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Report

Dosimetric Assessment of the Mobile Telephone Siemens Gigaset B420data According to the American FCC Requirements

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customer
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: 6575-MSA-J8
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Executive Summary

The Gigaset B420data is a mobile telecommunication device from Siemens operating in the 2450 MHz frequency range. The device has an integrated antenna. The system concept used is the Bluetooth standard.

The objective of the measurements done by IMST was the dosimetric assessment of the one test sample. The examinations have been carried out with the dosimetric assessment system „DASY".

The measurements were made according to the Federal Communications Commission (FCC) Guidelines [FCC 1997] for evaluating compliance of mobile phones with the American Standard ANSI C95.1 [ANSI 1992]. In [ANSI 1992] limits are defined to prevent harmful effects in human beings exposed to electromagnetic fields.

The Siemens Gigaset B420data is in compliance with the American Standard ANSI C95.1 [ANSI 1992].

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1 Subject of Investigation

The Gigaset B420data shown in Fig. 1 is a mobile telecommunication device from Siemens operating in the 2450 MHz frequency range. The device has an integrated antenna. The system concept used is the Bluetooth standard.

The objective of the measurements done by IMST was the dosimetric assessment of one test sample. The examinations have been carried out with the dosimetric assessment system „DASY" described below.

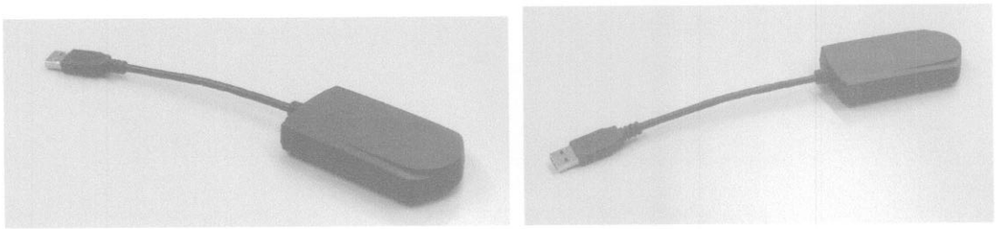

Fig. 1: Pictures of the Gigaset B420data under test including cable and USB connector.

2 The American Standard ANSI C95.1

In the USA the recent Standard ANSI C95.1 was published in April 1992 [ANSI 1992]. It sets limits for human exposure to radiofrequency fields in the frequency range 3 kHz to 300 GHz.

2.1 Distinction Between Exposed Population, Duration of Exposure and Frequencies

The American standard distinguishes between controlled and uncontrolled environment. Controlled environments are locations where there is exposure that may be incurred by persons who are aware of the potential for exposure as a concomitant of employment or by other cognizant persons. Uncontrolled environments are locations where there is the exposure of individuals who have no knowledge or control of their exposure. The exposures may occur in living quarters or workplaces.

For exposure in controlled environments higher field strengths are admissible. In addition the duration of exposure is considered. For the relevant frequency range the limit is made at 30 minutes exposure time. For short-term exposure below a duration of 30 minutes, higher field strengths are admissible.

Due to the influence of frequency on important parameters, as the penetration depth of the electromagnetic fields into the human body and the absorption capability of different tissues, the limits in general vary with frequency.

2.2 Distinction between Maximum Permissible Exposure and SAR Limits

The biological relevant parameter describing the effects of electromagnetic fields in the frequency range of interest is the specific absorption rate SAR (dimension: power/mass). It is a measure of the power absorbed per unit mass. The SAR may be spatially averaged over the total mass of an exposed body or its parts. The SAR is calculated from the r.m.s. electric field strength E inside the human body, the conductivity σ and the mass density ρ of the biological tissue:

$$SAR = \sigma \frac{E^2}{\rho} = c \left. \frac{\partial T}{\partial t} \right|_{t \to 0+} . \quad (1)$$

The specific absorption rate describes the initial rate of temperature rise $\partial T / \partial t$ as a function of the specific heat capacity c of the tissue. A limitation of the specific absorption rate prevents an excessive heating of the human body by electromagnetic energy.

As it is sometimes difficult to determine the SAR directly by measurement (e.g. whole body averaged SAR), the standard specifies more readily measurable maximum permissible exposures in terms of external electric E and magnetic field strength H and power density S, derived from the SAR limits. The limits for E, H and S have been fixed so that even under worst case conditions, the limits for the specific absorption rate SAR are not exceeded.

For the relevant frequency range the maximum permissible exposure may be exceeded if the exposure can be shown by appropriate techniques to produce SAR values below the corresponding limits.

2.3 SAR Limit

In this report the comparison between the American exposure limits and the measured data is made using the spatial peak SAR; the power level of the device under test guarantees that the whole body averaged SAR is not exceeded.

Having in mind a worst case consideration, the SAR limit is valid for uncontrolled environment and for exposure times longer than 30 minutes [ANSI 1992]. According to Table 1 the SAR values have to be averaged over a mass of 1 g (SAR_{1g}) with the shape of a cube.

Standard	Status	SAR limit [W/kg]
ANSI C95.1	In force	1.6

Table 1: Relevant spatial peak SAR limit averaged over a mass of 1 g.