



ER3DV6 SN:2358

January 22, 2010

**DASY - Parameters of Probe: ER3DV6 SN:2358**

**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ )	1.71	1.57	1.60	$\pm 10.1\%$
DCP (mV) <sup>A</sup>	94.0	91.5	96.7	

**Modulation Calibration Parameters**

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc <sup>E</sup> (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300	$\pm 1.5\%$
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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%.

<sup>A</sup> numerical linearization parameter: uncertainty not required

<sup>E</sup> Uncertainty is determined using the maximum deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

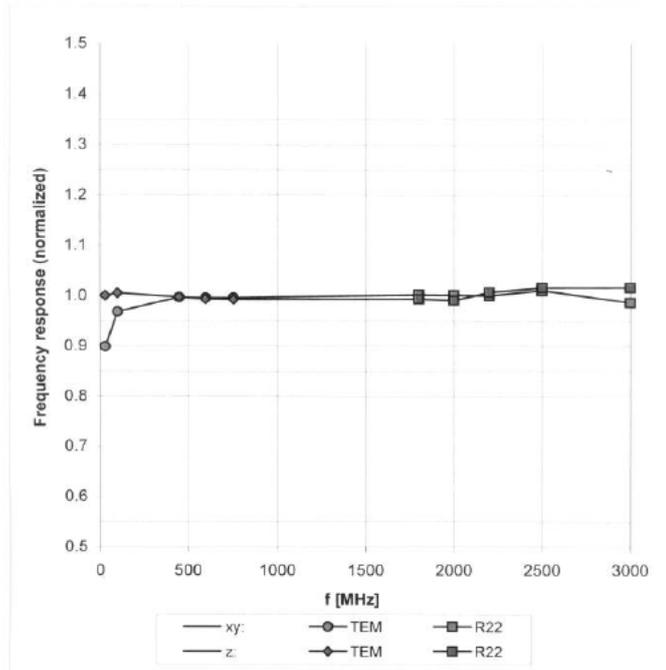


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### Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide R22)



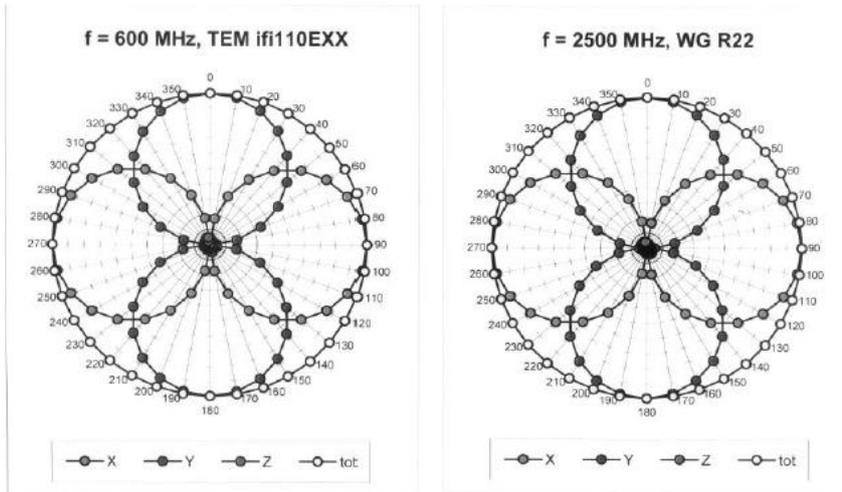
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)



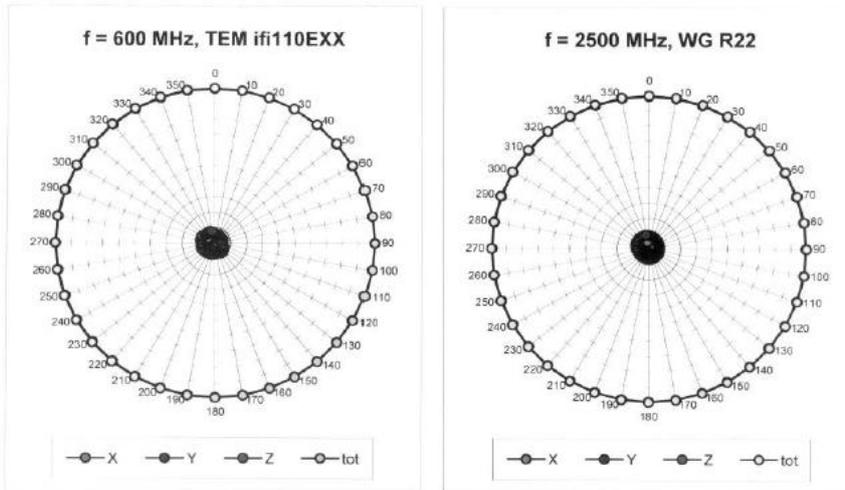
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Receiving Pattern ( $\phi$ ),  $\vartheta = 0^\circ$



Receiving Pattern ( $\phi$ ),  $\vartheta = 90^\circ$

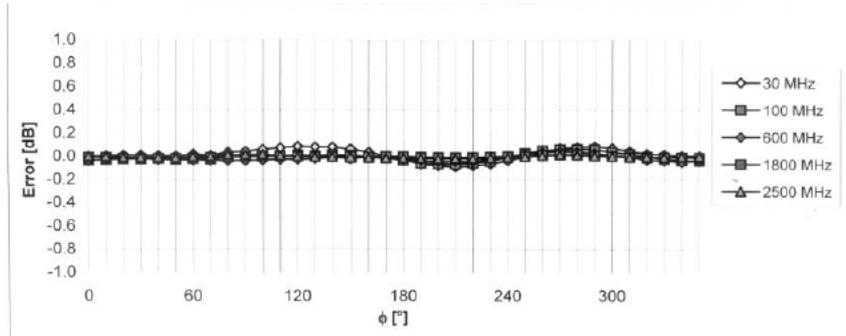




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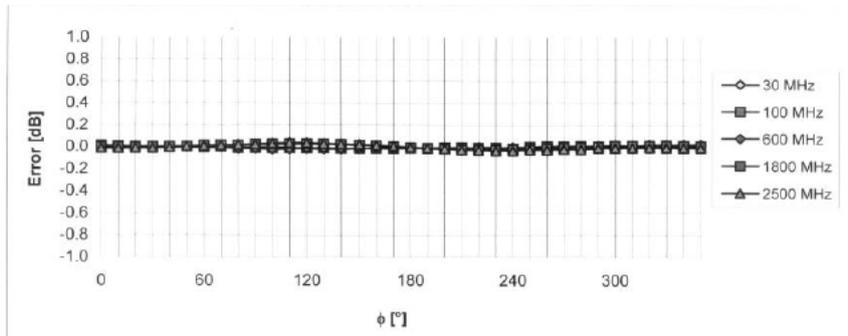
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### Receiving Pattern ( $\phi$ ), $\vartheta = 0^\circ$



Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

### Receiving Pattern ( $\phi$ ), $\vartheta = 90^\circ$



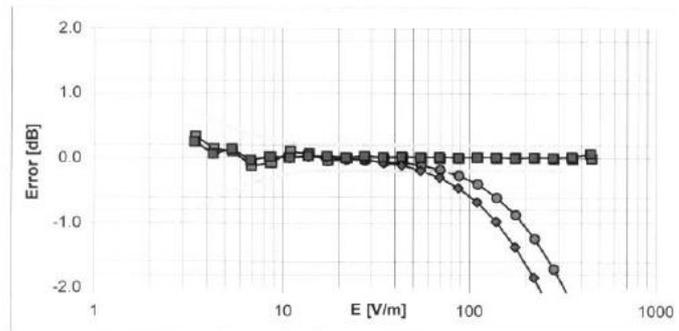
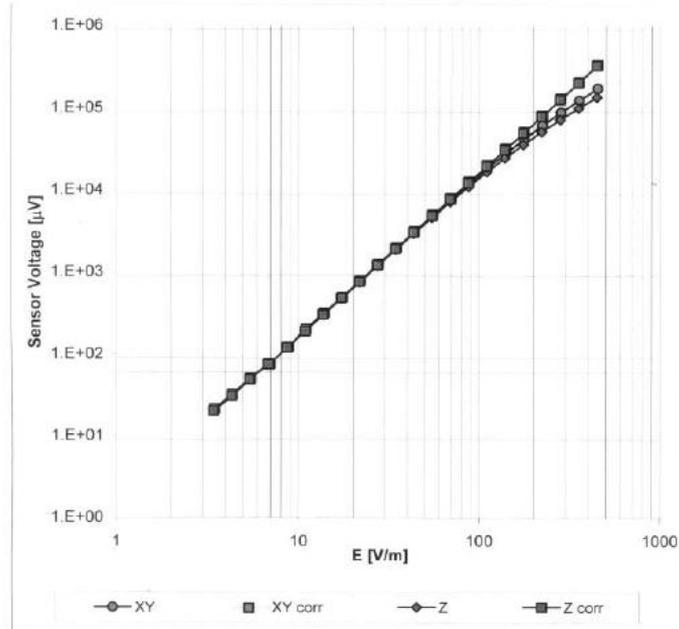
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )



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### Dynamic Range f(E-field) (Waveguide R22, f = 1800 MHz)



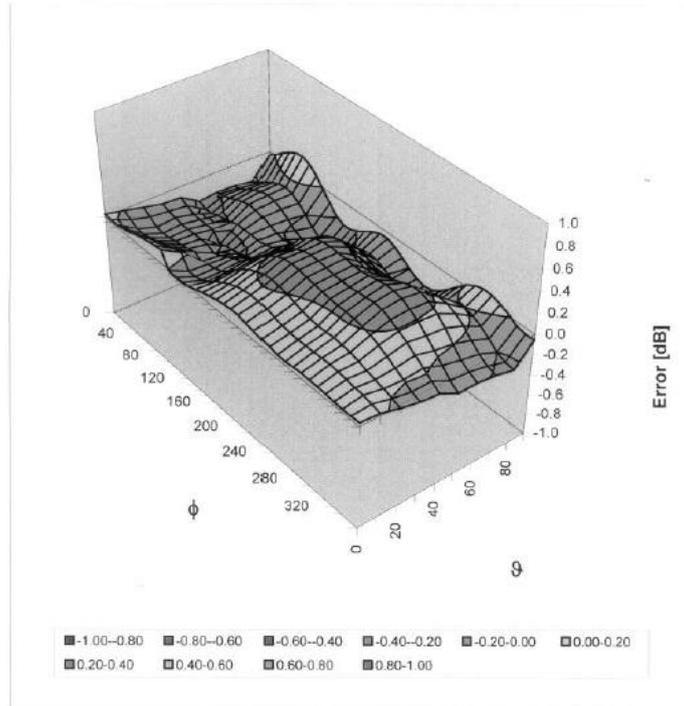
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  (k=2)



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### Deviation from Isotropy in Air Error ( $\phi, \vartheta$ ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )



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**Other Probe Parameters**

Sensor Arrangement	Rectangular
Connector Angle (°)	-242.4
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	8.0 mm
Probe Tip to Sensor X Calibration Point	2.5 mm
Probe Tip to Sensor Y Calibration Point	2.5 mm
Probe Tip to Sensor Z Calibration Point	2.5 mm



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



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Accreditation No.: SCS 108

Client Sporton (Auden)

Certificate No: H3-6184\_Jan10

CALIBRATION CERTIFICATE

Object: H3DV6 - SN:6184
Calibration procedure(s): QA CAL-03.v5 and QA CAL-25.v2
Calibration procedure for H-field probes optimized for close near field evaluations in air
Calibration date: January 22, 2010

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)

Table with 4 columns: Primary Standards, ID #, Cal Date (Certificate No.), Scheduled Calibration. Lists various power meters, sensors, and attenuators with their respective IDs and calibration dates.

Table with 4 columns: Secondary Standards, ID #, Check Date (in house), Scheduled Check. Lists RF generator and Network Analyzer with their IDs and check dates.

Calibrated by: Claudio Leubler, Laboratory Technician
Approved by: Katja Pokovic, Technical Manager

Issued: January 25, 2010

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



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



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Glossary:

Table with 2 columns: Term and Definition. Terms include NORMx,y,z, DCP, CF, A, B, C, Polarization phi, Polarization theta, and Connector Angle.

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 theta = 0 for XY sensors and theta = 90 for Z sensor...
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 with CW signal...
Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C are numerical linearization parameters assessed based on the data of power sweep...
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...
Connector Angle: The angle is assessed using the information gained by determining the X\_a0a1a2...



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January 22, 2010

# Probe H3DV6

## SN:6184

Manufactured:	June 8, 2004
Last calibrated:	January 19, 2009
Recalibrated:	January 22, 2010

Calibrated for DASYS Systems

(Note: non-compatible with DASYS2 system!)



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January 22, 2010

**DASY - Parameters of Probe: H3DV6 SN:6184**

**Basic Calibration Parameters**

		Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (A/m / $\sqrt{(\mu V)}$ )	a0	2.47E-3	2.53E-3	2.97E-3	± 5.1%
Norm (A/m / $\sqrt{(\mu V)}$ )	a1	1.05E-5	-6.02E-5	-1.02E-4	± 5.1%
Norm (A/m / $\sqrt{(\mu V)}$ )	a2	6.86E-6	-6.86E-7	6.53E-5	± 5.1%
DCP (mV) <sup>A</sup>		82.6	91.0	83.0	

**Modulation Calibration Parameters**

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc <sup>E</sup> (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300	± 1.5 %
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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%.

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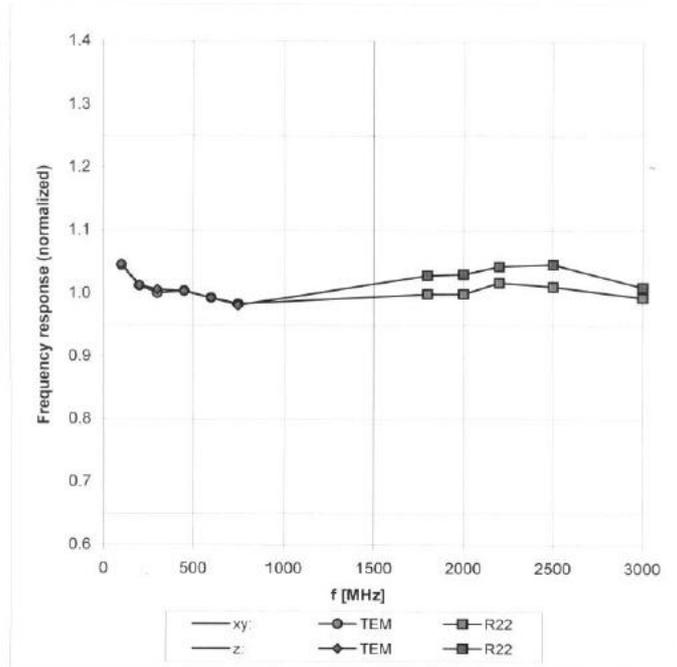


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### Frequency Response of H-Field

(TEM-Cell:ifi110 EXX, Waveguide R22)



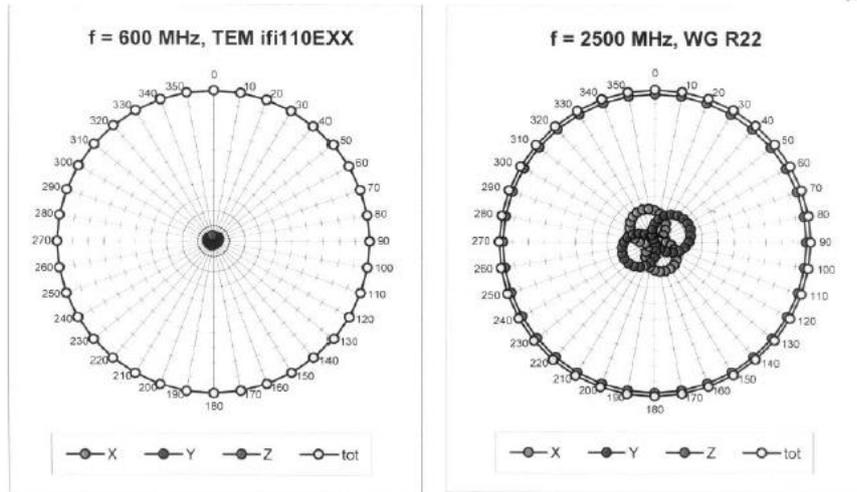
Uncertainty of Frequency Response of H-field:  $\pm 6.3\%$  (k=2)



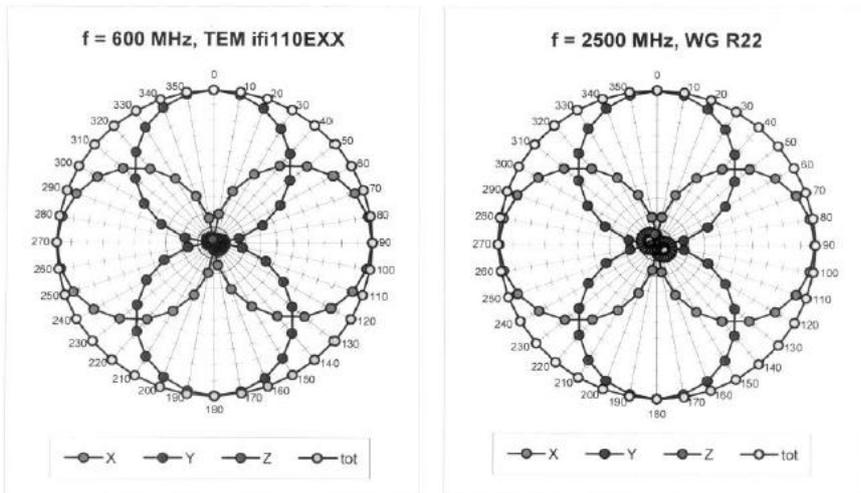
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Receiving Pattern ( $\phi$ ),  $\vartheta = 90^\circ$



Receiving Pattern ( $\phi$ ),  $\vartheta = 0^\circ$

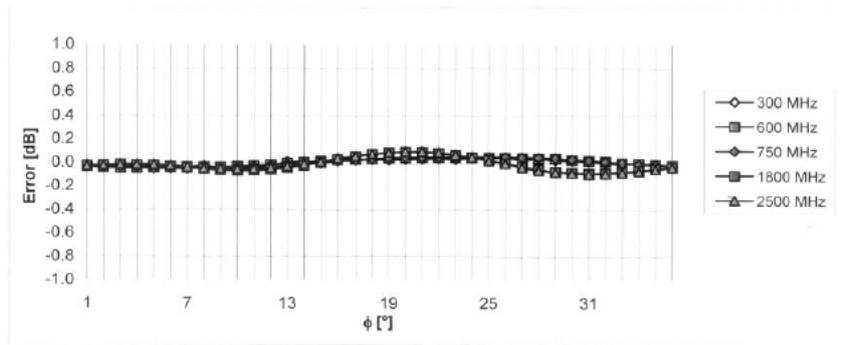




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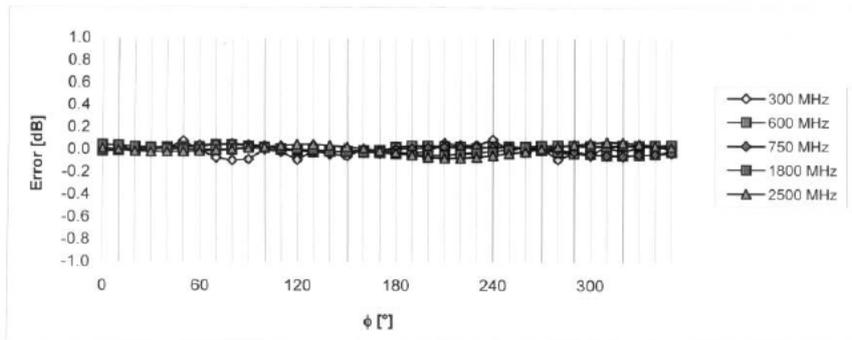
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### Receiving Pattern ( $\phi$ ), $\vartheta = 90^\circ$



Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

### Receiving Pattern ( $\phi$ ), $\vartheta = 0^\circ$



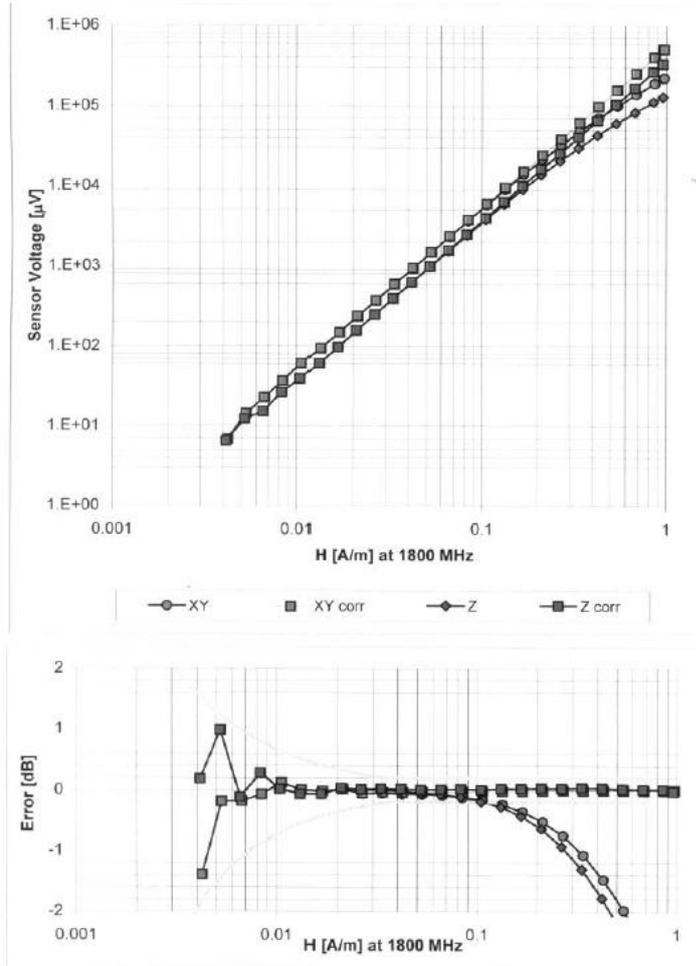
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H3DV6 SN:6184

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### Dynamic Range f(H-field) (Waveguide R22, f = 1800 MHz)



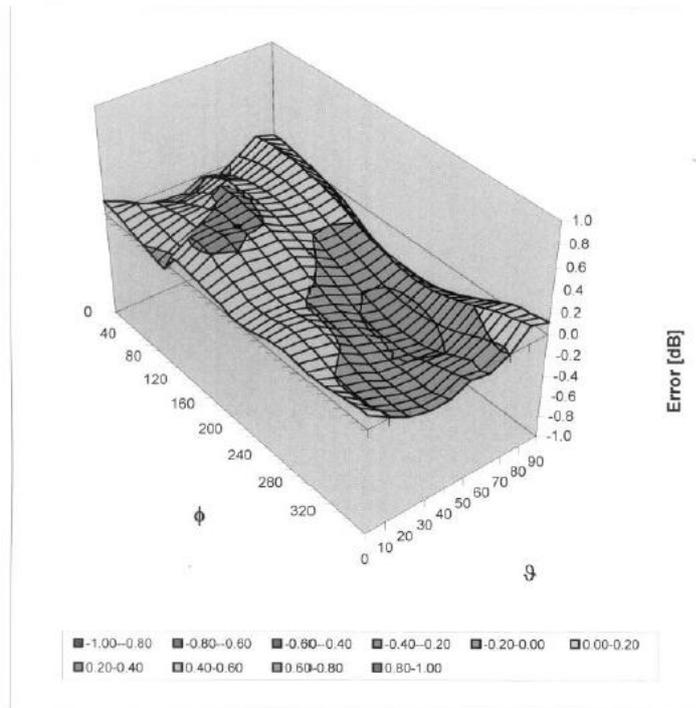
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Connector Angle (°)	-245.3
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Probe Body Diameter	10 mm
Tip Length	20 mm
Tip Diameter	6.0 mm
Probe Tip to Sensor X Calibration Point	3 mm
Probe Tip to Sensor Y Calibration Point	3 mm
Probe Tip to Sensor Z Calibration Point	3 mm