



METER Group, Inc USA

H110 Router Powered by POE + backup LI ion battery

FCC 15.247:2020

Bluetooth LE Radio

Report # MEGR0002.1



NVLAP LAB CODE: 200630-0

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CERTIFICATE OF TEST



Last Date of Test: March 11, 2020

METER Group, Inc USA

EUT: H110 Router Powered by POE + backup LI ion battery

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2020	ANSI C63.10:2013, KDB 558074
FCC 15.107:2020	ANSI C63.4:2014

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	EUT is a Class A device, measured conducted emissions against Class A limits with and without radio transmitting.
6.5, 6.6, 11.12.1, 11.13.2	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	Band Edge Compliance	Yes	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



Revision 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

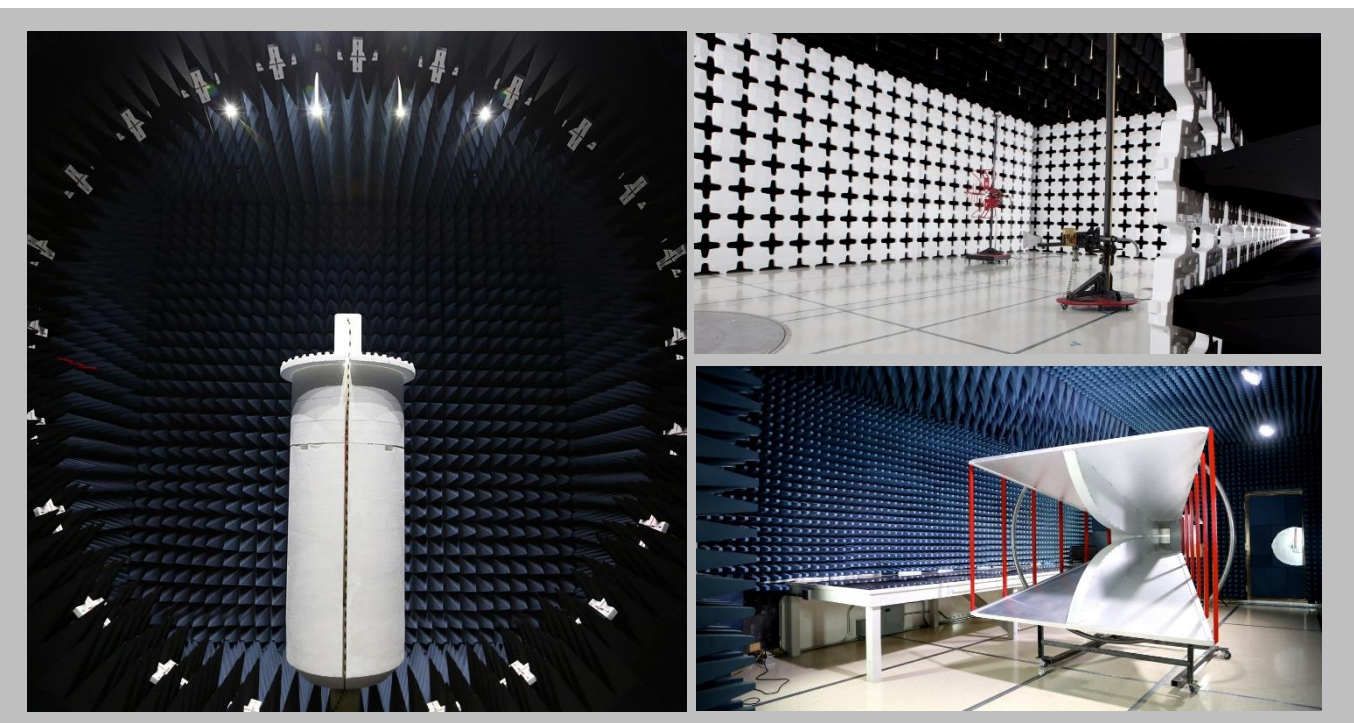
For details on the Scopes of our Accreditations, please visit:

<https://www.nwemc.com/emc-testing-accreditations>

FACILITIES



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

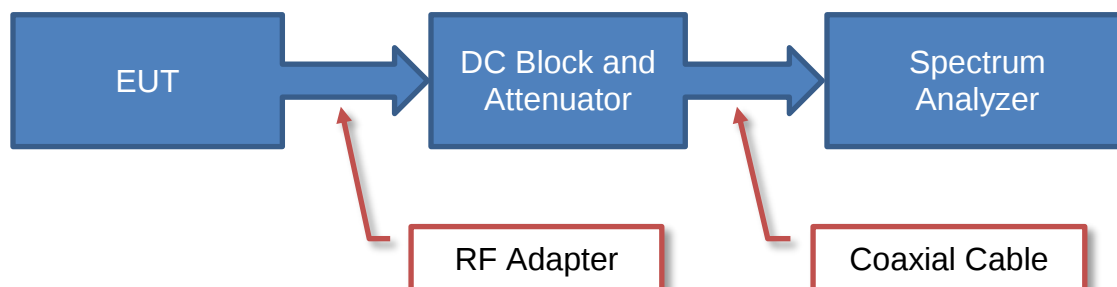
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable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

Test Setup Block Diagrams

Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION



Client and Equipment Under Test (EUT) Information

Company Name:	METER Group, Inc USA
Address:	2365 NE Hopkins Ct.
City, State, Zip:	Pullman, WA 99163
Test Requested By:	Michael Wadsworth
EUT:	H110 Router Powered by POE + backup LI ion battery
First Date of Test:	January 17, 2020
Last Date of Test:	March 11, 2020
Receipt Date of Samples:	January 16, 2020
Equipment Design Stage:	Preproduction
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Router
Testing Objective:
To demonstrate compliance of the Bluetooth radio to FCC 15.247 requirements.

CONFIGURATIONS



Configuration MEGR0002- 2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Router	METER Group, Inc USA	H110	H110T000003

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
POE Injector	ICREATIN	480050US	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
CAT 5 Cable	No	2.0m	No	Router	POE Injector

Configuration MEGR0002- 4

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Router	METER Group, Inc USA	H110	H110T000003

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
AC/POE Injector	LTS	POE-I100H	120600798

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
CAT 5 Cable	No	2.0m	No	Router	POE Injector
AC Power Cable	No	1.0m	No	AC/POE Injector	AC Mains

CONFIGURATIONS



Configuration MEGR0002- 5

Software/Firmware Running during test	
Description	Version
CMD	1.0

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Router	METER Group Inc.	H110	H110-T000020

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
POE Injector	ICREATIN	480050US	None
Laptop	Dell	E5430	9Q2FJX1

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
POE CAT 7 Cable	Yes	3.0m	No	Router	POE Injector
USB Cable	Unknown	1.5m	No	Laptop	Router

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2020-01-17	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.
2	2020-01-21	Powerline 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.
3	2020-03-11	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.
4	2020-03-11	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	2020-03-11	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	2020-03-11	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2020-03-11	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.
8	2020-03-11	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.
9	2020-03-11	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

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 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. 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	2019-05-02	2020-05-02
LISN	Solar Electronics	9252-50-R-24-BNC	LIP	2019-08-28	2020-08-28
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKT	EVGA	2020-01-06	2021-01-06

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

MEGR0002-4

MODES INVESTIGATED

Radio Off, System still and running

Radio On, Continuous Tx BLE, GFSK, Mid Ch.19, 2442 MHz, Power Level 7 (full power)

POWERLINE CONDUCTED EMISSIONS



EUT:	H110 Router Powered by POE + backup LI ion battery	Work Order:	MEGR0002
Serial Number:	H110T000003	Date:	2020-01-21
Customer:	METER Group, Inc USA	Temperature:	22.9°C
Attendees:	Daniel Winder, Ramakrishna Eepuri	Relative Humidity:	36.9%
Customer Project:	None	Bar. Pressure:	1012 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	POE via 110VAC/60Hz	Configuration:	MEGR0002-4

TEST SPECIFICATIONS

Specification: Equipment Class A FCC 15.107:2020	Method: ANSI C63.4:2014
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TEST PARAMETERS

Run #:	9	Line:	High Line	Add. Ext. Attenuation (dB):	0
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COMMENTS

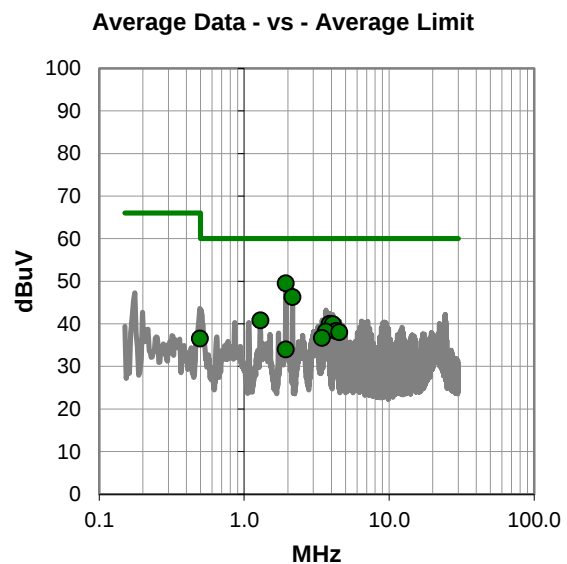
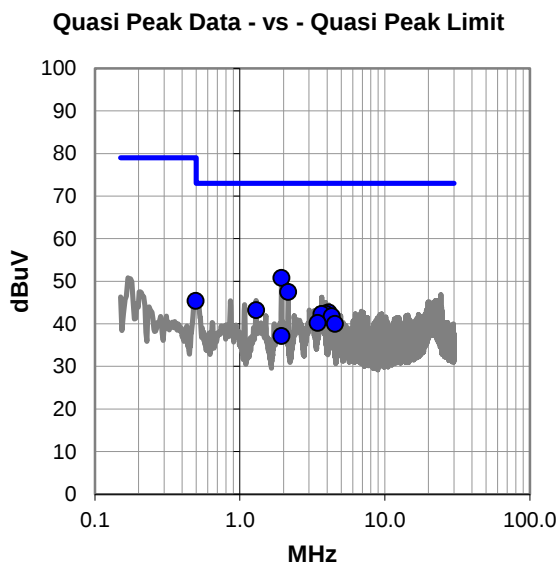
Data was taken with and without the radio active in order to prove out compliance in a Class A product.

EUT OPERATING MODES

Radio On, Continuous Tx BLE, GFSK, Mid Ch.19, 2442 MHz, Power Level 7 (full power)

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #9

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.9	30.900	19.9	50.8	73.0	-22.2
2.2	27.600	19.9	47.5	73.0	-25.5
0.5	25.600	19.8	45.4	79.0	-33.6
1.3	23.400	19.8	43.2	73.0	-29.8
4.1	22.600	20.1	42.7	73.0	-30.3
3.9	22.300	20.1	42.4	73.0	-30.6
3.7	22.200	20.1	42.3	73.0	-30.7
4.3	21.700	20.1	41.8	73.0	-31.2
3.4	20.100	20.1	40.2	73.0	-32.8
4.5	19.900	20.1	40.0	73.0	-33.0
1.9	17.200	19.9	37.1	73.0	-35.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.9	29.600	19.9	49.5	60.0	-10.5
2.2	26.400	19.9	46.3	60.0	-13.7
1.3	21.000	19.8	40.8	60.0	-19.2
3.9	19.900	20.1	40.0	60.0	-20.0
4.1	19.800	20.1	39.9	60.0	-20.1
4.3	18.200	20.1	38.3	60.0	-21.7
3.7	18.100	20.1	38.2	60.0	-21.8
4.5	17.900	20.1	38.0	60.0	-22.0
3.4	16.600	20.1	36.7	60.0	-23.3
0.5	16.700	19.8	36.5	66.0	-29.5
1.9	14.100	19.9	34.0	60.0	-26.0

CONCLUSION

Pass



Tested By

POWERLINE CONDUCTED EMISSIONS



EUT:	H110 Router Powered by POE + backup LI ion battery	Work Order:	MEGR0002
Serial Number:	H110T000003	Date:	2020-01-21
Customer:	METER Group, Inc USA	Temperature:	22.9°C
Attendees:	Daniel Winder, Ramakrishna Eepuri	Relative Humidity:	36.9%
Customer Project:	None	Bar. Pressure:	1012 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	POE via 110VAC/60Hz	Configuration:	MEGR0002-4

TEST SPECIFICATIONS

Specification: Equipment Class A FCC 15.107:2020	Method: ANSI C63.4:2014
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TEST PARAMETERS

Run #:	10	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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COMMENTS

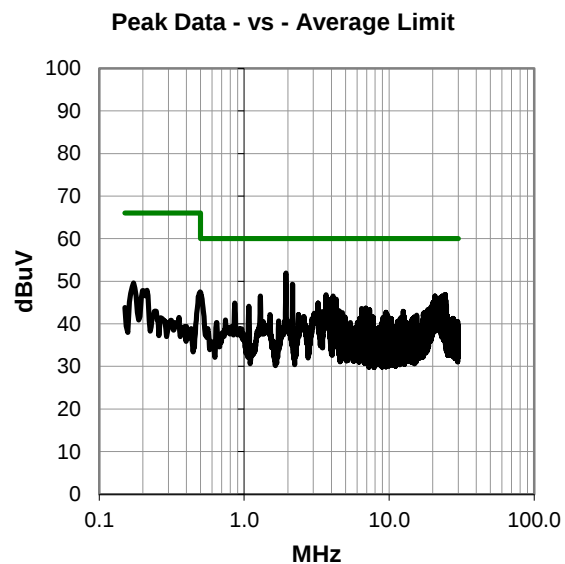
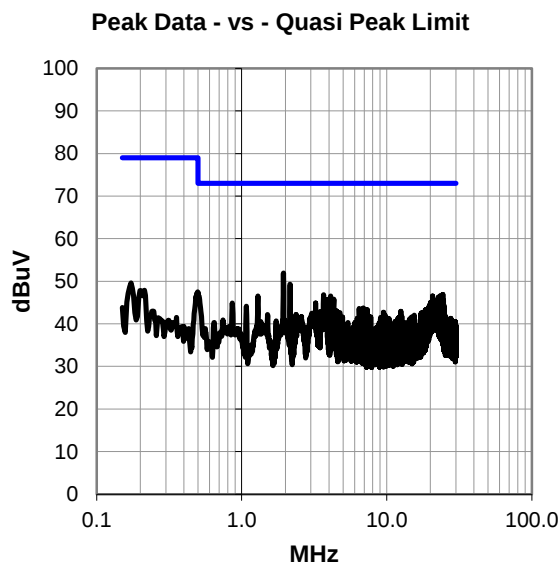
Data was taken with and without the radio active in order to prove out compliance in a Class A product.

EUT OPERATING MODES

Radio On, Continuous Tx BLE, GFSK, Mid Ch.19, 2442 MHz, Power Level 7 (full power)

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #10

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.9	32.000	19.9	51.9	73.0	-21.1
2.2	29.400	19.9	49.3	73.0	-23.7
24.4	26.100	20.8	46.9	73.0	-26.1
3.7	26.700	20.1	46.8	73.0	-26.2
1.3	26.700	19.8	46.5	73.0	-26.5
4.1	26.400	20.1	46.5	73.0	-26.5
20.7	25.800	20.7	46.5	73.0	-26.5
23.3	25.700	20.8	46.5	73.0	-26.5
22.6	25.500	20.7	46.2	73.0	-26.8
23.5	25.400	20.8	46.2	73.0	-26.8
4.3	25.700	20.1	45.8	73.0	-27.2
22.4	25.000	20.7	45.7	73.0	-27.3
3.9	25.500	20.1	45.6	73.0	-27.4
22.9	24.900	20.7	45.6	73.0	-27.4
24.6	24.700	20.8	45.5	73.0	-27.5
23.1	24.600	20.7	45.3	73.0	-27.7
20.9	24.500	20.7	45.2	73.0	-27.8
22.2	24.400	20.7	45.1	73.0	-27.9
20.1	24.300	20.7	45.0	73.0	-28.0
0.9	25.100	19.8	44.9	73.0	-28.1
3.2	24.900	20.0	44.9	73.0	-28.1
24.1	24.000	20.8	44.8	73.0	-28.2
20.5	24.000	20.7	44.7	73.0	-28.3
22.0	24.000	20.7	44.7	73.0	-28.3
23.7	23.900	20.8	44.7	73.0	-28.3

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.9	32.000	19.9	51.9	60.0	-8.1
2.2	29.400	19.9	49.3	60.0	-10.7
24.4	26.100	20.8	46.9	60.0	-13.1
3.7	26.700	20.1	46.8	60.0	-13.2
1.3	26.700	19.8	46.5	60.0	-13.5
4.1	26.400	20.1	46.5	60.0	-13.5
20.7	25.800	20.7	46.5	60.0	-13.5
23.3	25.700	20.8	46.5	60.0	-13.5
22.6	25.500	20.7	46.2	60.0	-13.8
23.5	25.400	20.8	46.2	60.0	-13.8
4.3	25.700	20.1	45.8	60.0	-14.2
22.4	25.000	20.7	45.7	60.0	-14.3
3.9	25.500	20.1	45.6	60.0	-14.4
22.9	24.900	20.7	45.6	60.0	-14.4
24.6	24.700	20.8	45.5	60.0	-14.5
23.1	24.600	20.7	45.3	60.0	-14.7
20.9	24.500	20.7	45.2	60.0	-14.8
22.2	24.400	20.7	45.1	60.0	-14.9
20.1	24.300	20.7	45.0	60.0	-15.0
0.9	25.100	19.8	44.9	60.0	-15.1
3.2	24.900	20.0	44.9	60.0	-15.1
24.1	24.000	20.8	44.8	60.0	-15.2
20.5	24.000	20.7	44.7	60.0	-15.3
22.0	24.000	20.7	44.7	60.0	-15.3
23.7	23.900	20.8	44.7	60.0	-15.3

CONCLUSION

Pass



Tested By

POWERLINE CONDUCTED EMISSIONS



EUT:	H110 Router Powered by POE + backup LI ion battery	Work Order:	MEGR0002
Serial Number:	H110T000003	Date:	2020-01-21
Customer:	METER Group, Inc USA	Temperature:	22.9°C
Attendees:	Daniel Winder, Ramakrishna Eepuri	Relative Humidity:	36.9%
Customer Project:	None	Bar. Pressure:	1012 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	POE via 110VAC/60Hz	Configuration:	MEGR0002-4

TEST SPECIFICATIONS

Specification: Equipment Class A FCC 15.107:2020	Method: ANSI C63.4:2014
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TEST PARAMETERS

Run #:	11	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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COMMENTS

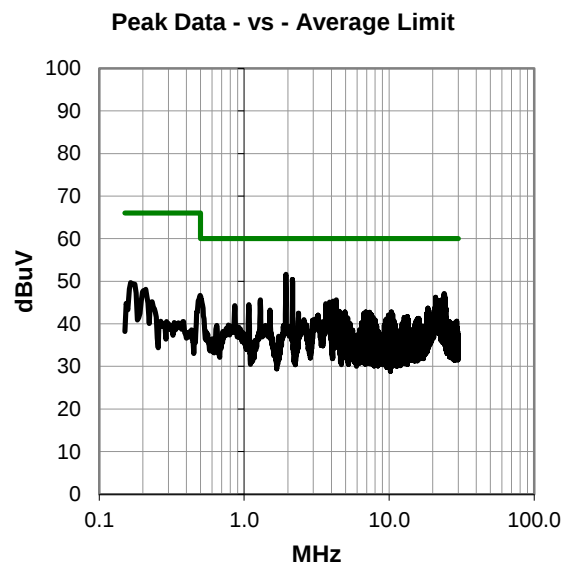
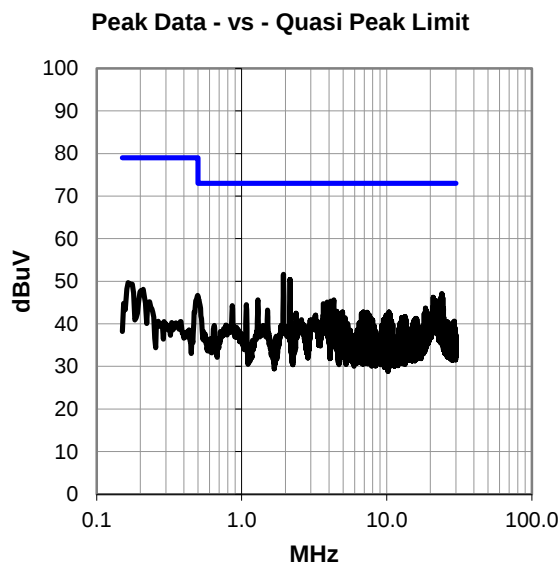
Data was taken with and without the radio active in order to prove out compliance in a Class A product.

EUT OPERATING MODES

Radio Off, System still and running

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #11

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.9	31.700	19.9	51.6	73.0	-21.4
2.1	30.500	19.9	50.4	73.0	-22.6
23.9	26.300	20.8	47.1	73.0	-25.9
24.1	26.000	20.8	46.8	73.0	-26.2
23.7	25.500	20.8	46.3	73.0	-26.7
20.9	25.500	20.7	46.2	73.0	-26.8
24.4	25.300	20.8	46.1	73.0	-26.9
23.5	25.100	20.8	45.9	73.0	-27.1
1.3	25.800	19.8	45.6	73.0	-27.4
4.3	25.500	20.1	45.6	73.0	-27.4
21.8	24.800	20.7	45.5	73.0	-27.5
4.1	25.200	20.1	45.3	73.0	-27.7
3.9	25.000	20.1	45.1	73.0	-27.9
21.3	24.400	20.7	45.1	73.0	-27.9
21.6	24.400	20.7	45.1	73.0	-27.9
23.3	24.200	20.8	45.0	73.0	-28.0
3.7	24.600	20.1	44.7	73.0	-28.3
21.1	24.000	20.7	44.7	73.0	-28.3
22.0	23.900	20.7	44.6	73.0	-28.4
1.1	24.700	19.8	44.5	73.0	-28.5
0.9	24.500	19.8	44.3	73.0	-28.7
22.2	23.500	20.7	44.2	73.0	-28.8
20.7	23.100	20.7	43.8	73.0	-29.2
0.2	29.800	19.9	49.7	79.0	-29.3
18.5	23.000	20.7	43.7	73.0	-29.3

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.9	31.700	19.9	51.6	60.0	-8.4
2.1	30.500	19.9	50.4	60.0	-9.6
23.9	26.300	20.8	47.1	60.0	-12.9
24.1	26.000	20.8	46.8	60.0	-13.2
23.7	25.500	20.8	46.3	60.0	-13.7
20.9	25.500	20.7	46.2	60.0	-13.8
24.4	25.300	20.8	46.1	60.0	-13.9
23.5	25.100	20.8	45.9	60.0	-14.1
1.3	25.800	19.8	45.6	60.0	-14.4
4.3	25.500	20.1	45.6	60.0	-14.4
21.8	24.800	20.7	45.5	60.0	-14.5
4.1	25.200	20.1	45.3	60.0	-14.7
3.9	25.000	20.1	45.1	60.0	-14.9
21.3	24.400	20.7	45.1	60.0	-14.9
21.6	24.400	20.7	45.1	60.0	-14.9
23.3	24.200	20.8	45.0	60.0	-15.0
3.7	24.600	20.1	44.7	60.0	-15.3
21.1	24.000	20.7	44.7	60.0	-15.3
22.0	23.900	20.7	44.6	60.0	-15.4
1.1	24.700	19.8	44.5	60.0	-15.5
0.9	24.500	19.8	44.3	60.0	-15.7
22.2	23.500	20.7	44.2	60.0	-15.8
20.7	23.100	20.7	43.8	60.0	-16.2
0.2	29.800	19.9	49.7	66.0	-16.3
18.5	23.000	20.7	43.7	60.0	-16.3

CONCLUSION

Pass



Tested By

POWERLINE CONDUCTED EMISSIONS



EUT:	H110 Router Powered by POE + backup LI ion battery	Work Order:	MEGR0002
Serial Number:	H110T000003	Date:	2020-01-21
Customer:	METER Group, Inc USA	Temperature:	22.9°C
Attendees:	Daniel Winder, Ramakrishna Eepuri	Relative Humidity:	36.9%
Customer Project:	None	Bar. Pressure:	1012 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	POE via 110VAC/60Hz	Configuration:	MEGR0002-4

TEST SPECIFICATIONS

Specification: Equipment Class A FCC 15.107:2020	Method: ANSI C63.4:2014
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TEST PARAMETERS

Run #:	12	Line:	High Line	Add. Ext. Attenuation (dB):	0
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COMMENTS

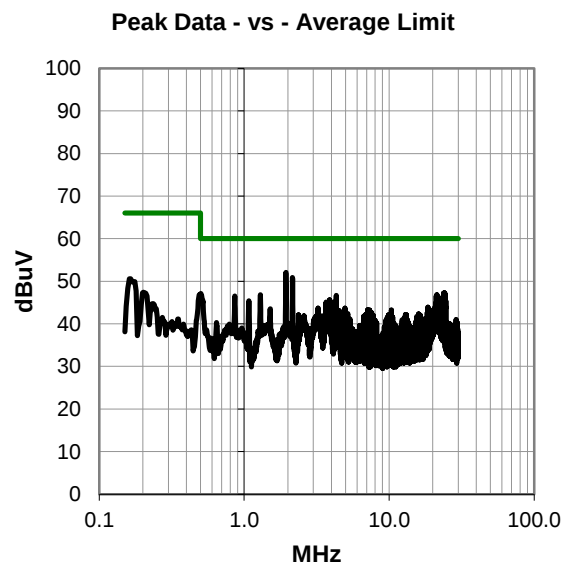
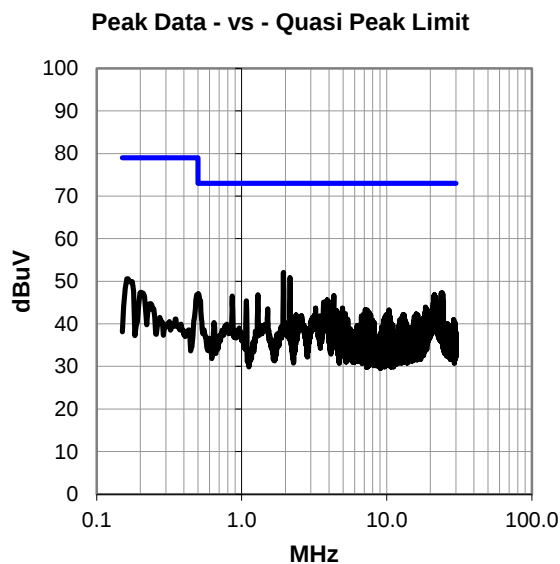
Data was taken with and without the radio active in order to prove out compliance in a Class A product.

EUT OPERATING MODES

Radio Off, System still and running

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #12

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.9	32.200	19.9	52.1	73.0	-20.9
2.2	31.000	19.9	50.9	73.0	-22.1
24.2	26.500	20.8	47.3	73.0	-25.7
23.7	26.400	20.8	47.2	73.0	-25.8
0.5	27.300	19.8	47.1	73.0	-25.9
23.9	26.300	20.8	47.1	73.0	-25.9
24.4	26.200	20.8	47.0	73.0	-26.0
1.3	27.000	19.8	46.8	73.0	-26.2
21.3	26.100	20.7	46.8	73.0	-26.2
4.3	26.600	20.1	46.7	73.0	-26.3
0.9	26.700	19.8	46.5	73.0	-26.5
21.1	25.800	20.7	46.5	73.0	-26.5
21.8	25.600	20.7	46.3	73.0	-26.7
3.9	25.500	20.1	45.6	73.0	-27.4
1.1	25.600	19.8	45.4	73.0	-27.6
24.6	24.500	20.8	45.3	73.0	-27.7
3.7	25.000	20.1	45.1	73.0	-27.9
4.1	25.000	20.1	45.1	73.0	-27.9
21.6	24.400	20.7	45.1	73.0	-27.9
23.5	24.300	20.8	45.1	73.0	-27.9
23.3	24.200	20.8	45.0	73.0	-28.0
20.9	24.200	20.7	44.9	73.0	-28.1
0.2	30.700	19.9	50.6	79.0	-28.4
23.1	23.600	20.7	44.3	73.0	-28.7
22.0	23.300	20.7	44.0	73.0	-29.0

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.9	32.200	19.9	52.1	60.0	-7.9
2.2	31.000	19.9	50.9	60.0	-9.1
24.2	26.500	20.8	47.3	60.0	-12.7
23.7	26.400	20.8	47.2	60.0	-12.8
0.5	27.300	19.8	47.1	60.0	-12.9
23.9	26.300	20.8	47.1	60.0	-12.9
24.4	26.200	20.8	47.0	60.0	-13.0
1.3	27.000	19.8	46.8	60.0	-13.2
21.3	26.100	20.7	46.8	60.0	-13.2
4.3	26.600	20.1	46.7	60.0	-13.3
0.9	26.700	19.8	46.5	60.0	-13.5
21.1	25.800	20.7	46.5	60.0	-13.5
21.8	25.600	20.7	46.3	60.0	-13.7
3.9	25.500	20.1	45.6	60.0	-14.4
1.1	25.600	19.8	45.4	60.0	-14.6
24.6	24.500	20.8	45.3	60.0	-14.7
3.7	25.000	20.1	45.1	60.0	-14.9
4.1	25.000	20.1	45.1	60.0	-14.9
21.6	24.400	20.7	45.1	60.0	-14.9
23.5	24.300	20.8	45.1	60.0	-14.9
23.3	24.200	20.8	45.0	60.0	-15.0
20.9	24.200	20.7	44.9	60.0	-15.1
0.2	30.700	19.9	50.6	66.0	-15.4
23.1	23.600	20.7	44.3	60.0	-15.7
22.0	23.300	20.7	44.0	60.0	-16.0

CONCLUSION

Pass



Tested By

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2019.05.10

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

Continuous Tx BLE, GFSK, Power Level 7 (Full Power)

CHANNELS OF OPERATION

Low Ch. 2402 MHz

Mid Ch. 2442 MHz

High Ch. 2480 MHz

POWER SETTINGS INVESTIGATED

Battery

POE via 110VAC/60Hz

CONFIGURATIONS INVESTIGATED

MEGR0002 - 2

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
Cable	ESM Cable Corp.	TTBJ141-KMKM-72	EVY	31-Jul-2019	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIV	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-10	AIW	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	31-Jul-2019	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	19-Nov-2019	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	0 mo
Cable	None	Standard Gain Horns Cable	EVF	19-Nov-2019	12 mo
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	19-Nov-2019	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HFO	18-Nov-2019	12 mo
Attenuator	Coaxicom	3910-20	AXZ	15-Feb-2019	12 mo
Cable	N/A	Double Ridge Horn Cables	EVB	18-Nov-2019	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	18-Nov-2019	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	7-Feb-2018	24 mo
Cable	N/A	Bilog Cables	EVA	18-Nov-2019	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	18-Nov-2019	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 $10 \cdot \text{LOG}(\text{dc})$.

SPURIOUS RADIATED EMISSIONS

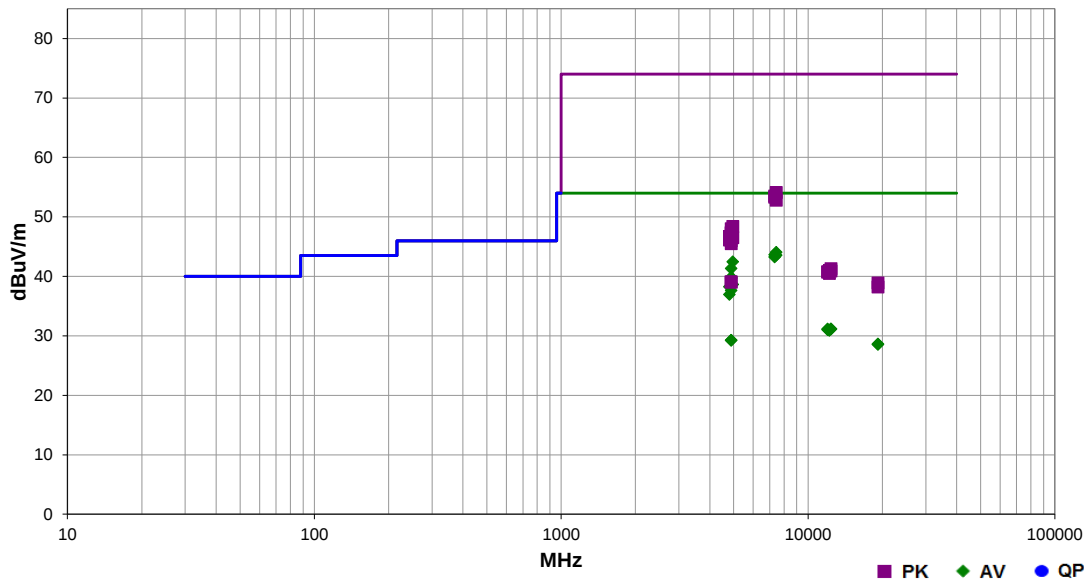


EmiRS 2019.08.15.1 PSA-ESCI 2019.05.10

Work Order:	MEGR0002	Date:	17-Jan-2020		
Project:	None	Temperature:	19.9 °C		
Job Site:	EV01	Humidity:	36.3% RH		
Serial Number:	H110T000003	Barometric Pres.:	1024 mbar		
EUT:	H110 Router Powered by POE + backup LI ion battery			Tested by:	Brandon Hobbs
Configuration:	2				
Customer:	METER Group, Inc USA				
Attendees:	Daniel Winder, Ramakrishna Eepuri				
EUT Power:	POE via 110VAC/60Hz				
Operating Mode:	Continuous Tx BLE, GFSK, Power Level 7 (Full Power)				
Deviations:	None				
Comments:	Please reference the data comments for EUT orientation, channel and for an alternate power source when used. Duty cycle correction factor (DCCF) of 0.73 dB added to RMS average points based on the formula $10 * \log(1/0.846)$, where 0.846 is the duty cycle during test.				

Test Specifications	FCC 15.247:2020	Test Method	ANSI C63.10:2013
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Run #	16	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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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
7439.575	28.7	14.6	3.6	246.0	0.7	0.0	Vert	AV	0.0	44.0	54.0	-10.0	EUT Horz, High Ch. 2480 MHz
7325.442	28.7	14.2	1.5	294.0	0.7	0.0	Vert	AV	0.0	43.6	54.0	-10.4	EUT Horz, Mid Ch 2442 MHz
7441.375	28.2	14.6	3.9	323.0	0.7	0.0	Horz	AV	0.0	43.5	54.0	-10.5	EUT Horz, High Ch. 2480 MHz
7324.525	28.4	14.1	1.5	12.0	0.7	0.0	Horz	AV	0.0	43.2	54.0	-10.8	EUT Horz, Mid Ch 2442 MHz
4960.008	35.2	6.5	1.7	221.0	0.7	0.0	Vert	AV	0.0	42.4	54.0	-11.6	EUT Horz, High Ch. 2480 MHz
4883.958	34.2	6.4	3.4	218.0	0.7	0.0	Vert	AV	0.0	41.3	54.0	-12.7	EUT Horz, Mid Ch 2442 MHz
4883.933	32.7	6.4	3.3	262.0	0.7	0.0	Horz	AV	0.0	39.8	54.0	-14.2	EUT Horz, Mid Ch 2442 MHz
4883.825	32.5	6.4	1.0	116.0	0.7	0.0	Horz	AV	0.0	39.6	54.0	-14.4	EUT On Side, Mid Ch 2442 MHz
4883.908	31.7	6.4	1.0	173.0	0.7	0.0	Vert	AV	0.0	38.8	54.0	-15.2	EUT On Side, Mid Ch 2442 MHz
4960.083	31.4	6.5	1.6	42.0	0.7	0.0	Horz	AV	0.0	38.6	54.0	-15.4	EUT Horz, High Ch. 2480 MHz
4884.075	31.4	6.4	1.2	51.0	0.7	0.0	Horz	AV	0.0	38.5	54.0	-15.5	EUT Vert, Mid Ch 2442 MHz
4803.850	32.1	5.4	3.7	159.0	0.7	0.0	Vert	AV	0.0	38.2	54.0	-15.8	EUT Horz, Low Ch. 2402 MHz
4884.000	30.5	6.4	1.0	360.0	0.7	0.0	Vert	AV	0.0	37.6	54.0	-16.4	EUT Vert, Mid Ch 2442 MHz
4803.925	30.8	5.4	1.5	41.0	0.7	0.0	Horz	AV	0.0	36.9	54.0	-17.1	EUT Horz, Low Ch. 2402 MHz
7438.600	39.5	14.6	3.6	246.0	0.0	0.0	Vert	PK	0.0	54.1	74.0	-19.9	EUT Horz, High Ch. 2480 MHz
7327.292	39.3	14.2	1.5	12.0	0.0	0.0	Horz	PK	0.0	53.5	74.0	-20.5	EUT Horz, High Ch. 2480 MHz
7325.317	39.1	14.2	1.5	294.0	0.0	0.0	Vert	PK	0.0	53.3	74.0	-20.7	EUT Horz, Mid Ch 2442 MHz
7442.350	38.2	14.6	3.9	323.0	0.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2	EUT Horz, High Ch. 2480 MHz
12010.870	29.4	1.0	1.5	163.0	0.7	0.0	Horz	AV	0.0	31.1	54.0	-22.9	EUT Horz, Low Ch. 2402 MHz
12397.730	29.3	1.1	3.0	25.0	0.7	0.0	Vert	AV	0.0	31.1	54.0	-22.9	EUT Horz, High Ch. 2480 MHz
12398.820	29.3	1.1	1.5	136.0	0.7	0.0	Horz	AV	0.0	31.1	54.0	-22.9	EUT Horz, High Ch. 2480 MHz
12008.800	29.3	1.0	1.6	127.0	0.7	0.0	Vert	AV	0.0	31.0	54.0	-23.0	EUT Horz, Low Ch. 2402 MHz
12207.550	29.4	0.8	2.6	343.0	0.7	0.0	Vert	AV	0.0	30.9	54.0	-23.1	EUT Horz, Mid Ch 2442 MHz
12210.500	29.4	0.8	2.0	204.0	0.7	0.0	Horz	AV	0.0	30.9	54.0	-23.1	EUT Horz, Mid Ch 2442 MHz
4883.033	22.1	6.4	1.5	353.0	0.7	0.0	Horz	AV	0.0	29.2	54.0	-24.8	EUT Horz, Low Ch. 2402 MHz, battery mode
4884.975	22.1	6.4	1.7	267.0	0.7	0.0	Vert	AV	0.0	29.2	54.0	-24.8	EUT Horz, Mid Ch. 2442 MHz, battery mode
19218.330	25.8	2.1	1.2	0.0	0.7	0.0	Horz	AV	0.0	28.6	54.0	-25.4	EUT Horz, Low Ch. 2402 MHz

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
19216.460	25.7	2.1	1.2	0.0	0.7	0.0	Vert	AV	0.0	28.5	54.0	-25.5	EUT Horz, Low Ch. 2402 MHz
4960.517	41.9	6.5	1.7	221.0	0.0	0.0	Vert	PK	0.0	48.4	74.0	-25.6	EUT Horz, High Ch. 2480 MHz
4884.383	41.6	6.4	3.4	218.0	0.0	0.0	Vert	PK	0.0	48.0	74.0	-26.0	EUT Horz, Mid Ch 2442 MHz
4884.725	41.0	6.4	1.0	116.0	0.0	0.0	Horz	PK	0.0	47.4	74.0	-26.6	EUT On Side, Mid Ch 2442 MHz
4883.683	40.9	6.4	3.3	262.0	0.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	EUT Horz, Mid Ch 2442 MHz
4882.933	40.4	6.4	1.0	173.0	0.0	0.0	Vert	PK	0.0	46.8	74.0	-27.2	EUT On Side, Mid Ch 2442 MHz
4803.417	41.3	5.4	3.7	159.0	0.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	EUT Horz, Low Ch. 2402 MHz
4959.150	40.0	6.5	1.6	42.0	0.0	0.0	Horz	PK	0.0	46.5	74.0	-27.5	EUT Horz, High Ch. 2480 MHz
4803.625	40.7	5.4	1.5	41.0	0.0	0.0	Horz	PK	0.0	46.1	74.0	-27.9	EUT Horz, Low Ch. 2402 MHz
4883.692	39.6	6.4	1.2	51.0	0.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	EUT Vert, Mid Ch 2442 MHz
4883.450	39.1	6.4	1.0	360.0	0.0	0.0	Vert	PK	0.0	45.5	74.0	-28.5	EUT Vert, Mid Ch 2442 MHz
12397.880	40.2	1.1	1.5	136.0	0.0	0.0	Horz	PK	0.0	41.3	74.0	-32.7	EUT Horz, High Ch. 2480 MHz
12211.380	40.2	0.8	2.6	343.0	0.0	0.0	Vert	PK	0.0	41.0	74.0	-33.0	EUT Horz, Mid Ch 2442 MHz
12398.570	39.8	1.1	3.0	25.0	0.0	0.0	Vert	PK	0.0	40.9	74.0	-33.1	EUT Horz, High Ch. 2480 MHz
12008.320	39.8	1.0	1.6	127.0	0.0	0.0	Vert	PK	0.0	40.8	74.0	-33.2	EUT Horz, Low Ch. 2402 MHz
12009.250	39.7	1.0	1.5	163.0	0.0	0.0	Horz	PK	0.0	40.7	74.0	-33.3	EUT Horz, Low Ch. 2402 MHz
12208.930	39.7	0.8	2.0	204.0	0.0	0.0	Horz	PK	0.0	40.5	74.0	-33.5	EUT Horz, Mid Ch 2442 MHz
4881.633	32.7	6.4	1.7	267.0	0.0	0.0	Vert	PK	0.0	39.1	74.0	-34.9	EUT Horz, Mid Ch. 2442 MHz, battery mode
4882.608	32.6	6.4	1.5	353.0	0.0	0.0	Horz	PK	0.0	39.0	74.0	-35.0	EUT Horz, Mid Ch. 2442 MHz, battery mode
19215.880	36.8	2.1	1.2	0.0	0.0	0.0	Horz	PK	0.0	38.9	74.0	-35.1	EUT Horz, Low Ch. 2402 MHz
19214.330	36.1	2.1	1.2	0.0	0.0	0.0	Vert	PK	0.0	38.2	74.0	-35.8	EUT Horz, Low Ch. 2402 MHz

SPURIOUS RADIATED EMISSIONS



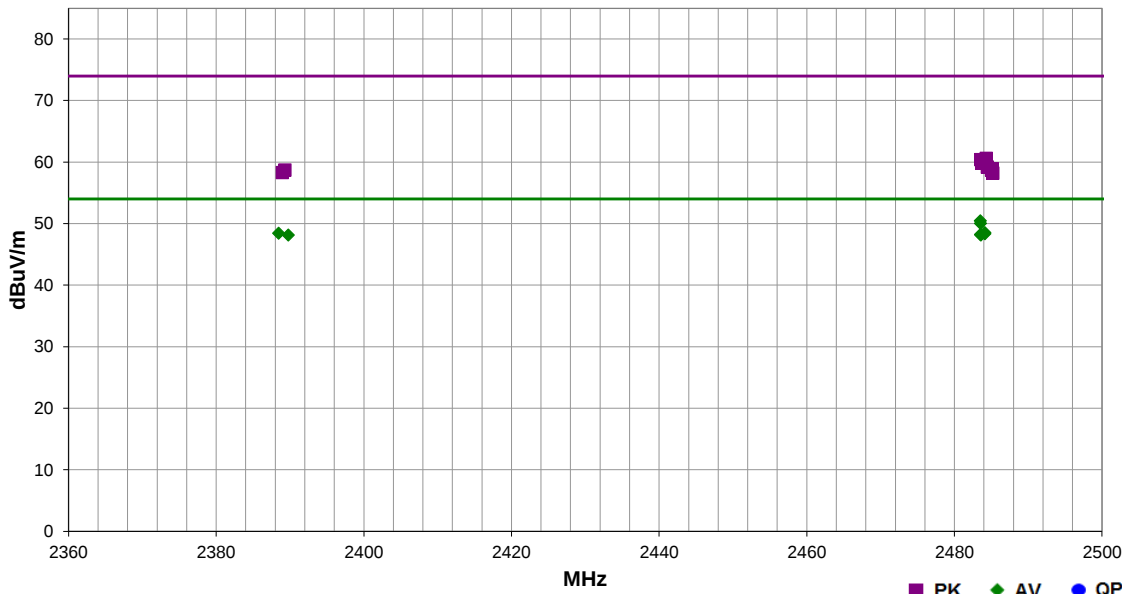
EmiR5 2019.08.15.1

PSA-ESCI 2019.06.10

Work Order:	MEGR0002	Date:	17-Jan-2020	
Project:	None	Temperature:	19.9 °C	
Job Site:	EV01	Humidity:	36.3% RH	
Serial Number:	H110T000003	Barometric Pres.:	1024 mbar	
EUT: H110 Router Powered by POE + backup LI ion battery				Tested by: Brandon Hobbs
Configuration:	2			
Customer:	METER Group, Inc USA			
Attendees:	Daniel Winder, Ramakrishna Eepuri			
EUT Power:	POE via 110VAC/60Hz			
Operating Mode:	Continuous Tx BLE, GFSK, Power Level 7 (Full Power)			
Deviations:	None			
Comments:	Please reference the data comments for EUT orientation, channel and for an alternate power source when used. Duty cycle correction factor (DCCF) of 0.73 dB added to RMS average points based on the formula $10 * \log(1/0.846)$, where 0.846 is the duty cycle during test.			

Test Specifications	Test Method
FCC 15.247:2020	ANSI C63.10:2013

Run #	18	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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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
2483.517	33.5	-3.8	1.5	257.0	0.7	20.0	Horz	AV	0.0	50.4	54.0	-3.6	EUT Vert, High Ch. 2480 MHz
2483.540	33.1	-3.8	1.2	38.0	0.7	20.0	Horz	AV	0.0	50.0	54.0	-4.0	EUT On Side, High Ch. 2480 MHz
2484.147	31.5	-3.7	1.5	350.0	0.7	20.0	Vert	AV	0.0	48.5	54.0	-5.5	EUT On Side, High Ch. 2480 MHz
2388.463	31.7	-4.0	1.5	207.0	0.7	20.0	Horz	AV	0.0	48.4	54.0	-5.6	EUT Vert, Low Ch. 2402 MHz
2484.133	31.4	-3.8	2.7	297.0	0.7	20.0	Horz	AV	0.0	48.3	54.0	-5.7	EUT Horz, High Ch. 2480 MHz
2483.547	31.3	-3.8	1.5	84.0	0.7	20.0	Vert	AV	0.0	48.2	54.0	-5.8	EUT Vert, High Ch. 2480 MHz
2389.777	31.4	-4.0	3.1	360.0	0.7	20.0	Vert	AV	0.0	48.1	54.0	-5.9	EUT On Side, Low Ch. 2402 MHz
2483.590	31.2	-3.8	1.5	45.0	0.7	20.0	Vert	AV	0.0	48.1	54.0	-5.9	EUT Vert, High Ch. 2480 MHz
2484.303	44.3	-3.7	1.5	257.0	0.0	20.0	Horz	PK	0.0	60.6	74.0	-13.4	EUT Vert, High Ch. 2480 MHz
2483.563	44.2	-3.8	1.5	360.0	0.0	20.0	Vert	PK	0.0	60.4	74.0	-13.6	EUT Horz, High Ch. 2480 MHz
2483.720	43.6	-3.8	1.2	38.0	0.0	20.0	Horz	PK	0.0	59.8	74.0	-14.2	EUT On Side, High Ch. 2480 MHz
2484.467	42.9	-3.7	1.5	84.0	0.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	EUT Vert, High Ch. 2480 MHz
2485.117	42.6	-3.7	2.7	297.0	0.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	EUT Horz, High Ch. 2480 MHz
2485.020	42.4	-3.7	1.5	350.0	0.0	20.0	Vert	PK	0.0	58.7	74.0	-15.3	EUT On Side, High Ch. 2480 MHz
2389.300	42.7	-4.0	1.5	207.0	0.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	EUT Vert, Low Ch. 2402 MHz
2388.967	42.3	-4.0	3.1	360.0	0.0	20.0	Vert	PK	0.0	58.3	74.0	-15.7	EUT On Side, Low Ch. 2402 MHz
2485.210	41.9	-3.7	1.5	45.0	0.0	20.0	Vert	PK	0.0	58.2	74.0	-15.8	EUT Vert, High Ch. 2480 MHz

DUTY CYCLE



XMIT 2019.09.05

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	D150A-1-0720-200	EVK	29-Mar-19	29-Mar-20
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-20
Attenuator	S.M. Electronics	SA26B-20	AUY	28-Mar-19	28-Mar-20
Block - DC	Fairview Microwave	SD3379	AMW	28-Mar-19	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	13-Dec-19	13-Dec-20

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.

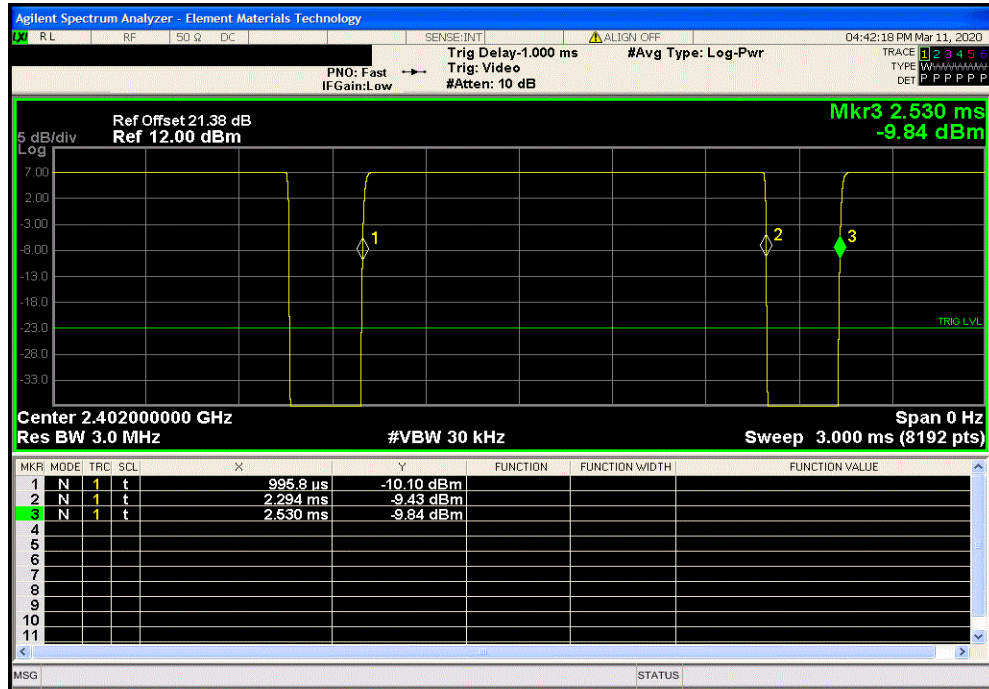
ThiTx 2019.08.30.0 XMIT 2019.09.05

DUTY CYCLE

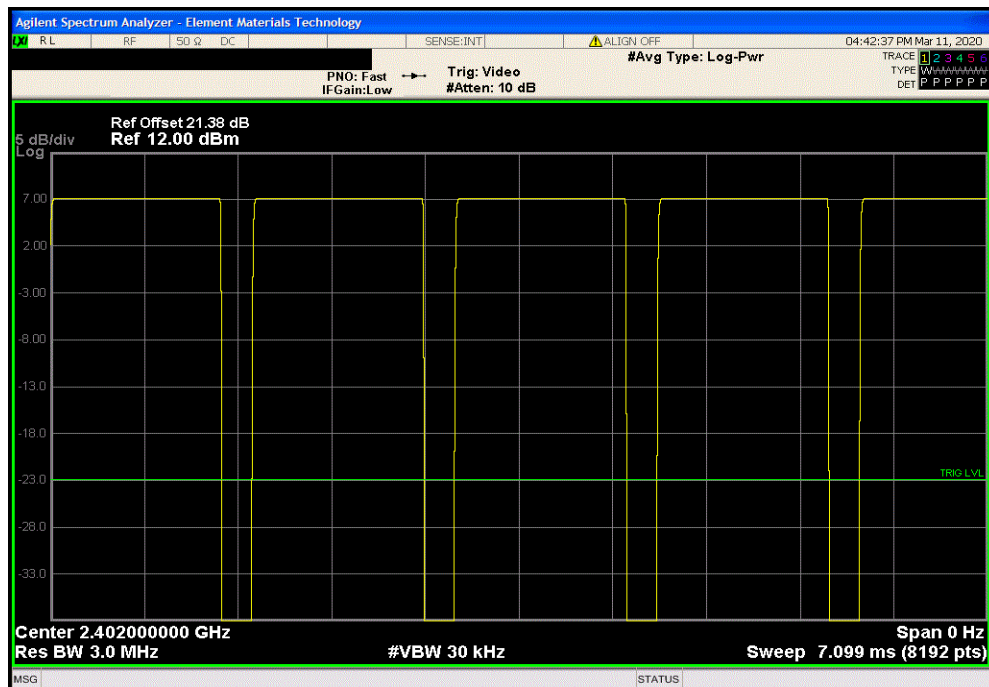


TbTtx 2019.08.30.0 XMt 2019.09.05

BLE/GFSK Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.298 ms	1.534 ms	1	84.6	N/A	N/A	



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

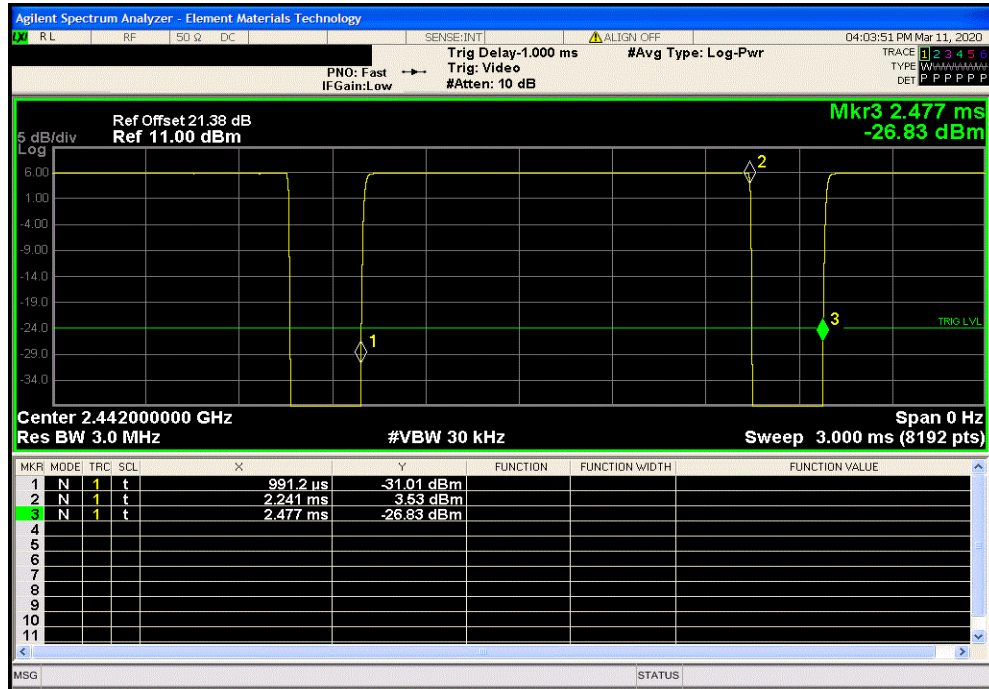


DUTY CYCLE

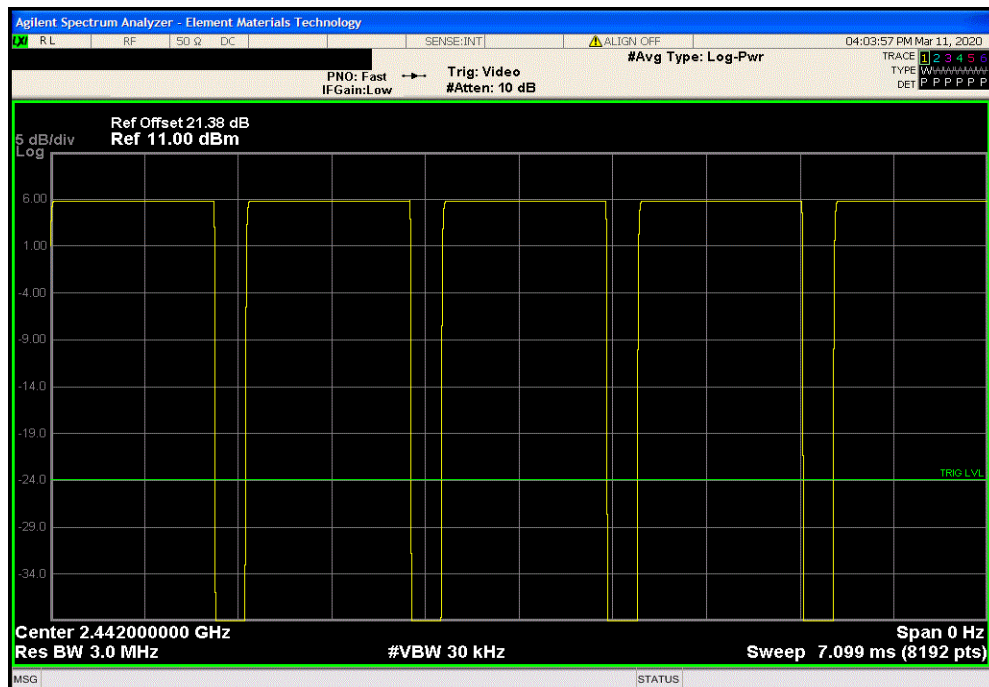


TbTtx 2019.08.30.0 XMt 2019.09.05

BLE/GFSK Mid Channel, 2442 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.25 ms	1.485 ms	1	84.2	N/A	N/A	



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

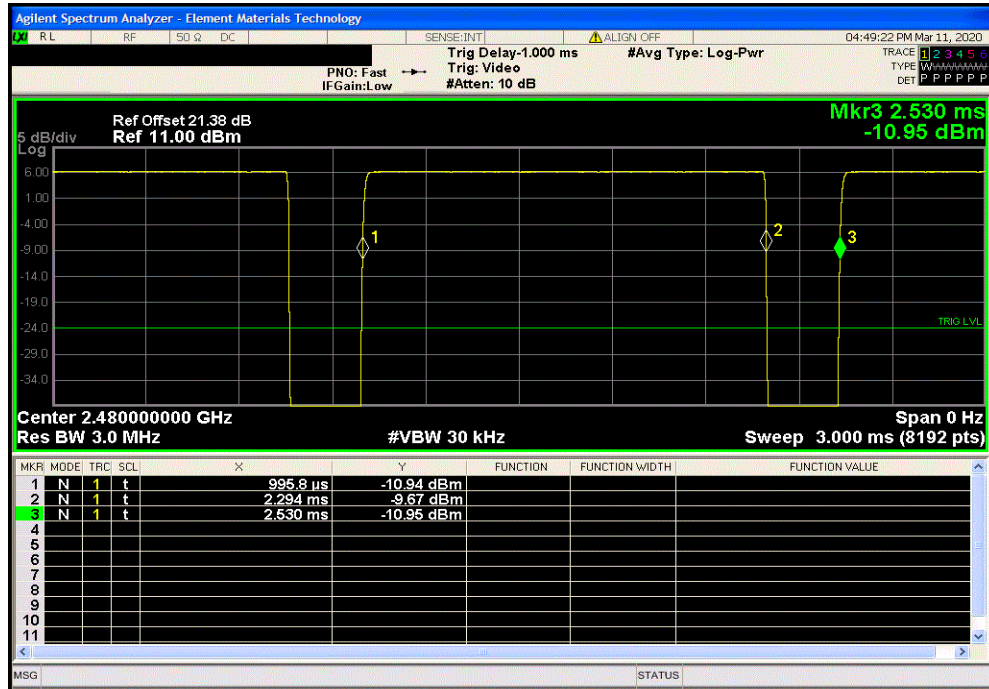


DUTY CYCLE

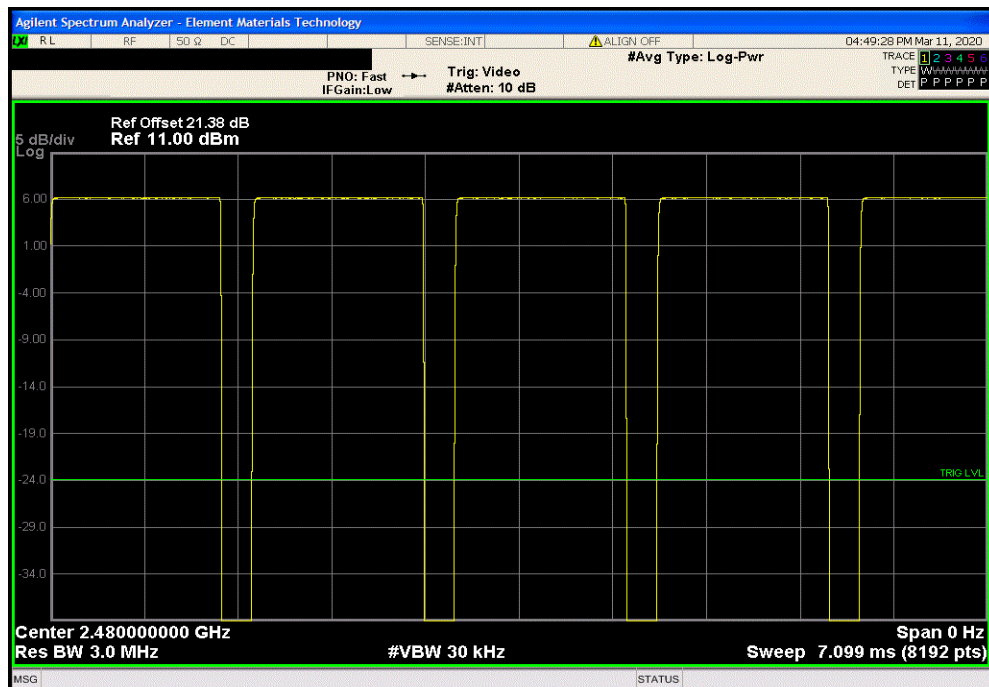


TbTx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.298 ms	1.534 ms	1	84.6	N/A	N/A	



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



OCCUPIED BANDWIDTH



XMIT 2019.09.05

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-20
Cable	Micro-Coax	D150A-1-0720-200	EVK	29-Mar-19	29-Mar-20
Attenuator	S.M. Electronics	SA26B-20	AUY	28-Mar-19	28-Mar-20
Block - DC	Fairview Microwave	SD3379	AMW	28-Mar-19	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	13-Dec-19	13-Dec-20

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.

OCCUPIED BANDWIDTH



TMTx 2019.08.30.0 XMt 2019.09.05

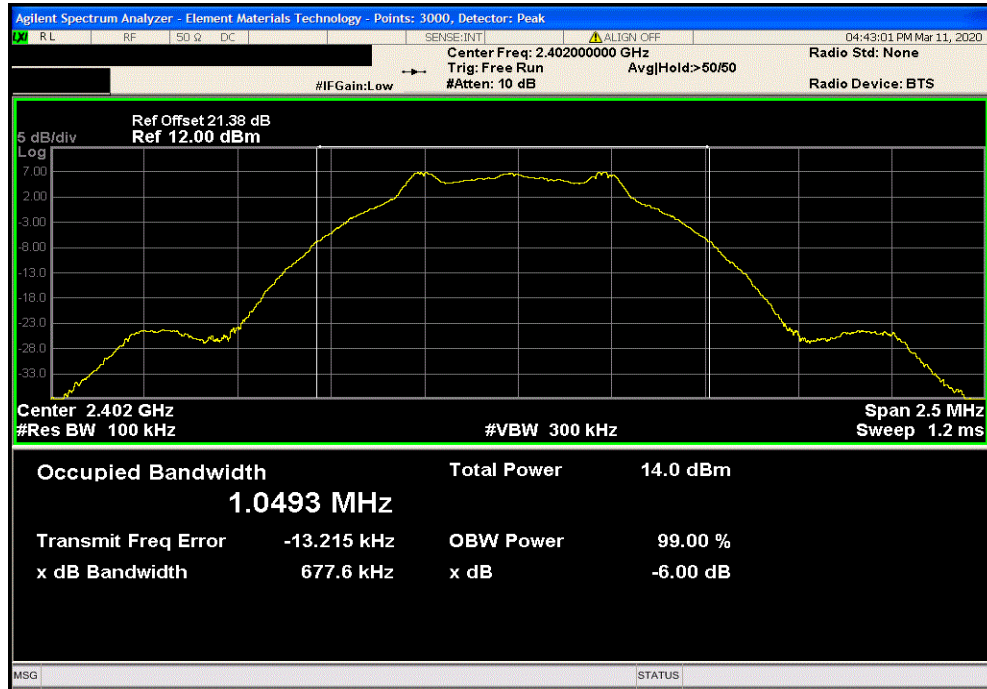
EUT: Router POE + backup li ion battery		Work Order: MEGR0002	
Serial Number: H110-T000020		Date: 11-Mar-20	
Customer: METER group		Temperature: 22.5 °C	
Attendees: None		Humidity: 35.1% RH	
Project: None		Barometric Pres.: 1027 mbar	
Tested by: Jeff Alcocke	Power: POE via 110VAC/60Hz	Job Site: EV06	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2020		ANSI C63.10:2013	
COMMENTS			
Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable. EUT was configured to the maximum power setting = 7			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	5	Signature 	
		Value	Limit (±) Result
BLE/GFSK Low Channel, 2402 MHz		677.574 kHz	500 kHz Pass
BLE/GFSK Mid Channel, 2442 MHz		666.857 kHz	500 kHz Pass
BLE/GFSK High Channel, 2480 MHz		662.905 kHz	500 kHz Pass

OCCUPIED BANDWIDTH

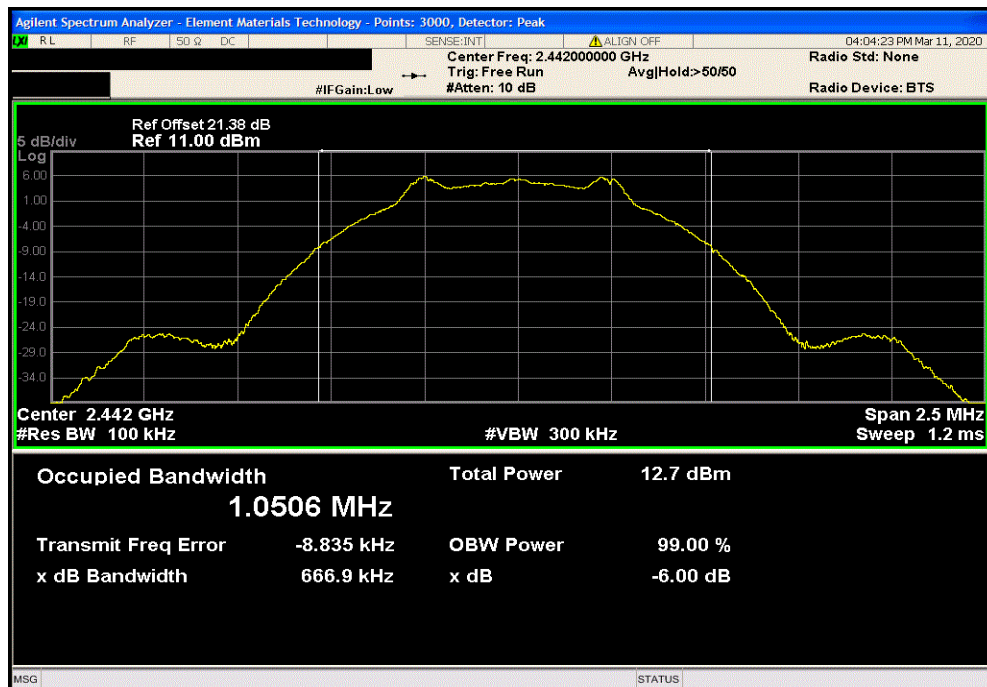


TbTtx 2019.08.30.0 XMI 2019.09.05

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



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

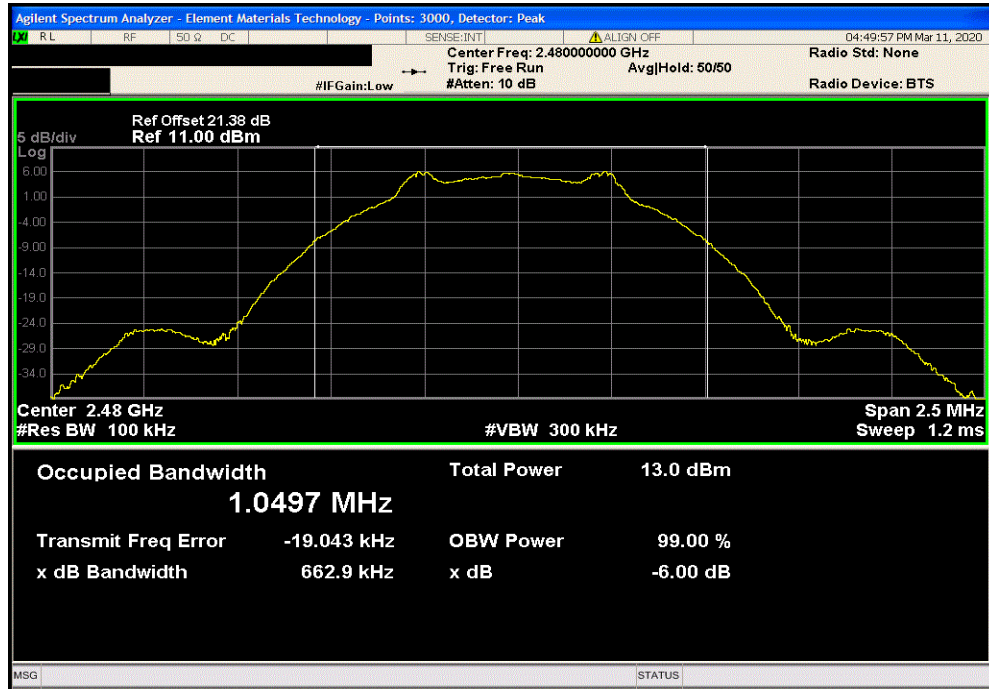


OCCUPIED BANDWIDTH



TbTx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK High Channel, 2480 MHz						
Value				Limit	Result	
662.905 kHz				500 kHz	Pass	



OUTPUT POWER



XMIT 2019.09.05

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-20
Cable	Micro-Coax	D150A-1-0720-200	EVK	29-Mar-19	29-Mar-20
Attenuator	S.M. Electronics	SA26B-20	AUY	28-Mar-19	28-Mar-20
Block - DC	Fairview Microwave	SD3379	AMW	28-Mar-19	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	13-Dec-19	13-Dec-20

TEST DESCRIPTION

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

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

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

OUTPUT POWER



TMTx 2019.08.30.0 XMt 2019.09.05

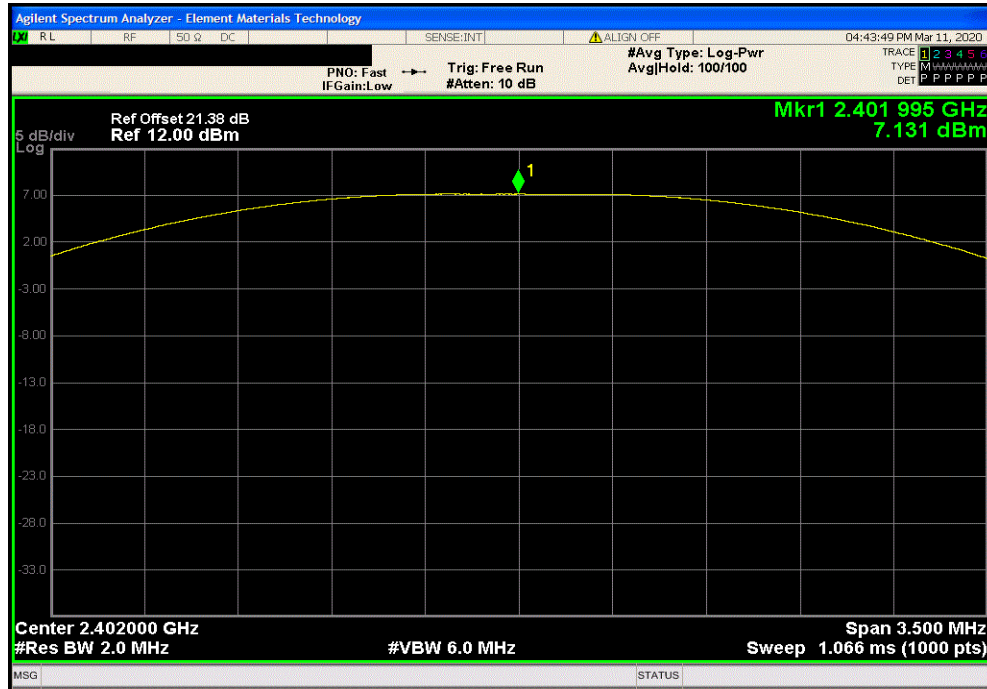
EUT: Router POE + backup li ion battery		Work Order: MEGR0002	
Serial Number: H110-T000020		Date: 11-Mar-20	
Customer: METER group		Temperature: 22.5 °C	
Attendees: None		Humidity: 35.5% RH	
Project: None		Barometric Pres.: 1027 mbar	
Tested by: Jeff Alcocke	Power: POE via 110VAC/60Hz	Job Site: EV06	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2020		ANSI C63.10:2013	
COMMENTS			
Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable. EUT was configured to the maximum power setting = 7			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	5	Signature 	
		Out Pwr (dBm)	Limit (dBm)
BLE/GFSK Low Channel, 2402 MHz		7.131	30
BLE/GFSK Mid Channel, 2442 MHz		6.877	30
BLE/GFSK High Channel, 2480 MHz		6.226	30
			Result
			Pass
			Pass
			Pass

OUTPUT POWER

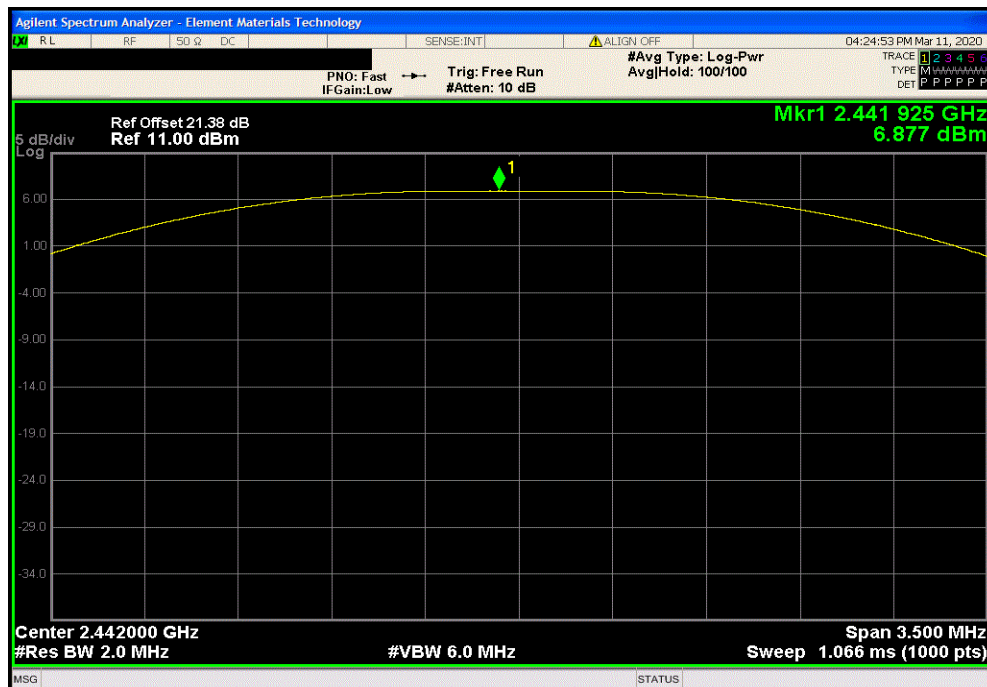


TbTx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				7.131	30	Pass



BLE/GFSK Mid Channel, 2442 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				6.877	30	Pass

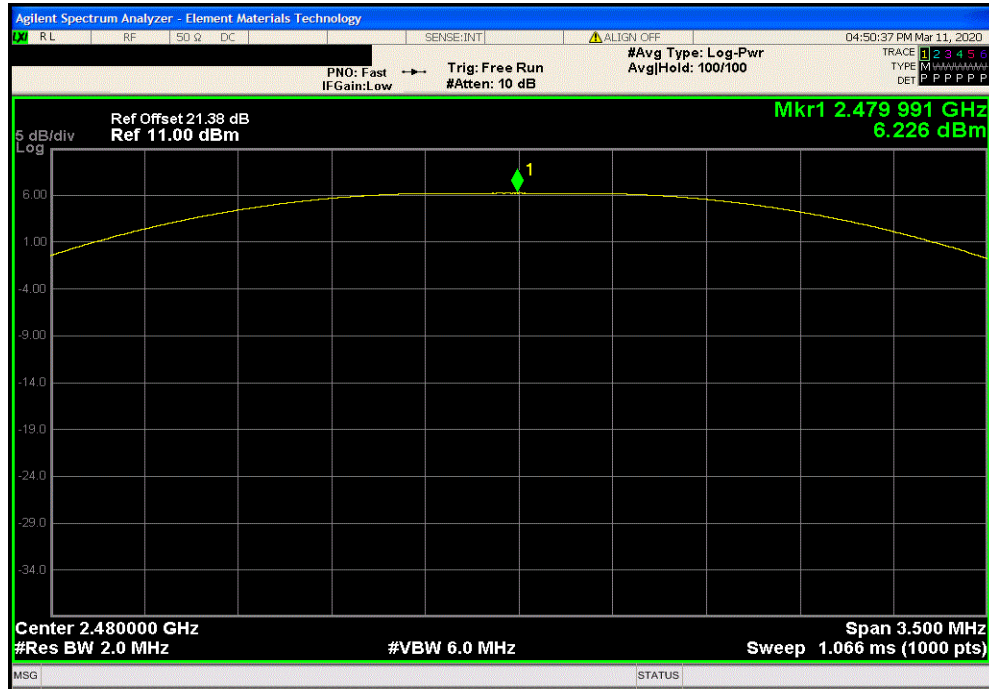


OUTPUT POWER



TbTx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				6.226	30	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



XMIT 2019.09.05

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-20
Cable	Micro-Coax	D150A-1-0720-200	EVK	29-Mar-19	29-Mar-20
Block - DC	Fairview Microwave	SD3379	AMW	28-Mar-19	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	13-Dec-19	13-Dec-20
Block - DC	Fairview Microwave	SD3379	AMW	28-Mar-19	28-Mar-20

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 antenna gain was added to the measured conducted output power to derive the EIRP.

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



TMTx 2019.08.30.0 XMM 2019.09.05

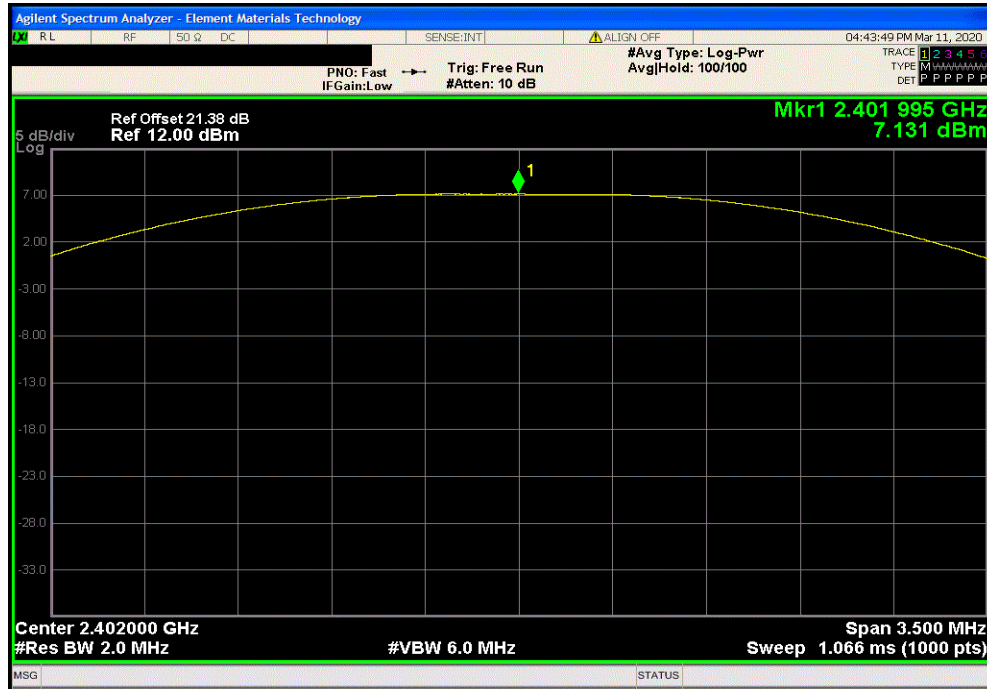
EUT: Router POE + backup li ion battery		Work Order: MEGR0002	
Serial Number: H110-T000020		Date: 11-Mar-20	
Customer: METER group		Temperature: 22.5 °C	
Attendees: None		Humidity: 35.1% RH	
Project: None		Barometric Pres.: 1027 mbar	
Tested by: Jeff Alcocke	Power: POE via 110VAC/60Hz	Job Site: EV06	
TEST SPECIFICATIONS			
FCC 15.247:2020		Test Method	
		ANSI C63.10:2013	
COMMENTS			
Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable. EUT was configured to the maximum power setting = 7			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	5	Signature 	
		Out Pwr (dBm)	Antenna Gain (dBi)
BLE/GFSK Low Channel, 2402 MHz		7.131	4.15
BLE/GFSK Mid Channel, 2442 MHz		6.877	4.15
BLE/GFSK High Channel, 2480 MHz		6.226	4.15
		EIRP (dBm)	EIRP Limit (dBm)
		11.281	36
		11.027	36
		10.376	36
			Result
			Pass
			Pass
			Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

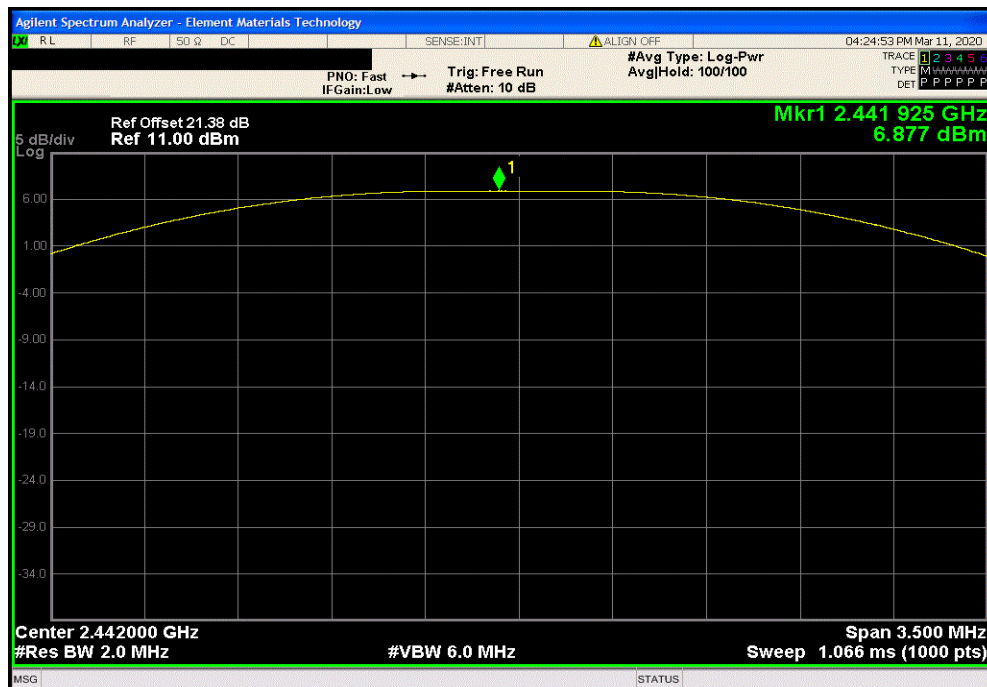


TbTx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK Low Channel, 2402 MHz						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	7.131	4.15	11.281	36	Pass	



BLE/GFSK Mid Channel, 2442 MHz						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	6.877	4.15	11.027	36	Pass	

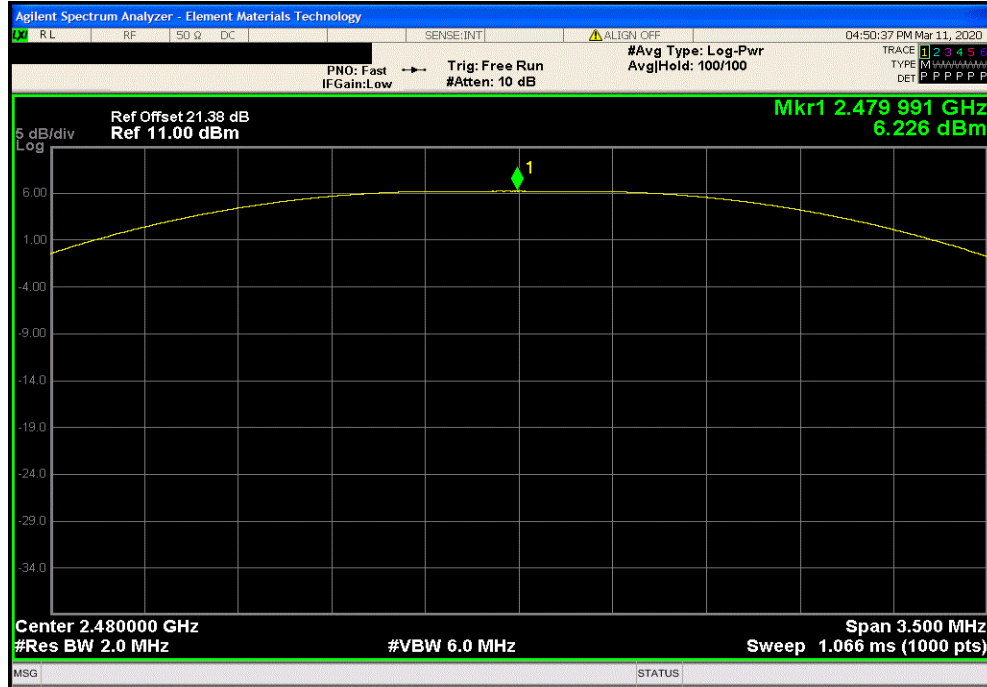


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



TbTx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK High Channel, 2480 MHz					
Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
6.226	4.15	10.376	36	Pass	



POWER SPECTRAL DENSITY



XMIT 2019.09.05

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-20
Cable	Micro-Coax	D150A-1-0720-200	EVK	29-Mar-19	29-Mar-20
Attenuator	S.M. Electronics	SA26B-20	AUY	28-Mar-19	28-Mar-20
Block - DC	Fairview Microwave	SD3379	AMW	28-Mar-19	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	13-Dec-19	13-Dec-20

TEST DESCRIPTION

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

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

POWER SPECTRAL DENSITY



TMTx 2019.08.30.0 XMI 2019.09.05

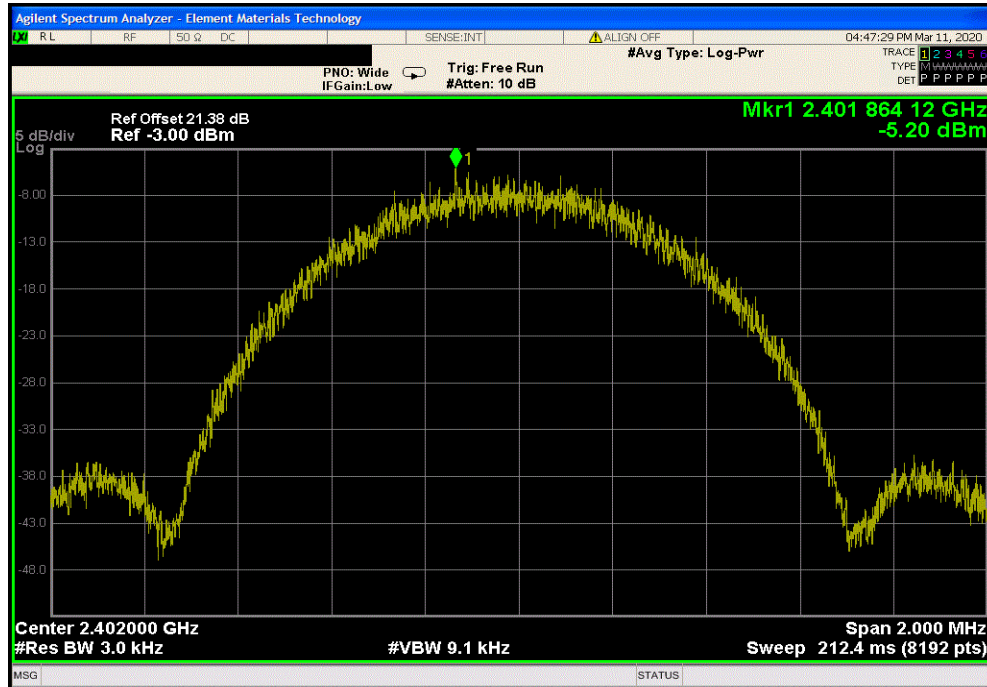
EUT: Router POE + backup li ion battery		Work Order: MEGR0002	
Serial Number: H110-T000020		Date: 11-Mar-20	
Customer: METER group		Temperature: 22.5 °C	
Attendees: None		Humidity: 35.6% RH	
Project: None		Barometric Pres.: 1027 mbar	
Tested by: Jeff Alcoka	Power: POE via 110VAC/60Hz	Job Site: EV06	
TEST SPECIFICATIONS			
FCC 15.247:2020		Test Method	
		ANSI C63.10:2013	
COMMENTS			
Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable. EUT was configured to the maximum power setting = 7			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	5	Signature 	
		Value dBm/3kHz	Limit < dBm/3kHz
BLE/GFSK Low Channel, 2402 MHz		-5.201	8
BLE/GFSK Mid Channel, 2442 MHz		-5.664	8
BLE/GFSK High Channel, 2480 MHz		-6.211	8
			Results
			Pass
			Pass
			Pass

POWER SPECTRAL DENSITY

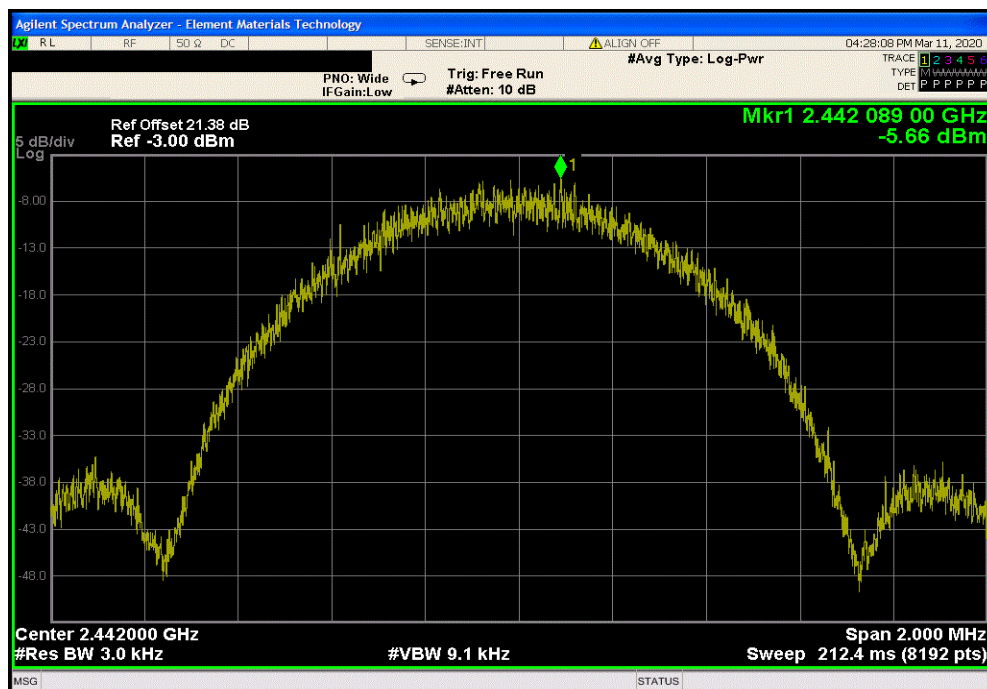


TbTx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK Low Channel, 2402 MHz						
	Value	Limit				
	dBm/3kHz	< dBm/3kHz	Results			
	-5.201	8	Pass			



BLE/GFSK Mid Channel, 2442 MHz						
	Value	Limit				
	dBm/3kHz	< dBm/3kHz	Results			
	-5.664	8	Pass			

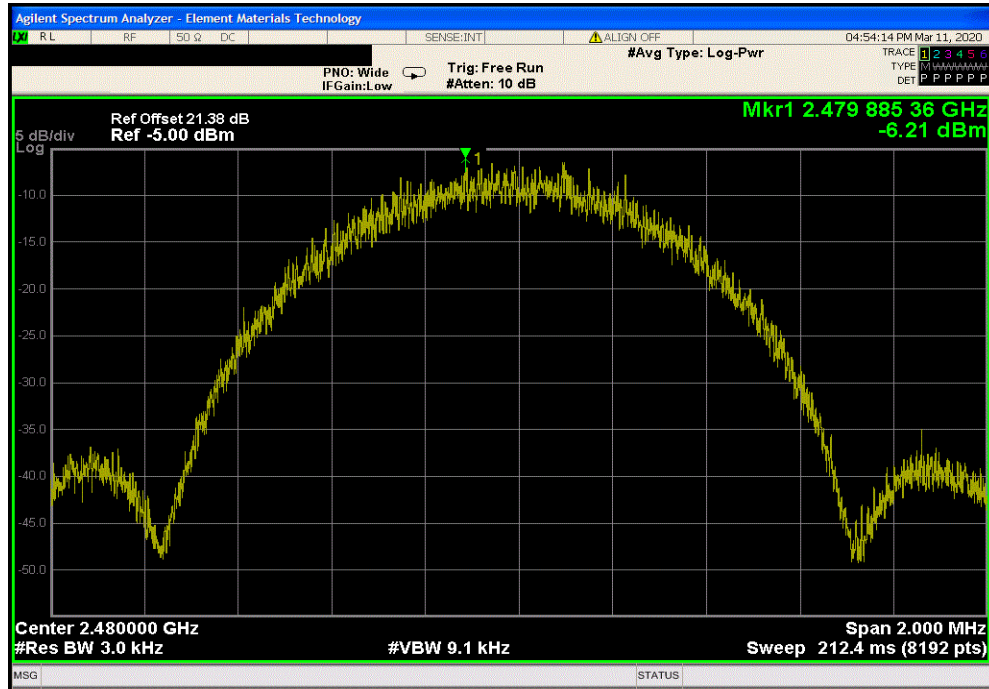


POWER SPECTRAL DENSITY



TbTx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK High Channel, 2480 MHz						
	Value	Limit				
	dBm/3kHz	< dBm/3kHz	Results			
	-6.211	8	Pass			



BAND EDGE COMPLIANCE



XMIT 2019.09.05

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-20
Cable	None	n Test Distance Ca	EVL	3-Feb-20	3-Feb-21
Attenuator	S.M. Electronics	SA26B-20	AUY	28-Mar-19	28-Mar-20
Block - DC	Fairview Microwave	SD3379	AMW	28-Mar-19	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	13-Dec-19	13-Dec-20

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



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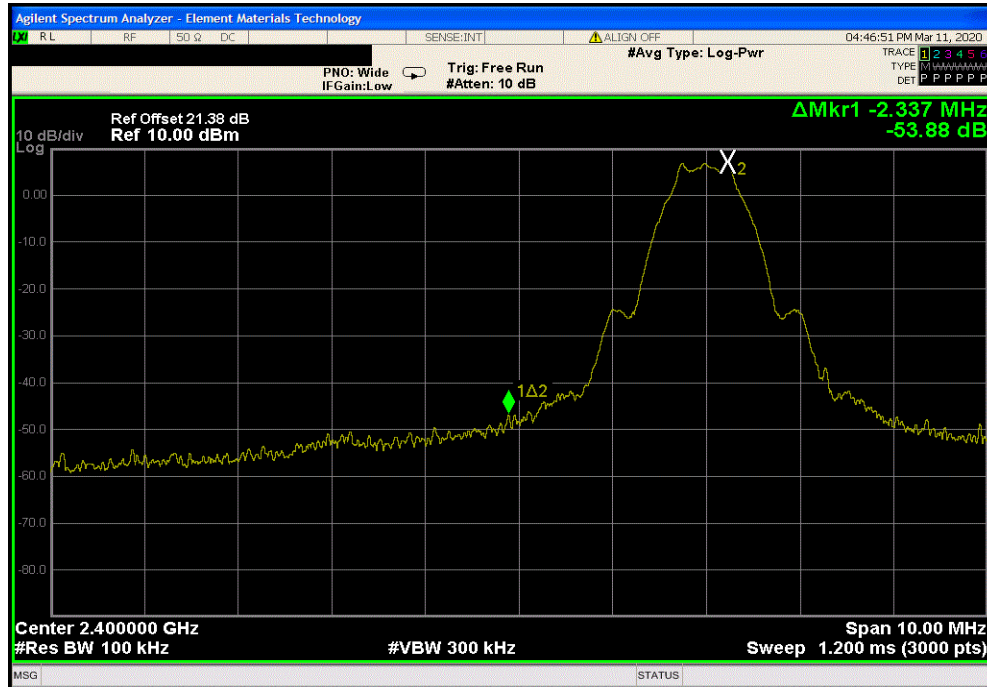
EUT: Router POE + backup li ion battery		Work Order: MEGR0002	
Serial Number: H110-T000020		Date: 11-Mar-20	
Customer: METER group		Temperature: 22.5 °C	
Attendees: None		Humidity: 35.5% RH	
Project: None		Barometric Pres.: 1027 mbar	
Tested by: Jeff Alcock	Power: POE via 110VAC/60Hz	Job Site: EV06	
TEST SPECIFICATIONS			
FCC 15.247:2020		Test Method	
		ANSI C63.10:2013	
COMMENTS			
Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable. EUT was configured to the maximum power setting = 7			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	5	Signature 	
		Value (dBc)	Limit ≤ (dBc) Result
BLE/GFSK Low Channel, 2402 MHz		-53.89	-20 Pass
BLE/GFSK High Channel, 2480 MHz		-58.64	-20 Pass

BAND EDGE COMPLIANCE

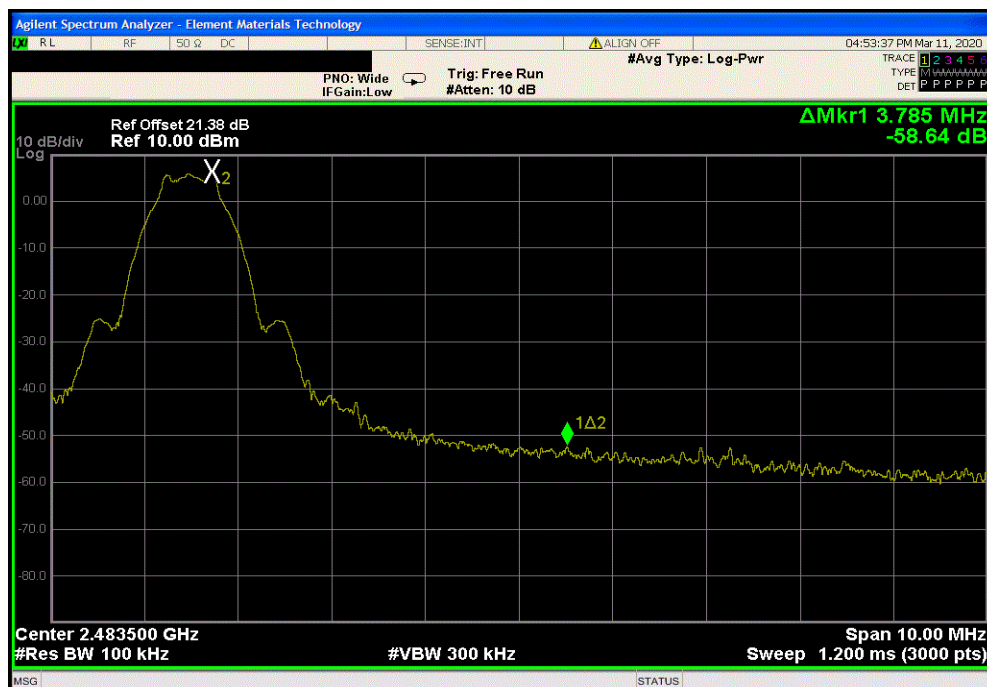


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BLE/GFSK Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-53.89	-20	Pass



BLE/GFSK High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-58.64	-20	Pass



SPURIOUS CONDUCTED EMISSIONS



XMIT 2019.09.05

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-20
Cable	Micro-Coax	D150A-1-0720-200	EVK	29-Mar-19	29-Mar-20
Attenuator	S.M. Electronics	SA26B-20	AUY	28-Mar-19	28-Mar-20
Block - DC	Fairview Microwave	SD3379	AMW	28-Mar-19	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	13-Dec-19	13-Dec-20

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.

SPURIOUS CONDUCTED EMISSIONS



TMTx 2019.08.30.0 XMM 2019.09.05

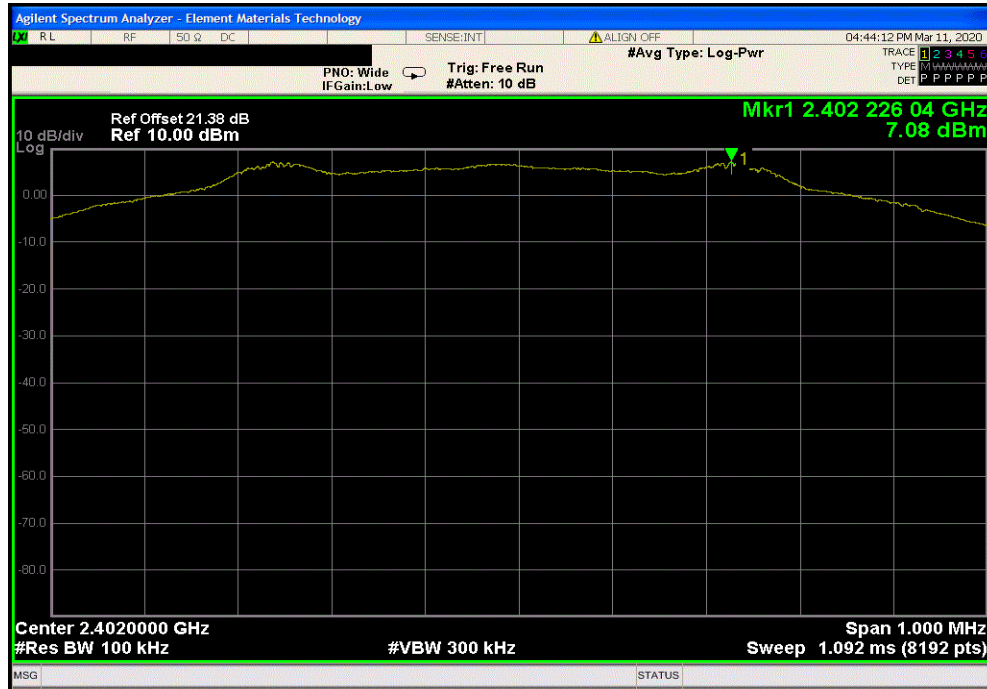
EUT: Router POE + backup li ion battery		Work Order: MEGR0002			
Serial Number: H110-T000020		Date: 11-Mar-20			
Customer: METER group		Temperature: 22.5 °C			
Attendees: None		Humidity: 35.2% RH			
Project: None		Barometric Pres.: 1027 mbar			
Tested by: Jeff Alcock	Power: POE via 110VAC/60Hz	Job Site: EV06			
TEST SPECIFICATIONS		Test Method			
FCC 15.247:2020		ANSI C63.10:2013			
COMMENTS					
Reference level offset includes: DC Block, 20 dB attenuator, and measurement cable. EUT was configured to the maximum power setting = 7					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	5	Signature			
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK Low Channel, 2402 MHz	Fundamental	2402.23	N/A	N/A	N/A
BLE/GFSK Low Channel, 2402 MHz	30 MHz - 12.5 GHz	2397.34	-59.85	-20	Pass
BLE/GFSK Low Channel, 2402 MHz	12.5 GHz - 25 GHz	23647.91	-58.63	-20	Pass
BLE/GFSK Mid Channel, 2442 MHz	Fundamental	2441.75	N/A	N/A	N/A
BLE/GFSK Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	3858.84	-59.66	-20	Pass
BLE/GFSK Mid Channel, 2442 MHz	12.5 GHz - 25 GHz	24130.14	-58.72	-20	Pass
BLE/GFSK High Channel, 2480 MHz	Fundamental	2480.22	N/A	N/A	N/A
BLE/GFSK High Channel, 2480 MHz	30 MHz - 12.5 GHz	3727.92	-59.5	-20	Pass
BLE/GFSK High Channel, 2480 MHz	12.5 GHz - 25 GHz	24468.93	-58.37	-20	Pass

SPURIOUS CONDUCTED EMISSIONS

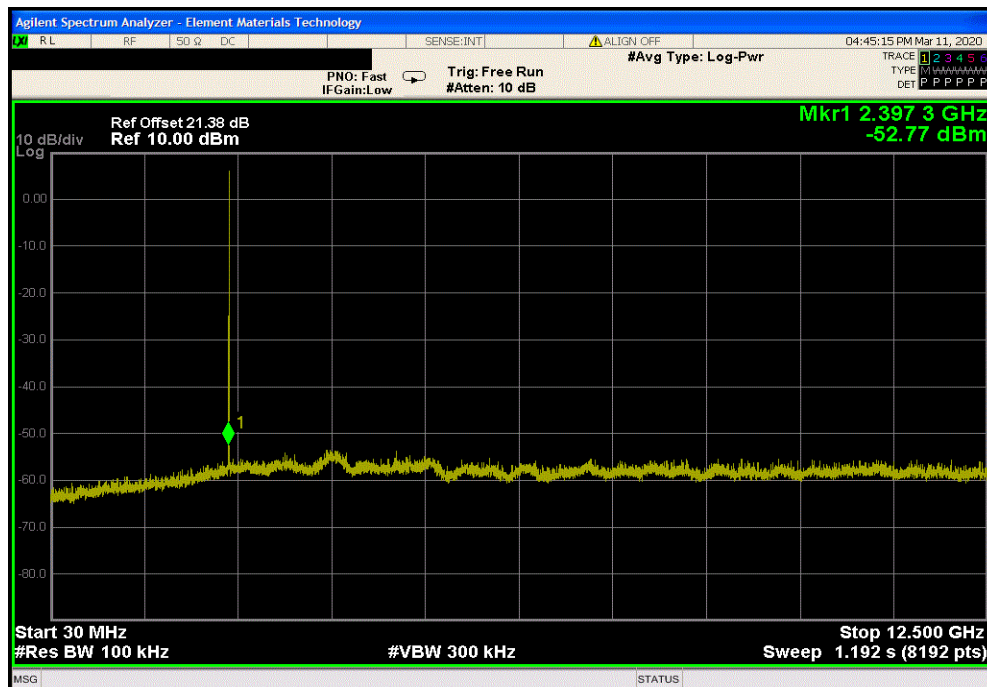


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BLE/GFSK Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2402.23	N/A	N/A	N/A	



BLE/GFSK Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	2397.34	-59.85	-20	Pass	

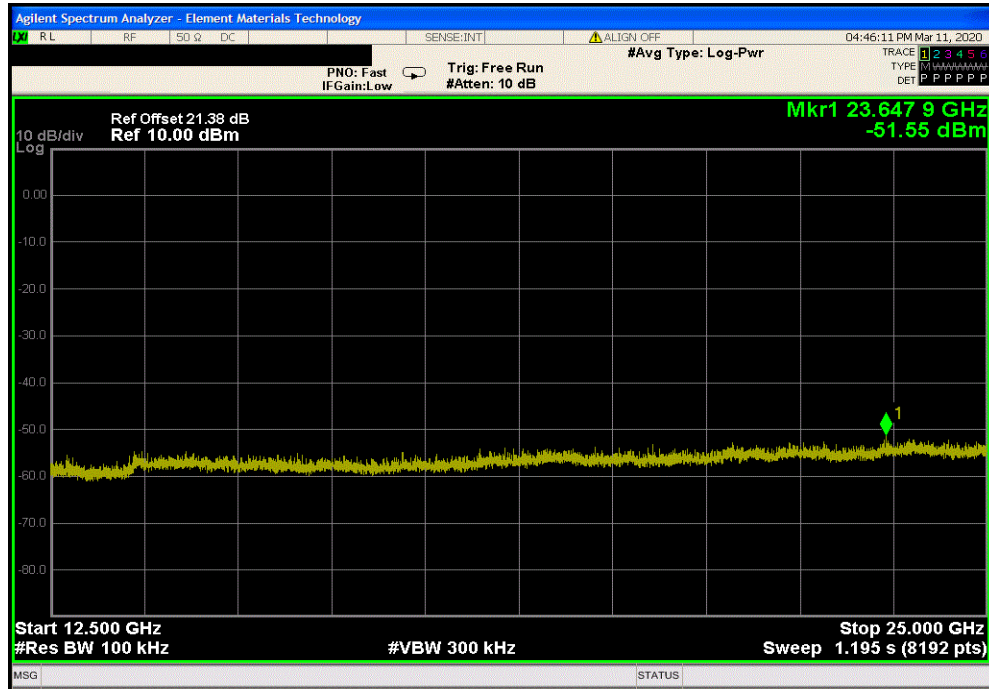


SPURIOUS CONDUCTED EMISSIONS

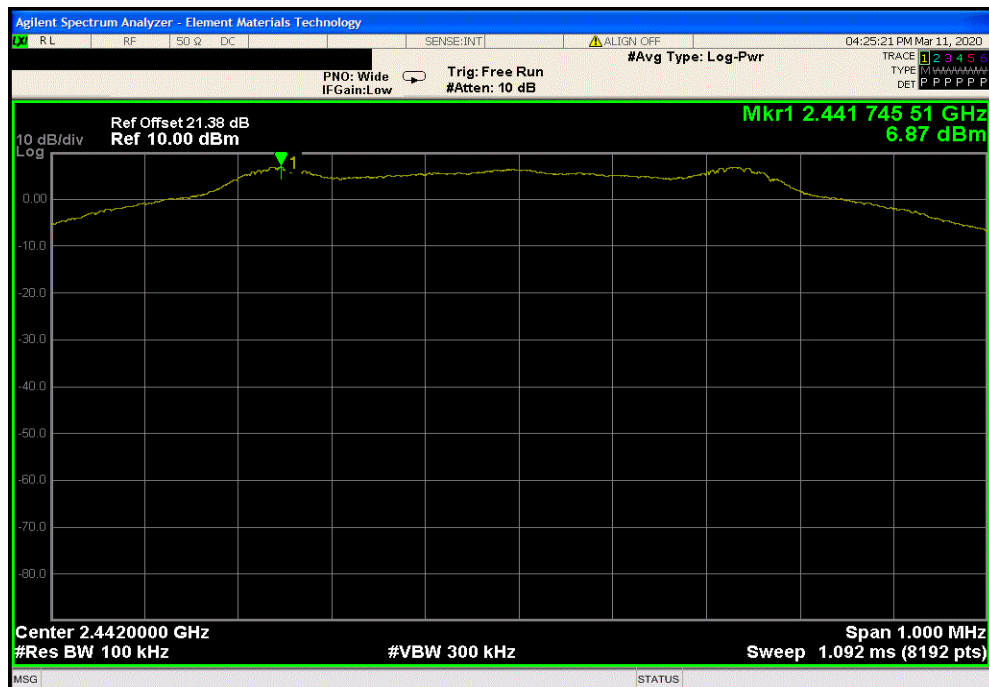


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BLE/GFSK Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	23647.91	-58.63	-20	Pass	



BLE/GFSK Mid Channel, 2442 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2441.75	N/A	N/A	N/A	

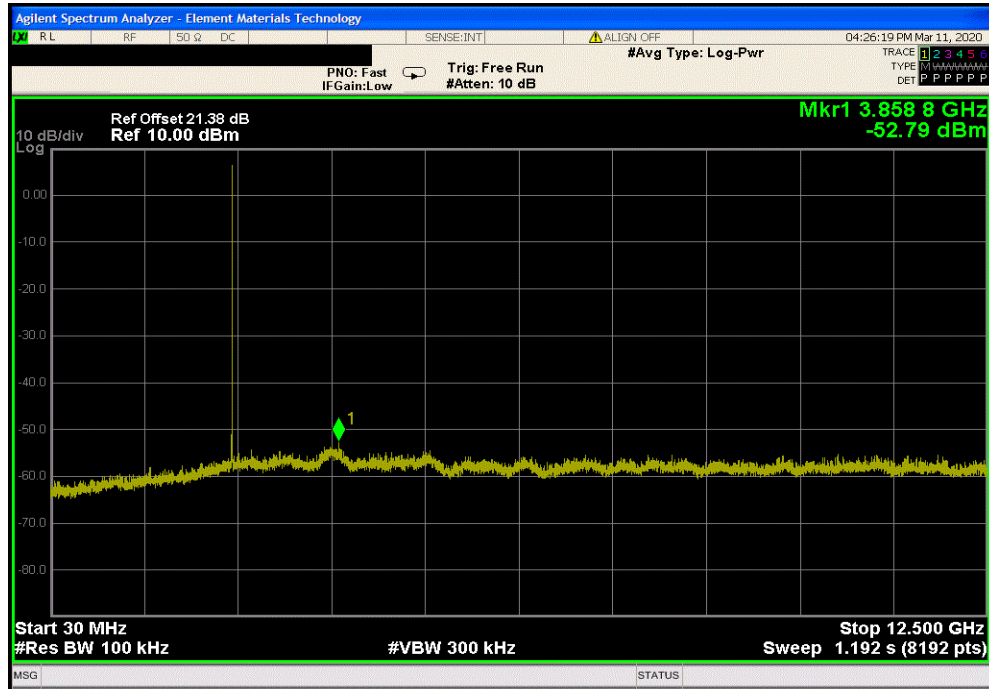


SPURIOUS CONDUCTED EMISSIONS

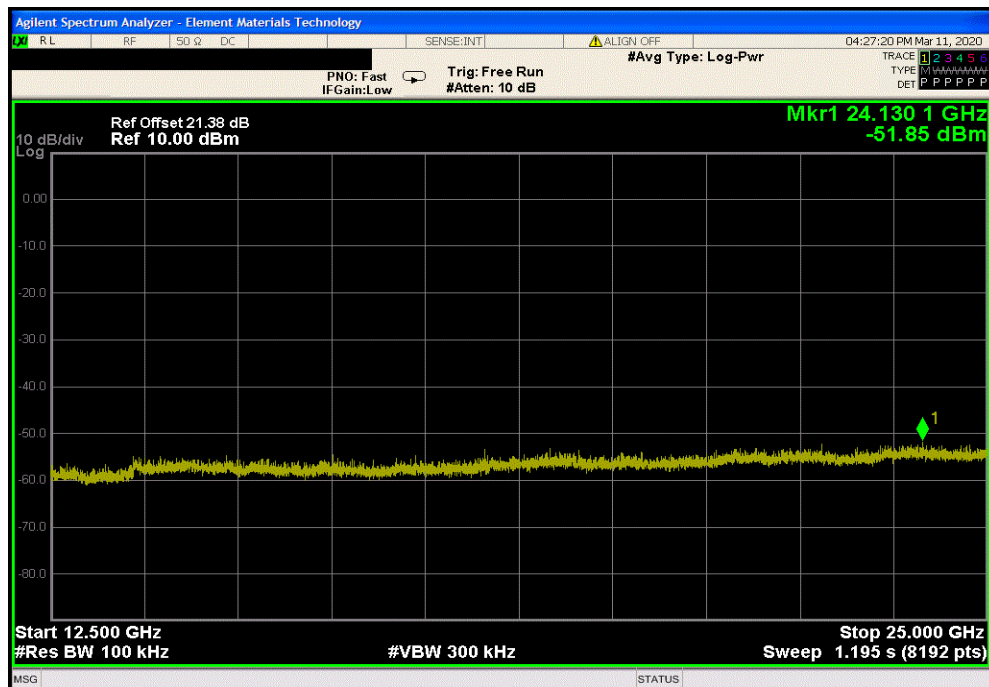


TbTx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK Mid Channel, 2442 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	3858.84	-59.66	-20	Pass	



BLE/GFSK Mid Channel, 2442 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24130.14	-58.72	-20	Pass	

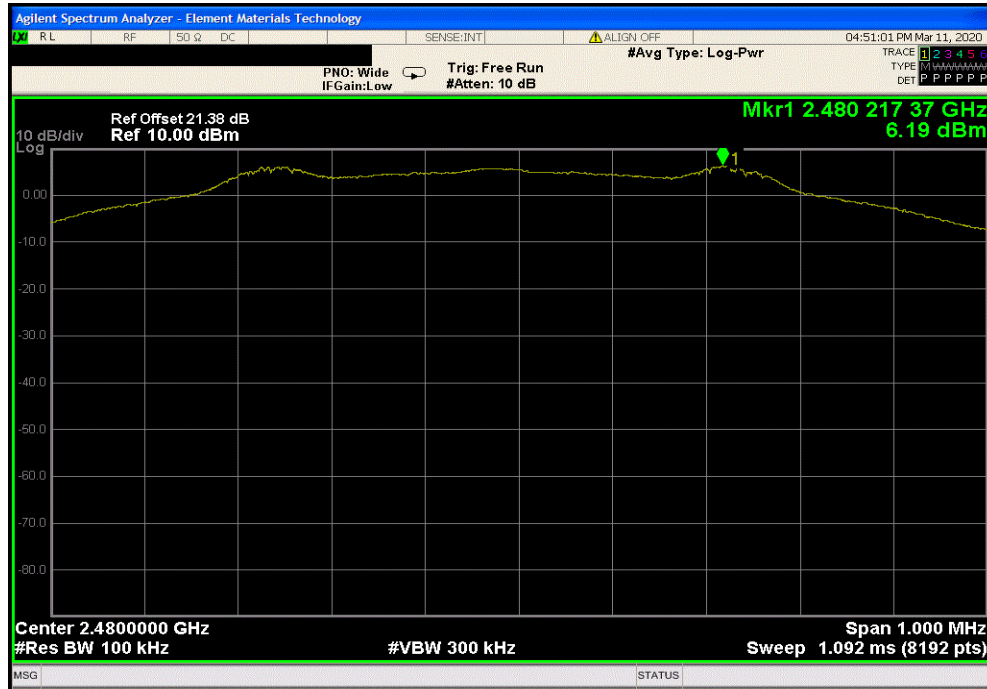


SPURIOUS CONDUCTED EMISSIONS

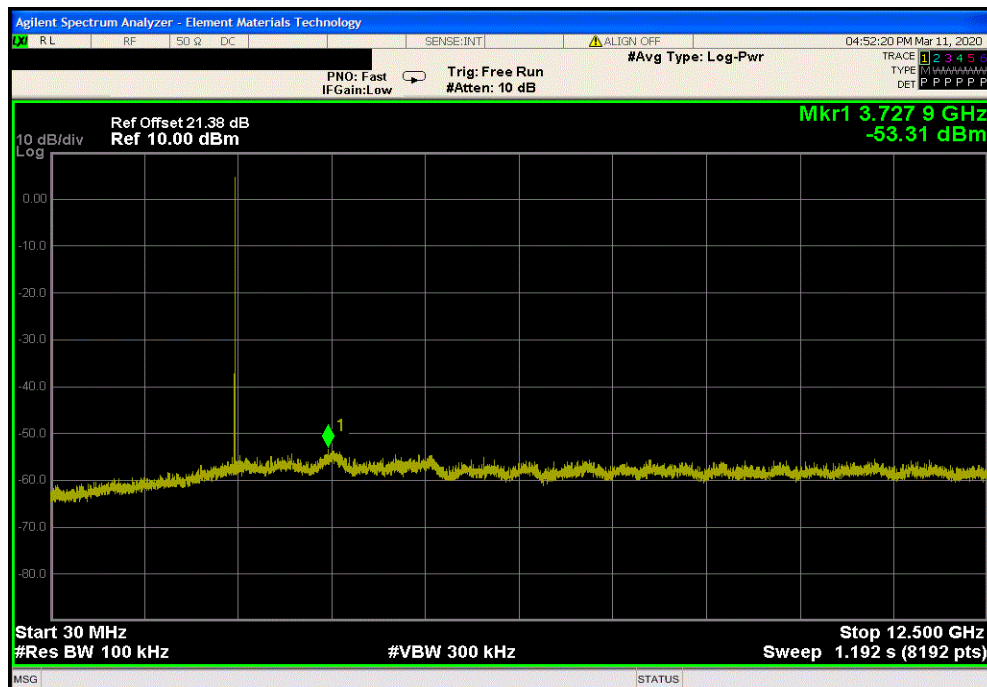


TbTtx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK High Channel, 2480 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2480.22	N/A	N/A	N/A		



BLE/GFSK High Channel, 2480 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	3727.92	-59.5	-20	Pass		



SPURIOUS CONDUCTED EMISSIONS



TbTx 2019.08.30.0 XMI 2019.09.05

BLE/GFSK High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24468.93	-58.37	-20	Pass	

