

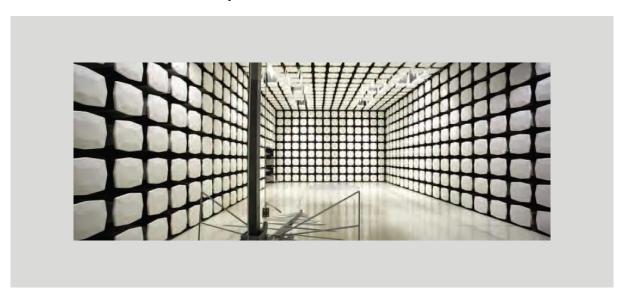
Masimo Corporation

AIR01 Receiver

FCC 15.247:2018

Bluetooth Low Energy (DTS) Radio

Report # MASI0519.3 Rev. 1







NVLAP LAB CODE: 200676-0

CERTIFICATE OF TEST



Last Date of Test: December 13, 2018
Masimo Corporation
Model: AIR01 Receiver

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2018	ANSI C63.10:2013, KDB 558074

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required for a battery powered EUT.
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	Equivalent Isotropic Radiated Power	Yes	Pass	
11.9.1.1	Output Power (EIRP)	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:

Victor Ratinoff, 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		
	Added EIRP results to certificate of test.	2019-11-24	2
	Added EIRP test date to modifications.	2019-11-24	10
01	Added DCCF to the measurements in Spurious Radiated Emissions.	2019-11-24	13-15
	Updated Output Power data by subtracting antenna gain from EIRP.	2019-11-24	28, 29
	In Output Power updated the radiated power measurement.	2019-11-26	28, 29

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). Certification chambers and Open Area Test Sites are filed with ISED.

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

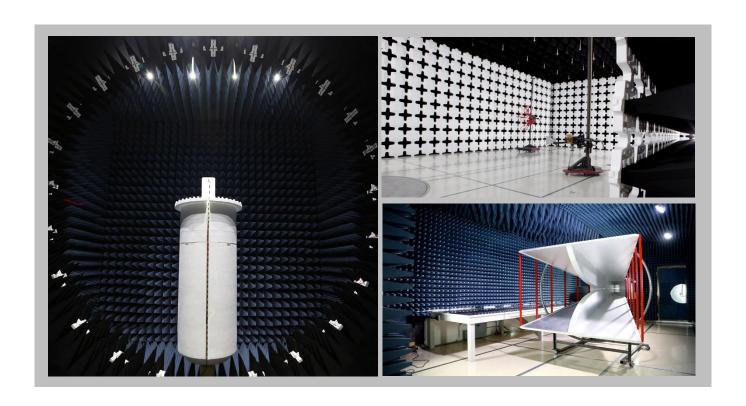
FACILITIES







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	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	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	
		NV	LAP			
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	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	N/A	2834D-1	2834G-1	2834F-1	
		BS	МІ			
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R	
	VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110	
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA						
US0158	US0175	N/A	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.

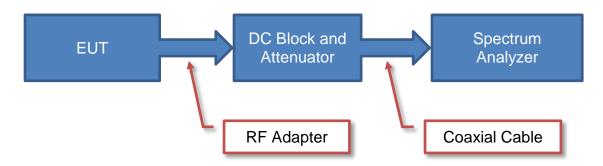
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

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)	5.1 dB	-5.1 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

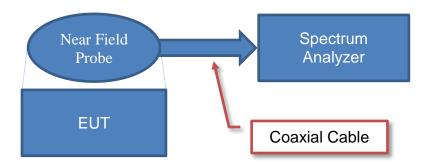
Test Setup Block Diagrams



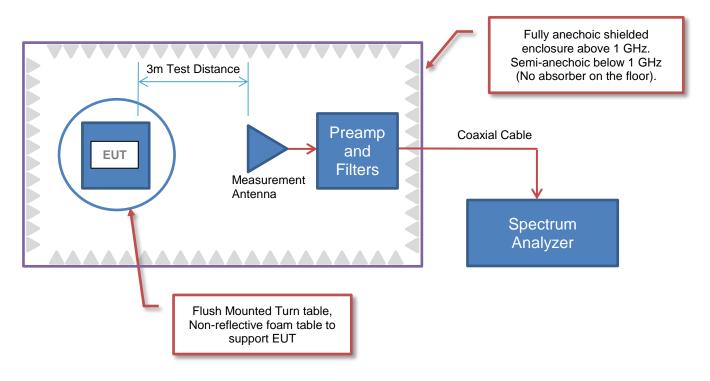
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION



Client and Equipment Under Test (EUT) Information

Company Name:	Masimo Corporation
Address:	52 Discovery
City, State, Zip:	Irvine, CA 92618
Test Requested By:	Anami Joshi
Model:	AIR01 Receiver
First Date of Test:	December 11, 2018
Last Date of Test:	December 13, 2018
Receipt Date of Samples:	December 10, 2018
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

AIR01 Technology Board snaps on to AIR01 Sensor (no cable). This assembly of AIR01 Technology Board and AIR01 Sensor is battery powered. This assembly connects to AIR01 Receiver over Bluetooth LE. AIR01 Receiver has a cable (less than 0.3m) that connects to patient port of Rad-97.

Testing Objective:

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

Client Supplied Information:

Channels	Power Setting	Data Rate	Modulation
Low	+4 dBm	1 Mbps	GFSK
Middle	+4 dBm	1 Mbps	GFSK
High	+4 dBm	1 Mbps	GFSK

Report No. MASI0519.3 Rev 1

CONFIGURATIONS



Configuration MASI0519- 2

Software/Firmware Running during test				
Description	Version			
AIR01 Receiver	v0001			

EUT					
Description	Manufacturer	Model/Part Number	Serial Number		
AIR01 Receiver	Masimo Corporation	26896 Rev A	RX-RF-1		

Peripherals in test setup boundary								
Description Manufacturer Model/Part Number Serial Number								
Host Laptop	Hewlett Packard	HSNIO4C	5CGB271JH4					
Host Laptop Power Adapter Masimo Corporation TPN-CAD6 1588-3003								

Cables						
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2	
Receiver Cable	No	0.15m	No	AIR01 Receiver	Unterminated	
USB Cable	Yes	1.8m	No	AIR01 Receiver	Host Laptop	
DC Cable	Yes	1.4m	No	Host Laptop	Host Laptop Power Adapter	
AC Cable	No	0.9m	No	Host Laptop Power Adapter	AC Mains	

MODIFICATIONS



Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2018-12-11	Output Power (EIRP)	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	2018-12-12	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.
3	2018-12-12	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	2018-12-12	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2018-12-12	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2018-12-13	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2018-12-13	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2018-12-13	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2018.07.27

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

Transmitting BLE: Low Ch (2402 MHz), Mid Ch (2440 MHz), High Ch (2480 MHz)

Transmitting BLE: Low Ch (2402 MHz), High Ch (2480 MHz)

POWER SETTINGS INVESTIGATED

USB via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

MASI0519 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz Stop Frequency 26000 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

1EST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Amplifier - Pre-Amplifier	Miteq	AM-1402	AOZ	10-Jul-2018	12 mo
Antenna - Biconilog	Teseq	CBL 6141A	AYE	7-Nov-2017	24 mo
Attenuator	Fairview Microwave	SA18H-20	TKQ	NCR	0 mo
Cable	Northwest EMC	8-18GHz RE Cables	OCO	6-Sep-2018	12 mo
Cable	Northwest EMC	18-26GHz RE Cables	OCK	27-Dec-2017	12 mo
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	6-Sep-2018	12 mo
Cable	Northwest EMC	10kHz-1GHz RE Cables	OCH	20-Sep-2018	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	HHX	16-Jul-2018	12 mo
Filter - High Pass	Micro-Tronics	HPM50108	HGP	25-Jan-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6-Sep-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	27-Dec-2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOF	7-Sep-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOE	7-Sep-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHR	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AHN	NCR	0 mo
Antenna - Double Ridge	EMCO	3115	AHB	28-Mar-2018	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	20-Nov-2018	12 mo

TEST DESCRIPTION

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

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

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

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

QP = Quasi-Peak Detector

PK = Peak Detector

AV = RMS Detector

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

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

Measurements 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).

SPURIOUS RADIATED EMISSIONS



PSA-ESCI 2018.07.27

EmiR5 2018.09.26

Project: None Temperature: 18.4 °C Job State OC10 Humidity: 55% R1H Tested by: Salvador Solorzano	3.0	laule Cualan	8440	10510		Data	40 D	2010			EmiR5 2018.09.26		PSA-ESCI 2018.07.27	, 1
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Serial Number: R. N. R. F. Barometric Pres. 1022 mbar Tested by: Salvador Solorzano									_			\geq		
EUT; AlROU Receiver Configuration: 22 Customer: Masimo Corporation Attendees: Masimo Corporation Coperating Mode: Transmitting BLE: Low Ch (2402 MHz), High Ch (2480 MHz) Deviations: None Comments:]
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Customer Masimo Corporation Masimo Corporation State 120/AC/60Hz USB visit USB vis				ceiver										_
Note Section Section														-
Deviations				•										-
Deviations Comments Test Method														_
Deviations De	Е	UT Power:												_
Comments	Opera	ting Mode:	Transmitti	ng BLE: Low	/ Ch (2402	MHz), High (Ch (2480 I	MHz)						
Test Method ANSI C63.10:2013 ANSI C63.10:2013		Deviations:	None											-
ANSI C63.10:2013	c	Comments:	DCCF add	ded to avera	ge data usi	ng formula 1	0*LOG(dc).						
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388.033 27.6 2.6 1.0 306.0 0.3 20.0 Vert AV 0.0 50.5 54.0 -3.5 Low Ch, EUT Vert 888.043 39.0 2.6 1.0 306.0 0.0 20.0 Vert PK 0.0 61.6 74.0 -12.4 Low Ch, EUT Vert 984.03 38.4 3.0 4.0 284.0 0.0 20.0 Vert PK 0.0 61.4 74.0 -12.6 High Ch, EUT Vert 189.390 38.7 2.6 1.0 134.0 0.0 20.0 Horz PK 0.0 61.3 74.0 -12.7 Low Ch, EUT on Side	2485.313	27.6	3.0	3.8	93.0	0.3	20.0	Horz	AV	0.0	50.9	54.0	-3.1	
388.043 39.0 2.6 1.0 306.0 0.0 20.0 Vert PK 0.0 61.6 74.0 -12.4 Low Ch, EUT Vert 484.343 38.4 3.0 4.0 284.0 0.0 20.0 Vert PK 0.0 61.4 74.0 -12.6 High Ch, EUT Vert 389.390 38.7 2.6 1.0 134.0 0.0 20.0 Horz PK 0.0 61.3 74.0 -12.7 Low Ch, EUT on Side	2388.747	27.6		1.0							50.5		-3.5	
484.343 38.4 3.0 4.0 284.0 0.0 20.0 Vert PK 0.0 61.4 74.0 -12.6 High Ch, EUT Vert 389.390 38.7 2.6 1.0 134.0 0.0 20.0 Horz PK 0.0 61.3 74.0 -12.7 Low Ch, EUT on Side	2388.033													
389.390 38.7 2.6 1.0 134.0 0.0 20.0 Horz PK 0.0 61.3 74.0 -12.7 Low Ch, EUT on Side	2388.043													
			2.0	4.0	284 0	0.0	20.0	Vert	PK	0.0	61 4	74.0	-12.6	High Ch FUT Vert
10F 220 20 4 2.0 2.0 02.0 0.0 0.0 20.0 Here DV 0.0 04.4 74.0 40.0 High Ch FHT an Cida														
485.320 38.1 3.0 3.8 93.0 0.0 20.0 Horz PK 0.0 61.1 74.0 -12.9 High Ch, EUT on Side	2484.343 2389.390	38.7	2.6	1.0	134.0	0.0	20.0	Horz	PK	0.0	61.3	74.0	-12.7	Low Ch, EUT on Side

SPURIOUS RADIATED EMISSIONS



Work Order: MASI0519						EmiR5 2018.09.26		PSA-ESCI 2018.07.27	_
Serial Number: RXFE-1 Barometric Pres.: 1022 mbar Tested by: Salvador Solorzano	Work Order		Date:	12-Dec-2018				2	
Serial Number: RX-RF-1 Barometric Pres.: 1022 mbar Tested by: Salvador Solorzano					Melon		5		
EUT: AIR01 Receiver Configuration: 2 Customer: Massimo Corporation Attendees: Nghi Nguyen EUT Power: USS via 120/VAC/60Hz Operating Mode: Deviations: Comments: Comments: Test Method CC 15.247:2018 Run # 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass 80 40 40 40 40 40 40 40 40 40					_				
Contiguration: 2 Customer; Massimo Corporation Attendees: Nghi Nguyen EUT Power; USB via 120VAC/60Hz Operating Mode: Transmitting BLE: Low Ch (2402 MHz), Mid Ch (2440 MHz), High Ch (2480 MHz) Deviations: None Comments: Dec Fadded to average data using formula 10*LOG(dc).			Barometric Pres.:	1022 mbar	Tested b	y: Salvador S	Solorzano		=
Autones Masimo Corporation									_
## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass ## 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Pass Pass	Configuration	2							_
Deviations: Comments: Comments: Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass Run # 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass 80 40 30 40 40 30 40 40 30 40 40 40 40 40 40 40 40 40 40 40 40 40									_
Deviations: Comments: Comments: Test Method ANSI C63.10:2013 Run # 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass 80 40 40 40 40 MHz), Mid Ch (2440 MHz), High Ch (2480 MHz)									_
Deviations: Deviations DCCF added to average data using formula 10°LOG(dc).	EUT Power								_
Deviations: Comments: Comments: DCCF added to average data using formula 10*LOG(dc).	perating Mode	Transmitting BLE: Lo	ow Ch (2402 MHz), Mid (Ch (2440 MHz), High	Ch (2480 MHz)				
Comments: DCCF added to average data using formula 10*LOG(dc).									_
Run # 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass	Deviations	None							
Run # 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass			and determined to the	10*1.00(-1.)					-
Test Method CC 15.247:2018 ANSI C63.10:2013 ANSI C63.10:2013 ANSI C63.10:2013 ANSI C63.10:2013 ANSI C63.10:2013 Antenna Height(s) 1 to 4(m) Results Pass	0		age data using tormula '	10^LOG(dc).					
Run # 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass 80	Comments								
Run # 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass 80		<u></u>							
Run # 15 Test Distance (m) 3 Antenna Height(s) 1 to 4(m) Results Pass 80				Test Meth	od				_
80 70 60 50 30 20	15.247:2018	<u> </u>		ANSI C63	.10:2013				
80 70 60 40 30 20		T. (C)		11-1-14(2)			· -	.	_
70 60 50 30 20	un # 15	Test Distance (m)	3 Antenna	Height(s)	1 to 4(m)	Results	j P	'ass	_
70 60 50 30 20									
70 60 50 30 20	80							$\perp \perp \perp$	
60 50 30 20									
60 50 30 20							- 		
60 50 30 20	70								
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80 40 30 20									
30 20	60							+	
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30 20	50								
30 20				+++	🔻 👞				
30 20	40								
30 20	40								
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10	20					1		+++	
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	40								
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	0								
10 100 1000 10000 100000		100)	1000	10000			100000	
MHz		100			10000			,00000	
MITZ ■ PK ◆ AV • QP				IVITIZ		■ PK	◆ AV	QP	
Duty Cycle Polarity/			Duty Cyclo	Polarity/					
Correction External Transducer Distance Compared to			Correction	External Transducer					
Freq Amplitude Factor Antenna Height Azimuth Factor Attenuation Type Detector Adjustment Adjustment Adjustment Adjustment			t Azimuth Factor	Attenuation Type					
(MHz) (dBuV) (dB) (meters) (degrees) (dB) (dB) (dB) (dB) (dB) (dB) (dBuV/m) (dBuV/m) (dB)	Hz) (dBuV)	(dB) (meters)	(degrees) (dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Comments
	758 343	17.3 1.5	167.0 0.3	0.0 Horz	AV 00	51.9	54.0	-21	Mid Ch, EU
									Mid Ch, El
									Mid Ch, EL
960.215 34.4 12.5 1.0 103.0 0.3 0.0 Vert AV 0.0 47.2 54.0 -6.8 H	0.215 34.4	12.5 1.0	103.0 0.3	0.0 Vert	AV 0.0	47.2	54.0	-6.8	High Ch, E
									Mid Ch, EL
	9.933 42.1								Mid Ch, EU
(321.375 41.8 17.3 1.0 55.0 0.0 0.0 Vert PK 0.0 59.1 74.0 -14.9 № 1804.300 26.3 11.3 1.2 283.0 0.3 0.0 Vert AV 0.0 37.9 54.0 -16.1 №	1.3/5 41.8	17.3 1.0		u.u vert	PK 0.0		74.0	-14.9	Mid Ch, EU

11.3

11.3

-3.4

12.1

12.5

-3.4

12.1

11.3

11.3

-5.3

1.2

1.6

1.0

1.0

1.0

1.0

1.2

1.0

283.0

224.0 324.0

105.0

103.0

349.0

168.0

224.0

283.0

244.0

0.3

0.3 0.3 0.0

0.0

0.3

0.0

0.0

0.0

0.3

0.0

0.0

0.0

0.0

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Vert

Horz

Horz

Vert

Vert

Vert

Horz

Horz

Vert

Vert

 AV

AV AV

PK

PK

ΑV

PK

PK

PΚ

ΑV

0.0

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0.0

0.0

0.0

0.0

0.0

0.0

0.0

37.9

37.9

36.0

55.5

54.1

33.8

52.9

48.9

48.3

28.2

54.0

54.0

54.0

74.0

74.0

54.0

74.0

74.0

74.0

54.0

-16.1

-16.1

-18.0

-18.5

-19.9

-20.2

-21.1

-25.1

-25.7

-25.8

4804.300

4804.800

12399.260

4880.710

4960.605

12399.240

4879.400

4803.425

4804.560

11998.930

26.3

26.3

39.1

43.4

41.6

36.9

40.8

37.6

37.0

33.2

Low Ch, EUT Vert

High Ch, EUT Vert

Low Ch, EUT on Side

High Ch, EUT on Side Mid Ch, EUT Vert

High Ch, EUT on Side

Mid Ch, EUT on Side

Low Ch, EUT on Side

Low Ch, EUT Vert

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
12008.500	33.3	-5.4	3.7	331.0	0.3	0.0	Horz	AV	0.0	28.2	54.0	-25.8	Low Ch, EUT on Side
11999.050	33.1	-5.3	2.2	164.0	0.3	0.0	Horz	AV	0.0	28.1	54.0	-25.9	Mid Ch, EUT on Side
12009.420	33.1	-5.4	1.0	216.0	0.3	0.0	Vert	AV	0.0	28.0	54.0	-26.0	Low Ch, EUT Vert
12399.020	47.6	-3.4	1.0	324.0	0.0	0.0	Horz	PK	0.0	44.2	74.0	-29.8	High Ch, EUT on Side
12399.180	46.6	-3.4	1.0	349.0	0.0	0.0	Vert	PK	0.0	43.2	74.0	-30.8	High Ch, EUT on Side
19217.400	24.9	-3.9	1.5	216.0	0.3	0.0	Horz	AV	0.0	21.3	54.0	-32.7	Low Ch, EUT on Side
19217.510	24.9	-3.9	1.5	56.0	0.3	0.0	Vert	AV	0.0	21.3	54.0	-32.7	Low Ch, EUT Vert
12009.100	44.6	-5.4	3.7	331.0	0.0	0.0	Horz	PK	0.0	39.2	74.0	-34.8	Low Ch, EUT on Side
12009.570	44.6	-5.4	1.0	216.0	0.0	0.0	Vert	PK	0.0	39.2	74.0	-34.8	Low Ch, EUT Vert
12001.160	44.0	-5.4	1.0	244.0	0.0	0.0	Vert	PK	0.0	38.6	74.0	-35.4	Mid Ch, EUT Vert
11998.550	43.6	-5.3	2.2	164.0	0.0	0.0	Horz	PK	0.0	38.3	74.0	-35.7	Mid Ch, EUT on Side
19213.990	35.7	-3.9	1.5	216.0	0.0	0.0	Horz	PK	0.0	31.8	74.0	-42.2	Low Ch, EUT on Side
19218.270	35.3	-3.9	1.5	56.0	0.0	0.0	Vert	PK	0.0	31.4	74.0	-42.6	Low Ch, EUT Vert



XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	SA18H-20	TKQ	12-Jul-18	12-Jul-19
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6-Sep-18	6-Sep-19
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	6-Sep-18	6-Sep-19
Antenna - Double Ridge	EMCO	3115	AHB	28-Mar-18	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	20-Nov-18	20-Nov-19

TEST DESCRIPTION

The measurement was made in a radiated configuration of the fundamental with the carrier fully maximized for its highest radiated power. 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.

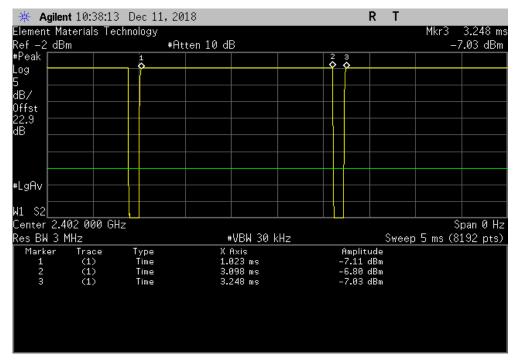
If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.



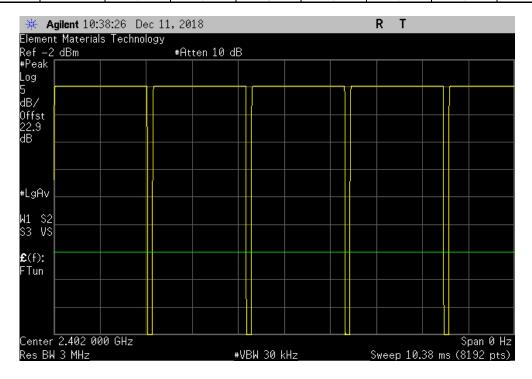
EUT: AIR01 Receiver
Serial Number: RX-RF-1
Customer: Masimo Corporation
Attendees: Nghi Nguyen
Project: None
Tested by: Salvador Solorzano
TEST SPECIFICATIONS Work Order: MASI0519
Date: 12-Dec-18
Temperature: 20.5 °C Humidity: 49.9% RH Barometric Pres.: 1021 mbar Power: USB via 120VAC/60Hz Test Method Job Site: OC10 FCC 15.247:2018 COMMENTS Total offset accounts for Antenna Gain, Cable Loss, 20dB Attenuator, and Pre-Amp Gain. Low Ch - 22.9dB, Mid Ch - 22.9dB, & High Ch - 23.1dB EUT Worst Case Orientation = Vertical DEVIATIONS FROM TEST STANDARD Configuration # 2 Signature **Value** (%) 93.2 Number of Pulses Pulse Width Period 2.225 ms Results **(%)** N/A BLE/GFSK Low Channel, 2402 MHz N/A N/A N/A BLE/GFSK Low Channel, 2402 MHz BLE/GFSK Mid Channel, 2440 MHz BLE/GFSK Mid Channel, 2440 MHz N/A 2.223 ms N/A N/A N/A N/A N/A N/A 2.075 ms 93.4 N/A 2.221 ms N/A 5 1 N/A BLE/GFSK High Channel, 2480 MHz 2.077 ms 93.5 N/A BLE/GFSK High Channel, 2480 MHz N/A N/A N/A N/A



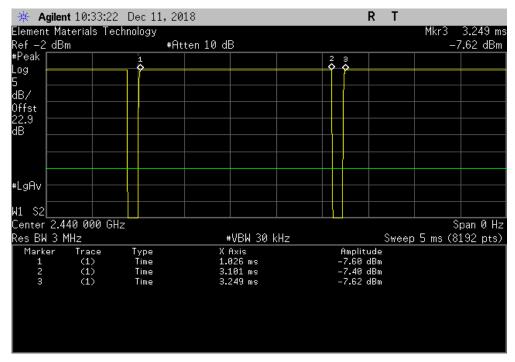
BLE/GFSK Low Channel, 2402 MHz	Number of Value	Limit			
Pulse Width	Period	Pulses	(%)	(%)	Results
2.074 ms	2.225 ms	1	93.2	N/A	N/A



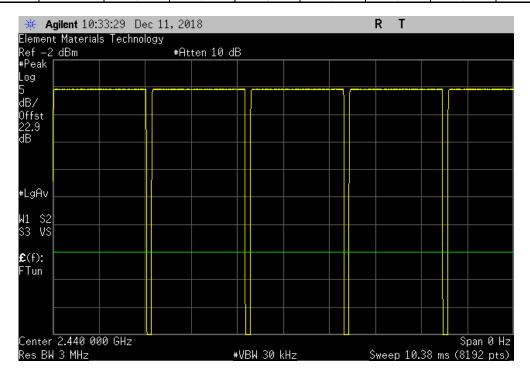
		BLE/GFS	K Low Channel, 2	2402 MHz		
			Number of	Value	Limit	
	 Pulse Width	Period	Pulses	(%)	(%)	Results
i	N/A	N/A	5	N/A	N/A	N/A





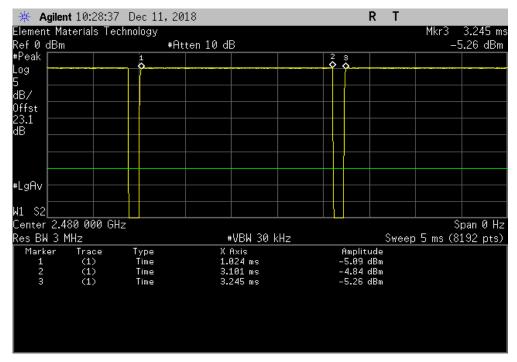


		BLE/GFS	K Mid Channel, 2	2440 MHz		
			Number of	Value	Limit	
	Pulse Width	Period	Pulses	(%)	(%)	Results
	N/A	N/A	5	N/A	N/A	N/A

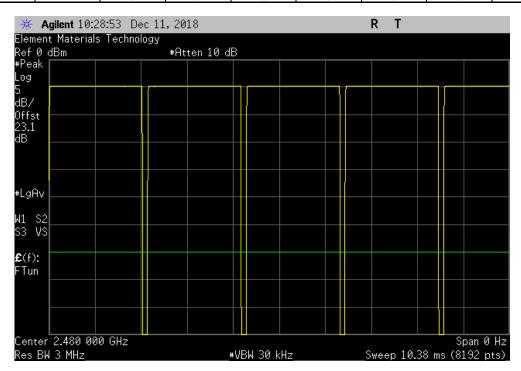




BLE/GFSK High Channel, 2480 MHz							
			Number of	Value	Limit		
	Pulse Width	Period	Pulses	(%)	(%)	Results	
	2.077 ms	2.221 ms	1	93.5	N/A	N/A	



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





XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	SA18H-20	TKQ	12-Jul-18	12-Jul-19
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6-Sep-18	6-Sep-19
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	6-Sep-18	6-Sep-19
Antenna - Double Ridge	EMCO	3115	AHB	28-Mar-18	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	20-Nov-18	20-Nov-19

TEST DESCRIPTION

The measurement was made in a radiated configuration of the fundamental with the carrier fully maximized for its highest radiated power. 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 2017.12.13
EUT: A	IR01 Receiver				Work Order:	MASI0519	
Serial Number: R	XX-RF-1				Date:	12-Dec-18	
Customer: N	Masimo Corporation				Temperature:	20.5 °C	
Attendees: N	lghi Nguyen				Humidity:	49.9% RH	
Project: N	lone				Barometric Pres.:	1021 mbar	
Tested by: S	Salvador Solorzano		Power:	USB via 120VAC/60Hz	Job Site:	OC10	
TEST SPECIFICATIO	NS			Test Method			
FCC 15.247:2018				ANSI C63.10:2013			
COMMENTS							
EUT Worst Case Orie	entation = Vertical	Loss, 20dB Attenuator, and Pre-Amp	p Gain. Low Ch - 2	2.9dB, Mid Ch - 22.9dB, & High Ch -	23.1dB		
DEVIATIONS FROM	TEST STANDARD						
None							
Configuration #	2	Signature		5			
						Limit	
					Value	(≥)	Result
BLE/GFSK Low Chang	nel, 2402 MHz				710.175 kHz	500 kHz	Pass
BLE/GFSK Mid Chann	nel, 2440 MHz				700.012 kHz	500 kHz	Pass
BLE/GFSK High Chan	nel, 2480 MHz				705.160 kHz	500 kHz	Pass

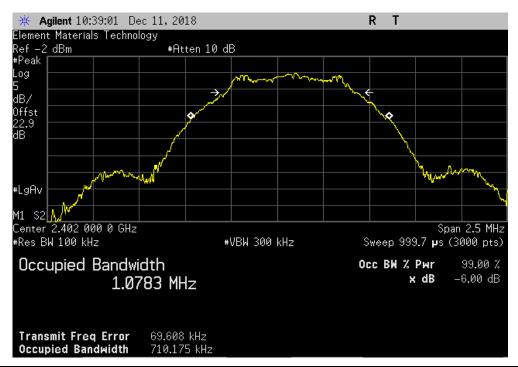


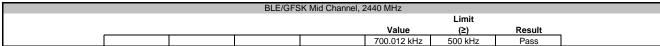
BLE/GFSK Low Channel, 2402 MHz

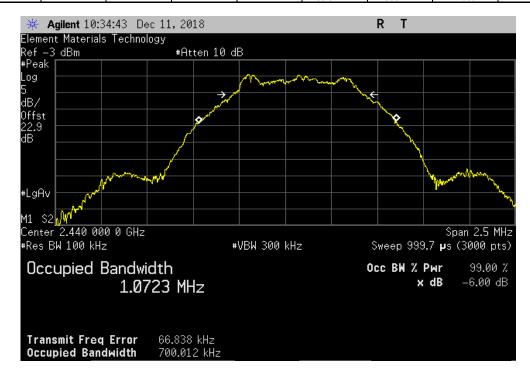
Limit

Value (≥) Result

710.175 kHz 500 kHz Pass







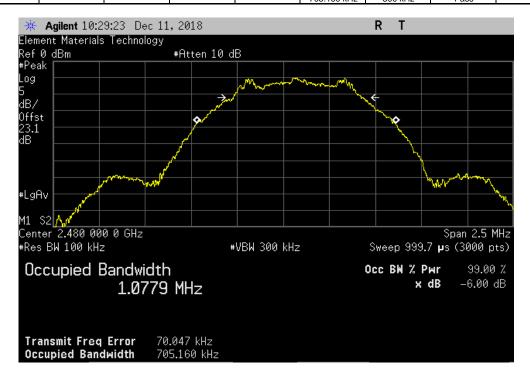


BLE/GFSK High Channel, 2480 MHz

Limit

Value (2) Result

705.160 kHz 500 kHz Pass



EFFECTIVE ISOTROPIC RADIATED POWER



PSA-ESCI 2018.07.27

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

Low Ch 2402 MHz, Mid Ch 2440 MHz, High Ch 2480 MHz

POWER SETTINGS INVESTIGATED

USB via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

MASI0519 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency 2400 MHz	Stop Frequency	2483.5 MHz
Start Frequency [2400 MHz	Stop Frequency	[2403.3 IVITZ

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna - Double Ridge	EMCO	3115	AHB	28-Mar-2018	24 mo
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	6-Sep-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6-Sep-2018	12 mo
Attenuator	Fairview Microwave	SA18H-20	TKQ	NCR	0 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	20-Nov-2018	12 mo

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. A field strength measurement was made of the fundamental with the carrier fully maximized for its highest radiated power.

The final data was converted from field strength to a radiated power value using equations found in ANSI C63.10:2013 Annex G.2

EFFECTIVE ISOTROPIC RADIATED POWER



Wol	rk Order	: MAS	SI0519		Date:	12-De	c-2018					5 2018.09.26	_	PSA-ESCI 20
	Project		lone	Ter	nperature:	20.9			1	11	_	-	1	
	Job Site	: 0	C10		Humidity:		% RH	_)	
	Number		-RF-1	Barome	etric Pres.:		mbar		Te	sted by	: Salv	ador Sol	lorzano	
Cornar		: AIR01 Re		Dai onii		1021	mour			otou by	· Carv	440. 00.	IOIZAIIO	
Confid	guration	. 2	300.110.											
			Corporation											
		: Nghi Ngu												
EU	i Power	: USB via	120VAC/60H	1Z										
Operatir	ng Mode	•	2402 MHz, M	lid Ch 2440	MHz, High C	Ch 2480 M	Hz							
De	viations													
Co	mments	None :												
est Specif	ications						Test Met	hod						
CC 15.247	:2018	•					ANSI C6		13					
Run#	22	Test D	istance (m)	3	Antenna	Height(s)		1 to 4	4(m)		Re	esults	F	Pass
40 —														
20														
30														
					1 1 1					1 1 1				1 1 1
20 +														
20														
20														
10 —														
10														
10														
10 —														
	-													
10 —														
10 — BB 0 —	3													
10 —	3					:								
10 — BB 0 —	-					:								
10 — EBB 0 —	-					:								
10 — E89 0 — -10 —	-					•								
10 — BB 0 —	-					•								
10 — E89 0 — -10 —														
10						•								
10 - Egg 0 - 10 - 20 - 30						•								
10	0	2410	2420	2	430	2440	24	50	24	160	2	2470	2.	480
10	0	2410	2420	2	430	2440	24	50	24	160				
10 - Egg 0 - 10 - 20 - 30	0	2410	2420	2	430	•	24	50	24	160				480 • QF
10	0	2410	2420	2 Polarity/	430	2440	24:	50	24	160				

Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
 2479.843	1.5	254.0	Vert	PK	1.85E-03	2.7	36.0	-33.3	High Ch, EUT Vert
2401.827	1.0	226.0	Vert	PK	1.61E-03	2.1	36.0	-33.9	Low Ch, EUT Vert
2480.307	1.0	275.0	Horz	PK	1.57E-03	2.0	36.0	-34.0	High Ch, EUT Horz
2440.313	1.3	299.0	Vert	PK	1.31E-03	1.2	36.0	-34.8	Mid Ch, EUT Vert
2480.310	1.5	136.0	Horz	PK	1.14E-03	0.6	36.0	-35.4	High CH, EUT on Side

Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
2440.080	1.0	266.0	Horz	PK	1.09E-03	0.4	36.0	-35.6	Mid Ch, EUT Horz
2402.307	1.5	174.0	Horz	PK	1.02E-03	0.1	36.0	-35.9	Low CH, EUT on Side
2401.830	1.0	158.0	Vert	PK	6.56E-04	-1.8	36.0	-37.8	Low Ch, EUT Horz
2479.817	1.0	205.0	Horz	PK	6.27E-04	-2.0	36.0	-38.0	High Ch, EUT Vert
2439.810	1.5	139.0	Horz	PK	6.13E-04	-2.1	36.0	-38.1	Mid Ch, EUT on Side
2401.790	1.5	224.0	Horz	PK	5.85E-04	-2.3	36.0	-38.3	Low Ch, EUT Horz
2402.337	1.6	206.0	Horz	PK	2.67E-04	-5.7	36.0	-41.7	Low Ch, EUT Vert
2439.837	1.5	205.0	Horz	PK	2.55E-04	-5.9	36.0	-41.9	Mid Ch, EUT Vert
2401.797	1.5	94.0	Vert	PK	2.50E-04	-6.0	36.0	-42.0	Low CH, EUT on Side
2440.343	1.5	134.0	Vert	PK	2.22E-04	-6.5	36.0	-42.5	Mid Ch, EUT Horz
2480.300	1.5	133.0	Vert	PK	2.08E-04	-6.8	36.0	-42.8	High Ch, EUT Horz
2479.837	1.5	105.0	Vert	PK	1.94E-04	-7.1	36.0	-43.1	High CH, EUT on Side
2440.360	1.5	51.0	Vert	PK	1.85E-04	-7.3	36.0	-43.3	Mid Ch, EUT on Side

OUTPUT POWER



PSA-ESCI 2018.07.27

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

Low Ch 2402 MHz, Mid Ch 2440 MHz, High Ch 2480 MHz

POWER SETTINGS INVESTIGATED

USB via 120VAC/60Hz

CONFIGURATIONS INVESTIGATED

MASI0519 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency 2400 MHz	Stop Frequency	2483.5 MHz
Start Frequency [2400 MHz	Stop Frequency	[2403.3 IVITZ

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna - Double Ridge	EMCO	3115	AHB	28-Mar-2018	24 mo
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	6-Sep-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6-Sep-2018	12 mo
Attenuator	Fairview Microwave	SA18H-20	TKQ	NCR	0 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	20-Nov-2018	12 mo

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. A field strength measurement was made of the fundamental with the carrier fully maximized for its highest radiated power.

The final data was converted from field strength to a radiated power value using equations found in ANSI C63.10:2013 Annex G.2

OUTPUT POWER



										F-:DE 2049 00 20	PSA-ESCI 2018.07.27
W	ork Order:	MASI	0519		Date:	12-De	c-2018		//	EIIIR3 2018.09.26	PSA-ESC12018.07.27
	Project:			Ten	nperature:	20.	9 °C	1	del		5
	Job Site:		10		Humidity:	55.9	% RH				
Seria	al Number:				tric Pres.:		mbar		Tested by:	Salvador S	Solorzano
	EUT:	AIR01 Rece	eiver		'				-	L	
Con	figuration:	2									
		Masimo Co									
	Attendees:	Nghi Nguye	n								
Е	UT Power:	USB via 12	0VAC/60H	Z							
Opera	ting Mode:	Low Ch 240	02 MHz, M	id Ch 2440	MHz, High	Ch 2480 M	Hz				
Орега	ting wode.										
	Deviations:	None									
		None									
C	Comments:										
Test Spec	cifications						Test Meth	od			
FCC 15.24	47:2018						ANSI C63.	.10:2013			
P		T	(11-1-1-1(-)		4154(5)		D	- Bur
Run #	22	Test Dis	tance (m)	3	Antenna	Height(s)		1 to 4(m)		Results	Pass
40											
30											
20											
20											
10	1										
dBm											
쁑											
0											
						I					
-10	_										
-10											
-20	1 1 1 1										
-30											
24	400	2410	2420	2	430	2440	245	0	2460	2470	2480
						MHz				■ PK	♦ AV • QP
										- FK	V AV • QI
				Polarity/							
	Freq	Antenna Height	Azimuth	Transducer Type	Detector	EIRP	Antenna Gain	Output Power	Spec. Limit	Compared to Spec.	Comments
	(MHz)	(meters)	(degrees)	,,		(dBm)	(dBi)	(dBm)	(dBm)	(dB)	
	` '		0515	.,	DI/	2 -		4 -	22.5	20	High Oh EUTV
	2479.843 2401.827	1.5 1.0	254.0 226.0	Vert Vert	PK PK	2.7 2.1	1 1	1.7 1.1	30.0 30.0	-28.3 -28.9	High Ch, EUT Vert Low Ch, EUT Vert
	2480.307	1.0	275.0	Horz	PK PK	2.1	1	1.0	30.0	-28.9 -29.0	High Ch, EUT Horz
	2440.313	1.3	299.0	Vert	PK	1.2	1	0.2	30.0	-29.8	Mid Ch, EUT Vert
	2480.310	1.5	136.0	Horz	PK	0.6	1	-0.4	30.0	-30.4	High CH, EUT on Side
	2440.080	1.0	266.0	Horz	PK	0.4	1	-0.6	30.0	-30.6	Mid Ch, EUT Horz
	2402.307	1.5	174.0	Horz	PK	0.1	1 1	-0.9	30.0	-30.9	Low Ch, EUT on Side
	2401.830 2479.817	1.0 1.0	158.0 205.0	Vert Horz	PK PK	-1.8 -2.0	1 1	-2.8 -3.0	30.0 30.0	-32.8 -33.0	Low Ch, EUT Horz High Ch, EUT Vert
	2479.817	1.5	139.0	Horz	PK PK	-2.0 -2.1	1	-3.0 -3.1	30.0	-33.0 -33.1	Mid Ch, EUT on Side
	2401.790	1.5	224.0	Horz	PK	-2.3	1	-3.3	30.0	-33.3	Low Ch, EUT Horz
	2402.337	1.6	206.0	Horz	PK	-5.7	1	-6.7	30.0	-36.7	Low Ch, EUT Vert
	2439.837	1.5	205.0	Horz	PK	-5.9	1	-6.9	30.0	-36.9	Mid Ch, EUT Vert
	2401.797	1.5	94.0	Vert	PK	-6.0	1	-7.0 7.5	30.0	-37.0	Low CH, EUT on Side
	2440.343	1.5	134.0	Vert	PK PK	-6.5 -6.8	1 1	-7.5 -7.8	30.0	-37.5 -37.8	Mid Ch, EUT Horz High Ch, EUT Horz
	2480.300 2479.837	1.5 1.5	133.0 105.0	Vert Vert	PK PK	-6.8 -7.1	1	-7.8 -8.1	30.0 30.0	-37.8 -38.1	High Ch, EUT Horz High CH, EUT on Side
	2440.360	1.5	51.0	Vert	PK	-7.3	1	-8.3	30.0	-38.3	Mid Ch, EUT on Side



XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	SA18H-20	TKQ	12-Jul-18	12-Jul-19
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6-Sep-18	6-Sep-19
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	6-Sep-18	6-Sep-19
Antenna - Double Ridge	EMCO	3115	AHB	28-Mar-18	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	20-Nov-18	20-Nov-19

TEST DESCRIPTION

The measurement was made in a radiated configuration of the fundamental with the carrier fully maximized for its highest radiated power. The maximum power spectral density measurements were measured with the EUT set to the required transmit frequencies in each band. The EUT was transmitting at the lowest, middle, and maximum data rate for each modulation type available.

The final data was converted from a field strength to a radiated power value. The equations in section 9.5 of ANSI C63.10:2013, were used to derive this conversion formula:

dBm/m (field strength) + 11.77 = dBm EIRP

Per the procedure outlined in ANSI C63.10:2013 Section 11.10.2, the peak power spectral density was measured.



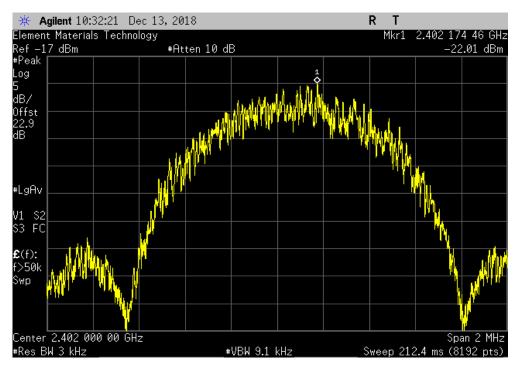
EUT: AIR01 Receiver
Serial Number: RX-RF-1
Customer: Masimo Corporation
Attendees: Nghi Nguyen
Project: None
Tested by: Johnny Candelas
TEST SPECIFICATIONS Work Order: MASI0519
Date: 13-Dec-18
Temperature: 20.8 °C Humidity: 51.8% RH
Barometric Pres.: 1023 mbar Power: USB via 120VAC/60Hz Test Method Job Site: OC10 FCC 15.247:2018 COMMENTS Total offset accounts for Antenna Gain, Cable Loss, 20dB Attenuator, and Pre-Amp Gain. Low Ch - 22.9dB, Mid Ch - 22.9dB, & High Ch - 23.1dB EUT Worst Case Orientation = Vertical DEVIATIONS FROM TEST STANDARD for d. lather Configuration # 2 Signature Correction Factor (dB) Measured Value (dBm/3kHz) Total EIRP Results < dBm/3kHz (dBm/3kHz) BLE/GFSK Low Channel, 2402 MHz Pass BLE/GFSK Mid Channel, 2440 MHz BLE/GFSK High Channel, 2480 MHz 11.77 11.77 Pass Pass -23.181 -11.411 -24.022 -12.252



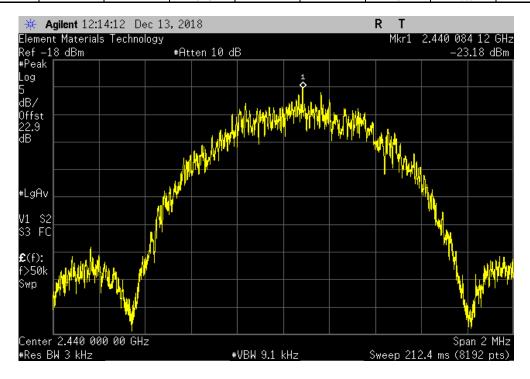
BLE/GFSK Low Channel, 2402 MHz

Measured Value Correction Total EIRP Limit
(dBm/3kHz) Factor (dB) (dBm/3kHz) < dBm/3kHz Results

-22.009 11.77 -10.239 8 Pass



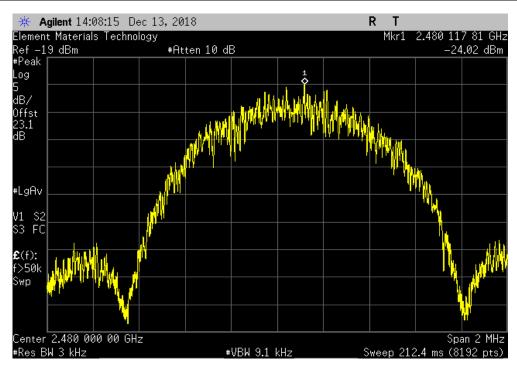
	BLE/GFS	K Mid Channel, 2	2440 MHz		
	Measured Value	Correction	Total EIRP	Limit	
	(dBm/3kHz)	Factor (dB)	(dBm/3kHz)	< dBm/3kHz	Results
	-23.181	11.77	-11.411	8	Pass





TbtTx 2018.09.13 XMit 2017.12.13

	BLE/GFSł	K High Channel,	2480 MHz		
	Measured Value	Correction	Total EIRP	Limit	
	(dBm/3kHz)	Factor (dB)	(dBm/3kHz)	< dBm/3kHz	Results
	-24.022	11.77	-12.252	8	Pass



BAND EDGE COMPLIANCE



XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	SA18H-20	TKQ	12-Jul-18	12-Jul-19
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6-Sep-18	6-Sep-19
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	6-Sep-18	6-Sep-19
Antenna - Double Ridge	EMCO	3115	AHB	28-Mar-18	28-Mar-20
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	20-Nov-18	20-Nov-19

TEST DESCRIPTION

The measurement was made in a radiated configuration of the fundamental with the carrier fully maximized for its highest radiated power. 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



EUT: AIR01 Receiver
Serial Number: RX-RF-1
Customer: Masimo Corporation
Attendees: Nghi Nguyen
Project: None
Tested by: Johnny Candelas
TEST SPECIFICATIONS Work Order: MASI0519
Date: 13-Dec-18
Temperature: 20.8 °C Humidity: 51.8% RH
Barometric Pres.: 1023 mbar Power: USB via 120VAC/60Hz Test Method Job Site: OC10 FCC 15.247:2018 COMMENTS Total offset accounts for Antenna Gain, Cable Loss, 20dB Attenuator, and Pre-Amp Gain. Low Ch - 22.9dB, Mid Ch - 22.9dB, & High Ch - 23.1dB EUT Worst Case Orientation = Vertical DEVIATIONS FROM TEST STANDARD for d. lather Configuration # 2 Signature Value (dBc) Result ≤ (dBc) BLE/GFSK Low Channel, 2402 MHz -46.08 -42.07 BLE/GFSK High Channel, 2480 MHz Pass -20

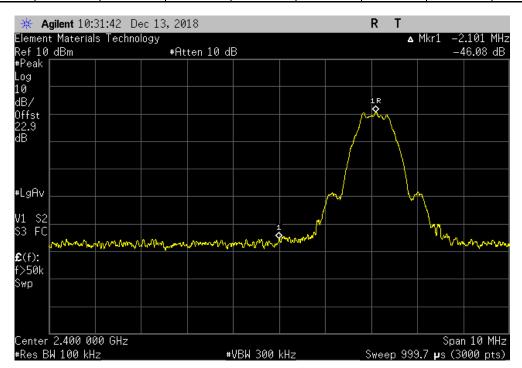
BAND EDGE COMPLIANCE



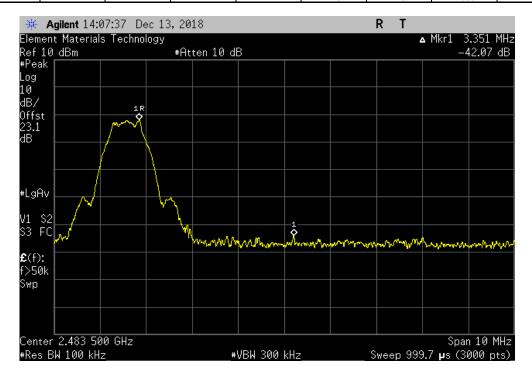
BLE/GFSK Low Channel, 2402 MHz

Value Limit
(dBc) ≤ (dBc) Result

-46.08 -20 Pass



BLE/GFSK High Channel, 2480 MHz									
Value Limit									
				(dBc)	≤ (dBc)	Result			
				-42.07	-20	Pass			





XMit 2017.12.13

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
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	27-Dec-17	27-Dec-18
Cable	Northwest EMC	18-26GHz RE Cables	OCK	27-Dec-17	27-Dec-18
Antenna - Standard Gain	ETS Lindgren	3160-09	AHN	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOF	7-Sep-18	7-Sep-19
Antenna - Standard Gain	ETS Lindgren	3160-08	AHT	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOE	7-Sep-18	7-Sep-19
Cable	Northwest EMC	8-18GHz RE Cables	oco	6-Sep-18	6-Sep-19
Antenna - Standard Gain	ETS Lindgren	3160-07	AHR	NCR	NCR
Attenuator	Fairview Microwave	SA18H-20	TKQ	12-Jul-18	12-Jul-19
Amplifier - Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6-Sep-18	6-Sep-19
Cable	Northwest EMC	1-8GHz RE Cables	OCJ	6-Sep-18	6-Sep-19
Antenna - Double Ridge	EMCO	3115	AHB	28-Mar-18	28-Mar-20
Amplifier - Pre-Amplifier	Miteq	AM-1402	AOZ	10-Jul-2018	12 mo
Cable	Northwest EMC	10kHz-1GHz RE Cables	OCH	20-Sep-2018	12 mo
Antenna - Biconilog	Teseq	CBL 6141A	AYE	7-Nov-2017	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	20-Nov-18	20-Nov-19

TEST DESCRIPTION

The measurement was made in a radiated configuration of the fundamental with the carrier fully maximized for its highest radiated power. 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.



EUT: AIR01 Receiver
Serial Number: RX-RF-1
Customer: Masimo Corporation Work Order: MASI0519
Date: 13-Dec-18
Temperature: 20.8 °C Attendees: Nghi Nguyen Humidity: 51.8% RH Project: None
Tested by: Johnny Candelas
TEST SPECIFICATIONS Barometric Pres.: 1023 mba Power: USB via 120VAC/60Hz Test Method Job Site: OC10 FCC 15.247:2018 COMMENTS Total offset accounts for Antenna Gain, Cable Loss, 20dB Attenuator, and Pre-Amp Gain. Low Ch - 22.9dB, Mid Ch - 22.9dB, & High Ch - 23.1dB EUT Worst Case Orientation = Vertical DEVIATIONS FROM TEST STANDARD Configuration # 2 Signature Freq (MHz) Result (dBc) Range ≤ (dBc) BLE/GFSK Low Channel, 2402 MHz Fundamental BLE/GFSK Low Channel, 2402 MHz BLE/GFSK Low Channel, 2402 MHz 30 MHz - 1 GHz 1 GHz - 8.2 GHz 384.08 -46.94 -20 Pass 1237.3 -42.5 -20 Pass BLE/GFSK Low Channel, 2402 MHz 8.2 GHz - 12.4 GHz 9607.5 -35.85 -20 Pass BLE/GFSK Low Channel, 2402 MHz 12.4 GHz - 18 GHz 13225.2 -42.81 -20 Pass BLE/GFSK Low Channel, 2402 MHz BLE/GFSK Mid Channel, 2440 MHz 18 GHz - 25 GHz Fundamental -20 N/A 24991.5 -42.79 Pass 2440.08 N/A N/A BLE/GFSK Mid Channel, 2440 MHz BLE/GFSK Mid Channel, 2440 MHz 30 MHz - 1 GHz 1 GHz - 8.2 GHz -45.07 -41.42 -20 -20 Pass Pass 383.97 3202.8 BLE/GFSK Mid Channel, 2440 MHz BLE/GFSK Mid Channel, 2440 MHz 8.2 GHz - 12.4 GHz 12.4 GHz - 18 GHz -20 -20 9759.3 -32.76 Pass 13621.7 -40.23 Pass 18 GHz - 25 GHz Fundamental BLE/GFSK Mid Channel, 2440 MHz 24058.2 -39.4 -20 Pass BLE/GFSK High Channel, 2480 MHz 2480.09 N/A N/A N/A BLE/GFSK High Channel, 2480 MHz BLE/GFSK High Channel, 2480 MHz 30 MHz - 1 GHz 1 GHz - 8.2 GHz -37 37 Pass Pass 384.2 -20 1033.4 -40.6 -20 BLE/GFSK High Channel, 2480 MHz BLE/GFSK High Channel, 2480 MHz 8.2 GHz - 12.4 GHz 9919.3 -33 -20 Pass 12.4 GHz - 18 GHz 14470.2 -39.52 -20 Pass BLE/GFSK High Channel, 2480 MHz 18 GHz - 25 GHz 24968.4 -39.33 Pass

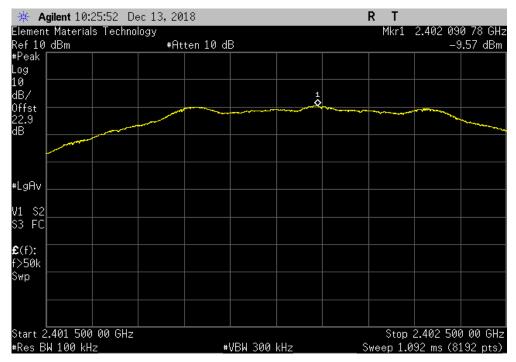


 BLE/GFSK Low Channel, 2402 MHz

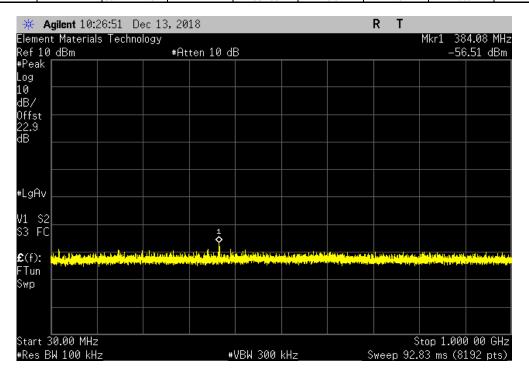
 Frequency
 Measured
 Max Value
 Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

 Fundamental
 2402.09
 N/A
 N/A
 N/A



	BLE	/GFSK Low Channel, 2	2402 MHz		
	Frequency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
,	30 MHz - 1 GHz	384.08	-46.94	-20	Pass



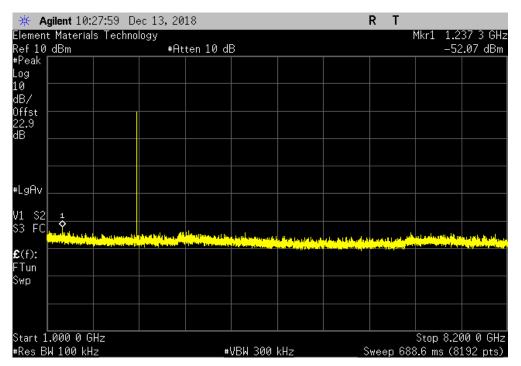


 BLE/GFSK Low Channel, 2402 MHz

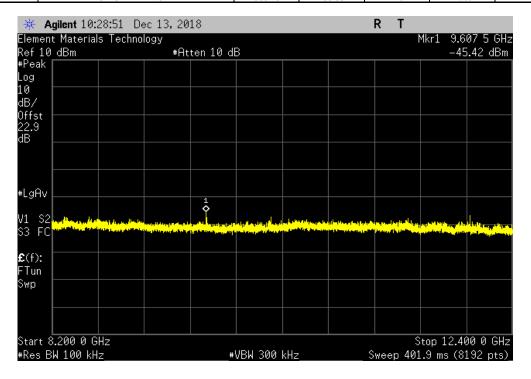
 Frequency
 Measured
 Max Value
 Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

 1 GHz - 8.2 GHz
 1237.3
 -42.5
 -20
 Pass



BLE/0	FSK Low Channel,	2402 MHz		
Frequency	Measured	Max Value	Limit	
 Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
8.2 GHz - 12.4 GHz	9607.5	-35.85	-20	Pass



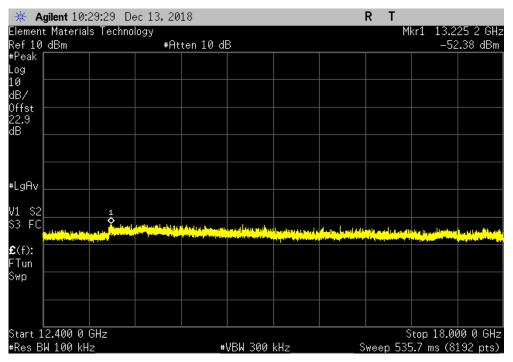


 BLE/GFSK Low Channel, 2402 MHz

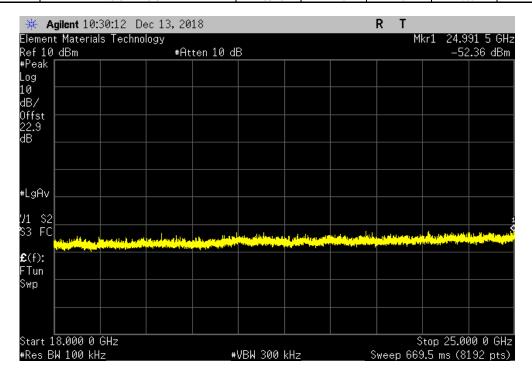
 Frequency
 Measured Max Value Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

 12.4 GHz - 18 GHz
 13225.2
 -42.81
 -20
 Pass



	BLE/G	FSK Low Channel, 2	2402 MHz		
	Frequency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
,	18 GHz - 25 GHz	24991.5	-42.79	-20	Pass



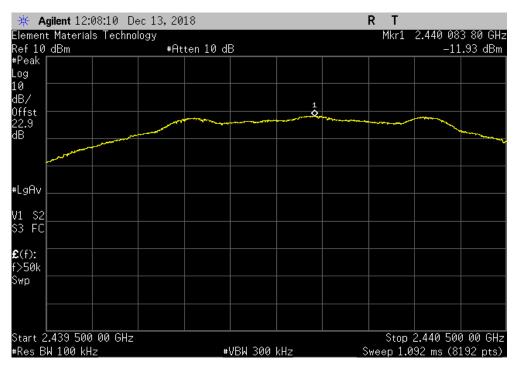


 BLE/GFSK Mid Channel, 2440 MHz

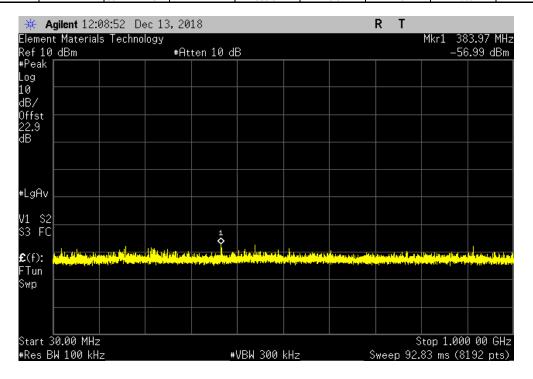
 Frequency
 Measured
 Max Value
 Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

 Fundamental
 2440.08
 N/A
 N/A
 N/A



BLE	/GFSK Mid Channel, 2	2440 MHz		
Frequency	Measured	Max Value	Limit	
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
30 MHz - 1 GHz	383.97	-45.07	-20	Pass



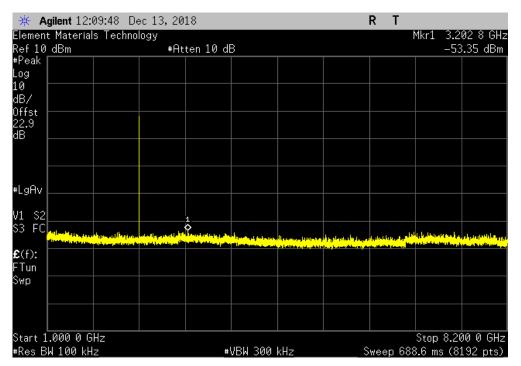


 BLE/GFSK Mid Channel, 2440 MHz

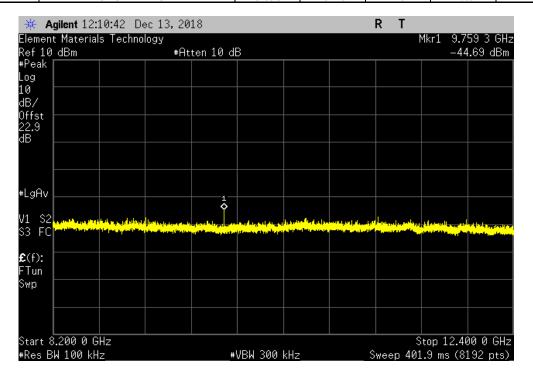
 Frequency
 Measured Max Value Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

 1 GHz - 8.2 GHz
 3202.8
 -41.42
 -20
 Pass



	BLE/GFSK Mid Cha	nnel, 2440 MHz		
Frequ	ency Measu	ed Max Valu	ıe Limit	
Ran	nge Freq (M	Hz) (dBc)	≤ (dBc)	Result
8.2 GHz -	12.4 GHz 9759.	3 -32.76	-20	Pass



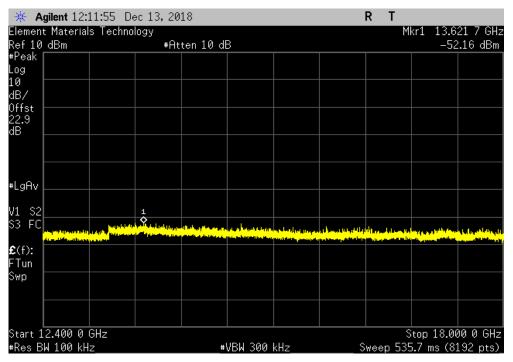


 BLE/GFSK Mid Channel, 2440 MHz

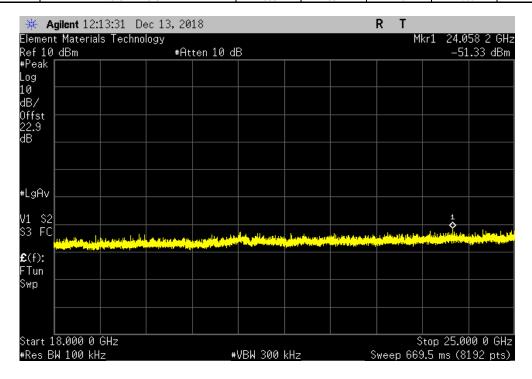
 Frequency
 Measured
 Max Value
 Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

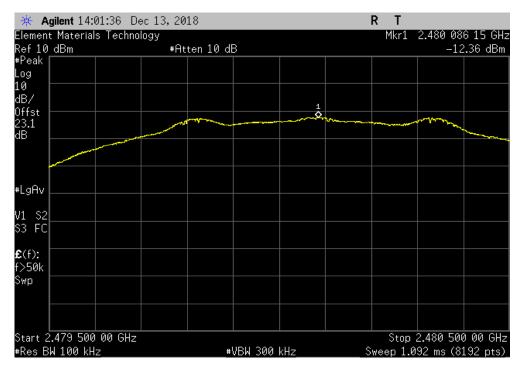
 12.4 GHz - 18 GHz
 13621.7
 -40.23
 -20
 Pass



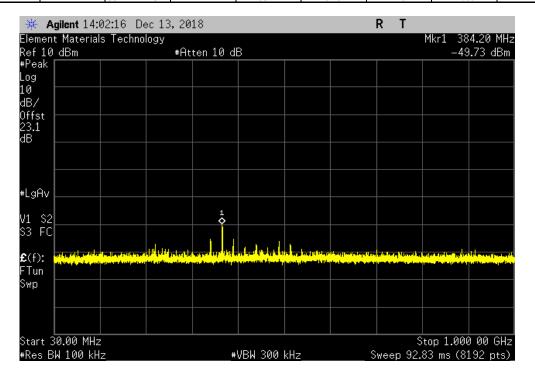
BLE/G	FSK Mid Channel, 2	2440 MHz		
Frequency	Measured	Max Value	Limit	
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
18 GHz - 25 GHz	24058.2	-39.4	-20	Pass







	BLE/GFSK High Channel, 2480 MHz				
	Frequency	Measured	Max Value	Limit	
_	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
, [30 MHz - 1 GHz	384.2	-37.37	-20	Pass



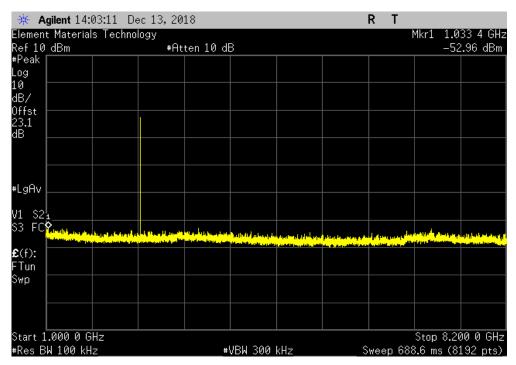


 BLE/GFSK High Channel, 2480 MHz

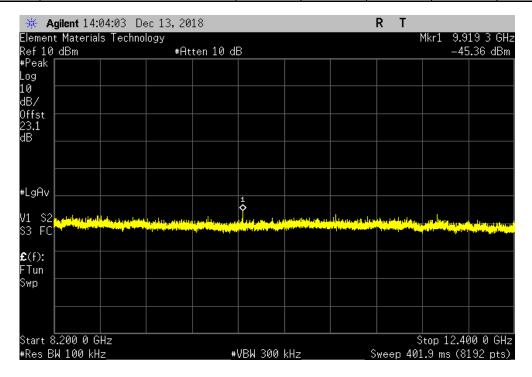
 Frequency
 Measured
 Max Value
 Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

 1 GHz - 8.2 GHz
 1033.4
 -40.6
 -20
 Pass



	BLE/G	FSK High Channel,	2480 MHz		
	Frequency	Measured	Max Value	Limit	
	Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
1	8.2 GHz - 12.4 GHz	9919.3	-33	-20	Pass



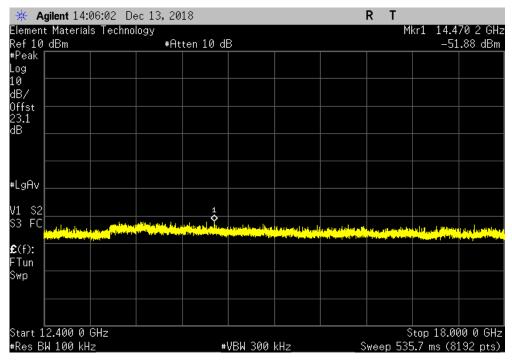


 BLE/GFSK High Channel, 2480 MHz

 Frequency
 Measured
 Max Value
 Limit

 Range
 Freq (MHz)
 (dBc)
 ≤ (dBc)
 Result

 12.4 GHz - 18 GHz
 14470.2
 -39.52
 -20
 Pass



BLE/GI	SK High Channel,	2480 MHz		
Frequency	Measured	Max Value	Limit	
Range	Freq (MHz)	(dBc)	≤ (dBc)	Result
18 GHz - 25 GHz	24968.4	-39.33	-20	Pass

