

Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 4/18/2007 11:48:32 PM

Body_802.11b Ch11_Keypad Down With 1.5cm Gap_20070418_without VT Camera_BT On

DUT: 731703

Communication System: 802.11b ; Frequency: 2462 MHz;Duty Cycle: 1:1 Medium: MSL_2450 Medium parameters used: f = 2462 MHz; $\sigma = 1.98$ mho/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

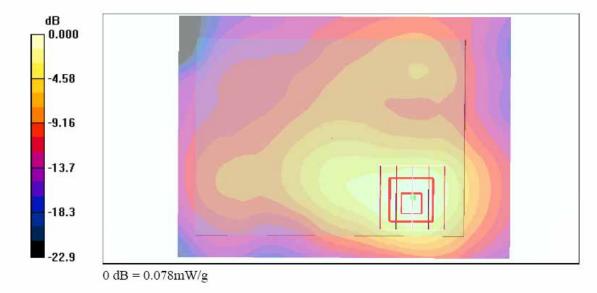
Ambient Temperature : 23.0 °C; Liquid Temperature : 21.9 °C

DASY4 Configuration:

- Probe: ET3DV6 SN1788; ConvF(4.11, 4.11, 4.11); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch11/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.078 mW/g

Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 3.26 V/m; Power Drift = -0.113 dB Peak SAR (extrapolated) = 0.155 W/kg SAR(1 g) = 0.073 mW/g; SAR(10 g) = 0.037 mW/g Maximum value of SAR (measured) = 0.078 mW/g





Date/Time: 3/30/2007 11:20:40 PM

Body_GSM850 Ch128_Keypad Down With 1.5cm Gap_20070330_GPRS10_2D

DUT: 731703

Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:4 Medium: MSL_850 Medium parameters used : f = 824.2 MHz; $\sigma = 0.956$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³ Ambient Temperature : 22.3 °C; Liquid Temperature : 21.0 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006

- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch128/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.417 mW/g

Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 17.9 V/m; Power Drift = -0.040 dB Peak SAR (extrapolated) = 0.567 W/kg SAR(1 g) = 0.380 mW/g; SAR(10 g) = 0.252 mW/g Maximum value of SAR (measured) = 0.411 mW/g

Ch128/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 17.9 V/m; Power Drift = -0.040 dB Peak SAR (extrapolated) = 0.343 W/g SAR(1 g) = 0.280 mW/g; SAR(10 g) = 0.221 mW/g Maximum value of SAR (measured) = 0.293 mW/g Ig/10g Averaged SAR SAR; Zoom Scan:Value Along Z, X=2, Y=2

0.020

0.025

0.030

0.035

0.015

0.010

0.005



Date/Time: 3/31/2007 9:01:43 AM

Body_PCS Ch512_Keypad Down With 1.5cm Gap_20070330_GPRS10_Bluetooth_2D

DUT: 731703

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:4

Medium: MSL_1900 Medium parameters used : f = 1850.2 MHz; $\sigma = 1.48 \text{ mho/m}$; $\varepsilon_r = 52.8$; $\rho = 1000 \text{ kg/m}^3$ Ambient Temperature : 22.3 °C; Liquid Temperature : 21.2 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch512/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.423 mW/g

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 10.5 V/m; Power Drift = 0.043 dB Peak SAR (extrapolated) = 0.614 W/kg SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.210 mW/g Maximum value of SAR (measured) = 0.434 mW/g





Date/Time: 3/31/2007 8:24:31 PM

Body_WCDMA Ch4182_Keypad Down With 1.5cm Gap_20070330_RMC 64k_Bluetooth_2D

DUT: 731703

Communication System: WCDMA; Frequency: 836.4 MHz; Duty Cycle: 1:1

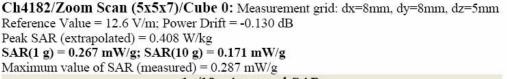
Medium: MSL_850 Medium parameters used : f = 836.4 MHz; $\sigma = 0.969 \text{ mho/m}$; $\varepsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$ Ambient Temperature : 22.9 °C; Liquid Temperature : 21.0 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006

- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch4182/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.310 mW/g







Date/Time: 3/31/2007 5:00:38 AM

Body_WCDMA Ch9538_Keypad Down With 1.5cm Gap_20070330_RMC 64k_Bluetooth_2D

DUT: 731703

Communication System: WCDMA; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: MSL_1900 Medium parameters used: f = 1908 MHz; $\sigma = 1.56$ mho/m; $\varepsilon_r = 52.5$; $\rho = 1000$ kg/m³ Ambient Temperature : 22.3 °C; Liquid Temperature : 21.2 °C

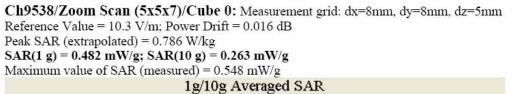
DASY4 Configuration:

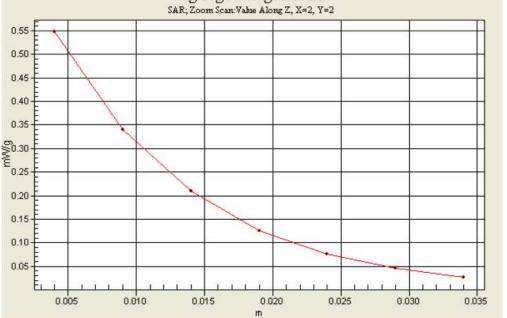
- Probe: ET3DV6 - SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch9538/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.563 mW/g







Date/Time: 4/18/2007 8:19:10 PM

Body_GSM850 Ch128_Keypad Down With 1.5cm Gap_20070418_without VT Camera_GPRS10_2D

DUT: 731703

Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:4 Medium: MSL_850 Medium parameters used : f = 824.2 MHz; $\sigma = 0.956$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³ Ambient Temperature : 23.3 °C; Liquid Temperature : 22.1 °C

DASY4 Configuration:

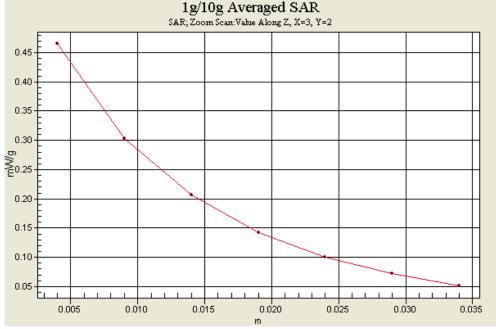
- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch128/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.460 mW/g

Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 17.8 V/m; Power Drift = -0.107 dB Peak SAR (extrapolated) = 0.644 W/kg SAR(1 g) = 0.427 mW/g; SAR(10 g) = 0.277 mW/g Maximum value of SAR (measured) = 0.465 mW/g





Date/Time: 4/18/2007 10:43:37 PM

Body_PCS Ch512_Keypad Down With 1.5cm Gap_20070418_without VT Camera_GPRS10_BT On_2D

DUT: 731703

Communication System: PCS; Frequency: 1850.2 MHz; Duty Cycle: 1:4 Medium: MSL_1900 Medium parameters used : f = 1850.2 MHz; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 52.8$; $\rho = 1000 \text{ kg/m}^3$ Ambient Temperature : 22.9 °C; Liquid Temperature : 21.7 °C

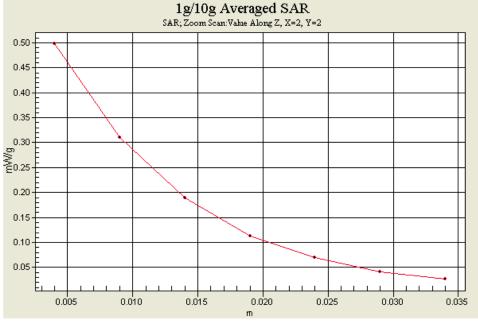
DASY4 Configuration:

- Probe: ET3DV6 SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch512/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.535 mW/g

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 10.8 V/m; Power Drift = -0.158 dB Peak SAR (extrapolated) = 0.726 W/kg SAR(1 g) = 0.444 mW/g; SAR(10 g) = 0.242 mW/gMaximum value of SAR (measured) = 0.498 mW/g







Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 4/18/2007 9:35:35 PM

Body_WCDMA Ch4182_Keypad Down With 1.5cm Gap_20070418_without VT Camera_RMC 64k_BT On_2D

DUT: 731703

Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1 Medium: MSL_850 Medium parameters used : f = 836.4 MHz; $\sigma = 0.969$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³ Ambient Temperature : 22.9 °C; Liquid Temperature : 22.1 °C

DASY4 Configuration:

- Probe: ET3DV6 - SN1788; ConvF(6.33, 6.33, 6.33); Calibrated: 9/19/2006

- Sensor-Surface: 4mm (Mechanical Surface Detection)

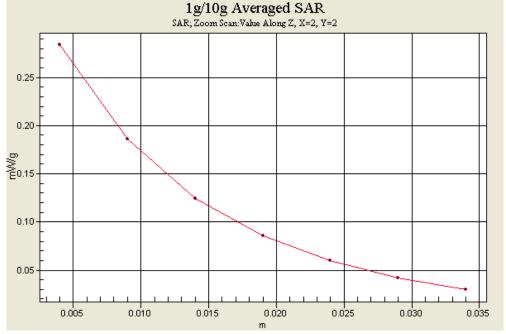
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006

- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303

- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch4182/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.291 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 13.0 V/m; Power Drift = 0.049 dB Peak SAR (extrapolated) = 0.395 W/kg SAR(1 g) = 0.261 mW/g; SAR(10 g) = 0.169 mW/g Maximum value of SAR (measured) = 0.284 mW/g





Test Laboratory: Sporton International Inc. SAR Testing Lab

Date/Time: 4/18/2007 10:06:47 PM

Body_WCDMA Ch9538_Keypad Down With 1.5cm Gap_20070418_without VT Camera_RMC 64k_BT On_2D

DUT: 731703

Communication System: WCDMA; Frequency: 1907.6 MHz;Duty Cycle: 1:1 Medium: MSL_1900 Medium parameters used: f = 1908 MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 52.5$; $\rho = 1000$ kg/m³ Ambient Temperature : 22.9 °C; Liquid Temperature : 21.7 °C

DASY4 Configuration:

- Probe: ET3DV6 SN1788; ConvF(4.67, 4.67, 4.67); Calibrated: 9/19/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch9538/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.614 mW/g

Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 11.4 V/m; Power Drift = -0.140 dB Peak SAR (extrapolated) = 0.860 W/kg SAR(1 g) = 0.520 mW/g; SAR(10 g) = 0.283 mW/g Maximum value of SAR (measured) = 0.582 mW/g

1g/10g Averaged SAR





Date/Time: 4/12/2007 2:29:31 PM

Body_802.11b Ch11_Keypad Down With 1.5cm Gap_20070412_Bluetooth_2D

DUT: 731703

Communication System: 802.11b ; Frequency: 2462 MHz;Duty Cycle: 1:1

Medium: MSL_2450 Medium parameters used: f = 2462 MHz; $\sigma = 1.98$ mho/m; $\epsilon_f = 53.3$; $\rho = 1000$ kg/m³ Ambient Temperature : 22.3 °C; Liquid Temperature : 22.0 °C

DASY4 Configuration:

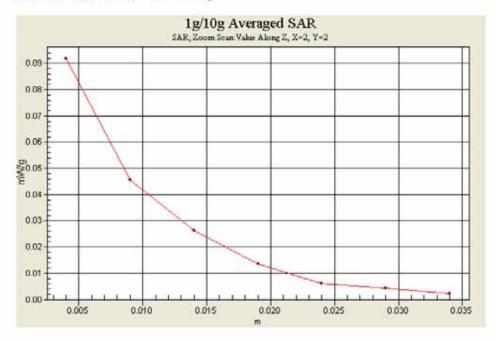
Probe: ET3DV6 - SN1788; ConvF(4.11, 4.11, 4.11); Calibrated: 9/19/2006

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-B; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch11/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.090 mW/g

Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8nm, dy=8mm, dz=5mm Reference Value = 2.65 V/m; Power Drift = -0.108 dB Peak SAR (extrapolated) = 0.196 W/kg SAR(1 g) = 0.088 mW/g; SAR(10 g) = 0.045 mW/g Maximum value of SAR (measured) = 0.092 mW/g





Date/Time: 4/18/2007 11:48:32 PM

Body_802.11b Ch11_Keypad Down With 1.5cm Gap_20070418_without VT Camera_BT On_2D

DUT: 731703

Communication System: 802.11b ; Frequency: 2462 MHz;Duty Cycle: 1:1

Medium: MSL_2450 Medium parameters used: f = 2462 MHz; $\sigma = 1.98$ mho/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.0 °C: Liquid Temperature : 21.9 °C

DASY4 Configuration:

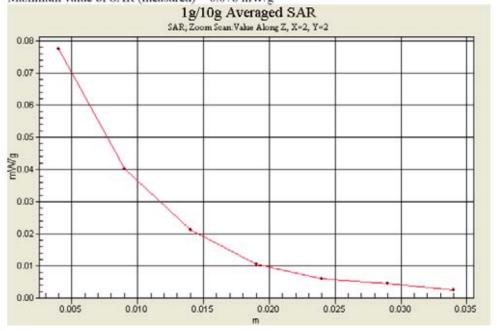
- Probe: ET3DV6 - SN1788; ConvF(4.11, 4.11, 4.11); Calibrated: 9/19/2006

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn577; Calibrated: 11/21/2006
- Phantom: SAM-A; Type: QD 000 P40 C; Serial: TP-1303
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Ch11/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 0.078 mW/g

Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 3.26 V/m; Power Drift = -0.113 dB Peak SAR (extrapolated) = 0.155 W/kg SAR(1 g) = 0.073 mW/g; SAR(10 g) = 0.037 mW/g Maximum value of SAR (measured) = 0.078 mW/g





Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zuri	ry of ch, Switzerland		chweizerischer Kalibrierdien ervice suisse d'étalonnage ervizio svizzero di taratura wiss Calibration Service
Accredited by the Swiss Federal The Swiss Accreditation Servi Multilateral Agreement for the	ce is one of the signatorie	es to the EA	.: SCS 108
Client Sporton (Aud	en)	Certificate No: D	0835V2-499_Mar06
CALIBRATION	CERTIFICATE		
Object	D835V2 - SN: 49	9	
Calibration procedure(s)	QA CAL-05.v6 Calibration proce	edure for dipole validation kits	
Calibration date:	March 15, 2006	alfante die wordele	
Condition of the calibrated item			NAME AND ADDRESS OF ADDRESS OF
		ional standards, which realize the physical units o robability are given on the following pages and ar	
The measurements and the unc	nents the traceability to nati ertainties with confidence p uoted in the closed laborato		e part of the certificate.
The measurements and the unc	nents the traceability to nati ertainties with confidence p uoted in the closed laborato	robability are given on the following pages and an	e part of the certificate.
The measurements and the uno All calibrations have been cond Calibration Equipment used (Ma Primary Standards Power meter EPM-442A	nents the traceability to nati ertainties with confidence p ucted in the closed laborato RTE critical for calibration) ID # GB37480704	robability are given on the following pages and an ry facility: environment temperature (22 ± 3)°C an Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516)	e part of the certificate. d humidity < 70%. Scheduled Calibration Oct-06
The measurements and the uno All calibrations have been condi Calibration Equipment used (Ma Primary Standards Power meter EPM-442A Power sensor HP 8481A	nents the traceability to nati ertainties with confidence p ucted in the closed laborato &TE critical for calibration) ID # GB37480704 US37292783	robability are given on the following pages and an ry facility: environment temperature (22 ± 3)°C an Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516)	e part of the certificate. d humidity < 70%. Scheduled Calibration Oct-06 Oct-06
The measurements and the uno All calibrations have been condi Calibration Equipment used (Mi Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator	nents the traceability to nati entainties with confidence p ucted in the closed laborato RTE cr ¹ tical for calibration) ID # GB37480704 US37292763 SN: 5086 (20g)	robability are given on the following pages and an ry facility: environment temperature (22 ± 3)°C an Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No 251-00498)	e part of the certificate. Id humidity < 70%. Scheduled Calibration Oct-06 Oct-06 Aug-06
The measurements and the uno All calibrations have been condi Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A	nents the traceability to nati ertainties with confidence p ucted in the closed laborato &TE critical for calibration) ID # GB37480704 US37292783	robability are given on the following pages and an ry facility: environment temperature (22 ± 3)°C an Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516)	e part of the certificate. d humidity < 70%. Scheduled Calibration Oct-06 Oct-06
The measurements and the uno All calibrations have been condi- Calibration Equipment used (Mt Primary Standards Power meter EPM-442A Power sensor HP 6481A Reference 20 dB Attenuator Reference 10 dB Attenuator	nents the traceability to nati entainties with confidence p ucted in the closed laborato RTE chitcal for calibration) ID # GB37480704 US37292783 SN: 5046(20g) SN: 5047.2 (10r)	robability are given on the following pages and an ry facility: environment temperature (22 ± 3)°C an- Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No 251-00498) 11-Aug-05 (METAS, No 251-00498)	e part of the certificate. d humidity < 70%. Scheduled Calibration Oct-06 Oct-06 Aug-06 Aug-06
The measurements and the uno All calibrations have been cond Calibration Equipment used (Ma Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Reference 10 dB Attenuator Reference Probe ET3DV6	nents the traceability to nati vertainties with confidence p ucted in the closed laborato RTE cr ¹ tical for calibration) ID # GB37480704 US37292783 SN: 5046 (20g) SN: 5047.2 (10r) SN 1507	robability are given on the following pages and an ry facility: environment temperature (22 ± 3)°C an- Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No 251-00498) 11-Aug-05 (METAS, No 251-00498) 28-Oct-05 (SPEAG, No. ET3-1507_Oct05)	e part of the certificate. d humidity < 70%. Scheduled Calibration Oct-06 Oct-06 Aug-06 Aug-06 Oct-08
The measurements and the uno All calibrations have been condi- Calibration Equipment used (Ma Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Reference 10 dB Attenuator Reference Probe ET3DV8 DAE4	nents the traceability to nati entainties with confidence p ucted in the closed laborato XTE critical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 (10r) SN 1507 SN 601	robability are given on the following pages and an ry facility: environment temperature (22 ± 3)°C an Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) 28-Oct-05 (SPEAG, No. ET3-1507_Oct05) 15-Dec-05 (SPEAG, No. DAE4-601_Dec05)	e part of the certificate. d humidity < 70%. Scheduled Calibration Oct-06 Oct-08 Aug-06 Aug-06 Oct-08 Dec-06
The measurements and the uno All calibrations have been condi Calibration Equipment used (Mi Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Reference 10 dB Attenuator Reference Probe ET3DV6 DAE4 Secondary Standards Power sensor HP 8481A RF generator Agilent E4421B	nents the traceability to nati ertainties with confidence p ucted in the closed laborato RTE critical for calibration) ID # GB37480704 US37292783 SN: 5046 (20g) SN: 5047.2 (10r) SN 1507 SN 1507 SN 601 ID # MY41092317 MY41000875	robability are given on the following pages and an ry facility: environment temperature (22 ± 3)°C an Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) 28-Oct-05 (SPEAG, No. ET3-1507_Oct05) 15-Dec-05 (SPEAG, No. DAE4-601_Dec05) Check Date (in house) 18-Oct-02 (SPEAG, in house check Oct-05) 11-May-05 (SPEAG, in house check Nov-05)	e part of the certificate. d humidity < 70%. Scheduled Calibration Oct-06 Oct-06 Aug-06 Aug-06 Oct-05 Dec-06 Scheduled Check In house check: Oct-07 In house check: Nov-07
The measurements and the uno All calibrations have been condi Calibration Equipment used (Ma Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Reference 10 dB Attenuator Reference Probe ET3DV6 DAE4 Secondary Standards Power sensor HP 8481A	nents the traceability to nati ertainties with confidence p ucted in the closed laborato &TE critical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5086 (20g) SN: 5087.2 (10r) SN 1507 SN 1507 SN 601 ID # MY41092317	robability are given on the following pages and an ry facility: environment temperature (22 ± 3)°C an Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) 28-Oct-05 (SPEAG, No. ET3-1507_Oct05) 15-Dec-05 (SPEAG, No. DAE4-601_Dec05) Check Date (In house) 18-Oct-02 (SPEAG, in house check Oct-05)	e part of the certificate. d humidity < 70%. Scheduled Calibration Oct-06 Oct-06 Aug-06 Oct-06 Dec-06 Dec-06 Scheduled Check In house check: Oct-07
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The measurements and the uno All calibrations have been condi Calibration Equipment used (Mi Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Reference 10 dB Attenuator Reference Probe ET3DV6 DAE4 Secondary Standards Power sensor HP 8481A RF generator Agilent E4421B	nents the traceability to nati ertainties with confidence p ucted in the closed laborato RTE cr ¹ tical for calibration) ID # GB37480704 US37292783 SN: 5086 (20g) SN: 5047.2 (10r) SN 1507 SN 601 ID # MY41092317 MY41000675 US37390585 S4206	robability are given on the following pages and an ry facility: environment temperature (22 ± 3)°C an- Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) 28-Oct-05 (SPEAG, No. ET3-1507_Oct05) 15-Dec-05 (SPEAG, No. DAE4-601_Dec05) Check Date (in house) 18-Oct-02 (SPEAG, in house check Oct-05) 11-May-05 (SPEAG, in house check Nov-05) 18-Oct-01 (SPEAG, in house check Nov-05)	e part of the certificate. d humidity < 70%. Scheduled Calibration Oct-06 Oct-06 Aug-06 Aug-06 Oct-06 Dec-06 Scheduled Check In house check: Oct-07 In house check: Nov-07 In house check: Nov-06
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Certificate No: D835V2-499_Mar06

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



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- Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end
 of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
 point exactly below the center marking of the flat phantom section, with the arms oriented
 parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
 positioned under the liquid filled phantom. The impedance stated is transformed from the
 measurement at the SMA connector to the feed point. The Return Loss ensures low
 reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No
 uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

Certificate No: D835V2-499_Mar06

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.1 ± 6 %	0.94mho/m ± 6 %
Head TSL temperature during test	(22.2 ± 0.2) °C		_

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	2.35 mW / g
SAR normalized	normalized to 1W	9.40 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	9.24 mW / g ± 17.0 % (k=2)
i		
SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 mW / g
SAR normalized	normalized to 1W	6.12 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	6.07 mW/g±16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D835V2-499_Mar06

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Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	56.8±6%	0.98 mho/m ± 6 %
Body TSL temperature during test	(21.4 ± 0.2) °C		-

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	condition	
SAR measured	250 mW input power	2.45 mW/g
SAR normalized	normalized to 1W	9.80 mW / g
SAR for nominal Body TSL parameters 2	normalized to 1W	9.91 mW / g ± 17.0 % (k=2)
	and the second s	
SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
	condition 250 mW input power	1.62 mW / g
SAR averaged over 10 cm ³ (10 g) of Body TSL SAR measured SAR normalized	12.5.70.5.05.0	1.62 mW / g 6.48 mW / g

² Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D835V2-499_Mar06

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.1 Ω - 2.9 jΩ	
Return Loss	- 29.1 dB	

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.9 Ω - 5.1 jΩ	
Return Loss	- 24.9 dB	

General Antenna Parameters and Design

	4.004
Electrical Delay (one direction)	1.391ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	July 10, 2003	

Certificate No: D835V2-499_Mar06

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DASY4 Validation Report for Head TSL

Date/Time: 15.03.2006 12:51:44

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:499

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1 Medium: HSL U10 BB; Medium parameters used: f = 835 MHz; $\sigma = 0.942$ mho/m; $\varepsilon_r = 42.1$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

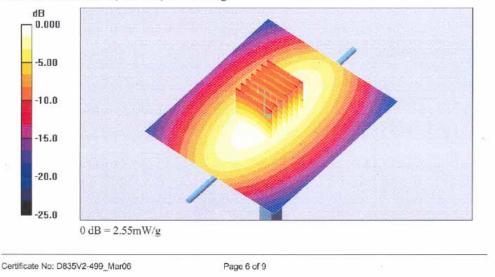
DASY4 Configuration:

- Probe: ET3DV6 SN1507 (HF); ConvF(6.09, 6.09, 6.09); Calibrated: 28.10.2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- · Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- · Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 14; Postprocessing SW: SEMCAD, V1.8 Build 165

Pin = 250 mW; d = 10 mm/Area Scan (71x81x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 2.54 mW/g

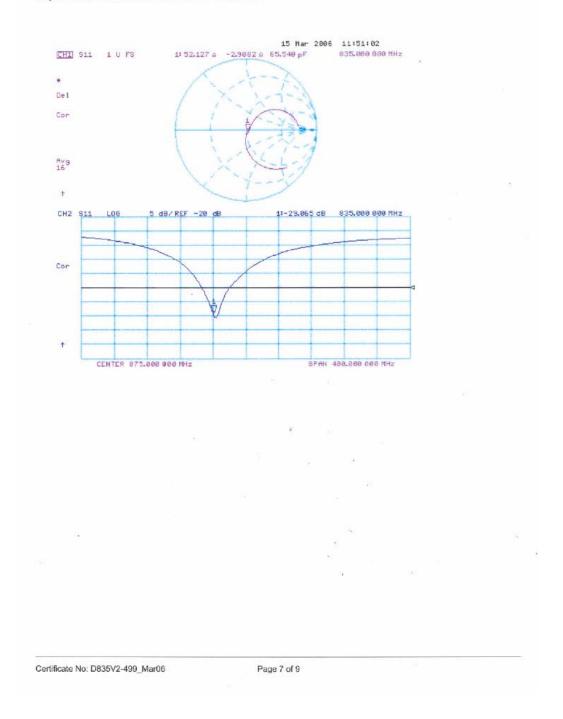
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.7 V/m; Power Drift = -0.008 dB Peak SAR (extrapolated) = 3.53 W/kg SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.53 mW/g Maximum value of SAR (measured) = 2.55 mW/g





Impedance Measurement Plot for Head TSL





DASY4 Validation Report for Body TSL

Date/Time: 14.03.2006 12:37:15

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:499

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1 Medium: MSL U10; Medium parameters used: f = 835 MHz; $\sigma = 0.972$ mho/m; $\epsilon_r = 56.9$; $\rho = 1000$ kg/m³ Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

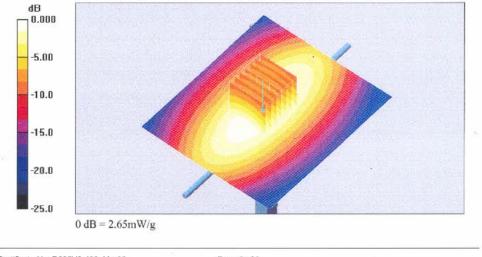
DASY4 Configuration:

- Probe: ET3DV6 SN1507 (HF); ConvF(5.84, 5.84, 5.84); Calibrated: 28.10.2005
- · Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 15.12.2005
- · Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 14; Postprocessing SW: SEMCAD, V1.8 Build 165

Pin = 250 mW; d = 10 mm/Area Scan (71x81x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 2.63 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.3 V/m; Power Drift = 0.026 dB Peak SAR (extrapolated) = 3:51 W/kg SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.62 mW/g Maximum value of SAR (measured) = 2.65 mW/g



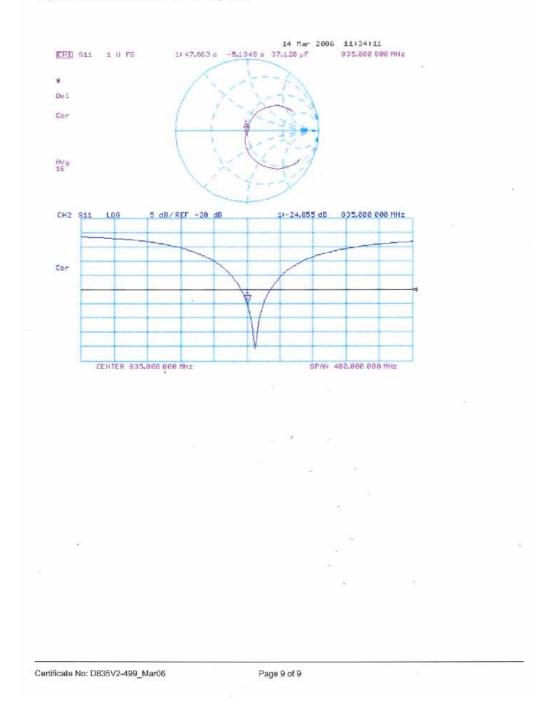
Certificate No: D835V2-499_Mar06

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Impedance Measurement Plot Body TSL





Accredited by the Swiss Federal Office of Metrology and Accreditation Accreditation No.: SCS 108 The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates Client Sporton (Auden) Certificate No: D1900V2-5d041_N CALIBRATION CERTIFICATE D1900V2 - SN: 5d041	
Client Sporton (Auden) Certificate No: D1900V2-5d041_N CALIBRATION CERTIFICATE	
	Mar06
Object D1900V2 - SN: 5d041	2.59
Calibration procedure(s) OA CAL-05.v6 Calibration procedure for dipole validation kits	
Calibration date: March 21, 2006	
Condition of the calibrated item In Tolerance	
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	n
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) 11-Aug-05 (METAS, No 251-00498) Aug-06	
Reference 10 dB Attenuator SN: 5047.2 (10r) 11-Aug-05 (METAS, No 251-00498) Aug-06	
Reference Probe ET3DV6 SN: 1507 28-Oct-05 (SPEAG, No. ET3-1507_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-	
RF generator Agilent E4421B MY41000675 11-May-05 (SPEAG, in house check Nov-05) In house check: Nov Network Analyzer HP 8753E US37390585 S4206 18-Oct-01 (SPEAG, in house check Nov-05) In house check: Nov	
Name Function Signature	
Calibrated by: Judith Müller Laboratory Technician	in
Approved by: Katja Pokovic Technical Manager	
Issued: March 22, 20	



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



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

Accreditation No.: SCS 108

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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

 Glossary:

 TSL
 tissue simulating liquid

 ConvF
 sensitivity in TSL / NORM x,y,z

 N/A
 not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end
 of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
 point exactly below the center marking of the flat phantom section, with the arms oriented
 parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
 positioned under the liquid filled phantom. The impedance stated is transformed from the
 measurement at the SMA connector to the feed point. The Return Loss ensures low
 reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- · SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

Certificate No: D1900V2-5d041_Mar06

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	124
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.4 ± 6 %	1.42 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C		

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.75 mW / g
SAR normalized	normalized to 1W	39.0 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	38.4 mW / g ± 17.0 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.17 mW / g
SAR measured SAR normalized	250 mW input power normalized to 1W	5.17 mW / g 20.7 mW / g
	and the second second	

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D1900V2-5d041_Mar06

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Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.7 ± 6 %	1.54 mho/m ± 6 %
Body TSL temperature during test	(21.6 ± 0.2) °C		

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.2 mW / g
SAR normalized	normalized to 1W	40.8 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	41.1 mW / g ± 17.0 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
	condition 250 mW input power	5.40 mW / g
SAR averaged over 10 cm ³ (10 g) of Body TSL SAR measured SAR normalized	and a second second	5.40 mW / g 21.6 mW / g

² Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D1900V2-5d041_Mar06

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.5 Ω + 5.1 jΩ
Return Loss	- 24.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.9 Ω + 6.3 jΩ	
Return Loss	- 23.4 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.200 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the force must be applied to the dipole arms, because they might bend or the soldered connections near the

feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 4, 2003

Certificate No: D1900V2-5d041_Mar06

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DASY4 Validation Report for Head TSL

Date/Time: 14.03.2006 16:18:53

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d041

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1 Medium: HSL U10 BB; Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ϵ_r = 39.4; ρ = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

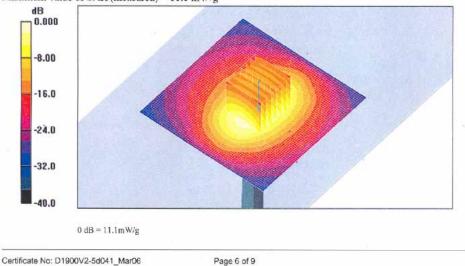
DASY4 Configuration:

- 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 14; Postprocessing SW: SEMCAD, V1.8 Build 165

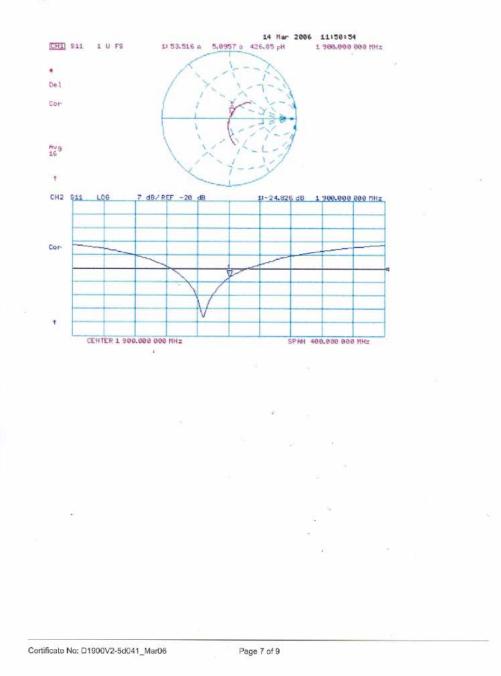
Pin = 250 mW; d = 10 mm/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 11.7 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.9 V/m; Power Drift = -0.093 dB Peak SAR (extrapolated) = 16.6 W/kg SAR(1 g) = 9.75 mW/g; SAR(10 g) = 5.17 mW/g Maximum value of SAR (measured) = 11.1 mW/g







Impedance Measurement Plot for Head TSL



DASY4 Validation Report for Body TSL

Date/Time: 21.03.2006 13:59:55

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d041

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1 Medium: MSL U10; Medium parameters used: f = 1900 MHz; σ = 1.54 mho/m; ϵ_r = 54.7; ρ = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

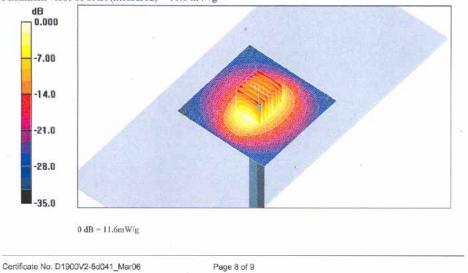
DASY4 Configuration:

- Probe: ET3DV6 SN1507 (HF); ConvF(4.3, 4.3, 4.3); 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, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 161

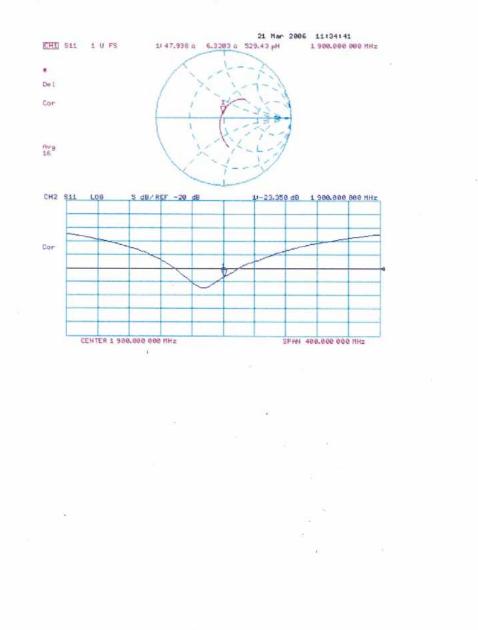
Pin = 250 mW; d = 10 mm/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (interpolated) = 11.8 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.3 V/m; Power Drift = 0.045 dB Peak SAR (extrapolated) = 17.4 W/kg SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.4 mW/g Maximum value of SAR (measured) = 11.6 mW/g







Impedance Measurement Plot for Body TSL

Certificate No: D1900V2-5d041_Mar06

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ccredited by the Swiss Federal (he Swiss Accreditation Servic ultilateral Agreement for the r	e is one of the signatorie	s to the EA	: SCS 108
lient Sporton (Aude	in)	Certificate No: D	2450V2-736_Jul05
CALIBRATION	CERTIFICATE		
Deject	D2450V2 - SN: 7	36	
Calibration procedure(s)	QA CAL-05.v6 Calibration proce	dure for dipole validation kits	
Calibration date	July 12, 2005		
Condition of the calibrated item	In Tolerance		
The measurements and the unce	ertainties with confidence p	onal standards, which realize the physical units o robability are given on the following pages and ar y facility: environment temperature (22 ± 3)°C an	e part of the certificate.
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Certificate No: D2450V2-736_Jul05

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



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

Accreditation No.: SCS 108

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

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end
 of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
 point exactly below the center marking of the flat phantom section, with the arms oriented
 parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
 positioned under the liquid filled phantom. The impedance stated is transformed from the
 measurement at the SMA connector to the feed point. The Return Loss ensures low
 reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

Certificate No: D2450V2-736 Jul05

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Measurement Conditions

DASY Version	DASY4	V4.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan resolution	dx, dy = 15 mm	

Head TSL parameters

Frequency

Zoom Scan Resolution

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.5±6%	1.73 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) *C		

dx, dy, dz = 5 mm

2450 MHz ± 1 MHz

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	13.1 mW / g
SAR normalized	normalized to 1W	52.4 mW / g
SAR for nominal Head TSL parameters 1	normalized to 1W	52.8 mW / g ± 17.0 % (k=2)
SAR averaged over 10 cm ² (10 g) of Head TSL	condition	
	condition 250 mWV input power	6.13 mW / g
SAR averaged over 10 cm ² (10 g) of Head TSL SAR measured SAR normalized		6.13 mW /g 24.5 mW /g

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

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Body TSL parameters

The following parameters and calculations were applied.	
	Temperature

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.2 ± 0.2) °C	52.5 ± 6 %	2.02 mho/m ± 8 %
Body TSL temperature during test	(22.2 ± 0.2) °C		

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	condition	
SAR measured	250 mW input power	13.5 mW / g
SAR normalized	normalized to 1W	54.0 mW / g
SAR for nominal Body TSL parameters 2	normalized to 1W	52.8 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.26 mW / g
SAR normalized	normalized to 1W	25.0 mW / g
SAR for nominal Body TSL parameters 2	normalized to 1W	24.5 mW / g ± 16.5 % (k=2)

² Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.6 Ω + 3.7 JΩ	
Return Loss	-26.0 dB	

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.9 Ω + 5.3 jΩ	
Return Loss	- 25.5 dB	

General Antenna Parameters and Design

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Electrical Delay (one direction)	1.157 ns	
----------------------------------	----------	--

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	August 26, 2003	

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DASY4 Validation Report for Head TSL

Date/Time: 12.07.2005 12:53:00

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN736

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium: HSL U10 BB Medium parameters used: f = 2450 MHz; σ = 1.73 mho/m; ϵ_e = 38.5; ρ = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 SN3025; ConvF(4.4, 4.4, 4.4); Calibrated: 29.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Snb01; Calibrated: 22.07.2004
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.5 Build 30; Postprocessing SW: SEMCAD, V1.8 Build 149

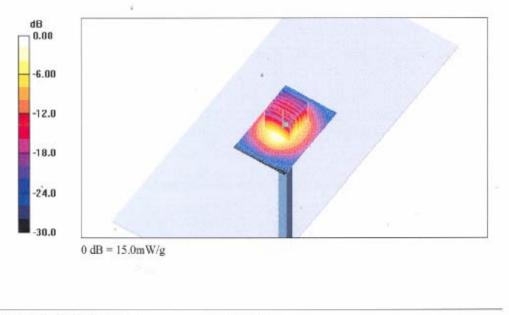
Pin = 250 mW; d = 10 mm 2/Area Scan (41x61x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 16.6 mW/g

Pin = 250 mW; d = 10 mm 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 91.6 V/m; Power Drift = 0.077 dB

Peak SAR (extrapolated) = 27.0 W/kg SAR(1 g) = 13.1 mW/g; SAR(10 g) = 6.13 mW/g Maximum value of SAR (measured) = 15.0 mW/g



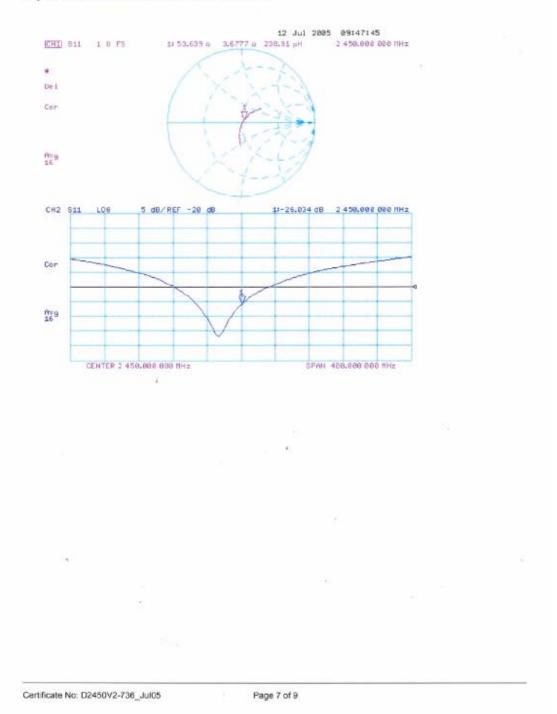
Certificate No: D2450V2-736_Jul05 Page 6 of 9

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Impedance Measurement Plot for Head TSL





DASY4 Validation Report for Body TSL

Date/Time: 11.07.2005 17:33:35

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN736

Communication System: CW-2450; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium: MSL 2450 Medium parameters used: f = 2450 MHz; σ = 2.02 mho/m; ϵ_r = 52.5; ρ = 1000 kg/m³ Phantom section: Flat Section Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 SN3025; ConvF(4.13, 4.13, 4.13); Calibrated: 29.10.2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601: Calibrated: 22.07.2004
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA
- Measurement SW: DASY4, V4.6 Build 4; Postprocessing SW: SEMCAD, V1.8 Build 149

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

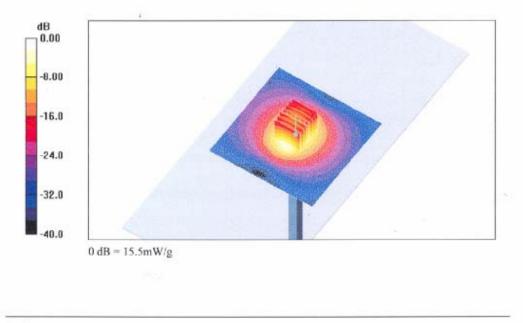
Maximum value of SAR (interpolated) = 15.8 mW/g

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Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx-5mm, dy-5mm, dz-5mm Reference Value = 85.9 V/m; Power Drift = 0.160 dB Peak SAR (extrapolated) = 27.6 W/kg SAR(1 g) = 13.5 mW/g; SAR(10 g) = 6.26 mW/g

Maximum value of SAR (measured) = 15.5 mW/g



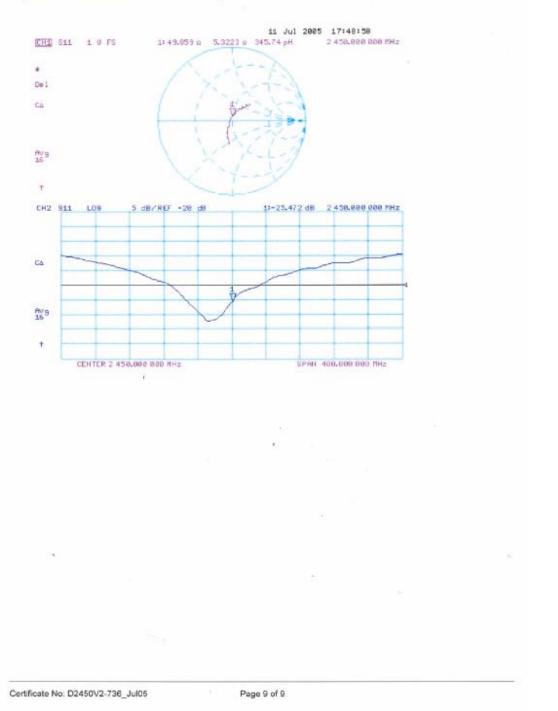
Certificate No: D2450V2-736_Jul05

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Accredited by the Swiss Federal I The Swiss Accreditation Servic Multilateral Agreement for the r	e is one of the signator ecognition of calibratio	es to the EA	: SCS 108
		n certificates	
Client Sporton (Aude	n)	Certificate No: E	T3-1788_Sep06
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Object	ET3DV6 - SN:1	788	
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



SINS

Spt

Schweizerischer Kalibrierdienst

- s Service suisse d'étalonnage
- С Servizio svizzero di taratura
- S Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization o	φ rotation around probe axis
Polarization 9	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- NORMX, y, z: Assessed for E-field polarization 3 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz; R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

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ET3DV6 SN:1788

September 19, 2006

Probe ET3DV6

SN:1788

Manufactured: Last calibrated: Recalibrated: May 28, 2003 September 30, 2004 September 19, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: ET3-1788_Sep06

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Rev. 05



ET3DV6 SN:1788

September 19, 2006

DASY - Parameters of Probe: ET3DV6 SN:1788

Sensitivity in Free Space^A

Diode Compression⁸

NormX	1.73 ± 10.1%	μV/(V/m) ²	DCP X	95 mV
NormY	1.67 ± 10.1%	μV/(V/m) ²	DCP Y	101 mV
NormZ	$\textbf{1.70} \pm 10.1\%$	$\mu V/(V/m)^2$	DCP Z	93 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL 900 MHz Typical SAR gradient: 5 % per mm

Sensor Cente	er to Phantom Surface Distance	3.7 mm	4.7 mm
SARte [%]	Without Correction Algorithm	7.9	4.3
SAR [%]	With Correction Algorithm	0.1	0.3

TSL 1810 MHz Typical SAR gradient: 10 % per mm

Sensor Cente	r to Phantom Surface Distance	3.7 mm	4.7 mm
SARee [%]	Without Correction Algorithm	11.8	7.0
SAR _{ce} [%]	With Correction Algorithm	0.2	0.4

Sensor Offset

Probe Tip to Sensor Center

2.7 mm

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

⁴ The uncertainties of NormX,Y,Z do not affect the E⁴-field uncertainty inside TSL (see Page 8).
⁸ Numerical Investigation parameter; uncertainty not required.

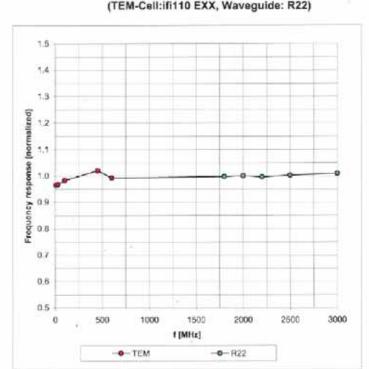
Certificate No: ET3-1786_Sep06

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September 19, 2006



Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

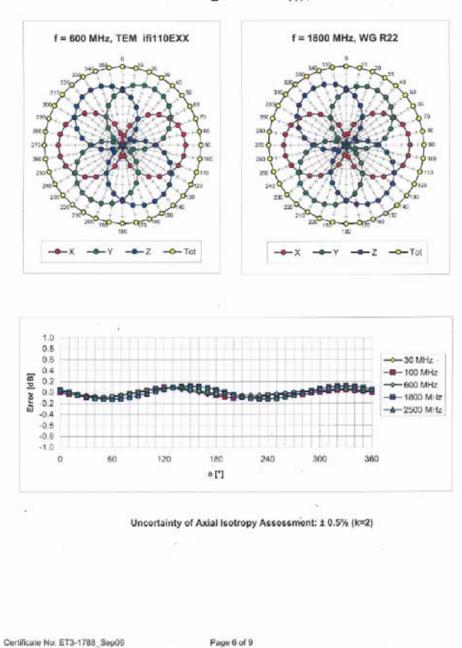
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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September 19, 2006

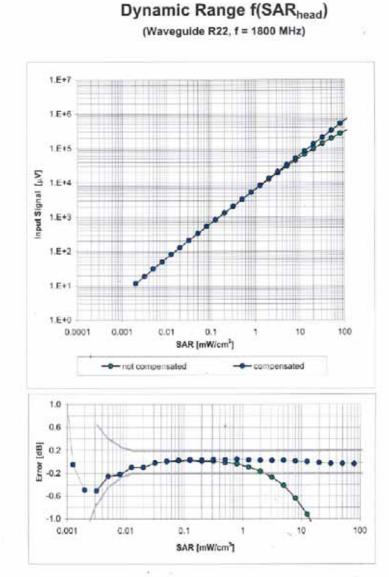


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September 19, 2006





Certificate No: ET3-1788_Sep06

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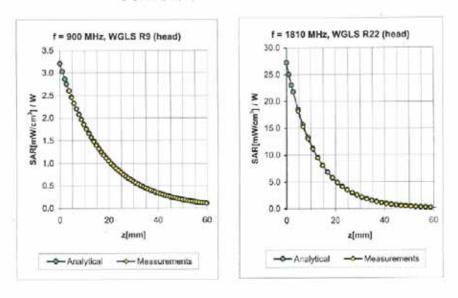
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September 19, 2006



Conversion Factor Assessment

f [MHz]	Validity [MHz] ^G	TSL.	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	$41.5 \pm 5\%$	0.97 ± 5%	0.49	1.94	6.60 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	$40.0\pm5\%$	1.40 ± 5%	0.48	2.74	5.30 ± 11.0% (k=2)
2000	± 50 / ± 100	Head	$40.0 \pm 5\%$	1.40 ± 5%	0.53	2.75	5.00 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	$39.2\pm5\%$	1.80 ± 5%	0.68	1.96	4.66 ± 11.8% (k=2)
				÷			
900	± 50 / ± 100	Body	$55.0 \pm 5\%$	1.05 ± 5%	0.45	2.12	6.33 ± 11.0% (k=2)
1810	±50/±100	Body	$53.3 \pm 5\%$	1.52 ± 5%	0.59	2.89	4.87 ± 11.0% (k=2)
2000	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.58	2.79	4,50 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.60	1.70	4.11 ± 11.8% (k=2)

⁶ 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 colloration frequency and the uncertainty for the indicated frequency bend.

Certificate No: ET3-1788_Sep06

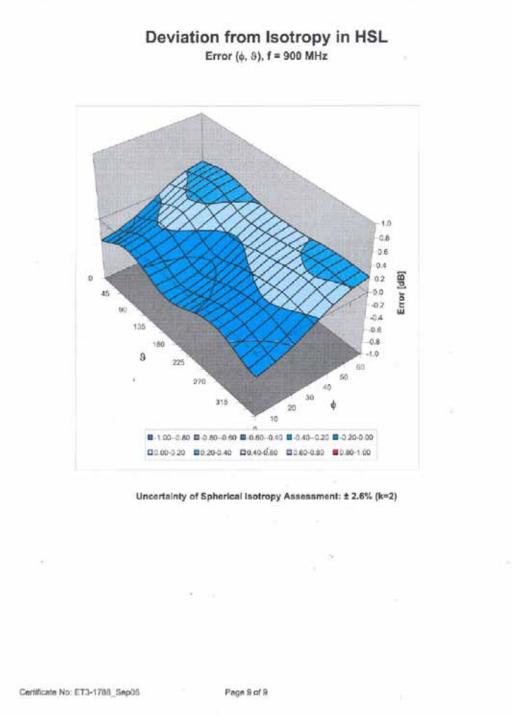
Fage 8 of 9

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September 19, 2006



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ngnanssnasso sa, ooos zunen,	Switzerland	Report S	Servizio svizzero di taratura Swiss Calibration Service
ccredited by the Swiss Federal Off he Swiss Accreditation Service I ultilateral Agreement for the rec	s one of the signatories	s to the EA	n No.: SCS 108
lient Sporton (Auden			o: DAE3-577_Nov06
CALIBRATION CI	ERTIFICATE		
Object	DAE3 - SD 000 D	03 AA + SN: 577	
Calibration procedure(s)	QA CAL-06.v12 Calibration proces	dure for the data acquisition ele	ctronics (DAE)
Calibration date:	Manager 21 20		
Calibration date:	November 21, 20	00	
Condition of the calibrated item	In Tolerance		
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Accredited by the Swiss Federal The Swiss Accreditation Servic Multilateral Agreement for the r	e is one of the signator	les to the EA		Accreditation N	a: SCS 108
Glossary					
Connector angle inf	ta acquisition ele ormation used in ordinate system.	DASY system	to align probe	sensor X to th	ie robot
		bration Factor a trument traceal	le to national	standards. Th	
 Connector angle mechanically by 	e: The angle of the atool inserted.			asuring the an	gle
 The following pa test and require 		n technical info	rmation as a r	esult from the	performance
 DC Voltage Mean nominal calibrat 	asurement Linea ion voltage. Influ				
 Common mode differential measure 		nce of a positiv	e or negative	common mode	voltage on the
 Channel separa voltage. 	tion: Influence of	a voltage on ti	ne neighbor ch	annels not su	bject to an input
 AD Converter V corresponding to 	alues with inputs o zero input volta		s on the inter	nal AD convert	er
 Input Offset Mea zero voltage me 		ut voltage and	statistical resu	lts over a large	e number of
 Input Offset Cur not considering 	rent: Typical valu the input resistar		on; Maximum	channel input (offset current,
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 Low Battery Ala alarm signal is g 		cal value for inf	ormation. Bel	ow this voltage	, a battery
 Power consump modes. 	<i>tion:</i> Typical valu	ue for information	on. Supply cur	rents in variou	s operating
Certificate No: DAE3-577 Nov			_		



DC Voltage Measurement

A/D - Converter Resk				
High Range.	1LSB =	6.1µV.	full range =	-100+300 mV
Low Range:	1LSB =	81nV ,	full range =	-1+3mV
DASY measurement	parameters: Aut	to Zero Time: 3	sec; Measuring	time: 3 sec

Calibration Factors	x	Y	Z
High Range	404.355 ± 0.1% (k=2)	403.806 ± 0.1% (k=2)	404.276 ± 0.1% (k=2)
Low Range	3.92854 ± 0.7% (k=2)	3.93862 ± 0.7% (k=2)	3.93591 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	268°±1°

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Appendix

1. DC Voltage Linearity

High Range	Input (µV)	Reading (µV)	Error (%)
Channel X + Input	200000	199999.5	0.00
Channel X + Input	20000	20005.87	0.03
Channel X - Input	20000	-19998.71	-0.01
Channel Y + Input	200000	200000	0.00
Channel Y + Input	20000	20004.22	0.02
Channel Y - Input	20000	-20003.23	0.02
Channel Z + Input	200000	200000.6	0.00
Channel Z + Input	20000	20005.24	0.03
Channel Z - Input	20000	-20001.80	0.01
Low Range	Input (μV)	Reading (µV)	Error (%)
Channel X + Input	2000	1999.9	0.00
Channel X + Input	200	200.27	0.13
Channel X - Input	200	-200.73	0.36
Channel Y + Input	2000	2000.1	0.00
Channel Y + input	200	199.22	-0,39
Channel Y - Input	200	+200.86	0.43
Channel Z + Input	2000	1999.9	0.00
Channel Z + Input	200	199.28	-0.36

- Input

Channel Z

2. Common mode sensitivity DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (µV)	Low Range Average Reading (µV)
Channel X	200	14.24	12,49
	- 200	-12.13	-12.92
Channel Y	200	-6.51	-7.06
	- 200	6.05	5.81
Channel Z	200	1.09	0.88
	- 200	-2.85	-2.63

200

-200.94

0.47

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200		2.51	0.09
Channel Y	200	0.43		3.37
Channel Z	200	-0.55	0.96	

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4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15970	16306
Channel Y	15851	16305
Channel Z	16208	17068

Input Offset Measurement DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec Input 10MΩ

	Average (µV)	min. Offset (µV)	max. Offset (μV)	Std. Deviation (µV)	
Channel X	-0.51	+1.55	0.47	0.50	
Channel Y	-2.06	-4.32	-0.65	0.60	
Channel Z	-1.63	-2.56	-0.15	0.35	

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)		
Channel X	0.2000	199.8		
Channel Y	0.2000	200.7		
Channel Z	0.2000	199.8		

8. Low Battery Alarm Voltage (verified during pre-fast)

Typical values	Alarm Level (VDC)	
Supply (+ Vcc)	+7.9	
Supply (- Vcc)	7,6	

9. Power Consumption (verified during pre-test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)	
Supply (+ Vcc)	+0.0	+6	+14	
Supply (- Vcc)	-0.01	-8	-9	

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Appendix D - WCDMA Test Mode

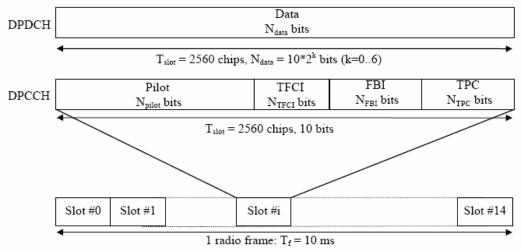
1. Conducted Output Power

RMC 144 kbps is the main WCDMA test mode for both EMC and SAR reports. A detailed analysis of the output power for all WCDMA modes is provided in the table below. The EUT supports DPDCH1 and HSDPA with a various of data rates, such as 12.2Kbps, 64kbps, 144Kbps and 384Kbps.

	Symbol Reference			Band II			Band V				
Mode	Rates	SF	K	Data	Channel Type	Ch 9262	Ch 9400	Ch 9538	Ch 4132	Ch 4182	Ch 4233
	(Kbps)				(Data Rates)	1852.4	1880.0	1907.6	826.4	836.4	846.6
	60	64	2	40	RMC 12.2 Kbps	23.12	23.36	23.63	23.91	23.87	23.94
DPDCH1	240	16	4	160	RMC 64 Kbps	22.94	23.49	23.59	23.91	23.92	23.89
DFDCHI	480	8	5	320	RMC 144 Kbps	23.10	23.15	23.68	23.93	23.81	23.96
	960	4	6	640	RMC 384 Kbps	23.28	23.13	23.47	23.92	23.81	23.88
HSDPA	60	64	2	40	RMC 12.2 Kbps	23.16	23.11	23.41	23.32	23.80	23.41
Data : Bits/	Slot; SF: Spre	ading F	actor	; K : Nu	mber of bits per uplink	DPDCH slo	ot.				

Table 1 Conducted output power

Followed by FCC suggestions[1]:



Frame structure for uplink DPDCH/DPCCH

The parameter K in the figure determines the number of bits per uplink DPDCH slot. It is related to the spreading factor SF of the DPDCH as $SF = 256/2^k$. The DPDCH spreading factor may range from 256 down to 4. The spreading factor of the uplink DPCCH is always equal to 256, i.e. there are 10 bits per uplink DPCCH slot.



	Channel Bit Rate (kbps)	Channel Symbol Rate (ksps)	Spreading Factor	Spreading Code Number	Bits/Slot
DPCCH	15	15	256	0	10
	15	15	256	64	10
	30	30	128	32	20
	60	60	64	16	40
DPDCH1	120	120	32	8	80
	240	240	16	4	160
	480	480	8	2	320
	960	960	4	1	640
DPDCHn	960	960	4	1, 2, 3	640

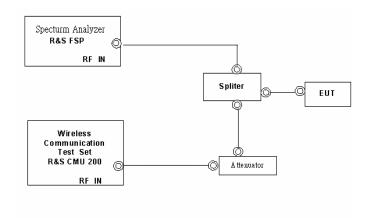
Table 2 DPCCH and DPDCH

There is only one DPCCH per radio link. Data rates, channelization codes and spread factor information for DPCCH and DPDCH_n are indicated in the following Table. Spreading Rate (SF) * Symbol Rate = 3.84 Mcps.



2. WCDMA Setup Configuration

- I. The EUT was connected to Spectrum Analyzer and Base Station via power splitter. Refer to the drawing of Setup Configuration.
- II. The RF path losses was compensated into the measurements.
- III. A call was established between EUT and Base Station with following setting
 - a. Data rates : Varied RMC for each measurements.
 - b. TPC with All Up
- IV. The transmitted maximum output power was recorded.



Setup Configuration



M	r. Code. 0	# DPCCH+I		SR1 CC1	16		Charuffe			CDP/Co Rho Mar
1 <u>0</u> 08 05	9	1011	U.		/ 011	0		/011	Curt	Appli- cation
0,4 0.2	_									Trigger Ana. Lev
8	DPCCH	DPDCH1	DPDCH2	DPDCH3	DPDCH4	DPDCHS	DFDCHS	н	S-OPCCH	UE Signa
Curr.	0.221	0.778						COI		Ana.Set
Avg	0.221	0.778						N/A		BS Signa
Max	0.222	0.779								Level
Mn	0.221	0.777								BS Signa Settings
EnVi	ectMagn-F	ave	2.6 %			10			0	-
Wad	rigin Offici	et –	45.97 dB			stic Count	21.		t Number	Marker
Sec. 1	er Freq En	TOT .	1 Hz		10	0.00 %		23.3	6 dBm	for surveyor

Single DPCCH with only one DPDCH at RMC 12.2Kbps (Symbol Rate 60 Kbps)

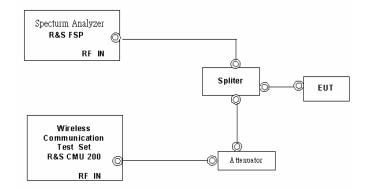
	Code Domair	Pwr. HSDPA	Č - C	Connect Control
😑 WCDMA FDD Connection Control 🖁	PS:	Attached	CS: Co	onnected
Setup		- TPC Settings/Set	t 1/Pattern Type	
TPC Step Size Activate Pattern TPC Pattern Setup Test Step Preconditions Set 1 Pattern Type Pattern	1 dB Execute Set 1 Manual All 1 11 bin			<u>o</u>
 Set 2 Set 3 Set 4 Set 5 Test Step A Test Step B Test Step C 				
Connection Handover UE Signal BS	Signal Network	k AF/RF⊕+	Sync.	1 2

TPC with All "1" (Continuous transmitting)



3. HSDPA Setup Configuration

- I. The EUT was connected to Spectrum Analyzer and Base Station via power splitter. Refer to the drawing of Setup Configuration.
- II. The RF path losses was compensated into the measurements.
- III. A call was established between EUT and Base Station with following setting:
 - a. Set RMC12.2Kbps with HSDPA mode.
 - b. TPC with All Up with H-set.
- IV. The transmitted maximum output power was recorded.



Setup Configuration



¢	W	CDM.	A FDD B	and Re	ceiver (Quality	CM OFF HSDPA		Connect Control
<u> </u>	ICDMA	FDD Conne	ction Cont	rol 🛔	PS:	Esta	ablished	CS: R	tegistered
Г	Setup					Pa	icket Switched	/HSDPA Test M	1ode/
	 Circu Pack Def DC TES Ra Ra RB RB	-B Settings it Switched et Switched ault Settings H (Dedicated DPA Test Mic adiobearer S VIC Test Loo PA HS-DSC A HS-DSC Jalink Physical Settings oressed Mod ower Contro	I Chn.) Type ode etup p XH Channels e Settings	2		2.2 kbps	Mode <u>+ HSDPA</u> RLC TM		
Con	nection	Handover	UE Signal	BS Sig	nal Net	work	AF/RF ⊕•	Sync.	
		R	-				A function		

Reference:

- [1.] SAR Measurement Procedures for 3G Devices CDMA 2000/Ev-Do/WCDMA/HSDPA June 2006 Laboratory Division Office of Engineering and Technology Federal Communications Commission
- [2.] TS 34.121 Universal Mobile Telecommunications System (UMTS); Terminal Conformance Specification, Radio Transmission and Reception (FDD)