==	: BlackBerry	/	Appendix A for the Report	BlackBerry® Smartpho	ne Model RGY181LV	V SAR	Page 1(78)	
Author Data	a	Dates of Te	st	Test Report No	FCC ID:			
Andre	w Becker	April 1	15 – June 13, 2014	RTS-6057-1405-01	L6ARGY180LW			

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA



Page **2(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Probe 1643

Calibration Laboratory of Schmid & Partner Engineering AG Zeoghausstrasse 41, 8004 Zurich, Switzerland





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

Scheduled Check

Accreditation No.: SCS 108

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

Certificate No: ET3-1643_Mar14 Blackberry Waterloo CALIBRATION CERTIFICATE ET3DV6 - SN:1643 Object QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes March 10, 2014 Calibration date: This calibration certificate documents the traceability to national standards, which malize the physical units of measurements (51). 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 Call Date (Certificate No.) Scheduled Calibration 04-Apr-13 (No. 217-01733) Apr-14 Power meter E4416B GB41293874 Power sensor E4412A MY41498087 04-Apr-13 (No. 217-01733) Apr-14 04-Apr-13 (No. 217-61737) Apr.14 SN: 95054 (3c) Reference 3 dB Attenuator Apr-14 64-Apr-13 (No. 217-01735) Reference 20 dB Attenuator SN: S5277 (20x) Reference 30 dB Attenuator SN: 85129 (30b) 04-Apr-13 (No. 217-01736) Apr-14 SN: 3013 30-Dec-13 (No. ES3-3013, Dec13) Dec-14 Reference Probe ES3DV2 Dec-14 13-Dec-13 (No. DAE4-000, Dec13) DAE4 SN: 960

RF generator HP 8648C			In house check: Apr-16
Network Analyzer HP 8753E	US37300585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14
	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Mra Wharing
Approved by:	Katja Pokovic	Technical Manager	had dely-
			Issued: March 12, 2014
This calibration certificate shall	not be reproduced except in	full without written approval of the laboratory	

Check Date (in house)

Certificate No: ET3-1643, Mar14

Secondary Standards

10

Page 1 of 11



3(78)

Author Data Andrew Becker Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





S

C

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

Accreditation No.: SCS 108

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

Glossary:

NORMx,y,z ConvE DCP CF

A.B.C.D

tissue simulating liquid sensitivity in free space sensitivity in TSL / NORMx,y,z diode compression point

crest factor (1/duty_cycle) of the RF signal modulation dependent linearization parameters

Polarization a a rotation around probe axis

Polarization 9 5 rotation around an axis that is in the plane normal to probe axis (at measurement center),

i.e., 3 = 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 8 = 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 E2-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
- 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
- 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):

Certificate No. ET3-1643_Mar14

Page 2 of 11



Page **4(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

ET3DV6 - SN:1643

March 10, 2014

Probe ET3DV6

SN:1643

Manufactured: Calibrated: November 7, 2001 March 10, 2014

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

Certificate No: ET3-1643_Mar14

Page 3 of 11



Page **5(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

ET3DV6-SN:1643

March 10, 2014

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1643

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor 2	Unc (k+2)
Norm (µV/(V/m) ²) ⁶ DCP (mV) ⁸	1.75	1.96	1.75	± 10.1 %
DCP (mV) ⁿ	101.5	100.6	102.0	1 1 1 1 1 1 1 1 1 1

Modulation Calibration Parameters

UID	Communication System Name		A dB	8 dBõV	С	D dB	VR mV	Unc* (k=2)
0	CW	X	0.0	0.0	1.0	0.00	262.5	23.3 %
		Y.:	0.0	0.0	1.0		238.8	
		Z	0.0	0.0	1.0		265.3	

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%.

^{*} The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

Numerical lineorization parameter: uncertainty not required.
Uncertainty is determined using the max: deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



6(78)

Author Data **Andrew Becker** Dates of Test **April 15 – June 13, 2014** Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

ET3DV6-SN:1643

March 10, 2014

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1643

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity*	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha d	Depth ¹⁰ (mm)	Unct. (k=2)
750	41.9	0.89	6.55	6.55	6.55	0.41	2.30	± 12.0 %
900	41.5	0.97	6.15	8.15	6.15	0.38	2.41	± 12.0 %
1810	40.0	1.40	5.17	5.17	5,17	0.80	2.07	± 12.0 %
1950	40.0	1.40	4.92	4.92	4.92	0.80	2.04	± 12.0 %
2450	39.2	1.80	4.46	4.45	4,46	0.80	1.83	± 12.0 %

Certificate No: ET3-1643_Mar14

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 Comiff uncertainty at calibration hopining and the uncertainty for the indicated bequency band.

"At frequencies below 3 GHz, the validity of bissue parameters (c and e) can be released to ± 10% if float compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of bissue parameters (c and e) is restricted to ± 5%. The uncertainty is the RSS of the Cohi-F uncertainty for indicated target fissue parameters.

"AphaDepth are determined during calibration. SPEAG astraints that the remaining deviation due to the boundary effect after compensation is always less than ± 11% 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.



Test Report No Dates of Test

Author Data FCC ID: **Andrew Becker April 15 – June 13, 2014** RTS-6057-1405-01 L6ARGY180LW

ET3DV6-SN:1643

March 10, 2014

7(78)

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1643

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^f	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha ⁴	Depth ^c (mm)	Unct. (k=2)
750	55.5	0.96	6.24	6.24	6.24	0.43	2.19	± 12.0 %
900	55.0	1.05	6.03	6.03	6.03	0.38	2.61	± 12.0 %
1810	53.3	1.52	4.59	4.59	4.59	0.80	2.41	± 12.0 %
1950	53.3	1.52	4,64	4.64	4.64	0.80	2.33	± 12.0 %
2450	52.7	1.95	4.07	4.07	4.07	0.70	1.23	± 12,0 %

Certificate No: ET3-1643_Mar14

⁶ Fooquency 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 Contif uncertainty at calibration hequency and the uncertainty for the indicated bequency band.
⁷ At feographics below 3 GHz, the validity of tissue parameters (s and s) can be relaxed to ± 10% if flagad compensation formula is applied to measured SAR values. At Peographics above 3 GHz, the validity of tissue parameters (s and r) is restricted to ± 5%. The uncertainty is the RSS of the Contif uncertainty for indicated target tissue parameters.
⁸ Apha Depth are determined during calibration. SHEAG warrants that the remaining deviation due to the boundary effect after compensation is always lists that ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 CHz at any distance larger than half the probe by diameter from the boundary.



Page **8(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

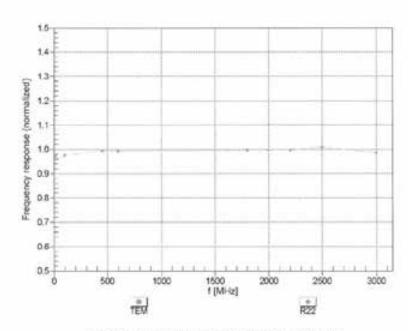
Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

ET3DV6-- SN:1843

March 10, 2014

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



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

Certificate No: ET3-1643_Mar14

Page 7 of 11



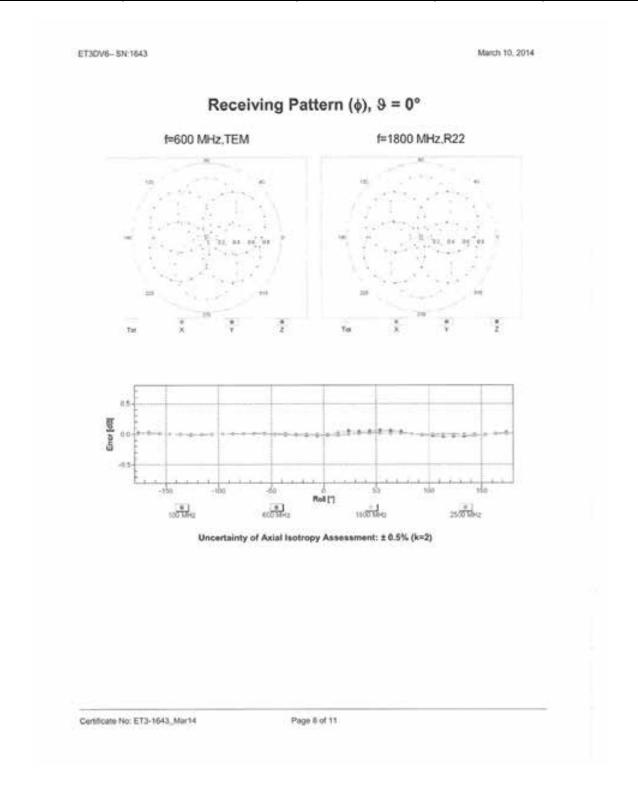
Page **9(78)**

Author Data
Andrew Becker

Dates of Test **April 15 – June 13, 2014**

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW





10(78)

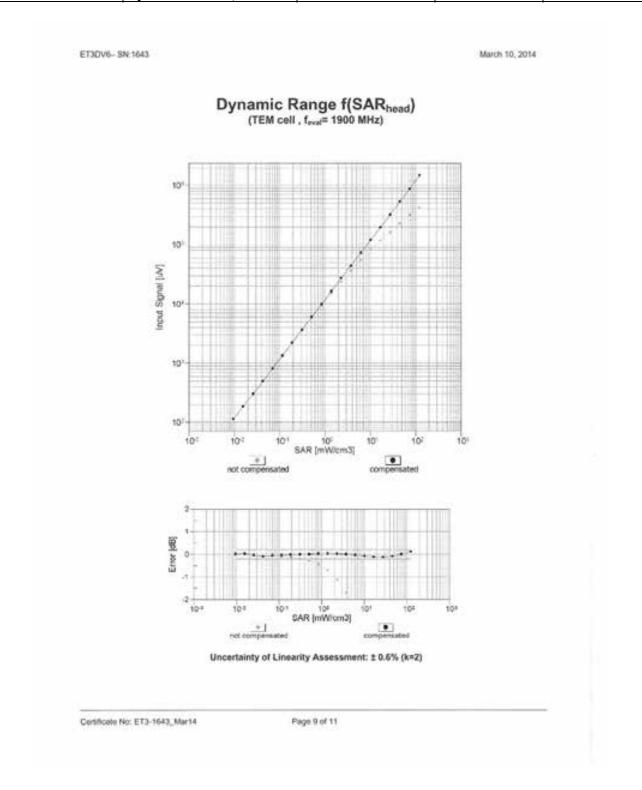
Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW





11(78)

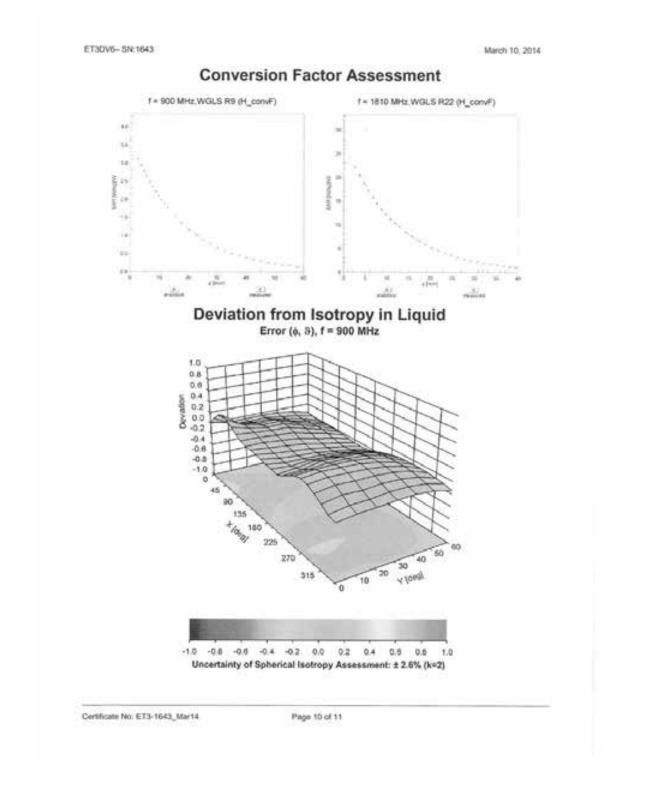
Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW





Page **12(78)**

Author Data
Andrew Becker

Dates of Test **April 15 – June 13, 2014**

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

ET3DV6-SN:1643

March 10, 2014

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1643

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	3.8
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	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

Certificate No: ET3-1643_Mar14

Page 11 of 11



13(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Probe 3225

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





Schweizerischer Kalibrierdienst Service suisse d'étalonnage 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

Ctient

Blackberry Waterloo

Certificate No: ES3-3225_Jan14

Accreditation No.: SCS 108

C

S

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3225

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

Calibration date: January 22, 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: 85277 (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

Calibrated by:

Israe El-Naouq

Laboratory Technician

Signature

Laboratory Technician

Signature

Laboratory Technician

Signature

Laboratory

Technical Manager

Issued: January 22, 2014

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

Certificate No: ES3-3225_Jan14

Page 1 of 11



14(78)

Author Data

Dates of Test

Test Report No

FCC ID:

Andrew Becker April 15 – June 13, 2014 RTS-6057-1405-01

L6ARGY180LW

Calibration Laboratory of

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kallbrierdienst C

Service suisse d'étalonnage Servizio svizzero di taratura

s Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL NORMx,y,z ConvF

tissue simulating liquid sensitivity in free space sensitivity in TSL / NORMx,y,z diode compression point

CF A. B, C. D crest factor (1/duty_cycle) of the RF signal modulation dependent linearization parameters

Polarization o

o rotation around probe axis

Polarization 9

9 rotation around an axis that is in the plane normal to probe axis (at measurement center),

i.e., 9 = 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:

- 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 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 9 = 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 E2-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).

Certificate No: ES3-3225_Jan14

Page 2 of 11



Page 15(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

ES3DV3 - SN:3225

January 22, 2014

Probe ES3DV3

SN:3225

Manufactured: Calibrated: September 1, 2009 January 22, 2014

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

Certificate No: ES3-3225_Jan14

Page 3 of 11



16(78)

Author Data **Andrew Becker** Dates of Test **April 15 – June 13, 2014** Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

ES3DV3- SN:3225

January 22, 2014

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3225

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) ²) ^A	1.26	1.20	1.30	± 10.1 %
DCP (mV) ⁸	99.9	99.5	100.4	

Modulation Calibration Parameters

O	Communication System Name		A dB	B dBõV	С	D dB	VR mV	Unc* (k=2)
	CW	X	0.0	0.0	1.0	0.00	158.9	±2.7 %
		Y	0.0	0.0	1.0		156.6	
		Z	0.0	0.0	1.0		165.1	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%.

Certificate No: ES3-3225_Jan14

Page 4 of 11

The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

Numerical linearization parameter: uncertainty not required.

Uncertainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the



Author Data Dates of Test

Andrew Becker April 15 – June 13, 2014 Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

ES3DV3-SN:3225

January 22, 2014

17(78)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3225

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 ⁶	Depth ^G (mm)	Unct. (k=2)
750	41.9	0.89	6.38	6.36	6.36	0.28	1.91	± 12.0 %
900	41.5	0.97	6.05	6.05	6.05	0.49	1.38	± 12.0 %
1810	40.0	1.40	5.24	5.24	5.24	0.69	1.23	± 12.0 %
1950	40.0	1.40	4.97	4.97	4.97	0.73	1.21	± 12.0 %
2450	39.2	1.80	4.64	4.64	4.64	0.80	1.23	± 12.0 %
2600	39.0	1.96	4.33	4.33	4.33	0.75	1.34	± 12.0 %

Certificate No: ES3-3225_Jan14

Page 5 of 11

E 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 cellbration frequency and the uncertainty for the indicated frequency band.

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

ApharDepth 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.



18(78)

Author Data **Andrew Becker** Dates of Test **April 15 – June 13, 2014** Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

ES3DV3-SN:3225

January 22, 2014

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3225

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	6.28	6.28	6.28	0.34	1.84	± 12.0 %
900	55,0	1.05	6.09	6.09	6.09	0.62	1.32	± 12.0 %
1810	53.3	1.52	4.93	4.93	4.93	0.48	1.57	± 12.0 %
1950	53.3	1.52	4.84	4.84	4.84	0.50	1.59	± 12.0 %
2450	52.7	1.95	4.28	4.28	4.28	0.77	1.23	± 12.0 %
2600	52.5	2.16	4.03	4.03	4.03	0.80	1.01	± 12.0 %

Certificate No: ES3-3225 Jan14

Page 6 of 11

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 Corn/F uncertainty at celibration frequency and the uncertainty for the indicated frequency band.

At frequencies below 3 GHz, the validity of tissue parameters (s and n) 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 (s and o) is restricted to ± 5%. The uncertainty is the RSS of the Corn/F uncertainty for indicated target tissue parameters.

AphaDepth 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 distance.

diameter from the boundary.



19(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

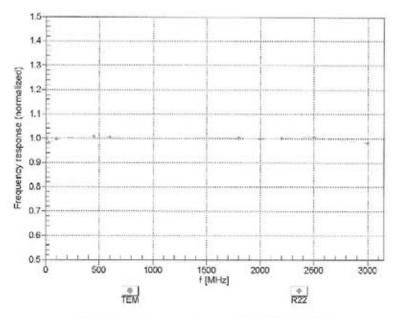
FCC ID: L6ARGY180LW

ES3DV3-SN:3225

January 22, 2014

Frequency Response of E-Field

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



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

Certificate No: ES3-3225_Jan14

Page 7 of 11



Appendix A for the BlackBerry® Smartphone Model RGY181LW SA	R
Report	

20(78)

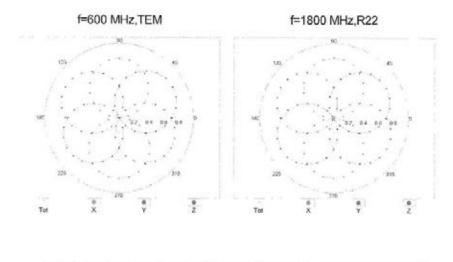
I no no no lineare

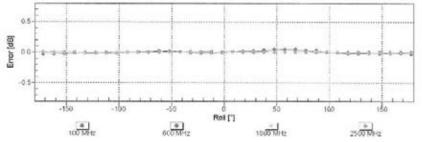
 Author Data
 Dates of Test
 Test Report No
 FCC ID:

 Andrew Becker
 April 15 – June 13, 2014
 RTS-6057-1405-01
 L6ARGY180LW

ES3DV3- SN:3225 January 22, 2014

Receiving Pattern (\$\phi\$), 9 = 0°





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

Certificate No: E\$3-3225_Jan14 Page 8 of 11



21(78)

Author Data
Andrew Becker

Dates of Test **April 15 – June 13, 2014**

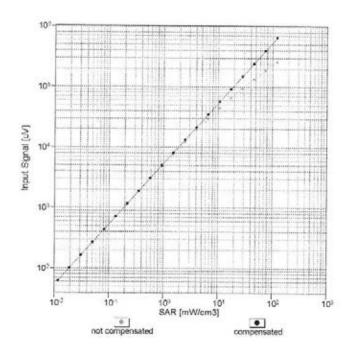
Test Report No **RTS-6057-1405-01**

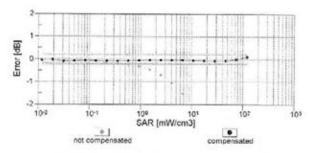
FCC ID: L6ARGY180LW

ES3DV3-SN:3225

January 22, 2014

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





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

Certificate No: ES3-3225_Jan14

Page 9 of 11



22(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

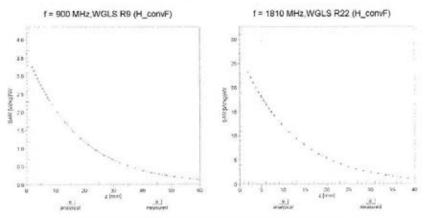
Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

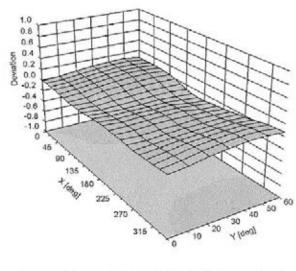
ES3DV3-- SN:3225

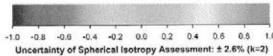
January 22, 2014

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (φ, θ), f = 900 MHz





Certificate No: ES3-3225_Jan14

Page 10 of 11



Page **23(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

ES3DV3-SN:3225

January 22, 2014

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3225

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	8
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

Certificate No: ES3-3225_Jan14

Page 11 of 11



cument

Appendix A for the BlackBerry® Smartphone Model RGY181LW SAR Report

24(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID:

L6ARGY180LW

Probe 3548

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 signal

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client

Blackberry Waterloo

Certificate No: EX3-3548_Jan14

Accreditation No.: SCS 108

Object EX3DV4 - SN:3548

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: January 17, 2014

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (\$1). 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 ES30V2	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	10	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3842U01700	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
-	ID US3842U01700	Check Date (in house) 4-Aug-99 (in house check Apr-13)	Scheduled Check In house check: Apr

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	Self Myen
Approved by:	Katja Pokovic	Technical Manager	SELL.
			Issued: January 20, 2014

Certificate No: EX3-3548 Jan14

Page 1 of 11



Author Data

Andrew Becker

Appendix A for the BlackBerry® Smartphone Model RGY181LW SAR Report

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW 25(78)

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





C

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

Accreditation No.: SCS 108

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

Glossarv:

NORMx,y,z ConvF

tissue simulating liquid sensitivity in free space sensitivity in TSL / NORMx,y,z diode compression point

CF A, B, C, D

DCP

crest factor (1/duty_cycle) of the RF signal modulation dependent linearization parameters

Polarization e

e rotation around probe axis

Polarization 8

8 rotation around an axis that is in the plane normal to probe axis (at measurement center),

i.e., 9 = 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:

- 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 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 9 = 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 E2-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
- 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
- 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).

Certificate No: EX3-3548 Jan14

Page 2 of 11



26(78)

Author Data **Andrew Becker** Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID:

L6ARGY180LW

EX3DV4 - SN:3548

January 17, 2014

Probe EX3DV4

SN:3548

Manufactured: Calibrated:

November 16, 2004 January 17, 2014

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: EX3-3548_Jan14

Page 3 of 11



Report

Author Data **Andrew Becker** Dates of Test **April 15 – June 13, 2014** Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

EX3DV4-SN:3548

January 17, 2014

27(78)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3548

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) ²) ^A	0.37	0.44	0.42	± 10.1 %
DCP (mV) [®]	100.9	99.2	98.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	С	D dB	VR mV	Unc ^L (k=2)
0	CW	X	0.0	0.0	1.0	0.00	179.3	±3.0 %
		Y	0.0	0.0	1.0		150.2	
		Z	0.0	0.0	1.0		196.1	

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%.

Certificate No: EX3-3548_Jan14

Page 4 of 11

<sup>The uncertainties of NormX.Y.Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

Numerical linearization parameter: uncertainty not required.

Uncertainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the</sup> field value.



28(78)

Author Data **Andrew Becker** Dates of Test **April 15 – June 13, 2014** Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

EX3DV4- SN:3548

January 17, 2014

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3548

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^c	Relative Permittivity	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha ^G	Depth ^G (mm)	Unct. (k=2)
2600	39.0	1.96	7.03	7.03	7.03	0.50	0.77	± 12.0 %
5200	36.0	4.66	5.37	5.37	5.37	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.94	4.94	4.94	0.35	1.80	± 13.1 %
5800	35.3	5.27	4.76	4.76	4.76	0.40	1.80	± 13.1 %

Certificate No: EX3-3548 Jan14

Page 5 of 11

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.

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

Application of the 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 diemeter from the boundary.



29(78)

Author Data **Andrew Becker** Dates of Test **April 15 – June 13, 2014** Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

EX3DV4- SN:3548

January 17, 2014

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3548

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^G	Relative Permittivity F	Conductivity (9/m) F	ConvF X	ConvF Y	ConvF Z	Alpha ⁶	Depth ^G (mm)	Unct. (k=2)
2600	52.5	2.16	6.91	6.91	6.91	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.83	4.83	4.83	0.40	1.90	± 13.1 %
5500	48.6	5.65	4.33	4.33	4.33	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.36	4.36	4.36	0.50	1.90	± 13.1 %

Certificate No: EX3-3548_Jan14

Page 6 of 11

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.

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

AdoptatDepth 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.



30(78)

Author Data **Andrew Becker** Dates of Test

April 15 – June 13, 2014

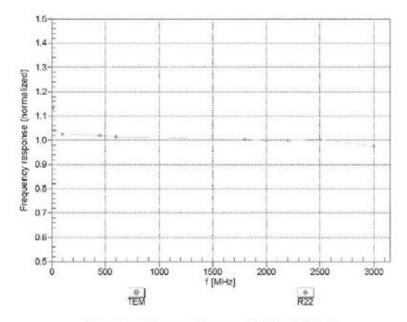
Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

EX3DV4-SN:3548

January 17, 2014

Frequency Response of E-Field

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



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

Certificate No: EX3-3548_Jan14

Page 7 of 11

::: BlackBerry

Page **31(78)**

Author Data
Andrew Becker

Dates of Test **April 15 – June 13, 2014**

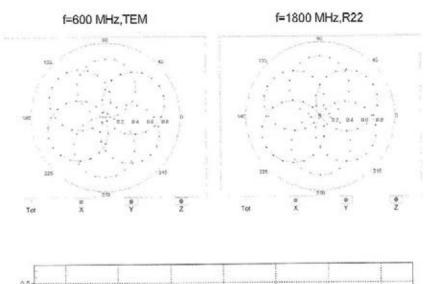
Test Report No **RTS-6057-1405-01**

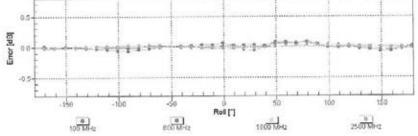
FCC ID: L6ARGY180LW

EX3DV4- SN:3548

January 17, 2014

Receiving Pattern (6), 9 = 0°





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

Certificate No: EX3-3548_Jan14

Page 8 of 11



32(78)

Author Data

Dates of Test **Andrew Becker**

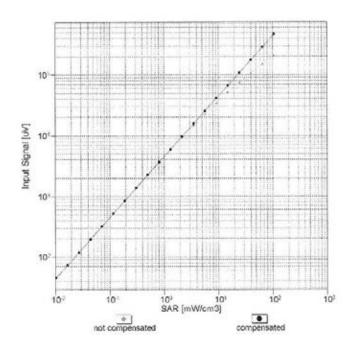
April 15 – June 13, 2014

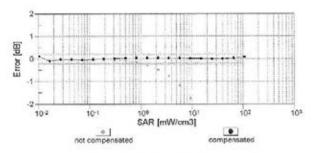
Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

EX3DV4-SN:3548

January 17, 2014

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





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

Certificate No: EX3-3548_Jan14

Page 9 of 11



33(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

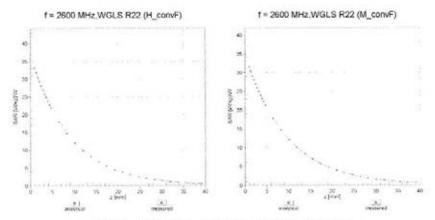
Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

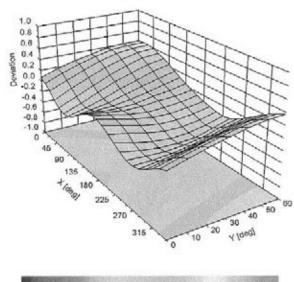
EX3DV4-- \$N:3548

January 17, 2014

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (\$\phi\$, \$\partial\$), f = 900 MHz



-1.0 -0.8 -0.6 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 1.0 Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: EX3-3548_Jan14

Page 10 of 11



Page **34(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Recommended Measurement Distance from Surface

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

EX3DV4-SN:3548

January 17, 2014

2 mm

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3548

Other Probe Parameters Sensor Arrangement Triangular -70.8 Connector Angle (") Mechanical Surface Detection Mode enabled disabled Optical Surface Detection Mode 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

Certificate No: EX3-3548_Jan14

Page 11 of 11



Page **35(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

750 Dipole

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





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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

Client RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D750V3-1021_Jan13

Object	D750V3 - SN: 10	215521110000000000000000000000000000000	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	January 07, 2013		
The measurements and the unce	retainties with confidence proceed in the closed laborator	onal standards, which realize the physical un robability are given on the following pages an y facility: environment temperature (22 ± 3)*0	nd are part of the certificate.
	100		
rimary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
rimary Standards Yower meter EPM-442A	ID # GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
rrimary Standards Power meter EPM-442A Power sensor HP 8481A	ID # GB37480704 US37292783	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Oct-13 Oct-13
rrimary Standards Tower meter EPM-442A Tower sensor HP 8481A teference 20 dB Attenuator	ID # GB37480704 US37292783 SN: 5058 (20k)	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530)	Oct-13 Oct-13 Apr-13
Primary Standards Power meter EPM-442A Power sensor HP 8491A Reference 20 dB Attenuator type-N mismatch combination	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01040) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)	Oct-19 Oct-19 Apr-19 Apr-13
Primary Standards Power meter EPM-442A Power sensor HP 8491A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3	ID # GB37480704 US37292763 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01040) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12)	Oct-19 Oct-19 Apr-19 Apr-13 Dec-13
rrimary Standards Power meter EPM-442A Power sensor HP 8491A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01040) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)	Oct-19 Oct-19 Apr-19 Apr-13
Primary Standards Power meter EPM-442A Power sensor HP 8491A Reference 20 dB Attenuator ype-N mismatch combination Reference Probe ES3DV3	ID # GB37480704 US37292763 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01040) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12)	Oct-19 Oct-19 Apr-19 Apr-13 Dec-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01040) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12)	Oct-19 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US97292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01590) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11)	Oct-19 Oct-19 Apr-19 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01590) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house)	Oct-19 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator type-N mismatch combination heterence Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US97292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01590) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11)	Oct-19 Oct-19 Apr-19 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8491A Reference 20 dB Attenuator ype-N mismatch combination Reference Probe ES3DV3 RAE4 Recondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Retwork Analyzer HP 8753E	ID # GB37480704 US37292793 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01530) 28-Dec-12 (No. E83-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 db Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E Calibrated by:	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. E83-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	Oct-19 Oct-19 Apr-19 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13

Certificate No: D750V3-1021_Jan13

Page 1 of 6



36(78)

Author Data

Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID:

L6ARGY180LW

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





Schweizerischer Kalibrierdienst S Service suisse d'étalonnage C

Servizio svizzero di taratura

Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL

tissue simulating liquid

ConvF N/A

sensitivity in TSL / NORM x,y,z not applicable or not measured

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
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

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%.

Certificate No: D750V3-1021_Jan13

Page 2 of 6



Appendix A for the BlackBerry $\hspace{-0.5em}$ Smartphone Model RGY181LW SAR Report

37(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01

FCC ID: L6ARGY180LW

Measurement Conditions

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

DASY Version	DASY5	V52.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41,4 ± 6 %	0.89 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	C = F4- S4T4 NOV
SAR measured	250 mW input power	2.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.46 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	Villana - 100
SAR measured	250 mW input power	1.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.51 W/kg ± 16.5 % (k=2)

Certificate No: D750V3-1021_Jan13

Page 3 of 6



ent

Appendix A for the BlackBerry® Smartphone Model RGY181LW SAR Report

Page **38(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.7 Ω - 0.2 jΩ
Return Loss	- 25.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 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	December 01, 2010

Certificate No: D750V3-1021_Jan13

Page 4 of 6



 $\label{lem:sarphone} \textbf{Appendix A for the BlackBerry} \& \textbf{Smartphone Model RGY181LW SAR} \\ \textbf{Report}$

39(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

L6ARGY180LW

FCC ID:

DASY5 Validation Report for Head TSL

Date: 07.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1021

Communication System: CW; Frequency: 750 MHz

Medium parameters used: f = 750 MHz; $\sigma = 0.89 \text{ S/m}$; $\varepsilon_r = 41.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

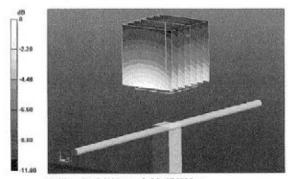
DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6.28, 6.28, 6.28); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 54.107 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.23 W/kg SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.38 W/kg

Maximum value of SAR (measured) = 2.47 W/kg



0 dB = 2.47 W/kg = 3.93 dBW/kg



Page **40(78)**

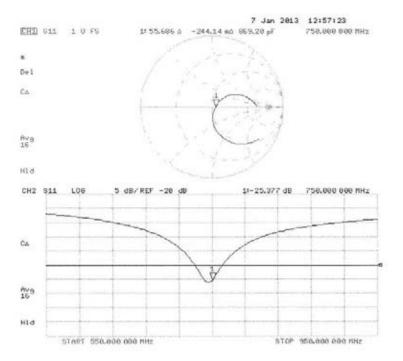
Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

Impedance Measurement Plot for Head TSL



Certificate No: D750V3-1021_Jan13

Page 6 of 6



Page **41(78)**

Author Data

Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No

RTS-6057-1405-01

FCC ID:

L6ARGY180LW

835 Dipole

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





S Schweizerischer Kallbrierdienst Service suisse d'étalonnage Servizio svizzero di taratura S Swiss Callbration 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

Client RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D835V2-446_Jan13

Object	D835V2 - SN: 44	6	
Calibration procedure(s)	QA CAL-05.v9		
	Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	January 07, 2013	e lectering and property and	
		onal standards, which realize the physical un	THE STORE STORE SHE STORE STORE SHE STORE
The measurements and the unce	rtainties with confidence pr	robability are given on the following pages an	d are part of the certificate.
All calibrations have been conduc	cted in the closed laborator	y facility: environment temperature (22 ± 3)°0	C and humidity < 70%.
Calibration Equipment used (M&)	TE critical for calibration)		
	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Primary Standards		Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640)	Scheduled Calibration Oct-13
Primary Standards Power meter EPM-442A	ID# GB37480704 US37292783	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Oct-13 Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A	ID # GB37480704 US37292783 SN: 5058 (20k)	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mur-12 (No. 217-01530)	Oct-13 Oct-13 Apr-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator	ID# GB37480704 US37292783	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Oct-13 Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3	ID # GB37480704 US37292783 SN: 5058 (20k)	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mur-12 (No. 217-01530)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)	Oct-13 Oct-13 Apr-13 Apr-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Pype-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards	ID # GB37490704 US37292783 SN: 5058 (20K) SN: 5047.3 / 06327 SN: 3205 SN: 601	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mmr-12 (No. 217-01530) 27-Mmr-12 (No. 217-01530) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A	ID # GB37480704 US37292783 SN: 5058 (20N) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US37292783 SN: 5058 (20N) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mnr-12 (No. 217-01530) 27-Mnr-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US37292783 SN: 5058 (20N) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US37292783 SN: 5058 (20N) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mnr-12 (No. 217-01530) 27-Mnr-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF-generator R&S SMT-06 Network Analyzer HP 8753E	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 50547.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mur-12 (No. 217-01530) 27-Mur-12 (No. 217-01530) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-12) Function	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4208	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mur-12 (No. 217-01530) 27-Mur-12 (No. 217-01530) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-96 Network Analyzer HP 8753E Calibrated by:	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 50547.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4206 Name	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mur-12 (No. 217-01530) 27-Mur-12 (No. 217-01530) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-12) Function	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13

Certificate No: D835V2-446_Jan13

Page 1 of 6



 $\label{lem:sarphone} \textbf{Appendix A for the BlackBerry} \& \textbf{Smartphone Model RGY181LW SAR} \\ \textbf{Report}$

Page **42(78)**

Author Data

Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No

DTC 6057 1405

FCC ID:

RTS-6057-1405-01

L6ARGY180LW

Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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

Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL ConvF

N/A

tissue simulating liquid

se

sensitivity in TSL / NORM x,y,z not applicable or not measured

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
- EC 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) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

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%.

Certificate No: D835V2-446_Jan13

Page 2 of 6



Appendix A for the BlackBerry $\hspace{-0.5em}$ Smartphone Model RGY181LW SAR Report

43(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Measurement Conditions

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

DASY Version	DASY5	V52.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	and the second the second second second

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.0 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

SAR result with Head TSL

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	C 73
SAR measured	250 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.39 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.13 W/kg ± 16.5 % (k=2)

Certificate No: D835V2-446_Jan13

Page 3 of 6



Page **44(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.1 Ω - 6.5 jΩ	
Return Loss	- 23.7 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.385 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	October 24, 2001

Certificate No: D835V2-446_Jan13

Page 4 of 6



Page 45(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID:

L6ARGY180LW

DASY5 Validation Report for Head TSL

Date: 07.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 446

Communication System: CW; Frequency: 835 MHz

Medium parameters used: f = 835 MHz; $\sigma = 0.92 \text{ S/m}$; $\varepsilon_r = 42$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6.05, 6.05, 6.05); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

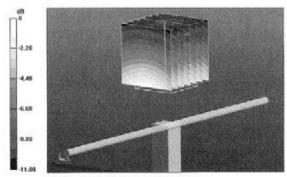
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 56.650 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.61 W/kg

SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.55 W/kg

Maximum value of SAR (measured) = 2.79 W/kg



0 dB = 2.79 W/kg = 4.46 dBW/kg



46(78)

Author Data
Andrew Becker

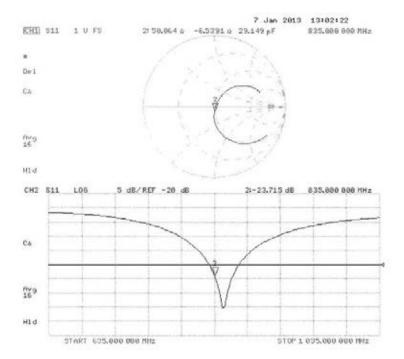
Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Impedance Measurement Plot for Head TSL



Certificate No: D835V2-446_Jan13

Page 6 of 6



Page **47(78)**

Author Data

Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No

RTS-6057-1405-01

FCC ID:

L6ARGY180LW

1800 Dipole

Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 6004 Zurich, Switzerland





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

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the sign

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

lient RT

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1800V2-2d020_Jan13

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 Cot-13 Cover meter EPM-442A GB37480704 01-Nov-12 (No. 217-01640) Oct-13 Primary Standards Cover sensor HP 8481A US37292783 01-Nov-12 (No. 217-01640) Oct-13 Primary Standards SN: 5066 (20K) 27-Mar-12 (No. 217-01530) Apr-13 Primary Standards SN: 5047.3 / 06327 27-Mar-12 (No. 217-01533) Apr-13 Reference 20 dB Attenuator SN: 5047.3 / 06327 27-Mar-12 (No. 217-01533) Apr-13 Reference Probe ES3DV3 SN: 3205 28-Dec-12 (No. ES3-3205_Dec-12) Dec-13 DAE4 SN: 601 27-Jun-12 (No. DAE4-601_Jun-12) Jun-13 Gecondary Standards ID # Check Date (in house) Scheduled Check Prover sensor HP 9481A MY41092317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 HE generator R&S SMT-06 US3/390585 S4206 18-Oct-01 (in house check Oct-11) In house check: Oct-13 Name Function Signature Calibrated by: Israe El-Naouq Laboratory Technician Chick Date (In house Check Oct-12) In house check: Oct-13 In house check: Oct-13 In house check: Oct-13 In house check: Oct-13		ERTIFICATE		
Calibration procedure for dipole validation kits above 700 MHz Calibration date: January 09, 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 Dil # Cal Date (Certificate No.) Scheduled Calibration Cal-13 Prover meter EPM-442A G637480704 01-Nov-12 (No. 217-01640) Oct-13 Prover sensor NP 8461A U537292783 01-Nov-12 (No. 217-01640) Oct-13 Proper Standards SN: 5069 (20k) 27-Mar-12 (No. 217-01640) Oct-13 Proper Primary Standards SN: 5067 (3 / 06327) 27-Mar-12 (No. 217-01530) Apr-13 Reference Probe ES3DV3 SN: 3005 28 Dec-12 (No. ES3-3205_Dec12) Dec-13 Pace Secondary Standards ID # Check Date (in house) Schoduled Check Prover sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 In house check: Oct-13 Name Function Signature Calibrated by: Laboratory Technician Calibration Signature Calibrated by: Laboratory Technician Calibration Signature Laboratory Technician Calibration Calibrated by: Laboratory Technician Calibration Calibration Calibration Calibration	Object	D1800V2 - SN: 2	d020	
Calibration date: January 09, 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. Not calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%. Calibration Equipment used (M&TE critical for cultivation) Primary Standards ID # Cal Date (Certificate No.) Scheduled Calibration Primary Standards ID # Cal Date (Certificate No.) Scheduled Calibration Oct-13 Prover meter EPM-442A GB37480704 01-Nov-12 (No. 217-01640) Oct-13 Particular of the Atlanta US37292783 01-Nov-12 (No. 217-01640) Oct-13 Particular of the Atlantaric Nov. 5068 (20k) 27-Mar-12 (No. 217-01530) Apr-13 Page-19 Nover sensor HP 8481A SN: 5047-3 / 06327 27-Mar-12 (No. 217-01533) Apr-13 Reference Probe ES3DV3 SN: 601 27-Jun-12 (No. DA2-4-601_Jun-12) Jun-13 Secondary Standards ID # Check Date (In house check Oct-11) In house check Oct-13 Reference Probe ES3DV3 Nover sensor HP 8481A MY+1082317 18-Oct-02 (In house check Oct-11) In house check: Oct-13 Reference Probe ES3DV3 Nover sensor HP 8481A MY+1082317 18-Oct-02 (In house check Oct-11) In house check: Oct-13 Reference Probe ES3DV3 Nover sensor HP 8481A MY+1082317 18-Oct-02 (In house check Oct-11) In house check: Oct-13 Reference Probe ES3DV3 Nover sensor HP 8481A MY+1082317 18-Oct-02 (In house check Oct-11) In house check: Oct-13 Reference Probe ES3DV3 Nover sensor HP 8481A MY+1082317 18-Oct-02 (In house check Oct-11) In house check: Oct-13 Reference Probe ES3DV3 Nover Reference Probe ES4DV3 Nover Sensor HP 8491A MY+1082317 18-Oct-02 (In house check Oct-11) In house check: Oct-13 Reference Probe ES4DV3 Nover Reference Probe ES4DV3 Nov	Calibration procedure(s)		dura for disale validation Lite about	700 MHz
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. NII 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 Primary Standards ID # Cal Date (Certificate No.) Scheduled Calibration Oct-13 Power ensor HP 8481A US37292783 01-Nov-12 (No. 217-01640) Oct-13 Particular of the control of the		Calibration proce	dure for dipole validation kits ab	love 700 MHZ
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. NII 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 Primary Standards ID # Cal Date (Certificate No.) Scheduled Calibration Oct-13 Power ensor HP 8481A US37292783 01-Nov-12 (No. 217-01640) Oct-13 Particular of the control of the				ASSESSED FOR THE PARTY OF THE P
Primary Standards ID # Cal Date (Certificate No.) Scheduled Calibration Power meter EPM-442A GB97480704 01-Nov-12 (No. 217-01640) Oct-13 Power sensor HP 8481A US37292763 01-Nov-12 (No. 217-01640) Oct-13 Reference 20 dB Attenuator SN: 5058 (20k) 27-Mar-12 (No. 217-01530) Apr-13 SN: 5058 (20k) 27-Mar-12 (No. 217-01533) Apr-13 SN: 5047.3 / 05327 27-Mar-12 (No. 217-01533) Apr-13 DAE4 SN: 601 27-Jun-12 (No. DAE4-601_Jun-12) Jun-13 DECONDERS SN: 601 27-Jun-12 (No. DAE4-601_Jun-12) Jun-13 DECONDERS SMT-06 NOWER sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 Network Analyzer HP 8759E US37390585 S4206 18-Oct-01 (in house check Oct-12) Name Function Signature Calibrated by: Us37390585 S4206 Laboratory Technician Function Signature Laboratory Technician Function Signature	Calibration date:	January 09, 2013	and the state of t	
Calibration Equipment used (M&TE critical for calibration) Calibration Equipment used (M&TE critical for 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: 5068 (20k) 27-Mar-12 (No. 217-01530) Apr-13 Reference Probe ES3DV3 SN: 3205 28-Dec-12 (No. ES3-3205_Dec12) Dec-13 DAE4 SN: 601 27-Jun-12 (No. DAE4-601_Jun12) Jun-13 Secondary Standards ID # Check Date (in house) Scheduled Check Power sensor HP 8481A MY41082317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 Network Analyzer HP 8759E US37/390585 S4206 18-Oct-01 (in house check Oct-12) Name Function Signature Page EI-Naouq Laboratory Technician AF Quality Standard Signature Laboratory Technician AF Quality Standard Signature Function Signature	All calibrations have been conduc	ted in the closed laborator	ry facility: environment temperature (22 ± 3)	°C and humidity < 70%.
Power meter EPM-442A GB37480704 01-Nov-12 (No. 217-01640) Oct-13	Calibration Equipment used (M&)	TE critical for calibration)		
Power sensor HP 8481A Reference 20 dB Attenuator Type-N miamatch combination Reference Probe ES3DV3 SN: 5068 (20k) SN: 5068 (20k) SN: 5068 (20k) SN: 5067 (20k) SN: 5067 (20k) SN: 5067 (20k) SN: 5047 (3 / 06327) SN: 3205 SR: 3205	Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Reference 20 dB Attenuator SN: 5058 (20k) 27-Mar-12 (No. 217-01530) Apr-13		GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
SN: 5047.3 / 06327 27-Mor-12 (No. 217-01533) Apr-13				Oct-13
SN: 3205 SN: 3205 SN: 3205 Dec-12 Dec-13 Dec-13 Dec-13 Dec-14 SN: 601 Z7-Jun-12 (No. DAE4-601_Jun12) Jun-13 Dec-13 Jun-13 Dec-14 Dec-15 Dec-				Apr-13
SN: 601 27-Jun-12 (No. DAE4-601_Jun12) Jun-13 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 HF 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 Name Function Signature Calibrated by: Israe El-Naouq Laboratory Technician			C	Apr-13
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 In hou		7.67.0.783.75	4 (1.41 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.11 (1.	07/07/07/0
Power sensor HP 8481A MY41082317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 I	DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13
AF generator R&S SMT-06 Network Analyzer HIP 8759E Name Name Function In house check: Oct-13 In house check: Oc	Secondary Standards	ID#	Check Date (in house)	Scheduled Check
Name Function Signature Calibrated by: US3/390565 S4206 18-Oct-01 (in house check Oct-12) In house check: Oct-13 Name Function Signature Laboratory Technician Hrau Grace	Young concor HP 9491A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
Name Function Signature Calibrated by: Israe El-Naouq Laboratory Technician Oprace		100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Calibrated by: Israe El-Naouq Laboratory Technician Optique Grandes	RF generator R&S SMT-06	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13
Calibrated by: Israe El-Naouq Laboratory Technician Optique Grandes	RF generator R&S SMT-06			
Hran Graa	RF generator R&S SMT-06	Name	Function	Signature
Approved by: Katja Pokovic Technical Manager	RF generator R&S SMT-06 Network Analyzer HIP 8753E	STATE OF THE STATE	a 10.000 mm (0.000 mm)	THE RESERVE ASSESSMENT
5000	RF generator R&S SMT-06 Network Analyzer HP 8753E Calibrated by:	STATE OF THE STATE	a 10.000 mm (0.000 mm)	Signature March Grobacer
Issued: January 9, 2013	RF generator R&S SMT-06 Network Analyzer HP 875SE Calibrated by:	Israe El-Naouq	Laboratory Technician	THE RESERVE AND ADDRESS OF REAL PROPERTY.

Certificate No: D1800V2-2d020_Jan13

Page 1 of 6



Page **48(78)**

Author Data

Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID:

L6ARGY180LW

Calibration Laboratory of Schmid & Partner

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdiens C Service suisse d'étalonnage

Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL

tissue simulating liquid

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

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
- EC 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) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

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%.

Certificate No: D1800V2-2d020_Jan13

Page 2 of 6



Page **49(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01

FCC ID: L6ARGY180LW

Measurement Conditions

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

DASY Version	DASY5	V52.8.4
Extrapolation	Advanced Extrapolation	52-53-7491
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

A CONTRACTOR OF THE CONTRACTOR	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.38 mha/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	9.61 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	38.5 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.3 W/kg ± 16.5 % (k=2)

Certificate No: D1800V2-2d020_Jan13

Page 3 of 6



Fage **50(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.2 Ω - 8.3 jΩ	
Return Loss	- 20.5 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.216 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	September 07, 2001

Certificate No: D1800V2-2d020_Jan13

Page 4 of 6



51(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

L6ARGY180LW

FCC ID:

DASY5 Validation Report for Head TSL

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d020

Communication System: CW; Frequency: 1800 MHz

Medium parameters used: f = 1800 MHz; $\sigma = 1.38 \text{ S/m}$; $\epsilon_r = 38.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

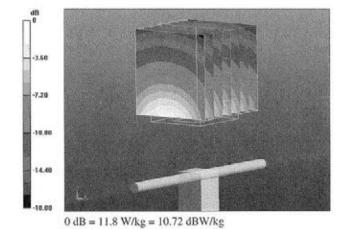
DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(5.04, 5.04, 5.04); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

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 = 95.870 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 17.5 W/kg SAR(1 g) = 9.61 W/kg; SAR(10 g) = 5.06 W/kg

Maximum value of SAR (measured) = 11.8 W/kg





Page **52(78)**

Author Data
Andrew Becker

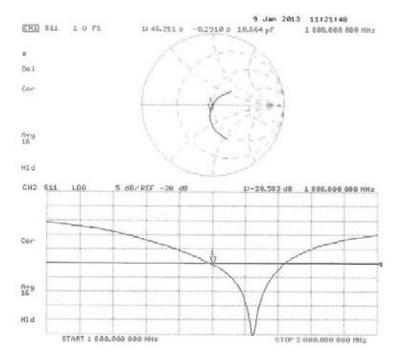
Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Impedance Measurement Plot for Head TSL



Certificate No: D1800V2-2d020_Jan13

Page 6 of 6



Report

Author Data Dates of Test **Andrew Becker**

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID:

L6ARGY180LW

53(78)

1900 Dipole

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





Schweizerischer Kalibrierdienst S Service suisse d'étalonnage C 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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D1900V2-545_Jan13

	and the same of th		
Object	D1900V2 - SN: 5	45	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	January 09, 2013	Company to the second	
		ional standards, which realize the physical un robability are given on the following pages an	
All calibrations have been conduc	cted in the closed laborator	ry facility: environment temperature (22 ± 3)*C	C and humidity < 70%.
Catibration Equipment used (M&)	TE critical for calibration)		
	TE critical for calibration)	Cal Date (Certificate No.)	Scheduled Calibration
Primary Standards	4	Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640)	Scheduled Calibration Oct-13
Primary Standards Power meter EPM-442A	tD #	The state of the s	
Primary Standards Power meter EPM-442A Power sensor HP 8481A	tD # GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator	ID # GB37480704 US37292783	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Oct-13 Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination	ID # GB37480704 US37292783 SN: 5058 (20k)	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630)	Oct-13 Oct-13 Apr-13
Primary Standards Power meter EPM-442A Power sensor IIP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)	Oct-13 Oct-13 Apr-13 Apr-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047:3706327 SN: 3205 SN: 801	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A	ID # GB37480704 US37292783 SN: 5056 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 db Attenuetor Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
Calibration Equipment used (M&) Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047:3706327 SN: 3206 SN: 801 ID # MY41092317 100005 US37390585 S4206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06	ID # GB3/480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01633) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	ID # GB37480704 US37292783 SN: 5058 (20k) SN: 5047:3706327 SN: 3205 SN: 801 ID # MY41092317 100005 US37390585 S4206	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01630) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13

Certificate No: D1900V2-545_Jan13

Page 1 of 6



54(78)

Author Data

Andrew Becker

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID:

L6ARGY180LW

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

Dates of Test





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

Accreditation No.: SCS 108

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

Glossary:

TSL ConvF

N/A

tissue simulating liquid

sensitivity in TSL / NORM x,y,z not applicable or not measured

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
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

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%.

Certificate No: D1900V2-545_Jan13

Page 2 of 6



Appendix A for the BlackBerry $\hspace{-0.5em}$ Smartphone Model RGY181LW SAR Report

55(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01

FCC ID: L6ARGY180LW

Measurement Conditions

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

DASY Version	DASY5	V52.8.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	200

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.4 ± 6 %	1.38 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	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.2 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.1 W/kg ± 16.5 % (k=2)

Certificate No: D1900V2-545_Jan13

Page 3 of 6



56(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.0 Ω + 1.7 jΩ
Return Loss	- 34.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.198 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 15, 2001

Certificate No: D1900V2-545_Jan13

Page 4 of 6



57(78)

Author Data

Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID:

L6ARGY180LW

DASY5 Validation Report for Head TSL

Date: 09.01.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 545

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz; $\sigma = 1.38 \text{ S/m}$; $\varepsilon_r = 39.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

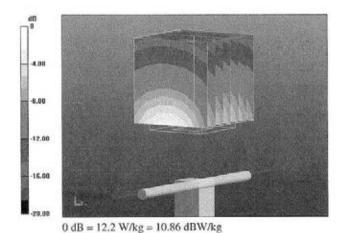
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.98, 4.98, 4.98); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

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 = 95.493 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 18.1 W/kg SAR(1 g) = 10 W/kg; SAR(10 g) = 5.26 W/kg Maximum value of SAR (measured) = 12.2 W/kg



Certificate No: D1900V2-545_Jan13

Page 5 of 6



Fage **58(78)**

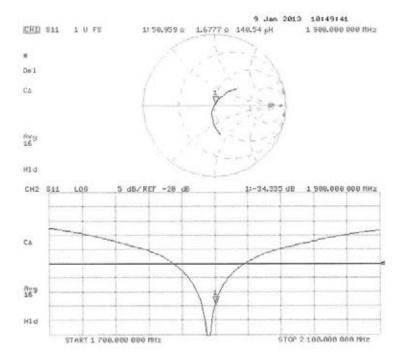
Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-545_Jan13

Page 6 of 6



Page **59(78)**

Author Data
Andrew Becker

Dates of Test **April 15 – June 13, 2014**

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

2450 Dipole

ocception by the Swee Accepting	h, Switzerland	Accredite	S Swiss Calibration Service
he Swiss Accreditation Service fulfilateral Agreement for the n	e is one of the signatorie	s to the EA	
Blackberry Wa			No: D2450V2-791_Sep13
CALIBRATION C	ERTIFICATE		VIII NOSTENES EL I
Disject	D2450V2 - SN; 7	91	
Calibration procedure(6)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits	above 700 MHz
Calibration date:	September 10, 2	013	
The measurements and the unor All calibrations have been condu	etainties with confidence p ctest in the closed laborator	ional standards, which realize the physic esbatelity and given on the following page ry facility: environment temperature (22 a	is and are part of the certificate.
The measurements and file unor All calibrations have been condu- Calibration Equipment used (NA)	etainties with confidence p clost in the closed laboration TE critical for cultivation)	esbability and given on the following page ny facility: environment temperature (22 s	is and are part of the certificate.
The messurements and file unor All calibrations have been condu Calibration Equipment used (M& Primary Standards	etainties with confidence p clost in the closed leborour TE critical for cultivation) ID #	rebability and given on the following page ry facility: environment temperature (22 a Gel Date (Certificate No.)	is and are part of the certificate. 20°C and humidity < 70%. Schoduled Calibration
The measurements and the unor All calibrations have been condu- Calibration Equipment used (M& Primary Standards Privace mater CPM-642A	etainthee with confidence p cled in the closed leborous TE critical for cultivation) ID # G807480704	rebability are given on the following page ry facility: environment temperature (22 a Cel Date (Certificate No.) 01-Nov-12 (No. 217-01640)	is and are part of the certificate. 20°C and humidity < 70%. Schoduled Calibration Oct-13
The measurements and the unor All calibrations have been condu- Calibration Equipment used (MA: Primary Standards Power make CPM-942A Power sonsor HP 8481A	etwirthes with confidence p cled in the closed leberator) TE critical for cultivation) ID # G807460704 US07292783	rebability are given on the following page ry facility: environment temperature (22 a Cel Date (Certificate No.) 91-Nov-12 (No. 217-91640) 91-Nov-12 (No. 217-91640)	is and are part of the certificate. 2)°C and humidity < 70%. Schoolung Calibration Oct-13 Oct-13
The measurements and the unor All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power mate CPM-942A Power sonsor HP 9481A Haference 20 dD Attensator	etainthee with confidence p check in the closed laborico TE critical for cultimatori). ID # G807480704 U507796780 SN: 5058 (204)	rebability are given on the following page ry facility: environment temperature (22 s Cel Detw (Certificate No.) 01-Nov-12 (No. 217-01640) 04-Apr-13 (No. 217-01738)	is and are part of the certificate. 20°C and humidity < 70%. Schodulod Calibration Oct-13 Oct-13 April 4
The measurements and the unor All calibrations have been condu- Calibration Equipment used (M& Primary Standards Prover solar EPM-642A Power solar FIP 9481A Neterosco 20 dB Attensions Type-N mismatch combination	etwirthes with confidence p cled in the closed leberator) TE critical for cultivation) ID # G807460704 US07292783	rebability are given on the following page by facility: environment temperature (22 a Cel Deter (Certificate No.) 01-Nov-12 (No. 217-01040) 01-Nov-12 (No. 217-01040) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01738)	is and are part of the certificate. 2)°C and humidity < 70%. Schoolung Calibration Oct-13 Oct-13
The measurements and the unor All calibrations have been condu- Calibration Equipment used (M& Primary Standards Prover mater CP16-642A Prover sortion (FP 6481 A Nationals of the American Type-N mismatch combination Reference Protoi F830V3	etainthes with confidence p cted in the closed laboration) TE critical for cultiration) ID # G837490704 U537297785 SN: 5088 (20k) SN: 5088 (20k)	rebability are given on the following page ry facility: environment temperature (22 s Cel Detw (Certificate No.) 01-Nov-12 (No. 217-01640) 04-Apr-13 (No. 217-01738)	se and are part of the certificate. 20°C and humidity < 70%. Schodulod Calibration Doi:13 Doi:13 Apr:14 Apr:14
The measurements and the unce All calibrations have been condu- Calibration Equipment used (MA: Primary Standards Power make CPM-942A Power sonsor HP 9481A Networks 20 dD Amensaco Type-N mismatch combination Reference Probe ESSDV3 DAE4 Secondary Standards	etwirther with confidence p check in the closed leberator). ID # G807490704 US377997783 SN: 5058 (20k) SN: 5047 D / 760277 SN: 3204 SN: 501	rebability are given on the following page ry facility: environment temperature (22 a Cel Date (Certificane No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01736) 05-Dec-12 (No. ES3-3205_Dec12) 25-Apr-13 (No. DAF4-801_Apr13) Chock Oate (in house)	to and are part of the certificate. 20°C and humidity < 70%. Schoolued Calibration Oct-13 April 4 April 4 Dec-13 April 4 Behald and Check
The measurements and the unor All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power make CPM-942A Power sonsor HP 8481A Heterorice 20 dD Attensator Type-N mismatch combination Reference Probe FSSDV3 DAE4 Secondary Standards Power sonsor HP 8481A	etwirthes with confidence p cted in the closed laborator). ID # G807490704 US37292780 SN: 5058 (206) SN: 5058 (206)	Cel Dete (Certificate No.) 01-Nov-12 (No. 217-01040) 01-Nov-12 (No. 217-01040) 01-Nov-13 (No. 217-01040) 04-Agr-13 (No. 217-01736) 04-Agr-13 (No. 217-01736) 28-Dec-12 (No. ES2-3206_Dec12) 25-Agr-13 (No. DAE-1-001_Agr-13) Check Date (in house)	Schoduled Calibration Oct-13 Oct-13 Apr-14 Behedyled Check In house check: Oct-13
The measurements and the unor All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power make CPM-642A Power sonsor HP 6461A Neteronce 20 dB Attensions Type-N mismatch combination Reference Probe ESSDV3 DAE4 Secondary Standards Power sonsor HP 6481A RF persentor R&S SMT-05	etwirther with confidence p check in the closed leberator). ID # G807490704 US377997783 SN: 5058 (20k) SN: 5047 D / 760277 SN: 3204 SN: 501	rebability are given on the following page ry facility: environment temperature (22 a Cel Date (Certificane No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01736) 05-Dec-12 (No. ES3-3205_Dec12) 25-Apr-13 (No. DAF4-801_Apr13) Chock Oate (in house)	to and are part of the certificate. 20°C and humidity < 70%. Schoolued Calibration Oct-13 April 4 April 4 Dec-13 April 4 Behald and Check
The measurements and the unor All calibrations have been condu- Calibration Equipment used (M& Primary Standards Privace mater CPM-642A	etairibles with confidence p cted in the closed laborico TE critical for cultination). ID # G807490704 US37796785 SN: 5058 (204) SN: 5047.0 / 06097 SN: 5009 SN: 501 ID # MY41039317 100005	Cel Dete (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 04-Apr-13 (No. 217-01738) 04-Apr-13 (No. 217-01738) 04-Apr-13 (No. 217-01738) 05-Apr-13 (No. 047-01738) 05-Apr-13 (No. 048-1-01_Apr13) Check Date (in house) 18-Oct-02 (in house) 18-Oct-02 (in house)	se and are part of the certificate. Schodulod Calibration Oct-13 Oct-13 Apr-14 Apr-14 Beheduled Check In house check: Oct-13 In house check: Oct-13
The measurements and the unor All calibrations have been condu- Calibration Equipment used (M& Primary Standards Power make CPM-642A Power sonsor HP 6461A Neteronce 20 dB Attensions Type-N mismatch combination Reference Probe ESSDV3 DAE4 Secondary Standards Power sonsor HP 6481A RF persentor R&S SMT-05	etwirther with confidence p cled in the closed leborator) ID # G807490704 U6377997765 SN: 5058 (20k) SN: 5058 (20k) SN: 5047 ± 7 00297 SN: 509 SN: 501 ID # MYK1039317 100005 U5307390585 S4206	rebability are given on the following page by facility: environment temperature (22 a Cel Dete (Certificane No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01736) 28-Det-12 (No. DAF-1-001_Apr-13) Check Date (in house) 18-Oct-02 (in house check Oct-11) 06-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	is and are part of the certificate. Schoolupd Calibration DCP-13 QCP-13 Apr-14 Apr-14 Dec-13 Apr-14 Scheduled Check In house check: Oct-13 in house check: Oct-13 in house check: Oct-13 in house check: Oct-13



 $\label{lem:sarphone} \textbf{Appendix A for the BlackBerry} \& \textbf{Smartphone Model RGY181LW SAR} \\ \textbf{Report}$

Page **60(78)**

Author Data

Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No

RTS-6057-1405-01

FCC ID:

L6ARGY180LW

Calibration Laboratory of

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerlacher Kallbrierdienst
C Service suizee d'étalonnage
Servicio svizzero di teratura
S Series Calibration Service

Accreditation No.: SCS 108

Accredited by the liwins Accreditation Service (SAS)
The Swiss Accreditation Service in one of the signatories to the EA

Multiraters: Agreement for the recognition of calibration certificates

Glossary:

TSL ConvF

N/A

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

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
- EC 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%.

Certificate No: D2450V2-791_Sep13

Page 2 of 6



61(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Measurement Conditions

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

DASY Version	DASYS	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	39.4 ± 6 %	1.83 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	-	-

SAR result with Head TSL

SAR averaged over 1 cm ² (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	51.5 W/kg ± 17.0 % (k::2)

SAR averaged over 10 cm ² (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.0 W/kg ± 16.5 % (k=2)

Certificate No: D2450V2-791_Sep13

Page 3 of 5



62(78)

- otdonochy

Author Data
Andrew Becker
April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	58.1 \O + 3.4 \(\O \)	Ξ
Return Loss	- 23.6 dB	_

General Antenna Parameters and Design

Electrical Delay (one direction)	1.153 ns
The state of the s	

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	January 24, 2006	

Certificate No: D2450V2-791_Sep13

Page 4 of 5



63(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID:

L6ARGY180LW

DASY5 Validation Report for Head TSL

Date: 10.09.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN; 791

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

Medium parameters used: f = 2450 MHz; $\sigma = 1.83 \text{ S/m}$; $\kappa_c = 39.4$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

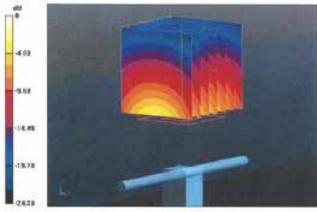
- Probe: ES3DV3 SN3205; ConvF(4.52, 4.52, 4.52); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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 = 99.824 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 26.7 W/kg

SAR(1 g) = 13 W/kg; SAR(10 g) = 6.03 W/kg

Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 12.28 dBW/kg

Certificate No: D2450V2-791_Sep13

Page 5 of 6



64(78)

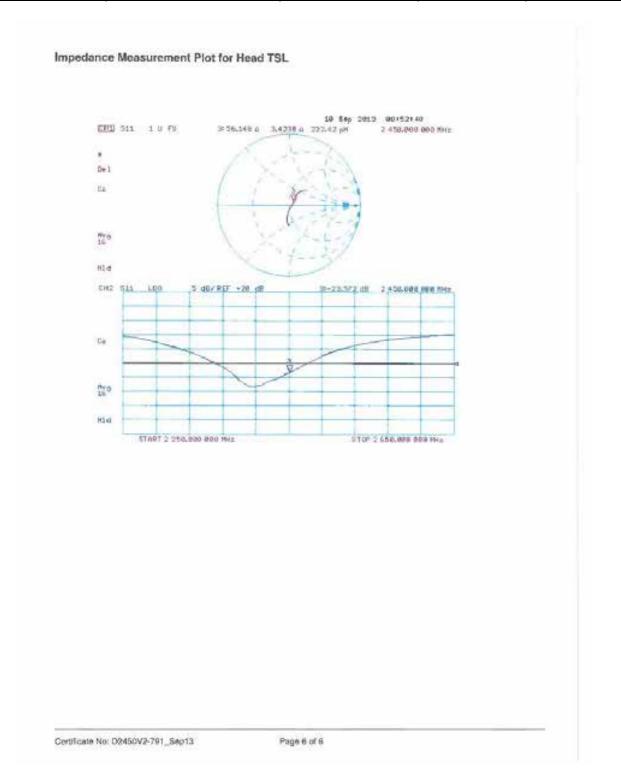
Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW





65(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

2600 Dipole

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





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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

Client RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D2600V2-1033_Mar13

Object	D2600V2 - SN: 10	033	
Calibration procedure(s)	QA CAL-05.v9 Calibration proces	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	March 11, 2013		
he measurements and the unce	rtainties with confidence pr	onal standards, which realize the physical un robability are given on the following pages an y facility: environment temperature $(22 \pm 3)^{6}$	d are part of the certificate.
Calibration Equipment used (M&)	E critical for calibration)		
rimary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NAMED I	G837480704	01-Nov-12 (No. 217-01640)	Oct-13
ower meter EPM-442A	GB37480704 US37292783	01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640)	Oct-13
ower meter EPM-442A ower sensor HP 8481A		11 THE STORES OF THE STATE OF T	Oct-13 Apr-13
ower meter EPM-442A ower sensor HP 8481A reference 20 dB Attenuator	US37292783	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)	Oct-13 Apr-13 Apr-13
ower meter EPM-442A ower sensor HP 8481A reference 20 dB Atternuator ype-N mismatch combination	US37292783 SN: 5058 (20k)	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dac-12 (No. ES3-3205_Dec12)	Oct-13 Apr-13 Apr-13 Dec-13
ower meter EPM-442A hower sensor HP 8481A deference 20 dB Atternator type-N mismatch combination deference Probe ESSDV3	US37292783 SN: 5058 (20k) SN: 5047.3 / 06327	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)	Oct-13 Apr-13 Apr-13
ower meter EPM-442A lower sensor HP 8481A telerence 20 dB Atternator ype-N mismatch combination telerence Probe ES3DV3 AAE4	US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dac-12 (No. ES3-3205_Dec12)	Oct-13 Apr-13 Apr-13 Dec-13 Jun-13
rower meter EPM-442A rower sensor HP 8481A telerence 20 dB Atternator ype-N mismatch combination telerence Probe ES3DV3 xAE4	US37292763 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dac-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house)	Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
rower meter EPM-442A rower sensor HP 8481A telerence 20 dB Attenuator ype-N mismatch combination telerence Probe ES3DV3 AAE4 secondary Standards Power sensor HP 8481A	US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 26-Dac-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11)	Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
rower meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator ype-N mismatch combination telerence Probe ES3DV3 AAE4 Recondary Standards Power sensor HP 8481A RF generator R&S SMT-06	US37292783 SN: 5056 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dac-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house)	Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13
Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator type-N mismatch combination telerence Probe ESSDV3 DAE4 Recondary Standards Power sensor HP 8481A RF generator R&S SMT-06	US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 26-Dac-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11)	Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13
Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Atternator Type-N mismatch combination Reference Probe ES3DV3 PAE4 Recondary Standards Power sensor HP 8491A RF generator R&S SMT-06 Network Analyzer HP 8753E	US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005 US37390585 S4208	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dac-12 (No. ES3-3205_Dac12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12)	Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13
Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 9491A RF generator R&S SMT-06 Network Analyzer HP 8753E Calibrated by: Approved by:	US37292783 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100006 US37390585 S4206	01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dac-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 18-Oct-02 (in house check Oct-11) 04-Aug-99 (in house check Oct-11) 18-Oct-01 (in house check Oct-12) Function	Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13 In house check: Oct-13 In house check: Oct-13

Certificate No: D2600V2-1033_Mar13

Page 1 of 6



Page **66(78)**

Author Data

Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID:

L6ARGY180LW

Calibration Laboratory of

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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

S Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL

tissue simulating liquid

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

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
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

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%.

Certificate No: D2600V2-1033_Mar13

Page 2 of 6



Page **67(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01

FCC ID: L6ARGY180LW

Measurement Conditions

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

DASY Version	DASY5	V52.8.5
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	AURITAGE

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	2.02 mha/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	15.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	58.6 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.64 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	26.2 W/kg ± 16.5 % (k=2)

Certificate No: D2600V2-1033_Mar13

Page 3 of 6



Page **68(78)**

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.4 Ω - 5.3 jΩ	
Return Loss	- 25.0 dB	

General Antenna Parameters and Design

Electrical Delay (one direction)	1.152 ns
Electrical Doing fore allected	77,104,110

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	March 03, 2009

Certificate No: D2600V2-1033_Mar13

Page 4 of 6



69(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

DASY5 Validation Report for Head TSL

Date: 11.03.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1033

Communication System: CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz; $\sigma = 2.02 \text{ S/m}$; $\epsilon_r = 37.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

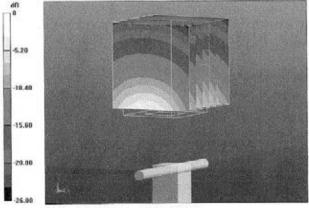
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 28.12.2012;
- · Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

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 = 101.2 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 32.2 W/kg SAR(1 g) = 15 W/kg; SAR(10 g) = 6.64 W/kg Maximum value of SAR (measured) = 19.1 W/kg



0 dB = 19.1 W/kg = 12.81 dBW/kg



Page **70(78)**

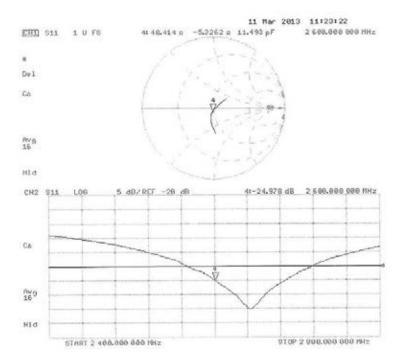
Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No RTS-6057-1405-01 FCC ID: L6ARGY180LW

Impedance Measurement Plot for Head TSL





71(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

5000 Dipole

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





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

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the alignatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Blackberry Wat

Certificate No: D5GHzV2-1033 Nov13

	to be a second or a firm		
Object	D5GHzV2 - SN: 1	033	
Calibration procedure(s)	QA CAL-22.v2 Calibration proces	dure for dipole validation kits bets	ween 3-6 GHz
Calibration date:	November 08, 20	13	
The measurements and the unco	utainties with confidence p	oral standards, which realize the physical un obability are given on the following pages an y facility: environment temporature (22 ± 3)*C	d are part of the certificate.
Calibration Equipment used (M&	TE critical for calibration)		
	TE critical for calibration)	Cal Date (Certificate No.)	Scheduled Calibration
Primary Standards		Cal Date (Certificate No.) 09-Oct-13 (No. 217-01827)	Scheduled Calibration Oct-14
Primary Standards Power meter EPM-442A Power sensor HP 8481A	ID # GB37480704 US37282783	09-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01827)	Oct-14 Oct-14
Primary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A	ID 9 GB37480704 US37292783 MY41092317	(9-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01828)	Oct-14 Oct-14 Oct-14
Primary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A Reference 20 dB Attenuator	ID # GB37480704 US37292783 MY41092317 SN: 5058 (20k)	(9-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01828) 04-Apr-13 (No. 217-01736)	Oct-14 Oct-14 Oct-14 Apr-14
Primary Standards Fower meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination	ID IP GB97480704 US37292783 MY41092317 SN: 5056 (20k) SN: 5047.3 / 08327	(9-Oct-13 (No. 217-01827) 08-Oct-13 (No. 217-01827) 08-Oct-13 (No. 217-01828) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739)	Out-14 Out-14 Out-14 Apr-14 Apr-14
Primary Standards Fower meter EPM-442A Power sensor HP 9481A Power sensor HP 9481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ESSDV3	ID IP GB37480704 US37282783 MY41082317 SN: 5058 (20k) SN: 5047.3 / 08327 SN: 3205	(9-Oci-13 (No. 217-01827) 06-Oci-13 (No. 217-01827) 06-Oci-13 (No. 217-01826) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739) 28-Dec-12 (No. ES3-3205_Dec12)	Out-14 Out-14 Out-14 Apr-14 Apr-14 Dao-13
Primary Standards Fower meter EPM-442A Power sensor HP 9481A Power sensor HP 9481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ESSDV3	ID IP GB37480704 US37282783 MY41092317 SN: 5068 (20k) SN: 5047.3 / 08327 SN: 5047.3 / 08327 SN: 601	0e-Oct-13 (No. 217-01827) 0e-Oct-13 (No. 217-01827) 0e-Oct-13 (No. 217-01828) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739) 2e-Oec-12 (No. ESS-3205_Dec12) 25-Apr-13 (No. DAE4-601_Apr13)	Out-14 Out-14 Out-14 Apr-14 Apr-14 Dec-13 Apr-14
Primary Standards Power meter EPM-642A Power sensor HP 8481A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ESSDV3 DAE4 Secondary Standards	ID IP GB37480704 US37282783 MY41092317 SN: 5068 (20k) SN: 5047.3 / 08327 SN: 3205 SN: 601	0e-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01828) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739) 28-Dec-12 (No. ESS-3205_Dec12) 25-Apr-13 (No. DAE4-601_Apri3) Check Date (in house)	Out-14 Out-14 Out-14 Apr-14 Apr-14 Dao-13 Apr-14 Scheduled Check
Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 9481A Power sensor HP 9481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ESSDV3 DAE4 Secondary Standards RF generator R&S SMT-06 Network Analyzer HP 8753E	ID IP GB37480704 US37282783 MY41092317 SN: 5068 (20k) SN: 5047.3 / 08327 SN: 5047.3 / 08327 SN: 601	0e-Oct-13 (No. 217-01827) 0e-Oct-13 (No. 217-01827) 0e-Oct-13 (No. 217-01828) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739) 2e-Oec-12 (No. ESS-3205_Dec12) 25-Apr-13 (No. DAE4-601_Apr13)	Out-14 Out-14 Out-14 Apr-14 Apr-14 Dec-13 Apr-14
Primary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A Reference 20 d6 Attenuator Type-N mismatch combination Reference Probe ESSDV3 DAE4 Secondary Standards RF generator R&S SMT-06	ID # GB37480704 US37292783 MY41092317 SN: 5056 (20k) SN: 5047.3 / 08327 SN: 3205 SN: 601	(9-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01828) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739) 28-Dec-12 (No. ES3-3205_Dec12) 25-Apr-13 (No. DAE4-601_Apri3) Check Date (in house)	Oct-14 Oct-14 Oct-14 Apr-14 Apr-14 Dep-13 Apr-14 Scheduled Check In house chack: Oct-15
Primary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A Reference 20 d6 Attenuator Type-N mismatch combination Reference Probe ESSDV3 DAE4 Secondary Standards RF generator R&S SMT-06	ID # GB37480704 US37292783 MY41092317 SN: 5056 (20k) SN: 5047.3 / 08327 SN: 3205 SN: 601	(9-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01828) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739) 28-Dec-12 (No. ES3-3205_Dec12) 25-Apr-13 (No. DAE4-601_Apri3) Check Date (in house)	Oct-14 Oct-14 Oct-14 Apr-14 Apr-14 Dep-13 Apr-14 Scheduled Check In house chack: Oct-15
Primary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A Reference 20 d6 Attenuator Type-N mismatch combination Reference Probe ESSDV3 DAE4 Secondary Standards RF generator R&S SMT-06	ID IP GB37480704 US37282783 MY41082317 SN: 5058 (20k) SN: 5047.3 / 08327 SN: 3205 SN: 601 ID # 100005 US37390585 S4206	0e-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01827) 06-Oct-13 (No. 217-01828) 04-Apr-13 (No. 217-01828) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 253-3205_Dect2) 25-Apr-13 (No. D&S-3205_Dect2) 25-Apr-13 (No. D&S-3205_Dect2) 05-Apr-13 (No. D&S-3205_Dect2) 05-Apr-13 (No. D&S-4601_Apr13) Check Date (in house) 04-Aug-99 (in house check Oct-13) 18-Oct-01 (in house check Oct-13)	Out-14 Out-14 Out-14 Apr-14 Apr-14 Dao-13 Apr-14 Scheduled Check In house check: Out-15 In house check: Out-14
Primary Standards Power meter EPM-442A Power sensor HP 9481A Power sensor HP 9481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards RF generator R&S SMT-06 Network Analyzer HP 8753E	ID IP GB37480704 US37282783 MY41092317 SN: 5058 (20k) SN: 5047.3 / 08327 SN: 3205 SN: 601 ID # 100005 US37390585 \$4206	0e-Oct-13 (No. 217-01827) 0e-Oct-13 (No. 217-01827) 0e-Oct-13 (No. 217-01828) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01739) 2e-Occ-12 (No. ESS-3205_Dect2) 25-Apr-13 (No. DAE+601_Apr13) Check Date (in house) 04-Aug-98 (in house check Oct-13) 18-Oct-01 (in house check Oct-13)	Out-14 Out-14 Out-14 Apr-14 Apr-14 Dao-13 Apr-14 Scheduled Check In house check: Out-15 In house check: Out-14

Certificate No: D6GHzV2-1033_Nov13

Page 1 of 8



Author Data Dates of Test

Test Report No

FCC ID:

Andrew Becker April 15 – June 13, 2014 RTS-6057-1405-01

L6ARGY180LW

72(78)

Calibration Laboratory of Schmid & Partner

Engineering AG Zaughausstrasse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst

Service suisse d'étalonnage C Servizio svizzero di taratura

Swiss Calibration Service

Accreditation No.: SCS 108

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

Glossary:

TSL

tissue simulating liquid

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

Calibration is Performed According to the Following Standards:

- a) IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters*, March 2010
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"
- c) 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

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 criented 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
- 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%.

Certificate No: D5GHzV2-1033 Nov13

Page 2 of 8



73(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

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 V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5500 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and palculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.0 ± 6 %	4.46 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	-	local

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.99 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	79.4 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.6 W/kg ± 19.5 % (k=2)

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	4.75 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	100	-

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8,51 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	84.4 W / kg ± 19.9 % (k=2)

SAR averaged over 10 cm3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.9 W/kg ± 19.5 % (k=2)

Certificate No: D5GHzV2-1033_Nov13

Page 3 of 8



74(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	5.06 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	<u> </u>	122

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	79.4 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm2 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.6 W/kg ± 19.5 % (k=2)

Certificate No: D5GHzV2-1033_Nov13

Page 4 of 8



75(78)

Author Data
Andrew Becker

Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	49.1 Ω - 9.6 Ω
Return Loss	- 20.3 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	50.3 Ω - 4.1 Ω
Return Loss	- 27.7 aB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	57.8 Ω - 4.0 jΩ
Return Loss	- 21.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.213 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	July 09, 2004	

Certificate No: D5GHzV2-1093 Nov13

Page 5 of 8



Author Data FCC ID: Dates of Test Test Report No RTS-6057-1405-01 L6ARGY180LW **Andrew Becker April 15 – June 13, 2014**

DASY5 Validation Report for Head TSL

Date: 08.11.2013

76(78)

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1033

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800

Medium parameters used: f = 5200 MHz; $\sigma = 4.46 \text{ S/m}$; $\epsilon_r = 35$; $\rho = 1000 \text{ kg/m}^3$, Medium parameters used: f = 5500 MHz; $\sigma = 4.75 \text{ S/m}$; $\varepsilon_r = 34.6$; $\rho = 1000 \text{ kg/m}^3$. Medium parameters used: f = 5800 MHz; $\sigma = 5.06 \text{ S/m}$; $\varepsilon_r = 34.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 SN3503; ConvF(5.41, 5.41, 5.41); Calibrated: 28.12.2012, ConvF(4.91, 4.91, 4.91); Calibrated: 28.12.2012, ConvF(4.81, 4.81, 4.81); Calibrated: 28.12.2012;
- Sensor-Surface: 1.4mm (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=100mW, dist=10mm, f=5200 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.635 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 29.5 W/kg

SAR(1 g) = 7.99 W/kg; SAR(10 g) = 2.28 W/kg

Maximum value of SAR (measured) = 18.4 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid; dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 64.397 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 33.8 W/kg

SAR(1 g) = 8.51 W/kg; SAR(10 g) = 2.41 W/kg

Maximum value of SAR (measured) = 20.3 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 61.128 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 33.0 W/kg

SAR(1 g) = 8.01 W/kg; SAR(10 g) = 2.28 W/kg

Maximum value of SAR (measured) = 19.2 W/kg

Certificate No: D5GHzV2-1033, Nov13

Page 6 of 8



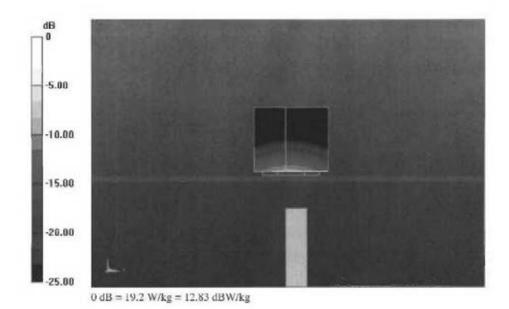
77(78)

Author Data
Andrew Becker

Dates of Test **April 15 – June 13, 2014**

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW





Page **78(78)**

Author Data
Andrew Becker

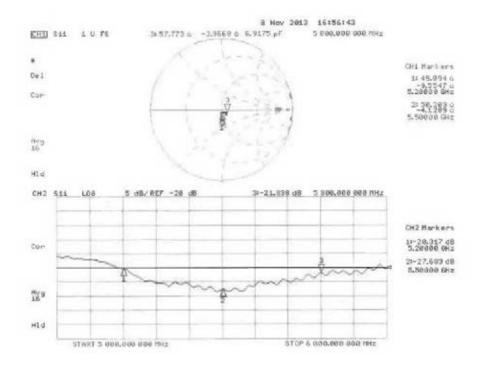
Dates of Test

April 15 – June 13, 2014

Test Report No **RTS-6057-1405-01**

FCC ID: L6ARGY180LW

Impedance Measurement Plot for Head TSL



Certificate No: D5GHzV2-1033_Nov13

Page 8 of 8