FCC ID LJPNSB-6NY

Applicant: Nokia Mobile Phones
Correspondence Reference Number: 13190
731 Confirmation Number: EA96734

NOKIA

CORRESPONDENCE

25. April 2000

1. *Q:* Body-worn data was not provided in the test data. The manual indicates that there is a connector for a Headset/car kit connection. Since there is a headset option the device can be worn on the body. As a result Body-worn data will be required. Address body-worn SAR compliance with respect to belt-clips, holsters or similar accessories provided with this device. Body-worn SAR may be addressed by testing SAR with a minimum separation distance, typically 0.5 cm to 1.0 cm including the antenna whether extended or retracted, between the back of the device and the body phantom. If the accessories are not included in the test, only belt clips and holsters containing no metallic parts in the assembly can be marketed providing that they keep the device separation from the body as specified in the test.

The specific operating requirements for body-worn SAR compliance must be included in the users manual for users to comply, indicating that it is for FCC RF exposure compliance and non-tested accessories may not comply and should be avoided.

A: Required body-worn data is shown in appendix 1 and modified user guide page is shown in appendix 2. Measurements are based on the information already shown in the original SAR report of LJPNSB-6NY.

2. *Q:* Clarification is needed on the car kit accessory. If external antennas are used an evaluation of MPE compliance or qualifications for categorical exclusion requirements of Part 2.1091 need to be addressed.

A: There is no external antenna connector in LJPNSB-6NY and thus no external antennas are used.

3. *Q:* Confirm SAR compliance with the hand either by measurements or other appropriate means.

A: SAR compliance data with the hand is shown in appendix 3. Measurement is based on the information already shown in the original SAR report of LJPNSB-6NY.

4. *Q:* The manual indicates in Section 3 that there is a retractable whip antenna and an internal antenna. Verify the type of antenna(s) used with this device, address SAR compliance, and provide updated pages of the manual as necessary.

A: LJPNSB-6NY has an internal antenna with rectractable whip. It is possible to use phone by having whip either up or down position. This question has already been addressed in original SAR report where SAR values were reported in both positions ('whip in' and 'whip up').

Appendix 1. Body-worn SAR Data

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Evaluation of SAR in Body Worn Configurations LJPNSB-6NY.

Introduction

Our approach was to measure the SAR, when phone is used with body worn accessories or is against the Flat Phantom. Body worn accessories CSH-3 Leather Carrying Case and Leather Carrying Case from CBP-2 Travel pack (Picture 1) was tested. The measurement test equipment and setup was the same as used and referred in SAR TEST REPORT of NOKIA 8890.

Picture 1. Leather Carrying Case CSH-3 and Leather Carrying Case from Travel pack CBP-2.

Test method

Measurements were done with the Dasy 2 dosimetric assessment system DAE V2, SN: 213 and with the generic Twin Phantom version 3 from Schmid & Partner Engineering Ag. Positioning of the phone in all measurements was done according to the user guide instructions in section *Radio Frequency (RF) Signals* i.e. display and keypad were facing the flat phantom. Also the design of body worn accessories encourages to this kind of positioning. The point of maximum SAR was searched and SAR was measured with a 3-dimensional cube measurement.

Because of the highest SAR values were originally measured on the channel 512 (1850 MHz) with the head phantom, body-worn SAR was measured on this same channel with the maximum output power level. Brain equivalent liquid, which has higher conductivity than tissues in the body, was used also in body-worn measurements. Thus this method overestimates SAR.

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Results

Graphical presentations of test positions with the highest SAR values are presented in the end of this report.

Digital mode GSM PCS (1900MHz)

meas. nr:	Phone position	Frequency MHz / channel	Power, dBm EIRP*)	SAR (1g)[mW/g]
1	Body Worn, Carrying Case (CSH-3) against Flat Phantom	1850 / 512	30.8	0.26
2	Body Worn, Carrying Case (from Travel Pack CBP-2) against Flat Phantom	1850 / 512	30.8	0.57
3	Body Worn, Display against Flat Phantom	1850 / 512	30.8	0.55
FCC ID: LJPNSB-6NY MEASURED: 2000-4-20/NMP		FCC limit		1.60[mW/g] (ANSI/IEEE)

***) Radiated power was measured by FCC accredited test lab**

Summary

The SAR values found for the portable cellular phone (FCC ID: LJPNSB-6NY) are below the maximum recommended levels of 1.6 mW/g.

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σ = 1.72 [mho/m] ε_r = 41.6 ρ = 1.00 [g/cm^3]
Coarse Grid Dx = 15.0 Dy = 15.0 Dz = 5.0 [mm]
SAR [mW/g] Max: 0.28
SAR (1g): 0.260 [mW/g] SAR (10g): 0.138 [mW/g]

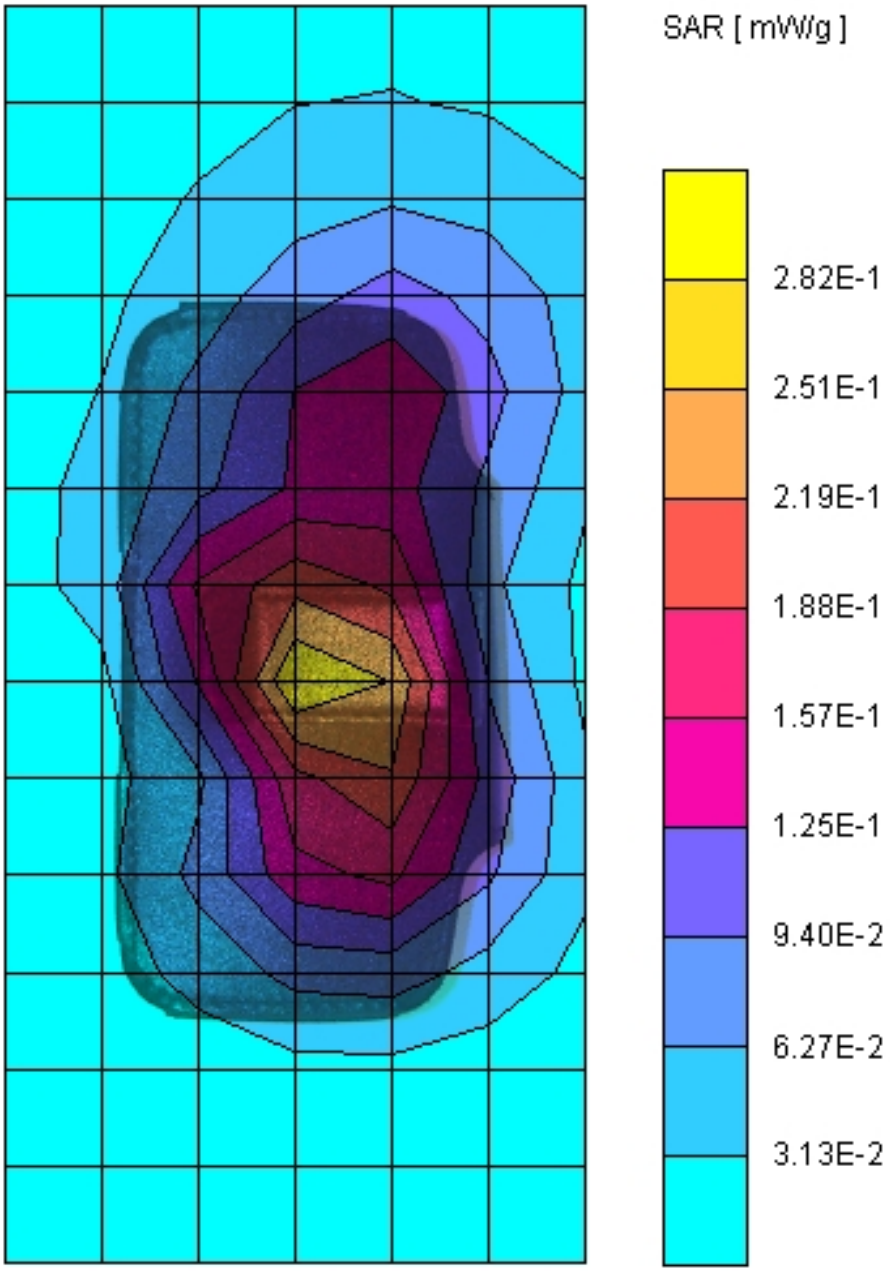

Figure 1. SAR-plot LJPNSB-6NY with Carrying Case CSH-3

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$\sigma = 1.72$ [mho/m] $\varepsilon_r = 41.6$ $\rho = 1.00$ [g/cm^3]
Coarse Grid Dx = 15.0 Dy = 15.0 Dz = 5.0 [mm]
SAR [mW/g] Max: 0.60
SAR (1g): 0.571 [mW/g] SAR (10g): 0.304 [mW/g]

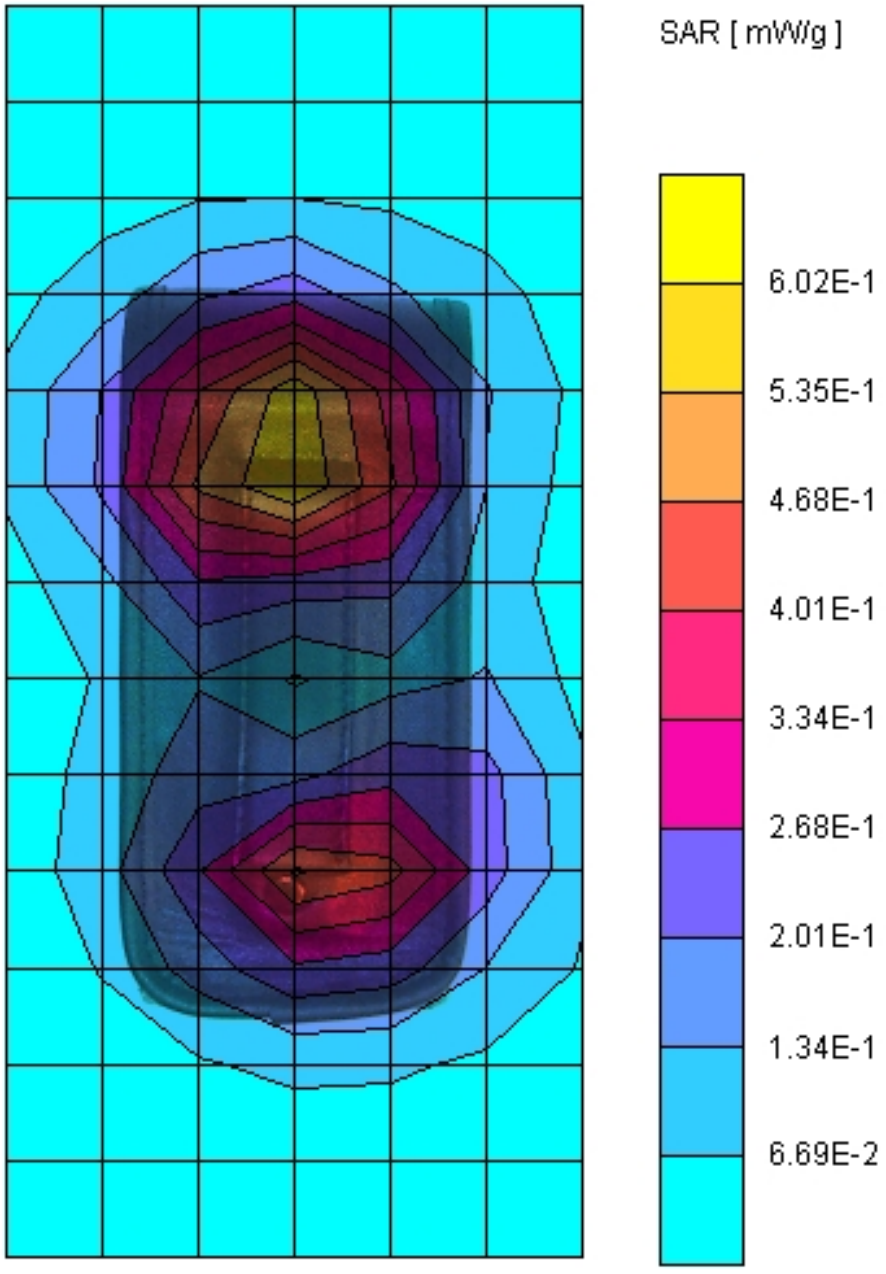

Figure 2. SAR-plot LJPNSB-6NY with Carrying Case from CBP-2

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$\sigma = 1.72$ [mho/m] $\varepsilon_r = 41.6$ $\rho = 1.00$ [g/cm^3]
Coarse Grid Dx = 20.0 Dy = 20.0 Dz = 5.0 [mm]
SAR [mW/g] Max: 0.64
SAR (1g): 0.550 [mW/g] SAR (10g): 0.280 [mW/g]

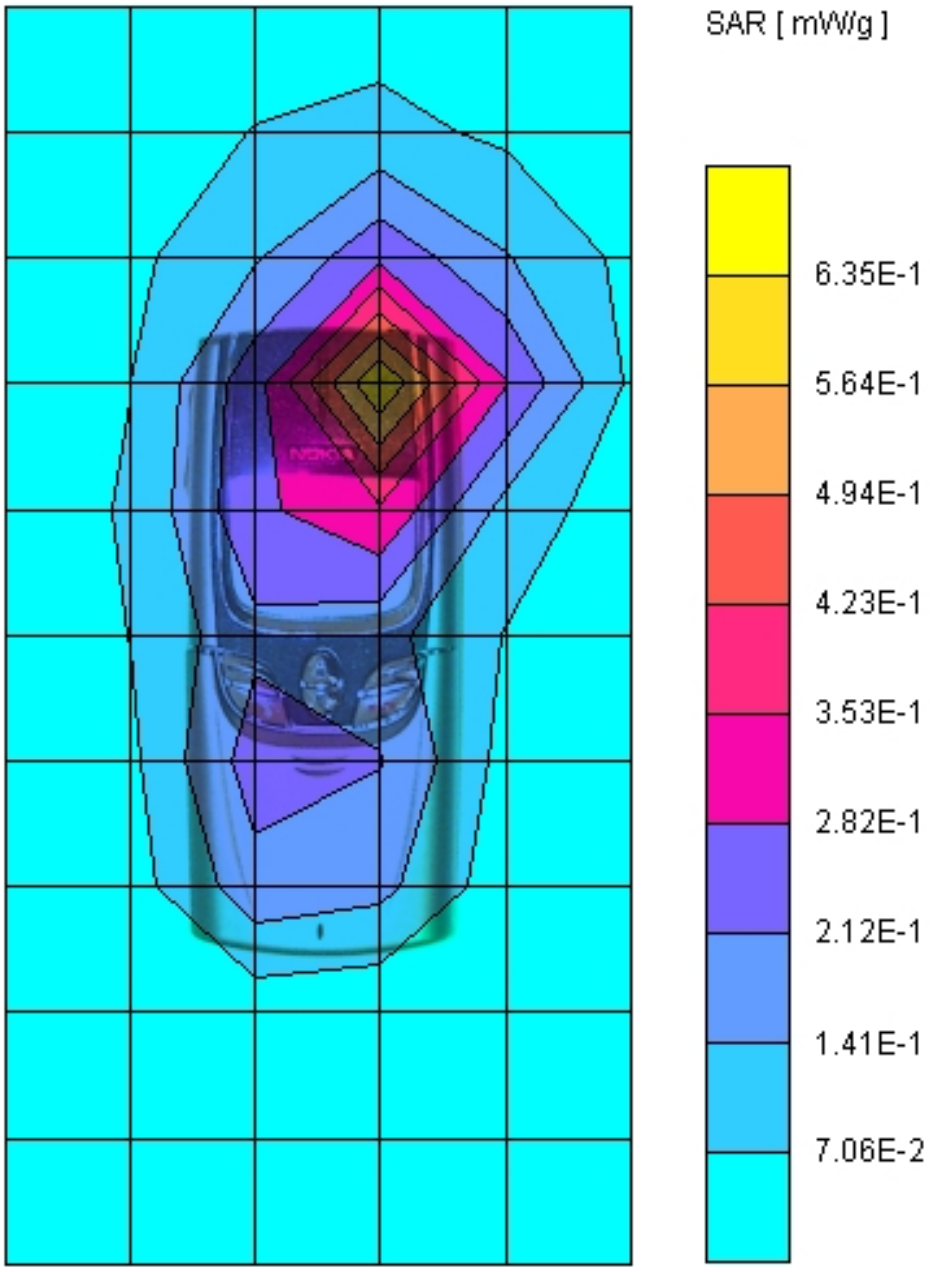

Figure 3. SAR-plot LJPNSB-6NY body worn

Appendix 2. FCC RF Exposure Info in User Guide

Radio Frequency (RF) Signals

Your wireless handheld portable telephone is a low-power radio transmitter and receiver. When it is ON, it receives and sends out radio frequency (RF) signals.

In August 1996, the Federal Communications Commission (FCC) adopted RF exposure guidelines that included safety levels for handheld wireless phones. Those guidelines are consistent with safety standards previously set by both U.S and international standards bodies:

- ANSI C95.1 (1992)*, NCRP Report 86 (1986)*, ICNIRP (1996)*, and RSS-102 issue 1.

Those standards were based on comprehensive and periodic evaluations of the relevant scientific literature. For example, over 120 scientists, engineers, and physicians from universities, government health agencies, and industry reviewed the available body of research to develop the ANSI Standard (C95.1).

The design of your phone complies with the FCC guidelines (and those standards).

To maintain compliance with FCC RF exposure guidelines, use only Nokia approved accesories. When carrying the phone while it is on, place the phone in Nokia approved belt clip, carrying case or holster, or place the phone in a pocket so that the keypad faces your body.

*American National Standards Institute, National Council on Radiation Protection and Measurements; International Commission on Non-Ionizing Radiation Protection.

Appendix 3. SAR Compliance in Hand

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Evaluation of SAR in user hand for LJPNSB-6NY

Introduction

There is no internationally accepted method to measure the SAR-value in user hand, when the phone is used beside the head. The position of the hand is also difficult to determine. Our approach was to measure the maximum SAR, that can occur when hand covers the back of the phone. In practice the situation, however, is different, because the hand is touching the phone in many places and this can change the current distribution.

Test method

Measurements were done with the Dasy 2 dosimetric assessment system DAE V2, SN:213 and with the generic Twin Phantom version 3 from Schmid & Partner Engineering Ag. The phone was positioned back, i.e. antenna and battery, against the flat part of the phantom. The point of maximum SAR was searched. Then the SAR was measured in 10g mass. Because of the highest SAR values were originally measured on the channel 512 (1850 MHz) with the head phantom, hand SAR was measured on this same channel with the maximum output power level.

The method overestimates the SAR: The whole back of the phone, including the antenna area, was scanned for the hand SAR evaluation, even though this is not consistent with the instructions in the user's guide to not touch the antenna unnecessarily. Brain equivalent liquid was used and this has higher conductivity than tissues in the hand. Furthermore a cube for 10g mass was used, which is difficult to realize in practice.

Results

Maximum SAR in hand in 10g mass

Nokia 8890 (NSB-6NY)

Back side (GSM 1850 MHz)	0.93 mW/g

Summary

The hand SAR values found for the portable cellular phone (FCC ID: LJPNSB-6NY) are below the maximum recommended levels of 4 mW/g.