



element

Ademco, Inc.

Fuji Thermostat

FCC 15.247:2024

RSS-247 Issue 3:2023

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

Wi-Fi 802.11 a/b/g/n SISO Radio

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



This report must not be used to claim product certification, approval, or endorsement by A2LA or any agency of the U.S. Government. This Report shall not be reproduced, except in full without written approval of the laboratory.

TABLE OF CONTENTS



Section	Page Number
Certificate of Test	3
Revision History	5
Accreditations.....	6
Facilities	7
Measurement Uncertainty	8
Test Setup Block Diagrams.....	9
Product Description.....	12
Power Settings and Antennas	13
Configurations	14
Modifications	15
Powerline Conducted Emissions.....	16
Duty Cycle.....	21
DTS Bandwidth	35
Occupied Bandwidth	44
Output Power	53
Equivalent Isotropic Radiated Power (EIRP).....	62
Power Spectral Density	65
Band Edge Compliance	74
Spurious Conducted Emissions	80
Spurious Radiated Emissions	99
End of Report.....	111

CERTIFICATE OF TEST

Last Date of Test: September 19, 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	Pass	15.247(a)(2), KDB 558074 -8.2	RSS-247 5.2(a)	11.8.2	
Occupied Bandwidth	Pass	KDB 558074 -2.1	RSS-Gen 6.7	6.9.3	
Output Power	Pass	15.247(b)(3), KDB 558074 -8.3.2	RSS-247 5.4(d, f), RSS-Gen 6.12	11.9.2.2.4	
Equivalent Isotropic Radiated Power (EIRP)	Pass	15.247(b)(3), KDB 558074 -8.3.2	RSS-247 5.4(d, f), RSS-Gen 6.12	11.9.2.2.4	
Power Spectral Density	Pass	15.247(e), KDB 558074 -8.4	RSS-247 5.2(b)	11.10.5	
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
01	Band edge was completely re-measured. 40 MHz BW is not required as the client does not support this channel BW, so this data was removed. Pre-scans have been added 1-18, duplicates have been removed. Fixed the distance correction and there is plenty of margin now. Modified power density data presentation	2024-09-18	65-66, 99-110
02	Clarified Measurement Uncertainty	2024-09-20	8

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](#)

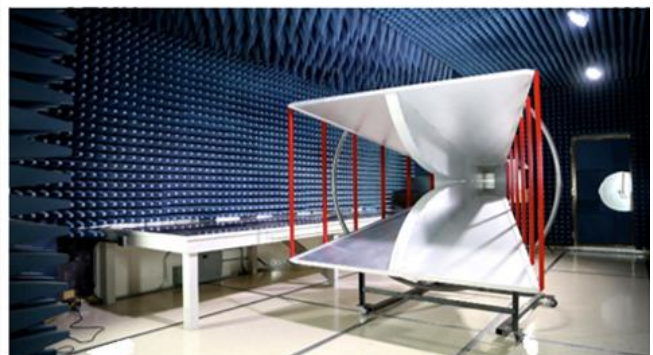
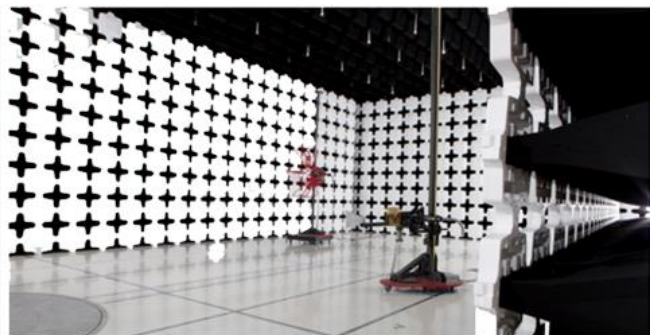
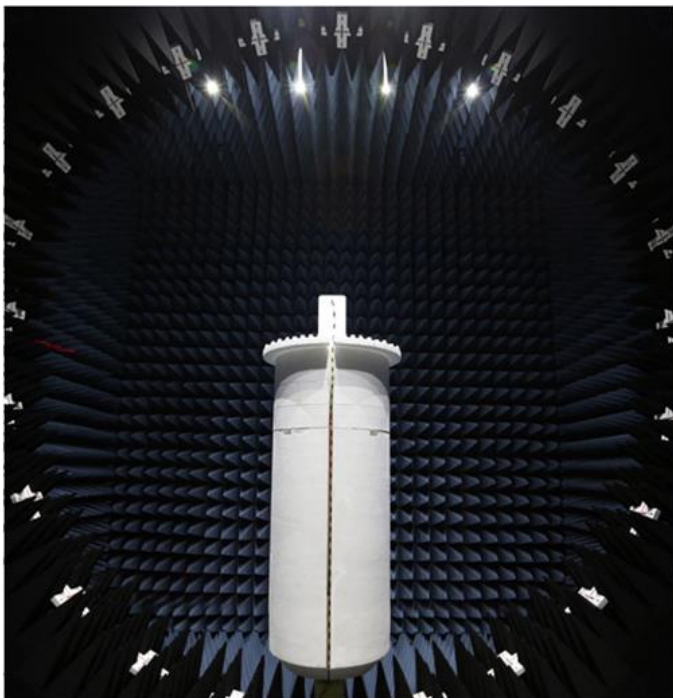
FACILITIES

Testing was performed at the following location(s)

Location	Labs ⁽¹⁾	Address	A2LA ⁽²⁾	ISED ⁽³⁾	BSMI ⁽⁴⁾	VCCI ⁽⁵⁾	CAB ⁽⁶⁾	FDA ⁽⁷⁾
<input type="checkbox"/> California	OC01-17	41 Tesla Irvine, CA 92618 (949) 861-8918	3310.04	2834B	SL2-IN-E-1154R	A-0029	US0158	TL-55
<input checked="" type="checkbox"/> 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
<input type="checkbox"/> 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
<input type="checkbox"/> 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
<input type="checkbox"/> 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
<input type="checkbox"/> 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
<input type="checkbox"/> 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



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

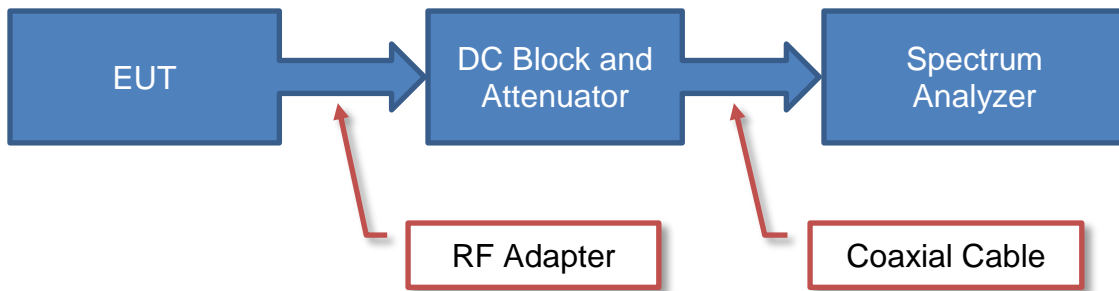
TEST SETUP BLOCK DIAGRAMS

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.

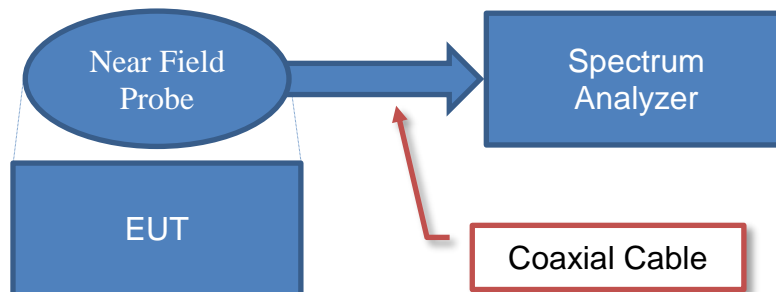
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

$$\begin{array}{r}
 \text{Measured Value} \\
 71.2
 \end{array}
 =
 \begin{array}{r}
 \text{Measured Level} \\
 42.6
 \end{array}
 +
 \begin{array}{r}
 \text{Reference Level Offset} \\
 28.6
 \end{array}$$

Near Field Test Fixture Measurements

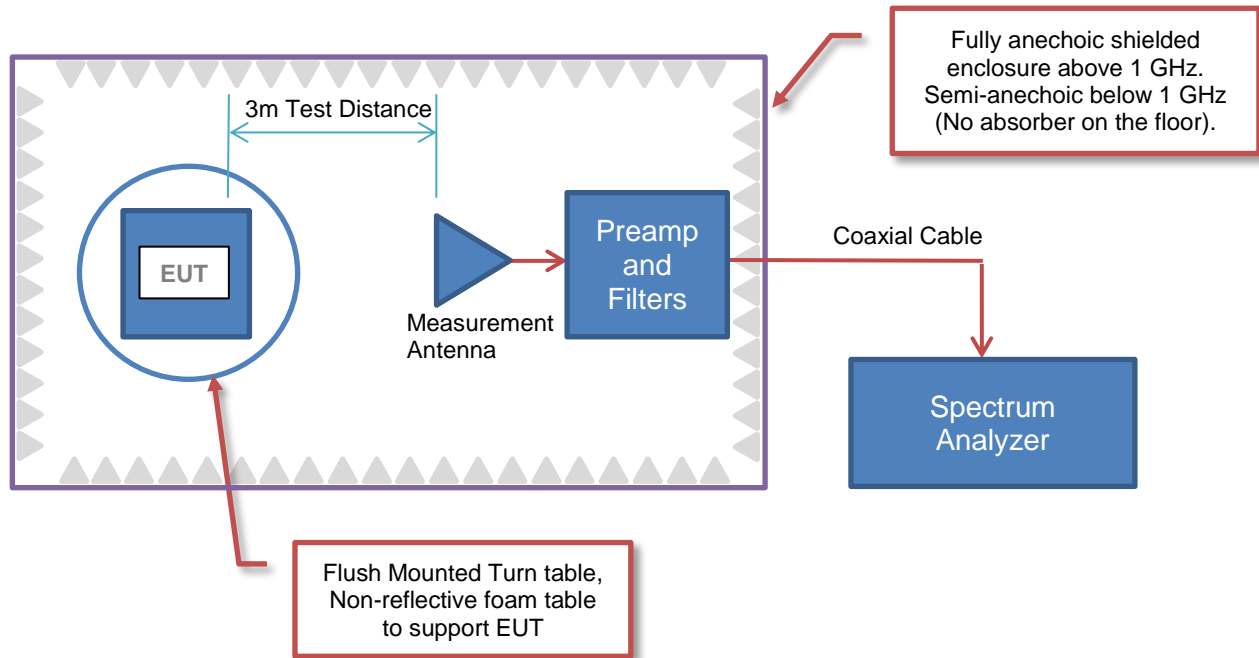


Sample Calculation (logarithmic units)

$$\begin{array}{r}
 \text{Measured Value} \\
 71.2
 \end{array}
 =
 \begin{array}{r}
 \text{Measured Level} \\
 42.6
 \end{array}
 +
 \begin{array}{r}
 \text{Reference Level Offset} \\
 28.6
 \end{array}$$

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

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

42.6 + 28.6 + 3.1 - 40.8 + 0.0 + 0.0 = 33.5

Conducted Emissions:

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

26.7 + 0.3 + 0.1 + 20.0 = 47.1

Radiated Power (ERP/EIRP) – Substitution Method:

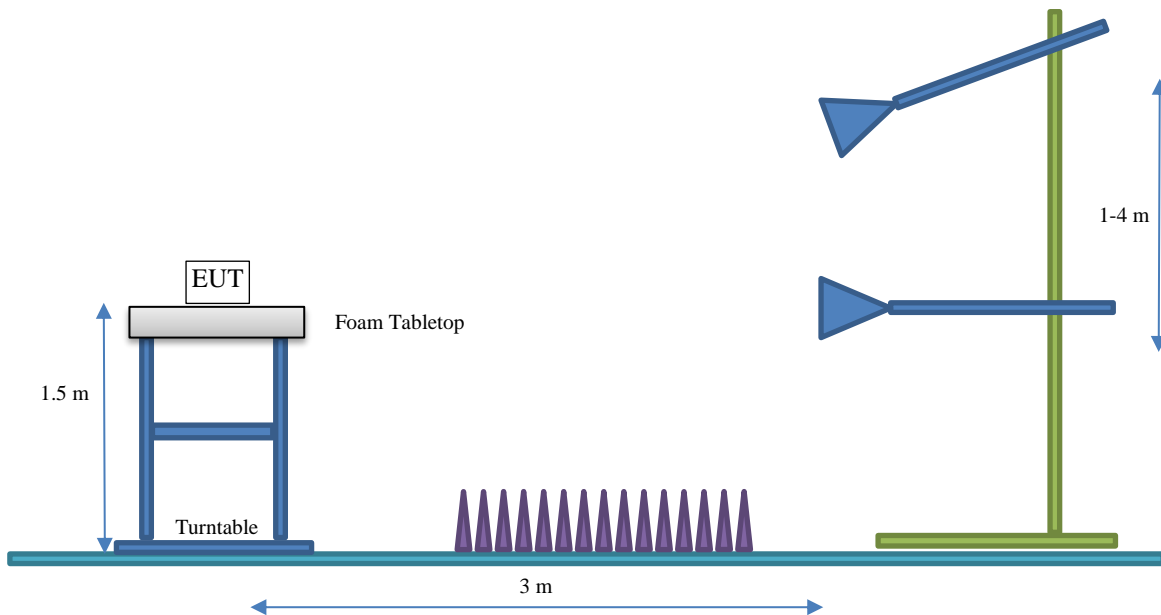
Measured Level into Substitution Antenna (Amplitude dBm)	Substitution Antenna Factor (dBi)	EIRP to ERP (if applicable)	Measured power (dBm ERP/EIRP)
10.0	6.0	2.15	13.9/16.0

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 22, 2024
Last Date of Test:	September 19, 2024
Receipt Date of Samples:	July 22, 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.

Testing Objective:

To demonstrate compliance of the Wi-Fi 802.11 a/b/g/n SISO radio under FCC 15.247/RSS-247 for operation in the 2.4 GHz band.

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	Ademco	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

Data Rates	Channel Bandwidths (MHz)	20 MHz Channels	Channel Position	Frequency Range (MHz)	Power Setting
1 Mbps	20	1, 6, 11	Low, Mid, High	2400-2483.5	Low:18.5 Mid:20 High:18.5
11 Mbps	20	1, 6, 11	Low, Mid, High	2400-2483.5	Low:18 Mid:18 High:18
6 Mbps	20	1, 6, 11	Low, Mid, High	2400-2483.5	Low:16.5 Mid:19 High:16
36 Mbps	20	1, 6, 11	Low, Mid, High	2400-2483.5	Low:16.5 Mid:18 High:16
54 Mbps	20	1, 6, 11	Low, Mid, High	2400-2483.5	Low:16.5 Mid:17 High:16
MCS0	20	1, 6, 11	Low, Mid, High	2400-2483.5	Low:14 Mid:18 High:14
MCS7	20	1, 6, 11	Low, Mid, High	2400-2483.5	Low:14 Mid:16 High:14

Specific frequencies are detailed in the data below

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	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	2024-07-22	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	2024-07-22	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	2024-07-22	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	2024-07-22	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	2024-07-22	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	2024-07-22	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	2024-07-22	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	2024-07-22	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	2024-08-05	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
10	2024-09-18	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



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, Wi-Fi 2.4 GHz active

POWERLINE CONDUCTED EMISSIONS



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
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	4	Line:	High Line	Add. Ext. Attenuation (dB):	0
--------	---	-------	-----------	-----------------------------	---

COMMENTS

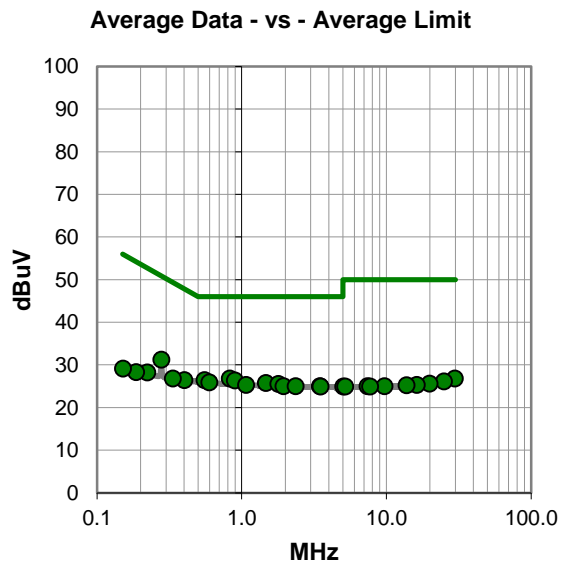
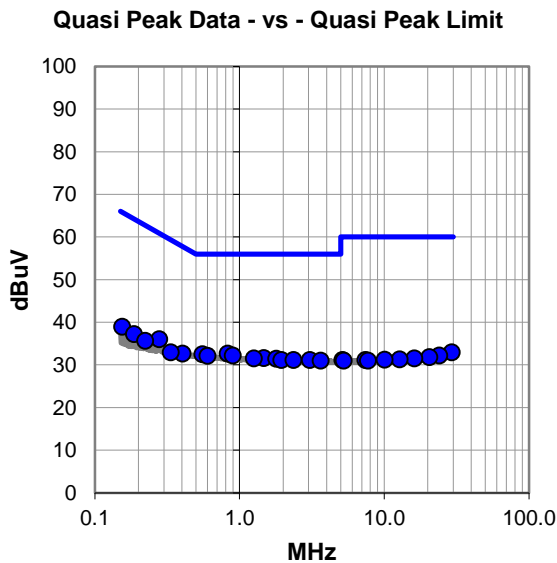
None

EUT OPERATING MODES

Thermostat On, Wi-Fi 2.4 GHz active

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS



RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.829	12.5	20.1	32.6	56.0	-23.4
0.554	12.4	20.1	32.5	56.0	-23.5
0.899	12.1	20.1	32.2	56.0	-23.8
0.600	12.0	20.1	32.1	56.0	-23.9
1.470	11.4	20.2	31.6	56.0	-24.4
1.259	11.3	20.2	31.5	56.0	-24.5
1.796	11.2	20.2	31.4	56.0	-24.6
0.278	15.8	20.2	36.0	60.9	-24.9
1.947	10.9	20.2	31.1	56.0	-24.9
2.369	10.8	20.3	31.1	56.0	-24.9
3.060	10.7	20.4	31.1	56.0	-24.9
3.636	10.6	20.4	31.0	56.0	-25.0
0.405	12.5	20.1	32.6	57.8	-25.2
0.335	12.8	20.1	32.9	59.3	-26.4
0.155	18.3	20.6	38.9	65.8	-26.9
0.187	16.8	20.4	37.2	64.2	-27.0
0.223	15.4	20.2	35.6	62.7	-27.1
29.267	10.0	22.9	32.9	60.0	-27.1
24.098	10.0	22.2	32.2	60.0	-27.8
20.491	10.0	21.8	31.8	60.0	-28.2
16.192	10.1	21.4	31.5	60.0	-28.5
12.804	10.1	21.2	31.3	60.0	-28.7
10.054	10.2	21.0	31.2	60.0	-28.8
5.149	10.5	20.6	31.1	60.0	-28.9
7.414	10.3	20.8	31.1	60.0	-28.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.829	6.7	20.1	26.8	46.0	-19.2
0.554	6.3	20.1	26.4	46.0	-19.6
0.278	11.0	20.2	31.2	50.9	-19.7
0.898	6.2	20.1	26.3	46.0	-19.7
0.597	5.8	20.1	25.9	46.0	-20.1
1.470	5.5	20.2	25.7	46.0	-20.3
1.795	5.3	20.2	25.5	46.0	-20.5
1.076	5.1	20.2	25.3	46.0	-20.7
1.946	4.8	20.2	25.0	46.0	-21.0
2.367	4.7	20.3	25.0	46.0	-21.0
3.470	4.6	20.4	25.0	46.0	-21.0
3.521	4.5	20.4	24.9	46.0	-21.1
0.402	6.3	20.1	26.4	47.8	-21.4
0.335	6.7	20.1	26.8	49.3	-22.5
29.738	3.8	23.0	26.8	50.0	-23.2
25.085	3.9	22.2	26.1	50.0	-23.9
19.921	3.8	21.8	25.6	50.0	-24.4
0.223	8.0	20.2	28.2	52.7	-24.5
16.258	3.9	21.4	25.3	50.0	-24.7
13.792	3.9	21.3	25.2	50.0	-24.8
7.408	4.2	20.8	25.0	50.0	-25.0
9.698	4.1	20.9	25.0	50.0	-25.0
5.039	4.3	20.6	24.9	50.0	-25.1
5.207	4.3	20.6	24.9	50.0	-25.1
7.721	4.1	20.8	24.9	50.0	-25.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS



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
RSS-Gen Issue 5:2018+A1:2019+A2:2021	ANSI C63.10:2013

TEST PARAMETERS

Run #:	5	Line:	Neutral	Add. Ext. Attenuation (dB):	0
--------	---	-------	---------	-----------------------------	---

COMMENTS

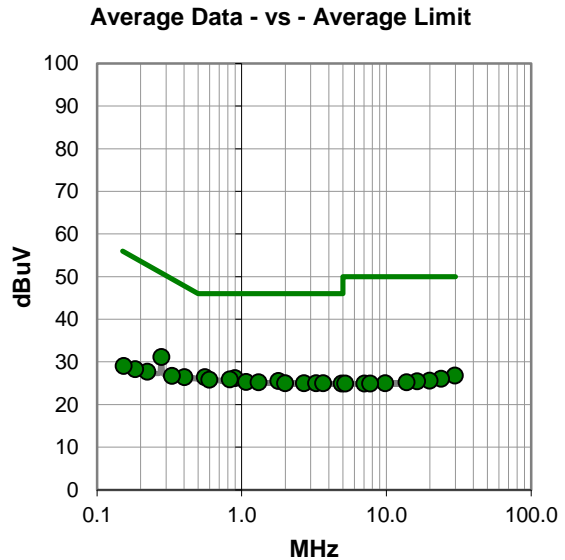
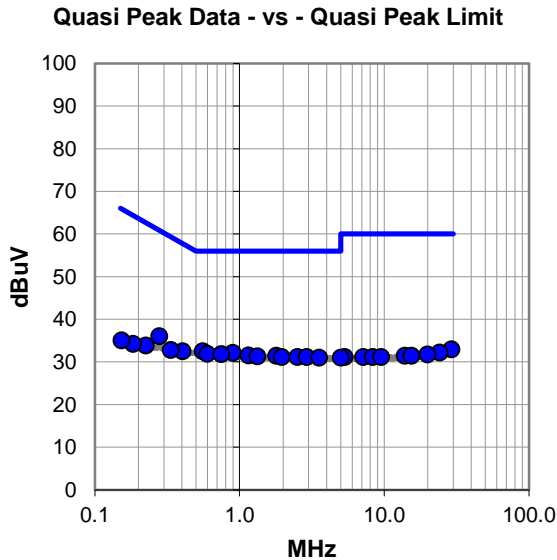
None

EUT OPERATING MODES

Thermostat On, Wi-Fi 2.4 GHz active

DEVIATIONS FROM TEST STANDARD

None



POWERLINE CONDUCTED EMISSIONS



RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.556	12.4	20.1	32.5	56.0	-23.5
0.898	12.0	20.1	32.1	56.0	-23.9
0.599	11.8	20.1	31.9	56.0	-24.1
0.747	11.7	20.1	31.8	56.0	-24.2
1.156	11.3	20.2	31.5	56.0	-24.5
1.793	11.2	20.2	31.4	56.0	-24.6
1.329	11.1	20.2	31.3	56.0	-24.7
0.278	15.8	20.2	36.0	60.9	-24.9
1.960	10.9	20.2	31.1	56.0	-24.9
2.509	10.8	20.3	31.1	56.0	-24.9
2.907	10.7	20.4	31.1	56.0	-24.9
3.542	10.6	20.4	31.0	56.0	-25.0
0.405	12.4	20.1	32.5	57.8	-25.3
0.335	12.7	20.1	32.8	59.3	-26.5
29.130	10.0	22.9	32.9	60.0	-27.1
24.213	10.0	22.2	32.2	60.0	-27.8
19.921	9.9	21.8	31.7	60.0	-28.3
13.865	10.1	21.3	31.4	60.0	-28.6
15.471	10.0	21.4	31.4	60.0	-28.6
0.225	13.6	20.2	33.8	62.6	-28.8
5.345	10.5	20.6	31.1	60.0	-28.9
7.175	10.4	20.7	31.1	60.0	-28.9
8.339	10.3	20.8	31.1	60.0	-28.9
9.538	10.2	20.9	31.1	60.0	-28.9
5.030	10.5	20.5	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
0.278	10.9	20.2	31.1	50.9	-19.8
0.898	6.1	20.1	26.2	46.0	-19.8
0.829	5.8	20.1	25.9	46.0	-20.1
0.597	5.7	20.1	25.8	46.0	-20.2
1.795	5.3	20.2	25.5	46.0	-20.5
1.076	5.1	20.2	25.3	46.0	-20.7
1.313	5.0	20.2	25.2	46.0	-20.8
1.993	4.8	20.2	25.0	46.0	-21.0
2.692	4.7	20.3	25.0	46.0	-21.0
3.278	4.6	20.4	25.0	46.0	-21.0
3.652	4.6	20.4	25.0	46.0	-21.0
4.917	4.4	20.5	24.9	46.0	-21.1
0.402	6.3	20.1	26.4	47.8	-21.4
0.330	6.6	20.1	26.7	49.5	-22.8
29.738	3.8	23.0	26.8	50.0	-23.2
23.988	3.8	22.2	26.0	50.0	-24.0
19.908	3.8	21.8	25.6	50.0	-24.4
16.308	3.9	21.5	25.4	50.0	-24.6
13.794	3.9	21.3	25.2	50.0	-24.8
9.799	4.0	21.0	25.0	50.0	-25.0
0.223	7.5	20.2	27.7	52.7	-25.0
5.205	4.3	20.6	24.9	50.0	-25.1
7.066	4.2	20.7	24.9	50.0	-25.1
7.715	4.1	20.8	24.9	50.0	-25.1

CONCLUSION

Pass

Tested By

DUTY CYCLE

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

DUTY CYCLE



EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-07-22
Customer:	Ademco, Inc.	Temperature:	21.8°C
Attendees:	None	Relative Humidity:	62.5%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Christopher Heintzelman, Arnauld Dedry	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

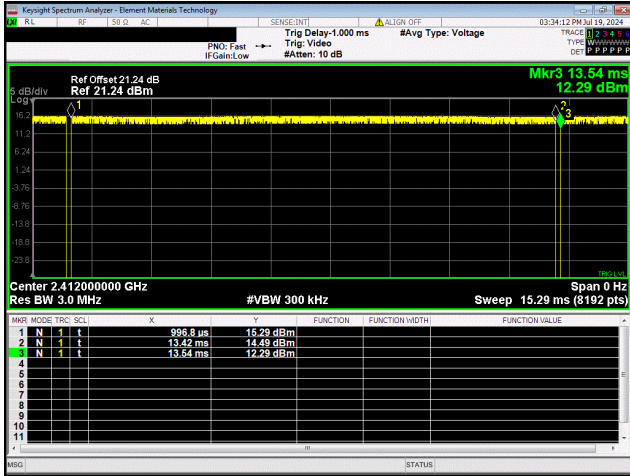
TEST RESULTS

	Pulse Width	Period	Number of Pulses	Value (%)	Limit N/A ()	Results
20 MHz BW						
802.11(b) 1 Mbps						
Low Channel 1, 2412 MHz	12.419 ms	12.548 ms	1	99	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	12.419 ms	12.548 ms	1	99	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel 11, 2462 MHz	12.419 ms	12.548 ms	1	99	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
802.11(b) 11 Mbps						
Low Channel 1, 2412 MHz	1.306 ms	1.435 ms	1	91	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	1.306 ms	1.435 ms	1	91	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel 11, 2462 MHz	1.306 ms	1.435 ms	1	91	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
802.11(g) 6 Mbps						
Low Channel 1, 2412 MHz	2.065 ms	2.194 ms	1	94.1	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	2.065 ms	2.194 ms	1	94.1	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel 11, 2462 MHz	2.065 ms	2.194 ms	1	94.1	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
802.11(g) 36 Mbps						

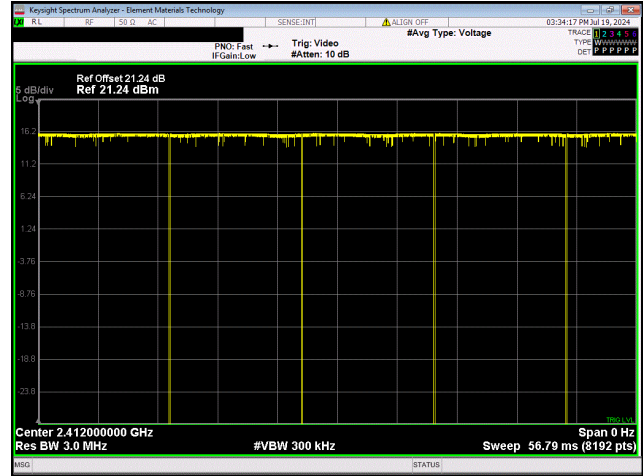
DUTY CYCLE

	Pulse Width	Period	Number of Pulses	Value (%)	Limit N/A ()	Results
Low Channel 1, 2412 MHz	364.6 us	494 us	1	73.8	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	364.6 us	494 us	1	73.8	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel 11, 2462 MHz	364.4 us	494.1 us	1	73.8	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
802.11(g) 54 Mbps						
Low Channel 1, 2412 MHz	248.6 us	378 us	1	65.8	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	248.5 us	378 us	1	65.7	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel 11, 2462 MHz	248.6 us	378.1 us	1	65.7	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
802.11(n) MCS0						
Low Channel 1, 2412 MHz	1.921 ms	2.05 ms	1	93.7	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	1.921 ms	2.05 ms	1	93.7	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel 11, 2462 MHz	1.921 ms	2.05 ms	1	93.7	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
802.11(n) MCS7						
Low Channel 1, 2412 MHz	228.5 us	358 us	1	63.8	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	228.5 us	358 us	1	63.8	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A
High Channel 11, 2462 MHz	228.5 us	358 us	1	63.8	N/A	N/A
	N/A	N/A	5	N/A	N/A	N/A

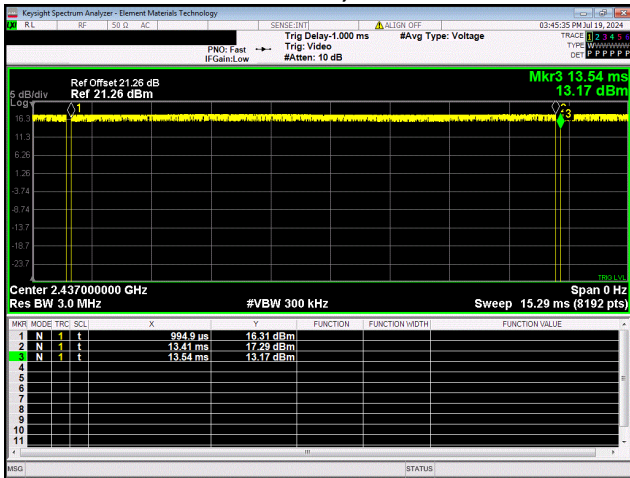
DUTY CYCLE



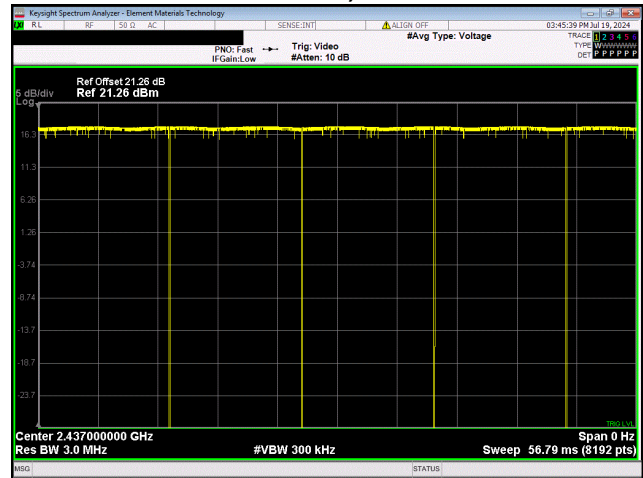
20 MHz BW
802.11(b) 1 Mbps
Low Channel 1, 2412 MHz



20 MHz BW
802.11(b) 1 Mbps
Low Channel 1, 2412 MHz

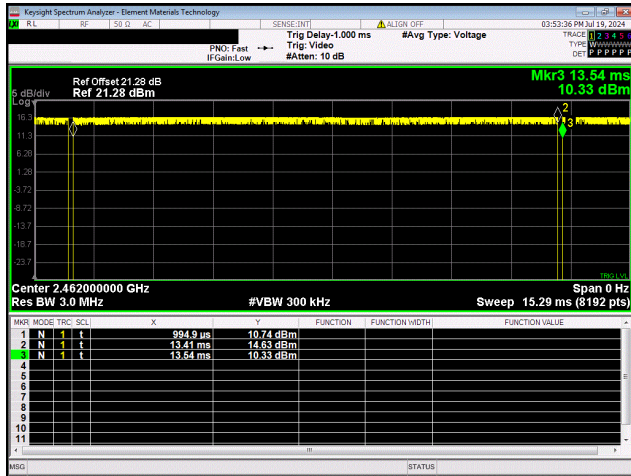


20 MHz BW
802.11(b) 1 Mbps
Mid Channel 6, 2437 MHz

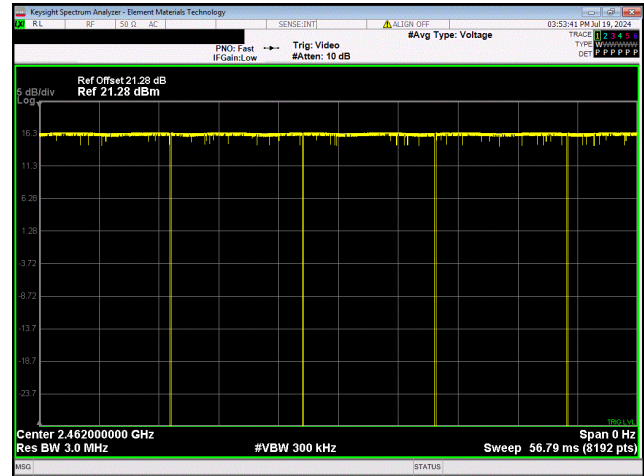


20 MHz BW
802.11(b) 1 Mbps
Mid Channel 6, 2437 MHz

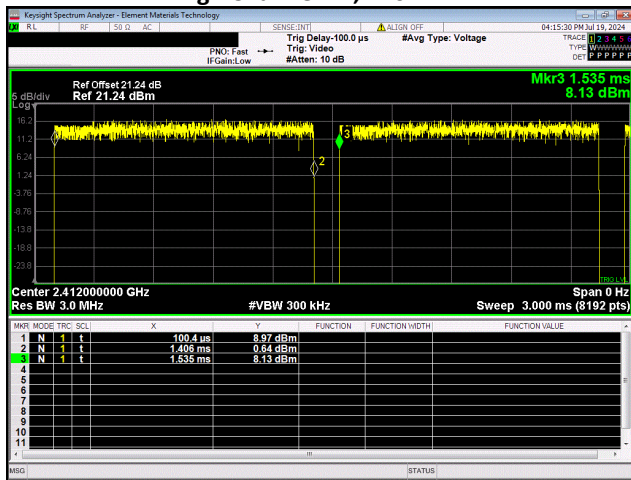
DUTY CYCLE



20 MHz BW
802.11(b) 1 Mbps
High Channel 11, 2462 MHz



20 MHz BW
802.11(b) 1 Mbps
High Channel 11, 2462 MHz

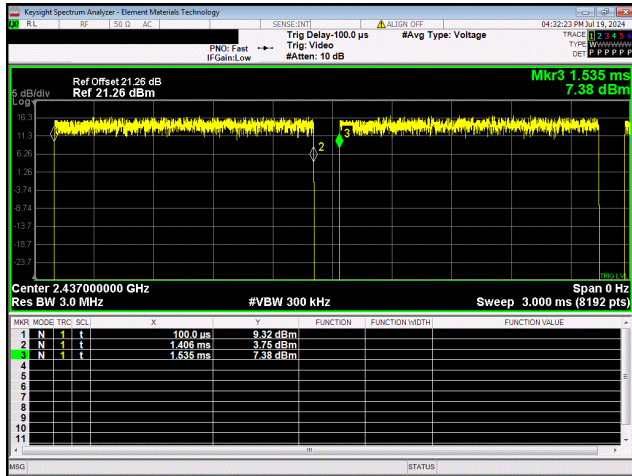


20 MHz BW
802.11(b) 11 Mbps
Low Channel 1, 2412 MHz



20 MHz BW
802.11(b) 11 Mbps
Low Channel 1, 2412 MHz

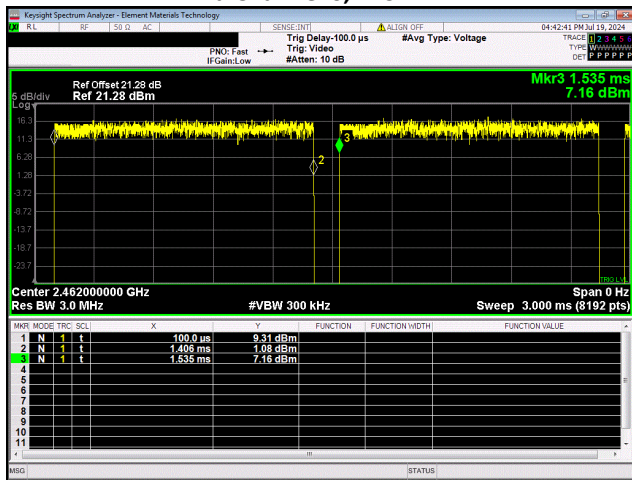
DUTY CYCLE



20 MHz BW
802.11(b) 11 Mbps
Mid Channel 6, 2437 MHz



20 MHz BW
802.11(b) 11 Mbps
Mid Channel 6, 2437 MHz

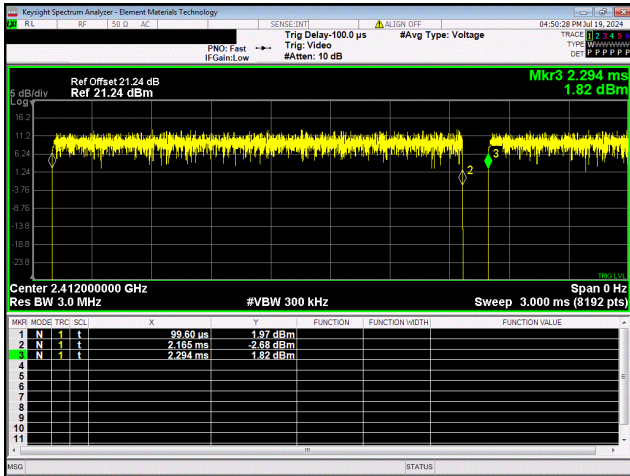


20 MHz BW
802.11(b) 11 Mbps
High Channel 11, 2462 MHz

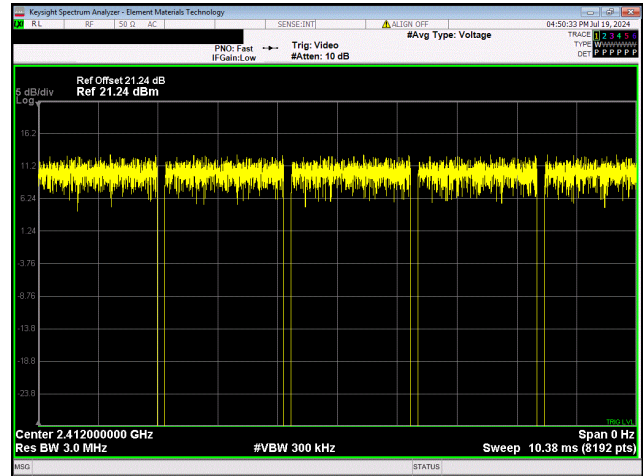


20 MHz BW
802.11(b) 11 Mbps
High Channel 11, 2462 MHz

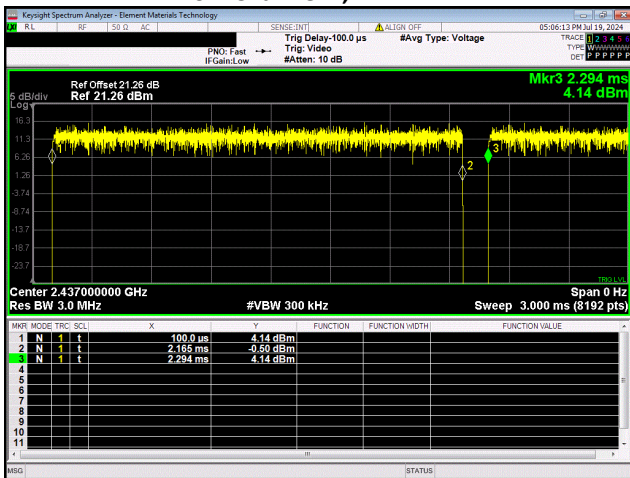
DUTY CYCLE



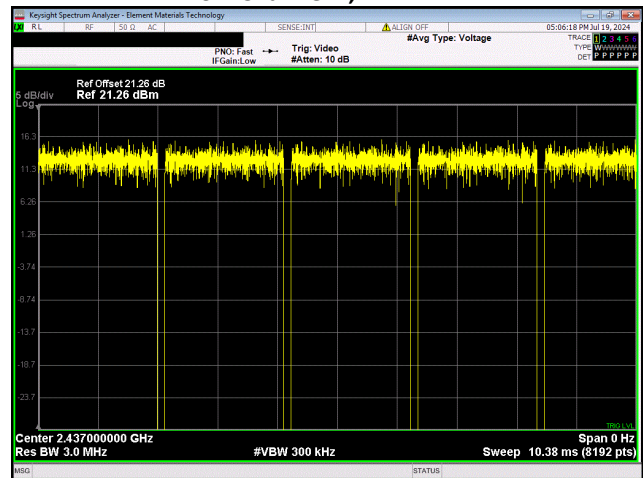
20 MHz BW
802.11(g) 6 Mbps
Low Channel 1, 2412 MHz



20 MHz BW
802.11(g) 6 Mbps
Low Channel 1, 2412 MHz

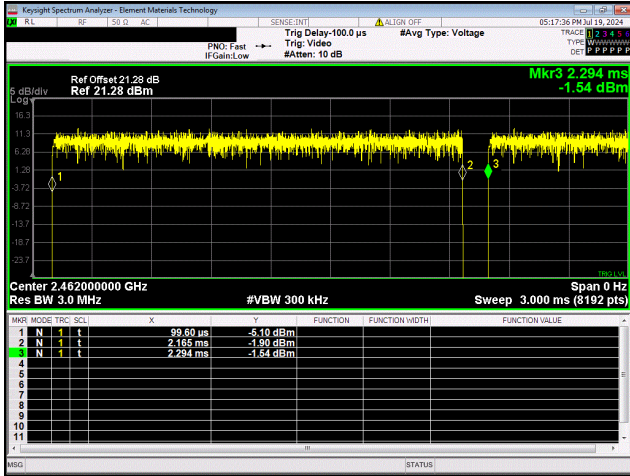


20 MHz BW
802.11(g) 6 Mbps
Mid Channel 6, 2437 MHz

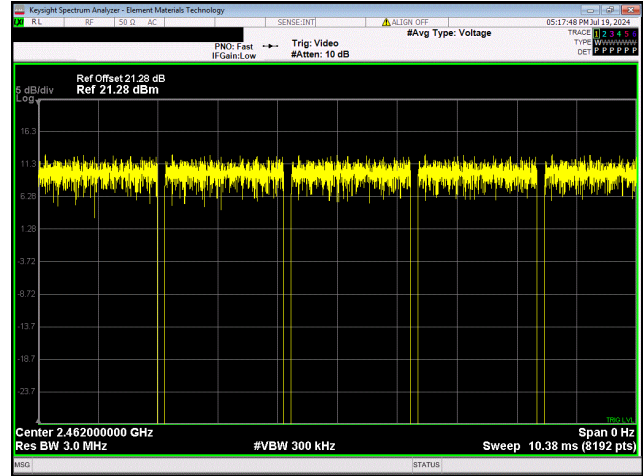


20 MHz BW
802.11(g) 6 Mbps
Mid Channel 6, 2437 MHz

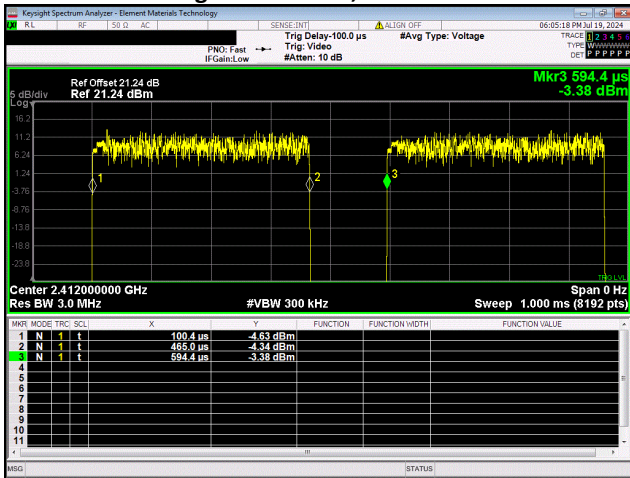
DUTY CYCLE



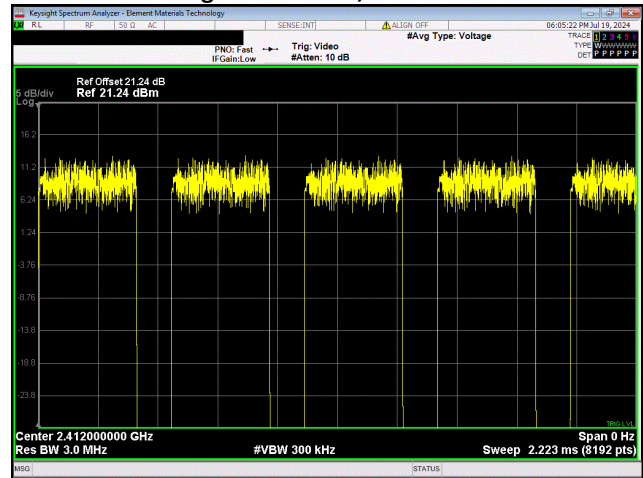
20 MHz BW
802.11(g) 6 Mbps
High Channel 11, 2462 MHz



20 MHz BW
802.11(g) 6 Mbps
High Channel 11, 2462 MHz

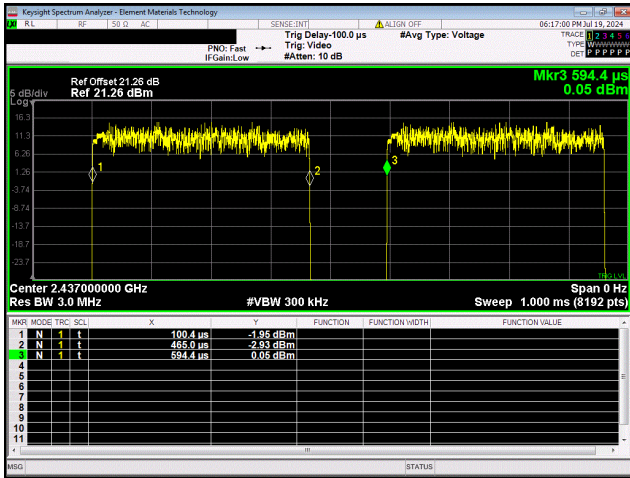


20 MHz BW
802.11(g) 36 Mbps
Low Channel 1, 2412 MHz

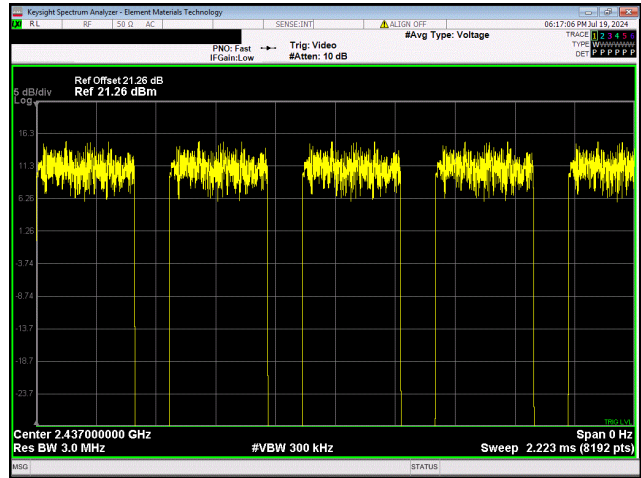


20 MHz BW
802.11(g) 36 Mbps
Low Channel 1, 2412 MHz

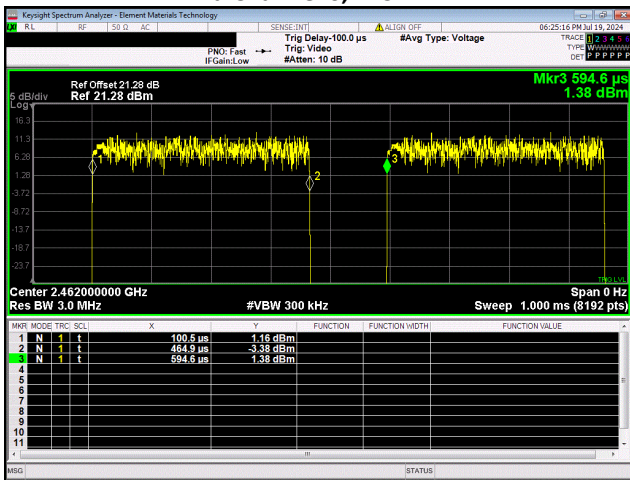
DUTY CYCLE



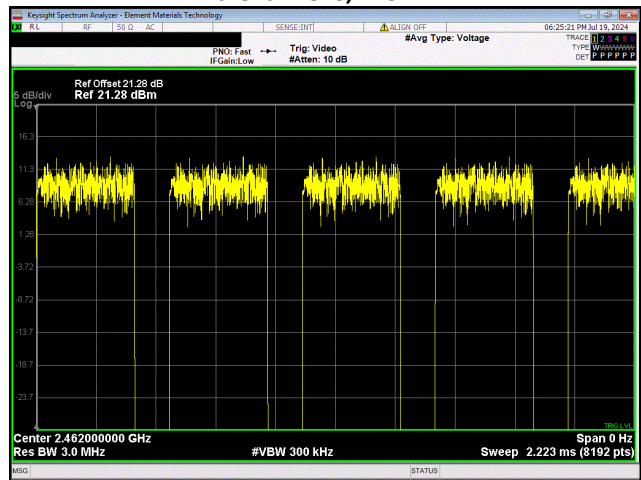
20 MHz BW
802.11(g) 36 Mbps
Mid Channel 6, 2437 MHz



20 MHz BW
802.11(g) 36 Mbps
Mid Channel 6, 2437 MHz

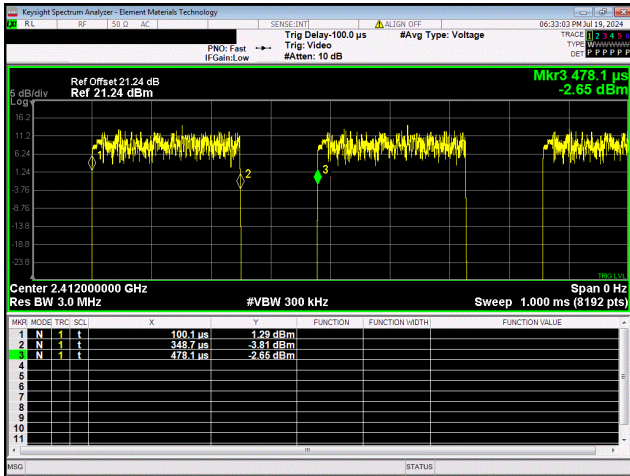


20 MHz BW
802.11(g) 36 Mbps
High Channel 11, 2462 MHz

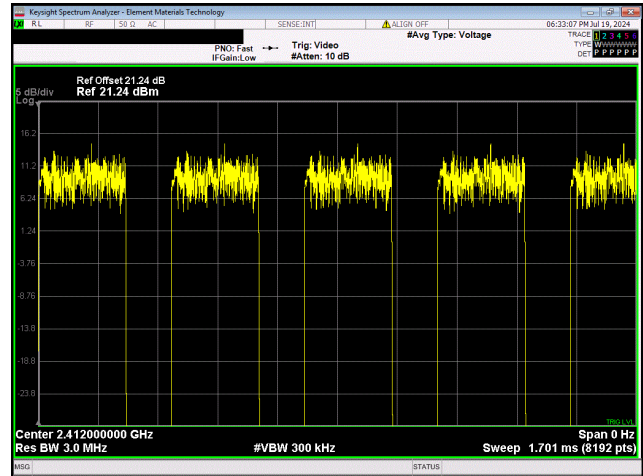


20 MHz BW
802.11(g) 36 Mbps
High Channel 11, 2462 MHz

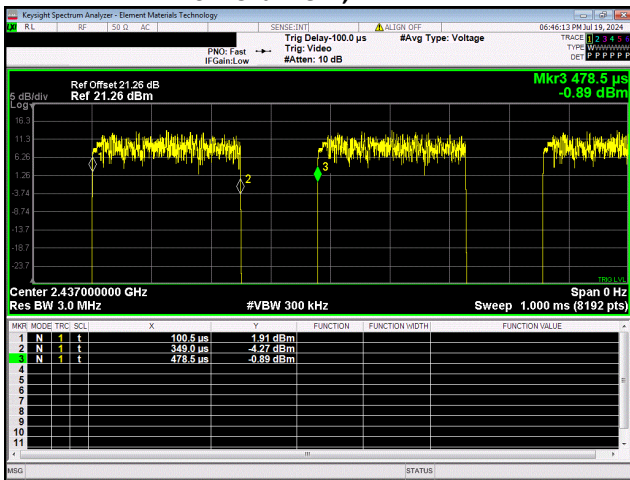
DUTY CYCLE



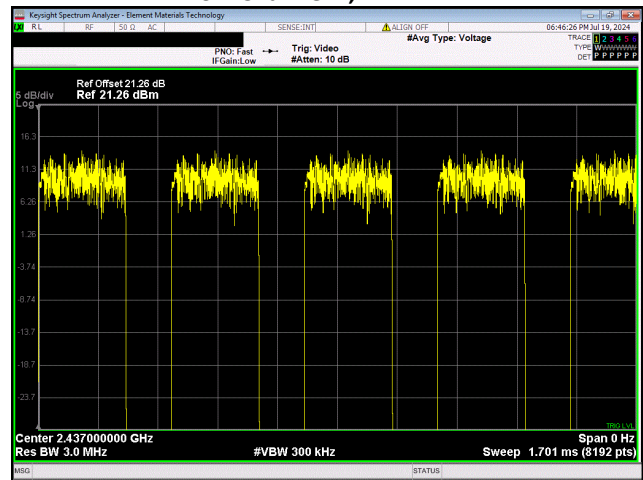
20 MHz BW
802.11(g) 54 Mbps
Low Channel 1, 2412 MHz



20 MHz BW
802.11(g) 54 Mbps
Low Channel 1, 2412 MHz

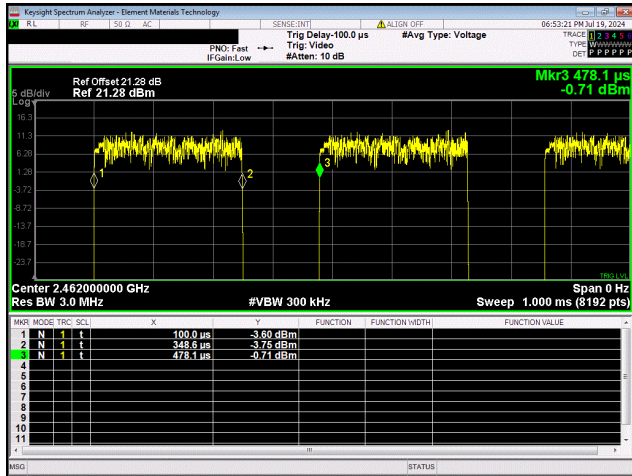


20 MHz BW
802.11(g) 54 Mbps
Mid Channel 6, 2437 MHz

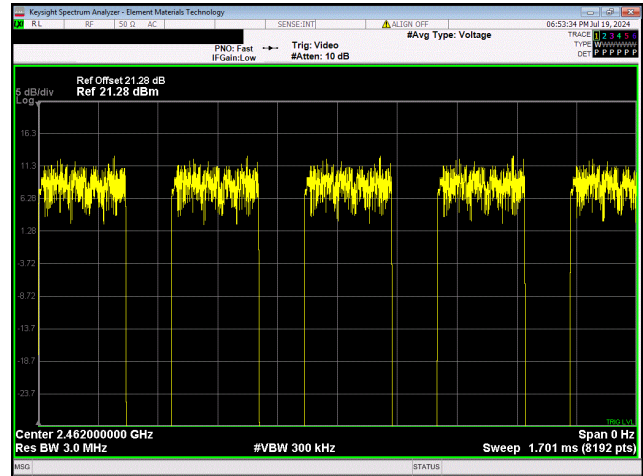


20 MHz BW
802.11(g) 54 Mbps
Mid Channel 6, 2437 MHz

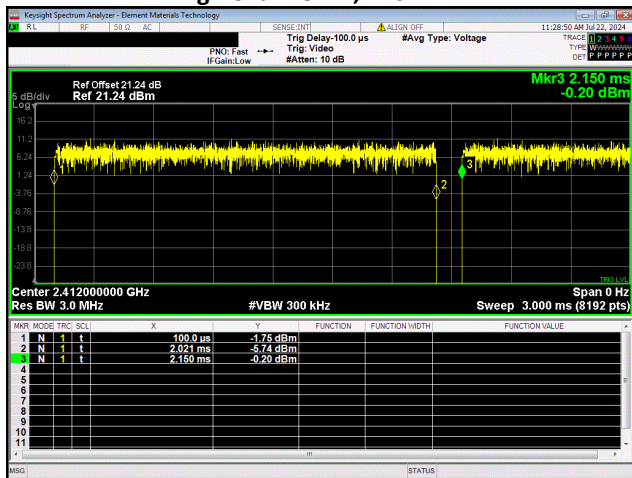
DUTY CYCLE



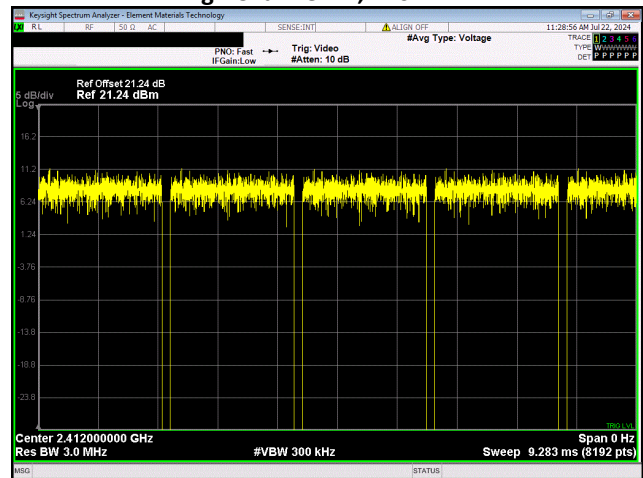
20 MHz BW
802.11(g) 54 Mbps
High Channel 11, 2462 MHz



20 MHz BW
802.11(g) 54 Mbps
High Channel 11, 2462 MHz

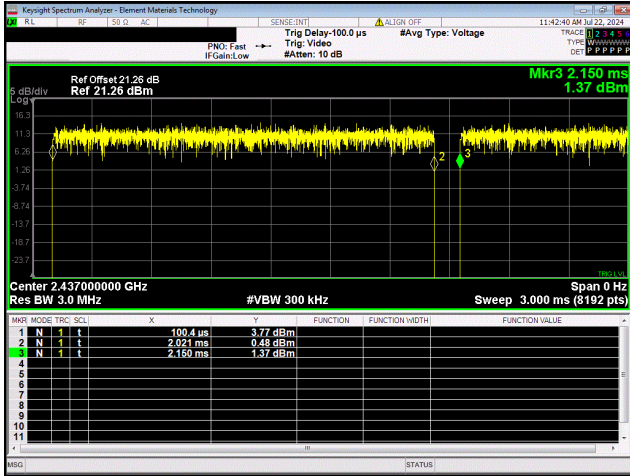


20 MHz BW
802.11(n) MCS0
Low Channel 1, 2412 MHz

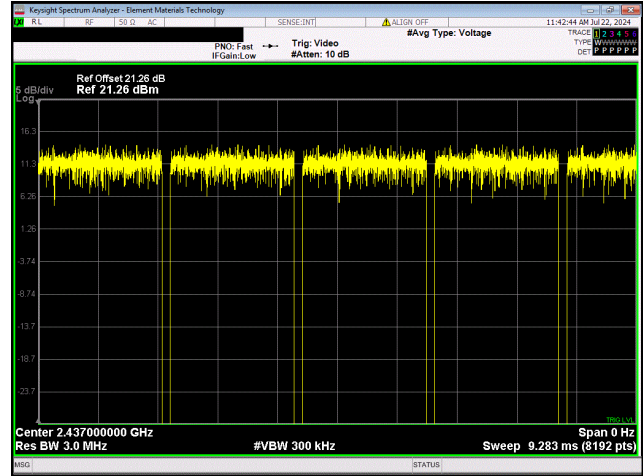


20 MHz BW
802.11(n) MCS0
Low Channel 1, 2412 MHz

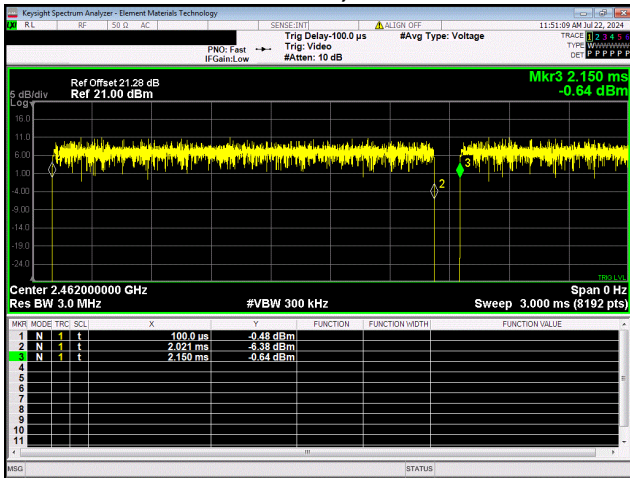
DUTY CYCLE



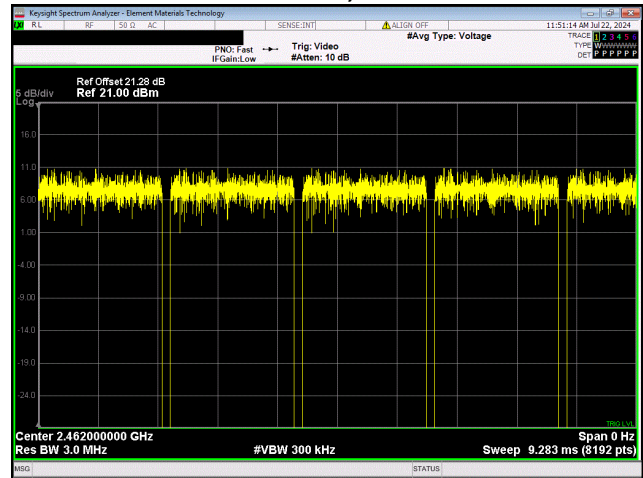
20 MHz BW
802.11(n) MCS0
Mid Channel 6, 2437 MHz



20 MHz BW
802.11(n) MCS0
Mid Channel 6, 2437 MHz

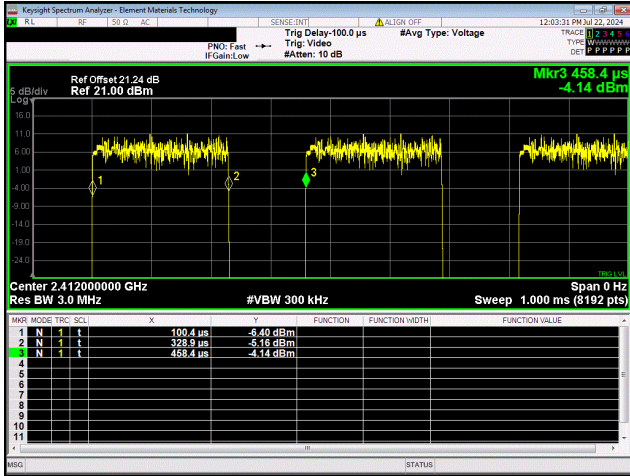


20 MHz BW
802.11(n) MCS0
High Channel 11, 2462 MHz

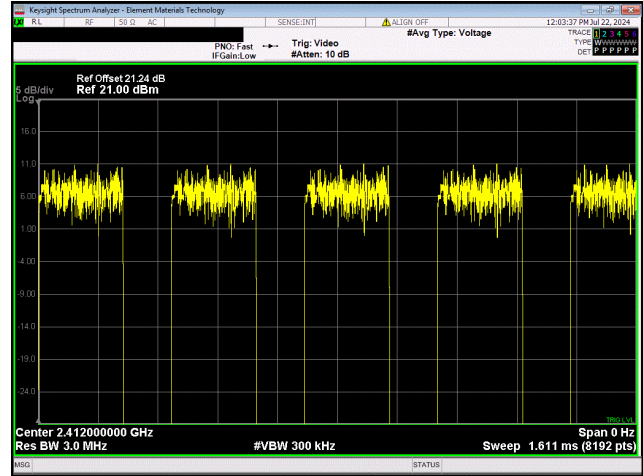


20 MHz BW
802.11(n) MCS0
High Channel 11, 2462 MHz

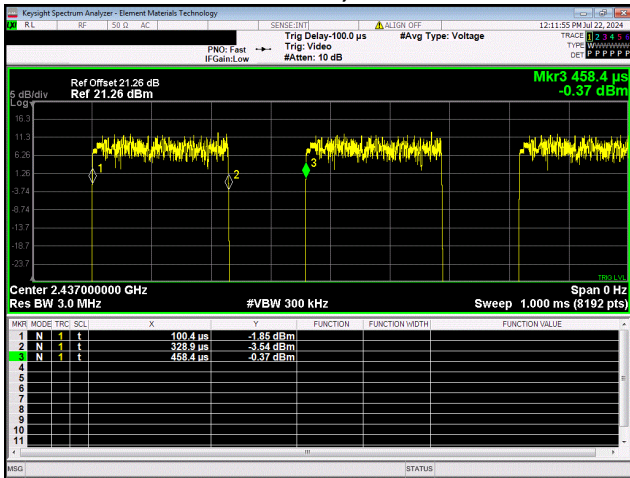
DUTY CYCLE



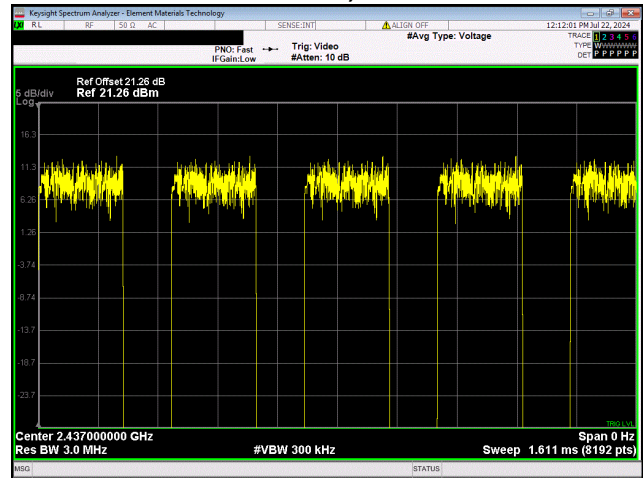
20 MHz BW
802.11(n) MCS7
Low Channel 1, 2412 MHz



20 MHz BW
802.11(n) MCS7
Low Channel 1, 2412 MHz

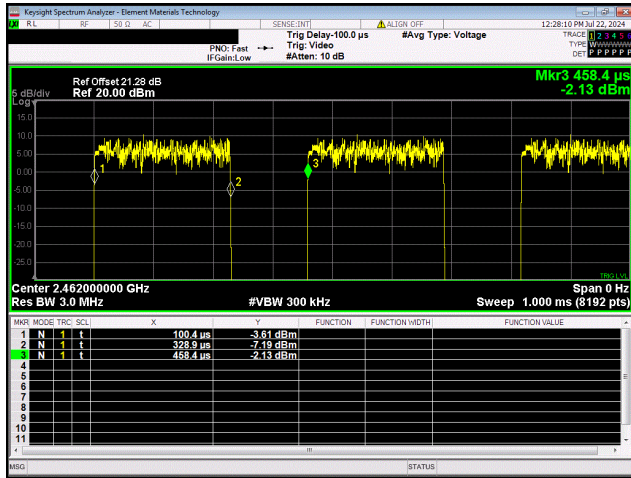


20 MHz BW
802.11(n) MCS7
Mid Channel 6, 2437 MHz

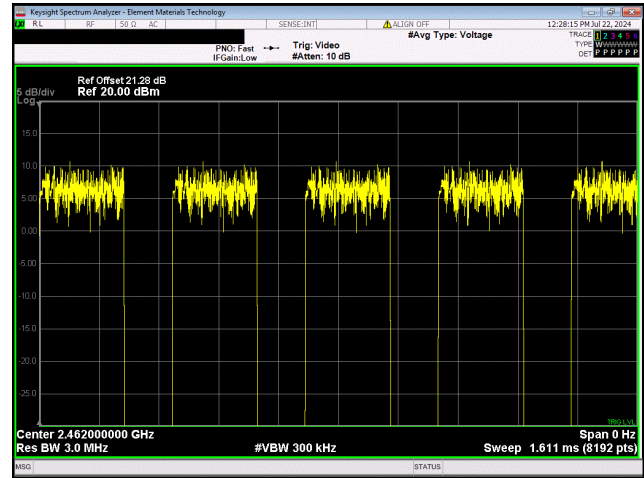


20 MHz BW
802.11(n) MCS7
Mid Channel 6, 2437 MHz

DUTY CYCLE



20 MHz BW
802.11(n) MCS7
High Channel 11, 2462 MHz



20 MHz BW
802.11(n) MCS7
High Channel 11, 2462 MHz

DTS BANDWIDTH (6dB)

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

DTS BANDWIDTH (6dB)



EUT:	Fuji Thermostat	Work Order:	ADEM0044
Serial Number:	52202030005204	Date:	2024-07-22
Customer:	Ademco, Inc.	Temperature:	21.8°C
Attendees:	None	Relative Humidity:	62.4%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Christopher Heintzleman, Arnaud Dedry	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

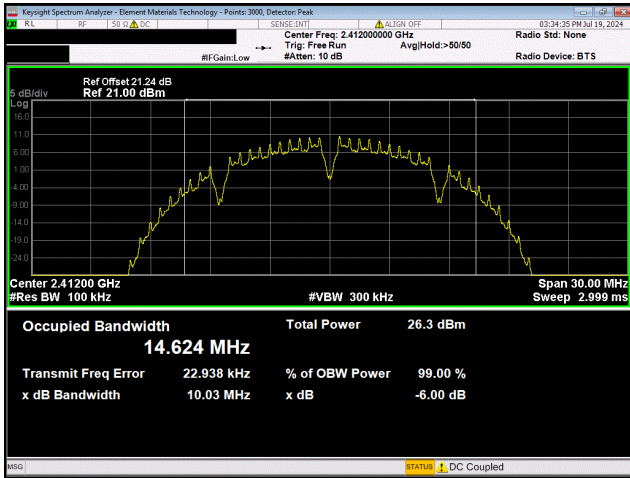
TEST RESULTS

	Value	Limit (>)	Result
20 MHz BW			
802.11(b) 1 Mbps			
Low Channel 1, 2412 MHz	10.026 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	10.045 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	10.033 MHz	500 kHz	Pass
802.11(b) 11 Mbps			
Low Channel 1, 2412 MHz	9.665 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	9.748 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	10.035 MHz	500 kHz	Pass
802.11(g) 6 Mbps			
Low Channel 1, 2412 MHz	16.305 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	16.324 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	16.308 MHz	500 kHz	Pass
802.11(g) 36 Mbps			
Low Channel 1, 2412 MHz	16.399 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	16.402 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	16.418 MHz	500 kHz	Pass
802.11(g) 54 Mbps			
Low Channel 1, 2412 MHz	16.314 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	16.428 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	16.376 MHz	500 kHz	Pass
802.11(n) MCS0			

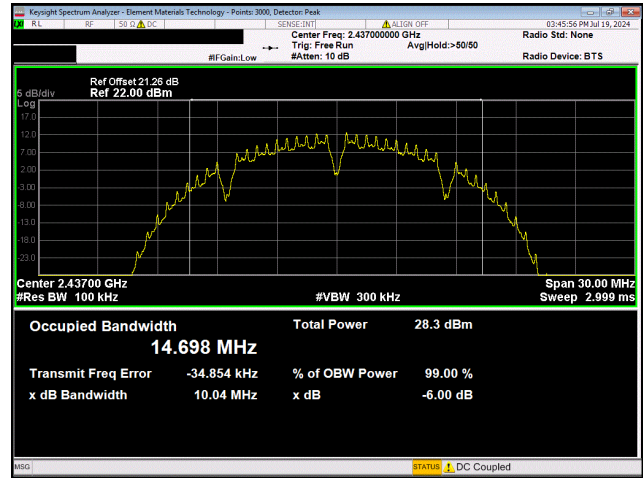
DTS BANDWIDTH (6dB)

	Value	Limit (>)	Result
Low Channel 1, 2412 MHz	17.101 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	17.065 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	17.058 MHz	500 kHz	Pass
802.11(n) MCS7			
Low Channel 1, 2412 MHz	17.644 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	17.59 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	17.108 MHz	500 kHz	Pass

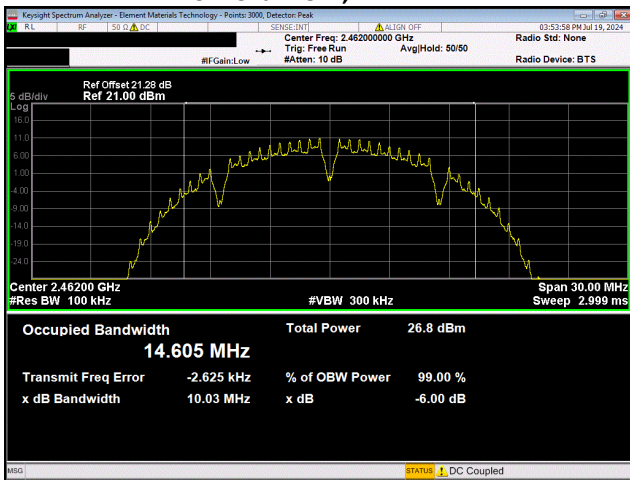
DTS BANDWIDTH (6dB)



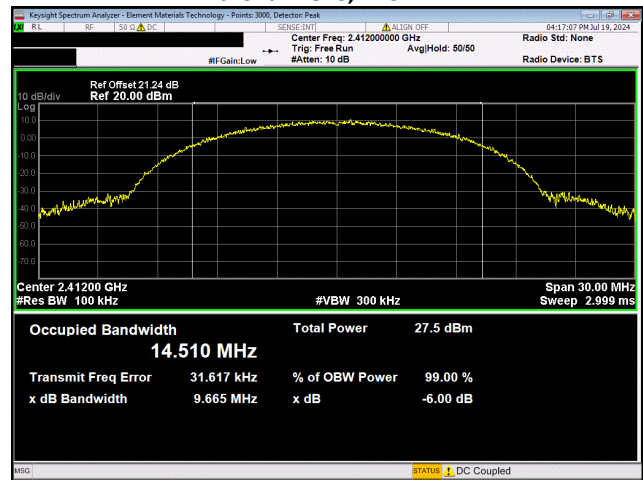
20 MHz BW
802.11(b) 1 Mbps
Low Channel 1, 2412 MHz



20 MHz BW
802.11(b) 1 Mbps
Mid Channel 6, 2437 MHz

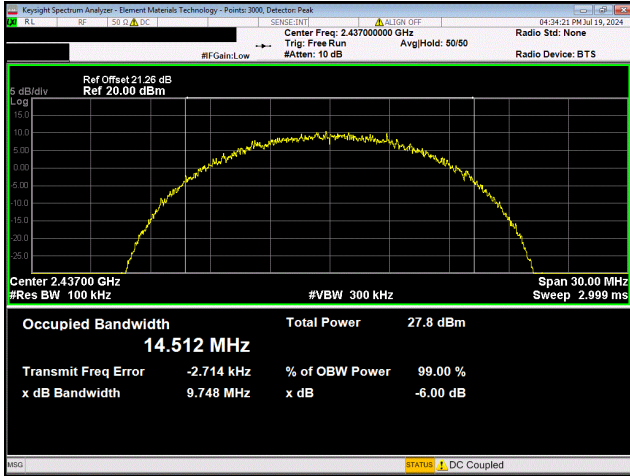


20 MHz BW
802.11(b) 1 Mbps
High Channel 11, 2462 MHz

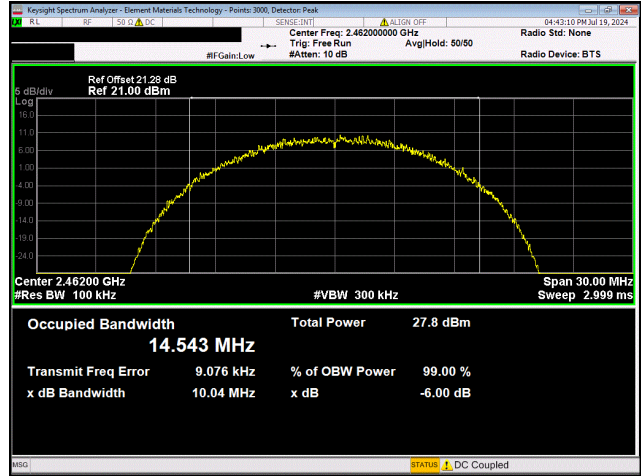


20 MHz BW
802.11(b) 11 Mbps
Low Channel 1, 2412 MHz

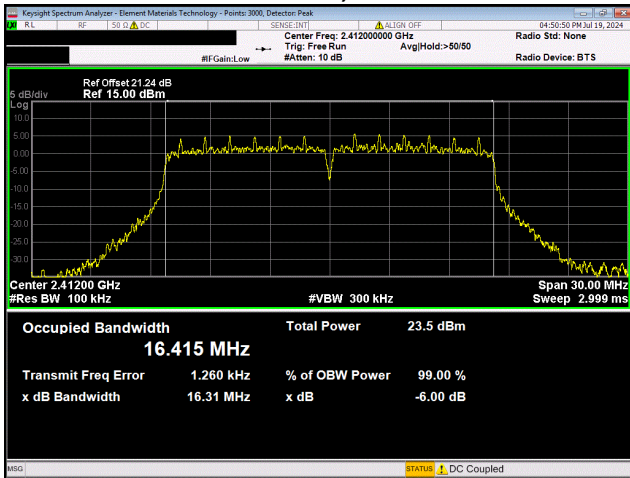
DTS BANDWIDTH (6dB)



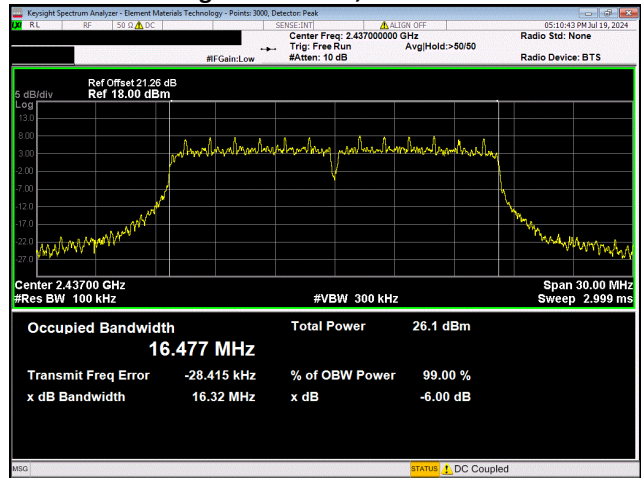
20 MHz BW
802.11(b) 11 Mbps
Mid Channel 6, 2437 MHz



20 MHz BW
802.11(b) 11 Mbps
High Channel 11, 2462 MHz

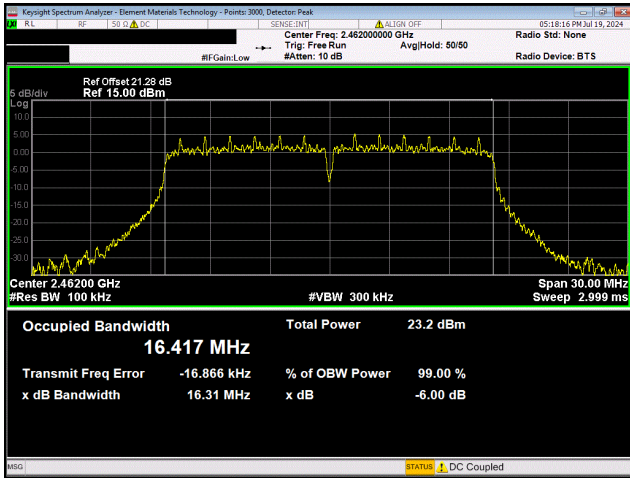


20 MHz BW
802.11(g) 6 Mbps
Low Channel 1, 2412 MHz

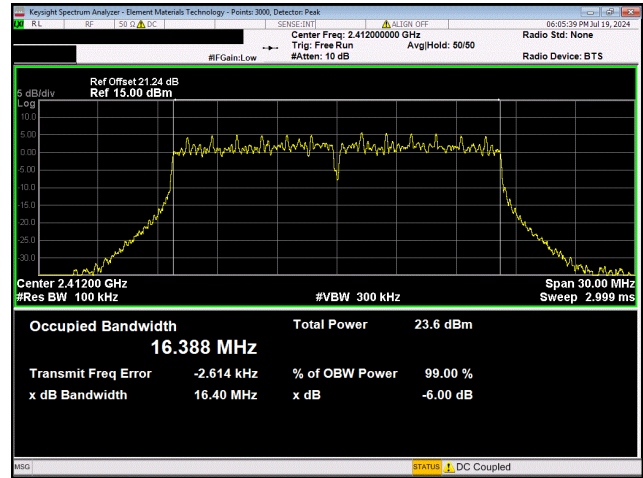


20 MHz BW
802.11(g) 6 Mbps
Mid Channel 6, 2437 MHz

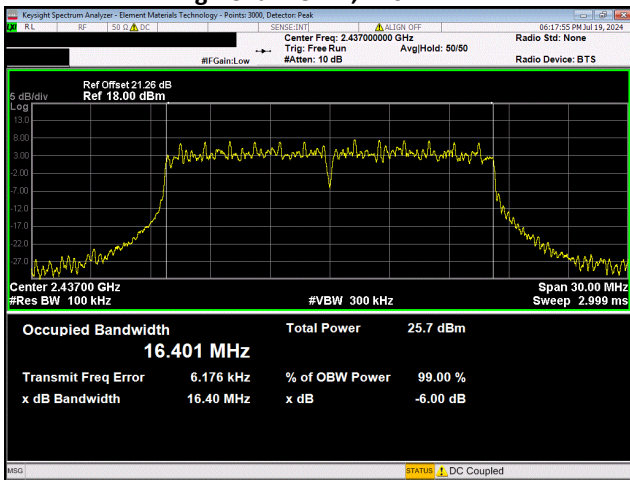
DTS BANDWIDTH (6dB)



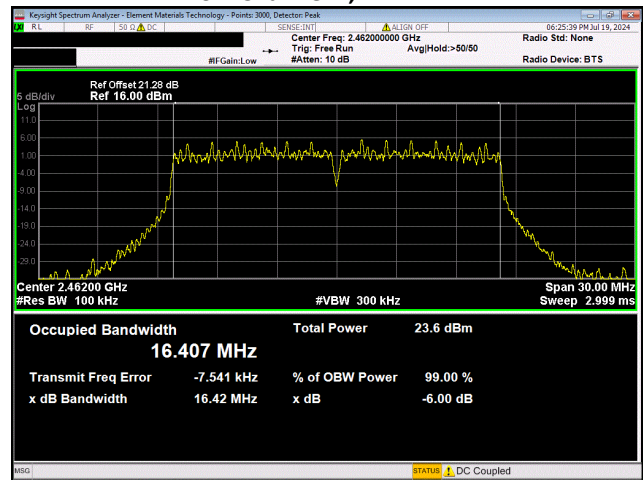
20 MHz BW
802.11(g) 6 Mbps
High Channel 11, 2462 MHz



20 MHz BW
802.11(g) 36 Mbps
Low Channel 1, 2412 MHz

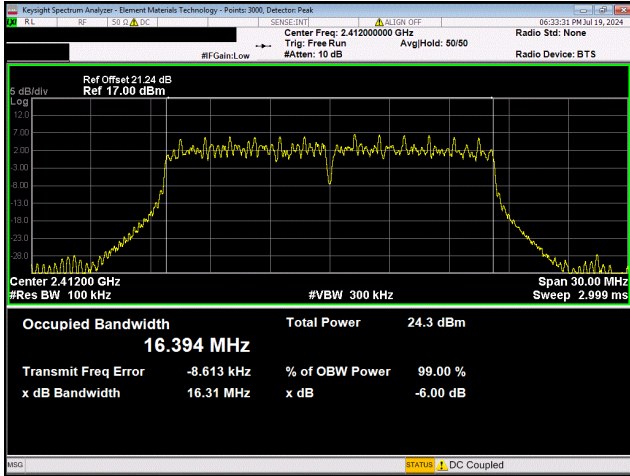


20 MHz BW
802.11(g) 36 Mbps
Mid Channel 6, 2437 MHz

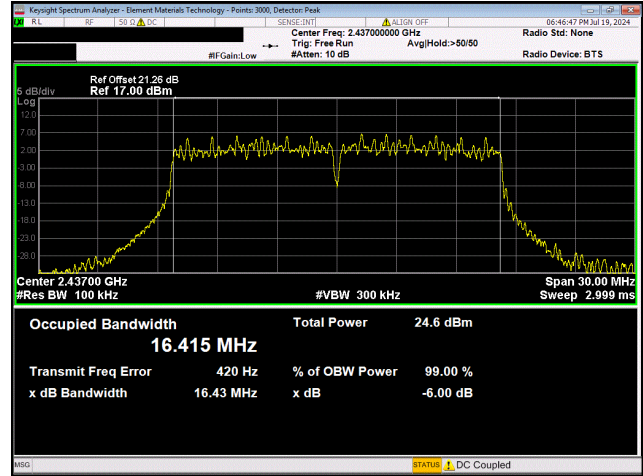


20 MHz BW
802.11(g) 36 Mbps
High Channel 11, 2462 MHz

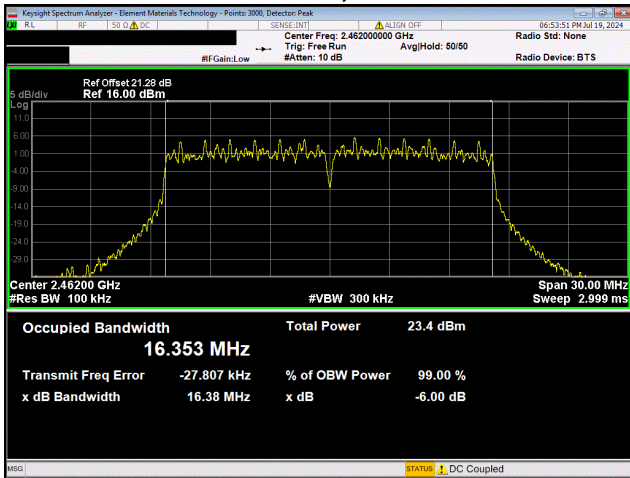
DTS BANDWIDTH (6dB)



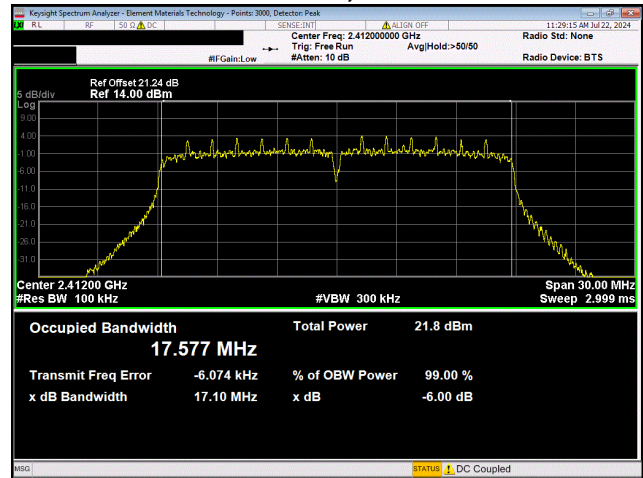
20 MHz BW
802.11(g) 54 Mbps
Low Channel 1, 2412 MHz



20 MHz BW
802.11(g) 54 Mbps
Mid Channel 6, 2437 MHz

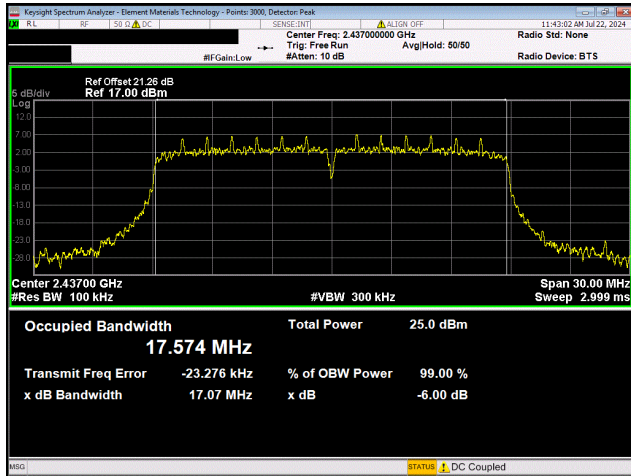


20 MHz BW
802.11(g) 54 Mbps
High Channel 11, 2462 MHz

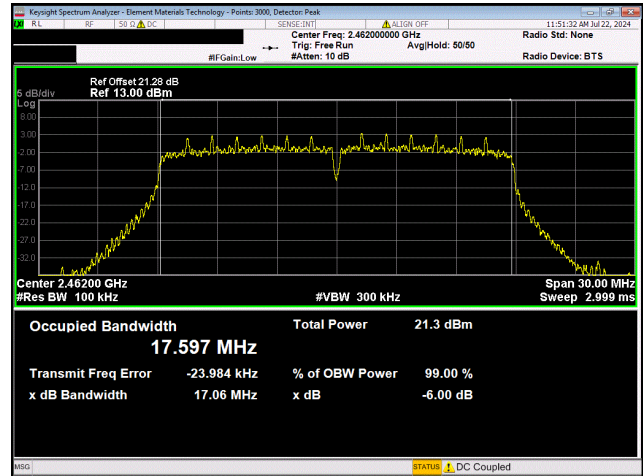


20 MHz BW
802.11(n) MCS0
Low Channel 1, 2412 MHz

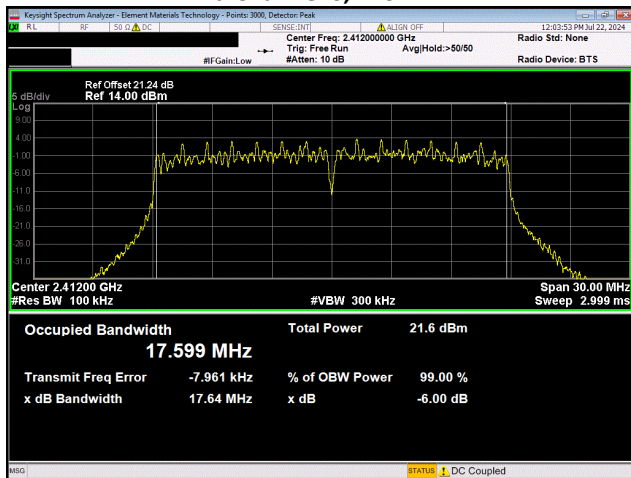
DTS BANDWIDTH (6dB)



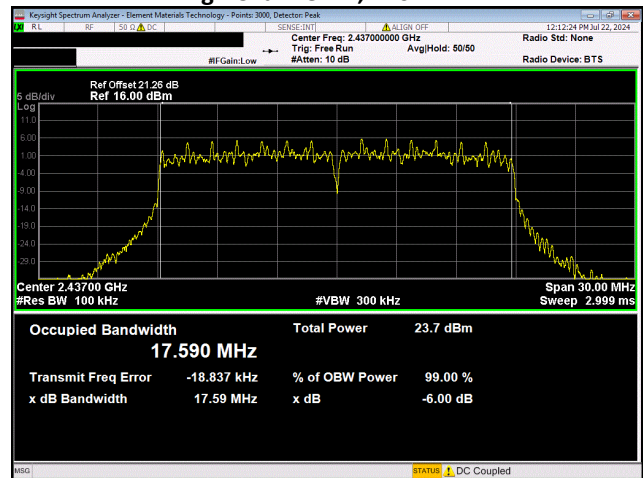
20 MHz BW
802.11(n) MCS0
Mid Channel 6, 2437 MHz



20 MHz BW
802.11(n) MCS0
High Channel 11, 2462 MHz

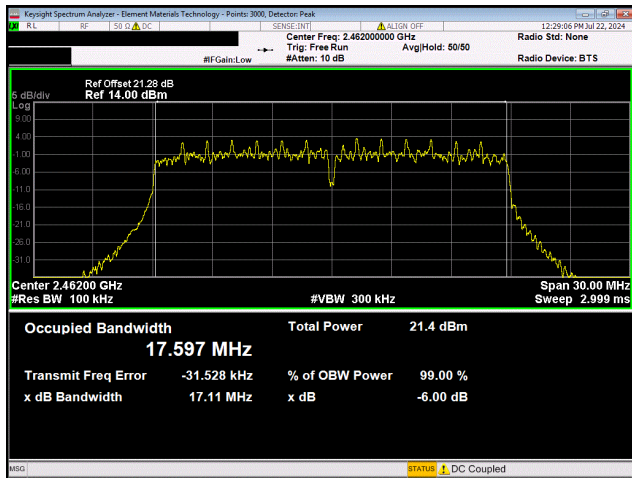


20 MHz BW
802.11(n) MCS7
Low Channel 1, 2412 MHz



20 MHz BW
802.11(n) MCS7
Mid Channel 6, 2437 MHz

DTS BANDWIDTH (6dB)



20 MHz BW
802.11(n) MCS7
High Channel 11, 2462 MHz