

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LICENSED TRANSMITTER

Test Report No. : OT-19O-RWD-026
AGR No. : A198A-017
Applicant : Suntech International Ltd.
Address : A-1705, A-1706, Greatvally, 32, Digital-ro 9-gil, Geumcheon-Gu, Seoul, Korea
Manufacturer : Suntech International Ltd.
Address : A-1705, A-1706, Greatvally, 32, Digital-ro 9-gil, Geumcheon-Gu, Seoul, Korea
Type of Equipment : Tracking Device
FCC ID. : WA2ST3330
Model Name : ST3330
Serial number : N/A
Total page of Report : 9 pages (including this page)
Date of Incoming : September 23, 2019
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SUMMARY

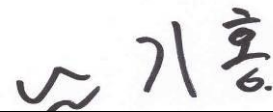
The equipment complies with the regulation; **FCC PART Part 2, Part 22 Subpart H, Part 24 Subpart E**
 This test report only contains the result of a single test of the sample supplied for the examination.
 It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:



Tae-Ho, Kim / Senior Manager
ONETECH Corp.

Approved by:



Ki-Hong, Nam / Chief Engineer
ONETECH Corp.

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Revision History

| Rev. No. | Issue Report No. | Issued Date | Revisions | Section Affected |
|----------|------------------|------------------|-----------------|------------------|
| 0 | OT-19O-RWD-026 | October 14, 2019 | Initial Release | All |
| | | | | |
| | | | | |

1. VERIFICATION OF COMPLIANCE

Applicant : Suntech International Ltd.
Address : A-1705, A-1706, Greatvally, 32, Digital-ro 9-gil, Geumcheon-Gu, Seoul, Korea
Contact Person : Yohan, Kim / Manager
Telephone No. : 82-2-6327-5661
FCC ID : WA2ST3330
Model Name : ST3330
Serial Number : N/A
Date : October 14, 2019

| | |
|---|---|
| EQUIPMENT CLASS | PCB-PCS Licensed Transmitter |
| EQUIPMENT DESCRIPTION | 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 ST3330 (referred to as the EUT in this report) is a Tracking Device. Product specification information 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 ERP Power | WCDMA Band 2 | 20.34 dBm | |
| | WCDMA Band 5 | 20.67 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 $f/1500 \text{ mW/cm}^2$ 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

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 | 22.70 dBm | |
| | WCDMA Band 5 | 23.04 dBm | |
| Antenna Gain | WCDMA Band 2 | 1.50 dBi | |
| | WCDMA Band 5 | 1.01 dBi | |
| Exposure Evaluation Applied | <div><input checked="" type="checkbox"/> MPE</div> <div><input type="checkbox"/> SAR</div> <div><input type="checkbox"/> N/A</div> | | |

5 Evaluation Results

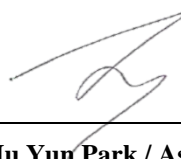
5.1 Assessment result of RF Power and Antenna gain

5.1.1 WCDMA Band 2

| Operating Mode | Operating Frequency (MHz) | Avg. Power Level | |
|----------------|---------------------------|------------------|-------|
| | | (dBm) | (W) |
| WCDMA Band 2 | 1 852.4 | 22.70 | 0.186 |

5.1.2 WCDMA Band 5

| Operating Mode | Operating Frequency (MHz) | Avg. Power Level | |
|----------------|---------------------------|------------------|-------|
| | | (dBm) | (W) |
| WCDMA Band 5 | 836.6 | 23.04 | 0.201 |



Tested by: Ju Yun Park / Assistant Manager

5.1.3 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

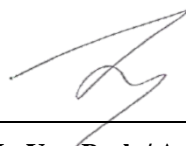
| Operating Mode | Operating Frequency (MHz) | Conducted Average Power | | Antenna Gain (dBi) | | Safe Distance (cm) | Power Density (mW/cm ²) @ 20 cm Separation | Limit (mW/cm ²) |
|----------------|---------------------------|-------------------------|--------|--------------------|--------|--------------------|--|-----------------------------|
| | | (dBm) | (mW) | Log | Linear | | | |
| WCDMA Band 2 | 1 852.4 | 22.70 | 186.21 | 1.50 | 1.413 | 4.57 | 0.052 4 | 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 | 836.6 | 23.04 | 201.37 | 1.01 | 1.262 | 4.50 | 0.050 6 | 0.55 |

$$\text{limit} = 836.6/1500 = 0.55 \text{ mW/cm}^2$$

$$\begin{aligned} \text{WCDMA Band 2 Power Density} &= \text{Conducted Average Power} * \text{Antenna Gain(dBi)} / (4\pi R^2) \\ &= (186.21 * 1.413) / (4 * \pi * 20^2) = 0.052 4 \text{ mW/cm}^2 \end{aligned}$$

$$\begin{aligned} \text{WCDMA Band 5 Power Density} &= \text{Conducted Average Power} * \text{Antenna Gain(dBd)} / (4\pi R^2) \\ &= (201.37 * 1.262) / (4 * \pi * 20^2) = 0.050 6 \text{ mW/cm}^2 \end{aligned}$$



Tested by: Ju Yun Park / Assistant Manager