




Maximum Permissible Exposure

FCC ID: 2ARBSEL300530S
APPLICANT: Hewlett Packard Enterprise


Application Type: Certification
Product: Wifi/BT Module
Model No.: EL300_ARTIK-530

Trademark: 

FCC Rule Part(s): 2.1091
IC Rule Part(s): RSS 102 issue 5
Test Procedure(s): 447498 D01 v06
Received Date: August 21, 2018
Test Date: November 1 ~ December 16, 2018

Reviewed By : 

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Approved By : 

 (Chenz Ker)



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB 558074 D01v03r05. Test results reported herein relate only to the item(s) tested.


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

Revision History

Report No.	Version	Description	Issue Date
1808TW5101-U12	1.0	Original Report	2019-01-14

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	Wifi/BT Module
Model No.	EL300_ARTIK-530
Trademark	
Hardware Version Identification Number (HVIN)	1.04
Firmware Version Identification Number (FVIN)	v1.1
Host Supports Radios Spec.	<p>WLAN (Contains FCC ID : 2ARBSEL3009260): 2.4G: 802.11b/g/n-20/n-40 5G: 802.11a/n-20/ac-20/n-40/ac-40/ac-80/ac-160, Band 1,2,3,4 Bluetooth Dual Mode: V2.1+EDR/ V5.0 LE</p> <p>WLAN (Contains FCC ID : 2ARBSEL300530S): 2.4G: 802.11b/g/n-20 5G: 802.11a/n-20/n-40, Band 1,2,3,4 Bluetooth Dual Mode: V2.1+EDR/ V4.2 LE</p> <p>WWAN (Contains FCC ID : 2ARBSEL3007565): 3G: WCDMA Band 2,4,5 4G: FDD Band 2,4,5,7,12,13,26,30,66; TDD Band 41 4G: CA Band 7,41</p> <p>GNSS</p>

Note: This case is change the following points from the original model, so the C2PC (Radiated Spurious Emission, Conducted Output Power, AC Conducted Emissions) is executed. (Original Report Grant Date: 12/27/2018, FCC ID: 2ARBSEL300530S)

1. Add a host : **HPE EL300 Converged Edge System** Brand : **HPE**, Product : **HSTNS-2162**
2. Change the type and higher gain of antenna
3. Remove the Zigbee (2405 ~2480MHz) by software from DTS grant , No hardware changes have been made.

1.2. Antenna Description

Frequency		Antenna Type	Gain(dBi)
2.4G	2402M~2480M	PIFA	2
5G	5.2G(5150M~5350M)		2
	5.6G(5470M~5725M)		
	5.8G(5725M~5850M)		

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 (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
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
0.3-1.4	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
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

Note : (1) f= Frequency in MHz , (2) * = Plane-wave equivalent power density

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

Where

Pd = power density in mW/cm²

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

Under normal use condition, is at least 20cm away from the body of the user .

So, this device is classified as **Mobile Device**.

2.2. Test Result of RF Exposure Evaluation

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For 2.4 GHz : 802.11b/g/n-20

Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412 ~ 2462	15.5	35.5	2	20	0.0112	1

For 5GHz UNII Band: 802.11a/n-20M/n-40M

Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
5180 ~ 5825	13.5	22.4	2	20	0.0071	1

For Bluetooth Mode

Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402 ~ 2480	7	5	2	20	0.0016	1

For BLE Mode

Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402 ~ 2480	6	4	2	20	0.0013	1

Conclusion :

$$CPD1/LPD1 + CPD2/LPD2 + \dots + CPDN/LPDN \leq 1$$

CPD : Calculation Power Density

LPD : Limit of Power Density

Mode	Power Density	Limit	Conclusion	Result (≤ 1)
WIFI-2.4G	0.0112	1	0.0212	Pass
WIFI-5G	0.0071	1		
BT	0.0016	1		
BLE	0.0013	1		

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For 2.4 GHz : 802.11b/g/n-20/n-40

Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412 ~ 2462	20	100	5	20	0.0629	1

For 5GHz UNII Band: a/n-20/ac-20/n-40/ac-40/ac-80/ac-160

Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
5180 ~ 5825	25	316.2	5	20	0.1989	1

For Bluetooth Mode

Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402 ~ 2480	11.5	14.1	5	20	0.0089	1

For BLE Mode

Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402 ~ 2480	10	10	5	20	0.0063	1

Conclusion :

$$CPD1/LPD1 + CPD2/LPD2 + \dots + CPDN/LPDN \leq 1$$

CPD : Calculation Power Density

LPD : Limit of Power Density

Mode	Power Density	Limit	Conclusion	Result (≤ 1)
WIFI-2.4G	0.0629	1	0.2743	Pass
WIFI-5G	0.1989	1		
BT	0.0089	1		
BLE	0.0036	1		

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Band (MHz)	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WCDMA Band II/ LTE Band 2	1850~1910	24	251.2	2.87	20	0.0968	1
WCDMA Band IV/ LTE Band 4	1710~1755	24	251.2	2.55	20	0.0899	1
WCDMA Band V/ LTE Band 5	824~849	24	251.2	1.31	20	0.0676	0.5493
LTE Band 7	2500~2570	23.8	239.9	2.55	20	0.0858	1
LTE Band 12	699~716	24	251.2	0.14	20	0.0516	0.4660
LTE Band 13	777~787	24	251.2	0.88	20	0.0612	0.5180
LTE Band 26	814~849	24	251.2	1.31	20	0.0676	0.5427
LTE Band 30	2305~2315	23	199.5	1.00	20	0.0500	1
LTE Band 41	2496~2690	23.8	239.9	2.55	20	0.0858	1
LTE Band 66	1710~1780	24	251.2	2.55	20	0.0899	1

Conclusion all contains module :

$$CPD1/LPD1 + CPD2/LPD2 + \dots + CPDN/LPDN \leq 1$$

CPD : Calculation Power Density

LPD : Limit of Power Density

Module (FCC ID)	Power Density	Limit	Conclusion	Result (≤ 1)
2ARBSEL300530S	0.0212	1	0.6109	Pass
2ARBSEL3009260	0.2743	1		
2ARBSEL3007565	0.0676	0.5493		

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