RF EXPOSURE REPORT

REPORT NO.:	SA111116C06
MODEL NO.:	EA3500
FCC ID:	Q87-EA3500
RECEIVED:	Nov. 16, 2011
TESTED:	Dec. 16, 2011
ISSUED:	Jan. 10, 2012
APPLICANT:	Cisco Consumer Products LLC
ADDRESS:	121 Theory Drive Irvine California 92617 United States
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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA111116C06	Original release	Jan. 10, 2012

1. CERTIFICATION

PRODUCT:	High Performance Dual-Band N Router
BRAND NAME:	CISCO
MODEL NO.:	EA3500
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	Cisco Consumer Products LLC
TESTED:	Dec. 16, 2011
STANDARDS:	FCC Part 2 (Section 2.1091)
	FCC OET Bulletin 65, Supplement C (01-01)
	IEEE C95.1

The above equipment (Model: EA3500) 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 : Phoenix Huang , **DATE:** *Jan. 10, 2012*
(Phoenix Huang, Specialist)

APPROVED BY : , **DATE:** *Jan. 10, 2012*
(May Chen, Deputy 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

There are six antennas provided to this EUT, please refer to the following table:

For 2.4GHz				
Transmitter Circuit	Freq.(MHz)	Peak Gain (dBi)	Antenna Type	Connecter Type
Chain (0) <Left>	2400	3.55	PIFA	UFL
	2450	3.67	PIFA	UFL
	2500	3.43	PIFA	UFL
Chain (1) <Front>	2400	4.77	PIFA	UFL
	2450	4.95	PIFA	UFL
	2500	4.60	PIFA	UFL
Chain (2) <Right>	2400	2.21	PIFA	UFL
	2450	2.69	PIFA	UFL
	2500	2.68	PIFA	UFL
For 5GHz				
Transmitter Circuit	Freq.(MHz)	Peak Gain (dBi)	Antenna Type	Connecter Type
Chain (0) <Left>	5150	2.44	PIFA	UFL
	5350	2.99	PIFA	UFL
	5600	2.99	PIFA	UFL
	5730	1.94	PIFA	UFL
	5850	3.23	PIFA	UFL
Chain (1) <Front>	5150	3.50	PIFA	UFL
	5350	3.23	PIFA	UFL
	5600	3.39	PIFA	UFL
	5730	3.42	PIFA	UFL
	5850	3.88	PIFA	UFL
Chain (2) <Right>	5150	4.24	PIFA	UFL
	5350	4.39	PIFA	UFL
	5600	4.73	PIFA	UFL
	5730	4.15	PIFA	UFL
	5850	4.46	PIFA	UFL

u The EUT incorporates CDD function with 802.11a, 802.11b & 802.11g.

6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For 15.247(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	365.5	6.22	20	0.305	1.00

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2]
Effective Legacy Gain (dBi) = 6.22

802.11g:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
2412-2462	458.3	6.22	20	0.382	1.00

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2]
Effective Legacy Gain (dBi) = 6.22

802.11n(20MHz):

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
2412-2462	479.8	3.7	20	0.224	1.00

802.11n(40MHz):

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
2422-2452	222.0	3.7	20	0.104	1.00

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	423.9	8.64	20	0.617	1.00

Directional gain = 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$)^2 / 3]
Effective Legacy Gain (dBi) = 8.64

802.11n(20MHz):

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
5745 ~ 5825	440.5	4.46	20	0.245	1.00

802.11n(40MHz):

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
5755 ~ 5795	485.8	4.46	20	0.270	1.00

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	38.2	6.73	20	0.036	1.00

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

Effective Legacy Gain (dBi) = 6.73

802.11n(20MHz):

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
5180-5240	44.8	4.39	20	0.024	1.00

802.11n(40MHz):

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm^2)	LIMIT (mW/cm^2)
5190-5230	48.3	4.39	20	0.026	1.00

CONCLUSION:

Both of the 2.4GHz and 5GHz technology 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 0.382 / 1 + 0.617 / 1= 0.999, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.

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