



## APPENDIX D – DIPOLE CALIBRATION CERTIFICATE

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



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

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

Accreditation No.: **SCS 108**

Client **MET Laboratories**

Certificate No: **D835V2-4d110\_Jul13**

## CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d110**

Calibration procedure(s) **QA CAL-05.v9  
Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **July 17, 2013**

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.

All calibrations have been conducted in the closed laboratory facility: environment temperature ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

Calibrated by: **Name** Leif Klynsner **Function** Laboratory Technician

**Signature**

Approved by: **Name** Katja Pokovic **Function** Technical Manager

Issued: July 18, 2013

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

# Impedance Measurement Plot for Body TSL

18 Jul 2013 09:09:12

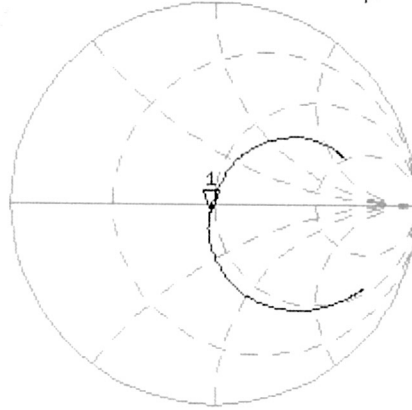
CH1 S11 1 U FS 1: 47.578  $\Omega$  -4.1309  $\Omega$  46.142 pF 835.000 000 MHz

\*  
Del

CA

Avg  
16

H1d

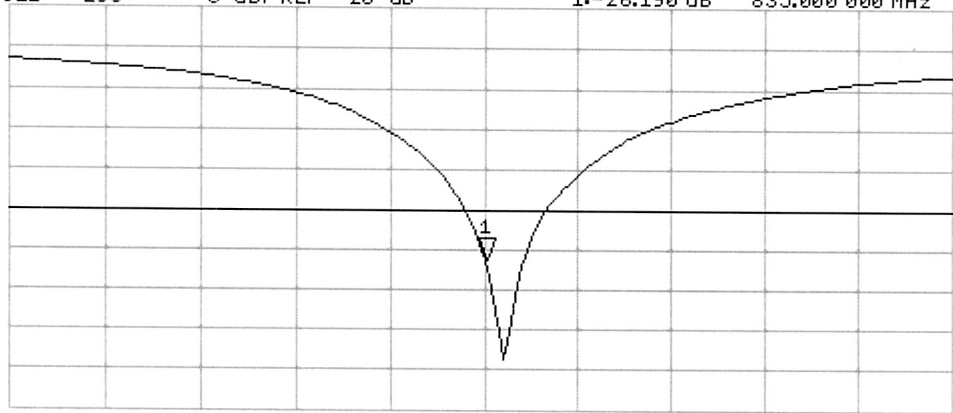


CH2 S11 LOG 5 dB/REF -20 dB 1:-26.190 dB 835.000 000 MHz

CA

Avg  
16

H1d



START 835.000 000 MHz

STOP 1 835.000 000 MHz

# DASY5 Validation Report for Body TSL

Date: 17.07.2013

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d110**

Communication System: UID 0 - CW ; Frequency: 835 MHz

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 1 \text{ S/m}$ ;  $\epsilon_r = 54.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.04, 6.04, 6.04); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

## Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

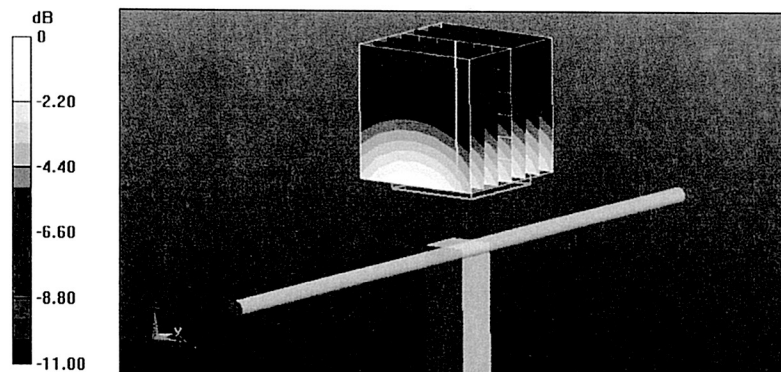
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 55.327 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.57 W/kg

**SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.61 W/kg**

Maximum value of SAR (measured) = 2.84 W/kg



0 dB = 2.84 W/kg = 4.53 dBW/kg

# Impedance Measurement Plot for Head TSL

18 Jul 2013 09:47:34

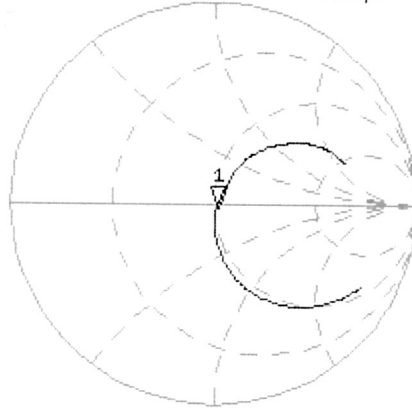
[CH1] S11 1 U FS 1: 51.242  $\Omega$  -2.7070  $\Omega$  70.411 pF 835.000 000 MHz

\*  
De1

CA

Avg  
16

H1 d

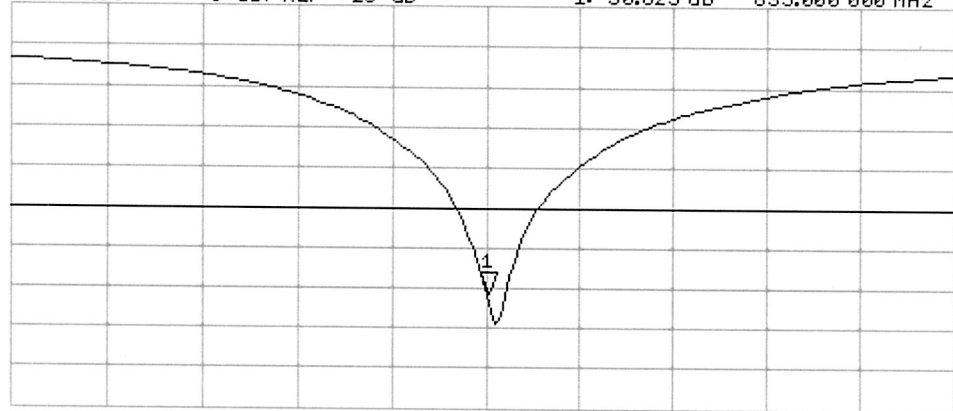


CH2 S11 LOG 5 dB/REF -20 dB 1:-30.625 dB 835.000 000 MHz

CA

Avg  
16

H1 d



START 635.000 000 MHz

STOP 1 035.000 000 MHz