

FCC Test Report

Product Name	ROG Strix F-WL Dongle
Model No.	ROG Strix F-WL Dongle
FCC ID	BJM-ROGSTRIXFWLD

Applicant	Tatung Company
Address	22 Chungshan N Road Sec 3 , Taipei 10451, Taiwan

Date of Receipt	Apr. 18, 2018
Issued Date	Jun. 05, 2018
Report No.	1840181R-RFUSP15V00
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Test Report

Issued Date: Jun. 05, 2018

Report No.: 1840181R-RFUSP15V00



Product Name	ROG Strix F-WL Dongle
Applicant	Tatung Company
Address	22 Chungshan N Road Sec 3 , Taipei 10451, Taiwan
Manufacturer	Tatung Company
Model No.	ROG Strix F-WL Dongle
EUT Rated Voltage	DC 5V (Power by USB)
EUT Test Voltage	DC 5V (Power by USB)
Trade Name	ASUS
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2017 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By

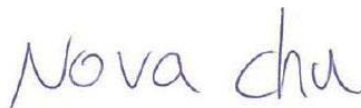
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(Engineer / Nova Chu)

Approved By

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(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	ROG Strix F-WL Dongle
Trade Name	ASUS
Model No.	ROG Strix F-WL Dongle
FCC ID	BJM-ROGSTRIXFWLD
Frequency Range	2405.35-2477.35MHz
Channel Number	37ch
Channel Control	Auto
Type of Modulation	Pi/4 DQPSK
Antenna Type	Multilayer ceramic Antenna
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Walsin	RFANT3216120A5T Series	Multilayer ceramic Antenna	2dBi for 2.4 GHz

Note: The antenna of EUT is conform to FCC 15.203

Center Frequency of Each Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1:	2405.35 MHz	Channel 11:	2425.35 MHz	Channel 21:	2445.35 MHz	Channel 31:	2465.35 MHz
Channel 2:	2407.35 MHz	Channel 12:	2427.35 MHz	Channel 22:	2447.35 MHz	Channel 32:	2467.35 MHz
Channel 3:	2409.35 MHz	Channel 13:	2429.35 MHz	Channel 23:	2449.35 MHz	Channel 33:	2469.35 MHz
Channel 4:	2411.35 MHz	Channel 14:	2431.35 MHz	Channel 24:	2451.35 MHz	Channel 34:	2471.35 MHz
Channel 5:	2413.35 MHz	Channel 15:	2433.35 MHz	Channel 25:	2453.35 MHz	Channel 35:	2473.35 MHz
Channel 6:	2415.35 MHz	Channel 16:	2435.35 MHz	Channel 26:	2455.35 MHz	Channel 36:	2475.35 MHz
Channel 7:	2417.35 MHz	Channel 17:	2437.35 MHz	Channel 27:	2457.35 MHz	Channel 37:	2477.35 MHz
Channel 8:	2419.35 MHz	Channel 18:	2439.35 MHz	Channel 28:	2459.35 MHz		
Channel 9:	2421.35 MHz	Channel 19:	2441.35 MHz	Channel 29:	2461.35 MHz		
Channel 10:	2423.35 MHz	Channel 20:	2443.35 MHz	Channel 30:	2463.35 MHz		

Note:

1. The EUT is a ROG Strix F-WL Dongle with a built-in 2.4GHz transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance of 2.4G transmitter with Part 15 Subpart C Paragraph 15.249 for spread spectrum devices.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit
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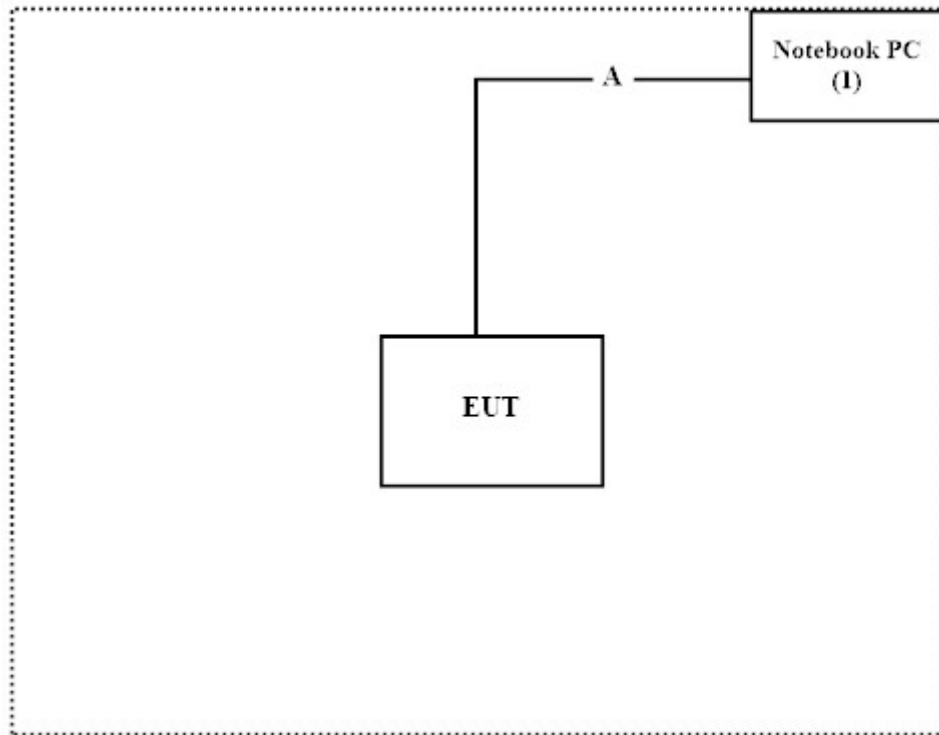
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	Inspiron 15 3000	GT5JPJ2	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Non-Shielded, 1.8m

1.4. Configuration of Test System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Execute software "Avnera v2017.1.20.4" on the Notebook.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press "OK" to start the continuous Transmit.
- (5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:

<http://www.dekra.com.tw/english/about/certificates.aspx?bval=5>

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw/index_en.aspx

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FCC Accreditation Number: TW3023

1.7. List of Test Equipment

For Conduction measurements /ASR1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	EMI Test Receiver	R&S	ESR7	101601	2018.02.08	2019.02.07
X	Two-Line V-Network	R&S	ENV216	101306	2018.03.09	2019.03.08
X	Two-Line V-Network	R&S	ENV216	101307	2018.03.20	2019.03.19
X	Coaxial Cable	Quietek	RG400_BNC	RF001	2018.05.24	2019.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

For Conducted measurements /ASR4

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103464	2018.01.23	2019.01.22
	Power Meter	Anritsu	ML2496A	1548003	2017.12.11	2018.12.10
	Power Sensor	Anritsu	MA2411B	1531024	2017.12.11	2018.12.10
	Power Sensor	Anritsu	MA2411B	1531025	2017.12.11	2018.12.10
	Bluetooth Tester	R&S	CBT	101238	2018.01.18	2019.01.17

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek Conduction Test System V8.0.110

For Radiated measurements /ACB1

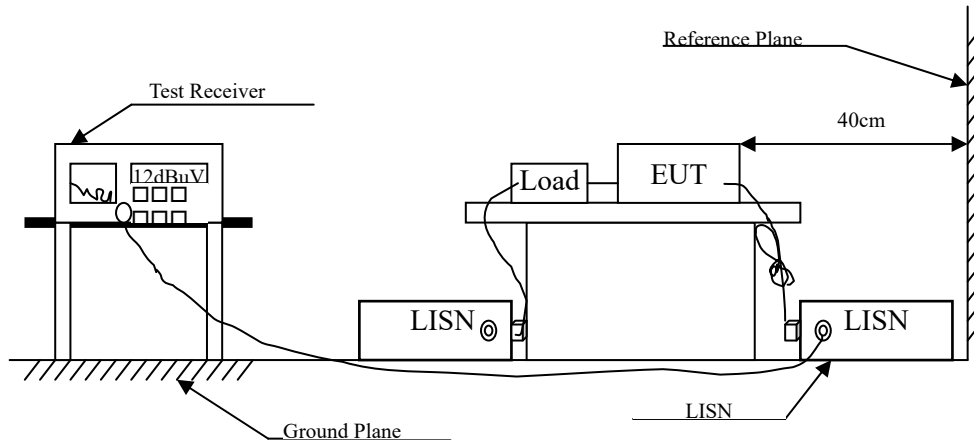
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2018.01.26	2019.01.25
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-674	2018.04.02	2019.04.01
X	Horn Antenna	ETS-Lindgren	3117	00203800	2017.11.10	2018.11.09
X	Horn Antenna	Com-Power	AH-840	101087	2018.06.01	2019.05.31
X	Pre-Amplifier	EMCI	EMC001330	980316	2018.06.01	2019.05.31
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2018.06.04	2019.06.03
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2018.06.04	2019.06.03
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2018.05.16	2019.05.15
	Filter	MICRO TRONICS	BRM50702	G251	2017.08.30	2018.08.29
	Filter	MICRO TRONICS	BRM50716	G188	2017.08.30	2018.08.29
X	EMI Test Receiver	R&S	ESR7	101602	2017.12.11	2018.12.10
X	Spectrum Analyzer	R&S	FSV40	101148	2018.02.08	2019.02.07
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2018.05.25	2019.05.24
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2017.08.11	2018.08.10

Note:

1. Loop Antenna is calibrated every two year, the other equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB μ V) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.4. Uncertainty

± 2.35 dB

2.5. Test Result of Conducted Emission

Product : ROG Strix F-WL Dongle
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Date : 2018/05/09
 Test Mode : Mode 1: Transmit (2441.35MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV	Margin dB	Limit dBμV
Line 1					
Quasi-Peak					
0.150	9.611	32.907	42.519	-23.481	66.000
0.456	9.697	28.133	37.829	-19.428	57.257
1.304	9.730	21.767	31.497	-24.503	56.000
2.845	9.779	17.760	27.538	-28.462	56.000
4.963	9.830	16.377	26.207	-29.793	56.000
17.599	10.058	11.887	21.945	-38.055	60.000
Average					
0.150	9.611	17.630	27.241	-28.759	56.000
0.456	9.697	22.040	31.736	-15.521	47.257
1.304	9.730	15.675	25.405	-20.595	46.000
2.845	9.779	12.035	21.814	-24.186	46.000
4.963	9.830	10.024	19.854	-26.146	46.000
17.599	10.058	6.837	16.895	-33.105	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : ROG Strix F-WL Dongle
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Date : 2018/05/09
 Test Mode : Mode 1: Transmit (2441.35MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dB μ V	dB μ V	dB	dB μ V
Line 2					
Quasi-Peak					
0.150	10.994	32.548	43.543	-22.457	66.000
0.454	9.982	28.635	38.618	-18.696	57.314
2.481	9.887	15.515	25.402	-30.598	56.000
4.972	9.871	15.067	24.937	-31.063	56.000
13.677	10.037	17.303	27.340	-32.660	60.000
17.432	10.109	16.144	26.253	-33.747	60.000
Average					
0.150	10.994	16.522	27.516	-28.484	56.000
0.454	9.982	22.339	32.321	-14.993	47.314
2.481	9.887	9.804	19.690	-26.310	46.000
4.972	9.871	9.171	19.042	-26.958	46.000
13.677	10.037	12.212	22.249	-27.751	50.000
17.432	10.109	9.913	20.022	-29.978	50.000

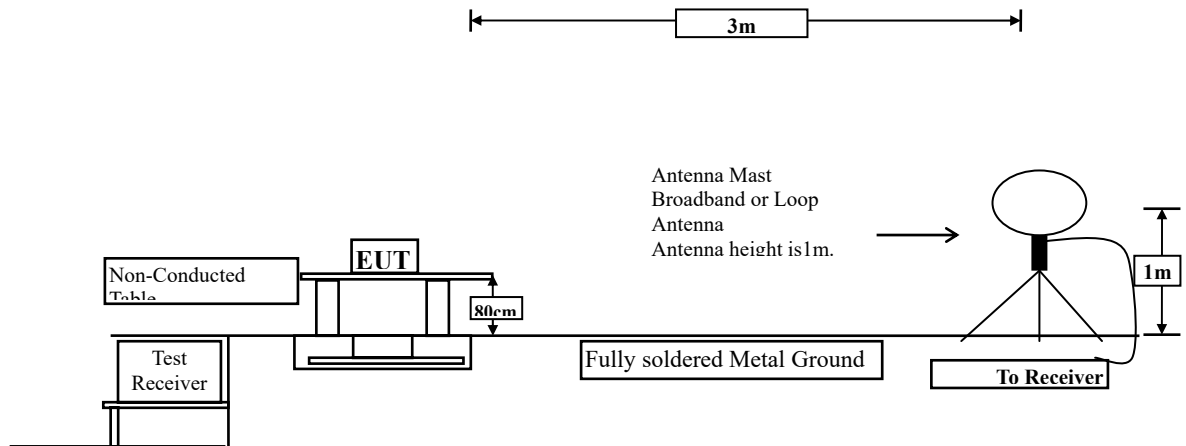
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

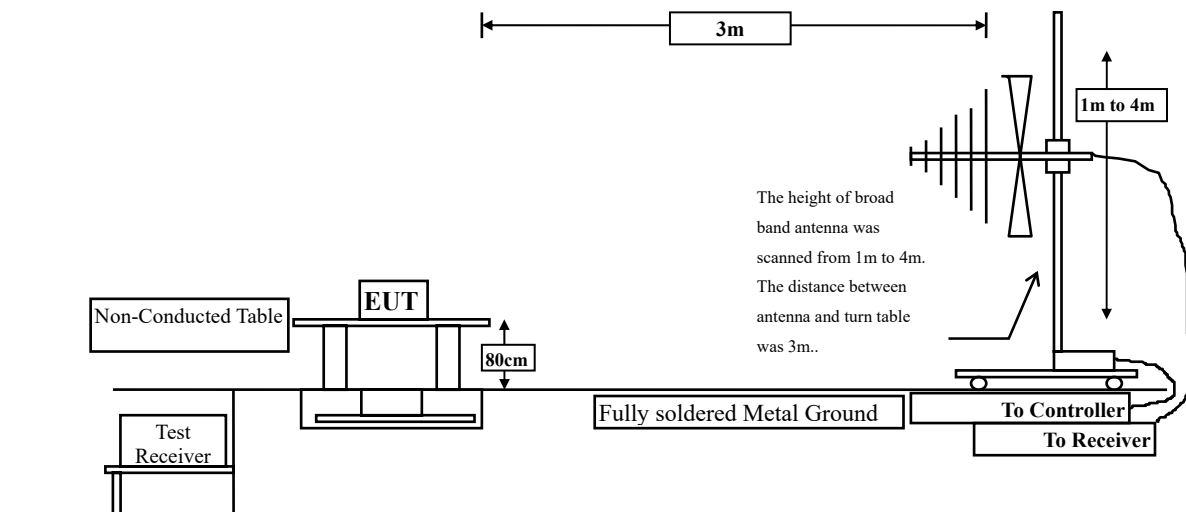
3. Radiated Emission

3.1. Test Setup

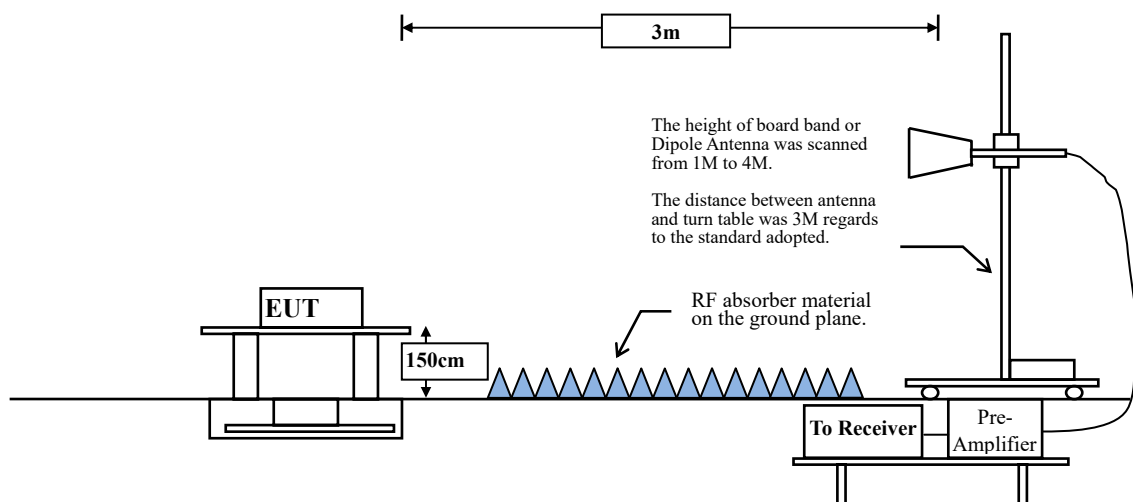
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dB μ V/m @3m)	(uV/m @3m)	(dB μ V/m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

Remarks : 1. RF Voltage (dB μ V/m) = 20 log RF Voltage (uV/m)
 2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
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

Remarks: E field strength (dB μ V/m) = 20 log E field strength (uV/m)

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.249 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level.

This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna. The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

3.4. Uncertainty

Horizontal :

30-300MHz: $\pm 4.08\text{dB}$; 300M-1GHz: $\pm 3.86\text{dB}$; 1-18GHz: $\pm 3.77\text{dB}$; 18-40GHz: $\pm 3.98\text{dB}$.

Vertical :

30-300MHz: $\pm 4.81\text{dB}$; 300M-1GHz: $\pm 3.87\text{dB}$; 1-18GHz: $\pm 3.83\text{dB}$; 18-40GHz: $\pm 3.98\text{dB}$.

3.5. Test Result of Radiated Emission

Product : ROG Strix F-WL Dongle
 Test Item : Fundamental Radiated Emission
 Test Date : 2018/05/09
 Test Mode : Mode 1: Transmit (X-Axis)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV/m	Margin dB	Limit dBμV/m
Horizontal					
Peak Detector:					
2405.350	10.325	89.170	99.495	-14.505	114.000
2441.350	10.471	85.690	96.162	-17.838	114.000
2477.350	10.617	82.640	93.257	-20.743	114.000
Vertical					
Peak Detector:					
2405.350	10.325	82.750	93.075	-20.925	114.000
2441.350	10.471	80.620	91.092	-22.908	114.000
2477.350	10.617	77.780	88.397	-25.603	114.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.

Average Detector:

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
MHz	Measurement	Correct Factor	Level		
	dB μ V/m	dB	dB μ V/m	dB	dB μ V/m

Horizontal**Average Detector:**

2405.350	99.495	-13.416	86.079	-7.921	94.000
2441.350	96.162	-13.416	82.746	-11.254	94.000
2477.350	93.257	-13.416	79.841	-14.159	94.000

Vertical**Average Detector:**

2405.350	93.075	-13.416	79.659	-14.341	94.000
2441.350	91.092	-13.416	77.676	-16.324	94.000
2477.350	88.397	-13.416	74.981	-19.019	94.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Fundamental Radiated Emission
 Test Date : 2018/05/09
 Test Mode : Mode 1: Transmit (Y-Axis)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV/m	Margin dB	Limit dBμV/m
Horizontal					
Peak Detector:					
2405.350	10.325	89.210	99.535	-14.465	114.000
2441.350	10.471	86.220	96.692	-17.308	114.000
2477.350	10.617	83.130	93.747	-20.253	114.000
Vertical					
Peak Detector:					
2405.350	10.325	84.430	94.755	-19.245	114.000
2441.350	10.471	82.650	93.122	-20.878	114.000
2477.350	10.617	78.720	89.337	-24.663	114.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.

Average Detector:

Frequency	Peak Measurement	Duty Cycle Correct Factor	Measurement Level	Margin	Limit
MHz	dBμV/m	dB	dBμV/m	dB	dBμV/m

Horizontal**Average Detector:**

2405.350	99.535	-13.416	86.119	-7.881	94.000
2441.350	96.692	-13.416	83.276	-10.724	94.000
2477.350	93.747	-13.416	80.331	-13.669	94.000

Vertical**Average Detector:**

2405.350	94.755	-13.416	81.339	-12.661	94.000
2441.350	93.122	-13.416	79.706	-14.294	94.000
2477.350	89.337	-13.416	75.921	-18.079	94.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Fundamental Radiated Emission
 Test Date : 2018/05/09
 Test Mode : Mode 1: Transmit (Z-Axis)

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
2405.350	10.325	81.990	92.315	-21.685	114.000
2441.350	10.471	79.920	90.392	-23.608	114.000
2477.350	10.617	74.970	85.587	-28.413	114.000
Vertical					
Peak Detector:					
2405.350	10.325	85.250	95.575	-18.425	114.000
2441.350	10.471	80.970	91.442	-22.558	114.000
2477.350	10.617	77.580	88.197	-25.803	114.000

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.

Average Detector:

Frequency	Peak Measurement	Duty Cycle Correct Factor	Measurement Level	Margin	Limit
MHz	dB μ V/m	dB	dB μ V/m	dB	dB μ V/m

Horizontal**Average Detector:**

2405.350	92.315	-13.416	78.899	-15.101	94.000
2441.350	90.392	-13.416	76.976	-17.024	94.000
2477.350	85.587	-13.416	72.171	-21.829	94.000

Vertical**Average Detector:**

2405.350	95.575	-13.416	82.159	-11.841	94.000
2441.350	91.442	-13.416	78.026	-15.974	94.000
2477.350	88.197	-13.416	74.781	-19.219	94.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2018/05/16
 Test Mode : Mode 1: Transmit (2405.35MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
Peak Detector:					
4810.700	-5.054	53.810	48.756	-25.244	74.000
7216.050	-2.553	64.070	61.517	-12.483	74.000
9621.400	-0.349	52.240	51.891	-22.109	74.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Average Detector:

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Correct Factor	Level		
MHz	dB μ V/m	dB	dB μ V/m	dB	dB μ V/m
Horizontal					
Average Detector:					
4810.700	48.756	-13.416	35.340	-18.660	54.000
7216.050	61.517	-13.416	48.101	-5.899	54.000
9621.400	51.891	-13.416	38.475	-15.525	54.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2018/05/16
 Test Mode : Mode 1: Transmit (2405.35MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Vertical					
Peak Detector:					
4810.700	-5.054	52.260	47.206	-26.794	74.000
7216.050	-2.553	63.900	61.347	-12.653	74.000
9621.400	-0.349	51.930	51.581	-22.419	74.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Average Detector:

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Correct Factor	Level		
MHz	dB μ V/m	dB	dB μ V/m	dB	dB μ V/m
Vertical					
Average Detector:					
4810.700	47.206	-13.416	33.790	-20.210	54.000
7216.050	61.347	-13.416	47.931	-6.069	54.000
9621.400	51.581	-13.416	38.165	-15.835	54.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2018/05/16
 Test Mode : Mode 1: Transmit (2441.35MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	Db	dB μ V	dB μ V/m	Db	dB μ V/m
Horizontal					
Peak Detector:					
4882.700	-5.024	51.960	46.936	-27.064	74.000
7324.050	-2.516	58.980	56.464	-17.536	74.000
9765.400	-0.127	53.810	53.684	-20.316	74.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Average Detector:

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Correct Factor	Level		
MHz	dB μ V/m	dB	dB μ V/m	dB	dB μ V/m
Horizontal					
Average Detector:					
4882.700	46.936	-13.416	33.520	-20.480	54.000
7324.050	56.464	-13.416	43.048	-10.952	54.000
9765.400	53.684	-13.416	40.268	-13.732	54.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2018/05/16
 Test Mode : Mode 1: Transmit (2441.35MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	Db	dB μ V	dB μ V/m	Db	dB μ V/m
Vertical					
Peak Detector:					
4882.700	-5.024	51.280	46.256	-27.744	74.000
7324.050	-2.516	59.760	57.244	-16.756	74.000
9765.400	-0.127	52.850	52.724	-21.276	74.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Average Detector:

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Correct Factor	Level		
MHz	dB μ V/m	dB	dB μ V/m	dB	dB μ V/m
Vertical					
Average Detector:					
4882.700	46.256	-13.416	32.840	-21.160	54.000
7324.050	57.244	-13.416	43.828	-10.172	54.000
9765.400	52.724	-13.416	39.308	-14.692	54.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2018/05/16
 Test Mode : Mode 1: Transmit (2477.35MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	Db	dB μ V	dB μ V/m	Db	dB μ V/m
Horizontal					
Peak Detector:					
4954.700	-5.035	48.440	43.405	-30.595	74.000
7432.050	-2.423	54.950	52.527	-21.473	74.000
9909.400	0.120	50.260	50.380	-23.620	74.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Average Detector:

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Correct Factor	Level		
MHz	dB μ V/m	dB	dB μ V/m	dB	dB μ V/m
Horizontal					
Average Detector:					
4954.700	43.405	-13.416	29.989	-24.011	54.000
7432.050	52.527	-13.416	39.111	-14.889	54.000
9909.400	50.380	-13.416	36.964	-17.036	54.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2018/05/16
 Test Mode : Mode 1: Transmit (2477.35MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	Db	dB μ V	dB μ V/m	Db	dB μ V/m
Vertical					
Peak Detector:					
4954.700	-5.035	52.480	47.445	-26.555	74.000
7432.050	-2.423	55.590	53.167	-20.833	74.000
9909.400	0.120	49.830	49.950	-24.050	74.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Average Detector:

Frequency	Peak	Duty Cycle	Measurement	Margin	Limit
	Measurement	Correct Factor	Level		
MHz	dB μ V/m	dB	dB μ V/m	dB	dB μ V/m
Vertical					
Average Detector:					
4954.700	47.445	-13.416	34.029	-19.971	54.000
7432.050	53.167	-13.416	39.751	-14.249	54.000
9909.400	49.950	-13.416	36.534	-17.466	54.000

Note:

1. AVG Measurement=Peak Measurement + Duty Cycle Correct Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : General Radiated Emission Data
 Test Date : 2018/05/04
 Test Mode : Mode 1: Transmit (2441.35MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dB μ V	dB μ V/m	dB	dB μ V/m
Horizontal					
263.362	-11.772	37.302	25.530	-20.470	46.000
398.319	-8.113	30.310	22.196	-23.804	46.000
533.275	-5.503	31.384	25.881	-20.119	46.000
647.145	-3.769	29.075	25.306	-20.694	46.000
782.101	-1.853	29.133	27.280	-18.720	46.000
903.000	-0.288	28.746	28.458	-17.542	46.000
Vertical					
138.246	-11.608	37.165	25.557	-17.943	43.500
280.232	-10.914	35.250	24.336	-21.664	46.000
399.725	-8.081	31.044	22.963	-23.037	46.000
536.087	-5.459	32.801	27.342	-18.658	46.000
659.797	-3.616	31.153	27.537	-18.463	46.000
843.957	-1.057	28.572	27.515	-18.485	46.000

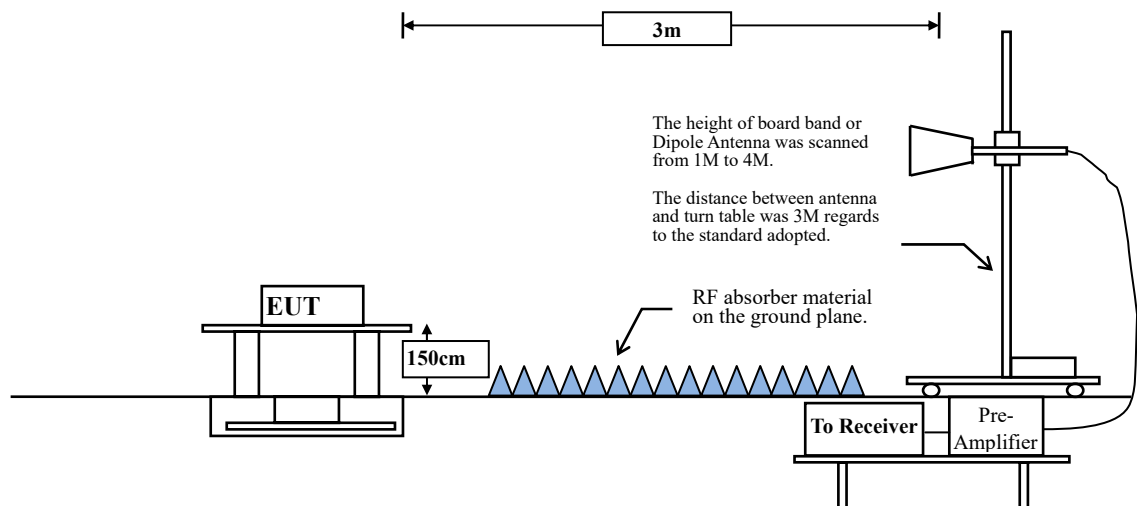
Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
5. The average measurement was not performed when the peak measured data under the limit of average detection.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.
7. No emission found between lowest internal used/generated frequency to 30MHz.

4. Band Edge

4.1. Test Setup

RF Radiated Measurement:



4.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
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

Remarks: E field strength (dBμV /m) = 20 log E field strength (uV/m)

4.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

4.4. Uncertainty

Horizontal polarization : 1-18GHz: ± 3.77 dB

Vertical polarization : 1-18GHz : ± 3.83 dB

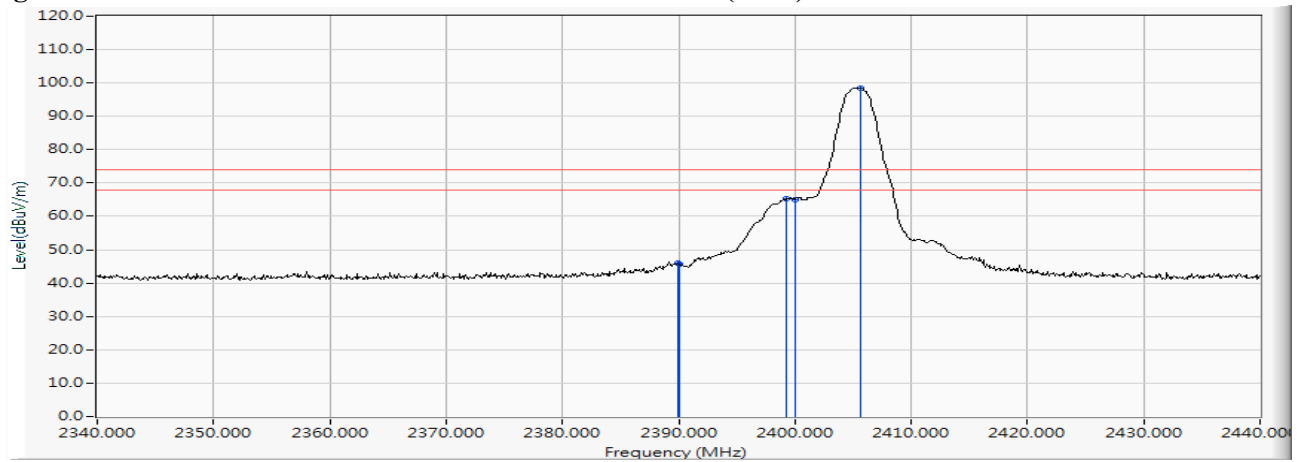
4.5. Test Result of Band Edge

Product : ROG Strix F-WL Dongle
 Test Item : Band Edge Data
 Test Date : 2018/05/16
 Test Mode : Mode 1: Transmit (2405.35MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2389.900	10.262	35.829	46.091	74.00	54.00	Pass
01 (Peak)	2390.000	10.262	35.362	45.624	74.00	54.00	Pass
01 (Peak)	2399.300	10.300	55.025	65.325	74.00	54.00	Pass
01 (Peak)	2400.000	10.304	54.844	65.147	74.00	54.00	Pass
01 (Peak)	2405.600	10.326	88.241	98.567	--	--	--

Figure Channel 1: Horizontal (Peak)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Average)	2405.600	98.567	-13.416	85.151	74.00	54.00	Pass
01 (Average)	2390.000	45.624	-13.416	32.208	74.00	54.00	Pass
01 (Average)	2389.900	46.091	-13.416	32.675	74.00	54.00	Pass

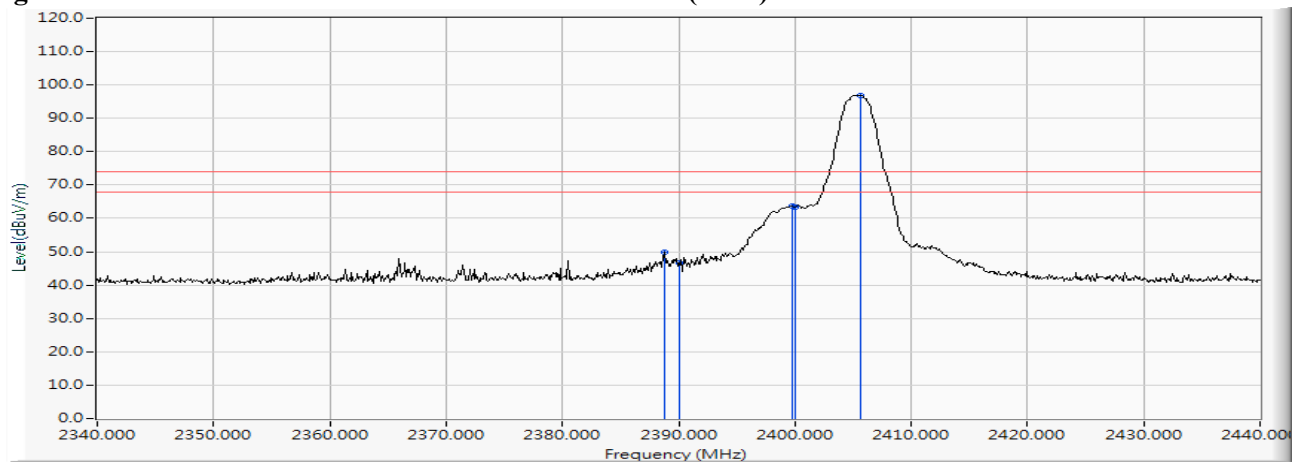
Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Band Edge Data
 Test Date : 2018/05/16
 Test Mode : Mode 1: Transmit (2405.35MHz)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Peak)	2388.800	10.257	39.578	49.835	74.00	54.00	Pass
01 (Peak)	2390.000	10.262	36.523	46.785	74.00	54.00	Pass
01 (Peak)	2399.800	10.302	53.459	63.762	74.00	54.00	Pass
01 (Peak)	2400.000	10.304	53.198	63.501	74.00	54.00	Pass
01 (Peak)	2405.600	10.326	86.587	96.913	--	--	--

Figure Channel 1: Vertical (Peak)

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
01 (Average)	2405.600	96.913	-13.416	83.497	74.00	54.00	Pass
01 (Average)	2390.000	46.785	-13.416	33.369	74.00	54.00	Pass
01 (Average)	2388.800	49.835	-13.416	36.419	74.00	54.00	Pass

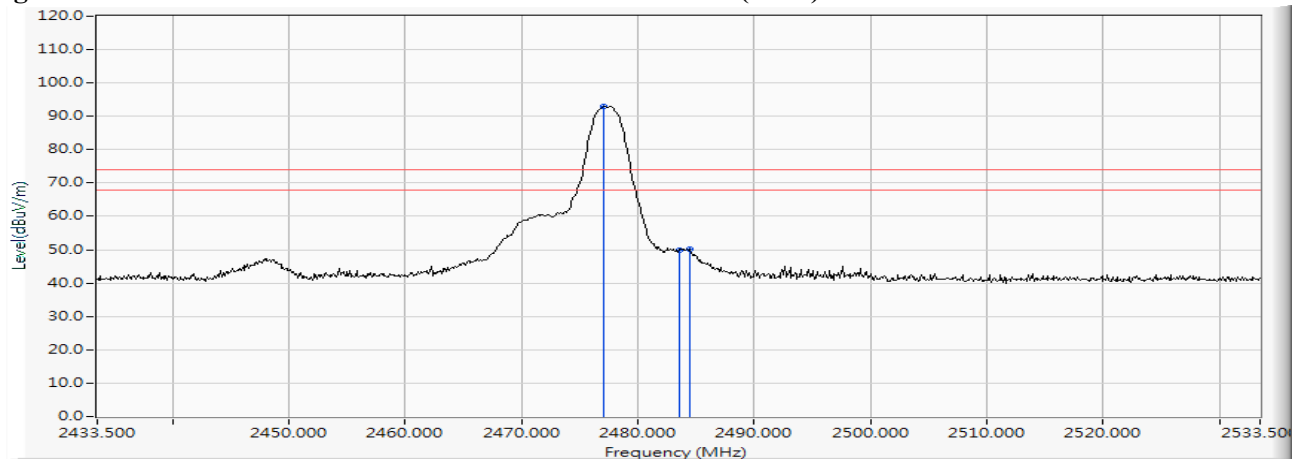
Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Band Edge Data
 Test Date : 2018/05/16
 Test Mode : Mode 1: Transmit (2477.35MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
37 (Peak)	2477.100	10.616	82.353	92.969	--	--	--
37 (Peak)	2483.500	10.640	39.285	49.926	74.00	54.00	Pass
37 (Peak)	2484.400	10.645	39.544	50.189	74.00	54.00	Pass

Figure Channel 37:**Horizontal (Peak)****Note:**

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

Channel No.	Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)	Result
37 (Average)	2477.100	92.969	-13.416	79.553	74.00	54.00	Pass
37 (Average)	2483.500	49.926	-13.416	36.510	74.00	54.00	Pass
37 (Average)	2484.400	50.189	-13.416	36.773	74.00	54.00	Pass

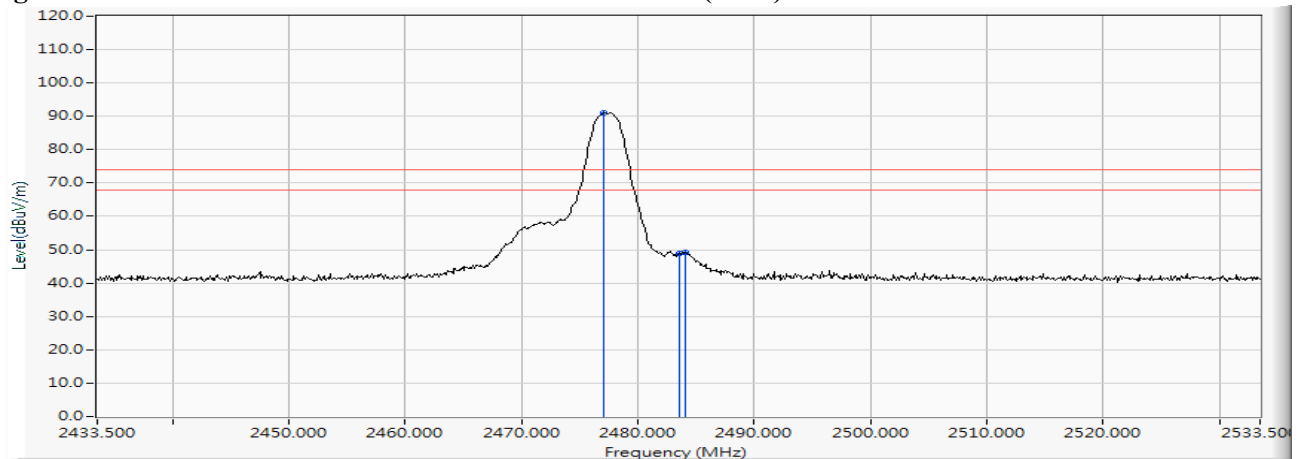
Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 5.

Product : ROG Strix F-WL Dongle
 Test Item : Band Edge Data
 Test Date : 2018/05/16
 Test Mode : Mode 1: Transmit (2477.35MHz)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
37 (Peak)	2477.100	10.616	80.454	91.070	--	--	--
37 (Peak)	2483.500	10.640	38.368	49.009	74.00	54.00	Pass
37 (Peak)	2484.100	10.644	38.475	49.119	74.00	54.00	Pass

Figure Channel 37:**Vertical (Peak)****Note:**

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection.

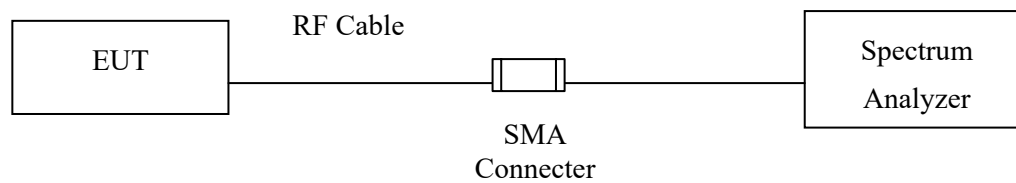
Channel No.	Frequency (MHz)	Peak Measurement (dB μ V/m)	Duty Cycle Factor (dB)	Average Measurement (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Result
37 (Average)	2477.100	91.07	-13.416	77.654	74.00	54.00	Pass
37 (Average)	2483.500	49.009	-13.416	35.593	74.00	54.00	Pass
37 (Average)	2484.100	49.119	-13.416	35.703	74.00	54.00	Pass

Note:

1. Average Measurement=Peak Measurement + Duty Cycle Factor
2. The Duty Cycle is refer to section 5.

5. Duty Cycle

5.1. Test Setup

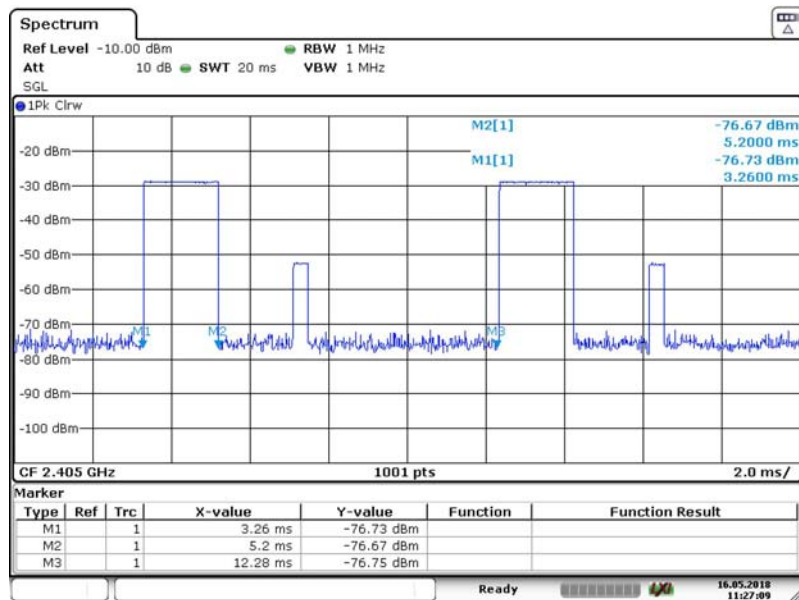


5.2. Uncertainty

$\pm 2.31\text{ms}$

5.3. Test Result of Duty Cycle

Product : ROG Strix F-WL Dongle
 Test Item : Duty Cycle Data
 Test Mode : Mode 1: Transmit



Date: 16.MAY.2018 11:27:10



Date: 16.MAY.2018 11:28:13

Time on of 100ms= 1.94ms*11= 21.34ms

Duty Cycle= 21.34ms / 100ms= 0.2134

Duty Cycle correction factor= 20 LOG 0.2134= -13.416 dB

Duty Cycle correction factor	-13.416	dB
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6. EMI Reduction Method During Compliance Testing

No modification was made during testing.