

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR TRANSMITTER

**Test Report No.** : W17DR-D038  
**AGR No.** : A17NA-103  
**Applicant** : Suntech International Ltd.  
**Address** : B-1506, Great Valley, 32, 9-Gil, Digital-Ro, Geumcheon-Gu, Seoul, 08512, South Korea  
**Manufacturer** : Suntech International Ltd.  
**Address** : B-1506, Great Valley, 32, 9-Gil, Digital-Ro, Geumcheon-Gu, Seoul, 08512, South Korea  
**Type of Equipment** : Vehicle Tracker  
**FCC ID.** : WA2ST340U  
**Model Name** : ST340U  
**Multiple Model Name** : N/A  
**Serial number** : N/A  
**Total page of Report** : 10 pages (including this page)  
**Date of Incoming** : November 07, 2017  
**Date of issue** : December 18, 2017

## SUMMARY

The equipment complies with the regulation; **FCC Part 22 Subpart H, Part 24 Subpart E**

This test report only contains the result of a single test of the sample supplied for the examination.

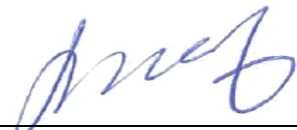
It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:



Jae-Ho Lee / Chief Engineer  
ONETECH Corp.

Approved by:



Keun-Young, Choi / Vice President  
ONETECH Corp.

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### Revision History

| Issued Report No. | Issued Date       | Revisions     | Effect Section |
|-------------------|-------------------|---------------|----------------|
| W17DR-D038        | December 18, 2017 | Initial Issue | All            |
|                   |                   |               |                |
|                   |                   |               |                |

**1. VERIFICATION OF COMPLIANCE**

Applicant : Suntech International Ltd.  
 Address : B-1506, Great Valley, 32, 9-Gil, Digital-Ro, Geumcheon-Gu, Seoul, 08512, South Korea  
 Contact Person : Yohan Kim / Manager  
 Telephone No. : +82-2-6327-5661  
 FCC ID : WA2ST340U  
 Model Name : ST340U  
 Serial Number : N/A  
 Date : December 18, 2017

|  |  |
|--|--|
| EQUIPMENT CLASS                                      | PCB-PCS Licensed Transmitter             |
| E.U.T. DESCRIPTION                                   | Vehicle Tracker                          |
| THIS REPORT CONCERNS                                 | Original Grant                           |
| MEASUREMENT PROCEDURES                               | ANSI C63.10: 2013                        |
| TYPE OF EQUIPMENT TESTED                             | Pre-Production                           |
| KIND OF EQUIPMENT AUTHORIZATION REQUESTED            | Certification                            |
| EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)   | FCC Part 22 Subpart H, Part 24 Subpart E |
| Modifications on the Equipment to Achieve Compliance | None                                     |
| Final Test was Conducted On                          | 3 m, Semi Anechoic Chamber               |

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. GENERAL INFORMATION

### 2.1 Product Description

The Suntech International Ltd., Model ST340U (referred to as the EUT in this report) is a Vehicle Tracker. Product specification information described herein was obtained from product data sheet or user's manual.

|  |                        |           |                           |
|--|------------------------|-----------|---------------------------|
| DEVICE TYPE  | Vehicle Tracker        |           |                           |
| OPERATING FREQUENCY                                | GSM850 / GSM850 EDGE   | TX        | 824.2 MHz ~ 848.8 MHz     |
|  |                        | RX        | 869.2 MHz ~ 893.8 MHz     |
|  | GSM1900 / GSM1900 EDGE | TX        | 1 850.2 MHz ~ 1 909.8 MHz |
|  |                        | RX        | 1 930.2 MHz ~ 1 989.8 MHz |
| MAX. RF OUTPUT POWER                               | GSM850                 | 32.53 dBm |                           |
|  | GSM850 EDGE            | 32.43 dBm |                           |
|  | GSM1900                | 29.46 dBm |                           |
|  | GSM1900 EDGE           | 29.15 dBm |                           |
| Effective Radiated Power                           | GSM850                 | 27.99 dBm |                           |
|  | GSM850 EDGE            | 27.80 dBm |                           |
| Equivalent Isotropic Radiated Power                | GSM1900                | 23.53 dBm |                           |
|  | GSM1900 EDGE           | 23.23 dBm |                           |
| ANTENNA TYPE                                       | INTENNA                |           |                           |
| ANTENNA GAIN                                       | GSM850                 | -1.2 dBi  |                           |
|  | GSM1900                | -1.2 dBi  |                           |
| List of each Osc. or crystal Freq.(Freq. >= 1 MHz) | 26 MHz                 |           |                           |

### 2.2 Emission Designator

| GSM Emission Designator   | EDGE Emission Designator   |
|---|--|
| <b>Emission Designator = 249KGXW</b><br>GSM BW = 249 kHz<br>G = Phase Modulation<br>X = Cases not otherwise covered<br>W = Combination (Audio/Data) | <b>Emission Designator = 249KG7W</b><br>GSM BW = 249 kHz<br>G = Phase Modulation<br>7 = Quantized/Digital Info<br>W = Combination (Audio/Data) |

**2.3 Alternative type(s)/model(s); also covered by this test report.**

-. None

**3. EUT MODIFICATIONS**

-. None

## 4. MAXIMUM PERMISSIBLE EXPOSURE

### 4.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are  $f/1500 \text{ mW/cm}^2$  for the frequency range between 300 MHz and 1 500 MHz and  $1.0 \text{ mW/cm}^2$  for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a  $1 \text{ mW/cm}^2$  exposure is calculated as follows:

$$E = \sqrt{(30 * P * G) / d}, \text{ and } S = E^2 / Z = E^2 / 377, \text{ because } 1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$$

Where

S = Power density in  $\text{mW/cm}^2$ , Z = Impedance of free space,  $377 \Omega$

E = Electric field strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G) / (377 * 10 S)}$$

Changing to units of mW and cm, using  $P (\text{mW}) = P (\text{W}) / 1 000$ ,  $d (\text{cm}) = 0.01 * d (\text{m})$

$$d = 0.282 * \sqrt{(P * G) / S}$$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in  $\text{mW/cm}^2$

**4.2 EUT Description**

|                             |  |           |
|-----------------------------|--|-----------|
| Kind of EUT                 | Vehicle Tracker  |           |
| Operating Frequency Band    | <input checked="" type="checkbox"/> GSM850 : 824.2 MHz ~ 848.8 MHz, 869.2 MHz ~ 893.8 MHz<br><input checked="" type="checkbox"/> GSM1900 : 1 850.2 MHz ~1 909.8 MHz, 1 930.2 MHz ~ 1 989.8 MHz |           |
| Device Category             | <input type="checkbox"/> Portable (< 20 cm separation)<br><input checked="" type="checkbox"/> Mobile (> 20 cm separation)<br><input type="checkbox"/> Others                                   |           |
| MAX. RF OUTPUT POWER        | GSM850   | 32.53 dBm |
|                             | GSM850 EDGE  | 32.43 dBm |
|                             | GSM1900  | 29.46 dBm |
|                             | GSM1900 EDGE   | 29.15 dBm |
| Antenna Gain                | GSM850   | -1.2 dBi  |
|                             | GSM1900  | -1.2 dBi  |
| Exposure Evaluation Applied | <input checked="" type="checkbox"/> MPE<br><input type="checkbox"/> SAR<br><input type="checkbox"/> N/A  |           |



## 5 Evaluation Results

### 5.1 Assessment result of RF Power and Antenna gain

#### 5.1.1 GSM850

| Operating Mode | Operating Frequency (MHz) | Duty Cycle | Antenna Gain |        | Peak Power Level |         | Avg. Power Level |        |
|----------------|---------------------------|------------|--------------|--------|------------------|---------|------------------|--------|
|                |                           |            | Log          | Linear | (dBm)            | (mW)    | (dBm)            | (mW)   |
| GSM            | 824.2                     | 0.25       | -1.2         | 0.759  | 33.00            | 1995.26 | 26.98            | 498.88 |

#### 5.1.2 GSM1900

| Operating Mode | Operating Frequency (MHz) | Duty Cycle | Antenna Gain |        | Peak Power Level |        | Avg. Power Level |        |
|----------------|---------------------------|------------|--------------|--------|------------------|--------|------------------|--------|
|                |                           |            | Log          | Linear | (dBm)            | (mW)   | (dBm)            | (mW)   |
| GPRS           | 1850.2                    | 0.25       | -1.2         | 0.759  | 29.50            | 891.25 | 23.48            | 222.84 |

### 5.1.3 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

| Operating Freq. Band (MHz) | Operating Mode | Conducted Peak Power |         | Conducted Average Power |        | Antenna Gain (dBi) |        | Safe Distance (cm) | Power Density (mW/cm <sup>2</sup> ) @ 20 cm Separation | Limit (mW/cm <sup>2</sup> ) |
|----------------------------|----------------|----------------------|---------|-------------------------|--------|--------------------|--------|--------------------|--|-----------------------------|
|                            |                | (dBm)                | (mW)    | (dBm)                   | (mW)   | Log                | Linear |                    |  |                             |
| GSM850                     | GSM            | 33.00                | 1995.26 | 26.98                   | 498.88 | -1.2               | 0.759  | 1.276              | 0.0753   | 0.55                        |

| Operating Freq. Band (MHz) | Operating Mode | Conducted Peak Power |        | Conducted Average Power |        | Antenna Gain (dBd) |        | Safe Distance (cm) | Power Density (mW/cm <sup>2</sup> ) @ 20 cm Separation | Limit (mW/cm <sup>2</sup> ) |
|----------------------------|----------------|----------------------|--------|-------------------------|--------|--------------------|--------|--------------------|--|-----------------------------|
|                            |                | (dBm)                | (mW)   | (dBm)                   | (mW)   | Log                | Linear |                    |  |                             |
| GSM1900                    | GPRS           | 29.50                | 891.25 | 23.48                   | 222.84 | -3.35              | 0.462  | 0.929              | 0.0205   | 1.00                        |

MPE limit =  $824/1500 = 0.55 \text{ mW/cm}^2$

GSM850 Power Density =  $\text{Conducted Average Power} * \text{Antenna Gain(dBi)} / (4\pi R^2)$   
 $= (498.88 * 0.759) / (4 * \pi * 20^2) = 0.0753 \text{ mW/cm}^2$

GSM1900 Power Density =  $\text{Conducted Average Power} * \text{Antenna Gain(dBd)} / (4\pi R^2)$   
 $= (222.84 * 0.462) / (4 * \pi * 20^2) = 0.0205 \text{ mW/cm}^2$



Tested by: Min-Gu Ji / Assistant Manager