



RF Exposure Evaluation Declaration

FCC ID: Q9DAPEX0674579
Applicant: Hewlett Packard Enterprise Company
Product: ACCESS POINT
Model No.: APEX0674, APEX0675, APEX0677, APEX0679
Trademark:  
FCC Classification: Digital Transmission System (DTS)
Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s): FCC Part 2.1091
Evaluation Date: 2024-01-23
Result: Complies

Reviewed By:

Jame Yuan

Approved By:

Robin Wu



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.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2306RSU028-U6	V01	Initial Report	2023-12-29	Invalid
2306RSU028-U6	V02	Update Antenna Gain	2024-01-23	Valid

CONTENTS

Description	Page
1. General Information	4
1.1. Applicant.....	4
1.2. Manufacturer	4
1.3. Testing Facility.....	4
1.4. Product Information	5
1.5. Antenna Details.....	6
1.6. Device Classification	8
1.7. Applied Standards	8
2. RF Exposure Evaluation.....	9
2.1. Test Limits	9
2.2. MPE Exemptions.....	10
2.3. Calculated Result	13

1.4. Product Information

Product Name	ACCESS POINT
Model No.	APEX0674, APEX0675, APEX0677, APEX0679
Serial No.	APEX0674: CNQQLWY018 APEX0675: CNQNLWZ040 APEX0677: CNQQLX0005 APEX0679: CNQQLX1011
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Bluetooth Specification	BLE only
Zigbee Specification	802.15.4
GNSS Specification	GPS, Galileo, BDS, GLONASS
Antenna Information	Refer to Section 1.7
Working Voltage	PoE Injector Input
Operating Temperature	-40 ~ 70 °C
Operating Environment	Outdoor Use
<p>Remark:</p> <p>1, The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.</p> <p>2, The difference between four models is that the EUT use different antenna and appearance, other hardware and software are the same. Each model has its own power parameter value.</p>	

1.5. Antenna Details

APEX0675

Polarization	Frequency Band (GHz)	30 Degree Ant Gain (dBi)	Directional Gain (dBi)	
			For Power	For PSD
Wi-Fi Internal Antenna (2*2 MIMO)				
Omni (Note 1)	2.4 ~ 2.5	N/A	3.8	3.8
	5.15 ~ 5.85	-2.16	5.7	5.7
Bluetooth / ZigBee Internal Antenna				
Omni	2.4 ~ 2.5		3.8	

APEX0677

Polarization	Frequency Band (GHz)	30 Degree Ant Gain (dBi)	Directional Gain (dBi)	
			For Power	For PSD
Wi-Fi Internal Antenna (2*2 MIMO)				
Omni (Note 1)	2.4 ~ 2.5	N/A	5.2	5.2
	5.15 ~ 5.85	6.5	6.5	6.5
Bluetooth / ZigBee Internal Antenna				
Omni	2.4 ~ 2.5		6.3	

APEX0679

Polarization	Frequency Band (GHz)	30 Degree Ant Gain (dBi)	CDD Directional Gain (dBi)	
			For Power	For PSD
Wi-Fi Internal Antenna (2*2 MIMO)				
Omni (Note 1)	2.4 ~ 2.5	N/A	6.1	6.1
Switch on				
Omni (Note 1)	5.15 ~ 5.85	7.7	7.7	7.7
Switch off				
Omni (Note 1)	5.15 ~ 5.85	10.5	10.5	10.5
Bluetooth / ZigBee Internal Antenna				
Omni	2.4 ~ 2.5		6.6	

1, These antennas are cross polarized design, the detail refer to antenna specification. Directional gain calculation refer to KDB 662911 section F)2)c).

2, The antenna gain and directional gain refer to the manufacturer's antenna specification.

3, N/A = Not applicable.

4, For APEX0679 5GHz antenna, it has one switch that allows the antenna to work at different antenna array.

APEX0674

Polarization	Model No.	Frequency Band (GHz)	Max Peak Gain (dBi)	30 Degree Ant Gain (dBi)	BF Gain (dBi)	CDD Directional Gain (dBi)	
						For Power	For PSD
Wi-Fi External Antenna List (2*2 MIMO)							
Omni	ANT-2x2-256O-6	2.4 ~ 2.5	3.0	N/A	3.0	3.0	3.0
		5.15 ~ 5.85	6.0	-3.0	6.0	6.0	6.0
Omni	ANT-2x2-56O-10	5.15 ~ 5.85	7.0	2.4	7.0	7.0	7.0
Directional (Note 1)	ANT-2x2-56D30-14	5.15 ~ 5.85	11.0	6.4	11.0	11.0	11.0
Omni (Note 1)	ANT-2x2-2005	2.4 ~ 2.5	5.0	N/A	5.0	5.0	5.0
Directional (Note 1)	ANT-2x2-2714	2.4 ~ 2.5	14.0	N/A	14.0	14.0	14.0
Directional (Note 1)	ANT-2x2-2314	2.4 ~ 2.5	14.0	N/A	14.00	14.0	14.00
Omni (Note 1)	ANT-2x2-5005	5.15 ~ 5.85	5.0	0.0	5.0	5.0	5.0
Omni (Note 1)	ANT-2x2-5010	5.15 ~ 5.85	10.0	0.0	10.0	10.0	10.0
Directional (Note 1)	ANT-3x3-5712	5.15 ~ 5.85	11.5	1.5	11.5	11.5	11.5
Directional (Note 1)	ANT-4x4-5314	5.15 ~ 5.85	14.0	6.0	14.0	14.0	14.0
Directional (Note 1)	ANT-4x4-D707	2.4 ~ 2.5	7.5	N/A	7.5	7.5	7.5
		5.15 ~ 5.85	7.5		7.5	7.5	7.5
Directional (Note 1)	ANT-4x4-D608	2.4 ~ 2.5	7.5	N/A	7.5	7.5	7.5
		5.15 ~ 5.85	7.5	4.5	7.5	7.5	7.5
Directional (Note 1)	ANT-4x4-D100	2.4 ~ 2.5	5.0	N/A	5.0	5.0	5.0
		5.15 ~ 5.85	5.0	4.0	5.0	5.0	5.0
Bluetooth / ZigBee Internal Antenna							
Omni	2.4 ~ 2.5		5.0				

Note:

1. These antennas are cross polarized design, the detail refer to antenna specification. Directional gain calculation refer to KDB 662911 section F)2)c).
2. The antenna gain and directional gain refer to the manufacturer's antenna specification.
3. N/A = Not applicable.

1.6. Device Classification

According to the user manual, this device is classified as a Fixed Device. So, the RF exposure evaluation requirements of § 2.1091 for mobile device exposure conditions subject to MPE limits.

1.7. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 2.1091 & KDB 447498 D04 Interim General RF Exposure Guidance v01

2. RF Exposure Evaluation

2.1. Test 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 (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500	--	--	f/300	<6
1,500-100,000	--	--	5	<6
(B) Limits for General Population/ Uncontrolled Exposures				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f ²)	<30
30-300	27.5	0.073	0.2	<30
300-1,500	--	--	f/1500	<30
1,500-100,000	--	--	1.0	<30

f= frequency in MHz. * = Plane-wave equivalent power density.

2.2. MPE Exemptions

For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307(b)(2) of this section): A single RF source is exempt if:

(Option A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A) of this section.

Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A);

(Option B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P is given by:

$$P_{th}(mW) = \{ERP_{20cm}(d / 20cm)^x \quad d \leq 20cm$$

$$P_{th}(mW) = \{ERP_{20cm} \quad 20cm < d \leq 40cm$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20cm}\sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20cm}(mW) = \{2040f \quad 0.3GHz \leq f < 1.5GHz$$

$$ERP_{20cm}(mW) = \{3060 \quad 1.5GHz \leq f \leq 6GHz$$

(Option C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to §1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1920R ²
1.34-30	3450R ² /f ²
30-300	3.83R ²
300-1,500	0.0128R ² f
1,500-100,000	19.2R ²

For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for P_{th} , including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

$P_{th,i}$ = the exemption threshold power (P_{th}) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i .

ERP_j = the ERP of fixed, mobile, or portable RF source j .

$ERP_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source j , at a distance of at least $\lambda/2\pi$ according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.

$Evaluated_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

$Exposure Limit_k$ = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k , as applicable from §1.1310 of this chapter.

2.3. Calculated Result

Product	ACCESS POINT
Test Item	RF Exposure Evaluation
Model No.	APEX0674

Test Mode	Frequency Band (MHz)	Maximum Conducted Power (dBm)	Tune-up Conducted Power (dBm)	Antenna Gain (dBi)	Tune-up ERP (dBm)
BLE	2402 ~ 2480	7.61	8.00	5.0	10.85
ZigBee	2405 ~ 2480	7.65	8.00	5.0	10.85
802.11b/g/n/ax	2412 ~ 2462	25.84	26.00	3.0	26.85
802.11a/n/ac/ax	5180 ~ 5885	25.76	26.00	5.0	28.85

Note: Tune-up power was declared by manufacturer.

For single RF source, Option C

Test Mode	$\lambda / 2 \pi$ (m)	R (m)	Tune-up ERP (mW)	Thresholds ERP (mW)
BLE (DTS)	0.02	0.45	12.16	3888
ZigBee (DTS)	0.02	0.45	12.16	3888
Wi-Fi (DTS)	0.02	0.45	484.17	3888
Wi-Fi (NII)	0.01	0.45	767.36	3888

Note: R is from user manual.

For multiple RF sources

The EUT supports Wi-Fi 2.4GHz + Wi-Fi 5GHz + IOT (BLE or Zigbee) simultaneous transmissions.

So the Max Simultaneous Transmission Ratio = $12.16/3888$ (IOT) + $484.17/3888$ (DTS) + $767.36/3888$ (NII)
 = $0.33 < 1$

Therefore, the device qualifies for RF exposure test exemption.

Product	ACCESS POINT
Test Item	RF Exposure Evaluation
Model No.	APEX0675

Test Mode	Frequency Band (MHz)	Maximum Conducted Power (dBm)	Tune-up Conducted Power (dBm)	Antenna Gain (dBi)	Tune-up ERP (dBm)
BLE	2402 ~ 2480	13.41	14.00	3.8	15.65
ZigBee	2405 ~ 2480	11.15	12.00	3.8	13.65
802.11b/g/n/ax	2412 ~ 2462	25.84	26.00	3.8	27.65
802.11a/n/ac/ax	5180 ~ 5885	25.76	26.00	5.7	29.55

Note: Tune-up power was declared by manufacturer.

For single RF source, Option C

Test Mode	$\lambda / 2 \pi$ (m)	R (m)	Tune-up ERP (mW)	Thresholds ERP (mW)
BLE (DTS)	0.02	0.45	36.73	3888
ZigBee (DTS)	0.02	0.45	23.17	3888
Wi-Fi (DTS)	0.02	0.45	582.10	3888
Wi-Fi (NII)	0.01	0.45	901.57	3888

Note: R is from user manual.

For multiple RF sources

The EUT supports Wi-Fi 2.4GHz + Wi-Fi 5GHz + IOT (BLE or Zigbee) simultaneous transmissions.

So the Max Simultaneous Transmission Ratio = $36.73/3888$ (IOT) + $582.10/3888$ (DTS) + $901.57/3888$ (NII)
 = $0.39 < 1$

Therefore, the device qualifies for RF exposure test exemption.

Product	ACCESS POINT
Test Item	RF Exposure Evaluation
Model No.	APEX0677

Test Mode	Frequency Band (MHz)	Maximum Conducted Power (dBm)	Tune-up Conducted Power (dBm)	Antenna Gain (dBi)	Tune-up ERP (dBm)
BLE	2402 ~ 2480	13.41	14.00	6.3	18.15
ZigBee	2405 ~ 2480	11.15	12.00	6.3	16.15
802.11b/g/n/ax	2412 ~ 2462	25.84	26.00	5.2	29.05
802.11a/n/ac/ax	5180 ~ 5885	25.76	26.00	6.5	30.35

Note: Tune-up power was declared by manufacturer.

For single RF source, Option C

Test Mode	$\lambda / 2 \pi$ (m)	R (m)	Tune-up ERP (mW)	Thresholds ERP (mW)
BLE (DTS)	0.02	0.45	65.31	3888
ZigBee (DTS)	0.02	0.45	41.21	3888
Wi-Fi (DTS)	0.02	0.45	803.53	3888
Wi-Fi (NII)	0.01	0.45	1083.93	3888

Note: R is from user manual.

For multiple RF sources

The EUT supports Wi-Fi 2.4GHz + Wi-Fi 5GHz + IOT (BLE or Zigbee) simultaneous transmissions.

So the Max Simultaneous Transmission Ratio = $65.31/3888$ (IOT) + $803.53/3888$ (DTS) + $1083.93/3888$ (NII)
 $= 0.50 < 1$

Therefore, the device qualifies for RF exposure test exemption.

Product	ACCESS POINT
Test Item	RF Exposure Evaluation
Model No.	APEX0679

Test Mode	Frequency Band (MHz)	Maximum Conducted Power (dBm)	Tune-up Conducted Power (dBm)	Antenna Gain (dBi)	Tune-up ERP (dBm)
BLE	2402 ~ 2480	7.61	8.00	6.6	12.45
ZigBee	2405 ~ 2480	13.70	14.00	6.6	18.45
802.11b/g/n/ax	2412 ~ 2462	25.84	26.00	6.1	29.95
802.11a/n/ac/ax	5180 ~ 5885	25.76	26.00	10.5	34.35

Note: Tune-up power was declared by manufacturer.

For single RF source, Option C

Test Mode	$\lambda / 2 \pi$ (m)	R (m)	Tune-up ERP (mW)	Thresholds ERP (mW)
BLE (DTS)	0.02	0.45	17.58	3888
ZigBee (DTS)	0.02	0.45	69.98	3888
Wi-Fi (DTS)	0.02	0.45	988.55	3888
Wi-Fi (NII)	0.01	0.45	2722.70	3888

Note: R is from user manual.

For multiple RF sources

The EUT supports Wi-Fi 2.4GHz + Wi-Fi 5GHz + IOT (BLE or Zigbee) simultaneous transmissions.

So the Max Simultaneous Transmission Ratio = $69.98/3888$ (IOT) + $988.55/3888$ (DTS) + $2722.70/3888$ (NII)
 = $0.97 < 1$

Therefore, the device qualifies for RF exposure test exemption.

_____ The End _____