

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3- SN:3169

December 19, 2013

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3169

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth (mm) ^G	Unct. (k=2)
750	41.9	0.89	6.56	6.56	6.56	0.37	1.61	± 12.0 %
900	41.5	0.97	6.33	6.33	6.33	0.49	1.40	± 12.0 %
1750	40.1	1.37	5.08	5.08	5.08	0.46	1.51	± 12.0 %
1900	40.0	1.40	4.96	4.96	4.96	0.80	1.15	± 12.0 %
2000	40.0	1.40	4.94	4.94	4.94	0.66	1.28	± 12.0 %
2450	39.2	1.80	4.42	4.42	4.42	0.74	1.32	± 12.0 %
2600	39.0	1.96	4.26	4.26	4.26	0.77	1.34	± 12.0 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3- SN:3169

December 19, 2013

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3169

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth (mm) ^G	Unct. (k=2)
750	55.5	0.96	6.07	6.07	6.07	0.53	1.40	± 12.0 %
900	55.0	1.05	5.96	5.96	5.96	0.53	1.39	± 12.0 %
1750	53.4	1.49	5.00	5.00	5.00	0.44	1.66	± 12.0 %
1900	53.3	1.52	4.77	4.77	4.77	0.46	1.70	± 12.0 %
2000	53.3	1.52	4.77	4.77	4.77	0.52	1.59	± 12.0 %
2450	52.7	1.95	4.27	4.27	4.27	0.80	1.12	± 12.0 %
2600	52.5	2.16	4.07	4.07	4.07	0.66	0.99	± 12.0 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

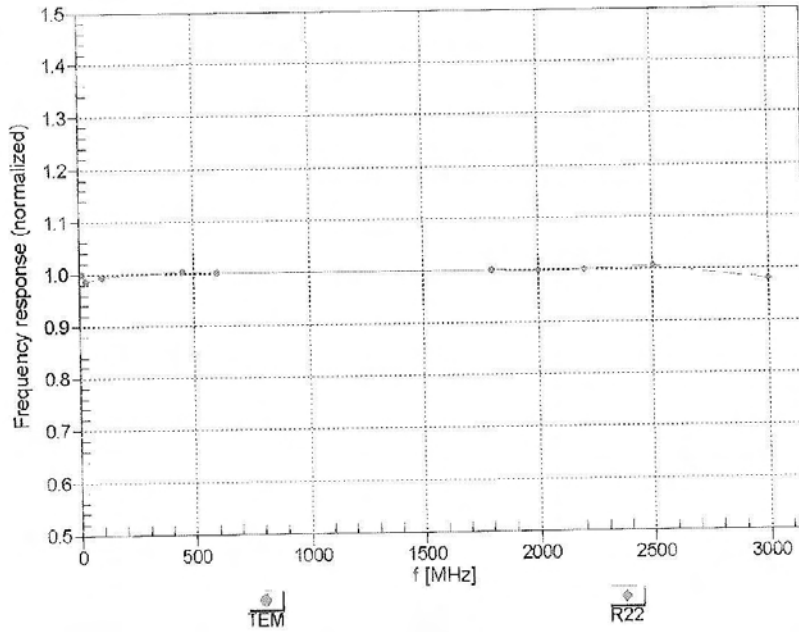
^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3-SN:3169

December 19, 2013

Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



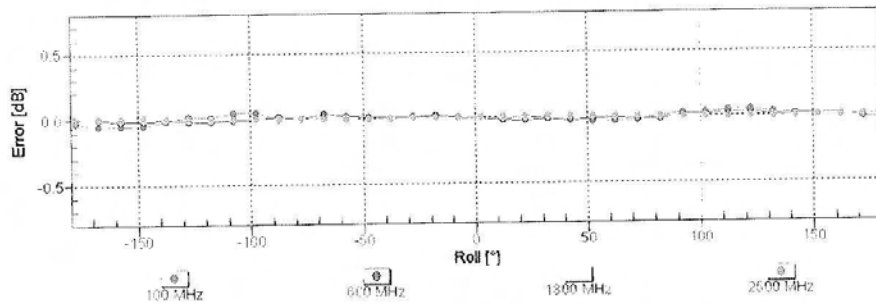
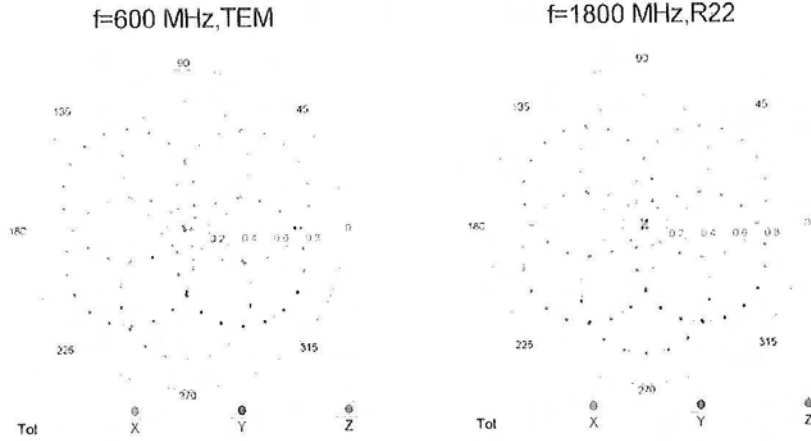
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3-SN:3169

December 19, 2013

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

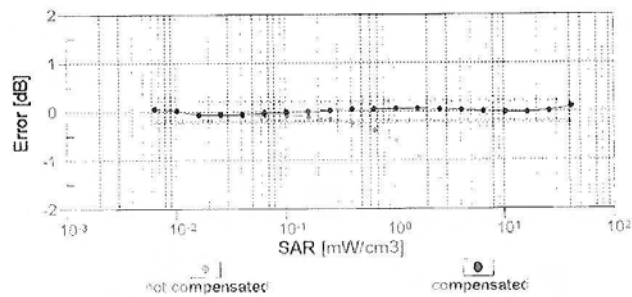
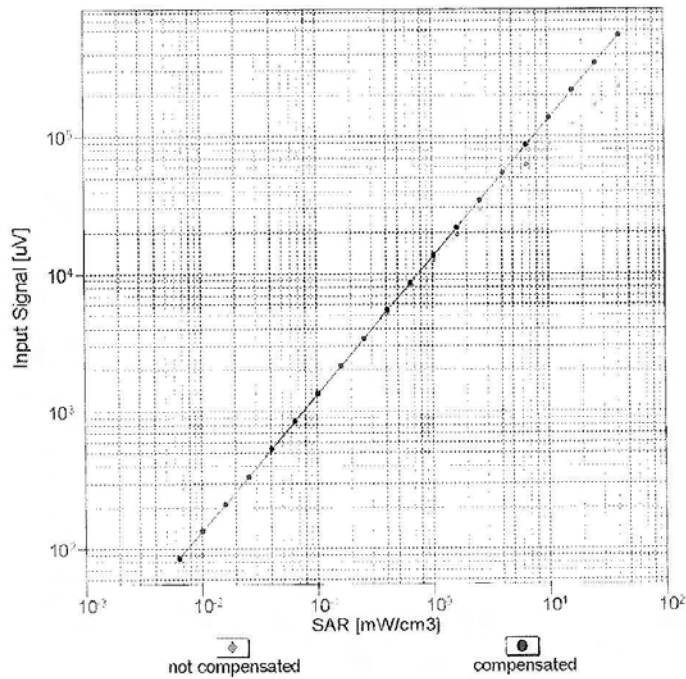


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

ES3DV3-SN:3169

December 19, 2013

Dynamic Range $f(SAR_{head})$ (TEM cell, $f = 900$ MHz)

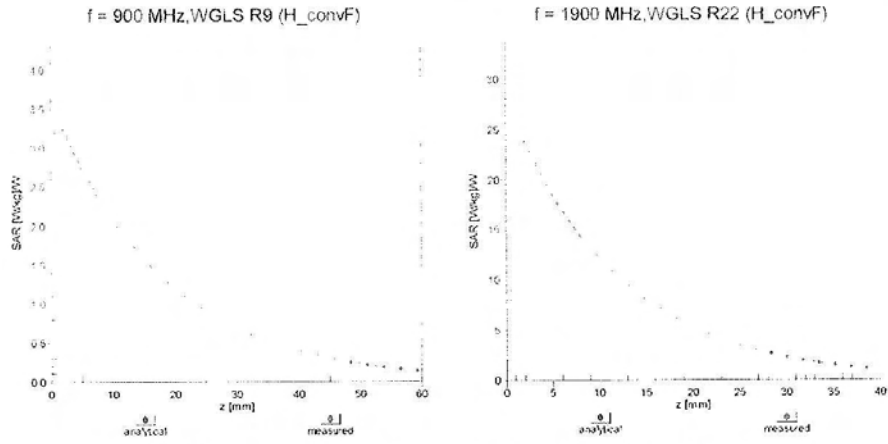


Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

ES3DV3-SN:3169

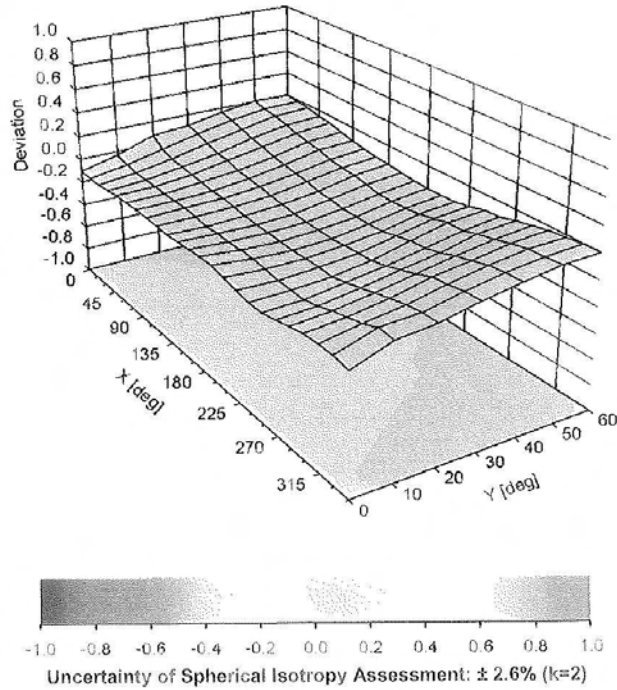
December 19, 2013

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), f = 900 MHz



SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3- SN:3169

December 19, 2013

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3169

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-27.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

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 **Sony Mobile Factory (PTT)**

Certificate No: **ES3-3170_Dec13**

CALIBRATION CERTIFICATE	
Object	ES3DV3 - SN:3170
Calibration procedure(s)	QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	December 19, 2013
<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 ± 3)°C and humidity < 70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p>	

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	04-Apr-13 (No. 217-01733)	Apr-14
Power sensor E4412A	MY41498087	04-Apr-13 (No. 217-01733)	Apr-14
Reference 3 dB Attenuator	SN: S5054 (3c)	04-Apr-13 (No. 217-01737)	Apr-14
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-13 (No. 217-01735)	Apr-14
Reference 30 dB Attenuator	SN: S5129 (30b)	04-Apr-13 (No. 217-01738)	Apr-14
Reference Probe ES3DV2	SN: 3013	28-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-15
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	
Issued: December 19, 2013			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory			

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

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

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
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., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- 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:

- **NORM_{x,y,z}:** Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-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.
- **DCP_{x,y,z}:** DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- **PAR:** PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- **A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,y,z}:** A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- **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 values 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.
- **Connector Angle:** The angle is assessed using the information gained by determining the NORM_x (no uncertainty required).

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01
PY7PM-0808 SAR FCC Test Report		Edition 2 Revision 0

ES3DV3 – SN:3170

December 19, 2013

Probe ES3DV3

SN:3170

Manufactured: January 23, 2008
Calibrated: December 19, 2013

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3- SN:3170

December 19, 2013

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3170

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V/m})^2$) ^A	1.26	1.04	0.95	± 10.1 %
DCP (mV) ^B	101.6	100.2	112.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc ^C (k=2)
0	CW	X	0.0	0.0	1.0	0.00	154.5	±3.0 %
		Y	0.0	0.0	1.0		139.1	
		Z	0.0	0.0	1.0		140.1	

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 E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3- SN:3170

December 19, 2013

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3170

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unct. (k=2)
835	41.5	0.90	6.39	6.39	6.39	0.62	1.26	± 12.0 %
1750	40.1	1.37	5.40	5.40	5.40	0.54	1.61	± 12.0 %
1900	40.0	1.40	5.15	5.15	5.15	0.71	1.27	± 12.0 %
2450	39.2	1.80	4.54	4.54	4.54	0.67	1.41	± 12.0 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3-SN:3170

December 19, 2013

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3170

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth (mm) ^G	Unct. (k=2)
835	55.2	0.97	6.08	6.08	6.08	0.56	1.34	± 12.0 %
1750	53.4	1.49	4.91	4.91	4.91	0.41	1.79	± 12.0 %
1900	53.3	1.52	4.70	4.70	4.70	0.48	1.54	± 12.0 %
2450	52.7	1.95	4.21	4.21	4.21	0.70	1.12	± 12.0 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

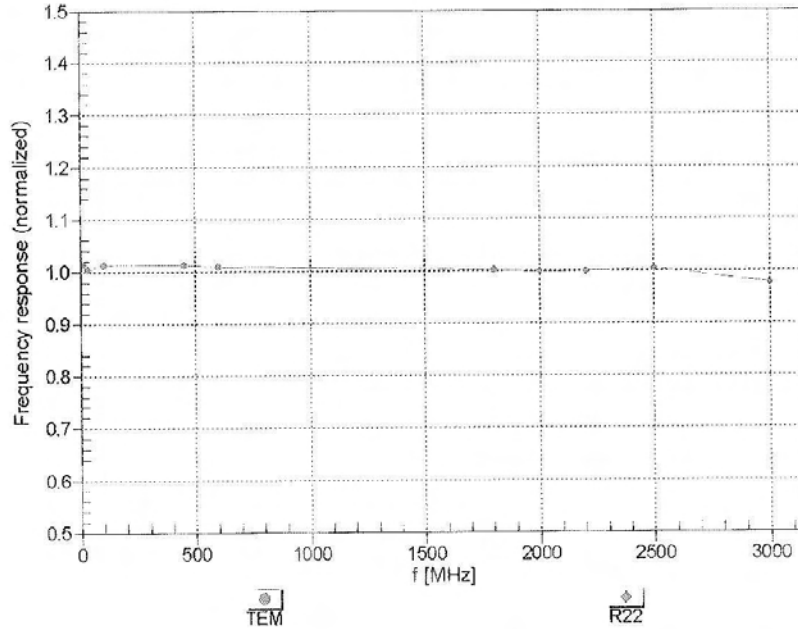
^G Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3- SN:3170

December 19, 2013

Frequency Response of E-Field (TEM-Cell: ifi110 EXX, Waveguide: R22)



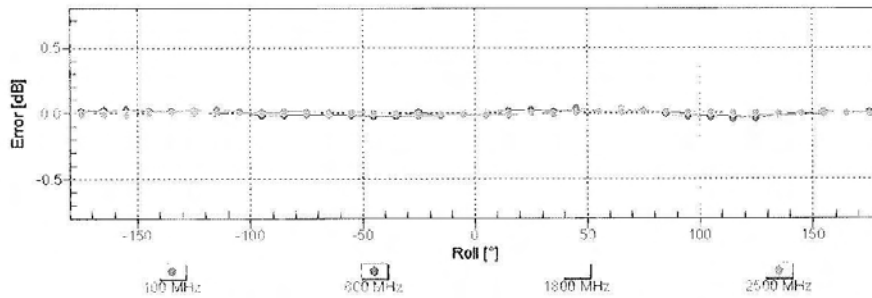
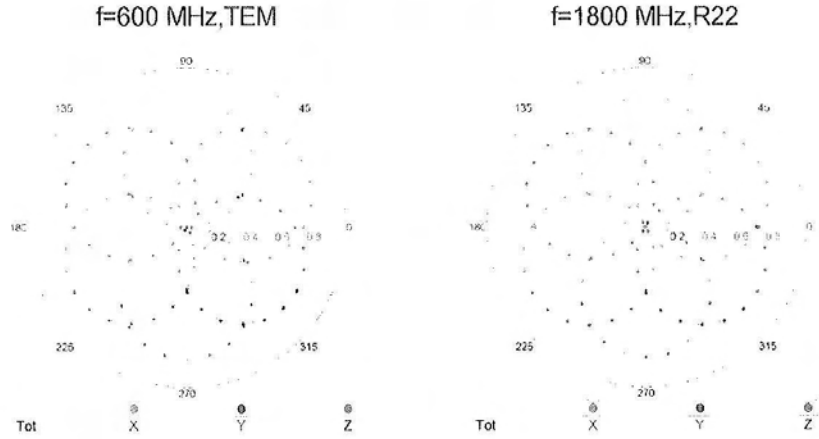
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3- SN:3170

December 19, 2013

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

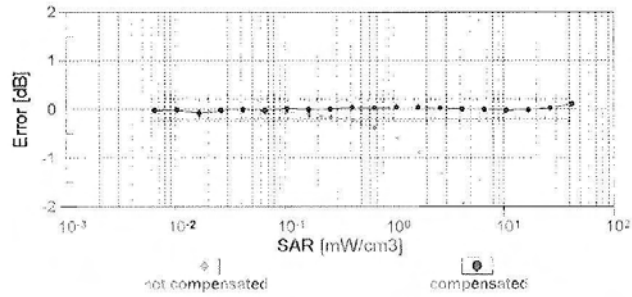
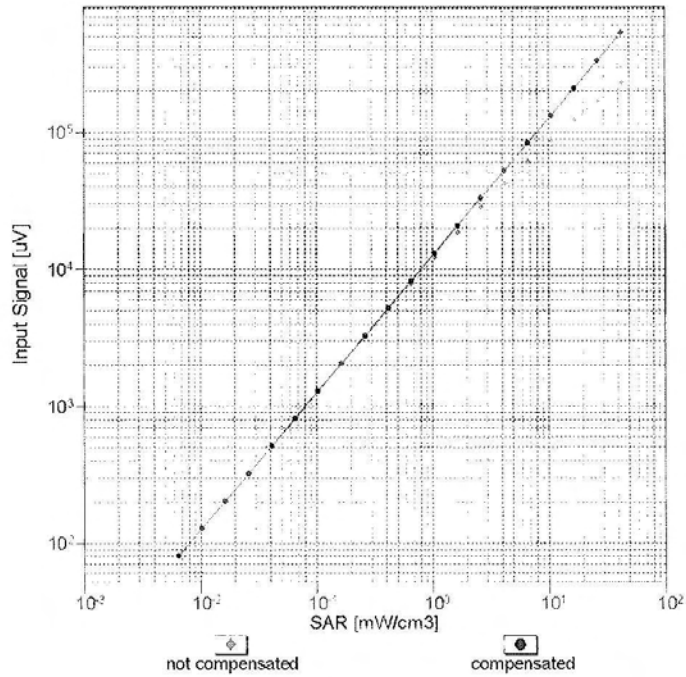


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

ES3DV3- SN:3170

December 19, 2013

Dynamic Range $f(SAR_{head})$ (TEM cell , $f = 900$ MHz)



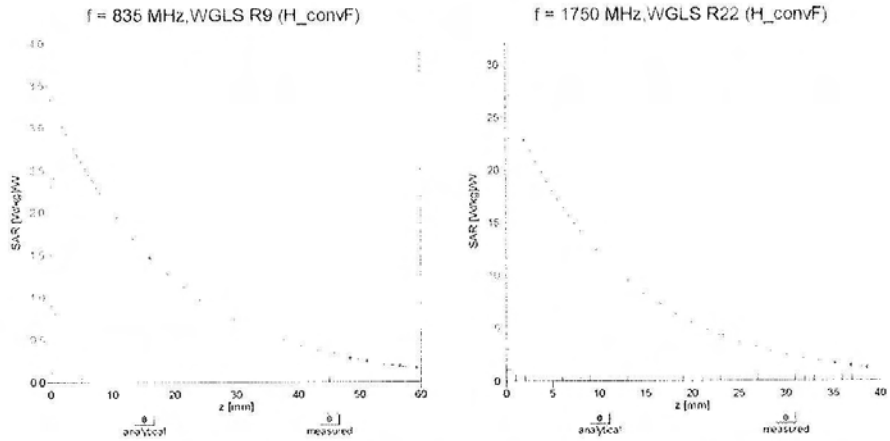
Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3- SN:3170

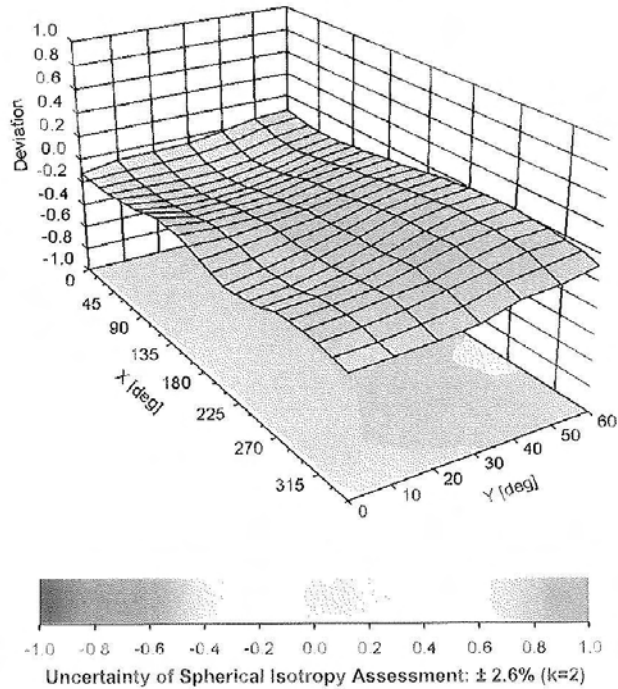
December 19, 2013

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, θ), $f = 900 \text{ MHz}$



SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

ES3DV3- SN:3170

December 19, 2013

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3170

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01
PY7PM-0808 SAR FCC Test Report		Edition 2 Revision 0

APPENDIX E: 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 **Sony Mobile Factory (PTT)**

Certificate No: **D2450V2-806_Feb14**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 806**

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

Calibration date: **February 18, 2014**

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	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
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	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by:	Name Israe El-Naouq	Function Laboratory Technician	Signature
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 18, 2014

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

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

**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**

Glossary:

TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,y,z
N/A not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- 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
- c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.1 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	51.6 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.1 W/kg ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.7 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	51.1 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.04 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	23.8 W/kg ± 16.5 % (k=2)

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.0 Ω + 2.6 j Ω
Return Loss	- 25.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.0 Ω + 4.5 j Ω
Return Loss	- 26.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.162 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 02, 2006

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

DASY5 Validation Report for Head TSL

Date: 18.02.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 806

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.86$ S/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

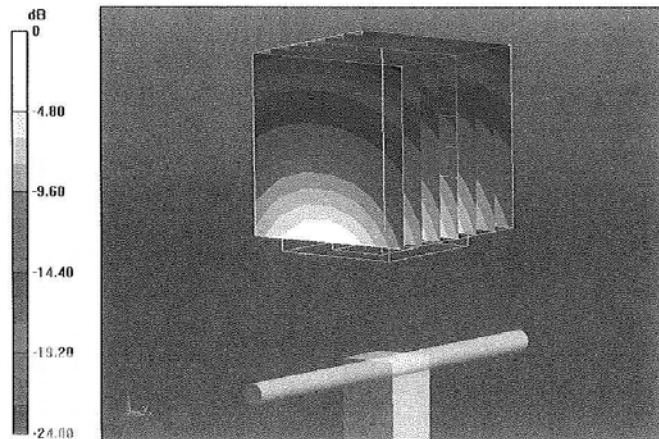
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.250 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 27.5 W/kg

SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.1 W/kg

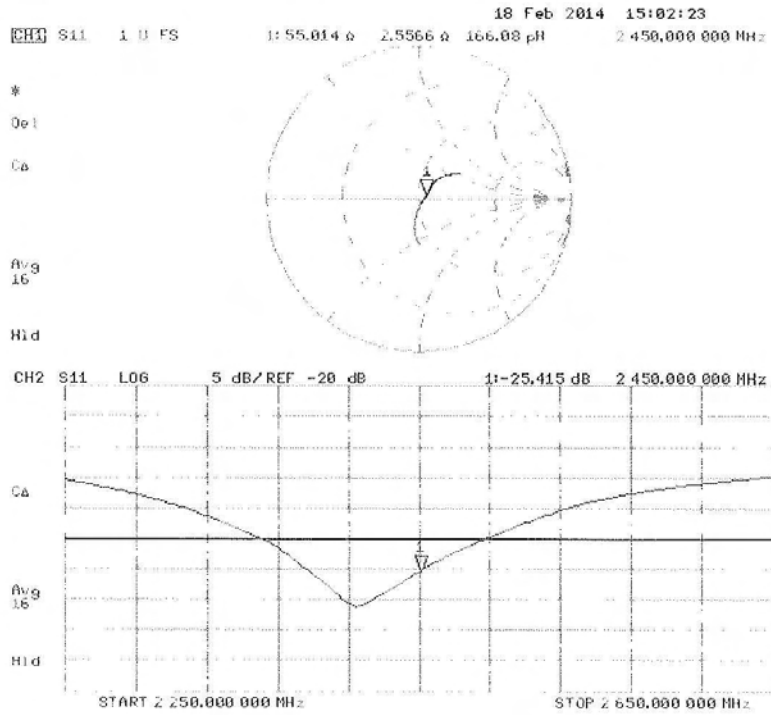
Maximum value of SAR (measured) = 17.0 W/kg



0 dB = 17.0 W/kg = 12.30 dBW/kg

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

Impedance Measurement Plot for Head TSL



SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

DASY5 Validation Report for Body TSL

Date: 18.02.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 806

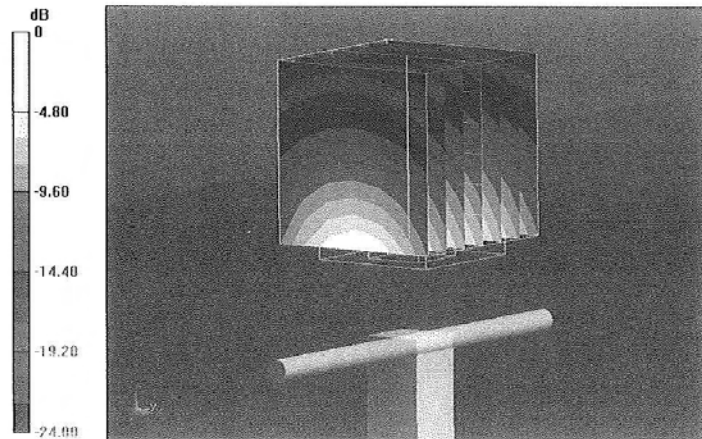
Communication System: UID 0 - CW; Frequency: 2450 MHz
 Medium parameters used: $f = 2450$ MHz; $\sigma = 2.02$ S/m; $\epsilon_r = 50.7$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASY5 (IEBEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 95.470 V/m; Power Drift = -0.01 dB
 Peak SAR (extrapolated) = 27.4 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.04 W/kg
 Maximum value of SAR (measured) = 17.3 W/kg



0 dB = 17.3 W/kg = 12.38 dBW/kg

SONY	Sony Mobile Communications (China) Co., Ltd. Test Laboratory	Report No.: TARC-PY7PM-0808- SAR-FCC-01	
	PY7PM-0808 SAR FCC Test Report	Edition 2	Revision 0

Impedance Measurement Plot for Body TSL

