Prepared (also subject responsible if other)		No.		
EUS/CV/RF/P Dulce Altabella		EUS/CV/R-01:0701/REP		
Approved	Checked			
EUS/CV/RF/P Mark Douglas	MGD	2001-6-28	A	E:\FCC Submittals\FCC_413 carmen nicole\XHIBIT11\Source\tr413 sar rpt.doc

SAR Test Report: T60c

Date of test: June 20,21, 25-27, 2001

Laboratory: Electromagnetic Near Field and Radio Frequency Dosimetry Laboratory
Ericsson, Inc.
7001 Development Drive, P.O. Box 13969,
Research Triangle Park, NC, 27709, USA

Test Responsible: Mark Douglas, Ph.D.
Senior Technical Leader, Antenna Development Group

This laboratory is accredited to ISO/IEC Guide 25-1990 to perform the following electromagnetic tests:
Specific Absorption Rate (SAR), dielectric parameters, and RF power measurement on the following types of products:
Wireless communications devices

A2LA certificate Number: 1650-01

Statement of Compliance: Ericsson, Inc. declares under its sole responsibility that the product

T60c

to which this declaration relates, is in conformity with the appropriate RF exposure standards, recommendations and guidelines. It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

Prepared (also subject responsible if other)		No.		
EUS/CV/RF/P Dulce Altabella		EUS/CV/R-01:0701/REP		
Approved	Checked			
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1. Introduction

In this report, compliance of the Ericsson T60c portable telephone with RF safety guidelines is demonstrated (applicable RF safety guidelines are given in [1]). The device was tested in accordance with the latest available test guidelines [1]. Detailed procedures of the test are described in the *Ericsson SAR Measurement Specification* [1].

2. Device Under Test

2.1 Antenna description

Type	Internal antenna + retractable antenna	
Location	Inside the back cover, near the top	
Dimensions	Maximum length for internal antenna	38 mm
	Maximum width for internal antenna	42 mm
	Maximum length for retractable	80 mm
Configuration	Patch antenna + whip	

2.2 Device description

Device model	T60c		
FCC ID	AXATR-413-A2		
Serial number	UA202092T8		
Mode	800 AMPS	800 CDMA	1900 CDMA
Multiple Access Scheme	FDMA	CDMA	CDMA
Maximum Output Power Setting [1]	26.25 dBm	23.4 dBm	23.4 dBm
Factory Tolerance in Power Setting	± 0.25	± 0.40	± 0.40
Maximum Peak Output Power [2]	26.50 dBm	23.80 dBm	23.80 dBm
Duty Cycle	1	1	1
Transmitting Frequency Range	824 – 849 MHz	824 – 849 MHz	1851 – 1909 MHz
Prototype or Production Unit	Prototype		

3. Test equipment

3.1 Dosimetric system

SAR measurements were made using two DASY3 professional systems (software version 3.1c), manufactured by Schmid & Partner Engineering AG and installed in February 1998, and November 2000. The extended SAR assessment uncertainty (K = 2) is ±32% with a +15% offset. This assessment uncertainty includes measurement uncertainty (±24%) and phantom uncertainty (±10%), as described in [1]. This results in a total uncertainty range of –17% to +47%. The equipment list is given below.

Description	**Serial Number**	**Due Date**
DASY3 DAE V1	416	01/2002
DASY3 DAE V1	369	12/2001
E-field probe ET3DV6	1539	01/2002
E-field probe ET3DV5	1324	01/2002
Dipole Validation Kit, D900V2	049	01/2003

[1] This is the conducted power measured at the antenna port when the device is set to its highest power setting. It is measured at the middle of the transmit frequency band. Note that the output power may be different at other frequencies.
[2] This equals the maximum output power setting plus the factory tolerance.

Dipole Validation Kit, D1800V2	217	12/2001

3.2 Additional calibrated equipment

Description	Serial Number	Due Date
Signal Generator HP8648C	3537A01598	9/2002
Dielectric probe kit HP 85070B	US33020256	10/2001
Network analyser HP 8752C	3410A03105	7/2001
Power meter E4418B	GB40206594	10/2001
Power sensor HP 8482H	3318A09268	8/2001
Power meter HP 437B	3125U16190	3/2002
Power sensor HP 8482H	3318A09268	8/2001
Power meter HP 437B	3125U13729	1/2002
Power sensor HP 8482H	3318A07097	2/2002

4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the tissue simulating liquids were measured with the dielectric probe kit. These values are shown in the table below. The mass density, ρ, entered into the DASY3 program is also given. Recommended limits for maximum permittivity, minimum conductivity and maximum mass density are also shown [2]. It is seen that the measured parameters result in an overestimation of SAR compared to the recommended values.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters			Chamber Temp. (°C)
			e_r	s (S/m)	r (g/cm^3)	
835	Head	**Measured, 6/25/01**	42.40	0.92	1.00	22.8
		Measured, 6/26/01	41.38	0.90	1.00	22.1
		Recommended Limits [2]	46.08	0.74	1.03	--
	Muscle	**Measured, 6/26/01**	55.42	0.97	1.00	23.3
		Measured, 6/27/01	55.13	0.98	1.00	23.2
		Recommended Limits [2]	56.11	0.95	1.04	--
1800	Head	**Measured, 6/20/01**	39.97	1.76	1.00	22.4
		Measured, 6/21/01	39.98	1.75	1.00	22.3
		Recommended Limits [2]	43.54	1.15	1.03	--
	Muscle	**Measured, 6/20/01**	39.97	1.76	1.00	22.4
		Measured, 6/21/01	39.98	1.75	1.00	22.3
		Recommended Limits [2]	54.44	1.39	1.04	--

5. System accuracy verification

A system accuracy verification of the DASY3 was performed using the dipole validation kits listed in Section 3.1. The system verification test was conducted on the same day as the measurement of the DUT. The obtained results are displayed in the table below (SAR values are scaled to 1 Watt power delivered to the antenna). It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. Reference values are taken from the system manufacturer. The distributions of SAR compare well with those of the reference measurements (see Appendix 1).

f (MHz)	Tissue type	Measured / Reference	SAR (W/kg), 1 gram/10 gram	Dielectric Parameters			Chamber Temp. (°C)
				e_r	s (S/m)	r (g/cm^3)	
900	Head	**Measured, 6/25/01**	10.80/6.84	41.66	0.98	1.00	22.8
		Measured, 6/26/01	10.84/6.84	40.66	0.96	1.00	22.2
		Reference	10.96/6.92	41.70	0.94	1.00	--
900	Muscle	**Measured, 6/26/01**	11.33/7.13	54.89	1.03	1.00	23.3
		Measured, 6/27/01	11.50/7.19	54.79	1.04	1.00	23.2
		Reference	11.08/7.08	56.10	0.99	1.00	--
1800	Head/ Muscle	**Measured, 6/20/01**	41.53/20.57	39.97	1.76	1.00	22.4
		Measured, 6/21/01	41.56/20.43	39.98	1.75	1.00	22.3
		Reference	40.00/20.20	40.0	1.72	1.00	--

6. Test results

The measured 1and 10-gram averaged SAR values of the device are provided in Tables 1 through 3. Also shown are the measured conducted output powers and the temperature of the test facility during the test. The depth of the tissue simulating liquid was at least 15 cm for all the cases except for muscle at 900 MHz. In this case, a depth of 14.2 cm was used. Test commands were used to control the device during the SAR measurements. The phone was supplied with a fully charged battery for the tests.

SAR measured against the head is presented in Table 1. The device was tested on the right-hand phantom (corresponding to the right side of the head) and the left-hand phantom. For 800 AMPS and 1900 CDMA modes, the device was tested at the lowest, middle, and highest frequencies of the transmit band. For 800 CDMA mode, the maximum power is significantly lower than that of AMPS mode, therefore SAR values are also lower.

mode	*f* (MHz)	Output Power (dBm)	Left hand			Right hand		
			Chamber Temp. (°C)	SAR, 1g /10g (W/kg)		Chamber Temp. (°C)	SAR, 1g /10g (W/kg)	
				measured	Calculated to max. power		measured	Calculated to max. power
800 AMPS ANTENNA RETRACTED	824	25.8	22.8	0.91/0.61	1.00/0.67	22.4	0.87/0.54	0.95/0.59
	837	26.1	22.3	**1.29**/0.84	**1.41**/0.92	22.4	1.20/0.77	1.31/0.84
	849	25.9	22.4	1.08/0.72	1.18/0.79	22.5	1.10/0.73	1.21/0.80
800 AMPS ANTENNA EXTENDED	824	25.8	22.8	1.06/0.69	1.16/0.76	22.3	1.12/0.70	1.23/1.35
	837	26.1	22.4	1.04/0.71	1.14/0.78	22.4	0.98/0.64	1.07/0.70
	849	25.9	22.5	1.04/0.68	1.14/0.75	22.5	0.99/0.66	1.08/0.72
1900 CDMA ANTENNA EXTENDED	1851	23.1	23.6	0.31/0.18	0.36/0.21	23.4	0.47/0.22	0.54/0.25
	1980	23.2	23.7	0.38/0.21	0.44/0.24	23.4	0.49/0.24	0.56/0.27
	1909	23.2	23.8	0.74/0.39	0.85/0.45	23.3	0.69/0.38	0.79/0.44
1900 CDMA ANTENNA RETRACTED	1851	23.1	23.6	0.70/0.29	0.80/0.33	23.4	**0.88**/0.37	**1.01**/0.42
	1980	23.2	23.6	0.64/0.29	0.73/0.33	23.4	0.74/0.34	0.85/0.39
	1909	23.2	23.7	0.49/0.26	0.56/0.30	23.4	0.77/0.35	0.88/0.40

Table 1: SAR measurement results for the Ericsson T60c telephone at highest possible output power. Measured against the head.

For body worn measurements, the device was tested against a flat phantom representing the user's body, using product # SXK 109 4518/2, product # SXK 107 6820/55, and product # SXK-109 4705. SAR was measured at the lowest, middle and highest frequencies of the 800 AMPS and 1900 CDMA bands (800 CDMA is not necessary due to the significantly lower output power). Results are given in Tables 2 through 3.

mode	*f* (MHz)	Output Power (dBm)	SXK 109 4518/2			SXK 107 6820/55		
			Chamber Temp. (°C)	SAR, 1g /10g (W/kg)		Chamber Temp. (°C)	SAR, 1g /10g (W/kg)	
				measured	Calculated to max. power		measured	Calculated to max. power
800 AMPS	824	25.8	23.1	**1.20**/0.83	**1.32**/0.91	22.9	**1.20**/0.83	**1.32**/0.91
	837	26.1	23.1	0.82/0.55	0.90/0.60	22.8	0.84/0.58	0.92/0.64
	849	25.9	23.1	0.82/0.56	0.90/0.61	22.9	1.01/0.69	1.11/0.76
1900 CDMA	1851	23.1	23.3	0.45/0.24	0.52/0.28	23.4	0.33/0.18	0.38/0.21
	1880	23.2	23.4	0.58/0.30	0.67/0.34	23.4	0.39/0.21	0.45/0.24
	1909	23.2	23.3	**0.61**/0.31	**0.70**/0.36	23.4	**0.55**/0.29	**0.63**/0.33

Table 2: SAR measurement results for the Ericsson T60c telephone at highest possible output power. Measured against the body using carry accessory SXK 109 4518/2and SXK 107 6820/55.

mode	*f* (MHz)	Output Power (dBm)	SXK-109 4705 Back of the phone against holster			SXK-109 4705 Front of the phone against holster		
			Chamber Temp. (°C)	SAR, 1g /10g (W/kg)		Chamber Temp. (°C)	SAR, 1g /10g (W/kg)	
				measured	Calculated to max. power		measured	Calculated to max. power
800 AMPS	824	25.8	22.8	**1.24/0.88**	**1.36/0.96**	22.7	0.78/0.55	0.86/0.60
	837	26.1	22.8	0.94/0.66	1.03/0.72	22.7	0.63/0.45	0.69/0.49
	849	25.9	22.9	0.93/0.65	1.02/0.71	22.8	0.49/0.34	0.54/0.37
1900 CDMA	1851	23.1	23.6	0.37/0.20	0.42/0.23	23.4	0.07/0.04	0.08/0.05
	1880	23.2	23.5	0.50/0.27	0.57/0.31	23.4	0.12/0.07	0.14/0.08
	1909	23.2	23.6	**0.55/0.30**	**0.63/0.34**	23.4	0.16/0.08	0.18/0.09

Table 3: SAR measurement results for the Ericsson T60c telephone at highest possible output power. Measured against the body using carry accessory SXK-109 4705.

References

[1] C. Törnevik, M. Siegbahn, T. Persson, M. Douglas, and R. Plicanic, "Ericsson SAR measurement specification", Internal Document ERA/TF-00:037, March 2001.

[2] Federal Communications Commission, "Tissue Dielectric Properties," http://www.fcc.gov/fcc-bin/dielec.sh.