RFID 900MHz_Test Position 5_Channel Low

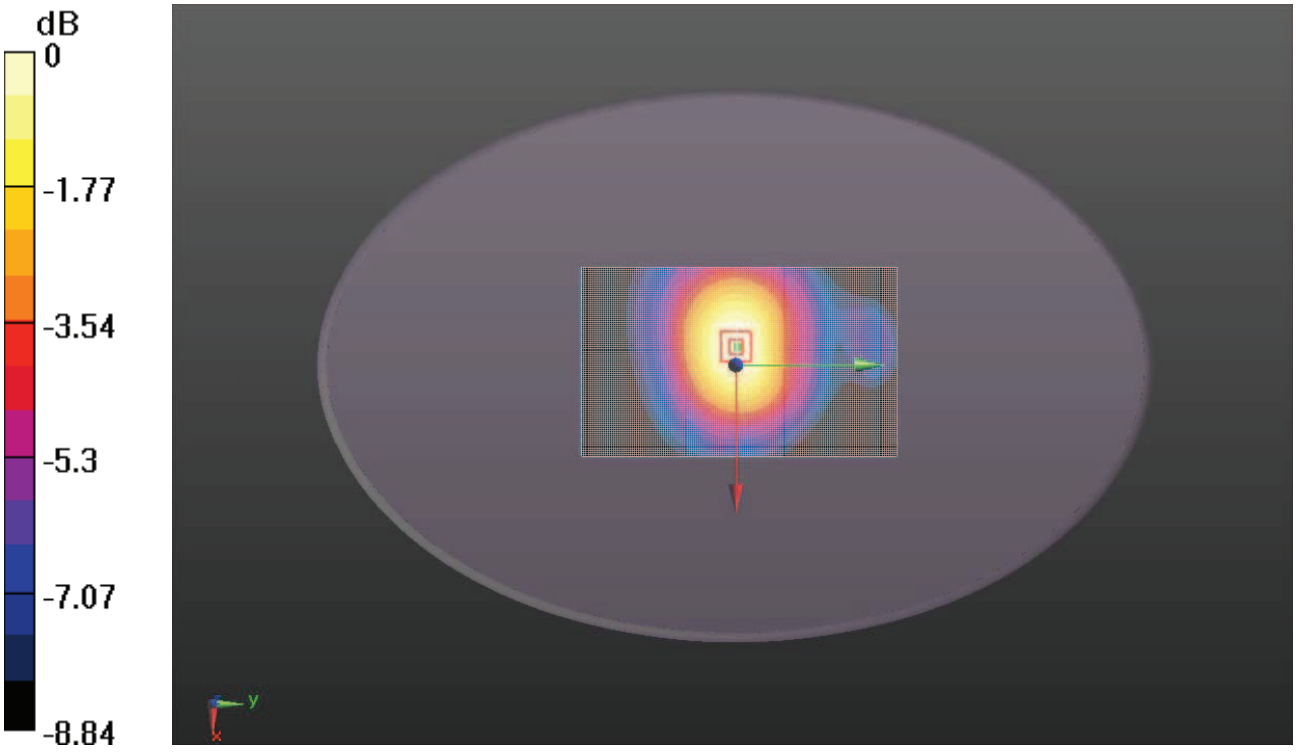
Date/Time: 11/17/2011 10:26:42 AM
Electronics: DAE4 Sn786
Medium: Body 900
Medium parameters used (interpolated): f = 902.75 MHz; σ = 1.06 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Ambient Temperature: 22.5℃ Liquid Temperature: 22.5℃
Communication System: RFID Frequency: 902.75 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3151 ConvF (6.02, 6.02, 6.02)

Test Position 5_Channel Low /Area Scan (91x151x1): Measurement grid:

dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.228 mW/g

Test Position 5_Channel Low /Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.6 V/m; Power Drift = -0.151 dB
Peak SAR (extrapolated) = 0.277 W/kg
SAR(1 g) = 0.212 mW/g; SAR(10 g) = 0.155 mW/g
Maximum value of SAR (measured) = 0.223 mW/g



0 dB = 0.223mW/g

Fig.23 RFID 900MHz CH1 Test Position 5

RFID 900MHz_Test Position 6_Channel Low

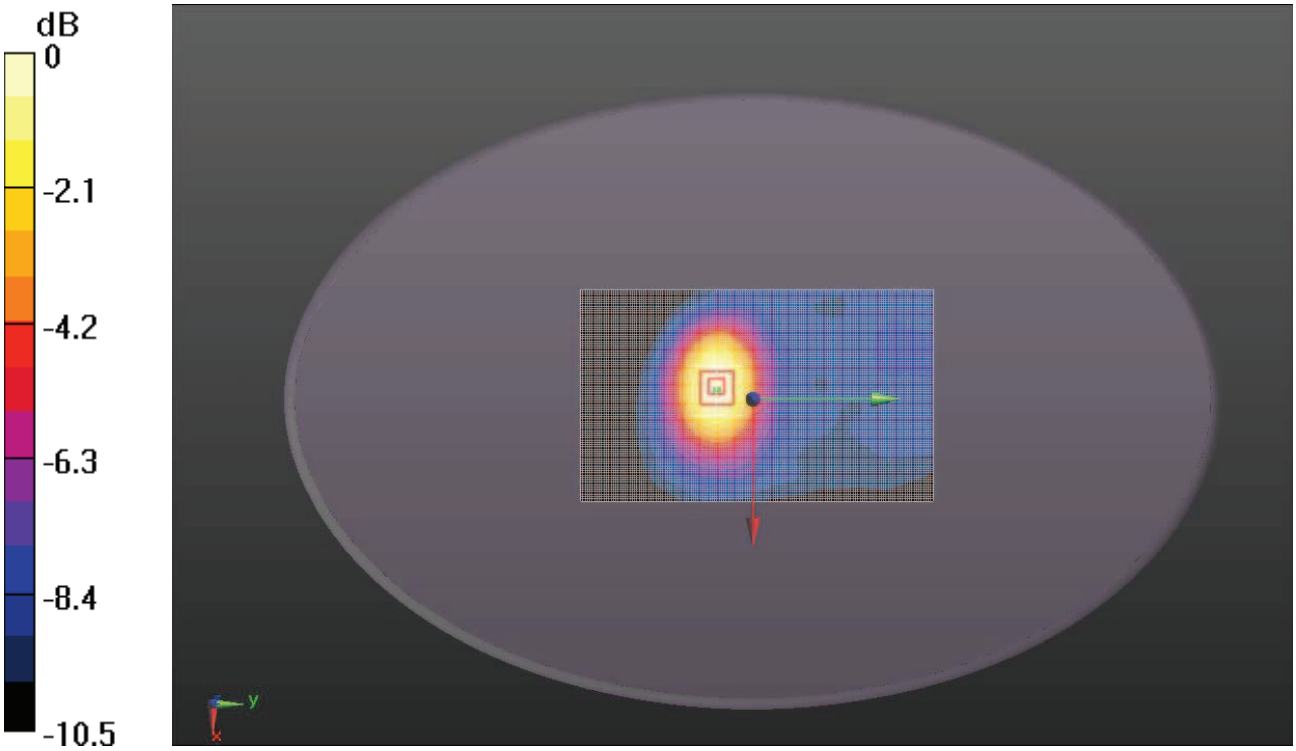
Date/Time: 11/17/2011 10:55:49 AM
Electronics: DAE4 Sn786
Medium: Body 900
Medium parameters used (interpolated): f = 902.75 MHz; σ = 1.06 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Ambient Temperature: 22.5℃ Liquid Temperature: 22.5℃
Communication System: RFID Frequency: 902.75 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3151 ConvF (6.02, 6.02, 6.02)

Test Position 6_Channel Low /Area Scan (91x151x1): Measurement grid:

dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.043 mW/g

Test Position 6_Channel Low /Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.96 V/m; Power Drift = 0.127 dB
Peak SAR (extrapolated) = 0.058 W/kg
SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.027 mW/g
Maximum value of SAR (measured) = 0.043 mW/g



0 dB = 0.043mW/g

Fig.24 RFID 900MHz CH1 Test Position 6

ANNEX D SYSTEM VALIDATION RESULTS

835MHz

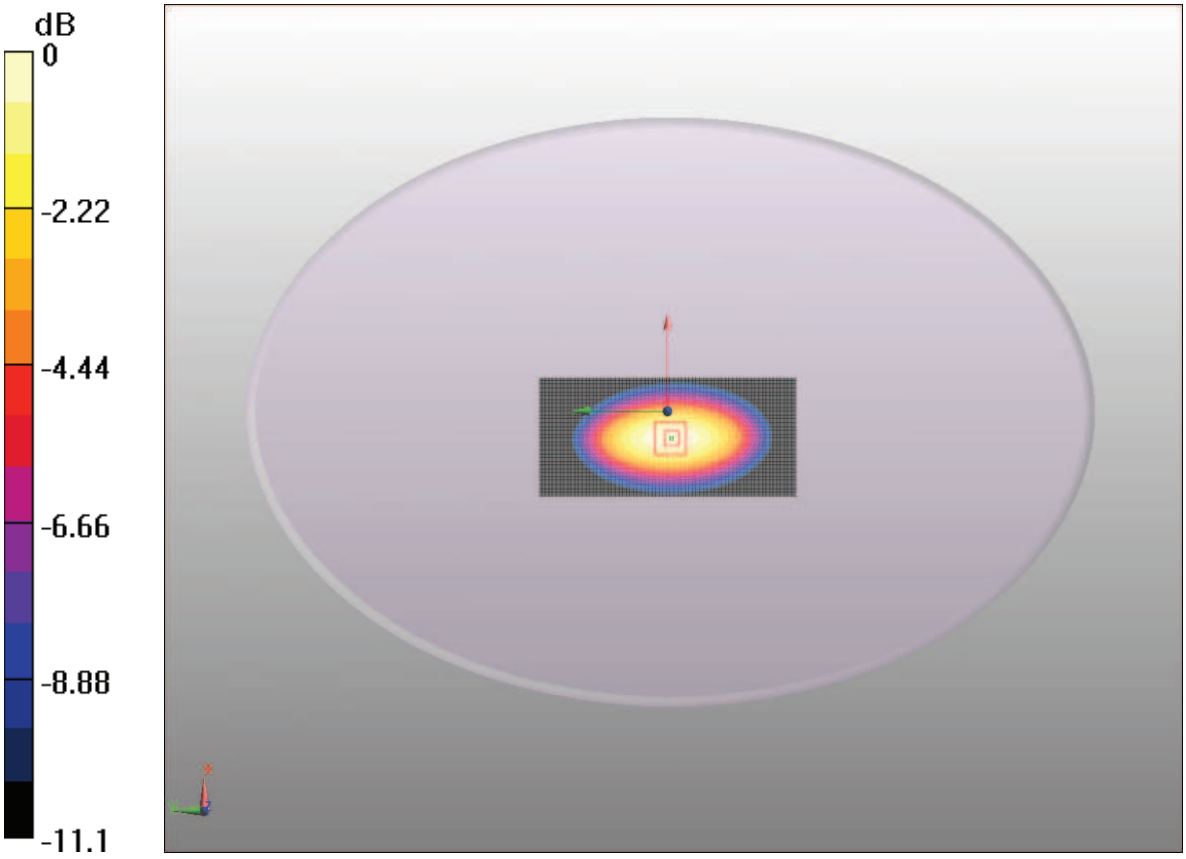
Date/Time: 11/17/2011 8:05:24 AM
Electronics: DAE4 Sn786
Medium: Body 850
Medium parameters used: f = 835 MHz; σ = 1.00 mho/m; ε_r = 53.83; ρ = 1000 kg/m^3
Ambient Temperature: 22.5℃ Liquid Temperature: 22.5℃
Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3151 ConvF (6.02, 6.02, 6.02)

System Validation /Area Scan (101x101x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 2.71 mW/g

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm
Reference Value = 53.1 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 3.49 W/kg
SAR(1 g) = 2.50 mW/g; SAR(10 g) = 1.56 mW/g
Maximum value of SAR (measured) = 2.58 mW/g



0 dB = 2.58mW/g

Fig.25 validation 835MHz 250Mw

1900MHz

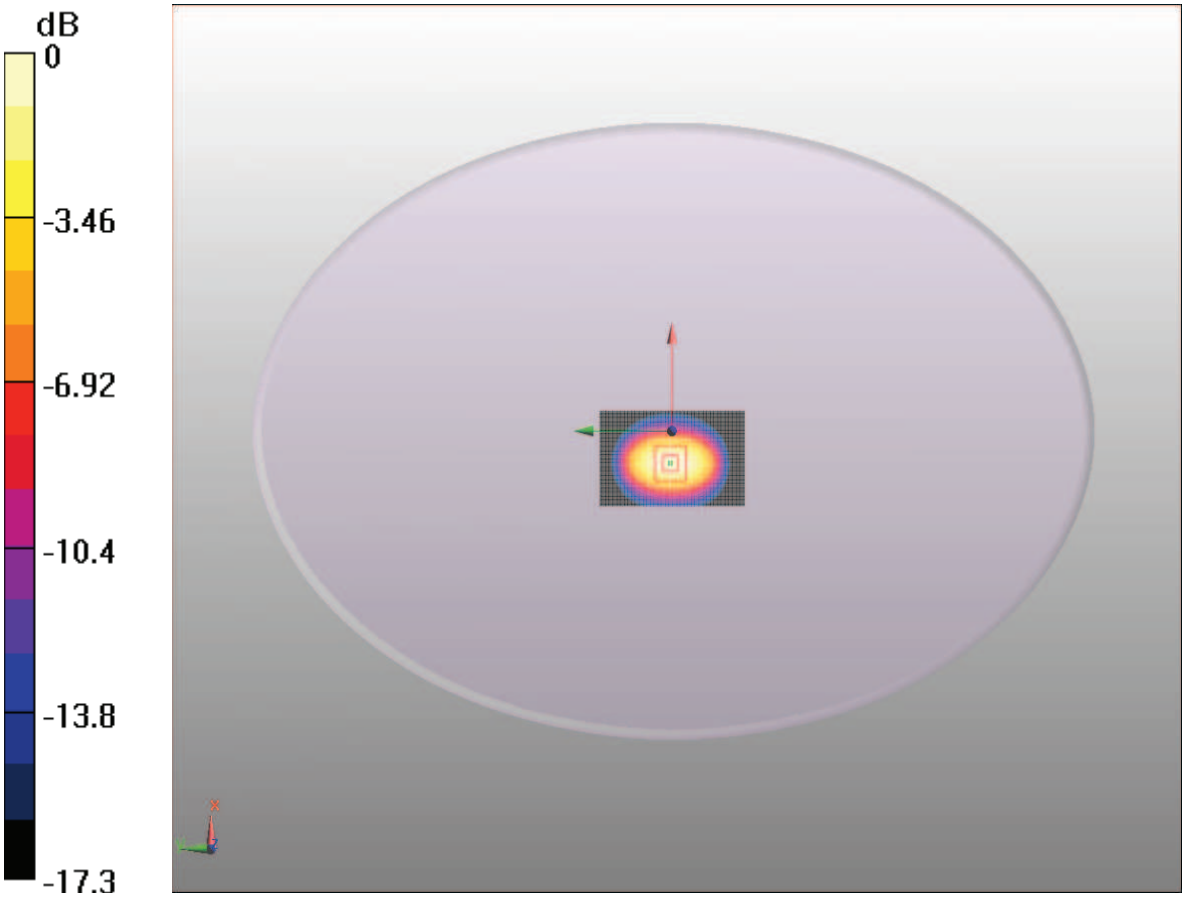
Date/Time: 11/04/2011 8:06:15 AM
Electronics: DAE4 Sn771
Medium: Body 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.58 mho/m; ε_r = 52.76; ρ = 1000 kg/m^3
Ambient Temperature: 22.0℃ Liquid Temperature: 22.0℃
Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3151 ConvF (4.87, 4.87, 4.87)

System Validation/Area Scan (101x101x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 11.7 mW/g

System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.5 V/m; Power Drift = 0.071 dB
Peak SAR (extrapolated) = 16.6 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.19 mW/g
Maximum value of SAR (measured) = 11.4 mW/g



0 dB = 11.4mW/g

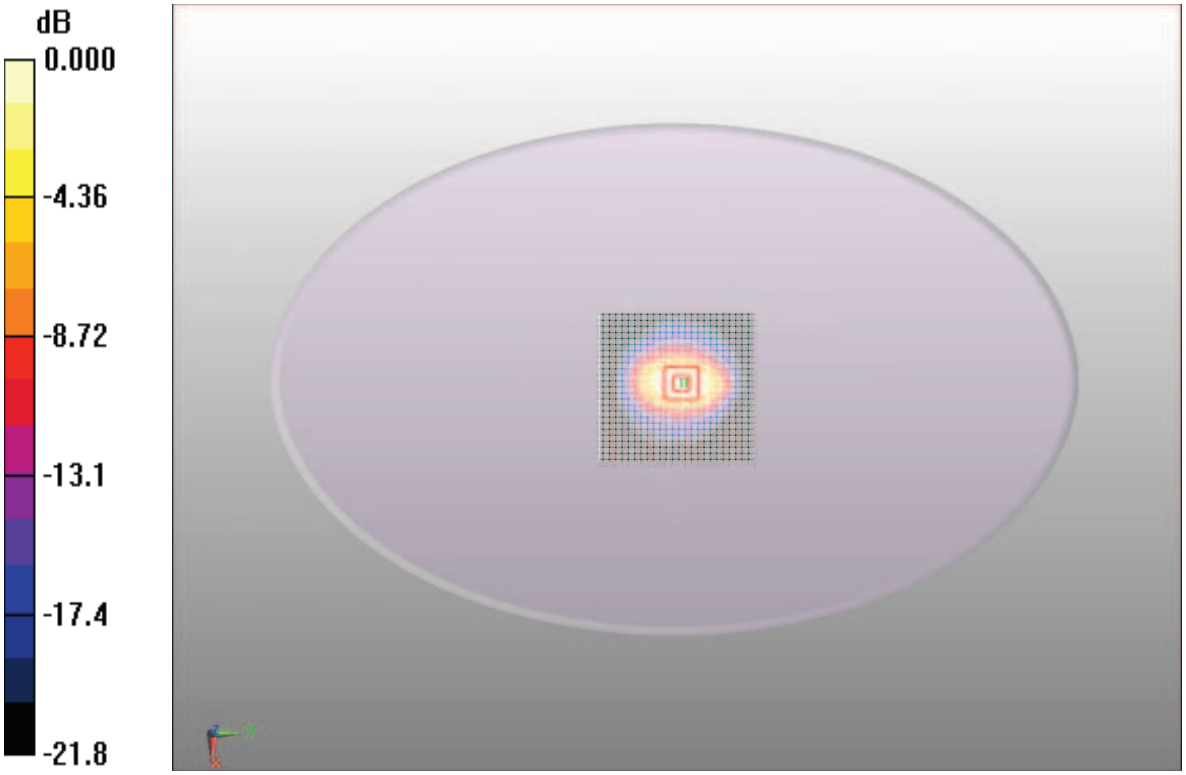
Fig.26 validation 1900MHz 250Mw

2450MHz

Date/Time: 11/07/2011 8:03:07 AM
Electronics: DAE4 Sn786
Medium: 2450 Body
Medium parameters used: σ = 2.04 mho/m; εr = 50.80; ρ = 1000 kg/m3
Ambient Temperature: 22.0 ℃ Liquid Temperature: 22.0 ℃
Communication System: CW Frequency: 2450 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3151 ConvF (3.72, 3.72, 3.72)

System Validation/Area Scan (101x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 13.9 mW/g

System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86.1 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 18.8 W/kg
SAR(1 g) = 12.8 mW/g; SAR(10 g) = 5.78 mW/g
Maximum value of SAR (measured) = 14.1 mW/g



0 dB = 14.1mW/g

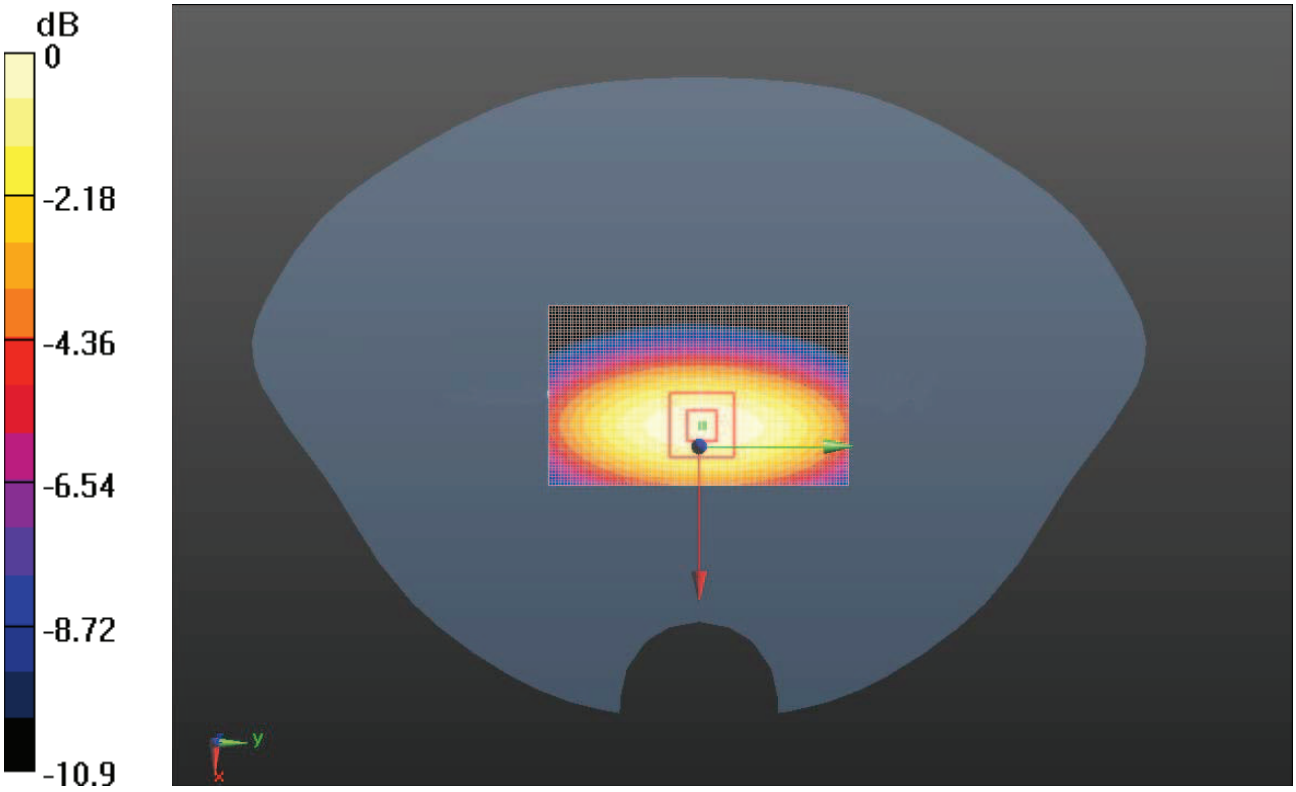
Fig.27 validation 2450MHz 250Mw

900MHz

Date/Time: 11/16/2011 4:39:34 PM,
Electronics: DAE4 Sn786
Medium: body 900
Medium parameters used: f = 900 MHz; σ = 1.05 mho/m; ε_r = 53.31; ρ = 1000 kg/m^3
Ambient Temperature: 22.5℃ Liquid Temperature: 22.5℃
Communication System: CW Frequency: 900 MHz Duty Cycle: 1:1
Probe: ES3DV3 - SN3151 ConvF (6.02, 6.02, 6.02)

System Validation /Area Scan (61x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 3.03 mW/g

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 46.6 V/m; Power Drift = -0.071 dB
Peak SAR (extrapolated) = 4.24 W/kg
SAR(1 g) = 2.79 mW/g; SAR(10 g) = 1.79 mW/g
Maximum value of SAR (measured) = 3.03 mW/g



0 dB = 3.03mW/g

Fig.28 validation 900MHz 250Mw

ANNEX E PROBE 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 Telecommunication Metrology Center of MIIT Certificate No: ES3DV3-3151_Apr11

CALIBRATION CERTIFICATE

Object	ES3DV3-SN: 3151
Calibration procedure(s)	QA CAL-01.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	April 27, 2011
Condition of the calibrated item	In Tolerance

This calibration certify 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 at an environment temperature (22±3)°C and humidity<70%

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Data (Calibrated by, Certification NO.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-10 (METAS, NO. 251-00388)	May-11
Power sensor E4412A	MY41495277	5-May-10 (METAS, NO. 251-00388)	May-11
Reference 3 dB Attenuator	SN:S5054 (3c)	10-Aug-10 (METAS, NO. 251-00403)	Aug-11
Reference 20 dB Attenuator	SN:S5086 (20b)	3-May-10 (METAS, NO. 251-00389)	May-11
Reference 30 dB Attenuator	SN:S5129 (30b)	10-Aug-10 (METAS, NO. 251-00404)	Aug-11
DAE4	SN:617	10-Jun-10 (SPEAG, NO.DAE4-907_Jun10)	Jun-11
Reference Probe ES3DV2	SN: 3013	11-Jan-11 (SPEAG, NO. ES3-3013_Jan11)	Jan-12

Secondary Standards	ID#	Check Data (in house)	Scheduled Calibration
RF generator HP8648C	US3642U01700	4-Aug-99(SPEAG, in house check Oct-10)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01(SPEAG, in house check Nov-10)	In house check: Nov-11

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: April 27, 2011

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

Certificate No: ES3DV3-3151_Apr11 Page 1 of 9

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
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

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *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 nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN: 3151

Manufactured: June 12, 2007

Calibrated: April 27, 2011

Calibrated for DASY4 System

ES3DV3 SN: 3151 April 27, 2011

DASY – Parameters of Probe: ES3DV3 SN:3151

Sensitivity in Free Space[A] Diode Compression[B]

NormX	1.18±10.1%	$\mu V/(V/m)^2$	DCP X	93mV
NormY	1.25±10.1%	$\mu V/(V/m)^2$	DCP Y	96mV
NormZ	1.21±10.1%	$\mu V/(V/m)^2$	DCP Z	94mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)
Please see Page 8

Boundary Effect

TSL 900MHz Typical SAR gradient: 5% per mm

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SARbe[%]	Without Correction Algorithm	10.7	6.5
SARbe[%]	With Correction Algorithm	1.0	0.5

TSL 1810MHz Typical SAR gradient: 10% per mm

Sensor Center to Phantom Surface Distance		3.0 mm	4.0 mm
SARbe[%]	Without Correction Algorithm	10.1	5.4
SARbe[%]	With Correction Algorithm	0.7	0.6

Sensor Offset

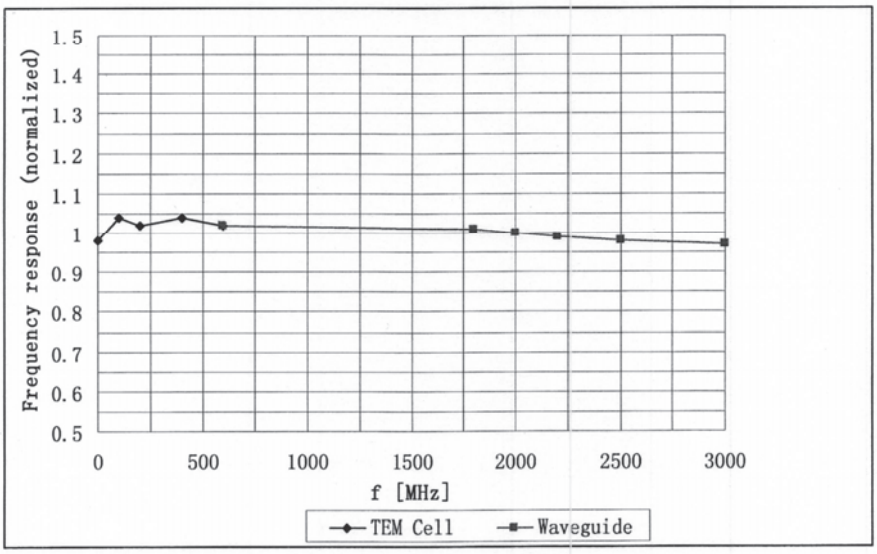
Probe Tip to Sensor Center	2.0 mm

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2,which for a normal distributio Corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).
[B] Numerical linearization parameter: uncertainty not required.

ES3DV3 SN: 3151 April 27, 2011

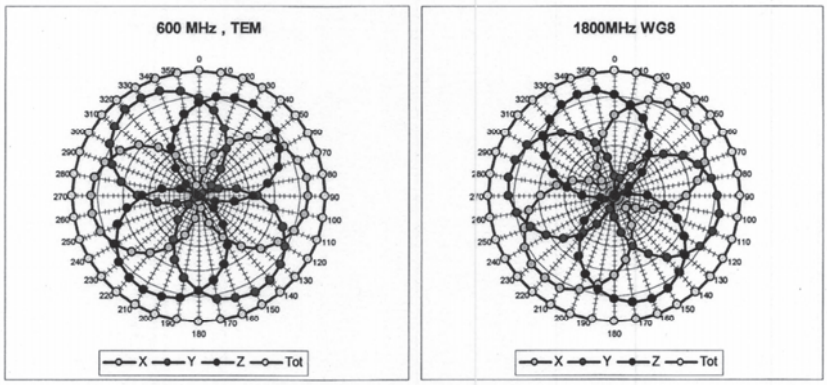
Frequency Response of E-Field

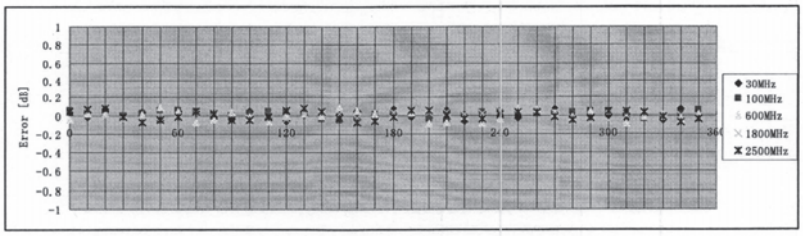


Uncertainty of Frequency Response of E-field: ±6.3% (k=2)

ES3DV3 SN: 3151 April 27, 2011

Receiving Pattern (ϕ), θ =0°





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