		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>1(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

## SAR Compliance Test Report

<b>Testing Lab:</b>	BlackBerry RTS 440 Phillip Street Waterloo, Ontario Canada N2L 5R9 Phone: 519-888-7465 Fax: 519-746-0189	<b>Applicant:</b>	BlackBerry Limited 2200 University Ave. East Waterloo, Ontario Canada N2K 0A7 Phone: 519-888-7465 Fax: 519-888-6906
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Web site: [www.BlackBerry.com](http://www.BlackBerry.com)

**Statement of Compliance:** BlackBerry RTS declares under its sole responsibility that the product to which this declaration relates, is in conformity with the appropriate RF exposure standards, recommendations and guidelines. It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices.

**Device Category:** This BlackBerry® Smartphone is a portable device, designed to be used in direct contact with the user’s head, hand and to be carried in approved accessories when carried on the user’s body.

**RF Exposure Environment:** This device has been shown to be in compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in, FCC 47 CFR Part 2.1093, FCC 96-326, IEEE Std. C95.1-1992, Health Canada’s Safety Code 6, as reproduced in RSS-102 issue 4-2010 and has been tested in accordance with the measurement procedures specified in latest FCC OET KDB Procedures, ANSI/IEEE Std. C95.3-2002, IEEE 1528-2013, and RSS 102-issue4-2010.

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Andrew Becker  
SAR & HAC Compliance Specialist  
(Author of the Test Report)

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Daoud Attayi  
Compliance Systems Analyst II  
SAR & HAC Compliance Lead  
(Verification and responsible of the Test Report)


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Masud S. Attayi  
Manager, Regulatory Compliance  
(Approval for the Test Report)

**RTS is accredited**  
according to  
EN ISO/IEC 17025 by:




**592**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>2(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>


Revision History		
Rev. Number	Date	Changes
Initial	May 24, 2013	----- ----
Rev 2	Apr 30, 2014	Added measured conducted power data for Wi-Fi Direct/GO mode: 1. Table 1.8.1-3d added on page 13 Updated equipment list to include those used for Wi-Fi Direct testing: 2. Table 2.1.1-1 changed to 2.1.1-1a on page 32 3. Table 2.1.1-1b added on page 33
Rev 3	Dec 16, 2014	Added measured conducted power data for 802.11a Direct/GO and Hotspot mode which will be supported on software 10.3.1.x maintenance release: <ul style="list-style-type: none"> <li>• Table 1.8.1-4d added on page 17</li> </ul> Updated simultaneous transmission results for Hotspot mode <ul style="list-style-type: none"> <li>• Table 1.8.3-1 updated on page 19</li> <li>• Table 1.9.1-1 updated on page 27</li> <li>• Table 1.9.1-4a updated on page 31</li> <li>• Table 1.9.1-5a added on page 32</li> </ul> Added equipment information used for 802.11a Direct/GO and Hotspot testing: <ul style="list-style-type: none"> <li>• Table 2.1.1-1c added on page 35</li> <li>• Table 3.2-5 added on page 39</li> <li>• Table 6.1.1-2 added on page 44</li> </ul> Added dipole and dielectric parameters information used for 802.11a Direct/GO and Hotspot testing: <ul style="list-style-type: none"> <li>• Table 4.1-2 added on page 41</li> <li>• Table 6.2-2 added on page 48</li> </ul> Added 802.11a Hotspot SAR test data <ul style="list-style-type: none"> <li>• Table 11.2-11e added on page 73</li> </ul> Updated References on page 74

**Note: According to the hardware similarity document BlackBerry model: RFN81UW has the same Wi-Fi 802.11a Direct/GO and Hotspot mode design as RFL111LW. Therefore, conducted power and radiated SAR testing was done on model RFL111LW and the results reused for this report.**

		Document		Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		<b>3(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>

## Contents

1.0	OPERATING CONFIGURATIONS AND TEST CONDITIONS.....	5
1.1	PICTURE OF DEVICE.....	5
1.2	ANTENNA DESCRIPTION.....	5
1.3	DEVICE DESCRIPTION.....	5
1.4	BODY WORN ACCESSORIES (HOLSTERS).....	7
1.5	HEADSET.....	7
1.6	BATTERY.....	7
1.7	PROCEDURE USED TO ESTABLISH TEST SIGNAL.....	7
1.8	HIGHLIGHTS OF THE FCC OET SAR MEASUREMENT REQUIREMENTS.....	8
1.8.1	SAR MEASUREMENT PROCEDURES FOR 802.11 A/B/G/N AS PER KDB 248227 D01 V01R02 AND SAR MEASUREMENTS 100 MHZ TO 6 GHZ AS PER KDB 865664 D0 V01.....	8
1.8.2	SAR MEASUREMENT REQUIREMENTS FOR BLUETOOTH.....	18
1.8.3	SAR EVALUATION PROCEDURES FOR PORTABLE DEVICES WITH WIRELESS ROUTER CAPABILITIES AS PER KDB 941225 D06 V01.....	18
1.8.4	SAR EVALUATION PROCEDURES FOR GSM/(E)GPRS DUAL TRANSFER MODE AS PER KDB 941225 D04 V01 AND SAR TEST REDUCTION PROCEDURES GSM GPRS EDGE AS PER DDB 941225 D03 V01.....	19
1.8.5	SAR MEASUREMENT PROCEDURE FOR FAST SAR SCAN AS PER KDB 447498.....	22
1.8.6	SAR MEASUREMENT PROCEDURES FOR 3G DEVICES.....	23
1.9	GENERAL SAR TEST REDUCTION AND EXCLUSION PROCEDURE AS PER KDB 447498 D01 V05 AND SAR HANDSETS MULTI XMITER AND ANT PROCEDURE AS PER 648474 D04 V01.....	26
1.9.1	SIMULTANEOUS TRANSMISSION ANALYSIS.....	27
2.1	SAR MEASUREMENT SYSTEM.....	33
2.1.1	EQUIPMENT LIST.....	34
2.2	DESCRIPTION OF THE TEST SETUP.....	35
2.2.1	DEVICE AND BASE STATION SIMULATOR SETUP.....	35
2.2.2	DASY SETUP.....	35
3.0	ELECTRIC FIELD PROBE CALIBRATION.....	36
3.1	PROBE SPECIFICATIONS.....	36
3.2	PROBE CALIBRATION AND MEASUREMENT UNCERTAINTY.....	36
4.0	SAR MEASUREMENT SYSTEM VERIFICATION.....	40
4.1	SYSTEM ACCURACY VERIFICATION FOR HEAD ADJACENT USE.....	40
5.0	PHANTOM DESCRIPTION.....	42
6.0	TISSUE DIELECTRIC PROPERTIES.....	43
6.1	COMPOSITION OF TISSUE SIMULANT.....	43
6.1.1	EQUIPMENT.....	43
6.2	ELECTRICAL PARAMETERS OF THE TISSUE SIMULATING LIQUID.....	44
6.2.2	TEST CONFIGURATION.....	49
6.2.3	PROCEDURE.....	49
7.0	SAR SAFETY LIMITS.....	50
8.0	DEVICE POSITIONING.....	51
8.1	DEVICE HOLDER FOR SAM TWIN PHANTOM.....	51
8.2	DESCRIPTION OF THE TEST POSITIONING.....	52
8.2.1	TEST POSITIONS OF DEVICE RELATIVE TO HEAD.....	52
8.2.2	BODY-WORN CONFIGURATION.....	54
8.2.3	LIMB/HAND CONFIGURATION.....	54
9.0	HIGH LEVEL EVALUATION.....	55
9.1	MAXIMUM SEARCH.....	55
9.2	EXTRAPOLATION.....	55
9.3	BOUNDARY CORRECTION.....	55
9.4	PEAK SEARCH FOR 1G AND 10G CUBE AVERAGED SAR.....	55
10.0	MEASUREMENT UNCERTAINTY.....	56
11.0	TEST RESULTS.....	59
11.1	SAR MEASUREMENT RESULTS AT HIGHEST POWER MEASURED AGAINST THE HEAD.....	59
11.2	SAR MEASUREMENT RESULTS AT HIGHEST POWER MEASURED AGAINST THE BODY USING ACCESSORIES.....	66
12.0	REFERENCES.....	74

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>4(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

APPENDIX A: SAR DISTRIBUTION COMPARISON FOR ACCURACY VERIFICATION


APPENDIX B: SAR DISTRIBUTION PLOTS - HEAD CONFIGURATION

APPENDIX C1: SAR DISTRIBUTION PLOTS - BODY-WORN CONFIGURATION

APPENDIX C2: SAR DISTRIBUTION PLOTS - HOT SPOT

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

APPENDIX E: PHOTOGRAPHS

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>5(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

## 1.0 OPERATING CONFIGURATIONS AND TEST CONDITIONS

### 1.1 Picture of Device

Please refer to Appendix E.

**Figure 1.1-1 BlackBerry Smartphone**


### 1.2 Antenna description

<b>Type</b>	Internal fixed antenna
<b>Location</b>	Please refer to Figure 1.9-1
<b>Configuration</b>	Internal fixed antenna

**Table 1.2-1 Antenna description**

### 1.3 Device description

<b>Device Model</b>	RFN81UW			
<b>FCC ID</b>	L6ARFN80UW			
<b>PIN</b>	Radiated: 25CF0BA5 (Rev 2), 2AB01FAD (Rev 3) Conducted: 25CF0B7F (Rev 2), 2AB01F81 (Rev 3)			
<b>Hardware Rev</b>	Rev 2-905-00/01, Rev 3-905-01/02/03			
<b>Software Version</b>	127.0.1.2982/3123/3901/4318, MFI 4_0_11-180/181, 10.3.1.1817			
<b>Prototype or Production Unit</b>	Production			
<b>Mode(s) of Operation</b>	1-slot GSM 850 GSM 1900	2-slots EDGE/GPRS 850/1900	3-slots EDGE/GPRS 850/1900	4-slots EDGE/GPRS 850/1900
<b>Nominal Maximum conducted RF Output Power (dBm)</b>	32.0 29.0	30.0 29.0	29.0 26.5	27.0 25.5
<b>Tolerance in Power Setting on centre channel (dB)</b>	± 0.5	± 0.5	± 0.5	± 0.5
<b>Duty Cycle</b>	1:8	2:8	3:8	4:8
<b>Transmitting Frequency Range (MHz)</b>	824.2 – 848.8 1850.2 – 1909.8	824.2 – 848.8 1850.2 – 1909.8	824.2 – 848.8 1850.2 – 1909.8	824.2 – 848.8 1850.2 – 1909.8
<b>Mode(s) of Operation</b>	802.11a/n (low band)	802.11a/n (middle band)	802.11a/n (upper band I)	802.11a/n (upper band II)
<b>Nominal Maximum conducted RF Output Power (dBm)</b>	14.5	16.5	17.0	11.0
<b>Tolerance in Power Setting on centre channel (dB)</b>	± 0.5	± 0.5	± 0.5	± 0.5
<b>Duty Cycle</b>	1:1	1:1	1:1	1:1
<b>Transmitting Frequency Range (MHz)</b>	5180-5240	5260-5320	5520-5700	5745-5825
<b>Mode(s) of Operation</b>	802.11b	802.11g	802.11n	Bluetooth
<b>Nominal Maximum conducted RF Output Power (dBm)</b>	18.5	18.5	16.5	9.5
<b>Tolerance in Power Setting</b>	± 0.5	± 0.5	± 0.5	N/A


		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>6(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

<b>on centre channel (dB)</b>				
<b>Duty Cycle</b>	1:1	1:1	1:1	N/A
<b>Transmitting Frequency Range (MHz)</b>	2412-2462	2412-2462	2412-2462	2402-2483
<b>Mode(s) of Operation</b>	WCDMA/HSPA <sup>+</sup> / UMTS FDD V (850)	WCDMA/HSPA <sup>+</sup> / UMTS FDD II (1900)	NFC	
<b>Nominal Maximum conducted RF Output Power (dBm)</b>	24.5	23.0	N/A	
<b>Tolerance in Power Setting on centre channel (dB)</b>	± 0.5	± 0.5	N/A	
<b>Duty Cycle</b>	1:1	1:1	N/A	
<b>Transmitting Frequency Range (MHz)</b>	824.6 – 846.6	1852.4 – 1907.6	13.56	

**Table 1.3-1 Test device characterization non-LTE U.S. wireless operating modes/bands**

**Note 1:** The BlackBerry model: RFN81UW also supports GSM/GPRS/EDGE 900/1800 MHz, UMTS Band I/VIII, and LTE Band 3/7/8/20 that are not operational in North America, therefore no data is presented in this report for those bands.

**Note 2:** SAR measurements on NFC haven't been conducted, since it is very low power and frequency magnetic field transceiver. SAR probes measure higher frequency/power electric field.

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>7(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

#### 1.4 Body worn accessories (holsters)

The device has been tested with the holsters listed below. The holster has been designed with the intended device orientation being with the LCD facing the belt clip only. Proper positioning is vital for protection of the LCD display, and to help maximize the battery life of the device. The device can also be placed in the holster with the backside facing the belt clip. Body SAR measurements were carried out with the worst-case configuration front LCD side and backside towards the belt clip.

Number	Holster Type	Part Number	Separation distance (mm)
1	Vertical Holster, Leather	HDW-50678-001	20
2	Vertical Holster, alt Leather	HDW-50677-001	20

**Table 1.4-1 Body worn holster**

**Note:** both holsters have identical design, except for different leather material being used.

Please refer to Appendix E.

**Figure 1.4-1 Body-worn holster**

#### 1.5 Headset

The device was tested with and without the following headset model numbers.

- 1) HDW-24529-004
- 2) HDW-15766-005
- 3) HDW-44306-001


#### 1.6 Battery

The device was tested with the following Lithium Ion Battery packs.

- 1)BAT-49702-002 (1800mA)
- 2)BAT-52961-002 (2100mA)

#### 1.7 Procedure used to establish test signal

- The device was put into test mode for SAR measurements by placing a call from a Rohde & Schwarz CMU 200 or CMW 500 Communications Test Instrument. The power control level was set to command the device to transmit at full power at the specified frequency. Software Tool was used to set WiFi to transmit at maximum power and duty cycle for each band, channel, and modulation.

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>8(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

## 1.8 Highlights of the FCC OET SAR Measurement Requirements

### 1.8.1 SAR Measurement Procedures for 802.11 a/b/g/n as per KDB 248227 D01 v01r02 and SAR Measurements 100 MHz to 6 GHz as per KDB 865664 D0 V01


- Repeat measurements when the measured SAR is  $\geq 0.80$  W/kg. If the measured SAR values are  $< 1.45$  W/kg with  $\leq 20\%$  variation, only one repeated measurement was performed to reaffirm that the results are not expected to have substantial variations. An additional repeated measurement is required only if the measured results are within 10% of the SAR limit and vary by more than 20%, which are often related to device and measurement setup difficulties.
- Maintained dielectric parameter uncertainty to  $\pm 5.0\%$  of the target values, (although it is very challenging to control/maintain both permittivity and conductivity for 5-6 GHz for all test channels within  $\pm 5.0\%$  of the target values, some conductivity values were measured slightly higher which resulted in more conservative SAR values.
- Liquid depth from SAM ERP or flat phantom was kept at 15 cm.
- Probe Requirement: Used SPEAG probe model ET3DV6/ES3DV3 for 2.45 GHz and EX3DV4 for 5-6 GHz SAR testing specs are outlined below:

ET3DV6/ES3DV3	
Probe tip to sensor center	2.7 mm / 2.0 mm
Probe tip diameter is	6.8 mm / 4.0 mm
Probe calibration uncertainty	$< 15\%$ for $f = 2.45$ GHz
Probe calibration range	$\pm 100$ MHz
EX3DV4	
Probe tip to sensor center	1.0 mm
Probe tip diameter is	2.5 mm
Probe calibration uncertainty	$< 15\%$ for $f = 2.45$ to $< 6.0$ GHz
Probe calibration range	$\pm 100$ MHz

**Table 1.8.1-1 Probe specification requirements**

- Area scan resolution was maintained at 10mm (5-6 GHz)
- Area scan resolution was maintained at 12mm (2-3 GHz)
- Area scan resolution was maintained at 15mm ( $\leq 2$  GHz)
- System accuracy validation was conducted within  $\pm 100$  MHz of device mid-band frequency and results were within  $\pm 10\%$  of the manufacturers target value for each band.
- Zoom Scan: The following settings were used for the validation and measurement.




		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>9(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

ET3DV6/ES3DV3	
Closest Measurement Point to Phantom	4.0 mm
Zoom Scan (x,y) Resolution	7.5 mm ( $\leq 2$ GHz) or 5 mm (2-3 GHz)
Zoom Scan (z) Resolution	5.0 mm
Zoom Scan Volume	Minimum 30 x 30 x 30 mm <sup>1</sup>
EX3DV4	
Closest Measurement Point to Phantom	2.0 mm
Zoom Scan (x,y) Resolution	4.0 mm (5-6 GHz)
Zoom Scan (z) Resolution	2.0 mm (5-6 GHz)
Zoom Scan Volume	Minimum 22 x 22 x 22 mm <sup>1</sup>

**Table 1.8.1-2 Zoom Scan requirement**


**Note 1: “Auto-extend zoom scan when maxima on boundary” is enabled, which can result in the zoom scan dimensions varying between 30x30x30 to 60x60x30 mm and 22x22x22 to 48x40x22 mm.**

- Frequency Channel Configuration: 802.11 b/g modes are tested on “default test channels” 1, 6 and 11.
- 802.11a is tested for UNII operations on the highest output power channel of each sub band (low, mid, upper band I, and upper band II). If the highest output power channel has a SAR level that is not 3dB lower than the limit, then the low, mid, and high channels of each sub band must also be tested.
- For each frequency band, testing at higher rates and higher modulations is not required when the maximum average output power for each of these configurations is less than ¼ dB higher than those measured at the lowest data rate.
- SAR is not required for 802.11g/n channels when the maximum average output power is less than ¼ dB higher than that measured on the corresponding 802.11b channels.
- SAR test was conducted on each “default test channel” and each band with the worst case modulation and highest duty cycle, if the SAR level was within 3dB of the limit.
- Conducted power measurements:

	Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone  Model RFN81UW Rev 3</b>			Page <b>10(74)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013  Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18  Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>


802.11b @ 1Mbps		802.11g @ 6Mbps		802.11n @ 6.5 Mbps	
Chan	Cond. Power (dBm)	Chan	Cond. Power (dBm)	Chan	Cond. Power (dBm)
1	19.11	1	18.41	1	18.37
<b>6</b>	<b>20.41</b>	6	19.70	6	19.60
11	20.21	11	19.41	11	19.42
		802.11g			
Data Rate (Mbps)	Mod.	Channel 6 Cond. Power (dBm)	Data Rate (Mbps)	Mod.	Channel 6 Cond. Power (dBm)
6	BPSK	19.67	1	BPSK	20.41
9	BPSK	19.66	2	DQPSK	20.31
12	QPSK	19.64	5.5	CCK	20.28
18	QPSK	19.68	11	CCK	20.29
24	16-QAM	19.69	22	CCK	20.30
36	16-QAM	19.67			
48	64-QAM	19.69			
54	64-QAM	19.65			
			802.11 n		
Data Rate (Mbps)	Mod.	Channel 6 Cond. Power (dBm)			
6.5	MCS0	17.64			
13	MCS1	17.56			
19.5	MCS2	17.55			
26	MCS3	17.58			
39	MCS4	17.54			
52	MCS5	17.57			
58.5	MCS6	17.52			
65	MCS7	17.54			

**Table 1.8.1-3a 802.11 b/g/n modulation type/data rate vs. conducted power with Hotspot mode enabled and disabled (Rev3-01)**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>11(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>


<b>802.11b @ 1Mbps</b>		<b>802.11g @ 6Mbps</b>		<b>802.11n @ 6.5 Mbps</b>	
<b>Chan</b>	<b>Cond. Power (dBm)</b>	<b>Chan</b>	<b>Cond. Power (dBm)</b>	<b>Chan</b>	<b>Cond. Power (dBm)</b>
1	16.50	1	14.45	1	14.24
<b>6</b>	<b>17.75</b>	6	15.63	6	15.50
11	17.50	11	12.15	11	12.05
		<b>802.11g</b>			
<b>Data Rate (Mbps)</b>	<b>Mod.</b>	<b>Channel 6</b>	<b>Data Rate (Mbps)</b>	<b>Mod.</b>	<b>Channel 6</b>
		<b>Cond. Power (dBm)</b>			<b>Cond. Power (dBm)</b>
6	BPSK	15.63	1	BPSK	17.75
9	BPSK	15.51	2	DQPSK	17.74
12	QPSK	15.41	5.5	CCK	17.61
18	QPSK	15.32	11	CCK	17.55
24	16-QAM	15.21	22	CCK	17.54
36	16-QAM	15.00			
48	64-QAM	14.79			
54	64-QAM	14.71			
			<b>802.11 n</b>		
<b>Data Rate (Mbps)</b>		<b>Mod.</b>	<b>Channel 6</b>		
			<b>Cond. Power (dBm)</b>		
6.5		MCS0	15.50		
13		MCS1	15.31		
19.5		MCS2	15.20		
26		MCS3	15.10		
39		MCS4	14.90		
52		MCS5	14.71		
58.5		MCS6	13.65		
65		MCS7	13.53		

**Table 1.8.1-3b 802.11 b/g/n modulation type/data rate vs. conducted power with Hotspot mode enabled and disabled (Rev3-02)**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>12(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>


<b>802.11b @ 1Mbps</b>		<b>802.11g @ 6Mbps</b>		<b>802.11n @ 6.5 Mbps</b>	
<b>Chan</b>	<b>Cond. Power (dBm)</b>	<b>Chan</b>	<b>Cond. Power (dBm)</b>	<b>Chan</b>	<b>Cond. Power (dBm)</b>
1	17.77	1	15.52	1	15.32
<b>6</b>	<b>18.95</b>	6	18.75	6	16.58
11	18.75	11	13.31	11	13.21
13	11.92	13	11.82	13	11.69
		<b>802.11g</b>			
<b>Data Rate (Mbps)</b>	<b>Mod.</b>	<b>Channel 6</b>	<b>Data Rate (Mbps)</b>	<b>Mod.</b>	<b>Channel 6</b>
		<b>Cond. Power (dBm)</b>			<b>Cond. Power (dBm)</b>
6	BPSK	18.75	1	BPSK	18.95
9	BPSK	18.65	2	DQPSK	18.92
12	QPSK	18.60	5.5	CCK	18.75
18	QPSK	18.47	11	CCK	18.67
24	16-QAM	17.38	22	CCK	18.68
36	16-QAM	17.13			
48	64-QAM	15.97			
54	64-QAM	15.75			
				<b>802.11 n</b>	
<b>Data Rate (Mbps)</b>		<b>Mod.</b>		<b>Channel 6</b>	
				<b>Cond. Power (dBm)</b>	
6.5		MCS0		16.58	
13		MCS1		16.36	
19.5		MCS2		16.23	
26		MCS3		16.20	
39		MCS4		14.92	
52		MCS5		14.77	
58.5		MCS6		13.62	
65		MCS7		13.54	

**Table 1.8.1-3c 802.11 b/g/n modulation type/data rate vs. conducted power with Hotspot mode enabled and disabled (Rev3-03)**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>13(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	


802.11b @ 1Mbps			802.11g @ 6Mbps			802.11n @ 6.5 Mbps		
f (MHz)	Chan	Max. average conducted power (dBm)	f (MHz)	Chan	Max. average conducted power (dBm)	f (MHz)	Chan	Max. average conducted power (dBm)
2412	1	12.6	2412	1	12.6	2412	1	12.7
2437	6	<b>13.8</b>	2437	6	<b>13.7</b>	2437	6	<b>13.8</b>
2462	11	13.5	2462	11	13.5	2462	11	13.6
802.11g					802.11b			
Data Rate (Mbps)	Mod.	Channel 6		Data Rate (Mbps)	Mod.	Channel 6		
		Max. average conducted power (dBm)				Max. average conducted power (dBm)		
18	QPSK	13.7		5.5	CCK	13.7		
54	64-QAM	13.8		11	CCK	13.7		
802.11 n								
Data Rate (Mbps)		Mod.		Channel 6				
				Max. average conducted power (dBm)				
26		MCS3		13.8				
65		MCS7		13.8				

**Table 1.8.1-3d 802.11 b/g/n modulation type/data rate vs. conducted power (Rev3-03)  
in Wi-Fi Direct/GO mode**

		Document			Page	
		SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3			14(74)	
Author Data	Dates of Test		Test Report No		FCC ID:	IC
Andrew Becker	Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014		RTS-6026-1302-18 Rev 3		L6ARFN80UW	2503A-RFN80UW


802.11a (low band) 6Mbps			802.11a (mid band) 6Mbps			802.11a (upper band I) 6Mbps		
Chan	f (MHz)	Cond. Power (dBm)	Chan	f(MHz)	Cond. Power (dBm)	Chan	f(MHz)	Cond. Power (dBm)
36	5180	17.29	52	5260	17.26	104	5520	19.80
40	5200	17.24	56	5280	17.22	116	5580	19.54
44	5220	17.42	60	5300	17.15	124	5620	19.39
48	5240	17.26	64	5320	17.12	140	5700	19.01
						<b>802.11a (upper band II) 6Mbps</b>		
						Chan	f(MHz)	Cond. Power (dBm)
						149	5745	14.25
						153	5765	14.11
						157	5785	14.00
						161	5805	13.85
						165	5825	13.75
		802.11a (lower band)	802.11a (middle band)	802.11a (upper band I)	802.11a (upper band II)			
Data Rate (Mbits)	Mod.	Channel 44	Channel 52	Channel 104	Channel 149			
		Cond. Power (dBm)	Cond. Power (dBm)	Cond. Power (dBm)	Cond. Power (dBm)			
6	BPSK	17.42	17.26	19.80	14.25			
9	BPSK	17.30	17.22	19.75	14.16			
12	QPSK	17.32	17.25	19.73	14.15			
18	QPSK	17.31	17.21	19.78	14.22			
24	16-QAM	17.30	17.23	19.79	14.16			
36	16-QAM	17.32	17.22	19.79	14.17			
48	64-QAM	17.29	17.20	19.77	14.20			
54	64-QAM	17.30	17.24	19.76	14.23			
		802.11n (lower band)	802.11n (middle band)	802.11n (upper band I)	802.11n (upper band II)			
Mod.		Channel 44	Channel 52	Channel 104	Channel 149			
		Cond. Power (dBm)	Cond. Power (dBm)	Cond. Power (dBm)	Cond. Power (dBm)			
MCS0		17.31	17.14	19.00	12.94			
MCS1		17.30	17.15	18.96	12.95			
MCS2		17.40	17.11	18.97	13.00			
MCS3		17.40	17.09	18.96	13.01			
MCS4		17.28	17.13	18.95	12.98			
MCS5		17.37	17.10	18.97	13.01			
MCS6		17.40	17.11	18.92	12.97			
MCS7		17.39	17.12	18.93	12.99			

**Table 1.8.1-4a 802.11 a/n modulation type/data rate vs. conducted power (Rev3-01)**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>15(74)</b>	
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>		Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>		IC <b>2503A-RFN80UW</b>

802.11a (low band) 6Mbps			802.11a (mid band) 6Mbps			802.11a (upper band I) 6Mbps		
Chan	f (MHz)	Cond. Power (dBm)	Chan	f(MHz)	Cond. Power (dBm)	Chan	f(MHz)	Cond. Power (dBm)
<b>36</b>	<b>5180</b>	<b>14.71</b>	52	5260	14.41	<b>104</b>	<b>5520</b>	<b>12.03</b>
40	5200	14.52	56	5280	14.20	116	5580	11.80
44	5220	14.49	60	5300	14.10	124	5620	11.61
48	5240	14.38	<b>64</b>	<b>5320</b>	<b>15.10</b>	140	5700	11.40
						<b>802.11a (upper band II) 6Mbps</b>		
						<b>Chan</b>	<b>f(MHz)</b>	<b>Cond. Power (dBm)</b>
						149	5745	10.52
						153	5765	10.50
						157	5785	10.55
						161	5805	10.51
						<b>165</b>	<b>5825</b>	<b>10.58</b>
		802.11a (lower band)	802.11a (middle band)	802.11a (upper band I)	802.11a (upper band II)			
Data Rate (Mbits)	Mod.	Channel 36	Channel 64	Channel 104	Channel 165			
		Cond. Power (dBm)	Cond. Power (dBm)	Cond. Power (dBm)	Cond. Power (dBm)			
6	BPSK	14.71	15.10	12.03	10.58			
9	BPSK	14.70	15.05	11.94	10.51			
12	QPSK	14.64	15.00	11.90	10.44			
18	QPSK	14.52	14.90	11.75	10.30			
24	16-QAM	14.37	14.80	11.57	10.12			
36	16-QAM	14.10	14.45	11.30	9.93			
48	64-QAM	13.81	14.30	11.13	9.65			
54	64-QAM	13.75	14.13	11.10	9.54			
		802.11n (lower band)	802.11n (middle band)	802.11n (upper band I)	802.11n (upper band II)			
		Channel 36	Channel 64	Channel 104	Channel 165			
		Cond. Power (dBm)	Cond. Power (dBm)	Cond. Power (dBm)	Cond. Power (dBm)			
MCS0	14.60	15.00	11.90	10.42				
MCS1	14.42	14.81	11.75	10.27				
MCS2	14.35	14.71	11.64	10.13				
MCS3	14.20	14.65	11.44	10.00				
MCS4	13.91	14.44	11.20	9.81				
MCS5	13.72	14.15	11.02	9.61				
MCS6	13.67	14.10	10.96	9.51				
MCS7	13.66	14.11	10.94	9.53				


**Table 1.8.1-4b 802.11 a/n modulation type/data rate vs. conducted power (Rev3-02)**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>16(74)</b>	
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>		Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>		IC <b>2503A-RFN80UW</b>

802.11a (low band) 6Mbps			802.11a (mid band) 6Mbps			802.11a (upper band I) 6Mbps		
Chan	f (MHz)	Cond. Power (dBm)	Chan	f(MHz)	Cond. Power (dBm)	Chan	f(MHz)	Cond. Power (dBm)
<b>36</b>	<b>5180</b>	<b>14.70</b>	<b>52</b>	<b>5260</b>	<b>16.78</b>	<b>104</b>	<b>5520</b>	<b>17.35</b>
40	5200	14.68	56	5280	16.66	116	5580	17.00
44	5220	14.54	60	5300	16.62	124	5620	16.87
48	5240	14.50	64	5320	14.12	140	5700	14.23
						<b>802.11a (upper band II) 6Mbps</b>		
						<b>Chan</b>	<b>f(MHz)</b>	<b>Cond. Power (dBm)</b>
						149	5745	11.42
						153	5765	11.39
						157	5785	11.34
						161	5805	11.32
						165	5825	11.35
		<b>802.11a (lower band)</b>	<b>802.11a (middle band)</b>	<b>802.11a (upper band I)</b>	<b>802.11a (upper band II)</b>			
<b>Data Rate (Mbits)</b>	<b>Mod.</b>	<b>Channel 36</b>	<b>Channel 52</b>	<b>Channel 104</b>	<b>Channel 149</b>			
		<b>Cond. Power (dBm)</b>	<b>Cond. Power (dBm)</b>	<b>Cond. Power (dBm)</b>	<b>Cond. Power (dBm)</b>			
6	BPSK	14.70	16.78	17.35	11.42			
9	BPSK	14.67	16.74	17.26	11.28			
12	QPSK	14.54	16.65	17.21	11.28			
18	QPSK	14.44	16.54	17.06	11.10			
24	16-QAM	14.32	16.43	15.80	10.86			
36	16-QAM	14.03	16.10	15.57	10.68			
48	64-QAM	13.87	15.94	14.20	10.47			
54	64-QAM	13.80	15.77	14.10	10.46			
		<b>802.11n (lower band)</b>	<b>802.11n (middle band)</b>	<b>802.11n (upper band I)</b>	<b>802.11n (upper band II)</b>			
		<b>Channel 36</b>	<b>Channel 52</b>	<b>Channel 104</b>	<b>Channel 149</b>			
		<b>Cond. Power (dBm)</b>	<b>Cond. Power (dBm)</b>	<b>Cond. Power (dBm)</b>	<b>Cond. Power (dBm)</b>			
MCS0	14.45	16.60	17.25	11.15				
MCS1	14.36	16.45	17.00	11.07				
MCS2	14.28	15.10	15.81	10.90				
MCS3	14.19	15.00	15.73	10.80				
MCS4	13.90	15.94	14.31	10.63				
MCS5	13.73	15.75	14.17	10.36				
MCS6	13.60	15.72	13.02	10.24				
MCS7	13.53	15.63	12.90	10.23				

**Table 1.8.1-4c 802.11 a/n modulation type/data rate vs. conducted power (Rev3-03)**




		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>17(74)</b>	
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>		Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

<b>802.11a/n Conducted Power in WiFi Direct/GO/Hotspot Mode</b>					
<b>802.11a (low band) 6Mbps</b>			<b>802.11a (upper band II) 6Mbps</b>		
<b>f (MHz)</b>	<b>Chan</b>	<b>Max. average conducted power (dBm)</b>	<b>f (MHz)</b>	<b>Chan</b>	<b>Max. average conducted power (dBm)</b>
5180	36	<b>13.10</b>	5745	149	<b>12.00</b>
5200	40	13.10	5765	153	11.95
5220	44	13.05	5785	157	11.95
5240	48	13.00	5805	161	11.90
			5825	165	11.90
		<b>802.11a (lower band)</b>		<b>802.11 a (upper band II)</b>	
		<b>Channel 36</b>		<b>Channel 153</b>	
<b>Data Rate (Mbits)</b>		<b>Max. average conducted power (dBm)</b>		<b>Max. average conducted power (dBm)</b>	
6		13.10		12.00	
24		13.05		12.00	
54		13.05		12.00	
		<b>802.11n (lower band)</b>		<b>802.11n (upper band II)</b>	
		<b>Channel 36</b>		<b>Channel 153</b>	
<b>Mod.</b>	<b>Max. average conducted power (dBm)</b>		<b>Max. average conducted power (dBm)</b>		
MCS0	13.10		12.00		
MCS4	13.05		11.95		
MCS7	13.05		12.00		

**Table 1.8.1-4d 802.11 a/n modulation type/data rate vs. maximum average conducted power in 802.11a Direct/Go and Hotspot mode**

**Note:** 802.11a/n Hotspot mode does not support channels 52-140

		Document		Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		<b>18(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>

### 1.8.2 SAR Measurement Requirements for Bluetooth

Channel	Freq (MHz)	Mode	Conducted Transmit Power (dBm)
0	2402	DH5	9.30
39	2441	DH5	10.0
78	2480	DH5	9.50

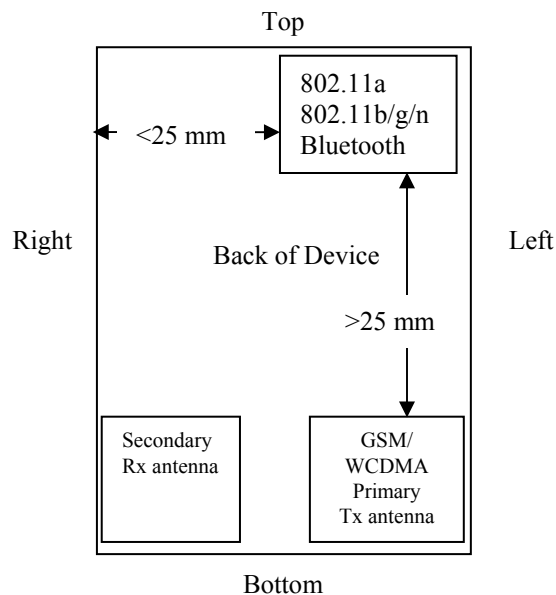
**Table 1.8.2-1 Bluetooth peak conducted power measurements**

### 1.8.3 SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities as per KDB 941225 D06 v01


Standalone personal wireless routers and handsets with hotspot mode capabilities must address hand-held and other near-body exposure conditions to show SAR compliance. The following procedures are applicable when the overall device length and width are  $\geq 9$  cm x 5 cm respectively. A test separation of 10 mm is required. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25 mm from that surface or edge, for the data modes, wireless technologies and frequency bands supporting hotspot mode. The standalone SAR results in each device test orientation must be analyzed for the applicable hotspot mode simultaneous transmission configurations to determine SAR test exclusion and volume scan requirements.

Static/fixed power reduction scheme on the following modes/bands have been implemented when Hotspot Mode is enabled or active to comply with body SAR with 10 mm test separation from flat phantom on standalone transmitter and multi-band simultaneous transmission conditions:

- EDGE/GPRS 850: back off 3 dB
- UMTS Band V: back off 3.5 dB



**Figure 1.8.3-1 Identification of all sides for SAR Testing**

		Document			Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>19(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>	

**Note:** According to FCC guidance, Hotspot SAR testing is not required on any edge that is more than 2.5cm from the transmitting antenna.


Hotspot Sides for SAR Testing						
Mode	Front	Back	Top	Bottom	Left	Right
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
WCDMA/HSPA 850	Yes	Yes	No	Yes	Yes	Yes
WCDMA/HSPA 1900	Yes	Yes	No	Yes	Yes	Yes
Bluetooth 2.4GHz	Yes	Yes	Yes	No	Yes	No
802.11b 2.4GHz	Yes	Yes	Yes	No	Yes	No
802.11a 5.0 GHz	Yes	Yes	Yes	No	Yes	No

**Table 1.8.3-1 Identification of all sides for SAR Testing**


#### **1.8.4 SAR Evaluation Procedures for GSM/(E)GPRS Dual Transfer Mode as per KDB 941225 D04 v01 and SAR Test Reduction Procedures GSM GPRS EDGE as per DDB 941225 D03 v01**

- The device supports EGPRS/GPRS Multi-slot Class 12, DTM/GPRS Multi-slot Class11 and DTM/EGPRS Multi-slot Class10.
- CMU200 base station simulator with DTM software option CMU-K44 was used to set device in DTM (CS+PD) mode for testing. However, device could not be connected in DTM 4-slots uplink.
- For each slot addition in multi-slot modes (DTM, GPRS, EDGE), there is software power reduction of ~ 2 dB per slot.
- For head configurations, 1 slot CS, 2/3/4-slots (PD) and DTM (CS+PD) were evaluated.
- For body SAR configurations, 2/3/4-slots GPRS (PD) mode were tested.
- In EDGE/GPRS mode, GMSK Modulation was used using CS1-CS4 or MCS1-MCS4.
- 8-PSK modulation or MCS5-MCS9 code scheme were avoided since maximum burst avg . power was measured lower on those modulation schemes.
- Please refer to the conducted power measurements table below:

Mode	Freq. (MHz)	Max burst averaged conducted power (dBm) CS1	Max burst averaged conducted power (dBm) MCS1	Max burst averaged conducted power (dBm) MCS5
2-slots GPRS 850 MHz	824.2	30.5	N/A	N/A
	836.8	30.2	N/A	N/A
	848.8	30.3	N/A	N/A
3-slots GPRS 850 MHz	824.2	29.2	N/A	N/A
	836.8	29.4	N/A	N/A
	848.8	28.9	N/A	N/A
4-slots GPRS 850 MHz	824.2	27.2	N/A	N/A
	836.8	27.4	N/A	N/A
	848.8	26.9	N/A	N/A

		Document		Page	
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		<b>20(74)</b>	
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>	

2-slots	824.2	30.5	30.4	27.0
EDGE	836.8	30.1	30.2	27.0
850 MHz	848.8	30.1	30.2	27.1
2-slots	824.2	30.3	30.2	30.3
DTM	836.8	29.9	30.3	29.8
850 MHz	848.8	29.9	29.8	29.9
3-slots	824.2	29.2	29.0	25.1
EDGE	836.8	29.3	29.1	25.2
850 MHz	848.8	29.0	29.0	25.1
3-slots	824.2	29.1	29.0	29.1
DTM	836.8	29.2	29.1	29.2
850 MHz	848.8	28.8	28.6	28.8
4-slots	824.2	27.2	27.1	24.1
EDGE	836.8	27.5	27.2	24.0
850 MHz	848.8	26.9	26.7	23.9
2-slots	1850.2	29.1	N/A	N/A
GPRS	1880.0	29.1	N/A	N/A
1900 MHz	1909.8	28.8	N/A	N/A
3-slots	1850.2	26.4	N/A	N/A
GPRS	1880.0	26.4	N/A	N/A
1900 MHz	1909.8	26.2	N/A	N/A
4-slots	1850.2	25.8	N/A	N/A
GPRS	1880.0	25.8	N/A	N/A
1900 MHz	1909.8	25.4	N/A	N/A
2-slots	1850.2	29.2	28.8	25.5
EDGE	1880.0	29.1	28.7	25.5
1900MHz	1909.8	29.0	28.5	25.4
2-slots	1850.2	29.1	29.0	28.8
DTM	1880.0	29.1	28.9	28.8
1900MHz	1909.8	28.8	28.8	28.6
3-slots	1850.2	26.6	26.7	24.4
EDGE	1880.0	26.6	26.7	24.4
1900MHz	1909.8	26.4	26.5	24.3
3-slots	1850.2	26.4	26.3	26.3
DTM	1880.0	26.4	26.3	26.1
1900MHz	1909.8	26.2	26.1	26.1
4-slots	1850.2	26.0	26.0	23.3
EDGE	1880.0	26.0	26.0	23.3
1900MHz	1909.8	25.6	25.7	23.1
<b>Mode</b>		<b>Freq. (MHz)</b>		<b>Max burst averaged conducted power (dBm)</b>
1-slot		824.2		32.2
GSM (CS)		836.8		31.9
850 MHz		848.8		32.0
1-slot		1850.2		29.3
GSM (CS)		1880.0		29.2


		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>21(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

1900 MHz	1909.8	29.0
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**1.8.4-1 GSM/EDGE/GPRS channel vs. conducted power  
with Hotspot mode disabled**


<b>Mode</b>	<b>Freq. (MHz)</b>	<b>Max burst averaged conducted power (dBm) CS1</b>	<b>Max burst averaged conducted power (dBm) MCS1</b>	<b>Max burst averaged conducted power (dBm) MCS5</b>
2-slots GPRS 1900 MHz	1850.2	28.4	N/A	N/A
	1880.0	28.5	N/A	N/A
	1909.8	28.4	N/A	N/A
<b>Mode</b>	<b>Freq. (MHz)</b>	<b>Max burst averaged conducted power (dBm)</b>		
1-slot GSM (CS) 1900 MHz	1850.2	28.9		
	1880.0	29.1		
	1909.8	28.8		

**1.8.4-2 GSM/EDGE/GPRS channel vs. conducted power  
with Hotspot mode enabled**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>22(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

### 1.8.5 SAR Measurement Procedure for Fast SAR Scan as per KDB 447498

- Area scan based 1-g SAR estimation.
  - Very specific implementation of fast SAR methods.
    - Reported in the 29<sup>th</sup> BEMS meeting in 2009.
    - Using the specific polynomial fit algorithm.
  - Other implementations are not considered.
- When estimated 1-g SAR is  $\leq 1.2$  W/kg, zoom scan is not required according to the following:
  - Zoom scan is not required for any other purposes.
  - Peaks are distinctively identified in the area scan.
  - No sharp gradients: SAR at 1 cm from peak  $\geq 40\%$  of peak value.
  - No measurement warnings or alerts for other measurement issues.
- 1-g SAR for estimated & zoom scan in the system verification (dipole) must be within 3% of each other to utilize Fast SAR.
- 1g Fast SAR values for dipole validation scans are generally more conservative than the standard SAR scans.
- Regardless of the SAR value, a zoom scan is required for the highest SAR configuration in each frequency band and wireless mode.
- Fast SAR Algorithm: The approach is based on the area scan using DASYS system.

		Document		Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		<b>23(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>

## 1.8.6 SAR Measurement Procedures for 3G Devices

### WCDMA Handsets

#### Output Power Verification

- Maximum output power is verified on the High, Middle and Low channels using 12.2 kbps RMC, 12.2 kbps AMR with a 3.4 kbps SRB (signal radio bearer) with TPC (transmit power control) set to all “1’s” for WCDMA/HSPA or applying the required inner loop.
- For Release 6 HSPA/Release 7 HSDPA<sup>+</sup>, output power is measured according to requirements for HS-DPCCH Sub-test 1-4/1-5 and 3GPP TS 34.121.

#### Head SAR Measurements


SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than ¼ dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signalling radio bearer) using the exposure configuration that results in the highest SAR for that RF channel in 12.2 RMC.

#### Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits configured to all “1s”. SAR for other spreading codes and multiple DPDCH<sub>n</sub>, when supported by the DUT, are not required when the maximum average outputs of each RF channel, for each spreading code and DPDCH<sub>n</sub> configuration, are less than ¼ dB higher than those measured in 12.2 RMC. Otherwise, SAR is measured on the maximum output channel with an applicable RMC configuration for the corresponding spreading code or DPDCH<sub>n</sub> using the exposure configuration that results in the highest SAR with 12.2 RMC.

#### Handsets with HSPA


Body SAR is not required for handsets with HSPA/HSPA+ capabilities, when the maximum average output of each RF channel with HSPA active is less than ¼ dB higher than that measured in 12.2 kbps RMC without HSPA/HSPA+. Otherwise, SAR for HSPA is measured using FRC (fixed reference channel) in the body exposure configuration that results in the highest SAR for that RF channel in 12.2kbps RMC.

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>24(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

	<b>Band</b>	<b>FDD V (850)</b>		
	<b>Channel</b>	4132	4182	4233
	<b>Freq (MHz)</b>	826.4	836.4	846.6
<b>Mode</b>	<b>Subtest</b>	<b>Max burst averaged conducted power (dBm)</b>		
Rel99	12.2 kbps RMC	24.63	24.42	24.27
Rel99	12.2 kbps, Voice, AMR, SRB 3.4 kbps	24.69	24.37	24.33
Rel6 HSUPA	1	23.22	23.00	22.80
Rel6 HSUPA	2	22.80	22.48	22.33
Rel6 HSUPA	3	23.70	23.38	23.26
Rel6 HSUPA	4	23.55	23.30	23.15
Rel6 HSUPA	5	21.65	21.55	21.30
Rel7 HSDPA+	1	22.90	22.92	22.91
Rel7 HSDPA+	2	22.16	22.11	22.15
Rel7 HSDPA+	3	21.80	21.72	22.05
Rel7 HSDPA+	4	21.41	21.60	22.01
	<b>Band</b>	<b>FDD II (1900)</b>		
	<b>Channel</b>	9262	9400	9538
	<b>Freq (MHz)</b>	1852.4	1880.0	1907.6
<b>Mode</b>	<b>Subtest</b>	<b>Max burst averaged conducted power (dBm)</b>		
Rel99	12.2 kbps RMC	23.10	22.95	22.98
Rel99	12.2 kbps, Voice, AMR, SRB 3.4 kbps	23.10	22.94	22.96
Rel6 HSUPA	1	22.71	22.51	22.54
Rel6 HSUPA	2	22.41	22.20	22.11
Rel6 HSUPA	3	23.09	22.92	22.95
Rel6 HSUPA	4	23.00	22.85	22.83
Rel6 HSUPA	5	21.20	21.00	20.95
Rel7 HSDPA+	1	22.60	22.81	22.81
Rel7 HSDPA+	2	22.05	22.04	22.10
Rel7 HSDPA+	3	22.48	22.41	22.32
Rel7 HSDPA+	4	21.25	21.10	21.20


**Table 1.8.6-1 WCDMA (Rel99) / HSPA/HSPA+ conducted power measurements  
with Mobile Hot Spot mode disabled**



		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>25(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

	Band	FDD V (850)		
	Channel	4132	4182	4233
	Freq (MHz)	826.4	836.4	846.6
Mode	Subtest	Max burst averaged conducted power (dBm)		
Rel99	12.2 kbps RMC	21.15	21.00	20.80
Rel99	12.2 kbps, Voice, AMR, SRB 3.4 kbps	21.08	20.95	20.80
Rel6 HSUPA	1			
Rel7 HSDPA+	1	20.05	19.95	19.78

**Table 1.8.6-2 WCDMA (Rel99) / HSPA/HSPA+ conducted power measurements  
with Mobile Hot Spot mode enabled**

		Document		Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		<b>26(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>

**1.9 General SAR Test Reduction and Exclusion procedure as per KDB 447498 D01 V05 and SAR Handsets Multi Xmitter and Ant procedure as per 648474 D04 v01**

**Standalone SAR test exclusion guidance:**

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances*

$$\left( \frac{\text{max. power of channel, including tune - up tolerance (mW)}}{\text{min. test separation distance (mm)}} \times \sqrt{f \text{ (GHz)}} \right) \leq 3.0, \text{ For 1g SAR}$$

Where:

- $f_{\text{(GHz)}}$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation<sup>17</sup>
- If *distance* is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion
- The result is rounded to one decimal place for comparison

**Simultaneous Transmission SAR Test exclusion considerations:**

When the sum of 1-g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration. When the sum is greater than the SAR limit, the SAR to peak location separation ratio procedures described below may be applied to determine if simultaneous transmission SAR test exclusion applies.

The ratio is determined by:


$$\left( [SAR1 + SAR2] \frac{1.5}{R_i} \right) \leq 0.04$$

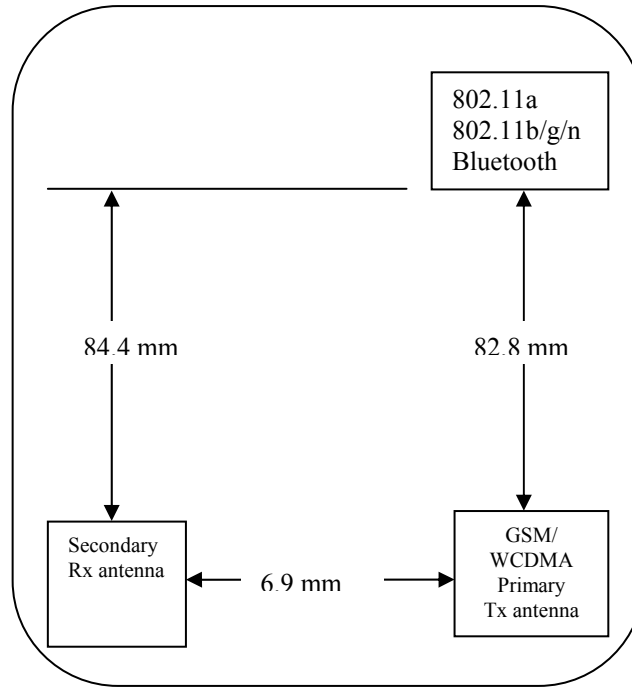
Where:

- $R_i$  = the separation distance between the peak SAR locations for the antenna pair (mm)

**Simultaneous Transmission SAR required:**

- antenna pairs with SAR to antenna separation ratio > 0.04; test is only required for the configuration that results in the highest SAR in standalone configuration for each wireless mode and exposure condition.

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>27(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>




**Figure 1.9-1 Back view of device showing closest distance between antenna pairs**

**1.9.1 Simultaneous Transmission Analysis**

<b>Simultaneous Transmission Combination</b>	<b>Head</b>	<b>Body-Worn Accessory</b>	<b>Mobile Hotspot</b>
WCDMA/GSM voice + WiFi 2.4 GHz	Yes	Yes	No
WCDMA/GSM voice + WiFi 5.0 GHz	Yes	Yes	No
WCDMA/GSM voice + BT	Yes	Yes	No
HSPA/EDGE/GPRS/LTE data + BT/Wi-Fi 2.45 GHz	Yes	Yes	Yes
HSPA/EDGE/GPRS/LTE data + BT/Wi-Fi 5 GHz	Yes	Yes	Yes

**Table 1.9.1-1 Simultaneous Transmission Scenarios**


		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>28(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

Test	Configuration	Licensed Transmitters		WiFi 2.4/5.0G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (W/kg)		
Head SAR	Right Cheek	GSM/GPRS/EDGE 850	0.54	0.40	0.94
	Right Cheek	UMTS Band V	0.63		1.03
	Right Cheek	GSM/GPRS/EDGE 1900	0.59		0.99
	Right Cheek	UMTS Band II	0.58		0.98
	Right Tilt	GSM/GPRS/EDGE 850	0.44	0.40	0.84
	Right Tilt	UMTS Band V	0.45		0.85
	Right Tilt	GSM/GPRS/EDGE 1900	0.42		0.82
	Right Tilt	UMTS Band II	0.44		0.84
	Left Cheek	GSM/GPRS/EDGE 850	0.80	0.19	0.99
	Left Cheek	UMTS Band V	0.90		1.09
	Left Cheek	GSM/GPRS/EDGE 1900	0.94		1.13
	Left Cheek	UMTS Band II	1.09		1.28
	Left Tilt	GSM/GPRS/EDGE 850	0.43	0.22	0.65
	Left Tilt	UMTS Band V	0.40		0.62
	Left Tilt	GSM/GPRS/EDGE 1900	0.45		0.67
	Left Tilt	UMTS Band II	0.45		0.67

**Table 1.9.1-2 Highest Head SAR values and summation**

**Note 1:** If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.

**Note 2:** If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.


		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>29(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

Test	Configuration	Licensed Transmitters		WiFi 2.4/5.0G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (W/kg)		
Body Worn SAR	15 mm separation, device back	GSM/GPRS/EDGE 850	0.62	0.41	1.03
		UMTS Band V	0.65		1.06
		GSM/GPRS/EDGE 1900	0.49		0.90
		UMTS Band II	0.59		1.00
	Holster device back	GSM/GPRS/EDGE 850	0.50	0.29	0.79
		UMTS Band V	0.60		0.89
		GSM/GPRS/EDGE 1900	0.19		0.48
		UMTS Band II	0.36		0.65
	Holster device front	GSM/GPRS/EDGE 850	0.47	0.05	0.52
		UMTS Band V	0.57		0.62
		GSM/GPRS/EDGE 1900	0.28		0.33
		UMTS Band II	0.25		0.30

**Table 1.9.1-3 Highest Body-worn SAR values for the same configuration**

**Note 1:** If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.

**Note 2:** If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters


		Document			Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>30(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>	

Test	Configuration	Licensed Transmitters		WiFi 2.4 G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (W/kg)		
Mobile Hotspot SAR	10 mm separation, device back	GSM/GPRS/EDGE 850	0.43	0.49	0.92
		UMTS Band V	0.38		0.87
		GSM/GPRS/EDGE 1900	0.94		1.43
		UMTS Band II	1.30		1.79
	10 mm separation, device front	GSM/GPRS/EDGE 850	0.32	0.10	0.42
		UMTS Band V	0.34		0.44
		GSM/GPRS/EDGE 1900	0.52		0.62
		UMTS Band II	0.52		0.62
	10 mm separation, device left	GSM/GPRS/EDGE 850	0.36	0.27	0.63
		UMTS Band V	0.34		0.61
		GSM/GPRS/EDGE 1900	0.30		0.57
		UMTS Band II	0.36		0.63
	10 mm separation, device right	GSM/GPRS/EDGE 850	0.21	0.08	0.29
		UMTS Band V	0.20		0.28
		GSM/GPRS/EDGE 1900	0.18		0.26
		UMTS Band II	0.16		0.24
	10 mm separation, device top	GSM/GPRS/EDGE 850	0.00	0.23	0.23
		UMTS Band V	0.00		0.23
		GSM/GPRS/EDGE 1900	0.00		0.23
		UMTS Band II	0.00		0.23
	10 mm separation, device top	GSM/GPRS/EDGE 850	0.06	0.00	0.06
		UMTS Band V	0.07		0.07
		GSM/GPRS/EDGE 1900	0.52		0.52
		UMTS Band II	0.23		0.23

**Table 1.9.1-4 Highest Mobile Hotspot SAR values for the same configuration**

**Note 1:** If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.

**Note 2:** If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.


		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>31(74)</b>	
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

Test	Configuration	Licensed Transmitters		WiFi 5 G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (W/kg)		
Mobile Hotspot SAR	10 mm separation, device back	GSM/GPRS/EDGE 850	0.43	0.58	1.01
		UMTS Band V	0.38		0.96
		GSM/GPRS/EDGE 1900	0.94		1.52
		UMTS Band II	1.30		1.88
	10 mm separation, device front	GSM/GPRS/EDGE 850	0.32	0.02	0.34
		UMTS Band V	0.34		0.36
		GSM/GPRS/EDGE 1900	0.52		0.54
		UMTS Band II	0.52		0.54
	10 mm separation, device left	GSM/GPRS/EDGE 850	0.36	0.06	0.42
		UMTS Band V	0.34		0.40
		GSM/GPRS/EDGE 1900	0.30		0.36
		UMTS Band II	0.36		0.42
	10 mm separation, device right	GSM/GPRS/EDGE 850	0.21	0.00	0.21
		UMTS Band V	0.20		0.20
		GSM/GPRS/EDGE 1900	0.18		0.18
		UMTS Band II	0.16		0.16
	10 mm separation, device top	GSM/GPRS/EDGE 850	0.00	0.12	0.12
		UMTS Band V	0.00		0.12
		GSM/GPRS/EDGE 1900	0.00		0.12
		UMTS Band II	0.00		0.12
	10 mm separation, device bottom	GSM/GPRS/EDGE 850	0.06	0.00	0.06
		UMTS Band V	0.07		0.07
		GSM/GPRS/EDGE 1900	0.52		0.52
		UMTS Band II	0.23		0.23

**Table 1.9.1-4a Highest Mobile Hotspot SAR values for the same configuration**

**Note 1:** If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.

**Note 2:** If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>32(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

Antenna	Position	SAR 1g	X [mm]	Y [mm]	Z [mm]	
Antenna 1 (802.11 b)	MHS 10 mm back	0.49	-39.2	-45.6	-208.0	
Antenna 2 (UMTS band II)	MHS 10 mm back	1.30	-39.5	45.5	-208.9	
	SAR Sum	1.79				
	[SAR Sum]^1.5	2.39				
	Delta [mm]		0.3	-91.1	0.9	
	closest Distance [mm]					<b>91.10</b>
	Ratio	<b>0.03</b>				

Antenna	Position	SAR 1g	X [mm]	Y [mm]	Z [mm]	
Antenna 1 (802.11 b)	MHS 10 mm back,2100 Batt	0.49	-39.2	-42.8	-208.1	
Antenna 2 (UMTS band II)	MHS 10 mm back,2100 Batt	1.30	-39.5	45.5	-208.9	
	SAR Sum	1.79				
	[SAR Sum]^1.5	2.39				
	Delta [mm]		0.3	-88.3	0.8	
	closest Distance [mm]					<b>88.32</b>
	Ratio	<b>0.03</b>				


**Table 1.9.1-5 Mobile Hotspot configuration ratio of SAR to peak separation distance for pair of transmitters**

Antenna	Position	Highest 1 g SAR	Hotspot Coordinates mm (x, y, z)		
		SAR Zoom 1g	X [mm]	Y [mm]	Z [mm]
Antenna 1 (802.11 a)	MHS 10mm, device back	0.58	-36.0	-53.0	-208.1
Antenna 2 (UMTS Band II)	MHS 10mm, device back	1.30	-39.5	45.5	-208.9
	SAR Sum	1.88			
	SAR Sum to the power of 1.5	2.58			
	Delta [mm]		3.5	-98.5	0.8
	closest Distance [mm]				<b>98.57</b>
	Ratio	<b>0.03</b>			

**Table 1.9.1-5a Mobile Hotspot configuration ratio of SAR to peak separation distance for pair of transmitters**

**Note 3:** If the ratio of SAR to peak separation distance is  $\leq 0.04$ , Simultaneous SAR measurement is not required.



		Document		Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		<b>33(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>

## 2.0 DESCRIPTION OF THE TEST EQUIPMENT

### 2.1 SAR measurement system

SAR measurements were performed using a Dosimetric Assessment System (DASY52), an automated SAR measurement system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich, Switzerland.

The DASY 52 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software.
- An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A DAE module that performs the signal amplification, signal multiplexing, A/D conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the Electro-optical coupler (EOC).
- A unit to operate the optical surface detector that is connected to the EOC.
- The EOC performs the conversion from an optical signal into the digital electric signal of the DAE. The EOC is connected to the PC plug-in card.
- The functions of the PC plug-in card based on a DSP are to perform the time critical tasks such as signal filtering, surveillance of the robot operation fast movement interrupts.
- A computer operating Windows.
- DASY52 software version 52.8.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM Twin Phantom enabling testing left-hand and right-hand usage.
- The device holder for mobile phones.
- Tissue simulating liquid mixed according to the given recipes (see section 6.1).
- System validation dipoles allowing for the validation of proper functioning of the system.

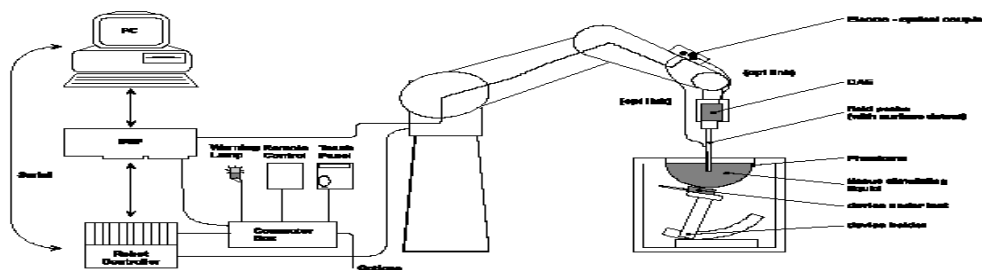




Figure 2.1-1 System Description

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>34(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

### 2.1.1 Equipment List

Manufacturer	Test Equipment	Model Number	Serial Number	Cal. Due Date (MM/DD/YY)
SCHMID & Partner Engineering AG	E-field probe	ES3DV3	3225	01/10/2014
SCHMID & Partner Engineering AG	E-field probe	EX3DV4	3592	11/14/2013
SCHMID & Partner Engineering AG	E-field probe	ET3DV6	1644	11/13/2013
SCHMID & Partner Engineering AG	Data Acquisition Electronics (DAE3)	DAE3 V1	473	01/15/2014
SCHMID & Partner Engineering AG	Data Acquisition Electronics (DAE3)	DAE3 V1	472	03/07/2013
SCHMID & Partner Engineering AG	Dipole Validation Kit	D835V2	446	01/07/2015
SCHMID & Partner Engineering AG	Dipole Validation Kit	D835V2	4d043	04/07/2013
SCHMID & Partner Engineering AG	Dipole Validation Kit	D1900V2	545	01/09/2015
SCHMID & Partner Engineering AG	Dipole Validation Kit	D1900V2	5d075	04/05/2013
SCHMID & Partner Engineering AG	Dipole Validation Kit	D2450V2	747	11/09/2013
SCHMID & Partner Engineering AG	Dipole Validation Kit	D5000V2	1033	11/15/2013
Agilent Technologies	Signal generator	8648C	4037U03155	09/23/2013
Agilent Technologies	Power meter	E4419B	GB40202821	09/23/2013
Agilent Technologies	Power sensor	8481A	MY41095417	09/26/2013
Amplifier Research	Amplifier	5S1G4M3	300986	CNR
Agilent Technologies	Power meter	N1911A	MY45100905	05/17/2013
Agilent Technologies	Power sensor	N1921A	SG45240281	06/12/2013
Agilent Technologies	Power sensor	N1921A	MY45241383	09/11/2013
Weinschel Corp	20dB Attenuator	33-20-34	BMO697	CNR
Agilent Technologies	Network analyzer	8753ES	US39174857	09/20/2013
Rohde & Schwarz	Base Station Simulator	CMU 200	109747	11/19/2013
CPI Wireless Solutions	Amplifier	VZC-6961K4	SK4310E5	CNR
Rohde & Schwarz	Signal generator	SMA 100A	102106	12/02/2013
Rohde & Schwarz	Wideband Base Station Simulator	CMW 500	109949	12/10/2014
Rohde & Schwarz	Wideband Base Station Simulator	CMW 500	101169	12/10/2014

**Table 2.1.1-1a Equipment list**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>35(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

Manufacturer	Test Equipment	Model Number	Serial Number	Cal. Due Date (MM/DD/YY)
Agilent Technologies	Power meter	N1911A	MY45100905	05/29/2015
Agilent Technologies	Power sensor	N1921A	SG45240281	12/04/2014

**Table 2.1.1-1b Equipment list for Wi-Fi Direct/GO additional testing**

Manufacturer	Test Equipment	Model Number	Serial Number	Cal. Due Date (MM/DD/YY)
SCHMID & Partner Engineering AG	E-field probe	EX3DV4	3592	11/10/2015
SCHMID & Partner Engineering AG	Data Acquisition Electronics (DAE3)	DAE3	472	03/18/2015
SCHMID & Partner Engineering AG	Dipole Validation Kit	D5000V2	1033	11/08/2015
Agilent Technologies	Signal generator	8648C	4037U03155	09/25/2015
Agilent Technologies	Power meter	E4419B	GB40202821	09/25/2015
Agilent Technologies	Power sensor	8481A	MY41095233	10/06/2015
Agilent Technologies	Power sensor	8481A	MY41095417	10/06/2015
Amplifier Research	Amplifier	5S1G4M3	300986	CNR
Rohde & Schwarz	Signal generator	SMA 100A	101540	11/28/2015
Amplifier Research	Coupler	DC7144	300993	CNR
CPI Wireless Solutions	Amplifier	VZC-6961K4	SK4310E5	CNR
Agilent Technologies	Network analyzer	8753ES	US39174857	10/24/2015
Agilent Technologies	Power meter	N1911A	MY45100905	05/29/2015
Agilent Technologies	Power sensor	N1921A	MY45241383	09/05/2015
Weinschel Corp	20dB Attenuator	33-20-34	BMO697	CNR

**Table 2.1.1-1c Equipment list for 802.11a Direct/Go and Hotspot mode**

## 2.2 Description of the test setup


Before SAR measurements are conducted, the device and the DASY equipment are setup as follows:

### 2.2.1 Device and base station simulator setup

- Power up the device.
- Turn on the base station simulator and set the radio channel and power to the appropriate values.
- Connect an antenna to the RF IN/OUT of the communication test set and place it close to the device.

### 2.2.2 DASY setup

- Turn the computer on and log on to Windows.

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>36(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

- Start the DASY software by clicking on the icon located on the Windows desktop.
- Mount the DAE unit and the probe. Turn on the DAE unit.
- Turn the Robot Controller on by turning the main power switch to the horizontal position
- Align the probe by clicking the ‘Align probe in light beam’ button.
- Open a file and configure the proper parameters - probe, medium, communications system etc.
- Establish a connection between the Device and the communications test instrument. Place the Device on the stand and adjust it under the phantom.
- Start SAR measurements.

### 3.0 ELECTRIC FIELD PROBE CALIBRATION

#### 3.1 Probe Specifications


SAR measurements were conducted using the dosimetric probes ES3DV3/ET3DV6 and EX3DV4, designed by Schmid & Partner Engineering AG for the measurement of SAR. The probe is constructed using the thin film technique, with printed resistive lines on ceramic substrates. It has a symmetrical design with triangular core, built-in optical fibre for the surface detection system and built-in shielding against static discharge. The probe is sensitive to E-fields and thus incorporates three small dipoles arranged so that the overall response is close to isotropic. The table below summarizes the technical data for the probe.

Property	Data
Frequency range	30 MHz – 3 GHz
Linearity	±0.1 dB
Directivity (rotation around probe axis)	≤ ±0.2 dB
Directivity (rotation normal to probe axis)	±0.4 dB
Dynamic Range	5 mW/kg – 100 W/kg
Probe positioning repeatability	±0.2 mm
Spatial resolution	< 0.125 mm <sup>3</sup>
<b>Probe model EX3DV4 for 2.4 – 6 GHz</b>	
Probe tip to sensor center	1.0 mm
Probe tip diameter is	2.5 mm
Probe calibration uncertainty	< 15 % for f = 2.45 to < 6.0 GHz
Probe calibration range	± 100 MHz

**Table 3.1-1 Probe specifications**

#### 3.2 Probe calibration and measurement uncertainty

The probe had been calibrated with accuracy better than ±12% . The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe were tested. The probe calibration parameters are shown on Appendix D and below:

	Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone          Model RFN81UW Rev 3</b>			Page <b>37(74)</b>
	Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013          Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18          Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>

**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.42	6.42	6.42	0.27	2.04	± 12.0 %
900	41.5	0.97	6.06	6.06	6.06	0.35	1.74	± 12.0 %
1810	40.0	1.40	5.23	5.23	5.23	0.73	1.21	± 12.0 %
1950	40.0	1.40	4.98	4.98	4.98	0.58	1.41	± 12.0 %
2450	39.2	1.80	4.50	4.50	4.50	0.79	1.26	± 12.0 %
2600	39.0	1.96	4.32	4.32	4.32	0.77	1.32	± 12.0 %

**Calibration Parameter Determined in Body Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.27	6.27	6.27	0.36	1.74	± 12.0 %
900	55.0	1.05	6.07	6.07	6.07	0.29	2.02	± 12.0 %
1810	53.3	1.52	4.92	4.92	4.92	0.50	1.57	± 12.0 %
1950	53.3	1.52	4.87	4.87	4.87	0.59	1.49	± 12.0 %
2450	52.7	1.95	4.30	4.30	4.30	0.68	1.16	± 12.0 %
2600	52.5	2.16	4.12	4.12	4.12	0.80	0.99	± 12.0 %

**Table 3.2-1 Probe ES3DV3 SN: 3225**


**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.57	6.57	6.57	0.44	2.25	± 12.0 %
900	41.5	0.97	6.24	6.24	6.24	0.38	2.52	± 12.0 %
1810	40.0	1.40	5.21	5.21	5.21	0.80	2.10	± 12.0 %
1950	40.0	1.40	5.16	5.16	5.16	0.80	2.09	± 12.0 %
2450	39.2	1.80	4.60	4.60	4.60	0.65	2.00	± 12.0 %

**Calibration Parameter Determined in Body Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.30	6.30	6.30	0.33	2.61	± 12.0 %
900	55.0	1.05	6.06	6.06	6.06	0.31	2.99	± 12.0 %
1810	53.3	1.52	4.75	4.75	4.75	0.80	2.40	± 12.0 %
1950	53.3	1.52	4.75	4.75	4.75	0.80	2.28	± 12.0 %
2450	52.7	1.95	4.11	4.11	4.11	0.50	2.15	± 12.0 %

**Table 3.2-2 Probe ET3DV6 SN: 1644**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>38(74)</b>	
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>		Test Report No <b>RTS-6026-1302-18 Rev 3</b>		FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

**Calibration Parameter Determined in Head Tissue Simulating Media**

f [MHz]	Validity [MHz] <sup>C</sup>	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
5200	± 50 / ± 100	36.0 ± 5%	4.66 ± 5%	4.50	4.50	4.50	0.45	1.90 ± 13.1%
5500	± 50 / ± 100	35.6 ± 5%	4.96 ± 5%	4.25	4.25	4.25	0.50	1.90 ± 13.1%
5800	± 50 / ± 100	35.3 ± 5%	5.27 ± 5%	3.98	3.98	3.98	0.52	1.90 ± 13.1%

**Calibration Parameter Determined in Body Tissue Simulating Media**

f [MHz]	Validity [MHz] <sup>C</sup>	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
5200	± 50 / ± 100	49.0 ± 5%	5.30 ± 5%	3.95	3.95	3.95	0.52	1.95 ± 13.1%
5500	± 50 / ± 100	48.6 ± 5%	5.65 ± 5%	3.73	3.73	3.73	0.55	1.95 ± 13.1%
5800	± 50 / ± 100	48.2 ± 5%	6.00 ± 5%	3.40	3.40	3.40	0.63	1.95 ± 13.1%

**Table 3.2-3 Probe EX3DV4 SN: 3592**

**Calibration Parameter Determined in Head Tissue Simulating Media**

f [MHz]	Validity [MHz] <sup>C</sup>	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
2600	± 50 / ± 100	39.0 ± 5%	1.96 ± 5%	7.08	7.08	7.08	0.23	1.34 ± 11.0%
5200	± 50 / ± 100	36.0 ± 5%	4.66 ± 5%	5.01	5.01	5.01	0.40	1.80 ± 13.1%
5500	± 50 / ± 100	35.6 ± 5%	4.96 ± 5%	4.63	4.63	4.63	0.50	1.80 ± 13.1%
5800	± 50 / ± 100	35.3 ± 5%	5.27 ± 5%	4.42	4.42	4.42	0.50	1.80 ± 13.1%


**Calibration Parameter Determined in Body Tissue Simulating Media**

f [MHz]	Validity [MHz] <sup>C</sup>	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
2600	± 50 / ± 100	52.5 ± 5%	2.16 ± 5%	7.12	7.12	7.12	0.67	0.71 ± 11.0%
5200	± 50 / ± 100	49.0 ± 5%	5.30 ± 5%	4.79	4.79	4.79	0.45	1.90 ± 13.1%
5500	± 50 / ± 100	48.6 ± 5%	5.65 ± 5%	4.29	4.29	4.29	0.50	1.90 ± 13.1%
5800	± 50 / ± 100	48.2 ± 5%	6.00 ± 5%	4.08	4.08	4.08	0.60	1.90 ± 13.1%

**Table 3.2-4 Probe EX3DV4 SN: 3548**

**Calibration Parameter Determined in Head Tissue Simulating Media**

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unct. (k=2)
2600	39.0	1.96	6.80	6.80	6.80	0.36	0.93	± 12.0 %
5250	35.9	4.71	4.63	4.63	4.63	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.20	4.20	4.20	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.34	4.34	4.34	0.40	1.80	± 13.1 %

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>39(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

**Calibration Parameter Determined in Body Tissue Simulating Media**


f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth (mm) <sup>G</sup>	Unct. (k=2)
2600	52.5	2.16	6.84	6.84	6.84	0.78	0.62	± 12.0 %
5250	48.9	5.36	4.06	4.06	4.06	0.45	1.90	± 13.1 %
5600	48.5	5.77	3.78	3.78	3.78	0.45	1.90	± 13.1 %
5750	48.3	5.94	3.81	3.81	3.81	0.50	1.90	± 13.1 %

**Table 3.2-5 Probe EX3DV4 SN: 3592 (cal: 11/10/2014)**

<sup>C</sup> The validity of ± 100 MHz only applies for DASY v4.4 and higher.  
DASY 52 has been used for measurements, therefore ± 100 MHz tolerance is valid.

Measured dielectric parameters are within +/- 5% of the probe calibration values and target values.  
Expanded probe calibration uncertainty (k=2) is < 15 %



		Document			Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>40(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>	

#### 4.0 SAR MEASUREMENT SYSTEM VERIFICATION


Prior to conducting SAR measurements, the system was validated using the dipole validation kit and the flat section of the SAM phantom. A power level of 1.0W was applied to the dipole antenna. The verification results are in the table below with a comparison to reference values. Printouts are shown in Appendix A. All the measured parameters are within the allowed tolerances.

At above 1.5 – 2 GHz, dipoles maintain good return loss of -15 dB to -20 dB, therefore SAR measurements are limited to approximately +/- 100 MHz of the probe/dipole calibration frequency.

#### 4.1 System accuracy verification for head adjacent use

f (MHz)	Limits / Measured (MM/DD/YYYY)	Scan Type	SAR 1 g/10 g (W/kg)	Dielectric Parameters		Liquid Temp. (°C)	
				$\epsilon_r$	$\sigma$ [S/m]		
835	Measured (12/09/2012)	Area/Fast Scan	9.44/6.40	40.1	0.89	22.5	
	Measured (12/09/2012)	Zoom Scan	9.37/6.15	40.1	0.89	22.5	
	Measured (02/04/2013)	Area/Fast Scan	9.15/6.24	40.0	0.90	22.6	
	Measured (02/04/2013)	Zoom Scan	9.20/6.05	40.0	0.90	22.6	
	Recommended Limits (Dipole: 446)			9.63/6.27	41.5	0.90	N/A
	Recommended Limits (Dipole: 4d043)			9.43/6.14	41.5	0.90	N/A
1900	Measured (11/26/2012)	Area/Fast Scan	38.8/20.5	38.9	1.36	22.6	
	Measured (11/26/2012)	Zoom Scan	38.3/20.0	38.9	1.36	22.6	
	Measured (11/30/2012)	Area/Fast Scan	39.6/21.0	39.4	1.38	22.8	
	Measured (11/30/2012)	Zoom Scan	39.3/20.5	39.4	1.38	22.8	
	Measured (12/02/2012)	Area/Fast Scan	40.2/21.3	40.8	1.40	22.7	
	Measured (12/02/2012)	Zoom Scan	40.1/20.9	40.8	1.40	22.7	
	Measured (01/24/2013)	Area/Fast Scan	38.3/20.3	38.2	1.44	22.7	
	Measured (01/24/2013)	Zoom Scan	36.9/19.6	38.2	1.44	22.7	
	Measured (01/28/2013)	Area/Fast Scan	38.2/20.4	38.3	1.38	22.9	
	Measured (01/28/2013)	Zoom Scan	36.9/19.9	38.3	1.38	22.9	
	Recommended Limits (Dipole: 545)			40.0/20.8	40.0	1.40	N/A
Recommended Limits (Dipole: 5d075)			40.4/21.0	40.0	1.40	N/A	
2450	Measured (01/18/2013)	Area/Fast Scan	53.5/25.4	37.6	1.79	22.8	
	Measured (01/18/2013)	Zoom Scan	52.6/24.6	37.6	1.79	22.8	
	Measured (01/21/2013)	Area/Fast Scan	52.1/24.7	37.4	1.76	22.5	
	Measured (01/21/2013)	Zoom Scan	50.9/24.1	37.4	1.76	22.5	
	Measured (02/27/2013)	Area/Fast Scan	50.4/22.4	37.7	1.78	20.5	
	Measured (02/27/2013)	Zoom Scan	49.6/23.2	37.7	1.78	20.5	
Recommended Limits			54.1/25.3	39.2	1.80	N/A	
5200	Measured (01/14/2013)	Zoom Scan	83.5/24.2	34.4	4.66	21.5	
	Measured (01/17/2013)	Zoom Scan	83.21/24	34.8	4.88	22.5	
	Measured (02/25/2013)	Zoom Scan	77.5/22.4	34.7	4.75	21.7	
	Recommended Limits			80.8/23.0	36.0	4.66	N/A
5500	Measured (01/14/2013)	Zoom Scan	93.9/26.7	34.2	5.10	21.5	
	Measured (01/17/2013)	Zoom Scan	86.1/24.5	34.0	4.97	22.5	
	Measured (02/25/2013)	Zoom Scan	85.8/24.5	34.6	5.13	21.7	
	Recommended Limits			87.3/24.7	35.6	4.96	N/A




		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>41(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

5800	Measured (01/10/2013)	Zoom Scan	86.1/24.4	34.7	5.52	21.1
	Measured (01/17/2013)	Zoom Scan	82/23.2	34.2	5.40	22.5
	Measured (02/25/2013)	Zoom Scan	85.8/24.4	34.0	5.45	21.7
	Recommended Limits		79.4/22.5	35.3	5.27	N/A

**Table 4.1-1 System accuracy (validation for head adjacent use)**

f (MHz)	Limits / Measured (MM/DD/YYYY)	Scan Type	SAR 1g/10g (W/kg)	Dielectric Parameters	
				$\epsilon_r$	$\sigma$ [S/m]
5200		Area Scan/Fast SAR	N/A		
	Measured (12/11/2014)	Zoom Scan	82.8/24.1	34.8	4.77
	Recommended Limits (Dipole: 1033)		79.4/22.6	36.0	4.66
5800		Area Scan/Fast SAR	N/A		
	Measured (12/11/2014)	Zoom Scan	86.2/24.7	34.3	5.42
	Recommended Limits (Dipole: 1033)		79.4/22.6	35.3	5.27

**Table 4.1-2 System accuracy (validation for head adjacent use) for 802.11a Hotspot testing**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>42(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

## 5.0 PHANTOM DESCRIPTION

The SAM Twin Phantom, manufactured by SPEAG, was used during the SAR measurements. The phantom is made of a fibreglass shell integrated with a wooden table.

The SAM Twin Phantom is a fibreglass shell phantom with 2 mm shell thickness. It has three measurement areas:

- Left side head
- Right side head
- Flat phantom

The phantom table dimensions are: 100x50x85 cm (LxWxH). The table is intended for use with freestanding robots.


The bottom shelf contains three pair of bolts for locking the device holder in place. The device holder positions are adjusted to the standard measurement positions in the three sections. Only one device holder is necessary if two phantoms are used (e.g., for different solutions).

A white cover is provided to top the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on the cover are possible; however the optical surface detector does not work properly at the cover surface. Place a sheet of white paper on the cover when using optical surface detection.

Liquid depth of  $\geq 15$  cm is maintained in the phantom for all the measurements.



**Figure 5.0-1 SAM Twin Phantom**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>43(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

## 6.0 TISSUE DIELECTRIC PROPERTIES

### 6.1 Composition of tissue simulant

The composition of the brain and muscle simulating liquids are shown in the table below.


INGREDIENT	MIXTURE 800–900MHz		MIXTURE 1800–1900MHz		MIXTURE 2450 MHz		MIXTURE 5 – 6 GHz	
	Brain %	Muscle %	Brain %	Muscle %	Brain %	Muscle %	Brain %	Muscle %
Water	40.29	65.45	55.24	69.91	55.0	68.75	64	64-78
Sugar	57.90	34.31	0	0	0	0	0	0
Salt	1.38	0.62	0.31	0.13	0	0	0	0
HEC	0.24	0	0	0	0	0	0	0
Bactericide	0.18	0.10	0	0	0	0	0	0
DGBE	0	0	44.45	29.96	40.0	31.25	0	0
Triton X-100	0	0	0	0	5.0	0	0	0
Additives and Salt	0	0	0	0	0	0	3	2-3
Emulsifiers	0	0	0	0	0	0	15	9-15
Mineral Oil	0	0	0	0	0	0	18	11-18

Table 6.1-1 Tissue simulant recipe

#### 6.1.1 Equipment

Manufacturer	Test Equipment	Model Number	Serial Number	Cal. Due Date (MM/DD/YY)
Pyrex, England	Graduated Cylinder	N/A	N/A	N/A
Pyrex, USA	Beaker	N/A	N/A	N/A
Acculab	Weight Scale	V1-1200	018WB2003	N/A
IKA Works Inc.	Hot Plate	RC Basic	3.107433	N/A
Dell	PC using GPIB card	GX110	347	N/A
Agilent Technologies	Dielectric probe kit	HP 85070C	US9936135	CNR
Agilent Technologies	Network Analyzer	8753ES	US39174857	09/20/2013
Control Company	Digital Thermometer	23609-234	21352860	09/26/2013

Table 6.1.1-1 Tissue simulant preparation equipment

		Document		Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		<b>44(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>

Manufacturer	Test Equipment	Model Number	Serial Number	Cal. Due Date (MM/DD/YY)
Pyrex, England	Graduated Cylinder	N/A	N/A	N/A
Pyrex, USA	Beaker	N/A	N/A	N/A
Acculab	Weight Scale	V1-1200	018WB2003	N/A
IKA Works Inc.	Hot Plate	RC Basic	3.107433	N/A
Dell	PC using GPIB card	GX110	347	N/A
Agilent Technologies	Dielectric probe kit	HP 85070C	US9936135	CNR
Agilent Technologies	Network Analyzer	8753ES	US39174857	10/24/2015
Control Company	Digital Thermometer	23609-234	21352860	09/22/2015
Control Company	Digital Thermometer	15-077-21	51129471	06/11/2015

**Table 6.1.1-2 Tissue simulant preparation equipment used for 802.11a Direct/GO and Hotspot mode**

## 6.1.2 Preparation procedure

### 800-900 MHz liquids

- Fill the container with **water**. Begin heating and stirring.
- Add the **Cellulose**, the **preservative substance** and the **salt**. After several hours, the liquid will become more transparent again. The container must be covered to prevent evaporation.
- Add **Sugar**. Stir it well until the sugar is sufficiently dissolved.
- Keep the liquid hot but below the boiling point for at least an hour. The container must be covered to prevent evaporation.
- Remove the container from, and turn the hotplate off and allow the liquid to cool off to room temperature prior to performing dielectric measurements.

### 1800-2450 MHz liquid


- Fill the container with water and place it on hotplate. Begin heating and stirring.
- Add the salt, Glycol/Triton X-100. The container must be covered to prevent evaporation.
- Keep the liquid hot enough to dissolve sugar for at least an hour. The container must be covered to prevent evaporation.
- Remove the container from, and turn the hotplate off and allow the liquid to cool off to room temperature prior to performing dielectric measurements.

## 6.2 Electrical parameters of the tissue simulating liquid


The tissue dielectric parameters shall be measured before a batch can be used for SAR measurements to ensure that the simulated tissue was properly made and will simulate the desired human characteristic. Limits and measured electrical parameters are shown in the table below.

Recommended limits are adopted from IEEE P1528-2003:


“Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, DASYS manual and from FCC Tissue Dielectric Properties web page at <http://www.fcc.gov/fcc-bin/dielec.sh>

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>45(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

Band (MHz)	Tissue Type	Limits / Measured (MM/DD/YYYY)	f (MHz)	Dielectric Parameters		Liquid Temp (°C)
				$\epsilon_r$	$\sigma$ [S/m]	
835	Head	Measured (12/09/2012)	815	40.4	0.87	22.5
			825	40.3	0.88	
			835	40.1	0.89	
			850	40.0	0.90	
		Measured (02/04/2013)	815	40.3	0.88	22.6
			825	40.2	0.89	
			835	40.0	0.90	
			850	39.8	0.91	
	Recommended Limits	835	41.5	0.90	N/A	
	Muscle	Measured (12/09/2012)	815	54.6	0.95	22.5
			825	54.5	0.96	
			835	54.4	0.97	
			850	54.2	0.98	
		Measured (02/04/2013)	815	53.3	0.96	22.6
825			53.2	0.97		
835			53.0	0.98		
Recommended Limits		835	55.2	0.97	N/A	
1900	Head	Measured (11/26/2012)	1850	39.1	1.33	22.6
			1900	38.9	1.36	
			1910	38.8	1.37	
			1980	38.8	1.46	
		Measured (11/28/2012)	1850	38.7	1.34	22.6
			1900	38.5	1.39	
			1910	38.4	1.40	
			1980	38.1	1.47	
		Measured (11/30/2012)	1850	39.6	1.33	22.8
			1900	39.4	1.38	
			1910	39.4	1.39	
			1980	39.2	1.46	
		Measured (12/02/2012)	1850	41.2	1.36	22.7
			1900	40.8	1.40	
			1910	40.8	1.41	
			1980	40.5	1.46	
		Measured (01/24/2013)	1850	38.8	1.34	20.4
			1900	38.6	1.39	
			1910	38.6	1.40	
			1980	38.4	1.48	
		Measured (01/24/2013)	1850	38.3	1.40	22.7
			1900	38.2	1.44	
			1910	38.1	1.45	


		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>46(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

	Muscle	Measured (01/28/2013)	1850	38.5	1.33	22.5
			1900	38.3	1.38	
			1910	38.3	1.39	
			1980	38.0	1.47	
		Recommended Limits	1900	40.0	1.40	N/A
		Measured (11/26/2012)	1850	50.9	1.47	22.6
			1900	50.7	1.51	
			1910	50.6	1.53	
	1850		51.2	1.51		
	Measured (11/28/2012)	1900	50.9	1.57	22.6	
		1910	50.9	1.58		
		1850	51.3	1.49		
		1900	51.2	1.55		
	Measured (11/30/2012)	1910	51.2	1.56	22.8	
1850		52.4	1.45			
1900		52.0	1.51			
1910		51.9	1.53			
Recommended Limits	1900	53.3	1.52	N/A		
2450	Head	Measured (01/18/13)	2410	37.8	1.75	22.8
			2450	37.6	1.79	
			2480	37.6	1.82	
		Measured (01/21/13)	2410	37.5	1.72	22.5
			2450	37.4	1.76	
			2480	37.2	1.79	
	Measured (02/27/2013)	2410	37.8	1.74	20.5	
		2450	37.7	1.78		
		2480	37.6	1.82		
	Recommended Limits	2450	39.2	1.80	N/A	
	Muscle	Measured (01/18/13)	2410	51.3	1.91	22.8
			2450	51.2	1.96	
			2480	51.1	2.00	
		Measured (01/21/13)	2410	51.2	1.85	22.5
			2450	51.1	1.91	
			2480	51.0	1.95	
	Measured (02/27/2013)	2410	50.3	1.89	20.5	
		2450	50.2	1.94		
2480		50.1	1.98			
Recommended Limits	2450	52.7	1.95	N/A		
5200	Head	Measured (01/14/13)	5180	34.4	4.65	21.5
			5200	34.4	4.66	
			5280	34.2	4.77	
		Measured (01/17/13)	5180	34.8	4.87	22.5
			5200	34.8	4.88	
			5280	34.6	4.99	
	Measured (02/25/2013)	5180	34.7	4.72	21.7	
		5200	34.7	4.75		
		5280	34.4	4.83		

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>47(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

	Muscle	Recommended Limits	5200	36.0	4.66	N/A	
		Measured (01/14/13)	5180	46.8	5.06	21.5	
			5200	46.7	5.09		
			5280	46.6	5.19		
		Measured (01/17/13)	5180	46.9	5.17	22.5	
			5200	46.9	5.19		
			5280	46.8	5.32		
		Measured (02/25/2013)	5180	47.0	5.12	22.1	
			5200	47.0	5.14		
			5320	46.7	5.32		
		Recommended Limits	5200	49.0	5.30	N/A	
5500	Head	Measured (01/14/13)	5500	34.2	5.10	21.5	
			5620	33.9	5.25		
		Measured (01/17/13)	5500	34.0	4.97	22.5	
			5620	33.8	5.10		
		Measured (02/25/2013)	5500	34.6	5.13	21.7	
	5620		34.3	5.27			
			Recommended Limits	5500	35.6	4.96	N/A
	Muscle	Measured (01/14/13)	5500	46.4	5.54	21.5	
			5620	46.2	5.72		
		Measured (01/17/13)	5500	46.4	5.37	22.5	
			5620	46.2	5.53		
		Measured (02/25/2013)	5500	47.9	5.64	22.1	
			5620	47.7	5.81		
				Recommended Limits	5500	48.6	5.65
5800	Head	Measured (01/10/13)	5745	34.9	5.43	21.1	
			5800	34.7	5.52		
		Measured (01/17/13)	5745	34.5	5.40	22.5	
			5800	34.2	5.48		
		Measured (02/25/2013)	5745	34.0	5.33	21.7	
	5800		34.0	5.45			
			Recommended Limits	5800	35.3	5.27	N/A
	Muscle	Measured (01/10/13)	5745	46.0	5.98	21.0	
			5800	45.9	6.06		
		Measured (01/17/13)	5745	46.6	5.80	22.5	
			5800	46.4	5.90		
		Measured (02/25/2013)	5745	45.8	5.72	22.1	
			5800	45.8	5.85		
			Recommended Limits	5800	48.2	6.00	N/A


**Table 6.2-1 Electrical parameters of tissue simulating liquid**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>48(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

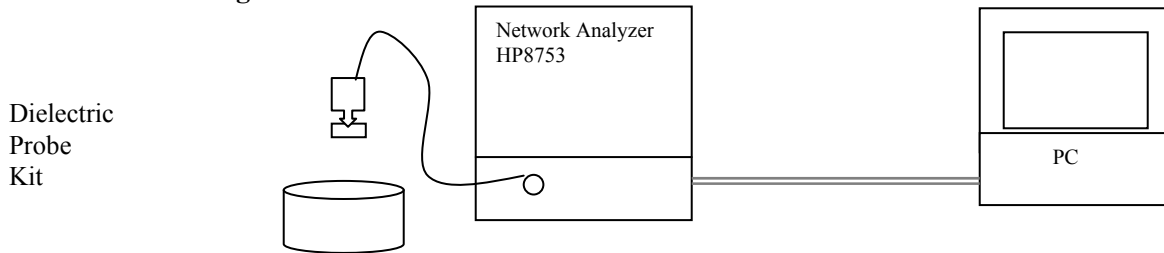
Band (MHz)	Tissue Type	Limits / Measured (MM/DD/YYYY)	f (MHz)	Dielectric Parameters		Liquid Temp (°C)
				$\epsilon_r$	$\sigma$ [S/m]	
5200	Head	Measured (12/11/2014)	5180	34.9	4.75	22.4
			5200	34.8	4.77	
			5280	34.6	4.85	
	Muscle	Measured (12/11/2014)	5180	45.7	5.56	22.4
			5200	45.7	5.59	
			5280	45.5	5.70	
		Recommended Limits	5200	36.0	4.66	N/A
		Recommended Limits	5200	49.0	5.30	N/A
5800	Head	Measured (12/11/2014)	5745	34.4	5.36	22.4
			5800	34.3	5.42	
			Recommended Limits	5800	35.3	
	Muscle	Measured (12/11/2014)	5745	44.4	6.40	22.4
			5800	44.3	6.49	
			Recommended Limits	5800	48.2	

**Table 6.2-2 Electrical parameters of tissue simulating liquid**



		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>49(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>


## 6.2.2 Test Configuration



**Figure 6.2.2-1 Test configuration**

## 6.2.3 Procedure

1. Turn NWA on and allow at least 30 minutes for warm up.
2. Mount dielectric probe kit so that interconnecting cable to NWA will not be moved during measurements or calibration.
3. Pour de-ionized water and measure water temperature ( $\pm 1^\circ$ ).
4. Set water temperature in HP-Software (Calibration Setup).
5. Perform calibration.
6. Relative permittivity  $\epsilon_r = \epsilon'$  and conductivity can be calculated from  $\epsilon''$  ( $\sigma = \omega \epsilon_0 \epsilon''$ )
7. Measure liquid shortly after calibration.
8. Stir the liquid to be measured. Take a sample (~50ml) with a syringe from the center of the liquid container.
9. Pour the liquid into a small glass flask. Hold the syringe at the bottom of the flask to avoid air bubbles.
10. Put the dielectric probe in the glass flask. Check that there are no air bubbles in front of the opening in the dielectric probe kit.
11. Perform measurements.
12. Adjust medium parameters in DASY software for the frequencies necessary for the measurements ('Setup Config', select medium (e.g. Head 835 MHz) and press 'Option'-button.
13. Select the current medium for the frequency of the validation (e.g. Setup Medium Brain 835 MHz).

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>50(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

## 7.0 SAR SAFETY LIMITS

<b>Standards/Guideline</b>	<b>Localized SAR Limit (W/kg) General public (uncontrolled)</b>	<b>Localized SAR Limits (W/kg) Workers (controlled)</b>
ICNIRP Standard	2.0 (10g)	10.0 (10g)
IEEE C95.1 Standard	1.6 (1g)	8.0 (1g)


**Table 7.0-1 SAR safety limits for Controlled / Uncontrolled environment**

<b>Human Exposure</b>	<b>Localized SAR Limits (W/kg) 10g, ICNIRP Standard</b>	<b>Localized SAR Limits (W/kg) 1g, IEEE C95.1 Standard</b>
Spatial Average (averaged over the whole body)	0.08	0.08
Spatial Peak (averaged over any X g of tissue)	2.00	1.60
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.00	4.00 (10g)

**Table 7.0-2 SAR safety limits**

**Uncontrolled Environments** are defined as locations where there is exposure of individuals who have no knowledge or control of their exposure.

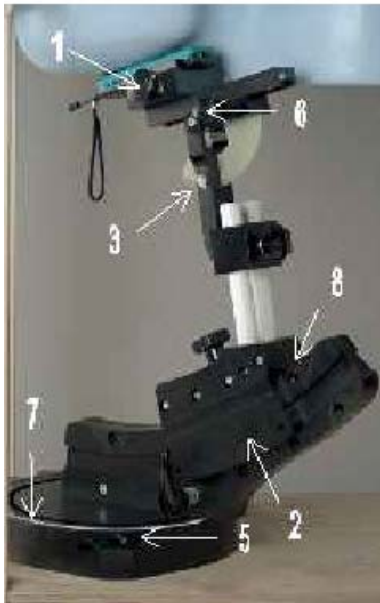
**Controlled Environments** are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

		Document		Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		<b>51(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>

## 8.0 DEVICE POSITIONING


### 8.1 Device holder for SAM Twin Phantom

The Device was positioned for all test configurations using the DASY5 holder. The device holder facilitates the rotation of the mounted transmitter in spherical coordinates whereby the rotation point is the ear opening. The devices can be easily, accurately and with repeatability positioned according to FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).



**Figure 8.1-1 Device Holder**

1. Put the phone in the clamp mechanism (1) and hold it straight while tightening. (Curved phones or phones with asymmetrical ear pieces should be positioned so that the earpiece is in the symmetry plane of the clamp).
2. Adjust the sliding carriage (2) to 90°. Then adjust the phone holder angle (3) until the reference line of the phone is horizontal (parallel to the flat phantom bottom). The phone reference line is defined as the front tangential line between the earpiece and the center of the device bottom (or the center of the flip hinge). For devices with parallel front and backsides, the phone holder angle (3) is 0°.
3. Place the device holder at the desired phantom section and move it securely against the positioning pins (4). The screw in front of the turning plate can be applied for correct positioning (5). (Do not tighten it too strongly).
4. Shift the phone clamp (6) so that the earpiece is exactly below the ear marking of the phantom. The phone is now correctly positioned in the holder for all standard phantom measurements, even after changing the phantom or phantom section.
5. Adjust the device position angles to the desired measurement position.
6. After fixing the device angles, move the phone fixture up until the phone touches the ear marking. (The point of contact depends on the design of the device and the positioning angle).

		Document		Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		<b>52(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>

## 8.2 Description of the test positioning

### 8.2.1 Test Positions of Device Relative to Head

The handset was tested in two test positions against the head phantom, the “cheek” position and the “tilted” position, on both left and right sides of the phantom.

The handset was tested in the above positions according to IEEE 1528- 2003 “Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques”.

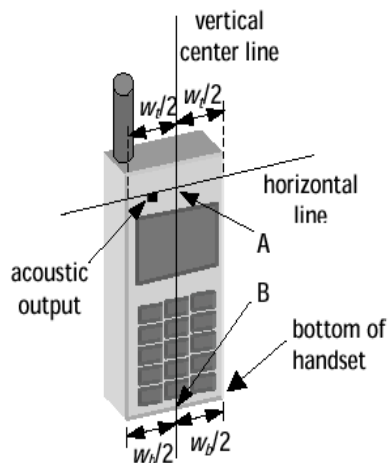


Figure 8.2.1-1 Handset vertical and horizontal reference lines – fixed case

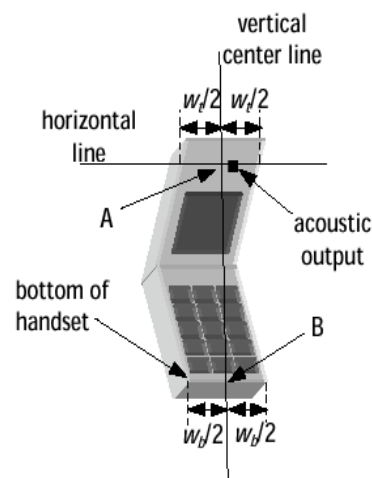

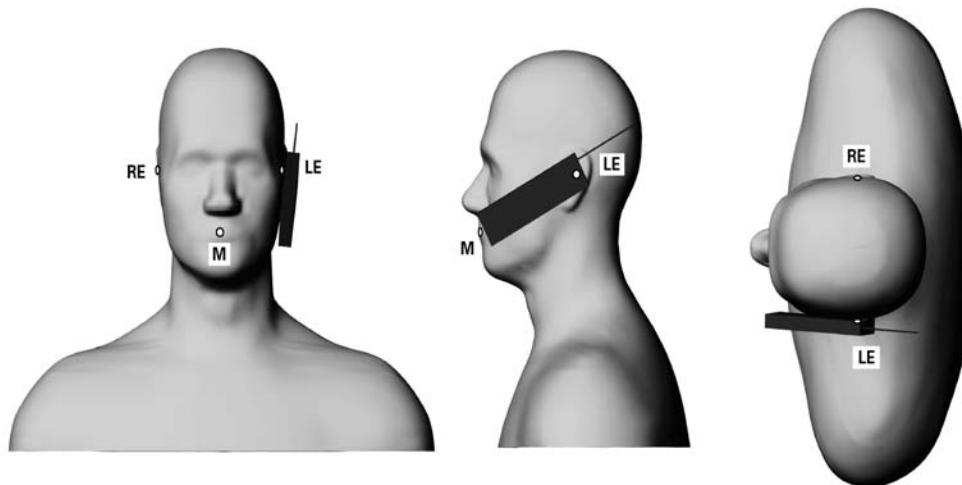


Figure 8.2.1-2 Handset vertical and horizontal reference lines – “clam-shell”


		Document		Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		<b>53(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>

### Definition of the “cheek” position

- 1) Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece, open the cover.
- 2) Define two imaginary lines on the handset: the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset: the midpoint of the width  $w_t$  of the handset at the level of the acoustic output (point A on Figures 8.2.1-1 and 8.2.1-2), and the midpoint of the width  $w_b$  of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 8.2.1-1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output. However, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 8.2.1-2), especially for clamshell handsets, handsets with flip pieces, and other irregularly shaped handsets.
- 3) Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 8.2.1-3), such that the plane defined by the vertical center line and the horizontal center line is in a plane approximately parallel to the sagittal plane of the phantom.
- 4) Translate the handset towards the phantom along the line passing through RE and LE until the handset touches the ear.
- 5) While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is the plane normal to MB (“mouth-back”) - NF (“neck-front”) including the line MB (reference plane).
- 6) Rotate the phone around the vertical centerline until the phone (horizontal line) is symmetrical with respect to the line NF.
- 7) While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, rotate the handset about the line NF until any point on the handset is in contact with a phantom point below the ear (cheek).

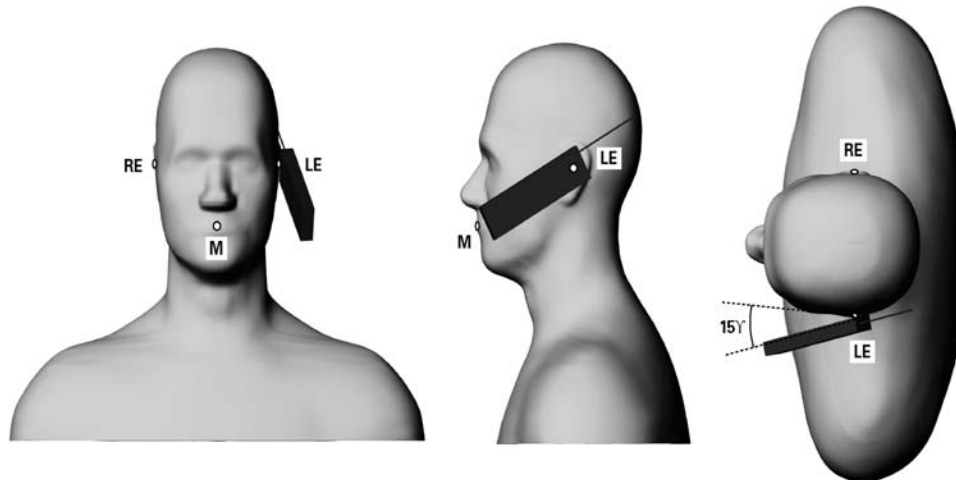


**Figure 8.2.1-3 Phone position 1, “cheek” or “touch” position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated. The shoulders are shown for illustration purposes only.**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>54(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

### Definition of the “Tilted” Position

- 1) Repeat steps 1 to 7 from above.
- 2) While maintaining the device in the reference plane (described above) and pivoting against the ear, move the device outward away from the mouth by an angle of 15 degrees, or until the antenna touches the phantom.



**Figure 8.2.1-4 Phone position 2, “tilted position.”** The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated. The shoulders are shown for illustration purposes only.

### 8.2.2 Body-worn Configuration

Body-worn holsters, as shown on Figure 1.4-1, have been test with the device for RF exposure compliance. The device was positioned in each holster case and the belt clip was placed against the flat section of the phantom. A headset was then connected to the device to simulate hands-free operation in a body worn holster configuration.


In addition, device was tested with 15 mm BB recommended separation distance to allow typical after-market holster to be used. BB body-worn holsters with belt-clip have been designed to maintain ~ 19-20 mm separation distance from body.

### 8.2.3 Limb/Hand Configuration

BlackBerry device is not a limb-worn device and hasn't been tested for such a configuration.

As per Clause 6.1.4.9 in the IEC/EN 62209-2 standard:

"Additional studies remain needed for devising a representative method for evaluating SAR in the hand of hand-held devices. Future versions of this standard are intended to contain a test method based on scientific data and rationale. Annex J presents the currently available test procedure."

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>55(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

Clause J.2 of the IEC/EN 62209-2 states that testing for compliance for the exposure of the hand is not applicable for devices that are intended to being hand-held to enable use at the ear (see EN 62209-1) or worn on the body when transmitting.

In addition, BlackBerry device is not intended to be held in hand at a distance of larger than 200 mm from the head and body during normal use.

## 9.0 HIGH LEVEL EVALUATION

### 9.1 Maximum search

The maximum search is automatically performed after each coarse scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the coarse scan measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations.

### 9.2 Extrapolation

The extrapolation can be used in z-axis scans with automatic surface detection. The SAR values can be extrapolated to the inner phantom surface. The extrapolation distance is the sum of the probe sensor offset, the surface detection distance and the grid offset. The extrapolation is based on fourth order polynomial functions. The extrapolation is only available for SAR values.

### 9.3 Boundary correction


The correction of the probe boundary effect in the vicinity of the phantom surface is done in the standard (worst case) evaluation; the boundary effect is reduced by different weights for the lowest measured points in the extrapolation routine. The result is a slight overestimation of the extrapolated SAR values (2% to 8%) depending on the SAR distribution and gradient. The advanced evaluation makes a full compensation of the boundary effect before doing the extrapolation. This is only possible for probes with specifications on the boundary effect.

### 9.4 Peak search for 1g and 10g cube averaged SAR

The 1g and 10g peak evaluations are only available for the predefined cube 5x5x7 / 7x7x9 scan. The routines are verified and optimized for the grid dimensions used in these cube measurements.

The measured volume of 30x30x30mm / 22x22x22 with 7.5 / 5 / 4.0 mm resolution in (x,y) and 5mm / 2mm resolution in z axis amounts to 175 / 693 measurement points. The first procedure is an extrapolation (incl. Boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume in a 1mm grid. In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is then moved around until the highest averaged SAR is found. This last procedure is repeated for a 10 g cube. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.



		Document			Page	
		SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3			56(74)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW		


## 10.0 MEASUREMENT UNCERTAINTY

DASY5 Uncertainty Budget According to IEEE 1528/2003 [1]								
Error Description	Uncert. value	Prob. Dist.	Div.	( $c_i$ ) 1g	( $c_i$ ) 10g	Std. Unc. (1g)	Std. Unc. (10g)	( $v_i$ ) $v_{eff}$
<b>Measurement System</b>								
Probe Calibration	±5.5 %	N	1	1	1	±5.5 %	±5.5 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	$\sqrt{3}$	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
<b>Test Sample Related</b>								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
<b>Phantom and Setup</b>								
Phantom Uncertainty	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Liquid Conductivity (target)	±5.0 %	R	$\sqrt{3}$	0.64	0.43	±1.8 %	±1.2 %	∞
Liquid Conductivity (meas.)	±2.5 %	N	1	0.64	0.43	±1.6 %	±1.1 %	∞
Liquid Permittivity (target)	±5.0 %	R	$\sqrt{3}$	0.6	0.49	±1.7 %	±1.4 %	∞
Liquid Permittivity (meas.)	±2.5 %	N	1	0.6	0.49	±1.5 %	±1.2 %	∞
Combined Std. Uncertainty						±10.7 %	±10.5 %	387
Expanded STD Uncertainty						±21.4 %	±21.0 %	

**Table 10.0-1 Worst-Case uncertainty budget for DASY52 assessed according to IEEE P1528.  
Source: Schmid & Partner Engineering AG.**

[1] The budget is valid for the frequency range 300MHz - 3 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerably smaller.




		Document			Page	
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>57(74)</b>	
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
Andrew Becker	Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW		

<b>Relative DASY5 Uncertainty Budget for Fast SAR Tests</b> According to IEEE 1528/2011 and IEC 62209-1/2011 (0.3 - 3 GHz range)								
Error Description	Uncert. value	Prob. Dist.	Div.	( $c_i$ ) 1g	( $c_i$ ) 10g	Std. Unc. (1g)	Std. Unc. (10g)	( $v_i$ ) $v_{eff}$
<b>Measurement System</b>								
Probe Calibration	±6.0 %	N	1	0	0			
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	$\infty$
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	$\infty$
Boundary Effects	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	$\infty$
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	$\infty$
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	$\infty$
Modulation Response	±2.4 %	R	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	$\infty$
Readout Electronics	±0.3 %	N	1	0	0			
Response Time	±0.8 %	R	$\sqrt{3}$	0	0			
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	$\infty$
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	$\infty$
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	0	0			
Probe Positioner	±0.4 %	R	$\sqrt{3}$	1	1	±0.2 %	±0.2 %	$\infty$
Probe Positioning	±2.9 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	$\infty$
Spatial x-y-Resolution	±10.0 %	R	$\sqrt{3}$	1	1	±5.8 %	±5.8 %	$\infty$
Fast SAR z-Approximation	±7.0 %	R	$\sqrt{3}$	1	1	±4.0 %	±4.0 %	$\infty$
<b>Test Sample Related</b>								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	$\infty$
Power Scaling	±0 %	R	$\sqrt{3}$	0	0			
<b>Phantom and Setup</b>								
Phantom Uncertainty	±6.1 %	R	$\sqrt{3}$	1	1	±3.5 %	±3.5 %	$\infty$
SAR correction	±1.9 %	R	$\sqrt{3}$	0	0			
Liquid Conductivity (mea.)	±2.5 %	R	$\sqrt{3}$	0	0			
Liquid Permittivity (mea.)	±2.5 %	R	$\sqrt{3}$	0	0			
Temp. unc. - Conductivity	±3.4 %	R	$\sqrt{3}$	0	0			
Temp. unc. - Permittivity	±0.4 %	R	$\sqrt{3}$	0	0			
Combined Std. Uncertainty						±11.4 %	±11.4 %	748
Expanded STD Uncertainty						±22.7 %	±22.7 %	


**Table 10.0-2 Worst-Case uncertainty budget for DASY5 assessed according to IEEE P1528/2011 and IEC 62209-1/2011**

**Source: Schmid & Partner Engineering AG.**

	Document			Page	
	SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3			58(74)	
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
Andrew Becker	Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014	RTS-6026-1302-18 Rev 3	L6ARFN80UW	2503A-RFN80UW	

DASY5 Uncertainty Budget for the 3 - 6 GHz range								
Error Description	Uncert. value	Prob. Dist.	Div.	(c <sub>1</sub> ) 1g	(c <sub>1</sub> ) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v <sub>1</sub> ) v <sub>eff</sub>
<b>Measurement System</b>								
Probe Calibration	±6.55 %	N	1	1	1	±6.55 %	±6.55 %	∞
Axial Isotropy	±4.7 %	R	√3	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	√3	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±2.0 %	R	√3	1	1	±1.2 %	±1.2 %	∞
Linearity	±4.7 %	R	√3	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	√3	1	1	±0.6 %	±0.6 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	√3	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	√3	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	√3	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	√3	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.8 %	R	√3	1	1	±0.5 %	±0.5 %	∞
Probe Positioning	±9.9 %	R	√3	1	1	±5.7 %	±5.7 %	∞
Max. SAR Eval.	±4.0 %	R	√3	1	1	±2.3 %	±2.3 %	∞
<b>Test Sample Related</b>								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	√3	1	1	±2.9 %	±2.9 %	∞
<b>Phantom and Setup</b>								
Phantom Uncertainty	±4.0 %	R	√3	1	1	±2.3 %	±2.3 %	∞
Liquid Conductivity (target)	±5.0 %	R	√3	0.64	0.43	±1.8 %	±1.2 %	∞
Liquid Conductivity (meas.)	±2.5 %	N	1	0.64	0.43	±1.6 %	±1.1 %	∞
Liquid Permittivity (target)	±5.0 %	R	√3	0.6	0.49	±1.7 %	±1.4 %	∞
Liquid Permittivity (meas.)	±2.5 %	N	1	0.6	0.49	±1.5 %	±1.2 %	∞
Combined Std. Uncertainty						±12.8 %	±12.6 %	330
Expanded STD Uncertainty						±25.6 %	±25.2 %	

Table 10.0-3 Worst-Case uncertainty budget for DASY52 assessed according to IEEE P1528.  
Source: Schmid & Partner Engineering AG.

		Document			Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>59(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>	

## 11.0 TEST RESULTS

### 11.1 SAR Measurement results at highest power measured against the head

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	2-slots GSM/EDGE 850 MHz	824.2	128	30.1	0.54	-0.14	0.54
		836.8	190				
		848.8	251				
Right Head 15° Tilt	2-slots GSM/EDGE 850 MHz	824.2	128	30.1	0.44	0.40	0.44
		836.8	190				
		848.8	251				
Right Head Cheek	1-slot GSM 850 MHz	824.2	128	31.9	0.49	0.03	0.49
		836.8	190				
		848.8	251				
Left Head Cheek	2-slots GSM/EDGE 850 MHz	824.2	128	30.5	0.75	-0.12	0.75
		836.8	190				
		848.8	251				
Left Head Cheek	3-slots GSM/EDGE 850 MHz	824.2	128	29.3	0.76	-0.17	0.76
		836.8	190				
		848.8	251				
Left Head Cheek	4-slots GSM/EDGE 850 MHz	824.2	128	27.5	0.69	-0.10	0.69
		836.8	190				
		848.8	251				
Left Head 15° Tilt	2-slots GSM/EDGE 850 MHz	824.2	128	30.1	0.43	-0.04	0.43
		836.8	190				
		848.8	251				
Left Head Cheek	1-slot GSM 850 MHz	824.2	128	31.9	0.66	0.11	0.66
		836.8	190				
		848.8	251				

**Table 11.1-1a SAR results for GSM/DTM 850 head configuration**


**Note 1:** If the power drift is  $\leq -0.200$  dB, the extrapolated SAR is calculated using the formula:

$$\text{Extrapolated SAR} = (\text{Measured SAR}) * 10^{(|\text{Power Drift (dB)}| / 10)}$$

**Note 2:** Only Middle channel was tested when 1g Average SAR < 0.8 W/Kg or 3dB lower than the limit.

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Left Head Cheek	2-slots GSM/EDGE 850 MHz	824.2	128	30.1	0.72	-0.14	0.72
		836.8	190				
		848.8	251				

**Table 11.1-1b SAR results for GSM/DTM 850 head configuration  
2100mA Battery**


		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>60(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Scan Type	SAR, averaged over 1 g		
						Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	WCDMA FDD V 850 MHz	826.4	4132					
		836.4	4182	24.4		0.63	0.01	0.63
		846.6	4233					
Right Head 15° Tilt	WCDMA FDD V 850 MHz	826.4	4132					
		836.4	4182	24.4		0.45	-0.07	0.45
		846.6	4233					
Left Head Cheek	WCDMA FDD V 850 MHz	826.4	4132	24.6		0.78	-0.13	0.78
		836.4	4182	24.4		0.83	-0.13	0.83
		846.6	4233	24.3		0.90	0.00	0.90
		846.6	4233	24.3	2 <sup>nd</sup> Scan	0.85	-0.03	0.85
Left Head 15° Tilt	WCDMA FDD V 850 MHz	826.4	4132					
		836.4	4182	24.4		0.40	0.04	0.40
		846.6	4233					

**Table 11.1-2a SAR results for WCDMA FDD V head configuration**

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Left Head Cheek	WCDMA FDD V 850 MHz	826.4	4132				
		836.4	4182				
		846.6	4233	24.3	0.84	-0.01	0.84

**Table 11.1-2b SAR results for WCDMA FDD V head configuration  
2100mA Battery**


		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>61(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Scan Type	SAR, averaged over 1 g		
						Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	2-slots GSM/EDGE 1900 MHz	1850.2	512					
		1880.0	661	29.1		0.59	0.09	0.59
		1909.8	810					
Right Head 15° Tilt	2-slots GSM/EDGE 1900 MHz	1850.2	512					
		1880.0	661	29.1		0.42	-0.01	0.42
		1909.8	810					
Right Head Cheek	1-slot GSM 1900 MHz	1850.2	512					
		1880.0	661	29.2		0.37	-0.11	0.37
		1909.8	810					
Left Head Cheek	2-slots GSM/EDGE 1900 MHz	1850.2	512	29.2		0.93	-0.06	0.93
		1850.2	512	29.2	2 <sup>nd</sup> Scan	0.91	0.17	0.91
		1880.0	661	29.1		0.83	-0.06	0.83
		1909.8	810	29.0		0.69	-0.08	0.69
Left Head Cheek	3-slots GSM/EDGE 1900 MHz	1850.2	512	26.6		0.70	-0.06	0.70
		1880.0	661	26.6				
		1909.8	810	26.4				
Left Head Cheek	4-slots GSM/EDGE 1900 MHz	1850.2	512	26.0		0.77	-0.09	0.77
		1880.0	661					
		1909.8	810					
Left Head 15° Tilt	2-slots GSM/EDGE 1900 MHz	1850.2	512					
		1880.0	661	29.1		0.45	0.05	0.45
		1909.8	810					
Left Head Cheek	1-slot GSM 1900 MHz	1850.2	512					
		1880.0	661	29.2		0.54	0.20	0.54
		1909.8	810					

**Table 11.1-3a SAR results for GSM/DTM 1900 head configuration**

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Left Head Cheek	2-slots GSM/EDGE 1900 MHz	1850.2	512	29.2	0.94	-0.03	0.94
		1880.0	661				
		1909.8	810				

**Table 11.1-3b SAR results for GSM/DTM 1900 head configuration  
2100mA Battery**


		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>62(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Scan Type	SAR, averaged over 1 g		
						Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	WCDMA FDD II 1900 MHz	1852.4	9262					
		1880.0	9400	23.0		0.58	0.05	0.58
		1907.6	9538					
Right Head 15° Tilt	WCDMA FDD II 1900 MHz	1852.4	9262					
		1880.0	9400	23.0		0.44	0.00	0.44
		1907.6	9538					
Left Head Cheek	WCDMA FDD II 1900 MHz	1852.4	9262	23.1		0.87	0.08	0.87
		1880.0	9400	23.0		0.96	0.02	0.96
		1907.6	9538	23.0		<b>1.09</b>	-0.07	<b>1.09</b>
		1907.6	9538	23.0	2 <sup>nd</sup> Scan	1.02	0.04	1.02
Left Head 15° Tilt	WCDMA FDD II 1900 MHz	1852.4	9262					
		1880.0	9400	23.0		0.45	0.07	0.45
		1907.6	9538					

**Table 11.1-4a SAR results for WCDMA FDD II head configuration**

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Left Head Cheek	WCDMA FDD II 1900 MHz	1852.4	9262				
		1880.0	9400				
		1907.6	9538	23.0	1.08	-0.12	1.08

**Table 11.1-4b SAR results for WCDMA FDD II head configuration  
2100mA Battery**

		Document			Page	
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>63(74)</b>	
Author Data	Dates of Test	Test Report No		FCC ID:	IC	
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>		<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>	

Test Position	Mode	f (MHz)	Channel	Volume Scan	Cond. Output Power (dBm)	Measured SAR (W/kg)		
						Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
Right Head Cheek	802.11 b 2450 MHz	2412	1					
		2437	6		20.4	-0.04	0.40	0.19
		2462	11					
Right Head 15° Tilt	802.11 b 2450 MHz	2412	1					
		2437	6		20.4	-0.06	0.40	0.19
		2462	11					
Left Head Cheek	802.11 b 2450 MHz	2412	1					
		2437	6		20.4	0.08	0.19	0.11
		2462	11					
Left Head 15° Tilt	802.11 b 2450 MHz	2412	1					
		2437	6		20.4	0.07	0.22	0.12
		2462	11					


**Table 11.1-5a SAR results for WiFi/WLAN/802.11b head configuration (Rev3-01/03)**

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	SAR, averaged over 1 g		
					Power Drift (dB)	Average d over 1 g	Averaged over 10 g
Right Head Cheek	802.11 b 2450 MHz	2412	1				
		2437	6	20.4	0.06	0.39	0.19
		2462	11				

**Table 11.1-5b SAR results for WiFi/WLAN/802.11b head configuration  
2100mA Battery (Rev3-01/03)**

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
Right Head Cheek	802.11 b 2450 MHz	2412	1				
		2437	6	17.8	0.45	0.12	0.06
		2462	11				

**Table 11.1-5c SAR results for WiFi/WLAN/802.11b head configuration (Rev3-02)**

		Document			Page	
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>64(74)</b>	
Author Data	Dates of Test	Test Report No		FCC ID:	IC	
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>		<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>	


Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
Right Head Cheek	Bluetooth 2450 MHz	2402	0				
		2441	39	10.0	0.55	0.00	0.00
		2480	78				
Right Head 15° Tilt	Bluetooth 2450 MHz	2402	0				
		2441	39	10.0	0.46	0.00	0.00
		2480	78				
Left Head Cheek	Bluetooth 2450 MHz	2402	0				
		2441	39	10.0	0.23	0.00	0.00
		2480	78				
Left Head 15° Tilt	Bluetooth 2450 MHz	2402	0				
		2441	39	10.0	0.44	0.00	0.00
		2480	78				

**Table 11.1-6a SAR results for Bluetooth head configuration**

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
Right Head Cheek	Bluetooth 2450 MHz	2402	0				
		2441	39	10.0	-0.05	0.00	0.00
		2480	78				

**Table 11.1-6b SAR results for Bluetooth head configuration  
2100mA Battery**



		Document			Page	
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>65(74)</b>	
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>		

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
Right Head Cheek	802.11 a 5180-5805 MHz	5220	44	17.4	0.14	0.21	0.08
		5260	52	17.3	0.23	0.23	0.09
		5520	104	19.8	0.14	0.24	0.07
		5745	149	14.2	0.15	0.10	0.04
Right Head 15° Tilt	802.11 a 5180-5805 MHz	5220	44				
		5260	52				
		5520	104	19.8	0.45	0.19	0.06
		5745	149				
Left Head Cheek	802.11 a 5180-5805 MHz	5220	44	17.4	-0.04	0.12	0.05
		5260	52	17.3	0.31	0.15	0.06
		5520	104	19.8	-0.06	0.12	0.04
		5745	149	14.2	1.03	0.05	0.02
Left Head 15° Tilt	802.11 a 5180-5805 MHz	5220	44				
		5260	52	17.3	0.18	0.18	0.07
		5520	104				
		5745	149				


**Table 11.1-7a SAR results for 802.11a head configuration (Rev3-01/03)**

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
Right Head Cheek	802.11 a 5180-5805 MHz	5220	44				
		5260	52				
		5520	104	19.8	0.21	0.23	0.07
		5745	149				

**Table 11.1-7b SAR results for 802.11a head configuration  
2100mA Battery (Rev3-01/03)**

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
Right Head Cheek	802.11 a 5180-5805 MHz	5220	44				
		5260	52				
		5520	104	12.0	0.25	0.04	0.01
		5745	149				

**Table 11.1-7c SAR results for 802.11a head configuration (Rev3-02)**

		Document			Page
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>66(74)</b>
Author Data	Dates of Test	Test Report No	FCC ID:	IC	
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>	

## 11.2 SAR measurement results at highest power measured against the body using accessories

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
2-slots GPRS 850 MHz	824.2	128	Body  Hotspot Mode	1.0	Back				
	836.8	190		1.0	Back	27.4	0.43	0.08	0.43
	848.8	251		1.0	Back				
	836.8	190		1.0	Front	27.4	0.32	0.19	0.32
	836.8	190		1.0	Left	27.4	0.36	0.03	0.36
	836.8	190		1.0	Right	27.4	0.21	-0.05	0.21
	836.8	190		1.0	Bottom	27.4	0.06	-0.07	0.06
	836.8	190		1.0	Back+HS	27.4	0.39	-0.05	0.39
	836.8	190		1.0	Back+ 2100mA	27.4	0.43	-0.02	0.43
3-slots GPRS 850 MHz	836.8	190		1.0	Back	26.1	0.41	-0.19	0.41
4-slots GPRS 850 MHz	836.8	190		1.0	Back	24.3	0.41	0.05	0.41
2-slots GPRS 850 MHz	836.8	190	Body- worn	1.5	Back	30.2	0.62	0.27	0.62
	836.8	190		Holster	Back	30.2	0.50	0.38	0.50
	836.8	190		Holster	Front	30.2	0.47	-0.09	0.47

**Table 11.2-1 SAR results for EDGE/EGPRS 850 body-worn and Hotspot configurations**


**Note 1:** If the power drift is  $\leq -0.200$  dB, the extrapolated SAR is calculated using the formula:

$$\text{Extrapolated SAR} = (\text{Measured SAR}) * 10^{(|\text{Power Drift (dB)}| / 10)}$$

**Note 2:** Only Middle channel was tested when 1g Average SAR <0.8 W/Kg or 3dB lower than the limit.


**Note 3:** Device was tested with 15 mm BB recommended separation distance to allow typical after-market holster to be used. BB body-worn holsters with belt-clip have been designed to maintain ~ 19 mm separation distance from body.

**Note 4:** For Hot Spot mode any side of the phone that is further than 2.5 cm away from the transmitting antenna can be exempted from testing.

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>67(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
WCDMA FDD V 850 MHz	826.4	4132	Body Hotspot Mode	1.0	Back				
	836.4	4182		1.0	Back	21.0	0.38	0.00	0.38
	846.6	4233		1.0	Back				
	836.4	4182		1.0	Front	21.0	0.34	-0.03	0.34
	836.4	4182		1.0	Left	21.0	0.34	0.05	0.34
	836.4	4182		1.0	Right	21.0	0.20	0.04	0.20
	836.4	4182		1.0	Bottom	21.0	0.07	-0.09	0.07
	836.4	4182		1.0	Back+HS	21.0	0.36	-0.05	0.36
	836.4	4182		1.0	Back+2100mA	21.0	0.38	0.04	0.38
WCDMA FDD V 850 MHz	836.4	4182	Body-worn	1.5	Back	24.4	<b>0.65</b>	-0.10	<b>0.65</b>
	836.4	4182		Holster	Back	24.4	0.60	0.03	0.60
	836.4	4182		Holster	Front	24.4	0.57	-0.09	0.57

**Table 11.2-2 SAR results for WCDMA FDD V body-worn and Hotspot configurations**


		Document			Page	
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>68(74)</b>	
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>		

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	Scan Type	SAR, averaged over 1 g		
								Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
2-slots GPRS 1900MHz	1850.2	512	Body Hotspot Mode	1.0	Back	29.1	2 <sup>nd</sup> Scan	0.91	-0.01	0.91
	1850.2	512		1.0	Back	29.1		0.92	-0.11	0.92
	1880.0	661		1.0	Back	29.1		0.86	-0.02	0.86
	1909.8	810		1.0	Back	28.8		0.83	-0.08	0.83
	1880.0	661		1.0	Front	29.1		0.49	-0.26	0.52
	1880.0	661		1.0	Left	29.1		0.30	-0.08	0.30
	1880.0	661		1.0	Right	29.1		0.18	-0.01	0.18
	1880.0	661		1.0	Bottom	29.1		0.52	-0.07	0.52
	1909.8	512		1.0	Back+HS	29.1		0.89	-0.06	0.89
3-slots GPRS 1900MHz	1850.2	512	Body Hotspot Mode	1.0	Back	26.4	2 <sup>nd</sup> Scan	0.74	0.11	0.74
4-slots GPRS 1900MHz	1850.2	512		1.0	Back	25.8		0.85	0.04	0.85
2-slots GPRS 1900 MHz	1880.0	661	Body- worn	1.5	Back	29.1	2 <sup>nd</sup> Scan	0.47	0.01	0.47
	1880.0	661		Holster	Front	29.1		0.19	-0.06	0.19
	1880.0	661		Holster	Back	29.1		0.28	-0.12	0.28

**Table 11.2-3a SAR results for GPRS/EDGE 1900 body-worn and Hotspot configurations**

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
2-slots GPRS/ EDGE 1900MHz	1850.2	512	Body	1.0	Back	29.1	0.94	0.00	0.94
	1880.0	661	Hotspot	1.0	Back				
	1909.8	810	Mode	1.0	Back				
2-slots GPRS/ EDGE 1900MHz	1850.2	512	Body- worn	1.5	Back				
	1880.0	661		1.5	Back	29.1	0.49	-0.01	0.49
	1909.8	810		1.5	Back				

**Table 11.2-3b SAR results for GPRS/EDGE 1900 body-worn and Hotspot configurations  
2100mA Battery**


		Document			Page	
		<b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			<b>69(74)</b>	
Author Data	Dates of Test	Test Report No	FCC ID:	IC		
<b>Andrew Becker</b>	<b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	<b>RTS-6026-1302-18 Rev 3</b>	<b>L6ARFN80UW</b>	<b>2503A-RFN80UW</b>		

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	Scan Type	SAR, averaged over 1 g		
								Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
WCDMA FDD II 1900 MHz	1852.4	9262	Body	1.0	Back	23.1		1.10	0.17	1.10
	1880.0	9400		1.0	Back	23.0		1.10	0.10	1.10
	1907.6	9538		1.0	Back	23.0		1.20	0.03	1.20
	1907.6	9538		1.0	Back	23.0	2 <sup>nd</sup> scan	<b>1.30</b>	0.09	<b>1.30</b>
	1880.0	9400	Hotspot Mode	1.0	Front	23.0		0.52	-0.11	0.52
	1880.0	9400		1.0	Left	23.0		0.36	0.11	0.36
	1880.0	9400		1.0	Right	23.0		0.16	0.04	0.16
	1880.0	9400		1.0	Bottom	23.0		0.56	0.06	0.56
	1907.6	9400		1.0	Back+HS	23.0		1.03	-0.06	1.03
WCDMA FDD II 1900 MHz	1880.0	9400	Body-worn	1.5	Back	23.0		0.59	0.05	0.59
	1880.0	9400		Holster	Back	23.0		0.36	0.04	0.36
	1880.0	9400		Holster	Front	23.0		0.25	0.05	0.25

**Table 11.2-4a SAR results for WCDMA FDD II body-worn and Hotspot configurations**

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
WCDMA FDD II 1900 MHz	1852.4	9262	Body	1.0	Back				
	1880.0	9400	Hotspot	1.0	Back				
	1907.6	9538	Mode	1.0	Back	23.0	1.13	0.10	1.13
WCDMA FDD II 1900 MHz	1852.4	9262	Body-worn	1.5	Back				
	1880.0	9400		1.5	Back	23.0	0.58	0.03	0.58
	1907.6	9538		1.5	Back				

**Table 11.2-4b SAR results for WCDMA FDD II body-worn and Hotspot configurations  
2100mA Battery**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone  Model RFN81UW Rev 3</b>				Page <b>70(74)</b>
		Author Data <b>Andrew Becker</b>		Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013  Mar 26 – 28, December 10-12, 2014</b>		Test Report No <b>RTS-6026-1302-18  Rev 3</b>

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	Measured SAR (W/kg)		
							Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
802.11b/WLAN 2450 MHz	2437	6	Body	1.0	Front	20.4	0.32	0.10	0.06
	2437	6		1.0	Left	20.4	-0.08	0.27	0.14
	2437	6	Hotspot Mode	1.0	Right	20.4	-0.08	0.08	0.04
	2437	6		1.0	Top	20.4	0.03	0.23	0.12
802.11b/WLAN 2450 MHz	2437	6	Body-worn	1.5	Back	20.4	-0.02	0.32	0.17
	2437	6		Holster	Front	20.4	0.02	0.05	0.03
	2437	6		Holster	Back	20.4	-0.02	0.26	0.14


**Table 11.2-5a SAR results for WiFi/WLAN/802.11b body-worn and Hotspot configurations (Rev3-01)**

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	Measured SAR (W/kg)		
							Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
802.11b/WLAN 2450 MHz	2437	6	Body	1.0	Back	17.8	-0.04	0.37	0.18
	2437	6		1.0	Back+HS	17.8	0.02	0.27	0.13
	2437	6	Hotspot Mode	1.0	Back 2100mA batt	17.8	0.07	0.37	0.18

**Table 11.2-5b SAR results for WiFi/WLAN/802.11b body-worn and Hotspot configurations (Rev3-02)**


Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	Extrapolated SAR (W/kg)		
							Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
802.11b/WLAN 2450 MHz	2437	6	Body	1.0	Back	18.9	-0.04	0.49	0.24
	2437	6		1.0	Back+HS	18.9	0.02	0.36	0.17
	2437	6	Hotspot Mode	1.0	Back 2100mA batt	18.9	0.07	0.49	0.24

**Table 11.2-5c SAR results for WiFi/WLAN/802.11b body-worn and Hotspot configurations (Rev3-03)**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>71(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	Measured SAR (W/kg)		
							Power Drift (dB)	Averaged over 1 g	Averaged over 10 g
Bluetooth 2450 MHz	2437	39	Body	1.0	Back	10.0	-0.01	0.00	0.00
	2437	39		1.0	Front				
	2437	39	Hotspot Mode	1.0	Left				
	2437	39		1.0	Right				
	2437	39		1.0	Top	10.0	0.14	0.00	0.00
Bluetooth 2450 MHz	2437	39	Body- worn	1.5	Back	10.0	-0.25	0.00	0.00
	2437	39		Holster	Front				
	2437	39		Holster	Back				

**Table 11.2-6 SAR results for Bluetooth body-worn and Hotspot configurations**

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>72(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	


Mode	Freq. (MHz)	Channel	Holster type / device configuration	Conducted Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dBm)	Averaged over 1 g	Averaged over 10 g
802.11a 5180 - 5805 MHz	5180	36	No Holster, back side 15 mm away	14.7	0.04	0.31	0.12
	5320	64	No Holster, back side 15 mm away	15.1	0.17	0.23	0.08
	5520	104	No Holster, back side 15 mm away	12.0	-0.15	0.05	0.02
	5825	165	No Holster, back side 15 mm away	10.6	-0.12	0.25	0.09
	5180	36	Leather Holster, back side facing	14.7	-0.17	0.10	0.04
	5180	36	Leather Holster, front side facing	14.7	-0.02	0.01	0.01
	5180	36	No Holster, Headset, back side 15mm away	14.7	-0.13	0.31	0.12

**Table 11.2-7a SAR results for 802.11a body-worn configurations (Rev3-02)**

Mode	Freq. (MHz)	Channel	Holster type / device configuration	Conducted Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dBm)	Averaged over 1 g	Averaged over 10 g
802.11a 5180 - 5805 MHz	5180	36	No Holster, back side 15 mm away	14.7	-0.19	0.31	0.12

**Table 11.2-7b SAR results for 802.11a body-worn configurations  
2100mA Battery (Rev3-02)**




		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>			Page <b>73(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>	

Mode	Freq. (MHz)	Channel	Holster type / device configuration	Conducted Output Power (dBm)	Extrapolated SAR (W/kg)		
					Power Drift (dBm)	Averaged over 1 g	Averaged over 10 g
802.11a 5180 - 5805 MHz	5180	36	No Holster, back side 15 mm away	14.7	0.04	0.31	0.12
	5320	60	No Holster, back side 15 mm away	16.7	0.17	0.41	0.14
	5520	104	No Holster, back side 15 mm away	17.3	-0.15	0.17	0.07
	5825	165	No Holster, back side 15 mm away	11.3	-0.12	0.30	0.11
	5180	36	Leather Holster, back side facing	14.7	-0.17	0.10	0.04
	5180	36	Leather Holster, front side facing	14.7	-0.02	0.01	0.01
	5180	36	No Holster, Headset, back side 15mm away	14.7	-0.13	0.31	0.12

Table 11.2-7c SAR results for 802.11a body-worn configurations (Rev3-03)

Measured/Extrapolated SAR Values - Hotspot - 802.11a 5000-6000 MHz									
Ch.	Freq. (MHz)	spacing (cm)/holster	Side Facing Phantom	Cond. Output Power (dBm)		Power Drift (dB)	1g SAR (W/Kg)		
				Declared	Measured		Extrapolated	Reported	
36*	5180	1.0	Back	13.5	13.1	0.28	0.53	0.58	
40	5200	1.0	Back					0.00	
44	5220	1.0	Back					0.00	
48*	5240	1.0	Back					0.00	
<hr/>									
149*	5745	1.0	Back	12.0	12.0	0.24	0.43	0.43	
153	5765	1.0	Back					0.00	
157*	5785	1.0	Back					0.00	
161	5805	1.0	Back					0.00	
165*	5825	1.0	Back					0.00	
<hr/>									
36*	5180	1.0	Front	13.5	13.1	0.39	0.02	0.02	
36*	5180	1.0	Left	13.5	13.1	0.06	0.05	0.06	
36*	5180	1.0	Right					0.00	
36*	5180	1.0	Top	13.5	13.1	0.05	0.11	0.12	

Table 11.2-11d SAR results for 802.11a Hotspot configurations

		Document <b>SAR Compliance Test Report for the BlackBerry® Smartphone Model RFN81UW Rev 3</b>		Page <b>74(74)</b>
Author Data <b>Andrew Becker</b>	Dates of Test <b>Nov. 26, 2012- Feb 28, Mar. 26, 2013 Mar 26 – 28, December 10-12, 2014</b>	Test Report No <b>RTS-6026-1302-18 Rev 3</b>	FCC ID: <b>L6ARFN80UW</b>	IC <b>2503A-RFN80UW</b>

## 12.0 REFERENCES

- [1] DASY 5 DOSIMETRIC ASSESSMENT SYSTEM SOFTWARE MANUAL, Schmid & Partner Engineering AG.
- [2] FCC 47 CRF Part 2.1093, Radiofrequency radiation exposure evaluation: portable devices. June 18, 2014.
- [3] FCC 96-326, Guidelines for Evaluating the Environmental Effects of Radio-Frequency Radiation.
- [4] Health Canada, Safety Code 6, 2009: Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency range from 3 kHz to 300 GHz.
- [5] IEEE C95.1-1992, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
- [6] IEEE C95.3-2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave.
- [7] IEEE 1528-2013: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.
- [8] KDB 248227 D01 v01r02, May 2007: FCC OET SAR Measurement Procedures for 802.11 a/b/g Transmitters.
- [9] KDB 447498 D01 v05r02, Feb 2014: FCC OET Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.
- [10] KDB 648474 D04 v01r02, Dec 2013: FCC OET SAR Evaluation Considerations for Wireless Handsets.
- [11] KDB 865664 D01 v01r03, Feb 2014: FCC OET SAR Measurement Requirements for 100 MHz to 6 GHz.
- [12] KDB 865664 D02 v01r01, May 2013: FCC OET RF Exposure Compliance Reporting and Documentation Considerations.
- [13] KDB 941225 D01 v03r00, Oct 2014: FCC OET 3G SAR Measurement Procedures.
- [14] KDB 941225 D05 v02r03, Dec 2013: FCC OET SAR Evaluation Considerations for LTE Devices.
- [15] KDB 941225 D05A v01r01, Aug 2014: FCC OET Rel.10 LTE SAR Test Guidance and KDB Inquires.
- [16] KDB 941225 D06 v02r00, Oct 2014: FCC OET SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities.
- [17] 3GPP TS 36.521-1 V10.0.0 (2011-12): Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing.
- [18] RSS-102, issue 4-2010: Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada’s Safety Code 6 for Exposure of Humans to Radio Frequency Fields.
- [19] ICNIRP, International Commission on Non-Ionizing Radiation Protection (2009), Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz).
- [20] IEC 62209-1, First Edition-2005: Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz).
- [21] IEC 62209-2, Edition 1.0-2010: Human exposure to radio frequency fields from hand-held and body-mount wireless communication devices – Human Models, instrumentation, and procedures - part 2 - procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz).