RF Exposure Report

Report No.:	SA141008E03C
FCC ID:	PPD-QCNFA435
Test Model:	QCNAF435
Received Date:	Jan. 21, 2015
Test Date:	Mar. 30 to Apr. 07, 2015
Issued Date:	Apr. 29, 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
Lab Address:	No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.
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.

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Release Control Record

Issue No.	Description	Date Issued
SA141008E03C	Original release.	Apr. 29, 2015

1 Certificate of Conformity

Product:	Single Stream 802.11a/b/g/n/ac + BT 4.1 M.2 Type Card
Brand:	Qualcomm Atheros
Test Model:	QCNAF435
Sample Status:	R&D SAMPLE
Applicant:	Qualcomm Atheros, Inc.
Test Date:	Mar. 30 to Apr. 07, 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 : _____ , **Date:** Apr. 29, 2015
Lori Chung / Specialist

Approved by : _____ , **Date:** Apr. 29, 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

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

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

Antenna No.	Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	Connector Type	Cable Length (mm)
1	Main	WNC	N15Q	PIFA	1.45	Band 1&2: 0.87 Band 3: 2.21 Band 4: 2.64	IPEX	643
	Aux	WNC	N15Q	PIFA	1.24	Band 1&2: 0.18 Band 3: 0.95 Band 4: 1.38	IPEX	756
2	Main	WNC	N15C	PIFA	0.7	Band 1&2: 0.97 Band 3: -0.01 Band 4: -0.32	IPEX	626
	Aux	WNC	N15C	PIFA	2.4	Band 1&2: -1.21 Band 3: -0.84 Band 4: -0.24	IPEX	749
3	Main	WNC	N15W	PIFA	2.2	Band 1&2: -0.41 Band 3: 0.74 Band 4: -0.05	IPEX	645
	Aux	WNC	N15W	PIFA	1.58	Band 1&2: -0.01 Band 3: -0.31 Band 4: -0.43	IPEX	720

4 Calculation Result of Maximum Conducted Power

For WLAN: 15.247 (2.4GHz):

VHT20

Frequency Band (MHz)	Max power Avg. (dBm)	Max power Avg. (mW)	Antenna gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	21	125.893	2.4	20	0.04352	1.00

NOTE: This power include tune-up tolerance range that specified in QCNAF435 Tune Up power table

For WLAN: 15.247 (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 (mW/cm^2)
5745 - 5825	17.50	56.234	2.64	20	0.02055	1.00

NOTE: This power include tune-up tolerance range that specified in QCNAF435 Tune Up power table

For WLAN: 15.407 (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 (mW/cm^2)
5180 - 5240, 5260 - 5320	17.50	56.234	0.97	20	0.01399	1.00
5500 - 5720	17.50	56.234	2.21	20	0.01861	1.00

NOTE: This power include tune-up tolerance range that specified in QCNAF435 Tune Up power table

For Bluetooth:

Frequency Band (MHz)	Max power Avg. (dBm)	Max power Avg. (mW)	Antenna gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2402-2480	11.50	14.125	2.4	20	0.00488	1.00

NOTE: This power include tune-up tolerance range that specified in QCNAF435 Tune Up power table

Conclusion:

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

$CPD_1 / LPD_1 + CPD_2 / LPD_2$ + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is 0.00488 / 1 + 0.02055 / 1 = 0.025, which is less than “1”.

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