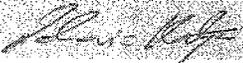
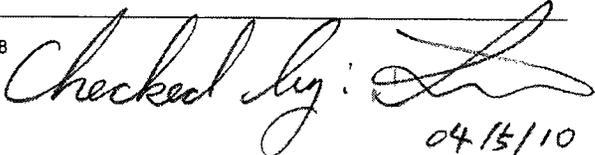


Client **Samsung Suwon (Dymstec)**

CALIBRATION CERTIFICATE																															
Object(s)	ET3DV6 - SN:1551																														
Calibration procedure(s)	QA CAL-01.v2 Calibration procedure for dosimetric E-field probes																														
Calibration date:	April 27, 2004																														
Condition of the calibrated item	In Tolerance (according to the specific calibration document)																														
<p>This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Model Type</th> <th>ID #</th> <th>Cal Date (Calibrated by, Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter EPM E442</td> <td>GB37480704</td> <td>6-Nov-03 (METAS, No. 252-0254)</td> <td>Nov-04</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>US37292783</td> <td>6-Nov-03 (METAS, No. 252-0254)</td> <td>Nov-04</td> </tr> <tr> <td>Fluke Process Calibrator Type 702</td> <td>SN: 6295803</td> <td>8-Sep-03 (Sintrel SCS No. E-030020)</td> <td>Sep-04</td> </tr> <tr> <td>Power sensor HP 8481A</td> <td>MY41092180</td> <td>18-Sep-02 (SPEAG, in house check Oct-03)</td> <td>In house check: Oct 05</td> </tr> <tr> <td>RF generator HP 8684C</td> <td>US3642U01700</td> <td>4-Aug-99 (SPEAG, in house check Aug-02)</td> <td>In house check: Aug-05</td> </tr> <tr> <td>Network Analyzer HP 8753E</td> <td>US37390585</td> <td>18-Oct-01 (SPEAG, in house check Oct-03)</td> <td>In house check: Oct 05</td> </tr> </tbody> </table>				Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration	Power meter EPM E442	GB37480704	6-Nov-03 (METAS, No. 252-0254)	Nov-04	Power sensor HP 8481A	US37292783	6-Nov-03 (METAS, No. 252-0254)	Nov-04	Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04	Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05	RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05	Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-03)	In house check: Oct 05
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Calibrated by:	Name Nico Vetterli	Function Technician	Signature 																												
Approved by:	Name Katja Pokovic	Function Laboratory Director	Signature 																												
Date issued: April 27, 2004																															
<p>This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.</p>																															

Checked by: 
04/15/10

Probe ET3DV6

SN:1551

Manufactured:	October 16, 2000
Last calibrated:	August 28, 2003
Recalibrated:	April 27, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1551**Sensitivity in Free Space****Diode Compression^A**

NormX	1.56 $\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	95	mV
NormY	1.58 $\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	95	mV
NormZ	1.47 $\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	95	mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 7.

Boundary Effect

Head **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	8.5	4.6
SAR _{be} [%]	With Correction Algorithm	0.1	0.3

Head **1800 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	12.3	8.4
SAR _{be} [%]	With Correction Algorithm	0.2	0.1

Sensor Offset

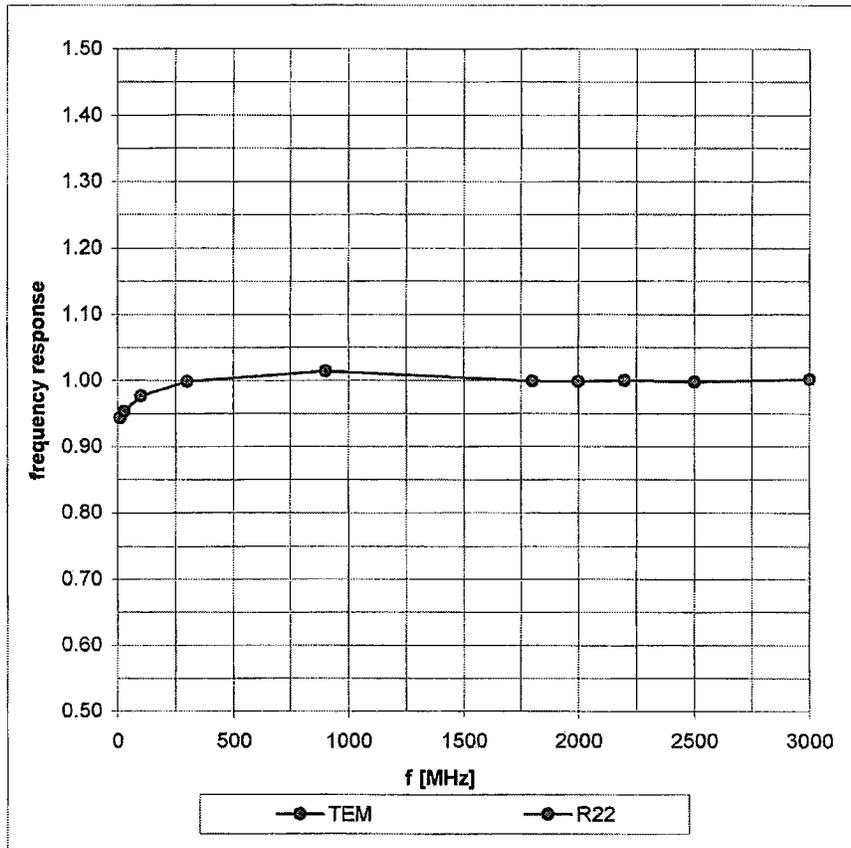
Probe Tip to Sensor Center	2.7 mm
Optical Surface Detection	in tolerance

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%.

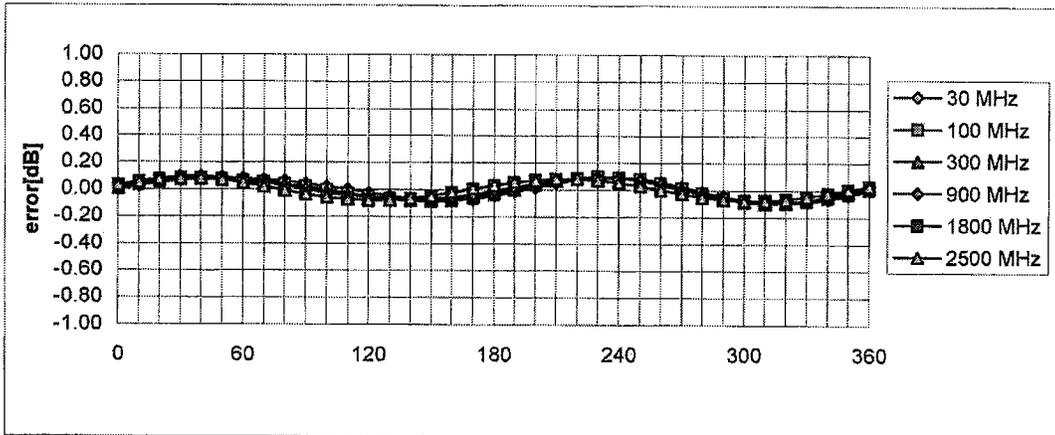
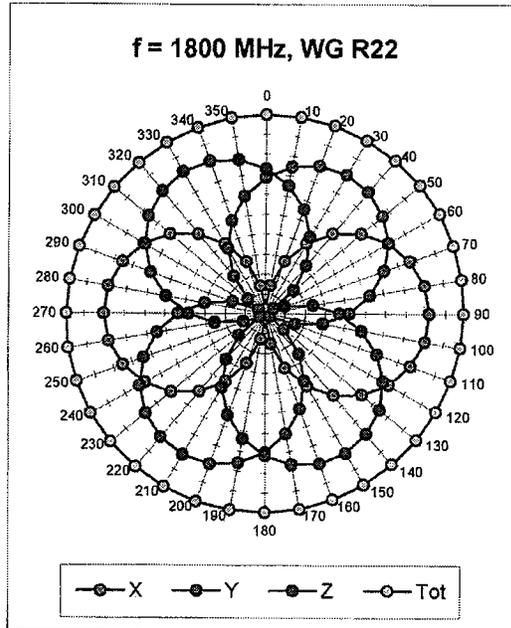
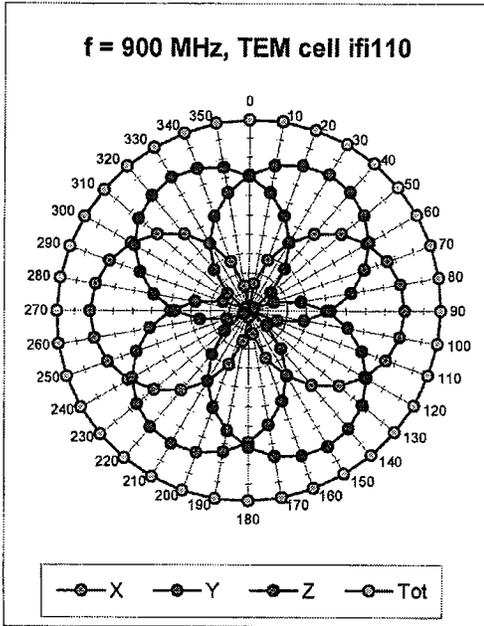
^A numerical linearization parameter: uncertainty not required

Frequency Response of E-Field

(TEM-Cell:ifi110, Waveguide R22)

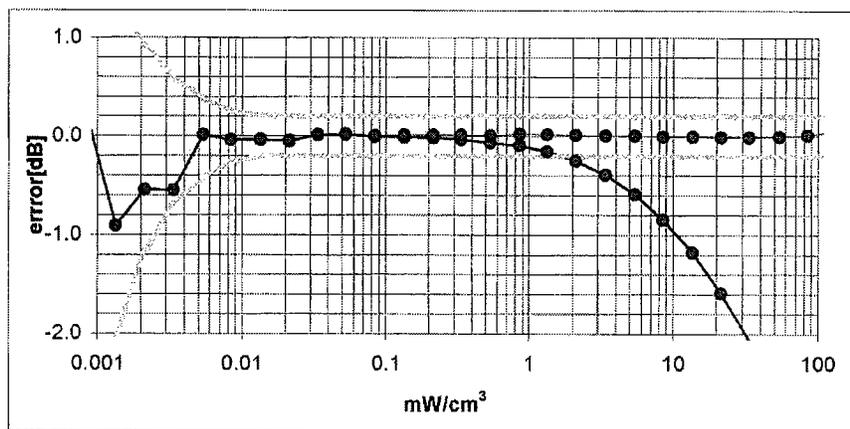
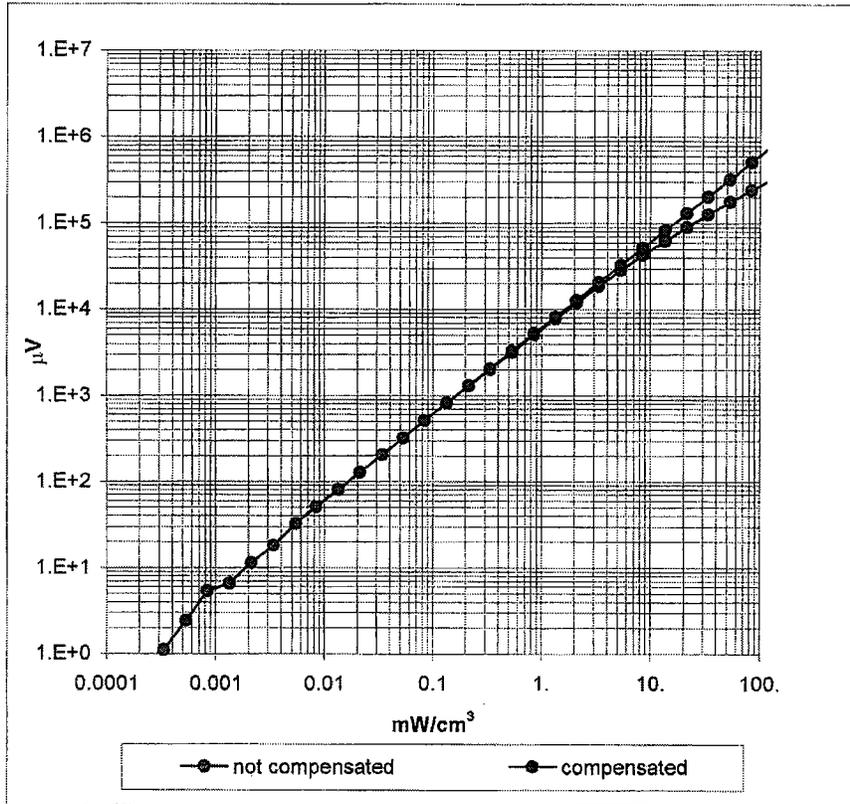


Receiving Pattern (ϕ), $\theta = 0^\circ$



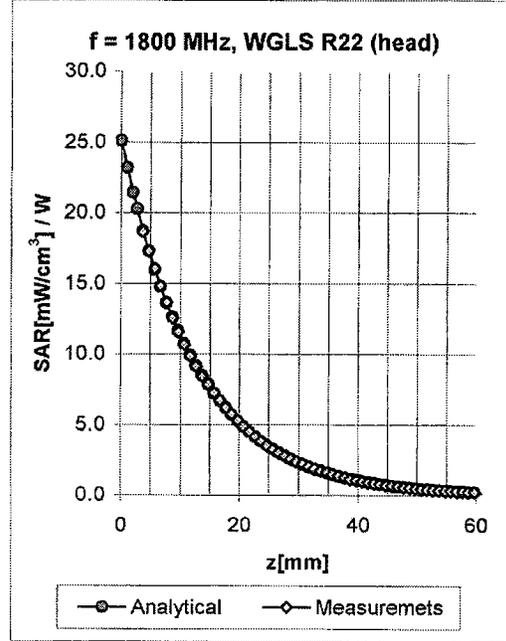
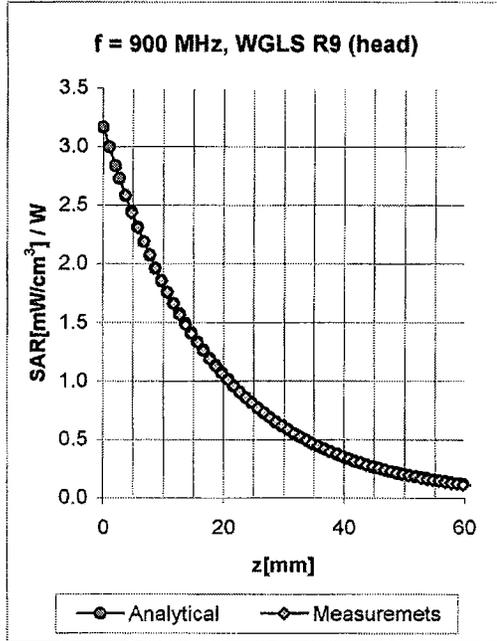
Axial Isotropy Error $< \pm 0.2$ dB

Dynamic Range f(SAR_{head}) (Waveguide R22)



Probe Linearity $< \pm 0.2$ dB

Conversion Factor Assessment

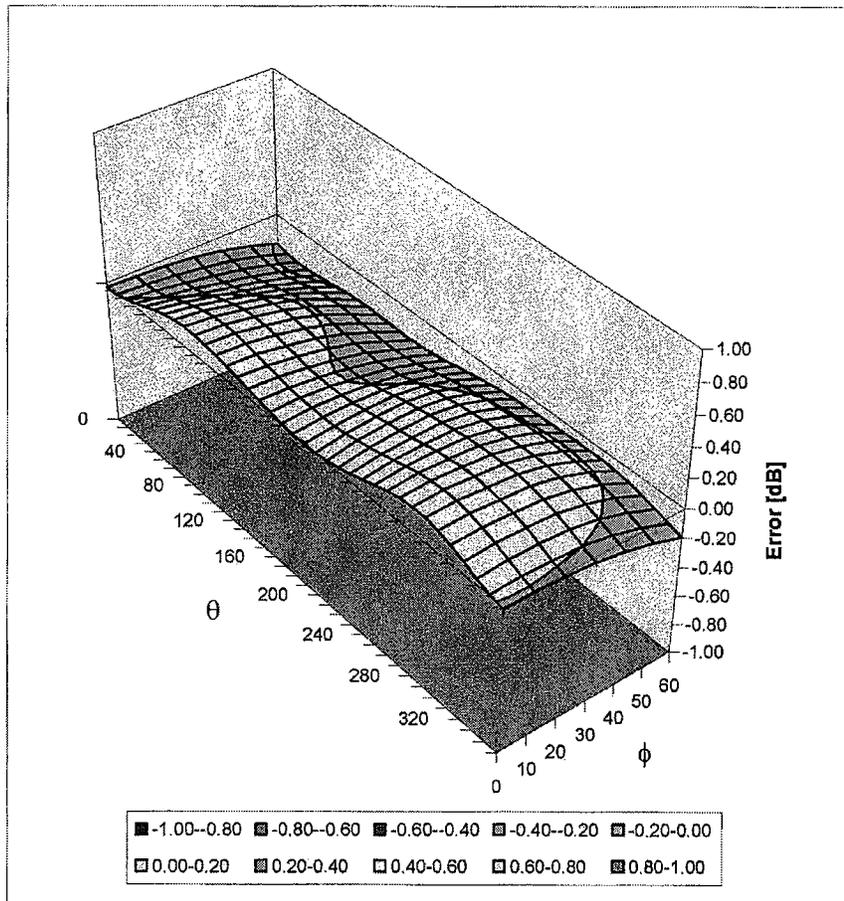


f [MHz]	Validity [MHz] ^B	Tissue	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
835	785-885	Head	41.5 ± 5%	0.90 ± 5%	0.70	1.62	6.54 ± 9.7%	(k=2)
900	850-950	Head	41.5 ± 5%	0.97 ± 5%	0.48	2.02	6.37 ± 9.7%	(k=2)
1750	1700-1800	Head	40.0 ± 5%	1.40 ± 5%	0.45	2.72	5.23 ± 9.7%	(k=2)
1900	1850-1950	Head	40.0 ± 5%	1.40 ± 5%	0.50	2.73	5.00 ± 9.7%	(k=2)
1950	1900-2000	Head	40.0 ± 5%	1.40 ± 5%	0.48	2.69	4.91 ± 9.7%	(k=2)
835	785-885	Body	55.2 ± 5%	0.97 ± 5%	0.43	2.28	6.34 ± 9.7%	(k=2)
900	850-950	Body	55.0 ± 5%	1.05 ± 5%	0.46	2.22	6.09 ± 9.7%	(k=2)
1750	1700-1800	Body	53.3 ± 5%	1.52 ± 5%	0.50	2.99	4.73 ± 9.7%	(k=2)
1900	1850-1950	Body	53.3 ± 5%	1.52 ± 5%	0.55	2.92	4.51 ± 9.7%	(k=2)
1950	1900-2000	Body	53.3 ± 5%	1.52 ± 5%	0.62	2.60	4.36 ± 9.7%	(k=2)

^B The total standard uncertainty is calculated as root-sum-square of standard uncertainty of the Conversion Factor at calibration frequency and the standard uncertainty for the indicated frequency band.

Deviation from Isotropy in HSL

Error (θ, ϕ), $f = 900$ MHz



Spherical Isotropy Error < ± 0.4 dB