ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : **W159R-D018**

AGR No. : **A157A-337**

Applicant : **Smart Power Solutions Inc.**

Address : **1FL, Venture Town Janyoungsilkwan 1688-5, Sinil-do, Daeduck-gu, Daejeon, 306-203, South Korea**

Manufacturer : **Smart Power Solutions Inc.**

Address : **1FL, Venture Town Janyoungsilkwan 1688-5, Sinil-do, Daeduck-gu, Daejeon, 306-203, South Korea**

Type of Equipment : **UHF RFID Reader Dongle**

FCC ID. : **UQBASR-03XD**

Model Name : **ASR-030D**

Serial number : **N/A**

Total page of Report : **6 pages (including this page)**

Date of Incoming : **August 20, 2015**

Date of issue : **September 11, 2015**

SUMMARY

The equipment complies with the regulation; ***FCC PART 15 SUBPART C Section 15.247***

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: Ki-Hong, Nam / Asst, Chief Engineer, ONETECH Corp.

Approved by: Sung-Ik, Han/ Managing Director, ONETECH Corp.

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

EMC Testing Div : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
W159R-D018	September 11, 2015	Initial Issue	All

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1. VERIFICATION OF COMPLIANCE

APPLICANT : Smart Power Solutions Inc.

ADDRESS : 1FL, Venture Town Janyoungsilkwan 1688-5, Sinil-do, Daeduck-gu, Daejeon, 306-203, South Korea

CONTACT PERSON : Sang-Min, Kim / Manager

TELEPHONE NO : +82-42-936-4905

FCC ID : UQBASR-03XD

MODEL NAME : ASR-030D

BRAND NAME : -

SERIAL NUMBER : N/A

DATE : September 11, 2015

EQUIPMENT CLASS	**DSS – PART 15 SPREAD SPECTRUM TRANSMITTER**
KIND OF EQUIPMENT	UHF RFID Reader Dongle
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 15 SUBPART C Section 15.247
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.

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2. GENERAL INFORMATION

2.1 Product Description

The Smart Power Solutions Inc., Model ASR-030D (referred to as the EUT in this report) is a UHF RFID Reader Dongle. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	RFID Reader
OPERATING FREQUENCY	917.1 MHz ~ 926.9 MHz
RF OUTPUT POWER	25.12 dBm (0.325 W)
NUMBER OF CHANNEL	50 Channels
MODULATION TYPE	ASK
ANTENNA TYPE	Patch Antenna
ANTENNA GAIN	1.10 dBi
LIST OF EACH OSC. OR CRYSTAL. FREQ.(FREQ.>=1 MHz)	19.20 MHz
RATED SUPPLY VOLTAGE	DC 5.0 V

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

-. None

3. EUT MODIFICATIONS

-. None

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4. RADIO FREQUENCY 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 is f/1500 mW/cm² for the frequency range between 300 MHz and 1500 MHz.

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

$E = \sqrt{(30 * P * G)} / d$, and $S = E^2 / Z = E^2 / 377$, because 1 mW/cm² = 10 W/m²

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

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

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

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

Changing to units of mW and cm, using P (mW) = P (W) / 1 000, d (cm) = 100 * 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

4.2 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Target Power W/tolerance	Max tune up power		Antenna Gain		Safe Distance (cm)	Power Density (mW/cm²) @ 20 cm Separation	Limit (mW/cm²)
(dBm)	(dBm)	(mW)	Log	Linear			
25.0 ± 0.5	25.5	354.81	1.1	1.29	7.79	0.091	0.60

According to above table, safe distance, $D = 0.282 * \sqrt{354.81 * 1.29/0.60} = 7.79$ cm.

For getting power density at 25 cm separation in above table, following formula was used.

$S = P * G / (4\pi * R^2) = 354.81 * 1.29 / (4 * 3.14 * 20^2) = 0.091$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

Note: End users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance, because the applicant does not provide an antenna for sale with the EUT.

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