Garrett Metal Detectors

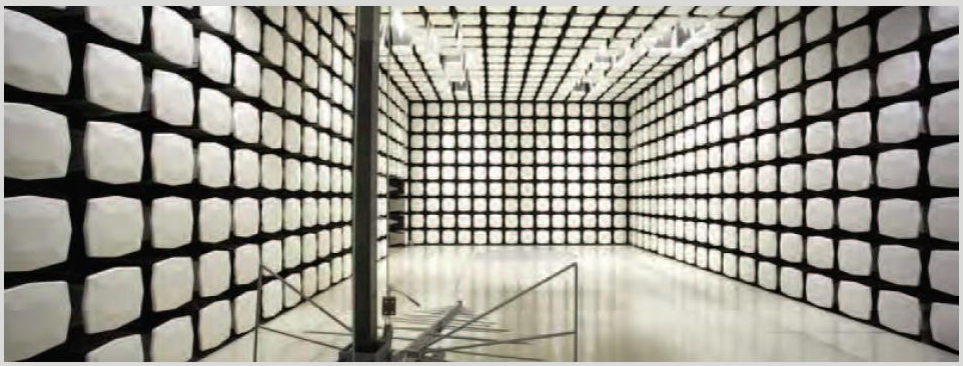
Garrett Z-Lynk MS-3 Headphones

FCC 15.207:2017

FCC 15.247:2017

2400 – 2483.5 MHz DTS Transceiver

Report # GARR0032.1



NVLAP Lab Code: 201049-0

CERTIFICATE OF TEST

2017-1-25

Last Date of Test: August 9, 2017
Garrett Metal Detectors
Model: Garrett Z-Lynk MS-3 Headphones

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2017	ANSI C63.10:2013, KDB 558074
FCC 15.247:2017	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6, 11.12.1, 11.13.2	Spurious Radiated Emissions	Yes	Pass	
7.8.2	Carrier Frequency Separation	No	N/A	Not required for DTS devices.
7.8.3	Number of Hopping Frequencies	No	N/A	Not required for DTS devices.
7.8.4	Dwell Time	No	N/A	Not required for DTS devices.
7.8.6	Band Edge Compliance - Hopping Mode	No	N/A	Not required for DTS devices.
11.6	Duty Cycle	Yes	N/A	Characterization of radio operation.
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.1.1	Output 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:

Jeremiah Darden, 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.

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

2017.6.12

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

MSIP / 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:
http://portlandcustomer.element.com/ts/scope/scope.htm
http://gsi.nist.gov/global/docs/cabs/designations.html

MEASUREMENT UNCERTAINTY

TMU.2015.07.10

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.

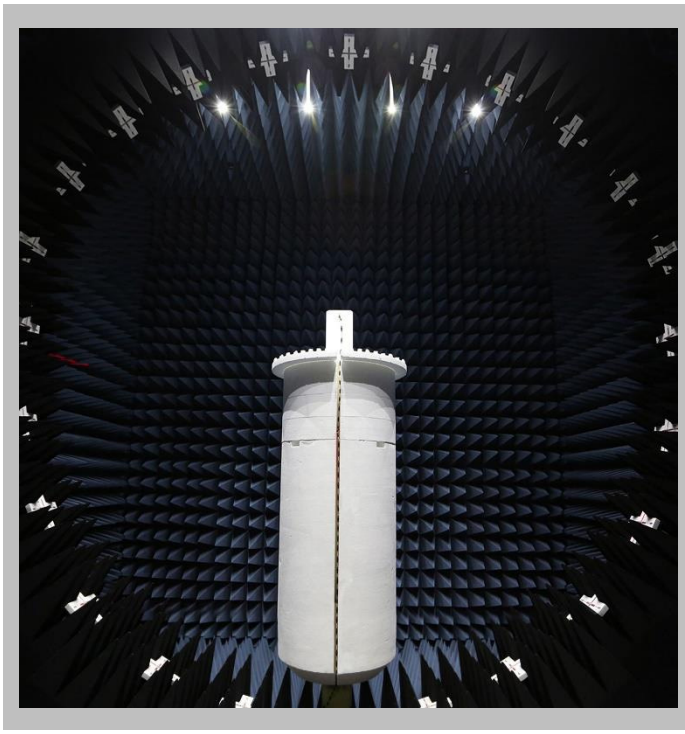
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

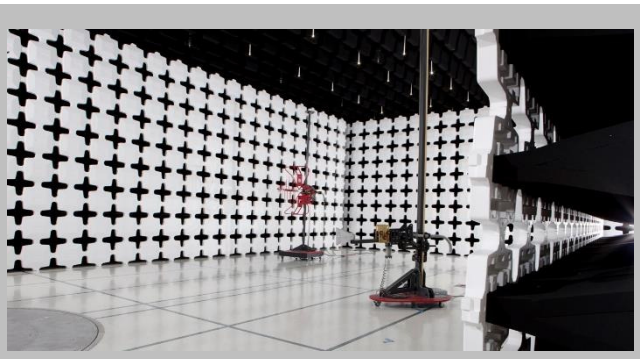
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	4.9 dB	-4.9 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

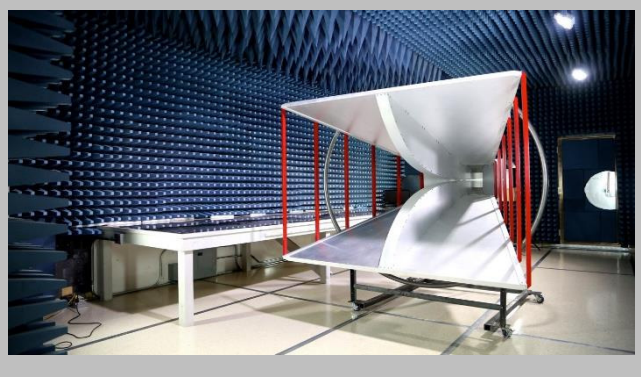
FACILITIES

2017.7.25

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP					
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, 2834D-*2*	2834G-1	2834F-1
BSMI					
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

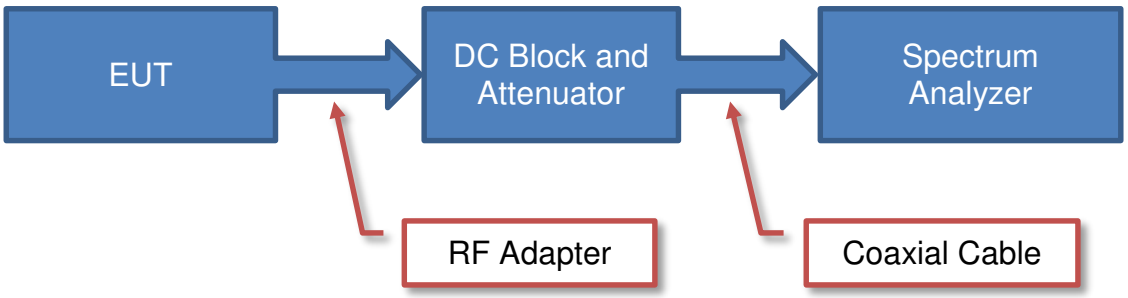




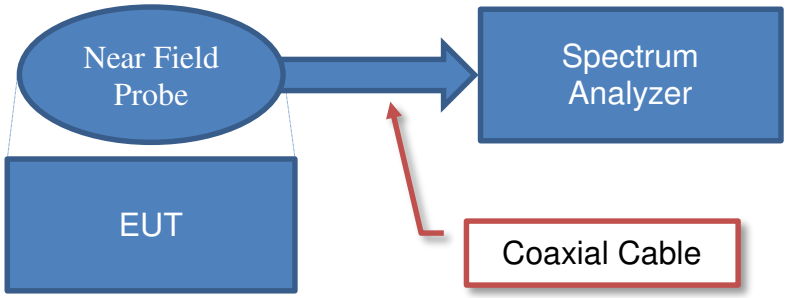


Test Setup Block Diagrams

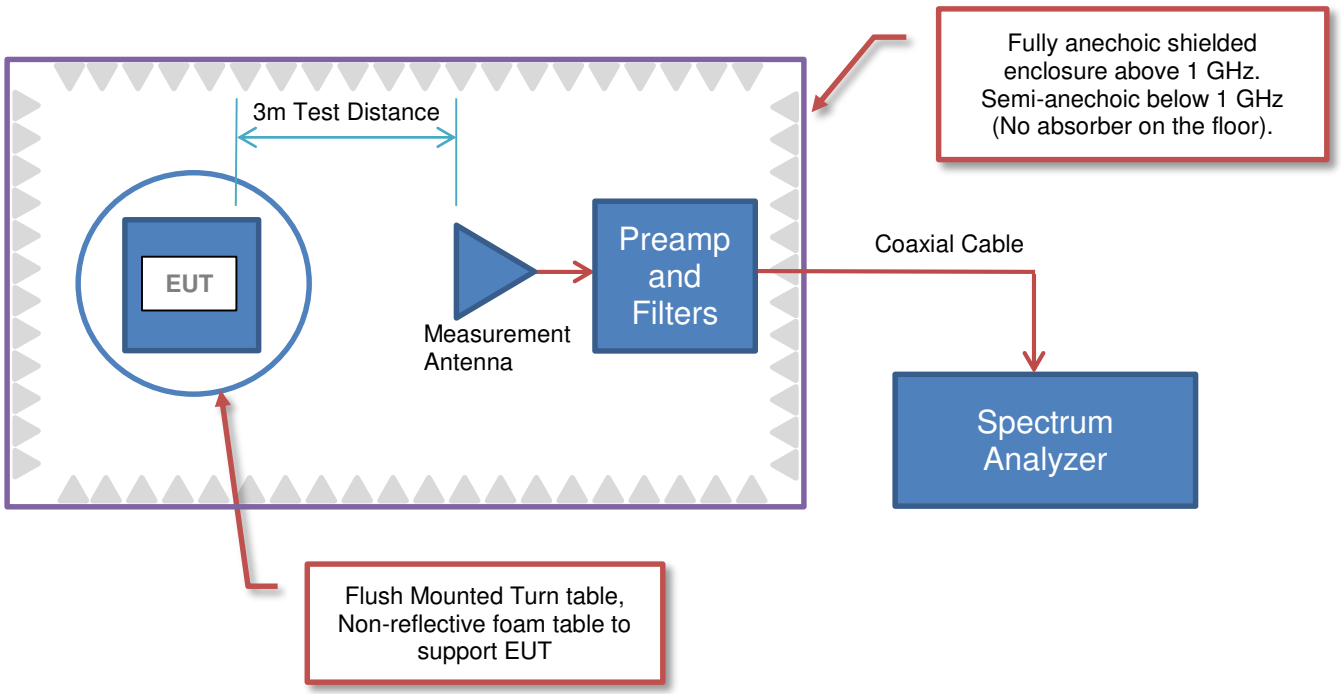
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Garrett Metal Detectors
Address:	1881 W. State Street
City, State, Zip:	Garland, TX 75042
Test Requested By:	Weldon Sanders
Model:	Garrett Z-Lynk MS-3 Headphones
First Date of Test:	July 20, 2017
Last Date of Test:	August 9, 2017
Receipt Date of Samples:	July 19, 2017
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Wireless Headphones pack using 2.4 GHz Wideband Radio that allows a user to connect their own headphones to a Garrett Z-Lynk WT-1 wireless module or a Garrett metal detector with Z-Lynk. It is using the same radio under FCC ID: DBDZLYNKWR1000 / IC: 20318-ZLYNKWR1000, but the PCB has been modified (board shape is different, slight changes in component locations, longer antenna feed line to the same original Inverted F PCB antenna) and the enclosure is different. The software has not changed and the same basic functionality and intended usage has not changed.

Testing Objective:
To demonstrate compliance of the DTS radio under FCC 15.247 for operation in the 2400 - 2483.5 MHz Band

CONFIGURATIONS

Configuration GARR0032- 1

Software/Firmware Running during test	
Description	**Version**
PurePath Wireless Commander	1.0.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Headphone Board (Direct Connect)	Garrett Metal Detectors	Garrett Z-Lynk MS-3	None

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop Computer	Acer	ZG5	LUS360B171909157F02547
AC/DC Power Supply (Laptop)	Delta Electronics, Inc.	ADP-30JH B	202W91502BN
Mouse	Microsoft	MSK-1113B	X821908-014
CC Debugger	Texas Instruments	6380	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Cable	No	1.6m	No	AC Mains	AC/DC Power Supply (Laptop)
DC Cable	No	1.7m	No	AC/DC Power Supply (Laptop)	Laptop Computer
USB Cable	Yes	0.5m	No	CC Debugger	Laptop Computer
Ribbon Cable	No	0.2m	No	CC Debugger	Headphone Board (Direct Connect)
USB Cable	Yes	1.6m	Yes	Mouse	Laptop Computer

CONFIGURATIONS

Configuration GARR0032- 2

Software/Firmware Running during test	
Description	**Version**
PurePath Wireless Commander	1.0.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Headphones	Garrett Metal Detectors	Garrett Z-Lynk MS-3	None

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop Computer	Acer	ZG5	LUS360B171909157F02547
AC/DC Power Supply (Laptop)	Delta Electronics, Inc.	ADP-30JH B	202W91502BN
Mouse	Microsoft	MSK-1113B	X821908-014
CC Debugger	Texas Instruments	6380	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Cable	No	1.6m	No	AC Mains	AC/DC Power Supply (Laptop)
DC Cable	No	1.7m	No	AC/DC Power Supply (Laptop)	Laptop Computer
USB Cable	Yes	0.5m	No	CC Debugger	Laptop Computer
Ribbon Cable	No	0.2m	No	CC Debugger	Headphone Board (Direct Connect)
USB Cable	Yes	1.6m	Yes	Mouse	Laptop Computer

CONFIGURATIONS

Configuration GARR0032- 3

Software/Firmware Running during test	
Description	**Version**
PurePath Wireless Commander	1.0.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Headphones	Garrett Metal Detectors	Garrett Z-Lynk MS-3	None

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop Computer	Acer	ZG5	LUS360B171909157F02547
AC/DC Power Supply (Laptop)	Delta Electronics, Inc.	ADP-30JH B	202W91502BN
Mouse	Microsoft	MSK-1113B	X821908-014
CC Debugger	Texas Instruments	6380	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Cable	No	1.6m	No	AC Mains	AC/DC Power Supply (Laptop)
DC Cable	No	1.7m	No	AC/DC Power Supply (Laptop)	Laptop Computer
USB Cable	Yes	0.5m	No	CC Debugger	Laptop Computer
Ribbon Cable	No	0.2m	No	CC Debugger	Headphone Board (Direct Connect)
USB Cable	Yes	1.6m	Yes	Mouse	Laptop Computer
USB Cable	Yes	0.9m	No	Headphones	Laptop Computer

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	7/20/2017	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.
2	7/25/2017	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.
3	8/9/2017	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	8/9/2017	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.
5	8/9/2017	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.
6	8/9/2017	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	8/9/2017	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

WTD.2017.03.21

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
LISN	Solar Electronics	9252-50-R-24-BNC	LJK	9/21/2016	9/21/2017
Cable - Conducted Cable Assembly	Element	TXA, HHZ, TQR	TXAA	4/17/2017	4/17/2018
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFD	8/2/2017	8/2/2018
Power Source/Analyzer	Hewlett Packard	6841A	THC	NCR	NCR

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

GARR0032-2

MODES INVESTIGATED

Continuous Transmit. Mid Channel, 2445 MHz

POWERLINE CONDUCTED EMISSIONS

WTD.2017.03.21

EUT:	Garrett Z-Lynk MS-3 Headphones	Work Order:	GARR0032
Serial Number:	None	Date:	08/09/2017
Customer:	Garrett Metal Detectors	Temperature:	24°C
Attendees:	None	Relative Humidity:	53%
Customer Project:	None	Bar. Pressure:	1018 mb
Tested By:	Marty Martin	Job Site:	TX01
Power:	USB via 110VAC/60Hz	Configuration:	GARR0032-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2017	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

None

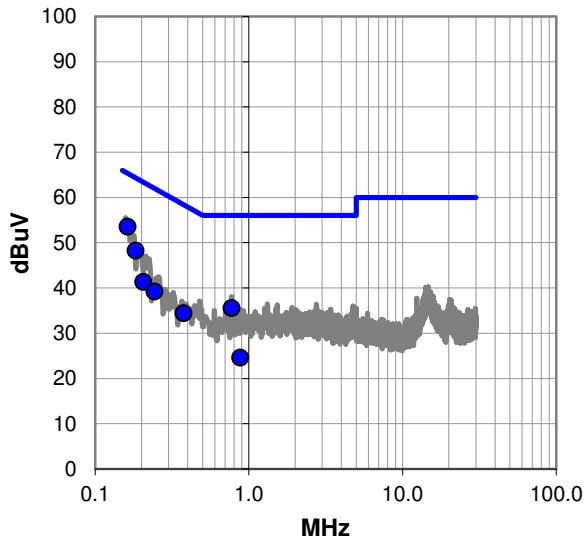
EUT OPERATING MODES

Continuous Transmit. Mid Channel, 2445 MHz

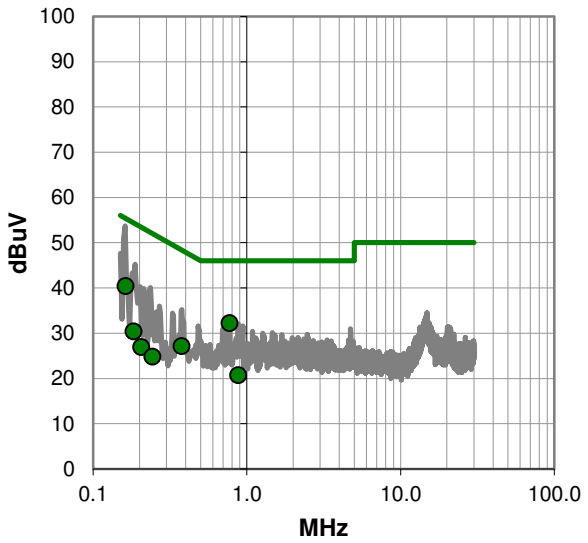
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

WTD.2017.03.21

RESULTS - Run #9

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.163	33.7	19.8	53.5	65.3	-11.8
0.184	28.4	19.8	48.2	64.3	-16.1
0.771	15.5	20.0	35.5	56.0	-20.5
0.206	21.4	19.9	41.3	63.4	-22.1
0.243	19.5	19.7	39.2	62.0	-22.8
0.376	14.5	19.9	34.4	58.4	-24.0
0.880	4.6	20.0	24.6	56.0	-31.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.771	12.2	20.0	32.2	46.0	-13.8
0.163	20.6	19.8	40.4	55.3	-14.9
0.376	7.2	19.9	27.1	48.4	-21.3
0.184	10.6	19.8	30.4	54.3	-23.9
0.880	0.7	20.0	20.7	46.0	-25.3
0.206	7.0	19.9	26.9	53.4	-26.5
0.243	5.1	19.7	24.8	52.0	-27.2

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

WTD.2017.03.21

EUT:	Garrett Z-Lynk MS-3 Headphones	Work Order:	GARR0032
Serial Number:	None	Date:	08/09/2017
Customer:	Garrett Metal Detectors	Temperature:	24°C
Attendees:	None	Relative Humidity:	53%
Customer Project:	None	Bar. Pressure:	1018 mb
Tested By:	Marty Martin	Job Site:	TX01
Power:	USB via 110VAC/60Hz	Configuration:	GARR0032-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2017	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

None

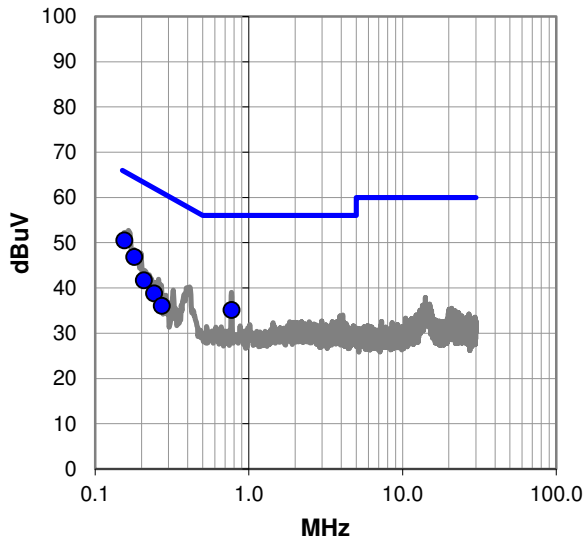
EUT OPERATING MODES

Continuous Transmit. Mid Channel, 2445 MHz

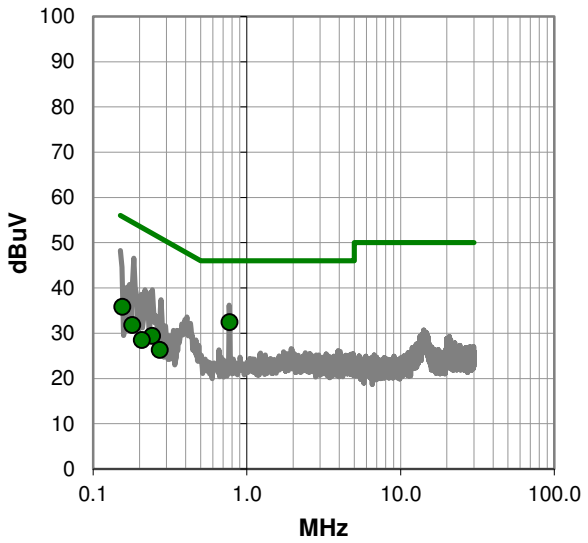
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

WTD.2017.03.21

RESULTS - Run #10

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.155	30.7	19.8	50.5	65.7	-15.2
0.180	27.0	19.8	46.8	64.5	-17.7
0.771	15.1	20.0	35.1	56.0	-20.9
0.208	21.8	19.9	41.7	63.3	-21.6
0.243	19.1	19.7	38.8	62.0	-23.2
0.272	16.3	19.7	36.0	61.1	-25.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.771	12.4	20.0	32.4	46.0	-13.6
0.155	16.0	19.8	35.8	55.7	-19.9
0.243	9.7	19.7	29.4	52.0	-22.6
0.180	12.0	19.8	31.8	54.5	-22.7
0.208	8.6	19.9	28.5	53.3	-24.8
0.272	6.6	19.7	26.3	51.1	-24.8

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2017.06.01

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 Transmit

POWER SETTINGS INVESTIGATED

USB via 110VAC/60Hz

Battery

CONFIGURATIONS INVESTIGATED

GARR0032 - 2

GARR0032 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	25000 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
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAM	11/18/2016	12 mo
Cable	Element	18-40GHz	TXE	11/18/2016	12 mo
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXW	8/5/2016	24 mo
Cable	Element	8-18GHz	TXD	5/31/2017	12 mo
Cable	Element	1-8.2 GHz	TXC	5/31/2017	12 mo
Cable	Element	RE 9kHz - 1GHz	TXB	11/9/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	PAL	10/12/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	PAK	10/18/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAJ	5/31/2017	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1551	PAH	11/9/2016	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	HHV	8/5/2016	12 mo
Antenna - Biconilog	ETS Lindgren	3143B	AYF	4/13/2016	24 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AJG	NCR	0 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AJF	NCR	0 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	10/4/2016	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.

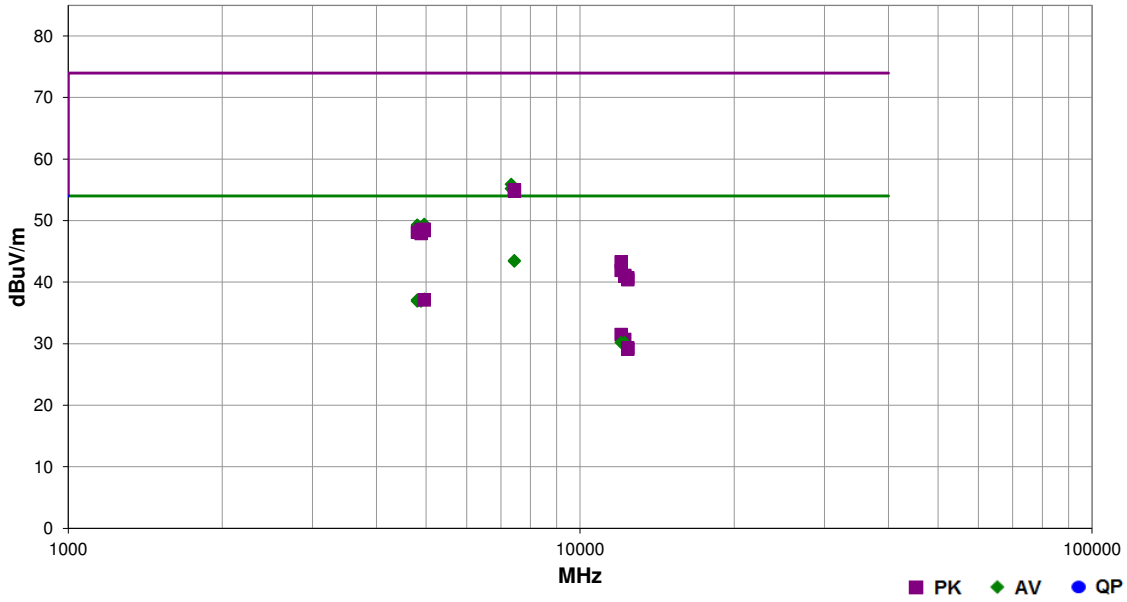
SPURIOUS RADIATED EMISSIONS

EmiR5 2017.07.11 PSA-ESCI 2017.06.01

Work Order:	GARR0032	**Date:**	07/25/17		
Project:	None	**Temperature:**	23.2 °C		
Job Site:	TX02	**Humidity:**	54% RH		
Serial Number:	None	**Barometric Pres.:**	1020 mbar	**Tested by:**	Marty Martin
EUT:	Garrett Z-Lynk MS-3 Headphones				
Configuration:	2				
Customer:	Garrett Metal Detectors				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Continuous Transmit				
Deviations:	None				
Comments:	Transmitting at 5dBm.				

Test Specifications	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

Run #	22	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7334.668	29.9	14.0	1.0	357.9	3.0	0.0	Horz	AV	0.0	43.9	54.0	-10.1	EUT Horz, Mid Channel, 2445 MHz
7334.772	29.9	14.0	1.0	242.0	3.0	0.0	Vert	AV	0.0	43.9	54.0	-10.1	EUT Horz, Mid Channel, 2445 MHz
7440.280	29.4	14.1	1.0	345.0	3.0	0.0	Horz	AV	0.0	43.5	54.0	-10.5	EUT Horz, High Channel 2480 MHz
7439.878	29.3	14.1	1.0	93.9	3.0	0.0	Vert	AV	0.0	43.4	54.0	-10.6	EUT Horz, High Channel 2480 MHz
4960.025	30.2	7.0	1.0	21.9	3.0	0.0	Horz	AV	0.0	37.2	54.0	-16.8	EUT Horz, High Channel 2480 MHz
4960.403	30.2	7.0	1.0	73.0	3.0	0.0	Vert	AV	0.0	37.2	54.0	-16.8	EUT Horz, High Channel 2480 MHz
4960.228	30.2	7.0	1.0	261.0	3.0	0.0	Horz	AV	0.0	37.2	54.0	-16.8	EUT on Side, High Channel 2480 MHz
4960.428	30.2	7.0	1.0	13.0	3.0	0.0	Horz	AV	0.0	37.2	54.0	-16.8	EUT Vert, High Channel 2480 MHz
4959.900	30.2	7.0	1.0	222.0	3.0	0.0	Vert	AV	0.0	37.2	54.0	-16.8	EUT Vert, High Channel 2480 MHz
4809.500	30.3	6.8	3.9	78.0	3.0	0.0	Horz	AV	0.0	37.1	54.0	-16.9	EUT Horz, Low Channel, 2405 MHz
4889.507	30.2	6.9	1.0	219.9	3.0	0.0	Horz	AV	0.0	37.1	54.0	-16.9	EUT Horz, Mid Channel, 2445 MHz
4809.507	30.1	6.8	1.0	247.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1	EUT Horz, Low Channel, 2405 MHz
4889.868	30.0	6.9	1.0	298.9	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1	EUT Horz, Mid Channel, 2445 MHz
7336.340	41.9	14.0	1.0	230.0	3.0	0.0	Horz	PK	0.0	55.9	74.0	-18.1	EUT Horz, Mid Channel, 2445 MHz
7335.975	41.2	14.0	1.2	231.0	3.0	0.0	Vert	PK	0.0	55.2	74.0	-18.8	EUT Horz, Mid Channel, 2445 MHz
7440.233	40.9	14.1	1.0	240.0	3.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	EUT Horz, High Channel 2480 MHz
7440.363	40.7	14.1	1.0	182.0	3.0	0.0	Horz	PK	0.0	54.8	74.0	-19.2	EUT Horz, High Channel 2480 MHz
12024.520	33.5	-2.0	1.0	102.0	3.0	0.0	Vert	AV	0.0	31.5	54.0	-22.5	EUT Horz, Low Channel, 2405 MHz
12224.650	32.3	-1.6	2.1	145.0	3.0	0.0	Horz	AV	0.0	30.7	54.0	-23.3	EUT Horz, Mid Channel, 2445 MHz
12024.530	32.2	-2.0	1.0	134.0	3.0	0.0	Horz	AV	0.0	30.2	54.0	-23.8	EUT Horz, Low Channel, 2405 MHz
12224.810	31.8	-1.6	1.0	130.9	3.0	0.0	Vert	AV	0.0	30.2	54.0	-23.8	EUT Horz, Mid Channel, 2445 MHz
4960.198	42.4	7.0	1.0	360.0	3.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	EUT Vert, High Channel 2480 MHz
4809.545	42.5	6.8	3.9	78.0	3.0	0.0	Horz	PK	0.0	49.3	74.0	-24.7	EUT Horz, Low Channel, 2405 MHz

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12399.620	30.1	-0.8	1.0	3.9	3.0	0.0	Vert	AV	0.0	29.3	54.0	-24.7	EUT Horz, High Channel 2480 MHz
12399.610	29.9	-0.8	1.6	190.9	3.0	0.0	Horz	AV	0.0	29.1	54.0	-24.9	EUT Horz, High Channel 2480 MHz
4959.922	41.8	7.0	1.0	295.0	3.0	0.0	Vert	PK	0.0	48.8	74.0	-25.2	EUT on Side, High Channel 2480 MHz
4960.015	41.7	7.0	1.0	270.0	3.0	0.0	Horz	PK	0.0	48.7	74.0	-25.3	EUT on Side, High Channel 2480 MHz
4959.923	41.6	7.0	1.0	153.9	3.0	0.0	Horz	PK	0.0	48.6	74.0	-25.4	EUT Horz, High Channel 2480 MHz
4890.387	41.6	6.9	1.0	87.9	3.0	0.0	Vert	PK	0.0	48.5	74.0	-25.5	EUT Horz, Mid Channel, 2445 MHz
4959.755	41.4	7.0	1.0	189.9	3.0	0.0	Vert	PK	0.0	48.4	74.0	-25.6	EUT Vert, High Channel 2480 MHz
4959.810	41.4	7.0	3.6	93.0	3.0	0.0	Vert	PK	0.0	48.4	74.0	-25.6	EUT Horz, High Channel 2480 MHz
4810.035	41.3	6.8	1.0	247.0	3.0	0.0	Vert	PK	0.0	48.1	74.0	-25.9	EUT Horz, Low Channel, 2405 MHz
4889.830	41.0	6.9	1.0	274.9	3.0	0.0	Horz	PK	0.0	47.9	74.0	-26.1	EUT Horz, Mid Channel, 2445 MHz
12025.290	45.3	-2.0	1.0	102.0	3.0	0.0	Vert	PK	0.0	43.3	74.0	-30.7	EUT Horz, Low Channel, 2405 MHz
12025.200	43.9	-2.0	1.0	134.0	3.0	0.0	Horz	PK	0.0	41.9	74.0	-32.1	EUT Horz, Low Channel, 2405 MHz
12225.500	42.7	-1.6	1.0	231.0	3.0	0.0	Vert	PK	0.0	41.1	74.0	-32.9	EUT Horz, Mid Channel, 2445 MHz
12224.740	42.6	-1.6	1.0	297.0	3.0	0.0	Horz	PK	0.0	41.0	74.0	-33.0	EUT Horz, Mid Channel, 2445 MHz
12399.980	41.5	-0.8	1.0	200.0	3.0	0.0	Vert	PK	0.0	40.7	74.0	-33.3	EUT Horz, High Channel 2480 MHz
12399.860	41.2	-0.8	1.0	147.9	3.0	0.0	Horz	PK	0.0	40.4	74.0	-33.6	EUT Horz, High Channel 2480 MHz
4959.760	30.1	7.0	1.0	32.0	3.0	0.0	Vert	AV	0.0	37.1	54.0	-16.9	EUT on Side, High Channel 2480 MHz

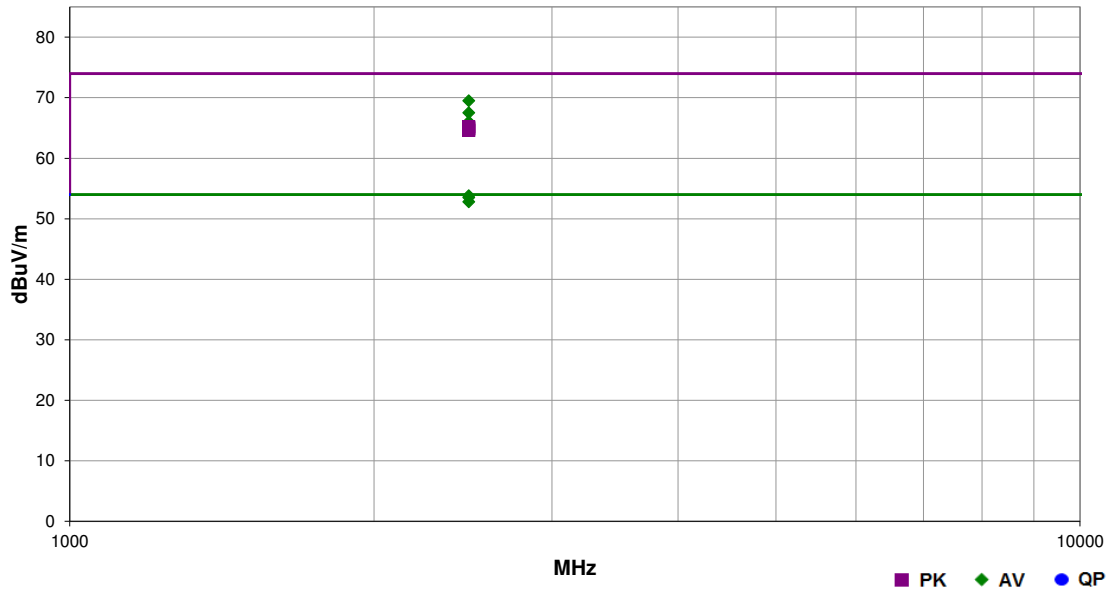
SPURIOUS RADIATED EMISSIONS

EmiR5 2017.07.11 PSA-ESCI 2017.06.01

Work Order:	GARR0032	**Date:**	07/25/17		
Project:	None	**Temperature:**	23.2 °C		
Job Site:	TX02	**Humidity:**	54% RH		
Serial Number:	None	**Barometric Pres.:**	1020 mbar	**Tested by:**	Marty Martin
EUT:	Garrett Z-Lynk MS-3 Headphones				
Configuration:	2				
Customer:	Garrett Metal Detectors				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Continuous Transmit				
Deviations:	None				
Comments:	Transmitting at 5dBm.				

Test Specifications	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

Run #	31	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.500	37.8	-4.0	1.0	94.9	3.0	20.0	Vert	AV	0.0	53.8	54.0	-0.2	EUT on Vert, High Channel 2480 MHz
2483.500	37.5	-4.0	3.2	141.9	3.0	20.0	Horz	AV	0.0	53.5	54.0	-0.5	EUT Horz, High Channel 2480 MHz
2483.500	36.8	-4.0	1.0	160.9	3.0	20.0	Vert	AV	0.0	52.8	54.0	-1.2	EUT on Side, High Channel 2480 MHz
2483.503	53.5	-4.0	3.9	31.0	3.0	20.0	Horz	PK	0.0	69.5	74.0	-4.5	EUT on Vert, High Channel 2480 MHz
2483.520	51.5	-4.0	2.9	231.0	3.0	20.0	Horz	PK	0.0	67.5	74.0	-6.5	EUT on Side, High Channel 2480 MHz
2483.510	50.0	-4.0	1.0	205.0	3.0	20.0	Vert	PK	0.0	66.0	74.0	-8.0	EUT Horz, High Channel 2480 MHz
2483.500	49.2	-4.0	1.0	94.9	3.0	20.0	Vert	PK	0.0	65.2	74.0	-8.8	EUT on Vert, High Channel 2480 MHz
2483.537	48.9	-4.0	3.2	141.9	3.0	20.0	Horz	PK	0.0	64.9	74.0	-9.1	EUT Horz, High Channel 2480 MHz
2483.503	48.6	-4.0	1.0	160.9	3.0	20.0	Vert	PK	0.0	64.6	74.0	-9.4	EUT on Side, High Channel 2480 MHz

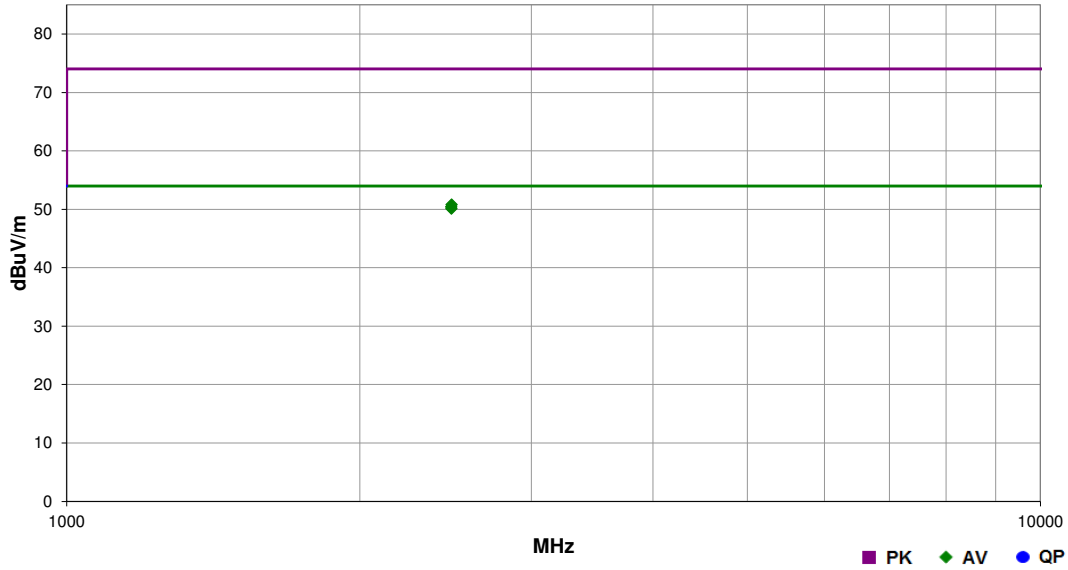
SPURIOUS RADIATED EMISSIONS

EmiR5 2017.07.11 PSA-ESCI 2017.06.01

Work Order:	GARR0032	**Date:**	07/25/17		
Project:	None	**Temperature:**	23.2 °C		
Job Site:	TX02	**Humidity:**	54% RH		
Serial Number:	None	**Barometric Pres.:**	1020 mbar	**Tested by:**	Marty Martin
EUT:	Garrett Z-Lynk MS-3 Headphones				
Configuration:	2				
Customer:	Garrett Metal Detectors				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Continuous				
Deviations:	None				
Comments:	Transmitting at 5 dBm				

Test Specifications	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

Run #	33	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Calculated Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Marker Delta Comments
2485.600	34.8	-4.0	3.9	31.0	3.0	20.0	Horz	AV	0.0	50.8	54.0	-3.2	EUT Vert, High Ch, 2480: Fund 72.4dBuV + -37.6dBc = 34.8dBuV (calc. amp.)
2483.800	34.4	-4.0	1.0	205.0	3.0	20.0	Vert	AV	0.0	50.4	54.0	-3.6	EUT Horz, High Ch, 2480: Fund 76.1dBuV + -41.7dBc = 34.4dBuV (calc. amp.)
2484.115	34.1	-4.0	2.9	231.0	3.0	20.0	Horz	AV	0.0	50.1	54.0	-3.9	EUT on Side, High Ch, 2480: Fund 76.1dBuV + -42.0dBc = 34.1dBuV (calc. amp.)

SPURIOUS RADIATED EMISSIONS

EUT on Side, High Ch, 2480

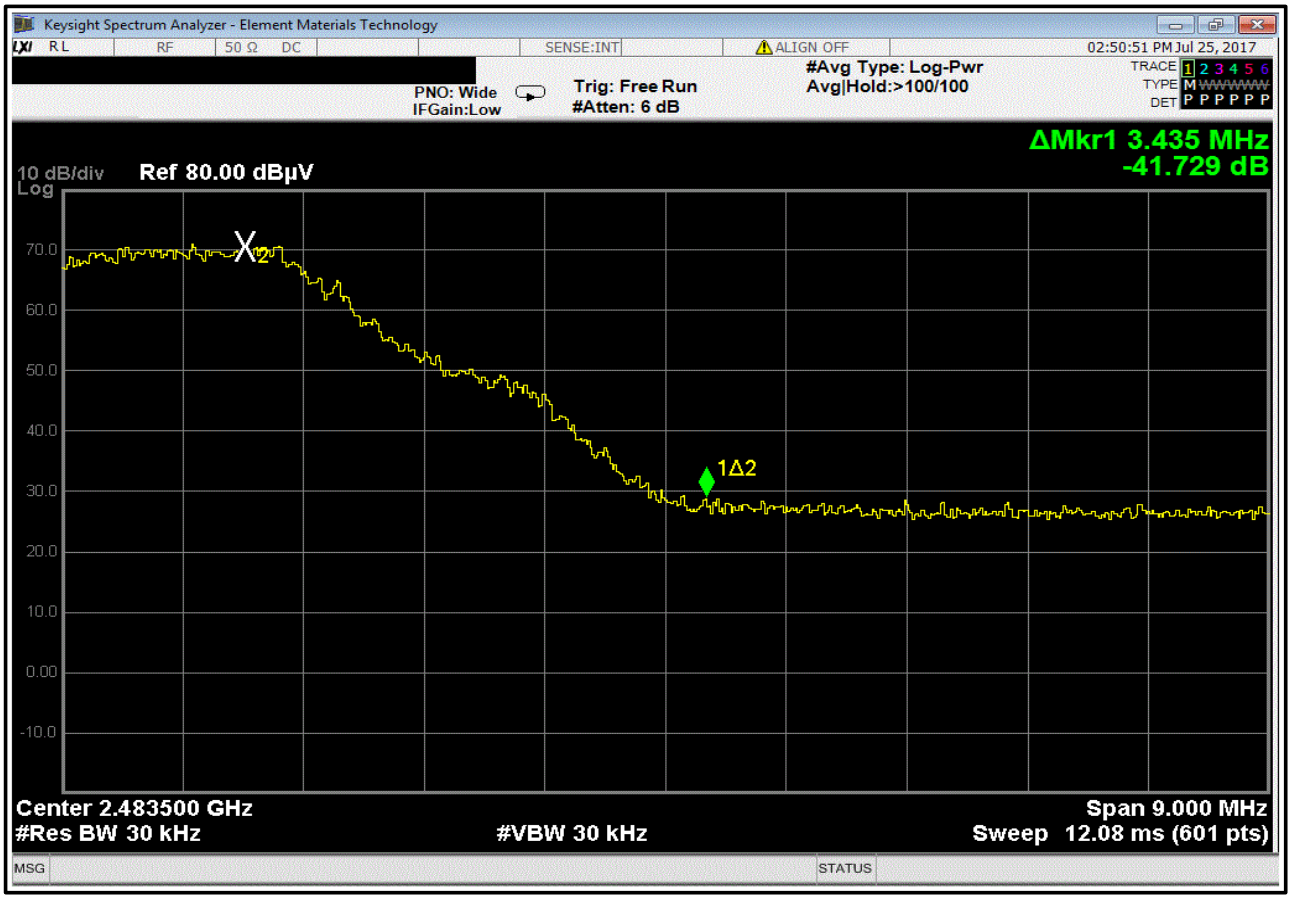
PSA-ESCI 2017.06.01

EUT Vert, High Ch, 2480

SPURIOUS RADIATED EMISSIONS

EUT Horz, High Ch, 2480

PSA-ESCI 2017.06.01



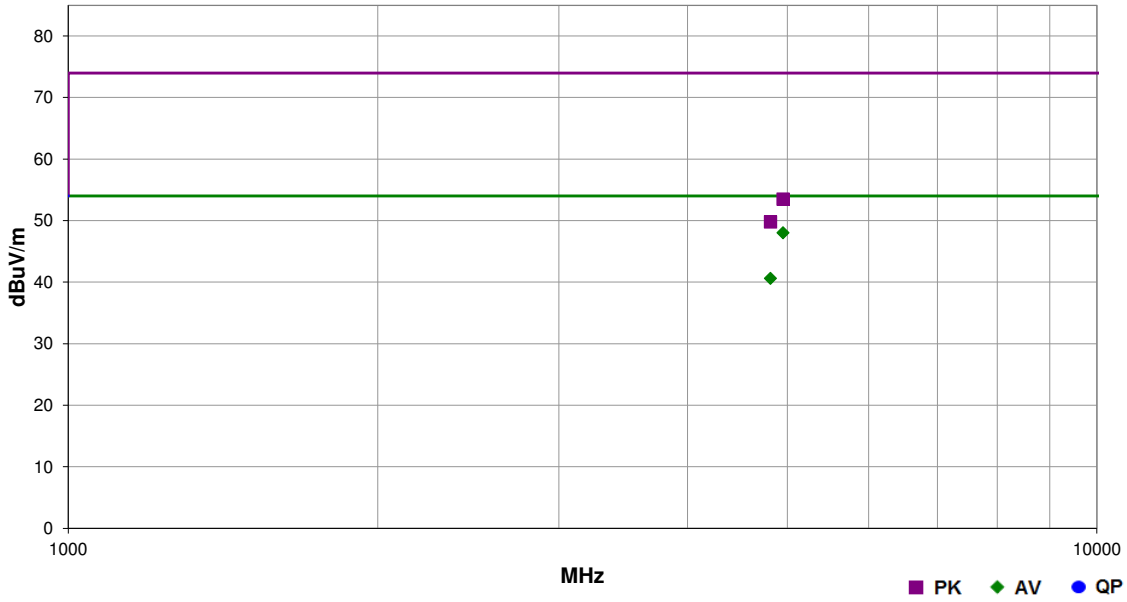
SPURIOUS RADIATED EMISSIONS

EmiR5 2017.07.11 PSA-ESCI 2017.06.01

Work Order:	GARR0032	**Date:**	07/25/17		
Project:	None	**Temperature:**	22.6 °C		
Job Site:	TX02	**Humidity:**	55.4% RH		
Serial Number:	None	**Barometric Pres.:**	1020 mbar	**Tested by:**	Marty Martin
EUT:	Garrett Z-Lynk MS-3 Headphones				
Configuration:	3				
Customer:	Garrett Metal Detectors				
Attendees:	None				
EUT Power:	USB via 110VAC/60Hz				
Operating Mode:	Continuous Transmit				
Deviations:	None				
Comments:	Transmitting at 5dBm. Using the headphones while charging is not a typical mode for the end user, but the headphones can operate in this mode. Scans were taken and the worse case points were re-tested to verify compliance while the headphones were charging and transmitting				

Test Specifications	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

Run #	60	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4953.765	41.0	7.0	1.0	147.0	3.0	0.0	Vert	AV	0.0	48.0	54.0	-6.0	EUT on Vert, High Channel 2480 MHz
4815.765	33.8	6.8	1.2	214.9	3.0	0.0	Horz	AV	0.0	40.6	54.0	-13.4	EUT Horz, Low Channel, 2405 MHz
4953.635	46.5	7.0	1.0	147.0	3.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	EUT on Vert, High Channel 2480 MHz
4815.635	43.0	6.8	1.2	214.9	3.0	0.0	Horz	PK	0.0	49.8	74.0	-24.2	EUT Horz, Low Channel, 2405 MHz

DUTY CYCLE

TEST DESCRIPTION

The Duty Cycle (x) were measured for each of the EUT operating modes. 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.

The EUT operates at 100% Duty Cycle.

OCCUPIED BANDWIDTH

XMit 2017.02.08

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	SA4018-20	TYE	10/24/2016	10/24/2017
Block - DC	Fairview Microwave	SD3379	AMT	10/24/2016	10/24/2017
Cable	Fairview Microwave	SCK0963-60	TXF	11/18/2016	11/18/2017
Generator - Signal	Agilent	E4422B	TGS	3/27/2015	3/27/2018
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	10/4/2016	10/4/2017

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

TbtTx 2017.07.11 XMit 2017.02.08

EUT:	Garrett Z-Lynk MS-3 Headphones			**Work Order:**	GARR0032
Serial Number:	None			**Date:**	08/09/17
Customer:	Garrett Metal Detectors			**Temperature:**	23.8 °C
Attendees:	None			**Humidity:**	53% RH
Project:	None			**Barometric Pres.:**	1018 mbar
Tested by:	Marty Martin	**Power:**	USB via 110VAC/60Hz	**Job Site:**	TX02

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

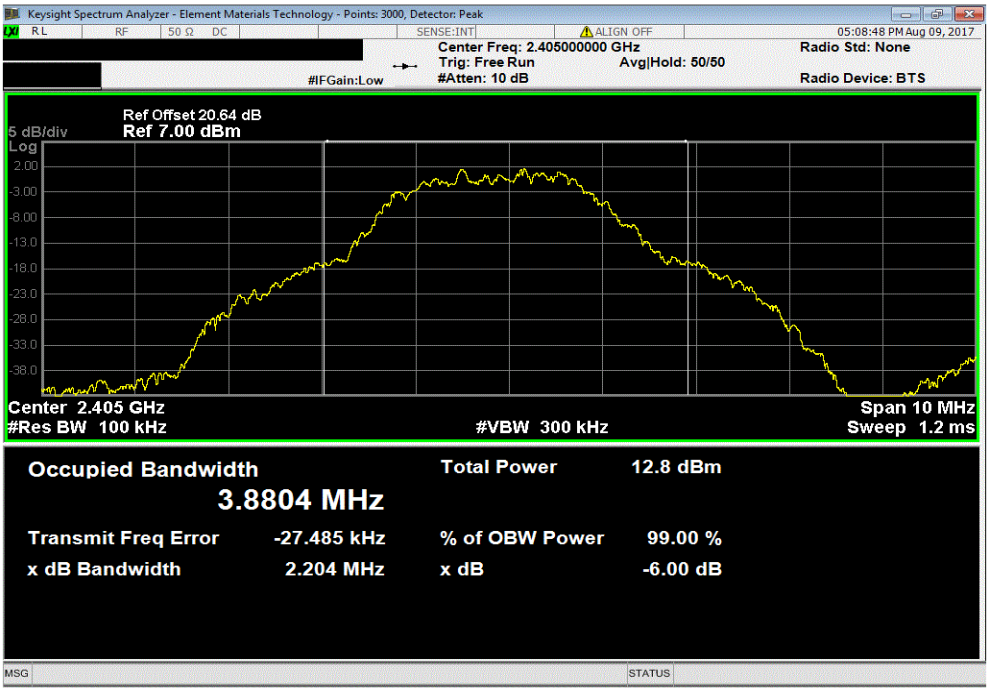
Configuration #	1	*Signature*

	Value	Limit (≥)	Result
BLE/GFSK Low Channel, 2405 MHz	2.204 MHz	500 kHz	Pass
BLE/GFSK Mid Channel, 2445 MHz	2.211 MHz	500 kHz	Pass
BLE/GFSK High Channel, 2480 MHz	2.211 MHz	500 kHz	Pass

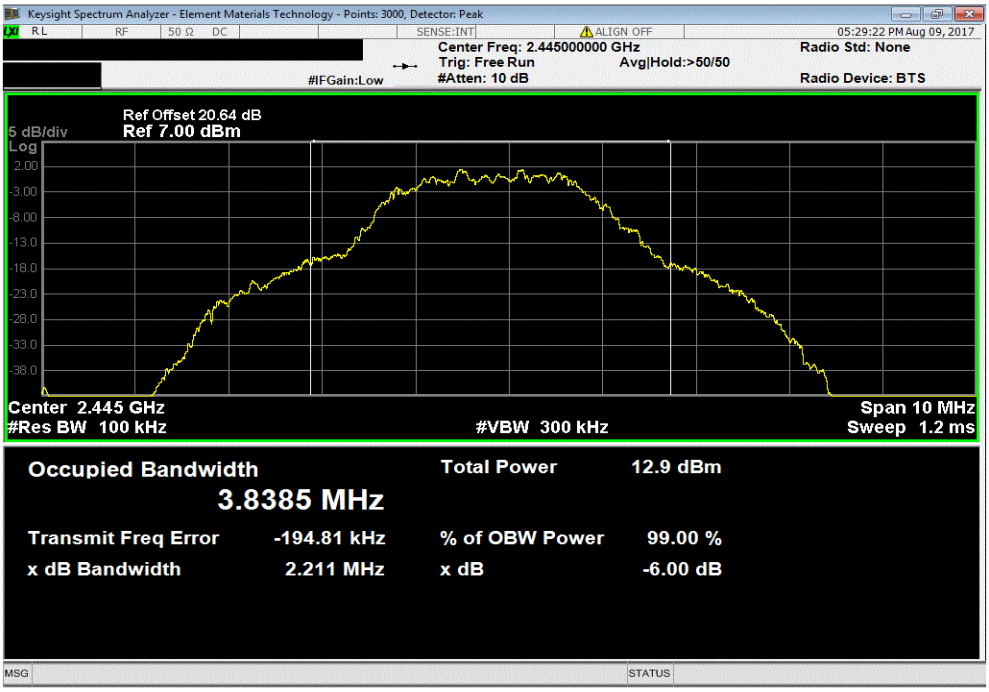
OCCUPIED BANDWIDTH

TbtTx 2017.07.11 XMit 2017.02.08

BLE/GFSK Low Channel, 2405 MHz							
					Value	Limit (≥)	Result
					2.204 MHz	500 kHz	Pass

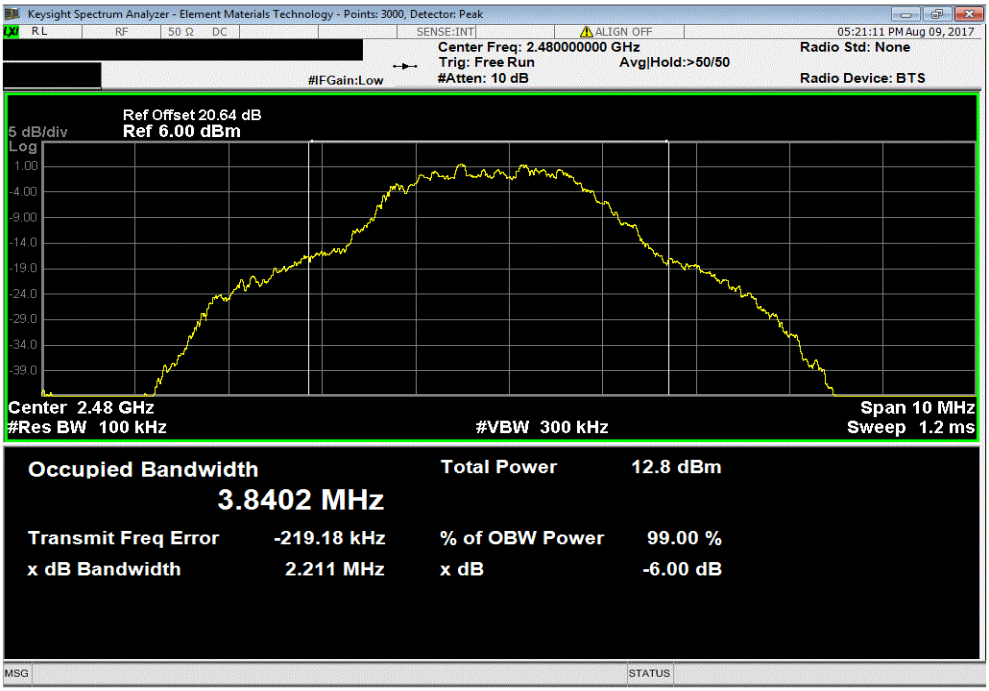


BLE/GFSK Mid Channel, 2445 MHz							
					Value	Limit (≥)	Result
					2.211 MHz	500 kHz	Pass



OCCUPIED BANDWIDTH

BLE/GFSK High Channel, 2480 MHz						
				Value	Limit (≥)	Result
				2.211 MHz	500 kHz	Pass



OUTPUT POWER

XMit 2017.02.08

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	Fairview Microwave	SCK0963-60	TXF	11/18/2016	11/18/2017
Block - DC	Fairview Microwave	SD3379	AMT	10/24/2016	10/24/2017
Attenuator	Fairview Microwave	SA4018-20	TYE	10/24/2016	10/24/2017
Generator - Signal	Agilent	E4422B	TGS	3/27/2015	3/27/2018
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	3/14/2017	3/14/2018

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.

De Facto EIRP Limit: The EUT meets the de facto EIRP limit of +36 dBm.

OUTPUT POWER

TbtTx 2017.04.18 XMit 2017.02.08

EUT:	Garrett Z-Lynk MS-3 Headphones			**Work Order:**	GARR0032
Serial Number:	None			**Date:**	07/20/17
Customer:	Garrett Metal Detectors			**Temperature:**	22.8 °C
Attendees:	None			**Humidity:**	53.5% RH
Project:	None			**Barometric Pres.:**	1022 mbar
Tested by:	Marty Martin	**Power:**	Battery	**Job Site:**	TX09

TEST SPECIFICATIONS	Test Method
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

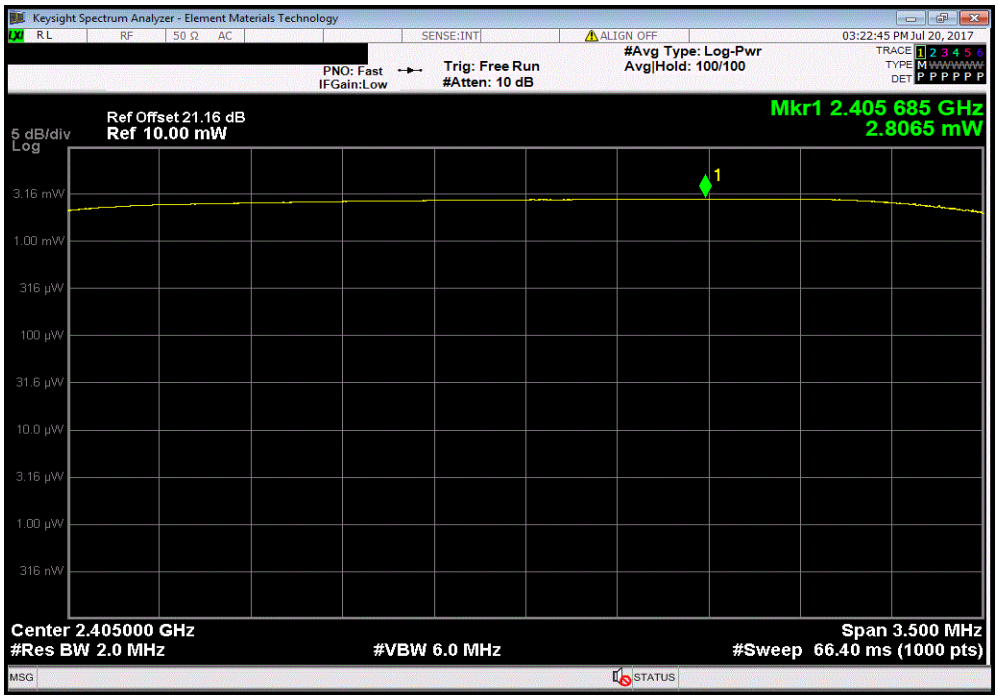
Configuration #	1	Signature

	Value	Limit (<)	Result
GFSK Low Channel, 2405 MHz	2.807 mW	1 W	Pass
GFSK Mid Channel, 2445 MHz	2.767 mW	1 W	Pass
GFSK High Channel, 2480 MHz	2.676 mW	1 W	Pass

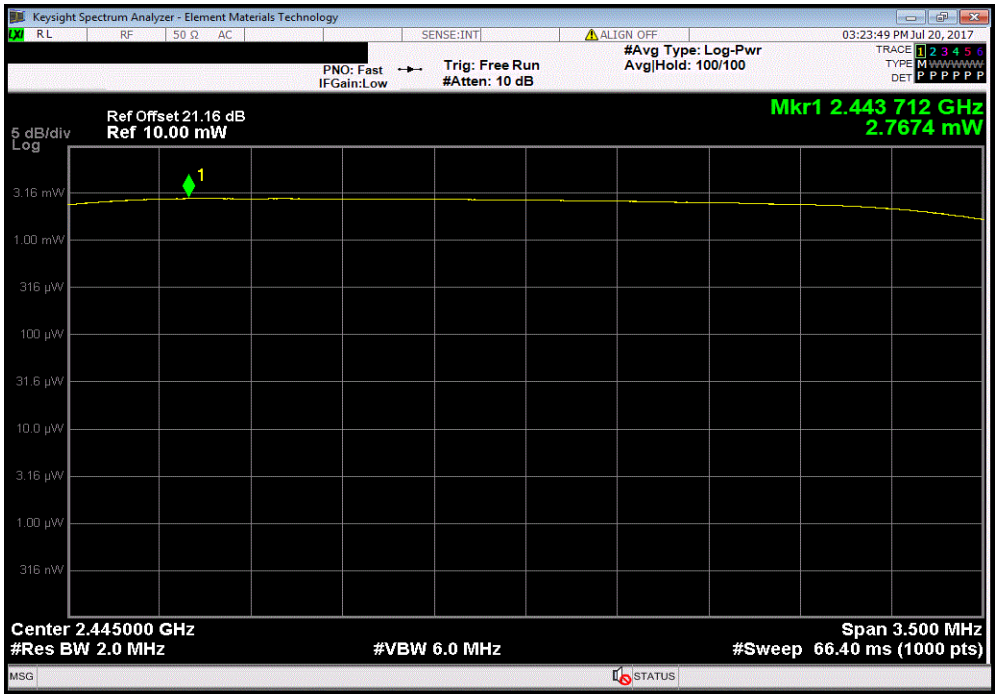
OUTPUT POWER

TbtTx 2017.04.18 XMit 2017.02.08

GFSK Low Channel, 2405 MHz						
				Value	Limit (<)	Result
				2.807 mW	1 W	Pass

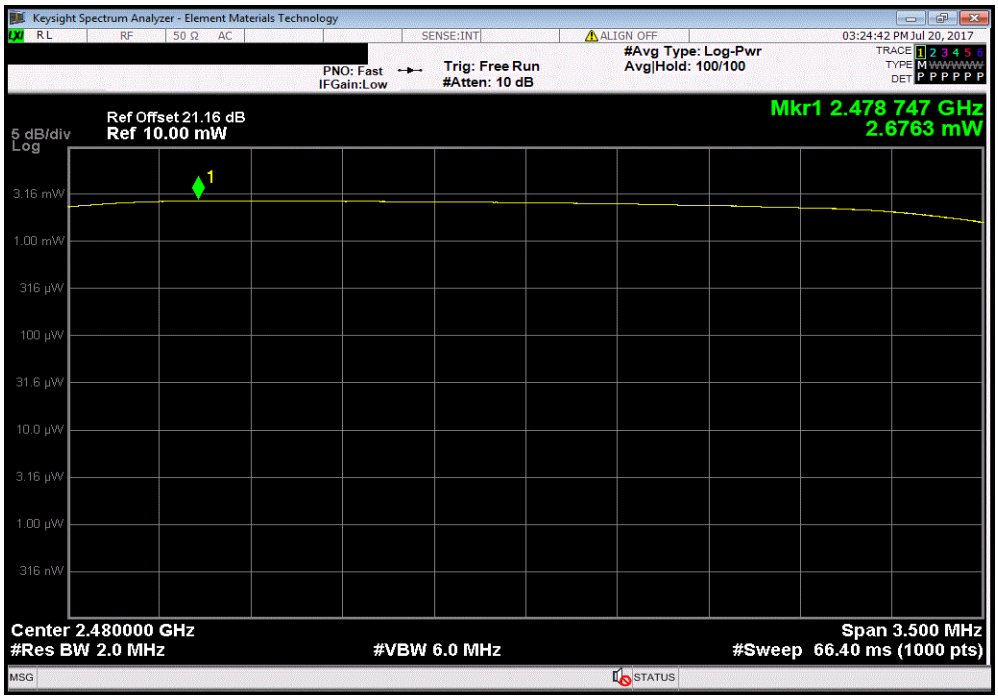


GFSK Mid Channel, 2445 MHz						
				Value	Limit (<)	Result
				2.767 mW	1 W	Pass



OUTPUT POWER

GFSK High Channel, 2480 MHz						
				Value	Limit (<)	Result
				2.676 mW	1 W	Pass



POWER SPECTRAL DENSITY

XMit 2017.02.08

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	SA4018-20	TYE	10/24/2016	10/24/2017
Block - DC	Fairview Microwave	SD3379	AMT	10/24/2016	10/24/2017
Cable	Fairview Microwave	SCK0963-60	TXF	11/18/2016	11/18/2017
Generator - Signal	Agilent	E4422B	TGS	3/27/2015	3/27/2018
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	10/4/2016	10/4/2017

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

TbtTx 2017.07.11 XMit 2017.02.08

EUT:	Garrett Z-Lynk MS-3 Headphones			**Work Order:**	GARR0032
Serial Number:	None			**Date:**	08/09/17
Customer:	Garrett Metal Detectors			**Temperature:**	23.8 °C
Attendees:	None			**Humidity:**	53% RH
Project:	None			**Barometric Pres.:**	1018 mbar
Tested by:	Marty Martin	**Power:**	USB via 110VAC/60Hz	**Job Site:**	TX02

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

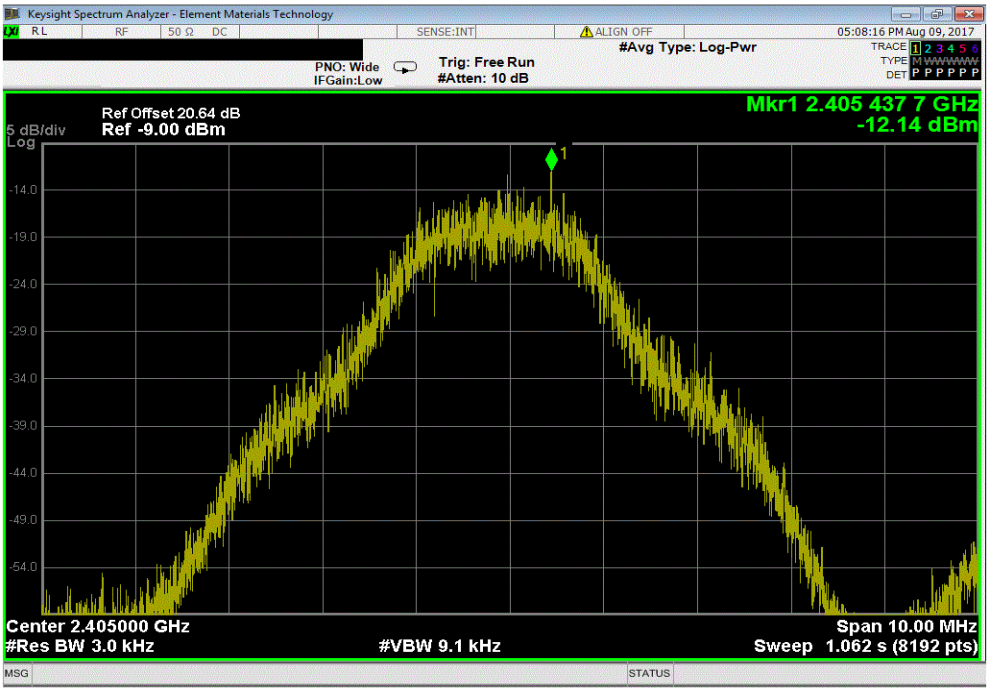
None

Configuration #	1	*Signature* Marty Martin

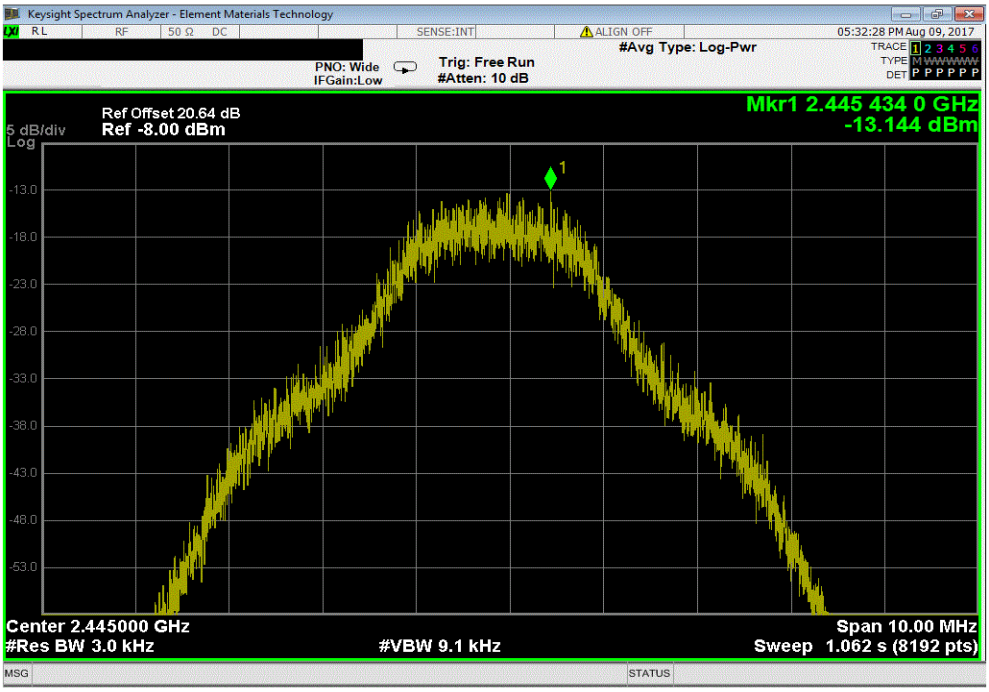
	Value dBm/3kHz	Limit < dBm/3kHz	Results
BLE/GFSK Low Channel, 2405 MHz	-12.144	8	Pass
BLE/GFSK Mid Channel, 2445 MHz	-13.144	8	Pass
BLE/GFSK High Channel, 2480 MHz	-13.337	8	Pass

POWER SPECTRAL DENSITY

BLE/GFSK Low Channel, 2405 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-12.144	8	Pass

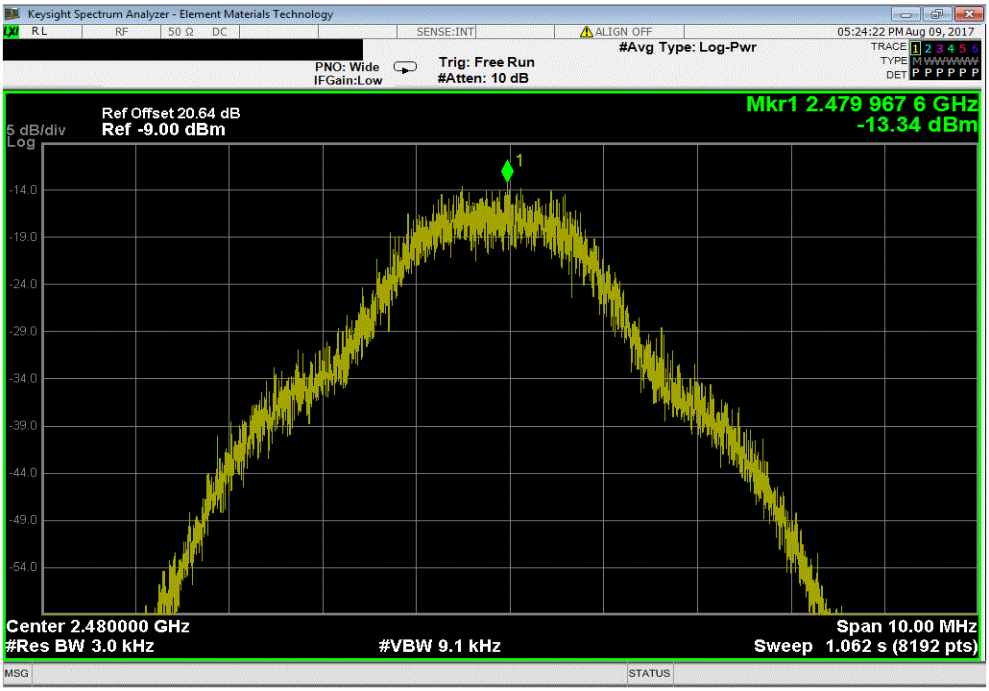


BLE/GFSK Mid Channel, 2445 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-13.144	8	Pass



POWER SPECTRAL DENSITY

BLE/GFSK High Channel, 2480 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-13.337	8	Pass



BAND EDGE COMPLIANCE

XMit 2017.02.08

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
Block - DC	Fairview Microwave	SD3379	AMT	10/24/2016	10/24/2017
Cable	Fairview Microwave	SCK0963-60	TXF	11/18/2016	11/18/2017
Attenuator	Fairview Microwave	SA4018-20	TYE	10/24/2016	10/24/2017
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	10/4/2016	10/4/2017
Generator - Signal	Agilent	E4422B	TGS	3/27/2015	3/27/2018

TEST DESCRIPTION

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

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

BAND EDGE COMPLIANCE

TbtTx 2017.07.11 XMit 2017.02.08

EUT:	Garrett Z-Lynk MS-3 Headphones			**Work Order:**	GARR0032
Serial Number:	None			**Date:**	08/09/17
Customer:	Garrett Metal Detectors			**Temperature:**	23.8 °C
Attendees:	None			**Humidity:**	53.2% RH
Project:	None			**Barometric Pres.:**	1018 mbar
Tested by:	Marty Martin	**Power:**	USB via 110VAC/60Hz	**Job Site:**	TX02

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

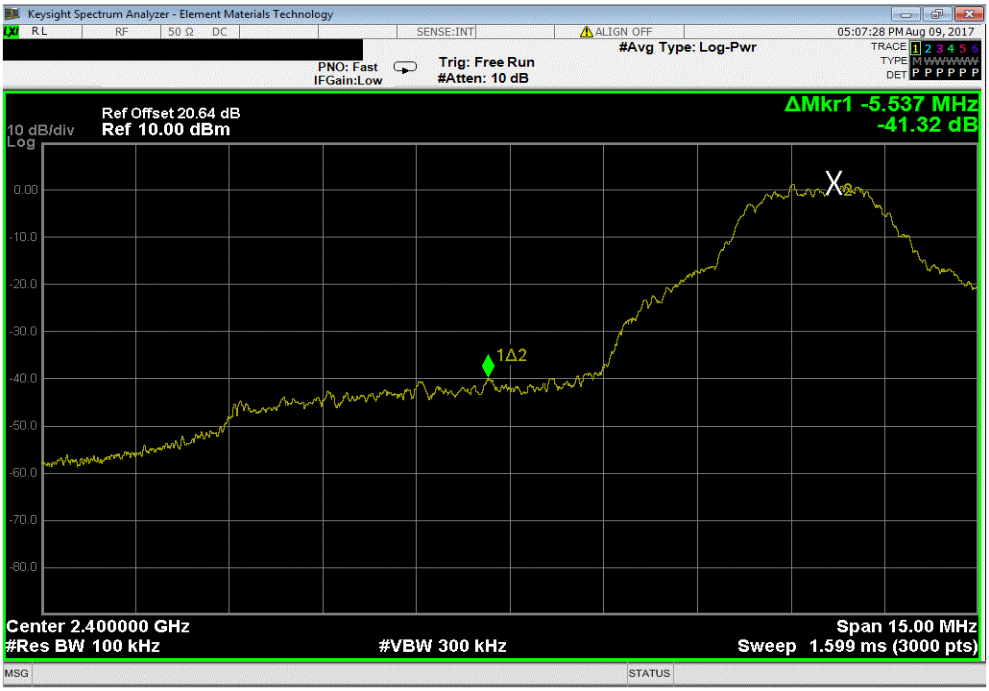
Configuration #	1	*Signature* Marty Martin

	Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK Low Channel, 2405 MHz	-41.3	-20	Pass
BLE/GFSK High Channel, 2480 MHz	-45.0	-20	Pass

BAND EDGE COMPLIANCE

TbtTx 2017.07.11 XMit 2017.02.08

BLE/GFSK Low Channel, 2405 MHz							
					Value (dBc)	Limit ≤ (dBc)	Result
					-41.3	-20	Pass



BLE/GFSK High Channel, 2480 MHz							
					Value (dBc)	Limit ≤ (dBc)	Result
					-45.0	-20	Pass

SPURIOUS CONDUCTED EMISSIONS

XMit 2017.02.08

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	Fairview Microwave	SA4018-20	TYE	10/24/2016	10/24/2017
Block - DC	Fairview Microwave	SD3379	AMT	10/24/2016	10/24/2017
Cable	Fairview Microwave	SCK0963-60	TXF	11/18/2016	11/18/2017
Generator - Signal	Agilent	E4422B	TGS	3/27/2015	3/27/2018
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	10/4/2016	10/4/2017

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

TbtTx 2017.07.11 XMit 2017.02.08

EUT:	Garrett Z-Lynk MS-3 Headphones			**Work Order:**	GARR0032
Serial Number:	None			**Date:**	08/09/17
Customer:	Garrett Metal Detectors			**Temperature:**	23.8 °C
Attendees:	None			**Humidity:**	53.2% RH
Project:	None			**Barometric Pres.:**	1018 mbar
Tested by:	Marty Martin	**Power:**	USB via 110VAC/60Hz	**Job Site:**	TX02

TEST SPECIFICATIONS	Test Method
FCC 15.247:2017	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

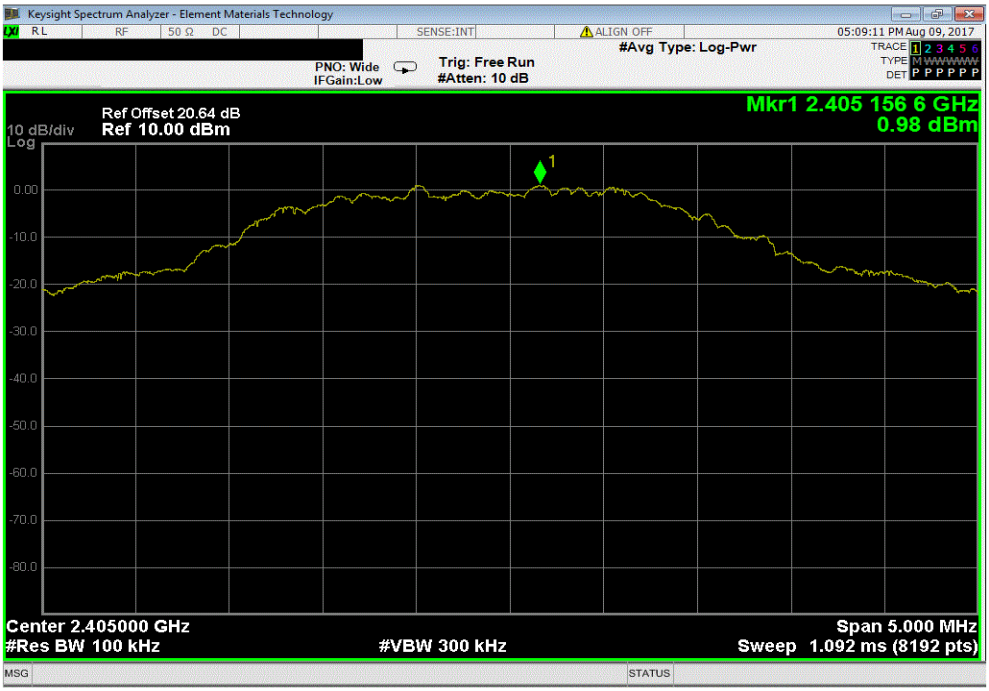
Configuration #	1	Signature

	Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK Low Channel, 2405 MHz	Fundamental	N/A	N/A	N/A
BLE/GFSK Low Channel, 2405 MHz	30 MHz - 12.5 GHz	-53.87	-20	Pass
BLE/GFSK Low Channel, 2405 MHz	12.5 GHz - 25 GHz	-52.71	-20	Pass
BLE/GFSK Mid Channel, 2445 MHz	Fundamental	N/A	N/A	N/A
BLE/GFSK Mid Channel, 2445 MHz	30 MHz - 12.5 GHz	-53.49	-20	Pass
BLE/GFSK Mid Channel, 2445 MHz	12.5 GHz - 25 GHz	-53.49	-20	Pass
BLE/GFSK High Channel, 2480 MHz	Fundamental	N/A	N/A	N/A
BLE/GFSK High Channel, 2480 MHz	30 MHz - 12.5 GHz	-50.41	-20	Pass
BLE/GFSK High Channel, 2480 MHz	12.5 GHz - 25 GHz	-53.24	-20	Pass

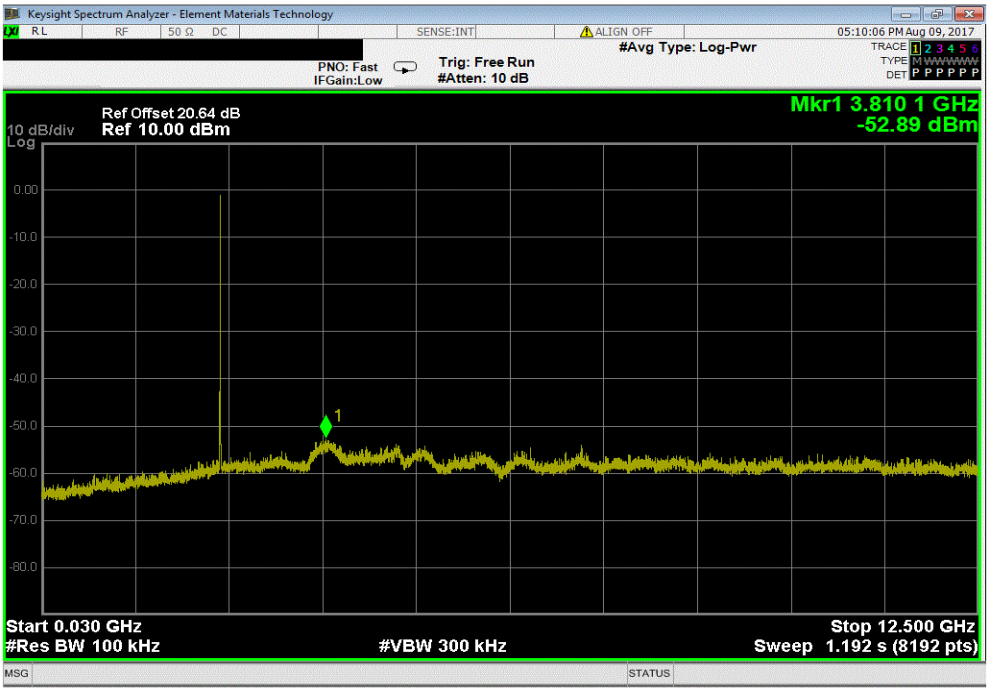
SPURIOUS CONDUCTED EMISSIONS

TbtTx 2017.07.11 XMit 2017.02.08

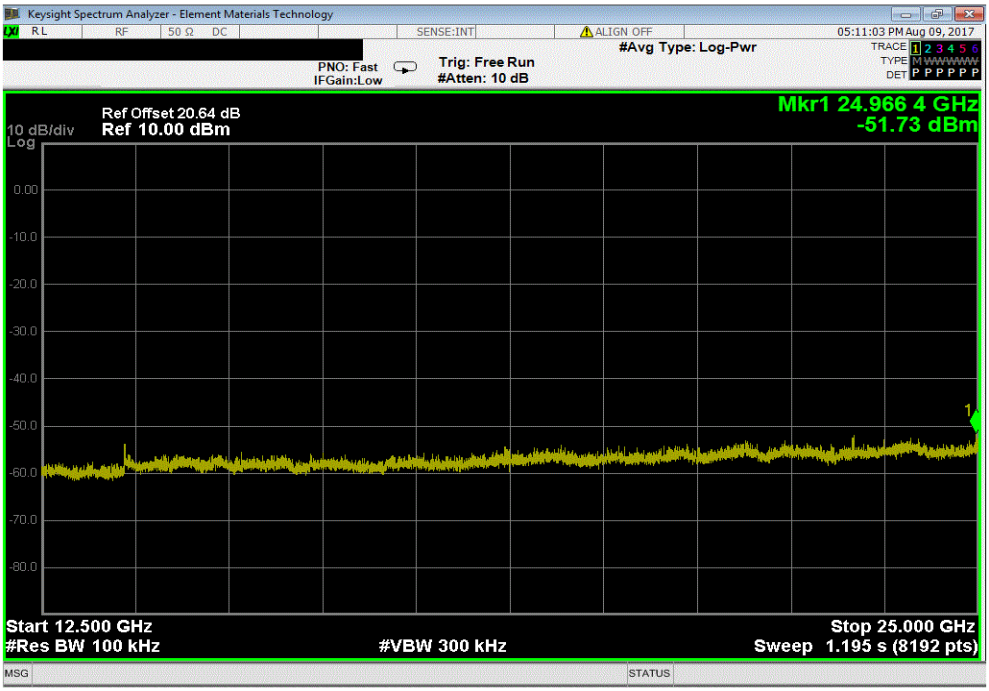
BLE/GFSK Low Channel, 2405 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



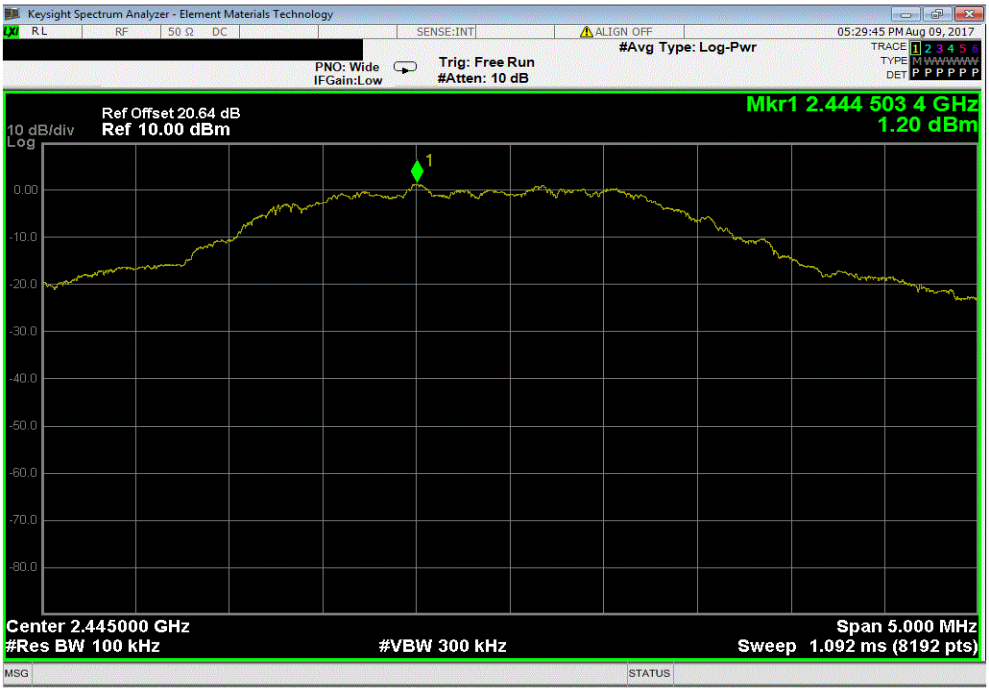
BLE/GFSK Low Channel, 2405 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-53.87	-20	Pass



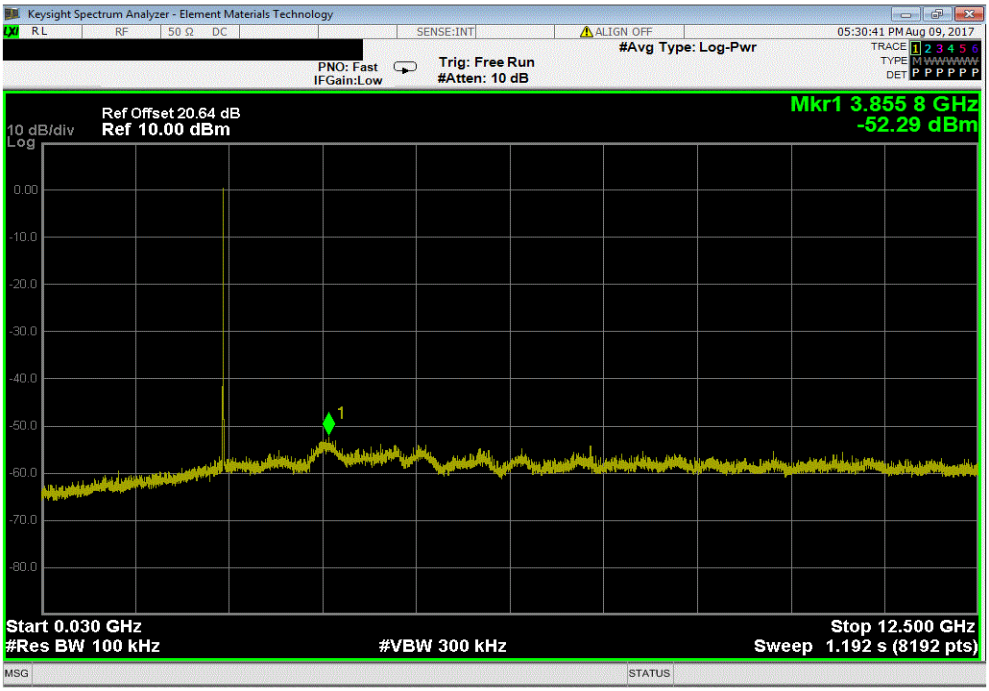
BLE/GFSK Low Channel, 2405 MHz				
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-52.71	-20	Pass



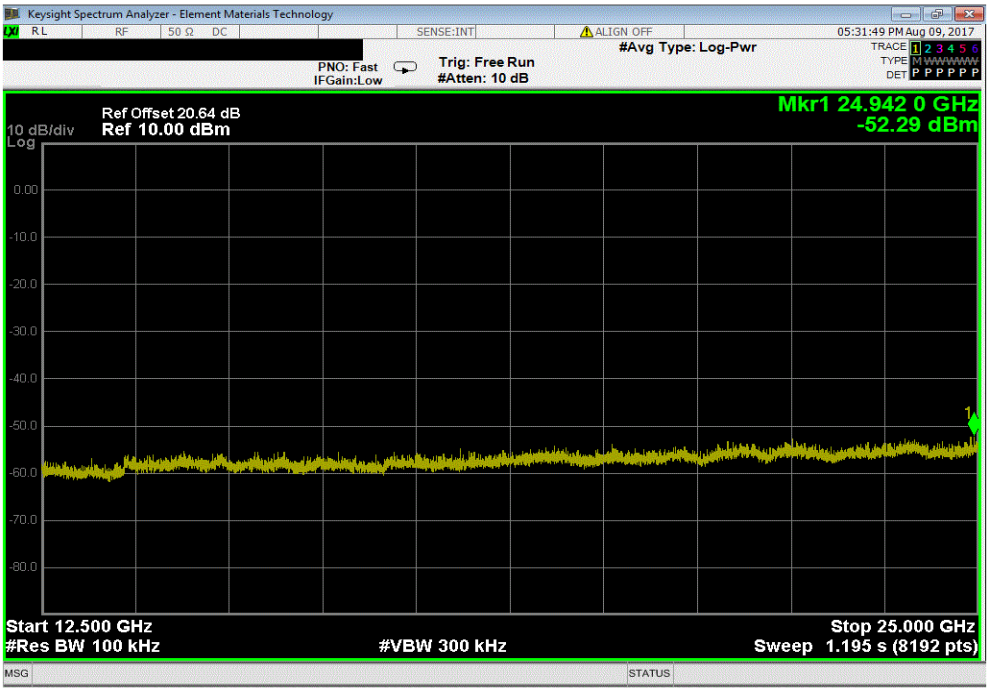
BLE/GFSK Mid Channel, 2445 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental		N/A	N/A	N/A



BLE/GFSK Mid Channel, 2445 MHz				
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-53.49	-20	Pass



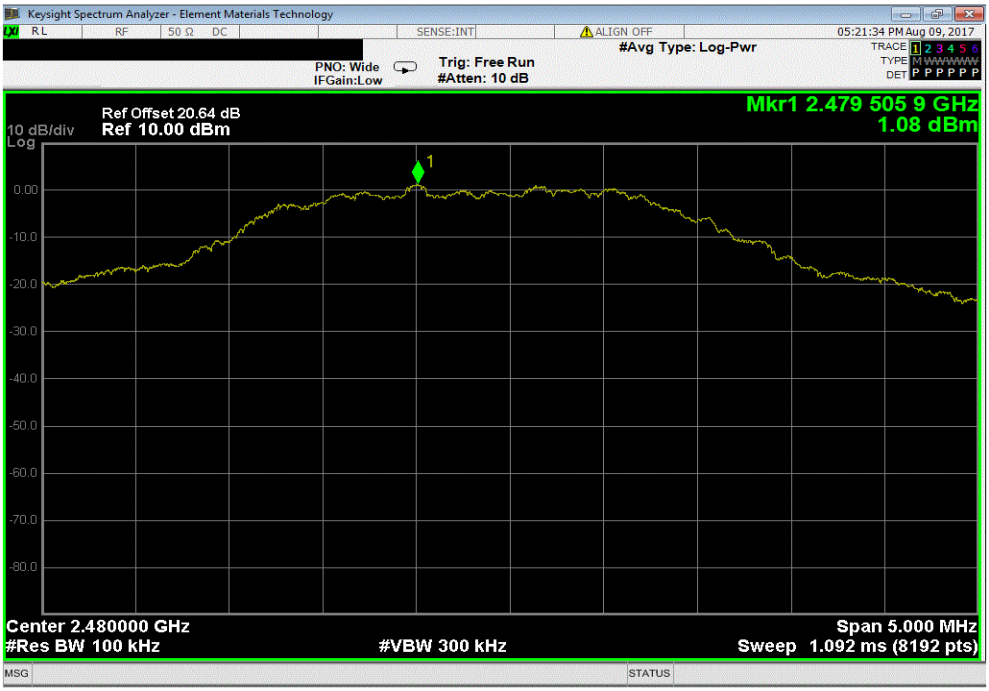
BLE/GFSK Mid Channel, 2445 MHz				
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-53.49	-20	Pass



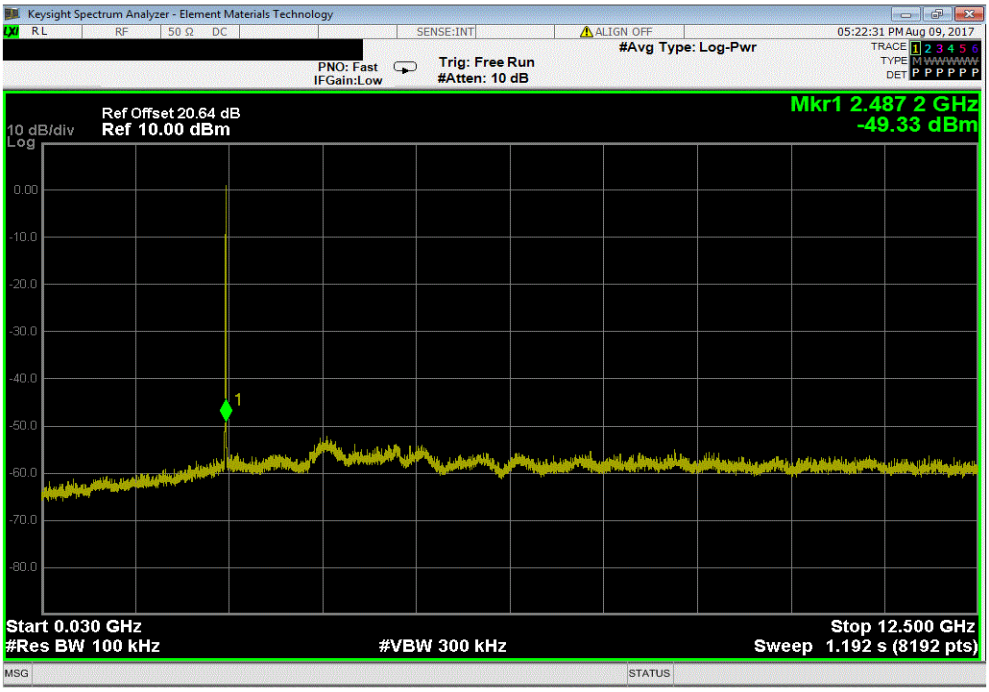
SPURIOUS CONDUCTED EMISSIONS

TbtTx 2017.07.11 XMit 2017.02.08

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



BLE/GFSK High Channel, 2480 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-50.41	-20	Pass



BLE/GFSK High Channel, 2480 MHz				
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-53.24	-20	Pass