



FCC ID: 2ARCQ-EM7565
Report No.: T180821D09-MF

Page: 1 / 9
Rev.: 00

**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。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Report No.: T180821D09-MF

Page: 2 / 9
Rev.: 00

Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|------|-------------------|---------------|-------------|--------------|
| 00 | November 27, 2018 | Initial Issue | ALL | Allison Chen |



Report No.: T180821D09-MF

Page: 3 / 9
Rev.: 00

TABLE OF CONTENTS

| | |
|--------------------------------------|---|
| 1. TEST RESULT CERTIFICATION | 4 |
| 2. LIMIT | 5 |
| 3. EUT SPECIFICATION | 5 |
| 4. TEST RESULTS | 7 |
| 5. MAXIMUM PERMISSIBLE EXPOSURE..... | 8 |

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) | <input type="checkbox"/> GPRS / EGPRS 850MHz: 824.2MHz ~ 848.8MHz <input type="checkbox"/> GPRS / EGPRS 1900MHz: 1850.2MHz ~ 1909.8MHz <input checked="" type="checkbox"/> WCDMA Band II: 1852.4MHz ~ 1907.6MHz <input checked="" type="checkbox"/> WCDMA Band V: 826.4MHz ~ 846.6MHz <input checked="" type="checkbox"/> WCDMA Band IV: 1712.4MHz ~ 1752.6MHz <input checked="" type="checkbox"/> LTE Band 2: 1850MHz ~ 1910MHz <input checked="" type="checkbox"/> LTE Band 4: 1710MHz ~ 1755MHz <input checked="" type="checkbox"/> LTE Band 5: 824MHz ~ 849MHz <input checked="" type="checkbox"/> LTE Band 7: 2500 MHz ~ 2570 MHz <input checked="" type="checkbox"/> LTE Band 12: 698 MHz ~ 716 MHz <input checked="" type="checkbox"/> LTE Band 13: 777 MHz ~ 787 MHz <input checked="" type="checkbox"/> LTE Band 26: 814 MHz ~ 849 MHz <input checked="" type="checkbox"/> LTE Band 30: 2305 MHz ~ 2315 MHz <input checked="" type="checkbox"/> LTE Band 41: 2496 MHz ~ 2690 MHz <input checked="" type="checkbox"/> LTE Band 66: 1710 MHz ~ 1780 MHz <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) |

| <p>Antenna Specification</p> | <p>For WWAN</p> <p>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)</p> <p>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)</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------|--|--------------|--------|-------------------|--|------|--|--|----------------|-----------|--------------|----------------|-----------|--------------|---------------|-----------|--------------|--|--|--|-------------|-----------|--------------|-------------|-----------|--------------|-------------|-----------|--------------|-------------|-----------|--------------|--------------|-----------|--------------|--------------|-----------|--------------|--------------|-----------|--------------|--------------|-----------|--------------|--------------|-----------|--------------|--------------|-----------|--------------|
| <p>Max tune up Power</p> | <table border="1"> <thead> <tr> <th>System</th> <th colspan="2">Max Tune up Power</th> </tr> </thead> <tbody> <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></td> <td></td> <td></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 7:</td> <td>24.00 dBm</td> <td>(251.189 mW)</td> </tr> <tr> <td>LTE Band 12:</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 26:</td> <td>24.00 dBm</td> <td>(251.189 mW)</td> </tr> <tr> <td>LTE Band 30:</td> <td>24.00 dBm</td> <td>(251.189 mW)</td> </tr> <tr> <td>LTE Band 41:</td> <td>24.00 dBm</td> <td>(251.189 mW)</td> </tr> <tr> <td>LTE Band 66:</td> <td>24.00 dBm</td> <td>(251.189 mW)</td> </tr> </tbody> </table> | | 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) |
| 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) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Evaluation applied</p> | <p><input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Report No.: T180821D09-MF

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:

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

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

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

Report No.: T180821D09-MF

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 / 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 |

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 |