



element

Motorola Solutions, Inc.

HiFi Base 3.0

FCC 15.247:2021

Report: WTVD0073 Rev. 1, Issue Date: December 8, 2021



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CERTIFICATE OF TEST

Last Date of Test: November 10, 2021
Motorola Solutions, Inc.
EUT: HiFi Base 3.0

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2021	ANSI C63.10:2013; KDB 558074 v05r02

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required due to EUT being only powered by a DC battery.
11.6	Duty Cycle	Yes	N/A	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.1.1	Output Power	Yes	Pass	
11.9.1.1	Equivalent Isotropic Radiated Power	Yes	Pass	
11.10.2	Power Spectral Density	Yes	Pass	
11.11	Band Edge Compliance	Yes	Pass	
11.11	Spurious Conducted Emissions	Yes	Pass	
11.12.1, 11.13.2, 6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:



Adam Bruno, Operations Manager

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

REVISION HISTORY



Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None	2021-11-29	None
01	Added attestation of worst case duty cycle calculation to Functional Description Page. Corrected Duty Cycle on Spurious Radiated Emissions data to $10\log(34.32\text{mSec}/100\text{mSec})$	2021-12-06	6/52, 47/52, 49/52

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 - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

Canada

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

European Union

European Commission – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

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

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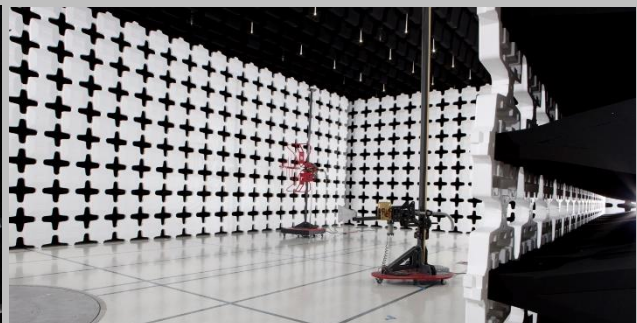
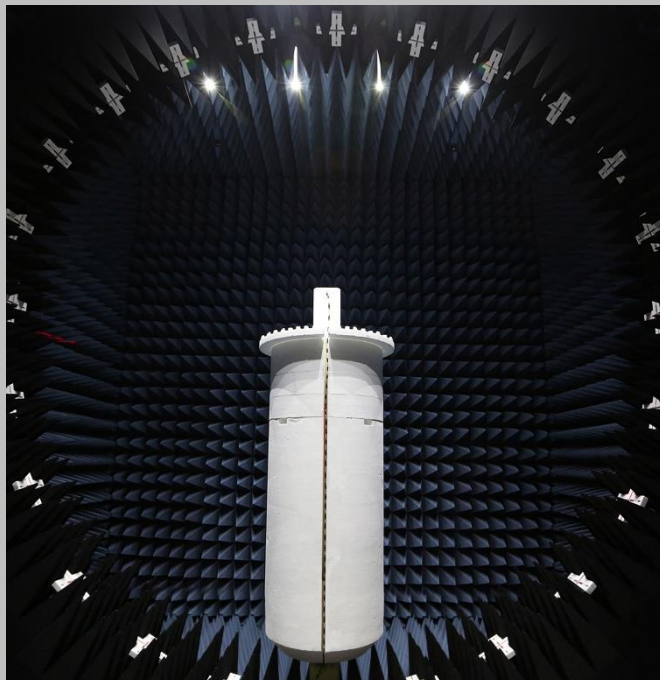
[Texas](#)

[Washington](#)

FACILITIES



California Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Oregon Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th Ave NE Bothell, WA 98011 (425)984-6600
A2LA				
Lab Code: 3310.04	Lab Code: 3310.05	Lab Code: 3310.02	Lab Code: 3310.03	Lab Code: 3310.06
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Motorola Solutions Inc.
Address:	415 East Exchange Pkwy
City, State, Zip:	Allen, TX 75002
Test Requested By:	Navaid Karimi
EUT:	HiFi Base 3.0
First Date of Test:	November 09, 2021
Last Date of Test:	November 10, 2021
Receipt Date of Samples:	November 09, 2021
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

Microphone system containing a 2.4 GHz DTS radio. EUT uses Motorola Solutions Inc. proprietary protocol using only coded PHY, S=8 and 125 kbps data rate supported.

HiFi Base 3.0 maximum operational duty cycle calculation:

- $1440 \mu\text{s ISO} \times 2 \times 6 \text{ ISO events} = 17280 \mu\text{s}$
- The 7th ISO would be overlapped by an extended ACL event.
- Total duty cycle = $17280 \mu\text{s} + 16784 \mu\text{s} + 256 \mu\text{s for ACL single packet} = 34320 \mu\text{s per 100 ms}$
- Maximum duty cycle is 34.32 ms per 100 ms, therefore, maximum duty cycle is 34.3%

Testing Objective:

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

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.

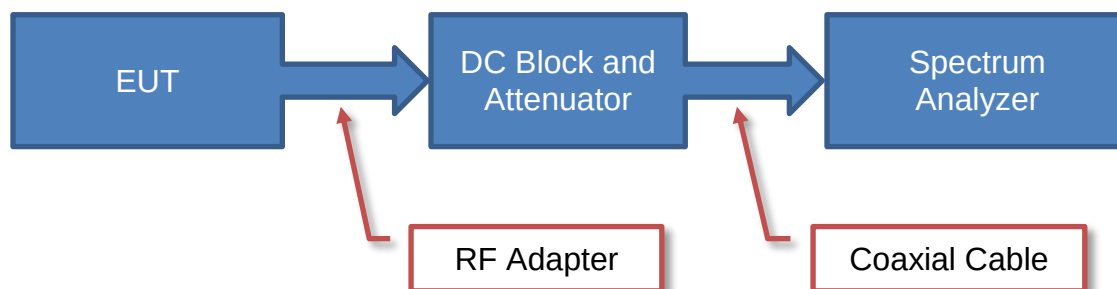
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific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

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

Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.1 dB	-5.1 dB
AC Powerline Conducted Emissions (dB)	3.1 dB	-3.1 dB

TEST SETUP BLOCK DIAGRAMS

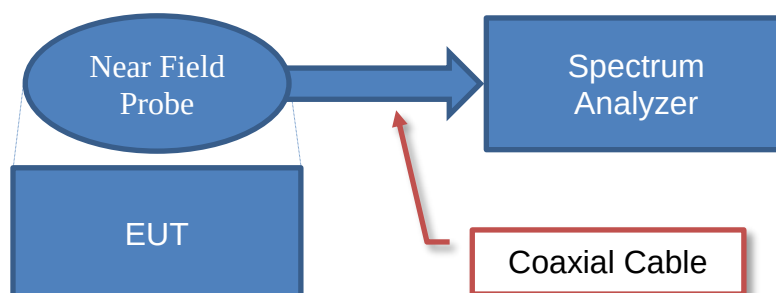
Antenna Port Conducted Measurements



Sample Calculation

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

Near Field Test Fixture Measurements

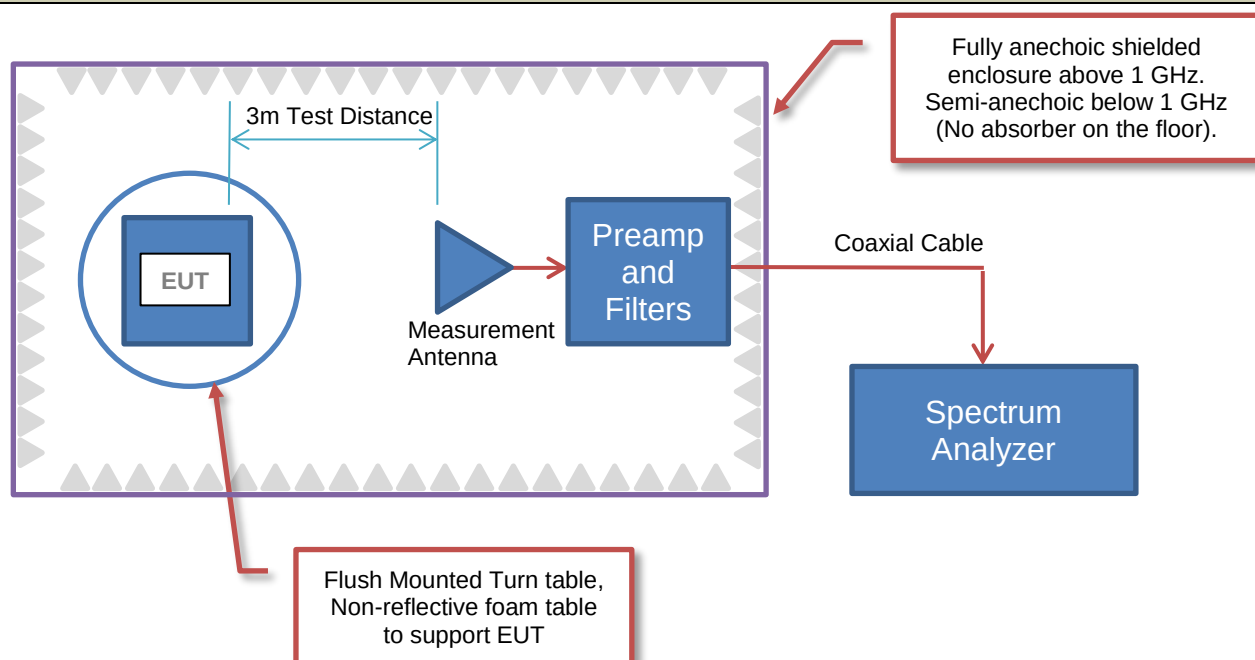


Sample Calculation

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

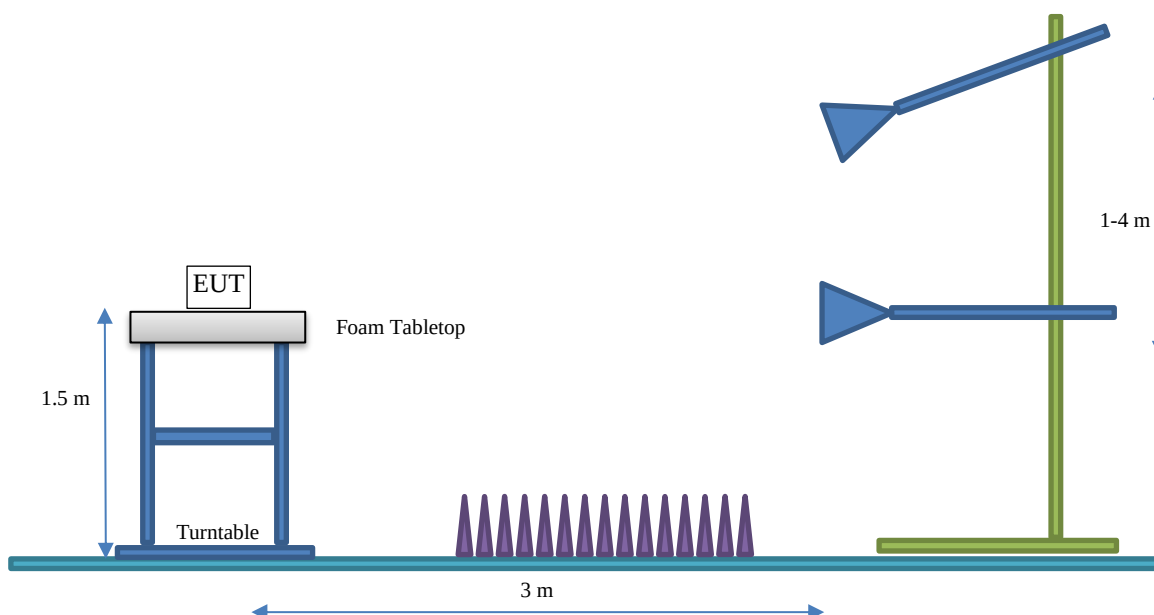
TEST SETUP BLOCK DIAGRAMS

Spurious Radiated Emissions



Bore Sighting (>1GHz)

The diameter of the illumination area is the dimension of the line tangent to the EUT formed by 3 dB beamwidth of the measurement antenna at the measurement distance. At a 3 meter test distance, the diameter of the illumination area was 3.8 meters at 1 GHz and greater than 2.1 meters up to 6 GHz. Above 1 GHz, when required by the measurement standard, the antenna is pointed for both azimuth and elevation to maintain the receive antenna within the cone of radiation from the EUT. The specified measurement detectors were used for comparison of the emissions to the peak and average specification limits.



POWER SETTINGS AND ANTENNAS



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

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
Dipole Antenna	PC Tel	2300 - 2500	4.6

The EUT was tested using the power settings provided by the manufacturer:

SETTINGS FOR ALL TESTS IN THIS REPORT

HiFi Base 3.0	Power Setting
Channels 0-38	3
Channel 39	2

CONFIGURATIONS



Configuration WTVD0073- 1

Software/Firmware Running During Test	
Description	Version
DTM	1.0
TeraTerm	4.105
Windows 10 Pro	20.H2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Dipole Antenna	PC Tel	WGP02504	None
HiFi Base 3.0	Motorola Solutions, Inc	MIC-WRL-TRN-500	2

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Keyboard (Tablet PC)	Logitech	Y-U0009	1837CS517YN8
Mouse (Tablet PC)	Logitech	M-U0025	180-002182
Tablet PC	ENTEGR A Technologies	940-10-972	CPWC43140066
Tablet Dock	ENTEGR A Technologies	DTC-0972	12102AR38140042
AC/DC adapter (Tablet)	FSP GRUOP INC.	FSP060-DBAE1	9NA0603116-0H-00645-142810
Debug Box	Motorola Solutions, Inc	WGA00487	None
AC/DC adaptor (debug box)	GlobTek, Inc	WR92E125LCP-Y(R)	GT-21089-1512-W3
RJ11 to RJ45 Cable	Motorola Solutions, Inc	WGA00380-004	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
RJ11 to RJ45 Cable	No	3.1m	Yes	Ethernet to USB Adapter	Base
Antenna sma cable	Yes	0.4m	No	Dipole Antenna	Base

CONFIGURATIONS



Configuration WTVD0073- 2

Software/Firmware Running During Test	
Description	Version
DTM	1.0
TeraTerm	4.105
Windows 10 Pro	20.H2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
HiFi Mic 3.0 (Transmitter)	Motorola Solutions, Inc	MIC-WRL-TRN-500	1

Peripherals in Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
HiFi Base 3.0	Motorola Solutions, Inc	MIC-WRL-CHG-500	1
Keyboard (Tablet PC)	Logitech	Y-U0009	1837CS517YN8
Mouse (Tablet PC)	Logitech	M-U0025	180-002182
Tablet PC	ENTEGR A Technologies	940-10-972	CPWC43140066
Tablet Dock	ENTEGR A Technologies	DTC-0972	12102AR38140042
AC/DC adapter (Tablet)	FSP GRUOP INC.	FSP060-DBAE1	9NA0603116-0H-00645-142810
Debug Box	Motorola Solutions, Inc	WGA00487	None
AC/DC adaptor (debug box)	GlobTek, Inc	WR92E125LCP-Y(R)	GT-21089-1512-W3
RJ11 to RJ45 Cable	Motorola Solutions, Inc	WGA00380-004	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC power Cable (Adapter Tablet)	Yes	2.0m	No	AC/DC adaptor	AC mains
DC power Cable (Adapter Tablet)	No	1.2m	Yes	AC/DC adaptor	Tablet Dock
Keyboard Cable	Yes	1.0m	No	Keyboard	Tablet
Mouse Cable	Yes	1.0m	No	Mouse	Tablet
RJ11 to RJ45 Cable	No	3.1m	Yes	Ethernet to USB Adapter	Base
DC power Cable (debug box)	No	1.0m	Yes	AC/DC adaptor (Debug Box)	Debug Box
USB A to B Cable	Yes	1.0m	Yes	Debug Box	Tablet

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2021-11-09	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2021-11-10	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.
3	2021-11-10	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	2021-11-10	Equivalent Isotropic Radiated 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.
5	2021-11-10	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	2021-11-10	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.
7	2021-11-10	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.
8	2021-11-10	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE



XMIT 2020.12.30.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	2020-08-29	2023-08-29
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	2021-09-13	2022-09-13
Attenuator	Fairview Microwave	SA18E 1913	TZV	2021-09-15	2022-09-15
Block - DC	Fairview Microwave	SD3239	ANC	2021-06-24	2022-06-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06

TEST DESCRIPTION

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

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

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

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

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

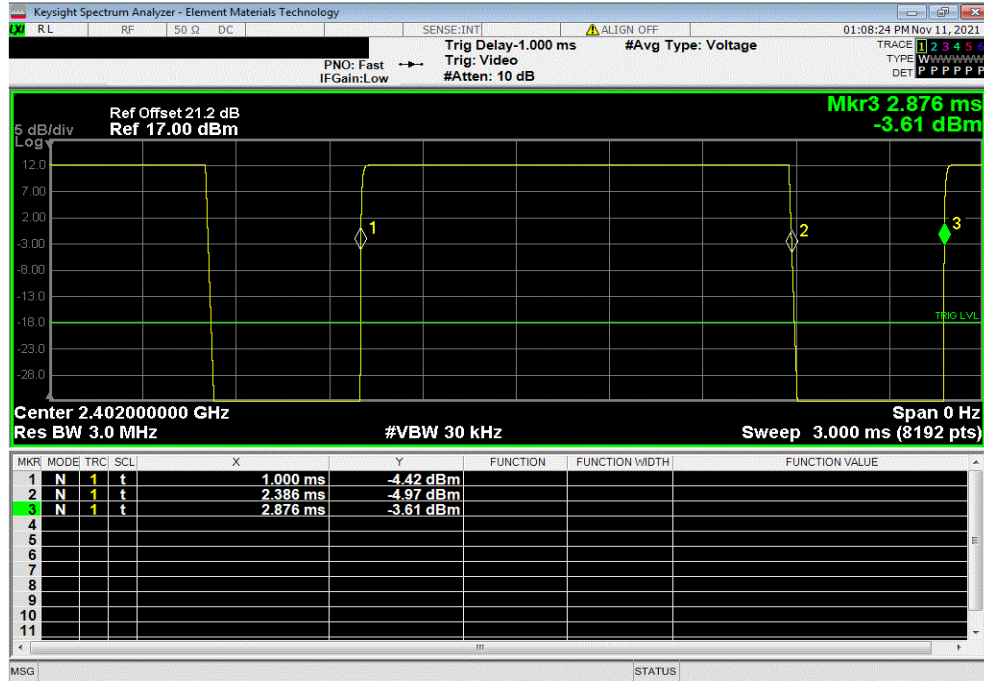
ThiTx 2021.03.19.1 XMIT 2020.12.30.0

DUTY CYCLE

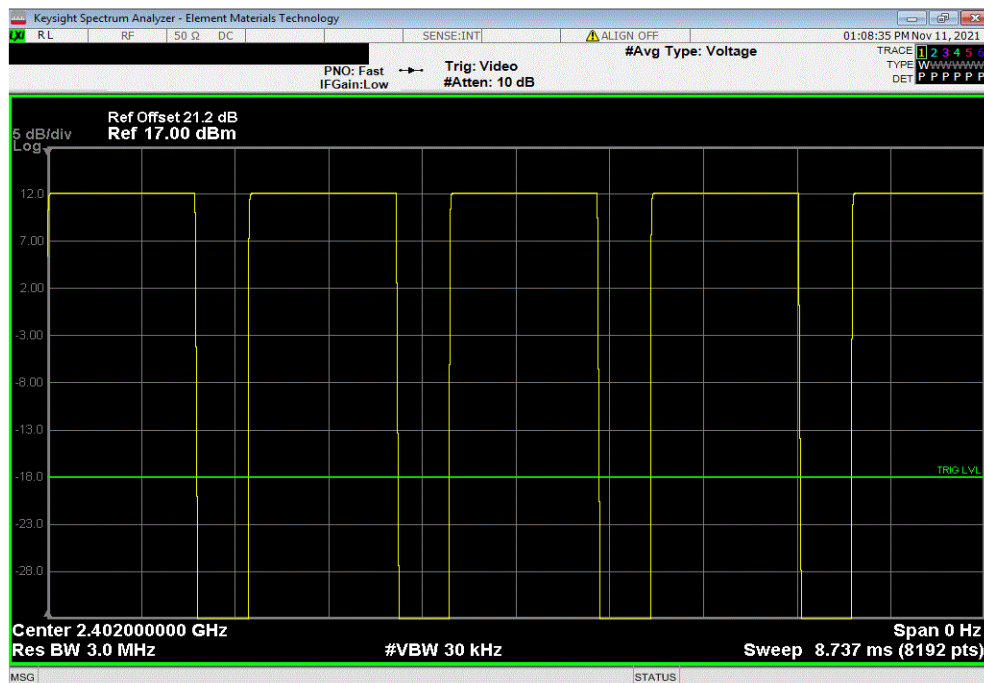


TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.386 ms	1.875 ms	1	73.9	N/A	N/A	



2.4 GHz DTS 125 kbps Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

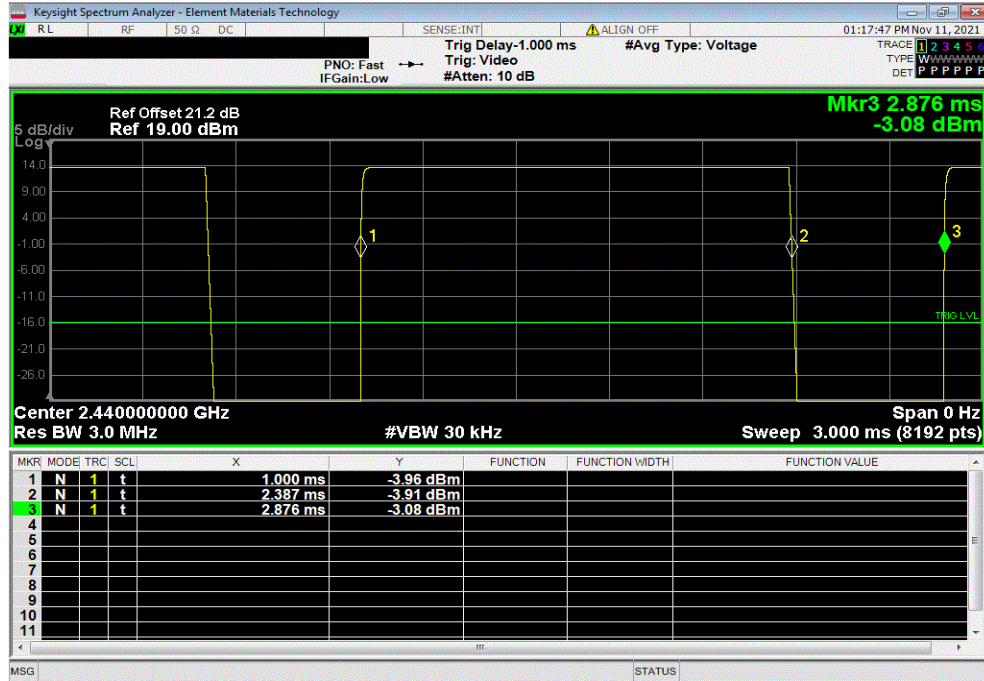


DUTY CYCLE

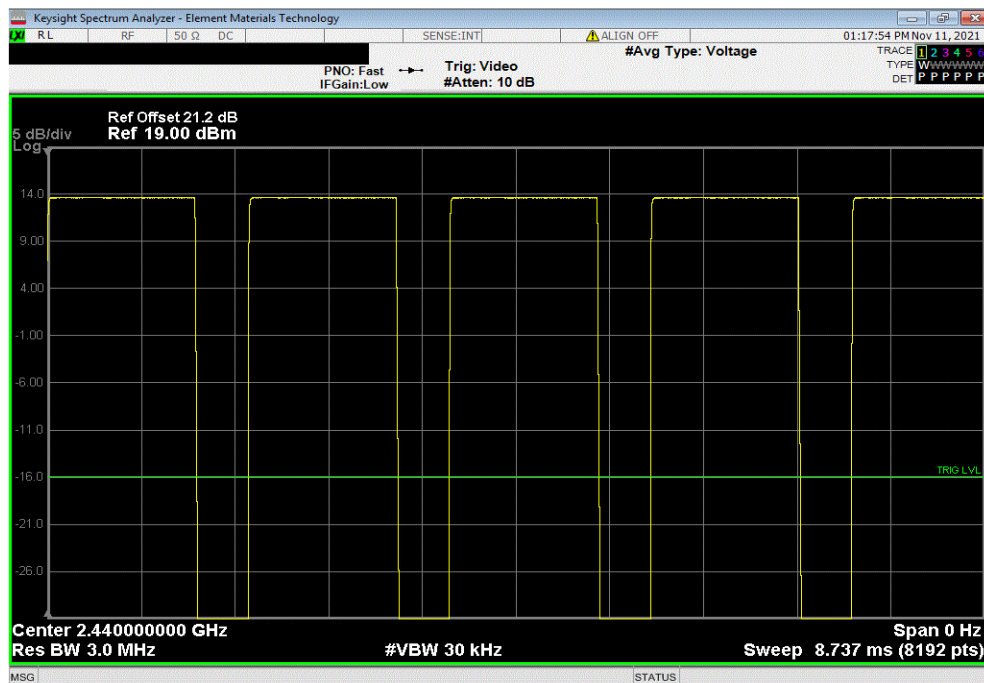


TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.386 ms	1.875 ms	1	73.9	N/A	N/A	



2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

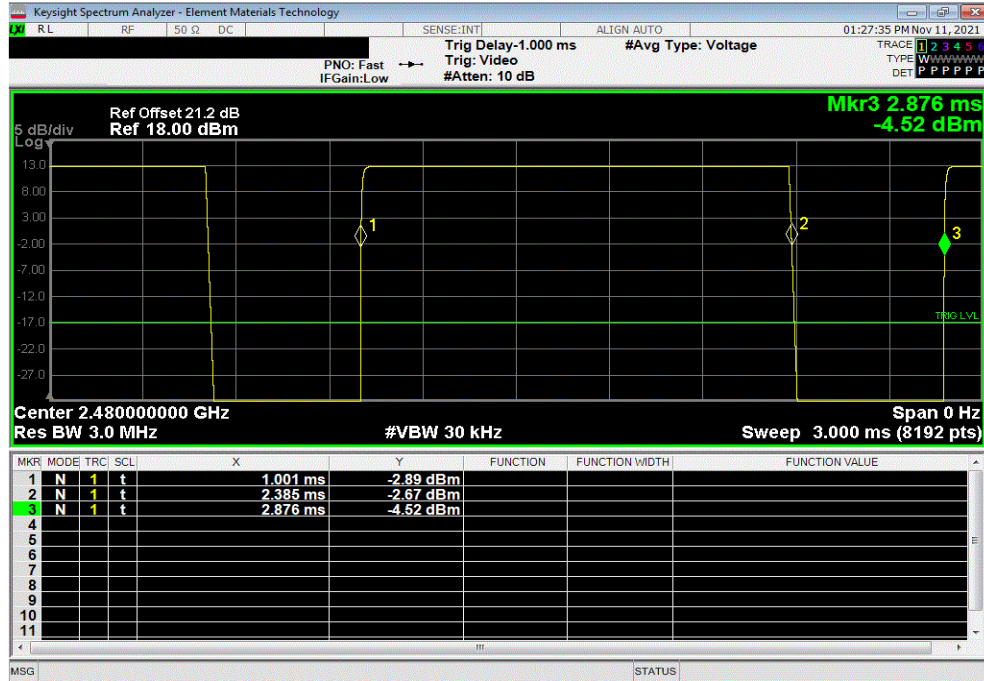


DUTY CYCLE

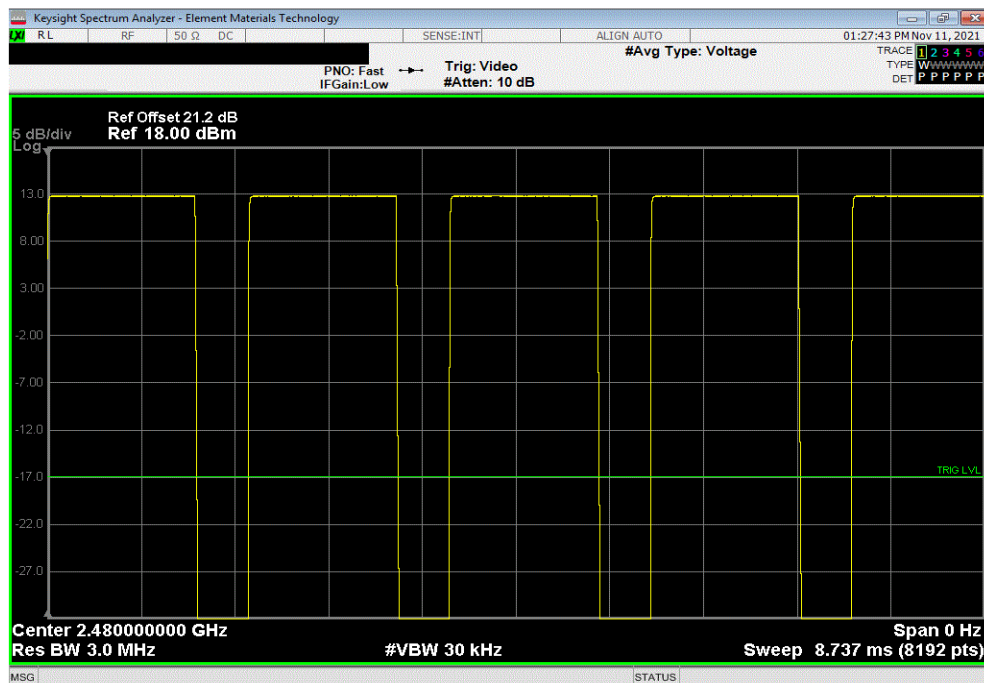


TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
1.385 ms	1.875 ms	1	73.9	N/A	N/A	



2.4 GHz DTS 125 kbps High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	



OCCUPIED BANDWIDTH



XMIT 2020.12.30.0

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Attenuator	Fairview Microwave	SA18E 1913	TZV	2021-09-15	2022-09-15
Block - DC	Fairview Microwave	SD3239	ANC	2021-06-24	2022-06-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06

TEST DESCRIPTION

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

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

OCCUPIED BANDWIDTH



TSMTx 2021.03.19.1 XMR 2020.12.30.0

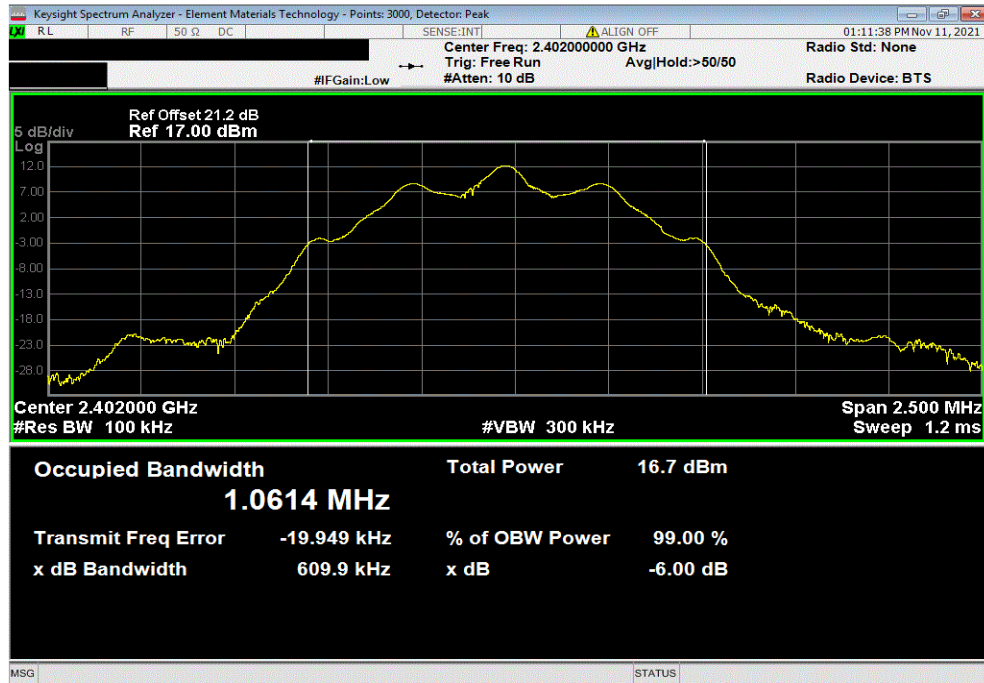
EUT: HiFi Base 3.0		Work Order: WTVD0073	
Serial Number: 1		Date: 10-Nov-21	
Customer: Motorola Solutions, Inc.		Temperature: 22 °C	
Attendees: Navaid Karimi		Humidity: 48.8% RH	
Project: None		Barometric Pres.: 1011 mbar	
Tested by: Mark Baytan		Power: 12VDC via 110VAC/60Hz	
Job Site: TX02			
TEST SPECIFICATIONS			
FCC 15.247:2021		Test Method	
		ANSI C63.10:2013	
COMMENTS			
21.2 dB reference level offset includes: DC block, 20dB attenuator, RF test cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Value	Limit (±)
2.4 GHz DTS 125 kbps Low Channel, 2402 MHz		609.939 kHz	500 kHz
2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz		610.161 kHz	500 kHz
2.4 GHz DTS 125 kbps High Channel, 2480 MHz		612.032 kHz	500 kHz
			Result
			Pass
			Pass
			Pass

OCCUPIED BANDWIDTH

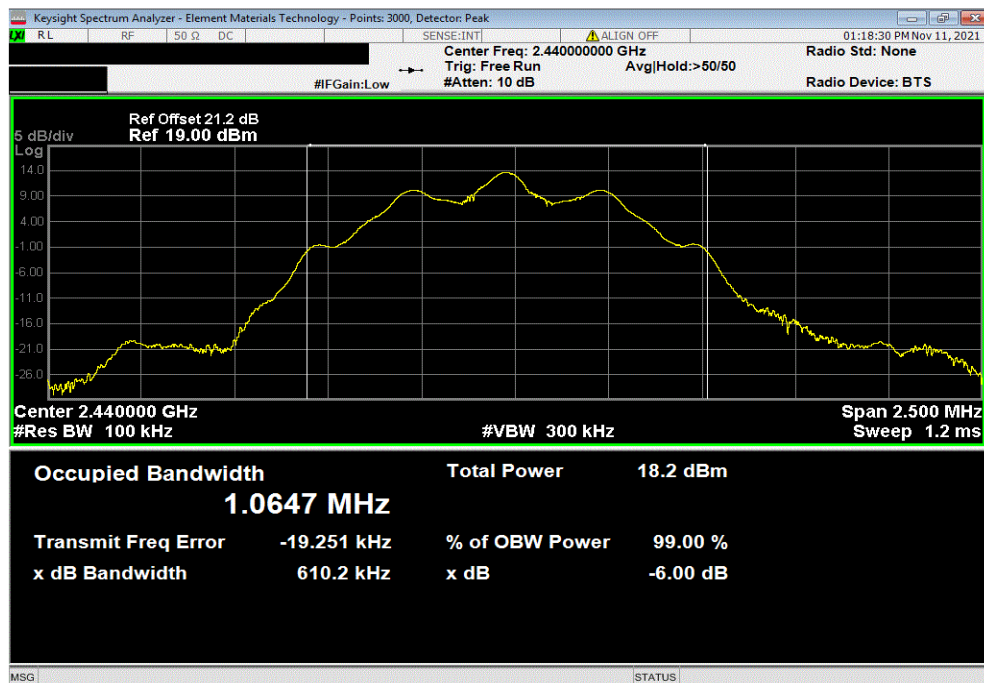


TbTx 2021.03.19.1 XM8 2020.12.30.0

2.4 GHz DTS 125 kbps Low Channel, 2402 MHz						
				Value	Limit (≥)	Result
				609.939 kHz	500 kHz	Pass



2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz						
				Value	Limit (≥)	Result
				610.161 kHz	500 kHz	Pass

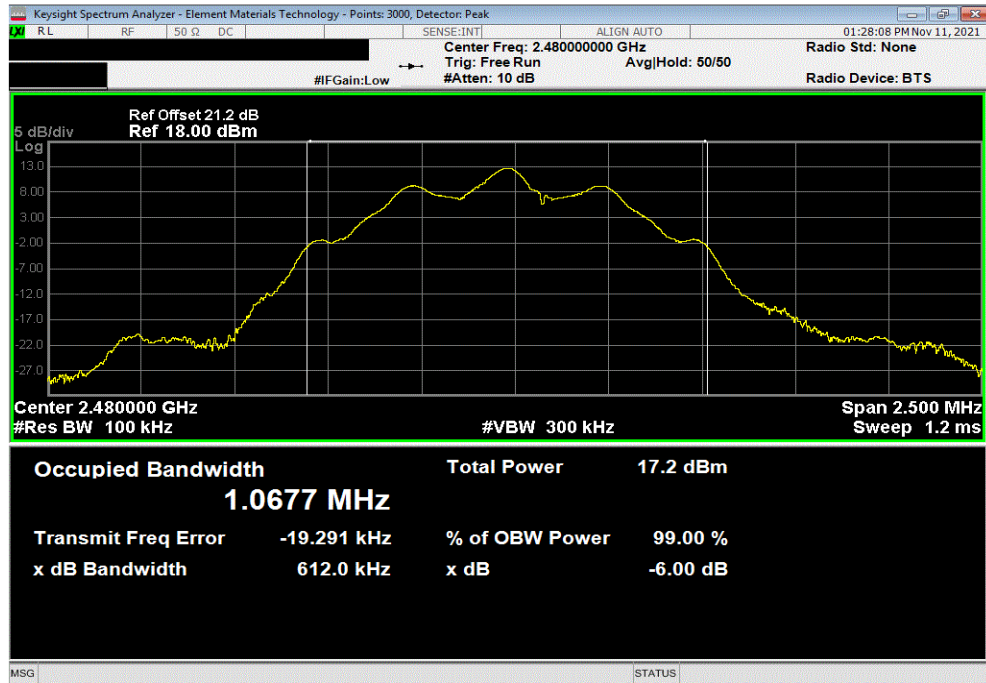


OCCUPIED BANDWIDTH



TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps High Channel, 2480 MHz						
Value				Limit	Result	
612.032 kHz				500 kHz	Pass	



OUTPUT POWER



XMIT 2020.12.30.0

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

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Block - DC	Fairview Microwave	SD3239	ANC	2021-06-24	2022-06-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

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

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

OUTPUT POWER



TSTx 2021.03.19.1 XMR 2020.12.30.0

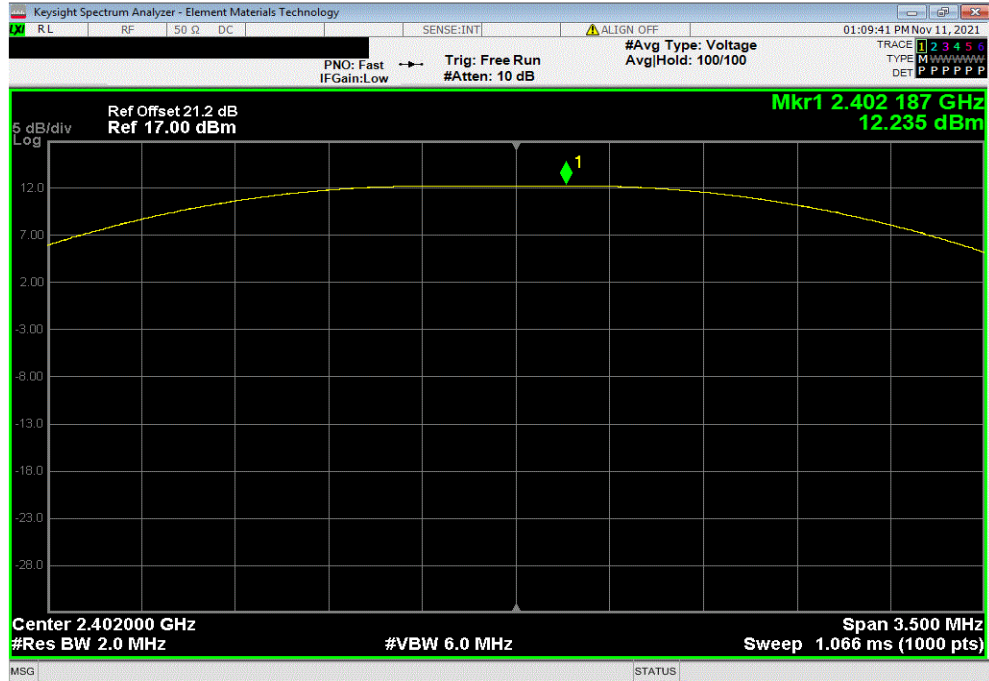
EUT: HiFi Base 3.0		Work Order: WTVD0073	
Serial Number: 1		Date: 10-Nov-21	
Customer: Motorola Solutions, Inc.		Temperature: 22 °C	
Attendees: Navaid Karimi		Humidity: 48.8% RH	
Project: None		Barometric Pres.: 1011 mbar	
Tested by: Mark Baytan		Power: 12VDC via 110VAC/60Hz	
		Job Site: TX02	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
21.2 dB reference level offset includes: DC block, 20dB attenuator, RF test cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Out Pwr (dBm)	Limit (dBm)
2.4 GHz DTS 125 kbps Low Channel, 2402 MHz		12.235	30
2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz		13.727	30
2.4 GHz DTS 125 kbps High Channel, 2480 MHz		12.904	30
			Result
			Pass
			Pass
			Pass

OUTPUT POWER

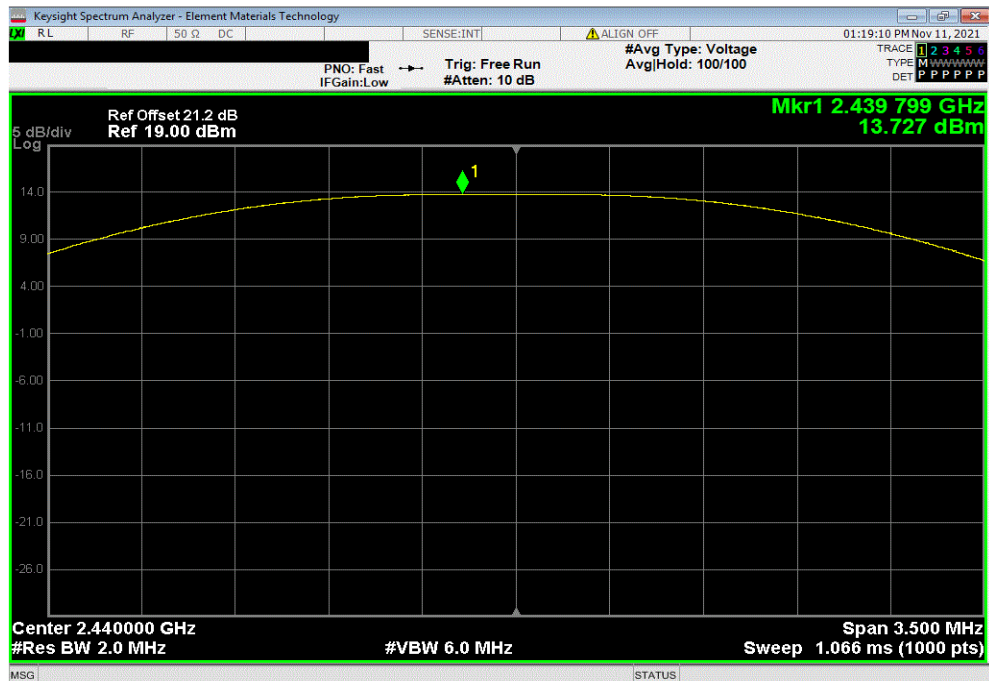


TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps Low Channel, 2402 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				12.235	30	Pass



2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				13.727	30	Pass

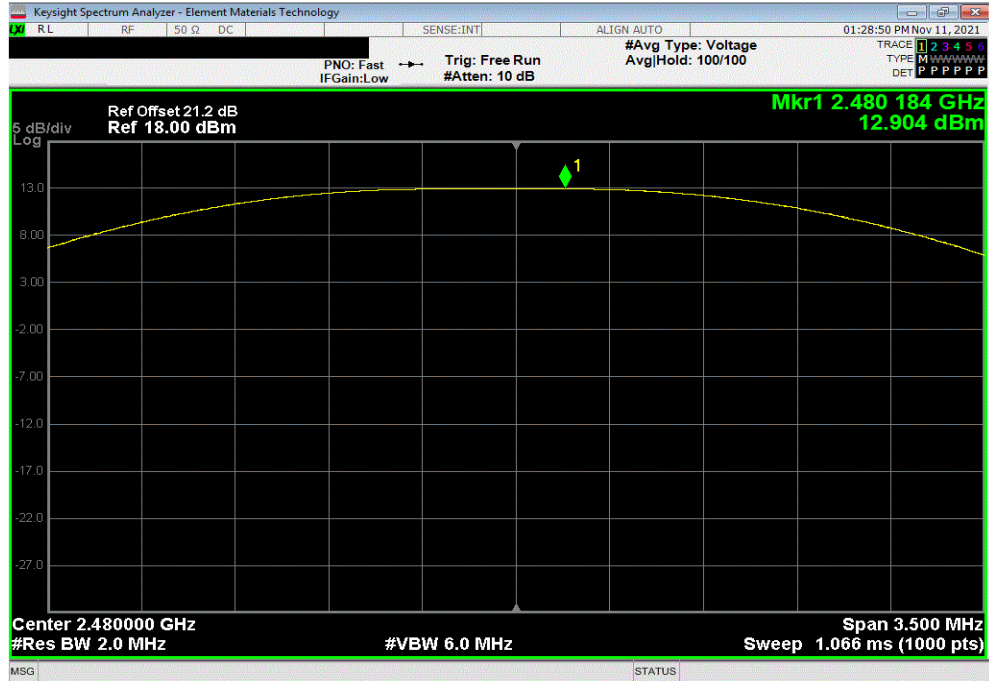


OUTPUT POWER



TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps High Channel, 2480 MHz						
				Out Pwr (dBm)	Limit (dBm)	Result
				12.904	30	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



XMIT 2020.12.30.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANC	2021-06-24	2022-06-24
Generator - Signal	Agilent	N5182A	TIF	2020-08-29	2023-08-29
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	2021-09-13	2022-09-13
Attenuator	Fairview Microwave	SA18E 1913	TZV	2021-09-15	2022-09-15
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

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

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

Equivalent Isotropic Radiated Power (EIRP) = Max Measured Power + Antenna gain (dBi)

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



TSMTx 2021.03.19.1 XMR 2020.12.30.0

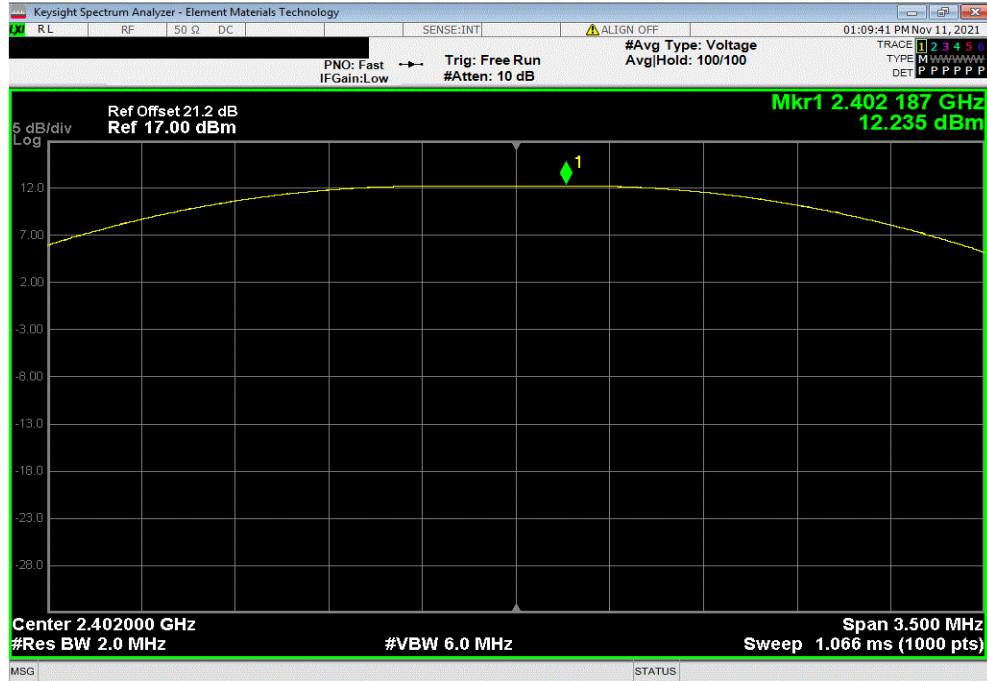
EUT: HiFi Base 3.0		Work Order: WTVD0073	
Serial Number: 1		Date: 10-Nov-21	
Customer: Motorola Solutions, Inc.		Temperature: 22 °C	
Attendees: Navaid Karimi		Humidity: 48.8% RH	
Project: None		Barometric Pres.: 1011 mbar	
Tested by: Mark Baytan	Power: 12VDC via 110VAC/60Hz	Job Site: TX02	
TEST SPECIFICATIONS			
FCC 15.247:2021		Test Method: ANSI C63.10:2013	
COMMENTS			
21.2 dB reference level offset includes: DC block, 20dB attenuator, RF test cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Out Pwr (dBm)	Antenna Gain (dBi)
2.4 GHz DTS 125 kbps Low Channel, 2402 MHz		12.235	4.6
2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz		13.727	4.6
2.4 GHz DTS 125 kbps High Channel, 2480 MHz		12.904	4.6
		EIRP (dBm)	EIRP Limit (dBm)
		16.835	36
		18.327	36
		17.504	36
			Result
			Pass
			Pass
			Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

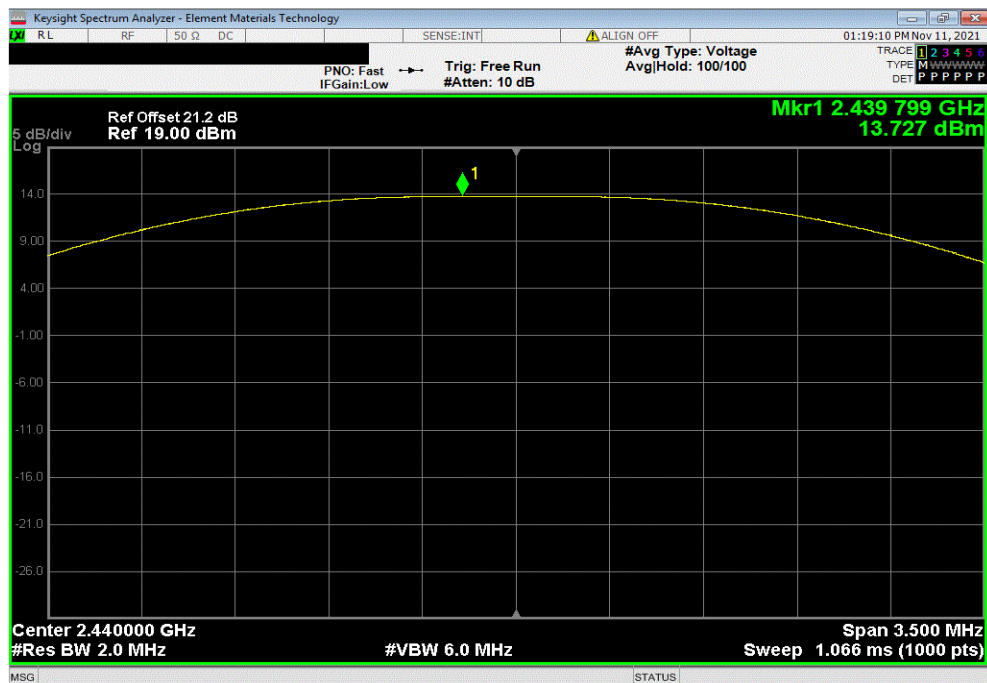


TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps Low Channel, 2402 MHz						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	12.235	4.6	16.835	36	Pass	



2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	13.727	4.6	18.327	36	Pass	

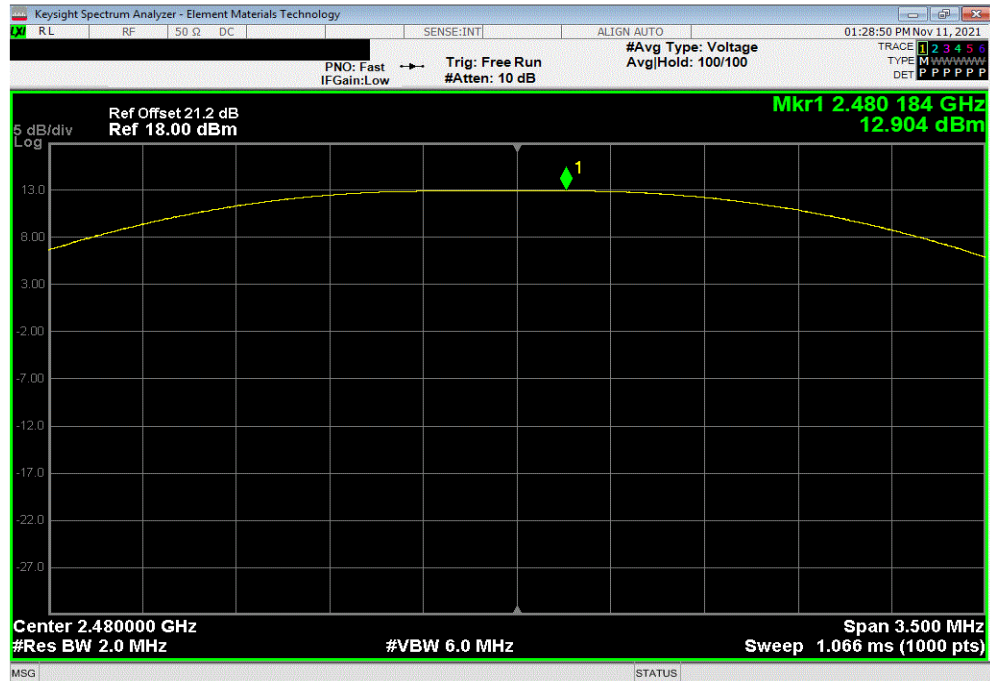


EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)



TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps High Channel, 2480 MHz						
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result	
	12.904	4.6	17.504	36	Pass	



POWER SPECTRAL DENSITY

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	2020-08-29	2023-08-29
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	2021-09-13	2022-09-13
Attenuator	Fairview Microwave	SA18E 1913	TZV	2021-09-15	2022-09-15
Block - DC	Fairview Microwave	SD3239	ANC	2021-06-24	2022-06-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06

TEST DESCRIPTION

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

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

POWER SPECTRAL DENSITY



TSMTx 2021.03.19.1 XMR 2020.12.30.0

EUT: HiFi Base 3.0		Work Order: WTVD0073	
Serial Number: 1		Date: 10-Nov-21	
Customer: Motorola Solutions, Inc.		Temperature: 22 °C	
Attendees: Navaid Karimi		Humidity: 48.8% RH	
Project: None		Barometric Pres.: 1011 mbar	
Tested by: Mark Baytan		Power: 12VDC via 110VAC/60Hz	
		Job Site: TX02	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
21.2 dB reference level offset includes: DC block, 20dB attenuator, RF test cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Value dBm/3kHz	Limit < dBm/3kHz
2.4 GHz DTS 125 kbps Low Channel, 2402 MHz		6.18	8
2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz		7.606	8
2.4 GHz DTS 125 kbps High Channel, 2480 MHz		6.848	8
			Results
			Pass
			Pass
			Pass

POWER SPECTRAL DENSITY

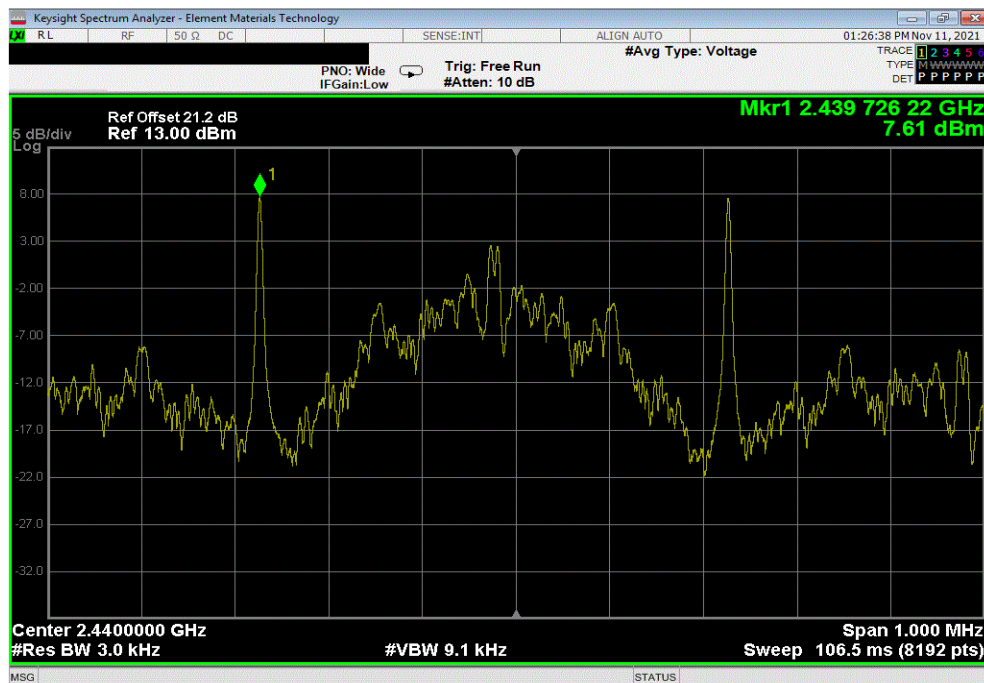


TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps Low Channel, 2402 MHz						
	Value	Limit				
	dBm/3kHz	< dBm/3kHz	Results			
	6.18	8	Pass			



2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz						
	Value	Limit				
	dBm/3kHz	< dBm/3kHz	Results			
	7.606	8	Pass			



POWER SPECTRAL DENSITY



TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps High Channel, 2480 MHz						
	Value	Limit				
	dBm/3kHz	< dBm/3kHz	Results			
	6.848	8	Pass			



BAND EDGE COMPLIANCE



XMIT 2020.12.30.0

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	2020-08-29	2023-08-29
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	2021-09-13	2022-09-13
Attenuator	Fairview Microwave	SA18E 1913	TZV	2021-09-15	2022-09-15
Block - DC	Fairview Microwave	SD3239	ANC	2021-06-24	2022-06-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06

TEST DESCRIPTION

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

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

BAND EDGE COMPLIANCE



TSTx 2021.03.19.1 XMR 2020.12.30.0

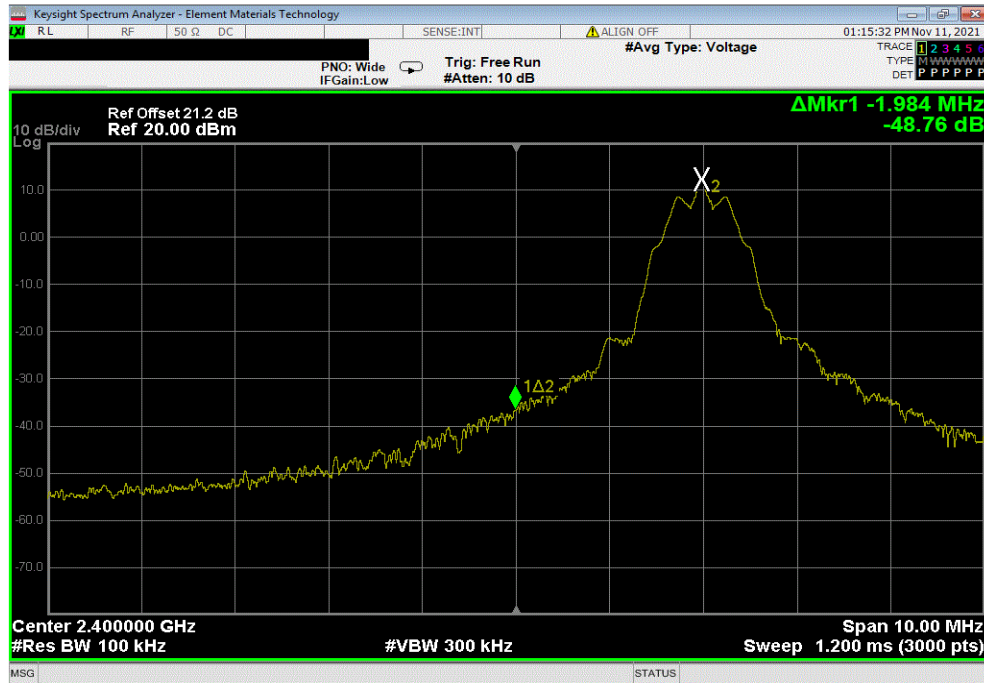
EUT: HiFi Base 3.0		Work Order: WTV00073	
Serial Number: 1		Date: 10-Nov-21	
Customer: Motorola Solutions, Inc.		Temperature: 22 °C	
Attendees: Navaid Karimi		Humidity: 48.8% RH	
Project: None		Barometric Pres.: 1011 mbar	
Tested by: Mark Baytan		Power: 12VDC via 110VAC/60Hz	
		Job Site: TX02	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2021		ANSI C63.10:2013	
COMMENTS			
21.2 dB reference level offset includes: DC block, 20dB attenuator, RF test cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Value (dBc)	Limit ≤ (dBc) Result
2.4 GHz DTS 125 kbps Low Channel, 2402 MHz		-48.76	-20 Pass
2.4 GHz DTS 125 kbps High Channel, 2480 MHz		-56.71	-20 Pass

BAND EDGE COMPLIANCE

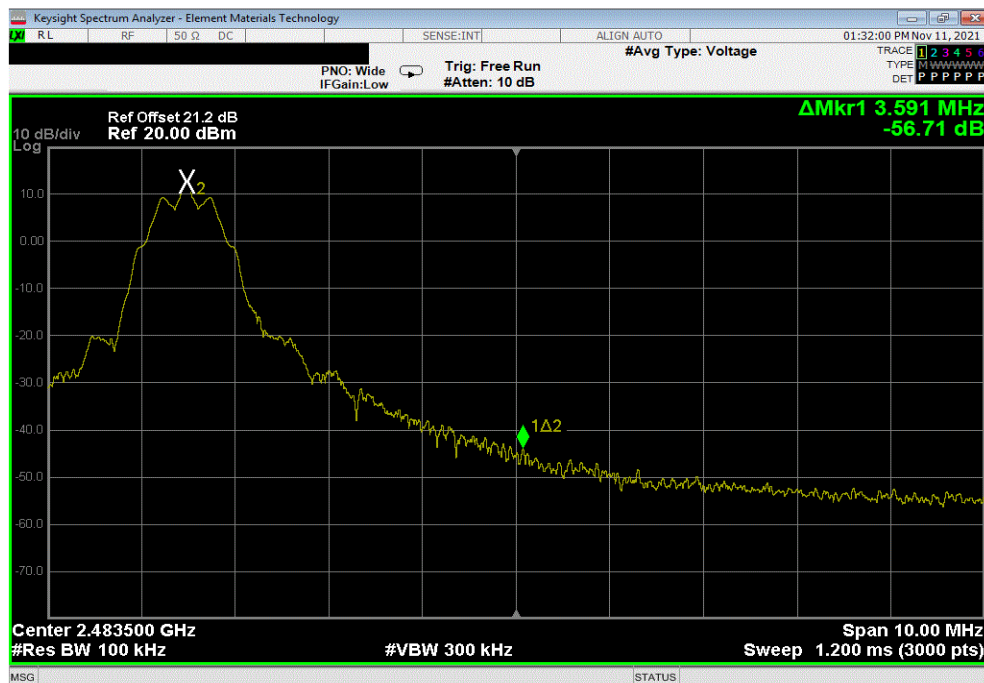


TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-48.76	-20	Pass



2.4 GHz DTS 125 kbps High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-56.71	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5182A	TIF	2020-08-29	2023-08-29
Cable	Micro-Coax	UFD150A-1-0720-200200	TXG	2021-09-13	2022-09-13
Attenuator	Fairview Microwave	SA18E 1913	TZV	2021-09-15	2022-09-15
Block - DC	Fairview Microwave	SD3239	ANC	2021-06-24	2022-06-24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the fundamental was measured with a 100 kHz resolution bandwidth and the highest value was recorded. The rest of the spectrum was then measured with a 100 kHz resolution bandwidth and the highest value was found. The difference between the value found on the fundamental and the rest of the spectrum was compared against the limit to determine compliance.

SPURIOUS CONDUCTED EMISSIONS



TSTx 2021.03.19.1 XMR 2020.12.30.0

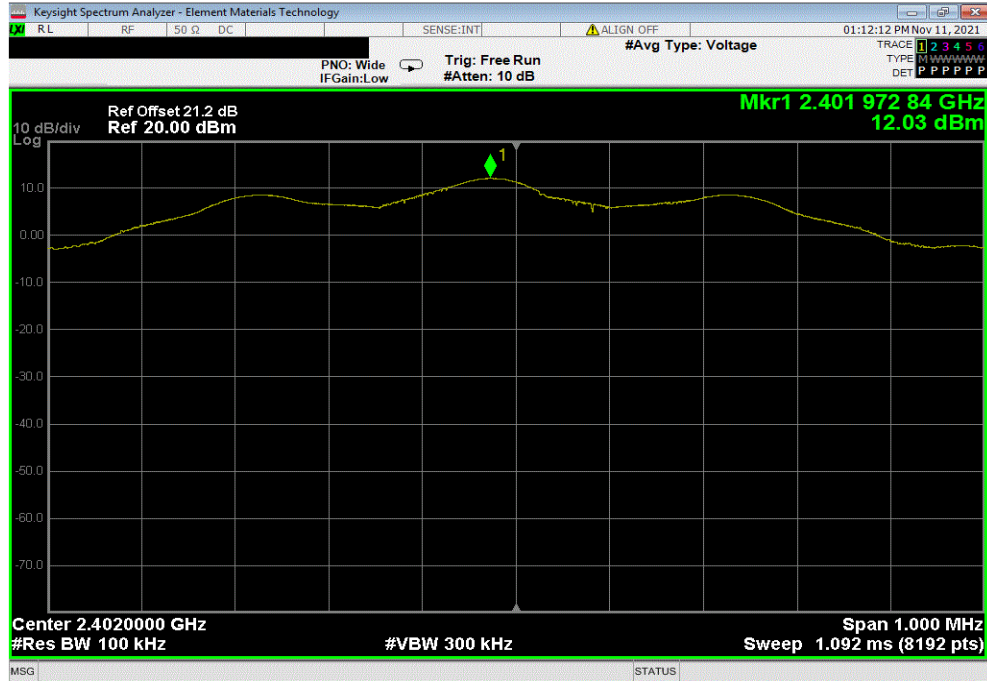
EUT: HiFi Base 3.0		Work Order: WTVD0073	
Serial Number: 1		Date: 10-Nov-21	
Customer: Motorola Solutions, Inc.		Temperature: 22 °C	
Attendees: Navaid Karimi		Humidity: 48.8% RH	
Project: None		Barometric Pres.: 1011 mbar	
Tested by: Mark Baytan		Power: 12VDC via 110VAC/60Hz	
Job Site: TX02			
TEST SPECIFICATIONS			
FCC 15.247:2021		Test Method: ANSI C63.10:2013	
COMMENTS			
21.2 dB reference level offset includes: DC block, 20dB attenuator, RF test cable.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Frequency Range	Measured Freq (MHz)
			Max Value (dBc)
			Limit ≤ (dBc)
			Result
2.4 GHz DTS 125 kbps Low Channel, 2402 MHz		Fundamental	2401.97
2.4 GHz DTS 125 kbps Low Channel, 2402 MHz		30 MHz - 12.5 GHz	2593.73
2.4 GHz DTS 125 kbps Low Channel, 2402 MHz		12.5 GHz - 25 GHz	23925.65
2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz		Fundamental	2439.98
2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz		30 MHz - 12.5 GHz	2631.79
2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz		12.5 GHz - 25 GHz	24195.76
2.4 GHz DTS 125 kbps High Channel, 2480 MHz		Fundamental	2479.98
2.4 GHz DTS 125 kbps High Channel, 2480 MHz		30 MHz - 12.5 GHz	2607.43
2.4 GHz DTS 125 kbps High Channel, 2480 MHz		12.5 GHz - 25 GHz	23914.97

SPURIOUS CONDUCTED EMISSIONS

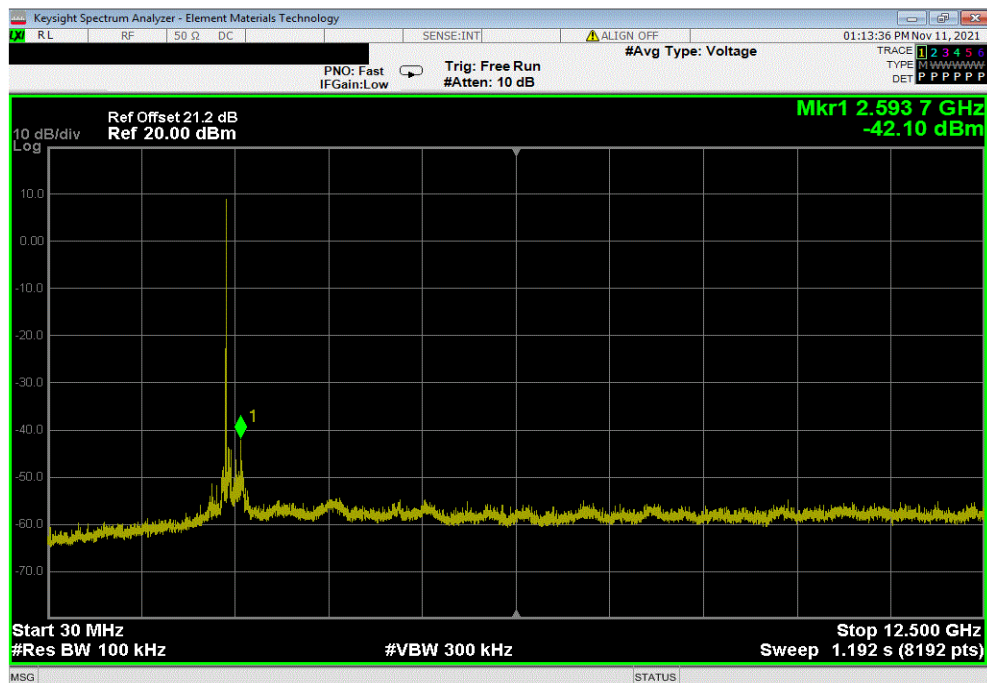


TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps Low Channel, 2402 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2401.97	N/A	N/A	N/A		



2.4 GHz DTS 125 kbps Low Channel, 2402 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	2593.73	-54.13	-20	Pass		

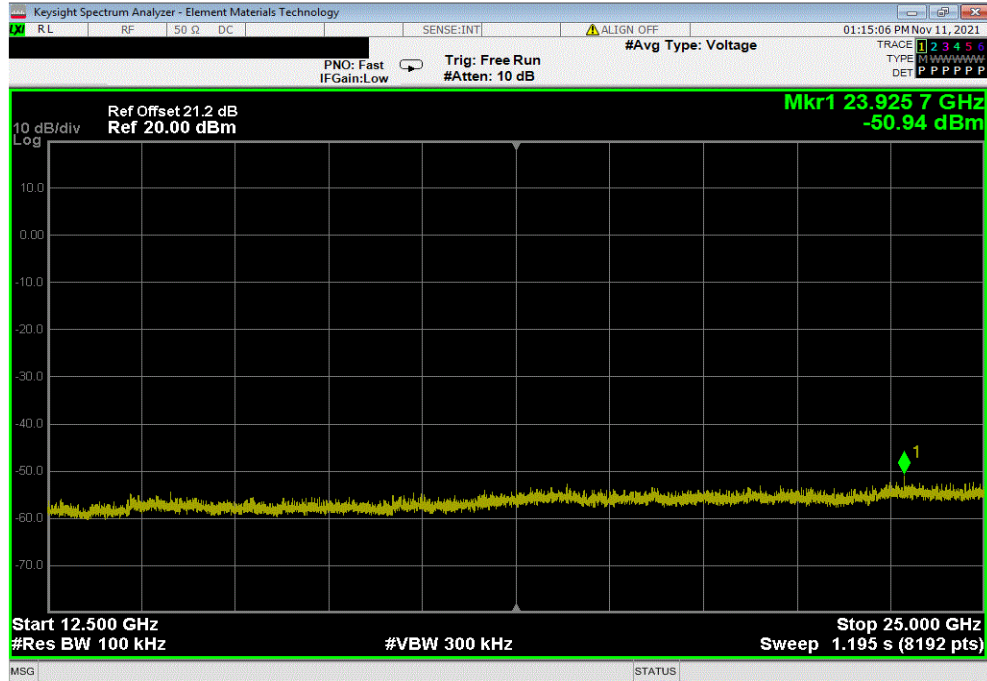


SPURIOUS CONDUCTED EMISSIONS

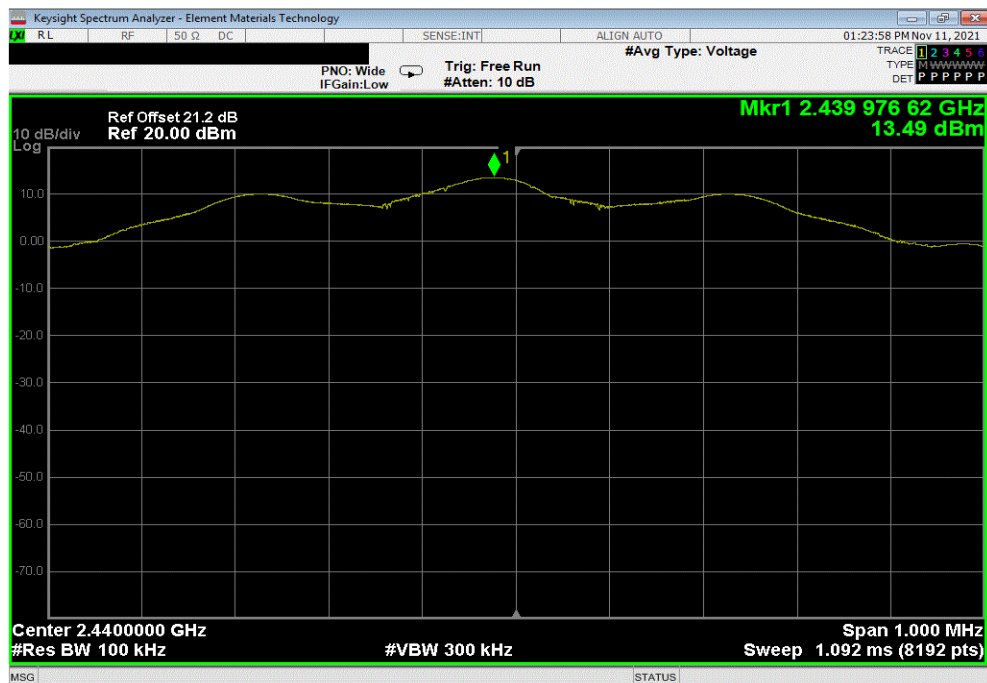


TbTx 2021.03.19.1 XM8 2020.12.30.0

2.4 GHz DTS 125 kbps Low Channel, 2402 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	23925.65	-62.97	-20	Pass	



2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
Fundamental	2439.98	N/A	N/A	N/A	

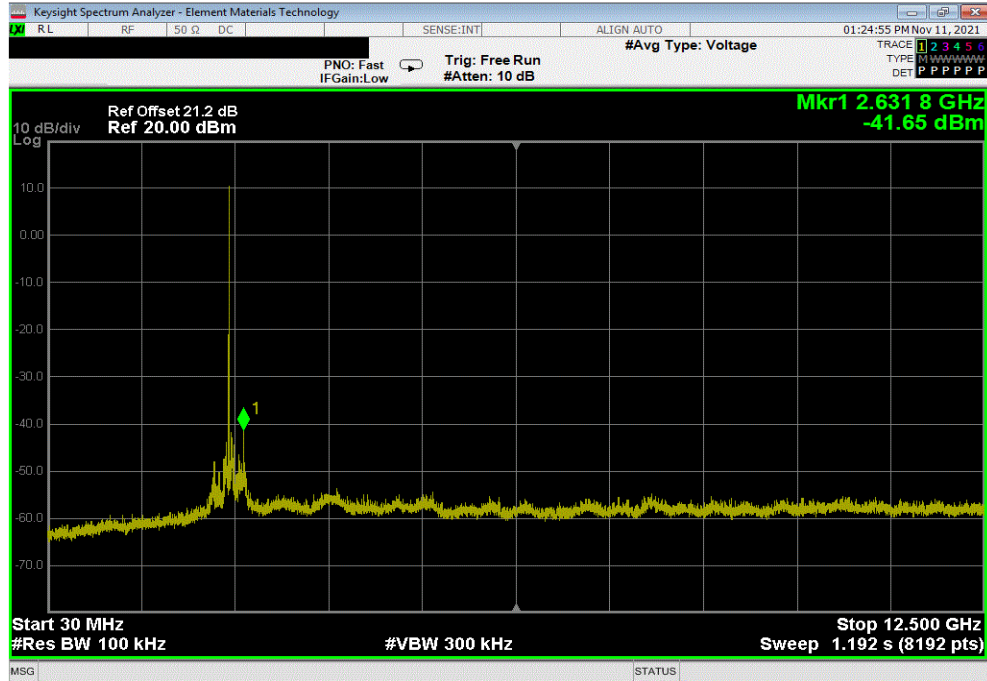


SPURIOUS CONDUCTED EMISSIONS

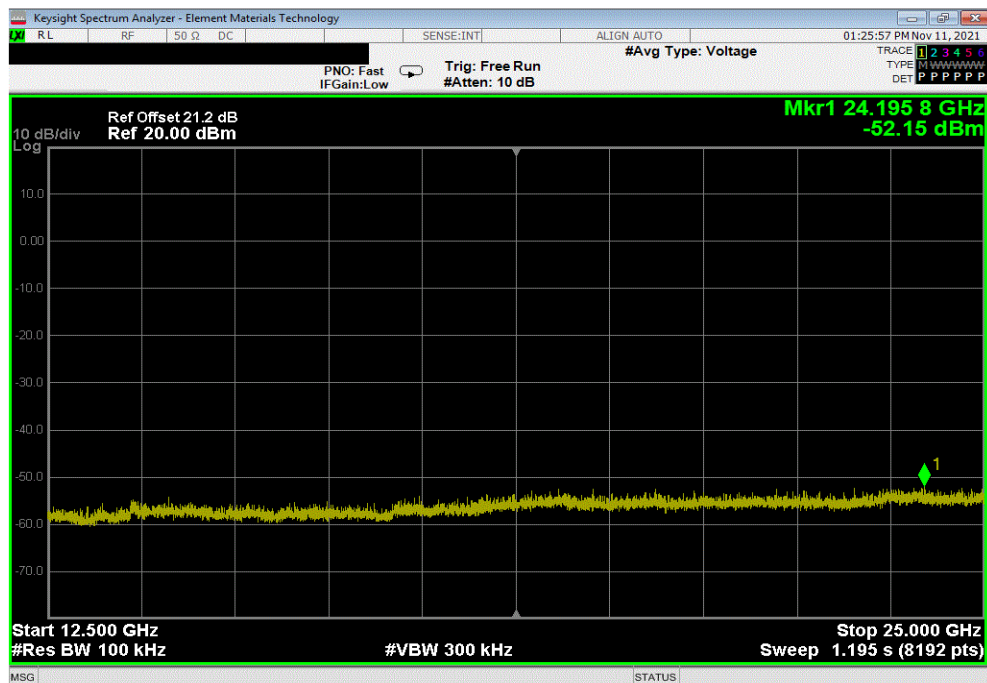


TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	2631.79	-55.14	-20	Pass	



2.4 GHz DTS 125 kbps Mid Channel, 2440 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	24195.76	-65.64	-20	Pass	

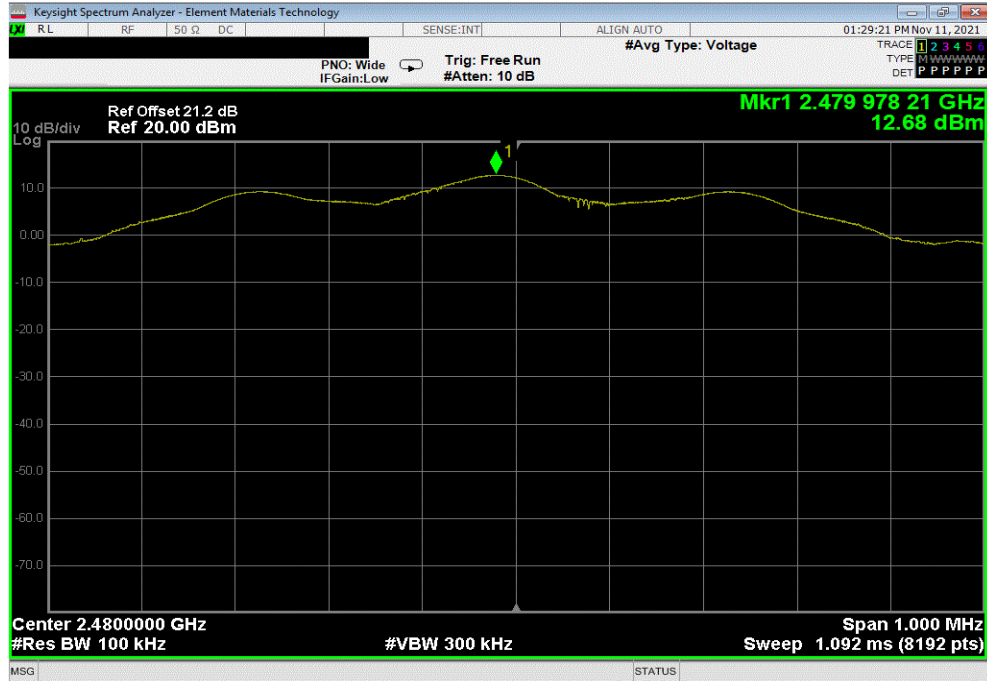


SPURIOUS CONDUCTED EMISSIONS

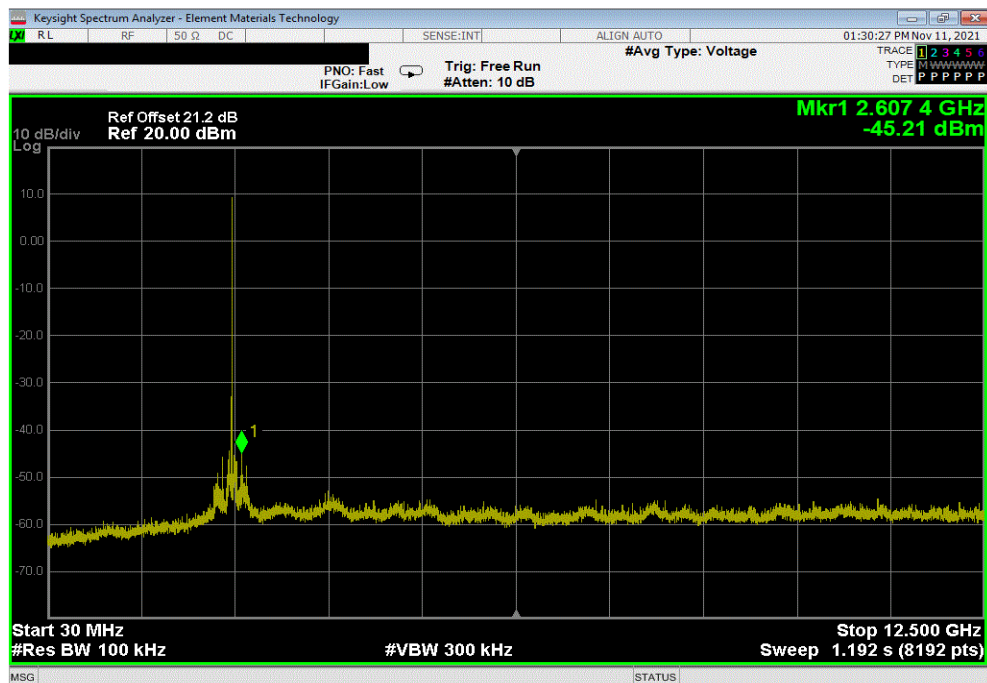


TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps High Channel, 2480 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
Fundamental	2479.98	N/A	N/A	N/A		



2.4 GHz DTS 125 kbps High Channel, 2480 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result		
30 MHz - 12.5 GHz	2607.43	-57.89	-20	Pass		

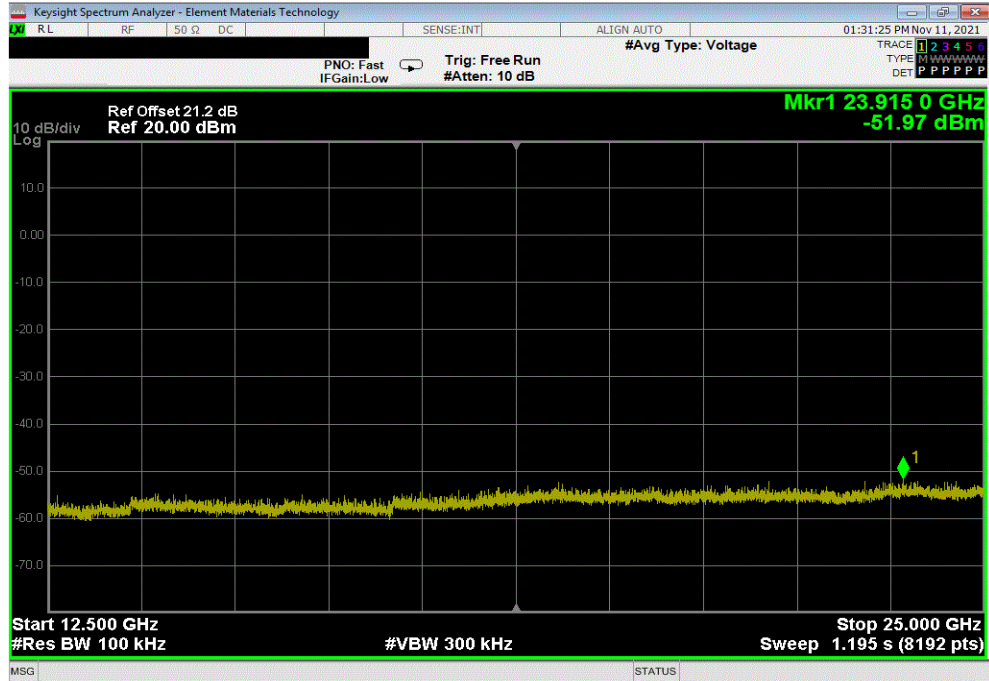


SPURIOUS CONDUCTED EMISSIONS



TbTx 2021.03.19.1 XMt 2020.12.30.0

2.4 GHz DTS 125 kbps High Channel, 2480 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	23914.97	-64.65	-20	Pass	



SPURIOUS RADIATED EMISSIONS

TEST DESCRIPTION

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

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

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

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

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

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

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

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

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06
Antenna - Biconilog	ETS Lindgren	3143B	AYF	2020-06-25	2022-06-25
Cable	Northwest EMC	RE 9kHz - 1GHz	TXB	2021-05-24	2022-05-24
Amplifier - Pre-Amplifier	Fairview Microwave	FMAM63001	PAS	2021-05-24	2022-05-24
Filter - Low Pass	Micro-Tronics	LPM50004	HHV	2021-07-27	2022-07-27
Antenna - Double Ridge	ETS Lindgren	3115	AJL	2020-10-20	2022-10-20
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAJ	2021-05-24	2022-05-24
Cable	Northwest EMC	1-8.2 GHz	TXC	2021-05-24	2022-05-24
Attenuator	Weinschel Corp	4H-20	AWB	2021-03-09	2022-03-09
Filter - High Pass	Micro-Tronics	HPM50108	HGD	2021-09-13	2022-09-13
Antenna - Standard Gain	ETS Lindgren	3160-07	AJF	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	PAK	2021-09-13	2022-09-13
Cable	Northwest EMC	8-18GHz	TXD	2021-04-30	2022-04-30
Antenna - Standard Gain	ETS Lindgren	3160-08	AJG	NCR	NCR
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	PAL	2021-09-13	2022-09-13
Antenna - Double Ridge	A.H. Systems, Inc.	SAS-574	AXW	2020-09-02	2022-09-02
Amplifier - Pre-Amplifier	Miteq	JSDWK42-18004000-60-5P	PAM	2021-09-15	2022-09-15
Cable	Northwest EMC	18-40GHz	TXE	2021-09-13	2022-09-13

SPURIOUS RADIATED EMISSIONS

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	5.1 dB	-5.1 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 26.5 GHz

POWER INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

WTV D0073-1

MODES INVESTIGATED

Transmitting Bluetooth LE 125 kbps: Low Ch 37 (2402 MHz), Mid Ch 20 (2440 MHz), High Ch 39 (2480 MHz).
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SPURIOUS RADIATED EMISSIONS

EUT:	HiFi Base 3.0	Work Order:	WTVDD0073
Serial Number:	None	Date:	2021-11-09
Customer:	Motorola Solutions, Inc.	Temperature:	22.9°C
Attendees:	Navaid Karimi	Relative Humidity:	44.2%
Customer Project:	None	Bar. Pressure (PMSL):	1025 mb
Tested By:	Jarrod Brenden	Job Site:	TX02
Power:	12VDC via 110VAC/60Hz	Configuration:	WTVDD0073-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	31	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

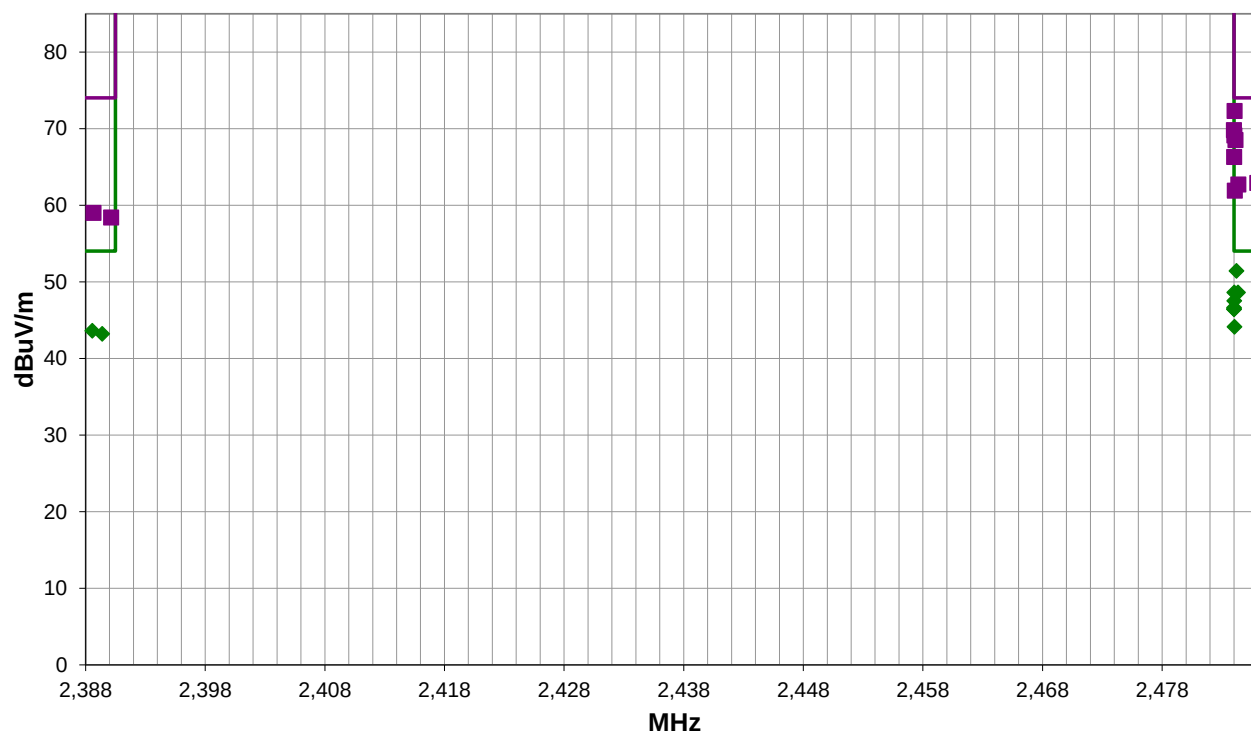
Duty cycle correction factor added to measurements. DCCF for 125 kbps is $10\log(1/0.751)=1.3\text{dB}$. Adding the downwards correction factor of $10*\log(34.32\text{mSec}/100\text{mSec}) = -4.64\text{dB}$. Total correction applied for 125 kbps = -3.34. EUT positions in comments below reflect the positions of the enclosure and antenna sharing the same axis. (ex. – “EUT horz” refers to enclosure horizontal and antenna horizontal)

EUT OPERATING MODES

Transmitting Bluetooth LE 125 kbps: Low Ch 37 (2402 MHz) and High Ch 39 (2480 MHz)

DEVIATIONS FROM TEST STANDARD

None



Run #: 31

■ PK ◆ AV ● QP

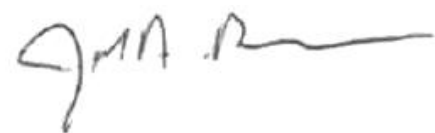
SPURIOUS RADIATED EMISSIONS

RESULTS - Run #31

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (motore)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.547	57.7	-5.4	3.7	30.0	0.0	20.0	Horz	PK	0.0	72.3	74.0	-1.7	EUT side, high ch, 125 kbps
2483.717	40.1	-5.4	3.7	357.9	-3.3	20.0	Horz	AV	0.0	51.4	54.0	-2.6	Mid ch, 125 kbps, EUT side
2483.503	55.2	-5.4	1.0	218.0	0.0	20.0	Horz	PK	0.0	69.8	74.0	-4.2	EUT horz, high ch, 125 kbps
2483.527	54.5	-5.4	3.0	91.0	0.0	20.0	Vert	PK	0.0	69.1	74.0	-4.9	EUT vert, high ch, 125 kbps
2483.627	53.9	-5.4	3.9	84.0	0.0	20.0	Vert	PK	0.0	68.5	74.0	-5.5	EUT side, high ch, 125 kbps
2483.527	37.3	-5.4	3.7	30.0	-3.3	20.0	Horz	AV	0.0	48.6	54.0	-5.5	EUT side, high ch, 125 kbps
2483.843	37.3	-5.4	3.5	314.0	-3.3	20.0	Vert	AV	0.0	48.6	54.0	-5.5	Mid ch, 125 kbps, EUT vert
2483.540	36.2	-5.4	1.0	218.0	-3.3	20.0	Horz	AV	0.0	47.5	54.0	-6.5	EUT horz, high ch, 125 kbps
2483.513	35.3	-5.4	3.0	91.0	-3.3	20.0	Vert	AV	0.0	46.6	54.0	-7.4	EUT vert, high ch, 125 kbps
2483.513	51.7	-5.4	3.3	357.9	0.0	20.0	Horz	PK	0.0	66.3	74.0	-7.7	EUT vert, high ch, 125 kbps
2483.513	35.1	-5.4	3.9	84.0	-3.3	20.0	Vert	AV	0.0	46.4	54.0	-7.6	EUT side, high ch, 125 kbps
2483.517	34.1	-5.4	3.3	357.9	-3.3	20.0	Horz	AV	0.0	46.4	54.0	-8.6	EUT vert, high ch, 125 kbps
2483.547	32.8	-5.4	2.1	225.9	-3.3	20.0	Vert	AV	0.0	44.1	54.0	-9.9	EUT horz, high ch, 125 kbps
2388.060	32.7	-5.8	3.1	264.0	-3.3	20.0	Horz	AV	0.0	43.6	54.0	-10.4	EUT side, low ch, 125 kbps
2388.887	32.3	-5.8	1.5	70.9	-3.3	20.0	Vert	AV	0.0	43.2	54.0	-10.8	EUT vert, low ch, 125 kbps
2485.447	48.3	-5.4	1.2	181.0	0.0	20.0	Vert	PK	0.0	62.9	74.0	-11.1	Mid ch, 125 kbps, EUT vert
2483.867	48.1	-5.4	3.7	357.9	0.0	20.0	Horz	PK	0.0	62.7	74.0	-11.3	Mid ch, 125 kbps, EUT side
2483.563	47.3	-5.4	2.1	225.9	0.0	20.0	Vert	PK	0.0	61.9	74.0	-12.1	EUT horz, high ch, 125 kbps
2388.157	44.8	-5.8	3.1	264.0	0.0	20.0	Horz	PK	0.0	59.0	74.0	-15.0	EUT side, low ch, 125 kbps
2389.637	44.2	-5.8	1.5	70.9	0.0	20.0	Vert	PK	0.0	58.4	74.0	-15.6	EUT vert, low ch, 125 kbps

CONCLUSION

Pass



Tested By

SPURIOUS RADIATED EMISSIONS

EUT:	HiFi Base 3.0	Work Order:	WTVD0073
Serial Number:	See Configurations	Date:	2021-11-09
Customer:	Motorola Solutions, Inc.	Temperature:	22.9°C
Attendees:	Navaid Karimi	Relative Humidity:	44.2%
Customer Project:	None	Bar. Pressure (PMSL):	1025 mb
Tested By:	Jarrod Brenden	Job Site:	TX02
Power:	12VDC via 110VAC/60Hz	Configuration:	WTVD0073-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	43	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)
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COMMENTS

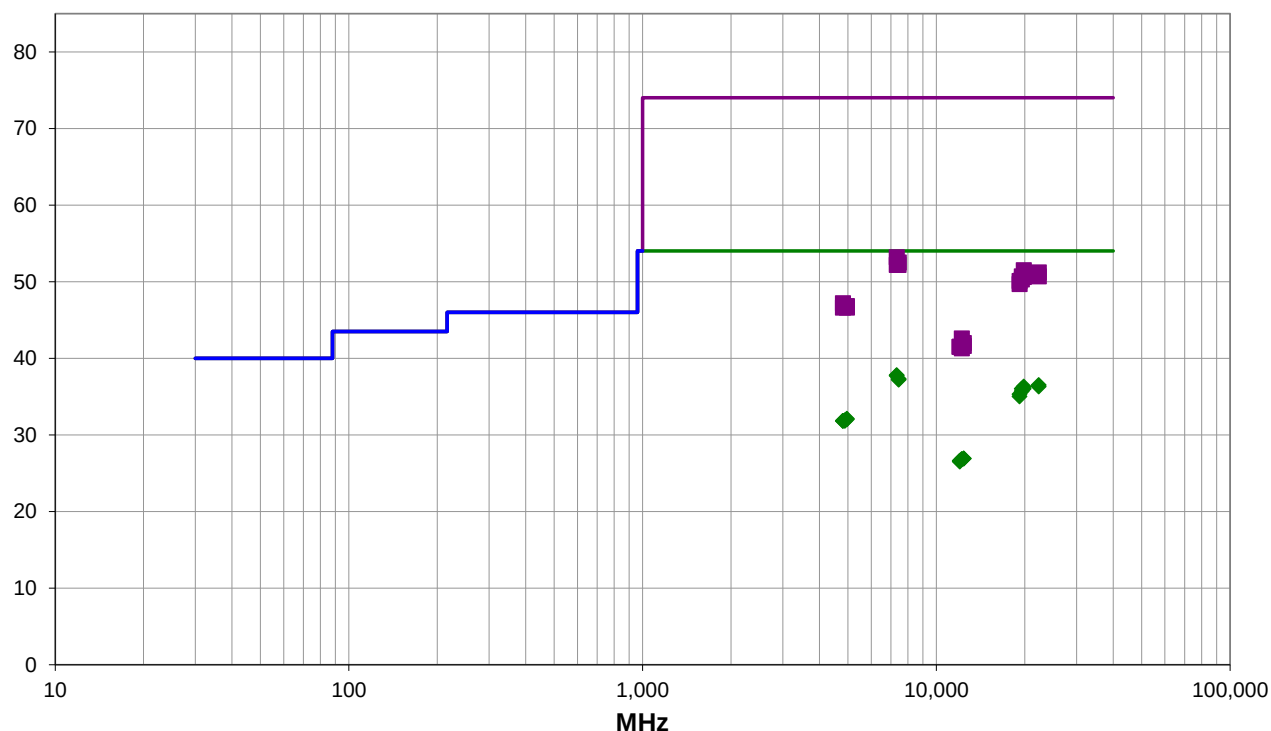
Final measurements were taken on the noise floor as there were no emissions pertaining to the radio present throughout the pre-scan and during maximization of the harmonics therefore measurements taken at different EUT positions not performed. Duty cycle correction added to measurements. DCCF for 125 kbps is $10\log(1/0.751)=1.3\text{dB}$. Adding the downwards correction factor of $10*\log(34.32\text{mSec}/100\text{mSec}) = -4.64\text{dB}$. Total correction applied for 125 kbps = -3.34.

EUT OPERATING MODES

Transmitting Bluetooth LE 125 kbps: Low Ch 37 (2402 MHz), Mid Ch 20 (2440 MHz), High Ch 39 (2480 MHz).

DEVIATIONS FROM TEST STANDARD

None



Run #: 43

PK AV QP

SPURIOUS RADIATED EMISSIONS

RESULTS - Run #43

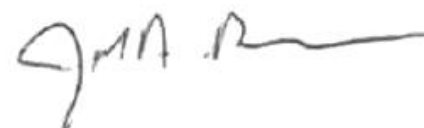
Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7326.503	29.2	11.9	1.5	136.9	-3.3	0.0	Horz	AV	0.0	37.8	54.0	-16.2	Mid Ch, 125 kbps, EUT Vert
7326.153	29.1	11.9	1.5	92.0	-3.3	0.0	Vert	AV	0.0	37.7	54.0	-16.3	Mid Ch, 125 kbps, EUT Vert
7440.430	28.5	12.1	1.5	297.0	-3.3	0.0	Vert	AV	0.0	37.3	54.0	-16.7	High Ch, 125 kbps, EUT Vert
7439.947	28.4	12.1	1.5	50.0	-3.3	0.0	Horz	AV	0.0	37.2	54.0	-16.8	High Ch, 125 kbps, EUT Vert
22320.390	48.2	-8.4	1.5	171.9	-3.3	0.0	Horz	AV	0.0	36.5	54.0	-17.5	High ch, 125 kbps, EUT vert
19840.670	47.3	-7.7	1.5	327.9	-3.3	0.0	Horz	AV	0.0	36.3	54.0	-17.7	High ch, 125 kbps, EUT vert
22320.820	48.0	-8.4	1.5	253.0	-3.3	0.0	Vert	AV	0.0	36.3	54.0	-17.7	High ch, 125 kbps, EUT vert
19537.000	46.9	-7.6	1.5	297.0	-3.3	0.0	Horz	AV	0.0	36.0	54.0	-18.0	Mid ch, 125 kbps, EUT vert
19840.910	47.0	-7.7	1.5	249.0	-3.3	0.0	Vert	AV	0.0	36.0	54.0	-18.0	High ch, 125 kbps, EUT vert
19535.600	46.6	-7.6	1.5	260.0	-3.3	0.0	Vert	AV	0.0	35.7	54.0	-18.3	Mid ch, 125 kbps, EUT vert
19216.810	46.1	-7.5	1.5	46.9	-3.3	0.0	Horz	AV	0.0	35.3	54.0	-18.7	Low ch, 125 kbps, EUT vert
19216.390	45.8	-7.5	1.5	8.0	-3.3	0.0	Vert	AV	0.0	35.0	54.0	-19.0	Low ch, 125 kbps, EUT vert
7325.760	41.3	11.9	1.5	136.9	0.0	0.0	Horz	PK	0.0	53.2	74.0	-20.8	Mid Ch, 125 kbps, EUT Vert
7440.707	40.4	12.1	1.5	297.0	0.0	0.0	Vert	PK	0.0	52.5	74.0	-21.5	High Ch, 125 kbps, EUT Vert
7439.733	40.1	12.1	1.5	50.0	0.0	0.0	Horz	PK	0.0	52.2	74.0	-21.8	High Ch, 125 kbps, EUT Vert
7326.253	40.3	11.9	1.5	92.0	0.0	0.0	Vert	PK	0.0	52.2	74.0	-21.8	Mid Ch, 125 kbps, EUT Vert
4959.027	29.4	6.0	1.6	273.0	-3.3	0.0	Horz	AV	0.0	32.1	54.0	-21.9	High Ch, 125 kbps, EUT Vert
4959.157	29.3	6.0	1.5	286.9	-3.3	0.0	Vert	AV	0.0	32.0	54.0	-22.0	High Ch, 125 kbps, EUT Vert
4883.100	29.4	5.8	1.2	103.0	-3.3	0.0	Horz	AV	0.0	31.9	54.0	-22.1	Mid Ch, 125 kbps, EUT Vert
4883.057	29.3	5.8	2.2	177.9	-3.3	0.0	Vert	AV	0.0	31.8	54.0	-22.2	Mid Ch, 125 kbps, EUT Vert
4808.763	29.5	5.6	1.5	79.0	-3.3	0.0	Horz	AV	0.0	31.8	54.0	-22.2	Low ch, 125 kbps, EUT vert
4808.997	29.5	5.6	1.5	45.0	-3.3	0.0	Vert	AV	0.0	31.8	54.0	-22.2	Low ch, 125 kbps, EUT vert
19840.470	59.2	-7.7	1.5	327.9	0.0	0.0	Horz	PK	0.0	51.5	74.0	-22.5	High ch, 125 kbps, EUT vert
22320.400	59.6	-8.4	1.5	171.9	0.0	0.0	Horz	PK	0.0	51.2	74.0	-22.8	High ch, 125 kbps, EUT vert
19535.770	58.3	-7.6	1.5	297.0	0.0	0.0	Horz	PK	0.0	50.7	74.0	-23.3	Mid ch, 125 kbps, EUT vert
22320.950	59.1	-8.4	1.5	253.0	0.0	0.0	Vert	PK	0.0	50.7	74.0	-23.3	High ch, 125 kbps, EUT vert
19840.870	58.3	-7.7	1.5	249.0	0.0	0.0	Vert	PK	0.0	50.6	74.0	-23.4	High ch, 125 kbps, EUT vert
19535.640	57.9	-7.6	1.5	260.0	0.0	0.0	Vert	PK	0.0	50.3	74.0	-23.7	Mid ch, 125 kbps, EUT vert
19215.830	57.6	-7.5	1.5	8.0	0.0	0.0	Vert	PK	0.0	50.1	74.0	-23.9	Low ch, 125 kbps, EUT vert
19215.020	57.2	-7.5	1.5	46.9	0.0	0.0	Horz	PK	0.0	49.7	74.0	-24.3	Low ch, 125 kbps, EUT vert
4808.103	41.6	5.6	1.5	45.0	0.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	Low ch, 125 kbps, EUT vert
12399.070	31.8	-1.6	1.5	348.0	-3.3	0.0	Horz	AV	0.0	26.9	54.0	-27.1	High Ch, 125 kbps, EUT Vert
12399.030	31.8	-1.6	1.5	121.0	-3.3	0.0	Vert	AV	0.0	26.9	54.0	-27.1	High Ch, 125 kbps, EUT Vert
12210.760	32.0	-1.9	1.3	165.0	-3.3	0.0	Horz	AV	0.0	26.8	54.0	-27.2	Mid Ch, 125 kbps, EUT Vert
12210.610	32.0	-1.9	1.5	1.0	-3.3	0.0	Vert	AV	0.0	26.8	54.0	-27.2	Mid Ch, 125 kbps, EUT Vert
4959.323	40.8	6.0	1.6	273.0	0.0	0.0	Horz	PK	0.0	46.8	74.0	-27.2	High Ch, 125 kbps, EUT Vert
4884.630	40.9	5.8	1.2	103.0	0.0	0.0	Horz	PK	0.0	46.7	74.0	-27.3	Mid Ch, 125 kbps, EUT Vert
4884.660	40.9	5.8	2.2	177.9	0.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	Mid Ch, 125 kbps, EUT Vert
4959.103	40.6	6.0	1.5	286.9	0.0	0.0	Vert	PK	0.0	46.6	74.0	-27.4	High Ch, 125 kbps, EUT Vert
4808.940	41.0	5.6	1.5	79.0	0.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	Low ch, 125 kbps, EUT vert

SPURIOUS RADIATED EMISSIONS

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	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
12010.750	32.8	-2.9	1.5	140.0	-3.3	0.0	Vert	AV	0.0	26.6	54.0	-27.4	Low ch, 125 kbps, EUT vert
12010.900	32.7	-2.9	2.0	99.9	-3.3	0.0	Horz	AV	0.0	26.5	54.0	-27.5	Low ch, 125 kbps, EUT vert
12210.630	44.5	-1.9	1.3	165.0	0.0	0.0	Horz	PK	0.0	42.6	74.0	-31.4	Mid Ch, 125 kbps, EUT Vert
12399.160	43.6	-1.6	1.5	348.0	0.0	0.0	Horz	PK	0.0	42.0	74.0	-32.0	High Ch, 125 kbps, EUT Vert
12399.990	43.2	-1.6	1.5	121.0	0.0	0.0	Vert	PK	0.0	41.6	74.0	-32.4	High Ch, 125 kbps, EUT Vert
12009.960	44.4	-2.9	2.0	99.9	0.0	0.0	Horz	PK	0.0	41.5	74.0	-32.5	Low ch, 125 kbps, EUT vert
12010.020	44.4	-2.9	1.5	140.0	0.0	0.0	Vert	PK	0.0	41.5	74.0	-32.5	Low ch, 125 kbps, EUT vert
12210.550	43.2	-1.9	1.5	1.0	0.0	0.0	Vert	PK	0.0	41.3	74.0	-32.7	Mid Ch, 125 kbps, EUT Vert

CONCLUSION

Pass



Tested By

End of Test Report