SAR Evaluation Report

FCC ID : SY6BPP-UP560

Project Reference No. : NK2GR281

Product Type : Dual-Band GPRS Mobile Phone

Brand Name : Bellwave

Model : BPP-UP560

Tested According to : IEEE Standard C95.1 / OET Bulletin 65 Supplement C

Tested Period : December. 15. 2006 to December. 20. 2006

Tested by	Seob Lee		date : December. 22. 2006
Verified by	Seonteag.Jin		date : December. 22. 2006

This test results are only related to the item tested.
This test report is only limited to the client company and the product.
This report must not be used by the client to claim product endorsement by any agency of the U.S. Government.

Lab Address : Nemko Korea Co., Ltd
300-2, Osan-Ri, Mohyun-Myun, Yongin-City, Gyunggi-Do, Korea
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Contents of This Report

1.General Information

1.1 Applicant

Company Name:	Bellwave Co., Ltd
Company Address:	23rd~24th Fl. Construction Finance Center Bldg.395-70 Shindaebang-dong, Dongjak-gu,Seoul,156-714,Korea
Phone/Fax:	Phone: +82-2-829-7415 / +82-2-829-7499
Contact Name:	Ju-Won, Seol

1.2 Manufacturer

Company Name:	Bellwave Co., Ltd
Company Address:	23rd~24th Fl. Construction Finance Center Bldg.395-70 Shindaebang-dong, Dongjak-gu,Seoul,156-714,Korea
Phone/Fax:	Phone: +82-2-829-7415 / +82-2-829-7499
Contact Name:	Ju-Won, Seol

1.3 Description of Device

Category:	Dual-Band GPRS Mobile Phone
Model Name:	BPP-UP560
Brand Name:	Bellwave
Serial Number:	0000001
Frequency Band	Tx : 824MHz ~ 849MHz, Rx : 869MHz ~ 894MHz Tx : 1850MHz ~ 1910MHz, Rx : 1930MHz ~ 1990MHz
Power Output (Conducted)	GSM850: 32.42dBm PCS1900: 29.55dBm
Frequency Error	< 0.1ppm
Operating Condition	-30to +60℃
Power Supply	Li-ion Battery: 3.7V DC, 650mAh
Antenna Type	Internal
Dimensions	143 X 44 X 20mm (80 X 44 X 20mm)
Weight	66g(with battery)
Remarks:	-

2. General Test Condition

2.1 Location

Nemko Korea
300-2, Osan-Ri, Mohyun-Myun, Yongin-City, Gyunggi-Do
Phone : 82-31-322-2333 , Fax : 82-31-322-2332

2.2 Operating Environment

Parameters	Recording during test	Accepted deviation
Ambient temperature	21 ~ 23℃	15 ~ 30℃
Relative humidity	25 ~ 55%	20 ~ 75%

2.3 Test Frequency

GSM850		PCS1900	
Test Channel	Test Frequency (MHz)	Test Channel	Test Frequency (MHz)
128	824.2	512	1850.2
190	836.6	661	1880.0
251	848.8	810	1909.8

2.4 Support Equipment

Equipment	Manufacturer	Model Name	Serial Number
-	-	-	-

3. Description of Test Equipment

3.1 SAR Measurement Setup

Robotic System

Measurements are performed using the DASY4 automated dosimetric assessment system. Which is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Stäubli), robot controller, measurement server, H/P computer, nearfield probe, probe alignment sensor, and the SAM twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Fig. 3.1).

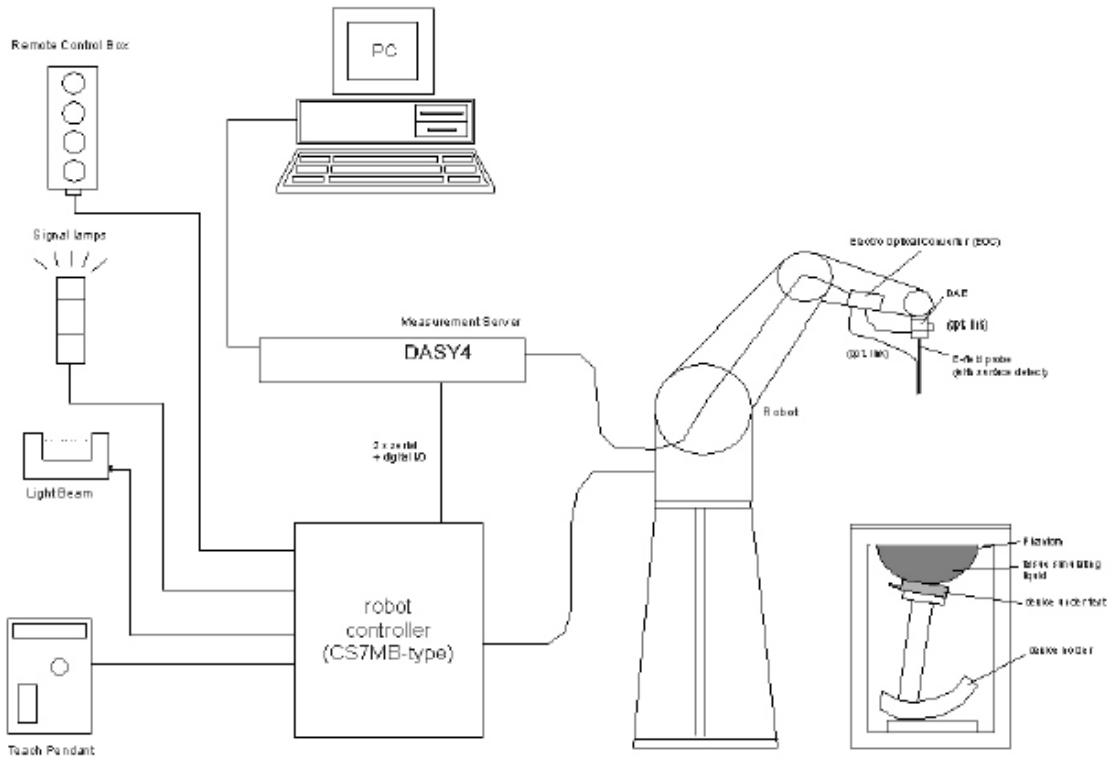


Figure 3.1 SAR Measurement System Setup

System Hardware

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and a remote control is used to drive the robot motors. The PC consists of the H/P computer with Windows XP system and SAR Measurement Software DASY4, LCD monitor, mouse and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A Data Acquisition Electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. Is connected to the Electro-Optical Coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the measurement server.

System Electronics

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with autozeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

3.2 E-field Probe

The SAR measurement were conducted with the dosimetric probe ES3DV3, designed in the classical triangular configuration (see Fig.3.3) and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates.

The probe is equipped with an optical multi-fiber line ending at the front of the probe tip (see Fig.3.4). It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface.

Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches a System maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero.

The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 softwarereads the reflection during a software approach and looks for the maximum using a 2nd order fitting (see Fig.3.2). The approach is stopped at reaching the maximum.

Figure3.2 DAE System

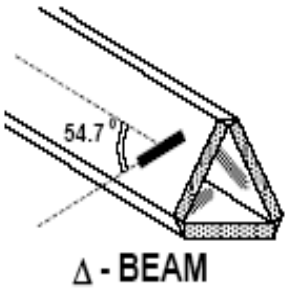


Figure 3.3 Triangular Probe Configuration

Figure 3.4 Probe Thick-Film Technique

Probe Specifications

Construction : Symmetrical design with triangular core
Interleaved sensors
Built-in shielding against static charges
PEEK enclosure material (resistant to organic DGBE)

Calibration : Basic Broad Band Calibration In air from 10 MHz to 3.0 GHz
In brain and muscle simulating tissue at Frequencies of HSL835,
HSL1900 MHz, Calibration certificates please find attached.

Frequency : 10 MHz to > 6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)

Directivity ±0.2 dB in HSL (rotation around probe axis)
±0.3 dB in HSL (rotation normal to probe axis)

Dynamic Range 5μW/g to > 100mW/g; Linearity: ±0.2dB

Dimensions Overall length: 330mm (Tip : 20mm)
Tip diameter: 4.0mm (Body : 12mm)
Distance from probe tip to dipole centers: 2.0mm

Application General dosimetry up to 3 GHz
Compliance tests of mobile phones
Fast automatic scanning in arbitrary phantoms

Optical Surface Detection
± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces

3.3 SAM Phantom

The SAM Twin Phantom V4.0C is constructed of a fiberglass shell Integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users.
It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region.
A cover prevents the evaporation of the liquid Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.
(See Figure 3.5)

Figure 3.5 SAM Twin Phantom

Phantom Specification

Construction : The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Shell Thickness 2 ± 0.2 mm
Filling Volume Approx. 25 liters
Dimensions Height; 830 mm; Length: 1000 mm; Width: 500 mm

3.4 Head & Muscle Simulating Mixture Characterization

The head and muscle mixture consist of a viscous gel using hydroxethyl-cellullose (HEC) gelling agent and saline solution(see Table 3.1). Preservation with a bacteriacide is added and visual inspection is made to make sure air Bubbles are not trapped during the mixing process.
The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 have been incorporated in the following table.

Table 3.1 Composition of the Head & Muscle Tissue Equivalent Matter

Ingredients	Simulating Tissue			
	835MHz Head	835MHz Muscle	1900MHz Head	1900MHz Muscle
De-ionised water	41.45%	52.40%	55.24%	70.17%
Sugar	56.00%	45.00%	0.00%	0.00%
Salt	1.45%	1.40%	0.31%	0.39%
Hydroxyethyl Cellulose	1.00%	1.00%	0.00%	0.00%
DGBE	-	-	44.45%	29.44%
Bacteriacide	0.10%	0.10%	0.00%	0.00%
Dielectric Constant Target	41.50	55.20	40.00	53.30
Conductivity Target (S/m)	0.90	0.97	1.40	1.52

3.5 Device Holder for Transmitters

In combination with the SAM Twin Phantom V4.0, the Mounting Device (see Fig. 3.6) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation point is the ear opening.
The device holder can be locked at different phantom locations (left head, right head, flat phantom).
* Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produce infinite number of configurations .
To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Figure 3.6Device Holder

3.6 Dipole Validation

The reference dipole should have a return loss better than –20dB(measured in the setup) at the resonant frequency to reduce the uncertainty in the power measurement.

835MHz dipole

Frequency	835MHz
Return Loss	< -20 dB at specified validation position
Dimensions	D835V2: dipole length: 161 mm; overall height: 330 mm

1900MHz dipole

Frequency	1900MHz
Return Loss	< -20 dB at specified validation position
Dimensions	D1900V2: dipole length: 68 mm; overall height: 300 mm

4. Measurement Procedure

The mobile phone operating at the maximum power level is placed by a non metallic device holder in the above described positions at a shell phantom of a human being.
The distribution of the electric field strength E is measured in the tissue simulating liquid within the shell phantom.
For this miniaturized field probes with high sensitivity and low field disturbance are used.
Afterwards the corresponding SAR values are calculated with the known electrical conductivity σ and the mass density p of the tissue in the SEMCAD software.
The software is able to determine the averaged SAR values (averaging region 1g or 10g) for compliance testing.

The measurements are done by two scans: first a coarse scan determines the region of the maximum SAR, afterwards the averaged SAR is measured in a second scan within the sharp of a cube. The measurement times takes about 15 minutes.

The following steps are used for each test position:

STEP1
Establish a call with the maximum output power with a base station simulator.
The connection between the mobile phone and the base station simulator is established via air interface.

STEP2
Measurement of the local E-Field value at a fixed location.
This value serves as a reference value for calculating a possible power drift.

STEP3
Measurement of the SAR distribution with a grid spacing of 15mm × 15mm and a constant distance to the inner surface of the phantom.
Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With this values the area of the maximum SAR is calculated by a interpolation scheme (combination of a least-square fitted function and a weighted average method). Additional peaks within 3dB of the maximum SAR are searched.

STEP4
Around this points, a cube of 30mm×30mm×30mm is assessed by measuring 5×5×7 points.
With these data, the peak spatial-average SAR value can be calculated with the SEMCAD software.

STEP 5
The used extrapolation and interpolation routines are all based on the modified Quadratic Shepard's method [DASY4].

STEP 6
Repetition of the E-Field measurement at the fixed location and repetition of the whole procedure if the two results differ by more than ±0.223dB.

5. Definition of Reference Points

5.1 EAR Reference Point

Figure 5.1 shows the front, back and side views of SAM. The point “M” is the reference point For the center of mouth, “LE” is the left ear reference point (ERP), and “RE” is the right ERP. The ERPs are 15 mm posterior to the entrance to ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 5.2.

Figure 5.1 Front, back and side view of SAM

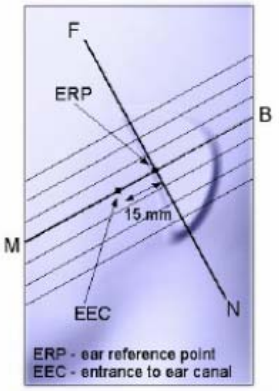


Figure 5.2 Close up side view

The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front)perpendicular to the reference plane and passing through the RE(or LE) is called the Reference Pivoting Line (see Figure 5.3).
Line B-M is perpendicular to the N-F line. Both N-F and B-M Lines should be marked on the external phantom shell to Facilitate handset positioning. Posterior to the N-F line, the thickness of the phantom shell with the shape of an ear is a flat surface 6 mm thick at the ERPs.

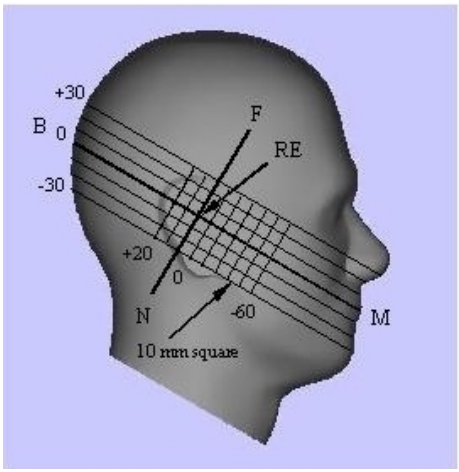


Figure 5.3 Side view of the phantom showing relevant markings

5.2 Handset Reference Points

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the “test device reference point” located along the “vertical centerline” on the front of the device aligned to the “ear reference point” (see Fig. 5.4).
The “test device reference point” was than located at the same level as the center of the eat reference point. The test device was positioned so that the “vertical centerline” was bisecting the front surface of the handset at it’s tip and bottom edges, positioning the “ear reference point” on the outer surface of the both the left and right head phantoms on the ear reference point.

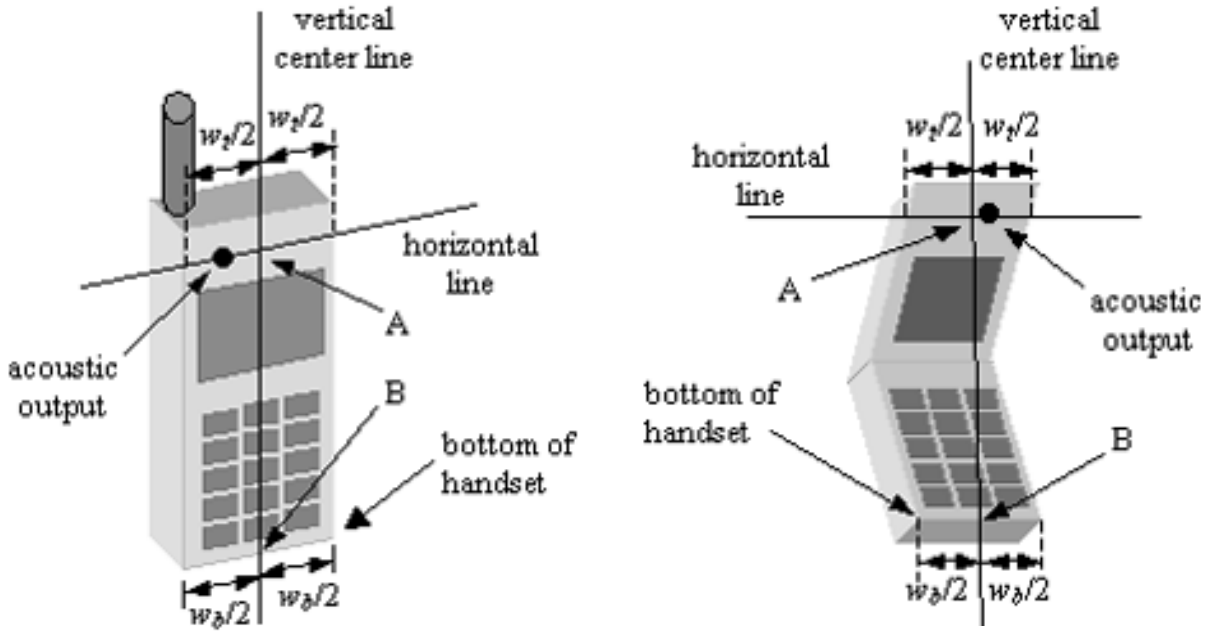


Figure 5.4 Handset vertical and horizontal reference lines

6. Test Configuration Positions

6.1 Cheek/Touch Position

Step 1
The test device was positioned with the handset close to the surface of the phantom such that point. A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 6.1), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

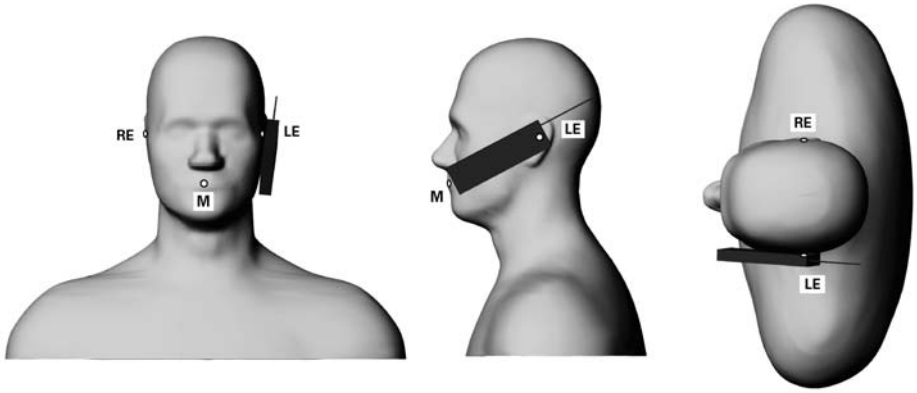


Figure 6.1 Front Side and Top View of Cheek/Touch Position

Step 2
The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.

Step 3
While maintaining the handset in this plane, the handset was rotated around the LE-RE line Until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).

Step 4
Rotate the handset around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.

Step 5
While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear cheek.(See Figure 5.2)

6.2 EAR/Tilt 15° Position

With the test device aligned in the “Cheek/Touch Position”:

Step 1
Repeat steps 1 to 5 of 5.2 to place the device in the “Cheek/Touch Position”

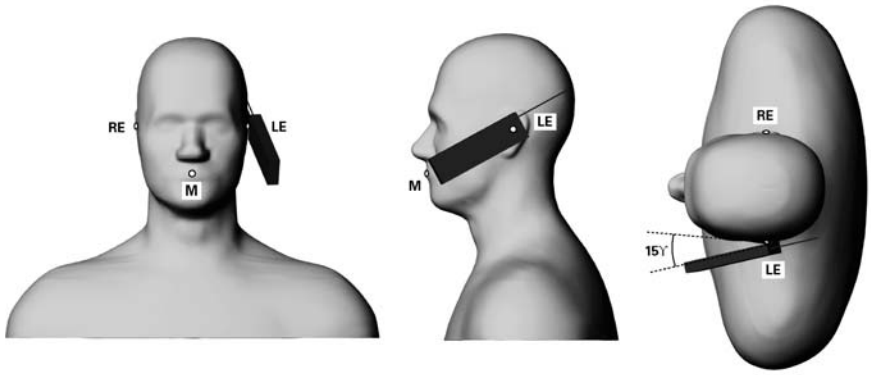


Figure 6.2 Front, side and Top View of Ear/Tilt 15° Position

Step 2
While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degree.

Step 3
The phone was then rotated around the horizontal line by 15 degree.

Step 4
While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head.
(In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced.
The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head. (See Figure 6.2)

6.3 Body-worn and Other Configurations

6.3.1 Phantom Requirement

For body-worn and other configurations a flat phantom shall be used which is comprised of material with electrical properties similar to the corresponding tissues.

6.3.2 Test Position

The body-worn configurations shall be tested with the supplied accessories (belt-clips, holsters, etc.) attached to the device in normal use configuration. Devices with a headset output shall be tested with a connected headset. Since the Supplement C to OET Bulletin 65 was mainly issued for mobile phones it is only a guideline and therefore some requirements are not usable or practical for devices other than mobile phones.

6.3.3 Test to be Performed

For purpose of determining test requirements, accessories may be divided into two categories: those that do not contain metallic components and those that do. For multiple accessories that do not contain metallic components, the device may be tested only with that accessory which provides the closet spacing to the body.
For multiple accessories that contain metallic components, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component, only the accessory that provides the closet spacing to the body must be tested.
If the manufacturer provides none body accessories, a separation distance of 1.5 cm between the back of the device and the flat phantom is recommended. Other separation distances may be used, but they shall not exceed 2.5cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.
For devices with retractable antenna, the SAR test shall be performed with the antenna fully extended and fully retracted. Other factors that may affect the exposure shall also be tested. For example, optional antennas or optional battery packs which may significantly change the volume, lengths, flip open/closed, etc. of the device or any other accessories which might have the potential to considerably increase the peak spatial-average SAR value.
The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at the middle channel for each test configuration is at least 3.0dB lower than the SAR limit, testing at the high and low channel is optional.

7. Measurement Uncertainty

DASY4 Uncertainty Budget
According to IEEE 1528 [1]

Error Description	Uncertainty value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±5.9 %	N	1	1	1	±5.9 %	±5.9 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Conditions	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	$\sqrt{3}$	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Phantom and Setup								
Phantom Uncertainty	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Liquid Conductivity (target)	±5.0 %	R	$\sqrt{3}$	0.64	0.43	±1.8 %	±1.2 %	∞
Liquid Conductivity (meas.)	±2.5 %	N	1	0.64	0.43	±1.6 %	±1.1 %	∞
Liquid Permittivity (target)	±5.0 %	R	$\sqrt{3}$	0.6	0.49	±1.7 %	±1.4 %	∞
Liquid Permittivity (meas.)	±2.5 %	N	1	0.6	0.49	±1.5 %	±1.2 %	∞
Combined Std. Uncertainty						±10.8 %	±10.6 %	330
Expanded STD Uncertainty						**±21.6 %**	**±21.1 %**	

Table 21.6: Worst-Case uncertainty budget for DASY4 assessed according to IEEE 1528 [1]. The budget is valid for the frequency range 300 MHz - 3 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

8. System Verification

8.1 Tissue Verification

For the measurement of the following parameters the HP 85070E dielectric probe kit is used, representing the open-ended slim form probe measurement procedure. The measured values should be within ±5% of the recommended values given by the IEEE Standard C95.1 / OET Bulletin 65 Supplement C.

Table 8.1 Measured Tissue Parameters of 835MHz

	835MHz Head		835MHz Muscle	
Date	December 14, 2006		December 15, 2006	
Liquid Temperature(°C)	22.2°C		21.5°C	
	Recommended Value	Measured Value	Recommended Value	Measured Value
Dielectric Constant (ε)	41.50±2.075	**40.7**	55.20±2.760	**56.2**
Conductivity(σ)	0.90 ±0.045	**0.886**	0.97 ±0.049	**0.953**

Table 8.2 Measured Tissue Parameters of 1900MHz

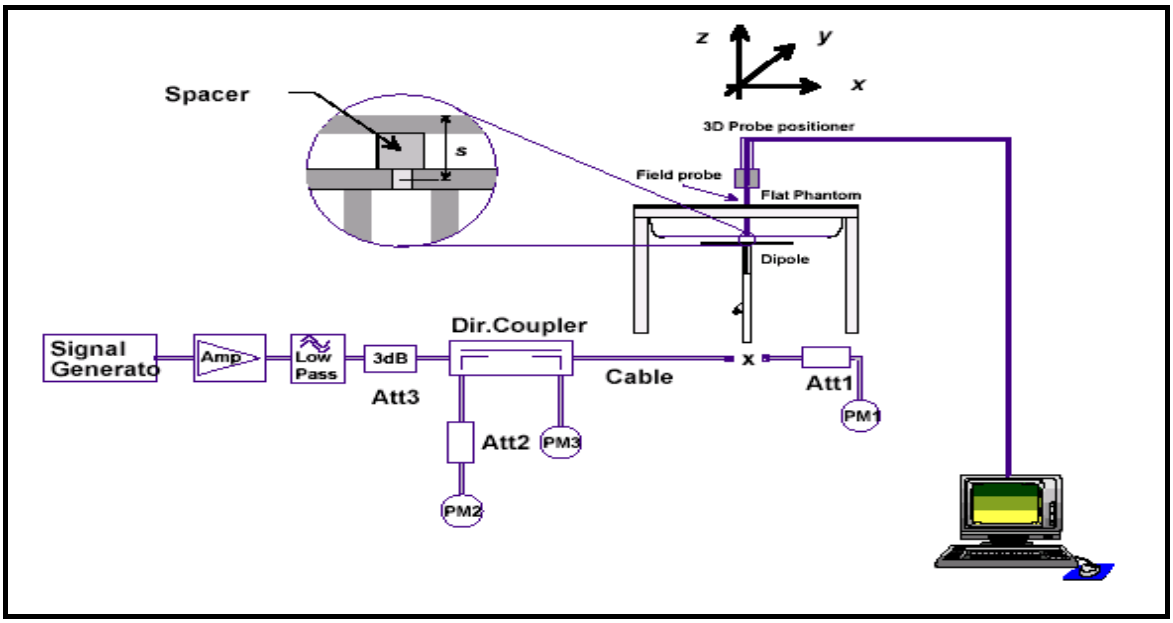
	1900MHz Head		1900MHz Muscle	
Date	December 17, 2006		December 19, 2006	
Liquid Temperature(°C)	22.0°C		22.1°C	
	Recommended Value	Measured Value	Recommended Value	Measured Value
Dielectric Constant (ε)	40.00±2.000	**40.0**	53.30±2.665	**51.3**
Conductivity(σ)	1.40 ±0.070	**1.42**	1.52 ±0.076	**1.53**

8.2 Test System Validation

The simplified performance check was realized using the dipole validation kits.
The input power of the dipole antennas were 250mW and they were placed under the flat Part of the SAM phantoms.
The target and measured results are listed in the table 8.2

Table 8.2 System Validation Results

Tissue	Date	Liquid Temperature(°C)	Targeted SAR (mW/g)	Measured SAR	Deviation (%)
			1g	1g	1g
835MHz Head	December 15, 2006	22.2°C	2.375	**2.34**	**-1.47**
835MHz Muscle	December 165, 2006	21.2°C	2.375	**2.50**	**5.26**
1900MHz Head	December 18, 2006	22.3°C	9.925	**10.2**	**2.77**
1900MHz Muscle	December 19, 2006	22.1°C	9.925	**10.7**	**7.81**



Dipole Validation Test Setup

8.3 Measurement Result of Test Data (GSM850 Head Validation)

Date/Time: 2006-12-15 12:37:40

Test Laboratory: Nemko Korea File Name: SY6BPP-UP560 GSM850 Validation.da4

DUT: Dipole 835 MHz Type: D835V2 Serial: D835V2 - SN:4d017 Applicant Name: Bellwave Co.,Ltd

Communication System: CW Frequency: 835 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 835 MHz; σ = 0.886 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.87, 6.87, 6.87); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SY6BPP-UP560 Validation/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.46 mW/g

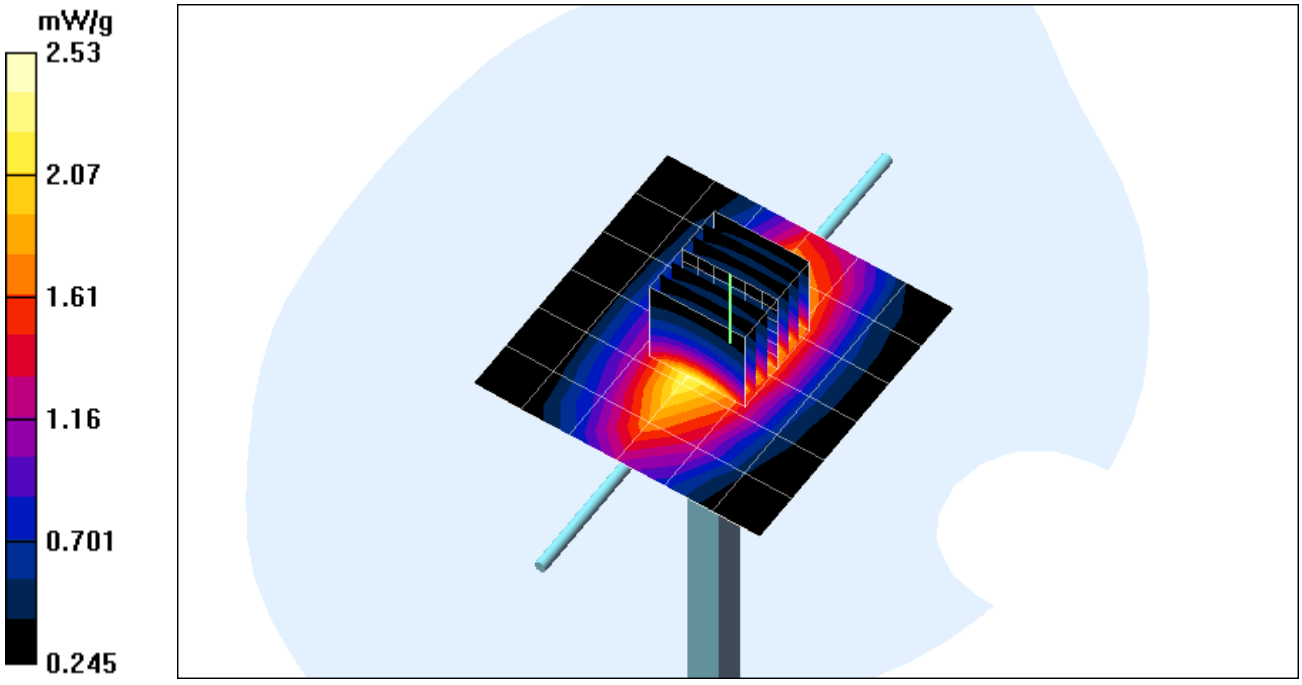
SY6BPP-UP560 Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.2 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 3.43 W/kg

SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.54 mW/g

Maximum value of SAR (measured) = 2.53 mW/g



8.4 Measurement Result of Test Data (GSM850 Muscle Validation)

Date/Time: 2006-12-16 9:52:29

Test Laboratory: Nemko Korea File Name: SY6BPP-UP560 GSM850 Validation.da4

DUT: Dipole 835 MHz Type: D835V2 Serial: D835V2 - SN:4d017 Applicant Name: Bellwave Co.,Ltd

Communication System: CW Frequency: 835 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 835 MHz; σ = 0.953 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.35, 6.35, 6.35); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SY6BPP-UP560 Validation/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.61 mW/g

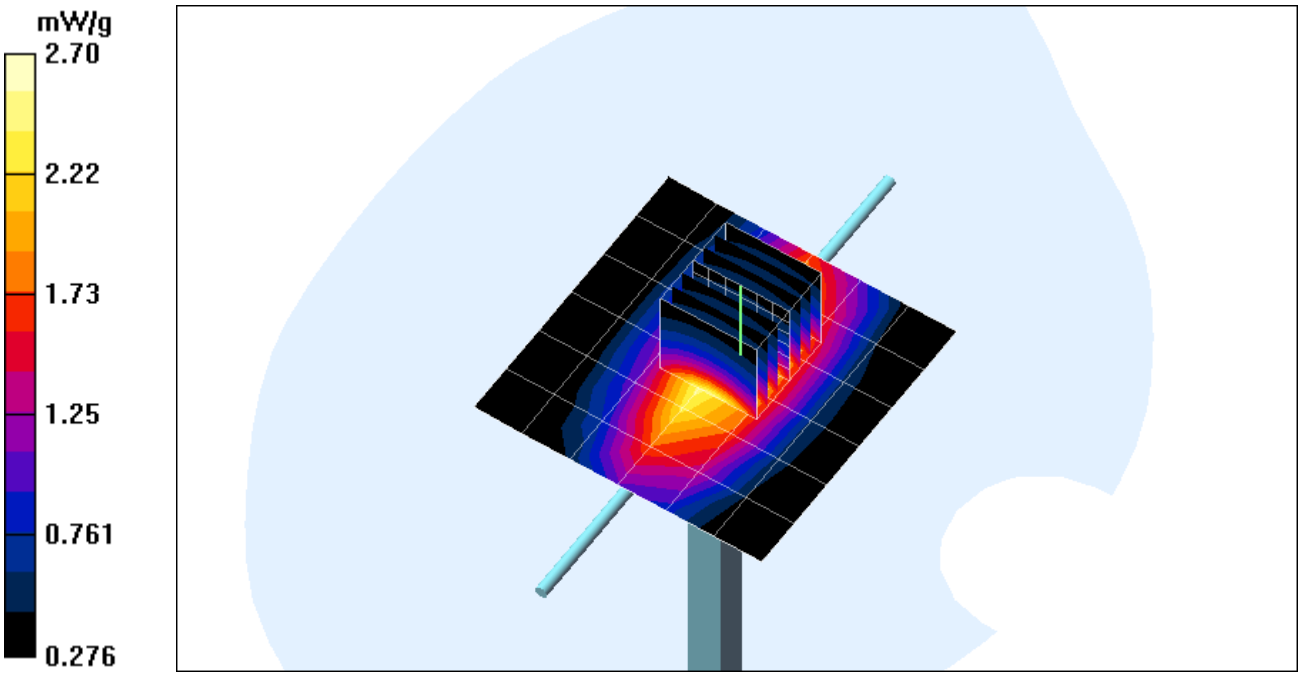
SY6BPP-UP560 Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.4 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 3.58 W/kg

SAR(1 g) = 2.5 mW/g; SAR(10 g) = 1.66 mW/g

Maximum value of SAR (measured) = 2.70 mW/g



8.5 Measurement Result of Test Data(PCS1900 Head Validation)

Date/Time: 2006-12-18 10:49:03

Test Laboratory: Nemko Korea File Name: SY6BPP-UP560 PCS Validation.da4

DUT: Dipole 1900 MHz Type: D1900V2 Serial: D1900V2 - SN:5d059 Applicant Name: Bellwave Co.,Ltd

Communication System: CW Frequency: 1900 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1900.29 MHz; σ = 1.42 mho/m; ε_r = 40; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(5.41, 5.41, 5.41); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SY6BPP-UP560 PCS Validation/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 11.0 mW/g

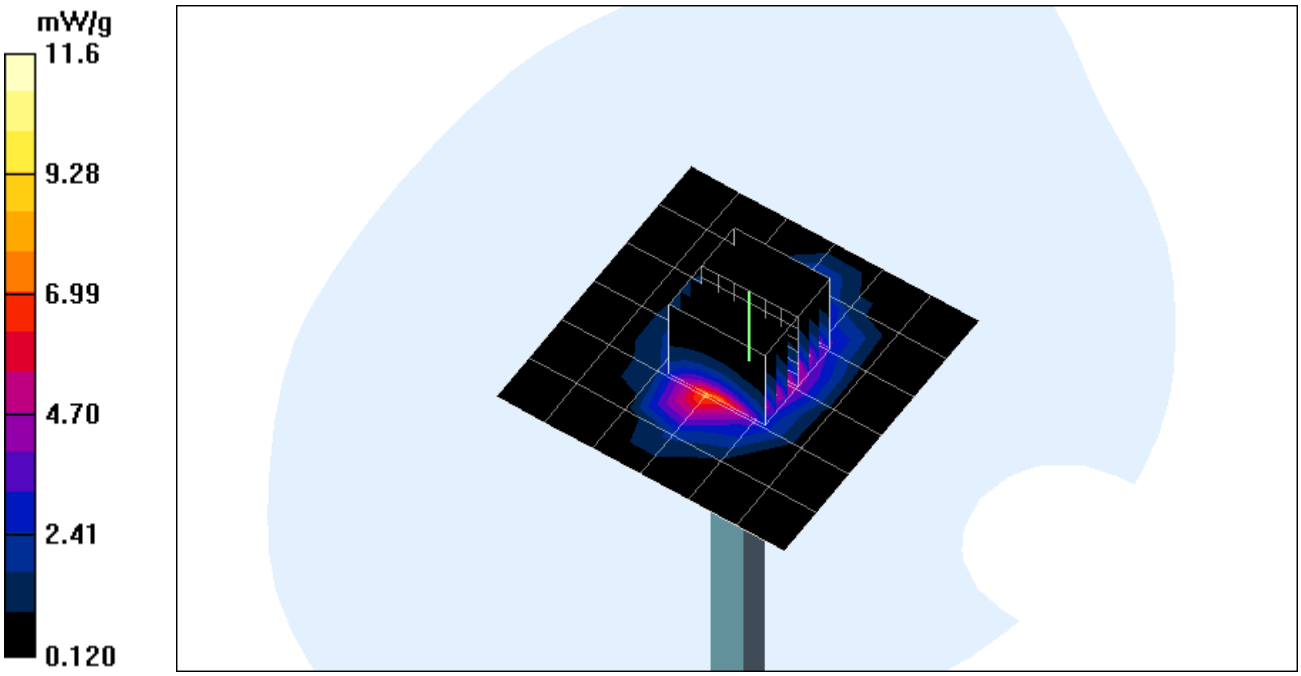
SY6BPP-UP560 PCS Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.7 V/m; Power Drift = -0.082 dB

Peak SAR (extrapolated) = 19.5 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.13 mW/g

Maximum value of SAR (measured) = 11.6 mW/g



8.6 Measurement Result of Test Data (PCS1900 Muscle Validation)

Date/Time: 2006-12-19 3:45:06

Test Laboratory: Nemko Korea File Name: SY6BPP-UP560 PCS Validation.da4

DUT: Dipole 1900 MHz Type: D1900V2 Serial: D1900V2 - SN:5d059 Applicant Name: Bellwave Co.,Ltd

Communication System: CW Frequency: 1900 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(4.67, 4.67, 4.67); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SY6BPP-UP560 PCS Validation/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 11.4 mW/g

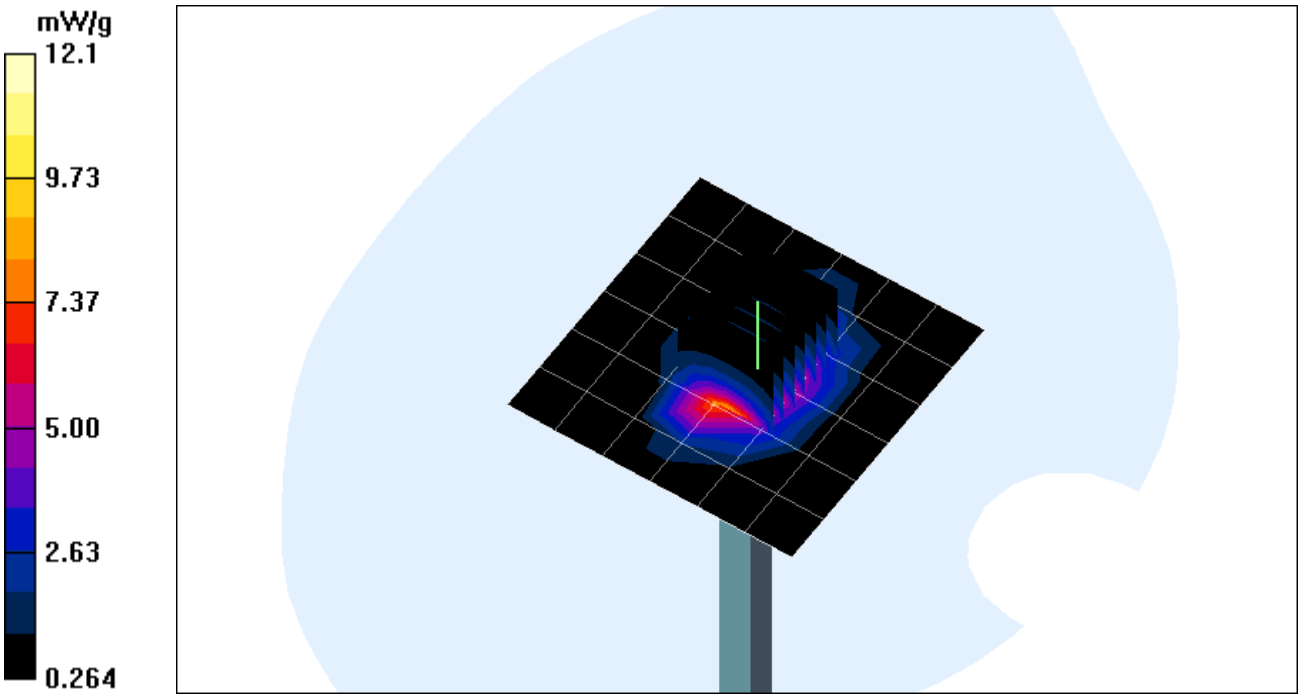
SY6BPP-UP560 PCS Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.3 V/m; Power Drift = 0.000 dB

Peak SAR (extrapolated) = 18.3 W/kg

SAR(1 g) = 10.7 mW/g; SAR(10 g) = 5.69 mW/g

Maximum value of SAR (measured) = 12.1 mW/g



9. SAR Measurement Results

Procedures Used To Establish Test Signal

The handset was placed into simulated call mode using manufacturers test codes. Such test signals offer a consistent means for testing SAR and are recommended for evaluating SAR.

Conducted Output Power

	FREQUENCY		Power (dBm)
	CH	MHz	
GSM850	128	824.2	32.39
	190	836.6	32.27
	251	848.8	32.42
PCS1900	512	1850.2	28.97
	661	1880.0	29.40
	810	1909.8	29.55

Maximum SAR

1g

Mode	CH	Frequency (MHz)	Position	Antenna	SAR Limit W/kg	Measured SAR W/kg	Result
850MHz Head	190	836.6	Right/ Touch	Intenna	1.6	0.778	Passed
850MHz Muscle	190	836.6	Flat/ 15mm	Intenna	1.6	0.359	Passed
1900MHz Head	512	1850.2	Right / Touch	Intenna	1.6	1.030	Passed
1900MHz Muscle	512	1850.2	Flat/ 15mm with Headset	Intenna	1.6	0.642	Passed

Device Test Conditions

The handset is battery operated. Each SAR measurement was taken with a fully charged battery. In order to verify that the device was tested at full power, conducted output power measurements were performed before and after each SAR measurement to confirm the output power.If a conducted power deviation of more than 5% occurred, the test was repeated.

EUT Handset Reference Points

Figure 9.1 Handset Reference Points

9.1 SAR Measurement Result (GSM850 Right Head Touch Position)

Date of Test : December 15 , 2006
Mixture Type: Head
Tissue Depth: 15.1 cm

Modulation	Frequency		Power Drift (dB)	Device Test Position	Antenna Position	1g SAR (W/kg)
	CH	MHz				
GSM850	128	824.2	**-0.054**	Cheek / Touch	Intenna	**0.752**
	190	836.6	**-0.139**	Cheek / Touch	Intenna	**0.778**
	251	848.8	**-0.049**	Cheek / Touch	Intenna	**0.696**

Notes:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration ☐ Left Head ☐ Flat Phantom ■ Right Head
6. SAR Configuration ■ Head ☐ Body ☐ Hand
7. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type ☐ Slim Type

Figure 9.1 Right Head SAR Test Setup
-- Cheek / Touch Position --

Measurement Result of Test Data (GSM850 Right Head Touch Position)

Date/Time: 2006-12-15 3:03:26

Test Laboratory: Nemko Korea File Name: Right Head Touch Position CH128.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GSM 850 Frequency: 824.2 MHz

Duty Cycle: 1:8.3 Phantom section: Right Section

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.874 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.87, 6.87, 6.87); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM850 Right Touch Position CH128/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.711 mW/g

GSM850 Right Touch Position CH128/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

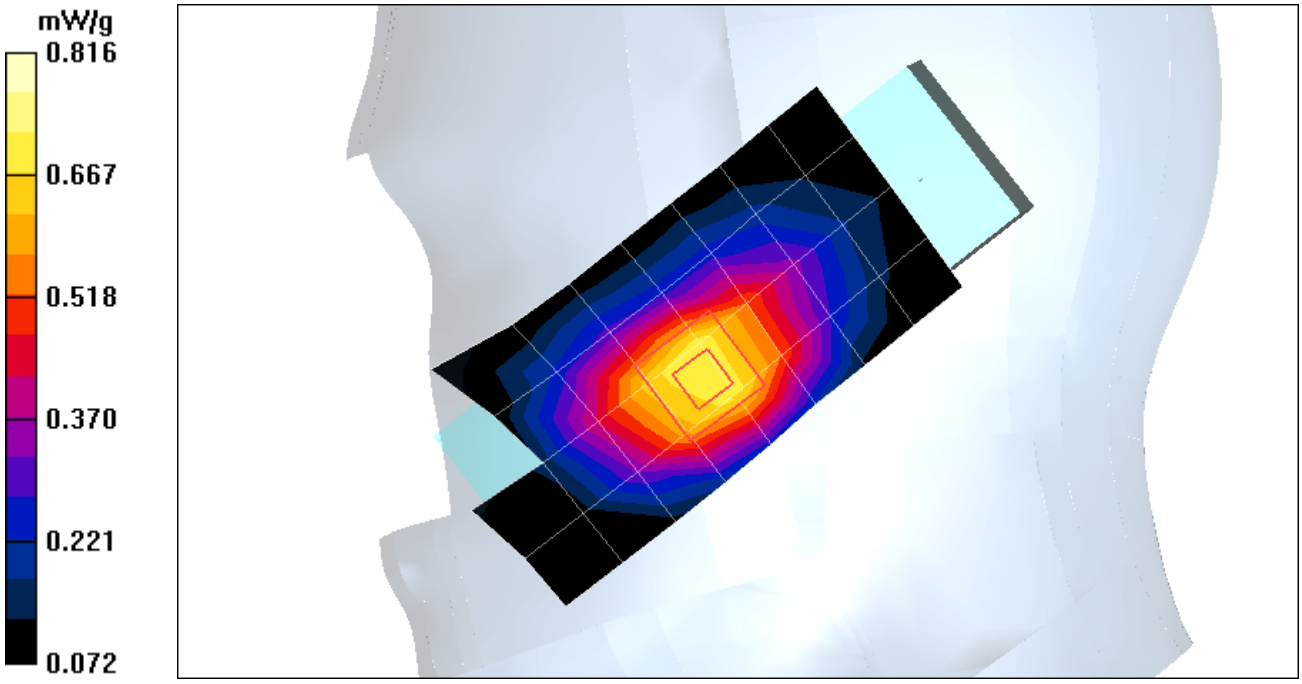
Reference Value = 11.1 V/m; Power Drift = -0.054 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.752 mW/g; SAR(10 g) = 0.496 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.816 mW/g



Date/Time: 2006-12-15 2:46:11

Test Laboratory: Nemko Korea File Name: Right Head Touch Position CH190.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GSM 850 Frequency: 836.6 MHz

Duty Cycle: 1:8.3 Phantom section: Right Section

Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.887 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.87, 6.87, 6.87); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM850 Right Touch Position CH190/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.739 mW/g

GSM850 Right Touch Position CH190/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

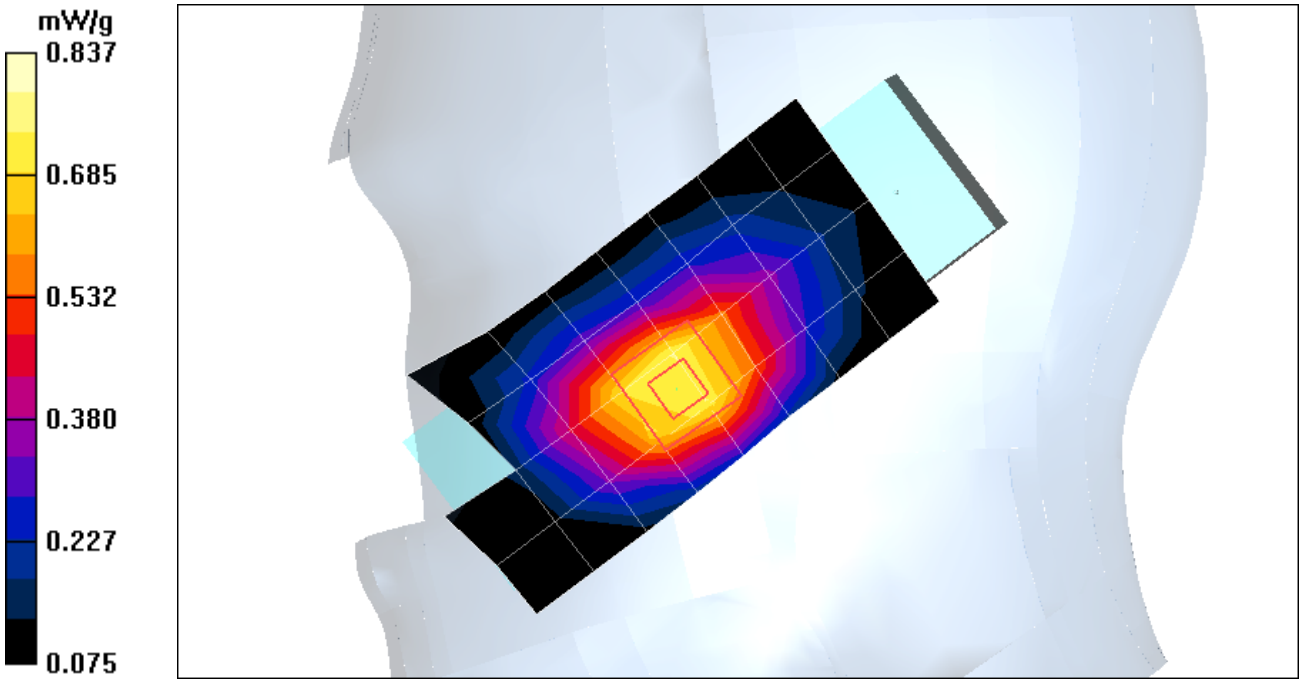
Reference Value = 11.2 V/m; Power Drift = -0.139 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.778 mW/g; SAR(10 g) = 0.512 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.837 mW/g



Date/Time: 2006-12-15 3:20:55

Test Laboratory: Nemko Korea File Name: Right Head Touch Position CH251.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GSM 850 Frequency: 848.8 MHz

Duty Cycle: 1:8.3 Phantom section: Right Section

Medium parameters used: f = 849 MHz; σ = 0.896 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.87, 6.87, 6.87); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM850 Right Touch Position CH251/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.668 mW/g

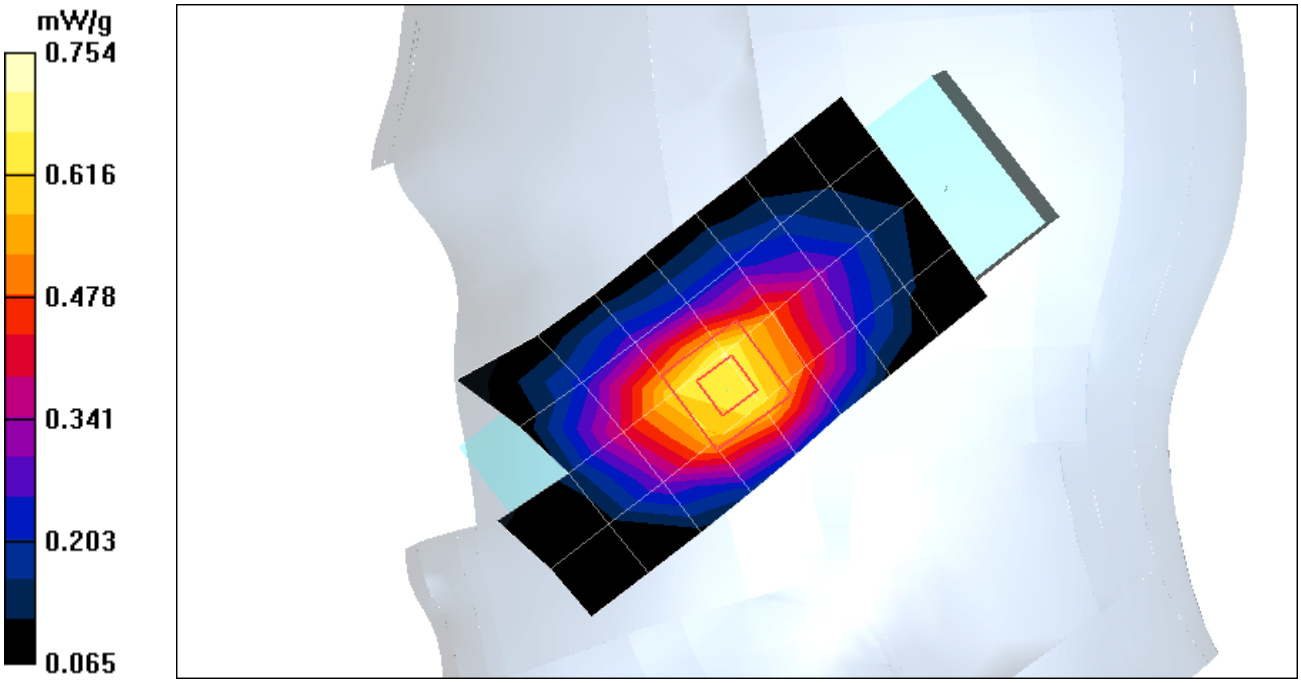
GSM850 Right Touch Position CH251/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.6 V/m; Power Drift = -0.049 dB

Peak SAR (extrapolated) = 0.977 W/kg

SAR(1 g) = 0.696 mW/g; SAR(10 g) = 0.456 mW/g

Maximum value of SAR (measured) = 0.754 mW/g



Date/Time: 2006-12-15 2:46:11

Test Laboratory: Nemko Korea File Name: Right Head Touch Position CH190.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GSM 850 Frequency: 836.6 MHz

Duty Cycle: 1:8.3 Phantom section: Right Section

Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.887 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.87, 6.87, 6.87); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM850 Right Touch Position CH190/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.739 mW/g

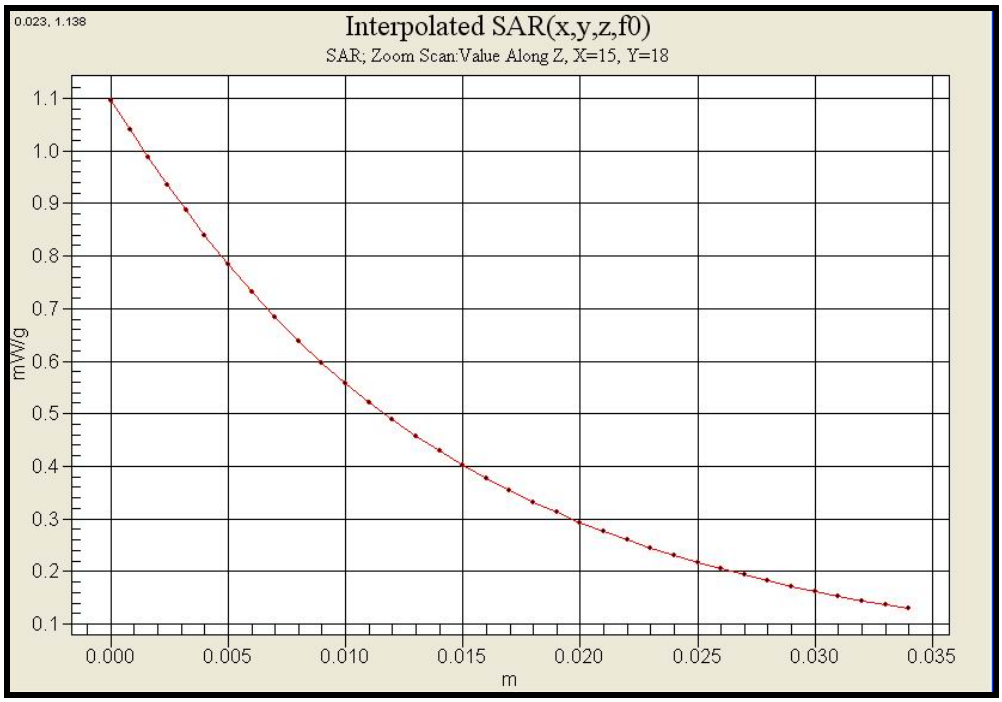
GSM850 Right Touch Position CH190/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.2 V/m; Power Drift = -0.139 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.778 mW/g; SAR(10 g) = 0.512 mW/g

Maximum value of SAR (measured) = 0.837 mW/g



9.2 SAR Measurement Result (GSM850 Right Head Tilted Position)

Date of Test : December 15 , 2006
Mixture Type: Head
Tissue Depth: 15.1 cm

Modulation	Frequency		Power Drift (dB)	Device Test Position	Antenna Position	1g SAR (W/kg)
	CH	MHz				
GSM850	190	836.6	**-0.026**	Cheek / Tilted	Intenna	**0.262**

Notes:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration ☐ Left Head ☐ Flat Phantom ■ Right Head
6. SAR Configuration ■ Head ☐ Body ☐ Hand
7. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type ☐ Slim Type

Figure 9.2 Right Head SAR Test Setup
-- Ear / Tilted Position --

Measurement Result of Test Data (GSM850 Right Head Tilted Position)

Date/Time: 2006-12-15 3:43:25

Test Laboratory: Nemko Korea File Name: Right Head Tilt Position CH190.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GSM 850 Frequency: 836.6 MHz

Duty Cycle: 1:8.3 Phantom section: Right Section

Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.887 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.87, 6.87, 6.87); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM850 Right Tilt Position CH190/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.266 mW/g

GSM850 Right Tilt Position CH190/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

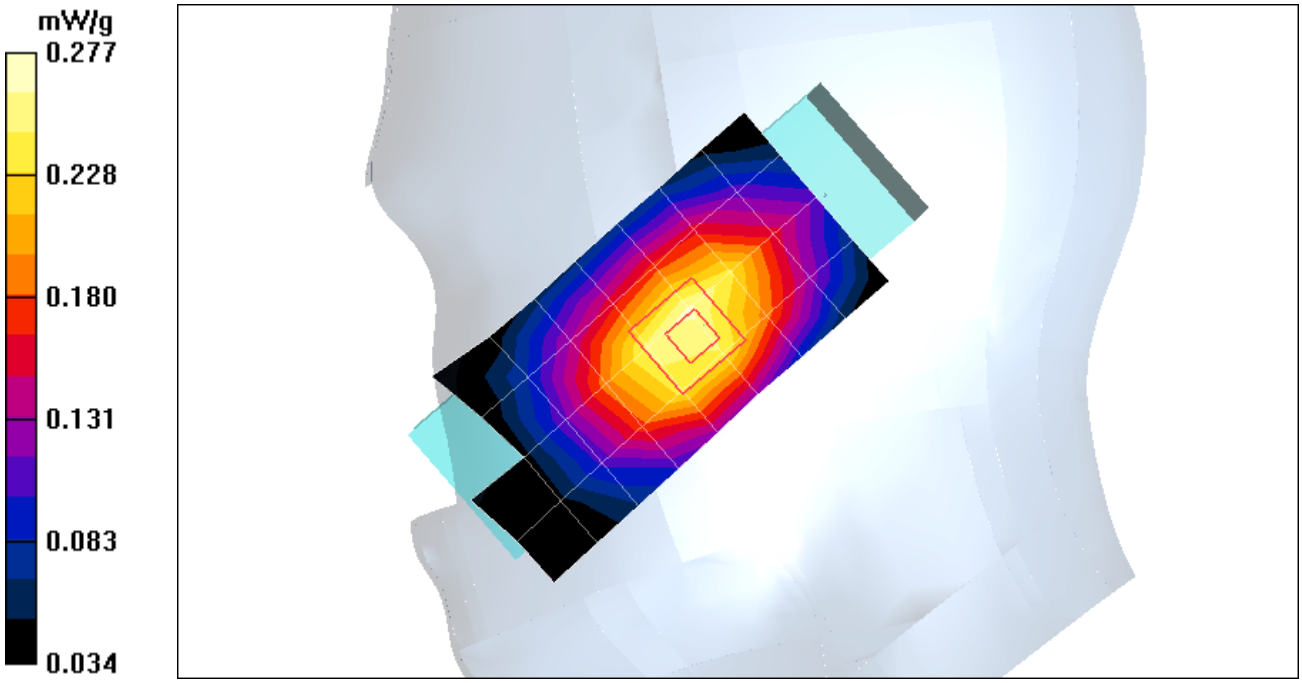
Reference Value = 11.4 V/m; Power Drift = -0.026 dB

Peak SAR (extrapolated) = 0.332 W/kg

SAR(1 g) = 0.262 mW/g; SAR(10 g) = 0.191 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.277 mW/g



9.3 SAR Measurement Result (GSM850 Left Head Touch Position)

Date of Test : December 15 , 2006
Mixture Type: Head
Tissue Depth: 15.1 cm

Modulation	Frequency		Power Drift (dB)	Device Test Position	Antenna Position	1g SAR (W/kg)
	CH	MHz				
GSM850	128	824.2	**-0.160**	Cheek / Touch	Intenna	**0.700**
	190	836.6	**-0.117**	Cheek / Touch	Intenna	**0.686**
	251	848.8	**0.003**	Cheek / Touch	Intenna	**0.671**

Notes:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration ■ Left Head ☐ Flat Phantom ☐ Right Head
6. SAR Configuration ■ Head ☐ Body ☐ Hand
7. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type ☐ Slim Type

Figure 9.3 Left Head SAR Test Setup
-- Cheek / Touch Position --

Measurement Result of Test Data (GSM850 Left Head Touch Position)

Date/Time: 2006-12-15 4:42:03

Test Laboratory: Nemko Korea File Name: Left Head Touch Position CH128.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GSM 850 Frequency: 824.2 MHz

Duty Cycle: 1:8.3 Phantom section: Left Section

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.874 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.87, 6.87, 6.87); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM850 Left Touch Position CH128/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.658 mW/g

GSM850 Left Touch Position CH128/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

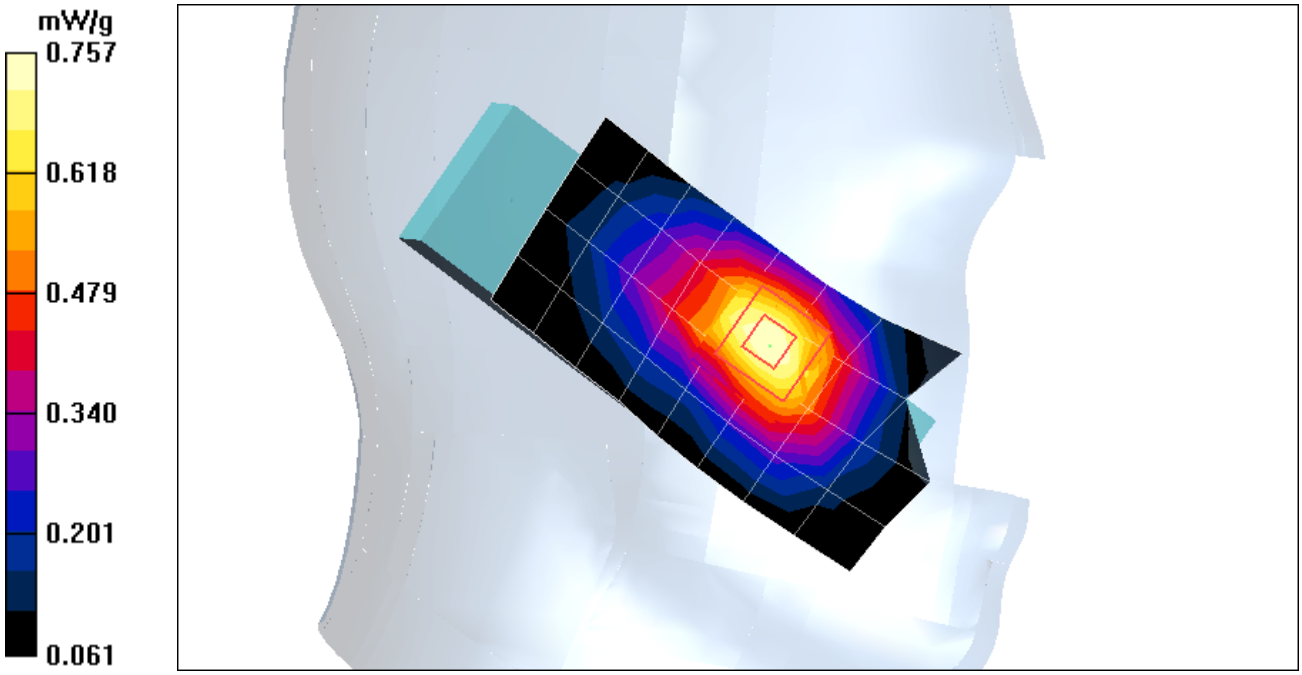
Reference Value = 9.53 V/m; Power Drift = -0.160 dB

Peak SAR (extrapolated) = 0.981 W/kg

SAR(1 g) = 0.700 mW/g; SAR(10 g) = 0.462 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.757 mW/g



Date/Time: 2006-12-15 4:23:32

Test Laboratory: Nemko Korea File Name: Left Head Touch Position CH190.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GSM 850 Frequency: 836.6 MHz

Duty Cycle: 1:8.3 Phantom section: Left Section

Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.887 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.87, 6.87, 6.87); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM850 Left Touch Position CH190/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.645 mW/g

GSM850 Left Touch Position CH190/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

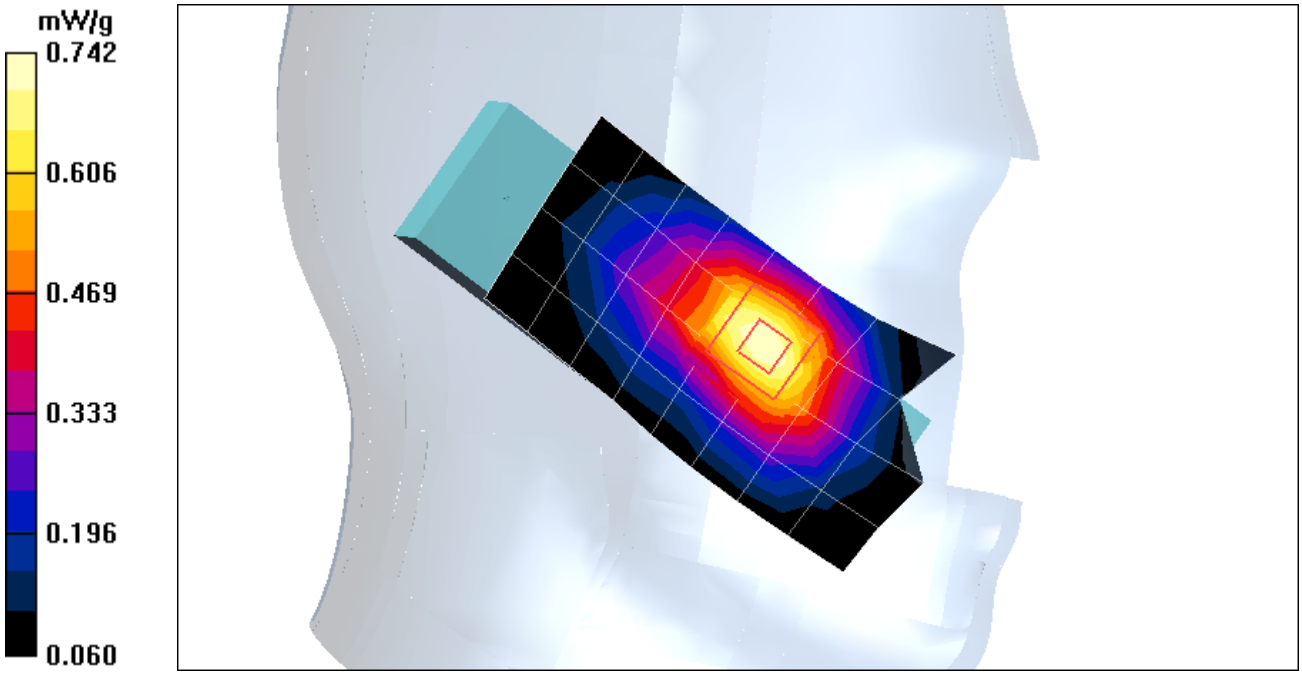
Reference Value = 9.25 V/m; Power Drift = -0.117 dB

Peak SAR (extrapolated) = 0.962 W/kg

SAR(1 g) = 0.686 mW/g; SAR(10 g) = 0.450 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.742 mW/g



Date/Time: 2006-12-15 5:37:58

Test Laboratory: Nemko Korea File Name: Left Head Touch Position CH251.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GSM 850 Frequency: 848.8 MHz

Duty Cycle: 1:8.3 Phantom section: Left Section

Medium parameters used: f = 849 MHz; σ = 0.896 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.87, 6.87, 6.87); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM850 Left Touch Position CH251/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.653 mW/g

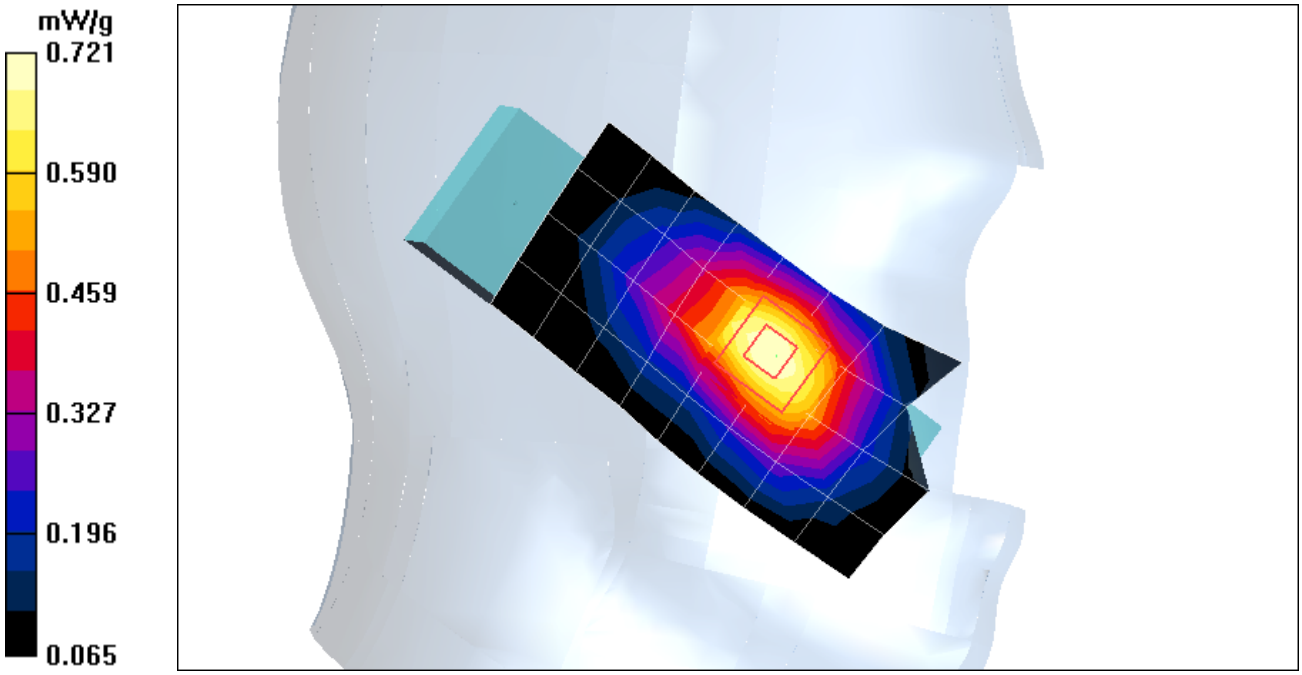
GSM850 Left Touch Position CH251/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.43 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 0.940 W/kg

SAR(1 g) = 0.671 mW/g; SAR(10 g) = 0.442 mW/g

Maximum value of SAR (measured) = 0.721 mW/g



9.4 SAR Measurement Result (GSM850 Left Head Tilted Position)

Date of Test : December 15 , 2006
Mixture Type: Head
Tissue Depth: 15.1 cm

Modulation	Frequency		Power Drift (dB)	Device Test Position	Antenna Position	1g SAR (W/kg)
	CH	MHz				
GSM850	190	836.6	**-0.142**	Cheek / Tilted	Intenna	**0.245**

Notes:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration ■ Left Head ☐ Flat Phantom ☐ Right Head
6. SAR Configuration ■ Head ☐ Body ☐ Hand
7. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type ☐ Slim Type

Figure 9.4 Left Head SAR Test Setup
-- Ear / Tilted Position --

Measurement Result of Test Data (GSM850 Left Head Tilted Position)

Date/Time: 2006-12-15 5:56:53

Test Laboratory: Nemko Korea File Name: Left Head Tilt Position CH190.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GSM 850 Frequency: 836.6 MHz

Duty Cycle: 1:8.3 Phantom section: Left Section

Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.887 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.87, 6.87, 6.87); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM850 Left Touch Position CH190/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.243 mW/g

GSM850 Left Touch Position CH190/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

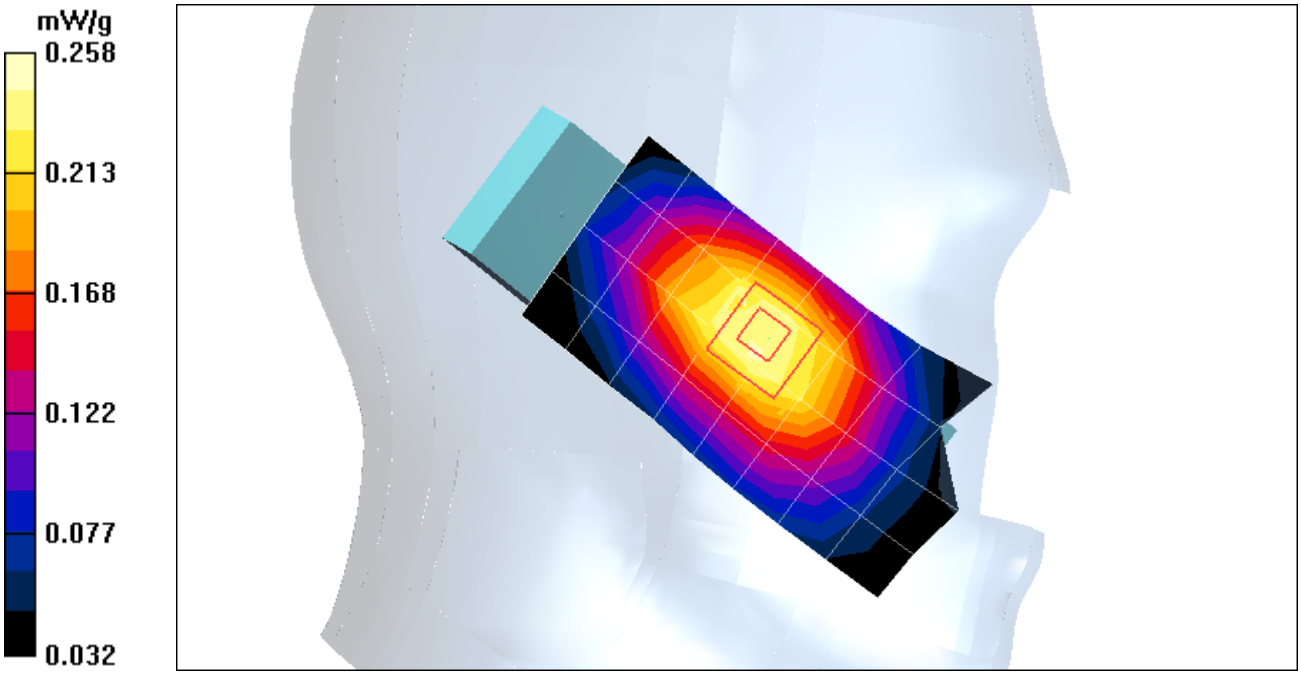
Reference Value = 9.43 V/m; Power Drift = -0.142 dB

Peak SAR (extrapolated) = 0.311 W/kg

SAR(1 g) = 0.245 mW/g; SAR(10 g) = 0.180 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.258 mW/g



9.5 SAR Measurement Result (GSM850 Muscle -15mm Distance- Position)

Date of Test : December 19 , 2006
Mixture Type: Muscle
Tissue Depth: 15.3 cm

Modulation	Frequency		Power Drift (dB)	Device Test Position	Antenna Position	1g SAR (W/kg)
	CH	MHz				
GSM850	128	824.2	**0.022**	15mm distance from Phantom	Intenna	**0.293**
	190	836.6	**-0.012**	15mm distance from Phantom	Intenna	**0.359**
	251	848.8	**-0.053**	15mm distance from Phantom	Intenna	**0.321**

Notes:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration ☐ Left Head ■ Flat Phantom ☐ Right Head
6. SAR Configuration ☐ Head ■ Muscle ☐ Hand
7. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type ☐ Slim Type

Figure 9.5 Muscle SAR Test Setup
-- 15mm Distance Position --

Measurement Result of Test Data (GSM850 Muscle -15mm Distance- Position)

Date/Time: 2006-12-19 1:15:57

Test Laboratory: Nemko Korea File Name: GPRS 15mm distance CH128.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GPRS 850 Frequency: 824.2 MHz

Duty Cycle: 1:4.15 Phantom section: Flat Section

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.941 mho/m; ε_r = 56.4; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.35, 6.35, 6.35); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GPRS 15mm distance CH 128/Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.294 mW/g

GPRS 15mm distance CH 128/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

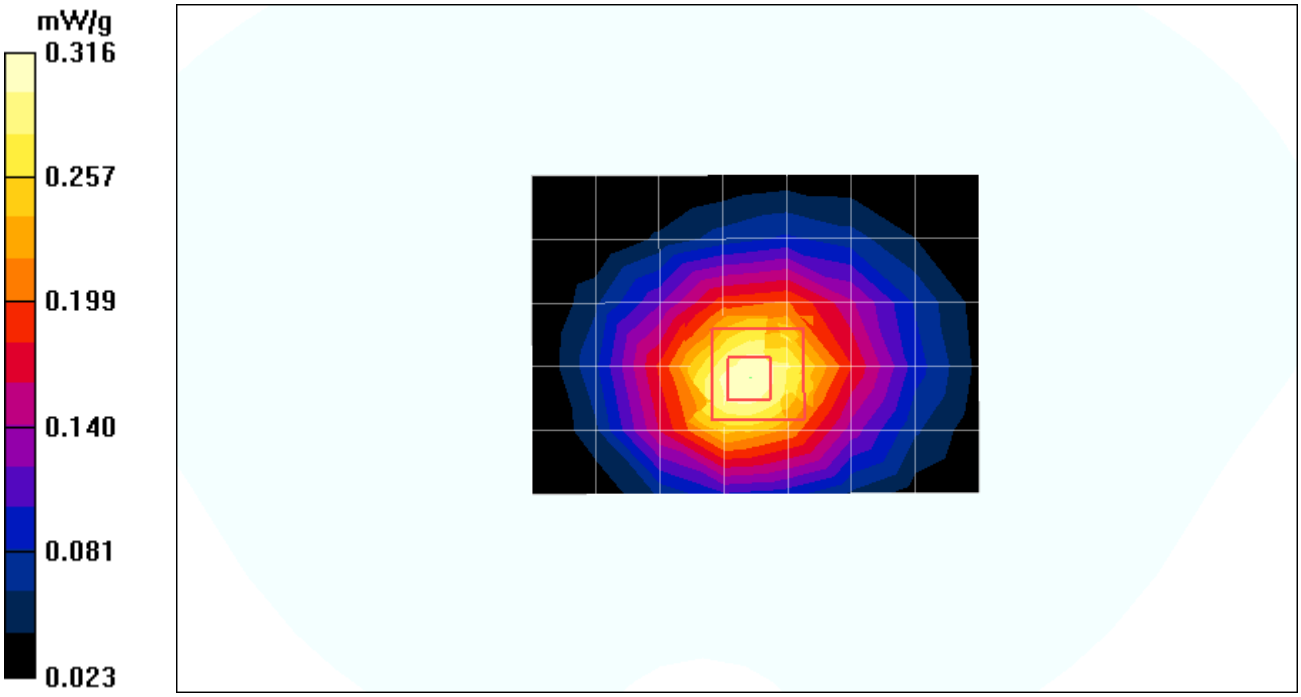
Reference Value = 15.8 V/m; Power Drift = 0.022 dB

Peak SAR (extrapolated) = 0.436 W/kg

SAR(1 g) = 0.293 mW/g; SAR(10 g) = 0.196 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.316 mW/g



Date/Time: 2006-12-19 1:32:34

Test Laboratory: Nemko Korea File Name: GPRS 15mm distance CH190.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GPRS 850 Frequency: 836.6 MHz

Duty Cycle: 1:4.15 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.955 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.35, 6.35, 6.35); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GPRS 15mm distance CH 190/Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.361 mW/g

GPRS 15mm distance CH 190/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

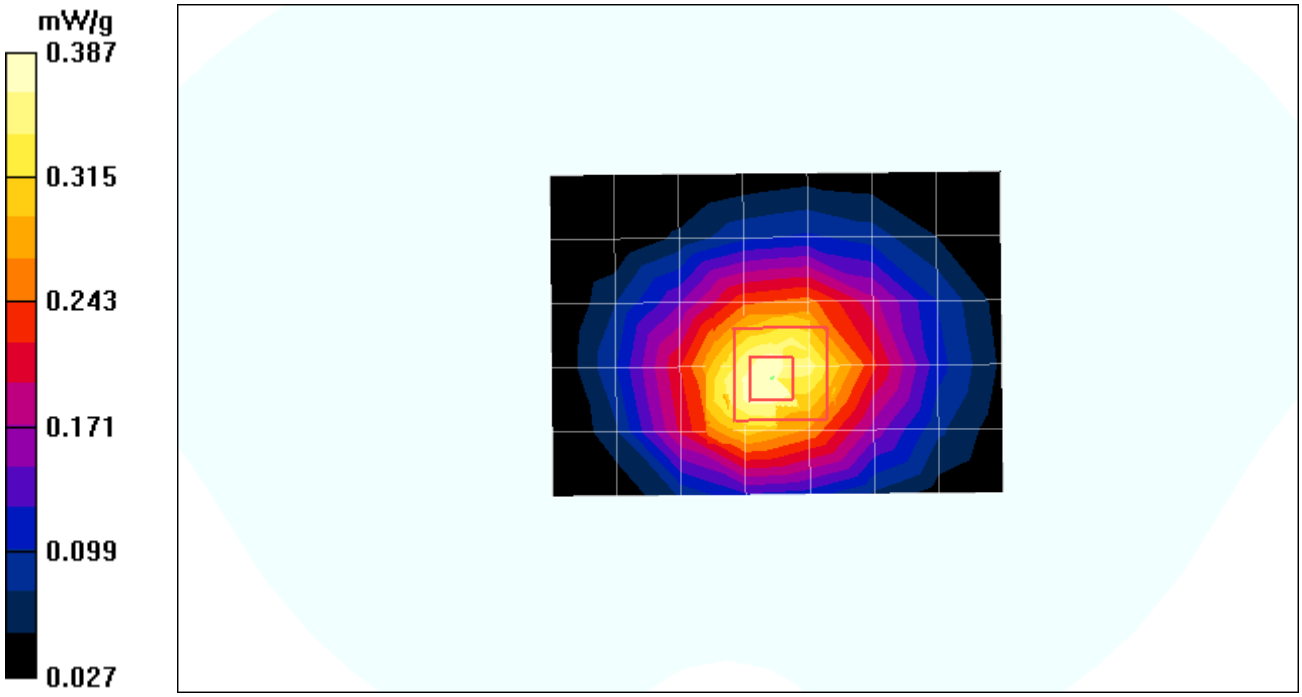
Reference Value = 17.4 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 0.513 W/kg

SAR(1 g) = 0.359 mW/g; SAR(10 g) = 0.241 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.387 mW/g



Date/Time: 2006-12-19 2:09:47

Test Laboratory: Nemko Korea File Name: GPRS 15mm distance CH251.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GPRS 850 Frequency: 848.8 MHz

Duty Cycle: 1:4.15 Phantom section: Flat Section

Medium parameters used: f = 849 MHz; σ = 0.966 mho/m; ε_r = 56; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.35, 6.35, 6.35); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GPRS 15mm distance CH 251/Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.332 mW/g

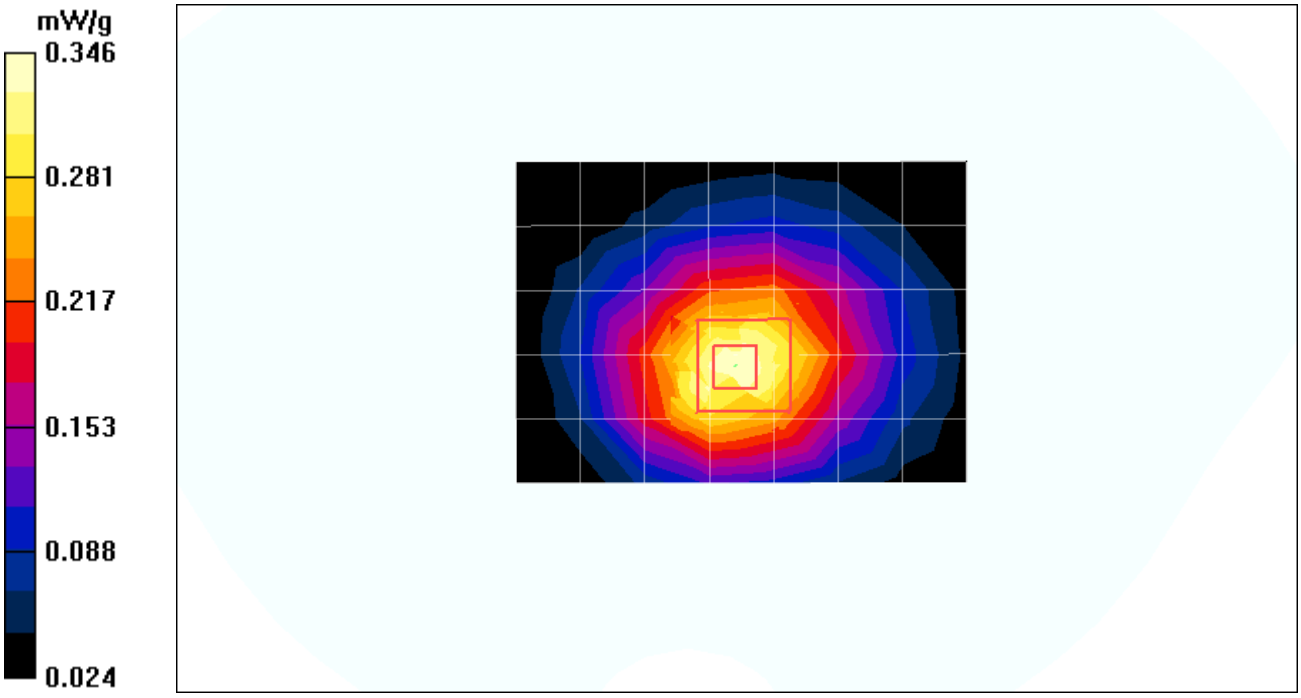
GPRS 15mm distance CH 251/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.8 V/m; Power Drift = -0.053 dB

Peak SAR (extrapolated) = 0.458 W/kg

SAR(1 g) = 0.321 mW/g; SAR(10 g) = 0.214 mW/g

Maximum value of SAR (measured) = 0.346 mW/g



Date/Time: 2006-12-19 1:32:34

Test Laboratory: Nemko Korea File Name: GPRS 15mm distance CH190.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GPRS 850 Frequency: 836.6 MHz

Duty Cycle: 1:4.15 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.955 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.35, 6.35, 6.35); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GPRS 15mm distance CH 190/Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.361 mW/g

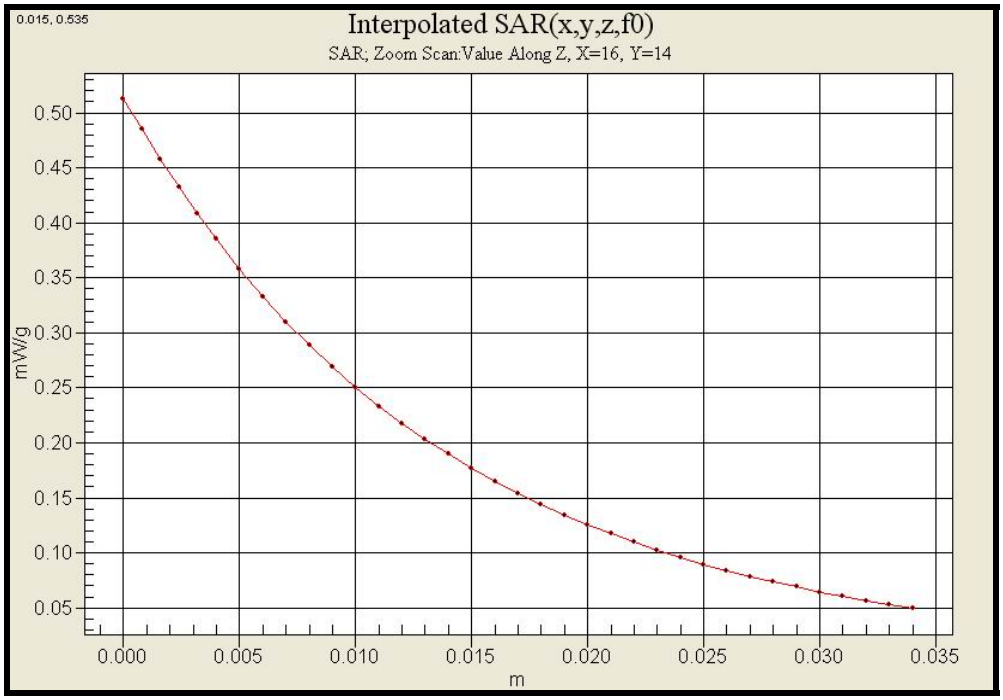
GPRS 15mm distance CH 190/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.4 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 0.513 W/kg

SAR(1 g) = 0.359 mW/g; SAR(10 g) = 0.241 mW/g

Maximum value of SAR (measured) = 0.387 mW/g



9.6 SAR Measurement Result (GSM850 Muscle -15mm Distance- with Headset)

Date of Test : December 19 , 2006
Mixture Type: Head
Tissue Depth: 15.3 cm

Modulation	Frequency		Power Drift (dB)	Device Test Position	Antenna Position	1g SAR (W/kg)
	CH	MHz				
GSM850	190	836.6	**0.040**	15mm distance from Phantom with Headset	Intenna	**0.261**

Notes:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration ☐ Left Head ■ Flat Phantom ☐ Right Head
6. SAR Configuration ☐ Head ■ Muscle ☐ Hand
7. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type ☐ Slim Type

Figure 9.6 Muscle SAR Test Setup
-- 15mm Distance with Headset position --

Measurement Result of Test Data (GSM850 Muscle -15mm Distance- with Headset)

Date/Time: 2006-12-19 12:12:25

Test Laboratory: Nemko Korea File Name: GPRS 15mm distance CH 190 with Earphone.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: GPRS 850 Frequency: 836.6 MHz

Duty Cycle: 1:4.15 Phantom section: Flat Section

Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.955 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(6.35, 6.35, 6.35); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

GPRS 15mm distance CH 190 with Earphone/Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.264 mW/g

GPRS 15mm distance CH 190 with Earphone/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

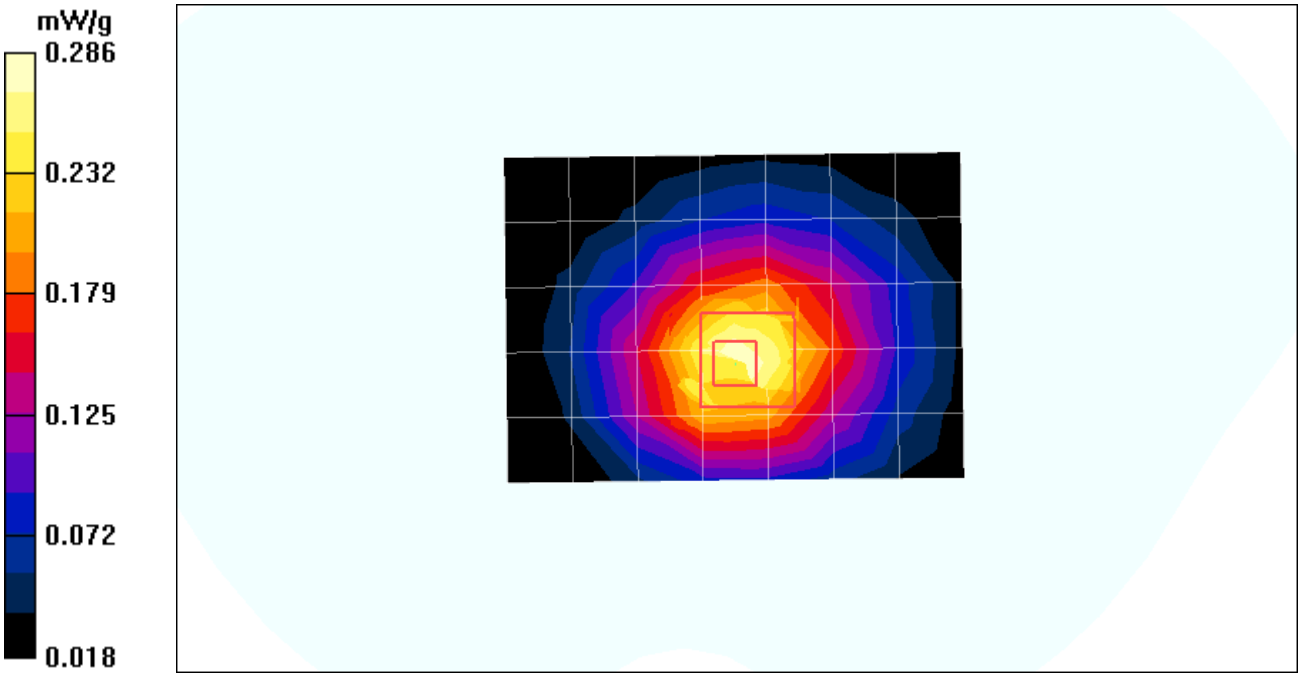
Reference Value = 14.3 V/m; Power Drift = 0.040 dB

Peak SAR (extrapolated) = 0.382 W/kg

SAR(1 g) = 0.261 mW/g; SAR(10 g) = 0.175 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.286 mW/g



9.7 SAR Measurement Result (PCS1900 Right Head Touch Position)

Date of Test : December 18 , 2006
Mixture Type: Head
Tissue Depth: 15.3 cm

Modulation	Frequency		Power Drift (dB)	Device Test Position	Antenna Position	1g SAR (W/kg)
	CH	MHz				
PCS1900	512	1850.2	**-0.214**	Cheek / Touch	Intenna	**1.030**
	661	1880.0	**-0.119**	Cheek / Touch	Intenna	**0.839**
	810	1909.8	**0.169**	Cheek / Touch	Intenna	**0.703**

Notes:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings.
4. SAR Measurement System ■ DASY4
5. Phantom Configuration ☐ Left Head ☐ Flat Phantom ■ Right Head
6. SAR Configuration ■ Head ☐ Body ☐ Hand
7. Test Signal Call Mode ☐ Manu. Test Codes ■ Base Station Simulator
8. Battery Option ■ Standard Type ☐ Slim Type

Figure 9.7 Right Head SAR Test Setup
-- Cheek / Touch Position --

Measurement Result of Test Data (PCS1900 Right Head Touch Position)

Date/Time: 2006-12-18 1:27:04

Test Laboratory: Nemko Korea File Name: Right Head Touch Position CH512.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: PCS1900 Frequency: 1850.2 MHz

Duty Cycle: 1:8.3 Phantom section: Right Section

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.36 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(5.41, 5.41, 5.41); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

PCS Right Touch Position CH512/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.08 mW/g

PCS Right Touch Position CH512/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

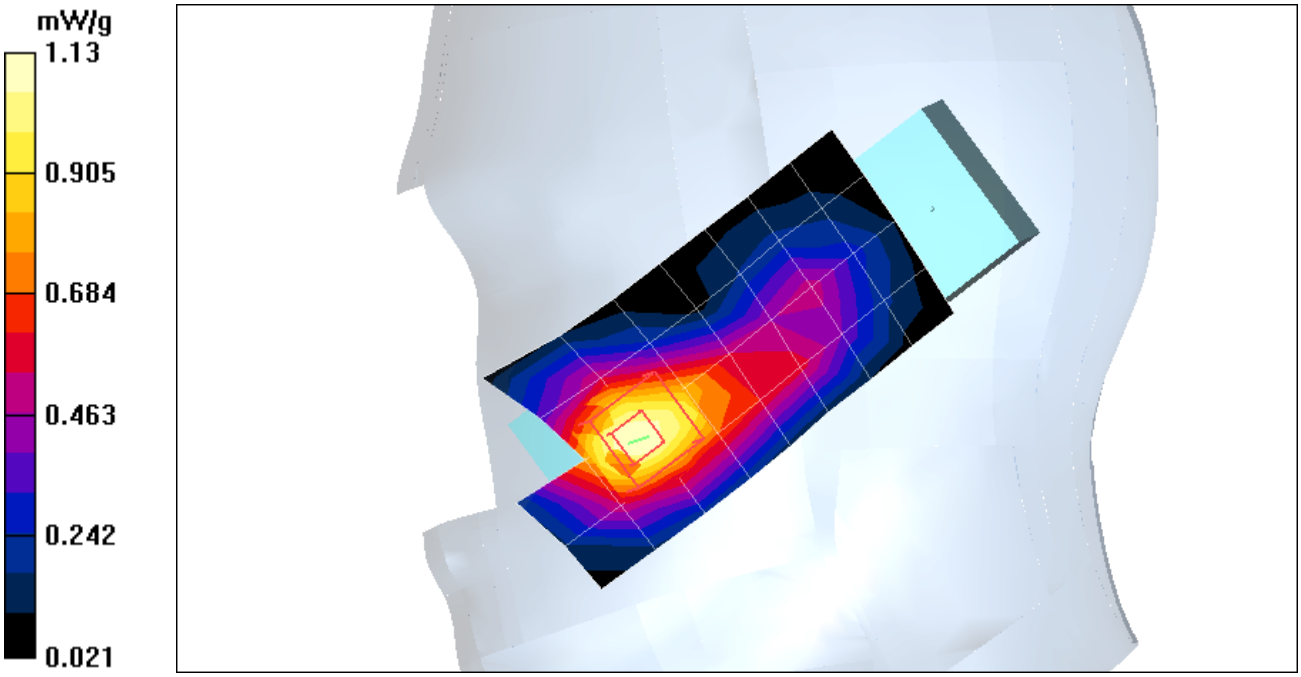
Reference Value = 8.55 V/m; Power Drift = -0.214 dB

Peak SAR (extrapolated) = 1.50 W/kg

SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.632 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.13 mW/g



Date/Time: 2006-12-18 12:56:44

Test Laboratory: Nemko Korea File Name: Right Head Touch Position CH661.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: PCS1900 Frequency: 1880 MHz

Duty Cycle: 1:8.3 Phantom section: Right Section

Medium parameters used: f = 1880.15 MHz; σ = 1.39 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(5.41, 5.41, 5.41); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

PCS Right Touch Position CH661/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.896 mW/g

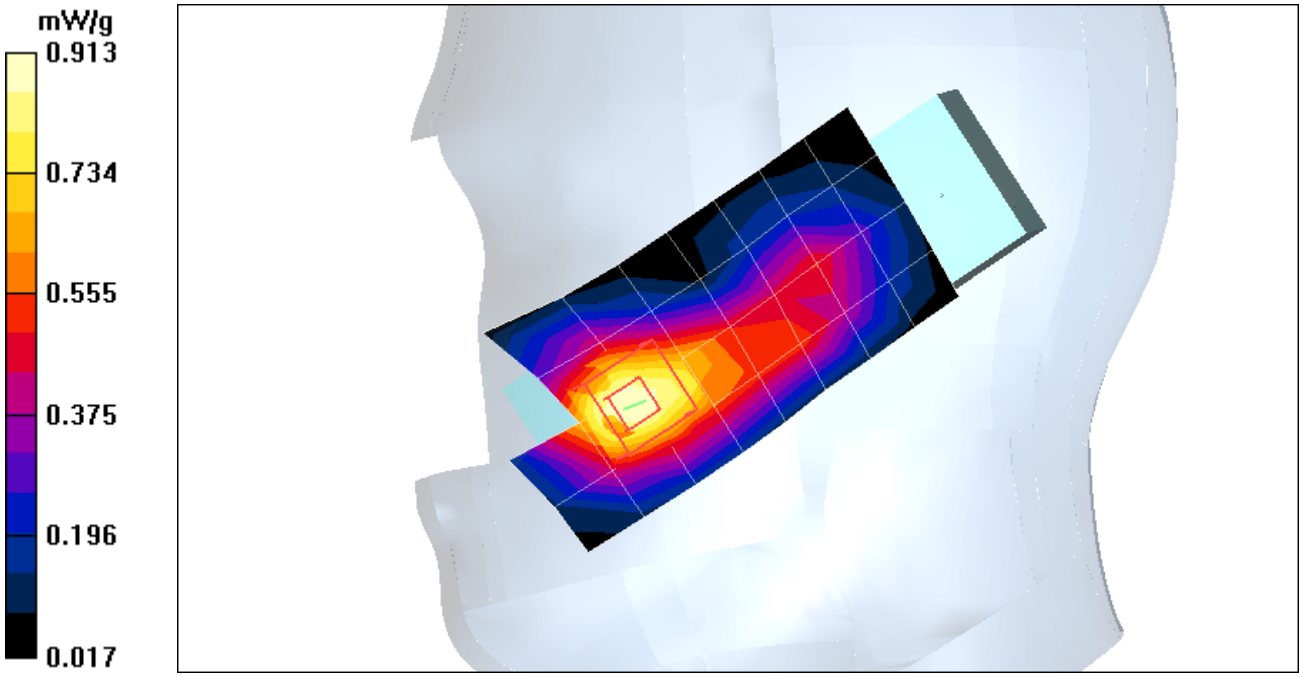
PCS Right Touch Position CH661/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.73 V/m; Power Drift = -0.119 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.839 mW/g; SAR(10 g) = 0.511 mW/g

Maximum value of SAR (measured) = 0.913 mW/g



Date/Time: 2006-12-18 1:45:43

Test Laboratory: Nemko Korea File Name: Right Head Touch Position CH810.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: PCS1900 Frequency: 1909.8 MHz

Duty Cycle: 1:8.3 Phantom section: Right Section

Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.43 mho/m; ε_r = 40; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(5.41, 5.41, 5.41); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

PCS Right Touch Position CH810/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.738 mW/g

PCS Right Touch Position CH810/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

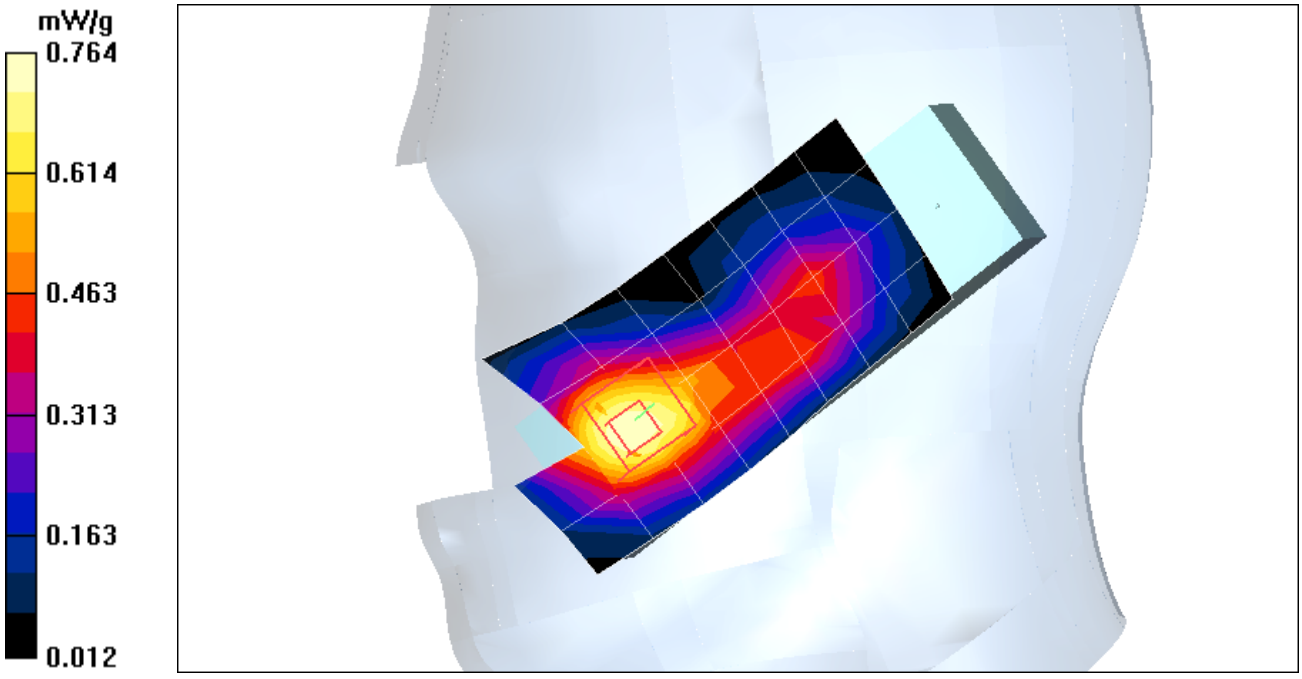
Reference Value = 8.16 V/m; Power Drift = 0.169 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.703 mW/g; SAR(10 g) = 0.430 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.764 mW/g



Date/Time: 2006-12-18 1:27:04

Test Laboratory: Nemko Korea File Name: Right Head Touch Position CH512.da4

DUT: BPP-UP560 Type: Folder Type Serial: 00000001 Applicant Name: Bellwave Co.,Ltd

Communication System: PCS1900 Frequency: 1850.2 MHz

Duty Cycle: 1:8.3 Phantom section: Right Section

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.36 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: ET3DV6 - SN1591; ConvF(5.41, 5.41, 5.41); Calibrated: 2006-03-23

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE3 Sn479; Calibrated: 2006-02-23

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

PCS Right Touch Position CH512/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.08 mW/g

PCS Right Touch Position CH512/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.55 V/m; Power Drift = -0.214 dB

Peak SAR (extrapolated) = 1.50 W/kg

SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.632 mW/g

Maximum value of SAR (measured) = 1.13 mW/g