RF EXPOSURE REPORT

REPORT NO.:	SA130221E04 R1
MODEL NO.:	CUS227
FCC ID:	PPD-CUS227
IC:	4104A-CUS227
RECEIVED:	Feb. 21, 2013
TESTED:	Apr. 11, 2013
ISSUED:	June 26, 2013

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.

This report should not be used by the client to claim product certification, approval, or endorsement by any government agencies.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA130221E04	Original release	June 14, 2013
SA130221E04 R1	Modify the antenna gain of EUT	June 26, 2013

1. CERTIFICATION

PRODUCT:	802.11a/b/g/n 2x2 WLAN card
BRAND NAME:	Qualcomm Atheros
MODEL NO.:	CUS227
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	Qualcomm Atheros, Inc.
STANDARDS:	FCC Part 2 (Section 2.1091)
	FCC OET Bulletin 65, Supplement C (01-01)
	IEEE C95.1

The above equipment (Model: CUS227) 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:** *June 26, 2013*
(Midoli Peng, Specialist)

APPROVED BY : _____ , **DATE:** *June 26, 2013*
(May Chen, Manager)

2. RF EXPOSURE LIMIT

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

3. 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

4. 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**.

5. ANTENNA GAIN

The antenna provided to the EUT, please refer to the following table:

Brand	Model	Antenna Type	Antenna gain 2.4G(dBi)	Antenna gain 5G(dBi)	Connector Type
Qualcomm	CUS227 V03-2	Integrated PCB antenna	2	3	NA

Note: 1. The EUT incorporates beam forming function

6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For 2.4GHz:

802.11b

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
2412-2462	121.264	5.01	20	0.07646	1.00

NOTE: Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$)^2 / 2] = 5.01dBi

802.11g

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
2412-2462	243.414	5.01	20	0.15349	1.00

NOTE: Directional gain = 2dBi + 10log(2) = 5.01dBi

802.11n (HT20)

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
2412-2462	239.950	5.01	20	0.15130	1.00

NOTE: Directional gain = 2dBi + 10log(2) = 5.01dBi

802.11n (HT40)

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
2422-2452	118.997	5.01	20	0.07504	1.00

NOTE: Directional gain = 2dBi + 10log(2) = 5.01dBi

For 15.247(5GHz):

802.11a

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
5745 ~ 5825	379.385	6.01	20	0.30117	1.00

NOTE: Directional gain = 3dBi + 10log(2) = 6.01dBi

802.11n(HT20)

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
5745 ~ 5825	379.840	6.01	20	0.30153	1.00

NOTE: Directional gain = 3dBi + 10log(2) = 6.01dBi

802.11n(HT40)

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
5755 ~ 5795	336.788	6.01	20	0.26735	1.00

NOTE: Directional gain = 3dBi + 10log(2) = 6.01dBi

For 15.407(5GHz):

802.11a

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
5180-5240 5260-5320 5500-5580 & 5660-5700	190.003	6.01	20	0.15083	1.00

NOTE: Directional gain = 3dBi + 10log(2) = 6.01dBi

802.11n(HT20)

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
5180-5240 5260-5320 5500-5580 & 5660-5700	185.792	6.01	20	0.14749	1.00

NOTE: Directional gain = 3dBi + 10log(2) = 6.01dBi

802.11n(HT40)

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
5190-5230 5270-5310 5510-5550 & 5670	120.049	6.01	20	0.09530	1.00

NOTE: Directional gain = 3dBi + 10log(2) = 6.01dBi

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