ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Applicant:	BitaTek Co., Ltd. 6F., No. 115, Wugong 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan.
Product Name:	Frey
Brand Name:	Bitatek
Model No.:	Frey M1-0000, Frey M1-0010
Model Difference:	Frey M1-0000 with GPS, Frey M1-0010 without GPS
FCC ID:	SPYIM0002
Report Number:	ER/2018/10129
FCC Rule Part:	§15.247, Cat: DTS
Issue Date:	Feb. 09, 2018
Date of Test:	Jan. 18, 2018~ Jan. 22, 2018
Date of EUT Received:	Jan. 17, 2018

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Prepared By: Allen Tsai

Allen Tsai / Engineer

Approved By: Jim Chang

Jim Chang / Asst. Manager

Testing Laboratory
0513

Revision History

Report Number	Revision	Description	Issue Date
ER/2018/10129	Rev.00	Initial creation of document	Feb. 09, 2018

Table of Contents

1 GENERAL INFORMATION

1.1 Product description

General:

Product Name of Host:	Mobile Computers	
Brand Name of Host:	Opticon	
Model No of Host.:	H-28	
Model Difference:	N/A	
Hardware Version:	ES1.1	
Software Version:	N/A	
Scope:	The test report covers the radiated emissions requirements of the standards referenced in the report to allow system level approval of the module in this specific host.	
Class II Permissive change:	Frey INSTALLED IN Mobile Computers	
Power Supply:	3.7Vdc from Rechargeable Li-polymer Battery or 5V & 9V from AC/DC Adapter	
	Battery:	1. Model No.: BTBAT2, Supplier: Leung's Communication & Electric Products (Guangzhou) LTD. 2. Model No.: BTBAT1, Supplier: Leung's Communication & Electric Products (Guangzhou) LTD.
	Adapter:	Model No.: S018BDV0900200, Supplier: Ten Pao Industrial Co., Ltd.

WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Modulation Technology
11b/g	2412-2462	11	DSSS OFDM
11n (2.4GHz)	HT20 2412-2462	11	OFDM
11n (2.4GHz)	HT40 2422-2452	11	OFDM
Antenna Designation:		IFA Antenna, Gain: 2dBi	
Modulation type		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM	
Transition Rate:		802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 HT20: 6.5 – 72.5Mbps 802.11 HT40: 13.5 – 150Mbps	

1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247
FCC KDB 558074 D01 DTS Meas. Guidance
ANSI C63.10:2013
Note: All test items have been performed and record as per the above standards.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803 (TAF code 0513)

FCC Registration Numbers are: 509634 / TW0001

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Radiated Emissions for DTS & DSS

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.

2.3.2 Radiated Emissions (ERP/EIRP) for PCE

According to measurement procured TIA/EIA 603C, The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13.

2.4 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration

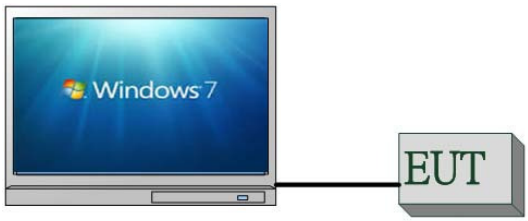


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	L430	R9-X11BG	Shielded	Unshielded

3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2483.5MHz Band

13 channels are provided for 802.11b, 802.11g and 802.11n_HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	8	2447 MHz
2	2417 MHz	9	2452 MHz
3	2422 MHz	10	2457 MHz
4	2427 MHz	11	2462 MHz
5	2432 MHz	12	2467 MHz
6	2437 MHz	13	2472 MHz
7	2442 MHz		

11 channels are provided for 802.11n_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422 MHz	8	2447 MHz
4	2427 MHz	9	2452 MHz
5	2432 MHz	10	2457 MHz
6	2437 MHz	11	2462 MHz
7	2442 MHz		

4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case.

RADIATED EMISSION TEST:

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
RADIATED EMISSION TEST (BELOW 1 GHz)					
802.11g	1 to 13	1,6,11,12,13	OFDM	6	Aux
RADIATED EMISSION TEST (ABOVE 1 GHz)					
802.11b	1 to 13	1,6,11,12,13	DSSS	1	Aux
802.11g	1 to 13	1,6,11,12,13	OFDM	6	Aux
802.11n (HT20)	1 to 13	1,6,11,12,13	OFDM	MCS 8	MIMO
802.11n (HT40)	3 to 11	3,6,9,10,11	OFDM	MCS 8	MIMO

Note:
The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case H position was reported.

5 MEASUREMENT UNCERTAINTY

Radiated Spurious Emission:

Measurement uncertainty (Polarization : **Vertical**)	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : **Horizontal**)	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

6 WLAN RADIATED SPURIOUS EMISSION MEASUREMENT

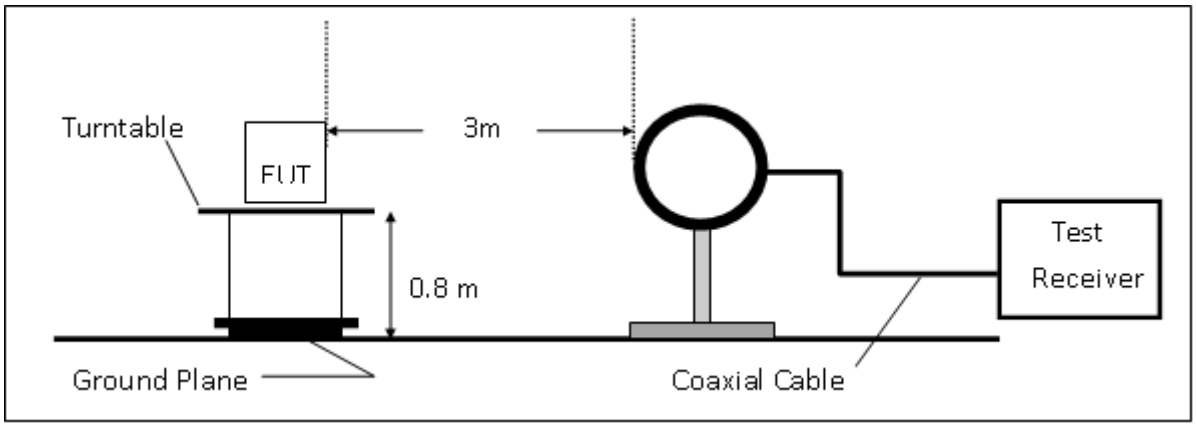
6.1 Measurement Equipment Used:

SGS SAC-III					
Name of Equipment	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Bi-log Antenna	SCHWAZBECK	VULB9168	378	2017/12/29	2018/12/28
Horn Antenna	Schwarzbeck	BBHA9120D	1441	2017/08/04	2018/08/03
Horn Antenna	Schwarzbeck	BBHA9170	184	2017/12/12	2018/12/11
Loop Antenna	ETS.LINDGREN	6502	148045	2017/09/26	2018/09/25
Spectrum Analyzer	Agilent	E4446A	MY51100003	2017/05/10	2018/05/09
EMI Test Receiver	R&S	ESCI7	100760	2017/06/06	2018/06/05
Pre-Amplifier	HP	8449B	3008A00578	2018/01/02	2019/01/01
Pre-Amplifier	HP	8447D	2944A07676	2018/01/02	2019/01/01
Pre-Amplifier	EMC Instru-ments Corp.	EMC0126530	980038	2018/01/02	2019/01/01
Attenuator	Mini-Circuit	BW-S10W2+	3	2018/01/02	2019/01/01
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M1	2018/01/02	2019/01/01
Low Loss Cable	Huber Suhner	966_RX	9	2018/01/02	2019/01/01

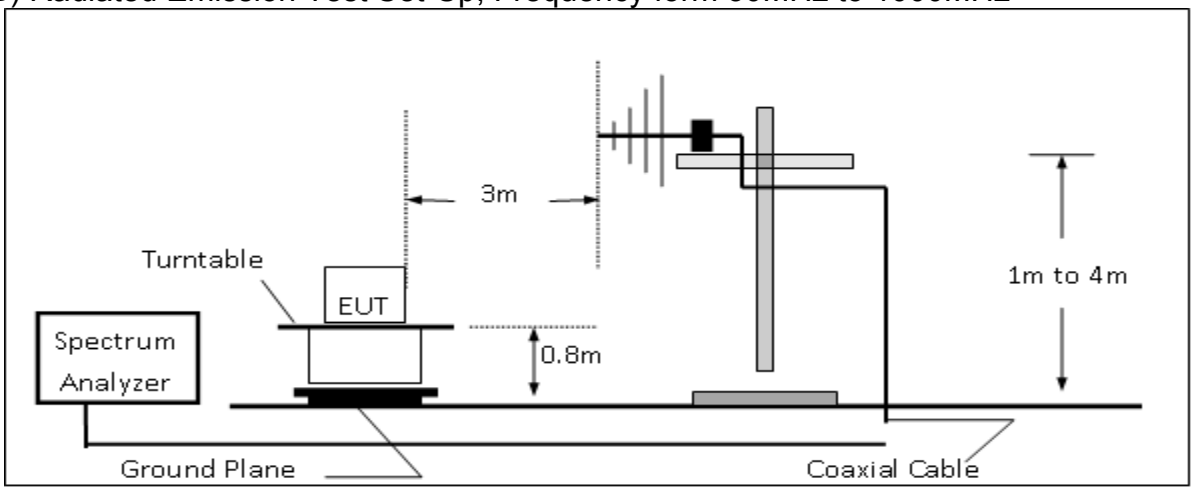
NOTE: N.C.R refers to Not Calibrated Required.

6.2 Test SET-UP

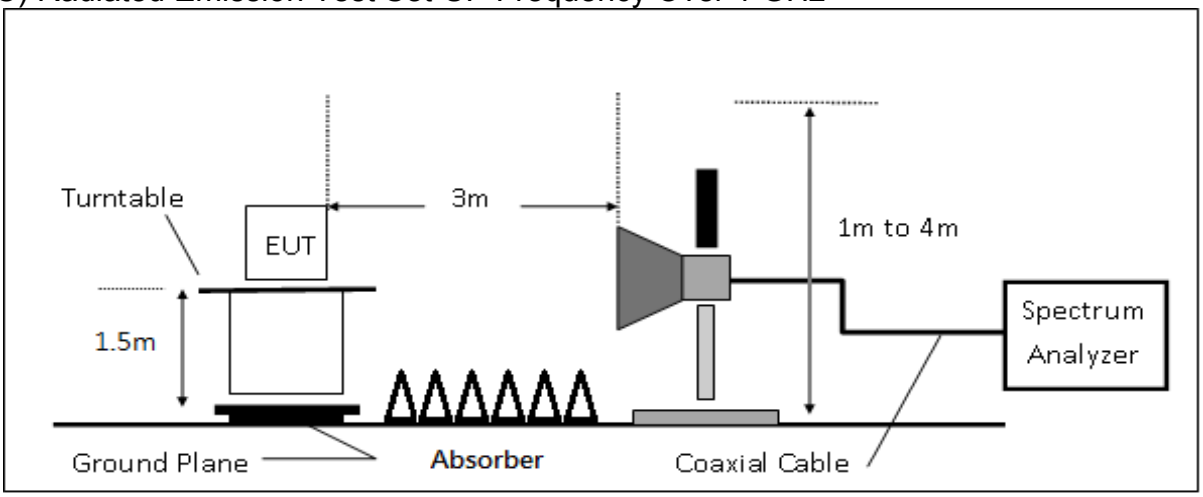
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



6.3 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plan.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
6. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
8. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
11. Repeat above procedures until all default test channel measured were complete.

6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note :

"**F**" : denotes Fundamental Frequency. ; "**H**" : denotes Harmonic Frequency.

"**E**" : denotes Band Edge Frequency. ; "**S**" : denotes Spurious Frequency.

6.5 Test Results of Radiated Spurious Emissions form 9 KHz to 30 MHz

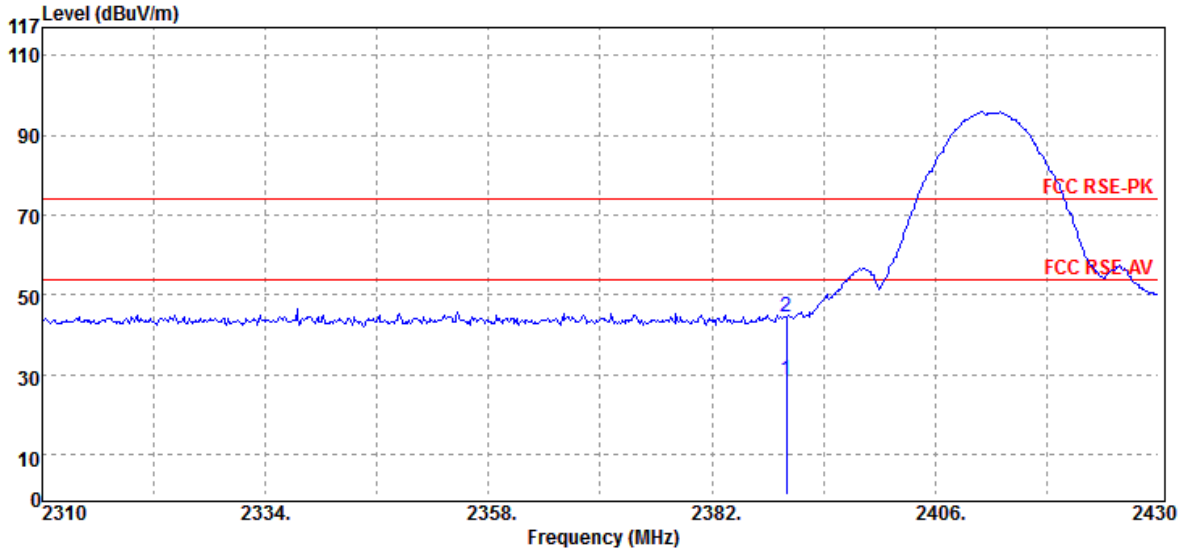
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

6.6 Measurement Result

Refer to attach tabular data sheets.

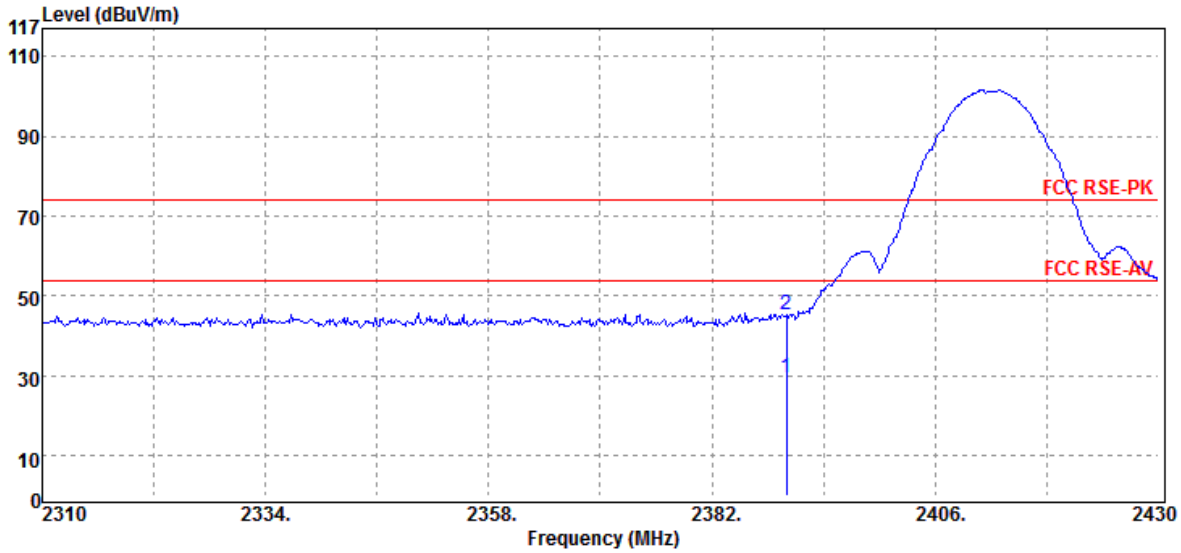
6.6.1 Bandedge Measurement Result

Operation Band	:802.11b	Test Date	:2018-01-18
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



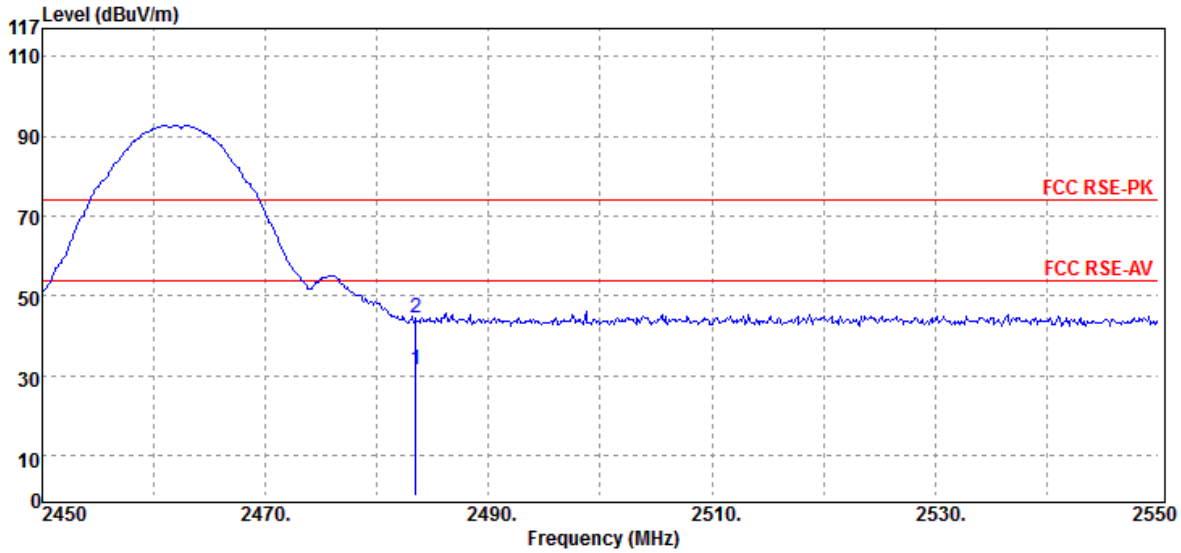
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	30.55	-1.74	28.81	54.00	-25.19
2390.00	E	Peak	46.26	-1.74	44.52	74.00	-29.48

Operation Band	:802.11b	Test Date	:2018-01-18
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



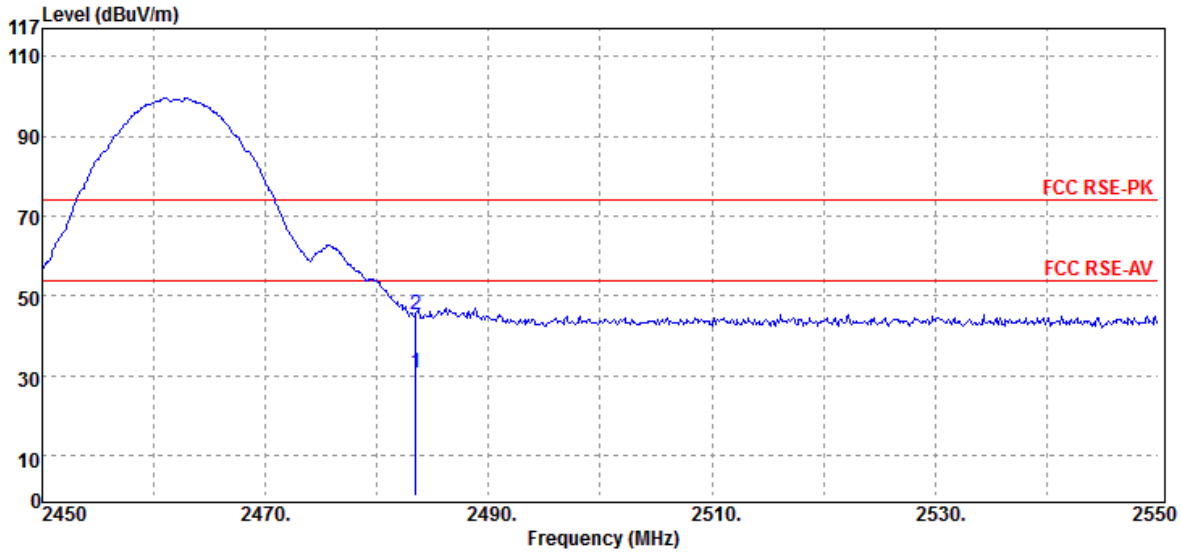
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	31.28	-1.74	29.54	54.00	-24.46
2390.00	E	Peak	46.92	-1.74	45.18	74.00	-28.82

Operation Band	:802.11b	Test Date	:2018-01-18
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



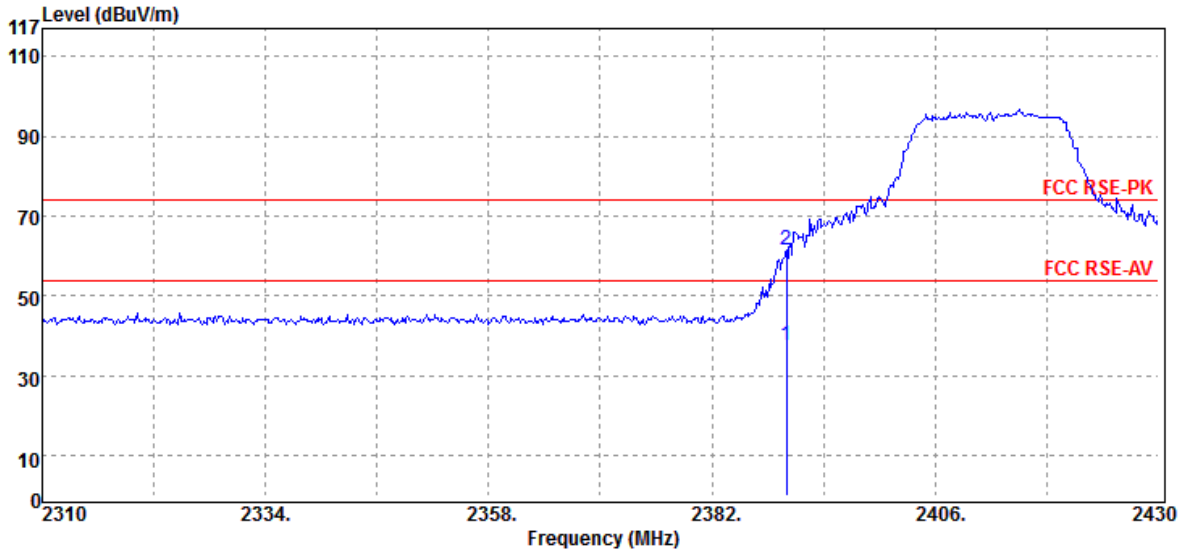
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	33.23	-1.62	31.61	54.00	-22.39
2483.50	E	Peak	46.33	-1.62	44.71	74.00	-29.29

Operation Band	:802.11b	Test Date	:2018-01-18
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



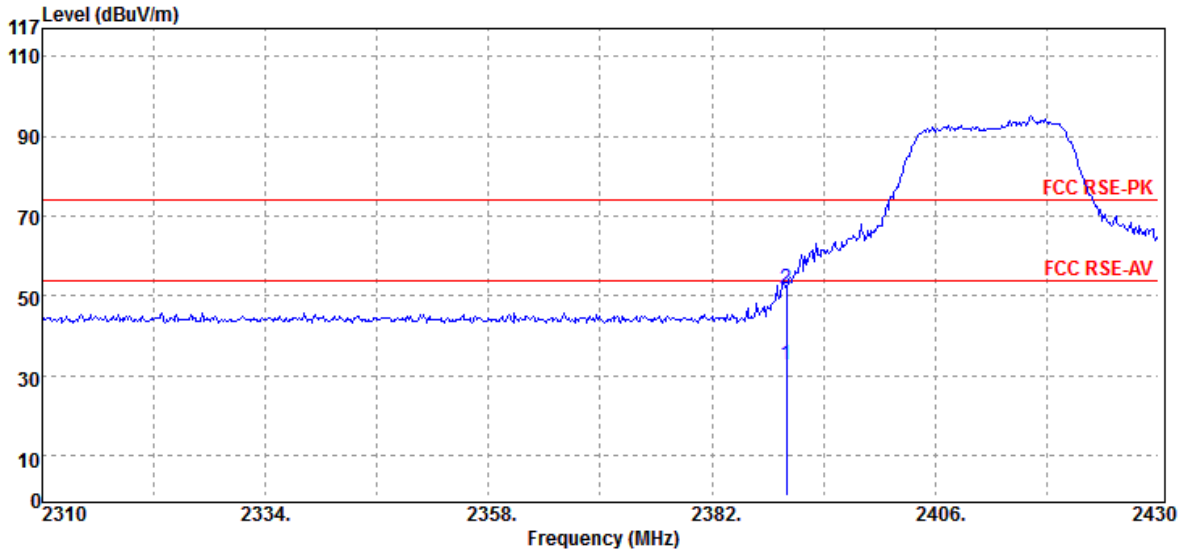
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	32.56	-1.62	30.94	54.00	-23.06
2483.50	E	Peak	47.09	-1.62	45.47	74.00	-28.53

Operation Band	:802.11g	Test Date	:2018-01-18
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



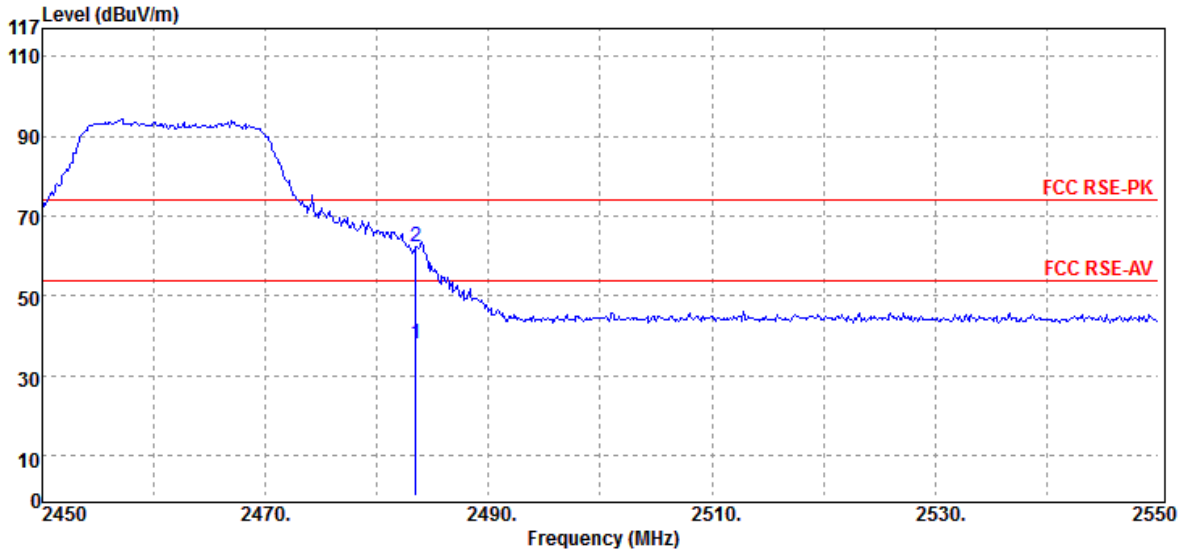
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	39.57	-1.74	37.83	54.00	-16.17
2390.00	E	Peak	63.42	-1.74	61.68	74.00	-12.32

Operation Band	:802.11g	Test Date	:2018-01-18
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



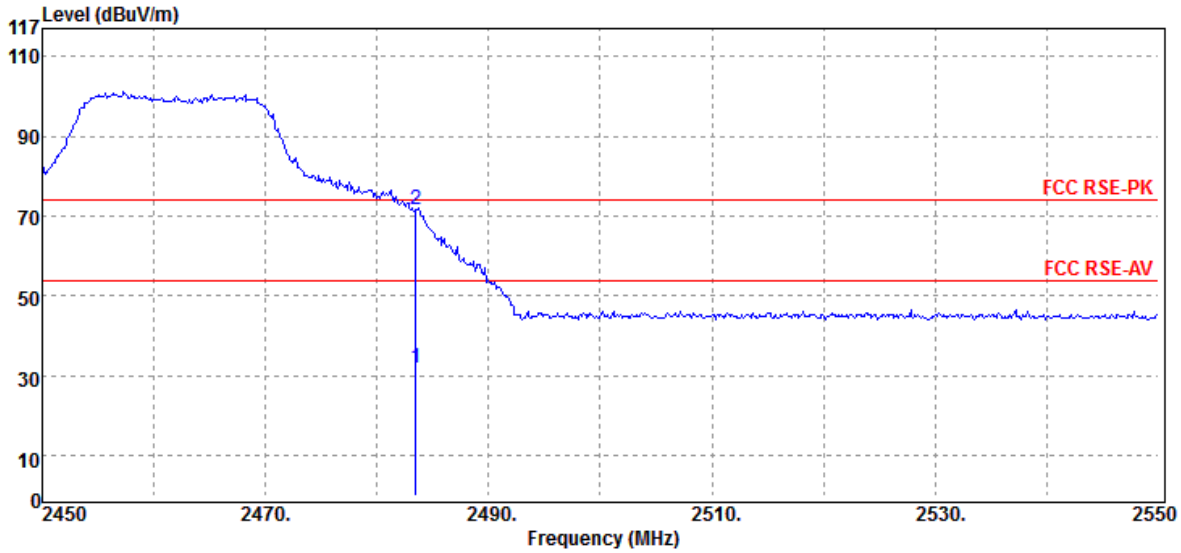
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	34.67	-1.74	32.93	54.00	-21.07
2390.00	E	Peak	53.51	-1.74	51.77	74.00	-22.23

Operation Band	:802.11g	Test Date	:2018-01-18
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



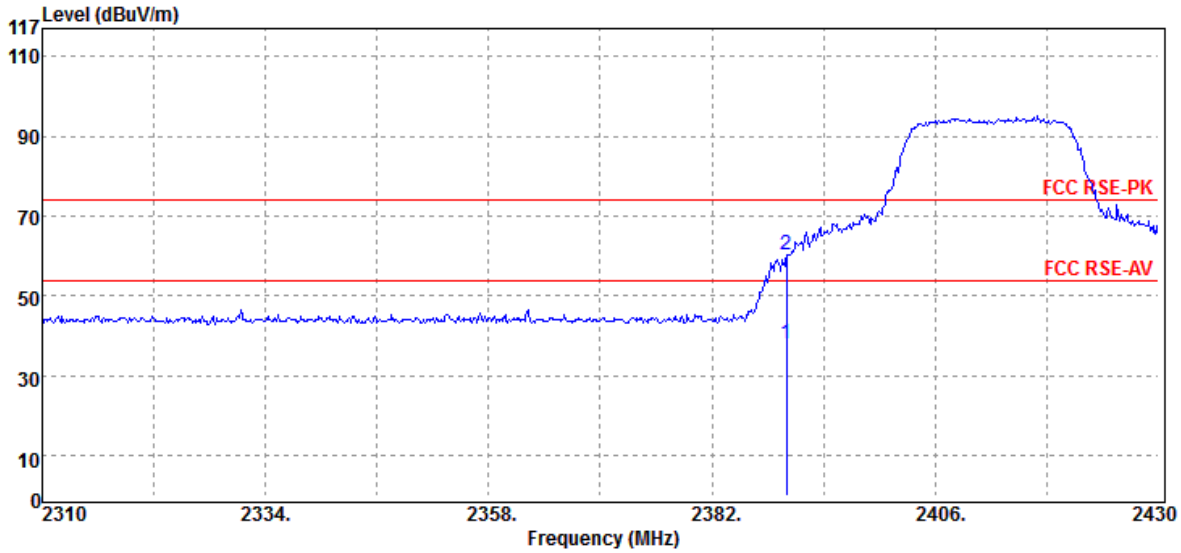
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	39.74	-1.62	38.12	54.00	-15.88
2483.50	E	Peak	64.03	-1.62	62.41	74.00	-11.59

Operation Band	:802.11g	Test Date	:2018-01-18
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



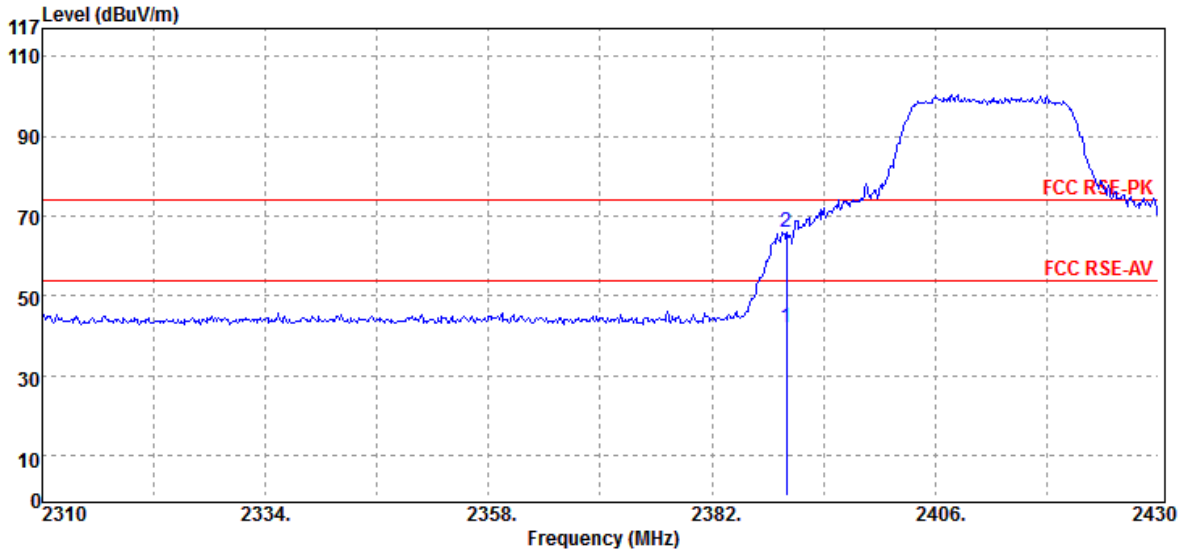
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	33.48	-1.62	31.86	54.00	-22.14
2483.50	E	Peak	73.33	-1.62	71.71	74.00	-2.29

Operation Band	:802.11n20	Test Date	:2018-01-18
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



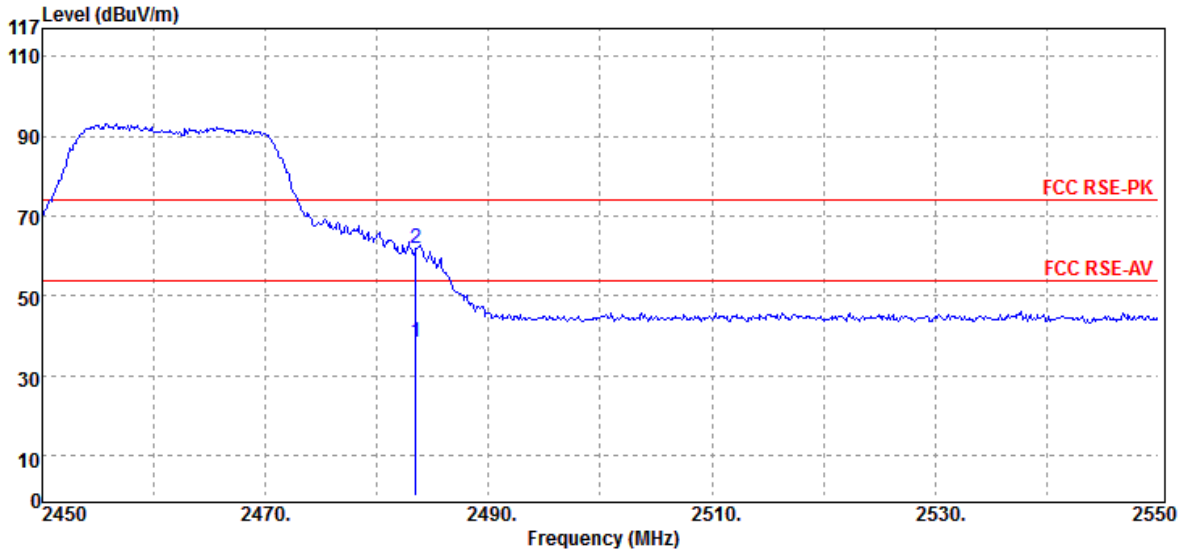
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	39.74	-1.74	38.00	54.00	-16.00
2390.00	E	Peak	61.94	-1.74	60.20	74.00	-13.80

Operation Band	:802.11n20	Test Date	:2018-01-18
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



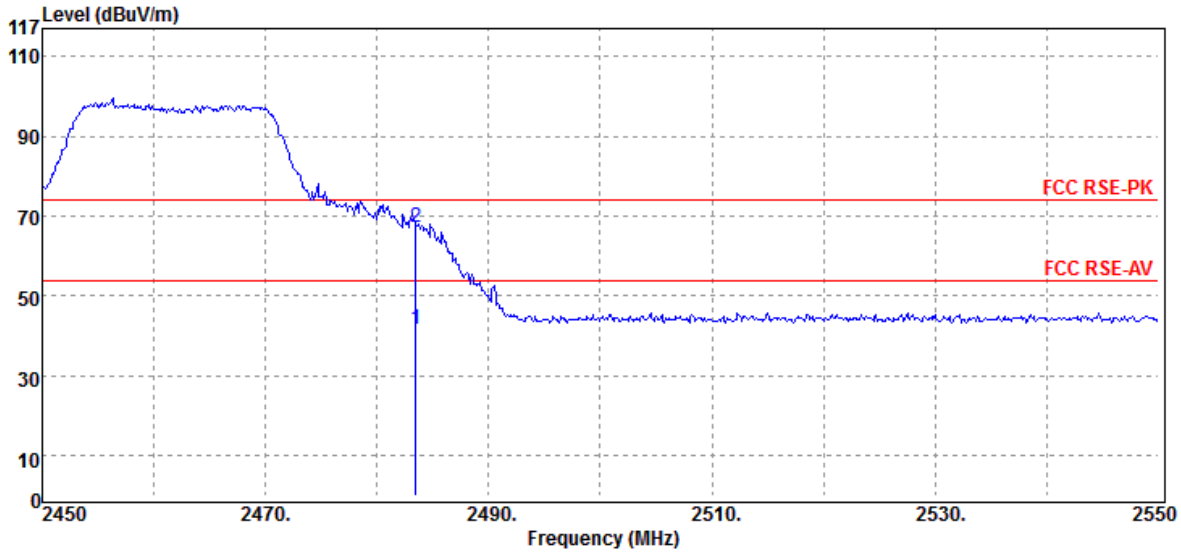
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	43.86	-1.74	42.12	54.00	-11.88
2390.00	E	Peak	67.87	-1.74	66.13	74.00	-7.87

Operation Band	:802.11n20	Test Date	:2018-01-18
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



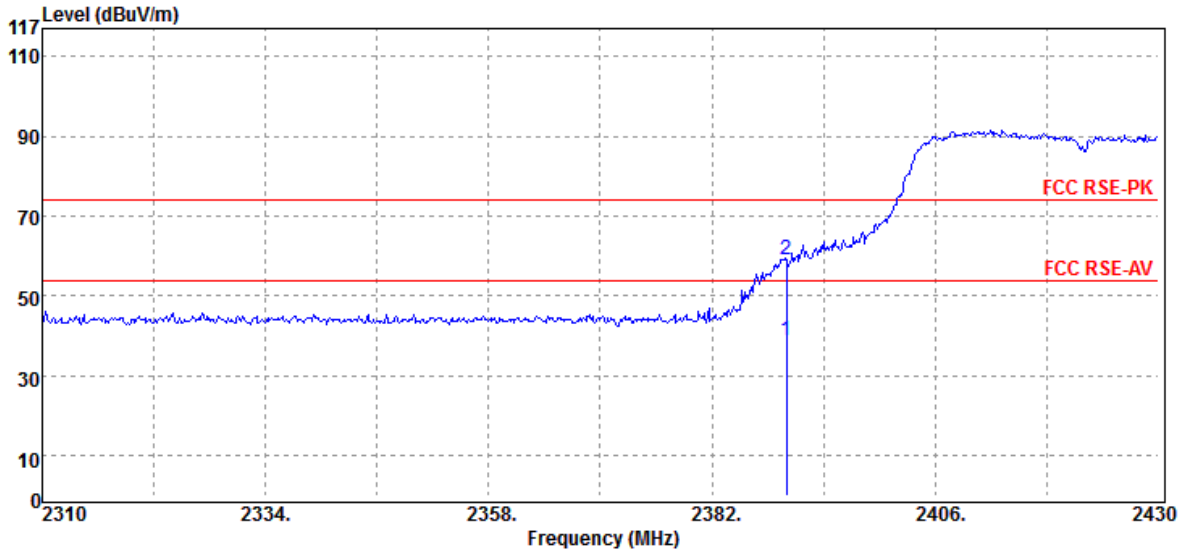
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	39.88	-1.62	38.26	54.00	-15.74
2483.50	E	Peak	63.49	-1.62	61.87	74.00	-12.13

Operation Band	:802.11n20	Test Date	:2018-01-18
Fundamental Frequency	:2462 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



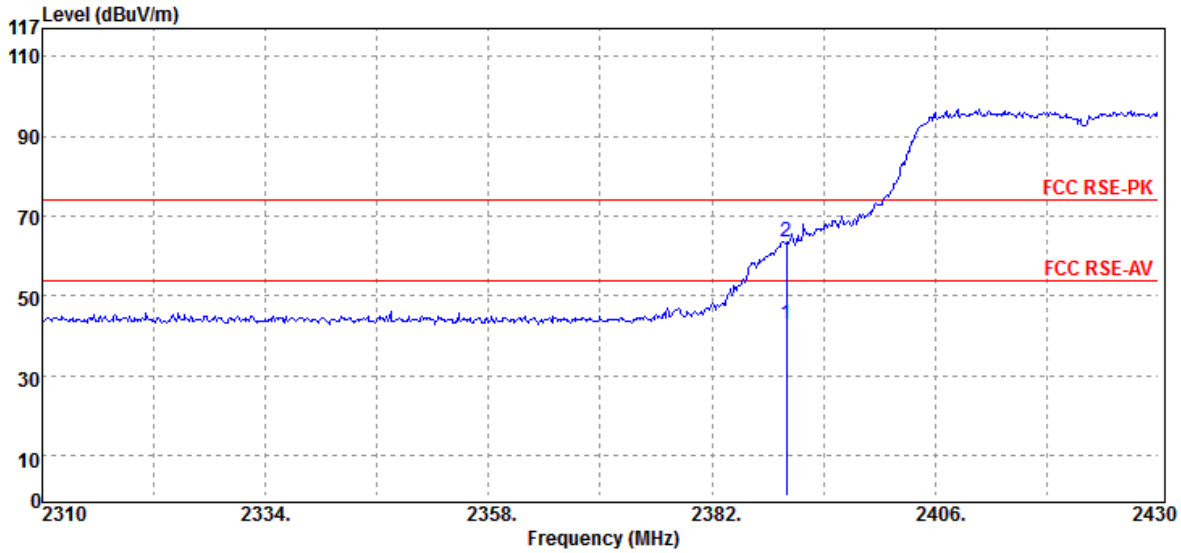
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	43.28	-1.62	41.66	54.00	-12.34
2483.50	E	Peak	68.97	-1.62	67.35	74.00	-6.65

Operation Band	:802.11n40	Test Date	:2018-01-19
Fundamental Frequency	:2422 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



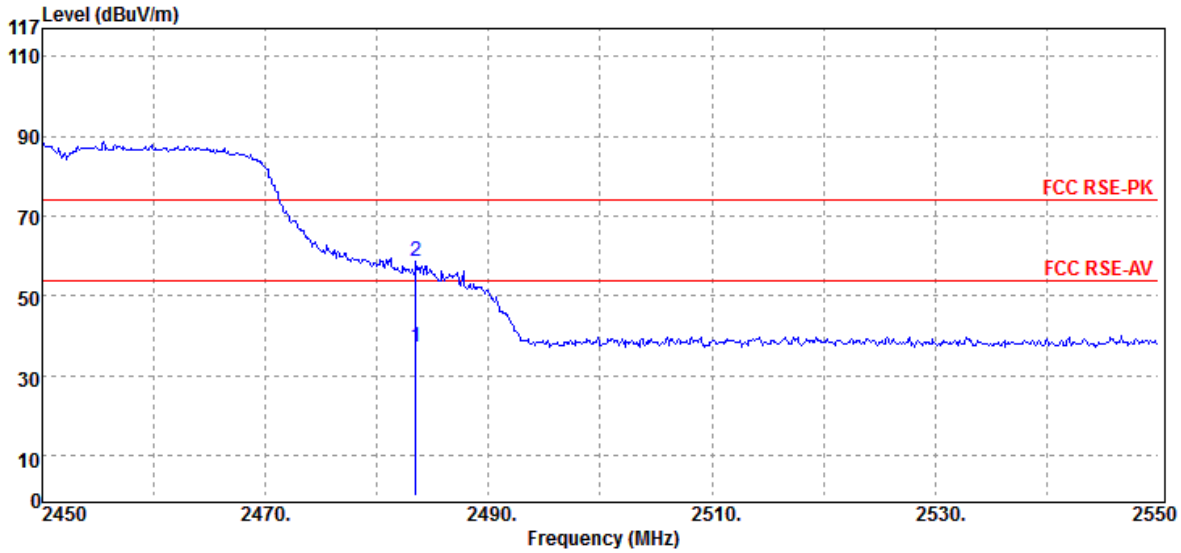
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	40.72	-1.74	38.98	54.00	-15.02
2390.00	E	Peak	60.92	-1.74	59.18	74.00	-14.82

Operation Band	:802.11n40	Test Date	:2018-01-19
Fundamental Frequency	:2422 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



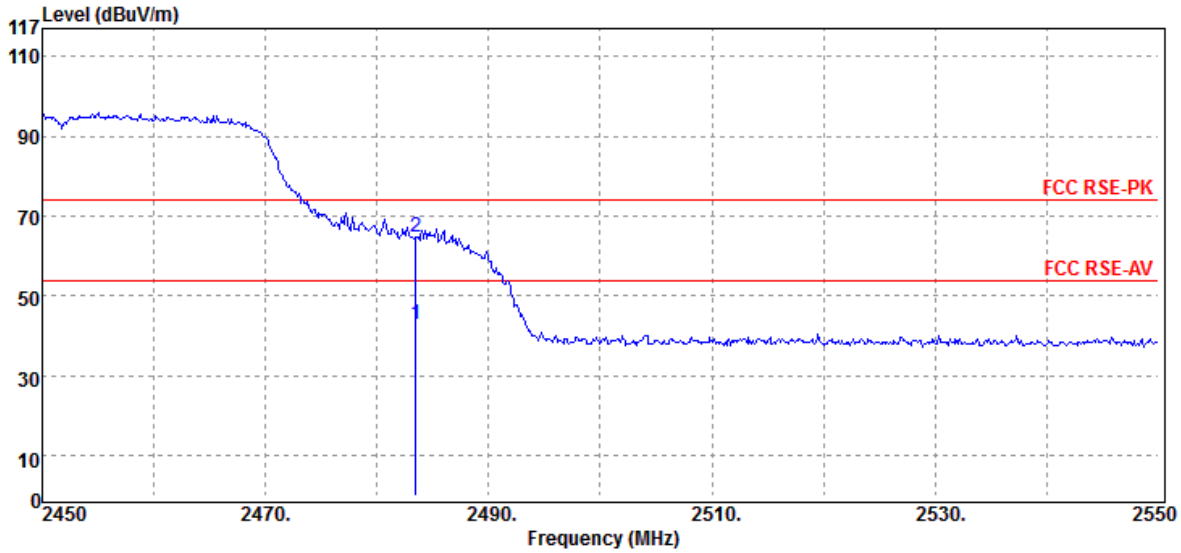
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	44.55	-1.74	42.81	54.00	-11.19
2390.00	E	Peak	65.10	-1.74	63.36	74.00	-10.64

Operation Band	:802.11n40	Test Date	:2018-01-19
Fundamental Frequency	:2452 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	38.77	-1.62	37.15	54.00	-16.85
2483.50	E	Peak	60.16	-1.62	58.54	74.00	-15.46

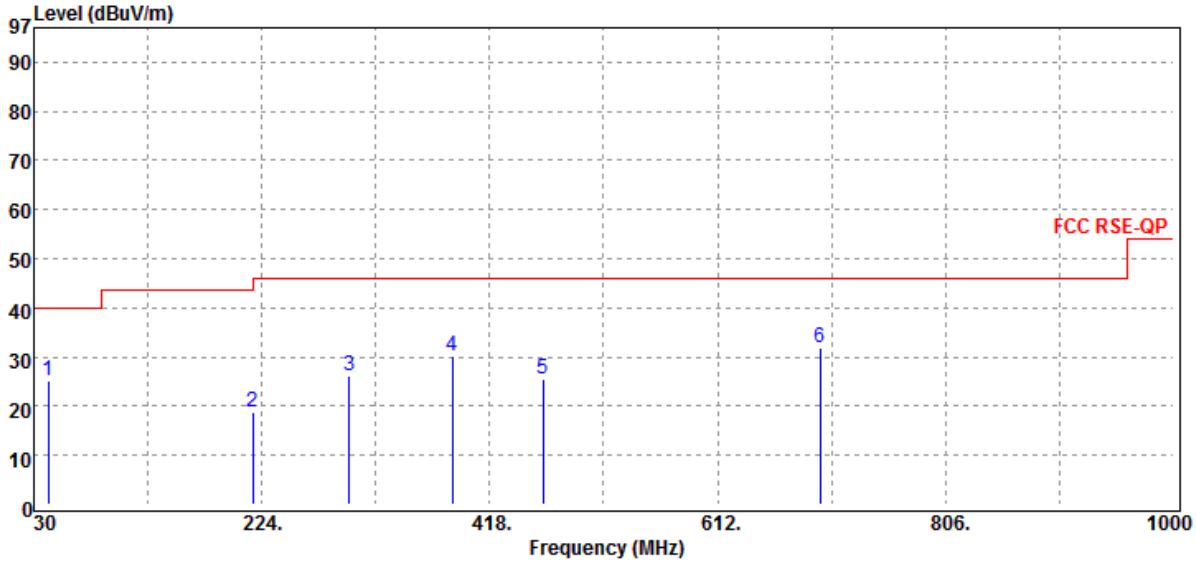
Operation Band	:802.11n40	Test Date	:2018-01-19
Fundamental Frequency	:2452 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Bandedge CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	44.44	-1.62	42.82	54.00	-11.18
2483.50	E	Peak	66.39	-1.62	64.77	74.00	-9.23

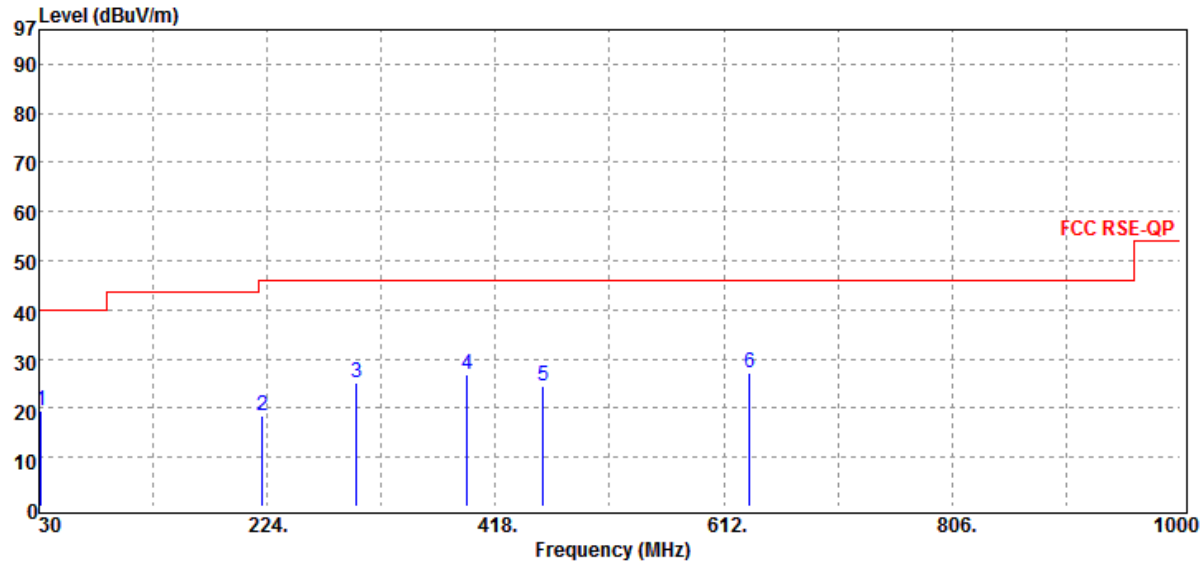
6.6.2 Below 1GHz Radiated Measurement Result

Operation Band	:802.11g	Test Date	:2018-01-22
Fundamental Frequency	:2437 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
42.61	S	Peak	33.37	-8.29	25.08	40.00	-14.92
216.24	S	Peak	28.38	-9.43	18.95	46.00	-27.05
298.69	S	Peak	32.01	-5.95	26.06	46.00	-19.94
385.99	S	Peak	34.36	-4.31	30.05	46.00	-15.95
463.59	S	Peak	27.90	-2.55	25.35	46.00	-20.65
699.30	S	Peak	30.28	1.44	31.72	46.00	-14.28

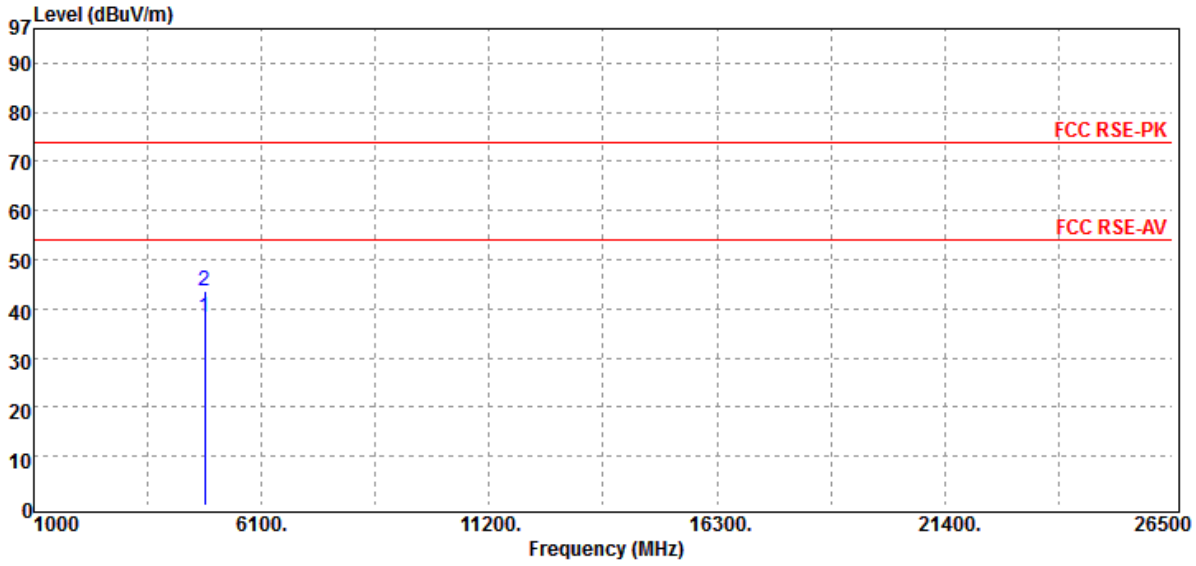
Operation Band	:802.11g	Test Date	:2018-01-22
Fundamental Frequency	:2437 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
31.94	S	Peak	28.49	-9.11	19.38	40.00	-20.62
220.12	S	Peak	27.59	-9.25	18.34	46.00	-27.66
299.66	S	Peak	30.99	-5.93	25.06	46.00	-20.94
393.75	S	Peak	31.00	-4.17	26.83	46.00	-19.17
458.74	S	Peak	27.26	-2.68	24.58	46.00	-21.42
634.31	S	Peak	26.54	0.51	27.05	46.00	-18.95

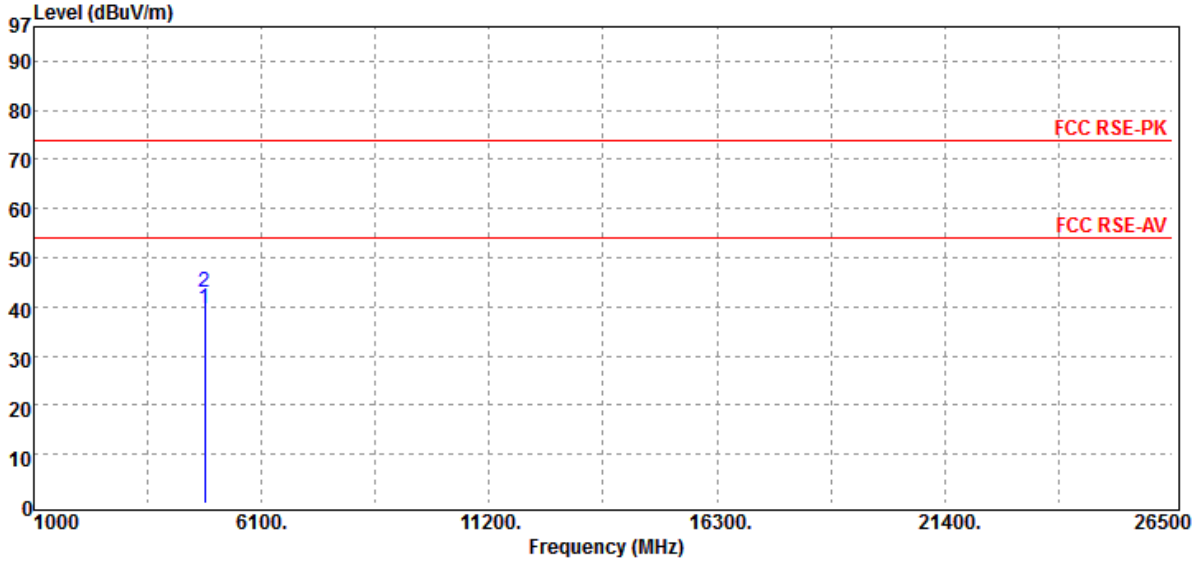
6.6.3 Above 1GHz Radio Measurement Result

Operation Band	:802.11b	Test Date	:2018-01-19
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



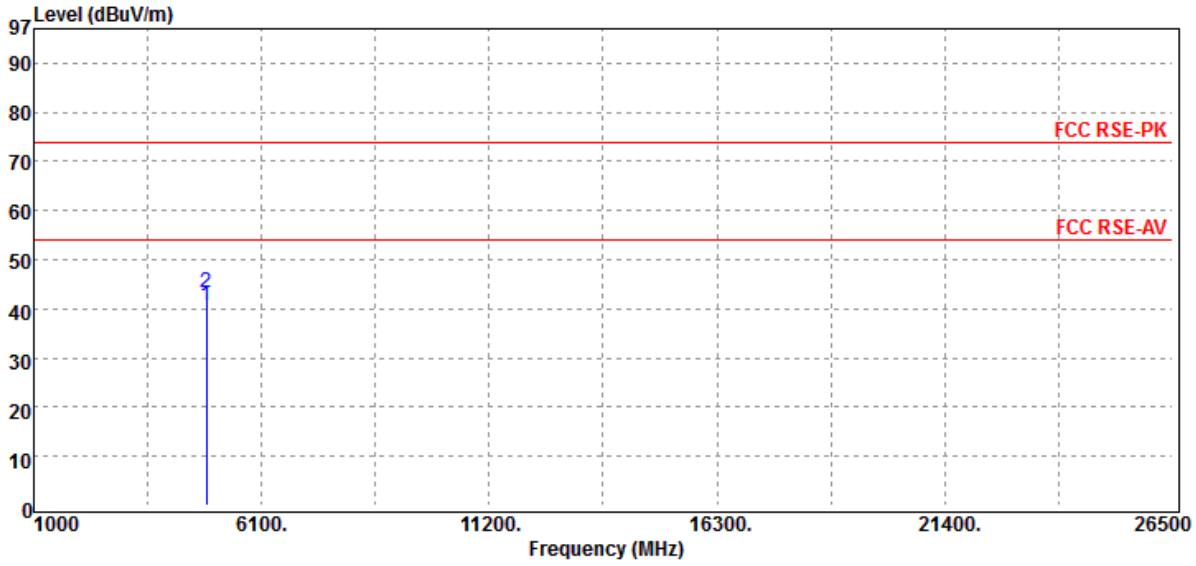
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	H	Average	33.45	4.93	38.38	54.00	-15.62
4824.00	H	Peak	38.55	4.93	43.48	74.00	-30.52

Operation Band	:802.11b	Test Date	:2018-01-19
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



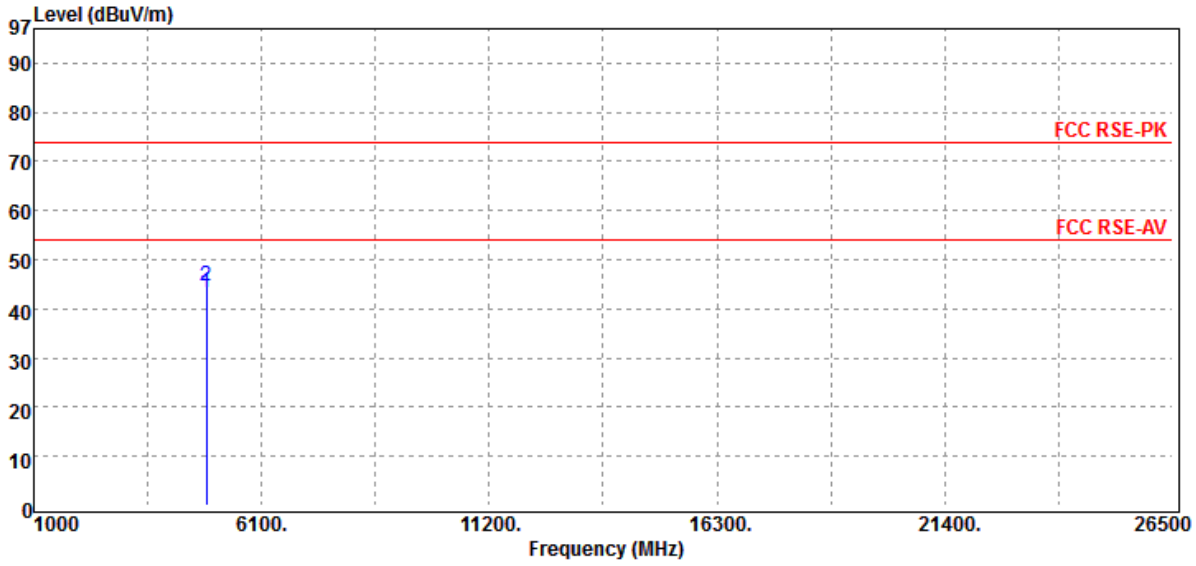
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	H	Average	34.75	4.93	39.68	54.00	-14.32
4824.00	H	Peak	38.12	4.93	43.05	74.00	-30.95

Operation Band	:802.11b	Test Date	:2018-01-19
Fundamental Frequency	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



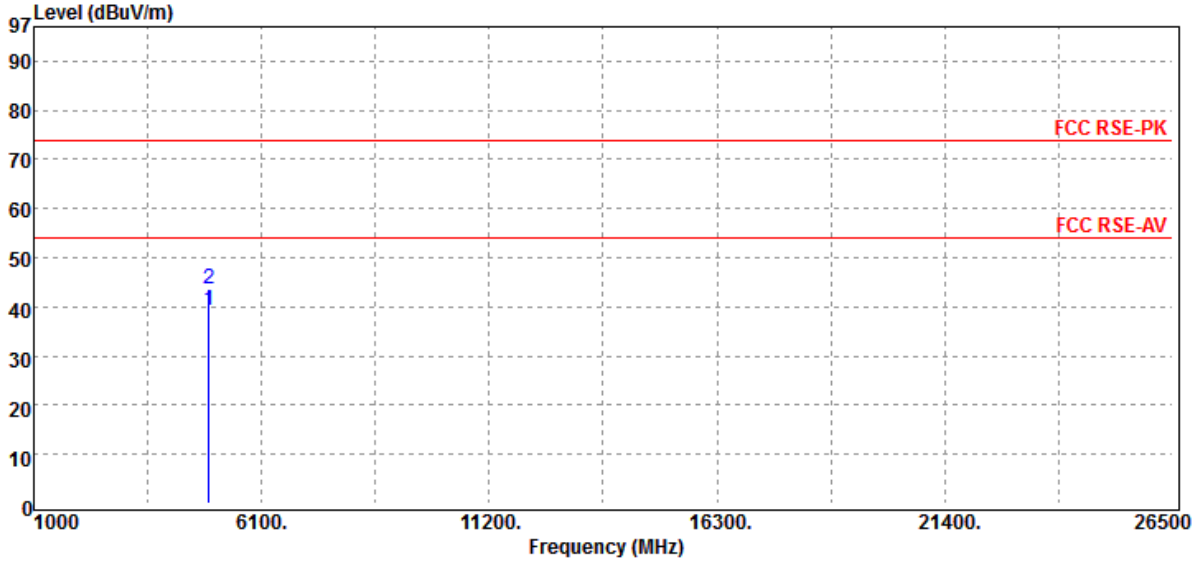
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	H	Average	35.33	5.13	40.46	54.00	-13.54
4874.00	H	Peak	38.24	5.13	43.37	74.00	-30.63

Operation Band	:802.11b	Test Date	:2018-01-19
Fundamental Frequency	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



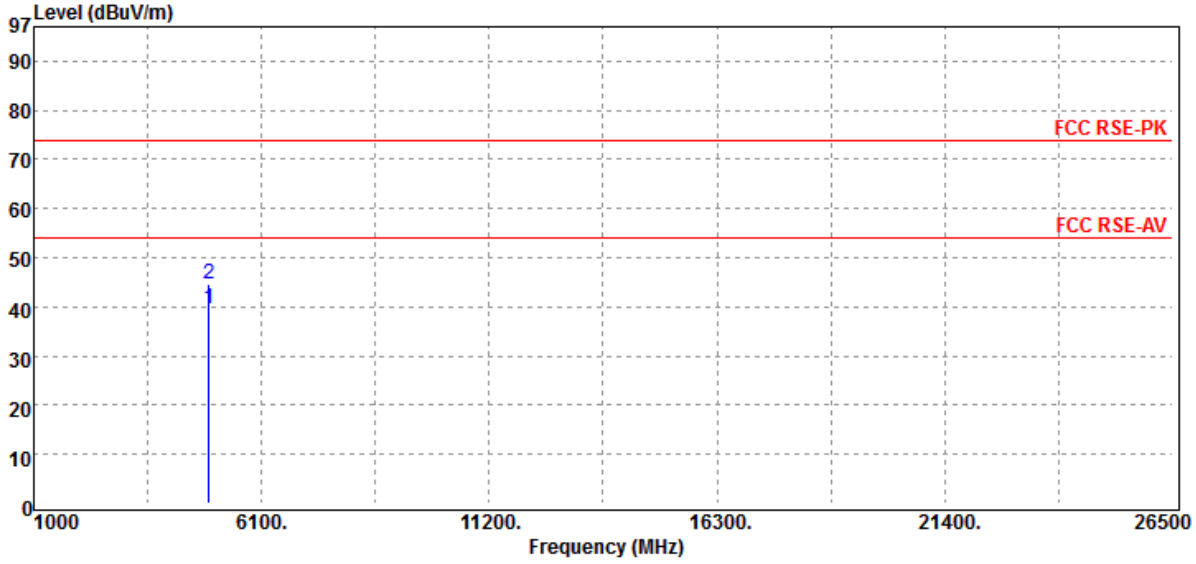
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	H	Average	38.19	5.13	43.32	54.00	-10.68
4874.00	H	Peak	39.48	5.13	44.61	74.00	-29.39

Operation Band	:802.11b	Test Date	:2018-01-19
Fundamental Frequency	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



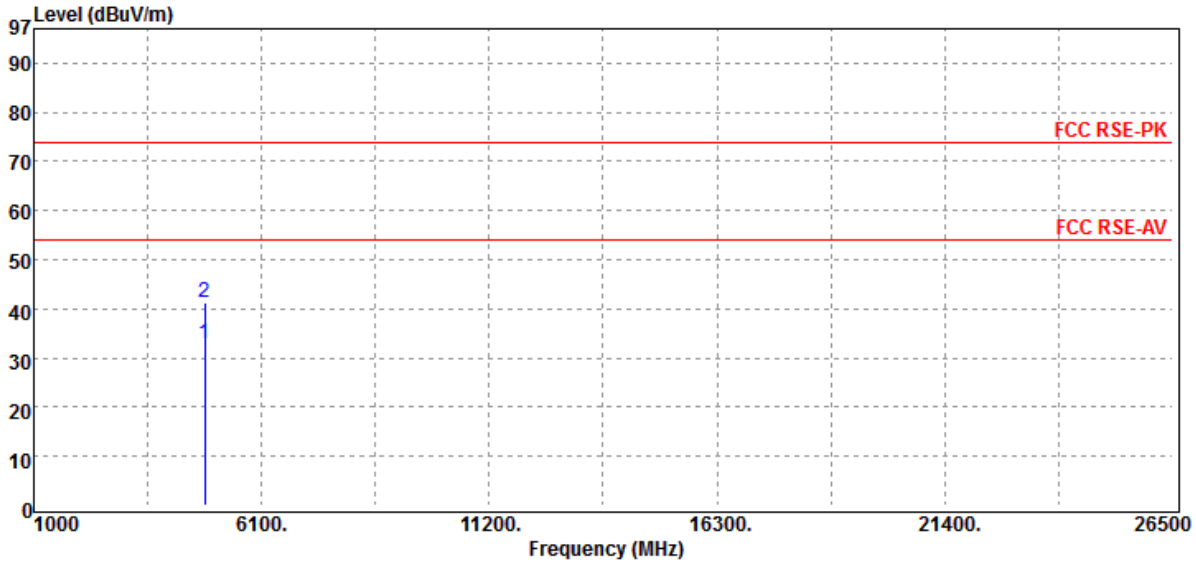
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	H	Average	33.95	5.25	39.20	54.00	-14.80
4924.00	H	Peak	38.35	5.25	43.60	74.00	-30.40

Operation Band	:802.11b	Test Date	:2018-01-19
Fundamental Frequency	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



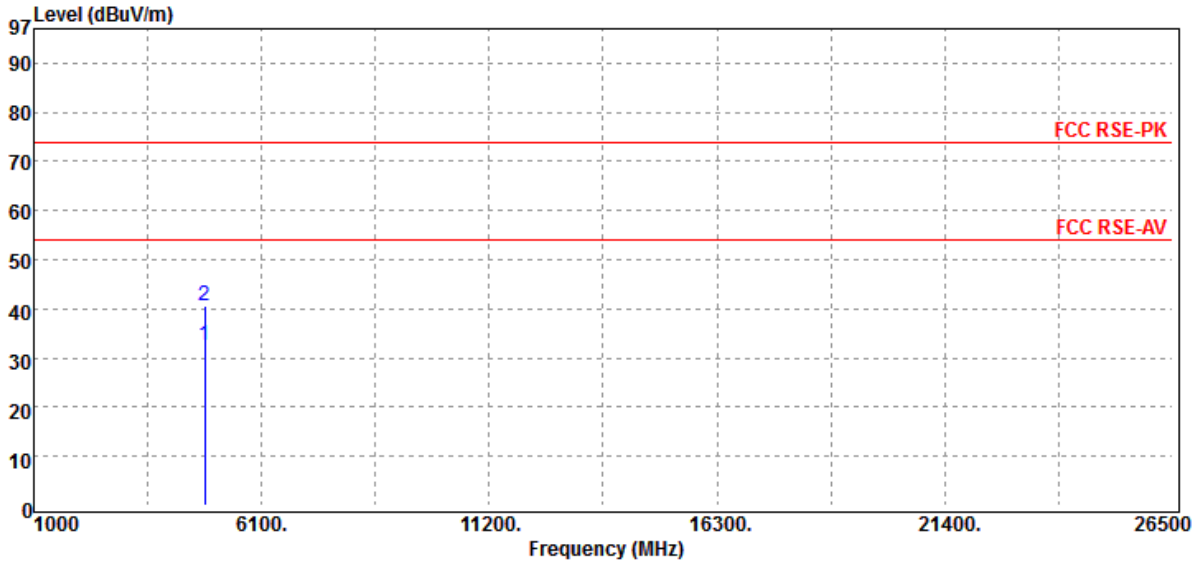
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	H	Average	34.22	5.25	39.47	54.00	-14.53
4924.00	H	Peak	39.28	5.25	44.53	74.00	-29.47

Operation Band	:802.11g	Test Date	:2018-01-19
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



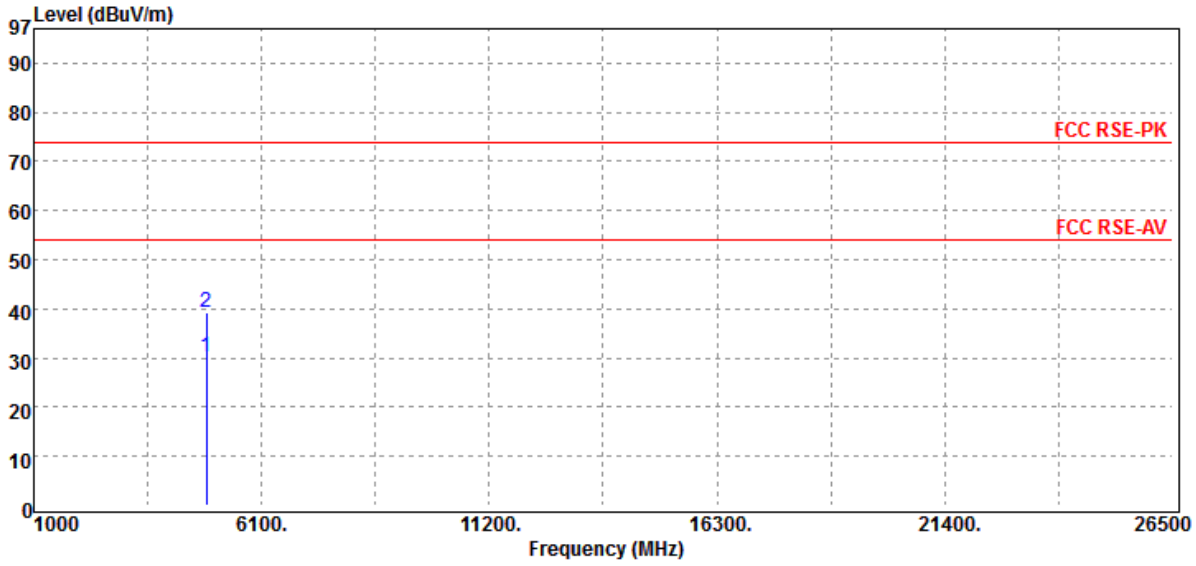
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	H	Average	28.12	4.93	33.05	54.00	-20.95
4824.00	H	Peak	36.19	4.93	41.12	74.00	-32.88

Operation Band	:802.11g	Test Date	:2018-01-19
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



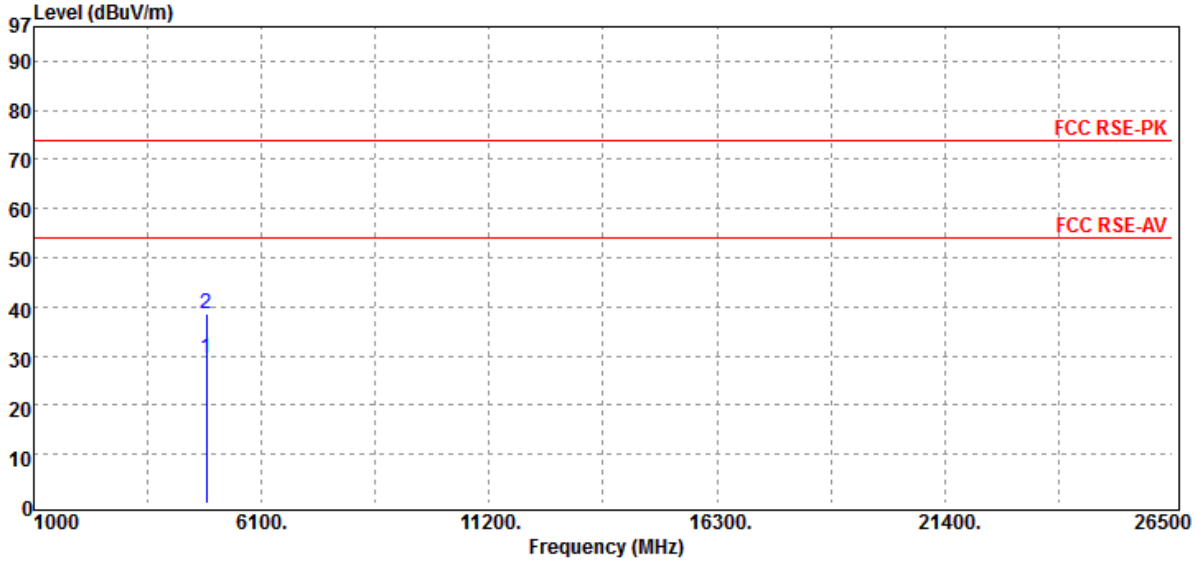
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	H	Average	27.62	4.93	32.55	54.00	-21.45
4824.00	H	Peak	35.75	4.93	40.68	74.00	-33.32

Operation Band	:802.11g	Test Date	:2018-01-19
Fundamental Frequency	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



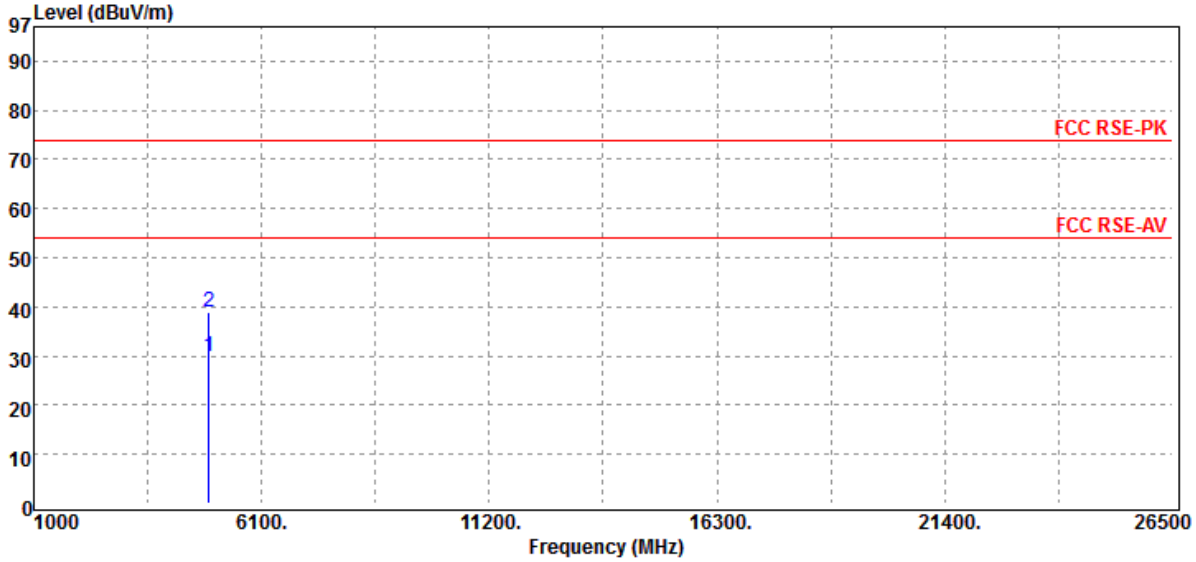
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	H	Average	25.20	5.13	30.33	54.00	-23.67
4874.00	H	Peak	34.12	5.13	39.25	74.00	-34.75

Operation Band	:802.11g	Test Date	:2018-01-19
Fundamental Frequency	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



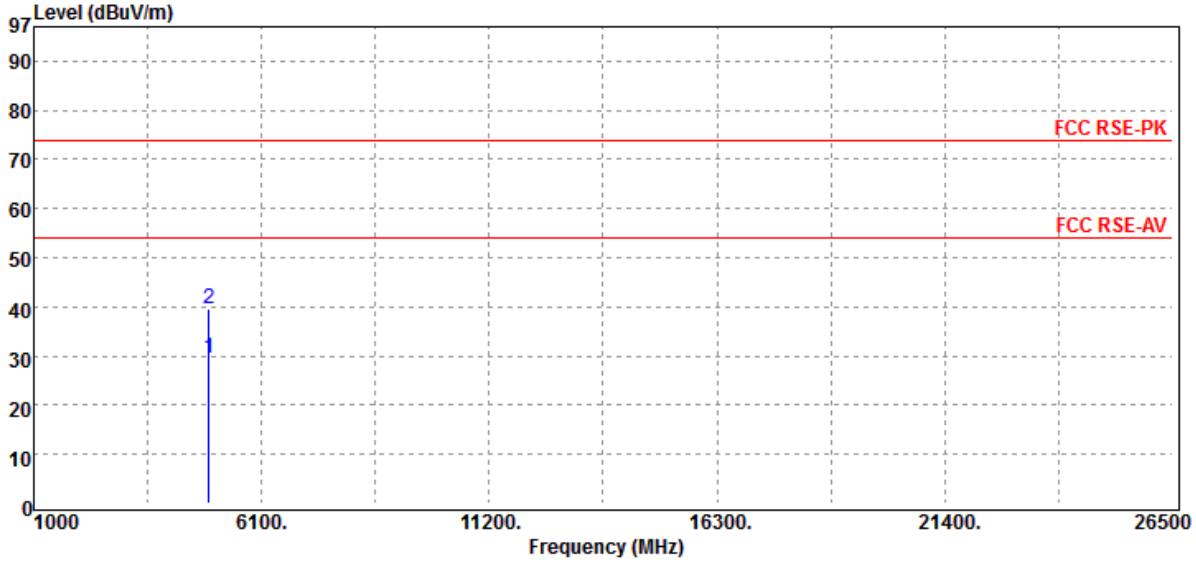
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	H	Average	24.55	5.13	29.68	54.00	-24.32
4874.00	H	Peak	33.45	5.13	38.58	74.00	-35.42

Operation Band	:802.11g	Test Date	:2018-01-19
Fundamental Frequency	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



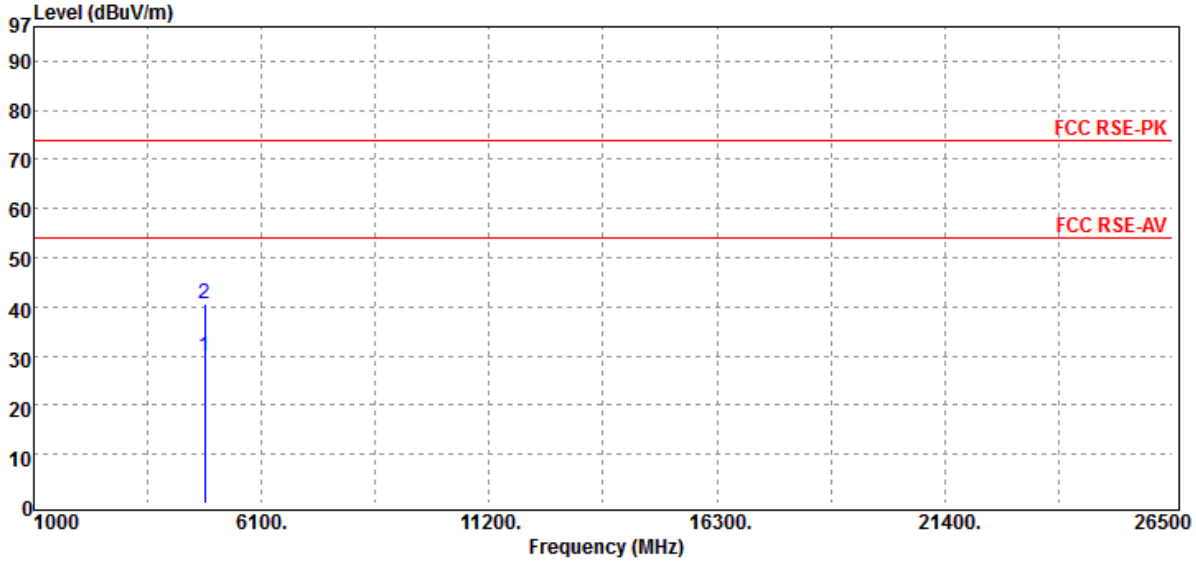
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	H	Average	24.51	5.25	29.76	54.00	-24.24
4924.00	H	Peak	33.78	5.25	39.03	74.00	-34.97

Operation Band	:802.11g	Test Date	:2018-01-19
Fundamental Frequency	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



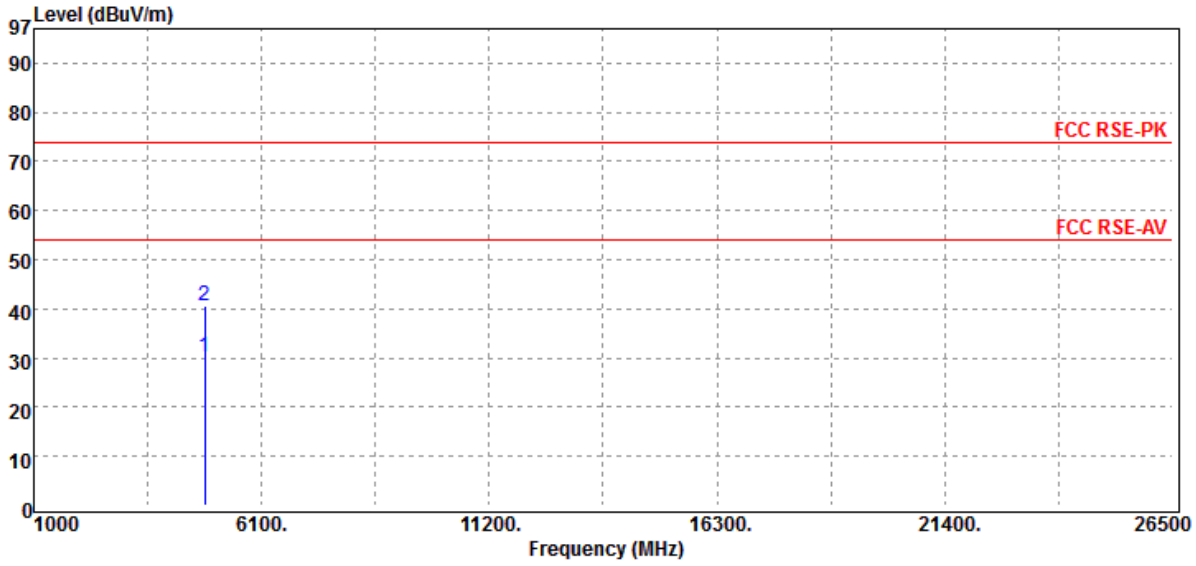
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	H	Average	24.33	5.25	29.58	54.00	-24.42
4924.00	H	Peak	34.37	5.25	39.62	74.00	-34.38

Operation Band	:802.11n20	Test Date	:2018-01-19
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



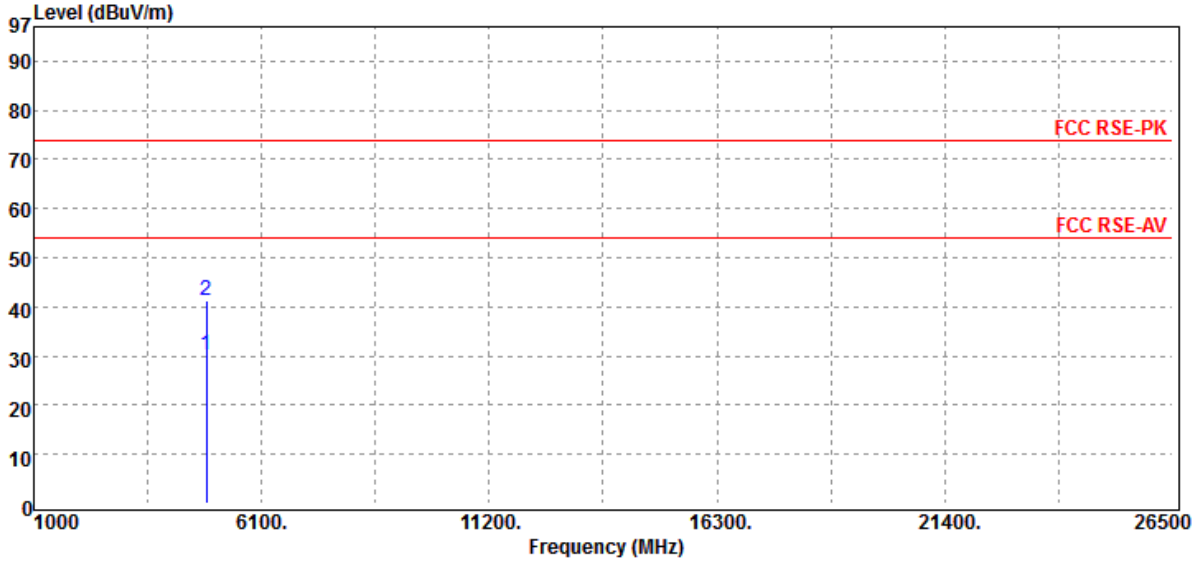
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	H	Average	24.84	4.93	29.77	54.00	-24.23
4824.00	H	Peak	35.67	4.93	40.60	74.00	-33.40

Operation Band	:802.11n20	Test Date	:2018-01-19
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



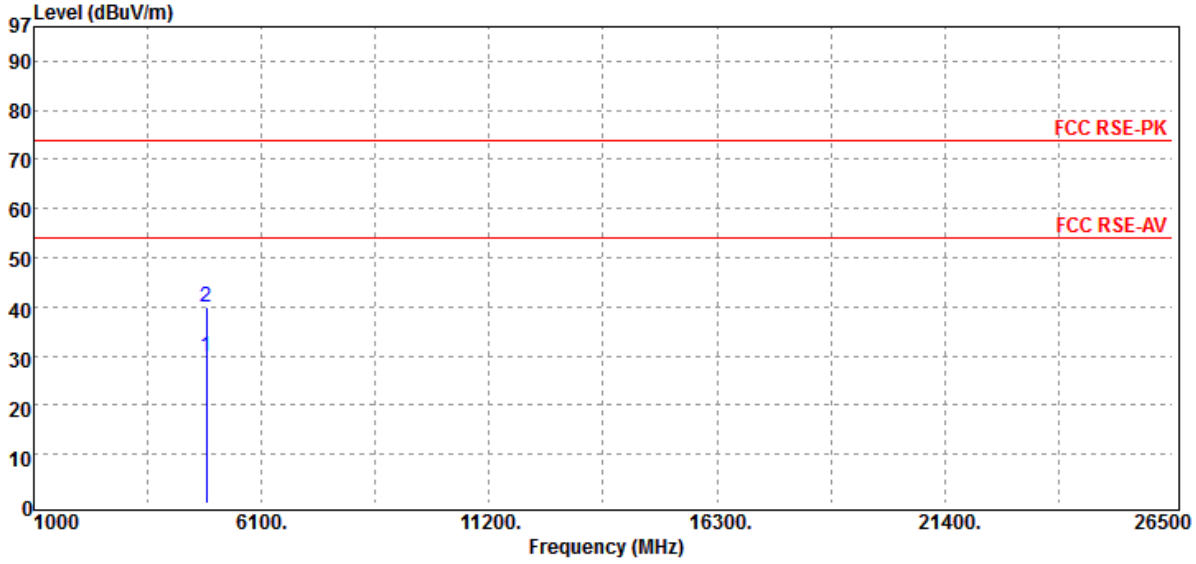
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	H	Average	25.24	4.93	30.17	54.00	-23.83
4824.00	H	Peak	35.66	4.93	40.59	74.00	-33.41

Operation Band	:802.11n20	Test Date	:2018-01-19
Fundamental Frequency	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



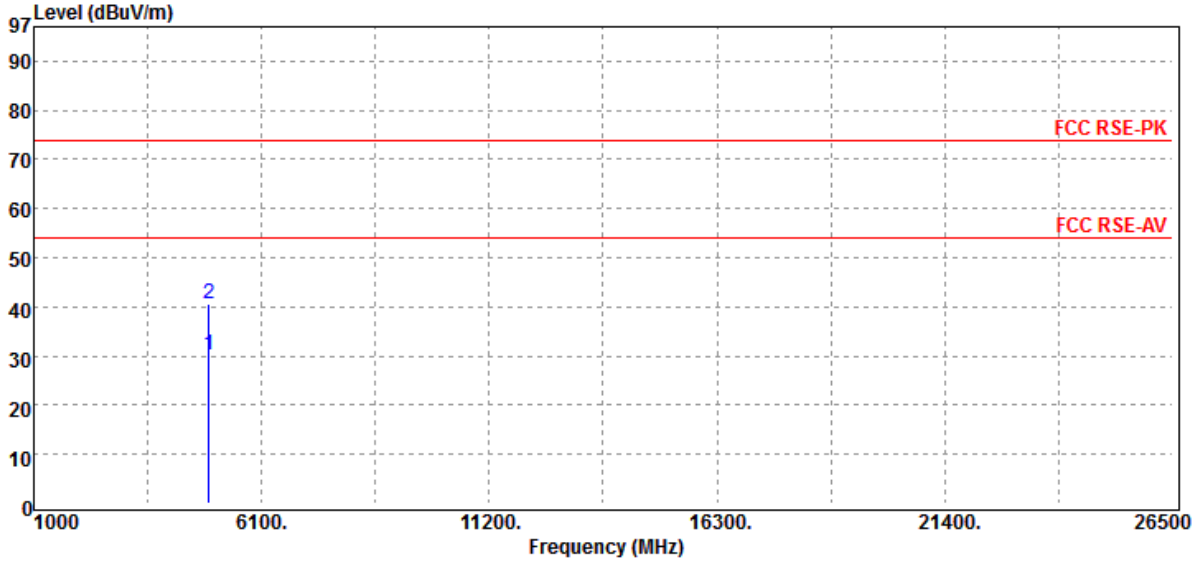
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	H	Average	25.13	5.13	30.26	54.00	-23.74
4874.00	H	Peak	36.11	5.13	41.24	74.00	-32.76

Operation Band	:802.11n20	Test Date	:2018-01-19
Fundamental Frequency	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



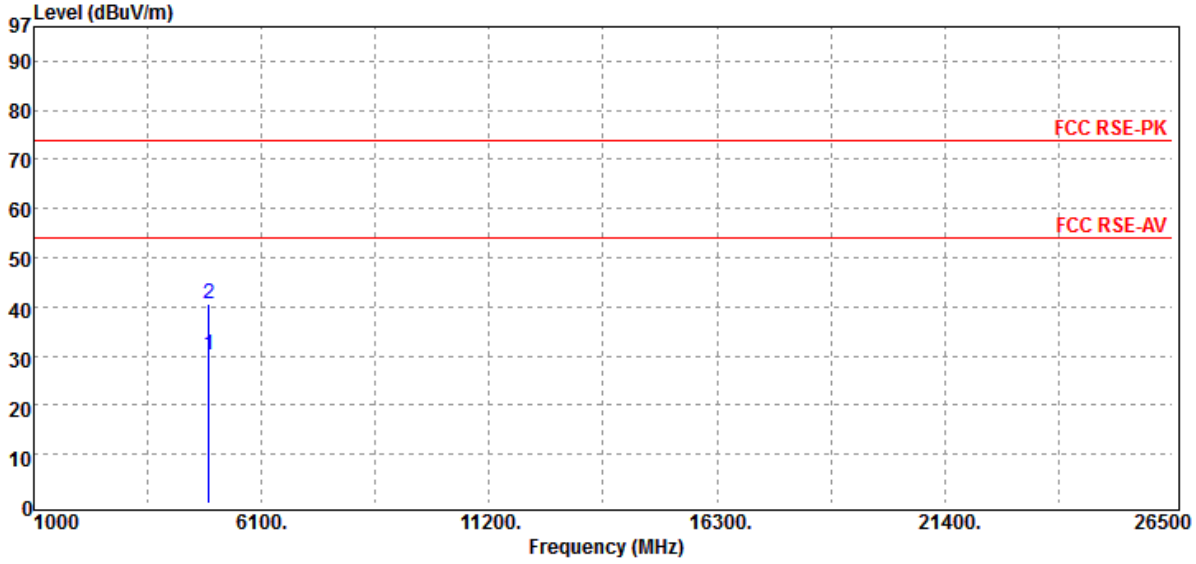
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	H	Average	24.77	5.13	29.90	54.00	-24.10
4874.00	H	Peak	34.91	5.13	40.04	74.00	-33.96

Operation Band	:802.11n20	Test Date	:2018-01-19
Fundamental Frequency	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



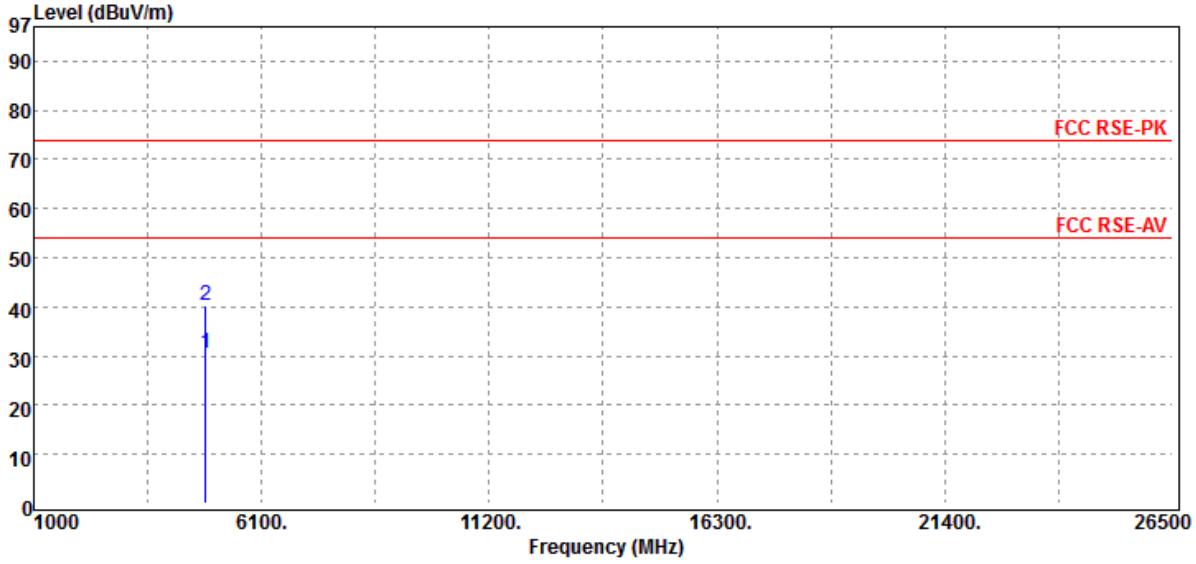
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	H	Average	24.88	5.25	30.13	54.00	-23.87
4924.00	H	Peak	35.37	5.25	40.62	74.00	-33.38

Operation Band	:802.11n20	Test Date	:2018-01-19
Fundamental Frequency	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



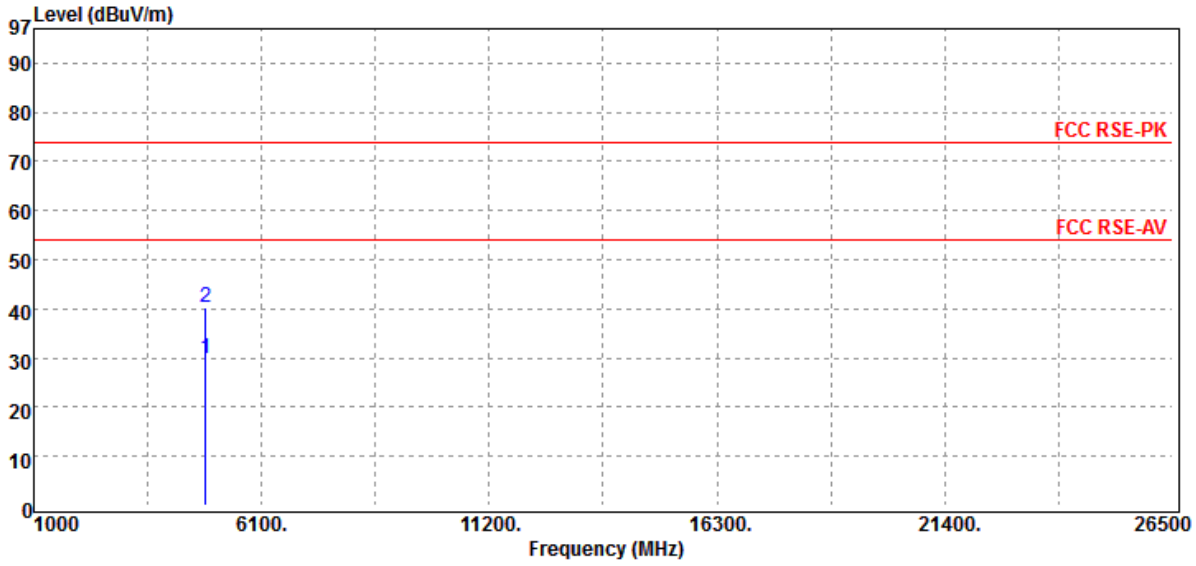
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	H	Average	24.93	5.25	30.18	54.00	-23.82
4924.00	H	Peak	35.48	5.25	40.73	74.00	-33.27

Operation Band	:802.11n40	Test Date	:2018-01-19
Fundamental Frequency	:2422 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



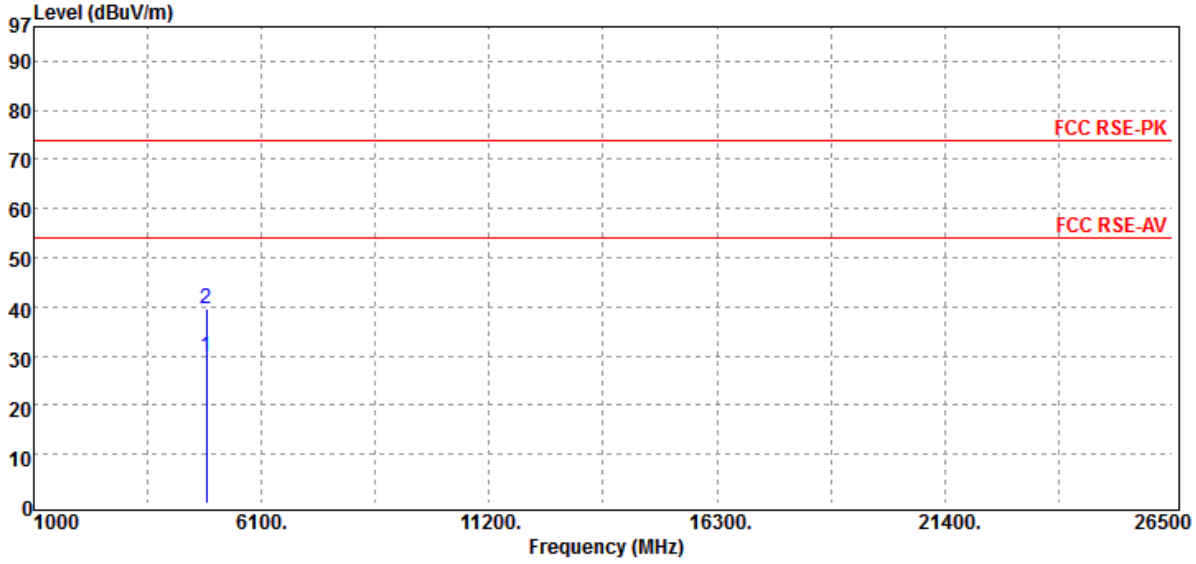
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4844.00	H	Average	25.41	4.97	30.38	54.00	-23.62
4844.00	H	Peak	35.32	4.97	40.29	74.00	-33.71

Operation Band	:802.11n40	Test Date	:2018-01-19
Fundamental Frequency	:2422 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



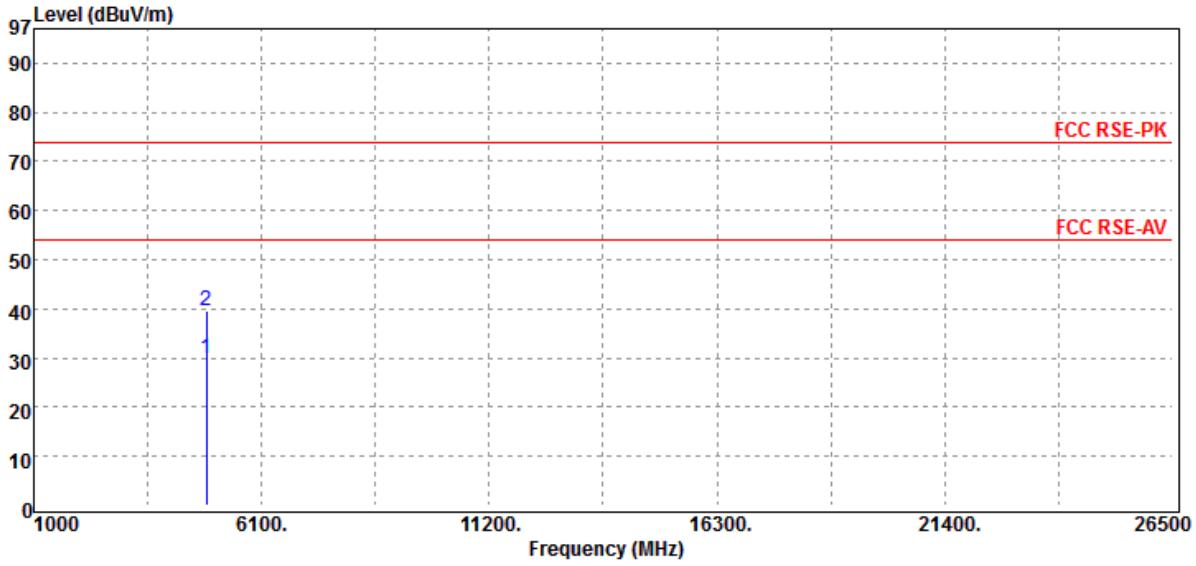
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4844.00	H	Average	24.92	4.97	29.89	54.00	-24.11
4844.00	H	Peak	35.41	4.97	40.38	74.00	-33.62

Operation Band	:802.11n40	Test Date	:2018-01-19
Fundamental Frequency	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



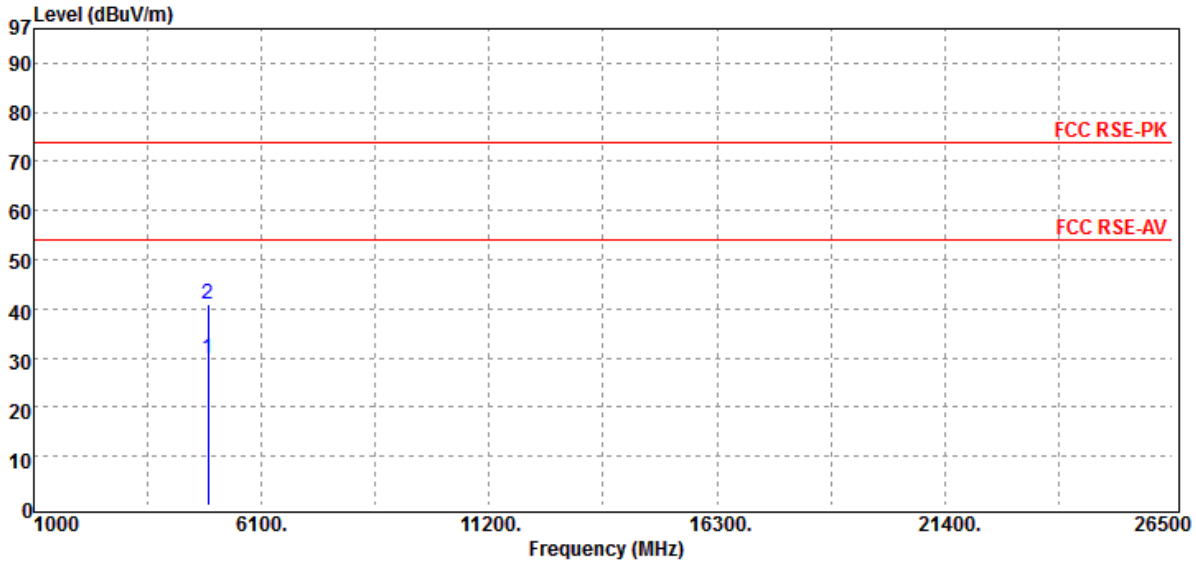
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	H	Average	24.83	5.13	29.96	54.00	-24.04
4874.00	H	Peak	34.51	5.13	39.64	74.00	-34.36

Operation Band	:802.11n40	Test Date	:2018-01-19
Fundamental Frequency	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



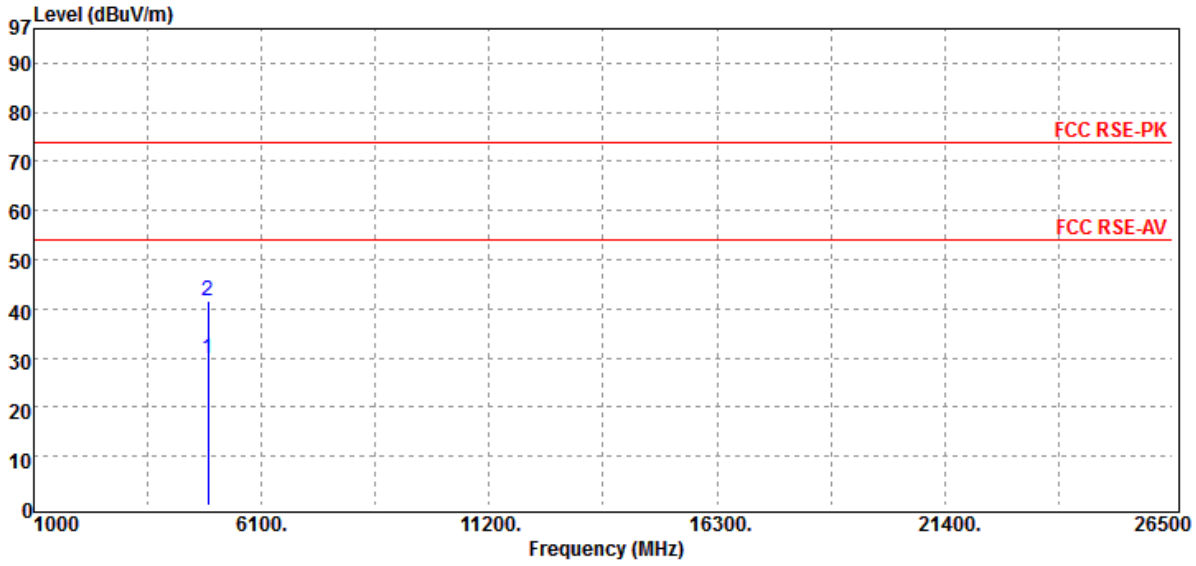
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	H	Average	24.68	5.13	29.81	54.00	-24.19
4874.00	H	Peak	34.44	5.13	39.57	74.00	-34.43

Operation Band	:802.11n40	Test Date	:2018-01-19
Fundamental Frequency	:2452 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4904.00	H	Average	24.60	5.24	29.84	54.00	-24.16
4904.00	H	Peak	35.80	5.24	41.04	74.00	-32.96

Operation Band	:802.11n40	Test Date	:2018-01-19
Fundamental Frequency	:2452 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4904.00	H	Average	24.78	5.24	30.02	54.00	-23.98
4904.00	H	Peak	36.22	5.24	41.46	74.00	-32.54

~ End of Report ~