



NOKIA MOBILE PHONES, Inc.
12278 Scripps Summit Drive
San Diego, CA 92131
Tel (858) 831 5000

20 June 2000

Federal Communications Commission,
Authorization & Evaluation Division,
7435 Oakland Mills Road,
Columbia, MD 21046

Attention: FCC Application Processing Branch
RE: FCC ID: GMLNSD-1AW
731 Confirmation number EA96445
Correspondence reference number: 13961

Reply to Correspondence Reference Number 13961 questions

Question 1. Latest reply requests radiated output changes that are different from previously measured results, please submit the corresponding test data.

[Please find test data attached to this reply.](#)

Question 2. SAR compliance for body-worn conditions with the back of the phone against the body, when inserted in a person's pocket, has not been demonstrated. Please either modify proposed body-worn SAR statement in the manual to exclude pocket use or provide additional SAR data to support such operating configuration. (also see below for tissue dielectric parameters)

We have modified our Nokia 5185 User Guide SAR statement to exclude this addressed non-demonstrated situation as follows:

Radio frequency (RF) signals

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

In August, 1996, the Federal Communications Commission (FCC) adopted RF exposure guidelines with 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)*.

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 accessories. When carrying the phone while it is on, place the phone in Nokia approved belt clip 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.*

Question 3. Except for operations next to a person's head, all other operating configurations should generally be tested for SAR using muscle equivalent tissue dielectric parameters. Latest reply indicates head tissue parameters have higher energy absorption than muscle is incorrect. Muscle has higher conductivity, which generally results in higher SAR. Please clarify if the existing body-worn and hand SAR data can be adjusted accordingly with respect to muscle equivalent parameters for demonstrating compliance or provide new test data using muscle equivalent parameters.

Permittivity and conductivity of muscle tissue simulating liquids at 1850 MHz is shown in table 1. and at 836 MHz in table 2..

FCC recommendation is acquired from <http://www.fcc.gov/fcc-bin/dielec.sh>

1850 MHz	Permittivity	Conductivity
FCC recommendation	54.373249	1.418387
Used brain tissue	41.6	1.72

Table 1. Properties of liquids simulating muscle tissue @1850MHz

836 MHz	Permittivity	Conductivity
FCC recommendation	56.111336	0,946714
Used brain tissue	44,3	0,80

Table 2. Properties of liquids simulating muscle tissue @ 836 MHz

FCC recommended conductivity would lead to higher SAR results than the liquid used. On the other hand, the used permittivity compensates some of the difference caused by the used conductivity.

Even if the measured SAR values were multiplied by factor 1.18, which is the difference between the conductivity values on the 800MHz band, the maximum body SAR result would stay within SAR limits. This approach leads however to overestimation of SAR.

Question 4. Body-worn SAR data for AMPS mode was tested at 24.7 dBm and scaled to an output level of 26 dBm. Previously measured conducted output and head SAR results were indicating 25.6 dBm, which should be the maximum AMPS mode output for this filing. The ERP (25.8 dBm ERP, 26.0 dBm conducted) requested in the latest reply will be adjusted accordingly, with respect to the difference in conducted output (26.0-25.6 dBm), to 25.4 dBm or to test results requested in item # 1 above.

Due to some discrepancies in previous 800MHz test data we conducted re-measurements on this frequency band. Based on these test results (See Question 1.) we have decided to set output power levels for this product as follows:

800 MHz AMPS mode

Maximum output power conducted 26.5 dBm (447 mW)
Maximum corresponding output power radiated 27.7 dBm ERP (589 mW)

800 MHz CDMA mode

Maximum output power conducted 24.5 dBm (282 mW)
Maximum corresponding output power radiated 27.7 dBm ERP (437 mW)

Corresponding worst case SAR values on 800MHz band will therefore be as follows

Head SAR Analog mode AMPS

Meas. #	Phone position	Freq.[MHz]/ Channel	Power	Whip in (1g)[mW/g]	Whip up (1g)[mW/g]
1,2	90°	824/991	26.5dBm	0.38	0.90
3,4	90°	836/383	26.5dBm	0.74	1.03
5,6	90°	849/799	26.5dBm	0.74	1.08
FCC ID: GMLNSD-1AW Calculated from measured values to match 26.5dBm P _{out}		FCC LIMIT		1.60 mW/g	1.60 mW/g

Body SAR Analog mode AMPS

Meas. #	Phone position	Freq.[MHz] / Channel	Power	Body SAR (1g)[mW/g]
1	Body worn, BCH-12U Belt Clip against flat phantom	836/383	26.5dBm	1.34
2	Body worn, Display against flat phantom	836/383	26.5dBm	0.88
FCC ID: GMLNSD-1AW Calculated from measured		FCC LIMIT		1.60 mW/g

values to match 26.5dBm P _{out}		
--	--	--

Hand SAR Analog mode AMPS

Meas. #	Position	Freq.[MHz] / Channel	Power	Hand SAR (10g)[mW/g]
1	Back side	836/383	26.5dB m	0.96
FCC ID: GMLNSD-1AW Calculated from measured values to match 26.5dBm P _{out}		RECOMMENDED LIMIT		4.0 mW/g

Question 5. Please confirm or clarify the output power for 800 MHz CDMA mode. Head SAR data is indicating substantially higher SAR with 2 dB lower output than AMPS mode for the same operating frequency and antenna. The results appear to be somewhat inconsistent. If the higher head SAR results for CDMA mode confirmed to be OK, please provide body-worn SAR data for 800 MHz CDMA mode.

Because of significantly lower output power on 800 MHz CDMA mode (+24.5 dBm) compared to 800MHz AMPS mode (+26.5 dBm) and also all SAR testing conducted with this product we have found 800MHz AMPS to be the worst case situation regarding SAR on this frequency band. Therefore we have never provided any 800 MHz CDMA SAR test data for this product. Your comparison between CDMA and AMPS head SAR results must be thereby a comparison between AMPS 800MHz and CDMA 1900MHz test results. These results are non-comparable due to different antenna and tissue properties on different frequency bands.