

## 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

**Address:** 4F., No.114, Zhouzi St., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Hsin Chu Laboratory

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

**Test Location:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

**FCC Registration /  
Designation Number:** 723255 / TW2022

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by any government agencies.

## Table of Contents

<b>Release Control Record .....</b>	<b>3</b>
<b>1      Certificate of Conformity.....</b>	<b>4</b>
<b>2      RF Exposure.....</b>	<b>5</b>
2.1    Limits for Maximum Permissible Exposure (MPE).....	5
2.2    MPE Calculation Formula .....	5
2.3    Classification .....	5
2.4    Antenna Gain .....	6
2.5    Calculation Result of Maximum Conducted Power.....	7

### 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, **Date:** Aug. 31, 2018

Phoenix Huang / Specialist

**Approved by :** May Chen, **Date:** Aug. 31, 2018

May Chen / Manager

## 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 <sup>2</sup> )	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 <sup>2</sup> )*	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/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

### 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 <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
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 =  $3.62\text{dBi} + 10\log(2) = 6.63\text{dBi}$

5GHz:

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

U-NII-2C & U-NII-3: Directional gain =  $4.76\text{dBi} + 10\log(2) = 7.77\text{dBi}$

### BT-EDR

Frequency Band (MHz)	Max. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
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 <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
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.**

--- END ---