REPORT ON

Specific Absorption Rate Testing of the Sagem
MC2004a GSM Dual Band Mobile Handset

FCC ID: M9HMC2004A

Report No WS615015/01 Issue 3 **May 2006**

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REPORT ON: Specific Absorption Rate Testing of the Sagem MC2004a GSM Dual Band Mobile Handset

FCC ID: M9HMC2004A

Report No: WS615015/01 Issue 2

PREPARED FOR: SAGEM Communication (SAFRAN Group)
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France

ATTESTATION: The wireless portable device described within this report has been shown to be capable of compliance for localised specific absorption rate (SAR) for OET Bulletin 65 (Edition 97-01) of 1.6 W/kg.

The measurements shown in this report were made in accordance with the procedures specified in OET Bulletin 65 (Edition 97-01) for SAR assessment..

All reported testing was carried out on a sample of equipment to demonstrate compliance with the above standards. The sample tested was found to comply with the requirements in the applied rules.

A. Miller
SAR Test Engineer

APPROVED BY:

M J. Hardy
Authorised Signatory

DATED: 15th May 2006

Note: The test results reported herein relate only to the item tested as identified above and on the Status Page.

CONTENTS

SECTION 1

REPORT SUMMARY

Specific Absorption Rate Testing of the Sagem MC2004a GSM Dual Band Mobile Handset

Max 1g SAR (W/kg)	0.814
The maximum 1g volume averaged SAR level measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg. Level defined in Supplement C (Edition 01-01) to OET Bulletin 65 (97-01).	

1.1 STATUS

MANUFACTURING DESCRIPTION	GSM Dual Band Mobile Handset
STATUS OF TEST	Specific Absorption Rate Testing
APPLICANT	Sagem
POWER CLASS	GSM 850 Class 4 GSM 1900 Class 1
GRPS CLASS	B
GPRS MULTI-SLOT CLASS	8 (4Dn;1Up;Sum5)
MANUFACTURER	Sagem
TYPE OR MODEL NUMBER	Sagem MC2004a
HARDWARE VERSION	V0x
SOFTWARE VERSION	L 5,8B
SERIAL NUMBER	01084300950028-2 (IMEISV: 01)
BATTERY MANUFACTURER	Sagem,
MODEL NUMBER	18 897 373-1(Type: Li-ion *3.7V / 780mAh*)

TEST SPECIFICATIONS:

1. FCC Publication Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01): Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields – Additional Information for evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions

REFERENCES:

2. IEEE 1528 – 2003: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques

BABT REGISTRATION NUMBER:	WS615015
RECEIPT OF TEST SAMPLES:	1st March 2006
START OF TEST:	1st March 2006
FINISH OF TEST:	4th March 2006

1.2 SUMMARY

The Sagem MC2004a handset supplied for Specific Absorption Rate (SAR) testing is a Dual Band GSM Mobile Handset with GPRS functionality. The testing was performed with batteries supplied and manufactured by Sagem. Each battery was fully charged before each measurement and there were no external connections.

For head SAR assessment, testing was performed with the device in GSM mode for 850MHz and 1900MHz using a Specific Anthropomorphic Mannequin (SAM) phantom as specified in the IEEE1528:2003 standard. The phantom was filled with simulant liquid appropriate to the frequency band. The dielectric properties were measured and found to be in accordance with the requirements for the dielectric properties specified in FCC OET Bulletin 65 (Edition 97-01) Supplement C. SAR testing was performed at both the left and right ear of the phantom at both handset positions stated in the specification.

For body SAR assessment, testing was performed for GPRS 850 MHz and GPRS 1900 MHz bands at maximum power. SAR assessment was performed with a Simple Hands Free (SHF) accessory (Model No.: 18 844 808-0) attached during testing on the Body. The device was placed at distance of 15 mm from the bottom of the flat phantom for all body testing. The Flat Phantom dimensions were 210mm x 210mm x 210mm with a sidewall thickness of 2.00mm. The phantom was filled to a minimum depth of 150mm with the appropriate Body simulant liquid. The dielectric properties were in accordance with the requirements for the dielectric properties specified in Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01).

Testing was performed at the middle frequency of each band and at the top and the bottom frequencies for the position giving maximum SAR. For head SAR assessment the sequence used accorded with the block diagram of tests given in FCC OET Bulletin 65 (Edition 97-01) Supplement C. For body SAR assessment testing was performed for both front and rear facing positions to establish the worst-case position. Testing was performed at the maximum power for GSM 850 MHz and GSM 1900 MHz. This was achieved using a Universal Radio Communications test set. The Sagem MC2004a had an integral antenna so that the requirement for testing with antenna extended and retracted was not applicable.

Included in this report are descriptions of the test method; the equipment used and an analysis of the test uncertainties applicable and diagrams indicating the locations of maximum SAR for each test position along with photographs indicating the positioning of the handset against the body as appropriate.

The maximum 1g volume averaged SAR level measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg. Level defined in Supplement C (Edition 01-01) to OET Bulletin 65 (97-01).

1.3 TEST RESULT SUMMARY

SYSTEM PERFORMANCE / VALIDATION CHECK RESULTS

Prior to formal testing being performed a System Check was performed in accordance with OET65 (c) [1] and the results were compared against published data in Standard IEEE 1528-2003 [2]. The following results were obtained: -

Date	Dipole Used	Frequency (MHz)	Max 1g SAR (W/kg)	Percentage Drift on Reference	Max 10g SAR (W/kg)	Percentage Drift on Reference
01/03/2006	900	907.5	10.69*	-1.03%	6.99*	1.31%
03/03/2006	1900	1929.0	39.77*	0.19%	20.92*	2.07%

*Normalised to a forward power of 1W

GSM 850 HEAD Specific Absorption Rate (Maximum SAR) 1g & 10g Results for the Sagem MC2004a Mobile Handset with standard antenna & battery

Position		Channel Number	Frequency (MHz)	Max Spot SAR (W/kg)	Max 1g SAR (W/kg	Max 10g SAR (W/kg)	SAR Drift (%)	Area scan (Figure number)
Left or Right Hand Ear	Mobile Position							
LH	Cheek	189	836.4	0.730	0.665	0.481	-2.980	Figure 7
LH	15°	189	836.4	0.200	0.186	0.142	-4.450	Figure 8
RH	Cheek	189	836.4	0.860	0.792	0.572	-1.890	Figure 9
RH	15°	189	836.4	0.260	0.243	0.184	-3.240	Figure 10
RH	Cheek	128	824.2	0.630	0.586	0.430	-0.270	Figure 11
RH	Cheek	251	848.8	0.600	0.551	0.399	-6.430	Figure 12
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) & 2.0 W/kg (10g)								

GPRS 850 BODY Specific Absorption Rate (Maximum SAR) 1g & 10g Results for the Sagem MC2004a Mobile Handset with Simple Hands Free (SHF) Accessory and standard antenna & battery.

Position		Channel Number	Frequency (MHz)	Max Spot SAR (W/kg)	Max 1g SAR (W/kg	Max 10g SAR (W/kg)	SAR Drift (%)	Area scan (Figure number)
Spacing from Phantom	Mobile Position							
15mm	Front Facing Phantom	189	836.4	0.110	0.136	0.094	-0.180	Figure 13
15mm	Rear Facing Phantom	189	836.4	0.680	0.806	0.465	-3.250	Figure 14
15mm	Rear Facing Phantom	128	824.2	0.700	0.814	0.476	4.660	Figure 15
15mm	Rear Facing Phantom	251	848.8	0.540	0.601	0.375	-1.030	Figure 16
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) & 2.0 W/kg (10g)								

1.3 TEST RESULT SUMMARY - Continued

GSM 1900 HEAD Specific Absorption Rate (Maximum SAR) 1g & 10g Results for the Sagem MC2004a Mobile Handset with standard antenna & battery

Position		Channel Number	Frequency (MHz)	Max Spot SAR (W/kg)	Max 1g SAR (W/kg)	Max 10g SAR (W/kg)	SAR Drift (%)	Area scan (Figure number)
Left or Right Hand Ear	Mobile Position							
LH	Cheek	691	1880.0	0.430	0.378	0.228	-2.420	Figure 17
LH	15°	691	1880.0	0.070	0.061	0.038	1.130	Figure 18
RH	Cheek	691	1880.0	0.580	0.505	0.297	-2.900	Figure 19
RH	15°	691	1880.0	0.100	0.088	0.056	-4.590	Figure 20
RH	Cheek	512	1850.2	0.640	0.571	0.323	-1.480	Figure 21
RH	Cheek	810	1909.8	0.590	0.536	0.298	1.290	Figure 22
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) & 2.0 W/kg (10g)								

GPRS 1900 BODY Specific Absorption Rate (Maximum SAR) 1g & 10g Results for the Sagem MC2004a Mobile Handset with Simple Hands Free (SHF) Accessory and standard antenna & battery.

Position		Channel Number	Frequency (MHz)	Max Spot SAR (W/kg)	Max 1g SAR (W/kg	Max 10g SAR (W/kg)	SAR Drift (%)	Area scan (Figure number)
Spacing from Phantom	Mobile Position							
15mm	Front Facing Phantom	691	1880.0	0.090	0.108	0.067	-0.880	Figure 23
15mm	Rear Facing Phantom	691	1880.0	0.280	0.362	0.218	-0.840	Figure 24
15mm	Rear Facing Phantom	512	1850.2	0.330	0.419	0.238	-2.350	Figure 25
15mm	Rear Facing Phantom	810	1909.8	0.300	0.389	0.219	-0.760	Figure 26
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) & 2.0 W/kg (10g)								

1.4 OUTPUT POWER OF TEST DEVICE MEASUREMENT METHOD

The EUT was set up to Transmit on all of the following frequencies (See Table Below).

A peak measurement of the carrier frequency was recorded with the EUT in the worst case orientation.

The EUT was removed and replaced by an antenna at 1.5m fixed height (substituting transmit antenna) connected to a signal generator. The receive antenna and substituting transmit antenna were then electronically aligned.

The signal generator level was adjusted until the recorded peak measurement of the carrier frequency was reached. The cable connected to the substitution transmit antenna was removed and attached to the measurement receiver input.

The level into the substitution transmit antenna was then added to the substitution transmit antenna gain to obtain the radiated output power.

Temperature (°C)	Relative Humidity (%)	Atmospheric Pressure (mbar)
26.2	27	1020

Channel	Output Power dBm	Output Power mW
824.2	28.69	739.6
836.4	27.32	539.5
848.8	26.4	436.5
1850.2	32	1945
1880.0	31.88	1541
1909.8	30.19	1044

SECTION 2

TEST DETAILS

Specific Absorption Rate Testing of the Sagem
MC2004a GSM Dual Band Mobile Handset

2.1 SAR MEASUREMENT SYSTEM

2.1.1 ROBOT SYSTEM SPECIFICATION

The SAR measurement system being used is the IndexSAR SARA2 system, which consists of a Mitsubishi RV-E2 6-axis robot arm and controller, IndexSAR probe and amplifier and SAM phantom Head Shape. The robot is used to articulate the probe to programmed positions inside the phantom head to obtain the SAR readings from the DUT.

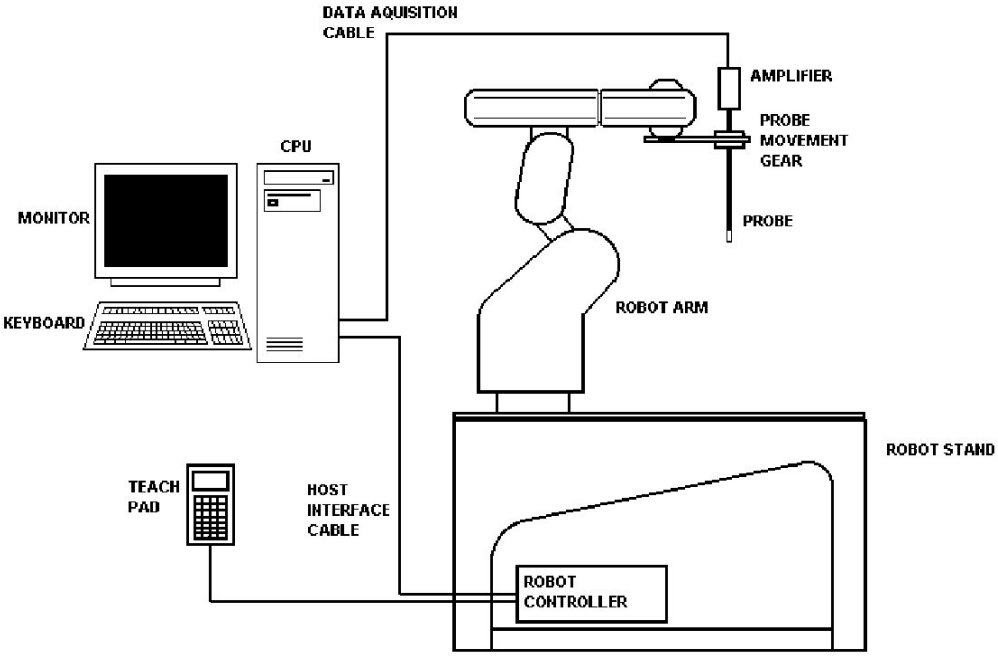

Figure 1: Schematic diagram of the SAR measurement system

The system is controlled remotely from a PC, which contains the software to control the robot and data acquisition equipment. The software also displays the data obtained from test scans.

The position and digitised shape of the phantom heads are made available to the software for accurate positioning of the probe and reduction of set-up time.
The SAM phantom heads are individually digitised using a Mitutoyo CMM machine to a precision of 0.001mm. The data is then converted into a shape format for the software, providing an accurate description of the phantom shell.

In operation, the system first does an area (2D) scan at a fixed depth within the liquid from the inside wall of the phantom. When the maximum SAR point has been found, the system will then carry out a 3D scan centred at that point to determine volume averaged SAR level.

2.1.2 PROBE AND AMPLIFIER SPECIFICATION

IXP-050 IndexSAR isotropic immersible SAR probe
The probes are constructed using three orthogonal dipole sensors arranged on an interlocking, triangular prism core. The probes have built-in shielding against static charges and are contained within a PEEK cylindrical enclosure material at the tip.
Probe calibration is described in the following section.

IFA-010 Fast Amplifier

Technical description of IndexSAR IFA-010 Fast probe amplifier
A block diagram of the fast probe amplifier electronics is shown below.

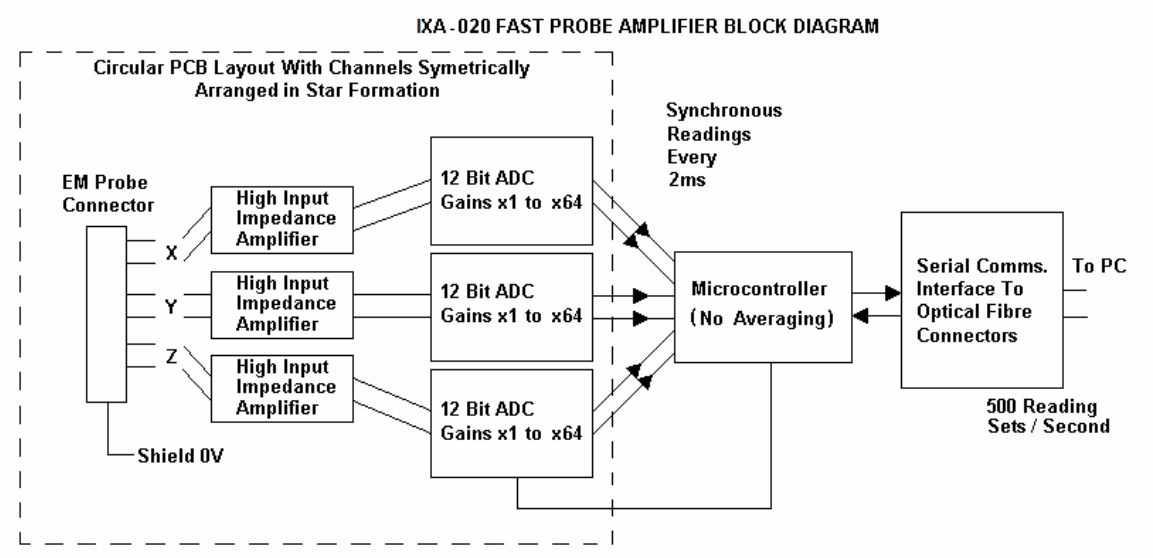

Figure 2: Block diagram of the fast probe amplifier electronic

This amplifier has a time constant of approx. 50µs, which is much faster than the SAR probe response time. The overall system time constant is therefore that of the probe (<1ms) and reading sets for all three channels (simultaneously) are returned every 2ms to the PC. The conversion period is approx. 1 µs at the start of each 2ms period. This enables the probe to follow pulse modulated signals of periods >>2ms. The PC software applies the linearisation procedure separately to each reading, so no linearisation corrections for the averaging of modulated signals are needed in this case. It is important to ensure that the probe reading frequency and the pulse period are not synchronised and the behaviour with pulses of short duration in comparison with the measurement interval need additional consideration.

Phantoms

The Flat phantom used is a rectangular Perspex Box IndexSAR item IXB-070. Dimensions 210w 210d 210h (mm). This phantom is used with IndexSAR side bench IXM-030.

The Specific Anthropomorphic Mannequin (SAM) Upright Phantom is fabricated using moulds generated from the CAD files as specified by CENELEC EN50361:2001. It is mounted via a rotation base to a supporting table, which also holds the robotic positioner. The phantom and robot alignment is assured by both mechanical and laser registration systems.

2.1.3 SAR MEASUREMENT PROCEDURE

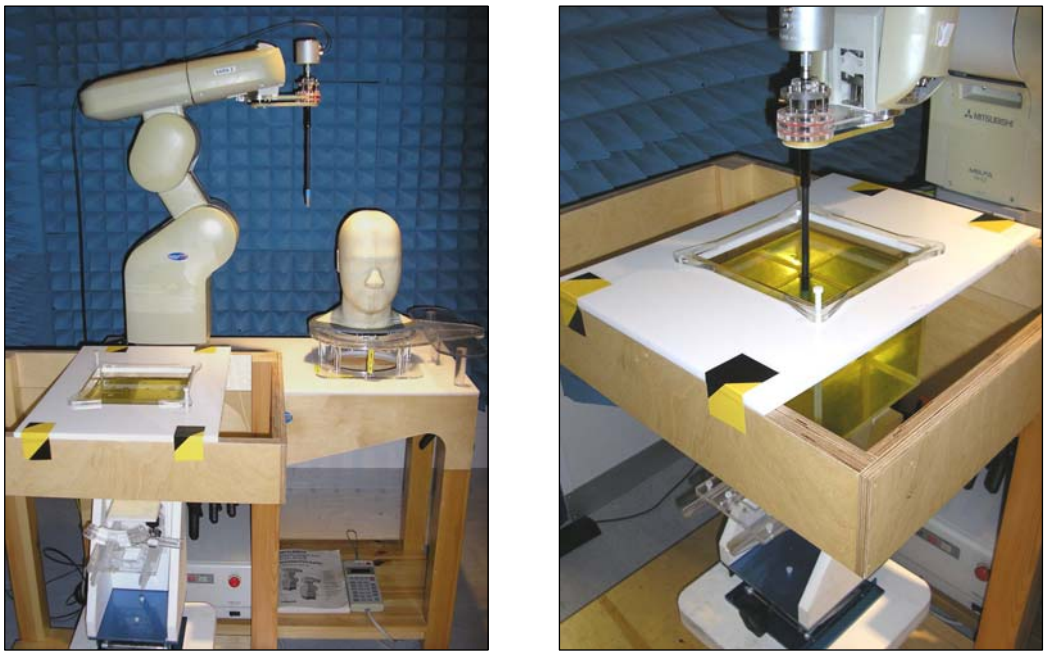

Figure 3: Principal components of the SAR measurement test bench

The major components of the test bench are shown in the picture above. A test set and dipole antenna control the handset via an air link and a low-mass phone holder can position the phone at either ear. Graduated scales are provided to set the phone in the 15 degree position. The upright phantom head holds approx. 7 litres of simulant liquid. The phantom is filled and emptied through a 45mm diameter penetration hole in the top of the head.

After an area scan has been done at a fixed distance of 8mm from the surface of the phantom on the source side, a 3D scan is set up around the location of the maximum spot SAR. First, a point within the scan area is visited by the probe and a SAR reading taken at the start of testing. At the end of testing, the probe is returned to the same point and a second reading is taken. Comparison between these start and end readings enables the power drift during measurement to be assessed.

SARA2 Interpolation and Extrapolation schemes
SARA2 software contains support for both 2D cubic B-spline interpolation as well as 3D cubic B-spline interpolation. In addition, for extrapolation purposes, a general n^{-th} order polynomial fitting routine is implemented following a singular value decomposition algorithm presented in [4]. A 4^{th} order polynomial fit is used by default for data extrapolation, but a linear-logarithmic fitting function can be selected as an option. The polynomial fitting procedures have been tested by comparing the fitting coefficients generated by the SARA2 procedures with those obtained using the polynomial fit functions of Microsoft Excel when applied to the same test input data.

Interpolation of 2D area scan
The 2D cubic B-spline interpolation is used after the initial area scan at fixed distance from the phantom shell wall. The initial scan data are collected with approx. 115mm spatial resolution and spline interpolation is used to find the location of the local maximum to within a 1mm resolution for positioning the subsequent 3D scanning.

2.1.3 SAR MEASUREMENT PROCEDURE - Continued

Extrapolation of 3D scan
For the 3D scan, data are collected on a spatially regular 3D grid having (by default) 6.4 mm steps in the lateral dimensions and 3.5 mm steps in the depth direction (away from the source). SARA2 enables full control over the selection of alternative step sizes in all directions.

The digitised shape of the head is available to the SARA2 software, which decides which points in the 3D array are sufficiently well within the shell wall to be 'visited' by the SAR probe. After the data collection, the data are extrapolated in the depth direction to assign values to points in the 3D array closer to the shell wall. A notional extrapolation value is also assigned to the first point outside the shell wall so that subsequent interpolation schemes will be applicable right up to the shell wall boundary.

Interpolation of 3D scan and volume averaging
The procedure used for defining the shape of the volumes used for SAR averaging in the SARA2 software follow the method of adapting the surface of the 'cube' to conform with the curved inner surface of the phantom (see Appendix C.2.2.1 in EN 50361:2001). This is called, here, the conformal scheme.

For each row of data in the depth direction, the data are extrapolated and interpolated to less than 1mm spacing and average values are calculated from the phantom surface for the row of data over distances corresponding to the requisite depth for 10g and 1g cubes. This results in two 2D arrays of data, which are then cubic B-spline interpolated to sub mm lateral resolution. A search routine then moves an averaging square around through the 2D array and records the maximum value of the corresponding 1g and 10g volume averages. For the definition of the surface in this procedure, the digitised position of the headshell surface is used for measurement in head-shaped phantoms. For measurements in rectangular, box phantoms, the distance between the phantom wall and the closest set of gridded data points is entered into the software.

For measurements in box-shaped phantoms, this distance is under the control of the user. The effective distance must be greater than 2.5mm as this is the tip-sensor distance and to avoid interface proximity effects, it should be at least 5mm. A value of 6 or 8mm is recommended. This distance is called **dbe** in EN 50361:2001.

For automated measurements inside the head, the distance cannot be less than 2.5mm, which is the radius of the probe tip and to avoid interface proximity effects, a minimum clearance distance of x mm is retained. The actual value of dbe will vary from point to point depending upon how the spatially-regular 3D grid points fit within the shell. The greatest separation is when a grid point is just not visited due to the probe tip dimensions. In this case the distance could be as large as the step-size plus the minimum clearance distance (i.e with x=5 and a step size of 3.5, **dbe** will be between 3.5 and 8.5mm).

The default step size (**dstep** in EN 50361:2001) used is 3.5mm, but this is under user-control. The compromise is with time of scan, so it is not practical to make it much smaller or scan times become long and power-drop influences become larger.

The robot positioning system specification for the repeatability of the positioning (**dss** in EN50361:2001) is +/- 0.04mm.

2.1.3 SAR MEASUREMENT PROCEDURE - Continued

The phantom shell is made by an industrial moulding process from the CAD files of the SAM shape, with both internal and external moulds. For the upright phantoms, the external shape is subsequently digitised on a Mitutoyo CMM machine (Euro C574) to a precision of 0.001mm. Wall thickness measurements made non-destructively with an ultrasonic sensor indicate that the shell thickness (**dph**) away from the ear is 2.0 +/- 0.1mm. The ultrasonic measurements were calibrated using additional mechanical measurements on available cut surfaces of the phantom shells.

For the upright phantom, the alignment is based upon registration of the rotation axis of the phantom on its 253mm-diameter baseplate bearing and the position of the probe axis when commanded to go to the axial position. A laser alignment tool is provided (procedure detailed elsewhere). This enables the registration of the phantom tip (**dmis**) to be assured to within approx. 0.2mm. This alignment is done with reference to the actual probe tip after installation and probe alignment. The rotational positioning of the phantom is variable – offering advantages for special studies, but locating pins ensure accurate repositioning at the principal positions (LH and RH ears).

2.2 TEST POSITIONS

This recommended practice specifies exactly two test positions for the handset against the head phantom, the “Cheek” position and the “tilted” position. These two test positions are defined in the following sub-clauses. The handset should be tested in both positions on the left and right sides of the SAM phantom. In each test position the centre of the earpiece of the device is placed directly at the entrance of the auditory canal. The angles mentioned in the test positions used are referenced to the line connecting both auditory canal openings. The plane this line is on is known as the reference plane. Testing is performed on the right and left-hand sides of the generic phantom head.

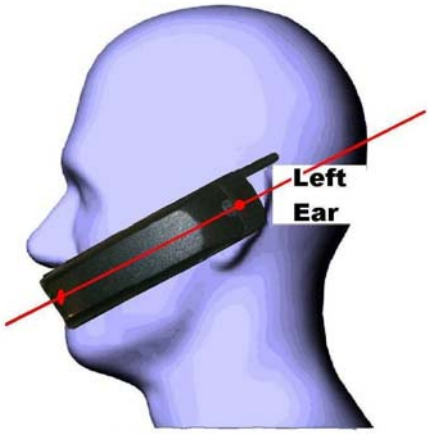

Figure 4. – Side View of Mobile next to head showing alignment.

The Cheek Position
The Cheek Position is where the mobile is in the reference plane and the line between the mobile and the line connecting both auditory canal openings is reduced until any part of the mobile touches any part of the generic twin phantom head.

The 15° Position
The 15° Position is where the mobile is in the reference Cheek position and the phone is kept in contact with the auditory canal at the earpiece; the bottom of the phone is then tilted away from the phantom mouth by 15°.

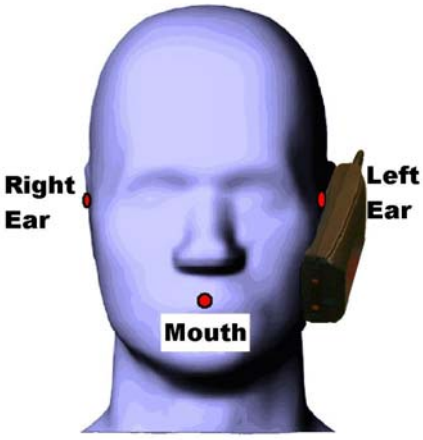

Figure 5. – Cheek Position.

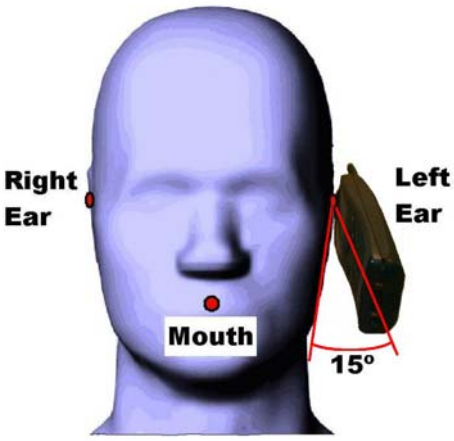

Figure 6. – 15º Tilt Position.

2.3 MAXIMUM GSM 850 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	01/03/2006 12:44:24	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_01.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	23.6°C	LIQUID SIMULANT:	835 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	43.12
RELATIVE HUMIDITY:	20%	CONDUCTIVITY:	0.919
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	21.5°C
PHANTOM ROTATION:	330°	MAX SAR Y-AXIS LOCATION:	-17.60 mm
DUT POSITION:	LH-Cheek	MAX SAR Z-AXIS LOCATION:	-168.95 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	28.16 V/m
TEST FREQUENCY:	836.4MHz	SAR 1g:	0.665 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.481 W/kg
CONVERSION FACTORS:	0.314 / 0.314 / 0.314	SAR START:	0.427 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.414 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-2.98 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	5	EXTRAPOLATION:	poly4

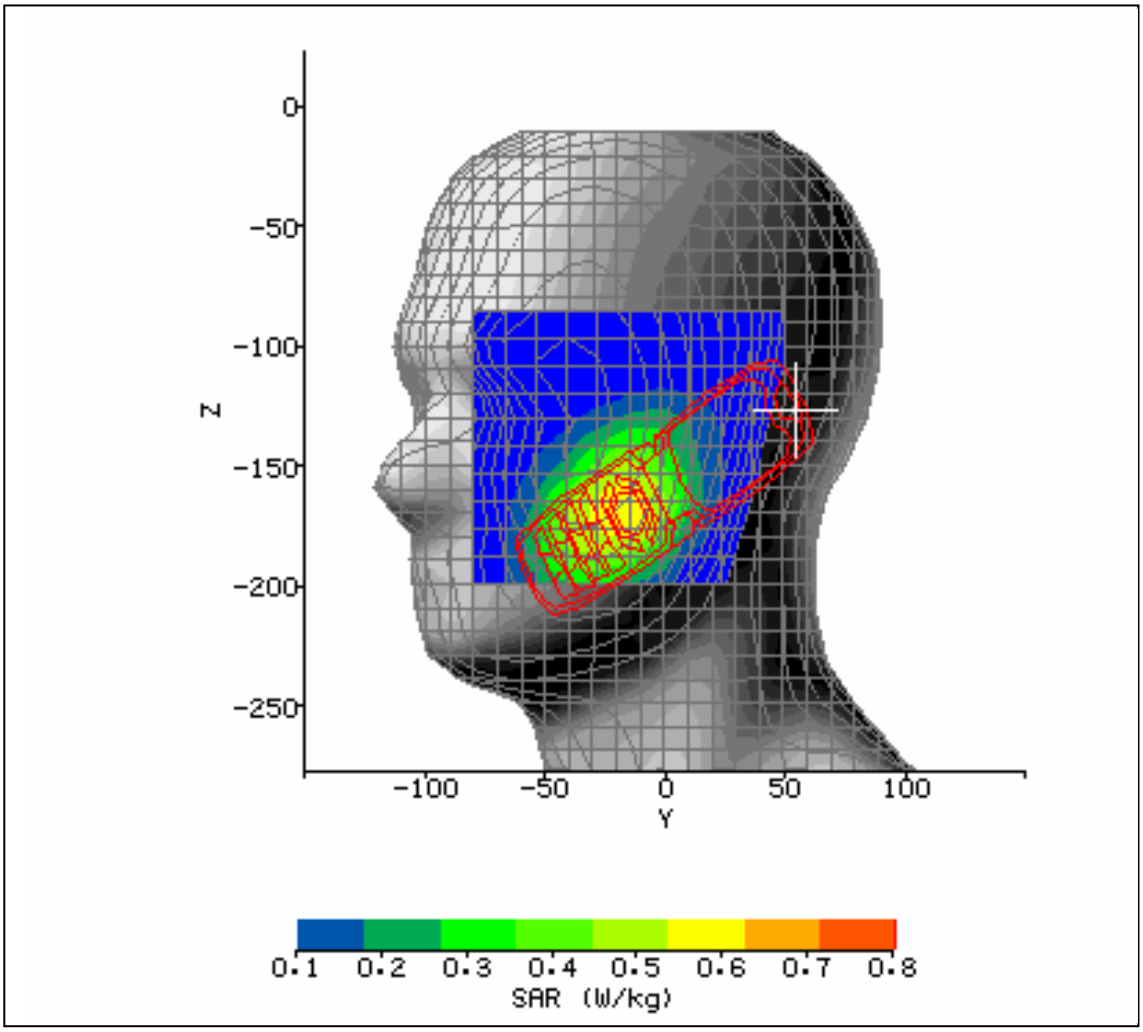

Figure 7: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in LH-Cheek Position; Tested at 836.4MHz (GSM 850 Middle Channel).

2.3 MAXIMUM GSM 850 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	01/03/2006 12:44:24	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_02.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	23.3°C	LIQUID SIMULANT:	835 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	43.12
RELATIVE HUMIDITY:	20%	CONDUCTIVITY:	0.919
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	21.6°C
PHANTOM ROTATION:	330°	MAX SAR Y-AXIS LOCATION:	-7.20 mm
DUT POSITION:	LH-Cheek 15°	MAX SAR Z-AXIS LOCATION:	-162.05 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	14.66 V/m
TEST FREQUENCY:	836.4MHz	SAR 1g:	0.186 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.142 W/kg
CONVERSION FACTORS:	0.314 / 0.314 / 0.314	SAR START:	0.128 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.122 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-4.45 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	5	EXTRAPOLATION:	poly4

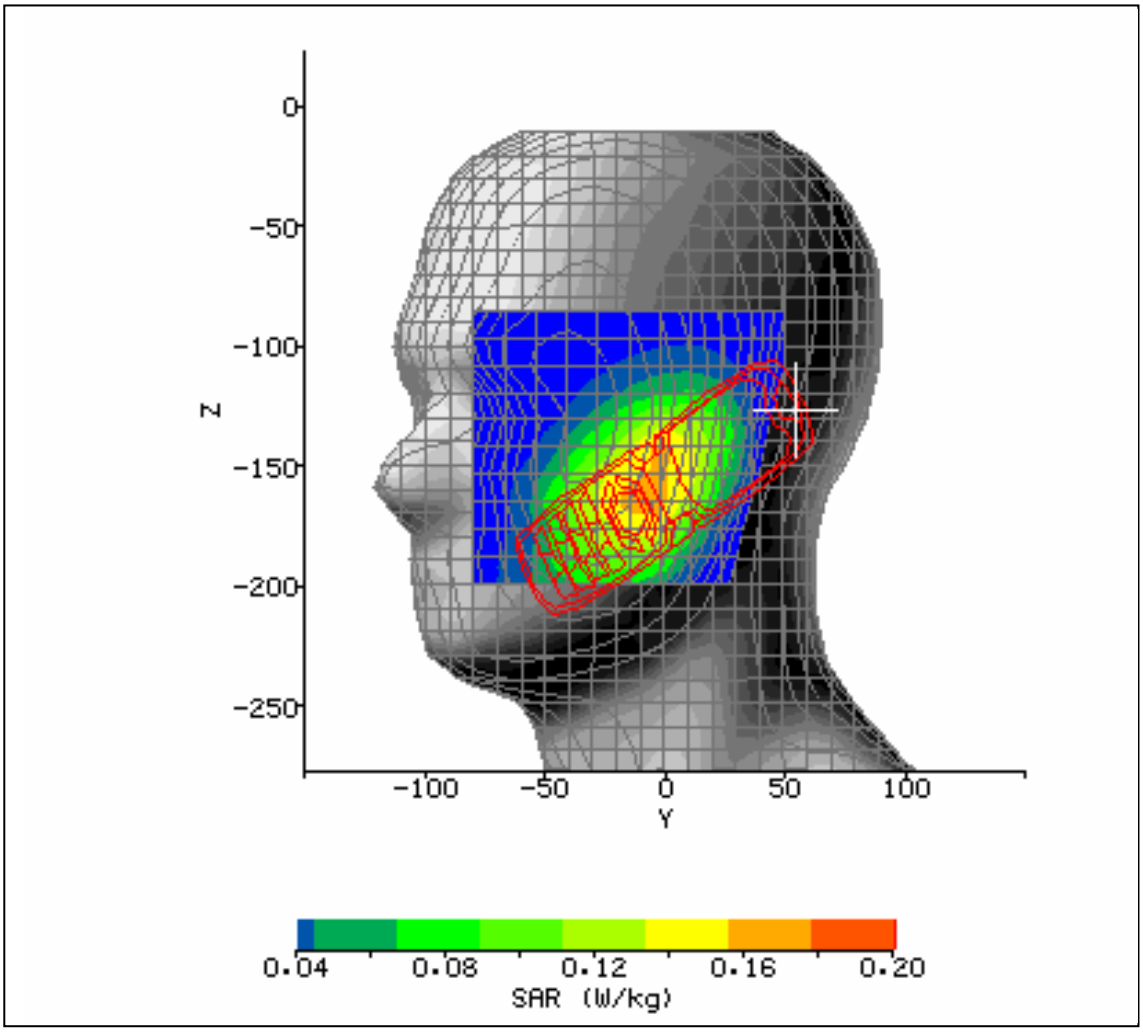

Figure 8: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in LH-Cheek 15° Position; Tested at 836.4MHz (GSM 850 Middle Channel).

2.3 MAXIMUM GSM 850 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	01/03/2006 15:19:51	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_03.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.5°C	LIQUID SIMULANT:	835 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	43.12
RELATIVE HUMIDITY:	20%	CONDUCTIVITY:	0.919
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	21.6°C
PHANTOM ROTATION:	210°	MAX SAR Y-AXIS LOCATION:	25.40 mm
DUT POSITION:	RH-Cheek	MAX SAR Z-AXIS LOCATION:	-167.80 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	30.58 V/m
TEST FREQUENCY:	836.4MHz	SAR 1g:	0.792 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.572 W/kg
CONVERSION FACTORS:	0.314 / 0.314 / 0.314	SAR START:	0.488 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.479 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-1.89 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	5	EXTRAPOLATION:	poly4

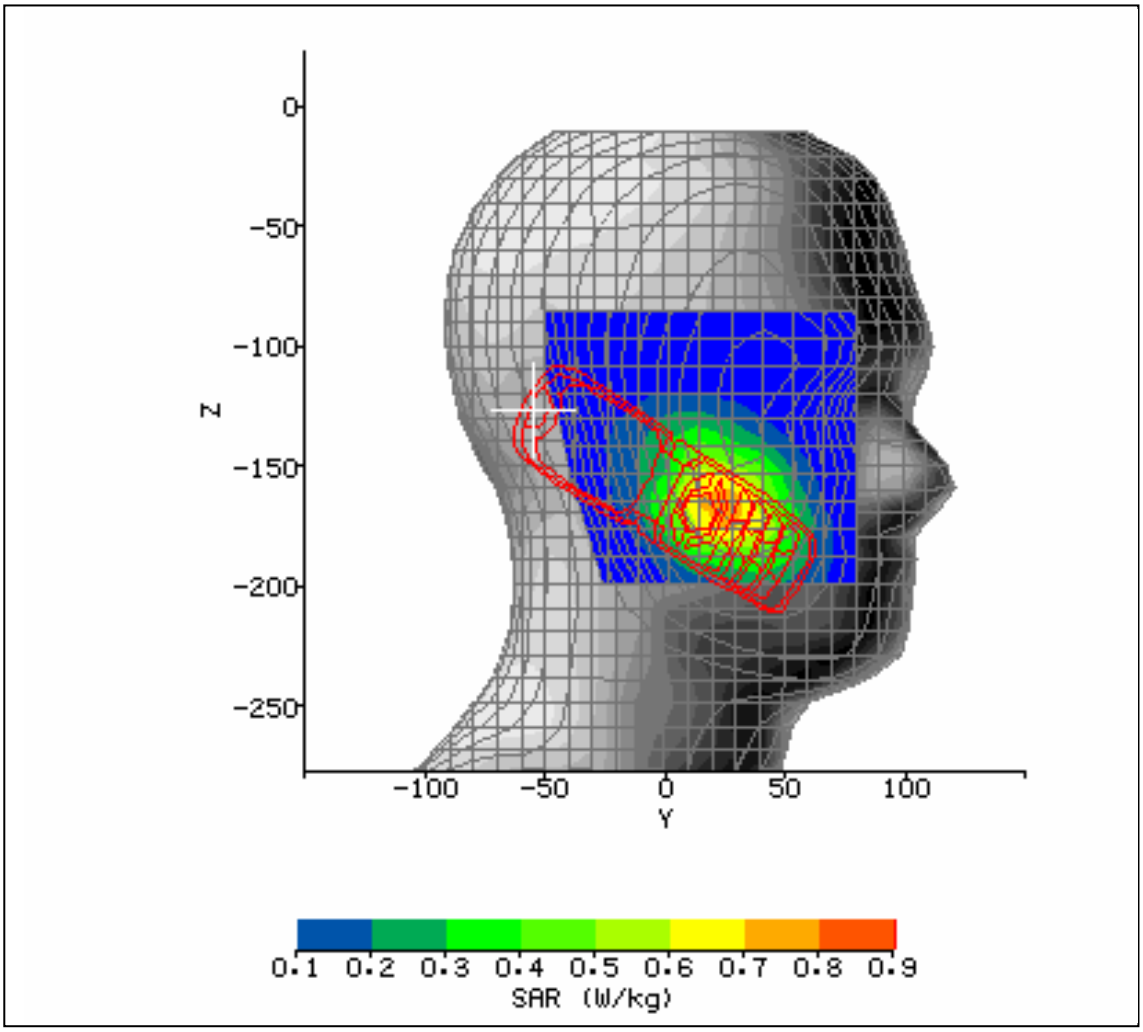

Figure 9: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in RH-Cheek Position; Tested at 836.4MHz (GSM 850 Middle Channel).

2.3 MAXIMUM GSM 850 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	01/03/2006 15:46:26	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_04.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.4°C	LIQUID SIMULANT:	835 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	43.12
RELATIVE HUMIDITY:	20%	CONDUCTIVITY:	0.919
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	21.6°C
PHANTOM ROTATION:	210°	MAX SAR Y-AXIS LOCATION:	17.60 mm
DUT POSITION:	RH-Cheek 15°	MAX SAR Z-AXIS LOCATION:	-163.20 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	16.71 V/m
TEST FREQUENCY:	836.4MHz	SAR 1g:	0.243 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.184 W/kg
CONVERSION FACTORS:	0.314 / 0.314 / 0.314	SAR START:	0.158 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.153 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-3.24 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	5	EXTRAPOLATION:	poly4

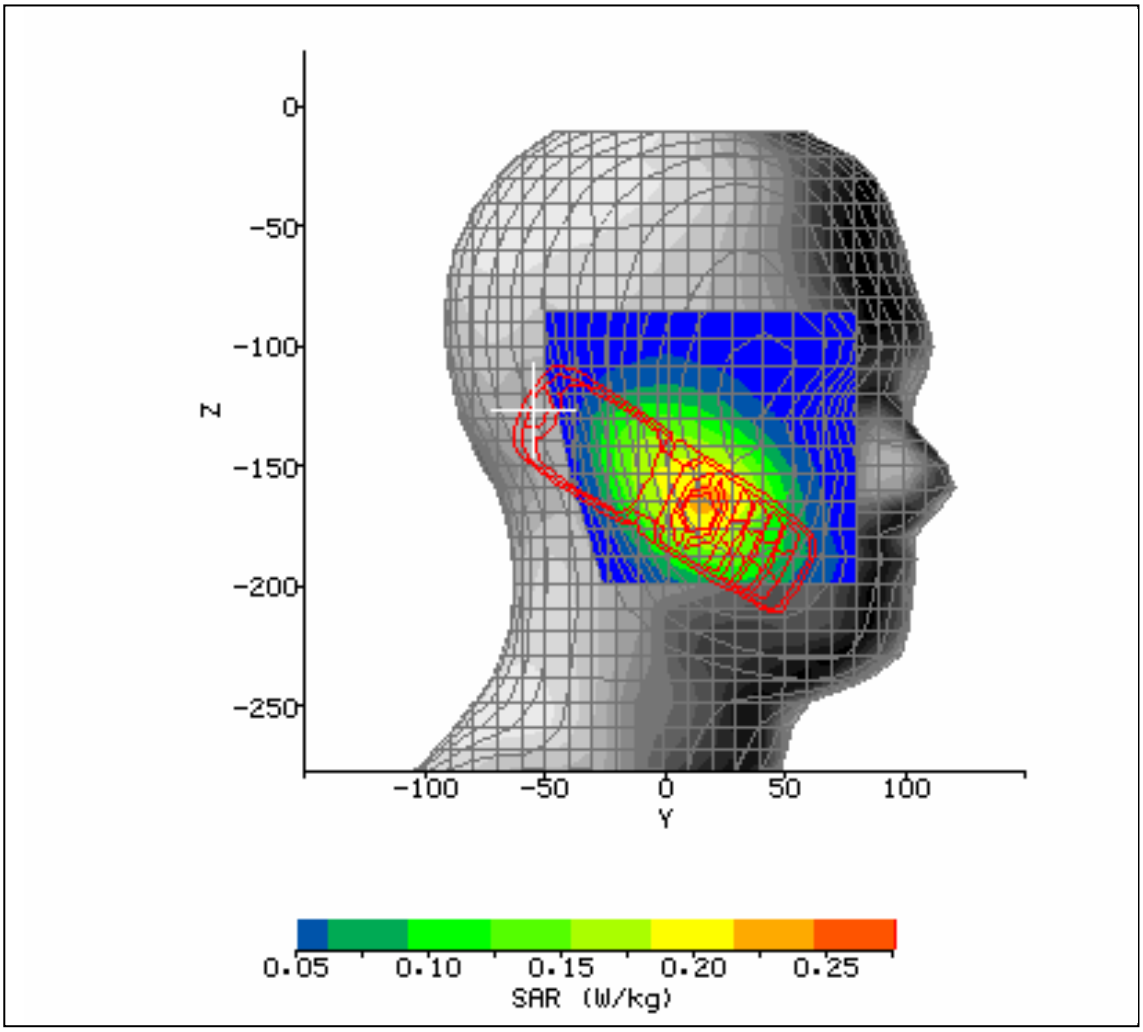

Figure 10: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in RH-Cheek 15° Position; Tested at 836.4MHz (GSM 850 Middle Channel)

2.3 MAXIMUM GSM 850 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	02/03/2006 09:43:14	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_05.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	23.2°C	LIQUID SIMULANT:	835 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	43.12
RELATIVE HUMIDITY:	20%	CONDUCTIVITY:	0.919
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	23.2°C
PHANTOM ROTATION:	210°	MAX SAR Y-AXIS LOCATION:	25.40 mm
DUT POSITION:	RH-Cheek	MAX SAR Z-AXIS LOCATION:	-168.95 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	26.12 V/m
TEST FREQUENCY:	824.2MHz	SAR 1g:	0.586 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.430 W/kg
CONVERSION FACTORS:	0.314 / 0.314 / 0.314	SAR START:	0.361 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.360 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-0.27 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	5	EXTRAPOLATION:	poly4

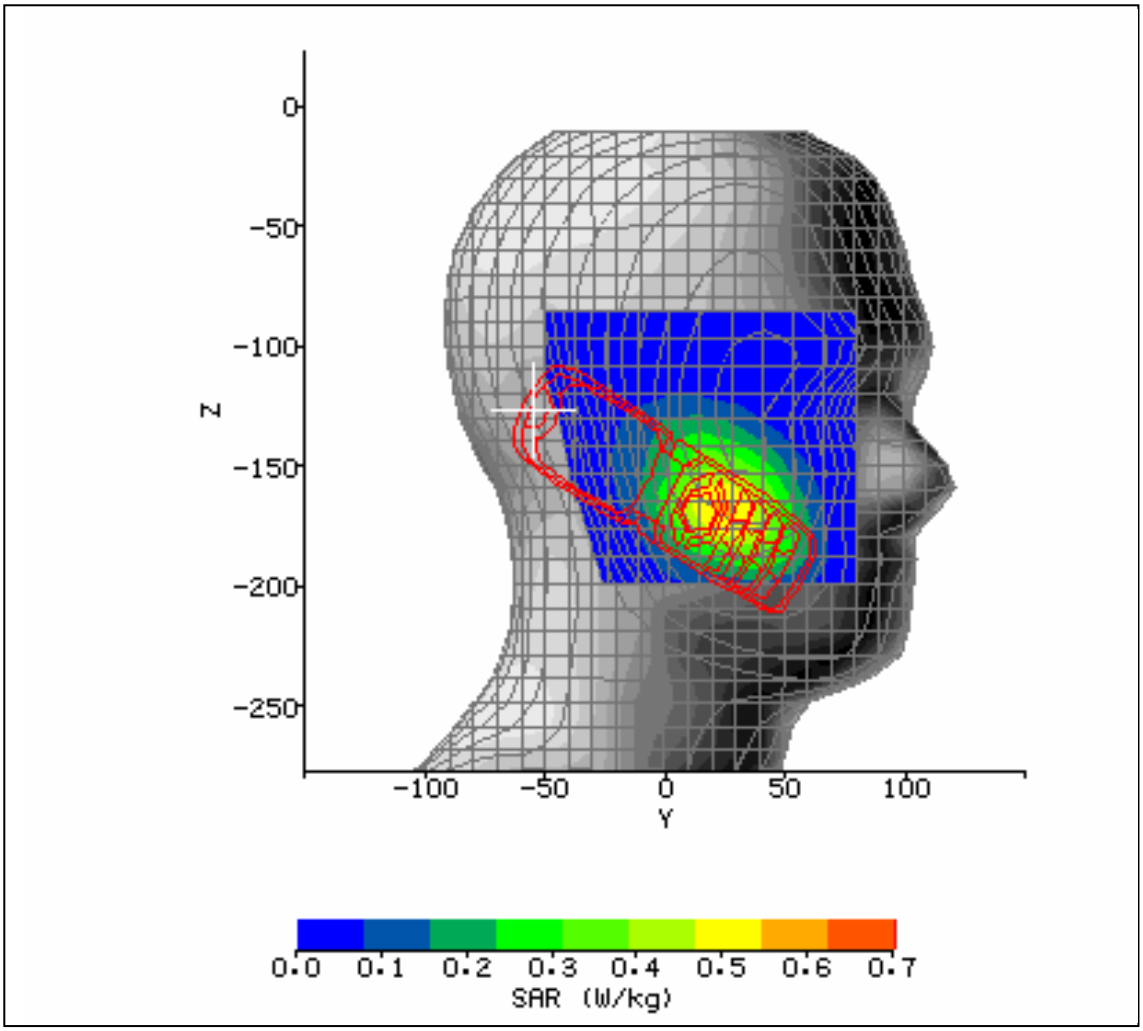

Figure 11: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in RH-Cheek Position (Worst Case); Tested at 824.2MHz (GSM 850 Bottom Channel)

2.3 MAXIMUM GSM 850 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	02/03/2006 11:24:03	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_06.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.7°C	LIQUID SIMULANT:	835 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	43.12
RELATIVE HUMIDITY:	20%	CONDUCTIVITY:	0.919
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	23.0°C
PHANTOM ROTATION:	210°	MAX SAR Y-AXIS LOCATION:	24.10 mm
DUT POSITION:	RH-Cheek	MAX SAR Z-AXIS LOCATION:	-167.80 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	25.50 V/m
TEST FREQUENCY:	848.8MHz	SAR 1g:	0.551 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.399 W/kg
CONVERSION FACTORS:	0.314 / 0.314 / 0.314	SAR START:	0.346 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.324 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-6.43 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	5	EXTRAPOLATION:	poly4

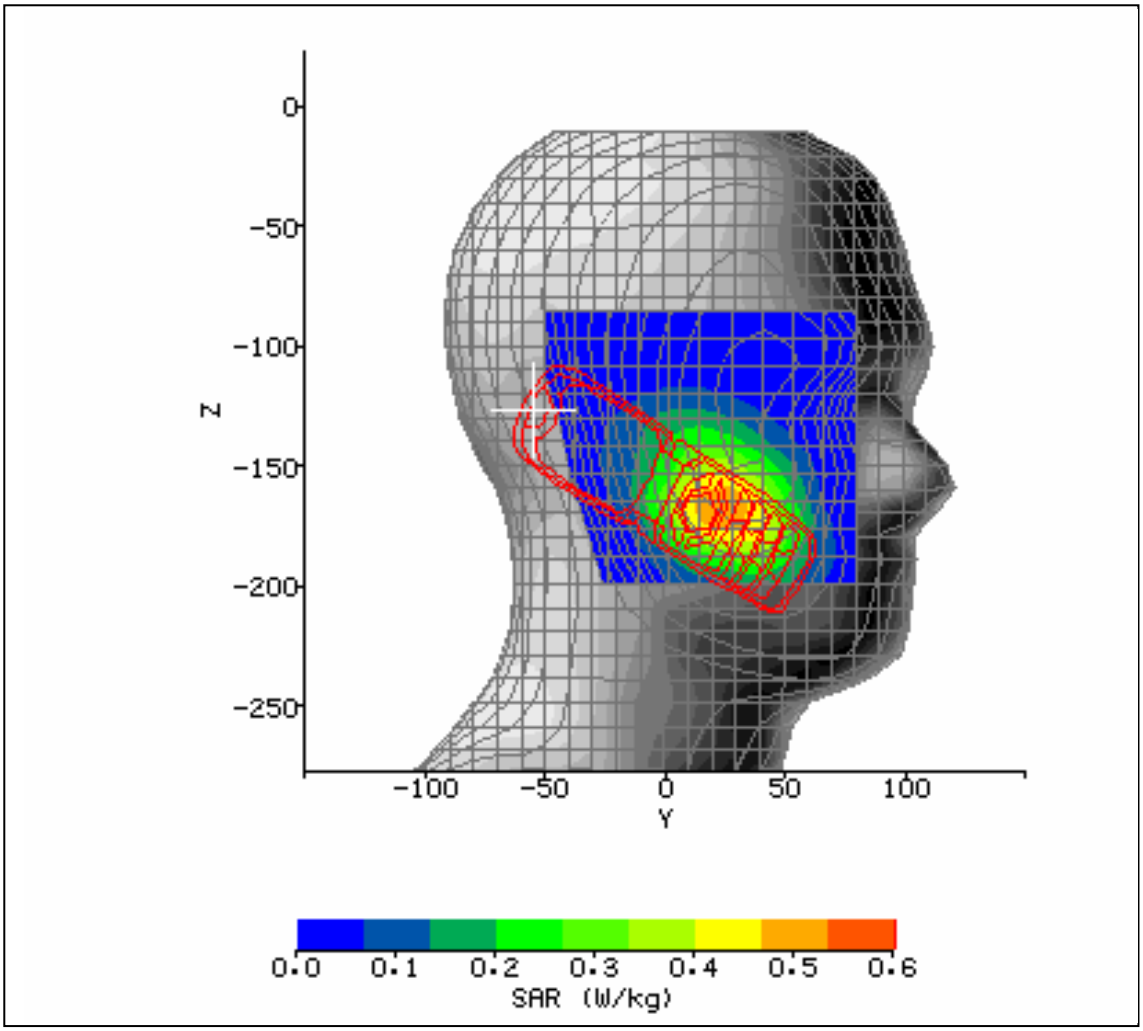

Figure 12: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in RH-Cheek Position (Worst Case); Tested at 848.8MHz (GSM 850 Top Channel)

2.3 MAXIMUM GPRS 850 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	03/03/2006 08:54:01	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_13.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	23.1°C	LIQUID SIMULANT:	835 Body
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	58.16
RELATIVE HUMIDITY:	20.2%	CONDUCTIVITY:	1.58
PHANTOM S/NO:	HeadBoxN.csv	LIQUID TEMPERATURE:	21.9°C
PHANTOM ROTATION:	0°	MAX SAR X-AXIS LOCATION:	0.00 mm
DUT POSITION:	Front facing 15mm	MAX SAR Y-AXIS LOCATION:	-9.00 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	10.79 V/m
TEST FREQUENCY:	836.4MHz	SAR 1g:	0.136 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.094 W/kg
CONVERSION FACTORS:	0.348 / 0.348 / 0.348	SAR START:	0.042 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.042 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-0.18 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	1x 33 dBm	EXTRAPOLATION:	poly4

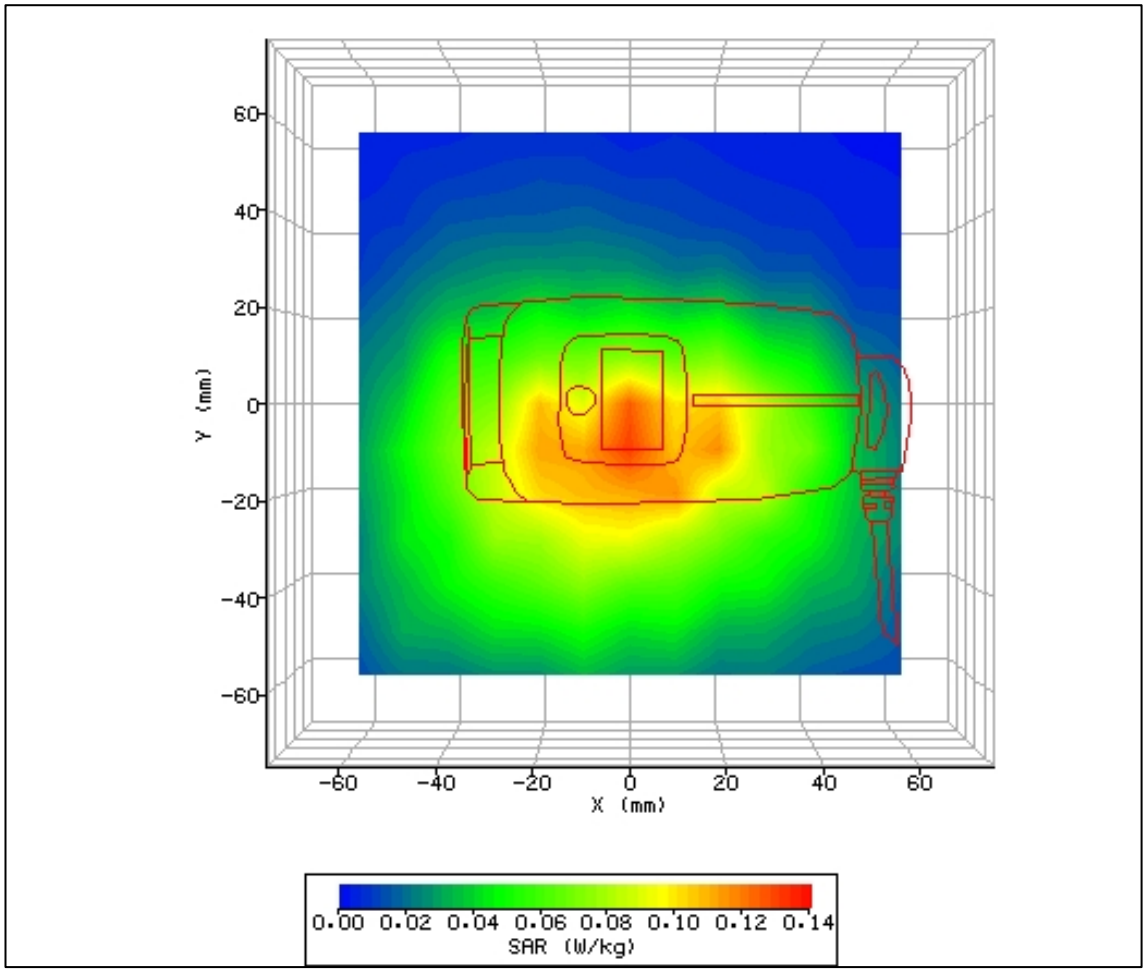

Figure 13: SAR Body Testing Results for the Sagem MC2004a Mobile Handset in Front Facing Phantom Position; Tested at 836.4MHz (GPRS 850 Middle Channel) with 15mm Separation Distance to the Phantom.

2.3 MAXIMUM GPRS 850 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	03/03/2006 10:05:17	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_14.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	23.0°C	LIQUID SIMULANT:	835 Body
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	58.16
RELATIVE HUMIDITY:	20.8%	CONDUCTIVITY:	0.976
PHANTOM S/NO:	HeadBox1.csv	LIQUID TEMPERATURE:	21.8°C
PHANTOM ROTATION:	0°	MAX SAR X-AXIS LOCATION:	-12.00 mm
DUT POSITION:	Rear facing 15mm	MAX SAR Y-AXIS LOCATION:	0.00 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	26.40 V/m
TEST FREQUENCY:	836.4MHz	SAR 1g:	0.806 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.465 W/kg
CONVERSION FACTORS:	0.348 / 0.348 / 0.348	SAR START:	0.176 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.170 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-3.25 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	1x 33 dBm	EXTRAPOLATION:	poly4

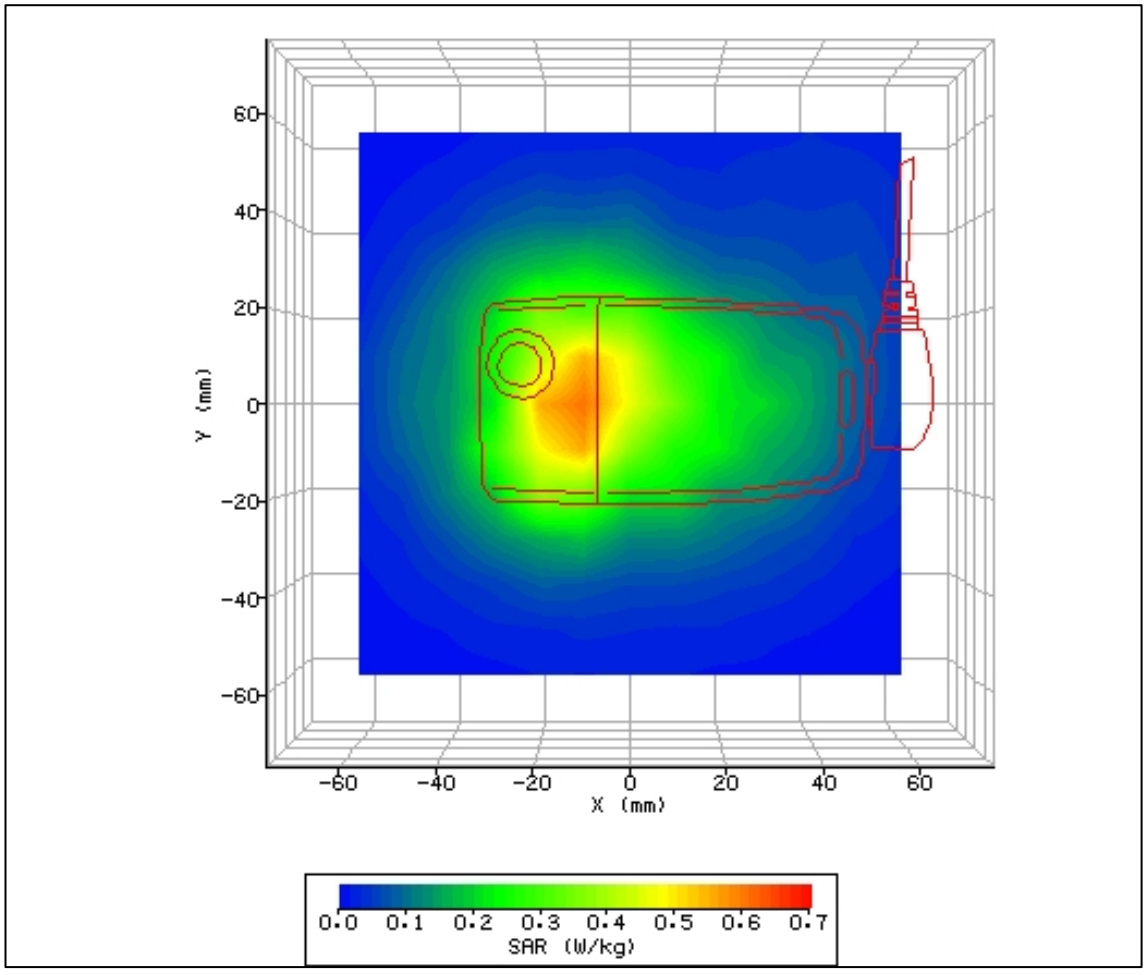

Figure 14: SAR Body Testing Results for the Sagem MC2004a Mobile Handset in Rear Facing Phantom Position; Tested at 836.4MHz (GPRS 850 Middle Channel) with 15mm Separation Distance to the Phantom.

2.3 MAXIMUM GPRS 850 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	03/03/2006 10:50:24	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_15.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	23.2°C	LIQUID SIMULANT:	835 Body
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	58.16
RELATIVE HUMIDITY:	20.7%	CONDUCTIVITY:	0.976
PHANTOM S/NO:	HeadBox1.csv	LIQUID TEMPERATURE:	21.8°C
PHANTOM ROTATION:	0°	MAX SAR X-AXIS LOCATION:	-13.00 mm
DUT POSITION:	Rear facing 15mm	MAX SAR Y-AXIS LOCATION:	-2.00 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	26.72 V/m
TEST FREQUENCY:	824.2MHz	SAR 1g:	0.814 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.476 W/kg
CONVERSION FACTORS:	0.348 / 0.348 / 0.348	SAR START:	0.189 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.198 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	4.66 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	1x 33 dBm	EXTRAPOLATION:	poly4

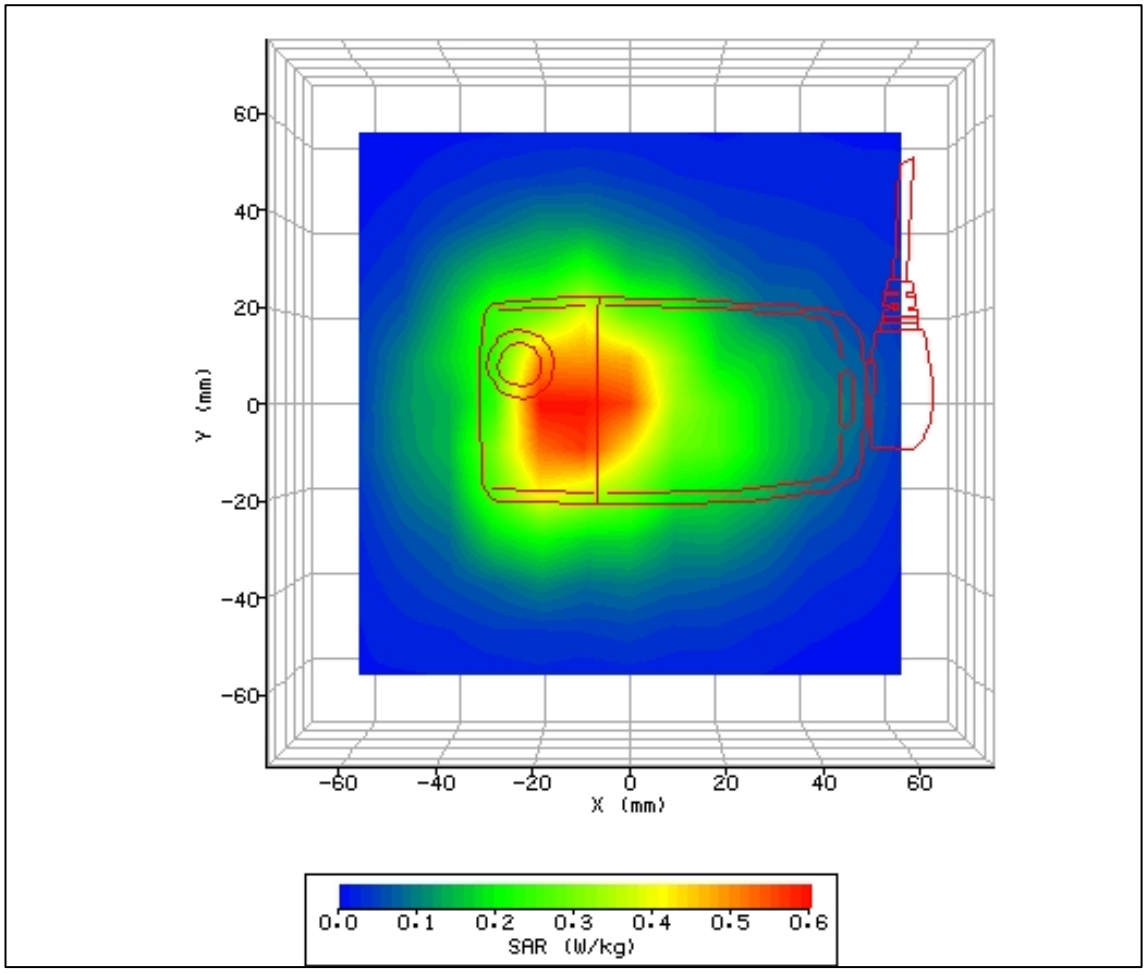

Figure 15: SAR Body Testing Results for the Sagem MC2004a Mobile Handset in Rear Facing Phantom Position; Tested at 824.2MHz (GPRS 850 Bottom Channel) with 15mm Separation Distance to Phantom.

2.3 MAXIMUM GPRS 850 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	03/03/2006 11:35:17	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_16.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	23.2°C	LIQUID SIMULANT:	835 Body
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	58.16
RELATIVE HUMIDITY:	20.7%	CONDUCTIVITY:	0.976
PHANTOM S/NO:	HeadBox1.csv	LIQUID TEMPERATURE:	21.7°C
PHANTOM ROTATION:	0°	MAX SAR X-AXIS LOCATION:	-12.00 mm
DUT POSITION:	Rear facing 15mm	MAX SAR Y-AXIS LOCATION:	-1.00 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	23.61 V/m
TEST FREQUENCY:	848.8MHz	SAR 1g:	0.601 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.375 W/kg
CONVERSION FACTORS:	0.348 / 0.348 / 0.348	SAR START:	0.158 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.156 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-1.03 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	1x 33 dBm	EXTRAPOLATION:	poly4

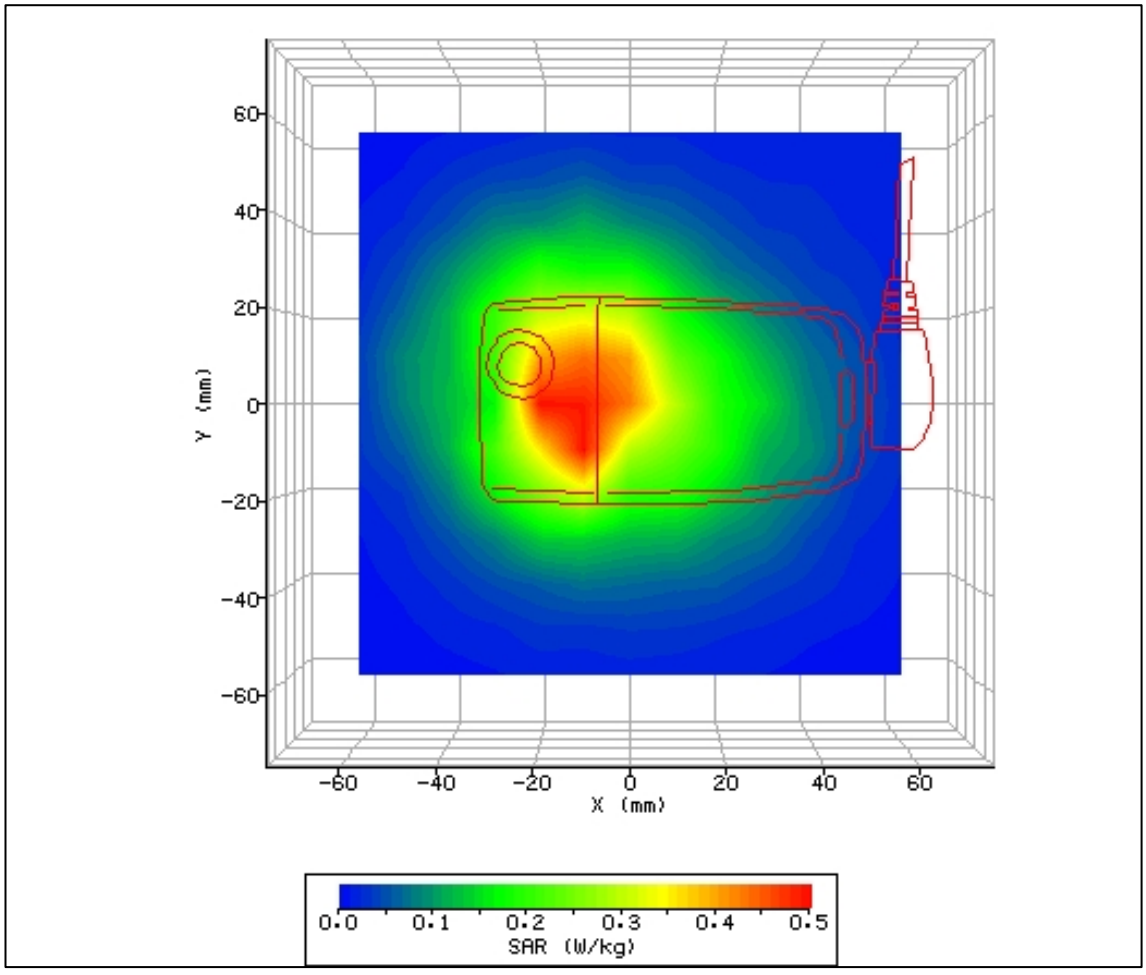

Figure 16: SAR Body Testing Results for the Sagem MC2004a Mobile Handset in Rear Facing Phantom Position; Tested at 848.8MHz (GPRS 850 Top Channel) with 15mm Separation Distance to the Phantom.

2.3 MAXIMUM GSM 1900 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	04/03/2006 09:07:32	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_07.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.7°C	LIQUID SIMULANT:	1900 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	40.92
RELATIVE HUMIDITY:	20%	CONDUCTIVITY:	1.386
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	22.7°C
PHANTOM ROTATION:	330°	MAX SAR Y-AXIS LOCATION:	-33.20 mm
DUT POSITION:	LH-Cheek	MAX SAR Z-AXIS LOCATION:	-164.35 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	17.65 V/m
TEST FREQUENCY:	1880MHz	SAR 1g:	0.378 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.228 W/kg
CONVERSION FACTORS:	0.387 / 0.387 / 0.387	SAR START:	0.176 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.172 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-2.42 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	0	EXTRAPOLATION:	poly4

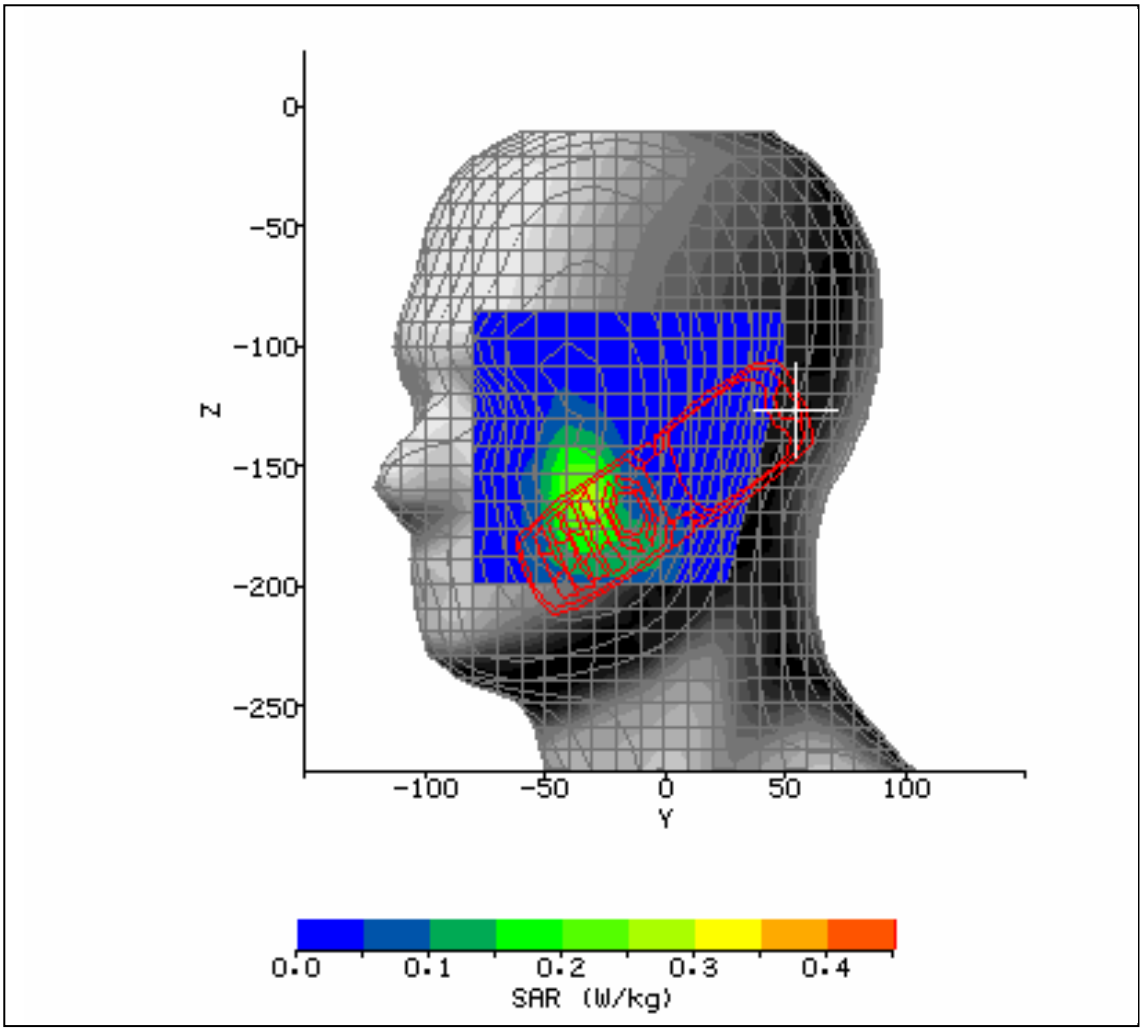

Figure 17: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in LH Cheek Position; Tested at 1880MHz (GSM 1900 Middle Channel)

2.3 MAXIMUM GSM 1900 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	04/03/2006 09:34:12	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_08.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.7°C	LIQUID SIMULANT:	1900 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	40.92
RELATIVE HUMIDITY:	20%	CONDUCTIVITY:	1.386
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	22.6°C
PHANTOM ROTATION:	330°	MAX SAR Y-AXIS LOCATION:	-30.60 mm
DUT POSITION:	LH-Cheek 15°	MAX SAR Z-AXIS LOCATION:	-157.45 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	7.01 V/m
TEST FREQUENCY:	1880MHz	SAR 1g:	0.061 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.038 W/kg
CONVERSION FACTORS:	0.387 / 0.387 / 0.387	SAR START:	0.023 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.024 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	1.13 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	0	EXTRAPOLATION:	poly4

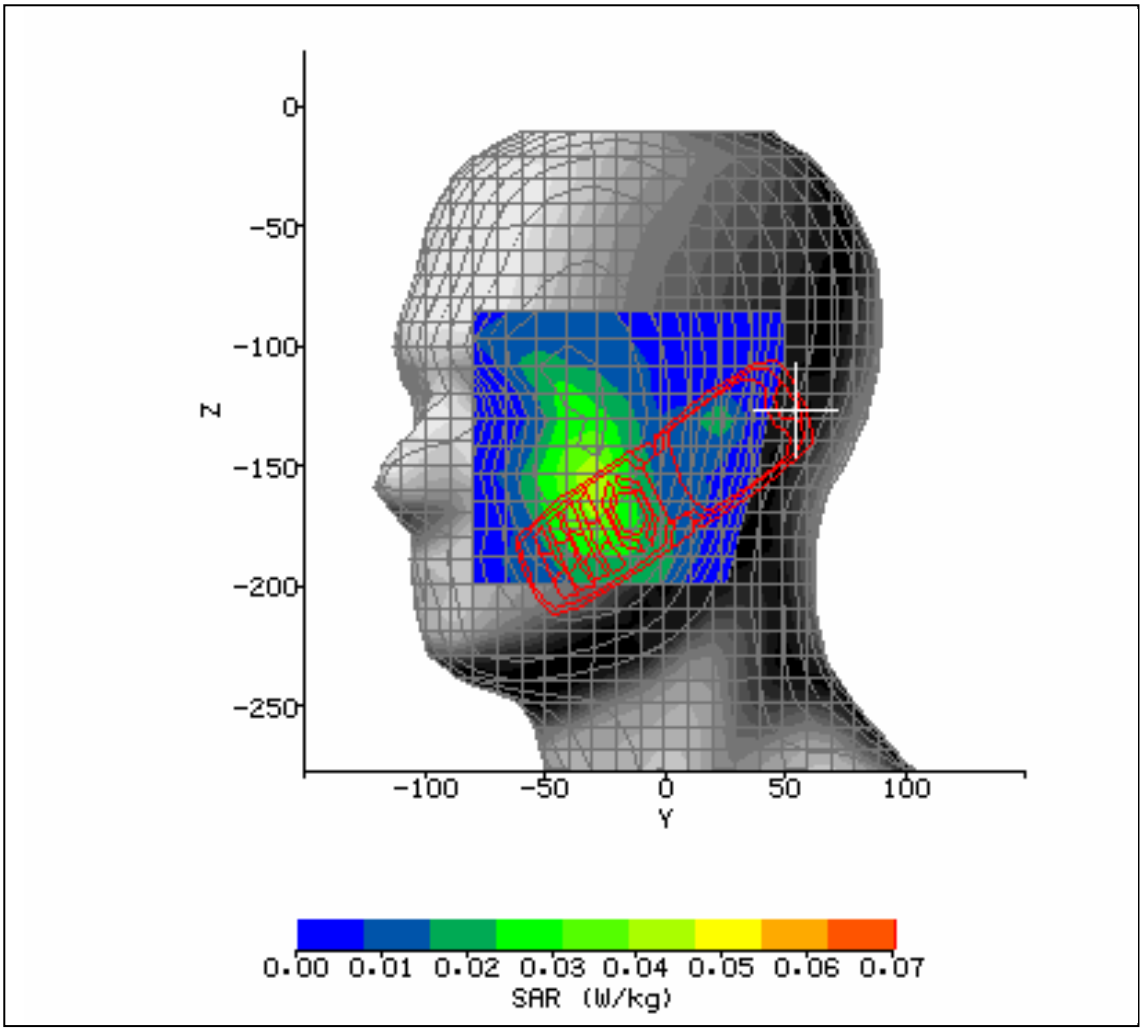

Figure 18: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in LH 15° Position; Tested at 1880MHz (GSM 1900 Middle Channel)

2.3 MAXIMUM GSM 1900 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	04/03/2006 09:34:12	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_08.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	23.2°C	LIQUID SIMULANT:	1900 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	40.92
RELATIVE HUMIDITY:	20.1%	CONDUCTIVITY:	1.386
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	22.6°C
PHANTOM ROTATION:	210°	MAX SAR Y-AXIS LOCATION:	24.10 mm
DUT POSITION:	RH-Cheek	MAX SAR Z-AXIS LOCATION:	-179.30 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	20.41 V/m
TEST FREQUENCY:	1880MHz	SAR 1g:	0.505 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.297 W/kg
CONVERSION FACTORS:	0.387 / 0.387 / 0.387	SAR START:	0.229 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.222 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-2.90 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	0	EXTRAPOLATION:	poly4

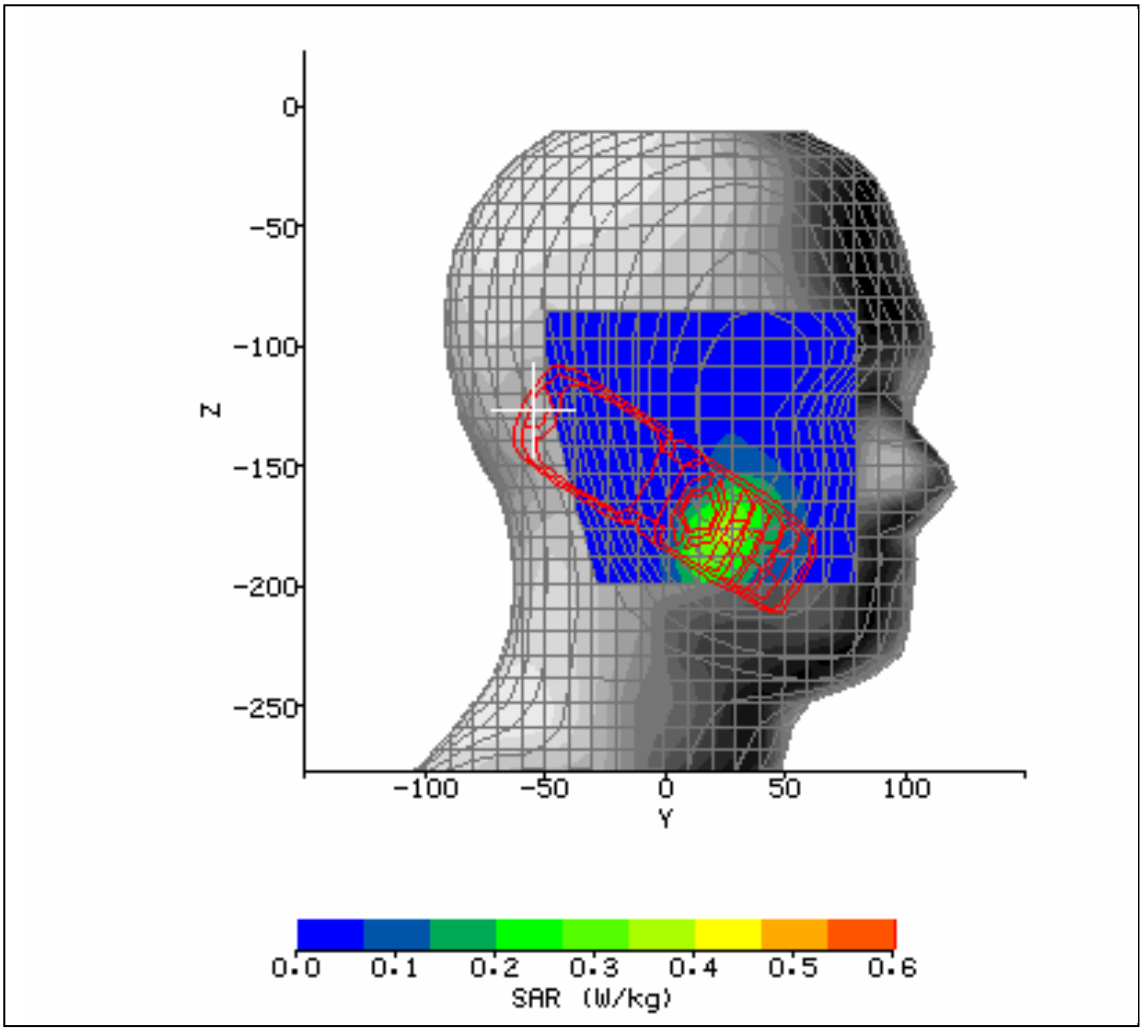

Figure 19: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in RH Cheek Position; Tested at 1880MHz (GSM 1900 Middle Channel)

2.3 MAXIMUM GSM 1900 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	04/03/2006 10:36:45	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_10.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.2°C	LIQUID SIMULANT:	1900 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	40.92
RELATIVE HUMIDITY:	20.2%	CONDUCTIVITY:	1.386
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	22.5°C
PHANTOM ROTATION:	210°	MAX SAR Y-AXIS LOCATION:	20.20 mm
DUT POSITION:	RH-Cheek 15°	MAX SAR Z-AXIS LOCATION:	-180.45 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	8.29 V/m
TEST FREQUENCY:	1880MHz	SAR 1g:	0.088 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.056 W/kg
CONVERSION FACTORS:	0.387 / 0.387 / 0.387	SAR START:	0.040 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.038 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-4.59 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	0	EXTRAPOLATION:	poly4

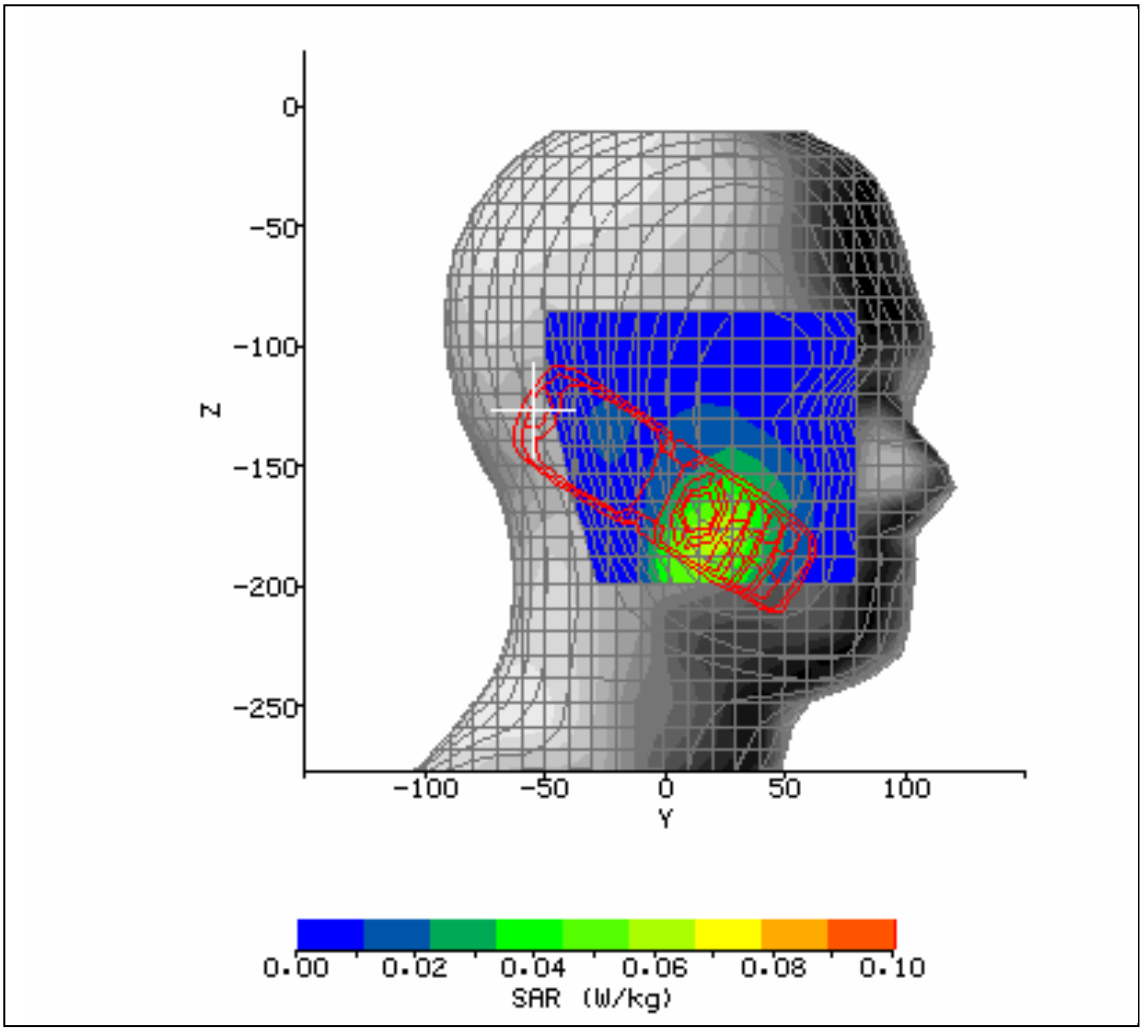

Figure 20: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in RH Cheek 15° Position; Tested at 1880MHz (GSM 1900 Middle Channel)

2.3 MAXIMUM GSM 1900 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	04/03/2006 11:23:44	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_11.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.1°C	LIQUID SIMULANT:	1900 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	40.92
RELATIVE HUMIDITY:	20.1%	CONDUCTIVITY:	1.386
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	22.4°C
PHANTOM ROTATION:	210°	MAX SAR Y-AXIS LOCATION:	25.40 mm
DUT POSITION:	RH-Cheek	MAX SAR Z-AXIS LOCATION:	-177.00 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	21.49 V/m
TEST FREQUENCY:	1850.2MHz	SAR 1g:	0.571 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.323 W/kg
CONVERSION FACTORS:	0.387 / 0.387 / 0.387	SAR START:	0.253 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.249 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-1.48 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	0	EXTRAPOLATION:	poly4

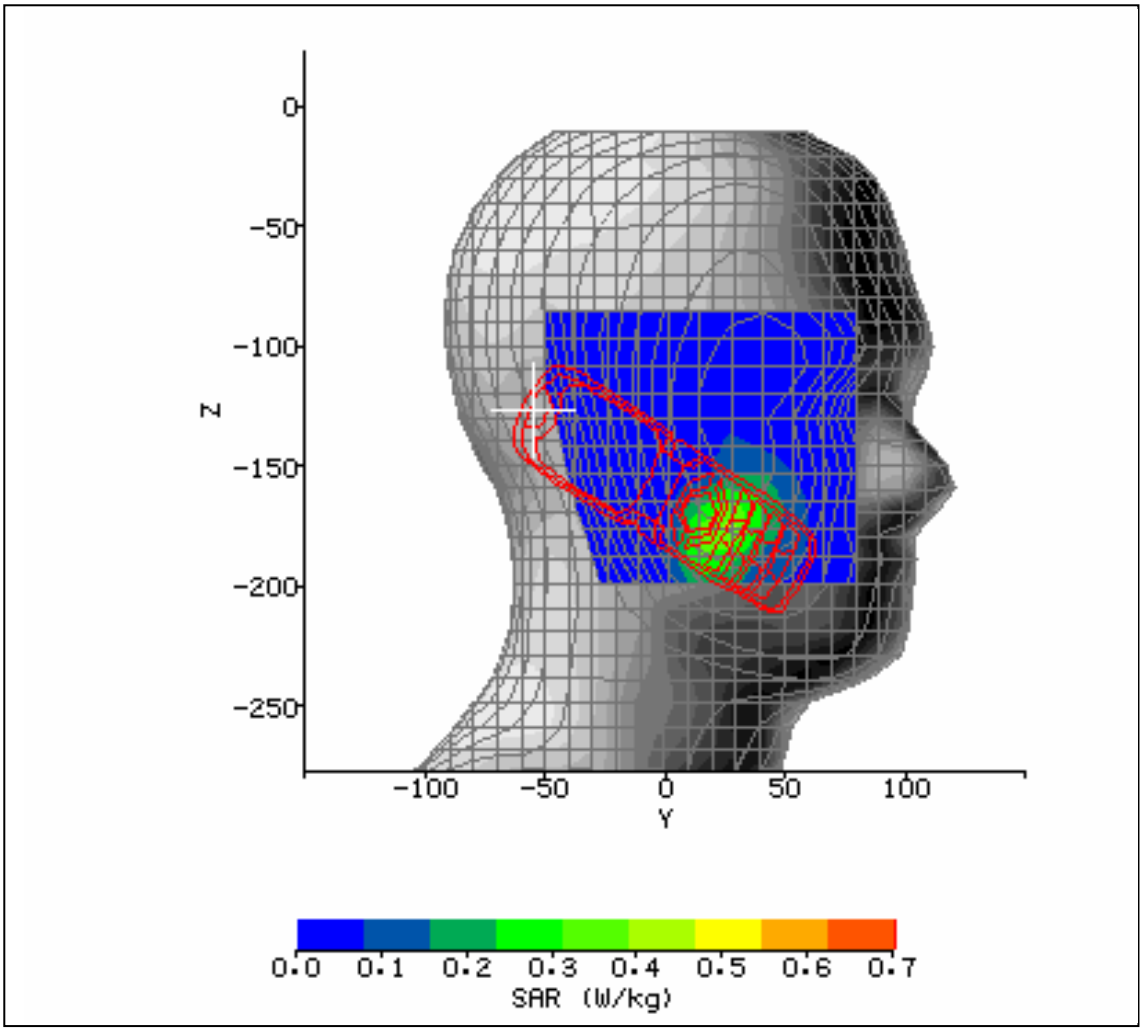

Figure 21: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in RH Cheek Position; Tested at 1850.2MHz (GSM 1900 Bottom Channel)

2.3 MAXIMUM GSM 1900 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	04/03/2006 11:55:34	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_12.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.1°C	LIQUID SIMULANT:	1900 Head
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	40.92
RELATIVE HUMIDITY:	20.1%	CONDUCTIVITY:	1.386
PHANTOM S/NO:	Head_04_35.csv	LIQUID TEMPERATURE:	22.4°C
PHANTOM ROTATION:	210°	MAX SAR Y-AXIS LOCATION:	25.40 mm
DUT POSITION:	RH-Cheek	MAX SAR Z-AXIS LOCATION:	-177.00 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	20.70 V/m
TEST FREQUENCY:	1909.8MHz	SAR 1g:	0.536 W/kg
AIR FACTORS:	345.6 / 425.4 / 428.9	SAR 10g:	0.298 W/kg
CONVERSION FACTORS:	0.387 / 0.387 / 0.387	SAR START:	0.221 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.224 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	1.29 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	0	EXTRAPOLATION:	poly4

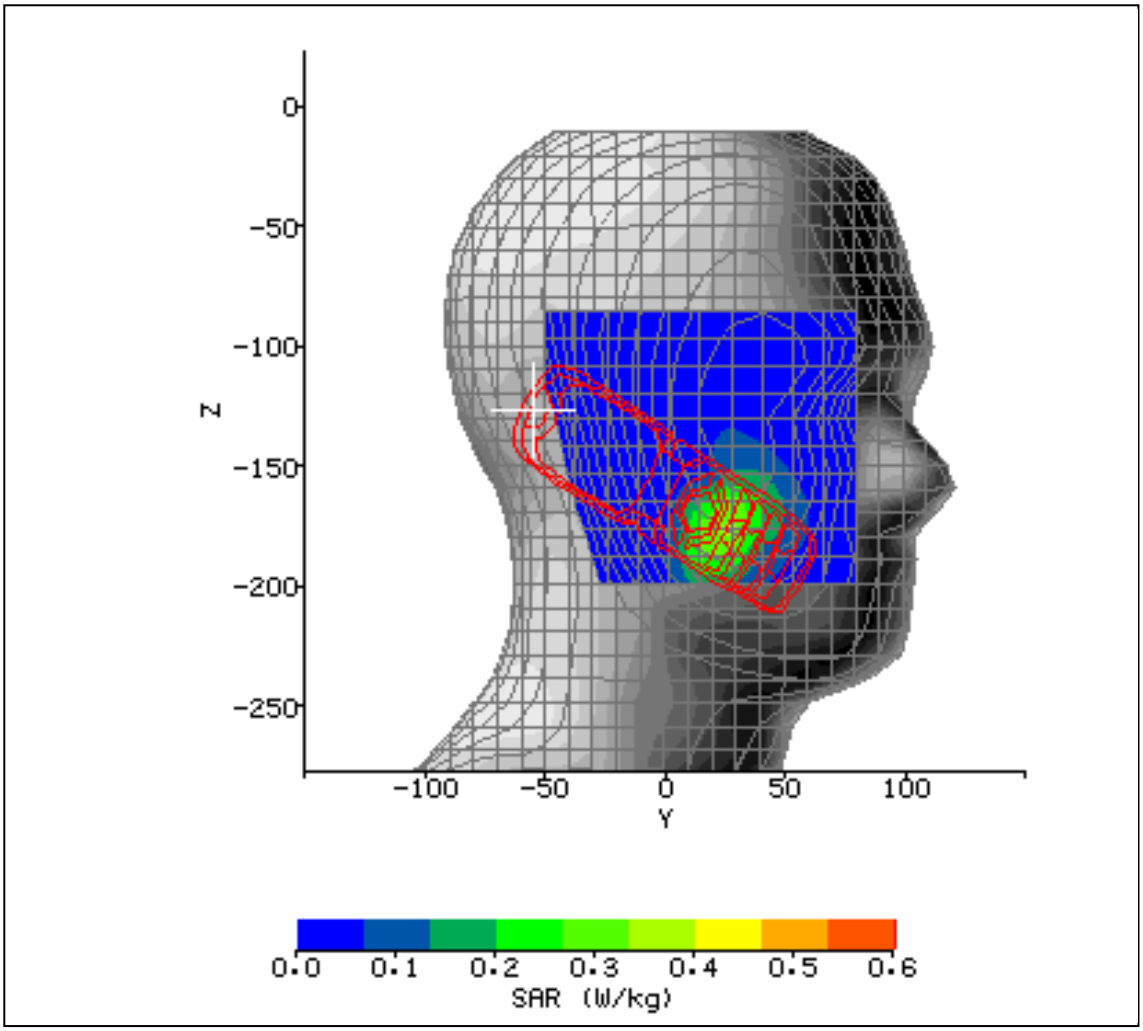

Figure 22: SAR Head Testing Results for the Sagem MC2004a Mobile Handset in RH Cheek Position. Tested at 1909.8MHz (GSM 1900 Top Channel)

2.3 MAXIMUM GPRS 1900 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	04/03/2006 12:42:00	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_17.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	23.3°C	LIQUID SIMULANT:	1900 Body
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	53.75
RELATIVE HUMIDITY:	20.0%	CONDUCTIVITY:	0.976
PHANTOM S/NO:	HeadBox1.csv	LIQUID TEMPERATURE:	22.7°C
PHANTOM ROTATION:	0°	MAX SAR X-AXIS LOCATION:	4.00 mm
DUT POSITION:	Front facing 15mm	MAX SAR Y-AXIS LOCATION:	1.00 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	7.65 V/m
TEST FREQUENCY:	1880MHz	SAR 1g:	0.108 W/kg
AIR FACTORS:	346 / 425 / 429	SAR 10g:	0.067 W/kg
CONVERSION FACTORS:	0.4 / 0.34 / 0.40	SAR START:	0.021 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.021 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-0.88 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	1x 33 dBm	EXTRAPOLATION:	poly4

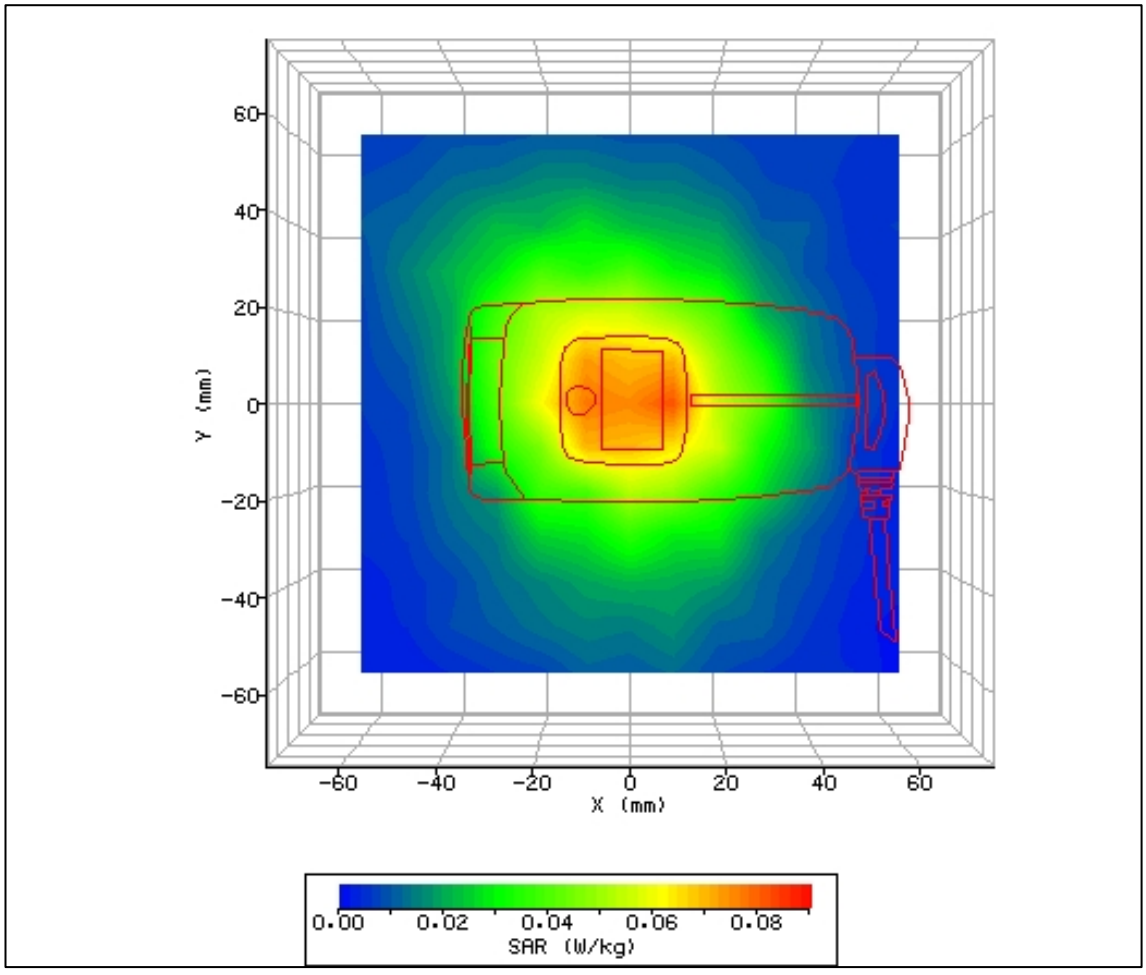

Figure 23: SAR Body Testing Results for the Sagem MC2004a Mobile Handset in Front Facing Phantom Position; Tested at 1880MHz (GRPS 1900 Middle Channel) with 15mm Separation Distance to the Phantom.

2.3 MAXIMUM GPRS 1900 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	04/03/2006 13:26:06	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_18.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.1°C	LIQUID SIMULANT:	1900 Body
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	53.75
RELATIVE HUMIDITY:	20.0%	CONDUCTIVITY:	0.976
PHANTOM S/NO:	HeadBox1.csv	LIQUID TEMPERATURE:	22.6°C
PHANTOM ROTATION:	0°	MAX SAR X-AXIS LOCATION:	-17.00 mm
DUT POSITION:	Rear facing 15mm	MAX SAR Y-AXIS LOCATION:	15.00 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	13.60 V/m
TEST FREQUENCY:	1880MHz	SAR 1g:	0.362 W/kg
AIR FACTORS:	346 / 425 / 429	SAR 10g:	0.218 W/kg
CONVERSION FACTORS:	0.4 / 0.34 / 0.40	SAR START:	0.058 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.058 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-0.84 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	1x 33 dBm	EXTRAPOLATION:	poly4

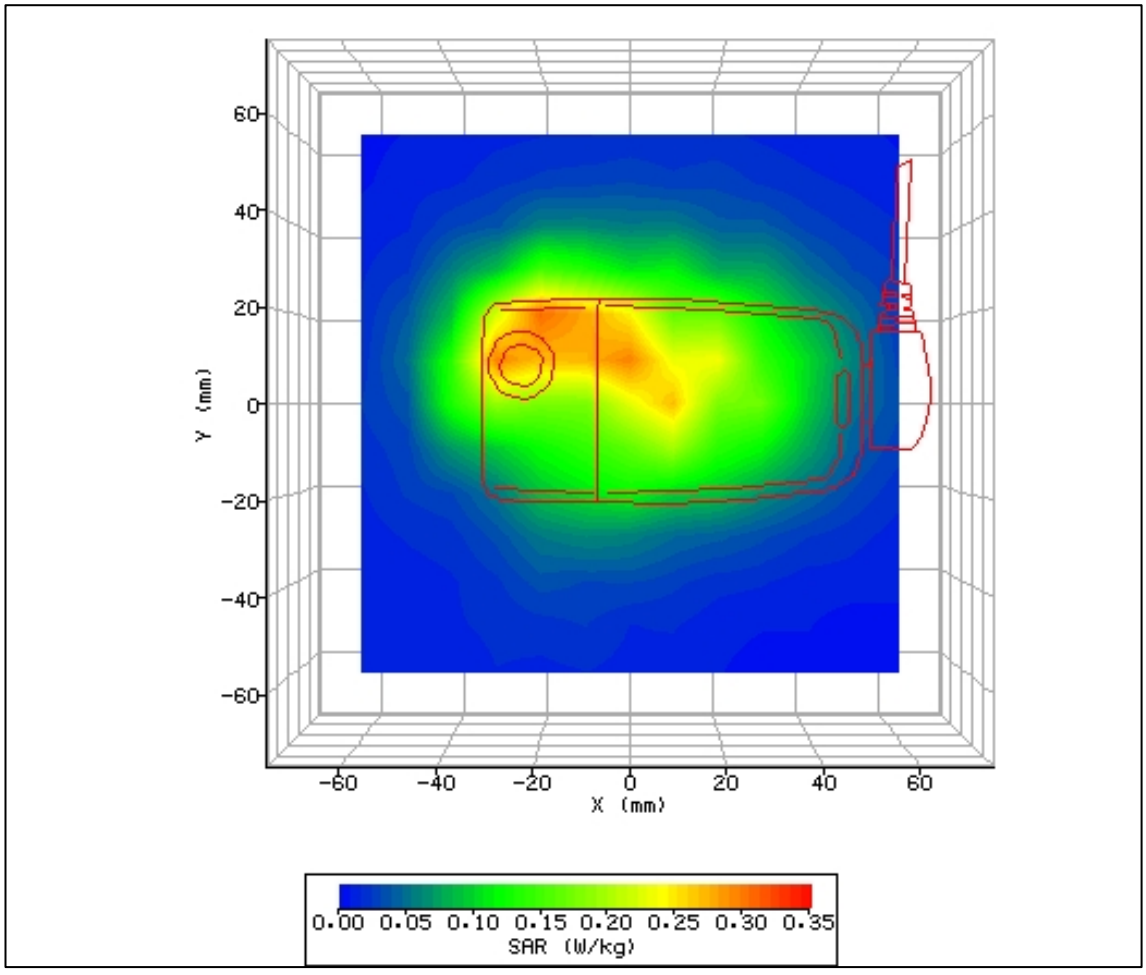

Figure 24: SAR Body Testing Results for the Sagem MC2004a Mobile Handset in Rear Facing Phantom Position; Tested at 1880MHz (GRPS 1900 Middle Channel) with 15mm Separation Distance to the Phantom.

2.3 MAXIMUM GPRS 1900 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	04/03/2006 13:49:52	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_19.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.9°C	LIQUID SIMULANT:	1900 Body
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	53.75
RELATIVE HUMIDITY:	20.0%	CONDUCTIVITY:	0.976
PHANTOM S/NO:	HeadBox1.csv	LIQUID TEMPERATURE:	22.1°C
PHANTOM ROTATION:	0°	MAX SAR X-AXIS LOCATION:	3.00 mm
DUT POSITION:	Rear facing 15mm	MAX SAR Y-AXIS LOCATION:	11.00 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	14.85 V/m
TEST FREQUENCY:	1850.2MHz	SAR 1g:	0.419 W/kg
AIR FACTORS:	346 / 425 / 429	SAR 10g:	0.238 W/kg
CONVERSION FACTORS:	0.4 / 0.34 / 0.40	SAR START:	0.066 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.064 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-2.35 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	1x 33 dBm	EXTRAPOLATION:	poly4

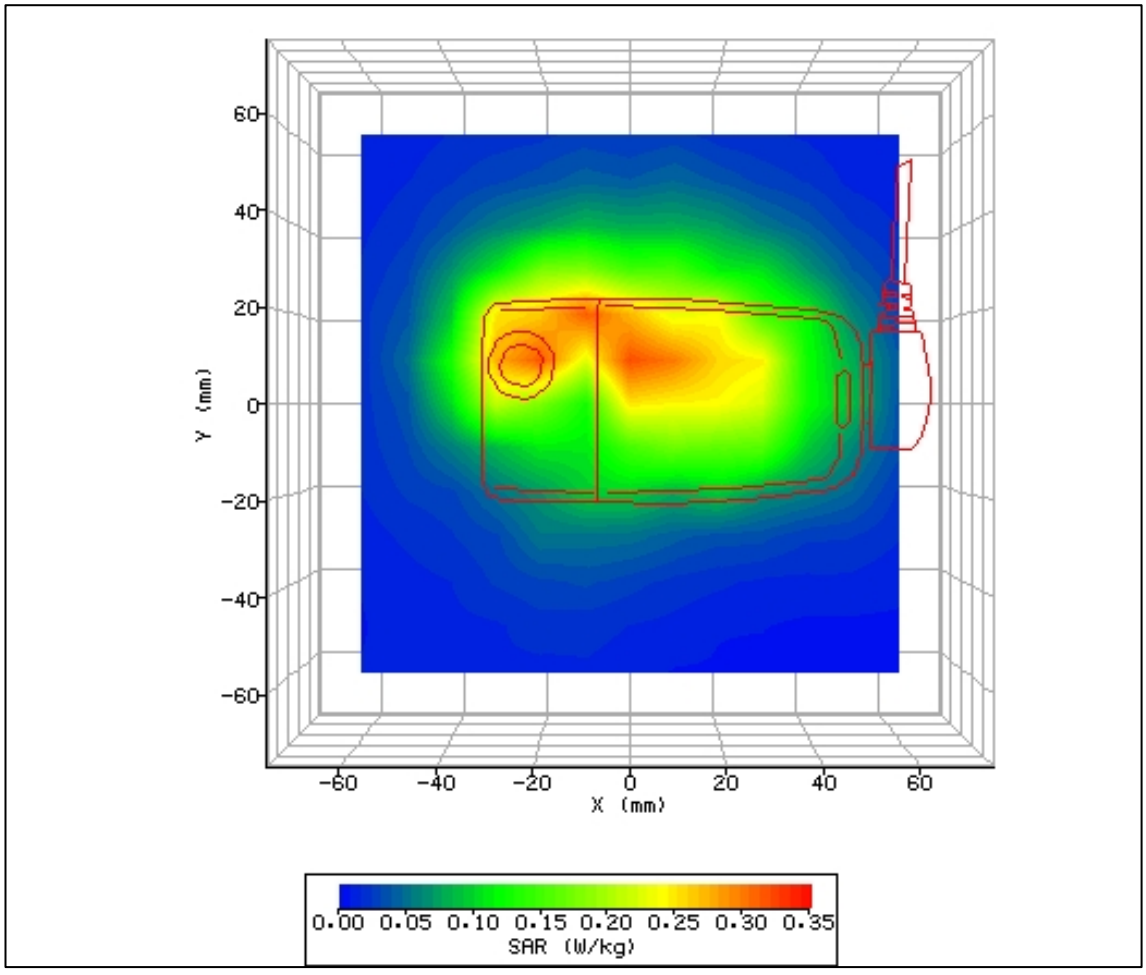

Figure 25: SAR Body Testing Results for the Sagem MC2004a Mobile Handset in Rear Facing Phantom Position; Tested at 1850.2MHz (GRPS 1900 Bottom Channel) with 15mm Separation Distance.

2.3 MAXIMUM GPRS 1900 SAR TEST RESULT INCLUDING COURSE AREA SCAN – 2D

SYSTEM / SOFTWARE:	SARA2 / 2.39 VPM	INPUT POWER DRIFT:	0.0 dB
DATE / TIME:	04/03/2006 14:22:46	DUT BATTERY MODEL/NO:	18 897 373-1
FILENAME:	WS615015_20.txt	PROBE SERIAL NUMBER:	0190
AMBIENT TEMPERATURE:	22.2°C	LIQUID SIMULANT:	1900 Body
DEVICE UNDER TEST:	Sagem MC2004a	RELATIVE PERMITTIVITY:	53.75
RELATIVE HUMIDITY:	20.1%	CONDUCTIVITY:	0.976
PHANTOM S/NO:	HeadBox1.csv	LIQUID TEMPERATURE:	22.1°C
PHANTOM ROTATION:	0°	MAX SAR X-AXIS LOCATION:	-20.00 mm
DUT POSITION:	Rear facing 15mm	MAX SAR Y-AXIS LOCATION:	14.00 mm
ANTENNA CONFIGURATION:	Internal Fixed	MAX E FIELD:	14.16 V/m
TEST FREQUENCY:	1909.8MHz	SAR 1g:	0.389 W/kg
AIR FACTORS:	346 / 425 / 429	SAR 10g:	0.219 W/kg
CONVERSION FACTORS:	0.4 / 0.34 / 0.40	SAR START:	0.066 W/kg
TYPE OF MODULATION:	GMSK	SAR END:	0.065 W/kg
MODN. DUTY CYCLE:	12.5%	SAR DRIFT DURING SCAN:	-0.76 %
DIODE COMPRESSION FACTORS (V*200):	20 / 20 / 20	PROBE BATTERY LAST CHANGED:	01/03/06
INPUT POWER LEVEL:	1x 33 dBm	EXTRAPOLATION:	poly4

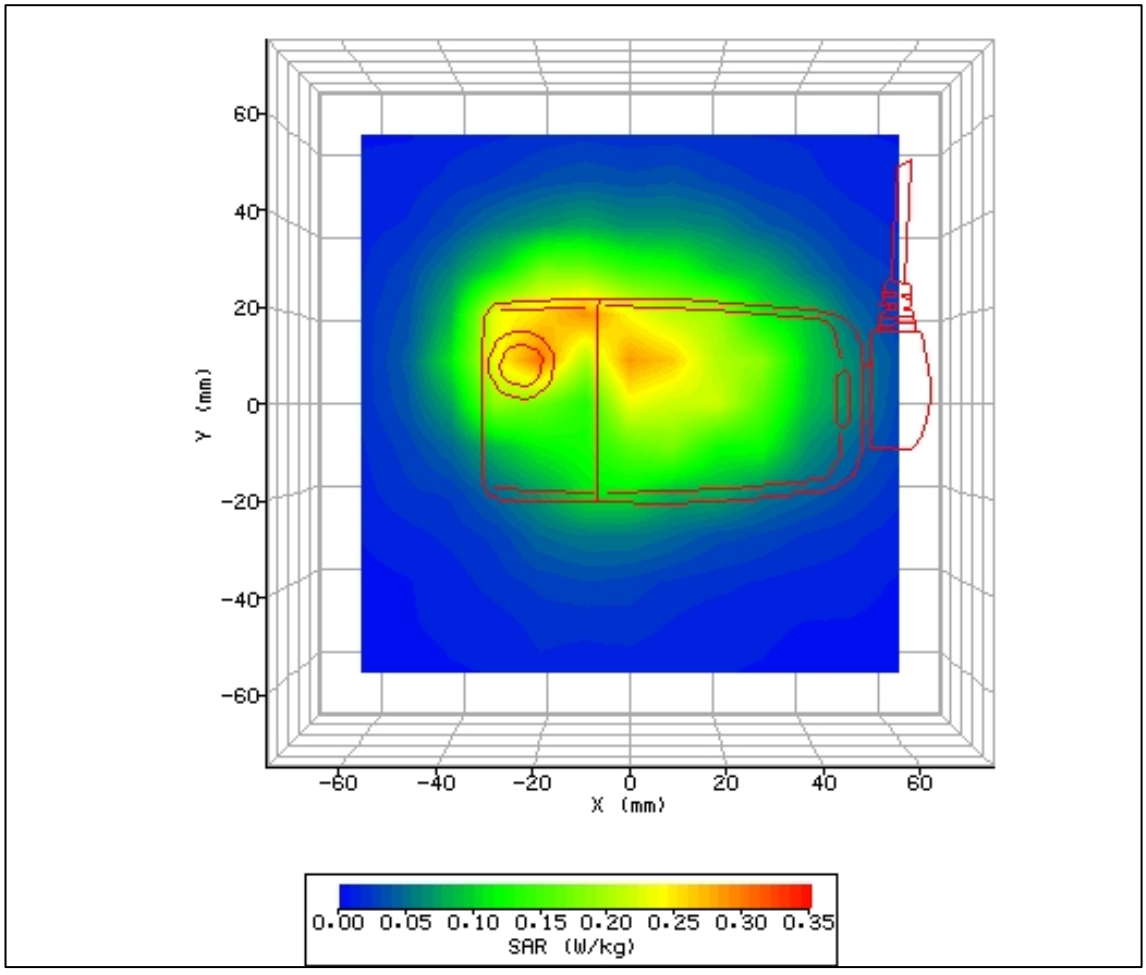

Figure 26: SAR Body Testing Results for the Sagem MC2004a Mobile Handset in Rear Facing Phantom Position; Tested at 1909.8MHz (GRPS 1900 Top Channel) with 15mm Separation Distance.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT

The following test equipment was used at BABT:

INSTRUMENT DESCRIPTION	MANUFACTURER	MODEL TYPE	TEST EQUIPMENT NO.	CALIBRATION DATES	
Bench-top Robot	Mitsubishi	RV-E2	156	N/A	N/A
Fast Probe Amplifier	IndexSAR Ltd.	IFA-010	1557	N/A	N/A
Side Bench 2	IndexSAR Ltd.	IXM-030	1571	N/A	N/A
Upright Bench 1	IndexSAR Ltd.	SARA2 system	1568	N/A	N/A
SAR Probe	IndexSAR Ltd.	IXP-050	1553	01/06/2005	01/06/2006
Radio Communication Tester	Rohde & Schwarz	CMU 200	000442	N/A	N/A
Signal Generator	Marconi	2031 (01)	000762	12/09/2005	12/09/2006
Power Meter	Rohde and Schwarz	NRV	000052	02/06/2005	02/06/2006
RF Pre-Amplifier	Vectawave Tech	300-3M	002415	N/A	N/A
Dual-Directional Coupler	Krytar	1850	000058	N/A	N/A
20dB Attenuator	Narda	766F-10	000483	31/05/2005	31/05/2006
Hygrometer	Rotronic	I-1000	002783	01/06/2005	01/06/2006
Digital Thermometer	Fluke	T-208	000064	18/10/2005	18/10/2006
Thermocouple	RS	SAR1	000065	18/10/2005	18/10/2006
850MHz Head Tissue Simulant	BABT	Batch 10	N/A	03/02/2006	05/03/2006
1900MHz Head Tissue Simulant	BABT	Batch 6	N/A	03/02/2006	05/03/2006
850MHz Body Tissue Simulant	BABT	Batch 5	N/A	03/02/2006	05/03/2006
1900MHz Body Tissue Simulant	BABT	Batch 3	N/A	03/02/2006	05/03/2006
850MHz Dipole	IndexSAR Ltd.	IEEE1528	N/A	01/03/2006	04/03/2006
1900MHz Dipole	IndexSAR Ltd.	IEEE1528	N/A	03/03/2006	04/03/2006
SAM Phantom	Antennessa	FT04_35.csv	1559	N/A	N/A
Flat Phantom 2mm Side	IndexSAR Ltd.	HeadBox01	1563	N/A	N/A
200mm Cube Box Phantom	IndexSAR Ltd.	IXB-070	1566	N/A	N/A
Ear Positioner with Support	IndexSAR Ltd.	IXH-050	1579	N/A	N/A
Dipole Positioner - Plastic	IndexSAR Ltd.	IXH-020	1582	N/A	N/A
Dipole Positioner - Plastic	IndexSAR Ltd.	IXH-020	1583	N/A	N/A
Dipole Positioner - Plastic	IndexSAR Ltd.	IXH-020	1584	N/A	N/A
Dipole Positioner - Foam	IndexSAR Ltd.	IXH-010	1587	N/A	N/A
Scissor Jack Base	IndexSAR Ltd.	IXB-030	1576	N/A	N/A

3.2 TEST SOFTWARE

The following software was used to control the BABT SARA2 System:

INSTRUMENT	VERSION NO.	DATE
SARA2 system	v.2.3.9 VPM	06/07/2005
Mitsubishi robot controller firmware revision	RV-E2 Version C9a	-
IFA-10 Probe amplifier	Version 2.5	-

3.3 DIELECTRIC PROPERTIES OF SIMULANT LIQUIDS

The fluid properties of the simulant fluids used during routine SAR evaluation meet the dielectric properties required by EN50361:2001 & OET Bulletin 65 (Edition 97-01).

The fluids were calibrated in our Laboratory and re-checked prior to any measurements being made against reference fluids stated in IEEE 1528-2003 of 0.9% NaCl (Salt Solution) at 23ºC and also for Dimethylsulphoxide (DMS) at 21ºC.

The fluids were made at BABT under controlled conditions from the following OET(65)c formulae and IEEE1528-2003. The composition of ingredients may have been modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation:

OET 65(c) Recipes

Ingredients (% by weight)	**Frequency (MHz)**									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

IEEE 1528 Recipes

Frequency (MHz)	**300**	**450**		**835**	**900**			**1450**	**1800**				**1900**		**1950**	**2000**	**2100**		**2450**		**3000**
Recipe #	**1**	**1**	**3**	**1**	**1**	**2**	**3**	**1**	**1**	**2**	**2**	**3**	**1**	**2**	**4**	**1**	**1**	**2**	**2**	**3**	**1**
Ingredients (% by weight)																					
1,2-Propanediol						64.81															
Bactericide	0.19	0.19	0.5	0.1	0.1		0.5					0.5								0.5	
Diacetin			48.9				49.2					49.43								49.75	
DGBE								45.41	47	13.84	44.92		44.92	13.84	45	50	50	7.99	7.99		7.99
HEC	0.98	0.98		1	1																
NaCl	5.95	3.95	1.7	1.45	1.48	0.79	1.1	0.67	0.36	0.35	0.18	0.64	0.18	0.35				0.16	0.16		0.16
Sucrose	55.32	56.32		57	56.5																
Triton X-100										30.45				30.45				19.97	19.97		19.97
Water	37.56	38.56	48.9	40.45	40.92	34.4	49.2	53.82	52.64	55.36	54.9	49.43	54.9	55.36	55	50	50	71.88	71.88	49.75	71.88
Measured dielectric parameters																					
ε_r'	46	43.4	44.3	41.6	41.2	41.8	42.7	40.9	39.3	41	40.4	39.2	39.9	41	40.1	37	36.8	41.1	40.3	39.2	37.9
σ (S/m)	0.86	0.85	0.9	0.9	0.98	0.97	0.99	1.21	1.39	1.38	1.4	1.4	1.42	1.38	1.41	1.4	1.51	1.55	1.88	1.82	2.46
Temp. (°C)	22	22	20	22	22	22	20	22	22	21	22	20	21	21	20	22	22	20	20	20	20
Target dielectric parameters (Table 5-1)																					
ε_r'	45.3	43.5		41.5	41.5			40.5	40								39.8		39.2		38.5
σ (S/m)	0.87	0.87		0.9	0.97			1.2	1.4								1.49		1.8		2.4

3.3 DIELECTRIC PROPERTIES OF SIMULANT LIQUIDS - Continued

The dielectric properties of the tissue simulant liquids used for the SAR testing at BABT are as follows:-

FLUID TYPE AND FREQUENY	RELATIVE PERMITTIVITY εr (ε') TARGET	RELATIVE PERMITTIVITY εr (ε') MEASURED	CONDUCTIVITY σ TARGET	CONDUCTIVITY σ MEASURED
Head 850MHz	**42.0**	43.12	**0.990**	0.919
Body 850MHz	**55.0**	58.16	**1.050**	0.976
Head 1900MHz	**40.0**	40.92	**1.380**	1.386
Body 1900MHz	**53.3**	53.75	**1.520**	1.500

3.4 TEST CONDITIONS

TEST LABORATORY CONDITIONS

Ambient Temperature: Within +15°C to +35°C at 20% RH to 75% RH.
The actual Temperature during the testing ranged from 22.1°C to 23.6°C.
The actual Humidity during the testing ranged from 20.0 to 22.0% RH.

TEST FLUID TEMPERATURE RANGE

FREQUENCY	850 MHz	1900 MHz	850 MHz	1900 MHz
BODY / HEAD FLUID	**HEAD**	**HEAD**	**BODY**	**BODY**
MIN TEMPERATURE	21.5°C	22.4°C	21.7°C	22.1°C
MAX TEMPERATURE	23.2°C	22.7°C	21.9°C	23.3°C

SAR DRIFT

The SAR Drift was within acceptable limits during scans. The maximum SAR Drift, drift due to the handset electronics, was recorded as -6.43% (-0.290dB) for all of the testing. The value of 6.43% has been included in the measurement uncertainty budget.

3.5 MEASUREMENT UNCERTAINTY

ERROR SOURCES	EN 50361 Description (Subclause)	Uncertainty (%)	Probability Distribution	Divisor	ci	ci^2	Standard Uncertainty (%)	Stand Uncert^2	(Stand Uncert^2) X (ci^2)
Measurement Equipment									
Calibration	7.2.1.1	10	Normal	2.00	1	1	5.00	25.00	25.00
Isotropy	7.2.1.2	10.6	Rectangular	1.73	1	1	6.12	37.45	37.45
Linearity	7.2.1.3	2.92	Rectangular	1.73	1	1	1.69	2.84	2.84
Probe Stability	-	2.46	Rectangular	1.73	1	1	1.42	2.02	2.02
Detection limits	7.2.1.4	0	Rectangular	1.73	1	1	0.00	0.00	0.00
Boundary effect	7.2.1.5	1.7	Rectangular	1.73	1	1	0.98	0.96	0.96
Measurement device	7.2.1.6	0	Normal	1.00	1	1	0.00	0.00	0.00
Response time	7.2.1.7	0	Normal	1.00	1	1	0.00	0.00	0.00
Noise	7.2.1.8	0	Normal	1.00	1	1	0.00	0.00	0.00
Integration time	7.2.1.9	2.3	Normal	1.00	1	1	2.30	5.29	5.29
Mechanical constraints									
Scanning system	7.2.2.1	0.57	Rectangular	1.73	1	1	0.33	0.11	0.11
Phantom shell	7.2.2.2	1.43	Rectangular	1.73	1	1	0.83	0.68	0.68
Matching between probe and phantom	7.2.2.3	2.86	Rectangular	1.73	1	1	1.65	2.73	2.73
Positioning of the phone 'Y' Co-ordinate	7.2.2.4	1.5	Normal	1.00	1	1	1.50	2.25	2.25
Positioning of the phone 'Z' Co-ordinate	7.2.2.4	1.73	Normal	1.00	1	1	1.73	2.99	2.99
Physical Parameters									
Liquid conductivity (deviation from target)	7.2.3.2	5	Rectangular	1.73	0.5	0.25	2.89	8.33	2.08
Liquid conductivity (measurement error)	7.2.3.2	15.3	Rectangular	1.73	0.5	0.25	8.83	78.03	19.51
Liquid permittivity (deviation from target)	7.2.3.3	5	Rectangular	1.73	0.5	0.25	2.89	8.33	2.08
Liquid permittivity (measurement error)	7.2.3.3	5	Rectangular	1.73	0.5	0.25	2.89	8.33	2.08
Drifts in output power of the phone, probe, temperature and humidity	7.2.3.4	6.43	Rectangular	1.73	1	1	3.71	13.78	13.78
Perturbation by the environment	7.2.3.5	3	Rectangular	1.73	1	1	1.73	3.00	3.00
Post-Processing									
SAR interpolation and extrapolation	7.2.4.1	2.4	Rectangular	1.73	1	1	1.39	1.92	1.92
Maximum SAR evaluation	7.2.4.2	2.4	Rectangular	1.73	1	1	1.39	1.92	1.92
Combined standard uncertainty	11.34						**Total**		128.70
Expanded uncertainty = 22.69 % (confidence interval of 95 %)									

% (Using a Coverage Factor of K=2)

SECTION 4

PHOTOGRAPHS

4.1 TEST POSITIONAL PHOTOGRAPHS

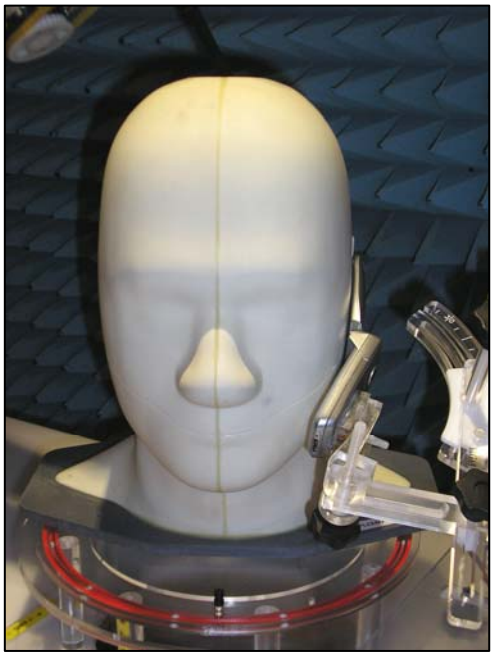

Figure 27: Positional Photograph of the Sagem MC2004a Handset in LH Cheek Position (SAR Head Test)

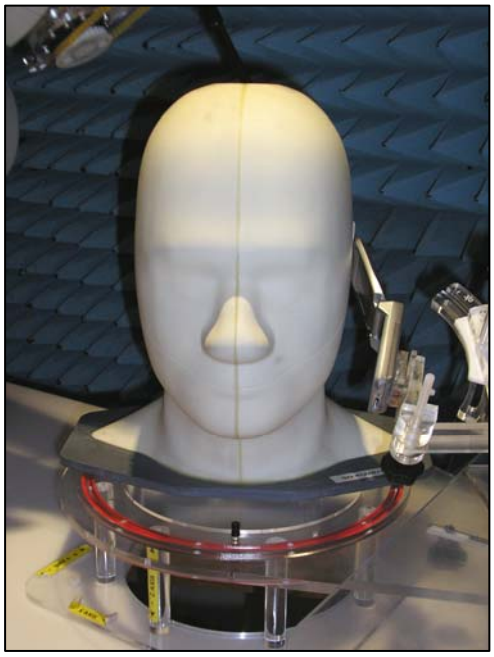

Figure 28: Positional Photograph of the Sagem MC2004a Handset in LH 15° Position (SAR Head Test)

Figure 29: Positional Photograph of the Sagem MC2004a Handset in RH Cheek Position (SAR Head Test)

Figure 30: Positional Photograph of the Sagem MC2004a Handset in RH 15° Position (SAR Head Test)

4.1 TEST POSITIONAL PHOTOGRAPHS - Continued

Figure 31: Positional Photograph of the Sagem MC2004a Handset Front Facing Phantom 15mm from the Phantom with Simple Hands Free Accessory (SAR Body Test)

Figure 32: Positional Photograph of the Sagem MC2004a Handset Rear Facing Phantom 15mm from the Phantom with Simple Hands Free Accessory (SAR Body Test)

4.2 PHOTOGRAPHS OF TEST SAMPLES

Figure 33: Front View

Figure 34: Rear View

4.2 PHOTOGRAPHS OF TEST SAMPLES - Continued

Figure 35: Open View

Figure 36: Rear View (Battery Removed)

4.2 PHOTOGRAPHS OF TEST SAMPLES - Continued

Figure 37: Simple Hands Free (SHF) Accessory – Model No: 18 844 808-0

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

ANNEX A

PROBE CALIBRATION INFORMATION

ANNEX A PROBE CALIBRATION DETAILS

NATIONAL PHYSICAL LABORATORY
Teddington Middlesex UK TW11 0LW Switchboard 020 8977 3222

Certificate of Calibration

SAR PROBE
IndexSAR
Model: IXP-050
Serial number: 0190

REPLACEMENT CERTIFICATE FOR: E05070339

FOR:. TUV Product Services Ltd / BABT
Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL

DESCRIPTION: An IndexSAR isotropic electric field probe for determining specific absorption rates (SAR) in dielectric liquids. The probe has three orthogonal sensors, and the output voltage of the sensors is converted to an optical signal by a meter unit containing an analogue to digital (AD) converter. Probe readings are obtained using software via the RS232 port. The probe was calibrated with IndexSAR amplifier model IXA-010 S/N 036 belonging to NPL.

IDENTIFICATION: The probe is marked with the manufacturer's serial number 0190.

MEASUREMENTS COMPLETED ON: 20 – 22 July 2005

PREVIOUS NPL CERTIFICATE: None

The reported uncertainty is based on a coverage factor $k = 2$, providing a level of confidence of approximately 95%

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Date of Issue : 22 November 2005 **Signed :** D G Gentle **(Authorised Signatory)**

Checked by : B. Loader **Name : Mr D G Gentle** **for Managing Director**

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This certificate provides traceability of measurement to recognised national standards, and to the units of measurement realised at the NPL or other recognised national standards laboratories. This certificate may not be reproduced other than in full, unless permission for the publication of an approved extract has been obtained in writing from the Managing Director. It does not of itself impute to the subject of calibration any attributes beyond those shown by the data contained herein.

ANNEX A PROBE CALIBRATION DETAILS

NATIONAL PHYSICAL LABORATORY

Continuation Sheet

MEASUREMENT PROCEDURE

The calibration method is based on establishing a calculable specific absorption rate (SAR) using a matched waveguide cell [1]. The cell has a feed-section and a liquid-filled section separated by a matching window that is designed to minimise reflections at the interface. A TE_{01} mode is launched into the waveguide by means of a N-type-to-waveguide adapter. The power delivered to the liquid is calculated from the forward power and reflection coefficient measured at the input to the cell. At the centre of the cross-section of the waveguide cell, the volume specific absorption rate (SAR^V) in the liquid as a function of distance from the window is given by

$$SAR^V = \frac{4(P_w)}{ab\delta} e^{-2Z/\delta} \quad (1)$$

where

a = the larger cross-sectional dimension of the waveguide.
b = the smaller cross-sectional dimension of the waveguide.
δ = the skin depth for the liquid in the waveguide.
Z = the distance of the probe's sensors from the liquid to matching window boundary.
P_w = the power delivered to the liquid.

Liquids having the properties specified by CENELEC and IEEE Standards [2,3] were used for the calibration. The value of δ for the liquid was obtained by measuring the electric field (E) at a number of distances from the matching window. The calibration was for continuous wave (CW) signals, and the axis of the probe was parallel to the direction of propagation of the incident field i.e. end-on to the incident radiation. The probe was rotated about its axis in 15-degree steps, and the ratio of the calibration factors for the three probe sensors X, Y, & Z were optimized to give the best axial isotropy.

The probe was calibrated with the linearisation and air-correction factors enabled. Comparing the measured values of E^2 in the liquid to those calculated for the waveguide cell allows the ratio, $ConvF$, of sensitivity for (E^2_{LIQUID}) / (E^2_{AIR}) to be determined, as required by the probe software.

ENVIRONMENT

Measurements were made in a temperature-controlled laboratory at 22 ± 1°C. The temperature of the liquid used was measured at the beginning and end of each measurement.

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ANNEX A PROBE CALIBRATION DETAILS

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UNCERTAINTIES

The estimated uncertainty in calibration for SAR (W kg^{-1}) is ± 10 %. The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

This uncertainty is valid when the probe is used in a liquid with the same dielectric properties as those used for the calibration. No estimate is made for the long-term stability of the device calibrated or of the fluids used in the calibration.

When using the probe for SAR testing, additional uncertainties should be added to account for the spherical isotropy of the probe, proximity effects, linearity, and response to pulsed fields. There will be additional uncertainty if the probe is used in liquids having significantly different electrical properties to those used for the calibration. The electrical properties of the liquids will be related to temperature.

RESULTS

Table 1 gives the results for calibration in liquid.

These calibration factors are only correct when the values for sensitivity in free-space, diode compression and sensor offset from the tip of the probe, as set in the probe software, are the same as those given in Table.

REFERENCES:

[1] Pokovic et al 1997, Pokovic, KT, T.Schmid and N.Kuster, "Robust set-up for Precise Calibration of E-field probes in Tissue Simulating Liquids at Mobile Phone Frequencies", Proceedings ICECOM 1997, pp 120 – 124, Dubrovnik, Croatia Oct 12-17, 1997.

[2] British Standard BS EN 503361:2001. "Basic standard for the measurement of specific absorption rate related to human exposure to electromagnetic fields from mobile phones (300 MHz – 3 GHz)".

[3] IEEE Standard 1528-2003 "Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

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ANNEX A PROBE CALIBRATION DETAILS

NATIONAL PHYSICAL LABORATORY
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Table 1
Sensitivity in Liquids.
SAR probe: IXP-050
S/N 0190

Probe settings for calibration		
Sensitivity in free-space[1]	**Diode Compression**[1]	**Sensor offset from tip of probe**[1]
Lin X = 346 $(V/m)^2/(V*200)$ Lin Y = 425 $(V/m)^2/(V*200)$ Lin Z = 429 $(V/m)^2/(V*200)$	DCP_X = 20 (V*200) DCP_Y = 20 (V*200) DCP_Z = 20 (V*200)	2.7 mm

Sensitivity in Liquid.							
Calibration frequency	Liquid [2]			Calibration Factors for E^2_{Liquid} / E^2_{Air}			Axial Isotropy
(MHz)	Identifier	ε' [3]	σ [3] (Sm^{-1})	$ConvF_X$	$ConvF_Y$	$ConvF_Z$	(dB)
900	TWS900B-1	56.5	1.00	**0.35**	**0.32**	**0.36**	±0.01
900	900 Cenelec	40.9	0.94	**0.34**	**0.30**	**0.33**	±0.02
1800	TWS1800B-2	53.9	1.54	**0.44**	**0.37**	**0.43**	±0.03
1800	TWS1800H-1	40.6	1.37	**0.40**	**0.34**	**0.39**	±0.02
1900	NPL1950B-1	39.9	1.45	**0.40**	**0.34**	**0.40**	±0.03
2450	TWS2450B-2	53.6	2.02	**0.49**	**0.41**	**0.48**	±0.03
2450	TWS2450H-1	38.7	1.79	**0.44**	**0.37**	**0.43**	±0.03

Notes.
[1] The manufacturer supplied these figures.
[2] Head or Muscle Simulating Liquid supplied by NPL.
[3] Measured at NPL at 22 ± 1 ^{0}C.

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