Ademco, Inc.

Fuji Thermostat

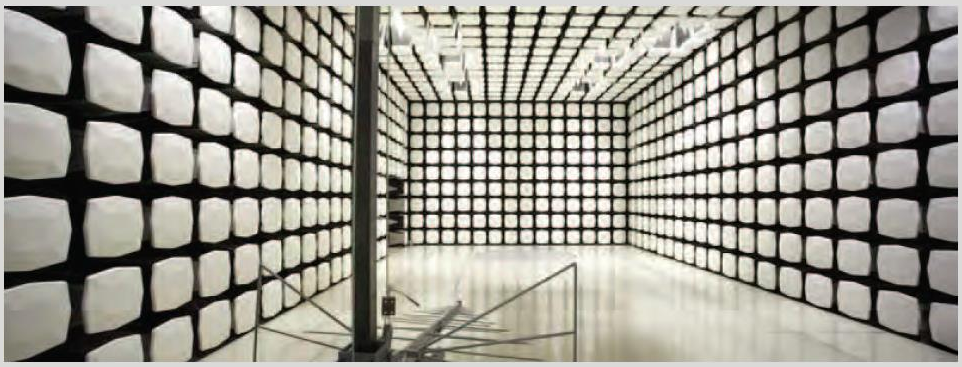
FCC 15.247:2024

RSS-247 Issue 3:2023

RSS-Gen Issue 5:2018+A1:2019+A2:2021

Bluetooth Radio

Report: ADEM0044.3 Rev. 2, Issue Date: September 20, 2024



CERT #3310.05

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element
2023.04.17

Section	Page Number

CERTIFICATE OF TEST

Last Date of Test: September 10, 2024
Ademco, Inc.
EUT: Fuji Thermostat

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	
RSS-Gen Issue 5:2018+A1:2019+A2:2021	

Guidance

FCC KDB 558074 v05r02:2019
Notice 2021 - CEB0001

Results

Test Description	Result	FCC Section(s)	RSS Section(s)	ANSI C63.10 Section(s)	Comments
Powerline Conducted Emissions	Pass	15.207	RSS-Gen 8.8	6.2	
Duty Cycle	Pass	KDB 558074 -6.0	RSS-Gen 3.2	11.6	
DTS Bandwidth (6 dB)	Pass	15.247(a)(2), KDB 558074 -8.2	RSS-247 5.2(a)	11.8.2	
Occupied Bandwidth (99%)	Pass	KDB 558074 -2.1	RSS-Gen 6.7	6.9.3	
Output Power	Pass	15.247(b)(3), KDB 558074 -8.3.1	RSS-247 5.4(d, f), RSS-Gen 6.12	11.9.1.1	
Equivalent Isotropic Radiated Power	Pass	15.247(b)(3), KDB 558074 -8.3.1	RSS-247 5.4(d, f), RSS-Gen 6.12	11.9.1.1	
Power Spectral Density	Pass	15.247(e), KDB 558074 -8.4	RSS-247 5.2(b)	11.10.2	
Band Edge Compliance	Pass	15.247(d), KDB 558074 -8.5	RSS-247 5.5	11.11	
Spurious Conducted Emissions	Pass	15.247(d), KDB 558074 -8.5	RSS-247 5.5	11.11	
Spurious Radiated Emissions	Pass	15.247(d), KDB 558074 - 8.6, 8.7	RSS-247 5.5, RSS-Gen 6.13, 8.10	11.12.1, 11.13.2, 6.5, 6.6	

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.

CERTIFICATE OF TEST

Deviations From Test Standards

None

Approved By:

Trevor Buls, Principal EMC Test Engineer
Signed for and on behalf of Element

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		
01	Updated data	2024-09-13	46-56
	Updated last day of testing		3, 12, 15
02	Updated spurious radiated emissions prescans. Clarified Measurement Uncertainty and configs	2024-09-20	8, 14, 55-56

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

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

California Minnesota Oregon Texas Washington

FACILITIES

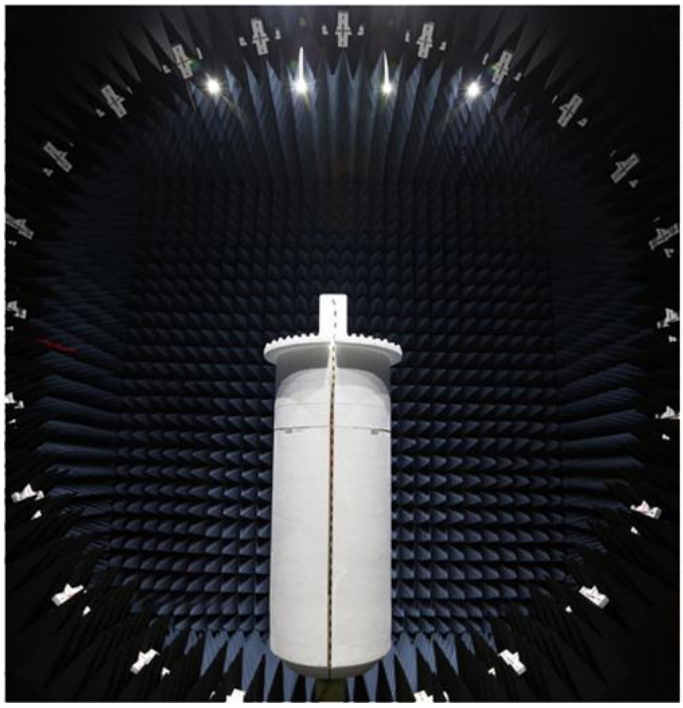
element
2024.07.18

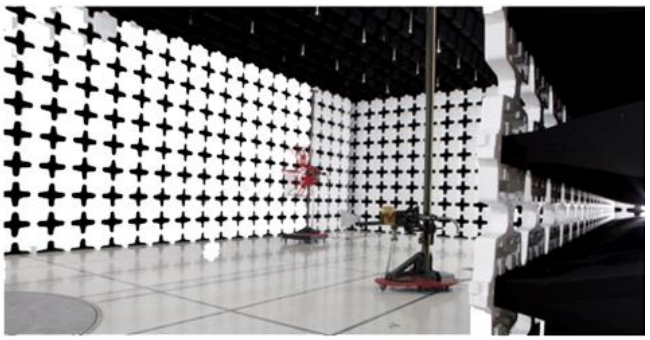
Testing was performed at the following location(s)

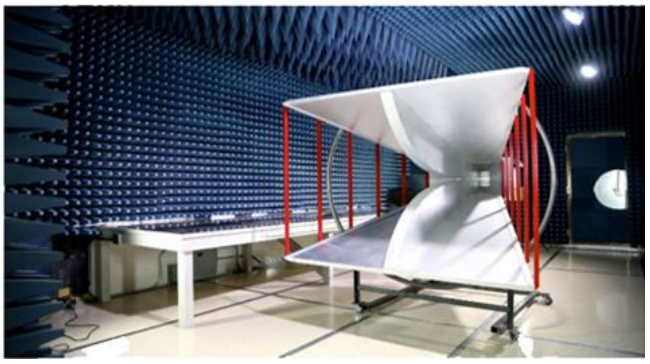
	Location	Labs (1)	Address	A2LA (2)	ISED (3)	BSMI (4)	VCCI (5)	CAB (6)	FDA (7)
☐	California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
☒	Minnesota	MN01-11	9349 W Broadway Ave. Brooklyn Park, MN 55445 (612) 638-5136	3310.05	2834E	SL2-IN-E-1152R	A-0109	US0175	TL-57
☐	Oregon	EV01-12	6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	3310.02	2834D	SL2-IN-E-1017	A-0108	US0017	TL-56
☐	Plano Texas	PT01-15	1701 E Plano Pkwy, Ste 150 Plano, TX 75074 (972) 509-2566	214.19	32637	SL2-IN-E-057R	N/A	US0054	N/A
☐	Texas	TX01-09	3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	3310.03	2834G	SL2-IN-E-1158R	N/A	US0191	TL-54
☐	Washington	NC01-05	19201 120th Ave NE Bothell, WA 98011 (425) 984-6600	3310.06	2834F	SL2-IN-E-1153R	A-0110	US0157	TL-67
☐	Offsite	N/A	See Product Description	N/A	N/A	N/A	N/A	N/A	N/A

See data sheets for specific labs

(1) The lab designations denote individual rooms within each location. (OC01, OC02, OC03, etc.)
(2) A2LA Certificate No.
(3) ISED Company No.
(4) BSMI No.
(5) VCCI Site Filing No.
(6) CAB Identifier. Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA
(7) FDA ASCA No.







MEASUREMENT UNCERTAINTY

element
MU 2023-09-21

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.

Various Measurements

Test	All Labs (+/-)
Frequency Accuracy (%)	0.0007
Amplitude Accuracy (dB)	1.2
Conducted Power (dB)	1.2
Radiated Power via Substitution (dB)	0.7
Temperature (degrees C)	0.7
Humidity (% RH)	2.5
Voltage (AC) (%)	1
Voltage (DC) (%)	0.7

Field Strength Measurements (dB)

Range	MN05 (+/-)	MN09 (+/-)
10kHz-30MHz	1.8	1.8
30MHz-1GHz 3m	4.6	4.7
1GHz-6GHz	5.1	5.1
6GHz-40GHz	5.2	5.2

AC Powerline Conducted Emissions Measurements (dB)

Range	MN03 (+/-)
9kHz-150kHz LISN	3.6
150kHz-30MHz LISN	3.2
150kHz-30MHz CVP	3.0
150kHz-30MHz Telecom-ISN	4.4

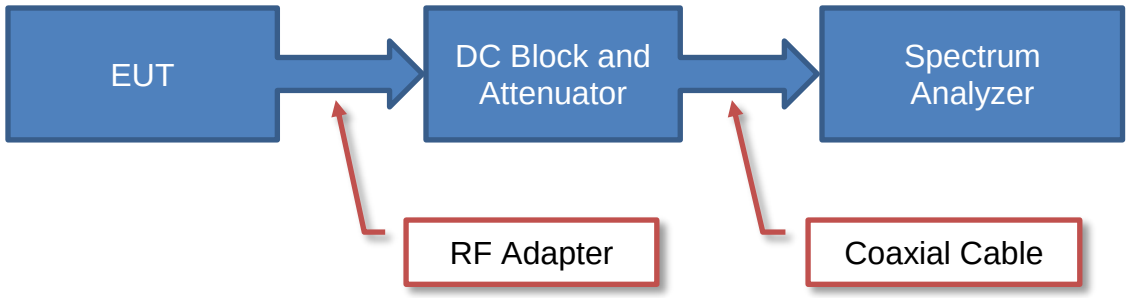
TEST SETUP BLOCK DIAGRAMS

Measurement Bandwidths

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.

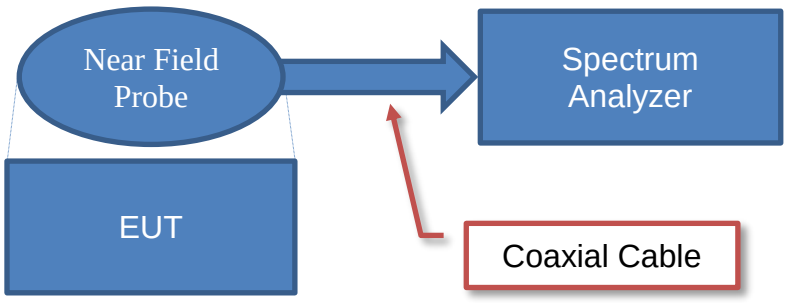
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

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

Near Field Test Fixture Measurements

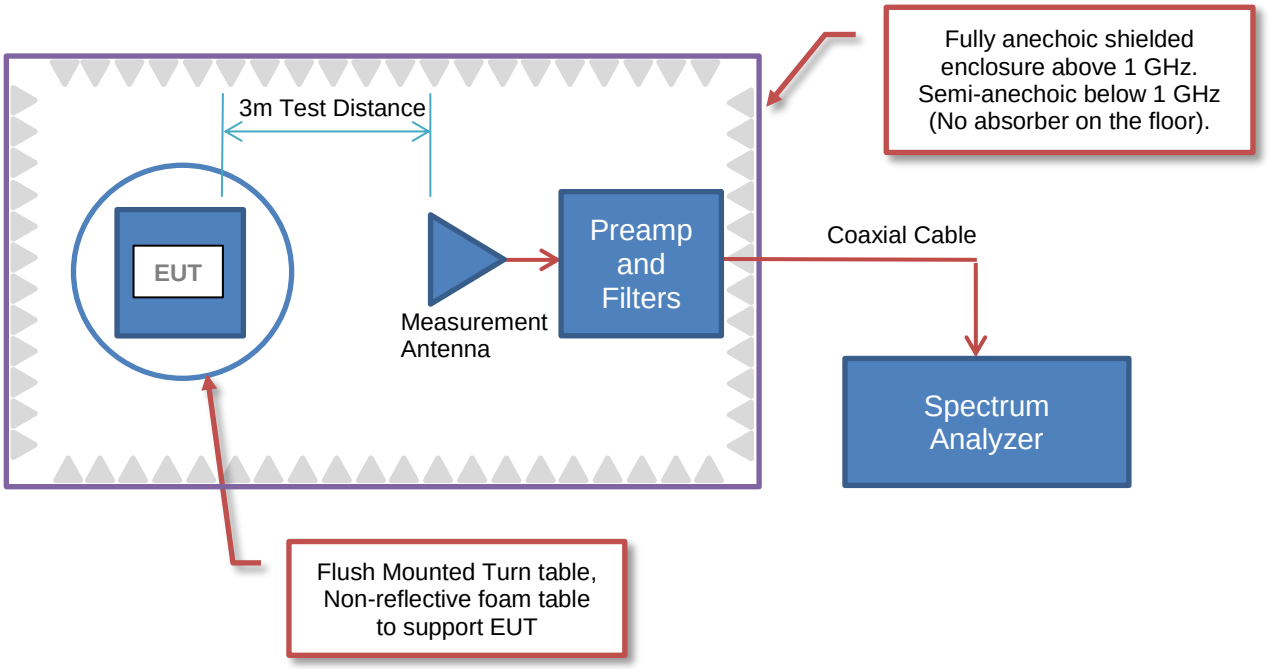


Sample Calculation (logarithmic units)

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

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

Measured Level (Amplitude)		Factor: Antenna Factor		Factor: Cable Factor		Factor: Amplifier Gain		Distance Adjustment Factor		External Attenuation		Field Strength
42.6	+	28.6	+	3.1	-	40.8	+	0.0	+	0.0	=	**33.5**

Conducted Emissions:

Measured Level (Amplitude)		Factor: Transducer Factor		Factor: Cable Factor		External Attenuation		Adjusted Level
26.7	+	0.3	+	0.1	+	20.0	=	**47.1**

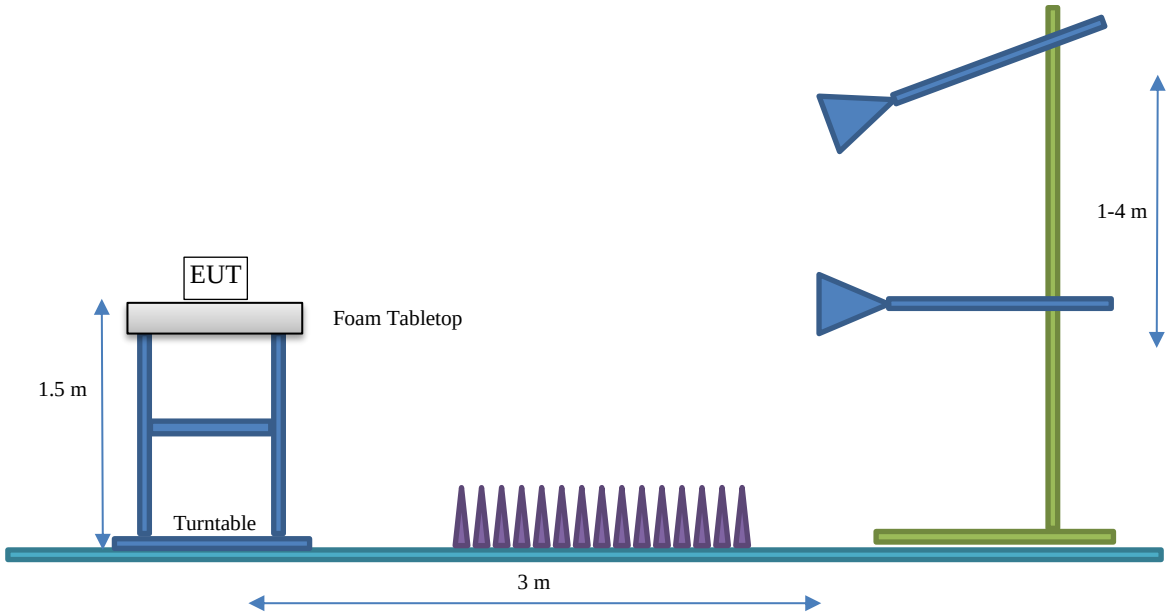
Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)		Substitution Antenna Factor (dBi)		EIRP to ERP (if applicable)		Measured power (dBm ERP/EIRP)
10.0	+	6.0	-	2.15	=	**13.9/16.0**

TEST SETUP BLOCK DIAGRAMS

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.



PRODUCT DESCRIPTION

Client and Equipment under Test (EUT) Information

Company Name:	Ademco, Inc.
Address:	251 Little Falls Drive
City, State, Zip:	Wilmington, DE 19808
Test Requested By:	Christian Fouth
EUT:	Fuji Thermostat
First Date of Test:	July 19, 2024
Last Date of Test:	September 10, 2024
Receipt Date of Samples:	July 19, 2024
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Fuji is a Wi-Fi (802.11 a/b/g/n 1x1, 2.4GHz & 5GHz)/BLE 5.0 enabled thermostat with only one antenna.

Highest Frequency Generated or used in the Device:
Assumes > 108 MHz and < 3.6 GHz

Testing Objective:
To demonstrate compliance of the Bluetooth radio to FCC 15.247/RSS-247 requirements.

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. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA GAIN (dBi)

Type	Provided by:	Frequency Range (MHz)	Gain (dBi)
PCB Trace	Resideo	2400-2483.5	2.43

The EUT was tested using the power settings provided by the manufacturer which were based upon:

☐ Test software settings
☒ Rated power settings

Software / firmware used for testing:

Radio module: XTR v2.4.3.0

Renesas micro: FujiX2S_XTR_En_BLE_F11 v00.01.14.99

SETTINGS FOR ALL TESTS IN THIS REPORT

Modulation Types / Data Rates	Type	Channel	Frequency (MHz)	Power Setting
BLE GFSK 1 Mbps	DTS	37	2402	4.5
		18	2442	4.5
		39	2480	4.5

CONFIGURATIONS

Configuration ADEM0044-1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Thermostat	Resideo	TH2320WF4010	52202030005204

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adapter	CUI Inc	48A-24-500	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Leads	No	1.7 m	No	AC Adapter	Thermostat

Configuration ADEM0044-2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Thermostat (WIFI/BLE SRE)	Resideo	TH2320WF4010	52202030005049

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adapter	CUI Inc	48A-24-500	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Leads	No	1.7 m	No	AC Adapter	Thermostat

Configuration ADEM0044-3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Thermostat	Resideo	TH2320WF4010	52202030005293

Peripherals in Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adapter	CUI Inc	48A-24-500	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Leads	No	1.7 m	No	AC Adapter	Thermostat

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2024-07-19	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.
2	2024-07-19	DTS 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.
3	2024-07-19	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.
4	2024-07-19	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2024-07-19	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.
6	2024-07-19	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	2024-07-19	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2024-07-19	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
9	2024-07-26	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.
10	2024-08-05	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.
11	2024-09-10	Spurious Radiated 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

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Gauss Instruments	TDEMI 30M	ARS	2024-05-07	2025-05-07
Cable - Conducted Cable Assembly	Northwest EMC	MNC, HGN, TYK, VAE	MNCA	2024-03-11	2025-03-11
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	2024-03-27	2025-03-27

CONFIGURATIONS INVESTIGATED

ADEM0044-1

MODES INVESTIGATED

Thermostat On, Bluetooth active

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-08-05
Customer:	Ademco, Inc.	Temperature:	21.9°C
Attendees:	None	Relative Humidity:	59.4%
Customer Project:	None	Bar. Pressure (PMSL):	1017 mb
Tested By:	Ko Vorasarn	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	ADEM0044-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	8	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

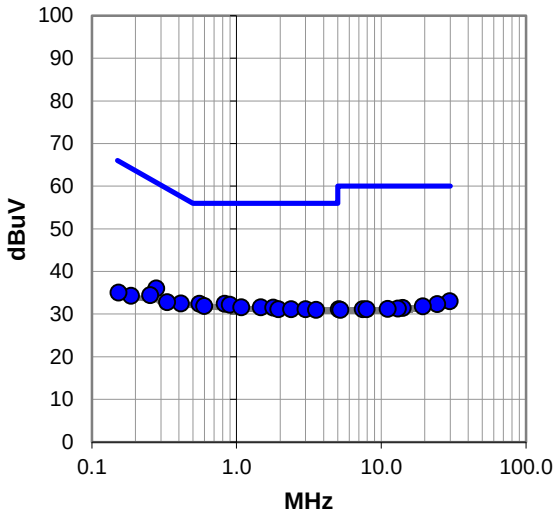
EUT OPERATING MODES

Thermostat On, Bluetooth active

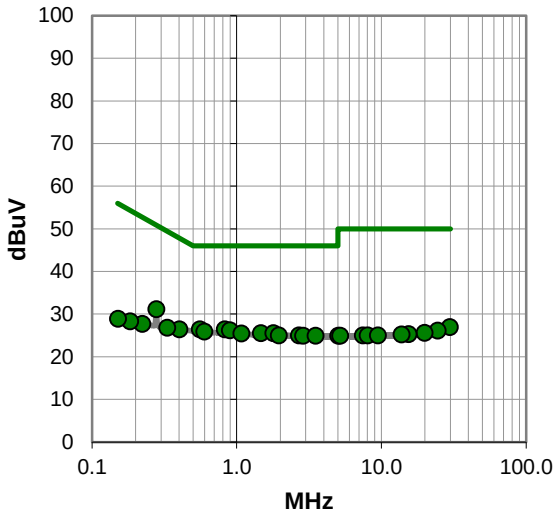
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #8

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.554	12.3	20.1	32.4	56.0	-23.6
0.829	12.3	20.1	32.4	56.0	-23.6
0.898	12.1	20.1	32.2	56.0	-23.8
0.597	11.8	20.1	31.9	56.0	-24.1
1.079	11.4	20.2	31.6	56.0	-24.4
1.470	11.4	20.2	31.6	56.0	-24.4
1.796	11.3	20.2	31.5	56.0	-24.5
0.278	15.8	20.2	36.0	60.9	-24.9
1.950	10.9	20.2	31.1	56.0	-24.9
2.393	10.8	20.3	31.1	56.0	-24.9
3.003	10.7	20.4	31.1	56.0	-24.9
3.548	10.6	20.4	31.0	56.0	-25.0
0.412	12.4	20.1	32.5	57.6	-25.1
0.332	12.7	20.1	32.8	59.4	-26.6
29.851	10.0	23.0	33.0	60.0	-27.0
0.254	14.2	20.2	34.4	61.6	-27.2
24.394	10.1	22.2	32.3	60.0	-27.7
19.453	10.1	21.7	31.8	60.0	-28.2
14.068	10.1	21.3	31.4	60.0	-28.6
13.067	10.1	21.2	31.3	60.0	-28.7
11.099	10.2	21.0	31.2	60.0	-28.8
5.084	10.5	20.6	31.1	60.0	-28.9
7.454	10.3	20.8	31.1	60.0	-28.9
7.926	10.3	20.8	31.1	60.0	-28.9
5.225	10.4	20.6	31.0	60.0	-29.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.556	6.3	20.1	26.4	46.0	-19.6
0.829	6.3	20.1	26.4	46.0	-19.6
0.278	10.9	20.2	31.1	50.9	-19.8
0.898	6.1	20.1	26.2	46.0	-19.8
0.597	5.8	20.1	25.9	46.0	-20.1
1.470	5.3	20.2	25.5	46.0	-20.5
1.795	5.3	20.2	25.5	46.0	-20.5
1.079	5.2	20.2	25.4	46.0	-20.6
1.955	4.8	20.2	25.0	46.0	-21.0
2.692	4.7	20.3	25.0	46.0	-21.0
2.881	4.5	20.4	24.9	46.0	-21.1
3.508	4.5	20.4	24.9	46.0	-21.1
0.402	6.3	20.1	26.4	47.8	-21.4
0.332	6.7	20.1	26.8	49.4	-22.6
29.815	3.9	23.0	26.9	50.0	-23.1
24.525	3.9	22.2	26.1	50.0	-23.9
19.908	3.8	21.8	25.6	50.0	-24.4
15.437	3.9	21.4	25.3	50.0	-24.7
13.786	3.9	21.3	25.2	50.0	-24.8
7.463	4.2	20.8	25.0	50.0	-25.0
8.067	4.2	20.8	25.0	50.0	-25.0
9.459	4.1	20.9	25.0	50.0	-25.0
0.223	7.5	20.2	27.7	52.7	-25.0
5.039	4.3	20.6	24.9	50.0	-25.1
5.202	4.3	20.6	24.9	50.0	-25.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-08-05
Customer:	Ademco, Inc.	Temperature:	21.9°C
Attendees:	None	Relative Humidity:	59.4%
Customer Project:	None	Bar. Pressure (PMSL):	1017 mb
Tested By:	Ko Vorasarn	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	ADEM0044-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

None

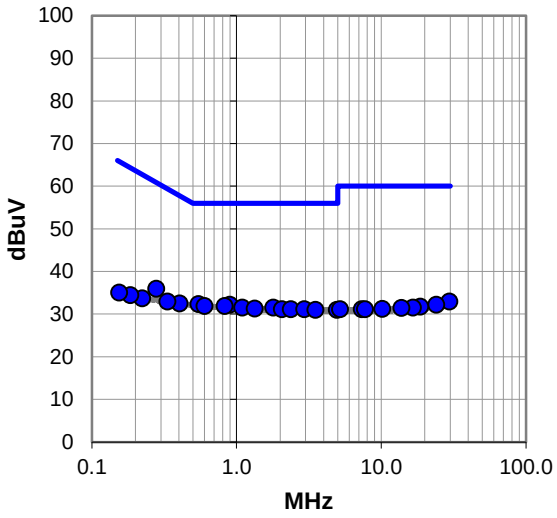
EUT OPERATING MODES

Thermostat On, Bluetooth active

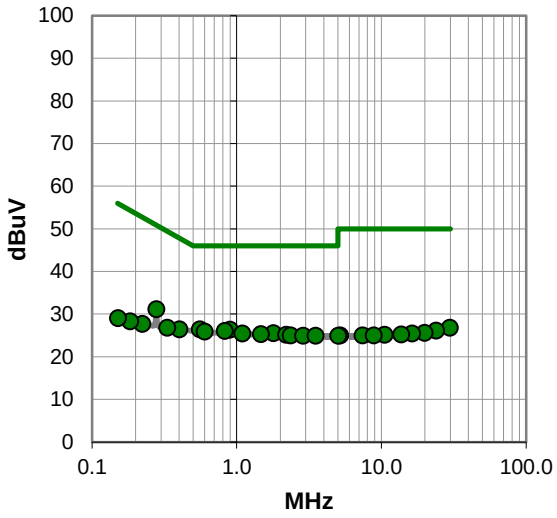
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #9

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.547	12.2	20.1	32.3	56.0	-23.7
0.898	12.1	20.1	32.2	56.0	-23.8
0.602	11.8	20.1	31.9	56.0	-24.1
0.829	11.8	20.1	31.9	56.0	-24.1
1.094	11.3	20.2	31.5	56.0	-24.5
1.796	11.3	20.2	31.5	56.0	-24.5
1.336	11.1	20.2	31.3	56.0	-24.7
2.057	10.9	20.2	31.1	56.0	-24.9
2.375	10.8	20.3	31.1	56.0	-24.9
2.938	10.7	20.4	31.1	56.0	-24.9
0.278	15.7	20.2	35.9	60.9	-25.0
3.521	10.6	20.4	31.0	56.0	-25.0
4.930	10.5	20.5	31.0	56.0	-25.0
0.403	12.4	20.1	32.5	57.8	-25.3
0.333	12.8	20.1	32.9	59.4	-26.5
29.674	10.0	22.9	32.9	60.0	-27.1
24.075	10.0	22.2	32.2	60.0	-27.8
18.658	10.0	21.7	31.7	60.0	-28.3
16.584	10.0	21.5	31.5	60.0	-28.5
13.801	10.1	21.3	31.4	60.0	-28.6
10.173	10.2	21.0	31.2	60.0	-28.8
5.203	10.5	20.6	31.1	60.0	-28.9
7.340	10.3	20.8	31.1	60.0	-28.9
7.745	10.3	20.8	31.1	60.0	-28.9
0.223	13.5	20.2	33.7	62.7	-29.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.556	6.3	20.1	26.4	46.0	-19.6
0.898	6.2	20.1	26.3	46.0	-19.7
0.278	10.9	20.2	31.1	50.9	-19.8
0.829	5.9	20.1	26.0	46.0	-20.0
0.600	5.8	20.1	25.9	46.0	-20.1
1.795	5.3	20.2	25.5	46.0	-20.5
1.094	5.2	20.2	25.4	46.0	-20.6
1.470	5.1	20.2	25.3	46.0	-20.7
2.199	4.8	20.3	25.1	46.0	-20.9
2.369	4.7	20.3	25.0	46.0	-21.0
2.881	4.5	20.4	24.9	46.0	-21.1
3.510	4.5	20.4	24.9	46.0	-21.1
0.402	6.3	20.1	26.4	47.8	-21.4
0.332	6.7	20.1	26.8	49.4	-22.6
29.749	3.8	23.0	26.8	50.0	-23.2
23.986	3.9	22.2	26.1	50.0	-23.9
19.908	3.8	21.8	25.6	50.0	-24.4
16.305	3.9	21.5	25.4	50.0	-24.6
13.725	4.0	21.2	25.2	50.0	-24.8
10.573	4.1	21.0	25.1	50.0	-24.9
5.205	4.4	20.6	25.0	50.0	-25.0
7.417	4.2	20.8	25.0	50.0	-25.0
8.862	4.2	20.8	25.0	50.0	-25.0
0.223	7.5	20.2	27.7	52.7	-25.0
5.040	4.3	20.6	24.9	50.0	-25.1

CONCLUSION

Pass

Tested By

DUTY CYCLE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

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 measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

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

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

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

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

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	Fairview Microwave	SA4014-20	AQI	2023-09-05	2024-09-05

DUTY CYCLE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-07-19
Customer:	Ademco, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	51.3%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	110VAC/60Hz	Configuration:	ADEM0044-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes attenuator, measurement cable, and DC block.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

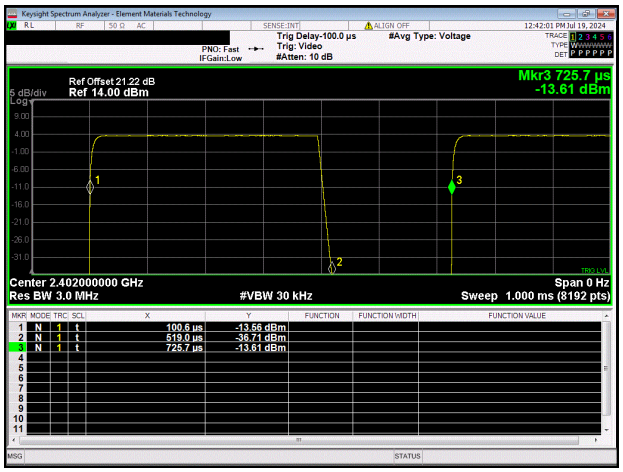
Tested By

TEST RESULTS

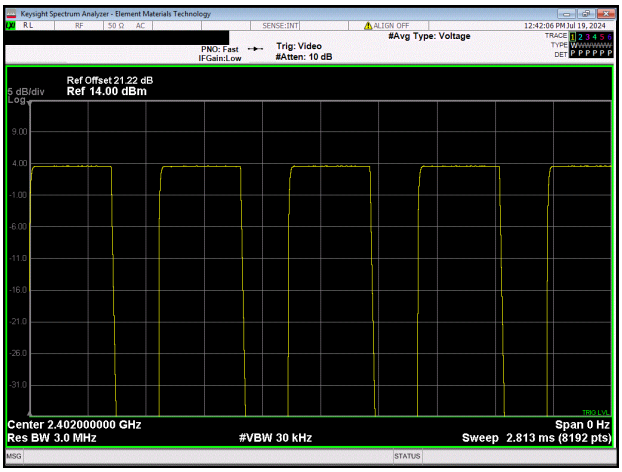
	Pulse Width	Period	Number of Pulses	Value (%)	Limit N/A ()	Results
BLE/GFSK 1 Mbps						
Low Channel, 2402 MHz	418.4 us	625.1 us	1	66.9	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2442 MHz	418 us	625.1 us	1	66.9	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel, 2480 MHz	417.8 us	625.1 us	1	66.8	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

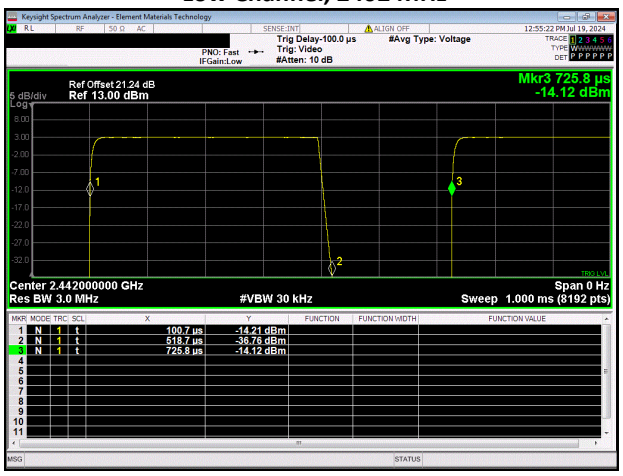
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



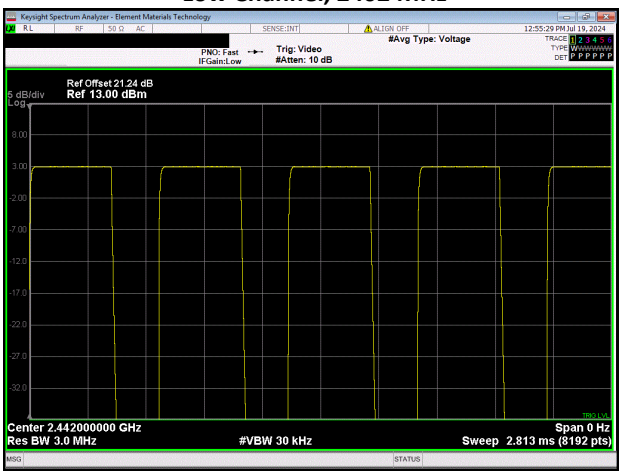
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



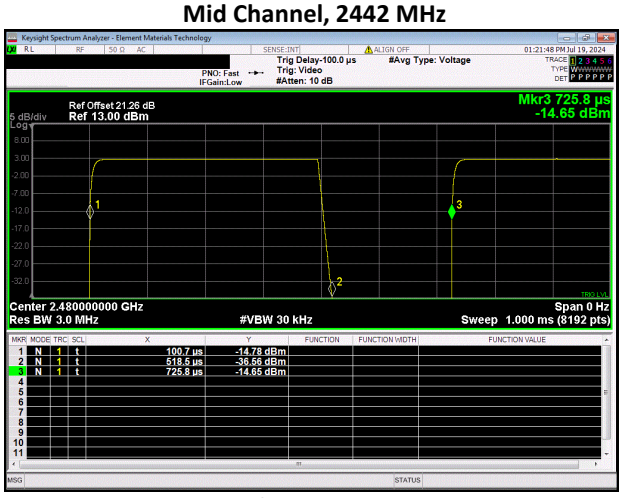
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



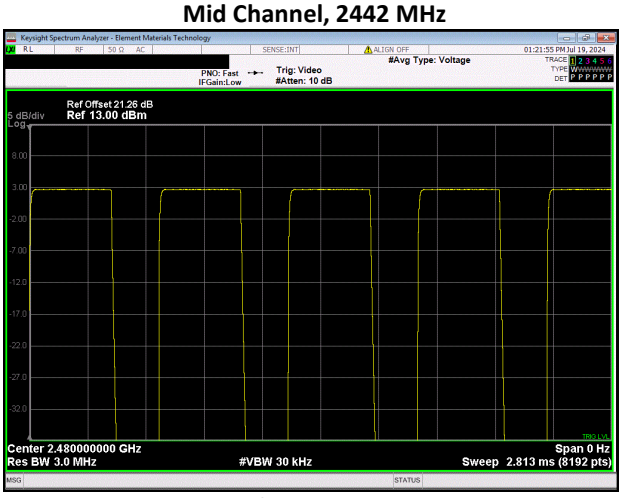
BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

DTS BANDWIDTH (6 dB)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

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 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 DTS bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	Fairview Microwave	SA4014-20	AQI	2023-09-05	2024-09-05

DTS BANDWIDTH (6 dB)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-07-19
Customer:	Ademco, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	51.3%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	110VAC/60Hz	Configuration:	ADEM0044-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes attenuator, measurement cable, and DC block.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

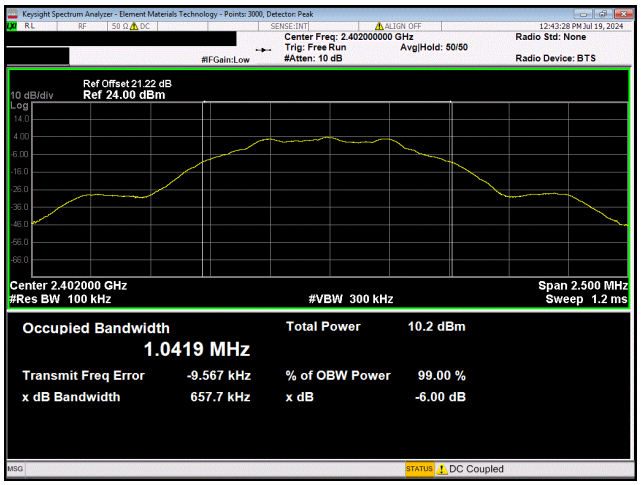
Tested By

TEST RESULTS

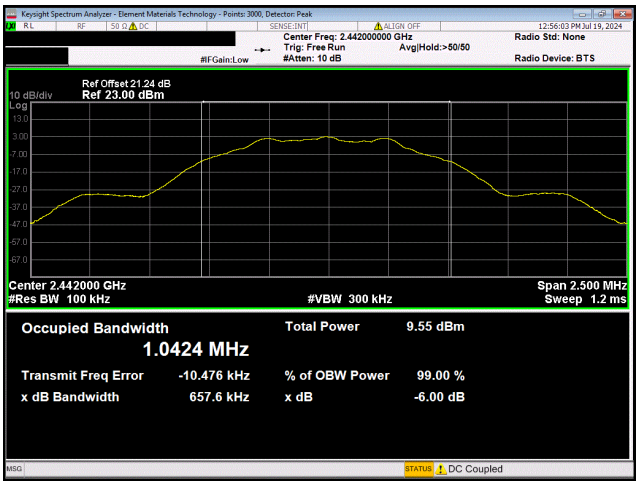
	Value	Limit (≥)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	657.748 kHz	500 kHz	Pass
Mid Channel, 2442 MHz	657.625 kHz	500 kHz	Pass
High Channel, 2480 MHz	657.702 kHz	500 kHz	Pass

DTS BANDWIDTH (6 dB)

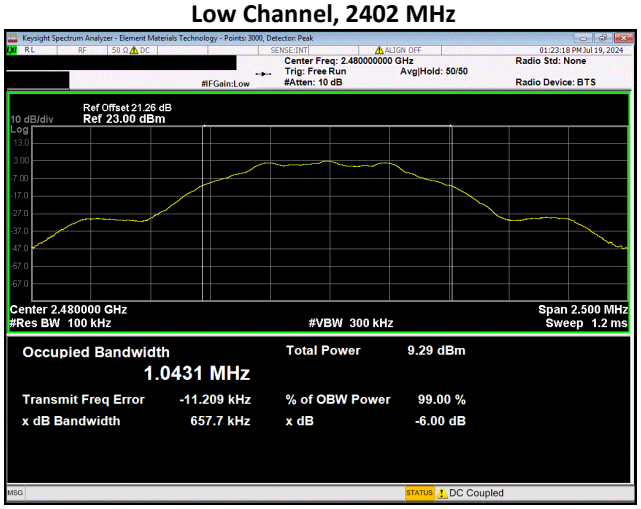
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

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 measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The 99% occupied bandwidth was measured with the EUT configured for continuous modulated operation.

Per ANSI C63.10:2013, 6.9.3, the spectrum analyzer was configured as follows:

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto to prevent video filtering or averaging. A sample detector was used unless the device was not able to be operated in a continuous transmit mode, in which case a peak detector was used.

The spectrum analyzer occupied bandwidth measurement function was used to sum the power of the transmission in linear terms to obtain the 99% bandwidth.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	Fairview Microwave	SA4014-20	AQI	2023-09-05	2024-09-05

OCCUPIED BANDWIDTH (99%)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-07-19
Customer:	Ademco, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	51.2%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	110VAC/60Hz	Configuration:	ADEM0044-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes attenuator, measurement cable, and DC block.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

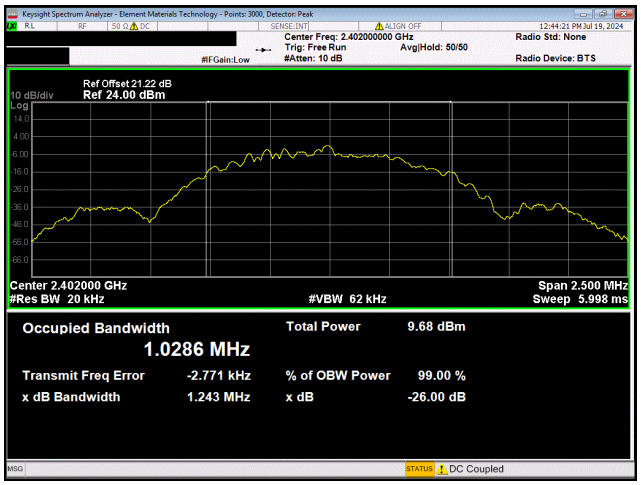
Tested By

TEST RESULTS

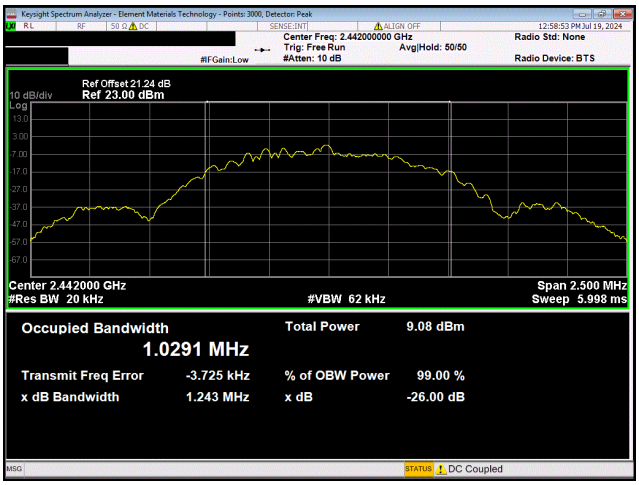
	Value	Limit	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	1.029 MHz	N/A	N/A
Mid Channel, 2442 MHz	1.029 MHz	N/A	N/A
High Channel, 2480 MHz	1.029 MHz	N/A	N/A

OCCUPIED BANDWIDTH (99%)

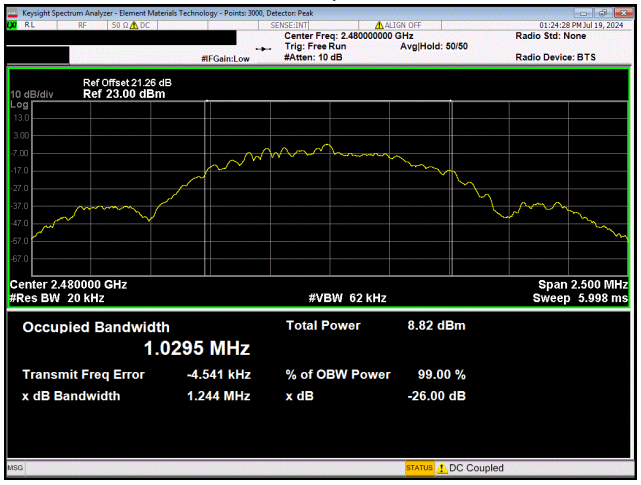
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

OUTPUT POWER

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

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 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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	Fairview Microwave	SA4014-20	AQI	2023-09-05	2024-09-05

OUTPUT POWER

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-07-19
Customer:	Ademco, Inc.	Temperature:	22.1°C
Attendees:	None	Relative Humidity:	51.6%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	110VAC/60Hz	Configuration:	ADEM0044-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes attenuator, measurement cable, and DC block.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

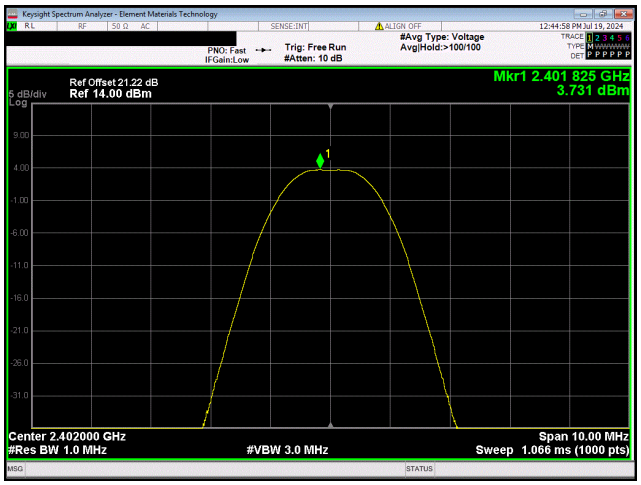
Tested By

TEST RESULTS

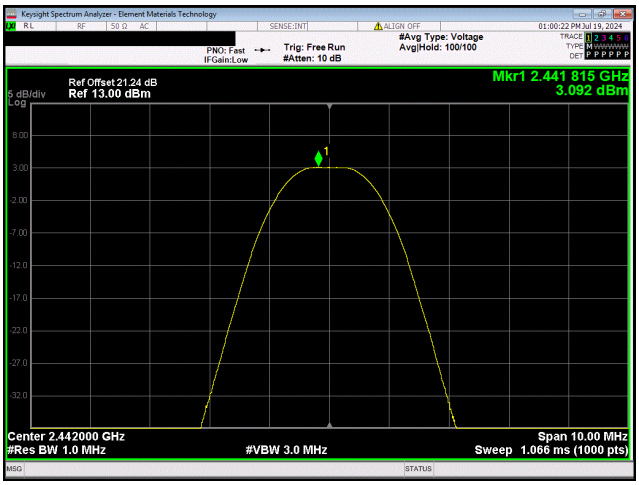
	Out Pwr (dBm)	Limit (dBm)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	3.731	30	Pass
Mid Channel, 2442 MHz	3.092	30	Pass
High Channel, 2480 MHz	2.853	30	Pass

OUTPUT POWER

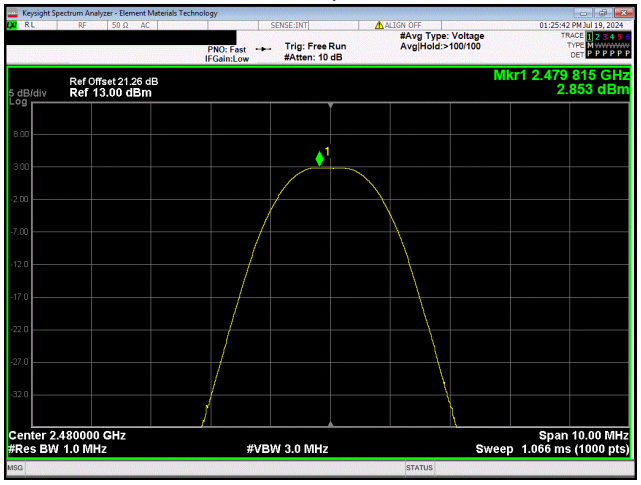
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

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 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.

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	Fairview Microwave	SA4014-20	AQI	2023-09-05	2024-09-05

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-07-19
Customer:	Ademco, Inc.	Temperature:	22.1°C
Attendees:	None	Relative Humidity:	51.4%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	110VAC/60Hz	Configuration:	ADEM0044-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes attenuator, measurement cable, and DC block.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

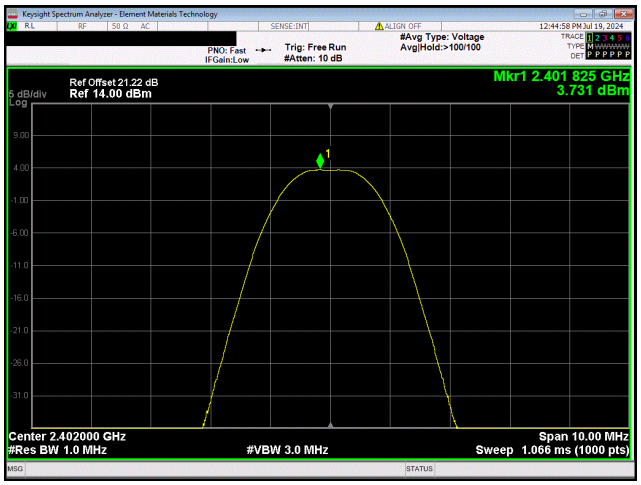
Tested By

TEST RESULTS

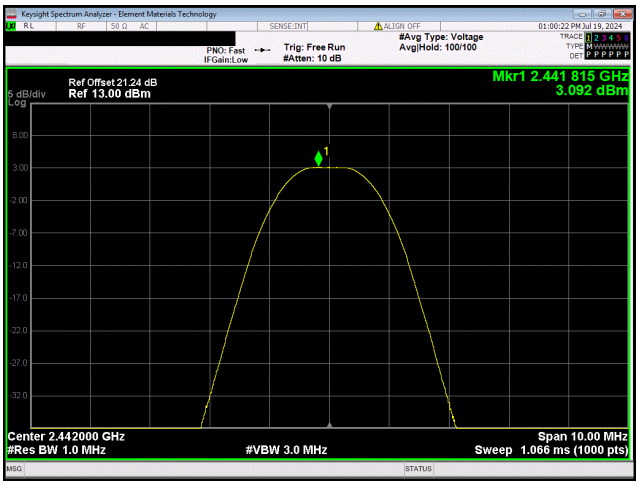
	Out Pwr (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Result
BLE/GFSK 1 Mbps					
Low Channel, 2402 MHz	3.731	2.43	6.16	36	Pass
Mid Channel, 2442 MHz	3.092	2.43	5.52	36	Pass
High Channel, 2480 MHz	2.853	2.43	5.28	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

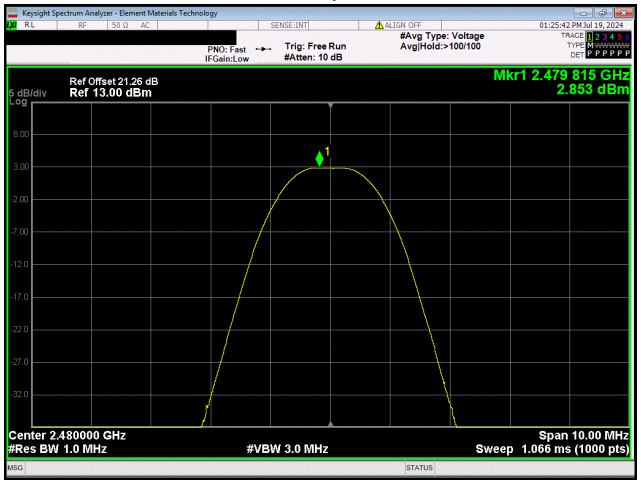
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

POWER SPECTRAL DENSITY

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

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 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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	Fairview Microwave	SA4014-20	AQI	2023-09-05	2024-09-05

POWER SPECTRAL DENSITY

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-07-19
Customer:	Ademco, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	51.8%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	110VAC/60Hz	Configuration:	ADEM0044-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes attenuator, measurement cable, and DC block.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

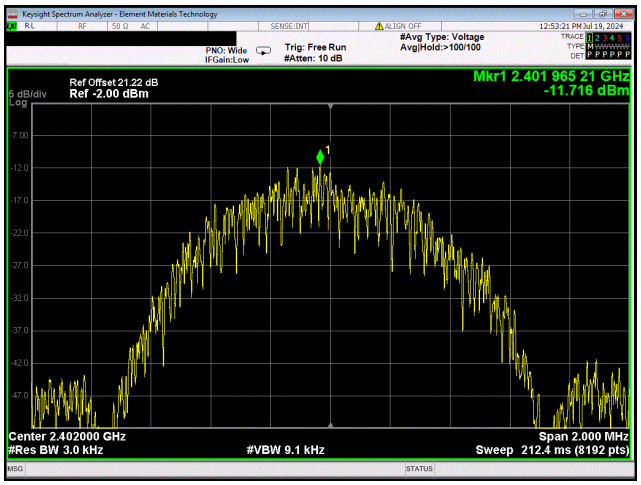
Tested By

TEST RESULTS

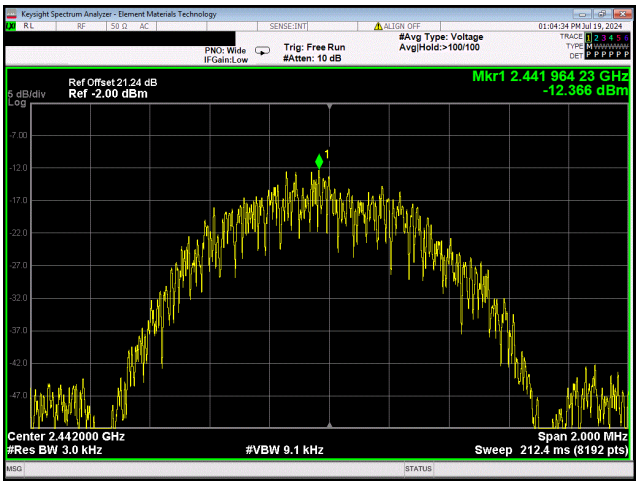
	Value dBm/3kHz	Limit ≤ (dBm/3kHz)	Results
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-11.716	8	Pass
Mid Channel, 2442 MHz	-12.366	8	Pass
High Channel, 2480 MHz	-12.543	8	Pass

POWER SPECTRAL DENSITY

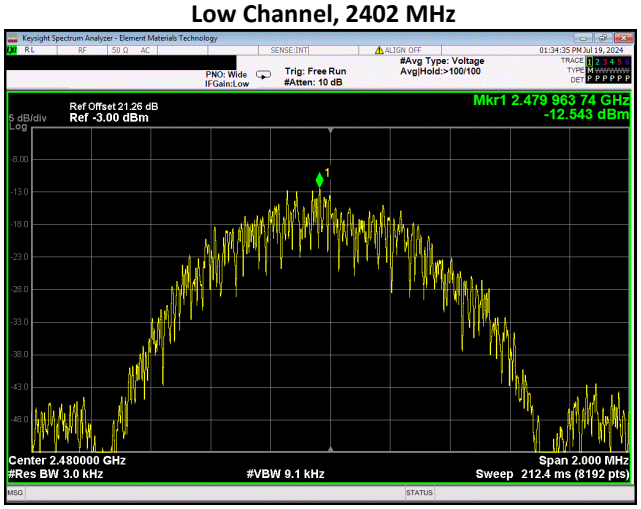
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

BAND EDGE COMPLIANCE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

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 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. The analyzer screen captures for this test show an example of the emission mask for the test mode also used during the radiated spurious emissions at the restricted band edges test.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	Fairview Microwave	SA4014-20	AQI	2023-09-05	2024-09-05

BAND EDGE COMPLIANCE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-07-19
Customer:	Ademco, Inc.	Temperature:	21.9°C
Attendees:	None	Relative Humidity:	51.7%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	110VAC/60Hz	Configuration:	ADEM0044-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

Reference level offset includes attenuator, measurement cable, and DC block.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

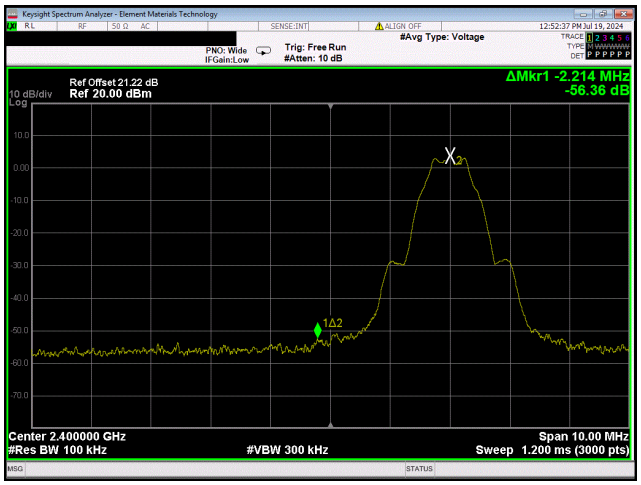
Tested By

TEST RESULTS

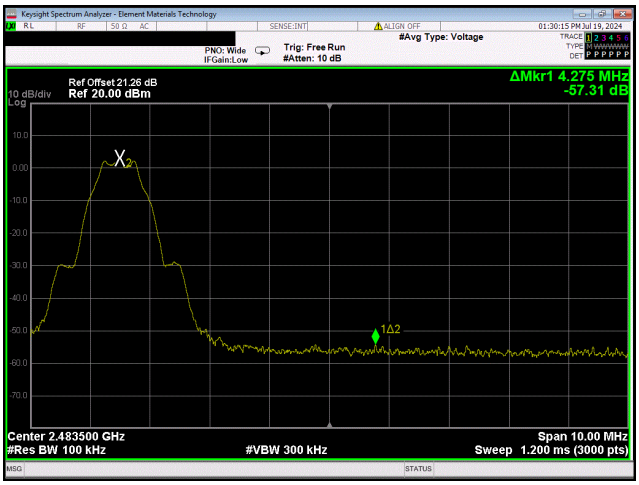
	Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps			
Low Channel, 2402 MHz	-56.36	-20	Pass
High Channel, 2480 MHz	-57.31	-20	Pass

BAND EDGE COMPLIANCE

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

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 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 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.

The reference level offset for the fundamental screen capture was based on a measured value of the loss between the spectrum analyzer and the EUT which was verified at the time of test. The remaining screen capture(s) use an internal transducer factor on the analyzer to correct the displayed trace based on the cable loss over frequency. The reference level offset for the additional screen capture(s) is then based on the expected attenuator value and any other losses.

Fundamental Offset = Ref Lvl Offset showing measured composite factor of all losses

Remaining Screen capture(s) Offset = “Internal” cable loss factor not shown on screen capture + Ref Lvl Offset showing expected attenuator value and any other losses

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFM	2024-05-22	2025-05-22
Generator - Signal	Agilent	N5183A	TIK	2022-01-24	2025-01-24
Cable	Micro-Coax	UFD150A-1-0720-200200	MNL	2023-09-05	2024-09-05
Block - DC	Fairview Microwave	SD3379	ANH	2023-09-05	2024-09-05
Attenuator	Fairview Microwave	SA4014-20	AQI	2023-09-05	2024-09-05

SPURIOUS CONDUCTED EMISSIONS

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-07-19
Customer:	Ademco, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	51.7%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mbar
Tested By:	Christopher Heintzelman	Job Site:	MN11
Power:	110VAC/60Hz	Configuration:	ADEM0044-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013
RSS-247 Issue 3:2023	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

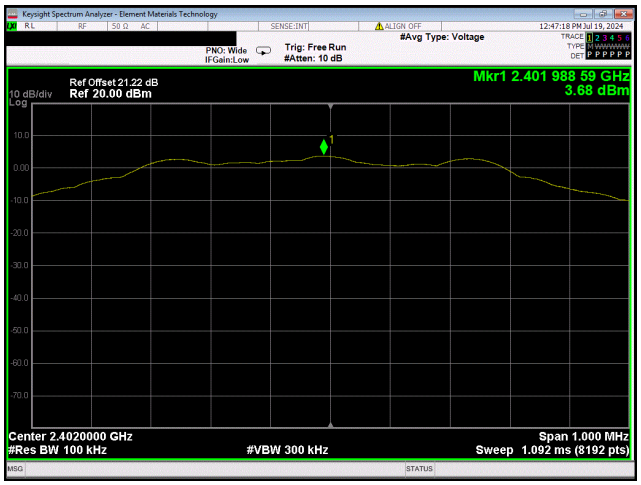
Tested By

TEST RESULTS

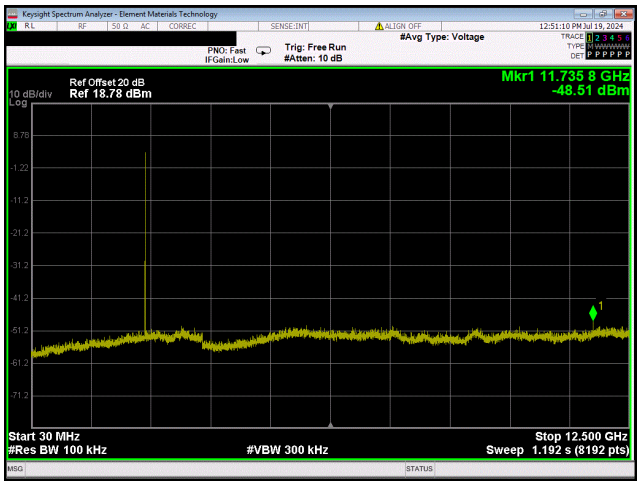
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
BLE/GFSK 1 Mbps					
Low Channel, 2402 MHz	Fundamental	2401.99	N/A	N/A	N/A
	30 MHz - 12.5 GHz	11735.75	-52.19	-20	Pass
	12.5 GHz - 25 GHz	24931.33	-41.36	-20	Pass
Mid Channel, 2442 MHz	Fundamental	2441.99	N/A	N/A	N/A
	30 MHz - 12.5 GHz	12181.82	-52.18	-20	Pass
	12.5 GHz - 25 GHz	24966.43	-39.27	-20	Pass
High Channel, 2480 MHz	Fundamental	2479.99	N/A	N/A	N/A
	30 MHz - 12.5 GHz	12122.44	-51.27	-20	Pass
	12.5 GHz - 25 GHz	24842.82	-40.2	-20	Pass

SPURIOUS CONDUCTED EMISSIONS

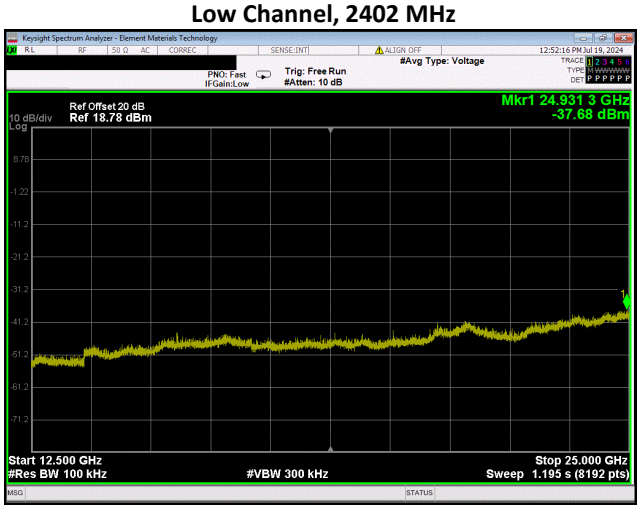
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



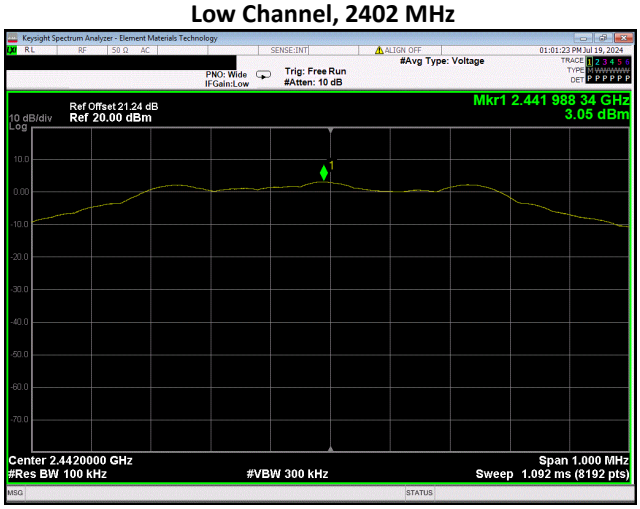
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



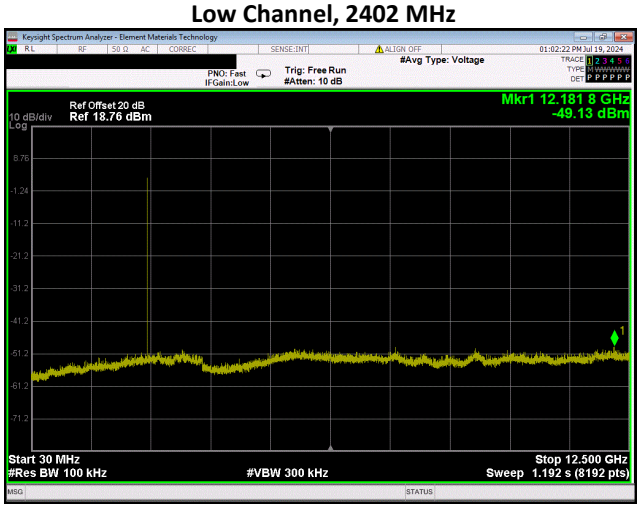
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



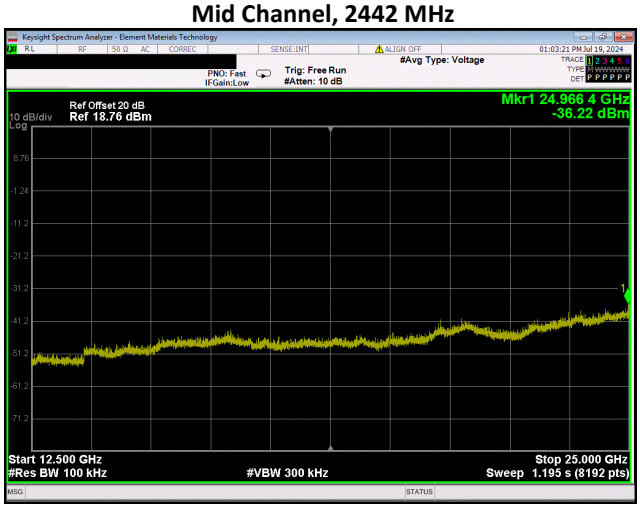
BLE/GFSK 1 Mbps
Low Channel, 2402 MHz



BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



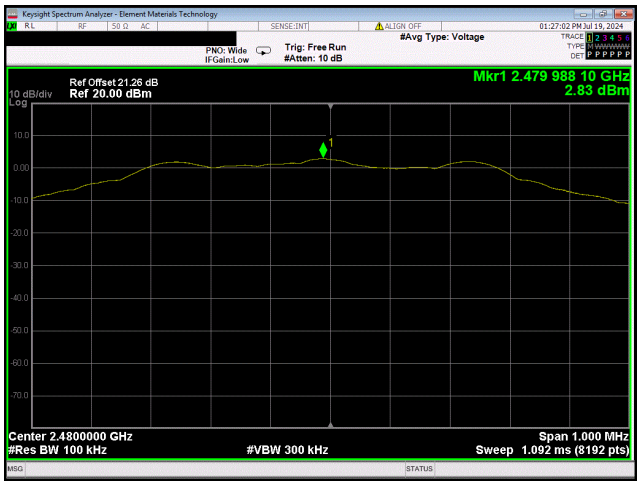
BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz



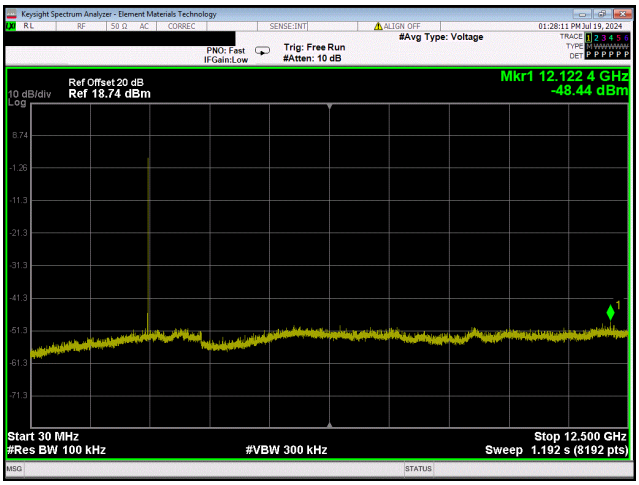
BLE/GFSK 1 Mbps
Mid Channel, 2442 MHz

SPURIOUS CONDUCTED EMISSIONS

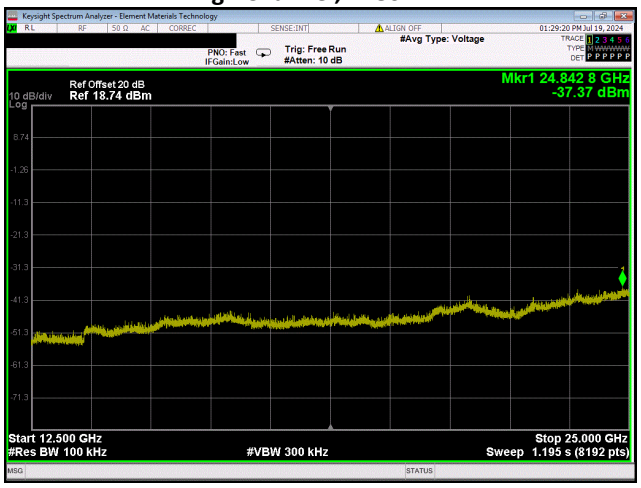
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz



BLE/GFSK 1 Mbps
High Channel, 2480 MHz

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

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*log(1/dc).

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Double Ridge	ETS Lindgren	3115	AIB	2022-09-01	2024-09-01
Cable	Element	Double Ridge Guide Horn Cables	MNV	2024-01-30	2025-01-30
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	2024-01-30	2025-01-30
Attenuator	Coaxicom	3910-20	AXY	2023-09-10	2024-09-10
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2024-02-29	2025-02-28
Filter - High Pass	Micro-Tronics	HPM50111	HFM	2023-09-10	2024-09-10
Antenna - Standard Gain	ETS-Lindgren	3160-07	AJJ	NCR	NCR
Cable	Element	Standard Gain Cable	MNW	2024-01-30	2025-01-30
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	2024-01-30	2025-01-30
Antenna - Standard Gain	ETS Lindgren	3160-09	AHG	NCR	NCR
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNP	2023-09-05	2024-09-05
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	2023-09-05	2024-09-05
Antenna - Biconilog	Ametek	CBL 6141B	AYS	2023-03-28	2025-03-28
Cable	Element	Biconilog Cable	MNX	2024-01-30	2025-01-30
Amplifier - Pre-Amplifier	Miteq	AM-1064-9079 and SA18E-10	AOO	2024-01-30	2025-01-30
Filter - Low Pass	Micro-Tronics	LPM50004	HGG	2023-09-10	2024-09-10
Antenna - Loop	ETS Lindgren	6502	AOB	2023-06-12	2025-06-12

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	ESM Cable Corp.	Bilog Cables	MNH	2023-10-08	2024-10-08
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2024-03-13	2025-03-13
Antenna - Double Ridge	ETS Lindgren	3115	AIP	2024-08-02	2026-08-02
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	2024-01-08	2025-01-08
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2024-01-08	2025-01-08
Attenuator	Fairview Microwave	SA18H-20	VAF	2024-08-25	2025-08-25
Filter - High Pass	Micro-Tronics	HPM50111	LFN	2024-08-25	2025-08-25
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	NCR
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	2024-01-28	2025-01-28
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	2024-01-08	2025-01-08
Antenna - Double Ridge	ETS Lindgren	3115	AIP	2024-08-02	2026-08-02
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	2024-01-08	2025-01-08
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	2024-01-08	2025-01-08
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	2024-03-13	2025-03-13
Attenuator	Fairview Microwave	SA18H-20	VAF	2024-08-25	2025-08-25
Filter - Band Pass/Notch	Micro-Tronics	BRC50705	LFI	2024-08-25	2025-08-25
Filter - High Pass	Micro-Tronics	HPM50108	LFM	2024-08-25	2025-08-25

FREQUENCY RANGE INVESTIGATED

9 kHz TO 26 GHz

POWER INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

ADEM0044-2
ADEM0044-3

MODES INVESTIGATED

Transmitting BLE 1Mbps

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005293	Date:	2024-09-10
Customer:	Ademco, Inc.	Temperature:	21.6°C
Attendees:	None	Relative Humidity:	52%
Customer Project:	None	Bar. Pressure (PMSL):	1011 mb
Tested By:	Arnauld Dedry	Job Site:	MN05
Power:	110VAC/60Hz	Configuration:	ADEM0044-3

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	60	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

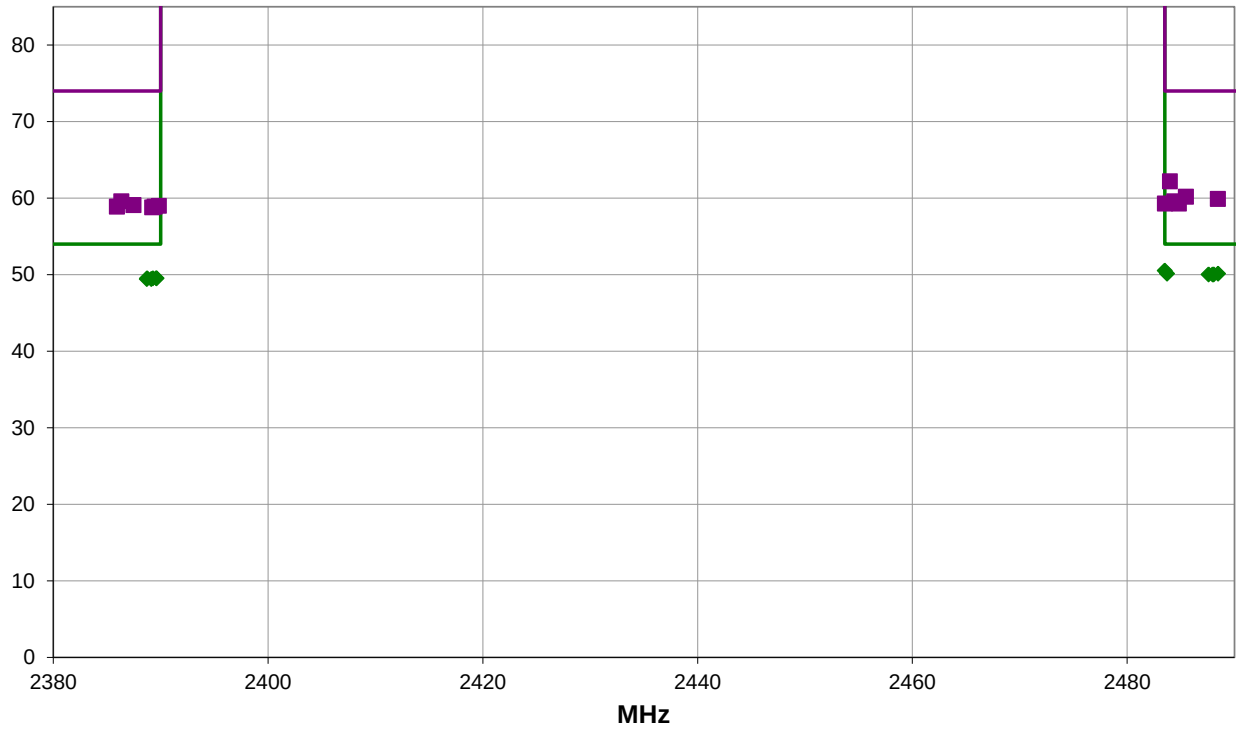
Duty Cycle Correction Factor 10*log10(1/.67) = 1.74

EUT OPERATING MODES

Transmitting BLE 1 Mbps

DEVIATIONS FROM TEST STANDARD

None



Run #: 60 ■ PK ◆ AV ● QP

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #60

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
2483.500	32.1	-3.3	1.4	261.9	1.7	20.0	Horz	AV	0.0	50.5	54.0	-3.5	EUT Horz, High Ch,1 Mbps
2488.467	31.7	-3.3	1.5	351.9	1.7	20.0	Horz	AV	0.0	50.1	54.0	-3.9	EUT On Side, High Ch, 1 Mbps
2483.717	31.7	-3.3	2.8	150.9	1.7	20.0	Vert	AV	0.0	50.1	54.0	-3.9	EUT On Side, High Ch, 1 Mbps
2487.958	31.6	-3.3	1.5	304.9	1.7	20.0	Horz	AV	0.0	50.0	54.0	-4.0	EUT Vert, High Ch, 1 Mbps
2488.058	31.6	-3.3	1.5	351.0	1.7	20.0	Vert	AV	0.0	50.0	54.0	-4.0	EUT Vert, High Ch, 1 Mbps
2487.583	31.6	-3.3	3.0	300.9	1.7	20.0	Vert	AV	0.0	50.0	54.0	-4.0	EUT Horz, High Ch,1 Mbps
2388.733	31.9	-4.1	1.5	199.9	1.7	20.0	Horz	AV	0.0	49.5	54.0	-4.5	EUT Horz, Low Ch, 1 Mbps
2389.267	31.9	-4.1	1.5	109.0	1.7	20.0	Vert	AV	0.0	49.5	54.0	-4.5	EUT Horz, Low Ch, 1 Mbps
2389.592	31.9	-4.1	1.5	155.0	1.7	20.0	Vert	AV	0.0	49.5	54.0	-4.5	EUT Vert, Low Ch, 1 Mbps
2389.600	31.9	-4.1	1.5	120.0	1.7	20.0	Vert	AV	0.0	49.5	54.0	-4.5	EUT On Side, Low Ch, 1 Mbps
2388.700	31.8	-4.1	1.5	200.9	1.7	20.0	Horz	AV	0.0	49.4	54.0	-4.6	EUT Vert, Low Ch, 1 Mbps
2389.117	31.8	-4.1	1.5	268.0	1.7	20.0	Horz	AV	0.0	49.4	54.0	-4.6	EUT On Side, Low Ch, 1 Mbps
2483.983	45.5	-3.3	1.4	261.9	0.0	20.0	Horz	PK	0.0	62.2	74.0	-11.8	EUT Horz, High Ch,1 Mbps
2485.467	43.5	-3.3	2.8	150.9	0.0	20.0	Vert	PK	0.0	60.2	74.0	-13.8	EUT On Side, High Ch, 1 Mbps
2488.450	43.2	-3.3	1.5	304.9	0.0	20.0	Horz	PK	0.0	59.9	74.0	-14.1	EUT Vert, High Ch, 1 Mbps
2386.333	43.7	-4.1	1.5	155.0	0.0	20.0	Vert	PK	0.0	59.6	74.0	-14.4	EUT Vert, Low Ch, 1 Mbps
2484.375	42.9	-3.3	1.5	351.0	0.0	20.0	Vert	PK	0.0	59.6	74.0	-14.4	EUT Vert, High Ch, 1 Mbps
2483.525	42.6	-3.3	1.5	351.9	0.0	20.0	Horz	PK	0.0	59.3	74.0	-14.7	EUT On Side, High Ch, 1 Mbps
2484.825	42.6	-3.3	3.0	300.9	0.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	EUT Horz, High Ch,1 Mbps
2387.458	43.2	-4.1	1.5	268.0	0.0	20.0	Horz	PK	0.0	59.1	74.0	-14.9	EUT On Side, Low Ch, 1 Mbps
2389.833	43.1	-4.1	1.5	199.9	0.0	20.0	Horz	PK	0.0	59.0	74.0	-15.0	EUT Horz, Low Ch, 1 Mbps
2389.425	43.0	-4.1	1.5	200.9	0.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	EUT Vert, Low Ch, 1 Mbps
2385.925	43.0	-4.1	1.5	120.0	0.0	20.0	Vert	PK	0.0	58.9	74.0	-15.1	EUT On Side, Low Ch, 1 Mbps
2389.208	42.9	-4.1	1.5	109.0	0.0	20.0	Vert	PK	0.0	58.8	74.0	-15.2	EUT Horz, Low Ch, 1 Mbps

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005049	Date:	2024-07-26
Customer:	Ademco, Inc.	Temperature:	22.5°C
Attendees:	None	Relative Humidity:	52.7%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Arnauld Dedry	Job Site:	MN09
Power:	110VAC/60Hz	Configuration:	ADEM0044-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.247:2024	ANSI C63.10:2013

TEST PARAMETERS

Run #:	16	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

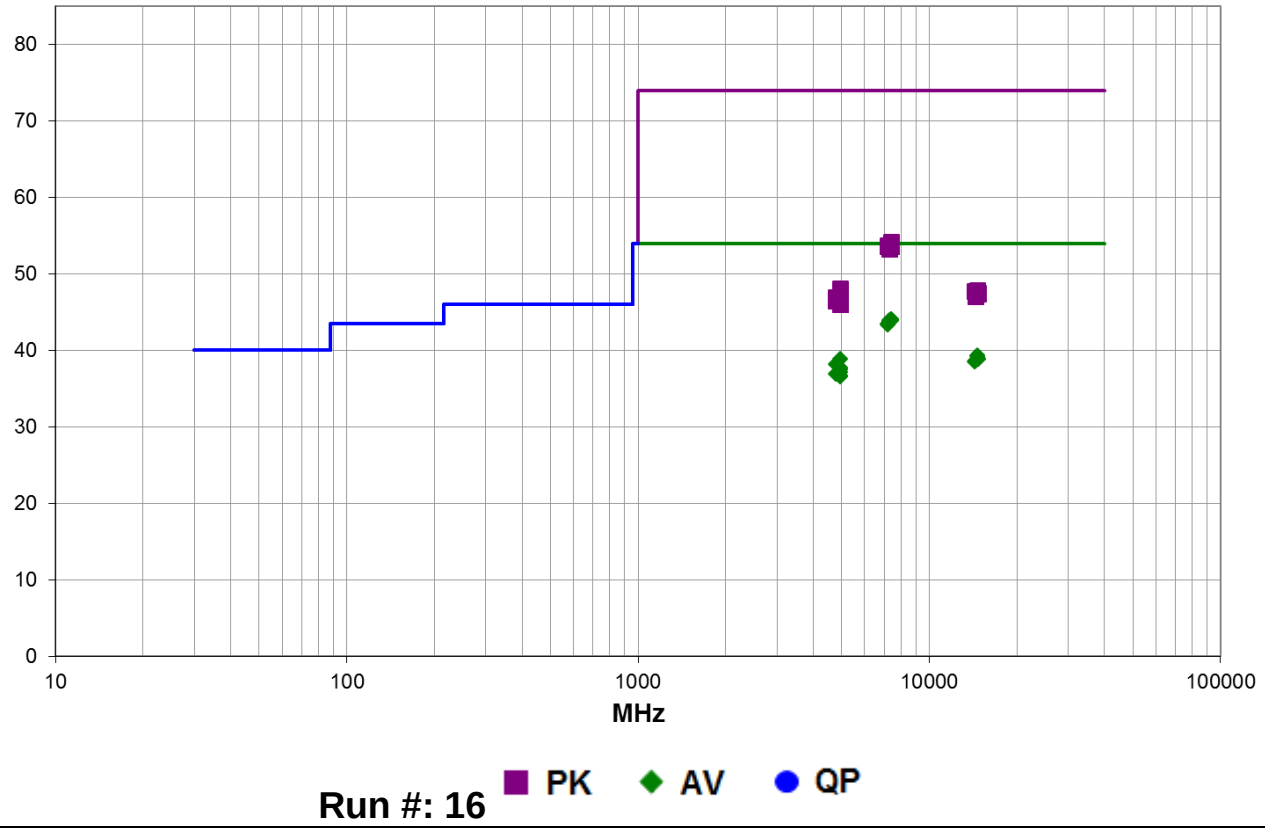
Duty Cycle Correction Factor 10*log10(1/.67) = 1.74

EUT OPERATING MODES

Transmitting BLE 1Mbps

DEVIATIONS FROM TEST STANDARD

None



Run #: 16

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

RESULTS - Run #16

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
7438.175	28.1	14.2	1.5	80.0	1.7	0.0	Horz	AV	0.0	44.0	54.0	-10.0	EUT Vert, High Ch, 1 Mbps
7438.067	28.1	14.2	1.5	43.0	1.7	0.0	Vert	AV	0.0	44.0	54.0	-10.0	EUT Vert, High Ch, 1 Mbps
7438.950	28.1	14.2	1.5	163.0	1.7	0.0	Horz	AV	0.0	44.0	54.0	-10.0	EUT Horz, High Ch, 1 Mbps
7439.650	28.0	14.2	3.0	70.0	1.7	0.0	Horz	AV	0.0	43.9	54.0	-10.1	EUT On Side, High Ch, 1 Mbps
7438.108	28.0	14.2	1.5	271.0	1.7	0.0	Vert	AV	0.0	43.9	54.0	-10.1	EUT On Side, High Ch, 1 Mbps
7439.075	28.0	14.2	1.5	71.0	1.7	0.0	Vert	AV	0.0	43.9	54.0	-10.1	EUT Horz, High Ch, 1 Mbps
7331.275	28.7	13.4	1.5	134.0	1.7	0.0	Vert	AV	0.0	43.8	54.0	-10.2	EUT Horz, Mid Ch, 1 Mbps
7331.900	28.6	13.4	1.5	251.0	1.7	0.0	Horz	AV	0.0	43.7	54.0	-10.3	EUT Vert, Mid Ch, 1 Mbps
7330.325	28.6	13.4	1.5	95.0	1.7	0.0	Vert	AV	0.0	43.7	54.0	-10.3	EUT Vert, Mid Ch, 1 Mbps
7329.725	28.6	13.4	1.6	133.0	1.7	0.0	Horz	AV	0.0	43.7	54.0	-10.3	EUT Horz, Mid Ch, 1 Mbps
7206.192	29.0	12.7	1.5	12.0	1.7	0.0	Horz	AV	0.0	43.4	54.0	-10.6	EUT Vert, Low Ch, 1 Mbps
7204.567	28.9	12.7	1.5	6.0	1.7	0.0	Vert	AV	0.0	43.3	54.0	-10.7	EUT Horz, Low Ch, 1 Mbps
14642.050	29.8	7.8	3.4	355.9	1.7	0.0	Horz	AV	0.0	39.3	54.0	-14.7	EUT Vert, Mid Ch, 1 Mbps
14642.060	29.7	7.8	1.5	189.0	1.7	0.0	Vert	AV	0.0	39.2	54.0	-14.8	EUT Horz, Mid Ch, 1 Mbps
4959.883	31.7	5.4	2.8	355.0	1.7	0.0	Horz	AV	0.0	38.8	54.0	-15.2	EUT Horz, High Ch, 1 Mbps
14774.200	29.3	7.8	2.7	285.0	1.7	0.0	Vert	AV	0.0	38.8	54.0	-15.2	EUT Horz, High Ch, 1 Mbps
14774.310	29.3	7.8	1.5	353.0	1.7	0.0	Horz	AV	0.0	38.8	54.0	-15.2	EUT Vert, High Ch, 1 Mbps
14413.530	30.4	6.5	1.6	63.9	1.7	0.0	Vert	AV	0.0	38.6	54.0	-15.4	EUT Horz, Low Ch, 1 Mbps
14411.340	30.3	6.5	1.5	175.9	1.7	0.0	Horz	AV	0.0	38.5	54.0	-15.5	EUT Vert, Low Ch, 1 Mbps
4804.083	30.3	6.1	1.6	168.0	1.7	0.0	Horz	AV	0.0	38.1	54.0	-15.9	EUT Vert, Low Ch, 1 Mbps
4960.067	30.5	5.4	1.5	183.0	1.7	0.0	Horz	AV	0.0	37.6	54.0	-16.4	EUT On Side, High Ch, 1 Mbps
4960.117	30.3	5.4	2.7	155.0	1.7	0.0	Horz	AV	0.0	37.4	54.0	-16.6	EUT Vert, High Ch, 1 Mbps
4960.000	30.0	5.4	1.5	206.0	1.7	0.0	Vert	AV	0.0	37.1	54.0	-16.9	EUT On Side, High Ch, 1 Mbps
4887.425	29.6	5.6	1.5	28.0	1.7	0.0	Horz	AV	0.0	36.9	54.0	-17.1	EUT Vert, Mid Ch, 1 Mbps
4886.267	29.6	5.6	1.5	86.0	1.7	0.0	Vert	AV	0.0	36.9	54.0	-17.1	EUT Horz, Mid Ch, 1 Mbps
4803.933	29.0	6.1	1.5	343.0	1.7	0.0	Vert	AV	0.0	36.8	54.0	-17.2	EUT Horz, Low Ch, 1 Mbps
4886.075	29.5	5.6	3.6	302.0	1.7	0.0	Horz	AV	0.0	36.8	54.0	-17.2	EUT Vert, Mid Ch, 1 Mbps
4887.858	29.5	5.6	1.5	358.0	1.7	0.0	Vert	AV	0.0	36.8	54.0	-17.2	EUT Horz, Mid Ch, 1 Mbps
4960.025	29.5	5.4	1.5	133.0	1.7	0.0	Vert	AV	0.0	36.6	54.0	-17.4	EUT Vert, High Ch, 1 Mbps
4957.658	29.4	5.4	1.5	333.0	1.7	0.0	Vert	AV	0.0	36.5	54.0	-17.5	EUT Horz, High Ch, 1 Mbps
7437.592	39.9	14.2	3.0	70.0	0.0	0.0	Horz	PK	0.0	54.1	74.0	-19.9	EUT On Side, High Ch, 1 Mbps
7439.925	39.7	14.2	1.5	71.0	0.0	0.0	Vert	PK	0.0	53.9	74.0	-20.1	EUT Horz, High Ch, 1 Mbps
7442.083	39.6	14.2	1.5	163.0	0.0	0.0	Horz	PK	0.0	53.8	74.0	-20.2	EUT Horz, High Ch, 1 Mbps
7207.508	41.0	12.7	1.5	6.0	0.0	0.0	Vert	PK	0.0	53.7	74.0	-20.3	EUT Horz, Low Ch, 1 Mbps
7330.142	40.3	13.4	1.5	95.0	0.0	0.0	Vert	PK	0.0	53.7	74.0	-20.3	EUT Vert, Mid Ch, 1 Mbps
7441.317	39.5	14.2	1.5	271.0	0.0	0.0	Vert	PK	0.0	53.7	74.0	-20.3	EUT On Side, High Ch, 1 Mbps
7439.725	39.5	14.2	1.5	80.0	0.0	0.0	Horz	PK	0.0	53.7	74.0	-20.3	EUT Vert, High Ch, 1 Mbps
7204.200	40.9	12.7	1.5	12.0	0.0	0.0	Horz	PK	0.0	53.6	74.0	-20.4	EUT Vert, Low Ch, 1 Mbps
7329.633	40.1	13.4	1.5	134.0	0.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	EUT Horz, Mid Ch, 1 Mbps
7441.125	39.3	14.2	1.5	43.0	0.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	EUT Vert, High Ch, 1 Mbps

SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

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
7332.308	40.0	13.4	1.5	251.0	0.0	0.0	Horz	PK	0.0	53.4	74.0	-20.6	EUT Vert, Mid Ch, 1 Mbps
7331.692	39.8	13.4	1.6	133.0	0.0	0.0	Horz	PK	0.0	53.2	74.0	-20.8	EUT Horz, Mid Ch, 1 Mbps
4960.433	42.6	5.4	2.7	155.0	0.0	0.0	Horz	PK	0.0	48.0	74.0	-26.0	EUT Vert, High Ch, 1 Mbps
14640.610	40.0	7.8	3.4	355.9	0.0	0.0	Horz	PK	0.0	47.8	74.0	-26.2	EUT Vert, Mid Ch, 1 Mbps
14410.240	41.2	6.5	1.6	63.9	0.0	0.0	Vert	PK	0.0	47.7	74.0	-26.3	EUT Horz, Low Ch, 1 Mbps
14640.920	39.8	7.8	1.5	189.0	0.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4	EUT Horz, Mid Ch, 1 Mbps
14773.660	39.7	7.8	2.7	285.0	0.0	0.0	Vert	PK	0.0	47.5	74.0	-26.5	EUT Horz, High Ch, 1 Mbps
4959.617	42.0	5.4	1.5	206.0	0.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6	EUT On Side, High Ch, 1 Mbps
4959.667	41.9	5.4	2.8	355.0	0.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	EUT Horz, High Ch, 1 Mbps
14773.830	39.5	7.8	1.5	353.0	0.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	EUT Vert, High Ch, 1 Mbps
14412.790	40.5	6.5	1.5	175.9	0.0	0.0	Horz	PK	0.0	47.0	74.0	-27.0	EUT Vert, Low Ch, 1 Mbps
4803.825	40.8	6.1	1.6	168.0	0.0	0.0	Horz	PK	0.0	46.9	74.0	-27.1	EUT Vert, Low Ch, 1 Mbps
4887.258	41.3	5.6	3.6	302.0	0.0	0.0	Horz	PK	0.0	46.9	74.0	-27.1	EUT Vert, Mid Ch, 1 Mbps
4888.308	41.2	5.6	1.5	86.0	0.0	0.0	Vert	PK	0.0	46.8	74.0	-27.2	EUT Horz, Mid Ch, 1 Mbps
4886.442	41.1	5.6	1.5	358.0	0.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3	EUT Horz, Mid Ch, 1 Mbps
4886.217	41.0	5.6	1.5	28.0	0.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	EUT Vert, Mid Ch, 1 Mbps
4801.842	40.3	6.1	1.5	343.0	0.0	0.0	Vert	PK	0.0	46.4	74.0	-27.6	EUT Horz, Low Ch, 1 Mbps
4959.792	41.0	5.4	1.5	183.0	0.0	0.0	Horz	PK	0.0	46.4	74.0	-27.6	EUT On Side, High Ch, 1 Mbps
4957.983	40.6	5.4	1.5	133.0	0.0	0.0	Vert	PK	0.0	46.0	74.0	-28.0	EUT Vert, High Ch, 1 Mbps
4960.258	40.6	5.4	1.5	333.0	0.0	0.0	Vert	PK	0.0	46.0	74.0	-28.0	EUT Horz, High Ch, 1 Mbps

CONCLUSION

Pass

Tested By

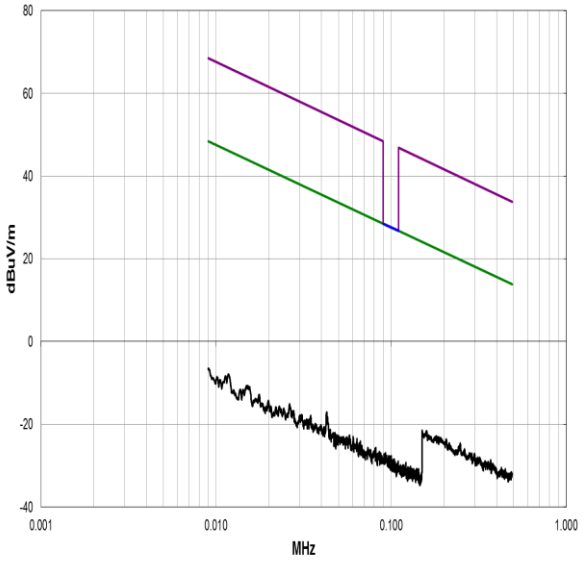
SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

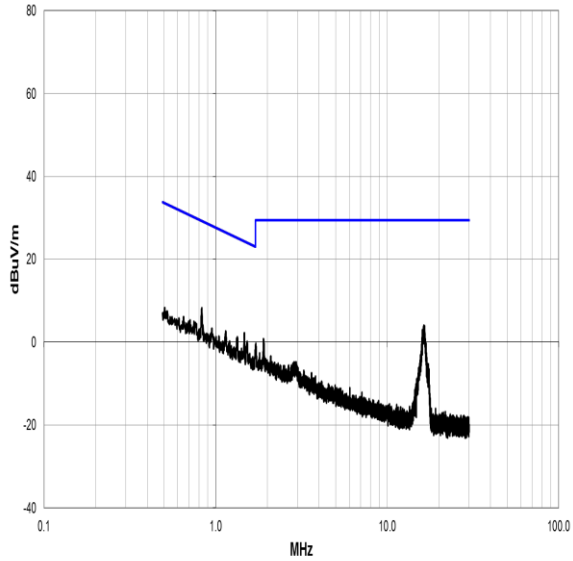
PRESCAN DATA

Radiated spurious emissions from the EUT are initially reviewed with Pre-scans (Preview scans). Pre-scans are performed, with the EUT transmitting on the lowest applicable data rate, for both vertical and horizontal polarizations. The Pre-scan plots below are shown with a peak detector and RBW for the following frequency ranges: 9 kHz RBW (< 30 MHz); 120 kHz RBW (30 - 1000 MHz); 1 MHz RBW (> 1 GHz). In the case where unintentional emissions are observed, an ambient or idle pre-scan with the radio off, will be shown for comparison.

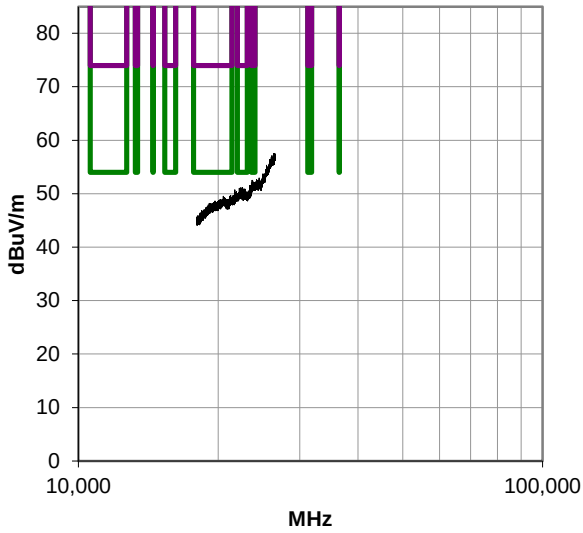
0.009-0.49 MHz, Run 27



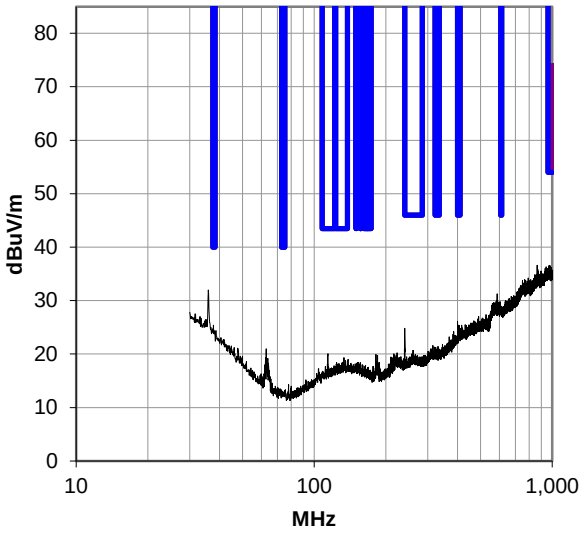
0.49-30 MHz, Run 28



18000-26500 MHz, Run 203



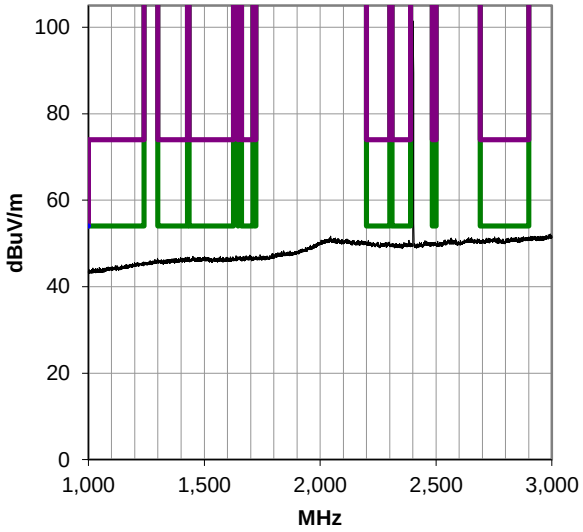
30-1000 MHz, Run 243



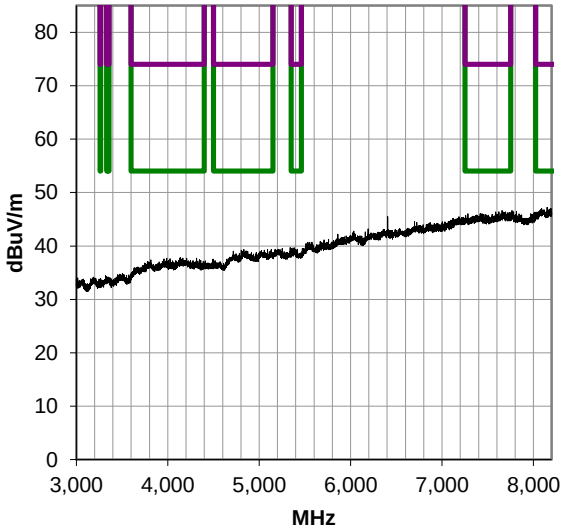
SPURIOUS RADIATED EMISSIONS

element
WTD.2024.01.16.0
EmiR5 2023.08.29.0
PSA-ESCI 2023.12.23.0

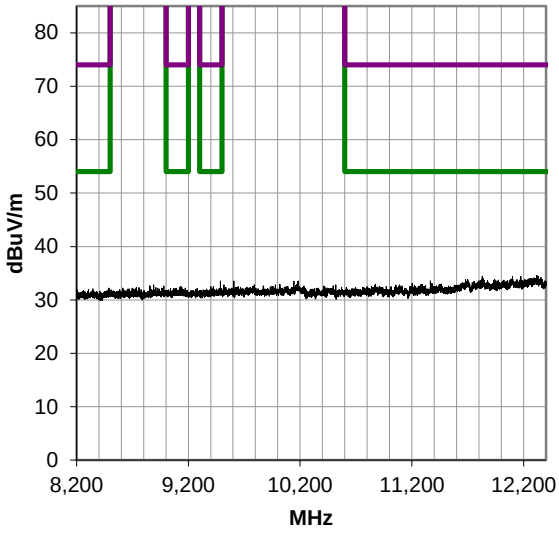
1000-3000 MHz, Run 1



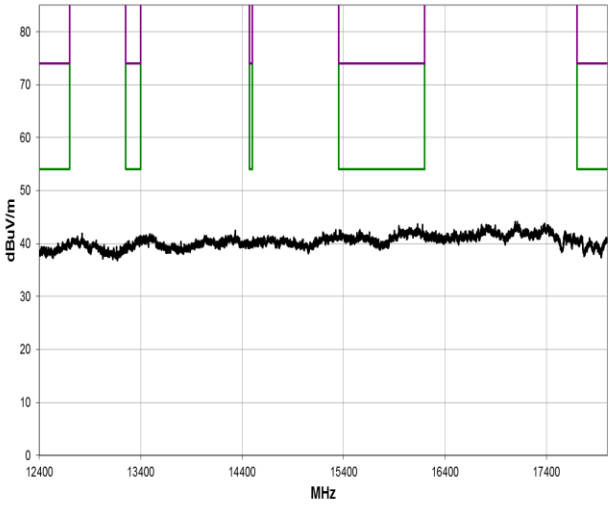
3000-8200 MHz, Run 2



8200-12400 MHz, Run 3



12400-18000 MHz, Run 86



End of Test Report