2
Element Materials Ref 15 mW #Peak Log	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW #Peak Log 5	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm)	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW #Peak Log 5 dB/ 0ffst	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW #Peak Log 5 dB/ 0ffst 21.4	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW #Peak Log 5 dB/ 0ffst	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW #Peak Log 5 dB/ 0ffst 21.4	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW #Peak Log 5 dB/ 0ffst 21.4 dB	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW #Peak Log 5 dB/ 0ffst 21.4	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW +Peak Log 5 dB/ Offst 21.4 dB #LgAv	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW +Peak Log 5 dB/ Offst 21.4 dB #LgAv	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW +Peak Log dB/ Offst 21.4 dB +LgAv M1 S2 S3 FS	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW #Peak Log 5 dB/ Offst 21.4 dB #LgAv M1 S2 S3 FS £(f):	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	
Element Materials Ref 15 mW #Peak Log 5 dB/ Offst 21.4 dB #LgAv #LgAv M1 S2 S3 FS £(f): FTun	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	
Element Materials Ref 15 mW #Peak Log 5 dB/ Offst 21.4 dB #LgAv M1 S2 S3 FS £(f):	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	
Element Materials Ref 15 mW #Peak Log 5 dB/ Offst 21.4 dB #LgAv #LgAv M1 S2 S3 FS £(f): FTun	(mW) 3.441 6:30 Mar 22, 2 Technology	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	2
Element Materials Ref 15 mW #Peak Log 5 dB/ Offst 21.4 dB #LgAv M1 S2 S3 FS £(f): FTun Swp	(mW) 3.441 6:30 Mar 22, 2 Technology #1	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T	Pass 1 2.442 173 GHz	
Element Materials Ref 15 mW #Peak Log 5 dB/ Offst 21.4 dB #LgAv #LgAv M1 S2 S3 FS £(f): FTun	(mW) 3.441 6:30 Mar 22, 2 Technology #1	Value (dBm) 5.37	Antenna Gain (dBi) 3	EIRP (dBm) 8.37	(< dBm) 36 R T Mkt	Pass 1 2.442 173 GHz	



		BLE/GFS	K High Channel,	2480 MHz			
	Value	Value	Antenna	EIRP	Limit		
	(mW) 3.920	(dBm) 5.93	Gain (dBi) 3	(dBm) 8.93	(< dBm) 36	Result Pass	٦
	3.920	5.55	5	0.95	50	1 833	
🔆 🔆 Agilent 12:59		,2019			RT		
Element Materials	Technology				Mkr1	2.479 725	
Ref 15 mW		#Atten 10 d	IB			3.92	mЫ
#Peak							
Log							
5 dB/							
Offst							
Offst 21.4 dB							
dB							
#LgAv							
"L9HV							
M1 S2 S3 FS							
S3 FS							
£(f):							
FTun Swp							
νπρ							
Center 2.480 000	GHz					Span 3.5 M	ИНZ
#Res BW 2 MHz	0.112		₩VBW 6 MHz		#Sweep 1.06	6 ms (1000 p	ts)



XMit 2019.02.26

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	N5182B	TFU	5-Nov-18	5-Nov-21
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Block - DC	Fairview Microwave	SD3379	AMU	18-Jan-19	18-Jan-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	27-Jul-18	27-Jul-19

TEST DESCRIPTION

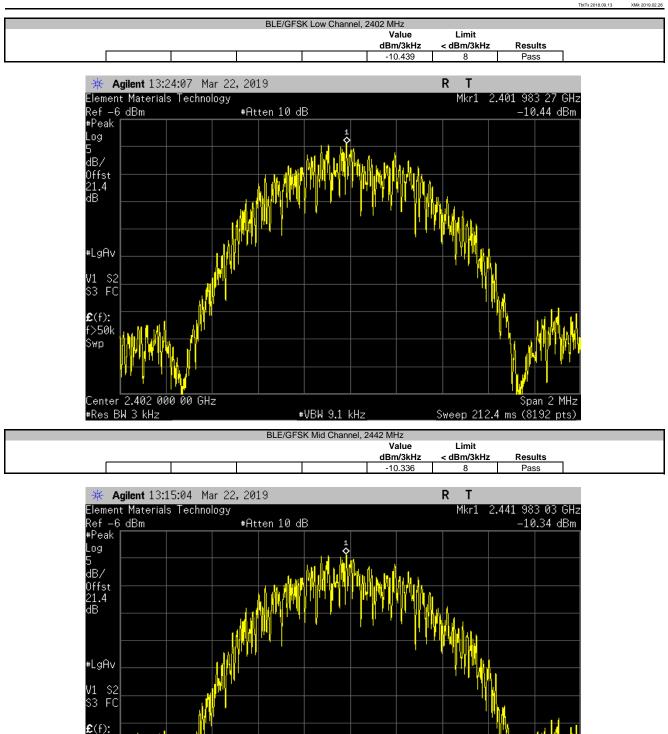
The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

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



	luKey Pro						Work Order:		
Serial Number: 2								23-Mar-19	
Customer: Pa							Temperature:	21.3 °C	
Attendees: Mi	ichael Mitchell						Humidity:	39.2% RH	
Project: No	one					Ba	rometric Pres.:	1014 mbar	
Tested by: Je	eff Alcoke			Power: 24	VAC via 110VAC/60Hz		Job Site:	EV06	
TEST SPECIFICATION	NS			Te	est Method				
FCC 15.247:2019				A	NSI C63.10:2013				
COMMENTS									
	et includes Cable loss and i	nline attenuation.							
Referenece level offse		nline attenuation.							
		nline attenuation.							
Referenece level offse DEVIATIONS FROM TE None		nline attenuation.	J	ĪĀ ļi					
Referenece level offse DEVIATIONS FROM TE None	EST STANDARD		Ū.	TAL.			Value dBm/3kHz	Limit < dBm/3kHz	Results
Reference level offse DEVIATIONS FROM TE None Configuration #	2			Tel II					Results Pass
Referenece level offse DEVIATIONS FROM TE	2 rel, 2402 MHz			TA II.			dBm/3kHz	< dBm/3kHz	





>50k Տ₩p

Center 2.442 000 00 GHz

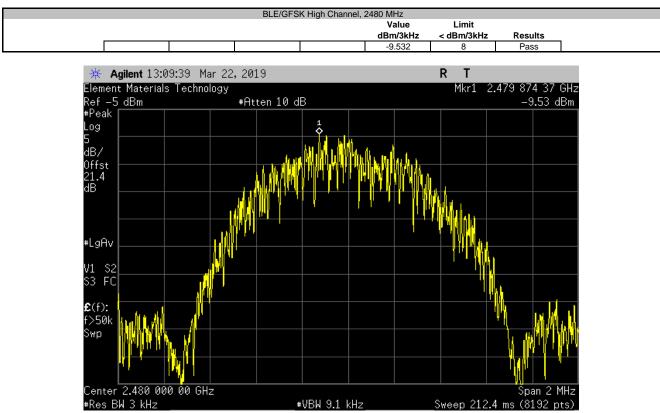
#Res BW 3 kHz

#VBW 9.1 kHz

Span 2 MHz

Sweep 212.4 ms (8192 pts)





BAND EDGE COMPLIANCE



XMit 2019.02.26

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	N5182B	TFU	5-Nov-18	5-Nov-21
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	27-Jul-18	27-Jul-19

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

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

BAND EDGE COMPLIANCE

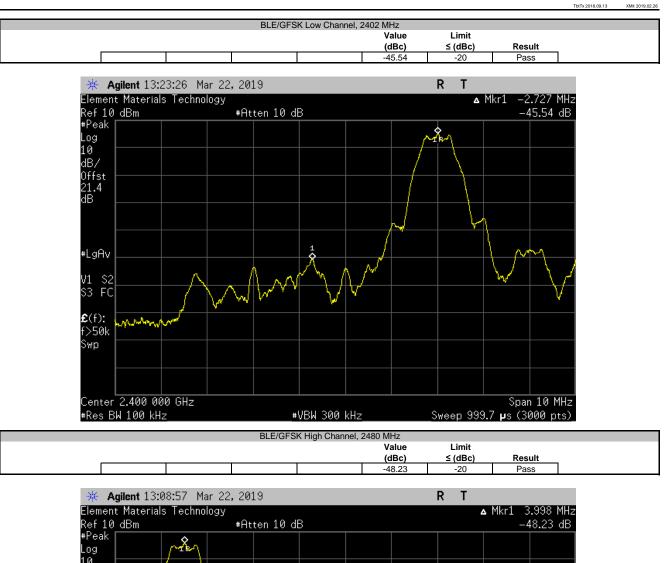


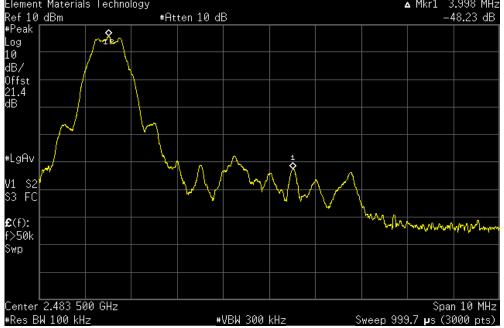
						TbtTx 2018.09.13	XMit 2019.02.
EUT: Blu	Key Pro				Work Order:		
Serial Number: 2						23-Mar-19	
Customer: Pay					Temperature:		
Attendees: Mic						39.1% RH	
Project: Nor					Barometric Pres.:		
Tested by: Jeff				Power: 24 VAC via 110VAC/60Hz	Job Site:	EV06	
TEST SPECIFICATIONS	5			Test Method			
FCC 15.247:2019				ANSI C63.10:2013			
COMMENTS							
Referenece level offset	Includes Cable loss and	inline attenuation.					
	51 STANDARD						
None							
Configuration #	2	Signature	$\overline{\mathcal{C}}$	Tot the			
					Value	Limit	
					(dBc)	≤ (dBc)	Result
BLE/GFSK Low Channel	, 2402 MHz				-45.54	-20	Pass
BLE/GFSK High Channel	l, 2480 MHz				-48.23	-20	Pass

High Channel, 2

BAND EDGE COMPLIANCE









XMit 2019.02.26

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

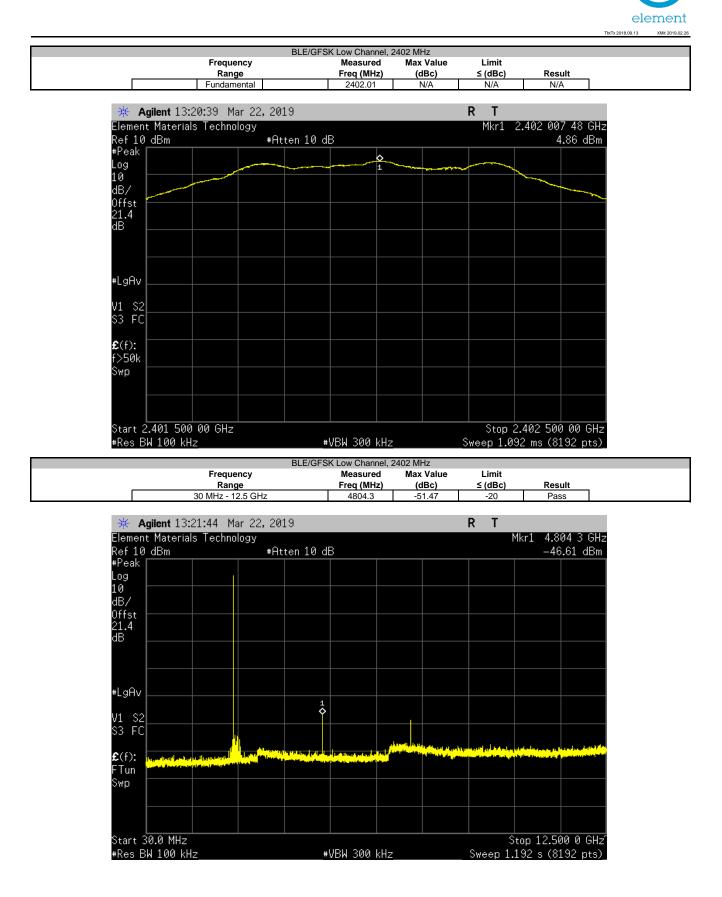
Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	27-Jul-18	27-Jul-19

TEST DESCRIPTION

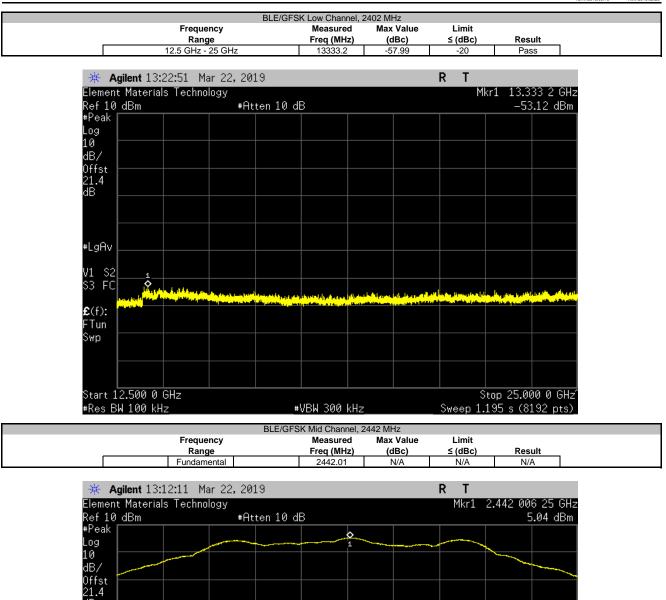
The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.



	BluKey Pro				Work Order:		
Serial Number: 2						23-Mar-19	
Customer: Pa					Temperature:		
	lichael Mitchell				Humidity:		
Project: N					Barometric Pres.:		
Tested by: Je			Power: 24 VAC via 110VAC/60Hz		Job Site:	EV06	
EST SPECIFICATION	NS		Test Method				
CC 15.247:2019			ANSI C63.10:2013				
COMMENTS							
EVIATIONS EDOM T							
EVIATIONS FROM T	TEST STANDARD						
	2	Signature	JA-M_				
lone		Signature	J.J.J. Frequency	Measured	Max Value	Limit	
one configuration #	2	Signature	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
one onfiguration # LE/GFSK Low Chann	2 nel, 2402 MHz	Signature	Range Fundamental	Freq (MHz) 2402.01	(dBc) N/A		Result N/A
ione configuration # LE/GFSK Low Chann LE/GFSK Low Chann	2 nel, 2402 MHz nel, 2402 MHz	Signature	Range Fundamental 30 MHz - 12.5 GHz	Freq (MHz) 2402.01 4804.3	(dBc) N/A -51.47	≤ (dBc) N/A -20	
Ione configuration # ILE/GFSK Low Chann ILE/GFSK Low Chann LE/GFSK Low Chann	2 nel, 2402 MHz nel, 2402 MHz nel, 2402 MHz	Signature	Range Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz	Freq (MHz) 2402.01 4804.3 13333.2	(dBc) N/A -51.47 -57.99	≤ (dBc) N/A -20 -20	N/A Pass Pass
LE/GFSK Low Chann LE/GFSK Low Chann LE/GFSK Low Chann LE/GFSK Low Chann LE/GFSK Mid Chann	2 nel, 2402 MHz nel, 2402 MHz nel, 2402 MHz nel, 2402 MHz	Signature	Range Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental	Freq (MHz) 2402.01 4804.3 13333.2 2442.01	(dBc) N/A -51.47	≤ (dBc) N/A -20	N/A Pass Pass N/A
Ione Configuration # LE/GFSK Low Chann LE/GFSK Low Chann LE/GFSK Mid Channu LE/GFSK Mid Channu	2 nel, 2402 MHz nel, 2402 MHz nel, 2402 MHz nel, 2442 MHz lel, 2442 MHz	Signature	Range - Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz	Freq (MHz) 2402.01 4804.3 13333.2 2442.01 7326.9	(dBc) N/A -51.47 -57.99 N/A -48.73	≤ (dBc) N/A -20 -20 N/A -20	N/A Pass Pass N/A Pass
LE/GFSK Low Chann LE/GFSK Low Chann LE/GFSK Low Chann LE/GFSK Wid Chann LE/GFSK Mid Chann LE/GFSK Mid Chann	2 nel, 2402 MHz nel, 2402 MHz nel, 2402 MHz nel, 2442 MHz nel, 2442 MHz nel, 2442 MHz	Signature	Range Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz 25 GHz 20 MHz - 12.5 GHz	Freq (MHz) 2402.01 4804.3 13333.2 2442.01 7326.9 13656.8	(dBc) N/A -51.47 -57.99 N/A -48.73 -58.01	≤ (dBc) N/A -20 -20 N/A -20 -20	N/A Pass Pass N/A Pass Pass
Inne ILE/GFSK Low Chann LE/GFSK Low Chann LE/GFSK Kow Chann LE/GFSK Mid Channu LE/GFSK Mid Channu LE/GFSK Mid Channu LE/GFSK Mid Channu	2 nel, 2402 MHz nel, 2402 MHz nel, 2402 MHz nel, 2442 MHz nel, 2442 MHz nel, 2442 MHz nel, 2440 MHz	Signature	Range - Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz	Freq (MHz) 2402.01 4804.3 13333.2 2442.01 7326.9	(dBc) N/A -51.47 -57.99 N/A -48.73	≤ (dBc) N/A -20 -20 N/A -20	N/A Pass Pass N/A Pass
lone	2 nel, 2402 MHz nel, 2402 MHz nel, 2402 MHz nel, 2442 MHz nel, 2442 MHz nel, 2442 MHz nel, 2480 MHz	Signature	Range Fundamental 30 MHz - 12.5 GHz 12.5 GHz - 25 GHz Fundamental 30 MHz - 12.5 GHz 12.5 GHz 25 GHz 20 MHz - 12.5 GHz	Freq (MHz) 2402.01 4804.3 13333.2 2442.01 7326.9 13656.8	(dBc) N/A -51.47 -57.99 N/A -48.73 -58.01	≤ (dBc) N/A -20 -20 N/A -20 -20	N/A Pass Pass N/A Pass Pass

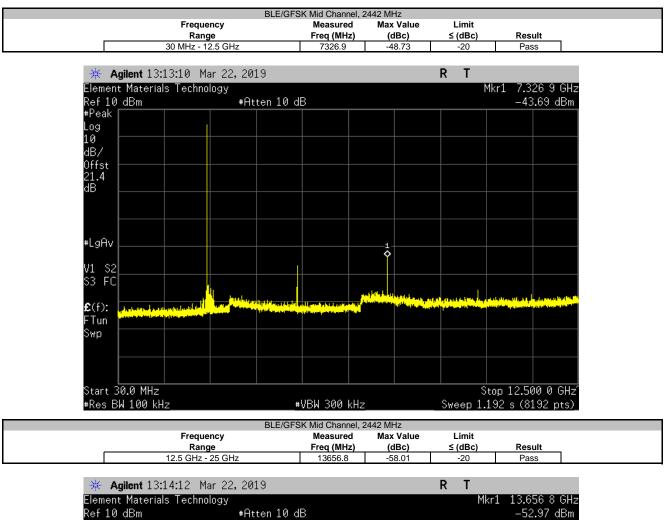


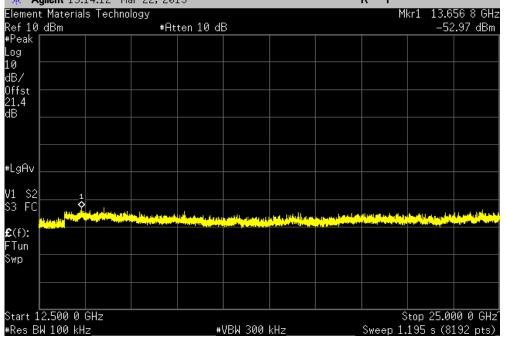


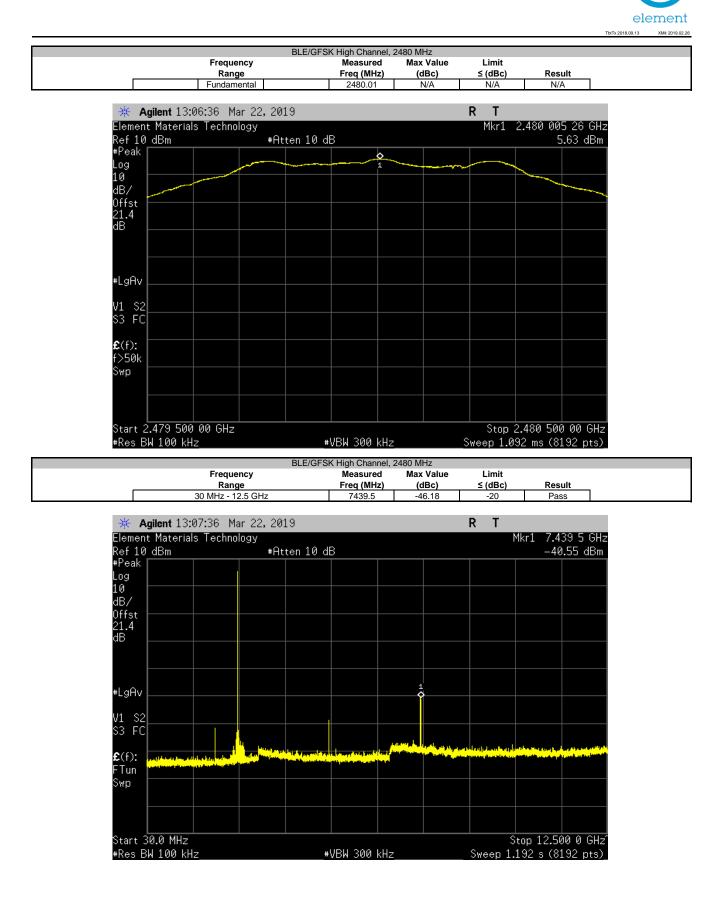


tart 2.4	41 500	00 GHz z		VBW 300		Stop :	2 <mark>.442 500</mark> 92 ms (81	0 00 GHz
'p								
(f): •50k								
. \$2 3 FC								
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				BLE/GFS	K High Chan	nel, 2480 N	ЛНz			
		Freque			Measure		x Value		D	
Г		Rang 12.5 GHz - 2			Freq (MH 13655.2		(dBc) 59.08	<u>≤ (dBc)</u> -20	Res Pa:	
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*	Agilent 13:	08:33 Ma	ir 22, 20:	19				RT		
	nt Material	s Technol						М		655 2 GHz
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	12.500 0 BW 100 kH				VBW 300	LU-				00 0 GHź 192 pts)
#Res I	DM IOO KH	2		#	000 MOV	КПИ		Sweep I.	.195 8 (0	192 pts)_