

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR TRANSMITTER

Test Report No. : OT-194-RWD-061
AGR No. : A193A-460
Applicant : Suntech International Ltd.
Address : (Gasam-dong, Greatvally), B-1506, 32, Digital-ro9-gil, Geumchon-gu, Seoul, Korea
Manufacturer : Suntech International Ltd.
Address : (Gasam-dong, Greatvally), B-1506, 32, Digital-ro9-gil, Geumchon-gu, Seoul, Korea
Type of Equipment : Tracking Device
FCC ID. : WA2ST3300
Model Name : ST3300
Serial number : N/A
Total page of Report : 9 pages (including this page)
Date of Incoming : March 29, 2019
Date of issue : April 23, 2019

SUMMARY

The equipment complies with the regulation; **FCC PART Part 2, 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: 

 Tae-Ho, Kim / Senior Manager
 ONETECH Corp.

Approved by: 

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 ONETECH Corp.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-194-RWD-061	April 23, 2019	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : Suntech International Ltd.
 Address : (Gasam-dong, Greatvally), B-1506, 32, Digital-ro9-gil, Geumchon-gu, Seoul, Korea
 Contact Person : Junkyung, Choi / Manager
 Telephone No. : 82-2-6327-5661
 FCC ID : WA2ST3300
 Model Name : ST3300
 Serial Number : N/A
 Date : April 23, 2019

EQUIPMENT CLASS	PCB-PCS Licensed Transmitter
KIND OF EQUIPMENT	Tracking Device
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.26:2015, KDB Publication 971168 D01
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART Part 2, 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 ST3300 (referred to as the EUT in this report) is a Tracking Device. The product specification described herein was obtained from product data sheet or user’s manual.

DEVICE TYPE	Tracking Device		
OPERATING FREQUENCY	WCDMA Band 2	TX	1 852.4 MHz ~ 1 907.6 MHz
		RX	1 932.4 MHz ~ 1 987.6 MHz
	WCDMA Band 5	TX	826.4 MHz ~ 846.6 MHz
		RX	871.4 MHz ~ 891.6 MHz
Modulation Type	QPSK, 16QAM		
Maximum EIRP Power	WCDMA Band 2	21.21 dBm	
Maximum ERP Power	WCDMA Band 5	20.15 dBm	
ANTENNA TYPE	PIFA Antenna		
ANTENNA GAIN	WCDMA Band 2	1.50 dBi	
	WCDMA Band 5	1.01 dBi	
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	26 MHz		

2.2 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 $f/1500$ mW/cm² for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm² for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm² 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/cm², Z = Impedance of free space, 377 Ω

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 (mW) = P (W) / 1 000, d (cm) = 0.01 * d (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/cm²

IMPORTANT NOTE:

To comply with the FCC RF exposure compliance requirements, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. No change to the antenna or the device is permitted. Any change to the antenna or the device could result in the device exceeding the RF exposure requirements and void user's authority to operate the device. There is no simultaneous operation within the bands used in this EUT

4.2 EUT Description

Kind of EUT	Tracking Device		
Operating Frequency Band	WCDMA Band 2	TX	1 852.4 MHz ~ 1 907.6 MHz
		RX	1 932.4 MHz ~ 1 987.6 MHz
	WCDMA Band 5	TX	826.4 MHz ~ 846.6 MHz
		RX	871.4 MHz ~ 891.6 MHz
MAX. RF OUTPUT POWER	WCDMA Band 2	22.77 dBm	
	WCDMA Band 5	22.61 dBm	
Antenna Gain	WCDMA Band 2	1.50 dBi	
	WCDMA Band 5	1.01 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 WCDMA Band 2

Operating Mode	Operating Frequency (MHz)	Avg. Power Level	
		(dBm)	(W)
WCDMA Band 2	1 907.6	22.77	0.189

5.1.2 WCDMA Band 5

Operating Mode	Operating Frequency (MHz)	Avg. Power Level	
		(dBm)	(W)
WCDMA Band 5	846.6	22.61	0.182



Tested by: Ju Yun Park / Assistant Manager

5.1.3 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

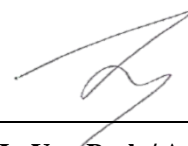
Operating Mode	Operating Frequency (MHz)	Conducted Average Power		Antenna Gain (dBi)		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(mW)	Log	Linear			
WCDMA Band 2	1 907.6	22.77	189.23	1.50	1.413	4.61	0.053 2	1.00

Operating Mode	Operating Frequency (MHz)	Conducted Average Power		Antenna Gain (dBi)		Safe Distance (cm)	Power Density (mW/cm ²) @ 20 cm Separation	Limit (mW/cm ²)
		(dBm)	(mW)	Log	Linear			
WCDMA Band 5	846.6	22.61	182.39	1.01	1.262	4.28	0.045 8	0.56

$$\text{limit} = 846.6/1500 = 0.56 \text{ mW/cm}^2$$

$$\begin{aligned} \text{WCDMA Band 2 Power Density} &= \text{Conducted Average Power} * \text{Antenna Gain(dBi)} / (4\pi R^2) \\ &= (189.23 * 1.413) / (4 * \pi * 20^2) = 0.053 2 \text{ mW/cm}^2 \end{aligned}$$

$$\begin{aligned} \text{WCDMA Band 5 Power Density} &= \text{Conducted Average Power} * \text{Antenna Gain(dBd)} / (4\pi R^2) \\ &= (185.39 * 1.262) / (4 * \pi * 20^2) = 0.045 8 \text{ mW/cm}^2 \end{aligned}$$



Tested by: Ju Yun Park / Assistant Manager