RF Exposure Report

Report No.: SA170816E07S

FCC ID: PPD-QCNFA344AH

Test Model: QCNFA344A

Received Date: Jan. 07, 2015

Test Date: Feb. 06 to 25, 2015 and May 07, 2015

Issued Date: Oct. 15, 2019

Applicant: Qualcomm Atheros, Inc.

Address: 1700 Technology Drive, San Jose, CA 95110

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

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

FCC Registration / Designation Number: 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SA170816E07S	Original release.	Oct. 15, 2019

1 Certificate of Conformity

Product: 802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card

Brand: Qualcomm Atheros

Test Model: QCNFA344A

Sample Status: R&D SAMPLE

Applicant: Qualcomm Atheros, Inc.

Test Date: Feb. 06 to 25, 2015 and May 07, 2015

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.3-1992

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:** _____ Oct. 15, 2019 _____

Claire Kuan / Specialist

Approved by : _____ , **Date:** _____ Oct. 15, 2019 _____

Clark Lin / Technical 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				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

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**.

3 Antenna Gain

The antenna gain was declared by client; please refer to the following table:

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

Note: 1. Above antenna gains of antenna are Total (H+V).

4 Calculation Result of Maximum Conducted Power

The Maximum power was copied from the original test report (Date of Grant: 08/21/2018)

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm²)	Limit (mW/cm²)
WLAN 2.4GHz	2412-2472	224.404	6.63	20	0.20548	1
WLAN U-NII-1	5180-5240	72	6.09	20	0.05822	1
WLAN U-NII-2A	5260-5320	66	6.09	20	0.05337	1
WLAN U-NII-2C	5500-5720	73	7.77	20	0.08691	1
WLAN U-NII-3	5745-5825	72.033	7.77	20	0.08576	1
Bluetooth (BT-EDR)	2402-2480	20	3.62	20	0.00916	1
Bluetooth (BT-LE)	2402-2480	3	3.62	20	0.00137	1

Note:
1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. This power include tune-up tolerance range that specified in QCNFA344A Tune Up power table
3. For WLAN 2.4GHz: Directional gain = 3.62dBi + 10log(2) = 6.63dBi
4. For WLAN 5GHz(U-NII-1 & U-NII-2A): Directional gain = 3.08dBi + 10log(2) = 6.09dBi
5. For WLAN 5GHz (U-NII-2C & U-NII-3): Directional gain = 4.76dBi + 10log(2) = 7.77dBi
6. For Bluetooth: Antenna gain: 3.62dBi

Conclusion:

Both of the WLAN (5GHz) and Bluetooth can transmit simultaneously, the formula of calculated the MPE is:

$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \ldots\ldots$etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is 0.08691 / 1 + 0.00916 / 1 = 0.09607, which is less than "1".

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