Date/Time: 7/26/2014 11:35:59 AM

Test Laboratory: GTA-Beijing

LTE Band17_Left_head_20140726

DUT: PY7PM-0808 **; Serial: CB5A1ZTFMM**

Communication System: UID 0, LTE-FDD(SC-FDMA,1RB,10MHz,QPSK) (0); Communication System Band: Band17→ ◘ 706.0-715.0 ; Frequency: 710 MHz;Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 710 MHz; σ = 0.858 S/m; ε_r = 43.053; ρ = 1000 kg/m^3

Phantom section: Left Section

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

DASY Configuration:

- Probe: ES3DV3 - SN3169; ConvF(6.56, 6.56, 6.56); Calibrated: 12/19/2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn853; Calibrated: 12/16/2013
- Phantom: SAM with CRP v4.0_1489; Type: QD000P40CC; Serial: TP:1489
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/LTE B17_Left Cheek_Mid CH_1RB offset Low/Area Scan (91x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.201 W/kg

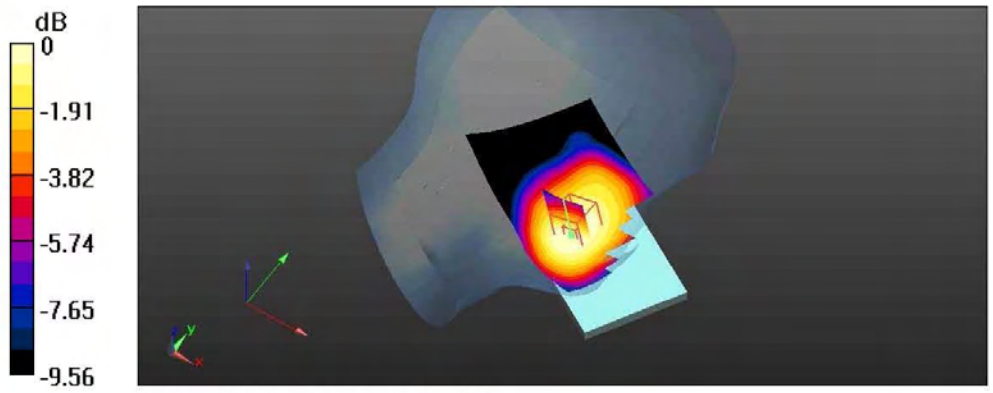
Configuration/LTE B17_Left Cheek_Mid CH_1RB offset Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.640 V/m; Power Drift = 0.08 dB

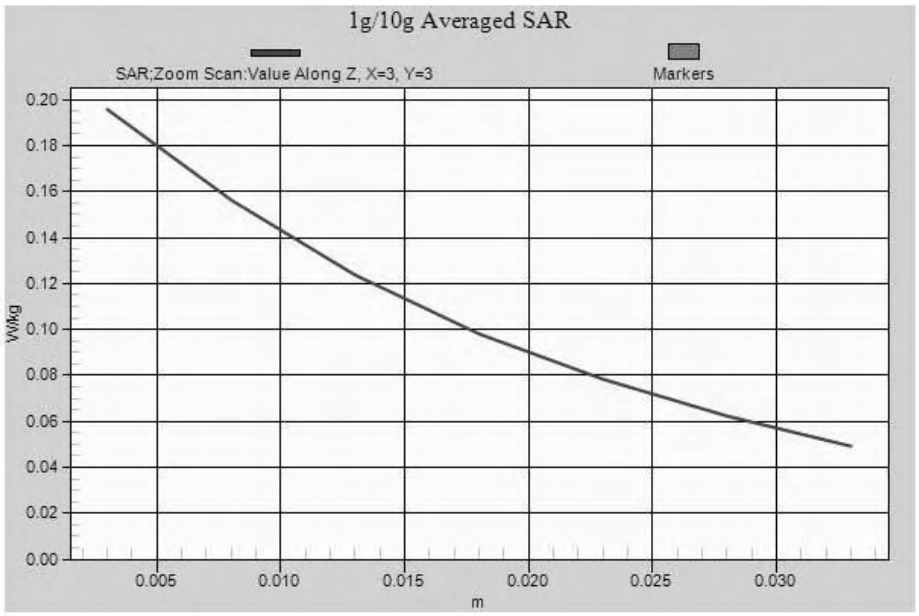
Peak SAR (extrapolated) = 0.229 W/kg

SAR(1 g) = 0.180 W/kg; SAR(10 g) = 0.139 W/kg

Maximum value of SAR (measured) = 0.196 W/kg



0 dB = 0.196 W/kg = -7.08 dBW/kg


1g/10g Averaged SAR
SAR;Zoom Scan:Value Along Z, X=3, Y=3
Markers
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
W/kg
0.005
0.010
0.015
0.020
0.025
0.030
m

Date/Time: 7/15/2014 9:55:16 AM

Test Laboratory: GTA-Beijing

Wlan2.4G_Body_10mm__20140714

DUT: PY7PM-0808 ; Serial: CB5A1ZTFXM

Communication System: UID 0, WLAN (0); Frequency: 2462 MHz;Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 2462 MHz; σ = 2.062 S/m; ε_r = 50.027; ρ = 1000 kg/m^3

Phantom section: Flat Section

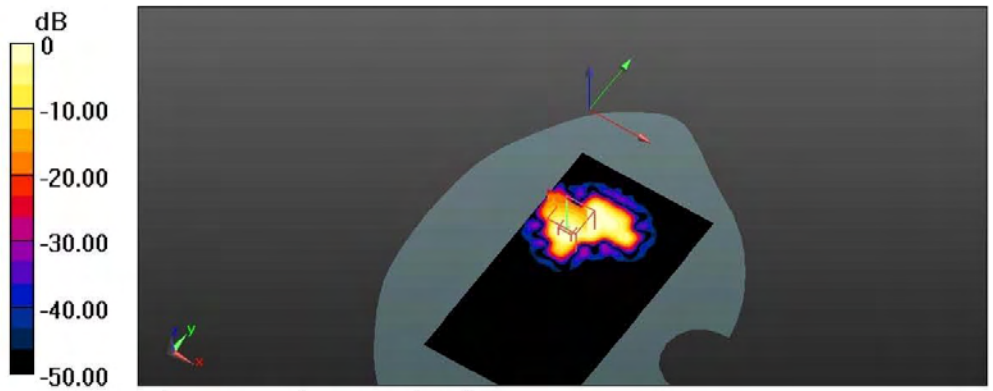
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

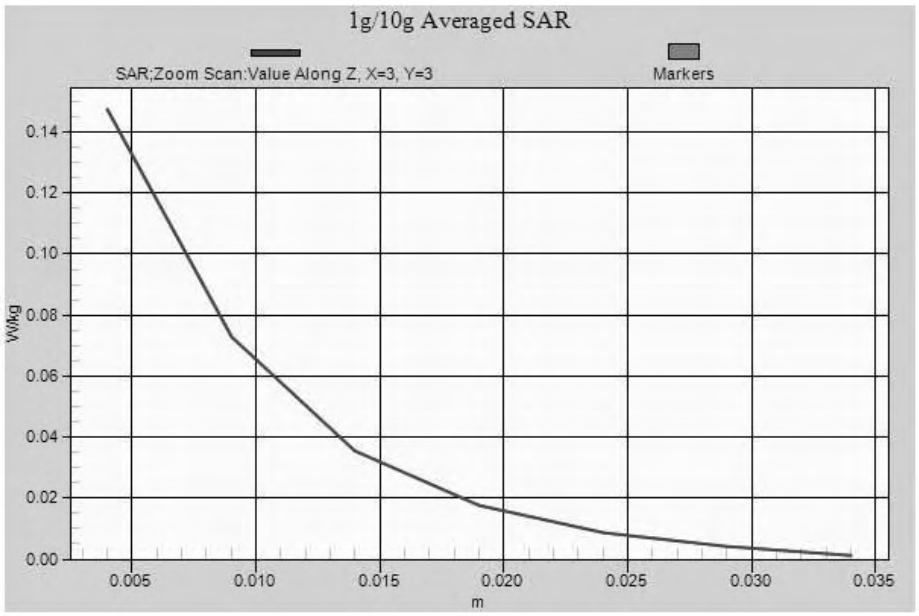
- Probe: EX3DV4 - SN3843; ConvF(6.6, 6.6, 6.6); Calibrated: 2/21/2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn854; Calibrated: 12/16/2013
- Phantom: SAM with CRP v5.0#1696; Type: QD000P40CD; Serial: TP:1696
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Wlan2.4G_CH11_Back/Area Scan (101x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.517 W/kg

Configuration/Wlan2.4G_CH11_Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.264 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.842 W/kg
SAR(1 g) = 0.167 W/kg; SAR(10 g) = 0.050 W/kg
Maximum value of SAR (measured) = 0.147 W/kg



0 dB = 0.147 W/kg = -8.33 dBW/kg


1g/10g Averaged SAR
SAR;Zoom Scan:Value Along Z, X=3, Y=3
Markers
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
W/kg
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date/Time: 7/28/2014 4:13:24 PM

Test Laboratory: GTA-Beijing

WLAN2.4G_Left head cheek_20140728

DUT: PY7PM-0808 '; Serial: CB5A1ZTFMM

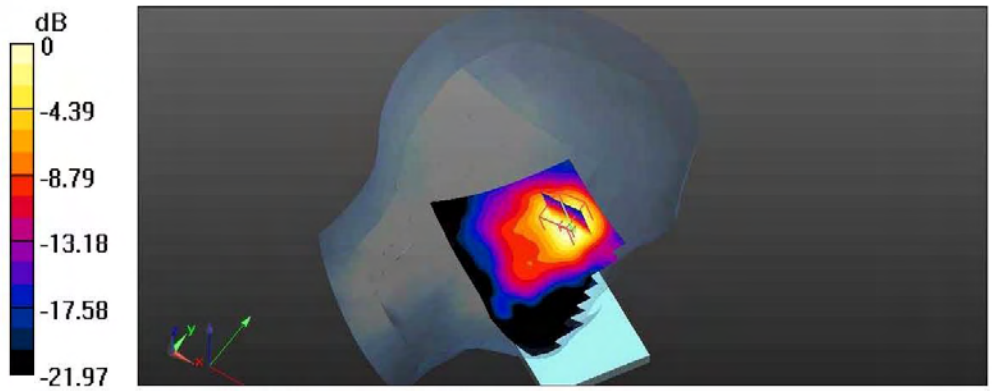
Communication System: UID 0, WLAN 802.11 b 1M (0); Frequency: 2437 MHz;Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.875 S/m; ε_r = 39.607; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

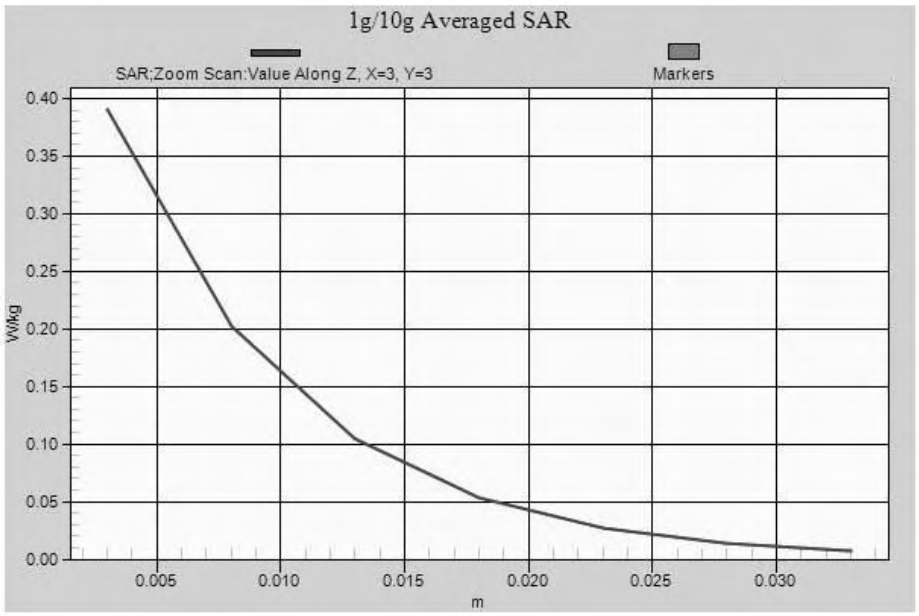
- Probe: ES3DV3 - SN3169; ConvF(4.42, 4.42, 4.42); Calibrated: 12/19/2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn853; Calibrated: 12/16/2013
- Phantom: SAM with CRP v4.0_1489; Type: QD000P40CC; Serial: TP:1489
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/WLAN2.4G_802.11b_Left Cheek_1M bits_Ch6/Area Scan (101x161x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.412 W/kg

Configuration/WLAN2.4G_802.11b_Left Cheek_1M bits_Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.260 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.599 W/kg
SAR(1 g) = 0.303 W/kg; SAR(10 g) = 0.148 W/kg
Maximum value of SAR (measured) = 0.390 W/kg



0 dB = 0.390 W/kg = -4.09 dBW/kg


1g/10g Averaged SAR
SAR;Zoom Scan:Value Along Z, X=3, Y=3
Markers
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
W/kg
0.005
0.010
0.015
0.020
0.025
0.030
m

Date/Time: 8/19/2014 3:41:53 PM

Test Laboratory: GTA Beijing

Wlan5G_Left head_20140819

DUT: PY7PM-0808; Serial: CB5A1ZTFXM

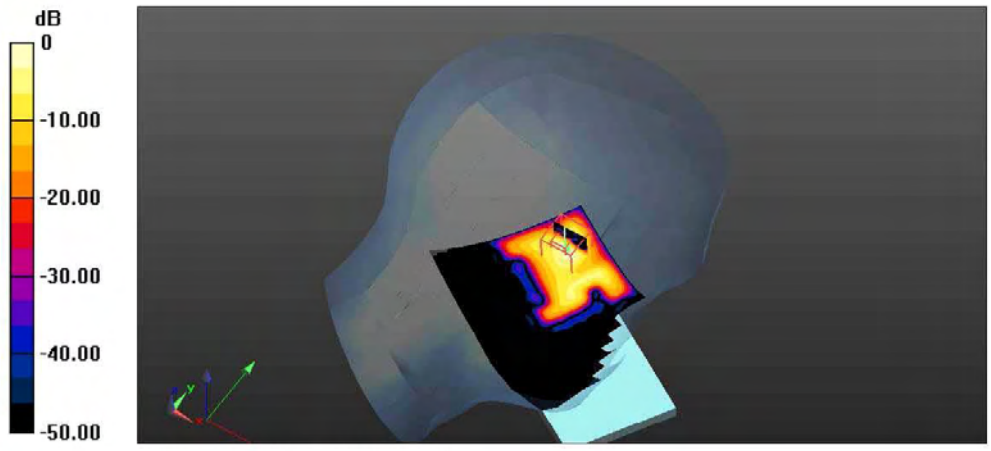
Communication System: UID 0, IEEE 802.11a/h WiFi5GHz(OFDM,6Mbps) (0); Communication System Band: Band 5GHz (5030 - 5825MHz); Frequency: 5825 MHz;Communication System PAR: 9 dB; PMF: 1.12202
Medium parameters used (interpolated): f = 5825 MHz; σ = 5.516 S/m; ε_r = 34.685; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

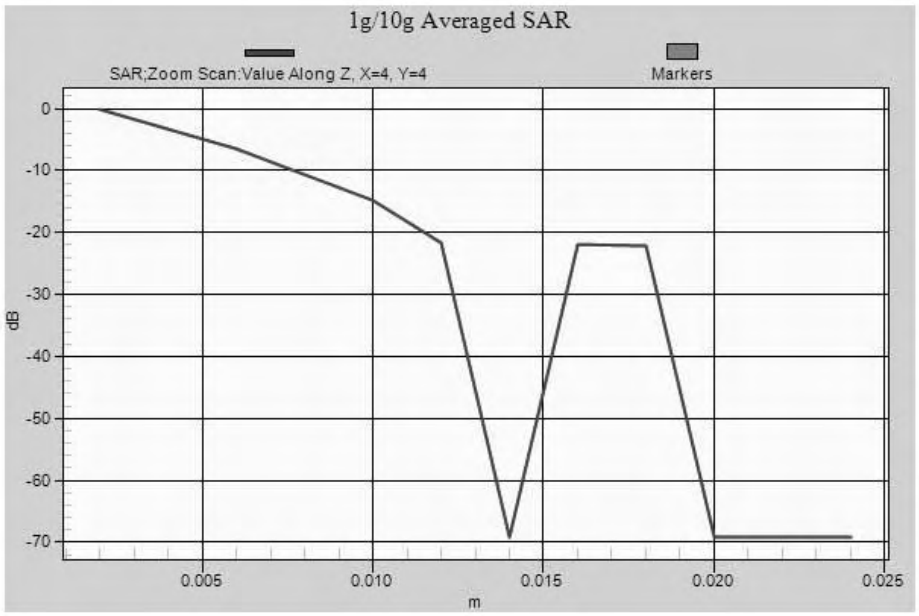
- Probe: EX3DV4 - SN3642; ConvF(4.41, 4.41, 4.41); Calibrated: 12/20/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1326; Calibrated: 2/14/2014
- Phantom: SAM; Type: QD000P40CD; Serial: TP:xxxx
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Wlan5G_CH165_Left Cheek/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.936 W/kg

Configuration/Wlan5G_CH165_Left Cheek/Zoom Scan (7x7x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.039 V/m; Power Drift = 4.94 dB
Peak SAR (extrapolated) = 2.14 W/kg
SAR(1 g) = 0.435 W/kg; SAR(10 g) = 0.097 W/kg
Maximum value of SAR (measured) = 1.12 W/kg



0 dB = 1.12 W/kg = 0.49 dBW/kg



file://C:\Users\gtatester.CORPUSERS\Desktop\SEMCAD report\Wlan5G_Left head_2... 8/20/2014

Date/Time: 8/19/2014 2:26:06 PM

Test Laboratory: GTA Beijing

Wlan5G_Body_15mm__20140819

DUT: PY7PM-0808; Serial: CB5A1ZTFXM

Communication System: UID 0, IEEE 802.11a/h WiFi5GHz(OFDM,6Mbps) (0); Communication System Band: Band 5GHz (5030 - 5825MHz); Frequency: 5240 MHz;Communication System PAR: 9 dB; PMF: 1.12202

Medium parameters used: f = 5240 MHz; σ = 5.441 S/m; ε_r = 49.95; ρ = 1000 kg/m^3

Phantom section: Right Section

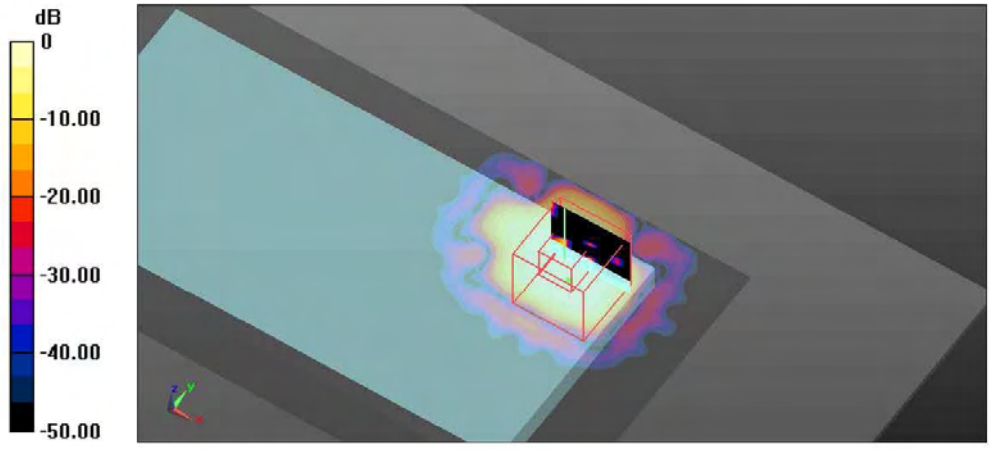
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3642; ConvF(4.1, 4.1, 4.1); Calibrated: 12/20/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1326; Calibrated: 2/14/2014
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: xxxx
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

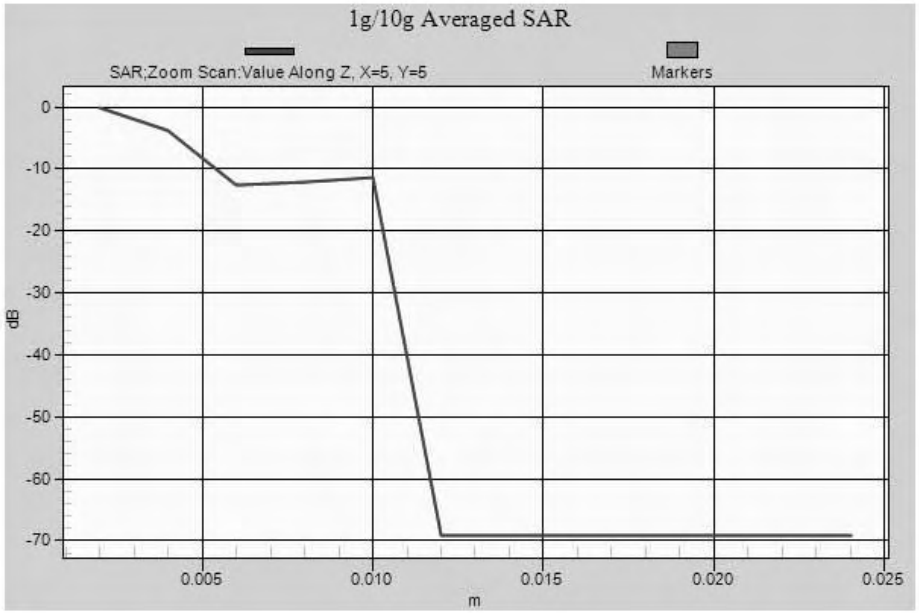
Configuration/Wlan5G_CH48_Back 2/Area Scan (101x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.0631 W/kg

Configuration/Wlan5G_CH48_Back 2/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.490 W/kg
SAR(1 g) = 0.030 W/kg; SAR(10 g) = 0.00364 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.0662 W/kg



0 dB = 0.0662 W/kg = -11.79 dBW/kg

file://C:\Users\gtatester.CORPUSERS\Desktop\SEMCAD report\Wlan5G_Body_15m... 8/20/2014



file://C:\Users\gtatester.CORPUSERS\Desktop\SEMCAD report\Wlan5G_Body_15m... 8/20/2014

Date/Time: 7/31/2014 4:21:17 PM

Test Laboratory: GTA-Beijing

Bluetooth_Left head_20140731

DUT: PY7PM-0808 ; Serial: CB5A1ZTFXM

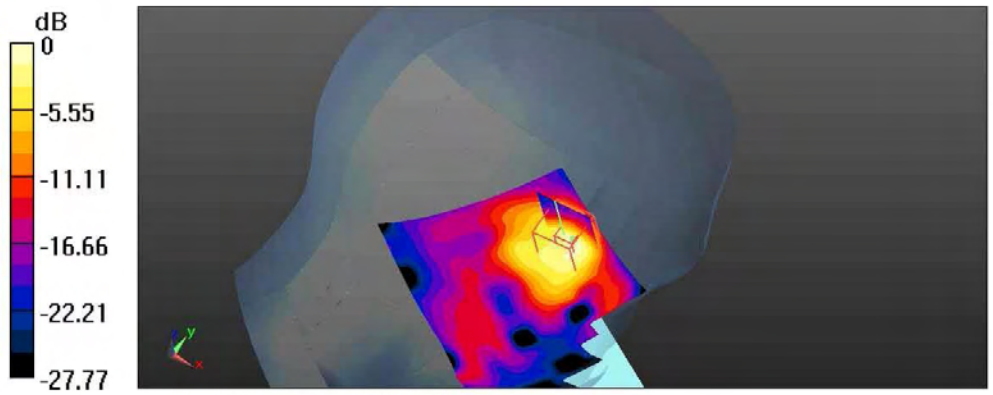
Communication System: UID 0, Bluetooth (0); Communication System Band: Bluetooth; Frequency: 2441 MHz;Communication System PAR: 1.16 dB; PMF: 1.14288
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.873 S/m; ε_r = 39.569; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

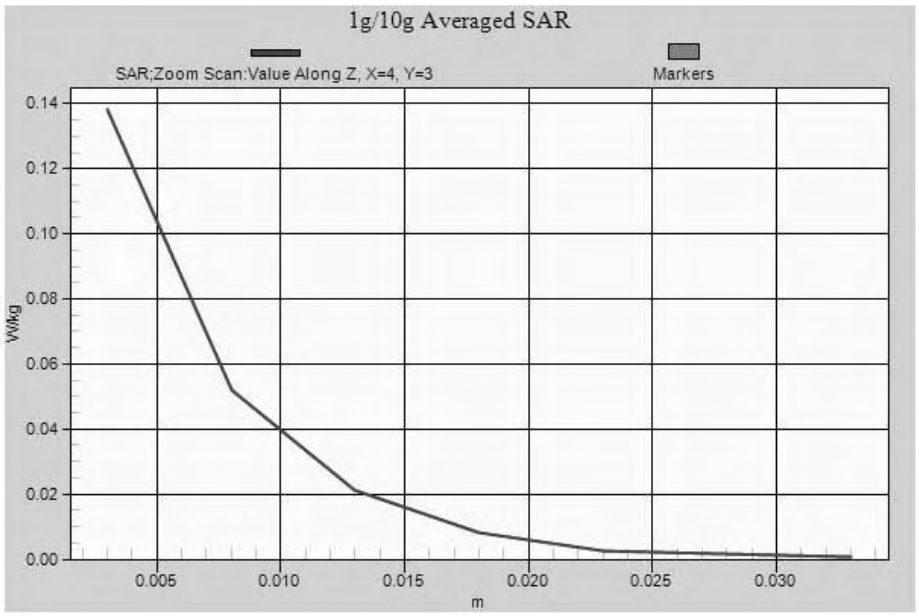
- Probe: ES3DV3 - SN3169; ConvF(4.42, 4.42, 4.42); Calibrated: 12/19/2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn853; Calibrated: 12/16/2013
- Phantom: SAM with CRP v4.0_1489; Type: QD000P40CC; Serial: TP:1489
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Bletooth_Right Cheek_Ch39 2/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.119 W/kg

Configuration/Bletooth_Right Cheek_Ch39 2/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.424 V/m; Power Drift = 0.25 dB
Peak SAR (extrapolated) = 0.260 W/kg
SAR(1 g) = 0.097 W/kg; SAR(10 g) = 0.038 W/kg
Maximum value of SAR (measured) = 0.138 W/kg



0 dB = 0.138 W/kg = -8.60 dBW/kg


1g/10g Averaged SAR
SAR;Zoom Scan:Value Along Z, X=4, Y=3
Markers
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
W/kg
0.005
0.010
0.015
0.020
0.025
0.030
m

APPENDIX D: 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 Sony Mobile CN (PTT)

Certificate No: EX3-3843_Feb14

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3843

Calibration procedure(s) QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: February 21, 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 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	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
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-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

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

Issued: February 22, 2014

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

Certificate No: EX3-3843_Feb14 Page 1 of 11

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
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,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., ϑ = 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:

- *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 affect 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 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
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,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 ≤ 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.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:3843

Manufactured: October 25, 2011
Calibrated: February 21, 2014

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3843

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.40	0.43	0.35	± 10.1 %
DCP (mV)[B]	99.1	99.2	105.2	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	122.9	±3.0 %
		Y	0.0	0.0	1.0		123.5	
		Z	0.0	0.0	1.0		134.5	

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 Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3843

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)
750	41.9	0.89	9.22	9.22	9.22	0.40	0.94	± 12.0 %
900	41.5	0.97	8.78	8.78	8.78	0.54	0.76	± 12.0 %
1450	40.5	1.20	8.16	8.16	8.16	0.80	0.64	± 12.0 %
1750	40.1	1.37	7.56	7.56	7.56	0.80	0.57	± 12.0 %
1900	40.0	1.40	7.33	7.33	7.33	0.65	0.64	± 12.0 %
2100	39.8	1.49	7.42	7.42	7.42	0.80	0.57	± 12.0 %
2300	39.5	1.67	6.92	6.92	6.92	0.40	0.79	± 12.0 %
2450	39.2	1.80	6.66	6.66	6.66	0.25	1.08	± 12.0 %
2600	39.0	1.96	6.44	6.44	6.44	0.43	0.81	± 12.0 %
3500	37.9	2.91	6.22	6.22	6.22	0.65	0.80	± 13.1 %
5200	36.0	4.66	4.49	4.49	4.49	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.29	4.29	4.29	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.25	4.25	4.25	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.11	4.11	4.11	0.35	1.80	± 13.1 %
5800	35.3	5.27	3.99	3.99	3.99	0.45	1.80	± 13.1 %

[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.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3843

Calibration Parameter Determined in Body Tissue Simulating Media

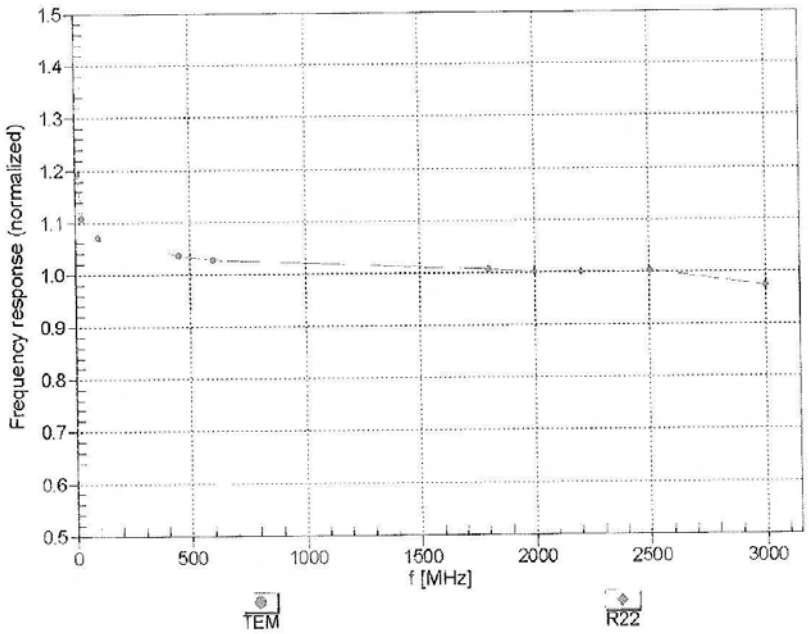
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	55.5	0.96	8.69	8.69	8.69	0.80	0.64	± 12.0 %
900	55.0	1.05	8.50	8.50	8.50	0.80	0.50	± 12.0 %
1450	54.0	1.30	7.74	7.74	7.74	0.38	0.99	± 12.0 %
1750	53.4	1.49	7.68	7.68	7.68	0.40	1.01	± 12.0 %
1900	53.3	1.52	7.31	7.31	7.31	0.34	1.02	± 12.0 %
2100	53.2	1.62	7.51	7.51	7.51	0.35	1.05	± 12.0 %
2300	52.9	1.81	6.98	6.98	6.98	0.62	0.67	± 12.0 %
2450	52.7	1.95	6.60	6.60	6.60	0.80	0.57	± 12.0 %
2600	52.5	2.16	6.27	6.27	6.27	0.80	0.50	± 12.0 %
3500	51.3	3.31	5.90	5.90	5.90	0.42	1.04	± 13.1 %
5200	49.0	5.30	4.00	4.00	4.00	0.50	1.90	± 13.1 %
5300	48.9	5.42	3.94	3.94	3.94	0.50	1.90	± 13.1 %
5500	48.6	5.65	3.63	3.63	3.63	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.39	3.39	3.39	0.55	1.90	± 13.1 %
5800	48.2	6.00	3.72	3.72	3.72	0.55	1.90	± 13.1 %

[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.

EX3DV4-- SN:3843 February 21, 2014

Frequency Response of E-Field

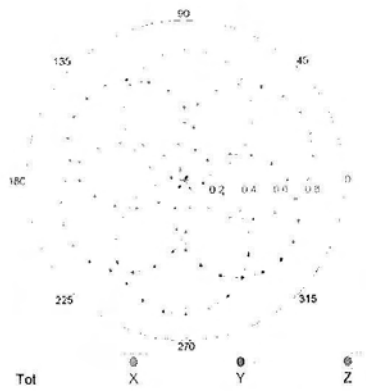
(TEM-Cell:ifi110 EXX, Waveguide: R22)



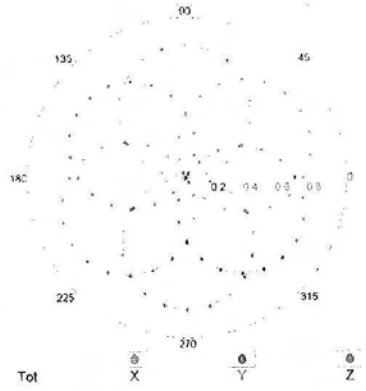
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

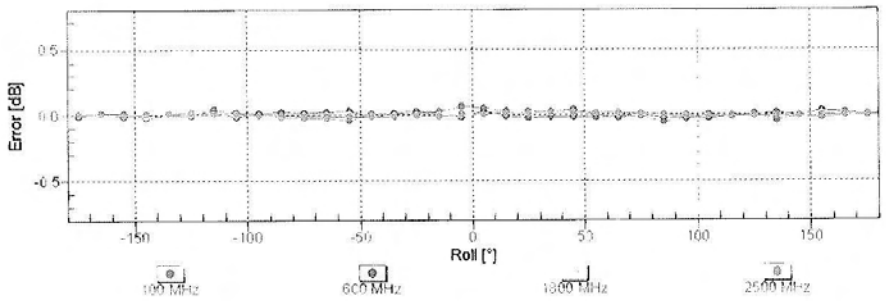
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



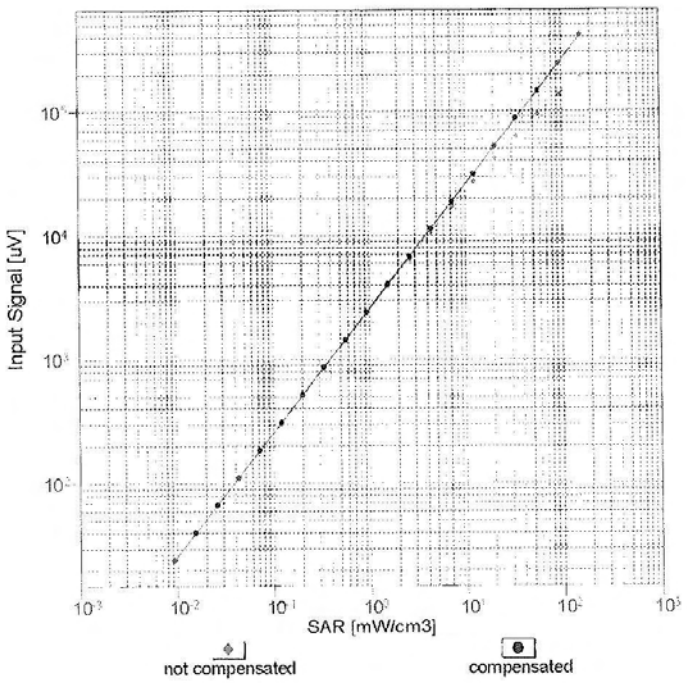
f=1800 MHz,R22

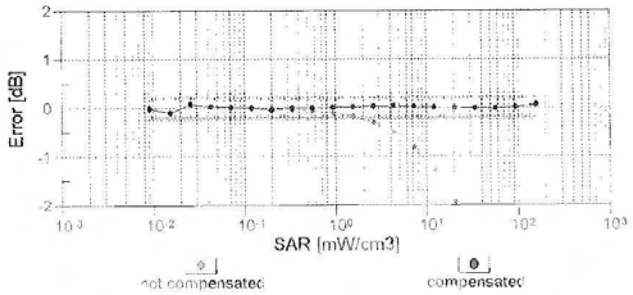




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR$_{head}$)
(TEM cell , f_{eval}= 1900 MHz)



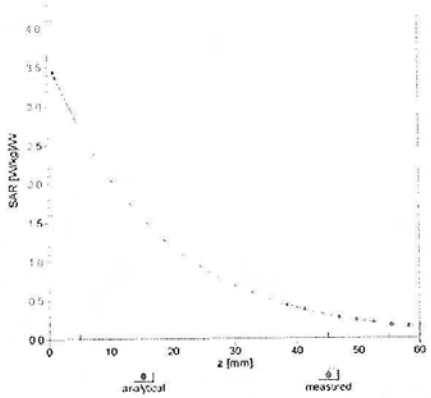


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

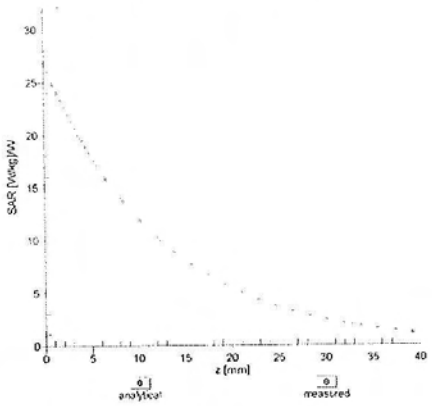
EX3DV4-- SN:3843 February 21, 2014

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

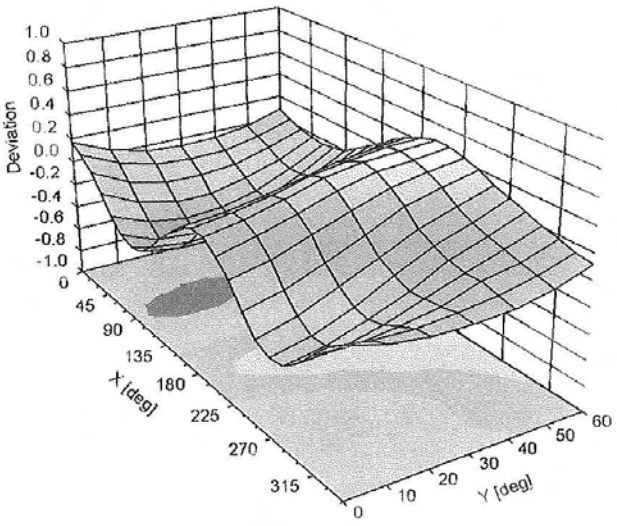


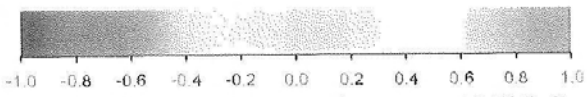
f = 1750 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3843

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-24.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

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

Client Sony Mobile Factory (PTT)

Certificate No: ES3-3169_Dec13

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3169

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

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 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

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) Accreditation No.: SCS 108
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,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., ϑ = 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:

- *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 affect 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 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
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,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 ≤ 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.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe ES3DV3

SN:3169

Manufactured: October 8, 2008
Calibrated: December 19, 2013

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

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.16	1.17	1.15	± 10.1 %
DCP (mV)[B]	101.4	98.0	95.9	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	145.9	±2.7 %
		Y	0.0	0.0	1.0		148.1	
		Z	0.0	0.0	1.0		142.7	

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 Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.