

TA Technology (Shanghai) Co., Ltd.
Test Report

Report No. RZA2010-0551

Page 41 of 65

Face Held, 12.5 KHz, Front towards Phantom, 469.975 MHz

Date/Time: 3/28/2010 2:02:15 PM

Communication System: PTT 450; Frequency: 469.975 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 469.975$ MHz; $\sigma = 0.895$ mho/m; $\epsilon_r = 44.3$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: ET3DV6 - SN1737; ConvF(7.2, 7.2, 7.2); Calibrated: 11/20/2009

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Towards Phantom/Area Scan (61x181x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.3 mW/g

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

Reference Value = 114.3 V/m; Power Drift = -0.070 dB

Peak SAR (extrapolated) = 14.4 W/kg

SAR(1 g) = 10 mW/g; SAR(10 g) = 7.16 mW/g

Maximum value of SAR (measured) = 10.5 mW/g

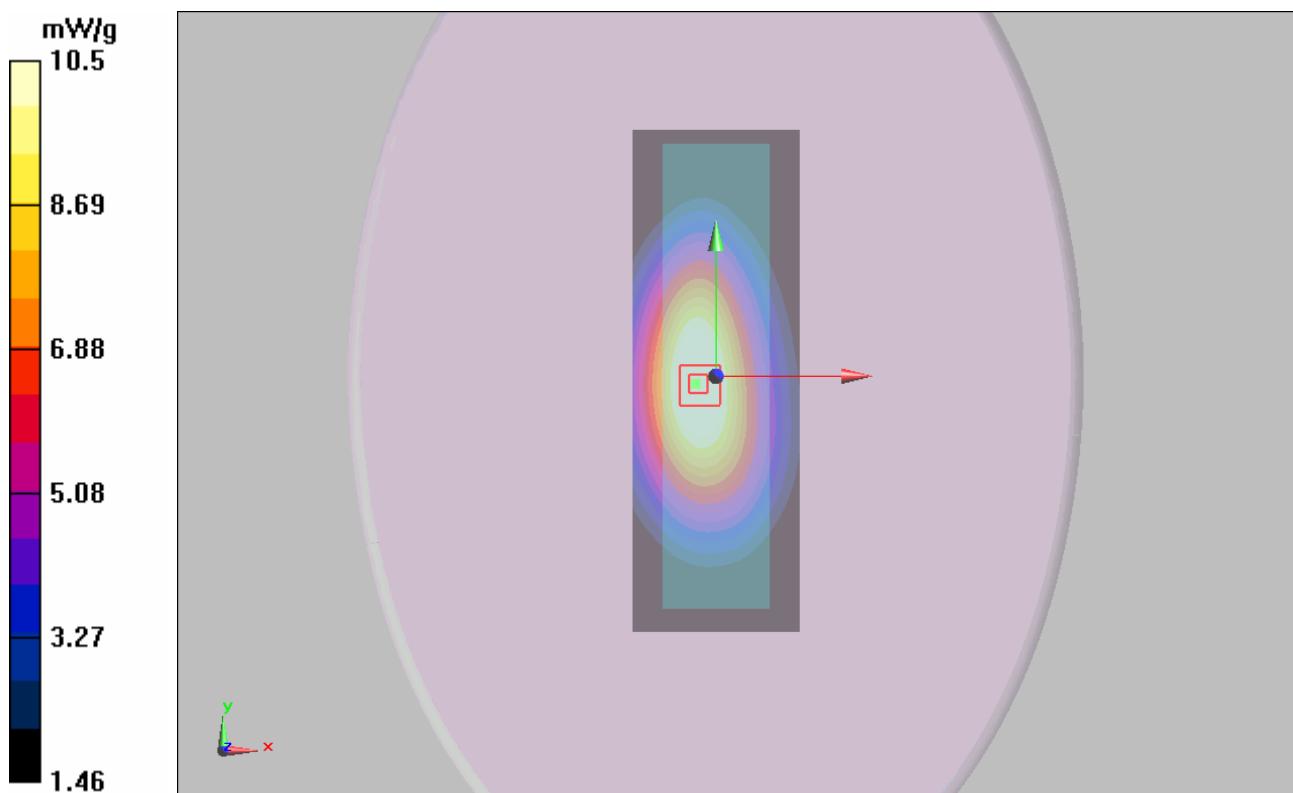


Figure 21 Face Held, 12.5 KHz, Front Towards Phantom, 470.025 MHz

TA Technology (Shanghai) Co., Ltd.

Test Report

Report No. RZA2010-0551

Page 42 of 65

ANNEX D: Probe Calibration Certificate



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E-mail: Info@emcite.com Http://www.emcite.com

Client

TA

Certificate No: ET3-1737_Nov09

CALIBRATION CERTIFICATE

Object ET3DV6 - SN: 1737

Calibration Procedure(s) TMC-XZ-01-028
Calibration procedure for dosimetric E-field probes

Calibration date: November 20, 2009

Condition of the calibrated item In Tolerance

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 ± 3)°C and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	SN.	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRV	101253	18-Jun-09 (TMC, No.JZ09-248)	Jun-10
Power sensor NRV-Z5	100333	18-Jun-09 (TMC, No. JZ08-248)	Jun-10
Reference Probe EX3DV4	SN 3631	13-Dec-08(TMC, No.EX3-3631_Dec08)	Dec-09
DAE4	SN 777	09-Jul-09(TMC, No.DAE4-777_Jul09)	Jul-10
RF generator E4438C	MY45092879	17-Jun-09(TMC, No.JZ09-302)	Jun-10
Network Analyzer 8753E	US38433212	02-Aug-09(TMC, No.JZ09-056)	Aug-10

Calibrated by:	Name	Function	Signature
	Lin Hao	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: November 20, 2009

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

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Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConF	sensitivity in TSL / NORM _{x,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., $\theta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- 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
- 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 300MHz to 3GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E^2 -field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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 $f \leq 800$ 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 valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,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.

TA Technology (Shanghai) Co., Ltd.

Test Report

Report No. RZA2010-0551

Page 44 of 65

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DASY – Parameters of Probe: ET3DV6 SN:1737

Sensitivity in Free Space^A

NormX	$1.42 \pm 10.1\%$	$\mu \text{ V}/(\text{V}/\text{m})^2$
NormY	$1.68 \pm 10.1\%$	$\mu \text{ V}/(\text{V}/\text{m})^2$
NormZ	$1.63 \pm 10.1\%$	$\mu \text{ V}/(\text{V}/\text{m})^2$

Diode Compression^B

DCP X	93mV
DCP Y	94mV
DCP Z	85mV

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	3.7 mm	4.7 mm
SAR _{be} [%] Without Correction Algorithm	10.7	6.9
SAR _{be} [%] With Correction Algorithm	0.3	0.4

TSL 1750MHz Typical SAR gradient: 10% per mm

Sensor Center to Phantom Surface Distance	3.7 mm	4.7 mm
SAR _{be} [%] Without Correction Algorithm	12.5	8.4
SAR _{be} [%] With Correction Algorithm	0.8	0.5

Sensor Offset

Probe Tip to Sensor Center 2.7 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 distribution 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.

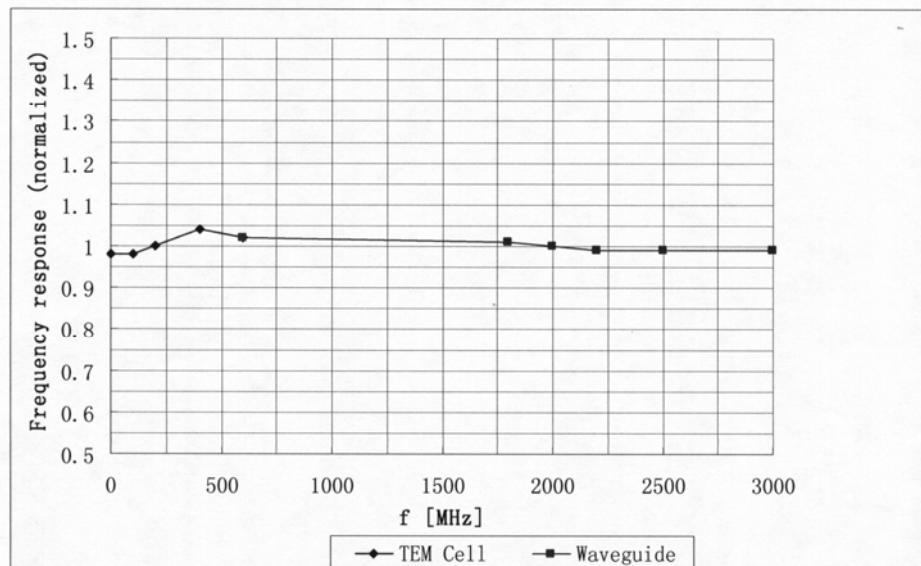
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Test Report

Report No. RZA2010-0551

Page 45 of 65

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Frequency Response of E-Field



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

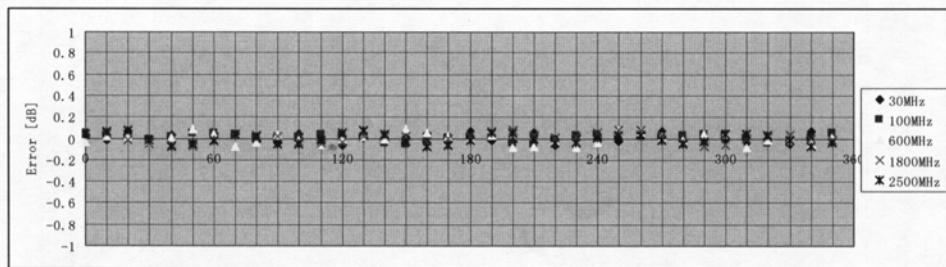
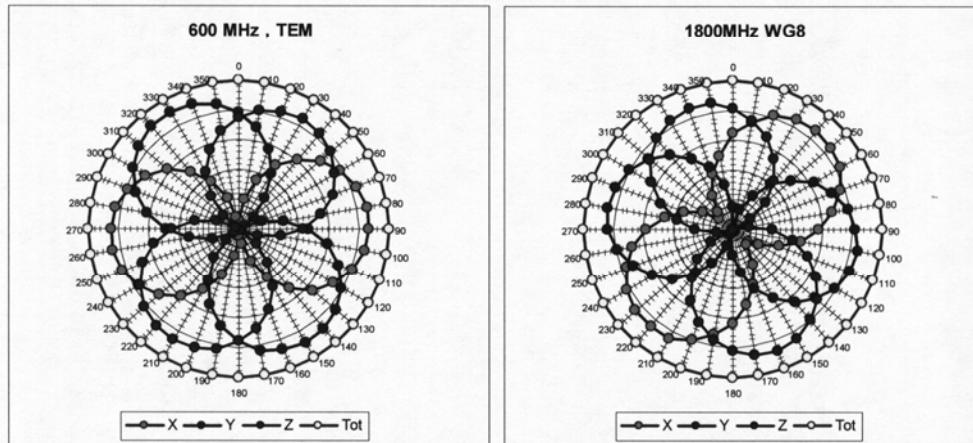
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Report No. RZA2010-0551

Page 46 of 65

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



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

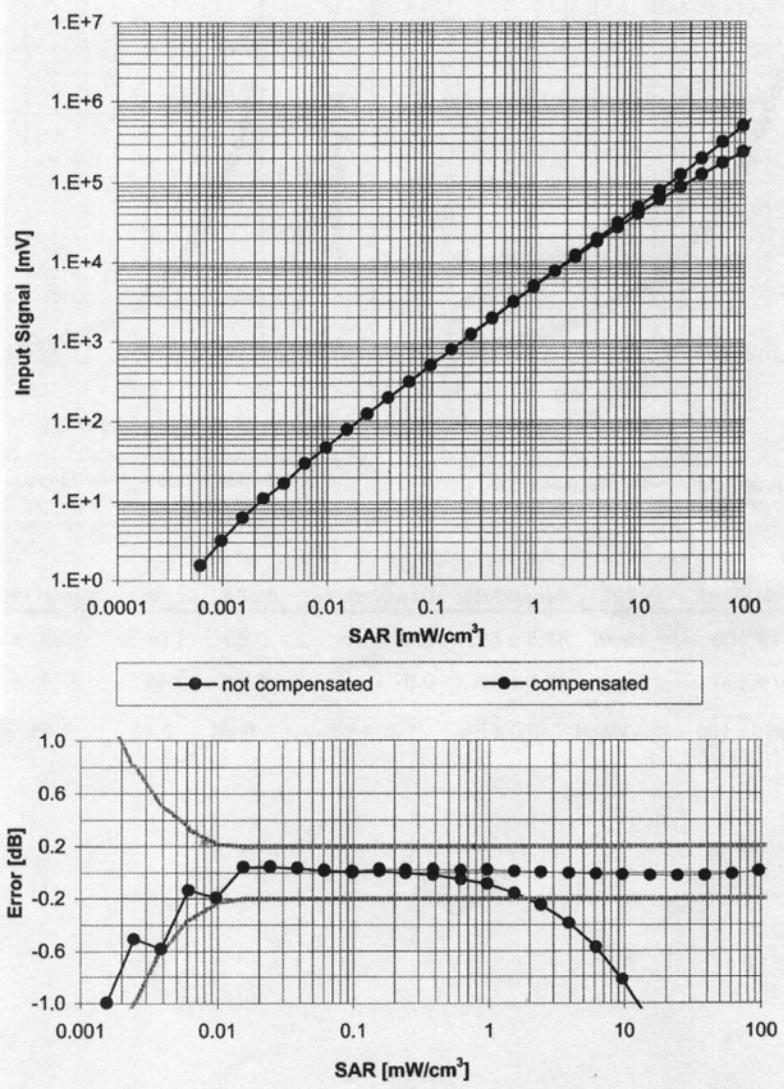
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Page 47 of 65

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Dynamic Range f(SAR_{head})
(Waveguide: WG8, f = 1800 MHz)



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