ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT AND INDUSTRY CANADA RSS 247 CLASS II & IV PC REPORT

OF

Product Name:	**M.2 Card form factor Bluetooth / IEEE 802.11a/b/g/n/ac wireless network adapter**
Brand Name:	acer
Model No.:	**7265D2W**
Model Difference:	**N/A**
FCC ID:	**HLZ7265D2**
IC:	**1754F-7265D2**
Report No.:	**E2/2018/70014**
Issue Date:	**Jul. 27, 2018**
FCC Rule Part:	**§15.247, Cat: DTS**
IC Rule Part:	**RSS-247 issue 2 :2017**
Prepared for:	**Acer Incorporated 8F., NO. 88, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221, Taiwan**
Prepared by:	**SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333**

ilac-MRA TAF Testing Laboratory 0513

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VERIFICATION OF COMPLIANCE

Applicant:	Acer Incorporated 8F., NO. 88, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 221, Taiwan
Product Name:	M.2 Card form factor Bluetooth / IEEE 802.11a/b/g/n/ac wireless network adapter
Brand Name:	acer
Model No.:	7265D2W
Model Difference:	N/A
FCC ID:	HLZ7265D2
IC:	1754F-7265D2
File Number:	E2/2018/70014
Date of test:	Jun 25, 2018 ~ Jul. 24, 2018
Date of EUT Received:	Jun 25, 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.

Test By:	Aken Huang	***Date:***	Jul. 27, 2018
	Aken Huang / Engineer		
Prepared By:	Yuri Tsai	***Date:***	Jul. 27, 2018
	Yuri Tsai / Clerk		
Approved By:	Jim Chang	***Date:***	Jul. 27, 2018
	Jim Chang / Manager		

Revision History

Report Number	Revision	Description	Issue Date
E2/2018/70014	Rev.00	Initial creation of document	Jul. 27, 2018

Contents

1 GENERAL INFORMATION

1.1 Product description

General Information of Host:

Product Name of Host:	Notebook Computer	
Brand Name:	acer	
Marketing Name of Host:	CP713-1WN	
Model No. of Host:	N18Q2	
Model Difference:	N/A	
Hardware Version:	vesion 1-1	
Software Version:	Win 10	
Model No. of BT/WLAN Module:	7265D2W	
Module FCC ID:	HLZ7265D2	
Module IC:	1754F-7265D2	
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 & Class IV Permissive change:	M.2 Card form factor Bluetooth / IEEE 802.11a/b/g/n/ac wireless network adapter INSTALLED IN Notebook Computer	
Power Supply:	11.55Vdc from Rechargeable Li-polymer Battery Pack or 5V/9V/15V by AC/DC Power Adapter	
	Battery:	Model No.: AP15O5L, Supplier: acer
	Adapter:	Model No.: PA-1450-78, Supplier: LITEON

WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Peak) / EIRP	Modulation Technology	Type of Emission
11b/g	2412-2462	11	b: 17.98dBm b: 15.36(EIRP) g: 17.81dBm g: 15.28 (EIRP)	DSSS OFDM	b: 12M8D2W g: 17M2D7W
11n (2.4GHz)	HT20 2412-2462	11	19.83dBm (MIMO) 19.92 (EIRP)	OFDM	18M4D7W
11n (2.4GHz)	HT40 2422-2452	7	19.69dBm (MIMO) 17.66 (EIRP)	OFDM	36M3D7W
Antenna Designation:		PIFA Antenna, Supplier: WNC 1. P/N: N/A, Gain: -0.46dBi (Main) 2. P/N: N/A, Gain: -0.83dBi (Aux)			
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 n_20MHz: 6.5 – 144.4Mbps 802.11 n_40MHz: 13.5 – 300.0Mbps			

The 2.4G max antenna gain is -0.46dBi which was choosing for Radiated Spurious Emission test.

1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

FCC KDB 662911 D01 Multiple Transmitter Output

Canada RSS-247 issue 2: 2017

RSS-Gen Issue 4:2014

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.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333 (TAF code 0513)

FCC Registration Numbers are: 735305 / TW0002

Canada Registration Number: 4620A-5

1.4 Special Accessories

There is no special accessory 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 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plan. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

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 plan. 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 hand-held 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.

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

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

3 SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§15.247(b) (3)	RSS-247 §5.4 (2)	Peak Output Power	Compliant
§15.247(d)	RSS-247 §5.5	Radiated Band Edge and Spurious Emission	Compliant
§15.203 §15.247(b)	RSS- Gen §6.8	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2483.5MHz Band

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

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

7 channels are provided for 802.11n_HT40

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

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (ABOVE 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	6	DSSS	1	Main
802.11g	1 to 11	1, 6, 11	OFDM	6	Main
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS8	MIMO
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS8	MIMO
RADIATED BAND EDGE EMISSION TEST					
MODE	MODE	MODE	MODE	MODE	MODE
802.11b	1 to 11	1, 6, 11	DSSS	1	Main

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

Pre-scanned was done on Antenna Main and Antenna Aux, and Antenna Aux results higher emission at 2.4GHz. Therefore, the completed set of measurement was done on Antenna Main (2.4GHz) to be presented on this test report.

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1, 6, 11	DSSS	1	Main
802.11g	1 to 11	1, 6, 11	OFDM	6	Main
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS8	MIMO
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS8	MIMO

5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 1.55dB (for Spectrum) +/- 1.42 dB (for Power Meter)
6dB Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Peak Power Density	+/- 1.55 dB
99% Power Bandwidth	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : **Vertical**)	9kHz-30MHz: +/-2.87dB
	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: +/-2.87dB
	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 PEAK OUTPUT POWER MEASUREMENT

6.1 Standard Applicable:

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power form the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

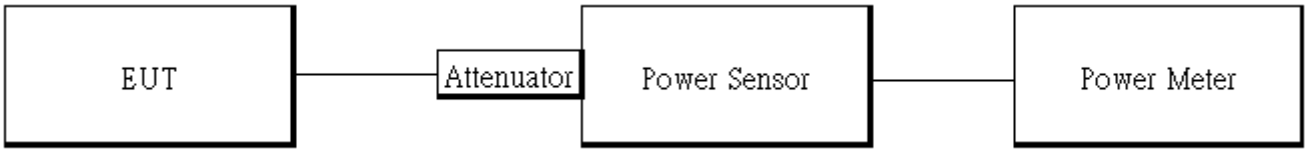
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	2018/06/20	2019/06/19
Power Meter	Anritsu	ML2496A	1326001	2018/06/23	2019/06/22
Power Sensor	Anritsu	MA2411B	1315048	2018/06/23	2019/06/22
Power Sensor	Anritsu	MA2411B	1315049	2018/06/23	2019/06/22
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	2017/12/24	2018/12/23
DC Block	PASTERNACK	PE8210	RF29	2017/12/24	2018/12/23
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	2017/12/24	2018/12/23
Attenuator	WOKEN	218FS-10	RF23	2017/12/24	2018/12/23
DC Power Supply	Agilent	E3640A	MY53140006	2018/05/02	2019/05/01

6.3 Test Set-up:

Power Meter:



6.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

   Power Meter:

   It is used as the auxiliary test equipment to conduct the output power measurement.
4. Record the max. Reading as observed from Spectrum or Power Meter.
5. For MIMO operation, measurement is done per chain basis, and then sum the simultaneous transmitting output in linear.

6.5 Measurement Result (Worst Case Data Rate):

802.11b

CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
1	2412	1	17.51	56.36	1 Watt = 30 dBm
6	2437	1	**17.98**	62.81	1 Watt = 30 dBm
11	2462	1	17.37	54.58	1 Watt = 30 dBm
CH	**Frequency (MHz)**	**Data Rate**	**Avg. Output Power (dBm)**	**Avg. Output Power (mW)**	**Limit**
1	2412	1	15.73	37.41	1 Watt = 30 dBm
6	2437	1	15.51	35.56	1 Watt = 30 dBm
11	2462	1	15.82	38.19	1 Watt = 30 dBm

802.11g

CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
1	2412	1	15.53	35.73	1 Watt = 30 dBm
6	2437	1	**17.81**	60.39	1 Watt = 30 dBm
11	2462	1	13.98	25.00	1 Watt = 30 dBm
CH	**Frequency (MHz)**	**Data Rate**	**Avg. Output Power (dBm)**	**Avg. Output Power (mW)**	**Limit**
1	2412	1	12.41	17.42	1 Watt = 30 dBm
6	2437	1	15.74	37.50	1 Watt = 30 dBm
11	2462	1	10.88	12.25	1 Watt = 30 dBm

802.11n_HT20

CH	Frequency (MHz)	DATA RATE	Peak Outout Power (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CHAIN 0	CHAIN 1				
1	2412	MCS8	14.21	15.02	17.64	58.132	30dBm	PASS
7	2442	MCS8	16.61	17.02	**19.83**	**96.164**	30dBm	PASS
11	2462	MCS8	13.64	13.32	16.49	44.599	30dBm	PASS

CH	Frequency (MHz)	DATA RATE	Avg. Outout Power (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CHAIN 0	CHAIN 1				
1	2412	MCS8	11.68	11.75	14.73	29.685	30dBm	PASS
7	2442	MCS8	14.51	14.21	17.37	54.612	30dBm	PASS
11	2462	MCS8	9.68	9.51	12.61	18.223	30dBm	PASS

802.11n_HT40

CH	Frequency (MHz)	DATA RATE	Peak Outout Power (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CHAIN 0	CHAIN 1				
3	2422	MCS8	11.35	11.09	14.23	26.499	30 dBm	PASS
6	2437	MCS8	16.61	16.74	**19.69**	**93.020**	30 dBm	PASS
9	2452	MCS8	11.54	11.23	14.40	27.530	30 dBm	PASS

CH	Frequency (MHz)	DATA RATE	Avg. Outout Power (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CHAIN 0	CHAIN 1				
3	2422	MCS8	9.65	9.54	12.61	18.221	30 dBm	PASS
6	2437	MCS8	12.19	12.01	15.11	32.443	30 dBm	PASS
9	2452	MCS8	8.51	8.22	11.38	13.733	30 dBm	PASS

**** Note: The duty cycle factor is compensated back to obtain the maximum value of the measurement in average.***

EIRP Measurement:

802.11b

CH	Frequency (MHz)	Avg. Output Power		GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
		TOTAL POWER (dBm)	TOTAL POWER (mW)				
1	2412	15.73	37.411	-0.46	15.27	36	PASS
6	2437	15.51	35.563	-0.46	15.05	36	PASS
11	2462	**15.82**	**38.194**	-0.46	**15.36**	36	PASS

802.11g

CH	Frequency (MHz)	Avg. Output Power		GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
		TOTAL POWER (dBm)	TOTAL POWER (mW)				
1	2412	12.41	17.418	-0.46	11.95	36	PASS
6	2437	**15.74**	**37.497**	-0.46	**15.28**	36	PASS
11	2462	10.88	12.246	-0.46	10.42	36	PASS

802.11n_HT20 (MIMO)

CH	Frequency (MHz)	Avg. Output Power		GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
		TOTAL POWER (dBm)	TOTAL POWER (mW)				
1	2412	14.73	29.717	2.55	17.28	36	PASS
7	2442	**17.37**	**54.576**	2.55	**19.92**	36	PASS
11	2462	12.61	18.239	2.55	15.16	36	PASS

802.11n_HT40 (MIMO)

CH	Frequency (MHz)	Avg. Output Power		GAIN (dBi)	EIRP	REQUIRED LIMIT (dBm)	RESULT
		TOTAL POWER (dBm)	TOTAL POWER (mW)				
3	2422	12.61	18.239	2.55	15.16	36	PASS
6	2437	**15.11**	**32.434**	2.55	**17.66**	36	PASS
9	2452	11.38	13.740	2.55	13.93	36	PASS

* Note: EIRP = Average Power + Gain, where the nominal gain of the antenna 2.55dBi for 2.4GHz (MIMO), where MIMO gain = directive gain + nominal gain.

7 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

7.1 Standard Applicable:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

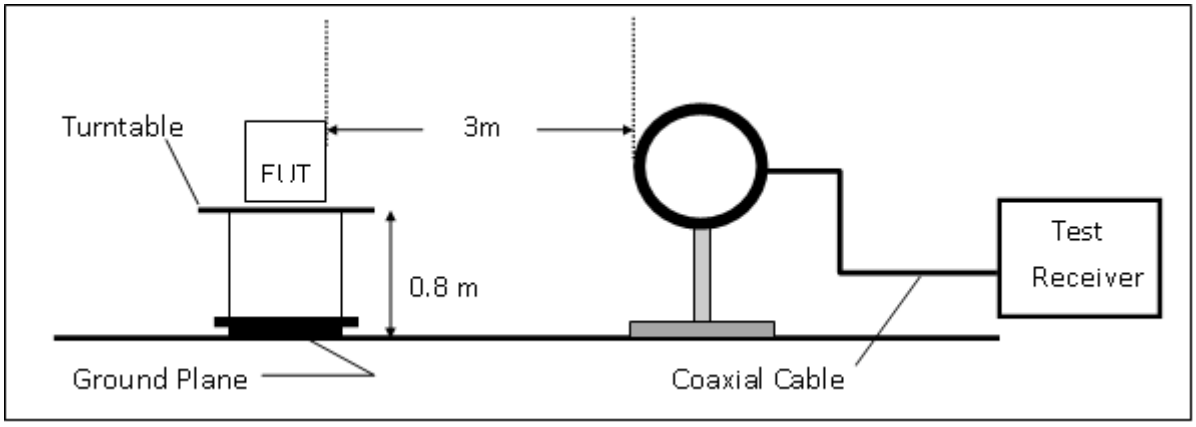
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (dBμV/m)

7.2 Measurement Equipment Used:

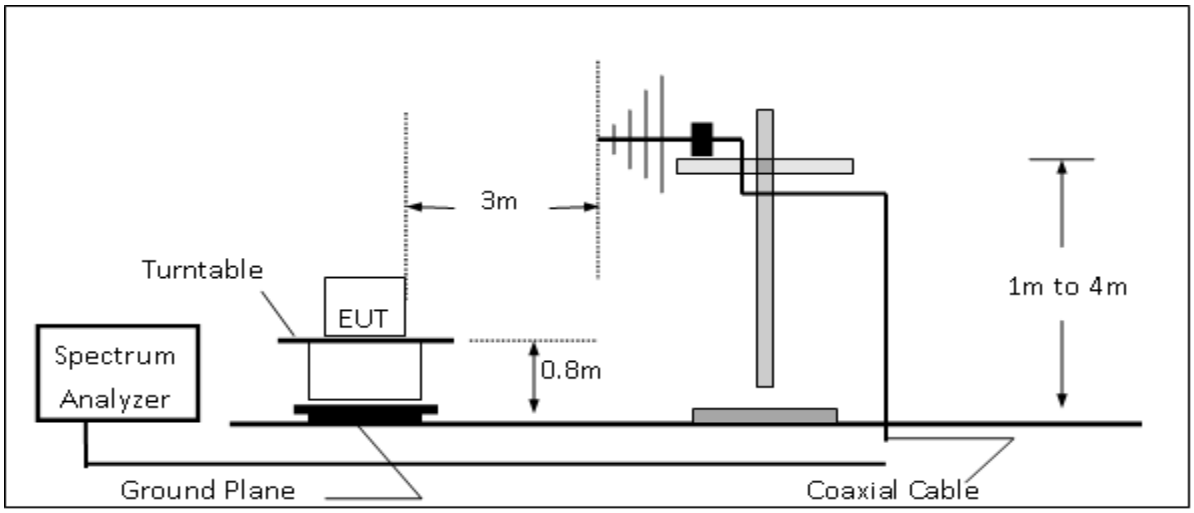
SGS 966 Chamber No.C					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Horn Antenna	Schwarzbeck	BBHA9120D	1341	2018/06/07	2019/06/06
3m Site NSA	SGS	966 chamber D	N/A	2017/07/06	2018/07/05
EMI Test Receiver	R&S	ESU 40	100363	2018/04/11	2019/04/10
Pre-Amplifier	EMC Instruments	EMC184045B	980135	2017/10/27	2018/10/26
Highpass Filter	Micro Tronics	BRM50701-01	G008	2017/12/26	2018/12/25
Coaxial Cable	Huber Suhner	EMC106-SM-SM-7200	150703	2017/12/26	2018/12/25

7.3 Test SET-UP:

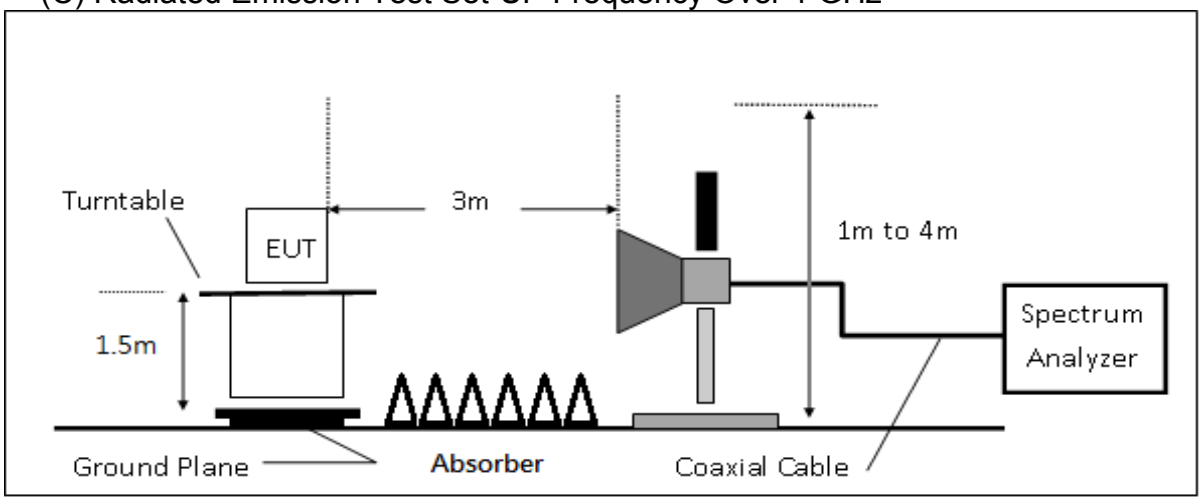
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



7.4 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 plane.
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. 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.
6. 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.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
8. 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.
9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
11. 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.
12. Repeat above procedures until all default test channel measured were complete.

7.5 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.

7.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

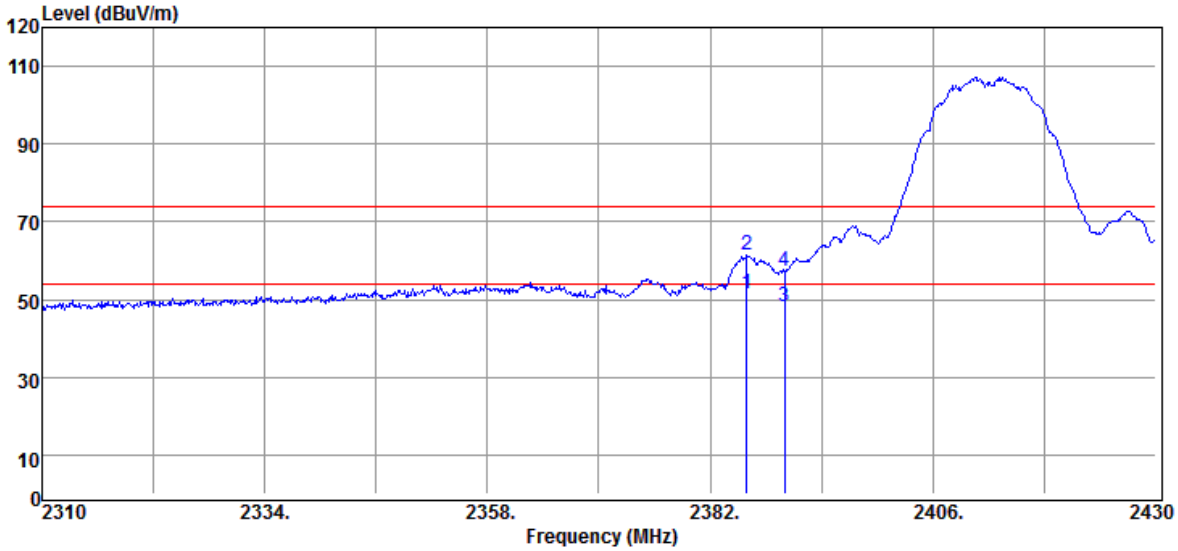
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

7.7 Measurement Result:

Note: Refer to next page tabular data sheets.

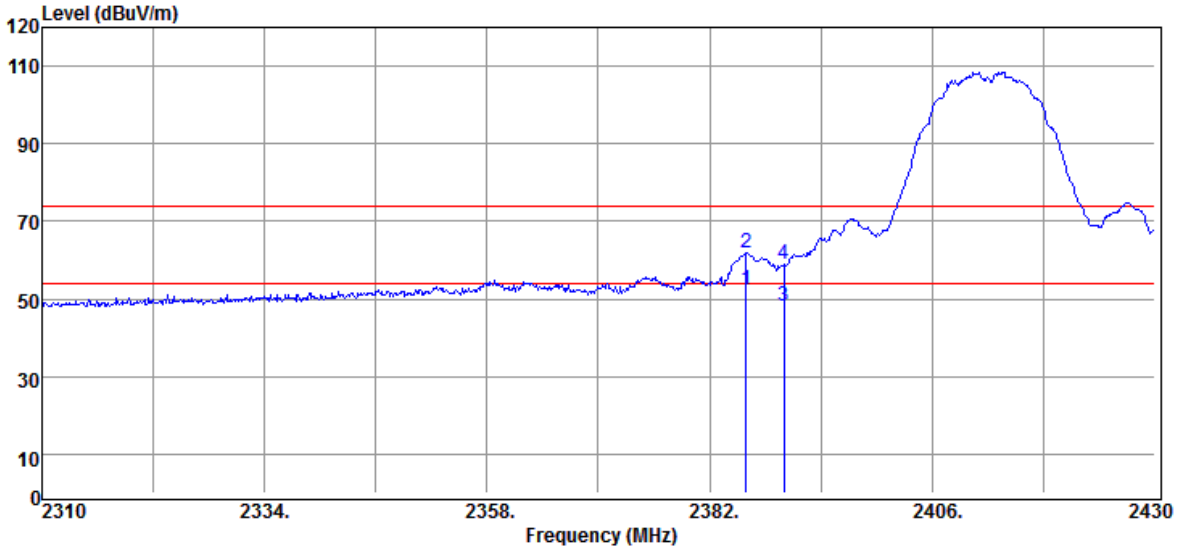
Radiated Band Edge Measurement Result: 802.11 b mode

Operation Mode	:802.11b	Test Date	:2018-06-25
Test Mode	:BE CH LOW	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:VERTICAL
Test Channel	:2412 MHz	Engineer	:Ashton



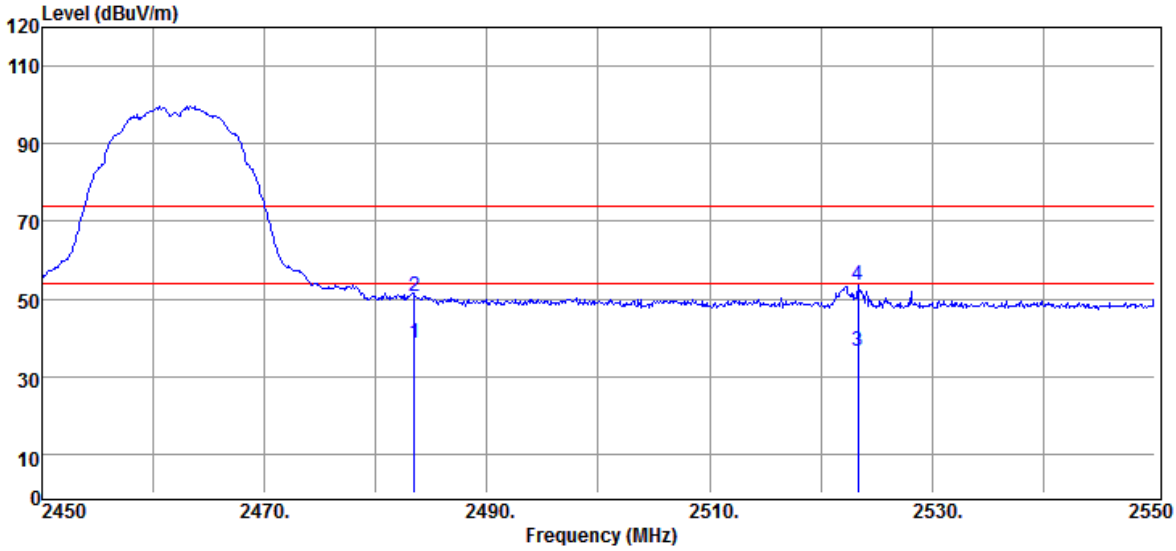
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2385.96	Average	47.91	3.39	51.30	54.00	-2.70
2385.96	Peak	57.95	3.39	61.34	74.00	-12.66
2390.00	Average	44.71	3.39	48.10	54.00	-5.90
2390.00	Peak	54.02	3.39	57.41	74.00	-16.59

Operation Mode	:802.11b	Test Date	:2018-06-25
Test Mode	:BE CH LOW	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2412 MHz	Engineer	:Ashton



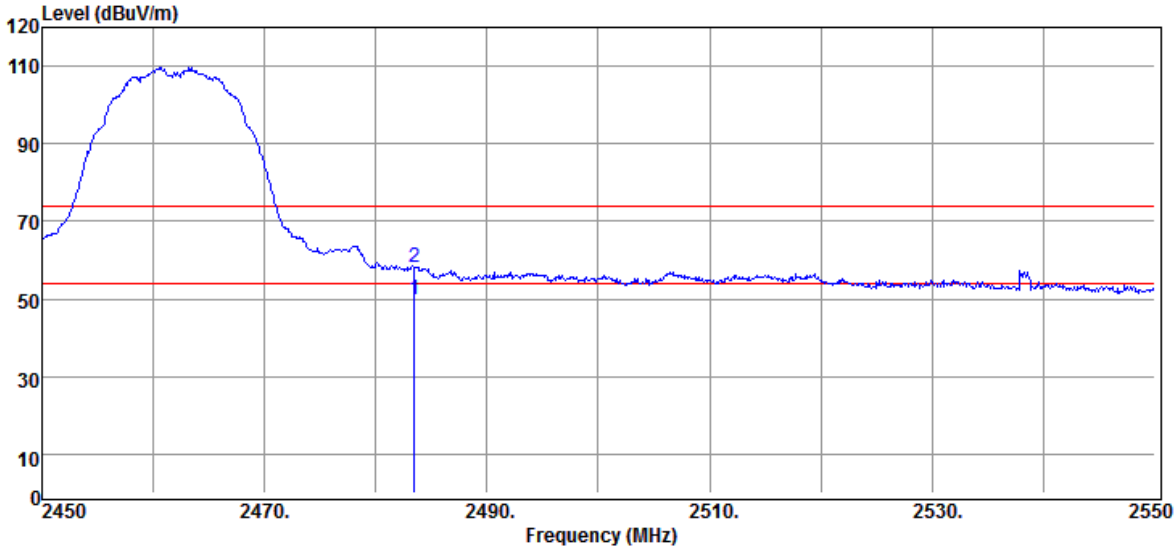
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2385.96	Average	49.06	3.39	52.45	54.00	-1.55
2385.96	Peak	58.41	3.39	61.80	74.00	-12.20
2390.00	Average	44.71	3.39	48.10	54.00	-5.90
2390.00	Peak	55.46	3.39	58.85	74.00	-15.15

Operation Mode	:802.11b	Test Date	:2018-06-25
Test Mode	:BE CH HIGH	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:VERTICAL
Test Channel	:2462 MHz	Engineer	:Ashton



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	34.59	3.96	38.55	54.00	-15.45
2483.50	Peak	46.75	3.96	50.71	74.00	-23.29
2523.30	Average	32.17	4.24	36.41	54.00	-17.59
2523.30	Peak	49.19	4.24	53.43	74.00	-20.57

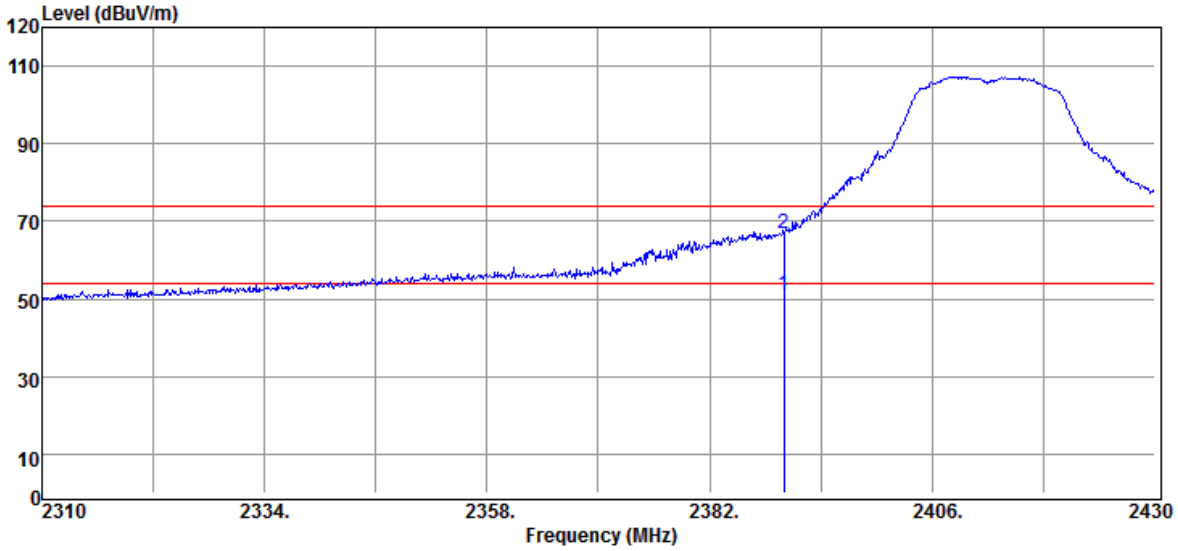
Operation Mode	:802.11b	Test Date	:2018-06-25
Test Mode	:BE CH HIGH	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2462 MHz	Engineer	:Ashton



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	45.74	3.96	49.70	54.00	-4.30
2483.50	Peak	54.34	3.96	58.30	74.00	-15.70

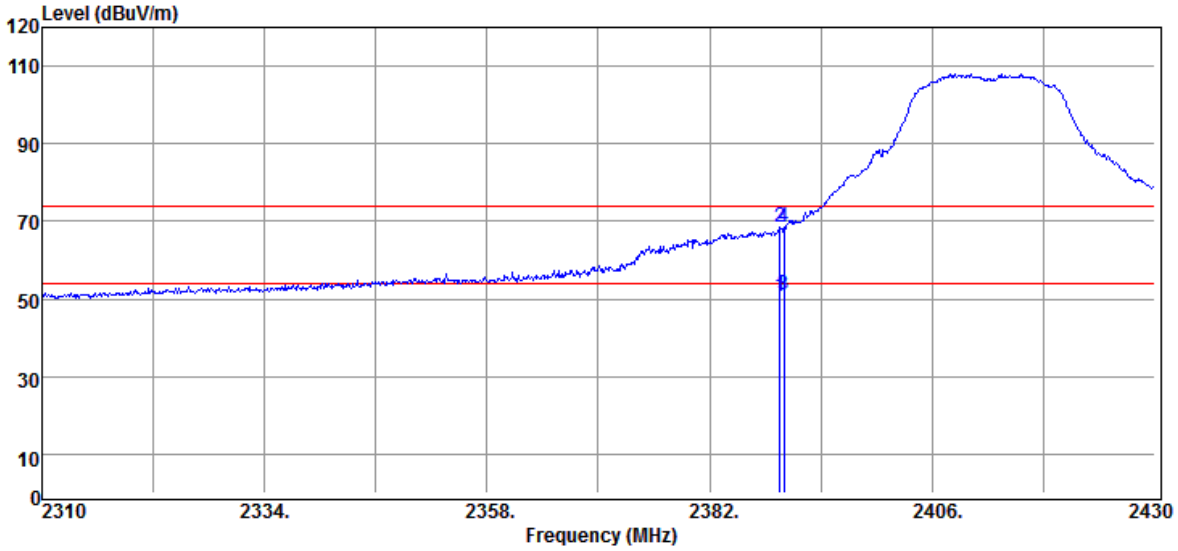
Radiated Band Edge Measurement Result: 802.11 g mode

Operation Mode	:802.11g	Test Date	:2018-06-25
Test Mode	:BE CH LOW	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:VERTICAL
Test Channel	:2412 MHz	Engineer	:Ashton



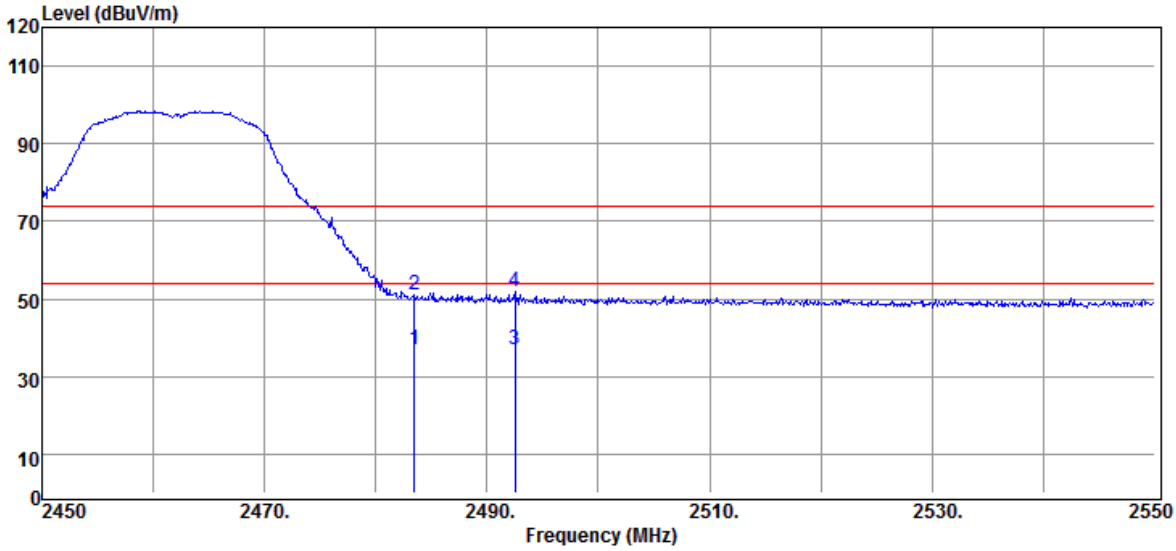
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	47.48	3.39	50.87	54.00	-3.13
2390.00	Peak	63.51	3.39	66.90	74.00	-7.10

Operation Mode	:802.11g	Test Date	:2018-06-25
Test Mode	:BE CH LOW	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2412 MHz	Engineer	:Ashton



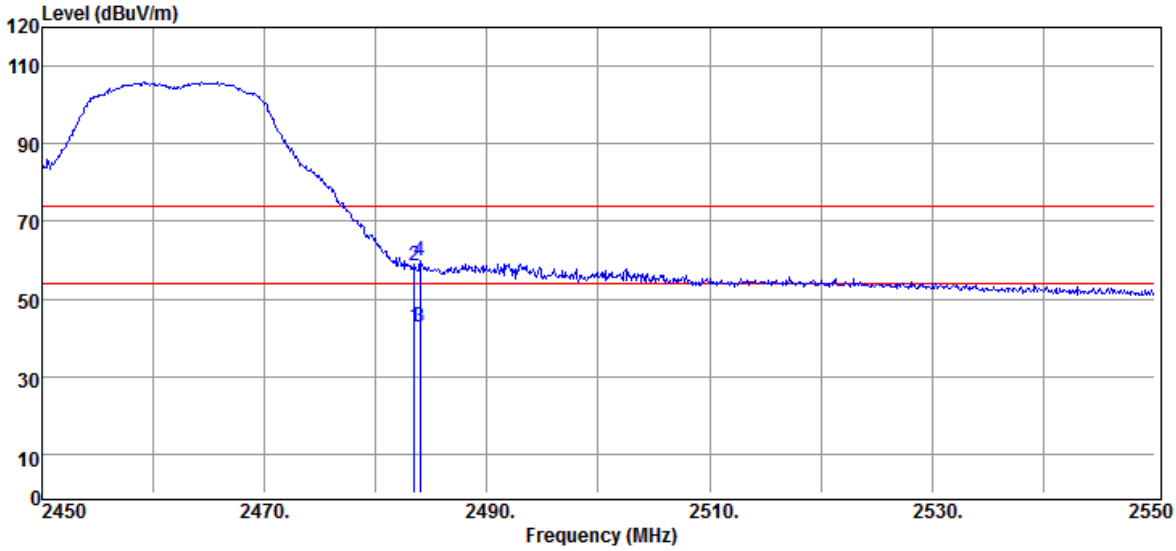
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2389.56	Average	47.20	3.40	50.60	54.00	-3.40
2389.56	Peak	64.99	3.40	68.39	74.00	-5.61
2390.00	Average	47.50	3.39	50.89	54.00	-3.11
2390.00	Peak	64.94	3.39	68.33	74.00	-5.67

Operation Mode	:802.11g	Test Date	:2018-06-25
Test Mode	:BE CH HIGH	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:VERTICAL
Test Channel	:2462 MHz	Engineer	:Ashton



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	33.07	3.96	37.03	54.00	-16.97
2483.50	Peak	47.02	3.96	50.98	74.00	-23.02
2492.50	Average	33.09	4.02	37.11	54.00	-16.89
2492.50	Peak	47.86	4.02	51.88	74.00	-22.12

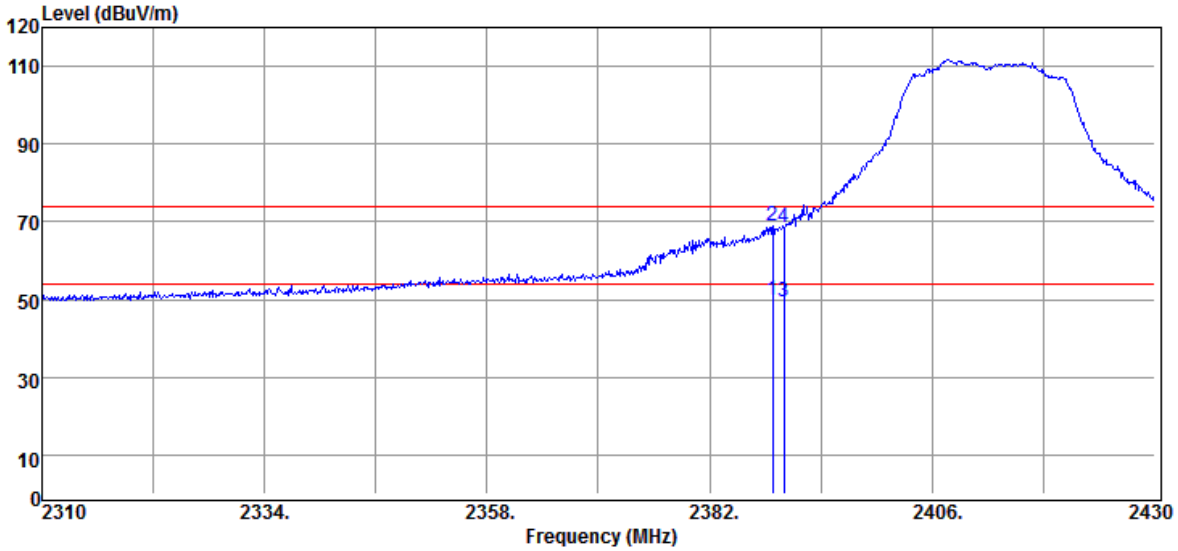
Operation Mode	:802.11g	Test Date	:2018-06-25
Test Mode	:BE CH HIGH	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2462 MHz	Engineer	:Ashton



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	39.01	3.96	42.97	54.00	-11.03
2483.50	Peak	54.54	3.96	58.50	74.00	-15.50
2484.00	Average	38.76	3.96	42.72	54.00	-11.28
2484.00	Peak	55.83	3.96	59.79	74.00	-14.21

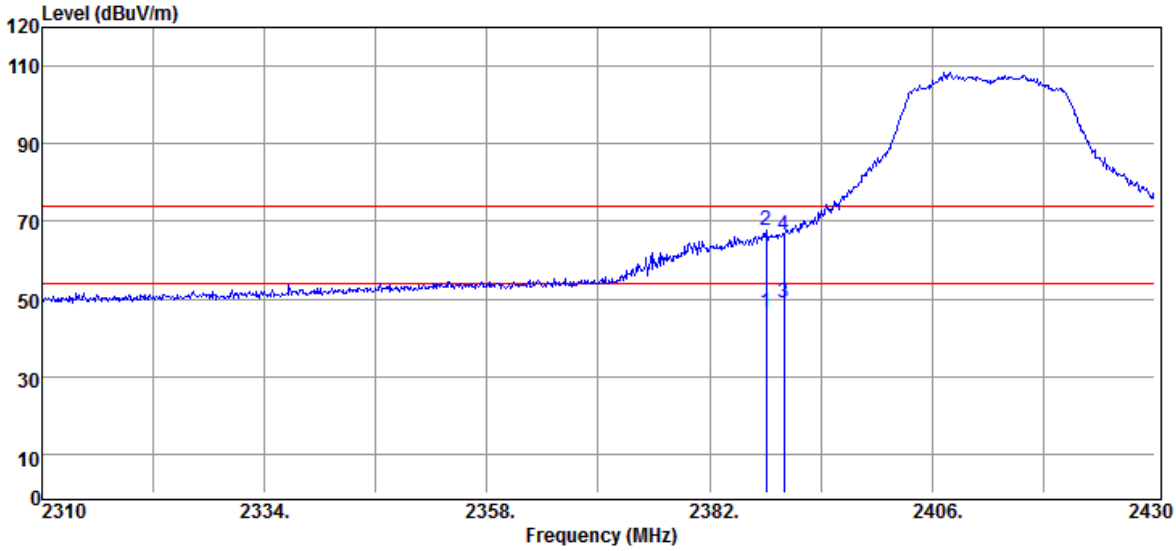
Radiated Band Edge Measurement Result (802.11n_HT20)

Operation Mode	:802.11n20	Test Date	:2018-06-25
Test Mode	:BE CH LOW	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:VERTICAL
Test Channel	:2412 MHz	Engineer	:Ashton



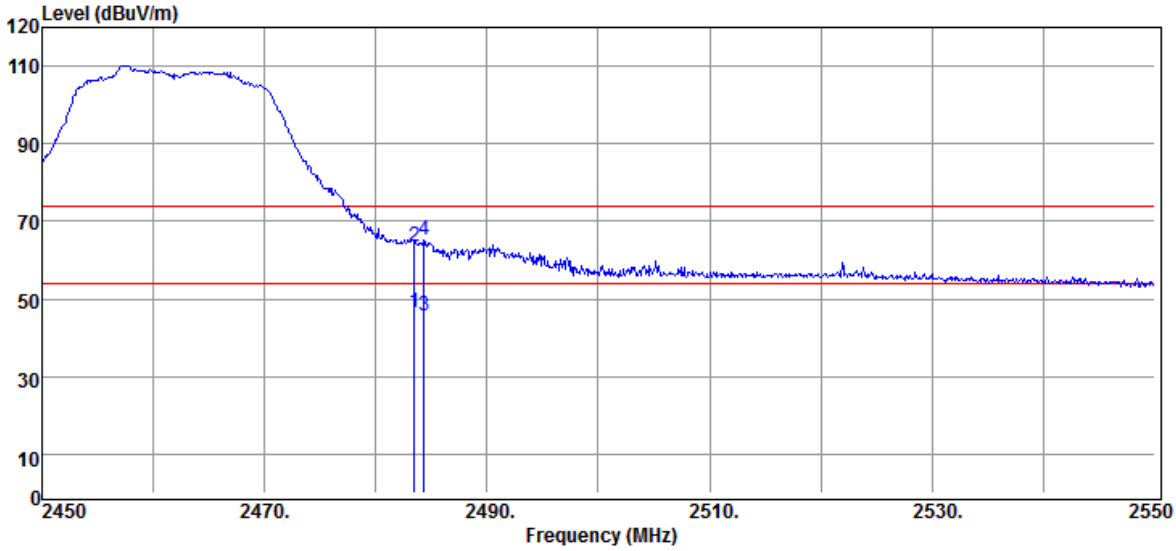
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2388.84	Average	46.35	3.39	49.74	54.00	-4.26
2388.84	Peak	65.51	3.39	68.90	74.00	-5.10
2390.00	Average	45.95	3.39	49.34	54.00	-4.66
2390.00	Peak	65.21	3.39	68.60	74.00	-5.40

Operation Mode	:802.11n20	Test Date	:2018-06-25
Test Mode	:BE CH LOW	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2412 MHz	Engineer	:Ashton



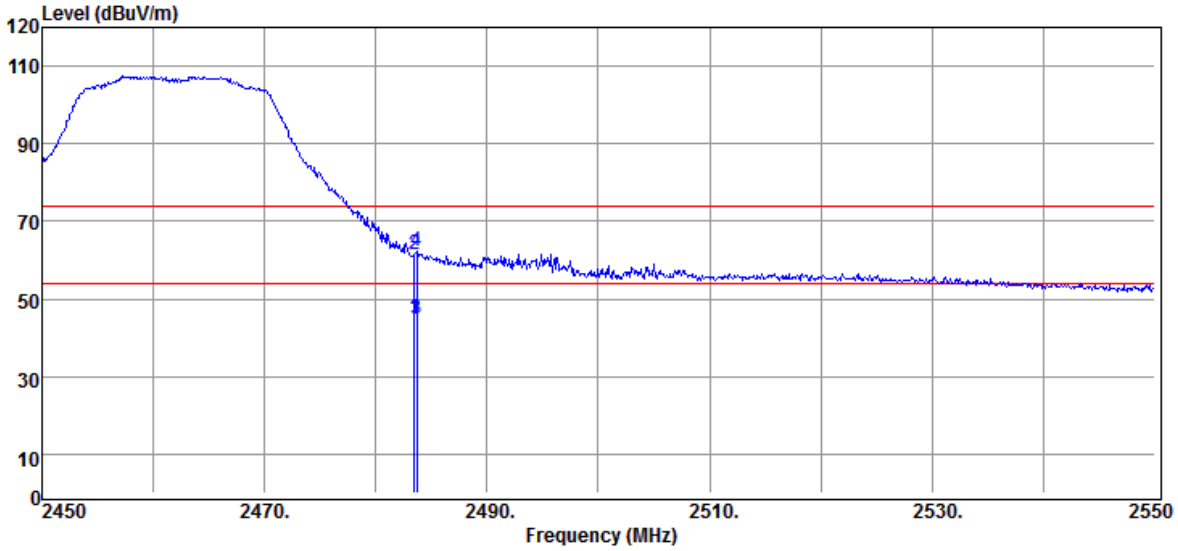
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2388.12	Average	43.29	3.38	46.67	54.00	-7.33
2388.12	Peak	64.34	3.38	67.72	74.00	-6.28
2390.00	Average	45.76	3.39	49.15	54.00	-4.85
2390.00	Peak	62.90	3.39	66.29	74.00	-7.71

Operation Mode	:802.11n20	Test Date	:2018-06-25
Test Mode	:BE CH HIGH	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:VERTICAL
Test Channel	:2462 MHz	Engineer	:Ashton



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	42.47	3.96	46.43	54.00	-7.57
2483.50	Peak	59.48	3.96	63.44	74.00	-10.56
2484.30	Average	41.76	3.96	45.72	54.00	-8.28
2484.30	Peak	61.21	3.96	65.17	74.00	-8.83

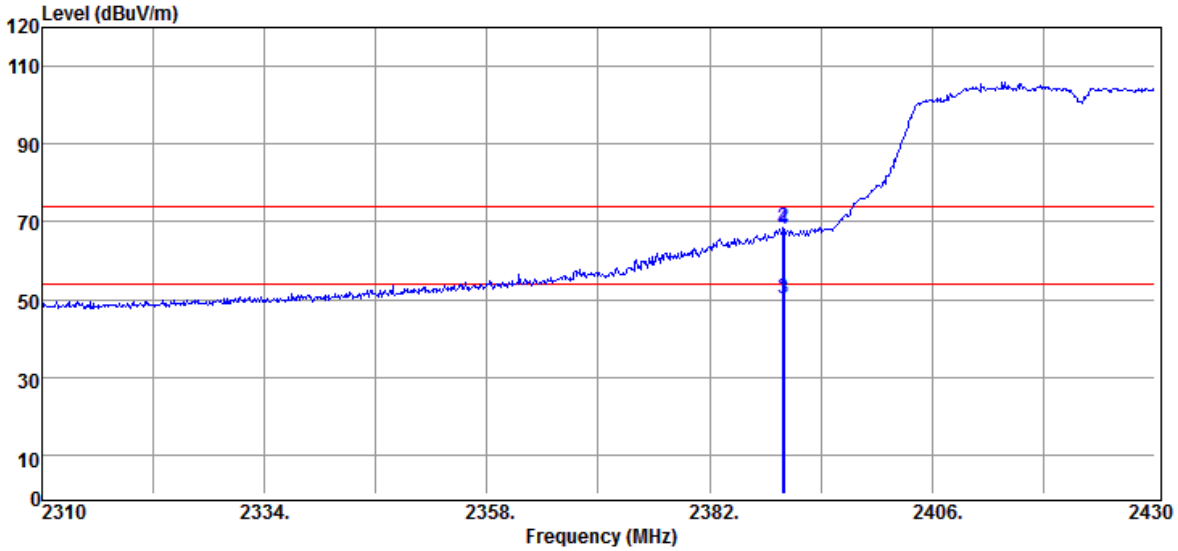
Operation Mode	:802.11n20	Test Date	:2018-06-25
Test Mode	:BE CH HIGH	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2462 MHz	Engineer	:Ashton



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	40.92	3.96	44.88	54.00	-9.12
2483.50	Peak	57.55	3.96	61.51	74.00	-12.49
2483.70	Average	40.95	3.96	44.91	54.00	-9.09
2483.70	Peak	58.22	3.96	62.18	74.00	-11.82

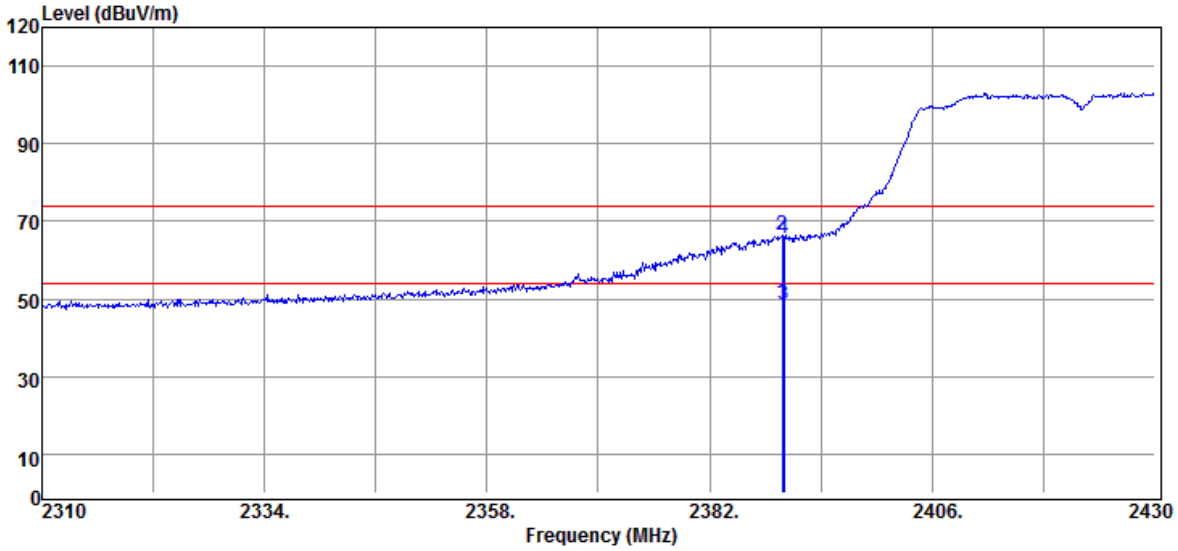
Radiated Band Edge Measurement Result (802.11n_HT40)

Operation Mode	:802.11n40	Test Date	:2018-06-25
Test Mode	:BE CH LOW	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:VERTICAL
Test Channel	:2422 MHz	Engineer	:Ashton



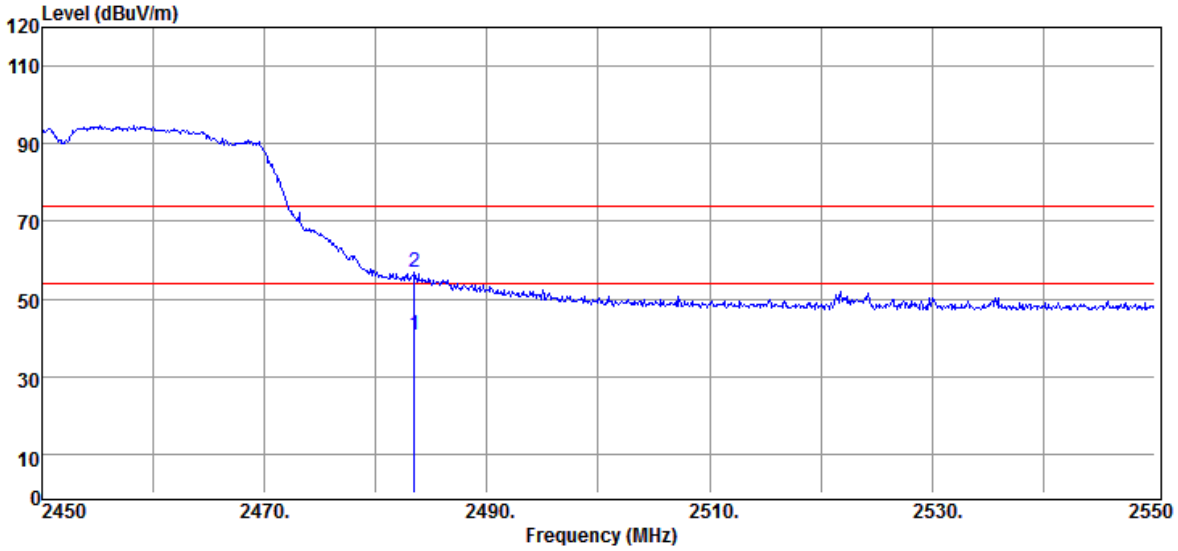
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2389.92	Average	46.70	3.39	50.09	54.00	-3.91
2389.92	Peak	65.17	3.39	68.56	74.00	-5.44
2390.00	Average	46.74	3.39	50.13	54.00	-3.87
2390.00	Peak	64.68	3.39	68.07	74.00	-5.93

Operation Mode	:802.11n40	Test Date	:2018-06-25
Test Mode	:BE CH LOW	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2422 MHz	Engineer	:Ashton



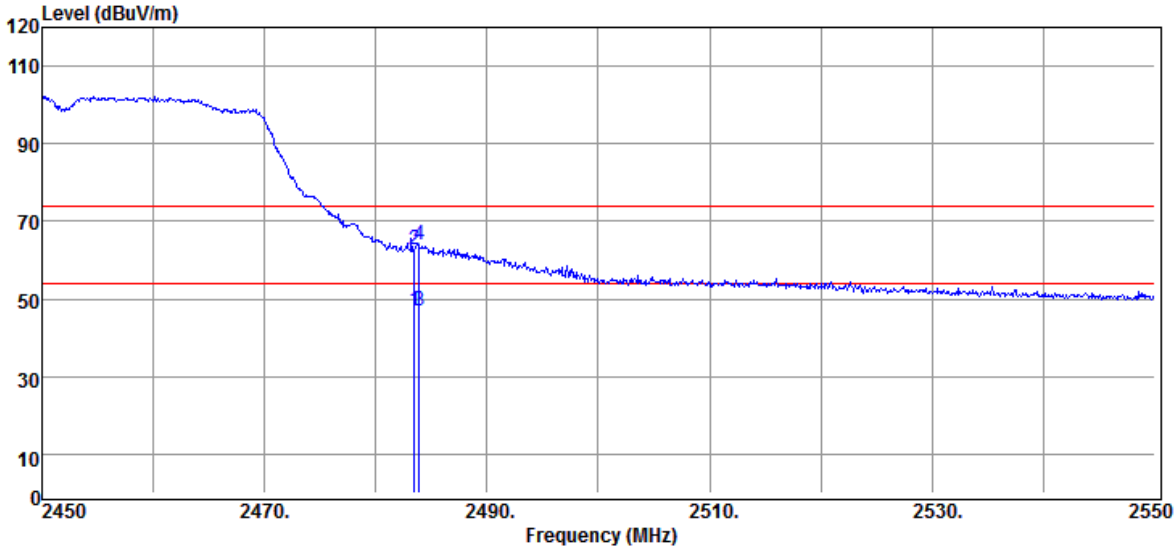
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2389.80	Average	45.54	3.39	48.93	54.00	-5.07
2389.80	Peak	62.96	3.39	66.35	74.00	-7.65
2390.00	Average	45.21	3.39	48.60	54.00	-5.40
2390.00	Peak	62.03	3.39	65.42	74.00	-8.58

Operation Mode	:802.11n40	Test Date	:2018-06-25
Test Mode	:BE CH HIGH	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:VERTICAL
Test Channel	:2452 MHz	Engineer	:Ashton



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	36.56	3.96	40.52	54.00	-13.48
2483.50	Peak	52.77	3.96	56.73	74.00	-17.27

Operation Mode	:802.11n40	Test Date	:2018-06-25
Test Mode	:BE CH HIGH	Temp./Humi.	:26/59
EUT Pol	:E2 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2452 MHz	Engineer	:Ashton

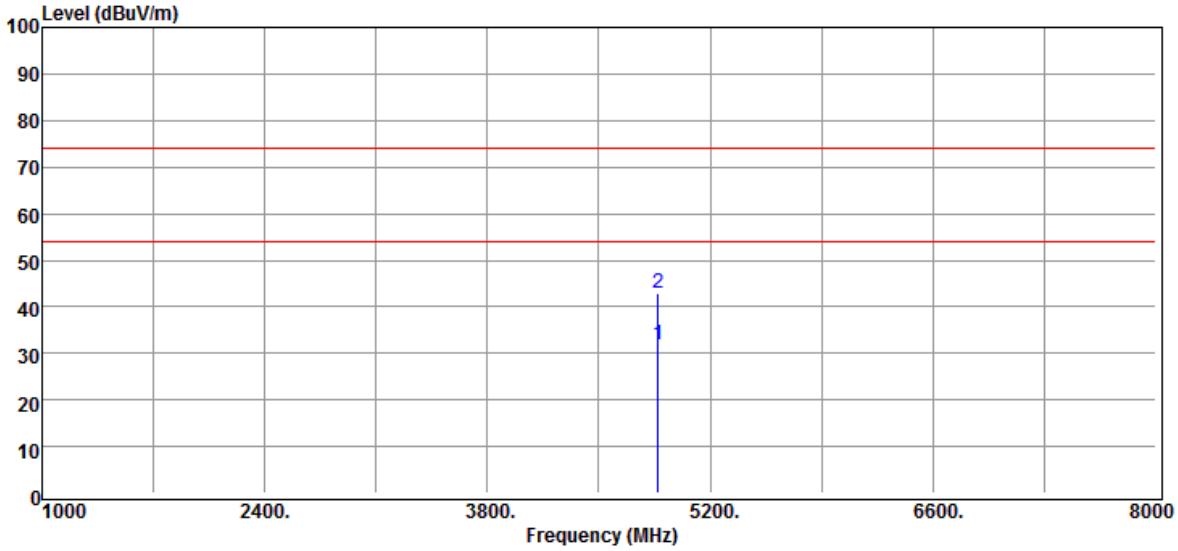


Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	43.09	3.96	47.05	54.00	-6.95
2483.50	Peak	58.69	3.96	62.65	74.00	-11.35
2483.90	Average	43.01	3.96	46.97	54.00	-7.03
2483.90	Peak	60.04	3.96	64.00	74.00	-10.00

Above 1GHz Data:

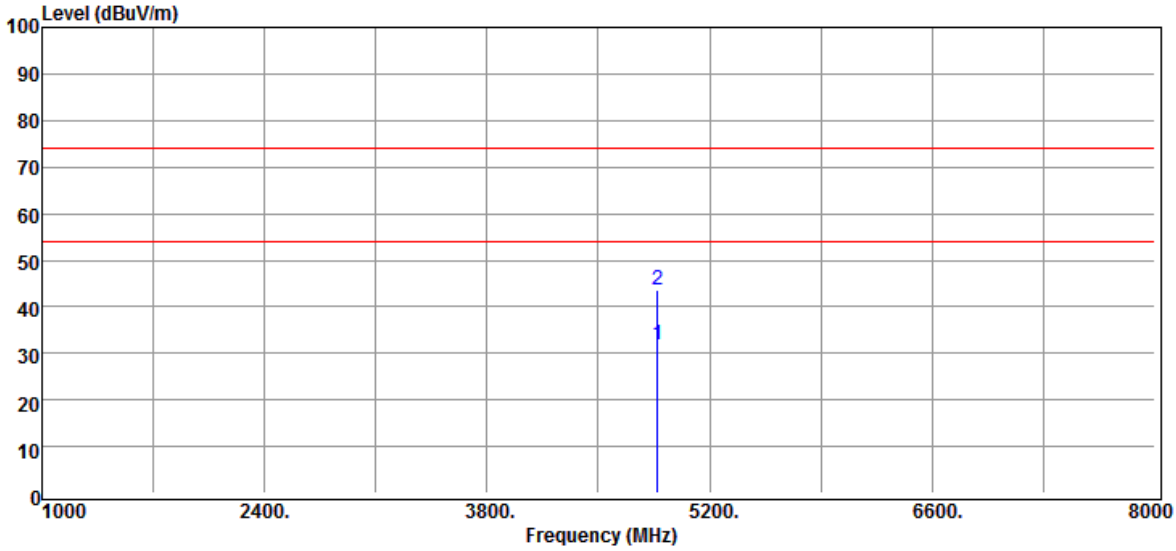
Radiated Spurious Emission Measurement Result (802.11 b)

Operation Mode	:802.11b	Test Date	:2018-07-19
Test Mode	:TX CH MID	Temp./Humi.	:26/60
EUT Pol	:E2 Plan	Antenna Pol.	:VERTICAL
Test Channel	:2437 MHz	Engineer	:Enzo



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	19.09	12.58	31.67	54.00	-22.33
4874.00	Peak	30.29	12.58	42.87	74.00	-31.13

Operation Mode	:802.11b	Test Date	:2018-07-19
Test Mode	:TX CH MID	Temp./Humi.	:26/60
EUT Pol	:E2 Plan	Antenna Pol.	:HORIZONTAL
Test Channel	:2437 MHz	Engineer	:Enzo



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	19.16	12.58	31.74	54.00	-22.26
4874.00	Peak	30.85	12.58	43.43	74.00	-30.57

8 ANTENNA REQUIREMENT

8.1 Standard Applicable:

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

8.2 Antenna Connected Construction:

An embedded-in antenna design is used.
The antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.
The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

~ End of Report ~