

Technology Centre
Research Group E561
Measurement Report



SAR measurement
for DECT remote unit and headset



Model	GN ellipse 24, FCC ID BCE-GNellipse2.4
Date of measurement:	10/17/01
Measurement report:	10/26/01

Contract awarder:	ETS Dr. Genz GmbH
Contract acceptor:	T-Nova GmbH
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I. Information on test device and exposure categories

The devices have been tested following with test setup performed by the manufacturer. We can't give further information about test mode and device characteristics.

The measured SAR values are compliant with FCC limits for occupational/controlled exposure as well as for general population/uncontrolled exposure.

II. Specific information for SAR measurements

1. Measurement system and site description

The used measurement system is the Dosimetric Assessment System DASY 3 from ETH Zürich by Prof. N. Kuster.

2. Electric field probe

The electric field probe is an ET3DV4, SN 1108 from the measurement system manufacturer with the following technical data.

Tip diameter	7 mm
Probe tip to sensor center	2.7 mm
Isotropy error	± 0.2 dB
Last calibrated at	10/06/1999
Dynamic range	0.003 W/kg up to 100 W/kg for an error less than 0.1 dB
Conversion Factor	4.29

The probe calibration is valid up to 3 GHz, whereas the probe conversion factor is specified by the manufacturer only up to 2 GHz. Therefore the used conversion factor is calculated by extrapolation. To calculate with the worst case, the conversion factor can't be lower than 1.

3. SAR measurement system verification

The validation has been performed with the measurement system manufacturers original system validation dipole, type D900V2, only at 900 MHz.

4. Phantom description

The used phantom is the flat phantom part of the „Generic Twin Phantom V3.0“ from ETH Zürich with a dimension of about 24cm x 35 cm. The phantom shell of fibre glass has a thickness of 2 ± 0.1 mm. The headset has been tested at the left side head of this phantom.

5. Tissue dielectric property

The used tissue simulating liquid contains 18.5 l of water, 21 kg sugar. The following electrical characteristics have been measured with dielectric probe kit HP85070A.

$$\epsilon_r = 37.5$$

$$\sigma = 2.49$$

As they are lower in dielectric constant and of higher conductivity than the prescribed values, this will lead to SAR overestimation.

During the whole measurement, the ambient temperature changed between 22 °C and 23 °C, the medium temperature between 21 °C and 22 °C.

6. Device positioning

The tested devices have been positioned touching the phantom with their case backside near the antennas.

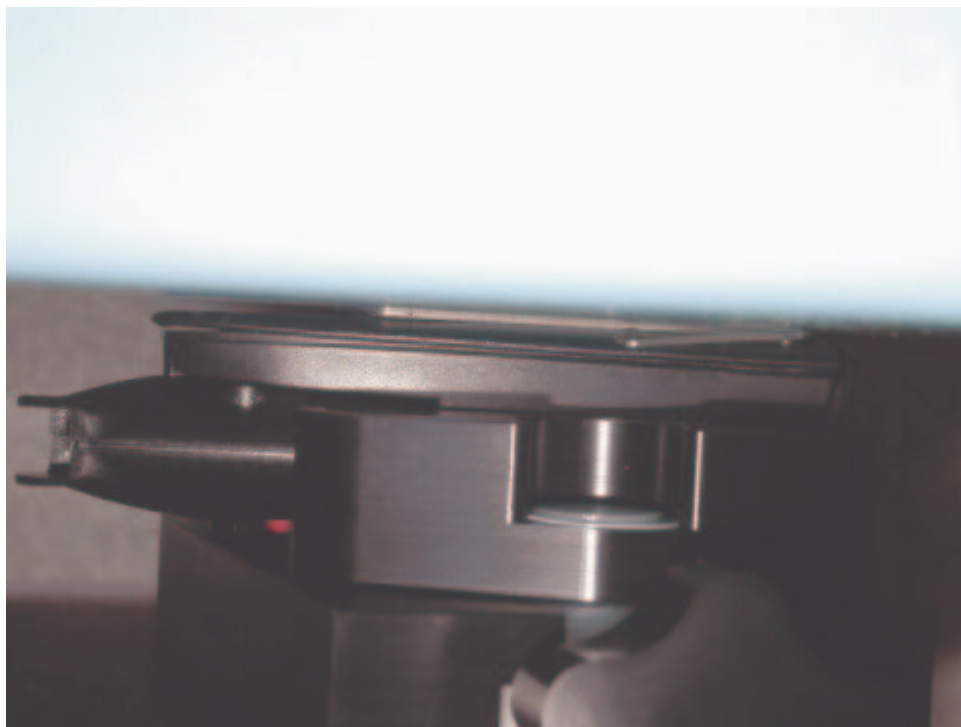


Fig. 1. Measurement of remote unit



Fig. 2. Measurement of headset



Fig. 3. Measurement of headset

With the headset, the measurement values were lower than the noise distortion of the measurement equipment.

7. Peak SAR locations

The coarse scans have been performed with a scan resolution of 12 mm, as shown in the graphical representation attached to this document.

8. One-gram averaged SAR

The one gram averaged SAR was measured by a cube scan with a horizontal resolution of 8 mm and a vertical resolution of 5 mm. All cube scans of the various frequencies have been positioned above the same peak SAR location, detected with the coarse scan measured at the center frequency (channel 23). The unmeasurable SAR values below a height of 3.7 mm above the surface have been calculated from DASY 3 software by numerical extrapolation.

9. Total measurement uncertainty

The total measurement uncertainty assessed by DASY combined with the Generic Twin Phantom is specified by the manufacturer¹ as less than 30%.

10. Test results for determining SAR compliance

Tested device	2400 MHz		2440 MHz		2480 MHz	
	SAR 1g	SAR 10g	SAR 1g	SAR 10g	SAR 1g	SAR 10g
remote unit	0,0833	0,0419	0,109	0,0537	0,106	0,0507
headset	0,0112	0,0095	0,0133	0,0102	0,0173	0,0139
all SAR values in mW/g						

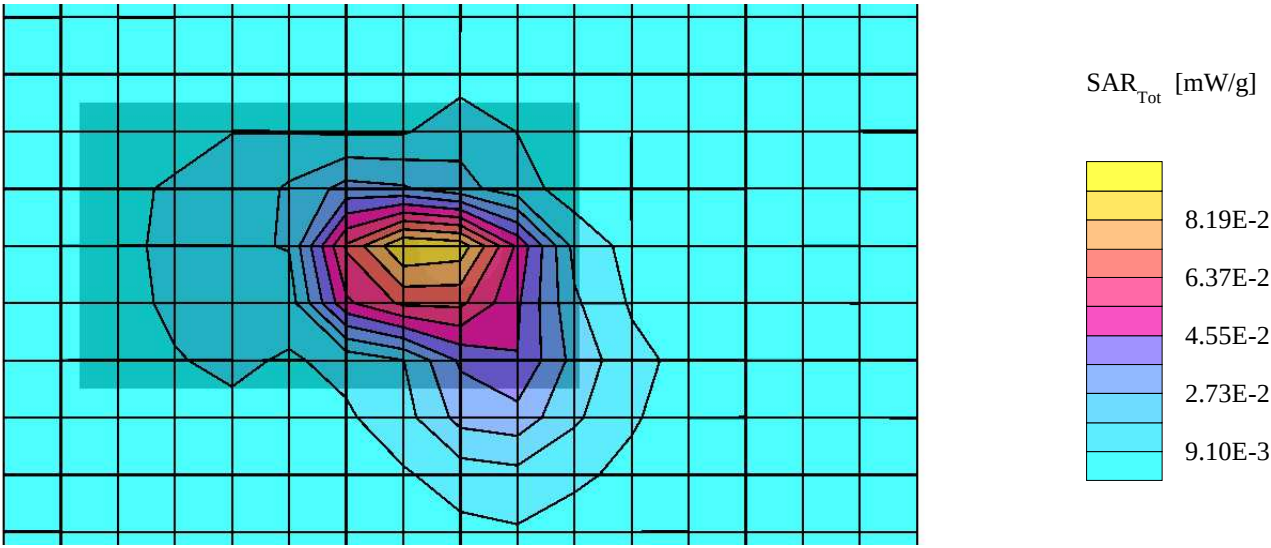
With the headset, the measurement values were lower than the noise distortion of the measurement equipment.

Calculating with a worst case conversion factor of 1, the highest measured 1 g SAR value of 0.109 W/kg would reach up to 0.47 W/kg.

¹ Ralf Kästle, Thomas Schmid, Niels Kuster: Generic Twin Phantom, Zürich 1996

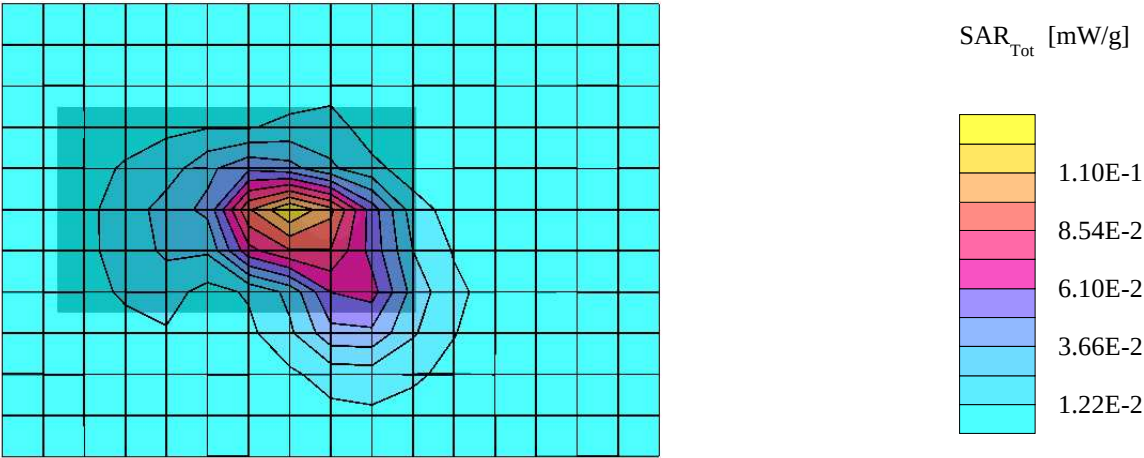
GN ellipse 24

Channel 0
Generic Twin Phantom; Flat Section; Position: (90°,90°); Frequency: 2400 MHz;
Probe: ET3DV4 - 1108; ConvF(4.29,4.29,4.29); Crest factor: 27.0; Medium: $\sigma = 2.49$ mho/m $\epsilon_r = 37.5$ $\rho = 1.00$ g/cm³
Cube 5x5x7: SAR (1g): 0.0833 mW/g, SAR (10g): 0.0419 mW/g, (Worst-case extrapolation)
Coarse: Dx = 12.0, Dy = 12.0, Dz = 10.0
Powerdrift: -0.06 dB



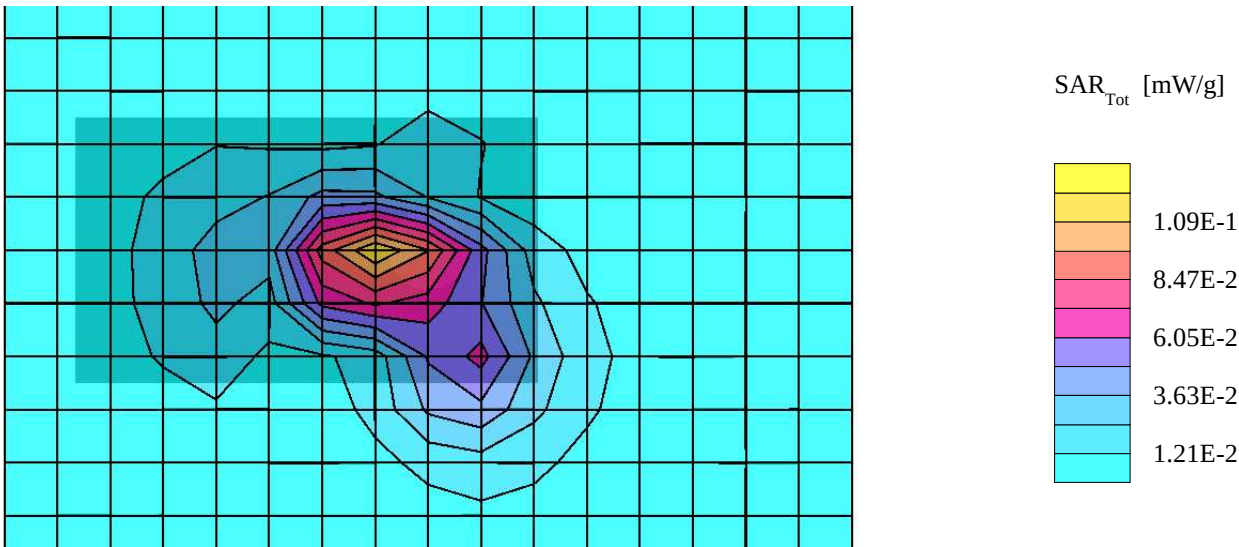
GN ellipse 24

Channel 40
Generic Twin Phantom; Flat Section; Position: (90°,90°); Frequency: 2440 MHz;
Probe: ET3DV4 - 1108; ConvF(4.29,4.29,4.29); Crest factor: 27.0; Medium: $\sigma = 2.49$ mho/m $\epsilon_r = 37.5$ $\rho = 1.00$ g/cm³
Cube 5x5x7: SAR (1g): 0.109 mW/g, SAR (10g): 0.0537 mW/g, (Worst-case extrapolation)
Coarse: Dx = 12.0, Dy = 12.0, Dz = 10.0
Powerdrift: 0.11 dB



GN ellipse 24

Channel 78
Generic Twin Phantom; Flat Section; Position: (90°,90°); Frequency: 2480 MHz;
Probe: ET3DV4 - 1108; ConvF(4.29,4.29,4.29); Crest factor: 27.0; Medium: $\sigma = 2.49$ mho/m $\epsilon_r = 37.5$ $\rho = 1.00$ g/cm³
Cube 5x5x7: SAR (1g): 0.106 mW/g, SAR (10g): 0.0507 mW/g, (Worst-case extrapolation)
Coarse: Dx = 12.0, Dy = 12.0, Dz = 10.0
Powerdrift: -0.17 dB



GN ellipse 24 headset

Intended use

Generic Twin Phantom; Left Hand Section; Position: (80°,65°); Frequency: 2440 MHz;

Probe: ET3DV4 - 1108; ConvF(4.29,4.29,4.29); Crest factor: 27.0; Medium: $\sigma = 2.49$ mho/m $\epsilon_r = 37.5$ $\rho = 1.00$ g/cm³

Cube 5x5x7: SAR (1g): 0.0112 mW/g * , SAR (10g): 0.0095 mW/g * Max outside, (Worst-case extrapolation)

Coarse: Dx = 12.0, Dy = 12.0, Dz = 10.0

Powerdrift: 1.06 dB

