Appendix C – Calibration Data

	h, Switzerland	RARATE S S	wiss Calibration Service
ccredited by the Swiss Accredita	tion Service (SAS)	Accreditation No.	: SCS 108
he Swiss Accreditation Servic			
luitilateral Agreement for the n	ecognition of calibration	n certificates	
lient Sporton (Aude	n)	Certificate No: E	R3-2358_Jan08
CALIBRATION	CERTIFICAT		
Object	ER3DV6 - SN:2	358	
Calibration procedure(s)	QA CAL-02.v5		
	Calibration proc	edure for E-field probes optimized for	close near field
	evaluations in a	ir -	
25.26.004.007200			Director Schemerica (Strategy and Strategy)
Calibration date:	January 28, 200	8	
o	In Televence		A REAL PROPERTY AND INCOMES IN
Condition of the calibrated item	In Tolerance	ALL CARDEN AND AND AND AND AND AND AND AND AND AN	
The measurements and the unce	rtainties with confidence	tional standards, which realize the physical units of probability are given on the following pages and an ory facility: environment temperature (22 ± 3)°C and	a part of the certificate.
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The measurements and the unce All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power meter E44198	rtainties with confidence cted in the closed laborat TE-critical for calibration)	probability are given on the following pages and an ory facility: environment temperature (22 ± 3)°C and Cal Date (Calibrated by, Certificate No.)	a part of the certificate. d humidity < 70%. Scheduled Calibration
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The measurements and the unce All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power meter E44198 Power sensor E4412A Power sensor E4412A Reference 3 dB Attenuator Reference 20 dB Attenuator	rtainties with confidence cted in the closed laborat TE-critical for calibration) ID # GB41293874 MY41495277 MY41498087 SN: S5086 (20b) SN: S5086 (20b) SN: S5129 (30b)	probability are given on the following pages and arr ory facility: environment temperature (22 ± 3)°C and Cal Date (Calibrated by, Certificate No.) 29-Mar-07 (METAS, No. 217-00670) 29-Mar-07 (METAS, No. 217-00670) 8-Aug-07 (METAS, No. 217-00670) 8-Aug-07 (METAS, No. 217-00671) 8-Aug-07 (METAS, No. 217-00671)	a part of the certificale. d humidity < 70%. Scheduled Calibration Mar-08 Mar-08 Aug-08 Mar-08 Aug-08
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WISS

BRA

S Schweizerischer Kallbrierdienst Service suisse d'étalonnage

C Service suisse d etalonnage Servizio svizzero di taratura

S Swiss Calibration Service

Accreditation No.: SCS 108

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

G	lossar	¢:
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NORMx,y,z	sensitivity in free space
DCP	diode compression point
Polarization ϕ	φ rotation around probe axis
Polarization 9	9 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
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

 a) IEEE Std 1309-2005, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005.

Methods Applied and Interpretation of Parameters:

- NORMx, y, z: Assessed for E-field polarization θ = 0 for XY sensors and θ = 90 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
- NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart).
- 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.
- Spherical isotropy (3D deviation from isotropy): in a locally homogeneous field realized using an open waveguide setup.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

Certificate No: ER3-2358 Jan08

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January 28, 2008

Probe ER3DV6

SN:2358

Manufactured: Last calibrated: Recalibrated: July 7, 2005 February 21, 2007 January 28, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: ER3-2358_Jan08

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January 28, 2008

DASY - Parameters of Probe: ER3DV6 SN:2358

Sensitivity in Free Space $[\mu V/(V/m)^2]$

Diode Compression^A

NormX	1.70 ± 10.1 % (k=2)
NormY	1.55 ± 10.1 % (k=2)
NormZ	1.61 ± 10.1 % (k=2)

DCP X 92 mV DCP Y 92 mV DCP Z 96 mV

Frequency Correction

х	0.0
Y	0.0
Z	0.0

Sensor Offset

(Probe Tip to Sensor Center)

х	2.5 mm
Y	2.5 mm
Z	2.5 mm
Connector Angle	-243 °

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%.

A numerical linearization parameter: uncertainty not required

Certificate No: ER3-2358_Jan08

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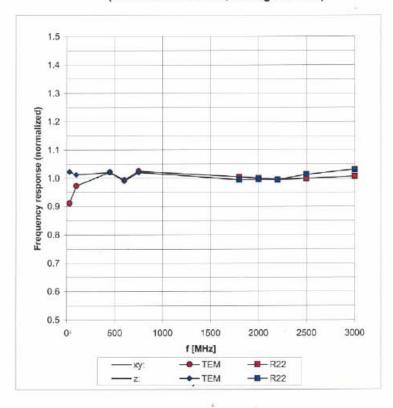
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January 28, 2008

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide R22)



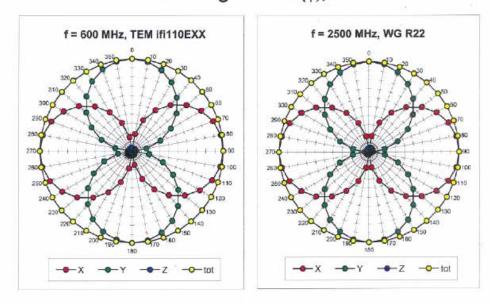
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Certificate No: ER3-2358_Jan08

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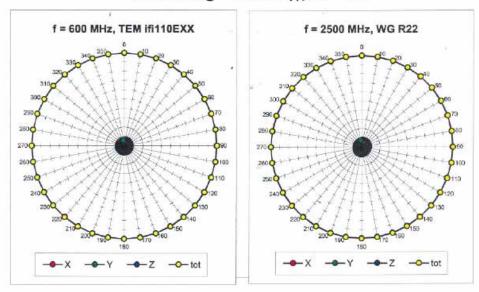


January 28, 2008



Receiving Pattern (ϕ), $\vartheta = 0^{\circ}$

Receiving Pattern (ϕ), ϑ = 90°



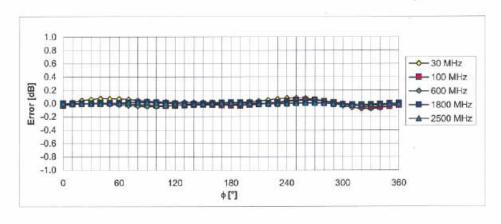
Certificate No: ER3-2358_Jan08

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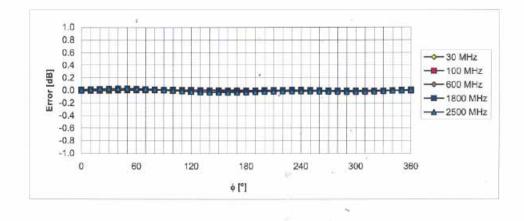
January 28, 2008



Receiving Pattern (ϕ), $\vartheta = 0^{\circ}$

Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Receiving Pattern (ϕ), ϑ = 90°



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

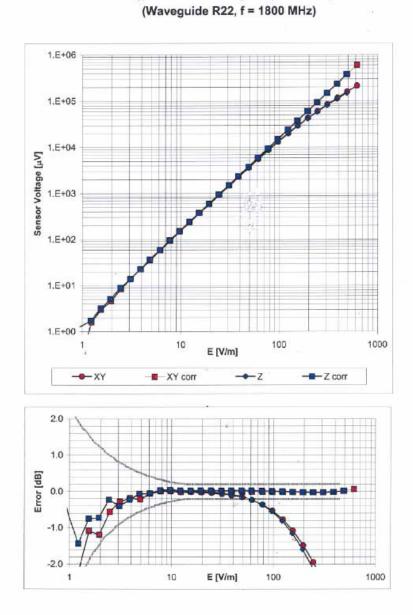
Certificate No: ER3-2358_Jan08

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January 28, 2008



Dynamic Range f(E-field)

Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: ER3-2358_Jan08

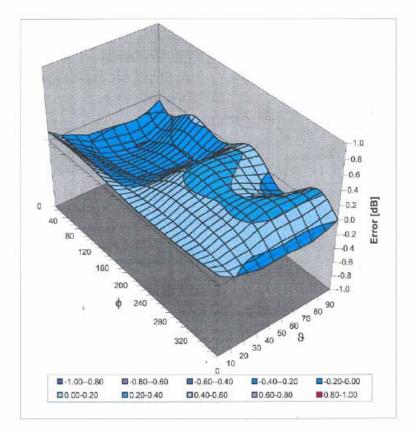
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January 28, 2008

Deviation from Isotropy in Air Error (\oplus, \varsigma), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: ER3-2358_Jan08

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Test Report No : HA891706A

Calibration date: January 28, 2008 Condition of the calibrated item In Tolerance This calibration cartificate 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.
This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
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 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 meter E4419B GB41293874 29-Mar-07 (METAS, No. 217-00670) Mar-08 Power sensor E4412A MY41495277 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41498087 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41498087 29-Mar-07 (METAS, No. 217-00670) Mar-03
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-03 Power sensor E4412A MY41496087 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41498087 29-Mar-07 (METAS, No. 217-00670) Mar-03 Reference 3 dB Attenuator SN: S5054 (3c) 8-Aug-07 (METAS, No. 217-00719) Aug-08
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-03 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41498067 29-Mar-07 (METAS, No. 217-00670) Mar-03 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
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-03 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41498067 29-Mar-07 (METAS, No. 217-00670) Mar-03 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-03 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08
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 MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Power sensor E4412A MY41496067 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-03 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference Probe H3DV6 SN: 6182 2-Oct-07 (SPEAG, No. H3-6182_Oct07) Oct-08
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-03 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41498067 29-Mar-07 (METAS, No. 217-00670) Mar-03 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-03 Reference 30 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 H3DV6 SN: 6182 2-Oct-07 (SPEAG, No. H3-6182_Oct07) Oct-08
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-03 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-03 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-03 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: 6182 2-Oct-07 (SPEAG, No. 13-5182_Oct07) Oct-08 DAE4 SN: 654 20-Apr-07 (SPEAG, No. DAE4-654_Apr07) Apr-08
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-03 Power sensor E4412A MY4149607 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41498087 29-Mar-07 (METAS, No. 217-00670) Mar-03 Reference 3 dB Attenuator SN: S5064 (3c) 8-Aug-07 (METAS, No. 217-00719) Aug-08 Reference 20 dB Attenuator SN: S5086 (20b) 29-Mar-07 (METAS, No. 217-00719) Mar-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference Probe H3DV6 SN: 6182 2-Oct-07 (SPEAG, No. 17-00720) Aug-08 Secondary Standards ID # Check Date (in house) Scheduled Check
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-03 Power sensor E4412A MY41496087 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41498087 29-Mar-07 (METAS, No. 217-00670) Mar-03 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. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference Probe H3DV6 SN: 6182 2-Oct-07 (SPEAG, No. 17-00720) Aug-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
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-03 Power sensor E4412A MY4149607 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41498087 29-Mar-07 (METAS, No. 217-00670) Mar-03 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. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 4 SN: 654 20-Oct-07 (SPEAG, No. H3-6182_Oct07) Oct-08 DAE4 SN: 654 20-Apr-07 (SPEAG, No. DAE4-654_Apr07) Apr-08 Secondary Standards ID # Check Date (in house)
Power meter E44198 GB41293874 29-Mar-07 (METAS, No. 217-00670) Mar-08 Power sensor E4412A MY41495277 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-03 Reference 3 dB Attenuator SN: S5056 (3c) 8-Aug-07 (METAS, No. 217-00719) Aug-08 Reference 20 dB Attenuator SN: S5086 (20b) 29-Mar-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: 654 20-Oct-07 (SPEAG, No. DAE4-654_Apr07) Oct-08 DAE4 SN: 654
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 MY41496087 29-Mar-07 (METAS, No. 217-00670) Mar-08 Power sensor E4412A MY41496087 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-03
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 MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Reference 3 dB Attenuator SN: S5056 (3c) 8-Aug-07 (METAS, No. 217-00719) Aug-08 Reference 20 dB Attenuator SN: S5086 (20b) 29-Mar-07 (METAS, No. 217-00719) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference Probe H3DV6 SN: 6182 2-Oct-07 (SPEAG, No. 147-61720) Aug-08 Reference Standards 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
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 MY4149607 29-Mar-07 (METAS, No. 217-00670) Mar-08 Power sensor E4412A MY41498087 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: S5056 (3c) 8-Aug-07 (METAS, No. 217-00719) Aug-08 Reference 20 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference Probe H3DV6 SN: 6182 2-Oct-07 (SPEAG, No. 147-00720) Aug-08 Reference Probe H3DV6 SN: 654 20-Apr-07 (SPEAG, No. DAE4-654_Apr07) Apr-08 Recondary 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
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 MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Reference 3 dB Attenuator SN: \$5054 (3c) 8-Aug-07 (METAS, No. 217-00670) Mar-08 Reference 20 dB Attenuator SN: \$5066 (20b) 29-Mar-07 (METAS, No. 217-00719) Aug-08 Reference 30 dB Attenuator SN: \$5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference Probe H3DV6 SN: 6162 2-Oct-07 (SPEAG, No. 127-00720) Aug-08 DAE4 SN: 654 20-Apr-07 (SPEAG, No. DAE4-654_Apr07) Apr-08 Secondary Standards ID # Check Date (in house) Scheduled Check
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 MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Reference 3 dB Attenuator SN: \$5065 (3c) 8-Aug-07 (METAS, No. 217-00719) Aug-08 Reference 20 dB Attenuator SN: \$5066 (20b) 29-Mar-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: \$5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference Probe H3DV6 SN: 6162 2-Oct-07 (SPEAG, No. 13-6182_Oct07) Oct-08 DAE4 SN: 654 20-Apr-07 (SPEAG, No. DAE4-654_Apr07) Apr-08 Secondary Standards ID # Check Date (in house) Scheduled Check
Tower meter E4419B GB41293874 29-Mar-07 (METAS, No. 217-00670) Mar-08 Tower sensor E4412A MY41495277 29-Mar-07 (METAS, No. 217-00670) Mar-08 Tower sensor E4412A MY4149607 29-Mar-07 (METAS, No. 217-00670) Mar-08 Tower sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Tower sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Teleference 3 dB Attenuator SN: S5056 (3c) 8-Aug-07 (METAS, No. 217-00719) Aug-08 Teleference 20 dB Attenuator SN: S5086 (20b) 29-Mar-07 (METAS, No. 217-00720) Aug-08 Teleference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Teleference Probe H3DV6 SN: 6182 2-Oct-07 (SPEAG, No. 17-00720) Aug-08 Teleference Probe H3DV6 SN: 654 20-Apr-07 (SPEAG, No. DAE4-654_Apr07) Apr-08 Teleference Standards ID # Check Date (in house) Scheduled Check
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 MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Power sensor E4412A MY41498067 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. 217-00710) Mar-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference Probe H3DV6 SN: 6182 2-Oct-07 (SPEAG, No. 13-6182_Oct07) Oct-08 DAE4 SN: 654 20-Apr-07 (SPEAG, No. DAE4-654_Apr07) Apr-08
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 MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Power sensor E4412A MY41498067 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 H3DV6 SN: 6182 2-Oct-07 (SPEAG, No. H3-6182_Oct07) Oct-08
Power meter E44198 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 MY41496087 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 H3DV6 SN: 6162 2-Oct-07 (SPEAG, No. H3-5182_Oct07) Oct-08
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-03 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-03 Power sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-03 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-03 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 40 dB Attenuator SN: S129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08 Reference 40 dB Attenuator SN: 6182 2-Oct-07 (SPEAG, No. H3-5182_Oct07) Oct-08
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 MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 Power sensor E4412A MY41498067 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. 217-0071) Mar-03 Reference 30 dB Attenuator SN: S5086 (20b) 29-Mar-07 (METAS, No. 217-00720) Aug-08 Reference 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08
Forward meter E4419B GB41293874 29-Mar-07 (METAS, No. 217-00670) Mar-08 forward sensor E4412A MY41495277 29-Mar-07 (METAS, No. 217-00670) Mar-08 forward sensor E4412A MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08 forward sensor E4412A MY41498067 29-Mar-07 (METAS, No. 217-00670) Mar-08 forward sensor E4412A MY41498067 29-Mar-07 (METAS, No. 217-00670) Mar-08 formaria SN: S5054 (3c) 8-Aug-07 (METAS, No. 217-00719) Aug-08 forefrance 20 dB Attenuator SN: S5086 (20b) 29-Mar-07 (METAS, No. 217-00671) Mar-08 forefrance 30 dB Attenuator SN: S5129 (30b) 8-Aug-07 (METAS, No. 217-00720) Aug-08
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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 MY41496067 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
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 MY41496067 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
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 MY41496067 29-Mar-07 (METAS, No. 217-00670) Mar-08
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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 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 meter E4419B GB41293874 29-Mar-07 (METAS, No. 217-00670) Mar-08
Power meter E4419B GB41293874 29-Mar-07 (METAS, No. 217-00670) Mar-08
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Primary Standards ID # Cal Date (Calibrated by Certificate No.) Scheduled Calibration
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Certificate No: H3-6184_Jan08

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

Glossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
Polarization ϕ	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
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

 a) IEEE Std 1309-2005, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005.

Methods Applied and Interpretation of Parameters:

- X,Y,Z_a0a1a2: Assessed for E-field polarization 9 = 90 for XY sensors and 9 = 0 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
- X,Y,Z(f)_a0a1a2= X,Y,Z_a0a1a2* frequency_response (see Frequency Response Chart).
- 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.
- Spherical isotropy (3D deviation from isotropy): in a locally homogeneous field realized using an open waveguide setup.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the X_a0a1a2 (no uncertainty required).

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January 28, 2008

Probe H3DV6

SN:6184

Manufactured: Last calibrated: Recalibrated:

4

June 8, 2004 February 21, 2007 January 28, 2008

Calibrated for DASY Systems

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(Note: non-compatible with DASY2 system!)

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DASY - Parameters of Probe: H3DV6 SN:6184

Sensitivity in Free Space [A/m / \(\mu V)]

	a0	a1	a2
х	2.409E-03	6.763E-5	-9.365E-6 ± 5.1 % (k=2)
Υ	2.502E-03	-4.500E-5	-8.887E-6 ± 5.1 % (k=2)
Z	2.915E-03	-3.422E-5	4.661E-5 ± 5.1 % (k=2)

Diode Compression¹

DCP X	84 mV
DCP Y	84 mV
DCP Z	85 mV

Sensor Offset

(Probe Tip to Sensor Center)

х		3.0 mm
Y	- 1	3.0 mm
Z		3.0 mm

Connector Angle

-244 °

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%.

1 numerical linearization parameter: uncertainty not required

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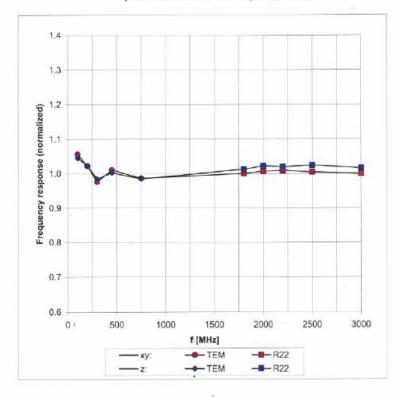
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January 28, 2008

Frequency Response of H-Field

(TEM-Cell:ifi110, Waveguide R22)



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

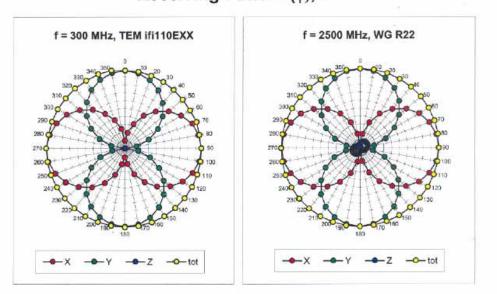
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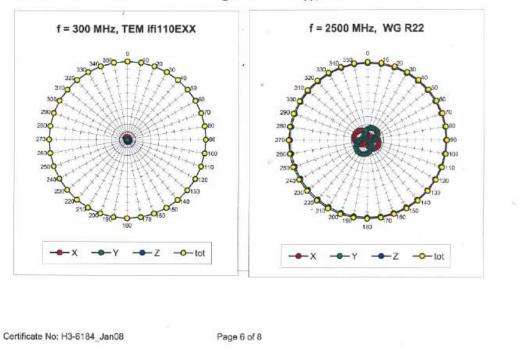


January 28, 2008



Receiving Pattern (ϕ), ϑ = 90°

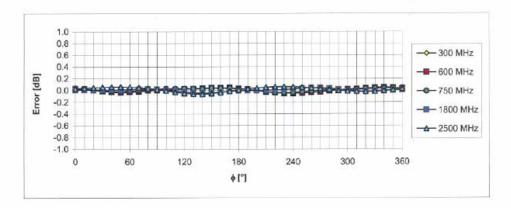




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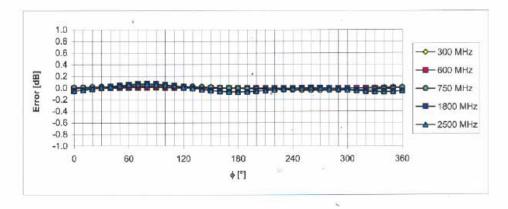
January 28, 2008



Receiving Pattern (ϕ), ϑ = 90°

Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Receiving Pattern (ϕ), $\vartheta = 0^{\circ}$



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

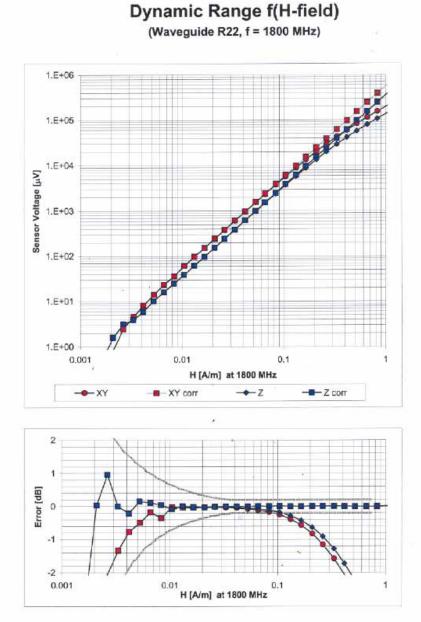
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Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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Sporton (Auden) Certificate No: CD835V3-1045 Sep07 Client CALIBRATION CERTIFICATE CD835V3 - SN: 1045 Object Calibration procedure(s) QA CAL-20.v4 Calibration procedure for dipoles in air Calibration date: September 25, 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), 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) Oc!-07 Power sensor HP 8481A US37292783 03-Oct-06 (METAS, No. 217-00608) Oct-07 Probe ER3DV6 SN: 2336 27-Dec-06 (SPEAG, No. ER3-2336_Dec06) Dec-07 Probe H3DV6 SN: 6065 27-Dec-06 (SPEAG, No. H3-6065-Dec06) Dec-07 DAE4 SN: 903 19-Sep-07 (SPEAG, No. DAE4-903_Sep07) Sep-08 Secondary Standards ID# Check Date (in house) Scheduled Check Power meter EPM-4419B GB42420191 11-May-05 (SPEAG, in house check Nov-06) In house check: Nov-07 Power sensor HP 8482A US37295597 11-May-05 (SPEAG, in house check Nov-06) In house check: Nov-07 Power sensor HP 8482H 3318A09450 08-Jan-02 (SPEAG, in house check Nov-06) In house check: Nov-07 Network Analyzer HP 8753E US37390585 18-Oct-01 (SPEAG, in house check Oct-06) In house check: Oct-07 RF generator E4433B MY 41310391 22-Nov-04 (SCV. TRS 001-021-0354) In house check: Nov-07 Name Function Signature Calibrated by: Mike Meili Laboratory Technician Approved by: Fin Bomholt Technical Director Issued: September 27, 2007 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: CD835V3-1045_Sep07

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Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura 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

References

[1] ANSI-C63.19-2006

American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

Methods Applied and Interpretation of Parameters:

- Coordinate System: y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with standard [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- Measurement Conditions: Further details are available from the hardcopies at the end of the certificate. All
 figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole
 connector is set with a calibrated power meter connected and monitored with an auxiliary power meter
 connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to
 the same level.
- Antenna Positioning: The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY4 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- Feed Point Impedance and Return Loss: These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminating by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- E- field distribution: E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- H-field distribution: H-field is measured with an isotropic H-field probe with 100mW forward power to the
 antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan.
 The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated
 as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at
 the feed point.

Certificate No: CD835V3-1045_Sep07

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1 Measurement Conditions

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

DASY Version	DASY4	V4.7 B55
DASY PP Version	SEMCAD	V1.8 B176
Phantom	HAC Test Arch	SD HAC P01 BA, #1070
Distance Dipole Top - Probe Center	10 mm	T.
Scan resolution	dx, dy = 5 mm	area = 20 x 180 mm
Frequency	835 MHz ± 1 MHz	
Forward power at dipole connector	20.0 dBm = 100mW	
Input power drift	< 0.05 dB	

2 Maximum Field values

H-field 10 mm above dipole surface	condition	interpolated maximum
Maximum measured	100 mW forward power	0.453 A/m
ncertainty for H-field measurement: 8.2% (k=2)		

E-field 10 mm above dipole surface	condition	Interpolated maximum
Maximum measured above high end-	100 mW forward power	168.2 V/m
Maximum measured above low end	100 mW forward power	165.9 V/m
Averaged maximum above arm	100 mW forward power	167.1 V/m

Uncertainty for E-field measurement: 12.8% (k=2)

3 Appendix

3.1 Antenna Parameters

Frequency	Return Loss	Impedance
800 MHz	15.4 dB '	(41.9 – j13.5) Ohm
835 MHz	30.8 dB	(49.7 + j2.8) Ohm
900 MHz	17.1 dB	(55.1 – j13.9) Ohm
950 MHz	18.9 dB	(48.6 + j11.1) Ohm
960 MHz	15.0 dB	(54.9 + j18.3) Ohm

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

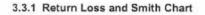
After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

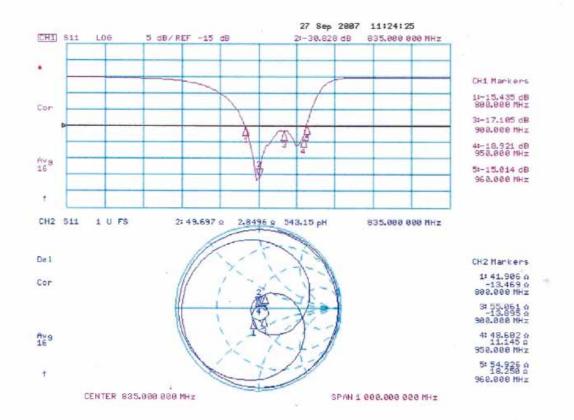
Certificate No: CD835V3-1045_Sep07

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FCC HAC RF Emissions Test Report

3.3 Measurement Sheets





Certificate No: CD835V3-1045_Sep07

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3.3.2 DASY4 H-field result

Date/Time: 25.09.2007 13:54:05

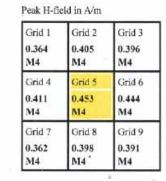
Test Laboratory: SPEAG Lab 2

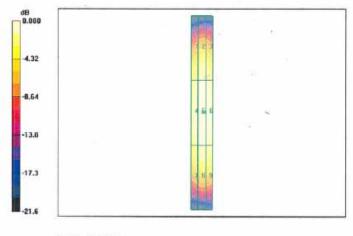
DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1045 Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: H Dipole Section Measurement Standard: DASY4 (High Precision Assessment) DASY4 Configuration:

- Probe: H3DV6 SN6065; Calibrated: 27.12.2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn903; Calibrated: 19.09.2007
- · Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

H Scan - Sensor Center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.453 A/m Probe Modulation Factor = 1.00 Device Reference Point: 0.000, 0.000, 354.7 mm Reference Value = 0.477 A/m; Power Drift = 0.000 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB)





0 dB = 0.453A/m

Certificate No: CD835V3-1045_Sep07

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Date/Time: 25.09.2007 11:58:13

3.3.3 DASY4 E-Field result

Test Laboratory: SPEAG Lab 2

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1045 Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: σ = 0 mho/m, ϵ_r = 1; ρ = 1000 kg/m³ Phantom section: E Dipole Section Measurement Standard: DASY4 (High Precision Assessment) **DASY4** Configuration:

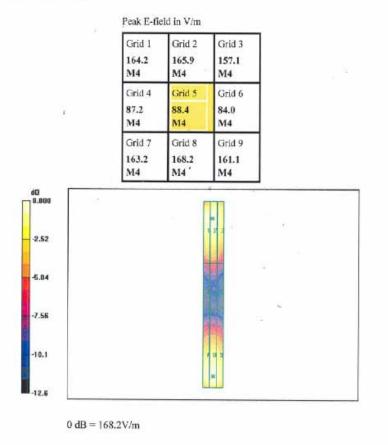
- Probe: ER3DV6 SN2336; ConvF(1, 1, 1); Calibrated: 27.12.2006
- Sensor-Surface: (Fix Surface) .
- Electronics: DAE4 Sn903; Calibrated: 31.08.2006
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - Sensor Center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 168.2 V/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 354.7 mm Reference Value = 109.0 V/m; Power Drift = -0.007 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Certificate No: CD835V3-1045_Sep07

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Test Report No : HA891706A

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Accredited by the Swiss Federal The Swiss Accreditation Servic			: SCS 108
Multilateral Agreement for the			
Client Sporton (Aude	en)	Certificate No: C	D1880V3-1038_Sep07
CALIBRATION	CERTIFICAT	E	
Object	CD1880V3 - St	N: 1038	
Calibration procedure(s)	QA CAL-20.v4		and the second
	Calibration proc	edure for dipoles in air	
Calibration date:	September 27,	2007	
Calibration date.	September 27,	2007	
Condition of the calibrated item	In Tolerance		作用的ALE 1927/07
	S. 3		
		ational standards, which realize the physical units of tory facility; environment temperature $(22 \pm 3)^{\circ}C$ and	
All calibrations have been condu	icted in the closed labora	tory facility; environment temperature (22 ± 3)°C and	
All calibrations have been condu Calibration Equipment used (M& Primary Standards	In the closed labora	tory facility: environment temperature (22 ± 3)°C and Cal Date (Calibrated by, Certificate No.)	I humidity < 70%.
All calibrations have been condu Calibration Equipment used (M& Primary Standards Power meter EPM-442A	ID # GB37480704	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608)	Scheduled Calibration
All calibrations have been condu Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A	ID # GB37480704 US37292783	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608)	Scheduled Calibration Oct-07 Oct-07
All calibrations have been condu Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6	ID # GB37480704 US37292783 SN: 2336	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608) 27-Dec-06 (SPEAG, No. ER3-2336_Dec06)	Scheduled Calibration Oct-07 Oct-07 Dec-07
All calibrations have been condu Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6 Probe H3DV6	ID # GB37480704 US37292783	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608)	Scheduled Calibration Oct-07 Oct-07
All calibrations have been condu Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6 Probe H3DV6 DAE4	ID # GB37480704 US37292783 SN: 2336 SN: 6065 SN: 903	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608) 27-Dec-06 (SPEAG, No. ER3-2336_Dec06) 27-Dec-06 (SPEAG, No. H3-6065-Dec06) 19-Sep-07 (SPEAG, No. DAE4-903_Sep07)	Scheduled Calibration Oct-07 Oct-07 Dec-07 Dec-07 Sep-08
All calibrations have been condu Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6 Probe H3DV6 DAE4 Secondary Standards	ID # GB37480704 US37292783 SN: 2336 SN: 6065 SN: 903	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608) 27-Dec-06 (SPEAG, No. ER3-2336_Dec06) 27-Dec-06 (SPEAG, No. H3-6065-Dec06) 19-Sep-07 (SPEAG, No. DAE4-903_Sep07) Check Date (in house)	I humidity < 70%. Scheduled Calibration Oct-07 Oct-07 Dec-07 Dec-07 Sep-08 Scheduled Check
All calibrations have been condu Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6 Probe H3DV6 DAE4 Secondary Standards Power meter EPM-4419B	ID # GB37480704 US37292783 SN: 2336 SN: 6065 SN: 903 ID # GB42420191	Cal Date (Calibrated by, Certificate No.) 03-Oct-05 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (SPEAG, No. ER3-2336_Dec06) 27-Dec-06 (SPEAG, No. H3-6065-Dec06) 19-Sep-07 (SPEAG, No. DAE4-903_Sep07) Check Date (in house) 11-May-05 (SPEAG, in house check Nov-06)	I humidity < 70%. Scheduled Calibration Oct-07 Oct-07 Dec-07 Dec-07 Sep-08 Scheduled Check In house check: Nov-07
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All calibrations have been condu Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6 Probe H3DV6 DAE4 Secondary Standards Power meter EPM-4419B Power sensor HP 8482A Power sensor HP 8482H Network Analyzer HP 8753E	ID # ID # GB37480704 US37292783 SN: 2336 SN: 6065 SN: 903 ID # GB42420191 US37295597 3318A09450	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (SPEAG, No. ER3-2336_Dec06) 27-Dec-06 (SPEAG, No. H3-6065-Dec06) 19-Sep-07 (SPEAG, No. DAE4-903_Sep07) Check Date (in house) 11-May-05 (SPEAG, in house check Nov-06) 11-May-05 (SPEAG, in house check Nov-06)	I humidity < 70%. Scheduled Calibration Oct-07 Oct-07 Dec-07 Dec-07 Sep-08 Scheduled Check In house check: Nov-07 In house check: Nov-07 In house check: Nov-07
All calibrations have been condu Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6 Probe H3DV6 DAE4 Secondary Standards Power meter EPM-4419B Power sensor HP 8482A Power sensor HP 8482H Network Analyzer HP 8753E	ID # ID # GB37480704 US37292783 SN: 2336 SN: 6065 SN: 903 ID # GB42420191 US37295597 3318A09450 US37390585	Cal Date (Calibrated by, Certificate No.) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (METAS, No. 217-00608) 03-Oct-06 (SPEAG, No. ER3-2336_Dec06) 27-Dec-06 (SPEAG, No. H3-6065-Dec06) 19-Sep-07 (SPEAG, No. DAE4-903_Sep07) Check Date (in house) 11-May-05 (SPEAG, in house check Nov-06) 11-May-05 (SPEAG, in house check Nov-06) 11-May-05 (SPEAG, in house check Nov-06) 18-Jan-02 (SPEAG, in house check Nov-06) 18-Oct-01 (SPEAG, in house check Not-06)	I humidity < 70%. Scheduled Calibration Oct-07 Oct-07 Dec-07 Dec-07 Sep-08 Scheduled Check In house check: Nov-07 In house check: Oct-07
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Certificate No: CD1880V3-1038_Sep07

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



SWISS C. D. Z. P. BONT

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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

References

[1] ANSI-C63.19-2006

American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

Methods Applied and Interpretation of Parameters:

- Coordinate System: y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with standard [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- Measurement Conditions: Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- Antenna Positioning: The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY4 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe sensor offset. The vertical distance to the probe sensor offset. The vertical and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- Feed Point Impedance and Return Loss: These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminating by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- E- field distribution: E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- H-field distribution: H-field is measured with an isotropic H-field probe with 100mW forward power to the
 antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field
 scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field
 value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the
 dipole surface at the feed point.

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1 Measurement Conditions

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

DASY Version	DASY4	V4.7 B55
DASY PP Version	SEMCAD	V1.8 B176
Phantom	HAC Test Arch	SD HAC P01 BA, #1002
Distance Dipole Top - Probe Center	10 mm	14
Scan resolution	dx, dy = 5 mm	area = 20 x 90 mm
Frequency	1880 MHz ± 1 MHz	
Forward power at dipole connector	20.0 dBm = 100mW	
Input power drift	< 0.05 dB	

2 Maximum Field values

H-field 10 mm above dipole surface	condition	Interpolated maximum
Maximum measured	100 mW forward power	0.471 A/m
ncertainty for H-field measurement: 8.2% (k=	2)	

E-field 10 mm above dipole surface	condition	Interpolated maximum
Maximum measured above high end	100 mW forward power	138.9 V/m
Maximum measured above low end	100 mW forward power	138.8 V/m
Averaged maximum above arm	100 mW forward power	138.9 V/m

Uncertainty for E-field measurement: 12.8% (k=2)

3 Appendix

3.1 Antenna Parameters

Frequency	Return Loss	Impedance
1710 MHz	19.2 dB	(48.9 + j10.9) Ohm
1880 MHz	22.1 dB	(53.8 + j7.2) Ohm
1900 MHz	22.1 dB *	(56.5 + j5.2) Ohm
1950 MHz	26.1 dB	(54.3 - j2.9) Ohm
2000 MHz	19.1 dB	(40.1 + j0.4) Ohm

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

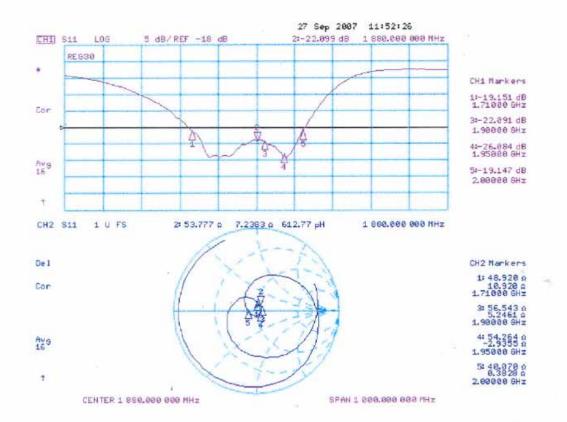
After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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3.3 Measurement Sheets

3.3.1 Return Loss and Smith Chart



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3.3.2 DASY4 H-Field Result

Date/Time: 25.09.2007 15:53:23

Test Laboratory: SPEAG Lab 2

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1038 Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1 Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: H Dipole Section Measurement Standard: DASY4 (High Precision Assessment) DASY4 Configuration:

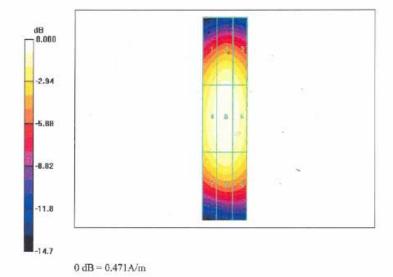
- Probe: H3DV6 SN6065; ; Calibrated: 27.12.2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn903; Calibrated: 19.09.2007
- · Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

H Scan - Sensor Center 10mm above CD1880V3 Dipole/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 0.471 A/m Probe Modulation Factor = 1.00 Device Reference Point: 0.000, 0.000, 354.7 mm Reference Value = 0.498 A/m; Power Drift = 0.009 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak H-field in A/m

Grid 1 -	Grid 2	Grid 3
0.404 M2	0.435 M2	0.418 M2
Grid 4	Grid 5	Grid 6
0.442 M2	0.471 M2	0.454 M2
Grid 7	Grid 8	Grid 9
0.402 M2	0.426 M2	0.410 M2



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3.3.3 DASY4 E-Field Result

Date/Time: 27.09.2007 12:27:44

Test Laboratory: SPEAG Lab 2

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1038 Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1 Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m³ Phantom section: E Dipole Section Measurement Standard: DASY4 (High Precision Assessment) DASY4 Configuration:

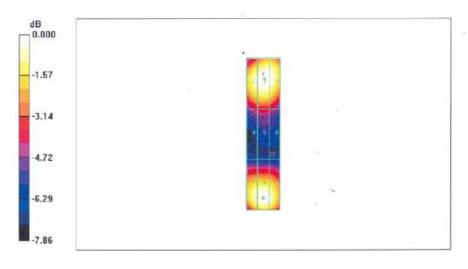
- Probe: ER3DV6 SN2336; ConvF(1, 1, 1); Calibrated: 27.12.2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn903; Calibrated: 19.09.2007
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 174

E Scan - Sensor Center 10mm above CD1880V3 Dipole/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 138.9 V/m Probe Modulation Factor = 1.00 Reference Value = 156.3 V/m; Power Drift = 0.002 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
133.8 M2	138.9 M2	137.0 M2
Grid 4	Grid 5	Grid 6
89.9 M3	92.3 M3	89.1 M3
Grid 7	Grid 8	Grid 9
133.4 M2	138.8 M2	133.8 M2





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Test Report No : HA891706A

Accredited by the Swiss Accreditati	on Service (SAS)	Accreditation	No.: SCS 108
The Swiss Accreditation Service	is one of the signatories		
Nultilateral Agreement for the rec			DAE3-577_Nov07
CALIBRATION C	ERTIFICATE		
Object	DAE3 - SD 000 D	03 AA - SN: 577	
Celibration procedure(s)	QA CAL-06.v12 Calibration proceed	dure for the data acquisition elect	tronics (DAE)
Calibration date:	November 16, 20	07	
The measurements and the uncert	ainties with confidence pr	onal standards, which realize the physical unit obability are given on the following pages and y facility: environment temperature (22 ± 3)°C	d are part of the certificate.
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



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Schweizerischer Kallbrierdienst

C Service suisse d'étalonnage

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

DAE Connector angle data acquisition electronics information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- DC Voltage Measurement: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- Connector angle: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
 - DC Voltage Measurement Linearity: Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
 - Common mode sensitivity: Influence of a positive or negative common mode voltage on the differential measurement.
 - Channel separation: Influence of a voltage on the neighbor channels not subject to an input voltage.
 - AD Converter Values with inputs shorted: Values on the internal AD converter corresponding to zero input voltage
 - Input Offset Measurement: Output voltage and statistical results over a large number of zero voltage measurements.
 - Input Offset Current: Typical value for information; Maximum channel input offset current, not considering the input resistance.
 - Input resistance: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
 - Low Battery Alarm Voltage: Typical value for information. Below this voltage, a battery alarm signal is generated.
 - Power consumption: Typical value for information. Supply currents in various operating modes.

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DC Voltage Measurement

High Range:	1LSB =	6.1µV,	full range =	-100+300 mV
Low Range:	1LSB =	61nV .	full range =	-1+3mV

2

Calibration Factors	x	Y	Z
High Range	404.432 ± 0.1% (k=2)	403.884 ± 0.1% (k=2)	404.331 ± 0.1% (k=2)
Low Range	3.94218 ± 0.7% (k=2)	3.94771 ± 0.7% (k=2)	3.94526 ± 0.7% (k=2)

Connector Angle

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

Appendix

1. DC Voltage Linearity

High Range	Input (µV)	Reading (µV)	Error (%)
Channel X + Input	200000	199999.3	0.00
Channel X + Input	20000	20005.75	0.03
Channel X - Input	20000	-19997.67	-0.01
Channel Y + Input	200000	199999.5	0.00
Channel Y + Input	20000	20002.82	0.01
Channel Y - Input	20000	-20004.40	0.02
Channel Z + Input	200000	199999.6	0.00
Channel Z + Input	20000	20005.54	0.03
Channel Z - Input	20000	-20001.11	0.01

Low Range		Input (µV)	Reading (µV)	Error (%)	
Channel X	+ input	2000	2000.1	0.00	
Channel X	+ Input	200	199.12	-0.44	
Channel X	- Input	200	-200.64	0.32	
Channel Y	+ Input	2000	2000	0.00	
Channel Y	+ Input	200	199.96	-0.02	
Channel Y	- Input	200	-201.00	0.50	
Channel Z	+ Input	2000	1999.9	0.00	
Channel Z	+ Input	200	199.05	-0.47	
Channel Z	- Input	200	-201.08	0.54	

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Averaģe Reading (μV)	Low Range Average Reading (µV)	
Channel X	200	13.88	12.97	
	- 200	-12.40	-14.29	
Channel Y	200	-6.32	-6.22	
	- 200	5.34	5.31	
Channel Z	200	1.08	0.59	
	- 200	-1.42	-1.66	

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	-	1.14	0.16
Channel Y	200	1.52	-	3.87
Channel Z	200	0.23	0.75	~

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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	15969	16269	
Channel Y	15848	16148	
Channel Z	16203	16661	

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec Input $10M\Omega$

	Average (µV)	min. Offset (µV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.12	-1.70	1.72	0.50
Channel Y	-2.46	-3.42	-1.39	0.44
Channel Z	-0.78	-2.16	0.00	0.29

6. Input Offset Current

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

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)	
Channel X	0.2000	199.3	
Channel Y	0.2001	199.9	
Channel Z	0.1999	199.4	

8. Low Battery Alarm Voltage (verified during pre test)

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 - CDMA2000 1xRTT Test Modes for HAC

The phone was tested in all normal configurations for the ear usage. These test configurations are tested at the high, middle and low frequency channels of each applicable operating mode, if applicable; each configuration is tested with the antenna in its fully stowed and deployed positions. The signal was setup by linking an over the air connection between the EUT and an Agilent 8960 (E5515C Wireless Communications Tester). The CDMA radio is available on IS-95 (Radio Configuration 1) and CDMA2000 1xRTT (Radio Configuration 3). The EUT supports IS95 2G networks, CDMA2000 1xRTT for Cellular band and PCS band. The maximum peak field is chosen for HAC testing for worst case scenario. A full HAC measurement in this report is done in CDMA2000 1xRTT mode RC2 + SO17 for Cellular band and PCS band.

Peak Field list:

Band	RC	SO	Туре	Data Rate	Peak Field (V/m) Mid Ch (384)			
	1	2	Loop	Full	111.5			
	1	2	Loop	Eighth	115.3			
	1	3	Voice	-	120.7			
CDMA2000	llular 1 55	55	Loop	Full	113.2			
Cellular			55	55	55	1 55	Eighth	118.2
(1xRTT)		17	Voice	-	122.4			
	2	32768	Voice	-	120.3			
	3	55	Loop	Full	112.1			
	3	2	Loop	Full	112.1			

CDMA2000 Cellular	RC	SO	Туре	Data Rate	Conducted Power (dBm)	Conducted Power (dBm)	Conducted Power (dBm)
					Low Ch (1013)	Mid Ch (384)	High Ch (777)
CDMA 1xRTT	1	2	Loop	Full	23.85	23.92	23.64
				Eighth	24.00	24.07	23.76
	1	3	Voice	-	24.34	24.41	24.13
	1	55	Loop	Full	23.83	23.91	23.61
				Eighth	24.02	24.06	23.84
	2	17	Voice	-	24.38	24.43	24.09
	2	32768	Voice	-	24.35	24.45	24.12
	3	2	Loop	Full	23.80	23.89	23.59
				Eighth	Х	Х	Х
	3	3	Voice	-	Х	Х	Х
	3	55	Loop	Full	23.81	23.89	23.60
				Eighth	Х	Х	Х
	4	3	Voice	-	Х	Х	Х
	5	17	Voice	-	Х	Х	Х
	5	32768	Voice	-	Х	Х	Х

Power list:

Remark: "x" = not supported

CDMA2000 PCS	RC	SO	Туре	Data Rate	Conducted Power (dBm) Low Ch (25)	Conducted Power (dBm) Mid Ch (600)	Conducted Power (dBm) High Ch (1175)
CDMA 1xRTT	1	2	Loop	Full	23.79	23.67	23.55
				Eighth	23.99	23.91	23.67
	1	3	Voice	-	24.34	24.22	24.01
	1	55	Loop	Full	23.79	23.69	23.53
				Eighth	23.98	23.86	23.66
	2	17	Voice	-	24.31	24.16	24.02
	2	32768	Voice	-	24.30	24.18	24.00
	3	2	Loop	Full	23.83	23.73	23.57
				Eighth	Х	Х	Х
	3	3	Voice	-	Х	Х	Х
	3	55	Loop	Full	23.82	23.73	23.57
				Eighth	Х	Х	Х
	4	3	Voice	-	Х	Х	Х
	5	17	Voice	-	Х	Х	Х
	5	32768	Voice	-	Х	Х	Х

Remark: "x" = not supported



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.] 3.1.2.3.4 Maximum RF Output Power 3GPP2 C.S0033-0 Version 2.0, Date: 12 December 2003 Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Terminal
- [3.] May 9, 2006 Preliminary Guidance for Reviewing Applications for Certification of 3G Devices.
- [4.] Publication Number: 766989 Rule Parts: 90S Publication Date: 04/09/2007