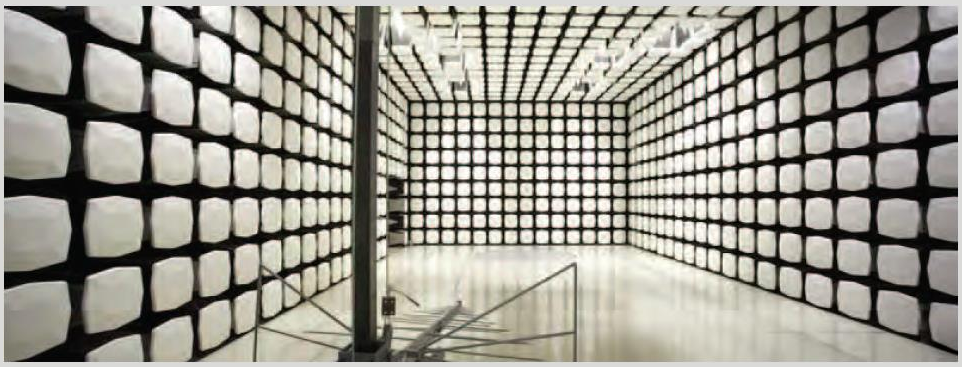
APDM, Inc.

V1 Accesspoint

FCC 15.247:2019

2400 – 2483.5 MHz Other Wideband (DTS) Transceiver

Report # APDM0016.1 Rev. 1



NVLAP LAB CODE: 200630-0

CERTIFICATE OF TEST

Last Date of Test: February 12, 2019
APDM, Inc.
Model: V1 Accesspoint

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2019	ANSI C63.10:2013, KDB 558074
FCC 15.207:2019	ANSI C63.10:2013

Results

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

Deviations From Test Standards

None

Approved By:

Kyle Holgate, Operations Manager

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

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
01	Revised antenna gain and corresponding radiated output power (EIRP) values.	2020-11-04	41-44

ACCREDITATIONS AND AUTHORIZATIONS

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

European Union

European Commission – Within Element, we have a EU Notified Body validated for the EMCD and RED Directives.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

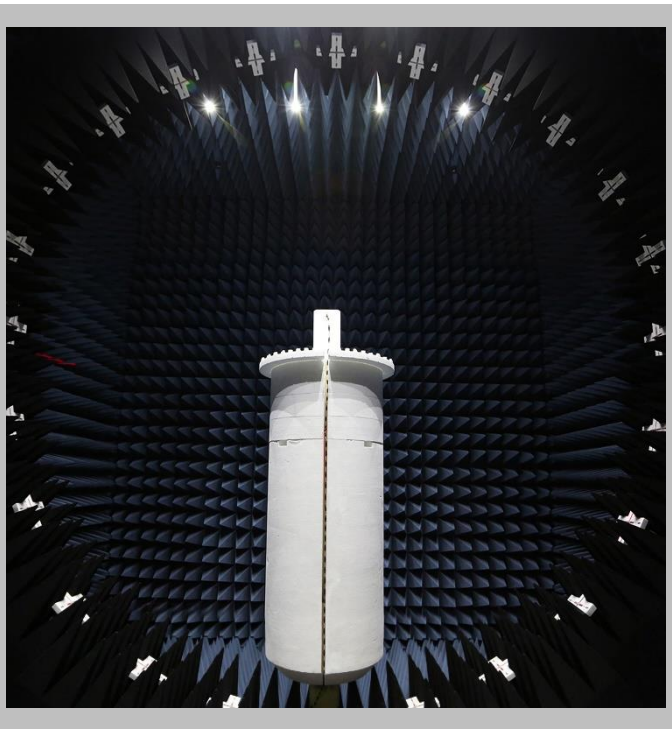
MIC – Recognized by MIC as a CAB for the acceptance of test data.

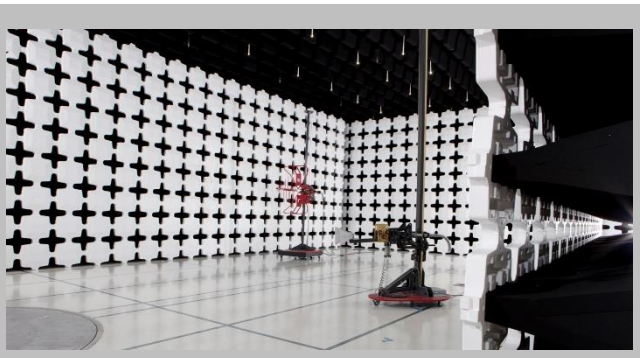
SCOPE

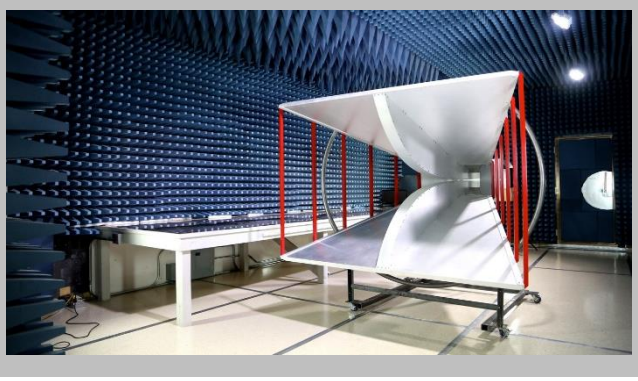
For details on the Scopes of our Accreditations, please visit:
https://www.nwemc.com/emc-testing-accreditations

FACILITIES

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada					
2834B-1, 2834B-3	2834E-1, 2834E-3	N/A	2834D-1	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

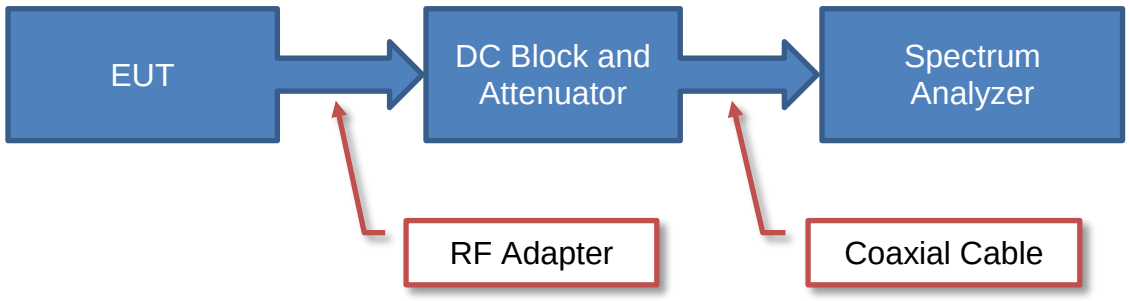
A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found included as part of the applicable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

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

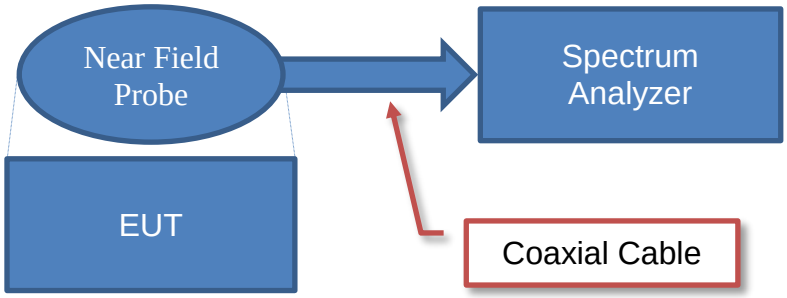
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

Test Setup Block Diagrams

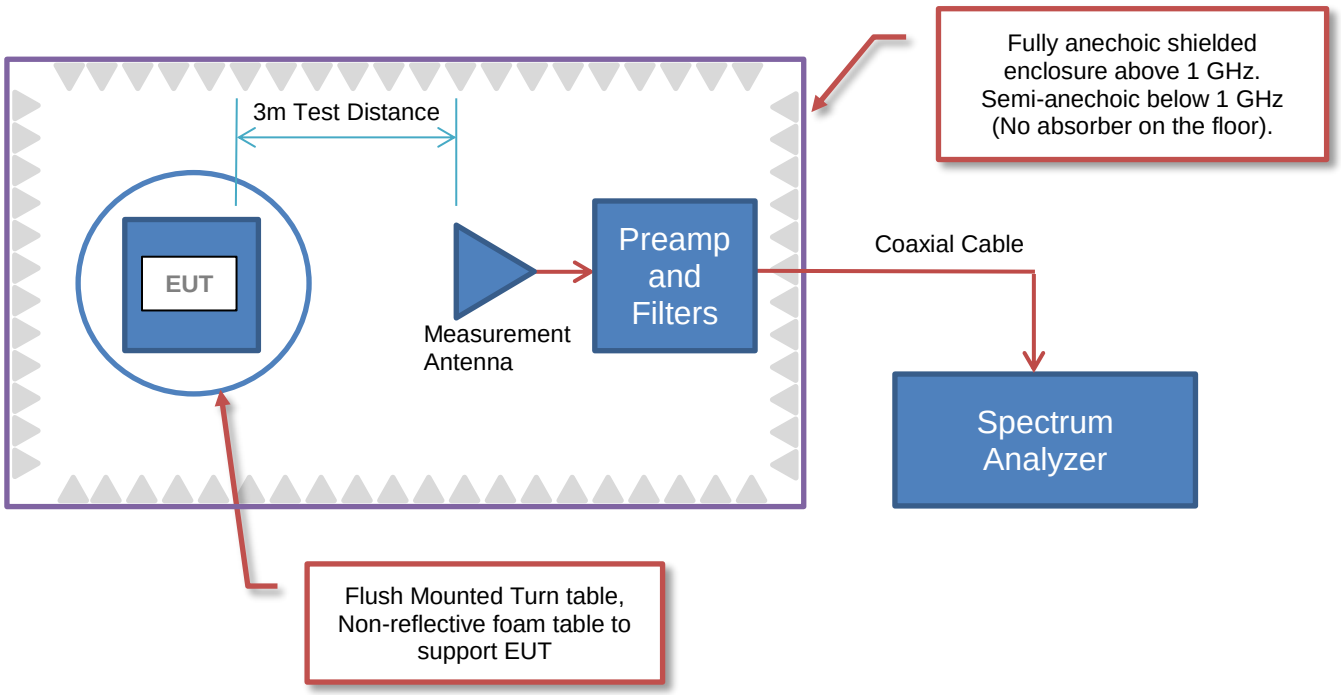
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	APDM, Inc.
Address:	2828 S Corbett Ave. Suite 135
City, State, Zip:	Portland, OR 97201
Test Requested By:	Andrew Greenberg
Model:	V1 Accesspoint
First Date of Test:	February 11, 2019
Last Date of Test:	February 12, 2019
Receipt Date of Samples:	February 11, 2019
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
The V1 Accesspoint is a transceiver

Highest frequency generated or used in the device:
Assumes: 2.48 MHz

Testing Objective:
Seeking to demonstrate compliance under FCC 15.247:2019 for operation in the 2400 - 2483.5 MHz Band.

CONFIGURATIONS

Configuration APDM0016- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Accesspoint	APDM, Inc.	V1 Accesspoint	9401

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Lenovo	T520	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	2.2 m	Yes	Laptop	Accesspoint

Configuration APDM0016- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Accesspoint	APDM, Inc.	V1 Accesspoint	9577

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Microsoft	Surface	211301654854
Power Supply	Microsoft	ProWindows	0C130K0NKTN66

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	2.2 m	Yes	Laptop	Accesspoint
RCA Cable	No	2 m	No	Accesspoint	Unterminated
Mini DIN6	No	2 m	No	Accesspoint	Unterminated
Mini DIN4	No	2 m	No	Accesspoint	Unterminated

CONFIGURATIONS

Configuration APDM0016- 4

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wearable movement monitor	APDM, Inc.	V1 Opal	1380
Access Point	APDM, Inc.	V1 Access Point	9536
Dock	APDM, Inc.	V1 Dock	5656
I.T.E. Power Supply	CUI, Inc.	EPSA050400U-PEP-EJ	None

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adapter	HP	PA-1650-32N	WASGU0AE7XQDVL
Laptop	HP	HP2140	CNU9312N8C

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power (Laptop)	No	1.9 m	No	AC Adapter	Laptop (HP)
AC Mains	No	1.9 m	No	AC Mains	AC Adapter
USB (Dock)	Yes	0.9 m	No	Laptop (HP)	Dock
USB (Accesspoint)	Yes	0.9 m	No	Laptop (HP)	Accesspoint
DC Power (Dock)	Yes	1.5 m	No	I.T.E Power Supply	Dock
RCA Cable (AP Sync Port)	Yes	2.5 m	No	Accesspoint	Unterminated
Mini DIN4 (AP Analog I/O)	Yes	0.9 m	No	Accesspoint	Unterminated
Mini DIN6 (AP Digital I/O)	Yes	2.0 m	No	Accesspoint	Unterminated

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2019-02-11	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	2019-02-11	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.
3	2019-02-11	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.
4	2019-02-11	Equivalent Isotropic Radiated Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2019-02-11	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.
6	2019-02-11	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
7	2019-02-11	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
8	2019-02-12	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.
9	2019-02-12	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2018.12.14.1

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	Rohde & Schwarz	ESCI	ARH	2018-04-11	2019-04-11
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKA	EVGA	2019-01-07	2020-01-07
LISN	Solar Electronics	9252-50-R-24-BNC	LIP	2018-09-11	2020-09-11

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

APDM0016-4

MODES INVESTIGATED

Continuously transmitting. Max power setting, GFSK, 2 MBps, R1 = 2445 MHz and R2 = 2452 MHz

POWERLINE CONDUCTED EMISSIONS

EUT:	V1 Accesspoint	Work Order:	APDM0016
Serial Number:	See configuration	Date:	02/12/2019
Customer:	APDM, Inc.	Temperature:	20°C
Attendees:	Andrew Greenberg, Gavin Gallino, Timothy Brandon, Christopher Andrews.	Relative Humidity:	38.6%
Customer Project:	None	Bar. Pressure:	1010 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	110 VAC/60Hz	Configuration:	APDM0016-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2019	ANSI C63.10:2013

TEST PARAMETERS

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

COMMENTS

Radio U3003 = R1, Radio U3004 = R2. Measuring AC mains for the Laptop power supply and ITE supply for the Dock

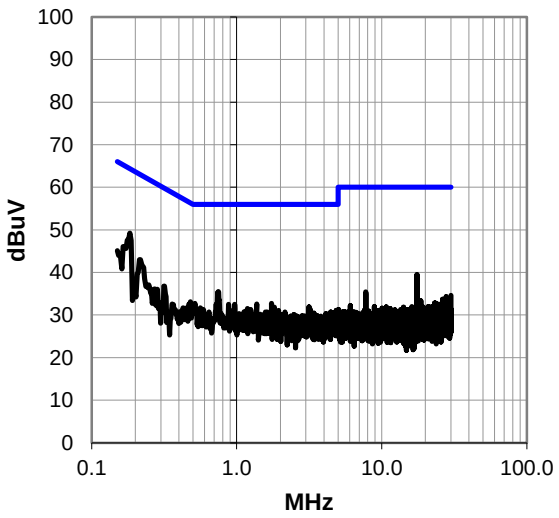
EUT OPERATING MODES

Continuously transmitting. Max power setting, GFSK, 2 MBps, R1 = 2445 MHz and R2 = 2452 MHz

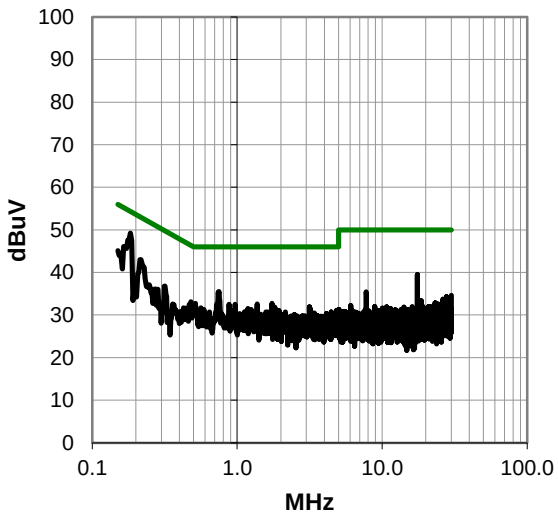
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2018.12.14.1

RESULTS - Run #5

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.184	29.2	20.0	49.2	64.3	-15.1
0.213	23.0	20.0	43.0	63.1	-20.1
0.747	15.5	20.0	35.5	56.0	-20.5
17.528	18.5	21.0	39.5	60.0	-20.5
0.150	25.0	20.1	45.1	66.0	-20.9
0.314	16.8	20.0	36.8	59.9	-23.1
0.478	13.2	19.9	33.1	56.4	-23.3
0.516	12.8	19.9	32.7	56.0	-23.3
1.739	12.6	20.1	32.7	56.0	-23.3
0.725	12.6	20.0	32.6	56.0	-23.4
1.374	12.6	20.0	32.6	56.0	-23.4
0.878	12.5	20.0	32.5	56.0	-23.5
0.967	12.5	20.0	32.5	56.0	-23.5
3.153	11.8	20.1	31.9	56.0	-24.1
1.821	11.7	20.1	31.8	56.0	-24.2
0.560	11.7	20.0	31.7	56.0	-24.3
1.183	11.5	20.0	31.5	56.0	-24.5
3.198	11.3	20.1	31.4	56.0	-24.6
7.772	15.1	20.3	35.4	60.0	-24.6
0.587	11.3	20.0	31.3	56.0	-24.7
1.247	11.3	20.0	31.3	56.0	-24.7
0.281	16.0	20.0	36.0	60.8	-24.8
1.941	11.0	20.1	31.1	56.0	-24.9
4.851	10.9	20.2	31.1	56.0	-24.9
0.269	16.1	20.0	36.1	61.1	-25.0
0.922	11.0	20.0	31.0	56.0	-25.0

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.184	29.2	20.0	49.2	54.3	-5.1
0.213	23.0	20.0	43.0	53.1	-10.1
0.747	15.5	20.0	35.5	46.0	-10.5
17.528	18.5	21.0	39.5	50.0	-10.5
0.150	25.0	20.1	45.1	56.0	-10.9
0.314	16.8	20.0	36.8	49.9	-13.1
0.478	13.2	19.9	33.1	46.4	-13.3
0.516	12.8	19.9	32.7	46.0	-13.3
1.739	12.6	20.1	32.7	46.0	-13.3
0.725	12.6	20.0	32.6	46.0	-13.4
1.374	12.6	20.0	32.6	46.0	-13.4
0.878	12.5	20.0	32.5	46.0	-13.5
0.967	12.5	20.0	32.5	46.0	-13.5
3.153	11.8	20.1	31.9	46.0	-14.1
1.821	11.7	20.1	31.8	46.0	-14.2
0.560	11.7	20.0	31.7	46.0	-14.3
1.183	11.5	20.0	31.5	46.0	-14.5
3.198	11.3	20.1	31.4	46.0	-14.6
7.772	15.1	20.3	35.4	50.0	-14.6
0.587	11.3	20.0	31.3	46.0	-14.7
1.247	11.3	20.0	31.3	46.0	-14.7
0.281	16.0	20.0	36.0	50.8	-14.8
1.941	11.0	20.1	31.1	46.0	-14.9
4.851	10.9	20.2	31.1	46.0	-14.9
0.269	16.1	20.0	36.1	51.1	-15.0
0.922	11.0	20.0	31.0	46.0	-15.0

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2018.12.14.1

EUT:	V1 Accesspoint	Work Order:	APDM0016
Serial Number:	See configuration	Date:	02/12/2019
Customer:	APDM, Inc.	Temperature:	20°C
Attendees:	Andrew Greenberg, Gavin Gallino, Timothy Brandon, Christopher Andrews.	Relative Humidity:	38.6%
Customer Project:	None	Bar. Pressure:	1010 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	110 VAC/60Hz	Configuration:	APDM0016-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2019	ANSI C63.10:2013

TEST PARAMETERS

Run #:	6	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

Radio U3003 = R1, Radio U3004 = R2. Measuring AC mains for the Laptop power supply and ITE supply for the Dock

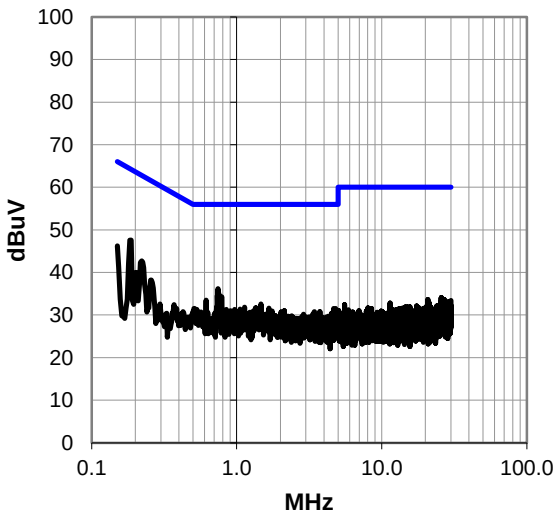
EUT OPERATING MODES

Continuously transmitting. Max power setting, GFSK, 2 MBps, R1 = 2445 MHz and R2 = 2452 MHz

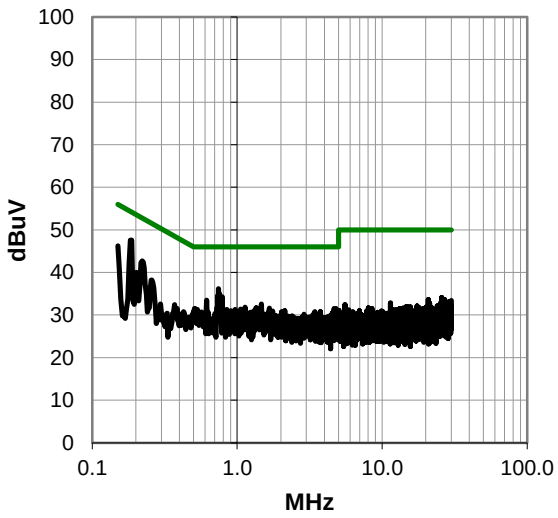
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2018.12.14.1

RESULTS - Run #6

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.184	27.6	20.0	47.6	64.3	-16.7
0.150	26.1	20.1	46.2	66.0	-19.8
0.743	16.2	20.0	36.2	56.0	-19.8
0.221	22.7	20.0	42.7	62.8	-20.1
0.784	14.3	20.0	34.3	56.0	-21.7
0.616	13.5	20.0	33.5	56.0	-22.5
0.254	18.2	20.0	38.2	61.6	-23.4
1.467	12.6	20.0	32.6	56.0	-23.4
0.202	20.0	20.0	40.0	63.5	-23.5
1.131	11.8	20.0	31.8	56.0	-24.2
1.344	11.7	20.0	31.7	56.0	-24.3
1.665	11.5	20.1	31.6	56.0	-24.4
0.508	11.6	19.9	31.5	56.0	-24.5
4.672	11.3	20.2	31.5	56.0	-24.5
4.795	11.3	20.2	31.5	56.0	-24.5
1.053	11.4	20.0	31.4	56.0	-24.6
0.531	11.3	20.0	31.3	56.0	-24.7
0.848	11.3	20.0	31.3	56.0	-24.7
0.967	11.3	20.0	31.3	56.0	-24.7
1.456	11.3	20.0	31.3	56.0	-24.7
0.904	11.0	20.0	31.0	56.0	-25.0
2.127	10.9	20.1	31.0	56.0	-25.0
1.303	10.9	20.0	30.9	56.0	-25.1
1.758	10.8	20.1	30.9	56.0	-25.1
0.952	10.8	20.0	30.8	56.0	-25.2
3.429	10.7	20.1	30.8	56.0	-25.2

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.184	27.6	20.0	47.6	54.3	-6.7
0.150	26.1	20.1	46.2	56.0	-9.8
0.743	16.2	20.0	36.2	46.0	-9.8
0.221	22.7	20.0	42.7	52.8	-10.1
0.784	14.3	20.0	34.3	46.0	-11.7
0.616	13.5	20.0	33.5	46.0	-12.5
0.254	18.2	20.0	38.2	51.6	-13.4
1.467	12.6	20.0	32.6	46.0	-13.4
0.202	20.0	20.0	40.0	53.5	-13.5
1.131	11.8	20.0	31.8	46.0	-14.2
1.344	11.7	20.0	31.7	46.0	-14.3
1.665	11.5	20.1	31.6	46.0	-14.4
0.508	11.6	19.9	31.5	46.0	-14.5
4.672	11.3	20.2	31.5	46.0	-14.5
4.795	11.3	20.2	31.5	46.0	-14.5
1.053	11.4	20.0	31.4	46.0	-14.6
0.531	11.3	20.0	31.3	46.0	-14.7
0.848	11.3	20.0	31.3	46.0	-14.7
0.967	11.3	20.0	31.3	46.0	-14.7
1.456	11.3	20.0	31.3	46.0	-14.7
0.904	11.0	20.0	31.0	46.0	-15.0
2.127	10.9	20.1	31.0	46.0	-15.0
1.303	10.9	20.0	30.9	46.0	-15.1
1.758	10.8	20.1	30.9	46.0	-15.1
0.952	10.8	20.0	30.8	46.0	-15.2
3.429	10.7	20.1	30.8	46.0	-15.2

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2018.07.27

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

MODES OF OPERATION

Continuously transmitting. GFSK. 2 MBps. Low channel = 2410 MHz, Mid channel = 2445 MHz , High channel = 2475 MHz. Maximum power setting. Radio U3003 = R1, Radio U3004 = R2.

POWER SETTINGS INVESTIGATED

5 VDC

CONFIGURATIONS INVESTIGATED

APDM0016 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	18-Mar-2018	12 mo
Cable	ESM Cable Corp.	KMKM-72	EVY	24-Aug-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	24-Aug-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-09	AIV	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	24-Nov-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	0 mo
Cable	None	Standard Gain Horns Cable	EVF	24-Nov-2018	12 mo
Amplifier - Pre-Amplifier	L-3 Narda-MITEQ	AMF-6F-08001200-30-10P	PAO	24-Nov-2018	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0 mo
Filter - High Pass	Micro-Tronics	HPM50111	HFO	11-Dec-2018	12 mo
Attenuator	Coaxicom	3910-20	AXZ	28-Feb-2018	12 mo
Cable	N/A	Double Ridge Horn Cables	EVB	24-Nov-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	24-Nov-2018	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	7-Feb-2018	24 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFD	28-Feb-2018	12 mo
Cable	N/A	Bilog Cables	EVA	24-Nov-2018	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	24-Nov-2018	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AXR	2-Oct-2018	24 mo

TEST DESCRIPTION

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

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

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

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

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

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

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

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

Where the radio test software does not provide for a duty cycle at continuous transmit conditions (> 98%) and the RMS (power average) measurements were made across the on and off times of the EUT transmissions, a duty cycle correction is added to the measurements using the formula of 10*LOG(dc). During testing, the EUT operated at an 18.3% duty cycle. The RMS average measurements were corrected upward by 10*LOG(1/0.183) = 7.38 dB.

In addition, per ANSI C63.10 Section 7.5, an adjustment was made to the RMS average measurements due to a protocol limited duty cycle. The EUT has a firmware protocol limited duty cycle of 0.037 ms of on-time per 100 ms time period. The RMS average measurements were downwardly adjusted by 20*LOG(dc) = 20*LOG(0.0037) = -68.64 dB. The total correction to RMS average measurements was, thus, -61.3 dB.

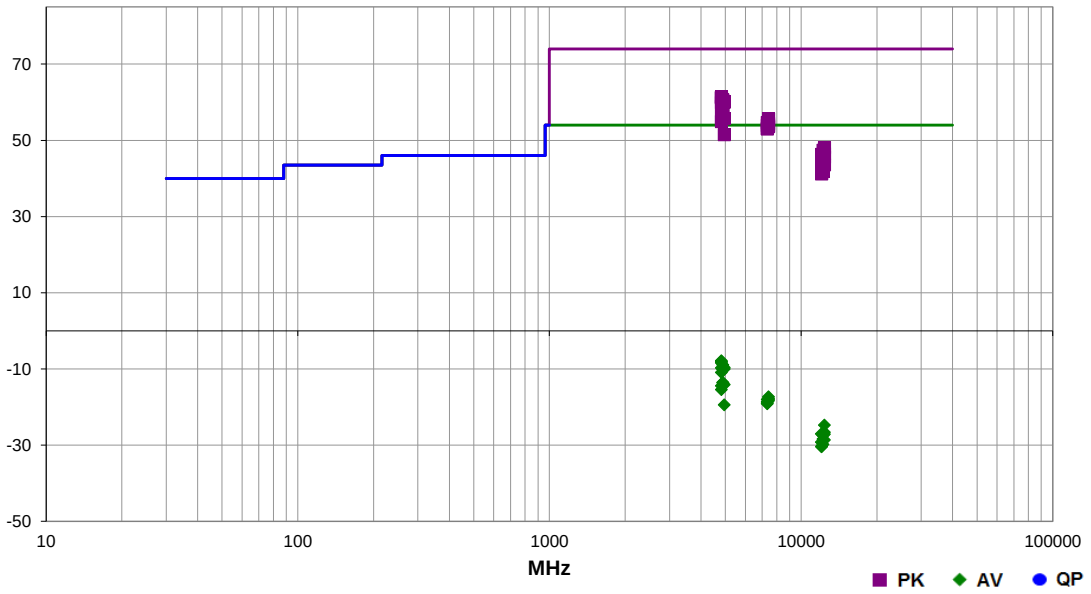
SPURIOUS RADIATED EMISSIONS

EmiR5 2018.09.26 PSA-ESCI 2018.07.27

Work Order:	APDM0016	**Date:**	12-Feb-2019		
Project:	None	**Temperature:**	19.7 °C		
Job Site:	EV01	**Humidity:**	38.6% RH		
Serial Number:	9577	**Barometric Pres.:**	1008 mbar	**Tested by:**	Jody House & Jeff Alcoke
EUT:	V1 Accesspoint				
Configuration:	2				
Customer:	APDM, Inc.				
Attendees:	Andrew Greenberg, Gavin Gallino, Timothy Brandon, Christopher Andrews.				
EUT Power:	5 VDC				
Operating Mode:	Continuously transmitting. GFSK. 2 MBps. Low channel = 2410 MHz, Mid channel = 2445 MHz , High channel = 2475 MHz. Maximum power setting. Radio U3003 = R1, Radio U3004 = R2.				
Deviations:	None				
Comments:	See comments for EUT orientation and R1, R2 channels.				

Test Specifications	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

Run #	12	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4819.442	56.6	4.8	2.7	208.0	0.0	0.0	Horz	PK	0.0	61.4	74.0	-12.6	EUT Vert, R1 Low Ch, R2 Mid Ch
4820.058	56.4	4.8	1.0	247.0	0.0	0.0	Vert	PK	0.0	61.2	74.0	-12.8	EUT Horz, R1 Low Ch, R2 Mid Ch
4819.367	56.4	4.8	1.7	114.0	0.0	0.0	Horz	PK	0.0	61.2	74.0	-12.8	EUT On Side, R1 Low Ch, R2 Mid Ch
4819.992	56.3	4.8	3.1	182.0	0.0	0.0	Vert	PK	0.0	61.1	74.0	-12.9	EUT On Side, R1 Low Ch, R2 Mid Ch
4887.808	55.2	5.4	1.0	4.0	0.0	0.0	Vert	PK	0.0	60.6	74.0	-13.4	EUT Horz, R1 Mid Ch, R2 High Ch
4949.475	54.6	5.5	2.2	175.0	0.0	0.0	Horz	PK	0.0	60.1	74.0	-13.9	EUT Vert, R1 High Ch, R2 Low Ch
4949.267	54.6	5.5	1.0	359.0	0.0	0.0	Vert	PK	0.0	60.1	74.0	-13.9	EUT Horz, R1 High Ch, R2 Low Ch
4819.950	55.1	4.8	1.0	154.0	0.0	0.0	Vert	PK	0.0	59.9	74.0	-14.1	EUT Vert, R1 Low Ch, R2 Mid Ch
4890.592	54.4	5.4	2.0	174.0	0.0	0.0	Horz	PK	0.0	59.8	74.0	-14.2	EUT Vert, R1 Mid Ch, R2 High Ch
4820.017	54.1	4.8	2.2	180.0	0.0	0.0	Horz	PK	0.0	58.9	74.0	-15.1	EUT Vert, R1 High Ch, R2 Low Ch
4890.133	51.1	5.4	1.0	273.0	0.0	0.0	Vert	PK	0.0	56.5	74.0	-17.5	EUT Horz, R1 Low Ch, R2 Mid Ch
4887.767	51.1	5.4	1.9	173.0	0.0	0.0	Horz	PK	0.0	56.5	74.0	-17.5	EUT Vert, R1 Low Ch, R2 Mid Ch
4950.183	50.2	5.5	1.0	289.0	0.0	0.0	Vert	PK	0.0	55.7	74.0	-18.3	EUT Horz, R1 Mid Ch, R2 High Ch
4819.417	50.9	4.8	1.0	355.0	0.0	0.0	Vert	PK	0.0	55.7	74.0	-18.3	EUT Horz, R1 High Ch, R2 Low Ch
7423.683	41.4	14.2	2.3	84.0	0.0	0.0	Horz	PK	0.0	55.6	74.0	-18.4	EUT Vert, R1 High Ch, R2 Low Ch
4819.967	50.1	4.8	1.0	52.0	0.0	0.0	Horz	PK	0.0	54.9	74.0	-19.1	EUT Horz, R1 Low Ch, R2 Mid Ch
7334.783	41.6	13.1	1.9	207.0	0.0	0.0	Horz	PK	0.0	54.7	74.0	-19.3	EUT Vert, R1 Low Ch, R2 Mid Ch
7424.883	40.2	14.2	2.4	194.0	0.0	0.0	Horz	PK	0.0	54.4	74.0	-19.6	EUT Vert, R1 Mid Ch, R2 High Ch
7424.925	39.7	14.2	1.0	55.0	0.0	0.0	Vert	PK	0.0	53.9	74.0	-20.1	EUT Horz, R1 High Ch, R2 Low Ch
7335.083	40.7	13.2	1.0	260.0	0.0	0.0	Vert	PK	0.0	53.9	74.0	-20.1	EUT Horz, R1 Low Ch, R2 Mid Ch
7423.908	39.4	14.2	1.0	263.0	0.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4	EUT Horz, R1 Mid Ch, R2 High Ch
7336.017	39.9	13.2	1.0	65.0	0.0	0.0	Vert	PK	0.0	53.1	74.0	-20.9	EUT Horz, R1 Mid Ch, R2 High Ch
7334.142	39.9	13.1	2.3	90.0	0.0	0.0	Horz	PK	0.0	53.0	74.0	-21.0	EUT Vert, R1 Mid Ch, R2 High Ch
4949.808	46.0	5.5	1.0	101.0	0.0	0.0	Horz	PK	0.0	51.5	74.0	-22.5	EUT Vert, R1 Mid Ch, R2 High Ch
12373.160	46.1	2.0	1.0	85.0	0.0	0.0	Horz	PK	0.0	48.1	74.0	-25.9	EUT Vert, R1 Mid Ch, R2 High Ch

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12224.930	45.6	1.8	1.0	104.0	0.0	0.0	Horz	PK	0.0	47.4	74.0	-26.6	EUT Vert, R1 Low Ch, R2 Mid Ch
12374.930	44.5	2.0	1.0	59.0	0.0	0.0	Vert	PK	0.0	46.5	74.0	-27.5	EUT Horz, R1 Mid Ch, R2 High Ch
12050.110	45.3	1.0	1.9	106.0	0.0	0.0	Horz	PK	0.0	46.3	74.0	-27.7	EUT Vert, R1 High Ch, R2 Low Ch
12375.180	43.6	2.0	1.8	75.0	0.0	0.0	Horz	PK	0.0	45.6	74.0	-28.4	EUT Vert, R1 High Ch, R2 Low Ch
12225.030	43.7	1.8	1.7	85.0	0.0	0.0	Horz	PK	0.0	45.5	74.0	-28.5	EUT Vert, R1 Mid Ch, R2 High Ch
12223.480	42.2	1.8	1.1	52.0	0.0	0.0	Vert	PK	0.0	44.0	74.0	-30.0	EUT Horz, R1 Mid Ch, R2 High Ch
12374.940	41.6	2.0	1.2	45.0	0.0	0.0	Vert	PK	0.0	43.6	74.0	-30.4	EUT Horz, R1 High Ch, R2 Low Ch
12050.990	42.4	1.0	1.1	48.0	0.0	0.0	Vert	PK	0.0	43.4	74.0	-30.6	EUT Horz, R1 High Ch, R2 Low Ch
12226.390	40.1	1.8	2.7	169.0	0.0	0.0	Vert	PK	0.0	41.9	74.0	-32.1	EUT Horz, R1 Low Ch, R2 Mid Ch
12050.820	40.3	1.0	1.3	62.0	0.0	0.0	Vert	PK	0.0	41.3	74.0	-32.7	EUT Horz, R1 Low Ch, R2 Mid Ch
12050.550	40.2	1.0	1.0	69.0	0.0	0.0	Horz	PK	0.0	41.2	74.0	-32.8	EUT Vert, R1 Low Ch, R2 Mid Ch
4819.867	48.6	4.8	2.7	208.0	-61.3	0.0	Horz	AV	0.0	-7.9	54.0	-61.9	EUT Vert, R1 Low Ch, R2 Mid Ch
4819.850	48.3	4.8	1.0	247.0	-61.3	0.0	Vert	AV	0.0	-8.2	54.0	-62.2	EUT Horz, R1 Low Ch, R2 Mid Ch
4819.825	48.3	4.8	1.7	114.0	-61.3	0.0	Horz	AV	0.0	-8.2	54.0	-62.2	EUT On Side, R1 Low Ch, R2 Mid Ch
4819.858	48.0	4.8	3.1	182.0	-61.3	0.0	Vert	AV	0.0	-8.5	54.0	-62.5	EUT On Side, R1 Low Ch, R2 Mid Ch
4889.867	46.9	5.4	1.0	4.0	-61.3	0.0	Vert	AV	0.0	-9.0	54.0	-63.0	EUT Horz, R1 Mid Ch, R2 High Ch
4949.858	46.1	5.5	1.0	359.0	-61.3	0.0	Vert	AV	0.0	-9.7	54.0	-63.7	EUT Horz, R1 High Ch, R2 Low Ch
4819.850	46.7	4.8	1.0	154.0	-61.3	0.0	Vert	AV	0.0	-9.8	54.0	-63.8	EUT Vert, R1 Low Ch, R2 Mid Ch
4949.917	45.7	5.5	2.2	175.0	-61.3	0.0	Horz	AV	0.0	-10.1	54.0	-64.1	EUT Vert, R1 High Ch, R2 Low Ch
4889.867	45.8	5.4	2.0	174.0	-61.3	0.0	Horz	AV	0.0	-10.1	54.0	-64.1	EUT Vert, R1 Mid Ch, R2 High Ch
4819.933	45.5	4.8	2.2	180.0	-61.3	0.0	Horz	AV	0.0	-11.0	54.0	-65.0	EUT Vert, R1 High Ch, R2 Low Ch
4889.900	42.3	5.4	1.9	173.0	-61.3	0.0	Horz	AV	0.0	-13.6	54.0	-67.6	EUT Vert, R1 Low Ch, R2 Mid Ch
4889.850	42.2	5.4	1.0	273.0	-61.3	0.0	Vert	AV	0.0	-13.7	54.0	-67.7	EUT Horz, R1 Low Ch, R2 Mid Ch
4949.892	41.6	5.5	1.0	289.0	-61.3	0.0	Vert	AV	0.0	-14.2	54.0	-68.2	EUT Horz, R1 Mid Ch, R2 High Ch
4819.933	42.0	4.8	1.0	355.0	-61.3	0.0	Vert	AV	0.0	-14.5	54.0	-68.5	EUT Horz, R1 High Ch, R2 Low Ch
4819.867	41.0	4.8	1.0	52.0	-61.3	0.0	Horz	AV	0.0	-15.5	54.0	-69.5	EUT Horz, R1 Low Ch, R2 Mid Ch
7425.125	29.6	14.3	2.4	194.0	-61.3	0.0	Horz	AV	0.0	-17.4	54.0	-71.4	EUT Vert, R1 Mid Ch, R2 High Ch
7424.525	29.3	14.2	2.3	84.0	-61.3	0.0	Horz	AV	0.0	-17.8	54.0	-71.8	EUT Vert, R1 High Ch, R2 Low Ch
7425.125	28.9	14.3	1.0	263.0	-61.3	0.0	Vert	AV	0.0	-18.1	54.0	-72.1	EUT Horz, R1 Mid Ch, R2 High Ch
7335.100	30.0	13.2	1.9	207.0	-61.3	0.0	Horz	AV	0.0	-18.1	54.0	-72.1	EUT Vert, R1 Low Ch, R2 Mid Ch
7424.150	28.7	14.2	1.0	55.0	-61.3	0.0	Vert	AV	0.0	-18.4	54.0	-72.4	EUT Horz, R1 High Ch, R2 Low Ch
7334.758	29.5	13.1	1.0	260.0	-61.3	0.0	Vert	AV	0.0	-18.7	54.0	-72.7	EUT Horz, R1 Low Ch, R2 Mid Ch
7334.833	29.2	13.1	2.3	90.0	-61.3	0.0	Horz	AV	0.0	-19.0	54.0	-73.0	EUT Vert, R1 Mid Ch, R2 High Ch
7334.625	29.0	13.1	1.0	65.0	-61.3	0.0	Vert	AV	0.0	-19.2	54.0	-73.2	EUT Horz, R1 Mid Ch, R2 High Ch
4949.925	36.3	5.5	1.0	101.0	-61.3	0.0	Horz	AV	0.0	-19.5	54.0	-73.5	EUT Vert, R1 Mid Ch, R2 High Ch
12374.960	34.5	2.0	1.0	85.0	-61.3	0.0	Horz	AV	0.0	-24.8	54.0	-78.8	EUT Vert, R1 Mid Ch, R2 High Ch
12375.010	32.6	2.0	1.0	59.0	-61.3	0.0	Vert	AV	0.0	-26.7	54.0	-80.7	EUT Horz, R1 Mid Ch, R2 High Ch
12223.220	32.4	1.8	1.0	104.0	-61.3	0.0	Horz	AV	0.0	-27.1	54.0	-81.1	EUT Vert, R1 Low Ch, R2 Mid Ch
12048.380	33.2	1.0	1.9	106.0	-61.3	0.0	Horz	AV	0.0	-27.1	54.0	-81.1	EUT Vert, R1 High Ch, R2 Low Ch
12373.230	32.1	2.0	1.8	75.0	-61.3	0.0	Horz	AV	0.0	-27.2	54.0	-81.2	EUT Vert, R1 High Ch, R2 Low Ch
12223.530	32.0	1.8	1.7	85.0	-61.3	0.0	Horz	AV	0.0	-27.5	54.0	-81.5	EUT Vert, R1 Mid Ch, R2 High Ch
12223.650	31.0	1.8	1.1	52.0	-61.3	0.0	Vert	AV	0.0	-28.5	54.0	-82.5	EUT Horz, R1 Mid Ch, R2 High Ch
12373.350	30.6	2.0	1.2	45.0	-61.3	0.0	Vert	AV	0.0	-28.7	54.0	-82.7	EUT Horz, R1 High Ch, R2 Low Ch
12048.510	31.0	1.0	1.1	48.0	-61.3	0.0	Vert	AV	0.0	-29.3	54.0	-83.3	EUT Horz, R1 High Ch, R2 Low Ch
12225.090	29.6	1.8	2.7	169.0	-61.3	0.0	Vert	AV	0.0	-29.9	54.0	-83.9	EUT Horz, R1 Low Ch, R2 Mid Ch
12049.800	29.9	1.0	1.0	69.0	-61.3	0.0	Horz	AV	0.0	-30.4	54.0	-84.4	EUT Vert, R1 Low Ch, R2 Mid Ch
12050.980	29.8	1.0	1.3	62.0	-61.3	0.0	Vert	AV	0.0	-30.5	54.0	-84.5	EUT Horz, R1 Low Ch, R2 Mid Ch

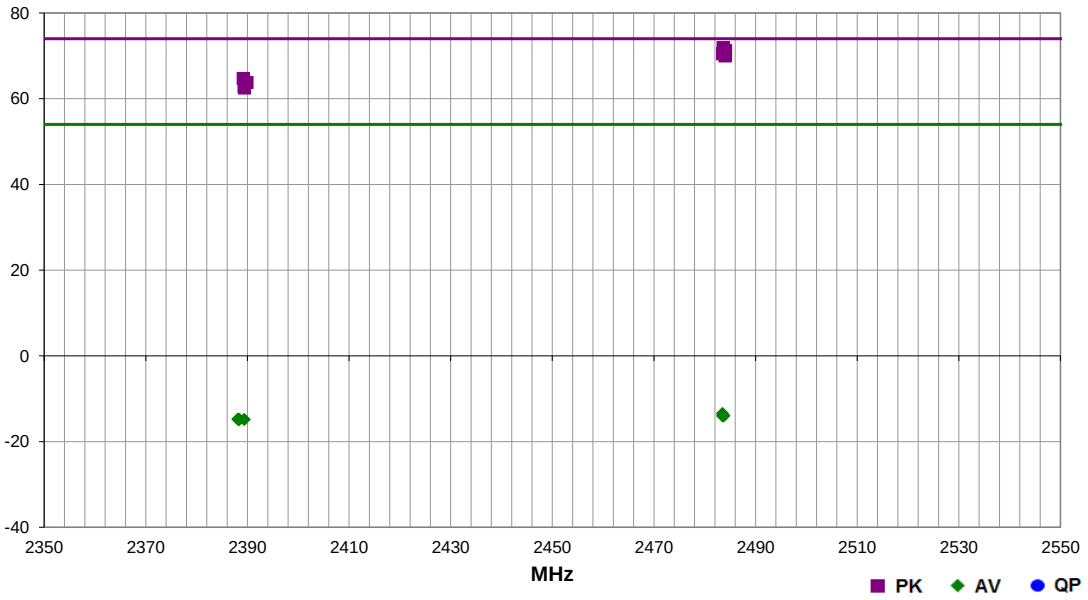
SPURIOUS RADIATED EMISSIONS

EmiR5 2018.09.26 PSA-ESCI 2018.07.27

Work Order:	APDM0016	**Date:**	12-Feb-2019		
Project:	None	**Temperature:**	19.7 °C		
Job Site:	EV01	**Humidity:**	38.6% RH		
Serial Number:	9577	**Barometric Pres.:**	1008 mbar	**Tested by:**	Jody House & Jeff Alcoke
EUT:	V1 Accesspoint				
Configuration:	2				
Customer:	APDM, Inc.				
Attendees:	Andrew Greenberg, Gavin Gallino, Timothy Brandon, Christopher Andrews.				
EUT Power:	5 VDC				
Operating Mode:	Continuously transmitting. GFSK. 2 MBps. Low channel = 2410 MHz, Mid channel = 2445 MHz , High channel = 2475 MHz. Maximum power setting. Radio U3003 = R1, Radio U3004 = R2.				
Deviations:	None				
Comments:	See comments for EUT orientation and R1, R2 channels.				

Test Specifications	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

Run #	20	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.593	56.8	-4.9	1.0	137.0	0.0	20.0	Horz	PK	0.0	71.9	74.0	-2.1	EUT Vert, R1 Mid Ch, R2 High Ch
2484.110	56.1	-4.9	3.0	132.0	0.0	20.0	Vert	PK	0.0	71.2	74.0	-2.8	EUT On Side, R1 Mid Ch, R2 High Ch
2483.520	55.4	-4.9	2.7	144.0	0.0	20.0	Vert	PK	0.0	70.5	74.0	-3.5	EUT On Side, R1 High Ch, R2 Low Ch
2483.990	54.9	-4.9	1.0	156.0	0.0	20.0	Horz	PK	0.0	70.0	74.0	-4.0	EUT Vert, R1 High Ch, R2 Low Ch
2389.173	49.8	-5.1	2.8	166.0	0.0	20.0	Horz	PK	0.0	64.7	74.0	-9.3	EUT Vert, R1 Low Ch, R2 Mid Ch
2389.897	48.9	-5.1	3.4	171.0	0.0	20.0	Horz	PK	0.0	63.8	74.0	-10.2	EUT Vert, R1 High Ch, R2 Low Ch
2389.337	47.9	-5.1	1.0	165.0	0.0	20.0	Vert	PK	0.0	62.8	74.0	-11.2	EUT On Side, R1 High Ch, R2 Low Ch
2389.417	47.6	-5.1	1.0	169.0	0.0	20.0	Vert	PK	0.0	62.5	74.0	-11.5	EUT On Side, R1 Low Ch, R2 Mid Ch
2483.517	32.7	-4.9	1.0	137.0	-61.3	20.0	Horz	AV	0.0	-13.5	54.0	-67.5	EUT Vert, R1 Mid Ch, R2 High Ch
2483.793	32.2	-4.9	3.0	132.0	-61.3	20.0	Vert	AV	0.0	-14.0	54.0	-68.0	EUT On Side, R1 Mid Ch, R2 High Ch
2483.540	32.2	-4.9	2.7	144.0	-61.3	20.0	Vert	AV	0.0	-14.0	54.0	-68.0	EUT On Side, R1 High Ch, R2 Low Ch
2483.577	32.1	-4.9	1.0	156.0	-61.3	20.0	Horz	AV	0.0	-14.1	54.0	-68.1	EUT Vert, R1 High Ch, R2 Low Ch
2388.157	31.6	-5.1	2.8	166.0	-61.3	20.0	Horz	AV	0.0	-14.8	54.0	-68.8	EUT Vert, R1 Low Ch, R2 Mid Ch
2389.380	31.5	-5.1	1.0	165.0	-61.3	20.0	Vert	AV	0.0	-14.9	54.0	-68.9	EUT On Side, R1 High Ch, R2 Low Ch
2388.213	31.5	-5.1	3.4	171.0	-61.3	20.0	Horz	AV	0.0	-14.9	54.0	-68.9	EUT Vert, R1 High Ch, R2 Low Ch
2388.410	31.5	-5.1	1.0	169.0	-61.3	20.0	Vert	AV	0.0	-14.9	54.0	-68.9	EUT On Side, R1 Low Ch, R2 Mid Ch

DUTY CYCLE

XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1-Feb-19	1-Feb-20
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21

TEST DESCRIPTION

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.

DUTY CYCLE

element

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	**V1 Accesspoint**			**Work Order:**	**APDM0016**
Serial Number:	**9401**			**Date:**	**11-Feb-19**
Customer:	**APDM, Inc.**			**Temperature:**	**19.8 °C**
Attendees:	**Andrew Greenberg, David Camarillo, Gavin Gallino, Timothy Brandon, Christopher Andrews.**			**Humidity:**	**37.4% RH**
Project:	**None**			**Barometric Pres.:**	**1009 mbar**
Tested by:	**Jody House & Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

COMMENTS

Continously transmitting. GFSK. 2 MBps. Maximum power setting.

DEVIATIONS FROM TEST STANDARD

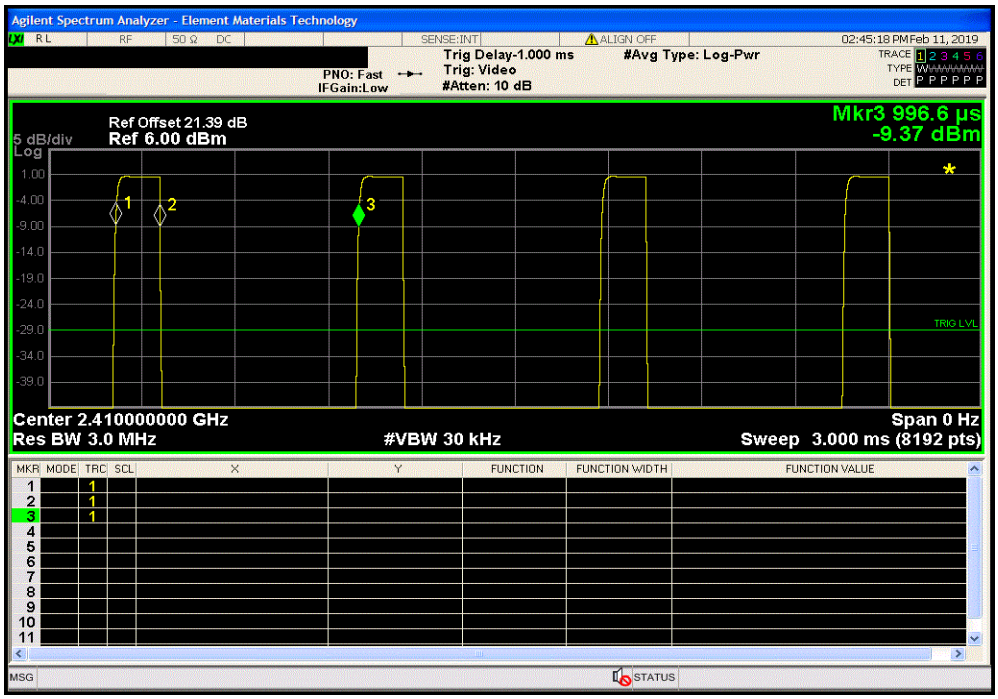
None

Configuration #	**1**	*Signature*

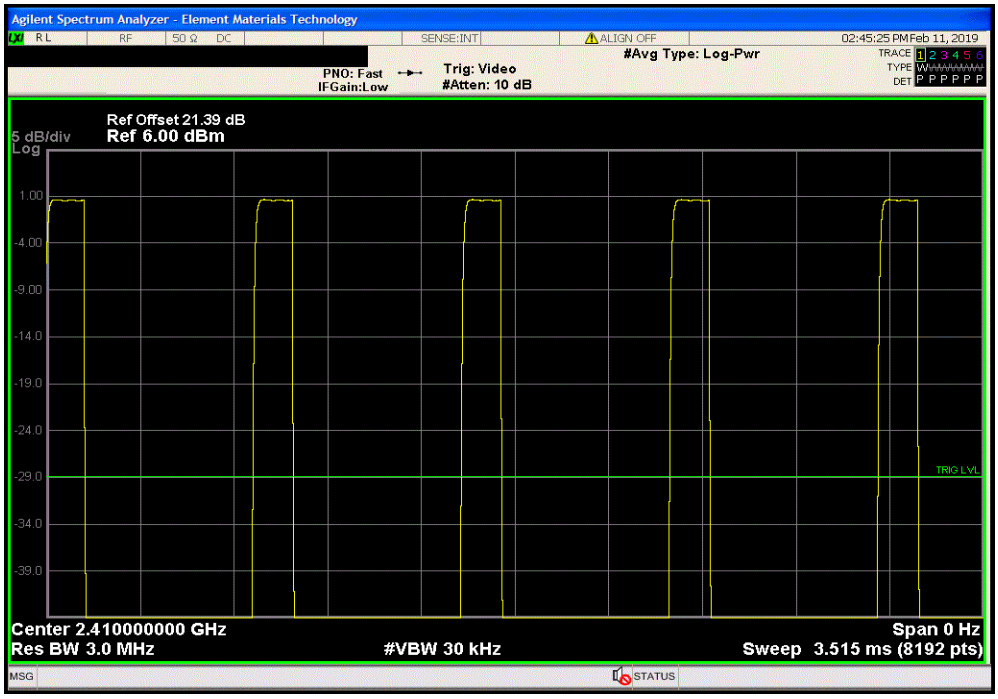
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
U3004 Antenna Port						
GFSK, Low Channel 2410 MHz	143 us	781 us	1	18.3	N/A	N/A
GFSK, Low Channel 2410 MHz	N/A	N/A	5	N/A	N/A	N/A
GFSK, Mid Channel 2445 MHz	142.3 us	781 us	1	18.2	N/A	N/A
GFSK, Mid Channel 2445 MHz	N/A	N/A	5	N/A	N/A	N/A
GFSK, High Channel 2475 MHz	142.8 us	781.3 us	1	18.3	N/A	N/A
GFSK, High Channel 2475 MHz	N/A	N/A	5	N/A	N/A	N/A
U3003 Antenna Port						
GFSK, Low Channel 2410 MHz	142.3 us	781.7 us	1	18.2	N/A	N/A
GFSK, Low Channel 2410 MHz	N/A	N/A	5	N/A	N/A	N/A
GFSK, Mid Channel 2445 MHz	143 us	781.7 us	1	18.3	N/A	N/A
GFSK, Mid Channel 2445 MHz	N/A	N/A	5	N/A	N/A	N/A
GFSK, High Channel 2475 MHz	142.6 us	781.3 us	1	18.3	N/A	N/A
GFSK, High Channel 2475 MHz	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

U3004 Antenna Port, GFSK, Low Channel 2410 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	143 us	781 us	1	18.3	N/A	N/A

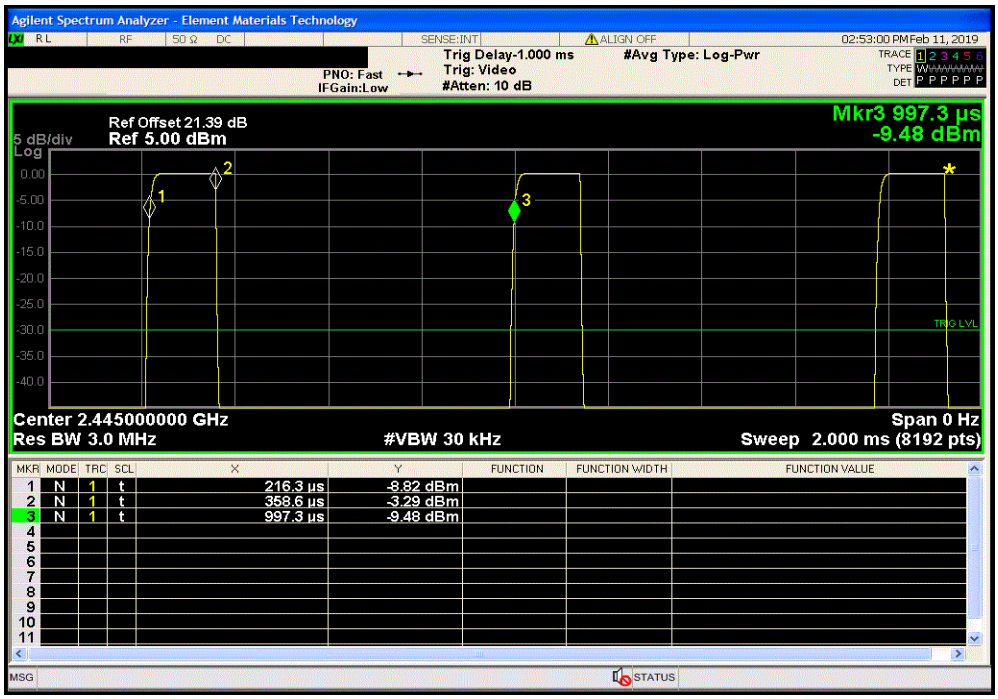


U3004 Antenna Port, GFSK, Low Channel 2410 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

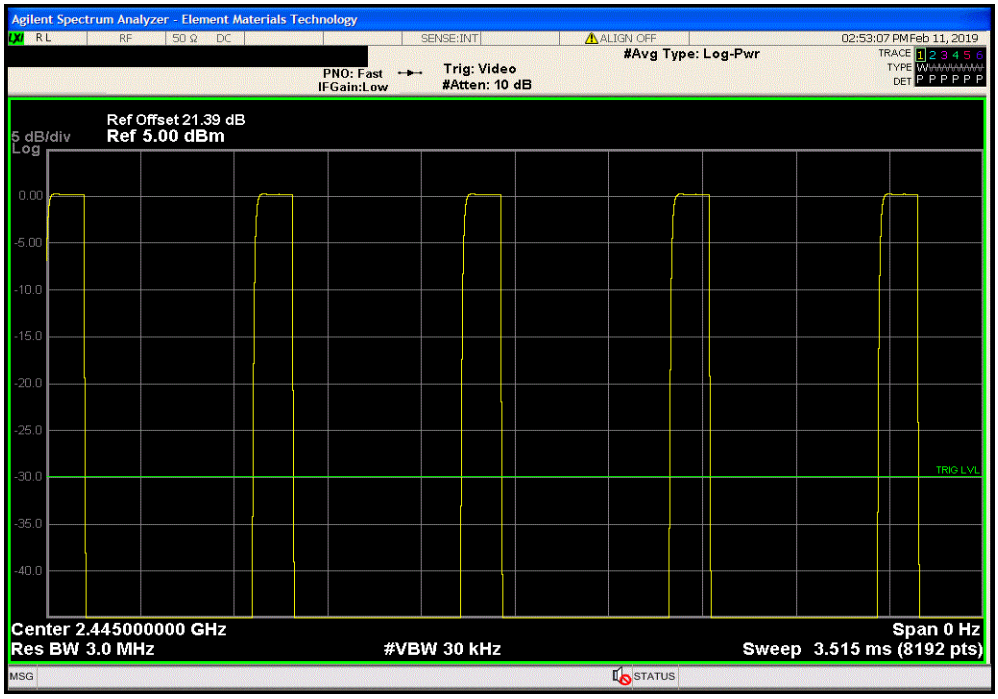


DUTY CYCLE

U3004 Antenna Port, GFSK, Mid Channel 2445 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	142.3 us	781 us	1	18.2	N/A	N/A

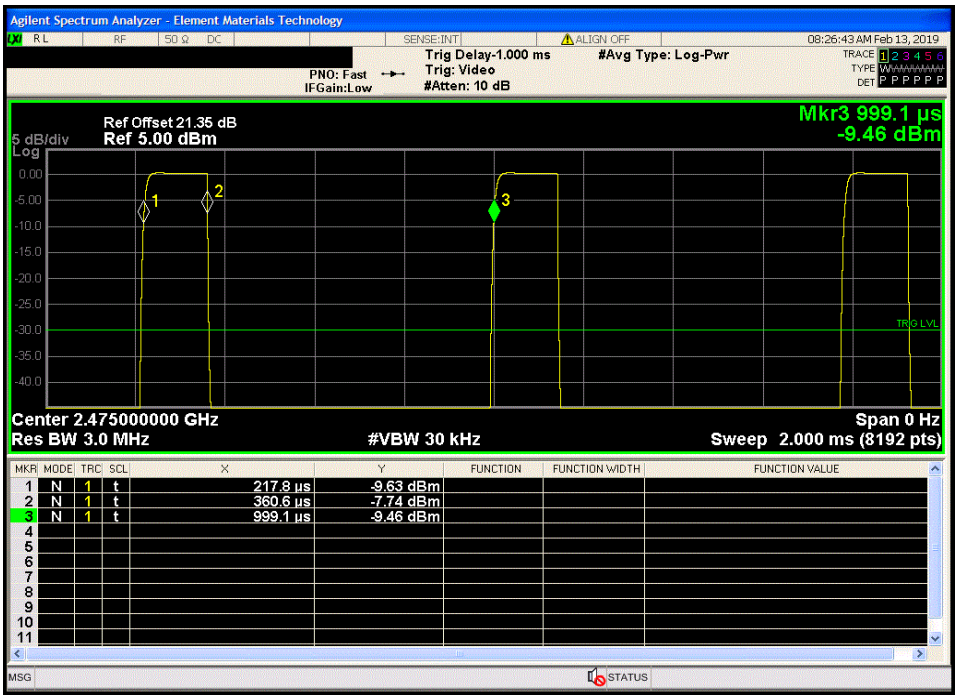


U3004 Antenna Port, GFSK, Mid Channel 2445 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

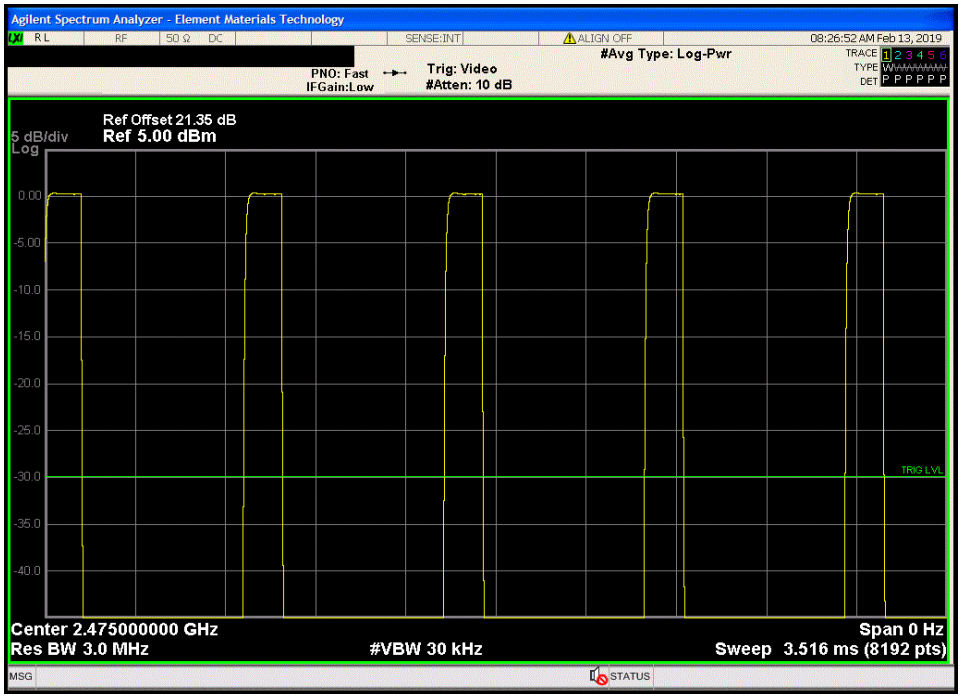


DUTY CYCLE

U3004 Antenna Port, GFSK, High Channel 2475 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	142.8 us	781.3 us	1	18.3	N/A	N/A

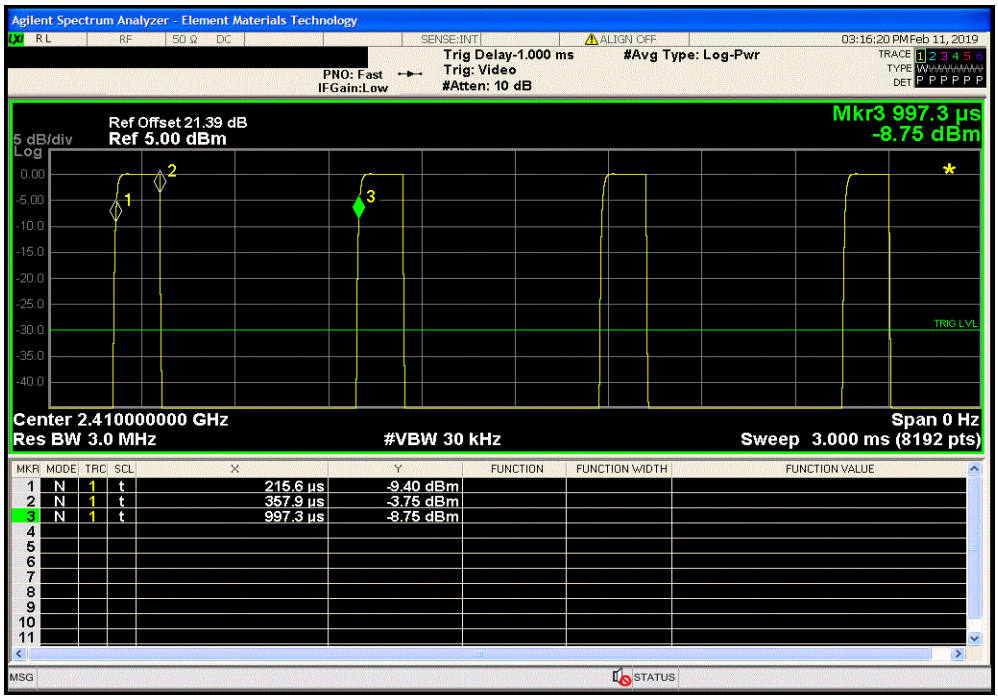


U3004 Antenna Port, GFSK, High Channel 2475 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

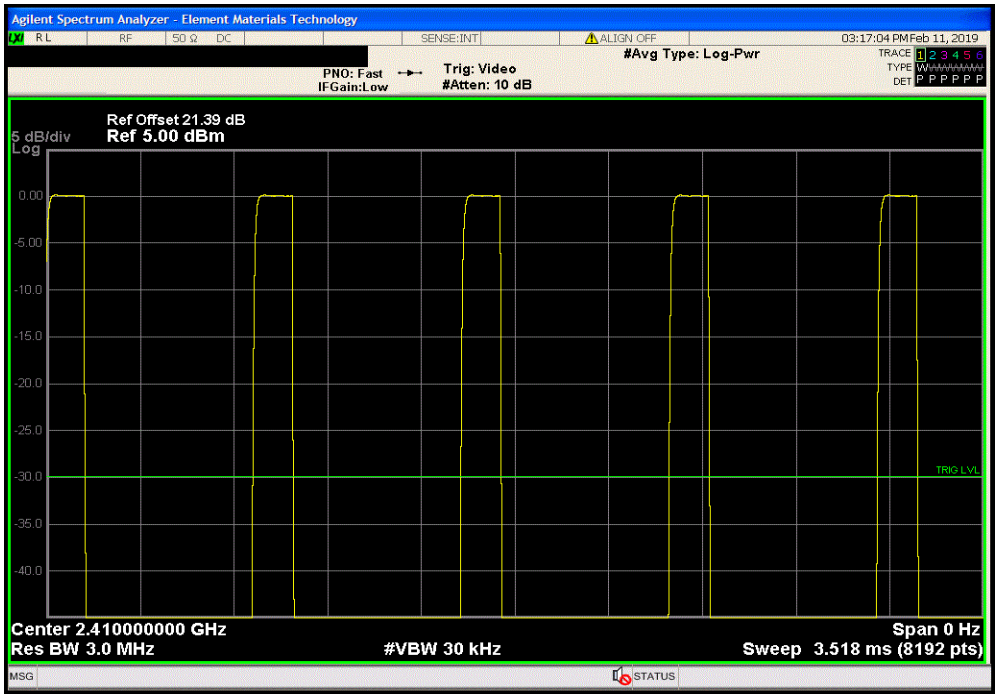


DUTY CYCLE

U3003 Antenna Port, GFSK, Low Channel 2410 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	142.3 us	781.7 us	1	18.2	N/A	N/A

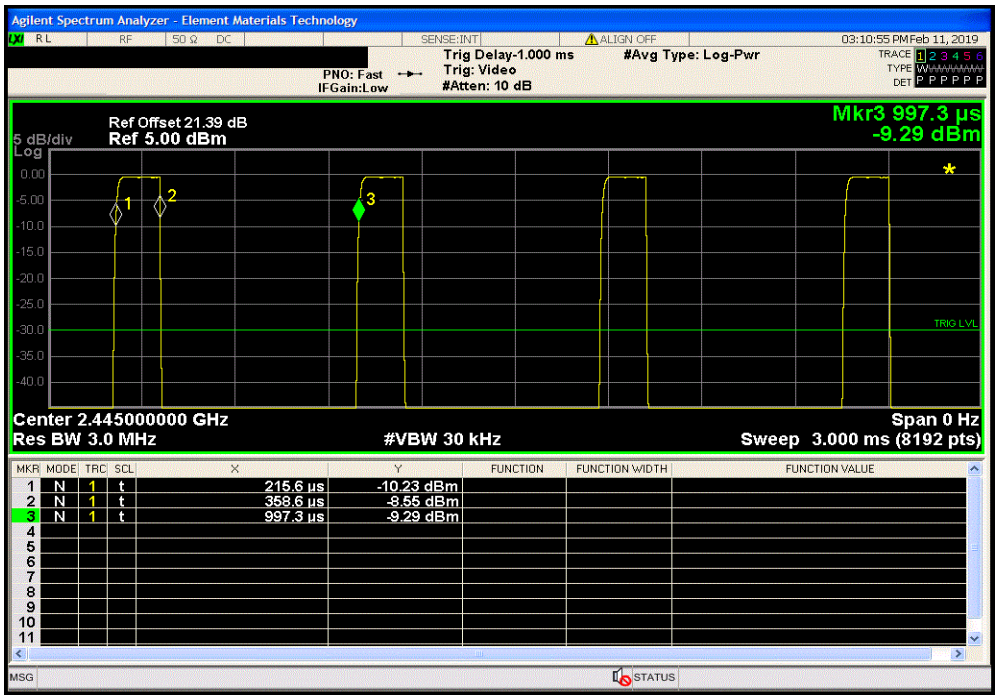


U3003 Antenna Port, GFSK, Low Channel 2410 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

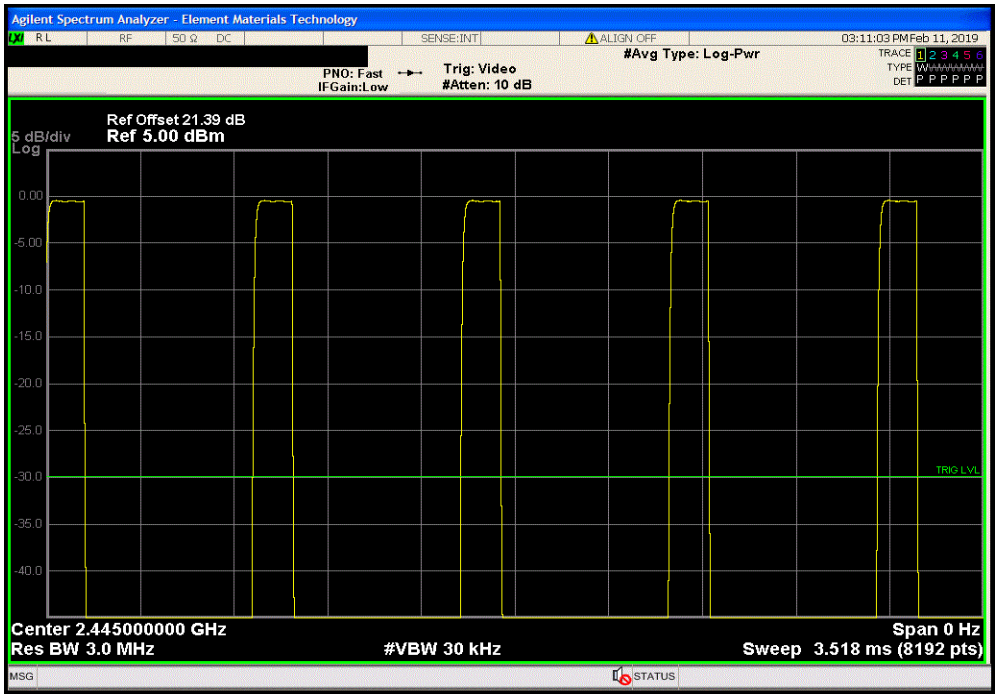


DUTY CYCLE

U3003 Antenna Port, GFSK, Mid Channel 2445 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	143 us	781.7 us	1	18.3	N/A	N/A

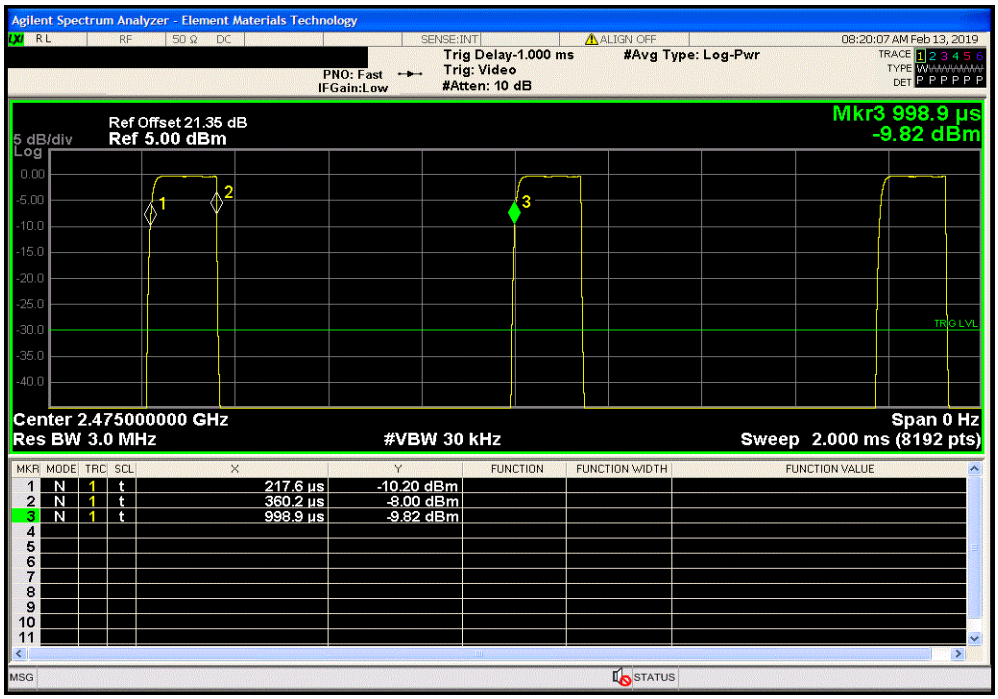


U3003 Antenna Port, GFSK, Mid Channel 2445 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

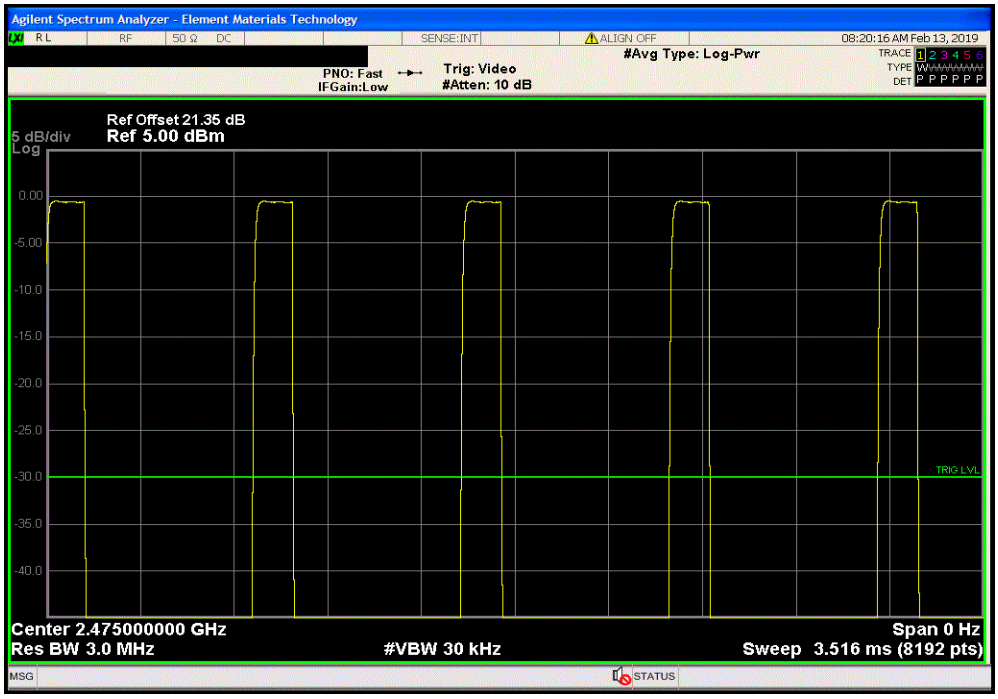


DUTY CYCLE

U3003 Antenna Port, GFSK, High Channel 2475 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	142.6 us	781.3 us	1	18.3	N/A	N/A



U3003 Antenna Port, GFSK, High Channel 2475 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



OCCUPIED BANDWIDTH

XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1-Feb-19	1-Feb-20
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was set to the channels and modes listed in the datasheet.

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

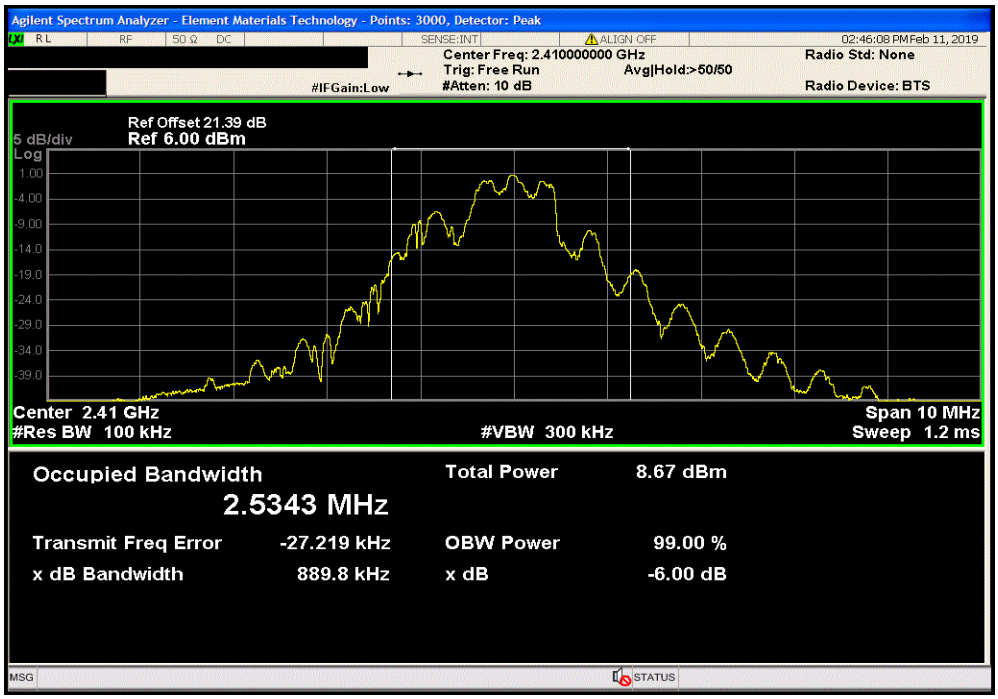
OCCUPIED BANDWIDTH

TbtTx 2018.09.13 XMit 2017.12.13

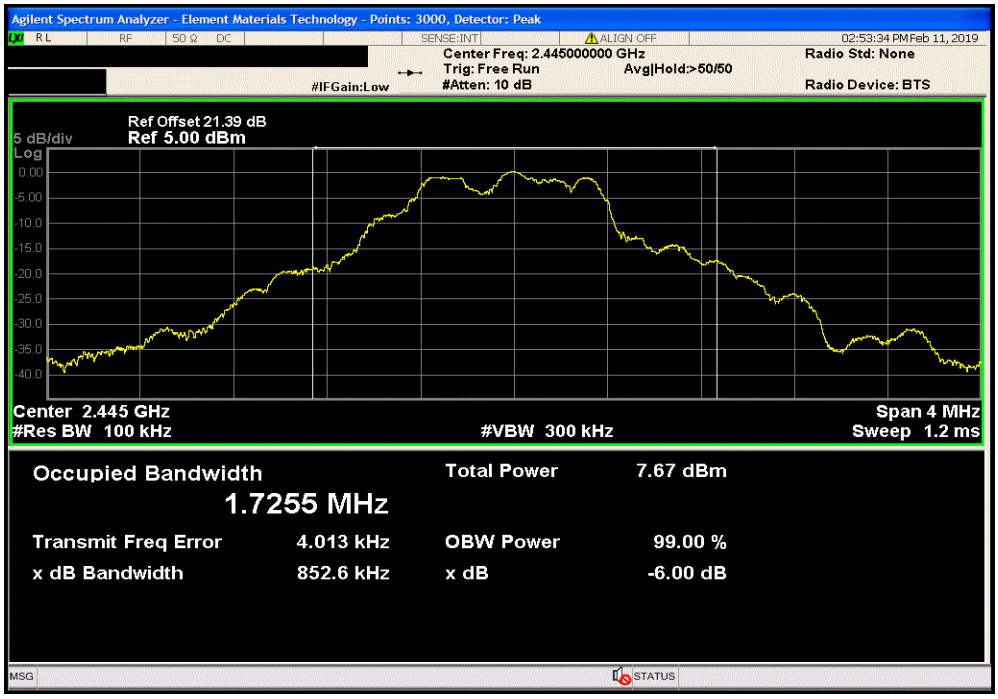
EUT:	**V1 Accesspoint**			**Work Order:**	**APDM0016**
Serial Number:	**9401**			**Date:**	**11-Feb-19**
Customer:	**APDM, Inc.**			**Temperature:**	**19.8 °C**
Attendees:	**Andrew Greenberg, David Camarillo, Gavin Gallino, Timothy Brandon, Christopher Andrews.**			**Humidity:**	**37.3% RH**
Project:	**None**			**Barometric Pres.:**	**1009 mbar**
Tested by:	**Jody House & Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**
TEST SPECIFICATIONS			**Test Method**		
FCC 15.247:2019			ANSI C63.10:2013		
COMMENTS					
Continously transmitting. GFSK. 2 MBps. Maximum power setting.					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	**1**	*Signature*			

	Value	Limit (≥)	Result
U3004 Antenna Port			
GFSK, Low Channel 2410 MHz	889.836 kHz	500 kHz	Pass
GFSK, Mid Channel 2445 MHz	852.635 kHz	500 kHz	Pass
GFSK, High Channel 2475 MHz	853.9 kHz	500 kHz	Pass
U3003 Antenna Port			
GFSK, Low Channel 2410 MHz	1.082 MHz	500 kHz	Pass
GFSK, Mid Channel 2445 MHz	830.389 kHz	500 kHz	Pass
GFSK, High Channel 2475 MHz	844.4 kHz	500 kHz	Pass

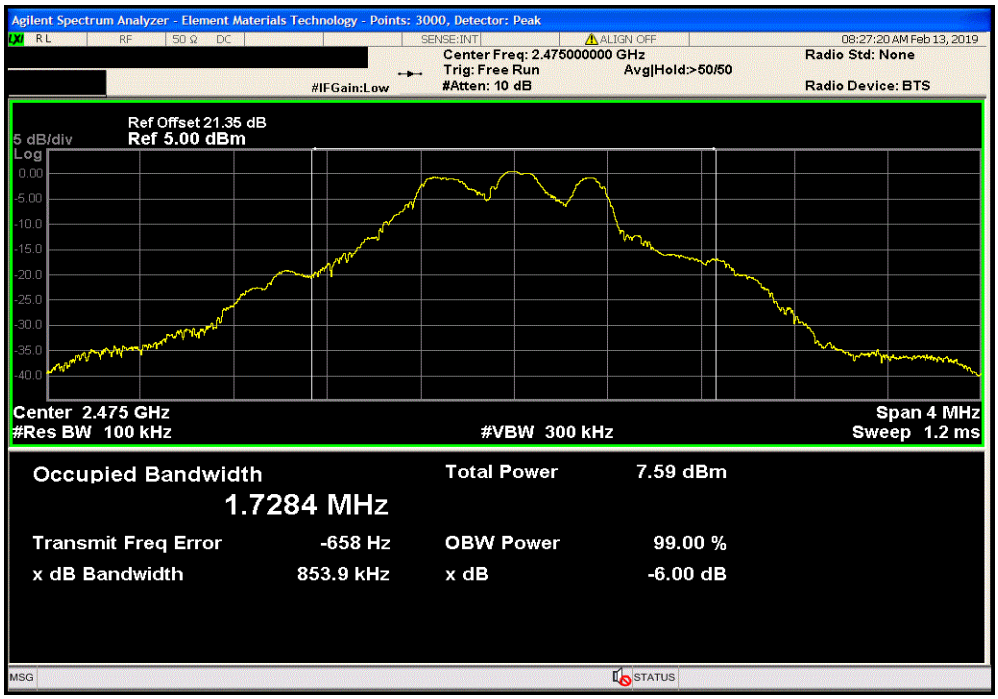
U3004 Antenna Port, GFSK, Low Channel 2410 MHz						
				Value	Limit (≥)	Result
				889.836 kHz	500 kHz	Pass



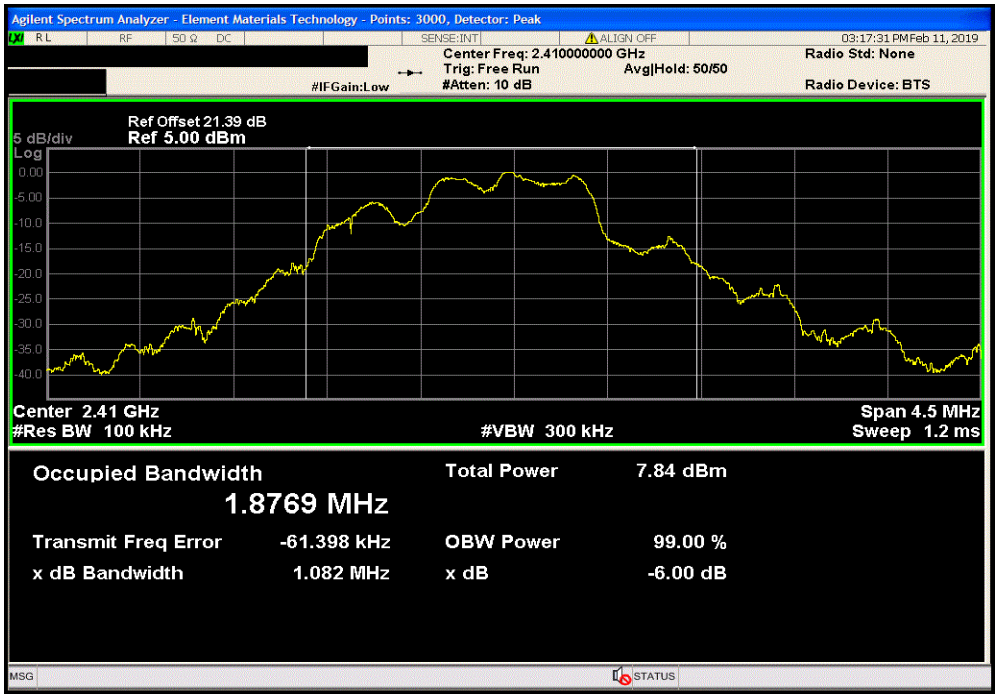
U3004 Antenna Port, GFSK, Mid Channel 2445 MHz						
				Value	Limit (≥)	Result
				852.635 kHz	500 kHz	Pass



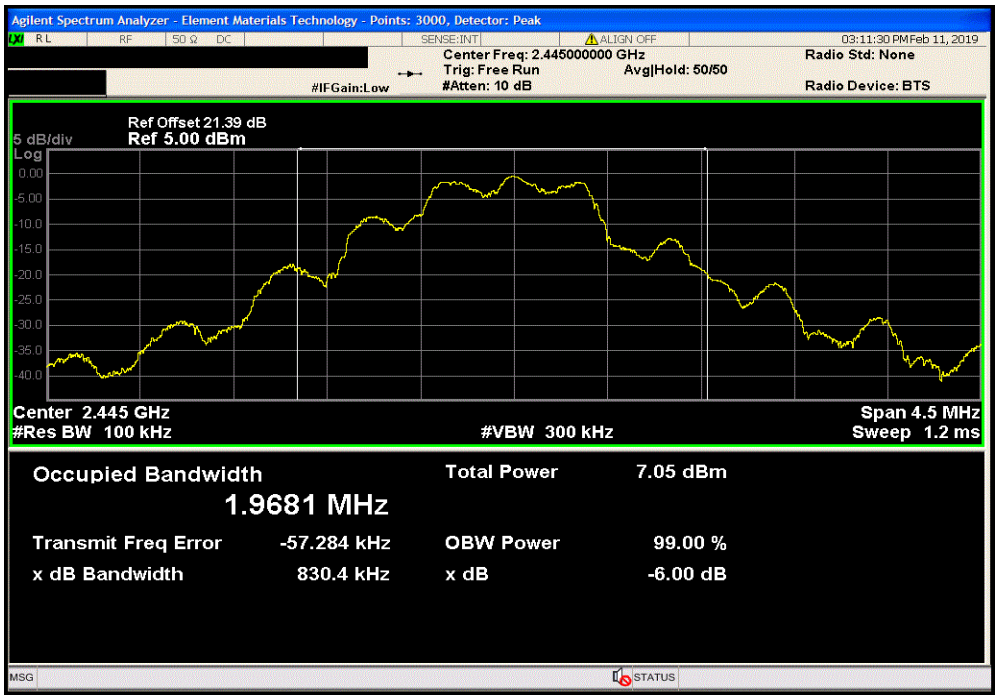
U3004 Antenna Port, GFSK, High Channel 2475 MHz						
				Value	Limit (≥)	Result
				853.9 kHz	500 kHz	Pass



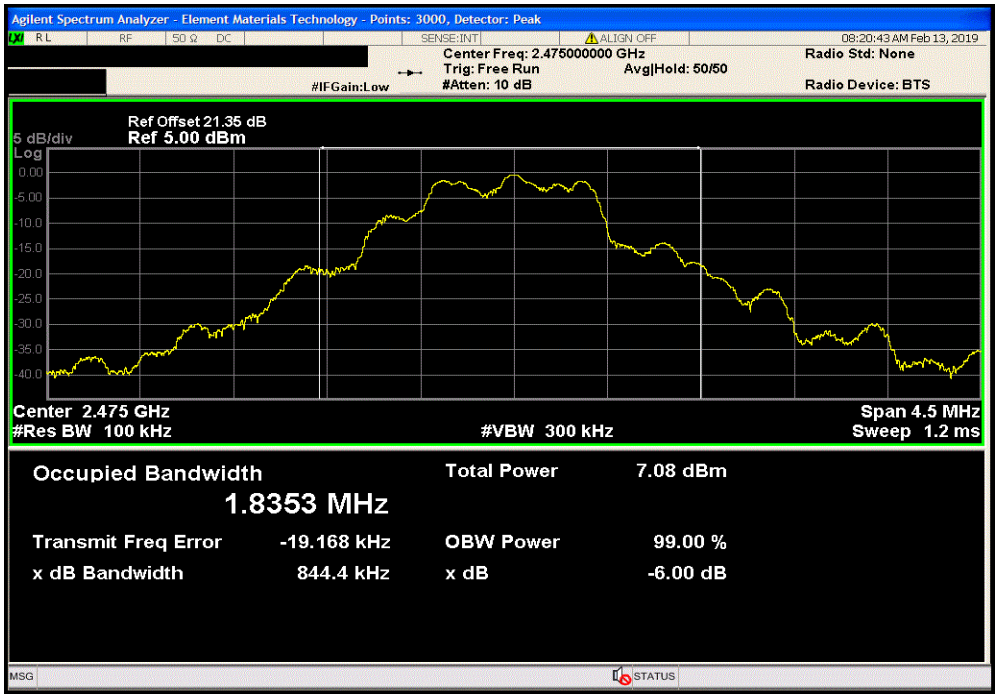
U3003 Antenna Port, GFSK, Low Channel 2410 MHz						
				Value	Limit (≥)	Result
				1.082 MHz	500 kHz	Pass



U3003 Antenna Port, GFSK, Mid Channel 2445 MHz						
				Value	Limit (≥)	Result
				830.389 kHz	500 kHz	Pass



U3003 Antenna Port, GFSK, High Channel 2475 MHz						
				Value	Limit (≥)	Result
				844.4 kHz	500 kHz	Pass



OUTPUT POWER

XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1-Feb-19	1-Feb-20
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

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

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

OUTPUT POWER

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	**V1 Accesspoint**			**Work Order:**	**APDM0016**
Serial Number:	**9401**			**Date:**	**11-Feb-19**
Customer:	**APDM, Inc.**			**Temperature:**	**19.8 °C**
Attendees:	**Andrew Greenberg, David Camarillo, Gavin Gallino, Timothy Brandon, Christopher Andrews.**			**Humidity:**	**37.2% RH**
Project:	**None**			**Barometric Pres.:**	**1009 mbar**
Tested by:	**Jody House & Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

COMMENTS

Continously transmitting. GFSK. 2 MBps. Maximum power setting.

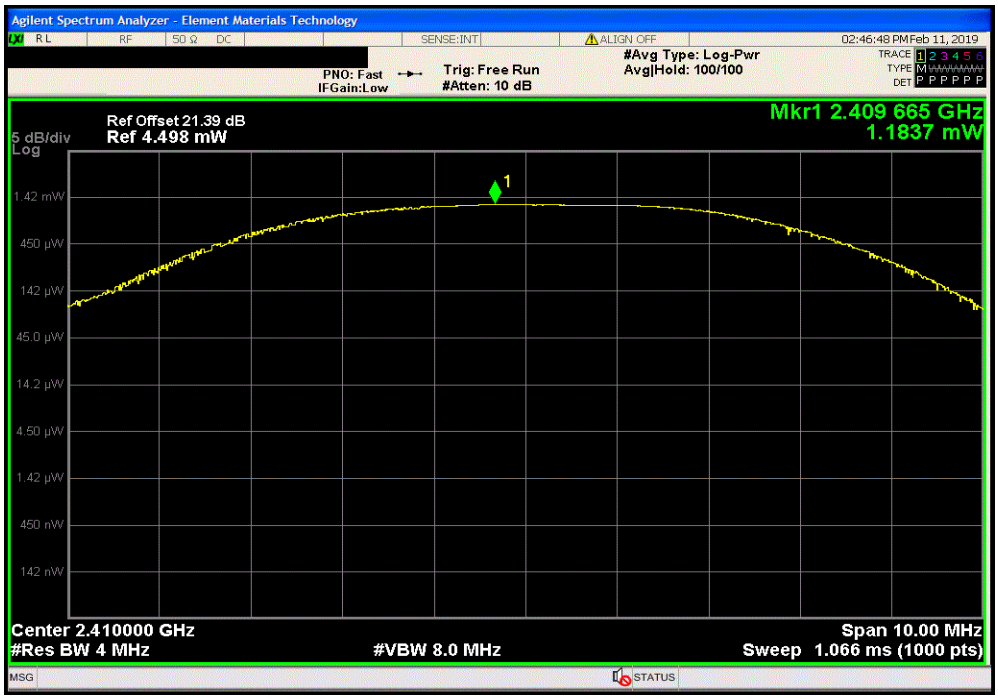
DEVIATIONS FROM TEST STANDARD

None

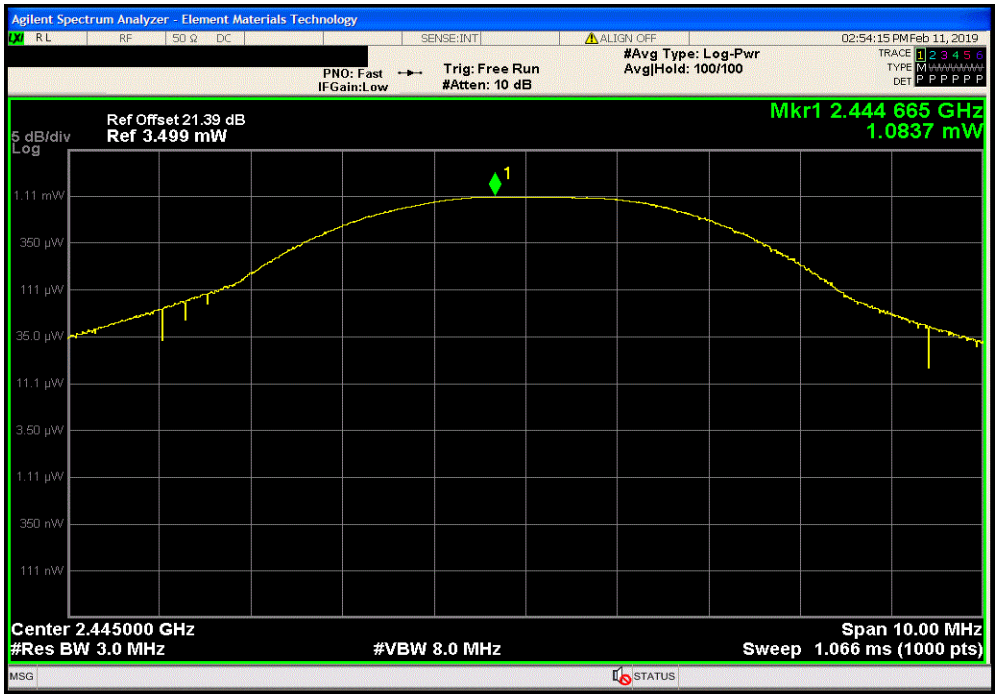
Configuration #	**1**	*Signature*

	Value	**Limit (<)**	**Result**
U3004 Antenna Port			
GFSK, Low Channel 2410 MHz	1.184 mW	1 W	Pass
GFSK, Mid Channel 2445 MHz	1.084 mW	1 W	Pass
GFSK, High Channel 2475 MHz	1.1006 mW	1 W	Pass
U3003 Antenna Port			
GFSK, Low Channel 2410 MHz	1.048 mW	1 W	Pass
GFSK, Mid Channel 2445 MHz	921.85 uW	1 W	Pass
GFSK, High Channel 2475 MHz	902.61 uW	1 W	Pass

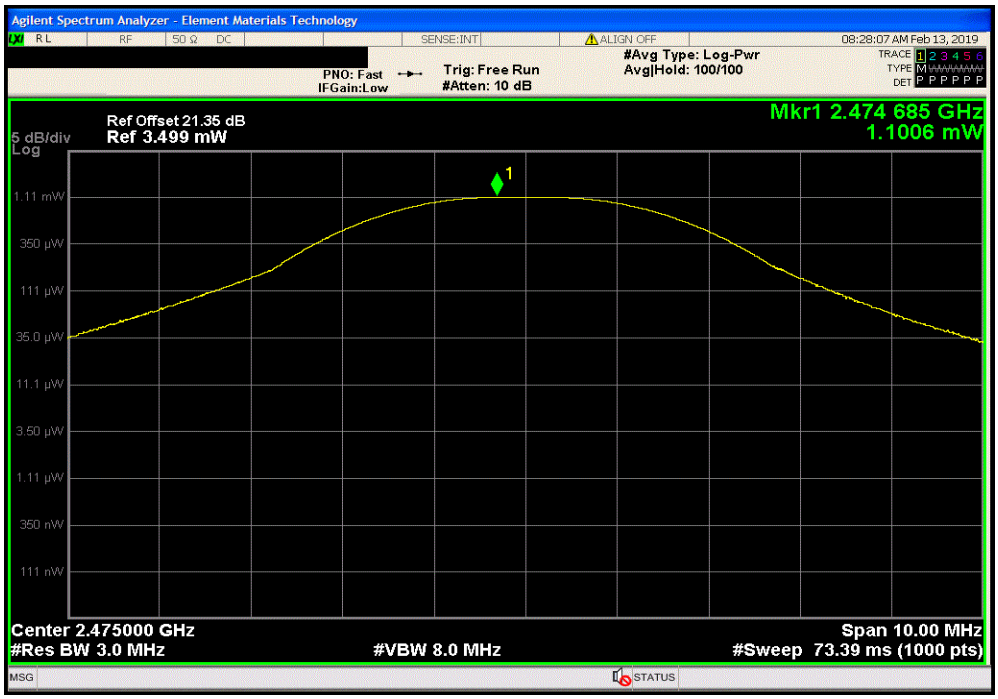
U3004 Antenna Port, GFSK, Low Channel 2410 MHz						
				Value	Limit (<)	Result
				1.184 mW	1 W	Pass



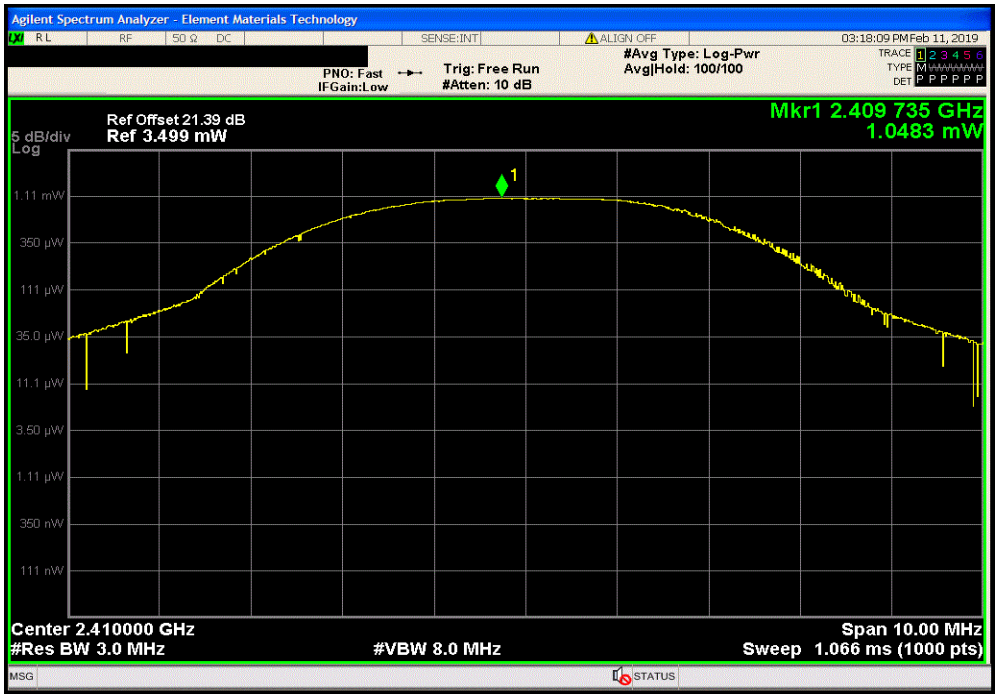
U3004 Antenna Port, GFSK, Mid Channel 2445 MHz						
				Value	Limit (<)	Result
				1.084 mW	1 W	Pass



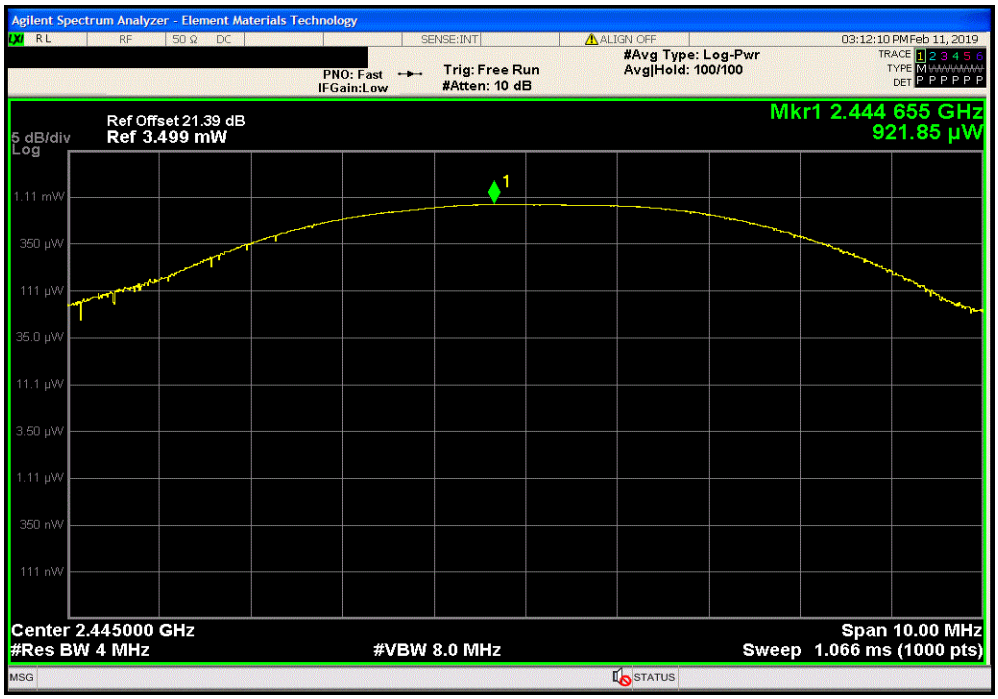
U3004 Antenna Port, GFSK, High Channel 2475 MHz						
				Value	Limit (<)	Result
				1.1006 mW	1 W	Pass



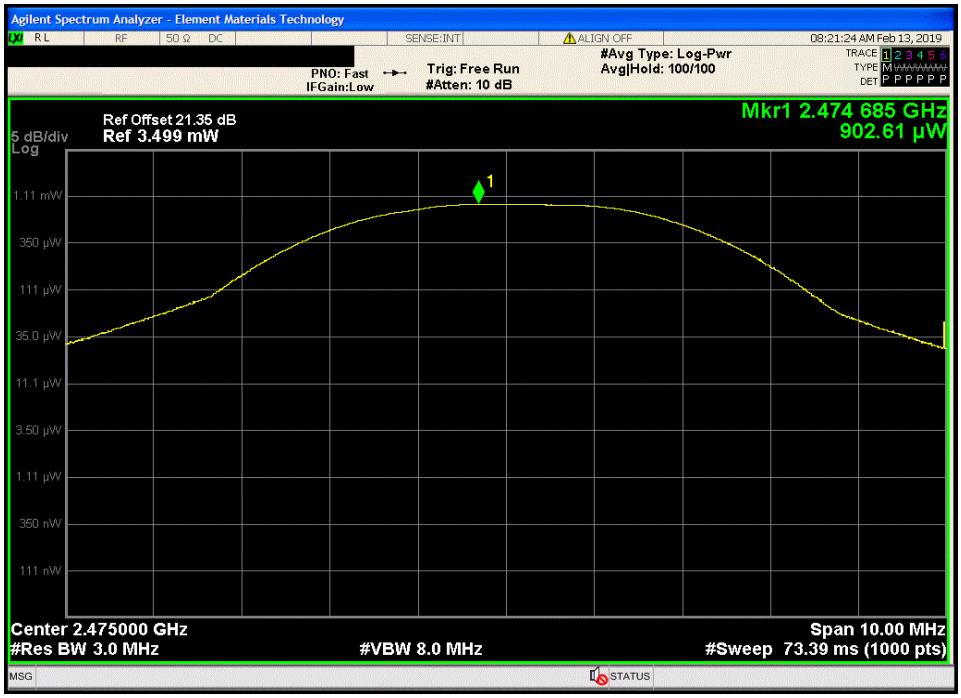
U3003 Antenna Port, GFSK, Low Channel 2410 MHz						
				Value	Limit (<)	Result
				1.048 mW	1 W	Pass



U3003 Antenna Port, GFSK, Mid Channel 2445 MHz						
				Value	Limit (<)	Result
				921.85 uW	1 W	Pass



U3003 Antenna Port, GFSK, High Channel 2475 MHz						
				Value	Limit (<)	Result
				902.61 uW	1 W	Pass



EQUIVALENT ISOTROPIC RADIATED POWER

XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1-Feb-19	1-Feb-20
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum.

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

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

The actual antenna gain of the EUT was added to the conducted output power to derive the EIRP values.

EQUIVALENT ISOTROPIC RADIATED POWER

element

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	**V1 Accesspoint**			**Work Order:**	**APDM0016**
Serial Number:	**9401**			**Date:**	**11-Feb-19**
Customer:	**APDM, Inc.**			**Temperature:**	**19.8 °C**
Attendees:	**Andrew Greenberg, David Camarillo, Gavin Gallino, Timothy Brandon, Christopher Andrews.**			**Humidity:**	**37.2% RH**
Project:	**None**			**Barometric Pres.:**	**1009 mbar**
Tested by:	**Jody House & Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

COMMENTS

Continously transmitting. GFSK. 2 MBps. Maximum power setting.

DEVIATIONS FROM TEST STANDARD

None

Configuration #	**1**	*Signature*

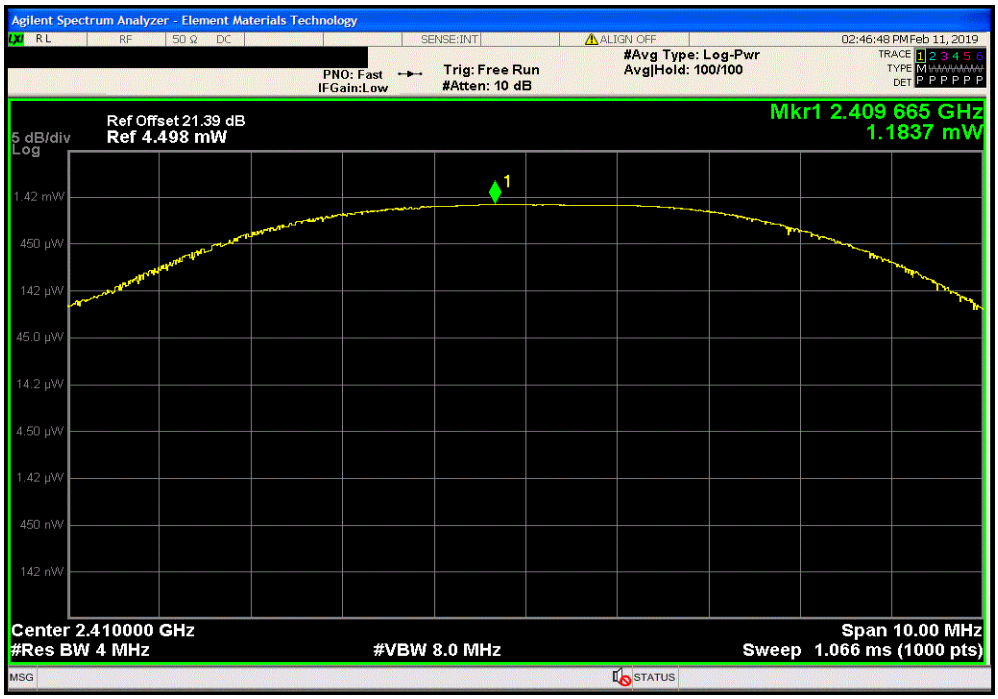
	Output Power (mW)	Antenna Gain (dBi)	EIRP (dBi)	Limit (< dBi)	Result
U3004 Antenna Port					
GFSK, Low Channel 2410 MHz	1.184	8	8.73	36	Pass
GFSK, Mid Channel 2445 MHz	1.084	8	8.35	36	Pass
GFSK, High Channel 2475 MHz	1.1006	8	8.42	36	Pass
U3003 Antenna Port					
GFSK, Low Channel 2410 MHz	1.048	8	8.20	36	Pass
GFSK, Mid Channel 2445 MHz	0.922	8	7.65	36	Pass
GFSK, High Channel 2475 MHz	0.903	8	7.56	36	Pass

EQUIVALENT ISOTROPIC RADIATED POWER

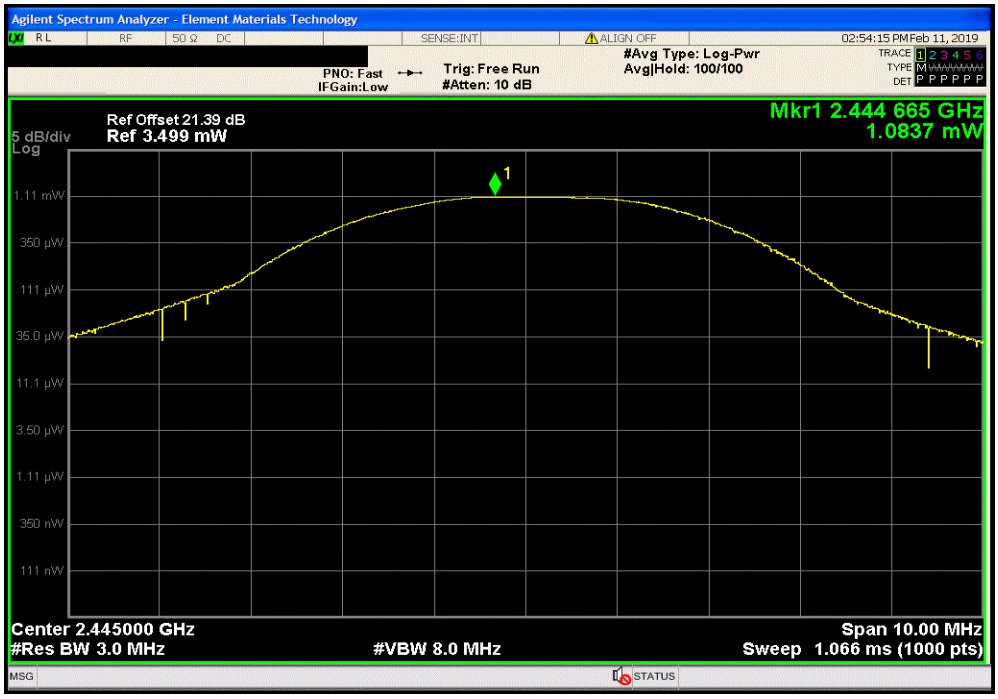
element

TbtTx 2018.09.13 XMit 2017.12.13

U3004 Antenna Port, GFSK, Low Channel 2410 MHz						
		Output Power (mW)	Antenna Gain (dBi)	EIRP (dBi)	Limit (< dBi)	Result
		1.184	8	8.7	36	Pass

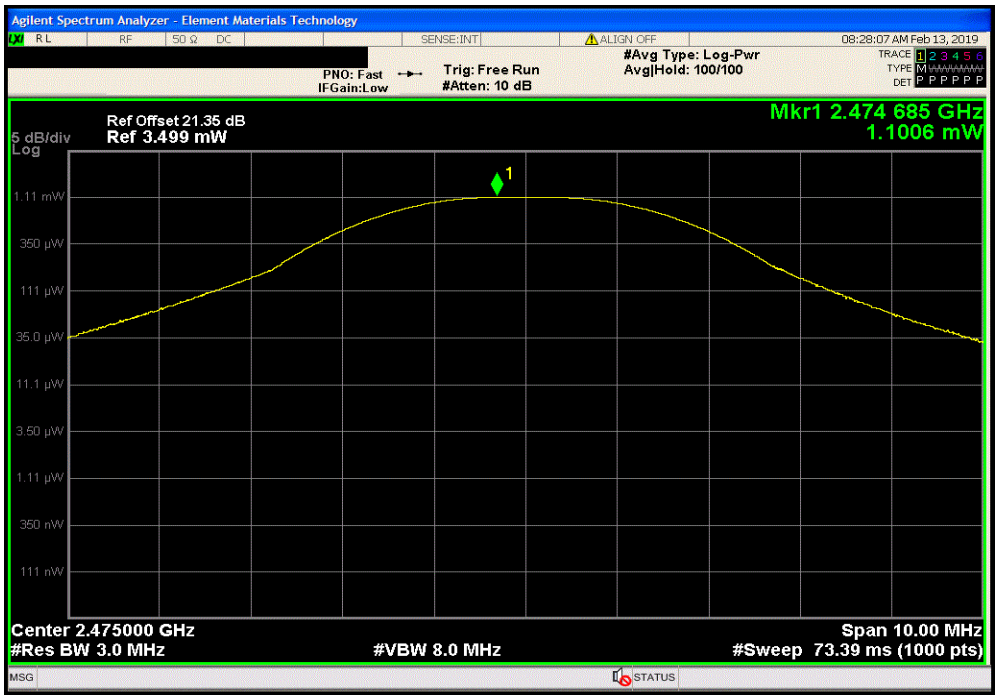


U3004 Antenna Port, GFSK, Mid Channel 2445 MHz						
		Output Power (mW)	Antenna Gain (dBi)	EIRP (dBi)	Limit (< dBi)	Result
		1.084	8	8.4	36	Pass

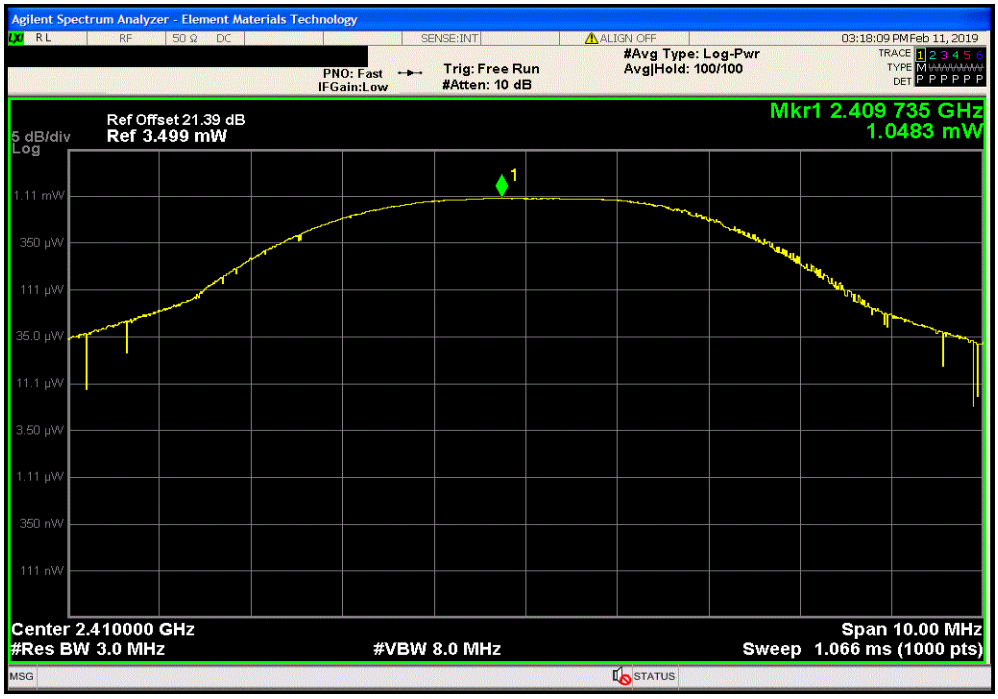


EQUIVALENT ISOTROPIC RADIATED POWER

U3004 Antenna Port, GFSK, High Channel 2475 MHz						
		Output Power (mW)	Antenna Gain (dBi)	EIRP (dBi)	Limit (< dBi)	Result
		1.1006	8	8.4	36	Pass

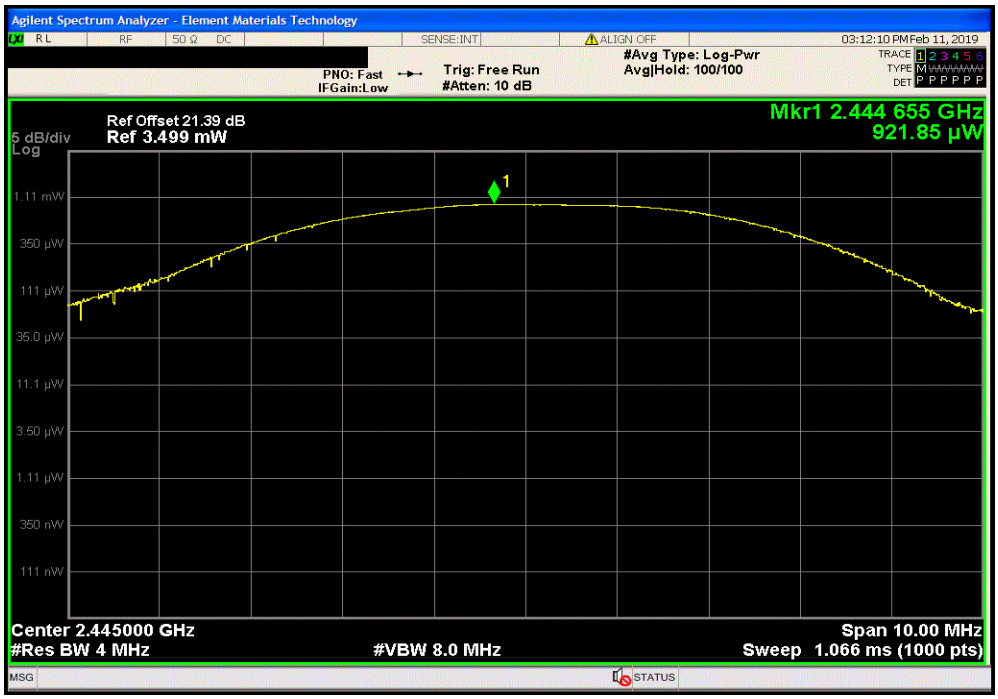


U3003 Antenna Port, GFSK, Low Channel 2410 MHz						
		Output Power (mW)	Antenna Gain (dBi)	EIRP (dBi)	Limit (< dBi)	Result
		1.048	8	8.2	36	Pass

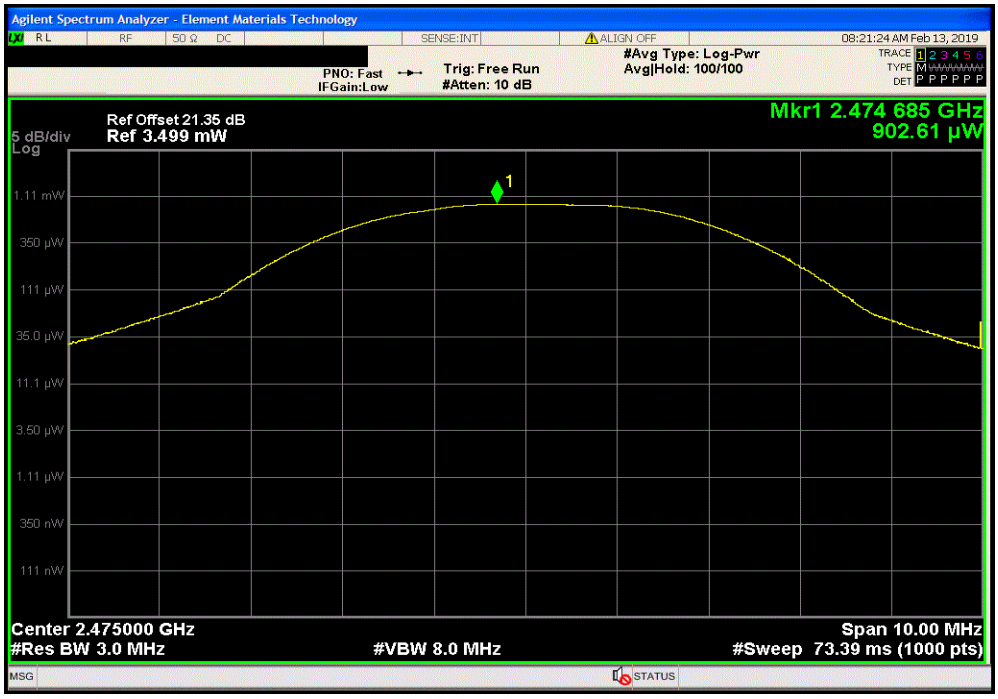


EQUIVALENT ISOTROPIC RADIATED POWER

U3003 Antenna Port, GFSK, Mid Channel 2445 MHz						
		Output Power (mW)	Antenna Gain (dBi)	EIRP (dBi)	Limit (< dBi)	Result
		0.92	8	7.6	36	Pass



U3003 Antenna Port, GFSK, High Channel 2475 MHz						
		Output Power (mW)	Antenna Gain (dBi)	EIRP (dBi)	Limit (< dBi)	Result
		0.90	8	7.6	36	Pass



POWER SPECTRAL DENSITY

XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1-Feb-19	1-Feb-20
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

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

POWER SPECTRAL DENSITY

element

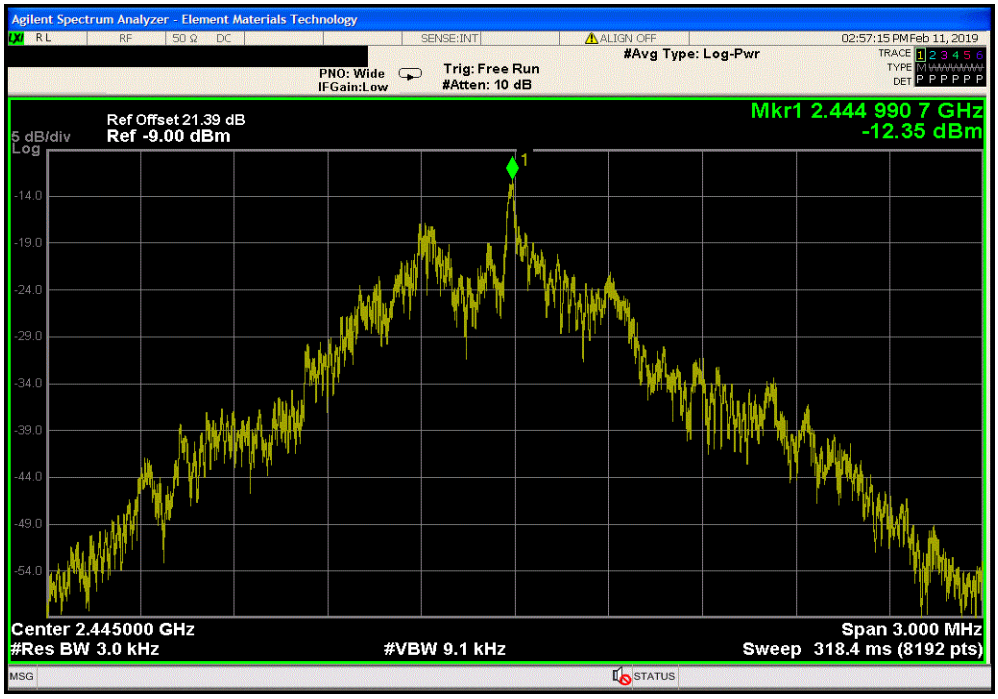
TbtTx 2018.09.13 XMit 2017.12.13

EUT:	**V1 Accesspoint**			**Work Order:**	**APDM0016**
Serial Number:	**9401**			**Date:**	**11-Feb-19**
Customer:	**APDM, Inc.**			**Temperature:**	**19.8 °C**
Attendees:	**Andrew Greenberg, David Camarillo, Gavin Gallino, Timothy Brandon, Christopher Andrews.**			**Humidity:**	**37.3% RH**
Project:	**None**			**Barometric Pres.:**	**1009 mbar**
Tested by:	**Jody House & Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**
TEST SPECIFICATIONS			**Test Method**		
FCC 15.247:2019			ANSI C63.10:2013		
COMMENTS					
Continously transmitting. GFSK. 2 MBps. Maximum power setting.					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	**1**	*Signature*			

	Value dBm/3kHz	Limit < dBm/3kHz	Results
U3004 Antenna Port			
GFSK, Low Channel 2410 MHz	-12.576	8	Pass
GFSK, Mid Channel 2445 MHz	-12.355	8	Pass
GFSK, High Channel 2475 MHz	-11.99	8	Pass
U3003 Antenna Port			
GFSK, Low Channel 2410 MHz	-14.142	8	Pass
GFSK, Mid Channel 2445 MHz	-14.236	8	Pass
GFSK, High Channel 2475 MHz	-13.68	8	Pass

U3004 Antenna Port, GFSK, Low Channel 2410 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-12.576	8	Pass

U3004 Antenna Port, GFSK, Mid Channel 2445 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-12.355	8	Pass

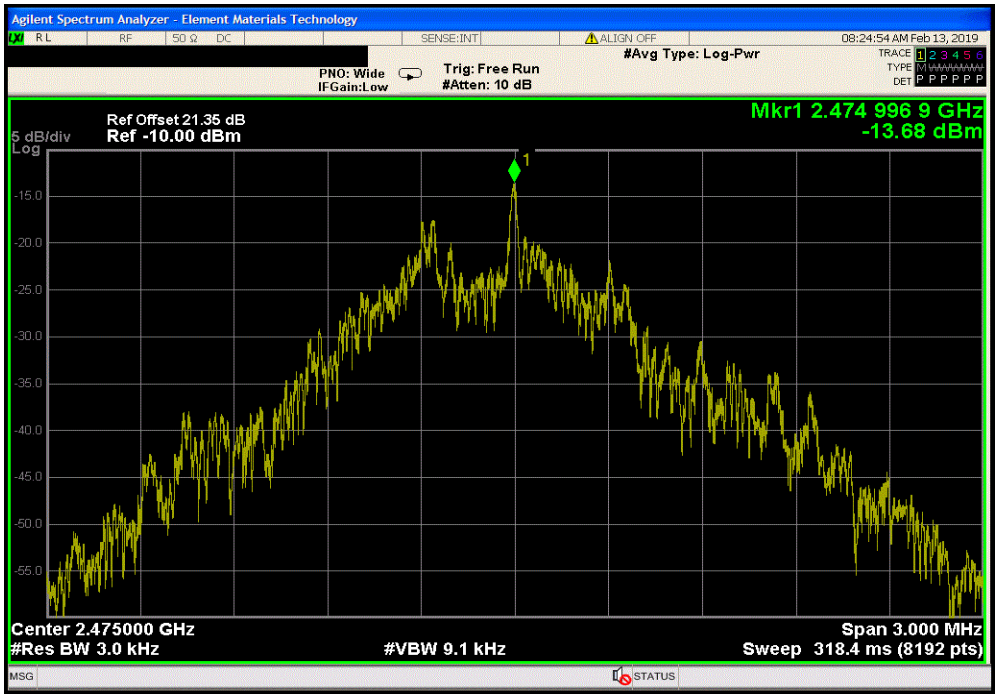


U3004 Antenna Port, GFSK, High Channel 2475 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-11.99	8	Pass

U3003 Antenna Port, GFSK, Low Channel 2410 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-14.142	8	Pass

U3003 Antenna Port, GFSK, Mid Channel 2445 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-14.236	8	Pass

U3003 Antenna Port, GFSK, High Channel 2475 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-13.68	8	Pass



BAND EDGE COMPLIANCE

XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1-Feb-19	1-Feb-20
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21

TEST DESCRIPTION

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

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

BAND EDGE COMPLIANCE

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	V1 Accesspoint			**Work Order:**	APDM0016
Serial Number:	9401			**Date:**	11-Feb-19
Customer:	APDM, Inc.			**Temperature:**	19.8 °C
Attendees:	Andrew Greenberg, David Camarillo, Gavin Gallino, Timothy Brandon, Christopher Andrews.			**Humidity:**	37.3% RH
Project:	None			**Barometric Pres.:**	1009 mbar
Tested by:	Jody House & Jeff Alcoke	**Power:**	Battery	**Job Site:**	EV06

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2019	ANSI C63.10:2013

COMMENTS

Continously transmitting. GFSK. 2 MBps. Maximum power setting.

DEVIATIONS FROM TEST STANDARD

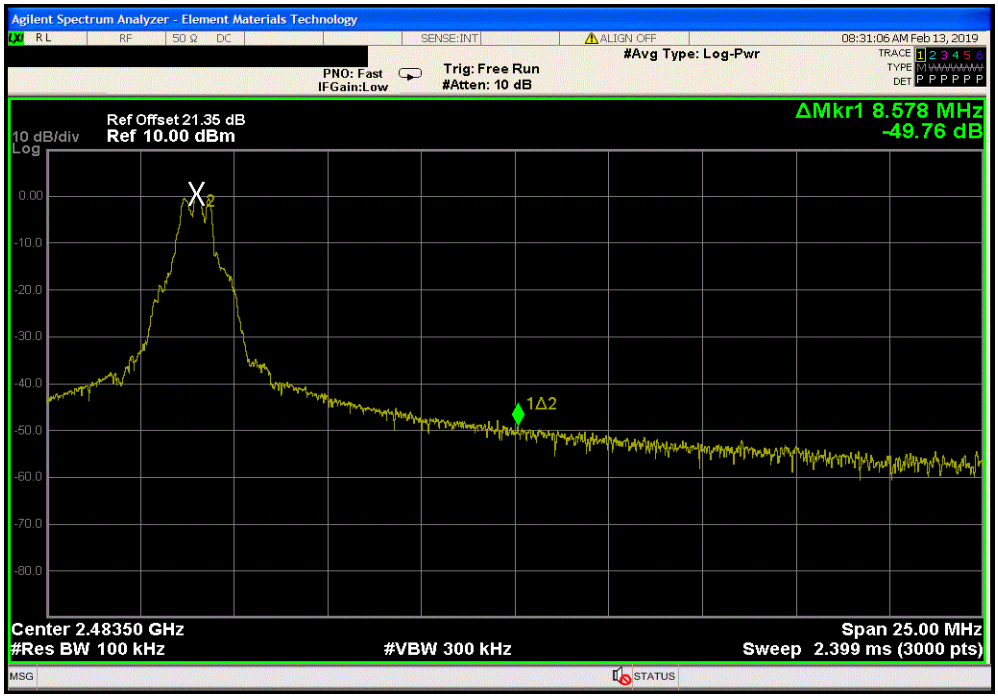
None

Configuration #	1	*Signature*

	Value (dBc)	Limit ≤ (dBc)	Result
U3004 Antenna Port			
GFSK, Low Channel 2410 MHz	-51.03	-20	Pass
GFSK, High Channel 2475 MHz	-49.76	-20	Pass
U3003 Antenna Port			
GFSK, Low Channel 2410 MHz	-50.78	-20	Pass
GFSK, High Channel 2475 MHz	-50.00	-20	Pass

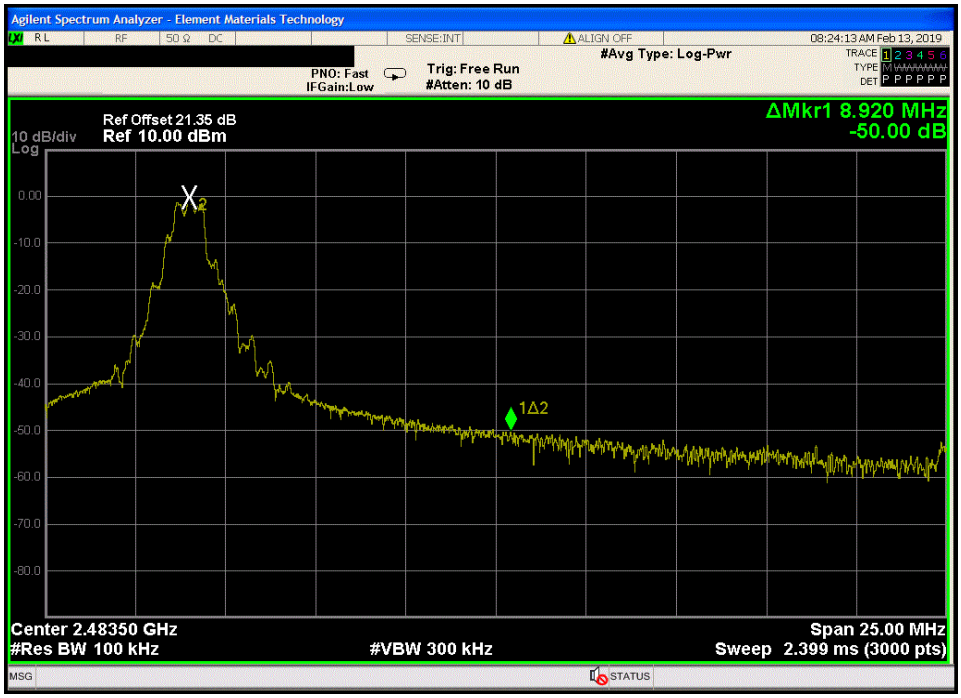
U3004 Antenna Port, GFSK, Low Channel 2410 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-51.03	-20	Pass

U3004 Antenna Port, GFSK, High Channel 2475 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-49.76	-20	Pass



U3003 Antenna Port, GFSK, Low Channel 2410 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-50.78	-20	Pass

U3003 Antenna Port, GFSK, High Channel 2475 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-50	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2017.12.13

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMW	23-Apr-18	23-Apr-19
Attenuator	S.M. Electronics	SA26B-20	AUY	16-Apr-18	16-Apr-19
Cable	Micro-Coax	UFD150A-1-0720-200200	EVH	23-Apr-18	23-Apr-19
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1-Feb-19	1-Feb-20
Generator - Signal	Keysight	N5182B	TFU	5-Nov-18	5-Nov-21

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS

TbtTx 2018.09.13 XMit 2017.12.13

EUT:	**V1 Accesspoint**			**Work Order:**	**APDM0016**
Serial Number:	**9401**			**Date:**	**11-Feb-19**
Customer:	**APDM, Inc.**			**Temperature:**	**19.8 °C**
Attendees:	**Andrew Greenberg, David Camarillo, Gavin Gallino, Timothy Brandon, Christopher Andrews.**			**Humidity:**	**37.5% RH**
Project:	**None**			**Barometric Pres.:**	**1009 mbar**
Tested by:	**Jody House & Jeff Alcoke**	**Power:**	**Battery**	**Job Site:**	**EV06**
TEST SPECIFICATIONS		**Test Method**			
FCC 15.247:2019		ANSI C63.10:2013			

COMMENTS

Continously transmitting. GFSK. 2 MBps. Maximum power setting.

DEVIATIONS FROM TEST STANDARD

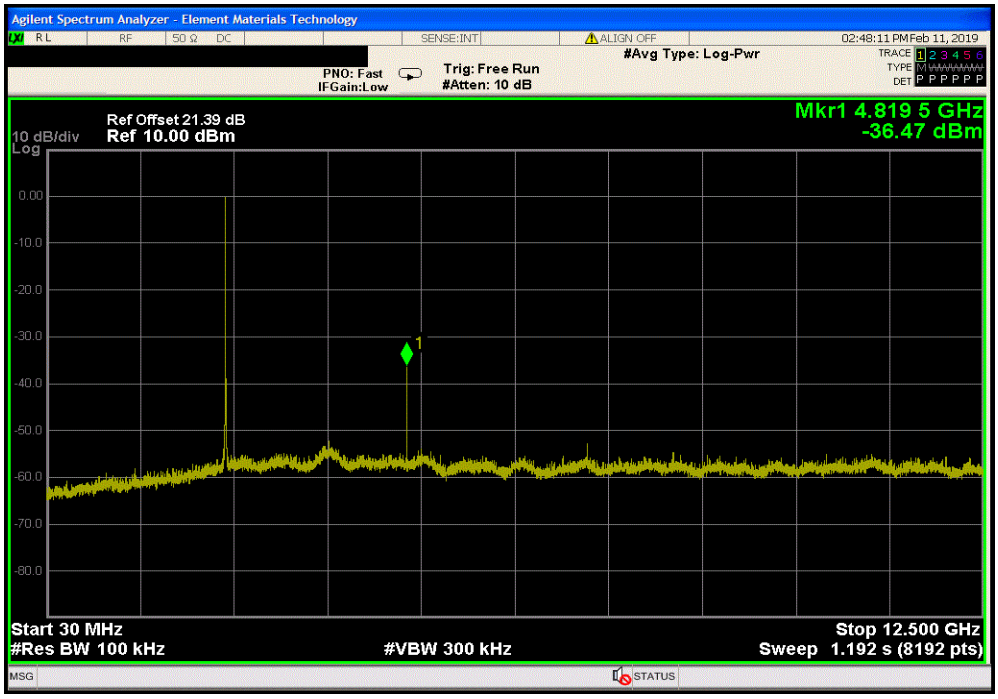
None

Configuration #	**1**	*Signature*

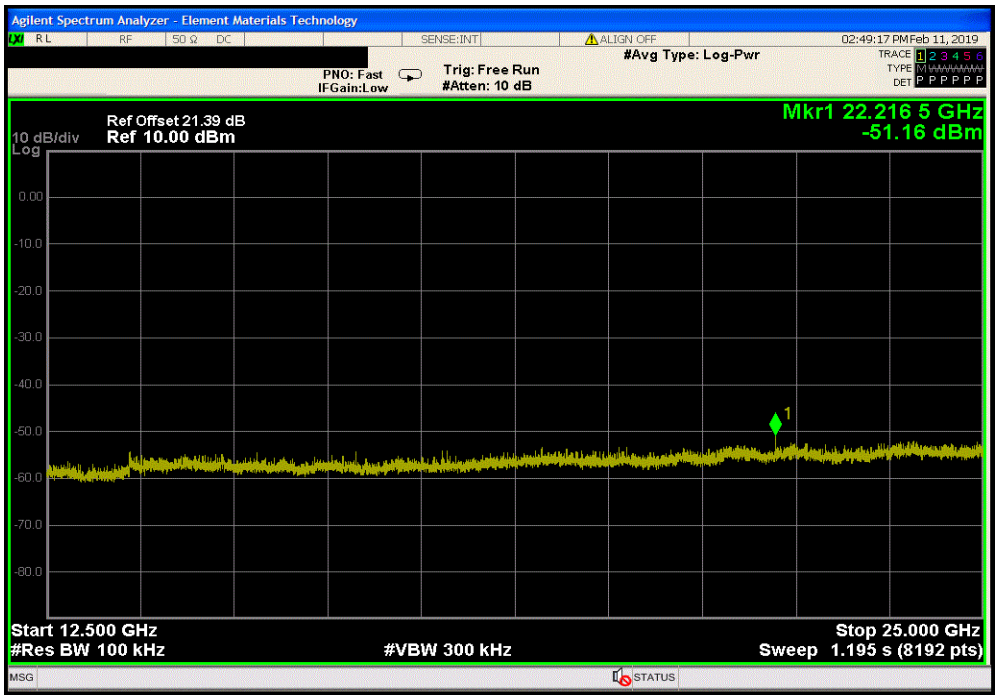
	Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
U3004 Antenna Port					
GFSK, Low Channel 2410 MHz	Fundamental	2409.97	N/A	N/A	N/A
GFSK, Low Channel 2410 MHz	30 MHz - 12.5 GHz	4819.48	-37.21	-20	Pass
GFSK, Low Channel 2410 MHz	12.5 GHz - 25 GHz	22216.46	-51.9	-20	Pass
GFSK, Mid Channel 2445 MHz	Fundamental	2444.99	N/A	N/A	N/A
GFSK, Mid Channel 2445 MHz	30 MHz - 12.5 GHz	4889.51	-40.77	-20	Pass
GFSK, Mid Channel 2445 MHz	12.5 GHz - 25 GHz	24942.01	-52.15	-20	Pass
GFSK, High Channel 2475 MHz	Fundamental	2479.99	N/A	N/A	N/A
GFSK, High Channel 2475 MHz	30 MHz - 12.5 GHz	4948.9	-45.35	-20	Pass
GFSK, High Channel 2475 MHz	12.5 GHz - 25 GHz	21804.4	-51.92	-20	Pass
U3003 Antenna Port					
GFSK, Low Channel 2410 MHz	Fundamental	2409.98	N/A	N/A	N/A
GFSK, Low Channel 2410 MHz	30 MHz - 12.5 GHz	4821	-37.08	-20	Pass
GFSK, Low Channel 2410 MHz	12.5 GHz - 25 GHz	24961.85	-52.21	-20	Pass
GFSK, Mid Channel 2445 MHz	Fundamental	2445	N/A	N/A	N/A
GFSK, Mid Channel 2445 MHz	30 MHz - 12.5 GHz	4889.51	-38.28	-20	Pass
GFSK, Mid Channel 2445 MHz	12.5 GHz - 25 GHz	24746.67	-51.31	-20	Pass
GFSK, High Channel 2475 MHz	Fundamental	2475	N/A	N/A	N/A
GFSK, High Channel 2475 MHz	30 MHz - 12.5 GHz	4950.54	-41.63	-20	Pass
GFSK, High Channel 2475 MHz	12.5 GHz - 25 GHz	24026.4	-51.81	-20	Pass

U3004 Antenna Port, GFSK, Low Channel 2410 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	2409.97	N/A	N/A	N/A

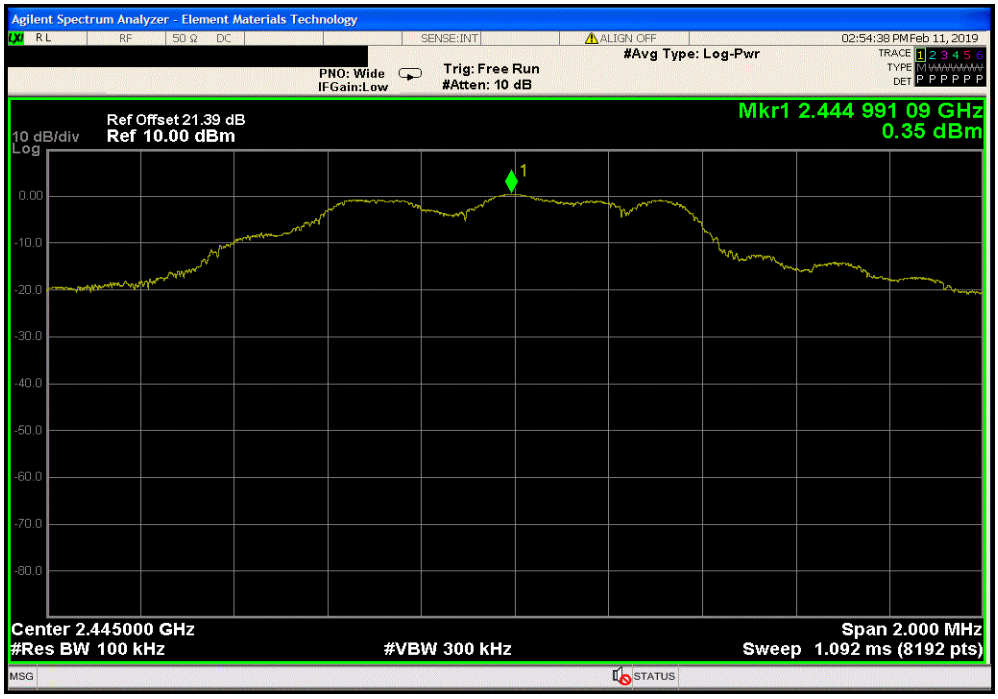
U3004 Antenna Port, GFSK, Low Channel 2410 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	4819.48	-37.21	-20	Pass



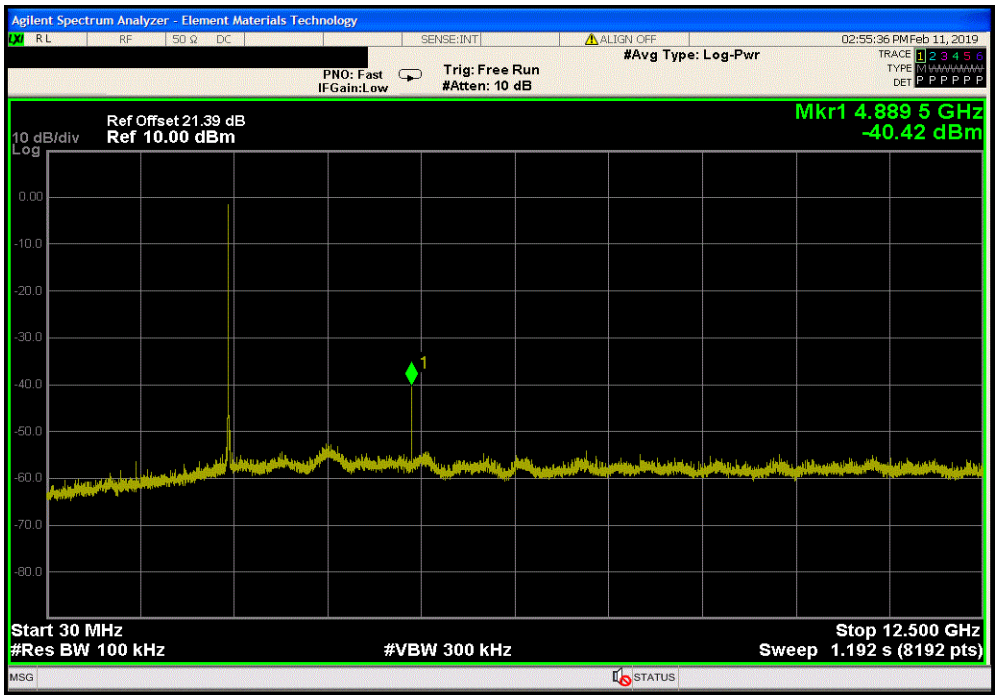
U3004 Antenna Port, GFSK, Low Channel 2410 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	22216.46	-51.9	-20	Pass



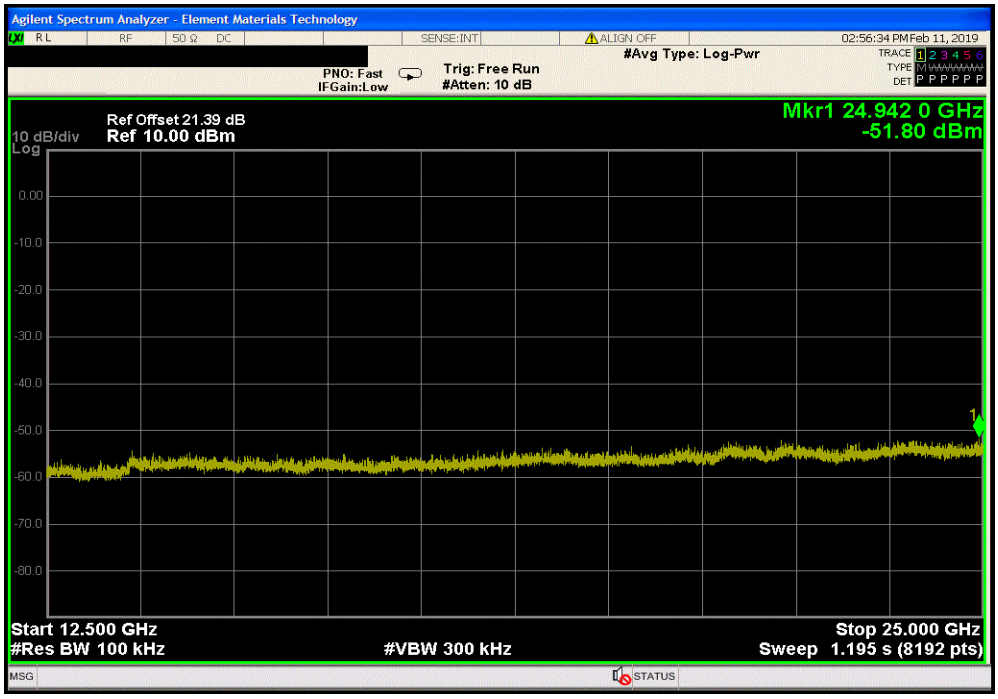
U3004 Antenna Port, GFSK, Mid Channel 2445 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental	2444.99	N/A	N/A	N/A



U3004 Antenna Port, GFSK, Mid Channel 2445 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	4889.51	-40.77	-20	Pass

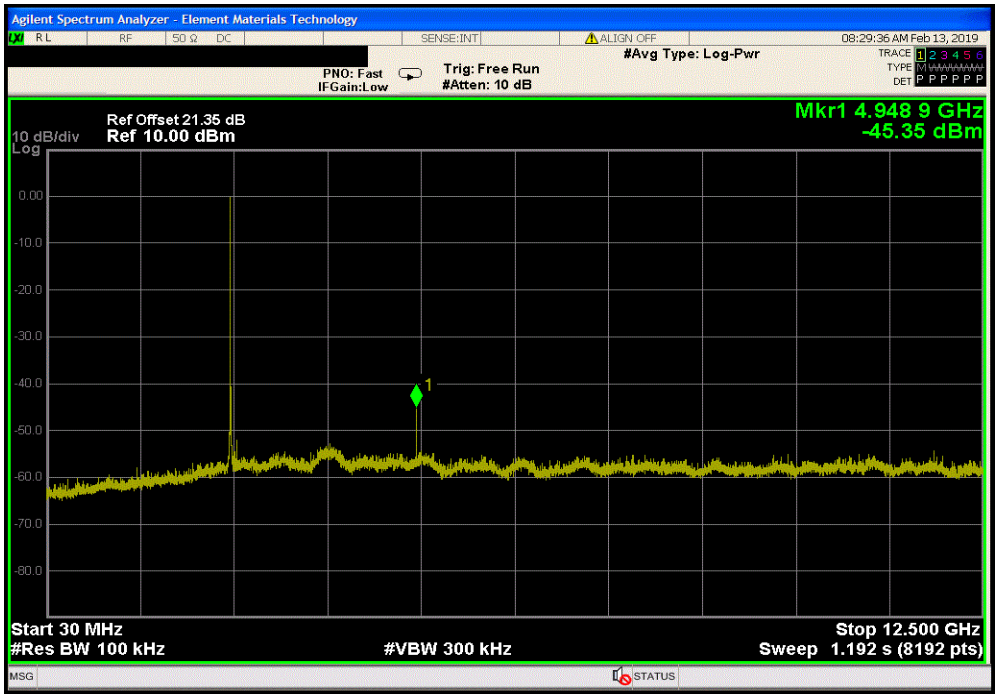


U3004 Antenna Port, GFSK, Mid Channel 2445 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24942.01	-52.15	-20	Pass

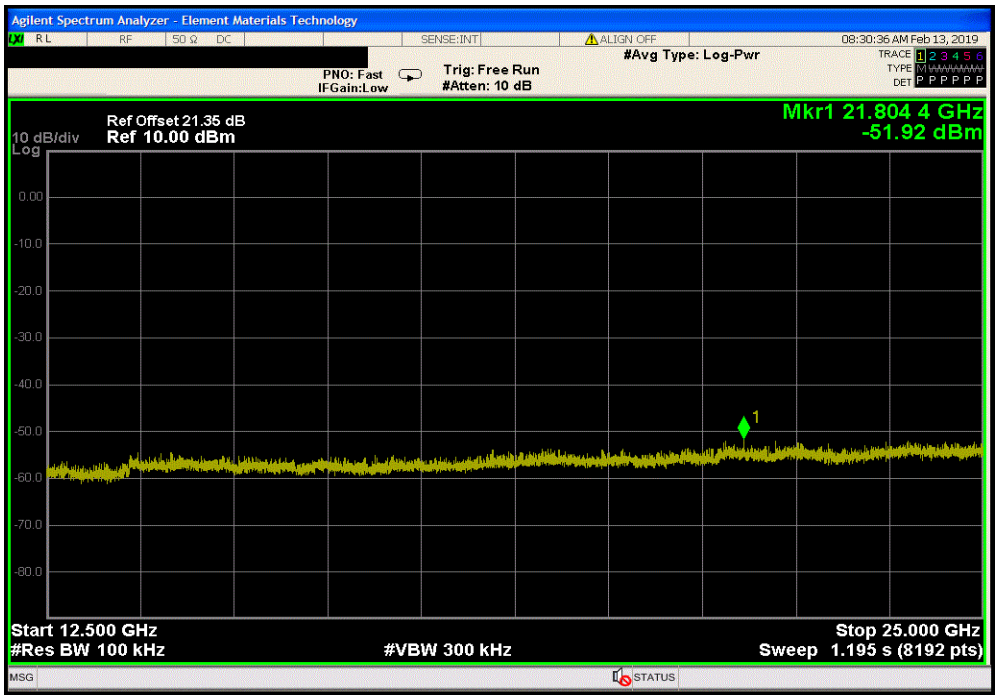


U3004 Antenna Port, GFSK, High Channel 2475 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	2479.99	N/A	N/A	N/A

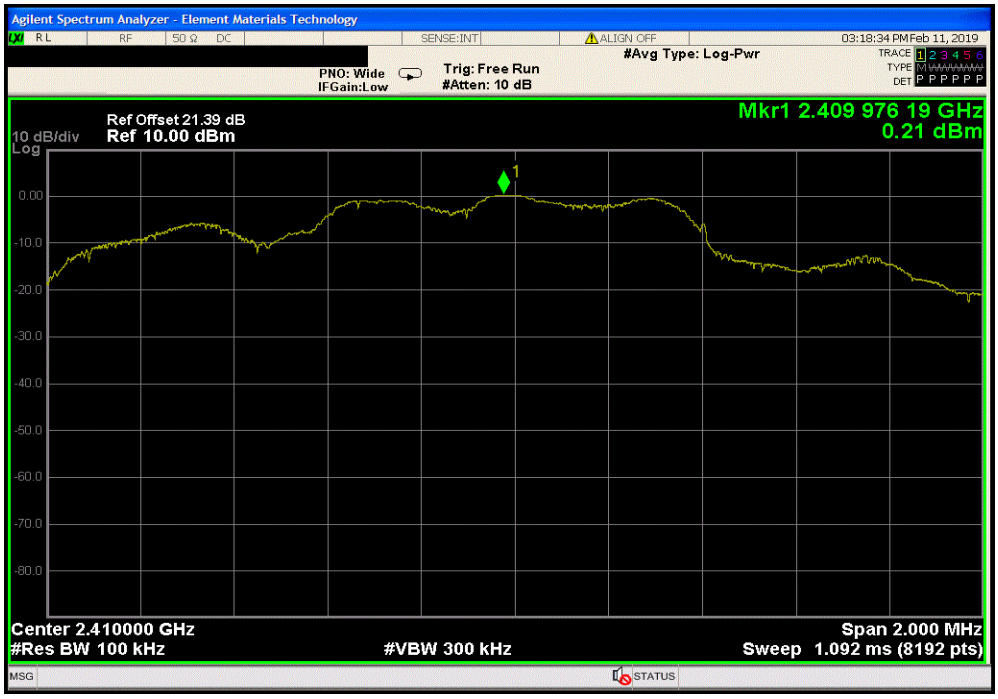
U3004 Antenna Port, GFSK, High Channel 2475 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	4948.9	-45.35	-20	Pass



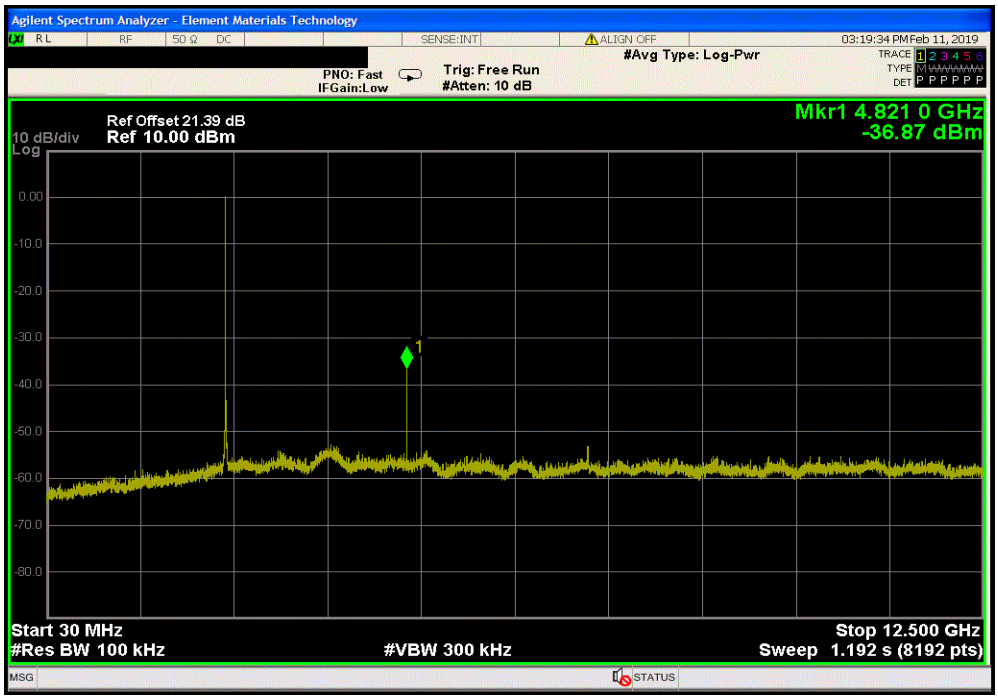
U3004 Antenna Port, GFSK, High Channel 2475 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	21804.4	-51.92	-20	Pass



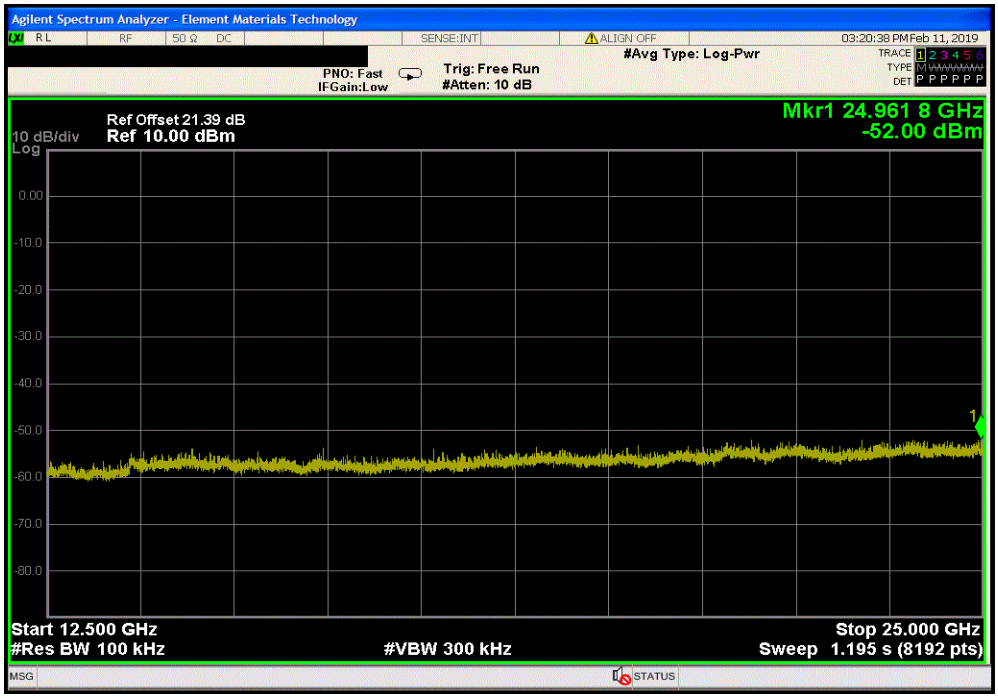
U3003 Antenna Port, GFSK, Low Channel 2410 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental	2409.98	N/A	N/A	N/A



U3003 Antenna Port, GFSK, Low Channel 2410 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	4821	-37.08	-20	Pass

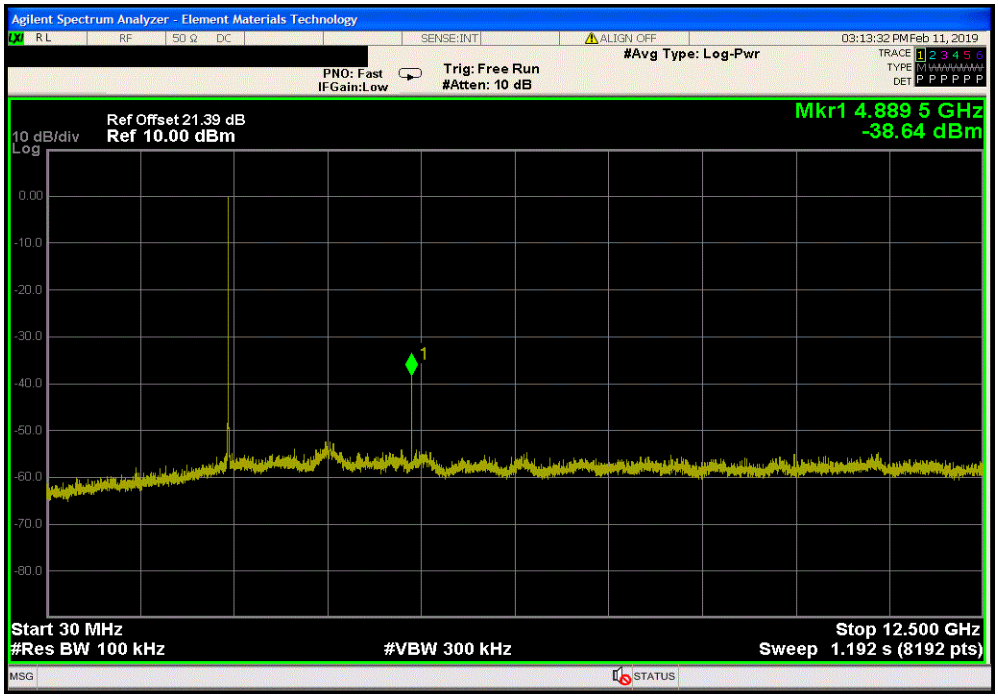


U3003 Antenna Port, GFSK, Low Channel 2410 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24961.85	-52.21	-20	Pass

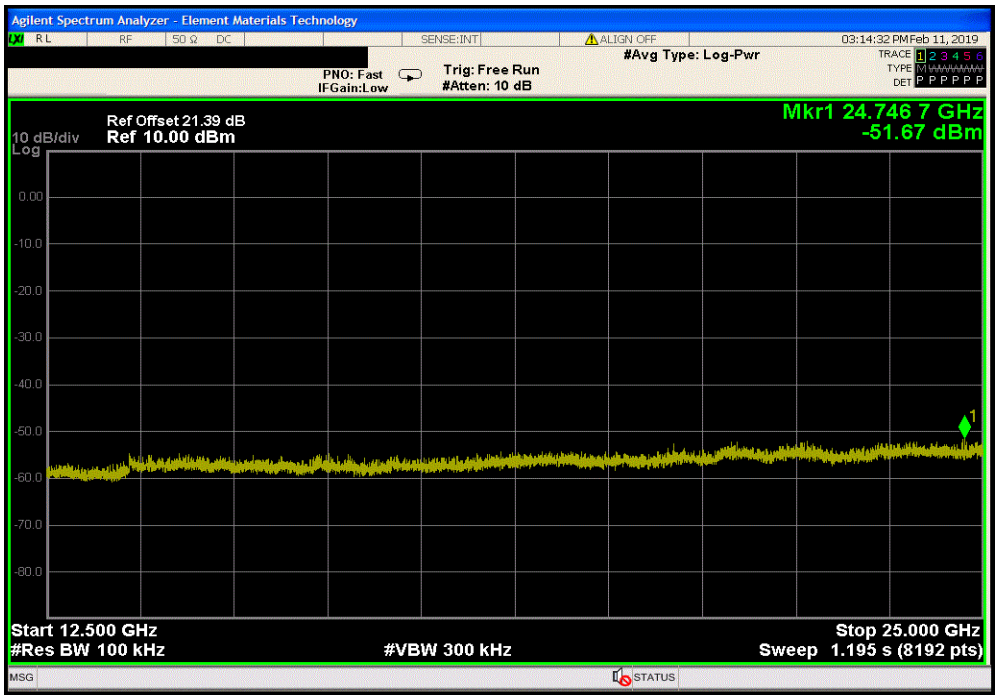


U3003 Antenna Port, GFSK, Mid Channel 2445 MHz					
Frequency Range		Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental	2445	N/A	N/A	N/A

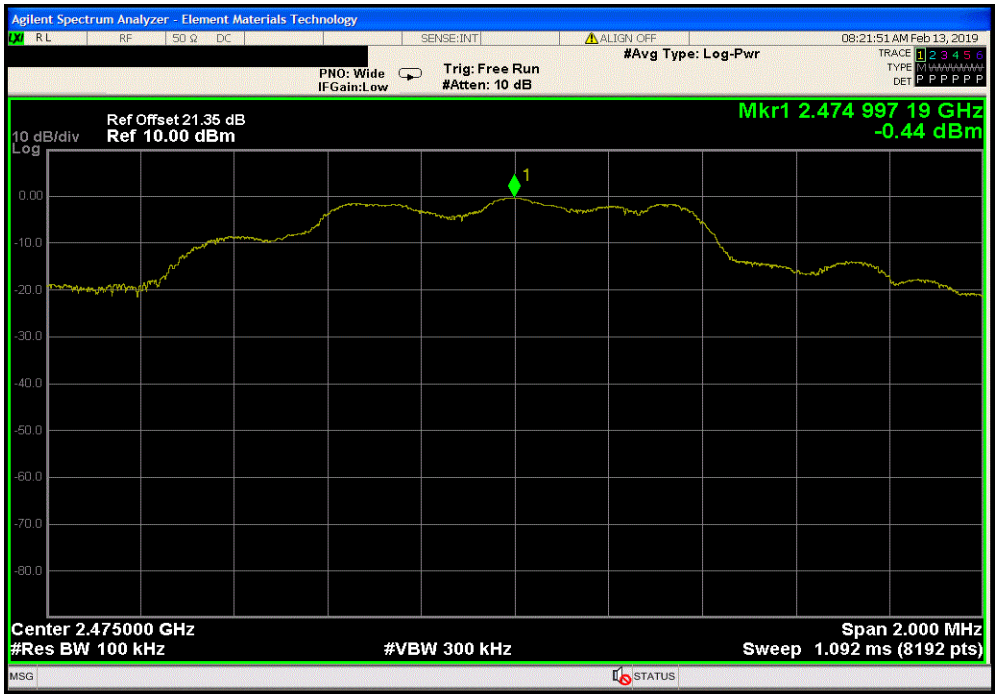
U3003 Antenna Port, GFSK, Mid Channel 2445 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	4889.51	-38.28	-20	Pass



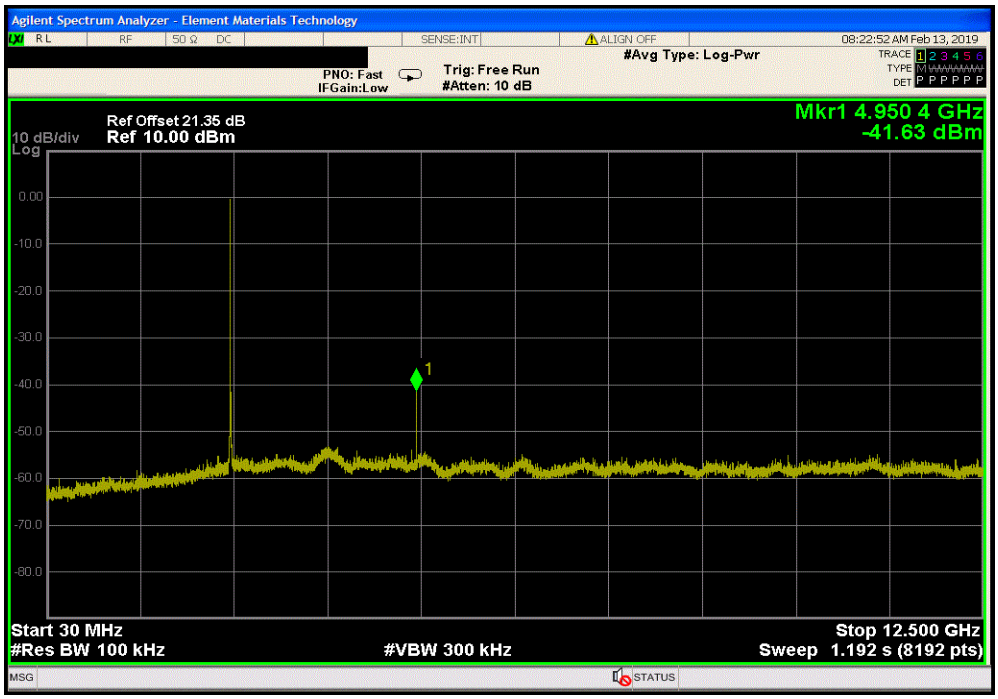
U3003 Antenna Port, GFSK, Mid Channel 2445 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24746.67	-51.31	-20	Pass



U3003 Antenna Port, GFSK, High Channel 2475 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
Fundamental	2475	N/A	N/A	N/A



U3003 Antenna Port, GFSK, High Channel 2475 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz	4950.54	-41.63	-20	Pass



U3003 Antenna Port, GFSK, High Channel 2475 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz	24026.4	-51.81	-20	Pass