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RF Exposure Report

Report No.: SA150401E01A

FCC ID: PPD-QCNFA425

Test Model: QCNFA425

Received Date: Apr. 01, 2015

Test Date: July 23 to 24, 2015

Issued Date: Aug. 07, 2015

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

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Test Location (1): No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

Test Location (2): No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

Test Location (3): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City, Taiwan R.O.C.



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Release Control Record

Issue No.	Description	Date Issued
SA150401E01A	Original release.	Aug. 07, 2015



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1 Certificate of Conformity

Product: Single Stream 802.11a/b/g/n/ac + BT 4.1 M.2 1216 Type Card

Brand: Qualcomm Atheros

Test Model: QCNFA425

Sample Status: ENGINEERING SAMPLE

Applicant: Qualcomm Atheros, Inc.

Test Date: July 23 to 24, 2015

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D03

IEEE C95.1

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 : C. Kuan, **Date:** Aug. 07, 2015
Claire Kuan / Specialist

Approved by : May Chen, **Date:** Aug. 07, 2015
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				
300-1500	F/1500	30
1500-100,000	1.0	30

F = Frequency in MHz

2.2 MPE Calculation Formula

$$P_d = (P_{out} * G) / (4 * \pi * r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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 Calculation Result Of Maximum Conducted Power

For WLAN: (2.4GHz)

802.11b

FREQUENCY BAND (MHz)	MAX POWER AVG. (dBm)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (W/m ²)
2412 - 2472	20.50	112.202	3.62	20	0.05137	1

NOTE: 1. This power include tune-up tolerance range that specified in QCNFA425 Tune Up power table

802.11g

FREQUENCY BAND (MHz)	MAX POWER AVG. (dBm)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (W/m ²)
2412 - 2472	20.50	112.202	3.62	20	0.05137	1

NOTE: 1. This power include tune-up tolerance range that specified in QCNFA425 Tune Up power table

802.11n (HT20)

FREQUENCY BAND (MHz)	MAX POWER AVG. (dBm)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (W/m ²)
2412 - 2472	20.50	112.202	3.62	20	0.05137	1

NOTE: 1. This power include tune-up tolerance range that specified in QCNFA425 Tune Up power table

802.11n (HT40)

FREQUENCY BAND (MHz)	MAX POWER AVG. (dBm)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (W/m ²)
2422 - 2462	19.50	89.125	3.62	20	0.04081	1

NOTE: 1. This power include tune-up tolerance range that specified in QCNFA425 Tune Up power table



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For WLAN: (5GHz)**802.11a**

FREQUENCY BAND (MHz)	MAX POWER AVG. (dBm)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (W/m ²)
5180 - 5240, 5260 - 5320	17.5	56.234	5.56	20	0.04025	1
5500 - 5580 & 5660 - 5720	17.5	56.234	5.34	20	0.03826	1
5745 - 5825	18.0	63.096	4.76	20	0.03756	1

NOTE: 1. This power include tune-up tolerance range that specified in QCNFA425 Tune Up power table

802.11ac (VHT20)

FREQUENCY BAND (MHz)	MAX POWER AVG. (dBm)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (W/m ²)
5180 - 5240, 5260 - 5320	17.5	56.234	5.56	20	0.04025	1
5500 - 5580 & 5660 - 5720	17.5	56.234	5.34	20	0.03826	1
5745 - 5825	17.5	56.234	4.76	20	0.03348	1

NOTE: 1. This power include tune-up tolerance range that specified in QCNFA425 Tune Up power table

802.11ac (VHT40)

FREQUENCY BAND (MHz)	MAX POWER AVG. (dBm)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (W/m ²)
5190 - 5230 5270 - 5310	17.0	50.119	5.56	20	0.03587	1
5510 - 5550 & 5670 - 5710	17.0	50.119	5.34	20	0.03410	1
5745 - 5825	16.5	44.668	4.76	20	0.03039	1

NOTE: 1. This power include tune-up tolerance range that specified in QCNFA425 Tune Up power table

802.11ac (VHT80)

FREQUENCY BAND (MHz)	MAX POWER AVG. (dBm)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (W/m ²)
5210, 5290	13.5	22.387	5.56	20	0.01602	1
5530, 5610, 5690	17.0	50.119	5.34	20	0.03410	1
5775	15.0	31.623	4.76	20	0.01882	1

NOTE: 1. This power include tune-up tolerance range that specified in QCNFA425 Tune Up power table

For Bluetooth:

BT-EDR

FREQUENCY BAND (MHz)	MAX POWER AVG. (dBm)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (W/m ²)
2402-2480	12.5	17.783	3.62	20	0.00814	1

NOTE: 1. This power include tune-up tolerance range that specified in QCNFA425 Tune Up power table

BT-LE

FREQUENCY BAND (MHz)	MAX POWER AVG. (dBm)	MAX POWER AVG. (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (W/m ²)
2402-2480	4.0	2.512	3.62	20	0.00115	1

NOTE: 1. This power include tune-up tolerance range that specified in QCNFA425 Tune Up power table

CONCLUSION:

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

$$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is $0.04025 + 0.00814 = 0.048$, which is less than "1".

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