IEEE C95.1 2005
KDB 447498 D01 V06
47 C.F.R. Part 1, Subpart I, Section 1.1310
47 C.F.R. Part 2, Subpart J, Section 2.1091

RF EXPOSURE REPORT

For

Computer

Model: UTC-520F, UTC-520FXXXXXXXXXXXXXXXX (where "X" may be any alphanumeric character , “-” or blank)

Trade Name: ADVANTECH

Issued to

Advantech Co.Ltd.
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Issued by

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Issued Date: February 8, 2018

Testing Laboratory
1309

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	February 8, 2018	Initial Issue	ALL	Allison Chen
01	March 28, 2018	1. Modify frequency band of UNII-2C and UNII-3.	P.5	Allison Chen

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1. TEST RESULT CERTIFICATION

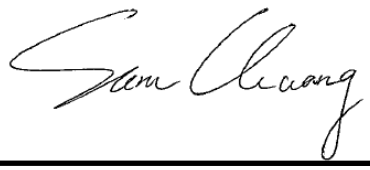
We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

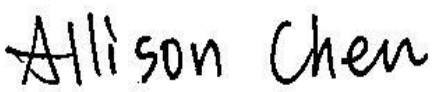
APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
IEEE C95.1 2005 KDB 447498 D03 47 C.F.R. Part 1, Subpart I, Section 1.1310 47 C.F.R. Part 2, Subpart J, Section 2.1091	No non-compliance noted

Approved by:



Sam Chuang
Manager
Compliance Certification Services Inc.

Tested by:



Allison Chen
Report coordinator
Compliance Certification Services Inc.

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2. LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

3. EUT SPECIFICATION

EUT	Computer
Model	UTC-520F, UTC-520FXXXXXXXXXXXXXXX (where "X" may be any alphanumeric character , "-" or blank)
Trade Name	ADVANTECH
Model Discrepancy	All the above models are identical except for the designation of model numbers. The suffix of (X= a-z / 0-9 or blank) on model number is just for marketing purpose only.
Frequency band (Operating)	☒ 802.11b/g/n 20: 2412MHz ~ 2462MHz 802.11n 40: 2422MHz ~ 2452MHz 802.11a/n 20: 5180MHz ~ 5240MHz / 5260MHz ~ 5320MHz / 5500MHz ~ 5700MHz / 5745MHz ~ 5825MHz 802.11n 40: 5190MHz ~ 5230MHz / 5270MHz ~ 5310MHz / 5510MHz ~ 5670MHz / 5755MHz ~ 5795MHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm^2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2)

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Antenna Specification

2.4G

	Description	Type	Peak Gain
Ant 1	WIFI black	PIFA	3.03dBi
Ant 2	WIFI white	PIFA	2.67dBi
Power Directional Gain			2.85dBi

5G

	Description	Type	Peak Gain
Ant 1	WIFI black	PIFA	6.42dBi
Ant 2	WIFI white	PIFA	5.50dBi
Power Directional Gain			5.98dBi

2.4GHz: Directional Gain : 2.85 dBi (Numeric gain: 1.93) Worst
5GHz: Directional Gain : 5.98 dBi (Numeric gain: 3.96) Worst

Notes:
1. Power Directional Gain: 10LOG(((10^(Ant1/10)+10^(Ant2/10))/2))

Max tune up Power

IEEE 802.11b :	14.50 dBm	(28.184 mW)
IEEE 802.11g :	17.50 dBm	(56.234 mW)
IEEE 802.11n 20 :	19.50 dBm	(89.125 mW)
IEEE 802.11n 40 :	19.50 dBm	(89.125 mW)
IEEE 802.11a :	19.00 dBm	(79.433 mW)
IEEE 802.11n 20 :	22.50 dBm	(177.828 mW)
IEEE 802.11n 40 :	18.00 dBm	(63.096 mW)

Evaluation applied

☒ MPE Evaluation*
☐ SAR Evaluation
☐ N/A

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4. TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$ ***Equation 1***

Where d = Distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm²

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5. MAXIMUM PERMISSIBLE EXPOSURE

Substituting the MPE safe distance using d = 20 cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm²

IEEE 802.11b:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
6	2437	28.184	1.93	20	0.0108	1

IEEE 802.11g:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
6	2437	56.234	1.93	20	0.0216	1

IEEE 802.11n 20:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
6	2437	89.125	1.97	20	0.0349	1

IEEE 802.11n 40:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
6	2437	89.125	1.97	20	0.0349	1

IEEE 802.11a:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
52	5260	79.433	3.96	20	0.0626	1

IEEE 802.11n 20:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
48	5240	177.828	3.96	20	0.1401	1

IEEE 802.11n 40:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
46	5230	63.096	3.96	20	0.0497	1

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