FCC PART 15 SUBPART B & SUBPART C SECTION 15.247

&

RSS 247, RSS GEN TEST REPORT

for

PHYN PLUS SMART WATER ASSISTANT

MODEL: PHYPF001

Prepared for

PHYN LLC
1855 DEL AMO BLVD
TORRANCE, CA 90501

Prepared by: _____

TOREY OLIVER

Reviewed by: _____

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DATE: NOVEMBER 3rd, 2017

	REPORT BODY	APPENDICES					TOTAL
		A	*B*	*C*	*D*	*E*	
PAGES	18	2	2	2	9	272	**305**

NVLAP TESTING
NVLAP LAB CODE 200527-0
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TABLE OF CONTENTS

LIST OF APPENDICES

APPENDIX	TITLE
A	Laboratory Accreditations and Recognitions
B	Modifications to the EUT
C	Additional Models Covered Under This Report
D	Diagrams, Factors, and Charts • Test Setup Diagrams • Antenna and Amplifier Gain Factors
E	Data Sheets

LIST OF FIGURES

FIGURE	TITLE
1	Conducted Emissions Test Setup
2	Plot Map and Layout of Test Site Below 1GHz
3	Plot Map and Layout of Test Site Above 1GHz

GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full with the written permission of Compatible Electronics.

This report must not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

Device Tested: Phyn Plus Smart Water Assistant
Model: PHYPF001
S/N: None

Product Description: The EUT is a water sensing technology that provides leak protection and itemized water consumption for the entire home from a single installation point. When a water fixture is opened and closed, its valve generates a unique pressure wave that propagates throughout the home's plumbing system. Phyn Plus observes these pressure transients or waveforms, classifies them into fixture usage events, and measures the amount of water being used with an on-board flow meter. An added benefit of the flow detection technology is the ability to detect leaks, from small drips to catastrophic pipe bursts. The Pro unit offers the ultimate ability to turn off the water remotely when/if a small or catastrophic leak is detected.

Modifications: The EUT was not modified in order to comply with specifications.

Manufacturer: Phyn LLC
1855 Del Amo Blvd
Torrance, CA 90501

Test Dates: October 11-27 & 30, 2017

November 1-3, 2017

Test Specifications Covered by Accreditation:

NVLAP® TESTING
NVLAP LAB CODE 200527-0

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EMI requirements

CFR Title 47, Part 15 Subpart B Sections 15.107, 15.109, & Subpart C Sections 15.205, 15.207, 15.209, & 15.247.
RSS 247 & RSS GEN

Test Procedure: ANSI C63.4 & C63.10, and KDB 558074 D01 v04.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz	Complies with the limits of CFR Title 47 Part 15 Subpart B Section 15.107 and Subpart C Section 15.207 and RSS GEN
2	Radiated RF Emissions & Harmonics, 9 kHz – 25,000 MHz	Complies with the limits of CFR Title 47 Part 15 Subpart B Section 15.109 and Subpart C Sections 15.205, 15.209, and RSS GEN
3	DTS Bandwidth	Complies with CFR Title 47 Part 15 Subpart C Section 15.247 and RSS 247
4	Maximum Peak Conducted Output Power	Complies with CFR Title 47 Part 15 Subpart C Section 15.247 and RSS 247
5	Maximum Peak Power Spectral Density Level In The Fundamental Emission	Complies with CFR Title 47 Part 15 Subpart C Section 15.247 and RSS 247
6	Emissions in Non-Restricted Frequency Bands (in 100kHz Bandwidth)	Complies with CFR Title 47 Part 15 Subpart C Section 15.247 and RSS 247
7	Emissions in the Restricted Bands	Complies with CFR Title 47 Part 15 Subpart C Section 15.205, 15.247 and RSS 247
8	Occupied Bandwidth	Complies with RSS 247 & RSS GEN

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Phyn Plus Smart Water Assistant Model: PHYPF001. The EMI measurements were performed according to the measurement procedure described in ANSI C63.10 & C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT (equipment under test) hereafter, are within the specification limits defined by the Code of Federal Regulations Title 47, Part 15 Subpart B sections 15.107, 15.109, & Part 15 Subpart C sections 15.205, 15.207, 15.209, 15.247, RSS GEN, and RSS 247.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The tests described herein were performed at the test facility of Compatible Electronics, 20621 Pascal Way Lake Forest, California 92630.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Phyn LLC

Lorenzo Villanueva

Compatible Electronics Inc.

Torey Oliver	Test Engineer
Jorge Reyes	Advanced Project Engineer
Matt Harrison	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on October 11th, 2017.

2.5 Disposition of the Test Sample

The test sample remains at Compatible Electronics as of the date of this test report.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
NVLAP	National Voluntary Laboratory Accreditation Program
CFR	Code of Federal Regulations
PCB	Printed Circuit Board
TX	Transmit
RX	Receive

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this Test Report.

SPEC	TITLE
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4 2014	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.
ANSI C63.10: 2013	American National Standard for Testing Unlicensed Wireless Devices
KDB 558074 D01 v04	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
ICES-003 Issue 6	Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement
RSS 247	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
RSS GEN	General Requirements for Compliance of Radio Apparatus

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration

The Phyn Plus Smart Water Assistant Model: PHYPF001 (EUT) was setup in a tabletop configuration. The EUT is connected to a power supply. The cable that is not terminated is used for programming the intentional radiator. The EUT was continuously transmitting a data stream during transmit tests and continuously receiving during receiver tests. The EUT was checked in all axes and the worst case was the Z-axis. The EUT has two intentional radiators. These radiators consist of BLE and WIFI. The WIFI mode has two antennas. The WIFI antennas do not transmit simultaneously. The WIFI was tested in four different modes. These modes are 802.11a, b, g, and n. 802.11n was tested using both 20MHz and 40MHz bandwidth. The EUT was checked with both radios operating simultaneously. The EUT was also tested with copper pipe to check for the worst-case configuration. The worst case was testing the radios individually without copper pipe.

The voltage was varied ± 15% and the transmitting signal amplitude and frequency did not vary.

It was determined that the emissions were at their highest level when the EUT was transmitting in the configuration described above for Radiated Emissions. The final radiated data was taken in the above configuration. Please see Appendix E for the test data.

4.1.1 Cable Construction and Termination

Cable 1

This is a 2 meter, braid shielded, cable that connects the EUT to the laptop (for programming only). The cable has a USB Type-C connector at the Laptop end and is hardwired at the EUT end of the cable. The cable was bundled to a length of 1 meter. The shield of the cable was terminated at both ends of the cable.

Cable 2

This is a 3 meter, unshielded, cable that connects the EUT to the AC mains. The cable has a US Male Plug at the AC mains end and is hardwired at the EUT end of the cable. The cable was not bundled.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

#	EQUIPMENT TYPE	MANU-FACTURER	MODEL	SERIAL NUMBER
1	PHYN PLUS SMART WATER ASSISTANT(EUT)	PHYN LLC	PHYPF001	NONE
2	LAPTOP	HP	HSTNN-DA24	NONE
3	LAPTOP POWER SUPPLY	HP	WORKSTATION Z BOOK	NONE

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Computer	Compatible Electronics	NONE	NONE	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100172	3/15/2017	3/15/2018
Power Sensor	ETS Lindgren	7002-006	00151018	10/1/2016	10/1/2018
Antenna, Loop	Com Power	AL-130	121049	2/9/2017	2/9/2018
Antenna, CombiLog	Com Power	AC-220	003	5/19/2016	5/19/2018
Antenna, Horn 1-18GHz	Com Power	AH-118	071250	5/16/2016	5/16/2018
Antenna, Horn 18-26 GHz	Com Power	AH-826	081033	NCR	NCR
Pre-Amp, 1-18GHz	Com Power	PAM-118A	551033	5/17/2016	5/17/2018
Pre-Amp, 18-40GHz	Com Power	PA-840	181289	6/16/2016	6/16/2018
High Pass Filter	AMTI Microwave Circuits	H3G020G4	481230	6/4/2016	6/4/2018
Mast, Antenna Positioner	Sunol Science Corporation	TWR 95-4	020808-3	N/A	N/A
Antenna Mast	Sunol Science Corporation	TWR 95-4	020808-3	N/A	N/A
Turntable	Sunol Science Corporation	FM 2001	N/A	N/A	N/A
Mast and Turntable Controller	Sunol Science Corporation	SC104V	020808-1	N/A	N/A
Variable Power Supply	Chroma	61511	615114800078	2/18/2016	2/18/2018
LISN	Com-Power	LI-215	191944	5/18/2017	5/18/2018

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and the figures in Appendix D of this report for test location.

6.2 EUT Mounting, Bonding and Grounding

For testing below 1 GHz the EUT was mounted on a 1.0 by 1.5 by 0.8 meters high non-conductive table, which was placed on the ground plane.

For testing above 1 GHz the EUT was mounted 1.5 meter above the ground plane.

The EUT was not grounded.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.

6.4 Measurement Uncertainty

"Compatible Electronics' U_{lab} value is less than U_{cispr}, thus based on this − compliance is deemed to occur if no measured disturbance exceeds the disturbance limit.

$$u_c(y) = \sqrt{\sum_i c_i^2 \; u^2(x_i)}$$

Measurement		U_{cispr}	$U_{lab} = 2\,uc\,(y)$
Conducted disturbance (mains port)	(150 kHz – 30 MHz)	4,0 dB	2.88
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(30 MHz – 1 000 MHz)	5,2 dB	3.53

7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Number and Frequencies

The EUT was programmed to be in the WIFI Mode. There is a total of 11 channels. The low channel is at 2412 MHz, mid channel is at 2437 MHz, and the high channel is at 2462 MHz. There is approximately 5 MHz separation between channels and the EUT uses QPSK modulation.

	WIFI
Channel 1	2412 MHz
Channel 2	2417 MHz
Channel 3	2422 MHz
Channel 4	2427 MHz
Channel 5	2432 MHz
Channel 6	2437 MHz
Channel 7	2442 MHz
Channel 8	2447 MHz
Channel 9	2452 MHz
Channel 10	2457 MHz
Channel 11	2462 MHz

7.2 Antenna

The EUT has three antennas. Two are internal and one external.

7.3 Software

BLE-STACK V2.2.1 supports Bluetooth 4.2 for CC2640/CC2650/CC1350 build date 10/28/2016 used from http://www.ti.com/tool/ble-stack but has been moved to Amazon S3

WiFi firmware v11387 bill date sept 2017 location amazon S3

8. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

8.1 RF Emissions

8.1.1 Conducted Emissions Test

The EMI receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. The LISN output was measured using the EMI receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT received its power through the LISN, which was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the computer software. The final qualification data is located in Appendix E.

Test Results:

The EUT complies with the limits of CFR Title 47 Part 15 Subpart B section 15.107 & Subpart C sections 15.207 and RSS GEN.

8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The R&S receiver was used as a measuring meter. The receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the receiver records the highest measured reading over all the sweeps. Amplifiers were used to increase the sensitivity of the instrument. A Preamplifier used for frequencies above 1 GHz.

For spurious emissions, the quasi-peak detector was used for frequencies below 1GHz and the average detector was used for frequencies above 1 GHz.

For the radiated Harmonic emissions, a linear average detector was used.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE (MHz)	TRANSDUCER	EFFECTIVE MEASUREMENT BANDWIDTH
.009 to .150	Active Loop Antenna	200 Hz
.150 to 30	Active Loop Antenna	9 kHz
30 to 1000	Combilog Antenna	100 kHz (120kHz for QP Measurements)
1000 to 25000	Horn Antenna	1 MHz

The TDK FAC-3 shielded test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI, EN 50147-2, and CISPR 22. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters in both vertical and horizontal polarizations (for E field radiated field strength).

Test Results:

The EUT complies with the limits of CFR Title 47 Part 15 Subpart B section 15.109 & Subpart C sections 15.205, 15.209, 15.247, RSS 247, and RSS GEN.

8.1.3 DTS Bandwidth

The DTS Bandwidth was measured directly connected to the EMI Receiver using a RBW of 100 kHz and a VBW of 300 kHz. A peak detector and a max hold trace were used with auto sweep time. The trace was allowed to fully maximize. We measured the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. The automatic bandwidth measurement capability of the EMI Receiver was employed using the n dB bandwidth mode with n set to 6 dB. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with Part 15, Subpart C, Section 15.247 and RSS 247.

8.1.4 Maximum Peak Conducted Output Power

The maximum peak conducted output power was measured using a power meter. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with Part 15, Subpart C, Section 15.247 and RSS 247.

8.1.5 Maximum Peak Power Spectral Density Level in The Fundamental Emission

The Maximum Peak Power Spectral Density Level in the Fundamental Emission was measured directly connected to the EMI Receiver. Tuned to the center frequency of the DTS channel and set the span to 1.5 times the DTS bandwidth. RBW was set to minimum of 3 kHz but not greater than 100kHz and VBW 3 * RBW. A peak detector was used with the sweep time set to auto. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the maximum amplitude level within the RBW. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with Part 15, Subpart C, Section 15.247 and RSS 247.

8.1.6 Emissions in Non-Restricted Frequency Bands (in 100kHz Bandwidth)

The Emissions in Non-Restricted Frequency Bands (in 100kHz Bandwidth) measurements were performed using the EMI Receiver directly connected to the EUT. A reference level was established by setting the instrument center frequency to DTS channel center frequency. The span was set to ≥ 1.5 times the DTS bandwidth. The RBW was 100 kHz and VBW 300 kHz. A peak detector was used with a sweep time set to auto. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the level and 20dB below that was the reference level. For Emission Level Measurement, the center frequency and span were set to encompass the frequency range to be measured. RBW was set to 100 kHz and VBW to 300 kHz. A peak detector was used with a sweep time set to auto. The number of measurement points were greater than span/RBW. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the maximum amplitude level. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with Part 15, Subpart C, Section 15.247 and RSS 247.

8.1.7 Emissions in the Restricted Bands (Radiated)

The Emissions in the Restricted Bands measurement was performed using the EMI Receiver at a 3-meter test distance to obtain the final test data. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with Part 15 Subpart C, Section 15.205 and RSS GEN.

8.1.8 Emissions Radiated Outside of the Fundamental Frequency Band

The Band Edge measurement was performed using the EMI Receiver at a 3-meter test distance to obtain the final test data. The low and high channels were tuned to during the low and high band edge tests. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with Part 15, Subpart C, Section 15.247 and RSS 247.

9. TEST PROCEDURE DEVIATIONS

There were no deviations from the test procedure.

10. CONCLUSIONS

The Phyn Plus Smart Water Assistant Model: PHYPF001 meets all of the relevant specification requirements defined in the Code of Federal Regulations Title 47, Part 15 Subpart B sections 15.107, 15.109, & Subpart C sections 15.205, 15.207, 15.209, 15.247, RSS GEN & RSS 247.

APPENDIX A

LABORATORY ACCREDITATIONS AND RECOGNITIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

NVLAP TESTING
NVLAP LAB CODE 200527-0

ilac-MRA

For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025.

For the most up-to-date version of our scopes and certificates please visit

http://celectronics.com/quality/scope/

Quote from ISO-ILAC-IAF Communiqué on 17025:

"A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems — Requirements."

IC OAT's Test Site Registration Numbers: 2154C-1 & 2154C-5

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

There were no modifications made during testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Phyn Plus Smart Water Assistant
Model: PHYPF001
S/N: None

No additional models were tested.

APPENDIX D

DIAGRAMS, FACTORS, AND CHARTS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

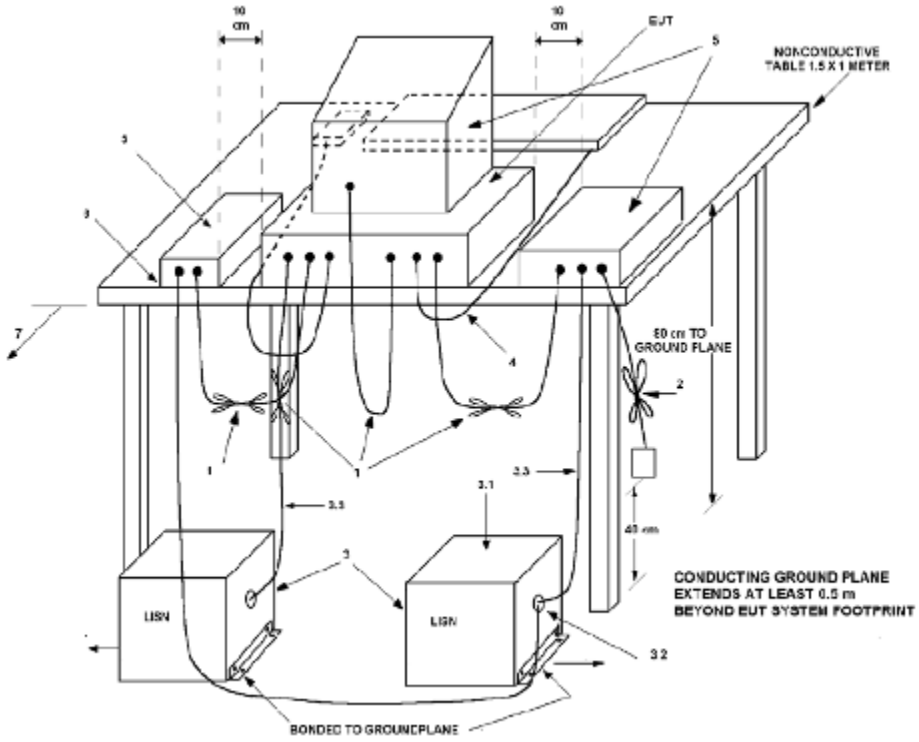


FIGURE 2: PLOT MAP AND LAYOUT OF TEST SITE BELOW 1GHZ

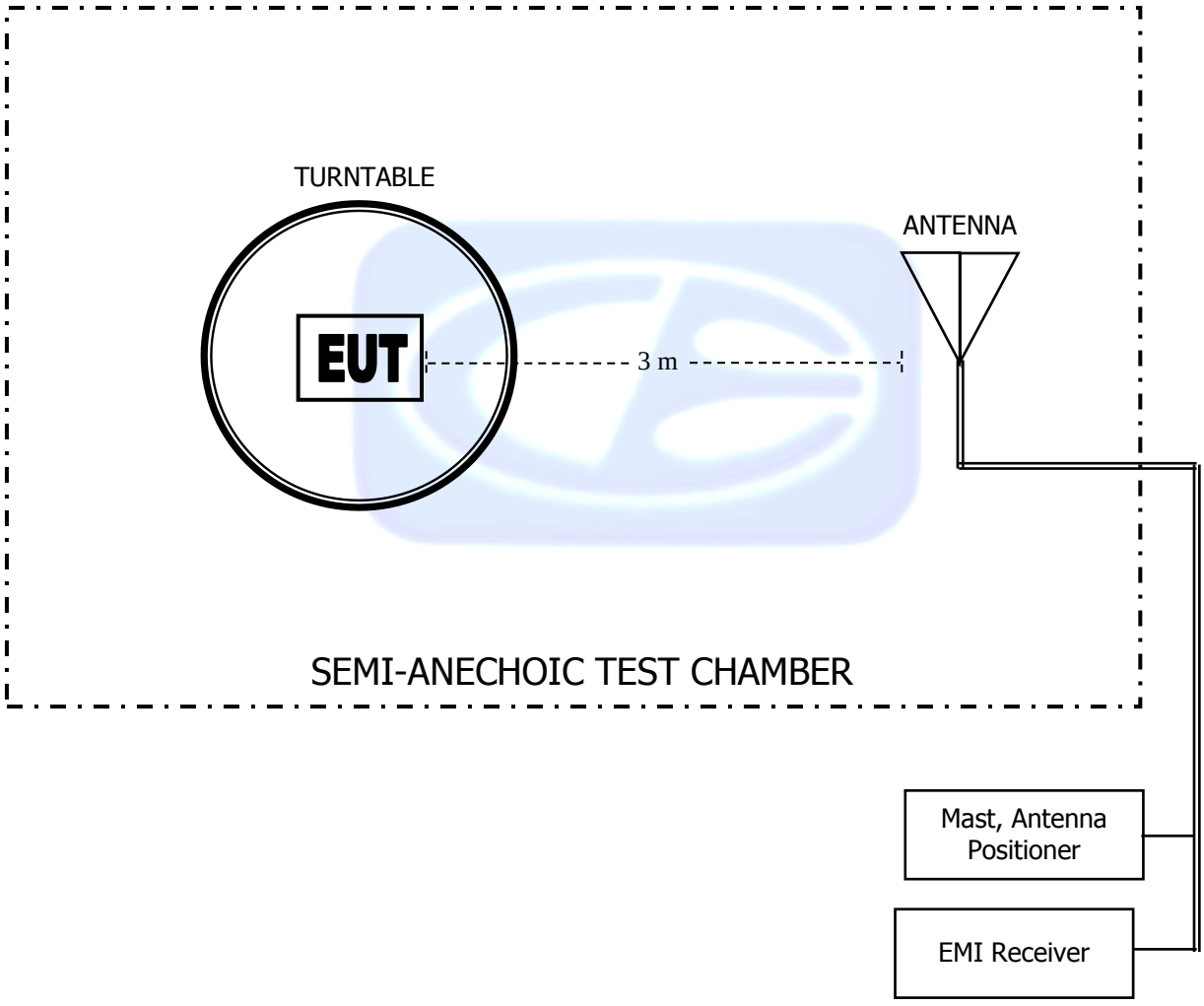
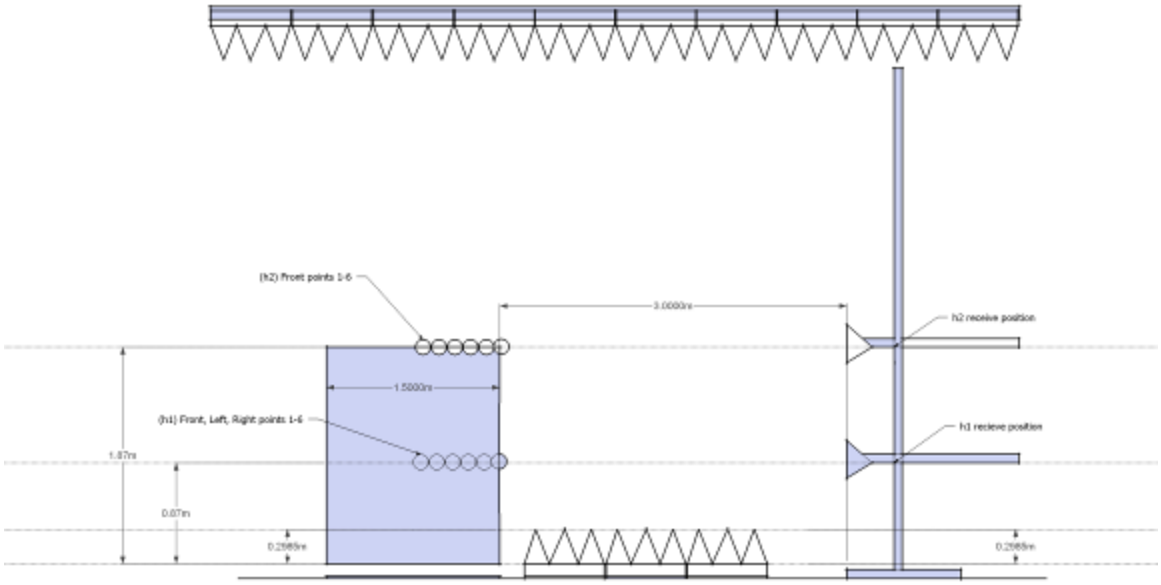


FIGURE 3: PLOT MAP AND LAYOUT OF TEST SITE ABOVE 1GHZ



COM-POWER AL-130

LOOP ANTENNA

S/N: 121049

CALIBRATION DUE: FEBRUARY 9, 2018

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)	FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-34.68	16.82	**0.8**	-37.44	14.06
0.01	-35.54	15.96	**0.9**	-37.34	14.16
0.02	-37.22	14.28	**1.0**	-37.34	14.16
0.03	-36.44	15.06	**2.0**	-37.03	14.47
0.04	-36.90	14.60	**3.0**	-37.02	14.48
0.05	-37.56	13.94	**4.0**	-37.12	14.38
0.06	-37.45	14.05	**5.0**	-36.92	14.58
0.07	-37.55	13.95	**6.0**	-37.12	14.38
0.08	-37.46	14.04	**7.0**	-37.02	14.48
0.09	-37.56	13.94	**8.0**	-36.81	14.69
0.1	-37.56	13.94	**9.0**	-36.81	14.69
0.2	-37.75	13.75	**10.0**	-36.70	14.80
0.3	-37.75	13.75	**15.0**	-37.08	14.42
0.4	-37.65	13.85	**20.0**	-36.60	14.90
0.5	-37.75	13.75	**25.0**	-38.62	12.88
0.6	-37.75	13.75	**30.0**	-38.92	12.58
0.7	-37.64	13.86			

COM-POWER AC-220

LAB P - COMBILOG ANTENNA

S/N: 003

CALIBRATION DUE: MAY 19, 2018

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	23.6	**160**	13.5
35	23.6	**180**	14.4
40	23.7	**200**	14.5
45	23.9	**250**	15.7
50	24.2	**300**	18.1
60	22.6	**400**	19.9
70	19.1	**500**	22.3
80	13.8	**600**	24.4
90	12.9	**700**	26.6
100	14.6	**800**	26.2
120	14.4	**900**	27.5
140	16.2	**1000**	28.9

COM-POWER AH-118

HORN ANTENNA

S/N: 071225

CALIBRATION DUE: MAY 17, 2018

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
1000	24.40	**9500**	39.11
1500	25.61	**10000**	39.38
2000	28.71	**10500**	39.55
2500	29.09	**11000**	39.66
3000	30.24	**11500**	40.28
3500	30.94	**12000**	40.26
4000	31.77	**12500**	40.64
4500	32.29	**13000**	41.33
5000	33.70	**13500**	41.74
5500	34.28	**14000**	41.52
6000	34.83	**14500**	41.80
6500	35.07	**15000**	43.51
7000	36.79	**15500**	41.03
7500	37.45	**16000**	40.88
8000	37.67	**16500**	40.18
8500	37.75	**17000**	42.59
9000	38.15	**17500**	44.49
		18000	45.27

COM-POWER PAM-118A

1-18GHz - PREAMPLIFIER

S/N: 551033

CALIBRATION DUE: MAY 16, 2018

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
500	41.06	**5500**	40.63
1000	41.06	**6000**	40.18
1100	41.12	**6500**	40.33
1200	41.09	**7000**	39.97
1300	41.20	**7500**	40.45
1400	41.28	**8000**	39.83
1500	41.34	**8500**	39.79
1600	41.37	**9000**	39.71
1700	41.43	**9500**	39.80
1800	41.47	**10000**	41.07
1900	41.53	**11000**	40.05
2000	41.59	**12000**	40.21
2500	41.87	**13000**	40.61
3000	42.13	**14000**	39.09
3500	42.21	**15000**	39.36
4000	42.22	**16000**	38.32
4500	41.53	**17000**	38.32
5000	41.16	**18000**	36.85

COM-POWER PA-840

18-40 GHz PREAMPLIFIER

S/N: 181289

CALIBRATION DUE: JUNE 16, 2018

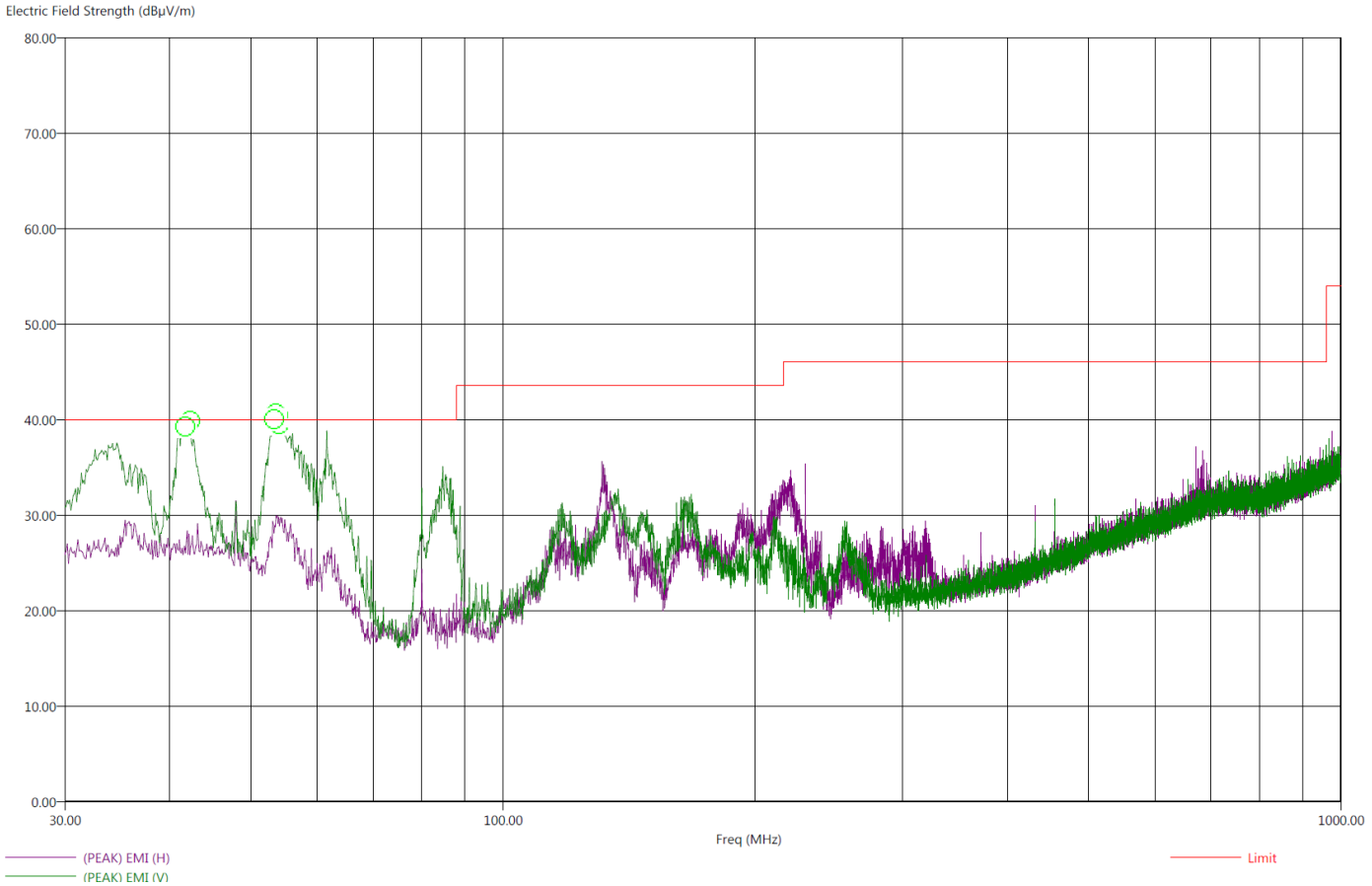
FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
18000	29.4	**31500**	28.2
19000	28.8	**32000**	28.6
20000	30.5	**32500**	28.8
21000	31.4	**33000**	28.2
22000	31.2	**33500**	27.7
23000	30.1	**34000**	27.2
24000	30.3	**34500**	28.2
25000	29.8	**35000**	27.3
26000	30.5	**35500**	27.2
26500	30.7	**36000**	27.2
27000	30.8	**36500**	27.5
27500	30.2	**37000**	27.0
28000	30.1	**37500**	26.7
28500	30.2	**38000**	26.2
29000	30.1	**38500**	26.5
29500	29.8	**39000**	26.3
30000	29.2	**39500**	26.9
30500	28.4	**40000**	27.6
31000	29.8		

APPENDIX E

RADIATED SPURIOUS EMISSIONS DATA SHEETS

Title: FCC 15.209 10/17/2017 3:34:15 PM
File: Radiated Pre-Scan 30-1000Mhz mid_channel.set Sequence: Preliminary Scan
Operator: Jorge Reyes
EUT Type: Phyn Plus
EUT Condition: The EUT is constantly transmitting 802.11n (20 MHz) at 2437 MHz.
Comments: Antenna 2
Z-Axis.
Temp: 73f
Hum: 49%
120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab P)



This was the worst case mode and channel.
There were no radiated emissions besides the fundamental and harmonics found between 9kHz-30 MHz or 1GHz-25GHz.

Title: FCC 15.209 10/17/2017 3:55:04 PM
File: Radiated Final 30-1000Mhz mid_channel.set Sequence: Final Measurements
Operator: Jorge Reyes
EUT Type: Phyn Plus
EUT Condition: The EUT is constantly transmitting 802.11n (20 MHz) at 2437 MHz.
Comments: Antenna 2
Z-Axis.
Temp: 73f
Hum: 49%
120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab P)

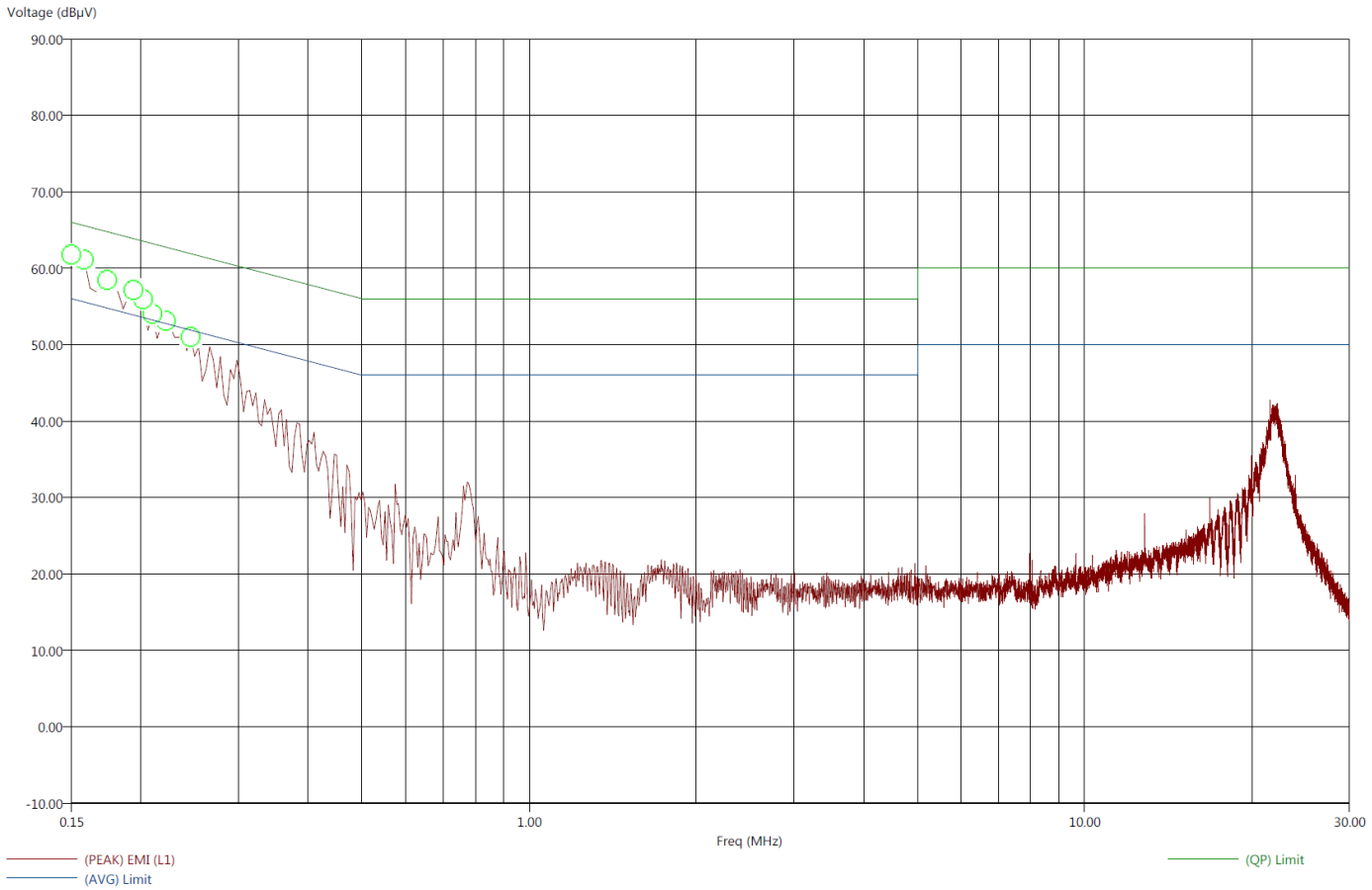
Freq (MHz)	(QP) Margin (dB)	(QP) EMI (dBµV/m)	(PEAK) EMI (dBµV/m)	Limit (dBµV/m)	Pol	Ttbl Agl (deg)	Twr Ht (cm)	Transducer(dB)	Cable(dB)
41.80	-1.74	38.26	41.16	40.00	V	106.75	101.52	24.01	0.52
42.30	-2.79	37.21	39.71	40.00	V	219.25	106.29	24.04	0.53
53.30	-2.12	37.88	40.52	40.00	V	88.25	109.58	21.36	0.64
53.60	-1.95	38.05	41.03	40.00	V	33.75	103.88	21.23	0.65
53.90	-0.96	39.04	41.69	40.00	V	13.50	106.35	21.17	0.65
54.10	-2.05	37.95	40.56	40.00	V	0.00	99.41	21.12	0.65

This was the worst case mode and channel.
There were no radiated emissions besides the fundamental and harmonics found between 9kHz-30 MHz or 1GHz-25GHz.

CONDUCTED SPURIOUS EMISSIONS DATA SHEETS

Title: FCC 15.207 10/23/2017 9:11:30 AM
File: Conducted Pre-Line 120.set Sequence: Preliminary Scan
Operator: Jorge Reyes
EUT Type: Phyn Plus Smart Water Assistant / PHYPF001
EUT Condition: The EUT is constantly transmitting 802.11b at 2437 MHz.
Comments: Antenna 1
Z-Axis.
Temp: 73f
Hum: 49%
120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab P)



This was the worst case mode and channel.

Title: FCC 15.207 10/23/2017 9:16:16 AM
File: Conducted Final-Line 120.set Sequence: Final Measurements
Operator: Jorge Reyes
EUT Type: Phyn Plus Smart Water Assistant / PHYPF001
EUT Condition: The EUT is constantly transmitting 802.11b at 2437 MHz.
Comments: Antenna 1
Z-Axis.
Temp: 73f
Hum: 49%
120V 60Hz

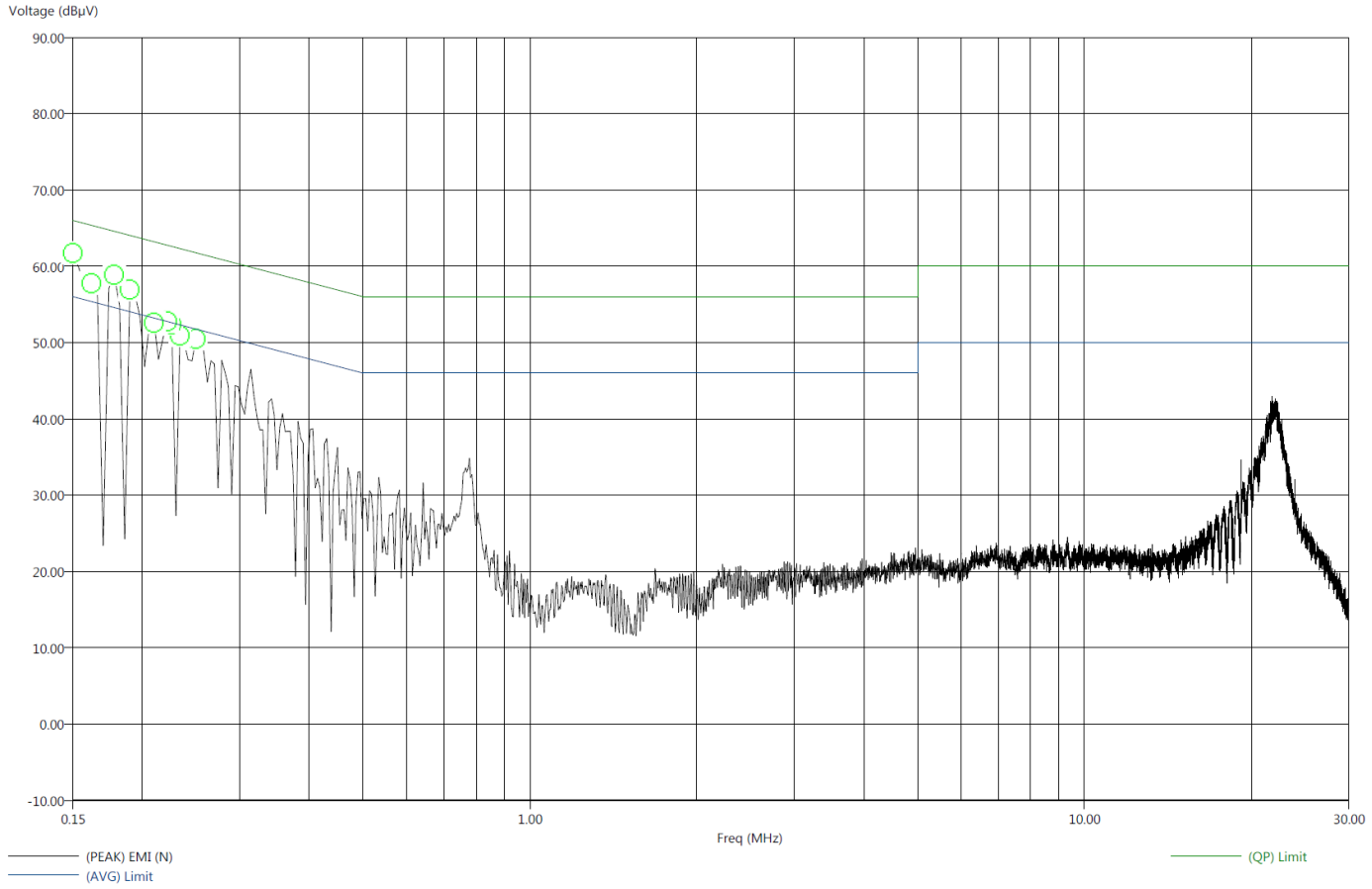
Compatible Electronics, Inc. FAC-3 (Lab P)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin AVL (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)	Transducer(dB)	Cable(dB)
0.15	-15.99	-5.98	40.01	60.02	63.99	56.00	66.00	0.44	0.01
0.16	-16.17	-7.18	39.39	58.39	62.77	55.57	65.57	0.41	0.01
0.17	-16.67	-7.95	38.09	56.82	60.80	54.77	64.77	0.37	0.01
0.19	-19.44	-9.97	34.43	53.89	58.51	53.86	63.86	0.32	0.01
0.20	-20.92	-10.60	32.61	52.92	56.76	53.53	63.53	0.30	0.01
0.21	-22.29	-13.77	30.91	49.44	53.99	53.21	63.21	0.28	0.01

This was the worst case mode and channel.

Title: FCC 15.207 10/23/2017 9:19:31 AM
File: Conducted Pre-Neutral 120.set Sequence: Preliminary Scan
Operator: Jorge Reyes
EUT Type: Phyn Plus Smart Water Assistant / PHYPF001
EUT Condition: The EUT is constantly transmitting 802.11b at 2437 MHz.
Comments: Antenna 1
Z-Axis.
Temp: 73f
Hum: 49%
120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab P)



This was the worst case mode and channel.

Title: FCC 15.207 10/23/2017 9:24:57 AM
File: Conducted Final-Neutral 120.set Sequence: Final Measurements
Operator: Jorge Reyes
EUT Type: Phyn Plus Smart Water Assistant / PHYPF001
EUT Condition: The EUT is constantly transmitting 802.11b at 2437 MHz.
Comments: Antenna 1
Z-Axis.
Temp: 73f
Hum: 49%
120V 60Hz

Compatible Electronics, Inc. FAC-3 (Lab P)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin AVL (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)	Transducer(dB)	Cable(dB)
0.15	-17.09	-6.62	38.91	59.38	62.79	56.00	66.00	0.44	0.01
0.16	-20.50	-11.59	34.86	53.77	59.28	55.36	65.36	0.40	0.01
0.18	-18.06	-8.55	36.52	56.03	58.66	54.58	64.58	0.36	0.01
0.19	-22.74	-12.23	31.30	51.81	56.22	54.04	64.04	0.33	0.01
0.21	-22.19	-14.00	31.01	49.21	53.04	53.21	63.21	0.28	0.01
0.22	-20.87	-12.71	31.88	50.03	54.17	52.74	62.74	0.25	0.01
0.23	-22.37	-13.16	30.23	49.44	54.42	52.60	62.60	0.24	0.01
0.23	-22.16	-13.65	30.15	48.66	52.75	52.31	62.31	0.23	0.01
0.25	-21.74	-14.95	30.02	46.80	50.50	51.76	61.76	0.19	0.01

This was the worst case mode and channel.

DTS BANDWIDTH DATA SHEETS

802.11b

ANTENNA 1

DTS BANDWIDTH

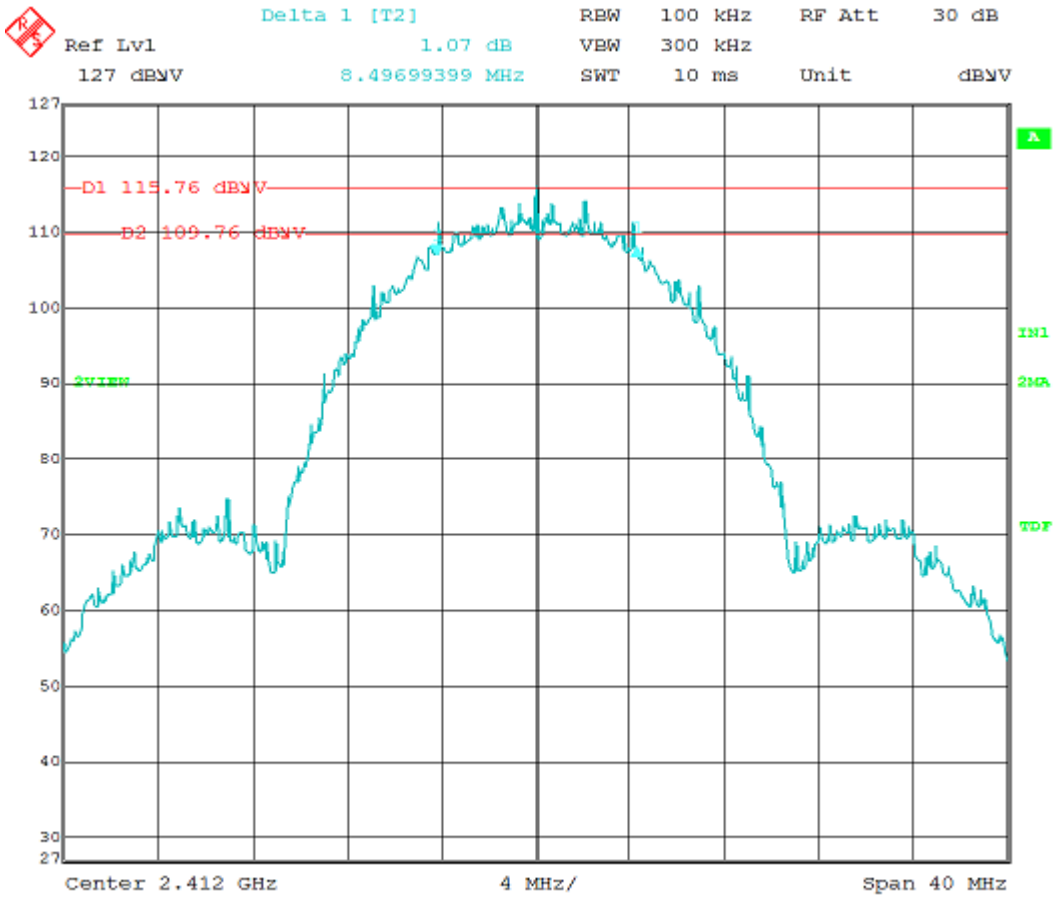
FCC 15.247

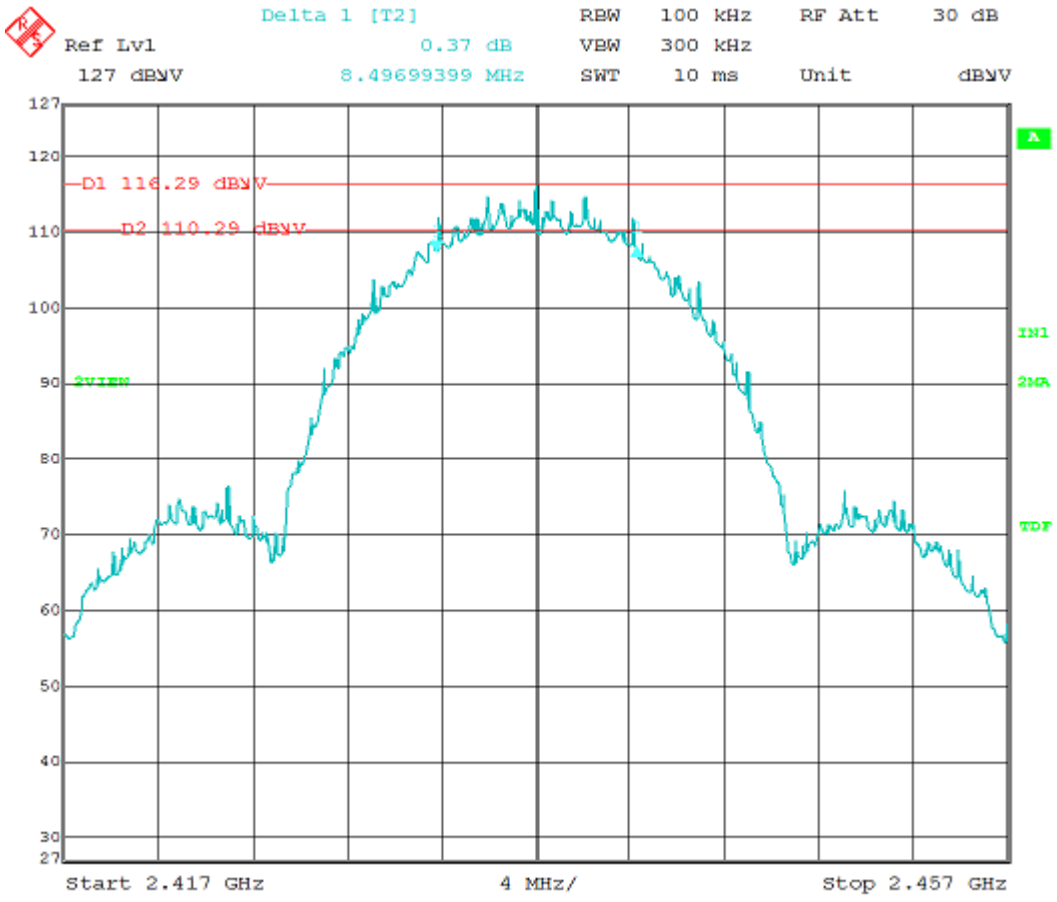
Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test Eng:	Torey Oliver
Mode:	802.11b		
Antenna:	1		

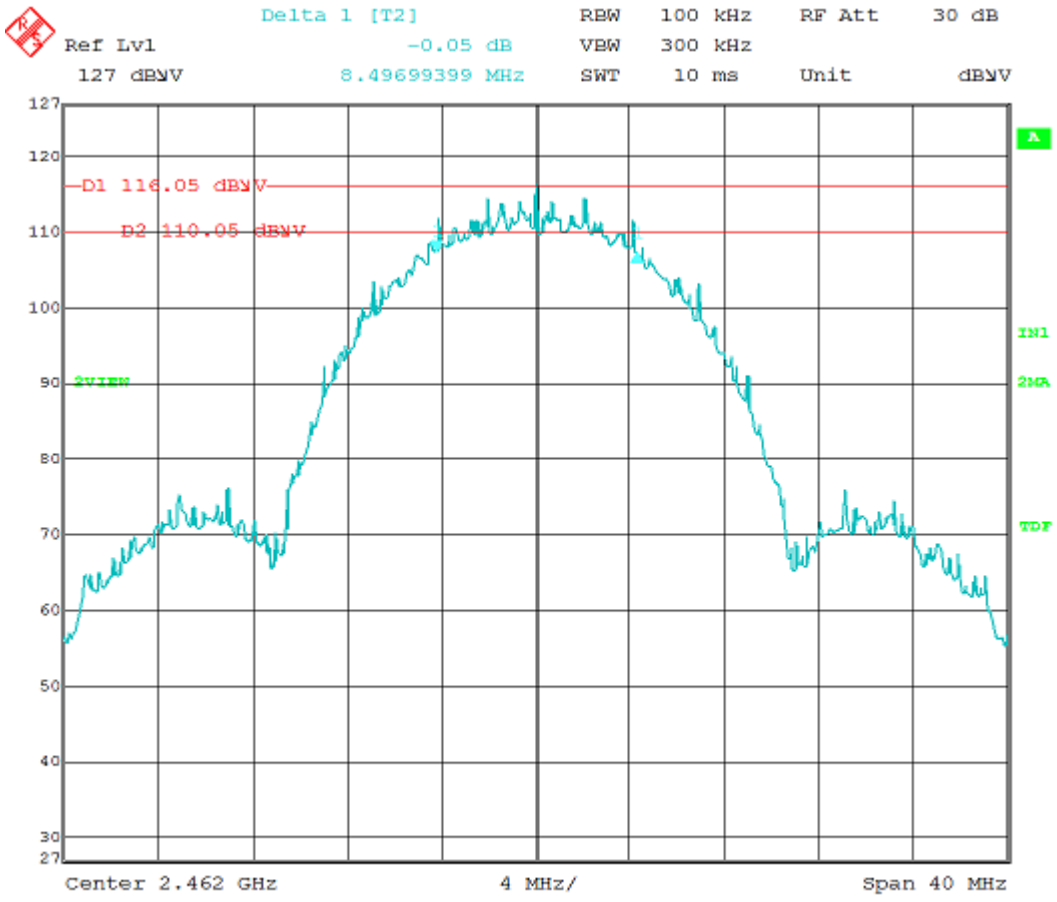
Compatible Electronics, Inc. FAC-3 (Lab P)

DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2412	8496.99	500.00	7996.99	Peak	
2437	8496.99	500.00	7996.99	Peak	
2462	8496.99	500.00	7996.99	Peak	


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
1.07 dB
VBW 300 kHz
127 dBµV
8.49699399 MHz
SWT 10 ms
Unit dBµV
D1 115.76 dBµV
D2 109.76 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.412 GHz
4 MHz/
Span 40 MHz
Comment A: DTS Bandwidth 2412 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
0.37 dB
VBW 300 kHz
127 dBµV
8.49699399 MHz
SWT 10 ms
Unit dBµV
D1 116.29 dBµV
D2 110.29 dBµV
2VIEW
A
IN1
2MA
TDF
Start 2.417 GHz
4 MHz/
Stop 2.457 GHz
Comment A: DTS Bandwidth 2437 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-0.05 dB
VBW 300 kHz
127 dBµV
8.49699399 MHz
SWT 10 ms
Unit dBµV
D1 116.05 dBµV
D2 110.05 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.462 GHz
4 MHz/
Span 40 MHz
Comment A: DTS Bandwidth 2462 MHz

DTS BANDWIDTH DATA SHEETS

802.11b

ANTENNA 2

DTS BANDWIDTH

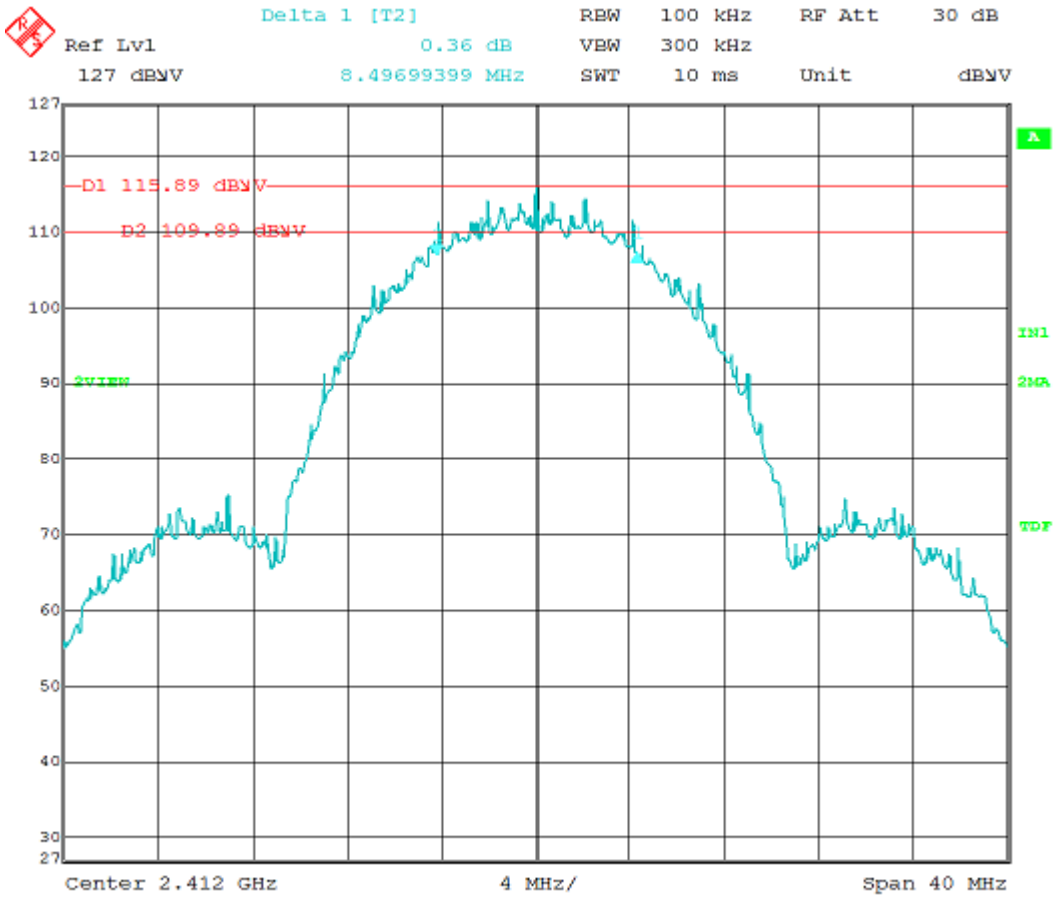
FCC 15.247

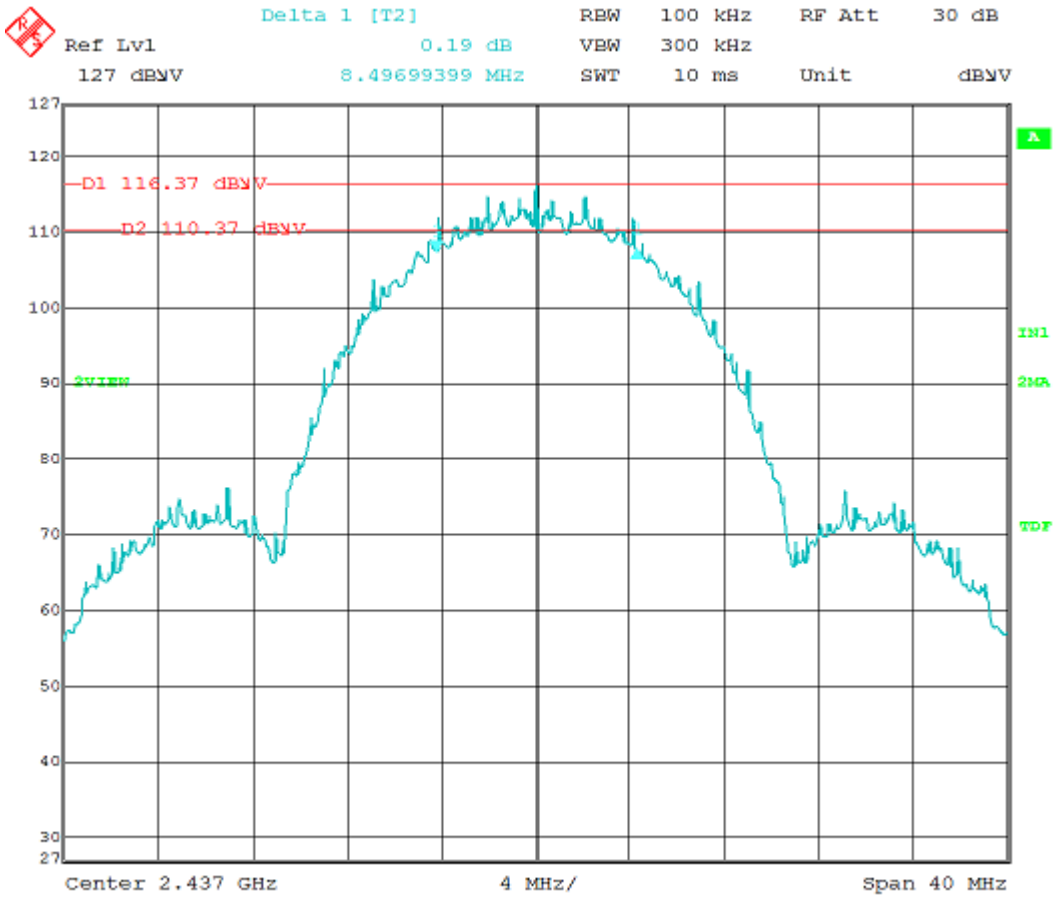
Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test Eng:	Torey Oliver
Mode:	802.11b		
Antenna:	2		

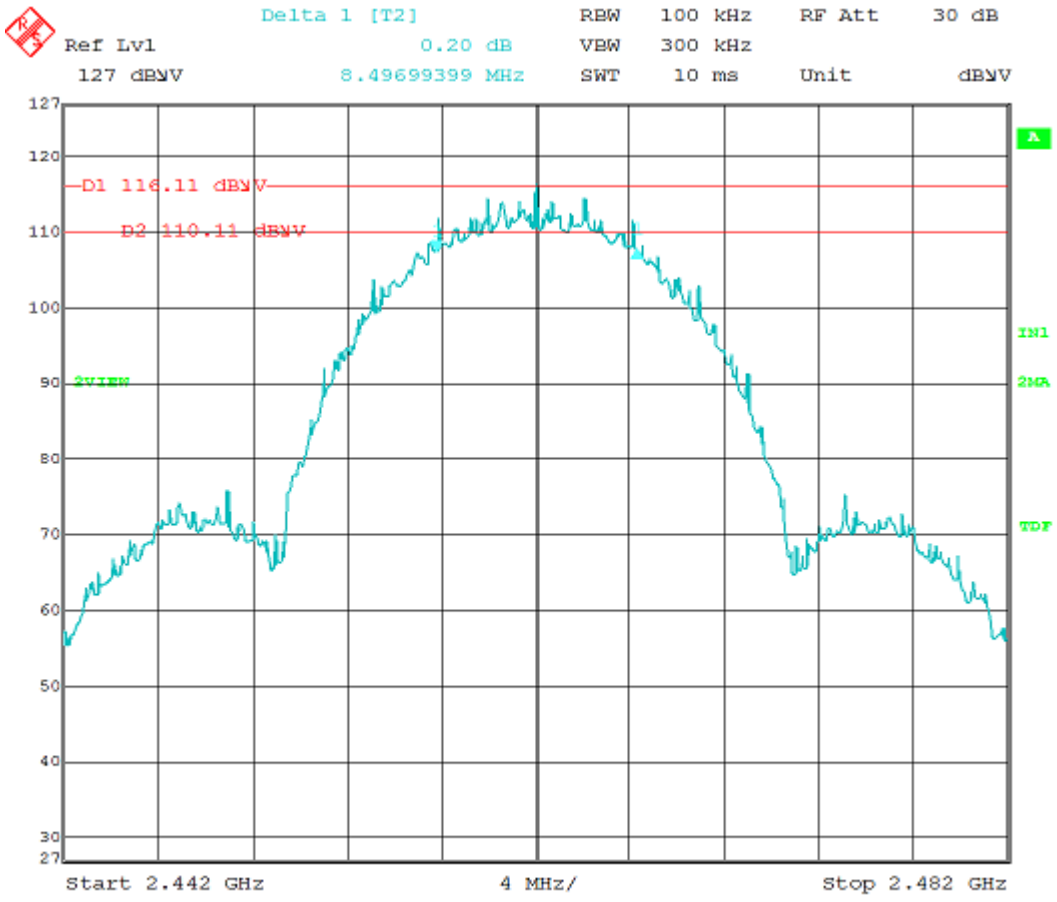
Compatible Electronics, Inc. FAC-3 (Lab P)

DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2412	8496.99	500.00	7996.99	Peak	
2437	8496.99	500.00	7996.99	Peak	
2462	8496.99	500.00	7996.99	Peak	


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
0.36 dB
VBW 300 kHz
127 dBµV
8.49699399 MHz
SWT 10 ms
Unit dBµV
D1 115.89 dBµV
D2 109.89 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.412 GHz
4 MHz/
Span 40 MHz
Comment A: DTS Bandwidth 2412 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
0.19 dB
VBW 300 kHz
127 dBµV
8.49699399 MHz
SWT 10 ms
Unit dBµV
D1 116.37 dBµV
D2 110.37 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.437 GHz
4 MHz/
Span 40 MHz
Comment A: DTS Bandwidth 2437 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
0.20 dB
VBW 300 kHz
127 dBµV
8.49699399 MHz
SWT 10 ms
Unit dBµV
D1 116.11 dBµV
D2 110.11 dBµV
2VIEW
A
IN1
2MA
TDF
Start 2.442 GHz
4 MHz/
Stop 2.482 GHz
Comment A: DTS Bandwidth 2462 MHz

DTS BANDWIDTH DATA SHEETS

802.11g

ANTENNA 1

DTS BANDWIDTH

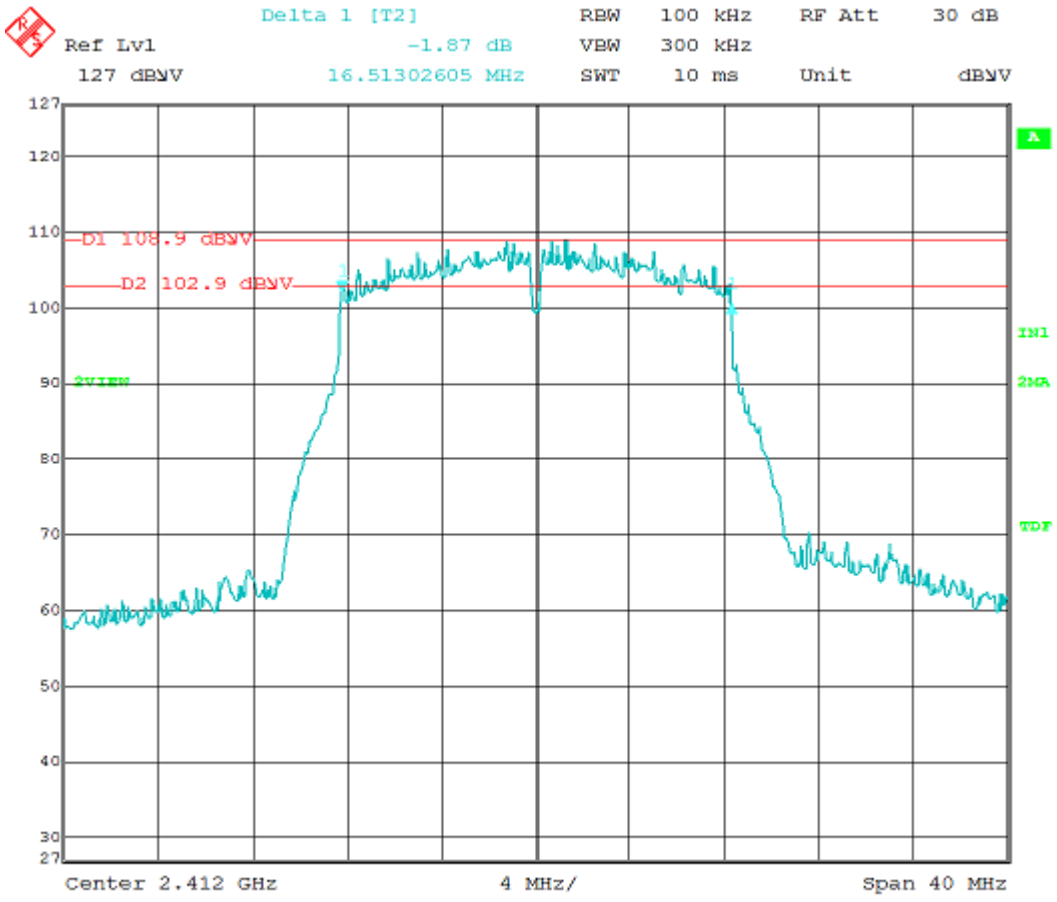
FCC 15.247

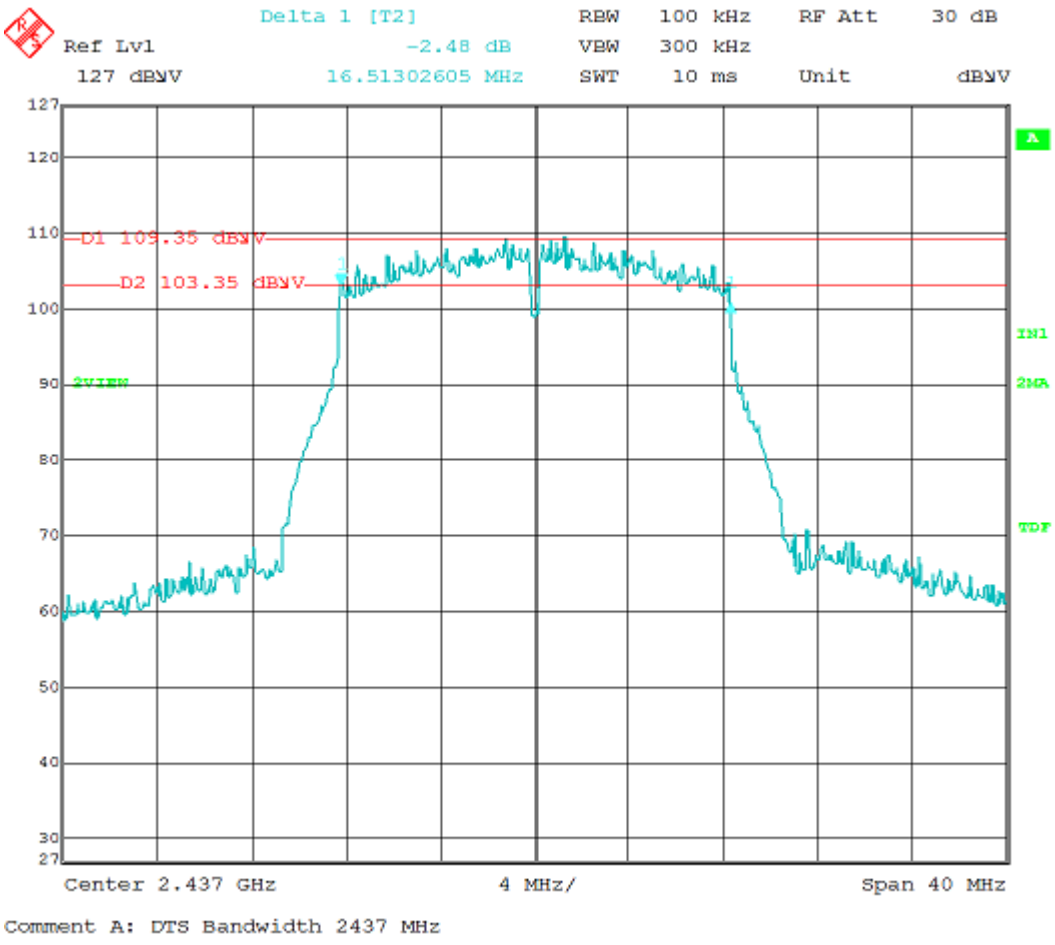
Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test Eng:	Torey Oliver
Mode:	802.11g		
Antenna:	1		

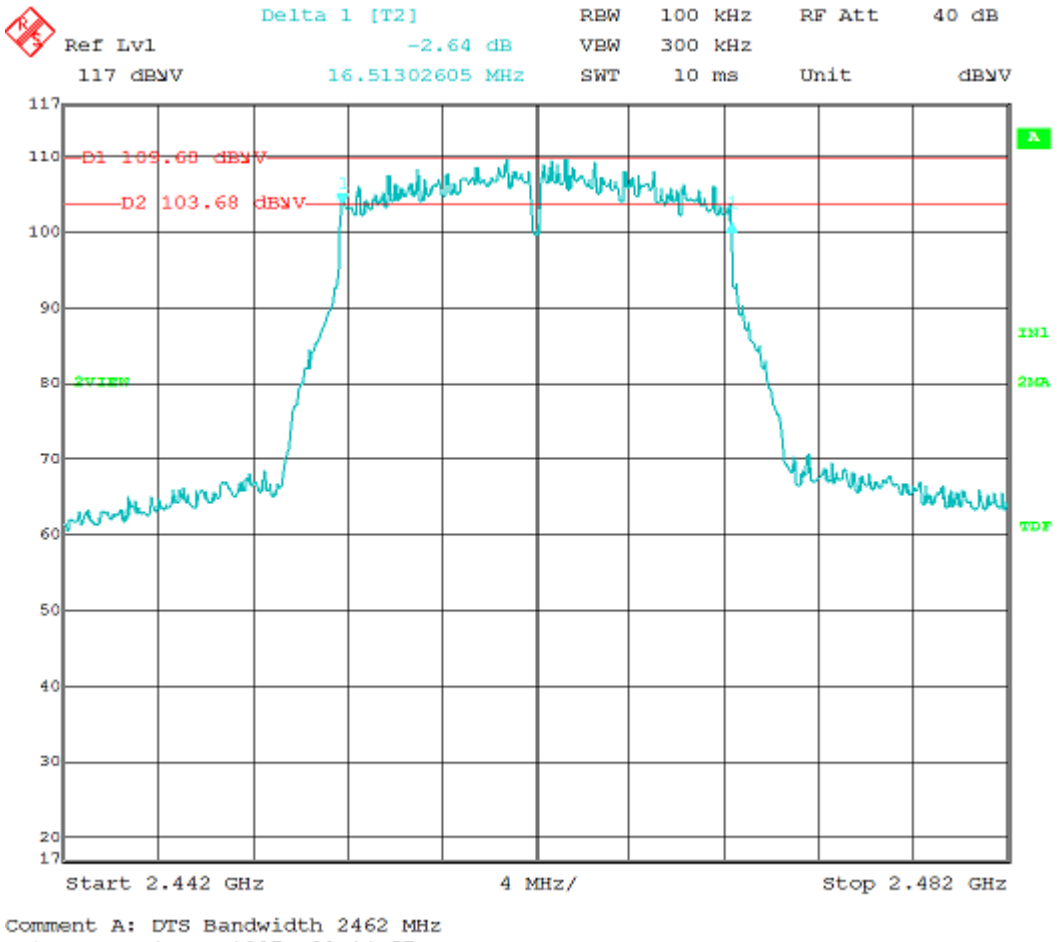
Compatible Electronics, Inc. FAC-3 (Lab P)

DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2412	16513.03	500.00	16013.03	Peak	
2437	16513.03	500.00	16013.03	Peak	
2462	16513.03	500.00	16013.03	Peak	


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-1.87 dB
VBW 300 kHz
127 dBµV
16.51302605 MHz
SWT 10 ms
Unit dBµV
D1 108.9 dBµV
D2 102.9 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.412 GHz
4 MHz/
Span 40 MHz
Comment A: DTS Bandwidth 2412 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-2.48 dB
VBW 300 kHz
127 dBµV
16.51302605 MHz
SWT 10 ms
Unit dBµV
127
120
110
100
90
80
70
60
50
40
30
27
D1 109.35 dBµV
D2 103.35 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.437 GHz
4 MHz/
Span 40 MHz
Comment A: DTS Bandwidth 2437 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
-2.64 dB
VBW 300 kHz
117 dBµV
16.51302605 MHz
SWT 10 ms
Unit dBµV
D1 109.68 dBµV
D2 103.68 dBµV
2VIEW
IN1
2MA
TDF
Start 2.442 GHz
4 MHz/
Stop 2.482 GHz
Comment A: DTS Bandwidth 2462 MHz

DTS BANDWIDTH DATA SHEETS

802.11g

ANTENNA 2

DTS BANDWIDTH

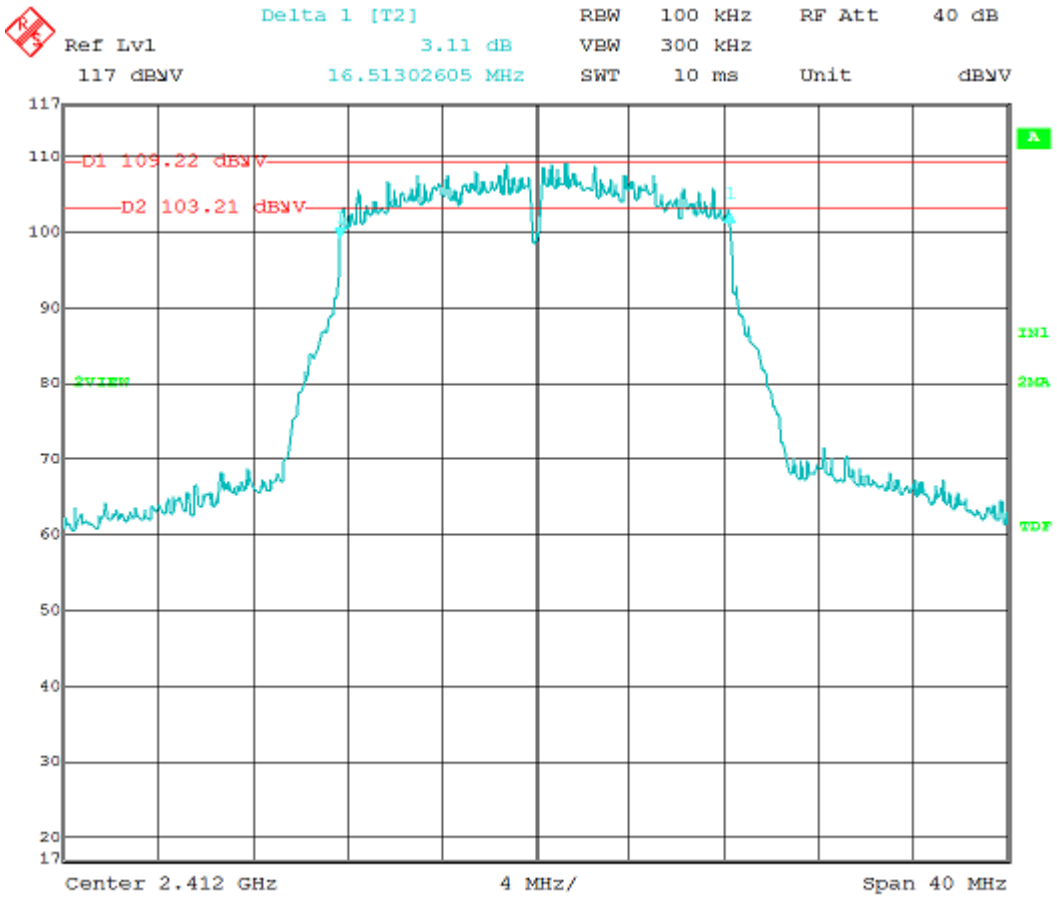
FCC 15.247

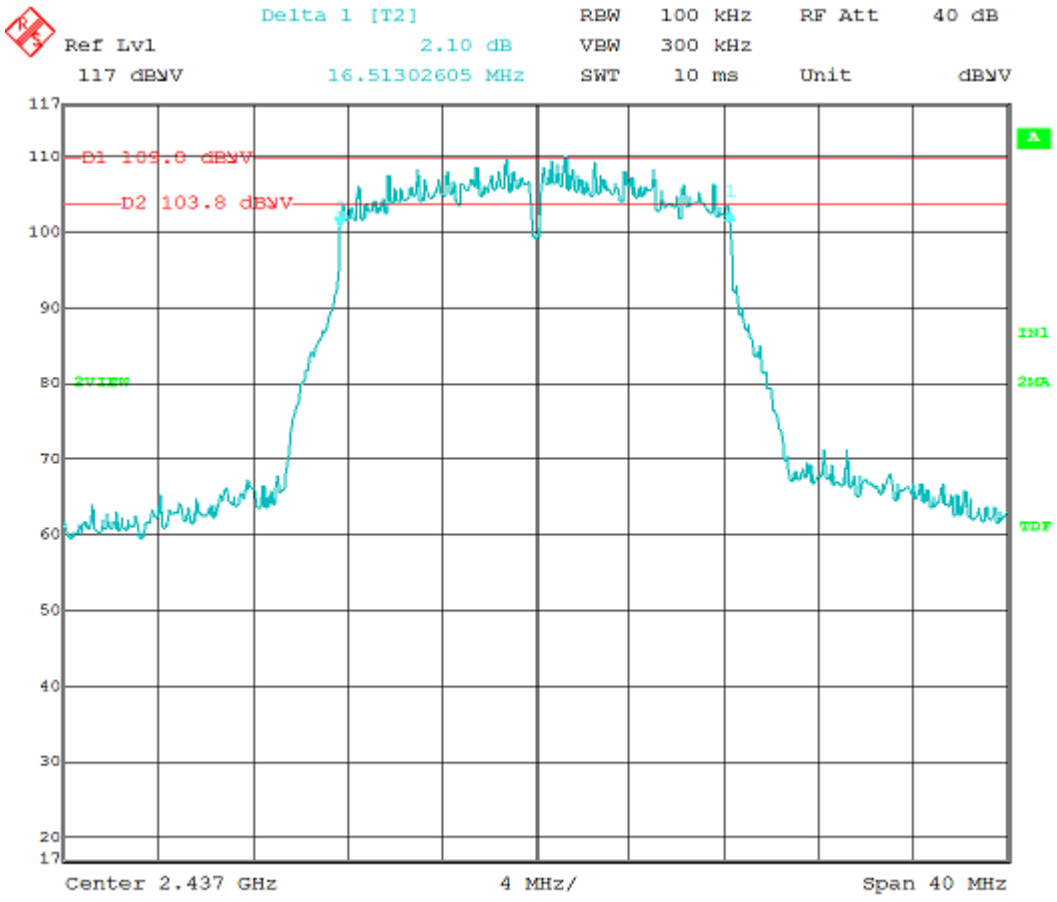
Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test Eng:	Torey Oliver
Mode:	802.11g		
Antenna:	2		

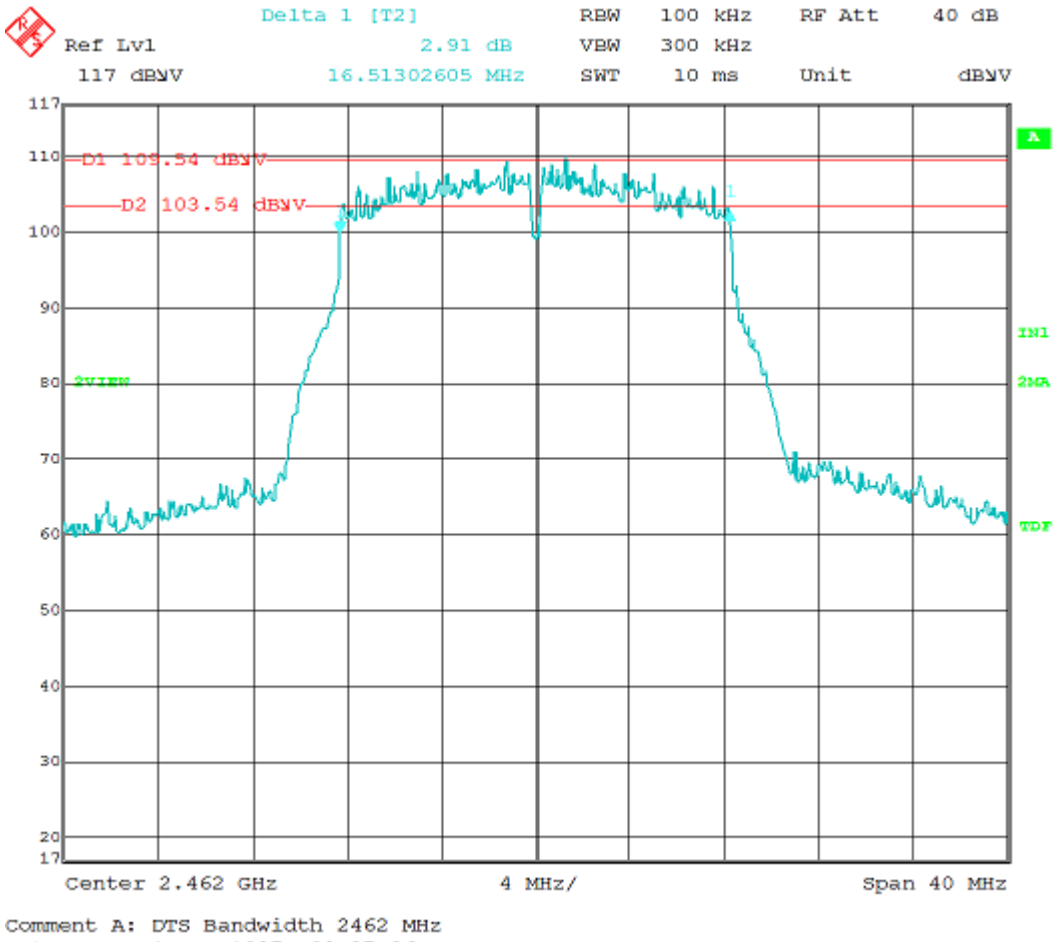
Compatible Electronics, Inc. FAC-3 (Lab P)

DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2412	16513.03	500.00	16013.03	Peak	
2437	16513.03	500.00	16013.03	Peak	
2462	16513.03	500.00	16013.03	Peak	


Delta 1 [T2]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
3.11 dB
VBW 300 kHz
117 dBµV
16.51302605 MHz
SWT 10 ms
Unit dBµV
D1 109.22 dBµV
D2 103.21 dBµV
1VIEW
IN1
2MA
TDF
Center 2.412 GHz
4 MHz/
Span 40 MHz
Comment A: DTS Bandwidth 2412 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
2.10 dB
VBW 300 kHz
117 dBµV
16.51302605 MHz
SWT 10 ms
Unit dBµV
D1 109.8 dBµV
D2 103.8 dBµV
2VIEW
IN1
2MA
TDF
Center 2.437 GHz
4 MHz/
Span 40 MHz
Comment A: DTS Bandwidth 2437 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
2.91 dB
VBW 300 kHz
117 dBµV
16.51302605 MHz
SWT 10 ms
Unit dBµV
D1 109.54 dBµV
D2 103.54 dBµV
117
110
100
90
80
70
60
50
40
30
20
17
A
IN1
2MA
TDF
Center 2.462 GHz
4 MHz/
Span 40 MHz
Comment A: DTS Bandwidth 2462 MHz

DTS BANDWIDTH DATA SHEETS

802.11n (20MHz)

ANTENNA 1

DTS BANDWIDTH

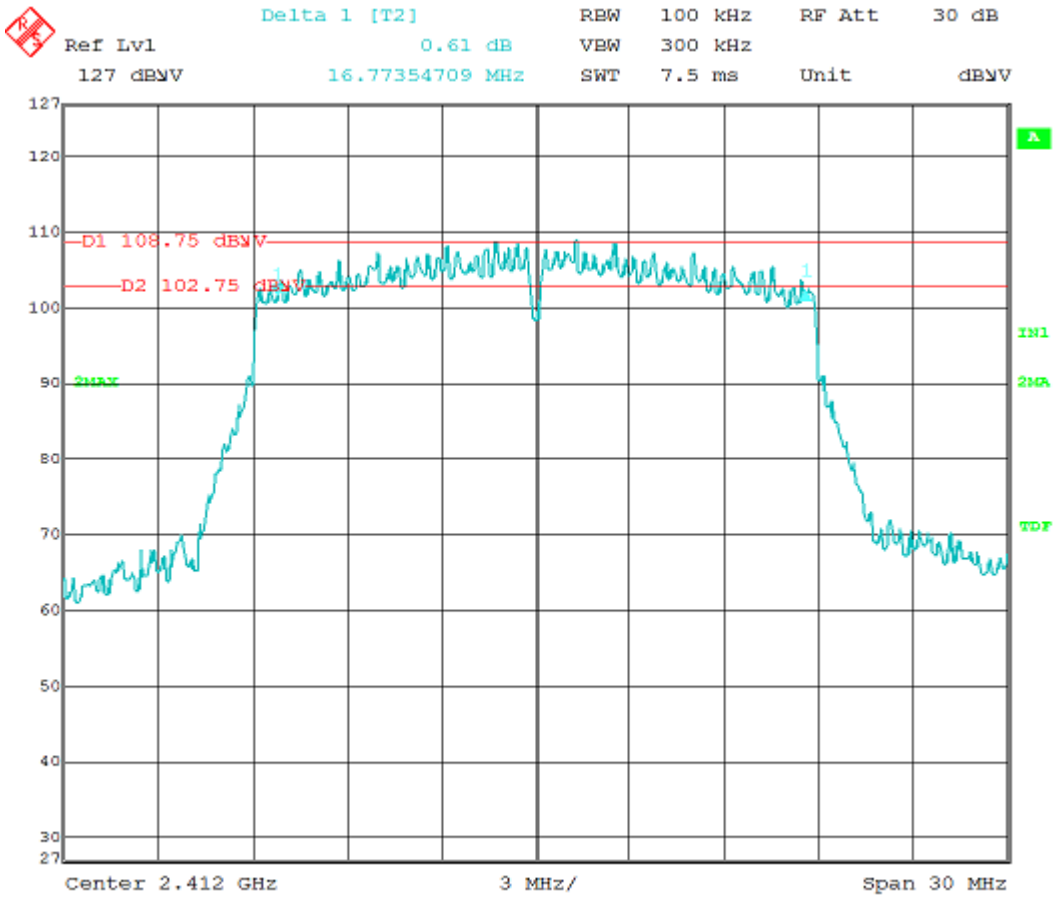
FCC 15.247

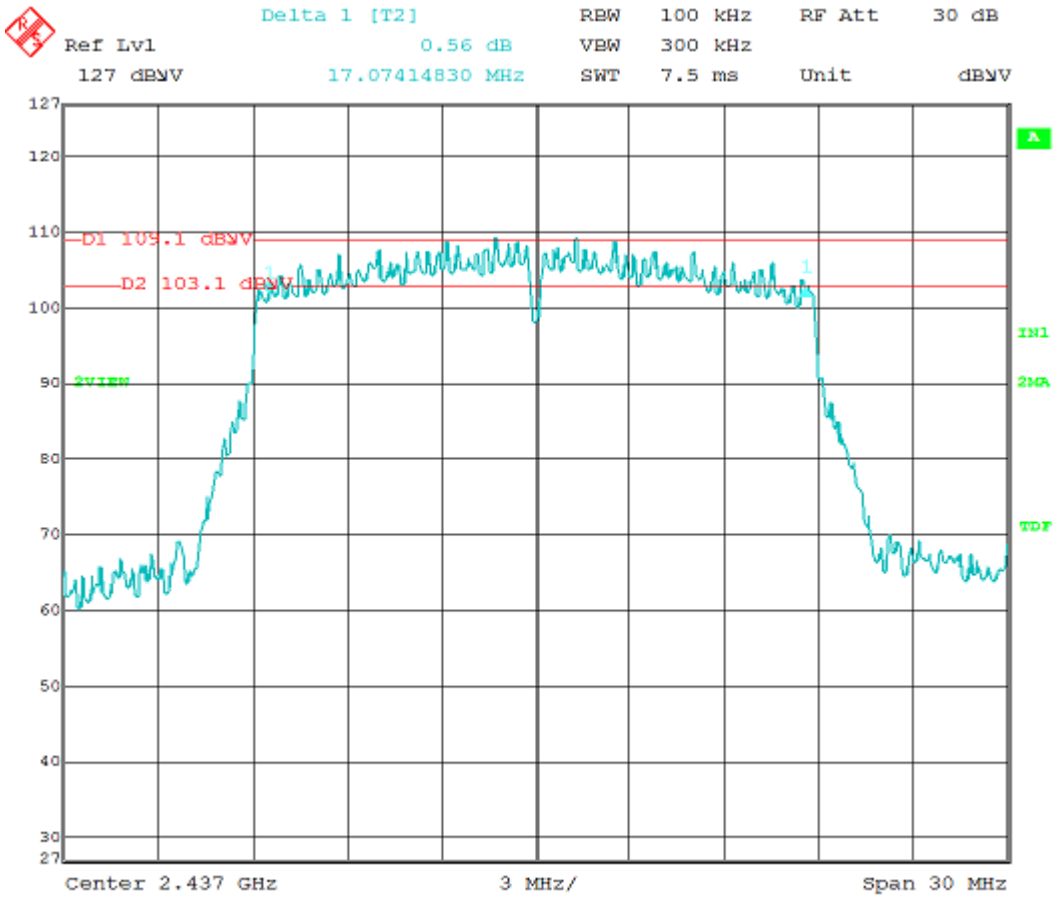
Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test Eng:	Torey Oliver
Mode:	802.11n		
Antenna:	1		

Compatible Electronics, Inc. FAC-3 (Lab P)

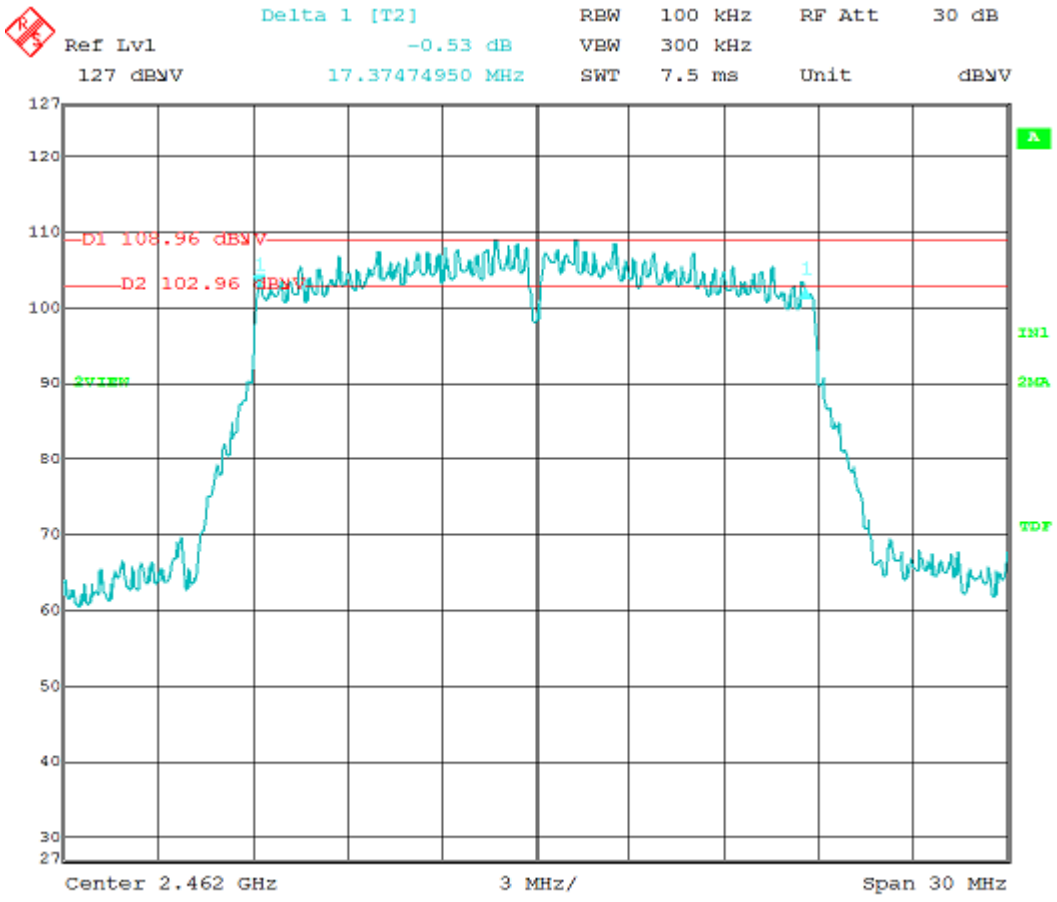
DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2412	16773.55	500.00	16273.55	Peak	
2437	17074.15	500.00	16574.15	Peak	
2462	17374.75	500.00	16874.75	Peak	


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
0.61 dB
VBW 300 kHz
127 dBµV
16.77354709 MHz
SWT 7.5 ms
Unit dBµV
127
120
110
100
90
80
70
60
50
40
30
27
D1 108.75 dBµV
D2 102.75 dBµV
A
IN1
2MA
TDF
Center 2.412 GHz
3 MHz/
Span 30 MHz
Comment A: DTS Bandwidth 2412 MHz



Comment A: DTS Bandwidth 2437 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-0.53 dB
VBW 300 kHz
127 dBµV
17.37474950 MHz
SWT 7.5 ms
Unit dBµV
D1 108.96 dBµV
D2 102.96 dBµV
1VIEW
A
IN1
2MA
TDF
Center 2.462 GHz
3 MHz/
Span 30 MHz
Comment A: DTS Bandwidth 2462 MHz

DTS BANDWIDTH DATA SHEETS

802.11n (20MHz)

ANTENNA 2

DTS BANDWIDTH

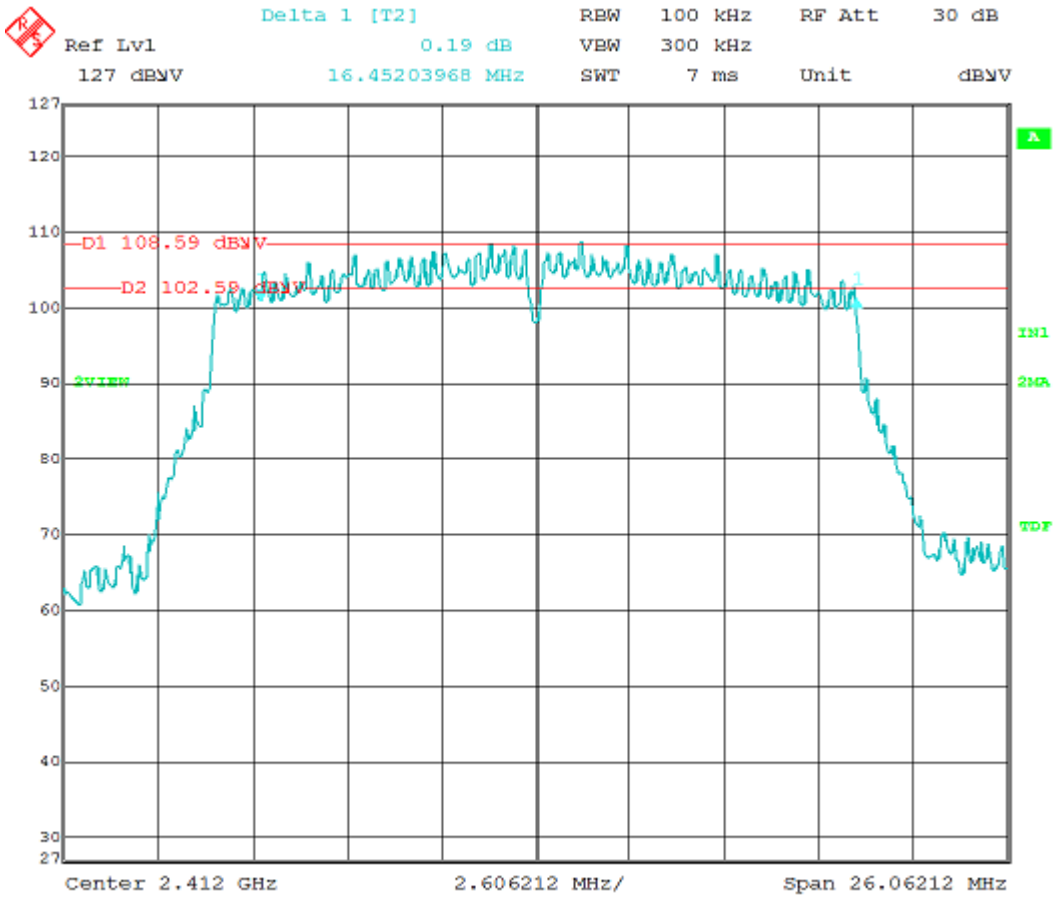
FCC 15.247

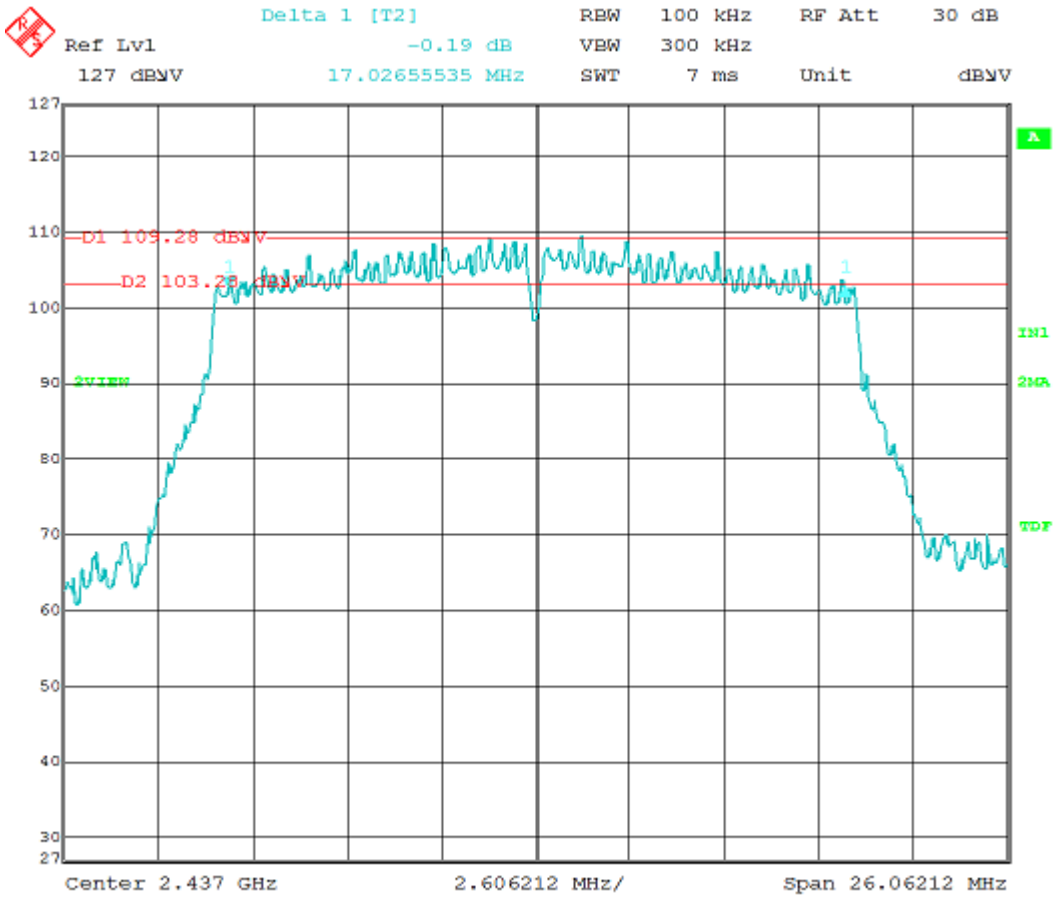
Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test Eng:	Torey Oliver
Mode:	802.11n		
Antenna:	2		

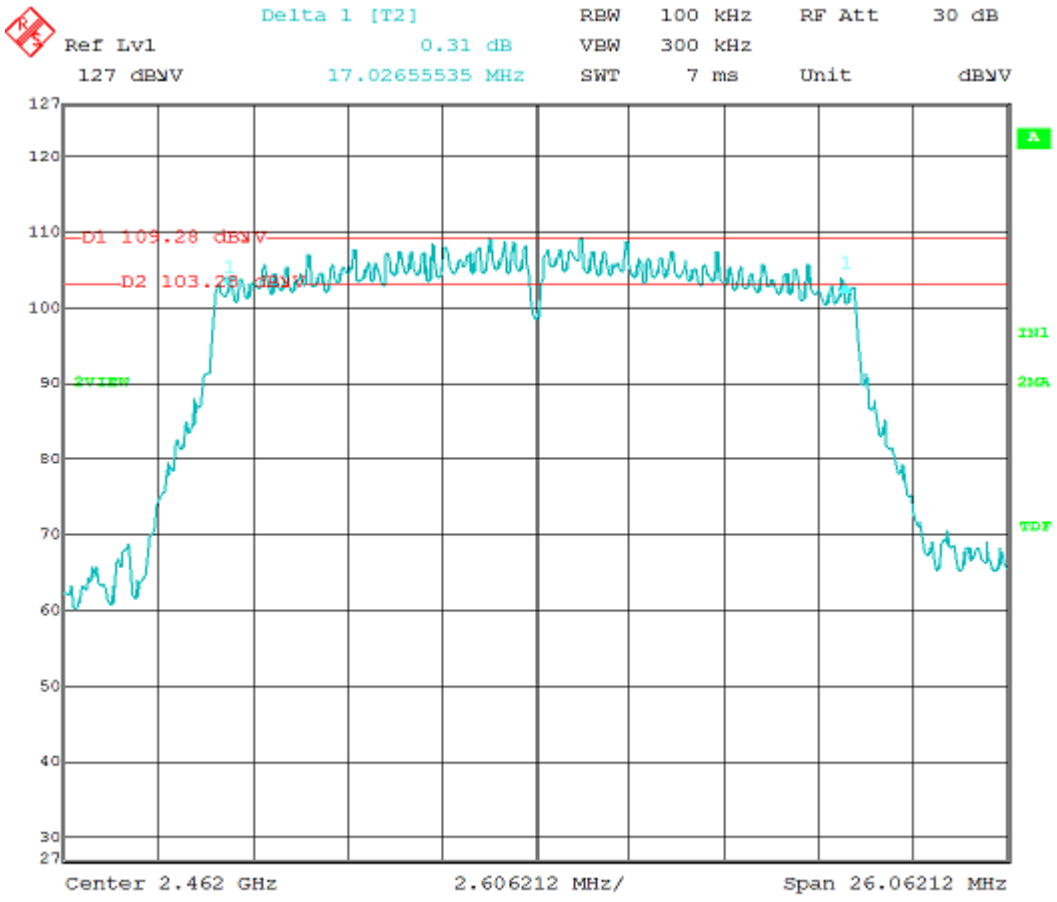
Compatible Electronics, Inc. FAC-3 (Lab P)

DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2412	16452.04	500.00	15952.04	Peak	
2437	17026.56	500.00	16526.56	Peak	
2462	17026.56	500.00	16526.56	Peak	


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
0.19 dB
VBW 300 kHz
127 dBµV
16.45203968 MHz
SWT 7 ms
Unit dBµV
127
120
110
100
90
80
70
60
50
40
30
27
D1 108.59 dBµV
D2 102.59 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.412 GHz
2.606212 MHz/
Span 26.06212 MHz
Comment A: DTS Bandwidth 2412 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-0.19 dB
VBW 300 kHz
127 dBµV
17.02655535 MHz
SWT 7 ms
Unit dBµV
D1 109.28 dBµV
D2 103.28 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.437 GHz
2.606212 MHz/
Span 26.06212 MHz
Comment A: DTS Bandwidth 2437 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
0.31 dB
VBW 300 kHz
127 dBµV
17.02655535 MHz
SWT 7 ms
Unit dBµV
D1 109.28 dBµV
D2 103.28 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.462 GHz
2.606212 MHz/
Span 26.06212 MHz
Comment A: DTS Bandwidth 2462 MHz

DTS BANDWIDTH DATA SHEETS

802.11n (40MHz)

ANTENNA 1

DTS BANDWIDTH

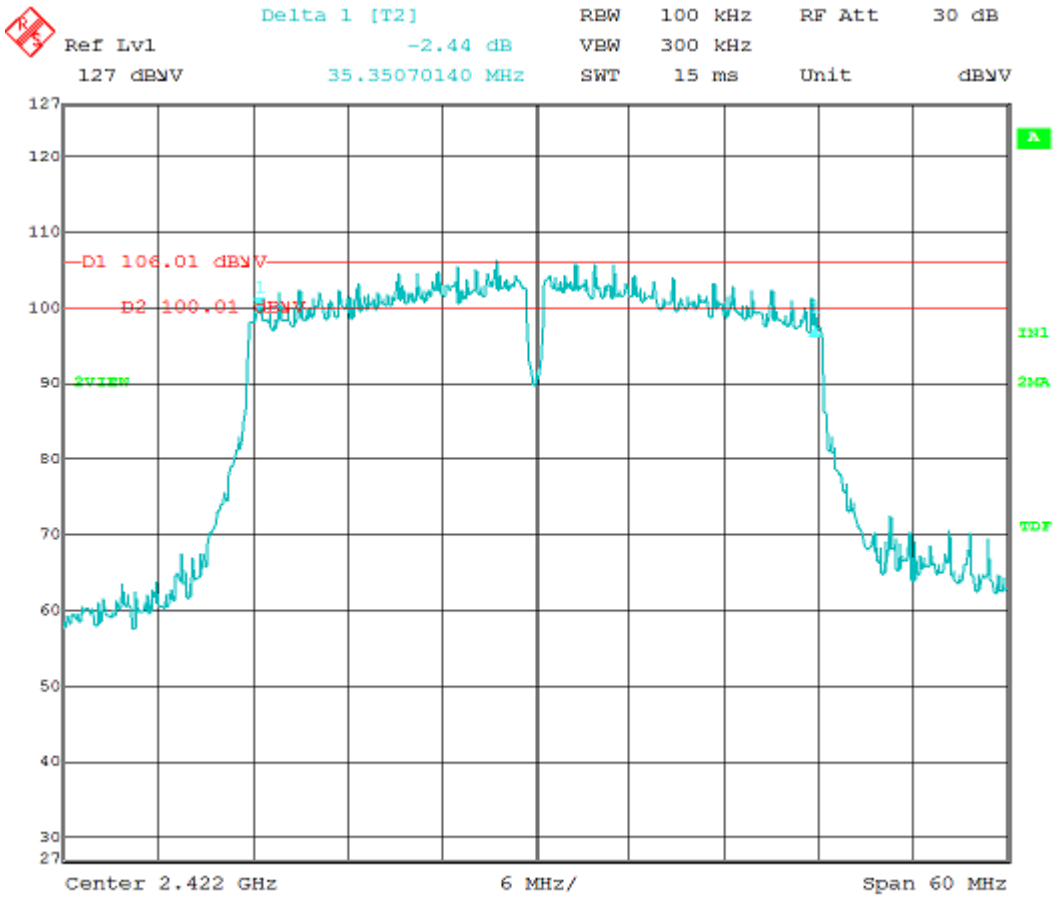
FCC 15.247

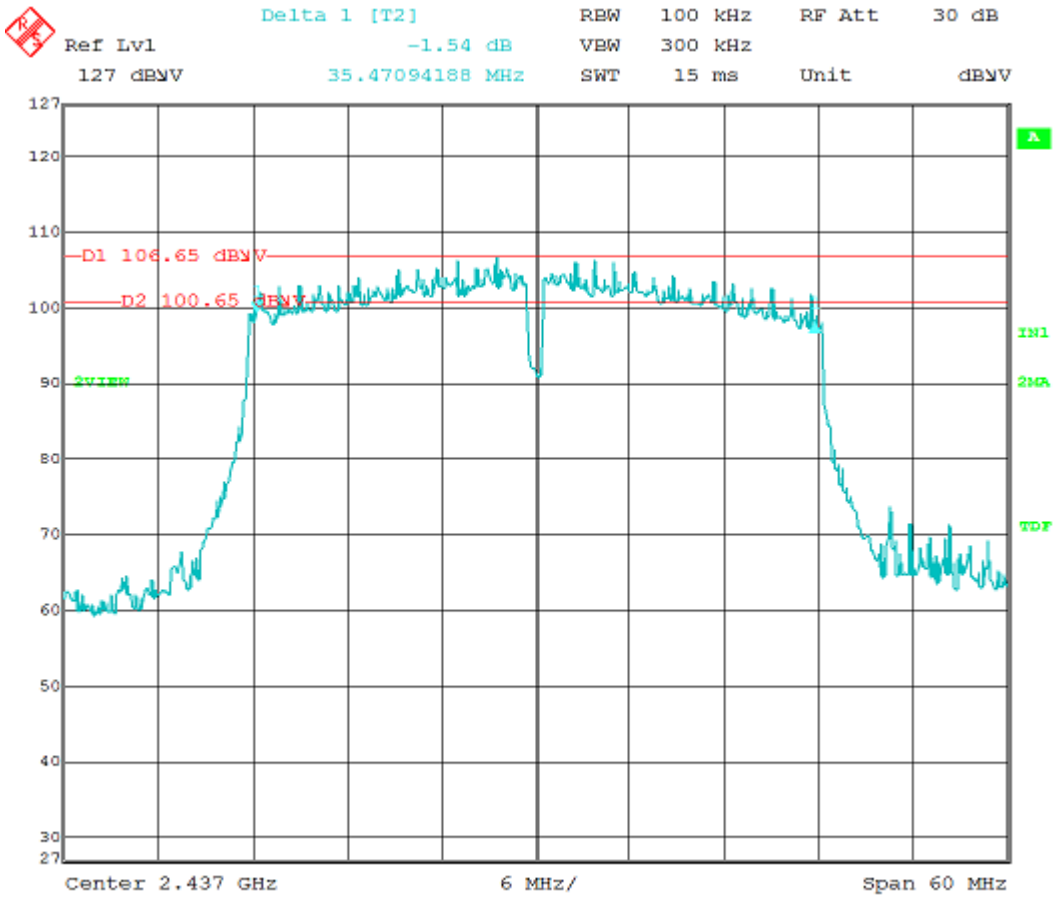
Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test Eng:	Torey Oliver
Mode:	802.11n		
Antenna:	1		

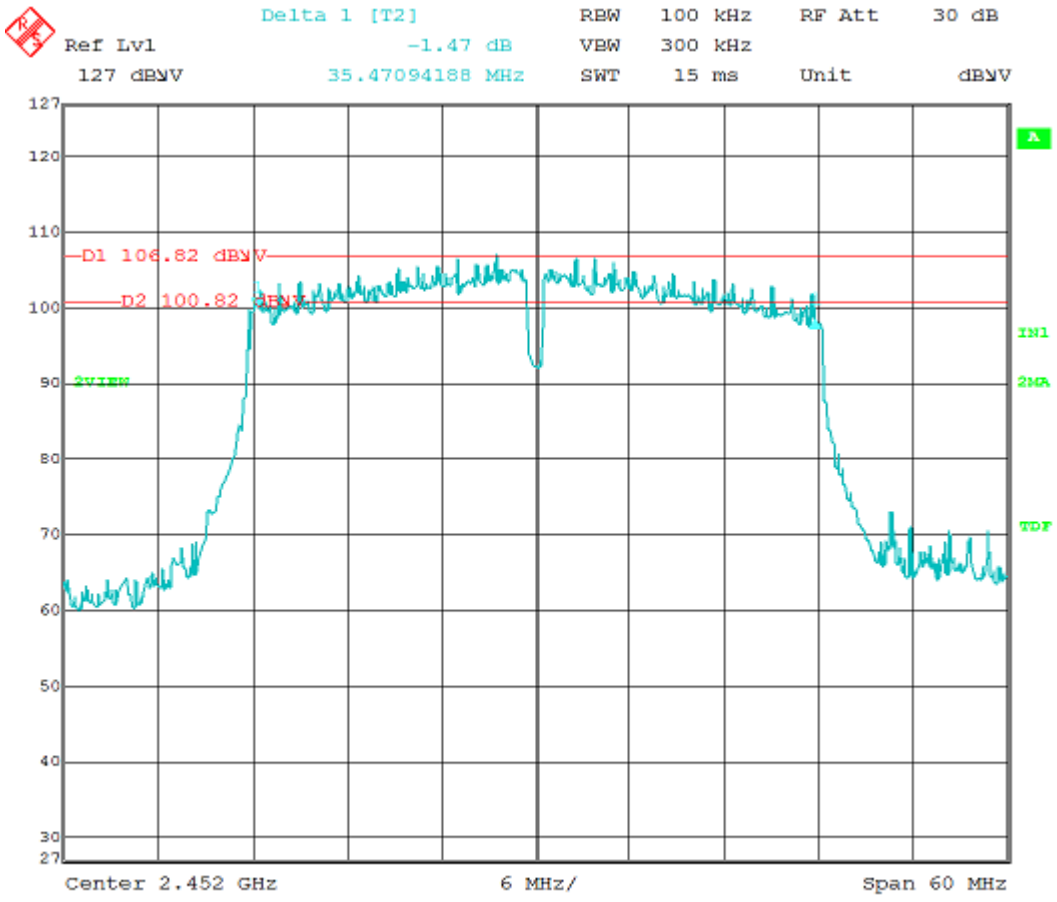
Compatible Electronics, Inc. FAC-3 (Lab P)

DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2422	35350.70	500.00	34850.70	Peak	
2437	35470.94	500.00	34970.94	Peak	
2452	35470.94	500.00	34970.94	Peak	


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-2.44 dB
VBW 300 kHz
127 dBµV
35.35070140 MHz
SWT 15 ms
Unit dBµV
D1 106.01 dBµV
D2 100.01 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.422 GHz
6 MHz/
Span 60 MHz
Comment A: DTS Bandwidth 2422 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-1.54 dB
VBW 300 kHz
127 dBµV
35.47094188 MHz
SWT 15 ms
Unit dBµV
D1 106.65 dBµV
D2 100.65 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.437 GHz
6 MHz/
Span 60 MHz
Comment A: DTS Bandwidth 2437 MHz



Comment A: DTS Bandwidth 2452 MHz

DTS BANDWIDTH DATA SHEETS

802.11n (40MHz)

ANTENNA 2

DTS BANDWIDTH

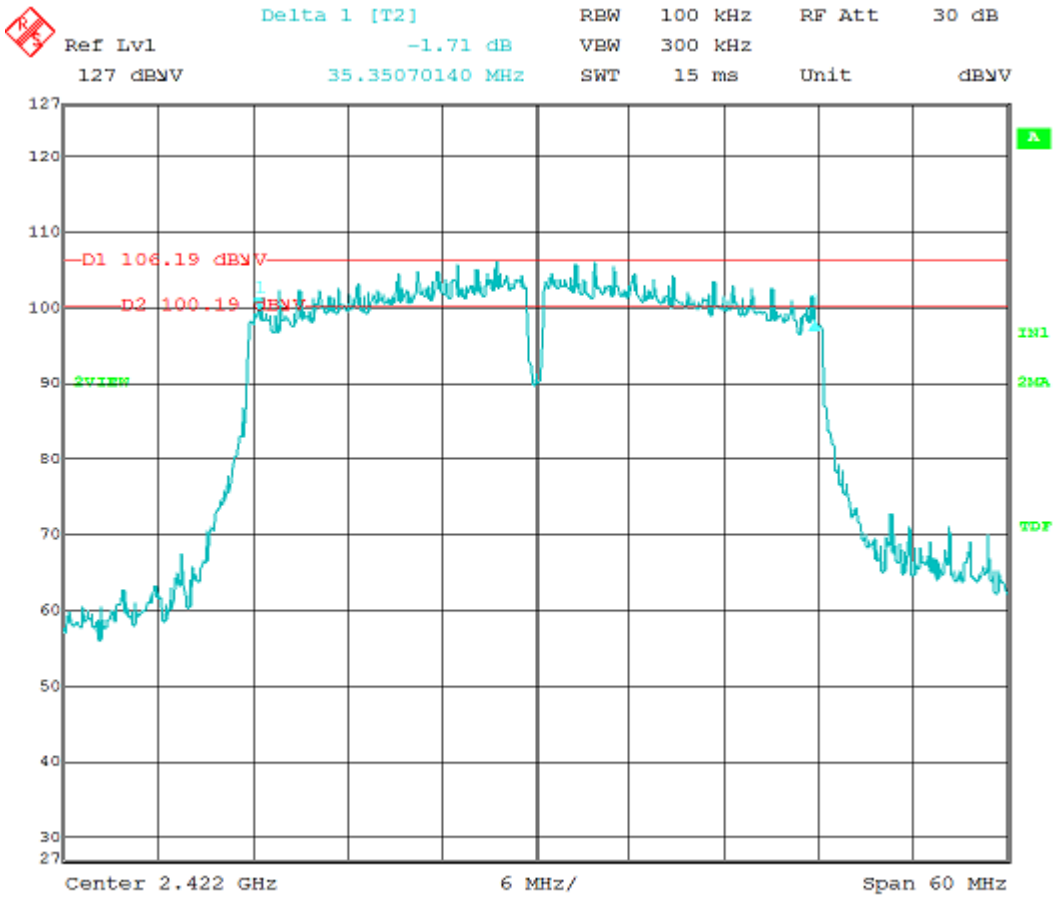
FCC 15.247

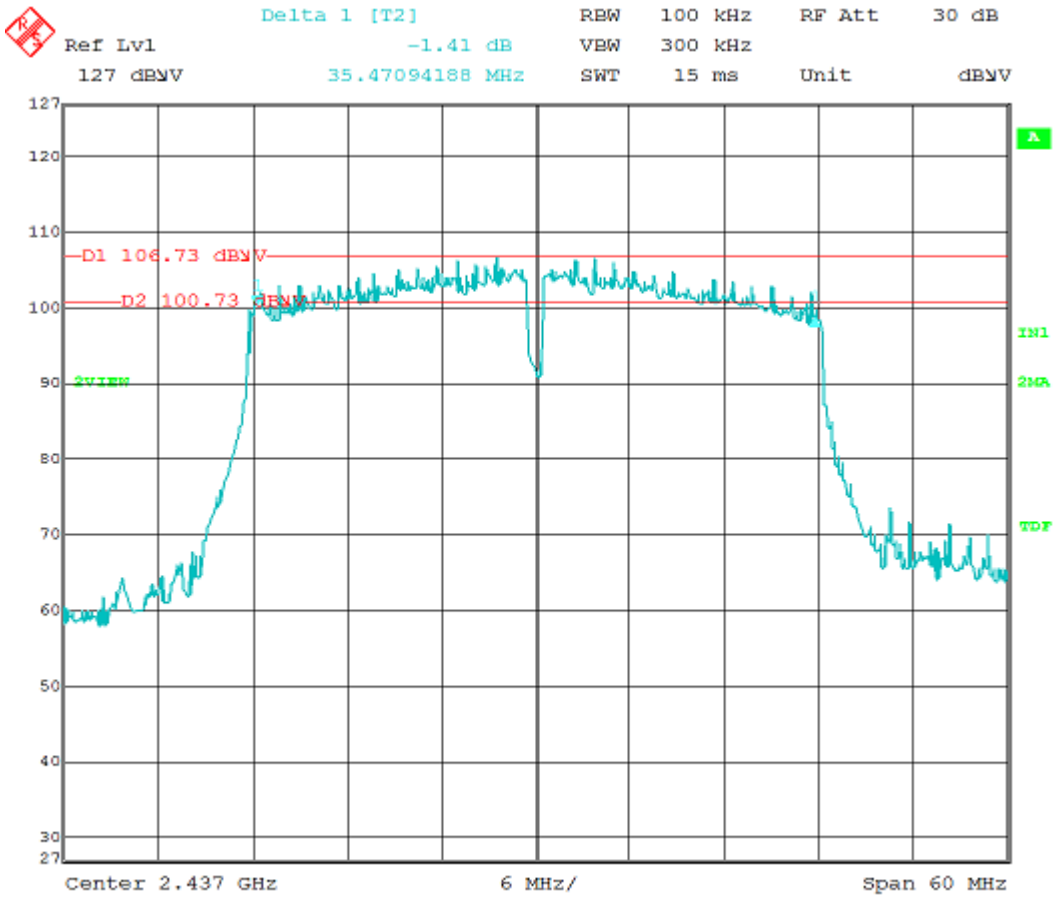
Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test Eng:	Torey Oliver
Mode:	802.11n		
Antenna:	2		

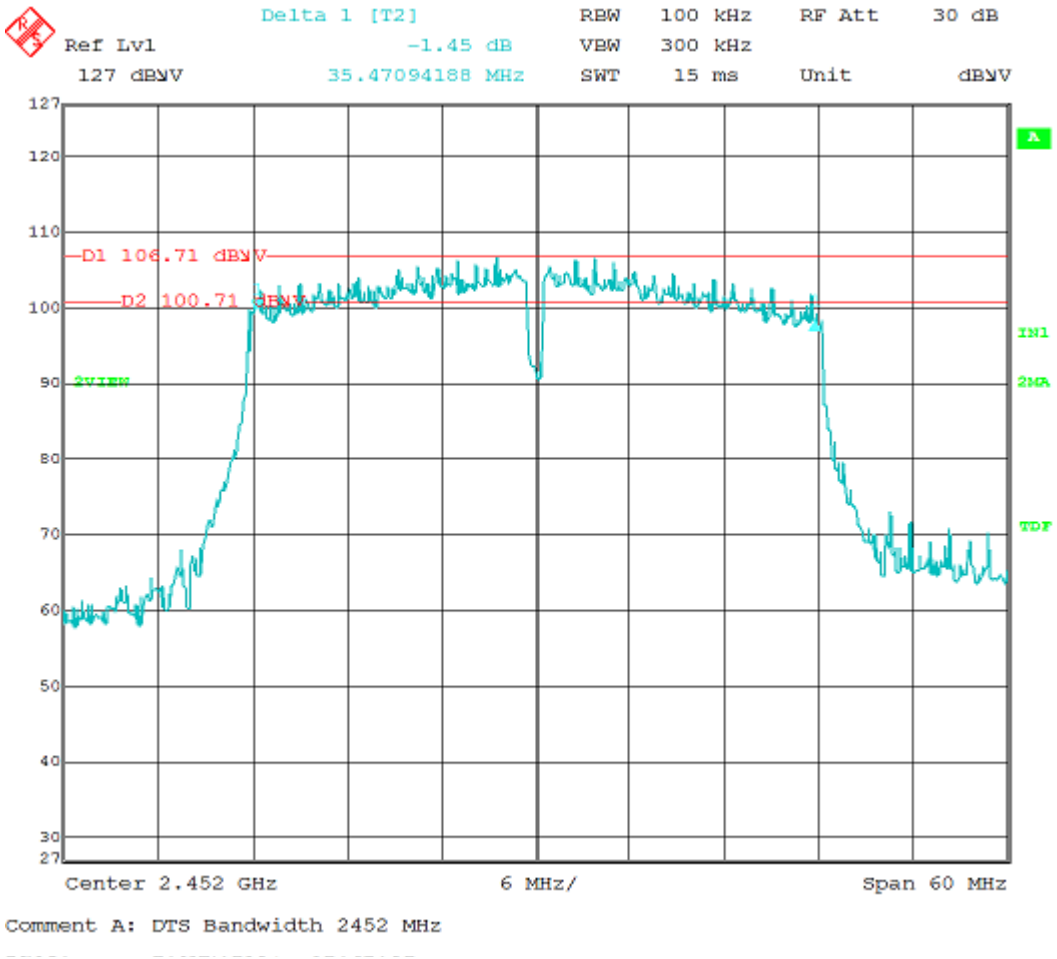
Compatible Electronics, Inc. FAC-3 (Lab P)

DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2422	35350.70	500.00	34850.70	Peak	
2437	35470.94	500.00	34970.94	Peak	
2452	35470.94	500.00	34970.94	Peak	


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-1.71 dB
VBW 300 kHz
127 dBµV
35.35070140 MHz
SWT 15 ms
Unit dBµV
D1 106.19 dBµV
D2 100.19 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.422 GHz
6 MHz/
Span 60 MHz
Comment A: DTS Bandwidth 2422 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-1.41 dB
VBW 300 kHz
127 dBµV
35.47094188 MHz
SWT 15 ms
Unit dBµV
D1 106.73 dBµV
D2 100.73 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.437 GHz
6 MHz/
Span 60 MHz
Comment A: DTS Bandwidth 2437 MHz


Delta 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-1.45 dB
VBW 300 kHz
127 dBµV
35.47094188 MHz
SWT 15 ms
Unit dBµV
D1 106.71 dBµV
D2 100.71 dBµV
2VIEW
A
IN1
2MA
TDF
Center 2.452 GHz
6 MHz/
Span 60 MHz
Comment A: DTS Bandwidth 2452 MHz

MAXIMUM PEAK CONDUCTED OUTPUT POWER

DATA SHEETS

802.11b

ANTENNA 1

MAXIMUM PEAK CONDUCTED OUTPUT POWER

FCC 15.247

Company:	Phyn LLC	Date:	10/25/2017
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Jorge Reyes
Mode:	802.11b		
Antenna:	1		

Compatible Electronics, Inc. FAC-3 (Lab P)

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	17.49	30.00	-12.51	Peak	
2437	17.73	30.00	-12.27	Peak	
2462	17.48	30.00	-12.52	Peak	

MAXIMUM PEAK CONDUCTED OUTPUT POWER

DATA SHEETS

802.11b

ANTENNA 2

MAXIMUM PEAK CONDUCTED OUTPUT POWER

FCC 15.247

Company:	Phyn LLC	Date:	10/23/2017
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Jorge Reyes
Mode:	802.11b		
Antenna:	2		

Compatible Electronics, Inc. FAC-3 (Lab P)

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	17.35	30.00	-12.65	Peak	
2437	17.60	30.00	-12.40	Peak	
2462	17.48	30.00	-12.52	Peak	

MAXIMUM PEAK CONDUCTED OUTPUT POWER

DATA SHEETS

802.11g

ANTENNA 1

MAXIMUM PEAK CONDUCTED OUTPUT POWER

FCC 15.247

Company:	Phyn LLC	Date:	10/25/2017
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Jorge Reyes
Mode:	802.11g		
Antenna:	1		

Compatible Electronics, Inc. FAC-3 (Lab P)

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	16.27	30.00	-13.73	Peak	
2437	16.71	30.00	-13.29	Peak	
2462	16.71	30.00	-13.29	Peak	

MAXIMUM PEAK CONDUCTED OUTPUT POWER

DATA SHEETS

802.11g

ANTENNA 2

MAXIMUM PEAK CONDUCTED OUTPUT POWER

FCC 15.247

Company:	Phyn LLC	Date:	10/16/2017
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Jorge Reyes
Mode:	802.11g		
Antenna:	2		

Compatible Electronics, Inc. FAC-3 (Lab P)

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	15.93	30.00	-14.07	Peak	
2437	16.39	30.00	-13.61	Peak	
2462	16.49	30.00	-13.51	Peak	

MAXIMUM PEAK CONDUCTED OUTPUT POWER

DATA SHEETS

802.11n (20 MHz)

ANTENNA 1

MAXIMUM PEAK CONDUCTED OUTPUT POWER

FCC 15.247

Company:	Phyn LLC	Date:	10/25/2017
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Jorge Reyes
Mode:	802.11n		
Antenna:	1		

Compatible Electronics, Inc. FAC-3 (Lab P)

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	15.33	30.00	-14.67	Peak	
2437	16.15	30.00	-13.85	Peak	
2462	16.05	30.00	-13.95	Peak	

MAXIMUM PEAK CONDUCTED OUTPUT POWER

DATA SHEETS

802.11n (20 MHz)

ANTENNA 2

MAXIMUM PEAK CONDUCTED OUTPUT POWER

FCC 15.247

Company:	Phyn LLC	Date:	10/25/2017
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Jorge Reyes
Mode:	802.11n		
Antenna:	2		

Compatible Electronics, Inc. FAC-3 (Lab P)

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	15.71	30.00	-14.29	Peak	
2437	15.93	30.00	-14.07	Peak	
2462	16.39	30.00	-13.61	Peak	

MAXIMUM PEAK CONDUCTED OUTPUT POWER

DATA SHEETS

802.11n (40 MHz)

ANTENNA 1

MAXIMUM PEAK CONDUCTED OUTPUT POWER

FCC 15.247

Company:	Phyn LLC	Date:	10/25/2017
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Jorge Reyes
Mode:	802.11n		
Antenna:	1		

Compatible Electronics, Inc. FAC-3 (Lab P)

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2422	13.08	30.00	-16.92	Peak	
2437	13.64	30.00	-16.36	Peak	
2452	13.48	30.00	-16.52	Peak	

MAXIMUM PEAK CONDUCTED OUTPUT POWER

DATA SHEETS

802.11n (40 MHz)

ANTENNA 2

MAXIMUM PEAK CONDUCTED OUTPUT POWER

FCC 15.247

Company:	Phyn LLC	Date:	10/25/2017
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Jorge Reyes
Mode:	802.11n		
Antenna:	2		

Compatible Electronics, Inc. FAC-3 (Lab P)

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2422	13.08	30.00	-16.92	Peak	
2437	13.32	30.00	-16.68	Peak	
2452	13.48	30.00	-16.52	Peak	

MAXIMUM PEAK POWER SPECTRAL DENSITY LEVEL IN THE FUNDAMENTAL EMISSION

DATA SHEETS

802.11b

ANTENNA 1

POWER SPECTRAL DENSITY

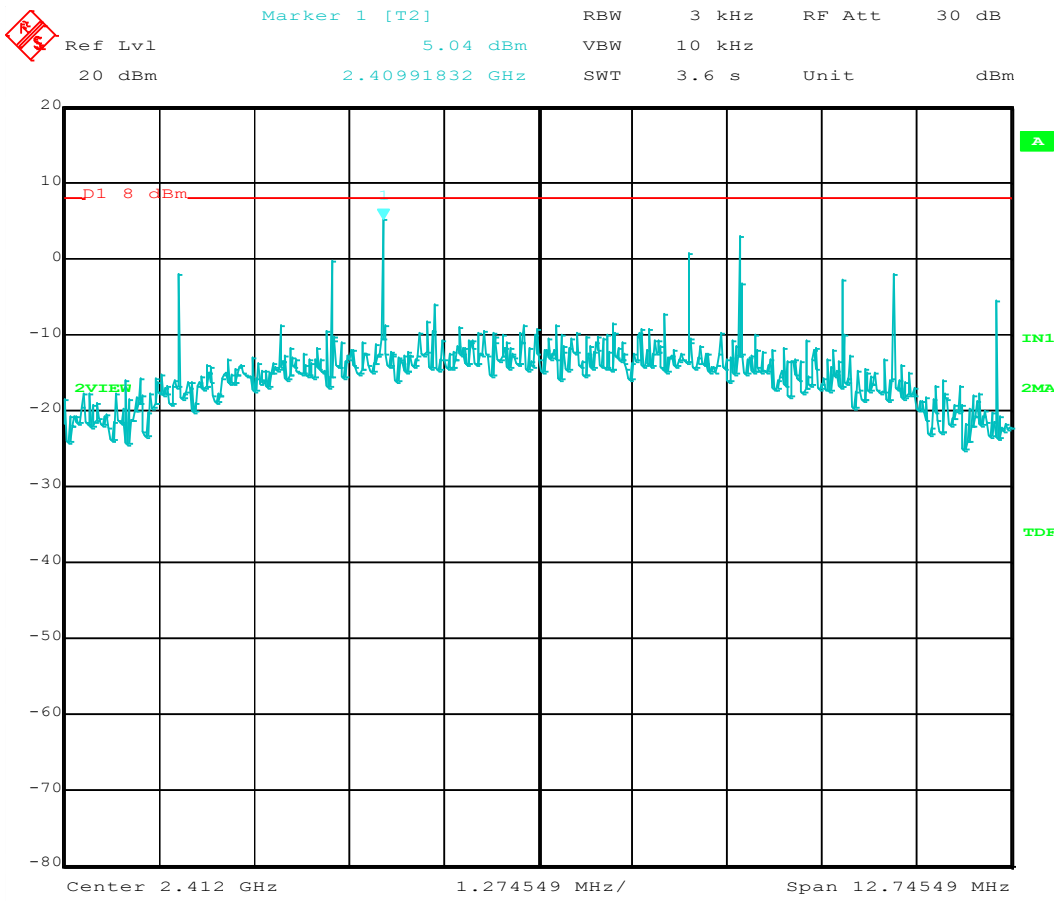
FCC 15.247

Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Torey Oliver
Mode:	802.11b		
Antenna:	1		

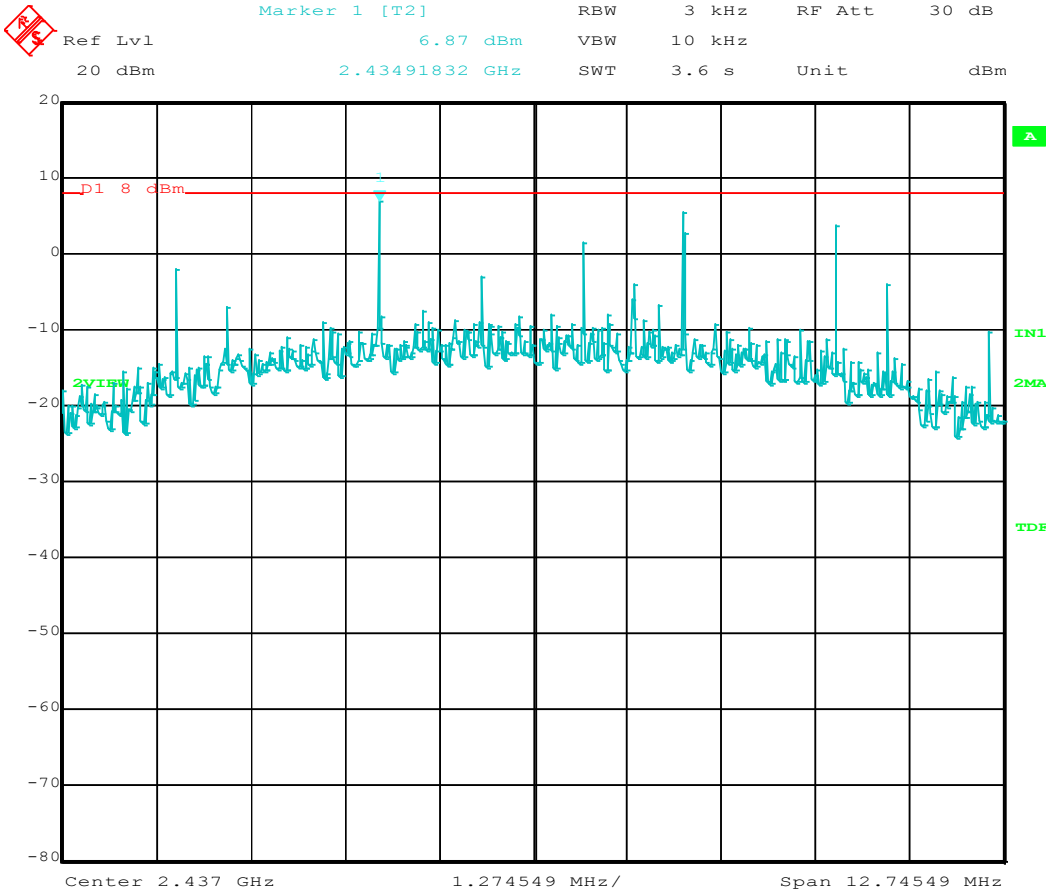
Compatible Electronics, Inc. FAC-3 (Lab P)

DTS Bandwidth

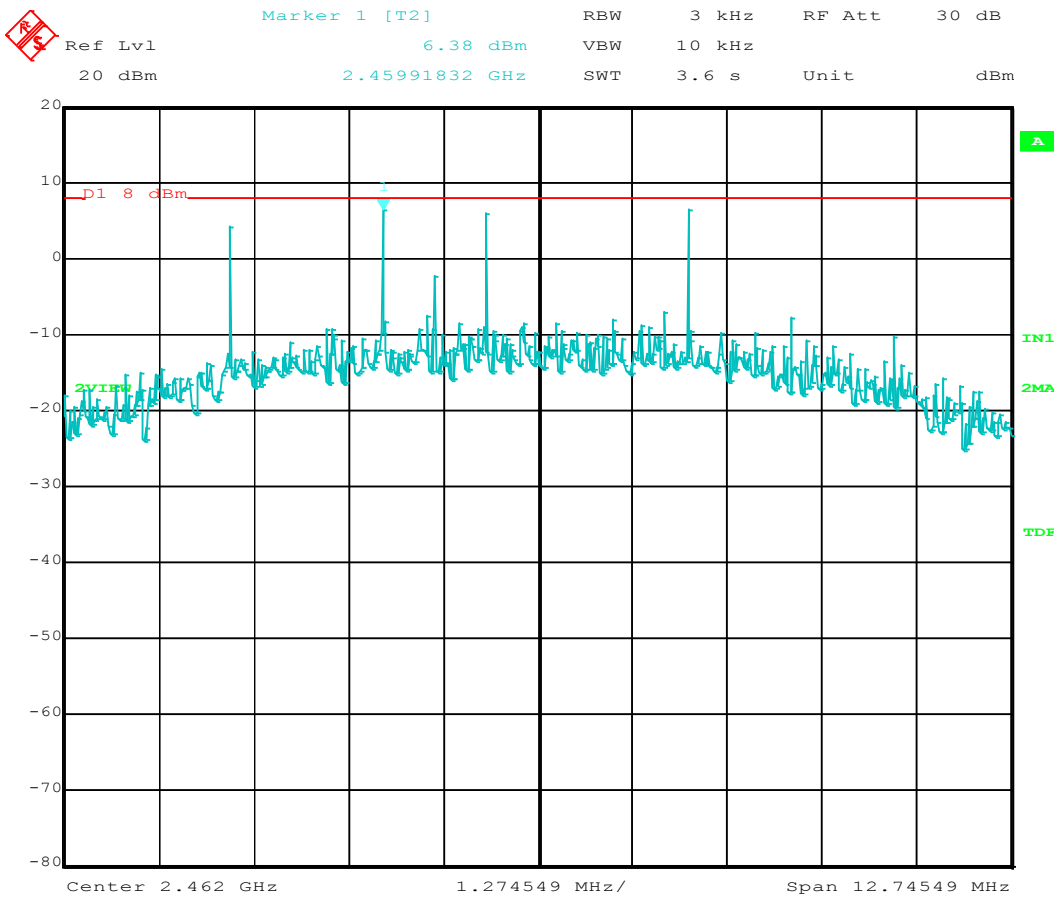
Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	5.04	8.00	-2.96	Peak	
2437	6.87	8.00	-1.13	Peak	
2462	6.38	8.00	-1.62	Peak	



Comment A: PSD 2412 MHz



Comment A: PSD 2437 MHz



Comment A: PSD 2462 MHz

MAXIMUM PEAK POWER SPECTRAL DENSITY LEVEL IN THE FUNDAMENTAL EMISSION

DATA SHEETS

802.11b

ANTENNA 2

POWER SPECTRAL DENSITY

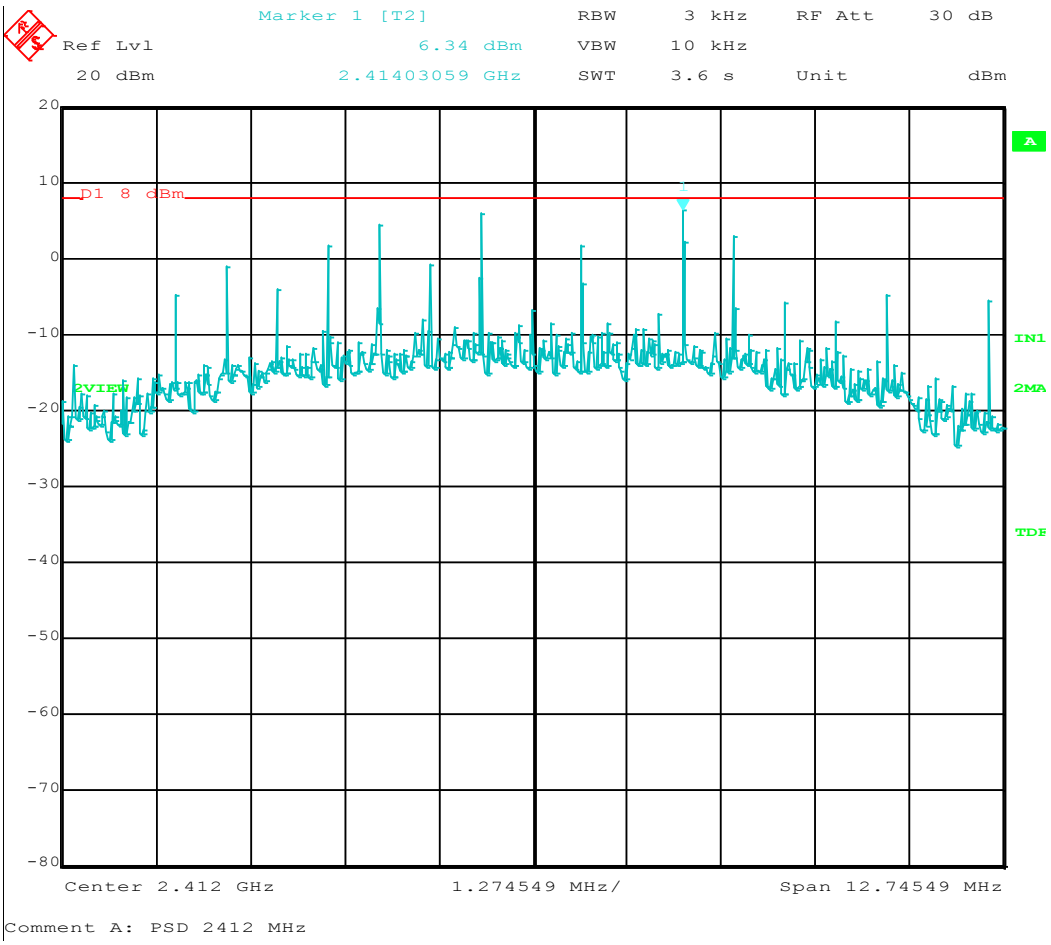
FCC 15.247

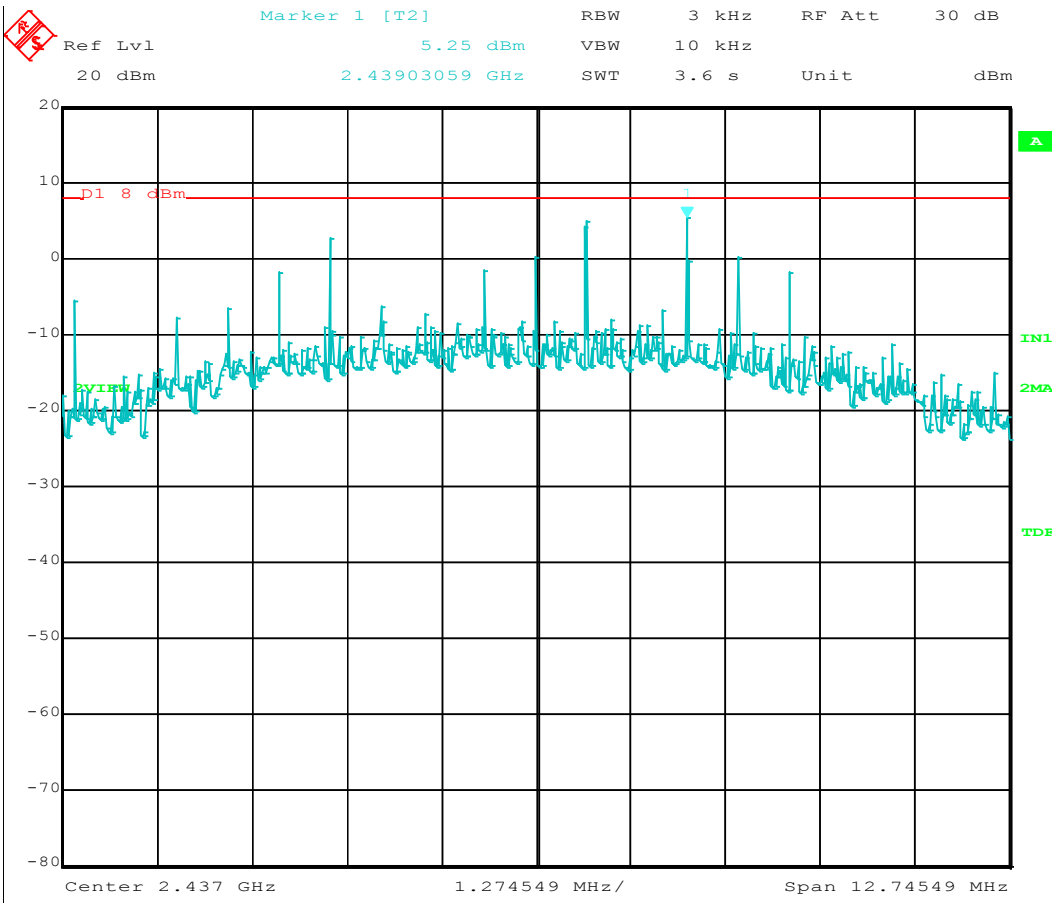
Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Torey Oliver
Mode:	802.11b		
Antenna:	2		

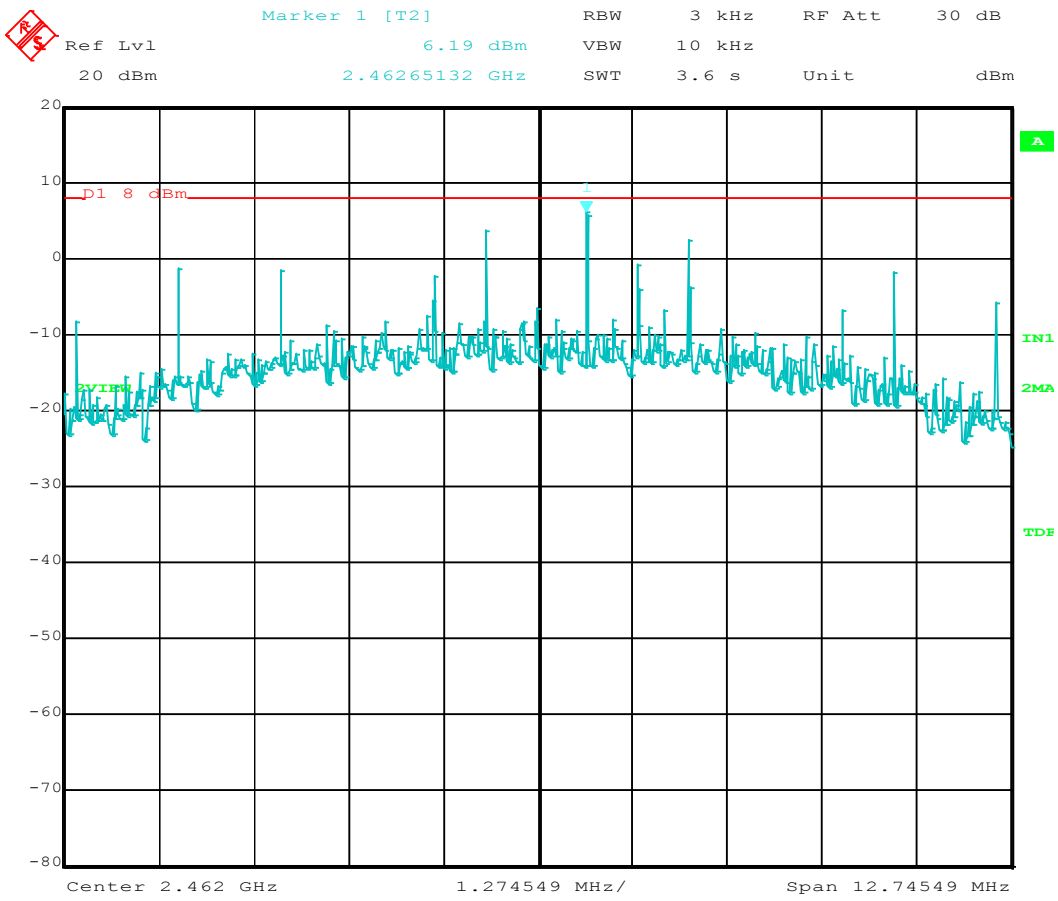
Compatible Electronics, Inc. FAC-3 (Lab P)

DTS Bandwidth

Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	6.34	8.00	-1.66	Peak	
2437	5.25	8.00	-2.75	Peak	
2462	6.19	8.00	-1.81	Peak	


Marker 1 [T2]
RBW 3 kHz
RF Att 30 dB
Ref Lvl
6.34 dBm
VBW 10 kHz
20 dBm
2.41403059 GHz
SWT 3.6 s
Unit dBm
D1 8 dBm
2VIEW
A
IN1
2MA
TDF
Center 2.412 GHz
1.274549 MHz/
Span 12.74549 MHz
Comment A: PSD 2412 MHz


Marker 1 [T2]
RBW 3 kHz
RF Att 30 dB
Ref Lvl
5.25 dBm
VBW 10 kHz
20 dBm
2.43903059 GHz
SWT 3.6 s
Unit dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
D1 8 dBm
A
IN1
2MA
TDE
Center 2.437 GHz
1.274549 MHz/
Span 12.74549 MHz
Comment A: PSD 2437 MHz



Comment A: PSD 2462 MHz

MAXIMUM PEAK POWER SPECTRAL DENSITY LEVEL IN THE FUNDAMENTAL EMISSION

DATA SHEETS

802.11g

ANTENNA 1

POWER SPECTRAL DENSITY

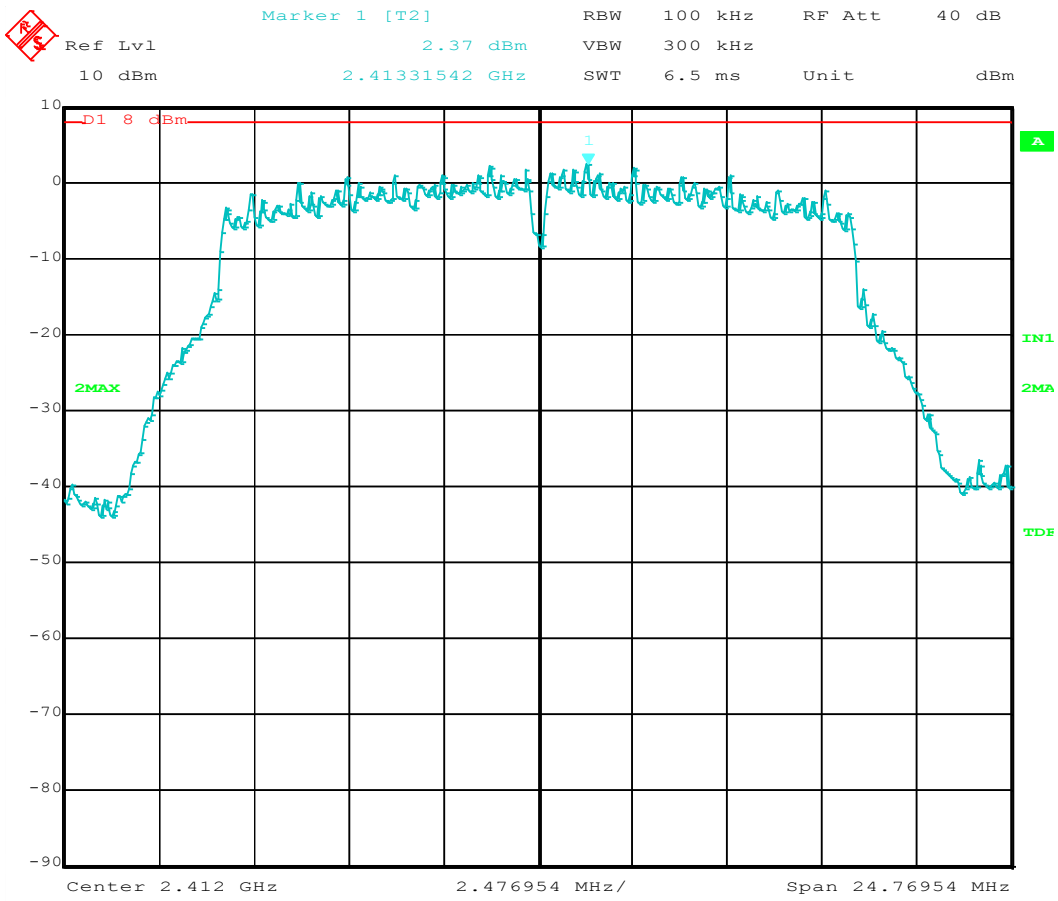
FCC 15.247

Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Torey Oliver
Mode:	802.11g		
Antenna:	1		

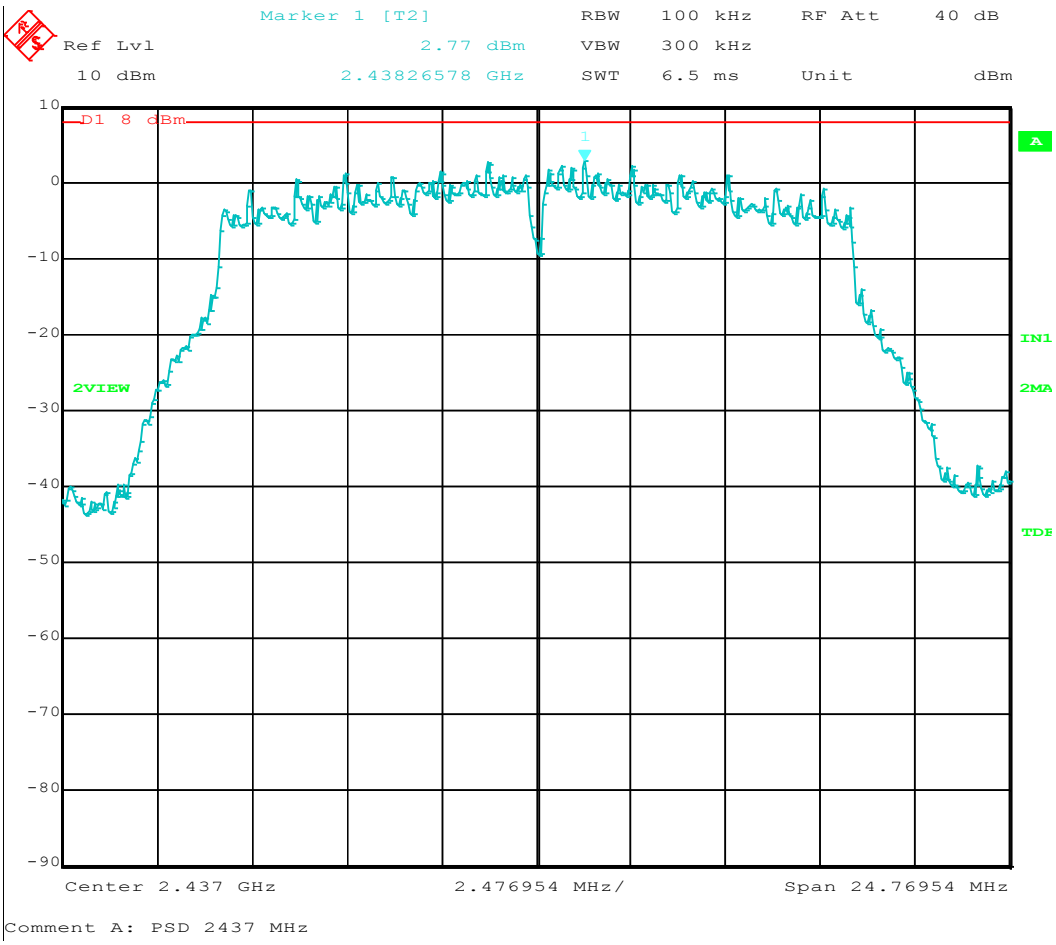
Compatible Electronics, Inc. FAC-3 (Lab P)

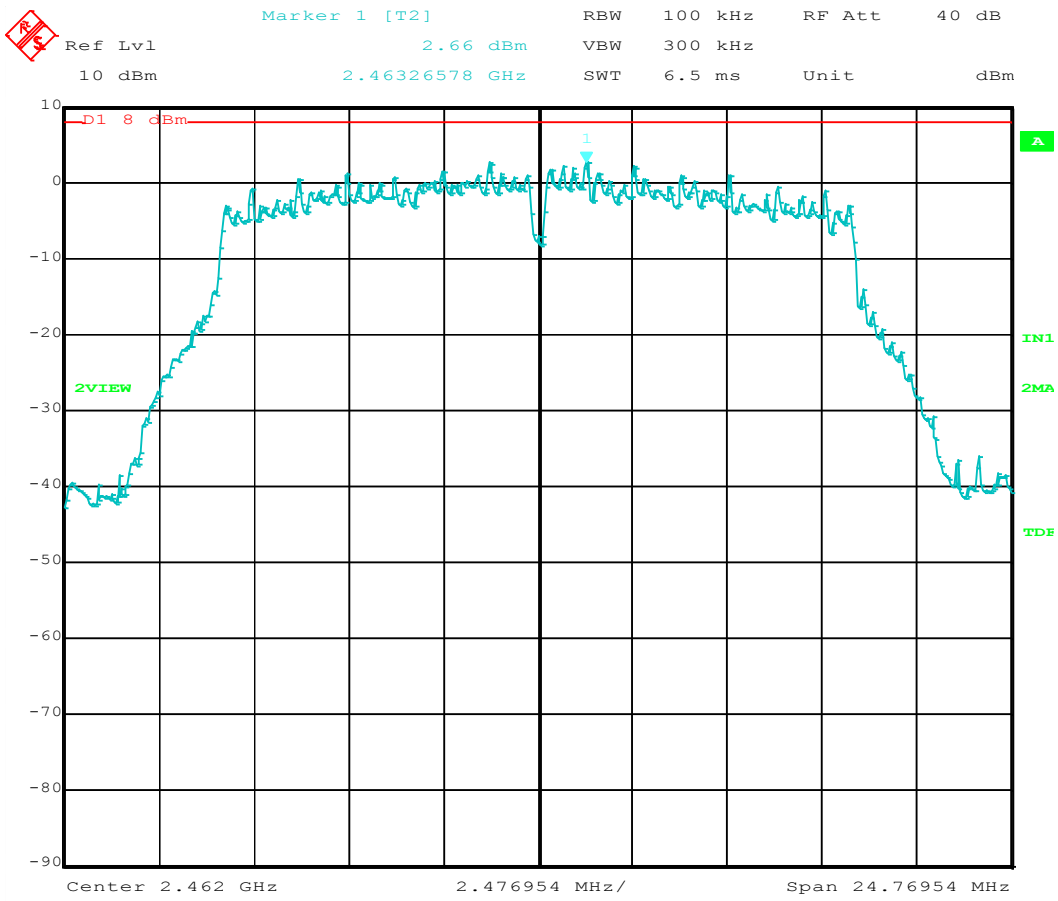
DTS Bandwidth

Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	2.37	8.00	-5.63	Peak	
2437	2.77	8.00	-5.23	Peak	
2462	2.63	8.00	-5.37	Peak	



Comment A: PSD 2412 MHz


Marker 1 [T2]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
2.77 dBm
VBW 300 kHz
10 dBm
2.43826578 GHz
SWT 6.5 ms
Unit dBm
D1 8 dBm
2VIEW
A
IN1
2MA
TDE
Center 2.437 GHz
2.476954 MHz/
Span 24.76954 MHz
Comment A: PSD 2437 MHz



Comment A: PSD 2462 MHz

MAXIMUM PEAK POWER SPECTRAL DENSITY LEVEL IN THE FUNDAMENTAL EMISSION

DATA SHEETS

802.11g

ANTENNA 2

POWER SPECTRAL DENSITY

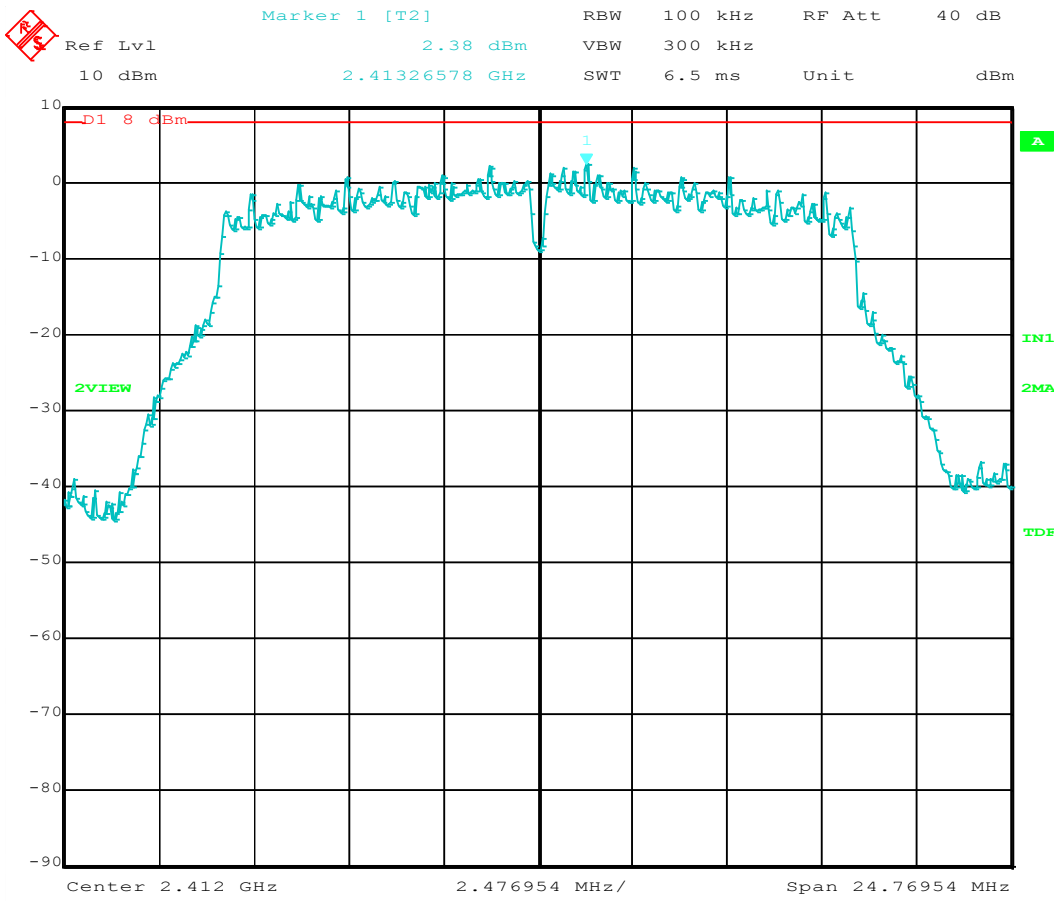
FCC 15.247

Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Torey Oliver
Mode:	802.11g		
Antenna:	2		

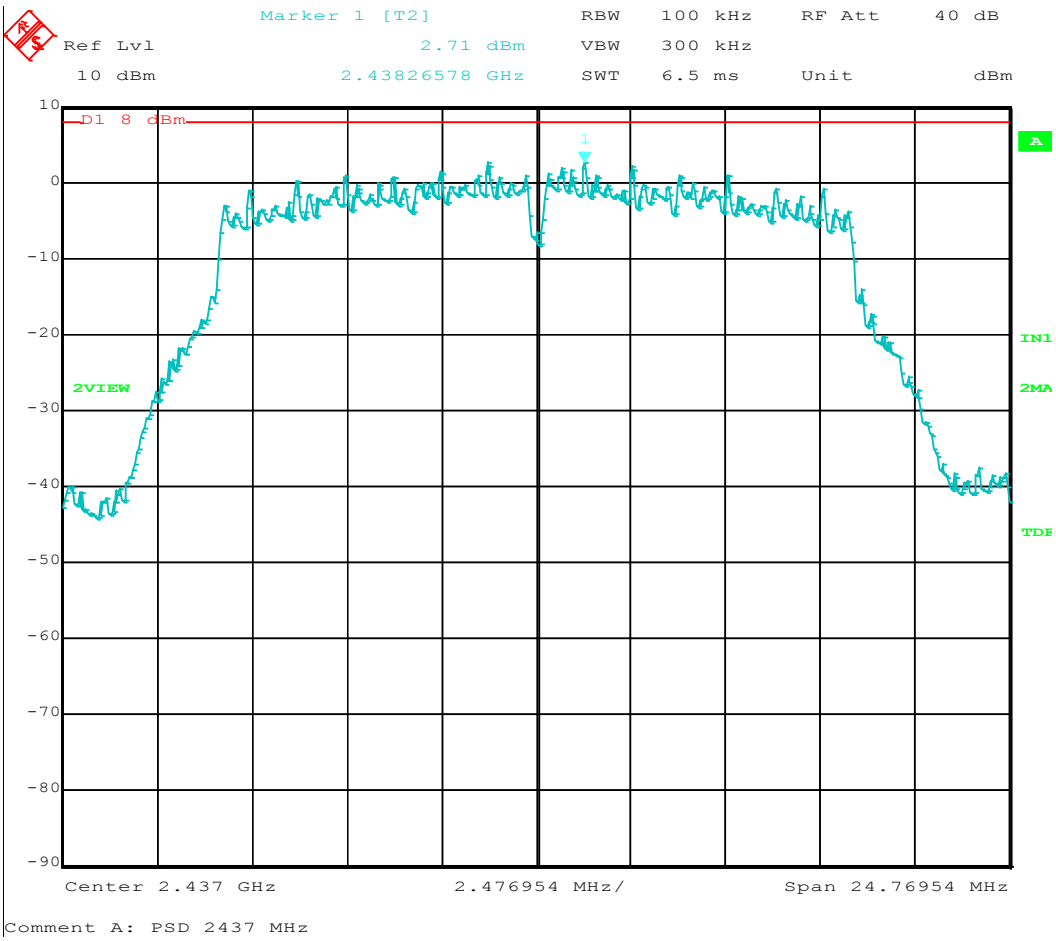
Compatible Electronics, Inc. FAC-3 (Lab P)

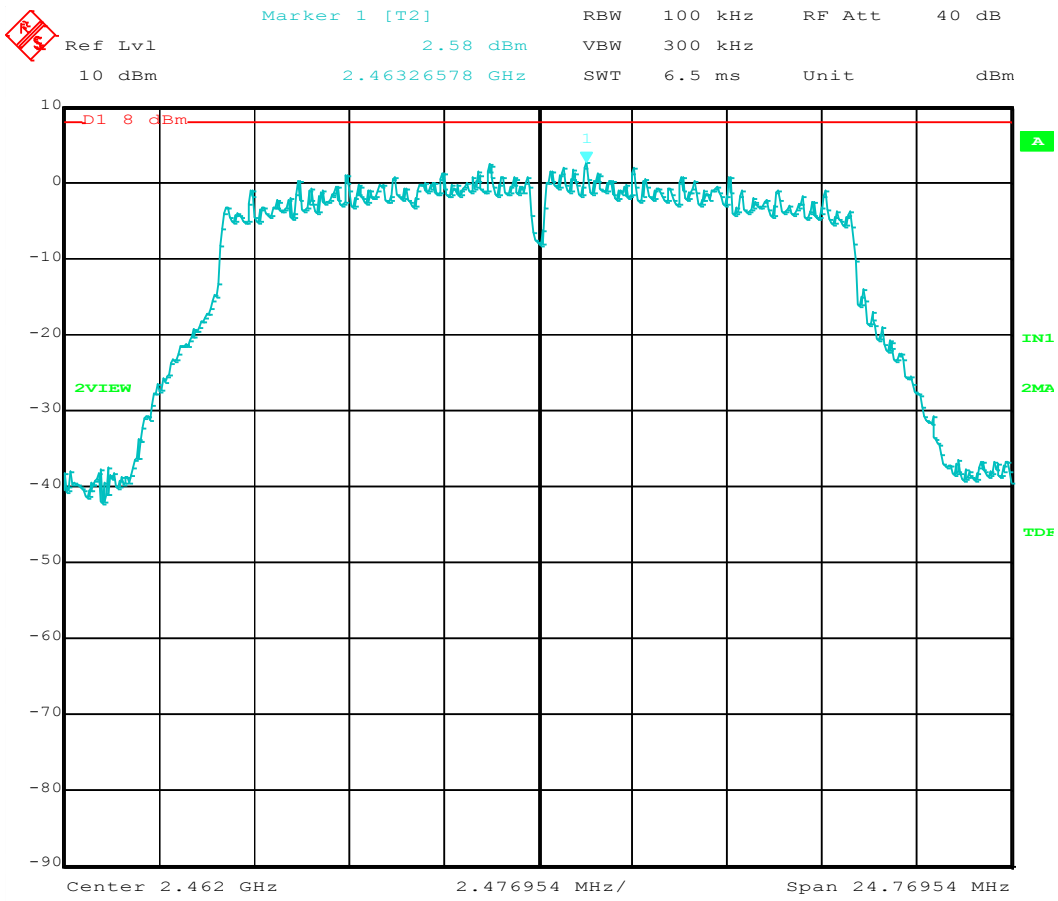
DTS Bandwidth

Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	2.38	8.00	-5.62	Peak	
2437	2.71	8.00	-5.29	Peak	
2462	2.58	8.00	-5.42	Peak	



Comment A: PSD 2412 MHz


Marker 1 [T2]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
2.71 dBm
VBW 300 kHz
10 dBm
2.43826578 GHz
SWT 6.5 ms
Unit dBm
D1 8 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
2VIEW
A
IN1
2MA
TDE
Center 2.437 GHz
2.476954 MHz/
Span 24.76954 MHz
Comment A: PSD 2437 MHz



Comment A: PSD 2462 MHz

MAXIMUM PEAK POWER SPECTRAL DENSITY LEVEL IN THE FUNDAMENTAL EMISSION

DATA SHEETS

802.11n (20 MHz)

ANTENNA 1

POWER SPECTRAL DENSITY

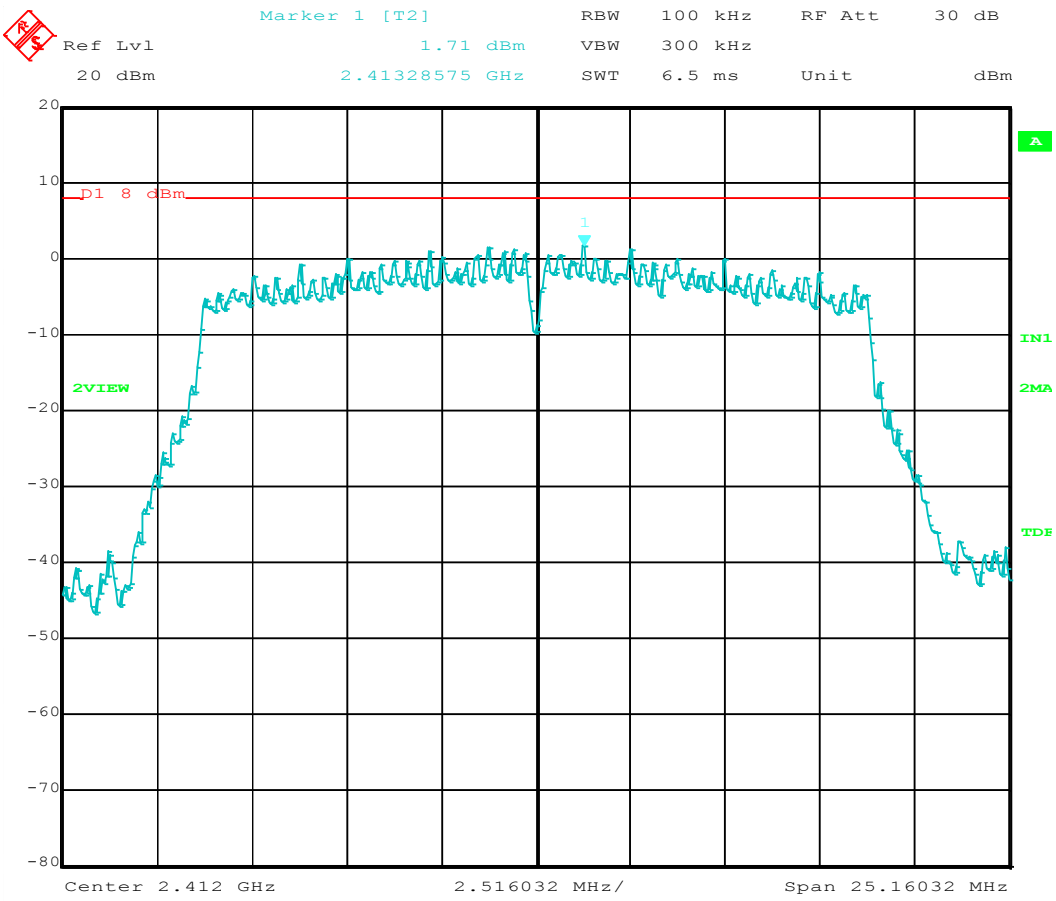
FCC 15.247

Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Torey Oliver
Mode:	802.11n		
Antenna:	1		

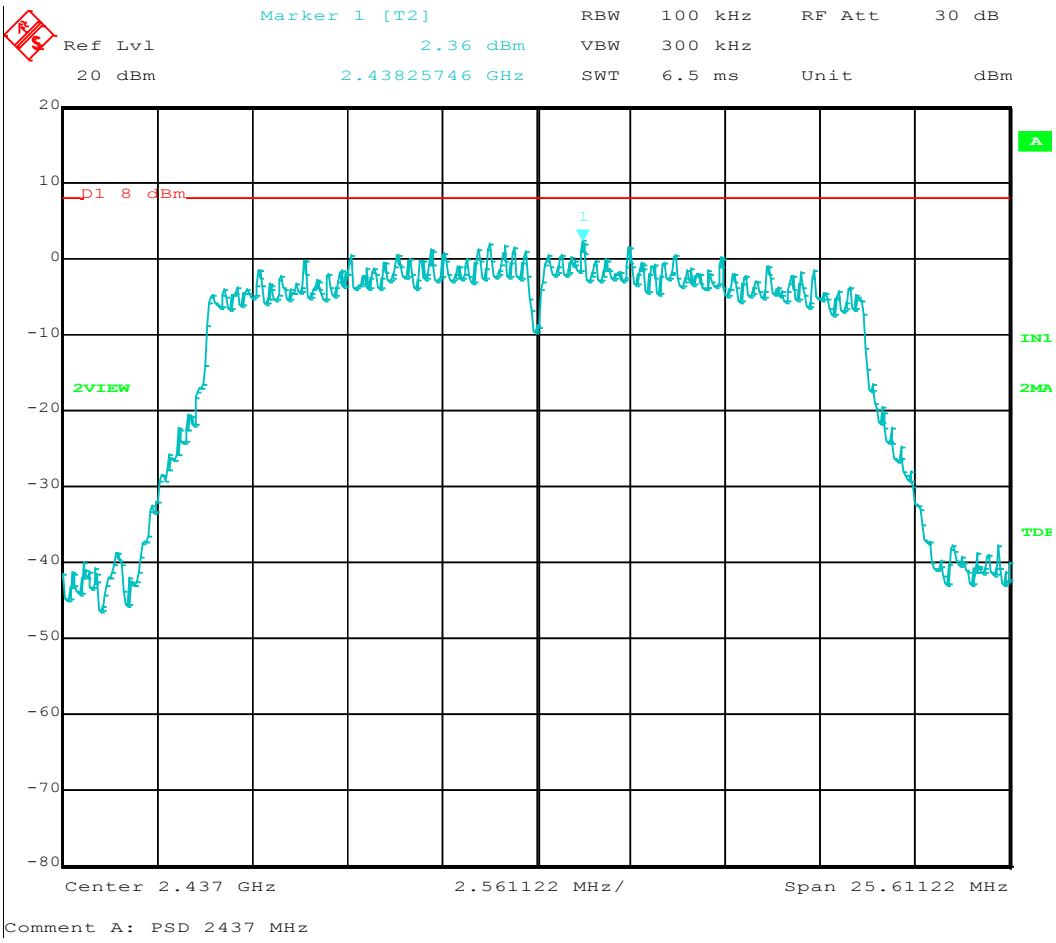
Compatible Electronics, Inc. FAC-3 (Lab P)

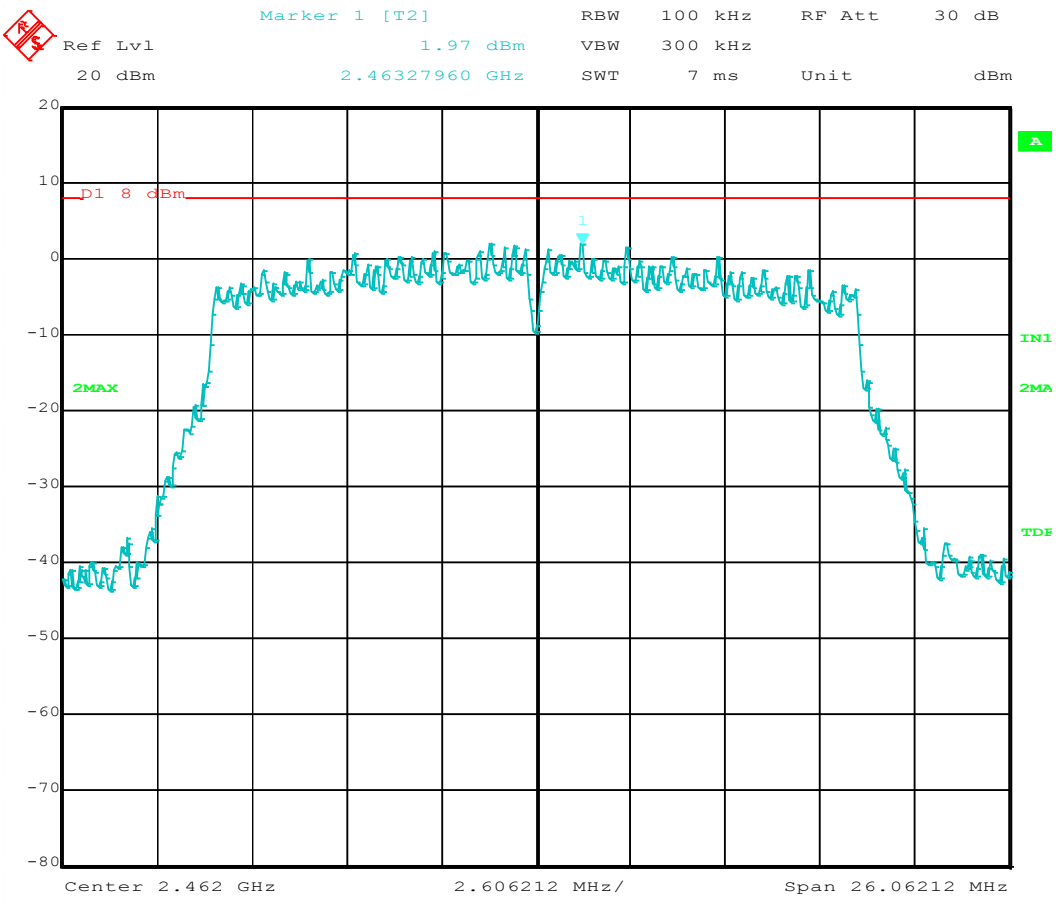
DTS Bandwidth

Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	1.71	8.00	-6.29	Peak	
2437	2.36	8.00	-5.64	Peak	
2462	1.97	8.00	-6.03	Peak	



Comment A: PSD 2412 MHz


Marker 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
2.36 dBm
VBW 300 kHz
20 dBm
2.43825746 GHz
SWT 6.5 ms
Unit dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
p1 8 dBm
1
2VIEW
A
IN1
2MA
TDE
Center 2.437 GHz
2.561122 MHz/
Span 25.61122 MHz
Comment A: PSD 2437 MHz



Comment A: PSD 2462 MHz

MAXIMUM PEAK POWER SPECTRAL DENSITY LEVEL IN THE FUNDAMENTAL EMISSION

DATA SHEETS

802.11n (20 MHz)

ANTENNA 2

POWER SPECTRAL DENSITY

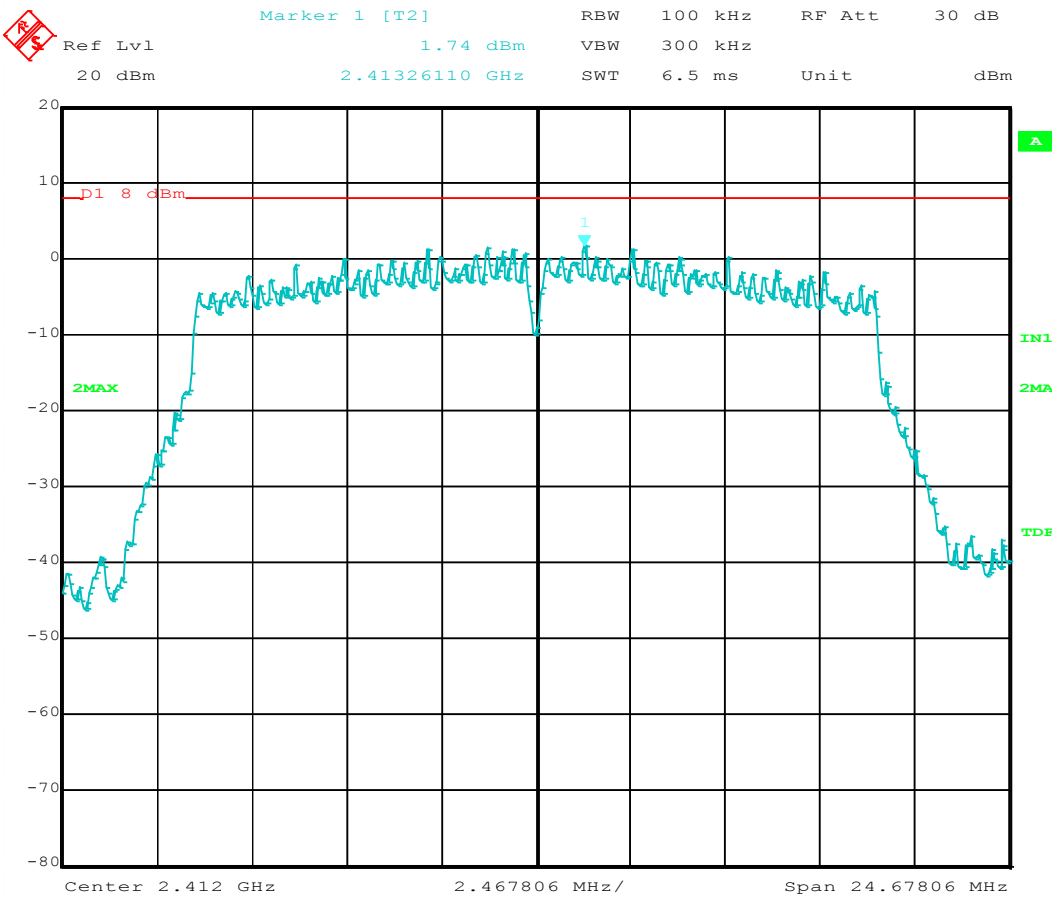
FCC 15.247

Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Torey Oliver
Mode:	802.11n		
Antenna:	2		

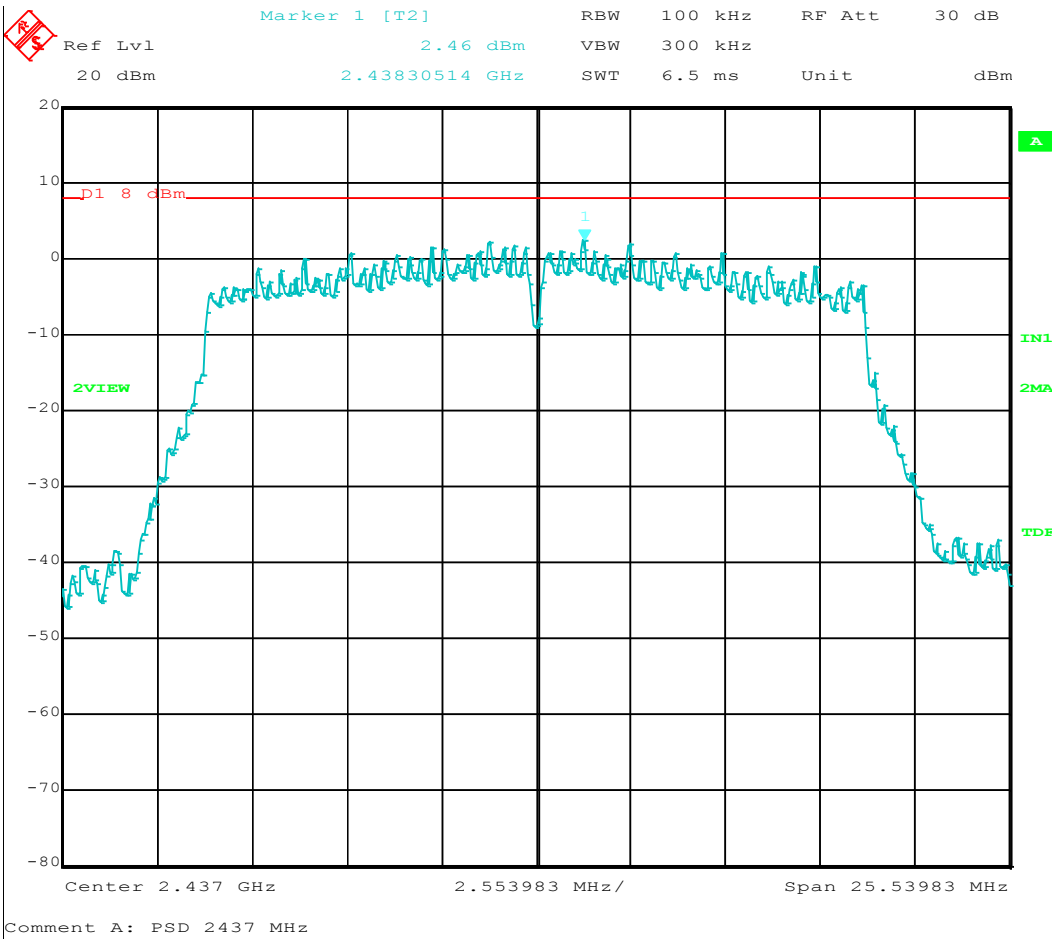
Compatible Electronics, Inc. FAC-3 (Lab P)

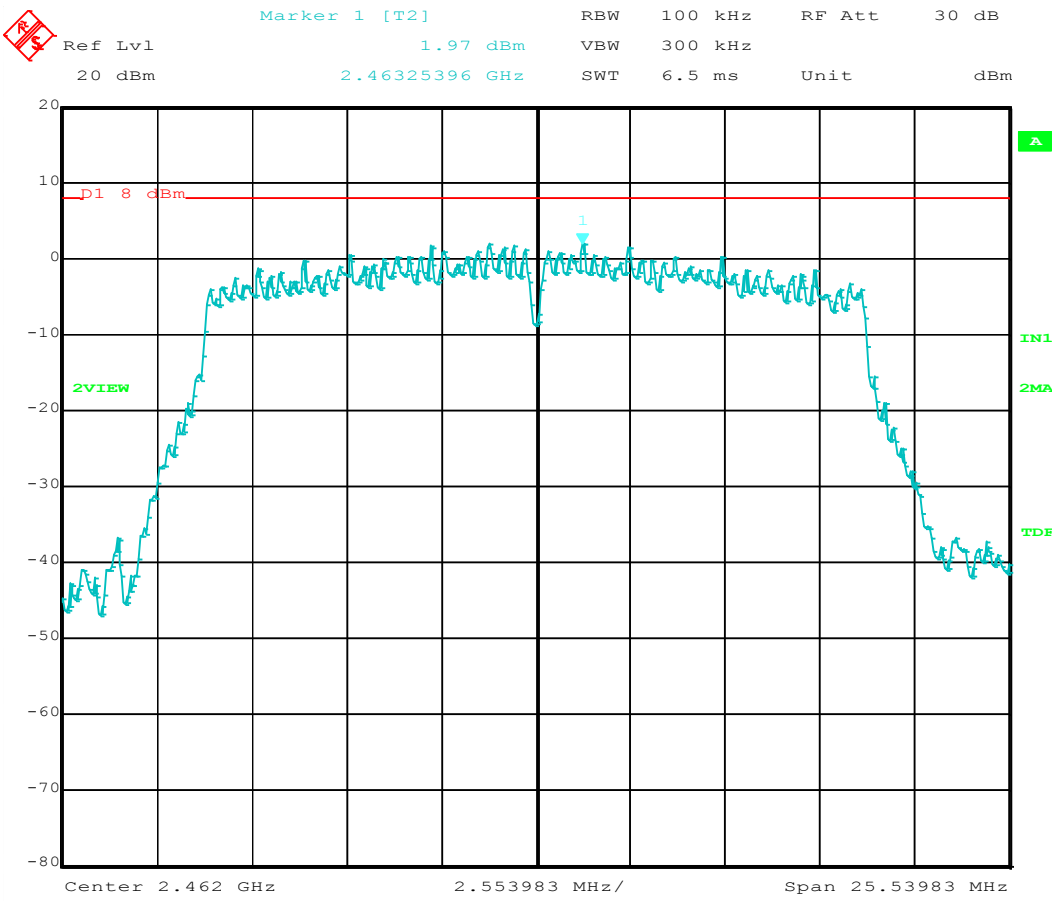
DTS Bandwidth

Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	1.74	8.00	-6.26	Peak	
2437	2.46	8.00	-5.54	Peak	
2462	1.97	8.00	-6.03	Peak	



Comment A: PSD 2412 MHz


Marker 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
2.46 dBm
VBW 300 kHz
20 dBm
2.43830514 GHz
SWT 6.5 ms
Unit dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
p1 8 dBm
1
2VIEW
A
IN1
2MA
TDE
Center 2.437 GHz
2.553983 MHz/
Span 25.53983 MHz
Comment A: PSD 2437 MHz



Comment A: PSD 2462 MHz

MAXIMUM PEAK POWER SPECTRAL DENSITY LEVEL IN THE FUNDAMENTAL EMISSION

DATA SHEETS

802.11n (40 MHz)

ANTENNA 1

POWER SPECTRAL DENSITY

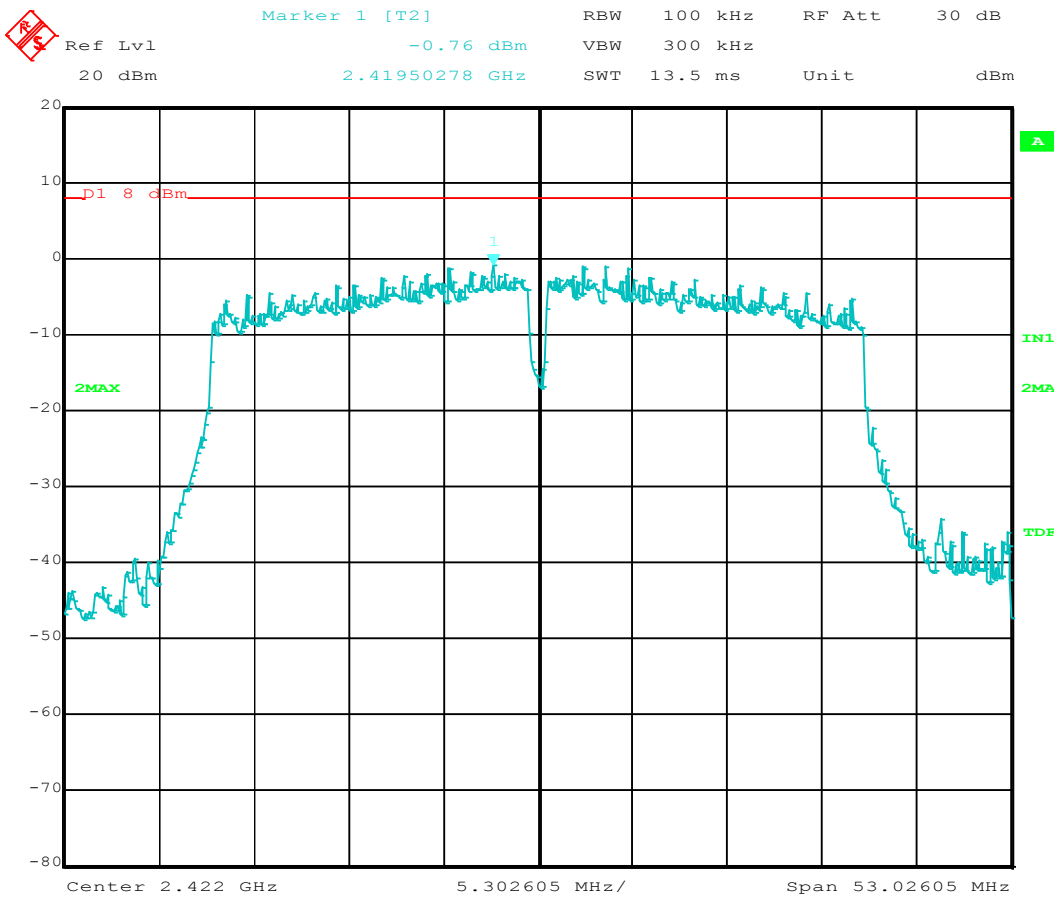
FCC 15.247

Company:	Phyn LLC	Date:	1/29/2018
EUT:	Leak Detector	Lab:	P
Model:	PHYPF001	Test ENG:	Torey Oliver
Mode:	802.11n		
Antenna:	1		

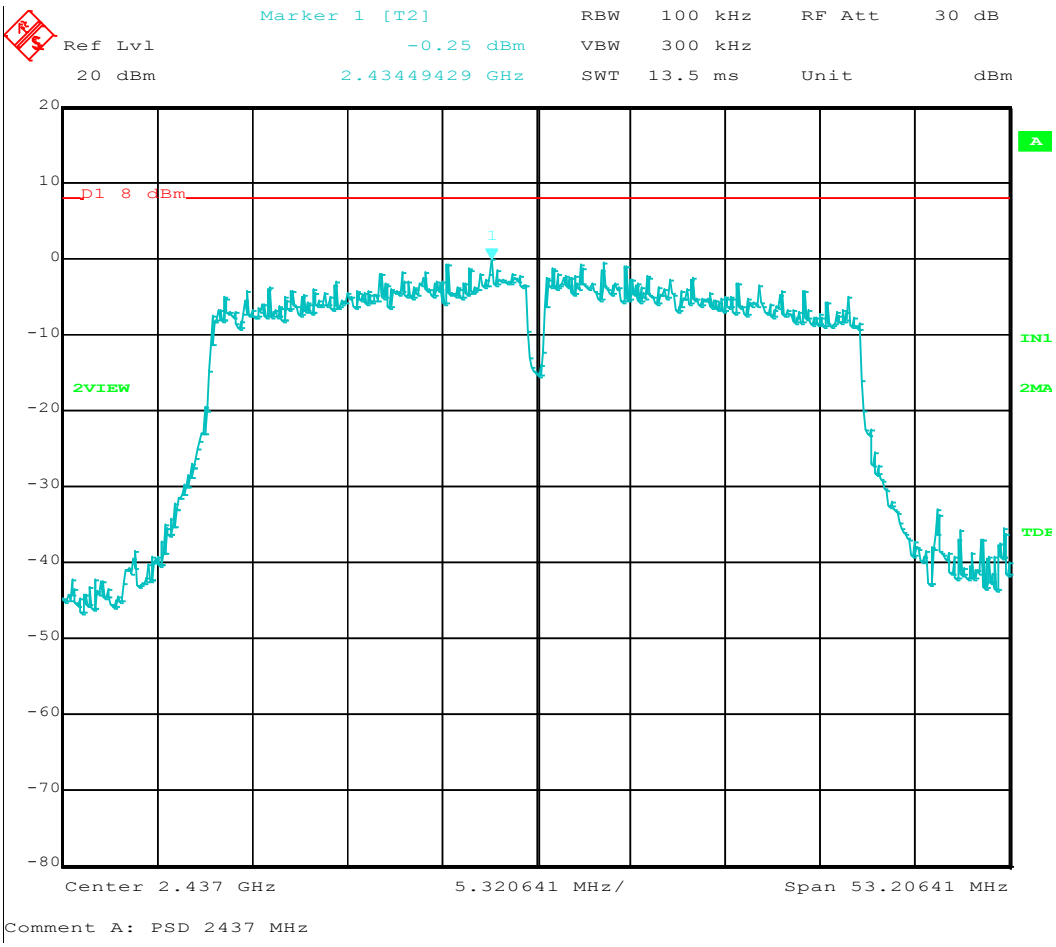
Compatible Electronics, Inc. FAC-3 (Lab P)

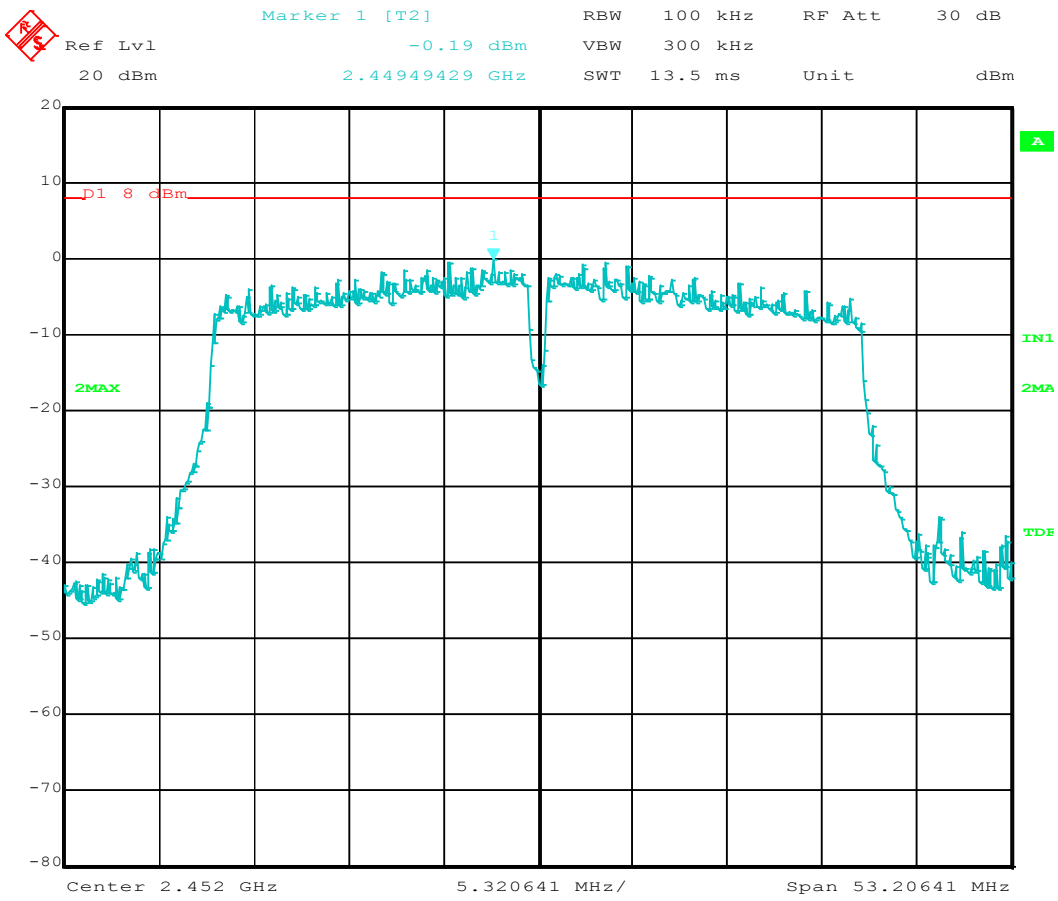
DTS Bandwidth

Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2422	-0.78	8.00	-8.78	Peak	
2437	-0.25	8.00	-8.25	Peak	
2452	-0.19	8.00	-8.19	Peak	



Comment A: PSD 2422 MHz


Marker 1 [T2]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-0.25 dBm
VBW 300 kHz
20 dBm
2.43449429 GHz
SWT 13.5 ms
Unit dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
D1 8 dBm
1
2VIEW
A
IN1
2MA
TDE
Center 2.437 GHz
5.320641 MHz/
Span 53.20641 MHz
Comment A: PSD 2437 MHz



Comment A: PSD 2452 MHz

MAXIMUM PEAK POWER SPECTRAL DENSITY LEVEL IN THE FUNDAMENTAL EMISSION

DATA SHEETS

802.11n (40 MHz)

ANTENNA 2