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

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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 : _____ , **Date:** Aug. 31, 2018
Phoenix Huang / Specialist

Approved by : _____ , **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^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/cm^2

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 Band 3: 4.76 Band 4: 4.76	1.15	Band 1&2: 1.70 Band 3: 1.74 Band 4: 1.79	IPEX	300
Chain (1)	WNC	81-EBJ15.005	PIFA	3.62	Band 1&2: 3.08 Band 3: 3.31 Band 4: 2.42	1.15	Band 1&2: 1.70 Band 3: 1.74 Band 4: 1.79	IPEX	300

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 Band 3: -0.63 Band 4: -0.97	2.0±0.5	4.0±0.5	SMA RP Plug	900
Chain (1)	INPAQ	DAM-I6-H-DB-800-10-17	Dipole	1.29	Band 1&2: 1.94 Band 3: -0.49 Band 4: -0.93	2.0±0.5	4.0±0.5	SMA RP Plug	900

*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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