TCC
Nokia

FINAS
Finnish Accreditation Service
T117 (EN ISO/IEC 17025)

SAR Compliance Test Report

Test report no.:	SD_SAR_0824_01	**Date of report:**	2008-06-20
Template version:	9.0	**Number of pages:**	47
Testing laboratory:	TCC Nokia San Diego Laboratory 12278 Scripps Summit Drive SAN DIEGO CA. 92131 USA Tel. +1 858 831 5000 Fax. +1 858 831 6500	**Client:**	Nokia Corporation 12278 Scripps Summit Drive SAN DIEGO CA. 92131 USA Tel. +1 858 831 5000 Fax. +1 858 831 6500
Responsible test engineer:	Jose Gomez	**Product contact person:**	Mary Washington
Measurements made by:	Jose Gomez, Julian Kim		
Tested device:	RM-339		
FCC ID:	QMNRM-339	**IC:**	661X-RM339
Supplement reports:	SD_SAR_0824_02, SD_SAR_0803_02		

Testing has been carried out in accordance with:

47CFR §2.1093
Radiofrequency Radiation Exposure Evaluation: Portable Devices

FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)
Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

RSS-102
Evaluation Procedure for Mobile and Portable Radio Transmitters with Respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields

IEEE 1528 - 2003
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Technique

Documentation: The documentation of the testing performed on the tested devices is archived for 15 years at TCC San Diego.

Test results: **The tested device complies with the requirements in respect of all parameters subject to the test.** The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.

Date and signatures:

For the contents: **Jose Gomez** 2008-07-22
Certification Test Engineer

CONTENTS

1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	2008-06-19 to 2008-06-20
SN, HW and SW numbers of tested device	SN: A00000011E585F, HW: 6000, SW: KN_3600T6_VZW_155, DUT: 30537
Batteries used in testing	BL-4B DUT:3069, 3070
Headsets used in testing	HS-9 DUT:3071
Other accessories used in testing	-
State of sample	Prototype unit
Notes	-

1.2 Maximum Results

The maximum measured SAR values for Head configuration and Body Worn configuration are given in section 1.2.1 and 1.2.2 respectively. The device conforms to the requirements of the standard(s) when the maximum measured SAR value is less than or equal to the limit.

1.2.1 Head Configuration

Mode	Ch / *f* (MHz)	Conducted power	Position	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
CDMA800	777/ 848.31	24.33dBm	Right, Cheek	0.824W/kg	**0.92W/kg**	1.6 W/kg	**PASSED**
CDMA1900	600/ 1880.0	23.38dBm	Right, Cheek	1.00W/kg	**1.12W/kg**	1.6 W/kg	**PASSED**

1.2.2 Body Worn Configuration

Mode	Ch / *f* (MHz)	Conducted power	Separation distance	Measured SAR value (1g avg)	Scaled* SAR value (1g avg)	SAR limit (1g avg)	Result
CDMA800	384/ 836.52	24.60dBm	2.2cm	0.614W/kg	**0.69W/kg**	1.6 W/kg	**PASSED**
CDMA1900	600/ 1880.0	24.07dBm	2.2cm	0.322W/kg	**0.36W/kg**	1.6 W/kg	**PASSED**

*SAR values are scaled up by 12% to cover measurement drift.

1.2.3 Maximum Drift

Maximum drift covered by 12% scaling up of the SAR values	Maximum drift during measurements
0.5dB	0.26dB

1.2.4 Measurement Uncertainty

Expanded Uncertainty (k=2) 95%	± 25.8%

2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	Portable
Exposure environment	General population / uncontrolled

Modes of Operation	Bands	Modulation Mode	Duty Cycle	Transmitter Frequency Range (MHz)
CDMA	800 1900	QPSK	1	824 – 849 1850 – 1910
BT	2450	GFSK	1	2402 – 2480

This is a CDMA2000 1x RTT device.

2.1 Description of the Antenna

The device has an internal antenna.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (°C):	20.4 to 21.8
Ambient humidity (RH %):	41 to 56

3.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester. Communication between the device and the call tester was established by air link.

The device output power was set to maximum power level for all tests; a fully charged battery was used for every test sequence.

In all operating bands the measurements were performed on lowest, middle and highest channels.

The number of test cases reported in this document has been minimised based on the earlier testing in SD_SAR_0803_02.

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

The measurements were performed using an automated near-field scanning system, DASY4, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements was the 'advanced extrapolation' algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE 4	389	12 months	2009-04
DAE 4	604	12 months	2008-08
E-field Probe ET3DV6	1505	12 months	2008-08
E-field Probe ET3DV6	1516	12 months	2008-11
Dipole Validation Kit, D900V2	120	24 months	2009-09
Dipole Validation Kit, D1900V2	534	24 months	2008-09
DASY Software	Version 4.7	-	-

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	HP E4432B	US 40053677	24 months	2008-08
Signal Generator	HP E4432B	US 40052231	24 months	2010-06
Amplifier	Milmega AS0822-8L	1004832	-	-
Amplifier	Milmega AS0822-20L	1009777	-	-
Power Meter	Agilent E4419B	GB39290694	12 months	2008-11
Power Meter	Agilent E4417A	GB41290918	12 months	2009-01
Power Sensor	Agilent E9300A	US39210503	12 months	2008-07
Power Sensor	Agilent E9301A	US39211865	12 months	2009-03
Call Tester	CMU200	837727708	-	-
Call Tester	Agilent 8960	GB45070553	-	-
Call Tester	Agilent 8960	US11-40047546-0	-	-
Vector Network Analyzer	Agilent 8753ES	US39174327	12 months	2009-05
Dielectric Probe Kit	Agilent 85070D	US01440165	-	-

4.1.1 Isotropic E-field Probe Type ET3DV6

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., butyl diglycol)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 3 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.2 Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 - 2003.

System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

The SPEAG device holder (see Section 5.1) was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 - 2003 and FCC Supplement C to OET Bulletin 65. All tests were carried out using simulants

whose dielectric parameters were within ± 5% of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

The depth of the tissue simulant was 15.0 ± 0.5 cm measured from the ear reference point during system checking and device measurements.

4.3.1 Tissue Simulant Recipes

The following recipe(s) were used for Head and Body tissue simulant(s):

800MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	51.50	69.25
Tween 20	47.35	30.00
Salt	1.15	0.75

1900MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	54.50	70.25
Tween 20	45.23	29.41
Salt	0.27	0.34

4.3.2 System Checking

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system checking results (dielectric parameters and SAR values) are given in the table below.

System checking, head tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
	Reference result	2.59	39.7	0.94	
	± 10% window	2.33 – 2.85			
900	2008-06-19	2.44	39.6	0.93	21.8
	Reference result	9.38	38.6	1.41	
	± 10% window	8.44 – 10.32			
1900	2008-06-19	10.2	38.6	1.44	20.4

System checking, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
	Reference result	10.1	52.6	1.56	
	± 10% window	9.1 - 11.1			
1900	2008-06-20	9.82	51.3	1.55	21.1

Plots of the system checking scans are given in Appendix A.

4.3.3 Tissue Simulants used in the Measurements

Head tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
	Recommended value	41.5	0.90	
	± 5% window	39.4 – 43.6	0.86 – 0.95	
836	2008-06-19	40.0	0.88	21.8
	Recommended value	40.0	1.40	
	± 5% window	38.0 – 42.0	1.33 – 1.47	
1880	2008-06-19	38.7	1.42	20.4

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
	Recommended value	55.2	0.97	
	± 5% window	52.4 – 58.0	0.92 – 1.02	
836	2008-06-19	54.0	0.98	21.4
	Recommended value	53.3	1.52	
	± 5% window	50.6 – 56.0	1.44 – 1.60	
1880	2008-06-20	51.4	1.53	21.1

5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.

Device holder supplied by SPEAG

A Nokia designed spacer (illustrated below) was used to position the device within the SPEAG holder. The spacer positions the device so that the holder has minimal effect on the test results but still holds the device securely. The spacer was removed before the tests.

Nokia spacer

5.2 Test Positions

5.2.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 - 2003 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

5.2.2 Body Worn Configuration

The device was placed in the SPEAG holder using the Nokia spacer and placed below the flat section of the phantom. The distance between the device and the phantom was kept at the separation distance indicated in Section 1.2.2 using a separate flat spacer that was removed

before the start of the measurements. The device was oriented with its antenna facing the phantom since this orientation gives higher results.

5.3 Scan Procedures

First, area scans were used for determination of the field distribution. Next, a zoom scan, a minimum of 5x5x7 points covering a volume of at least 30x30x30mm, was performed around the highest E-field value to determine the averaged SAR value. Drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan.

5.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within Dasy4 are all based on the modified Quadratic Shepard's method (Robert J. Renka, "Multivariate Interpolation Of Large Sets Of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).

The interpolation scheme combines a least-square fitted function method with a weighted average method. A trivariate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighbouring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	c_i	$c_i . u_i$ (%)	v_i
Measurement System							
Probe Calibration	E2.1	±5.9	N	1	1	±5.9	∞
Axial Isotropy	E2.2	±4.7	R	√3	$(1-c_p)^{1/2}$	±1.9	∞
Hemispherical Isotropy	E2.2	±9.6	R	√3	$(c_p)^{1/2}$	±3.9	∞
Boundary Effect	E2.3	±1.0	R	√3	1	±0.6	∞
Linearity	E2.4	±4.7	R	√3	1	±2.7	∞
System Detection Limits	E2.5	±1.0	R	√3	1	±0.6	∞
Readout Electronics	E2.6	±1.0	N	1	1	±1.0	∞
Response Time	E2.7	±0.8	R	√3	1	±0.5	∞
Integration Time	E2.8	±2.6	R	√3	1	±1.5	∞
RF Ambient Conditions - Noise	E6.1	±3.0	R	√3	1	±1.7	∞
RF Ambient Conditions - Reflections	E6.1	±3.0	R	√3	1	±1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	±0.4	R	√3	1	±0.2	∞
Probe Positioning with respect to Phantom Shell	E6.3	±2.9	R	√3	1	±1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E5	±3.9	R	√3	1	±2.3	∞
Test sample Related							
Test Sample Positioning	E4.2	±6.0	N	1	1	±6.0	11
Device Holder Uncertainty	E4.1	±5.0	N	1	1	±5.0	7
Output Power Variation - SAR drift measurement	6.6.3	±0.0	R	√3	1	±0.0	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	±4.0	R	√3	1	±2.3	∞
Conductivity Target - tolerance	E3.2	±5.0	R	√3	0.64	±1.8	∞
Conductivity - measurement uncertainty	E3.3	±5.5	N	1	0.64	±3.5	5
Permittivity Target - tolerance	E3.2	±5.0	R	√3	0.6	±1.7	∞
Permittivity - measurement uncertainty	E3.3	±2.9	N	1	0.6	±1.7	5
Combined Standard Uncertainty			RSS			**±12.9**	116
Coverage Factor for 95%			**k=2**				
Expanded Uncertainty						**±25.8**	

7. RESULTS

The measured Head SAR values for the test device are tabulated below:

800MHz Head SAR results

Option used	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch1013 824.70MHz	Ch384 836.52MHz	Ch777 848.31MHz
RC3 / SO55		Power	24.54dBm	24.32dBm	24.33dBm
Flip Open	Left	Cheek	-	-	-
		Tilt	-	-	-
	Right	Cheek	0.445	0.480	0.778
		Tilt	-	-	-
Flip Open	Right Cheek, BT active		-	-	**0.824**

1900MHz Head SAR results

Option used	Test configuration		SAR, averaged over 1g (W/kg)		
			Ch25 1851.25MHz	Ch600 1880.00MHz	Ch1175 1908.75MHz
RC3 / SO55		Power	24.01dBm	23.38dBm	23.41dBm
Flip Open	Left	Cheek	-	-	-
		Tilt	-	-	-
	Right	Cheek	0.884	**1.00**	0.975
		Tilt	-	-	-
Flip Open	Right Cheek, BT active		-	0.980	-

The measured Body SAR values for the test device are tabulated below:

CDMA800 Body SAR results

Mode	Test configuration	SAR, averaged over 1g (W/kg)		
		Ch 1013 824.70 MHz	Ch 384 836.52 MHz	Ch 777 848.31 MHz
RC3 / SO55	Power	24.86dBm	24.60dBm	24.59dBm
Flip Closed	Without headset	0.562	**0.578**	0.455
	Headset HS-9	0.463	0.416	0.400
Flip Closed	Without headset, BT active	-	**0.614**	-

CDMA1900 Body SAR results

Mode	Test configuration	SAR, averaged over 1g (W/kg)		
		Ch25 1851.25MHz	Ch600 1880.00MHz	Ch1175 1908.75MHz
RC3 / SO55	Power	24.60dBm	24.07dBm	24.05dBm
Flip Closed	Without headset	0.227	0.281	0.261
	Headset HS-9	0.258	**0.319**	0.302
Flip Closed	Headset HS-9, BT active	-	**0.322**	-

The conducted power measurement results of the product's other transmission configurations are given in Appendix E.

Plots of the Measurement scans are given in Appendix B.

APPENDIX A: SYSTEM CHECKING SCANS

Date/Time: 2008-06-19 10:48:51

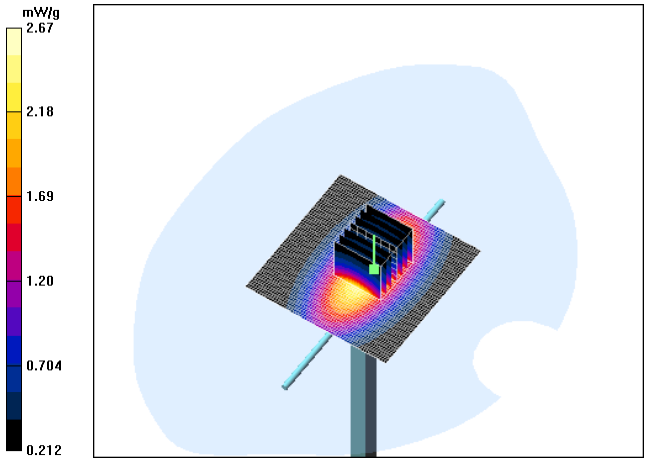
Test Laboratory: TCC Nokia
Type: D900V2; Serial: 120

Communication System: CW900
Frequency: 900 MHz; Duty Cycle: 1:1
Medium: Cellular Head; Medium Notes: Liquid temperature= 21.8C
Medium parameters used: f = 900 MHz; σ = 0.927 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1505; Probe Notes:
- ConvF(6.75, 6.75, 6.75); Calibrated: 2007-08-29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn389; Calibrated: 2008-04-14
- Phantom: SAM1; Type: Twin Phantom; Serial: TP-1035
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

System Check/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.65 mW/g

System Check/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.7 V/m
Peak SAR (extrapolated) = 3.71 W/kg
SAR(1 g) = 2.44 mW/g
SAR(10 g) = 1.57 mW/g
Power Drift = 0.057 dB
Maximum value of SAR (measured) = 2.67 mW/g



Date/Time: 2008-06-19 15:36:11

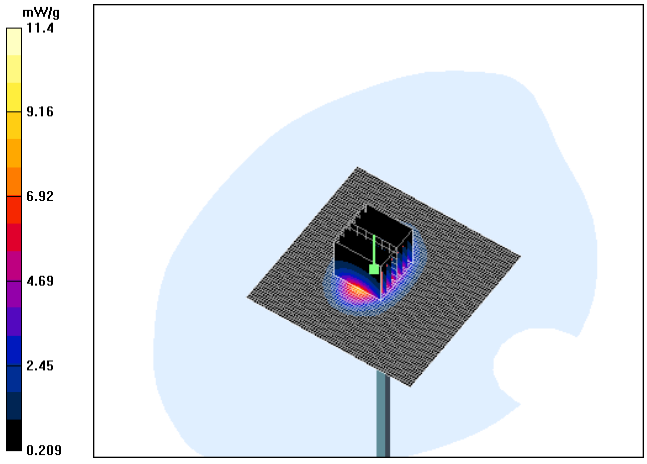
Test Laboratory: TCC Nokia
Type: D1900V2; Serial: 534

Communication System: CW1900
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900; Medium Notes: T=20.4
Medium parameters used: f = 1900 MHz; σ = 1.44 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(5.24, 5.24, 5.24); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn604; Calibrated: 2007-08-29
- Phantom: SAM 1; Type: Twin Phantom; Serial: NMP3310
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

System Check/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.2 mW/g

System Check/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.0 V/m
Peak SAR (extrapolated) = 18.1 W/kg
SAR(1 g) = 10.2 mW/g
SAR(10 g) = 5.37 mW/g
Power Drift = -0.019 dB
Maximum value of SAR (measured) = 11.4 mW/g



Date/Time: 2008-06-20 11:22:04

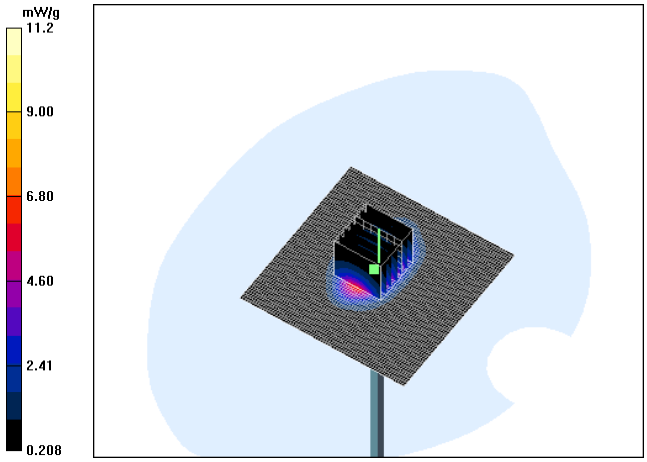
Test Laboratory: TCC Nokia
Type: D1900V2; Serial: 534

Communication System: CW1900
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL1900; Medium Notes: T=21.1C
Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.87, 4.87, 4.87); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn604; Calibrated: 2007-08-29
- Phantom: SAM 3; Type: Twin Phantom; Serial: NMP03311
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

System Check/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 11.4 mW/g

System Check/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 83.3 V/m
Peak SAR (extrapolated) = 16.6 W/kg
SAR(1 g) = 9.82 mW/g
SAR(10 g) = 5.25 mW/g
Power Drift = -0.020 dB
Maximum value of SAR (measured) = 11.2 mW/g



APPENDIX B: MEASUREMENT SCANS

Date/Time: 2008-06-19 12:15:55

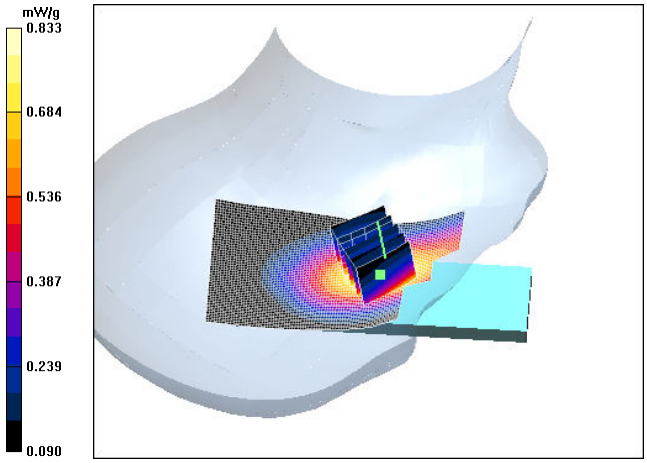
Test Laboratory: TCC Nokia
Type: RM-339; Serial: A00000011E585F

Communication System: CDMA800
Frequency: 848.31 MHz; Duty Cycle: 1:1
Medium: HSL900; Medium Notes: T=21.8 C
Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.892 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1505; Probe Notes:
- ConvF(6.86, 6.86, 6.86); Calibrated: 2007-08-29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn389; Calibrated: 2008-04-14
- Phantom: SAM1; Type: SAM; Serial: TP-1035
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Cheek, High, Flip open/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.801 mW/g

Cheek, High, Flip open/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.2 V/m
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.778 mW/g
SAR(10 g) = 0.540 mW/g
Power Drift = 0.262 dB
Maximum value of SAR (measured) = 0.833 mW/g



Date/Time: 2008-06-19 12:33:02

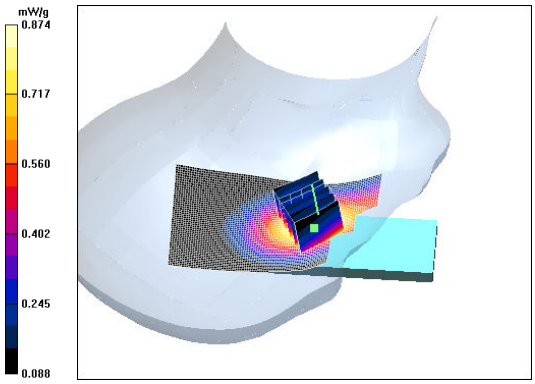
Test Laboratory: TCC Nokia
Type: RM-339; Serial: A00000011E585F

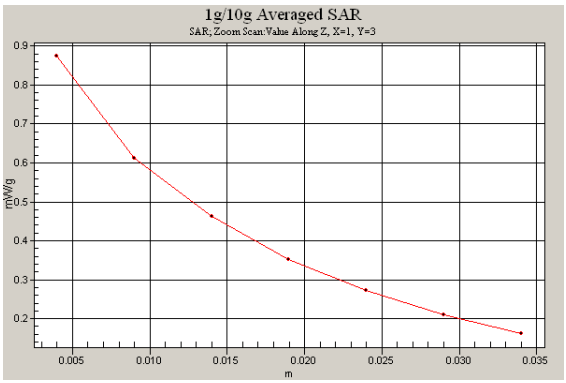
Communication System: CDMA800
Frequency: 848.31 MHz; Duty Cycle: 1:1
Medium: HSL900; Medium Notes: T=21.8 C
Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.892 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1505; Probe Notes:
- ConvF(6.86, 6.86, 6.86); Calibrated: 2007-08-29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn389; Calibrated: 2008-04-14
- Phantom: SAM1; Type: SAM; Serial: TP-1035
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Cheek, High, Flip open, BT active/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.881 mW/g

Cheek, High, Flip open, BT active/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.824 mW/g
SAR(10 g) = 0.586 mW/g
Power Drift = -0.142 dB
Maximum value of SAR (measured) = 0.874 mW/g





Date/Time: 2008-06-19 16:37:14

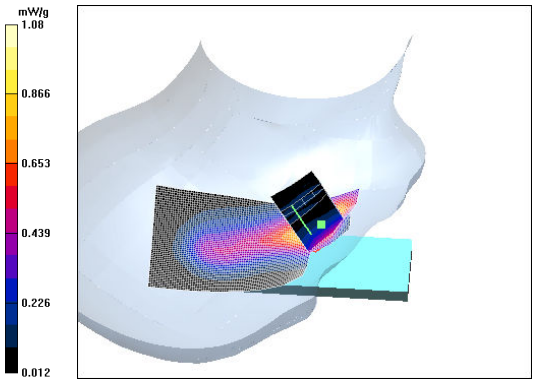
Test Laboratory: TCC Nokia
Type: RM-339; Serial: A00000011E585F

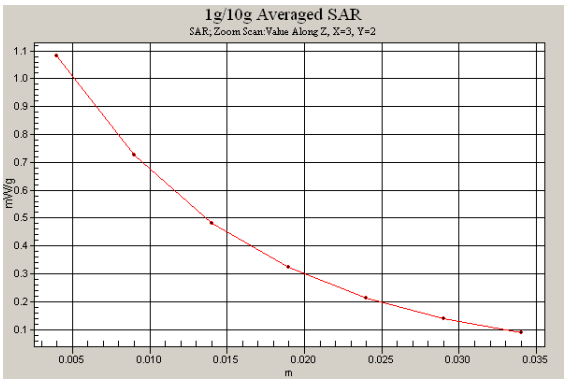
Communication System: CDMA1900
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: HSL1900; Medium Notes: T=20.4
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(5.24, 5.24, 5.24); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn604; Calibrated: 2007-08-29
- Phantom: SAM 1; Type: Twin Phantom; Serial: NMP3310
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Right Cheek, Middle, Flip open/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.09 mW/g

Right Cheek, Middle, Flip open/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.5 V/m
Peak SAR (extrapolated) = 1.53 W/kg
SAR(1 g) = 1 mW/g
SAR(10 g) = 0.610 mW/g
Power Drift = 0.000 dB
Maximum value of SAR (measured) = 1.08 mW/g





Date/Time: 2008-06-19 18:22:08

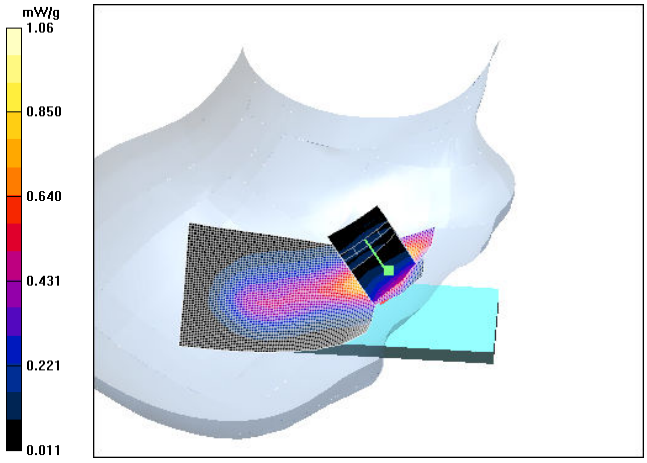
Test Laboratory: TCC Nokia
Type: RM-339; Serial: A00000011E585F

Communication System: CDMA1900
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: HSL1900; Medium Notes: T=20.4
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(5.24, 5.24, 5.24); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn604; Calibrated: 2007-08-29
- Phantom: SAM 1; Type: Twin Phantom; Serial: NMP3310
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Right Cheek, Middle, BT active, Flip open/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.07 mW/g

Right Cheek, Middle, BT active, Flip open/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.4 V/m
Peak SAR (extrapolated) = 1.51 W/kg
SAR(1 g) = 0.980 mW/g
SAR(10 g) = 0.596 mW/g
Power Drift = -0.015 dB
Maximum value of SAR (measured) = 1.06 mW/g



Date/Time: 2008-06-19 15:10:23

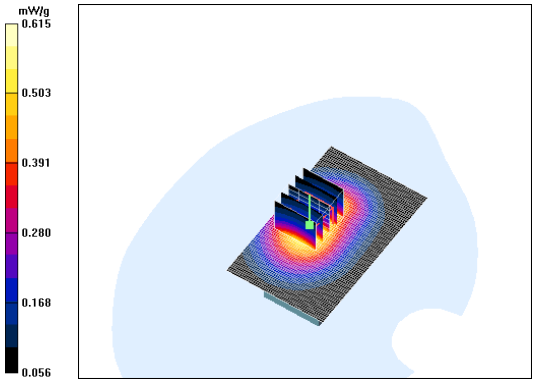
Test Laboratory: TCC Nokia
Type: RM-339; Serial: A00000011E585F

Communication System: CDMA800
Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: Cellular Body; Medium Notes: Temperature= 21.4C
Medium parameters used: f = 837 MHz; σ = 0.979 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1505; Probe Notes:
- ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn389; Calibrated: 2008-04-14
- Phantom: SAM2; Type: Twin Phantom; Serial: TP-1279
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Body measurement, Middle, No accessory, Flip closed/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.613 mW/g

Body measurement, Middle, No accessory, Flip closed/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.6 V/m
Peak SAR (extrapolated) = 0.788 W/kg
SAR(1 g) = 0.578 mW/g
SAR(10 g) = 0.397 mW/g
Power Drift = -0.011 dB
Maximum value of SAR (measured) = 0.615 mW/g



Date/Time: 2008-06-19 15:25:58

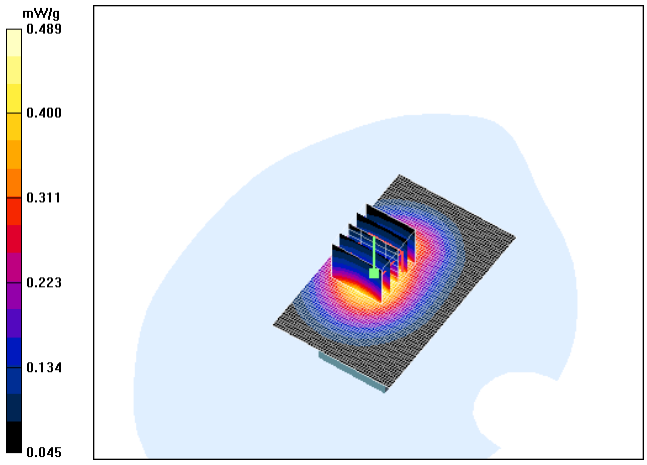
Test Laboratory: TCC Nokia
Type: RM-339; Serial: A00000011E585F

Communication System: CDMA800
Frequency: 824.7 MHz; Duty Cycle: 1:1
Medium: Cellular Body; Medium Notes: Temperature= 21.4C
Medium parameters used: f = 825 MHz; σ = 0.971 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1505; Probe Notes:
- ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn389; Calibrated: 2008-04-14
- Phantom: SAM2; Type: Twin Phantom; Serial: TP-1279
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Body measurement, Low, HS-9, Flip closed/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.495 mW/g

Body measurement, Low, HS-9, Flip closed/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.6 V/m
Peak SAR (extrapolated) = 0.643 W/kg
SAR(1 g) = 0.463 mW/g
SAR(10 g) = 0.319 mW/g
Power Drift = -0.131 dB
Maximum value of SAR (measured) = 0.489 mW/g



Date/Time: 2008-06-19 15:55:39

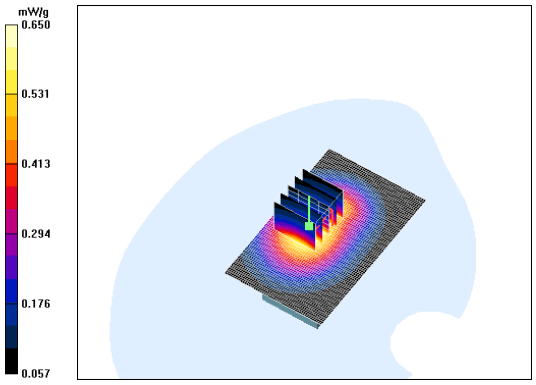
Test Laboratory: TCC Nokia
Type: RM-339; Serial: A00000011E585F

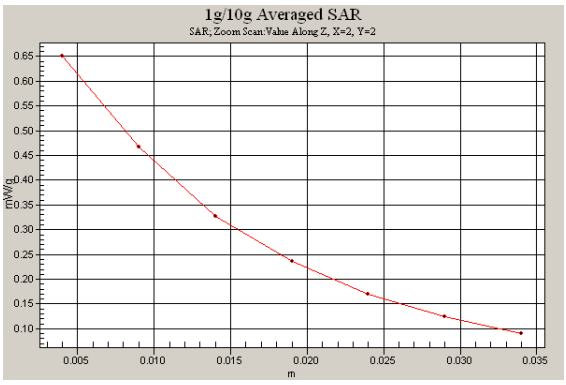
Communication System: CDMA800
Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: Cellular Body; Medium Notes: Temperature= 21.4C
Medium parameters used: f = 837 MHz; σ = 0.979 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1505; Probe Notes:
- ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-29
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn389; Calibrated: 2008-04-14
- Phantom: SAM2; Type: Twin Phantom; Serial: TP-1279
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, Middle, No accessory, BT active/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.669 mW/g

Body, Middle, No accessory, BT active/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.1 V/m
Peak SAR (extrapolated) = 0.831 W/kg
SAR(1 g) = 0.614 mW/g
SAR(10 g) = 0.420 mW/g
Power Drift = -0.153 dB
Maximum value of SAR (measured) = 0.650 mW/g





Date/Time: 2008-06-20 12:50:25

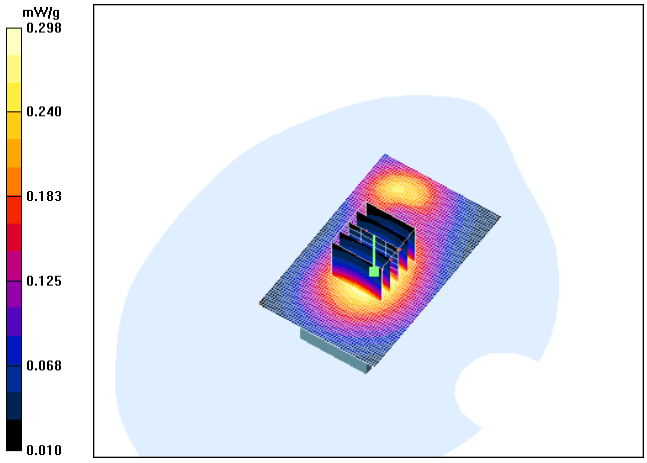
Test Laboratory: TCC Nokia
Type: RM-339; Serial: A00000011E585F

Communication System: CDMA1900
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: MSL1900; Medium Notes: T=21.1C
Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.87, 4.87, 4.87); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn604; Calibrated: 2007-08-29
- Phantom: SAM 3; Type: Twin Phantom; Serial: NMP03311
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, Middle, No accessory, Flip closed/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.314 mW/g

Body, Middle, No accessory, Flip closed/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.8 V/m
Peak SAR (extrapolated) = 0.431 W/kg
SAR(1 g) = 0.281 mW/g
SAR(10 g) = 0.184 mW/g
Power Drift = -0.190 dB
Maximum value of SAR (measured) = 0.298 mW/g



Date/Time: 2008-06-20 15:26:57

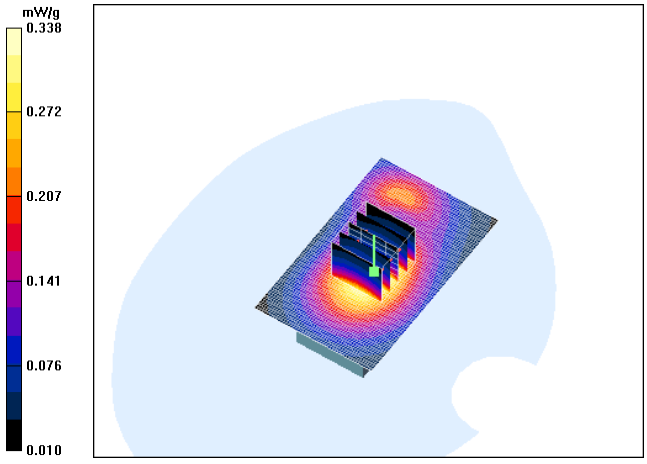
Test Laboratory: TCC Nokia
Type: RM-339; Serial: A00000011E585F

Communication System: CDMA1900
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: MSL1900; Medium Notes: T=21.1C
Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.87, 4.87, 4.87); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn604; Calibrated: 2007-08-29
- Phantom: SAM 3; Type: Twin Phantom; Serial: NMP03311
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, Middle, HS-9, Flip closed/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.360 mW/g

Body, Middle, HS-9, Flip closed/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.1 V/m
Peak SAR (extrapolated) = 0.488 W/kg
SAR(1 g) = 0.319 mW/g
SAR(10 g) = 0.208 mW/g
Power Drift = -0.238 dB
Maximum value of SAR (measured) = 0.338 mW/g



Date/Time: 2008-06-20 16:50:43

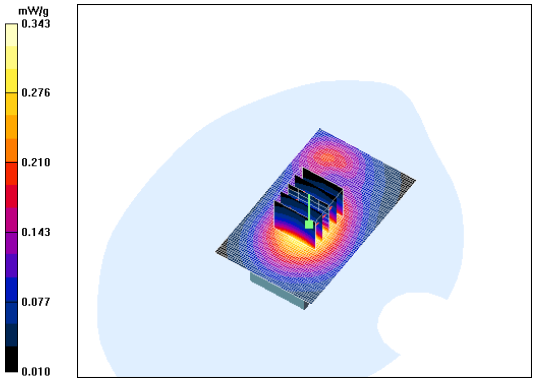
Test Laboratory: TCC Nokia
Type: RM-339; Serial: A00000011E585F

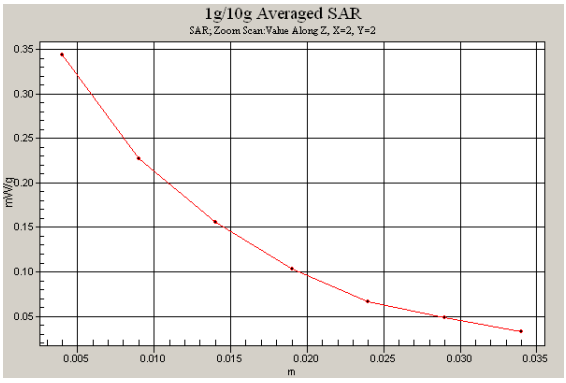
Communication System: CDMA1900
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: MSL1900; Medium Notes: T=21.1C
Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1516; Probe Notes:
- ConvF(4.87, 4.87, 4.87); Calibrated: 2007-11-12
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn604; Calibrated: 2007-08-29
- Phantom: SAM 3; Type: Twin Phantom; Serial: NMP03311
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 172

Body, Middle, HS-9, BT active, Flip closed/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.351 mW/g

Body, Middle, HS-9, BT active, Flip closed/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.4 V/m
Peak SAR (extrapolated) = 0.494 W/kg
SAR(1 g) = 0.322 mW/g
SAR(10 g) = 0.209 mW/g
Power Drift = -0.083 dB
Maximum value of SAR (measured) = 0.343 mW/g





APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S)

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client: Nokia SD TCC

Certificate No: ET3-1505_Aug07

CALIBRATION CERTIFICATE

Object: ET3DV6 - SN:1505

Calibration procedure(s): QA CAL-01.v6
Calibration procedure for dosimetric E-field probes

Calibration date: August 29, 2007

Condition of the calibrated item: In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41495277	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41498087	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (METAS, No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-07 (METAS, No. 217-00671)	Mar-08
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (METAS, No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	20-Apr-07 (SPEAG, No. DAE4-654_Apr07)	Apr-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

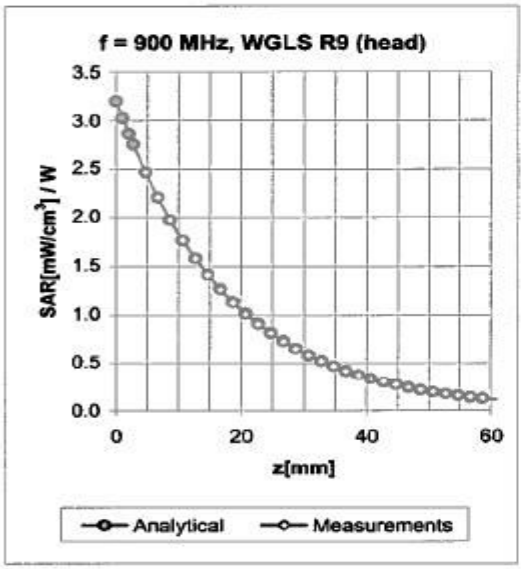
	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

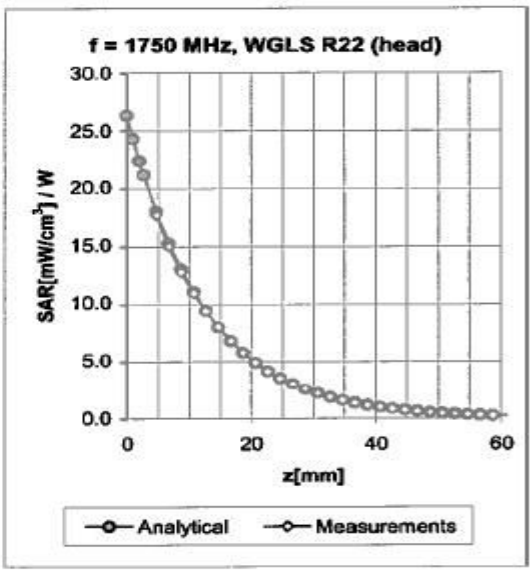
Issued: August 29, 2007

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: ET3-1505_Aug07 Page 1 of 9

Conversion Factor Assessment





f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 99	Head	41.5 ± 5%	0.90 ± 5%	0.31	2.54	6.86 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.34	2.42	6.75 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.46	2.74	5.35 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.63	5.17 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.52	2.11	4.61 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.29	2.72	6.49 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.31	2.73	6.21 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.53	2.78	4.81 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.65	2.41	4.65 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.51	2.50	3.95 ± 11.8% (k=2)

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client **Nokia SD**

Certificate No: **ET3-1516_Nov07**

CALIBRATION CERTIFICATE

Object: ET3DV6 - SN:1516

Calibration procedure(s): QA CAL-01.v6
Calibration procedure for dosimetric E-field probes

Calibration date: November 12, 2007

Condition of the calibrated item: In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

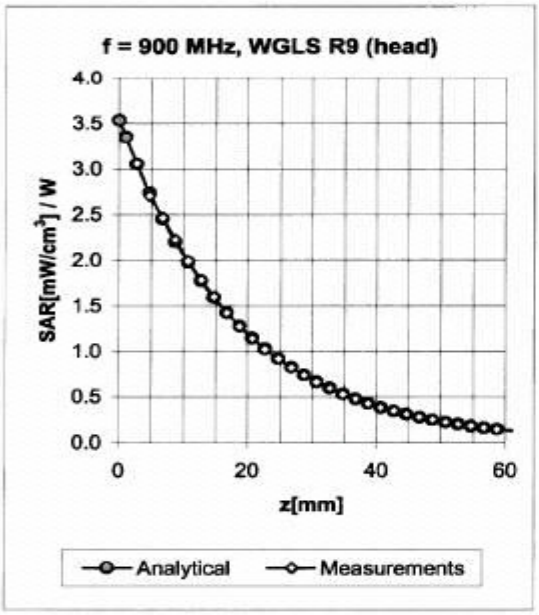
Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41495277	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41498087	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (METAS, No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-07 (METAS, No. 217-00671)	Mar-08
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (METAS, No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	20-Apr-07 (SPEAG, No. DAE4-654_Apr07)	Apr-08

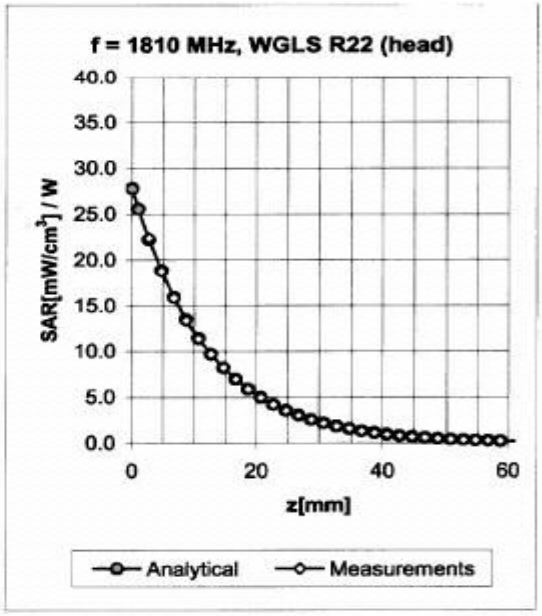
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: November 12, 2007

Conversion Factor Assessment





f [MHz]	Validity [MHz][c]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.72	2.07	6.45 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.63	2.19	5.24 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.96	1.75	4.96 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.92	1.71	4.47 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.79	1.94	6.01 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.73	2.35	4.87 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.64	2.49	4.56 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.63	2.50	4.21 ± 11.8% (k=2)

[c] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)

FINAS
Finnish Accreditation Service
T117 (EN ISO/IEC 17025)

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client: Nokia SD TCC

Certificate No: D900V2-120_Aug07

CALIBRATION CERTIFICATE

Object	D900V2 - SN: 120
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	August 27, 2007
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Power sensor HP 8481A	US37292783	03-Oct-06 (METAS, No. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference 10 dB Attenuator	SN: 5047.2 (10r)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference Probe ET3DV6 (HF)	SN 1507	19-Oct-06 (SPEAG, No. ET3-1507_Oct06)	Oct-07
DAE4	SN 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 29, 2007

DASY4 Validation Report for Head TSL

Date/Time: 27.08.2007 14:39:35

Test Laboratory: SPEAG, Zurich, Switzerland

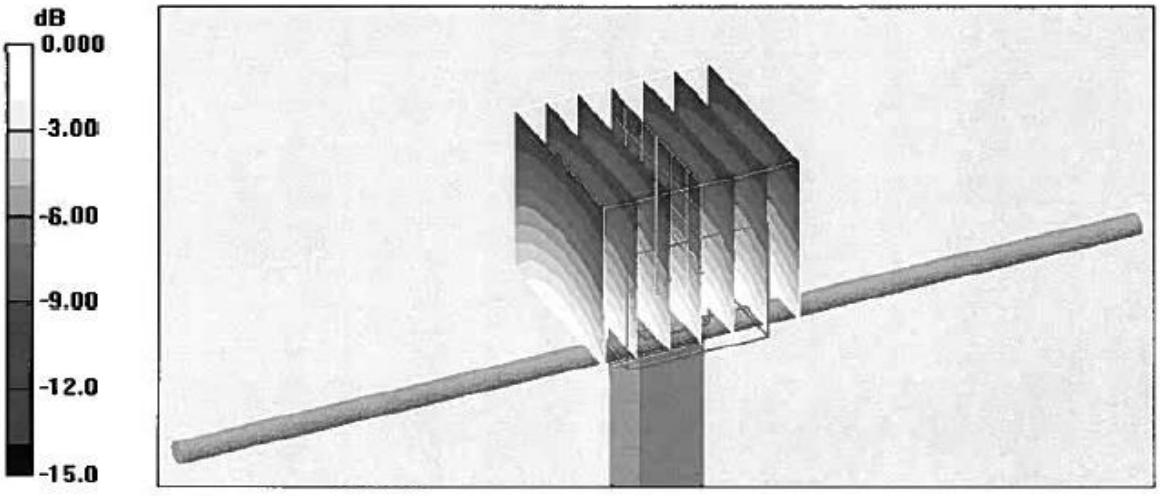
DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:120

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: HSL 900 MHz;
Medium parameters used: f = 900 MHz; σ = 0.941 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(6.01, 6.01, 6.01); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.1 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 3.79 W/kg
SAR(1 g) = 2.59 mW/g; SAR(10 g) = 1.67 mW/g
Maximum value of SAR (measured) = 2.81 mW/g



0 dB = 2.81mW/g

DASY4 Validation Report for Body TSL

Date/Time: 23.08.2007 14:35:10

Test Laboratory: SPEAG, Zurich, Switzerland

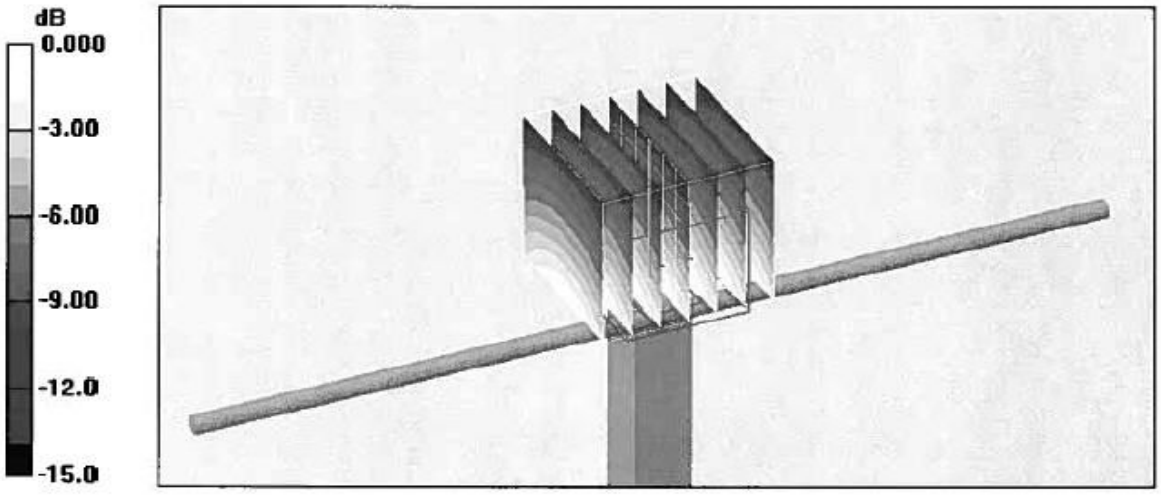
DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:120

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: MSL900;
Medium parameters used: f = 900 MHz; σ = 1.07 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(5.8, 5.8, 5.8); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin=250mW after straightening the arms/Zoom Scan (7x7x7)/Cube 0: Measurement grid:
dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.7 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 3.73 W/kg
SAR(1 g) = 2.65 mW/g; SAR(10 g) = 1.73 mW/g
Maximum value of SAR (measured) = 2.89 mW/g



0 dB = 2.89mW/g

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Nokia SD TCC

Certificate No: D1900V2-534_Sep06

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 534
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	September 20, 2006
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Power sensor HP 8481A	US37292783	04-Oct-05 (METAS, No. 251-00516)	Oct-06
Reference 20 dB Attenuator	SN: 5086 (20g)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference 10 dB Attenuator	SN: 5047.2 (10r)	10-Aug-06 (METAS, No 217-00591)	Aug-07
Reference Probe ET3DV6	SN: 1507	28-Oct-05 (SPEAG, No. ET3-1507_Oct05)	Oct-06
Reference Probe ES3DV3	SN: 3025	28-Oct-05 (SPEAG, No. ES3-3025_Oct05)	Oct-06
DAE4	SN: 601	15-Dec-05 (SPEAG, No. DAE4-601_Dec05)	Dec-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov-06

	Name	Function	Signature
Calibrated by:	Marcel Fehr	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 20, 2006

DASY4 Validation Report for Head TSL

Date/Time: 13.09.2006 15:19:52

Test Laboratory: SPEAG, Zurich, Switzerland

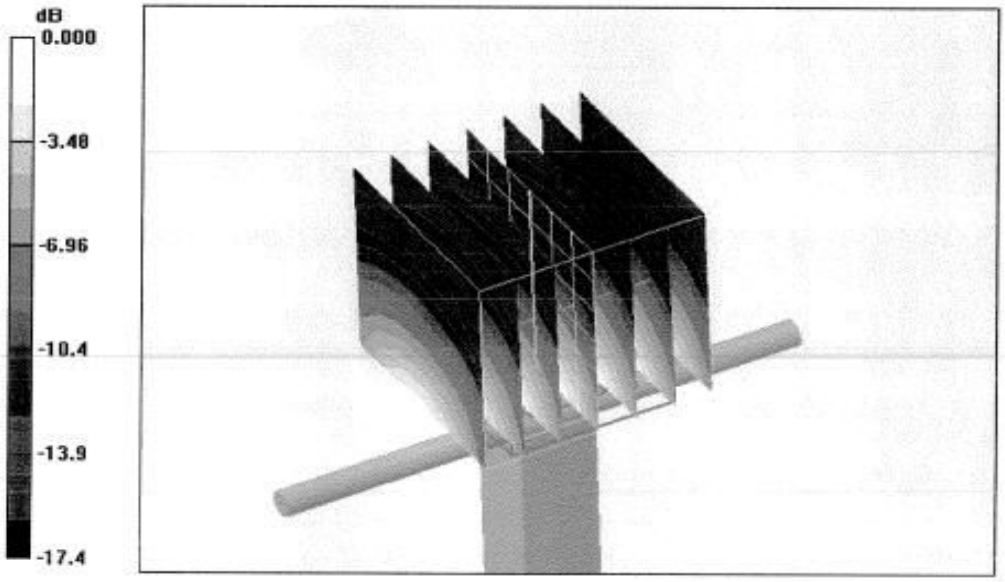
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:534

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 1900 MHz; σ = 1.41 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507 (HF); ConvF(4.74, 4.74, 4.74); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.2 V/m; Power Drift = 0.051 dB
Peak SAR (extrapolated) = 15.9 W/kg
SAR(1 g) = 9.38 mW/g; SAR(10 g) = 4.97 mW/g
Maximum value of SAR (measured) = 10.5 mW/g



0 dB = 10.5mW/g

DASY4 Validation Report for Body TSL

Date/Time: 20.09.2006 10:57:32

Test Laboratory: SPEAG, Zurich, Switzerland

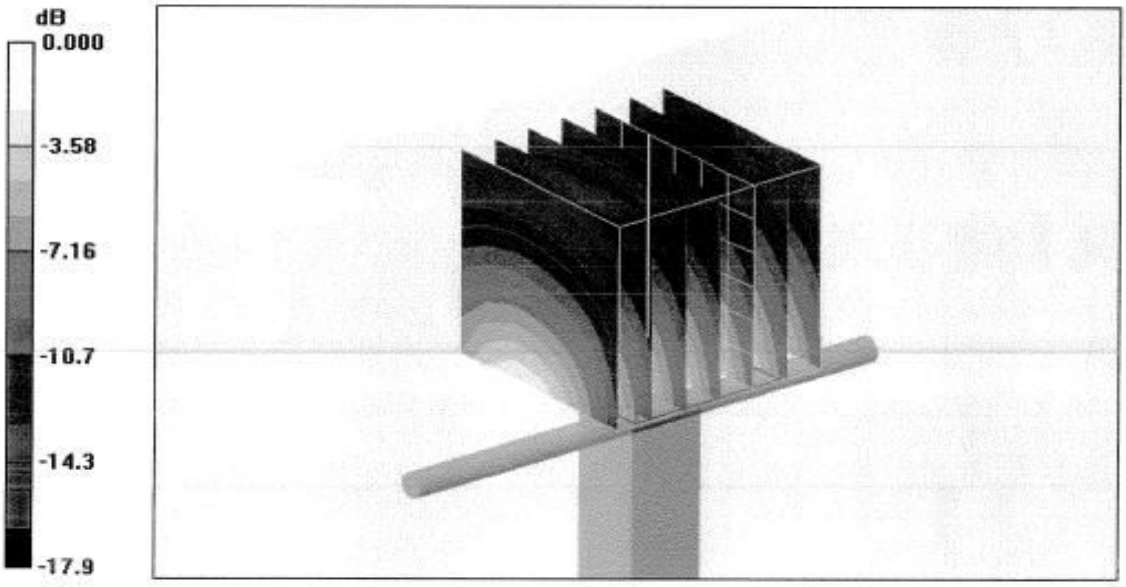
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:534

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL U10;
Medium parameters used: f = 1900 MHz; σ = 1.56 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025 (HF); ConvF(4.38, 4.38, 4.38); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.6 V/m; Power Drift = 0.060 dB
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.37 mW/g
Maximum value of SAR (measured) = 11.2 mW/g



0 dB = 11.2mW/g

APPENDIX E: CONDUCTED POWER MEASUREMENTS FOR SUPPORTED TRANSMISSION MODES

Type: RM-339; Serial: A00000011E585F

CDMA800 Flip Open

Radio Configuration	Service Options and Channel Configurations	Supported	Ch 1013 824.70 MHz	Ch 384 836.52 MHz	Ch 777 848.31 MHz
			Pavg (dBm)	Pavg (dBm)	Pavg (dBm)
RC1	SO1	no	-	-	-
RC1	SO2	yes	24.50	24.41	24.27
RC1	SO3	no	-	-	-
RC1	SO55	yes	24.50	24.31	24.38
RC2	SO9	yes	24.61	24.49	24.38
RC2	SO55	yes	24.49	24.28	24.31
RC3	SO1	no	-	-	-
RC3	SO2	yes	24.51	24.31	24.33
RC3	SO3	no	-	-	-
RC3	SO32 (no SCH1)	no	-	-	-
RC3	SO32 (SCH1 9.6 kpbs)	no	-	-	-
RC3	SO32 (SCH1 19.2 kpbs)	no	-	-	-
RC3	SO32 (SCH1 38.4 kpbs)	no	-	-	-
RC3	SO32 (SCH1 76.8 kpbs)	no	-	-	-
RC3	SO32 (SCH1 153.6 kpbs)	no	-	-	-
RC3	SO33 (SCH1 9.6 kpbs)	no	-	-	-
RC3	SO33 (SCH1 19.2 kpbs)	no	-	-	-
RC3	SO33 (SCH1 38.4 kpbs)	no	-	-	-
RC3	SO33 (SCH1 76.8 kpbs)	no	-	-	-
RC3	SO33 (SCH1 153.6 kpbs)	no	-	-	-
RC3	**SO55**	**yes**	**24.54**	**24.32**	**24.33**
RC4	SO1	no	-	-	-
RC4	SO2	yes	24.51	24.30	24.31
RC4	SO3	no	-	-	-
RC4	SO32 (no SCH1)	no	-	-	-
RC4	SO32 (SCH1 9.6 kpbs)	no	-	-	-
RC4	SO32 (SCH1 19.2 kpbs)	no	-	-	-
RC4	SO32 (SCH1 38.4 kpbs)	no	-	-	-
RC4	SO32 (SCH1 76.8 kpbs)	no	-	-	-
RC4	SO32 (SCH1 153.6 kpbs)	no	-	-	-
RC4	SO33 (SCH1 9.6 kpbs)	no	-	-	-
RC4	SO33 (SCH1 19.2 kpbs)	no	-	-	-
RC4	SO33 (SCH1 38.4 kpbs)	no	-	-	-
RC4	SO33 (SCH1 76.8 kpbs)	no	-	-	-
RC4	SO33 (SCH1 153.6 kpbs)	no	-	-	-
RC4	SO55	yes	24.50	24.32	24.33

RC5	SO9	yes	24.52	24.29	24.30
RC5	SO33 (SCH1 9.6 kpbs)	no	-	-	-
RC5	SO33 (SCH1 19.2 kpbs)	no	-	-	-
RC5	SO33 (SCH1 38.4 kpbs)	no	-	-	-
RC5	SO33 (SCH1 76.8 kpbs)	no	-	-	-
RC5	SO33 (SCH1 153.6 kpbs)	no	-	-	-
RC5	SO55	yes	24.50	24.31	24.32

CDMA1900 Flip Open

Radio Configuration	Service Options and Channel Configurations	Supported	Ch25 1851.25MHz	Ch600 1880.00MHz	Ch1175 1908.75MHz
			Pavg (dBm)	Pavg (dBm)	Pavg (dBm)
RC1	SO1	no	-	-	-
RC1	SO2	yes	23.96	23.43	23.51
RC1	SO3	no	-	-	-
RC1	SO55	yes	23.95	23.38	23.33
RC2	SO9	yes	24.02	23.48	23.45
RC2	SO55	yes	23.97	23.34	23.40
RC3	SO1	no	-	-	-
RC3	SO2	yes	23.81	23.36	23.39
RC3	SO3	no	-	-	-
RC3	SO32 (no SCH1)	no	-	-	-
RC3	SO32 (SCH1 9.6 kpbs)	no	-	-	-
RC3	SO32 (SCH1 19.2 kpbs)	no	-	-	-
RC3	SO32 (SCH1 38.4 kpbs)	no	-	-	-
RC3	SO32 (SCH1 76.8 kpbs)	no	-	-	-
RC3	SO32 (SCH1 153.6 kpbs)	no	-	-	-
RC3	SO33 (SCH1 9.6 kpbs)	no	-	-	-
RC3	SO33 (SCH1 19.2 kpbs)	no	-	-	-
RC3	SO33 (SCH1 38.4 kpbs)	no	-	-	-
RC3	SO33 (SCH1 76.8 kpbs)	no	-	-	-
RC3	SO33 (SCH1 153.6 kpbs)	no	-	-	-
RC3	**SO55**	**yes**	**24.01**	**23.38**	**23.41**
RC4	SO1	no	-	-	-
RC4	SO2	yes	23.83	23.34	23.40
RC4	SO3	no	-	-	-
RC4	SO32 (no SCH1)	no	-	-	-
RC4	SO32 (SCH1 9.6 kpbs)	no	-	-	-
RC4	SO32 (SCH1 19.2 kpbs)	no	-	-	-
RC4	SO32 (SCH1 38.4 kpbs)	no	-	-	-
RC4	SO32 (SCH1 76.8 kpbs)	no	-	-	-
RC4	SO32 (SCH1 153.6 kpbs)	no	-	-	-
RC4	SO33 (SCH1 9.6 kpbs)	no	-	-	-

RC4	S033 (SCH1 19.2 kpbs)	no	-	-	-
RC4	S033 (SCH1 38.4 kpbs)	no	-	-	-
RC4	S033 (SCH1 76.8 kpbs)	no	-	-	-
RC4	S033 (SCH1 153.6 kpbs)	no	-	-	-
RC4	S055	yes	24.03	23.37	23.39
RC5	S09	yes	23.83	23.33	23.41
RC5	S033 (SCH1 9.6 kpbs)	no	-	-	-
RC5	S033 (SCH1 19.2 kpbs)	no	-	-	-
RC5	S033 (SCH1 38.4 kpbs)	no	-	-	-
RC5	S033 (SCH1 76.8 kpbs)	no	-	-	-
RC5	S033 (SCH1 153.6 kpbs)	no	-	-	-
RC5	S055	yes	23.99	23.33	23.38

CDMA800 Flip Closed

Radio Configuration	Service Options and Channel Configurations	Supported	Ch 1013 824.70 MHz Pavg (dBm)	Ch 384 836.52 MHz Pavg (dBm)	Ch 777 848.31 MHz Pavg (dBm)
RC1	S01	no	-	-	-
RC1	S02	yes	24.84	24.52	24.57
RC1	S03	no	-	-	-
RC1	S055	yes	24.74	24.67	24.59
RC2	S09	yes	24.86	24.61	24.62
RC2	S055	yes	24.76	24.58	24.65
RC3	S01	no	-	-	-
RC3	S02	yes	24.90	24.61	24.59
RC3	S03	no	-	-	-
RC3	S032 (no SCH1)	no	-	-	-
RC3	S032 (SCH1 9.6 kpbs)	no	-	-	-
RC3	S032 (SCH1 19.2 kpbs)	no	-	-	-
RC3	S032 (SCH1 38.4 kpbs)	no	-	-	-
RC3	S032 (SCH1 76.8 kpbs)	no	-	-	-
RC3	S032 (SCH1 153.6 kpbs)	no	-	-	-
RC3	S033 (SCH1 9.6 kpbs)	no	-	-	-
RC3	S033 (SCH1 19.2 kpbs)	no	-	-	-
RC3	S033 (SCH1 38.4 kpbs)	no	-	-	-
RC3	S033 (SCH1 76.8 kpbs)	no	-	-	-
RC3	S033 (SCH1 153.6 kpbs)	no	-	-	-
RC3	**S055**	**yes**	**24.86**	**24.60**	**24.59**
RC4	S01	no	-	-	-
RC4	S02	yes	24.86	24.60	24.59
RC4	S03	no	-	-	-
RC4	S032 (no SCH1)	no	-	-	-

RC4	SO32 (SCH1 9.6 kpbs)	no	-	-	-
RC4	SO32 (SCH1 19.2 kpbs)	no	-	-	-
RC4	SO32 (SCH1 38.4 kpbs)	no	-	-	-
RC4	SO32 (SCH1 76.8 kpbs)	no	-	-	-
RC4	SO32 (SCH1 153.6 kpbs)	no	-	-	-
RC4	SO33 (SCH1 9.6 kpbs)	no	-	-	-
RC4	SO33 (SCH1 19.2 kpbs)	no	-	-	-
RC4	SO33 (SCH1 38.4 kpbs)	no	-	-	-
RC4	SO33 (SCH1 76.8 kpbs)	no	-	-	-
RC4	SO33 (SCH1 153.6 kpbs)	no	-	-	-
RC4	SO55	yes	24.95	24.72	24.73
RC5	SO9	yes	24.90	24.62	24.61
RC5	SO33 (SCH1 9.6 kpbs)	no	-	-	-
RC5	SO33 (SCH1 19.2 kpbs)	no	-	-	-
RC5	SO33 (SCH1 38.4 kpbs)	no	-	-	-
RC5	SO33 (SCH1 76.8 kpbs)	no	-	-	-
RC5	SO33 (SCH1 153.6 kpbs)	no	-	-	-
RC5	SO55	yes	24.99	24.72	24.73

CDMA1900 Flip Closed

Radio Configuration	Service Options and Channel Configurations	Supported	Ch25 1851.25MHz	Ch600 1880.00MHz	Ch1175 1908.75MHz
			Pavg (dBm)	Pavg (dBm)	Pavg (dBm)
RC1	SO1	no	-	-	-
RC1	SO2	yes	24.64	24.07	24.01
RC1	SO3	no	-	-	-
RC1	SO55	yes	24.64	24.03	24.07
RC2	SO9	yes	24.62	24.01	24.02
RC2	SO55	yes	24.60	23.98	24.08
RC3	SO1	no	-	-	-
RC3	SO2	yes	24.55	24.07	24.03
RC3	SO3	no	-	-	-
RC3	SO32 (no SCH1)	no	-	-	-
RC3	SO32 (SCH1 9.6 kpbs)	no	-	-	-
RC3	SO32 (SCH1 19.2 kpbs)	no	-	-	-
RC3	SO32 (SCH1 38.4 kpbs)	no	-	-	-
RC3	SO32 (SCH1 76.8 kpbs)	no	-	-	-
RC3	SO32 (SCH1 153.6 kpbs)	no	-	-	-
RC3	SO33 (SCH1 9.6 kpbs)	no	-	-	-
RC3	SO33 (SCH1 19.2 kpbs)	no	-	-	-
RC3	SO33 (SCH1 38.4 kpbs)	no	-	-	-
RC3	SO33 (SCH1 76.8 kpbs)	no	-	-	-

RC3	SO33 (SCH1 153.6 kpbs)	no	-	-	-
RC3	**SO55**	**yes**	**24.60**	**24.07**	**24.05**
RC4	SO1	no	-	-	-
RC4	SO2	yes	24.55	24.08	24.06
RC4	SO3	no	-	-	-
RC4	SO32 (no SCH1)	no	-	-	-
RC4	SO32 (SCH1 9.6 kpbs)	no	-	-	-
RC4	SO32 (SCH1 19.2 kpbs)	no	-	-	-
RC4	SO32 (SCH1 38.4 kpbs)	no	-	-	-
RC4	SO32 (SCH1 76.8 kpbs)	no	-	-	-
RC4	SO32 (SCH1 153.6 kpbs)	no	-	-	-
RC4	SO33 (SCH1 9.6 kpbs)	no	-	-	-
RC4	SO33 (SCH1 19.2 kpbs)	no	-	-	-
RC4	SO33 (SCH1 38.4 kpbs)	no	-	-	-
RC4	SO33 (SCH1 76.8 kpbs)	no	-	-	-
RC4	SO33 (SCH1 153.6 kpbs)	no	-	-	-
RC4	SO55	yes	24.65	24.08	24.07
RC5	SO9	yes	24.58	24.07	24.10
RC5	SO33 (SCH1 9.6 kpbs)	no	-	-	-
RC5	SO33 (SCH1 19.2 kpbs)	no	-	-	-
RC5	SO33 (SCH1 38.4 kpbs)	no	-	-	-
RC5	SO33 (SCH1 76.8 kpbs)	no	-	-	-
RC5	SO33 (SCH1 153.6 kpbs)	no	-	-	-
RC5	SO55	yes	24.60	24.07	24.03