



APPENDIX E – DIPOLE CALIBRATION DATA

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

Client **Hyundai CT (Dymstec)**

CALIBRATION CERTIFICATE			
Object(s)	D1900V2 - SN:5d032		
Calibration procedure(s)	QA CAL-05 v2 Calibration procedure for dipole validation kits		
Calibration date:	May 12, 2003		
Condition of the calibrated item	In Tolerance (according to the specific calibration document)		
This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.			
All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.			
Calibration Equipment used (M&TE critical for calibration)			
Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Network Analyzer HP 8753E	US38432426	3-May-00 (Agilent, No. 8702K064602)	In house check: May 03
Calibrated by:	Name Judith Mueller	Function Technician	Signature 
Approved by:	Name Katja Polovka	Function Laboratory Director	Signature 
			Date issued: May 13, 2003
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.			

Schmid & Partner Engineering AG

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DASY

Dipole Validation Kit

Type: D1900V2

Serial: 5d032

Manufactured: March 17, 2003

Calibrated: May 12, 2003

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with head simulating solution of the following electrical parameters at 1900 MHz:

Relative Dielectricity	38.8	$\pm 5\%$
Conductivity	1.44 mho/m	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.2 at 1900 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was 250 mW $\pm 3\%$. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm ³ (1 g) of tissue:	42.0 mW/g $\pm 16.8\%$ (k=2)¹
averaged over 10 cm ³ (10 g) of tissue:	21.6 mW/g $\pm 16.2\%$ (k=2)¹

¹ validation uncertainty

Date/Time: 05/12/03 20:36:30

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SNSd032_SN1507_HSL1900_120503.d4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN5d032
Program: Dipole Calibration

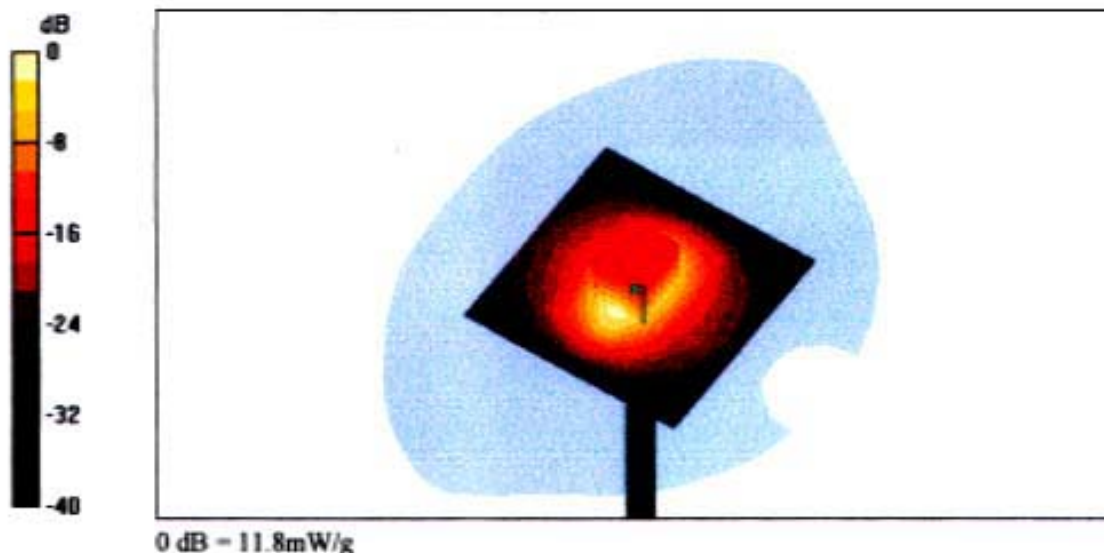
Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL 1900 MHz ($\sigma = 1.44 \text{ mho/m}$, $\epsilon_r = 38.8$, $\rho = 1000 \text{ kg/m}^3$)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.2, 5.2, 5.2); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1); Measurement grid: dx=15mm, dy=15mm
Reference Value = 94.9 V/m
Power Drift = 0.06 dB
Maximum value of SAR = 11.6 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0; Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 18.4 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.39 mW/g
Reference Value = 94.9 V/m
Power Drift = 0.06 dB
Maximum value of SAR = 11.8 mW/g

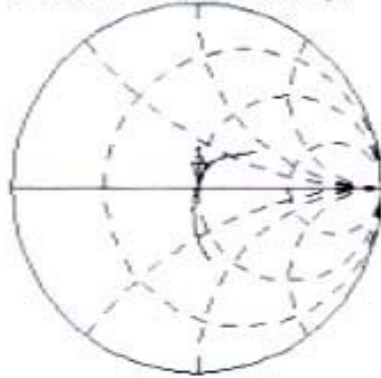


CH1 S11 1 U FS 1: 58.521 a 2: 1797 a 266.35 μ H 1 900.000 000 MHz

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PRa
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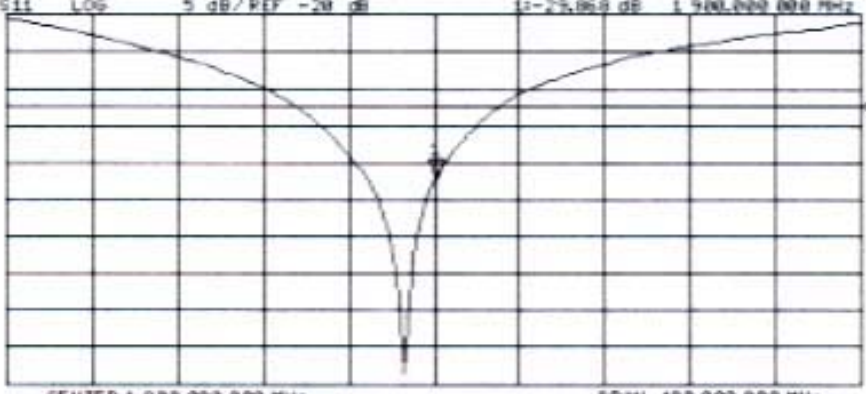
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CH2 S11 LOG 5 dB/REF -20 dB 1: -23.968 dB 1 900.000 000 MHz

PRa
 Cor

t



CENTER 1 900.000 000 MHz

SPAN 400.000 000 MHz