RF EXPOSURE ANALYSIS

EQUIPMENT

Type of equipment:	Data Collection Unit
Brand name:	SCA
Type / Model:	DCU / 682860
Manufacturer:	SCA Hygiene products AB
By request of:	SCA Hygiene products AB

Operating frequency: 2405 MHz

REQUIREMENT

CFR 47 §1.1310 RSS-102 issue 5 (2014) Radiocommunications (Electromagnetic Radiation — Human Exposure) Standard 2014

CALCULATIONS

2,4 GHz radio's Highest output power to antenna is1.4 dBm With +2 dBi antenna gain EIRP is 3.4 dBm or 2.2 mW

850 MHz cellular radio's highest output power to antenna is 1.904 W or 32.79 dBm With +1 dBi antenna gain EIRP is 33.79 dBm or 2.39 W

1900 MHz cellular radio's radio's highest output power to antenna is 0.964 W or 29.84 dBm With +2.0 dBi antenna gain EIRP is 31.84 dBm or 1.53 W

A test separation distance of 20 cm is used.

A worst case calculation is as follows:

$$S = \frac{EIRP}{4 \times \pi \times r^2}$$

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service or has ever been under an Intertek certification program.

Maximum power densities are

S = 0.0022 / (4 x π x 0,2²) = 0.0044 W/m² = 0.00044 mW/cm² at 2405 MHz

S = 2.39 / ($4 \times \pi \times 0.2^2$) = 4.761 W /m² = 0.476 mW/cm² at 824.2 MHz

S = 1.53 / (4 x π x 0,2²) = 3.044 W/m² = 0.344 mW/cm² 1850.2 MHz

LIMITS & EVALUATIONS:

Standard	Limit	Unit	Values	Result
CFR 47 §1.1310	1	mW / cm²	0.0004 at 2405 MHz	PASS
CFR 47 §1.1310	824.2 / 1500	mW / cm²	0.549 at 824.2 MHz	PASS
CFR 47 §1.1310	1	mW / cm²	0.344 at 1850.2 MHz	PASS

Simultaneous transmission

KDB 447498 D01 section 7.2: Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is \leq 1.0.

GSM 850 and 2.4 GHz transmitter transmitting simultaneously 0.476/(824.2/1500) + 0.00044/1 = 0.866

GSM 1900 and 2.4 GHz transmitter transmitting simultaneously 0.344/1 + 0.0004/1 = 0.344

The EUT is exempted from rf-evaluation in simultaneous transmission

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service or has ever been under an Intertek certification program.

RSS 102

RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment) between 300 and 6000 MHz is 0.02619 $f^{0.6834}$ W / m².

Standard	Reference for limit	Limit	Unit
RSS-102 issue 5 (2014) section 2.5.2	0.02619 f ^{0.6834}	5.35 at 2405 MHz	W/m ²
RSS-102 issue 5 (2014) section 2.5.2	0.02619 f ^{0.6834}	2.576 at 824.2 MHz	W/m ²
RSS-102 issue 5 (2014) section 2.5.2	0.02619 f ^{0.6834}	4.476 at 1850.2 MHz	W/m ²

The EUT doesn't fulfil requirement in 20 cm distance. Minimum safe use distance is (EIPP / 4π S)/0.5

Minimum sale use distance is (EIRP / 411 S) 0.5					
Frequency (MHz)	Limit	Use distance	Unit		
2405	5.355	0.20	m		
824.2	2.576	0.28	m		
1850.2	4.476	0.20	m		

Minimum safe use distance for EUT per RSS 102 issue 5 is 28 cm. For simultaneous transmission of GSM 850 and 2,4 GHz transmitter minimum safe use distance is 28 cm.

Date of issue: 2015-09-28

Issued by: Matti Virkki

Intertek Semko AB, Radio & EMC

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service or has ever been under an Intertek certification program.