

# FCC &ISED Radio Test Report

**FCC ID: X5B-048025T**  
**IC:8814A-048025T**

**The report concerns: Class II Permissive Change**

Report Reference No.....: 21EFSB08025 07591

Date Sample(s) Received.....: 2021-08-20

Date of Tested.....: 2021-08-20 to 2021-09-09

Date of issue.....: 2021-09-09

Testing Laboratory .....: DongGuan ShuoXin Electronic Technology Co., Ltd.

Address .....: Zone A, 1F, No. 6, XinGang Road YuanGang Street,  
XinAn District, ChangAn Town, DongGuan City,  
GuangDong, China

Applicant's name .....: PERFORMANCE DESIGNED PRODUCTS, LLC

Address .....: 14144 Ventura Blvd, Suite 200 Sherman. Oaks CA  
91423 United States Of America

Manufacturer.....: PERFORMANCE DESIGNED PRODUCTS, LLC

Equipment.....: LVL50 Wireless Dongle for XBO

Trade Mark .....:

Model .....: 048-025T

Ratings .....: Input: DC 5V

Test Engineer:

  
Blue Qiu

Responsible Engineer :

  
Smile Wang

Authorized Signatory:

  
King Wang

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**1TEST REPORT DECLARE**

Applicant	PERFORMANCE DESIGNED PRODUCTS, LLC
Address	14144 Ventura Blvd, Suite 200 Sherman. Oaks CA 91423 United States Of America
Manufacturer	Same as applicant
Address	Same as applicant
Factory	Same as applicant
Address	Same as applicant
Equipment	LVL50 Wireless Dongle for XBO
Model No.	048-025T
Trade Mark	/
Issued History	The purpose of this letter is to request a Class II Permissive change for FCC ID: 2AC23-WC16, original granted on 11/20/2018. The purpose of this letter is requesting to change the schematic and PCB layout, The changes do not affect RF transimission. So the report only reassessed radiation up to 1GHz and max out put power.
Standard	FCC Part15, Subpart C (15.209) FCC Part15, Subpart C (15.247) RSS-Gen Issue 5, Apr. 2018

**We Declare:**

The equipment described above is tested by DongGuan ShuoXin Electronic Technology Co., Ltd(ATT). and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and DongGuan ShuoXin Electronic Technology Co., Ltd.(ATT) is assumed of full responsibility for the accuracy and completeness of these tests.

ATT is not responsible for the sampling stage, so the results only apply to the sample as received.

ATT's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. ATT shall have no liability for any declarations, inferences or generalizations drawn by the client or others from ATT issued reports.

## 2SUMMARY OF TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below:

Standard(s) Section		Test Item	Judgment	Remark
FCC	ISED			
15.207	RSS-Gen8.8	AC Power Line Conducted Emissions	N/A	-----
15.209(a)	RSS-Gen 8.10	Radiated Emission	PASS	-----
15.247(a)(1)	RSS-247 5.1 (b)	Maximum Output Power	PASS	-----

Note:

- (1) "N/A" denotes test is not applicable in this test report
- (2) The device what use a permanently attached antenna were considered sufficient to comply with the provisions of 15.203.

**2.1 MEASUREMENT UNCERTAINTY**

Test Item	Uncertainty
Uncertainty for Conduction emission test (9kHz-150kHz)	3.7 dB
Uncertainty for Conduction emission test (150kHz-30MHz)	3.3 dB
Uncertainty for Radiation Emission test (30MHz-200MHz)	4.60 dB (Polarize: V)
	4.60 dB (Polarize: H)
Uncertainty for Radiation Emission test (200MHz-1GHz)	6.10 dB (Polarize: V)
	5.08 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz-6GHz)	5.01 dB (Polarize: V)
	5.01 dB (Polarize: H)
Uncertainty for Radiation Emission test (6GHz-18GHz)	5.26 dB (Polarize: V)
	5.26 dB (Polarize: H)
Uncertainty for Radiation Emission test (18GHz-40GHz)	5.06 dB (Polarize: V)
	5.06 dB (Polarize: H)
Uncertainty for radio frequency	±0.048kHz
Uncertainty for conducted RF Power	±0.32dB

**Note:**

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

**Test Facility:**

The Test site used by DongGuan ShuoXin Electronic Technology Co., Ltd. to collect test data is located on the Zone A, 1F, No. 6, XinGang Road YuanGang Street, XinAn District, ChangAn Town, DongGuan City, GuangDong, China

The test facility is recognized, certified, or accredited by the following organizations:

Item	Registration No.	Expiration Date
CNAS	L3098	2024-08-27
A2LA	4893.01	2022-06-30
Innovation, Science and Economic Development Canada (ISED)	11033A CAB identifier:CN0083	2022-06-30
Federal Communications Commission (FCC)	171688 Designation No.:CN1235	2022-06-30

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

Equipment	LVL50 Wireless Dongle for XBO	
Brand Name	/	
Test Model	048-025T	
Series Model	/	
Model Difference(s)	/	
Hardware Version	V1.0	
Software Version	V1.0	
PowerSource	Supplied from DC power.	
Power Rating	Input: DC 5V	
Operation Frequency	2405.35 MHz ~ 2477.35 MHz	
Modulation Technology	Pi/4 DQPSK	
Bit Rate of Transmitter	1Mbps	
Antenna Information	Antenna Type: SMD Chip	Maximum Peak Gain:2dBi

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT has three model number of antenna, these antenna type are the same, the test was used maximum antenna gain of antenna.

3. Channel List:

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

### 3.2 DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation mode.

Pretest Mode	Description
Mode 1	TX Mode

Following mode(s) was (were) found to be the worst case(s) and selected for the final test.

<b>Radiated emissions test - Below 1GHz</b>	
Final Test Mode	Description
Mode 2	TX Mode

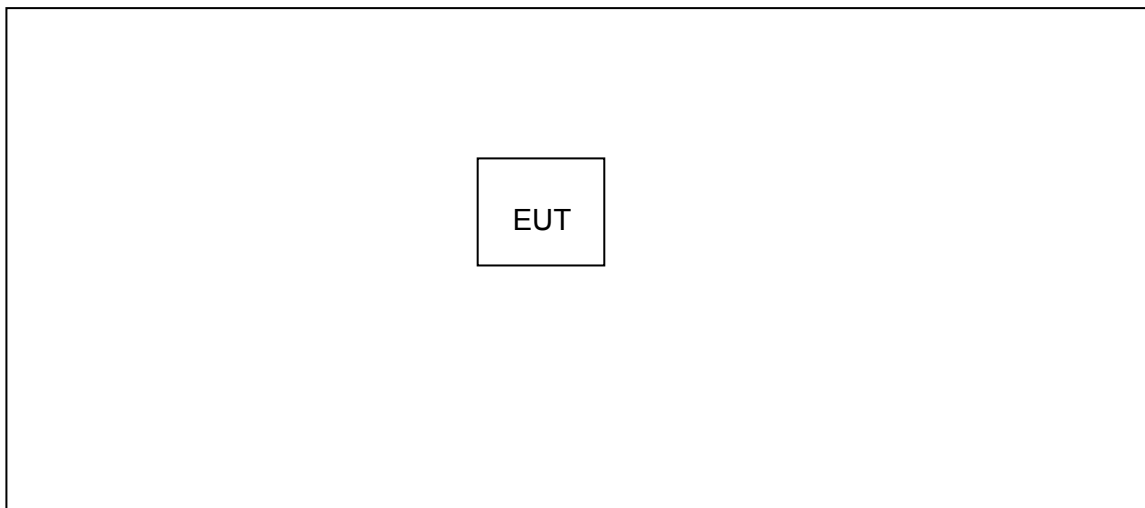


### 3.3PARAMETERS OF TEST SOFTWARE

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test Software	N/A
Frequency (MHz)	2441.35
Parameters(1Mbps)	Default

### 3.4BLOCKDIAGRAMSHOWINGTHECONFIGURATIONOFSYSTEMTESTED



### 3.5SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.
/	/	/	/	/

Item	Cable Type	Shielded Type	Ferrite Core	Length
/	/	/	/	/

**3.6 TEST ENVIRONMENT CONDITIONS**

Test Item	Temperature	Humidity	Test Voltage
Radiated Emissions-9K-30MHz	23.0°C	54%	DC 5V
Radiated Emissions-30 MHz to 1GHz	23.0°C	54%	DC 5V
Maximum Output Power	23.0°C	54%	DC 5V

## 4 RADIATED EMISSION TEST

### 4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205(a) & RSS-Gen 8.10, then the 15.209(a) & RSS-Gen 8.9 limit in the table below has to be followed.

#### LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-1000MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

#### LIMITS OF RADIATED EMISSION MEASUREMENT (9 kHz-30 MHz)

Frequency (MHz)	Magnetic field strength (H-Field) (μA/m)	Measurement Distance (meters)
0.009-0.490	6.37/F(kHz)	300
0.490-1.705	6.37/F(kHz)	30
1.705-30.0	0.08	30

#### LIMITS OF RADIATED EMISSION MEASUREMENT (30 MHz-1000MHz)

Frequency (MHz)	Field Strength (μV/m at 3m)
30-88	100
88-216	150
216-960	200
Above 960	500

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

Frequency (MHz)	(dBuV/m at 3 m)	
	Peak	Average
Above 1000	74	54

**Note:**

- (1) The limit for radiated test was performed according to FCC PART 15C and RSS-247.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

#### 4.2 TEST PROCEDURE AND SETTING

- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- i. The test result is calculated as the following:
  - (1) Result = Reading + Correct Factor
  - (2) Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain + Attenuator
  - (3) Margin = Result - Limit

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	RBW 1MHz VBW 3MHz peak detector for Pk value RMS detector for AV value

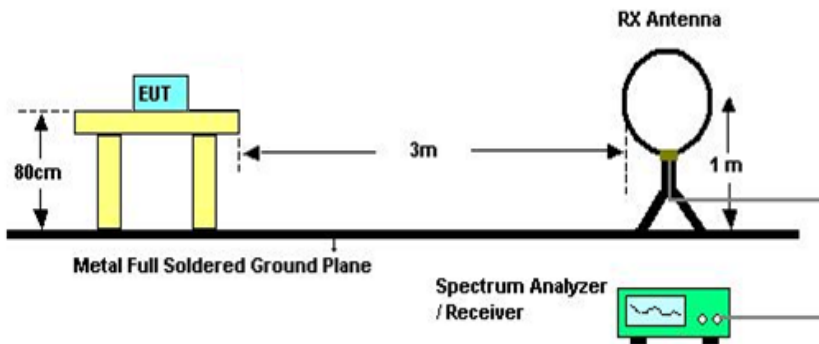
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9 kHz~90 kHz for PK/AVG detector
Start ~ Stop Frequency	90 kHz~110 kHz for QP detector
Start ~ Stop Frequency	110 kHz~490 kHz for PK/AVG detector
Start ~ Stop Frequency	490 kHz~30 MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

### 4.3 MEASUREMENT INSTRUMENTS LIST

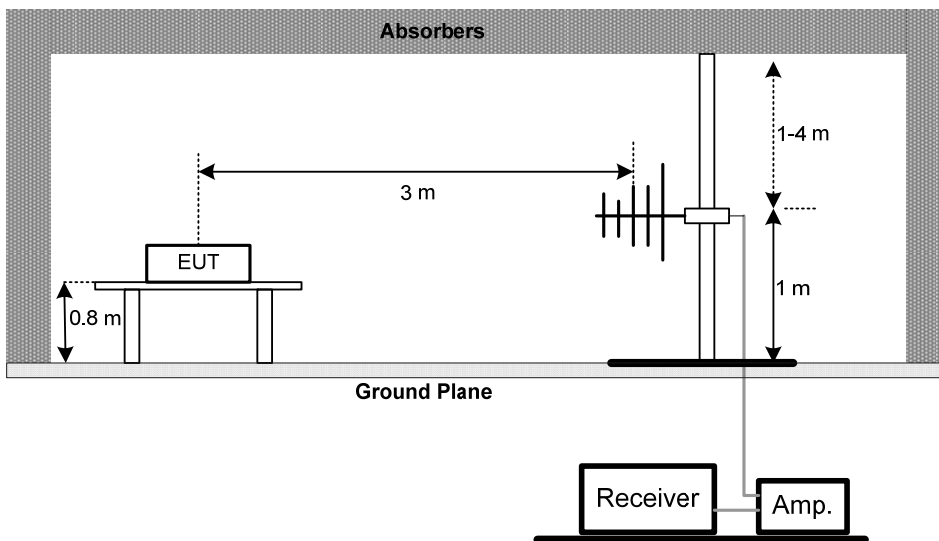
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	101307	12/12/2021
2	Spectrum Analyzer	Agilent	E4407B	US40240708	11/17/2021
3	Loop antenna	SCHWARZBECK K	FMZB1519	1519-062	12/14/2021
4	Broadband antenna	SCHWARZBECK	VULB9168	VULB9168-192	08/05/2022
5	HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D 1065	05/07/2022
6	Preamplifier Amplifier	HP	8447F	3113A05680	12/11/2021
7	PRE-AMPLIFIER	CY	EMC011830	980136	12/11/2021
8	RF Cable	R&S	Test Cable 4	4	12/11/2021
9	RF Cable	R&S	Test Cable 5	5	12/11/2021
10	RF Cable	R&S	Test Cable 9	9	04/21/2022
11	RF Cable	R&S	Test Cable 10	10	12/11/2021
12	Measurement Software	Farad	EZ-EMC (Ver.ATT-03A)	N/A	N/A

### 4.4 TEST SETUP

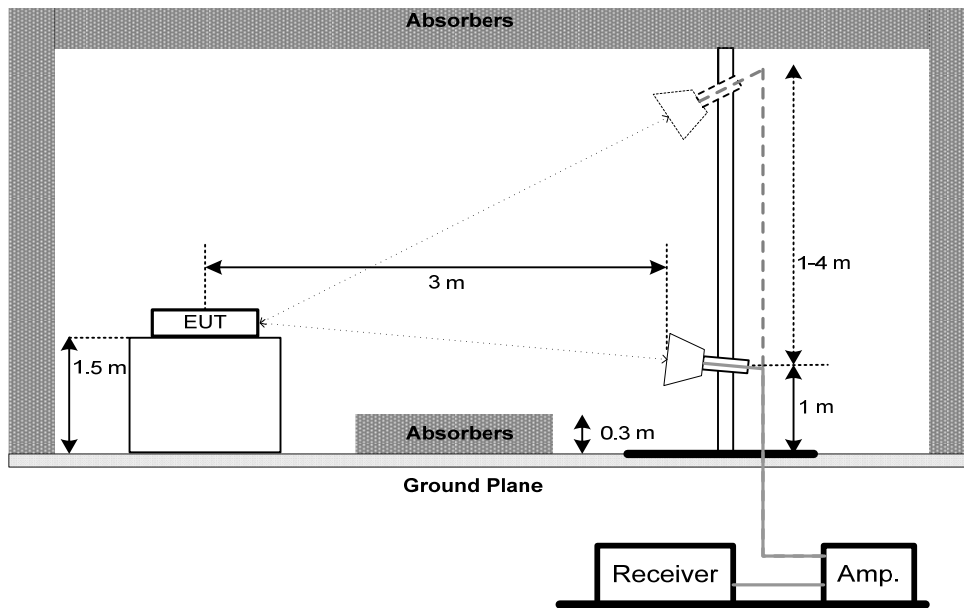
#### 9 kHz-30 MHz



#### 30 MHz to 1 GHz



### Above 1 GHz



### 4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

**4.6 TEST RESULTS - 9 kHz TO 30MHz**

Test Mode:	TX Mode
------------	---------

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

**Note:**

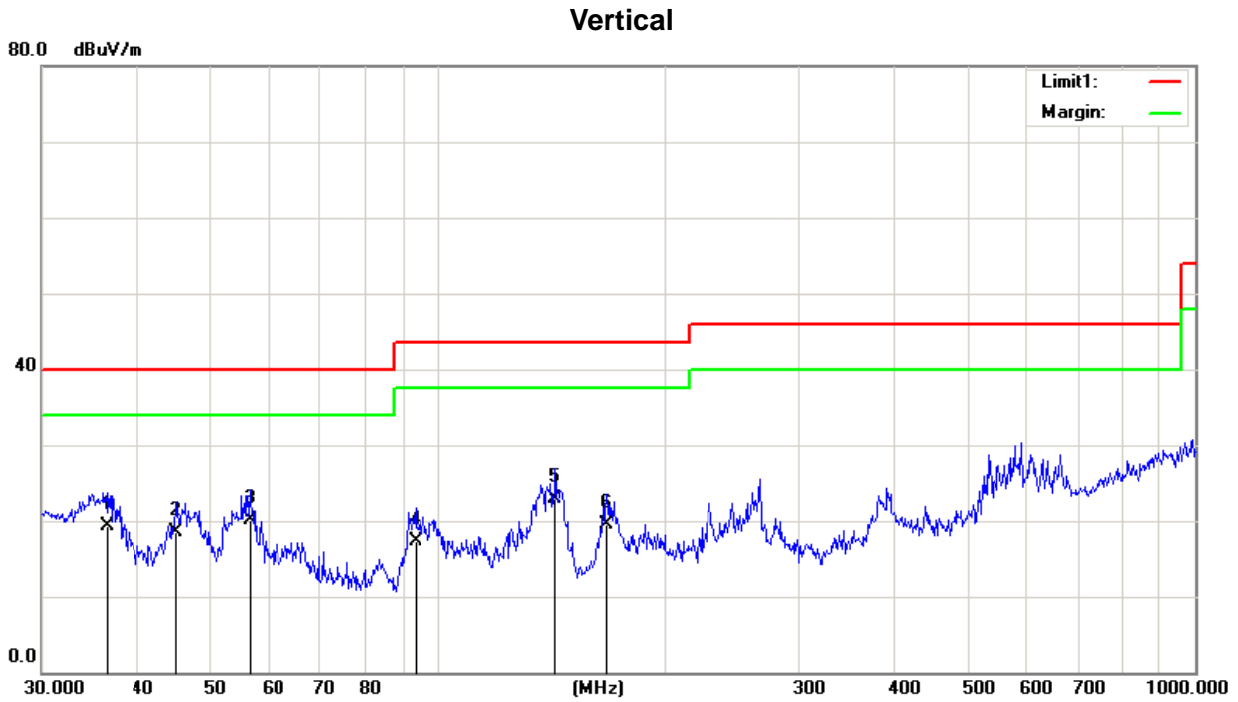
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $20 \log (\text{specific distance}/\text{test distance})(\text{dB})$ ;

Limit line = specific limits(dBuv) + distance extrapolation factor

## 4.7TEST RESULTS- 30 MHz TO 1000MHz

Test Mode: TX Mode

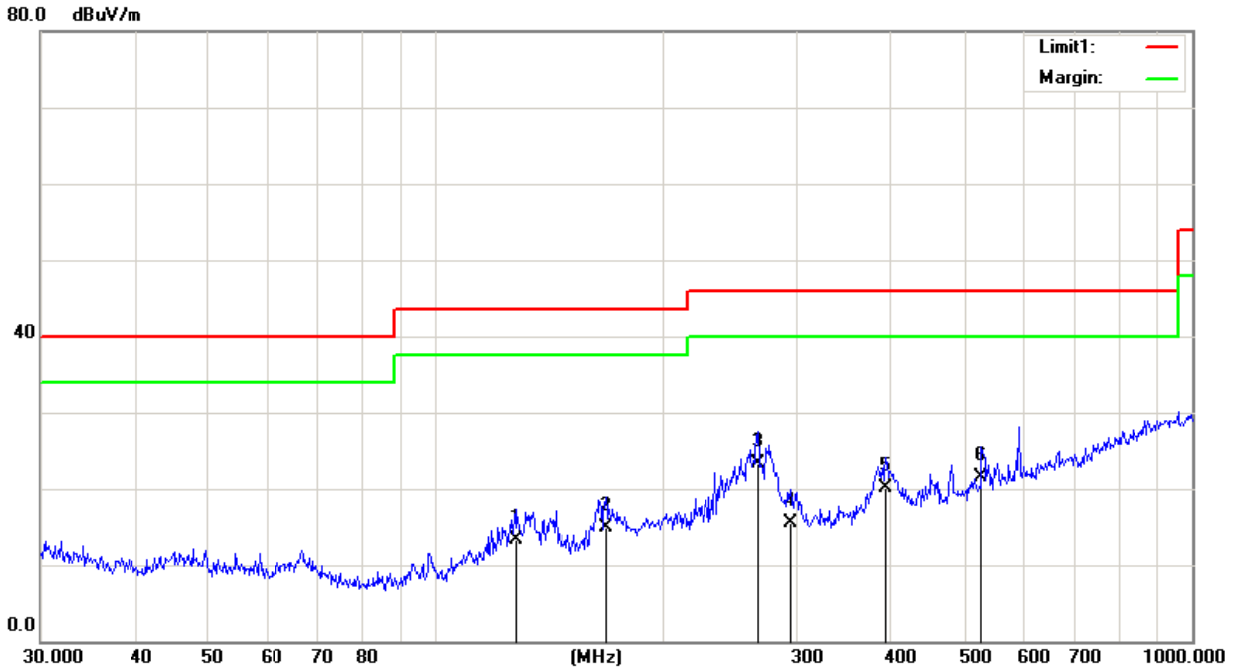


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Height cm	Degree
1	36.5092	32.59	-13.28	19.31	40.00	-20.69	QP		
2	45.2165	32.53	-13.95	18.58	40.00	-21.42	QP		
3	56.3947	32.70	-12.67	20.03	40.00	-19.97	QP		
4	93.4402	32.21	-14.90	17.31	43.50	-26.19	QP		
5	142.8243	35.31	-12.37	22.94	43.50	-20.56	QP		
6	167.2366	30.03	-10.55	19.48	43.50	-24.02	QP		



Test Mode: TX Mode

### Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Height cm	Degree
1	127.6645	26.20	-12.87	13.33	43.50	-30.17	QP	100	325
2	167.8242	25.77	-10.91	14.86	43.50	-28.64	QP	100	51
3	266.6089	28.58	-5.27	23.31	46.00	-22.69	QP	100	106
4	294.1136	22.45	-6.87	15.58	46.00	-30.42	QP	100	178
5	393.4723	28.03	-7.85	20.18	46.00	-25.82	QP	100	283
6	526.3967	26.71	-5.13	21.58	46.00	-24.42	QP	100	354

## 5 MAXIMUM OUTPUT POWER

### 5.1 LIMIT

FCC Part15 , Subpart C (15.247)&RSS-247		
Section	Test Item	Limit
15.247(a)(1) RSS-247 5.1 (b)	Maximum Output Power	0.125Watt or 21dBm

**Note:**

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

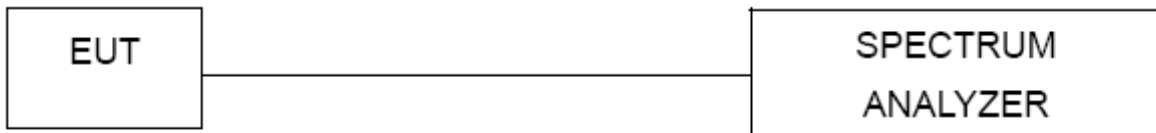
### 5.2 TEST PROCEDURE AND SETTING

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW= 1MHz/3MHz, VBW= 1MHz/3MHz, Sweep time = Auto.

### 5.3 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum analyzer	KEYSIGHT	N9010A	MY55150427	2022/05/28
2	Attenuator	Mini-Circuits	BW-S10W2	101109	N/A
3	RF Cable	Mi-cable	C10-01-01-1	100309	N/A

### 5.4 TEST SETUP

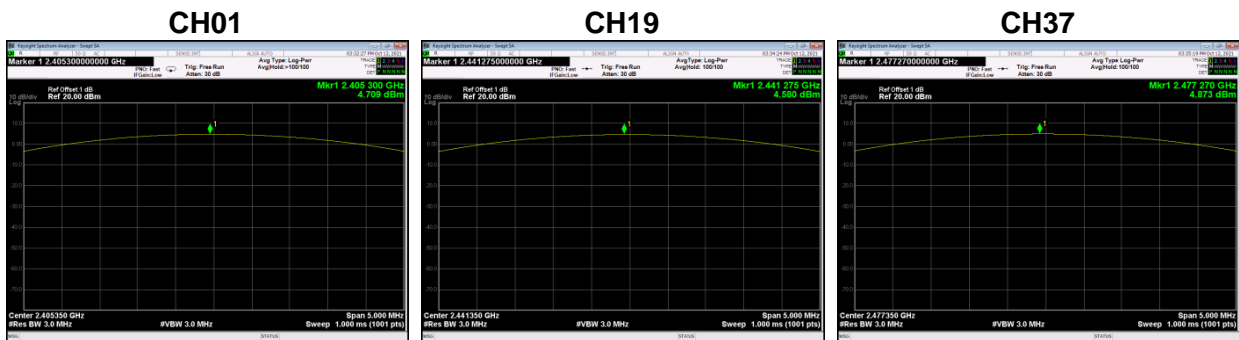


### 5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.5 unless otherwise a special operating condition is specified in the follows during the testing.

### 5.6 TEST RESULTS

TX Mode				
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Result
CH01	2405.35	4.709	0.002957	PASS
CH19	2441.35	4.580	0.002871	PASS
CH37	2477.35	4.873	0.003071	PASS
Limit	21dBm /0.125W			



END OF TEST REPORT