

RF Exposure Report

Report No.: SA170816E06F

FCC ID: 2AMAF-DPE109A104A

Test Model: DPE109A

Series Model: DPE104A

Received Date: Feb. 06, 2015

Test Date: Feb. 09 to Sep. 23, 2015

Issued Date: Aug. 31, 2018

Applicant: TAIJET BOINTEC CORPORATION LIMITED

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SA170816E06F	Original release.	Aug. 31, 2018

1 Certificate of Conformity

Product: 802.11 abgn/AC+BT4.2, 2T2R, mini PCIe Card

Brand: BOINTEC

Test Model: DPE109A

Series Model: DPE104A

Sample Status: ENGINEERING SAMPLE

Applicant: TAIJET BOINTEC CORPORATION LIMITED

Test Date: Feb. 09 to Sep. 23, 2015

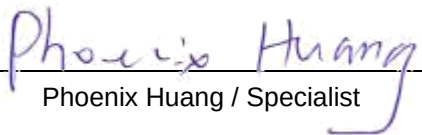
Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :


Phoenix Huang / Specialist

Date:

Aug. 31, 2018

Approved by :


May Chen / Manager

Date:

Aug. 31, 2018

2 RF Exposure

2.1 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)
Limits For General Population / Uncontrolled Exposure				
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
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

f = Frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

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

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Antenna Set 1									
Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dBi)	5G Cable Loss (dBi)	Connector Type	Cable Length (mm)
Chain (0)	WNC	81-EBJ15.005	PIFA	3.00	Band 1&2: 2.56	1.15	Band 1&2: 1.70	IPEX	300
					Band 3: 4.76		Band 3: 1.74		
					Band 4: 4.76		Band 4: 1.79		
Chain (1)	WNC	81-EBJ15.005	PIFA	3.62	Band 1&2: 3.08	1.15	Band 1&2: 1.70	IPEX	300
					Band 3: 3.31		Band 3: 1.74		
					Band 4: 2.42		Band 4: 1.79		
Antenna Set 2									
Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dBi)	5G Cable Loss (dBi)	Ant. Connector Type	Cable Length (mm)
Chain (0)	INPAQ	DAM-I6-H-DB-800-10-17	Dipole	1.13	Band 1&2: 1.33	2.0±0.5	4.0±0.5	SMA RP Plug	900
					Band 3: -0.63				
					Band 4: -0.97				
Chain (1)	INPAQ	DAM-I6-H-DB-800-10-17	Dipole	1.29	Band 1&2: 1.94	2.0±0.5	4.0±0.5	SMA RP Plug	900
					Band 3: -0.49				
					Band 4: -0.93				
*The RF cable is use with antenna set 2									
Cable Spec.									
Brand		Model	2.4GHz cable loss (dBi)		5GHz cable loss (dBi)		Cable Length (mm)	Cable Connector Type	
INPAQ		14012-00040100	-0.35		-0.39		42	IPEX to SMA RP Plug	
Antenna Set 3									
Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	Connector Type		Cable Length (mm)	
Chain (0)	Molex	479504012	Dipole	2.13	2.81	I-PEX MH4		300	
Chain (1)	Molex	479504012	Dipole	2.13	2.81	I-PEX MH4		300	
Antenna Set 4									
Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	Ant. Connector Type			
Chain (0)	BOINTEC	TWRN-9161202-101	Dipole	2.0	2.0	RP SMA			
Chain (1)	BOINTEC	TWRN-9161202-101	Dipole	2.0	2.0	RP SMA			
*The RF cable is use with antenna set 4									
Cable Spec.									
Brand		Model	2.4GHz cable loss (dBi)		5GHz cable loss (dBi)		Cable Length (mm)	Cable Connector Type	
Bointec		TWRB-003EQ01-210	0.27		0.21		210	IPEX to RP SMA	
Antenna Set 5									
Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	Ant. Connector Type			
Chain (0)	BOINTEC	TWRN-9161201-102	Dipole	3.17	2.61	RP SMA			
Chain (1)	BOINTEC	TWRN-9161201-102	Dipole	3.17	2.61	RP SMA			
*The RF cable is use with antenna set 5									
Cable Spec.									
Brand		Model	2.4GHz cable loss (dBi)		5GHz cable loss (dBi)		Cable Length (mm)	Cable Connector Type	
Bointec		TWRB-003EQ01-300	0.3		0.24		300	IPEX to RP SMA	
Note:									
1. Above antenna gains of antenna are Total (H+V).									

2.5 Calculation Result of Maximum Conducted Power

WLAN

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2412-2472	509.97	6.63	20	0.46695	1
5180-5240	114.377	6.09	20	0.09248	1
5260-5320	113.137	6.09	20	0.09148	1
5500-5720	104.278	7.77	20	0.12414	1
5745-5825	157.439	7.77	20	0.18743	1

NOTE:

2.4GHz: Directional gain = 3.62dBi + 10log(2) = 6.63dBi

5GHz:

U-NII-1 & U-NII-2A: Directional gain = 3.08dBi + 10log(2) = 6.09dBi.

U-NII-2C & U-NII-3: Directional gain = 4.76dBi + 10log(2) = 7.77dBi

BT-EDR

Frequency Band (MHz)	Max. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402-2480	14.928	3.62	20	0.00683	1

BT-LE

Frequency Band (MHz)	Max. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
2402-2480	1.995	3.62	20	0.00091	1

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 +etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 5GHz + Bluetooth = 0.18743 / 1 + 0.00683 / 1 = 0.19426

Therefore the maximum calculations of above situations are less than the "1" limit.

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