

# FCC Test Report

Product Name	TUF Gaming H3 Wireless dongle
Model No.	TUF GAMING H3 WIRELESS DONGLE
FCC ID	BJM-TUFH3WLD

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

Date of Receipt	Oct. 05, 2020
Issued Date	Nov. 20, 2020
Report No.	20A0023R-E3032110120
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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Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

## Test Report

Issued Date: Nov. 20, 2020

Report No.: 20A0023R-E3032110120



Product Name	TUF Gaming H3 Wireless dongle
Applicant	Tatung Company
Address	22 Chungshan N Road Sec 3 ,Taipei 10451,Taiwan
Manufacturer	Tatung Company
Model No.	TUF GAMING H3 WIRELESS DONGLE
FCC ID	BJM-TUFH3WLD
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 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By

:

Ida Tung

( Adm. Specialist / Ida Tung )

Tested By

:

Ivan Chuang

( Senior Engineer / Ivan Chuang )

Approved By

:



( Director / Vincent Lin )

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

## **Revision History**

Report No.	Version	Description	Issued Date
20A0023R-E3032110120	V1.0	Initial issue of report.	2020-11-20

## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	TUF Gaming H3 Wireless dongle
Trade Name	ASUS
Model No.	TUF GAMING H3 WIRELESS DONGLE
FCC ID	BJM-TUFH3WLD
Frequency Range	2405.35-2477.35MHz
Channel Number	37CH
Type of Modulation	Pi/4 DQPSK
Antenna Type	Chip Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
USB to Type-C Cable	MFR: ASUS, M/N: TUF GAMING H3 WIRELESS, Shielded, 1m
Connector	MFR: ASUS, M/N: TUF GAMING H3 WIRELESS

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Advanced Ceramic X Corp.	AT3216-B2R7HAA_	Chip Antenna	0.5dBi for 2.4GHz

Note: The antenna of EUT is conform to FCC 15.203

**Center Frequency of Each Channel:**

Channel	Frequency	Channel	Frequency
Channel 01:	2405.35 MHz	Channel 21:	2445.35 MHz
Channel 02:	2407.35 MHz	Channel 22:	2447.35 MHz
Channel 03:	2409.35 MHz	Channel 23:	2449.35 MHz
Channel 04:	2411.35 MHz	Channel 24:	2451.35 MHz
Channel 05:	2413.35 MHz	Channel 25:	2453.35 MHz
Channel 06:	2415.35 MHz	Channel 26:	2455.35 MHz
Channel 07:	2417.35 MHz	Channel 27:	2457.35 MHz
Channel 08:	2419.35 MHz	Channel 28:	2459.35 MHz
Channel 09:	2421.35 MHz	Channel 29:	2461.35 MHz
Channel 10:	2423.35 MHz	Channel 30:	2463.35 MHz
Channel 11:	2425.35 MHz	Channel 31:	2465.35 MHz
Channel 12:	2427.35 MHz	Channel 32:	2467.35 MHz
Channel 13:	2429.35 MHz	Channel 33:	2469.35 MHz
Channel 14:	2431.35 MHz	Channel 34:	2471.35 MHz
Channel 15:	2433.35 MHz	Channel 35:	2473.35 MHz
Channel 16:	2435.35 MHz	Channel 36:	2475.35 MHz
Channel 17:	2437.35 MHz	Channel 37:	2477.35 MHz
Channel 18:	2439.35 MHz		
Channel 19:	2441.35 MHz		
Channel 20:	2443.35 MHz		

**Note:**

1. The EUT is a TUF Gaming H3 Wireless dongle with a built-in 2.4GHz wireless 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 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
	Mode 2: Normal mode

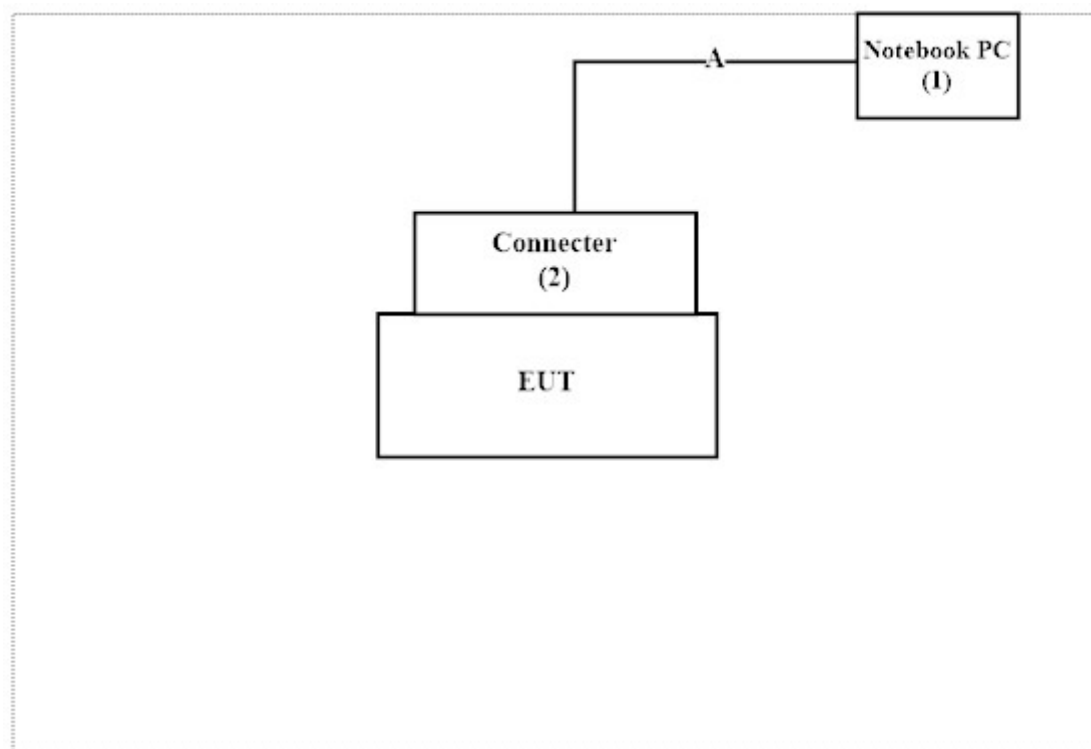
## 1.2. Tested System Details

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	4V5JPJ2	N/A
2 Connector	ASUS	TUF GAMING H3 WIRELESS	N/A	N/A

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

## 1.3. Configuration of Test System



## 1.4. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.3.
- (2) Execute “RF Power V2018.5.18.1” program on the Notebook PC.
- (3) Configure the test mode and the test channel
- (4) Start the continuous transmit.
- (5) Verify that the EUT works properly.

## 1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	23.4 °C
	Humidity (%RH)	10~90 %	56.9 %
Radiated Emission	Temperature (°C)	10~40 °C	23.5 °C
	Humidity (%RH)	10~90 %	65.5 %
Conductive	Temperature (°C)	10~40 °C	23.2 °C
	Humidity (%RH)	10~90 %	56.0 %

**USA : FCC Registration Number: TW0023**

**Canada : IC Registration Number: 25880**

Site Description : Accredited by TAF  
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd  
Address : No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,  
New Taipei City 24457, Taiwan, R.O.C.  
Phone number : 886-2-2602-7968  
Fax number : 866-2-2602-3286  
Email address : [info.tw@dekra.com](mailto:info.tw@dekra.com)  
Website : <http://www.dekra.com.tw>



## 1.6. 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	2020.05.28	2021.05.27
X	Two-Line V-Network	R&S	ENV216	101306	2020.03.25	2021.03.24
X	Two-Line V-Network	R&S	ENV216	101307	2020.04.17	2021.04.16
X	Coaxial Cable	DEKRA	RG400_BNC	RF001	2020.05.24	2021.05.23

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 : DEKRA Testing System V2.0

### For Conducted measurements /ASR2

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103466	2019.12.16	2020.12.15
	Peak Power Analyzer	KEYSIGHT	8900B	MY51000539	2020.05.13	2021.05.12
	Power Sensor	KEYSIGHT	N1923A	MY59240002	2020.05.22	2021.05.21
	Power Sensor	KEYSIGHT	N1923A	MY59240003	2020.05.22	2021.05.21

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 : DEKRA Conduction Test System V9.0.5

### For Radiated measurements /ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2020.03.16	2021.03.15
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-953	2020.01.03	2021.01.02
X	Horn Antenna	ETS-Lindgren	3117	00203800	2019.12.12	2020.12.11
X	Horn Antenna	Com-Power	AH-840	101087	2020.06.08	2021.06.07
X	Pre-Amplifier	EMCI	EMC001330	980316	2020.06.23	2021.06.22
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2020.06.23	2021.06.22
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2020.06.24	2021.06.23
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2020.06.10	2021.06.09
X	Filter	MICRO TRONICS	BRM50702	G251	2020.09.17	2021.09.16
	Filter	MICRO TRONICS	BRM50716	G188	2020.09.17	2021.09.16
X	EMI Test Receiver	R&S	ESR7	101602	2019.12.16	2020.12.15
X	Spectrum Analyzer	R&S	FSV40	101148	2020.03.16	2021.03.15
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2020.07.03	2021.07.02
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2020.06.10	2021.06.09

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 : DEKRA Testing System V2.0

## 1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

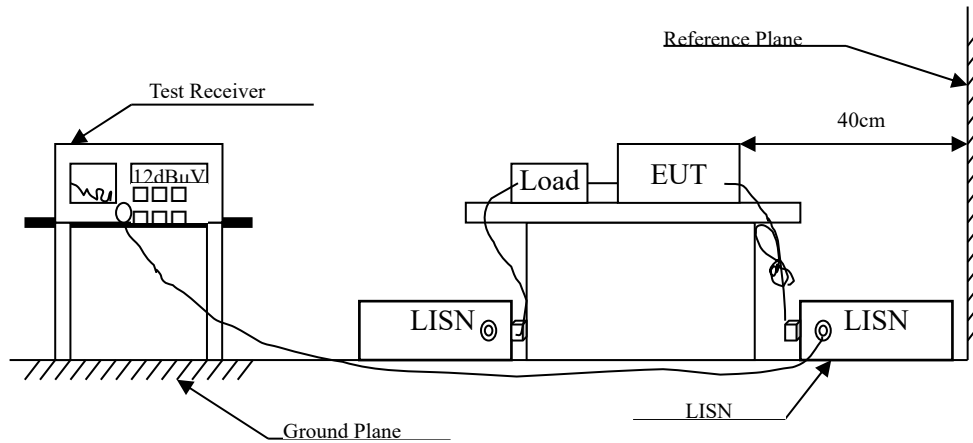
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
Conducted Emission	$\pm 3.42$ dB	
Radiated Emission	Under 1GHz $\pm 4.06$ dB	Above 1GHz $\pm 3.73$ dB
Band Edge	Under 1GHz $\pm 4.06$ dB	Above 1GHz $\pm 3.73$ dB
Duty Cycle	$\pm 2.31$ ms	

## 2. Conducted Emission

### 2.1. Test Setup



### 2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB $\mu$ 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**

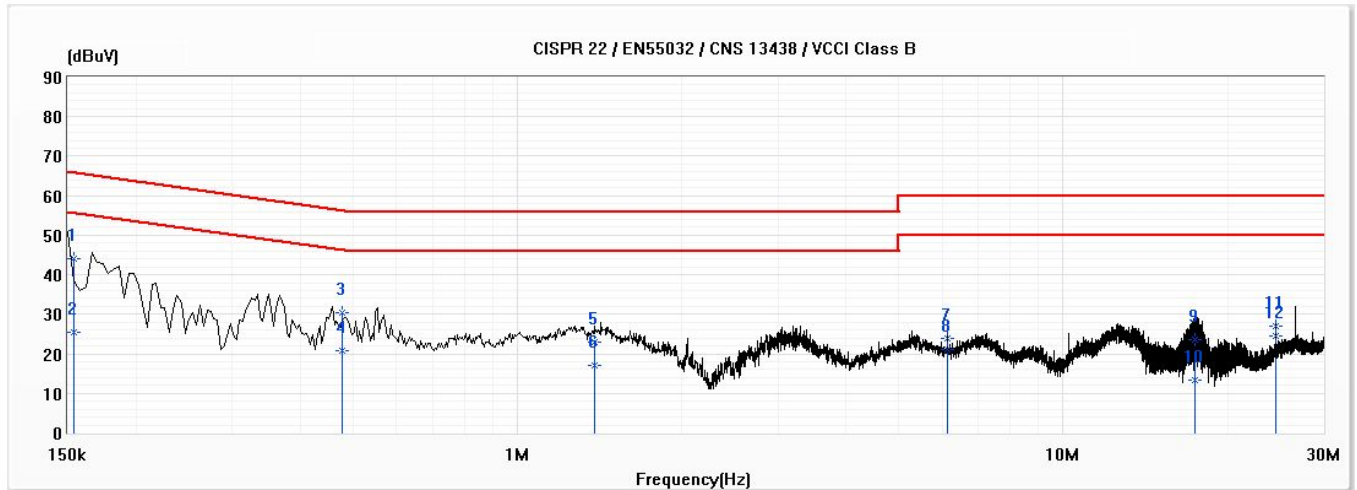
The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling 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. Test Result of Conducted Emission

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Conducted Emission Test  
 Power Line : L1  
 Test Date : 2020/11/10  
 Test Mode : Mode 1: Transmit (2441.35MHz)

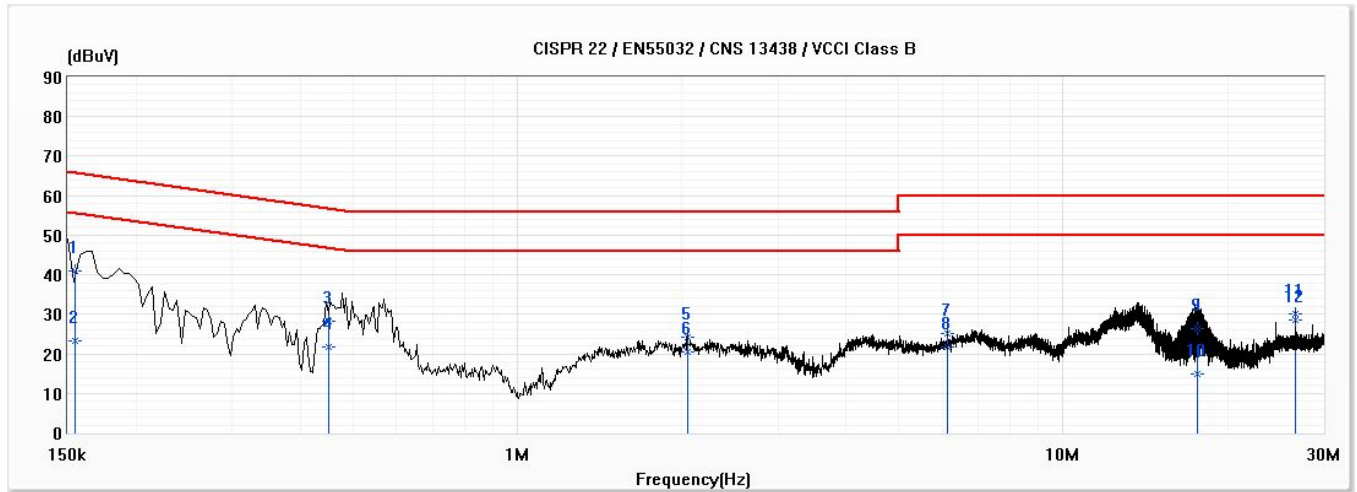


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.154	44.08	65.80	-21.72	34.42	9.66	QP
2	0.154	25.36	55.80	-30.44	15.70	9.66	AV
3	0.478	30.28	56.38	-26.10	20.62	9.66	QP
4	0.478	20.85	46.38	-25.53	11.19	9.66	AV
5	1.382	22.87	56.00	-33.13	13.16	9.70	QP
6	1.382	17.09	46.00	-28.91	7.39	9.70	AV
7	6.144	23.89	60.00	-36.11	14.07	9.82	QP
8	6.144	21.11	50.00	-28.89	11.29	9.82	AV
9	17.453	23.72	60.00	-36.28	13.76	9.95	QP
10	17.453	13.27	50.00	-36.73	3.31	9.95	AV
11	24.577	26.91	60.00	-33.09	16.95	9.96	QP
12	24.577	24.55	50.00	-25.45	14.59	9.96	AV

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 : TUF Gaming H3 Wireless dongle  
 Test Item : Conducted Emission Test  
 Power Line : N  
 Test Date : 2020/11/10  
 Test Mode : Mode 1: Transmit (2441.35MHz)



No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.154	40.86	65.76	-24.90	31.19	9.67	QP
2	0.154	23.40	55.76	-32.35	13.73	9.67	AV
3	0.451	28.36	56.86	-28.49	18.69	9.67	QP
4	0.451	21.72	46.86	-25.13	12.05	9.67	AV
5	2.048	24.30	56.00	-31.70	14.57	9.73	QP
6	2.048	20.38	46.00	-25.62	10.65	9.73	AV
7	6.144	25.10	60.00	-34.90	15.27	9.83	QP
8	6.144	21.86	50.00	-28.14	12.02	9.83	AV
9	17.630	26.29	60.00	-33.71	16.26	10.03	QP
10	17.630	14.88	50.00	-35.12	4.86	10.03	AV
11	26.624	30.01	60.00	-29.99	19.93	10.08	QP
*12	26.624	28.41	50.00	-21.59	18.33	10.08	AV

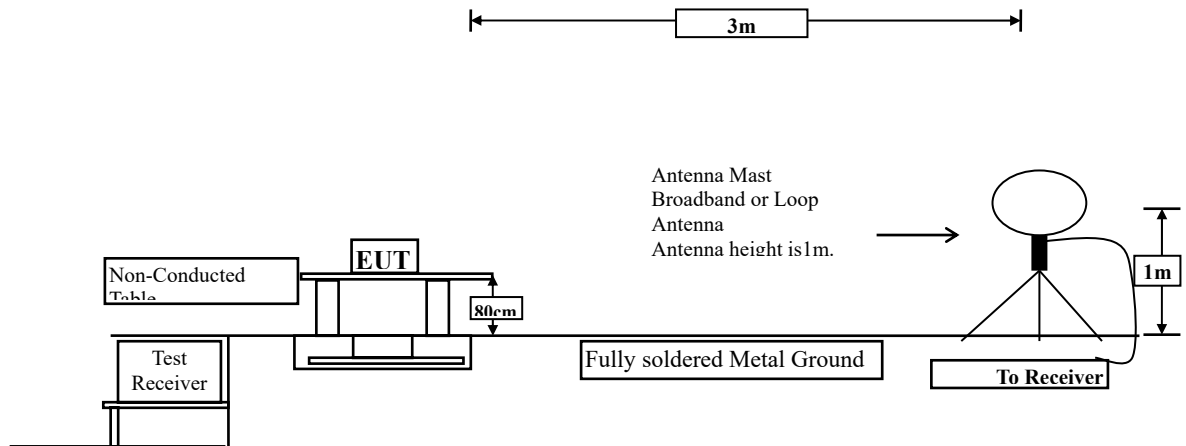
Note:

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

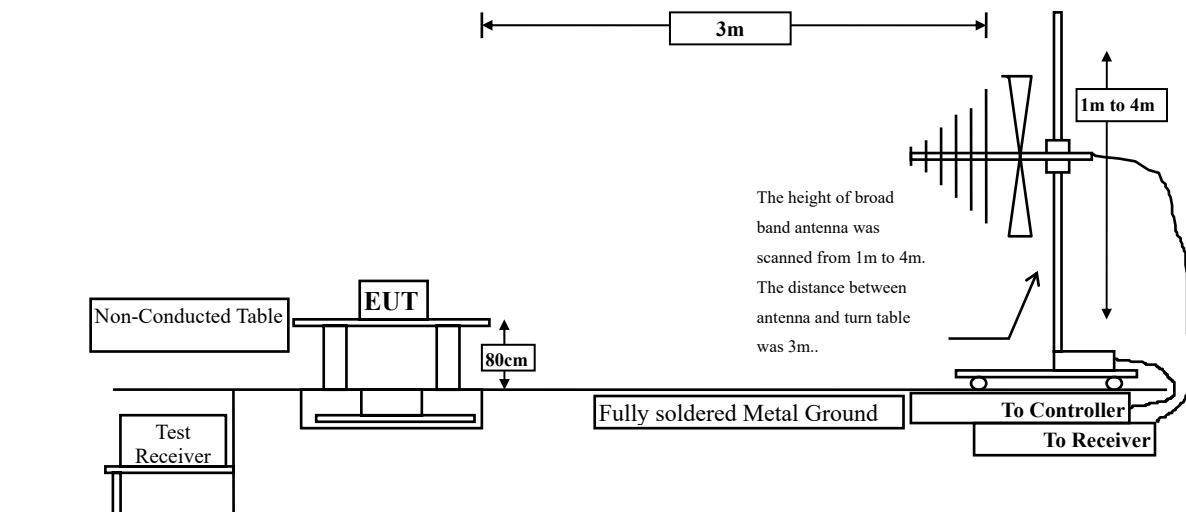
### 3. Radiated Emission

#### 3.1. Test Setup

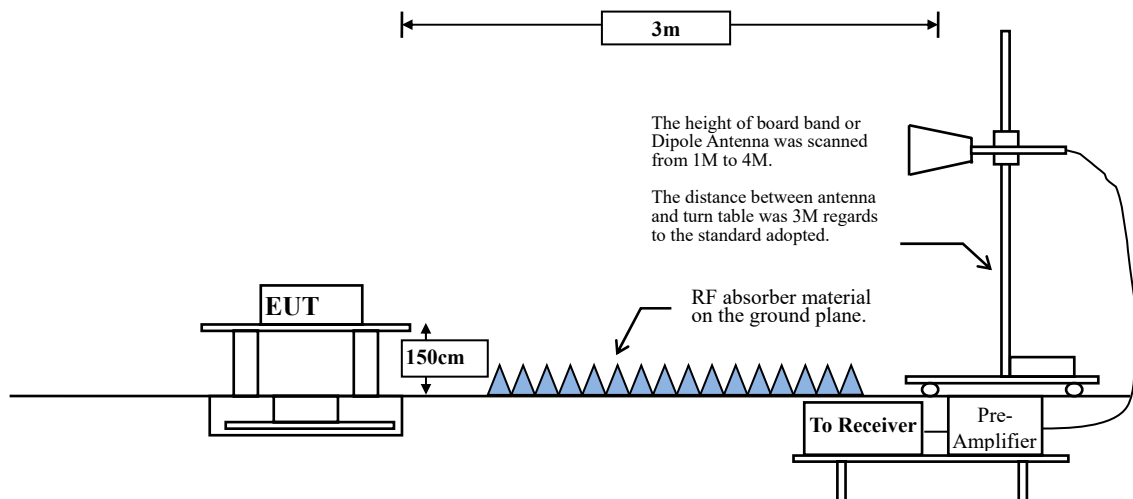
Radiated Emission Under 30MHz



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)	(dBμV /m @3m)	(uV/m @3m)	(dBμV /m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54
24000-24250	250	108	2500	68

Remarks : 1. RF Voltage (dBμV /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 (dBμV /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.

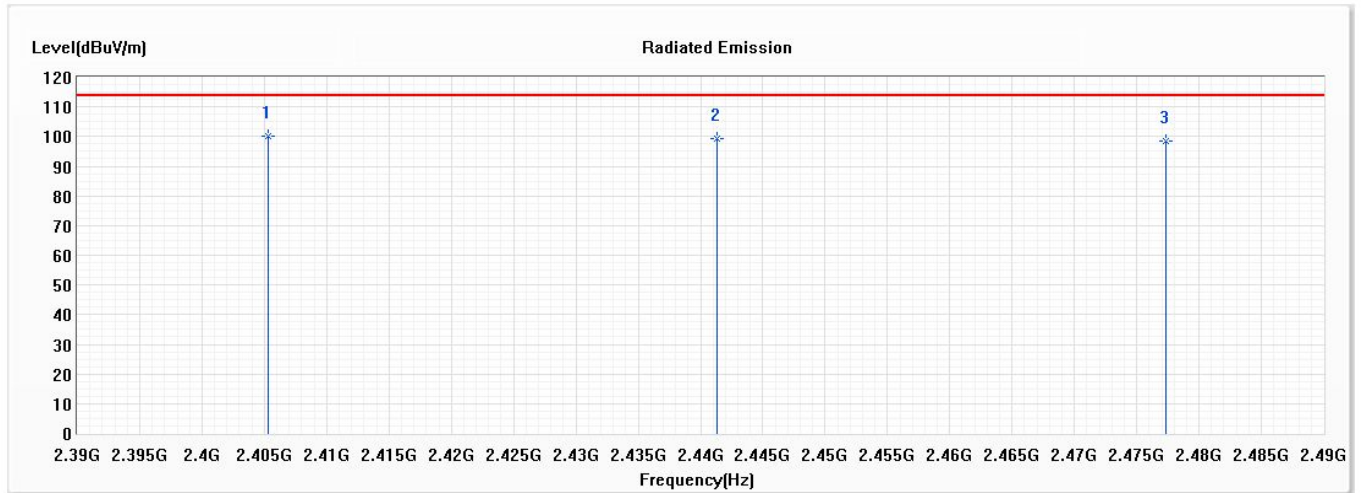
The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the 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. Test Result of Radiated Emission

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Fundamental Radiated Emission  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit

#### Horizontal\_X-Axis



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	2405.350	102.15	114.00	-11.85	90.46	11.69	PK
2	2441.350	99.36	114.00	-14.64	87.53	11.83	PK
3	2477.350	98.58	114.00	-15.42	86.60	11.98	PK

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.

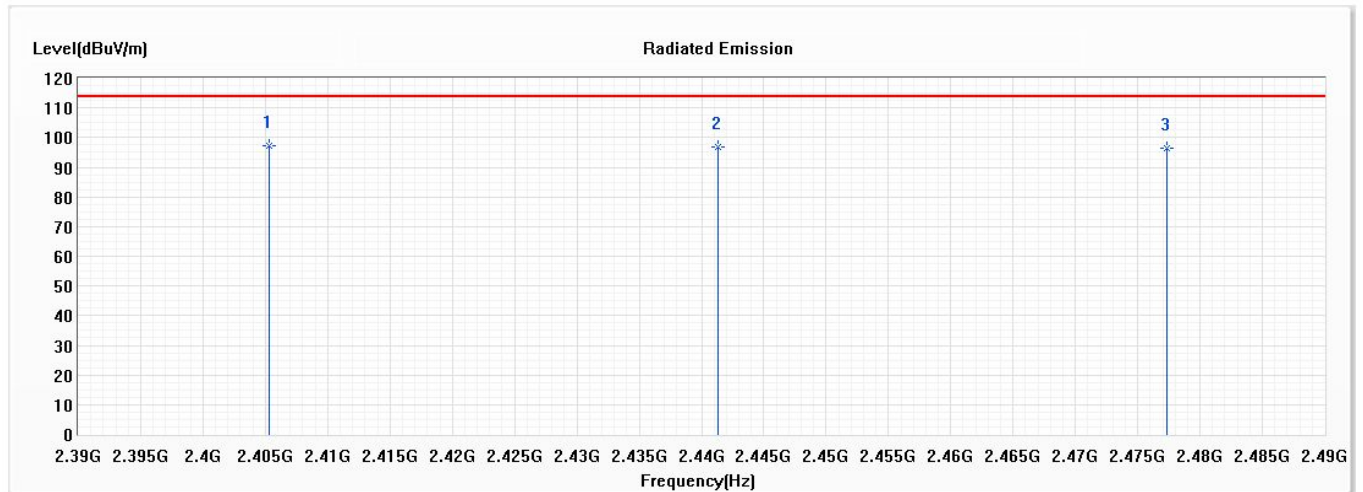
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2405.350	102.150	-33.971	68.179	-25.821	94.000
2441.350	99.360	-33.971	65.389	-28.611	94.000
2477.350	98.580	-33.971	64.609	-29.391	94.000

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Fundamental Radiated Emission  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit

### Vertical\_X-Axis



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	2405.350	97.22	114.00	-16.78	85.53	11.69	PK
2	2441.350	96.93	114.00	-17.07	85.10	11.83	PK
3	2477.350	96.35	114.00	-17.65	84.37	11.98	PK

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.

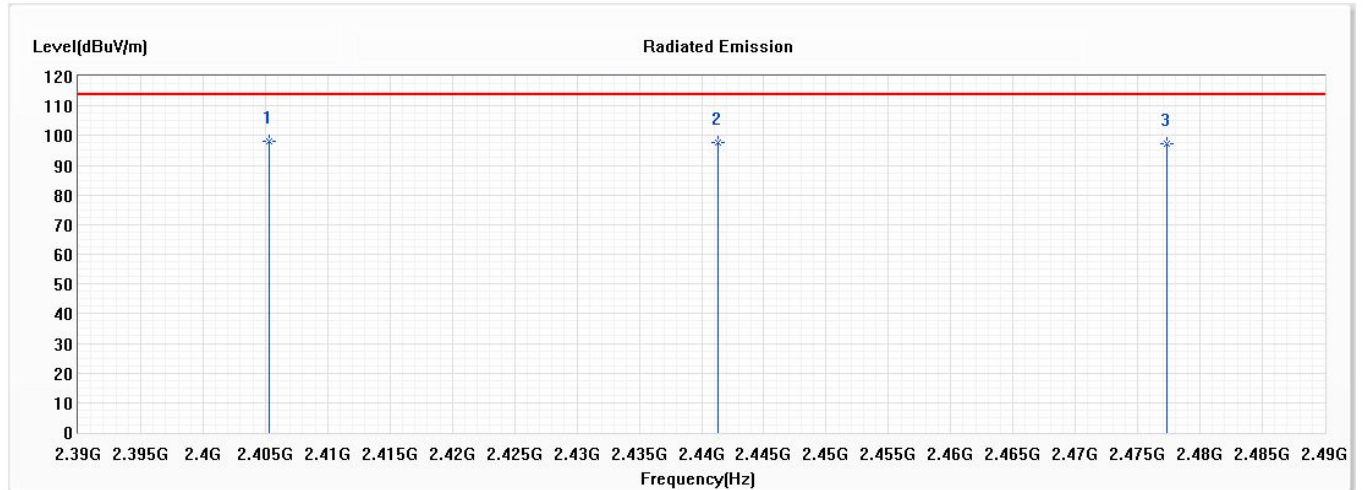
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2405.350	97.220	-33.971	63.249	-30.751	94.000
2441.350	96.930	-33.971	62.959	-31.041	94.000
2477.350	96.350	-33.971	62.379	-31.621	94.000

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Fundamental Radiated Emission  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit

### Horizontal\_Y-Axis



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	2405.350	97.87	114.00	-16.13	86.18	11.69	PK
2	2441.350	97.55	114.00	-16.45	85.72	11.83	PK
3	2477.350	97.08	114.00	-16.92	85.10	11.98	PK

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.

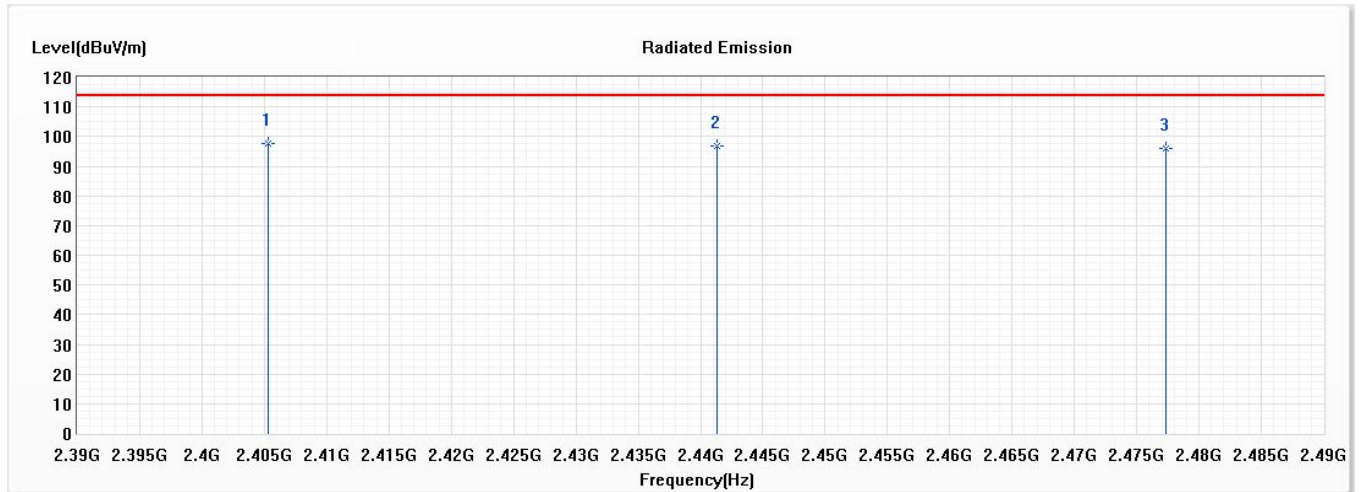
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2405.350	97.870	-33.971	63.899	-30.101	94.000
2441.350	97.550	-33.971	63.579	-30.421	94.000
2477.350	97.080	-33.971	63.109	-30.891	94.000

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Fundamental Radiated Emission  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit

### Vertical\_Y-Axis



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	2405.350	97.56	114.00	-16.44	85.87	11.69	PK
2	2441.350	96.97	114.00	-17.03	85.14	11.83	PK
3	2477.350	95.85	114.00	-18.15	83.87	11.98	PK

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.

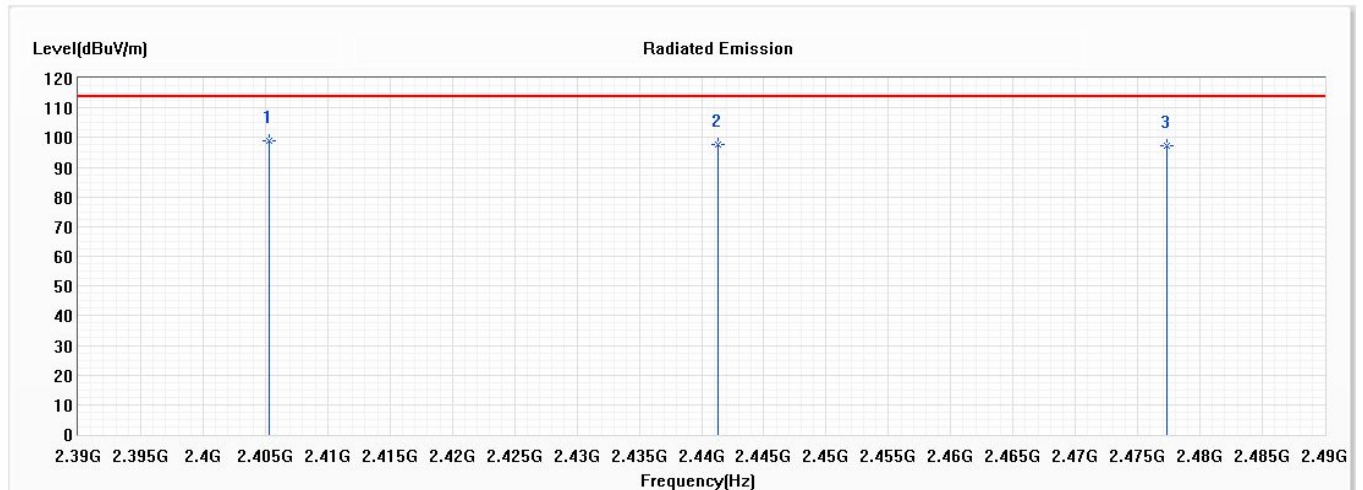
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2405.350	97.560	-33.971	63.589	-30.411	94.000
2441.350	96.970	-33.971	62.999	-31.001	94.000
2477.350	95.850	-33.971	61.879	-32.121	94.000

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Fundamental Radiated Emission  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit

### Horizontal\_Z-Axis



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	2405.350	98.72	114.00	-15.28	87.03	11.69	PK
2	2441.350	97.84	114.00	-16.16	86.01	11.83	PK
3	2477.350	97.23	114.00	-16.77	85.25	11.98	PK

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.

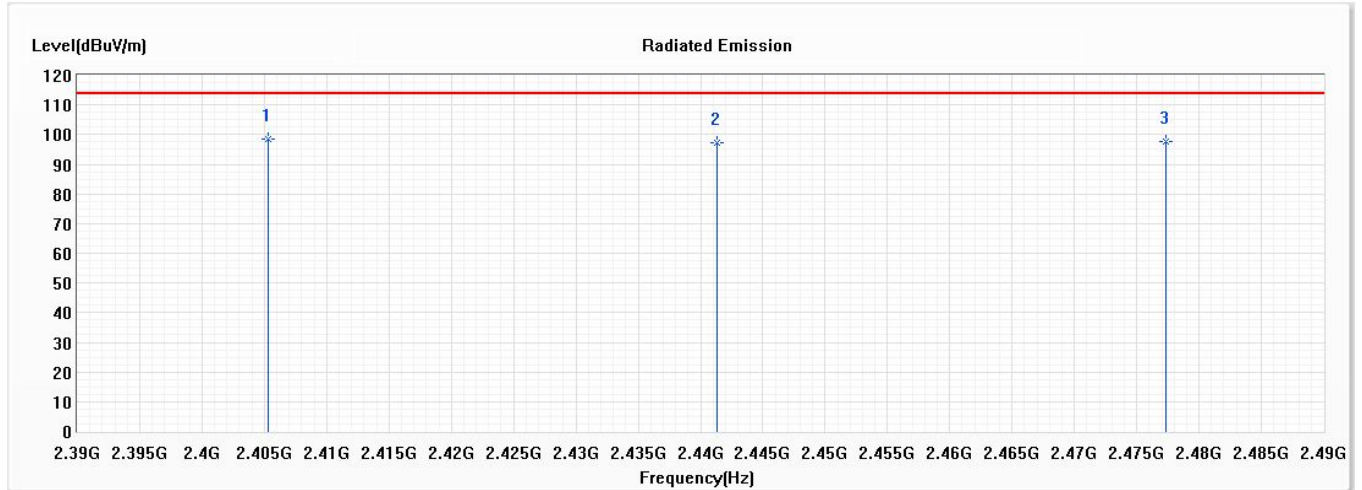
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2405.350	98.720	-33.971	64.749	-29.251	94.000
2441.350	97.840	-33.971	63.869	-30.131	94.000
2477.350	97.230	-33.971	63.259	-30.741	94.000

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Fundamental Radiated Emission  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit

### Vertical\_Z-Axis



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	2405.350	98.40	114.00	-15.60	86.71	11.69	PK
2	2441.350	97.04	114.00	-16.96	85.21	11.83	PK
3	2477.350	97.75	114.00	-16.25	85.77	11.98	PK

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.

Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)
2405.350	98.400	-33.971	64.429	-29.571	94.000
2441.350	97.040	-33.971	63.069	-30.931	94.000
2477.350	97.750	-33.971	63.779	-30.221	94.000

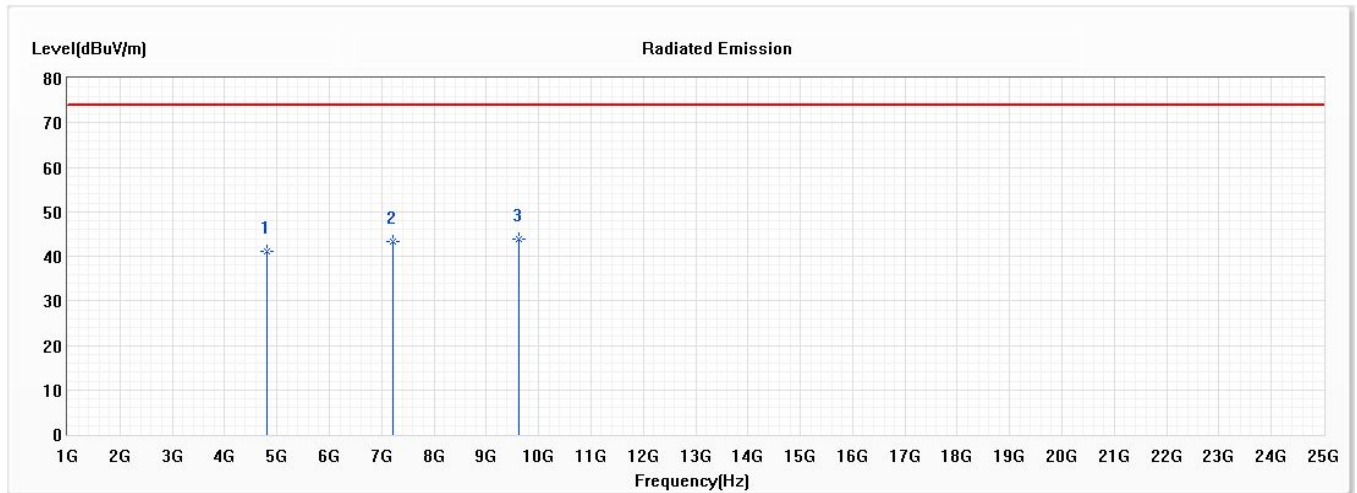
Note:

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



Product : TUF Gaming H3 Wireless dongle  
 Test Item : Harmonic Radiated Emission Data  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit (2405.35MHz)

### Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4810.700	40.97	74.00	-33.03	45.70	-4.73	PK
2	7216.050	43.43	74.00	-30.57	44.63	-1.20	PK
* 3	9621.400	43.94	74.00	-30.06	43.08	0.86	PK

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.

Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Average Measurement dBμV/m	Margin dB	Peak Limit dBμV/m	Average Limit dBμV/m
--	--	--	--	--	74.000	54.000

### Average Detector:

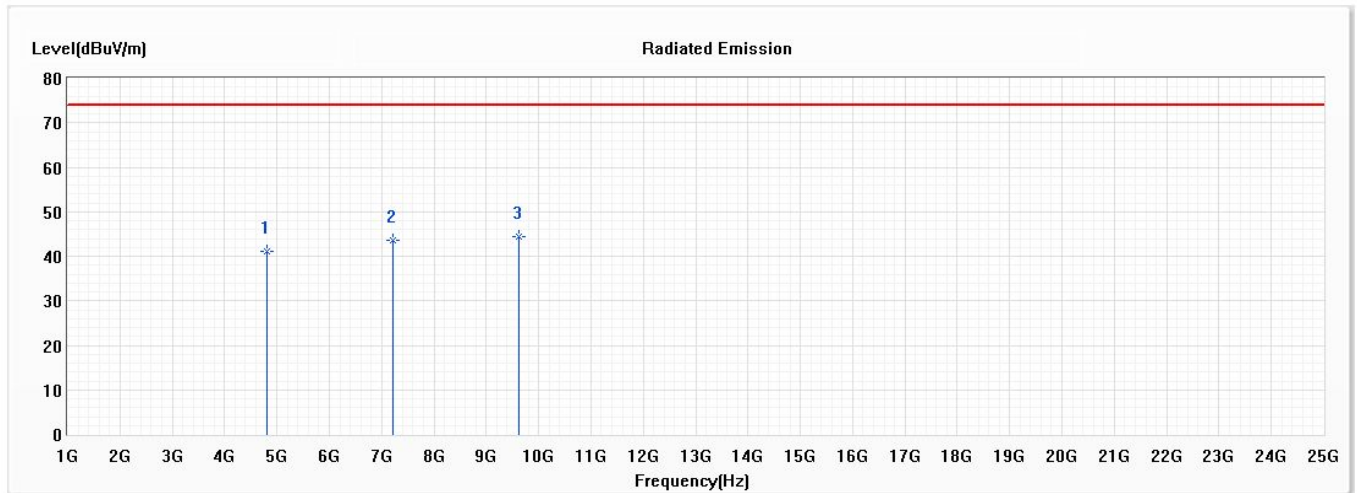
Note:

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



Product : TUF Gaming H3 Wireless dongle  
 Test Item : Harmonic Radiated Emission Data  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit (2405.35MHz)

## Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4810.700	41.03	74.00	-32.97	45.76	-4.73	PK
2	7216.050	43.54	74.00	-30.46	44.74	-1.20	PK
* 3	9621.400	44.28	74.00	-29.72	43.42	0.86	PK

Note:

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

Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Average Measurement dBμV/m	Margin dB	Peak Limit dBμV/m	Average Limit dBμV/m
--	--	--	--	--	74.000	54.000

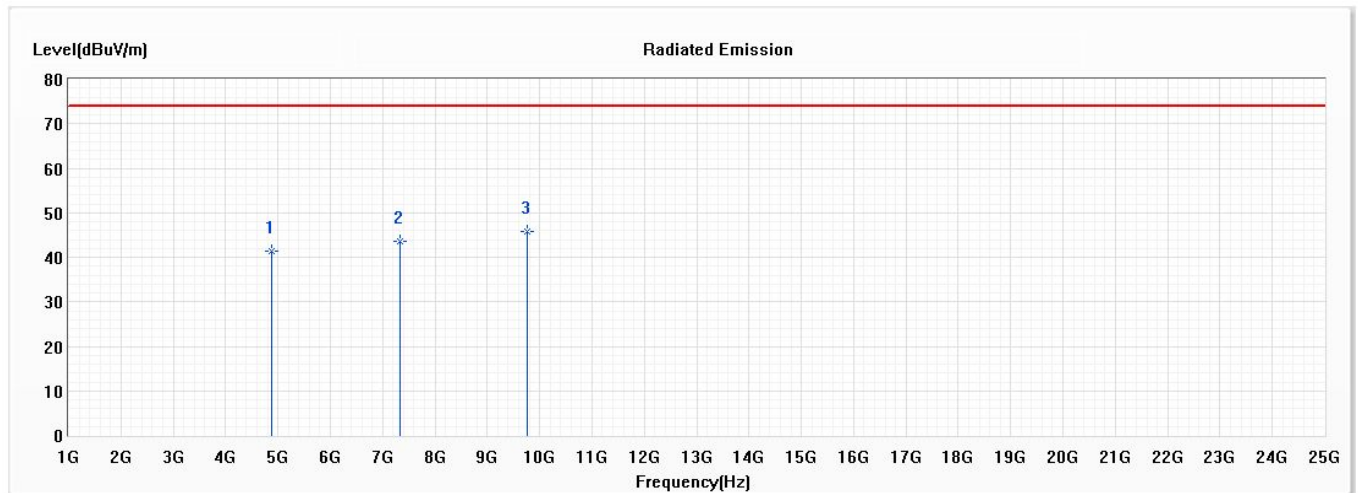
### Average Detector:

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Harmonic Radiated Emission Data  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit (2441.35MHz)

### Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4882.700	41.30	74.00	-32.70	45.97	-4.67	PK
2	7324.050	43.66	74.00	-30.34	44.89	-1.23	PK
* 3	9765.400	45.69	74.00	-28.31	44.60	1.09	PK

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.

Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Average Measurement dBμV/m	Margin dB	Peak Limit dBμV/m	Average Limit dBμV/m
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#### Average Detector:

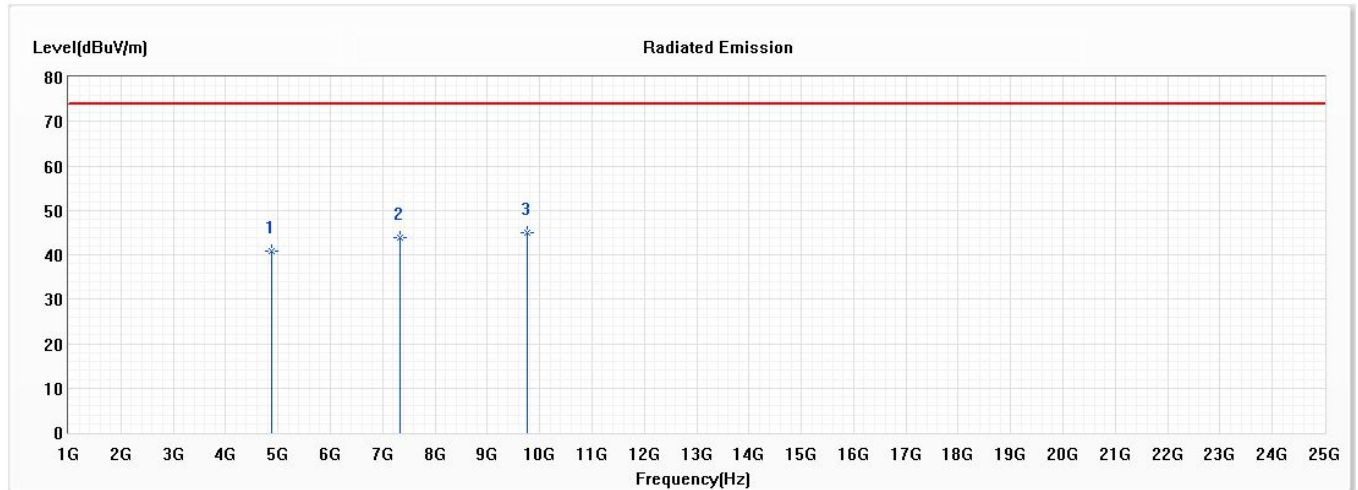
--	--	--	--	--	74.000	54.000
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Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Harmonic Radiated Emission Data  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit (2441.35MHz)

## Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4882.700	40.89	74.00	-33.11	45.56	-4.67	PK
2	7324.050	43.83	74.00	-30.17	45.06	-1.23	PK
* 3	9765.400	45.09	74.00	-28.91	44.00	1.09	PK

### 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.

Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Average Measurement dBμV/m	Margin dB	Peak Limit dBμV/m	Average Limit dBμV/m
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### Average Detector:

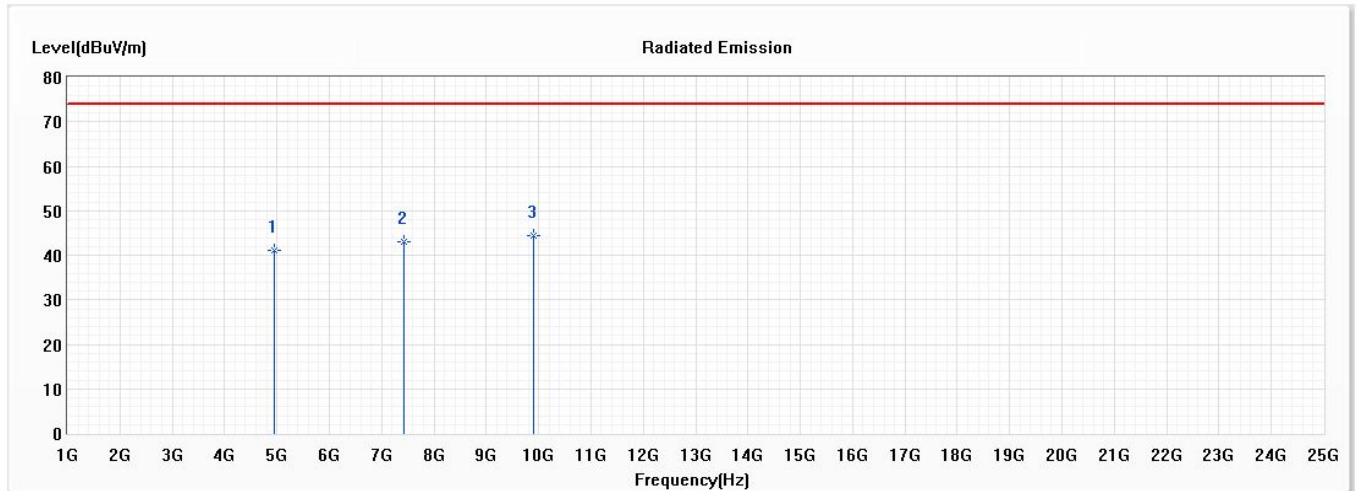
--	--	--	--	--	74.000	54.000
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### Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Harmonic Radiated Emission Data  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit (2477.35MHz)

### Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4954.700	41.05	74.00	-32.95	45.59	-4.54	PK
2	7432.050	43.04	74.00	-30.96	44.19	-1.15	PK
* 3	9909.400	44.45	74.00	-29.55	43.13	1.32	PK

Note:

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

Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Average Measurement dBμV/m	Margin dB	Peak Limit dBμV/m	Average Limit dBμV/m
--	--	--	--	--	74.000	54.000

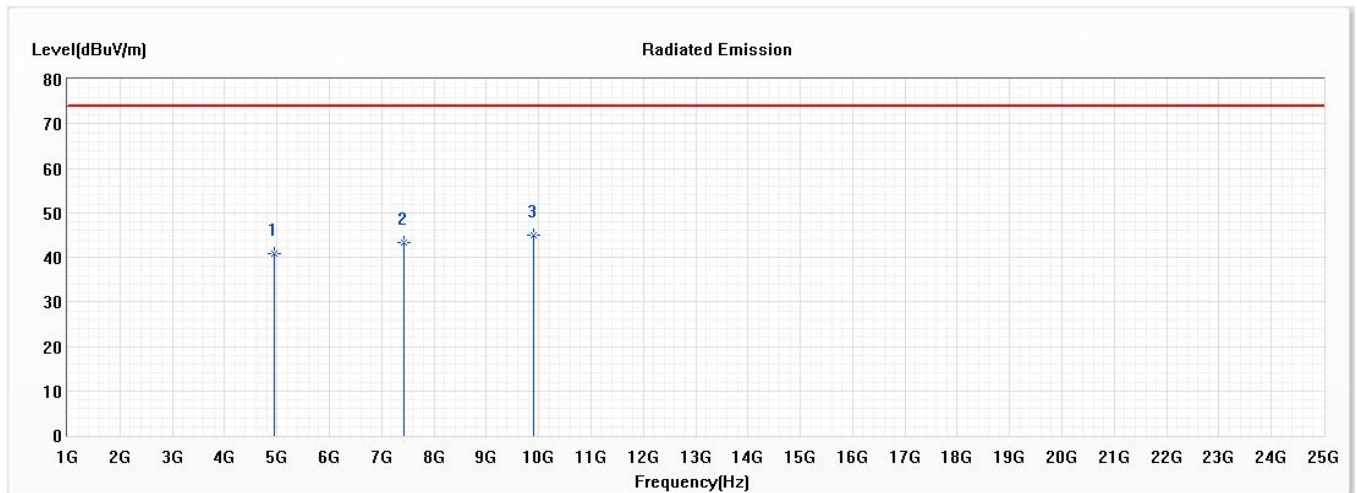
### Average Detector:

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Harmonic Radiated Emission Data  
 Test Date : 2020/11/06  
 Test Mode : Mode 1: Transmit (2477.35MHz)

## Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4954.700	40.73	74.00	-33.27	45.27	-4.54	PK
2	7432.050	43.36	74.00	-30.64	44.51	-1.15	PK
* 3	9909.400	44.85	74.00	-29.15	43.53	1.32	PK

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.

Frequency MHz	Peak Measurement dBμV/m	Duty Cycle Factor dB	Average Measurement dBμV/m	Margin dB	Peak Limit dBμV/m	Average Limit dBμV/m
--	--	--	--	--	74.000	54.000

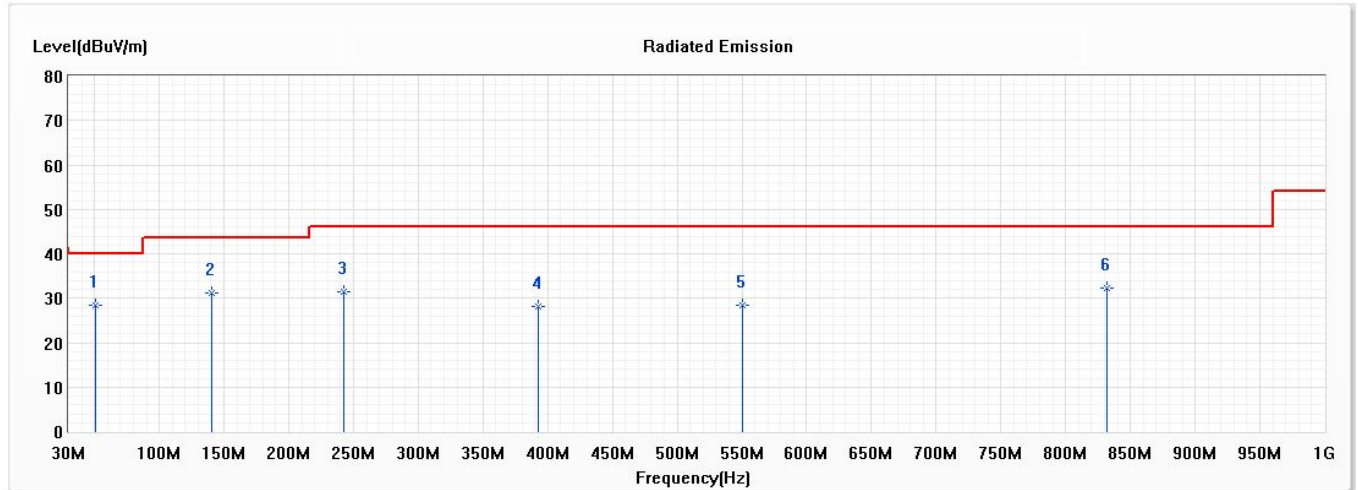
### Average Detector:

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : General Radiated Emission Data  
 Test Date : 2020/11/03  
 Test Mode : Mode 1: Transmit (2441.35MHz)

### Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	50.370	28.33	40.00	-11.67	38.61	-10.28	QP
2	140.580	31.27	43.50	-12.23	42.39	-11.12	QP
3	242.430	31.34	46.00	-14.66	42.80	-11.46	QP
4	392.780	28.25	46.00	-17.75	35.49	-7.24	QP
5	550.890	28.37	46.00	-17.63	32.57	-4.20	QP
6	832.190	32.30	46.00	-13.70	32.35	-0.05	QP

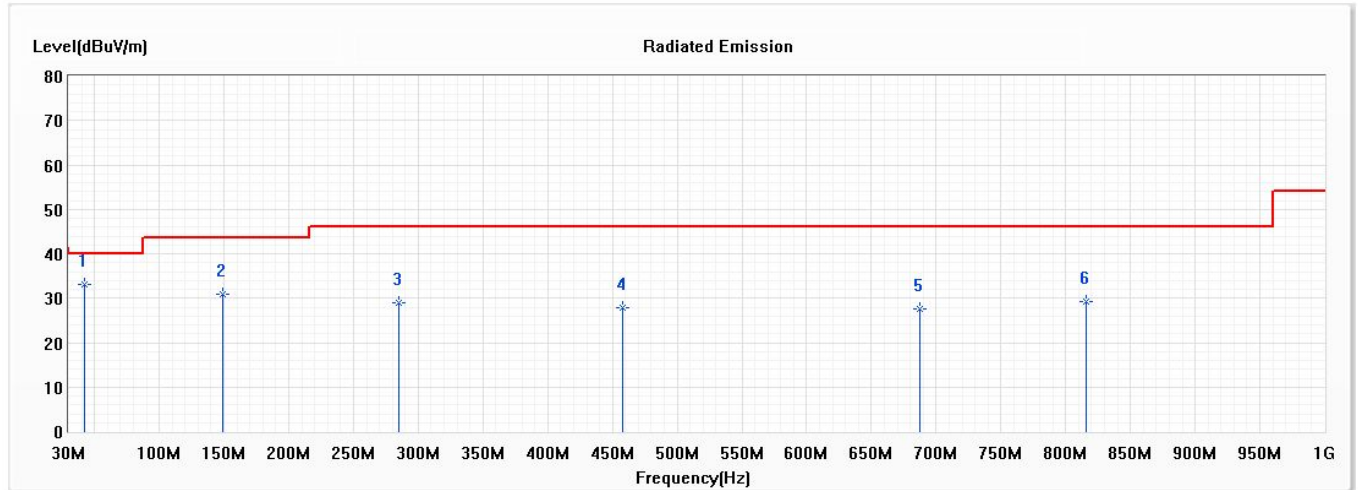
### Note:

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



Product : TUF Gaming H3 Wireless dongle  
 Test Item : General Radiated Emission Data  
 Test Date : 2020/11/03  
 Test Mode : Mode 1: Transmit (2441.35MHz)

## Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	42.610	32.97	40.00	-7.03	43.64	-10.67	QP
2	149.310	30.81	43.50	-12.69	41.57	-10.76	QP
3	285.110	28.84	46.00	-17.16	38.62	-9.78	QP
4	457.770	27.80	46.00	-18.20	33.49	-5.69	QP
5	687.660	27.57	46.00	-18.43	29.51	-1.94	QP
6	815.700	29.17	46.00	-16.83	29.39	-0.22	QP

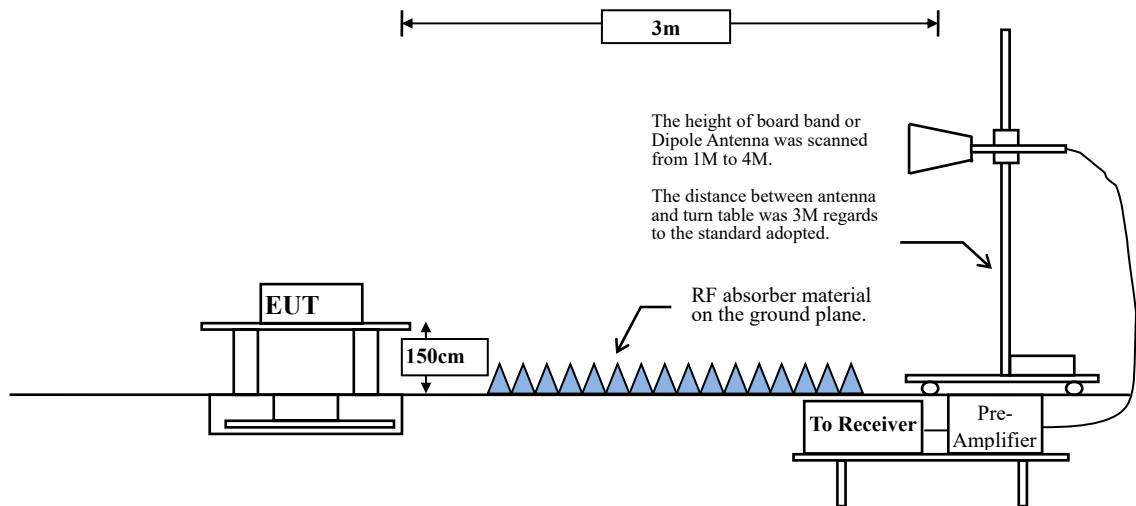
### Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. 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 (dB $\mu$ V /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.

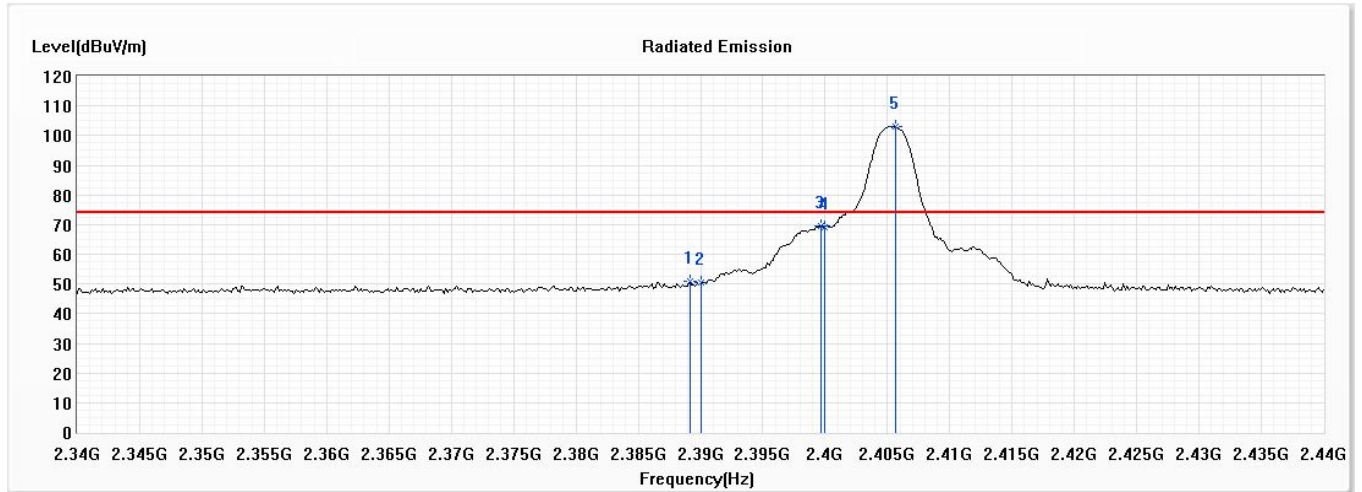
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

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

#### 4.4. Test Result of Band Edge

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Band Edge Data  
 Test Date : 2020/10/19  
 Test Mode : Mode 1: Transmit (2405.35MHz)

##### Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2389.130	50.96	74.00	-23.04	37.50	13.46	PK
2	2390.000	50.67	74.00	-23.33	37.21	13.46	PK
3	2399.710	69.67	74.00	-4.33	56.18	13.49	PK
4	2400.000	69.10	74.00	-4.90	55.61	13.49	PK
5	2405.652	102.96	--	--	89.45	13.51	PK

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.

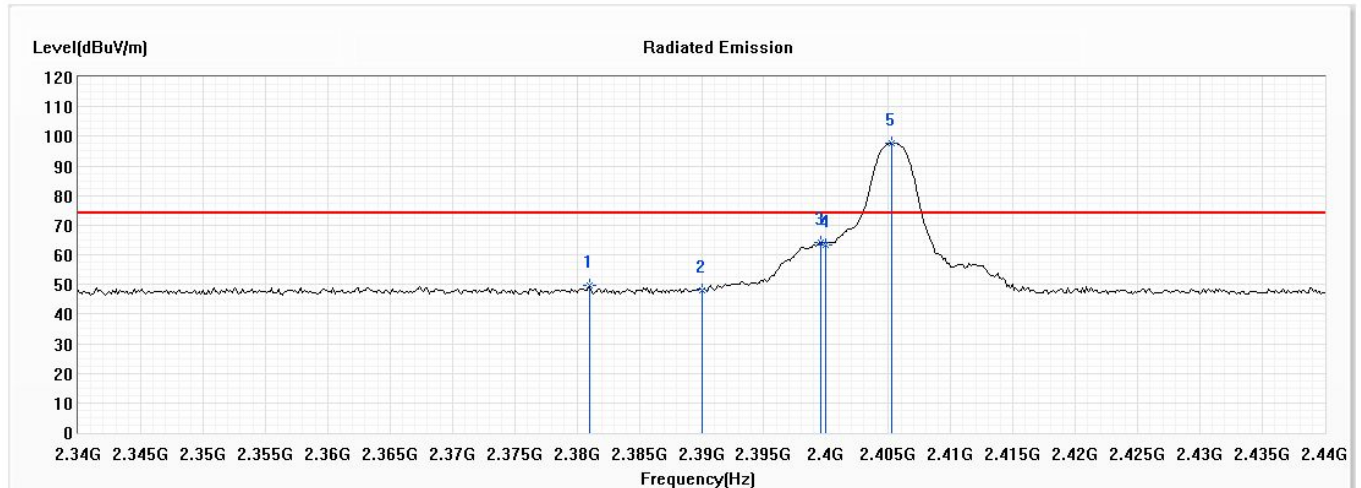
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)	Result
2389.130	50.960	-33.971	16.989	-37.011	54.000	Pass
2390.000	50.670	-33.971	16.699	-37.301	54.000	Pass
2399.710	69.670	-33.971	35.699	-18.301	54.000	Pass
2400.000	69.100	-33.971	35.129	-18.871	54.000	Pass
2405.652	102.960	-33.971	68.989	--	--	Pass

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Band Edge Data  
 Test Date : 2020/10/19  
 Test Mode : Mode 1: Transmit (2405.35MHz)

### Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2381.014	49.67	74.00	-24.33	36.23	13.44	PK
2	2390.000	48.09	74.00	-25.91	34.63	13.46	PK
3	2399.565	64.14	74.00	-9.86	50.65	13.49	PK
4	2400.000	63.47	74.00	-10.53	49.98	13.49	PK
5	2405.217	97.57	--	--	84.06	13.51	PK

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.

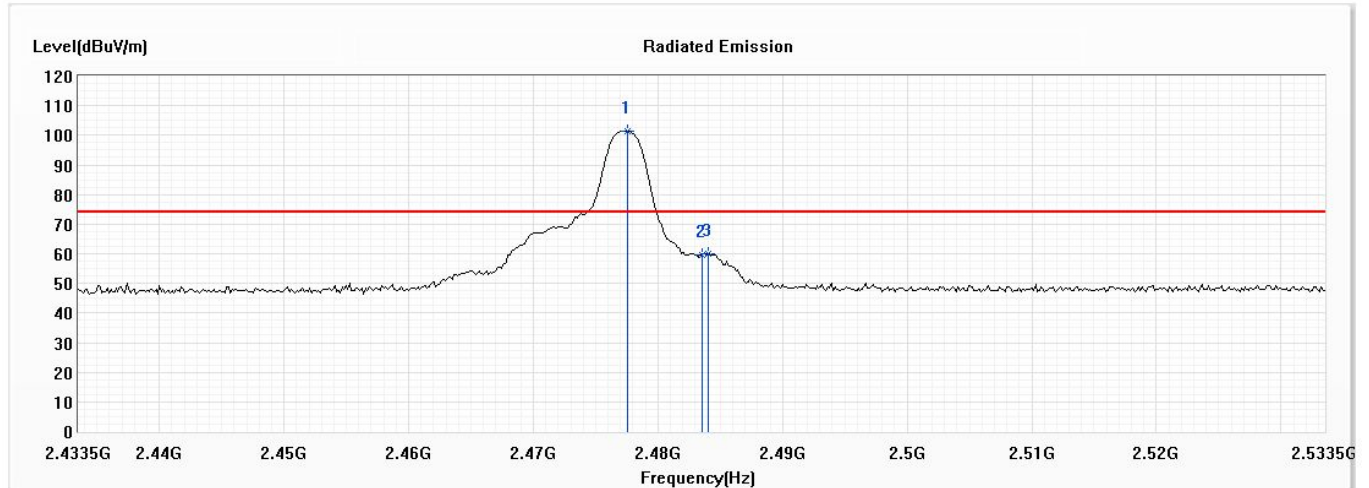
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)	Result
2381.014	49.670	-33.971	15.699	-38.301	54.000	Pass
2390.000	48.090	-33.971	14.119	-39.881	54.000	Pass
2399.565	64.140	-33.971	30.169	-23.831	54.000	Pass
2400.000	63.470	-33.971	29.499	-24.501	54.000	Pass
2405.217	97.570	-33.971	63.599	--	--	Pass

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Band Edge Data  
 Test Date : 2020/10/19  
 Test Mode : Mode 1: Transmit (2477.35MHz)

### Horizontal



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2477.558	101.56	--	--	87.67	13.89	PK
2	2483.500	59.44	74.00	-14.56	45.52	13.92	PK
3	2484.080	59.97	74.00	-14.03	46.04	13.93	PK

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.

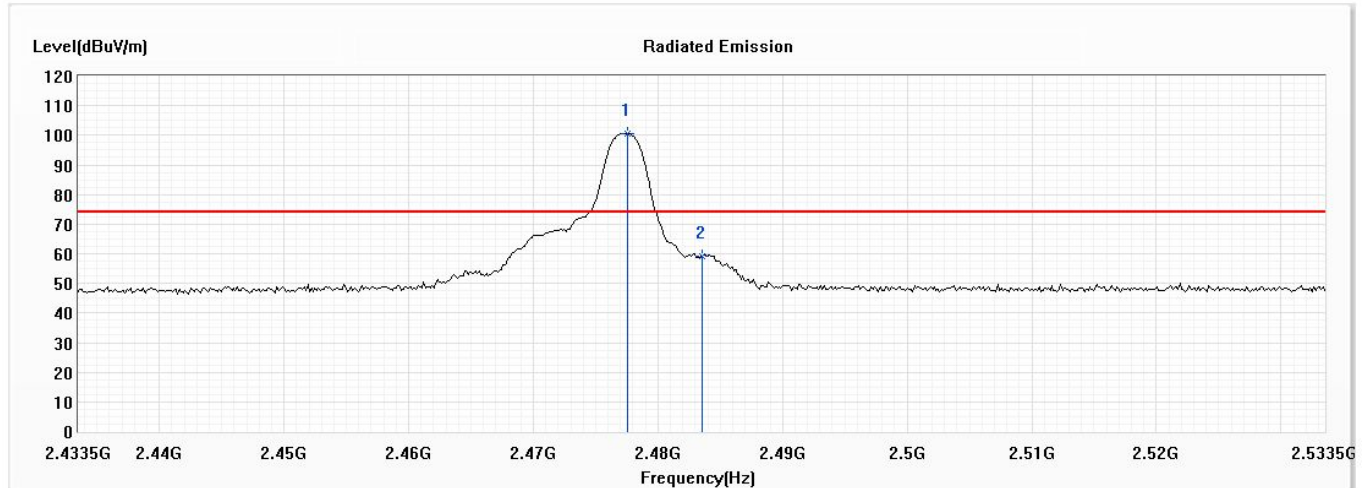
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)	Result
2477.558	101.560	-33.971	67.589	--	--	Pass
2483.500	59.440	-33.971	25.469	-28.531	54.000	Pass
2484.080	59.970	-33.971	25.999	-28.001	54.000	Pass

Note:

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

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Band Edge Data  
 Test Date : 2020/10/19  
 Test Mode : Mode 1: Transmit (2477.35MHz)

### Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2477.558	100.75	--	--	86.86	13.89	PK
2	2483.500	59.26	74.00	-14.74	45.34	13.92	PK

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.

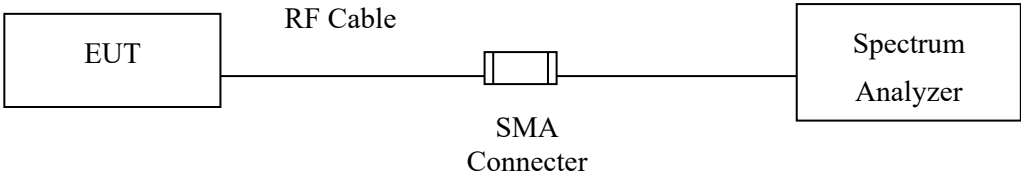
Frequency (MHz)	Peak Measurement (dBμV/m)	Duty Cycle Factor (dB)	Average Measurement (dBμV/m)	Margin (dB)	Average Limit (dBμV/m)	Result
2477.558	100.750	-33.971	66.779	--	--	Pass
2483.500	59.260	-33.971	25.289	-28.711	54.000	Pass

Note:

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

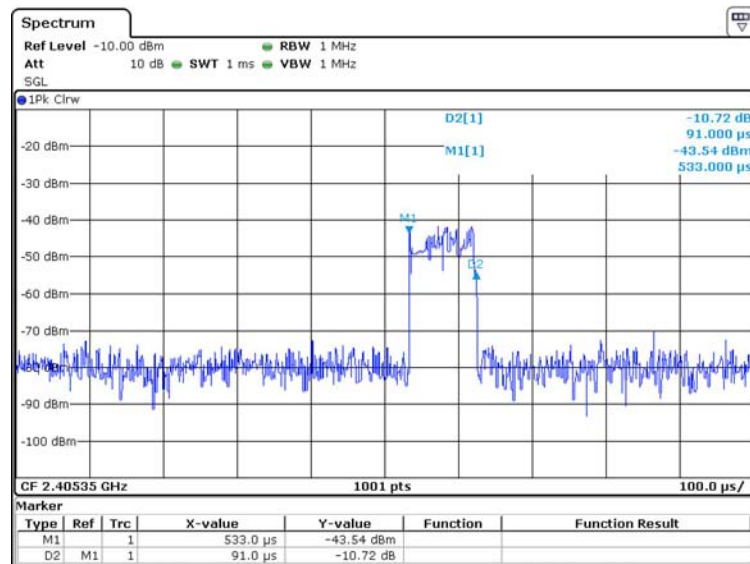
**5. Duty Cycle**

**5.1. Test Setup**

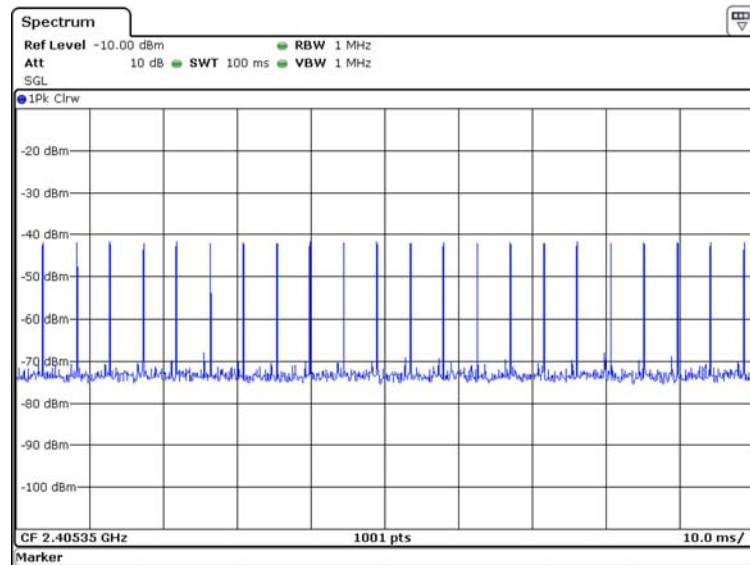


## 5.2. Test Result of Duty Cycle

Product : TUF Gaming H3 Wireless dongle  
 Test Item : Duty Cycle Data  
 Test Mode : Mode 2: Normal mode



Date: 5 NOV 2020 19:33:00



Date: 5 NOV 2020 19:31:20

Time on of 100ms= 91us\*22= 2.002ms

Duty Cycle=2.002ms / 100ms= 0.02002

Duty Cycle correction factor= 20 LOG 0.02002= -33.971 dB

<b>Duty Cycle correction factor</b>	<b>-33.971 dB</b>
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## **6. EMI Reduction Method During Compliance Testing**

No modification was made during testing.