

STATEMENT ON EXPOSURE TO ELECTROMAGNETIC FIELDS

EQUIPMENT

Type of equipment:	Remote terminal unit with 3G connectivity
Brand name:	Creowave
Type / Model:	R7-101, R7-102
Manufacturer:	Creowave Oy
By request of:	Creowave Oy

STANDARD

47 CFR §2.1091, 47 CFR §1.1307, 47 CFR §1.1310
RSS-102 Issue 5

CALCULATIONS

Power density calculation is as follows:

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

Manufacturer's installation guide states that minimum distance between antennas and user is 50 cm.

Highest Measured output power for ZigBee is 19.18 dBm.

Antenna Gain 5 dBi

$$S = (261,8 \text{ mW}) / (4\pi * 50\text{cm}^2) = 0.0083 \text{ mW} / \text{cm}^2$$

For three ZigBee transmitter simultaneous operation $S = 0.025 \text{ mW} / \text{cm}^2$

Highest measured output power for GSM /3G is

GSM and EDGE modes

824.2 - 848.8 MHz 31.92 dBm

1850.4 - 1909.8 MHz 27.21 dBm

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WCDMA mode

826.4 - 846.6 MHz 21.92dBm

1852.4 - 1907.6 MHz 20.74dBm

Antenna Gain 4 dBi @ 850 MHz 5 dBi @ 1900 MHz

Power density:

$$S_{\text{GSM 850}} = (3908.4 \text{ mW}) / (4\pi \cdot 50 \text{ cm}^2) = 0.1244 \text{ mW} / \text{cm}^2$$

$$S_{\text{GSM 1900}} = (1663.4 \text{ mW}) / (4\pi \cdot 50 \text{ cm}^2) = 0.0529 \text{ mW} / \text{cm}^2$$

$$S_{\text{WCDMA 850}} = (390.8 \text{ mW}) / (4\pi \cdot 50 \text{ cm}^2) = 0.0124 \text{ mW} / \text{cm}^2$$

$$S_{\text{WCDMA 1900}} = (375.0 \text{ mW}) / (4\pi \cdot 50 \text{ cm}^2) = 0.0119 \text{ mW} / \text{cm}^2$$

Limit for General Population/Uncontrolled Exposure according to §1.1310 for power density between 1500 – 100 000 MHz is $1 \text{ mW} / \text{cm}^2$ and $f(\text{MHz})/1500 \text{ mW} / \text{cm}^2$ between 300 – 1500 MHz.

RSS-102 table 4 field strength limit for general public environment between 300 – 6000 MHz is $0.02619 f(\text{MHz})^{0.6834}$.

Limits CFR 47 §1.1310

$$\text{Limit 1 at 824.2 MHz} = 0.549 \text{ mW} / \text{cm}^2$$

$$\text{Limit 2 at 1900 and 2450 MHz is} = 1 \text{ mW} / \text{cm}^2$$

Limits RSS-102 table 4

$$\text{Limit 1 at 824.2 MHz} = 5.49 \text{ W} / \text{m}^2$$

$$\text{Limit 2 at 1900 MHz} = 4.47 \text{ W} / \text{m}^2$$

$$\text{Limit 3 2450 is} = 5.42 \text{ W} / \text{m}^2$$

Simultaneous transmission conditions: $\text{MPE}_1 / \text{limit}_1 + \text{MPE}_2 / \text{limit}_2 + \text{MPE}_n / \text{limit}_n < 1$

$$\begin{aligned} 3 \times \text{ZigBee} + \text{GSM 850} &= 3 \times 0.0083/1 + 0.1244/0.549 = 0.251 \\ &= 3 \times (0.083/5.42) + 1.244/5.49 = 0.273 \end{aligned}$$

$$\begin{aligned} 3 \times \text{ZigBee} + \text{GSM 1900} &= 3 \times 0.0083/1 + 0.0529/1 = 0.078 \\ &= 3 \times (0.083/5.42) + 0.529/4.47 = 0.164 \end{aligned}$$

EUT complies without testing.

Intertek Semko AB, Radio& EMC

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