

Maximum Permissible Exposure Evaluation

Test Report No : CSTS-A14-FCC0002-1

Equipment Name : SMART VALIDATOR
Model No. : SAM-CRM-14
Applicant : SAMSUNG SDS Co., Ltd.
Address : 707-19, Yoksam 2-dong, Gangnam-gu, Seoul, Korea,
135-918

This report applies only to the product named in the title of this report manufactured at the location indicated. Test results apply only to the particular equipment and functionality described in this test report.

Prepared by :

S.J. Yang / RF Engineer

Date of Issue : January 7, 2014

Reviewed by :

Ik Seon, Jeong / Principle Engineer

Date of Issue : January 7, 2014

CERTIFICATION SERVICE TECHNOLOGY INC.

181, Manhaero, Danwan-gu, Ansan-city, Kyeonggi-do, 425-839, Korea
Tel: +82 31 493 2001 Fax: +82 31 493 2055

<http://www.cstlab.co.kr>

1. General Description of EUT

Item	Specification	note	
Dimension	193.0 mm x 319.0 mm x 61.5 mm		
RF spec	Frequency Range	2402 MHz ~ 2480 MHz	
	Channel	79	
	Modulation Type	GFSK (BDR), 8-DQPSK (EDR)	
	Power	0.01062 W (BDR) 0.00266 W (EDR)	
		* It is maximum peak conducted power in band	
Antenna Gain	2.5 dBi		
Power Source	DC 24V		

NOTE:

1. This report is issued as a supplementary report of the original report.
2. The EUT, operates in the 2.4GHz frequency range, lets you connect Bluetooth devices to the network.
3. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

2. General Information of Test

Certification Service Technology Inc. (CSTech)	
Test Site Location	1055, Singil-dong ,Danwon-gu ,Ansan-si, Gyeonggi-do, Korea 425-839 TEL : +82-31-493-2001 FAX : +82-31-493-2055

3. RF Exposure Measurement

3.1 Introduction & Standard

RF Exposure Requirements	: 47 CFR §1.1307(b)
RF Radiation Exposure Limits	: 47 CFR §1.1310
RF Radiation Exposure Guidelines	: FCC OST/OET Bulletin Number 65
EUT Frequency Band	: 2402 MHz ~ 2480 MHz (Bluetooth)
Limits for General Population/Uncontrolled Exposure in the band of Power Density Limit	: 1500 MHz ~ 100000 MHz : 1 mW/cm ²

3.2 Compliance criteria

Evaluating for Power flux density

Equations are accurate in the far-field If antenna but will over-predict in the near field.

Under above describe specification of EUT and Antenna, Equivalent plane wave power density is calculated as below underlined quotation formula ;

$$S_{eq} (W/m^2) = E \times H = E^2/\eta = \sqrt{P G(\phi)} / 4\pi r^2$$

Where :

- S_{eq} (W/m²) = Equivalent plane wave power density
- E (V/m) = Electric field strength
- H (A/m) = Magnetic field strength
- η (Ω) = Free space wave impedance = 120 π Ω
- ϕ = elevation and azimuth angles
- P (W) = Power input to the antenna
- G (dBi) = Antenna gain relative to an isotropic antenna
- r (m) = distance from observation point to the antenna

3.2.1 Accordingly as a result of calculated value

- P(W) = 0.01062 W
- G(dBi) = 2.5 dBi (Conversion 2.5 dBi to Linearity value is 1.778)
- r(m) = setting a distance (20cm) from the antenna to calibrated tuned receiving antenna in far field

$$S_{eq}(\text{W/m}^2) : \sqrt{0.01062 \times 1.778 / 4 \times 3.14 \times 0.2^2} = \underline{\underline{0.1938667 \text{ W/m}^2}}$$

So, above calculated **0.01938667 mW/cm²** is comply with the value required standard