

# **FCC Test Report**

FCC ID : Q9DARBTUSBZB1

Equipment : ZigBee USB Adapter

Model No. : ARBTUSBZB1

Brand Name : aruba a Hewlett Packard Enterprise Company

Applicant : Hewlett Packard Enterprise company

Address : 3333 Scott Blvd Santa Clara, CA 94089 United

**States** 

Standard : 47 CFR FCC Part 15.247

Received Date : Aug. 15, 2019

Tested Date : Aug. 22 ~ Aug. 27, 2019

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by: Approved by:

Along Cheid/ Assistant Manager Gary Chang / Manager

Testing Laboratory 2732

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## **Release Record**

Report No.	Version	Description	Issued Date
FR981501	Rev. 01	Initial issue	Nov. 01, 2019

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## **Summary of Test Results**

FCC Rules	Test Items	Measured	Result
15.207 Conducted Emissions		[dBuV]: 0.654MHz 33.47 (Margin -12.53dB) - AV	Pass
15.247(d)	Radiated Emissions	[dBuV/m at 3m]: 2483.50MHz	Pass
15.209	Natiated Liffissions	52.87 (Margin -1.13dB) - AV	rass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 8.43	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

#### **Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

#### **Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

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## 1 General Description

## 1.1 Information

## 1.1.1 Specification of the Equipment under Test (EUT)

RF General Information						
Frequency Range (MHz)  Ch. Frequency Channel Number Data Rate						
2400~2483.5	ZigBee	2405~2480	11-26 [16]	250kbps		
Note 1: ZigBee uses DSSS-OQPSK modulation.						

#### 1.1.2 Antenna Details

Ant. No.	Туре	Connector	Gain (dBi)	Remarks
1	Printed	No	1.5	

## 1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from host
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#### 1.1.4 Accessories

N/A

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## 1.1.5 Channel List

Channel No.	Frequency (MHz)
11	2405
12	2410
13	2415
14	2420
15	2425
16	2430
17	2435
18	2440
19	2445
20	2450
21	2455
22	2460
23	2465
24	2470
25	2475
26	2480

## 1.1.6 Test Tool and Duty Cycle

Test Tool	Tera Term, V4.74			
Duty Cycle and Duty Factor	Duty Cycle (%)	Duty Factor (dB)		
Duty Cycle and Duty Factor	100.00	0.00		

## 1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
OQPSK	2405	8
OQPSK	2440	8
OQPSK	2475	8
OQPSK	2480	5

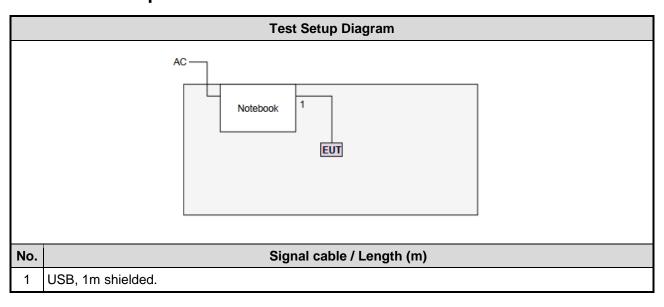
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## 1.2 Local Support Equipment List

	Support Equipment List							
No. Equipment Brand Model S/N Rem								
1	Notebook	DELL	NBXPS13-9360 -R1708S		Provided by applicant.			

## 1.3 Test Setup Chart



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## 1.4 The Equipment List

Test Item	Conducted Emission						
Test Site	Conduction room 1 / (	Conduction room 1 / (CO01-WS)					
Instrument	ıment Manufacturer Model No. Serial No. Calibration Date Calibration Until						
Receiver	R&S	ESR3	101657	Jan. 08, 2019	Jan. 07, 2020		
LISN	R&S	ENV216	101579	Mar. 08, 2019	Mar. 07, 2020		
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 23, 2018	Oct. 22, 2019		
Measurement Software	AUDIX	e3	6.120210k	NA	NA		
Note: Calibration Interval of instruments listed above is one year.							

Test Item	Radiated Emission						
Test Site	966 chamber1 / (03CH01-WS)						
Instrument	Manufacturer	Model No.	Calibration Date	Calibration Until			
Spectrum Analyzer	R&S	FSV40	101498	Dec. 27, 2018	Dec. 26, 2019		
Receiver	R&S	ESR3	101658	Dec. 11, 2018	Dec. 10, 2019		
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 12, 2019	Jul. 11, 2020		
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 18, 2018	Dec. 17, 2019		
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2018	Nov. 14, 2019		
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 09, 2018	Nov. 08, 2019		
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 08, 2018	Oct. 07, 2019		
Preamplifier	EMC	EMC02325	980225	Jul. 09, 2019	Jul. 08, 2020		
Preamplifier	Agilent	83017A	MY39501308	Oct. 04, 2018	Oct. 03, 2019		
Preamplifier	EMC	EMC184045B	980192	Aug. 01, 2019	Jul. 31, 2020		
RF Cable	EMC	EMC104-SM-SM-80 00	181106	Oct. 08, 2018	Oct. 07, 2019		
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 08, 2018	Oct. 07, 2019		
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 08, 2018	Oct. 07, 2019		
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 08, 2018	Oct. 07, 2019		
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 08, 2018	Oct. 07, 2019		
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Oct. 08, 2018	Oct. 07, 2019		
Measurement Software   AUDIX   e3   6.120210g   NA   NA							
Note: Calibration Interval of instruments listed above is one year.							

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Test Item	RF Conducted						
Test Site	(TH01-WS)						
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until		
Spectrum Analyzer	R&S	FSV40	101063	Apr. 17, 2019	Apr. 16, 2020		
Power Meter	Anritsu	ML2495A	1241002	Oct. 09, 2018	Oct. 08, 2019		
Power Sensor	Anritsu	MA2411B	1207366	Oct. 09, 2018	Oct. 08, 2019		
DC POWER SOURCE	GW INSTEK	GPC-6030D	EM892433	Oct. 25, 2018	Oct. 24, 2019		
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA		
Note: Calibration Inter	Note: Calibration Interval of instruments listed above is one year.						

#### 1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247 ANSI C63.10-2013

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

### 1.6 Deviation from Test Standard and Measurement Procedure

None

## 1.7 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty					
Parameters Uncertainty					
Bandwidth	±34.130 Hz				
Conducted power	±0.808 dB				
Power density	±0.583 dB				
Conducted emission	±2.715 dB				
AC conducted emission	±2.92 dB				
Radiated emission ≤ 1GHz	±3.41 dB				
Radiated emission > 1GHz	±4.59 dB				

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## 2 Test Configuration

## 2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	23°C / 60%	Alex Tsai
Radiated Emissions	03CH01-WS	25°C / 63%	Akun Chung
RF Conducted	TH01-WS	23°C / 65%	Roger Lu

FCC Designation No.: TW2732FCC site registration No.: 181692

➤ ISED#: 10807A

➤ CAB identifier: TW2732

### 2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	OQPSK	2475	250kbps	
Radiated Emissions ≤1GHz	OQPSK	2475	250kbps	
Radiated Emissions >1GHz Maximum Output Power 6dB bandwidth Power spectral density	OQPSK	2405 / 2440 / 2475 / 2480	250kbps	

#### NOTE:

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<sup>1.</sup> The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.



## 3 Transmitter Test Results

#### 3.1 Conducted Emissions

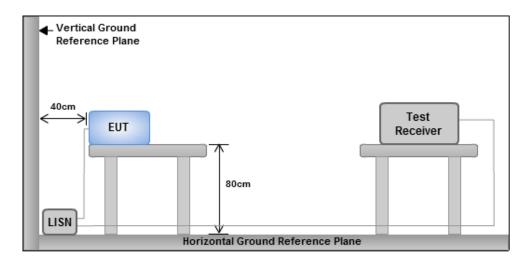
#### 3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit						
Frequency Emission (MHz) Quasi-Peak Average						
0.15-0.5 66 - 56 * 56 - 46 *						
0.5-5 56 46						
5-30 60 50						
Note 1: * Decreases with the logarithm of the frequency.						

#### 3.1.2 Test Procedures

- 1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
- 2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50  $\Omega$  LISN port.
- 3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
- 4. This measurement was performed with AC 120V / 60Hz.

#### 3.1.3 Test Setup



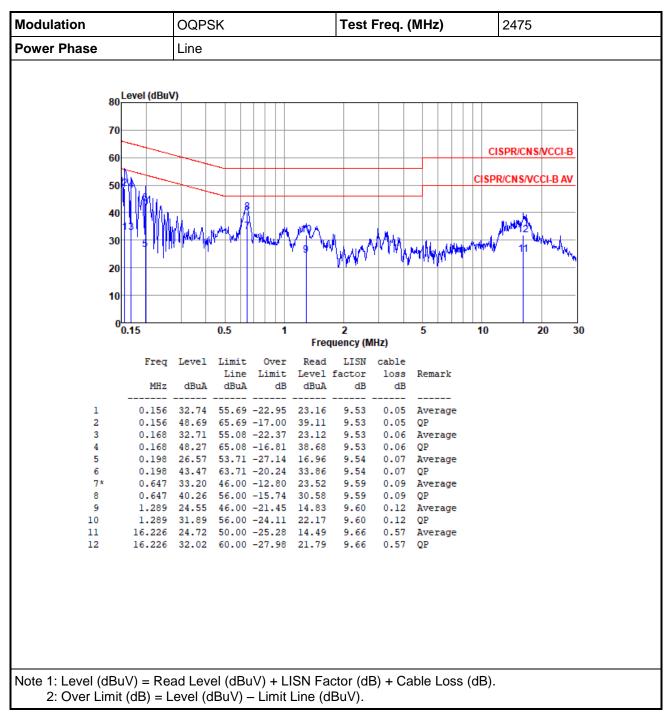
Note: 1. Support units were connected to second LISN.

Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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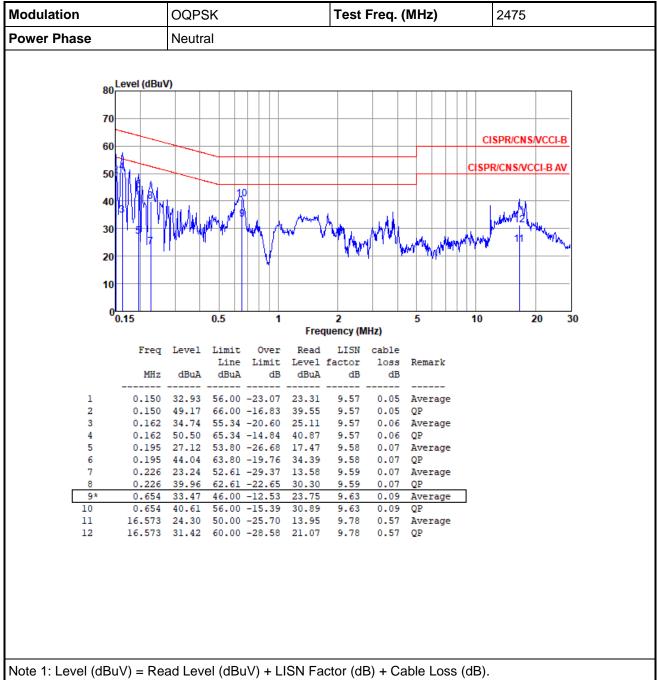


#### 3.1.4 Test Result of Conducted Emissions



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Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB). 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

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## 3.2 6dB and Occupied Bandwidth

#### 3.2.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

#### 3.2.2 Test Procedures

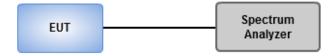
#### 6dB Bandwidth

- 1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
- 2. Detector = Peak, Trace mode = max hold.
- 3. Sweep = auto couple, Allow the trace to stabilize.
- 4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

#### **Occupied Bandwidth**

- 1. Set resolution bandwidth (RBW) = 1% ~ 5 % of OBW, Video bandwidth = 3 x RBW
- 2. Detector = Sample, Trace mode = max hold.
- 3 Sweep = auto couple, Allow the trace to stabilize.
- 4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

#### 3.2.3 Test Setup



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## 3.2.4 Test Result of 6dB and Occupied Bandwidth

### Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
2.4-2.4835GHz	-	-	-	-	-
Zigbee	1.522M	2.261M	2M26G1D	1.359M	2.243M

**Max-N dB** = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth; **Min-N dB** = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

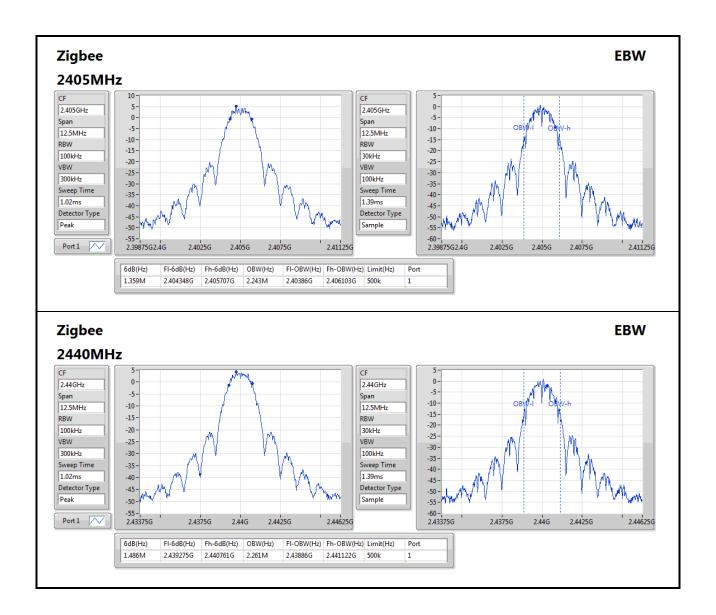
#### Result

1100411				
Mode	Result	Limit	Port 1-N dB	Port 1-OBW
		(Hz)	(Hz)	(Hz)
Zigbee	-	-	-	-
2405MHz	Pass	500k	1.359M	2.243M
2440MHz	Pass	500k	1.486M	2.261M
2475MHz	Pass	500k	1.522M	2.261M
2480MHz	Pass	500k	1.467M	2.261M

Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;

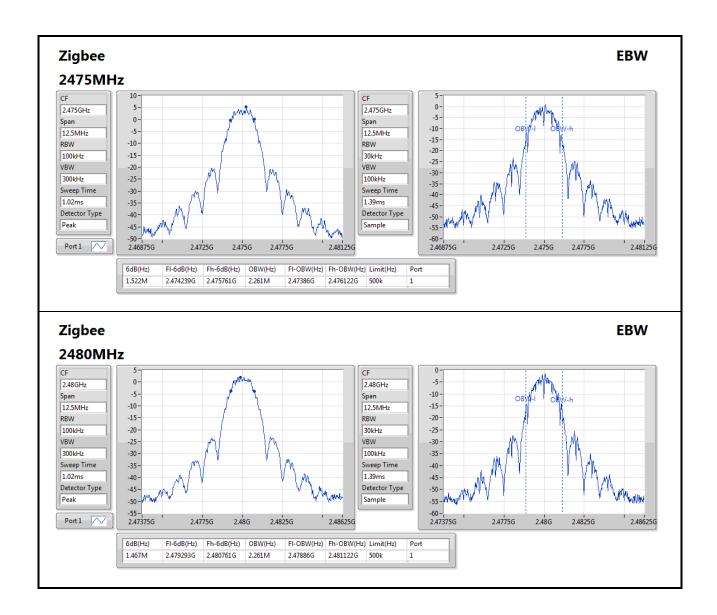
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## 3.3 RF Output Power

### 3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

Antenna gain <= 6dBi, no any corresponding reduction is in output power limit.

#### 3.3.2 Test Procedures

A broadband RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

### 3.3.3 Test Setup



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## 3.3.4 Test Result of Maximum Output Power

**Summary of Peak power** 

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
Zigbee	8.43	0.00697

#### Result

Mode	Result	DG	Port 1	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)
Zigbee	-	-	-	-	-
2405MHz	Pass	1.50	8.24	8.24	30.00
2440MHz	Pass	1.50	8.36	8.36	30.00
2475MHz	Pass	1.50	8.43	8.43	30.00
2480MHz	Pass	1.50	5.97	5.97	30.00

**DG** = Directional Gain;

**Summary of Average power** 

Mode	Total Power	Total Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
Zigbee	8.35	0.00684

#### Result

Mode	Result	DG	Port 1	Total Power	Power Limit
		(dBi)	(dBm)	(dBm)	(dBm)
Zigbee	-	-	-	-	-
2405MHz	Pass	1.50	8.15	8.15	-
2440MHz	Pass	1.50	8.27	8.27	-
2475MHz	Pass	1.50	8.35	8.35	-
2480MHz	Pass	1.50	5.87	5.87	-

DG = Directional Gain; Note : Conducted average output power is for reference only

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## 3.4 Power Spectral Density

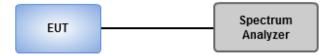
## 3.4.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

#### 3.4.2 Test Procedures

- 1. Set the RBW = 3 kHz, VBW = 10 kHz.
- 2. Detector = Peak, Sweep time = auto couple.
- 3. Trace mode = max hold, allow trace to fully stabilize.
- 4. Use the peak marker function to determine the maximum amplitude level.

### 3.4.3 Test Setup



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## 3.4.4 Test Result of Power Spectral Density

Summary

Mode	PD
	(dBm/3kHz)
2.4-2.4835GHz	-
Zigbee	-5.99

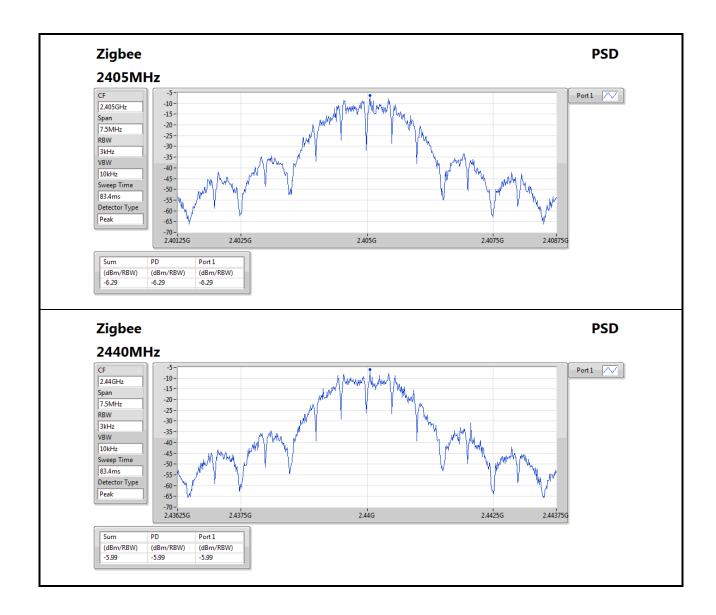
#### Result

Mode	Result	DG	PD	PD Limit
		(dBi)	(dBm/3kHz)	(dBm/3kHz)
Zigbee	-	-	-	-
2405MHz	Pass	1.50	-6.29	8.00
2440MHz	Pass	1.50	-5.99	8.00
2475MHz	Pass	1.50	-7.79	8.00
2480MHz	Pass	1.50	-9.62	8.00

**DG** = Directional Gain;

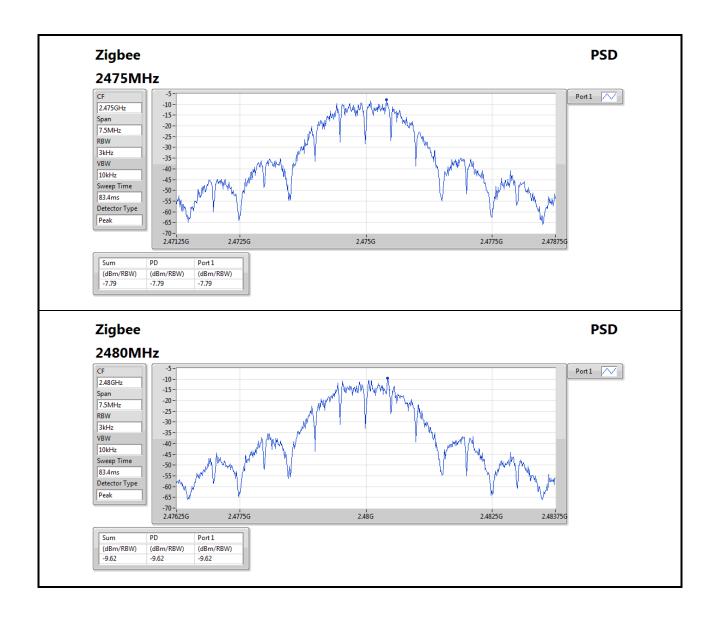
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### 3.5 Unwanted Emissions into Restricted Frequency Bands

#### 3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

	Restricted Band	Emissions Limit	
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

#### Note 1:

Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit **Note 2:** 

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

#### 3.5.2 Test Procedures

- 1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
- 2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
- 3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

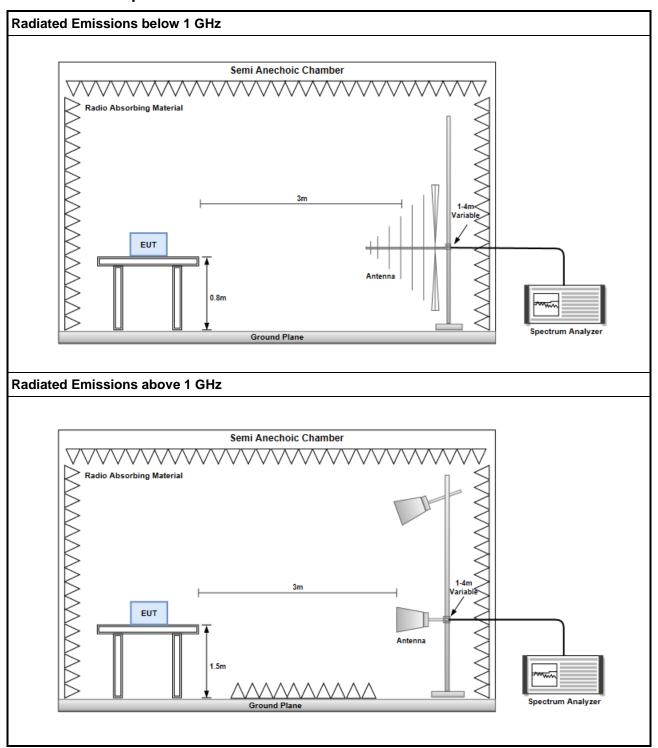
#### Note:

- 1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
- 2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
- RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

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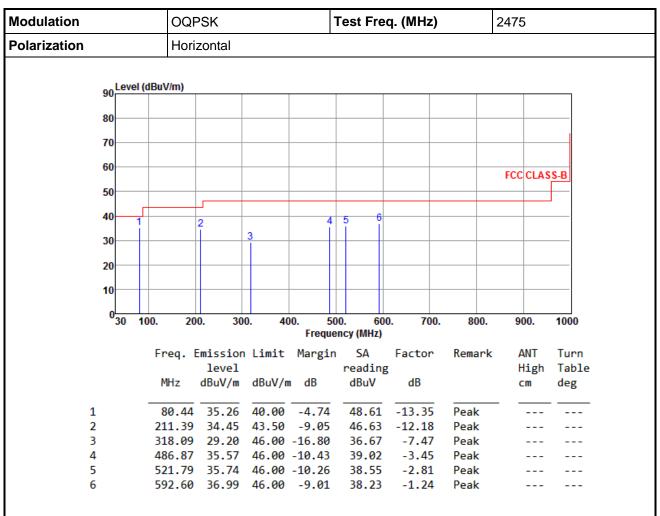
## 3.5.3 Test Setup



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### 3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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Polarization   Vertical   90   Level (dBuV/m)   90   60   70   60   60   60   60   60   6										
80 70 60 60 40 30 12 33 20 100. 200. 300. 400. 500. 600. 700. 800. 900. Frequency (MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High	Vertical									
80 70 60 60 40 30 12 33 20 100. 200. 300. 400. 500. 600. 700. 800. 900. Frequency (MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High										
FCC CLA  50  40  30  10  30  100. 200. 300. 400. 500. 600. 700. 800. 900.  Frequency (MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High										
60 FCC CL/ 50 40 40 5 6 30 20 30 100. 200. 300. 400. 500. 600. 700. 800. 900. Frequency (MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High										
50 40 30 20 10 30 100. 200. 300. 400. 500. 600. 700. 800. 900.  Frequency (MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High										
50 40 30 20 30 100. 200. 300. 400. 500. 600. 700. 800. 900.  Frequency (MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High	ASS D									
30 1 2 3 3 4 5 6 1 10 10 10 10 10 10 10 10 10 10 10 10 1	А33-Б									
30 100. 200. 300. 400. 500. 600. 700. 800. 900. Frequency (MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High	_									
20 10 030 100. 200. 300. 400. 500. 600. 700. 800. 900. Frequency (MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High										
0 100. 200. 300. 400. 500. 600. 700. 800. 900.  Frequency (MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High										
Frequency (MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High										
Frequency(MHz)  Freq. Emission Limit Margin SA Factor Remark ANT level reading High	1000									
level reading High	1000									
	h Table deg									
1 39.70 26.14 40.00 -13.86 34.94 -8.80 Peak										
2 83.35 24.85 40.00 -15.15 38.70 -13.85 Peak										
3 207.51 24.72 43.50 -18.78 36.91 -12.19 Peak										
4 424.79 30.01 46.00 -15.99 34.82 -4.81 Peak										
5 511.12 32.12 46.00 -13.88 35.11 -2.99 Peak 6 582.90 32.67 46.00 -13.33 34.16 -1.49 Peak										

\*Factor includes antenna factor, cable loss and amplifier gain

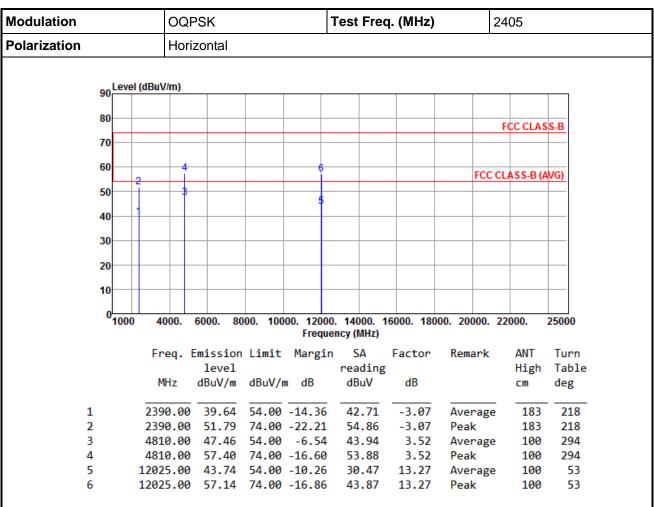
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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### 3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz)



Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

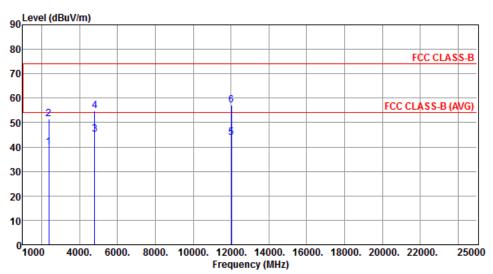
\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	OQPSK	Test Freq. (MHz)	2405
Polarization	Vertical		



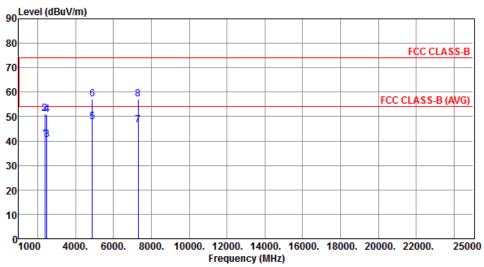
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	J	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
	PHIZ	ubuv/III	ubuv/III	ub	ubuv	ub		CIII	ueg
1	2390.00	39.77	54.00	-14.23	42.84	-3.07	Average	100	304
2	2390.00	51.57	74.00	-22.43	54.64	-3.07	Peak	100	304
3	4810.00	45.04	54.00	-8.96	41.52	3.52	Average	100	275
4	4810.00	54.79	74.00	-19.21	51.27	3.52	Peak	100	275
5	12025.00	43.81	54.00	-10.19	30.54	13.27	Average	100	125
6	12025.00	57.13	74.00	-16.87	43.86	13.27	Peak	100	125

\*Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	OQPSK Test Freq. (MHz) 2440						40		
Polarization	Horizontal								
90 Level (dBu	V/m)								



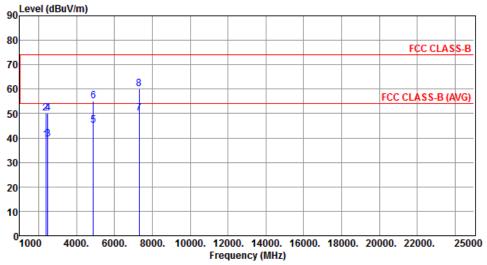
		Emission level		Ū	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	40.77	54.00	-13.23	43.84	-3.07	Average	100	217
2	2390.00	51.15	74.00	-22.85	54.22	-3.07	Peak	100	217
3	2483.50	40.47	54.00	-13.53	43.69	-3.22	Average	100	217
4	2483.50	50.95	74.00	-23.05	54.17	-3.22	Peak	100	217
5	4880.00	47.71	54.00	-6.29	44.10	3.61	Average	100	293
6	4880.00	57.11	74.00	-16.89	53.50	3.61	Peak	100	293
7	7320.00	46.34	54.00	-7.66	37.54	8.80	Average	381	199
8	7320.00	56.96	74.00	-17.04	48.16	8.80	Peak	381	199

\*Factor includes antenna factor, cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	OQPSK	Test Fre	eq. (MHz)	24	40	
Polarization	Vertical					
90 Level (	iBuV/m)					1



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	39.12	54.00	-14.88	42.19	-3.07	Average	100	301
2	2390.00	50.20	74.00	-23.80	53.27	-3.07	Peak	100	301
3	2483.50	39.41	54.00	-14.59	42.63	-3.22	Average	100	301
4	2483.50	50.07	74.00	-23.93	53.29	-3.22	Peak	100	301
5	4880.00	45.32	54.00	-8.68	41.71	3.61	Average	100	268
6	4880.00	55.00	74.00	-19.00	51.39	3.61	Peak	100	268
7	7320.00	50.27	54.00	-3.73	41.47	8.80	Average	290	77
8	7320.00	59.97	74.00	-14.03	51.17	8.80	Peak	290	77

\*Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation			OQF	PSK		-	Test Fred	q. (MHz)		2475			
Polarization			Horizontal										
			dD-M										
	90 Le	vei (	dBuV/m)										
	80-												
	<u> </u>	_								FCC CLAS	S-B		
	70												
	60	-	4	6					FCC	CLASS-B (A	V(C)		
	50	1							FCC	CLASS-B (A	(VG)		
	30		.   Ĭ	5									
	40												
	30-												
	20												
	10	+											
	ال												
	<b>~10</b>	00	4000.	6000. 80	000. 100		. 14000. 1 ncy (MHz)	16000. 180	00. 20000.	22000.	25000		
			Frea. I	missior	Limit	Margin	SA	Factor	Remark	ANT	Turn		
				level			reading			High	Table		
			MHz	d Bu V/m	dBuV/ı	n dB	dBuV	dB		cm	deg		
			2402 50	40.00	<u> </u>	42.74	42.54		•	400			
	1 2		2483.50 2483.50			-13.71 -21.23	43.51 55.99	-3.22 -3.22	Average Peak	100 100	207 207		
	2 3		4950.00					3.80	Average		288		
	4		4950.00				52.86	3.80	Peak	100	288		

8.52

8.52

Average

Peak

385

385

201

201

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

7425.00 45.80 54.00 -8.20 37.28 7425.00 56.41 74.00 -17.59 47.89

\*Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

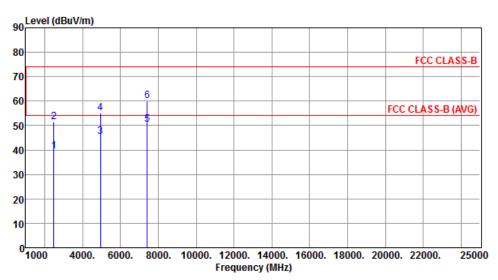
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Modulation	OQPSK	Test Freq. (MHz)	2475
Polarization	Vertical		

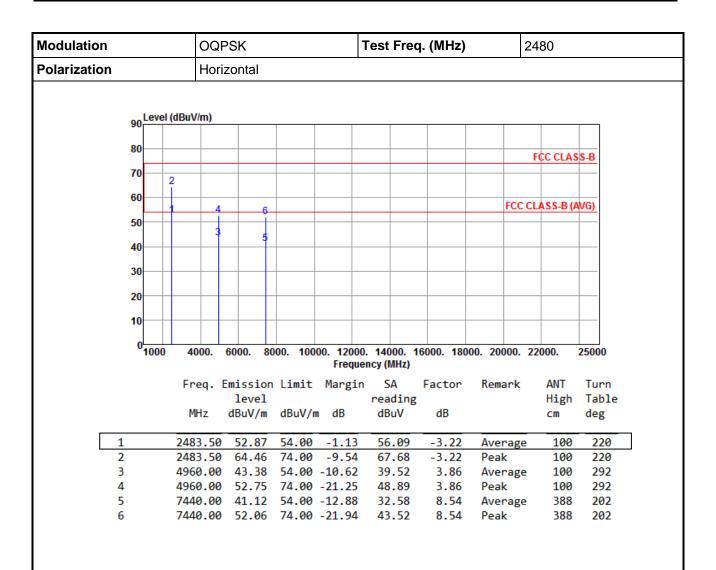


	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2483.50	39.62	54.00	-14.38	42.84	-3.22	Average	100	303
2	2483.50	51.64	74.00	-22.36	54.86	-3.22	Peak	100	303
3	4950.00	45.60	54.00	-8.40	41.80	3.80	Average	100	266
4	4950.00	55.02	74.00	-18.98	51.22	3.80	Peak	100	266
5	7425.00	50.48	54.00	-3.52	41.96	8.52	Average	238	68
6	7425.00	60.02	74.00	-13.98	51.50	8.52	Peak	238	68

\*Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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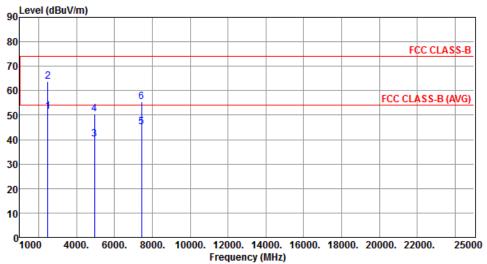
\*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	OQPSK	Test Freq. (MHz)	2480			
Polarization	Vertical					
Level (dRuV/m)						



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		CM	deg
1	2483.50	51.59	54.00	-2.41	54.81	-3.22	Average	100	304
2	2483.50	63.70	74.00	-10.30	66.92	-3.22	Peak	100	304
3	4960.00	40.34	54.00	-13.66	36.48	3.86	Average	100	272
4	4960.00	50.38	74.00	-23.62	46.52	3.86	Peak	100	272
5	7440.00	45.12	54.00	-8.88	36.58	8.54	Average	295	78
6	7440.00	55.38	74.00	-18.62	46.84	8.54	Peak	295	78

\*Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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## 3.6 Emissions in Non-Restricted Frequency Bands

### 3.6.1 Emissions in Non-Restricted Frequency Bands Limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

#### 3.6.2 Test Procedures

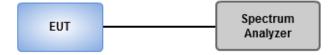
#### Reference level measurement

- 1. Set RBW=100kHz, VBW = 300kHz, Detector = Peak, Sweep time = Auto
- 2. Trace = max hold, Allow Trace to fully stabilize
- 3. Use the peak marker function to determine the maximum PSD level

#### **Emission level measurement**

- 1. Set RBW=100kHz, VBW = 300kHz, Detector = Peak, Sweep time = Auto
- 2. Trace = max hold, Allow Trace to fully stabilize
- 3. Scan Frequency range is up to 25GHz
- 4. Use the peak marker function to determine the maximum amplitude level

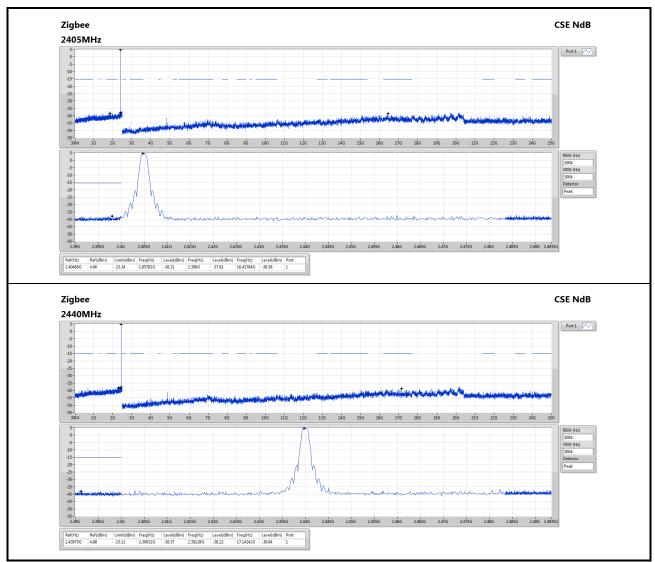
#### 3.6.3 Test Setup



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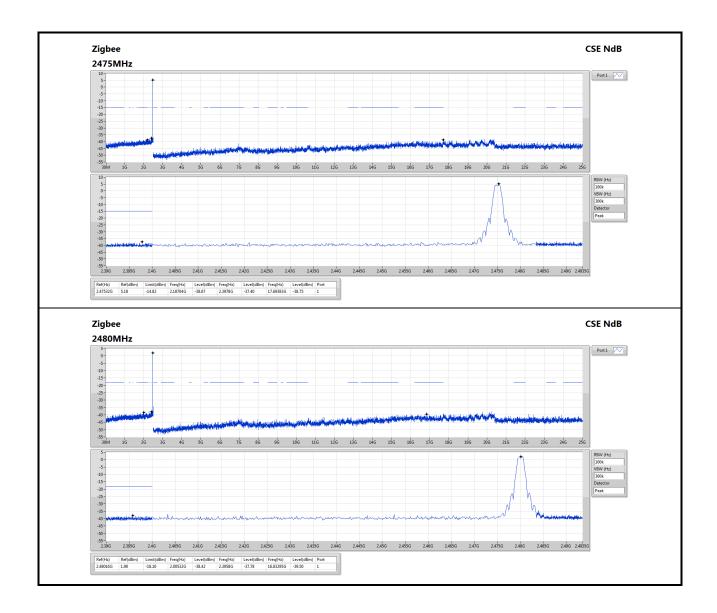


## 3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands



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## 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <a href="http://www.icertifi.com.tw">http://www.icertifi.com.tw</a>.

#### Linkou

Tel: 886-2-2601-1640 No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City,

Taiwan, R.O.C.

#### Kwei Shan

Tel: 886-3-271-8666 No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

#### Kwei Shan Site II

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666 Fax: 886-3-318-0155

Email: ICC\_Service@icertifi.com.tw

==END==

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