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TEST REPORT ON SAR

Model Tested:	**SCH-i730**
Additional Model	**SCH-i731, SCH-i732** **SCH-i733, SCH-i734**
FCC ID (Requested):	**A3LSCHI730**
Job No:	**FB-068**
Report No:	**FB-068-S1**
Date issued:	**Dec. 09, 2004**

- Abstract –

This document reports on SAR Tests carried out in accordance with FCC/OET Bulletin 65, Supplement C(July 2001).

Prepared By		**Date**	2004.12.09
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Contents

1. GENERAL INFORMATION

Test Sample :	CDMA/ PCS Phone With Bluetooth/WLAN
Model Number :	SCH-i730 ~ SCH-i734
Serial Number :	Identical prototype (S/N : # FB-068-A)
Manufacturer :	SAMSUNG ELECTRONICS Co., Ltd.
Contact :	HY JU, Engineer
Phone :	+82-31-279-8236
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Test Standard :	§2.1093; FCC/OET Bulletin 65, Supplement C(July 2001)
FCC Classification :	Licensed Portable Transmitter Held to Ear (PCE)
Test Dates :	Nov. 30, 2004 ~ Dec. 05, 2004
Tested for :	FCC/TCB Certification

2. DESCRIPTION OF DEVICE

Tx Freq. Range :	824.70 – 848.31 MHz (CDMA)
	1851.25 – 1908.75 MHz (PCS CDMA)
	2400 – 2483.5(WLAN & Bluetooth)
Rx Freq. Range :	869.70 – 893.31 MHz (CDMA)
	1931.25 – 1988.75 MHz (PCS CDMA)
Max. RF Output Power :	0.603 W ERP CDMA (27.80 dBm)
	0.360 W EIRP PCS (25.56 dBm)
	0.080 W WLAN (19.05 dBm)Condocted
	0.00105 W BT (0.21 dBm)Condocted
Antenna Manufacturer :	ACE
	Model No.: SCH-i730
Antenna Dimensions :	Length = 35.3mm/ 95.2mm [Helical / Whip]

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, Samsung computer, near-field 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).

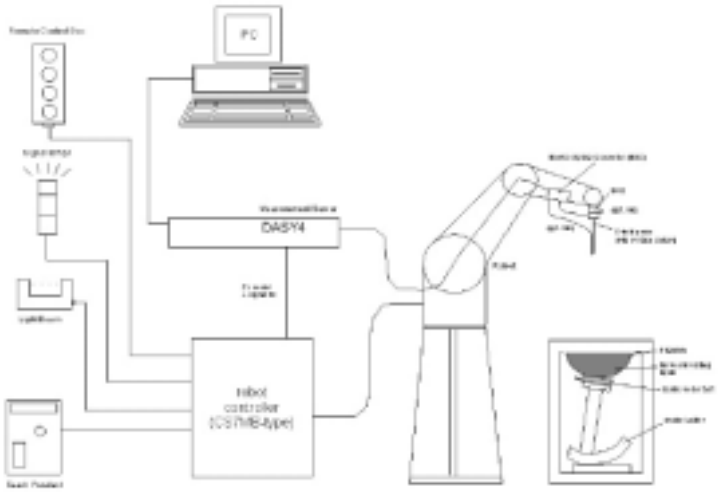

Figure 3.1 SAR Measurement System Setup

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 Samsung 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(or DAE3) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, 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

Figure 3.2 DAE System

The SAR measurement were conducted with the dosimetric probe ET3DV6, 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 multifiber 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 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 software reads the reflection during a software approach and looks for the maximum using a 2^{nd} order fitting (see Fig.3.2). The approach is stopped at reaching the maximum.

Probe Specifications

Construction	Symmetrical design with triangular core
	Built-in optical fiber for surface detection system
	Built-in shielding against static charges
	PEEK enclosure material (resistant to organic solvents, e.g., glycolether)

Calibration	In air from 10 MHz to 2.5 GHz In brain and muscle simulating liquid at 1900 MHz (accuracy ± 9.5%; k=2)
Frequency	10 MHz to 3 GHz; Linearity :±0.2 dB (30 MHz to 3 GHz)
Directivity	±0.2 dB in HSL (rotation around probe axis) ±0.4 dB in HSL (rotation normal to probe axis)
Dynamic Range	5μW/g to > 100mW/g; Linearity: ±0.2dB
Dimensions	Overall length: 330mm Tip length: 16mm Body diameter: 12mm Tip diameter: 6.8mm Distance from probe tip to dipole centers: 2.7mm
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

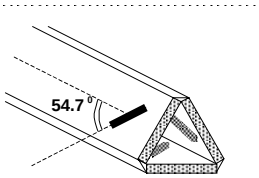

Figure 3.3 Triangular Probe Configuration

Figure 3.4 Probe Thick-Film Technique

3.3 SAM Phantom

The SAM Twin Phantom V4.0 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 1528-2003, 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.
Shell Thickness	2 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Height: 810 mm; Length: 1000 mm; Width: 500 mm

3.4 Brain & Muscle Simulating Mixture Characterization

The brain and muscle mixtures consist of a viscous gel using hydroxethylcellullose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bactericide 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 P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations.

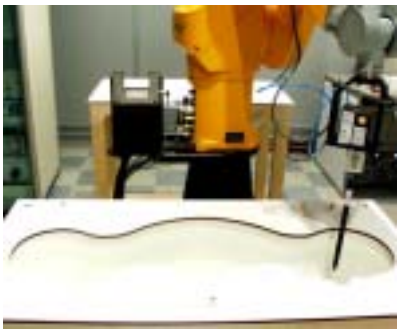

Figure 3.6 Simulated Tissue

Table 3.1 Composition of the Brain & Muscle Tissue Equivalent Matter

INGREDIENTS	835MHz Brain	835MHz Muscle	1900MHz Brain	1900MHz Muscle	2450MHz Brain	2450MHz Muscle
WATER	51.07%	65.45%	54.88%	69.91%	55%	73.2%
SUGAR	47.31%	34.31%	-	-	-	-
SALT	1.150%	0.620%	0.210%	0.130%	-	0.04%
DGBE	-	-	44.91%	29.96%	45%	26.7%
BACTERIACIDE	0.240%	0.100%	-	-	-	-
HEC	0.230%	-	-	-	-	-
Dielectric Constant Target	41.50	55.20	40.00	53.30	39.20	52.70
Conductivity Target (S/m)	0.900	0.970	1.400	1.520	1.80	1.950

3.5 Device Holder for Transmitters

In combination with the Twin SAM Phantom V4.0, the Mounting Device (see Fig. 3.7) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately and repeatedly be positioned according to the FCC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Figure 3.7 Device Holder

*Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produced infinite number of configuration. To produce worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

3.6 Validation Dipole

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

Frequency	835, 1900,2450 MHz
Return Loss	< -20 dB at specified validation position
Dimensions	D835V2: dipole length: 161 mm; overall height: 330 mm D1900V2: dipole length: 68 mm; overall height: 300 mm D2450V2: dipole length: 51.8 mm; overall height: 300 mm

3.7 Equipment Calibration

Table 3.1 Test Equipment Calibration

Type	Calibration Due Date	Asset Number
Stäubli Robot RX90BL	Not Required	SWR-S001
Stäubli Robot RX90BL	Not Required	SWR-S045
SPEAG DAE3	Aug. 23, 2005	SWR-S024
SPEAG DAE3	Jul. 14, 2005	SWR-S078
SPEAG E-Field Probe ET3DV6	Apr. 27, 2005	SWR-S023
SPEAG E-Field Probe ET3DV6	Nov. 22, 2005	SWR-S047
SPEAG SAM Twin Phantom V4.0	Not Required	SWR-S045-b
SPEAG SAM Twin Phantom V4.0	Not Required	SWR-S045-c
SPEAG Validation Dipole D835V2	Nov. 18, 2005	SWR-S026
SPEAG Validation Dipole D1900V2	Feb. 5, 2005	SWR-S058
SPEAG Validation Dipole D2450V2	Jul. 8, 2006	SWR-S050
NRVD Power Meter	Mar. 10, 2005	SWR-S004
NRVD Power Meter	Mar. 10, 2005	SWR-S005
E4421B Signal Generator	Nov. 11, 2005	SWR-S038
BBS3Q7ECK Power Amp.	Jan. 14, 2005	SWR-S056
HP-8753ES Network Analyzer	May. 24, 2005	SWR-S006
HP85070C Dielectric Probe Kit	Not Required	SWR-S002
DASY4 S/W (ver 4.4)	Not Required	SWR-S045-a
NRV-Z53 Power Sensor	Mar. 10, 2005	SWR-S076
NRV-Z55 Power Sensor	Mar. 12, 2005	SWR-S009
NRV-Z55 Power Sensor	Oct. 21, 2005	SWR-S010
SPEAG SAM Twin Phantom V4.0	Not Required	SWR-S001-c

NOTE:
The E-field probe was calibrated by SPEAG, by temperature measurement procedure. Dipole Validation measurement is performed by Samsung Lab. before each test. (see § 7.2) The brain simulating material is calibrated by Samsung using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain-equivalent material. (see § 7.1)

4. SAR MEASUREMENT PROCEDURE

The evaluation was performed using the following procedure.

STEP 1

The SAR measurement was taken at a selected spatial reference point to monitor power variations during testing. This fixed location point was measured and used as a reference value.

STEP 2

The SAR distribution at the exposed side of the head was measured at a distance of 3.9mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 20mm x 20mm. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

STEP 3

Around this point, a volume of 32mm x 32mm x 34mm (fine resolution volume scan, zoom scan) was assessed by measuring 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the center of the dipoles is 2.7mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluated the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

STEP 4

The SAR value at the same location as in step 1 was again measured. (If the value changed by more than 5%, the evaluation is repeated.)

5. DESCRIPTION OF TEST POSITION

5.1 SAM Phantom Shape

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

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.

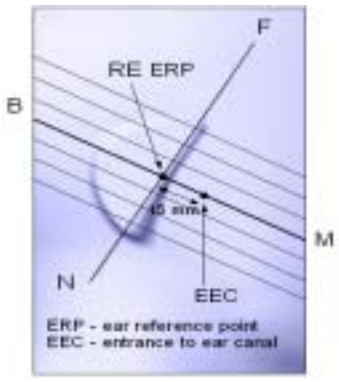

Figure 5.2 Close up side view

5.2 Cheek/Touch Position

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

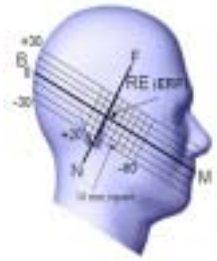

Figure 5.3 Side view of the phantom showing relevant markings

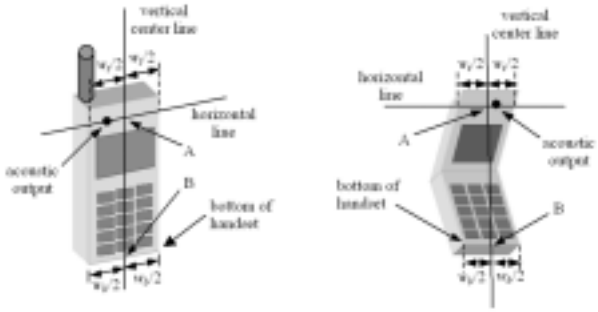

Figure 5.4 Handset vertical and horizontal reference lines

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 5.5), 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 5.5 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.

5.3 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 5.6 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.

5.4 Body Holster/Belt Clip Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 5.7). A device with a headset output is tested with a headset connected to the device. Body dielectric parameters are used.

Figure 5.7 Body Belt Clip and Holster Configurations

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are supplied with the device, the device is tested with each accessory that contains unique metallic component. If multiple accessory share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some Devices intended to be authorized for body-worn use. In this case, a test configuration where a separation distance between the back of the device and the flat phantom is used.

Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessory(ies), Including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

In all cases SAR measurements are performed to investigate the worst-case positioning. Worst-case positioning is then documented and used to perform Body SAR testing.

In order for users to be aware of the body-worn operating requirements for meeting RF exposure compliance, operating instructions and cautions statements must be included in the user's manual.

6. MEASUREMENT UNCERTAINTY

Table 6.1 Uncertainty Budget (835MHz)

Error Description	Uncertainty Value(±%)	Probability Distribution	Divisor	c_i	Standard uncertainty	v_i^2 or v_{eff}
Measurement System						
Probe Calibration	4.85	Normal	1.000	1	4.85	∞
Axial Isotropy	4.70	rectangular	1.732	0.7	1.90	∞
Hemispherical Isotropy	9.60	rectangular	1.732	0.7	3.88	∞
Linearity	4.70	rectangular	1.732	1	2.71	∞
System Detection Limits	0.25	rectangular	1.732	1	0.14	∞
Boundary effects	1.00	rectangular	1.732	1	0.58	∞
Readout electronics	1.00	Normal	1.000	1	1.00	∞
Response time	0.80	rectangular	1.732	1	0.46	∞
RF ambient conditions	3.00	rectangular	1.732	1	1.73	∞
Integration time	0.00	rectangular	1.732	1	0.00	∞
Mechanical constrains of robot	1.43	rectangular	1.732	1	0.83	∞
Probe positioning	2.86	rectangular	1.732	1	1.65	∞
Extrapolation and integration	1.00	rectangular	1.732	1	0.58	∞
Test Sample Related						
Test Sample positioning	1.21	Normal	1.000	1	1.21	11
Device holded uncertainty	3.33	Normal	1.000	1	3.33	∞
Power Drift	5.00	Rectangular	1.732	1	2.89	∞
Phantom and Setup						
Phantom uncertainty	4.00	Rectangular	1.732	1	2.31	∞
Liquid conductivity (deviation from target)	5.00	Rectangular	1.732	0.64	1.85	∞
Liquid conductivity (measurement error)	2.78	Normal	1.000	0.64	1.78	∞
Liquid permittivity (deviation from target)	5.00	Rectangular	1.732	0.6	1.73	∞
Liquid permittivity (measurement error)	2.75	Normal	1.000	0.6	1.65	∞
Combined Standard Uncertainty		Normal			9.82	48430
Extended Standard Uncertainty(K=2.00)					**19.63**	48430

Table 6.2 Uncertainty Budget (1900MHz)

Error Description	Uncertainty Value(±%)	Probability Distribution	Divisor	c_i	Standard uncertainty	v_i^2 or v_{eff}
Measurement System						
Probe Calibration	4.85	Normal	1.000	1	4.85	∞
Axial Isotropy	4.70	rectangular	1.732	0.7	1.90	∞
Hemispherical Isotropy	9.60	rectangular	1.732	0.7	3.88	∞
Linearity	4.70	rectangular	1.732	1	2.71	∞
System Detection Limits	0.25	rectangular	1.732	1	0.14	∞
Boundary effects	1.00	rectangular	1.732	1	0.58	∞
Readout electronics	1.00	Normal	1.000	1	1.00	∞
Response time	0.80	rectangular	1.732	1	0.46	∞
RF ambient conditions	3.00	rectangular	1.732	1	1.73	∞
Integration time	0.00	rectangular	1.732	1	0.00	∞
Mechanical constrains of robot	1.43	rectangular	1.732	1	0.83	∞
Probe positioning	2.86	rectangular	1.732	1	1.65	∞
Extrapolation and integration	1.00	rectangular	1.732	1	0.58	∞
Test Sample Related						
Test Sample positioning	1.21	Normal	1.000	1	1.21	11
Device holded uncertainty	3.33	Normal	1.000	1	3.33	∞
Power Drift	5.00	Rectangular	1.732	1	2.89	∞
Phantom and Setup						
Phantom uncertainty	4.00	Rectangular	1.732	1	2.31	∞
Liquid conductivity (deviation from target)	5.00	Rectangular	1.732	0.64	1.85	∞
Liquid conductivity (measurement error)	2.50	Normal	1.000	0.64	1.60	∞
Liquid permittivity (deviation from target)	5.00	Rectangular	1.732	0.6	1.73	∞
Liquid permittivity (measurement error)	2.42	Normal	1.000	0.6	1.45	∞
Combined Standard Uncertainty		Normal			9.75	13474
Extended Standard Uncertainty(K=2.00)					**19.51**	13474

Table 6.3 Uncertainty Budget (2450MHz)

Error Description	Uncertainty Value(±%)	Probability Distribution	Divisor	c_i	Standard uncertainty	v_i^2 or v_{eff}
Measurement System						
Probe Calibration	4.85	Normal	1.000	1	4.85	∞
Axial Isotropy	4.70	rectangular	1.732	0.7	1.90	∞
Hemispherical Isotropy	9.60	rectangular	1.732	0.7	3.88	∞
Linearity	4.70	rectangular	1.732	1	2.71	∞
System Detection Limits	0.25	rectangular	1.732	1	0.14	∞
Boundary effects	1.00	rectangular	1.732	1	0.58	∞
Readout electronics	1.00	Normal	1.000	1	1.00	∞
Response time	0.80	rectangular	1.732	1	0.46	∞
RF ambient conditions	3.00	rectangular	1.732	1	1.73	∞
Integration time	0.00	rectangular	1.732	1	0.00	∞
Mechanical constrains of robot	1.43	rectangular	1.732	1	0.83	∞
Probe positioning	2.86	rectangular	1.732	1	1.65	∞
Extrapolation and integration	1.00	rectangular	1.732	1	0.58	∞
Test Sample Related						
Test Sample positioning	1.21	Normal	1.000	1	1.21	11
Device holded uncertainty	3.33	Normal	1.000	1	3.33	∞
Power Drift	5.00	Rectangular	1.732	1	2.89	∞
Phantom and Tissue Setup						
Phantom uncertainty	4.00	Rectangular	1.732	1	2.31	∞
Liquid conductivity (deviation from target)	5.00	Rectangular	1.732	0.64	1.85	∞
Liquid conductivity (measurement error)	2.51	Normal	1.000	0.64	1.61	∞
Liquid permittivity (deviation from target)	5.00	Rectangular	1.732	0.6	1.73	∞
Liquid permittivity (measurement error)	2.43	Normal	1.000	0.6	1.46	∞
Combined Standard Uncertainty		Normal			9.76	13474
Extended Standard Uncertainty(K=2.00)					**19.51**	13474

7. SYSTEM VERIFICATION

7.1 Tissue Verification

Table 7.1 MEASURED TISSUE PARAMETERS

	835MHz Brain		835MHz Brain		835MHz Muscle	
	Target	Measured	Target	Measured	Target	Measured
Date	-	Dec.2, 2004	-	Dec.3, 2004	-	Dec.3, 2004
Liquid Temperature(°C)	-	21.0	-	20.7	-	21.4
Dielectric Constant: ε'	41.5	40.3	41.5	39.8	55.2	54.1
Conductivity: σ	0.90	0.87	0.90	0.87	0.97	0.96

	1900MHz Brain		1900MHz Brain		1900MHz Muscle	
	Target	Measured	Target	Measured	Target	Measured
Date	-	Nov.30, 2004	-	Dec.1, 2004	-	Dec.1, 2004
Liquid Temperature(°C)	-	21.2	-	20.9	-	20.6
Dielectric Constant: ε'	40.0	39.2	40.0	38.5	53.3	52.3
Conductivity: σ	1.40	1.39	1.40	1.39	1.52	1.52

	2450MHz Brain		2450MHz Brain		2450MHz Muscle	
	Target	Measured	Target	Measured	Target	Measured
Date	-	Dec.04, 2004	-	Dec.5, 2004	-	Dec.5, 2004
Liquid Temperature(°C)	-	23.0	-	23.0	-	22.8
Dielectric Constant: ε'	39.2	37.3	39.2	37.3	52.7	54.8
Conductivity: σ	1.80	1.88	1.80	1.88	1.95	1.98

The measured value must be within ±5% of the target value.

7.2 Test System Validation

Prior to assessment, the system is verified to the ±10% of the specification at 835MHz and 1900MHz by using the system validation kit(s). (see Appendix F, Graphic Plot Attached)

Table 7.2 System Validation Results

System Validation Kit	Tissue	Targeted SAR_{1g} (mW/g)	Measured SAR_{1g} (mW/g)	Deviation (%)	Date	Liquid Temperature(°C)
D-835V2 S/N: 451	835MHz Brain	2.375	2.49	4.84	Dec.02, 2004	21.6
D-835V2 S/N: 451	835MHz Brain	2.375	2.46	3.58	Dec.03, 2004	21.4
D-1900V2 S/N: 5d023	1900MHz Brain	9.925	10	0.76	Nov.30, 2004	21.1
D-1900V2 S/N: 5d023	1900MHz Brain	9.925	10.4	4.79	Dec.01, 2004	21.3
D-2450V2 S/N: 708	2450MHz Brain	13.1	13.5	3.05	Dec.04, 2004	22.5
D-2450V2 S/N: 708	2450MHz Brain	13.1	13.3	1.53	Dec.05, 2004	22.5

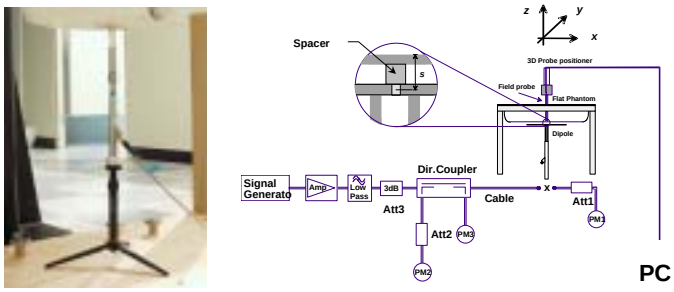

Figure 7.1 Dipole Validation Test Setup

8. SAR MEASUREMENT RESULTS

Procedures Used To Establish Test Signal

The handset was placed into simulated call mode (Cellular CDMA & PCS CDMA & WLAN & BT modes) using manufacturers test codes. Such test signals offer a consistent means for testing SAR and are recommended for evaluating SAR. When test modes are not available or inappropriate for testing a handset, the actual transmission is activated through a base station simulator or similar equipment. See data pages for actual procedure used in measurement.

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

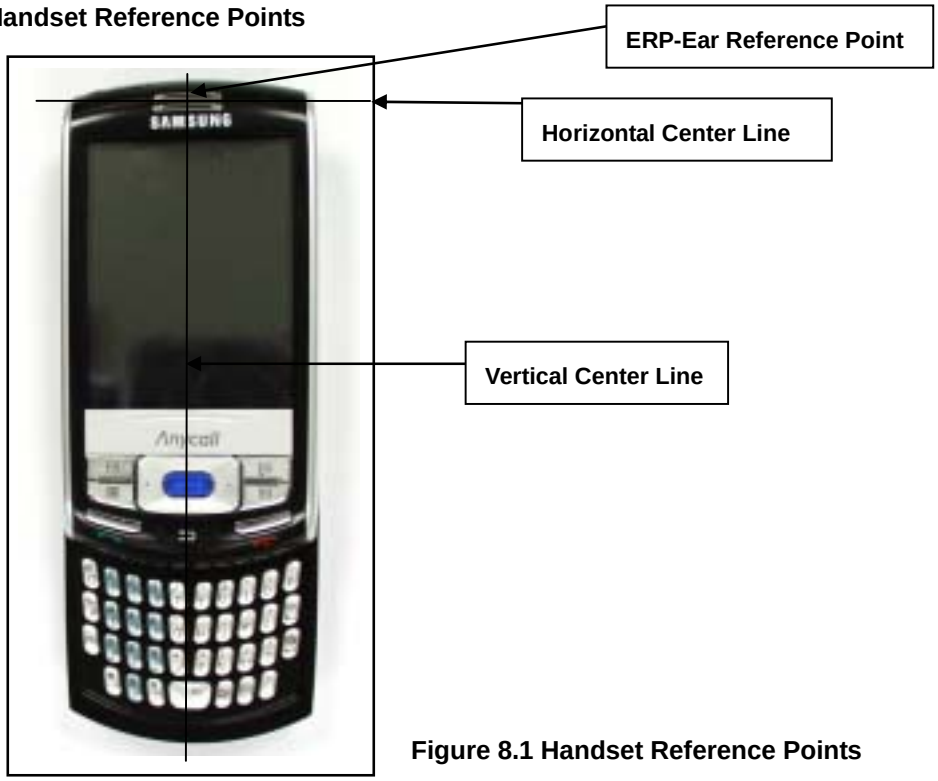

Figure 8.1 Handset Reference Points

8.1 MEASUREMENT RESULTS (CELLULAR CDMA Right Head SAR–Touch, Slide Up)

Date of Test :	Dec. 02, 2004		
Mixture Type:	835MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	40.3	Liquid Tissue Temp.:	21.4
Conductivity:	0.87	Ambient Temp:	22.6

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
824.70	1013	CDMA	25.51	25.516	Extended	Cheek / Touch	In	Up	0.112
824.70	1013	CDMA	25.53	25.43	Extended	Cheek / Touch	Out	Up	0.759
835.89	0363	CDMA	25.54	25.548	Extended	Cheek / Touch	In	Up	0.140
835.89	0363	CDMA	25.55	25.45	Extended	Cheek / Touch	Out	Up	0.432
848.31	0777	CDMA	25.53	25.53	Extended	Cheek / Touch	In	Up	0.166
848.31	0777	CDMA	25.56	25.56	Extended	Cheek / Touch	Out	Up	0.672
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☐ Left Head ☐ Flat Phantom ☒ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☐ Standard ☒ Extended ☐ Slim

Figure 8.2 Right Head SAR Test Setup

-- Cheek / Touch Position--

8.2 MEASUREMENT RESULTS (CELLULAR CDMA Right Head SAR–Touch, Slide Down)

Date of Test :	Dec. 02, 2004		
Mixture Type:	835MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	40.3	Liquid Tissue Temp.:	21.4
Conductivity:	0.87	Ambient Temp:	22.6

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
824.70	1013	CDMA	25.55	25.45	Extended	Cheek / Touch	In	Down	0.594
824.70	1013	CDMA	25.57	25.37	Extended	Cheek / Touch	Out	Down	0.723
835.89	0363	CDMA	25.58	25.48	Extended	Cheek / Touch	In	Down	0.566
835.89	0363	CDMA	25.54	25.44	Extended	Cheek / Touch	Out	Down	0.376
848.31	0777	CDMA	25.56	25.56	Extended	Cheek / Touch	In	Down	0.781
848.31	0777	CDMA	25.58	25.589	Extended	Cheek / Touch	Out	Down	0.595
848.31	0777	CDMA	25.58	25.38	Standard	Cheek / Touch	In	Down	0.762
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.

*Power Measured	☒	Conducted					
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	☒	Extended	☐	Slim	

Figure 8.3 Right Head SAR Test Setup

-- Cheek / Touch Position--

8.3 MEASUREMENT RESULTS (CELLULAR CDMA Right Head SAR–Tilt, Slide Up)

Date of Test :	Dec. 02, 2004		
Mixture Type:	835MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	40.3	Liquid Tissue Temp.:	21.4
Conductivity:	0.87	Ambient Temp:	22.6

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
824.70	1013	CDMA	25.52	25.52	Extended	Ear/Tilt 15°	In	Up	0.065
824.70	1013	CDMA	25.53	25.43	Extended	Ear/Tilt 15°	Out	Up	0.673
835.89	0363	CDMA	25.55	25.45	Extended	Ear/Tilt 15°	In	Up	0.079
835.89	0363	CDMA	25.55	25.65	Extended	Ear/Tilt 15°	Out	Up	0.446
848.31	0777	CDMA	25.58	25.48	Extended	Ear/Tilt 15°	In	Up	0.093
848.31	0777	CDMA	25.54	25.54	Extended	Ear/Tilt 15°	Out	Up	0.589
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.

*Power Measured	☒	Conducted					
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	☒	Extended	☐	Slim	

Figure 8.4 Right Head SAR Test Setup

-- Ear / Tilt 15° Position --

8.4 MEASUREMENT RESULTS (CELLULAR CDMA Right Head SAR–Tilt, Slide Down)

Date of Test :	Dec. 02, 2004		
Mixture Type:	835MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	40.3	Liquid Tissue Temp.:	21.4
Conductivity:	0.87	Ambient Temp:	22.6

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
824.70	1013	CDMA	25.51	25.41	Extended	Ear/Tilt 15°	In	Down	0.532
824.70	1013	CDMA	25.54	25.54	Extended	Ear/Tilt 15°	Out	Down	0.758
835.89	0363	CDMA	25.55	25.35	Extended	Ear/Tilt 15°	In	Down	0.475
835.89	0363	CDMA	25.56	25.46	Extended	Ear/Tilt 15°	Out	Down	0.398
848.31	0777	CDMA	25.57	25.57	Extended	Ear/Tilt 15°	In	Down	0.625
848.31	0777	CDMA	25.54	25.541	Extended	Ear/Tilt 15°	Out	Down	0.600
824.70	1013	CDMA	25.55	25.55	Standard	Ear/Tilt 15°	Out	Down	0.694
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
   *Power Measured ☒ Conducted
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 ☒ Extended ☐ Slim

Figure 8.5 Right Head SAR Test Setup

-- Ear / Tilt 15° Position --

8.5 MEASUREMENT RESULTS (CELLULAR CDMA Left Head SAR–Touch, Slide Up)

Date of Test :	Dec. 02, 2004		
Mixture Type:	835MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	40.3	Liquid Tissue Temp.:	21.4
Conductivity:	0.87	Ambient Temp:	22.6

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
824.70	1013	CDMA	25.52	25.514	Extended	Cheek / Touch	In	Up	0.146
824.70	1013	CDMA	25.53	25.33	Extended	Cheek / Touch	Out	Up	0.948
835.89	0363	CDMA	25.54	25.54	Extended	Cheek / Touch	In	Up	0.197
835.89	0363	CDMA	25.52	25.32	Extended	Cheek / Touch	Out	Up	0.577
848.31	0777	CDMA	25.56	25.56	Extended	Cheek / Touch	In	Up	0.222
848.31	0777	CDMA	25.58	25.48	Extended	Cheek / Touch	Out	Up	0.828
824.70	1013	CDMA	25.52	25.32	Standard	Cheek / Touch	Out	Up	0.910
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.

*Power Measured	☒	Conducted				
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	☒	Extended	☐	Slim

Figure 8.6 Left Head SAR Test Setup

-- Cheek / Touch Position--

8.6 MEASUREMENT RESULTS (CELLULAR CDMA Left Head SAR–Touch, Slide Down)

Date of Test :	Dec. 02, 2004		
Mixture Type:	835MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	40.3	Liquid Tissue Temp.:	21.4
Conductivity:	0.87	Ambient Temp:	22.6

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
824.70	1013	CDMA	25.52	25.32	Extended	Cheek / Touch	In	Down	0.667
824.70	1013	CDMA	25.51	25.41	Extended	Cheek / Touch	Out	Down	0.860
835.89	0363	CDMA	25.56	25.46	Extended	Cheek / Touch	In	Down	0.651
835.89	0363	CDMA	25.56	25.46	Extended	Cheek / Touch	Out	Down	0.462
848.31	0777	CDMA	25.53	25.33	Extended	Cheek / Touch	In	Down	0.868
848.31	0777	CDMA	25.53	25.33	Extended	Cheek / Touch	Out	Down	0.689
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☒ Left Head ☐ Flat Phantom ☐ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☐ Standard ☒ Extended ☐ Slim

Figure 8.7 Left Head SAR Test Setup

-- Cheek / Touch Position--

8.7 MEASUREMENT RESULTS (CELLULAR CDMA Left Head SAR–Tilt, Slide Up)

Date of Test :	Dec. 03, 2004		
Mixture Type:	835MHz Brain	Tissue Depth:	15.5cm
Dielectric Constant:	39.8	Liquid Tissue Temp.:	21.5
Conductivity:	0.87	Ambient Temp:	22.4

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
824.70	1013	CDMA	25.52	25.32	Extended	Ear/Tilt 15°	In	Up	0.082
824.70	1013	CDMA	25.51	25.41	Extended	Ear/Tilt 15°	Out	Up	0.863
835.89	0363	CDMA	25.54	25.44	Extended	Ear/Tilt 15°	In	Up	0.105
835.89	0363	CDMA	25.55	25.55	Extended	Ear/Tilt 15°	Out	Up	0.535
848.31	0777	CDMA	25.53	25.525	Extended	Ear/Tilt 15°	In	Up	0.119
848.31	0777	CDMA	25.56	25.46	Extended	Ear/Tilt 15°	Out	Up	0.747
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☒ Left Head ☐ Flat Phantom ☐ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☐ Standard ☒ Extended ☐ Slim

Figure 8.8 Left Head SAR Test Setup

-- Ear / Tilt 15° Position --

8.8 MEASUREMENT RESULTS (CELLULAR CDMA Left Head SAR–Tilt, Slide Down)

Date of Test :	Dec. 03, 2004		
Mixture Type:	835MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	39.8	Liquid Tissue Temp.:	21.5
Conductivity:	0.87	Ambient Temp:	22.4

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
824.70	1013	CDMA	25.51	25.41	Extended	Ear/Tilt 15°	In	Down	0.613
824.70	1013	CDMA	25.53	25.33	Extended	Ear/Tilt 15°	Out	Down	0.893
835.89	0363	CDMA	25.54	25.34	Extended	Ear/Tilt 15°	In	Down	0.563
835.89	0363	CDMA	25.53	25.53	Extended	Ear/Tilt 15°	Out	Down	0.509
848.31	0777	CDMA	25.56	25.46	Extended	Ear/Tilt 15°	In	Down	0.792
848.31	0777	CDMA	25.57	25.47	Extended	Ear/Tilt 15°	Out	Down	0.737
824.70	1013	CDMA	25.54	25.44	Standard	Ear/Tilt 15°	Out	Down	0.816
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.

	*Power Measured	☒	Conducted				
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	☒	Extended	☐	Slim

Figure 8.9 Left Head SAR Test Setup

-- Ear / Tilt 15° Position --

8.9 MEASUREMENT RESULTS (PCS CDMA Right Head SAR–Touch, Slide Up)

Date of Test :	Nov. 30, 2004		
Mixture Type:	1900MHz Brain	Tissue Depth:	14.7 cm
Dielectric Constant:	39.2	Liquid Tissue Temp.:	21.6
Conductivity:	1.39	Ambient Temp:	22.1

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
1851.25	0025	CDMA	25.02	24.92	Extended	Cheek / Touch	In	Up	0.086
1851.25	0025	CDMA	25.04	25.04	Extended	Cheek / Touch	Out	Up	0.225
1880.00	0600	CDMA	25.03	25.03	Extended	Cheek / Touch	In	Up	0.087
1880.00	0600	CDMA	25.04	25.044	Extended	Cheek / Touch	Out	Up	0.224
1908.75	1175	CDMA	25.05	24.95	Extended	Cheek / Touch	In	Up	0.110
1908.75	1175	CDMA	25.06	24.96	Extended	Cheek / Touch	Out	Up	0.213
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☐ Left Head ☐ Flat Phantom ☒ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☐ Standard ☒ Extended ☐ Slim

Figure 8.10 Right Head SAR Test Setup

-- Cheek / Touch Position--

8.10 MEASUREMENT RESULTS (PCS CDMA Right Head SAR–Touch, Slide Down)

Date of Test :	Nov. 30, 2004		
Mixture Type:	1900MHz Brain	Tissue Depth:	14.7 cm
Dielectric Constant:	39.2	Liquid Tissue Temp.:	21.6
Conductivity:	1.39	Ambient Temp:	22.1

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
1851.25	0025	CDMA	25.01	24.91	Extended	Cheek / Touch	In	Down	0.646
1851.25	0025	CDMA	25.02	24.92	Extended	Cheek / Touch	Out	Down	0.482
1880.00	0600	CDMA	25.03	25.03	Extended	Cheek / Touch	In	Down	0.642
1880.00	0600	CDMA	25.04	25.04	Extended	Cheek / Touch	Out	Down	0.436
1908.75	1175	CDMA	25.03	25.03	Extended	Cheek / Touch	In	Down	0.739
1908.75	1175	CDMA	25.02	25.12	Extended	Cheek / Touch	Out	Down	0.497
1908.75	1175	CDMA	25.04	24.94	Standard	Cheek / Touch	In	Down	0.721
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☐ Left Head ☐ Flat Phantom ☒ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☒ Standard ☒ Extended ☐ Slim

Figure 8.11 Right Head SAR Test Setup

-- Cheek / Touch Position--

8.11 MEASUREMENT RESULTS (PCS CDMA Right Head SAR–Tilt, Slide Up)

Date of Test :	Nov. 30, 2004		
Mixture Type:	1900MHz Brain	Tissue Depth:	14.7 cm
Dielectric Constant:	39.2	Liquid Tissue Temp.:	21.6
Conductivity:	1.39	Ambient Temp:	22.1

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
1851.25	0025	CDMA	25.04	24.84	Extended	Ear/Tilt 15°	In	Up	0.151
1851.25	0025	CDMA	25.04	25.04	Extended	Ear/Tilt 15°	Out	Up	0.326
1880.00	0600	CDMA	25.03	25.03	Extended	Ear/Tilt 15°	In	Up	0.148
1880.00	0600	CDMA	25.06	24.96	Extended	Ear/Tilt 15°	Out	Up	0.263
1908.75	1175	CDMA	25.02	24.92	Extended	Ear/Tilt 15°	In	Up	0.167
1908.75	1175	CDMA	25.05	25.057	Extended	Ear/Tilt 15°	Out	Up	0.288
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☐ Left Head ☐ Flat Phantom ☒ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☐ Standard ☒ Extended ☐ Slim

Figure 8.12 Right Head SAR Test Setup

-- Ear/Tilt 15° Position--

8.12 MEASUREMENT RESULTS (PCS CDMA Right Head SAR–Tilt, Slide Down)

Date of Test :	Nov. 30, 2004		
Mixture Type:	1900MHz Brain	Tissue Depth:	14.7 cm
Dielectric Constant:	39.2	Liquid Tissue Temp.:	21.6
Conductivity:	1.39	Ambient Temp:	22.1

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
1851.25	0025	CDMA	25.04	24.94	Extended	Ear/Tilt 15°	In	Down	0.957
1851.25	0025	CDMA	25.05	24.95	Extended	Ear/Tilt 15°	Out	Down	0.766
1880.00	0600	CDMA	25.03	24.93	Extended	Ear/Tilt 15°	In	Down	0.851
1880.00	0600	CDMA	25.05	24.95	Extended	Ear/Tilt 15°	Out	Down	0.620
1908.75	1175	CDMA	25.06	25.06	Extended	Ear/Tilt 15°	In	Down	1.02
1908.75	1175	CDMA	25.03	24.93	Extended	Ear/Tilt 15°	Out	Down	0.626
1908.75	1175	CDMA	25.07	24.97	Standard	Ear/Tilt 15°	In	Down	0.982
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☐ Left Head ☐ Flat Phantom ☒ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☒ Standard ☒ Extended ☐ Slim

Figure 8.13 Right Head SAR Test Setup

-- Ear/Tilt 15° Position--

8.13 MEASUREMENT RESULTS (PCS CDMA Left Head SAR–Touch, Slide Up)

Date of Test :	Nov. 30, 2004		
Mixture Type:	1900MHz Brain	Tissue Depth:	14.7 cm
Dielectric Constant:	39.2	Liquid Tissue Temp.:	21.6
Conductivity:	1.39	Ambient Temp:	22.1

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
1851.25	0025	CDMA	25.04	24.94	Extended	Cheek / Touch	In	Up	0.102
1851.25	0025	CDMA	25.03	25.037	Extended	Cheek / Touch	Out	Up	0.246
1880.00	0600	CDMA	25.06	25.06	Extended	Cheek / Touch	In	Up	0.111
1880.00	0600	CDMA	25.07	24.97	Extended	Cheek / Touch	Out	Up	0.196
1908.75	1175	CDMA	25.03	24.83	Extended	Cheek / Touch	In	Up	0.119
1908.75	1175	CDMA	25.02	24.92	Extended	Cheek / Touch	Out	Up	0.240
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.

	*Power Measured	☒	Conducted				
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	☒	Extended	☐	Slim

Figure 8.14 Left Head SAR Test Setup

-- Cheek / Touch Position--

8.14 MEASUREMENT RESULTS (PCS CDMA Left Head SAR–Touch, Slide Down)

Date of Test :	Nov. 30, 2004		
Mixture Type:	1900MHz Brain	Tissue Depth:	14.7 cm
Dielectric Constant:	39.2	Liquid Tissue Temp.:	21.6
Conductivity:	1.39	Ambient Temp:	22.1

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
1851.25	0025	CDMA	25.04	24.94	Extended	Cheek / Touch	In	Down	0.692
1851.25	0025	CDMA	25.07	25.07	Extended	Cheek / Touch	Out	Down	0.548
1880.00	0600	CDMA	25.03	25.03	Extended	Cheek / Touch	In	Down	0.742
1880.00	0600	CDMA	25.07	25.07	Extended	Cheek / Touch	Out	Down	0.515
1908.75	1175	CDMA	25.03	24.93	Extended	Cheek / Touch	In	Down	0.808
1908.75	1175	CDMA	25.05	24.95	Extended	Cheek / Touch	Out	Down	0.592
1908.75	1175	CDMA	25.06	24.96	Standard	Cheek / Touch	In	Down	0.760
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.

	*Power Measured	☒	Conducted				
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	☒	Extended	☐	Slim

Figure 8.15 Left Head SAR Test Setup

-- Cheek / Touch Position--

8.15 MEASUREMENT RESULTS (PCS CDMA Left Head SAR-Tilt, Slide Up)

Date of Test :	Dec. 01, 2004		
Mixture Type:	1900MHz Brain	Tissue Depth:	14.7 cm
Dielectric Constant:	38.5	Liquid Tissue Temp.:	21.6
Conductivity:	1.39	Ambient Temp:	22.4

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
1851.25	0025	CDMA	25.04	25.04	Extended	Ear/Tilt 15°	In	Up	0.164
1851.25	0025	CDMA	25.03	25.13	Extended	Ear/Tilt 15°	Out	Up	0.372
1880.00	0600	CDMA	25.06	25.06	Extended	Ear/Tilt 15°	In	Up	0.172
1880.00	0600	CDMA	25.02	24.92	Extended	Ear/Tilt 15°	Out	Up	0.324
1908.75	1175	CDMA	25.05	24.95	Extended	Ear/Tilt 15°	In	Up	0.192
1908.75	1175	CDMA	25.02	24.92	Extended	Ear/Tilt 15°	Out	Up	0.344
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☒ Left Head ☐ Flat Phantom ☐ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☐ Standard ☒ Extended ☐ Slim

Figure 8.16 Left Head SAR Test Setup

-- Ear/Tilt 15° Position--

8.16 MEASUREMENT RESULTS (PCS CDMA Left Head SAR-Tilt, Slide Down)

Date of Test :	Dec. 01, 2004		
Mixture Type:	1900MHz Brain	Tissue Depth:	14.7 cm
Dielectric Constant:	38.5	Liquid Tissue Temp.:	21.6
Conductivity:	1.39	Ambient Temp:	22.4

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
1851.25	0025	CDMA	25.03	24.93	Extended	Ear/Tilt 15°	In	Down	0.931
1851.25	0025	CDMA	25.04	24.94	Extended	Ear/Tilt 15°	Out	Down	0.744
1880.00	0600	CDMA	25.05	25.05	Extended	Ear/Tilt 15°	In	Down	1.05
1880.00	0600	CDMA	25.03	24.93	Extended	Ear/Tilt 15°	Out	Down	0.721
1908.75	1175	CDMA	25.06	24.96	Extended	Ear/Tilt 15°	In	Down	1.08
1908.75	1175	CDMA	25.04	24.94	Extended	Ear/Tilt 15°	Out	Down	0.777
1908.75	1175	CDMA	25.02	24.92	Standard	Ear/Tilt 15°	In	Down	1.07
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.

	*Power Measured	☒	Conducted				
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	☒	Extended	☐	Slim

Figure 8.17 Left Head SAR Test Setup

-- Ear/Tilt 15° Position--

8.17 MEASUREMENT RESULTS (WLAN and BT Right Head SAR–Touch, Slide Up)

Date of Test :	Dec. 04, 2004		
Mixture Type:	2450MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	37.3	Liquid Tissue Temp.:	22.5
Conductivity:	1.88	Ambient Temp:	23.0

FREQUENCY				Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz		Ch.			(dBm)		Battery				
WLAN	BT	WLAN	BT								
2412	2402	1	0	WLAN/BT	19.02	19.02	Extended	Cheek / Touch	In	Up	0.043
2412	2402	1	0	WLAN/BT	19.05	19.047	Extended	Cheek / Touch	Out	Up	0.043
2437	2441	6	39	WLAN/BT	19.09	19.09	Extended	Cheek / Touch	In	Up	0.045
2437	2441	6	39	WLAN/BT	19.04	19.046	Extended	Cheek / Touch	Out	Up	0.044
2462	2480	11	78	WLAN/BT	19.06	19.16	Extended	Cheek / Touch	In	Up	0.065
2462	2480	11	78	WLAN/BT	19.08	19.08	Extended	Cheek / Touch	Out	Up	0.067
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
   *Power Measured ☒ Conducted
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 ☒ Extended ☐ Slim

Figure 8.18 Right Head SAR Test Setup

-- Cheek / Touch Position--

8.18 MEASUREMENT RESULTS (WLAN and BT Right Head SAR–Touch, Slide Down)

Date of Test :	Dec. 04, 2004		
Mixture Type:	2450MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	37.3	Liquid Tissue Temp.:	22.5
Conductivity:	1.88	Ambient Temp:	23.0

FREQUENCY				Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz		Ch.			(dBm)		Battery				
WLAN	BT	WLAN	BT								
2412	2402	1	0	WLAN/BT	19.00	19.20	Extended	Cheek / Touch	In	Down	0.058
2412	2402	1	0	WLAN/BT	19.05	19.05	Extended	Cheek / Touch	Out	Down	0.063
2437	2441	6	39	WLAN/BT	19.00	19.20	Extended	Cheek / Touch	In	Down	0.101
2437	2441	6	39	WLAN/BT	19.04	18.94	Extended	Cheek / Touch	Out	Down	0.108
2462	2480	11	78	WLAN/BT	19.06	19.06	Extended	Cheek / Touch	In	Down	0.115
2462	2480	11	78	WLAN/BT	19.08	19.072	Extended	Cheek / Touch	Out	Down	0.105
2462	2480	11	78	WLAN/BT	19.08	18.98	Standard	Cheek / Touch	In	Down	0.115
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☐ Left Head ☐ Flat Phantom ☒ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☒ Standard ☒ Extended ☐ Slim

Figure 8.19 Right Head SAR Test Setup

-- Cheek / Touch Position--

8.19 MEASUREMENT RESULTS (WLAN and BT Right Head SAR–Tilt, Slide Up)

Date of Test :	Dec. 04, 2004		
Mixture Type:	2450MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	37.3	Liquid Tissue Temp.:	22.5
Conductivity:	1.88	Ambient Temp:	23.0

FREQUENCY				Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz		Ch.			(dBm)		Battery				
WLAN	BT	WLAN	BT								
2412	2402	1	0	WLAN/BT	19.05	19.05	Extended	Ear/Tilt 15°	In	Up	0.043
2412	2402	1	0	WLAN/BT	19.07	19.07	Extended	Ear/Tilt 15°	Out	Up	0.040
2437	2441	6	39	WLAN/BT	19.06	19.053	Extended	Ear/Tilt 15°	In	Up	0.049
2437	2441	6	39	WLAN/BT	19.02	19.02	Extended	Ear/Tilt 15°	Out	Up	0.048
2462	2480	11	78	WLAN/BT	19.01	19.013	Extended	Ear/Tilt 15°	In	Up	0.077
2462	2480	11	78	WLAN/BT	19.04	19.04	Extended	Ear/Tilt 15°	Out	Up	0.076
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
   *Power Measured ☒ Conducted
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 ☒ Extended ☐ Slim

Figure 8.20 Right Head SAR Test Setup

-- Ear/Tilt 15° Position--

8.20 MEASUREMENT RESULTS (WLAN and BT Right Head SAR–Tilt, Slide Down)

Date of Test :	Dec. 04, 2004		
Mixture Type:	2450MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	37.3	Liquid Tissue Temp.:	22.5
Conductivity:	1.88	Ambient Temp:	23.0

FREQUENCY				Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz		Ch.			(dBm)		Battery				
WLAN	BT	WLAN	BT								
2412	2402	1	0	WLAN/BT	19.03	19.03	Extended	Ear/Tilt 15°	In	Down	0.045
2412	2402	1	0	WLAN/BT	19.05	19.056	Extended	Ear/Tilt 15°	Out	Down	0.043
2437	2441	6	39	WLAN/BT	19.04	18.94	Extended	Ear/Tilt 15°	In	Down	0.070
2437	2441	6	39	WLAN/BT	19.07	19.17	Extended	Ear/Tilt 15°	Out	Down	0.036
2462	2480	11	78	WLAN/BT	19.03	18.93	Extended	Ear/Tilt 15°	In	Down	0.095
2462	2480	11	78	WLAN/BT	19.04	18.94	Extended	Ear/Tilt 15°	Out	Down	0.051
2462	2480	11	78	WLAN/BT	19.03	19.03	Standard	Ear/Tilt 15°	In	Down	0.074
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
   *Power Measured ☒ Conducted
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 ☒ Extended ☐ Slim

Figure 8.21 Right Head SAR Test Setup

-- Ear/Tilt 15° Position--

8.21 MEASUREMENT RESULTS (WLAN and BT Left Head SAR–Touch, Slide Up)

Date of Test :	Dec. 04, 2004		
Mixture Type:	2450MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	37.3	Liquid Tissue Temp.:	22.5
Conductivity:	1.88	Ambient Temp:	23.0

FREQUENCY				Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz		Ch.			(dBm)		Battery				
WLAN	BT	WLAN	BT								
2412	2402	1	0	WLAN/BT	19.05	19.05	Extended	Cheek / Touch	In	Up	0.057
2412	2402	1	0	WLAN/BT	19.04	19.04	Extended	Cheek / Touch	Out	Up	0.067
2437	2441	6	39	WLAN/BT	19.02	19.12	Extended	Cheek / Touch	In	Up	0.052
2437	2441	6	39	WLAN/BT	19.08	19.08	Extended	Cheek / Touch	Out	Up	0.057
2462	2480	11	78	WLAN/BT	19.07	19.07	Extended	Cheek / Touch	In	Up	0.077
2462	2480	11	78	WLAN/BT	19.06	18.96	Extended	Cheek / Touch	Out	Up	0.083
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☒ Left Head ☐ Flat Phantom ☐ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☐ Standard ☒ Extended ☐ Slim

Figure 8.22 Left Head SAR Test Setup

-- Cheek / Touch Position--

8.22 MEASUREMENT RESULTS (WLAN and BT Left Head SAR–Touch, Slide Down)

Date of Test :	Dec. 04, 2004		
Mixture Type:	2450MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	37.3	Liquid Tissue Temp.:	22.5
Conductivity:	1.88	Ambient Temp:	23.0

FREQUENCY				Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz		Ch.			(dBm)		Battery				
WLAN	BT	WLAN	BT								
2412	2402	1	0	WLAN/BT	19.07	19.07	Extended	Cheek / Touch	In	Down	0.086
2412	2402	1	0	WLAN/BT	19.03	19.03	Extended	Cheek / Touch	Out	Down	0.066
2437	2441	6	39	WLAN/BT	19.05	19.05	Extended	Cheek / Touch	In	Down	0.073
2437	2441	6	39	WLAN/BT	19.06	18.96	Extended	Cheek / Touch	Out	Down	0.055
2462	2480	11	78	WLAN/BT	19.07	19.061	Extended	Cheek / Touch	In	Down	0.101
2462	2480	11	78	WLAN/BT	19.06	19.16	Extended	Cheek / Touch	Out	Down	0.079
2462	2480	11	78	WLAN/BT	19.04	19.04	Standard	Cheek / Touch	In	Down	0.096
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☒ Left Head ☐ Flat Phantom ☐ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☒ Standard ☒ Extended ☐ Slim

Figure 8.23 Left Head SAR Test Setup

-- Cheek / Touch Position--

8.23 MEASUREMENT RESULTS (WLAN and BT Left Head SAR–Tilt, Slide Up)

Date of Test :	Dec. 05, 2004		
Mixture Type:	2450MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	37.3	Liquid Tissue Temp.:	22.5
Conductivity:	1.88	Ambient Temp:	22.8

FREQUENCY				Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz		Ch.			(dBm)		Battery				
WLAN	BT	WLAN	BT								
2412	2402	1	0	WLAN/BT	19.04	19.036	Extended	Cheek / Touch	In	Up	0.058
2412	2402	1	0	WLAN/BT	19.03	19.025	Extended	Cheek / Touch	Out	Up	0.052
2437	2441	6	39	WLAN/BT	19.05	19.05	Extended	Cheek / Touch	In	Up	0.052
2437	2441	6	39	WLAN/BT	19.08	19.08	Extended	Cheek / Touch	Out	Up	0.048
2462	2480	11	78	WLAN/BT	19.02	19.02	Extended	Cheek / Touch	In	Up	0.075
2462	2480	11	78	WLAN/BT	19.06	19.06	Extended	Cheek / Touch	Out	Up	0.069
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☒ Left Head ☐ Flat Phantom ☐ Right Head
7. SAR Configuration ☒ Head ☐ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Battery Option ☐ Standard ☒ Extended ☐ Slim

Figure 8.24 Left Head SAR Test Setup

-- Ear/Tilt 15° Position--

8.24 MEASUREMENT RESULTS (WLAN and BT Left Head SAR–Tilt, Slide Down)

Date of Test :	Dec. 05, 2004		
Mixture Type:	2450MHz Brain	Tissue Depth:	15.5 cm
Dielectric Constant:	37.3	Liquid Tissue Temp.:	22.5
Conductivity:	1.88	Ambient Temp:	22.8

FREQUENCY				Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz		Ch.			(dBm)		Battery				
WLAN	BT	WLAN	BT								
2412	2402	1	0	WLAN/BT	19.07	19.07	Extended	Cheek / Touch	In	Down	0.077
2412	2402	1	0	WLAN/BT	19.03	19.03	Extended	Cheek / Touch	Out	Down	0.055
2437	2441	6	39	WLAN/BT	19.05	19.057	Extended	Cheek / Touch	In	Down	0.073
2437	2441	6	39	WLAN/BT	19.06	19.06	Extended	Cheek / Touch	Out	Down	0.059
2462	2480	11	78	WLAN/BT	19.07	18.97	Extended	Cheek / Touch	In	Down	0.064
2462	2480	11	78	WLAN/BT	19.06	19.16	Extended	Cheek / Touch	Out	Down	0.042
2412	2402	1	0	WLAN/BT	19.04	19.041	Standard	Cheek / Touch	In	Down	0.072
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.

*Power Measured	☒	Conducted					
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	☒	Extended	☐	Slim	

Figure 8.25 Left Head SAR Test Setup

-- Ear/Tilt 15° Position--

8.25 MEASUREMENT RESULTS (CELLULAR CDMA Body SAR with Holster)

Date of Test :	Dec. 03, 2004		
Mixture Type:	835MHz Muscle	Tissue Depth:	15.1 cm
Dielectric Constant:	54.1	Liquid Tissue Temp.:	21.4
Conductivity:	0.96	Ambient Temp:	22.7

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
824.70	1013	CDMA	25.51	25.51	Extended	[with Holster]	In	Down	0.561
824.70	1013	CDMA	25.53	25.63	Extended	[with Holster]	Out	Down	0.259
835.89	0363	CDMA	25.54	25.44	Extended	[with Holster]	In	Down	0.689
835.89	0363	CDMA	25.58	25.48	Extended	[with Holster]	Out	Down	0.133
848.31	0777	CDMA	25.52	25.42	Extended	[with Holster]	In	Down	0.766
848.31	0777	CDMA	25.58	25.48	Extended	[with Holster]	Out	Down	0.261
848.31	0777	CDMA	25.56	25.46	Standard	[with Holster]	In	Down	0.737
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
   Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
   *Power Measured ☒ Conducted
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. Test Configuration ☒ With Holster ☐ Without Holster
9. Battery Option ☒ Standard ☒ Extended ☐ Slim
10. Body-worn of SCH-i730 is reported with holster rotating through ±90 degrees. The highest SAR value is measured at the angle of 90 degrees. Therefore, the value tested at this angle is reported.

Figure 8.26 Body SAR Test Setup

-- with Holster--

8.26 MEASUREMENT RESULTS (PCS CDMA Body SAR with Holster)

Date of Test :	Dec. 01, 2004		
Mixture Type:	1900MHz Muscle	Tissue Depth:	14.9 cm
Dielectric Constant:	52.3	Liquid Tissue Temp.:	20.6
Conductivity:	1.52	Ambient Temp:	22.4

FREQUENCY		Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz	Ch.		(dBm)		Battery				
1851.25	0025	CDMA	25.05	24.85	Extended	[with Holster]	In	Down	0.334
1851.25	0025	CDMA	25.09	24.99	Extended	[with Holster]	Out	Down	0.285
1880.00	0600	CDMA	25.04	24.94	Extended	[with Holster]	In	Down	0.321
1880.00	0600	CDMA	25.02	24.92	Extended	[with Holster]	Out	Down	0.245
1908.75	1175	CDMA	25.06	24.86	Extended	[with Holster]	In	Down	0.373
1908.75	1175	CDMA	25.08	24.98	Extended	[with Holster]	Out	Down	0.273
1908.75	1175	CDMA	25.05	24.85	Standard	[with Holster]	In	Down	0.363
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
   Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
   *Power Measured ☒ Conducted
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. Test Configuration ☒ With Holster ☐ Without Holster
9. Battery Option ☒ Standard ☒ Extended ☐ Slim
10. Body-worn of SCH-i730 is reported with holster rotating through ±90 degrees. The highest SAR value is measured at the angle of 0 degrees. Therefore, the value tested at this angle is reported.

Figure 8.27 Body SAR Test Setup

-- with Holster--

8.27 MEASUREMENT RESULTS (WLAN and BT Body SAR with Holster)

Date of Test :	Dec. 05, 2004		
Mixture Type:	2450MHz Muscle	Tissue Depth:	15.5 cm
Dielectric Constant:	54.8	Liquid Tissue Temp.:	22.5
Conductivity:	1.98	Ambient Temp:	22.8

FREQUENCY				Modulation	Begin/End POWER*			Device Test Position	Antenna Position	Slide Position	SAR (W/kg)
MHz		Ch.			(dBm)		Battery				
WLAN	BT	WLAN	BT								
2412	2402	1	0	WLAN/BT	19.06	18.96	Extended	[with Holster]	In	Down	0.041
2412	2402	1	0	WLAN/BT	19.06	19.16	Extended	[with Holster]	Out	Down	0.043
2437	2441	6	39	WLAN/BT	19.00	19.20	Extended	[with Holster]	In	Down	0.031
2437	2441	6	39	WLAN/BT	19.07	19.17	Extended	[with Holster]	Out	Down	0.033
2462	2480	11	78	WLAN/BT	19.06	18.96	Extended	[with Holster]	In	Down	0.050
2462	2480	11	78	WLAN/BT	19.06	19.16	Extended	[with Holster]	Out	Down	0.043
2462	2480	11	78	WLAN/BT	19.04	19.94	Standard	[with Holster]	In	Down	0.043
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Brain 1.6W/kg (mW/g) averaged over 1 gram**			

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
   Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
   *Power Measured ☒ Conducted
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. Test Configuration ☒ With Holster ☐ Without Holster
9. Battery Option ☒ Standard ☒ Extended ☐ Slim
10. Body-worn of SCH-i730 is reported with holster rotating through ±90 degrees. The highest SAR value is measured at the angle of 90 degrees. Therefore, the value tested at this angle is reported.
11. All cases of data rate were investigated and the worst case results are reported. Above SAR values are measured at 11Mbps(Data rate). The results measured at each data rate are recorded on next page.

Figure 8.28 Body SAR Test Setup

-- with Holster--

8.28 MEASUREMENT RESULTS (WLAN and BT Body SAR with Holster)

Date of Test :	Dec. 05, 2004		
Mixture Type:	2450MHz Muscle	Tissue Depth:	15.5 cm
Dielectric Constant:	54.8	Liquid Tissue Temp.:	22.5
Conductivity:	1.98	Ambient Temp:	22.8

FREQUENCY				Modulation	Begin/End POWER*			Device Test Position	Data rate (Mbps)	Antenna Position	Slide Position	SAR (W/kg)
MHz		Ch.			(dBm)		Battery					
WLAN	BT	WLAN	BT									
2462	2480	11	78	WLAN/BT	19.06	18.96	Extended	[with Holster]	11	In	Down	0.050
2462	2480	11	78	WLAN/BT	19.06	19.06	Extended	[with Holster]	1	In	Down	0.043
2462	2480	11	78	WLAN/BT	19.07	19.07	Extended	[with Holster]	2	In	Down	0.046
2462	2480	11	78	WLAN/BT	19.06	19.06	Extended	[with Holster]	5.5	In	Down	0.049
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population								**Brain 1.6W/kg (mW/g) averaged over 1 gram**				

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
   Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Battery is fully charged for all readings.
4. *Power Measured ☒ Conducted
5. SAR Measurement System ☒ DASY4
6. Phantom Configuration ☐ Left Head ☒ Flat Phantom ☐ Right Head
7. SAR Configuration ☐ Head ☒ Body ☐ Hand
8. Test Signal Call Mode ☒ Manu. Test Codes ☐ Base Station Simulator
9. Test Configuration ☒ With Holster ☐ Without Holster
10. Battery Option ☐ Standard ☒ Extended ☐ Slim
11. Body-worn of SCH-i730 is reported with holster rotating through ±90 degrees. The highest SAR value is measured at the angle of 90 degrees. Therefore, the value tested at this angle is reported.

Figure 8.29 Body SAR Test Setup

-- with Holster--

9. CONCLUSION

-Combining the maximum SAR values of CDMA Head (0.948 W/Kg) And WLAN&BT Head (0.115 W/Kg) yields a maximum Value of 1.063 W/Kg.

-Combining the maximum SAR values of CDMA Body (0.766 W/Kg) And WLAN&BT Body (0.050 W/Kg) yields a maximum Value of 0.816 W/Kg.

-Combining the maximum SAR values of PCS Head (1.08 W/Kg) And WLAN&BT Head (0.115 W/Kg) yields a maximum Value of 1.195 W/Kg.

-Combining the maximum SAR values of PCS Body (0.373 W/Kg) And WLAN&BT Body (0.050 W/Kg) yields a maximum Value of 0.423 W/Kg.

These values are an overestimate of SAR since these maxima don't occur in the same location or in the same test configuration.

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

10. REFERENCES

[1] IEEE Standards Coordinating Committee 34 – IEEE Std. 1528-2003 (Draft 6.1 – July 2001), *IEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques..*

[2] Federal Communications Commission, OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*, July 2001.

[3] ANSI/IEEE C95.3 – 1991, *IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave, New York: IEEE*, 1992.

[4] Federal Communications Commission, OET Bulletin 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. Supplement C, Dec. 1997.

[5] ANSI/IEEE C95.1 – 1991, *American National Standard Safety levels with respect to human exposure to radio frequency electromagnetic fields, 300kHz to 100GHz*, New York: : IEEE, Aug. 1992.

[6] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, Aug. 1996.

[7] NCRP, National Council on Radiation Protection and Measurements, *Biological Effects and Exposure Criteria for RadioFrequency Electromagnetic Fields,* NCRP Report No. 86, 1986. Reprinted Feb. 1995.

[8] T. Schmid, O. Egger, N. Kuster, *Automated E-field scanning system for dosimetric assessments,* IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.

[9] K. Pokovic, T.Schmid, N. Kuster, *Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies*, ICECOM97, Oct. 1997, pp. 120-124.

[10] G.Hartsgrove, A. raszewski, A. Surowiec, *Simulated Biological Materials for Electromagnetic Radiation Absorption Studies*, University of Ottawa, Bioelectromagnetics, Canada: 1987, pp. 29-36

[11] Q. Balzano, O. Garay, T. Manning Jr,. *Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones*, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.

[12] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, *Numerical Recepies in C,* The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.

[13] K. Pokovic, T.Schmid, N. Kuster, *E-field Probe with improved isotropy in brain simulating liquids*, Proceedings of the ELMAR, Zadar, June 23-25, 1996, pp. 172-175.

[14] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.

[15] V. Hombach, K.Meier, M. Burkhardt, E. Kuhn, N. Kuster, *The Dependence of EM Energy Absorption upon Human Head Modeling at 900MHz*, IEEE Transaction on Microwave Theory and Techniques, vol 44 no. 10, Oct. 1996, pp. 1865-1873.

[16] N. Kuster and Q. Balzano, *Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz*, IEEE Transaction on Vehicular Technology, vol. 41, no.1, Feb.1992, pp. 17-23.

[17] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp.645-652.

APPENDIX A

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy (*dU*) absorbed by (dissipated in) an incremental mass (*dm*) contained in a volume element (*dV*) of a given density (*p*). It is also defined as the rate of RF energy absorption pet unit mass at a point in an absorbing body (see Fig. A.1).

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{pdv}\right)$$

Figure A.1 SAR Mathematical Equation

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \sigma E^2 / p$$

Where :

σ = conductivity of the tissue-simulant material (S/m)

p = mass density of the tissue-simulant material (kg/m^3)

E = Total RMS electric field strength (V/m)

Note: The primary factors that control rate or energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

APPENDIX B

Probe Calibration Process

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure described in **K. Pokovic, T.Schmid, N. Kuster, *Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies*, ICECOM97, Oct. 1997, pp. 120-124** with an accuracy better than +/-10%. The spherical isotropy was evaluated with the procedure described in **K. Pokovic, T.Schmid, N. Kuster, *E-field Probe with improved isotropy in brain simulating liquids*, Proceedings of the ELMAR, Zadar, June 23-25, 1996, pp. 172-175** and found to be better than +/-0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz (see Fig. B.1), and in a waveguide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

Temperature Assessment

E-field temperature correlation calibration is performed in a flat phantom flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe (see Fig. B.2).

$$SAR = C\frac{\Delta T}{\Delta t}$$

where:

Δt = exposure time (30 seconds)

C = heat capacity of tissue (brain or muscle).

ΔT = temperature increase due to RF exposure.

SAR is proportional to ΔT/ Δt, the initial rate of tissue heating, before thermal diffusion takes place. Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E-field;

$$SAR = \frac{|E|^2 \cdot \sigma}{p}$$

where:

σ = simulated tissue conductivity

p = Tissue density (1.25 g/cm^3 for brain tissue)

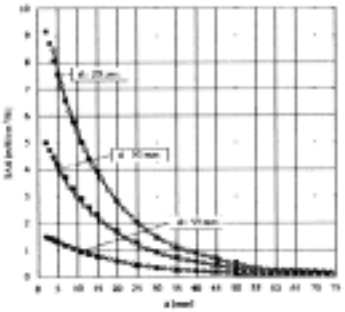

Figure B.1. E-Field and Temperature measurements at 900MHz

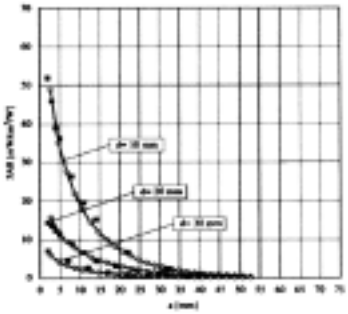

Figure B.2. E-Field and temperature measurements at 1.9GHz

APPENDIX C

ANSI/IEEE C95.1 – 1992 RF EXPOSURE LIMITS

Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is the exposure that may be incurred by persons who are aware of the potential for exposure,(i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table C.1 Safety Limits for Partial Body Exposure

	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)
SPATIAL PEAK SAR[1] Brain	1.60	8.00
SPATIAL PEAK SAR[2] Whole Body	0.08	0.40
SPATIAL PEAK SAR[3] Hands,Feet,Ankles, Wrists	4.00	20.00

[1] The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as tissue volume in the shape of a cube) and over the appropriate averaging time.
[2] The Spatial Average value of the SAR averaged over the whole body.
[3] The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.