

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.

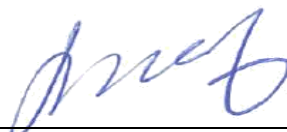
It is not a generally valid assessment of the features of the respective products of the mass-production.

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
Emission Designator = 249KGXW GSM BW = 249 kHz G = Phase Modulation X = Cases not otherwise covered W = Combination (Audio/Data)	Emission Designator = 249KG7W GSM BW = 249 kHz G = Phase Modulation 7 = Quantized/Digital Info 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 mW/cm^2 for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 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 mW/cm^2 , Z = Impedance of free space, 377Ω

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 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 <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) <input checked="" type="checkbox"/> Mobile (> 20 cm separation) <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 <input type="checkbox"/> SAR <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 ²) @ 20 cm Separation	Limit (mW/cm ²)
		(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 ²) @ 20 cm Separation	Limit (mW/cm ²)
		(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

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

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

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



Tested by: Min-Gu Ji / Assistant Manager