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**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**

RF EXPOSURE REPORT

For

Nodegrid

**Model:
SR**

Trade Name: ZPE

Issued to

**ZPE Systems, Inc.
46757 Fremont Blvd., Fremont, CA 94538, USA**

Issued by

**Compliance Certification Services Inc.
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
Issued Date: November 27, 2018**

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部分複製。

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 27, 2018	Initial Issue	ALL	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:

Reporter:

Sam Chuang
Manager
Compliance Certification Services Inc.

Allison Chen
Report coordinator
Compliance Certification Services Inc.

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	Nodegrid
Model	SR
Trade Name	ZPE
Frequency band (Operating)	☐ GPRS / EGPRS 850MHz: 824.2MHz ~ 848.8MHz ☐ GPRS / EGPRS 1900MHz: 1850.2MHz ~ 1909.8MHz ☒ 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 7: 2500 MHz ~ 2570 MHz ☒ LTE Band 12: 698 MHz ~ 716 MHz ☒ LTE Band 13: 777 MHz ~ 787 MHz ☒ LTE Band 26: 814 MHz ~ 849 MHz ☒ LTE Band 30: 2305 MHz ~ 2315 MHz ☒ LTE Band 41: 2496 MHz ~ 2690 MHz ☒ LTE Band 66: 1710 MHz ~ 1780 MHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure ($S = 5\text{mW/cm}^2$) ☒ General Population/Uncontrolled exposure ($S=1\text{mW/cm}^2$)

Antenna Specification	For WWAN		
	WCDMA Band II:	3.00 dBi	(Numeric gain: 2.00)
	WCDMA Band IV:	2.10 dBi	(Numeric gain: 1.62)
	WCDMA Band V:	1.80 dBi	(Numeric gain: 1.51)
	LTE Band 2:	3.00 dBi	(Numeric gain: 2.00)
	LTE Band 4:	2.10 dBi	(Numeric gain: 1.62)
	LTE Band 5:	1.80 dBi	(Numeric gain: 1.51)
	LTE Band 7:	5.10 dBi	(Numeric gain: 3.24)
	LTE Band 12:	2.60 dBi	(Numeric gain: 1.82)
	LTE Band 13:	2.60 dBi	(Numeric gain: 1.82)
LTE Band 26:	2.60 dBi	(Numeric gain: 1.82)	
LTE Band 30:	3.80 dBi	(Numeric gain: 2.40)	
LTE Band 41:	5.10 dBi	(Numeric gain: 3.24)	
LTE Band 66:	2.80 dBi	(Numeric gain: 1.91)	
Max tune up Power	System		Max Tune up Power
	WWAN		
	WCDMA Band II:	24.00 dBm	(251.189 mW)
	WCDMA Band IV:	24.00 dBm	(251.189 mW)
	WCDMA Band V:	24.00 dBm	(251.189 mW)
	LTE Band 2:	24.00 dBm	(251.189 mW)
	LTE Band 4:	24.00 dBm	(251.189 mW)
	LTE Band 5:	24.00 dBm	(251.189 mW)
	LTE Band 7:	24.00 dBm	(251.189 mW)
	LTE Band 12:	24.00 dBm	(251.189 mW)
	LTE Band 13:	24.00 dBm	(251.189 mW)
	LTE Band 26:	24.00 dBm	(251.189 mW)
	LTE Band 30:	24.00 dBm	(251.189 mW)
	LTE Band 41:	24.00 dBm	(251.189 mW)
LTE Band 66:	24.00 dBm	(251.189 mW)	
Evaluation applied	☒ MPE Evaluation*		
	☐ SAR Evaluation		
	☐ N/A		

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:

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

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

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

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 EXPOSURESubstituting 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 / cm ²	Limit (mW/cm ²)
9750	1950	251.189	2.00	20	0.1000	1.000

WCDMA Band IV mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
1413	1732.6	251.189	1.62	20	0.0810	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)
4183	836.6	251.189	1.51	20	0.0755	0.558

LTE Band 2:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
18900	1880	251.189	2.00	20	0.1000	1.000

LTE Band 4:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
20050	1720	251.189	1.62	20	0.0810	1.000

LTE Band 5:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
20600	844	251.189	1.51	20	0.0755	0.563

LTE Band 7:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
21100	2535	251.189	3.24	20	0.1620	1.690

LTE Band 12:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
23095	707.5	251.189	1.82	20	0.0910	0.472

LTE Band 13:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
23230	752	251.189	1.82	20	0.0910	1.000



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LTE Band 26:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
26740	819	251.189	1.82	20	0.0910	0.546

LTE Band 30:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
27710	2310	251.189	2.40	20	0.1200	1.540

LTE Band 41:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
40620	2590	251.189	3.24	20	0.1620	1.000

LTE Band 66:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
132322	1745	251.189	1.91	20	0.0955	1.163