

SAR Data Report 02050949

Start : 9-May-02 04:28:01 pm
End : 9-May-02 04:34:04 pm
Code Version : 4.08
Robot Version: 4.08

Product Data:

Type : SAMSUNG
Model Number : SCH-A592
Serial Number : 2
Frequency : 824.70 MHz
Transmit Pwr : 0.280 W
Antenna Type : Helical
Antenna Posn. : In

Measurement Data:

Phantom Name : SAM-FLAT
Phantom Type : Uniphantom
Tissue Type : Muscle
Tissue Dielectric : 57.260
Tissue Conductivity : 0.970
Tissue Density : 1.000
Robot Name : CRS

Probe Data:

Probe Name : PCT002
Probe Type : E Fld Triangle
Frequency : 835 MHz
Tissue Type : Muscle
Calibrated Dielectric : 55.700
Calibrated Conductivity : 0.990
Calibrated Density : 1.000
Probe Offset : 2.400 mm
Conversion Factor : 4.900
Probe Sensitivity : 3.597 3.474 3.049 mV/(mW/cm^2)
Amplifier Gains : 20.00 20.00 20.00

Sample:

Rate: 6000 Samples/Sec
Count: 100 Samples
NIDAQ Gain: 5

Comments:

CDMA MODE CH-1013
Body
CF=1; Amb. Temp= 21.3 'C; Liq. Temp=21.2 'C

Area Scan - Max Peak SAR Value at x=-1.0 y=-16.0 = 0.41 W/kg

Zoom Scan - Max Peak SAR Value at x=-4.0 y=-10.0 z=0.0 = 0.56 W/kg

Max 1g SAR at x=-1.0 y=-15.0 z=0.0 = 0.41 W/kg

Max 10g SAR at x=0.0 y=-16.0 z=0.0 = 0.27 W/kg

SAR Data Report 02050951

Start : 9-May-02 04:41:31 pm
End : 9-May-02 04:47:32 pm
Code Version : 4.08
Robot Version: 4.08

Product Data:

Type : SAMSUNG
Model Number : SCH-A592
Serial Number : 2
Frequency : 835.89 MHz
Transmit Pwr : 0.280 W
Antenna Type : Helical
Antenna Posn. : In

Measurement Data:

Phantom Name : SAM-FLAT
Phantom Type : Uniphantom
Tissue Type : Muscle
Tissue Dielectric : 57.260
Tissue Conductivity : 0.970
Tissue Density : 1.000
Robot Name : CRS

Probe Data:

Probe Name : PCT002
Probe Type : E Fld Triangle
Frequency : 835 MHz
Tissue Type : Muscle
Calibrated Dielectric : 55.700
Calibrated Conductivity : 0.990
Calibrated Density : 1.000
Probe Offset : 2.400 mm
Conversion Factor : 4.900
Probe Sensitivity : 3.597 3.474 3.049 mV/(mW/cm^2)
Amplifier Gains : 20.00 20.00 20.00

Sample:

Rate: 6000 Samples/Sec
Count: 100 Samples
NIDAQ Gain: 5

Comments:

CDMA MODE CH-363
Body
CF=1; Amb. Temp= 21.3 'C; Liq. Temp=21.2 'C

Area Scan - Max Peak SAR Value at x=-1.0 y=-14.0 = 0.39 W/kg

Zoom Scan - Max Peak SAR Value at x=-1.0 y=-14.0 z=0.0 = 0.61 W/kg

Max 1g SAR at x=-1.0 y=-14.0 z=0.0 = 0.41 W/kg

Max 10g SAR at x=-1.0 y=-14.0 z=0.0 = 0.26 W/kg

SAR Data Report 02050953

Start : 9-May-02 04:57:24 pm
End : 9-May-02 05:03:25 pm
Code Version : 4.08
Robot Version: 4.08

Product Data:

Type : SAMSUNG
Model Number : SCH-A592
Serial Number : 2
Frequency : 848.31 MHz
Transmit Pwr : 0.280 W
Antenna Type : Helical
Antenna Posn. : In

Measurement Data:

Phantom Name : SAM-FLAT
Phantom Type : Uniphantom
Tissue Type : Muscle
Tissue Dielectric : 57.260
Tissue Conductivity : 0.970
Tissue Density : 1.000
Robot Name : CRS

Probe Data:

Probe Name : PCT002
Probe Type : E Fld Triangle
Frequency : 835 MHz
Tissue Type : Muscle
Calibrated Dielectric : 55.700
Calibrated Conductivity : 0.990
Calibrated Density : 1.000
Probe Offset : 2.400 mm
Conversion Factor : 4.900
Probe Sensitivity : 3.597 3.474 3.049 mV/(mW/cm^2)
Amplifier Gains : 20.00 20.00 20.00

Sample:

Rate: 6000 Samples/Sec
Count: 100 Samples
NIDAQ Gain: 5

Comments:

CDMA MODE CH-777
Body
CF=1; Amb. Temp= 21.3 'C; Liq. Temp=21.2 'C

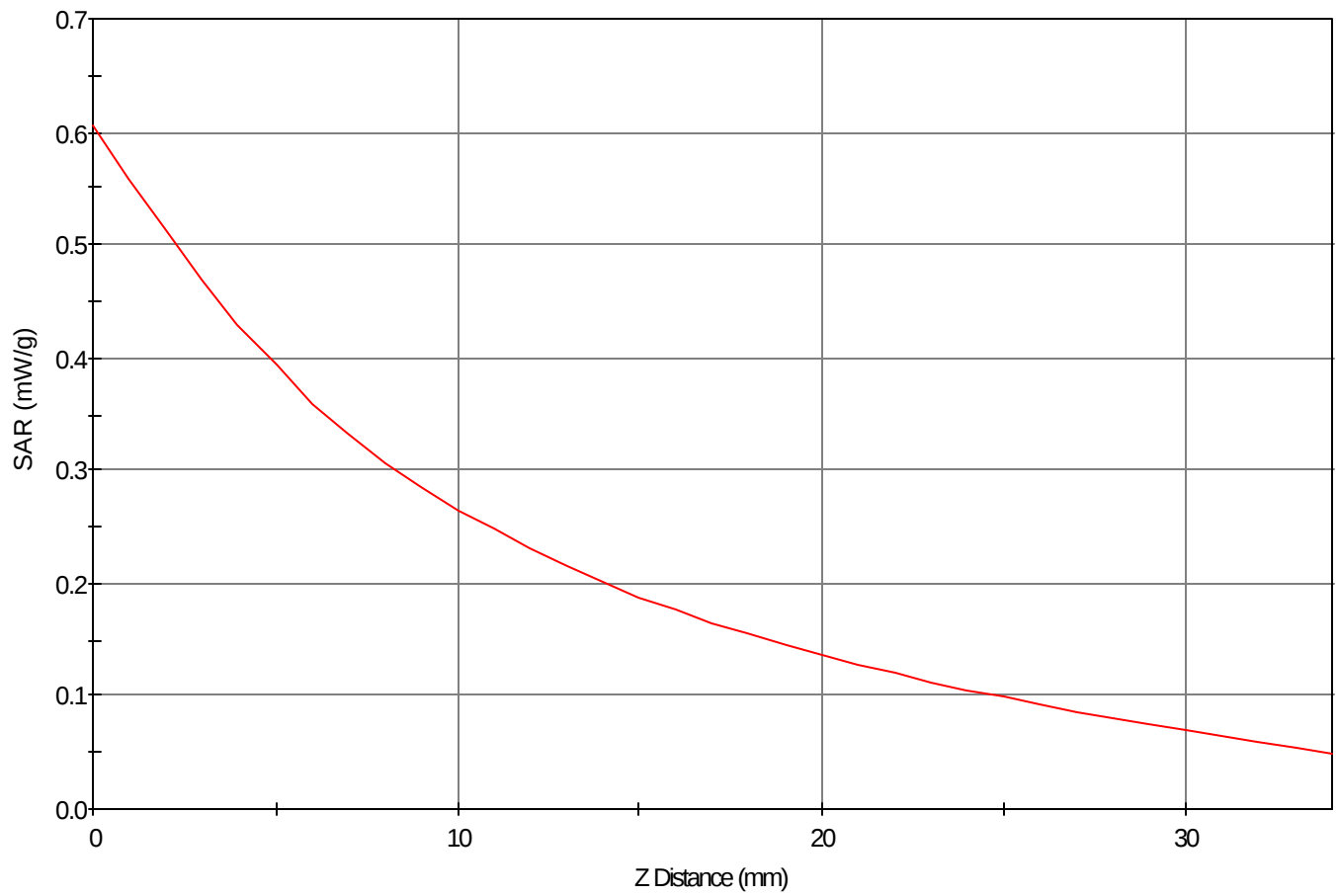
Area Scan - Max Peak SAR Value at x=-1.0 y=-14.0 = 0.41 W/kg

Zoom Scan - Max Peak SAR Value at x=-2.0 y=-11.0 z=0.0 = 0.61 W/kg

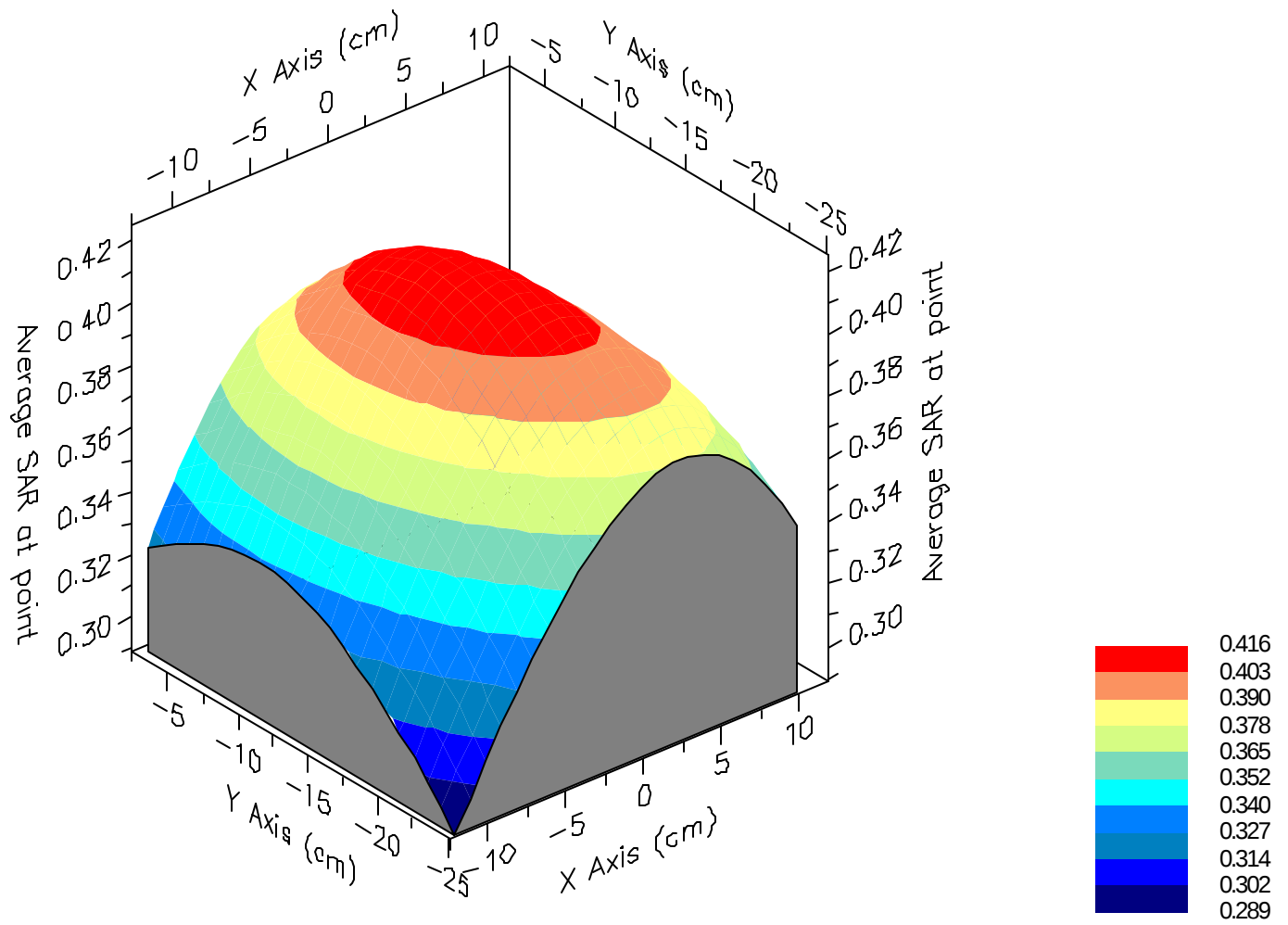
Max 1g SAR at x=-1.0 y=-13.0 z=0.0 = 0.42 W/kg

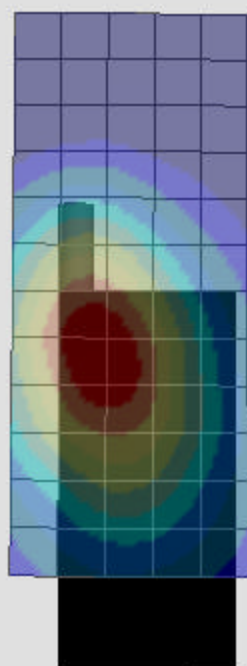
Max 10g SAR at x=0.0 y=-14.0 z=0.0 = 0.27 W/kg

SAR - Z Axis
at Hotspot x:-2.0 y:-11.0



1g SAR Values





4. Probe Calibration Process

Dosimetric Assessment Procedure

Each E-Probe/Probe amplifier combination has unique calibration parameters. A TEM calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the Probe to a known E-field density (1mW/cm²) using an RF Signal generator, TEM cell, and RF Power Meter. The SAR measurement software is used for Probe calibration.

Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or some other methodologies above 1 GHz for free space. For the free space calibration, we place the probe in the volumetric center of the cavity and at the proper orientation with the field. We then rotate the probe 360 degrees until the three channels show the maximum reading. The power density readings equates to 1mW/cm².

Temperature Assessment *

E-field temperature correlation calibration is performed in a 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. 4.2).

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

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 $\Delta T / \Delta t$, 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;

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

where:

σ = simulated tissue conductivity,

ρ = TISSUE density (1.25 g/cm³ for brain tissue)

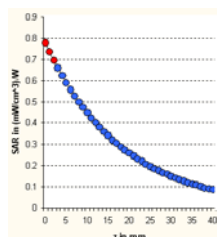


Figure 4.1 E-Field and Temperature measurements at 900MHz

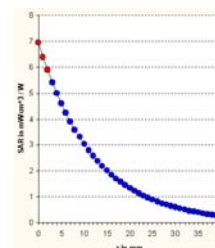


Figure 4.2 E-Field and temperature measurements at 1.9GHz

*NOTE: The temperature calibration was not performed by PCTEST. For information use only.

PCTEST™ SAR TEST REPORT	PCTEST Engineering Laboratory, Inc. FCC CERTIFICATION		Reviewed by: Quality Manager	
SAR Filename: SAR.220507238.A3L	Test Dates: MY. 8-10, 2002	Phone Type: Single-Mode CDMA	FCC ID: A3LSCHA592	Page 7 of 16

6.1 Test Data (Continued)

6.2 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.70 MHz
 CHANNEL: 1013 (Low)
 MEASURED OUTPUT POWER: 23.873 dBm = 0.244 W
 MODULATION SIGNAL: CDMA (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 36.87 dBc

FREQ . (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1649.40	-53.38	6.10	-47.28	H	71.1
2474.10	-53.68	6.70	-46.98	H	70.8
3298.80	-58.98	6.80	-52.18	H	76.0
4123.50	-71.98	6.50	-65.48	H	89.3

NOTES:

Radiated Spurious Emission Measurements by Substitution Method
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

PCTEST™ PT. 22 REPORT		FCC CERTIFICATION		Reviewed By: Quality Manager
Test Report S/N: 22.220507238.A3L	Test Dates: May 8-10, 2002	Phone Type: Single Mode CDMA	FCC ID: A3LSCHA592	Page 9 of 17

6.1 Test Data (Continued)

6.3 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 835.89 MHz
 CHANNEL: 0363 (Mid)
 MEASURED OUTPUT POWER: 23.873 dBm = 0.244 W
 MODULATION SIGNAL: CDMA (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 36.87 dBc

FREQ . (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1671.78	-56.78	6.10	-50.68	H	74.5
2507.67	-60.48	6.70	-53.78	H	77.6
3343.56	-67.88	6.80	-61.08	H	84.9
4179.45	-79.18	6.50	-72.68	H	96.5

NOTES:

Radiated Spurious Emission Measurements by Substitution Method
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

PCTEST™ PT. 22 REPORT		FCC CERTIFICATION		Reviewed By: Quality Manager
Test Report S/N: 22.220507238.A3L	Test Dates: May 8-10, 2002	Phone Type: Single Mode CDMA	FCC ID: A3LSCHA592	Page 10 of 17

6.1 Test Data (Continued)

6.4 CELLULAR CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 848.31 MHz
 CHANNEL: 0777 (High)
 MEASURED OUTPUT POWER: 23.873 dBm = 0.244 W
 MODULATION SIGNAL: CDMA (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.87 dBc

FREQ . (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1696.62	-50.68	6.10	-44.58	H	68.4
2544.93	-53.28	6.70	-46.58	H	70.4
3393.24	-61.58	6.80	-54.78	H	78.6
4241.55	-70.38	6.50	-63.88	H	87.7

NOTES:

Radiated Spurious Emission Measurements by Substitution Method
according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

PCTEST™ PT. 22 REPORT		FCC CERTIFICATION		Reviewed By: Quality Manager
Test Report S/N: 22.220507238.A3L	Test Dates: May 8-10, 2002	Phone Type: Single Mode CDMA	FCC ID: A3LSCHA592	Page 11 of 17