Author Data
Andrew Becker

Document
Appendix D for the BlackBerry® Smartphone Model RHC161LW
(STR100-2) SAR Report

Test Report No
RTS-6063-1503-15
RTS-6063-1503-15

Document
Appendix D for the BlackBerry® Smartphone Model RHC161LW
1(60)

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### APPENDIX D: PROBE & DIPOLE CALIBRATION DATA



Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

Page **2(60)** 

Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### **Probe 1643**

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

Client Blackberry Waterloo

Certificate No: ET3-1643\_Mar14

Accreditation No.: SCS 108

S

### CALIBRATION CERTIFICATE

Object

ET3DV6 - SN:1643

Calibration procedure(s)

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

Calibration date:

March 10, 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          | 1D              | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------|-----------------|-----------------------------------|------------------------|
| Power meter E4419B         | GB41293874      | 04-Apr-13 (No. 217-01733)         | Apr-14                 |
| Power sensor E4412A        | MY41498087      | 04-Apr-13 (No. 217-01733)         | Apr-14                 |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 04-Apr-13 (No. 217-01737)         | Apr-14                 |
| Reference 20 dB Attenuator | SN: S5277 (20x) | 04-Apr-13 (No. 217-01735)         | Apr-14                 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 04-Apr-13 (No. 217-01738)         | Apr-14                 |
| Reference Probe ES3DV2     | SN: 3013        | 30-Dec-13 (No. ES3-3013_Dec13)    | Dec-14                 |
| DAE4                       | SN: 660         | 13-Dec-13 (No. DAE4-660_Dec13)    | Dec-14                 |
| Secondary Standards        | ID              | Check Date (in house)             | Scheduled Check        |
| RF generator HP 8648C      | US3642U01700    | 4-Aug-99 (in house check Apr-13)  | In house check: Apr-16 |
| Network Analyzer HP 8753E  | US37390585      | 18-Oct-01 (in house check Oct-13) | In house check: Oct-14 |

Name Function Signature

Calibrated by: Israe El-Naouq Laboratory Technician

Approved by: Katja Pokovic Technical Manager

Issued: March 12, 2014

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

Certificate No: ET3-1643\_Mar14

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Andrew Becker

Dates of Test

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FCC ID: L6ARHC160LW

2503A-RHC160LW

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

DCP CF

crest factor (1/duty\_cycle) of the RF signal modulation dependent linearization parameters

A, B, C, D Polarization o

φ rotation around probe axis

Polarization 8

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

i.e., 8 = 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
- 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 \$\( \text{\$\frac{1}{2}} = 0 \) (f \( \leq \text{\$000 MHz} \) in TEM-cell; f \( \leq \text{\$1800 MHz} : R22 \) waveguide).
   NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E<sup>2</sup>-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).

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Andrew Becker

Dates of Test

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Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

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

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Author Data **Andrew Becker**  Dates of Test Jan 29 –Mar 09, 2015 Test Report No RTS-6063-1503-15 FCC ID: L6ARHC160LW

2503A-RHC160LW

ET3DV6-SN:1643

March 10, 2014

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

### **Basic Calibration Parameters**

|  | Sensor X | Sensor Y | Sensor Z | Unc (k=2)   |
|--|----------|----------|----------|-------------|
| Norm (µV/(V/m) <sup>2</sup> ) <sup>A</sup> | 1.75     | 1.96     | 1.75     | ± 10.1 %    |
| DCP (mV) <sup>8</sup>                      | 101.5    | 100.6    | 102.0    | 1 - 20.7.3. |

### Modulation Calibration Parameters

| UID | Communication System Name |   | A<br>dB | B<br>dB√μV | С   | D<br>dB | VR<br>mV | Unc*<br>(k=2) |
|-----|---------------------------|---|---------|------------|-----|---------|----------|---------------|
| 0   | CW                        | X | 0.0     | 0.0        | 1.0 | 0.00    | 262.5    | ±3,3 %        |
|     | A                         | 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%.

A 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,

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



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2503A-RHC160LW

ET3DV6-SN:1643

March 10, 2014

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

### Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) <sup>C</sup> | Relative<br>Permittivity F | Conductivity<br>(S/m) F | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup><br>(mm) | Unct.<br>(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    | 6.15    | 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    | 4.46    | 4.46    | 08.0               | 1.83                       | ± 12.0 %       |

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

f At frequencies below 3 GHz, the validity of tissue parameters (c and σ) can be relaxed to ± 10% if liquid compensation formula is applied to

Certificate No: ET3-1643\_Mar14

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An equations below 3 GHz, the valuity or inside parameters (c. and o) is nestricted to ± 5%. The uncertainty is the RSS of the ConyF 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 target than half the probe tip diameter from the boundary.



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2503A-RHC160LW

ET3DV6- SN:1643

March 10, 2014

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

### Calibration Parameter Determined in Body Tissue Simulating Media

| f (MHz) <sup>C</sup> | Relative<br>Permittivity F | Conductivity<br>(S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup><br>(mm) | Unct.<br>(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 %       |

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<sup>&</sup>lt;sup>C</sup> 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 (c and or) 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 (c and or) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

Alpha/Depth are usdermined 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.



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Author Data **Andrew Becker**  Dates of Test Jan 29 -Mar 09, 2015 Test Report No RTS-6063-1503-15 FCC ID: L6ARHC160LW

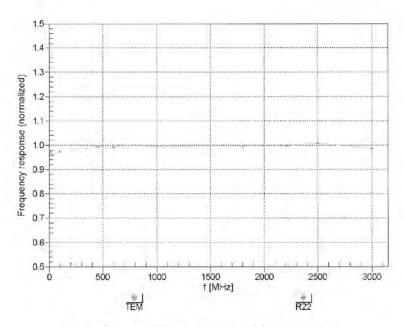
2503A-RHC160LW

ET3DV6-SN:1643

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 | Mar  | CT  | 2 4 | 642 | B. Arre | 11 |
|-------------|------|-----|-----|-----|---------|----|
| Seminoate   | INO. | = 1 | 2-1 | 040 | IVICII  | 14 |



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FCC ID:

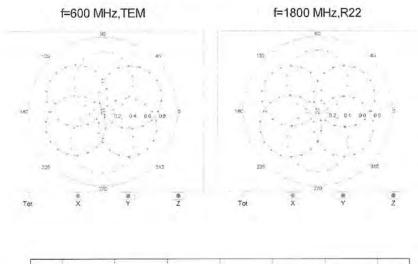
L6ARHC160LW

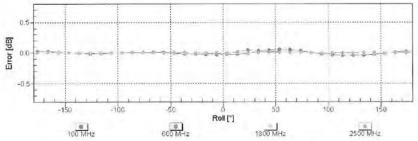
2503A-RHC160LW

ET3DV6-SN:1643

March 10, 2014

### Receiving Pattern ( $\phi$ ), $\vartheta = 0^{\circ}$





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

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Author Data
Andrew Becker

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FCC ID:

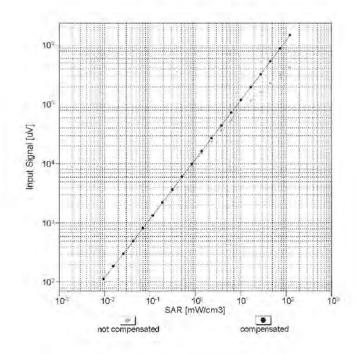
L6ARHC160LW

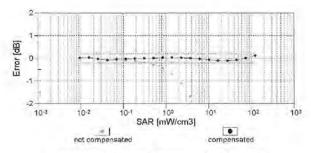
2503A-RHC160LW

ET3DV6- SN:1643

March 10, 2014

### Dynamic Range f(SAR<sub>head</sub>) (TEM cell , f<sub>eval</sub>= 1900 MHz)





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

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Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
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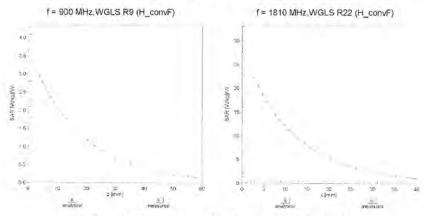
Test Report No **RTS-6063-1503-15** 

FCC ID: **L6ARHC160LW** 

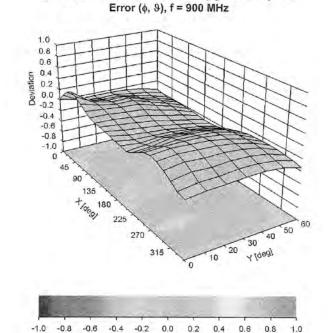
2503A-RHC160LW

ET3DV6- SN:1643 March 10, 2014

### **Conversion Factor Assessment**



### Deviation from Isotropy in Liquid



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



## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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2503A-RHC160LW

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       |

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|----------------|-------------|-------------------------------------|----------------------------------|------------------|---------|-------------|
| Author Data    | Dates of Te | st                                  | Test Report No                   | FCC ID:          | IC      |             |
| Andrew Becker  | Jan 29      | -Mar 09, 2015                       | RTS-6063-1503-15                 | L6ARHC160LW      | 2503A-R | RHC160LW    |

## **Probe 3225**



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Author Data **Andrew Becker**  Dates of Test

Jan 29 –Mar 09, 2015

Test Report No RTS-6063-1503-15 FCC ID: L6ARHC160LW

2503A-RHC160LW

Ca libration Laboratory of Schmid & Partner Engineering AG Zeu Shaisstrasse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst Service suisse d'étalonnage

Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 0108

Accreditation Service (SAS) The Swas Accreditation Service is one of the signatories to the EA Mul⊈ilateral Agreement for the recognition of calibration certificates

client Blackberry Waterloo

Certificate No: ES3-3225 Feb15

### CALIBRATION CERTIFICATE

Object

ES3DV3 - SN:3225

Cali braion procedure(s)

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

Cali braion date:

February 25, 2015

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          | 10              | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------|-----------------|-----------------------------------|------------------------|
| Power meter E4419B         | GB41293874      | 03-Apr-14 (No. 217-01911)         | Apr-15                 |
| Power sensor E4412A        | MY41498087      | 03-Apr-14 (No. 217-01911)         | Apr-15                 |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 03-Apr-14 (No. 217-01915)         | Apr-15                 |
| Reference 20 dB Attenuator | SN: S5277 (20x) | 03-Apr-14 (No. 217-01919)         | Apr-15                 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 03-Apr-14 (No. 217-01920)         | Apr-15                 |
| Reference Probe ES3DV2     | SN: 3013        | 30-Dec-14 (No. ES3-3013_Dec14)    | Dec-15                 |
| DAE4                       | SN: 660         | 14-Jan-15 (No. DAE4-660_Jan15)    | Jan-16                 |
| 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 8753F  | US37390585      | 18-Oct-01 (in house check Oct-14) | In house check: Oct-15 |

Function Name Calibrated by: Claudio Leubler Laboratory Technician Katja Pokovic Technical Manager Approved by: Issued: February 25, 2015 This calibration certificate shall not be reproduced except in full without written approval of the laboratory

Certificate No: ES3-3225 Feb15

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Ca li ration Laboratory of Schnid & Partner Engineering AG Zeu Shusstrasse 43, 8004 Zurich, Switzerland





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

Accreditation No.: SCS 0108

Acc Fetted by the Swiss Accreditation Service (SAS)

The Shiss Accreditation Service is one of the signatories to the EA Mul tilteral Agreement for the recognition of calibration certificates

GIOSsary:

TSL NO RIIX, Y.Z COLLA

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

DCP crest factor (1/duty\_cycle) of the RF signal modulation dependent linearization parameters A. B.C.D

o rotation around probe axis Polarization of

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

i.e., 8 = 0 is normal to probe axis

information used in DASY system to align probe sensor X to the robot coordinate system Connector Angle

### 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
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### Methods Applied and Interpretation of Parameters:

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- 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.
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- 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. ES3-3225\_Feb15

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

ES 30/3 - SN:3225

February 25, 2015

# Probe ES3DV3

SN:3225

Manufactured: Repaired:

Calibrated:

September 1, 2009 February 18, 2015 February 25, 2015

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

Certificate No. ES3-3225\_Feb15

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Author Data **Andrew Becker**  Dates of Test Jan 29 -Mar 09, 2015 Test Report No RTS-6063-1503-15 FCC ID: L6ARHC160LW

2503A-RHC160LW

ES:30/3- SN:3225

February 25, 2015

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

Basc Calibration Parameters

|  | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |  |
|--|----------|----------|----------|-----------|--|
| NOTh (µV/(V/m)2)A                                      | 1.07     | 1.00     | 1.12     | ± 10.1 %  |  |
| NOΓη (μV/(V/m)²) <sup>A</sup><br>DCP (mV) <sup>B</sup> | 107.0    | 106.0    | 105.6    |           |  |

Maguation Calibration Parameters

| UID | Communication System Name |   | A<br>dB | B<br>dB√μV | С   | dB   | VR<br>mV | Unc <sup>2</sup><br>(k=2) |
|-----|---------------------------|---|---------|------------|-----|------|----------|---------------------------|
| 0   | CW                        | X | 0.0     | 0.0        | 1.0 | 0.00 | 196.9    | ±3.3 %                    |
|     |                           | Y | 0.0     | 0.0        | 1.0 |      | 189.2    | -                         |
| _   |                           | Z | 0.0     | 0.0        | 1.0 | -    | 195.9    |                           |

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%.

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The incertainties of NormX,Y,Z do not affect the E<sup>Z</sup>-field uncertainty inside TSL (see Pages 5 and 6).
Nurmincal 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



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Author Data **Andrew Becker**  Dates of Test Jan 29 –Mar 09, 2015 Test Report No RTS-6063-1503-15 FCC ID: L6ARHC160LW

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

### Ca libration Parameter Determined in Head Tissue Simulating Media

| f(MHz) c | Relative<br>Permittivity <sup>F</sup> | Conductivity<br>(S/m) F | ConvF X | ConvF Y | ConvF Z | Alpha <sup>6</sup> | Depth <sup>G</sup><br>(mm) | Unct.<br>(k=2) |
|----------|---------------------------------------|-------------------------|---------|---------|---------|--------------------|----------------------------|----------------|
| 750      | 41.9                                  | 0.89                    | 6.50    | 6.50    | 6.50    | 0.61               | 1.31                       | ± 12.0 %       |
| 900      | 41.5                                  | 0.97                    | 6.22    | 6.22    | 6.22    | 0.30               | 1.84                       | ± 12.0 %       |
| 1810     | 40.0                                  | 1.40                    | 5.26    | 5.26    | 5.26    | 0.50               | 1.46                       | ± 12.0 %       |
| 1950     | 40.0                                  | 1.40                    | 5.01    | 5.01    | 5.01    | 0.80               | 1.11                       | ± 12.0 %       |
| 2300     | 39.5                                  | 1.67                    | 4.77    | 4.77    | 4.77    | 0.75               | 1.25                       | ± 12.0 %       |
| 2450     | 39.2                                  | 1.80                    | 4.60    | 4.60    | 4.60    | 0.57               | 1.49                       | ± 12.0 %       |
| 2600     | 39,0                                  | 1.96                    | 4.40    | 4.40    | 4.40    | 0.72               | 1.30                       | ± 12.0 %       |

Frequency validity above 300 MHz 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. Frequency validity below 900 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

\*All frequencies below 3 GHz, the validity of tissue parameters (a 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 tissue parameters (a and a) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

\*AlphaDepth 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.

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

#### Ca libration Parameter Determined in Body Tissue Simulating Media

| f MHz) <sup>C</sup> | Relative<br>Permittivity <sup>F</sup> | Conductivity<br>(S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha <sup>6</sup> | Depth <sup>5</sup><br>(mm) | Unct.<br>(k=2) |
|---------------------|---------------------------------------|------------------------------------|---------|---------|---------|--------------------|----------------------------|----------------|
| 750                 | 55.5                                  | 0.96                               | 6.19    | 6.19    | 6.19    | 0.80               | 1.23                       | ± 12.0 %       |
| 900                 | 55.0                                  | 1.05                               | 6,07    | 6.07    | 6.07    | 0.53               | 1.41                       | ± 12.0 %       |
| 1810                | 53.3                                  | 1.52                               | 4.89    | 4.89    | 4.89    | 0.63               | 1.46                       | ± 12.0 %       |
| 1950                | 53.3                                  | 1.52                               | 4.86    | 4.86    | 4.86    | 0.44               | 1.86                       | ± 12.0 %       |
| 2300                | 52.9                                  | 1.81                               | 4.48    | 4.48    | 4.48    | 0.80               | 1.29                       | ± 12.0 %       |
| 2450                | 52.7                                  | 1.95                               | 4.34    | 4.34    | 4.34    | 0.72               | 1.14                       | ± 12.0 %       |
| 2600                | 52.5                                  | 2.16                               | 4.06    | 4.06    | 4.06    | 0.80               | 1.08                       | ± 12.0 %       |

<sup>&</sup>lt;sup>C</sup> Frequency validity above 300 MHz 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. Frequency validity below 3lt0 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 126, 150 and 220 MHz respectively. Above 5 GHz frequency validity and be extended to ± 110 MHz.

F At frequencies below 3 GHz, the validity of tissue parameters (a and a) can be relaxed to ± 10% if liquid compensation formula is applied to

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At Theuricides below 3 GHz, the values, the values above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 10% in inquire compensation than a septical to the RSS of the Conf 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 proba tip diameter from the boundary.



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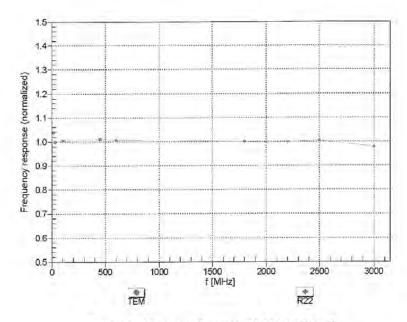
2503A-RHC160LW

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## Frequency Response of E-Field

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



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

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Andrew Becker

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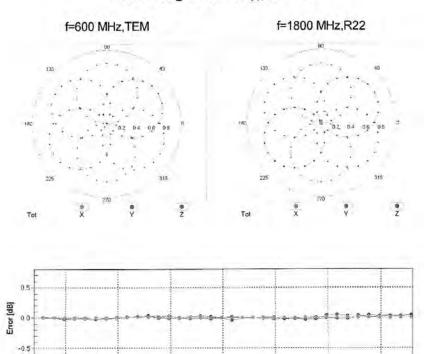
2503A-RHC160LW

ES# DI3- SN:3225

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2500 MHz

### Receiving Pattern ( $\phi$ ), $\vartheta = 0^{\circ}$



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

600 MHz

Roll ["]

1800 MHz

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100 MHz

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Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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FCC ID:

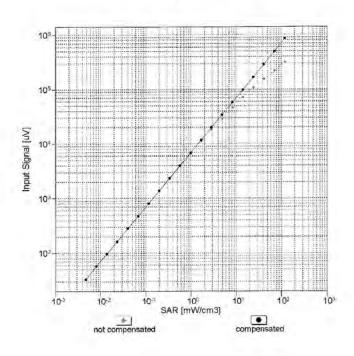
L6ARHC160LW

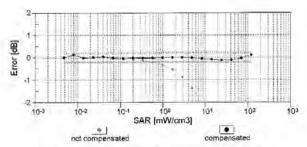
2503A-RHC160LW

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### Dynamic Range f(SAR<sub>head</sub>) (TEM cell , f<sub>eval</sub>= 1900 MHz)





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

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Appendix D for the BlackBerry® Smartphone Model RHC161LW

(STR100-2) SAR Report

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Andrew Becker

Dates of Test

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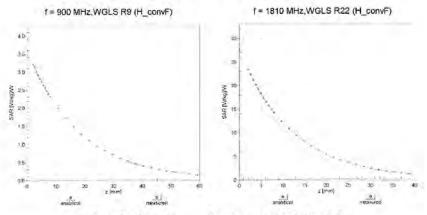
FCC ID: L6ARHC160LW

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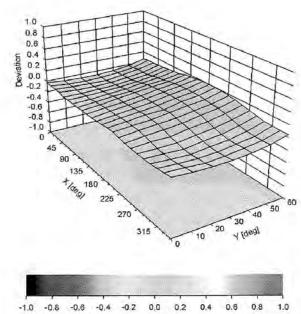
February 25, 2015

### **Conversion Factor Assessment**



### Deviation from Isotropy in Liquid

Error ( $\phi$ ,  $\vartheta$ ), f = 900 MHz



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



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

### Other Probe Parameters Selfor Arrangement

| Sentor Arrangement                            | Triangular |
|---|------------|
| COnjector Angle (°)                           | -61.4      |
| Meganical Surface Detection Mode              | enabled    |
| OPItal Surface Detection Mode                 | disabled   |
| Prote Overall Length                          | 337 mm     |
| Prote Body Diameter                           | 10 mm      |
| Tip length                                    | 10 mm      |
| Tip Diameter                                  | 4 mm       |
| Prote Tip to Sensor X Calibration Point       | 2 mm       |
| Probe Tip to Sensor Y Calibration Point       | 2 mm       |
| Prote Tip to Sensor Z Calibration Point       | 2 mm       |
| Recommended Measurement Distance from Surface | 3 mm       |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Dates of Test

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FCC ID: L6ARHC160LW

2503A-RHC160LW

## 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: 1021  |  |  |
|---|--|--|--|
| Calibration procedure(s)  | QA CAL-05.v9<br>Calibration proce  | dure for dipole validation kits abo  | ove 700 MHz  |
| Calibration date:   | January 07, 2013   |  |  |
|   | Charles and the second second second   | ional standards, which realize the physical un<br>robability are given on the following pages an   | Committee of the commit |
| All calibrations have been condu  | cted in the closed laborator   | ry facility: environment temperature (22 ± 3)°C  | C and humidity < 70%.  |
| All calibrations have been condu-   |  | ry facility: environment temperature (22 $\pm$ 3)°C  | C and humidity < 70%.  |
| Calibration Equipment used (M&  |  | ry facility: environment temperature (22 ± 3)°0  Cal Date (Certificate No.)  | C and humidity < 70%.  Scheduled Calibration   |
| Calibration Equipment used (M&  | TE critical for calibration)   |  | 1.4  |
| Calibration Equipment used (M&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A  | TE critical for calibration)  ID #  GB37480704  US37292783   | Cal Date (Certificate No.)<br>01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)   | Scheduled Calibration<br>Oct-13<br>Oct-13  |
| Calibration Equipment used (M&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator  | (D #<br>GB37480704<br>US37292783<br>SN: 5058 (20k)   | Cal Date (Certificate No.)<br>01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)  | Scheduled Calibration<br>Oct-13<br>Oct-13<br>Apr-13  |
| Calibration Equipment used (M&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination   | TE critical for calibration)  (D #  GB37480704  US37292783  SN: 5058 (20k)  SN: 5047.3 / 06327   | Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. 217-01533)   | Scheduled Calibration<br>Oct-13<br>Oct-13<br>Apr-13<br>Apr-13  |
| Calibration Equipment used (M&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination<br>Reference Probe ES3DV3   | (D #<br>GB37480704<br>US37292783<br>SN: 5058 (20k)   | Cal Date (Certificate No.)<br>01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)  | Scheduled Calibration<br>Oct-13<br>Oct-13<br>Apr-13  |
| Calibration Equipment used (M&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination<br>Reference Probe ES3DV3<br>DAE4   | TE critical for calibration)  ID #  GB37480704  US37292783  SN: 5058 (20k)  SN: 5047.3 / 06327  SN: 3205  SN: 601  | Cal Date (Certificate No.) 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)   | Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Apr-13 Dec-13 Jun-13   |
| Calibration Equipment used (M&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination<br>Reference Probe ES3DV3<br>DAE4   | TE critical for calibration)  ID #  GB37480704  US37292783  SN: 5058 (20k)  SN: 5047.3 / 06327  SN: 3205  SN: 601  | Cal Date (Certificate No.) 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)   | Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check  |
| Calibration Equipment used (M&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination<br>Reference Probe ES3DV3<br>DAE4<br>Secondary Standards<br>Power sensor HP 8481A   | TE critical for calibration)  (D #  GB37480704  US37292783  SN: 5058 (20k)  SN: 5047.3 / 06327  SN: 3205  SN: 601  ID #  MY41092317                                | Cal Date (Certificate No.) 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)   | Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13   |
| Calibration Equipment used (M&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination<br>Reference Probe ES3DV3<br>DAE4   | TE critical for calibration)  ID #  GB37480704  US37292783  SN: 5058 (20k)  SN: 5047.3 / 06327  SN: 3205  SN: 601  | Cal Date (Certificate No.) 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)   | Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Apr-13 Dec-13 Jun-13   |
| Calibration Equipment used (M&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination<br>Reference Probe ES3DV3<br>DAE4<br>Secondary Standards<br>Power sensor HP 8481A<br>RF generator R&S SMT-06                              | TE critical for calibration)  ID #  GB37480704  US37292783  SN: 5058 (20k)  SN: 5047.3 / 06327  SN: 3205  SN: 601  ID #  MY41092317 100005  US37390585 S4206       | Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-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) | Scheduled Calibration 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&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination<br>Reference Probe ES3DV3<br>DAE4<br>Secondary Standards<br>Power sensor HP 8481A<br>RF generator R&S SMT-06<br>Network Analyzer HP 8753E | TE critical for calibration)  ID #  GB37480704  US37292783  SN: 5058 (20k)  SN: 5047.3 / 06327  SN: 3205  SN: 601  ID #  MY41092317 100005  US37390585 S4206  Name | Cal Date (Certificate No.)  01-Nov-12 (No. 217-01640)  01-Nov-12 (No. 217-01640)  27-Mar-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         | Scheduled Calibration Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check; Oct-13 In house check; Oct-13  |
| Calibration Equipment used (M&<br>Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination<br>Reference Probe ES3DV3<br>DAE4<br>Secondary Standards<br>Power sensor HP 8481A<br>RF generator R&S SMT-06                              | TE critical for calibration)  ID #  GB37480704  US37292783  SN: 5058 (20k)  SN: 5047.3 / 06327  SN: 3205  SN: 601  ID #  MY41092317 100005  US37390585 S4206       | Cal Date (Certificate No.) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-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) | Scheduled Calibration 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   |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data

Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No

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FCC ID: L6ARHC160LW

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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

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
- 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%.

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## Appendix D for the BlackBerry $\mbox{\ensuremath{\mathbb{B}}}$ Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### **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        | Seat         |                  |

### SAR result with Head TSL

| SAR averaged over 1 cm3 (1 g) of Head TSL | Condition          |                          |
|---|--------------------|--------------------------|
| 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 cm3 (10 g) of Head TSL | condition          |                          |
|---|--------------------|--------------------------|
| 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

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 -Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### 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

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

Page **29(60)** 

Author Data
Andrew Becker

Dates of Test

Jan 29 – Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

#### 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

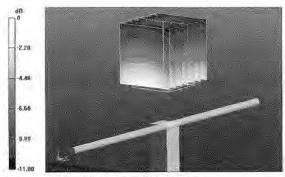
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

#### 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



Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

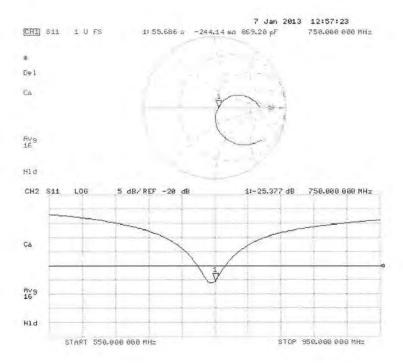
Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### Impedance Measurement Plot for Head TSL



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Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

## 835 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

RTS (RIM Testing Services)

Accreditation No.: SCS 108

Certificate No: D835V2-446\_Jan13

|  | ERTIFICATE   |   |  |
|--|--|---|--|
| Object   | D835V2 - SN: 44  | 6   |  |
| Calibration procedure(s)   | QA CAL-05,v9   | dure for dipole validation kits abo   | ove 700 MHz  |
|  |  |   |  |
| Calibration date:  | January 07, 2013   |   |  |
|  |  | onal standards, which realize the physical un<br>robability are given on the following pages an   |  |
|  |  | ry facility: environment temperature (22 = 3)°(   |  |
|  |  |   |  |
| Calibration Equipment used (M&T  | E critical for calibration)  |   |  |
|  | "E critical for calibration)   | Cal Date (Certificate No.)  | Scheduled Calibration  |
| Primary Standards  |  | Cal Date (Certificate No.)<br>01-Nov-12 (No. 217-01640)   | Scheduled Calibration Oct-13   |
| Primary Standards<br>Power meter EPM-442A  | ID#  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)  | Oct-13<br>Oct-13   |
| Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A   | ID #<br>GB37480704<br>US37292783<br>SN: 5058 (20k)   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)   | Oct-13<br>Oct-13<br>Apr-13   |
| Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination  | ID #<br>GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.9 / 06327   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13   |
| Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3   | ID #<br>GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13<br>Dec-13   |
| Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3   | ID #<br>GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.9 / 06327   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13   |
| Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 AE4   | ID #<br>GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13<br>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 #<br>GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601                                | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)<br>27-Jun-12 (No. DAE4-601_Jun12)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13<br>Dec-13<br>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 #<br>GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601                                | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)<br>27-Jun-12 (No. DAE4-601_Jun12)<br>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 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. 217-01530) 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 (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. 217-01530) 27-Mar-12 (No. 217-01533) 28-Dec-12 (No. ES3-3205_Dec12) 27-Jun-12 (No. DAE4-601_Jun12) Check Date (in house) 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 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 S4206          | 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. E37-01530) 28-Dec-12 (No. E53-3205_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                        |
| Calibration Equipment used (M&T 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: 5047.9 / 06327 SN: 3205 SN: 601  ID #  MY41092317 100005 US37390585 S4206  Name | 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. E37-01533) 28-Dec-12 (No. E33-3205_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  | ID #  GB37480704 US37292783 SN: 5058 (20k) SN: 5047.9 / 06327 SN: 3205 SN: 601  ID #  MY41092317 100005 US37390585 S4206  Name | 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01530) 27-Mar-12 (No. E37-01533) 28-Dec-12 (No. E33-3205_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: D835V2-446\_Jan13

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 -Mar 09, 2015

Test Report No

RTS-6063-1503-15

FCC ID: L6ARHC160LW

2503A-RHC160LW

Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





S 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:

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: D835V2-446\_Jan13

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## Appendix D for the BlackBerry $\mbox{\ensuremath{\mathbb{B}}}$ Smartphone Model RHC161LW (STR100-2) SAR Report

Page 33(60)

Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

#### 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        |             |

### 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        | -            | 2000             |

### SAR result with Head TSL

| SAR averaged over 1 cm3 (1 g) of Head TSL | Condition          |                          |  |
|---|--------------------|--------------------------|--|
| 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 <sup>3</sup> (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) |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 – Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### 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

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 – Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### **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;  $\sigma = 0.92 \text{ S/m}$ ;  $\epsilon_t = 42$ ;  $\rho = 1000 \text{ kg/m}^3$ 

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)

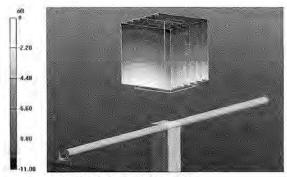
### Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

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



## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

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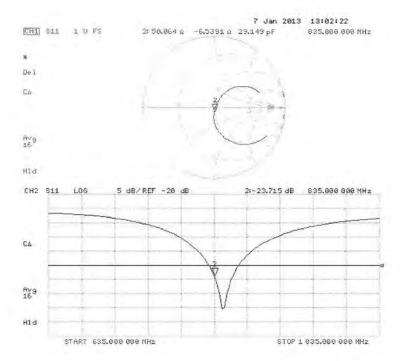
Test Report No **RTS-6063-1503-15** 

FCC ID:

L6ARHC160LW

2503A-RHC160LW

### Impedance Measurement Plot for Head TSL



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Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data **Andrew Becker**  Dates of Test Jan 29 -Mar 09, 2015 Test Report No RTS-6063-1503-15 FCC ID: L6ARHC160LW

2503A-RHC160LW

## 1800 Dipole

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





Schweizerischer Kalibrierdlenst 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: D1800V2-2d020\_Jan13

| 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 uncontainties 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  Prower standards  ID # Cal Date (Certificate No.) Scheduled Calibration  Prower sensor HP 8481A US37292783 01-Nov-12 (No. 217-01640) Oct-13  Reference 20 dB Attenuator SN: 5058 (20k) 27-Mar-12 (No. 217-01640) Oct-13  Proper Immismatch combination SN: 5047.3 (96327 27-Mar-12 (No. 217-01530) Apr-13  Proper Probe ES3DV3 SN: 3205 28-Dec-12 (No. 217-01533) Apr-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 MY41092317 18-Oct-02 (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   | Object  | D1800V2 - SN: 2d020   |   |  |
|--|---|---|---|--|
| 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 # CaliDate (Certificate No.) Scheduled 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: 5058 (20k) 27-Mar-12 (No. 217-01530) Apr-13  Type-N mismatch combination SN: 5058 (20k) 27-Mar-12 (No. 217-01533) 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 MY41092317 18-Oct-02 (in house check Oct-11) In house check: Oct-13  RF generator R&S SMT-06 100005 04-Aug-99 (in house check Oct-11) In house check: Oct-13  Name Function Signature  Calibrated by: Israe El-Naouq Laboratory Technician   | Calibration procedure(s)  |   | dure for dipole validation kits abo   | ove 700 MHz  |
| The measurements and the uncortainties with confidence probability are given on the following pages and are part of the certificate.  All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.  Calibration Equipment used (M&TE critical for calibration)  Primary Standards  ID # Cal Date (Certificate No.) Scheduled Calibration  Power meter EPM-442A  GB37480704  01-Nov-12 (No. 217-01640)  Oct-13  Power sensor HP B481A  US37292783  01-Nov-12 (No. 217-01640)  Oct-13  Reference 20 dB Attenuator  SN: 5058 (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 B481A  MY41092317  18-Oct-02 (in house check Oct-11)  Network Analyzer HP 8753E  US37390585 S4206  18-Oct-01 (in house check Oct-12)  Name:  Function  Signature  | Calibration date:   | January 09, 2013  | 3   |  |
| Primary Standards   ID #   Cal Date (Certificate No.)   Scheduled 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: 5058 (20k)   27-Mar-12 (No. 217-01530)   Apr-13   Type-N mismatch combination   SN: 5047, 3 / 06327   27-Mar-12 (No. 217-01533)   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   MY41092317   18-Oct-02 (in house check Oct-11)   In house check: Oct-13   Ref 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 No.   | The measurements and the unco   | rtainties with confidence p   | robability are given on the following pages ar  | nd are part of the certificate.  |
| 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: 5058 (20k) 27-Mar-12 (No. 217-01530) Apr-13 Type-N mismatch combination SN: 5047,3 / 06327 27-Mar-12 (No. 217-01533) 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 MY41092317 18-Oct-02 (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  | 2300 (200) - 40400 - 40400  | to street to see a second   |   |  |
| Power sensor HP 8481A US37292783 01-Nov-12 (No. 217-01640) Oct-13  Reference 20 dB Attenuator SN: 5058 (20k) 27-Mar-12 (No. 217-01530) Apr-13  Reference Probe ES3DV3 SN: 5047,3 / 66327 27-Mar-12 (No. 217-01533) 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 MY41092317 18-Oct-02 (in house check Oct-11) In house check: Oct-13  Ref generator R&S SMT-05 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   | Dilana Crando de  | Lio.  | A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1   | and the state of t |
| Reference 20 dB Attenuator   SN: 5058 (20k)   27-Mar-12 (No. 217-01530)   Apr-13   |   | 100   |   |  |
| Type-N mismatch combination   SN: 5047,3 / 06327   27-Mar-12 (No. 217-01533)   Apr-13  | Power meter EPM-442A  | GB37480704  | 01-Nov-12 (No. 217-01640)   | Oct-13   |
| Secondary Standards  | Power meter EPM-442A<br>Power sensor HP 8481A   | GB37480704<br>US37292783  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)  | Oct-13<br>Oct-13   |
| SN: 601   27-Jun-12 (No: DAE4-601_Jun12)   Jun-13  | Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator   | GB37480704<br>US37292783<br>SN: 5058 (20k)  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)   | Oct-13<br>Oct-13<br>Apr-13   |
| Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 RF generator R&S SMT-05 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   | Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination   | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047,3 / 06327  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)  | Ogl-13<br>Ogl-13<br>Apr-13<br>Apr-13   |
| Power sensor HP 8481A MY41092317 18-Oct-02 (in house check Oct-11) In house check: Oct-13 RF 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 Calibrator No.  | Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3  | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047,3 / 06327<br>SN: 3205  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13<br>Dec-13   |
| RF 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 In house check: Oc | Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4   | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047,3 / 06327<br>SN: 3205<br>SN: 601   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01530)<br>28-Dec-12 (No. ES3-3205_Dec12)<br>27-Jun-12 (No. DAE4-601_Jun12)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13<br>Dec-13<br>Jun-13   |
| Name Function Signature  | Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards   | GB37480704<br>US372927B3<br>SN: 5058 (20k)<br>SN: 5047,3 / 06327<br>SN: 3205<br>SN: 601   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)<br>27-Jun-12 (No. DAE4-601_Jun12)<br>Check Date (in house)   | Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check  |
| Calibrator by  | 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   | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047,3 / 06327<br>SN: 3205<br>SN: 601   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)<br>27-Jun-12 (No. DAE4-601_Jun12)<br>Check Date (in house)   | Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Check In house check: Oct-13   |
| Calibrator hus Jerra El-Nague Jahasias Technicias  | 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-08                           | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047,3 / 06327<br>SN: 3205<br>SN: 601<br>ID #<br>MY41092317<br>100005                     | 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) 18-Oct-02 (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  |
| Approved by: Katja Pokovic Technical Manager   | 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-08                           | GB37480704<br>US372927B3<br>SN: 5058 (20k)<br>SN: 5047,3 / 06327<br>SN: 3205<br>SN: 601<br>ID #<br>MY41092317<br>100005<br>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. 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  |
|  | 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-05 Network Analyzer HP 8753E | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047,3 / 06327<br>SN: 3205<br>SN: 601<br>ID #<br>MY41092317<br>100005<br>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. 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   |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No

RTS-6063-1503-15

FCC ID: L6ARHC160LW

2503A-RHC160LW

Calibration Laboratory of

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





S Schweizerischer Kallbrierdienst
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
- 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%.

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# Appendix D for the BlackBerry $\mbox{\ensuremath{\mathbb{B}}}$ Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### 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                    | 1800 MHz ± 1 MHz       |             |

### 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 | 38.9 ± 6 %   | 1.38 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | 1994         |                  |

### SAR result with Head TSL

| SAR averaged over 1 cm <sup>3</sup> (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 <sup>3</sup> (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) |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

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FCC ID: L6ARHC160LW

2503A-RHC160LW

#### Appendix

#### Antenna Parameters with Head TSL

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

#### General Antenna Parameters and Design

| 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 |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

#### 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

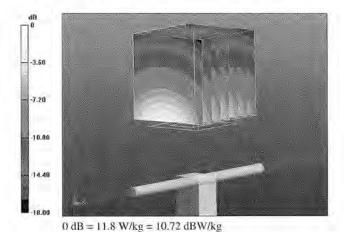
DASY52 52.8.4(1052); SEMCAD X 14.6.8(7028)

#### 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/kgMaximum value of SAR (measured) = 11.8 W/kg



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# Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

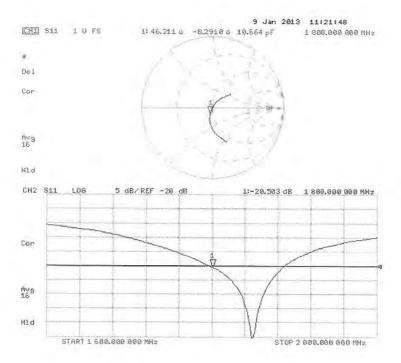
Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

#### Impedance Measurement Plot for Head TSL



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Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

## 1900 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: D1900V2-545\_Jan13

| Object   | D1900V2 - SN: 545   |   |   |
|--|---|---|---|
| Calibration procedure(s)   | QA CAL-05.v9<br>Calibration proces  | dure for dipole validation kits abo   | ove 700 MHz   |
| Calibration date:  | January 09, 2013  | (   |   |
| The measurements and the unce  | ertainties with confidence pr   | onal standards, which realize the physical ur<br>robability are given on the following pages are<br>ty facility: environment temperature $(22\pm3)^\circ$   | nd are part of the certificate.   |
| Calibration Equipment used (M&   | TE critical for calibration)  |   |   |
|  |   |   |   |
| rimary Standards   | ID #  | Cal Date (Certificate No.)  | Scheduled Calibration   |
|  | ID #<br>GB37480704  | Cal Date (Certificate No.)<br>01-Nov-12 (No. 217-01640)   | Scheduled Calibration<br>Oct-13   |
| Power meter EPM-442A   |   |   |   |
| Power meter EPM-442A<br>Power sensor HP 8481A  | GB37480704  | 01-Nov-12 (No. 217-01640)   | Oct-13<br>Oct-13<br>Apr-13  |
| Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator  | GB37480704<br>US37292783  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)  | Oct-13<br>Oct-13  |
| Power meter EPM-442A<br>Power sensor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination   | GB37480704<br>US37292783<br>SN: 5058 (20k)  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)   | Oct-13<br>Oct-13<br>Apr-13  |
| Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3   | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mai-12 (No. 217-01533)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13  |
| Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4  | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13<br>Dec-13  |
| Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards  | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)<br>27-Jun-12 (No. DAE4-601_Jun12)<br>Check Date (in house)   | Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Juri-13 Scheduled Check 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 8481A  | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601   | 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. 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                         |
| 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  | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601<br>ID #<br>MY41092317                               | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)<br>27-Jun-12 (No. DAE4-601_Jun12)<br>Check Date (in house)   | Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Juri-13 Scheduled Check 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 8481A RF generator R&S SMT-06  | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601<br>ID #<br>MY41092317<br>100005                     | 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. 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                         |
| 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 RE generator R&S SMT-06 Network Analyzer HP 8753E                                    | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601<br>ID #<br>MY41092317<br>100005<br>US37390585 S4206 | 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01530) 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-11) 18-Oct-01 (in house check Oct-12) | Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Juri-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-05 Network Analyzer HP 8753E  Calibrated by: | GB37480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601<br>ID #<br>MY41092317<br>100005<br>US37390585 S4206 | 01-Nov-12 (No. 217-01640) 01-Nov-12 (No. 217-01640) 27-Mar-12 (No. 217-01630) 27-Mar-12 (No. 217-01530) 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-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                         |

Certificate No: D1900V2-545\_Jan13

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

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 ConvF 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%.

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## 

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

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#### 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       |             |

## 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        | -            | Sale.            |

### SAR result with Head TSL

| SAR averaged over 1 cm3 (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 cm3 (10 g) of Head TSL | condition          |                          |
|---|--------------------|--------------------------|
| SAR measured                                | 250 mW input power | 5.26 W/kg                |
| SAR for nominal Head TSL parameters         | normatized to 1W   | 21.1 W/kg ± 16.5 % (k=2) |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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#### Appendix

### Antenna Parameters with Head TSL

| Impedance, transformed to feed point | $51.0 \Omega + 1.7 J\Omega$ |  |
|--------------------------------------|-----------------------------|--|
| 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 |  |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
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Dates of Test

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Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

#### 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)

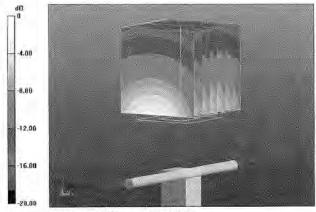
Electronics: DAE4 Sn601; Calibrated: 27.06.2012

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



0 dB = 12.2 W/kg = 10.86 dBW/kg

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# Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

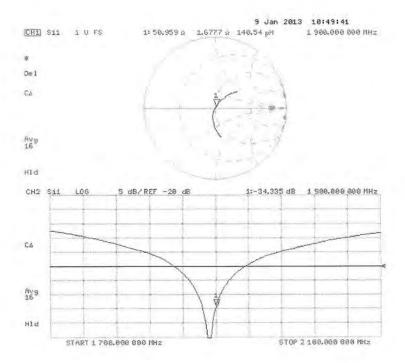
Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### Impedance Measurement Plot for Head TSL



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Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

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## 2450 Dipole

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





Schweizerischer Kalibrierdlenst Service suisse d'étalonnago Servizio svizzero di taratura Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

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

Accreditation No.: SCS 108

client Blackberry Waterloo

Certificate No: D2450V2-791\_Sep13

| Object  | D2450V2 - SN: 7   | 91  |  |
|---|---|---|--|
| Calibration procedure(s)  | QA CAL-05.v9<br>Calibration proce   | dure for dipole validation kits abo   | ove 700 MHz  |
| Dalibration date;   | September 10, 20  | 013   |  |
| The measurements and the unce   | rtaintles with confidence p   | orial standards, which realize the physical un<br>robability are given on the following pages an<br>y facility: environment temperature (22 ± 3) <sup>2</sup> 0   | d are part of the certificate.   |
| Calibration Equipment used (M&)   |   |   |  |
|   |   |   |  |
|   | ID fi   | Cal Date (Certificate No.)  | Scheduled Calibration  |
| Power mater EPM-442A  | GB37480704  | 01-Nov-12 (No. 217-01640)   | Oct-13   |
| Power meter EPM-442A<br>Power sensor HP 8481A   | GB37480704<br>US37292783  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)  | Oct-13<br>Oct-13   |
| Power meier EPM-442A<br>Power sonsor HP 8481A<br>Reference 20 dB Attenuator   | GB37480704<br>US37292783<br>SN: 5058 (20k)  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>04-Apr-13 (No. 217-01736)   | Oct-13<br>Oct-13<br>Apr-14   |
| Power meter CPM-442A<br>Power sensor HP 8481A<br>Heference 20 dB Attenuator<br>Type-N mismatch combination  | GB87480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>04-Apr-13 (No. 217-01736)<br>04-Apr-13 (No. 217-01739)  | Oct-13<br>Oct-13<br>Apr-14<br>Apr-14   |
| Power mater EPM-442A<br>Power sonsor HP 8481A<br>Reference 20 dB Attenuator<br>Type-N mismatch combination<br>Reference Probe ES3DV3  | GB37480704<br>US37292783<br>SN: 5058 (20k)  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>04-Apr-13 (No. 217-01736)   | Oct-13<br>Oct-13<br>Apr-14   |
| Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards   | GB37480704<br>US37292763<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205                                      | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>04-Apr-13 (No. 217-01736)<br>04-Apr-13 (No. 217-01739)<br>28-Dac-12 (No. ES3-3205_Dec12)  | Oct-13<br>Oct-13<br>Apr-14<br>Apr-14<br>Dec-13   |
| Power mater EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A   | GB87480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 96327<br>SN: 3205<br>SN: 601<br>ID #<br>MY41092317     | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>04-Apr-13 (No. 217-01736)<br>04-Apr-13 (No. 217-01739)<br>28-Dac-12 (No. ES3-3205_Dec12)<br>25-Apr-13 (No. DAF4-601_Apr13)<br>Chock Date (in house)   | Oct-13 Oct-13 Apr-14 Apr-14 Dec-13 Apr-14 Scheduled Check In house check; Oct-13   |
| Power mater 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                           | GB87480704<br>US37292783<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601                           | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>04-Apr-13 (No. 217-01736)<br>04-Apr-13 (No. 217-01799)<br>28-Dac-12 (No. ES3-3205_Dec12)<br>25-Apr-13 (No. DAF4-601_Apr13)<br>Chock Date (in house)   | Oct-13<br>Oct-13<br>Apr-14<br>Apr-14<br>Dec-13<br>Apr-14<br>Scheduled Check  |
| Power mater 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                           | GB87480704 US37292763 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317 100005                   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>04-Apr-13 (No. 217-01736)<br>04-Apr-13 (No. 217-01739)<br>28-Dac-12 (No. ES3-3205_Dec12)<br>25-Apr-13 (No. DAF4-601_Apr13)<br>Check Date (in house)<br>18-Oct-02 (in house check Oct-11)<br>04-Aug-99 (in house check Oct-11) | Oct-13 Oct-13 Apr-14 Apr-14 Dec-13 Apr-14 Scheduled Check In house check: Oct-13 In house check: Oct-13                        |
| Power maler EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4   | GB87480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 96327 SN: 3205 SN: 601 ID # MY41092317 100005 US87390585 \$4206 | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>04-Apr-13 (No. 217-01736)<br>04-Apr-13 (No. 217-01739)<br>28-Dac-12 (No. ES3-3205_Dec12)<br>25-Apr-13 (No. DAF4-601_Apr13)<br>Check Date (in house)<br>18-Oct-02 (in house check Oct-11)<br>04-Aug-99 (in house check Oct-11) | Oct-13 Oct-13 Apr-14 Apr-14 Dec-13 Apr-14 Scheduled Check In house check: Oct-13 In house check: Oct-13                        |
| Power maler EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3 DAE4 Secondary Standards Power sensor HP 8481A RE generator R&S SMT-06 Network Analyzer HP 8753E | GB87480704 US37292783 SN: 5058 (20k) SN: 5047.3 / 96327 SN: 3205 SN: 601 ID # MY41092317 100005 US87390585 \$4206 | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>04-Apr-13 (No. 217-01736)<br>04-Apr-13 (No. 217-01739)<br>28-Dac-12 (No. ES3-3205_Dec12)<br>25-Apr-13 (No. DAF4-601_Apr13)<br>Check Date (in house)<br>18-Oct-02 (in house check Oct-11)<br>04-Aug-99 (in house check Oct-11) | Oct-13 Oct-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 |

Certificate No: D2450V2-791\_Sep13

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

Fage 50(60)

Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID:

L6ARHC160LW

2503A-RHC160LW

Calibration Laboratory of Schmid & Partner

Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
C Service suisse d'étatonnage
Servizio svizzero di taretura

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "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) 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

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# Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### Measurement Conditions

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

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

### Head TSL parameters

The following parameters and calculations were applied.

|   | Temperature     | Permittivity | Conductivity     |
|---|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22,0 °C         | 39.2         | 1.80 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) "C | 39.4 ± 6 %   | 1.83 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | 1-44         | -                |

### SAR result with Head TSL

| SAR averaged over 1 cm3 (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   | 51.6 W/kg ± 17.0 % (k=2) |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                          |
|---|--------------------|--------------------------|
| SAR measured  | 250 mW input power | 6.03 W/kg                |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 24.0 W/kg ± 16.5 % (k=2) |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

#### Appendix

#### Antenna Parameters with Head TSL

| Impedance, transformed to feed point | 56 1 Ω + 3,4 <u>jΩ</u> |
|--------------------------------------|------------------------|
| 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

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### **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 M1Iz

Medium parameters used: f = 2450 MHz;  $\sigma = 1.83$  S/m;  $\epsilon_r = 39.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

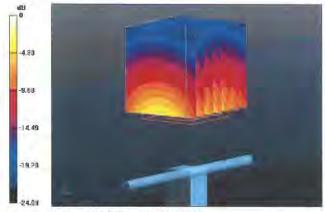
#### DASY52 Configuration:

- 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

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Appendix D for the BlackBerry® Smartphone Model RHC161LW

(STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

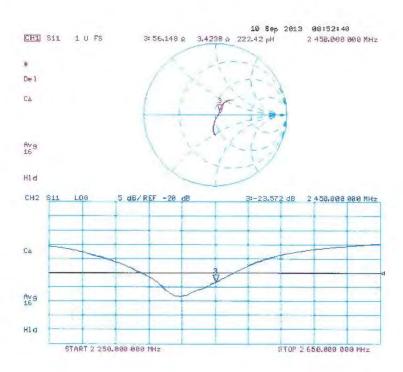
Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

## Impedance Measurement Plot for Head TSL



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Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
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Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

## **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<br>Calibration proced  | dure for dipole validation kits abo   | ove 700 MHz  |
| Calibration date:  | March 11, 2013  |   |  |
| The measurements and the unce  | ertainties with confidence proceed in the closed laborator  | onal standards, which realize the physical un<br>robability are given on the following pages an<br>$\gamma$ facility: environment temperature (22 $\pm$ 3)°C  | d are part of the certificate.   |
| Calibration Equipment used (M&   | E childal for calibration)  |   |  |
|  |   | Cal Pata (Cartificata No.)  | Schooluled Calibration   |
| Primary Standards  | ID#   | Cal Date (Certificate No.)  | Scheduled Calibration  |
| Primary Standards<br>Power meter EPM-442A  | ID#<br>GB37480704   | 01-Nov-12 (No. 217-01640)   |  |
| Primary Standards<br>Power meter EPM-442A<br>Power sensor HP 8481A   | ID#<br>GB37480704<br>US37292763   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)  | Oct-13   |
| Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator  | ID #<br>GB37480704<br>US37292763<br>SN: 5058 (20k)  | 01-Nov-12 (No. 217-01640)   | Oct-13<br>Oct-13   |
| Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination  | ID#<br>GB37480704<br>US37292763   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)   | Oct-13<br>Oct-13<br>Apr-13   |
| Primary Standards Power meter EPM-442A Power sensor HP 8481A Reterence 20 dB Attenuator Type-N mismatch combination Reference Probe ES3DV3   | ID #<br>GB37480704<br>US37292763<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327  | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13   |
| Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4  | ID #<br>GB37480704<br>US37292763<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601                       | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13<br>Dec-13   |
| Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenuator Type-N mismatch combination Reference Probe ES30V3 DAE4 Secondary Standards  | ID#<br>GB37480704<br>US37292763<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205                                   | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)<br>27-Jun-12 (No. DAE4-601_Jun12)  | Oct-13<br>Oct-13<br>Apr-13<br>Apr-13<br>Dec-18<br>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 #<br>GB37480704<br>US37292763<br>SN: 5058 (20k)<br>SN: 5047.3 / 06327<br>SN: 3205<br>SN: 601                       | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)<br>27-Jun-12 (No. DAE4-601_Jun12)<br>Check Date (in house)   | Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Cneck  |
| 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 US37292763 SN: 5058 (20k) SN: 5047.3 / 06327 SN: 3205 SN: 601 ID # MY41092317                         | 01-Nov-12 (No. 217-01640)<br>01-Nov-12 (No. 217-01640)<br>27-Mar-12 (No. 217-01530)<br>27-Mar-12 (No. 217-01533)<br>28-Dec-12 (No. ES3-3205_Dec12)<br>27-Jur-12 (No. DAE4-601_Jun12)<br>Check Date (in house)   | Oct-13 Oct-13 Apr-13 Apr-13 Dec-13 Jun-13 Scheduled Cneck 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 US37292763 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. E33-3205_Dec12) 27-Jun-12 (No. E53-3205_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  | ID # GB37480704 US37292763 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. ES3-3205_Dec12) 27-Juri-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 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 US37292763 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. E33-3205_Dec12) 27-Jun-12 (No. E53-3205_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 |
| 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 Calibrated by: Approved by: | ID # GB37480704 US37292763 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. ES3-3205_Dec12) 27-Juri-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 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

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No

RTS-6063-1503-15

FCC ID: L6ARHC160LW

2503A-RHC160LW

#### Calibration Laboratory of

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





S

Schweizerischer Kallbrierdienst

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

F sensitivity

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

### Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- 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%.

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# Appendix D for the BlackBerry $\mbox{\ensuremath{\mathbb{B}}}$ Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

#### 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       |             |

#### 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 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | Name:        | 100              |

#### SAR result with Head TSL

| SAR averaged over 1 cm3 (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 cm <sup>3</sup> (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) |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

### 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 |
|--|----------|
| and the state of t | - A      |

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 |

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## Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data
Andrew Becker

Dates of Test

Jan 29 –Mar 09, 2015

Test Report No **RTS-6063-1503-15** 

FCC ID: L6ARHC160LW

2503A-RHC160LW

#### **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;  $\sigma = 2.02 \text{ S/m}$ ;  $\varepsilon_r = 37.3$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

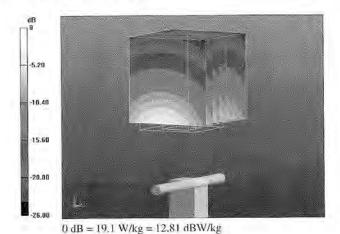
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

#### 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



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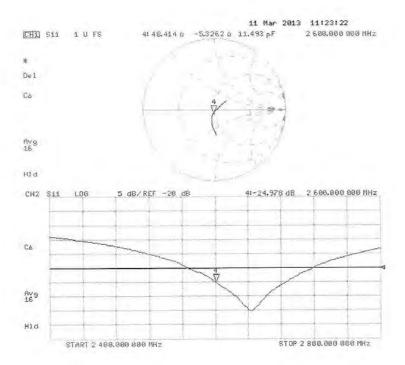
Appendix D for the BlackBerry® Smartphone Model RHC161LW (STR100-2) SAR Report

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Author Data **Andrew Becker**  Dates of Test Jan 29 -Mar 09, 2015 Test Report No RTS-6063-1503-15 FCC ID: L6ARHC160LW

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### Impedance Measurement Plot for Head TSL



Certificate No: D2600V2-1033\_Mar13

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