

**IEEE C95.1
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**

RF EXPOSURE REPORT

For

Computer

Model:

TREK-572, TREK-572XXXXXXXXXXXXXXXXXX
(where "X" may be any alphanumeric character , "-" or blank)

Trade Name: ADVANTECH

Issued to

Advantech Co. Ltd.

No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.

**No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
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Issued Date: November 9, 2015



Testing Laboratory
1309

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 9, 2015	Initial Issue	ALL	Doris Chu

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1. 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.

2. EUT SPECIFICATION

EUT	Computer
Model	TREK-572, TREK-572XXXXXXXXXXXXXXXXXX (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 (where "X" may be any alphanumeric character , "-" or blank) on model number is just for marketing purpose only.
Frequency band (Operating)	<input checked="" type="checkbox"/> Bluetooth 2.1 + EDR / 4.0: 2402 ~ 2480 MHz 802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40: 2422MHz ~ 2452MHz 802.11a/n HT20: 5180MHz ~ 5700MHz / 5745MHz ~ 5825MHz 802.11n HT40: 5190MHz ~ 5670MHz / 5755MHz ~ 5795MHz <input checked="" type="checkbox"/> GPRS / EDGE 850MHz: 824.2MHz ~ 848.8MHz <input checked="" type="checkbox"/> GPRS / EDGE 1900MHz: 1850.2MHz ~ 1909.8MHz <input checked="" type="checkbox"/> WCDMA / HSDPA / HSUPA Band II: 1852.4MHz ~ 1907.6MHz <input checked="" type="checkbox"/> WCDMA / HSDPA / HSUPA Band V: 826.4MHz ~ 846.6MHz <input type="checkbox"/> Others
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna Specification	BT 3.97 dBi (Numeric gain: 2.49) 2.4GHz 3.97 dBi (Numeric gain: 2.49) 5GHz 2.75 dBi (Numeric gain: 1.88) GPRS / EDGE 850MHz: 2.22 dBi (Numeric gain: 1.67) GPRS / EDGE 1900MHz: 1.42 dBi (Numeric gain: 1.39) WCDMA / HSDPA / HSUPA Band II: 1.42 dBi (Numeric gain: 1.39) WCDMA / HSDPA / HSUPA Band V: 2.22 dBi (Numeric gain: 1.67) Type: PIFA Antenna

Measurement Average output power	<table border="1"> <thead> <tr> <th>System</th> <th>Power</th> <th></th> </tr> </thead> <tbody> <tr> <td>Bluetooth 2.1 + EDR:</td> <td>2.65 dBm</td> <td>(1.841 mW)</td> </tr> <tr> <td>Bluetooth 4.0:</td> <td>2.39 dBm</td> <td>(1.734 mW)</td> </tr> <tr> <td>IEEE 802.11b Mode:</td> <td>21.94 dBm</td> <td>(156.315 mW)</td> </tr> <tr> <td>IEEE 802.11g Mode:</td> <td>20.88 dBm</td> <td>(122.462 mW)</td> </tr> <tr> <td>IEEE 802.11n HT 20 Mode:</td> <td>19.95 dBm</td> <td>(98.855 mW)</td> </tr> <tr> <td>IEEE 802.11n HT 40 Mode:</td> <td>17.41 dBm</td> <td>(55.081 mW)</td> </tr> <tr> <td>IEEE 802.11a Mode:</td> <td>21.10 dBm</td> <td>(128.825 mW)</td> </tr> <tr> <td>IEEE 802.11n HT 20 Mode:</td> <td>21.03 dBm</td> <td>(126.765 mW)</td> </tr> <tr> <td>IEEE 802.11n HT 40 Mode:</td> <td>20.64 dBm</td> <td>(115.878 mW)</td> </tr> <tr> <td>GPRS850</td> <td>32.70 dBm</td> <td>(1862.09 mW)</td> </tr> <tr> <td>EDGE850</td> <td>26.00 dBm</td> <td>(398.11 mW)</td> </tr> <tr> <td>GPRS1900</td> <td>30.10 dBm</td> <td>(1023.29 mW)</td> </tr> <tr> <td>EDGE1900</td> <td>26.60 dBm</td> <td>(457.09 mW)</td> </tr> <tr> <td>WCDMA Band II</td> <td>22.55 dBm</td> <td>(179.89 mW)</td> </tr> <tr> <td>WCDMA Band V</td> <td>22.96 dBm</td> <td>(197.70 mW)</td> </tr> </tbody> </table>	System	Power		Bluetooth 2.1 + EDR:	2.65 dBm	(1.841 mW)	Bluetooth 4.0:	2.39 dBm	(1.734 mW)	IEEE 802.11b Mode:	21.94 dBm	(156.315 mW)	IEEE 802.11g Mode:	20.88 dBm	(122.462 mW)	IEEE 802.11n HT 20 Mode:	19.95 dBm	(98.855 mW)	IEEE 802.11n HT 40 Mode:	17.41 dBm	(55.081 mW)	IEEE 802.11a Mode:	21.10 dBm	(128.825 mW)	IEEE 802.11n HT 20 Mode:	21.03 dBm	(126.765 mW)	IEEE 802.11n HT 40 Mode:	20.64 dBm	(115.878 mW)	GPRS850	32.70 dBm	(1862.09 mW)	EDGE850	26.00 dBm	(398.11 mW)	GPRS1900	30.10 dBm	(1023.29 mW)	EDGE1900	26.60 dBm	(457.09 mW)	WCDMA Band II	22.55 dBm	(179.89 mW)	WCDMA Band V	22.96 dBm	(197.70 mW)
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Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation*																																																	
	<input type="checkbox"/> SAR Evaluation																																																	
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3. 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:

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

Changing to units of mW and cm, using:

$$P (mW) = P (W) / 1000 \text{ and}$$

$$d (cm) = d(m) / 100$$

Yields

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

Where $d =$ Distance in cm

$P =$ Power in mW

$G =$ Numeric antenna gain

$S =$ Power density in mW / cm²

4. 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

Bluetooth 2.1 + EDR:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
1	2402	1.995	2.49	20	0.0010	1

Bluetooth 4.0:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
0	2402	1.778	2.49	20	0.0009	1

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	158.489	2.49	20	0.0785	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	125.893	2.49	20	0.0624	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	100	2.49	20	0.0496	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	56.234	2.49	20	0.0279	1

IEEE 802.11a mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
48	5240	141.254	1.88	20	0.0528	1

IEEE 802.11a HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
44	5220	141.254	1.88	20	0.0528	1

IEEE 802.11a HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
46	5230	125.893	1.88	20	0.0471	1

GPRS850 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
190	836.6	251.189	1.67	20	0.0835	0.558

EGPRS850 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
251	848.8	56.234	1.67	20	0.0187	0.566

GPRS1900 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
661	1880	141.254	1.39	20	0.0391	1.000

EGPRS1900 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
661	1880	63.096	1.39	20	0.0175	1.000

WCDMA Band II mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
9262	1852.4	199.526	1.39	20	0.0552	1.000

WCDMA Band V mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
4182	836.4	199.526	1.67	20	0.0663	0.558