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:
DMS-SJ03

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.
(Hsinchu Lab)
No.989-1, Wenshan Rd., Shangshan Village,Qionglin Township,
Hsinchu County 30741, Taiwan (R.O.C.)
http://www.ccsrf.com
service@ccsrf.com
Issued Date: October 2, 2017

Testing Laboratory
0240

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	October 2, 2017	Initial Issue	ALL	Allison Chen

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

TABLE OF CONTENTS

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

1. TEST RESULT CERTIFICATION

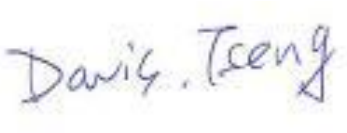
We hereby certify that:

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.

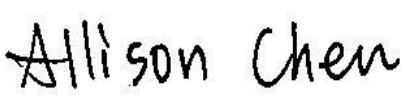
APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
IEEE C95.1 2005 KDB 447498 D03 47 C.F.R. Part 1, Subpart I, Section 1.1310 47 C.F.R. Part 2, Subpart J, Section 2.1091	No non-compliance noted

Approved by:



Davis Tseng
Sr. Engineer
Compliance Certification Services Inc.

Test by:



Allison Chen
Report coordinator
Compliance Certification Services Inc.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

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	DMS-SJ03
Trade Name	ADVANTECH
Frequency band (Operating)	☒ WCDMA Band II: 1852.4MHz ~ 1907.6MHz ☒ WCDMA Band V: 826.4MHz ~ 846.6MHz ☒ WCDMA Band IV: 1712.4MHz ~ 1752.6MHz ☒ LTE Band 2: 1850MHz ~ 1910MHz ☒ LTE Band 4: 1710MHz ~ 1755MHz ☒ LTE Band 5: 824MHz ~ 849MHz ☒ LTE Band 13: 777 MHz ~ 787 MHz ☒ LTE Band 25: 1850 MHz ~ 1915MHz ☒ 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 ☐ 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)

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

<table>
<tr><td>Antenna Specification</td><td>
For WWAN (WCDMA / LTE)
WCDMA Band II: 3.46 dBi (Numeric gain: 2.22)
WCDMA Band IV: 2.97 dBi (Numeric gain: 1.98)
WCDMA Band V: 3.24 dBi (Numeric gain: 2.11)
Type: PIFA Antenna

LTE Band 2: 3.46 dBi (Numeric gain: 2.22)
LTE Band 4: 2.97 dBi (Numeric gain: 1.98)
LTE Band 5: 3.24 dBi (Numeric gain: 2.11)
LTE Band 13: 5.25 dBi (Numeric gain: 3.35)
LTE Band 25: 3.46 dBi (Numeric gain: 2.22)
Type: PIFA Antenna

For WIFI (2GHz / 5GHz)
2.4 GHz 2.75 dBi (Numeric gain: 1.88)
5 GHz 2.81 dBi (Numeric gain: 1.91)
Type: PIFA Antenna
</td></tr>
<tr><td>Max tune up Power Power</td><td>
<table>
<tr><th>System</th><th colspan="2">Max Tune up Power</th></tr>
<tr><td>WWAN</td><td></td><td></td></tr>
<tr><td>WCDMA Band II:</td><td>24.00 dBm</td><td>(251.189 mW)</td></tr>
<tr><td>WCDMA Band IV:</td><td>24.00 dBm</td><td>(251.189 mW)</td></tr>
<tr><td>WCDMA Band V:</td><td>24.00 dBm</td><td>(251.189 mW)</td></tr>
<tr><td>LTE Band 2:</td><td>24.00 dBm</td><td>(251.189 mW)</td></tr>
<tr><td>LTE Band 4:</td><td>24.00 dBm</td><td>(251.189 mW)</td></tr>
<tr><td>LTE Band 5:</td><td>24.00 dBm</td><td>(251.189 mW)</td></tr>
<tr><td>LTE Band 13:</td><td>24.00 dBm</td><td>(251.189 mW)</td></tr>
<tr><td>LTE Band 25:</td><td>24.00 dBm</td><td>(251.189 mW)</td></tr>
<tr><td>WIFI</td><td></td><td></td></tr>
<tr><td>2.4 GHz:</td><td></td><td></td></tr>
<tr><td>IEEE 802.11b</td><td>22.00 dBm</td><td>(158.489 mW)</td></tr>
<tr><td>IEEE 802.11g</td><td>16.50 dBm</td><td>(44.668 mW)</td></tr>
<tr><td>IEEE 802.11n HT20</td><td>14.00 dBm</td><td>(25.119 mW)</td></tr>
<tr><td>IEEE 802.11n HT40</td><td>12.00 dBm</td><td>(15.849 mW)</td></tr>
<tr><td>5 GHz:</td><td></td><td></td></tr>
<tr><td>IEEE 802.11a</td><td>26.50 dBm</td><td>(446.684 mW)</td></tr>
<tr><td>IEEE 802.11n HT20</td><td>24.00 dBm</td><td>(251.189 mW)</td></tr>
<tr><td>IEEE 802.11n HT40</td><td>23.00 dBm</td><td>(199.526 mW)</td></tr>
</table>
</td></tr>
<tr><td>Evaluation applied</td><td>☒ MPE Evaluation*
☐ SAR Evaluation
☐ N/A</td></tr>
</table>

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

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 / cm^2

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

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

WCDMA Band II mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
9750	1950	251.189	2.22	20	0.1110	1.000

WCDMA Band IV mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
1413	1732.6	251.189	1.98	20	0.0990	1.000

WCDMA Band V mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
4183	836.6	251.189	2.11	20	0.1055	0.558

LTE Band 2:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
18900	1880	251.189	2.22	20	0.1110	1.000

LTE Band 4:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
20050	1720	251.189	1.98	20	0.0990	1.000

LTE Band 5:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
20600	844	251.189	2.11	20	0.1055	0.563

LTE Band 13:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
23230	782	251.189	3.35	20	0.1675	0.521

LTE Band 25:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm²)
26365	1882.5	251.189	2.22	20	0.1110	1.000

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
1	2412	158.489	1.88	20	0.0593	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	44.668	1.88	20	0.0167	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	25.119	1.88	20	0.0094	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	15.849	1.88	20	0.0059	1

IEEE 802.11a mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
52	5260	446.684	1.91	20	0.1698	1

IEEE 802.11a HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
157	5785	251.189	1.91	20	0.0955	1

IEEE 802.11a HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm^2	Limit (mW/cm2)
46	5230	199.526	1.91	20	0.0758	1

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

6. SIMULTANEOUS TRANSMISSION SAR ANALYSIS

There are the WWAN and WIFI can transmit simultaneously, the formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

The worst-case situation is 0.1675 / 0.521 + 0.1698 / 1 = 0.4913, which is less than “1”.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.