

MRT Technology (Taiwan) Co., Ltd Phone: +886-3-3288388 Web: www.mrt-cert.com Report No.: 1807TW0111-U10 Report Version: V01 Issue Date: 12-15-2018

# **RF Exposure Evaluation Declaration**

**FCC ID:** Q9DAPIN0514515

**APPLICANT:** Hewlett Packard Enterprise Company

**Application Type:** Class III Permissive Change

Product: ACCESS POINT

Model No.: APIN0514, APIN0515

Trademark: Qrubo

Hewlett Packard Enterprise

FCC Classification: Digital Transmission System (DTS)

Unlicensed National Information Infrastructure (UNII)

Reviewed By:

Paddy Chen )

Approved By:

(Chenz Ker)



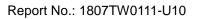


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The test results relate only to the samples tested.

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

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# **Revision History**

Report No.	Version	Description	Issue Date	Note
1807TW0111-U10	Rev. 01	Initial report	12-15-2018	Valid

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## 1. PRODUCT INFORMATION

## 1.1. Equipment Description

Due do et Nesses	ACCECC POINT	
Product Name:	ACCESS POINT	
Model No.:	APIN0514, APIN0515	
Brand Name:	a Hewlett Packard Enterprise company ,	
Wi-Fi Specification:	802.11a/b/g/n/ac/ax	
Bluetooth Specification:	v4.2 single mode	
Zigbee Specification:	802.15.4	
Software Version:	F.0.8	
Operating Temperature:	0 ~ 50 °C	
Power Type:	AC Adapter or POE input	
Operating Environment:	Indoor Use	

Note: The difference between models is that EUT use different antenna and appearance, APIN0514 use some external antennas, but APIN0515 use internal antenna, other hardware and software are the same. Besides, each model has its own power parameter value.

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# 1.2. Antenna Description

Model No.: APIN0514

Antenna	Directionalit	Frequency	Model No.	Max	BF Gain	CDD Direction	onal Gain
No.	у	Band		Peak	(dBi)	(dBi	)
		(GHz)		Gain		For Power	For PSD
				(dBi)			
Wi-Fi Extern	nal Antenna List	(2.4GHz 2*2	MIMO, 5GHz 4*4	MIMO)			
1	Omni	2.4	AP-ANT-40	4.0	3.01	4.0	7.01
ı	Onnin	5	AF-ANT-40	5.0	6.02	5.0	11.02
2	Omni	2.4	AP-ANT-19	3.0	3.01	3.0	6.01
2	Omni	5	AP-ANT-19	6.0	6.02	6.0	12.02
3	Omni	2.4	AP-ANT-1W	3.8	3.01	3.8	6.81
3	Omin	5	AP-ANT-TW	5.8	6.02	5.8	11.82
4	Omni	2.4	AP-ANT-13B	2.3	3.01	2.3	5.31
4	Omin	5		4.0	6.02	4.0	10.02
5	Omni	2.4	AP-ANT-20W	2.0	3.01	2.0	5.01
5	Omin	5	AP-ANT-2000	2.0	6.02	2.0	8.02
6 (Note 3)	Directional	2.4	AP-ANT-45	4.5	0.00	4.5	4.50
6 (Note 3)	Directional	5	AP-ANT-45	5.5	3.01	5.5	8.51
7 (Note 2)	Directional	2.4	AP-ANT-48	8.5	0.00	8.5	8.5
7 (Note 3)	Directional	5	AP-AN 1-48	8.5	3.01	8.5	11.51
Bluetooth & ZigBee Internal Antenna							
PCB			2.4			1.9	

Model No.: APIN0515

Directionality	Frequency Band	Max	BF Gain	CDD Dir	ectional
	(GHz)	Peak Gain	(dBi)	Gain	(dBi)
		(dBi)		For Power	For PSD
Wi-Fi Internal Antenna List (2.4GHz 2*2 MIMO, 5GHz 4*4 MIMO)					
Omni	2.4	3.77	3.01	3.77	6.78
Omni	5	4.55	5.97	4.55	10.52
Bluetooth & ZigBee Internal Antenna					
PCB	2.4	3.5			

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#### Note:

- 1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.
  - For CDD transmissions, directional gain is calculated as follows,  $N_{ANT} = 2$ ,  $N_{SS} = 1$ .

If all antennas have the same gain,  $G_{ANT}$ , Directional gain =  $G_{ANT}$  + Array Gain, where Array Gain is as follows.

- · For power spectral density (PSD) measurements on all devices,
  - Array Gain = 10 log  $(N_{ANT}/N_{SS})$  dB = 3.01;
- For power measurements on IEEE 802.11 devices,
  - Array Gain = 0 dB for  $N_{ANT} \le 4$ ;
- 2. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac/ax, not include 802.11a/b/g. Directional gain =  $G_{ANT}$  + BF Gain, BF Gain was declared by the applicant.
- 3. Two antennas have Cross-Polarized design, the detail see the antenna specification.

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## 2. RF Exposure Evaluation

### 2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range	Electric Field	Magnetic Field	Power Density	Average Time	
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm <sup>2</sup> )	(Minutes)	
	(A) Limits for Occupational/ Control Exposures				
300-1500			f/300	6	
1500-100,000			5	6	
(B) Limits for General Population/ Uncontrolled Exposures					
300-1500			f/1500	6	
1500-100,000			1	30	

f= Frequency in MHz

Calculation Formula:  $Pd = (Pout*G)/(4*pi*r^2)$ 

Where

Pd = power density in mW/cm<sup>2</sup>

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

r = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

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# 2.2. Test Result of RF Exposure Evaluation

Product	ACCESS POINT
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.2.

### Maximum EIRP for each model

Test Mode	Frequency Band (MHz)	Max Conducted Power (dBm)	Antenna Gain (dBi)	Max EIRP (dBm)
	Мо	del No.: APIN0514	<b>!</b>	
BLE	2402 ~ 2480	7.29	4.9	12.19
ZigBee	2405 ~ 2480	6.69	4.9	11.59
802.11b/g/n	2412 ~ 2462	21.19	2.0	23.19
802.11a/n/ac	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	24.14	2.0	26.14
	Мо	del No.: APIN0515	5	
BLE	2402 ~ 2480	7.95	3.5	11.45
ZigBee	2405 ~ 2480	6.98	3.5	10.48
802.11b/g/n	2412 ~ 2462	21.27	3.77	25.04
802.11a/n/ac	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	24.37	4.55	28.92

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Model No.: APIN0514

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at $R = 20 \text{ cm}$ $(\text{mW/cm}^2)$	Limit (mW/cm²)
BLE	2402 ~ 2480	12.19	0.0033	1
ZigBee	2405 ~ 2480	11.59	0.0029	1
802.11b/g/n	2412 ~ 2462	23.19	0.0415	1
802.11a/n/ac	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	26.14	0.0818	1

### **CONCULISON:**

Both of the WLAN 2.4GHz Band, WLAN 5GHz Band, BLE or ZigBee Band can transmit simultaneously.

The max Power Density at R (20 cm) = 0.0033mW/cm<sup>2</sup> + 0.0415mW/cm<sup>2</sup> + 0.0818mW/cm<sup>2</sup> = 0.1266mW/cm<sup>2</sup> < 1mW/cm<sup>2</sup>.

Therefore, the Min Safety Distance is 20cm.

### Model No.: APIN0515

Test Mode	Frequency Band	Maximum EIRP	Power Density at	Limit
	(MHz)	(dBm)	R = 20 cm	(mW/cm <sup>2</sup> )
			(mW/cm <sup>2</sup> )	
BLE	2402 ~ 2480	11.45	0.0028	1
ZigBee	2405 ~ 2480	10.48	0.0022	1
802.11b/g/n	2412 ~ 2462	25.04	0.0635	1
	5180 ~ 5320,			
802.11a/n/ac	5500 ~ 5720,	28.92	0.1551	1
	5745 ~ 5825			

### **CONCULISON:**

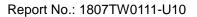
Both of the WLAN 2.4GHz Band, WLAN 5GHz Band, BLE or ZigBee band can transmit simultaneously.

The max Power Density at R (20 cm) = 0.0028mW/cm<sup>2</sup> + 0.0635mW/cm<sup>2</sup> + 0.1551mW/cm<sup>2</sup> = 0.2214mW/cm<sup>2</sup> < 1mW/cm<sup>2</sup>.

Therefore, the Min Safety Distance is 20cm.

 The End	

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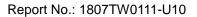




# **Appendix A - Test Setup Photograph**

Refer to "1807TW0111-UT" file.

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# Appendix B - EUT Photograph

Refer to "1807TW0111-UE" file.

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