STATEMENT ON EXPOSURE TO ELECTROMAGNETIC FIELDS

EQUIPMENT

Type of equipment: Mobile reader

Brand name: Nordic ID

Type / Model: 6GT2803-BA00, GT2803-1BA10

Manufacturer: Nordic ID Oy

By request of: Nordic ID Oy

STANDARD

47 CFR §1.1307, §1.1310, §2.1091
RSS-102 Issue 5
KDB 447498 D01 V06

OUTPUT POWER

The highest average output powers of the WLAN transmitter in the EUT:

44 mW on 2,4 GHz band
51 mW on U-NII 1 band
54 mW on U-NII 2a band
43 mW on U-NII 2b band
24 mW on U-NII 3 band

The power to the RFID transmitter is 200 mW. We assume that transmitter is ideal and all power is fed to the antenna.

CALCULATIONS

Standalone transmission conditions

From KDB 447498 CLAUSE 4.3.1a

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 10-g SAR test exclusion threshold is determined by the following

$$\frac{Pmax}{d} \times \sqrt{f(GHz)} \le 7.5$$

For separation distance > 50 mm we need Pmax at d = 50 mm distance

$$Pmax \le \frac{7,5}{\sqrt{f(GHz)}} \times d$$

4.3.1b

For 100 MHz to 6 GHz and test separation distances > 50 mm SAR test exclusion thresholds are determined by the following

For 100 MHz to 1500 MHz frequencies SAR exclusion threshold is defined as follows

$$\left[(Pmax \ in \ 4.3.1a + (d - 50 \ mm)) \times \frac{f(MHz)}{150} \right] mW$$

For > 1500 MHz and ≤ 6 GHz frequencies

$$[(Pmax \ 4.3.1a + (d - 50mm) \times 10)] mW$$

4.3.1c

For frequencies below 100 MHz and > 50 mm separation

$$\left[(Pmax \ in \ 4.3.1a + (d - 50 \ mm)) \times \frac{100 \ (MHz)}{150} \right] mW \times \left[1 + LOG \left(\frac{100}{f(MHz)} \right) \right]$$

For frequencies below 100 MHz and < 50 mm separation

$$\left\{ \left[(Pmax \ in \ 4.3.1a + (50 \ mm - 50 \ mm)) \times \frac{100 \ (MHz)}{150} \right] mW \times \left[1 + LOG \left(\frac{100}{f(MHz)} \right) \right] \right\} \times 0.5$$

Minimum distance from WLAN antenna and RFID internal antenna to user body is 85 mm when held in hand. Minimum distance from RFID external antenna to user body is 0 mm when held in hand.

In handheld use the SAR threshold results are following in standalone condition:

RFID internal antenna = 2258 mW
RFID external antenna = 1107 mW
2,4 GHz band = 592 mW
5,15 GHz – 5,35 GHz = 515 mW
5,5 – 5,7 GHz band = 510 mW
5,8 GHz band = 506 mW

RSS-102 exemption limits for limb worn devices are

Below 100 Mhz and separation distance over 50 mm 810 mW
2450 MHz and separation distance over 50 mm 772.5 mW
5800 MHz and separation distance over 50 mm 265 mW

All transmission levels are lower than threshold in standalone conditions

Simultaneous transmission conditions

When an antenna qualifies for the standalone SAR test exclusion and transmits simultaneously with other antennas the standalone SAR is evaluated according to following.

Test separation $\leq 50\ mm$

$$\frac{Pmax\ on\ channel}{minimum\ separation\ distance\ mm} \times \frac{\sqrt{f(GHz)}}{x} \frac{W}{kg}$$

Where x is 7.5 for 1-g SAR and 18.75 for 10-g SAR

Test separation $> 50\ mm$

$0.4\frac{W}{kg}$ for 1-g SAR and $1\frac{W}{kg}$ for 10-g SAR.

The RFID and WLAN transmitters can operate simultaneously. The RFID internal antenna and WLAN antenna are considered to be co-located.

Per clause 4.3.2b the estimated SAR value for each individual antenna is 1.0 W/kg.
Sum of simultaneous transmissions is then 2.0 W/kg

SAR limit per § 1.1310(c) and RSS-102 clause 4 for body extremities is 4 W/kg when averaged over any 10 g of tissue.

Estimated simultaneous condition SAR value is lower than SAR limit therefore device is excluded from testing in simultaneous in conditions.

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