

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.

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Date of Issue : January 7, 2014

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Date of Issue : January 7, 2014

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<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
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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	: 1500 MHz ~ 100000 MHz
Power Density Limit	: 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 ;

$$S_{eq} (W/m^2) = E \times H = E^2/\eta = \frac{\sqrt{PG(\phi, \Phi)}/4\pi r^2}{\eta}$$

Where :

- $S_{eq} (W/m^2)$ = Equivalent plane wave power density
- $E (V/m)$ = Electric field strength
- $H (A/m)$ = Magnetic field strength
- $\eta (\Omega)$ = Free space wave impedance = $120 \pi \Omega$
- ϕ, 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

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

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